LIGHTING SOLUTIONS

Component Systems for Lighting Applications

STANDARD TECHNOLOGY
HIGH LEVEL STANDARD
HIGH QUALITY

UPDATE!

Edition 2017-1

For Discharge Lamps
Ballasts, Control Gear Units, Ignitors, Power Switches, Capacitors and Lampholders

For Fluorescent Lamps
Ballasts, Capacitors, Lampholders, Starter Lampholders, Terminal Blocks and Accessories

For Incandescent Lamps
Transformers and Lampholders

For Emergency Lighting
Emergency lighting modules, Rechargable Batteries and Supports

07/2017 | www.vossloh-schwabe.com

Contents

Contents

LIGHT TECHNOLOGY PRODUCTS

Vossloh-Schwabe is not merely a manufacturer of top-quality components for the lighting industry, but above all a competent and innovative partner when it comes to providing the growing lighting market with cost-effective all-round solutions.

Featuring a future-proof component structure that already now satisfies both the requirements of energy-efficient lighting and European standards, VS' unique product range includes magnetic and electronic ballasts, state-of-the-art control systems (LiCS), LED lighting systems and matching operating devices.

Employing in excess of 1,000 people in more than 20 countries, Vossloh-Schwabe is represented all over the world. As a subsidiary of the Japanese Panasonic Group, VS can draw on extensive resources for R&D as well as for international expansion activities. A highly motivated workforce, comprehensive market knowledge, profound industry expertise as well as eco-awareness and environmental responsibility show Vossloh-Schwabe to be a reliable partner for the provision of optimum and cost-effective lighting solutions.

Vossloh-Schwabe's dedication to delivering superior quality is reflected in its ISO 9001 certification.

Vossloh-Schwabe is ready to embark on a collaborative journey into an economically illuminated future.

LED components are just as much a part of our product range as light control systems. Our extensive range of powerful LED modules, LED drivers, LiCS controllers and sensors is presented in our separate **Innovative Systems** catalogue.

We'll be happy to help you dimension your lighting project. Contact us.

PUMA Headquarters

Porsche Museum

1
2
3
4
5
6
7
8
9
10

PUMA Headquarters, Herzogenaurach

As the secret "capital of sport", the little German town of Herzogenaurach is home to the headquarters of the sport lifestyle company PUMA. Covering a total surface area of 50,000 square metres, the complex is made up of three buildings that are positioned so as to create a large central square, the PUMA Plaza.

The main aim of the lighting concept developed for the new PUMA corporate headquarters was to deliver optimum quality of light, enable maximum flexibility in using the available space and yield the greatest possible energy savings. No less than 985 electronic DALI ballasts and 4,650 standard electronic ballasts made by Vossloh-Schwabe went into implementing the lighting system.

The inner courtyard features additional red and white effect lighting in the form of ground-level linear markings created using LEDs made by Vossloh-Schwabe. These LEDs enable digital lighting sequences to flow over the square. To complement the clear-cut, rectilinear forms that characterise the entire building complex, a number of slender light columns, made of square aluminium sections, were installed to round off the courtyard's stylish appearance.

Photos: Markus Bollen

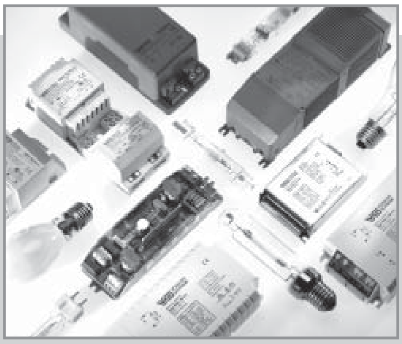
Porsche Museum, Stuttgart

The name "Porsche" both stands for a long tradition of outstanding quality and the excitement of high-octane driving. The Porsche Museum in Stuttgart constitutes a fitting presentation venue that does the brand image every justice. The architectural flagship thus serves to make the "Porsche experience" available to everyone.

The lighting installed in the Porsche Museum forms a crucial element of the exhibition space created for around 80 vehicles. It was important to ensure every detail of these high-end cars was clearly visible. In this regard, direct and reflecting lighting had to be reduced to an absolute minimum so as to neither irritate visitors, nor detract from the brilliant gloss of the bodywork.

This forms another instance in which Vossloh-Schwabe products have helped to add to the enjoyment of each and every visitor. Built-in electronic ballasts and electronic DALI safety converters ensure flicker-free, efficient light.

ELECTRONIC AND ELECTRO-MAGNETIC



ELECTRONIC AND ELECTROMAGNETIC OPERATING DEVICES

For high-pressure sodium lamps (HS), metal halide lamps (HI) and mercury vapour lamps (HM)

Electronic ballasts
Modern discharge lamps operate very efficiently in combination with electronic ballasts. The numerous advantages of using electronic ballasts to operate high-pressure discharge lamps are listed in more detail on the product pages.

With the help of temperature and service-life tests, VS electronic ballasts guarantee a high degree of reliability. The quality of the electronic ballasts is ensured by continuous in-circuit tests and function tests like burn-in tests.

Magnetic ballasts
The electrical specifications of VS' range of ballasts comply with lampspecific requirements. Vossloh-Schwabe attaches great importance to ensuring the impedance value of electromagnetic ballasts is kept within particularly narrow tolerances. This advantage, which is achieved by individual adjustment of the air gap during the automated production and testing process of every ballast, decisively contributes to optimising light output, light colour and service life of discharge lamps.

The range includes ballasts with variable voltage tapping points and varying degrees of inherent heating as well as encapsulated devices.

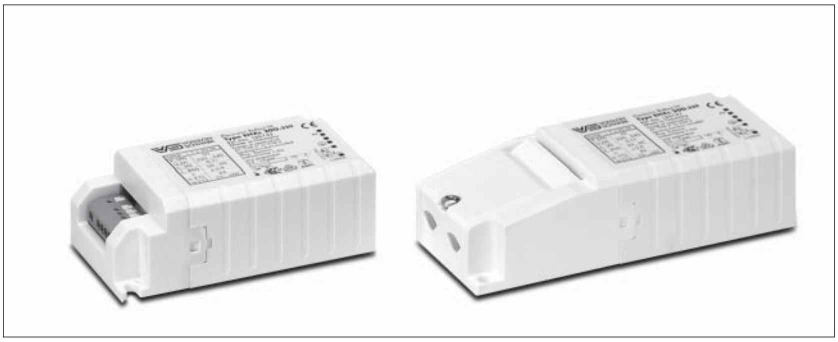
2 Ballasts for Discharge Lamps

For high-pressure sodium lamps (HS), metal halide lamps (HI) and mercury vapour lamps (HM)

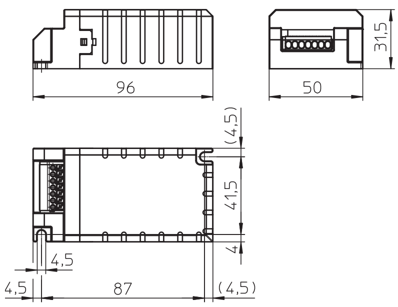
Compact Electronic Ballasts for HI Lamps 35 W

Shape: K35

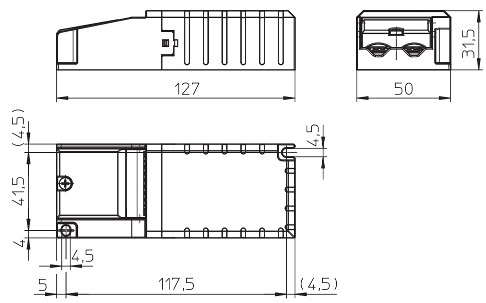
Casing: heat-resistant polyamide, encapsulated with polyurethane
For ceramic discharge tube lamps (C-HI)
Power factor: > 0.9
Operation frequency: 135 Hz
Push-in terminals: 0.5–1.5 mm²
Constant power consumption
Protection against "no load" operation
For luminaires of protection class I and II
Degree of protection: IP20
Permissible load capacity: 120 pF
RFI-suppressed
Fixing brackets for screws M4 for base mounting
No flickering of defective lamps



K35



K35 with cord grip



Lamp				Electronic ballast										System
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V –10%+6%	Mains current A	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Ignition voltage kV	Weight g	Output W
K35 – Electronic built-in ballasts														
35	HI	GU6.5, G8.5, GX8.5, GX10, G12	1 x 39	EHXc 35G.327 B	**188993**	220–240	0.2	A2	–15 to 45	max. 80	2–4	180	43.5
K35 – Independent electronic ballasts with cord grip														
35	HI	GU6.5, G8.5, GX8.5, GX10, G12	1 x 39	EHXc 35G.327 I	**188994**	220–240	0.2	A2	–15 to 45	max. 80	2–4	195	43.5

Circuit diagrams see page 87

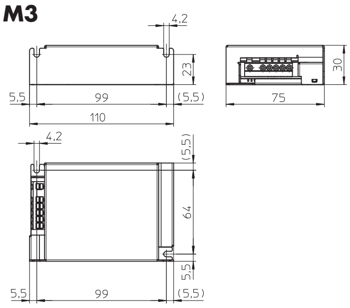
Electronic Ballasts for HI Lamps 35 and 70 W

Shape: M3/K34

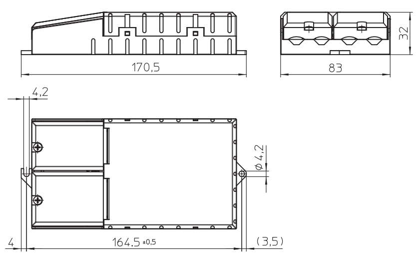
Casing: aluminium (M3),
heat-resistant polycarbonate (K34)
For ceramic discharge tube lamps (C-HI)
Power factor: ≥ 0.95
Ignition voltage: max. 5 kV
Operation frequency: 173 Hz
Push-in terminals with lever opener: 0.75–2.5 mm²
Total harmonic distortion: < 10%
Temperature protection
Constant power consumption
Protection against "no load" operation
For luminaires of protection class I (metal casing)
For luminaires of protection class I and II
(plastic casing)
Degree of protection: IP20
Permissible load capacity: 20–120 pF
RFI-suppressed
Fixing brackets for screws M4
for base mounting
No flickering of defective lamps

M3 **K34**

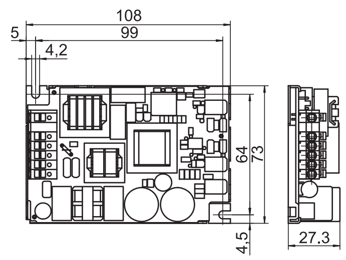
M3



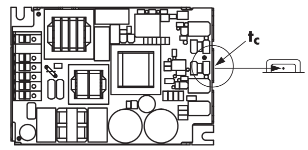
K34 with cord grip



M3 built-in PCB



t_c point definition



Lamp				Electronic ballast								System
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V ±10%	Mains current A	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Weight g	Output W
M3 – Electronic built-in ballast (with cap)												
35	HI	GU6.5, G8.5, GU8.5, GX8.5, G12, E27	1 x 39	EHXc 35.325	**183033**	220–240	0.20–0.18	A2	–20 to 65	max. 80	220	43
70	HI	G8.5, GU8.5, GX8.5, G12, PG12-2, E27, RX7s	1 x 73	EHXc 70.326	**183036**	220–240	0.36–0.34	A2	–20 to 55	max. 80	220	80
M3 Built-in PCB – Electronic built-in ballasts (without cap)												
35	HI	GU6.5, G8.5, GU8.5, GX8.5, G12, E27	1 x 39	EHXc 35.325	**183034**	220–240	0.20–0.18	A2	–20 to 65	max. 80	180	43
K34 – Independent electronic ballasts with cord grip												
35	HI	GU6.5, G8.5, GU8.5, GX8.5, G12, E27	1 x 39	EHXc 35.325	**183035**	220–240	0.20–0.18	A2	–20 to 65	max. 75	260	43
70	HI	G8.5, GU8.5, GX8.5, G12, PG12-2, E27, RX7s	1 x 73	EHXc 70.326	**183038**	220–240	0.36–0.34	A2	–20 to 55	max. 75	260	80

Circuit diagrams see page 87

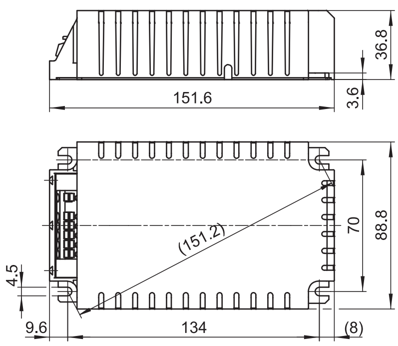
Electronic Ballasts for HI Lamps 150 W

Shape: K31

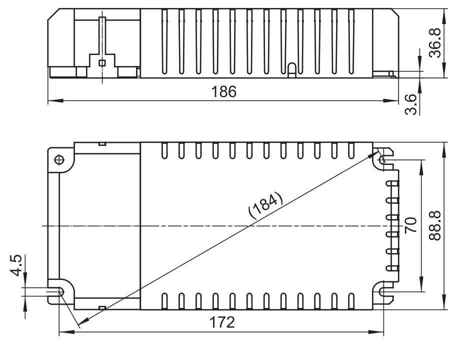
Casing: heat-resistant polycarbonate
For ceramic discharge tube lamps (C-HI)
Power factor: 0.98
Ignition voltage: max. 5 kV
Operation frequency: 170 Hz
Push-in terminals with lever opener: 0.75–2.5 mm²
Total harmonic distortion: < 10%
Temperature protection
Constant power consumption
Protection against "no load" operation
For luminaires of protection class I and II
Degree of protection: IP20
Permissible load capacity: 20–240 pF
RFI-suppressed
Fixing brackets for screws M4
for base mounting

K31

K31



K31 with cord grip

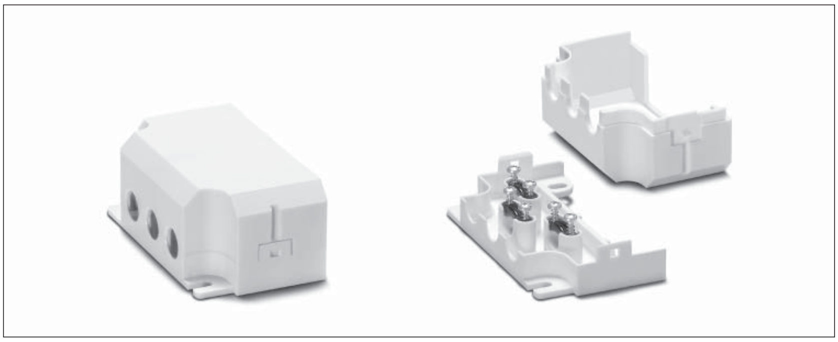


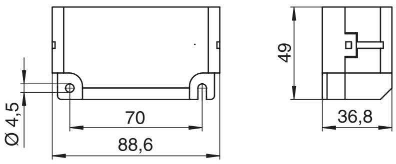
Lamp				Electronic ballast									System
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V ±10%	Mains current A	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Weight g	Output W
K31 – Electronic built-in ballasts													
150	HI	G12, PGX12-2, E27, E40, RX7s	1 x 147	EHXc 150G.334	**183046**	220–240	0.73–0.67	A2	–20 to 45	max. 85	K31	540	160
K31 – Independent electronic ballasts with cord grip													
150	HI	G12, PGX12-2, E27, E40, RX7s	1 x 147	EHXc 150G.334	**183047**	220–240	0.73–0.67	A2	–20 to 45	max. 85	K31	582	160

Circuit diagrams see page 87

Cord Grip for Electronic Built-in Ballasts

For shape K31





By using the cord grip electronic built-in ballasts for metal halide lamps become independent ballasts.
Material: heat-resistant polycarbonate
For use with electronic built-in ballasts with casing K31
For mains leads:
H03VV-F 3X0.75 or NYM 3X1.5 mm²
For lamp leads: SIHY-Cu 3X1 mm²
or SIHSI-Cu 3X1 mm²
Weight: 50 g
Unit: 20 pcs.
By turning the cable clamp by 180°
the lead diameter can be reduced to 5 mm.
Ref. No.: 188080

Luminaire Protection Device SP 230/10K

For electronic devices

When electronic components form part of lighting systems, it is often necessary to protect such components against power-supply interruptions and electric overloads (power surges).

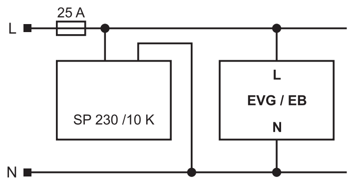
These can be caused by switching inductive loads or by atmospheric discharges such as lightning striking the mains or the ground. A further cause can be induced voltages from neighbouring cables when working with leading-edge phase-cutting controls.

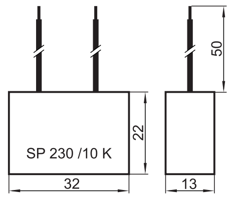
Suitable for luminaires of protection class I and II
Solid connecting wire: 0.75 mm²
Lead length: 50 mm

The SP230/10K protection unit reduces overvoltages at the connection terminals of electronic components. The remaining residual voltage is then reduced to a respective protective level, based on the discharge current (see diagram below).

In our Innovative Systems catalogue you will find further products of this series.

Wiring diagram

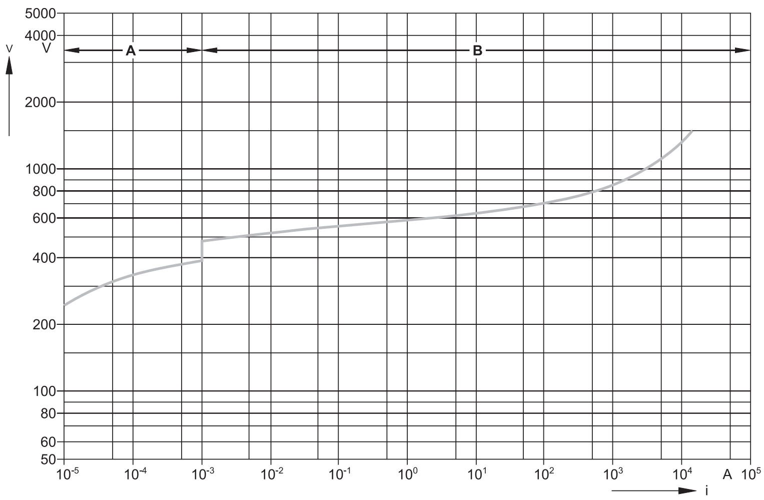




Type	**Best.-Nr.**	Voltage AC 50, 60 Hz V ±10%	Impulse voltage U_{OC} (V)	Impulse discharge current I_N (8/20 µs) (A)	Protection level at discharge current of 1,000 A (V)	Min. ambient temperature t_a (°C)	Casing temperature t_c (°C)	Weight g
SP 230/10 K	**147230**	220–240	max. 10,000	max. 10,000	≤ 850	–30	max. 80	20

Bandwidth of the standard impulse: tr = 20 µs
The protection unit can withstand at least 10 spikes of 5 kA.

Residual voltage, based on the discharge current (B)
A = Leak current | B = Protection levels

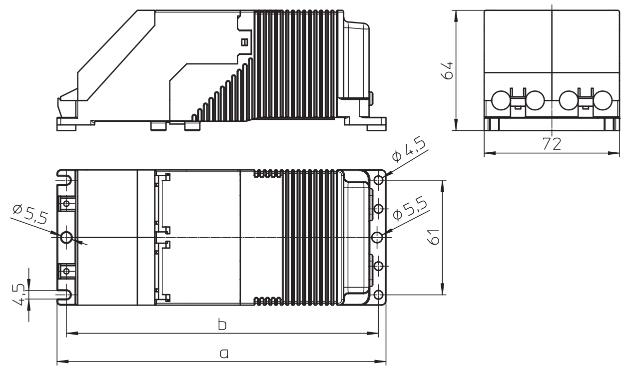


Source: Epcos Databook 2011

Control Gear Units for HS and HI Lamps 35 to 150 W

Compact plastic casing
Shape: 64x72 mm

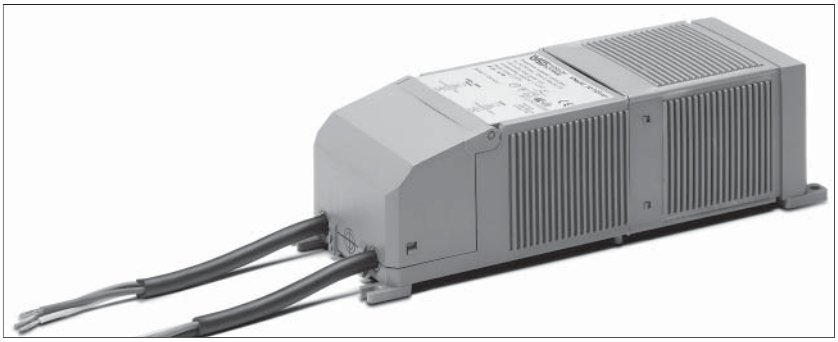
For high pressure sodium lamps (HS), metal halide lamps (HI) and ceramic discharge lamps (C-HI)
Compact control gear unit with ballast with patented, intelligent thermal cut-out with automatic reset (which evaluates the temperature and current of the ballast), digital timer ignitor with IPP++ technology and compensation capacitor with thermal fuse
As individual components no longer need to be wired, there is a significant reduction in assembly time and costs.
Protection class II
Degree of protection: IP40
Permissible load capacity: 20–1000 pF
Lead length to the lamp: max. 10 m
tw 130
Push-in terminals: 0.5–2.5 mm²
Cord grips for mains and lamp leads
Further outputs and voltages on request



Lamp			Control gear unit									
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Mains current A	a mm	b mm	Weight kg	t_a °C	Power factor λ	Energy efficiency
230 V, 50 Hz												
35	HS, HI	0.53	VNaHJ 35PZTG.568*	**536199**	230, 50	0.210	175	166	1.32	55	0.92	EEI=A3
70	HS, HI	0.98	VNaHJ 70PZTG.203	**563416**	230, 50	0.380	214	205	2.25	45	0.91	**A2**
			VNaHJ 70PZTG.566*	**535657**	230, 50	0.380	175	166	1.32	45	0.91	EEI=A3
100	HS, HI	1.20	VNaHJ 100PZTG.202	**563417**	230, 50	0.560	214	205	2.25	45	0.85	**A2**
			VNaHJ 100PZTG.571*	**536200**	230, 50	0.560	214	205	1.85	45	0.85	EEI=A3
150	HS, HI	1.80	VNaHJ 150PZTG.567*	**535695**	230, 50	0.720	214	205	2.25	45	0.91	EEI=A3
240 V, 50 Hz												
35	HS, HI	0.53	VNaHJ 35PZTG.568	**536201**	240, 50	0.210	175	166	1.32	55	0.94	EEI=A3
70	HS, HI	0.98	VNaHJ 70PZTG.566	**536202**	240, 50	0.370	175	166	1.32	40	0.94	EEI=A3
100	HS, HI	1.20	VNaHJ 100PZTG.571	**536203**	240, 50	0.560	214	205	1.85	40	0.86	EEI=A3
150	HS, HI	1.80	VNaHJ 150PZTG.567	**536204**	240, 50	0.730	214	205	2.25	40	0.91	EEI=A3
220 V, 60 Hz												
35	HS, HI	0.53	VNaHJ 35PZTG.574	**536205**	220, 60	0.220	175	166	1.32	60	0.98	EEI=A3
70	HS, HI	0.98	VNaHJ 70PZTG.575	**536207**	220, 60	0.370	175	166	1.32	50	0.97	EEI=A3
150	HS, HI	1.80	VNaHJ 150PZTG.576	**536209**	220, 60	0.800	214	205	2.25	45	0.98	EEI=A3

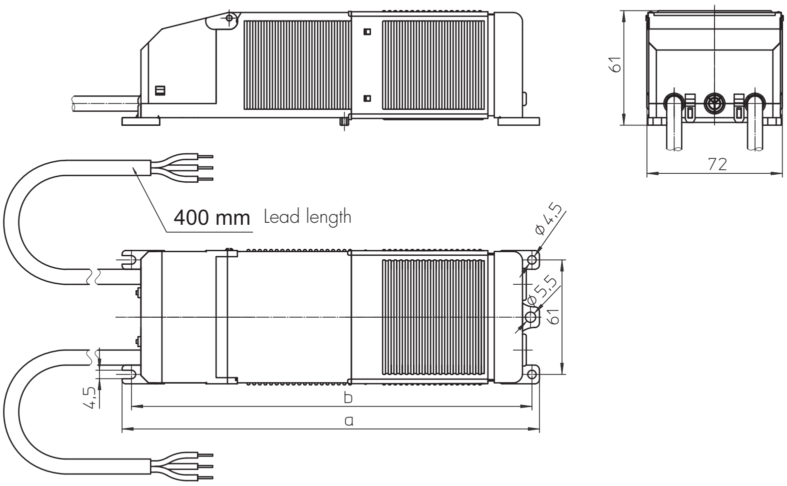
* Ballasts without CE marking for replacements or markets outside of the EU

Control Gear Units IP65 for HS and HI Lamps 35 to 150 W



Encapsulated unit in compact plastic casing
Shape: 61x72 mm

For high pressure sodium lamps (HS), metal halide lamps (HI) and ceramic discharge lamps (C-HI)
Compact control gear unit with ballast with patented, intelligent thermal cut-out with automatic reset (which evaluates the temperature and current of the ballast), digital timer ignitor with IPP++ technology and compensation capacitor with thermal fuse
As individual components no longer need to be wired, there is a significant reduction in assembly time and costs.
Protection class II
Degree of protection: IP65
Permissible load capacity: 20–1000 pF
Lead length to the lamp: max. 10 m
tw 130



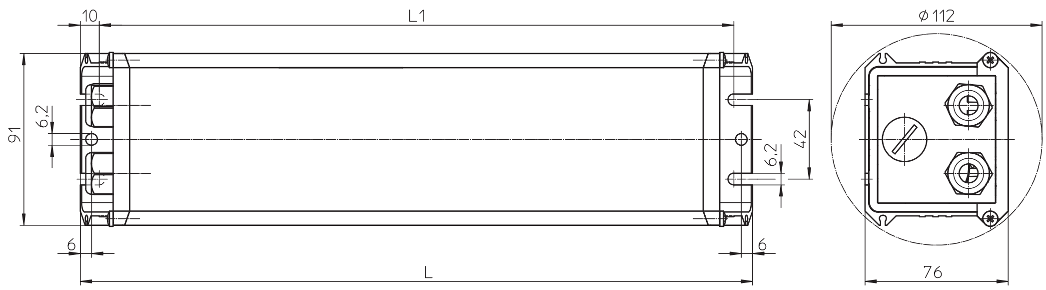
Lamp			Control gear unit									
Output W	Type	Current A	Type	**Ref. No.**	Voltage V, Hz	Mains current A	a mm	b mm	Weight kg	t_a °C	Power factor λ	Energy efficiency
230 V, 50 Hz												
35	HS, HI	0.53	VNaHJ 35PZTG.050*	**533391**	230, 50	0.240	222	214	1.95	60	0.96	EEI=A3
50	HS, HI	0.76	VNaH 50PZTG.058*	**543733**	230, 50	0.290	222	214	1.95	60	0.94	EEI=A3
70	HS, HI	0.98	VNaHJ 70PZTG.051*	**533392**	230, 50	0.370	222	214	1.95	50	0.97	EEI=A3
100	HS, HI	1.20	VNaHJ 100PZTG.078*	**533393**	230, 50	0.560	249	240	2.25	55	0.90	EEI=A3
150	HS, HI	1.80	VNaHJ 150PZTG.052*	**533394**	230, 50	0.740	249	240	2.75	50	0.94	EEI=A3
240 V, 50 Hz												
35	HS, HI	0.53	VNaHJ 35PZTG.053	**534107**	240, 50	0.240	222	214	1.95	60	0.96	EEI=A3
70	HS, HI	0.98	VNaHJ 70PZTG.054	**534109**	240, 50	0.370	222	214	1.95	50	0.97	EEI=A3
150	HS, HI	1.80	VNaHJ 150PZTG.055	**534115**	240, 50	0.730	249	240	2.75	50	0.95	EEI=A3
220 V, 60 Hz												
35	HS, HI	0.53	VNaHJ 35PZTG.041	**534122**	220, 60	0.220	222	214	1.95	70	0.98	EEI=A3
70	HS, HI	0.98	VNaHJ 70PZTG.067	**534111**	220, 60	0.370	222	214	1.95	50	0.97	EEI=A3
150	HS, HI	1.80	VNaHJ 150PZTG.068	**534117**	220, 60	0.800	249	240	2.25	45	0.98	EEI=A3

* Ballasts without CE marking for replacements or markets outside of the EU

Control Gear Units for HS and HI Lamps 250 and 400 W

Shape: 76x91 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
Fully wired slim, weather-proof control gear unit with ballast with thermal cut-out with automatic reset, capacitor, timer ignitor and connection terminal
Suitable for installation in or on pylons
Frontal cable feed using a PG thread fitting
Front access to terminals
Screw-fixed end cap
Screw terminals: 0.75–2.5 mm²
For luminaires of protection class I
Degree of protection: IP54
Permissible load capacity: 20–1000 pF
Distance to the lamp: max. 10 m
tw 130
With connection for protective earth conductor

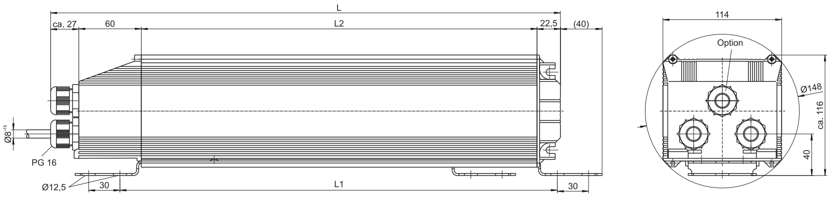


Lamp				Control gear unit							
Output W	Type	Current A	Mains current A	Type	**Ref. No.**	Voltage AC V, Hz	L mm	L1 mm	Weight kg	Power factor λ	Energy efficiency
250	HS, HI	3.0	1.3	VNaHJ 250PZT.745*	**531476**	230, 50	322	302	4.30	> 0.94	EEI=A3
400	HS, HI	4.45	2.0	VNaHJ 400PZT.743	**531475**	230, 50	357	337	5.62	> 0.91	**A2**

* Ballasts without CE marking for replacements or markets outside of the EU

Ballast Units for HS and HI Lamps 1000 and 2000 W

Shape: 114x116 mm



For high-pressure sodium vapour lamps (HS) and metal halide lamps (HI)
Slim, weather-proof ballast unit fully wired with ballast, capacitor and connection terminal
Suitable for installation in or on pylons
With connection for protective earth conductor
Frontal cable feed using a PG thread fitting
Front access to terminals or fuses
Optional additional third PG connection for mains feed-through wiring
Screw-fixed end cap
Diverse mounting options using an assembly plate or rail
Screw terminals: 0.75–10 mm²
For luminaires of protection class I
tw 130

Degree of protection: IP54

Lamp				Ballast unit								
Output W	Type	Current A	Mains current A	Type	**Ref. No.**	Voltage AC V, Hz	L mm	L1 mm	L2 mm	Weight kg	Power factor λ	Energy efficiency
1000	HS	10.3	5.0	VNaHJ 1000.61	**531472**	230–240, 50	487	410	370	11.6	> 0.90	**A2**
	HI	9.5	4.9									**A2**
2000	HI	10.3	6.0	VJD 2000.63	**531474**	380–400, 50	627	550	510	20.2	> 0.90	**A2**

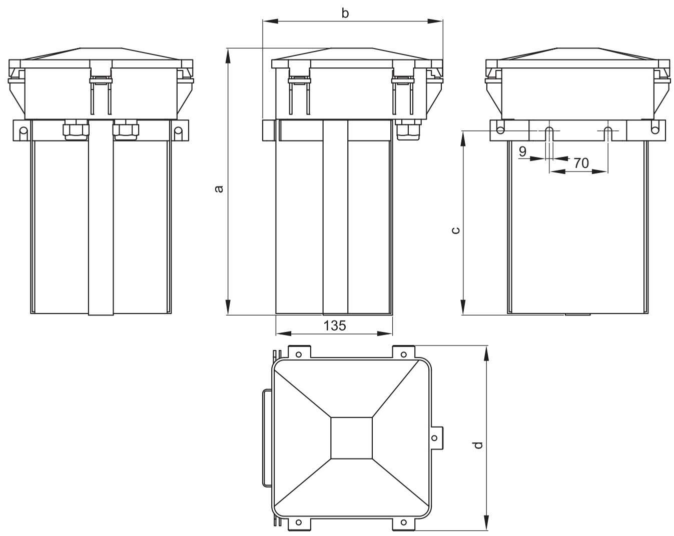
Degree of protection: IP65
Fully encapsulated ballast unit with leads

Lamp				Ballast unit								
Output W	Type	Current A	Mains current A	Type	**Ref. No.**	Voltage AC V, Hz	L mm	L1 mm	L2 mm	Weight kg	Power factor λ	Energy efficiency
1000	HS	10.3	5.0	VNaHJ 1000.61	**531480**	220, 50	487	410	370	11.6	> 0.90	**A2**
	HI	9.5	4.9									**A2**
2000	HI	10.3	6.0	VJD 2000.63	**531481**	380, 50	627	550	510	20.2	> 0.90	**A2**

Ballast Units for HS and HI Lamps 1000 to 2000 W

Encapsulated in a plastic casing

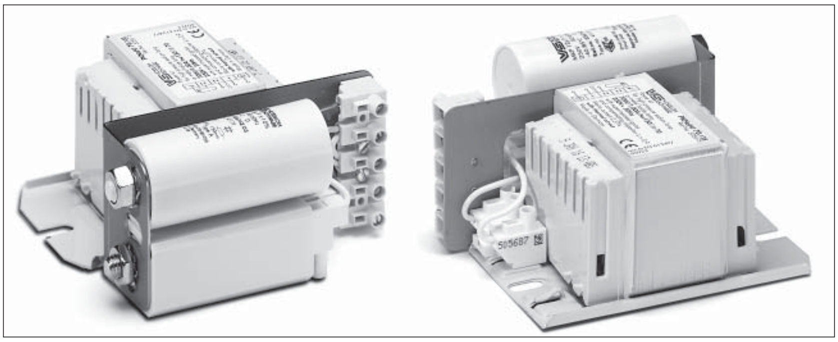
For high-pressure sodium vapour lamps (HS) and metal halide lamps (HI)
Fully encapsulated ballast unit in a self-extinguishing, fibre-glass-reinforced polyamide casing consisting of a ballast, capacitor, fuse and a ready-to-use, pre-wired connection terminal.
Cable feed using a PG thread fitting
Screw terminals: 0.75–10 mm²
Protection class II
tw 130



Degree of protection: IP65
With double insulation

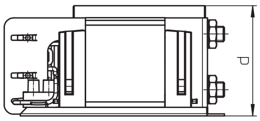
Lamp				Ballast unit									
Output W	Type	Current A	Mains current (A)	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	d mm	Weight kg	Power factor λ	Energy efficiency
230/240 V, 50 Hz and 380/400/415 V, 50 Hz													
1000	HS	10.3/11.3	5.75	VNaHJ 1000.75	**554313**	230/240, 50	288	217	–	220	15	> 0.90	**A2**
	HI	9.5	4.9										**A2**
2000	HI	8.8/9.2	5.7	VJ 2000.76	**554314**	380/400/415, 50	320	217	225	225	21	> 0.90	**A2**
		10.3/11.3	6.0	VJD 2000.77	**554315**	380/400/415, 50	320	220	225	225	23	> 0.90	**A2**
		12.2	6.0	VJD 2000I.78	**554316**	380/400/415, 50	320	220	225	225	25	> 0.90	**A2**
220 V, 60 Hz and 380 V, 60 Hz													
1000	HS	10.3/11.3	5.75	VNaHJ 1000.75	**554904**	220, 60	288	217	–	220	15	> 0.90	**A2**
	HI	9.5	4.9										**A2**
2000	HI	8.8/9.2	5.7	VJ 2000.76	**554905**	380, 60	320	220	225	225	21	> 0.90	**A2**
		10.3/11.3	6.0	VJD 2000.77	**554906**	380, 60	320	220	225	225	23	> 0.90	**A2**
		12.2	6.0	VJD 2000I.78	**554909**	380, 60	320	220	225	225	25	> 0.90	**A2**

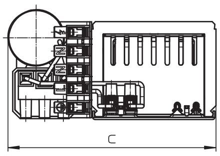
Compact Assembly Kits for HS and HI Lamps 35 to 150 W

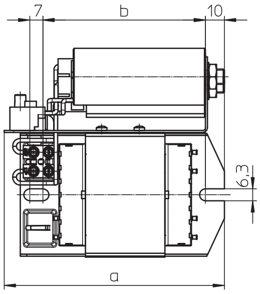


Ballast shape: 53x66 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI)
and ceramic discharge lamps (C-HI)
Compact assembly kit with ballast with or without patented, intelligent thermal cut-out with automatic reset (which evaluates the temperature and current of the ballast), superimposed ignitor and compensation capacitor
With luminaire terminal block:
screw terminal 0.75–2.5 mm²
With earth terminal
Permissible load capacity: 20–100 pF
Lead length to the lamp: max. 1.5 m
tw 130
On request:
Further outputs and voltages
With digital timer ignitor
For pulse ignition system







As individual components no longer need to be wired, there is a significant reduction in assembly time and costs.

Especially suitable for change of lamp technology from HM to HS.

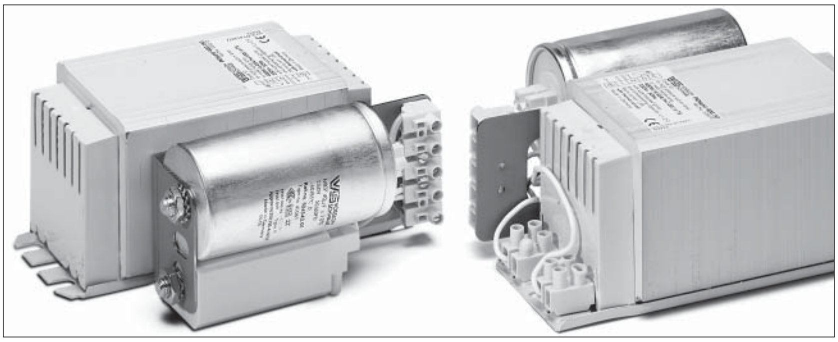
Lamp			Assembly kit											
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Mains current A	Temperature protection	a mm	b mm	c mm	d mm	Weight kg	Power factor λ	Energy efficiency
230 V, 50 Hz														
35	HS, HI	0.53	PKNaHJ 35.008*	**546797**	230, 50	0.22	yes	117	86	108	54	1.2	> 0.90	EEI=A3
50	HS, HI	0.76	PKNaH 50PZT.992*	**543378**	230, 50	0.30	yes	117	86	111	59	1.4	> 0.90	EEI=A3
70	HS, HI	0.98	PKNaHJ 70.128*	**538675**	230, 50	0.37	yes	117	86	111	59	1.4	> 0.90	EEI=A3
				538685			no							EEI=A3
100	HS, HI	1.20	PKNaHJ 100.941*	**538676**	230, 50	0.56	yes	117	86	111	59	1.6	> 0.90	EEI=A3
				538686			no							EEI=A3
150	HS, HI	1.80	PKNaHJ 150.620*	**538677**	230, 50	0.74	yes	151	120	115	63	2.2	> 0.90	EEI=A3
				538687			no							EEI=A3
220 V, 60 Hz														
35	HS, HI	0.53	PKNaHJ 35.008	**547285**	220, 60	0.23	yes	117	86	108	54	1.2	> 0.90	EEI=A3
				543401			no							EEI=A3
70	HS, HI	0.98	PKNaHJ 70.653	**547287**	220, 60	0.37	yes	117	86	111	59	1.4	> 0.90	EEI=A3
				538680			no							EEI=A3
100	HS, HI	1.20	PKNaHJ 100.271	**538681**	220, 60	0.56	no	117	86	111	59	1.6	> 0.90	EEI=A3
150	HS, HI	1.80	PKNaHJ 150.679	**538682**	220, 60	0.74	no	151	120	115	63	2.2	> 0.90	EEI=A3
220/240 V, 60 Hz														
100	HS, HI	1.20	PKNaHJ 100.345	**543295**	220/240, 60	0.60	no	117	86	111	60	1.6	> 0.90	EEI=A3
150	HS, HI	1.80	PKNaHJ 150.301	**543299**	220/240, 60	0.80	no	151	120	115	63	2.2	> 0.90	EEI=A3

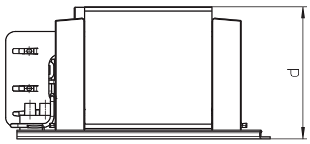
* Ballasts without CE marking for replacements or markets outside of the EU

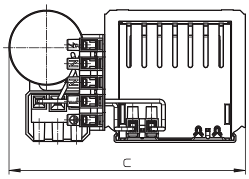
Compact Assembly Kits for HS and HI Lamps 250 and 400 W

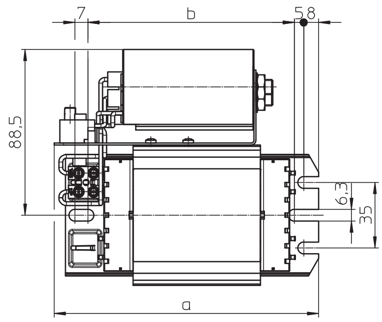
Ballast shape: 71x75 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI)
and ceramic discharge lamps (C-HI)
Compact assembly kit with ballast with or without thermal cut-out with automatic reset, superimposed ignitor and compensation capacitor
With luminaire terminal block:
  screw terminal 0.75–2.5 mm²
With earth terminal
Permissible load capacity: 20–100 pF
Lead length to the lamp: max. 1.5 m
tw 130
On request:
  Further outputs and voltages
  With digital timer ignitor
  For pulse ignition system







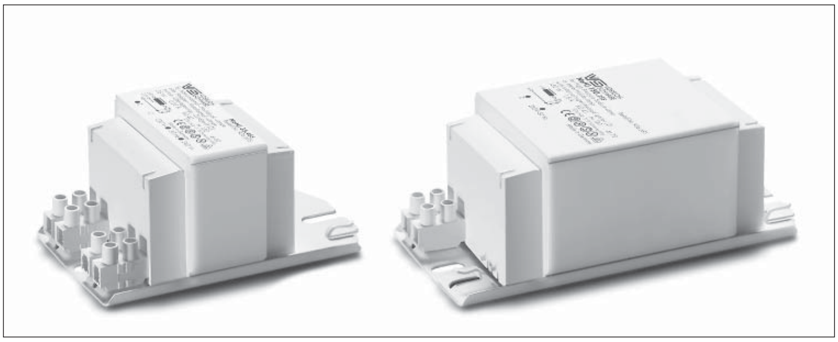


As individual components no longer need to be wired, there is a significant reduction in assembly time and costs.

Especially suitable for change of lamp technology from HM to HS.

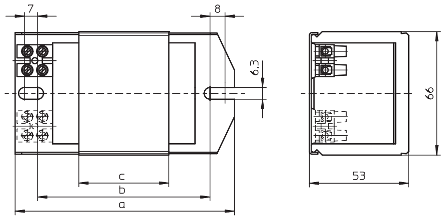
Lamp			Assembly kit											
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Mains current A	Temperature protection	a mm	b mm	c mm	d mm	Weight kg	Power factor λ	Energy efficiency
230 V, 50 Hz														
250	HS, HI	3.00	PKNaHJ 250.741	**538678**	230, 50	1.20	yes	141	110	128	73	3.2	> 0.90	**A2**
				538688			no							**A2**
400	HS, HI	4.45	PKNaHJ 400.743	**538679**	230, 50	1.80	yes	171	140	129	73	5.2	> 0.90	**A2**
				538689			no							**A2**
220 V, 60 Hz														
250	HS, HI	3.00	PKNaHJ 250.742	**538683**	220, 60	1.20	no	141	110	126	71	3.2	> 0.90	**A2**
400	HS, HI	4.45	PKNaHJ 400.744	**538684**	220, 60	1.80	no	171	140	129	71	5.2	> 0.90	**A2**

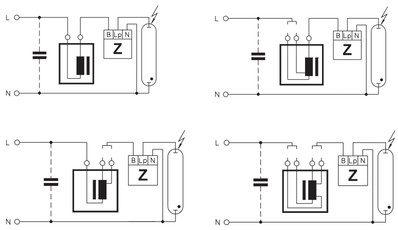
Standard Ballasts for HS and HI Lamps 35 to 70 W



Shape: 53x66 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
Vacuum-impregnated with polyester resin
Screw terminals: 0.5–2.5 mm²
Protection class I
tw 130
Ballasts for pulse ignition system on request





Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	C_P µF	I_N A
35	HS, HI	0.53	NaHJ 35.485*	**526517**	220/230, 50	108	86	36	1.07	60	0.40	EEI=A3	6	0.22/0.21
			NaHJ 35.485*	**161367**	230/240, 50	108	86	36	1.07	60	0.40	EEI=A3	6	0.22/0.21
			NaHJ 35.638	**161371**	220, 60	108	86	36	1.07	50	0.41	EEI=A3	5	0.23
50	HS, HI	0.76	NaH 50.486*	**161379**	230/240, 50	108	86	36	1.07	65	0.37	EEI=A3	8	0.30/0.29
			NaH 50.654	**161399**	220, 60	108	86	36	1.07	60	0.36	EEI=A3	8	0.31
50	HS, HI	0.76	NaHJ 70/50.157*	**160613**	230, 50	108	86	42	1.23	55	0.37	EEI=A3	8	0.30
70	HS, HI	0.98								70	0.37	EEI=A3	12	0.38
70	HS, HI	0.98	NaHJ 70.300	**174961**	220, 50	108	86	36	1.07	75	0.40	EEI=A3	12	0.40
			NaHJ 70.128*	**533568**	230, 50	108	86	36	1.07	70	0.36	EEI=A3	12	0.38
			NaHJ 70.128*	**539434**	230/240, 50	108	86	36	1.07	70/75	0.36	EEI=A3	12	0.38/0.37
			NaHJ 70.158	**161662**	240, 50	108	86	42	1.23	70	0.36	EEI=A3	12	0.37
			NaHJ 70.128	**538407**	240, 50	108	86	36	1.07	75	0.37	EEI=A3	12	0.37
			NaHJ 70.653	**161392**	220, 60	108	86	36	1.07	60	0.42	EEI=A3	10	0.40

* Ballasts without CE marking for replacements or markets outside of the EU

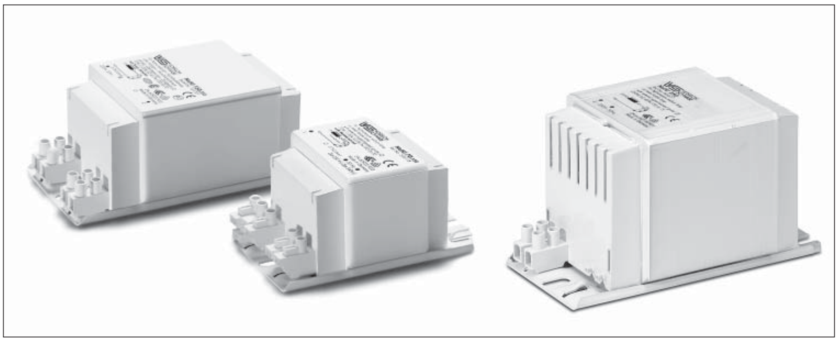
Standard Ballasts for HS and HI Lamps
70 to 250 W

Shape: 53x66 mm

Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	C_P µF	I_N A
70	HS, HI	0.98	NaHJ 100/70.703*	**161469**	230, 50	145	120	48	1.39	60	0.37	EEI=A3	12	0.38
100	HS, HI	1.20								70	0.43	EEI=A3	12	0.55
70	HS, HI	0.98	NaHJ 100/70.519	**161158**	230/240, 50	145	120	75	2.03	50	0.36	**A2**	12	0.38/0.37
100	HS, HI	1.20								60	0.42	EEI=A3	12	0.55/0.53
70	HS, HI	0.98	NaHJ 100/70.709	**161471**	220, 60	145	120	48	1.39	50	0.39	EEI=A3	10	0.40
100	HS, HI	1.20								60	0.44	EEI=A3	10	0.57
100	HS, HI	1.20	NaHJ 100.126	**507671**	220, 50	108	86	42	1.24	75	0.44	EEI=A3	12	0.55
			NaHJ 100.941*	**161707**	230/240, 50	108	86	42	1.24	75/80	0.42	EEI=A3	12	0.55/0.53
			NaHJ 100.271	**530195**	220, 60	108	86	42	1.24	75	0.45	EEI=A3	10	0.57
150	HS, HI	1.80	NaHJ 150.159	**533602**	220, 50	145	120	64	1.80	75	0.41	EEI=A3	20	0.80
			NaHJ 150.620*	**533565**	230, 50	145	120	64	1.80	70	0.40	EEI=A3	20	0.77
			NaHJ 150.620	**534540**	240, 50	145	120	64	1.80	75	0.40	EEI=A3	20	0.74
			NaHJ 150.679	**526196**	220, 60	145	120	55	1.55	75	0.44	EEI=A3	16	0.80
			NaHJ 150.679	**537793**	220, 60	117	92	55	1.55	75	0.44	EEI=A3	16	0.80
250	HS, HI	3.00	NaHJ 250.204	**529087**	220, 50	160	135	95	2.50	80	0.42	EEI=A3	32	1.32
			NaHJ 250.160	**160597**	220, 50	180	155	110	2.84	75	0.41	EEI=A3	32	1.32
			NaHJ 250.915*	**161686**	230, 50	180	155	110	2.84	80	0.40	EEI=A3	32	1.26
			NaHJ 250.340*	**504109**	230/240, 50	180	155	110	2.84	80	0.39	EEI=A3	32	1.26/1.21
			NaHJ 250.340	**178177**	240, 50	180	155	110	2.84	80	0.39	EEI=A3	32	1.21
			NaHJ 250.163	**529072**	220, 60	160	135	95	2.50	70	0.42	**A2**	25	1.35
			NaHJ 250.163	**160604**	220, 60	180	155	95	2.50	70	0.42	**A2**	25	1.35

* Ballasts without CE marking for replacements or markets outside of the EU

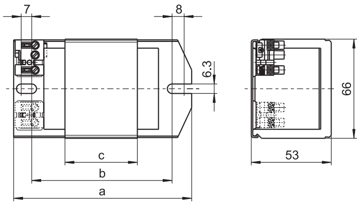
Ballasts with Thermal Cut-out for HS and HI Lamps 35 to 150 W



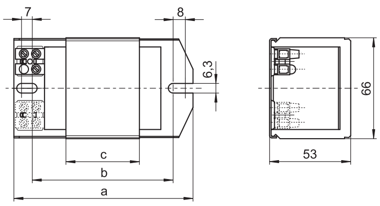
Shape: 53x66 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
Vacuum-impregnated with polyester resin
With VS-patented, intelligent temperature switch with automatic reset (evaluates the temperature and current of the ballast)
Protection class I
tw 130
Ballasts for pulse ignition system on request

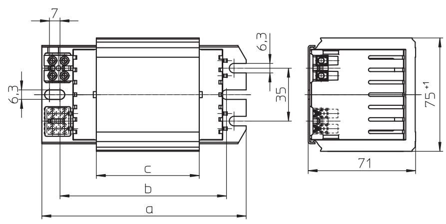
A Push-in terminals: 0.5–1.5 mm²

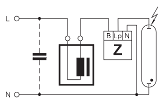


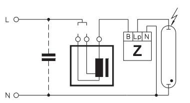
B Screw terminals: 0.5–2.5 mm²

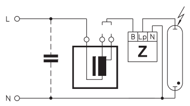


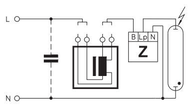
C Screw terminals: 0.75–2.5 mm²











Lamp			Ballast											Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Drawing	a mm	b mm	c mm	Weight kg	Δt K	Power factor (λ)	Energy efficiency	CP µF	IN A
Push-in terminals: 0.5–1.5 mm²															
35	HS, HI	0.53	NaHJ 35.209	**543737**	230/240, 50	A	108	86	36	1.07	35	0.36	**A2**	6	0.22
			NaHJ 35.485*	**506122**	230/240, 50	A	108	86	36	1.07	60	0.40	EEI=A3	6	0.22/0.21
			NaHJ 35.638	**509170**	220, 60	A	108	86	36	1.07	50	0.41	EEI=A3	5	0.23
50	HS, HI	0.76	NaH 50.206	**543738**	230, 50	A	108	86	48	1.39	45	0.35	**A2**	8	0.30
50	HS, HI	0.76	NaHJ 70/50.157*	**507341**	230, 50	A	108	86	42	1.23	55	0.37	EEI=A3	8	0.30
70	HS, HI	0.98									70	0.37	EEI=A3	12	0.38
50	HS, HI	0.76	NaHJ 70/50.520*	**538361**	230, 50	A	117	92	48	1.39	45	0.36	EEI=A3	8	0.30
70	HS, HI	0.98									55	0.36	EEI=A3	12	0.38
70	HS, HI	0.98	NaHJ 70.128*	**535191**	230, 50	A	108	86	36	1.07	70	0.36	EEI=A3	12	0.38
			NaHJ 70.226	**543741**	230, 50	A	108	86	48	1.39	50	0.37	**A2**	12	0.38
			NaHJ 70.128*	**533572**	230/240, 50	A	108	86	36	1.07	70/75	0.36	EEI=A3	12	0.38/0.37
			NaHJ 70.653	**509169**	220, 60	A	108	86	36	1.07	60	0.42	EEI=A3	10	0.40
70	HS, HI	0.98	NaHJ 100/70.703*	**507342**	230, 50	A	145	120	48	1.39	60	0.37	EEI=A3	12	0.38
100	HS, HI	1.20									70	0.43	EEI=A3	12	0.55
100	HS, HI	1.20	NaHJ 100.670*	**506120**	230/240, 50	A	117	92	48	1.39	70	0.42	EEI=A3	12	0.55/0.53
			NaHJ 100.941*	**539492**	230/240, 50	A	108	86	42	1.23	75/80	0.42	EEI=A3	12	0.55/0.53
100	HS, HI	1.20	NaHJ 150/100.973*	**507343**	230, 50	A	145	120	75	2.02	55	0.41	**A2**	12	0.55
150	HS, HI	1.80									75	0.41	EEI=A3	20	0.57
150	HS, HI	1.80	NaHJ 150.620*	**535216**	230, 50	A	145	120	64	1.80	70	0.40	EEI=A3	20	0.77
			NaHJ 150.620*	**538543**	230/240, 50	A	145	120	64	1.80	70/75	0.40	EEI=A3	20	0.77/0.74
			NaHJ 150.355*	**509100**	230/240, 50	A	145	120	75	2.02	65	0.39	EEI=A3	20	0.77/0.74
			NaHJ 150.679	**509171**	220, 60	A	145	120	75	2.02	65	0.42	EEI=A3	16	0.80

* Ballasts without CE marking for replacements or markets outside of the EU

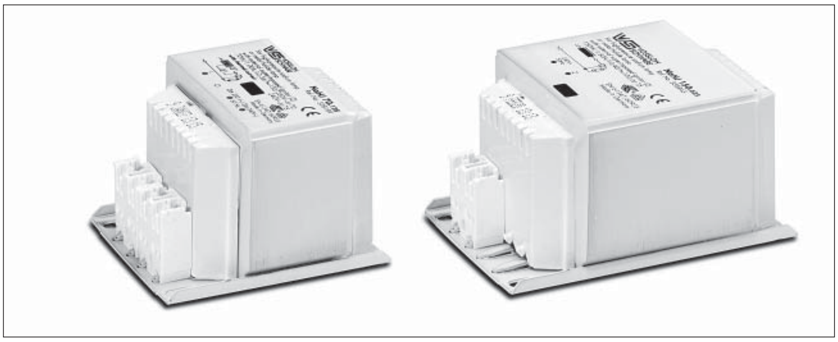
Ballasts with Thermal Cut-out for HS and HI Lamps 35 to 250 W

Shape: 53x66 mm

Lamp			Ballast											Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Drawing	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	Cp µF	IN A
Screw terminals: 0.5–2.5 mm² (Drawing B) or 0.75–2.5 mm² (Drawing C)															
35	HS, HI	0.53	NaHJ 35.485*	**503010**	230/240, 50	B	108	86	36	1.07	60	0.40	EEI=A3	6	0.22/0.21
35	HS, HI	0.53	NaH 50/35.412	**563871**	230, 50	B	117	92	55	1.52	25	0.36	**A2**	6	0.22
50	HS, HI	0.76									40	0.34	**A2**	8	0.30
35	HS, HI	0.53	NaH 50/35.797*	**539515**	230, 50	B	108	86	36	1.07	45	0.40	EEI=A3	6	0.22
50	HS, HI	0.76									70	0.37	EEI=A3	8	0.30
50	HS, HI	0.76	NaH 50.486*	**507498**	230/240, 50	B	108	86	36	1.07	65	0.37	EEI=A3	8	0.30
50	HS, HI	0.76	NaHJ 70/50.695*	**507697**	230/240, 50	B	108	86	48	1.39	50	0.37	EEI=A3	8	0.30/0.29
70	HS, HI	0.98									70	0.37	EEI=A3	12	0.38/0.37
70	HS, HI	0.98	NaHJ 70.226	**563039**	230, 50	B	108	86	48	1.39	50	0.37	**A2**	12	0.38
			NaHJ 70.128*	**536582**	230, 50	B	108	86	36	1.07	70	0.36	EEI=A3	12	0.38
			NaHJ 70.158*	**169722**	230/240, 50	B	108	86	42	1.23	70	0.36	EEI=A3	12	0.38/0.37
			NaHJ 70.128*	**538830**	230/240, 50	B	108	86	36	1.07	70/75	0.36	EEI=A3	12	0.38/0.37
			NaHJ 70.158	**546817**	240, 50	B	108	86	42	1.23	70	0.36	EEI=A3	12	0.37
70	HS, HI	0.98	NaHJ 100/70.519	**507628**	230, 50	B	145	120	75	2.03	60	0.36	**A2**	12	0.38
100	HS, HI	1.20									70	0.41	**A2**	12	0.55
70	HS, HI	0.98	NaHJ 100/70.703*	**504131**	230, 50	B	117	92	48	1.39	60	0.37	EEI=A3	12	0.38
100	HS, HI	1.20									70	0.43	EEI=A3	12	0.55
100	HS, HI	1.20	NaHJ 100.213	**554005**	230/240, 50	B	117	92	55	1.55	60	0.41	**A2**	12	0.55/0.53
			NaHJ 100.941*	**543349**	230, 50	B	108	86	42	1.23	75	0.42	EEI=A3	12	0.55
			NaHJ 100.941*	**502799**	230/240, 50	B	108	86	42	1.23	75/80	0.42	EEI=A3	12	0.55/0.53
100	HS, HI	1.20	NaHJ 150/100.923	**563876**	230, 50	C	135	115	68	2.87	30	0.40	**A2**	12	0.55
150	HS, HI	1.80									45	0.40	**A2**	20	0.77
100	HS, HI	1.20	NaHJ 150/100.973*	**504135**	230, 50	B	145	120	75	2.02	55	0.41	**A2**	12	0.55
150	HS, HI	1.80									75	0.41	EEI=A3	20	0.77
150	HS, HI	1.80	NaHJ 150.166	**562450**	230/240, 50	B	160	135	95	2.5	50	0.40	**A2**	20	0.77/0.74
			NaHJ 150.355	**539270**	220, 50	B	145	120	75	2.02	65	0.39	EEI=A3	20	0.80
			NaHJ 150.620*	**536593**	230, 50	B	145	120	64	1.80	70	0.40	EEI=A3	20	0.77
			NaHJ 150.995*	**169721**	230/240, 50	B	145	120	75	2.02	70	0.40	EEI=A3	20	0.77/0.74
			NaHJ 150.620*	**538831**	230/240, 50	B	145	120	64	1.80	70/75	0.40	EEI=A3	20	0.77/0.74
			NaHJ 150.620	**537763**	240, 50	B	130	105	64	1.80	75	0.40	EEI=A3	20	0.74
			NaHJ 150.679	**526616**	220, 60	B	145	120	75	2.02	65	0.42	EEI=A3	16	0.80
250	HS, HI	3.00	NaHJ 250.915*	**505054**	230, 50	B	180	155	110	2.84	80	0.40	EEI=A3	32	1.26
			NaHJ 250.340*	**542349**	230/240, 50	B	180	155	110	2.84	80	0.39	EEI=A3	32	1.26
			NaHJ 250.340	**508723**	240, 50	B	180	155	110	2.84	80	0.39	EEI=A3	32	1.26

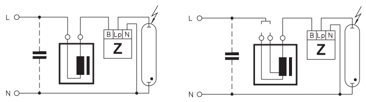
* Ballasts without CE marking for replacements or markets outside of the EU

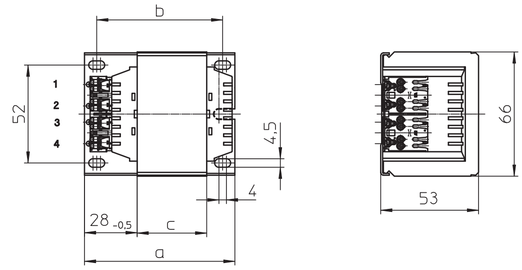
Compact Ballasts for HS and HI Lamps 35 to 150 W



Shape: 53x66 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
Vacuum-impregnated with polyester resin
Push-in terminals: 0.5–1 mm²
IDC terminals for leads H05V-U 0.5
Protection class I
Ballasts with screw terminals on request





Lamp			Ballast											Capacitor	
Output	Type	Current	Type	**Ref. No.**	Voltage AC	a	b	c	Weight	Δt	tw	Power factor	Energy efficiency	CP	IN
W		A			V, Hz	mm	mm	mm	kg	K	°C	λ		µF	A
35	HS, HI	0.53	NaHJ 35.485*	**538807**	230/240, 50	80	67	36	1.07	60	130	0.40	EEI=A3	6	0.22/0.21
70	HS, HI	0.98	NaHJ 70.128*	**538810**	230, 50	80	67	36	1.07	70	130	0.36	EEI=A3	12	0.38
			NaHJ 70.128*	**538823**	230/240, 50	80	67	36	1.07	70/75	130	0.36	EEI=A3	12	0.38/0.37
			NaHJ 70.653	**538828**	220, 60	80	67	36	1.07	60	130	0.42	EEI=A3	10	0.40
150	HS, HI	1.80	NaHJ 150.620*	**538834**	230, 50	107	94	64	1.80	70	130	0.40	EEI=A3	20	0.77
			NaHJ 150.625	**538843**	240, 50	107	94	64	1.80	75	130	0.40	EEI=A3	20	0.74
			NaHJ 150.679	**542557**	220, 60	107	94	64	1.80	75	130	0.44	EEI=A3	16	0.80

* Ballasts without CE marking for replacements or markets outside of the EU

With Thermal Cut-out

Thermal cut-out with automatic reset

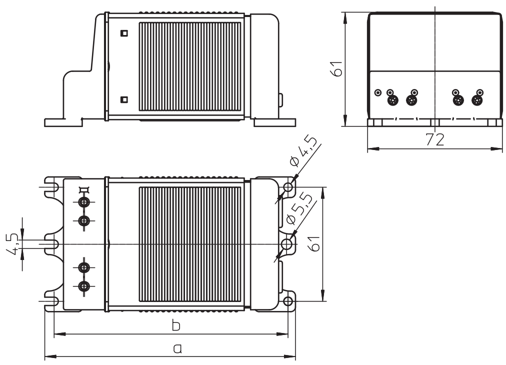
Lamp			Ballast											Capacitor	
Output	Type	Current	Type	**Ref. No.**	Voltage AC	a	b	c	Weight	Δt	tw	Power factor	Energy efficiency	CP	IN
W		A			V, Hz	mm	mm	mm	kg	K	°C	λ		µF	A
35	HS, HI	0.53	NaHJ 35.485*	**538258**	230/240, 50	80	67	36	1.07	60	130	0.40	EEI=A3	6	0.22/0.21
70	HS, HI	0.98	NaHJ 70.128*	**539223**	230/240, 50	80	67	36	1.07	70/75	140	0.36	EEI=A3	12	0.38/0.37
			NaHJ 70.653	**538537**	220, 60	80	67	36	1.07	60	130	0.42	EEI=A3	10	0.40
100	HS, HI	1.20	NaHJ 100.581*	**539081**	230/240, 50	107	94	64	1.80	60	130	0.42	EEI=A3	12	0.55/0.53
150	HS, HI	1.80	NaHJ 150.159	**548260**	220, 50	107	94	64	1.80	75	130	0.41	EEI=A3	20	0.77
			NaHJ 150.620*	**538262**	230, 50	107	94	64	1.80	70	130	0.40	EEI=A3	20	0.77
			NaHJ 150.620*	**539306**	230, 50	107	94	64	1.80	70	140	0.40	EEI=A3	20	0.77
			NaHJ 150.620	**538264**	240, 50	107	94	64	1.80	75	130	0.40	EEI=A3	20	0.74
			NaHJ 150.620	**539286**	240, 50	107	94	64	1.80	75	140	0.40	EEI=A3	20	0.74
			NaHJ 150.679	**539311**	220, 60	107	94	64	1.80	75	130	0.44	EEI=A3	16	0.80

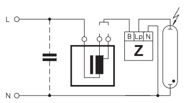
* Ballasts without CE marking for replacements or markets outside of the EU

Ballasts with Thermal Cut-out for HS and HI Lamps 35 to 150 W, Protection Class II

Encapsulated ballast in compact plastic casing
Shape: 61x72 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
With cable holder
Thermal cut-out with automatic reset
Screw terminals: 0.5–2.5 mm²
Protection class II
tw 130

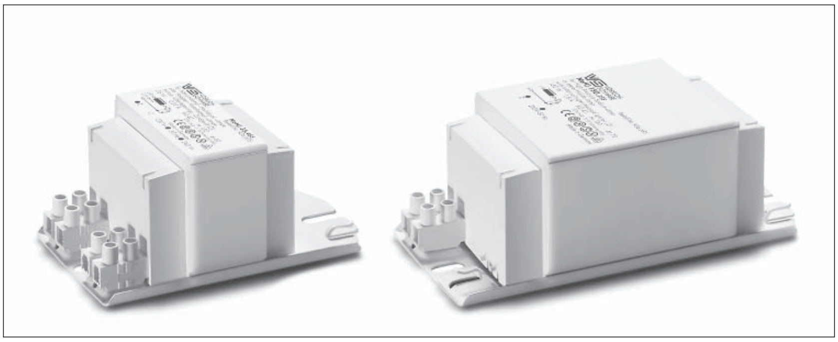




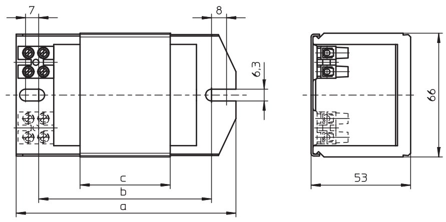
Lamp			Ballast									Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
35	HS, HI	0.53	NaHZ 50/35.797*	**539609**	230, 50	134	125	1.60	45	0.40	EEI=A3	6	0.22
50	HS, HI	0.76							70	0.37	EEI=A3	8	0.30
50	HS, HI	0.76	NaHJZ 70/50.520*	**533395**	230, 50	134	125	1.60	45	0.36	EEI=A3	8	0.30
70	HS, HI	0.98							65	0.36	EEI=A3	12	0.38
70	HS, HI	0.98	NaHJZ 100/70.519*	**533396**	230, 50	161	152	2.10	45	0.36	EEI=A3	12	0.38
100	HS, HI	1.20							60	0.42	EEI=A3	12	0.55
100	HS, HI	1.20	NaHJZ 150/100.466*	**533398**	230, 50	161	152	2.30	45	0.41	**A2**	12	0.85
150	HS, HI	1.80							70	0.39	EEI=A3	20	0.77

* Ballasts without CE marking for replacements or markets outside of the EU

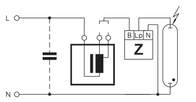
Ballasts with Thermal Cut-out and Thermal Fuse for HS and HI Lamps 35 to 150 W, Protection Class II



With double insulation
Shape: 53x66 mm



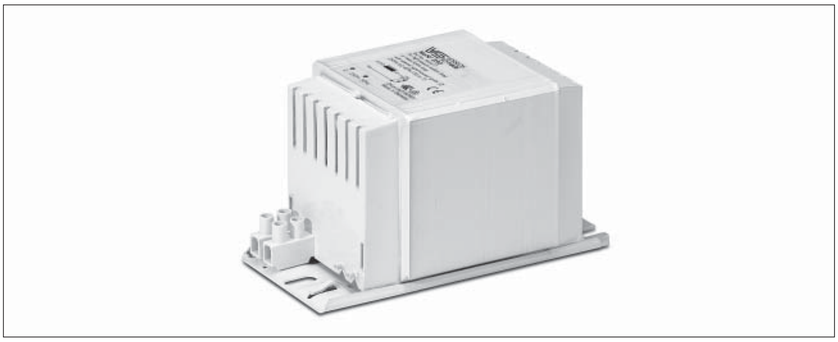
For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
Thermal cut-out with automatic reset
Screw terminals: 0.5–2.5 mm²
Protection class II
tw 130



Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	C_P μF	I_N A
35	HS, HI	0.53	NaHZ 50/35.797*	**553806**	230, 50	108	92	36	1.07	45	0.40	EEI=A3	6	0.22
50	HS, HI	0.76								70	0.37	EEI=A3	8	0.30
50	HS, HI	0.76	NaHJZ 70/50.785*	**509490**	230, 50	108	92	42	1.24	50	0.35	EEI=A3	8	0.30
70	HS, HI	0.98								70	0.38	EEI=A3	12	0.38
70	HS, HI	0.98	NaHJZ 100/70.786*	**509491**	230, 50	145	120	69	1.83	55	0.38	EEI=A3	12	0.38
100	HS, HI	1.20								65	0.41	EEI=A3	12	0.55
100	HS, HI	1.20	NaHJZ 150/100.787*	**509492**	230, 50	145	120	69	1.83	50	0.39	EEI=A3	12	0.85
150	HS, HI	1.80								75	0.41	EEI=A3	20	0.77

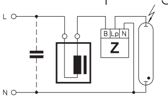
* Ballasts without CE marking for replacements or markets outside of the EU

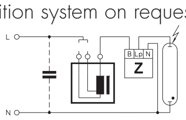
Ballasts for HS and HI Lamps 150 to 400 W

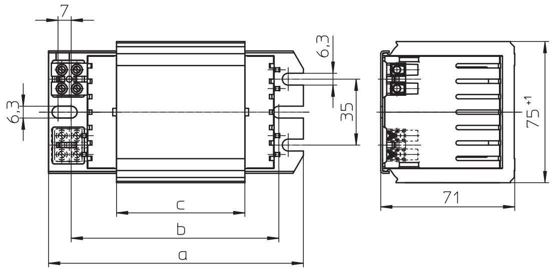


Shape: 71x75 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
Vacuum-impregnated with polyester resin
Screw terminals: 0.75–2.5 mm²
Protection class I
tw 130
Ballasts for pulse ignition system on request







Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
250	HS, HI	3.00	NaHJ 250.741	**536147**	220, 50	135	115	68	2.85	70	0.42	**A2**	32	1.35
			NaHJ 250.741	**536148**	230, 50	135	115	68	2.85	75	0.40	**A2**	32	1.30
			NaHJ 250.741	**536149**	240, 50	135	115	68	2.85	75	0.39	**A2**	32	1.25
			NaHJ 250.742	**536150**	220, 60	135	115	68	2.85	70	0.42	**A2**	25	1.40
400	HS, HI	4.45	NaHJ 400.743	**536142**	220, 50	165	145	103	4.1	70	0.45	**A2**	45	2.10
			NaHJ 400.743	**535142**	230, 50	165	145	103	4.1	75	0.44	**A2**	45	2.00
			NaHJ 400.743	**536143**	240, 50	165	145	103	4.1	75	0.40	**A2**	45	1.85
			NaHJ 400.744	**536144**	220, 60	165	145	103	4.1	70	0.44	**A2**	40	2.05

With Thermal Cut-out

Thermal cut-out with automatic reset

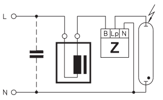
Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
150	HS, HI	1.80	NaHJ 150.216	**554006**	230/240, 50	135	115	68	2.85	45	0.40	**A2**	20	0.77
250	HS, HI	3.00	NaHJ 250.741	**539274**	220, 50	135	115	68	2.85	70	0.42	**A2**	32	1.35
			NaHJ 250.741	**544210**	230, 50	135	115	68	2.85	65	0.40	**A2**	32	1.30
			NaHJ 250.741	**536151**	230, 50	135	115	68	2.85	75	0.40	**A2**	32	1.30
			NaHJ 250.741	**537726**	230/240, 50	135	115	68	2.85	75	0.40	**A2**	32	1.30/1.25
			NaHJ 250.741	**536152**	240, 50	135	115	68	2.85	75	0.39	**A2**	32	1.25
400	HS, HI	4.45	NaHJ 400.743	**548259**	220, 50	165	145	103	4.1	70	0.44	**A2**	45	2.10
			NaHJ 400.743	**536145**	230, 50	165	145	103	4.1	75	0.44	**A2**	45	2.00
			NaHJ 400.743	**538204**	230, 50	165	145	103	4.1	65	0.41	**A2**	45	2.00
			NaHJ 400.743	**539209**	230/240, 50	165	145	103	4.1	75	0.41	**A2**	45	2.00/1.85
			NaHJ 400.743	**543986**	240, 50	165	145	103	4.1	70	0.40	**A2**	45	1.85
			NaHJ 400.743	**536146**	240, 50	165	145	103	4.1	75	0.40	**A2**	45	1.85
			NaHJ 400.744	**538620**	220, 60	165	145	103	4.1	70	0.44	**A2**	40	2.05

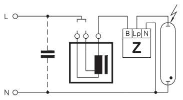
1 2 3 4 5 6 7 8 9 10

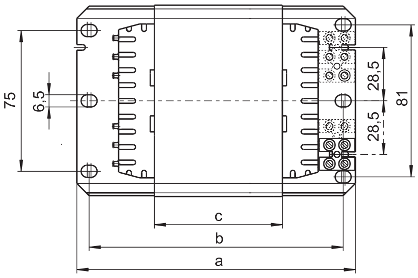
Ballasts for HS and HI Lamps 250 to 600 W

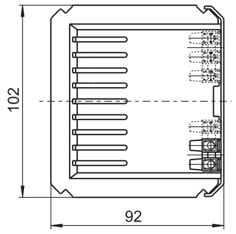
Shape: 92x102 mm

For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
Vacuum-impregnated with polyester resin
Screw terminals: 0.75–2.5 mm^2
Protection class I
tw 130
Ballasts for pulse ignition system on request









Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	C_P µF	I_N A
250	HS, HI	3.00	NaHJ 250.003	**179743**	220, 50	133	120	44	3.53	70	0.41	EEI=A3	32	1.32
			NaHJ 250.727*	**178771**	230, 50	133	120	44	3.53	70	0.39	EEI=A3	32	1.26
			NaHJ 250.727	**500976**	240, 50	133	120	44	3.53	70	0.39	EEI=A3	32	1.21
			NaHJ 250.011	**500401**	220, 60	133	120	44	3.53	65	0.43	**A2**	25	1.35
400	HS, HI	4.45	NaHJ 400.006	**179740**	220, 50	148	135	68	5.20	70	0.44	**A2**	45	2.00
			NaHJ 400.006	**178790**	230, 50	148	135	68	5.20	70	0.44	**A2**	45	1.95
			NaHJ 400.737	**500402**	240, 50	148	135	68	5.20	75	0.43	**A2**	45	1.90
			NaHJ 400.012	**500403**	220, 60	148	135	68	5.20	70	0.44	**A2**	40	2.00
	HI	3.50	J 400.027	**505782**	230/240, 50	148	135	68	5.20	60	0.45	**A2**	35	1.64/1.59
600	HS	6.20	NaH 600.010	**179742**	220, 50	173	160	96	6.80	70	0.44	**A2**	65	2.90
			NaH 600.005	**533484**	230/240, 50	173	160	96	6.80	70	0.44	**A2**	65	2.90/2.85
			NaH 600.140	**529560**	220, 60	173	160	96	6.80	65	0.46	**A2**	55	3.00

* Ballasts without CE marking for replacements or markets outside of the EU

With Thermal Cut-out

Thermal cut-out with automatic reset

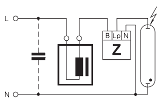
Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	C_P µF	I_N A
250	HS, HI	3.00	NaHJ 250.727*	**500969**	230/240, 50	133	120	44	3.53	70	0.39	EEI=A3	32	1.26/1.21
			NaHJ 250.011	**508744**	220, 60	133	120	44	3.46	65	0.43	**A2**	25	1.35
400	HS, HI	4.45	NaHJ 400.737	**179424**	230/240, 50	148	135	68	5.20	70/75	0.43	**A2**	45	1.95/1.90
	HI	3.50	J 400.027	**509613**	230/240, 50	148	135	68	5.20	60	0.45	**A2**	35	1.64/1.59
	HS, HI	4.45	NaHJ 400.012	**508741**	220, 60	148	135	68	5.20	70	0.44	**A2**	40	2.00
600	HS	6.20	NaH 600.005	**179454**	230/240, 50	173	160	96	6.80	70	0.44	**A2**	65	2.90/2.85

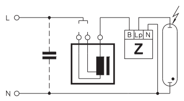
* Ballasts without CE marking for replacements or markets outside of the EU

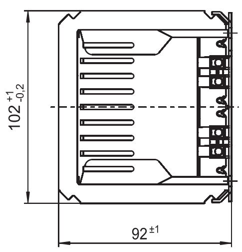
Ballasts for HS and HI Lamps 1000 W

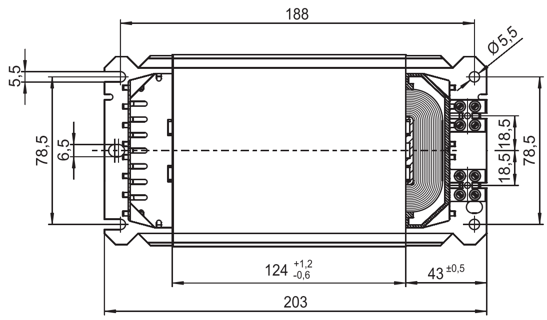
Shape: 92x102 mm

For high pressure sodium lamps (HS)
and metal halide lamps (HI)
Vacuum-impregnated with polyester resin
Screw terminals: 0.75–2.5 mm²
Protection class I
tw 130
Ballasts for pulse ignition system on request



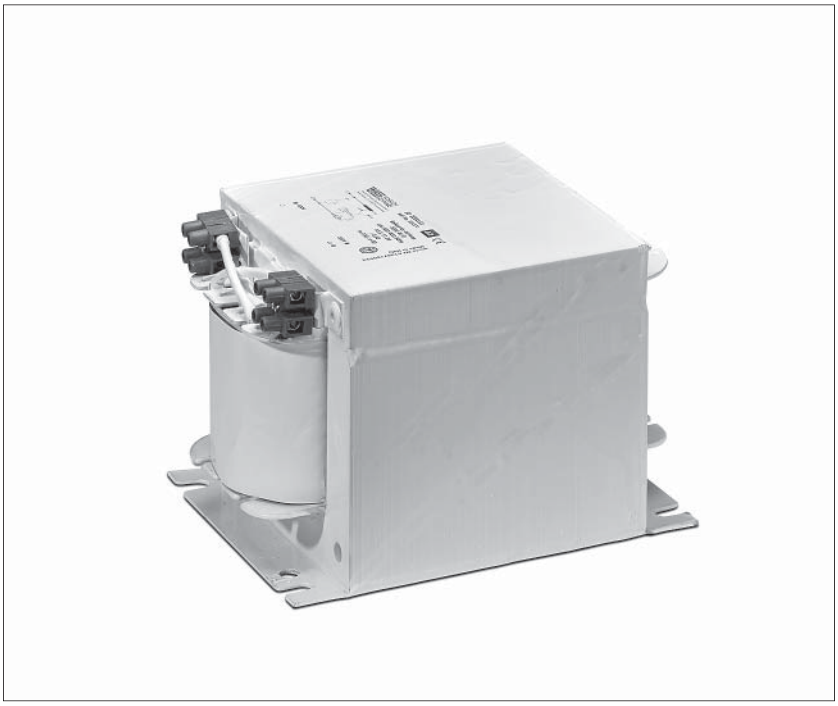






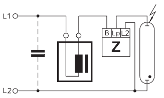
Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
1000	HS	10.30	NaHJ 1000.089	**534487**	220, 50	203	188	124	8.90	80	0.47	**A2**	100	5.1
	HI	9.50								70	0.51	**A2**	85	5.0
1000	HS	10.30	NaHJ 1000.089	**539212**	220/230, 50	203	188	124	8.90	80	0.45	**A2**	100	5.1
	HI	9.50								70	0.49	**A2**	85	5.0
1000	HS	10.30	NaHJ 1000.089	**528548**	230, 50	203	188	124	8.90	80	0.45	**A2**	100	5.1
	HI	9.50								70	0.49	**A2**	85	5.0
1000	HS	10.30	NaHJ 1000.089	**544787**	230/240, 50	203	188	124	8.90	85	0.45	**A2**	100	5.1
	HI	9.50								70	0.46	**A2**	85	5.0
1000	HS	10.30	NaHJ 1000.089	**536140**	240, 50	203	188	124	8.90	85	0.42	**A2**	100	4.8
	HI	9.50								75	0.46	**A2**	85	4.9
1000	HS	10.30	NaHJ 1000.089	**528536**	220, 60	203	188	124	8.90	75	0.46	**A2**	100	5.1
	HI	9.50								60	0.50	**A2**	85	5.0

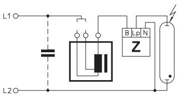
Ballasts for HI Lamps up to 2500 W

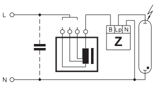


Shape: 150x150 mm

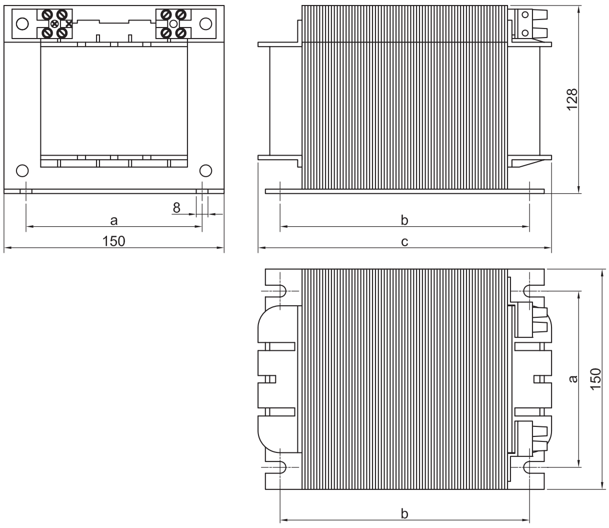
For metal halide lamps (HI)
Vacuum impregnated with polyester resin
Screw terminals: 0.75–4 mm²
For luminaires of protection class I
tw 130







For Short Arc Lamps

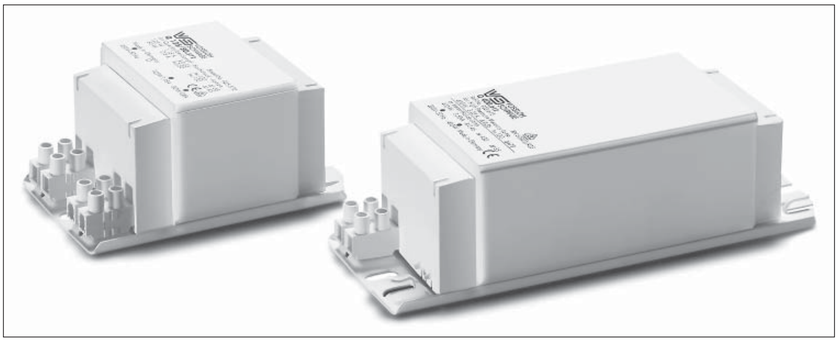


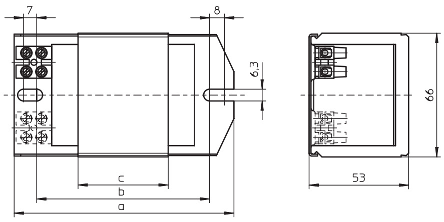
Lamp			Ballast										Capacitor	
Output	Type	Current	Type	**Ref. No.**	Voltage AC	a	b	c	Weight	Δt	Power factor	Energy efficiency	C_P	I_N
W		A			V, Hz	mm	mm	mm	kg	K	λ		μF	A
2000	HI	8.8	J 2000.71	**554303**	380/400, 50	122	175	200	15	75	0.60	**A2**	37	6
			J 2000.72	**554304**	380/400/415, 50	122	135	160	14	70	0.58	**A2**	37	6
			J 2000.73	**554305**	380, 60	122	175	200	15	75	0.53	**A2**	30	6
2000	HI	10.3/11.3	JD 2000.81	**554270**	380/400, 50	122	175	200	15	80	0.53	**A2**	60	6
			JD 2000.81	**554306**	380/400/415, 50	122	135	160	14	75	0.52	**A2**	60	6
			JD 2000.83	**554283**	380, 60	122	175	200	15	75	0.54	**A2**	50	6
2000	HI	12.2	JD 2000II.91	**554307**	380/400, 50	122	175	200	16	80	0.46	**A2**	70	6
			JD 2000II.92	**554308**	380, 60	122	175	200	16	75	0.45	**A2**	60	6
2000	HI	16.5	JD 2000I.85	**554309**	230/240, 50	122	135	160	14	80	0.57	**A2**	125	10.5
			JD 2000I.86	**554310**	220, 60	122	135	160	14	80	0.57	**A2**	105	10
For Short Arc Lamps 1200 and 2500 W														
1200	HI	13.8	J 1200.95	**554311**	208, 60	122	105	130	11	–	0.40	**A2**	150	6
					230/245, 50							**A2**		
2500	HI	25.6	J 2500.96	**554312**	208, 60	122	175	200	16	–	0.44	**A2**	260	12.3
					230/245, 50							**A2**		

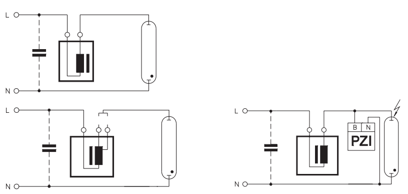
Ballasts for HM and HI Lamps 50 to 400 W

Shape: 53x66 mm

For mercury vapour lamps (HM) and
metal halide lamps (HI) with ignition voltage 1 kV
Vacuum-impregnated with polyester resin
Screw terminals: 0.5–2.5 mm²
Protection class I
tw 130







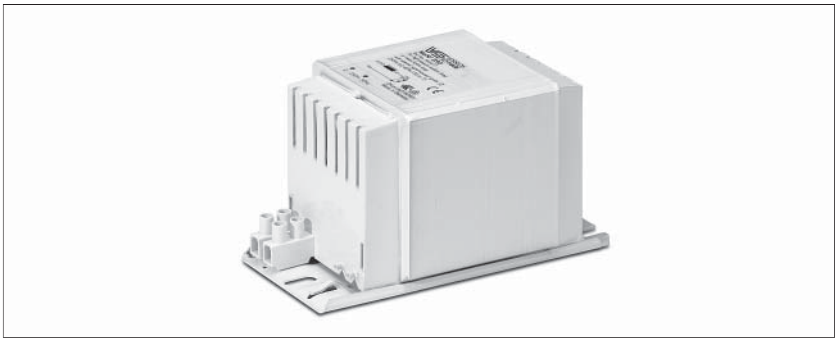
Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	Cp µF	IN A
50	HM	0.61	Q 50.501	**167100**	220, 50	108	86	36	1.07	55	0.44	EEI=A3	7	0.28
			Q 50.550*	**167213**	230, 50	108	86	36	1.07	55	0.44	EEI=A3	7	0.27
			Q 50.508	**167125**	240, 50	108	86	36	1.07	65	0.42	EEI=A3	7	0.26
			Q 50.535	**167185**	220, 60	108	86	36	1.07	50	0.44	EEI=A3	6	0.28
50	HM	0.61	Q 80/50.596*	**167311**	230, 50	108	86	36	1.07	55	0.43	EEI=A3	7	0.27
80	HM	0.80								70	0.51	EEI=A3	8	0.41
50	HM	0.61	Q 80/50.592	**167306**	220, 60	108	86	36	1.07	50	0.44	EEI=A3	6	0.28
80	HM	0.80								60	0.53	EEI=A3	7	0.43
80	HM	0.80	Q 80.587	**167302**	220, 50	108	86	36	1.07	65	0.52	EEI=A3	8	0.43
			Q 80.588*	**167304**	230, 50	108	86	36	1.07	70	0.51	EEI=A3	8	0.41
			Q 80.510	**167132**	240, 50	108	86	36	1.07	60	0.48	EEI=A3	8	0.40
			Q 80.584	**167299**	220, 60	108	86	36	1.07	55	0.51	EEI=A3	7	0.43
80	HM	0.80	Q 125/80.611*	**167326**	230, 50	108	86	42	1.23	50	0.49	EEI=A3	8	0.41
125	HM	1.15								70	0.54	EEI=A3	10	0.60
80	HM	0.80	Q 125/80.511	**167136**	240, 50	108	86	48	1.39	50	0.48	EEI=A3	8	0.40
125	HM	1.15								70	0.52	EEI=A3	10	0.58
125	HM	1.15	Q 125.549	**169947**	220, 50	108	86	36	1.07	70	0.56	EEI=A3	10	0.63
			Q 125.568*	**167263**	230, 50	108	86	36	1.07	75	0.54	EEI=A3	10	0.60
			Q 125.512	**167140**	240, 50	108	86	48	1.39	65	0.51	EEI=A3	10	0.58
			Q 125.598	**502818**	220, 60	108	86	36	1.07	60	0.57	EEI=A3	10	0.65
250	HM	2.13	Q 250.513	**167144****	220, 50	145	120	75	2.10	75	0.58	**A2**	18	1.26
			Q 250.528	**167367****	230, 50	145	120	75	2.10	75	0.56	**A2**	18	1.20
			Q 250.703	**507256****	240, 50	145	120	75	2.10	75	0.53	**A2**	18	1.15
			Q 250.606	**533705****	220, 60	145	120	64	1.80	70	0.58	**A2**	15	1.30
400	HM	3.25	Q 400.616	**528236****	220, 50	160	135	95	2.50	80	0.60	EEI=A3	25	2.00
			Q 400.561	**167250****	220, 50	180	155	110	2.88	75	0.60	**A2**	25	2.00
			Q 400.612	**167330****	230, 50	180	155	110	2.88	75	0.56	**A2**	25	1.90
			Q 400.669	**167374****	240, 50	180	155	110	2.88	75	0.54	**A2**	25	1.85
			Q 400.613	**167335****	220, 60	180	155	110	2.88	65	0.60	**A2**	25	2.00
			Q 400.613	**508245****	220, 60	180	155	95	2.50	75	0.60	**A2**	25	2.00

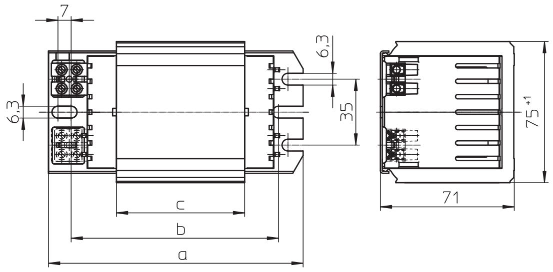
* Ballasts without CE marking for replacements or markets outside of the EU
** Suitable for metal halide lamps (HI) with ignition voltage 1 kV in combination with pulse ignitor PZI 1000/1 K (see page 52)

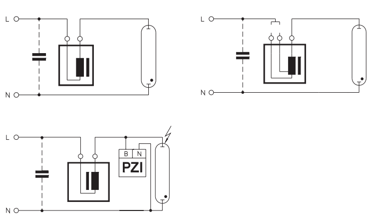
Ballasts for HM and HI Lamps 250 and 400 W

Shape: 71x75 mm

For mercury vapour lamps (HM) and
metal halide lamps (HI) with ignition voltage 1 kV
Vacuum-impregnated with polyester resin
Screw terminals: 0.75–2.5 mm²
Protection class I
tw 130







Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
250	HM	2.13	Q 250.800	**536260***	230/240, 50	135	115	68	2.85	55	0.53	**A2**	18	1.3
400	HM	3.25	Q 400.715	**537869***	220, 50	135	115	68	2.85	70	0.59	**A2**	25	2.0
			Q 400.801	**536258***	230, 50	135	115	68	2.85	75	0.58	**A2**	25	2.0
			Q 400.801	**538034***	230, 50	135	115	68	2.85	65	0.58	**A2**	25	2.0
			Q 400.801	**537703***	230/240, 50	135	115	68	2.85	75	0.58	**A2**	25	2.0/1.85
			Q 400.732	**537873***	220, 60	135	115	68	2.85	70	0.59	**A2**	25	2.0

* Suitable for metal halide lamps (HI) with ignition voltage 1 kV in combination with pulse ignitor PZI 1000/1 K (see page 52)

With Thermal Cut-out

Thermal cut-out with automatic reset

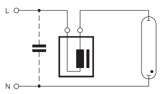
Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
250	HM	2.13	Q 250.800	**536261***	230/240, 50	135	115	68	2.85	55	0.53	**A2**	18	1.3
400	HM	3.25	Q 400.801	**536259***	230, 50	135	115	68	2.85	75	0.58	**A2**	25	2.0

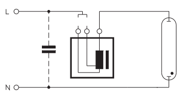
* Suitable for metal halide lamps (HI) with ignition voltage 1 kV in combination with pulse ignitor PZI 1000/1 K (see page 52)

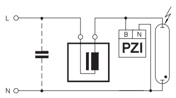
Ballasts for HM and HI Lamps 250 to 1000 W

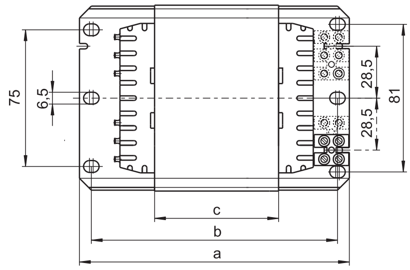
Shape: 92x102 mm

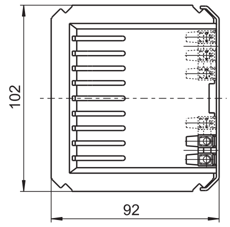
For mercury vapour lamps (HM) and
metal halide lamps (HI) with ignition voltage 1 kV
Vacuum-impregnated with polyester resin
Screw terminals: 0.75–2.5 mm²
Protection class I
tw 130











Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
250	HM	2.13	Q 250.417	**504467***	230/240, 50	133	120	44	3.53	50	0.52	**A2**	18	1.20
400	HM	3.25	Q 400.001	**504474***	230/240, 50	133	120	44	3.53	65	0.56	**A2**	25	1.80
700	HM	5.40	Q 700.035	**528521**	230/240, 50	173	160	96	6.90	60	0.56	**A2**	40	3.40
1000	HM	7.50	Q 1000.097	**537103***	220, 50	173	160	96	6.90	75	0.61	**A2**	60	4.80
			Q 1000.096	**538540***	230, 50	173	160	96	6.90	65	0.60	**A2**	60	4.80
			Q 1000.096	**528761***	230, 50	173	160	96	6.90	65	0.60	**A2**	60	4.80
			Q 1000.145	**528886***	240, 50	173	160	96	6.90	75	0.58	**A2**	60	4.60
			Q 1000.311	**526715***	220, 60	173	160	96	6.90	70	0.61	**A2**	50	5.00

* Suitable for metal halide lamps (HI) with ignition voltage 1 kV in combination with pulse ignitor PZI 1000/1 K (see page 52)

With Thermal Cut-out

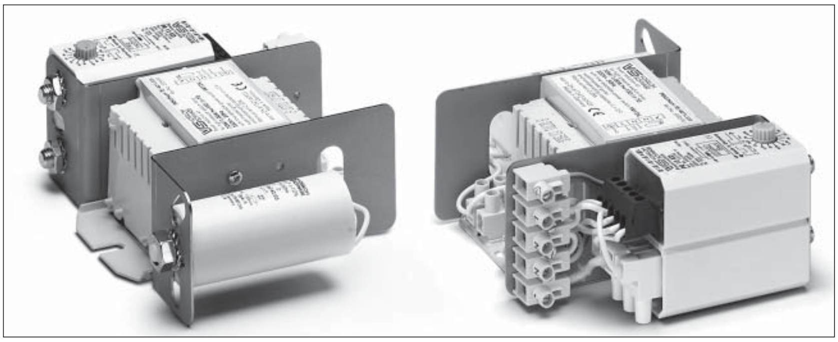
Thermal cut-out with automatic reset

Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
250	HM	2.13	Q 250.417	**508746***	230/240, 50	133	120	44	3.53	50	0.52	**A2**	18	1.20
400	HM	3.25	Q 400.001	**505002***	230/240, 50	133	120	44	3.53	65	0.56	**A2**	25	1.80

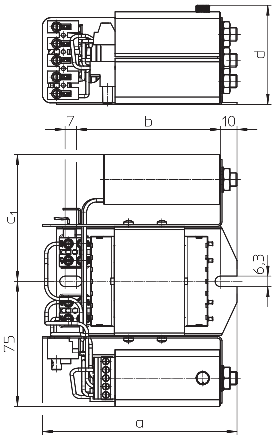
* Suitable for metal halide lamps (HI) with ignition voltage 1 kV in combination with pulse ignitor PZI 1000/1 K (see page 52)

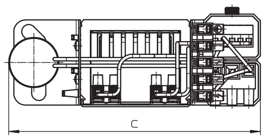
Compact Power Reduction Kits for HS Lamps 50 to 150 W

Ballast shape: 53x66 mm



For high pressure sodium lamps (HS)
Compact power reduction kit with ballast with or without patented, intelligent thermal cut-out with automatic reset (which evaluates the temperature and current of the ballast), ignitor, power switch and compensation capacitor
With luminaire terminal block:
screw terminal 0.75–2.5 mm²
With earth terminal
Permissible load capacity: 20–100 pF
Lead length to the lamp: max. 1.5 m
tw 130
Further outputs and voltages on request
With digital timer ignitor on request





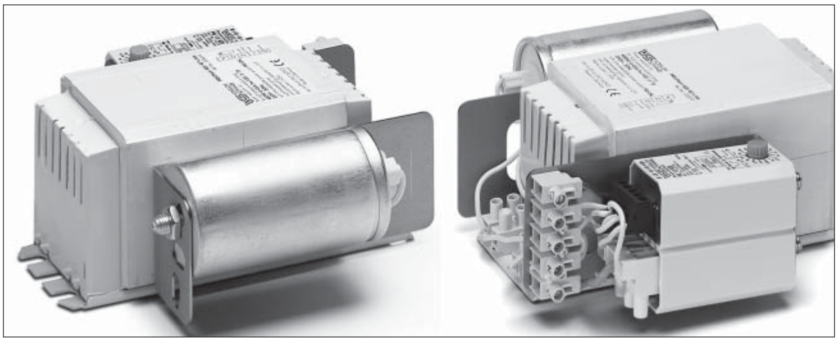
As individual components no longer need to be wired, there is a significant reduction in assembly time and costs.

Lamp			Power reduction kit												
Output	Type	Current	Type	**Ref. No.**	Voltage AC V, Hz	Mains current A	Temperature protection	a mm	b mm	c mm	c1 mm	d mm	Weight kg	Power factor λ	Energy efficiency
Power reduction without control phase – Intelligent power switch PR 12 K LC (Light Control)															
70/40%	HS	0.98	PRKUNaH 70/40%.525	**543384**	220, 50	0.38	no	117	86	151	76	60	1.5	> 0.90	EEI=A3
100/40%	HS	1.20	PRKUNaH 100/40%.522	**543388**	220, 50	0.56	no	123	92	151	76	60	1.7	> 0.90	EEI=A3
150/40%	HS	1.80	PRKUNaH 150/40%.142	**543385**	220, 50	0.77	no	151	120	154	79	60	2.3	> 0.90	EEI=A3
50/40%	HS	0.76	PRKUNaH 50/40%.021*	**544760**	230, 50	0.30	yes	117	86	151	76	56	1.5	> 0.90	EEI=A3
70/40%	HS	0.98	PRKUNaH 70/40%.525*	**543742**	230, 50	0.38	yes	117	86	151	76	60	1.5	> 0.90	EEI=A3
100/40%	HS	1.20	PRKUNaH 100/40%.522*	**543743**	230, 50	0.55	yes	123	92	151	76	60	1.7	> 0.90	EEI=A3
150/40%	HS	1.80	PRKUNaH 150/40%.142*	**543744**	230, 50	0.77	yes	151	120	154	79	60	2.3	> 0.90	EEI=A3
Power reduction without control phase – Power switch PR 12 KD with selectable switching time															
70/40%	HS	0.98	PRKUNaH 70/40%.525	**539328**	220, 50	0.38	no	117	86	151	76	60	1.5	> 0.90	EEI=A3
100/40%	HS	1.20	PRKUNaH 100/40%.522	**539330**	220, 50	0.56	no	123	92	151	76	60	1.7	> 0.90	EEI=A3
150/40%	HS	1.80	PRKUNaH 150/40%.142	**539332**	220, 50	0.77	no	151	120	154	79	60	2.3	> 0.90	EEI=A3
70/40%	HS	0.98	PRKUNaH 70/40%.525*	**538690**	230, 50	0.38	yes	117	86	151	76	60	1.5	> 0.90	EEI=A3
100/40%	HS	1.20	PRKUNaH 100/40%.522*	**538691**	230, 50	0.56	yes	123	92	151	76	60	1.7	> 0.90	EEI=A3
150/40%	HS	1.80	PRKUNaH 150/40%.142	**538692**	230, 50	0.77	yes	151	120	154	79	60	2.3	> 0.90	EEI=A3
70/40%	HS	0.98	PRKUNaH 70/40%.525	**538700**	220, 60	0.38	no	117	86	151	76	60	1.5	> 0.90	EEI=A3
100/40%	HS	1.20	PRKUNaH 100/40%.522	**538701**	220, 60	0.56	no	123	92	151	76	60	1.7	> 0.90	EEI=A3
150/40%	HS	1.80	PRKUNaH 150/40%.142	**538702**	220, 60	0.77	no	151	120	154	79	60	2.3	> 0.90	EEI=A3
Power reduction with control phase – Power switch PU 12 K															
70/40%	HS	0.98	PRKUNaH 70/40%.525	**539329**	220, 50	0.38	no	117	86	151	76	56	1.5	> 0.90	EEI=A3
100/40%	HS	1.20	PRKUNaH 100/40%.522	**539331**	220, 50	0.56	no	123	92	151	76	56	1.7	> 0.90	EEI=A3
150/40%	HS	1.80	PRKUNaH 150/40%.142	**539333**	220, 50	0.77	no	151	120	154	79	56	2.3	> 0.90	EEI=A3
70/40%	HS	0.98	PRKUNaH 70/40%.525*	**538695**	230, 50	0.38	yes	117	86	151	76	56	1.5	> 0.90	EEI=A3
100/40%	HS	1.20	PRKUNaH 100/40%.522*	**538696**	230, 50	0.56	yes	123	92	151	76	56	1.7	> 0.90	EEI=A3
150/40%	HS	1.80	PRKUNaH 150/40%.142*	**538697**	230, 50	0.77	yes	151	120	154	79	56	2.3	> 0.90	EEI=A3
70/40%	HS	0.98	PRKUNaH 70/40%.525	**538705**	220, 60	0.38	no	117	86	151	76	56	1.5	> 0.90	EEI=A3
100/40%	HS	1.20	PRKUNaH 100/40%.522	**538706**	220, 60	0.56	no	123	92	151	76	56	1.7	> 0.90	EEI=A3
150/40%	HS	1.80	PRKUNaH 150/40%.142	**538707**	220, 60	0.77	no	151	120	154	79	56	2.3	> 0.90	EEI=A3

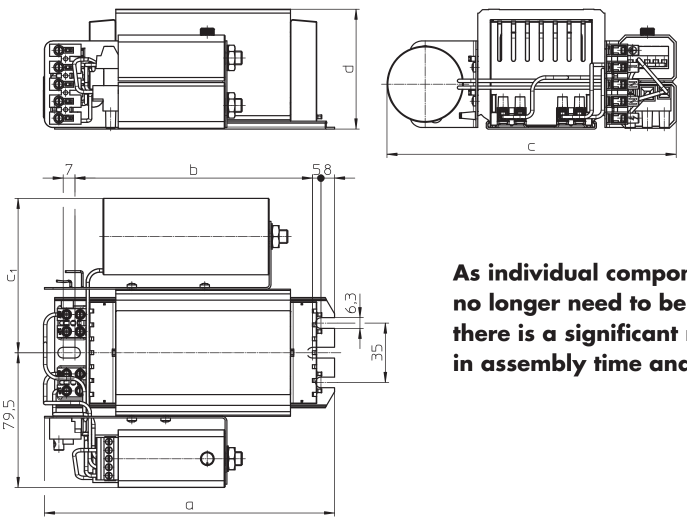
* Ballasts without CE marking for replacements or markets outside of the EU

Compact Power Reduction Kits for HS Lamps 250 and 400 W

Ballast shape: 71x75 mm



For high pressure sodium lamps (HS)
Compact power reduction kit with ballast with or without thermal cut-out with automatic reset, superimposed ignitor, power switch and compensation capacitor
With luminaire terminal block:
screw terminal 0.75–2.5 mm²
With earth terminal
Permissible load capacity: 20–100 pF
Lead length to the lamp: max. 1.5 m
tw 130
Further outputs and voltages on request
With digital timer ignitor on request



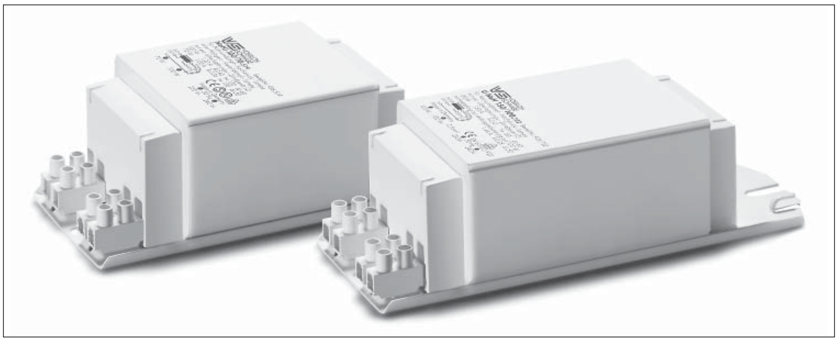
As individual components no longer need to be wired, there is a significant reduction in assembly time and costs.

Lamp			Power reduction kit												
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Mains current A	Temperature protection	a mm	b mm	c mm	c1 mm	d mm	Weight kg	Power factor λ	Energy efficiency
Power reduction without control phase – Intelligent power switch PR 12 K LC (Light Control)															
250/40%	HS	3.00	PRKUNaH 250/40%.936*	**543386**	220, 50	1.26	no	141	110	171	91	71	3.3	> 0.90	EEI=A3
400/40%	HS	4.45	PRKUNaH 400/40%.906	**543389**	220, 50	1.95	no	171	140	171	91	71	5.3	> 0.90	**A2**
250/40%	HS	3.00	PRKUNaH 250/40%.936*	**543745**	230, 50	1.26	yes	141	110	171	91	71	3.3	> 0.90	EEI=A3
400/40%	HS	4.45	PRKUNaH 400/40%.906	**543746**	230, 50	1.95	yes	171	140	171	91	71	5.3	> 0.90	**A2**
Power reduction without control phase – Power switch PR 12 KD with selectable switching time															
250/40%	HS	3.00	PRKUNaH 250/40%.758	**546585**	220, 50	1.26	no	171	140	171	91	71	5.3	> 0.90	EEI=A3
250/40%	HS	3.00	PRKUNaH 250/40%.936	**539334**	220, 50	1.26	no	141	110	171	91	71	3.3	> 0.90	EEI=A3
400/40%	HS	4.45	PRKUNaH 400/40%.906	**539335**	220, 50	1.95	no	171	140	171	91	71	5.3	> 0.90	**A2**
250/40%	HS	3.00	PRKUNaH 250/40%.936*	**538693**	230, 50	1.26	yes	141	110	171	91	71	3.3	> 0.90	EEI=A3
400/40%	HS	4.45	PRKUNaH 400/40%.906	**538694**	230, 50	1.95	yes	171	140	171	91	71	5.3	> 0.90	**A2**
250/40%	HS	3.00	PRKUNaH 250/40%.983	**538703**	220, 60	1.26	no	141	110	165	86	71	3.3	> 0.90	EEI=A3
400/40%	HS	4.45	PRKUNaH 400/40%.937	**538704**	220, 60	1.95	no	171	140	171	91	71	5.3	> 0.90	**A2**
Power reduction with control phase – Power switch PU 12 K															
250/40%	HS	3.00	PRKUNaH 250/40%.936	**539336**	220, 50	1.26	no	141	110	171	91	71	3.3	> 0.90	EEI=A3
400/40%	HS	4.45	PRKUNaH 400/40%.906	**539337**	220, 50	1.95	no	171	140	171	91	71	5.3	> 0.90	**A2**
250/40%	HS	3.00	PRKUNaH 250/40%.936*	**538698**	230, 50	1.26	yes	141	110	171	91	71	3.3	> 0.90	EEI=A3
400/40%	HS	4.45	PRKUNaH 400/40%.906	**538699**	230, 50	1.95	yes	171	140	171	91	71	5.3	> 0.90	**A2**
250/40%	HS	3.00	PRKUNaH 250/40%.983	**538708**	220, 60	1.26	no	141	110	165	86	71	3.3	> 0.90	EEI=A3
400/40%	HS	4.45	PRKUNaH 400/40%.937	**538709**	220, 60	1.95	no	171	140	171	91	71	5.3	> 0.90	**A2**

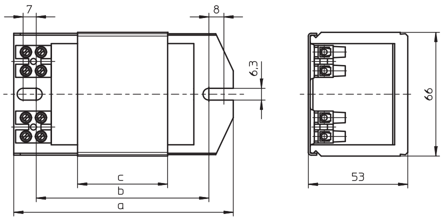
* Ballasts without CE marking for replacements or markets outside of the EU

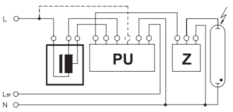
Ballasts for Power Reduction of HS Lamps 70 to 250 W

Shape: 53x66 mm



For high pressure sodium lamps (HS)
Vacuum-impregnated with polyester resin
Screw terminals: 0.5–2.5 mm²
Protection class I
tw 130

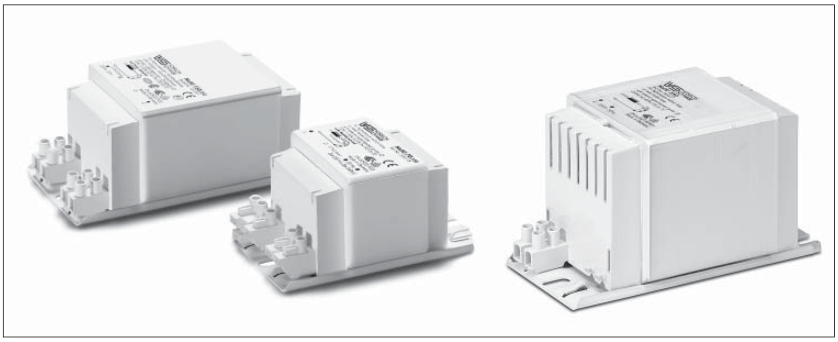




Lamp			Ballast										Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	C_P µF	I_N A
70 (42)	HS	0.98	UNaH 70/40%.501	**534128**	220, 50	108	86	42	1.23	65	0.39	EEI=A3	12	0.40
			UNaH 70/40%.525*	**535348**	230, 50	108	86	42	1.23	70	0.38	EEI=A3	12	0.38
			UNaH 70/40%.691	**161460**	220, 60	108	86	48	1.39	60	0.42	EEI=A3	10	0.40
100 (60)	HS	1.20	UNaH 100/40%.452	**533947**	220, 50	117	92	55	1.52	65	0.43	EEI=A3	12	0.55
			UNaH 100/40%.522*	**535347**	230, 50	117	92	55	1.52	70	0.42	EEI=A3	12	0.55
			NaHJ 100/70.709	**161471**	220, 60	145	120	48	1.39	60/50	0.44	EEI=A3	10	0.57
150 (90)	HS	1.80	UNaH 150/40%.453	**533948**	220, 50	145	120	75	2.03	75	0.42	EEI=A3	20	0.80
			UNaH 150/40%.142*	**535333**	230, 50	145	120	75	2.03	75	0.40	EEI=A3	20	0.77
			UNaH 150/40%.717	**161475**	220, 60	145	120	75	2.03	70	0.44	EEI=A3	20	0.77
250 (150)	HS	3.00	UNaH 250/40%.454	**533949**	220, 50	180	155	110	2.88	80	0.42	EEI=A3	32	1.32
			UNaH 250/40%.983	**169892**	220, 60	145	120	75	2.03	75	0.40	EEI=A3	32	1.32

* Ballasts without CE marking for replacements or markets outside of the EU

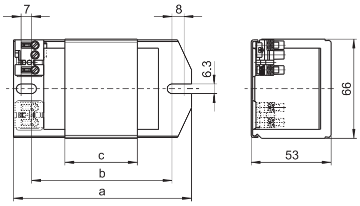
Ballasts with Thermal Cut-out for Power Reduction of HS Lamps 50 to 150 W



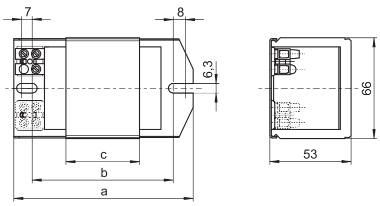
Shape: 53x66 mm

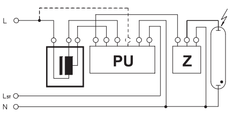
For high pressure sodium lamps (HS)
Vacuum-impregnated with polyester resin
Thermal cut-out with automatic reset
Protection class I
tw 130

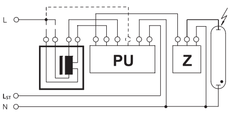
A Push-in terminals: 0.5–1.5 mm²



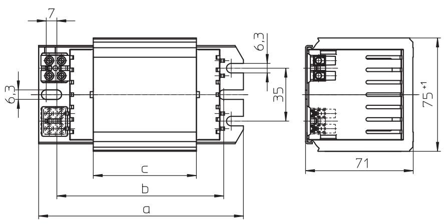
B Screw terminals: 0.5–2.5 mm²







C Screw terminals: 0.75–2.5 mm²

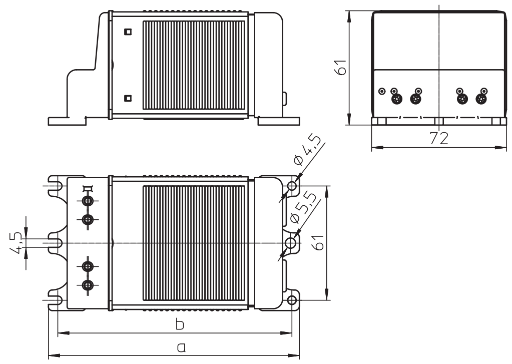


Lamp			Ballast											Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Drawing mm	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	Cp µF	IN A
With push-in terminals: 0.5–1.5 mm²															
70 (42)	HS	0.98	UNaH 70/40%.525*	**544728**	230, 50	A	108	86	42	1.23	70	0.38	EEI=A3	12	0.38
100 (60)	HS	1.20	UNaH 100/40%.522*	**544730**	230, 50	A	117	92	55	1.55	70	0.42	EEI=A3	12	0.55
150 (90)	HS	1.80	UNaH 150/40%.142*	**544729**	230, 50	A	145	120	75	2.10	75	0.40	EEI=A3	20	0.77
150 (101)	HS	1.80	UNaH 150/100.722*	**539050**	230/240, 50	A	160	135	95	2.50	65/50	0.41	EEI=A3	20	0.77
150 (101)	HS	1.80	UNaH 150/100.722*	**507627**	230/240, 50	A	180	155	95	2.50	65/50	0.41	EEI=A3	20	0.77
With screw terminals: 0.5–2.5 mm² (Drawing B) or 0.75–2.5 mm² (Drawing C)															
50 (33)	HS	0.76	NaH 50/35.412	**563871**	230, 50	B	117	92	55	1.07	40/25	0.34	**A2**	6	0.22
			NaH 50/35.797*	**539515**	230, 50	B	108	86	36	1.07	70/45	0.37	EEI=A3	6	0.22
70 (44)	HS	0.98	NaHJ 70/50.411	**563870**	230, 50	B	108	86	48	1.34	50/35	0.37	**A2**	12	0.38
			NaHJ 70/50.695*	**503136**	230, 50	B	108	86	48	1.34	70/50	0.37	EEI=A3	12	0.38
			UNAH 70/40%.413	**563872**	230, 50	B	117	92	55	1.52	50/35	0.37	**A2**	12	0.38
100 (64)	HS	1.20	NaHJ 100/70.519	**507628**	230, 50	B	145	120	75	2.03	60/50	0.42	**A2**	12	0.55
			NaHJ 100/70.703*	**504131**	230, 50	B	117	92	48	1.39	70/60	0.43	EEI=A3	12	0.55
			UNAH 100/40%.41	**563873**	230, 50	B	145	120	75	2.03	50	0.41	**A2**	12	0.55
150 (101)	HS	1.80	NaHJ 150/100.923	**563876**	230, 50	C	135	115	68	2.87	45/35	0.40	**A2**	20	0.77
			NaHJ 150/100.973*	**504135**	230, 50	B	145	120	75	2.10	75/55	0.41	EEI=A3/**A2**	20	0.77
			UNAH150/40%.922	**563874**	230, 50	C	135	115	68	2.87	45/35	0.40	**A2**	20	0.77

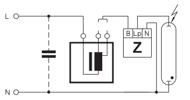
* Ballasts without CE marking for replacements or markets outside of the EU

Ballasts with Thermal Cut-out for Power Reduction of HS Lamps 70 to 150 W, Protection Class II

Encapsulated ballast in compact plastic casing
Shape: 61x72 mm



For high pressure sodium lamps (HS)
With cable holder
Thermal cut-out with automatic reset
Screw terminals: 0.5–2.5 mm²
Protection class II
tw 130

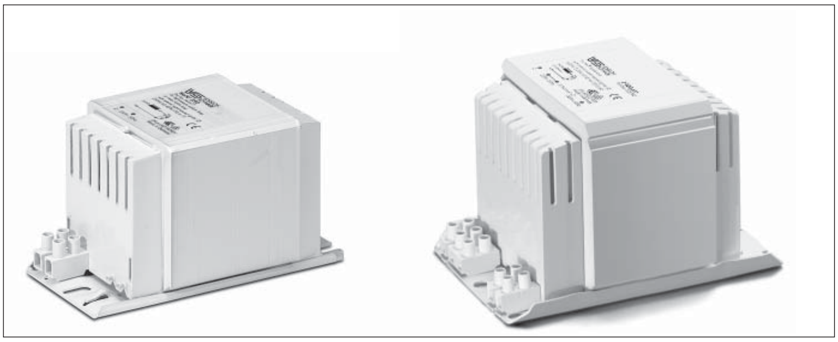


Lamp			Ballast									Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	a mm	b mm	Weight kg	Δt K	Power factor λ	Energy efficiency	C_P µF	I_N A
70 (44)	HS	0.98	NaHJZ 70/50.520*	**533395**	230, 50	134	125	1.52	65/45	0.36	EEI=A3	12	0.38
100 (64)	HS	1.20	NaHJZ 100/70.519*	**533396**	230, 50	161	152	2.10	60/45	0.42	EEI=A3	12	0.55
150 (101)	HS	1.80	NaHJZ 150/100.466*	**533398**	230, 50	161	152	2.30	70/45	0.39	EEI=A3	20	0.77

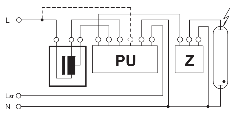
* Ballasts without CE marking for replacements or markets outside of the EU

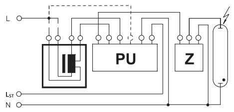
Ballasts for Power Reduction of HS Lamps 250 to 600 W

Shape: 71x75 mm
Shape: 92x102 mm

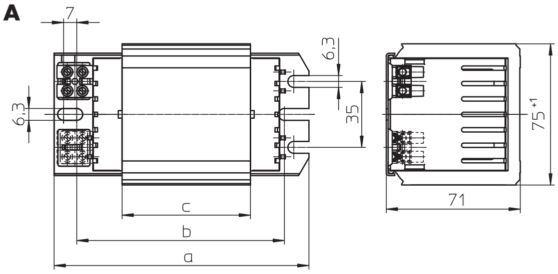


For high pressure sodium lamps (HS)
Vacuum-impregnated with polyester resin
Screw terminals: 0.75–2.5 mm²
Protection class I
tw 130

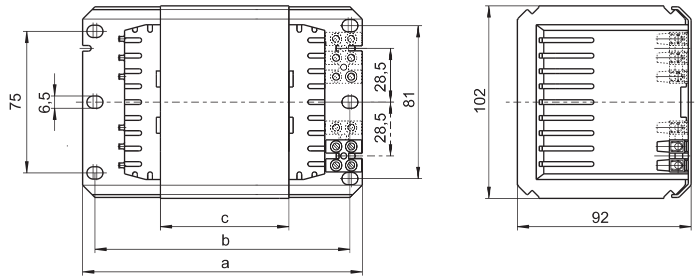




A



B



Lamp			Ballast											Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Drawing	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
250 (150)	HS	3.00	UNaH 250/40%.746	**539283**	220, 50	A	135	115	68	2.85	75	0.42	EEI=A3	32	1.35
			UNaH 250/150.176	**530509**	230, 50	B	133	120	44	3.97	65	0.40	**A2**	32	1.30
			UNaH 250/40%.936*	**543747**	230, 50	A	135	115	68	2.85	75	0.40	EEI=A3	32	1.30
			UNaH 250/40%.747	**539517**	220, 60	A	135	115	68	2.85	75	0.42	EEI=A3	25	1.40
400 (240)	HS	4.45	UNaH 400/40%.892	**538592**	220, 50	A	165	145	103	4.13	75	0.44	**A2**	45	2.10
			UNaH 400/40%.906	**543748**	230, 50	A	165	145	103	4.13	75	0.42	**A2**	45	2.00
			UNaH 400/40%.937	**538715**	220, 60	A	165	145	103	4.13	75	0.44	**A2**	40	2.05
600 (360)	HS	6.20	UNaH 600/40%.060	**539384**	230/240, 50	B	173	160	108	6.80	75	0.44	**A2**	65	2.80

* Ballasts without CE marking for replacements or markets outside of the EU

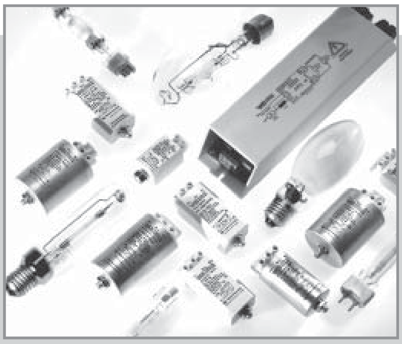
With Thermal Cut-out

Thermal cut-out with automatic reset

Lamp			Ballast											Capacitor	
Output W	Type	Current A	Type	**Ref. No.**	Voltage AC V, Hz	Drawing	a mm	b mm	c mm	Weight kg	Δt K	Power factor λ	Energy efficiency	CP µF	IN A
250 (150)	HS	3.00	UNaH 250/40%.936*	**538711**	230, 50	A	135	115	68	2.85	75	0.40	EEI=A3	32	1.30
400 (240)	HS	4.45	UNaH 400/40%.906	**538710**	230, 50	A	165	145	103	4.13	75	0.42	**A2**	45	2.00

* Ballasts without CE marking for replacements or markets outside of the EU

SUPERIMPOSED, PULSE AND INSTANT RESTRIKE



ELECTRONIC IGNITORS

Superimposed ignitors
Superimposed ignitors work independently of ballasts and generate defined ignition pulses during every half-wave within the stipulated voltage ranges. As the mains frequency only plays a subordinate role, these systems work equally well at 50 Hz and 60 Hz.

Superimposed ignitors should be mounted near the lampholder. The clearance needed between the ignitor and the lamp is determined by the respective maximum load capacitance, which is specified for each ignitor in the technical details. The capacitive load of the cable is dependent on its physical properties and wiring layout; this value usually ranges between 70–100 pF per metre.

Pulse ignitors
As pulse ignitors use the winding of an inductive ballast to generate the requisite pulse voltage, such ballasts must be designed to withstand these high ignition voltages.

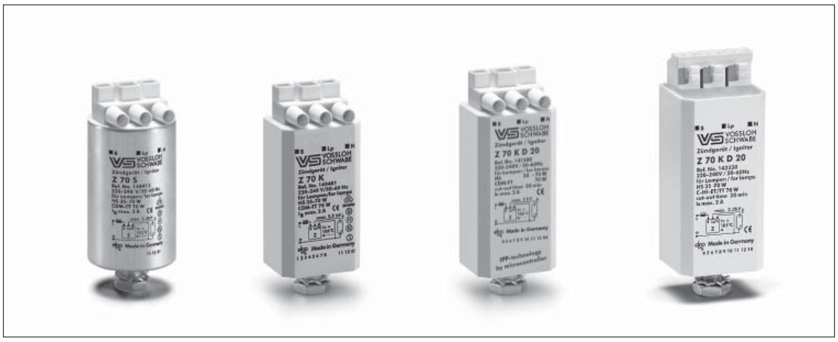
Instant restrike ignitors
Instant restrike ignitors are a special type of ignitor for high-pressure discharge lamps. In comparison to superimposed and pulse ignitors, instant restrike ignitors have a very specified field of application. However, safety-relevant lighting systems, e.g. in power plants, stadiums, but also in television studios, make instant re-ignition of hot high-pressure discharge lamps necessary.

On the following pages, Vossloh-Schwabe presents an extensive range of ignitors for all areas of application.

2

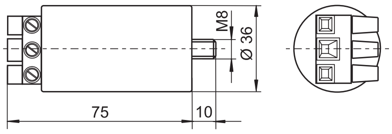
Ignitors and Accessories for Discharge Lamps

Electronic Superimposed Ignitors for HS Lamps up to 70 W

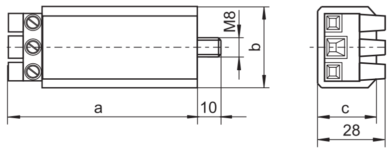


Standard version or with automatic switch-off
For high pressure sodium lamps (HS) and ceramic discharge lamps C-HI-TT/ET with base E27
Phasing of the ignition voltage: 60–90 °el and 240–270 °el
Max. permitted casing temperature: 105 °C
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I and II

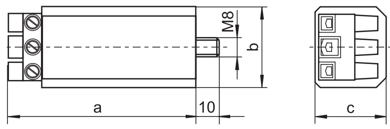
Al casing



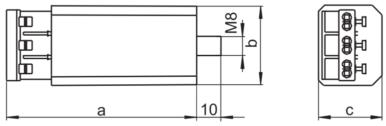
PC casing – K



PC casing – K D20



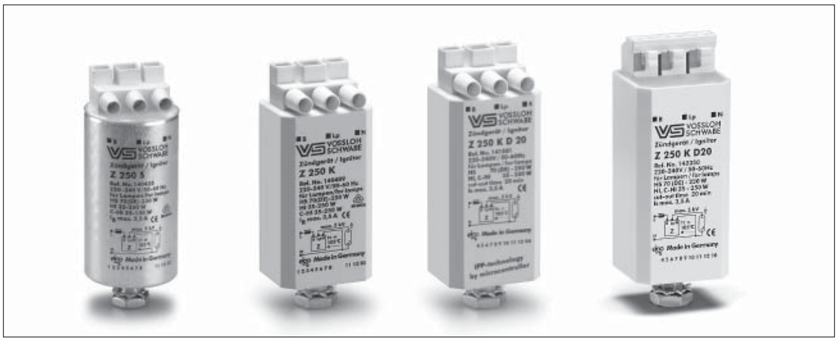
PC casing – with push-in terminals



Type	**Ref. No.**	Voltage AC 50–60 Hz	Max. lamp	Internal loss	Inherent heating	Ignition voltage	Load capacity	Switch-off time	Casing				Weight
									d (Ø)	a	b	c	
		V	A	W	K	kV	pF	sec./Hz	mm	mm	mm	mm	g
Aluminium casing (Al) with screw terminals: 0.75–4 mm²													
Z 70 S	**140413**	220–240	2	< 0.6	< 5	1.8–2.3	20–200	–	35	76	–	–	135
Plastic casing (PC) with screw terminals: 0.75–4 mm²													
Z 70 K	**140481**	220–240	2	< 0.6	< 5	1.8–2.3	20–200	–	–	78	34	27	125
Z 70 K D20	**141580***	220–240	2	< 0.6	< 5	1.8–2.3	20–100	1216/50–60	–	80	34	30	145
Plastic casing (PC) with push-in terminals: 0.5–2.5 mm²													
Z 70 K D20	**142330***	220–240	2	< 0.6	< 5	1.8–2.3	20–100	1216/50–60	–	83	34	30	145

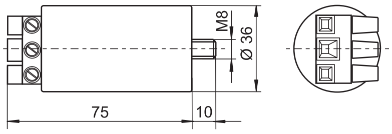
* With IPP technology

Electronic Superimposed Ignitors for HS Lamps 70 (DE) to 250 W and HI Lamps 35 to 250 W

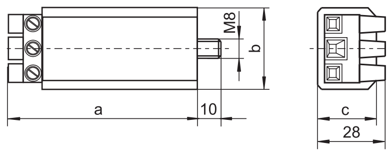


Standard version or with automatic switch-off
For high pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
Phasing of the ignition voltage:
60–90 °el and 240–270 °el
Max. permitted casing temperature: 105 °C
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I and II

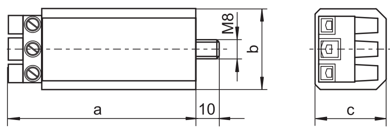
Al casing



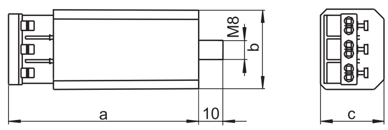
PC casing – K



PC casing – K D20



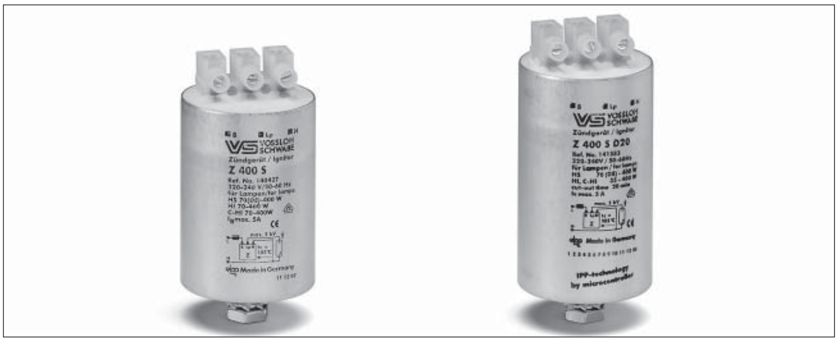
PC casing – with push-in terminals



Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al) with screw terminals: 0.75–4 mm²													
Z 250 S	**140425**	220–240	3.5	< 1.8	< 20	4–5	20–100	–	35	76	–	–	140
Plastic casing (PC) with screw terminals: 0.75–4 mm²													
Z 250 K	**140489**	220–240	3.5	< 1.8	< 20	4–5	20–100	–	–	78	34	27	130
Z 250 K D20	**141581***	220–240	3.5	< 1.8	< 20	4–5	20–100	1216/50–60	–	80	34	30	145
Plastic casing (PC) with push-in terminals: 0.5–2.5 mm²													
Z 250 K D20*	**142350***	220–240	3.5	< 1.8	< 20	4–5	20–100	1216/50–60	–	83	34	30	145

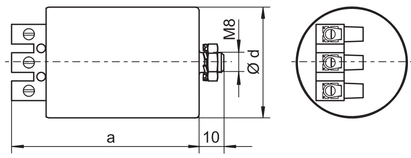
* With IPP technology

Electronic Superimposed Ignitors for HS Lamps 70 (DE) to 400 W and HI Lamps 35 to 400 W



Standard version or with automatic switch-off
For high pressure sodium lamps (HS), metal halide lamps (HI) and ceramic discharge lamps (C-HI)
Phasing of the ignition voltage: 60–90 °el and 240–270 °el
Max. permitted casing temperature: 105 °C
Screw terminals: 0.75–4 mm²
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I and II

Al casing

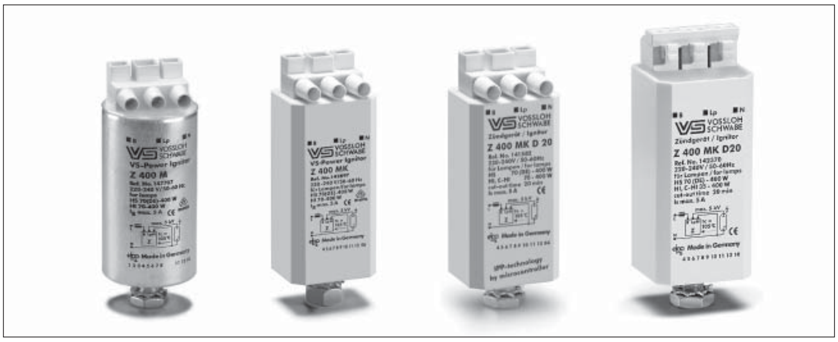


Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al)													
Z 400 S	**140427**	220–240	5	< 3	< 25	4–5	20–100	–	45	76	–	–	250
Z 400 S D20	**141583***	220–240	5	< 3	< 25	4–5	20–100	1216/50–60	45	90	–	–	280

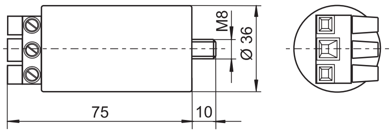
* With IPP technology

Electronic Superimposed Ignitors for HS Lamps 70 (DE) to 400 W and HI Lamps 35 to 400 W

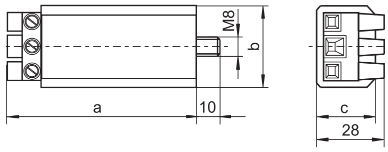
Standard version or with automatic switch-off
Compact shape
For high pressure sodium lamps (HS), metal halide lamps (HI) and ceramic discharge lamps (C-HI)
Ignition voltage: 4–5 kV
Phasing of the ignition voltage: 60–90 °el and 240–270 °el
Max. permitted casing temperature: 105 °C
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I and II
For luminaires of protection class I (140594, 147707)



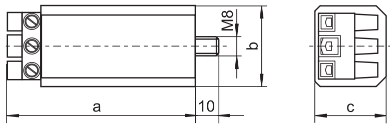
Al casing



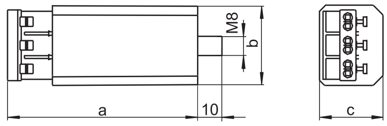
PC casing – K



PC casing – K D20



PC casing – with push-in terminals



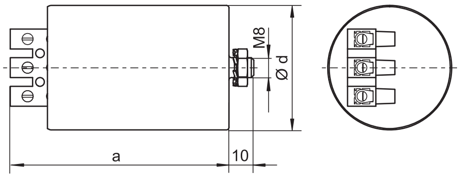
Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al) with screw terminals: 0.75–4 mm²													
Z 400 M	**140594**	220–240	5	< 3	< 35	4–5	20–50	–	35	76	–	–	140
Z 400 M VS-Power	**147707****	220–240	5	< 3	< 35	4–5	20–50	–	35	76	–	–	140
Z 400 M S	**140693**	220–240	5	< 3	< 35	4–5	20–50	–	35	76	–	–	140
Plastic casing (PC) with screw terminals: 0.75–4 mm²													
Z 400 M K	**140597**	220–240	5	< 3	< 35	4–5	20–50	–	–	78	34	27	130
Z 400 M K VS-Power	**142897****	220–240	5	< 3	< 35	4–5	20–50	–	–	78	34	27	130
Z 400 M K D20	**141582***	220–240	5	< 3	< 35	4–5	20–50	1216/50–60	–	80	34	30	145
Plastic casing (PC) with push-in terminals: 0.5–2.5 mm²													
Z 400 M K D20	**142370***	220–240	5	< 3	< 35	4–5	20–50	1216/50–60	–	83	34	30	145

Recommended for outdoor lighting
* With IPP technology
** Not suitable for C-HI lamps

Electronic Superimposed Ignitors for HS Lamps 600 and 750 W

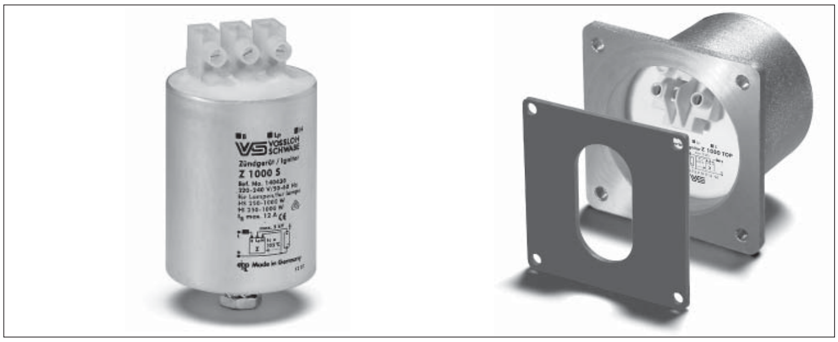
Standard version
For high pressure sodium lamps (HS)
Phasing of the ignition voltage:
60–90 °el and 240–270 °el
Max. permitted casing temperature: 105 °C
Screw terminals: 0.75–4 mm²
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I and II

Al casing



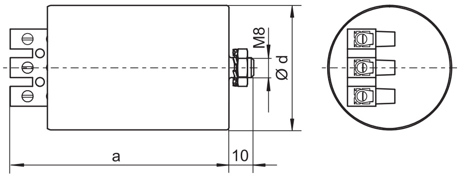
Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al)													
Z 750 S	**146990**	220–240	8	< 3	< 20	4–5	20–100	–	50	90	–	–	360

Electronic Superimposed Ignitors for HS and HI Lamps 250 to 1000 W

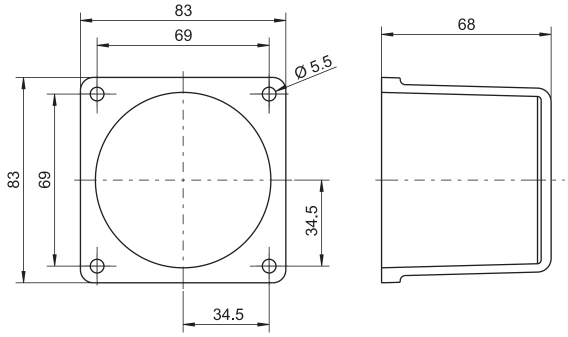


Standard version or with automatic switch-off
For high pressure sodium lamps (HS)
and metal halide lamps (HI)
Phasing of the ignition voltage:
60–90 °el and 240–270 °el
Max. permitted casing temperature: 105 °C
Screw terminals: 0.75–2.5 mm²
(Z 1000 S: 0.75–4 mm²)
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I and II

Al casing



Z 1000 TOP



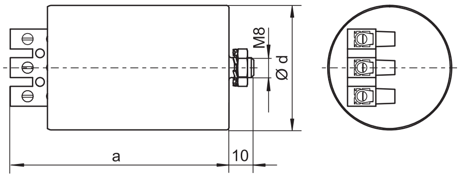
Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al)													
Z 1000 S	**140430**	220–240	12	< 6	< 35	4–5	20–100	–	50	80	–	–	340
Z 1000 TOP	**140607****	220–240	12	< 6	< 35	4–5	20–100	–	–	83	83	68	620
Z 1000 S D20	**141584***	220–240	12	< 6	< 35	4–5	20–100	1216/50–60	50	80	–	–	340

* With IPP technology
** For flange-mounting with gasket for degree of protection IP55

Electronic Superimposed Ignitors for HS and HI Lamps up to 1000 W

Standard version
For high pressure sodium lamps (HS)
and metal halide lamps (HI)
For long lead lengths
Max. permitted casing temperature: 105 °C
Screw terminals: 0.75–2.5 mm²
Fastening: male nipple with pre-assembled
washer and nut

Al casing



For HS and HI lamps 150 to 1000 W
Phasing of the ignition voltage: 60–90 °el
For luminaires of protection class I

Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al)													
Z 1000 L	**140471***	220–240	12	< 6	< 35	4–5	20–2000	–	50	97	–	–	340

* Not suitable for HI lamps types NDL, WDL or for HS lamps types S, de-Luxe, Comfort or similar

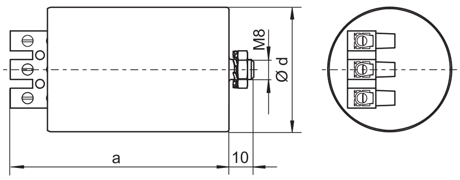
For HS lamps 600 to 1000 W/400 V and HI lamps 1000 W/400 V
Phasing of the ignition voltage:
60–90 °el and 240–270 °el
For luminaires of protection class I and II

Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al)													
Z 1000 S/400 V	**140496**	380–415	6	< 3.3	< 28	4–5	20–2000	–	45	84	–	–	295

Electronic Superimposed Ignitors for Projection Lamps up to 1200 W

Standard version
For high-pressure discharge lamps
Phasing of the ignition voltage:
60–90 °el and 240–270 °el
Max. permitted casing temperature: 105 °C
Screw terminals: 0.75–2.5 mm^2
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I

Al casing



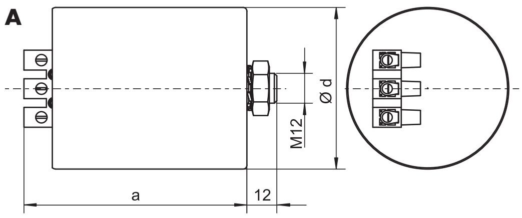
Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al)													
Z 1200/2.5	**140608***	220–240	15	< 7.5	< 40	2–2.5	20–200	–	50	80	–	–	330
Z 1200/9	**140609****	220–240	15	< 10	< 40	7–8	20–50	–	50	135	–	–	650

* For lamps, e.g. HSR, MSR, SN
** For lamps, e.g. HMI, HTI, CDI, RSI, CSR

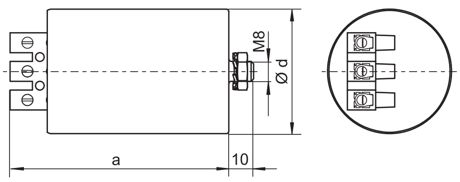
Electronic Superimposed Ignitors for HI Lamps up to 3500 W

Standard version
For metal halide lamps (HI)
Phasing of the ignition voltage:
60–90 °el and 240–270 °el
Max. permitted casing temperature: 105 °C
Screw terminals: 0.75–2.5 mm²
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I and II

A



B

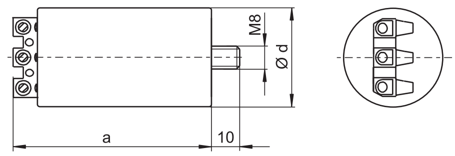


Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Switch-off time sec./Hz	Drawing	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al)														
Z 2000 S	**140432**	220–240	20	< 6	< 30	4–5	20–100	–	A	65	96	–	–	640
Z 2000 S/400 V	**140497**	380–415	12.7	< 5	< 32	4–5	20–2000	–	B	50	88	–	–	340
Z 3500 S/400 V	**140499**	380–415	20	< 7	< 35	4–5	20–100	–	A	65	96	–	–	650

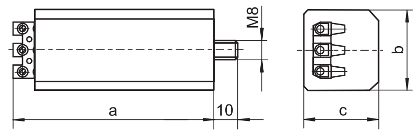
Pulse Ignitors for HS and HI Lamps up to 1000 W

With automatic switch-off
For high pressure sodium lamps (HS), metal halide lamps (HI) and ceramic discharge lamps (C-HI)
Max. permitted casing temperature: 95 °C
Screw terminals: 0.75–2.5 mm²
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I
This pulse ignitor is only for use with ballasts that have a dedicated tapping, as this determines the size of the ignition voltage.

Al casing



PC casing



For HS lamps 50 to 1000 W,
HI lamps 35 to 1000 W and C-HI lamps 35 to 400 W

Type	**Ref. No.**	Voltage AC 50–60 Hz V	Number of ignition pulses per mains period	Ignition voltage kV	Load capacity pF	Programmed switch-off time sec./Hz	Casing a mm	b mm	c mm	Weight g
Plastic casing (PC)										
PZ 1000 K D20	**142784***	220–240 $^{\pm 10\%}$	≥ 2	1.8–2.3/4–5	20–1000	1216/50–60	74	34	27	100

With IPP technology
* Suitable ballasts (type: NaHJ...PZT) are available on request

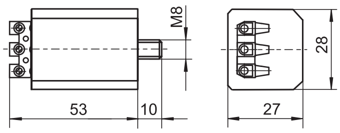
For HS lamps 600 to 1000 W/400 V
and HI lamps 1000 W/400 V

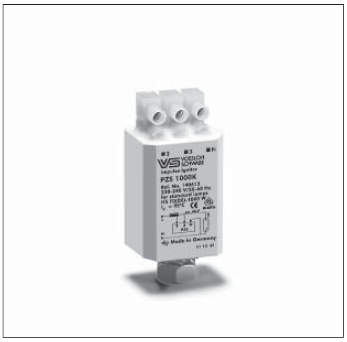
Type	**Ref. No.**	Voltage AC 50–60 Hz V	Number of ignition pulses per mains period	Ignition voltage kV	Load capacity pF	Programmed switch-off time sec./Hz	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Aluminium casing (Al)											
PZ 1000/400 V A5	**142783***	380–420	≥ 1	4–5	20–800	300/50	40	80	–	–	155

* Suitable ballasts (type: NaHJ...PZT) are available on request

Pulse Ignitors for HS Lamps 50 to 1000 W

Standard version
For standard high pressure sodium lamps (HS)
Max. permitted casing temperature: 95 °C
Screw terminals: 0.5–1.5 mm²
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I



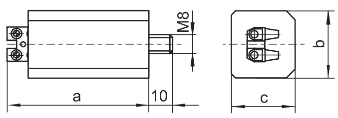


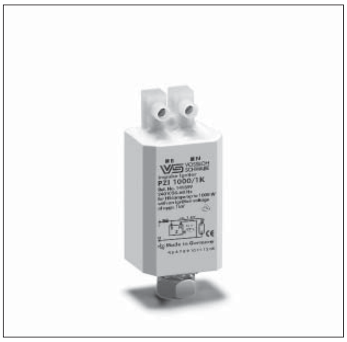
Type	**Ref. No.**	Voltage AC 50–60 Hz V	Number of ignition pulses per mains period	Ignition voltage kV	Load capacity pF	Programmed switch-off time sec.	Casing d (Ø) mm	a mm	b mm	c mm	Weight g
Plastic casing (PC)											
PZS 1000 K	**140613**	220–240	approx. 1/sec.	approx. 4	20–4000	–	–	50	28	27	50

Not suitable for HS lamps types Plus, Super, XL, HO
Suitable ballasts (type: NaH...P) are available on request

Pulse Ignitors for HI Lamps 250 to 2000 W, Ignition Voltage up to 1 kV

Standard version
For metal halide lamps (HI)
with ignition voltage of 0.9 kV
Max. permitted casing temperature: 95 °C
Screw terminals: 0.5–2.5 mm²
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I

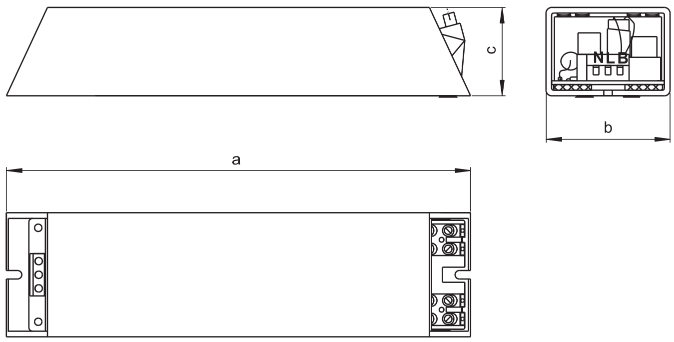




Type	**Ref. No.**	Voltage AC 50–60 Hz V	Number of ignition pulses per mains period	Ignition voltage kV	Load capacity pF	Programmed switch-off time sec.	Casing a mm	b mm	c mm	Weight g
Plastic casing (PC)										
PZI 1000/1 K	**140617**	220–240	≥ 1	0.7–0.9	max. 10000	–	57	28	27	50

Suitable ballasts see page 31, 32 and 33

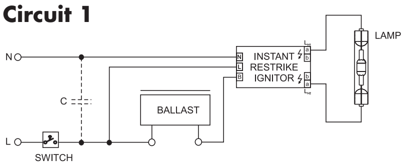
Instant Restrike Ignitors for High-pressure Discharge Lamps up to 600 W



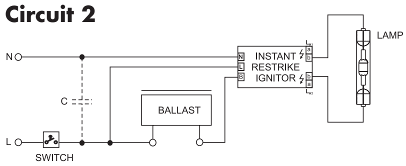
For high pressure sodium lamps (HS), metal halide lamps (HI), ceramic discharge lamps (C-HI) and projection lamps in accordance with the lamp table shown below
For installation as a symmetric ignition device (whereby the ignition voltage is split equally over both lamp electrodes)
For installation in luminaires of protection class I
Max. permitted ambient temperature t_a: 60 °C
Mains connection: screw terminal 3-poles, 0.75–2.5 mm²
Lamp connection: screw terminal 0.75–2.5 mm² for circuit 1 and 2
Fastening: 2 mounting slots for screws M4
Material: plastic casing made of ABS

CAUTION
Defective lamps must be replaced immediately

Circuit 1



Circuit 2

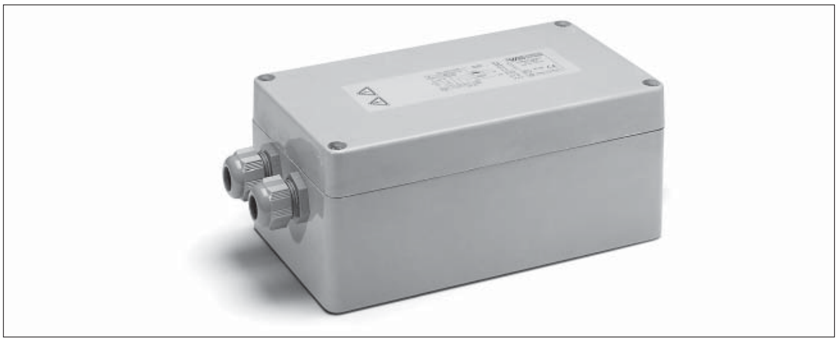


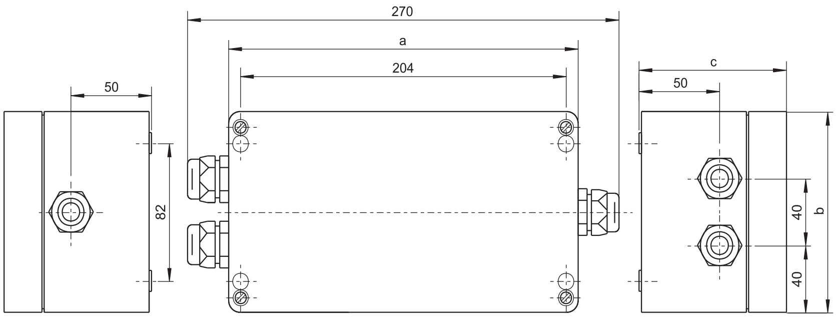
Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage* kV	Ignition time sec.	Load capacity pF	Casing a mm	b mm	c mm	Weight g
HZ 600 K	**147790**	230 ±10%	8	< 4	< 10	20–30	approx. 6	5–30	247	66	47	1000

* Depending on the respective circuit; the ignition voltage is split equally over both lamp electrodes

Lamp table						
Circuit 1				**Circuit 2**		
Lamp type	Base	VS lampholder type	Catalogue page	Lamp type	Base	VS lampholder type
CDM-TD 70 W	RX7s	306	77	HBO 50 W	SFa8-2	–
HCI-TS 70 W	RX7s	306	77	MSR 125 HR	GZX9.5	–
HI 70 W (DE)	RX7s	306	77	HBO 200 W	SFc10-4	–
HS 70 W (DE)	RX7s	306	77	HBO 200 W	SFc10-4	–
RCI-TS 70 W	RX7s	306	77	MSR 200 HR	GZX9.5	–
HS 150 W (DE)	RX7s	306	77	HTI 250 W	FaX1.5	–
HMI 200 W	X515	–		HMI 400 W/SE	GZZ9.5	–
HMI 200 W/X	GZY9.5	–		HMP 400 W	FaX1.5	–
MSI 200 W	GZY9.5	–		HTI 400 W	FaX1.5	–
RSI 200 W	X515	–		RSI 400 W	GZX9.5	–
HS 250 W (DE)	Fc2	025	77–78	HBO 500 W	SFcY13-5	–
HS 400 W (DE)	Fc2	025	77–78	HMP 575 W	SFc10-4 / G22	–
MSR 400 HR	GZZ9.5	–		HMI 575 W	SFc10-4	–
MSI 575 W	SFc10	–		RSI 575 W	G22	–
MSR 575 HR	G22	–		HTI 600 W	FaX1.5	–

Instant Restrike Ignitors for High-pressure Discharge Lamps 1000 W/230 V and 2000 W/400 V

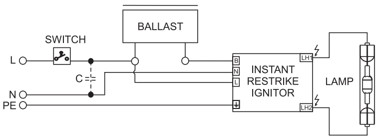




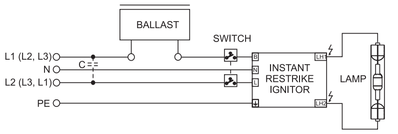
For high pressure sodium lamps (HS), metal halide lamps (HI), ceramic discharge lamps (C-HI) in accordance with the lamp table shown below
For installation as a symmetric ignition device (whereby the ignition voltage is split equally over both lamp electrodes)
Degree of protection: IP65
For installation in luminaires of protection class I
Max. permitted ambient temperature t_a: 60 °C
Mains connection: screw terminal 3-poles, max. 4 mm²
Earth connection: screw terminal max. 4 mm²
Lamp connection: screw terminal max. 4 mm²
Fastening: 4 holes ∅ 6.3 mm in the base of casing
Material: casing made of fibreglass-reinforced polyester

CAUTION
Defective lamps must be replaced immediately

Circuit diagram HZ 1000 K/230V



Circuit diagram HZ 2000 K/400 V



Type	**Ref. No.**	Voltage AC 50–60 Hz V	Max. lamp current A	Internal loss W	Inherent heating K	Ignition voltage* kV	Ignition time sec.	Load capacity pF	Casing a mm	b mm	c mm	Weight g
HZ 1000 K	**147791**	230 ±10%	12	< 5	< 10	36	approx. 6	5–50	218	120	92	3745
HZ 2000 K/400 V	**147793**	400 ±10%	12.7	< 5	< 10	36	approx. 6	5–30	218	120	92	3745

* The ignition voltage is split equally over both lamp electrodes

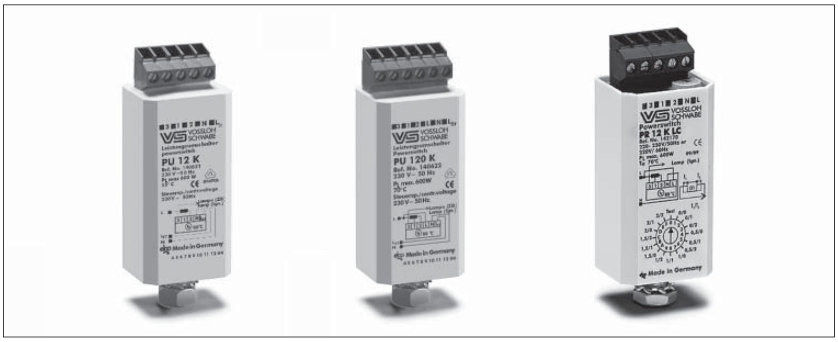
Lamp table HZ 1000 K

Lamp type	Lamp manufacturer	Base	VS lampholder type	Catalogue page	Lamp type	Base	VS lampholder type	Catalogue page
CDM-TD 150 W	Philips	RX7s	306	77	HI 400 W (DE)	Fc2	025	77–78
HCI-TS 150 W	Osram	RX7s	306	77	HS 400 W (DE)	Fc2	025	77–78
HI 150 W (DE)		RX7s	306	77	HI 1000 W (DE)	Fc2	025	77–78
HS 150 W (DE)		RX7s	306	77	HS 1000 W (DE)	Cable, K12s-7	211	79
HI 250 W (DE)		Fc2	025	77–78	–	–	–	–
HS 250 W (DE)		Fc2	025	77–78	–	–	–	–

Lamp table HZ 2000 K/400 V

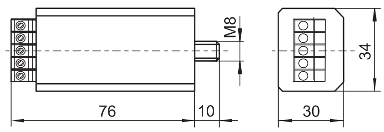
Lamp type	Base	VS lampholder type	Catalogue page	Note
HI 2000 W (DE)	Cable, K12s-7	211	79	not suitable for HRI-TS 2000 W/N/L, HQI-TS 2000 W/N/L

Electronic Power Switches for HS Lamps up to 600 W and HM Lamps up to 700 W

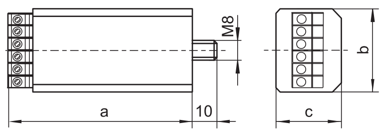


For high pressure sodium lamps (HS)
and mercury vapour lamps (HM)
For power reduction by using ballasts
with multiple voltage tapping and
superimposed ignitors
PR 12 K LC and PR 12 K D are also suitable for
power switching of LED drivers and electronic ballasts.
Casing: PC
Max. permitted casing temperature t_c: 80 °C
Screw terminals: 0.75–2.5 mm²
Fastening: male nipple with pre-assembled
washer and nut
For luminaires of protection class I and II
Circuit diagrams for power reduction
see pages 96–97.

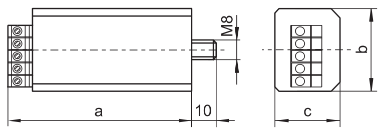
PU 12 K/PR 12 KD/PR 12 K LC



PU 120 K



PU 121 K



Advantages of PR 12 K LC

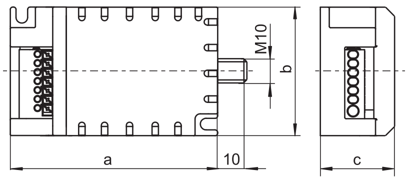
- intelligent, auto-adaptive concept
- eliminates the time-consuming task of continually adjusting the times of power-reduced operation to suit constantly changing day-night cycles
- removes the need for making adjustments due to daylight-saving times
- easy programming via dial
- no additional control line necessary
- optimal suitable for the supplementary integration into existing luminaires
- suitable for luminaires of protection class I and II

Type	**Ref. No.**	Voltage AC V, Hz	Max. contact current A/λ	A/λ	Inherent heating K	Integrated delay switching	Control phase for power reduction (circuitry logic)	Casing a mm	b mm	c mm	Weight g
Power reduction with control phase											
PU 12 K	**140621**	230, 50 / 220, 60	8/0.5	12/1	< 25	—	disconnect or connect	74	34	27	100
PU 120 K	**140622***	230, 50 / 220, 60	8/0.5	12/1	< 10	327 sec.	disconnect	74	34	27	100
PU 121 K	**140623***	230, 50 / 220, 60	8/0.5	12/1	< 25	327 sec.	connect	74	34	27	100
Power reduction without control phase											
PR 12 K LC****	**142170****	220–230 ±10%, 50 220 ±10%, 60	8/0.5	12/1	< 12	selectable	without control phase	76	34	31	100
PR 12 K D****	**142150*****	220–230 ±10%, 50 220 ±10%, 60	8/0.5	12/1	< 12	selectable	without control phase	76	34	31	100

* For full-load lamp start
** Time of power-reduced operation selectable, starting point of switching-time changes automatically to suit constantly changing day-night cycles
*** Power reduction after a constant switching-time (delay switching); swichting-time selectable: 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 hrs at 50 Hz
**** 120–240 V ±10% on request

Electronic Superimposed Ignitors with Power Switch for HS Lamps 50 to 250 W

For ignition and power reduction of high pressure sodium lamps (HS)
Casing: PC
Control voltage: 230 V ±10%
Response/cut-out voltage: 170–198 V
Phasing of the ignition voltage: 60–90 °el and 240–270 °el
Max. permitted casing temperature t_c: 80 °C
Push-in terminals: 0.75–1.5 mm²
Fastening: male nipple with pre-assembled washer and nut
For luminaires of protection class I and II



Applicable for positive switch logic allowing for terminal pin assignment of power switch

- Full load lamp start is guaranteed
- Switching to power reduced operation after delay time of approx. 5 min.

Type	**Ref. No.**	Voltage AC V, Hz	Max. lamp current A	Number of ignition pulses per mains period	Internal loss W	Inherent heating K	Ignition voltage kV	Load capacity pF	Programmed switch-off time sec./Hz	Casing a mm	b mm	c mm	Weight g
HS lamps 50 and 70 W													
ZPU 70 K D20	**142098**	230, 50/220, 60	2	4	< 2	< 15	1.8–2.3	20–200	1216/50–60	96	50	32	240
HS lamps 70 (DE) to 250 W													
ZPU 250 K D20	**142099**	230, 50/220, 60	3	6	< 2	< 15	4–5	20–50	1216/50–60	96	50	32	240

Circuit diagrams see page 95

Switch Units for Electronic Operating Devices with 1–10 V Interface

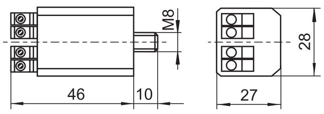
Vossloh-Schwabe's switch units are designed to enable one-step power reduction of lamps (FL, CFL, LED, HS, HI and C-HI) with the help of the respective electronic ballast or converter.

To this end, the switch units utilises the 1–10 V interface of the control gear unit. The switch unit is mainly intended for outdoor luminaires in systems with or without a control phase.

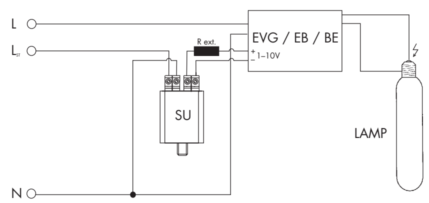
Shape: 56x28x27 mm
Casing: PC
Screw terminals: 0.75–2.5 mm²
Max. permissible casing temperature t_c: 80 °C
Min. permissible ambient temperature t_a: –30 °C
Fastening: plastic male nipple with pre-assembled washer and nut

Power reduction SU 1–10 V K for lighting systems featuring an L_{ST} control phase
The switch unit employs a positive switching to reduce power, i.e. power is reduced when the control phase is switched off (L_{ST} = 0 V).
The 1–10 V interface of the electronic ballast is addressed at the moment that power reduction is effected.

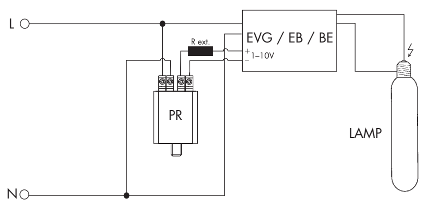
Power reduction PR 1–10 V K LC for lighting systems without a control phase
This switch unit can be used to effect power reduction in lighting systems that do not feature a control phase.
The 1–10 V interface is addressed on the basis of the fundamental operating principle used by Vossloh-Schwabe's PR 12 K LC power switch (details of which can be made available on request). This power switch is capable of determining the starting time of reduced-power operation over the measured operating time of a lighting system. As a result, it is no longer necessary to spend valuable time modifying the power-reduction unit to suit the continually changing day-night cycle; changing the clocks in line with daylight saving measures in the summer and winter is equally unnecessary. The 1–10 V interface of the electronic ballast is addressed as soon as the system is switched to reduced power.



Circuit diagram SU 1–10 V K



Circuit diagram PR 1–10 V K LC



Type	**Ref. No.**	Control voltage L_{ST} V, 50/60 Hz	Externally (on site) connected resistor ($R_{ext.}$) kΩ (min. 0.1 W)	Self-heating K	Weight g
For lighting systems with control phase					
SU 1–10 V K	**149992**	220–240 V ±10%	1–70	< 10	50
For lighting systems without control phase					
PR 1–10 V K LC	**149993**	–	1–70	< 10	50

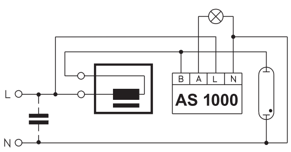
Start-up Switches for HS and HI Lamps 35 to 1000 W and HM Lamps 50 to 700 W

To bridge a phase of darkness during the starting-up period of high-pressure discharge lamps and also after a brief interruption of the power supply until the high-pressure discharge lamps are restarted

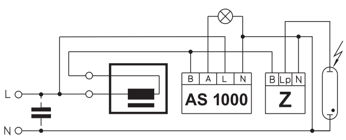
For mercury vapour lamps (HM),
high-pressure sodium lamps (HS),
metal halide lamps (HI) and
ceramic discharge lamps (C-HI)
For HS, HI and C-HI lamps only if used together with a superimposed ignitor
Nominal voltage/frequency:
 220–230 V ± 10%/50–60 Hz
 240 V ± 10%/50 Hz
Max. permitted casing temperature t_C: 85 °C
Screw terminals: 0.75–2.5 mm²
Fastening: male nipple with pre-assembled washer and nut
Max. wattage of incandescent lamp: 1000 W
Automatic switch-off at 60% of the discharge lamp's luminous flux

During the ignition and start-up period, the start-up switch activates an incandescent lamp to provide a basic level of lighting. After a brief interruption in the supply voltage during the re-ignition of the discharge lamp, the integrated control electronics also bridges the phase of darkness by switching on the auxilliary lighting. The incandescent lamp is automatically switched off when the discharge lamp has achieved a sufficient luminous flux (approx. 60%).

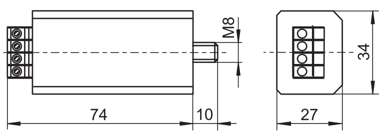
Circuit for HM lamps



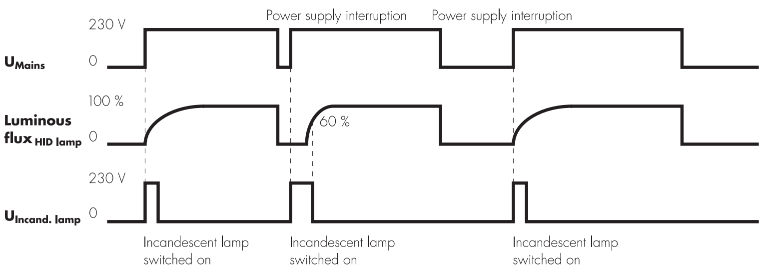
Circuit for HS and HI lamps



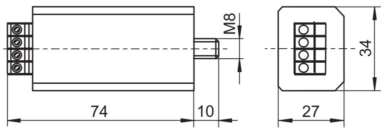
AS 1000 K
Casing: PC
Weight: 100 g
Internal loss: < 0.8 W
Inherent heating: < 10 K
Type: AS 1000 K
Ref. No.: 140627



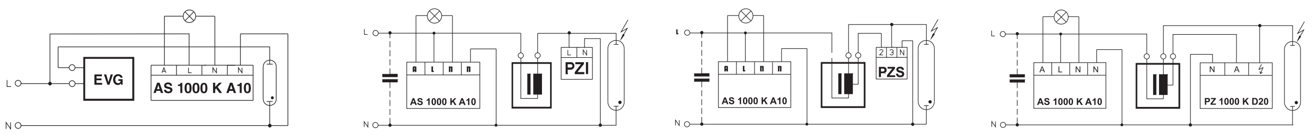
The time diagram shows some typical switching examples of a luminaire equipped with a high-pressure discharge lamp, incandescent lamp and start-up switch AS 1000 K.



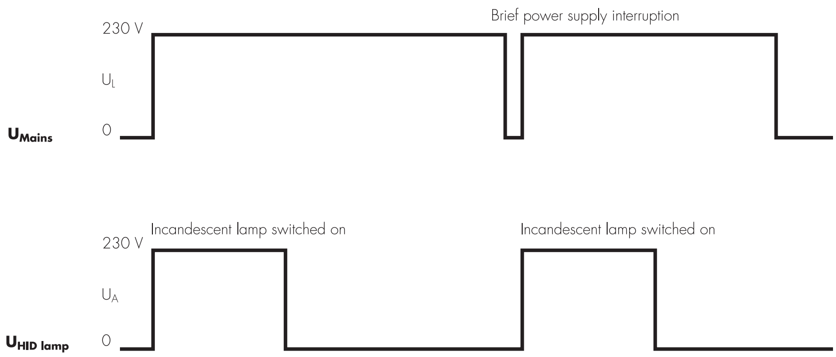
AS 1000 K A10
Specially for using with electronic ballasts or pulse ignitors for high-pressure discharge lamps
Casing: PC
Delayed switching: 655 sec. (50 Hz)
For luminaires of protection class I and II
Max. contact current: 6 A at λ 0.5, 10 A at λ 1
Internal loss: < 1 W
Inherent heating: < 12 K
Weight: 100 g
Type: AS 1000 K A10
Ref. No.: 141193



Circuit with electronic ballast



The time diagram shows some typical switching examples of a luminaire equipped with a high-pressure discharge lamp, incandescent lamp and start-up switch AS 1000 K A10.



Electronic Discharge Units for Parallel Connected Capacitors 0.1 to 100 µF

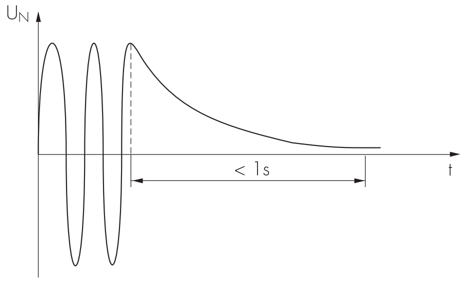
On luminaires with parallel compensation and designed for plug connection to the mains supply, the plugs retain their charge for a relatively long time after disconnection from the power supply. The discharge resistors built into the compensation capacitor are designed for stationary lamps and when disconnected from the mains permit a voltage reduction to 50 V after 1 minute at the earliest.

According to European standard EN 60598-1, the compensation capacitor on mobile lamps must be discharged to 34 V within 1 second. Until now so-called discharge chokes built like conventional ballasts have been used for this purpose. These conventional discharge chokes are connected in parallel to the compensation capacitor and after disconnection from the power supply rapidly discharge the capacitor owing to their low ohmic resistance.

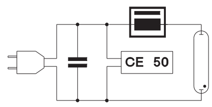
In their rated operating conditions, conventional discharge chokes exhibit a considerable inductive reactance which diminishes the effect of the compensation capacitor particularly if it has a low capacitance.

Furthermore, conventional discharge chokes cause considerable losses and feature high weight.

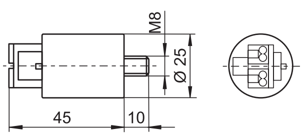
With the aid of the electronic discharge unit CE 50, it is possible to discharge a capacitor with a capacitance of up to 100 µF to 34 V within 1 second, i.e. within the time specified in EN 60598-1.



Thanks to its high reliability, low inherent losses, small dimensions and low weight, the CE 50 represents an inexpensive solution to the problem of capacitor discharge.



CE 50
All electronic, wear resistant switching element
Casing: aluminium
Nominal voltage: 34–264 V
Nominal frequency: 50–60 Hz
Internal loss: < 0.5 W
Inherent heating: < 6 K
Max. permitted casing temperature: 95 °C
Push-in terminals: 1 mm²
Fastening: male nipple with pre-assembled washer and nut
Weight: 40 g
Type: CE 50
Ref. No.: 140537



THERMOPLASTICS AND PORCELAIN

THE RIGHT MATERIAL MIX SPELLS A DECISIVE ADVANTAGE

The lampholders presented in this chapter are designed for high-pressure discharge lamps, for which high ignition voltages and high starting currents are characteristic. High temperatures can also occur with higher lamp outputs.

Vossloh-Schwabe therefore attaches great importance to ensuring casings, contacts and cables are made of high-grade materials.

Owing to the high ignition voltages, these lampholders are also governed by stricter requirements regarding creepage and air clearance distances.

When operating high-pressure discharge lamps with E27 and E40 Edison bases, care must be taken to ensure that the respective lampholders are approved for use with discharge lamps. Lampholders that are suitable in this respect are marked with "5 kV".

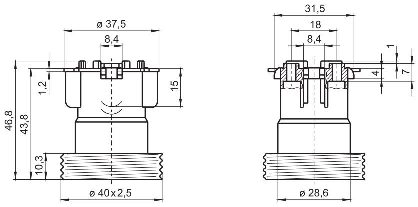
Lampholders with E26 and E39 bases and UL-approved wiring can be found under **www.unvlt.com**.

2 Lampholders for Discharge Lamps

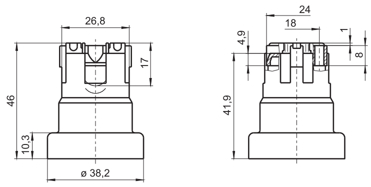
E27 Lampholders

For discharge lamps with base E27

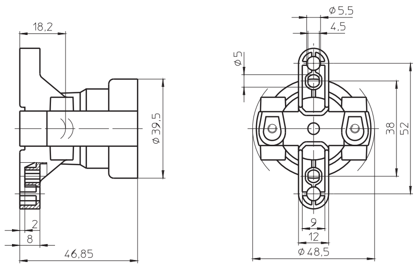
E27 lampholders, for cover caps (see p. 291-293)
Profiled shape, external thread 40x2.5 IEC 60399
Nominal rating: 4/250/5 kV
Push-in twin terminals: 0.5–2.5 mm²
Fixing holes for screws M3
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST3.9-C/F
Weight: 15/16.5 g, unit: 500 pcs.
Type: 64719
Ref. No.: 505721 PET GF, black, T210
Ref. No.: 505720 LCP, black, T270



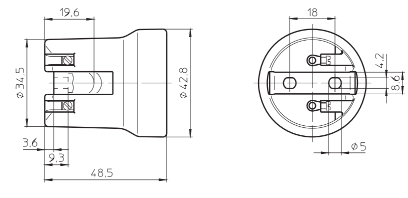
E27 lampholders, for cover caps (see p. 291-293)
Profiled shape, plain
Nominal rating: 4/250/5 kV
Push-in twin terminals: 0.5–2.5 mm²
Fixing holes for screws M3
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST3.9-C/F
Weight: 15 g, unit: 500 pcs.
Type: 64770
Ref. No.: 505389 PET GF, black, T210
Ref. No.: 505014 LCP, black, T270



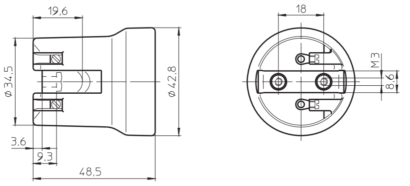
E27 lampholders
Casing: PPS, black, T230
Nominal rating: 4/500/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing holes for screws M4 and M5
Weight: 35/35.4 g, unit: 250 pcs.
Type: 62150
Ref. No.: 108718
Type: 62151 with lamp safety catch
Ref. No.: 108719



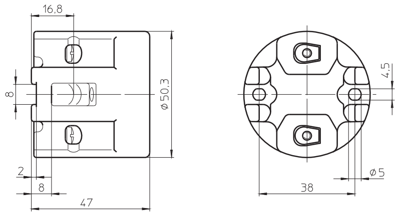
E27 lampholders
Casing: porcelain, white, T210
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Oblong holes for screws M4
Weight: 65/67.7 g, unit: 200 pcs.
Type: 62600
Ref. No.: 102635
Type: 62601 with lamp safety catch
Ref. No.: 102637



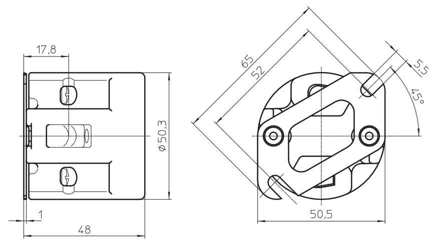
E27 lampholder
Casing: porcelain, white, T210
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Threaded bushes for screws M3
Weight: 69.3 g, unit: 200 pcs.
Type: 62622
Ref. No.: 108416



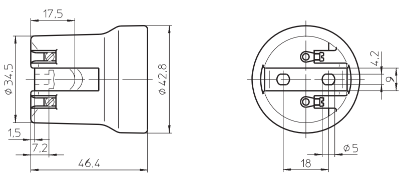
E27 lampholders
Casing: porcelain, white, T210
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Oblong holes for screws M4, length max. 15 mm
Weight: 106.8/103.9 g, unit: 100 pcs.
Type: 62104
Ref. No.: 102615
Type: 62105 with lamp safety catch
Ref. No.: 102617



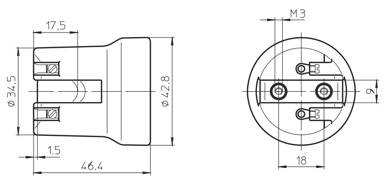
E27 lampholders
Casing: porcelain, white, T210
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing bracket with slot for screws M5
Weight: 113 g, unit: 100 pcs.
Type: 62110
Ref. No.: 106585
Type: 62111 with lamp safety catch
Ref. No.: 109568



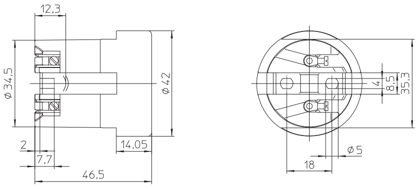
E27 lampholders
Casing: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing oblong holes for screws M4
Weight: 60.6 g, unit: 200 pcs.
Type: 62050
Ref. No.: 102599
Type: 62010 with lamp safety catch (with spring)
Ref. No.: 102577
Type: 62009 with lamp safety catch (with crushing)
Ref. No.: 544605



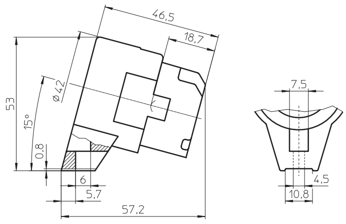
E27 lampholder
Casing: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fastening bushes for screws M3
Weight: 66.3 g, unit: 200 pcs.
Type: 62015
Ref. No.: 102582



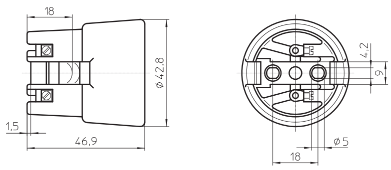
E27 lampholder, one-piece
Material: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing oblong holes for screws M4
Weight: 60.5 g, unit: 200 pcs.
Type: 62070
Ref. No.: 543304



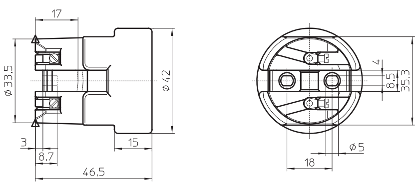
E27 lampholder
Material: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
With lateral fixing flange,
tilt angle: 15°
Spring loaded central contact
Fixing hole for screw M4
Weight: 67.6 g, unit: 200 pcs.
Type: 62415
Ref. No.: 543414



E27 lampholder, for cover caps (see page 291-293)
Casing: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing oblong holes for screws M4
Weight: 66.5 g, unit: 150 pcs.
Type: 62310
Ref. No.: 102624



E27 lampholder
For cover caps type 80010, 97735
and 97742 (see page 299)
Casing: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing oblong holes for screw M4
Weight: 66.5 g, unit: 200 pcs.
Type: 62370
Ref. No.: 543303

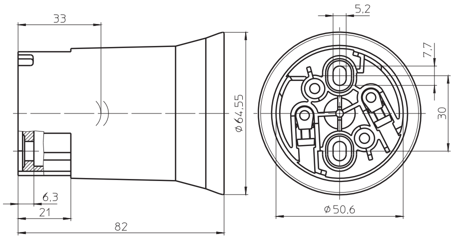


E40 Lampholders

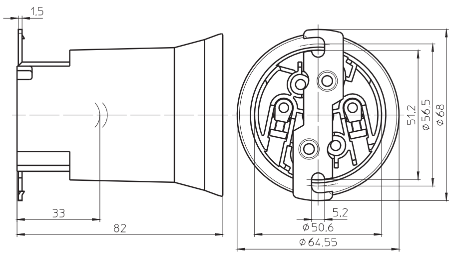
For discharge lamps with base E40

Nominal rating: 18/500/5 kV
Screw terminals: 1.5–4 mm²
Spring loaded central contact

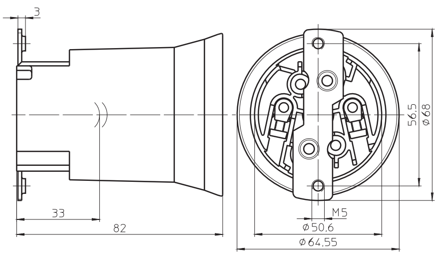
E40 lampholders
Casing: PPS, black, T240
Oblong holes for screws M5
Weight: 111.7/112.1 g, unit: 40 pcs.
Type: 12600/12601
Ref. No.: 400913
Ref. No.: 400914 with lamp safety catch
With steel thread
Ref. No.: 533428
Ref. No.: 533429 with lamp safety catch



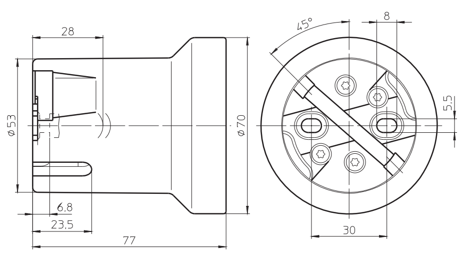
E40 lampholders
Casing: PPS, black, T240
Fixing bracket with slots for screws M5
Weight: 122.3/122.7 g, unit: 40 pcs.
Type: 12610/12611
Ref. No.: 400915
Ref. No.: 400916 with lamp safety catch
With steel thread
Ref. No.: 533430
Ref. No.: 533431 with lamp safety catch



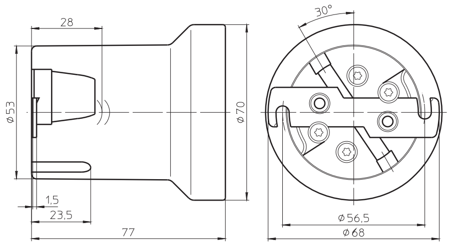
E40 lampholders
Casing: PPS, black, T240
Fixing bracket with tapped fixing holes M5
Weight: 122.9/123.3 g, unit: 40 pcs.
Type: 12614/12612
Ref. No.: 400917
Ref. No.: 400918 with lamp safety catch
With steel thread
Ref. No.: 536220
Ref. No.: 533432 with lamp safety catch



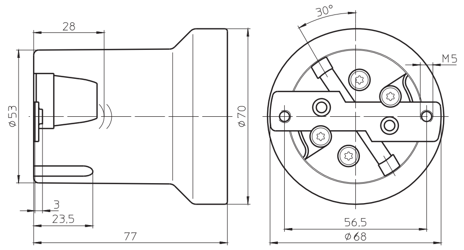
E40 lampholders
Casing: porcelain, white, T270
Oblong holes for screws M5
Weight: 224/229.3 g, unit: 48 pcs.
Type: 12800/12801
Ref. No.: 108208
Ref. No.: 107780 with lamp safety catch
With steel thread
Ref. No.: 532602
Ref. No.: 532603 with lamp safety catch

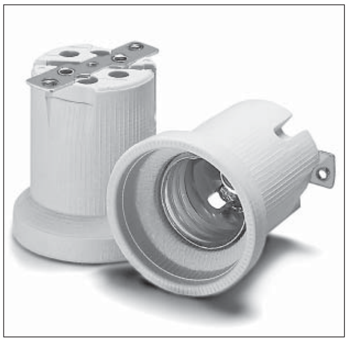


E40 lampholders
Casing: porcelain, white, T270
Fixing bracket with slots for screws M5
Weight: 252.3/243 g, unit: 48 pcs.
Type: 12810/12811
Ref. No.: 108374
Ref. No.: 108375 with lamp safety catch
With steel thread
Ref. No.: 532604
Ref. No.: 532605 with lamp safety catch

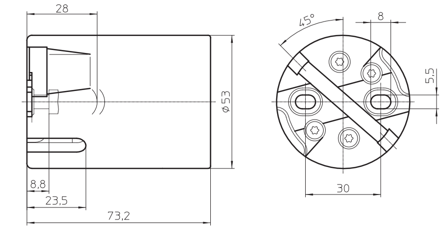


E40 lampholders
Casing: porcelain, white, T270
Fixing bracket with tapped fixing holes M5
With lamp safety catch
Weight: 252.8 g, unit: 48 pcs.
Type: 12812
Ref. No.: 108373
With steel thread
Ref. No.: 532606

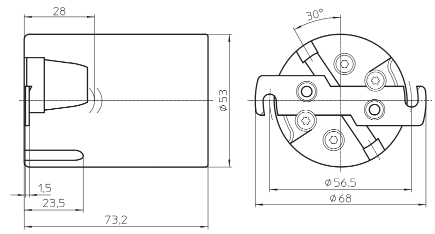




E40 lampholders
Only for lamps with base E40/E45
Casing: porcelain, white, T270
Oblong holes for screws M5
Weight: 206 g, unit: 50 pcs.
Type: 12900/12901
Ref. No.: 528252
Ref. No.: 528958 with lamp safety catch

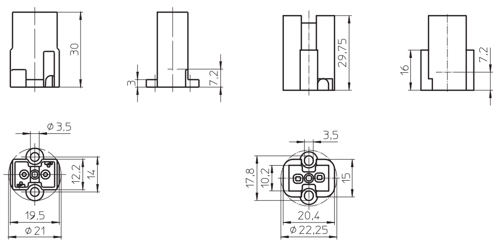


E40 lampholders
Only for lamps with base E40/E45
Casing: porcelain, white, T270
Fixing bracket with slots for screws M5
Weight: 217 g, unit: 50 pcs.
Type: 12910/12911
Ref. No.: 528253
Ref. No.: 528254 with lamp safety catch



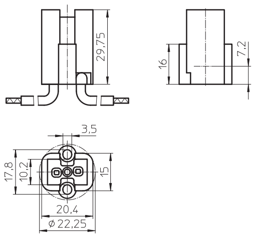
G8.5 Lampholders

For discharge lamps with base G8.5



Nominal rating: 2/500/5 kV
Multipoint contacts: CuNiZn
Fixing holes for screws M3

G8.5 lampholders
Push-in terminals for stranded conductors
with ferrule bare end of cores ∅ 1.4–1.8 mm
Type: 33600 casing: LCP, black, T260
Weight: 5 g, unit: 1000 pcs.
Ref. No.: 502394
Type: 33650 casing: ceramic, T300
Weight: 12.6 g, unit: 150 pcs.
Ref. No.: 554542

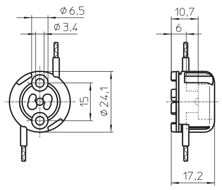


G8.5 lampholder
Casing: ceramic, T300
Welded leads: Cu tinned, stranded conductors 1 mm², Si-insulation max. ∅ 3.6 mm, length: 300 mm
Weight: 26.4 g, unit: 100 pcs.
Type: 33671
Ref. No.: 554543

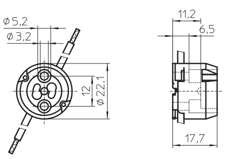
GU6.5 Lampholders

For discharge lamps with base GU6.5

Suitable for luminaries of protection class II
Casing: ceramic, cover: PPS, T250
Nominal rating: 2/250/5 kV
Leads: Cu nickel-plated, stranded conductors 0.75 mm², double PTFE-insulation, length: 250 mm



GU6.5 lampholders
Weight: 13.8 g, unit: 100 pcs.
Type: 34510 fixing holes for screws M3
Ref. No.: 547761
Type: 34511 threaded bushes for screws M3
Ref. No.: 534220

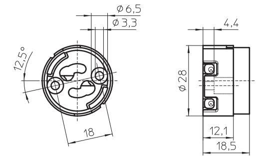


GU6.5 lampholder
Fixing holes for screws M3
Identical mounting hole layout and lamp focus of the PGJ5 lampholder 34120 offer an effortless interchangeability of both lamp technologies.
Weight: 15 g, unit: 100 pcs.
Type: 34520
Ref. No.: 539497

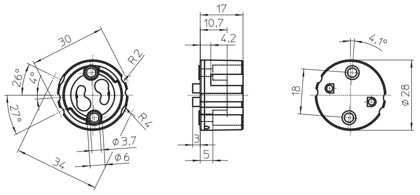
GX10 Lampholders

For discharge lamps with base GX10

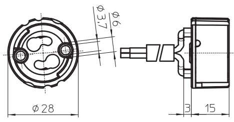
GX10 lampholder, for luminaires of protection class II
Casing: PPS, black, T240, nominal rating: 2/250/5 kV
Push-in twin terminals for stranded conductors
with ferrule bare end of cores max. Ø 1.8 mm
Fixing holes for screws M3
Weight: 9 g, unit: 100 pcs.. Type: 31400
Ref. No.: 509356



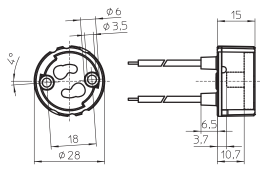
GX10 lampholder, for luminaires of protection class II
Casing: steatite, cover plate: PPS
T240, nominal rating: 2/500/5 kV
Push-in terminals for stranded conductors
with ferrule bare end of cores Ø 1.5–1.8 mm
For leads with outer diameter: max. 3 mm
Fixing holes for screws M3
Weight: 14 g, unit: 100 pcs.
Type: 31500
Ref. No.: 536469

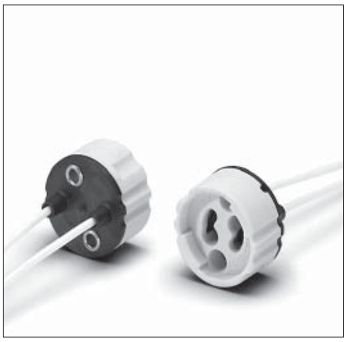


GX10 lampholder
Casing: steatite, cover plate: PPS
T240, nominal rating: 2/500/5 kV
Welded leads: 2x0.75 mm², stranded conductors,
length: 400 mm
5 kV: Cu nickel-plated, PTFE-insulation,
Cu tinned, Si-insulation
Fixing holes for screws M3
Weight: 36.3 g, unit: 100 pcs.
Type: 31500
Ref. No.: 549999



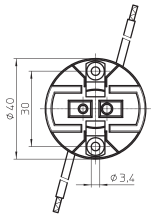
GX10 lampholder, for luminaires of protection class II
Casing: steatite, cover plate: PPS
T240, nominal rating: 2/500/5 kV
Welded leads: Cu nickel-plated, stranded conductors
0.75 mm², double PTFE-insulation, length: 250 mm
Fixing holes for screws M3
Weight: 23.3 g, unit: 100 pcs.
Type: 31530
Ref. No.: 543267

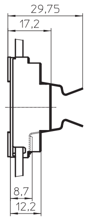




GY9.5 Lampholders

For discharge lamps with base GY9.5

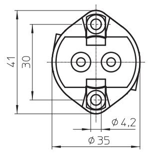


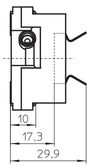


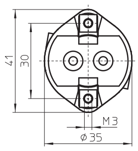
GY9.5 lampholder
Casing: ceramic, cover plate: PPS, black
T240, nominal rating: 10/500/5 kV, contacts: Ni
Leads: Cu tinned, stranded conductors
  5 kV: 1 mm², Si-insulation max. Ø 3.6 mm,
  length: 300 mm and Cu tinned,
  stranded conductors 0.75 mm², Si-insulation,
  length: 300 mm
Fixing holes for screws M3
Weight: 48 g, unit: 150 pcs.
Type: 37001
Ref. No.: 533663´

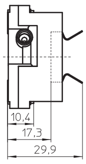
G12 Lampholders

For discharge lamps with base G12

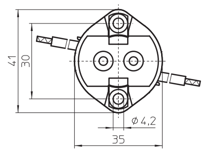


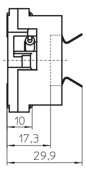


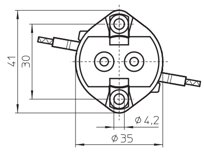


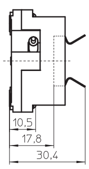


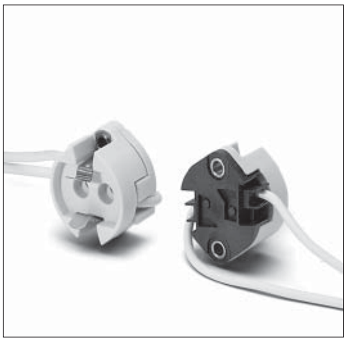
G12 lampholders
Casing: ceramic, cover plate: LCP
T250, nominal rating: 5/500/5 kV
Contacts: CrNi
Push-in terminals for leads with
ferrule bare end of cores max. Ø 1.8 mm
Weight: 30.7 g, unit: 25 pcs.
Type: 42200/ 42210
Ref. No.: 535750 fixing holes Ø 4.2 mm
Ref. No.: 535751 threaded bushes M3



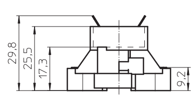


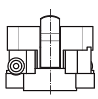


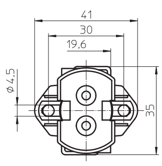




G12 lampholders
Casing: ceramic
T250, nominal rating: 5/500/5 kV
Contacts: CrNi
Welded leads: Cu tinned, stranded conductors 1 mm²
  Si-insulation, white, length: 300 mm
Weight: 43/52 g, unit: 25 pcs.
Type: 42222/42242
Ref. No.: 535755 cover plate: LCP
Ref. No.: 543643 cover plate: ceramic







G12 lampholder
Casing: LCP, black
T250, nominal rating: 2/500/5 kV
Contacts: CrNi
Push-in terminals for leads with
ferrule bare end of cores max. Ø 1.8 mm
For tinned lead ends: 0.5–1 mm²
Fixing holes for screws M4
Weight: 13.6 g, unit: 250 pcs.
Type: 42000
Ref. No.: 509213

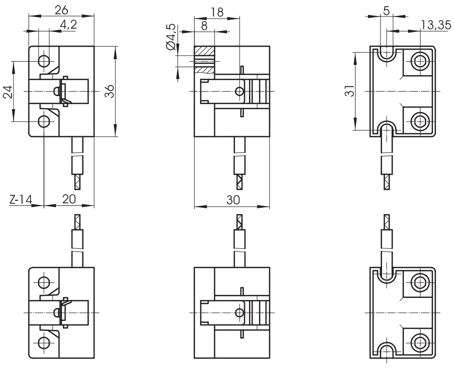
RX7s Lampholders

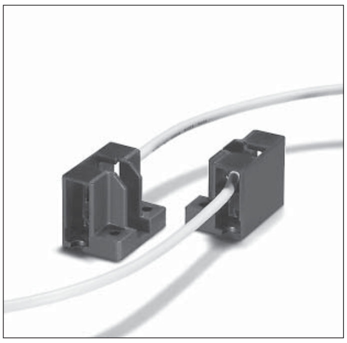
If the central hole on the bracket is used for fixing it has to be ensured by an additional support within the luminaire that the bracket cannot be deformed. If the lampholders are used for lamps with ignition voltage max. 20 kV the luminaire manufacturer is responsible for sufficient creepage distances and clearances.

Remark on lampholders type 323 and 343:
The luminaire design must ensure protection from electric shock as well as sufficient creepage distances and clearances from live parts on the back of lampholder.

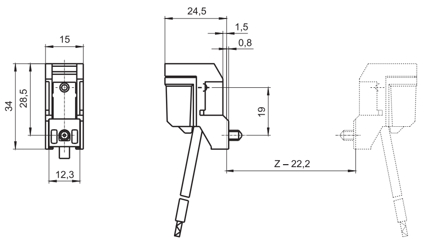
Type 343:
With doubled insulated leads suitable for luminaires of protection class II

RX7s lampholders
Contact pin: Ni, nominal rating: 2/500/5 kV
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 300 mm
Fixing holes for screws M4
Weight: 23.3/20.1 g, unit: 25 pcs.
Type: 31662/31672 PPS, black, T220
Ref. No.: 107065 lead exit right
Ref. No.: 107066 lead exit left
Type: 31695/31696 LCP, black, T260
Ref. No.: 504416 lead exit right
Ref. No.: 504669 lead exit left

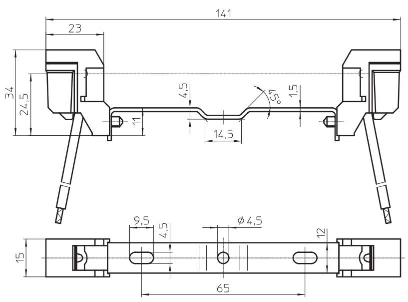


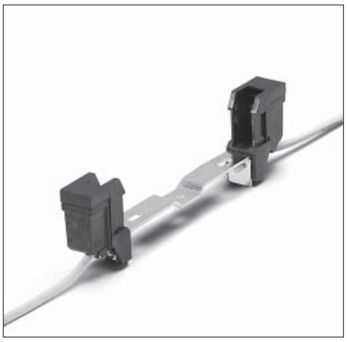


RX7s lampholder
Casing: PPS, black, T220
Contact pin: Cu, silver bulb
Nominal rating: 2/250/5 kV
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
With screw M4
Weight: 14 g, unit: 300 pcs.
Type: 34301
Ref. No.: 509117

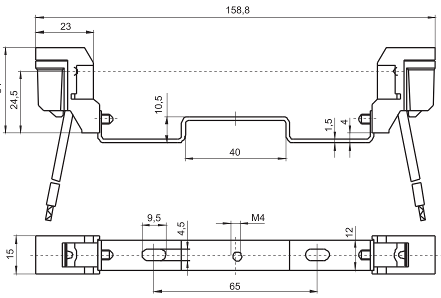


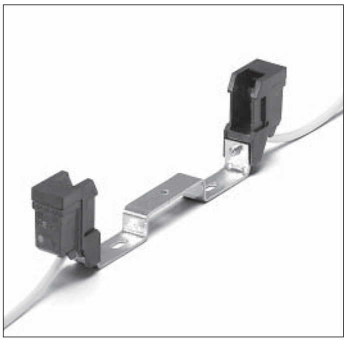
RX7s lampholder
Casing: PPS, black, T220
Contact pin: Cu, silver bulb
Nominal rating: 2/250/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central hole for screw M4
Other bracket versions on request
Weight: 43.8 g, unit: 200 pcs.
Type: 34311 contact distance 114.2 mm
Ref. No.: 529841



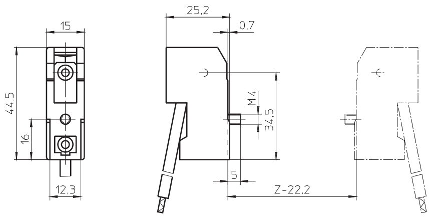


RX7s lampholder
Casing: PPS, black, T220
Contact pin: Cu, silver bulb
Nominal rating: 2/250/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central tapped hole M4
Weight: 47.5 g, unit: 200 pcs.
Type: 34326 contact distance: 132 mm
Ref. No.: 529845

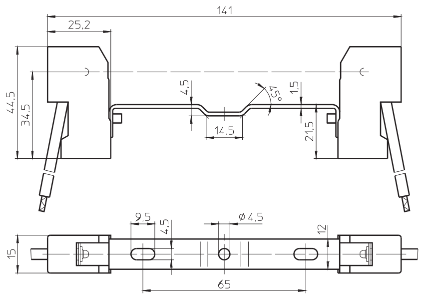


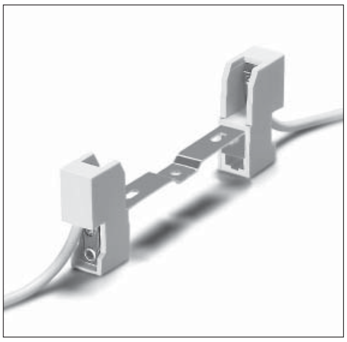


Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Fixing screw M4
Weight: 26.2 g, unit: 300 pcs.
Type: 32301
Ref. No.: 100913

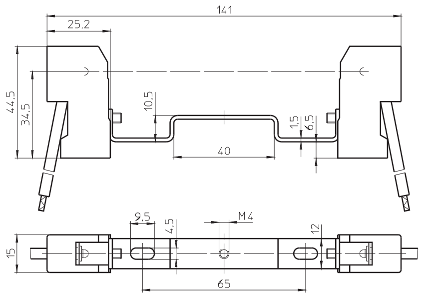


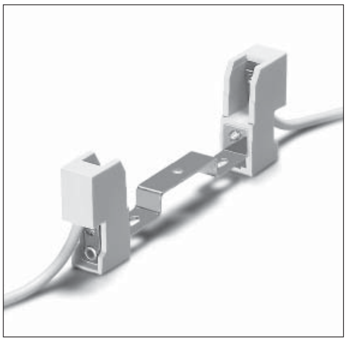
Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central hole for screw M4
Weight: 74.8 g, unit: 200 pcs.
Type: 32311 contact distance: 114.2 mm
Ref. No.: 100921



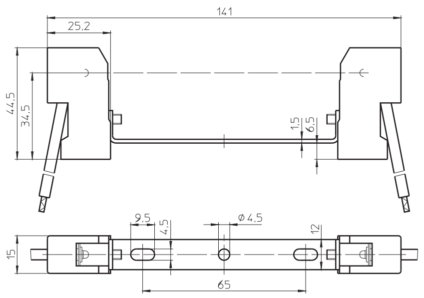


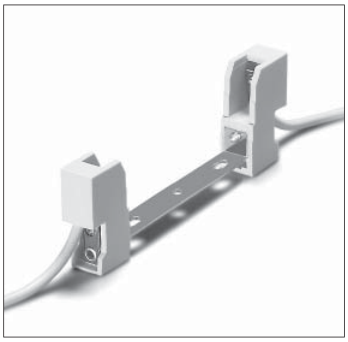
Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central tapped holes M4
Weight: 76 g, unit: 200 pcs.
Type: 32321 contact distance: 114.2 mm
Ref. No.: 100922



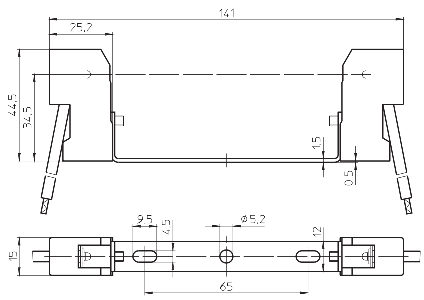


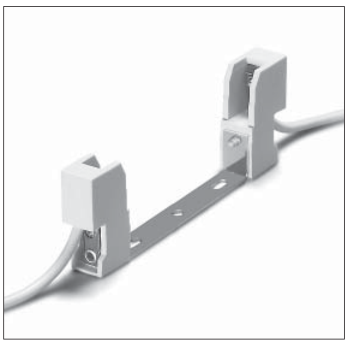
Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central hole for screw M4
Weight: 74 g, unit: 200 pcs.
Type: 32341 contact distance: 114.2 mm
Ref. No.: 100932



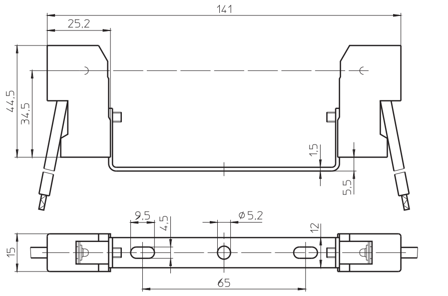


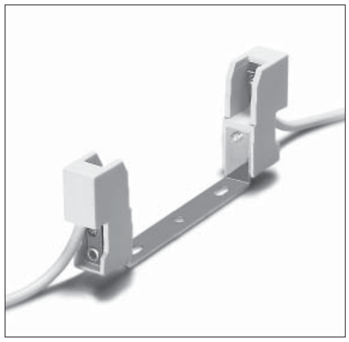
Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central hole for screw M5
Weight: 75.5 g, unit: 200 pcs.
Type: 32361 contact distance: 114.2 mm
Ref. No.: 100934



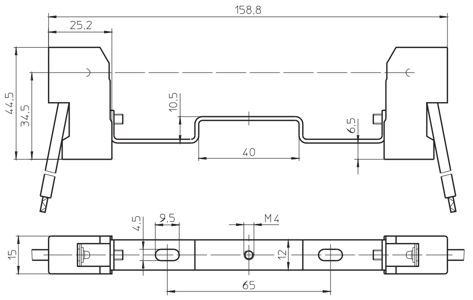


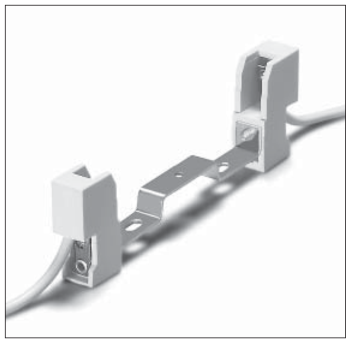
Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central hole for screw M5
Weight: 76.4 g, unit: 200 pcs.
Type: 32381 contact distance: 114.2 mm
Ref. No.: 100937



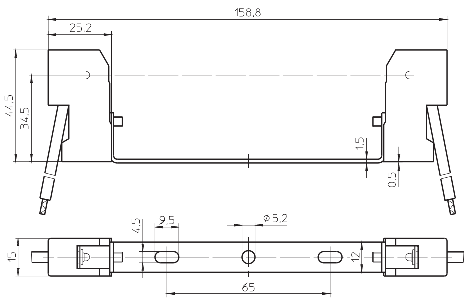


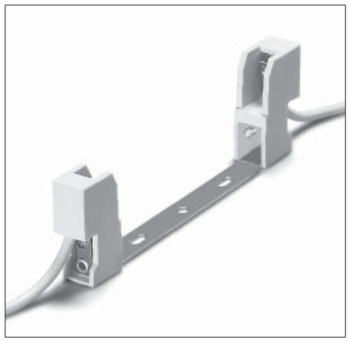
Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central tapped hole M4
Weight: 78.3 g, unit: 200 pcs.
Type: 32326 contact distance: 132 mm
Ref. No.: 100925



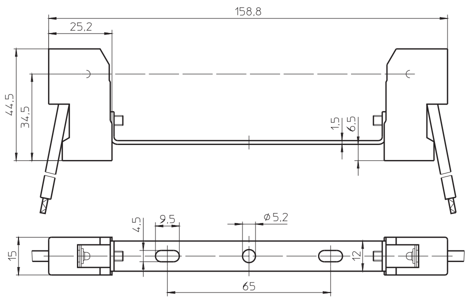


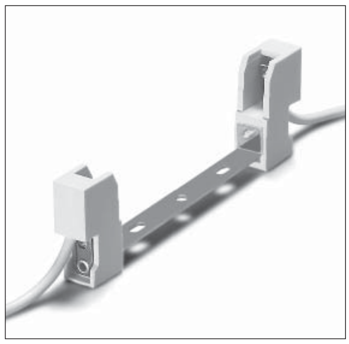
Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central hole for screw M5
Weight: 77.6 g, unit: 200 pcs.
Type: 32330 contact distance: 132 mm
Ref. No.: 100928



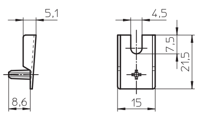


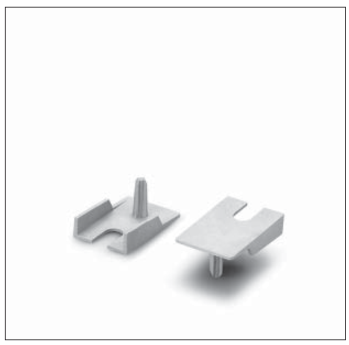
Partly enclosed RX7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 4/500/5 kV
Leads: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 200 mm
Oblong holes for screws M4
Central hole for screw M5
Weight: 75.7 g, unit: 200 pcs.
Type: 32336 contact distance: 132 mm
Ref. No.: 100931



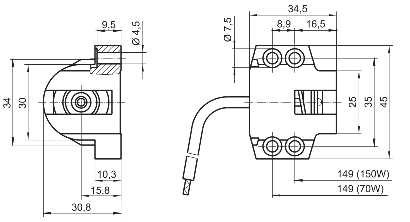


Protection caps for RX7s lampholders
For push-fit onto lampholders type 323
Protection against electrical shock
on the rear side of the lampholder
Lampholders with assembled protection cap
on request
Weight: 0.7/0.6 g, unit: 1000 pcs.
Type: 97528
Ref. No.: 507592 LCP, natural
Ref. No.: 507593 PET, white

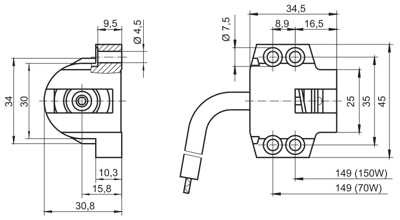


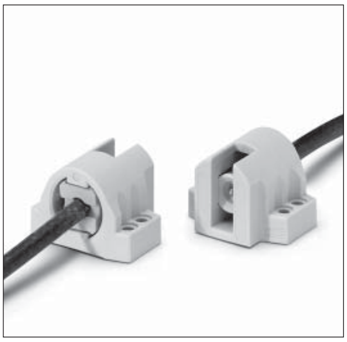


RX7s lampholder
Casing: ceramic, T250
Contact pin: Ni
Nominal rating: 10/500/5 kV
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 300 mm
Fixing holes for screws M4
Weight: 72 g, unit: 25 pcs.
Type: 30602
Ref. No.: 100723



RX7s lampholder
Casing: ceramic, T250, contact pin: Ni
Nominal rating: 10/500/20 kV
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation with spun glass filler ∅ 7 mm,
for ignition voltage: max. 20 kV,
length: 1000 mm
Fixing holes for screws M4
Weight: 120 g, unit: 25 pcs.
Type: 30620
Ref. No.: 100741



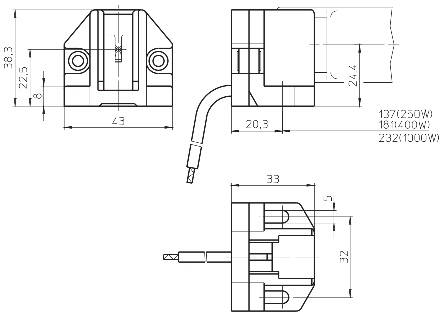


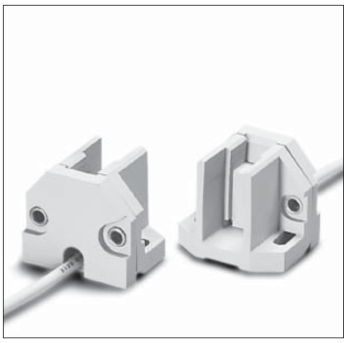
Fc2 Lampholders

For discharge lamps with base Fc2

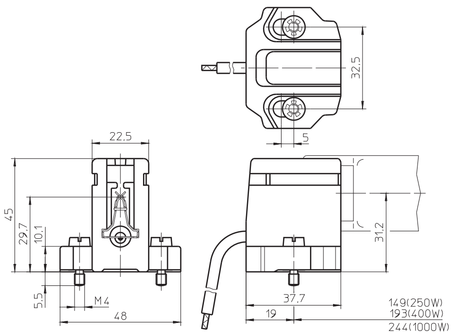
If the lampholders are used for lamps with ignition voltage max. 20 kV the luminaire manufacturer is responsible for sufficient creepage distances and clearances.

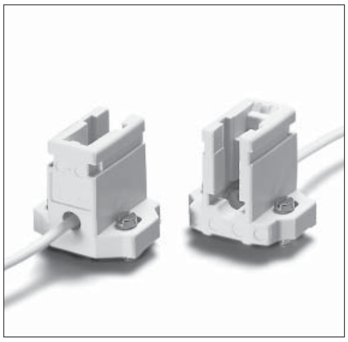
Fc2 lampholder
Casing: ceramic, T250
Nominal rating: 10/500/5 kV
Contacts: Ni
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 300 mm
Fixing holes for screws M4
Weight: 100 g, unit: 200 pcs.
Type: 02500
Ref. No.: 108937



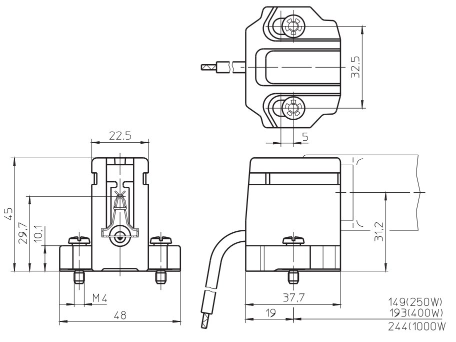


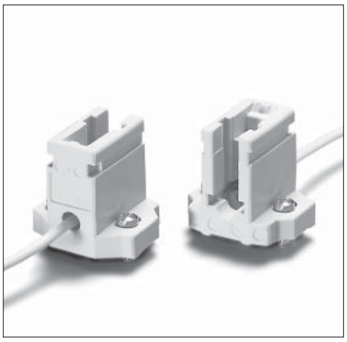
Fc2 lampholder
Casing: ceramic, T250
Nominal rating: 10/500/5 kV, contacts: Ni
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. ∅ 3.6 mm, length: 300 mm
Fixing screws M4, captive
Weight: 102 g, unit: 25 pcs.
Type: 02574 rigid fixing
Ref. No.: 100096



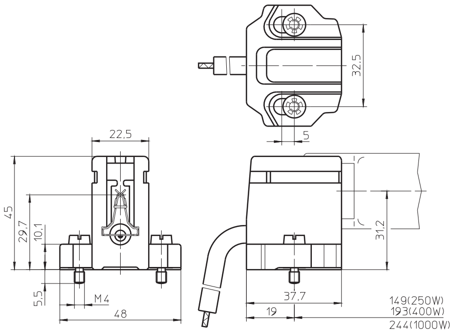


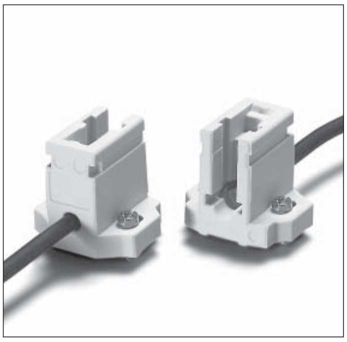
Fc2 lampholder
Casing: ceramic, T250
Nominal rating: 10/500/5 kV, contacts: Ni
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation max. Ø 3.6 mm, length: 300 mm
Fixing screws M4, captive
Weight: 102 g, unit: 25 pcs.
Type: 02575 adjustable fixing
Ref. No.: 100098



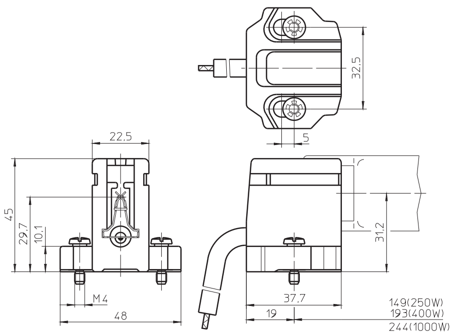


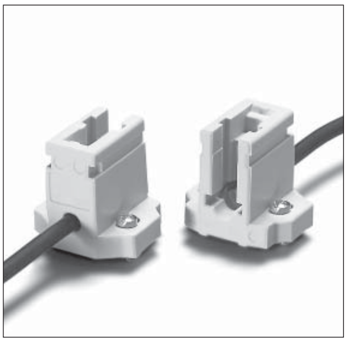
Fc2 lampholder
Casing: ceramic, T250
Nominal rating: 10/500/20 kV, contacts: Ni
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation with spun glass filler Ø 7 mm,
for ignition voltage: max. 20 kV,
length: 500 mm
Fixing screws M4, captive
Weight: 120 g, unit: 25 pcs.
Type: 02525 rigid fixing
Ref. No.: 100082



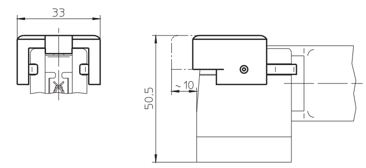


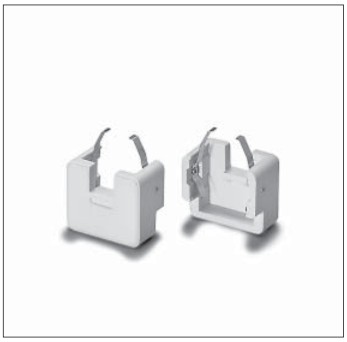
Fc2 lampholder
Casing: ceramic, T250
Nominal rating: 10/500/20 kV, contacts: Ni
Lead: Cu tinned, stranded conductors 1 mm²,
Si-insulation with spun glass filler Ø 7 mm,
for ignition voltage: max. 20 kV,
length: 500 mm
Fixing screws M4, captive
Weight: 120 g, unit: 25 pcs.
Type: 02543 adjustable fixing
Ref. No.: 100086





Lamp safety catch
For push-fit onto the lampholders 100082, 100086, 100096 and 100098
Casing: ceramic
Spring: stainless steel
Weight: 21 g, unit: 50 pcs.
Type: 86037
Ref. No.: 103818

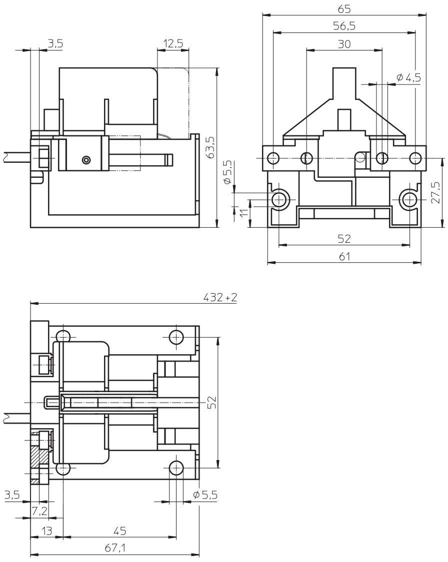


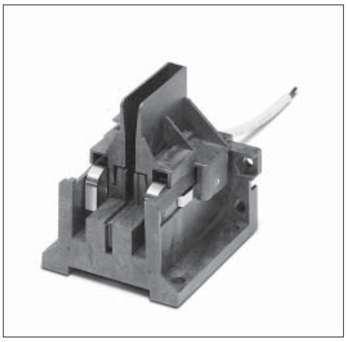


K12x30s Lampholders

For discharge lamps with base K12x30s

K12x30s lampholders
Suitable for luminaires of protection class II
Casing: LCP, black, T150
Nominal rating: 4/500/3 kV
Contacts: CuSn6, silver plated
Leads: Cu tinned, stranded conductors 1 mm²
Si-insulation, doubled insulated
Rear recess M4, wrench size 7
Rear and bottom fixing holes for screws M5
Weight: 75.9/61.5 g, unit: 100 pcs.
Type: 13010
Ref. No.: 532430 lead length: 705 mm
Ref. No.: 532431 lead length: 155 mm



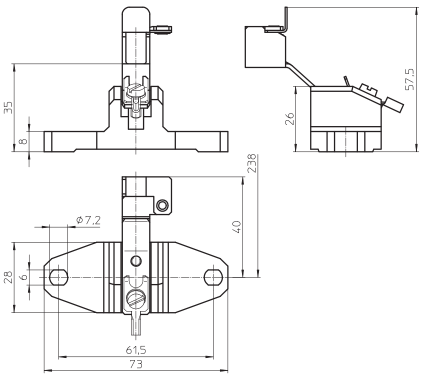


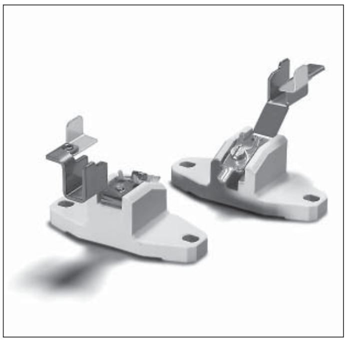
K12s-7 Support

For metal halide lamps 1000 and 2000 W
Type Osram HQI TS and Radium HRI TS

The luminaire design must ensure protection from electric shock as well as sufficient creepage and clearance distances.

K12s-7 support
Cable connection on cable lug for lead 0.75–2.5 mm²
Casing: ceramic, T300
Support: stainless steel, heat-resistant
Oblong holes for screws M5
Weight: 70 g, unit: 25 pcs.
Type: 21100
Ref. No.: 107677





2 Components for Discharge Lamps

If the electrical current through a discharge lamp is increased, a discharge channel with very high luminous efficiency is created in the discharge chamber. Luminous flux and light output increase substantially. The internal pressure of the discharge chamber rises and attains between 1 and 10 bar – these are so-called high-pressure discharge lamps or simply discharge lamps. The light output and colour rendition of high-pressure lamps vary considerably depending on the lamp family.

Discharge lamps can only be operated with ballasts. Ignitors are additionally required for sodium lamps and metal halide lamps. Furthermore, to compensate blind current when using magnetic ballasts, compensation capacitors must be fitted. The lampholders enable the lamp to be fixed in the luminaire and ensure simple exchange of lamps at the end of their service life.

As well as stabilising the lamp's operating point, ballasts also influence the lamp's output and luminous flux, the system's light output, the service life of the lamps as well as the colour temperature of the light.

The following chapters provide technical information regarding VS components for

- High-pressure sodium lamps (HS lamps)
- Metal halide lamps (HI lamps)
- Metal halide lamps with a ceramic discharge tube (C-HI lamps)
- Mercury vapour lamps (HM lamps)
- Low-pressure sodium lamps (LS lamps)

Electromagnetic or electronic ballasts can be used for high-pressure discharge lamps. Unlike with fluorescent lamps, lamp efficiency is not decisively altered by the use of electronic ballasts. In contrast, electronic ballasts lead to a reduction of the inherent losses and thus to an increase in system efficiency. In addition, electronic ballasts ensure gentle lamp operation, which increases the lamp's service life.

Independent electronic and electromagnetic ballasts have also been developed, which in the form of control gear units then provide special advantages during application.

Electronic Ballasts for HI and C-HI Lamps

Electronic ballasts are fitted with all the components required to operate discharge lamps. Furthermore, they safely shut down lamps at the end of their service life to prevent high temperatures from being generated within the luminaires that could influence the service life of the luminaires and components.

By adding a strain-relief module, VS electronic built-in ballasts turn into independent operating devices that can, for instance, be used as a power unit and can also be installed in intermediate ceilings in this form.

Assembly Instructions for Electronic Ballasts

Assembly instructions for mounting and installing electronic ballasts for high-pressure discharge lamps

Mandatory regulations

DIN VDE 0100	Erection of low voltage installations
EN 60598-1	Luminaires – part 1: general requirements and tests
EN 61347-1	Operating devices for lamps – part 1: general and safety requirements
EN 61347-2-12	Control gear for lamps; part 2-12: Particular requirements for d.c. or a.c. supplied electronic ballasts for discharge lamps (excluding fluorescent lamps)
EN 55015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61000-3-2	Electromagnetic Compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (device input current up to and including 16 A per conductor)
EN 61547	Installations for general lighting purposes – EMC immunity requirements

Descriptions of VS EBs for discharge lamps

The type designations for VS HID ballasts all follow the same pattern, as follows:

EHXc	70	.326
Electronic ballast for HID lamps	Wattage	Serial number

Mechanical mounting

Surface	Firm, flat surface required to ensure good heat transfer. Avoid mounting on protruding surfaces.
Mounting location	Electronic ballasts must be protected against moisture and heat. Installation in outdoor luminaires: water protection rate of > 4 (e.g. IP54 required).
Fastening	Using M4 screws in the designated holes
Heat transfer	If the ballast is destined for installation in a luminaire, sufficient heat transfer must be ensured between the electronic ballast and the luminaire casing. Electronic ballasts should be mounted with the greatest possible clearance to heat sources or lamps. During operation, the temperature measure at the ballast's t_c point must not exceed the specified maximum value.

Supplement for independent electronic ballasts

Mounting position	Any position using the mounting tabs
Clearance	Min. of 0.10 m from walls, ceilings and insulation Min. of 0.10 m from further electronic ballasts Min. of 0.25 m from sources of heat (lamp)
Surface	Solid; EB must not be allowed to sink into insulation materials

Technical specifications

Type	Operating voltage range AC: 220 V...240 V	Protective conductor mA	Mean service life*** hrs.	Power factor λ	Temperature protection*	Possible no. of VS devices/automatic cut-out type B (10A)	B (16A)	C (10A)	C (16A)
Standard EB									
EHXc 35.325 (183033;183034)	±10%	≤ 0.5	32,000 (t_c 85 °C) 40,000 (t_c 80 °C) 50,000 (t_c 75 °C)	0.95	yes**	7	12	12	20
EHXc 35.325 (183035)	±10%	≤ 0.5	32,000 (t_c 80 °C) 40,000 (t_c 75 °C) 50,000 (t_c 70 °C)	0.95	yes	7	12	12	20
EHXc 35G.327	+6 –10%	≤ 0.5	30,000 (t_c 80 °C)	> 0.95	yes	7	12	12	20
EHXc 70.326 (183036)	±10%	≤ 0.5	32,000 (t_c 80 °C) 40,000 (t_c 75 °C) 50,000 (t_c 70 °C)	0.95	yes**	7	12	12	20
EHXc 70.326 (183038)	±10%	≤ 0.5	26,000 (t_c 75 °C) 40,000 (t_c 65 °C) 50,000 (t_c 60 °C)	0.95	yes	7	12	12	20
EHXc 150G.334	+6 –10%	≤ 0.5	50,000 (t_c 75 °C)	> 0.98	yes	4	7	7	12

* The devices are fitted with a temperature switch to protect against impermissible overheating.
Once the device has cooled down, it is switched on again. It may prove necessary to briefly dis- and then reconnect the device to the mains voltage.
** The temperature protection inside the luminaire must be checked when using devices without a cap.
*** To achieve the mean service life, the max. temperature ($t_{c\ max.}$) at the t_c point must not be exceeded; failure rate = 0.2% per 1000 hrs

Product features

Shutdown of defective lamps

In the event of a lamp failing to ignite or of a lamp with an increased operating voltage (end of the lamp's service life), the electronic ballast will switch off after a defined period of time (< 20 minutes). The ballast will also shut down if the lamp fails to attain its specified rated output. The ballast can be reset by disconnecting and then reconnecting the mains voltage. The ballast must always be disconnected from the mains prior to changing a lamp.

EOL Effect

In high-pressure discharge lamps, the EOL effect manifests itself in a change of the lamp's voltage. These changes can, for instance, occur due to unsealed parts of the burner or the rectifier effect. An automatic EOL cut-out prevents safety risks at the end of the service life of high-pressure discharge lamps. EOL tests are conducted to check the behaviour of electronic ballasts at the end of a lamp's service life. The EOL cut-out stops the lamp base overheating at the end of a lamp's service life.

Short-circuit resistance

The ballast outputs (to the lamp) are short-circuit-proof. Short-circuits between the lamp connection and the casing (earth conductor) will destroy the ballast.

Temperature protection

To prevent excess temperatures, some ballasts are fitted with temperature protection. A ballast will restart after it has cooled down. It might be necessary to briefly interrupt the supply voltage. The above table contains a list of temperature-protected devices.

Transient mains peak protection

Values are in compliance with EN 61547 (interference immunity).

Electrical installation

Wiring
- The wiring between the mains, electronic ballast and lamp must comply with the respective circuit diagram. Note: the luminaire casing (metal) must be connected to the earth conductor.
- The electronic ballast must be earthed using a toothed washer or similar (protection class I, compliance with RFI/BCI standards).
- To ensure compliance with RFI suppression limits, mains conductors should not be wired parallel to lamp conductors and maximum clearance should be ensured.
- After the installation of electronic ballasts, luminaires must be tested to ensure compliance with maximum values laid down in EN 55015.

It is permissible to connect the protective conductor of the ballast by attaching the ballast to metal conductors that are connected to the protective conductor. In doing so, care must be taken to ensure the protective conductor is contacted in accordance with EN 60598. If, however, a ballast is fitted with a connection terminal for a protective conductor without through-wiring and if this is to be used to connect the protective conductor, this connection terminal may only be used for the ballast itself.

Push-in terminals The used terminals can be connected using rigid or flexible conductors with a section of 0.75–2.5 mm² (K35 ballasts: 0.5–1.5 mm²). The stripped conductor length is 10–11 mm (K35 ballasts: 8.5–9.5 mm) for terminal grid 3.5 mm. Conductors must not be tin-plated.

Error current Impulse-resistant leak-current protection must be installed. Distribute the luminaires to phases L1, L2 and L3; install tri-phase FI switches. If permissible, install FI switches with 30 mA leak current; connect no more than 15 luminaires as FI switches can be triggered at half the leak current value.

Tri-phase connection of luminaires with EB
- Prior to operating newly installed lighting systems: check the mains voltage is appropriate to the electronic ballast's mains voltage range (AC, DC).
- The N-type conductor must be properly connected to all luminaires or ballasts.
- Conductors can only be connected or disconnected if the ballast is disconnected from the mains. Attention: N-type conductors must never be disconnected individually or as the first element.
- Insulation resistance test: from L to PE (L and N must not be connected)
- The neutral conductor must be reconnected after completion of the test.

Electromagnetic Compatibility (EMC)

Vossloh-Schwabe's electronic ballast range was developed in accordance with valid EMC standards (interference, interference immunity and mains harmonics) and specially designed to ensure safe compliance with the limiting values. It is assumed that any remarks regarding conductor wiring and conductor length in the instructions for installing electronic ballasts in luminaires or for independent ballasts will be observed.

Compensation Luminaires with electronic ballasts do not need compensation (power factor ≥ 0.95).

Selection of automatic cut-outs

Dimensioning automatic cut-outs

High transient currents occur when an EB is switched on because the capacitors have to load. Lamp ignition occurs almost simultaneously.This also causes a simultaneous high demand for power. These high currents when the system is switched on put a strain on the automatic conductor cut-outs, which must be selected and dimensioned to suit.

Release reaction The release reaction of the automatic conductor cut-outs comply with VDE 0641, part 11, for B, C characteristics.

No. of electronic ballasts (see table on page 81)

The maximum number of VS ballasts applies to cases where the devices are switched on simultaneously. Specifications apply to single-pole fuses. The number of permissible ballasts must be reduced by 20% for multi-pole fuses. The considered circuit impedance equals 400 mΩ (approx. 20 m [2.5 mm²] of conductor from the power supply to the distributor and a further 15 m to the luminaire). Doubling circuit impedance to 800 mΩ increases the possible number of ballasts by 10%.

Additional information

Information on the installation of electronic ballasts for optimising EMC. To ensure good radio interference suppression and the greatest possible operating safety, the following points should be observed when installing electronic ballasts:

- Conductors between the EB and the lamp (HF conductors) must be kept short (reduction of electromagnetic interference).
- Mains and lamp conductors must be kept separate and if possible should not be laid in parallel to one another. The distance between HF and mains conductors should be as large as possible, ideally > 5 cm. (This prevents the induction of interference between the mains and lamp conductors.)
- The mains conductor within the luminaire must be kept short (to reduce the induction of interference).
- Devices must be properly earthed. EBs require secure contacts to the luminaire casing or must be earthed using a PE connection. This PE connection should be effected using an independent conductor to achieve better dissipation of the leak current. EMC improves at frequencies greater than 30 MHz.
- The mains conductor must not be laid too close to the EB or the lamp (this is especially important in the event of through-wiring).
- Mains and lamp conductors must not be crossed. Should this be impossible to avoid, conductors should be crossed at right angles to one another if at all possible.
- Should conductors be wired through metal parts, such conductors must always be additionally shielded (e.g. with an insulating sleeve or grommet).

Temperature

Reference point temperature t_c

The safe operation of electronic ballasts is dependent on the maximum permissible temperature not being exceeded at the measuring point. Vossloh-Schwabe has determined a casing temperature measuring point – $t_{c\ max.}$ – on all EB casings. To avoid shortening the service life or diminishing operating safety, the stipulated maximum temperature must not be exceeded at this t_c point. This point is determined by testing the converter during normal, IEC-standardised operation at the specified ambient temperature (t_a), which is also indicated on the type plate. As both the design-related ambient temperature and the ballast's inherent heat, as determined by the installed load, are subject to great variation, the casing temperature should be tested at the t_c point under real installation conditions.

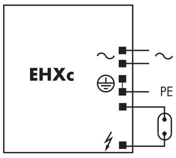
Ambient temperature t_a

The ambient temperature – as specified on every EB – denotes the permissible temperature range within the luminaire.

Reliability and service life

If the max. temperature at the t_c reference point (as specified on the type plate and the technical documentation of the ballast) is not exceeded, the defined service life can be expected to be achieved, assuming a switching cycle of 165 minutes on and 15 minutes off. See table on page 81 for service life details.

Circuit diagrams for metal halide lamps (HI) and high-pressure sodium lamps (HS) with electronic ballasts (EB)



35G.327, 35.325,
70.326, 150G.334

Electromagnetic Ballasts for Discharge Lamps

Electromagnetic ballasts for HI and HS Lamps

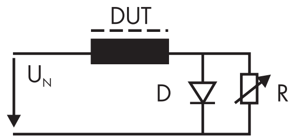
As the lamp manufacturer's reference values regarding lamp current and voltage are generally identical for metal halide (HI) and high-pressure sodium lamps (HS) of the same lamp wattage and the impedance values required for the ballast are also identical, the same ballasts can frequently be used for both lamp types. It should be remembered that HI lamps react sensitively to impedance deviations from the rated value with appreciable colour changes. Vossloh-Schwabe ballasts therefore comply with the lamp's narrower tolerances. Moreover, ballasts remain below the maximum peak DC value for HI lamps. This value is not specified for HS lamps; instead, the maximum stated start-up current must not be exceeded.

In order to keep the temperature of the luminaires and the electrical values of the lamps within tolerable limits, the impedance of the ballasts must remain constant over the entire service life. A so-called service life test (test of thermal durability) provides proof of this requirement having been met.

HI and HS lamps constitute a special case in terms of thermal testing. In rare cases, a safety risk can occur at the end of the service life of lamps fitted with external bulbs. The safety risk is caused by the so-called lamp rectifier effect, which can lead to overheating of ballasts, ignitors, lampholders and conductors and can therefore destroy the luminaire. Against this background, the luminaire standard EN 60598-1 "luminaires; part 1: general requirements and tests" has been supplemented by tests concerning this safety risk. As a result, since 1 September 2002, it has been illegal to market luminaires that do not comply with the new regulations. This means luminaires need to be fitted with thermal protection that prevents a luminaire from overheating in the event of this malfunction.

In this respect, it is recommended to use VS ballasts with temperature switches that have already been tested using this circuit.

Test circuit for thermally protected ballasts



DUT Device under Test
D Diode, 100A, 600V
R Resistor, 0...200 (1/2 lamp output)
U_N 110% of rated supply voltage

Electromagnetic ballasts for HM lamps

Even in the event of major mains fluctuations (92–106% of the rated voltage), the ballast must not fall short of the no-load voltage specified by the lamp manufacturer nor exceed a fixed short-circuit current. The start-up current must be high enough to ensure that at least 90% of the lamp's operating voltage is achieved within 15 minutes.

Power reduction with HS and HM lamps

The lamp wattage can be reduced by operating the ballast at a higher impedance value, higher than the rated value. The lamp manufacturer's specifications must be observed in doing so to avoid shortening the lamp's service life. The lamps should be started at the ballast's rated impedance and only switched down to reduced operation after a period of at least five minutes.
The impedance value can be altered by using an additional ballast (high-effort option) or by using a switch-able ballast (low-cost option). These ballast models can be switched using either a modern, time-controlled electronic power reduction switch, which is equipped with an additional control conductor (230 V), or a power reduction switch with a constant incentive rate setting (no control conductor).

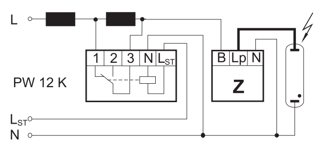
The construction of power reduction switches with control conductors differs according to the selected increase in impedance.

Power reduction with switchable ballasts

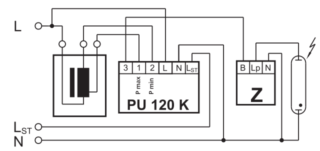
Ballast type	Tested with	Mains voltage	System output 100%	Reduced system output		Reduced luminous flux
			W	W	%	% (approx. values)
U-NaHJ 70/40%	HS 70	230, 50	83	50	60	55
U-NaH 100/40%	HS 100	230, 50	114	67	58	55
U-NaH 150/40%	HS 150	230, 50	160	98	61	55
U-NaH 250/40%	HS 250	230, 50	271	150	55	50
U-NaH 400/250.805	HS 400	230, 50	421	253	60	50
Q 80/50.596	HM 80	230, 50	90	55	61	55
Q 125/80.611	HM 125	230, 50	134	89	65	55
U-Q 250/150.438	HM 250	230, 50	274	164	60	55
U-Q 400/250.437	HM 400	230, 50	422	267	65	55

Example: Osram lamp, type NAV, HQL

Switching to reduced power using additional impedance (second ballast)



Switching to reduced power using a switchable ballast (ballast with tapping points)



Start-up switches

As high-pressure lamps operate with a start-up phase, the lamp's full luminous flux will only be reached after completion of this start-up period. In the event of disconnection from the mains, this start-up phase is dependent on the lamp's temperature. If an additional source of light is desired or required for this start-up period for safety-relevant applications, it is possible to switch on an auxiliary lamp with the help of a start-up switch.
There are two types of start-up switches:

- AS 1000 K for superimposed ignition systems. This switch monitors the lamp's operating voltage. If this is below a defined value (approx. 60% of the lamp's luminous flux), an auxiliary lamp is switched on.
- AS 1000 K A10 for pulse ignition systems and electronic ballasts.
  This model switches the auxiliary lamp off after a defined period of time (10 minutes), after which the high-pressure lamp will have reached the desired illumination level.

Lamp family	Typical start-up time	Typical restart time (mains interruption at lamp operating temperature)
HS	3 min.	5 min.
HI / C-HI	3 min.	10 min.
HM	4–5 min.	4–5 min.
LS	10 min.	5 min.

Control Gear Units for High-pressure Discharge Lamps

With electromagnetic ballasts

Control gear units with electromagnetic ballasts for high-pressure sodium lamps (HS), metal halide lamps (HI) and metal halide lamps with a ceramic discharge tube (C-HI) are fitted with all the components needed to ensure safe normal operation. Apart from a ballast, control gear units also contain a digital timer ignitor with IPP^{++} technology (Intelligent-Pulse-Pause-Mode), a compensation capacitor and a temperature switch with automatic reset. As all these components form a matched system, they create optimum operating conditions for lamps and small models. These compact control gear units remove the need for separate installation and wiring of individual components, thus considerably reducing assembly time.

Mandatory regulations

DIN VDE 0100	Erection of low voltage installations
EN 60598-1	Luminaires – part 1: general requirements and tests
EN 61347-1	Operating devices for lamps – part 1: general and safety requirements
EN 61347-2-1	Control gear for lamps; part 2-1: special requirements for ignitors (other than glow starters)
EN 61347-2-9	Control gear for lamps; part 2-9: special requirements for ballasts for discharge lamps (except fluorescent lamps)
EN 60923	Ballasts for discharge lamps – performance requirements
EN 60927	Operating devices for lamps; ignitors (glow starters); performance requirements
EN 61048	Operating devices for lamps – capacitors for fluorescent lamp circuits and other discharge lamp circuits; general and safety requirements
EN 61049	Operating devices for lamps – capacitors for fluorescent lamp circuits and other discharge lamp circuits; performance requirements
EN 55015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61000-3-2	Electromagnetic Compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (device input current up to and including 16 A per conductor)
EN 61547	Installations for general lighting purposes – EMC immunity requirements

Technical specifications

Operating voltage range
Control gear units can be operated at the specified mains voltage within a tolerance range of ± 10% for HS/HI lamps and ± 3% for C-HI lamps.

Leak current ≤ 0.1 mA

Compensation/power factor
Parallel-compensated control gear units with a power factor of $\lambda < 0.9$ ($\lambda < 0.85$ for 100 W)

Degree of protection
IP40, IP65
IP54 for aluminium casing

Protection class Independent, protection class II control gear units (plastic casing)
Independent, protection class I control gear units (aluminium casing)

Max. ambient temperature
See t_a value on the type plate of the control gear unit

Lead length to lamp
Max. 10 m

"F" designation Suitable for mounting on surfaces of normal flammability

Mechanical mounting

Mounting position
Any position using the mounting tabs

Clearance Min. of 0.20 m from walls, ceilings and insulation
Min. of 0.20 m from further control gear units
Min. of 0.25 m from sources of heat (lamp)

Surface Solid; control gear unit must not be allowed to sink into insulation materials

Electromagnetic compatibility (EMC)

Interference Interference voltage measurements only have to be taken at the connection terminals for luminaires with electromagnetic control gear units as these systems operate with lamp voltages of under 100 Hz. These low-frequency interference voltages are generally not critical with high-pressure discharge lamps with electromagnetic control gear units.

Interference immunity
Thanks to the robust design and choice of materials, electromagnetic control gear units provide a high degree of interference immunity and are not impaired by normal mains power interference.

Mains Harmonics
After every zero crossing of the lamp current, discharge lamps experience a re-ignition peak as the lamps go out for a brief (imperceptible) moment. These re-ignition peaks of discharge lamps generate mains harmonics that are smoothed by the ballast's impedance. VS electromagnetic control gear units all comply with the stipulated maximum values.

Selection of automatic cut-outs for VS control gear units

Dimensioning automatic cut-outs
When a control gear unit is switched on, high transient current peaks occur due to the smoothing capacitor having to load. The lamps are ignited almost simultaneously, which also causes energy consumption peaks. These high system switch-on currents put a strain on the automatic conductor cut-outs, which must be selected and dimensioned to suit.

Release reaction The release reaction of the automatic conductor cut-outs comply with VDE 0641, part 11, for B and C characteristics.

No. of control gear units
The following values are meant as guidelines only and may vary depending on the respective lighting system. The specified maximum number applies to the number of devices that can be switched on simultaneously. Specifications apply to single-pole fuses; using multi-pole fuses reduces the maximum number by 20%. The considered circuit impedance equals 400 mΩ (approx. 20 m [2.5 mm²] of conductor from the power supply to the distributor and a further 15 m to the luminaire). Doubling circuit impedance to 800 mΩ increases the possible number of control gear units by 10%.

Type of control gear unit	Type of automatic cut-out			
	B (10 A)	B (16 A)	C (10 A)	C (16 A)
VNaHJ 35PZT	7	12	12	20
VNaHJ 70PZT	7	12	12	20
VNaHJ 100PZT	6	10	10	16
VNaHJ 150PZT	5	8	8	14
VNaHJ 250PZT	3	5	5	7
VNaHJ 400PZT	2	4	3	5

Safety functions

Shutdown of defective lamps
In the event of a lamp failing to ignite the control gear unit will automatically shut down after a preset safety period. The programmed switch off time prevents flickering at the end of the lamp's service life. The control gear unit can be reset after shut down and lamp changing by disconnecting and then reconnecting the mains voltage.

Temperature protection
To protect against impermissible excess temperatures, the devices are fitted with a temperature fuse.

Protection against installation and wiring errors
The integrated IPP++ function will prevent the power unit from making any attempt to start the lamp in the event of an installation or wiring error and also if the neutral conductor is dislodged within the existing mains voltage network (three-phase supply network). Should the nominal supply voltage be connected, the power unit will begin starting the lamp immediately.

Reliability and service life

The control gear units can be expected to provide a service life of 50,000 operating hours provided that the assembly instructions are observed and the maximum tw value of the ballast is not exceeded. Failure rate: < 0.1%/1,000 hrs

Electrical installation

Connection terminals
Terminals can be contacted with rigid or flexible conductors
- Rigid conductors: max. 2.5 mm^2
- Flexible conductors: max. 2.5 mm^2
- Stripped lead length: 10–11 mm
- Conductors must not be tin-plated

Connection leads
Admissible diameter 7–9 mm
The suitability of luminaire conductors and cables for use within luminaires with ignition devices must be checked in accordance with luminaire standard EN 60598-1 10.2.2.
In general, all silicone and standard PVC cables meet these requirements.

Wiring — The wiring between the supply mains, control gear unit and lamp must be in accordance with the circuit diagram shown on the type plate.
Note: luminaire casing (metal) must be connected to the protective earth conductor.

Assembly Instructions for Electromagnetic Ballasts

For mounting and installing electromagnetic ballasts for high-pressure discharge lamps

Mandatory regulations

DIN VDE 0100	Erection of low voltage installations
EN 60598-1	Luminaires – part 1: general requirements and tests
EN 61347-1	Operating devices for lamps – part 1: general and safety requirements
EN 61347-2-9	Operating devices for lamps; part 2-9: special requirements for ballasts for discharge lamps (except fluorescent lamps)
EN 60923	Ballasts for discharge lamps – performance requirements
EN 55015	Maximum values and methods of measurement for RFI suppression in electrical lighting installations and similar electrical appliances
EN 61000-3-2	Electromagnetic Compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (device input current up to and including 16 A per conductor)
EN 61547	Installations for general lighting purposes – EMC immunity requirements

Technical specifications

Operating voltage range
The ballasts can be operated at the specified mains voltage within a tolerance range of ±10% for HS/HI and HM lamps and ±3% for C-HI lamps.

Leak current ≤ 0.1 mA

Compensation/power factor
Inductive ballasts: $\lambda \leq 0.5$
Parallel-compensated ballasts: $\lambda \geq 0.85$

Mechanical mounting

Mounting position
Any

Mounting location
Ballasts are designed for installation in luminaires or comparable devices. Independent ballasts do not need to be installed in a casing.

Fastening
Preferably using M4 to M6 screws, depending on the size of the ballast. Encapsulated ballasts may only be used with flat-headed screws (M5), underlaid with a washer (DIN 9021). (Tightening torque ≈ 2 Nm)

Temperature
The winding temperature tw must be checked during operation and must not exceed the specified maximum value. It must be tested by using the standardised method of measuring resistance. The Δt marking on the type plate is a measure of the ballast's inherent heating and thus of its power loss. The lower this value is the lower the power loss of the ballast. This value is determined using standardised measuring regulations and constitutes a benchmark for comparing ballasts of the same design for selection purposes.

Electromagnetic compatibility (EMC)

Interference
Interference voltage measurements have to be taken at the connection terminals for luminaires with electromagnetic ballasts as these are systems that operate with lamp voltages of under 100 Hz. These low-frequency interference voltages are generally not critical with high-pressure discharge lamps with electromagnetic ballasts.

Interference immunity
Thanks to the robust design and choice of materials, electromagnetic ballasts provide a high degree of interference immunity and are not impaired by normal mains power interference.

Mains Harmonics
After every zero crossing of the lamp current, discharge lamps experience a re-ignition peak as the lamps go out for a brief (imperceptible) moment. These re-ignition peaks of discharge lamps generate mains harmonics that are smoothed by the ballast's impedance. VS electromagnetic ballasts all comply with the stipulated maximum values.

Selection of automatic cut-outs for VS electromagnetic ballasts

Dimensioning automatic cut-outs
When a ballast is switched on, high transient current peaks occur due to parasite capacitances that can accumulate with the number of luminaires. These high system switch-on currents put a strain on the automatic conductor cut-outs. For this reason, only surge-current-proof automatic cut-outs should be used for lighting systems.

Release reaction The release reaction of the automatic conductor cut-outs comply with VDE 0641, part 11, for B and C characteristics.

No. of ballasts The following values are meant as guidelines only and may vary depending on the respective lighting system. The maximum number of VS ballasts applies to cases where the devices are switched on simultaneously. Specifications apply to singlepole fuses. The number of permissible ballasts must be reduced by 20% for multi-pole fuses. The considered circuit impedance equals 400 mΩ (approx. 20 m of [2.5 m²] conductor from the power supply to the distributor and a further 15 m to the luminaire). Doubling circuit impedance to 800 mΩ increases the possible number of ballasts by 10%. The values quoted in the following tables are guidelines and can be affected by system-specific factors.

Possible number of ballasts connected to automatic cut-outs with or without compensation

Lamp data		Cp	Max. number of ballasts connected to automatic cut-outs – without compensation / with compensation																			
			C10		C13		C16		C20		C25		B10		B13		B16		B20		B25	
W	V	µF	without	with	without	with	without	with	without	with	without	with	without	with	without	with	without	with	without	with	without	with
Mercury vapour lamps (HM)																						
50	230	7	10	19	13	25	15	31	18	39	23	49	8	10	11	12	13	15	16	18	20	23
80	230	8	6	12	7	15	9	19	11	24	14	30	6	6	8	7	10	9	12	11	15	14
125	230	10	4	7	5	9	7	12	7	15	9	19	4	4	5	5	7	6	9	7	10	9
250	230	18	2	4	3	5	3	6	3	7	4	9	2	2	3	2	3	3	4	3	5	4
400	230	25	1	2	1	3	2	4	2	5	2	6	1	1	1	1	2	22	3	2	3	2
700	230	40	–	1	–	1	1	2	1	2	1	3	1	–	1	–	1	1	1	1	2	1
1000	230	60	–	1	–	1	–	1	1	2	1	2	–	–	–	–	1	–	1	1	1	1
Metal halide lamps (HI)																						
35	230	6	11	22	14	29	18	36	23	45	29	50	9	11	12	14	15	18	18	23	23	27
70	230	12	7	12	9	15	11	18	14	23	17	29	5	8	6	10	8	13	9	16	12	20
100	230	12	6	10	7	13	9	16	11	20	14	25	4	7	5	9	6	11	8	14	10	17
150	230	20	4	7	5	9	6	11	7	14	9	17	2	5	3	6	4	8	5	10	6	12
250	230	32	2	5	2	6	3	7	4	9	5	11	1	3	1	4	2	5	3	6	4	8
400	230	35	2	3	2	4	3	5	4	7	5	8	1	2	1	3	2	4	2	5	3	6
1000	230	85	–	1	–	1	1	1	1	3	1	3	–	–	–	–	–	1	1	1	1	2
2000	380	60	–	1	–	1	–	2	–	2	–	3	–	–	–	–	–	1	–	1	–	2
2000	380	37	–	–	–	–	–	1	–	1	–	2	–	–	–	–	–	–	–	1	–	1
3500	380	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
High pressure sodium vapour lamps (HS)																						
35	230	6	11	22	14	29	18	36	23	45	29	50	9	11	12	14	15	18	18	23	23	27
50	230	10	9	16	11	20	14	24	18	31	22	38	6	11	8	14	10	17	13	22	16	27
70	230	12	7	12	9	15	11	18	14	23	17	29	5	8	6	10	8	13	10	16	12	20
100	230	12	6	10	7	13	9	16	11	20	14	25	4	7	5	9	6	11	8	14	10	17
150	230	20	4	7	5	9	6	11	7	14	9	17	2	5	3	6	4	8	5	10	7	12
250	230	36	2	5	2	6	3	7	4	9	5	11	1	3	1	4	2	5	3	6	4	8
400	230	45	1	3	1	3	2	4	3	5	4	7	1	2	1	2	1	3	2	4	2	5
600	230	60	1	2	1	2	1	2	2	3	2	4	–	1	–	1	1	2	2	2	2	3
1000	230	100	1	1	1	1	1	1	1	2	2	3	–	–	–	–	–	1	1	1	1	2

Safety functions

The VS range includes ballasts with an integrated temperature switch that safely disconnects the lamp from the power supply if the lamp should develop the rectifier effect towards the end of its service life. The cut-out behaviour of the temperature switch is influenced by the luminaire construction. The luminaire manufacturer is responsible for checking the factory settings of the temperature switch in accordance with EN 60598-1 Section 12.5. VS can adjust the temperature switch to the appropriate cut-out temperature to suit requirements.

Reliability and service life

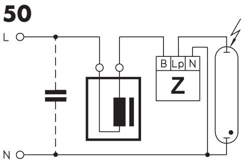
Provided the maximum winding temperature is not exceeded, the ballasts can be expected to yield a service life of 100,000 operating hours.
Failure rate < 0.025 %/1,000 hrs

Electrical installation

Push-in terminals	Terminals can be contacted with rigid conductors up to a maximum of 1.5 mm².
Screw terminals	• Terminals can be contacted with rigid or flexible conductors with ferrules on bare end of core • Conductor cross-sections are determined by the terminals and can vary according to type 0.5–1.5 mm² / 0.75–2.5 mm² / 1.5–2.5 mm² • Stripped lead length: 8–9 mm • Conductors must not be tin-plated • Max. tightening torque 0.5 Nm
Wiring	The wiring between the power supply, ballast and lamp must be in accordance with the respective circuit diagram (see pages 93–95).
Components	High-pressure discharge lamps must only be fitted with components that are rated to withstand the respective ignition voltage.

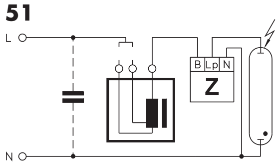
Circuit diagrams for high-pressure sodium lamps (HS) and metal halide lamps (HI)

50



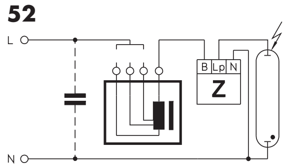
Superimposed ignition of HS and HI lamps

51



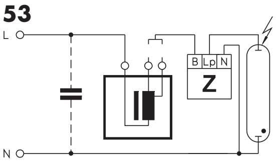
Superimposed ignition of HS and HI lamps
(ballasts with two alternative voltage tapping points)

52



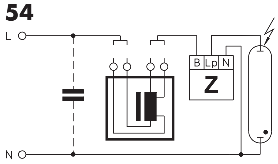
Superimposed ignition of HS and HI lamps
(ballasts with three alternative voltage tapping points)

53



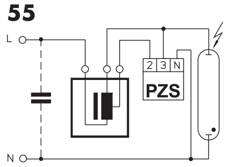
Superimposed ignition of HS and HI lamps
(ballasts with two alternative power tapping points)

54



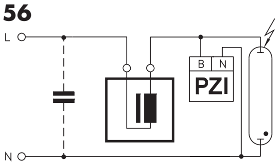
Superimposed ignition of HS and HI lamps
(ballasts with two alternative voltage and
power tapping points)

55



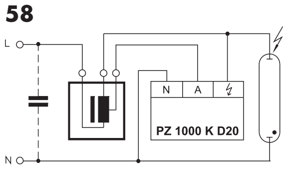
Pulse ignition of standard HS lamps

56



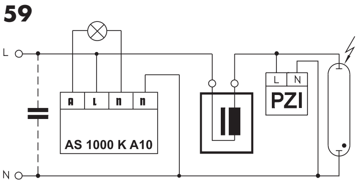
Pulse ignition of HI lamps, ignition voltage 0.9 kV

58



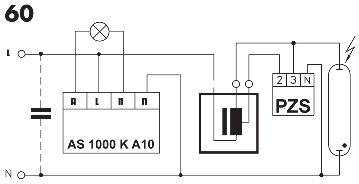
Pulse ignition for HS and HI lamps

59



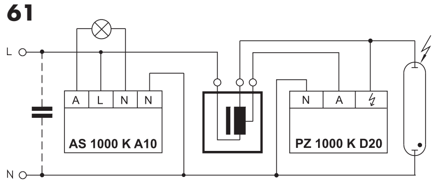
Start-up switch for HI lamps, ignition voltage 0.9 kV

60



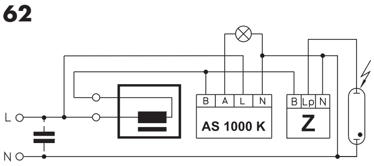
Start-up switch for standard HS lamps

61



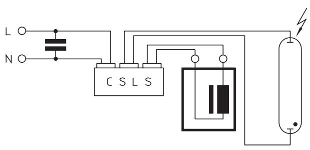
Start-up switch for HS and HI lamp

62



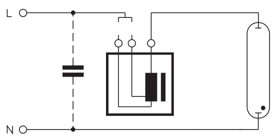
Start-up switch for HS and HI lamps

63



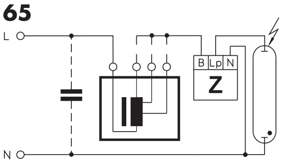
SDW-T lamps

64



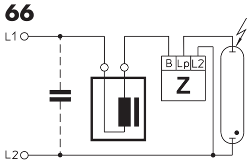
HS lamps with internal ignitor (ballasts with
two alternative voltage tapping points)

65



Superimposed ignition of HS and HI lamps
with three alternative power tapping points

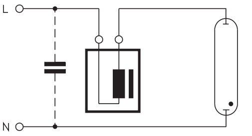
66



Superimposed ignition of HS and HI lamps
with polyphase power systems

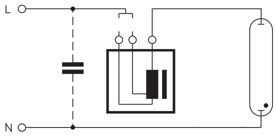
Circuit diagrams for mercury vapour lamps (HM)

67



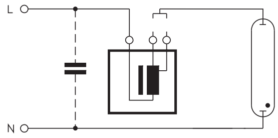
HM lamps

68



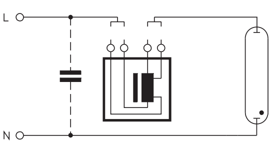
HM lamps (ballasts with
two alternative voltage tapping points)

69



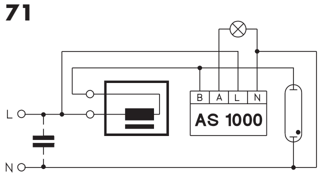
HM lamps (ballasts with
two alternative power tapping points)

70



HM lamps (ballasts with two alternative voltage
and power tapping points apiece)

71

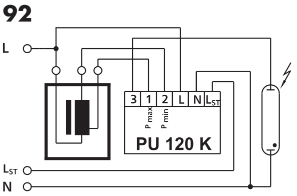


Start-up switch for HM lamps with auxiliary lamp

Power reduction of mercury vapour lamps (HM lamps)

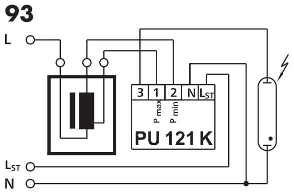
L_{ST} connectable to L1, L2 and L3

92



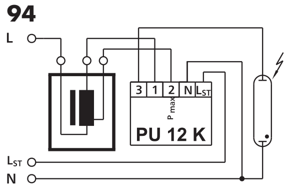
Disconnected control phase (L_{ST} = 0 V)
with ballasts with two tapping points

93



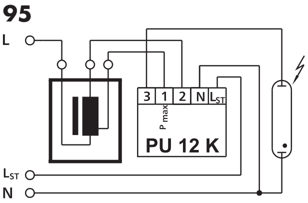
Connected control phase (L_{ST} = 230 V)
with ballasts with two tapping points

94



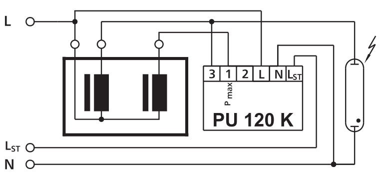
Disconnected control phase (L_{ST} = 0 V)
with ballasts with two tapping points

95



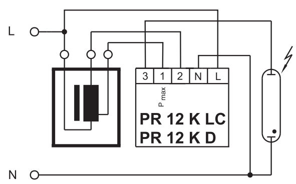
Connected control phase (L_{ST} = 230 V)
with ballasts with two tapping points

96



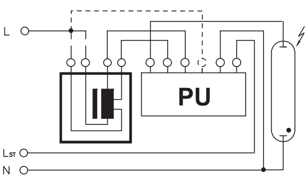
Disconnected control phase (L_{ST} = 0 V)
with two ballasts connected in parallel

97



Electronic power reduction without control phase

98

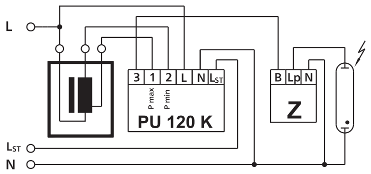


Ballasts with two tapping points and
two voltage tapping points (L_{ST} = 0 V or L_{ST} > 0 V)

Power reduction of high-pressure sodium lamps (HS lamps) – superimposed ignition system

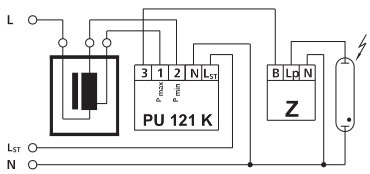
L_{ST} connectable to L1, L2 or L3

80



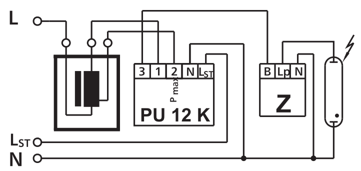
Disconnected control phase (L_{ST} = 0 V)
with ballasts with two tapping point

81



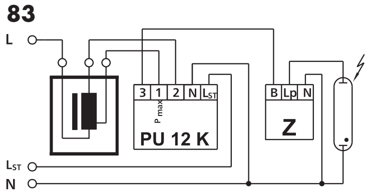
Connected control phase (L_{ST} = 230 V)
with ballasts with two tapping points

82



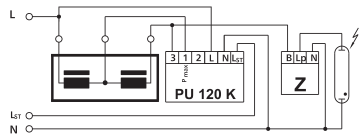
Disconnected control phase (L_{ST} = 0 V)
with ballasts with two tapping points

83



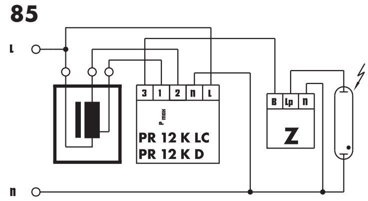
Connected control phase (L_{ST} = 230 V)
with ballasts with two tapping points

84



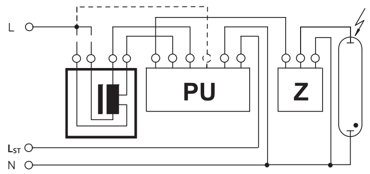
Disconnected control phase (L_{ST} = 0 V)
with main ballast and additional inductance

85



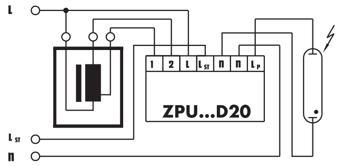
Electronic power reduction without control phase

86



Ballast with two tapping points and two
voltage tapping points (L_{ST} = 0 V or L_{ST} > 0 V)

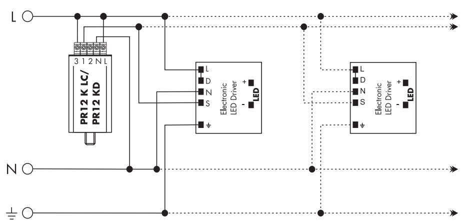
89



Disconnected control phase (L_{ST} = 0 V)
with ballasts with two tapping points

Power switching of LED drivers and electronic ballasts

100



Lampholders for High-pressure Discharge Lamps

Metal halide and high-pressure sodium lamps feature extremely different bases, which include RX7s, Fc2, G8.5, GX8.5, GU8.5, GX10, G12, GX12, PG12, PGJ5, GU6.5, E27 and E40, depending on whether the lamp is single- or double-ended. All lampholders are subject to the same typical conditions found with discharge lamps: high ignition voltages and temperatures. The high start-up currents deserve particular attention in lampholder design. This is also reflected by the insulation materials, which are usually solid ceramics or heat-resistant plastic (e.g. PPS – polyphenylene sulphide). Depending on the lamp's requirements (voltage, current, temperature, etc.), silver, nickel and copper alloys with thick nickel coatings are used as conductors. The luminaire regulation EN 60598-1 (VDE 0711 part 1), defines the safety requirements with regard to ignition voltages in connection with creepage and air clearance distances. Special care must be taken to ensure that lampholders are approved for discharge lamps when using high-pressure lamps with E27 and E40 Edison bases. Lampholders that are suitable for this purpose are marked with a maximum value of "5 kV" and comply with the increased creepage and air clearance distances specified by the lampholder requirements in EN 60238 (VDE 0616 part 1). The lampholder regulations governing special lampholders, EN 60838-1 (VDE 0616 part 5), apply analogously to all other base systems. The high ignition voltage pulses also place special demands on the conductors. In practice, silicone-insulated conductors with an outer diameter of 3.6 mm have proved to be suitable for discharge lamps. Silicone-insulated conductors with a glass-silk lining with a diameter of 7 mm should be used for lamps with an instant hot restart (20 kV) function.

VS lampholders for the UL market and UL approved leads are available for all common lamp types.

Further information can be found at www.unvlt.com.

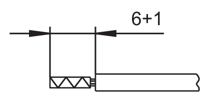
When connecting lampholders to push-in terminals of ballasts, the diameter of the conductor and the length of the stripped cables must be taken into account to ensure correct operation of the installed components. To this end, Vossloh-Schwabe can make additional versions available with compacted cable ends as further options.

When using compacted cable ends, the reduction of the cable diameter at the end of the cable must be taken into account, which means that the respective ballast push-in terminal has to be capable of taking the next-smaller cable diameter (see table with examples).

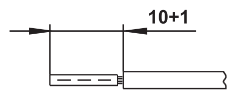
When using screw terminals to connect a ballast, it is recommended to use a ferrules on the bare end of core.

Cable cross-section mm²	Push-in terminal range on the ballast when using compacted cable ends mm²
0.75	≥ 0.5
1	≥ 0.75

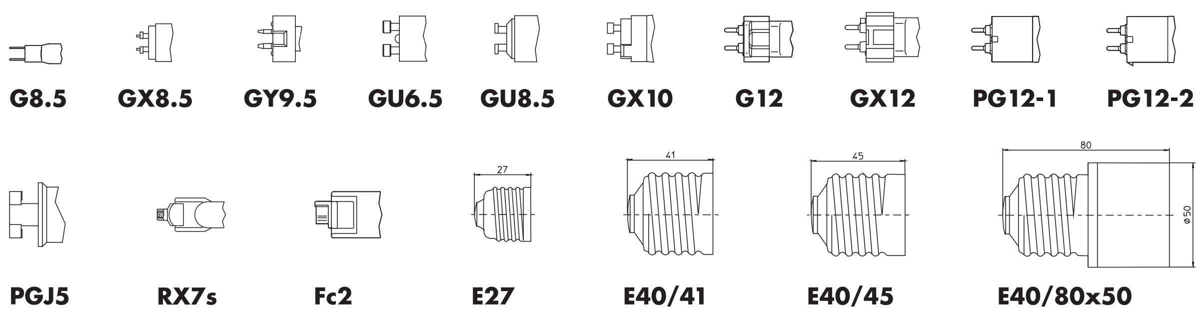
Ferrule on bare end of core



Compacted cable ends

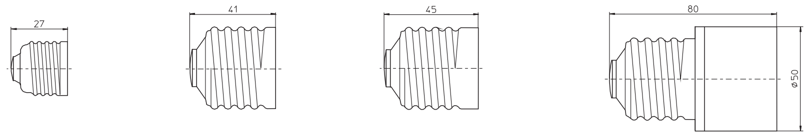


Bases for the most commonly used HI and HS lamps



Bases for the most commonly used HM lamps

Edison bases are predominantly used for mercury vapour lamps (HM)



E27 **E40/41** **E40/45** **E40/80x50**

Ignitors

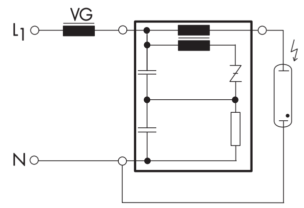
Ignition voltages for high-pressure sodium lamps (HS) and metal halide lamps (HI)

The ignition voltage of HS and HI lamps is determined by the respective lamp technology as well as the creepage and air clearance distances of the base-lampholder system. High-pressure sodium lamps of 35, 50 and 70 W with an E27 base are ignited with a voltage of between 1.8 and 2.3 kV. All other high-pressure lamps of the sodium and metal halide families require an ignition voltage of between 4 and 5 kV (except for special lamps and lamps with base PGJ5).

Superimposed ignitors

Superimposed ignitors work independently of ballasts and generate defined ignition pulses within the voltage ranges of 220–240 V ±10% and 380–415 V ±10%. As the mains frequency only plays a minor role, these systems work equally well at 50 Hz and 60 Hz. In accordance with the lamp manufacturer's specifications, pulses or clusters of pulses of defined width and height are generated in every half wave. Although lamp current flows through superimposed ignitors, they only cause low losses in relation to the system's power consumption. The maximum ambient temperature can be calculated by subtracting the ignitor's self-heating, which is caused by the inherent losses, from the specified maximum casing temperature (t_c).

Circuit principle of a superimposed ignitor

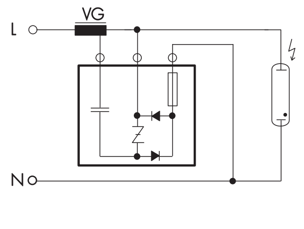


Superimposed ignitors should be mounted near the lampholder. The clearance needed between the ignitor and the lamp is determined by the respective maximum load capacitance, which is specified for each ignitor in the technical specifications. The capacitive load of the cable is dependent on its physical properties and wiring layout; this value usually ranges between 70 pF and 100 pF per metre. The casing temperature must not fall below –30 °C and must not exceed the maximum value specified on the device.

Pulse ignitors

Pulse ignitors use the winding of an inductive ballast to generate the pulse voltage needed to ignite high-pressure discharge lamps. For that reason, ballasts must be designed to withstand these high ignition voltages. In this respect, special attention is paid to the insulation as well as the creepage and air clearance distances. As pulse ignition systems generate high-energy pulses, they are also suitable in the event of longer conductor distances between ignitor and lamp. State-of-the-art ignitors feature electronic circuitry. Depending on their design and the technical requirements, the simplest solution is to connect pulse ignitors in parallel with the lamp. Further models make partial use of the winding of a ballast, which will either feature multiple tapping points for voltage selection or special tapping points for pulse operation.

Circuit principle of a pulse ignitor



VS ignitors provide the following advantages:

- fully electronic construction
- compact design
- large nominal voltage range
- large output range
- low self-heating
- minimal power loss
- low noise
- long service life
- high electrical safety due to high-quality components (e.g. approved capacitors)
- highly heat-resistant (max. permissible casing temperature t_C: 105 °C for superimposed ignitors and 95 °C for pulse ignitors)
- highly fire-resistant potting compound (certified according to EN 60926 and UL 94-V0)
- environmentally compatible potting compound (waste key No. 57110)

Product range

Vossloh-Schwabe's product range covers superimposed and pulse ignitors in standard models and with automatic cut-outs. Superimposed ignitors with automatic cut-outs are available with various cut-out times and ignition voltage pulse mechanisms (A and D). In this respect, D-series ignitors featuring the intelligent pulse-pause mode (IPP) are the best solution in terms of ignition reliability and switching off defective lamps.

Electronic ignitors with integrated cut-outs capture data on ignition behaviour during the ignition process. These data, e.g. regarding ignition frequency or failure, serve to identify ageing lamps and to ensure the ignition process is reliably switched off after a defined period of time at the end of the lamp's service life or in the event of defective lamps. This reduces the negative consequences associated with defective lamps.

Superimposed and Pulse Ignitors with Automatic Cut-out

Ignitors with IPP technology and extended cut-out – D series

After connection to mains voltage, D series ignitors generate ignition voltage pulses that are controlled and if necessary switched off by the ignitor in accordance with the lamp's operating state, lamp recognition and the safe burning time. If the safe burning time is not attained after three consecutive ignition attempts, pulse generation will cease.

Appropriately programmed microprocessors enable these performance features
of ignitors with IPP technology (Intelligent Pulse-Pause Mode) and extended cut-outs.

Z ... D20/
PZ ... D20 for HS, HI and C-HI lamps
programmed cut-out time: 1,216 seconds

Ignitors with IPP technology and extended cut-outs are available up to an output of 1,000 W.

Programmed cut-out function of VS ignitors

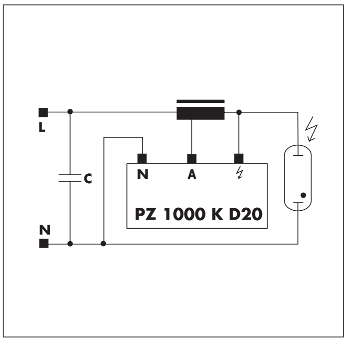
Ignitors with automatic cut-out – A series

After connection to mains voltage, A series ignitors supply a continuous stream of ignition voltage pulses until the lamp has ignited or the predefined cut-out time (sum of all ignition periods) has been reached if the lamp fails to ignite.

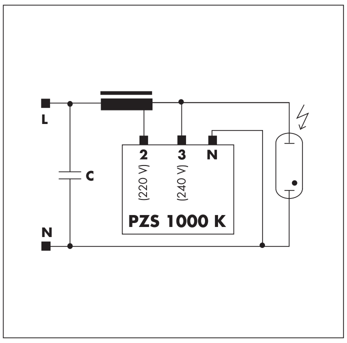
PZ ... A5 for HSI lamps
programmed cut-out time: ca. 300 seconds

Pulse ignition systems – overview of technical specifications

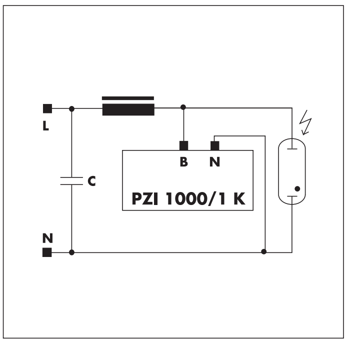
For HS, HI and C-HI lamps – PZ 1000 K D20
for high-pressure sodium lamps (HS) 50–1000 W,
metal halide lamps (HI) 35–1000 W and
for ceramic discharge tube lamps (C-HI) 35–400 W
Ignition voltage: 1.8–2.3 kV or 4–5 kV
No. of pulses: 2 per mains period
Load capacitance: 20–1000 pF
Ignitors with automatic cut-out and IPP technology
Suitable ballast types: NaHJ ... PZT with special winding tapping point, whose position is determined by the magnitude of the ignition voltage



For HS lamps – PZS 1000 K
for standard high-pressure sodium lamps (HS) 50–1000 W
Not suitable for discharge lamp models SUPER, PLUS, XL, etc.
Ignition voltage: approx. 4 kV
No. of pulses: 1 per second
Load capacitance: 20–4000 pF
Suitable ballast types:
NaH ... P with winding tapping point
(20 V voltage difference)



For HI lamps – PZI 1000/1 K
for metal halide lamps (HI)
with an ignition voltage up to 0.9 kV
No. of pulses: 1 per mains period
Load capacitance: max. 10,000 pF
Suitable ballast models: Q...



Assembly Instructions for Ignitors

For mounting and installing ignitors

Mandatory regulations

DIN VDE 0100	Erection of low voltage installations
EN 60598-1	Luminaires – part 1: general requirements and tests
EN 61347-1	Operating devices for lamps – part 1: general and safety requirements
EN 61347-2-1	Control gear for lamps; part 2-1: special requirements for ignitors (other than glow starters)
EN 60927	Control gear for lamps; ignitors (other than glow starters); performance requirements
EN 55015	Maximum values and methods of measurement for RFI suppression in electrical lighting installations and similar electrical appliances
EN 61000-3-2	Electromagnetic Compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (device input current up to and including 16 A per conductor)
EN 61547	Installations for general lighting purposes – EMC immunity requirements

Technical specifications

Operating voltage range

Ignitors can be operated at the specified mains voltage within a tolerance range of ±10%.

Max. casing temperature t_c

A maximum casing temperature t_c of 105 °C or 95 °C is specified for superimposed ignitors and pulse ignitors, respectively. Tests carried out during operation must ensure this maximum value is not exceeded. Selecting an ignitor for higher lamp currents can reduce self-heating and thus also the temperature at the t_c measuring point. Details regarding self-heating can be found in the following table. The temperature structure in the luminaires is negatively influenced by ageing lamps.

Minimum ambient temperature t_a

The minimum ambient temperature ta for all superimposed and pulse ignitors is –30 °C. Ignitors for use in applications with special requirements to the ambient temperature (for example –40 °C) are available on request.

Superimposed ignitors – Technical specifications

Voltage V/Hz	Ignitor type	Max. lamp current A	Power loss W	Inherent heating K	Ignition voltage kV	Max. load capacity pF	Max. conductor length between ignitor and lamp* m	Connection terminals (mm²) Screw	 Push-in	Casing material	Dimensions (dia. x L or L x W x H) length without threaded stud mm
220–240/50–60	**Z 70 S**	2	< 0.6	< 5	1.8–2.3	200	2	0.75–4	–	Al	Ø35 x 76
	Z 70 K	2	< 0.6	< 5	1.8–2.3	200	2	0.75–4	–	PC	78 x 34 x 27
								–	0.5–2.5		81 x 34 x 27
	Z 70 K D20	2	< 0.6	< 5	1.8–2.3	100	2	0.75–4	–	PC	80 x 34 x 30
								–	0.5–2.5		83 x 34 x 30
	Z 250 S	3.5	< 1.8	< 20	4.0–5.0	100	1	0.75–4	–	Al	Ø35 x 76
	Z 250 K	3.5	< 1.8	< 20	4.0–5.0	100	1	0.75–4	–	PC	78 x 34 x 27
								–	0.5–2.5		81 x 34 x 27
	Z 250 K D20	3.5	< 1.8	< 20	4.0–5.0	100	1	0.75–4	–	PC	80 x 34 x 30
								–	0.5–2.5		83 x 34 x 30
	Z 400 S	5	< 3.0	< 25	4.0–5.0	100	1	0.75–4	–	Al	Ø45 x 76
	Z 400 M **Z 400 M VS-Power** **Z 400 M S**	5	< 3.0	< 35	4.0–5.0	50	0.5	0.75–4	–	Al	Ø35 x 76
	Z 400 M K	5	< 3.0	< 35	4.0–5.0	50	0.5	0.75–4	–	PC	78 x 34 x 27
								–	0.5–2.5		81 x 34 x 27
	Z 400 M K VS-Power	5	< 3.0	< 35	4.0–5.0	50	0.5	0.75–4	–	PC	78 x 34 x 27
								–	0.5–2.5		81 x 34 x 27
	Z 400 S D20	5	< 3.0	< 25	4.0–5.0	100	1	0.75–4	–	Al	Ø45 x 90
	Z 400 M K D20	5	< 3.0	< 35	4.0–5.0	50	0.5	0.75–4	–	PC	80 x 34 x 30
								–	0.5–2.5		83 x 34 x 30
	Z 750 S	8	< 3.0	< 20	4.0–5.0	100	1	0.75–2.5	–	Al	Ø50 x 90
	Z 1000 S	12	< 6.0	< 35	4.0–5.0	100	1	0.75–2.5	–	Al	Ø50 x 80
	Z 1000 TOP										83 x 83 x 68
	Z 1000 S D20	12	< 6.0	< 35	4.0–5.0	100	1	0.75–2.5	–	Al	Ø50 x 89
	Z 1000 L	12	< 6.0	< 35	4.0–5.0	2000	20	0.75–2.5	–	Al	Ø50 x 97
	Z 1200/2,5	15	< 7.5	< 40	2.0–2.5	200	2	0.75–2.5	–	Al	Ø50 x 80
	Z 1200/9	15	< 10.0	< 40	7.0–8.0	50	0.5	0.75–2.5	–	Al	Ø50 x 135
	Z 2000 S	20	< 6.0	< 30	4.0–5.0	100	1	0.75–2.5	–	Al	Ø65 x 96
380–420/50–60	**Z 1000 S/400V**	6	< 3.3	< 28	4.0–5.0	2000	20	0.75–2.5	–	Al	Ø45 x 84
	Z 2000 S/400V	12	< 5.0	< 32	4.0–5.0	2000	20	0.75–2.5	–	Al	Ø50 x 88
	Z 3500 S/400V	20	< 7.0	< 35	4.0–5.0	100	1	0.75–2.5	–	Al	Ø65 x 96

* With a conductor of, for instance, 100 pF per m (3x2.5 mm²)

Pulse ignitors – Technical specifications

Nominal voltage/frequency V/Hz	Pulse ignitor type	Casing temperature t_c °C	Ignition voltage kV	Max. load capacity pF	Max. conductor length between ignitor and lamp* m	Connection screw terminals mm²	Casing material	Dimensions (dia. x L or L x W x H) length without threaded stud mm
220–240/50–60	**PZS 1000 K**	95	approx. 4	4000	40	0.5–1.5	PC	50 x 28 x 27
220–240/50–60	**PZ 1000 K D20**	95	1.8–2.3/ 4.0–5.0	1000	10	0.75–2.5	PC	74 x 34 x 27
220–240/50–60	**PZI 1000/1 K**	95	0.7–0.9	10000	100	0.5–2.5	PC	57 x 28 x 27
380–420/50–60	**PZ 1000/400 V A5**	95	4.0–5.0	800	8	0.75–2.5	Al	Ø40 x 80

* With a conductor of, for instance, 100 pF per m (3x2.5 mm²) – wiring must be taken into consideration

Mechanical mounting

Mounting position
Any

Mounting location
Ignitors are designed for installation in luminaires or comparable constructions. Ignitors must be protected against radiation of direct lamp heat by appropriate installation.

Clearance from lamp
The clearance needed between ignitor and lamp is determined by the load capacitance of the conductors and by the type of ignitor pulses. The table on page 101 gives details of the clearance needed for a typical 3-phase lead with a cross-section of 2.5 mm² per conductor.

Casing materials Unmarked in the type description: aluminium; marked "K": polycarbonate

Fastening Via threaded stud M8x10 (Z 2000 S, Z 3500 S/400 V: M12x12)

Dimensions The table on page 101 provides details of ignitor dimensions.

Electromagnetic compatibility (EMC)

Interference Ignitors only generate interference due to the high ignition voltages during lamp ignition. This is classified as click interference and is not evaluated in lighting technology. However, as this interference occurs continuously in the event of old lamps that fail to ignite, operators of lighting systems are legally obliged to exchange such lamps.

Interference immunity
Owing to their design and the materials used, VS ignitors are characterised by high interference immunity and comply with the specified maximum values.

Mains harmonics
Are not observed during lamp ignition. VS ignitors meet the requirements.

Reliability and service life

The service life of an ignitor is dependent on strict compliance with the casing temperature t_c during operation. As the ignitors are only subjected to loads during high-voltage lamp ignition, a service life of 10 years can be expected provided the t_c values are not exceeded. Failure rate: < 0.04%/1,000 hrs.

Electrical installation

Connection terminals
Ignitors feature screw or push-in terminals. For screw terminals a maximum torque value of 0.8 Nm must not be exceeded when connecting the conductor. Push-in terminals are for rigid conductors with a cross section of 0.5–2.5 mm² or respective flexible conductors with ferrule bare end of cores. Stripped lead ends of 8–9 mm are required. Tinned lead ends are not permitted. The permissible conductor cross-sections can be seen in the table on page 101.

Wiring The ignitors must be wired between ballast and lamp in accordance with the circuit diagrams on pages 93–95.
The load capacitances of the wiring must also be taken into account. Distances to lamps should be kept as short as possible.

Power switches for street lighting

In view of the drive to cut public spending on energy and also in the light of environmental policies to protect resources, reducing the power consumption of high-pressure discharge lamps is becoming increasingly important.

Power reduction is possible on high-pressure sodium vapour and mercury vapour lamps and is realised with the aid of electronic actuators or by switching the inductance in the luminaire itself with the aid of power switches.

Provided that the lamp still emits an acceptable minimum of light output and uniformity, these lamps can be used to reduce the lighting level of outdoor lighting systems during off-peak traffic periods (e.g. in accordance with DIN 5044 for street lighting).In conjunction with the appropriate ballasts, the VS power switches constitute a perfect all-round solution for power switching purposes. This VS system has been approved by leading lamp manufacturers.

Power switch PR 12 K LC – Power reduction without control line

The new VS PR 12 K LC power switch is capable of setting the period of power-reduced operation based on the measured burning time of a lighting system. This eliminates the time-consuming task of continually adjusting the times of power-reduced operation to suit constantly changing day-night cycles; it also removes the need for making adjustments due to daylight-saving times and is thus suitable for use worldwide (regionally independent).

Function

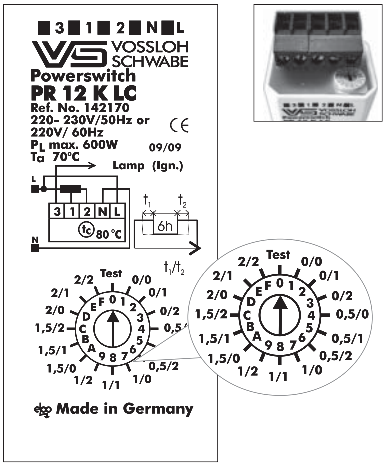
The intelligent PR 12 K LC power switch does not require a control line to reduce lamp output; it uses the tapping of the ballast. Thanks to an integrated microprocessor, the PR 12 K LC power switch can measure the burning time of the luminaire. This value is then compared to data stored on the chip and used to set the time at which the luminaire will switch over to power-reduced operation. The luminaire will be operated at reduced power for a minimum of six hours (reduced by approx. 40% of the lamp's nominal rating at 50% of luminous flux). This period of power reduction can be extended to a maximum of 10 hours.

Setting periods of power-reduced operation

The power switch is delivered in its default setting – i.e. the dial is set to 'Test (Code 0)'. After the luminaire has been installed, the desired power reduction time must be set using the dial on the power switch. The power-reduction period can be set to a minimum of six hours and can be extended by up to two hours in both directions (i.e. earlier or later). This results in a maximum power-reduction period of 10 hours.

The dial enables the following settings:

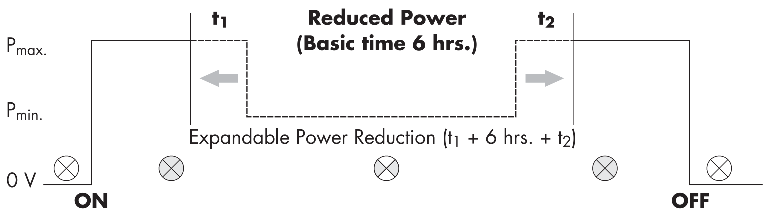
Dial settings Position	Timings	t_1 Hours	Basic power reduction period (hrs)	t_2 Hours	Total power reduction time (hrs)
0	Test	Factory setting: 5 seconds on full load, followed by power reduction			
1	0/0	0	6	0	6
2	0/1	0	6	1	7
3	0/2	0	6	2	8
4	0.5/0	0.5	6	0	6.5
5	0.5/1	0.5	6	1	7.5
6	0.5/2	0.5	6	2	8.5
7	1/0	1	6	0	7
8	1/1	1	6	1	8
9	1/2	1	6	2	9
A	1.5/0	1.5	6	0	7.5
B	1.5/1	1.5	6	1	8.5
C	1.5/2	1.5	6	2	9.5
D	2/0	2	6	0	8
E	2/1	2	6	1	9
F	2/2	2	6	2	10



Determining operating/power reduction periods

- The dial is set to the desired period of power reduction, e.g. to position 1 (0/0), which corresponds to a power-reduction period of six hours.
- In the first night, the luminaire is activated by the twilight switch (e.g. at 20:30 hours) and will operate at its nominal rating. After four hours (default setting), the luminaire will be switched down by 40% of the lamp output by the power switch and will then remain in power-reduced operation until the twilight switch turns the system off (e.g. at 06:30 hours).
- During this time, the power switch will measure the entire burning time of the lamp (10 hours in our example).
- The power switch then compares the measured burning period with values stored on the microprocessor. The integrated comparative values of the power switch form the basis for the starting point of power-reduced operation for the following night. The "new" starting time will then be stored by the power switch until the following night.
- In the second night, the lighting system – controlled by the twilight switch and thus dependent on the day/night cycle of the respective region and the time of year – will be activated (and deactivated) at a slightly different time as compared to the first night (either earlier or later, depending on the season)
- With the dial set to position 1, the power switch will thus activate the six-hour period of power-reduced operation after two hours, as per our example, and will then revert to nominal operation before the twilight switch finally sends the signal to switch the lighting system off.
- During the night, the power switch will again measure the entire burning time, compare this value with the stored values and then reset the starting time for power-reduced operation.
- The period of power-reduced operation can be adjusted by changing the dial setting. This period can be extended in both directions (i.e. earlier or later) as detailed in the table on page 103.
- If the dial is, for instance, set to 9 (1/2) this will produce a total period of power-reduced operation of 9 hours (1+6+2). As a result, power-reduced operation will begin one hour earlier than the value determined the night before would ordinarily prescribe and will then extend the minimum period of power-reduced operation by two hours.
- If, in very rare cases, the total burning period of the lighting system should remain under six hours per night, the power switch will activate power-reduced operation after 15 minutes of nominal operation and stay in power-reduced mode until the lighting system is switched off. Switching diagram for power reduced operation.

Switching diagram for power reduced operation



Deactivating reduced-power operation for the night

The functional scope of the PR 12 K LC power switch has been extended with an extra function that permits the operator to deactivate reduced-power operation of the lighting system for a single night. The function can be useful for local festivities or events (e.g. town fêtes) during which it would not be appropriate to operate the local street lighting system at reduced power for safety reasons.

The power switch can be easily programmed to operate the lighting system at normal (i.e. 100%) power for the immediately following night cycle. The power switch is programmed by briefly switching the lighting system on for a period of min. 60 and max. 90 seconds during the day of the event and then switching it off again. The intelligent power switch recognises this command and sets the usual reduced-power operation to zero. The power switch can be successively programmed in this manner as many days in a row as necessary. For every night the lighting system is to be operated at normal (100%) power, the lighting system will have to be switched on for a period of min. 60 and max. 90 seconds during the day. The lighting system will be operated at normal (100%) power in the respective night following day-time activation of the extra function.

The power switch does not need to be reprogrammed to return to power-reduced operation of the lighting system. The power switch will automatically return to its original (power-reducing) program if the lighting system is not switched on during the day for a period of min. 60 and max. 90 seconds.

Before testing the extra function, it is important to ensure that the power switch has been in operation for at least one night cycle. Only then will the "learning cycle" start that is required to perform the basic function. After that, the extra function can be activated as described above.

Luminaire testing

The 'Test (Code 0)' dial setting on the power switch is used for luminaire testing during production as well as for direct function tests for "subsequent" installation in the lighting system. After the luminaire is switched on, the lamp is first operated at its nominal rating. After only five seconds, the system will be switched over to power-reduced operation, which will produce a visible change even though the lamp will not yet have attained its full output.

Maintenance work on the lighting system

Maintenance work that requires the lighting system to be switched on for a period of less than two hours will not influence the settings of power switch PR 12 K LC.
Should the lighting system need to be switched on for more than two hours during maintenance work, the PR 12 K LC power switch will activate power-reduced operation after 15 minutes of nominal operation in the following night and will then start to re-measure the total burning time of the lighting system. To determine the starting time of power-reduced operation for subsequent nights, the power switch will again use the stored comparative values.

Switch Units

For power reduction using electronic ballasts with a 1–10 V interface

Suitable for a broad range of lamps

Vossloh-Schwabe's switch units are designed to enable one-step power reduction of lamps (FL, CFL, LED, HS, HI and C-HI) with the help of the respective electronic ballast or converter. To this end, the switch units utilises the 1–10 V interface of the control gear unit. The switch unit is mainly intended for outdoor luminaires in systems with or without a control phase.

Discharge lamps may only be operated at reduced power if they have been expressly approved for this purpose by the manufacturer. In addition, the unit can also be used to dim tubular and compact fluorescent lamps as well as LEDs.

The 1–10 V interface is addressed via an external circuit at the output of the switch unit using a suitably dimensioned resistor. The type of resistor and circuitry are selected by the luminaire manufacturer to suit the desired degree of power reduction.
The switch unit satisfies the provisions of DIN EN 61347 and is suitable for use in outdoor luminaires of protection classes I and II.

Function PR 1–10 V K LC

The intelligent PR 1–10 V K LC switch unit does not require a control line to reduce lamp output.

Thanks to an integrated microprocessor, the PR 1–10 V K LC switch unit can measure the burning time of the luminaire. This value is then compared to data stored on the chip and used to set the time at which the luminaire will switch over to power-reduced operation.

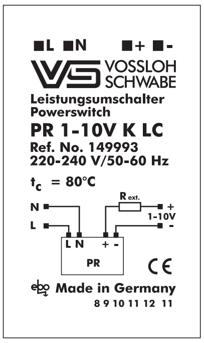
The luminaire will be operated at reduced power for a minimum of six hours (reduced by approx. 40% of the lamp's nominal rating at 50% of luminous flux). This period of power reduction can be extended to a maximum of 10 hours.

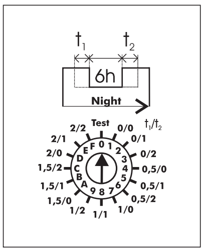
Setting periods of power-reduced operation for PR 1–10 V K LC

The PR 1–10 V K LC switch unit is delivered in its default setting – i.e. the dial is set to 'Test (Code 0)'.
After the luminaire has been installed, the desired power reduction time must be set using the dial on the switch unit. The power-reduction period can be set to a minimum of six hours and can be extended by up to two hours in both directions (i.e. earlier or later). This results in a maximum power-reduction period of 10 hours.

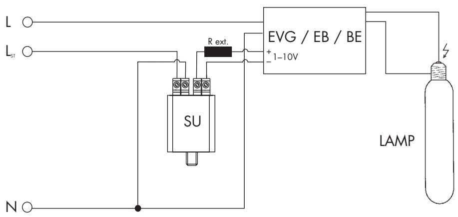
The dial enables the following settings:

Dial Settings Position	Timings	t1 Hours	Basic power reduction period (hrs)	t2 Hours	Total power reduction time (hrs)
0	Test	Factory setting: 5 seconds on full load, followed by power reduction			
1	0/0	0	6	0	6
2	0/1	0	6	1	7
3	0/2	0	6	2	8
4	0.5/0	0.5	6	0	6.5
5	0.5/1	0.5	6	1	7.5
6	0.5/2	0.5	6	2	8.5
7	1/0	1	6	0	7
8	1/1	1	6	1	8
9	1/2	1	6	2	9
A	1.5/0	1.5	6	0	7.5
B	1.5/1	1.5	6	1	8.5
C	1.5/2	1.5	6	2	9.5
D	2/0	2	6	0	8
E	2/1	2	6	1	9
F	2/2	2	6	2	10

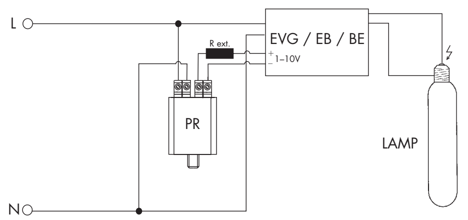




Circuit diagrams for switch units



SU 1–10 V K



PR 1–10 V K LC

Lamp Table for Discharge Lamps

High-pressure sodium lamps (HS lamps)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system		Pulse ignition system		Instant restrike ignition system		Control gear unit	EB
				Ignitor	Ballast	Ignitor	Ballast	Ignitor	Ballast		
Lamp output 35 W											
Philips	SDW-T	PG12-1	0.48	ignitor/ stabiliser	NaH 35II	–	–	–	–	–	–
Sylvania	SHP-S…CO/E	E27	0.53	Z 70…	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	–	–
Lamp output 50 W											
Aura	ST 50 W	E27	0.80	Z 70…	NaH 50	PZ 1000KD20	NaH 50PZT	–	–	VNaH 50	–
Aura	SE 50 W	E27	0.80	Z 70…	NaH 50	PZ 1000KD20	NaH 50PZT	–	–	VNaH 50	–
GE	LU…	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
GE	LU…XO	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
GE	LU…SBY	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Iwasaki	NH…/HV/…	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Narva	NA	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Narva	NA…-D	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Osram	NAV-E …/E	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Osram	NAV-E…4Y	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Osram	NAV-T…Super 4Y	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Philips	SDW-T	PG12-1	0.78	ignitor/ stabiliser	NaH 50II	–	–	–	–	–	–
Philips	SON…Hg free	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Philips	SON…Pro	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Philips	SON-T…Plus	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Radium	RNP	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Sylvania	SHP-S	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Sylvania	SHP-TS	E27	0.76	Z 70…	NaH 50	PZ 1000KD20	–	–	–	–	–
Lamp output 70 W											
Aura	ST 70 W	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Aura	SE 70 W	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
BLV	HST-SE	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
GE	LU	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
GE	LU…RFL	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
GE	LU…SBY	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
GE	LU…XO	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Iwasaki	NH…/HV/…	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Narva	NA.	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Narva	NA…-D	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Osram	NAV-E…/E	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Osram	NAV-E…4Y	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Osram	NAV-T	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Osram	NAV-T…4Y	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Osram	NAV-T…Super 4Y	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Osram	NAV-TS…Super 4Y	RX7s	0.98	Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	–
Philips	SON…Hg free	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Philips	SON…Pro	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Philips	SON-T…Plus	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Philips	SON-T…Pro	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Radium	RNP-E	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Radium	RNP-T	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Radium	RNP-TS	RX7s	0.98	Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	–
Sylvania	SHP	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Sylvania	SHP-T	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Sylvania	SHP-TS	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Sylvania	SHP…/CO-E	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Sylvania	SHP-S	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Lamp output 100 W											
Aura	ST 100 W	E40	1.20	Z 250…, Z 400…	NaHJ100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Aura	SE 100 W	E40	1.20	Z 250…, Z 400…	NaHJ100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
BLV	HST-SE	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
GE	LU	E40	1.20	Z 250…, Z 400…	NaHJ100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
GE	LU…SBY	E40	1.20	Z 250…, Z 400…	NaHJ100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
GE	LU…XO	E40	1.20	Z 250…, Z 400…	NaHJ100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Iwasaki	NH…F	E40	1.20	Z 250…, Z 400…	NaHJ100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Iwasaki	NHT…F	E40	1.20	Z 250…, Z 400…	NaHJ100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Narva	NA.	E40	1.20	Z 250…, Z 400…	NaHJ100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–

Lamp Table for Discharge Lamps

High-pressure sodium lamps (HS lamps)

Manu-	Designation	Base	Lamp	Superimposed ignition system		Pulse ignition system		Instant restrike ignition system		Control	EB
facturer			current	Ignitor	Ballast	Ignitor	Ballast	Ignitor	Ballast	gear unit	
Lamp output 100 W											
Narva	NA…-D	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Osram	NAV-E	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Osram	NAV-E…Super 4Y	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Osram	NAV-T	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Osram	NAV-T…Super 4Y	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Philips	SDW-T	PG12-1	1.30	ignitor/ stabiliser	NaH 100II	–	–	–	–	–	–
Philips	SON…Plus	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Philips	SON…Pro	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Philips	SON-T…Hg free	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Philips	SON-T…Plus	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Philips	SON-T…Pro	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Radium	RNP-E	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Radium	RNP-T	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Sylvania	SHP-S	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Sylvania	SHP-T	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Sylvania	SHP-TS	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Lamp output 150 W											
Aura	ST 150 W	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Aura	SE 150 W	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
BLV	HST-DE	Fc2	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 600K	NaHJ 150	VNaHJ 150	–
BLV	HST-DE	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 600K	NaHJ 150	VNaHJ 150	–
BLV	HST-SE	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
GE	LU	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
GE	LU…SBY	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
GE	LU…XO	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Iwasaki	NH	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Iwasaki	NHT	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Narva	NA	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Narva	NA…-D	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Osram	NAV-E	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Osram	NAV-E…4Y	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Osram	NAV-E…Super 4Y	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Osram	NAV-T	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Osram	NAV-T…4Y	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Osram	NAV-T…Super 4Y	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Osram	NAV-TS…Super 4Y	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 600K	NaHJ 150	VNaHJ 150	–
Philips	SON…Hg free	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Philips	SON…Plus	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Philips	SON…Pro	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Philips	SON…Comfort Pro	E40	1.82	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Philips	SON-T…Hg free	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Philips	SON-T…Plus	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Philips	SON-T…Pro	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Philips	SON-T…Comfort Pro	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Radium	RNP-E	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Radium	RNP-T	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Radium	RNP-TS	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 600K	NaHJ 150	VNaHJ 150	–
Sylvania	SHP-S	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Sylvania	SHP-T	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Sylvania	SHP-TS	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Lamp output 250 W											
Aura	ST 250 W	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Aura	SE 250 W	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
BLV	HST-DE	RX7s	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 600K	NaHJ 250	VNaHJ 250	–
BLV	HST-SE	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
GE	LU	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
GE	LU…SBY	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
GE	LU…TD	RX7s	2.95	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 600K	NaHJ 250	VNaHJ 250	–
GE	LU…XO	E40	2.95	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Iwasaki	NH	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Iwasaki	NHT	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–

Lamp Table for Discharge Lamps

High-pressure sodium lamps (HS lamps)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system		Pulse ignition system		Instant restrike ignition system		Control gear unit	EB
				Ignitor	Ballast	Ignitor	Ballast	Ignitor	Ballast		
Lamp output 250 W											
Narva	NA	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Narva	NA…-D	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	NAV-E	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	NAV-E…4Y	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	NAV-E…Super 4Y	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	NAV-T	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	NAV-T…4Y	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	NAV-T…Super 4Y	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	NAV-TS	RX7s	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 600K	NaHJ 250	VNaHJ 250	–
Philips	SON…Hg free	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Philips	SON…Plus	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Philips	SON…Pro	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Philips	SON…Comfort Pro	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Philips	SON-T…Hg free	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Philips	SON-T…Plus	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Philips	SON-T…Pro	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Philips	SON-T…Comfort Pro	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Radium	RNP-E	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Radium	RNP-T	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Sylvania	SHP	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Sylvania	SHP-T	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Sylvania	SHP-S	E40	2.95	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Sylvania	SHP-TS	E40	2.95	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Lamp output 400 W											
Aura	ST 400 W	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Aura	SE 400 W	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
BLV	HST-DE	RX7s	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	HZ 600K	NaHJ 400	VNaHJ 400	–
BLV	HST-SE	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
GE	LU	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
GE	LU…PSL	E40	4.30	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
GE	LU…SBY	E40	4.45	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
GE	LU…TD	RX7s	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	HZ 600K	NaHJ 400	VNaHJ 400	–
GE	LU…XO	E40	4.50	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Iwasaki	NH	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Iwasaki	NHT	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Narva	NA	E40	4.45	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Narva	NA…-D	E40	4.45	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Narva	NA…-S	E40	4.45	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	NAV-E	E40	4.45	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	NAV-E…4Y	E40	4.45	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	NAV-E…Super 4Y	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	NAV-T	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	NAV-T…4Y	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	NAV-T…Super 4Y	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	NAV-TS	RX7s	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	HZ 600K	NaHJ 400	VNaHJ 400	–
Osram	Plantastar	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON…Hg free	E40	4.50	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON…Plus	E40	4.50	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON…Pro	E40	4.45	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON…Comfort Pro	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON-T…Agro	E40	4.13	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON-T… Green Power	E40	4.23	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON-T…Hg free	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON-T…Plus	E40	4.50	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON-T…Pro	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Philips	SON-T…Comfort Pro	E40	4.45	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Radium	RNP-E	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Radium	RNP-T	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Sylvania	SHP	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Sylvania	SHP-S	E40	4.50	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Sylvania	SHP-TS	E40	4.50	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Sylvania	SHP-TS…Gro-Lux	E40	4.00	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–

Lamp Table for Discharge Lamps

High-pressure sodium lamps (HS lamps)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system		Pulse ignition system		Instant restrike ignition system		Control gear unit	EB
				Ignitor	Ballast	Ignitor	Ballast	Ignitor	Ballast		
Lamp output 600 W											
Aura	ST 600 W	E40	6.20	Z 1000…	NaHJ 600	PZ 1000KD20	NaHJ 600PZT	–	–	VNaHJ 600	–
Aura	SE 600 W	E40	6.20	Z 1000…	NaHJ 600	PZ 1000KD20	NaHJ 600PZT	–	–	VNaHJ 600	–
GE	LU…PSL	E40	6.00	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
GE	LU…XO	E40	6.00	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
GE	LU 400V/600W PSL	E40	3.60	Z 1000/400V	NaH 600/400V	PZ 1000/400V A5	NaH 600PZT/400V	–	–	–	–
Narva	NA	E40	6.20	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Narva	NA…-S	E40	6.20	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Osram	NAV-T….Super 4Y	E40	6.20	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Osram	Plantastar 600	E40	6.20	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Philips	SON-T…Plus	E40	5.80	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Philips	SON-T… Green Power	E40	6.30	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Philips	SON-T 600W/400V Green Power	E40	3.62	Z 1000/400V	NaH 600/400V	PZ 1000/400V A5	NaH 600PZT/400V	–	–	–	–
Philips	SON-T 600W EL 400V Green Power*	E40	2.93 –2.24	–	–	–	–	–	–	–	–
Radium	RNP-T	E40	6.20	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Sylvania	SHP-TS	E40	5.90	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Sylvania	SHP-TS…Gro-Lux	E40	5.50	Z 750…	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Lamp output 750 W											
GE	LU…PSL	E40	7.00	Z 750…	NaH 750	PZ 1000KD20	NaH 750/600PZT	–	–	–	–
GE	LU 400V/750W PSL	E40	4.40	Z 1000/400V	NaH 750/400V	PZ 1000/400V A5	NaHJ 750PZT	–	–	–	–
Lamp output 1000 W											
Aura	ST 1000 W	E40	10.60	Z 1000…	NaHJ 1000	PZ 1000KD20	–	–	–	–	–
Aura	SE 1000 W	E40	10.30	Z 1000…	NaHJ 1000	PZ 1000KD20	–	–	–	–	–
GE	LU…T	E40	10.60	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
GE	LU…D	E40	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
GE	LU…TD	RX7s	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Iwasaki	NH	E40	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Iwasaki	NHT	E40	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Narva	NA	E40	10.60	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Narva	NA…-D	E40	10.60	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Narva	NAT-VEG 1000/400V	E40	5.70	Z 1000/400V, Z 2000/400V	–	PZ 1000/400V A5	–	–	–	–	–
Osram	NAV-E	E40	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Osram	NAV-T	E40	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Philips	SON…Pro	E40	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Philips	SON-T…Pro	E40	10.60	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Philips	SON-T 1000W EL 400V Green Power**	Wire	4–3.17	–	–	–	–	–	–	–	–
Radium	RNP-E	E40	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Radium	RNP-T	E40	10.30	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Sylvania	SHP-T	E40	10.60	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–
Sylvania	SHP-T…SBY	E40	10.60	Z 1000…	NaH 1000, NaHJD 1000	PZ 1000KD20	–	–	–	–	–

* Voltage range 210–275 V ** Voltage range 250–315 V

Lamp Table for Discharge Lamps

Metal halide lamps (HI lamps)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system		Pulse ignition system		Instant restrike ignition system		Control gear unit	EB
				Ignitor	Ballast	Ignitor	Ballast	Ignitor	Ballast		
Lamp output 70 W											
BLV	HIE	E27	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
BLV	HIE-P	E27	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
BLV	HIT	G12	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
BLV	HIT-DE	RX7s	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
GE	ARC	G12	0.95	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
GE	ARC	Rx7s	0.95	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Iwasaki	M	E27	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Iwasaki	MT	E27	1.00	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Iwasaki	MT	G8.5	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Iwasaki	MT	G12	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Narva	NC…	E27; G12	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Narva	NC…	RX7s	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Osram	HQI-E	E27	0.95–1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HQI-T	G12	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HQI-TS	RX7s	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Philips	MHN-TD	RX7s	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Philips	MHW-TD	RX7s	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Radium	HRI-E	E27	0.95	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Radium	HRI-T	G12	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Radium	HRI-TS	RX7s	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Sylvania	HSI-MP	E27	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Sylvania	HSI-T	G12	0.95	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Sylvania	HSI-TD	RX7s	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Venture	HIE	E27	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Venture	HIPE	E27	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Venture	HIT	E27	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Venture	HIT	G12	0.90	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Venture	MH-DE	RX7s	1.00	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Lamp output 100 W											
BLV	HIE	E27	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
BLV	HIE-P	E27	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Narva	NC…	E27; E40	1.10	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Osram	HQI-E	E27	1.10	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Radium	HRI-E	E27	1.10	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Sylvania	HSI-MP	E27	1.15	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Venture	HIE	E27	1.10	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Venture	HIPE	E27; E40	1.10	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Venture	HIT	E27; E40	1.10	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Lamp output 150 W											
BLV	HIE	E27	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
BLV	HIE-P	E27	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
BLV	HIT	G12; E27; E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
BLV	HIT-DE	RX7s-24	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
GE	ARC	G12	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
GE	ARC	RX7s-24	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Iwasaki	M	E27	1.90	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Iwasaki	MT	E27	1.90	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Iwasaki	MT	G12	1.90	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Iwasaki	MTD	RX7s	1.90	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Narva	NC…	E27; E40; G12	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Narva	NC…	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Osram	HQI-E	E27	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Osram	HQI-R	connector	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Osram	HQI-T	G12	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Osram	HQI-TS	RX7s-24	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Philips	MHN-TD	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Philips	MHW-TD	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Radium	HRI-E	E27	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Radium	HRI-T	G12	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Radium	HRI-TS	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150

Lamp Table for Discharge Lamps

Metal halide lamps (HI lamps)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system		Pulse ignition system		Instant restrike ignition system		Control gear unit	EB
				Ignitor	Ballast	Ignitor	Ballast	Ignitor	Ballast		
Lamp output 150 W											
Sylvania	HSI-MP	E27	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Sylvania	HSI-T	G12	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Sylvania	HSI-TD	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Venture	HIE	E27	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Venture	HIPE	E27; E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Venture	HIT	E27; E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Venture	HIT	G12	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Venture	MH-DE	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Lamp output 250 W											
BLV	HIE	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
BLV	HIT	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
BLV	HIT-DE	Fc2	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
GE	ARC250/T	E40	2.75	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
GE	ARC250/TD	Fc2	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
Narva	NC…	E40	2.15	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Narva	NC…-P	E40	2.15	–	–	PZI 1000/1	Q 250	–	–	–	–
Osram	HQI-E	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	HQI-E/P	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	HQI-T	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	HQI-TS	Fc2	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
Philips	HPI Plus	E40	2.20	Z 250…, Z 400…	–	PZI 1000/1	Q 250	–	–	–	–
Philips	HPI-T	E40	2.15	Z 250…, Z 400…	–	PZI 1000/1	Q 250	–	–	–	–
Philips	MHN-TD	Fc2	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Radium	HRI-E	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Radium	HRI-T	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Radium	HRI-TS	Fc2	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
Sylvania	HSI-HX	E40	2.10	–	–	PZI 1000/1	Q 250	–	–	–	–
Sylvania	HSI-T	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Sylvania	HSI-TD	Fc2	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
Sylvania	HSI-THX	E40	2.10	–	–	PZI 1000/1	Q 250	–	–	–	–
Sylvania	HSI-TSX	E40	2.90	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Sylvania	HSI-SX	E40	2.90	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Venture	HIE	E40	3.10	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Venture	HIPE	E40	3.10	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Venture	HIT	E40	3.10	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Venture	HIT…EURO	E40	2.10	–	–	PZI 1000/1	Q 250	–	–	–	–
Venture	MH-DE	Fc2	3.10	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
Lamp output 400 W											
BLV	HIE	E40	4.00	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
BLV	HIT	E40	4.00	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
GE	ARC400/T	E40	4.35	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Narva	NC…	E40	3.25	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Narva	NC…-P	E40	3.25	–	–	PZI 1000/1	Q 400	–	–	–	–
Osram	HQI-E	E40	3.50	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	HQI-E/P	E40	3.50	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	HQI-T	E40	3.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	HQI-TS	Fc2	3.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	HZ 1000K	NaHJ 400	VNaHJ 400	–
Philips	HPI-T	E40	3.40	–	–	PZI 1000/1	Q 400	–	–	–	–
Philips	MH-T	E40	3.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Radium	HRI-BT	E40	4.00	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Radium	HRI-E	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Radium	HRI-T	E40	4.60	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Radium	HRI-TS	Fc2	4.10	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	HZ 1000K	NaHJ 400	VNaHJ 400	–
Sylvania	HSI-HX	E40	3.40	–	–	PZI 1000/1	Q 400	–	–	–	–
Sylvania	HSI-T	E40	4.00	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Sylvania	HSI-THX	E40	3.40	–	–	PZI 1000/1	Q 400	–	–	–	–
Sylvania	HSI-TSX	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Sylvania	HSI-SX	E40	4.40	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Venture	HIE	E40	3.20	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Venture	HIPE	E40	3.20	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–

1 2 3 4 5 6 7 8 9 10

Lamp Table for Discharge Lamps

Metal halide lamps (HI lamps)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system Ignitor	Superimposed ignition system Ballast	Pulse ignition system Ignitor	Pulse ignition system Ballast	Instant restrike ignition system Ignitor	Instant restrike ignition system Ballast	Control gear unit	EB
Lamp output 400 W											
Venture	HIT	E40	3.20	Z 400…, Z 1000…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Venture	HIT …EURO	E40	3.20	–	–	PZI 1000/1	Q 400	–	–	–	–
Lamp output 600 W											
Osram	HQI-TM	G22	6.10	Z1000	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Radium	HRI-TM	G22	6.10	Z1000	NaH 600	PZ 1000KD20	NaH 600PZT	–	–	VNaH 600	–
Lamp output 1000 W											
BLV	HIT	E40	9.50	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	–	–	–	–
GE	SPL 1000	E40	9.50	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	–	–	–	–
Narva	NC…	E40	8.25	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	–	–	–	–
Narva	NC…-P	E40	8.25	–	–	PZI 1000/1	Q 1000	–	–	–	–
Narva	NCT…/400V	E40	4.80	Z 1000/400V; Z 2000/400V	NaHJ 1000	–	–	–	–	–	–
Osram	HQI-TM	G22	9,50	Z 1000	NaHJ 1000	PZ 1000KD20					
Osram	HQI-E	E40	9.50	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	–	–	–	–
Osram	HQI-T	E40	9.50	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	–	–	–	–
Osram	HQI-TS	cables	9.60	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	HZ 1000K	NaHJ 1000	–	–
Philips	HPI-T	E40	8.25	–	–	PZI 1000/1	Q 1000	–	–	–	–
Philips	MHN-LA	cables	9.30	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	HZ 1000K	NaHJ 1000	–	–
Radium	HRI-T	E40	9.50	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	–	–	–	–
Radium	HRI-TM	G22	9.50	Z 1000	NaHJ 1000	PZ 1000KD20					
Radium	HRI-TS	cables	9.60	Z 1000…, Z 2000	NaHJ 1000	PZ 1000KD20	–	HZ 1000K	NaHJ 1000	–	–
Sylvania	HSI-THX	E40	8.25	–	–	PZI 1000/1	Q 1000	–	–	–	–
Venture	HIT	E40	9.15	Z 1000…, Z 2000	NaHJ1000	PZ 1000KD20	–	–	–	–	–
Venture	MBIL	RX7s	4.40	Z 2000/400V	–	–	–	HZ 2000K/ 400V	–	–	–
Lamp output 2000 W											
GE	SPL 2000/T	E40	10.30	Z 2000/400V	JD 2000	–	–	–	–	–	–
Osram	HQI-T/D	E40	10.30	Z 2000/400V	JD 2000	–	–	–	–	–	–
Osram	HQI-T… /380V	E40	8.80	–	–	–	QJ 2000	–	–	–	–
Osram	HQI-TS	cables	11.30	Z 2000/400V	JD 2000	–	–	HZ 2000K/ 400 V	JD 2000	–	–
Osram	HQI-TS	cables	12.2	Z 2000/400V	JD 2000II/ 12.2	–	–	–	–	–	–
Philips	HPI-T 220V	E40	16.50	–	–	PZI 1000/1	JD 2000 I	–	–	–	–
Philips	HPI-T 380V	E40	9.10	–		–	QJ 2000	–	–	–	–
Philips	MHN-LA	cables	9.6–10.3	Z 2000/400V	JD 2000	–	–	HZ 2000K/ 400 V	JD 2000	–	–
Philips	MHN-SA	X830R	11.30	Z 2000/400V	JD 2000	–	–	HZ 2000K/ 400 V	JD 2000	–	–
Philips	MHN-SB 400V	cables	11.30	Z 2000/400V	JD 2000	–	–	HZ 2000K/ 400 V	–	–	–
Radium	HRI-T 230V	E40	16.50 (2x8.25)	–	–	PZI 1000/1	JD 2000 I	–	–	–	–
Radium	HRI-T/D	E40	10.30	Z 2000/400V	JD 2000						
Radium	HRI-TS	E40	10.30	Z 2000/400V	JD 2000	–	–	–	–	–	–
Radium	HRI-TS	cables	11.30	Z 2000/400V	JD 2000	–	–	HZ 2000K/ 400 V*	JD 2000	–	–
Sylvania	HSI-T	E40	9.00	Z 2000/400V	JD 2000	–	–	–	–	–	–
Sylvania	HSI-TD	cables	11.30	Z 2000/400V	JD 2000	–	–	HZ 2000K/ 400	JD 2000	–	–
Venture	MH	cables	10.30	Z 2000	JD 2000	–	–	–	–	–	–
Venture	MBIL	RX7s	10.30	Z 2000	JD 2000	–	–	–	–	–	–
Lamp output 3500 W											
Radium	HRI-T	E40	18.00	Z 3500/400V	JD 3500	–	–	–	–	–	–
Radium	HRI-TS	cables	18.00	Z 3500/400V	JD 3500	–	–	–	–	–	–

* Not suitable HRI-TS 2000W/N/L; HQI-TS 2000W/N/L

Lamp Table for Discharge Lamps

Ceramic discharge tube lamps (C-HI)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system		Pulse ignition system		Instant restrike ignition sysrem		Control gear unit	EB
				Ignitor*	Ballast	Ignitor	Ballast	Ignitor	Ballast		
Lamp output 20 W											
GE	CMH20MR16	GX10	0.21	–	–	–	–	–	–	–	–
GE	CMH20PAR	E27	0.23	–	–	–	–	–	–	–	–
GE	CMH20T	G12	0.23	–	–	–	–	–	–	–	–
GE	CMH20T	GU6.5	0.21	–	–	–	–	–	–	–	–
GE	CMH20TC	G8.5	0.23	–	–	–	–	–	–	–	–
GE	CMH20TC	G12	0.23	–	–	–	–	–	–	–	–
Osram	HCI-PAR	E27	0.22	–	–	–	–	–	–	–	–
Osram	HCI-R111	GX8.5	0.22	–	–	–	–	–	–	–	–
Osram	HCI-TF	GU6.5	0.22	–	–	–	–	–	–	–	–
Osram	HCI-TC	G8.5	0.22	–	–	–	–	–	–	–	–
Philips	CDM-TM	PGJ5	0.22	–	–	–	–	–	–	–	–
Philips	CDM-R	GX10	0.22	–	–	–	–	–	–	–	–
Radium	RCC-TC	G8.5	0.22	–	–	–	–	–	–	–	–
Lamp output 35 W											
Aura	TT 35 W	E27	0.45	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	–
BLV	C-HIT	G12	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
GE	CMH35PAR	E27	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
GE	CMH35T	G12	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
GE	CMH35TC	G8.5	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Osram	HCI-E/P	E27	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Osram	HCI-PAR	E27	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Osram	HCI-R111	GX8.5	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Osram	HCI-T	G12	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Osram	HCI-TC	G8.5	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Osram	HCI-TF	GU6.5	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Panasonic	CPS 35 W	GU8.5	0.44	–	–	–	–	–	–	–	EHXc 35
Philips	CDM-R	E27	0.53	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Philips	CDM-R111	GX8.5	0.53	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Philips	CDM-T	G12	0.53	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Philips	CDM-TC	G8.5	0.53	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Philips	CDM-R	GX10	0,53	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	–	EHXc 35G
Radium	RCC-PAR	E27	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Radium	RCC-T	G12	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Radium	RCC-TC	G8.5	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Sylvania	CMI-T	G12	0.53	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Sylvania	CMI-TC	G8.5	0.53	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Venture	CMH35/T	G12	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Venture	CMH35/TC	G8.5	0.50	Z 250..., Z 400...	NaHJ 35	PZ 1000KD20	NaHJ 35PZT	–	–	VNaHJ 35	EHXc 35
Lamp output 50 W											
Aura	TT 50 W	E27	0.60	Z250..., Z400...	NaH 50	PZ1000KD20	NAH50PZT	–	–	VNaH 50	–
Philips	CDM-TC Elite	G8.5	0,59	Z 70...	NaH 50	–	–	–	–	VNaH 50	–
Philips	CDM-T Elite	G12	0,57	Z 70...	NaH 50	–	–	–	–	VNaH 50	–
Lamp output 70 W											
Aura	TT 70 W	E27	0.80	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
BLV	C-HIT	G12	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
BLV	C-HIT-DE	RX7s	0.90	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
GE	CMH70E	E27	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
GE	CMH70PAR	E27	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
GE	CMH70T	G12	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
GE	CMH70TC	G8.5	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
GE	CMH70TD	Rx7s	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
GE	CMH70TT	E27	0.98	Z 70...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HCI-E/P	E27	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HCI-PAR	E27	0.97	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HCI-R111	GX8.5	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HCI-T	G12	0.96	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HCI-T/P	E27	0.98	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HCI-TC	G8.5	0.96	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Osram	HCI-TS	RX7s	0.95	Z 250..., Z 400...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Osram	HCI-TT	E27	0.92	Z 70...	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70

Lamp Table for Discharge Lamps

Ceramic discharge tube lamps (C-HI)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system Ignitor*	Ballast	Pulse ignition system Ignitor	Ballast	Instant restrike ignition sysrem Ignitor	Ballast	Control gear unit	EB
Lamp output 70 W											
Panasonic	CPS 70 W	GU8.5	0.86	–	–	–	–	–	–	–	EHXc 70
Philips	CDO-ET	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Philips	CDO-TT	E27	1.00	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	–
Philips	CDM-R	E27	0.97	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Philips	CDM-R111	GX8.5	0.97	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Philips	CDM-T	G12	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Philips	CDM-TC	G8.5	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Philips	CDM-TD	RX7s	0.97	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Philips	CDM-TP	PG12-2	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Radium	RCC-PAR	E27	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Radium	RCC-T	G12	0.96	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Radium	RCC-TC	G8.5	0.96	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Radium	RCC-TS	RX7s	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	HZ 600K	NaHJ 70	VNaHJ 70	EHXc 70
Sylvania	CMI-T	G12	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Sylvania	CMI-TC	G8.5	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Sylvania	CMI-TD	RX7s	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Venture	CMH70/T	G12	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Venture	CMH70/TC	G8.5	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Venture	CMH70/TD	RX7s	0.98	Z 250…, Z 400…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Venture	CMH70/TT	E27	0.98	Z 70…	NaHJ 70	PZ 1000KD20	NaHJ 70PZT	–	–	VNaHJ 70	EHXc 70
Lamp output 100 W											
Aura	TT 100 W	E40	1.30	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
GE	CMH100PAR	E26	1.10	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
GE	LUCALOX XO	E40	1.11	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Osram	HCI-E/P	E27	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Osram	HCI-T/P	E27	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Osram	HCI-T	G12	1.10	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Philips	CDO-ET	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Philips	CDO-TT	E40	1.20	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Philips	CDM-T Elite	G12	1.14	Z 250…, Z 400…	NaHJ 100	PZ 1000KD20	NaHJ 100PZT	–	–	VNaHJ 100	–
Lamp output 150 W											
Aura	TT 150 W	E40	1.70	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
BLV	C-HIT	G12	1.85	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
BLV	C-HIT-DE	RX7s-24	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
GE	CMH150T	G12	1.85	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
GE	CMH150TD	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Osram	HCI-E/P	E27	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Osram	HCI-T	G12	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Osram	HCI-T/P	E27	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Osram	HCI-TS	RX7s-24	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	–
Osram	HCI-TT	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Philips	CDO-ET	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Philips	CDO-TT	E40	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Philips	CDM-T	G12	1.80–1.90	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Philips	CDM-TD	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Philips	CDM-TP	PGX12-2	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Radium	RCC-T	G12	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	HZ 1000K	NaHJ 150	VNaHJ 150	EHXc 150
Radium	RCC-TS	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Sylvania	CMI-T	G12	1.82	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Sylvania	CMI-TD	RX7s-24	1.82	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	–
Venture	CMH150/T	G12	1.85	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Venture	CMH150/TD	RX7s	1.80	Z 250…, Z 400…	NaHJ 150	PZ 1000KD20	NaHJ 150PZT	–	–	VNaHJ 150	EHXc 150
Lamp output 250 W											
Aura	TT 250 W	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
GE	CMH250E	E40	2.70	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
GE	CMH250P	E40	2.70	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
GE	CMH-TT	E40	2.90	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	HCI-E	E40	2.90	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	HCI-TC	E40	2.90	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Osram	HCI-TM	G22	2.90	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
Osram	HCI-TS	E40; Fc2	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–

Lamp Table for Discharge Lamps

Ceramic discharge tube lamps (C-HI)

Manu-facturer	Designation	Base	Lamp current	Superimposed ignition system		Pulse ignition system		Instant restrike ignition sysrem		Control gear unit	EB
				Ignitor*	Ballast	Ignitor	Ballast	Ignitor	Ballast		
Lamp output 250 W											
Philips	CDO-TT	E40	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Philips	CDM-T	G12	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Radium	RCC-E	E40	2.90	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Radium	RCC-T	E40	2.80	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	–	–	VNaHJ 250	–
Radium	RCC-TM	G22	2.90	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
Radium	RCC-TS	Fc2	3.00	Z 250…, Z 400…	NaHJ 250	PZ 1000KD20	NaHJ 250PZT	HZ 1000K	NaHJ 250	VNaHJ 250	–
Lamp output 400 W											
Aura	TT 400 W	E40	4.40	Z 400…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
GE	CMHTT	E40	4.60	Z 400M…, Z 400…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–
Osram	HCI-TM	G22	4.45	Z 400M…, Z 400…	NaHJ 400	PZ 1000KD20	NaHJ 400PZT	–	–	VNaHJ 400	–

* Z 400 M VS power ignitor is not suitable for C-HI lamps

Lamp Table for Discharge Lamps

Mercury vapour lamps (HM lamps)

Manufacturer	Designation	Base	Current	Operating devices Ballasts (ignitor not required)	Capacitor at 50 Hz
Lamp output 50 W					
GE	H 50	E27, B22d	0.62	Q 50, Q 80/50	7 µF
Iwasaki	HF 50 PD	E27	0.62	Q 50, Q 80/50	7 µF
Narva	NF 50	E27	0.62	Q 50, Q 80/50	7 µF
Osram	HQL 50	E27	0.62	Q 50, Q 80/50	7 µF
Philips	HPL 50	E27	0.62	Q 50, Q 80/50	7 µF
Radium	HRL 50	E27	0.62	Q 50, Q 80/50	7 µF
Sylvania	HSL 50	E27	0.62	Q 50, Q 80/50	7 µF
Lamp output 80 W					
GE	H 80	E27, B22d-3*	0.80	Q 80, Q 80/50, Q 125/80	8 µF
Iwasaki	HF 80 PD	E27	0.80	Q 80, Q 80/50, Q 125/80	8 µF
Narva	NF 80	E27	0.80	Q 80, Q 80/50, Q 125/80	8 µF
Osram	HQL 80	E27	0.80	Q 80, Q 80/50, Q 125/80	8 µF
Philips	HPL 80	E27	0.80	Q 80, Q 80/50, Q 125/80	8 µF
Radium	HRL 80	E27	0.80	Q 80, Q 80/50, Q 125/80	8 µF
Sylvania	HSL 80	E27	0.80	Q 80, Q 80/50, Q 125/80	8 µF
Lamp output 125 W					
GE	H 125	E27, B22d-3*	1.15	Q 125, Q 125/80	10 µF
Iwasaki	HF 125 PD	E27	1.15	Q 125, Q 125/80	10 µF
Narva	NF 125	E27	1.15	Q 125, Q 125/80	10 µF
Osram	HQL 125	E27, E40	1.15	Q 125, Q 125/80	10 µF
Philips	HPL 125	E27	1.15	Q 125, Q 125/80	10 µF
Radium	HRL 125	E27	1.15	Q 125, Q 125/80	10 µF
Sylvania	HSL 125	E27, B22d-3*	1.15	Q 125, Q 125/80	10 µF
Lamp output 250 W					
GE	H 250	E40	2.15	Q 250, U-Q 250/150	18 µF
Iwasaki	HF 250 PD	E40	2.15	Q 250, U-Q 250/150	18 µF
Narva	NF 250	E40	2.15	Q 250, U-Q 250/150	18 µF
Osram	HQL 250	E40	2.15	Q 250, U-Q 250/150	18 µF
Philips	HPL 250	E40	2.15	Q 250, U-Q 250/150	18 µF
Radium	HRL 250	E40	2.15	Q 250, U-Q 250/150	18 µF
Sylvania	HSL 250	E40	2.15	Q 250, U-Q 250/150	18 µF
Lamp output 400 W					
GE	H 400	E40	3.25	Q 400, U-Q 400/250	25 µF
Iwasaki	HF 400 PD	E40	3.25	Q 400, U-Q 400/250	25 µF
Narva	NF 400	E40	3.25	Q 400, U-Q 400/250	25 µF
Osram	HQL 400	E40	3.25	Q 400, U-Q 400/250	25 µF
Philips	HPL 400	E40	3.25	Q 400, U-Q 400/250	25 µF
Radium	HRL 400	E40	3.25	Q 400, U-Q 400/250	25 µF
Sylvania	HSL 400	E40	3.25	Q 400, U-Q 400/250	25 µF
Lamp output 700 W					
GE	H 700	E40	5.45	Q 700	40 µF
Iwasaki	HF 700 PD	E40	5.40	Q 700	40 µF
Narva	NF 700	E40	5.40	Q 700	40 µF
Osram	HQL 700	E40	5.40	Q 700	40 µF
Philips	HPL 700	E40	5.40	Q 700	40 µF
Radium	HRL 700	E40	5.40	Q 700	40 µF
Sylvania	HSL 700	E40	5.40	Q 700	40 µF
Lamp output 1000 W					
GE	H 1000	E40	7.50	Q 1000	60 µF
Iwasaki	HF 1000 PD	E40	7.50	Q 1000	60 µF
Narva	NF 1000	E40	7.50	Q 1000	60 µF
Osram	HQL 1000	E40	7.50	Q 1000	60 µF
Philips	HPL 1000	E40	7.50	Q 1000	60 µF
Radium	HRL 1000	E40	7.50	Q 1000	60 µF
Sylvania	HSL 1000	E40	7.50	Q 1000	60 µF

* The VS range does not include a lampholder for base B22d-3

Energy efficiency classification

The commission's regulation (EC) No. 245/2009 dated 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to defining ecodesign requirements for fluorescent lamps without integrated ballast, high-pressure discharge lamps and for ballasts and luminaires needed for their operation, and repealing Directive 2000/55/EC of the European Parliament and of the Council (official title), has created a legal framework in the EU that defines fundamental requirements for operating efficient lighting technology products.

Although the Regulation predominantly applies to general lighting, it is also product-orientated and thus independent of any specific application. The efficiency and performance requirements (specifications governing performance features) apply to fluorescent lamps without integrated ballast, high-pressure discharge lamps as well as ballasts and luminaires needed to operate these lamps. A brief overview of the requirements governing high-pressure discharge lamps is provided in the following table (excerpt from the CELMA guide).

Stage	Requirements governing	
1 13.04.2010	Ballasts	• No special requirements.
Interim Stage 13.09.2010	Luminaires	• After 18 months: technical information must be made available, both online and in luminaire documentation (for luminaires > 2,000 Lumens)
2 13.04.2012	Ballasts	• Introduction of minimum energy-efficiency index values for HID ballasts and their labelling: $P < 30$ W – $\eta \geq 65$ % $30 < P < 75$ W – $\eta \geq 75$ % $75 < P < 105$ W – $\eta \geq 80$ % $105 < P < 405$ W – $\eta \geq 85$ % $P > 405$ W – $\eta \geq 90$ % • HID ballasts to be labelled: EEI=A3
	Luminaires	• Luminaire designs must permit the integration of 3rd-stage ballasts. Exception: luminaires > IP4X
at the latest by **13.04.2014**	**Revision of the regulation** Technological progress as well as the sum of the experience gained during the implementation of the Regulatio be taken into oconsideration during the revision process..	
3 13.04.2017	Ballasts	• Minimum energy-efficiency index values will be raised: $P < 30$ W – $\eta \geq 78$% $30 < P < 75$ W – $\eta \geq 85$% $75 < P < 105$ W – $\eta \geq 87$% $105 < P < 405$ W – $\eta \geq 90$% $P > 405$ W – $\eta \geq 92$% • HID ballasts to be labelled: A2
	Luminaires	• All luminaire designs must permit the integration of 3rd-stage ballasts.

Directive EU 245/2009 stipulates limit values governing the energy consumption of lamps, luminaires and control gear, regardless of the technology, and applies to both electromagnetic and electronic control gear. Since the directive will apply in all EU member states with effect from 13th April 2017, it will only be possible to put products into circulation on this market onwards of this date if they comply with the energy efficiency values of stage three of directive EU 245/2009.

However, **outside of the EU** it will continue to be possible to market products of all energy classes, as before, in compliance with local laws and directives.

Warehouse stock held by traders may continue to be marketed without restrictions – even within the EU – after 13th April 2017.

Requirements for replacements constitute a special case with regard to the new directive. If the device in question is to be used for replacement purposes only, the device – even with poorer energy efficiency values than stipulated in the directive and without a CE mark – may be used to replace a defective unit in an existing luminaire.

The **approbation of a luminaire** will not be invalidated by replacing a defective control gear unit with an equivalent replacement control gear unit.

WARMSTART, DIMMABLE AND INSTANT START

ELECTRONIC BALLASTS

Operating fluorescent lamps with electronic ballasts yields numerous advantages with regard to efficiency and convenience. Further details are provided on the respective product pages and the technical appendix.

The brightness of fluorescent lamps can also be regulated with the help of dimmable electronic ballasts. Adjusting lamp wattage leads to a further reduction of energy consumption and of the associated costs. The corresponding ELXd units from Vossloh-Schwabe enable conventional 1–10 V control units to be connected via a bipolar 1–10 V dimmer interface.

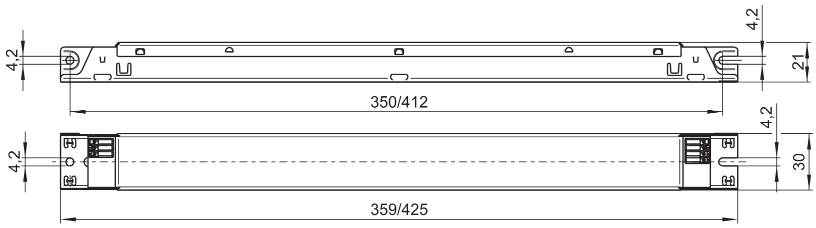
Moreover, Vossloh-Schwabe's product range also contains electronic ballasts that can be dimmed using conventional light sensors or polarity-independent dimmer interfaces via DALI-compatible control units. Both interfaces (1–10 V and DALI) were developed in accordance with EN 60929. Under consideration of the maximum current of the respective control unit, it is also possible to operate several electronic ballasts in parallel.

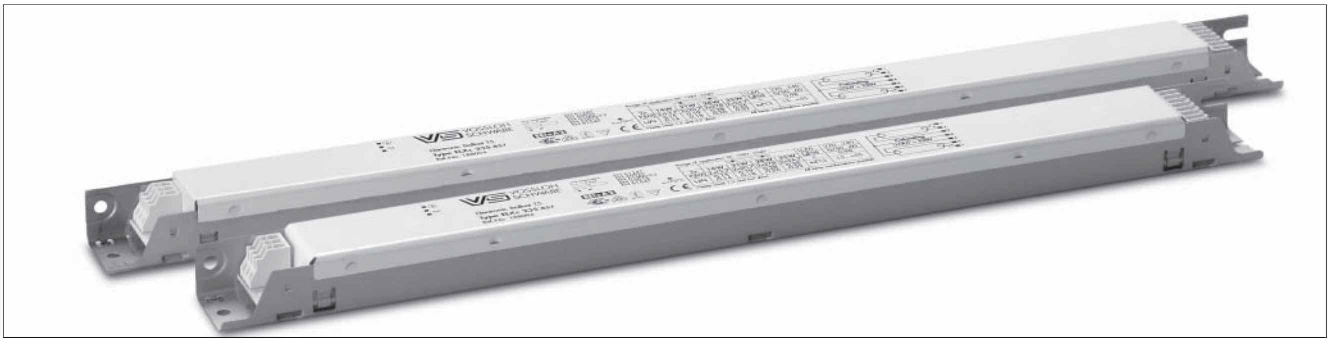
3 Electronic Ballasts for TC and T Lamps

ELXc – Warm Start for TC-F, TC-L Lamps

Electronic built-in ballasts
Casing: metal
Power factor: > 0.96
DC voltage
for operation: 176–264 V
for ignition: 198–264 V
(ELXc 180.866, 280.538: DC voltage cannot be reduced to 176 V)
Push-in terminals: 0.5–1 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
RFI-suppressed
For luminaires of protection class I
Degree of protection: IP20
For lighting systems with
high switching frequency (> 5/day)
EOL shut down approved acc. to EN 61347 Test 2

M10/M11





T5 | TC | BUILT-IN | 1–10 V
T8 | | INDEPENDENT | DALI/PUSH

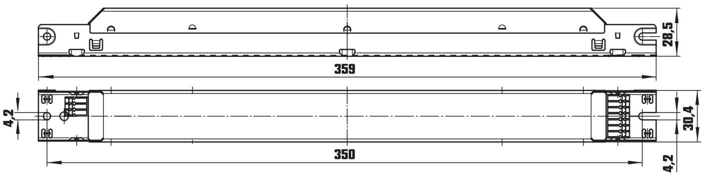
Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
18	TC-F/-L	2G10/2G11	1 x 16.0	ELXc 140.862	**188140**	220–240	A2	–15 to 55	max. 70	M10	19.0	109.0
2x18	TC-F/-L	2G10/2G11	2 x 16.0	ELXc 240.863	**188616**	220–240	A2 BAT	–15 to 55	max. 70	M10	35.0	105.3
24	TC-F/-L	2G10/2G11	1 x 22.0	ELXc 140.862	**188140**	220–240	A2	–15 to 55	max. 70	M10	27.0	109.0
2x24	TC-F/-L	2G10/2G11	2 x 22.0	ELXc 240.863	**188616**	220–240	A2 BAT	–15 to 55	max. 70	M10	51.0	106.8
36	TC-F/-L	2G10/2G11	1 x 32.0	ELXc 140.862	**188140**	220–240	A2	–15 to 55	max. 70	M10	35.0	101.0
2x36	TC-F/-L	2G10/2G11	2 x 32.0	ELXc 240.863	**188616**	220–240	A2 BAT	–15 to 55	max. 70	M10	71.0	98.7
40	TC-L	2G11	1 x 40.0	ELXc 140.862	**188140**	220–240	A2	–15 to 55	max. 70	M10	46.0	104.0
2x40	TC-L	2G11	2 x 40.0	ELXc 240.863	**188616**	220–240	A2 BAT	–15 to 55	max. 70	M10	89.0	103.6
55	TC-L	2G11	1 x 55.0	ELXc 180.866	**188144**	220–240	A2 BAT	–15 to 55	max. 70	M10	62.0	107.3
2x55	TC-L	2G11	2 x 50.0	ELXc 254.865	**188618**	220–240	A2 BAT	–15 to 50	max. 70	M10	112.0	92.9
			2 x 55.0	ELXc 280.538	**188619**	220–240	A2 BAT	–15 to 50	max. 70	M11	120.0	100.0
80	TC-L	2G11	1 x 80.0	ELXc 180.866	**188144**	220–240	A2 BAT	–15 to 55	max. 70	M10	87.0	97.6
2x80	TC-L	2G11	2 x 80.0	ELXc 280.538	**188619**	220–240	A2 BAT	–15 to 50	max. 70	M11	175.0	100.0

Circuit diagrams see pages 220–223

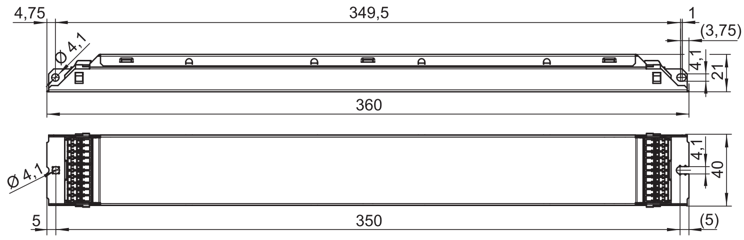
ELXd – Dimmable for TC-F, TC-L Lamps

Electronic built-in ballasts
Casing: metal
Dimming range:
approx. 1–100% of lamp power
Power factor: ≥ 0.95 at 100% operation
DC voltage
for operation: 154–276 V (M22, M23, M24)
for operation: 176–264 V (M9)
for ignition: 198–264 V
Push-in terminals: 0.5–1 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
RFI-suppressed
For luminaires of protection class I
Degree of protection: IP20
Fixing holes for screws M4
for lateral or base mounting
For lighting systems with
high switching frequency (> 5/day)
EOL shut down approved acc. to EN 61347 Test 2

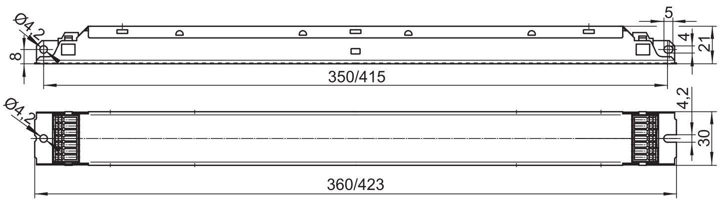
M9



M23



M22/M24



ELXd – Dimmable 1–10 V for TC-F, TC-L lamps

Control voltage: DC 1–10 V
acc. to EN 60929 with earth leakage current 0.5 mA
(protected if connected to mains voltage)
For use with open- or closed-loop control units

○ T5 ◉ TC ◉ BUILT-IN ◉ 1–10 V
○ T8 ○ INDEPENDENT ○ DALI/PUSH

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energie efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
18	TC-F/-L	2G10/2G11	1 x 16.0	ELXd 118.718	**188873**	220–240	EEI=A1	10 to 50	max. 70	M9	18.0	94.0
2x18	TC-F/-L	2G10/2G11	2 x 16.0	ELXd 218.719	**188874**	220–240	EEI=A1	10 to 50	max. 70	M9	36.0	90.6
24	TC-F/-L	2G10/2G11	1 x 22.0	ELXd 118.718	**188873**	220–240	EEI=A1	10 to 50	max. 70	M9	27.0	96.6
			1 x 23.0	ELXd 124.607	**188336**	220–240	A1 BAT	10 to 50	max. 75	M22	26.0	100.0
2x24	TC-F/-L	2G10/2G11	2 x 22.0	ELXd 218.719	**188874**	220–240	EEI=A1	10 to 50	max. 70	M9	52.0	100.8
			2 x 23.0	ELXd 224.608	**188337**	220–240	A1 BAT	10 to 50	max. 75	M24	49.0	100.0
3x24	TC-F/-L	2G10/2G11	3 x 24.0	ELXd 324.623	**188597**	220–240	A1 BAT	10 to 50	max. 75	M23	73.4	100.0
4x24	TC-F/-L	2G10/2G11	4 x 24.0	ELXd 424.624	**188598**	220–240	A1 BAT	10 to 50	max. 75	M23	97.6	100.0
36	TC-F/-L	2G10/2G11	1 x 32.0	ELXd 136.720	**188875**	220–240	A1 BAT	10 to 50	max. 70	M9	37.3	93.5
2x36	TC-F/-L	2G10/2G11	2 x 32.0	ELXd 236.721	**188876**	220–240	EEI=A1	10 to 50	max. 70	M9	72.0	92.6
40	TC-L	2G11	1 x 38.0	ELXd 139.609	**188338**	220–240	A1 BAT	10 to 50	max. 75	M22	42.0	100.0
2x40	TC-L	2G11	2 x 38.0	ELXd 239.610	**188339**	220–240	A1 BAT	10 to 50	max. 75	M24	82.0	100.0
55	TC-L	2G11	1 x 51.0	ELXd 158.722	**188877**	220–240	EEI=A1	10 to 50	max. 70	M9	56.0	92.5
			1 x 54.0	ELXd 154.611	**188340**	220–240	A1 BAT	10 to 50	max. 75	M22	59.0	100.0
2x55	TC-L	2G11	2 x 54.0	ELXd 254.612	**188341**	220–240	A1 BAT	10 to 50	max. 75	M24	115.0	100.0
80	TC-L	2G11	1 x 80.0	ELXd 180.613	**188342**	220–240	A1 BAT	10 to 50	max. 75	M22	88.0	100.0

Circuit diagrams see pages 220–223

ELXd – Dimmable with push key or DALI for TC-F, TC-L lamps

Complete implementation of the DALI-standard:
addressable, memory store for scenes and groups,
revertive information communication, physical and
RND-selection, standardized lamp characteristic
Low-power design ensures very low standby
power consumption
standby power consumption: ≤ 0.2 W

○ T5 ◉ TC ◉ BUILT-IN ○ 1–10 V
○ T8 ○ INDEPENDENT ◉ DALI/PUSH

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energie efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
24	TC-F/-L	2G10/2G11	1 x 23.0	ELXd 124.600	**188329**	220–240	A1 BAT	10 to 50	max. 75	M22	26.0	100.0
2x24	TC-F/-L	2G10/2G11	2 x 23.0	ELXd 224.601	**188330**	220–240	A1 BAT	10 to 50	max. 75	M24	49.0	100.0
3x24	TC-F/-L	2G10/2G11	3 x 23.0	ELXd 324.626	**188600**	220–240	A1 BAT	10 to 50	max. 75	M23	73.4	100.0
4x24	TC-F/-L	2G10/2G11	4 x 23.0	ELXd 424.628	**188602**	220–240	A1 BAT	10 to 50	max. 75	M23	97.6	100.0
40	TC-L	2G11	1 x 38.0	ELXd 139.602	**188331**	220–240	A1 BAT	10 to 50	max. 75	M22	42.0	100.0
2x40	TC-L	2G11	2 x 38.0	ELXd 239.621	**188350**	220–240	A1 BAT	10 to 50	max. 75	M24	82.0	100.0
55	TC-L	2G11	1 x 54.0	ELXd 154.603	**188332**	220–240	A1 BAT	10 to 50	max. 75	M22	59.0	100.0
2x55	TC-L	2G11	2 x 54.0	ELXd 254.604	**188333**	220–240	A1 BAT	10 to 50	max. 75	M24	115.0	100.0
80	TC-L	2G11	1 x 80.0	ELXd 180.605	**188334**	220–240	A1 BAT	10 to 50	max. 75	M22	88.0	100.0

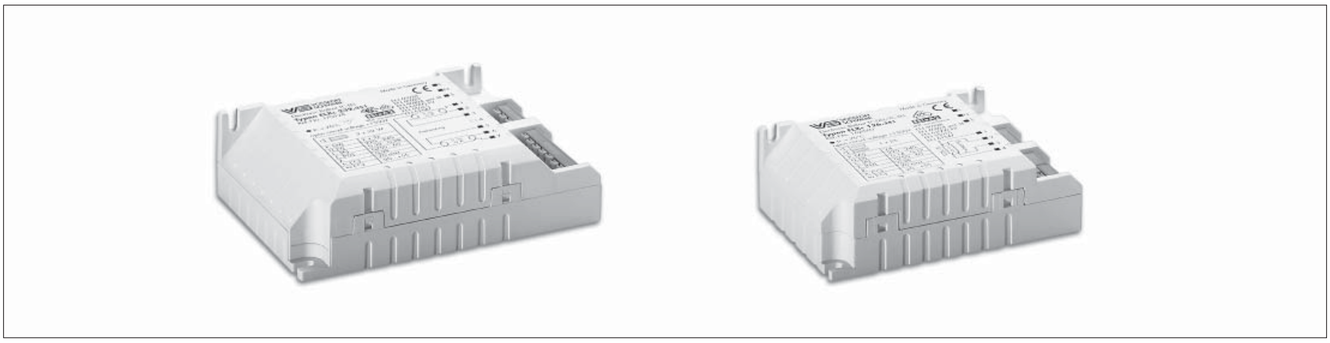
Circuit diagrams see pages 220–223

ELXc – Warm Start for Compact Fluorescent Lamps

Electronic ballasts
Casing: heat-resistant polyamide (K2, K3) or heat-resistant polycarbonate (K2.1)
DC voltage
for operation: 176–264 V
for ignition: 198–264 V
(ELXc 242.837: DC voltage cannot be reduced to 176 V)

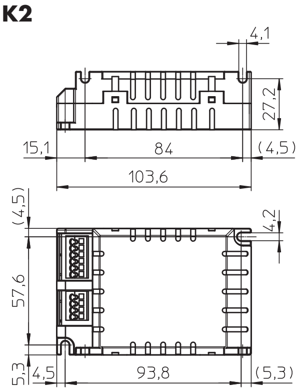
Power factor: > 0.96 (K2.1: 0.98)
Push-in terminals with lever opener: 0.5–1.5 mm²
RFI-suppressed
Constant power consumption
For luminaires of protection class I
Degree of protection: IP20
Fixing brackets for screws M4 for lateral or base mounting

For lighting systems with high switching frequency (> 5/day)
EOL shut down approved acc. to EN 61347 Test 2

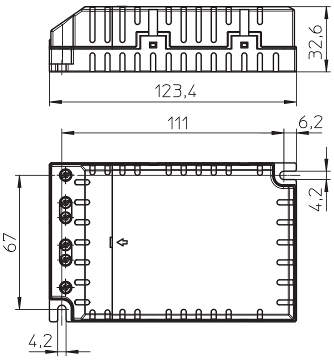


Electronic built-in ballasts

K2

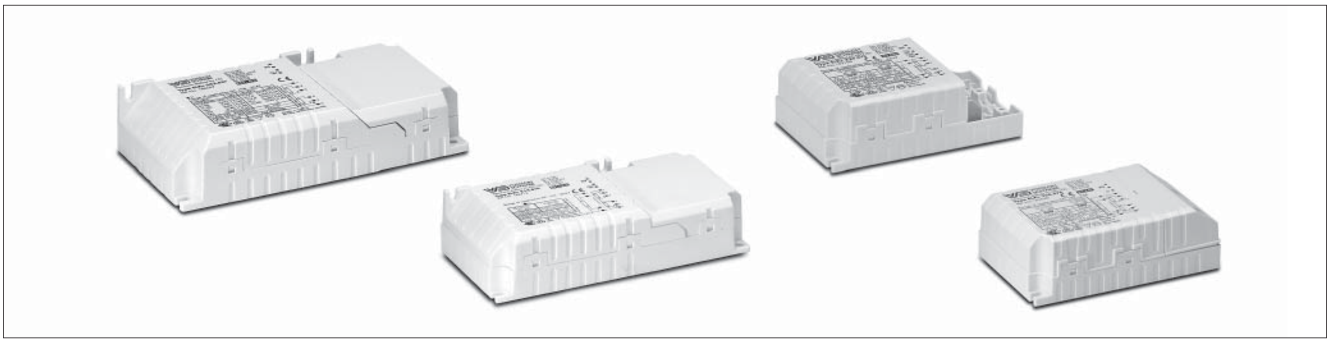


K3



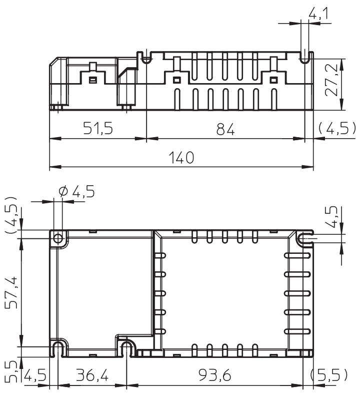
1 2 3 4 5 6 7 8 9 10

ELXc – Warm Start for Compact Fluorescent Lamps

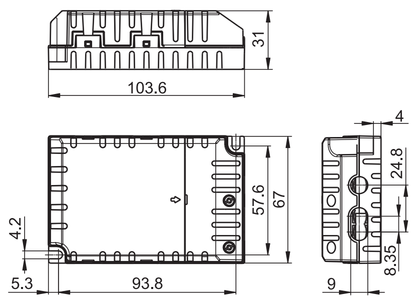


Independent electronic ballasts

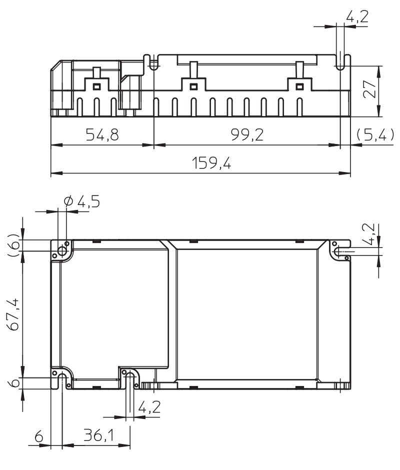
K2 with cord grip

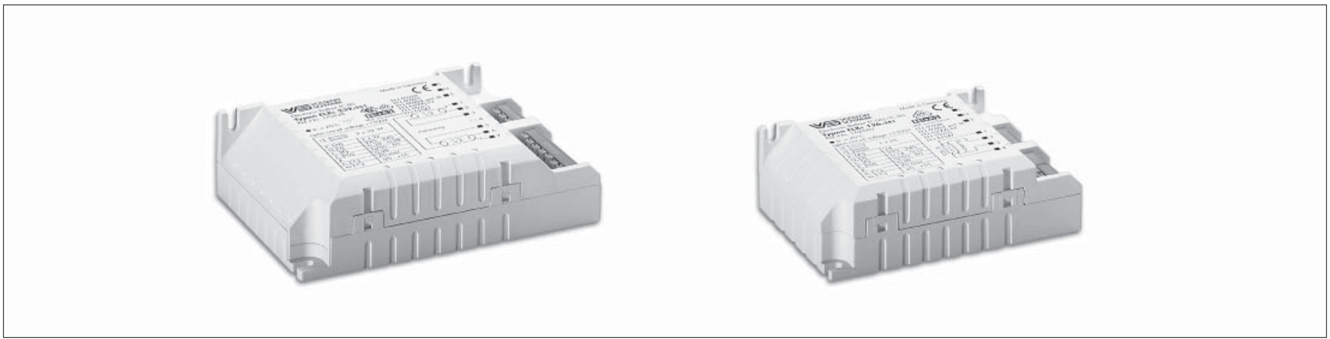


K2.1 with cord grip



K3 with cord grip





ELXc – Warm start for compact fluorescent lamps
Built-in ballasts

ELXc 213.870, 218.871, 142.872, 242.837, 155.378 have a second earth terminal to ground the luminaires for example

○ T5 ◉ TC ◉ BUILT-IN ○ 1–10 V
○ T8 ○ INDEPENDENT ○ DALI/PUSH

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energie efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
9	TC-SEL	2G7	1 x 8.0	ELXc 213.870	**188698**	220–240	A2 BAT	–20 to 50	max. 65	K2	10.7	102.9
2x9	TC-SEL	2G7	2 x 8.0	ELXc 213.870	**188698**	220–240	A2 BAT	–20 to 50	max. 65	K2	19.4	102.9
10	TC-DEL	G24q-1	1 x 9.5	ELXc 213.870	**188698**	220–240	A2 BAT	–20 to 50	max. 65	K2	10.9	99.2
2x10	TC-DEL	G24q-1	2 x 9.5	ELXc 213.870	**188698**	220–240	A2 BAT	–20 to 50	max. 65	K2	20.5	98.8
11	TC-SEL	2G7	1 x 11.0	ELXc 213.870	**188698**	220–240	A2 BAT	–20 to 50	max. 65	K2	14.7	110.1
2x11	TC-SEL	2G7	2 x 11.0	ELXc 213.870	**188698**	220–240	A2 BAT	–20 to 50	max. 65	K2	27.9	116.1
13	TC-DEL/-TEL	G24q-1/GX24q-1	1 x 12.5	ELXc 213.870	**188698**	220–240	A2 BAT	–20 to 50	max. 65	K2	15.0	102.9
2x13	TC-DEL/-TEL	G24q-1/GX24q-1	2 x 12.5	ELXc 213.870	**188698**	220–240	A2 BAT	–20 to 50	max. 65	K2	28.1	110.9
18	TC-DEL/-TEL	G24q-2/GX24q-2	1 x 16.5	ELXc 218.871	**188699**	220–240	A2 BAT	–20 to 50	max. 65	K2	21.0	104.8
	TC-F/-L	2G10/2G11	1 x 16.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	18.0	102.0
2x18	TC-DEL/-TEL	G24q-2/GX24q-2	2 x 16.5	ELXc 218.871	**188699**	220–240	A2 BAT	–20 to 50	max. 65	K2	38.0	100.7
	TC-F/-L	2G10/2G11	2 x 16.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	35.0	104.3
				ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	34.0	98.0
22	T-R5	2GX13	1 x 22.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	26.0	103.0
				ELXc 128.869	**188589**	220–240	A2 BAT	–20 to 50	max. 70	K2	25.0	96.7
22+40	T-R5	2GX13	1 x 22+40	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	68.0	100.0
2x22	T-R5	2GX13	2 x 22.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	48.5	105.8
24	TC-F/-L	2G10/2G11	1 x 22.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	27.0	105.0
			1 x 22.5	ELXc 128.869	**188589**	220–240	A2	–20 to 50	max. 70	K2	25.0	95.8
2x24	TC-F/-L	2G10/2G11	2 x 22.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	48.5	106.2
				ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	47.0	102.0
26	TC-DEL/-TEL	G24q-3/GX24q-3	1 x 24.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	26.0	104.0
2x26	TC-DEL/-TEL	G24q-3/GX24q-3	2 x 24.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	53.0	106.1
				ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	53.0	105.0

Circuit diagrams see pages 220–223

ELXc – Warm start for compact fluorescent lamps
Built-in ballasts

ELXc 213.870, 218.871, 142.872,
242.837, 155.378 have a second earth terminal
to ground the luminaires for example

○ **T5** ◉ **TC** ◉ **BUILT-IN** ○ **1–10 V**
○ **T8** ○ **INDEPENDENT** ○ **DALI/PUSH**

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energie efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
28	TC-DD	GR10q	1 x 26.0	ELXc 128.869	**188589**	220–240	A2 BAT	–20 to 50	max. 70	K2	32.0	98.1
32	TC-TEL	GX24q-3	1 x 32.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	33.0	102.0
2x32	TC-TEL	GX24q-3	2 x 32.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	70.5	104.8
36	TC-F/-L	2G10/2G11	1 x 32.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	34.0	105.0
2x36	TC-F/-L	2G10/2G11	2 x 32.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	70.5	101.8
38	TC-DD	GR10q	1 x 36.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	38.0	95.0
2x38	TC-DD	GR10q	2 x 36.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	79.2	101.3
40	TC-L	2G11	1 x 40.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	43.0	99.0
	T-R5	2GX13	1 x 40.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	41.0	96.0
2x40	TC-L	2G11	2 x 40.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	88.0	101.3
	T-R5	2GX13	2 x 40.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	88.0	101.1
42	TC-TEL	GX24q-4	1 x 42.0	ELXc 142.872	**188700**	220–240	A2 BAT	–20 to 50	max. 65	K2	45.0	99.0
2x42	TC-TEL	GX24q-4	2 x 43.0	ELXc 242.837	**188643**	220–240	A2 BAT	–20 to 50	max. 65	K3	94.5	100.6
55	TC-L	2G11	1 x 55.6	ELXc 155.378	**188680**	220–240	A2 BAT	–20 to 50	max. 70	K3	60.0	102.4
	T-R5	2GX13	1 x 55.6	ELXc 155.378	**188680**	220–240	A2 BAT	–20 to 50	max. 70	K3	60.0	101.2
60	T-R5	2GX13	1 x 60.6	ELXc 155.378	**188680**	220–240	A2	–20 to 50	max. 70	K3	66.0	109.5
80	TC-L	2G11	1 x 80.5	ELXc 155.378	**188680**	220–240	A2 BAT	–20 to 50	max. 70	K3	88.0	101.3

Circuit diagrams see pages 220–223

ELXc – Warm start for compact fluorescent lamps
Independent ballasts

ELXc 213.870, 218.871, 142.872,
155.378 have a second earth terminal
to ground the luminaires

T5 | TC (selected) | BUILT-IN | 1–10 V
T8 | | INDEPENDENT (selected) | DALI/PUSH

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
9	TC-SEL	2G7	1 x 8.0	ELXc 213.870	**188712**	220–240	A2 BAT	–20 to 50	max. 65	K2	10.7	102.9
2x9	TC-SEL	2G7	2 x 8.0	ELXc 213.870	**188712**	220–240	A2 BAT	–20 to 50	max. 65	K2	19.4	102.9
10	TC-DEL	G24q-1	1 x 9.5	ELXc 213.870	**188712**	220–240	A2 BAT	–20 to 50	max. 65	K2	10.9	99.2
2x10	TC-DEL	G24q-1	2 x 9.5	ELXc 213.870	**188712**	220–240	A2 BAT	–20 to 50	max. 65	K2	20.5	98.8
11	TC-SEL	2G7	1 x 11.0	ELXc 213.870	**188712**	220–240	A2 BAT	–20 to 50	max. 65	K2	14.7	110.1
2x11	TC-SEL	2G7	2 x 11.0	ELXc 213.870	**188712**	220–240	A2 BAT	–20 to 50	max. 65	K2	27.9	116.1
13	TC-DEL/-TEL	G24q-1/GX24q-1	1 x 12.5	ELXc 213.870	**188712**	220–240	A2 BAT	–20 to 50	max. 65	K2	15.0	102.9
2x13	TC-DEL/-TEL	G24q-1/GX24q-1	2 x 12.5	ELXc 213.870	**188712**	220–240	A2 BAT	–20 to 50	max. 65	K2	28.1	110.9
18	TC-DEL/-TEL	G24q-2/GX24q-2	1 x 16.5	ELXc 218.871	**188713**	220–240	A2 BAT	–20 to 50	max. 65	K2	21.0	104.8
	TC-F/-L	2G10/2G11	1 x 16.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	18.0	102.0
2x18	TC-DEL/-TEL	G24q-2/GX24q-2	2 x 16.5	ELXc 218.871	**188713**	220–240	A2 BAT	–20 to 50	max. 65	K2	38.0	100.7
	TC-F/-L	2G10/2G11	2 x 16.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	34.0	98.0
22	T-R5	2GX13	1 x 22.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	26.0	103.0
				ELXc 128.869	**188590**	220–240	A2 BAT	–20 to 50	max. 70	K2	25.0	96.7
24	TC-F/-L	2G10/2G11	1 x 22.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	27.0	105.0
	TC-F/-L	2G10/2G11	1 x 22.5	ELXc 128.869	**188590**	220–240	A2	–20 to 50	max. 70	K2	25.0	95.8
2x24	TC-F/-L	2G10/2G11	2 x 22.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	47.0	102.0
26	TC-DEL/-TEL	G24q-3/GX24q-3	1 x 24.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	26.0	104.0
				ELXc 226.878	**183040**	220–240	A2 BAT	–20 to 55	max. 65	K2.1	28.0	104.0
				ELXc 226.878	**183108***	220–240	A2 BAT	–20 to 55	max. 65	K2.1	28.0	104.0
2x26	TC-DEL/-TEL	G24q-3/GX24q-3	2 x 24.0	ELXc 226.878	**183040**	220–240	A2 BAT	–20 to 55	max. 65	K2.1	50.0	101.0
				ELXc 226.878	**183108***	220–240	A2 BAT	–20 to 55	max. 65	K2.1	50.0	101.0
				ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	53.0	105.0

Circuit diagrams see pages 220–223
* Without cover cap on cord grip = built-in version

ELXc – Compact warm start for compact fluorescent lamps – Independent ballasts

ELXc 213.870, 218.871, 142.872, 155.378 have a second earth terminal to ground the luminaires for example

T5 · TC (selected) · BUILT-IN · 1–10 V
T8 · INDEPENDENT (selected) · DALI/PUSH

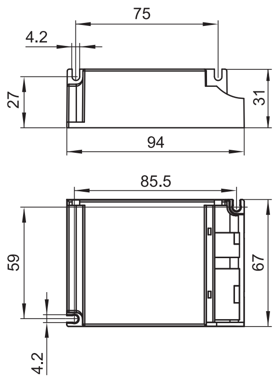
Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
28	TC-DD	GR10q	1 x 26.0	ELXc 128.869	**188590**	220–240	A2 BAT	–20 to 50	max. 70	K2	32.0	98.1
32	TC-TEL	GX24q-3	1 x 32.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	33.0	102.0
36	TC-F/-L	2G10/2G11	1 x 32.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	34.0	105.0
38	TC-DD	GR10q	1 x 36.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	38.0	95.0
40	TC-L	2G11	1 x 40.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	43.0	99.0
	T-R5	2GX13	1 x 40.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	41.0	96.0
42	TC-TEL	GX24q-4	1 x 42.0	ELXc 142.872	**188714**	220–240	A2 BAT	–20 to 50	max. 65	K2	45.0	99.0
55	TC-L	2G11	1 x 55.6	ELXc 155.378	**188681**	220–240	A2 BAT	–20 to 50	max. 70	K3	60.0	102.4
	T-R5	2GX13	1 x 55.6	ELXc 155.378	**188681**	220–240	A2 BAT	–20 to 50	max. 70	K3	60.0	101.2
60	T-R5	2GX13	1 x 60.6	ELXc 155.378	**188681**	220–240	A2	–20 to 50	max. 70	K3	66.0	109.5
80	TC-L	2G11	1 x 80.5	ELXc 155.378	**188681**	220–240	A2 BAT	–20 to 50	max. 70	K3	88.0	101.3

Circuit diagrams see pages 220–223

ELXc – ECO EffectLine Warm Start for Compact Fluorescent Lamps

Electronic ballasts
Casing: PC, white
Mains voltage: 198–264 V
Push-in terminals: 0.5–1.5 mm²
RFI-suppressed
For luminaires of protection class I
Degree of protection: IP20
For lighting systems with
high switching frequency (> 5/day)
EOL shut down approved acc. to EN 61347 Test 1

K1.1



ELXc – Warm start for compact fluorescent lamps – Built-in ballasts

T5 · **TC** (selected) · **BUILT-IN** (selected) · 1–10 V
T8 · INDEPENDENT · DALI/PUSH

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10 %	Energy efficiency	Power factor	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Output W	Luminous factor %
18	TC-DEL/-TEL	G24q-2/GX24q-2	1 x 16.5	ELXc 118.879	**183134**	220–240	A2	> 0.95	–10 to 50	max. 70	19.5	100
2x18	TC-DEL/-TEL	G24q-2/GX24q-2	2 x 16.5	ELXc 218.881	**183136**	220–240	A2	> 0.95	–15 to 50	max. 75	38.0	100
26	TC-DEL/-TEL	G24q-3/GX24q-3	1 x 24.0	ELXc 126.880	**183135**	220–240	A2	> 0.95	–10 to 50	max. 75	28.0	100
2x26	TC-DEL/-TEL	G24q-3/GX24q-3	2 x 24.0	ELXc 226.882	**183137**	220–240	A2	> 0.95	–15 to 50	max. 80	53.5	100

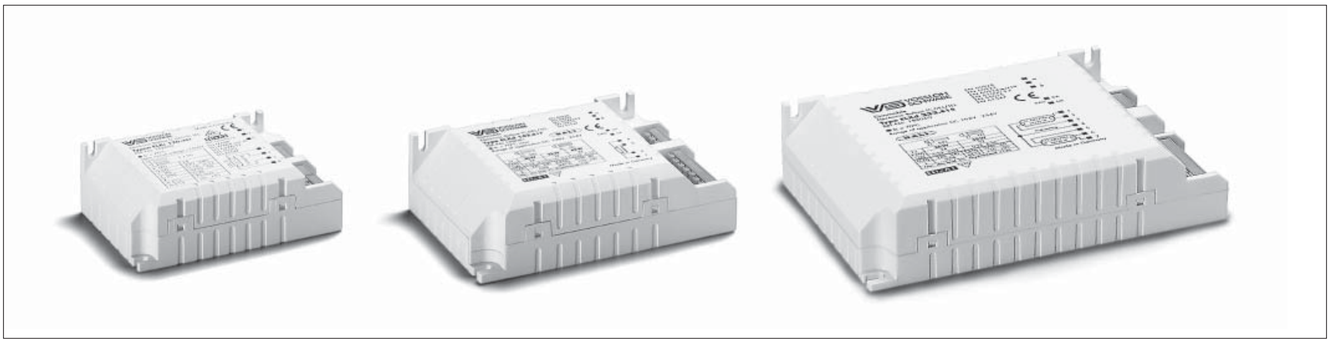
Circuit diagrams see pages 220–223

ELXd – Dimmable for TC-DEL, TC-TEL Lamps

Electronic ballasts
Casing: heat-resistant polycarbonate
Dimming range:
approx. 3–100% of lamp power
Push-in terminals with lever opener: 0.5–1.5 mm²
RFI-suppressed

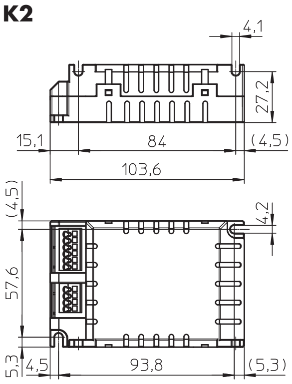
Degree of protection: IP20
For luminaires of protection class I
Fixing brackets for screws M4
for lateral or base mounting
For lighting systems with
high switching frequency (> 5/day

EOL shut down approved
acc. to EN 61347 Test 2

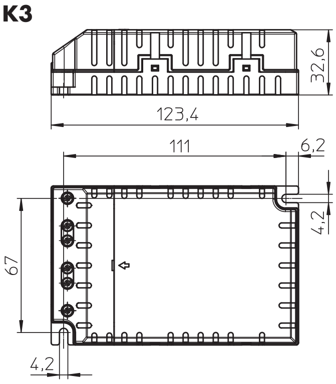


Electronic built-in ballasts

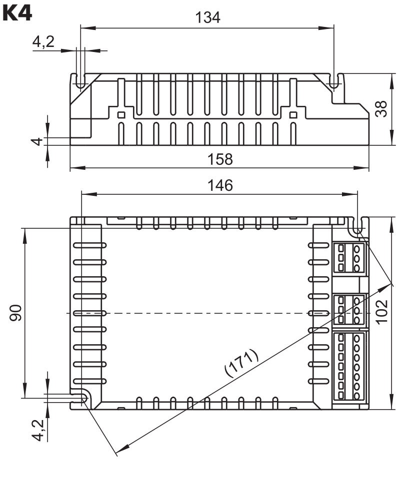
K2



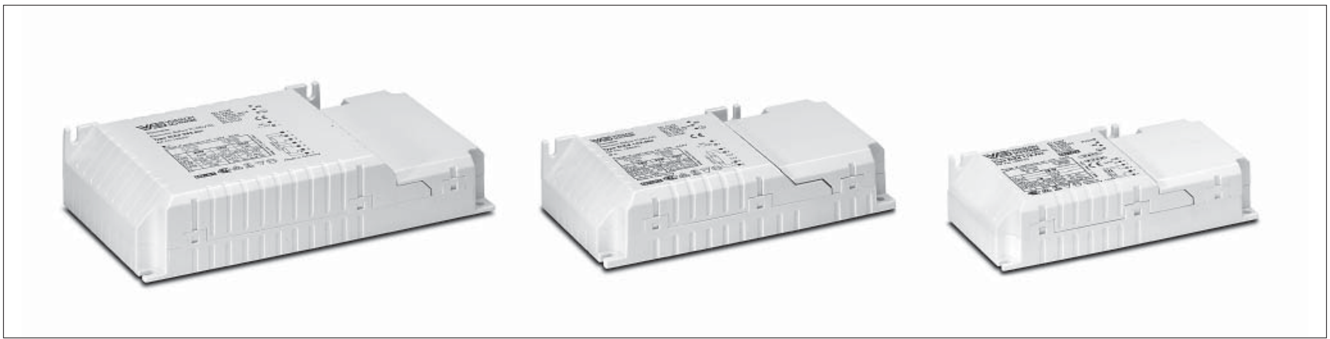
K3



K4

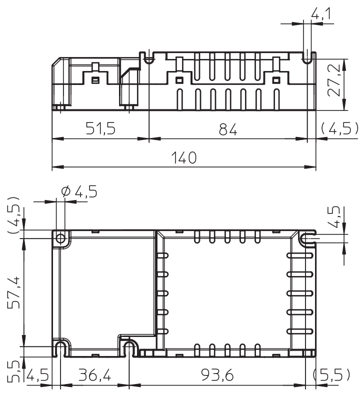


ELXd – Dimmable for TC-DEL, TC-TEL Lamps

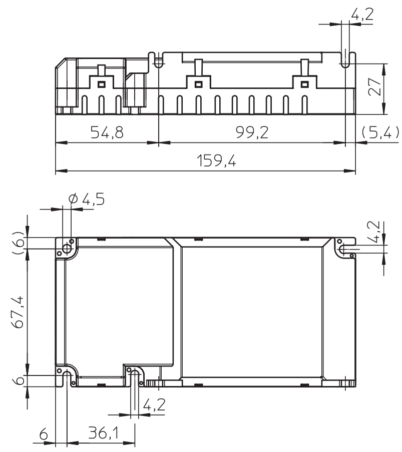


Independent electronic ballasts

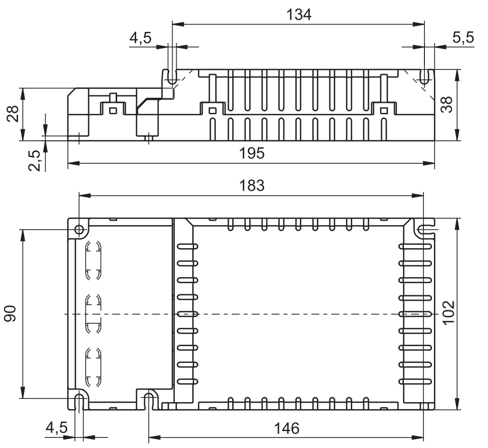
K2 with cord grip



K3 with cord grip



K4 with cord grip



ELXd – Dimmable 1–10 V for TC-DEL, TC-TEL lamps

Electronic built-in ballasts
Casing: K3, K4
Control voltage: DC 1–10 V acc. to EN 60929 with earth leakage current 0.5 mA (protected if connected to mains voltage)
For use with open- or closed-loop control units
Power factor: 0.98 at 100% operation

DC voltage
for operation: 176–264 V
for ignition: 198–264 V

○ T5 ◉ TC ◉ BUILT-IN ◉ 1–10 V
○ T8 ○ INDEPENDENT ○ DALI/PUSH

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
18	TC-DEL/-TEL	G24q-2/GX24q-2	1 x 16.5	ELXd 118.802	**188564**	220–240	A1 BAT	5 to 55	max. 70	K3	21.0	100.0
2x18	TC-DEL/-TEL	G24q-2/GX24q-2	2 x 16.5	ELXd 218.803	**188549**	220–240	A1 BAT	5 to 55	max. 70	K4	38.0	100.0
26	TC-DEL/-TEL	G24q-3/GX24q-3	1 x 24.0	ELXd 142.806	**188565**	220–240	A1 BAT	10 to 50	max. 70	K3	27.0	100.0
2x26	TC-DEL/-TEL	G24q-3/GX24q-3	2 x 24.0	ELXd 242.807	**188550**	220–240	A1 BAT	10 to 50	max. 70	K4	53.0	100.0
				ELXd 226.801	**188431**	220–240	A1 BAT	10 to 50	max. 70	K3	54.0	100.0
32	TC-TEL	GX24q-3	1 x 32.0	ELXd 142.806	**188565**	220–240	A1 BAT	10 to 50	max. 70	K3	36.0	100.0
2x32	TC-TEL	GX24q-3	2 x 32.0	ELXd 242.807	**188550**	220–240	A1 BAT	10 to 50	max. 70	K4	71.0	100.0
42	TC-TEL	GX24q-4	1 x 43.0	ELXd 142.806	**188565**	220–240	A1 BAT	10 to 50	max. 70	K3	46.0	100.0
2x42	TC-TEL	GX24q-4	2 x 43.0	ELXd 242.807	**188550**	220–240	A1 BAT	10 to 50	max. 70	K4	92.0	100.0

Circuit diagrams see pages 220–223

ELXd – Dimmable 1–10 V for TC-DEL, TC-TEL lamps

Independent electronic ballasts
Casing with cord grip: K3, K4
Control voltage: DC 1–10 V acc. to EN 60929 with earth leakage current 0.5 mA (protected if connected to mains voltage)
For use with open- or closed-loop control units
Power factor: 0.98 at 100% operation

DC voltage
for operation: 176–264 V
for ignition: 198–264 V

○ T5 ◉ TC ○ BUILT-IN ◉ 1–10 V
○ T8 ◉ INDEPENDENT ○ DALI/PUSH

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
18	TC-DEL/-TEL	G24q-2/GX24q-2	1 x 16.5	ELXd 118.802	**188694**	220–240	A1 BAT	5 to 55	max. 70	K3	21.0	100.0
2x18	TC-DEL/-TEL	G24q-2/GX24q-2	2 x 16.5	ELXd 218.803	**188696**	220–240	A1 BAT	5 to 55	max. 70	K4	38.0	100.0
26	TC-DEL/-TEL	G24q-3/GX24q-3	1 x 24.0	ELXd 142.806	**188695**	220–240	A1 BAT	10 to 50	max. 70	K3	27.0	100.0
2x26	TC-DEL/-TEL	G24q-3/GX24q-3	2 x 24.0	ELXd 242.807	**188697**	220–240	A1 BAT	10 to 50	max. 70	K4	53.0	100.0
				ELXd 226.801	**188490**	220–240	A1 BAT	10 to 50	max. 70	K3	54.0	100.0
32	TC-TEL	GX24q-3	1 x 32.0	ELXd 142.806	**188695**	220–240	A1 BAT	10 to 50	max. 70	K3	36.0	100.0
2x32	TC-TEL	GX24q-3	2 x 32.0	ELXd 242.807	**188697**	220–240	A1 BAT	10 to 50	max. 70	K4	71.0	100.0
42	TC-TEL	GX24q-4	1 x 43.0	ELXd 142.806	**188695**	220–240	A1 BAT	10 to 50	max. 70	K3	46.0	100.0
2x42	TC-TEL	GX24q-4	2 x 43.0	ELXd 242.807	**188697**	220–240	A1 BAT	10 to 50	max. 70	K4	92.0	100.0

Circuit diagrams see pages 220–223

ELXd – Dimmable with push key or DALI for TC-DEL, TC-TEL lamps

Electronic ballasts
PUSH: dimmable with usual push key and sensor
DALI: poles are not polarity sensitive (protected if connected to mains voltage) for use with DALI compatible control units
Automatic restart after lamp has been changed
Power factor: > 0.95 at 100% operation
DC voltage
for operation: 176–264 V
for ignition: 198–264 V
Standby power consumption: ≤ 0.5 W

Complete implementation of the DALI-standard: addressable, memory store for scenes and groups, revertive information communication, physical and RND-selection, standardized lamp characteristic
Low-power design ensures very low standby power consumption
Compatible with IEC 62386

Electronic built-in ballasts

○ T5 ◉ TC ◉ BUILT-IN ○ 1–10 V
○ T8 ○ INDEPENDENT ◉ DALI/PUSH

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
2x18	TC-DEL/-TEL	G24q-2/GX24q-2	2 x 18.0	ELXd 218.707	**188954**	220–240	A1 BAT	10 to 50	max. 70	K3	40.0	100.1
26	TC-DEL/-TEL	G24q-3/GX24q-3	1 x 25.0	ELXd 142.709	**188923**	220–240	A1 BAT	10 to 50	max. 65	K2	27.5	106.8
2x26	TC-DEL/-TEL	G24q-3/GX24q-3	2 x 24.0	ELXd 242.711	**188974**	220–240	A1 BAT	10 to 50	max. 70	K3	56.0	97.9
32	TC-TEL	GX24q-3	1 x 32.0	ELXd 142.709	**188923**	220–240	A1 BAT	10 to 50	max. 65	K2	34.5	106.3
2x32	TC-TEL	GX24q-3	2 x 32.0	ELXd 242.711	**188974**	220–240	A1 BAT	10 to 50	max. 70	K3	69.0	97.6
42	TC-TEL	GX24q-4	1 x 42.0	ELXd 142.709	**188923**	220–240	A1 BAT	10 to 50	max. 65	K2	45.0	103.8
2x42	TC-TEL	GX24q-4	2 x 42.0	ELXd 242.711	**188974**	220–240	A1 BAT	10 to 50	max. 70	K3	90.0	99.1

Circuit diagrams see pages 220–223

Independent electronic ballasts

○ T5 ◉ TC ○ BUILT-IN ○ 1–10 V
○ T8 ◉ INDEPENDENT ◉ DALI/PUSH

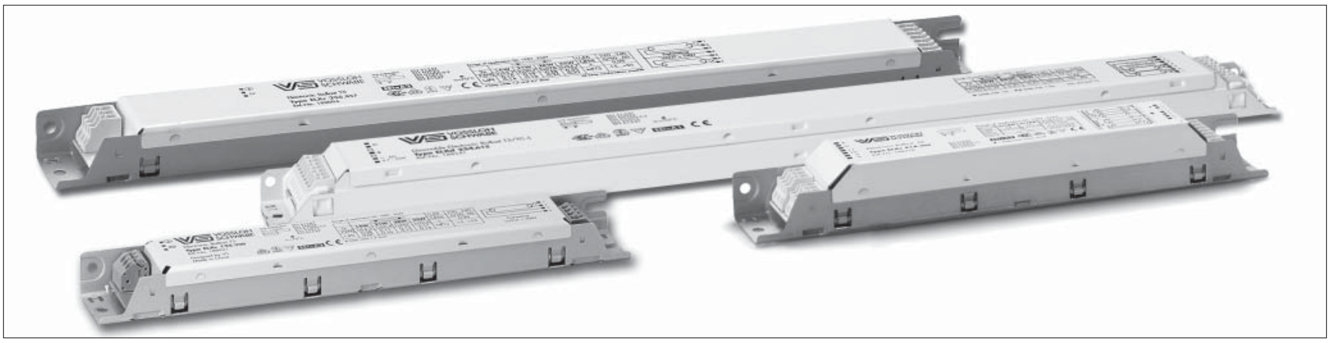
Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
18	TC-DEL/-TEL	G24q-2/GX24q-2	1 x 16.5	ELXd 118.705	**188953**	220–240	A1BAT	10 to 50	max. 65	K2	20.2	105.5
2x18	TC-DEL/-TEL	G24q-2/GX24q-2	2 x 18.0	ELXd 218.707	**188955**	220–240	A1BAT	10 to 60	max. 70	K3	40.0	100.1
26	TC-DEL/-TEL	G24q-3/GX24q-3	1 x 25.0	ELXd 142.709	**188924**	220–240	A1BAT	10 to 50	max. 65	K2	27.5	106.3
2x26	TC-DEL/-TEL	G24q-3/GX24q-3	2 x 24.0	ELXd 242.711	**188975**	220–240	A1BAT	10 to 50	max. 70	K3	56.0	97.9
32	TC-TEL	GX24q-3	1 x 32.0	ELXd 142.709	**188924**	220–240	A1BAT	10 to 50	max. 65	K2	34.8	106.3
2x32	TC-TEL	GX24q-3	2 x 32.0	ELXd 242.711	**188975**	220–240	A1BAT	10 to 50	max. 70	K3	69.0	97.6
42	TC-TEL	GX24q-4	1 x 42.0	ELXd 142.709	**188924**	220–240	A1BAT	10 to 50	max. 65	K2	45.0	103.8
2x42	TC-TEL	GX24q-4	2 x 42.0	ELXd 242.711	**188975**	220–240	A1BAT	10 to 50	max. 70	K3	90.0	99.1

Circuit diagrams see pages 220–223

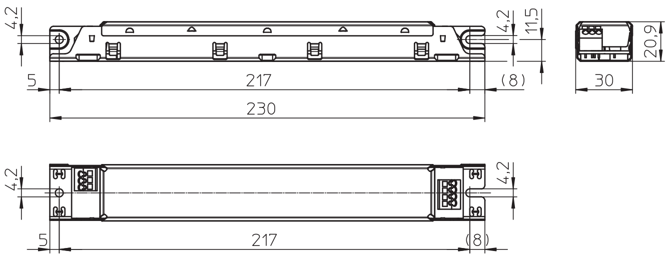
ELXc – Warm Start for T5 and T8 Lamps

Electronic built-in ballasts
Casing: metal
Power factor: ≥ 0.95
RFI-suppressed
For luminaires of protection class I

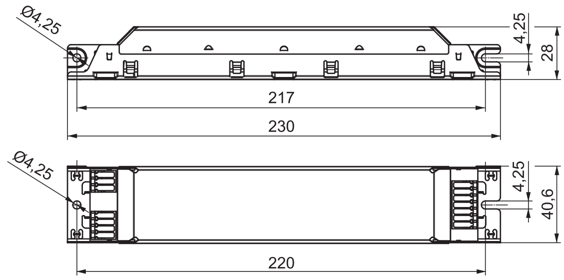
Degree of protection: IP20
For lighting systems with
high switching frequency (> 5/day)



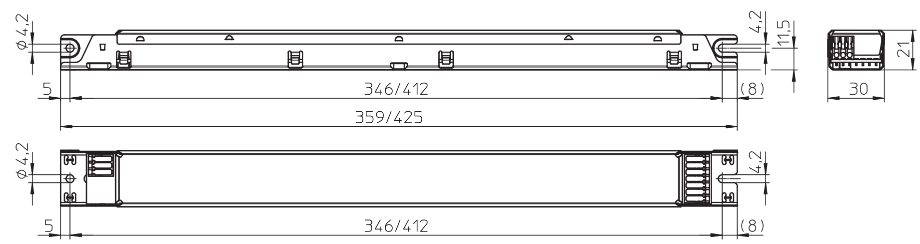
M6



M8



M10/M11



ELXc – Warm Start for T5 and T8 Lamps

DC voltage
for operation: 176–264 V
for ignition: 198–264 V
(ELXc 135.856, 235.857, 149.858, 154.864, 180.866, 280.538: DC voltage cannot be reduced to 176 V)
Push-in terminals: 0.5–1 mm²

For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
EOL shut down approved acc. to EN 61347 Test 2 (for T5)
EOL shut down (for T8)

T5 (selected) **TC** **BUILT-IN** (selected) **1–10 V**
T8 (selected) **INDEPENDENT** **DALI/PUSH**

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
For T5 lamps – Casing: M8, M10 and M11												
14	T5	G5	1 x 14.0	ELXc 135.856	**188093**	220–240	A2 BAT	–15 to 55	max. 70	M10	17.0	110.7
2x14	T5	G5	2 x 14.0	ELXc 235.857	**188094**	220–240	A2 BAT	–15 to 55	max. 70	M10	33.4	107.0
3x14	T5	G5	3 x 14.0	ELXc 414.868	**188438**	220–240	A2 BAT	–15 to 55	max. 70	M8	48.0	105.4
4x14	T5	G5	4 x 14.0	ELXc 414.868	**188438**	220–240	A2 BAT	–15 to 55	max. 70	M8	63.0	102.3
21	T5	G5	1 x 21.0	ELXc 135.856	**188093**	220–240	A2 BAT	–15 to 55	max. 70	M10	24.0	107.4
2x21	T5	G5	2 x 21.0	ELXc 235.857	**188094**	220–240	A2 BAT	–15 to 55	max. 70	M10	50.2	110.6
24	T5	G5	1 x 22.5	ELXc 140.862	**188140**	220–240	A2 BAT	–15 to 55	max. 70	M10	27.0	114.0
2x24	T5	G5	2 x 22.5	ELXc 240.863	**188616**	220–240	A2 BAT	–15 to 55	max. 70	M10	51.0	107.4
3x24	T5	G5	3 x 22.5	ELXc 424.223	**183039**	220–240	A2 BAT	–15 to 55	max. 75	M8	78.0	103.7
4x24	T5	G5	4 x 22.5	ELXc 424.223	**183039**	220–240	A2 BAT	–15 to 55	max. 75	M8	101.7	103.5
28	T5	G5	1 x 28.0	ELXc 135.856	**188093**	220–240	A2 BAT	–15 to 55	max. 70	M10	32.0	104.9
2x28	T5	G5	2 x 28.0	ELXc 235.857	**188094**	220–240	A2 BAT	–15 to 55	max. 70	M10	60.6	106.2
35	T5	G5	1 x 35.0	ELXc 135.856	**188093**	220–240	A2 BAT	–15 to 55	max. 70	M10	39.5	102.7
2x35	T5	G5	2 x 35.0	ELXc 235.857	**188094**	220–240	A2 BAT	–15 to 55	max. 70	M10	74.5	102.5
39	T5	G5	1 x 38.0	ELXc 140.862	**188140**	220–240	A2 BAT	–15 to 55	max. 70	M10	43.0	107.0
2x39	T5	G5	2 x 38.0	ELXc 240.863	**188616**	220–240	A2 BAT	–15 to 55	max. 70	M10	82.0	97.9
49	T5	G5	1 x 49.0	ELXc 149.858	**188095**	220–240	A2 BAT	–15 to 55	max. 70	M10	54.0	102.5
2x49	T5	G5	2 x 49.0	ELXc 249.859	**188617**	220–240	A2 BAT	–15 to 50	max. 70	M10	113.0	106.6
54	T5	G5	1 x 54.0	ELXc 154.864	**188142**	220–240	A2 BAT	–15 to 55	max. 65	M10	59.0	101.1
2x54	T5	G5	2 x 54.0	ELXc 254.865	**188618**	220–240	A2 BAT	–15 to 50	max. 70	M10	119.0	106.0
80	T5	G5	1 x 80.0	ELXc 180.866	**188144**	220–240	A2 BAT	–15 to 55	max. 70	M10	87.0	97.6
2x80	T5	G5	2 x 80.0	ELXc 280.538	**188619**	220–240	A2 BAT	–15 to 50	max. 70	M11	175.0	97.2
For T8 lamps – Casing: M8												
3x18	T8	G13	3 x 16.0	ELXc 418.204	**188744**	220–240	A2 BAT	–15 to 55	max. 70	M8	56.0	100.8
4x18	T8	G13	4 x 16.0	ELXc 418.204	**188744**	220–240	A2 BAT	–15 to 55	max. 70	M8	71.5	98.9
3x36	T8	G13	3 x 32.0	ELXc 336.214	**188595**	220–240	A2 BAT	–15 to 50	max. 65	M8	105.0	99.4

Circuit diagrams see pages 220–223

ELXc EffectLine – Warm start

Warm start for T5 and T8 lamps – Casing: M6, M8 and M10

DC voltage
for operation: 176–264 V
for ignition: 198–264 V
(not possible for T8)
Push-in terminals with lever opener: 0.5–1.5 mm²
EOL shut down approved
acc. to EN 61347 Test 2 (for T5)
EOL shut down (for T8)

◉ **T5** ○ **TC** ◉ **BUILT-IN** ○ **1–10 V**
◉ **T8** ○ **INDEPENDENT** ○ **DALI/PUSH**

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
For T5 lamps – Casing: M6 and M10												
14	T5	G5	1 x 14.3	ELXc 135.220	**188921**	220–240	A2 BAT	–15 to 55	max. 70	M6	17.0	104.8
2x14	T5	G5	2 x 14.3	ELXc 235.221	**188922**	220–240	A2 BAT	–15 to 55	max. 70	M10	34.5	101.9
21	T5	G5	1 x 20.4	ELXc 135.220	**188921**	220–240	A2 BAT	–15 to 55	max. 70	M6	23.3	106.9
2x21	T5	G5	2 x 21.4	ELXc 235.221	**188922**	220–240	A2 BAT	–15 to 55	max. 70	M10	48.3	104.9
28	T5	G5	1 x 26.7	ELXc 135.220	**188921**	220–240	A2 BAT	–15 to 55	max. 70	M6	29.9	107.5
2x28	T5	G5	2 x 28.7	ELXc 235.221	**188922**	220–240	A2 BAT	–15 to 55	max. 70	M10	62.1	109.0
35	T5	G5	1 x 32.6	ELXc 135.220	**188921**	220–240	A2 BAT	–15 to 55	max. 70	M6	36.5	103.0
2x35	T5	G5	2 x 35.6	ELXc 235.221	**188922**	220–240	A2 BAT	–15 to 55	max. 70	M10	78.2	100.8
For T8 lamps – Casing: M8												
18	T8	G13	1 x 16.0	ELXc 136.207	**188704**	220–240	A2 BAT	–20 to 55	max. 60	M8	18.4	105.0
2x18	T8	G13	2 x 16.0	ELXc 236.208	**188705**	220–240	A2 BAT	–20 to 50	max. 60	M8	35.2	106.0
36	T8	G13	1 x 32.0	ELXc 136.207	**188704**	220–240	A2 BAT	–20 to 55	max. 60	M8	35.4	97.0
2x36	T8	G13	2 x 32.0	ELXc 236.208	**188705**	220–240	A2 BAT	–20 to 50	max. 60	M8	69.7	98.0
58	T8	G13	1 x 50.0	ELXc 158.209	**188706**	220–240	A2 BAT	–20 to 50	max. 60	M8	52.6	106.0
2x58	T8	G13	2 x 50.0	ELXc 258.210	**188707**	220–240	A2	–20 to 50	max. 65	M8	109.9	105.0

Circuit diagrams see pages 220–223

ELXc EffectLine II – Warm start

Warm start for T8 lamps – Casing: M8

DC voltage
for operation: 176–264 V
(DC voltage can be reduced to 176 V for 2 hours)
for ignition: 198–264 V
Push-in terminals with lever opener: 0.5–1.5 mm²
EOL 2 shut down

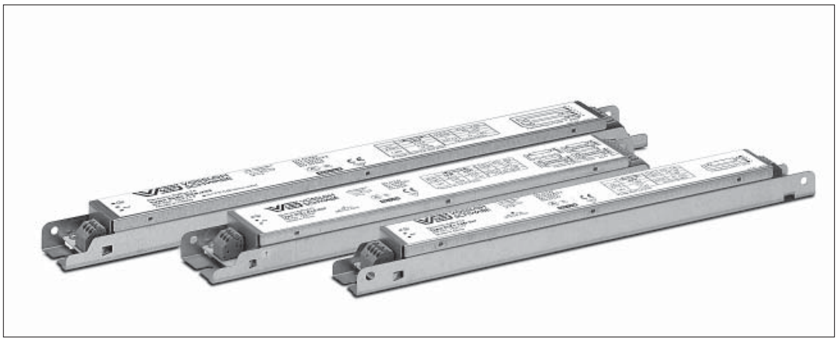
○ **T5** ○ **TC** ◉ **BUILT-IN** ○ **1–10 V**
◉ **T8** ○ **INDEPENDENT** ○ **DALI/PUSH**

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
18	T8	G13	1 x 16.0	ELXc 136.216	**188912**	220–240	A2 BAT	–20 to 55	max. 65	M8	19.8	105.7
2x18	T8	G13	2 x 16.0	ELXc 236.217	**188913**	220–240	A2 BAT	–20 to 60	max. 70	M8	38.0	101.6
36	T8	G13	1 x 32.0	ELXc 136.216	**188912**	220–240	A2 BAT	–20 to 55	max. 65	M8	34.4	97.5
2x36	T8	G13	2 x 32.0	ELXc 236.217	**188913**	220–240	A2 BAT	–20 to 60	max. 70	M8	71.9	110.6
58	T8	G13	1 x 50.0	ELXc 158.218	**188914**	220–240	A2 BAT	–20 to 60	max. 65	M8	56.0	100.8
2x58	T8	G13	2 x 50.0	ELXc 258.219	**188915**	220–240	A2	–20 to 55	max. 70	M8	110.0	101.0

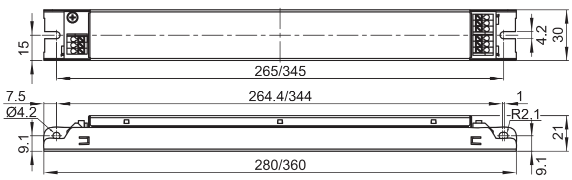
Circuit diagrams see pages 220–223

ELXc – Warm Start New T5 EffectLine

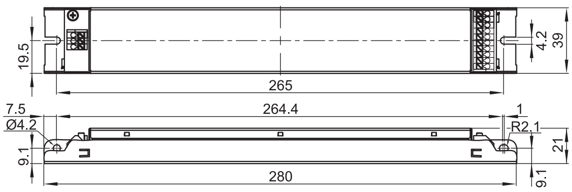
Electronic built-in ballasts
Casing: metal
Push-in terminals with lever opener: 0.5–1 mm²
RFI-suppressed
For luminaires of protection class I
Degree of protection: IP20
For lighting systems with high switching frequency (> 5/day)
Automatic restart after lamp has been changed
Suitable for use in luminaires for emergency lighting systems acc. to VDE 0108
EOL shut down approved acc. to EN 61347 Test 1



M7.1 / M10.2



M7.2

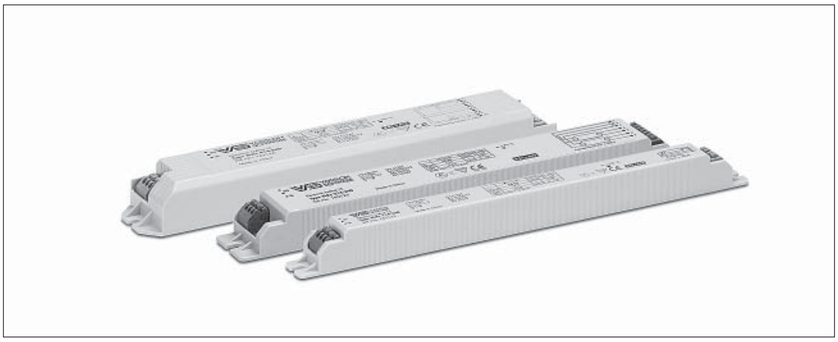


◉ **T5** ○ **TC** ◉ **BUILT-IN** ○ **1–10 V**
○ **T8** ○ **INDEPENDENT** ○ **DALI/PUSH**

Lamp				Electronic ballast										System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10 %	Energy efficiency	Power factor	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	L mm	W mm	Output W	Luminous factor %
14	T5 HE	G5	1 x 14.0	ELXc 228.229	**183111**	220–240	EEI=A2	> 0.90	0 to 50	max. 75	M7.1	280	30	16,5	100
				ELXc 135.231	**183113**	220–240	EEI=A2	> 0.90	0 to 50	max. 75	M7.1	280	30	16,5	100
2x14	T5 HE	G5	2 x 14.0	ELXc 228.229	**183111**	220–240	EEI=A2	> 0.92	0 to 50	max. 75	M7.1	280	30	31,0	100
3x14	T5 HE	G5	3 x 14.0	ELXc 414.227	**183109**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.2	280	39	48,0	100
4x14	T5 HE	G5	4 x 14.0	ELXc 414.227	**183109**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.2	280	39	63,0	100
21	T5 HE	G5	1 x 21.0	ELXc 228.229	**183111**	220–240	EEI=A2	> 0.90	0 to 50	max. 75	M7.1	280	30	24,0	100
				ELXc 135.231	**183113**	220–240	EEI=A2	> 0.92	0 to 50	max. 75	M7.1	280	30	24,0	100
2x21	T5 HE	G5	2 x 21.0	ELXc 228.229	**183111**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	47,5	100
24	T5 HO	G5	1 x 24.0	ELXc 239.233	**183115**	220–240	EEI=A2	> 0.90	0 to 50	max. 75	M7.1	280	30	28,0	100
2x24	T5 HO	G5	2 x 24.0	ELXc 239.233	**183115**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	53,5	100
3x24	T5 HO	G5	3 x 24.0	ELXc 424.228	**183110**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.2	280	39	76,0	100
4x24	T5 HO	G5	4 x 24.0	ELXc 424.228	**183110**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.2	280	39	100,0	100
28	T5 HE	G5	1 x 28.0	ELXc 228.229	**183111**	220–240	EEI=A2	> 0.92	0 to 50	max. 75	M7.1	280	30	31,0	100
				ELXc 135.231	**183113**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	32,0	100
2x28	T5 HE	G5	2 x 28.0	ELXc 228.229	**183111**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	61,0	100
				ELXc 328.230	**183112**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.2	280	39	61,0	100
3x28	T5 HE	G5	3 x 28.0	ELXc 328.230	**183112**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.2	280	39	94,0	100
35	T5 HE	G5	1 x 35.0	ELXc 135.231	**183113**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	38,0	100
2x35	T5 HE	G5	2 x 35.0	ELXc 235.232	**183114**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M10.2	360	30	74,0	100
39	T5 HO	G5	1 x 39.0	ELXc 239.233	**183115**	220–240	EEI=A2	> 0.92	0 to 50	max. 75	M7.1	280	30	43,5	100
2x39	T5 HO	G5	2 x 39.0	ELXc 239.233	**183115**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	83,0	100
49	T5 HO	G5	1 x 49.0	ELXc 149.234	**183116**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	51,0	100
2x49	T5 HO	G5	2 x 49.0	ELXc 249.235	**183117**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M10.2	360	30	108,0	100
54	T5 HO	G5	1 x 54.0	ELXc 254.236	**183118**	220–240	EEI=A2	> 0.92	0 to 50	max. 75	M7.1	280	30	58,0	100
2x54	T5 HO	G5	2 x 54.0	ELXc 254.236	**183118**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	113,0	100
80	T5 HO	G5	1 x 80.0	ELXc 180.237	**183119**	220–240	EEI=A2	> 0.95	0 to 50	max. 75	M7.1	280	30	86,0	100

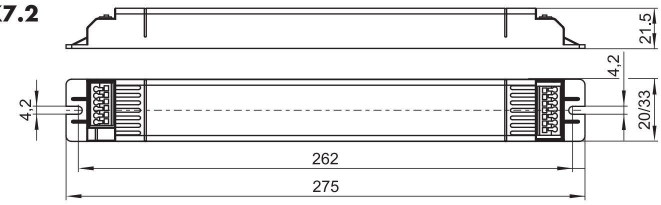
Preliminary data | Circuit diagrams see pages 220–223

ELXc – ECO EffectLine Warm Start for T5 and T8 Lamps

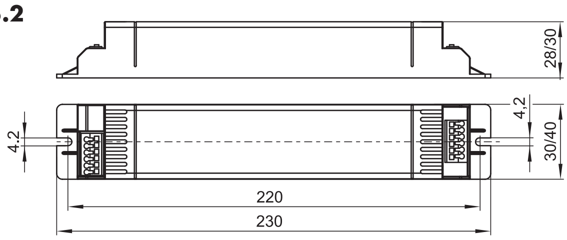


Electronic built-in ballasts
Casing: PC, white
Push-in terminals with lever opener: 0.5–1.5 mm²
RFI-suppressed
For luminaires of protection class I
Degree of protection: IP20
For lighting systems with
high switching frequency (> 5/day)
EOL shut down approved acc. to EN 61347 Test 1 (for T5 lamps); EOL shut down (for T8 lamps)

K7.1 / K7.2



K5.1 / K5.2



T5 **TC** **BUILT-IN** **1–10 V**
T8 **INDEPENDENT** **DALI/PUSH**

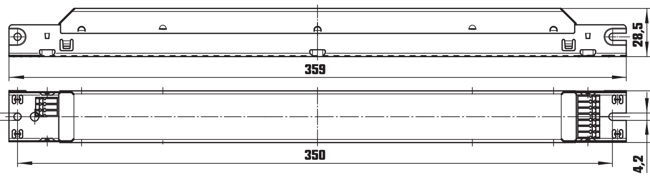
Lamp				Electronic ballast										System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10 %	Energy efficiency	Power factor	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	W mm	H mm	Output W	Luminous factor %
For T5 lamps															
14	T5 HE	G5	1 x 14.8	ELXc 114.238	**183122**	220–240	A2	> 0.95	0 to 50	max. 75	K7.1	20	21.5	17.0	100
2x14	T5 HE	G5	2 x 14.5	ELXc 214.240	**183124**	220–240	A2	> 0.95	0 to 50	max. 75	K7.2	33	21.5	33.0	100
4x14	T5 HE	G5	4 x 14.0	ELXc 414.242	**183126**	220–240	A2	> 0.95	0 to 50	max. 75	K5.2	40	30	64.0	100
28	T5 HE	G5	1 x 28.5	ELXc 128.239	**183123**	220–240	A2	> 0.95	0 to 50	max. 75	K7.1	20	21.5	31.5	100
2x28	T5 HE	G5	2 x 26.5	ELXc 228.241	**183125**	220–240	A2	> 0.95	0 to 50	max. 75	K7.2	33	21.5	59.0	95
For T8 lamps															
18	T8	G13	1 x 15.5	ELXc 118.243	**183127**	220–240	A2	> 0.95	–15 to 50	max. 70	K5.1	30	28	18.5	98
2x18	T8	G13	2 x 15.5	ELXc 218.246	**183130**	220–240	A2	> 0.96	–15 to 50	max. 70	K5.1	30	28	35.0	98
4x18	T8	G13	4 x 15.5	ELXc 418.249	**183133**	220–240	A2	> 0.98	–15 to 50	max. 70	K5.2	40	30	69.0	97
36	T8	G13	1 x 30.5	ELXc 136.244	**183128**	220–240	A2	> 0.96	–15 to 50	max. 70	K5.1	30	28	34.0	95
2x36	T8	G13	2 x 31.0	ELXc 236.247	**183131**	220–240	A2	> 0.98	–15 to 50	max. 70	K5.2	40	30	68.0	97
58	T8	G13	1 x 48.0	ELXc 158.245	**183129**	220–240	A2	> 0.96	–15 to 50	max. 70	K5.1	30	28	53.5	96
2x58	T8	G13	2 x 49.5	ELXc 258.248	**183132**	220–240	A2	> 0.98	–15 to 50	max. 80	K5.2	40	30	107.0	100

Preliminary data | Circuit diagrams see pages 220–223

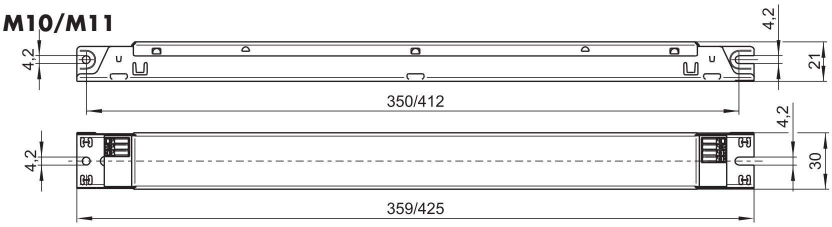
ELXd – Dimmable for T5 and T8 Lamps

Electronic built-in ballasts
Casing: metal
Power factor: ≥ 0.95 at 100% operation
DC voltage
  for operation: 154–276 V (M22, M23, M24)
  for operation: 176–264 V (M9)
  for ignition: 198–264 V
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
RFI-suppressed
For luminaires of protection class I
Degree of protection: IP20
For lighting systems with
high switching frequency (> 5/day)
Suitable for use in luminaires for emergency
lighting systems acc. to VDE 0108

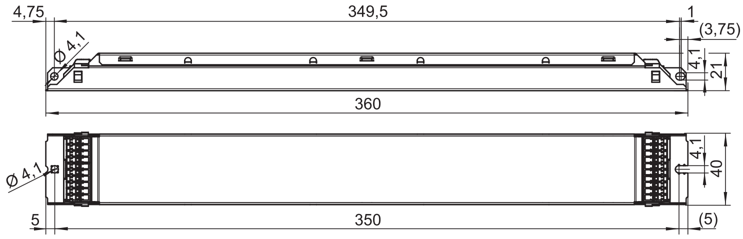
M9



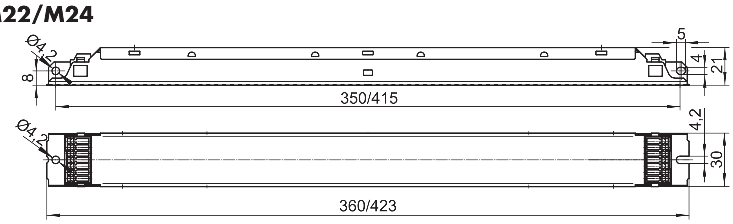
M10/M11



M23



M22/M24



ELXd – Dimmable 1–10 V with lamp detection

Dimming range:
approx. 1–100% of lamp power
(*3–100 %: ELXd 135.823, 235.735, 118.718, 218.719, 136.720, 236.721, 158.722, 258.723)
Control voltage: DC 1–10 V acc. to EN 60929 with earth leakage current 0.5 mA (protected if connected to mains voltage)

For use with open- or closed-loop control units
Push-in terminals: 0.5–1 mm²
EOL shut down approved acc. to EN 61347 Test 2 (for T5)
EOL 2 shut down (for T8)

T5 **TC** **BUILT-IN** **1–10 V**
T8 **INDEPENDENT** **DALI/PUSH**

Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
T5 lamps – Casing: M10, M22, M23 and M24												
14	T5	G5	1 x 14.0	ELXd 135.823	**188717***	220–240	A1 BAT	10 to 55	max. 65	M10	17.0	99.5
				ELXd 124.607	**188336**	220–240	A1 BAT	10 to 50	max. 75	M22	16.0	100.0
2x14	T5	G5	2 x 13.6	ELXd 235.735	**183059***	220–240	A1 BAT	10 to 50	max. 70	M11	33.4	98.7
			2 x 14.0	ELXd 224.608	**188337**	220–240	A1 BAT	10 to 50	max. 75	M24	31.0	100.0
3x14	T5	G5	3 x 14.0	ELXd 324.623	**188597**	220–240	A1 BAT	10 to 50	max. 75	M23	45.3	100.0
4x14	T5	G5	4 x 14.0	ELXd 424.624	**188598**	220–240	A1 BAT	10 to 50	max. 75	M23	60.4	100.0
21	T5	G5	1 x 21.0	ELXd 135.823	**188717***	220–240	A1 BAT	10 to 55	max. 65	M10	24.0	99.0
				ELXd 139.609	**188338**	220–240	A1 BAT	10 to 50	max. 75	M22	23.0	100.0
2x21	T5	G5	2 x 20.5	ELXd 235.735	**183059***	220–240	A1 BAT	10 to 50	max. 70	M11	47.0	95.1
			2 x 21.0	ELXd 239.610	**188339**	220–240	A1 BAT	10 to 50	max. 75	M24	45.0	100.0
24	T5	G5	1 x 23.0	ELXd 124.607	**188336**	220–240	A1 BAT	10 to 50	max. 75	M22	26.0	100.0
2x24	T5	G5	2 x 23.0	ELXd 224.608	**188337**	220–240	A1 BAT	10 to 50	max. 75	M24	50.0	100.0
3x24	T5	G5	3 x 23.0	ELXd 324.623	**188597**	220–240	A1 BAT	10 to 50	max. 75	M23	73.4	100.0
4x24	T5	G5	4 x 23.0	ELXd 424.624	**188598**	220–240	A1 BAT	10 to 50	max. 75	M23	97.6	100.0
28	T5	G5	1 x 28.0	ELXd 135.823	**188717***	220–240	A1 BAT	10 to 55	max. 65	M10	32.0	98.6
				ELXd 154.611	**188340**	220–240	A1 BAT	10 to 50	max. 75	M22	31.0	100.0
2x28	T5	G5	2 x 27.3	ELXd 235.735	**183059***	220–240	A1 BAT	10 to 50	max. 70	M11	62.1	97.6
			2 x 28.0	ELXd 254.612	**188341**	220–240	A1 BAT	10 to 50	max. 75	M24	61.0	100.0
35	T5	G5	1 x 35.0	ELXd 135.823	**188717***	220–240	A1 BAT	10 to 55	max. 65	M10	38.0	95.0
				ELXd 180.613	**188342**	220–240	A1 BAT	10 to 50	max. 75	M22	38.0	100.0
2x35	T5	G5	2 x 33.9	ELXd 235.735	**183059***	220–240	A1 BAT	10 to 50	max. 70	M11	76.9	96.7
			2 x 35.0	ELXd 249.614	**188343**	220–240	A1 BAT	10 to 50	max. 75	M24	75.0	100.0
				ELXd 280.630	**188604**	220–240	A1 BAT	10 to 50	max. 75	M24	75.0	100.0
39	T5	G5	1 x 38.0	ELXd 139.609	**188338**	220–240	A1 BAT	10 to 50	max. 75	M22	42.0	100.0
2x39	T5	G5	2 x 38.0	ELXd 239.610	**188339**	220–240	A1 BAT	10 to 50	max. 75	M24	82.0	100.0
49	T5	G5	1 x 49.0	ELXd 180.613	**188342**	220–240	A1 BAT	10 to 50	max. 75	M22	54.0	100.0
2x49	T5	G5	2 x 49.0	ELXd 249.614	**188343**	220–240	A1 BAT	10 to 50	max. 75	M24	104.0	100.0
				ELXd 280.630	**188604**	220–240	A1 BAT	10 to 50	max. 75	M24	104.0	100.0
54	T5	G5	1 x 54.0	ELXd 154.611	**188340**	220–240	A1 BAT	10 to 50	max. 75	M22	59.0	100.0
2x54	T5	G5	2 x 54.0	ELXd 254.612	**188341**	220–240	A1 BAT	10 to 50	max. 75	M24	115.0	100.0
80	T5	G5	1 x 80.0	ELXd 180.613	**188342**	220–240	A1 BAT	10 to 50	max. 75	M22	88.0	100.0
2x80	T5	G5	2 x 80.0	ELXd 280.630	**188604**	220–240	A1 BAT	10 to 50	max. 75	M24	165.0	100.0
T8 lamps – Casing: M9												
18	T8	G13	1 x 16.0	ELXd 118.718	**188873***	220–240	EEI=A1	10 to 50	max. 70	M9	21.0	102.1
2x18	T8	G13	2 x 16.0	ELXd 218.719	**188874***	220–240	EEI=A1	10 to 50	max. 70	M9	41.5	104.6
36	T8	G13	1 x 32.0	ELXd 136.720	**188875***	220–240	A1 BAT	10 to 50	max. 70	M9	37.3	101.6
2x36	T8	G13	2 x 32.0	ELXd 236.721	**188876***	220–240	EEI=A1	10 to 50	max. 70	M9	72.0	98.9
58	T8	G13	1 x 50.0	ELXd 158.722	**188877***	220–240	A1 BAT	10 to 50	max. 70	M9	55.0	101.3
2x58	T8	G13	2 x 50.0	ELXd 258.723	**188878***	220–240	EEI=A1	10 to 50	max. 75	M9	109.0	96.5

Circuit diagrams see pages 220–223

ELXd – Dimmable with push key or DALI with lamp detection

Dimming range:
approx. 1–100% of lamp power
PUSH: dimmable with usual push key
DALI: poles are not polarity sensitive (protected if connected to mains voltage) for use with DALI compatible control units
Push-in terminals: 0.5–1 mm²
EOL shut down approved acc. to EN 61347 Test 2 (for T5)
EOL 2 shut down (for T8)
standby power consumption: ≤ 0.2 W

Complete implementation of the DALI-standard: addressable, memory store for scenes and groups, revertive information communication, physical and RND-selection, standardized lamp characteristic
Low-power design ensures very low standby power consumption
Compatible with IEC 62386

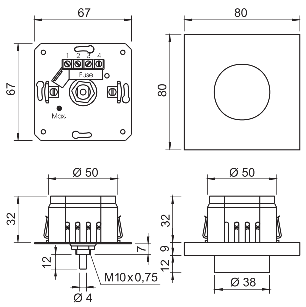
● T5 ○ TC ● BUILT-IN ○ 1–10 V
○ T8 ○ INDEPENDENT ● DALI/PUSH

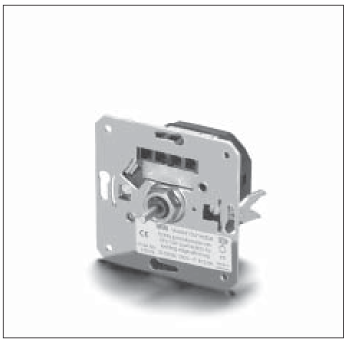
Lamp				Electronic ballast							System	
Output W	Type	Base	Power consumption W	Type	**Ref. No.**	Voltage AC 50, 60 Hz V±10%	Energy efficiency	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Casing	Output W	Luminous factor %
For T5 lamps – Casing: M10, M11, M22, M23 and M24												
14	T5	G5	1 x 13.7	ELXd 135.724	**188932**	220–240	A1 BAT	10 to 50	max. 65	M10	16.4	102.6
			1 x 14.0	ELXd 124.600	**188329**	220–240	A1 BAT	10 to 50	max. 75	M22	16.0	100.0
2x14	T5	G5	2 x 13.6	ELXd 235.725	**188933**	220–240	A1 BAT	10 to 50	max. 70	M11	33.4	96.7
			2 x 14.0	ELXd 224.601	**188330**	220–240	A1 BAT	10 to 50	max. 75	M24	31.0	100.0
3x14	T5	G5	3 x 14.0	ELXd 324.626	**188600**	220–240	A1 BAT	10 to 50	max. 75	M23	45.3	100.0
4x14	T5	G5	4 x 14.0	ELXd 424.628	**188602**	220–240	A1 BAT	10 to 50	max. 75	M23	60.4	100.0
21	T5	G5	1 x 20.7	ELXd 135.724	**188932**	220–240	A1 BAT	10 to 50	max. 65	M10	24.3	102.7
			1 x 21.0	ELXd 139.602	**188331**	220–240	A1 BAT	10 to 50	max. 75	M22	23.0	100.0
2x21	T5	G5	2 x 20.5	ELXd 235.725	**188933**	220–240	A1 BAT	10 to 50	max. 70	M11	47.0	97.6
			2 x 21.0	ELXd 239.621	**188350**	220–240	A1 BAT	10 to 50	max. 75	M24	45.0	100.0
24	T5	G5	1 x 23.0	ELXd 124.600	**188329**	220–240	A1 BAT	10 to 50	max. 75	M22	26.0	100.0
2x24	T5	G5	2 x 23.0	ELXd 224.601	**188330**	220–240	A1 BAT	10 to 50	max. 75	M24	50.0	100.0
3x24	T5	G5	3 x 23.0	ELXd 324.626	**188600**	220–240	A1 BAT	10 to 50	max. 75	M23	73.4	100.0
4x24	T5	G5	4 x 23.0	ELXd 424.628	**188602**	220–240	A1 BAT	10 to 50	max. 75	M23	97.6	100.0
28	T5	G5	1 x 27.8	ELXd 135.724	**188932**	220–240	A1 BAT	10 to 50	max. 65	M10	32.0	104.1
			1 x 28.0	ELXd 154.603	**188332**	220–240	A1 BAT	10 to 50	max. 75	M22	31.0	100.0
2x28	T5	G5	2 x 27.3	ELXd 235.725	**188933**	220–240	A1 BAT	10 to 50	max. 70	M11	62.1	95.1
			2 x 28.0	ELXd 254.604	**188333**	220–240	A1 BAT	10 to 50	max. 75	M24	61.0	100.0
35	T5	G5	1 x 34.7	ELXd 135.724	**188932**	220–240	A1 BAT	10 to 50	max. 65	M10	40.0	107.5
			1 x 35.0	ELXd 180.605	**188334**	220–240	A1 BAT	10 to 50	max. 75	M22	38.0	100.0
2x35	T5	G5	2 x 33.9	ELXd 235.725	**188933**	220–240	A1 BAT	10 to 50	max. 70	M11	76.9	98.7
			2 x 35.0	ELXd 280.631	**188605**	220–240	A1 BAT	10 to 50	max. 75	M24	74,0	100,0
				ELXd 249.606	**188335**	220–240	A1 BAT	10 to 50	max. 75	M24	75.0	100.0
39	T5	G5	1 x 38.0	ELXd 139.602	**188331**	220–240	A1 BAT	10 to 50	max. 75	M22	42.0	100.0
2x39	T5	G5	2 x 38.0	ELXd 239.621	**188350**	220–240	A1 BAT	10 to 50	max. 75	M24	82.0	100.0
49	T5	G5	1 x 49.0	ELXd 180.605	**188334**	220–240	A1 BAT	10 to 50	max. 75	M22	54.0	100.0
2x49	T5	G5	2 x 49.0	ELXd 280.631	**188605**	220–240	A1 BAT	10 to 50	max. 75	M24	101,0	100,0
				ELXd 249.606	**188335**	220–240	A1 BAT	10 to 50	max. 75	M24	104.0	100.0
54	T5	G5	1 x 54.0	ELXd 154.603	**188332**	220–240	A1 BAT	10 to 50	max. 75	M22	59.0	100.0
2x54	T5	G5	2 x 54.0	ELXd 254.604	**188333**	220–240	A1 BAT	10 to 50	max. 75	M24	115.0	100.0
80	T5	G5	1 x 80.0	ELXd 180.605	**188334**	220–240	A1 BAT	10 to 50	max. 75	M22	88.0	100.0
2x80	T5	G5	2 x 80.0	ELXd 280.631	**188605**	220–240	A1 BAT	10 to 50	max. 75	M24	165.0	100.0

Circuit diagrams see pages 220–223

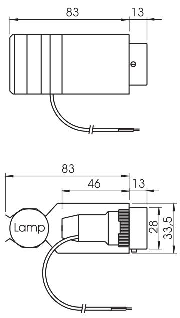
Accessories for Dimmable Electronic Ballasts

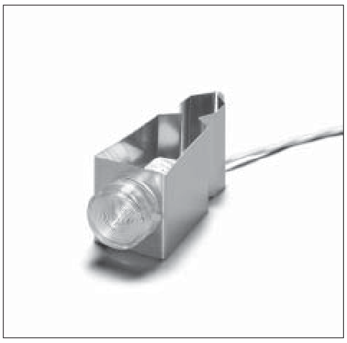
Manual controller
Dimmer for EB with low-voltage interface 1–10 V
Dimensions: 67x67x51 mm
Push-button change-over switch with stud 4 mm
for installation in flushtype boxes with Ø 55 mm
Max. 50 EBs per dimmer
Weight: 60/30 g, unit: 25 pcs.
Without cover plate
Ref. No.: 172778
Cover plate with rotary knob
Dimensions: 80x80x9 mm
Ref. No.: 172775 white



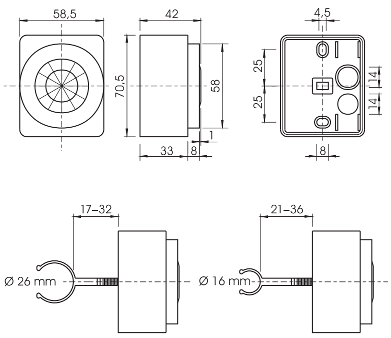


Light sensor
Constant light control with clamp
fastening for fluorescent lamps T8 (T26)
and compact fluorescent lamps
Dimensions: 33.5x40x96 mm
With connection lead: 2x0.24 mm²
Length: 800 mm
Max. 50 EBs per light sensor
Weight: 55 g, unit: 60 pcs.
Ref. No.: 172776

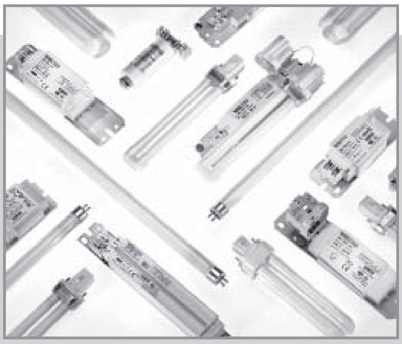




Multi sensor
Dimensions: 58.5x70.5x42 mm
With the sensor the lighting can be kept
on a pre-defined level
With integrated motion detector
Max. 50 EBs per multi sensor
Weight: 125 g, unit: 25 pcs.
Ref. No.: 172777



RELIABLE AND DURABLE



ELECTROMAGNETIC BALLASTS

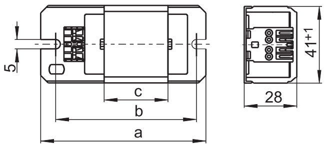
The following chapter presents Vossloh-Schwabe's broad range of electromagnetic ballasts for compact fluorescent lamps and tubular fluorescent lamps. The variety of available performance properties and shapes satisfies the most diverse design requirements.

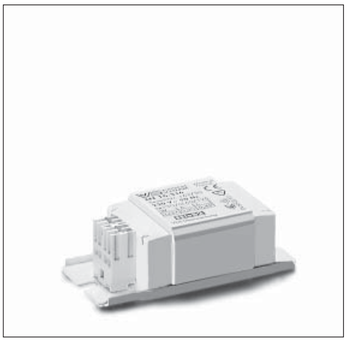
Vossloh-Schwabe's electromagnetic ballasts are characterized by extremely tight impedance-value tolerances, which are achieved by individual adjustment of the air gap during the automated production and testing process of the ballasts. This optimises both light output as well as the service life of fluorescent lamps.

3 Electromagnetic Ballasts for TC and T Lamps

Standard Ballasts
5–16 W, 230/240/220 V

For compact fluorescent lamps
Shape: 28x41 mm





Vacuum-impregnated with polyester resin
Push-in terminal for leads: 0.5–1 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
tw 130
Protection class I

Lamp				Ballast									Capacitor	
Output W	Type	Base	Current mA	Type	**Ref. No.**	Voltage V, Hz	a mm	b mm	c mm	Weight kg	Δt/Δtan. K	Energy efficiency	Cp µF	Current mA
230 V, 50 Hz														
5	TC-S	G23	180	L 7/9/11.307*	**163694**	230, 50	85	75	34	0.32	60/85	B2	2.0	50
2x5	TC-S	G23	180	LN 13.805*	**169647**	230, 50	85	75	34	0.32	50/85	B1	2.0	70
				LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B2	2.0	70
7	TC-S	G23	175	L 7/9/11.307*	**163694**	230, 50	85	75	34	0.32	60/85	B2	2.0	50
2x7	TC-S	G23	160	LNN 13.044	**564190**	230, 50	155	140	92	0.80	25/40	**A2**	2.0	80
				LN 13.805*	**169647**	230, 50	85	75	34	0.32	50/85	B1	2.0	70
				LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B2	2.0	70
9	TC-S	G23	170	LNN 9/11.015	**562658**	230, 50	155	140	92	0.80	15/40	**A2**	2.0	60
				L 7/9/11.307*	**163694**	230, 50	85	75	34	0.32	60/85	B1	2.0	60
2x9	TC-S	G23	140	LNN 13.044	**564190**	230, 50	155	140	92	0.80	25/40	**A2**	2.0	80
				LN 13.805*	**169647**	230, 50	85	75	34	0.32	50/85	B1	2.0	70
				LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B2	2.0	80
10	TC-D	G24d-1	190	LN 13.805*	**169647**	230, 50	85	75	34	0.32	50/85	B1	2.0	70
				LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B2	2.0	70
	TC-DD	GR10q	180	LN 13.805*	**169647**	230, 50	85	75	34	0.32	50/85	B1	2.0	70
				LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B2	2.0	70
11	TC-S	G23	155	LNN 9/11.015	**562658**	230, 50	155	140	92	0.80	15/40	**A2**	2.0	60
				L 7/9/11.307*	**163694**	230, 50	85	75	34	0.32	60/85	B1	2.0	80
13	TC-D/TC-T	G24d-1/GX24d-1	175	LNN 13.044	**564190**	230, 50	155	140	92	0.80	25/40	**A2**	2.0	80
				LN 13.805*	**169647**	230, 50	85	75	34	0.32	50/85	B1	2.0	80
				LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B2	2.0	80
16	TC-DD	GR8/GR10q	195	LN 16.316*	**163730**	230, 50	85	75	34	0.32	60/125	B1	2.0	100
240 V, 50 Hz														
5	TC-S	G23	180	L 7/9/11.411	**164335**	240, 50	85	75	34	0.32	60/85	B2	2.0	50
2x5	TC-S	G23	180	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B2	2.0	70
7	TC-S	G23	175	L 7/9/11.411	**164335**	240, 50	85	75	34	0.32	60/85	B2	2.0	50
2x7	TC-S	G23	160	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B2	2.0	70
9	TC-S	G23	170	L 7/9/11.411	**164335**	240, 50	85	75	34	0.32	60/85	B1	2.0	60
2x9	TC-S	G23	140	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B2	2.0	80
10	TC-D	G24d-1	190	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B2	2.0	70
	TC-DD	GR10q	180	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B2	2.0	70
11	TC-S	G23	155	L 7/9/11.411	**164335**	240, 50	85	75	34	0.32	60/85	B1	2.0	80
13	TC-D/TC-T	G24d-1/GX24d-1	175	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B1	2.0	80
16	TC-DD	GR8/GR10q	195	LN 16.417	**164358**	240, 50	85	75	34	0.32	60/130	B1	2.0	100

* Ballasts without CE marking for replacements or markets outside of the EU

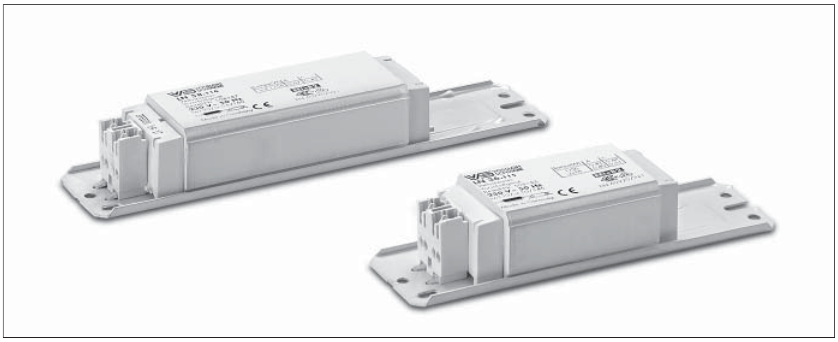
Standard Ballasts 5–16 W, 230/240/220 V

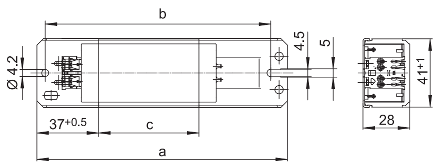
Lamp				Ballast									Capacitor	
Output W	Type	Base	Current mA	Type	**Ref. No.**	Voltage V, Hz	a mm	b mm	c mm	Weight kg	Δt/Δtan. K	Energy efficiency	Cp µF	Current mA
220 V, 60 Hz														
5	TC-S	G23	180	L 7/9/11.207	**163305**	220, 60	85	75	34	0.32	35/65	–	2.0	70
2x5	TC-S	G23	180	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	90
7	TC-S	G23	175	L 7/9/11.207	**163305**	220, 60	85	75	34	0.32	35/65	–	2.0	70
2x7	TC-S	G23	160	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	90
9	TC-S	G23	170	L 7/9/11.207	**163305**	220, 60	85	75	34	0.32	35/65	–	2.0	70
2x9	TC-S	G23	140	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	90
10	TC-D	G24d-1	190	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	80
	TC-DD	GR10q	180	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	80
11	TC-S	G23	155	L 7/9/11.207	**163305**	220, 60	85	75	34	0.32	35/65	–	2.0	80
13	TC-D/TC-T	G24d-1/GX24d-1	165	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	110

Standard Ballasts 18–58 W 230/240/220 V

For compact fluorescent lamps
Shape: 28x41 mm

Vacuum-impregnated with polyester resin
Push-in terminal for leads: 0.5–1 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
tw 130
Protection class I





Lamp				Ballast									Capacitor	
Output W	Type	Base	Current mA	Type	**Ref. No.**	Voltage V, Hz	a mm	b mm	c mm	Weight kg	Δt/Δtan. K	Energy efficiency	Cp µF	Current mA
230 V, 50 Hz														
18	TC-D/TC-T	G24d-2/GX24d-2	220	LNN 18I.046	**564192**	230, 50	232.5	220	160	1.35	15/30	**A2**	2.0	110
				LN 18I.940*	**508922**	230, 50	85	75	34	0.32	50/120	B1	2.0	110
				LN 18I.319*	**163763**	230, 50	85	75	34	0.32	60/140	B1	2.0	110
	TC-F/TC-L	2G10/2G11	370	LN 18.510*	**164572**	230, 50	155	140	92	0.80	40/65	B1	4.5	120
				LN 18.131*	**530941**	230, 50	150	140	60	0.55	55/95	B2	4.5	120
				L 18.934*	**534621**	230, 50	150	140	45	0.43	70/150	–	4.5	120
	T-U	2G13	370	LN 18.131*	**530941**	230, 50	150	140	60	0.55	55/95	B2	4.5	120
				L 18.934*	**534621**	230, 50	150	140	45	0.43	70/150	–	4.5	120
2x18	TC-F/TC-L	2G10/2G11	400	LNN 2X18.043	**564189**	230, 50	150	135	60	0.55	40/160	**A2**	4.0	210
				LN 2x18.135*	**532155**	230, 50	150	140	45	0.43	65	B1	4.0	210
22	T-R	G10q	400	LN 30.530*	**164680**	230, 50	155	140	92	0.80	45/65	B2	4.5	200
24	TC-F/TC-L	2G10/2G11	345	LN 24/26.804*	**534490**	230, 50	150	140	60	0.55	55/110	B2	4.5	150
				L 18.934*	**534621**	230, 50	150	140	45	0.43	70/150	–	4.5	150

* Ballasts without CE marking for replacements or markets outside of the EU

Standard Ballasts 18–58 W, 230/240/220 V

Lamp				Ballast									Capacitor	
Output W	Type	Base	Current mA	Type	**Ref. No.**	Voltage V, Hz	a mm	b mm	c mm	Weight kg	Δt/Δtan. K	Energy efficiency	CP μF	Current mA
230 V, 50 Hz														
26	TC-D/TC-T	G24d-3/GX24d-3	325	LN 18.131*	**530941**	230, 50	150	140	60	0.55	55/95	B1	3.5	140
				LN 26.813*	**509502**	230, 50	110	100	45	0.41	55/145	B2	3.5	140
				L 18.934*	**534621**	230, 50	150	140	45	0,43	70/150	–	3,5	140
28	TC-DD	GR8/GR10q	320	LN 18.510*	**164572**	230, 50	155	140	92	0.80	40/65	B1	3.5	150
				LN 18.131*	**530941**	230, 50	150	140	60	0.55	55/95	B1	3.5	150
				L 18.934*	**534621**	230, 50	150	140	45	0.43	70/150	–	3.5	150
32	T-R	G10q	450	LN 36.570*	**169779**	230, 50	155	140	92	0.80	35/90	B2	4.0	220
36	TC-F/TC-L	2G10/2G11	430	LN 36.570*	**169779**	230, 50	155	140	92	0.80	35/90	B1	4.5	210
				LN 36.511*	**164590**	230, 50	155	140	92	0.80	35/95	B1	4.5	210
				LN 36.130*	**527191**	230, 50	150	140	60	0.55	50/140	B2	4.5	210
				LN 36.149*	**529029**	230, 50	150	140	60	0.55	55/150	B2	4.5	210
				L 36.132*	**535977**	230, 50	150	140	45	0.43	65	–	4.5	210
36/40	T-U/T-R	2G13/G10q	430	LN 36.570*	**169779**	230, 50	150	140	92	0.80	35/90	B1	4.5	210
				LN 36.149*	**529029**	230, 50	150	140	60	0.55	55/150	B2	4.5	210
				L 36.132*	**535977**	230, 50	150	140	45	0.43	65	–	4.5	210
38	TC-DD	GR10q	430	LN 36.570*	**169779**	230, 50	155	140	92	0.80	35/90	B1	4.5	210
				LN 36.149*	**529029**	230, 50	150	140	60	0.55	55/150	B2	4.5	210
				L 36.132*	**535977**	230, 50	150	140	45	0.43	65	–	4.5	210
58	T-U	2G13	670	LN 58.568*	**169389**	230, 50	233	220	160	1.31	35/95	B1	7.0	320
				LN 58.990*	**509349**	230, 50	190	180	110	0.95	50/130	B2	7.0	320
				LN 58.116*	**508186**	230, 50	190	180	92	0.80	55/160	B2	7.0	320
240 V, 50 Hz														
18	TC-D/TC-T	G24d-2/GX24d-2	220	LN 18I.418	**164353**	240, 50	85	75	34	0.28	60/130	B1	2.0	110
	TC-F/TC-L	2G10/2G11	370	LN 18.507	**164566**	240, 50	155	140	92	0.80	35/60	B1	4.5	120
				LN 18.162	**533043**	240, 50	150	140	60	0.55	60/110	B2	4.5	120
				L 18.936*	**534627**	240, 50	150	140	45	0.43	70/140	–	4.5	120
	T-U	2G13	370	LN 18.507	**164566**	240, 50	155	140	92	0.80	35/60	B1	4.5	120
				LN 18.162	**533043**	240, 50	150	140	60	0.55	60/110	B2	4.5	120
				L 18.936*	**534627**	240, 50	150	140	45	0.43	70/140	–	4.5	120
2x18	TC-F/TC-L	2G10/2G11	400	LN 2x18.135	**535778**	240, 50	150	140	45	0.43	65	B1	4.0	210
				LN 36.201	**527196**	240, 50	150	140	60	0.55	55/140	B1	4.0	210
				LN 36.505	**164555**	240, 50	155	140	92	0.80	40/95	B1	4.0	210
21	TC-DD	GR10q	260	LN 21.293	**547145**	240, 50	105	95	45	0,41	55	B1	3,0	120
24	TC-F/TC-L	2G10/2G11	345	LN 18.507	**164566**	240, 50	155	140	92	0.80	35/60	B1	4.5	150
				LN 18.162	**533043**	240, 50	150	140	60	0.55	60/110	B2	4.5	150
				L 18.936*	**534627**	240, 50	150	140	45	0.43	70/140	–	4.5	150
26	TC-D/TC-T	G24d-3/GX24d-3	325	LN 18.162	**533043**	240, 50	150	140	60	0.55	60/110	B1	4.5	150
				LN 26.238	**545405**	240, 50	105	95	45	0.41	55/145	B2	3.5	140
28	TC-DD	GR8/GR10q	320	LN 18.162	**533043**	240, 50	150	140	60	0.55	60/110	B1	3.5	150
				L 18.936*	**534627**	240, 50	150	140	45	0.43	70/140	–	3.5	150
32	T-R	G10q	450	LN 36.505	**164555**	240, 50	155	140	92	0.80	40/95	B1	4.0	220
36	TC-F/TC-L	2G10/2G11	430	LN 36.505	**164555**	240, 50	155	140	92	0.80	40/95	B1	4.5	210
				LN 36.201	**527196**	240, 50	155	140	60	0.55	55/140	B2	4.5	210
				L 36/40.443*	**164438**	240, 50	150	140	60	0.55	65/155	–	4.5	210
36/40	T-U/T-R	2G13/G10q	430	LN 36.505	**164555**	240, 50	155	140	92	0.80	40/95	B1	4.5	210
				LN 36.201	**527196**	240, 50	150	140	60	0.55	55/140	B2	4.5	210
				L 36/40.443*	**164438**	240, 50	150	140	60	0.55	65/155	–	4.5	210
38	TC-DD	GR10q	430	LN 36.201	**527196**	240, 50	150	140	60	0.55	55/140	B2	4.5	210
				L 36/40.443*	**164438**	240, 50	150	140	60	0.55	65/155	–	4.5	210
58	T-U	2G13	670	LN 58.506	**164560**	240, 50	233	220	160	1.31	35/85	B1	7.0	320
				LN 58.192	**507936**	240, 50	190	180	110	0.95	50/150	B2	7.0	320
				LN 58.722	**534252**	240, 50	190	180	92	0.80	60/180	B2	7.0	320

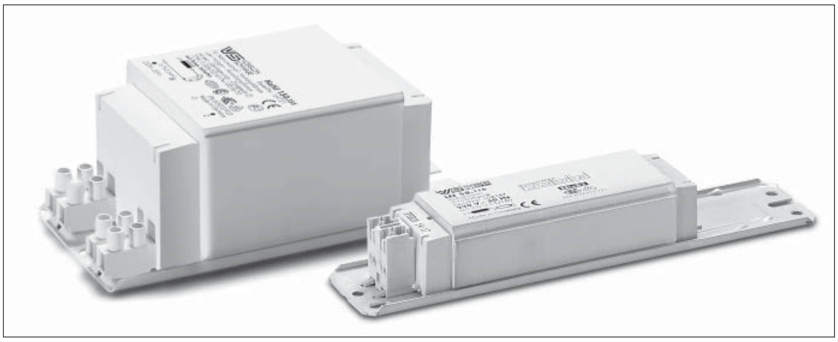
* Ballasts without CE marking for replacements or markets outside of the EU

Standard Ballasts 18–58 W, 230/240/220 V

Lamp				Ballast									Capacitor	
Output W	Type	Base	Current mA	Type	**Ref. No.**	Voltage V, Hz	a mm	b mm	c mm	Weight kg	Δt/Δtan. K	Energy efficiency	CP µF	Current mA
220 V, 50 Hz														
18	TC-F/TC-L	2G10/2G11	370	L18.933	**534624**	220,50	150	140	45	0.43	70/160	–	4.5	120
	T-U	2G13	370	L18.933	**534624**	220,50	150	140	45	0.43	70/160	–	4.5	120
2x18	TC-F/TC-L	2G10/2G11	400	L 36.158	**530252**	220,50	150	140	45	0.43	65	–	4.0	210
24	TC-F/TC-L	2G10/2G11	345	L18.933	**534624**	220,50	150	140	45	0.43	70/160	–	4.5	150
26	TC-D/TC-T	G24d-3/GX24d-3	325	L18.933	**534624**	220,50	150	140	45	0.43	70/160	–	3.5	140
28	TC-DD	GR8/GR10q	320	L18.933	**534624**	220,50	150	140	45	0.43	70/160	–	3.5	150
36	TC-F/TC-L	2G10/2G11	430	L 36.158	**530252**	220,50	150	140	45	0.43	65	–	4.5	210
36/40	T-U/T-R	2G13/G10q	430	L 36.158	**530252**	220,50	150	140	45	0.43	65	–	4.5	210
38	TC-DD	GR10q	430	L 36.158	**530252**	220,50	150	140	45	0.43	65	–	4.5	210
58	T-U	2G13	670	L 58.625	**164828**	220,50	190	180	92	0.80	55/155	–	7.0	320
220 V, 60 Hz														
18	TC-D/TC-T	G24d-2/GX24d-2	220	L 18I.602	**164779**	220, 60	85	75	34	0.32	45/110	–	2.0	110
	TC-F/TC-L	2G10/2G11	370	L 18.121	**532149**	220, 60	110	100	45	0.42	65/145	–	4.0	150
				L 18.121	**528582**	220, 60	150	140	45	0.43	65/145	–	4.0	150
				L 18.249	**538801**	220, 60	150	140	34	0.32	75/140	–	4.0	150
	T-U	2G13	370	L 18.121	**532149**	220, 60	110	100	45	0.42	65/145	–	4.0	150
				L 18.121	**528582**	220, 60	150	140	45	0.43	65/145	–	4.0	150
				L 18.249	**538801**	220, 60	150	140	34	0.32	75/140	–	4.0	150
2x18	TC-F/TC-L	2G10/2G11	400	L 36.120	**509373**	220, 60	150	140	45	0.43	60/170	–	4.0	210
24	TC-F/TC-L	2G10/2G11	345	L 18.121	**532149**	220, 60	110	100	45	0.42	65/145	–	4.0	190
				L 18.121	**528582**	220, 60	150	140	45	0.43	65/145	–	4.0	190
				L 18.249	**538801**	220, 60	150	140	34	0.32	75/140	–	4.0	190
26	TC-D/TC-T	G24d-3/GX24d-3	325	L 18.121	**532149**	220, 60	110	100	45	0.42	65/145	–	3.0	160
				L 18.121	**528582**	220, 60	150	140	45	0.43	65/145	–	3.0	160
				L 18.249	**538801**	220, 60	150	140	34	0.32	75/140	–	3.0	160
28	TC-DD	GR8/GR10q	320	L 18.121	**532149**	220, 60	110	100	45	0.42	65/145	–	3.0	155
				L 18.249	**538801**	220, 60	150	140	34	0.32	75/140	–	3.0	155
36	TC-F/TC-L	2G10/2G11	430	L 36.120	**509373**	220, 60	150	140	45	0.43	60/170	–	4.0	210
36/40	T-U/T-R	2G13/G10q	430	L 36.120	**509373**	220, 60	150	140	45	0.43	60/170	–	4.0	220
38	TC-DD	GR10q	430	L 36.120	**509373**	220, 60	150	140	45	0.43	60/170	–	4.0	220
58	T-U	2G13	670	L 58.657	**164870**	220, 60	195	180	92	0.80	55/140	–	6.0	320

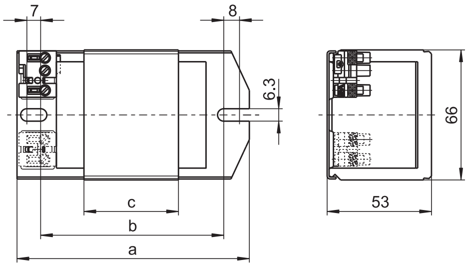
Super Low-loss Ballasts 18–65 W, 230 V

For fluorescent lamps
Shape: 28x41 mm / 53x66 mm

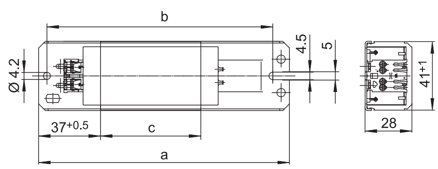


Vacuum-impregnated with polyester resin
Push-in terminal for leads: 0.5–1 mm²
tw 130
Protection class I
Energy efficiency: A2, minimum EU energy efficiency requirements as of 2017

A 53x66 mm



B 28x41 mm

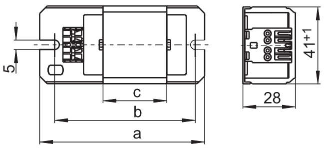


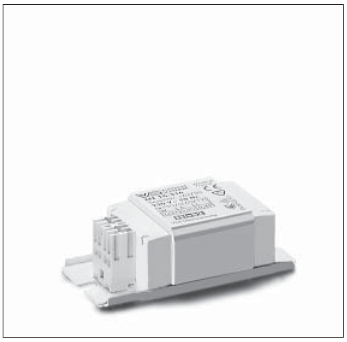
Lamp				Ballast										Capacitor	
Output	Type	Base	Current	Type	**Ref. No.**	Voltage	Draw-ing	a	b	c	Weight	Δt/Δtan.	Energy efficiency	C_P	Current
W			mA			V, Hz		mm	mm	mm	kg	K		µF	mA
230 V, 50 Hz															
2x8	T5 (T16)	G5	155	LNN 13.044	**564190**	230, 50	B	155	140	92	0.80	25/40	**A2**	2.0	80
13	T5 (T16)	G5	165	LNN 13.044	**564190**	230, 50	B	155	140	92	0.80	25/40	**A2**	2.0	80
2x15	T8 (T26)	G13	340	LNN 30.045	**564191**	230, 50	B	232.5	220	160	1.35	25/40	**A2**	4.0	185
18	T8 (T26)/T12 (T38)	G13	370	LNN 18I.046	**564192**	230, 50	B	232.5	220	160	1.35	15/30	**A2**	2.0	110
18/20	T8 (T26)/T12 (T38)	G13	370	LNN 18.645	**560657**	230, 50	A	130	105	64	1.80	10/20	**A2**	4.5	120
2x18/20	T8 (T26)/T12 (T38)	G13	400	LNN 36.646	**560659**	230, 50	A	108	90	36	1.10	25/70	**A2**	4.0	210
				LNN 2X18.043	**564189**	230, 50	B	150	135	60	0.55	40/160	**A2**	4.0	210
				LNN 36.648	**560664**	230, 50	B	232.5	220	160	1.35	25/40	**A2**	4.5	210
30	T8 (T26)	G13	365	LNN 30.045	**564191**	230, 50	B	232.5	220	160	1.35	25/40	**A2**	4.5	180
36/40	T8 (T26)/T12 (T38)	G13	430	LNN 36.646	**560659**	230, 50	A	108	90	36	1.10	25/70	**A2**	4.0	120
				LNN 36.648	**560664**	230, 50	B	232.5	220	160	1.35	25/40	**A2**	4.5	210
58/65	T8 (T26)/T12 (T38)	G13	670	LNN 58.647	**560661**	230, 50	A	108	90	36	1.10	30/110	**A2**	7.0	320
				LNN 58TD.649*	**560665**	230, 50	B	232.5	220	160	1.35	20/40	**A2**	7.0	320

* TD = halfchoke (two ballasts per lamp are necessary)

Standard Ballasts 4–13 W 230/240/220 V

For fluorescent lamps
Shape: 28x41 mm





Vacuum-impregnated with polyester resin
Push-in terminal for leads: 0.5–1 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
tw 130
Protection class I

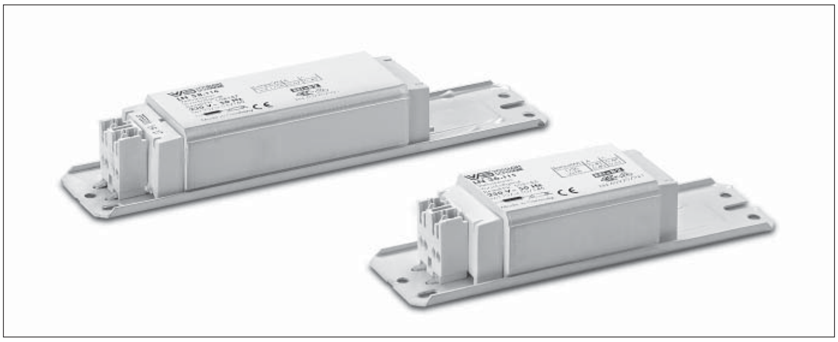
Lamp				Ballast									Capacitor	
Output W	Type	Base	Current mA	Type	**Ref. No.**	Voltage V, Hz	a mm	b mm	c mm	Weight kg	Δt/Δtan. K	Energy efficiency	Cp µF	Current mA
230 V, 50 Hz														
4	T5 (T16)	G5	170	L 4/6/8.304*	**163683**	230, 50	85	75	34	0.32	55/85	B2	2.0	40
2x4	T5 (T16)	G5	155	L 4/6/8.304*	**163683**	230, 50	85	75	34	0.32	55/85	B1	2.0	50
6	T5 (T16)	G5	160	L 4/6/8.304*	**163683**	230, 50	85	75	34	0.32	55/85	B1	2.0	50
2x6	T5 (T16)	G5	175	LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B1	2.0	65
8	T5 (T16)	G5	145	L 4/6/8.304*	**163683**	230, 50	85	75	34	0.32	55/85	B1	2.0	60
2x8	T5 (T16)	G5	155	LNN 13.044	**564190**	230, 50	155	140	92	0.80	25/40	**A2**	2.0	80
				LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B1	2.0	85
13	T5 (T16)	G5	165	LNN 13.044	**564190**	230, 50	155	140	92	0.80	25/40	**A2**	2.0	80
				LN 13.313*	**163711**	230, 50	85	75	34	0.32	55/80	B1	2.0	80
240 V, 50 Hz														
4	T5 (T16)	G5	170	L 4/6/8.404	**164326**	240, 50	85	75	34	0.32	55/80	B2	2.0	40
2x4	T5 (T16)	G5	155	L 4/6/8.404	**164326**	240, 50	85	75	34	0.32	55/80	B1	2.0	50
6	T5 (T16)	G5	160	L 4/6/8.404	**164326**	240, 50	85	75	34	0.32	55/80	B1	2.0	50
2x6	T5 (T16)	G5	175	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B1	2.0	65
8	T5 (T16)	G5	145	L 4/6/8.404	**164326**	240, 50	85	75	34	0.32	55/80	B1	2.0	60
2x8	T5 (T16)	G5	155	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B1	2.0	85
13	T5 (T16)	G5	165	LN 13.413	**164342**	240, 50	85	75	34	0.32	60/90	B1	2.0	80
220 V, 60 Hz														
4	T5 (T16)	G5	170	L 4/6/8.218	**532644**	220, 60	85	75	34	0.32	60/80	–	2.0	40
2x4	T5 (T16)	G5	155	L 4/6/8.218	**532644**	220, 60	85	75	34	0.32	60/80	–	2.0	50
6	T5 (T16)	G5	160	L 4/6/8.218	**532644**	220, 60	85	75	34	0.32	60/80	–	2.0	50
2x6	T5 (T16)	G5	175	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	65
8	T5 (T16)	G5	145	L 4/6/8.218	**532644**	220, 60	85	75	34	0.32	60/80	–	2.0	60
2x8	T5 (T16)	G5	155	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	85
13	T5 (T16)	G5	165	L 13.210	**520992**	220, 60	85	75	34	0.32	45/80	–	2.0	80

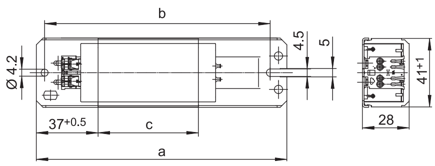
* Ballasts without CE marking for replacements or markets outside of the EU

Standard Ballasts 14–65 W, 230 V

For fluorescent lamps
Shape: 28x41 mm

Vacuum-impregnated with polyester resin
Push-in terminal for leads: 0.5–1 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
tw 130
Protection class I





Lamp				Ballast									Capacitor	
Output	Type	Base	Current	Type	**Ref. No.**	Voltage	a	b	c	Weight	Δt/Δtan.	Energy efficiency	Cp	Current
W			mA			V, Hz	mm	mm	mm	kg	K		µF	mA
230 V, 50 Hz														
14	T8 (T26)	G13	395	LN 18.510*	**164572**	230, 50	155	140	92	0.80	40/65	B2	4.5	150
15	T8 (T26)	G13	310	LN 15.329*	**163861**	230, 50	150	140	60	0.55	50/80	B2	3.5	120
2x15	T8 (T26)	G13	340	LNN 30.045	**564191**	230, 50	232.5	220	160	1.35	25/40	**A2**	4.0	185
				LN 30.801*	**169645**	230, 50	150	140	60	0.55	55/110	B2	4.0	185
				L 30.347*	**164033**	230, 50	150	140	60	0.55	60/150	–	4.0	185
16	T8 (T26)	G13	200	LN 16.316*	**163730**	230, 50	85	75	34	0.32	60/125	B1	2.0	90
18/20	T8 (T26)/T12 (T38)	G13	370	LN 18.510*	**164572**	230, 50	155	140	92	0.80	40/65	B1	4.5	120
				LN 18.131*	**530941**	230, 50	150	140	60	0.55	55/95	B2	4.5	120
				L 18.934*	**534621**	230, 50	150	140	45	0.43	70/150	–	4.5	120
2x18/20	T8 (T26)/T12 (T38)	G13	400	LNN 2X18.043	**564189**	230, 50	150	135	60	0.55	40/160	**A2**	4.0	210
				LN 2x18.135*	**532155**	230, 50	150	140	45	0.43	65	B1	4.0	210
25	T12 (T38)	G13	290	L 25.346*	**164013**	230, 50	150	140	60	0.55	45/80	B1	3.5	130
30	T8 (T26)	G13	365	LNN 30.045	**564191**	230, 50	232.5	220	160	1.35	25/40	**A2**	4.5	180
				LN 30.801*	**169645**	230, 50	150	140	60	0.55	55/110	B2	4.5	180
36-1	T8 (T26)	G13	556	L 36I.342*	**538072**	230, 50	195	180	110	0.87	50/120	B2	6.5	250
36/40	T8 (T26)/T12 (T38)	G13	430	LN 36.570*	**169779**	230, 50	155	140	92	0.80	35/90	B1	4.5	210
				LN 36.511*	**164590**	230, 50	155	140	92	0.80	35/95	B1	4.5	210
				LN 36.130*	**527191**	230, 50	150	140	60	0,55	50/140	B2	4.5	210
				LN 36.149*	**529029**	230, 50	150	140	60	0.55	55/150	B2	4.5	210
				L 36.132*	**535977**	230, 50	150	140	45	0.43	65	–	4.5	210
38	T8 (T26)	G13	430	LN 36.570*	**169779**	230, 50	155	140	92	0.80	35/90	B1	4.5	210
				LN 36.511*	**164590**	230, 50	155	140	92	0.80	35/95	B1	4.5	210
				LN 36.149*	**529029**	230, 50	150	140	60	0.55	55/150	B2	4.5	210
				L 36.132*	**535977**	230, 50	150	140	45	0.43	65	–	4.5	210
58/65	T8 (T26)/T12 (T38)	G13	670	LN 58.568*	**169389**	230, 50	233	220	160	1.31	35/95	B1	7.0	320
				LN 58.990*	**509349**	230, 50	190	180	110	0.95	50/130	B2	7.0	320
				LN 58.116*	**508186**	230, 50	190	180	92	0.80	55/160	B2	7.0	320
				L 58.718*	**169658**	230, 50	190	180	92	0.80	60/170	–	7.0	320

* Ballasts without CE marking for replacements or markets outside of the EU

Standard Ballasts
15–75 W, 240/220 V

For fluorescent lamps
Shape: 28x41 mm

Lamp				Ballast									Capacitor	
Output W	Type	Base	Current mA	Type	**Ref. No.**	Voltage V, Hz	a mm	b mm	c mm	Weight kg	$\Delta t/\Delta t_{an.}$ K	Energy efficiency	C_P µF	Current mA
240 V, 50 Hz														
2x15	T8 (T26)	G13	340	LN 30.806	**533067**	240, 50	150	140	60	0.55	55/130	B2	4.0	185
16	T8 (T26)	G13	200	LN 16.417	**164358**	240, 50	85	75	34	0.32	60/130	B1	2.0	90
18/20	T8 (T26)/T12 (T38)	G13	370	LN 18.507	**164566**	240, 50	155	140	92	0.80	35/60	B1	4.5	120
				LN 18.162	**533043**	240, 50	150	140	60	0.55	60/110	B2	4.5	120
				L 18.936*	**534627**	240, 50	150	140	45	0.43	70/140	–	4.5	120
2x18/20	T8 (T26)/T12 (T38)	G13	400	LN 2x18.135	**535778**	240, 50	150	140	45	0.43	65	B1	4.0	210
				LN 36.201	**527196**	240, 50	150	140	60	0.55	55/140	B1	4.0	210
				LN 36.505	**164555**	240, 50	155	140	92	0.80	40/95	B1	4.0	210
30	T8 (T26)	G13	365	LN 30.806	**533067**	240, 50	150	140	60	0.55	55/130	B2	4.5	180
36/40	T8 (T26)/T12 (T38)	G13	430	LN 36.505	**164555**	240, 50	155	140	92	0.80	40/95	B1	4.5	210
				LN 36.201	**527196**	240, 50	150	140	60	0.55	55/140	B2	4.5	210
				L 36/40.443*	**164438**	240, 50	150	140	60	0.55	65/155	–	4.5	210
38	T8 (T26)	G13	430	LN 36.505	**164555**	240, 50	155	140	92	0.80	40/95	B1	4.5	210
				LN 36.201	**527196**	240, 50	150	140	60	0.55	55/140	B2	4.5	210
				L 36/40.443*	**164438**	240, 50	150	140	60	0.55	65/155	–	4.5	210
58/65	T8 (T26)/T12 (T38)	G13	670	LN 58.506	**164560**	240, 50	233	220	160	1.31	35/85	B1	7.0	320
				LN 58.192	**507936**	240, 50	190	180	110	0.95	50/150	B2	7.0	320
				LN 58.722	**534252**	240, 50	190	180	92	0.80	60/180	B2	7.0	320
70/75	T8 (T26)/T12 (T38)	G13	670	LN 75.170	**533650**	240, 50	190	180	110	0.95	50/150	B2	6.0	320
220 V, 50 Hz														
18/20	T8 (T26)/T12 (T38)	G13	370	L 18.933	**534624**	220, 50	150	140	45	0.43	70/160	–	4.5	120
2x18/20	T8 (T26)/T12 (T38)	G13	430	L 36.158	**530252**	220, 50	150	140	45	0.43	65	–	4.0	210
36/40	T8 (T26)/T12 (T38)	G13	430	L 36.158	**530252**	220, 50	150	140	45	0.43	65	–	4.5	210
38	T8 (T26)	G13	430	L 36.158	**530252**	220, 50	150	140	45	0.43	65	–	4.5	210
58/65	T8 (T26)/T12 (T38)	G13	670	L 58.625	**164828**	220, 50	190	180	92	0.80	55/155	–	7.0	320
220 V, 60 Hz														
15	T8 (T26)	G13	310	L 15.007	**537744**	220, 60	150	140	45	0.43	55/80	–	3.0	120
2x15	T8 (T26)	G13	350	L 30.006	**537750**	220, 60	150	140	45	0.43	60/120	–	4.0	185
18/20	T8 (T26)/T12 (T38)	G13	370	L 18.121	**532149**	220, 60	110	100	45	0.42	65/145	–	4.0	190
				L 18.121	**528582**	220, 60	150	140	45	0.43	65/145	–	4.0	190
				L 18.149	**538801**	220, 60	150	140	34	0.32	75/140	–	4.0	190
2x18/20	T8 (T26)/T12 (T38)	G13	430	L 36.120	**509373**	220, 60	150	140	45	0.43	60/170	–	4.0	220
30	T8 (T26)	G13	365	L 30.006	**537750**	220, 60	150	140	45	0.43	60/120	–	4.0	180
36/40	T8 (T26)/T12 (T38)	G13	430	L 36.120	**509373**	220, 60	150	140	45	0.43	60/170	–	4.0	220
38	T8 (T26)	G13	430	L 36.120	**509373**	220, 60	150	140	45	0.43	60/170	–	4.0	230
58/65	T8 (T26)/T12 (T38)	G13	670	L 58.657	**164870**	220, 60	195	180	92	0.80	55/140	–	6.0	320

* Ballasts without CE marking for replacements or markets outside of the EU

COMPACT AND VERSATILE

VS LAMPHOLDERS FOR COMPACT FLUORESCENT LAMPS

Vossloh-Schwabe provides a broad range of lampholders for singleended compact fluorescent lamps, with regard to which the numerous fixing methods make just about any luminaire design possible.

As compact fluorescent lamps generate considerably less heat in comparison to incandescent lamps, the advantages provided by thermoplastics can be fully utilized for lampholder design.

Almost all VS lampholders for compact fluorescent lamps are made of thermoplastic PBT and therefore bear the T marking T140, which refers to the maximum base temperature in accordance with EN 61199 (VDE 0715 T9). The use of this highly heat-resistant material was born of close cooperation between Vossloh-Schwabe and the world's leading lamp manufacturers that also use PBT for producing lamp bases. In connection with fatigue-resistant, stainless steel lamp mounting springs, harmonizing the casing material ensures a permanent and secure lamp fit.

3 Lampholders and Accessories for TC Lamps

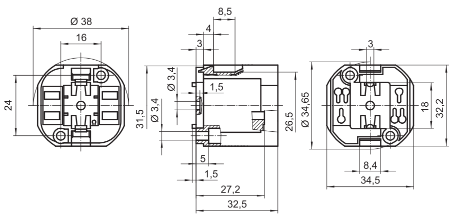
G24, GX24 Lampholders

For single-ended compact fluorescent lamps TC-D, TC-T, TC-DEL, TC-TEL

The drawings and photos contained in this chapter only show lampholders for lamps with base G24q-1. Further drawings of lamp bases can be found on page 230.

When mounting the lampholder it has to be considered that the TC-T and TC-TEL lamp is wider than the lampholder. When using the central hole for mounting additional depressions for anti-rotation pips have to be provided.

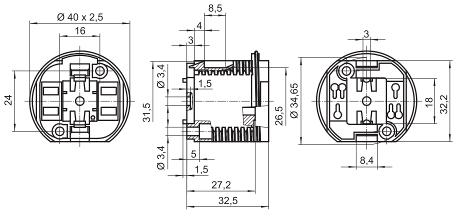
G24, GX24 lampholders
Plain casing
Casing: PBT GF, white, T140
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Central fixing hole for screw M3
Rotation stop
For cover caps (see p. 291–293)



Type	**Ref. No.**	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
71501	**527735**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	13	500
71502	**527736**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	13	500
71503	**527737**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	13	500
71511	**527739**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	14.5	500
71512	**527740**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	14.5	500
71513	**527741**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	14.5	500
71519	**527745**	GX24q-3/-4*	TC-TEL	26, 32 / 42	14.5	500
71514	**527742**	GX24q-4	TC-TEL	42	14.5	500
71515	**527743**	GX24q-5	TC-TEL	57	15.1	500
71516	**527744**	GX24q-6	TC-TEL	70	15.1	500

* Lampholder 527745 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.

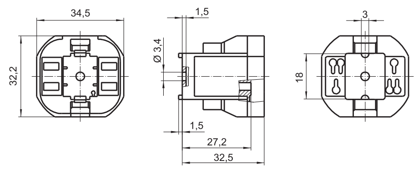
G24, GX24 lampholders
External thread 40x2.5 IEC 60399
Casing: PBT GF, white, T140
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Central fixing hole for screw M3
Rotation stop
For cover caps (see p. 291–293)
For screw rings (see p. 307)



Type	**Ref. No.**	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
71001	**527502**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	12.7	500
71002	**527503**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	12.7	500
71003	**527504**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	12.7	500
71011	**527506**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	15.2	500
71012	**527507**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	15.2	500
71013	**527508**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	15.2	500
71019	**527512**	GX24q-3/-4*	TC-TEL	26, 32 / 42	15.2	500
71014	**527509**	GX24q-4	TC-TEL	42	15.2	500
71015	**527510**	GX24q-5	TC-TEL	57	15.8	500
71016	**527511**	GX24q-6	TC-TEL	70	15.8	500

* Lampholder 527512 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.

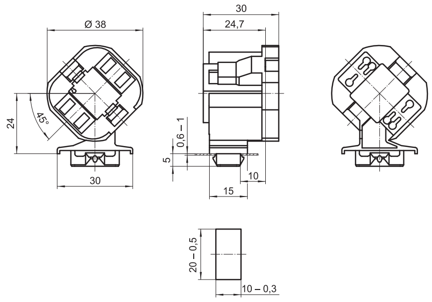
G24, GX24 lampholders
Profiled shape
Casing: PBT GF, white, T140
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Central fixing hole for screw M3
Rotation stop



Type	**Ref. No.**	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
71101	**527529**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	8.5	500
71102	**527530**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	8.5	500
71103	**527531**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	8.5	500
71111	**527533**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	10.9	500
71112	**527534**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	10.9	500
71113	**527535**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	10.9	500
71119	**527539**	GX24q-3/-4*	TC-TEL	26, 32 / 42	10.9	500
71114	**527536**	GX24q-4	TC-TEL	42	10.9	500
71115	**527537**	GX24q-5	TC-TEL	57	11.1	500
71116	**527538**	GX24q-6	TC-TEL	70	11.1	500

* Lampholder 527539 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.

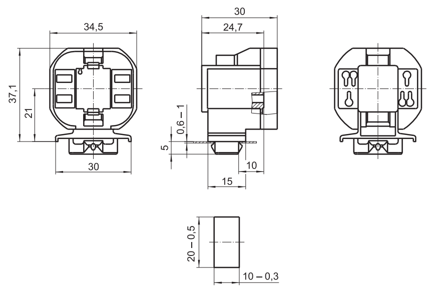
G24, GX24 push-fit lampholders
Lamp position: 45°
Casing: PBT GF, white, T140
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Push-fit foot for cut-out 10x20 mm
for wall thickness 0.6–1 mm
Foot with facility for cable routing



Type	**Ref. No.**	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
71301	**527585**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	10.2	500
71302	**527586**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	10.2	500
71303	**527587**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	10.2	500
71311	**527589**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	12.1	500
71312	**527590**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	12.1	500
71313	**527591**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	12.1	500
71319	**527596**	GX24q-3/-4*	TC-TEL	26, 32 / 42	12.1	500
71314	**527592**	GX24q-4	TC-TEL	42	12.1	500
71315	**527594**	GX24q-5	TC-TEL	57	12.6	500
71316	**527595**	GX24q-6	TC-TEL	70	12.6	500

* Lampholder 527596 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.

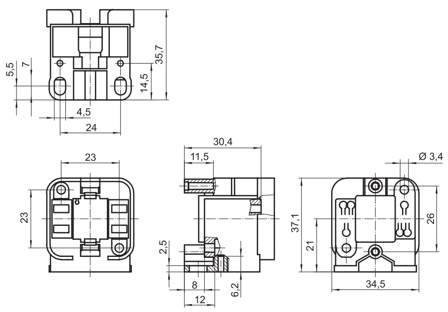
G24, GX24 push-fit lampholders
Casing: PBT GF, white, T140
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Push-fit foot for cut-out 10x20 mm
for wall thickness 0.6–1 mm
Foot with facility for cable routing

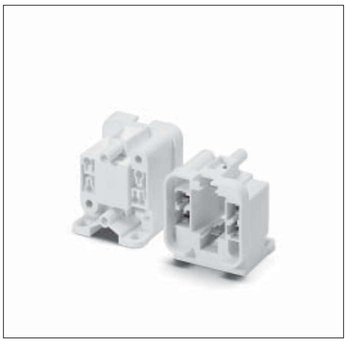


Type	**Ref. No.**	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
71801	**528029**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	10.2	500
71802	**528030**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	10.2	500
71803	**528031**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	10.2	500
71811	**528033**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	12.1	500
71812	**528034**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	12.1	500
71813	**528035**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	12.1	500
71819	**528039**	GX24q-3/-4*	TC-TEL	26, 32 / 42	12.1	500
71814	**528036**	GX24q-4	TC-TEL	42	12.1	500
71815	**528037**	GX24q-5	TC-TEL	57	12.7	500
71816	**528038**	GX24q-6	TC-TEL	70	12.7	500

* Lampholder 528039 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.

G24, GX24 surface-mounted lampholders
Casing: PBT GF, white, T140, Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Base fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Base oblong holes for screws M4
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
and ST4.2-C/F
Front fixing holes for screws M3

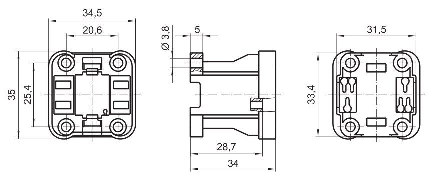




Type	Ref. No.	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
71701	**527790**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	13.2	500
71702	**527791**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	13.2	500
71703	**527792**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	13.2	500
71711	**527794**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	15.2	500
71712	**527795**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	15.2	500
71713	**527796**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	15.2	500
71719	**527800**	GX24q-3/-4*	TC-TEL	26, 32 / 42	15.2	500
71714	**527797**	GX24q-4	TC-TEL	42	15.2	500
71715	**527798**	GX24q-5	TC-TEL	57	15.8	500
71716	**527799**	GX24q-6	TC-TEL	70	15.8	500

* Lampholder 527800 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.G24, GX24 surface-mounted lampholders

Casing: PBT GF, white, T140
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Front fixing holes for screws M3

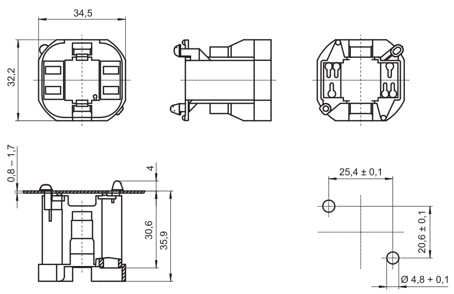


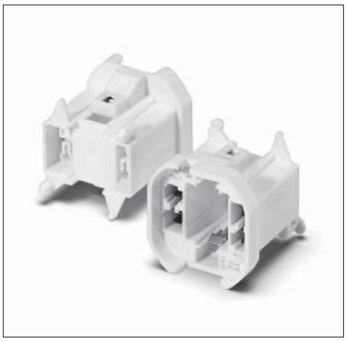
Type	Ref. No.	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
71201	**527556**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	12	500
71202	**527557**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	12	500
71203	**527558**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	12	500
71211	**527560**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	12.9	500
71212	**527561**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	12.9	500
71213	**527562**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	12.9	500
71219	**527566**	GX24q-3/-4*	TC-TEL	26, 32 / 42	12.9	500
71214	**527563**	GX24q-4	TC-TEL	42	12.9	500
71215	**527564**	GX24q-5	TC-TEL	57	13.5	500
71216	**527565**	GX24q-6	TC-TEL	70	13.5	500

* Lampholder 527566 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.

1 2 3 4 5 6 7 8 9 10

G24, GX24 push-fit lampholders
Casing: PBT GF, white, T140
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Base split pins for wall thickness 0.8–1.7 mm

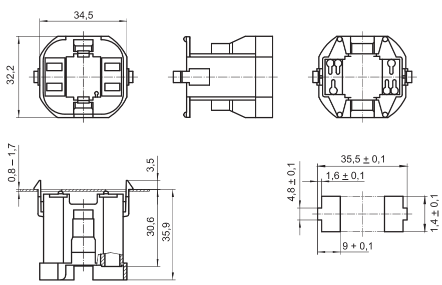


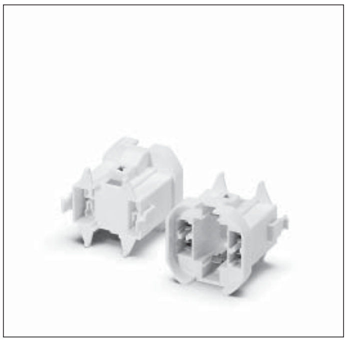


Type	**Ref. No.**	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
71601	**527762**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	10.5	500
71602	**527763**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	10.5	500
71603	**527764**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	10.5	500
71611	**527766**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	12	500
71612	**527768**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	12	500
71613	**527769**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	12	500
71619	**527773**	GX24q-3/-4*	TC-TEL	26, 32 / 42	12	500
71614	**527770**	GX24q-4	TC-TEL	42	12	500
71615	**527771**	GX24q-5	TC-TEL	57	12.6	500
71616	**527772**	GX24q-6	TC-TEL	70	12.6	500

* Lampholder 527773 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.

G24, GX24 push-fit lampholders
Casing: PBT GF, white, T140
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
In addition for G24q, GX24q lampholders:
push-in terminals: 0.5–1 mm² (starter circuit)
Rear split pins for wall thickness 0.8–1.7 mm
Width of split pin: 4.5 mm





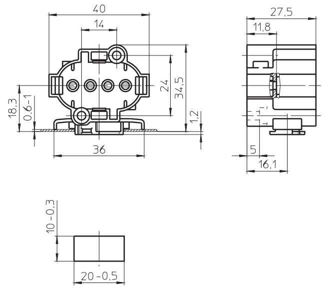
Type	**Ref. No.**	Base	Lamp	Output (W)	Weight (g)	Unit (pcs.)
72101	**528116**	G24d-1/GX24d-1	TC-D/TC-T	10, 13 / 13	10.4	500
72102	**528117**	G24d-2/GX24d-2	TC-D/TC-T	18 / 18	10.4	500
72103	**528118**	G24d-3/GX24d-3	TC-D/TC-T	26 / 26	10.4	500
72111	**528120**	G24q-1/GX24q-1	TC-DEL/TC-TEL	10, 13 / 13	12.3	500
72112	**528121**	G24q-2/GX24q-2	TC-DEL/TC-TEL	18 / 18	12.3	500
72113	**528122**	G24q-3/GX24q-3	TC-DEL/TC-TEL	26 / 26, 32	12.3	500
72119	**528126**	GX24q-3/-4*	TC-TEL	26, 32 / 42	12.3	500
72114	**528123**	GX24q-4	TC-TEL	42	12.3	500
72115	**528124**	GX24q-5	TC-TEL	57	12.9	500
72116	**528125**	GX24q-6	TC-TEL	70	12.9	500

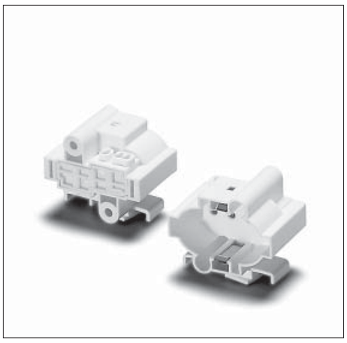
* Lampholder 528126 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42 W.

2G7 Lampholders

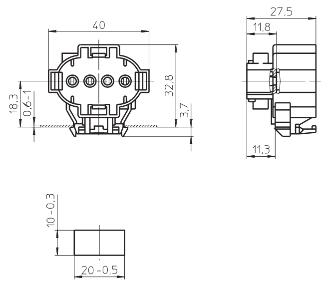
For single-ended compact fluorescent lamps TC-SEL

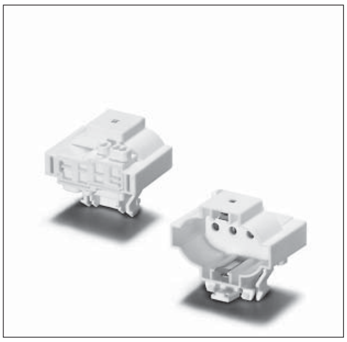
2G7 push-fit lampholder
Casing: PBT GF, white, T140, nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
Push-in terminals: 0.5–1 mm² (starter circuit)
Rear fixing hole for self-tapping screw
acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Locking of the lampholder by a 15° turn
Weight: 13.7 g, unit: 500 pcs.
Type: 35610
Ref. No.: 109235



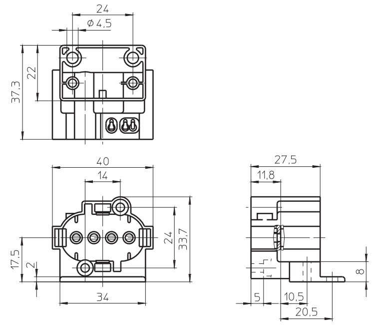


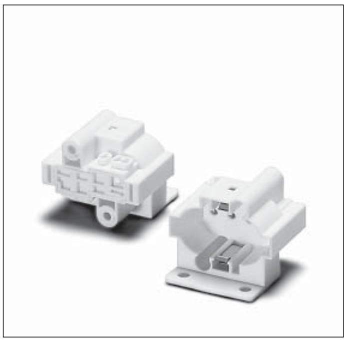
2G7 push-fit lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
Push-in terminals: 0.5–1 mm² (starter circuit)
Push-fit foot for cut-out 10x20 mm
for wall thickness 0.6–1 mm
Weight: 18 g, unit: 500 pcs.
Type: 35613
Ref. No.: 500574



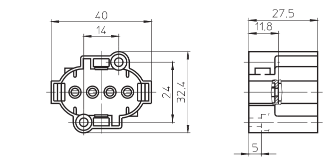


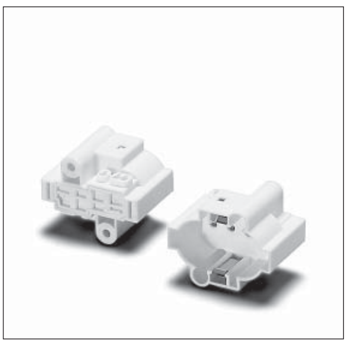
2G7 surface-mounted lampholder
Casing: PBT GF, white, T140, nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
Push-in terminals: 0.5–1 mm² (starter circuit)
Fixing holes for screws M4
Lateral and rear fixing holes for self-tapping
screws acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Weight: 18.1 g, unit: 500 pcs.
Type: 35611
Ref. No.: 109238





2G7 surface-mounted lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
Push-in terminals: 0.5–1 mm² (starter circuit)
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Weight: 14 g, unit: 500 pcs.
Type: 35612
Ref. No.: 109240



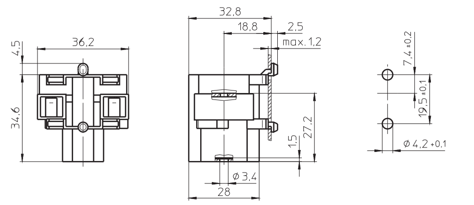


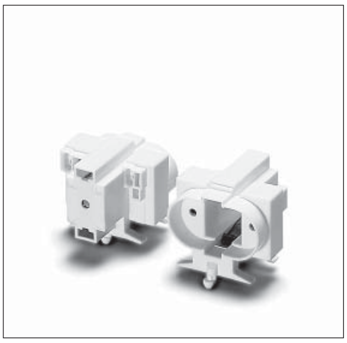
G23 Lampholders

For single-ended compact fluorescent lamps TC-S

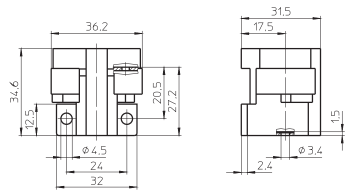
If the central hole is used for mounting,
make sure there is no risk of rotation.

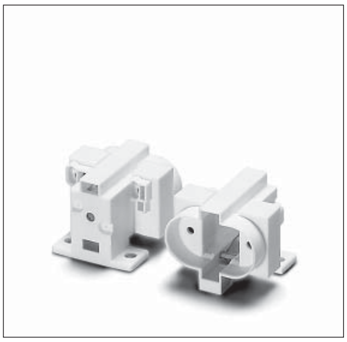
G23 push-fit lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Split pins for wall thickness up to 1.2 mm
Central fixing hole for screw M3
Weight: 12 g, unit: 500 pcs.
Type: 35004
Ref. No.: 101298



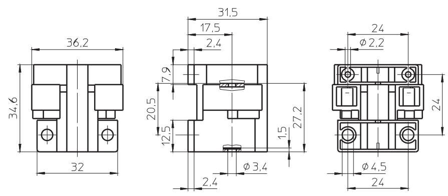


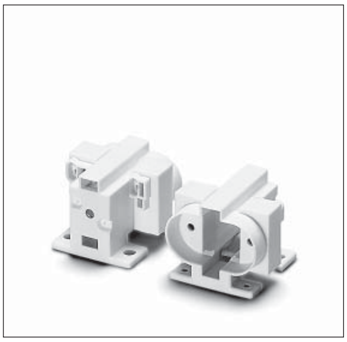
G23 surface-mounted lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Fixing holes for screws M4
Central fixing hole for screw M3
Weight: 12.4 g, unit: 500 pcs.
Type: 35006
Ref. No.: 101306



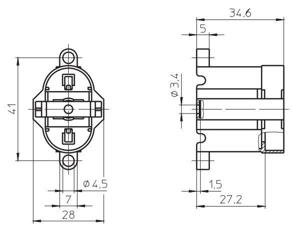


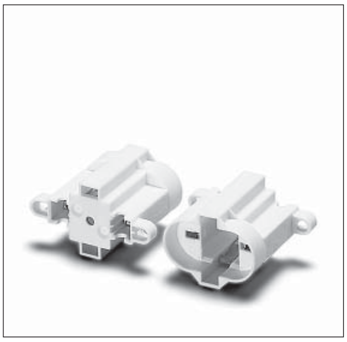
G23 lampholder
For push-fit on track
Casing: PBT GF, white, T140, nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Lateral fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
Fixing holes for screws M4
Central fixing hole for screw M3
Weight: 14 g, unit: 500 pcs.
Type: 35007
Ref. No.: 101310



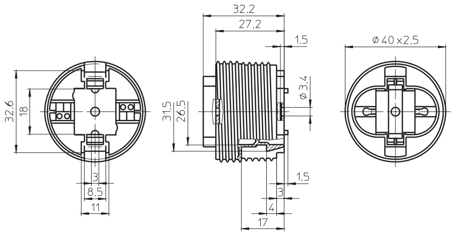


G23 surface-mounted lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Fixing holes for screws M4
Central fixing hole for screw M3
Weight: 11.1 g, unit: 500 pcs.
Type: 35008
Ref. No.: 101314

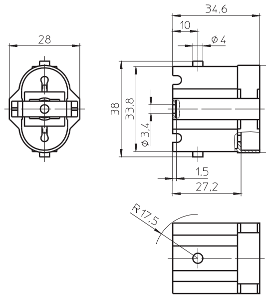


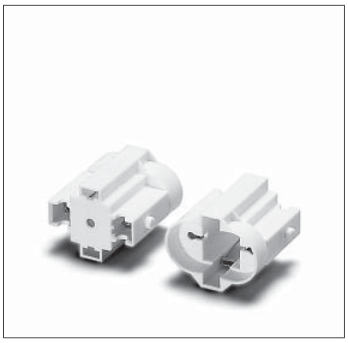


G23 lampholder, for cover caps (see p. 291–293)
External thread 40x2.5 IEC 60399
Casing: PBT GF, white, T140, nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Central fixing hole for screw M3
When using the central hole for mounting additional depressions for anti-rotation pips have to be provided.
For screw rings (see p. 307)
Weight: 16.3 g, unit: 500 pcs.
Type: 35010
Ref. No.: 101320

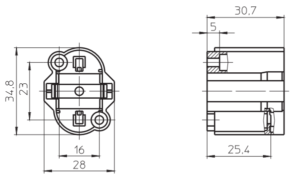


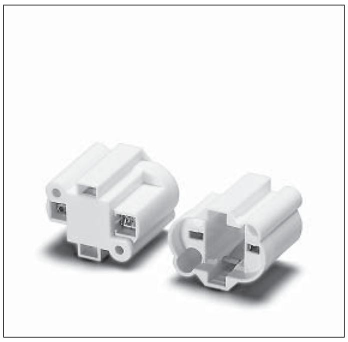
G23 lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Lateral pivots for bracket 105820
Central fixing hole for screw M3
Weight: 11 g, unit: 500 pcs.
Type: 35011
Ref. No.: 101324



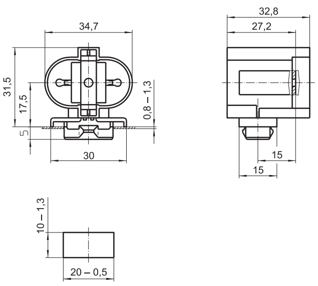


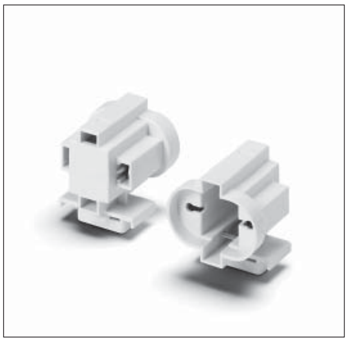
G23 surface-mounted lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Front fixing holes for screws M3
Rear fixing holes for self-tapping screws acc. to ISO 1481/7049-ST4.2-C/F
Weight: 11.9 g, unit: 500 pcs.
Type: 35012
Ref. No.: 108898



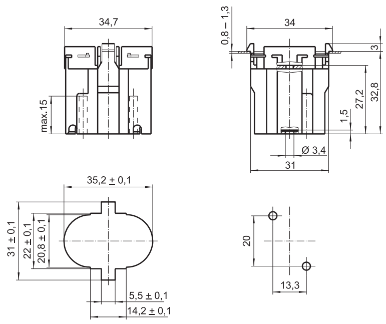


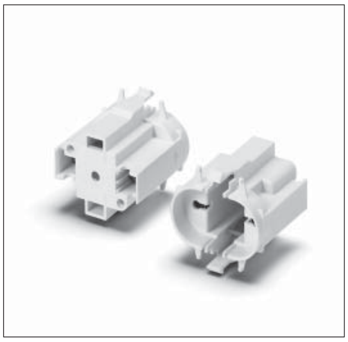
G23 push-fit lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Push-fit foot for wall thickness 0.8–1.3 mm
Central fixing hole for screw M3
Weight: 11 g, unit: 500 pcs.
Type: 35051
Ref. No.: 101344





G23 push-fit lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Front split pins for wall thickness 0.8–1.3 mm
Central fixing hole for screw M3
Weight: 12 g, unit: 500 pcs.
Type: 35052
Ref. No.: 101346





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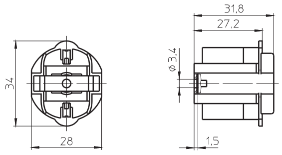
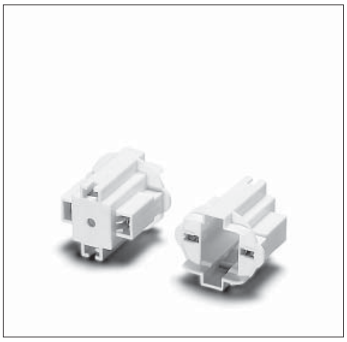
G23 lampholder
Casing: PBT GF, white, T140
Nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Central fixing hole for screw M3
Particularly suitable for narrow mounting
(e.g. for insertion into tube systems)
Weight: 8 g, unit: 500 pcs.
Type: 35201
Ref. No.: 101364

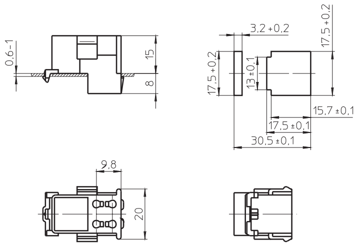




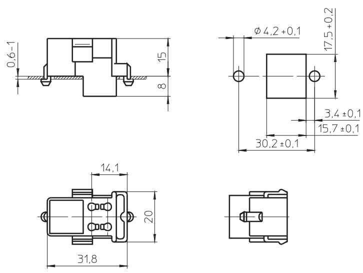
GR10q Lampholders

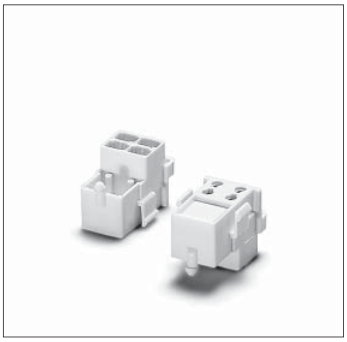
For single-ended compact fluorescent lamps TC-DD

GR10q push-fit lampholder
Casing: PC, white, T110
Nominal rating: 2/250
Base push-in terminals: 0.5–1 mm²
Base fixing clip for wall thickness 0.6–1 mm
Weight: 6.2 g, unit: 1000 pcs.
Type: 35500
Ref. No.: 108927

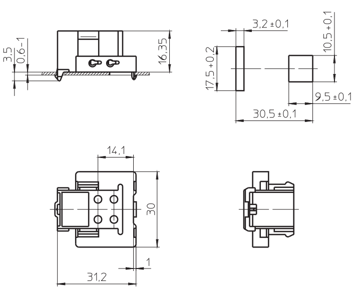


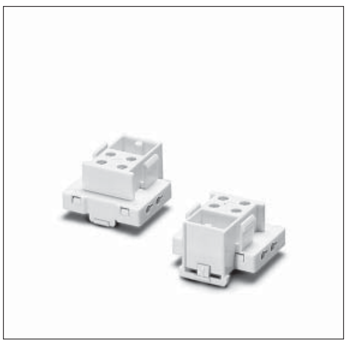
GR10q push-fit lampholder
Casing: PC, white, T110
Nominal rating: 2/250
Base push-in terminals: 0.5–1 mm²
Base split pins for wall thickness 0.6–1 mm
Weight: 6.2 g, unit: 1000 pcs.
Type: 35510
Ref. No.: 108928



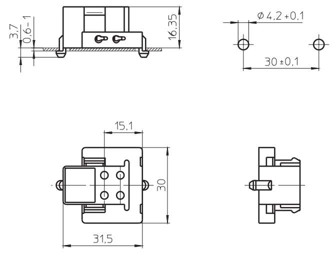


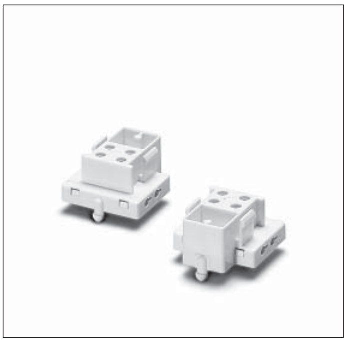
GR10q push-fit lampholder
Material: PBT, white, T110
Nominal rating: 2/250
Lateral push-in terminals: 0.5–1 mm²
Base fixing clip for wall thickness 0.6–1 mm
Weight: 7.2 g, unit: 1000 pcs.
Type: 35530
Ref. No.: 108932



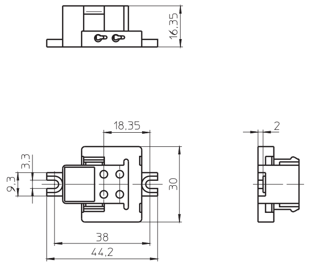


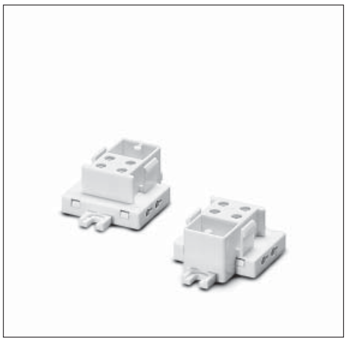
GR10q push-fit lampholder
Material: PBT, white, T110
Nominal rating: 2/250
Lateral push-in terminals: 0.5–1 mm²
Base split pins for wall thickness 0.6–1 mm
Weight: 7.2 g, unit: 1000 pcs.
Type: 35540
Ref. No.: 108933





GR10q surface-mounted lampholder
Material: PBT, white, T110
Nominal rating: 2/250
Lateral push-in terminals: 0.5–1 mm²
Fastening slots for screws M3
Weight: 7.4 g, unit: 1000 pcs.
Type: 35550
Ref. No.: 108934

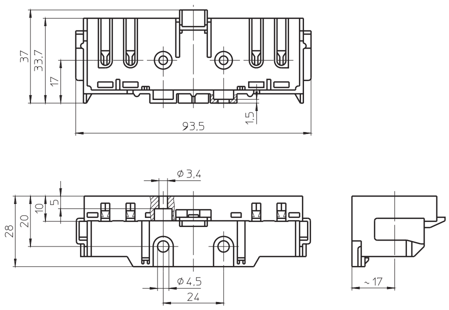


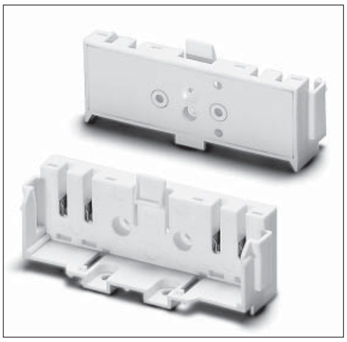


2G10 Lampholders

For single-ended compact fluorescent lamps TC-F

2G10 surface-mounted lampholder, with lamp lock
Casing: PBT GF, white, T140, nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Lateral lamp insertion
Front fixing holes for cheese-head screws M3
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Base fixing holes for screws M4
Weight: 25.5 g, unit: 250 pcs.
Type: 36300
Ref. No.: 101521

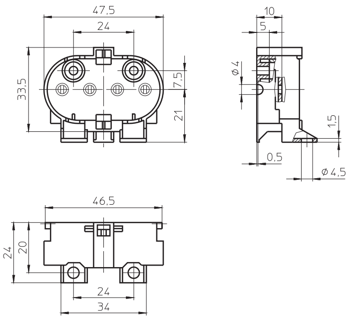




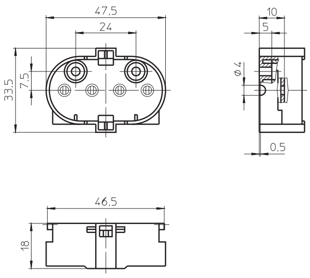
2G11 Lampholders

For single-ended compact fluorescent lamps TC-L

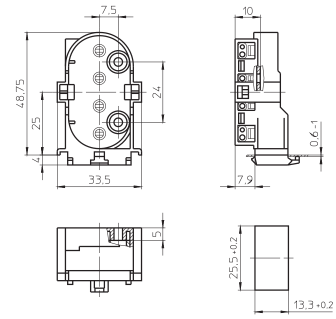
2G11 surface-mounted lampholder
Casing: PBT GF, white, T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
Push-in terminals: 0.5–1 mm² (starter circuit)
Base fixing holes for screws M4
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Weight: 13.7 g, unit: 500 pcs.
Type: 36050
Ref. No.: 101485

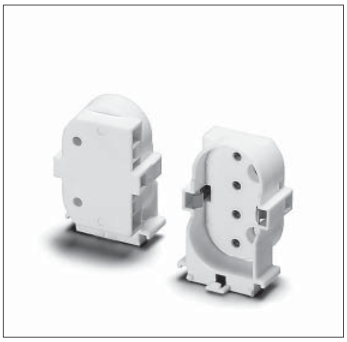


2G11 surface-mounted lampholder
Casing: PBT GF, white, T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
Push-in terminals: 0.5–1 mm² (starter circuit)
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Weight: 12.7 g, unit: 500 pcs.
Type: 36051
Ref. No.: 101489

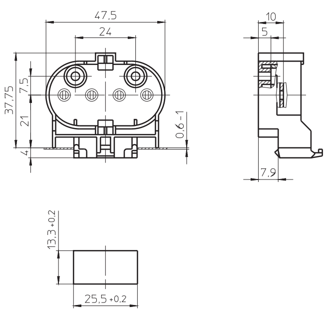


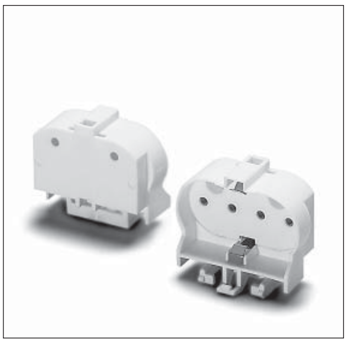
2G11 push-fit lampholder
Casing: PBT GF, white, T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
Push-in terminals: 0.5–1 mm² (starter circuit)
Lamp position: vertical
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Weight: 14.3 g, unit: 500 pcs.
Type: 36052
Ref. No.: 101491





2G11 push-fit lampholder
Casing: PBT GF, white, T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm² (lamp circuit)
Push-in terminals: 0.5–1 mm² (starter circuit)
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST4.2-C/F
Front fixing holes for screws M3
Option for base wiring
Weight: 14.1 g, unit: 500 pcs.
Type: 36053
Ref. No.: 101493



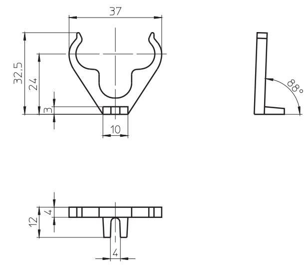


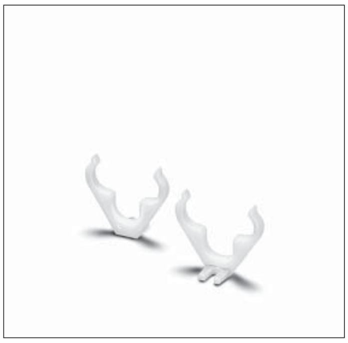
Accessories

For single-ended compact fluorescent lamps

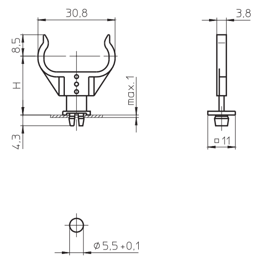
The luminaire manufacturer is responsible for the right choice of accessories.
Cover caps for G24/GX24 lampholders (see p. 290–293)

Lamp support for TC-D, TC-DEL lamps
Material: PC, white, UV-stabilised
Lamp position: 45°
Fixing foot with slot for screw M3.5
Weight: 1.5 g, unit: 500 pcs.
Type: 97031
Ref. No.: 105448

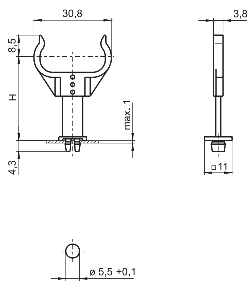




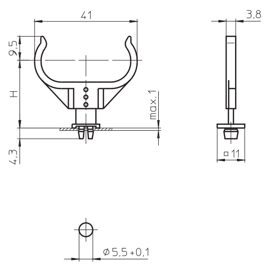
Lamp supports for TC-S, TC-SEL lamps
Height adjustable H: 17.5/20.5/23.5 mm
Push-fit foot for cut-out ∅ 5.5 mm
for wall thickness up to 1 mm
Weight: 0.4/0.8/0.8 g, unit: 500 pcs.
Type: 35060
Ref. No.: 105775 foot, PC, white
Ref. No.: 105776 bracket, PC, crystal-clear, UV-stabilised
Ref. No.: 106416 bracket, PC, white, UV-stabilised



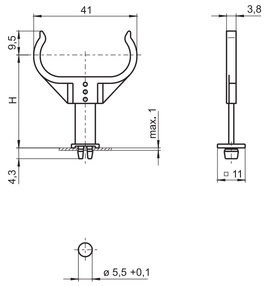
Lamp supports for TC-S, TC-SEL lamps
Height adjustable H: 27.5/30.5/33.5 mm
Push-fit foot for cut-out ∅ 5.5 mm
for wall thickness up to 1 mm
Weight: 0.7/0.8/0.8 g, unit: 500 pcs.
Type: 35061
Ref. No.: 105931 foot, PC, white
Ref. No.: 105776 bracket, PC, crystal-clear, UV-stabilised
Ref. No.: 106416 bracket, PC, white, UV-stabilised



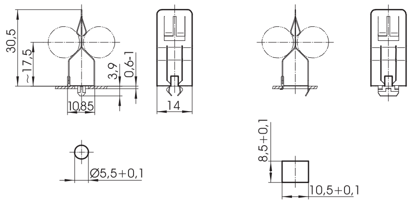
Lamp supports for TC-L lamps
Height adjustable H: 21/24/27 mm
Push-fit foot for cut-out ∅ 5.5 mm
for wall thickness up to 1 mm
Weight: 0.4/1.3/1.1 g, unit: 500 pcs.
Type: 35760
Ref. No.: 105775 foot, PC, white
Ref. No.: 105777 bracket, PC, crystal-clear, UV-stabilised
Ref. No.: 106417 bracket, PC, white, UV-stabilised



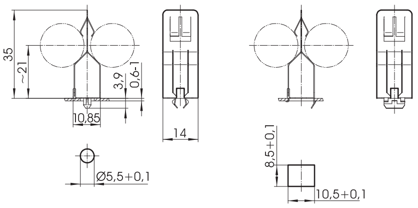
Lamp supports for TC-L lamps
Height adjustable H: 31/34/37 mm
Push-fit foot for cut-out ∅ 5.5 mm
for wall thickness up to 1 mm
Weight: 0.7/1.3/1.1 g, unit: 500 pcs.
Type: 35761
Ref. No.: 105931 foot, PC, white
Ref. No.: 105777 bracket, PC, crystal-clear, UV-stabilised
Ref. No.: 106417 bracket, PC, white, UV-stabilised



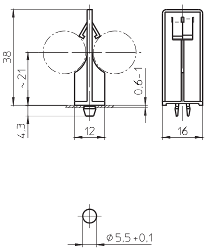
Lamp supports for TC-S, TC-SEL lamps
Material: stainless steel
Weight: 1.3 g, unit: 500 pcs.
Type: 93056 push-fit foot for ∅ 5.5 mm
Ref. No.: 509522
Type: 93057 push-fit foot for 8.5x10.5 mm
Ref. No.: 509521



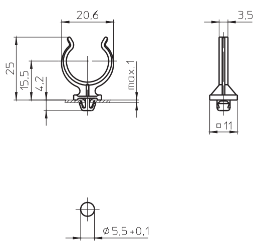
Lamp supports for TC-F, TC-L lamps
Material: stainless steel
Weight: 1.5 g, unit: 500 pcs.
Type: 93058 push-fit foot for ∅ 5.5 mm
Ref. No.: 509520
Type: 93059 push-fit foot for 8.5x10.5 mm
Ref. No.: 509519



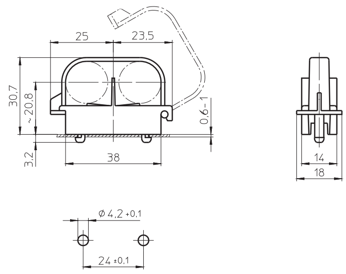
Lamp supports for TC-F, TC-L lamps
For wall thickness 0.6–1 mm
Material: PC, white, UV-stabilised
Weight: 1.3 g, unit: 500 pcs.
Type: 97638 push-fit foot for ∅ 5.5 mm
Ref. No.: 105981

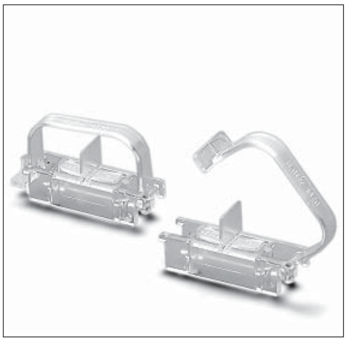


Lamp support for TC-L lamps
Material: PC, white, UV-stabilised
Push-fit foot for cut-out ∅ 5.5 mm
for wall thickness up to 1 mm
Weight: 0.7 g, unit: 500 pcs.
Type: 36060
Ref. No.: 108878



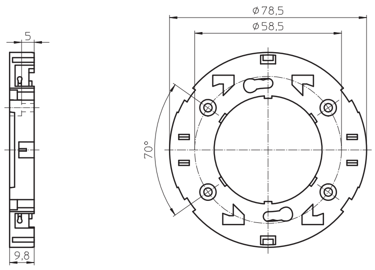
Lamp support for TC-L lamps
Material: PC, crystal-clear, UV-stabilised
Lockable
Base split pins for wall thickness 0.6–1 mm
Weight: 4 g, unit: 500 pcs.
Type: 36061
Ref. No.: 101497

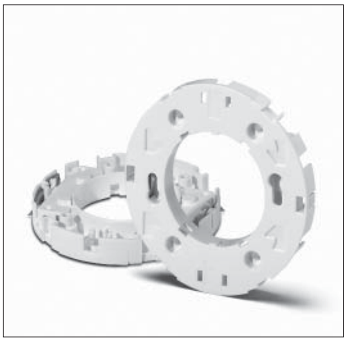




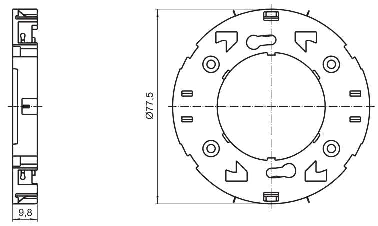
GX53-1 Lampholders, Accessories

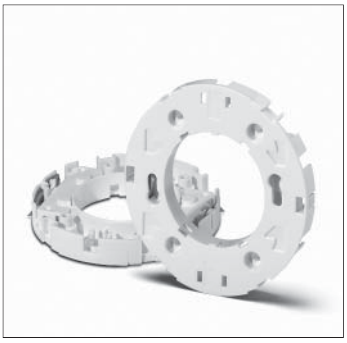
For single-ended compact fluorescent lamps with integrated ballasts



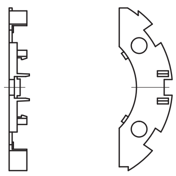


GX53-1 lampholder
Casing: PC, white, T100, nominal rating: 2/250
Push-in terminals for through-wiring
for single-core leads: 0.5–1 mm^2
for stranded leads:
0.75 mm^2, tinned lead ends
Fixing holes for screws M3
Weight: 12.8 g, unit: 200 pcs.
Type: 11000
Ref. No.: 530878

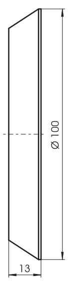




GX53-1 lampholder
Fixing springs for installation into furniture panels
Casing: PC, white, T100, nominal rating: 2/250
Push-in terminals for through-wiring
for single-core leads: 0.5–1 mm^2
for stranded leads:
0.75 mm^2, tinned lead ends
Cut-out: Ø $78^{+0.2}$ mm
Weight: 13.2 g, unit: 200 pcs.
Type: 11010
Ref. No.: 530879



Cord grip/cover plate for GX53-1 lampholders
For leads H03VVH2-F 2X0.75, tinned lead ends
For luminaires of protection class II
Material: PC, white
Weight: 1.6 g, unit: 200 pcs.
Type: 97278
Ref. No.: 504939



Surface-mounted installation ring
For wood or furniture panels
Material: PC, white
Weight: 10.4 g, unit: 100 pcs.
Type: 97277
Ref. No.: 504938

LAMPHOLDERS FOR T5, T8, T12 AND T2 LAMPS

VS LAMPHOLDERS FOR DOUBLE-ENDED FLUORESCENT LAMPS

Vossloh-Schwabe's comprehensive range of lampholders for double-ended fluorescent lamps covers all major fixing methods. Push-through, push-fit and built-in lampholders with split pins or catches are available just as models with screw and push fittings.

High-grade materials for the contacts and thermoplastics for the casings guarantee reliable contacts and a long service life of the components.

Special G13 lampholders for the USA and Canada can be found under **www.unvlt.com**.

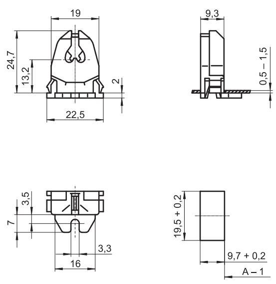
3 Lampholders and Accessories for T Lamps

G5 Lampholders, Accessories

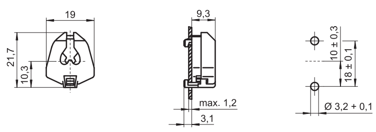
For fluorescent lamps T5 (T16)

Max. permitted temperature T_m
on the rear side of the lampholder: 110 °C

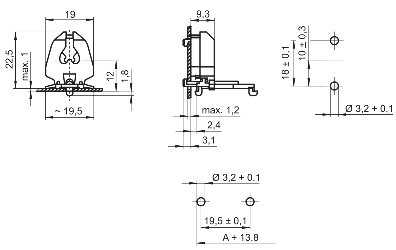
G5 push-through/surface-mounted lampholder
Lamp axis push-through lampholder: 13.2 mm
Lamp axis surface-mounted lampholder: 15.2 mm
Casing: PC, white, T110
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.5–1.5 mm
Fixing slot for screw M3
Weight: 3.2 g, unit: 1000 pcs.
Type: 09105
Ref. No.: 100305



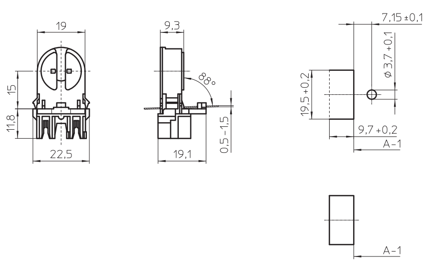
G5 built-in lampholder
Casing: PC, white, T110
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Weight: 2.6 g, unit: 1000 pcs.
Type: 09205
Ref. No.: 100310



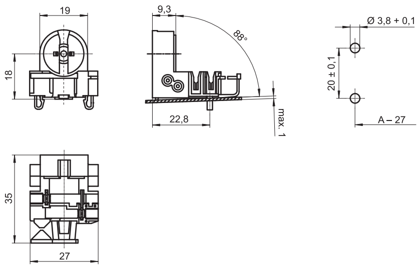
G5 built-in/push-fit lampholder
Lamp axis: 12 mm
Casing: PC, white, T110
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Base split pins for wall thickness up to 1 mm
Weight: 2.9 g, unit: 1000 pcs.
Type: 09210
Ref. No.: 106455



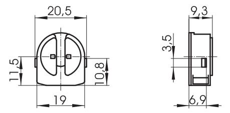
G5 push-through lampholders
For the automatic luminaire wiring
Casing: PBT GF, white, frontplate: PC, white
Rotor: PBT GF, white, T140, lamp axis: 15 mm
Nominal rating: 2/500
IDC terminals for leads H05V-U 0.5
Lateral fixing clips for wall thickness 0.5–1.5 mm
Weight: 5 g, unit: 1000 pcs.
Type: 09420/ 09421
Ref. No.: 532377 with stop
Ref. No.: 532378 without stop



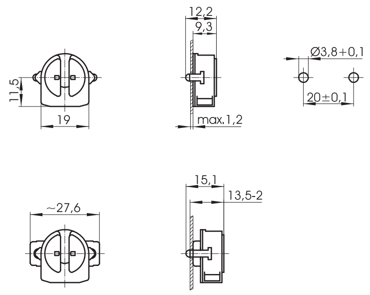
G5 push-fit lampholder
For the automatic luminaire wiring
Lamp axis: 18 mm
Casing: PC, white, rotor: PBT GF, white, T130
Nominal rating: 2/500
IDC terminals for leads H05V-U 0.5
Lateral push-in twin terminals: 0.5–1 mm²
Weight: 5.5 g, unit: 1000 pcs.
Type: 09900
Ref. No.: 534644



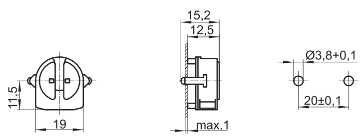
G5 built-in lampholder
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Lateral fixing clips
Weight: 2.8 g, unit: 1000 pcs.
Type: 09404
Ref. No.: 505732



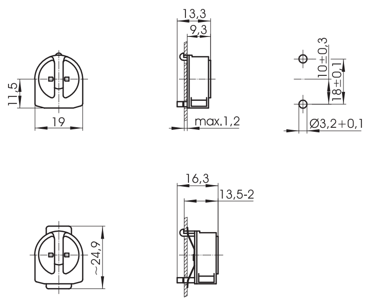
G5 built-in lampholders
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Weight: 2.9/3.3 g, unit: 1000 pcs.
Type: 09405
Ref. No.: 505733
Type: 09406 with spring adjustment
Ref. No.: 505734



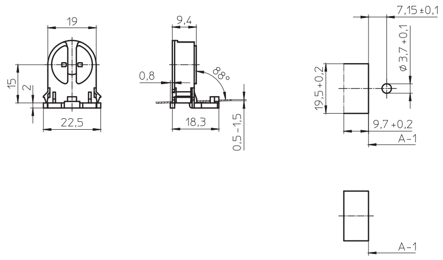
G5 built-in lampholder
Lampholder thickness: 12.5 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1 mm
Weight: 3 g, unit: 1000 pcs.
Type: 09407
Ref. No.: 508590



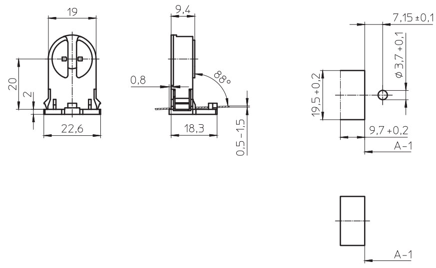
G5 built-in lampholders
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Weight: 2.9/3.2 g, unit: 1000 pcs.
Type: 09415
Ref. No.: 505735
Type: 09416 with spring adjustment
Ref. No.: 505736



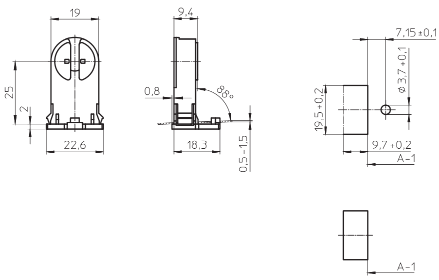
G5 push-through lampholders
Lamp axis: 15 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.5–1.5 mm
Weight: 3.5/3.4 g, unit: 1000 pcs.
Type: 09420/09421
Ref. No.: 505737 with stop
Ref. No.: 505739 without stop



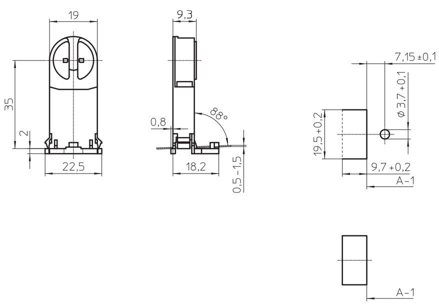
G5 push-through lampholders
Lamp axis: 20 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.5–1.5 mm
Weight: 4.1 g, unit: 1000 pcs.
Type: 09432/09433
Ref. No.: 545933 with stop
Ref. No.: 545935 without stop



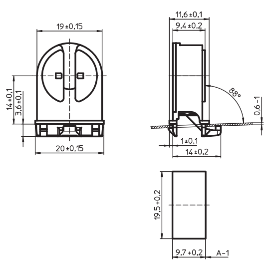
G5 push-through lampholders
Lamp axis: 25 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.5–1.5 mm
Weight: 4.5 g, unit: 1000 pcs.
Type: 09434/09435
Ref. No.: 545937 with stop
Ref. No.: 545939 without stop



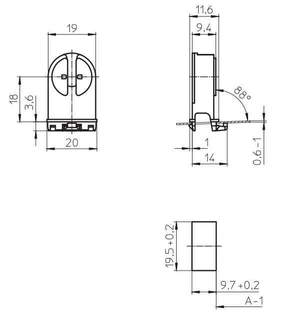
G5 push-through lampholders
Lamp axis: 35 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.5–1.5 mm
Weight: 4.6 g, unit: 1000 pcs.
Type: 09426/09427
Ref. No.: 505745 with stop
Ref. No.: 505746 without stop



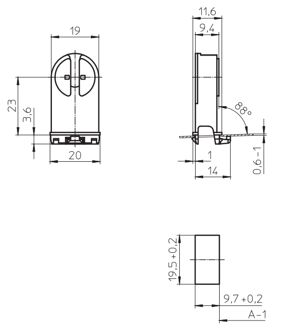
G5 push-fit lampholder
Lamp axis: 14 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Rear fixing clips for wall thickness 0.6–1 mm
Base or lateral wiring
Weight: 3.3 g, unit: 1000 pcs.
Type: 09440
Ref. No.: 505747



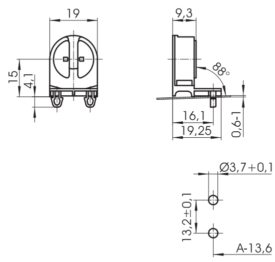
G5 push-fit lampholder
Lamp axis: 18 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Rear fixing clips for wall thickness 0.6–1 mm
Base or lateral wiring
Weight: 3.9 g, unit: 1000 pcs.
Type: 09446
Ref. No.: 545894



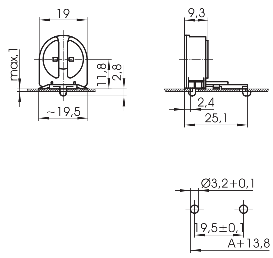
G5 push-fit lampholder
Lamp axis: 23 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Rear fixing clips for wall thickness 0.6–1 mm
Base or lateral wiring
Weight: 4.2 g, unit: 1000 pcs.
Type: 09447
Ref. No.: 545896



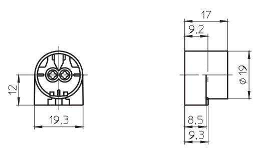
G5 push-fit lampholder
Lamp axis: 15 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Base split pins for wall thickness 0.6–1 mm
Weight: 3.4 g, unit: 1000 pcs.
Type: 09450
Ref. No.: 505750



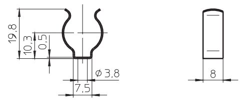
G5 push-fit lampholder
Lamp axis: 11.8 mm
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Base split pins for wall thickness up to 1 mm
Lateral wiring
Weight: 3.1 g, unit: 1000 pcs.
Type: 09460
Ref. No.: 505751



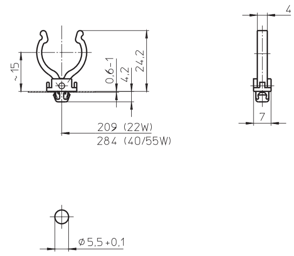
G5 lampholder
For push-fit onto the lamp
Casing: PBT GF, white, T130
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Pin support for reliable contact
Lamp support 109685 (see page 178)
Weight: 3.7 g, unit: 1000 pcs.
Type: 09170
Ref. No.: 109686



Lamp support for lamps Ø 16 mm
Material: zinc-coated polished steel
Fixing hole for screw M3.5
Weight: 1.3 g, unit: 1000 pcs.
Type: 94088
Ref. No.: 109685



Lamp support for lamps Ø 16 mm
Material: PC, white, UV-stabilised
Push-fit foot for cut-out Ø 5.5 mm
Weight: 1 g, unit: 500 pcs.
Type: 84001
Ref. No.: 500757

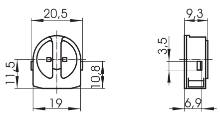


G5 Twin Lampholder

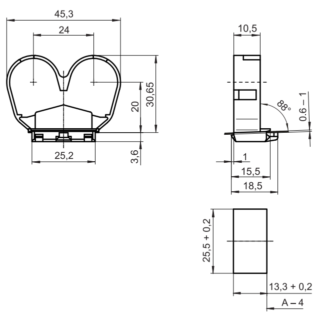
For fluorescent lamps T5 (T16)

Max. permitted temperature T_m
on the rear side of the lampholder: 110 °C

G5 built-in lampholder
Casing: PBT GF, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Lateral fixing clips
Weight: 2.8 g, unit: 1000 pcs.
Type: 09404
Ref. No.: 505732



Push-fit bracket
For two G5 built-in lampholders 505732
Material: PC, white
Lamp axis: 20 mm
Distance between two lamp axes: 24 mm
Push-fit foot for wall thickness 0.5–1 mm
Weight: 3.5 g, unit: 1000 pcs.
Type: 97677
Ref. No.: 507562



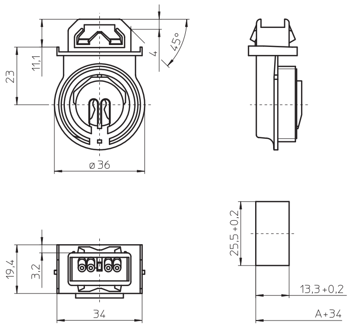
G5 Lampholders, Degree of Protection IP54/IP65/IP67

For fluorescent lamps T5 (T16)
For luminaires of protection class I and II

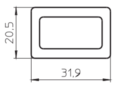
Lampholders protected against dust and splashing water (IP54)
Lampholders protected against dust and jet of water (IP65)
Dust and watertight lampholders (IP67)

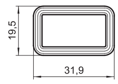
Pin support for reliable contact
With spring adjustment
Max. permitted temperature T_m on the rear side of the lampholder: 110 °C

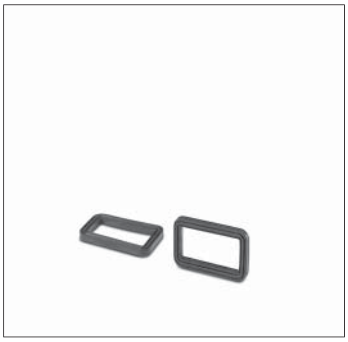
G5 push-fit lampholder for metal casing
Casing: PC, white, interior part: PBT GF
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Push-fit foot for wall thickness: 1.4–2 mm
Weight: 11.3 g, unit: 500 pcs.
Type: 84101 system 153
Ref. No.: 529832



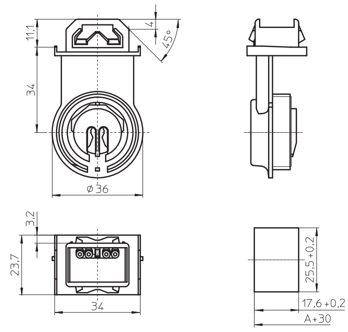
Foot gaskets for systems 153
Weight: 0.5/0.7/0.7 g
Unit: 1000 pcs.
Type: 98002 degree of protection IP67
Ref. No.: 108947 material: PE foam
Type: 98087 degree of protection IP67
Ref. No.: 503773 material: EPDM, black
Type: 98003 degree of protection IP54
Ref. No.: 108266 material: EPDM, black



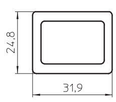


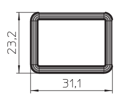


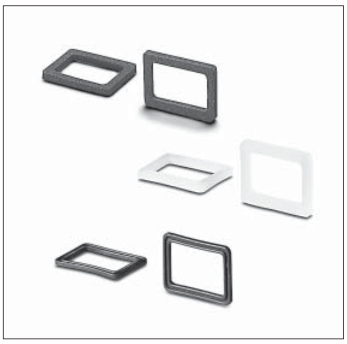
G5 push-fit lampholder
Casing: PC, white, interior part: PBT GF
T140, nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Push-fit foot for wall thickness: 1.4–2 mm
Weight: 12.7 g, unit: 250 pcs.
Type: 84108 system 151
Ref. No.: 534073



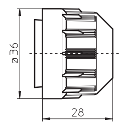
Foot gaskets for system 151
Weight: 1/1.1/1.1 g
Unit: 1000 pcs.
Type: 98004 degree of protection IP65
Ref. No.: 108267 material: cellular rubber, black
Type: 98011 degree of protection IP67
Ref. No.: 504078 material: silicone, transparent
Type: 98008 degree of protection IP67
Ref. No.: 546254 profiled foot gasket, material: EPDM, black







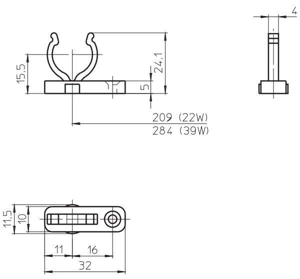
Screw ring for systems 151 and 153
Ring: PBT GF, white, gasket: silicone
Weight: 11.8 g, unit: 250 pcs.
Type: 84103
Ref. No.: 529836



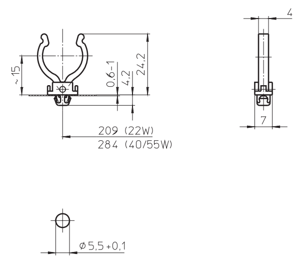
Lamp supports for lamps T-R5

For fluorescent lamps T-R5 (T-R16)

Lamp support for lamps ∅ 16 mm
Material: PC, white, UV-stabilised
Fixing hole for screw M3
Fixing hole for self-tapping screw acc. to ISO 1481/7049-ST4.2-C/F
Weight: 1 g, unit: 500 pcs.
Type: 84000
Ref. No.: 109532



Lamp support for lamps ∅ 16 mm
Material: PC, white, UV-stabilised
Push-fit foot for cut-out ∅ 5.5 mm
Weight: 1 g, unit: 500 pcs.
Type: 84001
Ref. No.: 500757



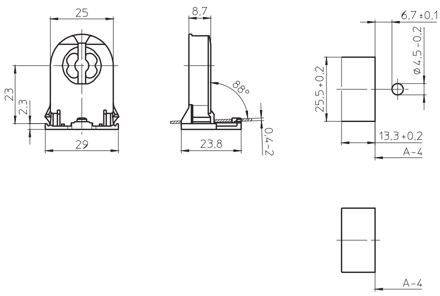
1 2 3 4 5 6 7 8 9 10

G13 Push-through Lampholders

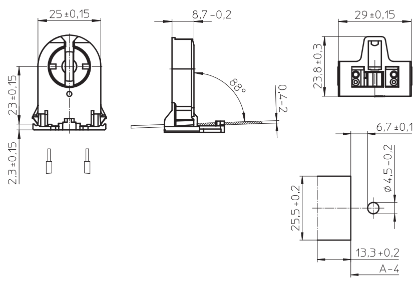
For fluorescent lamps T8 (T26), T12 (T38)

Lampholders with integrated starter holder have push-in twin terminals for the lamp circuit and push-in terminals for the the starter circuit.
Pin support for reliable contact
Max. permitted temperature T_m
on the rear side of the lampholder: 110 °C

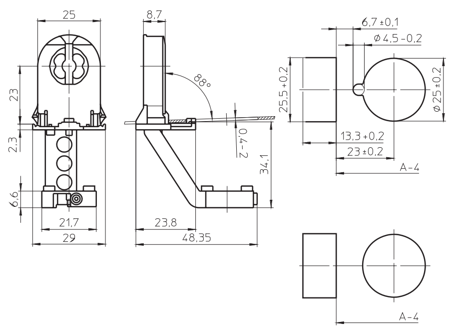
G13 push-through lampholders for lamps T8 and T12
Lamp axis: 23 mm
Casing: PC, white, frontplate: PBT GF, white
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.4–2 mm
Weight: 6 g, unit: 1000 pcs.
Type: 27700/27701
Ref. No.: 109330 with stop
Ref. No.: 109331 without stop



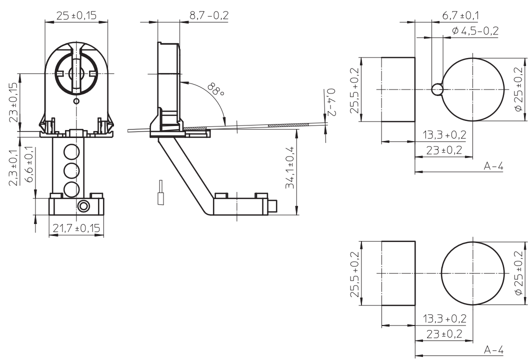
G13 Rotoclic push-through lampholders
for lamps T8 and T12
Lamp axis: 23 mm
Casing: PC, white, frontplate: PBT GF, white
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.4–2 mm
Weight: 6.8 g, unit: 1000 pcs.
Type: 27700/27701
Ref. No.: 546641 with stop
Ref. No.: 546642 without stop



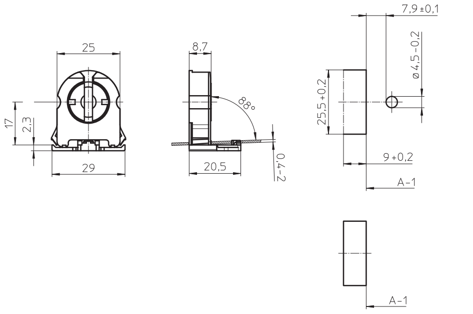
G13 push-through lampholders for lamps T8
With starter attachment
Lamp axis: 23 mm
Casing: PC, white, frontplate: PBT GF, white
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.4–2 mm
Weight: 10.4 g, unit: 500 pcs.
Type: 27800/27801
Ref. No.: 109332 with stop
Ref. No.: 109335 without stop



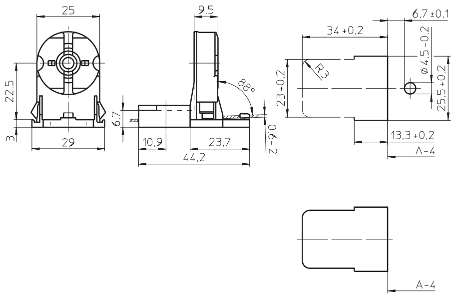
G13 Rotoclic push-through lampholders
for lamps T8, with starter attachment
Lamp axis: 23 mm
Casing: PC, white, frontplate: PBT GF, white
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.4–2 mm
Weight: 10.4 g, unit: 500 pcs.
Type: 27800/27801
Ref. No.: 546647 with stop
Ref. No.: 546648 without stop



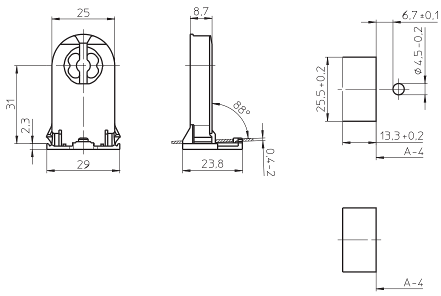
G13 push-through lampholders for lamps T8, T12
Lamp axis: 17 mm
Casing: PC, white, frontplate: PBT GF, white
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.4–2 mm
Weight: 5,4 g, unit: 1000 pcs.
Type: 26300/26310
Ref. No.: 551271 with stop
Ref. No.: 551272 without stop



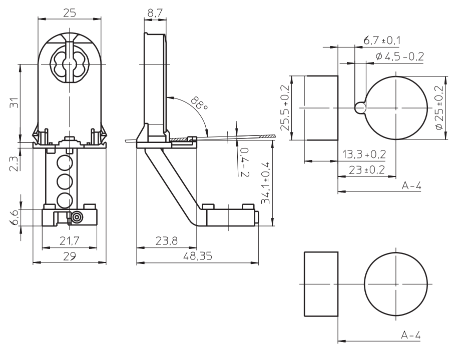
G13 push-through lampholders for lamps T8 and T12
With starter attachment
Lamp axis: 22.5 mm
Casing: PC, white, rotor: PBT, white
T130, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.6–2 mm
Weight: 9.5 g, unit: 500 pcs.
Type: 27820/27821
Ref. No.: 100579 with stop
Ref. No.: 100581 without stop



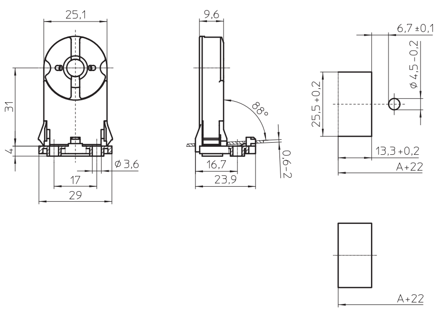
G13 push-through lampholders for lamps T8 and T12
Lamp axis: 31 mm
Casing: PC, white, frontplate: PBT GF, white
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.4–2 mm
Weight: 7.8 g, unit: 1000 pcs.
Type: 28500/28501
Ref. No.: 109338 with stop
Ref. No.: 109339 without stop



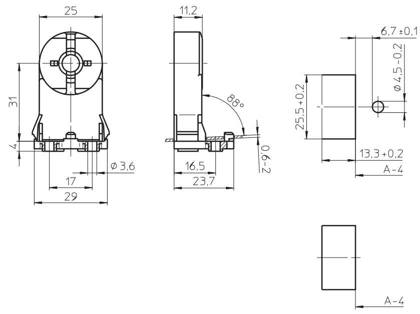
G13 push-through lampholders for lamps T8 and T12
With starter attachment
Lamp axis: 31 mm
Casing: PC, white, frontplate: PBT GF, white
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.4–2 mm
Weight: 10.3/10.1 g, unit: 500 pcs.
Type: 28600/28601
Ref. No.: 109340 with stop
Ref. No.: 109341 without stop



G13 push-through lampholders for lamps T8 and T12
Lamp axis: 31 mm
Casing: PC, white, rotor: PBT GF, white
T130, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.6–2 mm
Weight: 9.6 g, unit: 500 pcs.
Type: 28740/28741
Ref. No.: 542983 with stop
Ref. No.: 542984 without stop



G13 push-through lampholders for lamps T8 and T12
Lamp axis: 31 mm
Casing: PC, white, rotor: PBT, white
T130, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.6–2 mm
Weight: 9.9 g, unit: 1000 pcs.
Type: 28500/28501
Ref. No.: 100591 with stop
Ref. No.: 100593 without stop



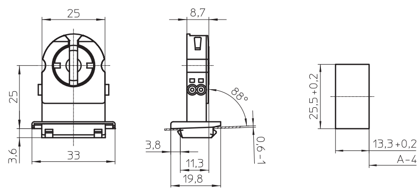
G13 Push-fit Lampholders

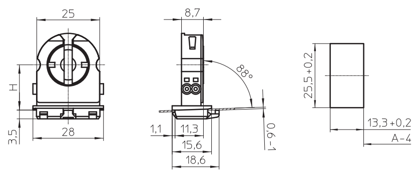
For fluorescent lamps T8 (T26), T12 (T38)

Lampholders with integrated starter holder are equipped with big rotor and have push-in twin terminals for the lamp circuit and push-in terminals for the the starter circuit.
Pin support for reliable contact

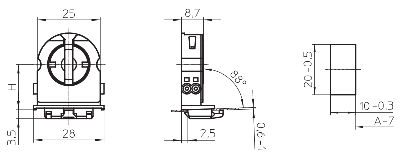
Casing: PC, white, frontplate/rotor: PBT GF, white
Max. permitted temperature T_m on the rear side of the lampholder: 110 °C
T-Marking acc. to IEC
IP50 version: push-fit foot with gasket

G13 Rotoclic push-fit lampholders for lamps T8 and T12
T140, nominal rating: 2/500, suitable for Top Test
Lateral push-in terminals: 0.5–1 mm²
Push-fit foot for luminaire cut-out 13.3x25.5 mm
with wall thickness 0.6–1 mm
Lampholder foot/luminaire: IP40 (537135: IP50)
Weight: 5.9/5.9/6/6 g, unit: 1000 pcs.
Type: 24100/24110/24170/24150
Ref. No.: 537132 lamp axis H: 25 mm
Ref. No.: 537135 lamp axis H: 25 mm, IP50
Ref. No.: 537150 lamp axis H: 21 mm
Ref. No.: 537144 lamp axis H: 18 mm

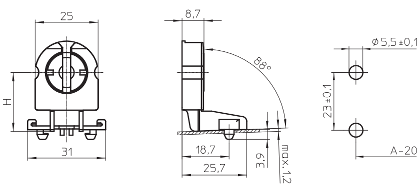




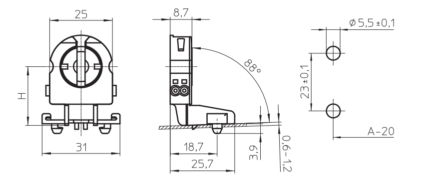
G13 Rotoclic push-fit lampholders for lamps T8 and T12
T140, nominal rating: 2/500, suitable for Top Test
Lateral push-in terminals: 0.5–1 mm²
Push-fit foot for luminaire cut-out 10x20 mm
with wall thickness 0.6–1 mm
Lampholder foot/luminaire: IP40
Weight: 5.7/6 g, unit: 1000 pcs.
Type: 24120/24160
Ref. No.: 537138 lamp axis H: 25 mm
Ref. No.: 537147 lamp axis H: 21 mm



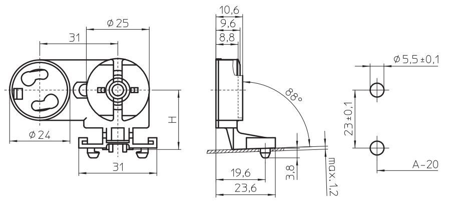
G13 Rotoclic push-fit lampholders for lamps T8
T140, nominal rating: 2/500
Base push-in terminals: 0.5–1 mm²
Base split pins for wall thickness up to 1.2 mm
Lampholder foot/luminaire: IP40
Weight: 5.9/5.7 g, unit: 1000 pcs.
Type: 24360/24350
Ref. No.: 537155 lamp axis H: 30 mm
Ref. No.: 537153 lamp axis H: 23.5 mm

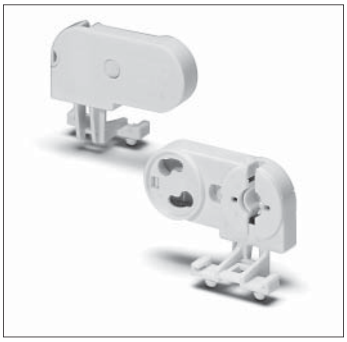


G13 Rotoclic push-fit lampholders for lamps T8
T140, nominal rating: 2/500
Suitable for Top Test
Lateral push-in terminals: 0.5–1 mm²
Base split pins for wall thickness up to 1.2 mm
Lampholder foot/luminaire: IP40
Weight: 6/5.8/5.3 g, unit: 1000 pcs.
Type: 23360/23350/23370
Ref. No.: 537160 lamp axis H: 30 mm
Ref. No.: 537157 lamp axis H: 23.5 mm
Ref. No.: 539128 lamp axis H: 18 mm

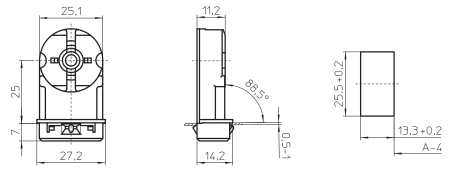


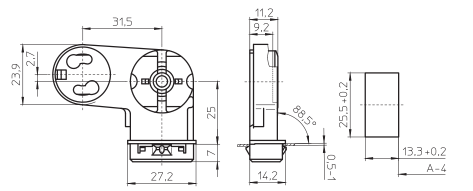
G13 push-fit lampholders with starter attachment for lamps T8
T130, nominal rating: 2/250
Base push-in terminals: 0.5–1 mm²
Base split pins for wall thickness up to 1.2 mm
Lampholder foot/luminaire: IP40
Weight: 9.7/9.5 g, unit: 1000 pcs.
Type: 27460/27450
Ref. No.: 100559 lamp axis H: 30 mm
Ref. No.: 100557 lamp axis H: 23.5 mm



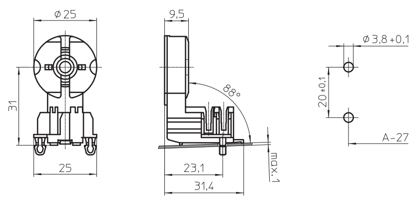


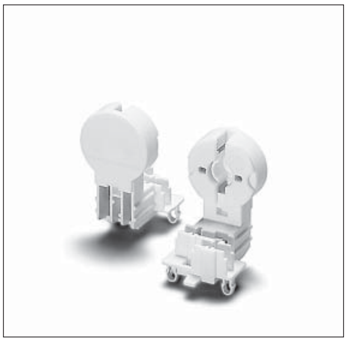
G13 push-fit lampholders for lamps T8 and T12
Lamp axis H: 25 mm
T130, nominal rating: 2/500
Base push-in terminals: 0.5–1 mm²
Push-fit foot for luminaire cut-out 13.3x25.5 mm with wall thickness 0.5–1 mm
Lampholder foot/luminaire: IP40
Weight: 5/11 g, unit: 500 pcs.
Type: 28100/28200
Ref. No.: 100585
Ref. No.: 100588 with starter attachment



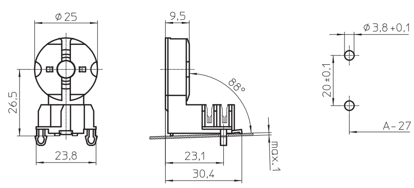


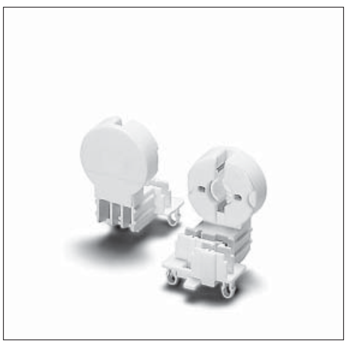
G13 push-fit lampholder for lamps T8
For the automatic luminaire wiring
Lamp axis: 31 mm
T130, nominal rating: 2/500
IDC terminals for leads H05V-U 0.5
Base split pins for wall thickness up to 1 mm
Weight: 7.2 g, unit: 1000 pcs.
Type: 28310
Ref. No.: 506007



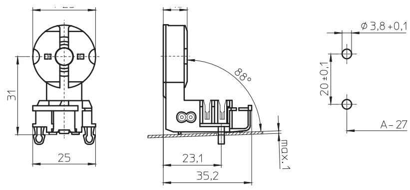


G13 push-fit lampholder for lamps T8
For the automatic luminaire wiring
Lamp axis: 26.5 mm
T130, nominal rating: 2/500
IDC terminals for leads H05V-U 0.5
Base split pins for wall thickness up to 1 mm
Weight: 7.1 g, unit: 1000 pcs.
Type: 28315
Ref. No.: 504202

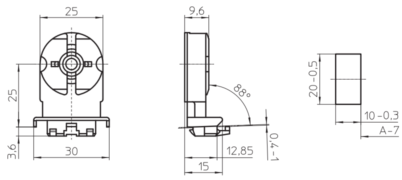


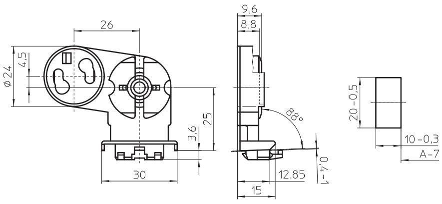


G13 push-fit lampholder for lamps T8
For the automatic luminaire wiring
Lamp axis: 31 mm
T130, nominal rating: 2/500
IDC terminals for leads H05V-U 0.5
Lateral push-in twin terminals: 0.5–1 mm²
Base split pins for wall thickness up to 1 mm
Front cable holder for up to 3 individual conductors
Weight: 8 g, unit: 1000 pcs.
Type: 28330
Ref. No.: 508423



G13 push-fit lampholders
Lamp axis: 25 mm
T130, nominal rating: 5/500
Lateral and base push-in terminals: 0.5–1 mm²
Push-fit foot for luminaire cut-out 10x20 mm
for wall thickness 0.4–1 mm
Weight: 6/8.5 g, unit: 500 pcs.
Type: 28921/28920
Ref. No.: 108438 for lamps T8 and T12
Ref. No.: 108437 for lamps T8
with starter attachment





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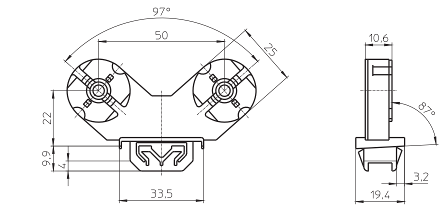
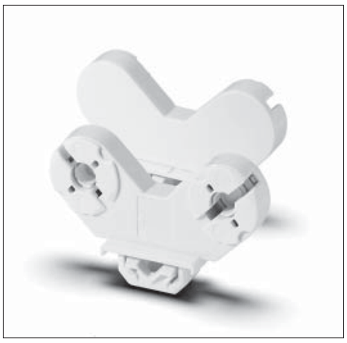
G13 Push-fit Twin Lampholders, Accessories

For fluorescent lamps T8 (T26), T12 (T38)

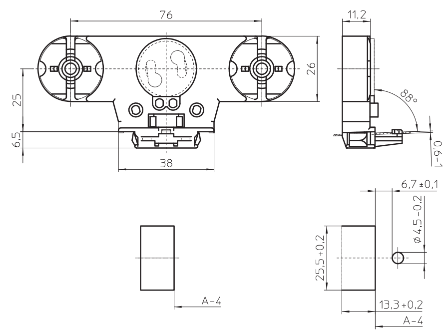
Casing: PC, white, rotor: PBT GF, white
Pin support for reliable contact
Max. permitted temperature T_m
on the rear side of the lampholder: 110 °C

G13 twin lampholder for lamps T8
Lamp axis: 22 mm
Distance between two lamp axes: 50 mm
T130, nominal rating: 2/500
Base wiring
Push-in terminals: 0.5–1 mm²
Push-fit foot for wall thickness 1 mm
Weight: 14 g, unit: 400 pcs.
Type: 22900
Ref. No.: 108984

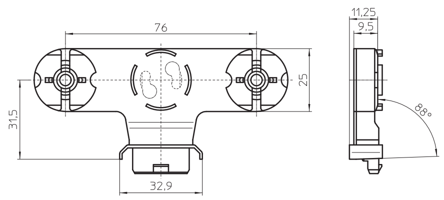




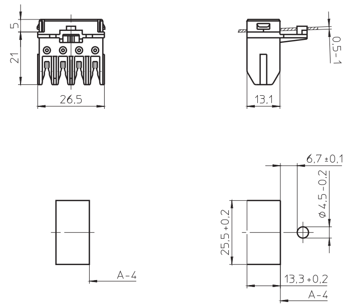
G13 twin lampholders for lamps T8 and T12
Lamp axis: 25 mm
Distance between two lamp axes: 76 mm
T130, nominal rating: 2/500
Base push-in twin terminals: 0.5–1 mm² (lamp circuit)
Base push-in terminals: 0.5–1 mm² (starter circuit)
Push-fit foot for wall thickness 0.6–1 mm
Weight: 21 g, unit: 200/500 pcs.
Type: 22604/22602 without starter attachment
Ref. No.: 108816 with stop
Ref. No.: 100487 without stop
Type: 22600/22601 with starter attachment
Ref. No.: 100484 with stop
Ref. No.: 100486 without stop



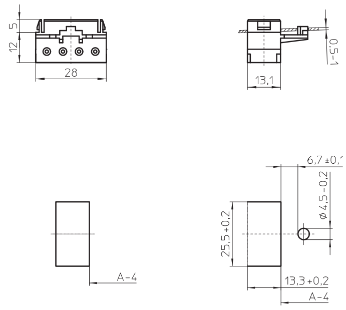
G13 twin lampholders for lamps T8 and T12
Lamp axis: 31.5 mm
Distance between two lamp axes: 76 mm
T130, nominal rating: 2/500
For wiring inserts 108777/108778
and 545261/545262
Weight: 17 g, unit: 250 pcs.
Type: 22800/22801
Ref. No.: 108773 with starter attachment
Ref. No.: 108775 without starter attachment

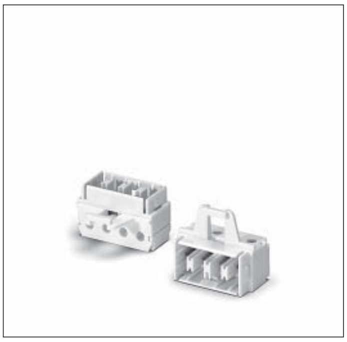


Wiring inserts with push-fit foot
For G13 twin lampholders 108773/108775
Material: PC, white
Push-in terminals: 0.5 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
Weight: 5.3 g, unit: 500 pcs.
Type: 22850/22851
Ref. No.: 108777 with stop
Ref. No.: 108778 without stop



Wiring inserts with push-fit foot
For G13 twin lampholders 108773/108775
Material: PC, white
Push-in terminals: 0.5–1 mm²
Weight: 4.4 g, unit: 500 pcs.
Type: 22860/22861
Ref. No.: 545261 with stop
Ref. No.: 545262 without stop

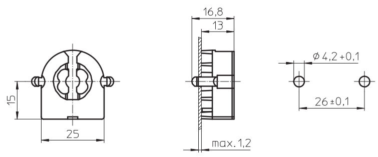




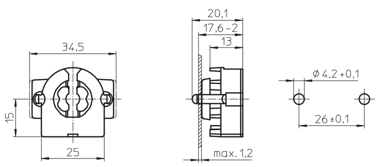
G13 Built-in Lampholders

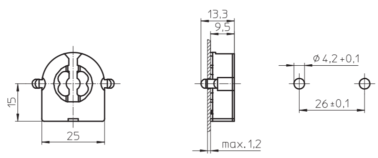
For fluorescent lamps T8 (T26), T12 (T38)

Lampholders with integrated starter holder are equipped with big rotor and have push-in twin terminals for the lamp circuit and push-in terminals for the the starter circuit.
Pin support for reliable contact (except for type 485)
Casing: PC, white, frontplate/rotor: PBT GF, white
Max. permitted temperature T_m on the rear side of the lampholder: 110 °C
T-Marking acc. to IEC

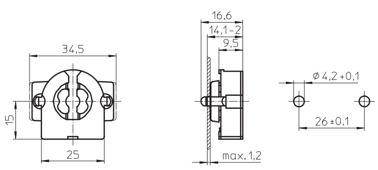


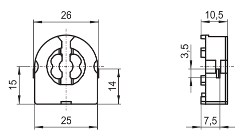
G13 built-in lampholders for lamps T8 and T12
Lampholder thickness: 13 mm
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Weight: 4.6/5.4 g, unit: 1000 pcs.
Type: 47105/47106
Ref. No.: 509152
Ref. No.: 509154 with spring adjustment





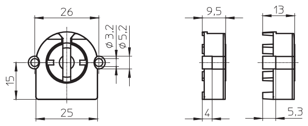
G13 built-in lampholders for lamps T8 and T12
Lampholder thickness: 9.5 mm
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Weight: 4.4/5.1 g, unit: 1000 pcs.
Type: 47505/47506
Ref. No.: 509162
Ref. No.: 509164 with spring adjustment



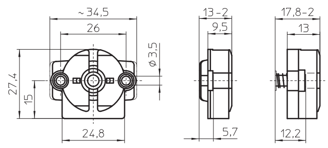


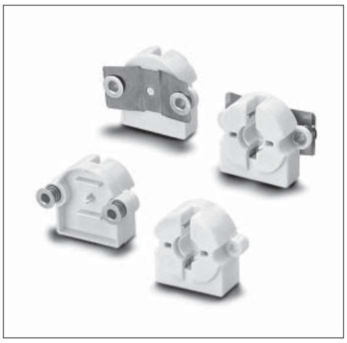
G13 built-in lampholder for lamps T8 and T12
Lampholder thickness: 10.5 mm
T140, nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Weight: 4.6 g, unit: 1000 pcs.
Type: 47304
Ref. No.: 509156

G13 Rotoclic built-in lampholders for lamps T8 and T12
T140, nominal rating: 2/500
Base push-in terminals: 0.5–1 mm²
Fixing holes ∅ 3.2 mm
Weight: 5 g, unit: 1000 pcs.
Type: 49100/49500
Ref. No.: 537165 lampholder thickness: 13 mm
Ref. No.: 537173 lampholder thickness: 9.5 mm

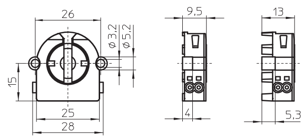


G13 built-in lampholders with spring adjustment
for lamps T8 and T12
T130, nominal rating: 2/500
Base push-in terminals: 0.5–1 mm²
Fixing holes for screws M3
Weight: 6/5.5 g, unit: 1000 pcs.
Type: 47102/47502
Ref. No.: 101681 lampholder thickness: 13 mm
Ref. No.: 101740 lampholder thickness: 9.5 mm

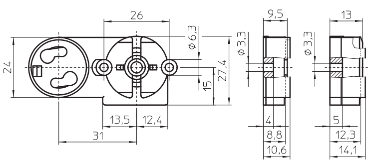




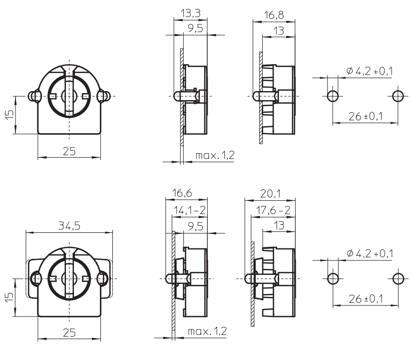
G13 Rotoclic built-in lampholders for lamps T8 and T12
T140, nominal rating: 2/500
Lateral push-in terminals: 0.5–1 mm²
Suitable for Top Test
Fixing holes ∅ 3.2 mm
Weight: 5/4.7 g, unit: 1000 pcs.
Type: 59100/59500
Ref. No.: 537181 lampholder thickness: 13 mm
Ref. No.: 537205 lampholder thickness: 9.5 mm



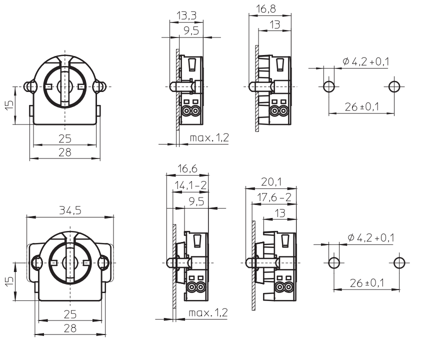
G13 built-in lampholders with starter attachment
for lamps T8 and T12
T130, nominal rating: 2/500
Base push-in terminals: 0.5–1 mm²
Fixing holes for screws M3
Weight: 8.7/8 g, unit: 1000 pcs.
Type: 47200 lampholder thickness: 13 mm
Ref. No.: 101706
Type: 47600 lampholder thickness: 9,5 mm
Ref. No.: 101765

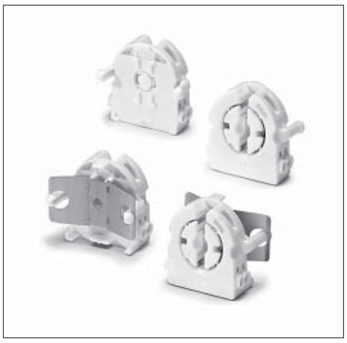


G13 Rotoclic built-in lampholders for lamps T8 and T12
T140, nominal rating: 2/500
Base push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Weight: 5.1/5.9/5/5.5 g, unit: 1000 pcs.
Type: 49105/49106 lampholder thickness: 13 mm
Ref. No.: 537166
Ref. No.: 537167 with spring adjustment
Type: 49505/49506 lampholder thickness: 9.5 mm
Ref. No.: 537174
Ref. No.: 537175 with spring adjustment

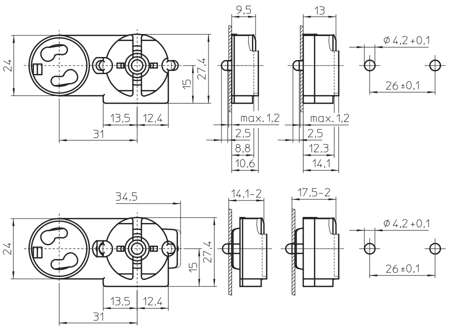


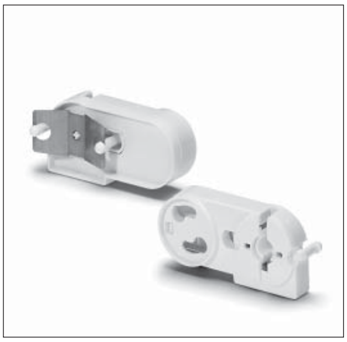
G13 Rotoclic built-in lampholders for lamps T8 and T12
T140, nominal rating: 2/500
Lateral push-in terminals: 0.5–1 mm², suitable for Top Test
Rear split pins for wall thickness up to 1.2 mm
Weight: 5.1/5.9/5/5.5 g, unit: 1000 pcs.
Type: 59105/59106 lampholder thickness: 13 mm
Ref. No.: 537182
Ref. No.: 537183 with spring adjustment
Type: 59505/59506 lampholder thickness: 9.5 mm
Ref. No.: 537206
Ref. No.: 537207 with spring adjustment



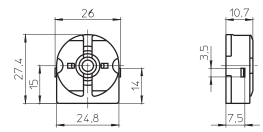


G13 built-in lampholders with starter attachment
for lamps T8 and T12, T130, nominal rating: 2/500
Base push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Weight: 9/9.5/8/8.5 g, unit: 1000 pcs.
Type: 47205/47206 lampholder thickness: 13 mm
Ref. No.: 101712
Ref. No.: 101716 with spring adjustment
Type: 47605/47606 lampholder thickness: 9.5 mm
Ref. No.: 101769
Ref. No.: 101773 with spring adjustment

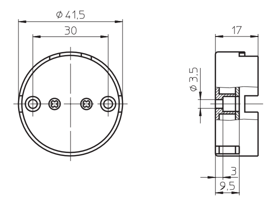


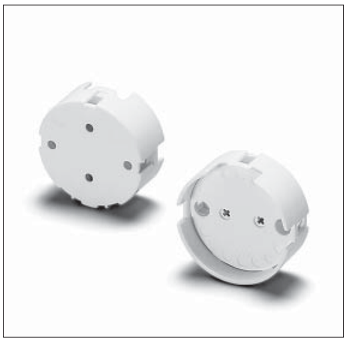


G13 built-in lampholder for lamps T8 and T12
Lampholder thickness: 10.7 mm
T130
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Lateral fixing clips
Weight: 4.7 g, unit: 1000 pcs.
Type: 47504
Ref. No.: 101745

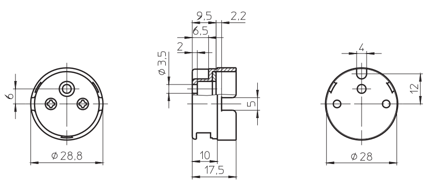


G13 lampholder
For push-fitting onto lamps T12
Lampholder thickness: 9.5 mm
Casing: PC, white, T110
Front cover plate: PBT GF, white
Nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Fixing holes for screws M3
Weight: 10.5 g, unit: 1000 pcs.
Type: 47700
Ref. No.: 101781

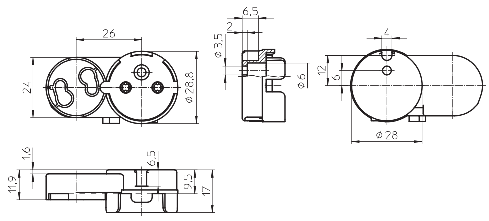




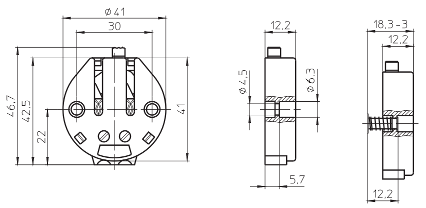
G13 lampholder
For push-fitting onto lamps T8
Lampholder thickness: 9.5 mm
Casing: PC, white, T110
Front cover plate: PBT GF, white
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Fixing hole for screw M3
Weight: 5.3 g, unit: 1000 pcs.
Type: 47900
Ref. No.: 101784



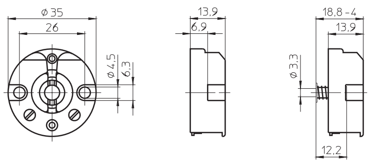
G13 lampholder with starter attachment
For push-fitting onto lamps T8
Lampholder thickness: 9.5 mm
Casing: PC, white, T110
Front cover plate: PBT GF, white
Nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Fixing hole for screw M3
Weight: 8.1 g, unit: 1000 pcs.
Type: 47920
Ref. No.: 101785



G13 built-in lampholder with lamp lock
for lamps T8 and T12
Contacts on both sides
Casing: PBT GF, white, T130, nominal rating: 2/500
Screw terminals: 0.5–2.5 mm²
Fixing holes for screws M3
Weight: 12.9/18 g, unit: 500 pcs.
Type: 46100/46101
Ref. No.: 101643
Ref. No.: 101647 with spring adjustment



G13 built-in lampholders for lamps T8 and T12
Casing: PC, white, T110
Nominal rating: 2/500
Screw terminals: 0.5–2.5 mm²
Fixing holes for screws M3
5 rotation stops
Weight: 9/10.6 g, unit: 1000 pcs.
Type: 48500/48501
Ref. No.: 101787
Ref. No.: 101789 with spring adjustment

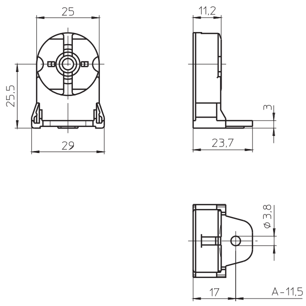


G13 Surface-mounted Lampholders

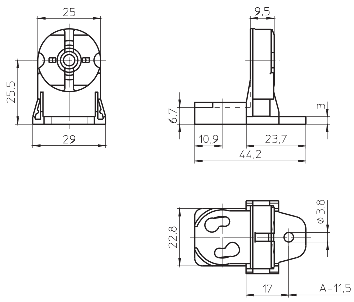
For fluorescent lamps T8 (T26), T12 (T38)

Pin support for reliable contact
(except for type 485)
Max. permitted temperature T_m
on the rear side of the lampholder: 110 °C

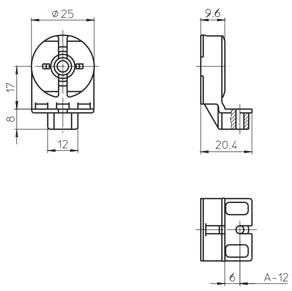
G13 surface-mounted lampholder for lamps T8 and T12
Lamp axis: 25.5 mm
Casing: PC, white, rotor: PBT GF, white, T130
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Fixing hole: ∅ 3.8 mm
Weight: 7.2 g, unit: 500 pcs.
Type: 27722
Ref. No.: 100572

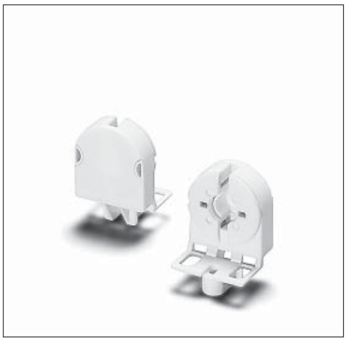


G13 surface-mounted lampholder with starter attachment
for lamps T8 and T12
Lamp axis: 25.5 mm
Casing: PC, white, rotor: PBT GF, white, T130
Nominal rating: 2/500
Push-in twin terminals: 0.5–1 mm²
Fixing hole: ∅ 3.8 mm
Weight: 9.5 g, unit: 500 pcs.
Type: 27822
Ref. No.: 100583

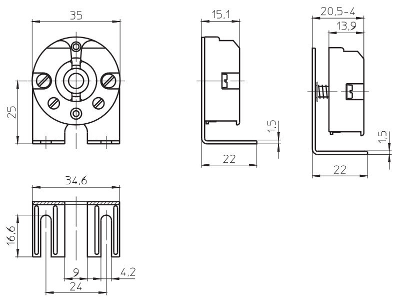


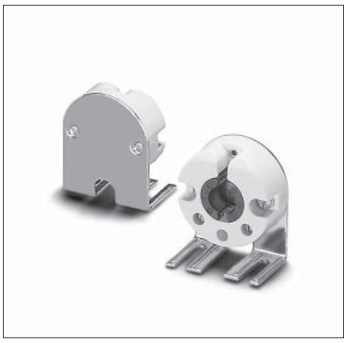
G13 surface-mounted lampholder for lamps T8
Lamp axis: 17 mm
Casing: PC, white, rotor: PBT GF, white, T130
Nominal rating: 2/250
Push-in twin terminals: 0.5–1 mm²
Fixing hole for self-tapping screw
acc. to ISO 1481/7049-ST3.5-C/F
Weight: 5.4 g, unit: 1000 pcs.
Type: 27356
Ref. No.: 100551





G13 surface-mounted lampholders
for lamps T8 and T12
Lamp axis: 25 mm, casing: PC, white, T110
Screw terminals: 0.5–2.5 mm², nominal rating: 2/500
Bracket: zinc-coated polished steel
Fixing slots for screws M4
5 rotation stops
Weight: 26/28.1 g, unit: 500 pcs.
Type: 48502/48503
Ref. No.: 101791
Ref. No.: 101793 with spring adjustment



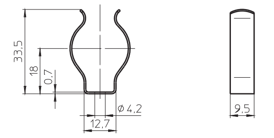


Accessories

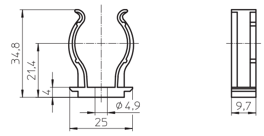
For lampholders for fluorescent lamps T8 (T26), T12 (T38)

The luminaire manufacturer is responsible for
the right choice of accessories.

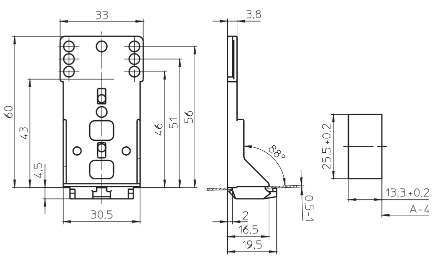
Lamp supports
Fixing hole for screw M4
Weight: 4.3/6.8 g, unit: 500 pcs.
Type: 20400 for lamps T8
Ref. No.: 100442
material: zinc-coated polished steel



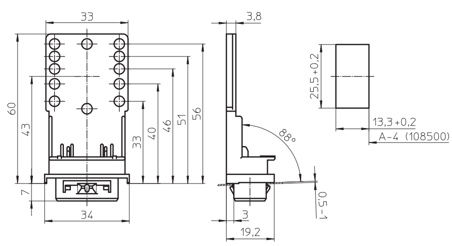
Lamp supports for lamps T8
Material: PC, crystal-clear
Fixing hole for screw M4
Weight: 2 g, unit: 1000 pcs.
Type: 20501
Ref. No.: 100448

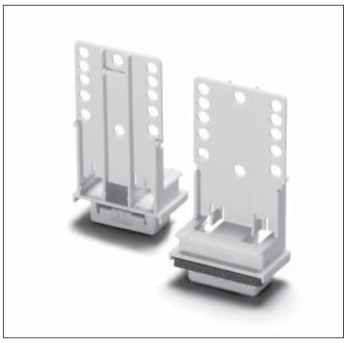


Push-fit bracket
For G13 built-in lampholder 537174, 537206
(see p. 188, 189) and starter holder 101627
and 109792 (see p. 201, 202), material: PC, white
Lamp axis optional: 46/51/56 mm
or 43 mm (lateral lamp insertion)
Push-fit foot for wall thickness 0.5–1 mm
Option for lateral or base wiring
Weight: 5.3 g, unit: 1000 pcs.
Type: 97532
Ref. No.: 105843

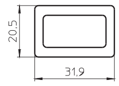


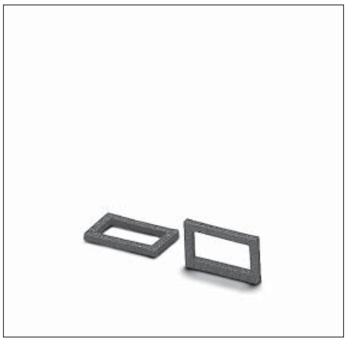
Push-fit bracket
For G13 built-in lampholder 537181, 537166,
537174 (see p. 188), 537206 (see p. 189)
Material: PC, grey
Lamp axis optional: 33/40/46/51/56
or 43 mm (lateral lamp insertion)
Push-fit foot for wall thickness 0.5–1 mm
Weight: 6 g, unit: 1000 pcs.
Type: 97044
Ref. No.: 108780



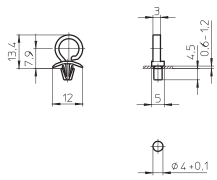


Foot gasket for degree of protection IP50
For push-fit bracket 108780
Material: EPDM, black
Weight: 0.7 g
Type: 98003
Ref. No.: 108266

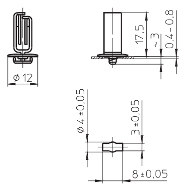




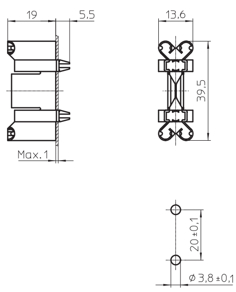
Cable holder
Material: PA, white
Push-fit foot for cut-out ∅ 4 mm
for wall thickness 0.6–1.2 mm
Weight: 0.2 g, unit: 5000 pcs.
Type: 97147
Ref. No.: 109086



Cable holder
For the automatic luminaire wiring
and manual wiring
Material: PC, white
Degree of protection IP50
Weight: 0.5 g, unit: 5000 pcs.
Type: 97117
Ref. No.: 108845



Cable holder
For the automatic luminaire wiring
and manual wiring
Material: PA, white
Weight: 2.1 g, unit: 7500 pcs.
Type: 0607
Ref. No.: 159968



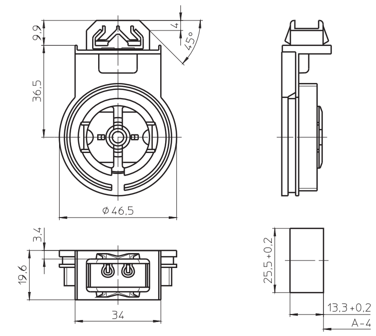
G13 Lampholders, Degree of Protection IP54

For fluorescent lamps T8 (T26), T12 (T38)
For luminaires of protection class I and II

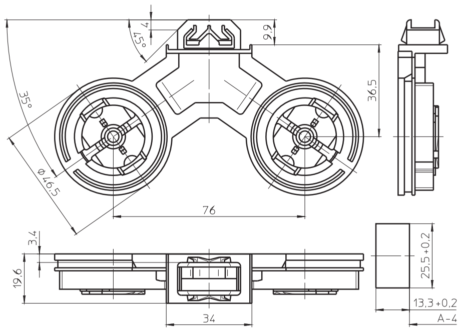
Lampholders protected against dust and splashing water (IP54)
To convert luminaires from IP20 to IP54
Pin support for reliable contact
With spring adjustment

Max. permitted temperature T_m on the rear side of the lampholder: 110 °C

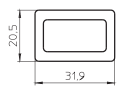
G13 push-fit lampholder for lamps T8/T12
Casing: PC, white, interior part: PBT GF, white
Rotor: PBT GF, white, T140
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Fixing clips for wall thickness 0.7 mm
Screw rings see page 197
Weight: 17.1 g, unit: 500 pcs.
Type: 84171 system 161
Ref. No.: 107957

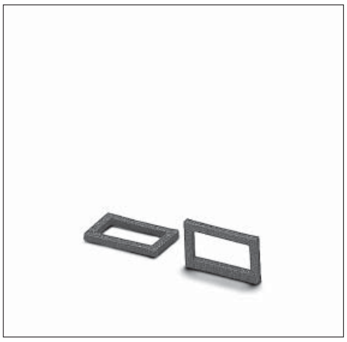


G13 push-fit twin lampholder for lamps T8/T12
Casing: PC, white, interior part: PBT GF, white
Rotor: PBT GF, white, T140
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Fixing clips for wall thickness 0.7 mm
Screw rings see page 197
Weight: 33.6 g, unit: 250 pcs.
Type: 84173 system 162
Ref. No.: 107959



Food gasket for degree of protection IP54
For lampholder systems 161, 162
Material: EPDM, black
Weight: 0.7 g
Type: 98003
Ref. No.: 108266





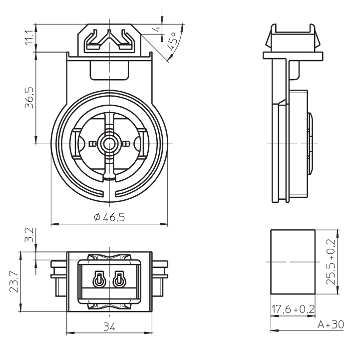
G13 Lampholders, Degree of Protection IP65/IP67

For fluorescent lamps T8 (T26), T12 (T38)
For luminaires of protection class I and II

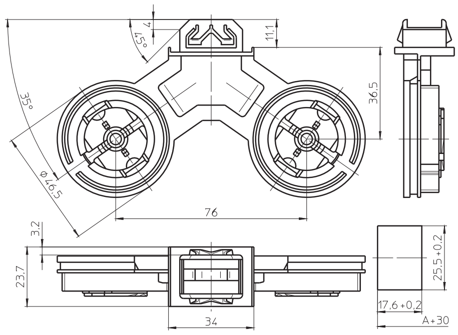
Lampholders protected against dust and
jet of water (IP65)
Dust and watertight lampholders (IP67)
Pin support for reliable contact
with spring adjustment

Max. permitted temperature T_m
on the rear side of the lampholder: 110 °C

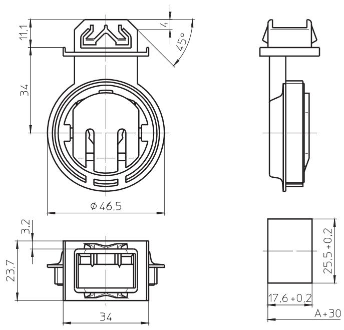
G13 push-fit lampholders for lamps T8/T12
Casing: PC, interior part: PBT GF
Rotor: PBT GF, white, T140
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Fixing clips for wall thickness 1.4–2 mm
Screw rings see page 197
Weight: 17.3 g, unit: 500 pcs.
Type: 84172 system 163
Ref. No.: 107958 casing white
Ref. No.: 108666 casing grey



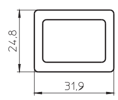
G13 push-fit twin lampholders for lamps T8/T12
Casing: PC, interior part: PBT GF
Rotor: PBT GF, white, T140
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Fixing clips for wall thickness 1.4–2 mm
Screw rings see page 197
Weight: 34.2 g, unit: 250 pcs.
Type: 84174 system 164
Ref. No.: 107960 casing white
Ref. No.: 108669 casing grey

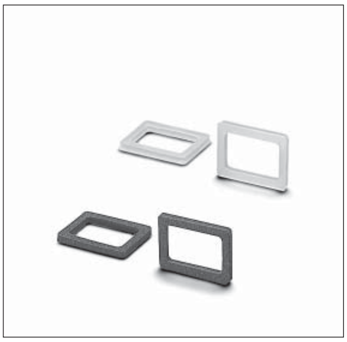


G13 push-fit lampholders for lamps T8/T12
Casing: PC, interior part: PBT GF, T140
Nominal rating: 2/500
Push-in terminals: 0.5–1 mm²
Fixing clips for wall thickness 1.4–2 mm
With slot insertion
Screw rings see page 197
Weight: 14.5 g, unit: 250 pcs.
Type: 84175 system 165
Ref. No.: 108608 casing white
Ref. No.: 108614 casing grey

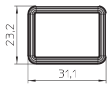


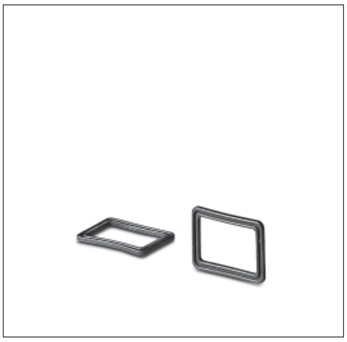
Foot gaskets
For lampholder systems 163, 164, 165
Weight: 1/1.1 g
For degree of protection IP65
Material: cellular rubber
Type: 98004
Ref. No.: 108267
For degree of protection IP67
Material: silicone, transparent
Type: 98011
Ref. No.: 504078



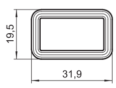


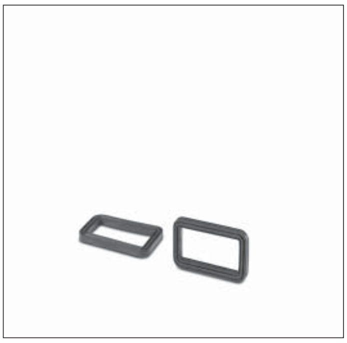
Profiled foot gasket
For degree of protection IP67
For lampholder systems 163, 164, 165
Material: EPDM, black
Weight: 1.1 g, unit: 1000 pcs.
Type: 98008
Ref. No.: 546254



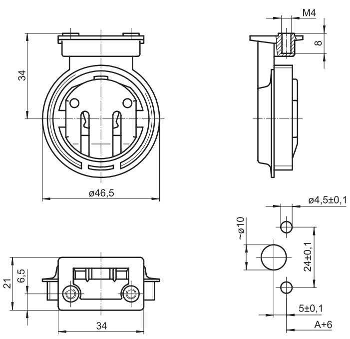


Foot gasket, profiled shape
For degree of protection IP67
For lampholder systems 167, 168
Material: EPDM, black
Weight: 0.7 g, unit: 1000 pcs.
Type: 98087
Ref. No.: 503773

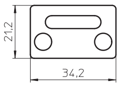


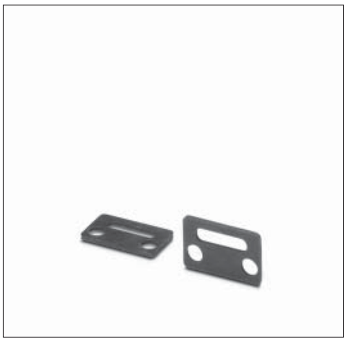


G13 lampholder for lamps T8/T12
Casing: PC, white, interior part: PBT GF, T140
Nominal rating: 2/500
Screw fixing foot with tapped holes M4
Screw rings see page 197
With slot insertion
Weight: 14 g, unit: 250 pcs.
Type: 84105 system 152
Ref. No.: 521123



Foot gasket for degree of protection IP65/IP67
For lampholder system 152
Material: EPDM, black
Weight: 1.4 g, unit: 1000 pcs.
Type: 98085
Ref. No.: 106094





Screw Rings for G13 Lampholders, Degree of Protection IP54, IP65, IP67

For lampholder systems 152, 161, 162, 163, 164, 165

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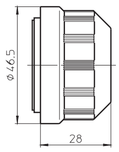
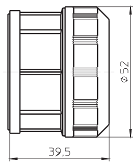
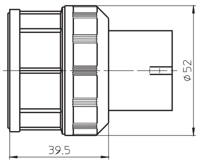
Screw rings
Ring: PBT GF, gasket: silicone
Weight: 17/20 g, unit: 500/250 pcs.
Type: 84122 for lamps T8
Ref. No.: 103710 white
Ref. No.: 103709 grey
Type: 84123 for lamps T12 or
for lamps T8 with protection tube ∅ 38 mm
Ref. No.: 103712 white
Ref. No.: 103711 grey





Screw rings with heat dissipator
For lamps T8 with
plastic protection tube ∅ 38 mm
Ring: PBT GF
Gasket: silicone, shell: aluminium
Weight: 40 g, unit: 250 pcs.
Type: 84154
Ref. No.: 103744 white
Ref. No.: 103743 grey



OPTIMUM START WITH COMPONENTS MADE BY VS

STARTER HOLDERS AND TERMINAL BLOCKS, ACCESSORIES

Vossloh-Schwabe provides a comprehensive range of miscellaneous accessories for operating fluorescent lamps.

Starter holders
Starters are needed for lamp circuits operated with electromagnetic ballasts. VS provides a number of starter holders with various designs for this purpose. Almost all starter holders are made of polycarbonate and qualify for a T110 temperature rating.

Terminal blocks
Furthermore, Vossloh-Schwabe's product range also includes connection terminals, some of which feature the VDE-approved IDC method in addition to the well-known and installation-friendly push-in connectors. The connection terminals therefore make it possible to automate luminaire wiring and thus wire up several terminals using a single cable.

The range is rounded off by built-in rocker switches.

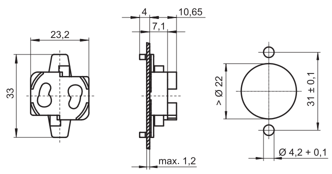
3 Starter Holders and Terminal Blocks, Accessories

Starter Holders, Accessories

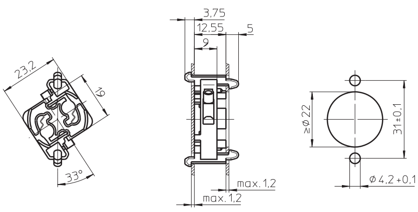
For starters acc. to DIN VDE 0712 part 101, IEC 60155

Starter holders with central studs, suitable for luminaires of protection class II, are available on request.

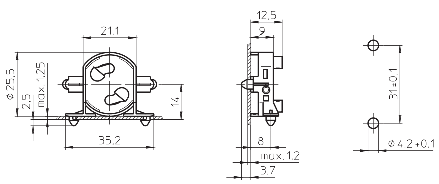
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Weight: 2.1 g, unit: 1000 pcs.
Type: 02113
Ref. No.: 535131



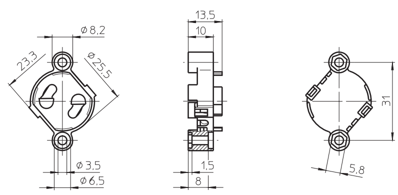
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm², single-core
Front and rear split pins for wall thickness up to 1.2 mm
Rear of starter holder/luminaire: IP40
Weight: 2.8 g, unit: 1000 pcs.
Type: 02110
Ref. No.: 109784



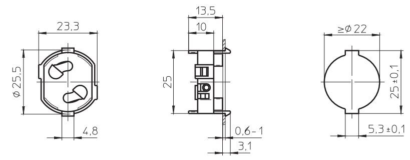
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Lateral split pins for wall thickness up to 1.25 mm
Rear of starter holder/luminaire: IP40
Weight: 3.7 g, unit: 1000 pcs.
Type: 02120
Ref. No.: 100064



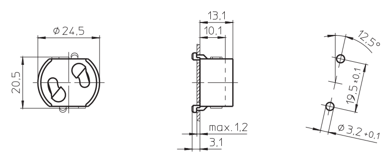
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Fixing holes for screws M3
Weight: 3.8 g, unit: 1000 pcs.
Type: 02150
Ref. No.: 100069



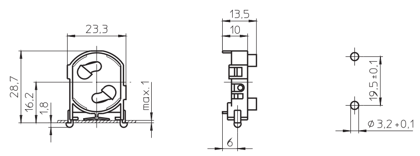
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Front split pins, flat
for wall thickness 0.6–1 mm
Weight: 3.1 g, unit: 1000 pcs.
Type: 02170
Ref. No.: 106818



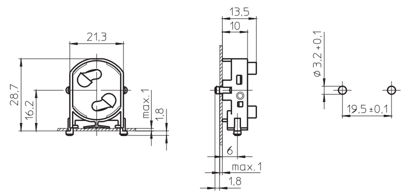
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Rear split pins for wall thickness up to 1.2 mm
Rear of starter holder/luminaire: IP40
Weight: 3.3 g, unit: 1000 pcs.
Type: 43000
Ref. No.: 101627



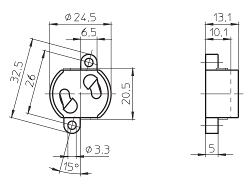
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Lateral split pins for wall thickness up to 1 mm
Rear of starter holder/luminaire: IP40
Weight: 3.4 g, unit: 1000 pcs.
Type: 43010
Ref. No.: 101629



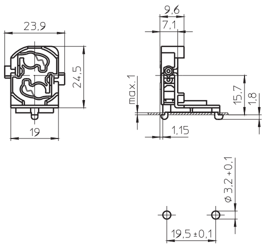
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Rear and lateral split pins
for wall thickness up to 1 mm
Rear of starter holder/luminaire: IP40
Weight: 3.5 g, unit: 1000 pcs.
Type: 43020
Ref. No.: 108671



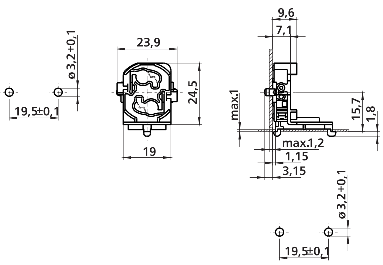
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Fixing holes for screws M3
Weight: 3.7 g, unit: 1000 pcs.
Type: 43100
Ref. No.: 101631



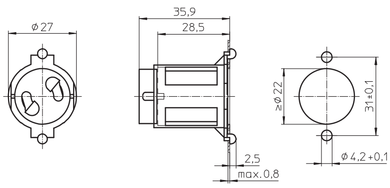
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm², single-core
Lateral split pins for wall thickness up to 1 mm
Rear of starter holder/luminaire: IP40
Weight: 3.7 g, unit: 1000 pcs.
Type: 43200
Ref. No.: 109790



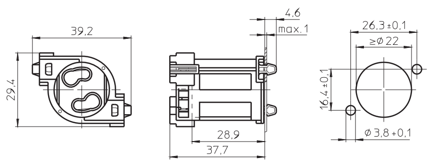
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm², single-core
Rear split pins for wall thickness up to 1.2 mm
Lateral split pins for wall thickness up to 1 mm
Rear of starter holder/luminaire: IP40
Weight: 3.7 g, unit: 1000 pcs.
Type: 43210
Ref. No.: 109792

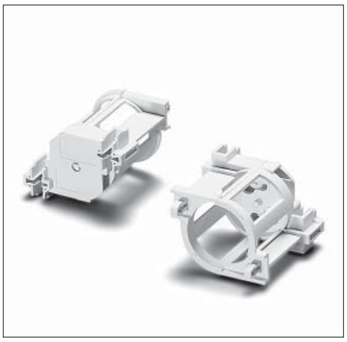


Starter holder with integrated extension piece
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
Front split pins for wall thickness up to 0.8 mm
Weight: 5.4 g, unit: 1000 pcs.
Type: 43300
Ref. No.: 101636

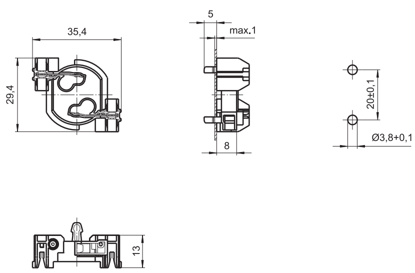


Starter holder with integrated extension piece
Material: PC, white
For the automatic luminaire wiring
T110, nominal rating: 2/250
IDC terminals for leads H05V-U 0.5
Front split pins for wall thickness up to 1 mm
Weight: 5.4 g, unit: 1000 pcs.
Type: 43500
Ref. No.: 108454

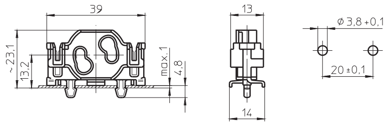




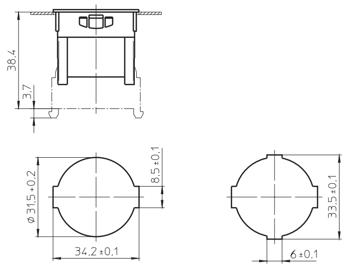
Starter holder
Material: PC, white
T110, nominal rating: 2/250
Push-in terminals: 0.5–1 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
Rear split pins for wall thickness up to 1 mm
Weight: 3 g, unit: 1000 pcs.
Type: 43520
Ref. No.: 530079



Starter holder
Material: PA, white
T110, nominal rating: 2/250
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
Lateral split pins for wall thickness up to 1 mm
Weight: 3 g, unit: 1000 pcs.
Type: 43410
Ref. No.: 107445



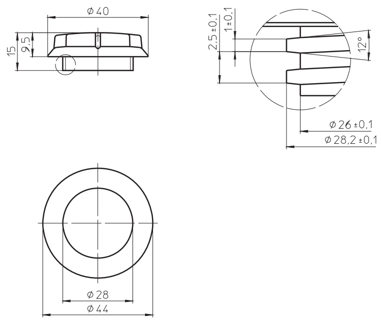
Extension piece
For front clip-in fixing into luminaire metal sheets
For use with starter holder 109784 (see p. 200)
For screw caps type 97065
Material: PC, white
Weight: 3.5 g, unit: 500 pcs.
Type: 97064
Ref. No.: 105482



Cut-out for wall thickness 0.7–1.2 mm

Cut-out for wall thickness 1.5–2 mm

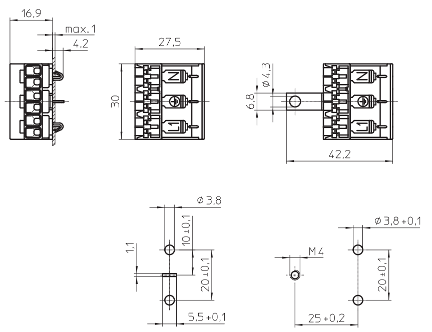
Screw caps for degree of protection IP54/IP65/IP67
For extension piece 105482
Material: PP
Gasket: EPDM cellular rubber
Weight: 3.2/4/0.3 g, unit: 500 pcs.
Type: 97065 screw cap
Ref. No.: 105483 white
Ref. No.: 109575 grey
Type: 98086 gasket
Ref. No.: 106095

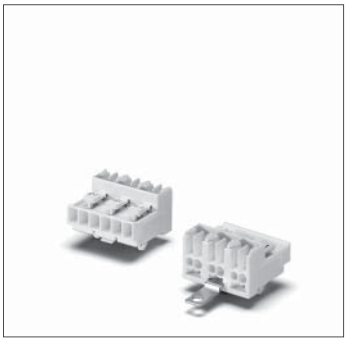


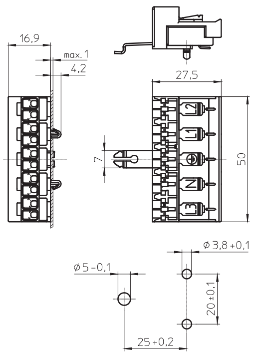
Terminal Blocks, Accessories

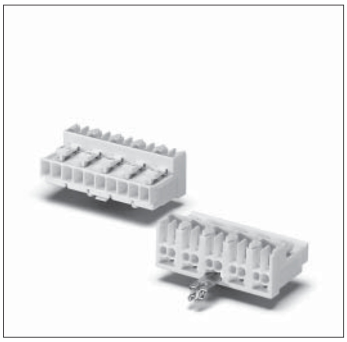
Suitable only for solid conductors on the secondary connection

Terminal blocks
Casing: PC, white, T85
Nominal rating: 450 V
Primary connection with release button:
    push-in twin terminals 0.5–2.5 mm²/16 A
Secondary connection:
    push-in twin terminals 0.5–1.5 mm²/16 A
    and 0.5–2.5 mm²/16 A
Connection for X2 RFI-suppression capacitor:
    0.5–0.75 mm², capacitor's pins must be
    insulated (stripped lead ends: 8^{+1} mm)
For the automatic luminaire wiring:
    IDC terminals for leads H05V-U 0.5/6 A
Base split pins for wall thickness 0.6–1 mm



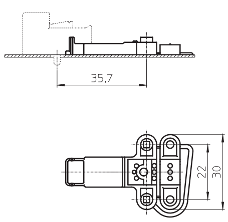




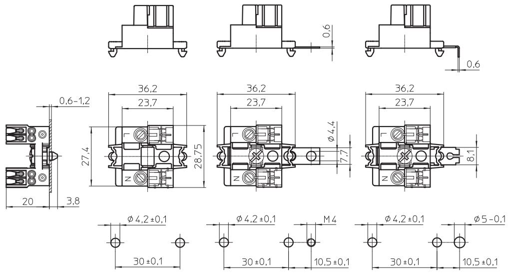


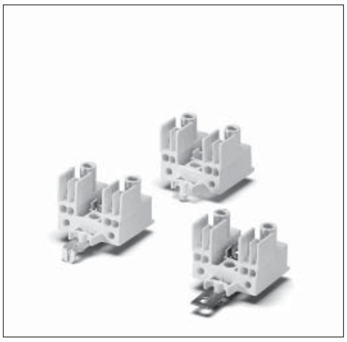
Type	**Ref. No.**	Number of poles	Earth-contact connection	Mark	Weight (g)	Unit (pcs.)
41500	**533312**	3-poles	not earthed	N, L2, L1	9.2	500
41510	**533313**	3-poles	earth spike	N, PE, L1	9.4	500
41520	**533314**	3-poles	earth strap M4	N, PE, L1	10	500
41530	**534948**	3-poles	earth finger	N, PE, L1	10	500
41540	**533315**	5-poles	not earthed	L3, L2, L4, N, L1	15.1	500
41550	**533316**	5-poles	earth spike	L3, L2, PE, N, L1	15.3	500
41560	**533317**	5-poles	earth strap M4	L3, L2, PE, N, L1	16	500
41570	**534954**	5-poles	earth finger	L3, L2, PE, N, L1	16	500

Push-in cord grip
For terminal blocks type 415
For leads with insulation max. Ø 10.5 mm
Conductor fixed with self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
Material: PA, white
Weight: 2.2 g, unit: 500 pcs.
Type: 97734
Ref. No.: 535474



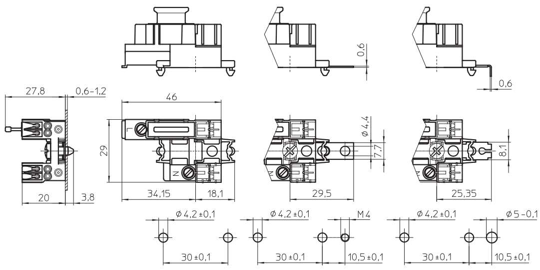
Terminal blocks
Casing: PC, white, T85
Nominal rating: 450 V
Primary connection:
screw terminals 2.5 mm²
Secondary connection:
push-in twin terminals 1.5 mm²
(with IDC contacts: 1 mm²)
push-in terminal 0.5 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
Base split pins for wall thickness 0.6–1.2 mm

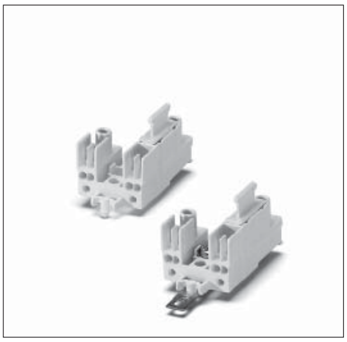




Type	**Ref. No.**	IDC	Number of poles	Earth-contact connection	Weight (g)	Unit (pcs.)
40660	**543793**	no	3-poles	not earthed	5.7	1000
40662	**543795**	no	3-poles	earth strap M4	8.4	1000
40666	**543800**	no	3-poles	earth finger	8.3	1000
40661	**543794**	yes	3-poles	not earthed	6	1000
40663	**543796**	yes	3-poles	earth strap M4	8.7	1000
40667	**547801**	yes	3-poles	earth finger	8.6	1000

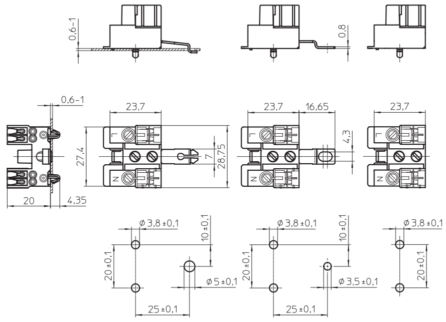
Terminal blocks with fuse holder
Material: PC, white, T70
nominal rating: 250 V
Primary connection: screw terminals 2.5 mm²
Secondary connection:
push-in twin terminals 1.5 mm²
(with IDC contacts: 1 mm²)
push-in terminal 0.5 mm²
For the automatic luminaire wiring:
IDC terminals for leads H05V-U 0.5
With retaining clip for fuses 5x20 mm
With integrated fuse on request
Base split pins for wall thickness 0.6–1.2 mm

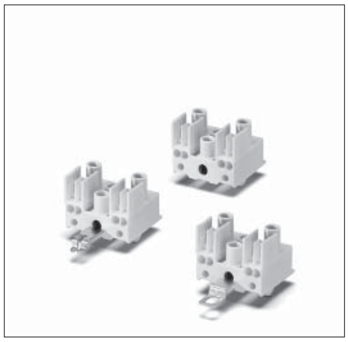




Type	**Ref. No.**	IDC	Number of poles	Earth-contact connection	Weight (g)	Unit (pcs.)
40670	**543802**	no	3-poles	not earthed	8.7	1000
40672	**543805**	no	3-poles	earth strap M4	11.5	1000
40676	**543809**	no	3-poles	earth finger	14.1	1000
40671	**543803**	yes	3-poles	not earthed	9.0	1000
40673	**543806**	yes	3-poles	earth strap M4	11.8	1000
40677	**543810**	yes	3-poles	earth finger	14.4	1000

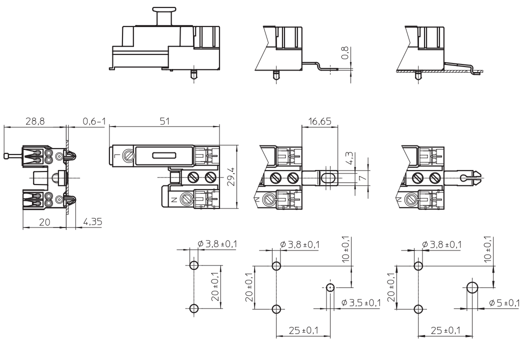
Terminal blocks
Casing: PC, grey, T85
Nominal rating: 450 V
Primary connection:
  screw terminals 2.5 mm²
Secondary connection:
  push-in twin terminal 1.5 mm²
  (with IDC contacts: 1 mm²)
  push-in terminal 0.5 mm²
For the automatic luminaire wiring:
  IDC terminals for leads H05V-U 0.5
Base split pins for wall thickness 0.6–1.2 mm

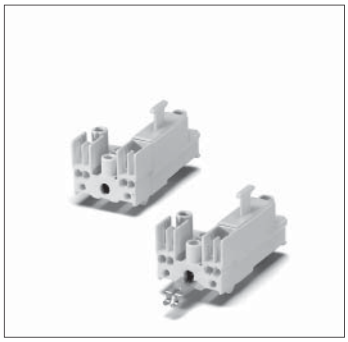




Type	**Ref. No.**	IDC	Number of poles	Earth-contact connection	Weight (g)	Unit (pcs.)
40560	**543770**	no	3-poles	not earthed	8	1000
40562	**543772**	no	3-poles	earth strap M4	8.7	1000
40566	**543777**	no	3-poles	earth finger	8.8	1000
40561	**543771**	yes	3-poles	not earthed	8.3	1000
40563	**543773**	yes	3-poles	earth strap M4	9	1000
40567	**543778**	yes	3-poles	earth finger	9.1	1000

Terminal blocks with fuse holder
Material: PBT, grey, T70
Nominal rating: 250 V
Primary connection: screw terminals 2.5 mm²
Secondary connection:
  push-in twin terminals 1.5 mm²
  (with IDC contacts: 1 mm²)
  push-in terminal 0.5 mm²
For the automatic luminaire wiring:
  IDC terminals for leads H05V-U 0.5
With retaining clip for fuses 6x25 mm
With integrated fuse on request
Base split pins for wall thickness 0.6–1.2 mm





Type	**Ref. No.**	IDC	Number of poles	Earth-contact connection	Weight (g)	Unit (pcs.)
40570	**543781**	no	3-poles	not earthed	11	500
40572	**543783**	no	3-poles	earth strap M4	11.7	500
40576	**543787**	no	3-poles	earth finger	11.8	500
40571	**543782**	yes	3-poles	not earthed	11.3	500
40573	**543784**	yes	3-poles	earth strap M4	12	500
40577	**543788**	yes	3-poles	earth finger	12.1	500

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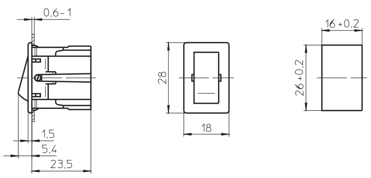
Built-in Rocker Switches

Built-in rocker switch 1-pole
For cut-out 16x26 mm
Casing: PC, white, T100
Contact pillar and rocker: PBT, white
Terminal: nichrome steel
Nominal rating: 6(2)/250~
Push-in terminals: 0.5–1 mm²
Lateral fixing clips for wall thickness 0.6–1 mm
Weight: 7.2 g, unit: 500 pcs.
Type: 20200
Ref. No.: 100437



3 Components for Fluorescent Lamps

Ballasts for fluorescent lamps

The operation of a fluorescent lamp depends on a ballast that stabilises the lamp's preheat current after connection to the mains and, in conjunction with the starter, also supplies the required lamp ignition voltage after preheating. After ignition, the ballast then serves to limit the lamp current. As fluorescent lamps are characterised by a negative characteristic current-voltage curve, lamp current stabilisation is essential with regard to both the lamp's stable operation and a long service life, which is also dependent on compliance with the starting conditions (preheat current and ignition voltage). Unfavourable starting conditions cause damage to the electrodes every time the lamp is started and thus reduce the lamp's service life. Furthermore, care should be taken to prevent crossdischarge in the electrode area during preheating, which also shortens lamp service life.

Electromagnetic (inductive) ballasts have to be operated in conjunction with starters for lamp ignition and capacitors for blind current compensation. In addition, capacitors for RFI suppression will also be required for certain circuits. Electronic ballasts do not require any additional components.

Electronic ballasts (EB)

VS electronic ballasts are designed for mains voltages of 220 V to 240 V (exceptions are devices for the North American market where the nominal mains voltage is 120 V or 277 V) and are used to operate fluorescent lamps at high frequencies. The lamps are ignited with an internally generated ignition voltage, thereby removing the need for an external starter. The power factor (λ) > 0.95 also removes the need for compensation, unlike with electromagnetic ballasts. The only exceptions are low-output ELXs models, which attain a power factor of 0.6. Luminaires fitted with electronic ballasts are characterised by low energy consumption as they draw substantially less system power than conventional, inductive applications. This is firstly because the lamp consumes less power to achieve the same luminous flux and secondly because the internal loss of an electronic ballast only amounts to approx. 8% to 10% of the lamp's output. Furthermore, thanks to their modern circuitry, the power input of VS electronic ballasts remains constant even in the event of mains voltage fluctuations, thus ensuring permanently low energy consumption.

VS electronic ballasts permit a broad range of applications. For instance, the VS product range includes many ballast types for multiple lamp operation. These ballasts reduce installation and component costs and thus enable particularly efficient luminaires. Twin-lamp electronic ballasts permit so-called master-slave operation. The lamps of two single-lamp luminaires are operated by a twin-lamp electronic ballast that is built into the so-called master luminaire. The lamp of the slave luminaire is electrically connected to the electronic ballast.

Multi-lamp electronic ballasts also provide an interesting advantage in that several lamps of different ratings can be connected. Electronic ballasts of this kind simplify storage and logistics.

The use of electronic ballasts makes a lighting system both more convenient and efficient to operate:
- reduced power consumption (up to 30%) at undiminished light output
- 50% longer service life
- stabilised lamp output
- overvoltage protection
- no stroboscopic effect
- flicker-free lamp start
- no need for a starter or capacitor
- low wiring effort
- no radiated electromagnetic interference
- low self-heating due to minimal power loss
- automatic shutdown of defective lamps
- automatic restart once the lamp has been changed (except ELXe series)

Vossloh-Schwabe electronic ballasts are developed on the basis of the latest technological and component standards and are produced using state-of-the-art technology, whereby consideration is taken of our customers' quality standards in our quality assurance system.

Assembly Instructions for Electronic Ballasts

For mounting and installing of electronic ballasts for fluorescent lamps

Mandatory regulations

EN 61347-1	Lamp controlgear – part 1: general and safety requirements
EN 61347-2-3	Lamp controlgear – part 2-3: particular requirements for a.c. supplied electronic ballasts for fluorescent lamps
EN 60929	AC-supplied electronic ballasts for tubular fluorescent lamps
DIN VDE 0100	Erection of low voltage installations
EN 60598-1	Luminaires – part 1: general requirements and tests
EN 61000-3-2	Electromagnetic compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (device input current up to and including 16 A per conductor)
EN 55015	Maximum values and methods of measurement for RFI suppression in electrical lighting installations and similar electrical appliances
EN 61547	Installations for general lighting purposes – EMC immunity requirements

Descriptions of VS electronic ballasts (EBs)

ELXc ballasts (warm start)
In contrast to the ELXs series, ELXc ballasts have a power factor of better than 0.95 and cover the complete capacity range.
ELXc ballasts ensure the lamp is started following a defined lamp electrode preheating period of approx. 1–2.5 seconds using a fixed ignition voltage. This particularly gentle lamp start makes over 20,000 lamp starts possible. ELXc ballasts should be used for applications with high switching frequencies (e.g. hotels or offices) where energy savings as well as low maintenance costs are desired. The average service life of these ballasts totals 50,000 hours with a failure rate of ≤ 0.2% per 1,000 operating hours. The average life of the series ECO-EffectLine: 30.000 hours and New T5 EffectLine: 50.000 hours with a failure rate of ≤ 0.2% per 1,000 operating hours.

ELXd ballasts (dimmable)
These are warm start ballasts with an additional dimming function that is controlled via an interface fitted to the ballast. The interface of these ballasts can be either analogue (1–10 Volt) or digital (DALI; PUSH); the interface enables lighting to be ideally adjusted to suit the given need. Control components can also be used as long as they comply with the respective standard (Annex to IEC/EN 60929). The power factor for these ballasts is > 0.95 at 100% lamp operation. When using ELXd ballasts in a lighting system, an energy saving of 75% can be achieved if, for instance, the control inputs of the ballasts are coupled with movement detectors and light sensors. The average service life of these ballasts totals 50,000 hours with a failure rate of ≤ 0.2% per 1,000 operating hours.

To guarantee trouble-free operation and a long service life of the various types of electronic ballast, attention should be paid to the regulations and mounting instructions (page 228–235). In addition, the installation instructions for lighting systems must be observed when installing luminaires with electronic ballasts.

Mounting and installation instructions can be obtained from Vossloh-Schwabe on request or can be found online at **www.vossloh-schwabe.com**.

Mechanical mounting

Surface Solid, flat surface for good heat dissipation required.
Avoid mounting on protruding surfaces.

Mounting location
Electronic ballasts must be protected against moisture and heat.
Installation in external luminaires: water protection rate of ≥ 4
(e.g. IP54 required)

Fastening With M4 screws in the designated holes

Heat transfer If the ballast is destined for installation in a luminaire, sufficient heat transfer must be ensured between the ballast and the luminaire casing.
Electronic ballasts should be mounted with the greatest possible clearance to heat sources or lamps. During operation, the temperature measured at the t_c point of the ballast must not exceed the specified maximum value.

Supplement for independent electronic ballasts

Mounting positionAny

Clearance Min. of 0.10 m from walls, ceilings, insulation
Min. of 0.10 m from other electronic ballasts
Min. of 0.25 m from sources of heat (lamp)

Surface Solid; device must not be allowed to sink into insulation materials

Technical specifications

Operating voltage range
AC: 220 to 240 V (±10%)
DC: please observe the specifications on the individual product pages

Ignition time ELXe ballasts t < 0.5 seconds (instant start)

Preheat time ELXc and ELXd ballasts t = 0.5 or 1.5 to 2.5 seconds (warm start)

Leak current ≤ 0.5 mA per electronic ballast

Product features

Overheating VS EBs for fluorescent lamps are not protected against overheating

Overvoltage protection
AC: up to 48 hours at U_{NAC} = 320 V
DC: no disorders occur with input voltages of up to U_{NDC} 285 V.
U_{NDC} voltages in excess of 288 V destroy the ballast.

Shutdown of defective lamps
During starting operation, the electronic ballast will detect whether a lamp is connected. If no lamp is present, the ballast will cancel the starting operation. Deactivated lamps or interrupted electrodes are detected and lead to the high-frequency supply being switched off after an unsuccessful ignition attempt. Changing a lamp during operation will lead to the high-frequency supply being switched off.

EOL effect

Up to now, it has not been possible to conclusively reproduce the end-of-life effect under laboratory conditions. However, it can be qualitatively described for fluorescent lamps as follows: when the emitter material of the cathode (i.e. the filament in conventional bi-pin lamps) has been fully consumed or has otherwise lost its emitting power, the emission of electrons is hampered, which leads to a voltage drop at the cathode. Frequent cold starts accelerate active emitter loss.

Operating a lamp with a constant current (an electronic ballasts (EB) provides a near-constant current) results in high dissipation losses that also cause the lamp base and lampholder to heat up and can even cause damage to both. This is often referred to as the EOL effect; from an electrical point of view, this is manifested in the so-called "partial rectifier effect".

The EOL cut-out ensures that a ballast is safely switched off and the lamp base does not overheat at the end of a lamp's service life.

EN 61347-2-3:2011 + AC:2011 describes three possible tests.
The first are now in widespread use and are described in more detail here.
The third test is not conducted at VS.

1. EOL Test 1 (61347-2-3:2011 + AC:2011 17.2)
   Asymmetric pulse test
2. EOL Test 2 (61347-2-3:2011 + AC:2011 17.3)
   Asymmetric power test
3. EOL Test 3 (61347-2-3:2011 + AC:2011 17.4)
   Exposed filament test

The first two tests attempt to simulate the rectifier effect:

- Test 1 pulse switching of rectifying effect
- Test 2 by applying a DC voltage that is constantly higher than required by the lamp.

VS EBs are capable of suitably assessing the altered voltage signal in comparison to normal operation so as to meet EOL requirements.

Protection against transient mains peaks

Values are in compliance with EN 61547 (interference immunity)
(1 kV for AC and 0.5 kV for DC and control conductors).

Electrical installation

Wiring

The wiring between the mains, electronic ballast and lamp must comply with the respective circuit diagram. Note: with ELXe models, one side of the lamp electrode is never connected to the electronic ballast.
The electronic ballast must be earthed using a toothed washer or similar (protection class I, ignition help, compliance with RFI/BCI standards).
To ensure compliance with RFI-suppression limits, mains conductors should not be wired in parallel to high-frequency carrying lamp conductors; maximum clearance should be ensured and all conductors marked with an * must be kept short. As a general rule, a maximum conductor length should not be exceeded when using conventional conductors (see table on page 221–223 for precise details). Luminaire must be tested for compliance with the RFI suppression limits stipulated by EN 55015.

Conductors must not exceed 3 m in length in the event of master-slave operation.

Dimmable electronic ballasts are unsuitable for master/slave operation.

Cord grip — EBs with cord grip can be used with the following conductors, for instance:

Designation	Lead type
Mains lead	H03VV-F 3X0.75 mm² or NYM 3X1.5 mm²
Control lead	H03VV-F 2X0.5 mm²
Mains and control lead in one lead	H03VV-F 5X0.75 mm²
Lamp lead	H05VV-F 4X1 mm² or 5X1 mm²

Connection terminals for automatic luminaire wiring (ALF connections)

- Use copper (not stranded) wire
- Rquired diameter for push-in connection 0.5–1 mm²
- Stripped lead length 8–9 mm
- Required diameter for IDC 0.5 mm², max. ∅ 2 mm including insulation, no wire stripping required; mounting requires a special tool

Push-in terminals — The integrated terminals can be used with flexible or rigid leads with a crosssection of 0.5–1.5 mm². The stripped lead length ranges between 8.5–9.5 mm for a 3.5 mm terminal grid.

Error current — Impulse-resistant leak-current protection must be installed. Distribute the luminaires to phases L1, L2 and L3; install tri-phase FI switches. If permissible, install FI switches with 30 mA leak current; connect no more than 15 luminaires as FI switches can be triggered at half the leak current value.

Tri-phase connection of luminaires with EB

- Prior to operating newly installed lighting systems: check the mains voltage is appropriate to the electronic ballast's mains voltage range (AC, DC).
- The N-type conductor must be properly connected to all luminaires or ballasts.
- Conductors can only be connected or disconnected if the ballast is disconnected from the mains. Attention: N-type conductors must never be disconnected individually or as the first element.
- Insulation resistance test: from L to PE (L and N must not be connected)
- The neutral conductor must be reconnected after completion of the test.

Power factor/compensation

Luminaires with electronic ballasts do not require compensation:
power factor ≥ 0.95.

Selection of automatic cut-outs

Dimensioning automatic cut-outs

High transient currents occur when an EB is switched on because the capacitors have to load. Lamp ignition occurs almost simultaneously. This also causes a simultaneous high demand for power. These high currents when the system is switched on put a strain on the automatic conductor cut-outs, which must be selected and dimensioned to suit.

Release reaction

The release reaction of the automatic conductor cut-outs comply with VDE 0641, part 11, for B and C characteristics.

No. of electronic ballasts (see the table on pages 229–231)

The maximum number of VS ballasts applies to cases where the devices are switched on simultaneously. Specifications apply to single-pole fuses. The number of permissible ballasts must be reduced by 20% for multi-pole fuses. The considered circuit impedance equals 400 mΩ (approx. 20 m of conductor [2.5 mm²] from the power supply to the distributor and a further 15 m to the luminaire). Doubling circuit impedance to 800 mΩ increases the possible number of ballasts by 10%.

EB output voltage

Electronic ballasts bear the information "U_{OUT}" on their type plates. All subsequently connected components must be designed for this EB output voltage. When using T5 lamps, any components connected to the output side of the EB must be approved for a voltage of ≥ 430 V (especially lampholders). This also applies to dimmable T5 EBs.

Lamps and dimmed operation

For lighting systems with dimmable electronic ballasts, Vossloh-Schwabe recommends that fluorescent lamps always be replaced as a **full complement** to maintain uniform lighting levels and colour impressions. New lamps must be burnt in at maximum brightness for approx. 100 hours.
Without restrictions, VS electronic ballasts can be used to operate ECO T5 fluorsecent lamps (except for with types ELXc 135.856 and ELXc 235.857) and T8 fluorescent lamps. A two-lamp dimmable electronic ballast can only be used with lamps of a single lamp manufacturer. The following EBs are restricted in their suitability for dimmer operation of amalgam lamps: ELXd 118.802, 218.803, 142.806, 242.807.

Dimming interface

DC 1–10 V according to EN 60929 with power source 0.5 mA (protected in the event of mains voltage connection); designed to enable connection of control and regulation units. Dimming range: 3–100% of lamp power

DALI (Digital Addressable Lighting Interface) dimming interface

Polarity reversible dimmer interface – protected in accordance with EN 60929 given mains voltage supply – for connecting control devices that work according to the standard digital protocol. Dimming range: 1–100% of the lamp's rating

Potential interference with IR systems

Operating lamps at frequencies of 20 to 50 kHz can cause interference with infrared systems (remote controls, sound transmission, personal pager systems).
Countermeasures: optical filters, switching to infrared systems with higher carrier frequencies (over 400 kHz).

Electromagnetic Compatibility (EMC)

Vossloh-Schwabe's electronic ballast range was developed in accordance with valid EMC standards (interference, interference immunity and mains harmonics) and specially designed to ensure safe compliance with the limiting values.
It is assumed that that any remarks regarding conductor wiring and conductor length in the instructions for installing electronic ballasts in luminaires or for independent ballasts will be observed.

Vossloh-Schwabe electronic ballasts are also tested in commercially available luminaires in addition to the CISPR 30 sample luminaires.

Mains harmonics: the maximum values laid down in EN 61547 (Interference Immunity) are satisfied.

Additional information

Information on the installation of electronic ballasts for optimising EMC

To ensure good radio interference suppression and the greatest possible operating safety, the following points should be observed when installing electronic ballasts:

- Conductors between the EB and the lamp (HF conductors) must be kept short (reduction of electromagnetic interference). High-potential lamp conductors must be kept as short as possible, in particular with tubular lamps. Lamp conductors of this kind are labelled with an * in the wiring diagram on the type plate (see page 221–223).
- Mains and lamp conductors must be kept separate and if possible should not be laid in parallel to one another. The distance between HF and mains conductors should be as large as possible, ideally > 5 cm. (This prevents the induction of interference between the mains and lamp conductors.)
- The mains conductor within the luminaire must be kept short (to reduce the induction of interference).
- Devices must be properly earthed. EBs require secure contacts to the luminaire casing or must be earthed using a PE connection. This PE connection should be effected using an independent conductor to achieve better dissipation of the leak current. EMC improves at frequencies greater than 30 MHz.
- The mains conductor must not be laid too close to the EB or the lamp (this is especially important in the event of through-wiring).
- Mains and lamp conductors must not be crossed. Should this be impossible to avoid, conductors should be crossed at right angles to one another to avoid inducing interference between mains and HF conductors.
- Should conductors be wired through metal parts, such conductors must always be additionally shielded (e.g. with an insulating sleeve or grommet).

Temperature

Reference point temperature t_c

The safe operation of electronic ballasts is dependent on the maximum permissible temperature not being exceeded at the measuring point. Vossloh-Schwabe has determined a casing temperature measuring point – $t_{c\ max.}$ – on all EB casings. To avoid shortening the service life or diminishing operating safety, the stipulated maximum temperature must not be exceeded at this t_c point. This point is determined by testing the convertor during normal, IEC-standardised operation at the specified ambient temperature (t_a), which is also indicated on the type plate. As both the design-related ambient temperature and the ballast's inherent heat, as determined by the installed load, are subject to great variation, the casing temperature should be tested at the t_c point under real installation conditions.

Ambient temperature t_a

The ambient temperature – as specified on every EB – denotes the permissible temperature range within the luminaire.

Reliability and service life

If the max. temperature at the t_c reference point (as specified on the type plate and the technical documentation of the ballast) is not exceeded, the defined service life can be expected to be achieved, assuming a switching cycle of 165 minutes on and 15 minutes off. See page 211 for service life details regarding the various electronic ballast families.

Emergency lighting

All Vossloh-Schwabe EBs that are suitable for DC voltage operation can be used in emergency lighting systems. Consideration must, however, be taken of system requirements.

VS Dimmable Electronic Ballasts

Vossloh-Schwabe's range of electronic ballasts is rounded off by dimmable ballasts for fluorescent lamps The standardised interfaces "1–10 V" and "DALI" are used for this purpose. Coupled with sensors, electronic ballasts fitted with a "1–10 V" interface make it easy to create intelligent luminaires and room lighting systems, whereby the luminaires are "programmed" via the wiring to the control units, i.e. via the hardware.

The digital interface "DALI" (Digital Addressable Lighting Interface) constitutes a further development of the "1–10 V" analogue interface. This digital interface was jointly developed by leading manufacturers of electronic ballasts in order to create a uniform standard for the lighting industry. The uniform interface and telegram definition dictates the function of a DALI operating device or DALI consumer and ensures exchangeability of operating devices made by various manufacturers.

Each VS DALI ballast is additionally fitted with the so-called PUSH function. The data input DA (DALI & PUSH) is used as a control input for both signal structures, with the exception of devices featuring separate inputs. When used as a DALI ballast, control is effected via the DALI protocol; when used as a PUSH ballast, control is effected via a push key and is achieved via current flow times of differing duration.

Due to the working principle involved, dimming compact fluorescent lamps causes a negligible drop in colour temperature. However, sudden larger changes in the dimmer setting can temporarily cause greater variation in colour temperature. The dimmer function is optimised to minimise this subjective visual change in colour temperature when the dimmer setting is suddenly subjected to larger change.

VS DALI electronic ballasts are characterised by the following performance feature

- Two-strand, potential-free, polarity-independent control input
- Dimmer curve analogue to the light sensitivity of the human eye
- Addressing options: total system, group-wise or individually
- Scene memory
- Feedback in the event of defective lamps

These features ensure a number of advantages for lighting systems

- No group wiring needed
- Each DALI ballast can be individually addressed
- No need for scene memory modules
- Synchronised scene transitions
- Operating devices provide reports on lamp status
- Simple integration into facility management systems

1–10V

DALI

PUSH

VS DALI electronic ballasts provide the convenience of a bus system that is both easy to install and operate.

DALI and PUSH must not be used at the same time!

Switching mains voltage to the DALI conductors within a DALI system will lead to the destruction of both the DALI power supply and the DALI master!

PUSH function characteristic

- Just one key for dimming and ON/OFF
- Polarity- and phase-independent control
- Control input with large working voltage range
- Suitable for multi-layer control
- Fully DC-compatible – no functional restrictions during DC operation
- After disconnection from the primary voltage the ballast will reproduce the last stored lighting level
- Soft start
- Automatic recognition of DALI and PUSH signals

PUSH operating voltage ranges during control signal input

EB type	ELXd 118.705, ELXd 218.707, ELXd 142.709, ELXd 242.711	All other DALI/PUSH ballasts
AC	220–240 V ±10%	10–230 V
DC	198–264 V	–
	Failing to observe these working voltage ranges can lead to non-recognition of the signals; exceeding the maximum voltages can lead to the destruction of the data inputs.	

PUSH control signals (key activation)

Short push	(80 ms < t < 460 ms)	(0 ms < t < 500 ms)
	Is used to switch between ON/OFF lighting states. After the device is switched on, the last selected lighting level is restored and the next dimming direction will be upwards.	
Long push	(460 ms < t < 10 s)	(500 ms < t < ∞)
	Is used to dim upwards or downwards; a long push will change the dimming direction. Thus, a long push will reverse the dimming direction until the upper or lower limit is reached. If the light was off, a long push will switch it on and the dimmer will start at the lowest light intensity.	
Push to synchronise	(t > 10 s)	long – short – long
	Light is dimmed to the preset factory level and the next dimming direction will be upwards.	Starting situation: luminaires are switched off. The "long – short – long" combination first switches the lamp on, then off and finally on again, after which it gets gradually brighter. The EBs will be synchronised again after this procedure.
Synchronisation	Any 1-key dimmer that does not feature a central control module (as each ballast will have its own controls) can develop asynchronous behaviour (e.g. children might play with the key). The system will then be out of sync, i.e. some lamps will be on, others off or the dimming direction will differ from lamp to lamp.	
	Two methods of synchronisation can be used: • Push the key for more than 10 seconds, after which the light will be dimmed to a preset level and the next dimming direction will be upwards. • Start with a long push of the key so that all lamps are switched on. Follow with a short push to turn the system off. The system will now be resynchronised.	

Wiring examples for PUSH function

Note **Not permissible**: N-type conductors must not be used as PUSH potentials for multi-phase systems. Example: if the PUSH key is not activated, the series connection of the internal resistors of the DA inputs will approach the delta voltage of 400 V (voltage between L2 and L3) (Fig. 1).

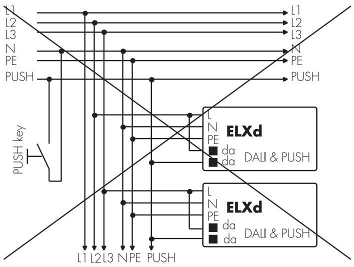


Fig. 1
N conductor must not be used as a PUSH potential

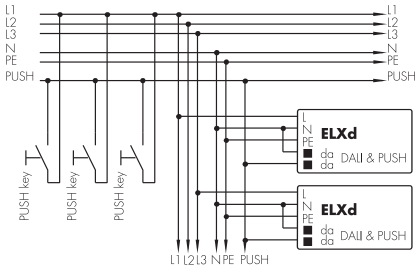


Fig. 2
Standard application for T5 and T8 lamps

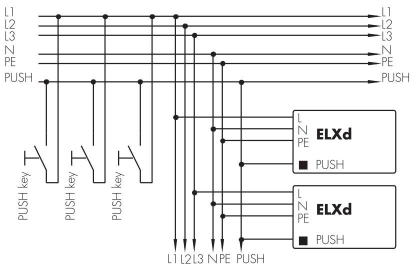


Fig. 3
Standard application for TC lamps

General information on PUSH and DALI

Mains voltage and interface conductors must not be wired in parallel to the lamp conductors so as to avoid capacitive bridging of the mains filter.

If more than one device is operated with a single key during PUSH operation, asynchronous behaviour can occur, which will require manual resynchronisation using the method described. Should this be unacceptable, a DALI control module will have to be used instead. It is recommended not to control more than four devices using a single key.

When using dimmable devices, new lamps should generally be burnt in for at least 100 hours at full brightness before they are dimmed. This process can become necessary again should the lamps be physically relocated (e.g. transport).

After initial operation of a DALI system (address assignment, luminaire allocation, group formation, scene settings) it is recommended to disconnect the primary voltage of the DALI control units at the circuit breaker for at least 3 seconds and then to reconnect it. The devices will detect this disconnection from the mains and store the settings.

DALI devices with a PUSH function must be operated with a control module (DALI control module or key pad with PUSH function). DALI devices with a PUSH function must not be operated with an open or bridged DALI/PUSH input.

To ensure the ballast does not distort and misinterpret signals when operated in PUSH mode, connected PUSH buttons must not feature a control lamp.

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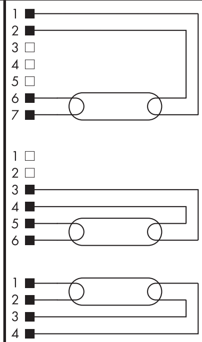
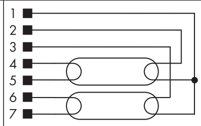
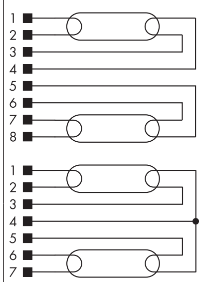
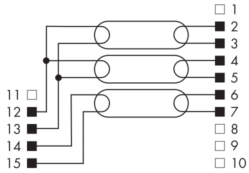
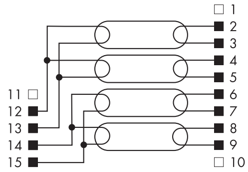
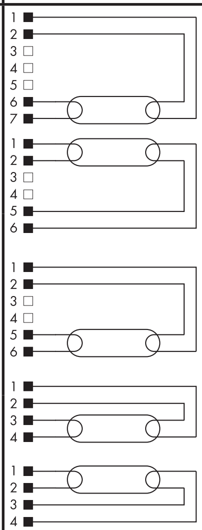
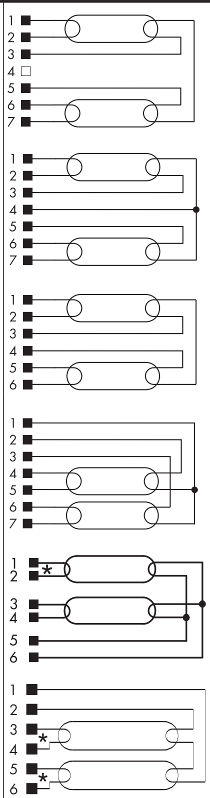
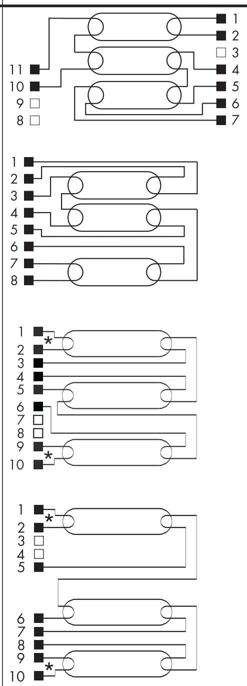
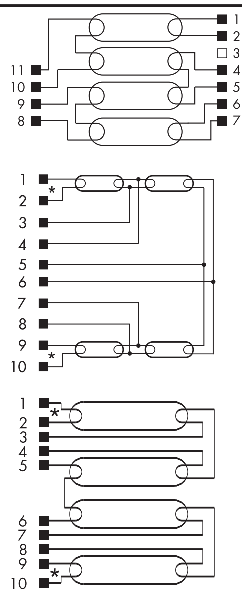
Circuit diagrams for Vossloh-Schwabe electronic ballasts

The circuit diagrams shown here are wiring examples for Vossloh-Schwabe electronic ballasts, whereby the number and configuration of the contacts differ. See the table on page 221–223 for details.

EB	1 lamp	2 lamps	3 lamps	4 lamps
ELXd		 Linear ballast shape*  Compact ballast shape		
ELXc				

* ELXc devices can also be wired under observation of the circuit diagram on the ballast.

Explanation of circuit diagrams for Vossloh-Schwabe electronic ballasts (see page 220)

Electronic ballasts		Lamp	Electronic ballasts															Max. lead length		Operation	Output	THD	Possible quantity of			
Ref. No.	Type	Quantity	Terminals															hot*	cold	frequency	voltage		EB/automatic cut-outs			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				UOUT		B	B	C	C
																		(m/pf)	(m/pf)	kHz	V	%	(10A)	(16A)	(10A)	(16A)
ELXc																										
183039	ELXc 424.223	3	x*	x*	–	x	x	x	x	–	–	x	x	–	–	–	–	1/100	2/200	44	400	< 10	9	14	14	22
		4	x*	x*	–	x	x	x	x	x	x	x	x	–	–	–	–	1/100	2/200	44	400	< 10	9	14	14	22
183040	ELXc 226.878	1	x	x	–	–	x*	x*	–	–	–	–	–	–	–	–	–	1/100	1.5/150	45	300	< 10	11	18	18	30
		2	x	x	x	x	x*	x*	–	–	–	–	–	–	–	–	–	1/100	1.5/150	45	300	< 10	11	18	18	30
183108	ELXc 226.878	1	x	x	–	–	x*	x*	–	–	–	–	–	–	–	–	–	1/100	1.5/150	45	300	< 10	11	18	18	30
		2	x	x	x	x	x*	x*	–	–	–	–	–	–	–	–	–	1/100	1.5/150	45	300	< 10	11	18	18	30
183109	ELXc 414.227	3	x*	x*	x	x	x	x	x	x	x*	x*	–	–	–	–	–	1/100	2/200	45	350	< 15	7	12	12	20
		4	x*	x*	x	x	x	x	x	x	x*	x*	–	–	–	–	–	1/100	2/200	45	350	< 15	7	12	12	20
183110	ELXc 424.228	3	x*	x*	x	x	x	x	x	x	x*	x*	–	–	–	–	–	1/100	2/200	47	350	< 15	7	12	12	20
		4	x*	x*	x	x	x	x	x	x	x*	x*	–	–	–	–	–	1/100	2/200	47	350	< 15	7	12	12	20
183111	ELXc 228.229	1	x*	x*	x	x	x	x	–	–	–	–	–	–	–	–	–	1/100	2/200	47	350	< 15	9	15	15	25
		2	x*	x*	x	x	x	x	–	–	–	–	–	–	–	–	–	1/100	2/200	47	350	< 20	9	15	15	25
183112	ELXc 328.230	2	x*	x*	x	x	x	x	x	x	x*	x*	–	–	–	–	–	1/100	2/200	45	350	< 15	7	12	12	20
		3	x*	x*	x	x	x	x	x	x	x*	x*	–	–	–	–	–	1/100	2/200	45	350	< 15	7	12	12	20
183113	ELXc 135.231	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	47	400	< 15	11	18	18	30
183114	ELXc 235.232	2	x	x	x*	x*	x*	x*	–	–	–	–	–	–	–	–	–	1/100	2/200	46	400	< 15	9	15	15	25
183115	ELXc 239.233	1	x*	x*	x	x	x	x	–	–	–	–	–	–	–	–	–	1/100	2/200	47	350	< 15	7	12	12	20
		2	x*	x*	x	x	x	x	–	–	–	–	–	–	–	–	–	1/100	2/200	47	350	< 15	7	12	12	20
183116	ELXc 149.234	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	47	250	< 15	9	15	15	25
183117	ELXc 249.235	2	x	x	x*	x*	x*	x*	–	–	–	–	–	–	–	–	–	1/100	2/200	47	350	< 15	7	12	12	20
183118	ELXc 254.236	1	x*	x*	x	x	x	x	–	–	–	–	–	–	–	–	–	1/100	2/200	48	350	< 15	7	12	12	20
		2	x*	x*	x	x	x	x	–	–	–	–	–	–	–	–	–	1/100	2/200	48	350	< 15	7	12	12	20
183119	ELXc 180.237	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	46	350	< 15	9	15	15	25
183122	ELXc 114.238	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	380	< 20	8	17	17	28
183123	ELXc 128.239	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	380	< 20	8	17	17	28
183124	ELXc 214.240	2	x	x	x	x	x*	x*	x*	–	–	–	–	–	–	–	–	1/100	2/200	45	380	< 20	8	17	17	28
183125	ELXc 228.241	2	x	x	x	x	x*	x*	x*	–	–	–	–	–	–	–	–	1/100	2/200	45	380	< 20	4	7	7	12
183126	ELXc 414.242	4	x*	x*	x	x	x	x	x	x	x*	x*	–	–	–	–	–	1/100	2/200	45	430	< 20	4	7	7	12
183127	ELXc 118.243	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	390	< 20	8	17	17	28
183128	ELXc 136.244	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	390	< 20	8	17	17	28
183129	ELXc 158.245	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	390	< 20	4	7	7	12
183130	ELXc 218.246	2	x*	x*	x	x	x	x	–	–	–	–	–	–	–	–	–	1/100	2/200	45	390	< 20	8	17	17	28
183131	ELXc 236.247	2	x*	x*	x	x	x	x	–	–	–	–	–	–	–	–	–	1/100	2/200	45	390	< 20	4	7	7	12
183132	ELXc 258.248	2	x*	x*	x	x	x*	x*	x	–	–	–	–	–	–	–	–	1/100	2/200	45	390	< 20	2	5	5	8
183133	ELXc 418.249	4	x*	x*	x	x	x	x	x	x	x*	x*	–	–	–	–	–	1/100	2/200	45	390	< 20	4	7	7	12
183134	ELXc 118.879	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	380	< 20	8	17	17	28
183135	ELXc 126.880	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	380	< 20	8	17	17	28
183136	ELXc 218.881	2	x*	x*	x	x	x*	x*	–	–	–	–	–	–	–	–	–	1/100	2/200	45	380	< 20	4	7	7	12
183137	ELXc 226.882	2	x*	x*	x	x	x*	x*	–	–	–	–	–	–	–	–	–	1/100	2/200	45	380	< 20	4	7	7	12
188093	ELXc 135.856	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	44	330	< 10	11	18	18	30
188094	ELXc 235.857	2	x*	x*	x	x	x	x*	x*	–	–	–	–	–	–	–	–	1/100	2/200	45	330	< 10	9	15	15	25
188095	ELXc 149.858	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	28	330	< 10	11	18	18	30
188140	ELXc 140.862	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	250	< 10	11	18	18	30
188142	ELXc 154.864	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	34	300	< 10	9	15	15	25
188144	ELXc 180.866	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	45	300	< 10	9	15	15	25
188438	ELXc 414.868	3	x*	x*	–	x	x	x	x	–	–	x	x	–	–	–	–	1/100	2/200	45	400	< 10	7	12	12	20
		4	x*	x*	–	x	x	x	x	x	x	x	x	–	–	–	–	1/100	2/200	45	400	< 10	7	12	12	20
188589	ELXc 128.869	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	1.5/150	54	450	< 10	11	18	18	30
188590	ELXc 128.869	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	1.5/150	54	450	< 10	11	18	18	30
188595	ELXc 336.214	3	x	x	x	x	x	x	x*	x*	–	–	–	–	–	–	–	1/100	2/200	70	370	< 10	6	11	11	18
188616	ELXc 240.863	2	x*	x*	x	–	x	x	x	–	–	–	–	–	–	–	–	1/100	2/200	46	360	< 15	7	12	12	20
188617	ELXc 249.859	2	x*	x*	x	x	x	x*	x*	–	–	–	–	–	–	–	–	1/100	2/200	43	480	< 10	7	12	12	20
188618	ELXc 254.865	2	x*	x*	x	–	x	x	x	–	–	–	–	–	–	–	–	1/100	2/200	43	390	< 10	7	12	12	20
188619	ELXc 280.538	2	x*	x*	x	x	x	x*	x*	–	–	–	–	–	–	–	–	1/100	2/200	50	420	< 10	–	10	–	10
188643	ELXc 242.837	2	x	x	x	x	x*	x*	–	–	–	–	–	–	–	–	–	1/100	1.5/150	43	440	< 15	7	12	12	20
188680	ELXc 155.378	1	x	x	x*	x*	–	–	–	–	–	–	–	–	–	–	–	1/100	1.5/150	47	250	< 15	7	12	12	20
188681	ELXc 155.378	1	x	x	x*	x*	–	–	–	–	–	–	–	–	–	–	–	1/100	1.5/150	47	250	< 15	7	12	12	20

1
2
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10

Electronic ballasts Ref. No.	Type	Lamp Quantity	Electronic ballasts Terminals 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Max. lead length hot* (m/pf)	cold (m/pf)	Operation frequency kHz	Output voltage U_{OUT} V	THD %	Possible quantity of EB/automatic cut-outs B (10A)	B (16A)	C (10A)	C (16A)
ELXc																										
188698	ELXc 213.870	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	42	250	< 20	11	18	18	30
		2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	42	250	< 20	11	18	18	30
188699	ELXc 218.871	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	35	350	< 12	11	18	18	30
		2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	35	350	< 12	11	18	18	30
188700	ELXc 142.872	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	44	480	< 15	11	18	18	30
		2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	44	480	< 15	11	18	18	30
188704	ELXc 136.207	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	—	—	48	350	< 20	11	18	18	30
188705	ELXc 236.208	2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	—	—	45	250	< 20	11	18	18	30
188706	ELXc 158.209	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	—	—	33	250	< 20	9	15	15	25
188707	ELXc 258.210	2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	—	—	48	350	< 20	7	12	12	19
188712	ELXc 213.870	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	42	250	< 20	11	18	18	30
		2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	42	250	< 20	11	18	18	30
188713	ELXc 218.871	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	35	350	< 12	11	18	18	30
		2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	35	350	< 12	11	18	18	30
188714	ELXc 142.872	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	44	480	< 15	11	18	18	30
		2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	1/100	1.5/150	44	480	< 15	11	18	18	30
188744	ELXc 418.204	3	x*	x*	—	x	x	x	x	—	—	x	x	—	—	—	—	1/100	2/200	44	480	< 10	7	12	12	20
		4	x*	x*	—	x	x	x	x	x	x	x	x	—	—	—	—	1/100	2/200	44	480	< 10	7	12	12	20
188912	ELXc 136.216	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	1/75	1.5/100	47,5	430	< 20	17	28	28	46
188913	ELXc 236.217	2	x*	x*	x	x	x*	x*	—	—	—	—	—	—	—	—	—	1/75	1.5/100	45	430	< 10	17	28	28	46
188914	ELXc 158.218	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	1/75	1.5/100	34	430	< 10	17	28	28	46
188915	ELXc 258.219	2	x*	x*	x	x	x*	x*	—	—	—	—	—	—	—	—	—	1/75	1.5/100	52	430	< 10	17	28	28	46
188921	ELXc 135.220	1	x*	x*	x	x	—	—	—	—	—	—	—	—	—	—	—	1/100	2/150	41	300	< 10	11	18	18	30
188922	ELXc 235.221	2	x	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	1/100	2/150	41	300	< 10	11	18	18	30
ELXd																										
183059	ELXd 235.735	2	x*	x+	x	x	x	x*	x*	—	—	—	—	—	—	—	—	1/100	2/200	42	300	< 5	10	17	18	28
188329	ELXd 124.600	1	x	x	—	—	—	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	76–120	430	< 10	17	28	28	46
188330	ELXd 224.601	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	53–120	430	< 10	17	28	28	46
188331	ELXd 139.602	1	x	x	—	—	—	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	85–120	430	< 10	17	28	28	46
188332	ELXd 154.603	1	x	x	—	—	—	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	83–120	430	< 10	17	28	28	46
188333	ELXd 254.604	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	44–120	430	< 10	8	13	13	21
188334	ELXd 180.605	1	x	x	—	—	—	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	91–120	430	< 10	12	19	19	31
188335	ELXd 249.606	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	44–120	430	< 10	8	13	13	21
188336	ELXd 124.607	1	x	x	—	—	—	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	76–120	430	< 10	17	28	28	46
188337	ELXd 224.608	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	53–120	430	< 10	17	28	28	46
188338	ELXd 139.609	1	x	x	—	—	—	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	85–120	430	< 10	17	28	28	46
188339	ELXd 239.610	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	53–120	430	< 10	17	28	28	46
188340	ELXd 154.611	1	x	x	—	—	—	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	83–120	430	< 10	17	28	28	46
188341	ELXd 254.612	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	44–120	430	< 10	8	13	13	21
188342	ELXd 180.613	1	x	x	—	—	—	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	91–120	430	< 10	12	19	19	31
188343	ELXd 249.614	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	44–120	430	< 10	8	13	13	21
188350	ELXd 239.621	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	53–120	430	< 10	17	28	28	46
188431	ELXd 226.801	2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	0.5/50	0.75/75	50–90	470	< 10	7	12	12	20
188490	ELXd 226.801	2	x	x	x	x	x*	x*	—	—	—	—	—	—	—	—	—	0.5/50	0.75/75	50–90	470	< 10	7	12	12	20
188549	ELXd 218.803	2	x*	x*	x	x	x	x*	x*	—	—	—	—	—	—	—	—	0.5/50	0.75/75	60–99	300	< 10	11	18	18	30
188550	ELXd 242.807	2	x*	x*	x	x	x	x*	x*	—	—	—	—	—	—	—	—	0.5/50	0.75/75	45–95	400	< 10	7	12	12	20
188564	ELXd 118.802	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	0.5/50	0.75/75	60–105	400	< 10	11	18	18	30
188565	ELXd 142.806	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	0.5/50	0.75/75	40–95	400	< 10	11	18	18	30
188597	ELXd 324.623	3	—	x*	x*	x*	x*	x*	x*	—	—	—	—	x*	x*	x*	x*	0.5/50	—	67–120	430	< 10	8	13	13	21
188598	ELXd 424.624	4	—	x*	x*	x*	x*	x*	x*	x*	x*	—	—	x*	x*	x*	x*	0.5/50	—	45–120	430	< 10	8	13	13	21
188600	ELXd 324.626	3	—	x*	x*	x*	x*	x*	x*	—	—	—	—	x*	x*	x*	x*	0.5/50	—	67–120	430	< 10	8	13	13	21
188602	ELXd 424.628	4	—	x*	x*	x*	x*	x*	x*	x*	x*	—	—	x*	x*	x*	x*	0.5/50	—	45–120	430	< 10	8	13	13	21
188604	ELXd 280.630	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	44–120	430	< 10	5	9	9	15
188605	ELXd 280.631	2	x	x	x	x*	x*	x*	x*	—	—	—	—	—	—	—	—	1/100	1.5/150	44–120	430	< 10	5	9	9	15
188694	ELXd 118.802	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	0.5/50	0.75/75	60–105	400	< 10	11	18	18	30
188695	ELXd 142.806	1	x	x	—	—	x*	x*	—	—	—	—	—	—	—	—	—	0.5/50	0.75/75	40–95	400	< 10	11	18	18	30
188696	ELXd 218.803	2	x*	x*	x	x	x	x*	x*	—	—	—	—	—	—	—	—	0.5/50	0.75/75	60–99	300	< 10	11	18	18	30
188697	ELXd 242.807	2	x*	x*	x	x	x	x*	x*	—	—	—	—	—	—	—	—	0.5/50	0.75/75	45–95	400	< 10	7	12	12	20
188717	ELXd 135.823	1	x*	x*	x	x	—	—	—	—	—	—	—	—	—	—	—	1/75	1.5/100	45	420	< 10	30	50	30	50

Electronic ballasts		Lamp	Electronic ballasts															Max. lead length		Operation	Output	THD	Possible quantity of			
Ref. No.	Type	Quantity	Terminals															hot*	cold	frequency	voltage		EB/automatic cut-outs			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				U_{OUT}		B	B	C	C
																		(m/pf)	(m/pf)	kHz	V	%	(10A)	(16A)	(10A)	(16A)
ELXd																										
188873	ELXd 118.718	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1.5/150	2,0/200	55–113	300	< 5	15	24	25	40
188874	ELXd 218.719	2	x*	x*	x	x	x	x*	x*	–	–	–	–	–	–	–	–	1.5/150	2,0/200	42–114	400	< 5	17	27	28	46
188875	ELXd 136.720	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1.5/100	2,0/200	47–105	300	< 5	15	24	25	40
188876	ELXd 236.721	2	x*	x*	x	x	x	x*	x*	–	–	–	–	–	–	–	–	1.5/100	2,0/200	42–107	400	< 5	17	27	27	44
188877	ELXd 158.722	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1.5/100	2,0/200	47–105	300	< 8	15	24	25	40
188878	ELXd 258.723	2	x*	x*	x	x	x	x*	x*	–	–	–	–	–	–	–	–	1.5/150	2,0/200	45–110	400	< 10	11	18	19	31
188923	ELXd 142.709	1	–	–	x*	x*	x*	x*	–	–	–	–	–	–	–	–	–	0.5/50	0.5/50	41–104	400	< 10	8	12	12	20
188924	ELXd 142.709	1	–	–	x*	x*	x*	x*	–	–	–	–	–	–	–	–	–	0.5/50	0.5/50	41–104	400	< 10	8	12	12	20
188932	ELXd 135.724	1	x*	x*	x	x	–	–	–	–	–	–	–	–	–	–	–	1/100	2/200	43	330	< 10	11	17	18	29
188933	ELXd 235.725	2	x*	x*	x	x	x	x*	x*	–	–	–	–	–	–	–	–	1/100	2/200	43	330	< 5	10	17	18	28
188953	ELXd 118.705	1	–	–	x*	x*	x*	x*	–	–	–	–	–	–	–	–	–	0.5/50	0.5/50	47	250	< 10	13	20	21	34
188954	ELXd 218.707	2	x*	x*	x*	x*	x*	x*	x*	–	–	–	–	–	–	–	–	0.5/50	0.5/50	41	250	< 10	12	20	21	33
188955	ELXd 218.707	2	x*	x*	x*	x*	x*	x*	x*	–	–	–	–	–	–	–	–	0.5/50	0.5/50	41	250	< 10	12	20	21	33
188974	ELXd 242.711	2	x*	x*	x*	x*	x*	x*	x*	–	–	–	–	–	–	–	–	0.5/50	0.5/50	40	250	< 10	12	20	21	33
188975	ELXd 242.711	2	x*	x*	x	x*	x*	x*	–	–	–	–	–	–	–	–	–	0.5/50	0.5/50	40	250	< 10	12	20	21	33

Electromagnetic ballasts

Electromagnetic (inductive) ballasts are active components that in conjunction with starters preheat the lamp electrodes, supply the ignition voltage and stabilise lamp currents during operation. Series or parallel capacitors are required to compensate blind current.

For installation in luminaires, consideration must be taken of the mains voltage and mains frequency, the dimensions and maximum thermal values as well as any potential noise generation. To fulfil these special requirements, Vossloh-Schwabe provides a large variety of different ballasts.

VS magnetic ballasts have been optimised with regard to their magnetic fields and loads so that usually so that noise cannot usually be perceived. However, the luminaire design can cause magnetic vibrations to affect large areas. When designing luminaires, it might therefore be necessary to fit a concertina section or grooves to prevent vibrations from spreading and thus from noise being generated.

The service life of an inductive ballast is mainly determined by the material chosen for the winding insulation. The maximum winding temperature denotes the temperature (tw) that the insulation will withstand for a period of 10 years given continuous operation under rated conditions. This maximum winding temperature must not be exceeded in real conditions to ensure the ballast can achieve its full service life. The winding temperature of the ballast that is measured in the luminaire is made up of the ambient temperature of the luminaire, the thermal conditions within the luminaire and the power loss of the ballast. The Δt marking on the ballast type plate provides a measure of the power loss of the ballast. In addition to this, the power loss of ballast-lamp circuits is measured in accordance with EN 50294. This test method forms the basis for the CELMA energy classification of ballasts and is also applied in European Regulation 245/2009/EG "Definition of eco-design requirements regarding fluorescent lamps without an integrated ballast, high-pressure discharge lamps as well as ballasts and luminaires in their operation and the invalidation of Directive 2000/55/EC" (see pages 233–235 for further details).

As a result of their design features, inductive ballasts cause leak current that is discharged via the earth conductor of the luminaire. The maximum permissible leak current for protection class I luminaires is 1 mA, a value of which all Vossloh-Schwabe electronic ballasts fall clearly short. Values of max. 0.1 mA are measured per electromagnetic ballast. However, as these values accumulate with the number of installed ballasts, this should be taken into account when dimensioning the F1 protective switch.

Starters for fluorescent lamps
As mentioned above, the operation of fluorescent lamps also requires starters in addition to ballasts. A distinction is made between glow starters, which are also available with automatic cut-outs, and electronic starters. The correct choice of voltage and power range is crucial. Starters are available for 220–240 V and for 110–127 V mains voltage. The latter are also required for twin-lamp operation (e.g. 2x18 W at 230 V).

Operating SL-series VS ballasts (100–127 V) depends on the use of a 220–240 V starter as these operating devices are high-reactance transformers that supply higher voltages to the lamp. Starters should only be used with starter contacts with a hardness value of at least HB 100.

Assembly Instructions for Electromagnetic Ballasts

For mounting and installing of electromagnetic ballasts for fluorescent lamps

Mandatory regulations

DIN VDE 0100	Erection of low voltage installations
EN 60598-1	Luminaires – part 1: general requirements and tests
EN 61347-1	Operating devices for lamps – part 1: general and safety requirements
EN 61347-2-8	Operating devices for lamps – part 2-8: special requirements for ballasts for fluorescent lamps
EN 60921	Ballasts for fluorescent tube lamps – performance requirements
EN 50294	Methods for measuring the total input power of ballast-lamp circuits
EN 55015	Maximum values and methods of measurement for RFI suppression in electrical lighting installations and similar electrical appliances
EN 61000-3-2	Electromagnetic Compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (device input current up to and including 16 A per conductor)
EN 61547	Installations for general lighting purposes – EMC immunity requirements

Technical specifications

Operating voltage range	VS ballasts can be operated at the specified mains voltage within a tolerance range of ±10%
Leak current	≤ 0.1 mA per ballast
Error current	Impulse-resistant leak-current protection must be installed. Distribute the luminaires to phases L1, L2 and L3; install tri-phase FI switches. If permissible, install FI switches with 30 mA leak current; connect no more than 15 luminaires as FI switches can be triggered at half the leak current value.
Power factor	Inductive ballasts: λ ≥ 0.5 Parallel-compensated ballasts: λ ≥ 0.85

Compensation VS recommends the use of parallel capacitors owing to their technical advantages and power balance.

Possible interference with IR systems
Are not known to occur

Mechanical mounting

Mounting position
Any

Mounting location
Ballasts are designed for installation in luminaires or comparable devices.
Independent ballasts do not need to be installed in a casing.

Fastening Preferably using screws ∅ 4 mm

Maximum temperatures
The stipulated winding temperature (tw 130, tw 140 and tw 150, respectively) must not be exceeded during normal operation. The corresponding maximum values (232 °C, 248 °C and 264 °C, respectively) must be observed during anomalous operation. These values must be checked by measuring resistance during operation.

Temperature increase
The lamp current flowing through the ballast generates a power loss that leads to an increase in winding temperature. The Δt values for normal and abnormal operation provide
a measure of this temperature increase. The Δt values are ascertained using standardised connections for measurement and are provided on the ballast type plate in Kelvin.

Example: Δt = 55 K/140 K:
The first Δt value indicates the temperature increase for normal operation at the lamp's operating current. The second value, 140 K in this case, denotes the temperature increase of the winding that results from the current that flows when the lamp's discharge path is short-circuited. The current that flows in this state is the preheat current through the lamp's electrodes.

Electromagnetic compatibility (EMC)

Interference Interference voltage measurements have to be taken at the connection terminals for luminaires with magnetic ballasts as these are systems that operate with lamp voltages of under 100 Hz. These low-frequency interference voltages are generally not critical with magnetic ballasts.

Interference immunity
Thanks to the robust design and choice of materials, magnetic ballasts provide a high degree of interference immunity and are not impaired by admissible mains power interference.

Mains Harmonics
After every zero crossing of the lamp current, fluorescent lamps experience a re-ignition peak as the lamps go out for a brief (imperceptible) moment. These re-ignition peaks generate mains harmonics that are smoothed by the ballast's impedance. The right design, i.e. determining the operating point of the magnetic ballast, ensures mains harmonics are limited to the maximum values permitted by EN 61000-3-2. VS electromagnetic ballasts all comply with the stipulated maximum values.

Selection of automatic cut-outs for VS electromagnetic ballasts

Dimensioning automatic cut-outs

When a ballast is switched on, high transient current peaks occur due to parasite capacitances that can accumulate with the number of luminaires. These high system switch-on currents put a strain on the automatic conductor cut-outs. For this reason, only surge-current-proof automatic cut-outs should be used for lighting systems.

Release reaction The release reaction of the automatic conductor cut-outs comply with VDE 0641, part 11, for B and C characteristics.

No. of ballasts The following values are meant as guidelines only and may vary depending on the respective lighting system. The maximum number of VS ballasts applies to cases where the devices are switched on simultaneously. Specifications apply to single-pole fuses. The number of permissible ballasts must be reduced by 20% for multi-pole fuses. The considered circuit impedance equals 400 mΩ (approx. 20 m of [2.5 m²] conductor from the power supply to the distributor and a further 15 m to the luminaire). Doubling circuit impedance to 800 mΩ increases the possible number of ballasts by 10%.
The values quoted in the following tables are guidelines and can be affected by systemspecific factors.

Possible number of ballasts connected to automatic cut-outs for compact fluorescent lamps (single lamp operation)

Lamp output	10 A (B)		16 A (B)	
W	Inductive	Parallel compensation	Inductive	Parallel compensation
5/7/8/9/10/11/13	50	90	80	130
18 (TC-L)	27	32	43	51
18 (TC-D)	40	65	65	110
24	25	32	40	51
26	27	32	43	51
36	23	32	37	51

Possible number of ballasts connected to automatic cut-outs for tubular and U-shaped fluorescent lamps (single lamp operation)

Lamp output	10 A (B)		16 A (B)	
W	Inductive	Parallel compensation	Inductive	Parallel compensation
4/6/8/10	50	90	80	130
13	45	80	70	115
15/18/20	27	32	43	51
30/36/38/40	23	32	37	51
58/65	15	20	22	32
70	13	18	20	30

Reliability and service life

Provided the specified maximum values for the winding temperature are complied with, a service life of 10 years can be expected. Failure rate: ≤ 0.025%/1,000 hours.

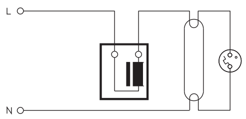
Electrical installation

Connection terminals (combination terminals)

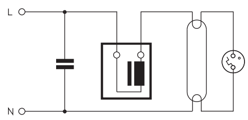
- Use copper (not stranded) wire
- Required diameter for push-in connection 0.5–1 mm²
- Stripped lead length 8 mm
- Required cross-section for IDC zone 0.5 mm²; max. Ø 2 mm including Insulation, no wire stripping required; mounting requires a special tool

Push-in terminals	The integrated terminals can only be used with rigid leads. Rigid leads: 0.5–1.5 mm². The stripped lead length totals 8 mm.
Wiring	The wiring between the mains, ballasts and lamps must comply with the respective circuit diagram.

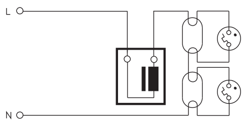
Circuit diagrams for the operation of fluorescent lamps with Vossloh-Schwabe electromagnetic ballasts



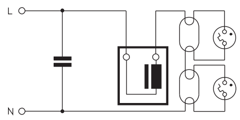
Inductive single circuit



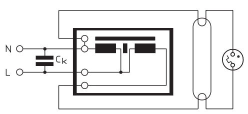
Parallel-compensated single circuit



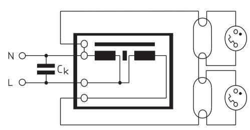
Inductive tandem circuit



Parallel-compensated tandem circuit



Parallel-compensated single circuit with high-reactance transformer



Parallel-compensated tandem circuit with high-reactance transformer

Connection terminals
In the interest of ensuring firm contacts and long component service life, Vossloh-Schwabe uses only top-quality materials for plastic or metal parts during the production of connection terminals. These quality features apply to both Vossloh-Schwabe's luminaire connection terminals as well as to the terminals fitted to ballasts and lampholders.

Notes on connection terminals on electronic ballasts
Vossloh-Schwabe electronic ballasts are fitted with installation-friendly push-in connectors. In addition, many models for linear fluorescent lamps are also available with IDC terminals (for solid conductors 0.5 mm^2) and supplementary push-in terminals (for solid conductors 0.5–1 mm^2), stripped length 8–9 mm. IDC terminals permit automated luminaire wiring and testing using the ALF system and are thus particularly efficient.

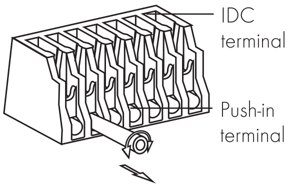
Notes on connection terminals on electromagnetic ballasts
Standard issue Vossloh-Schwabe electromagnetic ballasts are fitted with installation-friendly IDC/push-in terminals (combination terminals) or push-in terminals. The terminals are designed for use with solid conductors with cross-sections of 0.5–1 mm^2 (combination terminals) or up to 1.5 mm^2 (push-in terminals) and are approved for current loads of up to 6 A (combination terminal) and 16 A (push-in terminal). The lead stripping length totals 7–9 mm for push-in terminals; leads do not need to be stripped for IDC terminals. On request, many ballasts can also be provided with screw terminals (current load up to 16 A) for conductor cross-sections of 0.5 to 2.5 mm^2.

Notes on connection terminals on lampholders
Vossloh-Schwabe usually equips lampholders for T and TC lamps as well as starter lampholders with installation-friendly push-in terminals for solid conductors of 0.5–1 mm^2. Most lampholders are fitted with twin push-in terminals and thus permit through-wiring. The required lead stripping length amounts to 8–9 mm for all types.

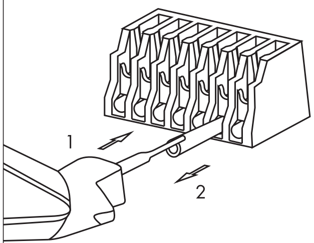
IDC terminals
In order to fully exploit the vast potential for rationalisation offered by automated wiring and testing with the ALF system, a totally new component family was developed that is equipped with the VDE-tested IDC terminal technology. This technology has already been used very successfully on a large scale in other branches of industry. This connection technology dispenses with the stripping of conductors that is required for the push-in, screw or crimping methods. The tried-and-tested IDC terminal technology has created the foundation for efficient automation as it ensures both high connection quality and rapid contacting. Components equipped in this fashion make it possible to through-wire several terminals with a single conductor. This constitutes a further economic advantage as it significantly reduces the required conductor lengths. Furthermore, this design principle makes it possible to use adapters to simply and reliably make electrical contact from above for a VDE-compatible final luminaire inspection.

ALF connection
Height: 12 mm

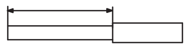
Release by twisitng and pulling the conductor at the same time



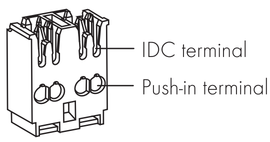
1. Insert release tool above the conductor
2. Pull out the conductor



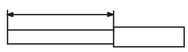
Stripping the conductor for push-in terminal 0.5 – 1 mm^2: 8 – 9 mm



IDC/Push-in terminal for electromagnetic ballasts



Stripping the conductor for push-in terminal 0.5 – 1 mm^2: 7 – 9 mm



Lampholders for Fluorescent Lamps

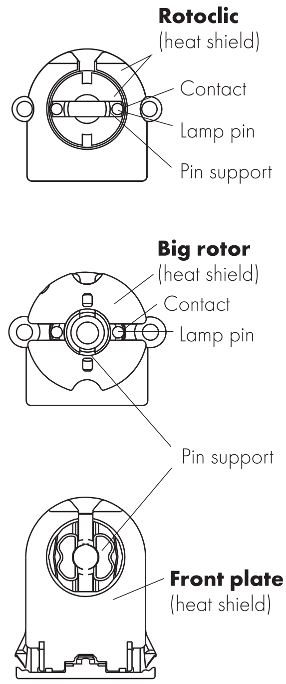
Lampholders for compact fluorescent lamps
Vossloh-Schwabe produces the majority of lampholders for TC lamps using PBT, a thermoplastic material. This highly heat-resistant material is responsible for the T140 temperature rating. Leading lamp manufacturers also use PBT for the lamp bases they produce. This material harmonisation in conjunction with fatigue-free, stainless steel lamp mounting springs ensures a permanently secure lamp fit.

Lampholders for double-ended fluorescent lamps
VS lampholders for T lamps are characterised by a number of technical features that guarantee a high degree of reliability and safety. The heat-resistant PBT rotor with which most VS lampholders are fitted is a recognised trademark. In addition to the lampholders with the field-tested large rotor, VS also provides a new generation of lampholders featuring innovative "Rotoclic" rotor technology. This new VS technology constitutes a further milestone in the development of highly heat-resistant rotor systems.

Among the special features of this new technology is a T140 temperature rating thanks to a front plate made entirely of PBT as well as a clearly audible click when the lamp is inserted or replaced. As a result, the motion of turning the lamp from "replacement" to "operating" position is aided acoustically.

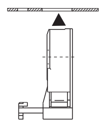
In addition to this, VS produces a further series of lampholders with a rotor-like function, whose front plates are also made of highly heat-resistant PBT and have similarly been given a T140 temperature rating.

The maximum permissible temperature at the back of all lampholders is T_m 110 °C. Another key feature common to all VS lampholders is a highly effective support for the lamp pin that reliably prevents any base pin deflection, even with older lamps, and guarantees a durable and firm contact.



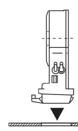
Push-through lampholders
Push-through lampholders are inserted from below through a cut-out in the luminaire casing and are secured by lateral catches. This type of lampholder is frequently used in luminaires on which the lampholder remains visible from the outside, e.g. in so-called strip lighting. The electrical leads are laid beneath the sheet metal level. Luminaire directive EN 60598-1 Para. 8.2 must be observed with regard to the luminaire.

Push-through lampholder



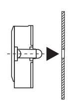
Push-fit lampholders
This lampholder type, which is frequently found in surface-mounted ceiling and built-in luminaires, is pushed into the luminaire casing from above. The lampholder foot should protrude by no more than 4 mm to match the usual height of the spacing cams in the luminaire casing. These lampholders are mostly wired above the luminaire casing to the side of the lampholder. However, there are also lampholders on which the wiring runs through the lampholder foot, with the leads laid beneath the luminaire casing.

Push-fit lampholder



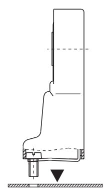
Built-in lampholders
This design is also predominantly used for recessed ceiling and surface-mounted luminaires. However, unlike push-fit lampholders, built-in lampholders are usually fitted at the ends of the luminaire boxes. In addition to the usual fixing with split pins attached to the rear, there are also countless versions with fixing clips, push-fit studs or screw-in holes, which are also available with spring-loaded length compensation. Built-in lampholders offer luminaire designers a wealth of scope regarding the choice of lamp position in relation to the reflector. This enables great variation in light distribution as the lampholder does not dictate the distance of the centre of the lamp from the metal casing.

Built-in lampholder



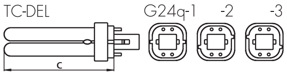
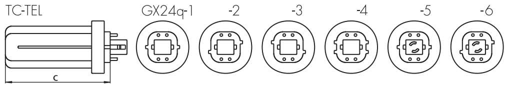
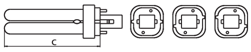
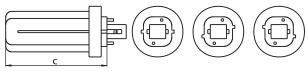
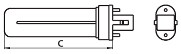
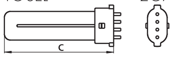
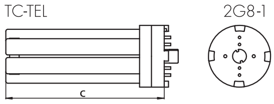
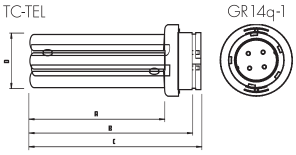
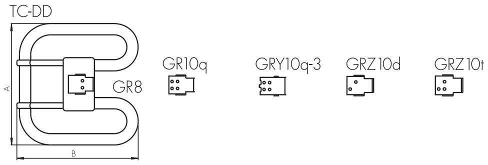
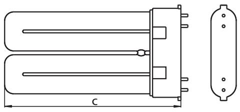
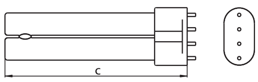
Surface-mounted lampholders
The fastening system of surface-mounted lampholders usually consists of screws or rivets above a fixing level, along which the wiring is also laid. As this type of installation is usually too costly nowadays for large unit numbers, these lampholders are used almost exclusively for special applications, e.g. displays or illuminated advertisements.

Surface-mounted lampholder



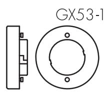
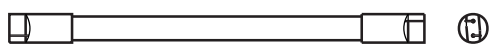
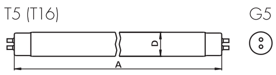
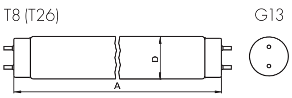
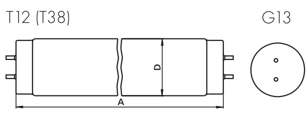
VS lampholders for the UL market and UL approved leads are available for all common lamp types. Further information can be found at www.unvlt.com.

Lamp Table – Fluorescent Lamps

Lamp type/lamp base	Base	Output (W)	Max. length (C) acc. to IEC			
TC-DEL G24q-1 -2 -3 	G24q-1	10 13	95 130			
	G24q-2	18	140			
	G24q-3	26	160			
TC-TEL GX24q-1 -2 -3 -4 -5 -6 	GX24q-1	13	90			
	GX24q-2	18	110			
	GX24q-3	26 32	130 145			
	GX24q-4	42	155			
	GX24q-5	57	191			
	GX24q-6	70	219			
TC-D G24d-1 -2 -3 	G24d-1	8 10 13	73* 95 130			
	G24d-2	18	140			
	G24d-3	26	160			
TC-T GX24d-1 -2 -3 	GX24d-1	13	90			
	GX24d-2	18	110			
	GX24d-3	26	130			
TC-S G23 	G23	5 7 9 11	85 115 145 215			
TC-SEL 2G7 	2G7	5 7 9 11	85 115 145 215			
TC-TEL 2G8-1 	2G8-1	60 85 120	167 208 285			
TC-TEL GR14q-1 			A	B	C	D
	GR14q-1	14 17	99.7 121.7	120 142	126.6 148.6	41* 41*
TC-DD GR8 GR10q GRY10q-3 GRZ10d GRZ10t 			A	B		
	GR8	16 28	138 205	141 207		
	GR10q	10 16 21 28 38	92 138 138 205 205	95 141 141 207 207		
	GRY10q-3	55	205	205*		
	GRZ10d	18	137	141*		
	GRZ10t	30	202	206*		
TC-F 2G10 	2G10	18 24 36	122 165 217			
TC-L 2G11 	2G11	18 24 34 36 40 55 80	225 320 533* 415 535 535 565			

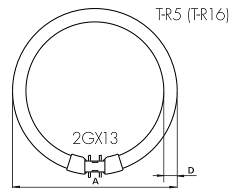
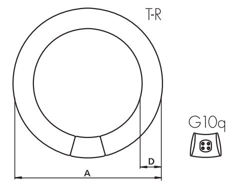
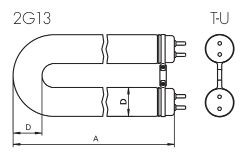
*not included in IEC standard (non-committal specifications)

Lamp Table – Fluorescent Lamps

Lamp type/lamp base	Base	Output (W)	Ø D (mm)	Length A/C (mm) acc. to IEC 60081/ 60901 (for circular lamps B)
	GX53-1	7		
		9		
	W4.3x8.5d	6	7	219.3
		8	7	320.9
		11	7	422.5
		13	7	524.1
	G5	4	16	135.9
		6	16	212.1
		8	16	288.3
		13	16	516.9
		14	16	549.0
		20	16	549.0
		21	16	849.0
		24	16	549.0
		25	16	1149.0
		28	16	1149.0
		32	16	1449.0
		34	16	849.0
		35	16	1449.0
		39	16	849.0
		45	16	1449.0
		49	16	1449.0
		50	16	1449.0
		54	16	1149.0
		73	16	1449.0
		80	16	1449.0
	G13	10	26	470.0*2
		14	26	360.0*2
		15	26	437.4
		16	26	589.8
		16	26	720.0*2
		18	26	589.8
		20*1	26	438.0*2
		23	26	970.0*2
		30	26	894.6
		32	26	1199.4
		33	26	1149.0
		34	26	1047.0*2
		36	26	1199.4
		36	26	970.0*2
		38	26	1047.0
		50	26	1500.0
		51	26	1500.0
		58	26	1500.0
		70	26	1763.8
	G13	20	38	589.8
		25	38	970.0
		30	38	894.6
		40	38	1199.4
		65	38	1500.0
		75	38	1763.8
		80*1	38	1500.0
		85	38	2374.3
		85*1	38	1763.8
		100	38	2374.3
		100*1	38	1800.0*2
		115	38	1200.0*2
		125	38	2374.3
		140	38	1500.0*2
		140*1	38	1800.0*2
		160*1	38	1800.0*2

*1 UV solarium lamps
*2 Not included in IEC standard (non-committal specifications)

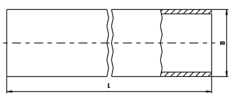
Lamp Table – Fluorescent Lamps

Lamp type/lamp base	Base	Output (W)	Ø D (mm)	A (mm)
	2GX13	22 40 55 60	16 16 16 16	230.0 305.0 305.0 379.0
	G10q	22 32 40 60	29 29 29 30	215.9 304.8 406.4 408.8*
	2G13-92	18 36 58	26 26 26	304* 566, 601* 566, 759*

* Not yet included in IEC standard (non-committal specifications)

Tube lengths of plastic and glass protective tube

Ø D (mm)	Length L (mm)
$38^{\pm 0.5}$	L = A–$20^{\pm 1}$
$50^{\pm 0.8}$	L = A–$30^{\pm 1}$



Key to lamp designations

TC-S	Tube Compact-Single
TC-SEL	Tube Compact-Single Electronic
TC-D	Tube Compact-Double
TC-DEL	Tube Compact-Double Electronic
TC-T	Tube Compact-Triple
TC-TEL	Tube Compact-Triple Electronic
TC-Q	Tube Compact-Quad
TC-QEL	Tube Compact-Quad Electronic
TC-DD	Tube Compact-Double D-Shape
TC-L	Tube Compact-Long
TC-F	Tube Compact-Flat
T2 (T7)	Tube Ø 2/8" (7 mm)
T5 (T16)	Tube Ø 5/8" (16 mm)
T8 (T26)	Tube Ø 8/8" (26 mm)
T12 (T38)	Tube Ø 12/8" (38 mm)
T-U	Tube, U-Shape
T-R	Tube, Ring-Shape
T-R5 (T-R16)	Tube, Ring-Shape Ø 5/8" (16 mm)

Energy efficiency classification

Together with the amendments in Commission Regulation (EU) 2015/1428 dated 25. August 2015, Commission Regulation (EU) 245/2009 dated 18. March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to defining ecodesign requirements for fluorescent lamps without integrated ballast, high-pressure discharge lamps and for ballasts and luminaires needed for their operation, and repealing Directive 2000/55/EC of the European Parliament and of the Council (official title), has created a legal framework in the EU that defines fundamental requirements for operating efficient lighting technology products.

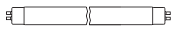
Although the Regulation predominantly applies to general lighting, it is also product-orientated and thus independent of any specific application. The efficiency and performance requirements (specifications governing performance features) apply to fluorescent lamps without integrated ballast, high-pressure discharge lamps as well as ballasts and luminaires needed to operate these lamps.

Energy efficiency classification

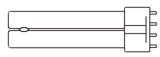
The following table taken from Regulation 245/2009/EC provides an overview of (1st- and 2nd-stage) ballast requirements, ordered according to efficiency values:

Lamp data					Ballast efficiency (P_{Lamp}/P_{Input}) (non-dimmable ballasts)				
Type	Nominal output W	ILCOS-Code	Typical rating 50 Hz W	Typical rating HF W	A2 BAT %	A2 %	A3 %	B1 %	B2 %
T8	15	FD-15-E-G13-26/450	15	13.5	87.8	84.4	75.0	67.9	62.0
	18	FD-18-E-G13-26/600	18	16	87.7	84.2	76.2	71.3	65.8
	30	FD-30-E-G13-26/900	30	24	82.1	77.4	72.7	79.2	75.0
	36	FD-36-E-G13-26/1200	36	32	91.4	88.9	84.2	83.4	79.5
	38	FD-38-E-G13-26/1050	38.5	32	87.7	84.2	80.0	84.1	80.4
	58	FD-58-E-G13-26/1500	58	50	93.0	90.9	84.7	86.1	82.2
	70	FD-70-E-G13-26/1800	69.5	60	90.9	88.2	83.3	86.3	83.1
TC-L	18	FSD-18-E-2G11	18	16	87.7	84.2	76.2	71.3	65.8
	24	FSD-24-E-2G11	24	22	90.7	88.0	81.5	76.0	71.3
	36	FSD-36-E-2G11	36	32	91.4	88.9	84.2	83.4	79.5
TC-F	18	FSS-18-E-2G10	18	16	87.7	84.2	76.2	71.3	65.8
	24	FSS-24-E-2G10	24	22	90.7	88.0	81.5	76.0	71.3
	36	FSS-36-E-2G10	36	32	91.4	88.9	84.2	83.4	79.5
TC-D/	10	FSQ-10-E-G24q=1 FSQ-10-I-G24d=1	10	9.5	89.4	86.4	73.1	67.9	59.4
TC-DE	13	FSQ-13-E-G24q=1 FSQ-13-I-G24d=1	13	12.5	91.7	89.3	78.1	72.6	65.0
	18	FSQ-18-E-G24q=2 FSQ-18-I-G24d=2	18	16.5	89.8	86.8	78.6	71.3	65.8
	26	FSQ-26-E-G24q=3 FSQ-26-I-G24d=3	26	24	91.4	88.9	82.8	77.2	72.6
TC-T/	13	FSM-13-E-GX24q=1 FSM-13-I-GX24d=1	13	12.5	91.7	89.3	78.1	72.6	65.0
TC-TE	18	FSM-18-E-GX24q=2 FSM-18-I-GX24d=2	18	16.5	89.8	86.8	78.6	71.3	65.8
	26	FSM-26-E-GX24q=3 FSM-26-I-GX24d=3	26.5	24	91.4	88.9	82.8	77.5	73.0
TC-DD/	10	FSS-10-E-GR10q FSS-10-L/P/H-GR10q	10.5	9.5	86.4	82.6	70.4	68.8	60.5
TC-DDE	16	FSS-16-E-GR10q FSS-16-I-GR10q FSS-10-L/P/H-GR10q	16	15	87.0	83.3	75.0	72.4	66.1
	21	FSS-21-E-GR10q FSS-21-I-GR10q FSS-21-L/P/H-GR10q	21	19	89.4	86.4	79.2	73.9	68.8
	28	FSS-28-E-GR10q FSS-28-I-GR10q FSS-28-L/P/L-GR10q	28	26	89.7	86.7	81.3	78.2	73.9
	38	FSS-38-E-GR10q FSS-38-L/P/L-GR10q	38.5	36	92.3	90.0	85.7	84.1	80.4
TC	5	FSD-5-I-G23 FSD-5-E-2G7	5.4	5	72.7	66.7	58.8	49.3	41.4
	7	FSD-7-I-G23 FSD-7-E-2G7	7.1	6.5	77.6	72.2	65.0	55.7	47.8
	9	FSD-9-I-G23 FSD-9-E-2G7	8.7	8	78.0	72.7	66.7	60.3	52.6
	11	FSD-11-I-G23 FSD-11-E-2G7	11.8	11	83.0	78.6	73.3	66.7	59.6
T5	4	FD-4-E-G5-16/150	4.5	3.6	64.9	58.1	50.0	45.0	37.2
	6	FD-6-E-G5-16/225	6	5.4	71.3	65.1	58.1	51.8	43.8
	8	FD-8-E-G5-16/300	7.1	7.5	69.9	63.6	58.6	48.9	42.7
	13	FD-13-E-G5-16/525	13	12.8	84.2	80.0	75.3	72.6	65.0
T9-C	22	FSC-22-E-G10q-29/200	22	19	89.4	86.4	79.2	74.6	69.7
	32	FSC-32-E-G10q-29/300	32	30	88.9	85.7	81.1	80.0	76.0
	40	FSC-40-E-G10q-29/400	40	32	89.5	86.5	82.1	82.6	79.2

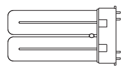
Lamp types



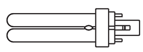
T8



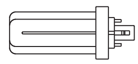
TC-L



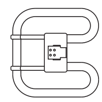
TC-F



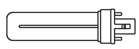
TC-D/TC-DE



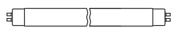
TC-T/TC-TE



TC-DD/TC-DDE



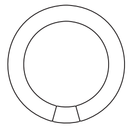
TC



T5

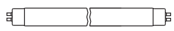
Lamp data					Ballast efficiency (P_{Lamp}/P_{Input})				
Type	Nominal output W	ILCOS-Code	Typical rating 50 Hz W	HF W	(non-dimmable ballasts) A2 BAT %	A2 %	A3 %	B1 %	B2 %
T2	6	FDH-6-L/P-W4.3x8.5d-7/220		5	72.7	66.7	58.8	–	–
	8	FDH-8-L/P-W4.3x8.5d-7/320		7.8	76.5	70.9	65.0	–	–
	11	FDH-11-L/P-W4.3x8.5d-7/420		10.8	81.8	77.1	72.0	–	–
	13	FDH-13-L/P-W4.3x8.5d-7/520		13.3	84.7	80.6	76.0	–	–
	21	FDH-21-L/P-W4.3x8.5d-7		21	88.9	85.7	79.2	–	–
	23	FDH-23-L/P-W4.3x8.5d-7		23	89.8	86.8	80.7	–	–
T5-E	14	FDH-14-L/P-G5-16/550		13.7	84.7	80.6	72.1	–	–
	21	FDH-21-L/P-G5-16/850		20.7	89.3	86.3	79.6	–	–
	24	FDH-24-L/P-G5-16/550		22.5	89.6	86.5	80.4	–	–
	28	FDH-28-L/P-G5-16/1150		27.8	89.8	86.9	81.8	–	–
	35	FDH-35-L/P-G5-16/1450		34.7	91.5	89.0	82.6	–	–
	39	FDH-39-L/P-G5-16/850		38	91.0	88.4	82.6	–	–
	49	FDH-49-L/P-G5-16/1450		49.3	91.6	89.2	84.6	–	–
	54	FDH-54-L/P-G5-16/1150		53.8	92.0	89.7	85.4	–	–
	80	FDH-80-L/P-G5-16/1150		80	93.0	90.9	87.0	–	–
	95	FDH-95-L/P-G5-16/1150		95	92.7	90.5	84.1	–	–
	120	FDH-120-L/P-G5-16/1450		120	92.5	90.2	84.5	–	–
T5-C	22	FSCH-22-L/P-2GX13-16/225		22.3	88.1	84.8	78.8	–	–
	40	FSCH-40-L/P-2GX13-16/300		39.9	91.4	88.9	83.3	–	–
	55	FSCH-55-L/P-2GX13-16/300		55	92.4	90.2	84.6	–	–
	60	FSCH-60-L/P-2GX13-16/375		60	93.0	90.9	85.7	–	–
TC-LE	40	FSDH-40-L/P-2G11		40	91.4	88.9	83.3	–	–
	55	FSDH-55-L/P-2G11		55	92.4	90.2	84.6	–	–
	80	FSDH-80-L/P-2G11		80	93.0	90.9	87.0	–	–
TC-TE	32	FSMH-32-L/P-GX24q=3		32	91.4	88.9	82.1	–	–
	42	FSMH-42-L/P-GX24q=4		43	93.5	91.5	86.0	–	–
	57	FSM6H-57-L/P-GX24q=5 FSM8H-57-L/P-GX24q=5		56	91.4	88.9	83.6	–	–
	70	FSM6H-70-L/P-GX24q=6 FSM8H-70-L/P-GX24q=6		70	93.0	90.9	85.4	–	–
	60	FSM6H-60-L/P-2G8=1		63	92.3	90.0	84.0	–	–
	62	FSM8H-62-L/P-2G8=2		62	92.2	89.9	83.8	–	–
	82	FSM8H-82-L/P-2G8=2		82	92.4	90.1	83.7	–	–
	85	FSM6H-85-L/P-2G8=1		87	92.8	90.6	84.5	–	–
	120	FSM6H-120-L/P-2G8=1 FSM8H-120-L/P-2G8=1		122	92.6	90.4	84.7	–	–
TC-DD	55	FSSH-55-L/P-GR10q		55	92.4	90.2	84.6	–	–

Lamp types

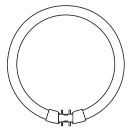


T9-C

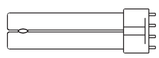
T2



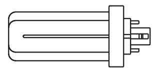
T5-E



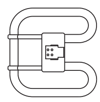
T5-C



TC-LE



TC-TE



TC-DD

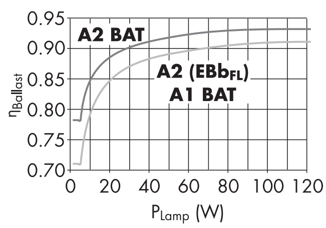
At the very latest, the following energy efficiency formula for ballasts will be introduced to coincide with the 3rd stage:

If $P_{Lamp} \leq 5$ W　　$EBb_{FL} = 0.71$
If $5 \text{ W} < P_{Lamp} < 100$ W　　$Bb_{FL} = P_{Lamp}/(2 * \text{sqrt}(P_{Lamp}/36) + 38/36 * P_{Lamp} + 1)$
If $P_{Lamp} \geq 100$ W　　$EBb_{FL} = 0.91$

The following limiting values must be observed:

η Ballast	Energy efficiency classes
$\geq EBb_{FL}$	A2 and A1BAT
$\geq 1 - 0.75 * (1 - EBb_{FL})$	A2 BAT

The graph illustrates the difference between Classes A2, A1 BAT and A2 BAT (BAT = best available technology).



1 2 3 4 5 6 7 8 9 10

SYSTEM-OPTIMISING COMPENSATION

PARALLEL CAPACITORS

Capacitors are designed to compensate inductive reactive current of discharge lamps in 50/60 Hz networks when operated with electro-magnetic ballasts. As required by utility companies, capacitors serve to compensate the reactive current generated by the respective ballast. A power factor of $\lambda \geq 0.9$ is achieved.

In addition, capacitors can also be used to compensate or generate phase displacements. Careful selection of the raw materials as well as special thermal treatment of the capacitor coil guarantee a long servicelife and stable capacitance.

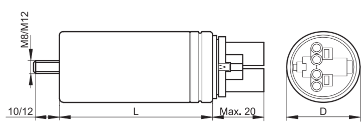
4 Parallel Capacitors

Parallel Connected Capacitors with Break-action Mechanism

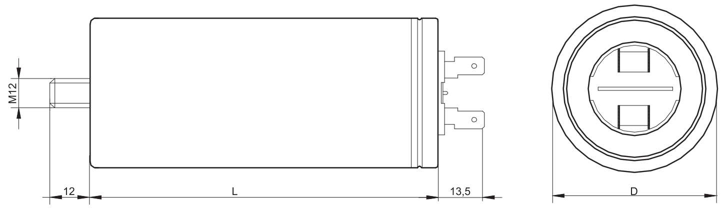
Capacitors type B

Casing: aluminium
Filling material: based on vegetable oil
Fastening: male nipple
with nut and washer included
Discharge resistance
Overpressure protection
On request further capacities or connectors

A Push-in twin terminals 0.5–1 mm²



B Double spade connector 6.3x0.8 acc. to IEC 61210



Parallel Connected Capacitors with Break-action Mechanism

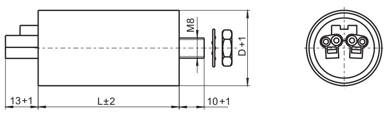
Capacitors type B

Ref. No.	Capacity µF	Temperature range °C	Drawing	Ø (D) mm	Length (L) mm	Male nipple/ length (mm)	Weight g	Unit pcs.
250 V, 50/60 Hz								
536378	2.0	–40 to 100	A	25	63	M8x10	85	100
536379	4.0	–40 to 100	A	25	63	M8x10	80	100
536380	6.0	–40 to 100	A	25	63	M8x10	80	100
536381	8.0	–40 to 100	A	25	63	M8x10	85	100
551645	9.0	–40 to 100	A	30	78	M8x10	95	100
536382	10.0	–40 to 100	A	30	78	M8x10	90	100
536383	12.0	–40 to 100	A	30	78	M8x10	90	100
536384	13.0	–40 to 100	A	30	78	M8x10	90	100
536385	16.0	–40 to 100	A	35	78	M8x10	90	81
536386	18.0	–40 to 100	A	35	78	M8x10	90	81
536387	20.0	–40 to 100	A	35	78	M8x10	90	81
536388	25.0	–40 to 100	A	40	78	M8x10	100	64
536389	30.0	–40 to 100	A	35	103	M8x10	100	81
536390	32.0	–40 to 100	A	35	103	M8x10	120	81
536391	35.0	–40 to 100	A	40	103	M8x10	120	64
536392	40.0	–40 to 100	A	40	103	M8x10	120	64
536393	45.0	–40 to 100	A	40	103	M8x10	150	64
536394	50.0	–40 to 100	A	45	103	M8x10	150	49
536395	55.0	–40 to 100	A	45	103	M8x10	150	49
536396	60.0	–40 to 100	A	45	103	M8x10	200	49
380–450 V, 50/60 Hz								
536397	13.0	–40 to 85	A	35	103	M8x10	100	81
536398	18.0	–40 to 85	A	40	103	M8x10	120	64
536399	28.0	–40 to 85	A	45	103	M8x10	150	49
536400	32.0	–40 to 85	A	45	103	M8x10	200	49
536401	37.0	–40 to 85	A	50	103	M12x12	200	36
536402	50.0	–40 to 85	A	55	103	M12x12	250	36
536403	55.0	–40 to 85	B	50	128	M12x12	250	36
536404	60.0	–40 to 85	B	55	128	M12x12	250	36
536405	85.0	–40 to 85	B	60	138	M12x12	300	36

Parallel Connected Capacitors 250 V, 50/60 Hz

Capacitors type A

Casing: plastics, white or aluminium
Fastening: male nipple
with nut and washer included
Discharge resistance
Optional: thermal cut-out,
European wide patent
On request with alternative capacities,
connection terminals, mounting options,
casing materials or with a thermal fuse
as well as versions with IDC terminal for
the automatic luminaire wiring

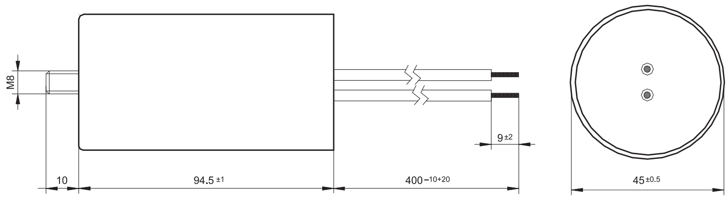


Ref. No.	Capacity µF	Temperature range °C	Ø (D) mm	Length (L) mm	Male nipple/ length (mm)	Push-in twin terminals	Weight g	Unit pcs.
Plastic casing								
500296	2.0	–40 to 85	30	53	M8x10	0.5–1 mm²	22	530
500299	2.5	–40 to 85	30	53	M8x10	0.5–1 mm²	22	530
500300	3.0	–40 to 85	25	57	M8x10	0.5–1 mm²	22	530
500301	3.5	–40 to 85	30	53	M8x10	0.5–1 mm²	22	530
500302	4.0	–40 to 85	30	53	M8x10	0.5–1 mm²	22	450
500303	4.5	–40 to 85	30	53	M8x10	0.5–1 mm²	22	450
500304	5.0	–40 to 85	30	53	M8x10	0.5–1 mm²	22	450
500305	6.0	–40 to 85	30	53	M8x10	0.5–1 mm²	22	450
506495	7.0	–40 to 85	30	53	M8x10	0.5–1 mm²	22	320
502783	8.0	–40 to 85	30	69	M8x10	0.5–1 mm²	24	320
504351	9.0	–40 to 85	30	69	M8x10	0.5–1 mm²	32	320
508667	10.0	–40 to 85	30	69	M8x10	0.5–1 mm²	32	320
506366	12.0	–40 to 85	30	78	M8x10	0.5–1 mm²	32	260
508468	15.0	–40 to 85	30	93	M8x10	0.5–1 mm²	36	260
508668	16.0	–40 to 85	30	93	M8x10	0.5–1 mm²	32	260
500315	18.0	–40 to 85	35	93	M8x10	0.5–1.5 mm²	36	190
500316	20.0	–40 to 85	35	93	M8x10	0.5–1.5 mm²	55	190
500317	25.0	–40 to 85	35	93	M8x10	0.5–1.5 mm²	66	80
500318	30.0	–40 to 85	40	93	M8x10	0.5–1.5 mm²	72	100
Aluminium casing								
500319	32.0	–40 to 85	35	135	M8x10	0.5–1.5 mm²	110	50
500320	35.0	–40 to 85	40	139	M8x10	0.5–1.5 mm²	127	36
500321	40.0	–40 to 85	40	139	M8x10	0.5–1.5 mm²	127	36
536406	45.0	–40 to 85	40	103	M8x10	0.5–1.5 mm²	120	36
500322	50.0	–40 to 85	45	103	M8x10	0.5–1.5 mm²	150	32
500323	55.0	–40 to 85	45	135	M8x10	0.5–1.5 mm²	159	32

Parallel Connected Capacitors with Leads 250 V, 50/60 Hz

Capacitors type A

Casing: plastics, white
Fastening: male nipple
with nut and washer included
Discharge resistance
Fixing centres: 20 mm
Optional: thermal cut-out,
European wide patent
On request with alternative capacities,
connection terminals, mounting options,
casing materials or with a thermal fuse
as well as versions with IDC terminal
for the automatic luminaire wiring



Ref. No.	Capacity µF	Temperature range °C	Ø (D) mm	Length (L) mm	Male nipple/ length (mm)	Lead length mm	Weight g	Unit pcs.
Plastic casing								
552774	2.0	–25 to 85	25	57	M8x10	150	22	400
526169	4.0	–25 to 85	25	63	M8x10	250	31	350
526170	6.0	–40 to 85	28	54	M8x10	250	22	320
526171	8.0	–40 to 85	32	67	M8x10	250	24	220
529665	10.0	–40 to 85	32	67	M8x10	200	32	280
536742	12.0	–25 to 85	30	78	M8x10	150	42	120
529666	16.0	–25 to 85	35	73	M8x10	200	52	120
536741	20.0	–40 to 85	36	92	M8x10	150	85	160
508484	25.0	–25 to 85	40	93	M8x10	250	89	80
536743	30.0	–25 to 85	40	93	M8x10	150	108	80
528554	35.0	–25 to 85	45	94	M8x10	250	173	60
536813	40.0	–25 to 85	45	94	M8x10	400	166	60
528555	45.0	–25 to 85	50	94	M8x10	250	167	50

4 Capacitors for Fluorescent and Discharge Lamps

Compensation of idle current

When using magnetic ballasts a phase shift occurs between the mains voltage and the current drawn. This phase shift is expressed by the power factor λ, which generally ranges between a value of 0.3 and 0.7 with inductive circuits.

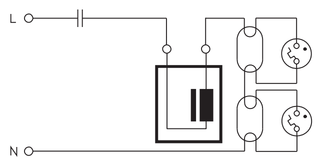
As a result of this phase shift, idle current, which does not boost the efficiency of the lighting unit, is also taken up from the power supply network in addition to real power. Power utility companies therefore require an increase of the power factor to values of over 0.85 for systems exceeding a certain rating (usually upwards of 250 W per external conductor).

Compensation capacitors are used to counteract idle current (by increasing the power factor) and can be connected either in parallel or in series.

Thanks to a power factor of approx. 0.95, electronic ballasts do not need to be operated with compensation capacitors.

Compensation using series capacitors

Series compensation employs a so-called dual circuit (two fluorescent lamp circuits connected in parallel), whereby the capacitor, which is connected in a branch of the circuit, over compensates the inductive idle current to such an extent that it covers the idle current of both ballasts. This type of circuit is only used with fluorescent lamps. As series capacitors are dimensioned for nominal-voltage and ballast tolerances, the lamp in the capacitor branch of the dual circuit operates with a higher current and thus also with a higher rating. Apart from differences in lamp brightness, the power loss in the circuit branch with the capacitor will also be greater.



Series compensation in a branch of the dual circuit with a series capacitor, magnetic ballasts and starters

An advantage of the dual circuit is that it prevents the radiated light from flickering.

The higher current in the so-called capacitive lamp circuit causes an up to 14% increase in lamp rating and a reduction of the lamp service life by as much as 20%. This goes hand in hand with substantial technical, ecological and economic disadvantages.

Series capacitors have to meet very high technical requirements to suit various aspects like temperature, nominal voltage, tolerances of the capacitance values, etc.

As defined by EC directive 2000/55/EC (European Standard EN 50294 governing the measurement of total power consumption), a series capacitor is considered to be a part of the ballast. If the system rating of the capacitive circuit containing the lamps and ballasts is then determined in line with the above definition, rating increases of up to 14% will become apparent in comparison to operation without a series capacitor. Experience has shown that this increased power consumption often means devices fall in the directive's "banned" category. It is therefore strongly advised that due consideration be given to the elevated power consumption values common to using series capacitors for compensation purposes.

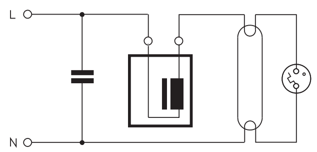
Parallel compensation

During parallel compensation, each lamp circuit is assigned to a capacitor connected in parallel to the mains. Only one capacitor providing sufficient capacitance is needed for luminaires with several lamps. Parallel compensation does not affect current flow through a discharge lamp. The requirements placed on parallel capacitors are clearly lower than those for series capacitors.

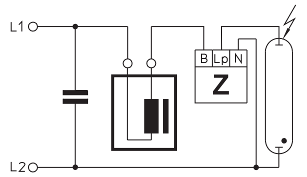
However, parallel compensation can be subject to limitations when using audio-frequency ripple control pulses if the system operates with a connected rating of over 5 kVA and ripple control frequencies of over 300 Hz are used. The respective power utility company should be consulted for advice in such cases.

Parallel compensation is used in fluorescent lamp and high-pressure discharge lamp circuits.

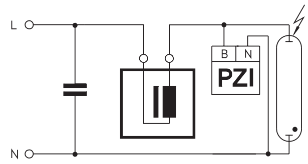
As parallel compensation offers substantial advantages, this has become the accepted method in the last few years.



Parallel compensation of a fluorescent lamp circuit



Parallel compensation of a high-pressure discharge lamp circuit with a superimposed ignitor



Parallel compensation of a high-pressure discharge lamp circuit with a pulse ignitor

Metallised polypropylene film capacitors

Metallised polypropylene film capacitors are designed to compensate the inductive idle current drawn by discharge lamps (fluorescent lamps, high-pressure mercury vapour lamps, high-pressure sodium vapour lamps and metal halide lamps with a ceramic discharge tube) in 50 Hz/60 Hz grids. All Vossloh-Schwabe compensation capacitors for luminaires feature a metallised polypropylene film dielectric. Compensation capacitors help to increase the power factor to values of over λ 0.85 as required by power utility companies.

Construction of metallised polypropylene film capacitors

VS MPP capacitors contain a low-loss metallised polypropylene film dielectric, which is produced by depositing a thin layer of zinc and aluminium or pure aluminium vapour onto one side of the polypropylene film. The contacts at either end of the capacitor coil are created by spraying on a layer of metal and thus guarantee a high current-carrying capacity as well as a low-inductive connection between the terminals and the coils.

All capacitors with a nominal voltage upwards of 280 V are filled with oil or resin after the coils have been inserted and then hermetically sealed. This protects the coils from environmental influences and reduces partial discharge, which contributes to a long service life and stable capacitance. The effects of partial discharge only play a minor role for capacitors with a nominal voltage of under 280 V so that these devices do not need to be filled.

Hermetically sealed, filled capacitors with an overpressure contact breaker should always be used in critical ambient conditions (high humidity, aggressive atmospheres, high temperatures), if the workload and power supply conditions are unknown as well as in situations that demand increased attention to safety.

VS MPP capacitors feature a self-healing dielectric. In the event of a dielectric breakdown in the coil (short circuit), the metal coating vaporises around the breakdown site owing to the high temperature of the transient arc that is produced. Owing to the excess pressure generated during such a breakdown, the metal vapour is pushed outwards away from the centre of the site within the space of just a few microseconds. This creates a coating-free corona around the breakdown site that completely isolates it and means the capacitor remains fully functional during a dielectric breakdown.

The self-healing properties of a capacitor can decrease with time and with constant overloading. This bears the risk of a non-healing breakdown with a permanent short circuit. Therefore self-healing must not be confused with failsafe.

Compensation capacitors are divided into two type families (A and B) in accordance with IEC 61048 A2.

- Type A capacitors defined:
  "Self-healing parallel capacitors; without an (overpressure) contact breaker in the event of failure".
  They are referred to as unsecured capacitors.

- Type B capacitors defined:
  "Self-healing capacitors for series connection in lighting circuits or self-healing parallel capacitors; with an (overpressure) contact breaker in the event of failure".
  These are referred to as hermetically sealed, secured capacitors.

In accordance with the standard, the discharge resistor of both capacitor families must be capable of reducing capacitor voltage to a value of under 50 V in the space of 60 seconds after disconnection from the mains.

**Capacitors without a contact breaker, unsecured,
Type A capacitors in accordance with IEC 61048 A2**

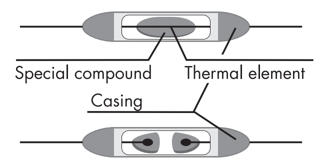
IEC 61048 A2-compliant Type A capacitors are self-healing and require no short-circuit protection for normal operation.

Type A capacitors are not fitted with a specific failsafe mechanism as prescribed by the standards for Type B capacitors. Nevertheless, the requirements laid down in the standard for Type A capacitors, especially with regard to temperature and service life tests, are designed to ensure a sufficient degree of device safety and availability **provided the device was correctly installed and operated under calculable and known ambient operating conditions**.

Even so, in very rare cases these capacitors can still develop erratic behaviour due to overloading or at the end of the device's service life.

For that reason, Type A capacitors should only be integrated into luminaires for operation in ambient conditions that are uncritical with regard to flammable materials. Luminaires should feature protection against secondary damage inside and outside the luminaire in the event of a defect.

Temperature-protected capacitors are a further development of Type A capacitors and are fitted with a thermal fuse that is triggered by overheating as a result of electrical or thermal overloading. They are tested in accordance with IEC 61048 A2 and comply with Type A requirements. Excess temperatures cause the two wire ends of the element inside the fuse to melt into bead shapes that are fully isolated from each other by special insulation.



In 99% of all the rare cases of critical capacitor failure, this failure is preceded by a gradual increase in the loss factor, which leads to an increase in the winding temperature and thus triggers the thermal fuse.

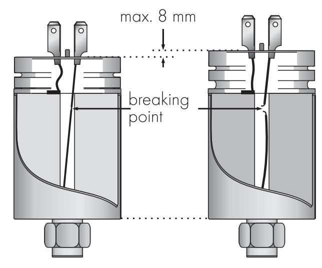
Vossloh-Schwabe recommends that preference be given to Type A capacitors with a thermal fuse as a matter of course for reasons of safety.

Type A capacitors predominantly feature a plastic casing.

Capacitors with a contact breaker,
secured Type B capacitors in accordance with IEC 61048 A2

Self-healing capacitors do not require short-circuit protection for normal operation as they automatically regenerate after a dielectric breakdown. However, as a result of frequent self-healing caused by overloading (voltage, current, temperature) or towards the end of the capacitor's service life, overpressure can build up inside the capacitor (due to the decomposition products of the vaporised polypropylene).

Contact breaker



In order to prevent the capacitor casing from exploding in such cases, hermetically sealed capacitors in accordance with IEC 61048 A2 (Type B capacitors) are fitted with an overpressure contact breaker. If excess pressure builds up within these capacitors, e.g. due to undue thermal loading or excessive voltages or at the end of the capacitor's service life, a concertina section opens out that causes the casing to expand lengthways. As a result, the wire contacts rupture at a predetermined breaking point, which irreversibly interrupts the current (contact breaker).

This type of overpressure-protected capacitor with a contact breaker is also referred to as a flame- and explosion-proof capacitor with a break-action mechanism.

Type B capacitors with a contact breaker are available in an aluminium casing.

Assembly Instructions for Capacitors

For mounting and installing compensation capacitors

Mandatory regulations

DIN VDE 0100	Erection of low voltage installations
EN 60598	Luminaires – part 1: General requirements and tests
EN 55015	Maximum values and testing methods for radio disturbance of electrical lighting facilities and similar electrical equipment
EN 61000-3-2	Electromagnetic Compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (ballast input current up to and including 16 A per conductor)
EN 61048	Operating devices for lamps – capacitors for fluorescent lamp circuits and other discharge lamp circuits; general and safety requirements
EN 61049	Operating devices for lamps – capacitors for fluorescent lamp circuits and other discharge lamp circuits; performance requirements

Mechanical mounting

Fastening	Base screw (permissible torque): • M8x10 – 5 Nm (aluminium casing) • M8x10 – 2.2 Nm (plastic casing)
Mounting location	Any Capacitors fitted with overpressure protection require clearance of at least 10 mm above the contacts so ensure the casing can expand unhindered if the contact breaker is triggered.
Heat transfer	Capacitors should be mounted with the greatest possible clearance to heat sources or lamps. During operation, the temperature measured at the t_c point must not exceed the specified maximum value.
t_c point	The t_c point is defined as an arbitrary point on the surface of the capacitor, which is not specifically marked.
UV Radiation	Capacitors should not be installed in an unprotected manner directly next to any sources of light, heat radiation or convection (ballasts, lamps, heating elements, etc.) as both high temperatures and constant exposure to UV radiation can lead to premature ageing. In combination with high temperatures, UV radiation or other substances and influencing factors, chemicals such as ozone and chlorine can lead to accelerated ageing and material embrittlement.
Thermal load	All capacitor casings are made of flame-retardant materials. However, the potting material, oils and the winding material are flammable and consideration must be taken of this fact during installation. The thermal load of an MKP capacitor is approx. 40 MJ/kg.

Safety functions

Type A capacitors
are not fitted with any special protective functions in case of defect.
Temperature-protected capacitors are a further development of Type A capacitors and feature a thermal fuse that is triggered by excess temperatures and disconnects the capacitor from the mains.

Type B capacitors
are fitted with an overpressure contact breaker in case of defects at the end of the capacitor's service life.

Connection
Parallel capacitors for fluorescent lamps:
- Casing diameter 25–30 mm: push-in terminals for 0.5–1 mm² conductors and IDC terminals for H05V-U 0.5 conductors
- Casing diameter > 30 mm: push-in terminals for 0.5–1 mm² conductors

Parallel capacitors for high-pressure lamps:
- Casing diameter 25–30 mm: push-in terminals for 0.5–1 mm² conductors and IDC terminals for H05V-U 0.5 conductors
- Casing diameter > 30 mm: push-in terminals for 0.5–1.5 mm² conductors

Reliability and service life

Provided the max. specified voltage and current loads, temperature, humidity and mains harmonics values are observed,
- approx. 50,000 hours for overpressure-protected parallel capacitors
- approx. 30,000 hours for parallel capacitors without overpressure protection in a plastic or aluminium casing

A 3–10% decrease in capacitance must be expected in the course of the capacitor's service life.
Failure rate: 1‰ per 1,000 operating hours when maximum voltage, current and temperature values are not exceeded.

Electrical installation

Nominal voltage
250 V, 50/60 Hz; 280 V, 50/60 Hz; 450 V, 50/60 Hz (dependent on type)

Capacitance tolerance
±10% (±5% dependent on type)

Temperature range
–25/–40 °C to +85/+100 °C (dependent on type, details see product page)

Optional thermal fuse

Relative humidity
Class F for Type B capacitors: 75% annual mean, 95% peak value on 30 days
Class G for Type A capacitors: 65% annual mean, 85% peak value on 30 days

Condensation
Impermissible

Capacitors for fluorescent lamp circuits

Lamp		Parallel compensation capacitor (µF ±10% at 250 V)		Series compensation capacitor (µF ±4%)		
Output W	Type	220–240 V/50 Hz µF	220–230 V/60 Hz µF	220 V/50 Hz µF	230 V/50 Hz µF	220 V/60 Hz µF
4	T	2**	2**	–	–	–
6	T	2**	2**	–	–	–
8	T	2**	2**	–	–	–
10	T	2	2	–	–	–
13	T	2	2	–	–	–
14	T	4.5	4.5	–	–	–
15	T	3.5 or 4*	3 or 4*	–	–	–
16	T	2	2	–	–	–
18	T	4.5 or 4*	4**	2.9/440 V	2.8/480 V	2.4/440 V
20	T	4.5 or 4*	4**	2.9/440 V	2.8/480 V	2.4/440 V
23	T	3.5	3	–	–	–
25	T	3.5	3	–	2.3/450 V	–
30	T	4.5	4	3/420 V	2.9/450 V	–
36	T	4.5	4	3.6/420 V	3.4/450 V	3/420 V
36-1m	T	6.5	–	–	–	–
38	T	4.5	4	–	–	–
40	T	4.5	4	3.6/420 V	3.4/450 V	3/420 V
42	T	6.5	–	–	–	–
58	T	7	6	5.7/450 V	5.3/450 V	4.8/420 V
65	T	7	6	5.7/450 V	5.3/450 V	4.8/420 V
70	T	6	–	–	–	–
75	T	6	–	–	–	–
80	T	9	8	–	7.2/420 V	–
85	T	8	6.5	–	8.4/420 V	–
100	T	10	9	–	–	–
115	T	18	16	–	–	–
140	T	14	14	–	–	–
160	T	14	14	–	–	–
16	T-U	2	2	–	–	–
18/20	T-U	4.5 or 4*	4**	2.9/440 V	2.8/480 V	2.4/440 V
36/40	T-U	4.5	4	3.6/420 V	3.4/450 V	3/420 V
58/65	T-U	7	6	–	–	–
22	T-R	5	4.5	–	3.2/440 V	–
32	T-R	5	4.5	–	3.4/450 V	–
40	T-R	4.5	4	3.6/420 V	3.4/450 V	3/420 V
5/7/9/11	TC-S	2**	2**	–	–	–
10	TC-D/TC-T	2	2	–	–	–
13	TC-D/TC-T	2	2	–	–	–
18	TC-D/TC-T	2	2	–	–	–
26	TC-D/TC-T	3.5	3	–	–	–
10	TC-DD	2	2	–	–	–
16	TC-DD	2	2	–	–	–
21	TC-DD	3	3	–	–	–
28	TC-DD	3.5	3	–	–	–
38	TC-DD	4.5	4	–	–	–
18	TC-L/TC-F	4.5 or 4*	4**	–	–	–
24	TC-L/TC-F	4.5	4	–	–	–
34	TC-L/TC-F	4.5	4	–	–	–
36	TC-L/TC-F	4.5	4	–	–	–

*) Two lamps connected to a ballast in series **) Applies to one lamp connected to a ballast or two lamps connected in series

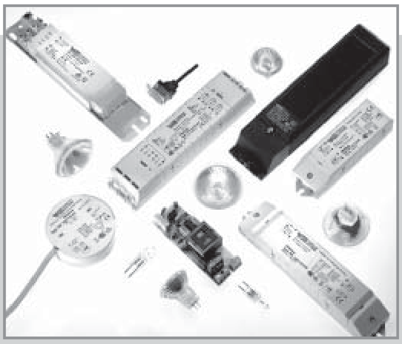
Capacitors for

Lamp		Compensation capacitor (µF ±10%)			
Output W	Type	220/230/240/252 V 50 Hz (µF)	220 V 60 Hz (µF)	380/400/420 V, 50 Hz (µF)	380 V/60 Hz 60 Hz (µF)
high-pressure mercury vapour lamp circuits					
50	HM	7	6		
80	HM	8	7		
125	HM	10	10		
250	HM	18	15		
400	HM	25	25		
700	HM	40	35		
1000	HM	60	50		
high-pressure sodium vapour lamp circuits					
35	HS	6	5		
50	HS	8	8		
70	HS	12	10		
100	HS	12	10		
150	HS	20	16		
250	HS	32	25		
400	HS	45	40		
600	HS	65	55	25	20
750	HS	70	60	25	25
1000	HS	100	85		
metal halide lamp circuits					
35	HI	6	5		
70	HI	12	10		
100	HI	12	10		
150	HI	20	16		
250	HI	32	25		
400	HI	35/45	35/45		
1000	HI	85	75		
2000	HI	125	125		
2000	HI			37	37
2000	HI			60	60
2000	HI			60	60
2000	HI			100	100

Capacitors for low-pressure discharge lamp circuits

Lamp		Compensation capacitor (µF ±10%)
Output W	Type	230 V/50 Hz µF
35	LS	20
55	LS	20
90	LS	26
135	LS	40
180	LS	40

ELECTRONIC AND ELECTRO-MAGNETIC TRANSFORMERS



FOR LOW-VOLTAGE HALOGEN INCANDESCENT LAMPS

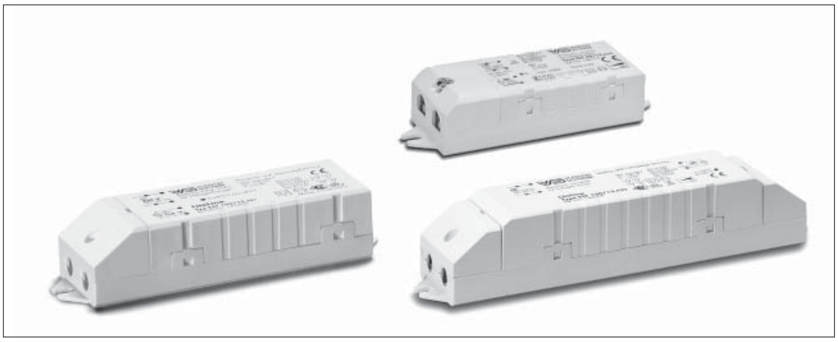
The operating voltage of low-voltage halogen lamps is normally 12 V (6 and 24 V are also used for special applications). As a result, transformers are required in order to connect such lamps to the normal mains supply within buildings, whereby international requirements governing building installations specify that safety transformers or converters (electronic transformers) be exclusively used for such purposes nowadays. These devices are designed in such a way as to prevent both personal injury and the outbreak of fire should the lighting system malfunction.

Electronic converters
The following chapter provides an overview of the VS range of electronic converters that feature a whole range of advantages: light and compact, superior efficiency (approx. 95%), short-circuit protection, integrated overheating and overload protection, soft start for longer lamp life, broad part-load range and dimmability.

Electromagnetic safety transformers
The following chapter also provides an overview of Vossloh-Schwabe's range of electromagnetic transformers. The range is split into protection class II transformers and protection class I built-in transformers whose ultra-flat design make them particularly user-friendly. Lamp brightness can be regulated using conventional phase dimmers for low-voltage halogen lamps.

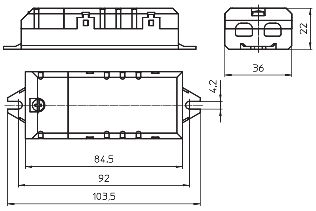
5 Transformers for Low-voltage Halogen Incandescent Lamps

Independent Electronic Converters – LiteLine



Electronic safety converters
for low-voltage halogen incandescent lamps 12 V
Casing: heat-resistant polyamide
Mains frequency: 50–60 Hz
Protection against "no load" operation
Protection against short-circuit:
electronic switch-off with automatic restart
Electronically controlled overload
and temperature protection
Suitable for installation in furniture
and on combustible surfaces
Power factor: > 0.95
Efficiency: ≥ 94%
Dimming: optional with phase-cutting leading-
edge or phase-cutting trailing-edge dimmer
Screw terminals: 2.5 mm²
(EST 60/12.635 primary: 4 mm²)
Quantity of screw terminals:
1x2-poles primary
1x2-poles secondary
With integrated cord grip
Protection class II
SELV
Degree of protection: IP20
RFI-suppressed

A



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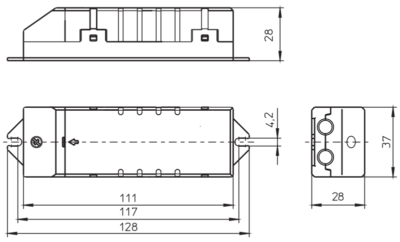
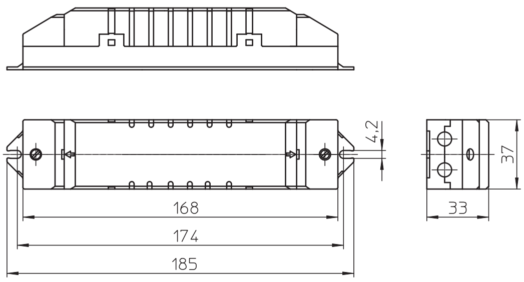


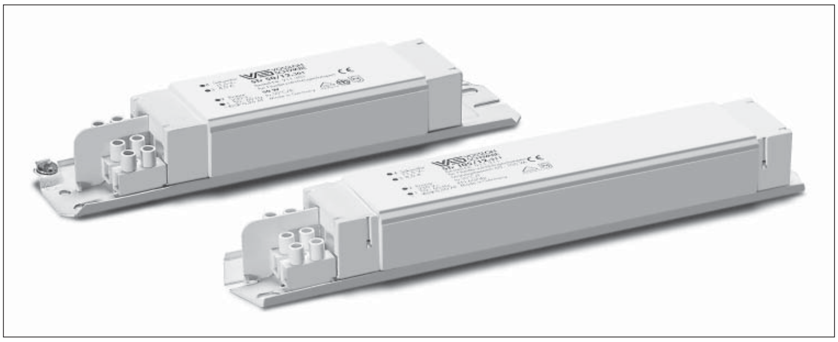
C



Type	**Ref. No.**	Capacity range (W)	Voltage (V) prim. (±10%)	sec.	Nominal current A	Ambient temperature t_a (°C)	Casing temperature t_c (°C)	Drawing	Weight g
Dimensions: 22x36x103.5 mm									
EST 60/12.635	**186173**	10–60	220–240	10.2–12	0.258–0.260	–20 to 45	max. 85	A	70
Dimensions: 28x37x128 mm									
EST 70/12.380	**186072**	20–70	230–240	11.3–11.7	0.30–0.31	–20 to 45	max. 70	B	85
EST 105/12.381	**186077**	20–105	230–240	11.2–11.7	0.435–0.445	–20 to 40	max. 85	B	95
Dimensions: 33x37x185 mm									
EST 150/12.622	**186098**	50–150	230–240	11.2–11.6	0.595–0.605	–20 to 45	max. 85	C	175

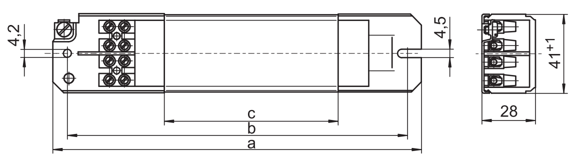
Super-thin Electromagnetic Built-in Transformers 20–105 VA

Shape: 28x41 mm



Electromagnetic safety transformers
for low-voltage halogen incandescent lamps 12 V
Vacuum-impregnated with polyester resin
Screw terminals: 0.5–2.5 mm²
Protection class I
For these transformers without thermal cut-out, a slow-acting fuse should be installed in the wiring on site

A



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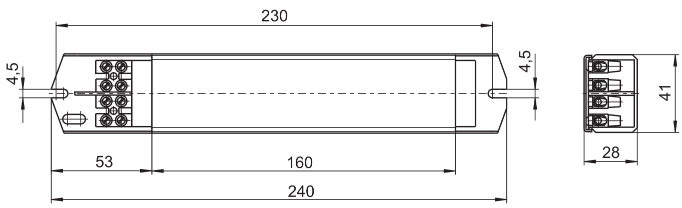
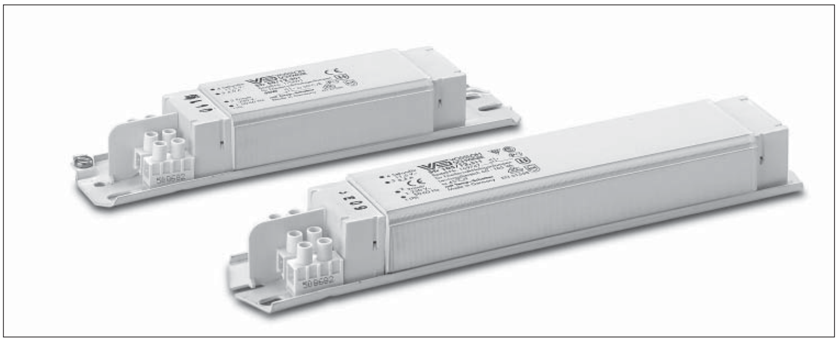


Safety transformers											Primary fuse
Type	**Ref. No.**	Capacity range W	50, 60 Hz V prim.	V sec.	Ambient temperature t_a (°C)	Drawing	a mm	b mm	c mm	Weight kg	AT
220 V/50, 60 Hz											
STr 50/12.207	**500843**	35–50	220	11.5	40/B	A	175	165	83	0.73	0.250
230 V/50, 60 Hz											
STr 20/12.306	**161781**	15–20	230	11.5	60/B	A	155	140	63	0.55	0.125
STr 50/12.301	**161757**	35–50	230	11.5	50/B	A	195	180	92	0.80	0.250
STr 50/12.342	**507181**	35–50	230	11.5	40/B	A	175	165	83	0.73	0.250
STr 60/12.338	**179604**	40–60	230	11.5	50/F	A	195	180	92	0.80	0.315
STr 105/12.311	**170002**	60–105	230	11.5	30/F	B	240	230	160	1.33	0.500
240 V/50, 60 Hz											
STr 50/12.401	**169830**	35–50	240	11.5	45/B	A	195	180	92	0.80	0.250
STr 50/12.422	**502592**	35–50	240	11.5	40/B	A	175	165	83	0.73	0.250
STr 105/12.406	**169125**	60–105	240	11.5	50/H	B	240	230	160	1.33	0.500
127 V/60 Hz											
STr 50/12.109	**525791**	35–50	127	11.5	40/F	A	155	140	63	0.55	0.500

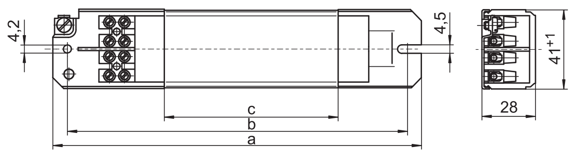
Super-thin Electromagnetic Built-in Transformers with Thermal Cut-out 20–105 VA



Shape: 28x41 mm

Electromagnetic safety transformers
for low-voltage halogen incandescent lamps 12 V
Vacuum-impregnated with polyester resin
Screw terminals: 0.5–2.5 mm²
Protection class I
Temperature switch with self-holding protection against overheating,
no primary fuse necessary

A



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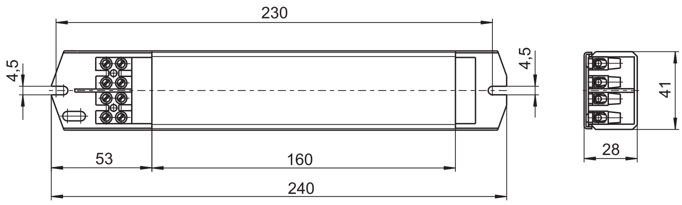
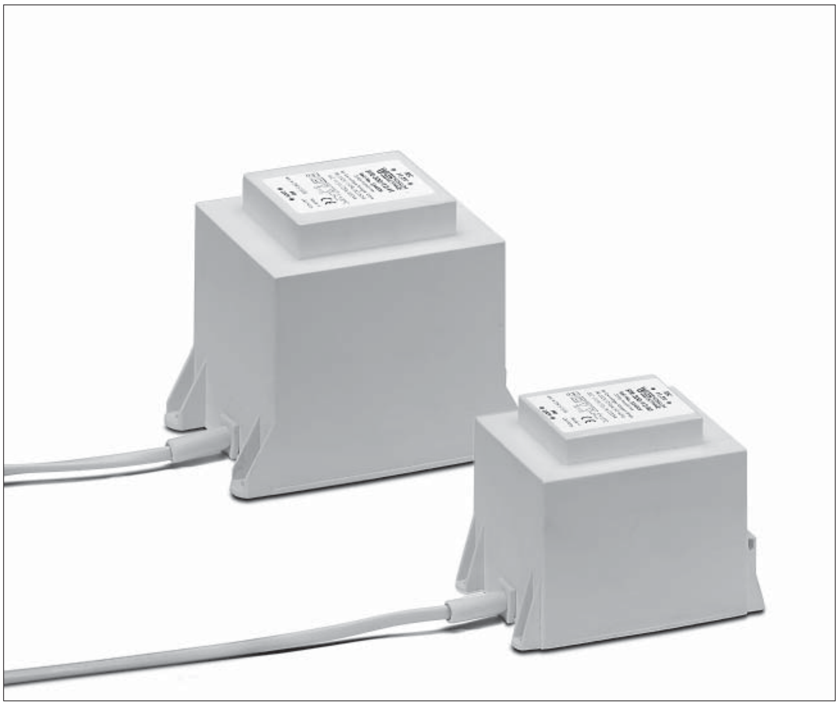


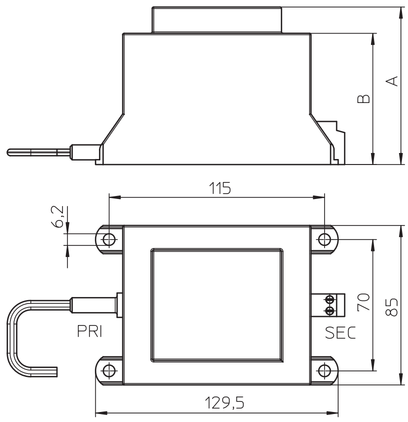
Type	**Ref. No.**	Capacity range W	50, 60 Hz V prim.	V sec.	Ambient temperature t_a (°C)	Drawing	a mm	b mm	c mm	Weight kg
230 V/50, 60 Hz										
STr 20/12.306	**161860**	15–20	230	11.5	60/B	A	155	140	63	0.55
STr 50/12.337	**179444**	35–50	230	11.5	50/F	A	175	165	83	0.73
STr 50/12.301	**170091**	35–50	230	11.5	50/B	A	195	180	92	0.80
STr 60/12.338	**179608**	40–60	230	11.5	50/F	A	195	180	92	0.80
STr 105/12.311	**169747**	60–105	230	11.5	45/F	B	240	230	160	1.33
240 V/50, 60 Hz										
STr 50/12.401	**169748**	35–50	240	11.5	45/B	A	195	180	92	0.80
STr 105/12.406	**161935**	60–105	240	11.5	50/H	B	240	230	160	1.33
127 V/60 Hz										
STr 50/12.109	**537403**	35–50	127	11.5	40/F	A	155	140	63	0.55

Compact Electromagnetic Transformers 70–300 VA



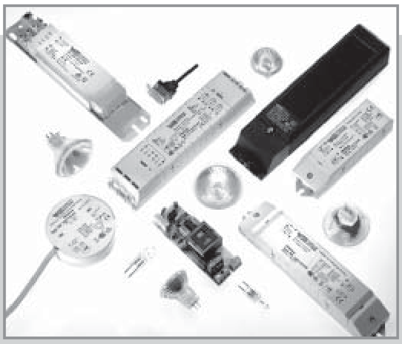
Shape: 85x85 mm (200 VA)
Shape: 99x85 mm (300 VA)

Built-in electromagnetic safety transformers
for low-voltage halogen incandescent lamps 12 V
Fully encapsulated transformer in a plastic casing
Mains frequency: 50–60 Hz
Built-in primary fuse and temperature switch
Connections
primary: lead
secondary: screw terminals up to 6 mm²
Degree of protection: IP24
Protection class II
Suitable for installation in furniture
and on combustible surfaces



Type	**Ref. No.**	Capacity range	Voltage AC V −10%+6%		Ambient temperature t_a	A	B	Weight
		W	prim.	sec.	°C	mm	mm	kg
230 V/50, 60 Hz								
STr 200/12.40	**554325**	70–200	230	12	40	85	70	2.9
STr 300/12.41	**554326**	150–300	230	12	40	99	84	3.9

LOW- AND MAINS VOLTAGE LAMPHOLDERS



LAMPHOLDERS FOR HALOGEN INCANDESCENT LAMPS

As the tungsten-halogen cycle and the high lamp current can cause very high temperatures when operating low-voltage halogen lamps, close attention must be paid to the luminaire's thermal conditions and components must be made of high-grade materials.

VS lampholders for low-voltage halogen lamps
The following chapter contains Vossloh-Schwabe's comprehensive range of connection elements, lampholders and accessories for safe and reliable installation in accordance with the latest regulations and developments.

VS lampholders for mains voltage halogen lamps
The following chapter contains Vossloh-Schwabe's comprehensive range of lampholders for single-ended halogen lamps (GU/GZ10 and G9 bases), lampholders for bayonet lamps (B15d and B22d bases) as well as lampholders for double-ended tubular lamps (R7s base).

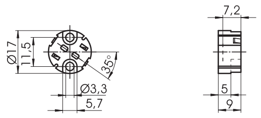
5 Lampholders for Halogen Incandescent Lamps

G4, GZ4, G5.3, GX5.3, G6.35, GY6.35 Lampholders, Accessories

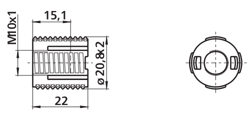
For low-voltage halogen incandescent lamps

The lampholders listed in this chapter permit the use of lamps with different bases. It is important to ensure that under no circumstances a lamp with a smaller pin diameter is used if a lamp with a larger pin diameter has already been used.

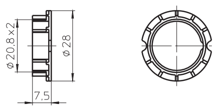
G/GZ4, G/GX5.3, G/GY6.35 lampholder
Casing: LCP, natural, T270
Nominal rating: 8/24 (for G4/GZ4 lamps: 4/24)
Multipoint contacts: CuNiZn
Push-in terminals for stranded conductors
with ferrule on bare end of core Ø 1.4–1.8 mm
Fixing holes for screws M3
Weight: 2.4 g, unit: 1000 pcs.
Type: 33300
Ref. No.: 109547



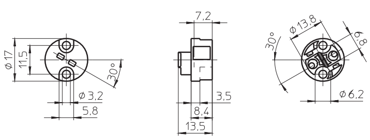
Cover caps
For push-fit onto lampholders type 333
External thread 20.8x2
Material: LCP, natural
Moulded thread: M10x1
Weight: 3.8 g, unit: 1000 pcs.
Type: 97255
Ref. No.: 109548



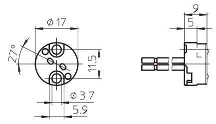
Screw rings
For components with external thread 20.8x2
Weight: 1.7/1.4 g, unit: 1000 pcs.
Type: 97257
Ref. No.: 109550 PPS, black
Ref. No.: 507490 LCP, natural



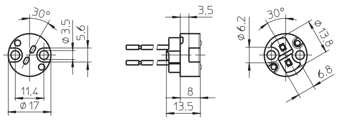
G/GZ4, G/GX5.3, G/GY6.35 lampholder
Casing: LCP, natural, T270
Nominal rating: 8/24 (for G4/GZ4 lamps: 4/24)
Multipoint contacts: CuNiZn
Push-in terminals for stranded conductors
with ferrule on bare end of core Ø 1.4–1.8 mm
Fixing holes for screws M3
Weight: 2.6 g, unit: 1000 pcs.
Type: 33400
Ref. No.: 109674



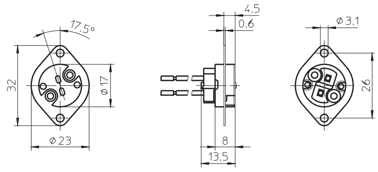
G/GZ4, G/GX5.3, G/GY6.35 lampholder
Casing: ceramic, cover plate: mica
T350
Nominal rating: 10/24
Contacts: Ni
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Fixing holes for screws M3
Weight: 6.8 g, unit: 500 pcs.
Type: 32400
Ref. No.: 100939



G/GZ4, G/GX5.3, G/GY6.35 lampholder
Casing: ceramic, cover plate: mica
T300
Nominal rating: 10/24
Multipoint contacts: CuNiZn
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Fixing holes for screws M3
Weight: 7.1 g, unit: 1000 pcs.
Type: 32700
Ref. No.: 101258



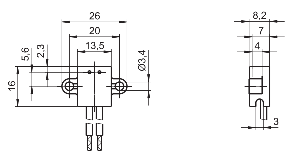
G/GZ4, G/GX5.3, G/GY6.35 lampholder
Casing: ceramic, cover plate: mica
T300, nominal rating: 10/24
Multipoint contacts: CuNiZn
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Fixing plate: zinc-coated polished steel
Fixing holes for screws M3
Weight: 8.8 g, unit: 1000 pcs.
Type: 32720
Ref. No.: 101274

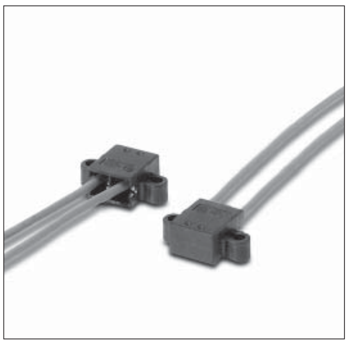


G4 Lampholders, GZ4 Lamp Connectors

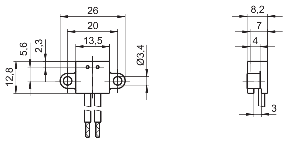
For low-voltage halogen incandescent lamps

G4 lampholder, GZ4 lamp connector
Casing: PPS, black, T240
Nominal rating: 4/24, multipoint contacts: steel
Leads: Cu tinned, stranded conductors 0.75 mm²,
Si-insulation, length: 140 mm
Option for lateral wiring
Lampholder height: 16 mm
Fixing holes for screws M3
Weight: 5.7 g, unit: 1000 pcs.
Type: 30400
Ref. No.: 530024

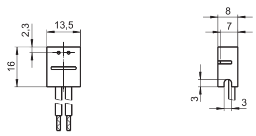


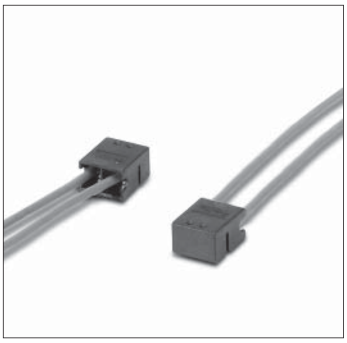


G4 lampholder, GZ4 lamp connector
Casing: PPS, black, T240
Nominal rating: 4/24, multipoint contacts: steel
Leads: Cu tinned, stranded conductors 0.75 mm², Si-insulation, length: 140 mm
Lampholder height: 12.8 mm
Fixing holes for screws M3
Weight: 5.5 g, unit: 1000 pcs.
Type: 30450
Ref. No.: 530025

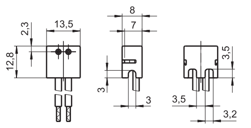


G4 lampholder, GZ4 lamp connector
Casing: PPS, black, T240
Nominal rating: 4/24, multipoint contacts: steel
Leads: Cu tinned, stranded conductors 0.75 mm², Si-insulation, length: 140 mm
Option for lateral wiring
Lampholder height: 16 mm
For push-fit onto the lamp
Weight: 5.3 g, unit: 1000 pcs.
Type: 30460
Ref. No.: 530026

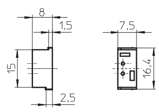


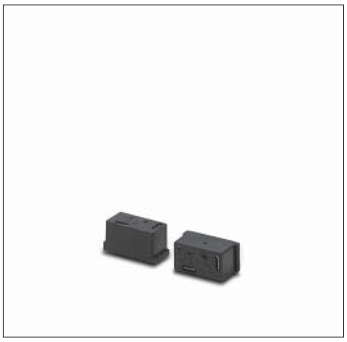


G4 lampholder, GZ4 lamp connector
Casing: PPS, black, T240
Nominal rating: 4/24, multipoint contacts: steel
Leads: Cu tinned, stranded conductors 0.75 mm², Si-insulation, length: 140 mm
Option for lateral and base wiring
Lampholder height: 12.8 mm
For push-fit onto the lamp
Weight: 5.1 g, unit: 1000 pcs.
Type: 30465
Ref. No.: 530027

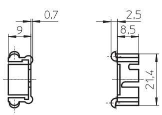


G4 lampholders
For push-fit into lampholder support 535267
T240
Nominal rating: 2/50
Multipoint contacts: CuNiZn
Push-in terminals for stranded conductors with ferrule on bare end of core ∅ 1.4–1.8 mm
Weight: 1.5/1.6 g, unit: 1000 pcs.
Type: 30800
Ref. No.: 535146 material: LCP
Ref. No.: 535263 material: PPS

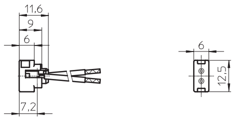




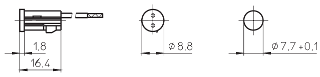
Lampholder support for G4 lampholders type 30800
Material: polyamide
Base split pins for wall thickness 0.6 mm
Weight: 0.8 g, unit: 500 pcs.
Type: 95300
Ref. No.: 535267



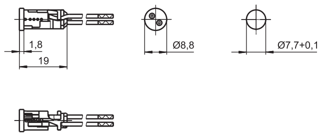
G4 lampholder
Casing: PPS, black, T200
Nominal rating: 2/24
Multipoint contacts: CuNiZn
Leads: Cu tinned, stranded conductors 0.75 mm²,
Si-insulation brown/blue, length: 140 mm
Push-in fixing
Weight: 4.4 g, unit: 1000 pcs.
Type: 30485
Ref. No.: 535988



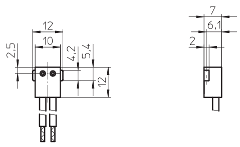
G4 clip-in tube lampholder
With earth contact
Casing: PPS, black, T200
Nominal rating: 2/24
Multipoint contacts: CuNiZn
Lead: Cu tinned, stranded conductors 0.75 mm²,
Si-insulation blue, length: 140 mm
Push-in fixing
Weight: 2.7 g, unit: 1000 pcs.
Type: 30471
Ref. No.: 108449

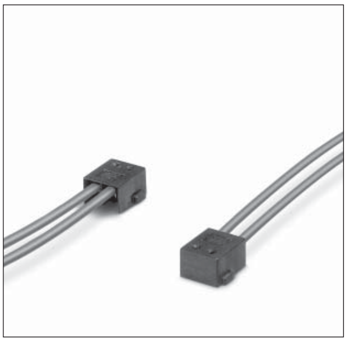


G4 clip-in tube lampholder
With integrated cable holder for Teflon conductor
Casing: PPS, black, T200
Nominal rating: 2/24
Multipoint contacts: CuNiZn
Leads: Cu tinned, stranded conductors 0.61 mm²,
FEP-insulation brown/blue, length: 140 mm
Push-in fixing
Weight: 8.1 g, unit: 1000 pcs.
Type: 30470
Ref. No.: 520865



G4 lampholder
Casing: PPS, black, T240
Nominal rating: 4/24
Multipoint contacts: steel
Leads: Cu tinned, stranded conductors 0.75 mm²,
Si-insulation, length: 140 mm
For push-fit onto the lamp
Weight: 4.7 g, unit: 1000 pcs.
Type: 34000
Ref. No.: 507105





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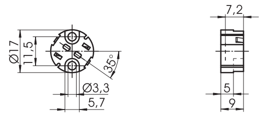
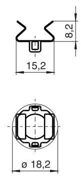
Lampholders with Separate Mounting Spring for GU4 Lamps

For low-voltage halogen incandescent lamps

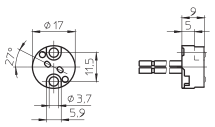
G/GZ4, G/GX5.3, G/GY6.35 lampholder
Casing: LCP, natural, T270
Nominal rating: 8/24 (for G4/GZ4 lamps: 4/24)
Multipoint contacts: CuNiZn
Push-in terminals for stranded conductors
with ferrule on bare end of core ∅ 1.4–1.8 mm
Fixing holes for screws M3
For cover cap (see p. 268)
Weight: 2.4 g, unit: 1000 pcs.
Type: 33300
Ref. No.: 109547



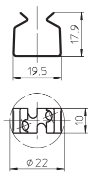
GU4 mounting spring for lamp
Material: stainless steel
For push-fit onto lampholders type 333 and 32210
Weight: 0.8 g, unit: 1000 pcs.
Type: 94095
Ref. No.: 109553



G/GZ4-, G/GX5.3, G/GY6.35 lampholder
Casing: ceramic, cover plate: mica
T350
Nominal rating: 10/24
Contacts: Ni
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Fixing holes for screws M3
Weight: 6.8 g, unit: 500 pcs.
Type: 32400
Ref. No.: 100939



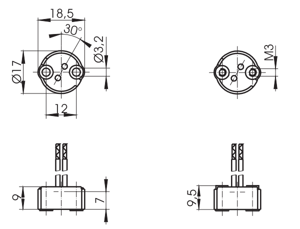
GU4 mounting spring for lamp
Material: stainless steel
The mounting spring has to be fastened
to the lampholder 100939.
The luminaire manufacturer is responsible
for the attachment.
Weight: 1.6 g, unit: 1000 pcs.
Type: 94071
Ref. No.: 108678



GX5.3 Lamp Connectors

For low-voltage halogen incandescent lamps

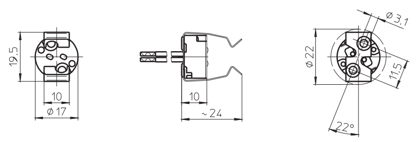
GX5.3 lamp connectors
Casing: ceramic, cover plate: mica
T300, nominal rating: 10/24
Multipoint contacts: Ni
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Weight: 7.8/8.5 g, unit: 500 pcs.
Type: 32600 holes for screws M3
Ref. No.: 101162
Type: 32620 threaded bushes M3
Ref. No.: 101207

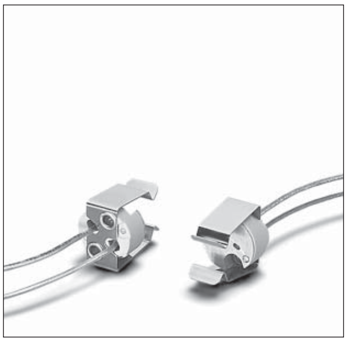


GU5.3 Lampholders

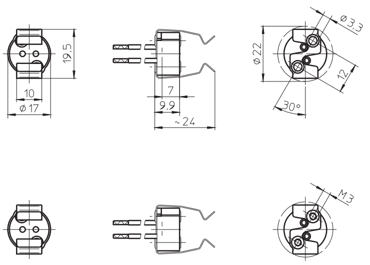
For low-voltage halogen incandescent lamps

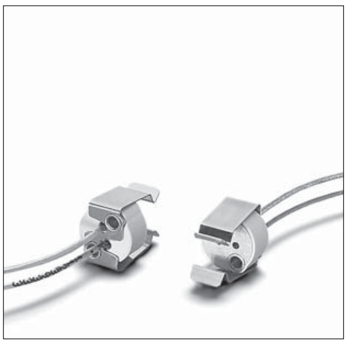
GU5.3 lampholder
Casing: ceramic, cover plate: mica
T350, nominal rating: 10/24
Contacts: Ni
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Fixing holes for screws ST2.9
Mounting spring for lamp: stainless steel
Weight: 9.1 g, unit: 1000 pcs.
Type: 32480
Ref. No.: 106457





GU5.3 lampholders
Casing: ceramic, cover plate: mica
T300, nominal rating: 10/24, multipoint contacts: Ni
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Mounting spring for lamp: stainless steel
Weight: 11/12 g, unit: 500 pcs.
Type: 32680 holes for screws M3
Ref. No.: 101248
Type: 32690 threaded bushes M3
Ref. No.: 101253

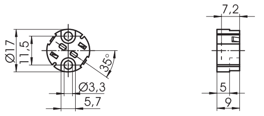




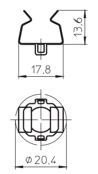
Lampholders with Separate Mounting Spring for GU5.3 Lamps

For low-voltage halogen incandescent lamps

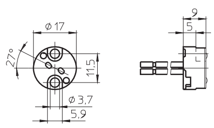
G/GZ4, G/GX5.3, G/GY6.35 lampholder
Casing: LCP, natural, T270
Nominal rating: 8/24 (for G4/GZ4 lamps: 4/24)
Multipoint contacts: CuNiZn
Push-in terminals for stranded conductors
with ferrule on bare end of core ∅ 1.4–1.8 mm
Fixing holes for screws M3
For cover cap (see p. 260)
Weight: 2.4 g, unit: 1000 pcs.
Type: 33300
Ref. No.: 109547



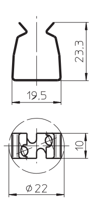
GU5.3 mounting spring for lamp
Material: stainless steel
For push-fit onto lampholders type 333
Weight: 1.1 g, unit: 1000 pcs.
Type: 94096
Ref. No.: 109554



G/GZ4, G/GX5.3, G/GY6.35 lampholder
Casing: ceramic, cover plate: mica
T350
Nominal rating: 10/24
Contacts: Ni
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Fixing holes for screws M3
Weight: 6.8 g, unit: 500 pcs.
Type: 32400
Ref. No.: 100939



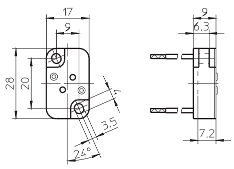
GU5.3 mounting spring for lamp
Material: stainless steel
The mounting spring has to be fastened
to the lampholder 100939.
The luminaire manufacturer is responsible
for the attachment.
Weight: 2 g, unit: 1000 pcs.
Type: 94060
Ref. No.: 106256



G6.35, GY6.35 Lampholders, GZ6.35 Lamp Connectors

For low-voltage halogen incandescent lamps

G/GY6.35 lampholder, GZ6.35 lamp connector
Casing: ceramic, cover plate: mica
T300, nominal rating: 10/24
Multipoint contacts: Ni
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 140 mm
Fixing holes for screws M3
Lamp fixing holes: diagonal
Weight: 11 g, unit: 500 pcs.
Type: 30300
Ref. No.: 100662

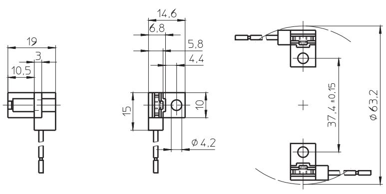


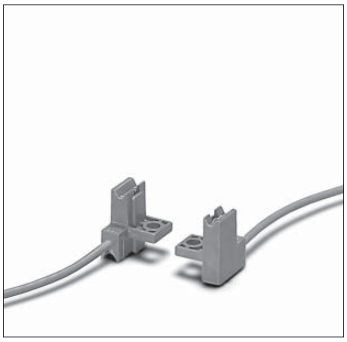
G53 Lamp Connectors

For low-voltage halogen incandescent lamps

G53 lamp connector
Casing: PPS, black
Nominal rating: 10/24
Contacts: CuNiZn
Lead: Cu tinned, stranded conductors 0.75 mm²,
Si-insulation, length: 140 mm

Fixing hole for screw M4
Lead exit: lateral
Weight: 4.4 g, unit: 1000 pcs.
Type: 33100
Ref. No.: 107694



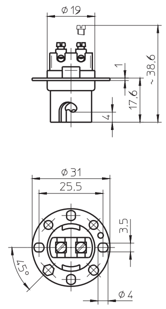


B15d, BA15d Lampholders

For low-voltage and mains voltage halogen incandescent lamps

One-piece contact pins with screw terminals
to reduce voltage drop.
When using lampholders without cap it has to
be ensured protection from electric shock as well
as sufficient creepage distances and clearances
from live parts on the back of lampholders.

B15d, BA15d lampholders
Casing with fixing flange: zinc-coated polished steel
Insert: ceramic, T230
Nominal rating: 8/250
Fixing holes for screws M3
Weight: 15/16 g, unit: 500 pcs.
Type: 78100
Ref. No.: 102923

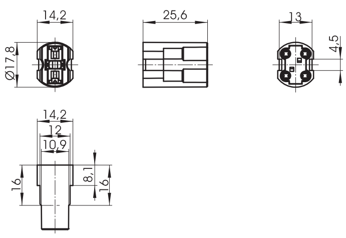


G9 Lampholders, Accessories

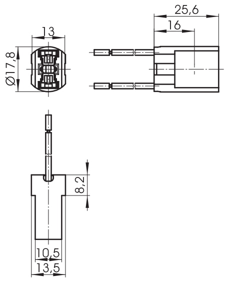
For mains voltage halogen incandescent lamps

For luminaires of protection class II

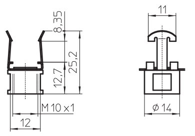
G9 lampholder
Casing: ceramic, cover plate: LCP, natural
T300, nominal rating: 2/250
Push-in twin terminals for stranded conductors
with ferrule on bare end of core Ø 1.4–1.8 mm
Weight: 7.5 g, unit: 1000 pcs.
Type: 33800
Ref. No.: 509357



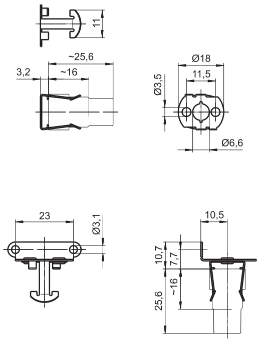
G9 lampholder
Casing: ceramic, T300, nominal rating: 2/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², double PTFE-insulation,
length: 180 mm
Weight: 12.8 g, unit: 1000 pcs.
Type: 33906
Ref. No.: 532610



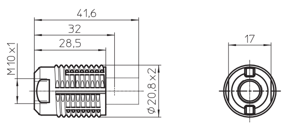
Metal bracket with nipple
For G9 lampholders type 338/339
Material: zinc-coated steel
Female nipple: M10x1
Weight: 7.8 g, unit: 1000 pcs.
Type: 94455
Ref. No.: 520880



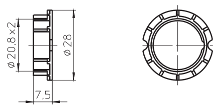
Metal brackets
For G9 lampholders type 338/339
Material: zinc-coated steel
Fixing holes for screws M3
Weight: 1.5/3.5 g, unit: 1000 pcs.
Type: 94457
Ref. No.: 520882
Type: 80280 with bracket 90°
Ref. No.: 521010



Cover cap for G9 lampholders type 338/339
Material: LCP
External thread 20.8x2
Moulded thread: M10x1
Weight: 3.2 g, unit: 1000 pcs.
Type: 97760
Ref. No.: 525583



Screw rings
For components with external thread 20.8x2
Weight: 1.7/1.4 g, unit: 1000 pcs.
Type: 97257
Ref. No.: 109550 PPS, black
Ref. No.: 507490 LCP, natural



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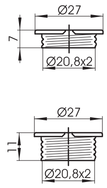
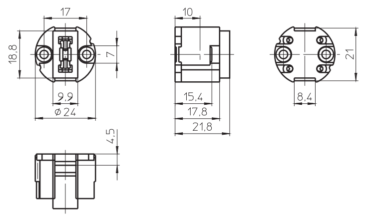
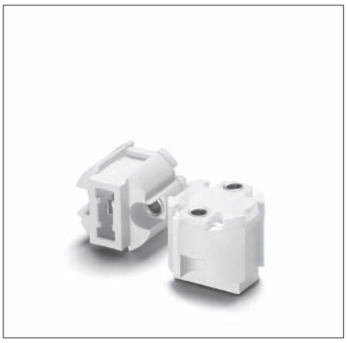
Metal screw rings
For components with external thread 20.8x2
Material: zinc-coated polished steel
Weight: 1.6/2 g, unit: 1000 pcs.
Type: 93034 ∅ 27 mm, height: 7 mm
Ref. No.: 509110
Type: 93035 ∅ 27 mm, height: 11 mm
Ref. No.: 509118

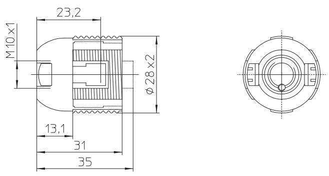


G9 lampholder
Casing: ceramic, cover plate: LCP, natural
T270, nominal rating: 2/250
Push-in twin terminals for stranded conductors
with ferrule on bare end of core ∅ 1.4–1.8 mm
Fixing holes for screws M3
Weight: 14.4 g, unit: 1000 pcs.
Type: 33500
Ref. No.: 502004

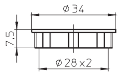




Cover caps for G9 lampholder 502004
Material: LCP, natural
External thread 28x2 IEC 60399
Fixing holes for screws M3
Weight: 8.7/4.6 g, unit: 1000 pcs.
Type: 83310 female nipple: M10x1
Ref. No.: 505951
Type: 97268 moulded thread: M10x1
Ref. No.: 501942



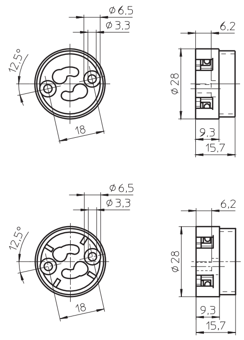
Screw ring
For components with external thread 28x2
Material: PPS, black
∅ 34 mm, height: 7.5 mm
Weight: 1.9 g, unit: 1000 pcs.
Type: 05202
Ref. No.: 502503



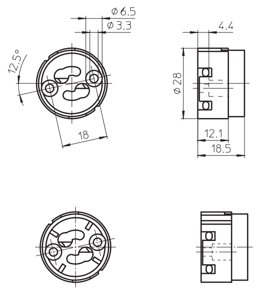
GU10, GZ10 Lampholders, Accessories

For mains voltage halogen incandescent lamps

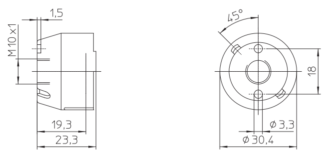
GU10, GZ10 lampholders
Casing: LCP, natural, T270, nominal rating: 2/250
Push-in twin terminals for stranded conductors
with ferrule on bare end of core ∅ 1.4–1.8 mm
Fixing holes for screws M3
Weight: 7 g, unit: 1000 pcs.
Type: 31000/31010
Ref. No.: 108979 GU10, GZ10 lampholder
Ref. No.: 109007 GU10 lampholder



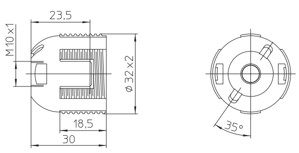
GU10, GZ10 lampholders
For luminaires of protection class II
Casing: LCP, natural, T270, nominal rating: 2/250
Push-in twin terminals for stranded conductors
with ferrule on bare end of core ∅ 1.4–1.8 mm
Fixing holes for screws M3
Weight: 8 g, unit: 1000 pcs.
Type: 31020/31030
Ref. No.: 502111 GU10, GZ10 lampholder
Ref. No.: 502112 GU10 lampholder



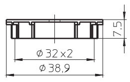
Cover cap for GU10, GZ10 lampholders type 310
Material: PA GF, black
Moulded thread: M10x1
Fixing holes for screws M3
Weight: 3.4 g, unit: 1000 pcs.
Type: 97244
Ref. No.: 109411



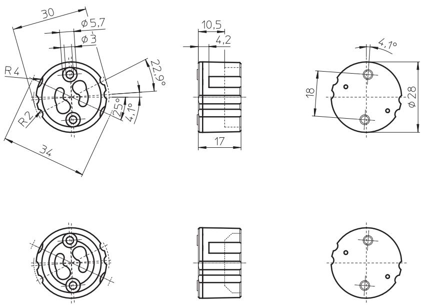
Cover cap for lampholders 502111/502112
External thread 32x2
Material: LCP, natural
Moulded thread: M10x1
Weight: 6 g, unit: 1000 pcs.
Type: 97320
Ref. No.: 502064



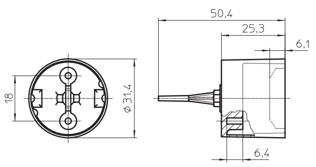
Screw ring
For components with external thread 32x2
Ø 38.9 mm, height: 7.5 mm
Material: PPS, black
Weight: 2.3 g, unit: 1000 pcs.
Type: 97282
Ref. No.: 502416



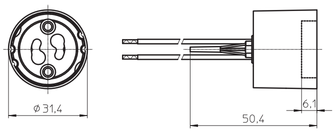
GU10, GZ10 lampholders
Casing: steatite, cover plate: PPS
T240, nominal rating: 2/250
Push-in terminals for stranded conductors
with ferrule on bare end of core Ø 1.5–1.8 mm
Fixing holes for screws M3
Weight: 13.6/14 g, unit: 500 pcs.
Type: 31755/31705
Ref. No.: 535034 GU10, GZ10 lampholder
Ref. No.: 535032 GU10 lampholder



Cover caps for lampholders type 315/317
Material: PBT GF
Front fixing holes for self-tapping
screws acc. to ISO 1481/7049-ST2.9-C/F
Cord grip: twist and block (for single-core leads)
Rear lead exit: max. Ø 2.5 mm
Weight: 6.9 g, unit: 500 pcs.
Type: 97765
Ref. No.: 536164 black
Ref. No.: 543615 grey



GU/GZ10 Lampholder set
For luminaires of protection class II
Casing lampholder: steatite, cover plate: PPS
T240, nominal value: 2/250
Cover cap with cord grip: PBT GF
Leads: Cu, stranded conductors
0.5 mm², double FEP-insulation, length: 150 mm
Weight: 25 g, unit: 500 pcs.
Type: 31760
Ref. No. 554662



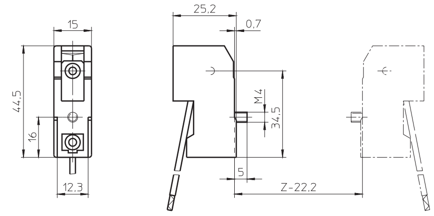
R7s Ceramic Lampholders

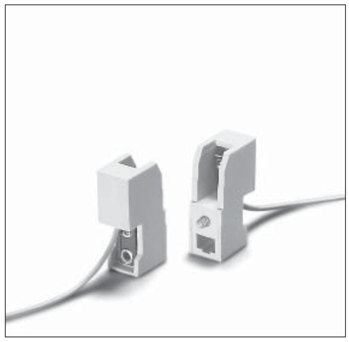
For mains voltage halogen incandescent lamps

The luminaire design must ensure protection from electric shock as well as sufficient creepage distances and clearances from live parts on the back of lampholder.

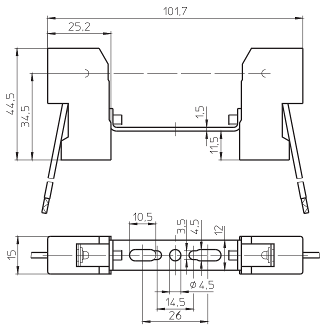
If the central hole on the bracket is used for fixing there must be a support within the luminaire to ensure that the bracket cannot be deformed.

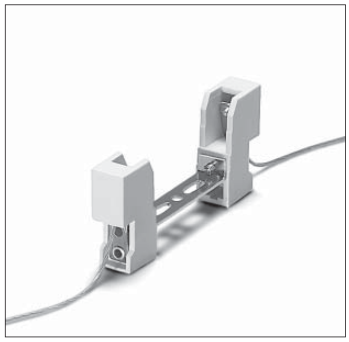
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
With fixing screw M4
Weight: 25.4 g, unit: 400 pcs.
Type: 32300
Ref. No.: 100912



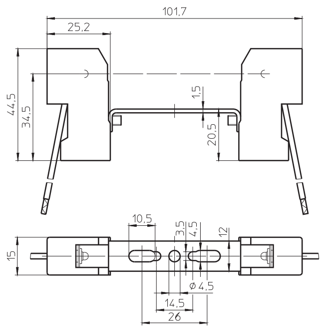


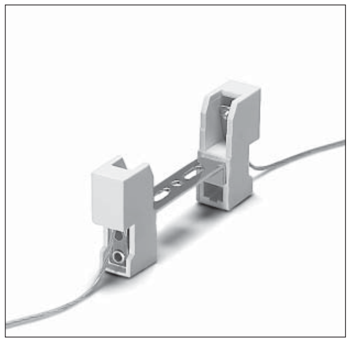
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
Oblong holes for screws M3/M4
Central hole for screw M4
Weight: 59.3 g, unit: 200 pcs.
Type: 32390 contact distance: 74.9 mm
Ref. No.: 107213



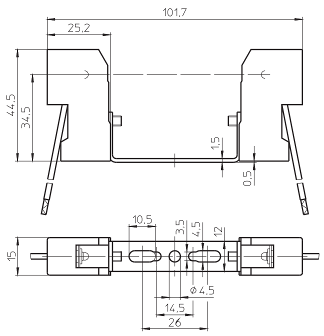


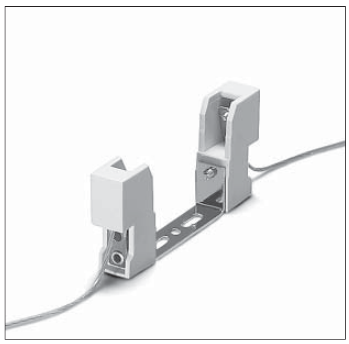
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
Oblong holes for screws M3/M4
Central hole for screw M4
Weight: 61 g, unit: 200 pcs.
Type: 32391 contact distance: 74.9 mm
Ref. No.: 107214



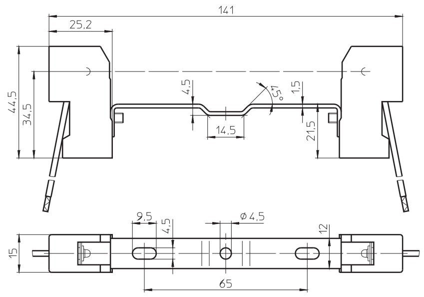


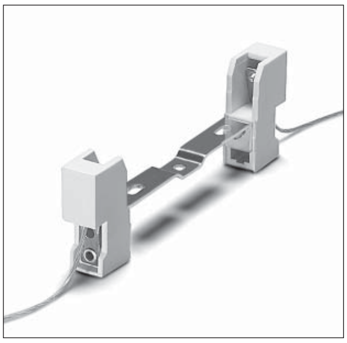
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
Oblong holes for screws M3/M4
Central hole for screw M4
Weight: 61.3 g, unit: 200 pcs.
Type: 32395 contact distance: 74.9 mm
Ref. No.: 107215



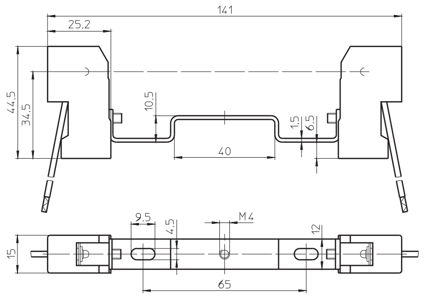


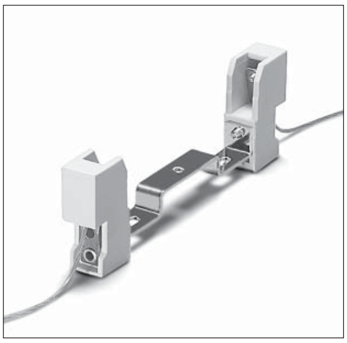
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
Oblong holes for screws M4
Central hole for screw M4
Weight: 64.9 g, unit: 200 pcs.
Type: 32310 contact distance: 114.2 mm
Ref. No.: 107195



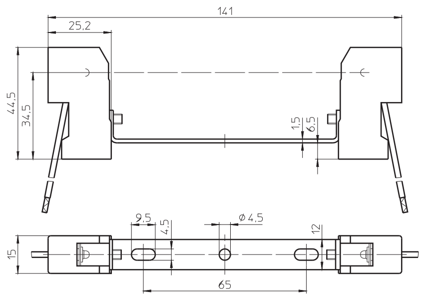


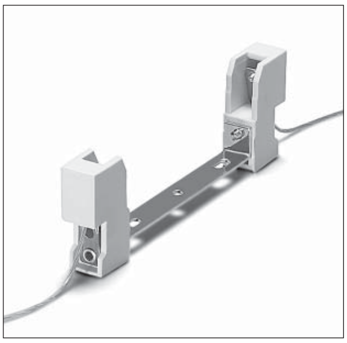
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
Oblong holes for screws M4
Central threaded bush M4
Weight: 66.5 g, unit: 200 pcs.
Type: 32320 contact distance: 114.2 mm
Ref. No.: 107194



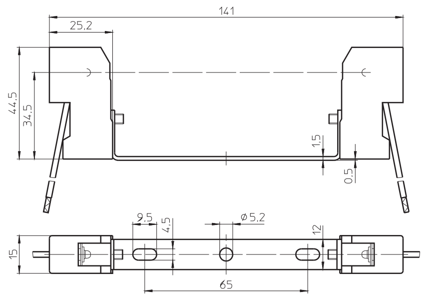


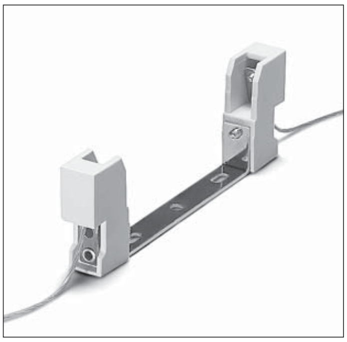
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
Oblong holes for screws M4
Central hole for screw M4
Weight: 65.4 g, unit: 200 pcs.
Type: 32340 contact distance: 114.2 mm
Ref. No.: 107193



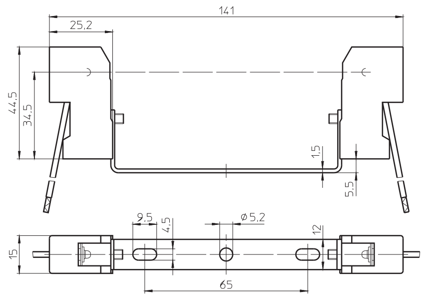


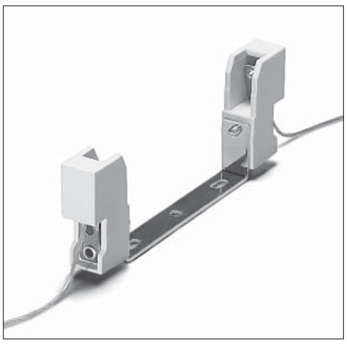
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
Oblong holes for screws M4
Central hole for screw M5
Weight: 66.7 g, unit: 200 pcs.
Type: 32360 contact distance: 114.2 mm
Ref. No.: 107192



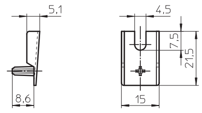


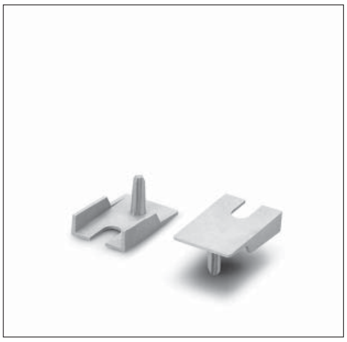
Partly enclosed R7s lampholder
Casing: ceramic, T350
Contact pin: Cu, silver bulb
Nominal rating: 8/250
Leads: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 200 mm
Oblong holes for screws M4
Central hole for screw M5
Weight: 71.3 g, unit: 200 pcs.
Type: 32380 contact distance: 114.2 mm
Ref. No.: 109497





Protection cap for R7s lampholders
For push-fit onto lampholders type 323
Protection against electrical shock
on the rear side of the lampholder
Lampholder with assembled protection cap on request
Material: LCP, natural
Weight: 0.7 g, unit: 1000 pcs.
Type: 97528
Ref. No.: 507592

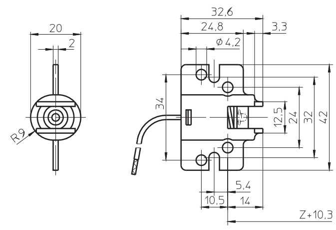


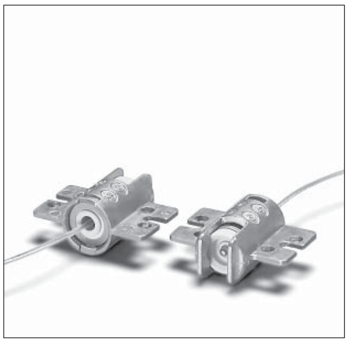


R7s Metal Lampholders

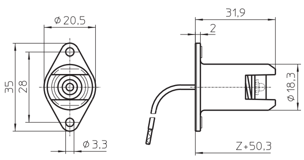
For mains voltage halogen incandescent lamps

R7s lampholder
Casing: Al, T300, contact pin: Ni
Nominal rating: 10/250
Lead: Cu nickel-plated, stranded conductors
0.75 mm², PTFE-insulation, length: 300 mm
Fixing flange
Fixing holes for screws M4
Weight: 21 g, unit: 50 pcs.
Type: 30023
Ref. No.: 100616

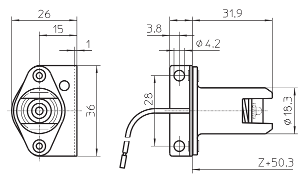




R7s lampholder
Casing: Al, T300, contact pin: Cu, silver bulb
Nominal rating: 10/250
Lead: Cu nickel-plated, stranded conductors
1 mm², PTFE-insulation, length: 300 mm
Fixing flange
Fixing holes for screws M3
Weight: 15.7 g, unit: 1000 pcs.
Type: 30523
Ref. No.: 100710



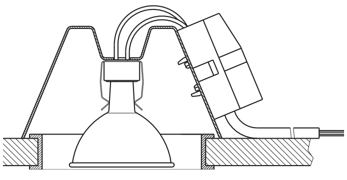
R7s lampholder
Casing: Al, T300, contact pin: Cu, silver bulb
Nominal rating: 10/250
Lead: Cu nickel-plated, stranded conductors
1 mm², PTFE-insulation, length: 350 mm
Fixing bracket
Fixing holes for screws M4
Weight: 24.8 g, unit: 500 pcs.
Type: 30550
Ref. No.: 100720

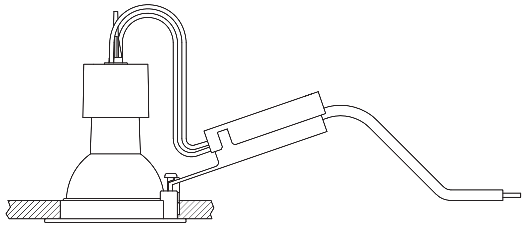


Connection Boxes

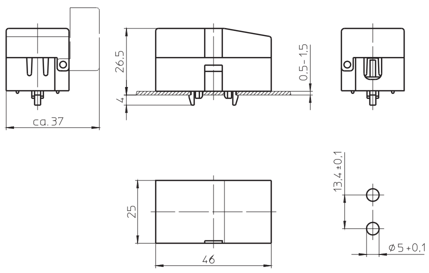
For connecting downlights in false ceilings according to standards
The luminaire manufaturer is responsible for the right choice of accessories.

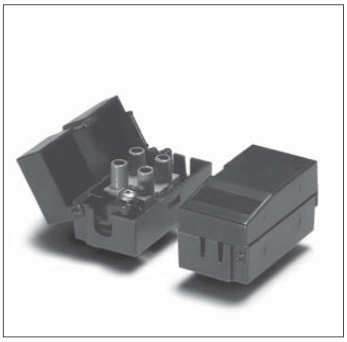
Application examples for connection box



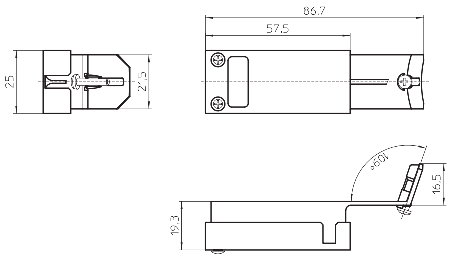


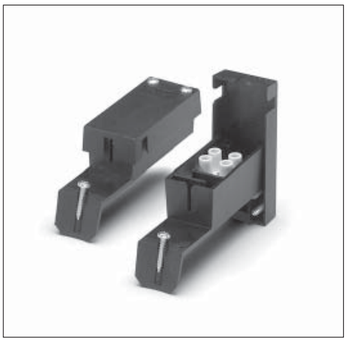
Connection box
Material: PC, black
Split pins for wall thickness 0.5–1.5 mm
With integrated 2-pole terminal block and contact bushings: 2.5 mm²
With cord grip
Weight: 18 g, unit: 500 pcs.
Type: 85007
Ref. No.: 108940

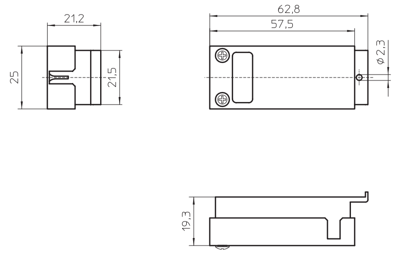


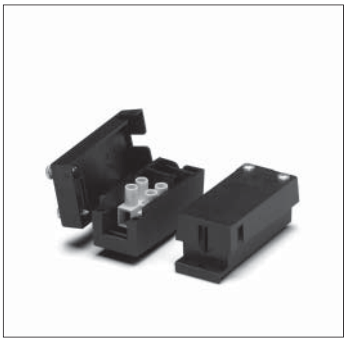


Connection boxes
Material: PA, black
With integrated 2-pole terminal block for leads with cross-section: 0.5–2.5 mm²
Cord grip on primary side for leads
H03VV-F/H05VV-F (Ø 5–7 mm) and
single-core Ø 3–7 mm
Cord grip on secondary side for
single-core Teflon leads up to Ø 3 mm
and single-core PVC leads up to Ø 2.2 mm
Weight: 21.8/20.1 g, unit: 500 pcs.
Type: 85011/85012 plastic bracket with locking screw
Ref. No.: 543048 12 V
Ref. No.: 543049 230 V
Type: 85013/85014 for fixing screw
Ref. No.: 543053 12 V
Ref. No.: 543054 230 V

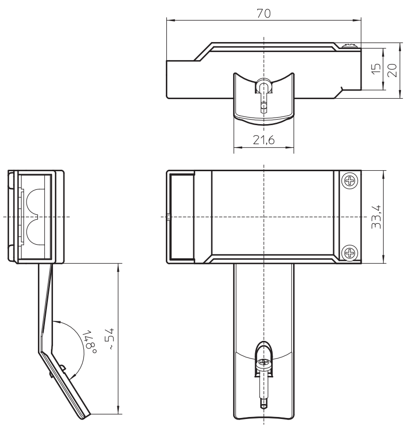


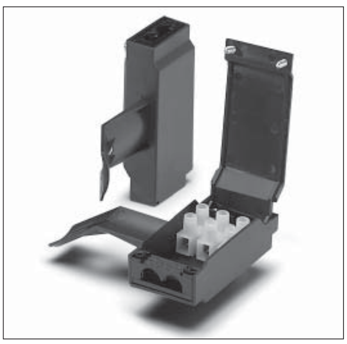






Connection boxes
With plastic bracket with locking screw
Material: PA, black
With integrated 3-pole terminal block for leads with cross-section: 0.75–4 mm²
Cord grip on primary side for leads Ø 2.5–11 mm
Cord grip on secondary side for
single-core Teflon leads up to Ø 1.8 mm
and single-core PVC leads up to Ø 2.2 mm
Weight: 28.7 g, unit: 500 pcs.
Type: 85015/85016
Ref. No.: 543058 12 V
Ref. No.: 543059 230 V

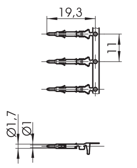


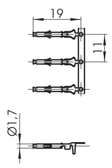


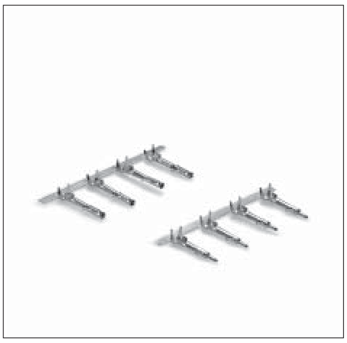
Connectors

Modular system for various assembly options
Connectors can be delivered pre-assembled
with lampholder and lead assemblies

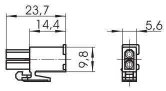
Male and female plug
Nominal rating: 7/600
For cable: 0.3–0.9 mm²
For crimping on the end of lead
Material: brass, tinned
Weight: 0.1 g, unit: 5000 pcs.
Type: 93088 male plug
Ref. No.: 505251
Type: 93089 female plug
Ref. No.: 506807

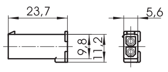




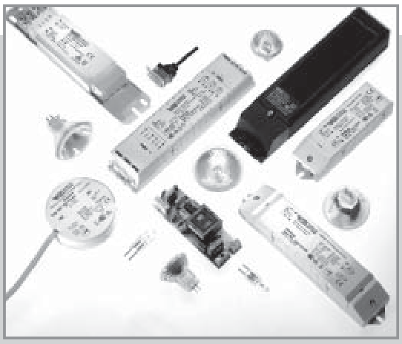


Male and female casing
For male and female plug
For push-fit assembly
Material: PA, natural
Weight: 0.8/1 g, unit: 2500 pcs.
Type: 97355 male casing
Ref. No.: 509295 UL94V-0
Ref. No.: 508562 UL94V-2
Type: 97356 female casing
Ref. No.: 509296 UL94V-0
Ref. No.: 508563 UL94V-2





LAMPHOLDERS MADE OF THERMO-PLASTICS, METAL AND PORCELAIN



LAMPHOLDERS FOR GENERAL-SERVICE INCANDESCENT

The general-service light bulb owes its name to its bulbous shape, which has remained almost unchanged to this day. The tungsten filament contained within the bulb's glass shell, in which there used to be a vacuum but which is nowadays more usually filled with an inert gas, begins to glow as electricity is passed through it. Despite the considerable technical progress that has been made, the typical disadvantages associated with light bulbs still remain. For instance, incandescent lamps mainly radiate heat with no more than 5–10% light output and have a service life of approx. 1000 operating hours.

As a result of energy-efficiency regulations in the various regions of the world, the use of all-purpose incandescent lamps has been limited or even banned. Nonetheless, thanks to the many different shapes and surfaces of lamp bulbs, all-purpose incandescent lamps still have a firm place in decorative residential lighting applications and are often an important feature of luminaire designs. Retrofit lamps that comply with energy-efficiency regulations are increasingly being used as a replacement for all-purpose incandescent lamps and use the same lampholder systems found with E12/E14, E26/E27, E39/E40, B15d and B22d bases.

VS lampholders for general-service incandescent and retrofit lamps
Depending on the operating conditions, lampholders can be made of thermoplastics, metal or porcelain. Metal lampholders are most often used for high-grade decorative luminaires. In accordance with protection class I, metal lampholders must be included in the measures taken to earth the luminaire.

Due to their heat resistance, Edison lampholders made of porcelain are frequently used for higher-output lamps. Classic lampholder materials like metal and porcelain are increasingly being displaced by modern thermoplastics.

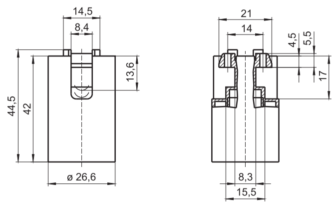
5 Lampholders for General-service Incandescent

E14 Thermoplastic Lampholders, One-piece

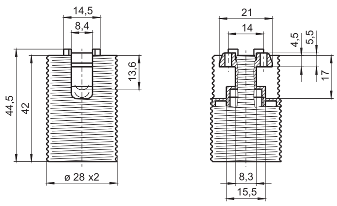
For incandescent lamps with base E14

E14 lampholders with temperature marking
T180 on request.
Brass-finished versions are available on request.

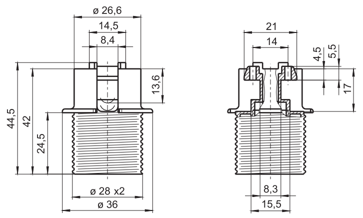
E14 lampholders, for cover caps
Plain casing
Casing: PET GF, T210, nominal rating: 2/250
Push-in twin terminals: 0.5–1.5 mm²
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
Weight: 11.3/11.4 g, unit: 1000 pcs.
Type: 64001
Ref. No.: 109384 white
Ref. No.: 109383 black



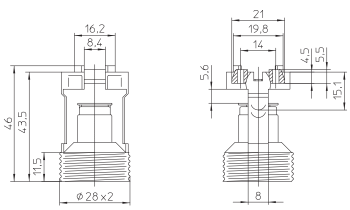
E14 lampholders, for cover caps
External thread 28x2 IEC 60399
Casing: PET GF, T210, nominal rating: 2/250
Push-in twin terminals: 0.5–1.5 mm²
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
Weight: 12.5/12.2 g, unit: 1000 pcs.
Type: 64101
Ref. No.: 109387 white
Ref. No.: 109386 black



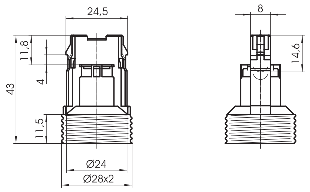
E14 lampholders, for cover caps
External thread 28x2 IEC 60399, with flange
Casing: PET GF, T210, nominal rating: 2/250
Push-in twin terminals: 0.5–1.5 mm²
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
Weight: 12.7 g, unit: 1000 pcs.
Type: 64201
Ref. No.: 503924 white
Ref. No.: 503923 black



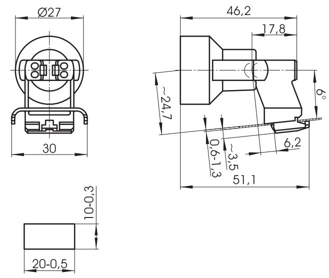
E14 lampholders, for cover caps
Profiled shape, short external thread 28x2 IEC 60399
Casing: PET GF, T210, Nominal rating: 2/250
Push-in twin terminals: 0.5–1.5 mm²
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
Weight: 8.5/8.4 g, unit: 1000 pcs.
Type: 64370
Ref. No.: 546456 white
Ref. No.: 546454 black



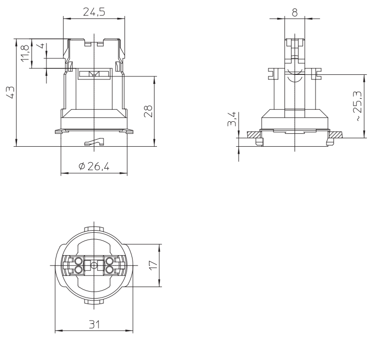
E14 lampholders
Profiled shape, short external thread 28x2 IEC 60399
Casing: PET GF, T210, nominal rating: 2/250
Push-in twin terminals: 0.5–1.5 mm²
For clipping-in
Weight: 6.6/6.8 g, unit: 1000 pcs.
Type: 64360
Ref. No.: 506247 white
Ref. No.: 506249 black



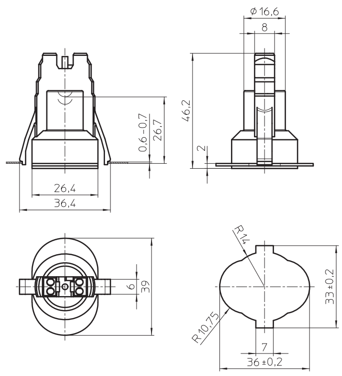
E14 lampholders
Profiled shape, nominal rating: 2/250
Push-in twin terminals: 0.5–1.5 mm²
Lateral push-fit foot for cut-out 10x20 mm
for wall thickness 0.6–1.3 mm
Tilt of lamp axis: 6°
For cover cap 503579
Weight: 9.1/9.2 g, unit: 1000 pcs.
Type: 64307
Ref. No.: 108983 PBT GF, white, T180
Ref. No.: 509263 PET GF, natural, T210



E14 lampholder
Profiled shape
Casing: PET GF, white, T210
Nominal rating: 2/250
Push-in twin terminals: 0.5–1.5 mm²
For insertion, clipping-in or bayonet fixing
for plastic cut-out: Ø 27.5 mm
with wall thickness: 2.5 mm
Weight: 7.1 g, unit: 1000 pcs.
Type: 64308
Ref. No.: 533820



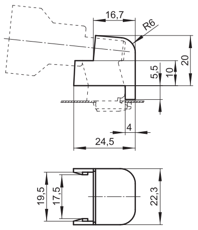
E14 lampholder
Profiled shape
Casing: PET GF, white, T250
Nominal rating: 2/250
Push-in twin terminals: 0.5–1.5mm²
For insertion: clipping-in for
a profiled hole with wall thickness 0.6–0.7 mm
Weight: 9 g, packaging unit: 1000 pcs.
Type: 64314
Ref. No.: 564135



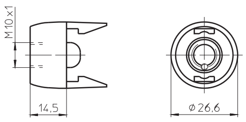
Cover Caps

For E14 thermoplastic lampholders, one-piece

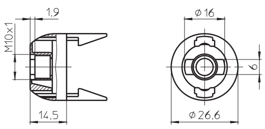
Brass-finished versions are available on request.



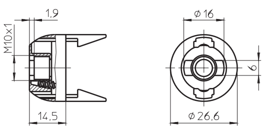
Cover cap for lampholders type 64307
For luminaires of protection class II
Material: PP, white
Weight: 2.4 g, unit: 1000 pcs.
Type: 97322
Ref. No.: 503579



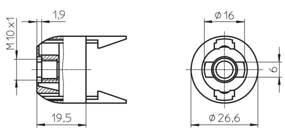
Cover caps
Material: PA GF
Female nipple: M10x1
Weight: 7.6/8.8 g, unit: 1000 pcs.
Type: 85075
Ref. No.: 109110 white
Ref. No.: 109112 black



Cover caps
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
Weight: 2.7 g, unit: 1000 pcs.
Type: 97636
Ref. No.: 109676 white
Ref. No.: 109677 black

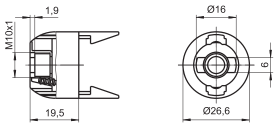


Cover caps
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
With locking screw
Weight: 3 g, unit: 1000 pcs.
Type: 85076
Ref. No.: 400818 white
Ref. No.: 400817 black

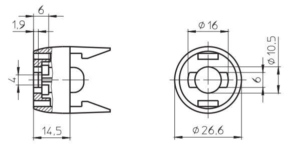


Cover caps
Height: 19 mm
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
Weight: 3.2/3.1 g, unit: 1000 pcs.
Type: 97705
Ref. No.: 520733 white
Ref. No.: 520734 black

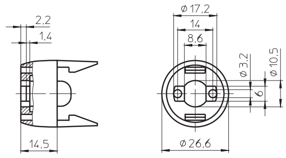
Cover caps
Height: 19 mm
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
With locking screw
Weight: 3.6/3.5 g, unit: 1000 pcs.
Type: 85074
Ref. No.: 520735 white
Ref. No.: 520736 black



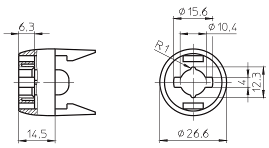
Cover caps
Material: PA GF
Round hole: Ø 10.5 mm
Rotation stop: internal and external
Weight: 4.3 g, unit: 1000 pcs.
Type: 97666
Ref. No.: 109119 white
Ref. No.: 109120 black



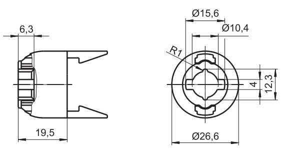
Cover caps
Material: PA GF
Profiled hole: Ø 10.5x8.6 mm
Fixing holes for screws M3
Weight: 4.4/4.3 g, unit: 1000 pcs.
Type: 97635
Ref. No.: 109122 white
Ref. No.: 109123 black



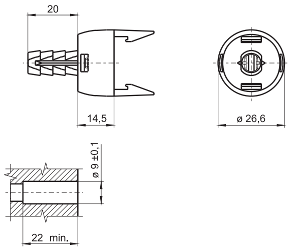
Cover cap
Material: PA GF
Profiled hole: Ø 10.4 mm
Rotation stop: internal and external
Weight: 4 g, unit: 1000 pcs.
Type: 97697
Ref. No.: 109126 black



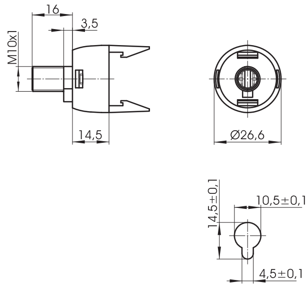
Cover caps
Height: 19 mm
Material: PA GF
Profiled hole: Ø 10.4 mm
Rotation stop: internal and external
Weight: 2.7 g, unit: 1000 pcs.
Type: 97708
Ref. No.: 520759 white
Ref. No.: 520760 black



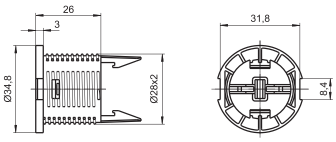
Cover caps
With peg
With integrated cord grip
For leads H03VVH2-F 2X0.75
Material: PA GF
Weight: 4.2/4.3 g, unit: 1000 pcs.
Type: 97000
Ref. No.: 503457 white
Ref. No.: 503458 black

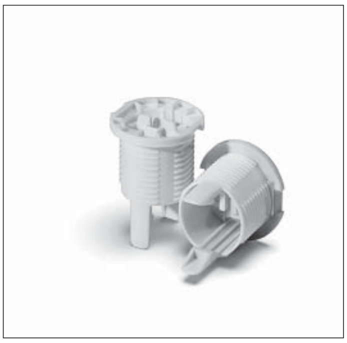


Cover cap
With male nipple: M10x1
With rotation stop
With integrated cord grip
For leads H03VVH2-F 2X0.75
Material: PA GF, white
Weight: 4.1 g, unit: 1000 pcs.
Type: 97037
Ref. No.: 508067

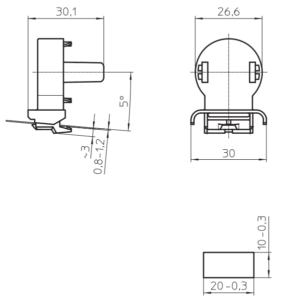


Cover cap
External thread 28x2 IEC 60399
With integrated cord grip
For leads H03VVH2-F 2X0.75
Material: PA GF, natural
Weight: 5.5 g, unit: 1000 pcs.
Type: 97427
Ref. No.: 509340

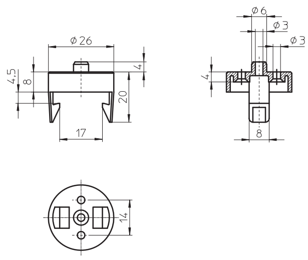




Cover cap
Lateral push-fit foot for cut-out 10x20 mm
For luminaires of protection class II
Material: PA GF, white
Weight: 4.3 g, unit: 1000 pcs.
Type: 97745
Ref. No.: 546006



Cover cap
With central positioning stud
Material: PA GF
Fixing holes for countersunk screws Ø 3 mm
Weight: 3 g, unit: 1000 pcs.
Type: 91522
Ref. No.: 535357

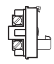


E14 Thermoplastic Lampholders, Three-piece

For incandescent lamps with base E14

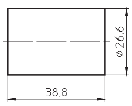
Nominal rating: 2/250
Temperature marking: T190
Brass-finished versions are available on request.

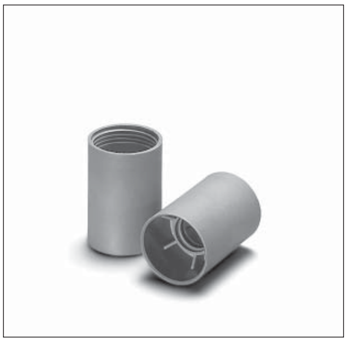
Inserts
Material: PET GF, black
Casing lock
Weight: 3.9/3.2 g, unit: 1000 pcs.
Type: 81095 screw terminals: 0.5–2.5 mm²
Ref. No.: 103424



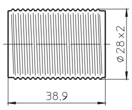
Type: 81096 push-in twin terminals: 0.5–1.5 mm²
Ref. No.: 107716

Plain casings
Material: PET GF
Weight: 9/8.5 g, unit: 1000 pcs.
Type: 81093
Ref. No.: 103415 white
Ref. No.: 103414 black

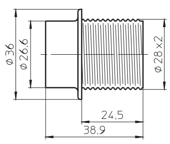




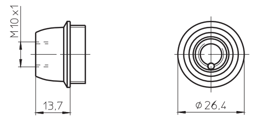
Threaded casings 28x2 IEC 60399
Material: PET GF
Weight: 9.8/9.6 g, unit: 1000 pcs.
Type: 81109
Ref. No.: 103431 white
Ref. No.: 103430 black



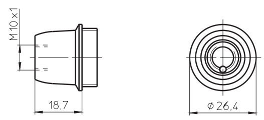
Threaded casings 28x2 IEC 60399
With flange
Material: PET GF
Weight: 10.6/10.4 g, unit: 1000 pcs.
Type: 81120
Ref. No.: 103443 white
Ref. No.: 103442 black



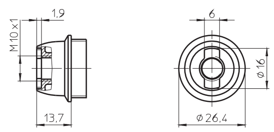
Caps
Material: PA GF
Female nipple: M10x1
Height: 13.7 mm
Weight: 6.9/7.2 g, unit: 1000 pcs.
Type: 81002
Ref. No.: 109102 white
Ref. No.: 109103 black



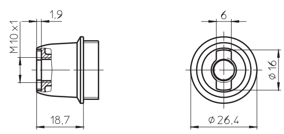
Caps
Material: PA GF
Female nipple: M10x1
Height: 18.7 mm
Weight: 7/7.3 g, unit: 1000 pcs.
Type: 81024
Ref. No.: 109805 white
Ref. No.: 109145 black



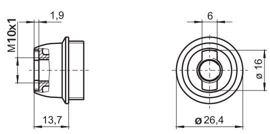
Caps
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
Height: 13.7 mm
Weight: 3.3/3.7 g, unit: 1000 pcs.
Type: 96159
Ref. No.: 109095 white
Ref. No.: 109084 black



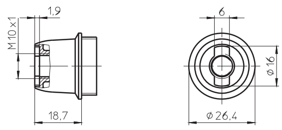
Caps
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
Height: 18.7 mm
Weight: 3.6/3.9 g, unit: 1000 pcs.
Type: 96211
Ref. No.: 109149 white
Ref. No.: 109150 black



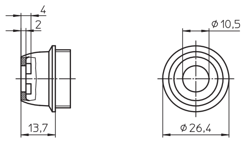
Caps
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
With locking screw
Height: 13.7 mm
Weight: 3.7/4 g, unit: 1000 pcs.
Type: 81130
Ref. No.: 109041 white
Ref. No.: 109054 black



Caps
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
With locking screw
Height: 18.7 mm
Weight: 3.9/4.3 g, unit: 1000 pcs.
Type: 81132
Ref. No.: 109152 white
Ref. No.: 109153 black



Caps
Material: PA GF
Round hole: ∅ 10.5 mm
Rotation stop: internal
Height: 13.7 mm
Weight: 3.3 g, unit: 1000 pcs.
Type: 96004
Ref. No.: 508352 white
Ref. No.: 508353 black

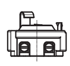


E14 Metal Lampholders, Three-piece

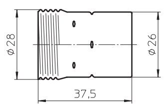
For incandescent lamps with base E14

Nominal rating: 2/250
Temperature marking: T190/T240
Type: 513 plain casing
Type: 514 threaded casing 28x2

Insert
Material: porcelain, white
Casing lock
Screw terminals: 0.5–2.5 mm²
Weight: 10.3 g, unit: 500 pcs.
Type: 83142
Ref. No.: 550375

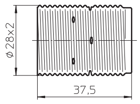


Plain casings
Material: zinc-coated polished steel
Weight: 14.3/14.2/18.3/18.2 g
Unit: 500 pcs.
Type: 81019 insulating threaded ring: duroplastic, T190
Ref. No.: 103359 chrome-finish
Ref. No.: 103360 brass-finish
Type: 81018 insulating threaded ring: steatite, T240
Ref. No.: 507049 chrome-finish
Ref. No.: 507050 brass-finish

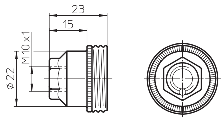


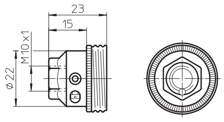
1 2 3 4 5 6 7 8 9 10

Threaded casings 28x2 IEC 60399
Material: zinc-coated polished steel
Weight: 14.4/14.4/18.9/18.9 g
Unit: 500 pcs.
Type: 81022 insulating threaded ring: duroplastic, T190
Ref. No.: 103365 chrome-finish
Ref. No.: 103366 brass-finish
Type: 81017 insulating threaded ring: steatite, T240
Ref. No.: 507052 chrome-finish
Ref. No.: 507053 brass-finish



Caps
Material: zinc-coated polished steel
Female nipple: M10x1
Weight: 7.2/7.1/7.9/7.8 g
Unit: 500 pcs.
Type: 80006
Ref. No.: 102946 chrome-finish
Ref. No.: 102947 brass-finish
Type: 80003 with earth terminal
Ref. No.: 102938 chrome-finish
Ref. No.: 102939 brass-finish



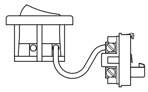


E14 Thermoplastic Rocker Switch Lampholders

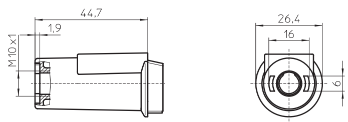
For incandescent lamps with base E14

Nominal rating: 2/250
Temperature marking: T160
Suitable casings see page 293:
Type: 81093 plain casing
Type: 81109 threaded casing 28x2
Type: 81120 threaded casing 28x2, with flange

Inserts with switch
Material: PET GF
Screw terminals: 0.5–2.5 mm²
Weight: 7.9 g, unit: 1000 pcs.
Type: 83141
Ref. No.: 537087 switch, white
Ref. No.: 537088 switch, black



Caps
Material: PET GF
Moulded thread: M10x1
with locking screw
Weight: 9.9 g, unit: 1000 pcs.
Type: 81100
Ref. No.: 537079 white
Ref. No.: 537080 black

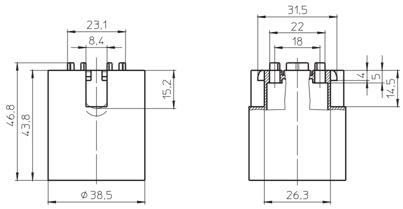


E27 Thermoplastic Lampholders, One-piece

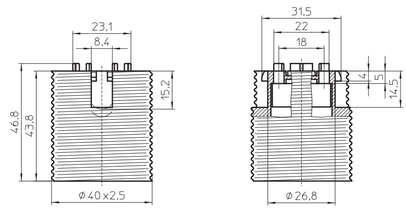
For incandescent lamps with base E27

E27 lampholders with temperature marking
T180 on request.
Brass-finished versions are available on request.

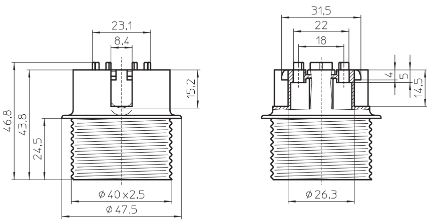
E27 lampholders, for cover caps
Plain casing
Casing: PET GF, T210
Nominal rating: 4/250
Push-in twin terminals: 0.5–2.5 mm²
Fixing holes for screws M4
Weight: 17.4 g, unit: 500 pcs.
Type: 64401
Ref. No.: 108936 white
Ref. No.: 500810 black



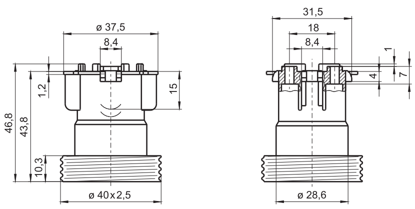
E27 lampholders, for cover caps
External thread 40x2.5 IEC 60399
Casing: PET GF, T210
Nominal rating: 4/250
Push-in twin terminals: 0.5–2.5 mm²
Fixing holes for screws M4
Weight: 19.1/18.8 g, unit: 500 pcs.
Type: 64501
Ref. No.: 108965 white
Ref. No.: 109429 black



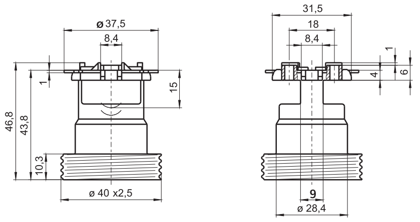
E27 lampholders, for cover caps
External thread 40x2.5 IEC 60399, with flange
Casing: PET GF, T210
Nominal rating: 4/250
Push-in twin terminals: 0.5–2.5 mm²
Fixing holes for screws M4
Weight: 21.4 g, unit: 500 pcs.
Type: 64601
Ref. No.: 501358 white
Ref. No.: 501356 black



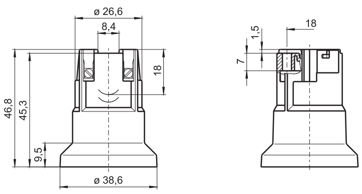
E27 lampholders, for cover caps
Profiled shape, external thread 40x2.5 IEC 60399
Casing: PET GF, T210, nominal rating: 4/250
Push-in twin terminals: 0.5–2.5 mm²
Fixing holes for screws M3
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST3.9-C/F
Weight: 14.8/14.9 g, unit: 500 pcs.
Type: 64719
Ref. No.: 504303 white
Ref. No.: 504302 black



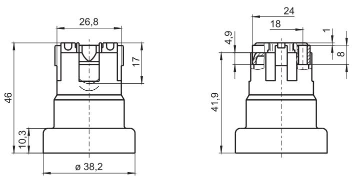
E27 lampholders, for cover caps
Profiled shape, external thread 40x2.5 IEC 60399
Casing: PET GF, T210, nominal rating: 4/250
Push-in twin terminals: 0.5–2.5 mm²
Fixing holes for screws M3
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST3.9-C/F
Weight: 11.4/11.3 g, unit: 500 pcs.
Type: 64775
Ref. No.: 506255 white
Ref. No.: 506257 black



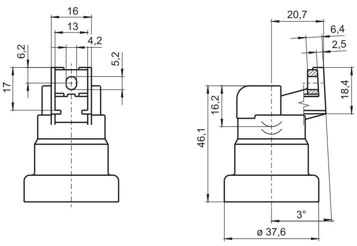
E27 lampholders
Profiled shape, plain, nominal rating: 4/250
Screw terminals: 0.5–2.5 mm²
Fixing holes for screws M3
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST3.9-C/F
Weight: 11.7/11.5/13 g, unit: 500 pcs.
Type: 64785
Ref. No.: 506263 PET GF, white, T210
Ref. No.: 506265 PET GF, black, T210
Ref. No.: 506267 LCP, natural, T270



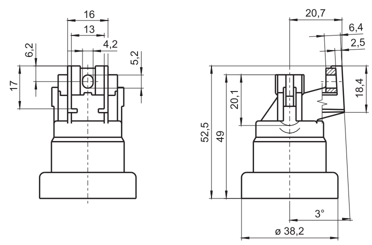
E27 lampholders
For cover caps type 97545/80023 (see p. 292)
Profiled shape, plain, nominal rating: 4/250
Push-in twin terminals: 0.5–2.5 mm²
Fixing holes for screws M3
Rear fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST3.9-C/F
Weight: 11.5/14.9 g, unit: 500 pcs.
Type: 64770
Ref. No.: 108953 PET GF, natural, T210
Ref. No.: 109838 LCP, natural, T270



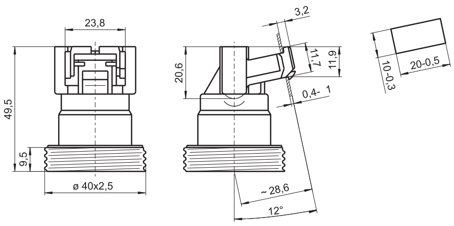
E27 lampholder
For luminaires of protection class II
Profiled shape, plain
Casing: PET GF, white, T210
Nominal rating: 4/250
Screw terminals: 0.5–2.5 mm²
Lateral fixing hole for screw M4
Tilt of lamp axis: 3°
Weight: 15.2 g, unit: 500 pcs.
Type: 64781
Ref. No.: 503041



E27 lampholders
Profiled shape, plain
Casing: PET GF, T210
Nominal rating: 4/250
Push-in twin terminals: 0.5–2.5 mm²
Lateral fixing hole for screw M4
Tilt of lamp axis: 3°
Weight: 13.3 g, unit: 500 pcs.
Type: 64740
Ref. No.: 108747 white
Ref. No.: 529599 natural



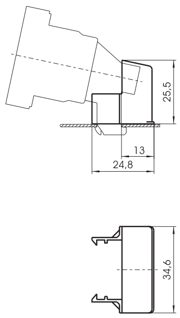
E27 lampholder
Profiled shape, external thread 40x2.5 IEC 60399
Casing: PET GF, natural, T210, nominal rating: 4/250
Push-in twin terminals: 0.5–2.5 mm²
Lateral push-fit foot for cut-out 10x20 mm
Fixing clips for wall thickness 0.4–1 mm
Tilt of lamp axis: 12°
For cover cap 504615 (see below)
Weight: 14.7 g, unit: 500 pcs.
Type: 64741
Ref. No.: 108758

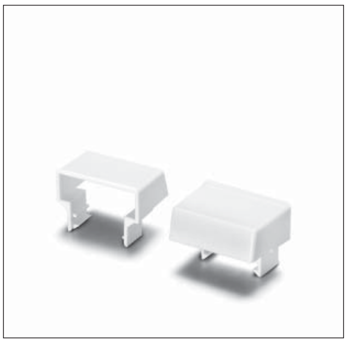


Cover Caps

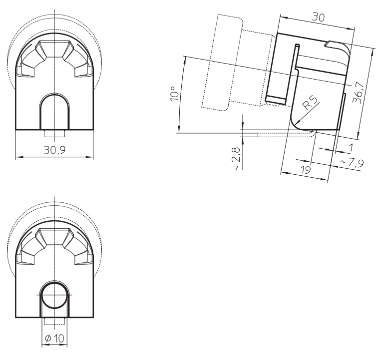
For E27 thermoplastic lampholders, one-piece and for B22d thermoplastic lampholders

Cover cap for lampholder 108758 (see above)
For luminaires of protection class II
Material: PA GF, white
Weight: 2.7 g, unit: 500 pcs.
Type: 97321
Ref. No.: 504615

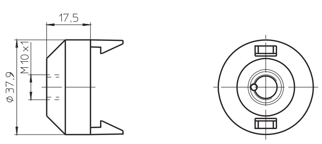




Protection caps for E27 lampholders with bracket with earth connection 400772 (s. p. 309
For lampholder type 64770/64785 (s. p. 290)
For luminaires of protection class II
Material: PA GF, natural
Weight: 4.8 g, unit: 500 pcs.
Type: 97497
Ref. No.: 526886
Type: 97498 fixing hole: ∅ 10 mm
Ref. No.: 529464



Cover caps
Material: PA GF
Female nipple: M10x1
Weight: 9.6/9.9 g, unit: 500 pcs.
Type: 85070
Ref. No.: 109077 white
Ref. No.: 109092 black



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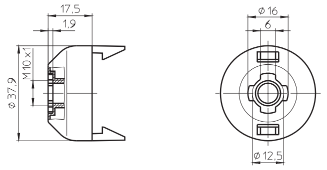
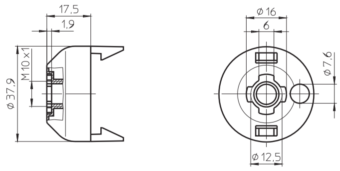
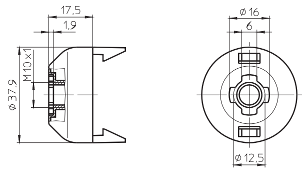
Cover caps
Material: PA GF
Moulded thread: M10x1
Cross groove for rotation stop: external
Weight: 4.4/4.6 g, unit: 500 pcs.
Type: 97665
Ref. No.: 109679 white
Ref. No.: 109680 black



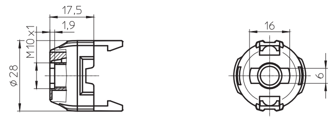
Cover caps
Material: PA GF
Moulded thread: M10x1
Cross groove for rotation stop: external
With lateral hole
Weight: 4/4.6 g, unit: 500 pcs.
Type: 97664
Ref. No.: 109795 white
Ref. No.: 109794 black



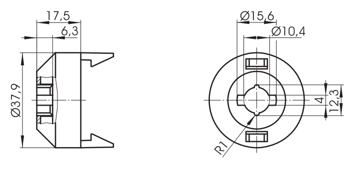
Cover caps
Material: PA GF
Moulded thread: M10x1
Cross groove for rotation stop: external
With locking screw
Weight: 4.7/4.9 g, unit: 500 pcs.
Type: 85077
Ref. No.: 400819 white
Ref. No.: 400820 black



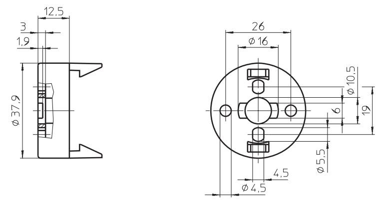
Cover caps
For E27 lampholders type 64770
Material: PA GF, black
Moulded thread: M10x1
Cross groove for rotation stop: external
Weight: 3.1/3.4 g, unit: 500 pcs.
Type: 97545
Ref. No.: 532390
Type: 80023 with locking screw
Ref. No.: 532391



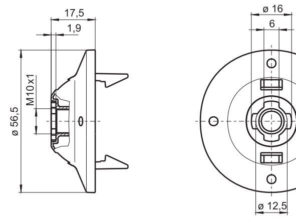
Cover caps
Material: PA GF
Profiled hole: Ø 10.4 mm
Rotation stop: internal and external
Weight: 5.7/5.9 g, unit: 500 pcs.
Type: 97698
Ref. No.: 109560 white
Ref. No.: 109184 black

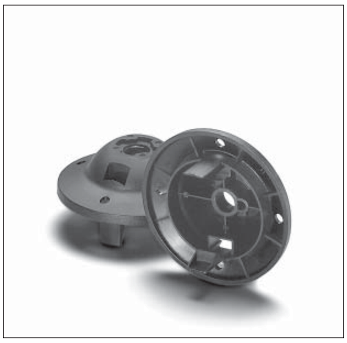


Cover caps
Material: PA GF
Round hole: Ø 10.5 mm
Rotation stop: external
Fixing holes for screws M4
Weight: 5.4/5.5 g, unit: 500 pcs.
Type: 97511
Ref. No.: 109045 white
Ref. No.: 109062 black

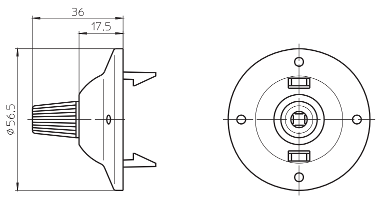


Cover caps
Conical shape
Material: PA GF
Moulded thread: M10x1
Cross groove for rotation stop: external
Weight: 8.9/8.8 g, unit: 500 pcs.
Type: 97260
Ref. No.: 109555 white
Ref. No.: 109556 black

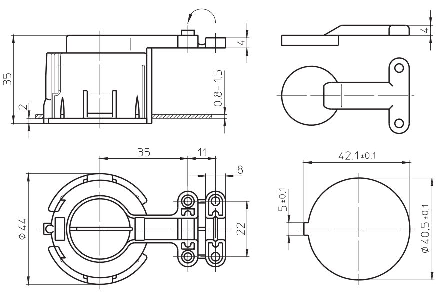




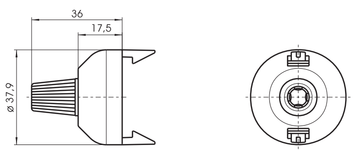
Cover caps
Conical shape
Material: PA GF
With integrated cord grip
For leads H03VV-F 2X0.5 or
H03VV-F 2X0.75
Weight: 10.6/10.5 g, unit: 500 pcs.
Type: 83282
Ref. No.: 109159 white
Ref. No.: 109462 black



Cover cap for lampholder 102624 (see p. 299)
With cord grip for self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
Cord grip for luminaires of protection class II
Material: PA GF, black
Weight: 12.5/2.2 g, unit: 500 pcs.
Type: 96206 cover cap
Ref. No.: 107178
Type: 96242 cord grip
Ref. No.: 107177



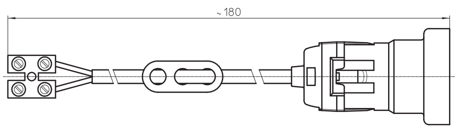
Cover caps
Material: PA GF
With integrated cord grip
For leads H03VV-F 2X0.5 or
H03VV-F 2X0.75
Weight: 6.6/5.8 g, unit: 500 pcs.
Type: 83283
Ref. No.: 504769 white
Ref. No.: 507075 black



E27 Renovation Kit Lampholders

For incandescent lamps with base E27

E27 renovation kit lampholders with suspension
Profiled shaped lampholder 64770 – T180
Cover cap with cord grip 532394
Nominal rating: 4/250
Lead: Cu, stranded conductors 0.75 mm²,
double PVC-insulation, length: 150 mm
Weight: 25.8/26.2 g, unit: 150 pcs.
Type: 64770
Ref. No.: 564680 black, with screw terminal
Ref. No.: 564681 black, with push-in terminal

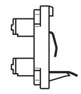


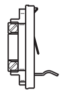
E27 Thermoplastic Lampholders, Three-piece

For incandescent lamps with base E27

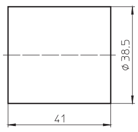
Nominal rating: 4/250
Temperature marking: T190
Brass-finished versions are available on request.

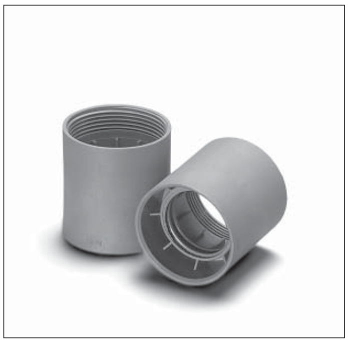
Inserts
Material: PET GF, black
Casing lock
Weight: 5.7/6.1 g, unit: 500 pcs.
Type: 83285 push-in terminals: 0.5–1.5 mm²
Ref. No.: 103643
Type: 83011 screw terminals: 0.5–2.5 mm²
Ref. No.: 103520



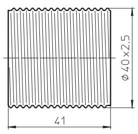


Plain casings
Material: PET GF
Weight: 14.5/14.3 g, unit: 500 pcs.
Type: 83000
Ref. No.: 103468 white
Ref. No.: 103467 black

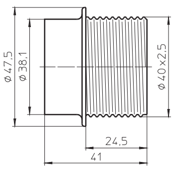




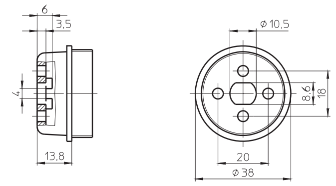
Threaded casings 40x2.5 IEC 60399
Material: PET GF
Weight: 17/16.1 g, unit: 500 pcs.
Type: 83002
Ref. No.: 103484 white
Ref. No.: 103483 black



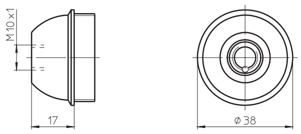
Threaded casings 40x2.5 IEC 60399
With flange
Material: PET GF
Weight: 16.7/17 g, unit: 500 pcs.
Type: 83173
Ref. No.: 103570 white
Ref. No.: 103569 black



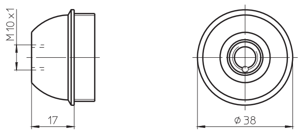
Caps
Material: PA GF
Profiled hole: ∅ 10.5x8.6 mm
Fixing holes for screws M4
Height: 13.8 mm
Weight: 5.6/6 g, unit: 500 pcs.
Type: 96148
Ref. No.: 109188 white
Ref. No.: 109187 black



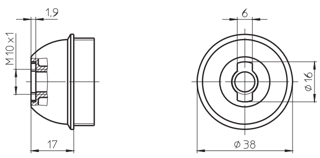
Caps
Material: PA GF
Female nipple: M10x1
Height: 17 mm
Weight: 9.8/10.1 g, unit: 500 pcs.
Type: 83007
Ref. No.: 109052 white
Ref. No.: 109039 black



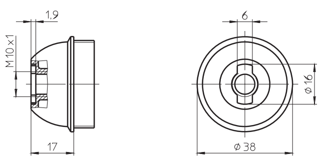
Caps with earth terminal
Material: PA GF
Female nipple: M10x1
Height: 17 mm
Weight: 10.7/11 g, unit: 500 pcs.
Type: 83035
Ref. No.: 109098 white
Ref. No.: 109099 black



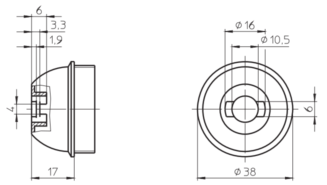
Caps
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
Height: 17 mm
Weight: 6.7/7 g, unit: 500 pcs.
Type: 96147
Ref. No.: 109195 white
Ref. No.: 109196 black



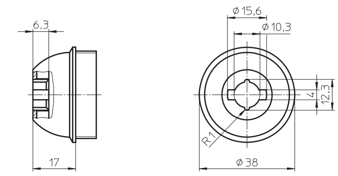
Caps
Material: PA GF
Moulded thread: M10x1
Rotation stop: external
With locking screw
Height: 17 mm
Weight: 7.1/7.3 g, unit: 500 pcs.
Type: 83293
Ref. No.: 109087 white
Ref. No.: 109074 black



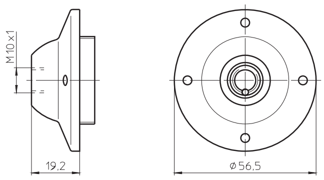
Caps
Material: PA GF
Round hole: ∅ 10.5 mm
Rotation stop: internal and external
Height: 17 mm
Weight: 5.9/6.6 g, unit: 500 pcs.
Type: 96154
Ref. No.: 109190 white
Ref. No.: 109191 black



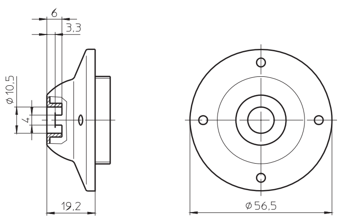
Caps
Material: PA GF
Profiled hole: ∅ 10.3 mm
Rotation stop: internal and external
Height: 17 mm
Weight: 5.9/6.6 g, unit: 500 pcs.
Type: 96124
Ref. No.: 109559 white
Ref. No.: 109512 black



Caps
Conical shape
Material: PA GF
Female nipple: M10x1
Height: 19.2 mm
Weight: 14.2/15.2 g, unit: 500 pcs.
Type: 83274
Ref. No.: 109081 white
Ref. No.: 109093 black



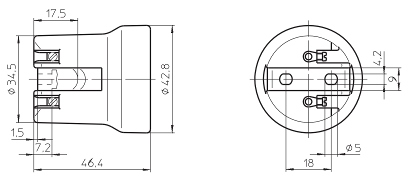
Caps
Conical shape
Material: PA GF
Round hole: ∅ 10.5 mm
Rotation stop: internal
Height: 19.2 mm
Weight: 10.4/10.6 g, unit: 500 pcs.
Type: 96172
Ref. No.: 109060 white
Ref. No.: 109044 black



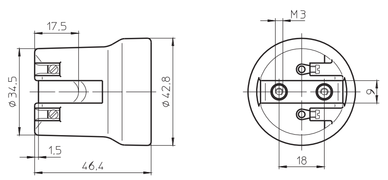
E27 Porcelain Lampholders

For incandescent lamps with base E27

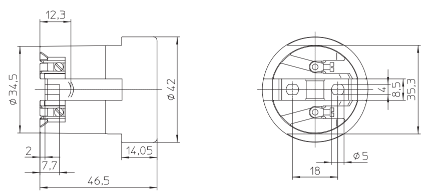
E27 lampholders, one-piece
Material: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing oblong holes for screws M4
Weight: 60.6 g, unit: 250 pcs.
Type: 62050
Ref. No.: 102599
Type: 62010 with lamp safety catch (with spring)
Ref. No.: 102577
Type: 62009 with lamp safety catch (with crushing)
Ref. No.: 544605



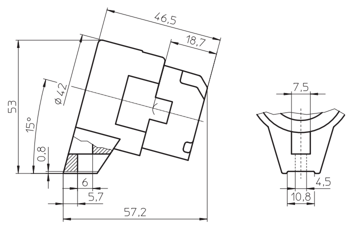
E27 lampholder, one-piece
Material: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing pillars for screws M3
Weight: 66.3 g, unit: 250 pcs.
Type: 62015
Ref. No.: 102582



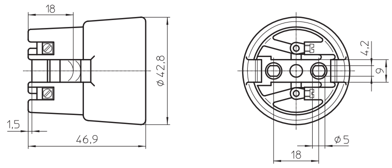
E27 lampholder, one-piece
Material: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing oblong holes for screws M4
Weight: 60.5 g, unit: 200 pcs.
Type: 62070
Ref. No.: 543304



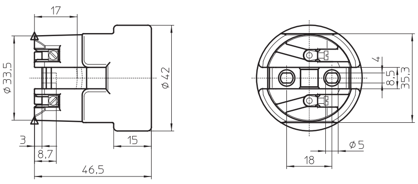
E27 lampholder, one-piece
Material: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
With lateral fixing flange,
tilt angle: 15°
Spring loaded central contact
Fixing hole for screw M4
Weight: 67.6 g, unit: 200 pcs.
Type: 62415
Ref. No.: 543414



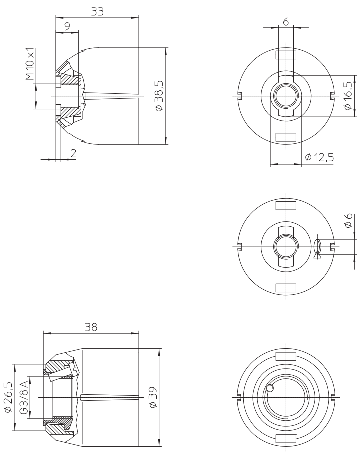
E27 lampholder, one-piece, for cover caps (see p. 291–293)
Material: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing oblong holes for screws M4
Weight: 66.5 g, unit: 250 pcs.
Type: 62310
Ref. No.: 102624



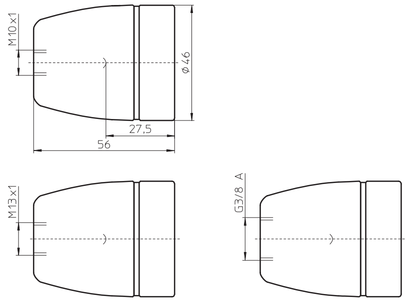
E27 lampholder
For cover caps type 80010, 97735 and 97742 (see below)
Material: porcelain, white, T270
Nominal rating: 4/250/5 kV
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact
Fixing holes for screw M4
Weight: 66.5 g, unit: 250 pcs.
Type: 62370
Ref. No.: 543303



Cover caps for lampholder 543303
Material: PA GF
Weight: 12.5/12.5/10/10 g, unit: 500 pcs.
Type: 97735 moulded thread: M10x1, without locking screw
Ref. No.: 536445 black
Ref. No.: 536446 white
Type: 97742 moulded thread: M10x1, with lateral hole, without locking screw
Ref. No.: 535247 black
Type: 80010 female nipple: G3/8A
Ref. No.: 535694 white



E27 lampholder, three-piece
Material: porcelain, white, T240, nominal rating: 4/250, screw terminals: 0.5–2.5 mm²
Weight: 116/125/116/125/121.7/130.7 g
Unit: 25 pcs.
Type: 62061 female nipple: M10x1
Ref. No.: 535684
Ref. No.: 535685 with earth screw
Type: 62062 female nipple: M13x1
Ref. No.: 536451
Ref. No.: 536452 with earth screw
Type: 62063 female nipple: G3/8A
Ref. No.: 534832
Ref. No.: 534833 with earth screw

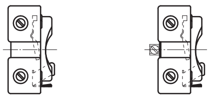


E27 Metal Lampholders, Three-piece

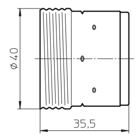
For incandescent lamps with base E27

Nominal rating: 4/250
Type: 670 plain casing
Type: 671 threaded casing 40x2.5
Temperature marking: T240

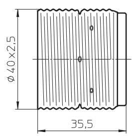
Inserts
Material: porcelain, white
Screw terminals: 0.5–2.5 mm²
Spring loaded central contact, casing lock
Weight: 22.8/23.3 g, unit: 500 pcs.
Type: 83221
Ref. No.: 103595
Type: 83223 with earth terminal
Ref. No.: 103597



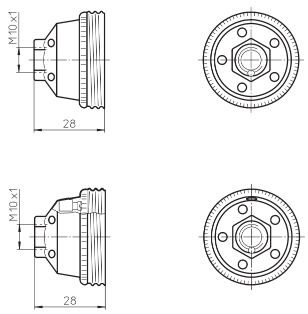
Plain casings
Material: zinc-coated polished steel
Weight: 23.5/22.9/27.1/27.1g
Unit: 500 pcs.
Type: 83218 insulating threaded ring: PPS
Ref. No.: 103582 chrome-finish
Ref. No.: 103583 brass-finish
Type: 83226 insulating threaded ring: steatite
Ref. No.: 504640 chrome-finish
Ref. No.: 504641 brass-finish



Threaded casings 40x2.5 IEC 60399
Material: zinc-coated polished steel
Weight: 24/23.1/27.3/27.6 g
Unit: 500 pcs.
Type: 83219 insulating threaded ring: PPS
Ref. No.: 103590 chrome-finish
Ref. No.: 103591 brass-finish
Type: 83227 insulating threaded ring: steatite
Ref. No.: 504643 chrome-finish
Ref. No.: 504644 brass-finish



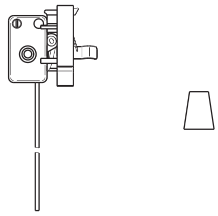
Caps
Material: zinc-coated polished steel
Female nipple: M10x1
Weight: 10.6/10.8/11.4/11.3 g
Unit: 500 pcs.
Type: 80342
Ref. No.: 103020 chrome-finish
Ref. No.: 103021 brass-finish
Type: 80343 with earth terminal
Ref. No.: 103026 chrome-finish
Ref. No.: 103027 brass-finish



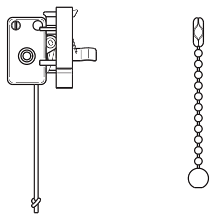
E27 Thermoplastic Pull-switch Lampholders

For incandescent lamps with base E27

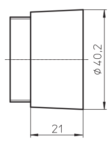
Nominal rating: 2/250
Type: 65300 plain casing, with pull cord
Type: 65308 plain casing, with draw chain
Type: 65400 threaded casing 40x2.5, with pull cord
Type: 65408 threaded casing 40x2.5, with draw chain



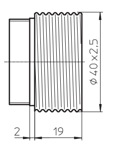
Insert with pull cord
Material: PET GF, black
Screw terminals: 0.5–2.5 mm²
Length of cord: 250 mm
Weight: 12.3 g, unit: 500 pcs.
Type: 83146
Ref. No.: 507802
End button for pull cord, material: PS, white
Weight: 0.8 g, unit: 500 pcs.
Type: 96010
Ref. No.: 105144



Insert for brass chain
Material: PET GF, black
Screw terminals: 0.5–2.5 mm²
Weight: 11.7 g, unit: 500 pcs.
Type: 83147
Ref. No.: 507803
Draw chain with end button
Material: brass, length of chain: 85 mm
Weight: 3.9 g, unit: 500 pcs.
Type: 94304
Ref. No.: 104928

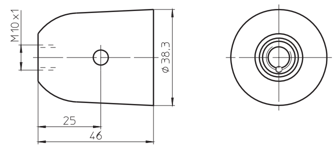


Plain casings
Material: PET GF
Weight: 11.7 g, unit: 500 pcs.
Type: 96033
Ref. No.: 105179 white
Ref. No.: 109280 black

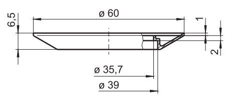


Threaded casings 40x2.5 IEC 60399
Material: PET GF
Weight: 9.3 g, unit: 500 pcs.
Type: 96034
Ref. No.: 105185 white
Ref. No.: 109281 black

Caps
Material: PET GF
Female nipple: M10x1
Weight: 19.8/19.4 g, unit: 500 pcs.
Type: 83258
Ref. No.: 109282 white
Ref. No.: 109283 black



Flange rings
For pull-switch lampholders type 654
Material: PA GF
Ø 60 mm, height: 6.5 mm
Weight: 3/3.1 g, unit: 500 pcs.
Type: 08400
Ref. No.: 501351 white
Ref. No.: 501352 black

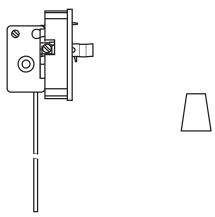


E27 Metal Pull-switch Lampholders

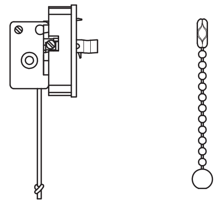
For incandescent lamps with base E27

Nominal rating: 2/250
Type: 55204 plain casing, with pull cord
Type: 55203 plain casing, with draw chain
Type: 55304 threaded casing 40x2.5, with pull cord
Type: 55303 threaded casing 40x2.5, with draw chain

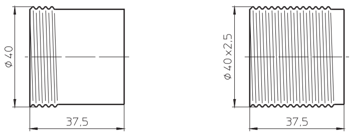
Insert with pull cord
Material: porcelain, white
Screw terminals: 0.5–2.5 mm²
Length of cord: 250 mm, casing lock
Weight: 28 g, unit: 500 pcs.
Type: 83006
Ref. No.: 103504
End button for pull cord, material: PS, white
Weight: 0.8 g, unit: 500 pcs.
Type: 96010
Ref. No.: 105144



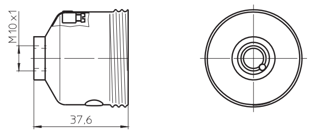
Insert for brass chain
Material: porcelain, white
Screw terminals: 0.5–2.5 mm²
Weight: 29.4 g, unit: 500 pcs.
Type: 83008
Ref. No.: 103515
Draw chain with end button
Material: brass, length of chain: 85 mm
Weight: 3.9 g, unit: 500 pcs.
Type: 94304
Ref. No.: 104928



Casings
Material: brass, passivated
Insulating threaded ring: PPS
Weight: 21.5/22.7 g, unit: 500 pcs.
Type: 83218 plain casing
Ref. No.: 103587
Type: 83219 threaded casing 40x2.5
Ref. No.: 103594



Cap with earth terminal
Material: brass, passivated
Female nipple: M10x1
With insulating insert
Weight: 20 g, unit: 500 pcs.
Type: 80014
Ref. No.: 102956

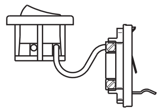


E27 Thermoplastic Rocker Switch Lampholders

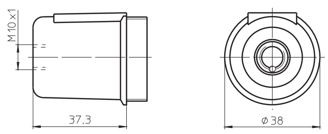
For incandescent lamps with base E27

Nominal rating: 2/250
Temperature marking: T180
Suitable casings see page 295:
Type: 83000 plain casing
Type: 83002 threaded casing 40x2.5
Type: 83173 threaded casing 40x2.5, with flange

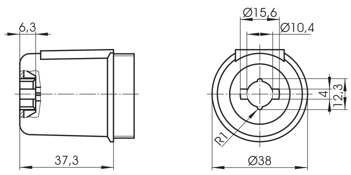
Inserts with switch
Material: PET GF, white
Screw terminals: 0.5–2.5 mm²
Weight: 11/11.1 g, unit: 500 pcs.
Type: 83015
Ref. No.: 107331 switch, white
Ref. No.: 107096 switch, black



Caps
Material: PA GF
Female nipple: M10x1
Weight: 14.2/14.7 g, unit: 500 pcs.
Type: 83260
Ref. No.: 109198 white
Ref. No.: 109199 black



Caps
Material: PA GF
Profiled hole: Ø 10.4 mm
Rotation stop: internal and external
Weight: 8.2/10.4 g, unit: 500 pcs.
Type: 96229
Ref. No.: 109200 white
Ref. No.: 109201 black

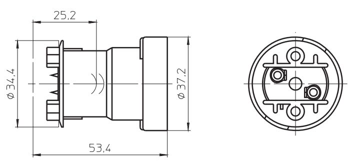


E27 Festoon Lampholders

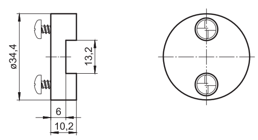
For lighting chains of protection class II

Degree of protection: IP44
Type: 64710/11
The lampholders may only be operated with the lamp pointing downwards and with a gasket.

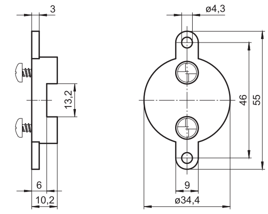
E27 festoon lampholder
For lamps max. 40 W
Material: PBT GF, black
Nominal rating: 4/250
Blade contacts
for festoon lead H05RN H2-F 2X1.5
To be used only with protection cap
Weight: 13.8 g, unit: 500 pcs.
Type: 83297
Ref. No.: 109158



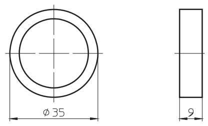
Protection cap
For E27 festoon lampholders
Material: PA GF, black
With ready-fitted stainless screws
Weight: 6.3 g, unit: 500 pcs.
Type: 83300 with non-removable screws
Ref. No.: 109243



Protection cap
For E27 festoon lampholders
Material: PA GF, black
With ready-fitted stainless screws
Fixing holes for screws M4
Weight: 7.2 g, unit: 500 pcs.
Type: 83301 with non-removable screws
Ref. No.: 502515



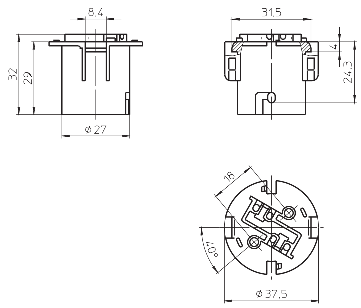
Gasket
For E27 festoon lampholders
Material: silicone
Weight: 4 g, unit: 500 pcs.
Type: 98006
Ref. No.: 106817



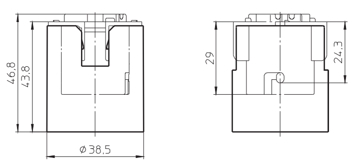
B22d Lampholders, Accessories

For mains voltage halogen incandescent lamps

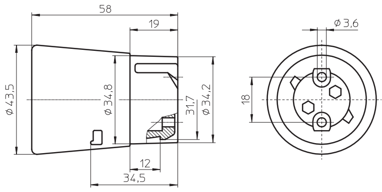
B22d lampholders
For cover caps (see p. 291–293)
Nominal rating: 2/250
Push-in twin terminals: 0.5–1.5 mm²
Fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST3.9-C/F
Weight: 12.7/12.3 g, unit: 500 pcs.
Type: 64800
Ref. No.: 108748 PET GF, T180, white
Ref. No.: 544621 PET GF, T210, white



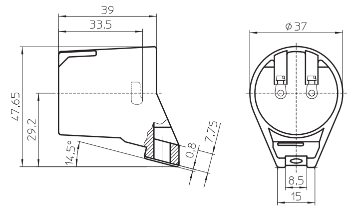
Plain casing
For B22d lampholders type 64800
For cover caps (see p. 291–293)
Threaded casing on request
Material: PA GF, white
Weight: 14.5 g, unit: 500 pcs.
Type: 96021
Ref. No.: 504749



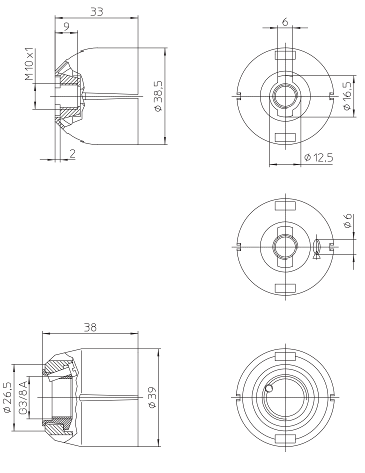
B22d lampholder
With protection flange
For cover caps type 80010, 97735
and 97742 (see below)
Casing: porcelain, white, T240
Nominal rating: 2/250
Screw terminals: 0.5–2.5 mm²
Fixing holes for screws M3
Weight: 84.7 g, unit: 150 pcs.
Type: 64900
Ref. No.: 535673



B22d lampholder
Casing: porcelain, white, T240
Nominal rating: 2/250
Screw terminals: 0.5–2.5 mm²
Lateral fixing bracket
Tilt angle: 15°
Fixing hole for screws M4
Weight: 70 g, unit: 150 pcs.
Type: 64940
Ref. No.: 535674



Cover caps for lampholder 535673
Material: PA GF
Weight: 12.5/12.5/10/10 g, unit: 500 pcs.
Type: 97735 moulded thread: M10x1,
without locking screw
Ref. No.: 536445 black
Ref. No.: 536446 white
Type: 97742 moulded thread: M10x1,
with lateral hole, without locking screw
Ref. No.: 535247 black
Type: 80010 female nipple: G3/8A
Ref. No.: 535694 white

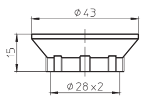


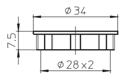
Accessories

For E14, E27 lampholders, one-piece and three-piece and B22d lampholders

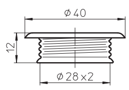
The luminaire manufacturer is responsible for the right choice of accessories.
Brass-finished versions are available on request.

Plastic screw rings
For E14 lampholders
with external thread 28x2 IEC 60399
Weight: 3.6/3.2/1.8/1.6 g, unit: 1000 pcs.
Type: 03210 ∅ 43 mm, height: 15 mm
Ref. No.: 100125 PET GF, white
Ref. No.: 109162 PA GF, black
Type: 05202 ∅ 34 mm, height: 7.5 mm
Ref. No.: 107154 PET GF, white
Ref. No.: 109166 PA GF, black

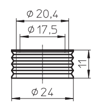




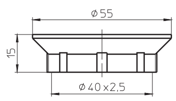
Metal screw ring
For E14 lampholders
with external thread 28x2 IEC 60399
Material: zinc-coated polished steel, chrome-finish
∅ 40 mm, height: 12 mm
Weight: 4.3 g, unit: 500 pcs.
Type: 06700
Ref. No.: 100194

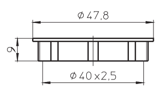


Front gasket
For E14 lampholders type 64305, 64306, 64308, 64313, 64316, 64360, 64380 and 64381
As lamp safety catch and for protection against moisture acc. to IEC 60079-15
Material: elastomer
Weight: 1.1 g, unit: 2000 pcs.
Type: 98013
Ref. No.: 534689

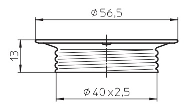


Plastic screw rings
For E27 and B22d lampholders
Weight: 4.9/4.4/3.3/3 g, unit: 500 pcs.
Type: 08610 ∅ 55 mm, height: 15 mm
Ref. No.: 100270 PET GF, white
Ref. No.: 109285 PA GF, black
Type: 08701 ∅ 47.8 mm, height: 9 mm
Ref. No.: 100273 PET GF, white
Ref. No.: 109291 PA GF, black

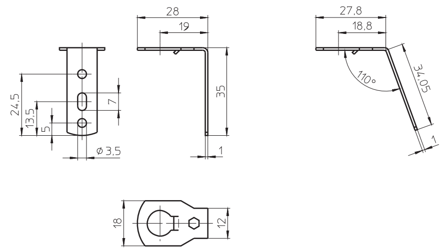




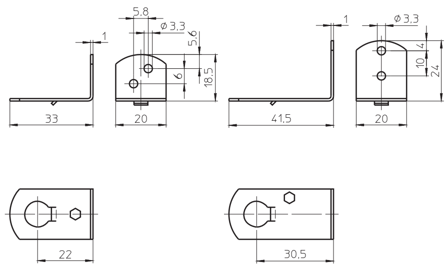
Metal screw ring
For E27 and B22d lampholders
Material: zinc-coated polished steel, chrome-finish
Ø 56.5 mm, height: 13 mm
Weight: 7 g, unit: 500 pcs.
Type: 07400
Ref. No.: 100217



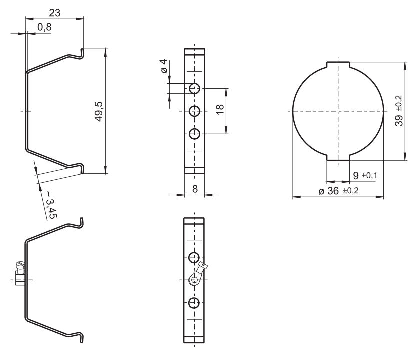
Brackets for E14 lampholders
For fastening with nipples 109249, 109247
Material: zinc-coated polished steel
Fixing holes for screws M3
Weight: 5.5/5.3/5.3 g, unit: 1000 pcs.
Type: 94068 internal bracket 90°
Ref. No.: 106767
Type: 94066 external bracket 90°
Ref. No.: 400671
Type: 94069 internal bracket 110°
Ref. No.: 106768



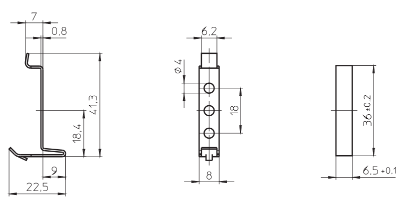
Bracket 90° for E14 lampholders
For fastening with nipples 109249, 109247
Material: zinc-coated polished steel
Fixing holes for screws M3
Weight: 6.2/8.5/8.5 g, unit: 1000 pcs.
Type: 94074 external bracket 18.5x33 mm
Ref. No.: 106802 holes diagonal
Type: 94067 external bracket 24x41.5 mm
Ref. No.: 106766 holes vertical
Type: 94079 internal bracket 24x41.5 mm
Ref. No.: 506211 holes vertical



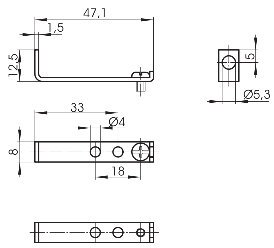
U-shaped clips
For E27 lampholders, one-piece
Material: zinc-coated polished steel, chrome-finish
For wall thickness: 0.5–2 mm
Weight: 3.7/4.3 g, unit: 2500 pcs.
Type: 94435
Ref. No.: 109621
Type: 80433 with earth terminal
Ref. No.: 103087



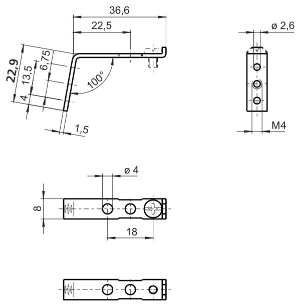
Base clips
For E14 and E27 lampholders, one-piece
Material: zinc-coated polished steel, chrome-finish
For wall thickness: 0.8–1.5 mm
Weight: 3.3/4 g, unit: 2500 pcs.
Type: 94436
Ref. No.: 109622
Type: 80474 with earth terminal
(without drawing)
Ref. No.: 400699



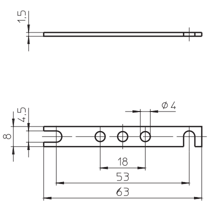
Brackets: 90°, 12.5x47.1 mm
For E14 and E27 lampholders, one-piece
Material: zinc-coated polished steel, chrome-finish
Fixing hole for screw M5
Weight: 5.6/4.8 g, unit: 500 pcs.
Type: 80475 with earth terminal
Ref. No.: 400779
Type: 94444
Ref. No.: 401536



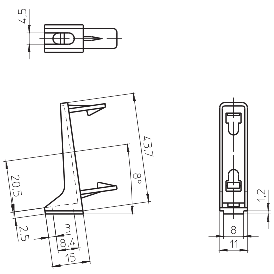
Brackets: 100°, 22.9x36.6 mm
For E14 and E27 lampholders, one-piece
Material: zinc-coated polished steel, chrome-finish
Fixing holes for self-tapping screws
acc. to ISO 1481/7049-ST2.9-C/F
Tapped hole M4
Weight: 5.5/4.6 g, unit: 1000 pcs.
Type: 80476 with earth terminal
Ref. No.: 400772
Type: 94438
Ref. No.: 401549



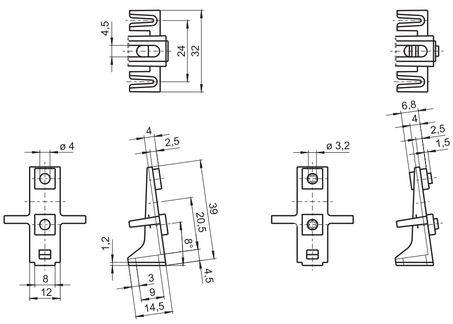
Fixing bracket
For E14 and E27 lampholders, one-piece
Material: zinc-coated polished steel, chrome-finish
With slots for screws M4
Weight: 4.6 g, unit: 1000 pcs.
Type: 94450
Ref. No.: 106829

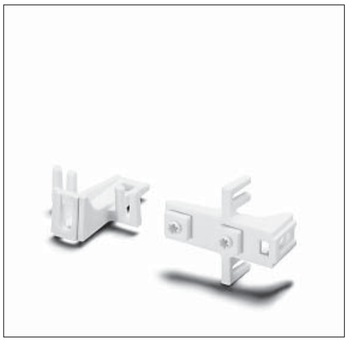


Fixing bracket: 8°
For E27 thermoplastic lampholders
type 64719 (see p. 289) and for B22d
thermoplastic lampholders type 648 (see p. 313)
For clicking-on onto the lampholder
Material: PA, white
Oblong hole for screw M4
Weight: 1.9 g, unit: 500 pcs.
Type: 97194
Ref. No.: 108956



Fixing brackets: 8°, 14.5x39 mm
For E27 thermoplastic lampholders, one-piece
Material: PET GF, white
With cable holder
Oblong hole for screw M4
Weight: 3/3.6 g, unit: 1000 pcs.
Type: 97750 fixing holes: Ø 4 mm
Ref. No.: 109725
Type: 97752 fixing holes for self-tapping
screws acc. to ISO 1481/7049-ST3.9-C/F
Ref. No.: 109728





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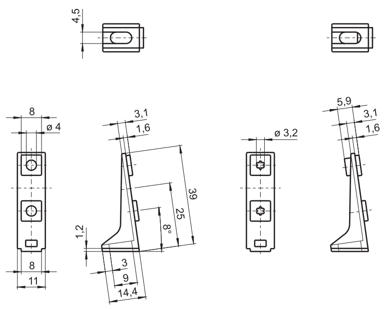
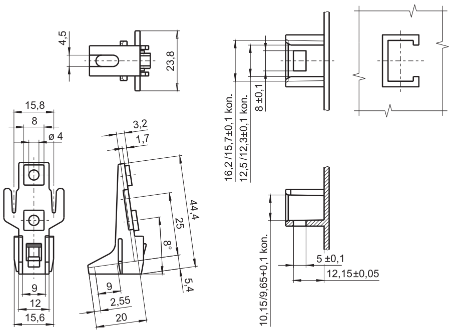
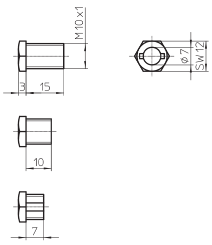
Fixing brackets: 8°, 14.4x39 mm
For E27 thermoplastic lampholders, one-piece
Material: PET GF, white
Oblong hole for screw M4
Weight: 1.9/4.3 g, unit: 1000 pcs.
Type: 97159 fixing holes: ∅ 4 mm
Ref. No.: 108304
Type: 97755 fixing holes for self-tapping screws acc. to ISO 1481/7049-ST3.9-C/F
Ref. No.: 400732



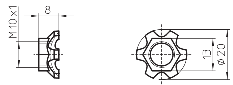
Fixing bracket: 8°, 20x44.4 mm
For E27 thermoplastic lampholders, one-piece
Material: PET GF, white
Fixing holes: ∅ 4 mm
With cable holder
Oblong hole for screw M4
Weight: 3.7 g, unit: 1000 pcs.
Type: 97754
Ref. No.: 401970



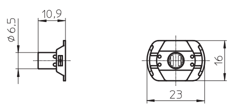
Nipples
For E14 cover caps with moulded thread: M10x1
Cross groove for rotation stop: external
For E27 caps (see p. 296–297), for fastening of brackets 106766 and 106802 (see p. 308)
Material: PA, white
Male nipple: M10x1, with hexagon flange
Weight: 0.5 g, unit: 1000 pcs.
Type: 09700/09703/09708
Ref. No.: 538089 length: 15 mm
Ref. No.: 109249 length: 10 mm
Ref. No.: 109247 length: 7 mm



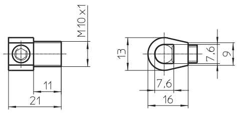
Locking nut for thread M10x1
Material: PA GF
Weight: 0.9 g, unit: 1000 pcs.
Type: 97267
Ref. No.: 507797 white
Ref. No.: 507798 black



Cord grip with insulating socket
For E14 and E27 lampholders
Material: PA, natural
For luminaires of protection class II
For leads H03VVH2-F 2X0.75
Weight: 0.6 g, unit: 1000 pcs.
Type: 97632
Ref. No.: 534097

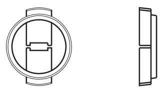


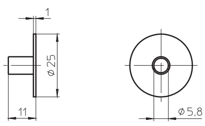
Cable grips
For leads H03VV-F and H03VVH2-F 2X0.5
or 2X0.75
Material: PA
Male nipple: M10x1, length: 11 mm
With locking screw
Weight: 1.6/1.5 g, unit: 1000 pcs.
Type: 09701
Ref. No.: 109248 white
Ref. No.: 109253 black



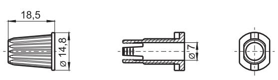
Cord grip
For E14 lampholders, three-piece,
with cap height: 19 mm
For leads H03VVH2-F
Material: PA, black
Weight: 0.6 g, unit: 1000 pcs.
Type: 09501
Ref. No.: 106948

Cord grip
For E27 lampholders, three-piece (without switch)
For leads H03VVH2-F
Weight: 0.9 g, unit: 1000 pcs.
Type: 09502
Ref. No.: 106949 PA, black
Insulating socket
Material: PA, transparent
Weight: 0.5 g, unit: 1000 pcs.
Type: 09705
Ref. No.: 109592

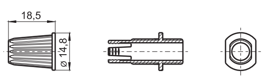




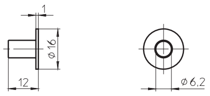
Cord grips
For leads H03VV-F 2X0.5 or
H03VV-F 2X0.75
Material: PA
Weight: 0.9/0.8/1.7/1.6 g, unit: 1000 pcs.
Type: 09606 cord grips
Ref. No.: 506026 white
Ref. No.: 506027 black
Type: 96160 screw caps
Ref. No.: 109318 white
Ref. No.: 109317 black



Cord grips
For leads H03VV-F 2X0.5 or
H03VV-F 2X0.75
Material: PA, male nipple: M10x1
Weight: 1/0.9/1.7/1.6 g, unit: 1000 pcs.
Type: 09607 cord grips
Ref. No.: 506024 white
Ref. No.: 506020 black
Type: 96160 screw caps
Ref. No.: 109318 white
Ref. No.: 109317 black



Insulating socket for E14 lampholders
Material: PA, transparent
Weight: 1 g, unit: 1000 pcs.
Type: 09704
Ref. No.: 109600

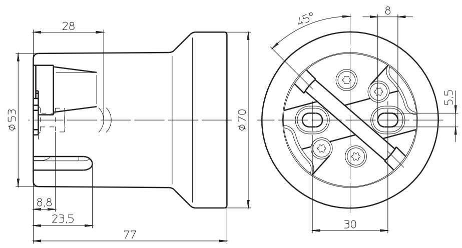


E40 Porcelain Lampholders

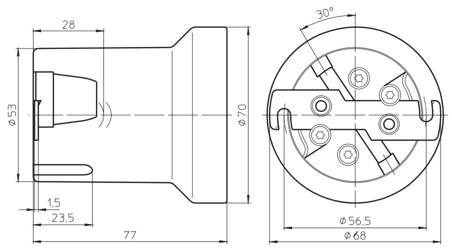
For incandescent lamps with base E40

Nominal rating: 18/500/5 kV
Screw terminals: 1.5–4 mm²
Spring loaded central contact

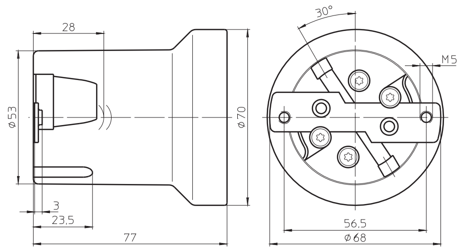
E40 lampholders
Material: porcelain, white, T270
Oblong holes for screws M5
Weight: 224/229.3/224/229.3 g
Unit: 48 pcs.
Type: 12800/12801
Ref. No.: 108208
Ref. No.: 107780 with lamp safety catch
With steel thread
Ref. No.: 532602
Ref. No.: 532603 with lamp safety catch

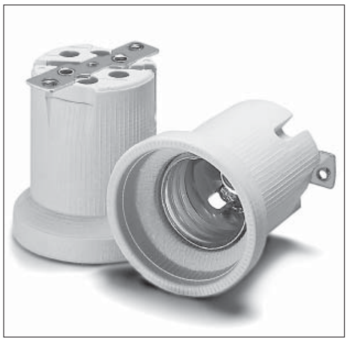


E40 lampholders
Material: porcelain, white, T270
Fixing bracket with slots for screws M5
Weight: 252.3/243/252.3/243 g
Unit: 48 pcs.
Type: 12810/12811
Ref. No.: 108374
Ref. No.: 108375 with lamp safety catch
With steel thread
Ref. No.: 532604
Ref. No.: 532605 with lamp safety catch



E40 lampholders
Material: porcelain, white, T270
Fixing bracket with tapped holes
for screws M5
With lamp safety catch
Weight: 252.8 g, unit: 48 pcs.
Type: 12812
Ref. No.: 108373
With steel thread
Ref. No.: 532606





5 Components for Incandescent Lamps

Transformers and converters for low-voltage halogen lamps

Operating low-voltage halogen lamps depends on operating devices that transform the usual mains voltage of 230 V to under 24 V. Safety transformers, of either electromagnetic or electronic (converter) design, have been in almost exclusive use for several years now. The type plate of electromagnetic transformers bears the symbol for safety transformers in accordance with VDE 0570, corresponding to EN 61558. Electronic converters are marked with the sign for Safety Extra-Low Voltage (SELV), which indicates that the product is an isolating converter whose secondary output is safe to touch even during no-load operation.

All Vossloh-Schwabe transformers are safety transformers, i.e. isolation transformers for supplying SELV (safety extra-low voltage) and PELV (protection extra-low voltage) circuits. With such systems, the voltage must not exceed a value of 50 V AC or 120 V DC (smoothed) between the conductors or a conductor and the earth conductor of a circuit that is separated from the mains by a safety transformer. The specified values apply for protected (non-touchable) voltages; 25 V AC and 60 V DC (smoothed) apply for exposed (touchable) voltages.

Depending on their design features to protect against touchable live parts, transformers and converters fall into one of two protection classes. Operating devices of protection class I are base-insulated and have a protective earth conductor connection terminal that must be connected to the protective earth conductor for safety reasons. Isolating transformers and converters of protection class II are equipped with double or reinforced insulation that protects against dangerous casing currents; these operating devices are solely available as independent operating devices (also see page 353; Protection Classes of Luminaires and Operating Devices).

Electronic converters can also be fitted with a functional earth terminal that must be connected to a functional earth to ensure compliance with EMC requirements. In addition, some electronic converters are designed in such a way that neither a protective earth conductor nor a functional earth needs to be connected.

Operating devices can also be differentiated according to the way they are used. Built-in transformers have to be installed in a permanent casing, e.g. a luminaire. In contrast, so-called independent transformers and converters can be operated independently of a luminaire. These are often found in ceiling installations; in order to prevent possible noise development, isolation transformers must be mounted in such a way as to avoid vibration transmission.

Transformers or converters bearing the MM mark can be mounted on surfaces of unknown flammability, which can be the case when mounting these devices on wooden furniture elements. Such devices comply with the temperature requirements of VDE 0710, part 14, of < 95 °C during normal and < 115 °C during abnormal operation.

Converters are labelled with a t_c point. The stipulated temperature (e.g. 75 °C) must not be exceeded when installed so that the service life of the converter is not shortened. The temperature quoted in the triangle (e.g. 110) denotes that the surface of the converter must never (even in the event of a defect) exceed this temperature.

Protection symbols

Safety transformer

SELV

Safety Extra Low Voltage

Protection class II

Independent operating device

M M

Furniture installation
Normal operation < 95 °C
Abnormal operation < 115 °C

If the maximum value of 130 °C is not exceeded, the luminaire does not have to be tested in accordance with F conditions.

t_c = 75 °C
Measuring point for maximum permissible casing temperature

110

Temperature-protected converter (in this case < 110 °C)

1 2 3 4 5 6 7 8 9 10

Dimmability of VS transformers and VS converters

Electromagnetic VS transformers can be controlled using phase-cutting leading-edge dimmers. These dimmers "cut" the sinusoidal mains voltage in the negative and positive half wave at an angle in the ascending portion of this sinusoidal half wave. The higher the angle is set at the dimmer controls, the lower the effective value of the voltage and hence the lamp's output.

Electronic VS converters can be controlled using phase-cutting trailing-edge dimmers. In this case, a semiconductor ensures the predefined descending portion of the sinusoidal half wave is clipped, i.e. the voltage is reduced in reverse mode. Again, higher the angle is set at the dimmer controls, the lower the effective value of the voltage and hence the lamp's output.

Converters of the LiteLine (EST 70/12.380, EST 105/12.381, EST 150/12.622 and EST 60/12.635) families can be operated using conventional phase-cutting trailing-edge and phase-cutting leading-edge dimmers.

Electronic Converters

The safe operation of electronic converters is dependent on the maximum permissible temperature not being exceeded at the measuring point. Vossloh-Schwabe has determined a casing temperature measuring point – $t_{c\ max}$. – on all converter casings. To avoid shortening the service life or diminishing operating safety, the stipulated maximum temperature must not be exceeded at this tc point. This point is determined by testing the converter during normal, IEC-standardised operation at the specified max. ambient temperature (ta), which is also indicated on the type plate. As both the design-related ambient temperature and the converter's inherent heat generation, as determined by the installed load, are subject to great variation, the casing temperature should be tested at the converter's tc point under real installation conditions.

Temperature-protected converters feature a further protection symbol, namely a triangle containing the maximum temperature. This symbol certifies that the stipulated surface temperature of the device casing will not be exceed during any operating state or in the event of a defect.

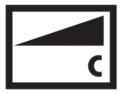
Vossloh-Schwabe electronic converters are tested in accordance with EN 61347. Function tests are carried out in accordance with EN 61047. VS converters can be operated without causing any inadmissible system reactions as all devices comply with EN 61000-3-2 on the limitation of mains harmonics. They also meet the EMC requirements of EN 61547. These devices are thus also protected against mains surges (as defined in the standard) that can be caused by, for instance, inductive ballasts during combined operation of fluorescent and low-voltage halogen lamps.

In addition, all devices comply with the RFI requirements of EN 55015. As the highly effective integrated filter can only limit the unit's own interference, the secondary conductor should be kept to under 2 metres in length so as to avoid RFI interference in the lighting system.

Dimmable using phase-cutting leading-edge or trailing-edge dimmers

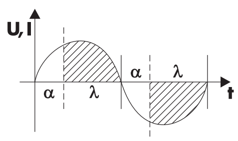
Dimmable using phase-cutting leading-edge dimmers

Dimmable using phase-cutting trailing-edge dimmers

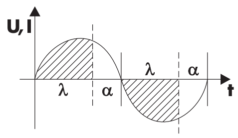


Working principle of a phase-cutting leading-edge dimmer

α = Ignition angle
λ = Operating angle
U = Voltage
I = Current



Working principle of a phase-cutting trailing-edge dimmer



Assembly Instruction for Electronic Converters

For mounting and installing electronic converters for low-voltage halogen lamps

Mandatory regulations

DIN VDE 0100	Erection of low voltage installations
EN 60598-1	Luminaires – part 1: general requirements and tests
EN 61000-3-2	Electromagnetic compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (device input current up to and including 16 A per conductor)
EN 55015	Maximum values and methods of measurement for RFI suppression in electrical lighting installations and similar electrical appliances
EN 61547	Installations for general lighting purposes – EMC immunity requirements
EN 61347-1	Operating devices for lamps – part 1: general and safety requirements
EN 61347-2-2	Operating devices for lamps – part 2-2: special requirements for DC- or AC-powered electronic converters for incandescent lamps
EN 61047	DC- or AC-powered electronic converters for incandescent lamps – performance requirements

Designations for VS converters

Designations for electronic converters are first listed by the name of the product family, which in each case reflects the visible product properties. The type designation should be read as follows:

EST	60	/12	.388
Electronic safety transformer	Max. wattage	Lamp voltage	Serial number

Mechanical mounting

Mounting position	Any
Clearance	Min. of 0.1 m from walls, ceilings, insulation; min. of 0.1 m from other electronic converters; min. of 0.25 m from sources of heat (lamp)
Surface	Solid; device must not be allowed to sink into insulation materials
Mounting location	In dry rooms or in luminaires, cases, casings or similar in the instance of built-in converters
Fastening	Independent converters: using screws, ∅ 4 mm
Heat transfer	If the electronic converter is destined for installation in a luminaire, sufficient heat transfer must be ensured between the converter and the luminaire casing. During operation, the t_c point must not exceed the specified value.

Technical specifications

Type		Operating voltage range AC	Dimmability		Temperature protection	Through-wiring[3]	Type of automatic cut-out and number of possible VS devices			
		Unsuitable for DC operation	Phasecutting trailing edge[1]	Phasecutting leading edge[1]	Electronic control[2]	Converter quantity	B (10A)	B (16A)	C (10A)	C (16A)
LiteLine	EST 70/12.380	230–240	x	x	x	–	28	45	28	45
	EST 105/12.381	230–240	x	x	x	–	20	32	20	32
	EST 150/12.622	230–240	x	x	x	–	14	23	14	23
...Mini	EST 60/12.635	220–240	x	x	x	–	35	56	35	56

1 The dimmer is connected to the primary side between mains and converter.
It is possible to connect several converters to one dimmer (whereby the dimmer's minimum and maximum load must be observed).
The dimmer-converter system should be subjected to function and noise development tests prior to installation.
2 The rating is decreased electronically in the event of overheating.
3 Distributed secondary leads are only permitted on non-metallic surfaces (RFI suppression)

Properties of electronic converters

Overheating — Protection against overheating is provided by an electronic controller (see table above).

Short-circuit — The converter will be electronically disconnected in the event of a short-circuit at the output; once the short-circuit has been eliminated, the converter will switch on again automatically.

Overload — Minor overloads (< 50%) will trigger the temperature switch against overheating; major overloads (> 50%) will trigger the same reaction as for short-circuit.

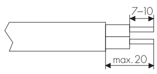
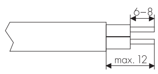
Should any of the above-mentioned safety functions be triggered, disconnect the converter from the power supply, then find and eliminate the cause of the problem.

Protection against transient mains peaks
Values compliant with EN 61547 (immunity)

Electrical installation

Conductors Primary conductor cross-section: min. 0.75 mm²
Secondary conductor cross-section: min. 0,75 mm² for 50 W output and min. 1 mm² for 100 W output

Stripping

Converter	60/12.635	70/12.380, 105/12.381, 150/12.622
Type of lead	All usual types of lead up to 4 mm²	H03-VVH2-F 2X0.75 H05-VVH2-F 2X0.75 H03-VV-F 2X0.75 H05-VV-F 2X0.75
Lead preparation		

Connections Screw terminals: max. initial torque of 0.4 Nm must not be exceeded

Secondary length
Min. 0.25 m (clearance to lamp), max. 2 m (RFI protection)

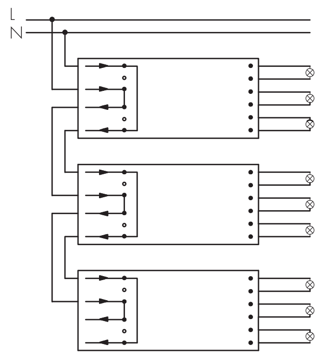
Secondary wiring
Min. 0.1 m clearance from the mains (RFI protection)

Star wiring Twist single-wire or lead wires narrowly; silicone-insulated leads are recommended

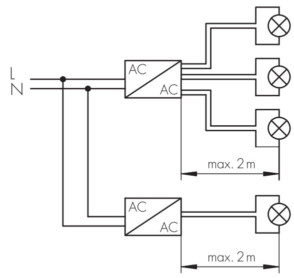
Parallel connection
Secondary-side parallel connection is inadmissible

Feed-through of the mains voltage
See table on page 318
Distributed secondary leads are only permitted on non-metallic surfaces (RFI suppression)

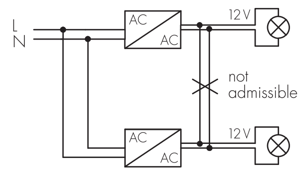
Connection circuit



Lead length



Wiring



Selection of automatic cut-outs for VS converters

Dimensioning automatic cut-outs
High transient mains current pulses occur when a converter is switched on because the capacitor has to load. As the lamps ignite almost simultaneously, this also creates a high power drain. The high currents that occur when the system is switched on put a strain on the automatic conductor cut-outs, which must be selected and dimensioned to suit.

Release reaction Release reaction of automatic cut-outs in accordance with VDE 0641, Part 11; for B and C characteristics. The values provided in the table on page 318 are meant as guidelines only and may vary depending on the respective lighting system.

No. of converters The maximum number of VS converters (see table on page 318) applies to cases where the devices are switched on simultaneously. Specifications apply to single-pole fuses. The number of permissible ballasts must be reduced by 20% for multi-pole fuses. The considered circuit impedance equals 400 mΩ (approx. 20 m [2.5 mm²] of conductor from the power supply to the distributor and a further 15 m to the luminaire).

Dimmability of electronic converters

Dimmed operation

VS converters can be operated with phase-cutting trailing-edge dimmers. Some converters can additionally be operated with phase-cutting leading-edge dimmers (see table on page 326). The dimmer is connected to the primary side between mains and converter. It is possible to connect several converters to one dimmer (whereby the dimmer's minimum and maximum load must be observed). The dimmer-converter system should be subjected tofunction and noise development tests prior to installation.

Electromagnetic compatibility (EMC)

Mains Harmonics

Maximum values are observed in accordance with EN 61000-3-2.

Interference

The requirements of EN 55015 must be met for luminaires with converters for operating low-voltage halogen lamps.
Vossloh-Schwabe converters are designed and manufactured to ensure these requirements are satisfied provided the installation instructions regarding the interference voltage at the connection terminals and electromagnetic interference fields up to 300 MHz are observed.

Additional information

Wiring

To ensure good radio interference suppression and the greatest possible operating safety, the following points should be observed when installing electronic converters:

- Conductors between the EST and the lamp (HF conductors) must be kept short (reduction of electromagnetic interference).
- Mains and lamp conductors must be kept separate and if possible should not be laid in parallel to one another. The distance between HF conductors and mains conductors should be as large as possible, ideally > 5 cm. (This prevents the induction of interference between the mains and lamp conductors).
- The mains conductor within the luminaire must be kept short (to reduce the induction of interference).
- The mains conductor must not be laid too close to the EST (this is especially important in the event of through-wiring).
- Mains and lamp conductors must not be crossed. Should this be impossible to avoid, conductors should be crossed at right angles to one another (to avoid inducing interference between mains and HF conductors).
- Should conductors be wired through metal parts, such conductors must always be additionally shielded (e.g. with an insulating sleeve or grommet).

Temperature

Reference point temperature t_c
The safe operation of electronic converters is dependent on the maximum permissible temperature not being exceeded at the measuring point. Vossloh-Schwabe has determined a casing temperature measuring point – $t_{c\ max.}$ – on all converter casings. To avoid shortening the service life or diminishing operating safety, the stipulated maximum temperature must not be exceeded at this t_c point. This point is determined by testing the converter during normal, IEC-standardised operation at the specified ambient temperature (t_a), which is also indicated on the type plate. As both the design-related ambient temperature and the converter's inherent heat, as determined by the installed load, are subject to great variation, the casing temperature should be tested at the t_c point under real installation conditions.

Ambient temperature t_a
The ambient temperature – as specified on every converter – denotes the permissible temperature range within the luminaire or at the place of installation.

Reliability

Service life of 50,000 hrs at reference point temperature t_c, whereby a switching cycle of 165 minutes on and 15 minutes off is assumed. Failure rate: ≤ 0.2%/1,000 hrs
In order to achieve the average service life, the maximum temperature ($t_{c\ max.}$) must not be exceeded at the t_c point.

Emergency lighting

VS electronic converters cannot be used for emergency lighting purposes as they are unsuitable for DC voltage operation.

Electromagnetic Transformers

Owing to the low internal impedance of electromagnetic transformers, high currents can occur in the event of a short-circuit on the secondary side, which can lead to the transformer being destroyed. For this reason, IEC 61558-1 differentiates between three types of transformer:

Transformers without short-circuit resistance
These transformers require external protection to prevent excessive temperatures being generated.

At Vossloh-Schwabe, these transformers are marked with the symbol "not short-circuit proof safety transformer". To protect against current overload during overload or short-circuit operation, Vossloh-Schwabe recommends installing a fuse on the primary side. As an aid to the user, the rating of this fuse is stated on the type plate in accordance with IEC 60127. The installed primary-side fuse should be easily accessible so that it can be readily replaced at any time.

Transformers with (limited) short-circuit resistance
These transformers feature a safety device that prevents excessive temperatures being generated.

Electromagnetic transformers with thermal cut-outs afford a limited degree of short-circuit resistance and do not need to be additionally fused. VS safety transformers of limited short-circuit resistance are designed to safely cut out in the event of overload or short-circuit, but not to restart automatically after cooling off. The transformer must first be disconnected from the mains (i.e. switched off and on) before it can be restarted. The thermal cut-outs are dimensioned to ensure that the maximum permissible winding temperature of 225 °C (transformers of thermal class B) or 240 °C (F) or 260 °C (H) is not exceeded in the event of overload or short-circuit.

Transformers with (unlimited) short-circuit resistance
These transformers are designed to ensure that fixed maximum temperatures are not exceeded in the event of overload or short-circuit.

This type of safety transformer is not in common use within the lighting industry due to the relatively large dimensions it needs to meet the overload and short-circuit requirements.

All transformers will function perfectly and meet the requirements of the standard after the overload or shortcircuit has been eliminated.

In addition to the above, there are also so-called **failsafe transformers** that are rendered permanently inoperative in the event of improper use, but do not pose a threat to the user or the surroundings. Vossloh-Schwabe does not provide this type of isolation transformer.

All Vossloh-Schwabe transformers are tested for compliance with the safety requirements of European standard EN 61558 regarding creepage and air clearance distances, the winding temperature and the maximum permissible ambient temperature (t_a).

Protection symbols

Non short-circuit proof safety transformer

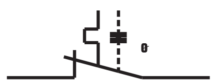
Limited short-circuit proof safety transformer

 0.25 AT

Rated fuse value

t_a 65

Transformer's maximum permissible ambient temperature



Thermal cut-out
(reset after disconnection from the mains)

EN 61558 specifies five insulation classes for electromagnetic transformers; respective testing temperatures and times are assigned to these classes. Due to the quality of the insulation materials used by Vossloh-Schwabe, VS transformers are only available in the three highest insulation classes B (120°C), F (140°C) and H (165°C). In this case, the quoted temperature refers to the maximum permissible winding temperature during permanent operation.

As luminaire casings made of plastic or sheet metal will discharge heat to varying degrees and because transformer installation conditions can differ, a transformer's winding temperature must be tested within the luminaire. The measured values will show whether the maximum temperature corresponds to the transformer's insulation class.

On request, Vossloh-Schwabe can carry out such luminaire tests to assess built-in components.

Assembly Instruction for Electromagnetic Transformers

For mounting and installing electromagnetic transformers for low-voltage halogen lamps

Mandatory regulations

DIN VDE 0100	Erection of low voltage installations
EN 60598-1	Luminaires – part 1: general requirements and tests
EN 61558-1	Safety of transformers, power supply units and similar – part 1: general requirements and tests
EN 61558-2-6	Safety of transformers, power supply units and similar – part 2-6: special requirements for safety transformers for general use
EN 61000-3-2	Electromagnetic compatibility (EMC) – part 3: maximum values – main section part 2: maximum values for mains harmonics (device input current up to and including 16 A per conductor)
EN 55015	Maximum values and testing methods for radio disturbance of electrical lighting facilities and similar electrical equipment
EN 61547	Installations for general lighting purposes – EMC immunity requirements

Technical specifications

Mains voltage range	VS safety transformers can be operated at the specified mains voltage within a tolerance range of ±10%
Leak current	≤ 0.1 mA per safety transformer
Power factor	$\lambda \geq 0.85$
Compensation	Not required

1 2 3 4 5 6 7 8 9 10

Mechanical mounting

Mounting position
Any

Mounting location
Safety transformers are designed for installation in luminaires or comparable devices. Independent safety transformers do not need to be built into a casing.

Fastening Preferably using screws, ∅ 4 mm

Insulation classes and maximum temperatures
In accordance with EN 61558, safety transformers are assigned to insulation classes on the basis of the insulation materials used (also called insulation material classes for this reason) in the transformers. These insulation classes also prescribe respective maximum winding temperatures that must not be exceeded during normal operation or in the event of overload or short-circuit.

Compliance with the maximum winding temperatures is tested by measuring the resistance of the transformer's copper winding.

Insulation classes for safety transformers in accordance with EN 61558-1

	A	E	B	F	H
Max. winding temperature (1.06 U_N) during normal operation	100 °C	115 °C	120 °C	140 °C	165 °C
Max. winding temperature in the event of overload or short-circuit	200 °C	215 °C	225 °C	240 °C	260 °C

Electromagnetic compatibility (EMC)

Interference Interference voltage measurements do not have to be taken for luminaires with magnetic safety transformers for operating low-voltage halogen lamps as these are systems with lamp voltages of under 100 Hz and it is assumed that such systems do not cause interference.

Interference immunity
Thanks to the robust design and choice of materials, magnetic safety transformers provide a high degree of interference immunity and are not impaired by admissible mains power interference.

Mains harmonics
Owing to the Ohmic resistance characteristics of low-voltage halogen lamps and the low degree of distortion caused by magnetic transformers, mains harmonics remain low.

Safety functions of VS transformers

Load	Transformer features	
	Unprotected (OS)	With self-locking temperature protection (TS)
Overheating	Is not recorded	Protection is provided by the built-in thermal switch
Short-circuit Overload	Protection must be provided by devices fitted in the luminaire (fuse or thermal switch)	

Should one of the safety functions be triggered, the transformer must be disconnected from the mains, the cause of the fault found and then eliminated.

Dimmer operation

VS safety transformers can be controlled using progressively adjustable phase-cutting leading-edge dimmers for low-voltage halogen lamps.

Reliability and service life

VS safety transformers are designed for a long service life. Provided the specified maximum values for the winding temperature are complied with during operation, a service life of 10 years can be expected. Failure rate: < 0.025%/1,000 hrs

Electrical installation

Conductors — Primary conductor cross-section: min. 0.75 m², secondary conductor cross-section: min. 0.75 m² for 50 W output and a min. of 1 mm² for 100 W output

Connections — Terminal screws: max. torque of 0.5 Nm must not be exceeded

Parallel connection — Parallel connection is admissible on the primary side, but is inadmissible on the secondary side

Conductors for low-voltage halogen installations

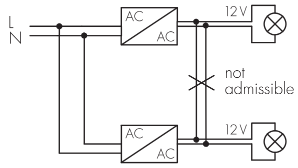
As the high temperatures associated with the operation of low-voltage halogen lamps place severe demands on lampholder conductors, a skilful combination of conductor and insulation is essential. Tin-plated copper conductors with silicone insulation are recommended for temperatures of up to 180 °C at the cable's conductor; nickel-plated copper cables with polytetrafluoroethylene (PTFE) sheathing are recommended for temperatures of up to 250 °C. Welded connections ensure the most effective heat discharge. Control measurements should be carried out if other connection types are used, e.g. crimping or plug connectors. To prevent the risk of additional heat generation, the maximum permissible current load must be observed when dimensioning the conductor cross-section. When using electromagnetic transformers, the conductor resistance causes a relatively large voltage drop. This drop in voltage is always associated with a reduction of luminous flux. For instance, an 11% drop in voltage will lead to a 30% drop in luminous flux. For this reason, care should be taken to ensure secondary conductors are kept as short as possible and conductor cross-sections are adequately dimensioned when wiring luminaires. Nevertheless, transformers should not be mounted too near the light source (> 25 cm clearance if possible) to prevent the heat generated by the lamp from raising the ambient temperature above the critical level for a transformer.

As electronic converters operate at high frequencies, consideration must be taken of the skin effect, i.e. the displacement of the electrons from the middle of the conductor to its surface. As a result, the full cross-section of the conductor is no longer used, resistance increases and thus leads to a greater drop in voltage. In addition, AC resistance, which is caused by feed line inductance, can result in an even greater voltage drop. It is therefore recommended that lamp conductors be laid closely parallel or twisted together.

Voltage losses (V) with a two-metre secondary conductor

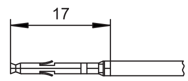
Working frequency	Load	Cross-section/Voltage drop		
	W	0.75 mm²	1 mm²	1.5 mm²
50 Hz (electromagnetic transformers)	50	0,38 V	0.29 V	0.2 V
any wiring layout	100	0.74 V	0.56 V	0.39 V
40 kHz (electronic converters)	50	1.4 V	1.25 V	1.2 V
any wiring layout (loops)	100	3.3 V	3.1 V	3 V
40 kHz (electronic converters)	50	0.5 V	0.45 V	0.35 V
wires twisted together or closely parallel	100	1.2 V	1 V	0.85 V

Wiring

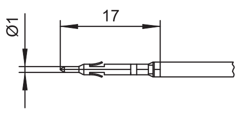


Conductor Contacts

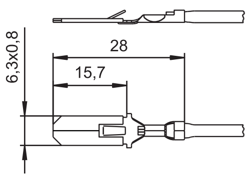
Pin contact Ø 1



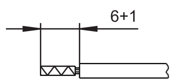
Socket connector



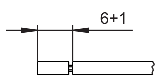
Flat connector 6.3x0.8



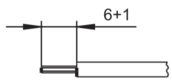
Cable with ferrules



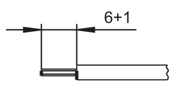
Cable, notched at 6 mm



Cable, bared at 6 mm



Ultrasonically welded cable end



Conductors for installations with halogen lamps

All conductors must be selected to suit the luminaire conditions (see table) in terms of material, cross-section and insulation. Testing these conductors under worst case conditions is essential as the commonly occurring high temperatures considerably reduce the conductivity of the conductor and hence its current-carrying capacity.

Insulation	Conductor Material	Cross-section mm²	Mains voltage V	Max. temperature °C
SI	Cu tin-plated (Cu vz)	0.75	300	180
FEP	Cu tin-plated (Cu vz)	0.75	300	180
PTFE	Cu nickel-plated (Cu vn)	0.75	500	250
PTFE	Cu nickel-plated (Cu vn)	1	500	250
PTFE	Ni	1	500	250
PTFE	Ni	1.5	500	250

Lampholders

For low-voltage halogen lamps

With the exception of B15d bases, the low-voltage sector is dominated by pin bases, which are fitted with a variety of different pin distances and diameters. Apart from classic lampholders that ensure both the electrical contact and the correct positioning of the lamp, connection elements are also available. These components are solely responsible for establishing electrical contact and are used in cases where, for instance, the regulations demand that the lamp be attached to its reflector (e.g. cold-light reflector lamps with GZ4 and GX5.3 bases). Extremely high temperatures are also generated when operating low-voltage halogen lamps as a result of the tungsten-halogen cycle and high lamp currents. In addition, the respective luminaires are often of very compact design, which leads to heat accumulation and thus to high internal temperatures. The materials the lampholder is made of thus play a vital role for the luminaire's operating safety and the lamp's service life. In addition to tried-and-tested materials – ceramics for casings and mica for covers – ever more frequent use is being made of highly heat-resistant plastics like LCP (liquid crystal polymer for e.g. G4, GU4, GX5.3, GU5.3 and GY6.35 lampholders) and PPS (polyphenylene sulphide for G4 lampholders). Plastic lampholders provide clear advantages: narrow dimensional tolerances, no material fractures, low weight and clip-attachment options.

VS lampholders for the UL market and UL approved leads are available for all common lamp types.

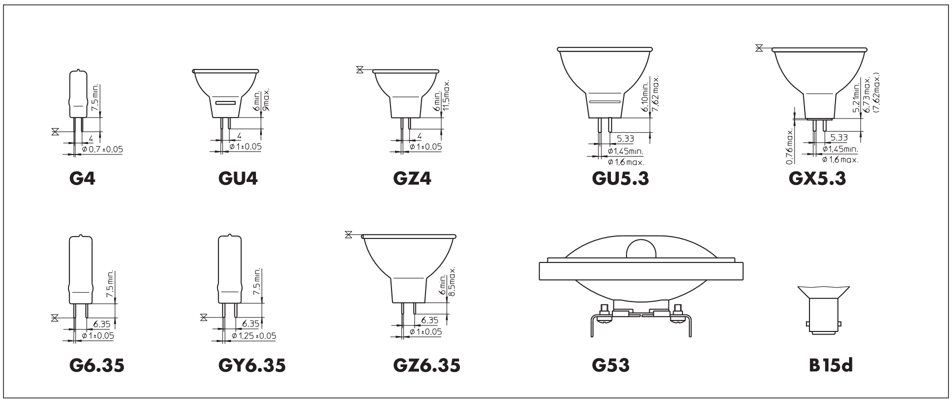
Further information can be found at www.unvlt.com.

The type of contact also plays an important role. Conventional contacts are only attached to one side of the lamp pin. In contrast, additional contact points – known as multipoint contacts – lead to a reduction of current density at the point of transition from the lamp pins to the lampholder contact and with that to a decrease in temperature. These contacts provide the further advantage of ensuring superior heat dissipation from the lamp pins to the conductor. The temperature advantage of multipoint contacts in defined conditions (including welded-on conductors) can amount to as much as 100 °C. In extremely rare cases, due to the high internal pressure in the bulb, it is possible for the lamp to shatter. For reasons of fire prevention (high temperature of the glass bulb), the lamp's components must be prevented from falling out. Enclosed luminaires meet these requirements. Open luminaires, however, may only be operated using lamps with enclosed bulbs or low-pressure lamps. Lamps of this kind are suitably marked with pictograms on the lamp's packaging and in the lamp manufacturer's documentation. Lamps marked with pictogram No. 1 are suitable for use with open luminaires, whereas those marked with pictogram No. 2 may only be used in enclosed luminaires.

1 **2**

Lampholders for low-voltage halogen lamps are equipped with mounted cables or with plug-type connectors. In addition to the various lampholders contained in the catalogue, further lampholder models with various cable lengths and of various qualities as well as lampholders with plug-connected cables can be made available on request.

Bases of the most widely used low-voltage halogen lamps



Lampholders for mains voltage halogen lamps

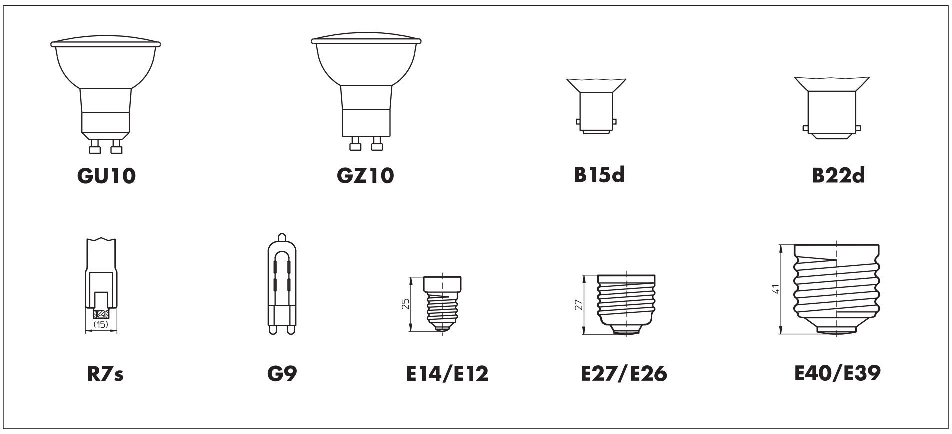
A major factor in lampholder design is the lamp temperature, which is determined by the tungstenhalogen cycle, high lamp current and high wattages. Lampholder casings can be made of ceramics, metal or the ever more popular highly heat-resistant thermoplastics like PET (polyethyleneterephthalate), PPS (polyphenylene sulphide) and LCP (liquid crystal polymer). The most suitable contact materials for these temperatures are nickel, copper-nickel alloys or copper materials with sufficiently thick nickel coatings. For tubular lamps (R7s base), the standard IEC 60061-2 7005-53 prescribes the respective contact pressure of lampholder contact materials.

Although halogen lamps offer twice the service life of general-purpose light bulbs, this can only be fully realised if luminaire manufacturers observe the recommended maximum temperatures at the lamp's pinch point. There is usually a welded-on molybdenum plate at the pinch point where the lamp base pins join the lamp filament. Lamp manufacturers ascertain the pinch temperature at this point, which is generally located within the lamp's quartz glass, using specially prepared measuring lamps. The pinch temperature is a critical thermal reference point which must not be exceeded within the luminaire.

VS lampholders for the UL market and UL approved leads are available for all common lamp types.

Further information can be found at www.unvlt.com.

The bases of the most widely used mains voltage incandescent lamps

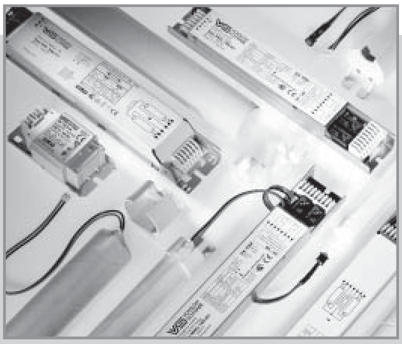


Retrofit Lamps

So-called retrofit lamps have been introduced to the market thanks to LED technology. Some of these can significantly exceed the weight of the original lamp.

When using such lamps in luminaires already introduced to the market (with conventional lampholders), but also for new luminaire designs (with conventional lampholders), this can cause a greater risk with regard to disconnecting the power supply and, in addition, can lead to greater mechanical damage.

6–80 W EMERGENCY LIGHTING MODULES



EMERGENCY LIGHTING

Emergency lighting systems spring to life any time normal artificial lighting systems fail. Emergency lighting is designed to ensure that work can continue without risk, that staff can safely leave any workplaces involving special hazards and that there is sufficient lighting to illuminate rescue paths/routes as well as to avoid panic situations.

As power cuts result in a risk to safety, legislation has been enacted in the form of the Health and Safety at Work Directive (Europe) and the Health and Safety at Work Acts of the individual European countries (e.g. Germany), all of which stipulate that emergency lighting must be provided. The requirements placed on emergency lighting installed in places of public assembly and public buildings are governed by supplementary directives and laws.

Vossloh-Schwabe's emergency lighting units are designed for use with T5, T8 and compact fluorescent lamps and can be operated with electromagnetic or electronic ballasts.

VS emergency lighting units are suitable for both continuous and standby circuits with a nominal operating period of 1 or 3 hours.

6 Emergency Lighting Modules for TC and T Lamps

Emergency Lighting Modules 6 to 80 W with Self-Diagnosis Function

EMXs – Emergency lighting modules

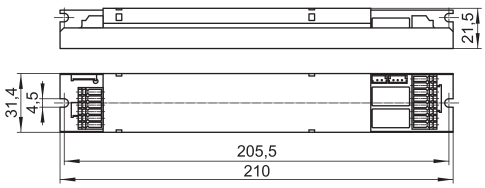
For one-, two-, three- or four-lamp operation with standard and dimmable electronic or magnetic ballasts
EB phase is switched off during emergency operation
Short circuit protection
RoHS-compliant (excluding rechargeable batteries)
5-pin technology and therefore EMC-compliant even during emergency operation
Suitable for protection class I
EN 61347-1, EN 61347-2-7
Suitable for systems in accordance with VDE 0108 or EN 50172
Not suitable for lamps with an integrated starter
Dimensions (LxWxH): 210x31.4x21.5 mm
Fixing hole distance: 205.5 mm
Nominal voltage: 230 V ±10%, 50–60 Hz
Ambient temperature t_a: 0 to 50 °C
Unit: 25 pcs.

These VS emergency lighting modules include an automatic self-diagnosis feature that performs a two-minute function test of the device, the lamp and the battery every seven days.
In addition, the operating period is tested every 12 months with subsequent battery reactivation.

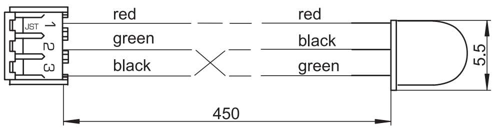
Optical status display

- Red LED, flashing intermittently:
  defective lamp. The status display will be reset approx. one minute after the fault has been rectified.
- White LED, not illuminated:
  if connected to the power supply, the LED must turn green after a maximum of five minutes. If not, the device either has no voltage supply or the emergency lighting module is defective.
- Red LED, permanently flashing:
  battery capacity is too low or the battery supply line has been interrupted.
- Green LED: fully functional.

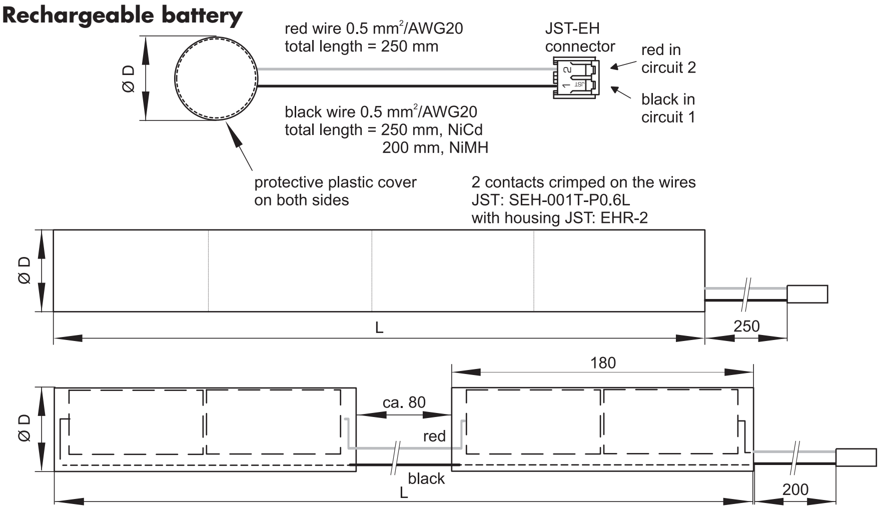
Emergency lighting module



LED



Rechargeable battery



Emergency Lighting Modules 6 to 80 W with Self-Diagnosis Function

EMXs – Emergency lighting modules

Type	**Ref. No. Module**	**Ref. No. Battery**	Nominal operating period hrs.	Rechargeable battery type	Dimensions LxD (Ø) of battery mm	Test function	Weight module g	Weight battery g
EMXs 180.000	**188792**	**188823**	1	4.8V 1.8Ah NiCd	1 / 190 x 23	automatic	160	200
EMXs 180.001	**188793**	**188824**	3	4.8V 4.5Ah NiCd	1 / 240 x 33	automatic	160	490
EMXs 180.002	**188794**	**188825**	1	4.8V 1.8Ah NiMH	1 / 200 x 17	automatic	160	140
EMXs 180.003	**188795**	**188826**	3	4.8V 4.5Ah NiMH	2 / 450 x 19	automatic	160	320

Circuit diagrams see page 336–338

Holders for Rechargeable Batteries for Emergency Lighting Modules

Material: PC (188828: PBT)
Type: Rechargeable Battery Holder

Ref. No.	For rechargeable battery type	Dimensions (mm) a	b	c	d	e	f
188827	4.8V 1.8Ah NiCd	35.0	18.0	26.3	26.7	13.0	5.5
188828	4.8V 4.5Ah NiCd	39.0	23.2	36.2	37.3	12.4	6.0
188829	4.8V 1.8Ah NiMH	22.5	15.0	22.8	22.5	8.0	4.0
188829	4.8V 4.5Ah NiMH	22.5	15.0	22.8	22.5	8.0	4.0

It is recommended to use two holders per rechargeable battery to ensure optimum hold.

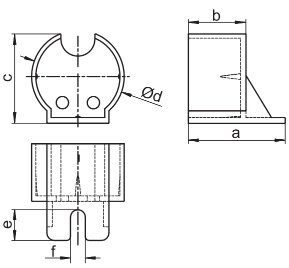


Table of suitable lamp types

Lamp type	Lamp nominal output W
T8	15, 18, 32, 36, 58, 70
T5 HE	14, 21, 28, 35
T5 HO	24, 39, 49, 54, 80
T5	6, 8, 13
T-R5 (T-R16)	22, 40, 55, 60
T-R (T29-R)	22, 32, 40
TC-L/TC-F	18, 24, 36, 40, 55, 80
TC-DEL	10, 13, 18, 26
TC-TEL	13, 18, 26, 32, 42, 57, 70
TC-SEL	7, 9, 11
TC-DD (2D)	10, 16, 21, 28, 38, 55

Luminous flux factor of lamps during emergency operation

Lamp nominal output W	Luminous flux factor* %
6	43.0
8	32.0
18	13.0
28	9.0
32	7.0
35	7.0
36	7.0
49	4.7
54	4.3
55	4.7
58	5.2
70	4.3
80	3.7

* Theoretically defined reference values at 25 °C ambient temperature

6 Emergency Lighting Modules for TC and T Lamps

Emergency lighting modules are designed for operation with 6 to 80 W, 4-pin fluorescent lamps.
Luminaires with integrated emergency lighting modules can be operated using a continuous or standby circuit.

Technical specifications	EMXs emergency lighting modules
Permissible mains voltage	230 V ±10%
Permissible mains frequency	50–60 Hz
Power consumption with standby circuit	3 W
Nominal period of operation	1 to 3 hours, depending on the type of rechargeable battery
Batteries	NiCd or NiMH
Ambient temperature	0* to 50°C
Charging time	24 hrs
Protection class	1
Degree of protection	IP20
Certification	CENELEC
Tested in accordance with	EN 61347-2-7
Suitable for systems compliant with	VDE 0108 / EN 50172
Casing	Metal (zinc-plated)
Installation outside the luminaire	Permissible lead length between the emergency lighting module and the lamp must not exceed two metres.
Luminous flux factors during emergency operation	See the table on page 331, values apply to 25 °C ambient temperature.

* Ignition in progress; the values of the colour rendering index and the luminous flux factor may deviate.

Assembly Instructions for Emergency Lighting Modules

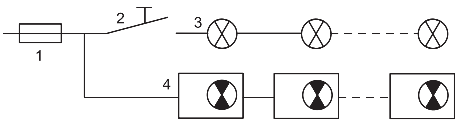
For mounting and installing of emergency lighting modules

If the emergency lighting module is integrated in the luminaire, the LED and battery have to be wired separately, i.e. not in parallel with the mains or lamp. Emergency lighting modules must be fixed in a suitable spot within the luminaire (4-mm bore holes for mounting).
In the interest of maximising battery capacity and service life, care must be taken to ensure the battery is positioned at the coolest part of the luminaire. The ambient temperature of the battery must not exceed 50 °C. Emergency lighting modules must not be mounted on surfaces that ignite, melt or undergo some other thermal change at a temperature of 60 °C. Moreover, emergency lighting modules must not be operated in explosionendangered enclosed spaces.

Electrical installation
The respective ordinances and standards valid at the place of operation must be observed for installation purposes. Emergency lighting modules and luminaires must only be installed by trained staff. Operating voltages exceed 50 V. Caution: potentially fatal hazard!

Prior to first operation of emergency luminaires, all covers must be attached. Furthermore, care must be taken to ensure that the supply voltage complies with the specifications on the type plate and the protective conductor is connected.

1. Fuse
2. Light switch
3. Room lighting
4. Emergency luminaires



Emergency luminaires must be connected to a direct phase to enable mains monitoring and ensure constant charge retention. This phase must be connected to the group fuse of the regular room luminaire. Emergency luminaires are generally delivered with uncharged batteries and must be connected to the mains for at least 48 hours to be fully functional or for approx. 10 minutes for mains operation in the case of a continuous circuit.

Additional information for optimising EMC

Information on the installation of electronic ballasts for optimising EMC

To ensure good radio interference suppression and the greatest possible operating safety, the following points should be observed when installing electronic ballasts:

- Conductors between the EB and the lamp (HF conductors) must be kept short (reduction of electromagnetic interference). High-potential lamp conductors must be kept as short as possible, in particular with tubular lamps.
  Lamp conductors of this kind are labelled with an * in the wiring diagram on the type plate.
- Mains and lamp conductors must be kept separate and if possible should not be laid in parallel to one another. The distance between HF and mains conductors should be as large as possible, ideally > 5 cm.
  (This prevents the induction of interference between the mains and lamp conductors.)
- The mains conductor within the luminaire must be kept short (to reduce the induction of interference).
- Devices must be properly earthed. EBs require secure contacts to the luminaire casing or must be earthed using a PE connection. This PE connection should be effected using an independent conductor to achieve better dissipation of the leak current. EMC improves at frequencies greater than 30 MHz.
- The mains conductor must not be laid too close to the EB or the lamp (this is especially important in the event of through-wiring).
- Mains and lamp conductors must not be crossed. Should this be impossible to avoid, conductors should be crossed at right angles to one another to avoid inducing interference between mains and HF conductors.
- Should conductors be wired through metal parts, such conductors must always be additionally shielded (e.g. with an insulating sleeve or grommet).

Maintenance With regard to system maintenance and control, care must be taken to ensure compliance with any ordinances and standards governing emergency lighting at the place of installation. Prior to opening lamp covers, the following procedure must be observed:

1. Disconnect luminaires from the mains voltage.
2. Remove cover.
3. Disconnect battery from the emergency lighting module (disconnect the plug).

VS recommends connecting control LEDs to be visible on the outside of emergency luminaires to enable simple and regular control of emergency luminaires and emergency lighting modules.

Changing batteries

Batteries need to be replaced if the operating period of luminaires falls short of 60 minutes in the case of 1-hour operation and 180 minutes for 3-hour operation, respectively. Emergency lighting modules have a status display for this purpose.

Spent batteries must be replaced with the manufacturer's original batteries only. Furthermore, the polarity of the batteries must be strictly observed. The battery supply lines of the emergency lighting module are marked as follows:

red = **+**; black = **–**

Emergency lighting module display

Normal operation is indicated by a green LED. During emergency operation or for as long as the battery remains fully discharged, the LED is off (i.e. does not glow). The LED will flash red if the battery is missing or not properly connected.

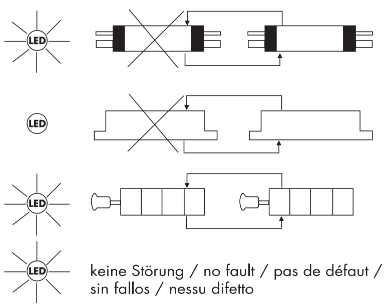
Automatic test of emergency lighting modules

In the case of emergency luminaires with emergency lighting modules, the operational readiness of the device, the lamp and the battery is tested automatically every seven days. In addition, battery capacity is measured during a simulated loss of mains power every 12 months.

The first capacity test will be carried out seven days following initial installation or any repair work. The LED must be checked after the first self-test. A green LED indicates all is in working order, any other display indicates a problem.

The device features a two-colour LED display to indicate that the emergency luminaire is ready for use.

Optical status display



Emergency luminaires merely require regular visual inspection of the status display (LED) and the luminaire itself.

Red LED, flashing intermittently	During initial operation, a lamp recognition test is first carried out. Prior to and during this test, the LED will be red and flash intermittently.
White LED, not illuminated	If connected to mains power, the LED must turn green after a maximum of five minutes. If not, the device has no mains voltage or the emergency lighting module is defective.
Red LED, continuous flashing	Battery capacity is too low or the battery supply line has been interrupted. The warning light will go off again as soon as the problem has been rectified.
Green LED	Fully functional.

Notes

Vossloh-Schwabe accepts no liability for any direct, indirect or incidental damage caused by putting a device to any improper use, i.e. any use not expressly permitted by VS. Similarly, Vossloh-Schwabe accepts no liability for third-party claims arising from putting a device to any improper use, i.e. any use not expressly permitted by VS. Emergency lighting modules must not be opened or modified in any way. The components of emergency lighting modules must be replaced with original parts only.

Should emergency lighting modules be damaged in a way that suggests it cannot be operated safely, the luminaires or emergency lighting modules, respectively, must not be operated. VS reserves the right to make changes to diagrams, weights, tables of dimensions or other such details included in the catalogue or instructions for use without prior notice if such changes prove to be necessary or are made as a result of technological progress. VS emergency lighting modules are patent protected.

Any act of producing counterfeit VS products will be prosecuted according to criminal and civil law.

Caution! Emergency lighting modules from VS must not be operated with amalgam lamps.

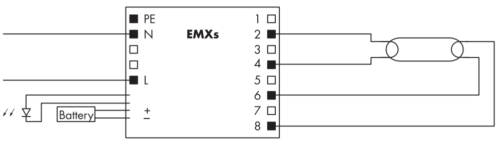
Circuit Diagrams

For VS emergency lighting modules

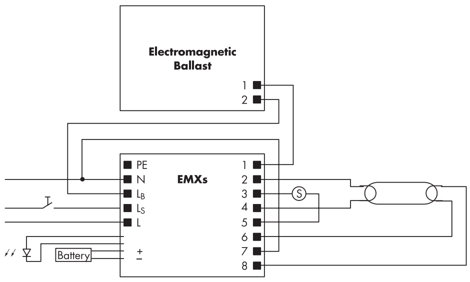
Notes for wiring:

- The distance between mains lead and lead 8 should be as large as possible
- Leads 2/4/6/8 must be kept short

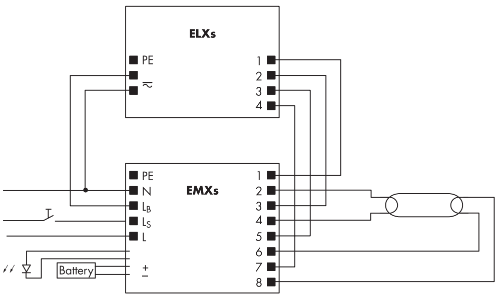
Circuit diagrams – 1-lamp operation



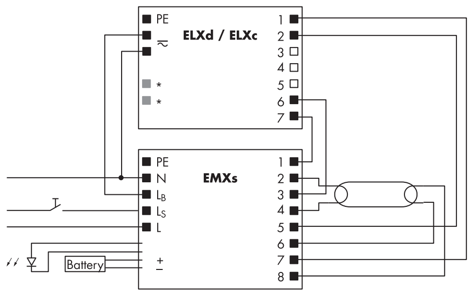
1-lamp operation
without electronic or electromagnetic
ballast (continuous circuits)



1-lamp operation
with electromagnetic ballast

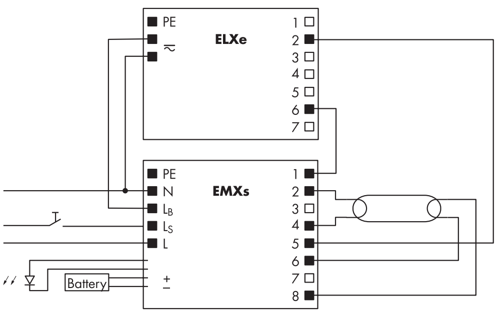


1-lamp operation – Warm start
with electronic ballast ELXs



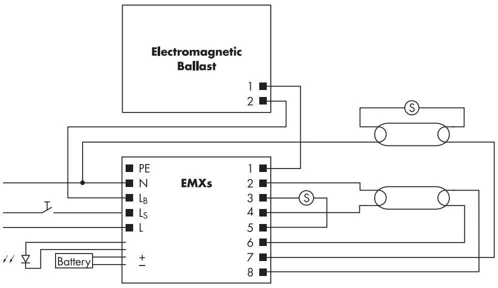
*nur bei dimmbaren Vorschaltgeräten/only with dimmable ballasts/juste avec ballasts graduables/solo con alimentatori dimmerabili/sólo con reactancia regulable

1-lamp operation – Dimming / Warm start
with electronic ballast ELXd / ELXc

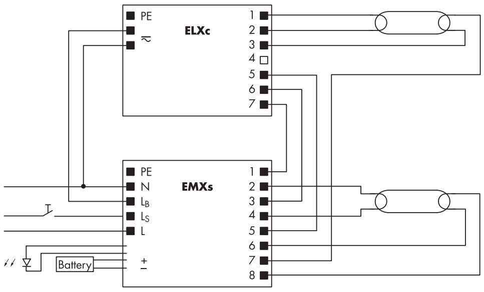


1-lamp operation – Instant start
with electronic ballast ELXe

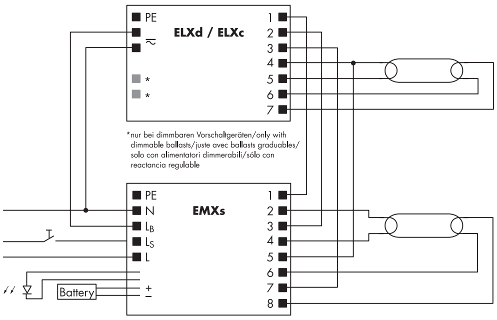
Circuit diagrams – 2-lamp operation



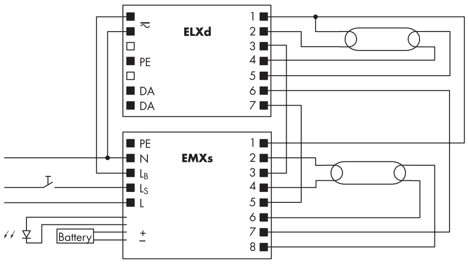
2-lamp operation
with electromagnetic ballast



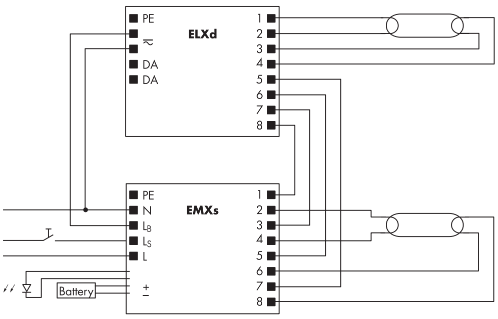
2-lamp operation – Warm start
with electronic ballast ELXc



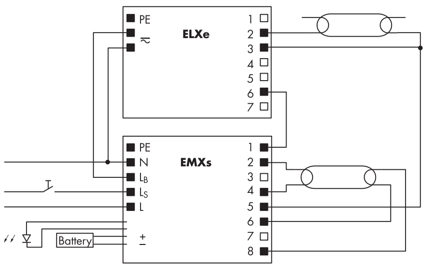
2-lamp operation – Dimming / Warm start
with electronic ballast ELXd / ELXc



2-lamp operation – Dimming
with electronic ballast ELXd

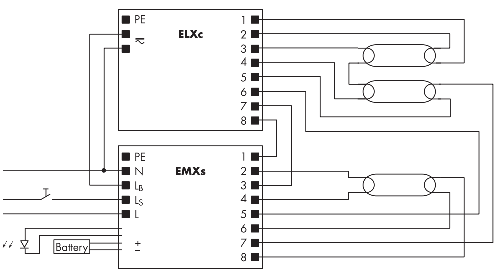


2-lamp operation – Dimming
with electronic ballast ELXd

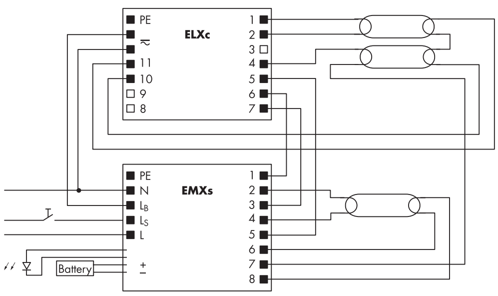


2-lamp operation – Instant start
with electronic ballast ELXe

Circuit diagrams – 3-lamp operation

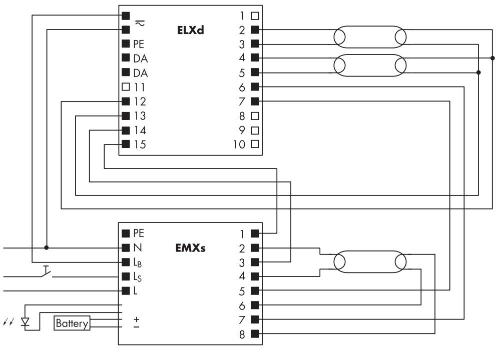


3-lamp operation – Warm start
with electronic ballast ELXc

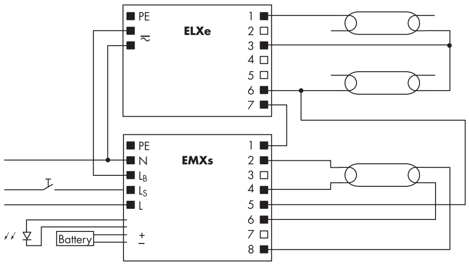


3-lamp operation – Warm start
with electronic ballast ELXc

Circuit diagrams – 3-lamp operation

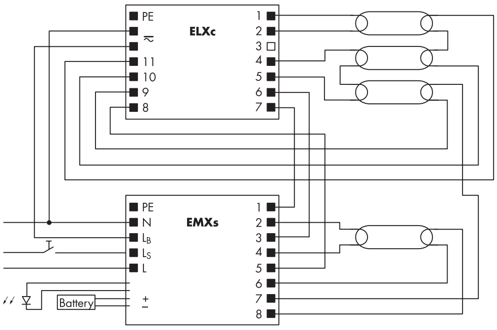


3-lamp operation – Dimming
with electronic ballast ELXd

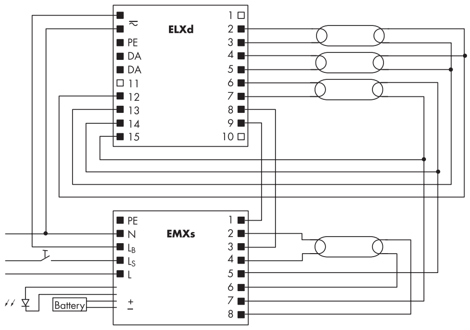


3-lamp operation – Instant start
with electronic ballast ELXe

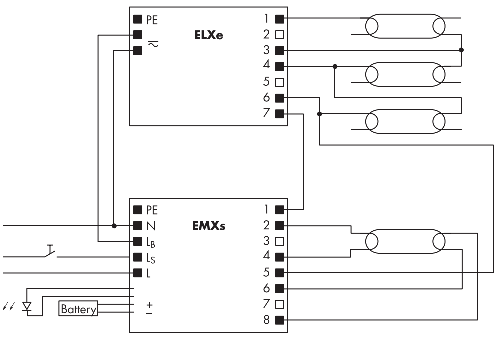
Circuit diagrams – 4-lamp operation



4-lamp operation – Warm start
with electronic ballast ELXc

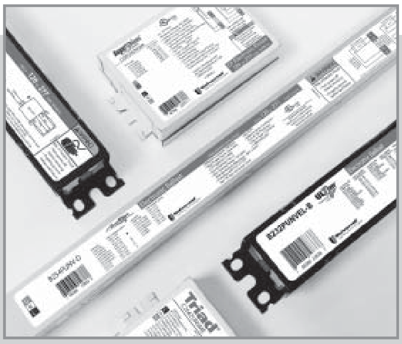


4-lamp operation – Dimming
with electronic ballast ELXd



4-lamp operation – Instant start
with electronic ballast ELXe

LIGHTING TECHNOLOGY COMPONENTS FOR THE UL MARKET



At the beginning of 2010, the US American sales office, Vossloh-Schwabe Inc., was merged with Universal Lighting Technologies, Inc., a further Panasonic subsidiary.

Universal Lighting Technologies, Inc., produces some of the world's most advanced linear fluorescent, compact fluorescent, HID, eHID, and LED solutions for commercial lighting applications.

The following pages serve to give you some idea of the highly extensive product range of VS lampholders for the UL market.

A global leader in research and development since 1947, Universal proudly features recognized and trusted brands like Universal® and Triad®, with a reputation for innovations that can significantly reduce energy costs with high efficiency solutions, installer-friendly options, and greater flexibility for fixture designs.

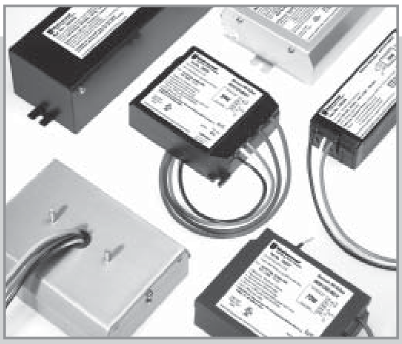
Advanced lighting technologies such as step-dimming, 0–10 V analog dimming, DALI dimming and energy management systems help meet specific application and user requirements.

The EVERLINE® brand of LED products leads the industry on performance, flexibility and quality. Whether developed individually or to be part of a system, EVERLINE makes it easy to configure a full featured, high efficiency LED system.

Further information can be found at **www.unvlt.com**.

Universal™ Lighting Technologies

Nashville, TN 37214
Phone: 615-316-5100
www.unvlt.com



Energy Management & Controllable Lighting

Linear Fluorescent Ballasts

Electronic & Magnetic HID Ballasts

Sign Ballasts

Comapct Fluorescent Ballasts

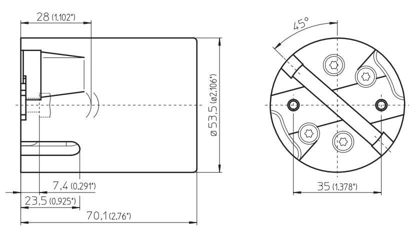
LED Systems

E39 Porcelain Lampholders

For discharge lamps with base E39 / Mogul base

Screw terminals: max. 16–12 AWG, solid conductor

E39 lampholders
Casing: porcelain, white
Nominal rating: 2000 W/600 V/6 kV pulse rating
Cylindric shape
Screw shell: brass, nickel-plated
Central contact: brass, nickel-plated
Spring loaded central contact
Screw terminals: 18–14 AWG
Fixing distance: 35 mm (1.378")
Thread measured in inches No. 8-32 UNC (ISO)
Weight: 190 g, unit: 50 pcs.
Type: 12870/12876
Ref. No.: 109014
Ref. No.: 109518 with lamp safety catch

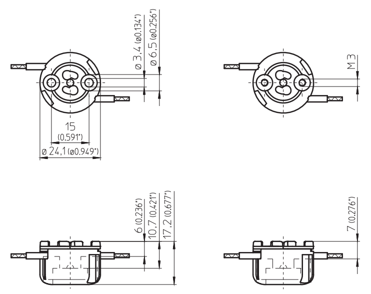


GU6.5 Lampholders

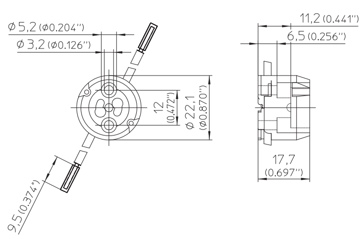
For single-ended discharge lamps

Additional lead lengths and types on request

GU6.5 lampholders
Casing: ceramic, cover plate: PPS
Nominal rating: 2 A/250 V/5 kV pulse rating
Leads: Cu nickel-plated, stranded conductors 18 AWG,
PTFE-insulation, length: 305 mm (12")
Weight: 20 g, unit: 100 pcs.
Type: 34515 fixing holes for screws M3 (#4)
Ref. No.: 534218
Type: 34516 threaded bushes for screws M3 (#4)
Ref. No.: 534219

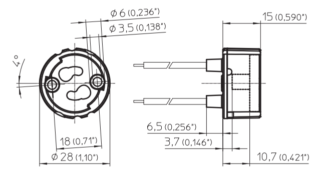


GU6.5 lampholders
Casing: ceramic, cover plate: PPS
Nominal rating: 2 A/250 V/5 kV pulse rating
Leads: Cu nickel-plated, stranded conductors 18 AWG,
PTFE-insulation, length: 305 mm (12")
Weight: 20 g, unit: 100 pcs.
Type: 34525 dia. 22 mm
Ref. No.: 535783



GX10 Lampholders

For single-ended discharge lamps



GX10 lampholder
Casing: steatite, cover plate: PPS
Nominal rating: 2/500/5 kV
Leads: Cu nickel-plated, stranded conductors
18AWG, PTFE insulation, length: 305 mm (12")
Weight: 25 g, unit: 100 pcs.
Type: 31550
Ref. No.: 543153

2G11 Lampholders for Twin-tube 4-pin Lamps

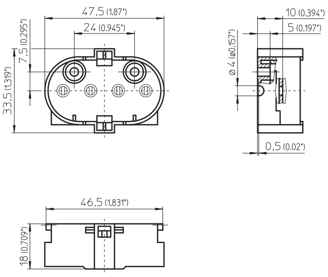
For Single-ended Compact Fluorescent Twin-tube 4-pin Lamps

Nominal rating: 660W/600V
Degree of protection: IP20

Quick-connect twin terminals: 18AWG solid or stranded solder-dipped (lamp circuit)
Quick-connect terminals: 18AWG solid or stranded solder-dipped (starter circuit)

All products in this chapter carry a T rating of T120 acc. to UL standards (shunted versions correspond to Circle-I requirements).

2G11 back panel or bracket mount lampholders
Casing: PBT GF, white
Lateral pivots for bracket
Rear mounting holes for self-tapping #8 screws
Front mounting holes for #4 screws (M3)
Weight: 12.7 g, unit: 500 pcs.
Type: 36051
Ref. No.: 101489



G24 Lampholders for Quad-tube Lamps, GX24 Lampholders for Triple-tube Lamps

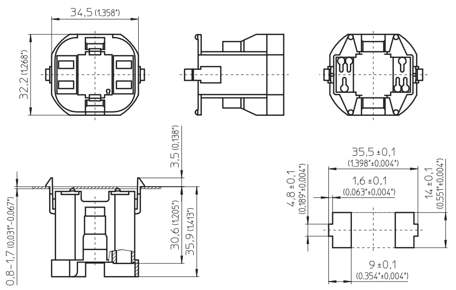
For Single-ended Compact Fluorescent Bi-pin and 4-pin Lamps

The drawings and photos contained in this chapter only show lampholders for lamps with base G24d-1.
All T ratings in this chapter refer to IEC standards

When mounting lampholder remember triple-tube GX24d/GX24q lamps are wider than lampholder. When using central-mounting hole provisions must be made to prevent lampholder rotation.

All lampholders with quick-connect terminals (UL File No. E110363): 18AWG solid or stranded solder-dipped

G24, GX24 snap-in lampholders
Casing: PBT GF, white, T140 (acc. to IEC)
Nominal rating: 660 W/600 V
Quick-connect twin terminals: 18AWG (lamp circuit)
For G24q, GX24q lampholders:
quick-connect terminals: 18AWG (starter circuit)
Rear split pins for wall thickness
0.8–1.7 mm (0.031–0.067")
Width of split pin: 4.5 mm (0.177")



Type	**Ref. No.**	Base	Output (W)	Weight (g)	Unit (pcs.)
72101	**528116**	G24d-1/GX24d-1	8, 10, 13 / 13	10.4	500
72102	**528117**	G24d-2/GX24d-2	18 / 18	10.4	500
72103	**528118**	G24d-3/GX24d-3	26 / 26	10.4	500
72111	**528120**	G24q-1/GX24q-1	10, 13 / 13	12.3	500
72112	**528121**	G24q-2/GX24q-2	18 / 18	12.3	500
72113	**528122**	G24q-3/GX24q-3	26 / 26, 32	12.3	500
72119	**528126**	GX24q-3/-4*	26, 32 / 42	12.3	500
72114	**528123**	GX24q-4	42	12.3	500
72115	**528124**	GX24q-5	57	12.9	500
72116	**528125**	GX24q-6	70	12.9	500
Shunted Version					
72111	**528128**	G24q-1/GX24q-1	10, 13 / 13	12.3	500
72112	**528129**	G24q-2/GX24q-2	18 / 18	12.3	500
72113	**528130**	G24q-3/GX24q-3	26 / 26, 32	12.3	500
72119	**528134**	GX24q-3/-4*	26, 32 / 42	12.3	500
72114	**528131**	GX24q-4	42	12.3	500
72115	**528132**	GX24q-5	57	12.9	500
72116	**528133**	GX24q-6	70	12.9	500

* Lampholders 528126 and 528134 may only be used in luminaires that are operated with electronic ballasts that have been certified according to the applicable standards and that cover the luminaire performance range of 26, 32 and 42W.

G13 Push-through Lampholders for T8, T12 Lamps

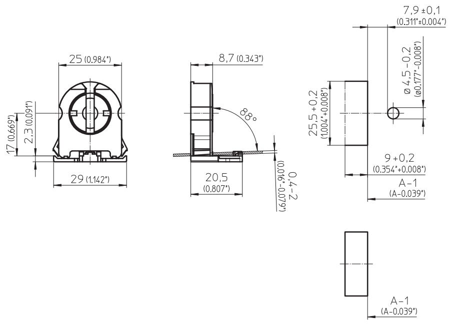
Lampholders for fluorescent lamps T8 and T12 / Medium Bi-Pin

Nominal rating: 660 W/600 V
Push-in twin terminals: 18 AWG, solid or stranded conductors, tinned
Lateral fixing clips for wall thickness 0.4–2 mm (0.016"–0.079")

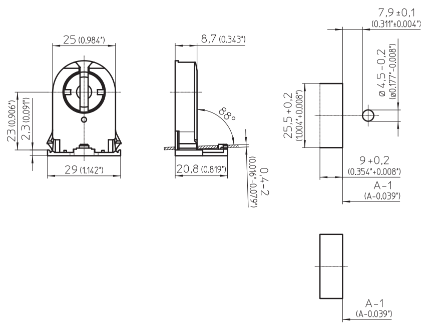
Casing: PC, white
(shunted versions: PBT, white)
Front plate: PBT GF, white

All products in this chapter carry a T rating of T120 acc. to UL standards (shunted versions correspond to Circle-I requirements).

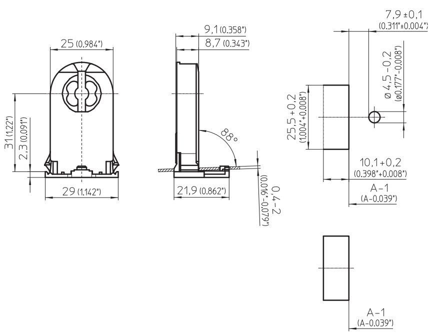
G13 push-through lampholders for lamps T8, T12
Pin support for reliable contact
Lamp axis: 17 mm (0.67")
Weight: 5,4 g, unit: 1000 pcs.
Type: 26300/26302 with stop
Ref. No.: 551271
Ref. No.: 551275 internally shunted
Type: 26310/26312 without stop
Ref. No.: 551272
Ref. No.: 551277 internally shunted



G13 push-through lampholders for lamps T8, T12
Pin support for reliable contact
Lamp axis: 23 mm (0.906")
Weight: 6.6 g, unit: 1000 pcs.
Type: 29100/29125 with stop
Ref. No.: 545845
Ref. No.: 545840 internally shunted
Type: 29101/29126 without stop
Ref. No.: 545849
Ref. No.: 545842 internally shunted



G13 push-through lampholders for lamps T8, T12
Pin support for reliable contact
Lamp axis: 31 mm (1.220")
Weight: 7.8 g, unit: 1000 pcs.
Type: 28700/28725 with stop
Ref. No.: 109342
Ref. No.: 109376 internally shunted
Type: 28701/28726 without stop
Ref. No.: 109343
Ref. No.: 109377 internally shunted



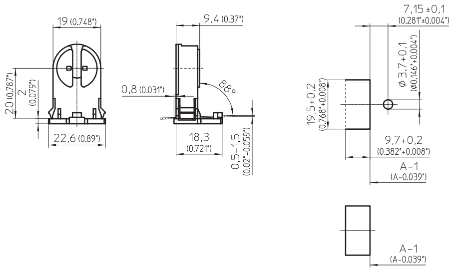
G5 Lampholders

Lampholders for fluorescent lamps with base G5

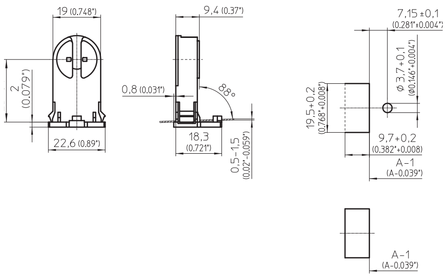
Nominal rating: 120 W/600 V
Push-in twin terminals: 18 AWG, solid or stranded conductors, tinned
Lateral fixing clips for wall thickness 0.5–1.5 mm (0.020"–0.059")

All products in this chapter carry a T rating of T120 acc. to UL standards (shunted versions correspond to Circle-I requirements).

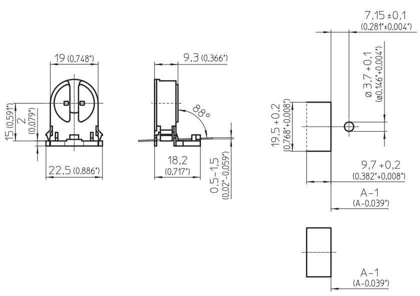
G5 push-through lampholders
Lamp axis: 20 mm (0.787")
Casing: PBT GF/PC, white, rotor: PBT GF, white
Weight: 4.1 g, unit: 1000 pcs.
Type: 09432/09433
Ref. No.: 545933 with stop
Ref. No.: 545935 without stop



G5 push-through lampholders
Lamp axis: 25 mm (0.984")
Casing: PBT GF/PC, white, rotor: PBT GF, white
T140, nominal rating: 2/500
Weight: 4.5 g, unit: 1000 pcs.
Type: 09434/09435
Ref. No.: 545937 with stop
Ref. No.: 545939 without stop



G5 push-through lampholders
Lamp axis: 15 mm (0.591")
Casing: PBT GF/PC, white, rotor: PBT GF, white
Weight: 3.5 g, unit: 1000 pcs.
Type: 09420/09421
Ref. No.: 505737 with stop
Ref. No.: 505739 without stop



8 General Technical Details

Product development and product certification

The increasingly converging world and the global markets that are being created are both placing new design demands on the sector and its technologies. Against this background, standardisation – both on a regional and international scale – is becoming more and more important in positioning new technologies and innovations on the market. Standardisation ensures the necessary degree of safety, reliability, exchangeability and cost-effectiveness.

Vossloh-Schwabe products have been developed and produced on the basis of technical innovations, internationally and regionally applicable standards and valid environmental regulations for more than 90 years. In this respect, we already take account of integrated components and materials, production methods and technologies, comprehensive environmental aspects as well as a product's energy efficiency during the development phase. An important entrepreneurial goal in all these years has been and continues to be to create lighting components that satisfy the requirements of our customers with regard to safety, function, longevity and cost-effectiveness.

In addition to observing valid, state-of-the-art standards, we also take consideration of the recommendations of industrial associations when developing new products.

Our cooperation in national and international committees ensures we receive early information about new or changed regulations and thus helps to guarantee future-orientated products.

In addition to undergoing internal production approval tests, mass-produced devices are also submitted to national and international testing institutes for certification. The applicable testing and assessment regulations of the testing institutes are subject to international variation. The marks of conformity shown here are therefore not valid for all the products featured in the catalogue. You will find an overview of the approval marks for the products presented in the catalogue from page 360 on. On request, we will gladly provide information about all of the existing approvals. You can also find test certificates in our online catalogue at **www.vossloh-schwabe.com**.

As the international IEC (International Electrotechnical Commission) standards for lighting technology are also adopted by the European Institute for Standardisation CENELEC (Comité Européen de Normalisation Electrotechnique), the European standards (EN) therefore contain the same requirements. In rare cases, national deviations are permitted. The certification (third-party testing) of VS catalogue products in accordance with EN standards is documented by the ENEC mark.

The ENEC mark (European Norms of Electrical Certification) was created in Europe as a uniform certification mark for electrotechnical products. The ENEC Agreement currently governs the following product groups:

- luminaires
- luminaire components
- energy-saving lamps
- IT equipment
- connection terminals, clips
- capacitors
- couplers
- switches for household appliances
- noise filters
- safety transformers
- tools
- consumer electronic
- batteries
- domestic appliance mobile tools
- IT products

There are plans to include further electrical equipment in the ENEC Agreement.

The certification of products is also expanded to include non-European manufacturers. However, certification testing for lighting equipment must be carried out by an ENEC testing institute in Europe.

At present, a total of 24 testing houses in 20 countries are signatories of the ENEC agreement (see table). Obtaining an ENEC mark for luminaire components like ballasts and ignitors also includes having the product assessed in accordance with the standards governing safety and function. Certification must be based on the EN standards listed in the Agreement.The mark documents that the product not only complies with the applicable standards, but also that ongoing production is monitored by inspectors from a testing institute and that the manufacturer operates an effective quality assurance system in accordance with the ISO 9000 standard suite (International Standards Organisation). ISO deals with the standardisation of non-electrotechnical products.

The ENEC mark is displayed with the identification number and often the logo of the testing institute, as follows:

Identification No.	Testing Institute	Identification No.	Testing Institute
01	AENOR – Spain	16	SGS Fimko – Finland
02	SGS – Belgium	17	NEMKO – Norway
03	IMQ – Italy	18	TRI MEEI – Hungary
04	CERTIF – Portugal	19	ITCL – United Kingdom
05	DEKRA – Netherlands	21	EZÚ – Czech Republic
08	LCIE – France	22	SIQ – Slovenia
09	MIR-TEC – Greece	23	TSE – Turkey
10	VDE – Germany	24	TRLPTÜV – Germany
11	ÖVE – Austria	25	TÜV SÜD PS – Germany
12	BSI – United Kingdom	28	SEP – BBJ – Poland
13	Electrosuisse – Switzerland	30	PREDOM – OBR – Poland
14	Intertek SEMKO – Sweden		EVPU – Slovakia
15	UL Int'l DEMKO – Denmark		

Apart from a product's safety and performance certification, a further useful selection aid is to have a product's electromagnetic compatibility (EMC) tested by an independent test institute, particularly in the case of electronic ballasts. If the product passes the EMC test, an additional test mark is awarded, for instance the VDE EMC mark of the VDE test and certification institute in Offenbach. The EMC certifications for control gears are helpful for the EMC luminaire certification and could reduce time and cost for the luminaire certification.

CE mark

EC Directives form the basis for a common European domestic market without any trade restrictions.
Any products that are destined for the European market have to meet the requirements of all directives that apply to the product in question. Compliance with the directives is documented by the CE mark on the product or in the technical documents.

CE

This CE mark is therefore not a mark of compliance with standards (test certificate) of a testing institute, like the ENEC mark is, and can therefore not be issued by a testing institute. The CE mark must be printed on the product, the packaging or both and is not directed at the consumer, but at supervisory authorities.

The following table contains a list of key EC Directives governing lighting:

2015/1428/EC	Directive dated 25 August 2015 that amends Directive (EC) No. 244/2009 of the Commission with regard to laying down requirements for the eco-friendly design of households lamps with unbundled light and Directive (EC) No. 245/2009 of the Commission with regard to laying down requirements for the eco-friendly design of fluorescent lamps without a built-in ballast, high-pressure discharge lamps as well as ballasts and luminaires for their operation and for annulling Directive 2000/55/EC of the European Parliament and the Committee and Directive (EU) No. 1194/2012 of the Commission with regard to the eco-friendly design of lamps with bundled light, LED lamps and associated devices.
2014/53/EC	Requirements for radio equipment (luminaires with built-in transmitters) dated 16 April 2014 governing the harmonisation of legal regulations on retailing radio equipment on the market and to render Directive 1999/5/EC invalid.
2014/35/EC	Electrical equipment designed for use within certain voltage limits (Low Voltage Directive); valid from 20.04.2016
2014/30/EC	Directive on the harmonisation of the laws of the Member States relating to electromagnetic compatibility; national laws had to take effect by 20.01.2007. Applicable to new products since 20.07.2007. (EMC Directive); valid from 20.04.2016
2012/19/EU	Directive governing the recycling of used electric and electronic devices (WEEE Directive)
2012/27/EU	Energy efficiency directive that amends Directives 2009/125/EC as well as 2010/30/EU and renders Directives 2004/8/EC and 2006/32/EC invalid
1194/2012/EC	Ecodesign requirements for directional lamps, light emitting diode lamps and related equipment
874/2012/EC	Energy labelling of electrical lamps and luminaires
2011/65/EC	Restrictions governing the use of certain hazardous substances in electrical and electronic devices. On 3 January 2015, the 2011/65/EU (RoHS 2) Directive superseded the previous 2002/95/EC (RoHS 1) Directive. Both directives are unofficially shortened to RoHS (Restriction of Hazardous Substances).
347/2010/EC	Ecodesign requirements for fluorescent lamps without an integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps
2010/31/EC	Directive governing the total energy efficiency of buildings
2010/30/EC	Indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (this directive supersedes directive 98/11/EC)
859/2009/EC	Ecodesign requirements on ultraviolet radiation of non-directional household lamps
245/2009/EC	Definition of eco-design requirements regarding fluorescent lamps without an integrated ballast, high-pressure discharge lamps as well as ballasts and luminaires in their operation and the invalidation of Directive 2000/55/EC of the European Parliament and Council.
244/2009/EC	Definition of eco-design requirements regarding household lamps with non-directional light.
2009/125/EC	Setting of ecodesign requirements for energy-related products (ErP). This directive supersedes directive 2005/32/EC. The new directive was extended and now includes all energy-consuming products. Regulations 244 and 245 remain unaffected by this change.
1907/2006/EC	Specifications governing the registration, evaluation, authorisation and description of chemicals: REACH (**R**egistration, **E**valuation, **A**uthorisation and Restriction of **Ch**emical Substances) plus amending regulations; e.g. 348/2013/EC, latest amendment of the REACH regulation
2006/95/EC	Electrical equipment designed for use within certain voltage limits (Low Voltage Directive); valid till 19.04.2016
2006/32/EC	Energy end-use efficiency and energy services â “ ES Directive (Energy Service); national laws must take effect by 17.05.2008.
2006/25/EC	Directive on the minimum health and safety requirements regarding the exposure of workers arising from physical agents (artificial optical radiation)
2005/32/EC	Eco-design requirements for energy-using products â “ EuP directive (Energy using Products).
2005/20/EC	Directive regarding packaging
2004/108/EC	Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility; national laws had to take effect by 20.01.2007. Applicable to new products since 20.07.2007. (EMC Directive); valid till 19.04.2016
2004/40/EC	Directive on the minimum health and safety requirements regarding the exposure to the risks arising from physical agents (electromagnetic fields)
2004/12/EC	Directive on packaging
2003/66/EC	Directive on energy labelling of household electrical refrigerators, freezers and lamps
2002/96/EC	Old electrical and electronic devices; effective since 13.08.2005; does not fall under the CE mark directive
2002/91/EC	Total energy efficiency of buildings; effective since 04.01.2006; does not fall under the CE mark directive
2001/95/EC	Directive on general product safety
1999/05/EC	Requirements for radio-controlled systems and telecommunications equipment as well as reciprocal acknowledgement of their conformity (R&TTE = Radio Equipment and Telecommunications Terminal Equipment) dated 9 March 1999. Also applies to luminaires with built-in transmitters.
1998/11/EC	Energy rating of household lamps; effective since 14.06.1999
1994/62/EC	Directive on packaging
93/68/EWC	CE marking directive

Manufacturers are obliged to keep conformity declarations as well as test and production documentation ready for presentation.

The documents must be retained for a period of 10 years after the product was last marketed.

Vossloh-Schwabe operating devices all bear the CE mark; the respective conformity declaration and production documentation are available for inspection. As a consequence, all luminaires that are equipped with properly installed VS components and for which the assembly instructions were observed meet the legal requirements.

Climate and environmental protection

The European Union adopted a number of EU Directives that are designed to reduce the CO_2 output. Essentially, these objectives can be grouped into three categories:

- requirements placed on new products,
- requirements placed on buildings and
- revision of existing installations.

The requirements placed on new products are governed by the **ErP framework directive** (**E**nergy-**r**elated **P**roducts) together with the so-called implementation directives, which envisage the setting of special energy requirements for lamps (minimum lm/W requirements), operating devices (minimum efficiency ratings) and luminaires (minimum energy efficiency requirements) for all lighting technologies.
The directive on energy efficiency requirements regarding ballasts for fluorescent lamps is integrated into the implementation directives.

The requirements for buildings (**EPBD: E**nergy **P**erformance of **B**ui**ld**ings) are specify targets for the maximum permissible primary output of lighting. In so doing, a calculation method is employed that will stipulate the permissible maximum electrical output values of the lighting system using a reference procedure.

With regard to the revision of existing installations the EU member states are called upon to set up national action plans (**Energy Service Directive**) that show which measures can be used to achieve the targeted CO_2 reductions.

In addition to the climate protection requirements, a number of directives were also produced to cover waste reduction and recycling, specifically the **WEEE** (**W**aste of **E**lectrical and **E**lectronic **E**quipment) and **RoHS** (**R**estriction of the use of certain **H**azardous **S**ubstances) directives. These directives regulate the disposal and reduction of waste and the use of hazardous substances.

As a result of the REACH system (**R**egistration, **E**valuation, **A**uthorisation and Restriction of **Ch**emical Substances) only registered chemical substances can now be brought onto the market. The principle is: no data, no market.

As operating devices and lampholders are constituent parts of luminaires, these components are to be disposed of along with the luminaire; separate disposal is not provided for.

Protection classes of luminaires and operating devices

The electric shock protection that luminaires and control gears are fitted with provides dual protection, which prevents any danger in the event of a technical defect. With regard to safety, the simultaneous occurrence of two errors can be taken into account in certain circumstances, e.g. given a street luminaire with two lamp casings, one of which is used to house the ballast that operates the lamp. This also applies to low-voltage LED lighting systems.

Luminaires and operating devices of **protection class I** provide protection against electrical shock solely using the base insulation and the safe connection of all exposed conductive parts to an earth conductor. Thus, should the base insulation fail, no exposed conductive parts can become live.

Luminaires and operating devices of **protection class II** provide protection against electrical shock using both the base insulation and an additional or reinforced insulation. Protection class II products do not feature a connection to a protective earth conductor. The mounting conditions do not ensure any additional degree of protection, either.

In special cases with Protection Class II luminaires, it can be permissible to connect a protective conductor or a function protection conductor, as follows:

- **for EMC reasons** – in such cases, it can be necessary to connect a function protection conductor to remain within EMC limiting values. The component manufacturer's specifications regarding the individual operating devices must be observed during the construction of the luminaire. If an operating device is marked as containing a function protection conductor, the creepage and air clearance distances of the operating device connection must comply with the requirements of protection class II (reinforced or additional insulation);

- **as an ignition aid for lamps** – connecting a function protection conductor can be necessary as a capacitive ignition aid for lamps. In such cases the creepage and air clearance distances around the ignition aid within the luminaire and the function protection conductor connection terminal have to comply with the requirements of protection class II (reinforced or additional insulation). The ignition behaviour of a lamp should be agreed with the manufacturer in these cases;

- **when wiring the protective conductor** from the luminaire to another device. This is an installation point of the protective conductor and creepage and air clearances must comply with the respective requirements laid down in the luminaire standard as well as any requirements regarding reinforced or additional insulation.
  Functional earth connections of control gear or Protection Class II luminaires must always feature double or reinforced insulation since no technical safety requirements exist for functional earth.

Operating devices with double or reinforced insulation for installation in protection class II luminaires

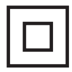
Protection class II specifications have to be met by the luminaire along with its installed operating device. Both protection class I and class II ballasts can be installed. The design of the luminaire must be adapted to suit. This means that if a protection class I ballast is installed in a protection class II luminaire, the design of the luminaire has to be correspondingly sophisticated to ensure the creepage and air clearance distances can be met. On the other hand, using a protection class II ballast, only available as an independent ballast nowadays, will in most cases result in a need for too much technical effort and thus in high costs. Against this background, the standards contain special requirements for ballasts destined for installation in protection class II luminaires.

These "**double or reinforced insulation ballasts**" and respective protection class II lampholders permit technically and cost-effective construction of protection class II luminaires.

Connection terminal for the protective earth conductor Protection class I

Connection of the function protection conductor (will drop in future)

General symbol for an earth connection



Protection class II

Ballasts with double or reinforced insulation

Protection class III

Protection class III luminaires provide protection against electrical shock by using Safety Extra Low Voltage (SELV). Luminaires of protection class III are not permitted to generate higher voltages than the Safety Extra Low Voltage (SELV).

The following table (X1), which has been taken from the luminaire standard EN 60598-1, provides an overview of the insulation coordination between the various types of built-in electronic ballasts and the types of insulation found in luminaires.

Operating gear		**Necessary insulation between active parts and exposed conductive parts**		
Insulation between LV supply and the secondary circuit	Output voltage	Protection class I Insulation of exposed, earthed and conductive parts	Protection class II Insulation of an exposed, conductive part or more as one with potential equalisation	Protection class II Insulation of more than one exposed, conductive part without potential equalisation
None	$U_{OUT} > LV_{Supply}$	Basic insulation suitable for U_{OUT}	Double or reinforced insulation suitable for U_{OUT}	Double or reinforced insulation suitable for U_{OUT}
	$U_{OUT} \le LV_{Supply}$	Basic insulation suitable for U_{OUT}	Double or reinforced insulation suitable for U_{OUT}	Double or reinforced insulation suitable for LV_{Supply}
Basic	Voltage > ELV	Basic insulation suitable for U_{OUT}	Additional insulation suitable for U_{OUT} plus LV_{Supply}	Insulation must satisfy the higher requirement of a) or b) a) Additional insulation suitable for U_{OUT} plus LV_{Supply} b) Double or reinforced insulation suitable for U_{OUT}
	ELV (FELV)	Basic insulation suitable for U_{OUT}	Additional insulation suitable for U_{OUT} plus LV_{Supply}	Additional insulation suitable for U_{OUT} plus LV_{Supply}
Double or reinforced	Voltage > ELV	Basic insulation suitable for U_{OUT}	Basic insulation suitable for U_{OUT}	Double or reinforced insulation suitable for U_{OUT}
	ELV (SELV)	Basic insulation suitable for U_{OUT}	Basic insulation suitable for U_{OUT}	Basic insulation suitable for U_{OUT}
		also see requirement of IEC 60598-1, sections 8, 10 and 11		

Protection classes of luminaires and operating devices

IEC 60529 (EN 60529) defines protection classes for enclosures of casings. The IP Code (International Protection Code) describes the level of protection provided against accidental contact and penetration by foreign bodies as well as protection against water. The first number stands for protection against foreign bodies, the second stands for protection against water. These specifications are important with particular regard to built-in or mounted luminaires as the provisions governing protection against accidental contact provide the basis for the insulation system for components and conductors (also see luminaire standard EN 60598-1).

To comply with the IP requirements, the installation instructions supplied by the luminaire and/or operating device manufacturer(s) must be observed.

Number	**1st Number**		**2nd Number**
	Protection against contact	**Protection against foreign bodies**	**Protection against water**
0	No protection	No protection	No protection
1	Protected against contact with the back of the hand	Protected against solid foreign bodies Ø ≥ 50 mm	Protected against vertically dripping water
2	Protected against finger contact	Protected against solid foreign bodies Ø ≥ 12 mm	Protected against diagonally dripping water (angle of 15° from above)
3	Protected against contact with tools	Protected against solid foreign bodies Ø ≥ 2.5 mm	Protected against diagonal water spray up to an angle of 60° from above
4	Protected against contact with wire	Protected against solid foreign bodies Ø ≥ 1 mm	Protected against water splashes from any direction
5	Protected against contact with wire	Protected against dust	Protected against jets of water
6	Protected against contact with wire	Dust-tight	Protected against strong jets of water
7	–	–	Protected against temporary immersion in water
8	–	–	Protected against permanent submersion in water. Specific testing conditions must be agreed, especially with regard to high-pressure cleaning equipment.
9	–	–	For high-pressure cleaning IPx9 in accordance with DIN 4005

If any components like ballasts or conductors of built-in or mounted luminaires (e.g. wall-mounted luminaires) are accessible to accidental contact, they must comply with the requirements of the two safety levels stipulated for these components. Luminaire construction must be in line with these conditions, which can mean that, for instance, conductors have to feature additional or reinforced insulation.

For lampholders the compliance with the two safety levels is proved by conducting a special voltage test.

European standard EN 50102 "Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)" introduces an IK code, analogous to the IP degree of protection of electrical control gear, that was also adopted as a national standard in France, e.g. with the French standard NF EN 50102. Testing is carried out using a pendulum hammer that, in accordance with the IK code, must be dropped from a certain height with respective weights attached to exert the specified impact energy. The table details impact energy values for luminaires (IK00 to IK10).

IK Code	**Energy** Nm or Joule	**IK Code**	**Energy** Nm or Joule
IK00	0.0	IK06	1
IK01	0.14	IK07	2
IK02	0.2	IK08	5
IK03	0.35	IK09	10
IK04	0.5	IK10	20
IK05	0.7		

Selection of components, materials and dimensions

The documentation provided by Vossloh-Schwabe is carefully researched. Technical advice is given to the best of our knowledge. The details on the product or the type plate are binding in every case.

Any manipulation of VS products or product packaging is illegal and violates registered trademark rights. Manipulations can negatively influence or destroy technical properties and can possibly result in secondary damage. Vossloh-Schwabe does not accept any liability for manipulated products and cannot be held responsible for any secondary damage.

Manufacturers of luminaires and lighting systems remain responsible for the selection of suitable luminaire components, e.g. operating devices and lampholders, and component materials just as for their safe and correct installation in line with luminaire and system set-up regulations.

Particular attention should be paid to the following:
- temperature measurements and temperature limits
- compliance with creepage and air clearance distances and insulation thicknesses
- selection of components to suit their operating conditions and degree of strain (e.g. voltage, current, mechanical loading, UV radiation)
- protection against contact and safe protective earth conductor connections
- resistance to corrosion

The product drawings without tolerances are contained in this catalogue only feature nominal dimensions. For space and simplicity reasons, the full dimensions and particularly the associated tolerances cannot be shown. For detailed information resp. details of luminaire design, please request our in-depth dimensional assembly drawings.

All VS products comply with the relevant standards and are developed and produced using the latest technological expertise.

To ensure safe luminaire production we do not recommend reusing dismantled lampholders.

Impulse voltage categories for lampholders

Lampholder	Standard	Impulse voltage category
E14: 250 V / 2 A		2
E27: 250/500 V / 4 A	IEC 60238 / VDE 0616-1	2
E40		2
Starters: 250 V / 2 A	IEC 60400 / VDE 0616-3	2
Fluorescent lamps 250 V / 500 V / 2 A	IEC 60400 / VDE 0616-3	2
Halogen lamps and other lamps	IEC 60838-1 / VDE 0616-5	2
Bayonet fitting	IEC 61184 / VDE 0616-2	2

Torques for screws

With regard to lampholders secured with screws, we recommend using a torque of around 80% of the value stipulated in DIN EN 60598-1

Nominal diameter of the screw's outside thread mm	Torque (Nm) for screws with a head in acc. with DIN EN 60598-1
to 2.8	0.40
< 2.8 to 3.0	0.50
< 3.0 to 3.2	0.60
< 3.2 to 3.5	0.80
< 3.6 to 4.1	1.20
< 4.1 to 4.7	1.80
< 4.7 to 5.3	2.00
< 5.3 to 6.0	2.50

A	**A type, B type capacitors**	The requirements of the safety standard for capacitors differentiates between capacitor types; A type capacitors stand for plastic can capacitors; B type capacitors stand for aluminium can capacitors.
	AG DALI	International working group under the umbrella of ZVEI (the German Electrical and Electronic Manufacturers' Association) in support of DALI (Digital Addressable Lighting Interface).
	Analogue interface 1–10 V	Bipolar interface of dimmable operating devices with a built-in constant current source.
	Average service life	Specified service life of electronic operating devices with a failure rate per unit of time.
B	**Ballast**	Device that is connected in between the voltage supply and one or more discharge lamps and serves the purpose of igniting the lamps and limiting lamp current during operation.
	Ballast-Lumen Factor (luminous flux factor of a ballast)	The ratio of luminous flux emitted by a reference lamp when operated with a particular production ballast to the luminous flux emitted by the same lamp when operated with its reference ballast.
C	**Capacitive circuit (series compensation)**	Circuit of an inductive ballast with a capacitor connected in series.
	CE Mark	European regulation governing all products that are introduced to the market. Products must comply with the respective EC directives.
	CELMA	Association of European component and luminaire manufacturers (Committee of E.E.C. Luminaires Components Manufacturers Associations).
	CENELEC	European committee for electronic standardisation (Comité Européen de Normalisation Electrotechnique).
	CISPR	International special commission for radio interference (Comité International Spécial des Perturbations Radioélectriques).
	Colour rendering index (CRI) R_a	Index to determine the degree of deviation from a viewed body colour (with 8 standardised test colours) under a given type of lighting. R_a = 100 denotes a light source that causes no distortion of any colour. Lower R_a values denote light sources with less positive colour rendition properties.
	Compensated circuit (parallel compensation)	Circuit of an inductive ballast with a capacitor between phase and neutral conductor.
	Compensation capacitors	The power factor can be increased to a value of 0.9–0.98 by using compensation capacitors.
	Conformity declaration	Documentation for an operating device or a luminaire regarding compliance with European directives; this documentation is for submission to national supervisory authorities (e.g. regulation authority for telecommunications and post (Reg. TP) or trade supervisory authorities).
	Convertors	Electronic convertor (electronic conversion of mains voltage in extra-low voltage) to generate operating voltage for low-voltage halogen lamps.
	Creepage and air clearance distances	Regulation minimum distances between voltage-carrying components of different polarity or between voltage-carrying components and the accessible casing surfaces (air clearance: shortest distance through air; creepage distance: shortest distance across a surface).
	Cross discharge	Discharge in the lamp electrode region during preheating.
D	**DALI**	Digital interface for controlling dimmable electronic operating devices (Digital Addressable Lighting Interface).
	Δt	Increase in the winding temperature during the operation of a ballast (the ballast is mounted on 75 mm high wooden blocks and its temperature is measured at an ambient temperature of 25 °C).
	Δt_{an}	Temperature increase during short-circuit operation (e.g. defective starter, defective lamp).
	DIAL	German institute for applied lighting technology (Deutsches Institut für Angewandte Lichttechnik), Lüdenscheid, Germany.
	DKE	German electrotechnical commission of the DIN and VDE.
	Driver	Name commonly given to ballasts used for operating LED modules.
E	**EC directives**	Regulations (laws) of the European Community that have to be transposed into national laws within a prescribed period of time.
	Efficiency	Ratio of power output in relation to power input.
	ELC	European Lamp Companies Federation
	EMC	Electromagnetic compatibility
	EMF	Electromagnetic fields
	ENEC agreement	Agreement between the European testing institutes for issuing the European test mark.
	ENEC mark	Marking for a device that complies with the European standards and that was tested by a testing institute that is a part of the ENEC agreement (European Norms of Electrical Certification).
	Energy classification EEI	CELMA system to determine energy classes for ballasts for fluorescent lamps (Energy Efficency Index).
	Error current	Current that is caused by a fault in the insulation of a device or via creepage or air clearance distances.
	Error current protection switch	Evaluates the magnitude of the error current and switches the circuit off if a predefined maximum value is reached.
F	**Feed-through of mains voltage**	The possibility of connecting two lamps to a single terminal so that an electrical connection can be made to another device.
	FELV	Functional extra-low voltage without adequate protection from accidental contact with higher voltages in other parts of the same circuit.
	FEP capacitors	Flame- and explosion-proof capacitors with a contact breaker.
	FGL	Promotion Society for Good Lighting (Fördergemeinschaft Gutes Licht – ZVEI).
	Function protection conductor	It may be necessary to connect a "function protection conductor" to ensure compliance with the EMC requirements or as a starting aid for lamps; VS operating devices are suitably marked.

I	**IDC terminal (ALF terminal)**	IDC-type connection terminal (Insulation Displacement Connection) for automatic luminaire fabrication (ALF terminal).
	IEC	International Electrotechnical Commission
	ILCOS lamp designation system	International IEC marking system for lamps.
	Illuminance Ev	Illuminance (Ev) is the total luminous flux (Φ) incident on a horizontal, vertical or angled illuminated surface (per unit area). The unit is lux [lx=lm/m²], with luminous flux in [lm] and area in [m²]. Illuminance Ev forms the basis for all lighting calculations and designs.
	Impedance	Impedance is a conductor's apparent resistance to an alternating current.
	IMQ	Italian institute for quality marking; at the same time, the mark of conformity with standards (Istituto Italiano del Marchio di Qualitá).
	Independent lamp operation	Possibility of operating a single lamp with a multi-lamp operating device after the other lamps have failed.
	Independent operating device	Operating device that does not have to be installed in a casing; the safety regulations are fulfilled by the operating device itself.
	Inductance	Inductance establishes the connection between the current and the magnetic flux caused by it in a conductor arrangement after taking account of all design and material fluctuations.
	Inductive circuit	Operation of a fluorescent lamp with a ballast without a capacitor.
	Interference	Interference signals emitted by operating devices via the mains voltage or the air.
	Interference immunity	Property of an operating device to remain fully functional despite interference emitted by other operating devices.
	IP numbers	Code system for marking the protection level of an operating device or a luminaire against moisture or foreign bodies entering (the first figure stands for foreign bodies and the second for moisture).
	IPP technology	Generating the ignition voltage required for high-pressure lamps using the special intelligent pulse pause technology.
L	**LBS lamp designation System**	Marking system for lamps, established for Europe.
	Leak current	Current of an operating device or a luminaire that is discharged via the potential compensation conductor (earth conductor).
	LED (light emitting diode)	Solid state device embodying a p-n junction, emtting optical radiation when excited by an electric current.
	LED light engine	Functional unit consisting of an LED module and control gear. The LED light module and the control gear can be used separately in two different casings or combined as a single unit.
	LED module	Unit supplied as a light source. In addition to one or more LED's it may contain other components, e.g. optical, electrical, mechanical and/or electronic.
	Light colour	Perceived colour of the light radiated by a lamp.
	LightingEurope	An industry association consisting of European lamp, component and luminaire manufacturers as well as national lighting associations in Europe. LightingEurope is the successor organisation of CELMA and ELC (European Lamp Companies). LightingEurope represents the interests of the European lighting industry.
	Light intensity distribution curve	Represents the spatial distribution of the light intensity of light sources.
	LiTG	German Association for Lighting Technology (Deutsche Lichttechnische Gesellschaft)
	Luminance L	Luminance L is the luminous intensity density of an area that emits or reflects light with a certain emission angle. The unit of luminance L is [cd/m²] and is the photo-technical measure that corresponds to the subjective perception of the level of brightness of a light source or an object, while luminous flux Φ, luminous intensity I and illuminance E are not visible, i.e. not sensed by the human eye. Light only becomes visible when it hits an object that it is either reflected by or penetrates in a diffused manner. Objects of different levels of brightness therefore only seem to be darker or brighter at same illuminance because they reflect the light differently.
	Luminous efficiency / efficiency	Ratio of luminous flux to power input (lm/W).
	Luminous flux Φ (photon radiation)	Luminous flux Φ is the radiated/emitted light power in lumen [lm] of a light source, a unit of measurement for the number of light photons emitted in all directions. Luminous flux is the photometrical light output perceived by the human eye.
	Luminous intensity I	Luminous intensity I in [cd] is decisive for characterising of a source of light and is defined as a quotient of the emitted luminous flux Φ and the radiated area of the solid angle Ω. Luminous intensity I is thus the focused luminous flux Φ within the radiated solid angle Ω. Today's LEDs can reach a luminous intensity of more than I=10 cd. The luminous intensity value depends on the viewing angle, i.e. the luminous intensity of an LED chip in a 30° reflector will be higher than that of an identical LED chip in a 60° reflector. This is because a 60° reflector results in the same luminous flux Φ having to illuminate a larger area.
M	**Mains harmonics**	Mains current distortions by higher-frequency currents.
	Master/slave circuit	Operating several lamps in different luminaires with one ballast.
	µF	Unit of capacitance (microfarad)
	MPP capacitors	Metallised polypropylene film dielectric capacitors.
P	**Parallel-compensated circuits**	Circuit of an inductive ballast with a capacitor between phase and neutral conductor (connected in parallel to the lamp circuit).
	Part load range	Variable load range up to the maximum rated load.
	PELV	Protective extra-low voltage with adequate protection from accidental contact with higher voltages in other parts of the same circuit.
	Phase-cutting leading-edge control	In accordance with the defined angle, voltage regions are suppressed of the positive and negative sinusoidal oscillations of the mains voltage in an upwards direction starting with the voltage zero crossing.
	Pinch temperature	This is measured at a defined point of the lamp base; the permissible maximum values are internationally determined.
	Polyester resin impregnation	High-grade vacuum impregnation with polyester resin.
	Power factor	Ratio of true power to apparent power (total power). Lambda (λ) expresses the power factor for non-sinusoidal currents and voltages. In contrast, cos φ (phi) expresses the power factor for sinusoidal currents or voltages.
	Pulse Ignition	Generation of the ignition voltage for high-pressure lamps with the help of ballasts (ballast insulation must match the ignition voltage).
	PUSH	Key-operated bipolar interface of VS electronic ballasts for controlling the brightness of connected lamps.

R	**Reference ballast**	Special ballast that is either inductive for lamps operated with mains voltage or ohmic for lamps operated at high frequencies. Reference ballasts are designed to deliver comparable values for testing ballasts, selecting reference lamps and testing mass-produced lamps under standardised conditions.
	Reference lamp	When used in combination with a suitable reference ballast, reference lamps provide key electrical data that are close to the target values laid down in the lamp standards.
S	**Safety transformer**	Isolation transformer for supplying circuits with safety extra-low voltages.
	SELV	Safety extra-low voltage.
	Short-circuit-proof	Short-circuit-proof operating devices do not pose a safety risk if a short-circuit occurs at the output of the operating device; a difference is made between operating devices offering limited and unlimited protection against short-circuit; in the case of operating devices with limited short-circuit protection, an additional mechanism has to be installed.
	Solid angle Ω	Solid angle Ω is the area within a sphere that is pervaded by the light emitted by a light source. The steradian (sr) is the unit of measure for solid angle, whereby 1sr = 65.5°. This describes a cone with its peak in the light source and a beam spread angle of 65.5°. A whole solid angle is expressed as 4πsr = 12.56 sr.
	Standards	VS products comply with the regulations of the following European standards: • **Electronic ballasts for fluorescent lamps:** EN 61347-1, EN 61347-2-3, EN 60929, EN 55015, EN 61547, EN 61000-3-2, IEC 62493 • **Electronic ballasts for high-pressure discharge lamps:** EN 61347-1, EN 61347-2-12, EN 55015, EN 61547, EN 61000-3-2, IEC 62493 • **Electronic convertors:** EN 61347-1, EN 61347-2-2, EN 61047, EN 55015, EN 61547, EN 61000-3-2, IEC 62493 • **Electromagnetic ballasts:** EN 61347-1, EN 61347-2-8, EN 61347-2-9, EN 60921, EN 60923, EN 50294, EN 55015, EN 61547, EN 61000-3-2, IEC 62493 • **Electromagnetic transformers:** EN 61558-1, EN 61558-2-6, EN 55015, EN 61547, EN 61000-3-2, IEC 62493 • **Ignitors:** EN 61347-1, EN 61347-2, EN 60927, EN 55015, EN 61547, EN 61000-3-2 • **Capacitors:** EN 61048, EN 61049 • **Lampholders:** EN 60238, EN 60400, EN 60838-1, EN 61184, EN 60399 • **Digital control inputs of operating devices:** IEC 62386 • **LED:** IEC 62031, IEC 61347-1, IEC 61347-2-13, IEC 62384, IEC 61231, IEC TR 61341, IEC 60838-2-2, IEC 62471(-1), EC 62471-2 • **EMC/EMF:** EN 55015, EN 61547, EN 61000-3-2, IEC 62493
	Stroboscopic effect	Optical illusion whereby objects appear either to be moving or stationary in contrast to their actual state when illuminated by periodically alternating light.
	Superimposed ignition	Generation of the ignition voltage required for high-pressure lamps by the ignitor independent of the ballast (superimposed over the mains voltage).
	System power consumption	Total power input of lamp and operating device (in watt).
T	**t_a**	Ambient temperature
	TALQ	Industrial consortium for the globally recognised standardisation of a management software interface for outdoor lighting networks. The aim is to enable the interoperability of central management systems and outdoor lighting networks made by different manufacturers.
	Tandem circuit	Series connection of two fluorescent lamps using a single ballast.
	t_c	Maximum operating temperature of the casing at the marked measuring point.
	Temperature details	The temperature details on our VS ballasts are always maximum values; these are based on the maximum voltage values given on the type plate.
	The Connected Lighting Alliance	Industrial consortium that was founded by GE Lighting, Lutron, OSRAM, Panasonic, Philips, Toshiba in August 2012 for the purpose of supporting global use and distribution of wireless connectivity in lighting applications.
	Thermal classes	Classification of transformers according to the degree of heat resistance offered by the insulation materials.
	Thermal cut-out	Protection from overheating due to abnormal lamp conditions (rectifier effect, short-circuit and overload), with automatic restart after cooling.
	Transient mains overvoltages	Voltage peaks that briefly occur and are superimposed over the mains voltage.
	T rating	Rated value of the lampholder's maximum operating temperature (e.g. T130).
	Tungsten-halogen cycle	In the outer, cooler part of the lamp, the halogen combines with the tungsten vapour released by the filament to form a tungsten-halogen molecule which then decomposes and deposits the tungsten on the filament.
	tw	Maximum permissible winding temperature.
U	**UL, UL approval**	Underwriters' Laboratories Inc., USA; US conformity mark for safety.
V	**VDE mark**	Safety mark on the basis of the German safety standard for electrical equipment; tested by the VDE-PZI (Verband Deutscher Elektrotechniker – Prüf- und Zertifizierungsinstitut).
W	**Winding temperature**	Temperature of the copper winding in a magnetic ballast; the change in winding temperature is measured using the change of the resistance of the copper winding.
Z	**Zhaga**	Global industrial consortium that has taken on the task of standardising the interfaces needed for LED light engines.
	ZVEI	Central association of the electrotechnical and electronics industry in Germany (Zentralverband Elektrotechnik- und Elektronikindustrie e.V.).

Ref. No.	Type	Page	Approval
100064	02120	200	1,3
100069	02150	200	1,3,33
100082	02525	76	1
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100096	02574	75	1
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100273	08701	307	–
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100310	09205	174	1,3
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100442	20400	192	–
100448	20501	192	–
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100486	22601	186	1,3,33
100487	22602	186	1,3,33
100551	27356	191	1,3
100557	27450	184	1,3,33
100559	27460	184	1,3
100572	27722	191	1,3
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100581	27821	182	1,3
100583	27822	191	1,3
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100588	28200	184	1,3,33
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100710	30523	275	1
100720	30550	275	1
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101258	32700	261	1
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101310	35007	164	1,3,33
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101320	35010	165	1,3,33

Ref. No.	Type	Page	Approval
101324	35011	165	1,3,33
101344	35051	165	1,3,33
101346	35052	165	1,3
101364	35201	166	1,3,33
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101491	36052	168	1,3,33
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101643	46100	190	1,3
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101716	47206	189	1,3
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103027	80343	300	–
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103414	81093	285	–
103415	81093	285	–
103424	81095	285	1,33

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Ref. No.	Type	Page	Approval
103430	81109	285	–
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103582	83218	300	–
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105185	96034	301	–
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105483	97065	203	–
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105777	35760	169	–
105843	97532	192	–
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Ref. No.	Type	Page	Approval
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107178	96206	293	–
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107193	32340	274	1
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107214	32391	273	1
107215	32395	273	1
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108374	12810	68,313	1
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108777	22850	186	1
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108927	35500	166	1,3
108928	35510	166	1,3

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Ref. No.	Type	Page	Approval
108932	35530	166	1,3
108933	35540	167	1,3
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108983	64307	281	1,33
108984	22900	186	1
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109014	12870	342	34
109039	83007	296	–
109041	81130	286	–
109044	96172	297	–
109045	97511	293	–
109052	83007	296	–
109054	81130	286	–
109060	96172	297	–
109062	97511	293	–
109074	83293	296	–
109077	85070	291	–
109081	83274	297	–
109084	96159	286	–
109086	97147	193	–
109087	83293	296	–
109092	85070	291	–
109093	83274	297	–
109095	96159	286	–
109098	83035	296	–
109099	83035	296	–
109102	81002	286	–
109103	81002	286	–
109110	85075	282	–
109112	85075	282	–
109119	97666	283	–
109120	97666	283	–
109122	97635	283	–
109123	97635	283	–
109126	97697	283	–
109145	81024	286	–
109149	96211	286	–
109150	96211	286	–
109152	81132	287	–
109153	81132	287	–
109158	83297	304	1
109159	83282	293	–
109162	03210	307	–
109166	05202	307	–
109184	97698	292	–
109187	96148	296	–
109188	96148	296	–
109190	96154	297	–
109191	96154	297	–
109195	96147	296	–

Ref. No.	Type	Page	Approval
109196	96147	296	–
109198	83260	303	–
109199	83260	303	–
109200	96229	304	–
109201	96229	304	–
109235	35610	163	1,3
109238	35611	163	1,3
109240	35612	163	1,3
109243	83300	304	–
109247	09708	310	–
109248	09701	311	–
109249	09703	310	–
109253	09701	311	–
109280	96033	301	–
109281	96034	301	–
109282	83258	302	–
109283	83258	302	–
109285	08610	307	–
109291	08701	307	–
109317	96160	311,312	17
109318	96160	311,312	17
109330	27700	181	1,3,33
109331	27701	181	1,3,33
109332	27800	181	1,3
109335	27801	181	1,3
109338	28500	182	1,3,33
109339	28501	182	1,3,33
109340	28600	182	1,3,33
109341	28601	182	1,3,33
109342	28700	345	–
109343	28701	345	–
109376	28725	345	–
109377	28726	345	–
109383	64001	280	1,33
109384	64001	280	1,33
109386	64101	280	1,33
109387	64101	280	1,33
109411	97244	271	–
109429	64501	289	1,33
109462	83282	293	–
109497	32380	274	1
109512	96124	297	–
109518	12876	342	34
109532	84000	180	–
109547	33300	260,264,266	1,34
109548	97255	260	–
109550	97257	260,269	–
109553	94095	264	–
109554	94096	266	–
109555	97260	293	–
109556	97260	293	–
109559	96124	297	–
109560	97698	292	–
109568	62111	65	1
109575	97065	203	–
109592	09705	311	–
109600	09704	312	–
109621	94435	308	–

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36 DEKRA

Ref. No.	Type	Page	Approval
109622	94436	308	–
109674	33400	260	1,34
109676	97636	282	–
109677	97636	282	–
109679	97665	292	–
109680	97665	292	–
109685	94088	178	–
109686	09170	177	1,3
109725	97750	309	–
109728	97752	309	–
109784	02110	200	1,3,33
109790	43200	202	1,3
109792	43210	202	1,3,33
109794	97664	292	–
109795	97664	292	–
109805	81024	286	–
109838	64770	290	1,33
140413	Z 70 S	42	1,14
140425	Z 250 S	43	1,14
140427	Z 400 S	44	1,14
140430	Z 1000 S	47	1,14
140432	Z 2000 S	50	–
140471	Z 1000 L	48	–
140481	Z 70 K	42	1,14
140489	Z 250 K	43	1,14
140496	Z 1000 S/400 V	48	14
140497	Z 2000 S/400 V	50	14
140499	Z 3500 S/400 V	50	–
140537	CE 50	60	–
140594	Z 400 M	45	1,14
140597	Z 400 M K	45	1,14
140607	Z 1000 TOP	47	14
140608	Z 1200/2,5	49	–
140609	Z 1200/9	49	–
140613	PZS 1000 K	52	14
140617	PZI 1000/1 K	52	14
140621	PU 12 K	55	14
140622	PU 120 K	55	14
140623	PU 121 K	55	–
140627	AS 1000 K	58	1,14
140693	Z 400 M S	45	1,14
141193	AS 1000 K A10	59	–
141580	Z 70 K D20	42	1,14
141581	Z 250 K D20	43	1,14
141582	Z 400 M K D20	45	1,14
141583	Z 400 S D20	44	1,14
141584	Z 1000 S D20	47	1,14
142098	ZPU 70 K D20	56	14
142099	ZPU 250 K D20	56	14
142150	PR 12 K D	55	14
142170	PR 12 K LC	55	14
142330	Z 70 K D20	42	1,14
142350	Z 250 K D20	43	1,14
142370	Z 400 M K D20	45	1,14
142783	PZ 1000/400 V A5	51	14
142784	PZ 1000 K D20	51	14
142897	Z 400 M K VS-Power	45	14
146990	Z 750 S	46	14

Ref. No.	Type	Page	Approval
147230	SP 230/10 K	12	14
147707	Z 400 M VS-Power	45	14
147790	HZ 600 K	53	–
147791	HZ 1000 K	54	–
147793	HZ 2000 K/400 V	54	–
149992	SU 1–10 V K	57	14
149993	PR 1–10 V K LC	57	14
159968	0607	193	–
160597	NaHJ 250.160	21	1,19,31
160604	NaHJ 250.163	21	–
160613	NaHJ 70/50.157	20	1
161158	NaHJ 100/70.519	21	1
161367	NaHJ 35.485	20	1
161371	NaHJ 35.638	20	–
161379	NaH 50.486	20	1
161392	NaHJ 70.653	20	–
161399	NaH 50.654	20	–
161460	UNaH 70/40%.691	36	–
161469	NaHJ 100/70.703	21	1
161471	NaHJ 100/70.709	21, 36	–
161475	UNaH 150/40%.717	36	–
161662	NaHJ 70.158	20	1
161686	NaHJ 250.915	21	1,31,32
161707	NaHJ 100.941	21	1
161757	STr 50/12.301	255	15,19
161781	STr 20/12.306	255	19
161860	STr 20/12.306	256	19
161935	STr 105/12.406	256	–
163305	L 7/9/11.207	149	–
163683	L 4/6/8.304	153	1,19,25
163694	L 7/9/11.307	148	1,19,25,31
163711	LN 13.313	148,153	1,19,25,31
163730	LN 16.316	148,154	1,25
163763	LN 18I.319	149	1,19,25,31
163861	LN 15.329	154	1,25
164013	L 25.346	154	1
164033	L 30.347	154	19,25,31
164326	L 4/6/8.404	153	1
164335	L 7/9/11.411	148	1
164342	LN 13.413	148,153	1
164353	LN 18I.418	150	1
164358	LN 16.417	148,155	1
164438	L 36/40.443	150,155	1
164555	LN 36.505	150,155	1
164560	LN 58.506	150,155	1
164566	LN 18.507	150,155	1
164572	LN 18.510	149,150,154	1
164590	LN 36.511	150,154	1
164680	LN 30.530	149	–
164779	L 18I.602	151	–
164828	L 58.625	151,155	–
164870	L 58.657	151,155	–
167100	Q 50.501	31	1
167125	Q 50.508	31	1
167132	Q 80.510	31	1
167136	Q 125/80.511	31	1
167140	Q 125.512	31	1
167144	Q 250.513	31	1,19,31

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36 DEKRA

Ref. No.	Type	Page	Approval
167185	Q 50.535	31	–
167213	Q 50.550	31	1,32
167250	Q 400.561	31	1,19,31
167263	Q 125.568	31	1,19,31,32
167299	Q 80.584	31	–
167302	Q 80.587	31	19
167304	Q 80.588	31	1,19,31,32
167306	Q 80/50.592	31	–
167311	Q 80/50.596	31	1
167326	Q 125/80.611	31	1
167330	Q 400.612	31	1,19,31,32
167335	Q 400.613	31	–
167367	Q 250.528	31	1,19,31,32
167374	Q 400.669	31	1
169125	STr 105/12.406	255	–
169389	LN 58.568	150,154	1
169645	LN 30.801	154	1
169647	LN 13.805	148	1
169721	NaHJ 150.995	23	1,32
169722	NaHJ 70.158	23	1,32
169747	STr 105/12.311	256	19,31
169748	STr 50/12.401	256	–
169779	LN 36.570	150,154	1
169830	STr 50/12.401	255	–
169892	UNaH 250/40%.983	36	–
169947	Q 125.549	31	1,19
170002	STr 105/12.311	255	15,19,31
170091	STr 50/12.301	256	14,19
172775	Cover plate	144	–
172776	Light sensor	144	–
172777	Multi sensor	144	–
172778	Manual controller	144	–
174961	NaHJ 70.300	20	1,31
178177	NaHJ 250.340	21	1
178771	NaHJ 250.727	28	1,19,32
178790	NaHJ 400.006	28	1,31,32
179424	NaHJ 400.737	28	1,19,31,32
179444	STr 50/12.337	256	–
179454	NaH 600.005	28	1,19
179604	STr 60/12.338	255	–
179608	STr 60/12.338	256	–
179740	NaHJ 400.006	28	1,31,19
179742	NaH 600.010	28	1
179743	NaHJ 250.003	28	1
183033	EHXc 35.325	9	1,14,28
183034	EHXc 35.325	9	1,14,28
183035	EHXc 35.325	9	1,14,28
183036	EHXc 70.326	9	1,14,28
183038	EHXc 70.326	9	1,14,28
183039	ELXc 424.223	137	1,14,28
183040	ELXc 226.878	129	1,14,28
183046	EHXc 150G.334	10	1,14,28
183047	EHXc 150G.334	10	1,14,28
183059	ELXd 235.735	142	1,14,28
183108	ELXc 226.878	129	1,14,28
183109	ELXc 414.227	139	16
183110	ELXc 424.228	139	16
183111	ELXc 228.229	139	16
183112	ELXc 328.230	139	16
183113	ELXc 135.231	139	16
183114	ELXc 235.232	139	16
183115	ELXc 239.233	139	16
183116	ELXc 149.234	139	16
183117	ELXc 249.235	139	16
183118	ELXc 254.236	139	16
183119	ELXc 180.237	139	16
183122	ELXc 114.238	140	16
183123	ELXc 128.239	140	16
183124	ELXc 214.240	140	16
183125	ELXc 228.241	140	16
183126	ELXc 414.242	140	16
183127	ELXc 118.243	140	16
183128	ELXc 136.244	140	16
183129	ELXc 158.245	140	16
183130	ELXc 218.246	140	16
183131	ELXc 236.247	140	16
183132	ELXc 258.248	140	16
183133	ELXc 418.249	140	16
183134	ELXc 118.879	131	16
183135	ELXc 126.880	131	16
183136	ELXc 218.881	131	16
183137	ELXc 226.882	131	16
186072	EST 70/12.380	254	1,14,28
186077	EST 105/12.381	254	1,14,28
186098	EST 150/12.622	254	1,14,28
186173	EST 60/12.635	254	13
188080	Cord Grip	11	–
188093	ELXc 135.856	137	1,14,28
188094	ELXc 235.857	137	1,14,28
188095	ELXc 149.858	137	1,14,28
188140	ELXc 140.862	122,137	1,14,28
188142	ELXc 154.864	137	1,14,28
188144	ELXc 180.866	122,137	1,14,28
188329	ELXd 124.600	124,143	1,14,28
188330	ELXd 224.601	124,143	1,14,28
188331	ELXd 139.602	124,143	1,14,28
188332	ELXd 154.603	124,143	1,14,28
188333	ELXd 254.604	124,143	1,14,28
188334	ELXd 180.605	124,143	1,14,28
188335	ELXd 249.606	143	1,14,28
188336	ELXd 124.607	124,142	1,14,28
188337	ELXd 224.608	124,142	1,14,28
188338	ELXd 139.609	124,142	1,14,28
188339	ELXd 239.610	124,142	1,14,28
188340	ELXd 154.611	124,142	1,14,28
188341	ELXd 254.612	124,142	1,14,28
188342	ELXd 180.613	124,142	1,14,28
188343	ELXd 249.614	142	1,14,28
188350	ELXd 239.621	124,143	1,14,28
188431	ELXd 226.801	134	14,28
188438	ELXc 414.868	137	1,14,28
188490	ELXd 226.801	134	14,28
188549	ELXd 218.803	134	1,14,28
188550	ELXd 242.807	134	1,14,28
188564	ELXd 118.802	134	1,14,28
188565	ELXd 142.806	134	1,14,28

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36 DEKRA

Ref. No.	Type	Page	Approval
188589	ELXc 128.869	127	1,14,28
188590	ELXc 128.869	129,13	1,14,28
188595	ELXc 336.214	137	1,14,28
188597	ELXd 324.623	124,142	1,14,28
188598	ELXd 424.624	124,142	1,14,28
188600	ELXd 324.626	124,143	1,14,28
188602	ELXd 424.628	124,143	1,14,28
188604	ELXd 280.630	142	1,14,28
188605	ELXd 280.631	143	1,14,28
188616	ELXc 240.863	122,137	1,14,28
188617	ELXc 249.859	137	1,14,28
188618	ELXc 254.865	122,137	1,14,28
188619	ELXc 280.538	122,137	1,14,28
188643	ELXc 242.837	127,128	1,14,28
188680	ELXc 155.378	128	1,14,28
188681	ELXc 155.378	130	1,14,28
188694	ELXd 118.802	134	1,14,28
188695	ELXd 142.806	134	1,14,28
188696	ELXd 218.803	134	1,14,28
188697	ELXd 242.807	134	1,14,28
188698	ELXc 213.870	127	1,14,28
188699	ELXc 218.871	127	1,14,28
188700	ELXc 142.872	127,128	1,14,28
188704	ELXc 136.207	138	14
188705	ELXc 236.208	138	14
188706	ELXc 158.209	138	14
188707	ELXc 258.210	138	14
188712	ELXc 213.870	129	
188713	ELXc 218.871	129	1,14,28
188714	ELXc 142.872	129,13	1,14,28
188717	ELXd 135.823	142	1,14,28
188744	ELXc 418.204	137	1,14,28
188792	EMXs 180.000	331	36
188793	EMXs 180.001	331	36
188794	EMXs 180.002	331	36
188795	EMXs 180.003	331	36
188823	EMXs 180.000	331	–
188824	EMXs 180.001	331	–
188825	EMXs 180.002	331	–
188826	EMXs 180.003	331	–
188827	Battery Holder	331	–
188828	Battery Holder	331	–
188829	Battery Holder	331	–
188873	ELXd 118.718	124,142	1,14,28
188874	ELXd 218.719	124,142	1,14,28
188875	ELXd 136.720	124,142	1,14,28
188876	ELXd 236.721	124,142	1,14,28
188877	ELXd 158.722	124,142	1,14,28
188878	ELXd 258.723	142	1,14,28
188912	ELXc 136.216	138	1,14,28
188913	ELXc 236.217	138	1,14,28
188914	ELXc 158.218	138	1,14,28
188915	ELXc 258.219	138	1,14,28
188921	ELXc 135.220	138	14,28
188922	ELXc 235.221	138	14,28
188923	ELXd 142.709	135	1,14,28
188924	ELXd 142.709	135	1,14
188932	ELXd 135.724	143	1,14,28

Ref. No.	Type	Page	Approval
188933	ELXd 235.725	143	1,14,28
188953	ELXd 118.705	135	1,14
188954	ELXd 218.707	135	1,14,28
188955	ELXd 218.707	135	1,14
188974	ELXd 242.711	135	1,14,28
188975	ELXd 242.711	135	1,14
188993	EHXc 35G.327 B	8	1,14,28
188994	EHXc 35G.327 I	8	1,14,28
400671	94066	308	–
400699	80474	308	–
400732	97755	310	–
400772	80476	309	–
400779	80475	309	–
400817	85076	282	–
400818	85076	282	–
400819	85077	292	–
400820	85077	292	–
400913	12600	67	1
400914	12600	67	1
400915	12610	67	1
400916	12610	67	1
400917	12614	67	1
400918	12614	67	1
401536	94444	309	–
401549	94438	309	–
401970	97754	310	–
500296	Capacitor	240	1
500299	Capacitor	240	1
500300	Capacitor	240	1
500301	Capacitor	240	1
500302	Capacitor	240	1
500303	Capacitor	240	1
500304	Capacitor	240	1
500305	Capacitor	240	1
500315	Capacitor	240	1
500316	Capacitor	240	1
500317	Capacitor	240	1
500318	Capacitor	240	1
500319	Capacitor	240	1
500320	Capacitor	240	1
500321	Capacitor	240	1
500322	Capacitor	240	1
500323	Capacitor	240	–
500401	NaHJ 250.011	28	–
500402	NaHJ 400.737	28	1
500403	NaHJ 400.012	28	1
500574	35613	163	1,3
500757	84001	178,18	–
500810	64401	289	1,33
500843	STr 50/12.207	255	–
500969	NaHJ 250.727	28	1,19
500976	NaHJ 250.727	28	1,19
501351	08400	302	–
501352	08400	302	–
501356	64601	289	1,33
501358	64601	289	1,33
501942	97268	270	–
502004	33500	270	1,34

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36 DEKRA

Ref. No.	Type	Page	Approval
502064	97320	271	–
502111	31020	271	1,34
502112	31030	271	1,34
502394	33600	69	1
502416	97282	272	–
502503	05202	270	–
502515	83301	305	–
502592	STr 50/12.422	255	–
502783	Capacitor	240	1
502799	NaHJ 100.941	23	1
502818	Q 125.598	31	–
503010	NaHJ 35.485	23	1,32
503041	64781	290	1,33
503136	NaHJ 70/50.695	37	1
503457	97000	284	5
503458	97000	284	5
503579	97322	282	–
503773	98087	179,196	–
503923	64201	280	1,33
503924	64201	280	1,33
504078	98011	179,195	–
504109	NaHJ 250.340	21	1
504131	NaHJ 100/70.703	23, 37	1
504135	NaHJ 150/100.973	23, 37	1
504202	28315	184	1
504302	64719	289	1,33
504303	64719	289	1,33
504351	Capacitor	240	1
504416	31695	72	1
504467	Q 250.417	33	1,32
504474	Q 400.001	33	1,32
504615	97321	291	–
504640	83226	300	–
504641	83226	300	–
504643	83227	300	–
504644	83227	300	–
504669	31696	72	1
504749	96021	305	–
504769	83283	293	–
504938	97277	171	–
504939	97278	171	–
505002	Q 400.001	33	1
505014	64770	64	1
505054	NaHJ 250.915	23	1,31,32
505251	93088	277	15
505389	64770	64	1,33
505720	64719	64	1
505721	64719	64	1,33
505732	09404	175,178	1,3
505733	09405	175	1,3,33
505734	09406	175	1,3,33
505735	09415	175	1,3,33
505736	09416	175	1,3,33
505737	09420	176,346	1,3,33
505739	09421	176,346	1,3
505745	09426	176	1,3,33
505746	09427	176	1,3,33
505747	09440	176	1,3

Ref. No.	Type	Page	Approval
505750	09450	177	1,3,33
505751	09460	177	1,3,33
505782	J 400.027	28	1
505951	83310	270	–
506007	28310	184	1,33
506020	09607	312	17
506024	09607	312	17
506026	09606	311	17
506027	09606	311	17
506120	NaHJ 100.670	22	1,19
506122	NaHJ 35.485	22	1,32
506211	94079	308	–
506247	64360	281	1,33
506249	64360	281	1,33
506255	64775	290	1,33
506257	64775	290	1,33
506263	64785	290	1,33
506265	64785	290	1,33
506267	64785	290	1,33
506366	Capacitor	240	1
506495	Capacitor	240	1
506807	93089	277	15
507049	81018	287	–
507050	81018	287	–
507052	81017	288	–
507053	81017	288	–
507075	83283	293	–
507105	34000	263	1
507181	STr 50/12.342	255	–
507256	Q 250.703	31	1
507341	NaHJ 70/50.157	22	1
507342	NaHJ 100/70.703	22	1
507343	NaHJ 150/100.973	22	1
507490	97257	260,269	–
507498	NaH 50.486	23	1
507562	97677	178	–
507592	97528	74,275	–
507593	97528	74	–
507627	UNaH 150/100.722	37	1
507628	NaHJ 100/70.519	23, 37	0
507671	NaHJ 100.126	21	1,19
507697	NaHJ 70/50.695	23	1
507797	97267	310	–
507798	97267	310	–
507802	83146	301	1
507803	83147	301	1
507936	LN 58.192	150,155	1
508067	97037	284	5
508186	LN 58.116	150,154	1
508245	Q 400.613	31	–
508352	96004	287	–
508353	96004	287	–
508423	28330	185	1
508468	Capacitor	240	1
508484	Capacitor	241	1
508562	97355	277	15
508563	97356	277	15
508590	09407	175	1,3

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Ref. No.	Type	Page	Approval
508667	Capacitor	240	1
508668	Capacitor	240	1
508723	NaHJ 250.340	23	1
508741	NaHJ 400.012	28	1
508744	NaHJ 250.011	28	–
508746	Q 250.417	33	1
508922	LN 18l.940	149	1
509100	NaHJ 150.355	22	1,19,31
509110	93034	270	–
509117	34301	72	1
509118	93035	270	–
509152	47105	187	1,3,33
509154	47106	187	1,3,33
509156	47304	187	1,3,33
509162	47505	187	1,3,33
509164	47506	187	1,3,33
509169	NaHJ 70.653	22	–
509170	NaHJ 35.638	22	–
509171	NaHJ 150.679	22	–
509213	42000	71	1,3
509263	64307	281	1,33
509295	97355	277	15
509296	97356	277	15
509340	97427	284	17
509349	LN 58.990	150,154	1
509356	31400	70	1,34
509357	33800	268	1,34
509373	L 36.120	151,155	–
509490	NaHJZ 70/50.785	26	15
509491	NaHJZ 100/70.786	26	15
509492	NaHJZ 150/100.787	26	15
509502	LN 26.813	150	1,31
509519	93059	170	–
509520	93058	170	–
509521	93057	170	–
509522	93056	170	–
509613	J 400.027	28	1
520733	97705	282	–
520734	97705	282	–
520735	85074	283	–
520736	85074	283	–
520759	97708	283	–
520760	97708	283	–
520865	30470	263	1,34
520880	94455	269	–
520882	94457	269	–
520992	L 13.210	149,153	–
521010	80280	269	–
521123	84105	196	1,3
525583	97760	269	–
525791	STr 50/12.109	255	–
526169	Capacitor	241	1
526170	Capacitor	241	1
526171	Capacitor	241	1
526196	NaHJ 150.679	21	–
526517	NaHJ 35.485	20	1
526616	NaHJ 150.679	23	–
526715	Q 1000.311	33	–

Ref. No.	Type	Page	Approval
526886	97497	291	–
527191	LN 36.130	150,154	1
527196	LN 36.201	150,155	1
527502	71001	159	1,3,33
527503	71002	159	1,3,33
527504	71003	159	1,3,33
527506	71011	159	1,3,33
527507	71012	159	1,3,33
527508	71013	159	1,3,33
527509	71014	159	1,3,33
527510	71015	159	1,3
527511	71016	159	1,3
527512	71019	159	1,3,33
527529	71101	159	1,3,33
527530	71102	159	1,3,33
527531	71103	159	1,3,33
527533	71111	159	1,3,33
527534	71112	159	1,3,33
527535	71113	159	1,3,33
527536	71114	159	1,3,33
527537	71115	159	1,3
527538	71116	159	1,3
527539	71119	159	1,3,33
527556	71201	161	1,3,33
527557	71202	161	1,3,33
527558	71203	161	1,3,33
527560	71211	161	1,3,33
527561	71212	161	1,3,33
527562	71213	161	1,3,33
527563	71214	161	1,3,33
527564	71215	161	1,3
527565	71216	161	1,3
527566	71219	161	1,3,33
527585	71301	160	1,3,33
527586	71302	160	1,3,33
527587	71303	160	1,3,33
527589	71311	160	1,3,33
527590	71312	160	1,3,33
527591	71313	160	1,3,33
527592	71314	160	1,3,33
527594	71315	160	1,3
527595	71316	160	1,3
527596	71319	160	1,3,33
527735	71501	158	1,3,33
527736	71502	158	1,3,33
527737	71503	158	1,3,33
527739	71511	158	1,3,33
527740	71512	158	1,3,33
527741	71513	158	1,3,33
527742	71514	158	1,3,33
527743	71515	158	1,3
527744	71516	158	1,3
527745	71519	158	1,3,33
527762	71601	162	1,3,33
527763	71602	162	1,3,33
527764	71603	162	1,3,33
527766	71611	162	1,3,33
527768	71612	162	1,3,33

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Ref. No.	Type	Page	Approval
527769	71613	162	1,3,33
527770	71614	162	1,3,33
527771	71615	162	1,3
527772	71616	162	1,3
527773	71619	162	1,3,33
527790	71701	161	1,3,33
527791	71702	161	1,3,33
527792	71703	161	1,3,33
527794	71711	161	1,3,33
527795	71712	161	1,3,33
527796	71713	161	1,3,33
527797	71714	161	1,3,33
527798	71715	161	1,3
527799	71716	161	1,3
527800	71719	161	1,3,33
528029	71801	160	1,3,33
528030	71802	160	1,3,33
528031	71803	160	1,3,33
528033	71811	160	1,3,33
528034	71812	160	1,3,33
528035	71813	160	1,3,33
528036	71814	160	1,3,33
528037	71815	160	1,3
528038	71816	160	1,3
528039	71819	160	1,3,33
528116	72101	162,344	1,3,33
528117	72102	162,344	1,3,33
528118	72103	162,344	1,3,33
528120	72111	162,344	1,3,33
528121	72112	162,344	1,3,33
528122	72113	162,344	1,3,33
528123	72114	162,344	1,3,33
528124	72115	162,344	1,3
528125	72116	162,344	1,3
528126	72119	162,344	1,3,33
528128	72131	344	–
528129	72132	344	–
528130	72133	344	–
528131	72134	344	–
528132	72135	344	–
528133	72136	344	–
528134	72139	344	–
528236	Q 400.616	31	1,19
528252	12900	68	15
528253	12910	68	15
528254	12911	68	15
528521	Q 700.035	33	–
528536	NaHJ 1000.089	29	1
528548	NaHJ 1000.089	29	1
528554	Capacitor	241	1
528555	Capacitor	241	1
528582	L 18.121	151,155	1
528761	Q 1000.096	33	1
528886	Q 1000.145	33	1
528958	12901	68	15
529029	LN 36.149	150,154	1
529072	NaHJ 250.163	21	–
529087	NaHJ 250.204	21	1,19

Ref. No.	Type	Page	Approval
529464	97498	291	–
529560	NaH 600.140	28	–
529599	64740	290	1,33
529665	Capacitor	241	1
529666	Capacitor	241	1
529832	84101	179	1,3
529836	84103	180	–
529841	34311	72	1
529845	34326	72	1
530024	30400	261	1
530025	30450	262	1
530026	30460	262	1
530027	30465	262	1
530079	43520	202	1
530195	NaHJ 100.271	21	–
530252	L 36.158	151,155	14
530509	UNaH 250/150.176	39	0
530878	11000	171	1,3,33
530879	11010	171	1,3,33
530941	LN 18.131	149,150,155	1
531472	VNaHJ 1000.61	16	–
531474	VJD 2000.63	16	–
531475	VNaHJ 400PZT.743	15	–
531476	VNaHJ 250PZT.745	15	–
531480	VNaHJ 1000.61	16	–
531481	VJD 2000.63	16	–
532149	L 18.121	151,155	1
532155	LN 2x18.135	149,154	1
532377	09420	174	1,3
532378	09421	174	1,3
532379	09422	175	1,3
532390	97545	292	–
532391	80023	292	–
532430	13010	77	0
532431	13010	77	0
532602	12800	67,313	1
532603	12801	67,313	1
532604	12810	68,313	1
532605	12811	68,313	1
532606	12812	68,313	1
532610	33906	269	1
532644	L 4/6/8.218	153	–
533043	LN 18.162	150,155	1
533067	LN 30.806	155	–
533312	41500	204	1
533313	41510	204	1
533314	41520	204	1
533315	41540	204	1
533316	41550	204	1
533317	41560	204	1
533391	VNaHJ 35PZTG.050	14	1
533392	VNaHJ 70PZTG.051	14	1
533393	VNaHJ 100PZTG.078	14	–
533394	VNaHJ 150PZTG.052	14	1
533395	NaHJZ 70/50.520	25, 38	1
533396	NaHJZ 100/70.519	25, 38	1
533398	NaHJZ 150/100.466	25, 38	1
533428	12601	67	1

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Ref. No.	Type	Page	Approval
533429	12601	67	1
533430	12611	67	1
533431	12611	67	1
533432	12612	67	1
533484	NaH 600.005	28	1,19
533565	NaHJ 150.620	21	1
533568	NaHJ 70.128	20	1
533572	NaHJ 70.128	22	1
533602	NaHJ 150.159	21	1,19
533650	LN 75.170	155	1
533663	37001	71	1
533705	Q 250.606	31	–
533820	64308	281	1,33
533947	UNaH 100/40%.452	36	–
533948	UNaH 150/40%.453	36	–
533949	UNaH 250/40%.454	36	–
534073	84108	179	1,3
534097	97632	310	17
534107	VNaHJ 35PZTG.053	14	1
534109	VNaHJ 70PZTG.054	14	1
534111	VNaHJ 70PZTG.067	14	–
534115	VNaHJ 150PZTG.055	14	1
534117	VNaHJ 150PZTG.068	14	–
534122	VNaHJ 35PZTG.041	14	–
534128	UNaH 70/40%.501	36	–
534218	34515	342	17, 34
534219	34516	342	17, 34
534220	34511	69	1
534252	LN 58.722	150,155	1
534487	NaHJ 1000.089	29	1
534490	LN 24/26.804	149	1
534540	NaHJ 150.620	21	1
534621	L 18.934	149,150,156	–
534624	L18.933	151,155	–
534627	L 18.936	150,155	–
534644	09900	175	1
534689	98013	307	–
534832	62063	299	1
534833	62063	299	1
534948	41530	204	1
534954	41570	204	1
535032	31705	272	1
535034	31755	272	1
535131	02113	200	1
535142	NaHJ 400.743	27	1
535146	30800	262	1
535191	NaHJ 70.128	22	1
535216	NaHJ 150.620	22	1
535247	97742	299,306	–
535263	30800	262	1
535267	95300	262	–
535333	UNaH 150/40%.142	36	–
535347	UNaH 100/40%.522	36	–
535348	UNaH 70/40%.525	36	–
535357	91522	284	–
535474	97734	204	17
535657	VNaHJ 70PZTG.566	13	1
535673	64900	306	–

Ref. No.	Type	Page	Approval
535674	64940	306	–
535684	62061	299	1
535685	62061	299	1
535694	80010	299,306	–
535695	VNaHJ 150PZTG.567	13	1
535750	42200	71	1
535751	42210	71	1
535755	42222	71	1
535778	LN 2x18.135	150,155	1
535783	34525	342	17, 34
535977	L 36.132	150,154	14
535988	30485	263	1
536140	NaHJ 1000.089	29	1
536142	NaHJ 400.743	27	1
536143	NaHJ 400.743	27	1
536144	NaHJ 400.744	27	–
536145	NaHJ 400.743	27	1
536146	NaHJ 400.743	27	1
536147	NaHJ 250.741	27	1
536148	NaHJ 250.741	27	1
536149	NaHJ 250.741	27	1
536150	NaHJ 250.742	27	–
536151	NaHJ 250.741	27	1
536152	NaHJ 250.741	27	1
536164	97765	272	–
536199	VNaHJ 35PZTG.568	13	1
536200	VNaHJ 100PZTG.571	13	–
536201	VNaHJ 35PZTG.568	13	1
536202	VNaHJ 70PZTG.566	13	1
536203	VNaHJ 100PZTG.571	13	–
536204	VNaHJ 150PZTG.567	13	1
536205	VNaHJ 35PZTG.574	13	–
536207	VNaHJ 70PZTG.575	13	–
536209	VNaHJ 150PZTG.576	13	–
536220	12612	67	1
536258	Q 400.801	32	1
536259	Q 400.801	32	1
536260	Q 250.800	32	1
536261	Q 250.800	32	1
536378	Capacitor	239	1
536379	Capacitor	239	1
536380	Capacitor	239	1
536381	Capacitor	239	1
536382	Capacitor	239	1
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536392	Capacitor	239	1
536393	Capacitor	239	1
536394	Capacitor	239	1
536395	Capacitor	239	1
536396	Capacitor	239	1

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Ref. No.	Type	Page	Approval
536397	Capacitor	239	1
536398	Capacitor	239	1
536399	Capacitor	239	1
536400	Capacitor	239	1
536401	Capacitor	239	1
536402	Capacitor	239	1
536403	Capacitor	239	1
536404	Capacitor	239	1
536405	Capacitor	239	1
536406	Capacitor	240	–
536445	97735	299,306	–
536446	97735	299,306	–
536451	62062	299	1
536452	62062	299	1
536469	31500	70	1
536582	NaHJ 70.128	23	1
536593	NaHJ 150.620	23	1
536741	Capacitor	241	1
536742	Capacitor	241	1
536743	Capacitor	241	1
536813	Capacitor	241	1
537079	81100	288	–
537080	81100	288	–
537087	83141	288	1
537088	83141	288	1
537103	Q 1000.097	33	19
537132	24100	183	1,3
537135	24110	183	1,3
537138	24120	183	1,3
537144	24150	183	1,3
537147	24160	183	1,3
537150	24170	183	1,3
537153	24350	183	1,3
537155	24360	183	1,3
537157	23350	184	1,3
537160	23360	184	1,3
537165	49100	188	1,3
537166	49105	188	1,3
537167	49106	188	
537173	49500	188	1,3
537174	49505	188	1,3
537175	49506	188	1,3
537181	59100	188	1,3
537182	59105	189	1,3
537183	59106	189	1,3
537205	59500	188	1,3
537206	59505	189	1,3
537207	59506	189	1,3
537403	STr 50/12.109	256	–
537703	Q 400.801	32	1
537726	NaHJ 250.741	27	1
537744	L 15.007	155	–
537750	L 30.006	155	–
537763	NaHJ 150.620	23	1
537793	NaHJ 150.679	21	–
537869	Q 400.715	32	–
537873	Q 400.732	32	–
538034	Q 400.801	32	1

Ref. No.	Type	Page	Approval
538072	L 36I.342	154	1
538089	09700	310	–
538204	NaHJ 400.743	27	1
538258	NaHJ 35.485	24	1
538262	NaHJ 150.620	24	1
538264	NaHJ 150.620	24	1
538361	NaHJ 70/50.520	22	1
538407	NaHJ 70.128	20	1
538537	NaHJ 70.653	24	–
538540	Q 1000.096	33	1
538543	NaHJ 150.620	22	1
538592	UNaH 400/40%.892	39	–
538620	NaHJ 400.744	27	–
538675	PKNaHJ 70.128	18	–
538676	PKNaHJ 100.941	18	–
538677	PKNaHJ 150.620	18	–
538678	PKNaHJ 250.741	19	–
538679	PKNaHJ 400.743	19	–
538680	PKNaHJ 70.653	18	–
538681	PKNaHJ 100.271	18	–
538682	PKNaHJ 150.679	18	–
538683	PKNaHJ 250.742	19	–
538684	PKNaHJ 400.744	19	–
538685	PKNaHJ 70.128	18	–
538686	PKNaHJ 100.941	18	–
538687	PKNaHJ 150.620	18	–
538688	PKNaHJ 250.741	19	–
538689	PKNaHJ 400.743	19	–
538690	PRKUNaH 70/40%.525	34	–
538691	PRKUNaH 100/40%.522	34	–
538692	PRKUNaH 150/40%.142	34	–
538693	PRKUNaH 250/40%.936	35	–
538694	PRKUNaH 400/40%.906	35	–
538695	PRKUNaH 70/40%.525	34	–
538696	PRKUNaH 100/40%.522	34	–
538697	PRKUNaH 150/40%.142	34	–
538698	PRKUNaH 250/40%.936	35	–
538699	PRKUNaH 400/40%.906	35	–
538700	PRKUNaH 70/40%.525	34	–
538701	PRKUNaH 100/40%.522	34	–
538702	PRKUNaH 150/40%.142	34	–
538703	PRKUNaH 250/40%.983	35	–
538704	PRKUNaH 400/40%.937	35	–
538705	PRKUNaH 70/40%.525	34	–
538706	PRKUNaH 100/40%.522	34	–
538707	PRKUNaH 150/40%.142	34	–
538708	PRKUNaH 250/40%.983	35	–
538709	PRKUNaH 400/40%.937	35	–
538710	UNaH 400/40%.906	39	1
538711	UNaH 250/40%.936	39	1
538715	UNaH 400/40%.937	39	–
538801	L 18.249	151,155	14
538807	NaHJ 35.485	24	1
538810	NaHJ 70.128	24	1
538823	NaHJ 70.128	24	1
538828	NaHJ 70.653	24	–
538830	NaHJ 70.128	23	1
538831	NaHJ 150.620	23	1

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Ref. No.	Type	Page	Approval
538834	NaHJ 150.620	24	1
538843	NaHJ 150.625	24	1
539050	UNaH 150/100.722	37	1
539081	NaHJ 100.581	24	1
539128	23370	184	1,3
539209	NaHJ 400.743	27	1
539212	NaHJ 1000.089	29	1
539223	NaHJ 70.128	24	1
539270	NaHJ 150.355	23	1,19,31
539274	NaHJ 250.741	27	1
539283	UNaH 250/40%.746	39	–
539286	NaHJ 150.620	24	1
539306	NaHJ 150.620	24	1
539311	NaHJ 150.679	24	–
539328	PRKUNaH 70/40%.525	34	–
539329	PRKUNaH 70/40%.525	34	–
539330	PRKUNaH 100/40%.522	34	–
539331	PRKUNaH 100/40%.522	34	–
539332	PRKUNaH 150/40%.142	34	–
539333	PRKUNaH 150/40%.142	34	–
539334	PRKUNaH 250/40%.936	35	–
539335	PRKUNaH 400/40%.906	35	–
539336	PRKUNaH 250/40%.936	35	–
539337	PRKUNaH 400/40%.906	35	–
539384	UNaH 600/40%.060	39	–
539434	NaHJ 70.128	20	1
539492	NaHJ 100.941	22	1
539497	34520	69	1
539515	NaH 50/35.797	23, 37	1
539517	UNaH 250/40%.747	39	–
539609	NaHZ 50/35.797	25	1
542349	NaHJ 250.340	23	1
542557	NaHJ 150.679	24	–
542983	28740	182	1
542984	28741	182	1
543048	85011	276	–
543049	85012	276	–
543053	85013	276	–
543054	85012	276	–
543058	85015	276	–
543059	85016	276	–
543153	31550	343	–
543267	31530	70	1
543295	PKNaHJ 100.345	18	–
543299	PKNaHJ 150.301	18	–
543303	62370	66,299	1
543304	62070	66,298	1
543349	NaHJ 100.941	23	1
543378	PKNaH 50PZT.992	18	–
543384	PRKUNaH 70/40%.525	34	–
543385	PRKUNaH 150/40%.142	34	–
543386	PRKUNaH 250/40%.936	35	–
543388	PRKUNaH 100/40%.522	34	–
543389	PRKUNaH 400/40%.906	35	–
543401	PKNaHJ 35.008	18	–
543414	62415	66,298	1
543615	97765	272	–
543643	42242	71	1

Ref. No.	Type	Page	Approval
543733	VNaH 50PZTG.058	14	–
543737	NaHJ 35.209	22	1
543738	NaH 50.206	22	1
543741	NaHJ 70.226	22	1
543742	PRKUNaH 70/40%.525	34	–
543743	PRKUNaH 100/40%.522	34	–
543744	PRKUNaH 150/40%.142	34	–
543745	PRKUNaH 250/40%.936	35	–
543746	PRKUNaH 400/40%.906	35	–
543747	UNaH 250/40%.936	39	1
543748	UNaH 400/40%.906	39	1
543770	40560	206	1
543771	40561	206	1
543772	40562	206	1
543773	40563	206	1
543777	40566	206	1
543778	40567	206	1
543781	40570	206	1
543782	40571	206	1
543783	40572	206	1
543784	40573	206	1
543787	40576	206	1
543788	40577	206	1
543793	40660	205	1
543794	40661	205	1
543795	40662	205	1
543796	40663	205	1
543800	40666	205	1
543801	40667	205	1
543802	40670	205	7
543803	40671	205	7
543805	40672	205	7
543806	40673	205	7
543809	40676	205	7
543810	40677	205	7
543986	NaHJ 400.743	27	1
544210	NaHJ 250.741	27	1
544605	62009	65,298	1
544621	64800	305	–
544728	UNaH 70/40%.525	37	–
544729	UNaH 150/40%.142	37	–
544730	UNaH 100/40%.522	37	–
544760	PRKUNaH 50/40%.021	34	–
544787	NaHJ 1000.089	29	1
545261	22860	187	1
545262	22861	187	1
545405	LN 26.238	150	1
545840	29125	345	–
545842	29126	345	–
545845	29100	345	–
545849	29101	345	–
545894	09446	177	1,3
545896	09447	177	1,3
545933	09432	176,346	1,3
545935	09433	176,346	1,3
545937	09434	176,346	1,3
545939	09435	176,346	1,3
546006	97745	284	–

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Ref. No.	Type	Page	Approval
546254	98008	179,196	–
546454	64370	280	1,33
546456	64370	280	1,33
546585	PRKUNaH 250/40%.758	35	–
546641	27700 R	181	1,3
546642	27701 R	181	1,3
546647	27800 R	181	1,3
546648	27801 R	181	1,3
546797	PKNaHJ 35.008	18	–
546817	NaHJ 70.158	23	–
547145	LN 21.293	150	–
547285	PKNaHJ 35.008	18	–
547287	PKNaHJ 70.653	18	–
547761	34510	69	1
548259	NaHJ 400.743	27	1
548260	NaHJ 150.159	24	1,19
549999	31500	70	1
550375	83142	287	1
551271	26300	182,345	1a,3
551272	26310	182,345	1a,3
551275	26302	345	–
551277	26312	345	–
551645	Capacitor	239	–
552774	Capacitor	241	1
553806	NaHZ 50/35.797	26	–
554005	NaHJ 100.213	23	1
554006	NaHJ 150.216	27	1
554270	JD 2000.81	30	–
554283	JD 2000.83	30	–
554303	J 2000.71	30	–
554304	J 2000.72	30	–
554305	J 2000.73	30	–
554306	JD 2000.82	30	–
554307	JD 2000II.91	30	–
554308	JD 2000II.92	30	–
554309	JD 2000I.85	30	–
554310	JD 2000I.86	30	–
554311	J 1200.95	30	–
554312	J 2500.96	30	–
554313	VNaHJ 1000.75	17	–
554314	VJ 2000.76	17	–
554315	VJD 2000.77	17	–
554316	VJD 2000I.78	17	–
554325	STr 200/12.40	257	–
554326	STr 300/12.41	257	–
554542	33650	69	1
554543	33671	69	1
554662	31760	272	1
554904	VNaHJ 1000.75	17	–
554905	VJ 2000.76	17	–
554906	VJD 2000.77	17	–
554909	VJD 2000I.78	17	–
560657	LNN 18.645	152	–
560659	LNN 18.646	152	–
560661	LNN 18.647	152	–
560664	LNN 18.648	152	–
560665	LNN 58TD.649	152	–
562450	NaHJ 150.166	23	1

Ref. No.	Type	Page	Approval
562658	LNN 9/11.015	148	1a
563039	NaHJ 70.226	23	1
563416	VNaHJ 70PZTG.203	13	–
563417	VNaHJ 100PZTG.202	13	–
563870	NaHJ 70/50.411	37	–
563871	NaH 50/35.412	23, 37	–
563872	UNAH 70/40%.413	37	–
563873	UNAH 100/40%.41	37	–
563874	UNAH150/40%.922	37	–
563876	NaHJ 150/100.923	23, 37	–
564135	64314	281	1
564189	LNN 2X18.043	149,152,154	1a
564190	LNN 13.044	148,152,153	1a
564191	LNN 30.045	152,154	1a
564192	LNN 18I.046	149,152	1a
564680	64770	294	–
564681	64770	294	–
554314	VJ 2000.76	17	–
554315	VJD 2000.77	17	–
554316	VJD 2000I.78	17	–
554325	STr 200/12.40	265	–
554326	STr 300/12.41	265	–
554542	33650	69	1
554543	33671	69	1
554662	31760	280	1
554904	VNaHJ 1000.75	17	–
554905	VJ 2000.76	17	–
554906	VJD 2000.77	17	–
554909	VJD 2000I.78	17	–
560657	LNN 18.645	154	–
560659	LNN 18.646	154	–
560661	LNN 18.647	154	–
560664	LNN 18.648	154	–
560665	LNN 58TD.649	154	–
562450	NaHJ 150.166	23	1
562658	LNN 9/11.015	150	1a
563039	NaHJ 70.226	23	1
563416	VNaHJ 70PZTG.203	13	–
563417	VNaHJ 100PZTG.202	13	–
563870	NaHJ 70/50.411	37	–
563871	NaH 50/35.412	23, 37	–
563872	UNAH 70/40%.413	37	–
563873	UNAH 100/40%.41	37	–
563874	UNAH150/40%.922	37	–
563876	NaHJ 150/100.923	23, 37	–
564135	64314	289	1
564189	LNN 2X18.043	151, 154, 156	1a
564190	LNN 13.044	150, 154, 155	1a
564191	LNN 30.045	154, 156	1a
564192	LNN 18I.046	151, 154	1a
564680	64770	302	–
564681	64770	302	–

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Whenever an electric light goes on around the world, Vossloh-Schwabe is likely to have made a key contribution to ensuring that everything works at the flick of a switch.

Headquartered in Germany, Vossloh-Schwabe has been a member of the global Panasonic group since 2002 and counts as a technology leader within the lighting sector. Top-quality, high-performance products form the basis of the company's success.

Whether cost-effective standard components or tailor-made product developments are needed, Vossloh-Schwabe can satisfy even the most diverse market and customer requirements. Vossloh-Schwabe's extensive product portfolio covers all lighting components: LED systems with matching control gear units and state-of-the-art control systems (LiCS) as well as electronic and magnetic ballasts and lampholders.

A member of the Panasonic group **Panasonic**

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LIGHTING SOLUTIONS

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