



Control Gear and Accessories
CATALOGUE 2016



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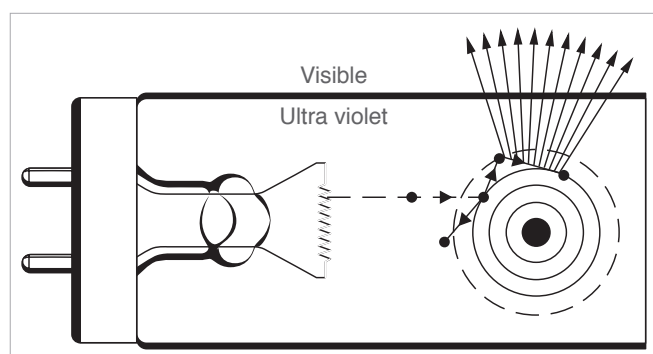
Fluorescent lamps

Operation

A fluorescent lamp is a type of low pressure mercury discharge lamp. A discharge arc operates in a glass tube internally coated with a phosphor powder. The electrical discharge produces mostly ultraviolet and some blue and green light. The phosphor coating converts the ultraviolet energy produced by the discharge into light. Cathodes, coated with an electron emitting material are sealed into each end of the glass envelope and connected to the pins of the lamp caps. The lamp contains gases such as argon and krypton with a drop of liquid mercury.

A control circuit is required which first causes an electric current to flow through each cathode. When the cathode filaments are heated, the emitter coating emits a cloud of electrons, which are negatively charged. The electrons are accelerated by a voltage applied across the lamp, producing ionisation. The current flow through the lamp is then limited by the external control circuit.

The inert gas used in traditional fluorescent lamps is argon, krypton or a mixture of both. The improvement in efficacy achieved using krypton offers a power saving approaching 8% which translates directly into lower energy costs.



De-activation of excited mercury atoms produce UV photon and is converted to visible light by the internal phosphor coating of the fluorescent lamp.

Flicker

Fluorescent lamps typically exhibit very little flicker (flicker factor 0.5% or less). However, stroboscopic effects from rotating parts or parts with reciprocal motion can cause problems. These can be reduced by connecting lamps to different phases or by the use of lead-lag circuits or electronic (high frequency) ballasts.

Electrical Measurements

All electrical measurements on lamp or circuit voltage, current and wattage have to be made with instruments of the true RMS type allowing for crest factors of up to 2.5.

Operating Performance

The performance of a fluorescent lamp is dependent upon not only the control circuit, but also on the ambient temperature. This influences the gas pressure in the lamp which in turn determines the yield of UV radiation.

The optimum light output occurs when the lamp wall temperature is approximately 40°C (for T8 / T12 lamps) at the cold spot (fig.1).

This highlights the problems encountered in brightness control of fluorescent lamps if widely varying ambient temperatures prevail. It also shows that high open circuit voltages are required to reliably start the lamp in low temperature conditions (fig. 2).

The more reliable starting, however, of control gear with high open circuit voltages is negated by the increased probability of cold starts occurring. "Cold start" is striking the arc before the cathodes are fully heated. It has a detrimental effect on lamp life and, coupled with frequent switching, can reduce lamp life to one quarter or less. "Cold starts" are more likely to occur with lamps of low operating voltage, such as 18 W 600 mm lamp with only 57 V across the lamp. The life of a fluorescent lamp is dependent to a certain degree on the frequency of switching on and off. A lamp which is switched infrequently will last considerably longer (fig. 3).

The effect of mains voltage variations on the operating characteristics of fluorescent lamps is indicated in the graph (fig. 4). Increases in the mains voltage can influence lamp life in proportion to the increases in the lamp current.

Fig. 1

Typical relationship between temperature and lamps output

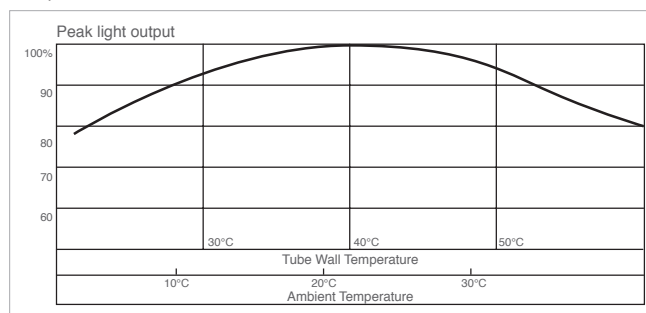


Fig. 2

Start voltage versus ambient temperature

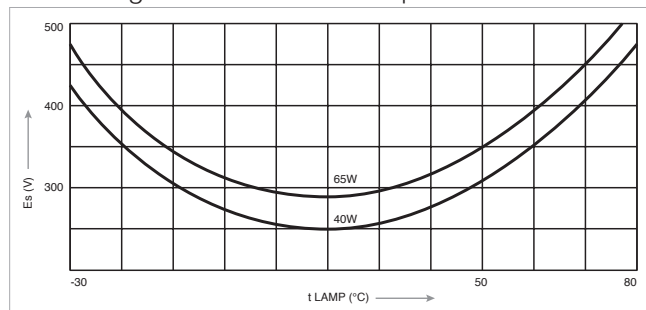


Fig. 3

Typical effect on life of switching

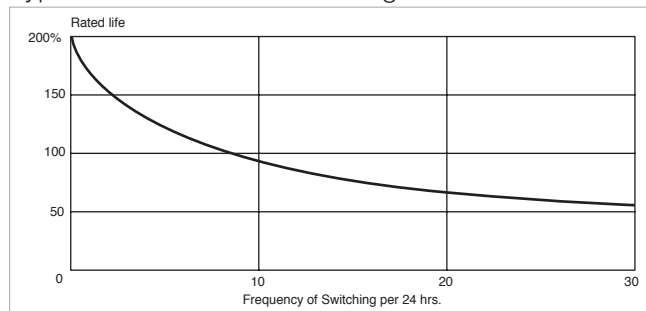
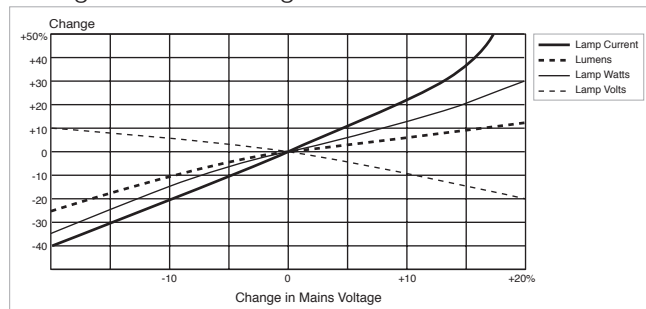


Fig. 4

Change in Main Voltage



Magnetic ballasts for fluorescent lamps



A ballast is required to run a fluorescent lamp. This is a current limiting device which works on the self-inductance principle. The impedance of the ballast is set to match the arc voltage of the lamp which ensures that the correct current is supplied. In some cases a ballast can be used for more than one lamp but the lamp should never be used with any other ballast than the one specifically designed for the job. Also any supply voltage or frequency variation will affect the optimum performance of the ballast, and hence the lamp, the type with the correct values should always be used.

Optimum Performance

This is achieved by maintaining careful control of the main parameters.

Preheat Current

This is supplied to the cathodes prior to the striking voltage. Without the correct preheat current, the cathodes would be progressively damaged resulting in short lamp life.

Strike Voltage

In the case of a glow starter, this is produced by the ballast when the starter switch opens. The required voltage increases at high and low temperatures, and electronic starters may be required in abnormal temperature conditions. For a fluorescent lamp to operate constantly the supply voltage must be at least twice the lamp voltage. If it is less, then an auto transformer is required to step up the voltage.

Lamp Current

The tight tolerances used in manufacture ensure that the impedance is the correct value for the correct lamp current and hence lamp wattage and luminous flux.

Minimum Power Losses

An inefficient ballast means high losses, which in turn leads to high temperatures. This means the lamp runs out of its optimum temperature range and, in some cases, other components in the luminaire, such as capacitors, will also run too hot and fail prematurely.

CMP have designed ballasts with minimal losses through the optimum use of windings within the bobbin. They have compact dimensions and use the highest quality materials in their manufacture.

The losses (lamp and ballast) are rated in accordance with the ballast-lamp circuit (EEL) classification.

Selection of the Right Ballast

CMP offers ballasts in the following energy classes:

- standard (EEL=C)
- low loss (EEL=B2)
- low loss (EEL=B1)

Each version has the same impedance and provides the same lamp current. The difference is that the losses, and temperature rise, are progressively less, which can be seen from the data.

There are two reasons to select lower loss ballasts:

- Energy consumption
A low loss B2 ballast typically consumes 30% less power than a standard C ballast, and a low loss B1 ballast uses 67% less power than a standard C ballast.
- Temperature rise
A typical standard C ballast will increase in temperature by 55 K (Kelvin) above its surroundings, a low loss B2 ballast 35–40 K and a low loss B1 ballast 25 K.

When considering dimensions, CMP ballasts have optimised dimensions to minimise losses but lower loss ballasts do have increased dimensions.

As the measured power consumption depends strongly on the method of measurement, differences up to 10 K are possible in the results.

Long Service Life

The choice of insulating materials and their operating temperatures determine the ballast life. CMP ballasts use class H insulation materials which are designed for temperatures up to 180°C, thus ensuring maximum service life.

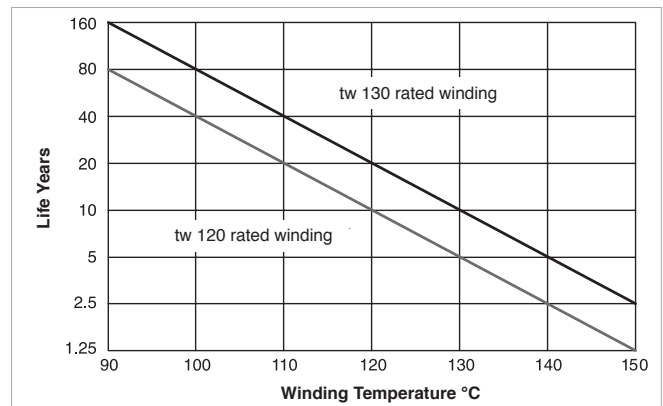
The permitted maximum working temperature of the winding is designated “tw”. The adherence to this temperature guarantees an average life of 10 years continuous usage. If the temperature in application is lower, then the life is correspondingly higher.

The designation Δt is the temperature rise in degrees Celsius operating under prescribed conditions at rated voltage and is a function of ballast power losses. The difference between the “tw” rating and t is an indication of the ambient temperature in which the ballast can operate. This is a very important consideration.

The high quality and reliability of insulated conductors is dependent not only on the production process, but also on the choice of raw materials. Many years of experience, both as a user and manufacturer of enamelled winding wire has given CMP the knowledge and expertise to select the best raw materials from internationally approved suppliers.

The copper is made from a high conductivity hot rolled copper rod and complies with the chemical composition limits and resistivity requirements of International Registered Alloy Designation 110.

Critical attention is paid to the enamel as the material utilised to insulate the conductor. Choice of enamel is a key factor and is linked both to the enamelling system as well as the electrical, mechanical and technical characteristics of the finished product.



The graph shows the theoretical service life of a ballast against winding temperature. Every 10°C over the maximum winding temperature of 130°C (tw130) halves ballast life. The winding temperature is the ambient temperature plus Δt or temperature rise which is a function of ballast power consumption (watts loss).

The insulation enamels specified by CMP Controls are supplied by internationally approved manufacturers specialising within this field. For all CMP ballasts insulation Class H+ (200°C) is used.

Minimum Stray Fields

CMP ballasts are designed to keep stray fields at a minimum, thus enabling them to be used near sensitive equipment.

Consistent High Quality

Certified to ISO 9001, the production process and equipment guarantee a consistent high quality standard. All finished goods are 100% end of line tested and only the highest quality raw materials are used. Consistent high quality is ensured by the use of fully automatic production.

Special Features of CMP Ballasts:

- very short magnetic paths
- transverse lamination design with no stray field junctions
- compact windings
- low power consumption
- short heat paths
- maximum winding temperature $t_w = 130^\circ\text{C}$
- class H insulation
- fully automatic production with continuous tolerance test
- varnish impregnation
- 100% final testing, including continuity, high voltage, winding short-circuit and operating values
- long service life

National and International Test Marks

CMP ballasts are approved by national and international test houses.

Switch Start Circuit

The most widely used circuit. It is simple, economical and one of the most efficient ways of operating a fluorescent lamp. The starter can be of the glow switch type or electronic. By far the most common is the glow starter. When the starter contacts open, the ballast supplies the starting voltage.

Advantages:

- simple wiring
- low temperature operation (to -10°C)
- economical

Disadvantages:

- flicker on start-up
- short delay in striking
- more than 1 wear part (lamp and starter)

The Operating Sequence is as follows:

1. When power is switched on, mains voltage appears across the contacts in the starter bottle, striking an arc between them.
2. The heat of the arc causes the bi-metal contact to bend and make contact with the other contact thereby extinguishing the arc and removing the heat source. The ballast and the lamp cathodes are now connected in series across the supply and

the relatively heavy pre-heat current flows, heating the lamp cathodes.

3. The starter contact cools down and reopens. The sudden interruption of the pre-heat current causes a voltage spike to develop which ignites the lamp. Lamp voltage of less than half supply voltage is now insufficient to re-strike the arc in the starter bottle and the lamp remains alight.

Switch start circuits provide reliable starting in ambient temperatures -10 to $+50^\circ\text{C}$.

FS2 type starters are used in single and twin lamp circuits up to and including 20 W.

FSU type starters are used in single lamp circuits to 80 W. Note that 85 and 125 W lamps require very special starters.

Electronic starters are far more complex. They provide rapid start precision operation of the lamp.

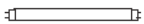
Twin Series Circuit

A circuit used for most lamps up to 20 W. Two fluorescent lamps are run in series on one ballast but with individual starters operating per lamp.

Fluorescent lamp ballast guide

Fluorescent lamps have combined the technology and sophistication of fluorescent lighting with the compact convenience of incandescent light fittings.

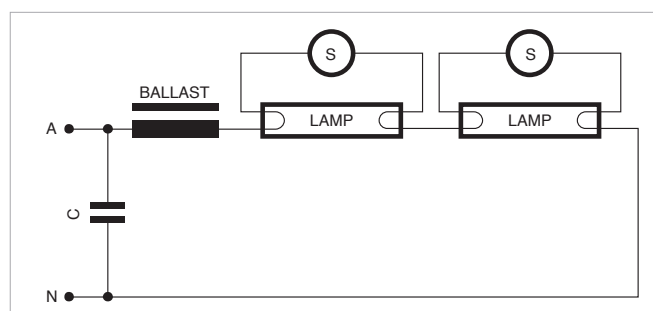
CMP offers a comprehensive range of standard EC energy control ballasts as well as LLEC low loss ballasts designed to operate compact fluorescent lamps from 5 through to 38 W.

Lamp	Code	Wattage	Length	Cap	Nominal current	Standard ballast	Low lost ballast
T5-Lamp 16 mm 	FD-4	4 W	150 mm	G5	170 mA	EC 4/6/8	LLEC 4/6/8
	FD-6	6 W	225 mm	G5	160 mA	EC 4/6/8	LLEC 4/6/8
	FD-6	2x6 W	225 mm	G5	160 mA	EC 13	LLEC 13
	FD-8	8 W	300 mm	G5	145 mA	EC 4/6/8	LLEC 4/6/8
	FD-8	2x8 W	300 mm	G5	145 mA	EC 13	LLEC 13
	FD-13	13 W	525 mm	G5	165 mA	EC 13	LLEC 13
T8-Lamp 26 mm 	FD-10	10 W	330 mm	G13	230 mA	EC 10	LLEC 10
	FD-15	15 W	450 mm	G13	310 mA	EC 15	LLEC 15
	FD-15	2x15 W	450 mm	G13	310 mA	EC 30	LLEC 30
	FD-18	18 W	600 mm	G13	370 mA	EC 18/20	LLEC 18/20
	FD-18	2x18 W	600 mm	G13	370 mA	EC 36/40	LLEC 36/40
	FD-30	30 W	900 mm	G13	365 mA	EC 30	LLEC 30
	FD-36	36 W	1,200 mm	G13	430 mA	EC 36/40	LLEC 36/40
	FD-58	58 W	1,500 mm	G13	670 mA	EC 58/65	LLEC 58/65
T12-Lamp 38 mm 	FD-20	20 W	600 mm	G13	370 mA	EC 18/20	LLEC 18/20
	FD-20	2x20 W	600 mm	G13	370 mA	EC 36/40	LLEC 36/40
	FD-40	40 W	1,200 mm	G13	430 mA	EC 36/40	LLEC 36/40
	FD-65	65 W	1,500 mm	G13	670 mA	EC 58/65	LLEC 58/65
T8-Circline 26 mm 	FC-22	22 W	ø210 mm	G10q	400 mA	EC 22	LLEC 22
	FC-32	32 W	ø305 mm	G10q	450 mA	EC 32	LLEC 32
	FC-40	40 W	ø406 mm	G10q	420 mA	EC 36/40	LLEC 36/40
TC-S and TC-L 	FSD-5	5 W	TC-S	2G7 / G23	180 mA	EC 9	LLEC 9
	FSD-5	2x5 W	TC-S	2G7 / G23	180 mA	EC 13	LLEC 13
	FSD-7	7 W	TC-S	2G7 / G23	175 mA	EC 9	LLEC 9
	FSD-7	2x7 W	TC-S	2G7 / G23	175 mA	EC 13	LLEC 13
	FSD-9	9 W	TC-S	2G7 / G23	170 mA	EC 9	LLEC 9
	FSD-9	2x9 W	TC-S	2G7 / G23	170 mA	EC 13	LLEC 13
	FSD-11	11 W	TC-S	2G7 / G23	155 mA	EC 9	LLEC 9
	FSD-18	18 W	TC-L	2G11	375 mA	EC 18/20	LLEC 18/20
	FSD-18	2x18 W	TC-L	2G11	375 mA	EC 36/40	LLEC 36/40
	FSD-24	24 W	TC-L	2G11	345 mA	EC 18/20	LLEC 18/20
	FSD-36	36 W	TC-L	2G11	435 mA	EC 36/40	LLEC 36/40
TC-D 	FSQ-10	10 W	TC-D	G24q-1	190 mA	EC 13	LLEC 13
	FSQ-13	13 W	TC-D	G24q-1	175 mA	EC 13	LLEC 13
	FSQ-18	18 W	TC-D	G24q-1	220 mA	EC 18H	LLEC 18H
	FSQ-26	26 W	TC-D	G24q-1	325 mA	EC 18/20	LLEC 18/20
TC-T 	FSM-10	10 W	TC-T	GX24q-1	190 mA	EC 13	LLEC 13
	FSM-13	13 W	TC-T	GX24q-1	175 mA	EC 13	LLEC 13
	FSM-18	18 W	TC-T	GX24q-1	225 mA	EC 18H	LLEC 18H
	FSM-26	26 W	TC-T	GX24q-1	325 mA	EC 18/20	LLEC 18/20
TC-DD 2D-lamp 	FSS-10	10 W	TC-DD	GR10q	180 mA	EC 13	LLEC 13
	FSS-16	16 W	TC-DD	GR10q	195 mA	EC 16	LLEC 16
	FSS-21	21 W	TC-DD	GR10q	260 mA	EC 21	LLEC 21
	FSS-28	28 W	TC-DD	GR10q	320 mA	EC 18/20	LLEC 18/20
	FSS-38	38 W	TC-DD	GR10q	430 mA	EC 36/40	LLEC 36/40
TC-F flat 	FSS-18	18 W	TC-F	2G10	375 mA	EC 18/20	LLEC 18/20
	FSS-18	2x18 W	TC-F	2G10	375 mA	EC 36/40	LLEC 36/40
	FSS-24	24 W	TC-F	2G10	345 mA	EC 18/20	LLEC 18/20
	FSS-36	36 W	TC-F	2G10	435 mA	EC 36/40	LLEC 36/40

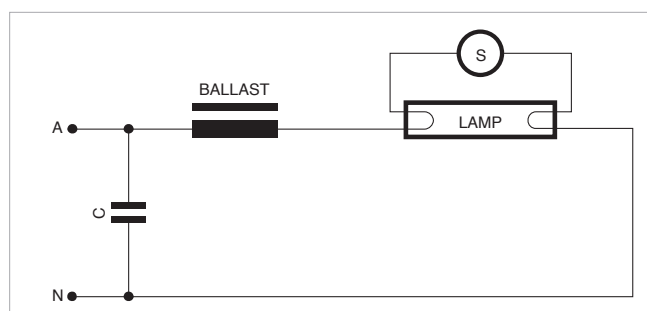
Technical tips for fluorescent lamp circuits

Symptom	Possible fault	Test and remedy
Tube does not attempt to strike – no end glow from tube	Fuse blown	Check supply voltage – replace broken fuse
	Supply fault	Check supply volts and circuit fuse
	Faulty starter	Test starter switch in sound fitting
	Faulty tube	Test tube in sound fitting. NOTE: If one or both cathodes are broken, check for faulty circuit (short circuit to earth or wrong control gear) before inserting new tube.
	Open circuit	Test for open-circuit on ballast etc., or short to earth between ballast and tube
Tube fails to strike – bright glow from one end of tube	Crossed leads in twin tube fitting	Check that the correct lampholders are connected to each tube – leads connected to a given tube should have the same colour
	Short-circuit on lampholder lead	Test for short-circuit across lampholder lead or for short-circuit to earth on starter switch or wiring
Tube does not attempt to strike – both ends of tube glow brightly	Short-circuit on starter switch or associated wiring	Test starter switch in sound fitting. If satisfactory, test switch socket and wiring for short-circuit.
Tube flashes on and off	Faulty tube (end of life)	Check tube in sound fitting. At end of life, the lamp fails to maintain discharge. Symptoms are reduced light output, increased flicker and reddish glow from cathodes.
	Low voltage or incorrect ballast rating	Test supply voltage at fitting-if low, check external wiring for excessive voltage drop (fuseholders, etc.) If "sustained" voltage at the fitting is persistently low, use lower voltage rated ballast.
	Faulty starter	Test starter switch in sound fitting
	Low Temperature	Screen open type fittings
	Crossed leads in twin tube fitting	Check that correct lampholders are connected to each tube, i.e. leads connected to a given tube should have the same colour.
Lamp takes a long time to light	Some period is needed to start the lamp after switching on.	Measure the period. 2 to 6 seconds is normal
	Supply voltage is low due to: a) Overload on line. b) Lower voltage supplied.	Check the line voltage and conditions
	The lamp quality is poor	Test with a known good lamp
The lamp repeats on-off operation	Supply voltage is low	Check supply voltage with multimeter
	Incorrect wiring occurs in the apparatus	Check the wiring condition
	The lamp or the glow starter is damaged because of end of life.	Test with a known good lamp
	Poor contact between lamp pins in lampholders.	Check the lamp contact condition
Excessive blackening at the end (or both ends) of a lamp is found	The supply voltage doesn't match the ballast rating	Check the supply voltage with a multimeter
	Incorrect wiring in apparatus or between the supply and fitting	Check the wire connecting condition
	Too many switching operations of the lamp have been performed	The lamp or the ballast has failed. Change the lamp or the ballast with replacement and observe for a time.

Twin Series Circuit



Switch Start Circuit



LLEC low loss ballasts

Figure 1

50, 54 and (90 mm) stack

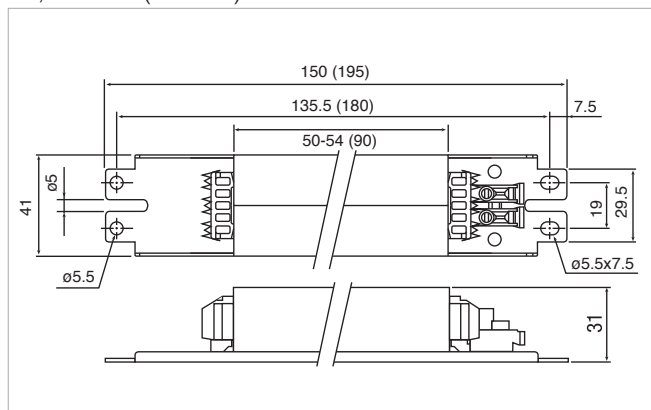
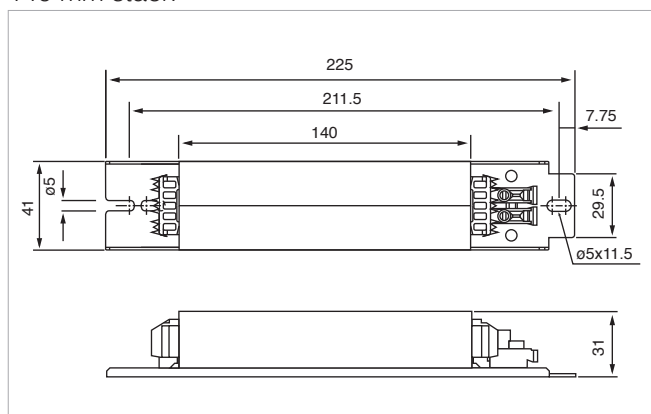


Figure 2

140 mm stack



- low power consumption
- slim cross-section and compact
- for building into a luminaire, a box, or an enclosure
- low loss core laminations
- low magnetic stray field
- long service life
- varnish impregnation
- non-audible noise level
- nomex class "H" gap for fixed calibration
- resistant to moisture and corrosion
- 10 A push-in terminals for 0.5-1.5 mm² solid wires (or screw terminals for up to 2.5 mm² solid or stranded wires)
- maximum winding temperature tw130°C
Low temperature rise
- other supply voltages than listed are available i.e. 120 V, 277 V etc.

100% final testing

- continuity
- winding short circuit
- core to coil high voltage test
- operating values

220 V 50 Hz – LLEC low loss ballasts (EEI=B1)

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	LLEC4/6/8		3.3	7.8	165	170	0.21	39	43	3.0	25/35	50	1	150.0	135.5	0.55
6	42	160	225	LLEC4/6/8		3.1	9.1	155	170	0.27	46	53	2.0	25/35	50	1	150.0	135.5	0.55
2x6	42	160	225	LLEC13		3.0	15.0	160	200	0.43	76	99	2.0	25/35	50	1	150.0	135.5	0.55
8	56	145	300	LLEC4/6/8		2.9	10.0	145	170	0.31	51	62	2.0	25/35	50	1	150.0	135.5	0.55
2x8	56	145	300	LLEC13		2.7	16.9	145	200	0.53	85	124	1.5	25/35	50	1	150.0	135.5	0.55
10	49	230	330	LLEC10*		4.5	14.5	230	275	0.29	73	92	3.0	30/40	50	1	150.0	135.5	0.55
13	95	165	525	LLEC13		3.1	16.1	165	200	0.44	81	103	2.0	25/35	50	1	150.0	135.5	0.55
15	55	310	450	LLEC15		EEI=B1	20.0	310	360	0.29	101	123	4.0	30/40	50	1	150.0	135.5	0.55
18	57	370	600	LLEC18/20		EEI=B1	23.5	370	415	0.29	119	140	5.0	25/40	90	1	195.0	180.0	1.00
2x18	57	370	600	LLEC36/40		4.7	40.7	370	495	0.50	206	289	3.5	25/50	90	1	195.0	180.0	1.00
20	57	370	600	LLEC18/20		5.5	24.8	370	415	0.30	125	148	5.0	25/40	90	1	195.0	180.0	1.00
2x20	57	370	600	LLEC36/40		4.7	43.3	370	495	0.53	219	307	3.5	25/50	90	1	195.0	180.0	1.00
22	62	400	ø210	LLEC22		6.5	28.5	400	440	0.32	144	166	5.0	35/50	90	1	195.0	180.0	1.00
30	96	365	900	LLEC30		EEI=B1	35.9	365	440	0.45	181	230	4.0	35/50	90	1	195.0	180.0	1.00
32	81	450	ø305	LLEC32		7.0	39.0	430	520	0.41	197	250	5.0	40/70	90	1	195.0	180.0	1.00
32	135	265	1,200	LLEC32H*		3.0	33.5	265	435	0.57	169	292	3.0	15/30	90	1	195.0	180.0	1.00
36	103	430	1,200	LLEC36/40		EEI=B1	41.5	415	625	0.45	210	331	4.0	30/60	90	1	195.0	180.0	1.00
40	103	430	1,200	LLEC36/40		5.5	45.0	415	625	0.49	227	359	4.0	30/60	90	1	195.0	180.0	1.00
58	110	670	1,500	LLEC58/65		EEI=B1	66.0	660	1,130	0.45	333	599	7.0	35/70	140	2	225.0	211.5	1.40
65	110	670	1,500	LLEC58/65		8.0	72.0	660	1,130	0.50	364	654	6.0	35/70	140	2	225.0	211.5	1.40
Compact lamps																			
5	35	180	TC-S	LLEC9		EEI=B1	8.8	180	180	0.22	44	47	3.0	30/35	50	1	150.0	135.5	0.55
2x5	35	180	TC-S	LLEC13		3.3	14.1	175	200	0.37	71	85	2.0	25/35	50	1	150.0	135.5	0.55
7	47	175	TC-S	LLEC9		EEI=B1	10.4	175	180	0.27	53	57	3.0	30/35	50	1	150.0	135.5	0.55
2x7	47	175	TC-S	LLEC13		3.1	17.3	165	200	0.48	87	111	1.5	25/35	50	1	150.0	135.5	0.55
9	60	170	TC-S	LLEC9		EEI=B1	11.8	165	180	0.33	60	68	2.0	30/35	50	1	150.0	135.5	0.55
2x9	60	170	TC-S	LLEC13		2.9	20.7	155	200	0.61	105	142	1.5	25/35	50	1	150.0	135.5	0.55
10	64	190	TC-D	LLEC13		EEI=B1	13.5	185	200	0.33	68	77	3.0	25/35	50	1	150.0	135.5	0.55
10	72	180	TC-DD	LLEC13		EEI=B1	13.8	175	200	0.36	70	84	2.0	25/35	50	1	150.0	135.5	0.55
11	91	155	TC-S	LLEC9		EEI=B1	14.7	155	180	0.43	74	91	2.0	30/35	50	1	150.0	135.5	0.55
13	91	175	TC-D	LLEC13		EEI=B1	16.2	170	200	0.43	82	101	2.0	25/35	50	1	150.0	135.5	0.55
13	91	175	TC-T	LLEC13		EEI=B1	16.2	170	200	0.43	82	101	2.0	25/35	50	1	150.0	135.5	0.55
16	103	195	TC-DD	LLEC16		EEI=B1	19.3	195	200	0.45	97	105	2.0	25/35	50	1	150.0	135.5	0.55
18	100	220	TC-D	LLEC18H		EEI=B1	22.1	220	290	0.46	112	154	3.0	40/50	50	1	195.0	135.5	0.55
18	58	375	TC-F	LLEC18/20		EEI=B1	23.5	370	415	0.29	119	140	5.0	25/40	90	1	195.0	180.0	1.00
18	58	375	TC-L	LLEC18/20		EEI=B1	23.5	370	415	0.29	119	140	5.0	25/40	90	1	150.0	180.0	1.00
18	100	225	TC-T	LLEC18H		EEI=B1	22.1	220	290	0.46	112	154	3.0	40/50	50	1	195.0	135.5	0.55
2x18	58	375	TC-L	LLEC36/40		4.7	40.7	370	495	0.50	206	289	3.5	25/50	90	1	195.0	180.0	1.00
24	87	345	TC-F	LLEC18/20		EEI=B1	28.9	345	415	0.38	146	184	4.0	25/40	90	1	195.0	180.0	1.00
24	87	345	TC-L	LLEC18/20		EEI=B1	28.9	345	415	0.38	146	184	4.0	25/40	90	1	195.0	180.0	1.00
26	105	325	TC-D	LLEC18/20		EEI=B1	30.2	315	415	0.44	153	211	3.5	25/40	90	1	195.0	180.0	1.00
26	105	325	TC-T	LLEC18/20		EEI=B1	30.7	315	415	0.44	155	215	3.5	25/40	90	1	195.0	180.0	1.00
28	108	320	TC-DD	LLEC18/20		EEI=B1	32.6	315	410	0.47	165	225	3.0	25/50	90	1	195.0	180.0	1.00
36	106	435	TC-F	LLEC36/40		EEI=B1	41.5	415	625	0.45	210	331	4.0	30/60	90	1	195.0	180.0	1.00
36	106	435	TC-L	LLEC36/40		EEI=B1	41.5	415	625	0.45	210	331	4.0	30/60	90	1	195.0	180.0	1.00
38	110	430	TC-DD	LLEC36/40		EEI=B1	44.0	415	625	0.48	222	351	4.0	30/60	90	1	150.0	180.0	1.00

Notes

- * Other wattages available on request.
- * Lamps not included in IEC 60081 or IEC 60901.
- Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.

220 V 60 Hz – LLEC low loss ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot	input power	lamp current	lamp start current	circuit P F	line current	line start current	capacitor	normal/abnormal	stack	figure	length	mtg centres	weight
W	V	mA	mm			W	W	mA	mA	cos ø	mA@0.9PF	mA@0.9PF	µF0.9PF	Δt	mm		mm	mm	kg
Linear and circular lamps																			
4	29	170	150	LLEC4/6/8		3.3	7.8	165	170	0.21	39	43	2.0	25/35	50	1	150.0	135.5	0.55
6	42	160	225	LLEC4/6/8		3.1	9.1	155	170	0.27	46	53	2.0	25/35	50	1	150.0	135.5	0.55
2x6	42	160	225	LLEC13		3.0	15.0	160	200	0.43	76	99	1.5	25/35	50	1	150.0	135.5	0.55
8	56	145	300	LLEC4/6/8		2.9	10.0	145	170	0.31	51	62	1.5	25/35	50	1	150.0	135.5	0.55
2x8	56	145	300	LLEC13		2.7	16.9	145	200	0.53	85	124	1.5	25/35	50	1	150.0	135.5	0.55
10	49	230	330	LLEC10*		4.5	14.5	230	275	0.29	73	92	3.0	30/40	50	1	150.0	135.5	0.55
13	95	165	525	LLEC13		3.1	16.1	165	200	0.44	81	103	1.5	25/35	50	1	150.0	135.5	0.55
15	55	310	450	LLEC15		5.0	20.0	310	360	0.29	101	123	3.0	30/40	50	1	150.0	135.5	0.55
18	57	370	600	LLEC18/20		6.0	24.0	360	400	0.30	121	141	3.5	40/60	50	1	150.0	135.5	0.55
2x18	57	370	600	LLEC36/40		4.7	40.7	370	495	0.50	206	289	3.0	25/50	90	1	195.0	180.0	1.00
20	57	370	600	LLEC18/20		6.0	25.3	360	400	0.32	128	149	3.5	40/60	50	1	150.0	135.5	0.55
2x20	57	370	600	LLEC36/40		4.7	43.3	370	495	0.53	219	307	3.0	25/50	90	1	195.0	180.0	1.00
22	62	400	ø210	LLEC22		6.5	28.5	400	440	0.32	144	166	4.0	35/50	90	1	195.0	180.0	1.00
30	96	365	900	LLEC30		5.9	35.9	365	440	0.45	181	230	3.0	35/50	90	1	195.0	180.0	1.00
32	81	450	ø305	LLEC32		7.0	39.0	430	520	0.41	197	250	4.0	40/70	90	1	195.0	180.0	1.00
32	135	265	1,200	LLEC32H*		3.0	33.5	265	435	0.57	169	292	2.0	15/30	90	1	195.0	180.0	1.00
36	103	430	1,200	LLEC36/40		5.5	41.5	415	625	0.45	210	331	3.5	30/60	90	1	195.0	180.0	1.00
40	103	430	1,200	LLEC36/40		5.5	45.0	415	625	0.49	227	359	3.5	30/60	90	1	195.0	180.0	1.00
58	110	670	1,500	LLEC58/65		8.0	66.0	660	1,130	0.45	333	599	6.0	35/70	140	2	225.0	211.5	1.40
65	110	670	1,500	LLEC58/65		8.0	72.0	660	1,130	0.50	364	654	5.0	35/70	140	2	225.0	211.5	1.40
Compact lamps																			
5	35	180	TC-S	LLEC9	89003647	3.4	8.8	180	180	0.22	44	47	2.0	30/35	50	1	150.0	135.5	0.55
2x5	35	180	TC-S	LLEC13		3.3	14.1	175	200	0.37	71	85	2.0	25/35	50	1	150.0	135.5	0.55
7	47	175	TC-S	LLEC9	89003647	3.3	10.4	175	180	0.27	53	57	2.0	30/35	50	1	150.0	135.5	0.55
2x7	47	175	TC-S	LLEC13		3.1	17.3	165	200	0.48	87	111	1.5	25/35	50	1	150.0	135.5	0.55
9	60	170	TC-S	LLEC9	89003647	3.1	11.8	165	180	0.33	60	68	2.0	30/35	50	1	150.0	135.5	0.55
2x9	60	170	TC-S	LLEC13		2.9	20.7	155	200	0.61	105	142	1.5	25/35	50	1	150.0	135.5	0.55
10	64	190	TC-D	LLEC13		3.5	13.5	185	200	0.33	68	77	2.0	25/35	50	1	150.0	135.5	0.55
10	72	180	TC-DD	LLEC13		3.3	13.8	175	200	0.36	70	84	2.0	25/35	50	1	150.0	135.5	0.55
11	91	155	TC-S	LLEC9	89003647	2.9	14.7	155	180	0.43	74	91	1.5	30/35	50	1	150.0	135.5	0.55
13	91	175	TC-D	LLEC13		3.2	16.2	170	200	0.43	82	101	1.5	25/35	50	1	150.0	135.5	0.55
13	91	175	TC-T	LLEC13		3.2	16.2	170	200	0.43	82	101	1.5	25/35	50	1	150.0	135.5	0.55
16	103	195	TC-DD	LLEC16		3.3	19.3	195	200	0.45	97	105	2.0	25/35	50	1	150.0	135.5	0.55
18	100	220	TC-D	LLEC18H		4.1	22.1	220	290	0.46	112	154	2.0	40/50	50	1	150.0	135.5	0.55
18	58	375	TC-F	LLEC18/20		6.0	24.0	360	400	0.30	121	141	3.5	40/60	50	1	150.0	135.5	0.55
18	58	375	TC-L	LLEC18/20		6.0	24.0	360	400	0.30	121	141	3.5	40/60	50	1	150.0	135.5	0.55
18	100	225	TC-T	LLEC18H		4.1	22.1	220	290	0.46	112	154	2.0	40/50	50	1	150.0	135.5	0.55
2x18	58	375	TC-L	LLEC36/40		4.7	40.7	370	495	0.50	206	289	3.0	25/50	90	1	195.0	180.0	1.00
24	87	345	TC-F	LLEC18/20		5.5	29.5	345	400	0.39	149	182	3.0	40/60	50	1	150.0	135.5	0.55
24	87	345	TC-L	LLEC18/20		5.5	29.5	345	400	0.39	149	182	3.0	40/60	50	1	150.0	135.5	0.55
26	105	325	TC-D	LLEC18/20		4.6	30.6	315	400	0.44	155	206	3.0	40/60	50	1	150.0	135.5	0.55
26	105	325	TC-T	LLEC18/20		4.6	31.1	315	400	0.45	157	209	3.0	40/60	50	1	150.0	135.5	0.55
28	108	320	TC-DD	LLEC18/20		4.6	33.0	315	410	0.48	167	228	3.0	40/60	50	1	150.0	135.5	0.55
36	106	435	TC-F	LLEC36/40		5.5	41.5	415	625	0.45	210	331	3.5	30/60	90	1	195.0	180.0	1.00
36	106	435	TC-L	LLEC36/40		5.5	41.5	415	625	0.45	210	331	3.5	30/60	90	1	195.0	180.0	1.00
38	110	430	TC-DD	LLEC36/40		5.5	44.0	415	625	0.48	222	351	3.5	30/60	90	1	195.0	180.0	1.00

Notes

- Other wattages available on request.
- * Lamps not included in IEC 60081 or IEC 60901.

230 V 50 Hz – LLEC low loss ballasts (EEI=B1)

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	LLEC4/6/8		3.4	7.9	165	170	0.21	38	41	2.0	25/35	50	1	150.0	135.5	0.55
6	42	160	225	LLEC4/6/8		3.2	9.2	155	170	0.26	44	51	2.0	25/35	50	1	150.0	135.5	0.55
2x	42	160	225	LLEC13		3.1	15.1	160	205	0.41	73	98	2.0	25/40	50	1	150.0	135.5	0.55
8	56	145	300	LLEC4/6/8		3.0	10.1	145	170	0.30	49	60	2.0	25/35	50	1	150.0	135.5	0.55
2x8	56	145	300	LLEC13		2.8	17.0	145	205	0.51	82	122	1.5	25/40	50	1	150.0	135.5	0.55
10	49	230	330	LLEC10*		4.8	14.8	230	280	0.28	71	91	3.0	30/40	50	1	150.0	135.5	0.55
13	95	165	525	LLEC13		3.2	16.2	165	205	0.43	78	102	2.0	25/40	50	1	150.0	135.5	0.55
15	55	310	450	LLEC15		EEI=B1	20.3	310	370	0.28	98	123	3.5	30/40	50	1	150.0	135.5	0.55
18	57	370	600	LLEC18/20		EEI=B1	24.0	370	420	0.28	116	138	5.0	35/55	90	1	195.0	180.0	1.00
2x18	57	370	600	LLEC36/40	89000530	4.9	40.9	370	505	0.48	198	283	3.5	25/50	90	1	195.0	180.0	1.00
20	57	370	600	LLEC18/20		6.0	25.3	370	420	0.30	122	146	5.0	35/55	90	1	195.0	180.0	1.00
2x20	57	370	600	LLEC36/40	89000530	4.9	43.5	370	505	0.51	210	301	3.5	25/50	90	1	195.0	180.0	1.00
22	62	400	ø210	LLEC22		6.5	28.5	400	445	0.31	138	161	5.0	35/55	90	1	195.0	180.0	1.00
30	96	365	900	LLEC30	89000519	EEI=B1	35.9	365	445	0.43	174	222	3.5	35/55	90	1	195.0	180.0	1.00
32	81	450	ø305	LLEC32		7.3	39.3	430	530	0.40	190	246	5.0	40/70	90	1	195.0	180.0	1.00
32	135	265	1,200	LLEC32H*		3.1	33.6	265	440	0.55	162	283	3.0	15/30	90	1	195.0	180.0	1.00
36	103	430	1,200	LLEC36/40	89000530	EEI=B1	42.0	415	635	0.44	203	326	4.0	35/75	90	1	195.0	180.0	1.00
40	103	430	1,200	LLEC36/40	89000530	6.0	45.5	415	635	0.48	220	353	4.0	35/75	90	1	195.0	180.0	1.00
58	110	670	1,500	LLEC58/65	89002475	EEI=B1	66.9	660	1,150	0.44	323	591	7.0	30/70	140	2	225.0	211.5	1.40
65	110	670	1,500	LLEC58/65	89002475	8.9	72.9	660	1,150	0.48	352	644	6.0	30/70	140	2	225.0	211.5	1.40
Compact lamps																			
5	35	180	TC-S	LLEC9		EEI=B1	8.9	180	180	0.21	43	45	3.0	30/35	50	1	150.0	135.5	0.55
2x5	35	180	TC-S	LLEC13		3.4	14.2	175	205	0.35	69	84	2.0	25/40	50	1	150.0	135.5	0.55
7	47	175	TC-S	LLEC9		EEI=B1	10.5	175	180	0.26	51	55	2.0	30/35	50	1	150.0	135.5	0.55
2x7	47	175	TC-S	LLEC13		3.2	17.4	165	205	0.46	84	110	1.5	25/40	50	1	150.0	135.5	0.55
9	60	170	TC-S	LLEC9		EEI=B1	11.9	165	180	0.31	58	66	2.0	30/35	50	1	150.0	135.5	0.55
2x9	60	170	TC-S	LLEC13		3.0	20.8	155	205	0.58	101	140	1.5	25/40	50	1	150.0	135.5	0.55
10	64	190	TC-D	LLEC13		EEI=B1	13.6	185	205	0.32	66	76	2.0	25/40	50	1	150.0	135.5	0.55
10	72	180	TC-DD	LLEC13		EEI=B1	13.9	175	205	0.35	67	83	2.0	25/40	50	1	150.0	135.5	0.55
11	91	155	TC-S	LLEC9		EEI=B1	14.8	155	180	0.42	72	87	1.5	30/35	50	1	150.0	135.5	0.55
13	91	175	TC-D	LLEC13		EEI=B1	16.3	170	205	0.42	79	100	2.0	25/40	50	1	150.0	135.5	0.55
13	91	175	TC-T	LLEC13		EEI=B1	16.3	170	205	0.42	79	100	2.0	25/40	50	1	150.0	135.5	0.55
16	103	195	TC-DD	LLEC16		EEI=B1	19.4	195	205	0.43	94	103	2.0	30/50	50	1	150.0	135.5	0.55
18	100	220	TC-D	LLEC18H		EEI=B1	22.3	220	295	0.44	108	152	3.0	25/55	50	1	150.0	135.5	0.55
18	58	375	TC-F	LLEC18/20		EEI=B1	24.0	370	420	0.28	116	138	5.0	35/55	90	1	195.0	180.0	1.00
18	58	375	TC-L	LLEC18/20		EEI=B1	24.0	370	420	0.28	116	138	5.0	35/55	90	1	195.0	180.0	1.00
18	100	225	TC-T	LLEC18H		EEI=B1	22.3	220	295	0.44	108	152	3.0	25/55	50	1	150.0	135.5	0.55
2x18	58	375	TC-L	LLEC36/40	89000530	4.9	40.9	370	505	0.48	198	283	3.5	25/50	90	1	195.0	180.0	1.00
24	87	345	TC-F	LLEC18/20		EEI=B1	29.4	345	420	0.37	142	181	4.0	35/55	90	1	195.0	180.0	1.00
24	87	345	TC-L	LLEC18/20		EEI=B1	29.4	345	420	0.37	142	181	4.0	35/55	90	1	195.0	180.0	1.00
26	105	325	TC-D	LLEC18/20		EEI=B1	30.6	315	420	0.42	148	207	3.5	35/55	90	1	195.0	180.0	1.00
26	105	325	TC-T	LLEC18/20		EEI=B1	31.1	315	420	0.43	150	210	3.0	35/55	90	1	195.0	180.0	1.00
28	108	320	TC-DD	LLEC18/20		EEI=B1	33.0	315	415	0.46	159	221	3.0	35/55	90	1	195.0	180.0	1.00
36	106	435	TC-F	LLEC36/40	89000530	EEI=B1	42.0	415	635	0.44	203	326	4.0	35/75	90	1	195.0	180.0	1.00
36	106	435	TC-L	LLEC36/40	89000530	EEI=B1	42.0	415	635	0.44	203	326	4.0	35/75	90	1	195.0	180.0	1.00
38	110	430	TC-DD	LLEC36/40	89000530	EEI=B1	44.5	415	635	0.47	215	345	4.0	35/75	90	1	195.0	180.0	1.00

Notes

- Other wattages available on request.
- * Lamps not included in IEC 60081 or IEC 60901.
- Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.

240 V 50 Hz – LLEC low loss ballasts (EEI=B1)

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos ø	line current mA@0.9PF	line start current mA@0.9PF	capacitor µF0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	LLEC4/6/8		3.5	8.0	165	170	0.20	37	40	2.0	25/35	50	1	150.0	135.5	0.55
6	42	160	225	LLEC4/6/8		3.3	9.3	155	170	0.25	43	50	2.0	25/35	50	1	150.0	135.5	0.55
2x6	42	160	225	LLEC13		3.2	15.2	160	210	0.40	70	97	1.5	25/40	50	1	150.0	135.5	0.55
8	56	145	300	LLEC4/6/8		3.1	10.2	145	170	0.29	47	58	2.0	25/35	50	1	150.0	135.5	0.55
2x8	56	145	300	LLEC13		2.9	17.1	145	210	0.49	79	120	1.5	25/40	50	1	150.0	135.5	0.55
10	49	230	330	LLEC10*	89000385	5.0	15.0	230	285	0.27	69	90	3.0	30/40	50	1	150.0	135.5	0.55
13	95	165	525	LLEC13		3.3	16.3	165	210	0.41	75	101	2.0	25/40	50	1	150.0	135.5	0.55
15	55	310	450	LLEC15	89000493	EEI=B1	20.5	310	370	0.28	95	119	3.5	30/40	50	1	150.0	135.5	0.55
15	57	300	550	LLEC15 ES8*		5.5	20.5	300	350	0.28	95	116	3.5	30/40	90	1	195.0	180.0	1.00
18	57	370	600	LLEC18/20	89000494	EEI=B1	24.0	370	425	0.27	111	134	5.0	35/55	90	1	195.0	180.0	1.00
2x18	57	370	600	LLEC36/40	89000524	5.0	41.0	370	515	0.46	190	277	3.5	25/50	90	1	195.0	180.0	1.00
2x18	57	370	600	LLEC36/40-20		5.5	41.5	370	515	0.47	192	281	3.5	30/50	90	1	195.0	180.0	1.00
20	57	370	600	LLEC18/20	89000494	6.0	25.3	370	425	0.28	117	141	4.0	35/55	90	1	195.0	180.0	1.00
2x20	57	370	600	LLEC36/40	89000524	5.0	43.6	370	515	0.49	202	295	3.5	25/50	90	1	195.0	180.0	1.00
22	62	400	ø210	LLEC22		6.5	28.5	400	450	0.30	132	156	5.0	35/55	90	1	195.0	180.0	1.00
23		290	970	LLEC18/20	89000494	4.6	23.9	290	425	0.34	111	170	3.0	35/55	90	1	195.0	180.0	1.00
30	96	365	900	LLEC30	89000518	EEI=B1	35.9	365	450	0.41	166	215	3.5	35/55	90	1	195.0	180.0	1.00
32	81	450	ø305	LLEC32		7.5	39.5	430	540	0.38	183	241	5.0	40/70	90	1	195.0	180.0	1.00
32	135	265	1,200	LLEC32H*		3.2	33.7	265	445	0.53	156	275	3.0	15/30	90	1	195.0	180.0	1.00
33	103	380	1,150	LLEC33 ES8*		5.5	38.5	380	520	0.42	178	256	3.5	30/55	90	1	195.0	180.0	1.00
36	103	430	1,200	LLEC36/40	89000524	EEI=B1	42.0	415	645	0.42	194	317	4.0	35/75	90	1	195.0	180.0	1.00
36	103	430	1,200	LLEC36/40-20		EEI=B1	42.6	415	645	0.43	197	322	4.0	40/75	90	1	195.0	180.0	1.00
40	103	430	1,200	LLEC36/40	89000524	6.0	45.5	415	645	0.46	211	344	4.0	35/75	90	1	195.0	180.0	1.00
58	110	670	1,500	LLEC58/65	89002631	EEI=B1	67.0	660	1,170	0.42	310	577	7.0	35/70	140	2	225.0	211.5	1.40
65	110	670	1,500	LLEC58/65	89002631	9.0	73.0	660	1,170	0.46	338	629	6.0	35/70	140	2	225.0	211.5	1.40
Compact lamps																			
5	35	180	TC-S	LLEC9	89000400	EEI=B1	9.0	180	180	0.21	42	44	3.0	30/35	50	1	150.0	135.5	0.55
5	35	180	TC-S	EC 9 B103K	89003614	EEI=B1	10.5	180	190	0.24	49	54	2.0	50/70	27	-	84.5	76.0	0.33
2x5	35	180	TC-S	LLEC13		3.5	14.3	175	210	0.34	66	83	2.0	25/40	50	1	150.0	135.5	0.55
7	47	175	TC-S	LLEC9	89000400	EEI=B1	10.6	175	180	0.25	49	53	2.0	30/35	50	1	150.0	135.5	0.55
7	47	175	TC-S	EC 9 B103K	89003614	EEI=B1	12.1	175	190	0.29	56	64	2.0	50/70	27	-	84.5	76.0	0.33
2x7	47	175	TC-S	LLEC13		3.3	17.5	165	210	0.44	81	108	1.5	25/40	50	1	150.0	135.5	0.55
9	60	170	TC-S	LLEC9	89000400	EEI=B1	12.0	165	180	0.30	56	64	2.0	30/35	50	1	150.0	135.5	0.55
9	60	170	TC-S	EC 9 B103K	89003614	EEI=B1	13.4	165	190	0.34	62	75	2.0	50/70	27	-	84.5	76.0	0.33
2x9	60	170	TC-S	LLEC13		3.1	20.9	155	210	0.56	97	138	1.5	25/40	50	1	150.0	135.5	0.55
10	64	190	TC-D	LLEC13		EEI=B1	13.7	185	210	0.31	63	76	2.0	25/40	50	1	150.0	135.5	0.55
10	72	180	TC-DD	LLEC13		EEI=B1	14.0	175	210	0.33	65	82	2.0	25/40	50	1	150.0	135.5	0.55
11	91	155	TC-S	LLEC9	89000400	EEI=B1	14.9	155	180	0.40	69	84	1.5	30/35	50	1	150.0	135.5	0.55
11	91	155	TC-S	EC 9 B103K	89003614	EEI=B1	16.2	155	190	0.44	75	97	1.5	50/70	27	-	84.5	76.0	0.33
13	91	175	TC-D	LLEC13		EEI=B1	16.4	170	210	0.40	76	98	2.0	25/40	50	1	150.0	135.5	0.55
13	91	175	TC-T	LLEC13		EEI=B1	16.4	170	210	0.40	76	98	2.0	25/40	50	1	150.0	135.5	0.55
16	103	195	TC-DD	LLEC16		EEI=B1	19.5	195	210	0.42	90	102	2.0	30/50	50	1	150.0	135.5	0.55
18	100	220	TC-D	LLEC18H		EEI=B1	22.4	220	300	0.42	104	148	2.0	30/55	50	1	150.0	135.5	0.55
18	58	375	TC-F	LLEC18/20	89000494	EEI=B1	24.0	370	425	0.27	111	134	5.0	35/55	90	1	195.0	180.0	1.00
18	58	375	TC-L	LLEC18/20	89000494	EEI=B1	24.0	370	425	0.27	111	134	5.0	35/55	90	1	195.0	180.0	1.00
18	100	225	TC-T	LLEC18H		EEI=B1	22.4	220	300	0.42	104	148	2.0	30/55	50	1	150.0	135.5	0.55
2x18	58	375	TC-L	LLEC36/40	89000524	5.0	41.0	370	515	0.46	190	277	3.5	25/50	90	1	195.0	180.0	1.00
2x18	58	375	TC-L	LLEC36/40-20		5.5	41.5	370	515	0.47	192	281	3.5	30/50	90	1	195.0	180.0	1.00
24	87	345	TC-F	LLEC18/20	89000494	EEI=B1	29.4	345	425	0.35	136	176	3.5	35/55	90	1	195.0	180.0	1.00
24	87	345	TC-L	LLEC18/20	89000494	EEI=B1	29.4	345	425	0.35	136	176	3.5	35/55	90	1	195.0	180.0	1.00
26	105	325	TC-D	LLEC18/20	89000494	EEI=B1	30.6	315	425	0.40	142	201	3.0	35/55	90	1	195.0	180.0	1.00
26	105	325	TC-T	LLEC18/20	89000494	EEI=B1	31.1	315	425	0.41	144	204	3.0	35/55	90	1	195.0	180.0	1.00
28	108	320	TC-DD	LLEC18/20	89000494	EEI=B1	33.0	315	420	0.44	153	214	3.0	35/55	90	1	195.0	180.0	1.00
36	106	435	TC-F	LLEC36/40	89000524	EEI=B1	42.0	415	645	0.42	194	317	4.0	35/75	90	1	195.0	180.0	1.00
36	106	435	TC-F	LLEC36/40-20		EEI=B1	42.6	415	645	0.43	197	322	4.0	40/75	90	1	195.0	180.0	1.00
36	106	435	TC-L	LLEC36/40	89000524	EEI=B1	42.0	415	645	0.42	194	317	4.0	35/75	90	1	195.0	180.0	1.00
36	106	435	TC-L	LLEC36/40-20		EEI=B1	42.6	415	645	0.43	197	322	4.0	40/75	90	1	195.0	180.0	1.00
38	110	430	TC-DD	LLEC36/40	89000524	EEI=B1	44.5	415	645	0.45	206	336	4.0	35/75	90	1	195.0	180.0	1.00
38	110	430	TC-DD	LLEC36/40-20		EEI=B1	45.1	415	645	0.45	209	341	4.0	40/75	90	1	195.0	180.0	1.00

Notes

- Other wattages available on request.
- * Lamps not included in IEC 60081 or IEC 60901.
- Refer to Energy Classification System table for ballasts from CELMA and/or MEPS

250 V 50 Hz – LLEC low loss ballasts (EEI=B1)

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	LLEC4/6/8		3.6	8.1	165	175	0.20	36	40	2.0	25/35	50	1	150.0	135.5	0.55
6	42	160	225	LLEC4/6/8		3.4	9.4	155	175	0.24	42	49	2.0	25/35	50	1	150.0	135.5	0.55
2x6	42	160	225	LLEC13		3.3	15.3	160	215	0.38	68	96	1.5	25/40	50	1	150.0	135.5	0.55
8	56	145	300	LLEC4/6/8		3.2	10.3	145	175	0.28	46	58	1.5	25/35	50	1	150.0	135.5	0.55
2x8	56	145	300	LLEC13		3.0	17.2	145	215	0.47	76	119	1.5	25/40	50	1	150.0	135.5	0.55
10	49	230	330	LLEC10*		5.0	15.0	230	290	0.26	67	88	3.0	30/40	50	1	150.0	135.5	0.55
13	95	165	525	LLEC13		3.4	16.4	165	215	0.40	73	100	1.5	25/40	50	1	150.0	135.5	0.55
15	55	310	450	LLEC15		EEI=B1	20.7	310	380	0.27	92	118	3.5	30/40	50	1	150.0	135.5	0.55
18	57	370	600	LLEC18/20		EEI=B1	24.5	370	435	0.26	109	134	4.0	40/60	90	1	195.0	180.0	1.00
2x18	57	370	600	LLEC36/40	89000529	5.1	41.1	370	520	0.44	183	270	3.5	30/55	90	1	195.0	180.0	1.00
20	57	370	600	LLEC18/20		6.5	25.8	370	435	0.28	115	142	4.0	40/60	90	1	195.0	180.0	1.00
2x20	57	370	600	LLEC36/40	89000529	5.1	43.7	370	520	0.47	194	287	3.5	30/55	90	1	195.0	180.0	1.00
22	62	400	ø210	LLEC22		6.8	28.8	400	455	0.29	128	153	5.0	40/60	90	1	195.0	180.0	1.00
30	96	365	900	LLEC30		EEI=B1	36.2	365	455	0.40	161	211	3.5	40/60	90	1	195.0	180.0	1.00
32	81	450	ø305	LLEC32		7.8	39.8	430	545	0.37	177	235	5.0	45/75	90	1	195.0	180.0	1.00
32	135	265	1,200	LLEC32H*		3.3	33.8	265	450	0.51	150	268	3.0	15/30	90	1	195.0	180.0	1.00
36	103	430	1,200	LLEC36/40	89000529	EEI=B1	42.5	415	655	0.41	189	313	4.0	40/80	90	1	195.0	180.0	1.00
40	103	430	1,200	LLEC36/40	89000529	6.5	46.0	415	655	0.44	204	339	4.0	40/80	90	1	195.0	180.0	1.00
58	110	670	1,500	LLEC58/65		EEI=B1	67.4	660	1,180	0.41	300	562	6.0	40/75	140	2	225.0	211.5	1.40
65	110	670	1,500	LLEC58/65		9.4	73.4	660	1,180	0.44	326	612	6.0	40/75	140	2	225.0	211.5	1.40
Compact lamps																			
5	35	180	TC-S	LLEC9		EEI=B1	9.1	180	185	0.20	40	44	2.0	30/35	50	1	150.0	135.5	0.55
2x5	35	180	TC-S	LLEC13		3.6	14.4	175	215	0.33	64	83	2.0	25/40	50	1	150.0	135.5	0.55
7	47	175	TC-S	LLEC9		EEI=B1	10.7	175	185	0.24	48	53	2.0	30/35	50	1	150.0	135.5	0.55
2x7	47	175	TC-S	LLEC13		3.4	17.6	165	215	0.43	78	107	1.5	25/40	50	1	150.0	135.5	0.55
9	60	170	TC-S	LLEC9		EEI=B1	12.1	165	185	0.29	54	63	2.0	30/35	50	1	150.0	135.5	0.55
2x9	60	170	TC-S	LLEC13		3.2	21.0	155	215	0.54	93	136	1.5	25/40	50	1	150.0	135.5	0.55
10	64	190	TC-D	LLEC13		EEI=B1	13.8	185	215	0.30	61	75	2.0	25/40	50	1	150.0	135.5	0.55
10	72	180	TC-DD	LLEC13		EEI=B1	14.1	175	215	0.32	63	81	2.0	25/40	50	1	150.0	135.5	0.55
11	91	155	TC-S	LLEC9		EEI=B1	15.0	155	185	0.39	67	83	1.5	30/35	50	1	150.0	135.5	0.55
13	91	175	TC-D	LLEC13		EEI=B1	16.5	170	215	0.39	73	97	2.0	25/40	50	1	150.0	135.5	0.55
13	91	175	TC-T	LLEC13		EEI=B1	16.5	170	215	0.39	73	97	2.0	25/40	50	1	150.0	135.5	0.55
16	103	195	TC-DD	LLEC16		EEI=B1	19.6	195	215	0.40	87	101	2.0	30/50	50	1	150.0	135.5	0.55
18	100	220	TC-D	LLEC18H		EEI=B1	22.5	220	305	0.41	100	146	2.0	30/55	50	1	150.0	135.5	0.55
18	58	375	TC-F	LLEC18/20		EEI=B1	24.5	370	435	0.26	109	134	4.0	40/60	90	1	195.0	180.0	1.00
18	58	375	TC-L	LLEC18/20		EEI=B1	24.5	370	435	0.26	109	134	4.0	40/60	90	1	195.0	180.0	1.00
18	100	225	TC-T	LLEC18H		EEI=B1	22.5	220	305	0.41	100	146	2.0	30/55	50	1	150.0	135.5	0.55
2x18	58	375	TC-L	LLEC36/40	89000529	5.1	41.1	370	520	0.44	183	270	3.5	30/55	90	1	195.0	180.0	1.00
24	87	345	TC-F	LLEC18/20		EEI=B1	29.8	345	435	0.35	132	175	3.5	40/60	90	1	195.0	180.0	1.00
24	87	345	TC-L	LLEC18/20		EEI=B1	29.8	345	435	0.35	132	175	3.5	40/60	90	1	195.0	180.0	1.00
26	105	325	TC-D	LLEC18/20		EEI=B1	31.0	315	435	0.39	138	200	3.0	40/60	90	1	195.0	180.0	1.00
26	105	325	TC-T	LLEC18/20		EEI=B1	31.5	315	435	0.40	140	203	3.0	40/60	90	1	195.0	180.0	1.00
28	108	320	TC-DD	LLEC18/20		EEI=B1	33.4	315	425	0.42	148	210	3.0	40/60	90	1	195.0	180.0	1.00
36	106	435	TC-F	LLEC36/40	89000529	EEI=B1	42.5	415	655	0.41	189	313	4.0	40/80	90	1	195.0	180.0	1.00
36	106	435	TC-L	LLEC36/40	89000529	EEI=B1	42.5	415	655	0.41	189	313	4.0	40/80	90	1	195.0	180.0	1.00
38	110	430	TC-DD	LLEC36/40	89000529	EEI=B1	45.0	415	655	0.43	200	331	4.0	40/80	90	1	195.0	180.0	1.00

Notes

- Other wattages available on request.
- * Lamps not included in IEC 60081 or IEC 60901.
- Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.

220 V 50 Hz – EC low loss ballasts (EEI=B2)

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
2x6	42	160	225	EC13	89000039	4.2	16.2	160	200	0.46	82	107	1.5	55/100	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13	89000039	3.8	18.0	145	200	0.56	91	132	1.5	55/100	27	2	84.5	76.0	0.33
13	95	165	525	EC13	89000039	EEI=B2	17.3	165	200	0.48	87	111	1.5	55/100	27	2	84.5	76.0	0.33
18	57	370	600	EC18/20	89003428	EEI=B2	25.9	370	435	0.32	131	161	5.0	55/85	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40		6.5	42.5	370	560	0.52	215	341	3.5	45/130	54	1	150.0	135.5	0.60
20	57	370	600	EC18/20	89003428	7.9	27.2	370	435	0.33	137	170	5.0	55/85	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40		6.5	45.1	370	560	0.55	228	362	3.0	45/130	54	1	150.0	135.5	0.60
36	103	430	1,200	EC36/40		EEI=B2	43.8	415	635	0.48	221	355	4.0	50/150	54	1	150.0	135.5	0.60
40	103	430	1,200	EC36/40		7.8	47.3	415	635	0.52	239	384	4.0	50/150	54	1	150.0	135.5	0.60
Compact lamps																			
5	35	180	TC-S	EC9	89000131	5.7	11.1	180	190	0.28	56	62	3.0	55/75	27	2	84.5	76.0	0.33
2x5	35	180	TC-S	EC13	89000039	4.6	15.4	175	200	0.40	78	93	2.0	55/100	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9	89000131	EEI=B2	12.6	175	190	0.33	64	73	2.0	55/75	27	2	84.5	76.0	0.33
2x7	47	175	TC-S	EC13	89000039	4.3	18.5	165	200	0.51	93	119	1.5	55/100	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9	89000131	EEI=B2	13.9	165	190	0.38	70	85	2.0	55/75	27	2	84.5	76.0	0.33
2x9	60	170	TC-S	EC13	89000039	4	21.8	155	200	0.64	110	149	1.5	55/100	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13	89000039	4.8	14.8	185	200	0.36	75	85	2.0	55/100	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13	89000039	4.6	15.1	175	200	0.39	76	91	2.0	55/100	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9	89000131	EEI=B2	16.7	155	190	0.49	84	108	1.5	55/75	27	2	84.5	76.0	0.33
13	91	175	TC-D	EC13	89000039	EEI=B2	17.4	170	200	0.47	88	109	2.0	55/100	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13	89000039	EEI=B2	17.4	170	200	0.47	88	109	2.0	55/100	27	2	84.5	76.0	0.33
16	103	195	TC-DD	EC16		EEI=B2	21.4	195	250	0.50	108	145	2.0	60/115	27	2	84.5	76.0	0.33
18	100	220	TC-D	EC18H	89000096	EEI=B2	23.8	220	315	0.49	120	181	2.0	50/120	27	2	84.5	76.0	0.33
18	58	375	TC-F	EC18/20	89003428	EEI=B2	25.9	370	435	0.32	131	161	5.0	55/85	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20	89003428	EEI=B2	25.9	370	435	0.32	131	161	5.0	55/85	50	1	150.0	135.5	0.55
18	100	225	TC-T	EC18H	89000096	EEI=B2	23.8	220	315	0.49	120	181	2.0	50/120	27	2	84.5	76.0	0.33
2x18	58	375	TC-L	EC36/40		6.5	42.5	370	560	0.52	215	341	3.5	45/130	54	1	150.0	135.5	0.60
21	101	270	TC-DD	EC21		EEI=B2	26.6	270	350	0.45	134	183	3.0	40/80	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20	89003428	EEI=B2	31.1	345	435	0.41	157	208	4.0	55/85	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20	89003428	EEI=B2	31.1	345	435	0.41	157	208	4.0	55/85	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20	89003428	EEI=B2	32.1	315	435	0.46	162	235	3.0	55/85	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20	89003428	EEI=B2	32.6	315	435	0.47	164	238	3.0	55/85	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20	89003428	EEI=B2	34.5	315	410	0.50	174	238	3.0	55/85	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40		EEI=B2	43.8	415	635	0.48	221	355	4.0	50/150	54	1	150.0	135.5	0.60
36	106	435	TC-L	EC36/40		EEI=B2	43.8	415	635	0.48	221	355	4.0	50/150	54	1	150.0	135.5	0.60
38	110	430	TC-DD	EC36/40		EEI=B2	46.3	415	635	0.51	234	376	4.0	50/150	54	1	150.0	135.5	0.60

Notes

Other wattages available on request.

Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.

Some ballast and lamp combination may not operate within the EEI=B2 rating.

230 V 50 Hz – EC low loss ballasts (EEI=B2)

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	EC4/6/8		5.5	10.0	165	170	0.26	48	52	2.0	60/95	27	2	84.5	76.0	0.33
6	42	160	225	EC4/6/8		EEI=B2	11.2	155	170	0.31	54	62	2.0	60/95	27	2	84.5	76.0	0.33
2x6	42	160	225	EC13	89000041	3.9	15.9	155	210	0.45	77	109	1.5	55/105	27	2	84.5	76.0	0.33
8	56	145	300	EC4/6/8		EEI=B2	11.9	145	170	0.36	58	71	1.5	60/95	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13	89000041	3.5	17.7	140	210	0.55	86	135	1.5	55/105	27	2	84.5	76.0	0.33
13	95	165	525	EC13	89000041	EEI=B2	17.0	160	210	0.46	82	113	1.5	55/105	27	2	84.5	76.0	0.33
15	55	310	450	EC15		EEI=B2	23.2	310	360	0.33	112	137	3.5	50/80	50	1	150.0	135.5	0.55
18	57	370	600	EC18/20	89003333	EEI=B2	26.4	370	430	0.31	128	156	5.0	55/85	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89002851	6.5	42.5	370	560	0.50	205	326	3.5	50/130	54	1	150.0	135.5	0.60
20	57	370	600	EC18/20	89003333	8.4	27.7	370	430	0.33	134	163	4.0	55/8	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89002851	6.5	45.1	370	560	0.53	218	346	3.0	50/130	54	1	150.0	135.5	0.60
22	62	400	ø210	EC22		EEI=B2	31.5	400	480	0.34	152	192	5.0	50/95	50	1	150.0	135.5	0.55
30	96	365	900	EC30	89003480	EEI=B2	39.0	360	480	0.47	188	264	3.5	50/95	50	1	150.0	135.5	0.55
32	81	450	ø305	EC32		EEI=B2	41.5	430	520	0.42	200	255	5.0	55/125	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89002851	EEI=B2	44.3	415	630	0.46	214	341	4.0	50/150	54	1	150.0	135.5	0.60
40	103	430	1,200	EC36/40	89002851	8.3	47.8	415	630	0.50	231	368	4.0	50/150	54	1	150.0	135.5	0.60
58	110	670	150	EC58/65	89003334	EEI=B2	68.4	660	960	0.45	330	505	7.0	45/130	90	1	195.0	180.0	1.00
65	110	670	1,500	EC58/65	89003334	10.4	74.4	660	960	0.49	359	549	6.0	45/130	90	1	195.0	180.0	1.00

Compact lamps

5	35	180	TC-S	EC9	89000133	5.1	10.5	175	190	0.26	51	58	2.0	55/75	27	2	84.5	76.0	0.33
2x5	35	180	TC-S	EC13	89000041	4.4	15.2	175	210	0.38	73	92	2.0	55/105	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9	89000133	EEI=B2	12.1	170	190	0.31	58	69	2.0	55/75	27	2	84.5	76.0	0.33
2x7	47	175	TC-S	EC13	89000041	4.1	18.3	165	210	0.48	89	118	1.5	55/105	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9	89000133	EEI=B2	13.6	165	190	0.36	65	79	2.0	55/75	27	2	84.5	76.0	0.33
2x9	60	170	TC-S	EC13	89000041	3.9	21.7	155	210	0.61	105	149	1.5	55/105	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13	89000041	4.6	14.6	185	210	0.34	71	84	2.0	55/105	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13	89000041	4.4	14.9	175	210	0.37	72	91	2.0	55/105	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9	89000133	EEI=B2	16.2	150	190	0.47	78	104	1.5	55/75	27	2	84.5	76.0	0.33
13	91	175	TC-D	EC13	89000041	EEI=B2	17.3	170	210	0.44	83	108	2.0	55/105	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13	89000041	EEI=B2	17.3	170	210	0.44	83	108	2.0	55/105	27	2	84.5	76.0	0.33
16	103	195	TC-DD	EC16		EEI=B2	21.5	195	250	0.48	104	140	2.0	60/115	27	2	84.5	76.0	0.33
18	100	220	TC-D	EC18H	89000100	EEI=B2	24.2	220	300	0.48	117	167	2.0	55/120	27	2	84.5	76.0	0.33
18	58	375	TC-F	EC18/20	89003333	EEI=B2	26.4	370	430	0.31	128	156	5.0	55/85	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20	89003333	EEI=B2	26.4	370	430	0.31	128	156	5.0	55/85	50	1	150.0	135.5	0.55
18	100	225	TC-T	EC18H	89000100	EEI=B2	24.2	220	300	0.48	117	167	2.0	55/120	27	2	84.5	76.0	0.33
2x18	58	375	TC-L	EC36/40	89002851	6.5	42.5	370	560	0.50	205	326	3.5	50/130	54	1	150.0	135.5	0.60
21	101	270	TC-DD	EC21		EEI=B2	26.8	270	340	0.43	129	171	3.0	40/80	50	1	150.0	135.5	0.60
24	87	345	TC-F	EC18/20	89003333	EEI=B2	31.5	345	430	0.40	152	199	3.5	55/85	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20	89003333	EEI=B2	31.5	345	430	0.40	152	199	3.5	55/85	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20	89003333	EEI=B2	32.4	315	430	0.45	157	225	3.0	55/85	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20	89003333	EEI=B2	32.9	315	430	0.45	158	228	3.0	55/85	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20	89003333	EEI=B2	34.8	315	410	0.48	168	230	3.0	55/85	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89002851	EEI=B2	44.3	415	630	0.46	214	341	4.0	50/150	54	1	150.0	135.5	0.60
36	106	435	TC-L	EC36/40	89002851	EEI=B2	44.3	415	630	0.46	214	341	4.0	50/150	54	1	150.0	135.5	0.60
38	110	430	TC-DD	EC36/40	89002851	EEI=B2	46.8	415	630	0.49	226	360	4.0	50/150	54	1	150.0	135.5	0.60

Notes

Other wattages available on request.
Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.
Some ballast and lamp combination may not operate within the EEI=B2 rating.

240 V 50 Hz – EC low loss ballasts (EEI=B2)

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	EC4/6/8	89000114	5.5	10.0	165	170	0.25	46	50	2.0	60/95	27	2	84.5	76.0	0.33
6	42	160	225	EC4/6/8	89000114	EEI=B2	11.2	155	170	0.30	52	60	2.0	60/95	27	2	84.5	76.0	0.33
2x6	42	160	225	EC13	89000037	4.4	16.4	160	215	0.43	76	107	1.5	55/105	27	2	84.5	76.0	0.33
8	56	145	300	EC4/6/8	89000114	EEI=B2	11.9	145	170	0.34	55	68	1.5	60/95	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13	89000037	4.0	18.2	145	215	0.52	84	131	1.5	55/105	27	2	84.5	76.0	0.33
13	95	165	525	EC13	89000037	EEI=B2	17.5	165	215	0.44	81	111	1.5	55/105	27	2	84.5	76.0	0.33
15	55	310	450	EC15	89002928	EEI=B2	23.7	310	360	0.32	110	134	3.5	55/80	50	1	150.0	135.5	0.55
18	57	370	600	EC18/20	89002929	EEI=B2	26.9	370	425	0.30	125	150	4.0	55/85	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89002931	6.5	42.5	370	560	0.48	197	313	3.5	45/130	54	1	150.0	135.5	0.60
20	57	370	600	EC18/20	89002929	8.9	28.2	370	425	0.32	131	157	4.0	55/85	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89002931	6.5	45.1	370	560	0.51	209	332	3.0	45/130	54	1	150.0	135.5	0.60
22	62	400	ø210	EC22		EEI=B2	31.5	400	475	0.33	146	182	5.0	55/100	50	1	150.0	135.5	0.55
30	96	365	900	EC30	89002930	EEI=B2	39.5	360	475	0.46	183	253	3.5	55/100	50	1	150.0	135.5	0.55
32	81	450	ø305	EC32		EEI=B2	41.5	430	520	0.40	192	244	5.0	55/125	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89002931	EEI=B2	44.8	415	625	0.45	207	328	4.0	55/150	54	1	150.0	135.5	0.60
40	103	430	1,200	EC36/40	89002931	8.8	48.3	415	625	0.48	224	354	3.5	55/150	54	1	150.0	135.5	0.60
58	110	670	1,500	EC58/65	89002932	EEI=B2	68.4	660	940	0.43	317	474	7.0	50/135	90	1	195.0	180.0	1.00
65	110	670	1,500	EC58/65	89002932	10.4	74.4	660	940	0.47	344	515	6.0	50/135	90	1	195.0	180.0	1.00

Compact lamps

5	35	180	TC-S	EC9	89000128	5.7	11.1	180	187	0.26	51	56	2.0	60/75	27	2	84.5	76.0	0.33
2x5	35	180	TC-S	EC13	89000037	4.8	15.6	175	215	0.37	72	93	2.0	55/105	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9	89000128	EEI=B2	12.6	175	187	0.30	58	65	2.0	60/75	27	2	84.5	76.0	0.33
2x7	47	175	TC-S	EC13	89000037	4.5	18.7	165	215	0.47	87	118	1.5	55/105	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9	89000128	EEI=B2	13.9	165	187	0.35	64	77	2.0	60/75	27	2	84.5	76.0	0.33
2x9	60	170	TC-S	EC13	89000037	4.2	22.0	155	215	0.59	102	149	1.5	55/105	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13	89000037	5.0	15.0	185	215	0.34	70	85	2.0	55/105	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13	89000037	4.8	15.3	175	215	0.36	71	91	2.0	55/105	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9	89000128	EEI=B2	16.7	155	187	0.45	77	98	1.5	60/75	27	2	84.5	76.0	0.33
13	91	175	TC-D	EC13	89000037	EEI=B2	17.6	170	215	0.43	82	108	2.0	55/105	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13	89000037	EEI=B2	17.6	170	215	0.43	82	108	2.0	55/105	27	2	84.5	76.0	0.33
16	103	195	TC-DD	EC16	89000076	EEI=B2	21.5	195	250	0.46	100	134	2.0	60/115	27	2	84.5	76.0	0.33
18	100	220	TC-D	EC18H	89000095	EEI=B2	24.5	220	280	0.46	113	152	2.0	65/120	27	2	84.5	76.0	0.33
18	58	375	TC-F	EC18/20	89002929	EEI=B2	26.9	370	425	0.30	125	150	4.0	55/85	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20	89002929	EEI=B2	26.9	370	425	0.30	125	150	4.0	55/85	50	1	150.0	135.5	0.55
18	100	225	TC-T	EC18H	89000095	EEI=B2	24.5	220	280	0.46	113	152	2.0	65/120	27	2	84.5	76.0	0.33
2x18	58	375	TC-L	EC36/40	89002931	6.5	42.5	370	560	0.48	197	313	3.5	45/130	54	1	150.0	135.5	0.60
21	101	270	TC-DD	EC21	89000259	EEI=B2	26.8	270	340	0.41	124	164	3.0	40/80	50	1	150.0	135.5	0.60
24	87	345	TC-F	EC18/20	89002929	EEI=B2	32.0	345	425	0.39	148	191	3.5	55/85	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20	89002929	EEI=B2	32.0	345	425	0.39	148	191	3.5	55/85	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20	89002929	EEI=B2	32.8	315	425	0.43	152	215	3.0	55/85	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20	89002929	EEI=B2	33.3	315	425	0.44	154	219	3.0	55/85	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20	89002929	EEI=B2	35.2	315	410	0.47	163	223	3.0	55/85	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89002931	EEI=B2	44.8	415	625	0.45	207	328	4.0	55/150	54	1	150.0	135.5	0.60
36	106	435	TC-L	EC36/40	89002931	EEI=B2	44.8	415	625	0.45	207	328	4.0	55/150	54	1	150.0	135.5	0.60
38	110	430	TC-DD	EC36/40	89002931	EEI=B2	47.3	415	625	0.47	219	346	4.0	55/150	54	1	150.0	135.5	0.60

Notes

Other wattages available on request.
Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.
Some ballast and lamp combination may not operate within the EEI=B2 rating.

EC energy control ballasts

Figure 1

50, 54 and (90 mm) stack

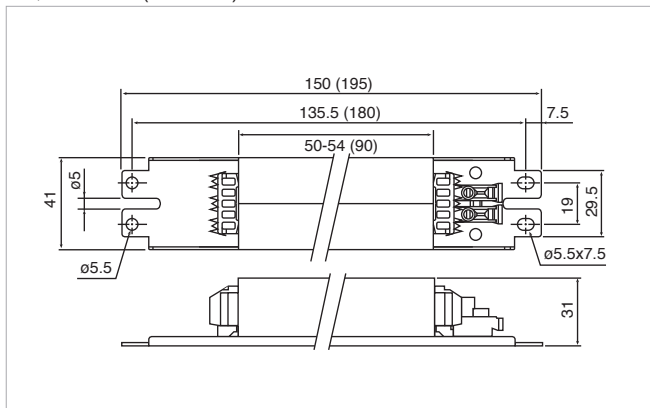
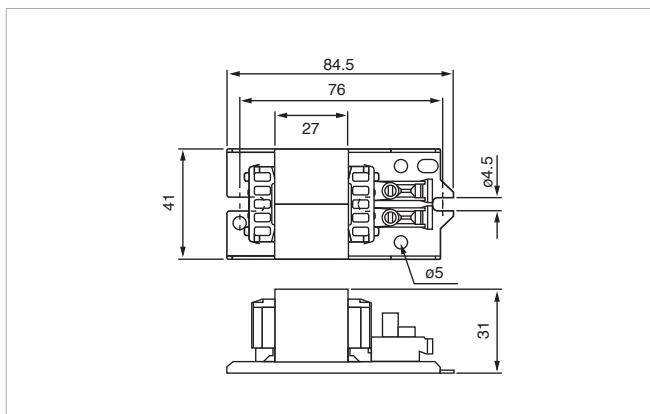


Figure 2

27 mm stack



- slim cross-section and compact
- for building into a luminaire, a box, or an enclosure
- low magnetic stray field
- varnish impregnation
- long service life
- non-audible noise level
- nomex class "H" gap for fixed calibration
- resistant to moisture and condensation
- 10 A push-in terminals for 0.5-1.5 mm² solid wires (or screw terminals for up to 2.5 mm² solid or stranded wires)
- low power consumption
- maximum winding temperature tw130°C
- other supply voltages than listed are available i.e. 120 V, 277 V etc.

100% final testing

- continuity
- winding short circuit
- core to coil high voltage test
- operating values

220 V 50 Hz – EC energy control ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm			W	W	mA	mA		mA	mA	μF		mm		mm	mm	kg
Linear and circular lamps																			
4	29	170	150	EC4/6/8		5.5	10.0	165	170	0.28	51	55	2.0	60/95	27	2	84.5	76.0	0.33
6	42	160	225	EC4/6/8		5.2	11.2	155	170	0.33	56	65	2.0	60/95	27	2	84.5	76.0	0.33
2x6	42	160	225	EC13	89000039	4.2	16.2	160	200	0.46	82	107	1.5	55/100	27	2	84.5	76.0	0.33
8	56	145	300	EC4/6/8		4.8	11.9	145	170	0.37	60	74	2.0	60/95	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13	89000039	3.8	18.0	145	200	0.56	91	132	1.5	55/100	27	2	84.5	76.0	0.33
10	49	230	330	EC10*	89000185	6.2	16.2	225	240	0.33	82	92	3.0	40/105	50	1	150.0	135.5	0.55
13	95	165	525	EC13	89000039	4.3	17.3	165	200	0.48	87	111	1.5	55/100	27	2	84.5	76.0	0.33
15	55	310	450	EC15		8.5	23.5	310	360	0.34	119	145	3.5	50/85	50	1	150.0	135.5	0.55
18	57	370	600	EC18/20	89000208	9.0	27.0	370	440	0.33	136	170	5.0	50/90	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89000325	6.7	42.7	370	620	0.52	216	379	3.5	50/130	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20	89000208	9.0	28.3	370	440	0.35	143	178	5.0	50/90	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89000325	6.7	45.3	370	620	0.56	229	403	3.0	50/130	50	1	150.0	135.5	0.55
22	62	400	ø210	EC22		10.5	32.5	400	450	0.37	164	194	5.0	65/115	50	1	150.0	135.5	0.55
30	96	365	900	EC30		9.5	39.5	360	450	0.50	199	262	3.5	55/115	50	1	150.0	135.5	0.55
30	55	610	ø224	EC30L		12.0	42.0	600	670	0.32	212	249	7.0	50/100	90	1	195.0	180.0	1.00
32	81	450	ø305	EC32		10.5	42.5	440	580	0.44	215	297	5.0	55/130	50	1	150.0	135.5	0.55
32	135	265	1,200	EC32H*		4.5	35.0	265	475	0.60	177	333	2.0	35/55	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89000325	8.5	44.5	415	636	0.49	225	362	4.0	55/140	50	1	150.0	135.5	0.55
40	103	430	1,200	EC36/40	89000325	8.5	48.0	415	636	0.53	242	390	4.0	55/140	50	1	150.0	135.5	0.55
58	110	670	1,500	EC58/65	89000454	12.0	70.0	660	980	0.48	354	551	7.0	45/135	90	1	195.0	180.0	1.00
65	110	670	1,500	EC58/65	89000454	12.0	76.0	660	980	0.52	384	598	6.0	45/135	90	1	195.0	180.0	1.00

Compact lamps

5	35	180	TC-S	EC9	89000131	5.7	11.1	180	190	0.28	56	62	3.0	55/75	27	2	84.5	76.0	0.33
2x5	35	180	TC-S	EC13	89000039	4.6	15.4	175	200	0.40	78	93	2.0	55/100	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9	89000131	5.5	12.6	175	190	0.33	64	73	2.0	55/75	27	2	84.5	76.0	0.33
2x7	47	175	TC-S	EC13	89000039	4.3	18.5	165	200	0.51	93	119	1.5	55/100	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9	89000131	5.2	13.9	165	190	0.38	70	85	2.0	55/75	27	2	84.5	76.0	0.33
2x9	60	170	TC-S	EC13	89000039	4.0	21.8	155	200	0.64	110	149	1.5	55/100	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13	89000039	4.8	14.8	185	200	0.36	75	85	2.0	55/100	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13	89000039	4.6	15.1	175	200	0.39	76	91	2.0	55/100	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9	89000131	4.9	16.7	155	190	0.49	84	108	1.5	55/75	27	2	84.5	76.0	0.33
13	91	175	TC-D	EC13	89000039	4.4	17.4	170	200	0.47	88	109	2.0	55/100	27	2	84.5	76.0	0.33
13	59	285	TC-S	EC13L		7.6	20.6	285	320	0.33	104	123	3.5	40/85	50	1	150.0	135.5	0.55
13	91	175	TC-T	EC13	89000039	4.4	17.4	170	200	0.47	88	109	2.0	55/100	27	2	84.5	76.0	0.33
18	58	375	TC-F	EC18/20	89000208	9.0	27.0	370	440	0.33	136	170	5.0	50/90	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20	89000208	9.0	27.0	370	440	0.33	136	170	5.0	50/90	50	1	150.0	135.5	0.55
2x18	58	375	TC-L	EC36/40	89000325	6.7	42.7	370	620	0.52	216	379	3.5	50/130	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20	89000208	8.0	32.0	345	440	0.42	162	217	3.5	50/90	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20	89000208	8.0	32.0	345	440	0.42	162	217	3.5	50/90	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20	89000208	6.9	32.9	315	440	0.47	166	244	3.0	50/90	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20	89000208	6.9	33.4	315	440	0.48	169	247	3.0	50/90	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20	89000208	6.9	35.3	315	410	0.51	178	244	3.0	50/90	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89000325	8.5	44.5	415	636	0.49	225	362	4.0	55/140	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40	89000325	8.5	44.5	415	636	0.49	225	362	4.0	55/140	50	1	150.0	135.5	0.55
38	110	430	TC-DD	EC36/40	89000325	8.5	47.0	415	636	0.51	237	382	4.0	55/140	50	1	150.0	135.5	0.55

Notes

Other wattages available on request.

* Lamps not included in IEC 60081 or IEC 60901

220 V 60 Hz – EC energy control ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	EC4/6/8	89000120	5.0	9.5	165	170	0.26	48	52	2.0	45/90	27	2	84.5	76.0	0.33
6	42	160	225	EC4/6/8	89000120	4.7	10.7	155	170	0.31	54	62	1.5	45/90	27	2	84.5	76.0	0.33
2x6	42	160	225	EC13	89000040	4.2	16.2	160	206	0.46	82	110	1.5	50/100	27	2	84.5	76.0	0.33
8	56	145	300	EC4/6/8	89000120	4.4	11.5	145	170	0.36	58	71	1.5	45/90	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13	89000040	3.8	18.0	145	206	0.56	91	135	1.5	50/100	27	2	84.5	76.0	0.33
10	49	230	330	EC10*		7.0	17.0	225	250	0.34	86	100	3.0	55/110	27	2	84.5	76.0	0.33
13	95	165	525	EC13	89000040	4.3	17.3	165	206	0.48	87	115	1.5	50/100	27	2	84.5	76.0	0.33
15	55	310	450	EC15	89000199	8.5	23.5	310	360	0.34	119	145	3.0	55/85	50	1	150.0	135.5	0.55
18	57	370	600	EC18/20	89000206	9.0	27.0	370	440	0.33	136	170	3.5	50/90	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89000330	6.5	42.5	370	620	0.52	215	378	3.0	50/130	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20	89000206	9.0	28.3	370	440	0.35	143	178	3.5	50/90	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89000330	6.5	45.1	370	620	0.55	228	401	3.0	50/130	50	1	150.0	135.5	0.55
22	62	400	ø210	EC22		9.8	31.8	400	450	0.36	161	190	4.0	50/115	50	1	150.0	135.5	0.55
30	96	365	900	EC30		8.8	38.8	360	450	0.49	196	257	3.0	50/115	50	1	150.0	135.5	0.55
30	55	610	ø224	EC30L		11.0	41.0	600	670	0.31	207	243	6.0	50/100	90	1	195.0	180.0	1.00
32	81	450	ø305	EC32	89000311	10.2	42.2	440	580	0.44	213	295	4.0	55/130	50	1	150.0	135.5	0.55
32	135	265	1,200	EC32H*		4.2	34.7	265	485	0.60	175	337	2.0	35/55	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89000330	8.5	44.5	415	640	0.49	225	364	3.5	50/140	50	1	150.0	135.5	0.55
40	103	430	1,200	EC36/40	89000330	8.5	48.0	415	640	0.53	242	393	3.0	50/140	50	1	150.0	135.5	0.55
58	110	670	1,500	EC58/65	89000449	10.9	68.9	660	980	0.47	348	543	6.0	40/130	90	1	195.0	180.0	1.00
65	110	670	1,500	EC58/65	89000449	10.9	74.9	660	980	0.52	378	590	5.0	40/130	90	1	195.0	180.0	1.00
Compact lamps																			
5	35	180	TC-S	EC9	89000137	5.1	10.5	180	190	0.27	53	59	2.0	55/75	27	2	84.5	76.0	0.33
2x5	35	180	TC-S	EC13	89000040	4.6	15.4	175	206	0.40	78	96	1.5	50/100	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9	89000137	5.0	12.1	175	190	0.31	61	70	2.0	55/75	27	2	84.5	76.0	0.33
2x7	47	175	TC-S	EC13	89000040	4.3	18.5	165	206	0.51	93	122	1.5	50/100	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9	89000137	4.7	13.4	165	190	0.37	68	82	1.5	55/75	27	2	84.5	76.0	0.33
2x9	60	170	TC-S	EC13	89000040	4.0	21.8	155	206	0.64	110	154	1.5	50/100	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13	89000040	4.8	14.8	185	206	0.36	75	88	2.0	50/100	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13	89000040	4.6	15.1	175	206	0.39	76	94	1.5	50/100	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9	89000137	4.4	16.2	155	190	0.48	82	105	1.5	55/75	27	2	84.5	76.0	0.33
13	91	175	TC-D	EC13	89000040	4.4	17.4	170	206	0.47	88	112	1.5	50/100	27	2	84.5	76.0	0.33
13	59	285	TC-S	EC13L		7.1	20.1	285	315	0.32	102	118	3.0	35/65	50	1	150.0	135.5	0.55
13	91	175	TC-T	EC13	89000040	4.4	17.4	170	206	0.47	88	112	1.5	50/100	27	2	84.5	76.0	0.33
16	103	195	TC-DD	EC16		5.4	21.4	195	255	0.50	108	148	1.5	60/115	27	2	84.5	76.0	0.33
18	100	220	TC-D	EC18H	89000097	5.3	23.3	220	315	0.48	118	177	2.0	50/110	27	2	84.5	76.0	0.33
18	58	375	TC-F	EC18/20	89000206	9.0	27.0	370	440	0.33	136	170	3.5	50/90	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20	89000206	9.0	27.0	370	440	0.33	136	170	3.5	50/90	50	1	150.0	135.5	0.55
18	100	225	TC-T	EC18H	89000097	5.3	23.3	220	315	0.48	118	177	2.0	50/110	27	2	84.5	76.0	0.33
2x18	58	375	TC-L	EC36/40	89000330	6.5	42.5	370	620	0.52	215	378	3.0	50/130	50	1	150.0	135.5	0.55
21	101	270	TC-DD	EC21		5.6	25.6	270	350	0.43	129	176	3.0	40/80	50	1	150.0	135.5	0.60
24	87	345	TC-F	EC18/20	89000206	8.0	32.0	345	440	0.42	162	217	3.0	50/90	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20	89000206	8.0	32.0	345	440	0.42	162	217	3.0	50/90	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20	89000206	6.9	32.9	315	440	0.47	166	244	3.0	50/90	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20	89000206	6.9	33.4	315	440	0.48	169	247	3.0	50/90	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20	89000206	6.9	35.3	315	420	0.51	178	250	3.0	50/90	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89000330	8.5	44.5	415	640	0.49	225	364	3.5	50/140	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40	89000330	8.5	44.5	415	640	0.49	225	364	3.5	50/140	50	1	150.0	135.5	0.55
38	110	430	TC-DD	EC36/40	89000330	8.5	47.0	415	640	0.51	237	384	3.0	50/140	50	1	150.0	135.5	0.55

Notes

* Other wattages available on request.

* Lamps not included in IEC 60081 or IEC 60901.

220 V 60 Hz – EC energy control ballasts for Taiwan

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos ø	line current mA@0.9PF	line start current mA@0.9PF	capacitor µF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm			W	W	mA	mA		mA@0.9PF	mA@0.9PF	µF@0.9PF	Δt	mm		mm	mm	kg
Linear and circular lamps																			
10	49	230	330	EC10*		6.6	16.0	225	250	0.32	81	94	3.0	55/110	27	2	84.5	76.0	0.33
20	59	350	580	EC18/20*		6.0	24.0	350	410	0.31	121	149	3.5	40/100	50	1	150.0	135.5	0.55
30	96	365	900	EC30		7.0	37.0	360	490	0.47	187	267	3.0	50/115	50	1	150.0	135.5	0.55
30	55	590	ø233	EC30L*	89000446	9.3	40.0	590	670	0.31	202	241	6.0	45/90	90	1	195.0	180.0	1.00
32	81	450	ø305	EC32		7.2	39.2	450	590	0.40	198	273	4.0	40/150	50	1	150.0	135.5	0.55
40	113	415	1,198	EC36/40*		6.6	43.0	415	590	0.47	217	324	3.5	40/150	50	1	150.0	135.5	0.55

Notes

- Other wattages available on request.
- * Lamps not included in IEC 60081 or IEC 60901.

230 V 50 Hz – EC energy control ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos ø	line current mA@0.9PF	line start current mA@0.9PF	capacitor µF0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	EC4/6/8		5.5	10.0	165	170	0.26	48	52	2.0	60/95	27	2	84.5	76.0	0.33
6	42	160	225	EC4/6/8		EEI=B2	11.2	155	170	0.31	54	62	2.0	60/95	27	2	84.5	76.0	0.33
2x6	42	160	225	EC13	89000041	3.9	15.9	155	210	0.45	77	109	1.5	55/105	27	2	84.5	76.0	0.33
8	56	145	300	EC4/6/8		EEI=B2	11.9	145	170	0.36	58	71	1.5	60/95	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13	89000041	3.5	17.7	140	210	0.55	86	135	1.5	55/105	27	2	84.5	76.0	0.33
10	49	230	330	EC10*		6.8	16.8	225	245	0.32	81	93	3.0	40/105	50	1	150.0	135.5	0.55
13	95	165	525	EC13	89000041	EEI=B2	17.0	160	210	0.46	82	113	1.5	55/105	27	2	84.5	76.0	0.33
15	55	310	450	EC15		8.8	23.8	310	360	0.33	115	140	3.5	55/90	50	1	150.0	135.5	0.55
18	57	370	600	EC18/20		10.0	28.0	370	430	0.33	135	165	4.0	60/95	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89000334	7.2	43.2	370	580	0.51	209	344	3.5	50/130	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20		10.0	29.3	370	430	0.34	142	173	4.0	60/95	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89000334	7.2	45.8	370	580	0.54	221	364	3.0	50/130	50	1	150.0	135.5	0.55
22	62	400	ø210	EC22		11.0	33.0	400	450	0.36	159	188	5.0	65/105	50	1	150.0	135.5	0.55
30	96	365	900	EC30		9.9	39.9	360	450	0.48	193	253	3.5	65/105	50	1	150.0	135.5	0.55
30	55	610	ø224	EC30L		14.5	44.5	600	660	0.32	215	248	7.0	55/100	90	1	195.0	180.0	1.00
32	81	450	ø305	EC32		11.0	43.0	440	550	0.42	208	273	5.0	65/130	50	1	150.0	135.5	0.55
32	135	265	1,200	EC32H*		5.3	35.8	265	455	0.59	173	312	2.0	40/60	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89000334	10.0	46.0	415	630	0.48	222	354	4.0	55/160	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40(54mm)**		10.0	46.0	415	610	0.48	222	343	4.0	55/140	54	1	150.0	135.5	0.60
40	103	430	1,200	EC36/40	89000334	10.0	49.5	415	630	0.52	239	381	3.5	55/160	50	1	150.0	135.5	0.55
58	110	670	1,500	EC58/65		13.0	71.0	660	960	0.47	343	524	6.0	50/140	90	1	195.0	180.0	1.00
65	110	670	1,500	EC58/65		13.0	77.0	660	960	0.51	372	568	6.0	50/140	90	1	195.0	180.0	1.00

Compact lamps

5	35	180	TC-S	EC9	89000133	5.1	10.5	175	190	0.26	51	58	2.0	55/75	27	2	84.5	76.0	0.33
2x5	35	180	TC-S	EC13	89000041	4.4	15.2	175	210	0.38	73	92	2.0	55/105	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9	89000133	EEI=B2	12.1	170	190	0.31	58	69	2.0	55/75	27	2	84.5	76.0	0.33
2x7	47	175	TC-S	EC13	89000041	4.1	18.3	165	210	0.48	89	118	1.5	55/105	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9	89000133	EEI=B2	13.6	165	190	0.36	65	79	2.0	55/75	27	2	84.5	76.0	0.33
2x9	60	170	TC-S	EC13	89000041	3.9	21.7	155	210	0.61	105	149	1.5	55/105	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13	89000041	4.6	14.6	185	210	0.34	71	84	2.0	55/105	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13	89000041	4.4	14.9	175	210	0.37	72	91	2.0	55/105	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9	89000133	EEI=B2	16.2	150	190	0.47	78	104	1.5	55/75	27	2	84.5	76.0	0.33
13	91	175	TC-D	EC13	89000041	EEI=B2	17.3	170	210	0.44	83	108	2.0	55/105	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13	89000041	EEI=B2	17.3	170	210	0.44	83	108	2.0	55/105	27	2	84.5	76.0	0.33
18	58	375	TC-F	EC18/20		10.0	28.0	370	430	0.33	135	165	4.0	60/95	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20		10.0	28.0	370	430	0.33	135	165	4.0	60/95	50	1	150.0	135.5	0.55
2x18	58	375	TC-L	EC36/40	89000334	7.2	43.2	370	580	0.51	209	344	3.5	50/130	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20		8.9	32.9	345	430	0.42	159	208	3.5	60/95	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20		8.9	32.9	345	430	0.42	159	208	3.5	60/95	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20		7.7	33.7	315	430	0.46	163	233	3.0	60/95	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20		7.7	34.2	315	430	0.47	165	237	3.0	60/95	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20		7.7	36.1	315	410	0.50	174	238	3.0	60/95	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89000334	10.0	46.0	415	630	0.48	222	354	4.0	55/160	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40	89000334	10.0	46.0	415	630	0.48	222	354	4.0	55/160	50	1	150.0	135.5	0.55
38	110	430	TC-DD	EC36/40	89000334	10.0	48.5	415	630	0.51	234	373	3.5	55/160	50	1	150.0	135.5	0.55

Notes

Other wattages available on request.

* Lamps not included in IEC 60081 or IEC 60901.

** Ballasts suitable for use in Class F luminaires.

Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.

240 V 50 Hz – EC energy control ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos ø	line current mA@0.9PF	line start current mA@0.9PF	capacitor µF@0.9PF	normal/ abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	EC4/6/8	89000114	5.5	10.0	165	170	0.25	46	50	2.0	60/95	27	2	84.5	76.0	0.33
6	42	160	225	EC4/6/8	89000114	EEI=B2	11.2	155	170	0.30	52	60	2.0	60/95	27	2	84.5	76.0	0.33
2x6	42	160	225	EC13	89000037	4.4	16.4	160	215	0.43	76	107	1.5	55/105	27	2	84.5	76.0	0.33
8	56	145	300	EC4/6/8	89000114	EEI=B2	11.9	145	170	0.34	55	68	1.5	60/95	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13	89000037	4.0	18.2	145	215	0.52	84	131	1.5	55/105	27	2	84.5	76.0	0.33
10	49	230	330	EC10*	89000184	7.0	17.0	225	245	0.31	79	90	3.0	40/105	50	1	150.0	135.5	0.55
13	95	165	525	EC13	89000037	EEI=B2	17.5	165	215	0.44	81	111	1.5	55/105	27	2	84.5	76.0	0.33
15	55	310	450	EC15		9.0	24.0	310	360	0.32	111	135	3.5	60/90	50	1	150.0	135.5	0.55
15	57	300	550	EC15 ES8*		9.0	24.0	300	340	0.33	111	132	3.5	50/85	50	1	150.0	135.5	0.55
18	57	370	600	EC18/20	89000200	10.3	28.3	370	425	0.32	131	158	4.0	60/95	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89000319	7.5	43.5	370	560	0.49	201	320	3.5	50/130	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20	89000200	10.3	29.6	370	425	0.33	137	165	4.0	60/95	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89000319	7.5	46.1	370	560	0.52	213	339	3.0	50/130	50	1	150.0	135.5	0.55
22	62	400	ø210	EC22	89000263	11.5	33.5	400	450	0.35	155	183	5.0	65/135	50	1	150.0	135.5	0.55
23		290	970	EC18/20	89000200	7.9	27.2	290	425	0.39	126	194	3.0	60/95	50	1	150.0	135.5	0.55
30	96	365	900	EC30		10.5	40.5	365	450	0.46	187	243	3.5	65/135	50	1	150.0	135.5	0.55
30	55	610	ø224	EC30L		15.0	45.0	600	660	0.31	208	241	7.0	55/100	90	1	195.0	180.0	1.00
32	81	450	ø305	EC32	89000307	11.0	43.0	430	520	0.42	199	253	4.0	60/130	50	1	150.0	135.5	0.55
32	135	265	1,200	EC32H*		5.9	36.4	265	445	0.57	169	297	2.0	40/60	50	1	150.0	135.5	0.55
33	103	380	1,150	EC33 ES8*		9.5	42.5	380	500	0.47	197	272	3.5	50/130	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89000319	10.0	46.0	415	625	0.46	213	337	4.0	60/160	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40 (54mm)**		10.0	46.0	415	605	0.46	213	326	4.0	60/145	54	1	150.0	135.5	0.60
40	103	430	1,200	EC36/40	89000319	10.0	49.5	415	625	0.50	229	362	3.5	60/160	50	1	150.0	135.5	0.55
58	110	670	1,500	EC58/65		13.0	71.0	660	940	0.45	329	492	6.0	60/145	90	1	195.0	180.0	1.00
65	110	670	1,500	EC58/65		13.0	77.0	660	940	0.49	356	533	6.0	60/145	90	1	195.0	180.0	1.00
75	120	670	1,800	EC75		12.5	87.5	660	950	0.55	405	612	5.0	55/150	90	1	195.0	180.0	1.00
Compact lamps																			
5	35	180	TC-S	EC9	89000128	5.7	11.1	180	187	0.26	51	56	2.0	60/75	27	2	84.5	76.0	0.33
2x5	35	180	TC-S	EC13	89000037	4.8	15.6	175	215	0.37	72	93	2.0	55/105	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9	89000128	EEI=B2	12.6	175	187	0.30	58	65	2.0	60/75	27	2	84.5	76.0	0.33
2x7	47	175	TC-S	EC13	89000037	4.5	18.7	165	215	0.47	87	118	1.5	55/105	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9	89000128	EEI=B2	13.9	165	187	0.35	64	77	2.0	60/75	27	2	84.5	76.0	0.33
2x9	60	170	TC-S	EC13	89000037	4.2	22.0	155	215	0.59	102	149	1.5	55/105	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13	89000037	5.0	15.0	185	215	0.34	70	85	2.0	55/105	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13	89000037	4.8	15.3	175	215	0.36	71	91	2.0	55/105	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9	89000128	EEI=B2	16.7	155	187	0.45	77	98	1.5	60/75	27	2	84.5	76.0	0.33
13	91	175	TC-D	EC13	89000037	EEI=B2	17.6	170	215	0.43	82	108	2.0	55/105	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13	89000037	EEI=B2	17.6	170	215	0.43	82	108	2.0	55/105	27	2	84.5	76.0	0.33
18	58	375	TC-F	EC18/20	89000200	10.3	28.3	370	425	0.32	131	158	4.0	60/95	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20	89000200	10.3	28.3	370	425	0.32	131	158	4.0	60/95	50	1	150.0	135.5	0.55
2x18	58	375	TC-L	EC36/40	89000319	7.5	43.5	370	560	0.49	201	320	3.5	50/130	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20	89000200	9.2	33.2	345	425	0.40	154	199	3.5	60/95	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20	89000200	9.2	33.2	345	425	0.40	154	199	3.5	60/95	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20	89000200	7.9	33.9	315	425	0.45	157	222	3.0	60/95	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20	89000200	7.9	34.4	315	425	0.45	159	226	3.0	60/95	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20	89000200	7.9	36.3	315	410	0.48	168	230	3.0	60/95	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89000319	10.0	46.0	415	625	0.46	213	337	4.0	60/160	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40	89000319	10.0	46.0	415	625	0.46	213	337	4.0	60/160	50	1	150.0	135.5	0.55
38	110	430	TC-DD	EC36/40	89000319	10.0	48.5	415	625	0.49	225	355	3.5	60/160	50	1	150.0	135.5	0.55

Notes

* Other wattages available on request.

* Lamps not included in IEC 60081 or IEC 60901.

** Ballasts suitable for use in Class F luminaires.

Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.

250 V 50 Hz – EC energy control ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
4	29	170	150	EC4/6/8		6.0	10.5	165	170	0.25	47	50	2.0	60/95	27	2	84.5	76.0	0.33
6	42	160	225	EC4/6/8		EEI=B2	11.6	155	170	0.30	52	60	2.0	60/95	27	2	84.5	76.0	0.33
2x6	42	160	225	EC13		4.8	16.8	160	215	0.42	75	106	1.5	55/105	27	2	84.5	76.0	0.33
8	56	145	300	EC4/6/8		EEI=B2	12.4	145	170	0.34	55	68	1.5	60/95	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13		4.4	18.6	145	215	0.51	83	129	1.5	55/105	27	2	84.5	76.0	0.33
10	49	230	330	EC10*		7.2	17.2	225	245	0.31	76	87	3.0	40/105	50	1	150.0	135.5	0.55
13	95	165	525	EC13		EEI=B2	18.0	165	215	0.44	80	109	1.5	55/105	27	2	84.5	76.0	0.33
15	55	310	450	EC15		9.2	24.2	310	360	0.31	108	131	3.5	60/90	50	1	150.0	135.5	0.55
18	57	370	600	EC18/20		10.6	28.6	370	425	0.31	127	153	4.0	60/95	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40		7.8	43.8	370	560	0.47	195	309	3.5	50/130	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20		10.6	29.9	370	425	0.32	133	160	4.0	60/95	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40		7.8	46.4	370	560	0.50	206	328	3.0	50/130	50	1	150.0	135.5	0.55
22	62	400	ø210	EC22		12.0	34.0	400	450	0.34	151	179	4.0	65/135	50	1	150.0	135.5	0.55
30	96	365	900	EC30		11.0	41.0	365	450	0.45	182	236	3.5	65/135	50	1	150.0	135.5	0.55
30	55	610	ø224	EC30L		15.5	45.5	600	660	0.30	202	234	7.0	55/100	90	1	195.0	180.0	1.00
32	81	450	ø305	EC32	89000310	11.0	43.0	430	520	0.40	191	243	4.0	65/130	50	1	150.0	135.5	0.55
32	135	265	1,200	EC32H*		6.0	36.5	265	445	0.55	162	286	2.0	40/60	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40		10.0	46.0	415	625	0.44	204	323	4.0	60/160	50	1	150.0	135.5	0.55
40	103	430	1,200	EC36/40		10.0	49.5	415	625	0.48	220	348	3.5	60/160	50	1	150.0	135.5	0.55
58	110	670	1,500	EC58/65		13.0	71.0	660	940	0.43	316	472	6.0	60/145	90	1	195.0	180.0	1.00
65	110	670	1,500	EC58/65		13.0	77.0	660	940	0.47	342	512	6.0	60/145	90	1	195.0	180.0	1.00
Compact lamps																			
5	35	180	TC-S	EC9		6.2	11.6	180	187	0.26	51	56	2.0	60/75	27	2	84.5	76.0	0.33
2x5	35	180	TC-S	EC13		5.3	16.1	175	215	0.37	72	92	2.0	55/105	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9		EEI=B2	13.1	175	187	0.30	58	65	2.0	60/75	27	2	84.5	76.0	0.33
2x7	47	175	TC-S	EC13		5.0	19.2	165	215	0.47	85	117	1.5	55/105	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9		EEI=B2	14.4	165	187	0.35	64	76	2.0	60/75	27	2	84.5	76.0	0.33
2x9	60	170	TC-S	EC13		4.7	22.5	155	215	0.58	100	146	1.5	55/105	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13		5.6	15.6	185	215	0.34	69	85	2.0	55/105	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13		5.3	15.8	175	215	0.36	70	91	2.0	55/105	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9		EEI=B2	17.1	155	187	0.44	76	96	1.5	60/75	27	2	84.5	76.0	0.33
13	91	175	TC-D	EC13		EEI=B2	18.2	170	215	0.43	81	107	1.5	55/105	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13		EEI=B2	18.2	170	215	0.43	81	107	1.5	55/105	27	2	84.5	76.0	0.33
18	58	375	TC-F	EC18/20		10.6	28.6	370	425	0.31	127	153	4.0	60/95	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20		10.6	28.6	370	425	0.31	127	153	4.0	60/95	50	1	150.0	135.5	0.55
2x18	58	375	TC-L	EC36/40		7.8	43.8	370	560	0.47	195	309	3.5	50/130	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20		9.5	33.5	345	425	0.39	149	192	3.5	60/95	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20		9.5	33.5	345	425	0.39	149	192	3.5	60/95	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20		8.1	34.1	315	425	0.43	152	215	3.0	60/95	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20		8.1	34.6	315	425	0.44	154	218	3.0	60/95	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20		8.1	36.5	315	410	0.46	162	222	3.0	60/95	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40		10.0	46.0	415	625	0.44	204	323	4.0	60/160	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40		10.0	46.0	415	625	0.44	204	323	4.0	60/160	50	1	150.0	135.5	0.55
38	110	430	TC-DD	EC36/40		10.0	48.5	415	625	0.47	216	341	3.5	60/160	50	1	150.0	135.5	0.55

Notes

- Other wattages available on request.
- * Lamps not included in IEC 60081 or IEC 60901.
- Refer to Energy Classification System table for ballasts from CELMA and/or MEPS.

EC optimised ballasts

Figure 1
50 mm stack

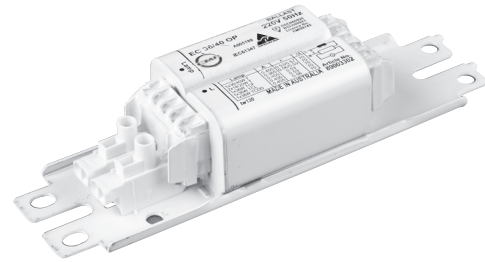
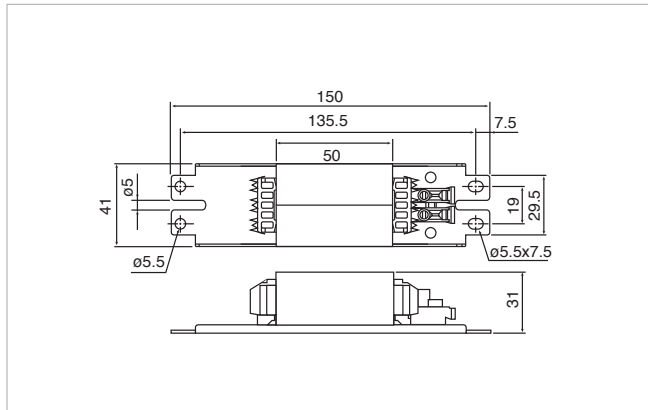
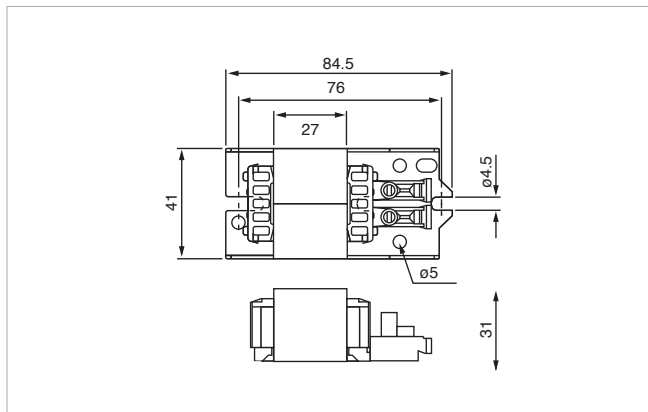


Figure 2
27 mm stack



- slim cross-section and compact
- for building into a luminaire, a box, or an enclosure
- low magnetic stray field
- long service life
- varnish impregnation
- non-audible noise level
- nomex class "H" gap for fixed calibration
- resistant to moisture and condensation
- 10 A push-in terminals for 0.5-1.5 mm² solid wires (or screw terminals for up to 2.5 mm² solid or stranded wires)
- maximum winding temperature tw130°C

100% final testing

- continuity
- winding short circuit
- core to coil high voltage test
- operating values

220 V 50 Hz – EC optimised ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm			W	W	mA	mA						mm		mm	mm	kg
Linear and circular lamps																			
2x6	42	160	225	EC13		4.8	16.8	160	220	0.48	85	123	1.5	55/110	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13		4.4	18.6	145	220	0.58	94	150	1.5	55/110	27	2	84.5	76.0	0.33
13	95	165	525	EC13		5.0	18.0	165	220	0.50	91	127	1.5	55/110	27	2	84.5	76.0	0.33
18	57	370	600	EC18/20	89003329	11.3	29.3	370	440	0.36	148	185	5.0	65/100	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89003302	8.9	44.9	365	640	0.56	227	418	3.0	70/160	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20	89003329	11.3	30.6	370	440	0.38	155	193	4.0	65/100	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89003302	8.9	47.5	365	640	0.59	240	442	3.0	70/160	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89003302	11.0	47.0	405	640	0.53	237	394	3.5	70/160	50	1	150.0	135.5	0.55
40	103	430	1,200	EC36/40	89003302	11.0	50.5	405	640	0.57	255	423	3.5	70/160	50	1	150.0	135.5	0.55
Compact lamps																			
5	35	180	TC-S	EC9		6.2	11.6	180	192	0.29	58	65	3.0	55/80	27	1	84.5	76.0	0.33
2x5	35	180	TC-S	EC13		5.3	16.1	175	220	0.42	81	107	2.0	55/110	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9		6.0	13.1	175	192	0.34	66	76	2.0	55/80	27	1	84.5	76.0	0.33
2x7	47	175	TC-S	EC13		5.0	19.2	165	220	0.53	97	136	1.5	55/110	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9		5.7	14.4	165	192	0.40	73	89	2.0	55/80	27	1	84.5	76.0	0.33
2x9	60	170	TC-S	EC13		4.7	22.5	155	220	0.66	114	169	1.5	55/110	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13		5.6	15.6	185	220	0.38	79	98	2.0	55/110	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13		5.3	15.8	175	220	0.41	80	105	2.0	55/110	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9		5.3	17.1	155	192	0.50	86	112	1.5	55/80	27	1	84.5	76.0	0.33
13	91	175	TC-D	EC13		5.2	18.2	170	220	0.49	92	125	2.0	55/110	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13		5.2	18.2	170	220	0.49	92	125	2.0	55/110	27	2	84.5	76.0	0.33
18	100	220	TC-D	EC18H		6.8	24.8	220	285	0.51	125	170	2.0	65/125	27	1	84.5	76.0	0.33
18	58	375	TC-F	EC18/20	89003329	11.3	29.3	370	440	0.36	148	185	5.0	65/100	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20	89003329	11.3	29.3	370	440	0.36	148	185	5.0	65/100	50	1	150.0	135.5	0.55
18	100	225	TC-T	EC18H		6.8	24.8	220	285	0.51	125	170	2.0	65/125	27	1	84.5	76.0	0.33
2x18	58	375	TC-L	EC36/40	89003302	8.9	44.9	365	640	0.56	227	418	3.0	70/160	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20	89003329	10.1	34.1	345	440	0.45	172	231	3.5	65/100	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20	89003329	10.1	34.1	345	440	0.45	172	231	3.5	65/100	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20	89003329	8.7	34.7	315	440	0.50	175	257	3.0	65/100	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20	89003329	8.7	35.2	315	440	0.51	178	260	3.0	65/100	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20	89003329	8.7	37.1	315	440	0.53	187	275	3.0	65/100	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89003302	11.0	47.0	405	640	0.53	237	394	3.5	70/160	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40	89003302	11.0	47.0	405	640	0.53	237	394	3.5	70/160	50	1	150.0	135.5	0.55
36	110	430	TC-DD	EC36/40	89003302	11.0	49.5	405	640	0.56	250	415	3.5	70/160	50	1	150.0	135.5	0.55

Notes

Other wattages available on request.

220 V 60 Hz – EC optimised ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot	input power	lamp current	lamp start current	circuit P F	line current	line start current	capacitor	normal/abnormal	stack	figure	length	mtg centres	weight
W	V	mA	mm			W	W	mA	mA	cos ø	mA@0.9PF	mA@0.9PF	µF0.9PF	Δt	mm		mm	mm	kg
Linear and circular lamps																			
2x6	42	160	225	EC13		4.8	16.8	160	220	0.48	85	123	1.5	55/110	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13		4.4	18.6	145	220	0.58	94	150	1.5	55/110	27	2	84.5	76.0	0.33
13	95	165	525	EC13		5.0	18.0	165	220	0.50	91	127	1.5	55/110	27	2	84.5	76.0	0.33
18	57	370	600	EC18/20		11.3	29.3	370	440	0.36	148	185	3.5	65/100	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40		8.9	44.9	365	640	0.56	227	418	3.0	65/160	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20		11.3	30.6	370	440	0.38	155	193	3.5	65/100	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40		8.9	47.5	365	640	0.59	240	442	3.0	65/160	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40		11.0	47.0	405	640	0.53	237	394	3.0	65/160	50	1	150.0	135.5	0.55
40	103	430	1,200	EC36/40		11.0	50.5	405	640	0.57	255	423	3.0	65/160	50	1	150.0	135.5	0.55
Compact lamps																			
5	35	180	TC-S	EC9		6.2	11.6	180	192	0.29	58	65	2.0	55/80	27	1	84.5	76.0	0.33
2x5	35	180	TC-S	EC13		5.3	16.1	175	220	0.42	81	107	1.5	55/110	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9		6.0	13.1	175	192	0.34	66	76	2.0	55/80	27	1	84.5	76.0	0.33
2x7	47	175	TC-S	EC13		5.0	19.2	165	220	0.53	97	136	1.5	55/110	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9		5.7	14.4	165	192	0.40	73	89	1.5	55/80	27	1	84.5	76.0	0.33
2x9	60	170	TC-S	EC13		4.7	22.5	155	220	0.66	114	169	1.5	55/110	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13		5.6	15.6	185	220	0.38	79	98	2.0	55/110	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13		5.3	15.8	175	220	0.41	80	105	1.5	55/110	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9		5.3	17.1	155	192	0.50	86	112	1.5	55/80	27	1	84.5	76.0	0.33
13	91	175	TC-D	EC13		5.2	18.2	170	220	0.49	92	125	1.5	55/110	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13		5.2	18.2	170	220	0.49	92	125	1.5	55/110	27	2	84.5	76.0	0.33
18	100	220	TC-D	EC18H		6.8	24.8	220	285	0.51	125	170	2.0	65/125	27	1	84.5	76.0	0.33
18	58	375	TC-F	EC18/20		11.3	29.3	370	440	0.36	148	185	3.5	65/100	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20		11.3	29.3	370	440	0.36	148	185	3.5	65/100	50	1	150.0	135.5	0.55
18	100	225	TC-T	EC18H		6.8	24.8	220	285	0.51	125	170	2.0	65/125	27	1	84.5	76.0	0.33
2x18	58	375	TC-L	EC36/40		8.9	44.9	365	640	0.56	227	418	3.0	65/160	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20		10.1	34.1	345	440	0.45	172	231	3.0	65/100	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20		10.1	34.1	345	440	0.45	172	231	3.0	65/100	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20		8.7	34.7	315	440	0.50	175	257	3.0	65/100	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20		8.7	35.2	315	440	0.51	178	260	3.0	65/100	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20		8.7	37.1	315	440	0.53	187	275	3.0	65/100	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40		11.0	47.0	405	640	0.53	237	394	3.0	65/160	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40		11.0	47.0	405	640	0.53	237	394	3.0	65/160	50	1	150.0	135.5	0.55
36	110	430	TC-DD	EC36/40		11.0	49.5	405	640	0.56	250	415	3.0	65/160	50	1	150.0	135.5	0.55

Notes

Other wattages available on request.

230 V 50 Hz – EC optimised ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm			W	W	mA	mA		mA	mA	μF		mm		mm	mm	kg
Linear and circular lamps																			
2x6	42	160	225	EC13		4.8	16.8	160	215	0.46	81	115	1.5	60/115	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13		4.4	18.6	145	215	0.56	90	140	1.5	60/115	27	2	84.5	76.0	0.33
13	95	165	525	EC13		5.0	18.0	165	215	0.47	87	119	1.5	60/115	27	2	84.5	76.0	0.33
18	57	370	600	EC18/20		12.0	30.0	370	430	0.35	145	177	4.0	70/105	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89002896	9.7	45.7	365	630	0.54	221	400	3.0	70/170	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20		12.0	31.3	370	430	0.37	151	185	4.0	70/105	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89002896	9.7	48.3	365	630	0.58	233	423	3.0	70/170	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89002896	12.0	48.0	405	630	0.52	232	379	3.5	70/170	50	1	150.0	135.5	0.55
40	103	430	1,200	EC36/40	89002896	12.0	51.5	405	630	0.55	249	406	3.5	70/170	50	1	150.0	135.5	0.55
Compact lamps																			
5	35	180	TC-S	EC9		6.2	11.6	180	187	0.28	56	61	3.0	60/85	27	1	84.5	76.0	0.33
2x5	35	180	TC-S	EC13		5.3	16.1	175	215	0.40	78	100	2.0	60/115	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9		6.0	13.1	175	187	0.33	63	71	2.0	60/85	27	1	84.5	76.0	0.33
2x7	47	175	TC-S	EC13		5.0	19.2	165	215	0.51	93	127	1.5	60/115	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9		5.7	14.4	165	187	0.38	69	83	2.0	60/85	27	1	84.5	76.0	0.33
2x9	60	170	TC-S	EC13		4.7	22.5	155	215	0.63	109	158	1.5	60/115	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13		5.6	15.6	185	215	0.37	75	92	2.0	60/115	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13		5.3	15.8	175	215	0.39	76	98	2.0	60/115	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9		5.3	17.1	155	187	0.48	83	105	1.5	60/85	27	1	84.5	76.0	0.33
13	91	175	TC-D	EC13		5.2	18.2	170	215	0.46	88	116	2.0	60/115	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13		5.2	18.2	170	215	0.46	88	116	2.0	60/115	27	2	84.5	76.0	0.33
18	100	220	TC-D	EC18H		7.2	25.2	220	280	0.50	122	163	2.0	70/130	27	1	84.5	76.0	0.33
18	58	375	TC-F	EC18/20		12.0	30.0	370	430	0.35	145	177	4.0	70/105	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20		12.0	30.0	370	430	0.35	145	177	4.0	70/105	50	1	150.0	135.5	0.55
18	100	225	TC-T	EC18H		7.2	25.2	220	280	0.50	122	163	2.0	70/130	27	1	84.5	76.0	0.33
2x18	58	375	TC-L	EC36/40	89002896	9.7	45.7	365	630	0.54	221	400	3.0	70/170	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20		10.7	34.7	345	430	0.44	168	220	3.5	70/105	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20		10.7	34.7	345	430	0.44	168	220	3.5	70/105	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20		9.2	35.2	315	430	0.49	170	244	3.0	70/105	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20		9.2	35.7	315	430	0.49	172	247	3.0	70/105	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20		9.2	37.6	315	430	0.52	182	260	3.0	70/105	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89002896	12.0	48.0	405	630	0.52	232	379	3.5	70/170	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40	89002896	12.0	48.0	405	630	0.52	232	379	3.5	70/170	50	1	150.0	135.5	0.55
36	110	430	TC-DD	EC36/40	89002896	12.0	50.5	405	630	0.54	244	398	3.5	70/170	50	1	150.0	135.5	0.55

Notes

Other wattages available on request.

240 V 50 Hz – EC optimised ballasts

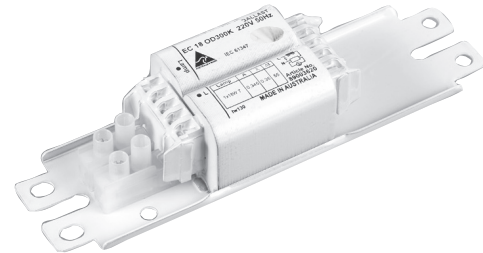
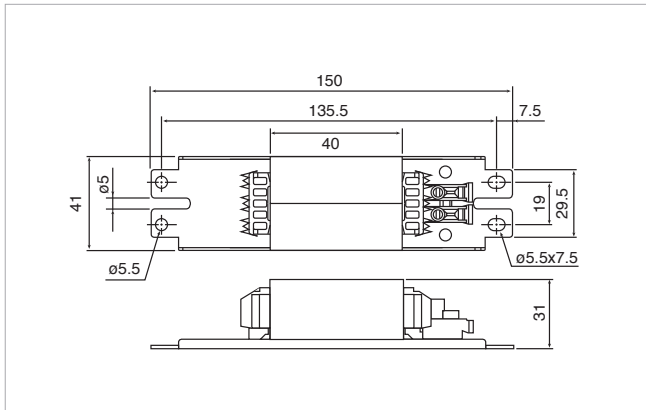
Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot W	input power W	lamp current mA	lamp start current mA	circuit P F cos φ	line current mA@0.9PF	line start current mA@0.9PF	capacitor μF@0.9PF	normal/abnormal Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	mA	mm																
Linear and circular lamps																			
2x6	42	160	225	EC13		5.3	17.3	160	215	0.45	80	113	1.5	60/115	27	2	84.5	76.0	0.33
2x8	56	145	300	EC13		4.8	19.0	145	215	0.55	88	137	1.5	60/115	27	2	84.5	76.0	0.33
13	95	165	525	EC13		5.5	18.5	165	215	0.47	86	117	1.5	60/115	27	2	84.5	76.0	0.33
18	57	370	600	EC18/20	89002968	12.8	30.8	370	425	0.35	143	172	4.0	70/105	50	1	150.0	135.5	0.55
2x18	57	370	600	EC36/40	89003304	10.2	46.2	365	625	0.53	214	385	3.0	70/170	50	1	150.0	135.5	0.55
20	57	370	600	EC18/20	89002968	12.8	32.1	370	425	0.36	149	179	4.0	70/105	50	1	150.0	135.5	0.55
2x20	57	370	600	EC36/40	89003304	10.2	48.8	365	625	0.56	226	406	3.0	70/170	50	1	150.0	135.5	0.55
36	103	430	1,200	EC36/40	89003304	12.5	48.5	405	625	0.50	225	364	3.5	70/170	50	1	150.0	135.5	0.55
40	103	430	1,200	EC36/40	89003304	12.5	52.0	405	625	0.53	241	390	3.5	70/170	50	1	150.0	135.5	0.55
Compact lamps																			
5	35	180	TC-S	EC9		6.7	12.1	180	187	0.28	56	61	2.0	60/85	27	1	84.5	76.0	0.33
2x5	35	180	TC-S	EC13		5.8	16.6	175	215	0.40	77	99	2.0	60/115	27	2	84.5	76.0	0.33
7	47	175	TC-S	EC9		6.5	13.6	175	187	0.32	63	71	2.0	60/85	27	1	84.5	76.0	0.33
2x7	47	175	TC-S	EC13		5.5	19.7	165	215	0.50	91	125	1.5	60/115	27	2	84.5	76.0	0.33
9	60	170	TC-S	EC9		6.1	14.8	165	187	0.37	69	82	2.0	60/85	27	1	84.5	76.0	0.33
2x9	60	170	TC-S	EC13		5.2	23.0	155	215	0.62	106	155	1.5	60/115	27	2	84.5	76.0	0.33
10	64	190	TC-D	EC13		6.2	16.2	185	215	0.36	75	91	2.0	60/115	27	2	84.5	76.0	0.33
10	72	180	TC-DD	EC13		5.8	16.3	175	215	0.39	76	98	2.0	60/115	27	2	84.5	76.0	0.33
11	91	155	TC-S	EC9		5.8	17.6	155	187	0.47	81	103	1.5	60/85	27	1	84.5	76.0	0.33
13	91	175	TC-D	EC13		5.7	18.7	170	215	0.46	86	115	1.5	60/115	27	2	84.5	76.0	0.33
13	91	175	TC-T	EC13		5.7	18.7	170	215	0.46	86	115	1.5	60/115	27	2	84.5	76.0	0.33
18	100	220	TC-D	EC18H		7.5	25.5	220	280	0.48	118	158	2.0	70/130	27	1	84.5	76.0	0.33
18	58	375	TC-F	EC18/20	89002968	12.8	30.8	370	425	0.35	143	172	4.0	70/105	50	1	150.0	135.5	0.55
18	58	375	TC-L	EC18/20	89002968	12.8	30.8	370	425	0.35	143	172	4.0	70/105	50	1	150.0	135.5	0.55
18	100	225	TC-T	EC18H		7.5	25.5	220	280	0.48	118	158	2.0	70/130	27	1	84.5	76.0	0.33
2x18	58	375	TC-L	EC36/40	89003304	10.2	46.2	365	625	0.53	214	385	3.0	70/170	50	1	150.0	135.5	0.55
24	87	345	TC-F	EC18/20	89002968	11.4	35.4	345	425	0.43	164	212	3.5	70/105	50	1	150.0	135.5	0.55
24	87	345	TC-L	EC18/20	89002968	11.4	35.4	345	425	0.43	164	212	3.5	70/105	50	1	150.0	135.5	0.55
26	105	325	TC-D	EC18/20	89002968	9.8	35.8	315	425	0.47	166	235	3.0	70/105	50	1	150.0	135.5	0.55
26	105	325	TC-T	EC18/20	89002968	9.8	36.3	315	425	0.48	168	238	3.0	70/105	50	1	150.0	135.5	0.55
28	108	320	TC-DD	EC18/20	89002968	9.8	38.2	315	425	0.51	177	251	3.0	70/105	50	1	150.0	135.5	0.55
36	106	435	TC-F	EC36/40	89003304	12.5	48.5	405	625	0.50	225	364	3.5	70/170	50	1	150.0	135.5	0.55
36	106	435	TC-L	EC36/40	89003304	12.5	48.5	405	625	0.50	225	364	3.5	70/170	50	1	150.0	135.5	0.55
38	110	430	TC-DD	EC36/40	89003304	12.5	51.0	405	625	0.52	236	383	3.5	70/170	50	1	150.0	135.5	0.55

Notes

Other wattages available on request.

EC lean ballasts

Figure 1
40 mm stack



- slim cross-section and compact
- for building into a luminaire, a box, or an enclosure
- low magnetic stray field
- long service life
- varnish impregnation
- non-audible noise level
- nomex class "H" gap for fixed calibration
- resistant to moisture and condensation
- 10 A push-in terminals for 0.5-1.5 mm² solid wires (or screw terminals for up to 2.5 mm² solid or stranded wires)
- maximum winding temperature tw130°C

100% final testing

- continuity
- winding short circuit
- core to coil high voltage test
- operating values

220 V 50 Hz, 220 V 60 Hz and 230 V 50 Hz – EC lean ballasts

Lamp				Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	length	type	article number	loss hot	input power	lamp current	lamp start current	circuit P F	line current	line start current	capacitor	normal/ abnormal	stack	figure	length	mtg centres	weight
W	V	mA	mm			W	W	mA	mA	cos φ	mA@0.9PF	mA@0.9PF	μF@0.9PF	Δt	mm		mm	mm	kg
220 V 50 Hz																			
Linear lamps																			
18	57	370	600	EC 18 OD100K	89003600	9.1	26.7	345	435	0.36	130	170	4.0	55/90	40	1	150.0	135.5	0.45
18	57	370	600	EC 18 OD300K *	89003620	9.1	26.7	345	435	0.36	130	170	4.0	55/90	40	1	150.0	135.5	0.45
36	103	430	1,200	EC 36 OD100K	89003587	8.0	40.1	370	830	0.49	200	467	3.5	45/200	40	1	150.0	135.5	0.45
36	103	430	1,200	EC 36 OD300K *	89003606	8.0	40.1	370	830	0.49	200	467	3.5	45/200	40	1	150.0	135.5	0.45
220 V 60 Hz																			
Linear lamps																			
18	57	370	600	EC 18 OD103K	89003601	8.8	26.6	350	435	0.35	190	145	3.5	55/90	40	1	150.0	135.5	0.45
18	57	370	600	EC 18 OD303K *	89003621	8.8	26.6	350	435	0.35	190	145	3.5	55/90	40	1	150.0	135.5	0.45
36	103	430	1,200	EC 36 OD103K	89003602	8.0	41.8	385	665	0.49	210	375	3.0	50/180	40	1	150.0	135.5	0.45
36	103	430	1,200	EC 36 OD303K *	89003623	8.0	41.8	385	665	0.49	210	375	3.0	50/180	40	1	150.0	135.5	0.45
230 V 50 Hz																			
Linear lamps																			
18	57	370	600	EC 18 OD101K	89003603	9.6	27.3	350	465	0.34	125	175	4.0	60/110	40	1	150.0	135.5	0.45
18	57	370	600	EC 18 OD301K *	89003622	9.6	27.3	350	465	0.34	125	175	4.0	60/110	40	1	150.0	135.5	0.45
36	103	430	1,200	EC 36 OD101K	89003604	8.8	39.6	360	650	0.49	185	355	3.5	55/200	40	1	150.0	135.5	0.45
36	103	430	1,200	EC 36 OD301K *	89003624	8.8	39.6	360	650	0.49	185	355	3.5	55/200	40	1	150.0	135.5	0.45

Notes

- Other wattages available on request.
- * With screw terminals



Magnetic ballasts for HID lamps

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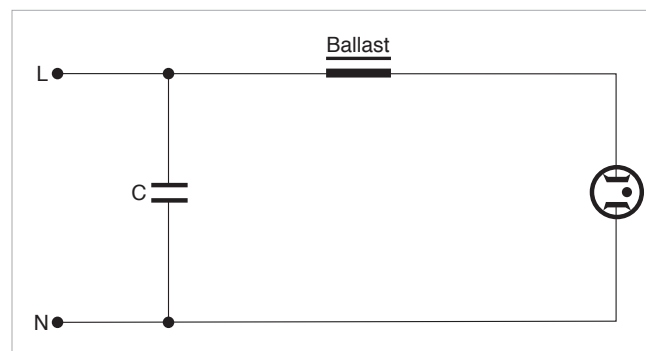
High-pressure mercury vapour (HM) lamps

The high-pressure mercury vapour (HM) lamps are used in a wide variety of applications.

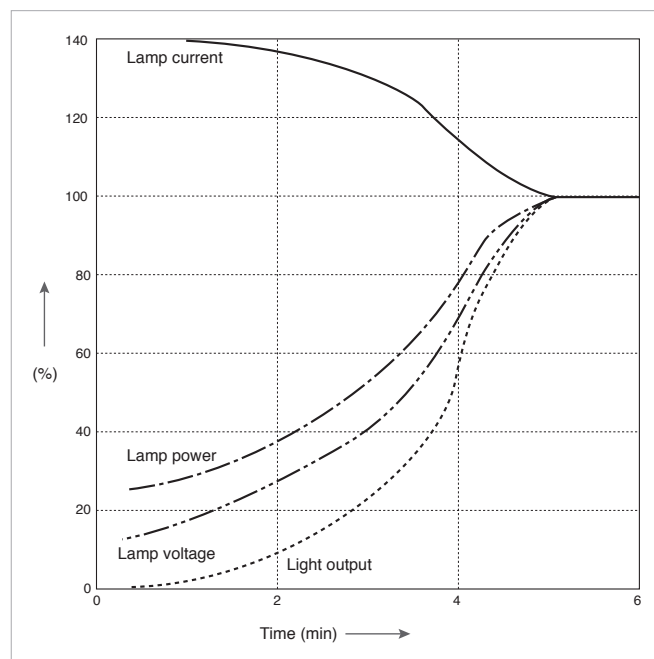
Ambient temperature has little, if any, effect on the performance of these lamps as the temperature in the discharge tube is usually over 500°C. Most high-pressure mercury vapour lamps will strike and operate from -30°C on standard control equipment. Once struck, the upper ambient temperature limit is determined by the maximum allowable lamp cap and bulb temperatures.

High-pressure mercury vapour lamps require a cooling period of approximately 5–10 minutes before they will reignite. These lamps are not affected by short-term mains voltage variations. However, prolonged operation at other than normal wattage should be avoided if full lamp life is expected. Stroboscopic effects should be minimised by operating adjacent lamps on different phases or using lead / lag control equipment. Flicker factors for good quality lamps should be 3% or less.

Single-voltage Circuit for Mercury Vapour Lamps



No ignitor is required for starting high-pressure mercury lamps. In order to achieve the performance values, 3 basic types of ballasts are offered and tapped versions which can be adjusted to various supply voltages are also available. With the aid of power tapplings on the ballasts, e.g. OMB 125/80, and a power switch, high-pressure mercury vapour lamps can be step-dimmed to 50% of the standard output.



Unlike fluorescent lamps, mercury vapour lamps require several minutes to develop full light output as shown by these starting curves for a 400W mercury vapour lamp

Metal halide (HI) Lamps

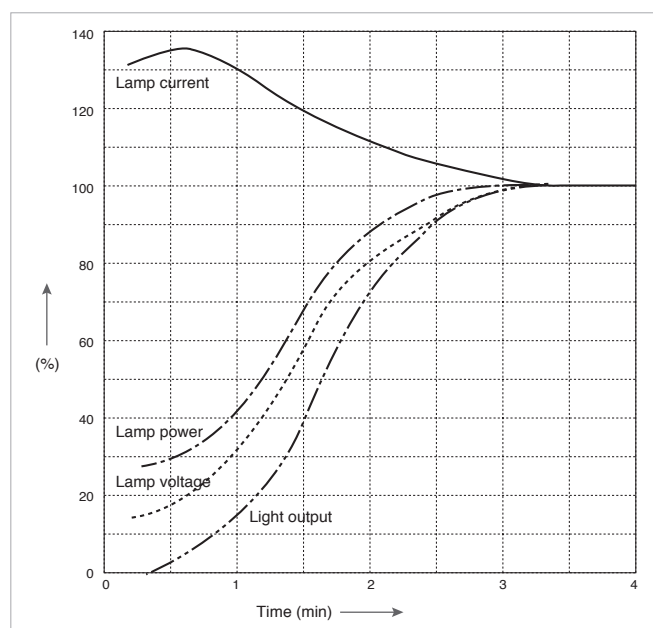
Metal halide (HI) lamps are similar in their construction to mercury vapour lamps. They are popular for their excellent colour rendering which is achieved by the inclusion of rare earth elements in the discharge tube.

Metal halide lamps are temperature sensitive and operate optimal at 100°C to 180°C ambient temperature and luminaires should be designed to provide suitable conditions. Ballasts must operate lamps from the correct supply voltage and their impedance should not vary more than $\pm 3\%$ from the specified value. The supply voltage should not deviate for extended periods of more than 3% of the nominal rated voltage of the ballast and the supply frequency should not deviate by more than $\pm 3\%$.

Metal halide lamps require higher voltages for starting than the usual supply voltages. Various circuits are used to achieve the required starting conditions. They are leakage reactance ballasts, constant wattage auto-transformer control equipment or series reactor type ballasts with ignitor. The latter is the most economical solution.

Most metal halide lamps will require an ignitor to start the discharge in the arc. The ignition voltage is generally 4.0–5.0 kV peak for a cold start with the lamps requiring a cooling period of between 10–15 minutes before they will re-ignite. Certain lamps are capable of hot re-ignition in which cases voltages of up to 35 kV peak are required. Some of the higher wattage 2,000 and 3,500 W lamps can require hot instant re-strike voltages of up to 60 kV peak.

Note: Not all makes and/or types of metal halide lamps can be operated on ignitor circuits—consult the lamp manufacturer or CMP for information on lamp control gear compatibility.



Similar to the mercury vapour lamps, metal halide lamps also require several minutes to develop full light output as is illustrated by the starting curves for a 400W metal halide lamp

Control Gear Protection for Compact Metal Halide Lamps

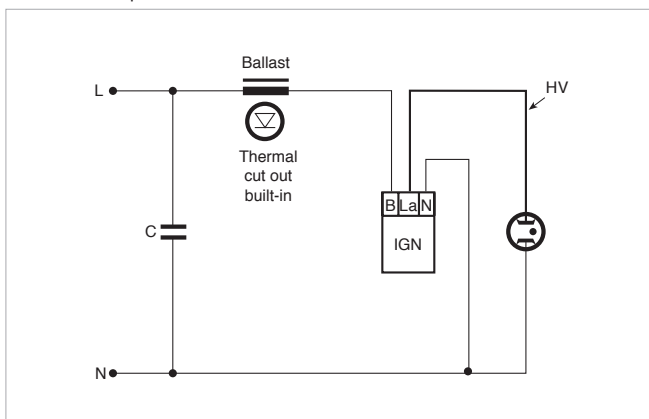
The concentrated optics of short-arc metal halide lamps are ideal for compact luminaire designs, particularly in ratings of 20, 35, 70 and 150 W. However, as some of these particular type of metal halide lamps age, they may become polarised. The polarisation superimposes a d.c. component on the a.c. lamp current. The combination of the a.c. and d.c. components results in a higher than normal current to flow (up to three times the nominal current) causing overheating of the control equipment.

Because of this characteristic, the IEC International Standards have published data on short-arc metal halide lamps which states: “Because of the possible risk of abnormal operating conditions that may occur at the end of lamp life which can lead to ballast overloading, suitable protected circuits shall be used for operation of this lamp.”

Circuit protection can be provided in a number of ways. However, the most common is a self-resetting thermal cut-out against the ballast winding. This switches the circuit off when the temperature of the ballast increases beyond the maximum permissible winding temperature. Once the device cools down, the lamp will re-ignite and the circuit will continue to cycle. Bearing in mind that the polarisation tends to occur at the end of lamp life, replacement of the lamp at the end of rated life will ensure that the control equipment is not abnormally stressed, even though the circuit may be protected.

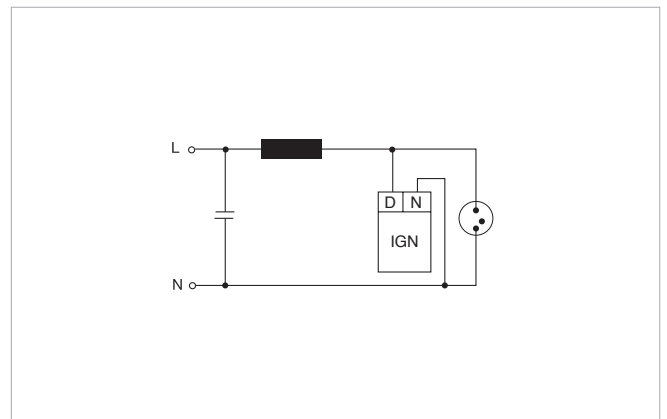
Single-voltage Circuit

With superimposed-pulse ignitor for short-arc metal halide lamps



Parallel Pulse Circuit

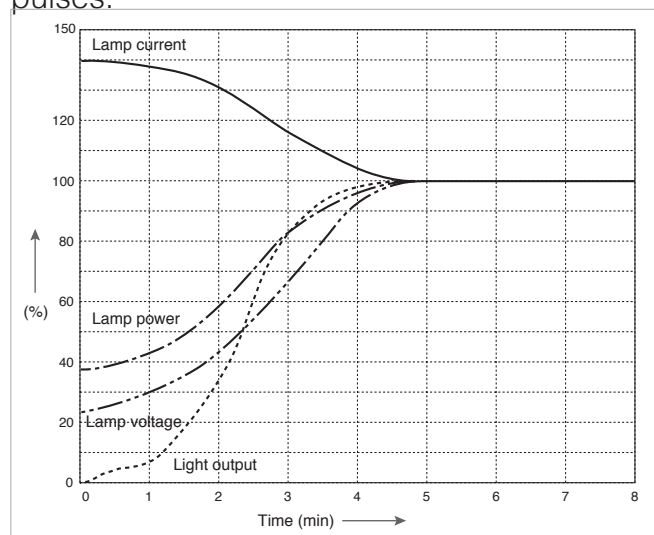
For metal halide lamps up to 1kV_p ignition voltage



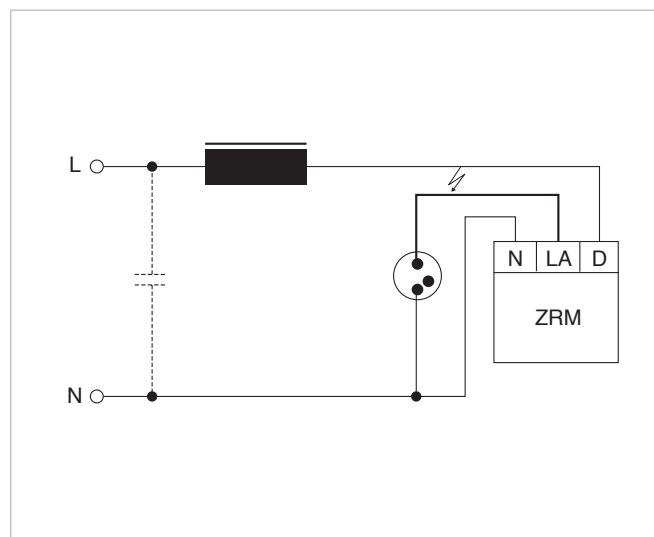
High pressure sodium (HS) lamps

High pressure sodium (HS) lamps can operate satisfactorily from -30°C to 100°C on series reactor ballast circuits, but precautions against increase arc tube voltage, due to thermal back radiation when mounted in luminaires should be considered. Only a typical 10 volt increase in lamp voltage is tolerable.

Standard lamps will re-ignite after 60 to 90 seconds with an ignition voltage of 2.5–5.0 kV peak for cold start depending on the lamp specifications. High pressure sodium lamps can only be re-ignited hot if they are of linear double ended construction because hot re-strike requires 18 to 25 kV peak starting pulses.



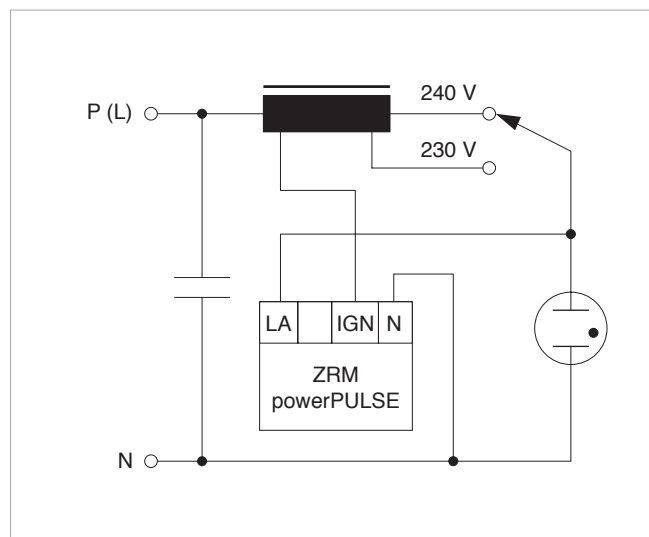
Run-up to full light output takes approximately 4 minutes from a cold start as is illustrated by the starting curves of a 400 W high pressure sodium lamp



Single-voltage circuit with superimposed-pulse ignitor for sodium vapour lamps and metal halide lamps

High pressure sodium lamps are most commonly used in a series reactor ballast and ignitor circuit. The lamp power and discharge tube temperature are highly dependent upon the lamp voltage.

It is therefore important that the mains voltage does not exceed 105% of the nominal rated voltage of the ballast for extended periods. The ballast should exhibit a closely controlled current / voltage characteristic to prevent the lamp from exceeding the maximum power limit as it ages and the lamp voltage rises.

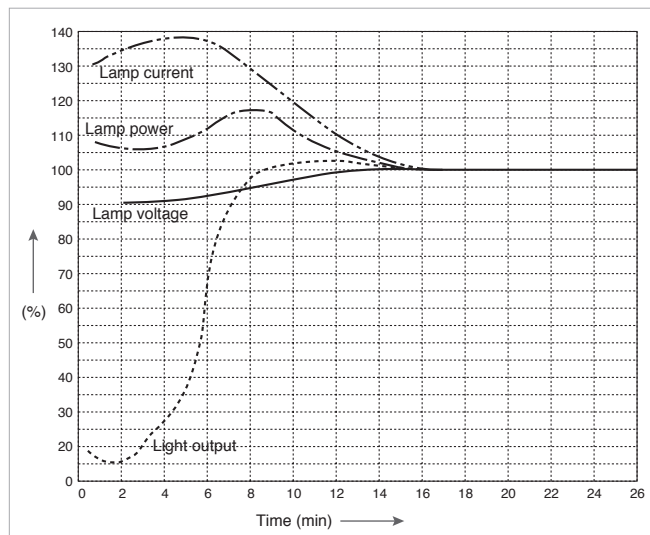


Multi-voltage circuit with pulse ignitors ZRM 4000 powerPULSE for sodium vapour lamps and metal halide lamps

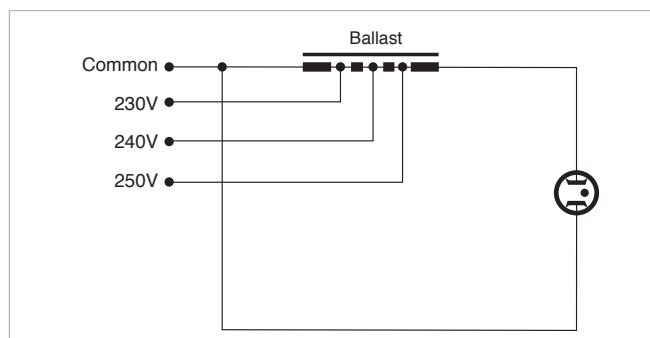
Low pressure sodium (LPS) lamps

Low pressure sodium (LPS) lamps are the most efficient of the common HID lamps. However, their main drawback is the monochromatic light output at 590 nm (yellow). Low pressure sodium lamps require voltages from 390 to 670 V (ballast open-circuit voltage) for ignition

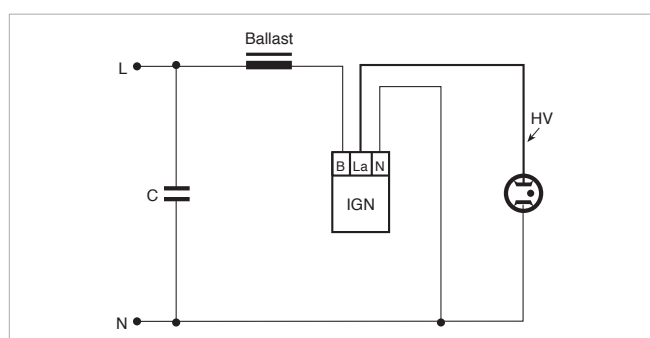
and are therefore operated on leakage reactance ballasts or on series reactor ballasts with an ignitor. The latter system is only suitable for lamp ratings up to 100 W on 240 V supply.



Typical starting curves for a 90W low pressure sodium lamp. These lamps re-strike immediately after a mains consumption.



Leakage reactor ballast circuit for LPS lamps



Superimposed-pulse ignitor circuit for LPS lamps

Magnetic ballasts for HID lamps

Ballasts are required to operate high-intensity discharge lamps. Magnetic ballasts work on the self-inductance principle and limit lamp current and lamp wattage with a high level of efficiency. The impedance of the ballast is set to match the particular type of lamp, which ensures that the correct lamp performance is achieved.

In some cases, a ballast can be used for more than one lamp. Supply voltage and supply frequency influence ballast requirements and so the operating devices should be matched to the current supply voltage. It is possible to expand the scope of application by using ballasts with several voltage tapings.

Optimum Performance

Optimum performance is achieved by careful control of the main parameters. The tight tolerances used in manufacture ensure that the correct lamp current, the correct wattage and the expected luminous flux are achieved.

Minimum Consumption

An inefficient ballast means high losses and has a dramatic effect on the overall efficiency.

Technical Specific Data

The hot losses specified in the technical data is an indicative figure, measured at 25°C and at nominal lamp current according to IEC 61347-1. Furthermore, the circuit power is calculated by adding the nominal lamp power and the ballast losses.

Minimum Stray Field

CMP ballasts are designed to keep the stray field to a minimum. This considerably reduces the noise generated near to magnetically sensitive parts as well as magnetic influences on sensitive parts.

National and International Test Marks

CMP ballasts are approved by national and international test houses. Standard ballasts for the European market are all ENEC-approved without exception.

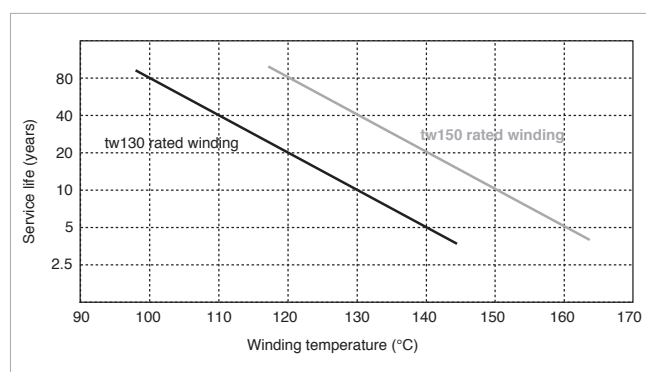
Consistent High Quality

Our Quality Assurance system, based on AS/NZS ISO 9001, guarantees consistent high quality. CMP's Quality Assurance department monitors all incoming materials, performs continuous production tests and 100% of our finished products are comprehensively tested.

Maintenance-free Long Service Life

CMP HID ballast windings are designed and constructed using Class H insulation materials, the tw130 (or in some OG models, tw150) rated winding ensuring maximum service life. In normal operation, in a 40°C ambient temperature, probable service life of more than 50 years could be expected.

The graph shows the theoretical service life of a CMP HID ballast. Even when arduously operated at the maximum recommended temperature, more than 10 years service life can be expected. Every 10°C over maximum winding temperature of 130°C (or 150°C) halves ballast life. The winding temperature is the ambient temperature plus Δt , the temperature rise, which is a function of ballast power consumption.



The manufacturing technique used by CMP is to varnish impregnate the ballast with an unsaturated polyester resin. Typical characteristics are thermal class "H" (180°C IEC 60085). Varnish impregnation improves quality and longevity because the resin is drawn into the heart of the core and coil. This maximises heat transfer and also ensures silent operation.

Based on the concept of thermal conduction, varnish impregnation eliminates air pockets within the ballast winding, maximising heat transfer. The surface temperature of a varnish impregnated ballast may be higher than one which is simply dipped in resin. However, the winding temperature of a varnish impregnated ballast will be correspondingly lower because of the insulation system's optimised ability to transfer the heat from the coil to the core, resulting in a longer service life in comparison. Reducing the ballast winding temperature by 10°C will effectively double its service life.

The high quality and reliability of insulated conductors is dependent not only on the production process, but also on the choice of raw materials. Many years of experience, both as a user and manufacturer of enamelled winding wire, has given CMP the knowledge and expertise to select the best raw materials from internationally approved suppliers.

The copper is made from a high conductivity hot rolled copper rod and complies with the chemical composition limits and resistivity requirements of International Registered Alloy Designation 110.

Critical attention is paid to the enamel as the material utilised to insulate the conductor. Choice of enamel is a key factor and is linked both to the enameling system as well as the electrical, mechanical and technical characteristics of the finished product. The insulation enamels specified by CMP Controls are supplied by internationally approved manufacturers specialising within this field. Class H+ (200°C) insulation is used in all CMP ballasts.

Constant wattage ballasts for HID lamps

Modern HID lighting has the potential of offering high efficiency, a wide choice of colour characteristics and long service life. However, given variations in mains supply voltage, a slight compromise in lamp performance will occur when using standard reactor-ignitor control equipment.

Disadvantages of Standard Reactor-ignitor Control Equipment:

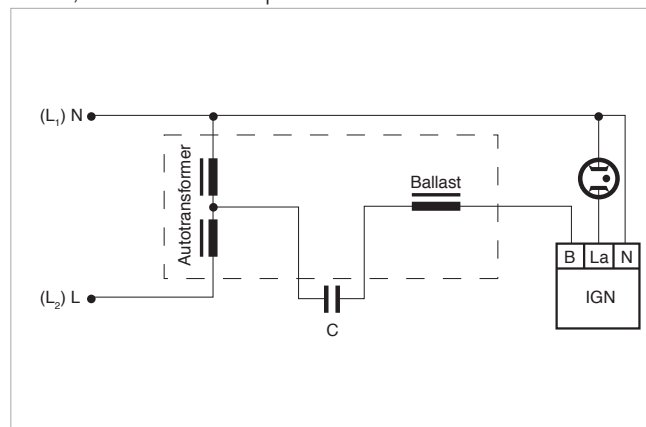
- Lumen output and colour temperature variations with changes in supply voltage
- Extinction of a HID lamp due to severe supply voltage dip of more than a few cycles followed by the resultant long restrike period
- High starting currents which require large feeder cable sizes together with sequenced switching for large installations
- Mains capacitors for power factor correction resulting in a low input impedance to high frequency mains switching signals
- High capacitor inrush current at switch on
- Abnormally high supply voltage may result in overrunning the lamp, shortening lamp life

Benefits of Using Constant Wattage Control Equipment:

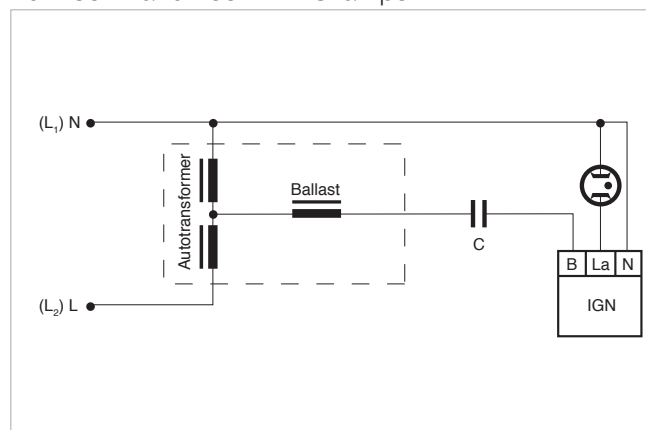
- Greater control of lumen output and colour temperature over $\pm 10\%$ variations in supply voltage
- Reduction in lamp flicker
- Will sustain lamp operation with substantial dips in supply voltage
- Low line starting current
- High power factor characteristic >0.95
- High input impedance to supply switching frequencies

Typical Constant Wattage Circuits

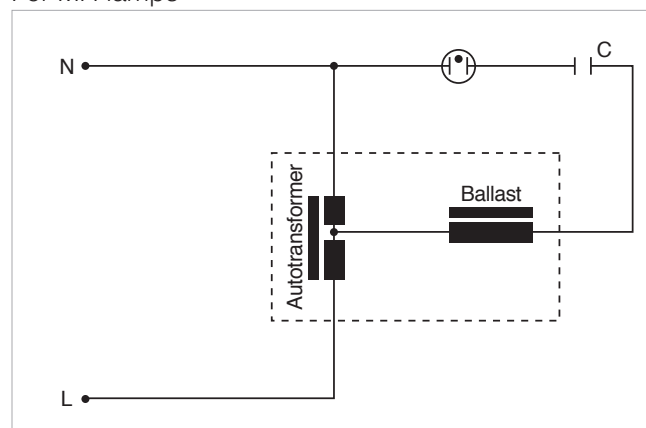
For 1,000 W HPS lamps



For 250 W and 400 W HPS lamps



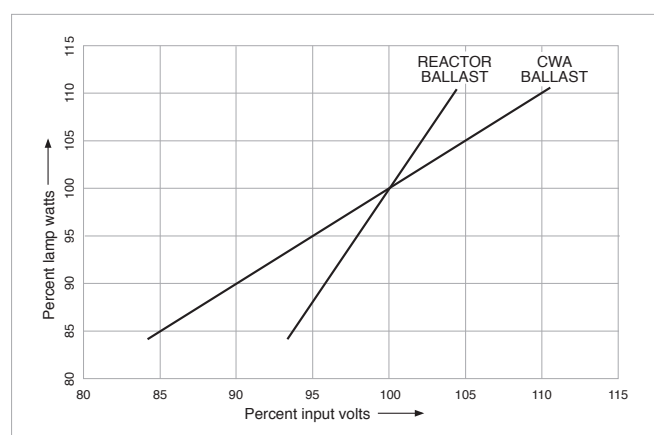
For MH lamps



The constant wattage circuit consists of an autoleak transformer ballast with a matching capacitor in series with the lamp. The capacitor takes part in the regulation of the lamp current and corrects the power factor. The capacitor also prevents the occurrence of the so-called rectifying effect at the end of lamp life.

The main benefit of constant wattage control equipment is that the degree of regulation is capable of holding average lamp watts closer to nominal, even with varying primary voltage. This circuit can be used with as much as 10% input voltage variation, keeping the lamp wattage within acceptable tolerances. A reactor ballast can only accommodate a maximum of 4% input voltage variation to keep the lamp within the same acceptable tolerance.

Constant wattage control equipment offers reliable starting and run-up of the lamp through a higher than supply RMS value. It also provides favourable operating conditions for the lamps. However, the system does have its disadvantages, being lossier and physically larger and heavier than comparable reactor ballasts.



Constant wattage control equipment is being increasingly specified in areas that require consistent / nominal lamp performance. Examples are lighting for sports, heavy industry lighting and mining sites, particularly in installations where there is a likelihood of supply voltage disturbances.

Application note

Check physical size and thermal performance when retrofitting and/or new designs. Constant wattage control equipment is physically larger than standard control equipment and has higher losses generating more heat.

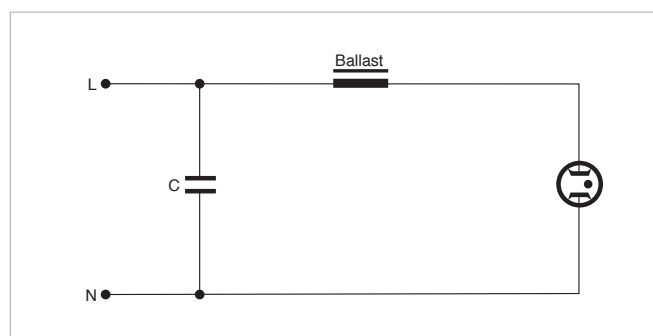
Special features of CMP Ballasts

- Maximum winding temperature $t_w = 130^\circ\text{C}$
- $\pm 3\%$ selected premium grade long life capacitor rated for 100°C case temperature
- Class H insulation
- Vacuum impregnation
- 100% final testing
- Long service life
- Designed and manufactured in accordance with and compliance to relevant Australian and International Standards, ANSI C78, IEC 61347 and IEC 60923

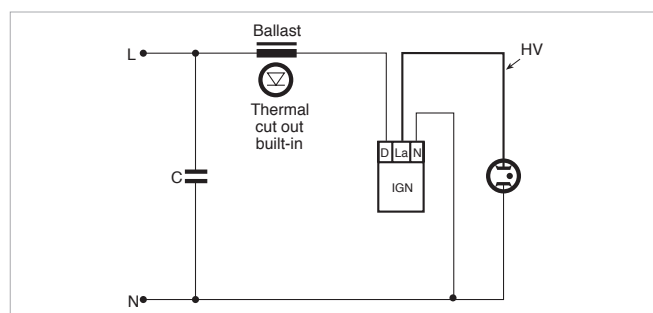
Line voltage (V)	Standard CWA ballast CWMH400-19		Reactor ballast OGB400-100	
	Line power (W)	Lamp power (W)	Line power (W)	Lamp power (W)
200	385	342	284	267
210	403	357	324	304
220	422	372	360	337
230	441	387	395	369
240	459	400	429	400
250	475	412	463	430
260	490	422	498	459

Technical tips for HID reactor / ignitor circuits

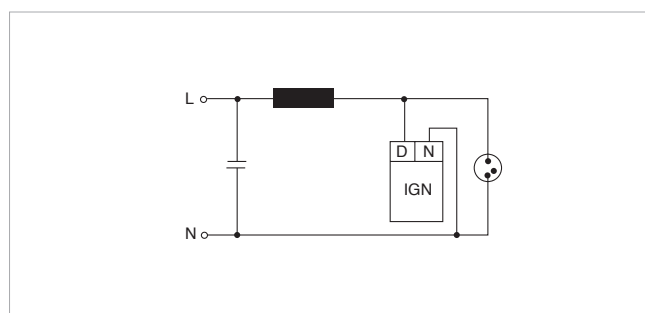
Symptom	Possible fault	Test and remedy
Lamp intact but will not light	Failed lamp	Replace lamp
	Supply fault	Check supply volts and circuit fuse
	Wiring fault	Check for loose connections and correct connections to ignitor
		Check that insulation of cable between ballast or ignitor and lamp is sound
		Look for signs of breakdown due to ignitor high voltage pulses
		Check that cable length between ignitor and lamp are within limits specified
	Ignitor fault	Check with ignitor tester or remove ignitor and try another
	Ballast fault	Disconnect ignitor. Check for mains volts at ballast output terminal
Try substitute ballast		
Low light output	Low lamp power	Check supply voltage is correct
		Check correct compatible ballast is in use
	Failing lamp	Try another lamp
	Wiring	Check circuit is correctly wired, that all connections are tight and lamp is making contact in holder
Light output unstable or fluctuating	Unsuitable fitting	Check that fitting is recommended for the lamp, eg. high pressure sodium lamp voltage may rise and cause extinction
	Failing lamp	Replace lamp



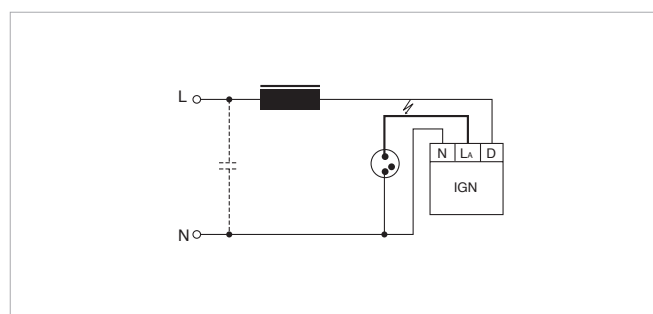
Single-voltage circuit for mercury vapour lamps



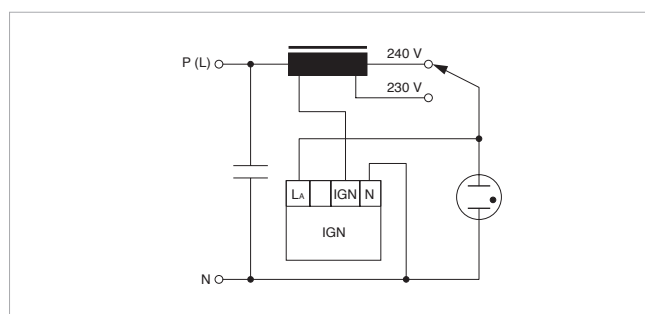
Single-voltage circuit with superimposed-pulse ignitor for short-arc metal halide lamps



Parallel pulse circuit for metal halide lamps up to 1 kV_p ignition voltage



Single-voltage circuit with superimposed-pulse ignitor for sodium vapour lamps and metal halide lamps



Multi-voltage circuit with pulse ignitors for sodium vapour lamps and metal halide lamps

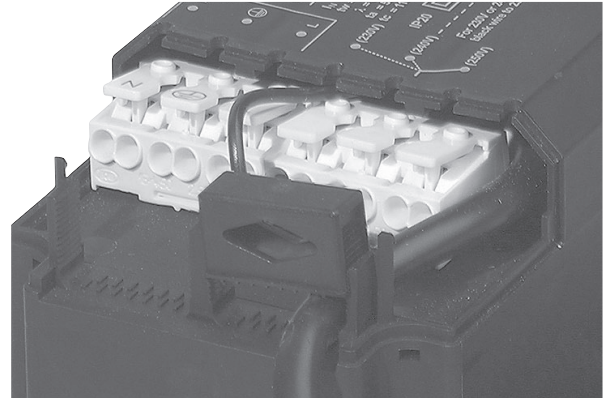
Remote assemblies for high-intensity discharge lamps

The OM PAK assemblies from CMP combine choke, ignitor, p.f. correction capacitor and terminals in a compact casing. These independent units in safety class 2 are very easy to install. No tools are needed at all, so they save an enormous amount of time on site.

All the assemblies for operating metal halide lamps or sodium lamps are generally temperature-protected and are suitable for mounting on normally flammable material (fire category F).

The robust design also means that the units can be used at high ambient temperatures (t_a). The compact casing design results in exceptionally quiet operation.

The assemblies are available with or without prewired lamp cables. Screw terminals make it easy to connect to the mains. Quick fastening of the terminal covers and tool-less cable clamps add-up to efficient installation.



The ignitors used are an essential quality feature of the OM PAK series from CMP. There is a choice of two superimposed-pulse ignitors—the successful standard ZRM ES/C ignitor or the ZRM/CT ignitor with digital timer and pulse-pause operation.

With these different versions, CMP presents a rounded application-oriented range of OM PAK assemblies that ensure that high-intensity discharge lamps are operated in accordance with manufacturers' specifications.

50 W High-pressure mercury vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	H 50 ...	E27	95	0.60	–	EMV 50; OMB 50	OM PAK 50 Q
Iwasaki	HF50 PD	E27	95	0.61	–	EMV 50; OMB 50	OM PAK 50 Q
Osram	HQL 50	E27	95	0.62	–	EMV 50; OMB 50	OM PAK 50 Q
Philips	HPL-N50 W	E27	95	0.61	–	EMV 50; OMB 50	OM PAK 50 Q
Plusrite	MV50W/...	E27	95	0.62	–	EMV 50; OMB 50	OM PAK 50 Q
Radium	HRL50	E27	95	0.62	–	EMV 50; OMB 50	OM PAK 50 Q
Sylvania	HSL-BW50	E27	95	0.61	–	EMV 50; OMB 50	OM PAK 50 Q

80 W High-pressure mercury vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	H 80 ...	E27	115	0.80	–	EMV 80; OMB 80	OM PAK 80 Q
Iwasaki	HF 80 PD	E27	115	0.80	–	EMV 80; OMB 80	OM PAK 80 Q
Osram	HQL 80	E27	115	0.80	–	EMV 80; OMB 80	OM PAK 80 Q
Philips	HPL-N 80 W	E27	115	0.80	–	EMV 80; OMB 80	OM PAK 80 Q
Plusrite	MV80W/...	E27	110	0.85	–	EMV 80; OMB 80	OM PAK 80 Q
Radium	HRL 80	E27	115	0.80	–	EMV 80; OMB 80	OM PAK 80 Q
Sylvania	HSL-BW 80	E27	115	0.80	–	EMV 80; OMB 80	OM PAK 80 Q

125 W High-pressure mercury vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	H 125 ...	E27	125	1.15	–	EMV 125; OMB 125	OM PAK 125 Q
Iwasaki	HF 125 PD	E27, E40	125	1.15	–	EMV 125; OMB 125	OM PAK 125 Q
Osram	HQL 125	E27	125	1.15	–	EMV 125; OMB 125	OM PAK 125 Q
Philips	HPL-N 125 W	E27, E40	125	1.15	–	EMV 125; OMB 125	OM PAK 125 Q
Plusrite	MV125W/...	E27	125	1.15	–	EMV 125; OMB 125	OM PAK 125 Q
Radium	HRL 125	E27	125	1.15	–	EMV 125; OMB 125	OM PAK 125 Q
Sylvania	HSL-BW 125	E40	125	1.15	–	EMV 125; OMB 125	OM PAK 125 Q

175 W High-pressure mercury vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Sylvania	H39KC-175/DX	E39	130	1.50	–	OMB 175	–

250 W High-pressure mercury vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	H 250 ...	E40	130	2.15	–	OMB 250; OGB 250	OM PAK 250 Q
Iwasaki	HF 250 PD	E40	130	2.13	–	OMB 250; OGB 250	OM PAK 250 Q
Osram	HQL 250	E40	130	2.15	–	OMB 250; OGB 250	OM PAK 250 Q
Philips	HPL-N 250 W	E40	135	2.10	–	OMB 250; OGB 250	OM PAK 250 Q
Plusrite	MV250W/...	E40	130	2.15	–	OMB 250; OGB 250	OM PAK 250 Q
Radium	HRL 250	E40	130	2.15	–	OMB 250; OGB 250	OM PAK 250 Q
Sylvania	HSL-BW 250	E40	130	2.15	–	OMB 250; OGB 250	OM PAK 250 Q

400 W High-pressure mercury vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	H 400 ...	E40	135	3.25	–	OGB 400	–
Iwasaki	HF 400 PD	E40	135	3.25	–	OGB 400	–
Osram	HQL 400	E40	135	3.25	–	OGB 400	–
Philips	HPL-N 400 W	E40	140	3.25	–	OGB 400	–
Plusrite	MV400W/...	E40	135	3.15	–	OGB 400	–
Radium	HRL 400	E40	135	3.25	–	OGB 400	–
Sylvania	HSL-BW 400	E40	135	3.25	–	OGB 400	–

700 W High-pressure mercury vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	H 700 ...	E40	140	5.50	–	OGB 700	–
Iwasaki	HF 700 PD	E40	140	5.40	–	OGB 700	–
Osram	HQL 700	E40	140	5.40	–	OGB 700	–
Philips	HPL 700 W	E40	145	5.40	–	OGB 700	–

1,000 W High-pressure mercury vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	H 1000 ...	E40	145	7.50	–	OGB 1000	–
Iwasaki	HF 1000 PD	E40	145	7.50	–	OGB 1000	–
Osram	HQL 1000	E40	145	7.50	–	OGB 1000	–
Philips	HPL-N 1000 W	E40	145	7.50	–	OGB 1000	–
Radium	HRL 1000	E40	145	7.50	–	OGB 1000	–
	HRLV 1000	E40	145	7.50	–	OGB 1000	–
Sylvania	H34GW 1000 /DX	E39	135	8.00	–	OGB 1000	–
	H36GW 1000 /DX	E39	265	4.00	–	OGB 1000H	–
	HSL-BW 1000	E40	145	7.50	–	OGB 1000	–

20 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	CMH 20 ...	G8.5	90	0.23	–	–	–
	CMH 20 MR16	GX10	90	0.21	–	–	–
	CMH 20 Super Mini	GU6.5	90	0.21	–	–	–
Osram	HCI-TC 20	G8.5	100	0.23	–	–	–
	HCI-PAR 30 20	E27	90	0.22	–	–	–
	HCI-R111 20	GX8.5	100	0.22	–	–	–
	HCI-TF 20	GU6.5	90	0.22	–	–	–
Philips	CDM-R111 20 W	GX8.5	101	0.22	–	–	–
	CDM-TM 20 W	PGJ5	100	0.22	–	–	–
Radium	RCC-PAR20 20 W...	E27	100	0.23	–	–	–
	RCC-TC 20 ...	G8.5	100	0.23	–	–	–
Sylvania	Britespot ES50 20 W	GX10	100	0.22	–	–	–
	CMI-TC 20 W/SB	G8.5	100	0.20	–	–	–

35 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	C-HIT 35	G12	95	0.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
GE	CMH 35/...	E27, G8.5, G12, GX10, RX7S	90	0.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
Osram	HCI-E/P 35	E27	90	0.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	HCI-PAR ... 35	E27	90	0.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	HCI-R111 35	GX8.5	90	0.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	HCI-T 35...	G12	90	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	HCI-TC 35 W/WDL	G8.5	90	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
Philips	CDM-R 35 W	E27	88	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	CDM-R111 35 W	GX8.5	88	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	CDM-T 35 W	G12	88	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	CDM-TC 35 W	G8.5	88	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
Plusrite	CMP35W/...	E27, G8.5, G12, GX8.5, R7S	85	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
Radium	RCC-E/P 35	E27	90	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	RCC-PAR20 35 W...	E27	90	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	RCC-T 35	G12	90	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	RCC-TC 35 ...	G8.5	90	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
Sylvania	Britespot ES111 35 W	GX10	100	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	Britespot ES50 35 W	GX10	95	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	Britespot ESD50 35 W	GX10	95	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	CMI-PAR 20 35 W/SB	E27	90	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	CMI-PAR 30 35 W/SB	E27	90	0.53	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	CMI-T 35 W/SB	G12	90	0.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
	CMI-TC 35 W/SB	G8.5	90	0.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 35TH	OM PAK 35 M
Venture	HIE 35 /x/x	E27	95	0.53	ZRM 6-ES/C 3.5kV; AVS 100-DP*	EPS 35; OMS 35	–
	MH 35 ...	E26	85	0.47	ZRM 6-ES/C 3.5kV; AVS 100-DP*	EPS 35; OMS 35	–

* ballast with ignitor tap required

50 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	MXR/MVR 50	E26/27	85	0.68	ZRM 6-ES/C 3.5kV; AVS 100-DP	EMV 50; OMB 50	–
Plusrite	MP50W/...	E27	85	0.68	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EMV 50; OMB 50	–
Venture	MH 50 ... (M110)	E26	85	0.68	ZRM 6-ES/C 3.5kV; AVS 100-DP	EMV 50; OMB 50	–

* ballast with ignitor tap required

70 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	C-HIT 70 DE	RX7s	95	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	C-HIT 70 WW	G12	95	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HIE ... 70 ...	E27	95	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HIE-P 70	E27	95	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HIT 70 DE	RX7s	95	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
GE	ARC 70	G12, RX7s	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CMH 70/...	E27, G8.5, G12, RX7S	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH; OMS 70ATH	OM PAK 70 M
	MXR/MVR 70	E26/27	85	0.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 70	OM PAK 70 M
Iwasaki	MT 70 Color Arc	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-DP*	EPS 70ATH, OMS 70ATH	–
	MT 70 Color Arc	G12	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	MTD 70 Color Arc	RX7s	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
Osram	HCI-E/P 70 W/WDL	E27	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HCI-PAR 30 70 W/WDL	E27	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HCI-R111 70	GX8.5	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HCI-T 70...	G12	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HCI-TC 70 W/WDL	G8.5	95	0.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HCI-TS 70...	RX7s	95	0.96	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HCI-TT 70	E27	90	0.92	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HQI-E 70 W/WDL	E27	95	0.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HQI-T 70...	G12	95	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HQI-TS 70...	RX7s	95	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
Philips	CDM-ET 70 W	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-DP*	EPS 70ATH, OMS 70ATH	–
	CDM-R 70 W	E27	90	0.97	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CDM-R111 70 W	Gx8.5	83	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CDM-T 70 W	G12	88	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CDM-TC 70 W	G8.5	83	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CDM-TD 70 W	RX7s	92	0.97	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CDM-TT 70 W	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-DP*	EPS 70ATH, OMS 70ATH	–
	CDO-ET 70 W	E27	87	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-DP*	EPS 70ATH, OMS 70ATH	–
	CDO-TT 70 W	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-DP*	EPS 70ATH, OMS 70ATH	–

70 W Metal halide lamps (cont'd.)

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Plusrite	MHN-TD 70 W	RX7s	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	MHW-TD 70 W	RX7s	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CMP70W/...	E27, G8.5, G12, GX8.5, R7S	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH; OMS 70ATH	OM PAK 70 M
	MH70W/...	E27, G12	90/85	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH; OMS 70ATH	OM PAK 70 M
	MHDE70W/...	R7S	85	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH; OMS 70ATH	OM PAK 70 M
	MP70W/...	E27	85	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH; OMS 70ATH	OM PAK 70 M
Radium	HRI-E 70 W...	E27	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HRI-T 70...	G12	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HRI-TS 70...	RX7s	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	RCC-E/P 70	E27	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	RCC-PAR30 70 W...	E27	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	RCC-T 70	G12	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	RCC-TC 70 ...	G8.5	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	RCC-TS 70	RX7s	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	RCC-TT 70...	E27	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
Sylvania	Britespot DE 70 ...	RX7s	95	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	Britespot ESD111 70 ...	GX10	100	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CMI-MCP 70 W PAR 38	E26	88	0.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 70	OM PAK 70 M
	CMI-MP 70 W/SB	E27	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CMI-PAR 30 70 W/SB	E27	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CMI-T 70 W/SB	G12	100	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	CMI-TT 70 W/SB	E27	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HSI-MP 70 W	E27	95	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HSI-T 70 W	G12	95	0.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	HSI-TD 70 W	RX7s	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	MP 70 W PAR 38	E26	85	0.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 70	OM PAK 70 M
Venture	HIE 70 /x/x	E27	85	0.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 70	OM PAK 70 M
	HIPE 70 /x/x	E27	85	0.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 70	OM PAK 70 M
	MH 70 / ... (M98)	E26	85	0.91	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 70	OM PAK 70 M
	MH-DE 70 / ... (M85)	RX7s	95	0.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	EPS 70ATH, OMS 70ATH	OM PAK 70 M
	MS 70 / ... (M98)	E26	85	0.91	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 70	OM PAK 70 M

* ballast with ignitor tap required

100 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	HIE 100	E27	95	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	MHR 100	plug	95	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
GE	CMH 100...	E27	100	1.15	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	MXR 100	E27	95	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
Osram	HQI-E 100 W/WDL...	E27	95	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	HQI-EP 100 W/WDL	E27	95	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
Philips	CDO-ET 100 W	E40	90	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	CDO-TT 100 W	E40	95	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
Plusrite	MP100W/...	E27	100	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
Radium	HRI-E 100 W...	E27	90	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
Sylvania	CMI-MCP PAR 38 100 W/SB...	E26	100	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	CMI MP 100 W/SB...	E27	100	1.15	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	HSI-MP 100 ...	E27	100	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	MP PAR 38 100 W...	E26	100	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
Venture	HIE 100 /x/x	E27	100	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	HIPE 100/x/x	E27	100	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	MH 100 /... (M90)	E26	100	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	MH-DE 100 (M90)	RX7s	100	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M
	MS 100 (M90)	E26	100	1.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMH 100TH	OM PAK 100 M

* ballast with ignitor tap required

150 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	C-HIT 150 DE	RX7s	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	C-HIT 150 WW	G12	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HIE 150	E27	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HIT 150	E40	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HIT 150 DE	RX7s	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MHR 150	plug	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
GE	ARC 150...	G12; RX7s	105-110	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CMH 150	E27, G12, RX7s	95-105	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MBI 150 /T	G12	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MXR/MVR 150	E26/27	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
Iwasaki	MT 150 CEH-W/BU	E27	95	1.90	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-DP*	OMS 150TH, OGS 150TH	–
	MT 150 Color Arc	E27	95	1.90	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-DP*	OMS 150TH, OGS 150TH	–

150 W Metal halide lamps (cont'd.)

Lamps					Igniters	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Osram	MT 150 Color Arc	G12	95	1.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MTD 150 Color Arc	RX7s	95	1.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HCI-E/P 150 W/WDL	E27	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HCI-T 150...	G12	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HCI-TS 150...	RX7s 24	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HCI-TT 150	E40	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH; OGS 150TH	OM PAK 150 M
	HQI-E 150...	E27	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HQI-R 150...	plug	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HQI-T 150...	G12	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HQI-TS 150...	RX7s 24	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HTI 150 W (Display Optics)	GY9.5	90	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
Philips	CDM-ET 150 W	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CDM-SA/T 150 W	G12	96	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CDM-T 150 W	G12	96	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CDM-TD 150 W	RX7s	96	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CDM-TT 150 W	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CDO-ET 150 W	E40	93	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CDO-TT 150 W	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MHN-TD 150 W	RX7s	98	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MHW-TD 150 W	RX7s	96	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
Plusrite	CMP150W/...	G12	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH; OGS 150TH	OM PAK 150 M
	MH150W/...	E27, G12	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH; OGS 150TH	OM PAK 150 M
	MHDE150W/...	R7S	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH; OGS 150TH	OM PAK 150 M
	MP150W/...	E27	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH; OGS 150TH	OM PAK 150 M
Radium	HRI-E 150...	E27	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HRI-T 150...	G12	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HRI-TS 150...	RX7s	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	RCC-E/P 150...	E27	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH; OGS 150TH	OM PAK 150 M
	RCC-T 150...	G12	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	RCC-TS 150...	RX7s	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	RCC-TT 150...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH; OGS 150TH	OM PAK 150 M
Sylvania	Britespot DE 150...	RX7s	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CMI-MCP PAR 38 150 W	E26	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CMI-MP 150 W	E27	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	CMI-T 150 W/SB	G12	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M

150 W Metal halide lamps (cont'd.)

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
	CMI-TT 150 W/SB	E40	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HSI-MP 150 W	E27	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HSI-T 150 W...	G12	95	1.82	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HSI-TD 150 W...	RX7s	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MP PAR 38 150 W	E26	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
Venture	HIE 150/x/x	E27, RX7s	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HIPE 150/x/x	E27, RX7s	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	HIT 150 W/U/LU/T38/4K	E27	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MH 150 /... /LV	E26	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M
	MH 150 /... (M102)	E26	95	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMS 150TH, OGS 150TH	OM PAK 150 M

* ballast with ignitor tap required

175 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	MVR/MXR 175 /E	E26/E27	135	1.40	–	CWMH 175	–
					ATIG-14; AH 002-D; NP 603	OMB 175	–
Iwasaki	M 175 X/U	E40	130	1.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMB 175	–
Osram	MI 175 /C/U	E40	130	1.50	–	CWMH 175	–
					ATIG-14; AH 002-D; NP 603	OMB 175	–
Plusrite	MP175W/...	E27	132	1.50	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-DP*	OMB 175	–
Sylvania	M 175	E27, E39	132	1.50	–	CWMH 175	–
	MP 175 ...BU	EX39	132	1.50	–	CWMH 175	–
	MS 175 ...HOR	E39POM	132	1.50	–	CWMH 175	–
	MS 175 ...PS	E39	132	1.50	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OMB 175	–
Venture	MH 175 /... (M57)	E39	130	1.50	–	CWMH 175	–
	MH 175 /MED	E26	130	1.50	ATIG-14; AH 002-D; NP 603	OMB 175	–
					–	CWMH 175	–
					ATIG-14; AH 002-D; NP 603	OMB 175	–

* ballast with ignitor tap required

200 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Venture	MP 200 /.../PS	E39	132	1.60	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OMH 200	–
	MS 200 /.../PS	E39	132	1.60	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OMH 200	–

* ballast with ignitor tap required

250 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	HIT 250...	E40, Fc2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
GE	ARC 250...	E40, Fc2	110	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	CMH 250 ...	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	MVR 250	E40	133	2.10	–	CWMH 250	–
Iwasaki	MF 250 LSH	E40	130	2.13	–	OMB 250, OGB 250	–
	MF 250 X/U	E40	130	2.13	–	CWMH 250	–
					ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	MT 250	E40	130	2.13	–	OMB 250, OGB 250	–
	MT 250 –BH	E40	130	2.13	–	CWMH 250	–
					ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	MT 250 Color arc	E40	130	2.13	–	OMB 250, OGB 250	–
	MT 250 LSH	E40	130	2.13	–	OMB 250, OGB 250	–
Osram	HCI-E 250 W/...	E40	95	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HCI-TM 250	G22	101	2.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HCI-TS 250	FC2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HQI-E 250 /D	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HQI-E 250 W/N/SI	E40	133	2.15	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HQI-E/P 250W/D	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HQI-T 250 /D	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HQI-T 250 W/N/SI	E40	133	2.15	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HQI-TS 250 W/...	Fc2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	MI 250/.../U	E40	133	2.10	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
Philips	CDM-T 250 W	G12	93	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	CDM-TT 250 W	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	HPI plus 250 W +	E40	128	2.15	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HPI-T 250 W +	E40	128	2.15	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HPI-T plus 250 W +	E40	128	2.15	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	MH 250 W	E40	133	2.10	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	MHN-TD 250 W	Fc2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
Plusrite	MH250W/...	E40	130	2.15	ATIG-14; AH 002-D; NP 603	OMB 250; OGB 250	–
	MHDE250W/...	FC2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	MP250W/.../PS/...	EX39	133	2.10	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OMB 250; OGB 250	–
	MP250W/...	E40	130	2.15	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMB 250; OGB 250	–
Radium	HRI-E 250 W/D	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HRI-E 250 W/NSI	E40	130	2.10	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HRI-E/P 250..	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HRI-T 250 W/D	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	HRI-T 250 W/N/SI	E40	130	2.10	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HRI-TS 250 ...	Fc2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	RCC-E 250...	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	RCC-T 250 W/D	E40	100	3.00	ZRM 2.5-ES/CT, ZRM 4.5-ES/CT	OGS 250TH	–
	RCC-TM 250...	G22	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250TH	–
	RCC-TS 250 ...	Fc2	100	3.00	ZRM 2.5-ES/CT, ZRM 4.5-ES/CT	OGS 250TH	–
Sylvania	CMI-TT 250 W/G22/SB	G22	95	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	CMI-TT 250 W/SB	E40	105	2.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	HSI-HX 250 ...	E40	130	2.10	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HSI-SX 250 /P...	E40	100	2.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–

250 W Metal halide lamps (cont'd.)

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
	HSI-T 250 /6K...	E40	98	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	HSI-TD 250 ...	Fc2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*C	OGS 250	–
	HSI-THX 250 ...	E40	130	2.10	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HSI-TSX 250 ...	E40	100	2.90	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	M 250 ...U	E39	133	2.10	–	CWMH 250	–
					ZRM 6-ES/C 3.5 kV; AVS 100-D*; AVS 100-DP*	OMB 250, OGB 250	–
	MP 250 ...BU	EX39	133	2.10	–	CWMH 250	–
	MP 250 ...PS	EX39	133	2.10	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OMB 250, OGB 250	–
	MS 250 ...HOR	E39POM	133	2.10	–	CWMH 250	–
	MS 250 ...PS	E39	133	2.10	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OMB 250, OGB 250	–
Venture	HIE 250 /LU/x	E40	95	3.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	HIE 250 /x/x/EURO/x	E40	133	2.10	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	HIT 250 /LU/x	E40	95	3.10	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	HIT 250 /x/x/EURO/x	E40	133	2.10	ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	MH 250 /... (M58)	E39	133	2.10	–	CWMH 250	–
					ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	MH-DE 250 (M80)	Fc2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OFB 250, OGS 250	–
	MP 250 /N/.../PS	E39	133	2.10	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OMB 250, OGB 250	–
	MS 250 /... (M58)	E39	133	2.10	–	CWMH 250	–
					ATIG-14; AH 002-D; NP 603	OMB 250, OGB 250	–
	MS 250 /.../PS	E39	133	2.10	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OMB 250, OGB 250	–

+ can also be operated with HPS gear

* ballast with ignitor tap required

320 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Plusrite	MP320W/...	EX39	135	2.63	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 320	–
Sylvania	MP 320/350 ...PS	EX39	132	2.60	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 320	–
	MS 320 ...PS	E39	135	2.63	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 320	–
Venture	MP 320 /N/.../PS	E39	135	2.63	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 320	–
	MS 320 /.../PS	E39	135	2.63	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 320	–

* ballast with ignitor tap required

350 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Plusrite	MP350W/...	EX39	135	2.80	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 350	–
	MS350W/...	E39	135	2.80	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 350	–
Sylvania	MP 320/350 ...PS	EX39	135	2.90	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 350	–
	MP 350/400 ...PS	EX39	135	2.90	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 350	–
Venture	MP 350 /N/.../PS	E39	135	2.80	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 350	–
	MS 350 /.../PS	E39	135	2.80	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 350	–

* ballast with ignitor tap required

400 W Metal halide lamps

Lamps					Igniters	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	HIT 400...	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
GE	ARC 400/D	E40	120	4.35	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	CMH 400 /...E	E40	125	4.20	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	KRC 400...	E40	130	3.50	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGB 400, OGH 400	–
	MVR 400 /...E	E40	135	3.20	–	CWMH 400	–
					ATIG-14; AH 002-D; NP 603		–
Iwasaki	MF 400 /BUH	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	MF 400 LSH/U	E40	135	3.25	–	OGB 400	–
	MF 400 SX	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	MF 400 X/U	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	MT 400 /BH	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	MT 400 LSH	E40	135	3.25	–	OGB 400	–
Osram	HCI-TM 400	G22	103	4.40	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HQI-BT 400 W/D HPS Gear	E40	120	4.00	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HQI-E 400 W/N/SI	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	HQI-E 400 W/... HPS Gear	E40	120	4.00	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HQI-E/P 400W/D	E40	110	3.8	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HQI-T 400 W/N/SI	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	HQI-T 400 W/N HPS Gear	E40	120	4.00	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HQI-TS 400 W/...	Fc2	120	4.10	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	MI 400 /.../U	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
Philips	CDM-TT 400 W	E40	95	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	HPI 400 W	E40	125	3.40	ATIG-14; AH 002-D; NP 603	OGB 400, OGH 400	–
	HPI plus 400 W+	E40	125	3.40	ATIG-14; AH 002-D; NP 603	OGB 400, OGH 400	–
	HPI plus 400 W BUS+	E40	125	3.40	–	OGB 400, OGH 400	–
	HPI-T 400 W	E40	125	3.40	ATIG-14; AH 002-D; NP 603	OGB 400, OGH 400	–
	HPI-T plus 400 W+	E40	125	3.40	ATIG-14; AH 002-D; NP 603	OGB 400, OGH 400	–
	MH 400 W	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
Plusrite	MH400W/.../PS/...	E40	130	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	MP400W/...	E40	135	3.25	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGB 400	–
	MP400W/.../PS/...	EX39	135	3.25	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGB 400	–
	MS400W/.../PS/...	E39	135	3.25	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGB 400	–
Radium	HRI-BT 400 ...	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HRI-E 400 ...	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HRI-E 400 W/NSC/S..	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HRI-E 400 W/NSI	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	HRI-E/P 400..	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HRI-T 400W/N/SI	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	HRI-T 400W/NSC/S..	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
	HRI-TS 400 ...	Fc2	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400TH	–
Sylvania	HSI-HX 400	E40	130	3.40	ATIG-14; AH 002-D; NP 603	OGB 400, OGH 400	–
	HSI-HX 400 /CO/I	E40	130	3.40	–	OGB 400, OGH 400	–
	HSI-SX 400 /P...	E40	120	4.40	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	HSI-T 400 /6K...	E40	122	4.40	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–

400 W Metal halide lamps (cont'd.)

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
	HSI-THX 400	E40	130	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	HSI-TSX 400 ...	E40	105	4.40	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	M 400 ...	E39	135	3.25	AVS 100-D*; AVS 100-DP*	CWMH 400	–
					ZRM 6-ES/C 3.5 kV; AVS 100-D*; AVS 100-DP*	OGB 400	–
	MP 350/400 ...PS	EX39	135	3.25	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGB 400	–
	MP 400 ...	EX39	135	3.25	–	CWMH 400	–
					ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGB 400	–
	MS 400 ...	E39POM	135	3.25	–	CWMH 400	–
					ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGB 400	–
	Venture HIE 400 / LU	E40	120	4.00	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	HIE 400 /x/x	E40	135	3.20	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGB 400	–
	HIE 400 W/x/x/EURO/x	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	HIT 400 W/x/LU/x	E40	110	4.20	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	HIT 400 W/x/x/EURO/x	E40	135	3.25	ATIG-14; AH 002-D; NP 603	OGB 400	–
	MH 400 /... (M59)	E39	135	3.20	ATIG-14; AH 002-D; NP 603	OGB 400	–
	MP 400 /.../PS	E39	135	3.20	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGB 400	–
	MS 400 /.../PS	E39	135	3.20	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGB 400	–
	MS 400 /... (M59)	E39	135	3.20	ATIG-14; AH 002-D; NP 603	OGB 400	–

+ can also be operated with HPS gear

* ballast with ignitor tap required

450 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Plusrite	MP450W/...	EX39	135	3.70	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 450	–
Venture	MP 450 /.../PS	E39	135	3.70	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 450	–
	MS 450 /.../PS	E39	135	3.70	ZRM 6-ES/C 3.5kV; AVS 100-D*; AVS 100-DP*	OGH 450	–

* ballast with ignitor tap required

1,000 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	HIT 1000	E40	120	9.50	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
GE	MVR 1000	E40	250	4.30	–	CWMH 1000	–
	SPL 1000	RX7sM	270	4.20	ZRM 12-ES/C 400; AVS 2000/380	OGH 1000H	–
	SPL 1000	E40	130	9.50	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
Iwasaki	MF 1000 B SX	E40	230	4.70	–	CWMH 1000	–
	MF 1000 B X/U	E40	263	4.10	–	CWMH 1000	–
	MT 1000 ...	E40	130	8.25	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000	–
	MT 1000 A-BH/67	E40	145	7.50	ATIG-14; AH 002-D; NP 603	OGB 1000	–
	MT 1000 B	E40	230	4.70	–	CWMH 1000	–
	MT 1000 B-BH	E40	230	4.70	ZRM 1200/400 A001; AH 005/380-DP	OGH 1000H	–
Osram	HQI-E 1000 ...	E40	130	9.50	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
	HQI-T 1000 ...	E40	130	9.50	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
	HQI-TS 1000 W/D/S	cable	120	9.60	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
	HQI-TS 1000 W/NDL/S	cable	120	9.60	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
	MI 1000/U	E40	263	4.10	–	CWMH 1000	–
Philips	HPI-T 1000 W	E40	130	8.25	ATIG-14; AH 002-D; NP 603	OGH 1000	–
	MHN-LA 1000 W	cable	125	9.30	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
Plusrite	MH1000W/.../US Standard	E39	263	4.10	–	CWMH 1000	–
	MH1000W/.../Europe/HPI	E40	130	8.25	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000	–
Radium	HRI-T 1000 ...	E40	130	9.50	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
	HRI-TS 1000 /D	Fe2	130	9.50	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
	HRI-TS 1000 W/D/S	cable	130	9.50	ZRM 12-ES/C; ZRM 12-ES/CT; AH 1000; AVS 100-D*; AVS 100-DP*	OGH 1000A	–
Sylvania	HSI-T 1000 W/4K	E40	130	8.25	ATIG-14; AH 002-D; NP 603	OGH 1000	–
	M 1000 ...	E39	263	4.10	–	CWMH 1000	–
	M 1000 ...BT37	E39	263	4.10	–	CWMH 1000	–
	MP 1000 ...	EX39	263	4.10	–	CWMH 1000	–
	MS 1000 ...	E39	263	4.10	–	CWMH 1000	–
Venture	MH 1000	E39	263	4.30	–	CWMH 1000	–

* ballast with ignitor tap required

1,500 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	MVR 1500 Sports	E40	270	6.00	–	CWMH 1500	–
	SPL 1500 /L/H	RX7sM	250	6.80	ZRM 12-ES/C 400; AVS 2000/380	CWMH 1500; OGH 1500	–
Osram	MI 1500/BU	E40	268	6.20	–	CWMH 1500	–
Plusrite	MH1500W/...	E39	268	6.20	–	CWMH 1500	–
Sylvania	M 1500 ...	E39	268	6.20	–	CWMH 1500	–
	M 1500 T7/DE	RSC	500	3.30	–	CWBL 1500	–
	M 1500 T8/DE	CER/SP	265	6.30	–	CWMH 1500	–
Venture	MBILS 1500	RSC (RX7s)	250	6.70	ZRM 12-ES/C 400; AVS 2000/380	CWMH 1500; OGH 1500	–
	MH 1500 /	E39	268	6.20	–	CWMH 1500	–

1,800 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Philips	MHN-SA 1800 W/230V	X830R, (P) SFC	120	17.30	ZRM 20-ES/B; AH 2000/220	MHD 1800	–
	MHN-SA 1800 W/400V	(P)SFC	205	10.50	ZRM 12-ES/C 400; AVS 2000/380	MHD 1800H	–

2,000 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	SPL 2000 /L	special	250	10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	SPL 2000 /T	E40	250	10.30	ZRM 1200/400 A001; AH 005/380-DP	HQI 2000/D	–
	SPL 2000 /T/HR	E40	250	10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	SPL 2000 /T/I	E40	250	10.30	–	HQI 2000/D	–
Iwasaki	MT 2000 B-BH-L	E40	230	9.20	ZRM 1200/400 A001; AH 005/380-DP	HQI 2000	–
	MT 2000 B-BH-L/T	E40	230	9.20	–	HQI 2000	–
Osram	HQI-T 2000 /D	E40	230	10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	HQI-T 2000 /D/I	E40	230	10.30	–	HQI 2000/D	–
	HQI-T 2000 /N	E40	245	8.80	–	HQI 2000	–
	HQI-T 2000 /N/230 V	E40	120	16.50	ATIG-14; AH 002-D; NP 603	HQI 2000L, 2 x OGH 1000	–
	HQI-T 2000 /N/E/SUPER	E40	220	8.80	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000	–
	HQI-T 2000 /N/SN/SUPER	E40	220	8.80	ZRM 1200/400 A001; AH 005/380-DP	HQI 2000	–
	HQI-TS 2000 /D	cable	205	11.30/10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	HQI-TS 2000 /DS	cable	205	11.30/10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
Philips	HPI-T 2000 W/220V	E40	130	16.50	ZRM 20-ES/B; AH 2000/220	HQI 2000L, 2 x OGH 1000	–
	HPI-T 2000 W/380V	E40	240	8.80	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000	–
	MHN-LA 2000 W/400V	cable	225/235	10.30/9.60	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	MHN-SA 2000 W/400V	X830R	205	11.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	MHN-TD 2000 W	cable	235	9.60	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	MHT-TD 2000 W	cable	225	10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
Radium	HRI-T 2000 /D	E40	230	10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	HRI-T 2000 /D/I	E40	230	10.30	–	HQI 2000/D	–
	HRI-T 2000 /N/230V	E40	130	16.50	ATIG-14; AH 002-D; NP 603	HQI 2000L, 2 x OGH 1000	–
	HRI-T 2000 /N/I	E40	245	8.80	–	HQI 2000	–
	HRI-T 2000 /NSC/400	E40	245	8.80	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000	–
	HRI-TS 2000 /D	E40	205	10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	HRI-TS 2000 /DS	cable	205	11.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	HRI-TS 2000 /NDL/S	cable	205	11.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
Sylvania	HSI-T 2000 W/S	E40	235	9.00	ZRM 1200/400 A001; AH 005/380-DP	HQI 2000	–
	HSI-T 2000 WS/I	E40	235	9.00	–	HQI 2000	–
	HSI-TD 2000 W/D	cable	205	11.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
	M 2000 T8/DE	RSC	250	8.50	ZRM 12-ES/C 400; AVS 2000/380	CWBL 2000	–
	M 2000 T9/DE	CER/SP	250	8.50	ZRM 12-ES/C 400; AVS 2000/380	CWBL 2000	–
	M 2000 T10/DE	CER/SP	220	10.70	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–
Venture	MBILS 2000	special	230	10.30	ZRM 12-ES/C 400; AVS 2000/380	HQI 2000/D	–

3,500 W Metal halide lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Osram	HQI-T 3500 W/D	E40	220	18.00	ZRM 20-ES/B 400	HQI 3500	–
Radium	HRI-T 3500 /D	E40	220	18.00	ZRM 20-ES/B 400	HQI 3500	–

35 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
Philips	SDW-T 35 W	PG12-1	96	0.48	Philips CSLS 35	EPS 35, OMS 35	–
Sylvania	SHP-S 35 ...	E27	90	0.49	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 35, OMS 35	–
	SHP-TS 35 W	E27	90	0.49	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 35, OMS 35	–

* ballast with ignitor tap required

50 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	LU 50/90	E27	85	0.76	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–
	LU 50/90...I	E27	85	0.76	–	EPS 50, OMS 50	–
Iwasaki	NH 50 .../HV/...	E27	85	0.76	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–
	NH 50 F/HV/I	E27	85	0.76	–	EPS 50, OMS 50	–
	NHT 50 /I	E27	85	0.76	–	EPS 50, OMS 50	–
Osram	NAV E 50	E27	85	0.76	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–
	NAV E 50 I	E27	85	0.76	–	EPS 50, OMS 50	–
	NAV T 50 SUPER 4Y	E27	90	0.80	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–
Philips	SDW-T 50 W	PG12-1	92	0.76	Philips CSLS 50	EPS 50, OMS 50	–
	SON 50 W-E	E27	90	0.76	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–
	SON 50 W-I	E27	90	0.76	–	EPS 50, OMS 50	–
	SON-T ... 50 W	E27	88	0.75	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–
Radium	RNP-E 50 W	E27	85	0.76	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–
	RNP-E 50 W/I	E27	85	0.76	–	EPS 50, OMS 50	–
Sylvania	SHP 50 W... I	E27	85	0.76	–	EPS 50, OMS 50	–
	SHP-S 50 W...	E27	85	0.76	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–
	SHP-TS 50 W	E27	85	0.76	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 50, OMS 50	–

* ballast with ignitor tap required

70 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	NAH-E 70	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	NAH-TR 70	RX7s	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	OM PAK 70 M
GE	LU 70 /90...	E27	85	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	LU 70 /90...I	E27	85	0.98	–	EPS 70A, OMS 70A	–
Iwasaki	NH 70 /HV/... 70 S	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	NH 70 F/HV/I	E27	90	0.98	–	EPS 70A, OMS 70A	–
	NHT 70	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	NHT 70 /I	E27	90	0.98	–	EPS 70A, OMS 70A	–
Osram	NAV E 70 ...	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	NAV E 70 I	E27	90	0.98	–	EPS 70A, OMS 70A	–
	NAV T 70 ...	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	NAV TS 70 SUPER 4Y	RX7s	85	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	OM PAK 70 M
Philips	SON 70 W...	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SON 70 W-E	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SON 70 W-I	E27	90	0.98	–	EPS 70A, OMS 70A	–
	SON Hg free 70 W...	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SON-T 70 W...	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SON Hg free 70 W...	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SON-T plus 70 W...	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
Plusrite	HPS70W/...	E27	90	0.98	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	EPS 70A; OMS 70A	OM PAK 70 M
	HPS70W/.../SI/...	E27	90	0.98	–	EPS 70A; OMS 70A	–
Radium	RNP-E 70 W	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	RNP-E 70 W/I	E27	90	1.00	–	EPS 70A, OMS 70A	–
	RNP-T 70 W	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	RNP-TS 70 W	RX7s	90	1.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	OM PAK 70 M
Sylvania	SHP 70 W/CO-E	E27	90	0.98	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SHP 70 W...	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SHP 70 W... I	E27	90	1.00	–	EPS 70A, OMS 70A	–
	SHP-S 70 W...	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SHP-T 70 W...	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SHP-TD 70 W...	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
	SHP-TS 70 W...	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–
Venture	HPSE.70W/E27	E27	90	1.00	ZRM 2-ES/C; ZRM 2-ES/CT; AVS 100-D*; AVS 100-DP*	EPS 70A, OMS 70A	–

* ballast with ignitor tap required

100 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	LU 100 ...	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M
	TCF 100	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M
Iwasaki	NH 100 F	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M
	NH 100 F/HV/I	E40	100	1.20	–	OMS 100	–
	NHT 100	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M
	NHT 100 /I	E40	100	1.20	–	OMS 100	–
Osram	NAV E 100 SUPER 4Y	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M
	NAV T 100 SUPER 4Y	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M
Philips	SDW-T 100 W	PG12-1	98	1.31	Philips CSLs 100	OMS 100A	–
	SON plus 100 W	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M
	SON ... 100 W	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M
Venture	HPSE.100W/E40	E40	100	1.20	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 100	OM PAK 100 M

* ballast with ignitor tap required

150 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	HST-DE 150	Fc2, RX7s	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	NAH-T 150	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
GE	LU 150 /100 (S56)	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	TCF 150	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
Iwasaki	NH 150 /I	E40	100	1.80	–	OMS 150, OGS 150	–
	NH 150 ...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	NH 150 F/HV/I	E40	100	1.80	–	OMS 150, OGS 150	–
	NHT 150 ...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
Osram	NAV E 150 ...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	NAV T 150 ...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	NAV TS 150 ...	RX7s	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
Philips	SON Comfort 150 W	E40	105	1.82	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SON Hg free 150 W	E40	98	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SON plus 150 W	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SON 150 W	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SON-E 150 W	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SON-T Comfort 150 W	E40	105	1.82	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SON-T Hg free 150 W	E40	98	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M

150 W High-pressure sodium vapour lamps (cont'd.)

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
	SON-T plus 150 W	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SON-T 150 W	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
Plusrite	HPS150W/...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150; OGS 150	OM PAK 150 M
Radium	RNP-E 150 ...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	RNP-T 150 ...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	RNT-T 150 ...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	RNT-TS 150 ...	RX7s	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
Sylvania	LU 150 ... (100V)	E39	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SHP-S 150 W...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SHP-T 150 W...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SHP-TD 150 W...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	SHP-TS 150 W...	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
Venture	HPSE.150W/E40	E40	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M
	LU 150 /100 (S56)	Mogul	100	1.80	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OMS 150, OGS 150	OM PAK 150 M

* ballast with ignitor tap required

250 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	HST-DE 250	Fc2, RX7s	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	NAH-T 250	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
GE	LU 250 .../40 (S50)	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	LU 250 /TD	RX7s	100	2.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
Iwasaki	NH 250 ...	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	NH 250 F/I	E40	100	3.00	–	OGS 250	–
	NHT 250 /I	E40	100	3.00	–	OGS 250	–
	NHT 250 ...	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
Osram	NAV E 250 ...	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	NAV T 250 ...	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	NAV TS 250	Fc2	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
Philips	SON... 250 W	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	SON-T... 250 W	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
Plusrite	HPS250W/...	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
Radium	RNP-E 250 ...	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	RNP-T 250	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
Sylvania	LU 250 ... (S50)	E39	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	SHP 250 W...	E40	100	2.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–

250 W High-pressure sodium vapour lamps (cont'd.)

	SHP-S 250 W...	E40	100	2.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	SHP-T 250 W...	E40	100	2.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	SHP-TS 250 W...	E40	100	2.95	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
Venture	HPSE.250W/E40	E40	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	LU 250 (S50)	Mogul	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–
	LU 250 /T7/ (S50)	RSC	100	3.00	ZRM 2.5-ES/C; ZRM 2.5-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 250	–

* ballast with ignitor tap required

400 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	HST-DE 400	Fc2, RX7s	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	NAH-T 400	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
GE	LU 400 .../TD	RX7s	100	4.40	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	LU 400...	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
Iwasaki	NH 400 ...	E40	105	4.45	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	NH 400 F/I	E40	105	4.45	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	NHT 400 /I	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	NHT 400 ...	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
Osram	NAV E 400 ...	E40	105	4.40	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	NAV T 400 ...	E40	105	4.40	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	NAV TS 400 ...	Fc2	105	4.40	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
Philips	SON... 400 W	E40	105	4.45	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	SON-T... 400 W	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	SON-T-AGRO	E40	116	4.13	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
Plusrite	HPS400W/...	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
Radium	RNP-E 400 W	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	RNP-T 400 W	E40	100	4.60	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
Sylvania	LU 400 ... (S51)	E39	100	4.70	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	SHP 400 W...	E40	100	4.50	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	SHP-T 400 W...	E40	100	4.50	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	SHP-TS 400 W Grolux	E40	120	4.00	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	SHP-TS 400 W...	E40	100	4.50	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
Venture	HPSE.400W/E40	E40	100	4.50	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	LU 400 /T7/ (S51)	RSC	100	4.70	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–
	LU 400 ... (S51)	Mogul	100	4.70	ZRM 6-ES/C; ZRM 6-ES/CT; AVS 400-D; AVS 400-DP; AVS 100-D*; AVS 100-DP*	OGS 400	–

* ballast with ignitor tap required

600 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
BLV	NAH-T 600	E40	112	6.20	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 600	–
GE	LU 600	E40	115	6.00	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 600	–
Osram	NAV-T 600 SUPER 4Y	E40	112	6.20	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 600	–
Philips	SON-T plus 600 W	E40	115	5.80	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 600	–
Radium	RNP-T 600 W	E40	112	6.20	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 600	–
Sylvania	SHP-TS 600	E40	110	5.90	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 600	–
	SHP-TS 600 Grolux	E40	125	5.50	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 600	–

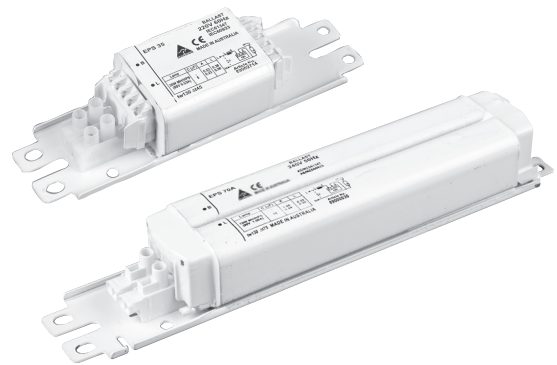
* ballast with ignitor tap required

1,000 W High-pressure sodium vapour lamps

Lamps					Ignitors	Magnetic ballast	Remote gear boxes
manufacturer	description	lamp holder	nominal voltage (V)	nominal current (A)			
GE	LU 1000 (S52)	E40	250	4.70	ATIG-10; AVS 2000/480	CWHS 1000	–
	LU 1000 /110	E40	100	10.30	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
Iwasaki	NH 1000	E40	100	10.30	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
	NHT 1000	E40	100	10.60	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
	NHT 1000 B	E40	250	4.70	ATIG-10; AVS 2000/480	CWHS 1000	–
	NHT 1000 F/I	E40	100	10.60	–	OGS 1000	–
	NHT 1000 I	E40	100	10.60	–	OGS 1000	–
Osram	NAV E 1000	E40	115	10.30	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
	NAV T 1000	E40	100	10.60	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
Philips	SON 1000 W	E40	100	10.30	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
	SON-T 1000 W	E40	105	10.60	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
Plusrite	LU1000W/...	E39	250	4.70	ATIG-10; AVS 2000/480	CWHS 1000	–
Radium	RNP-E 1000 W	E40	115	10.30	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
	RNP-T 1000 W	E40	115	10.30	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
Sylvania	LU 1000 (S52)	E40	250	4.70	ATIG-10; AVS 2000/480	CWHS 1000	–
	SHP-T 1000 W...	E40	100	10.60	ZRM 12-ES/C; ZRM 12-ES/CT; AVS 100-D*; AVS 100-DP*	OGS 1000	–
Venture	LU 1000 (S52)		250	4.70	ATIG-10; AVS 2000/480	CWHS 1000	–

EC type HID ballasts

- slim cross-section and compact
- very short magnetic paths
- low magnetic stray field
- varnish impregnation and short heat paths
- long service life
- non-audible noise level
- nomex fixed air-gap ensuring permanent calibration
- resistant to moisture and corrosion
- 24A double screw terminal
- low power consumption
- winding insulation class H materials
- tw130 winding temperature rating



100% final testing

- continuity
- winding short circuit
- core to coil high voltage test
- operating values

Fig. 1

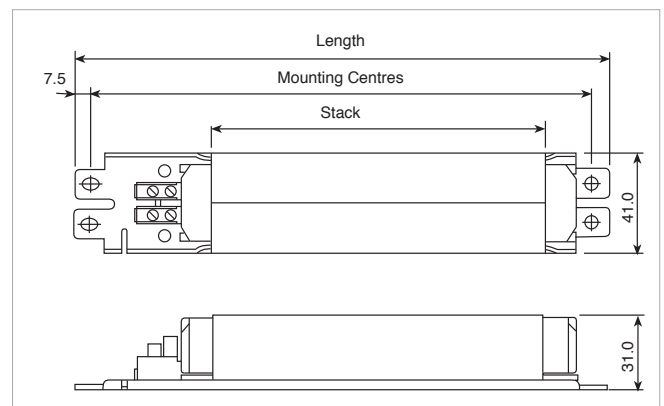
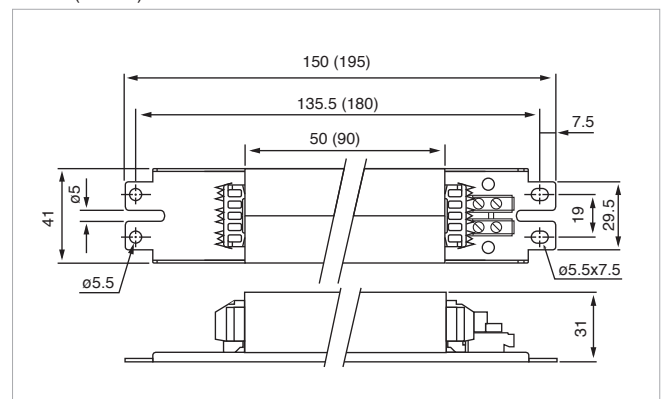


Fig. 2

50 mm (90 mm) stack



220 V 50 Hz and 220 V 60 Hz – EC ballasts

Lamp			Ballast		Electrical								Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF@0.9PF	Δt	stack mm	length mm	mtg centres mm	weight kg
W	V	A			W	W	A	A		A	A	μF	°C	mm	mm	mm	kg
220 V 50 Hz																	
High-pressure mercury vapour																	
50	95	0.61	EMV50		13.0	63.0	0.610	0.810	0.47	0.318	0.444	6	65	90	195.0	180.0	1.00
80	115	0.80	EMV80-03		14.0	94.0	0.800	1.310	0.53	0.475	0.816	7	60	90	195.0	180.0	1.00
125	125	1.15	EMV125-02		21.0	146.0	1.150	1.710	0.58	0.737	1.150	9	70	140	225.0	210.0	1.40
Metal-halide																	
35	85	0.53	EPS35		11.4	46.4	0.530	0.665	0.40	0.234	0.309	6	55	90	195.0	180.0	1.00
50	95	0.61	EMV50		13.0	63.0	0.610	0.810	0.47	0.318	0.444	6	65	90	195.0	180.0	1.00
70	90	1.00	EPS70A-04		22.5	92.5	1.000	1.280	0.42	0.467	0.628	11	80	130	225.0	210.0	1.30
70	90	1.00	EPS70A (TH) ¹		22.5	92.5	1.000	1.280	0.42	0.467	0.628	11	80	130	225.0	210.0	1.30
High-pressure sodium																	
35	85	0.53	EPS35		11.4	46.4	0.530	0.665	0.40	0.234	0.309	6	55	90	195.0	180.0	1.00
50	85	0.76	EPS50-01		15.5	65.5	0.760	0.947	0.39	0.331	0.433	8	60	105	195.0	180.0	1.10
70	90	1.00	EPS70A-04		22.5	92.5	1.000	1.280	0.42	0.467	0.628	11	80	130	225.0	210.0	1.30
70	90	1.00	EPS70A (TH) ¹		22.5	92.5	1.000	1.280	0.42	0.467	0.628	11	80	130	225.0	210.0	1.30
220 V 60 Hz																	
High-pressure mercury vapour																	
50	95	0.61	EMV50-02		11.0	61.0	0.610	0.810	0.45	0.308	0.430	5	65	90	195.0	180.0	1.00
80	115	0.80	EMV80-04		13.0	93.0	0.800	1.310	0.53	0.470	0.808	6	60	90	195.0	180.0	1.00
125	125	1.15	EMV125-03		18.0	143.0	1.150	1.730	0.57	0.722	1.14	8	70	120	205.0	190.0	1.25
Metal halide																	
35	85	0.53	EPS35	89002714	10.1	45.1	0.530	0.665	0.39	0.228	0.300	5	55	50	150.0	135.5	0.55
50	95	0.61	EMV50-02		11.0	61.0	0.610	0.810	0.45	0.308	0.430	5	65	90	195.0	180.0	1.00
70	90	1.00	EPS70A-03		19.0	89.0	1.000	1.270	0.40	0.449	0.599	9	75	105	195.0	180.0	1.10
70	90	1.00	EPS70A (TH) ¹		19.0	89.0	1.000	1.270	0.40	0.449	0.599	9	75	105	195.0	180.0	1.10
High pressure sodium																	
35	85	0.53	EPS35	89002714	10.1	45.1	0.530	0.665	0.39	0.228	0.300	5	55	50	150.0	135.5	0.55
50	85	0.76	EPS50		13.7	63.7	0.760	0.947	0.38	0.322	0.421	7	65	90	195.0	180.0	1.00
70	90	1.00	EPS70A-03		19.0	89.0	1.000	1.270	0.40	0.449	0.599	9	75	105	195.0	180.0	1.10
70	90	1.00	EPS70A (TH) ¹		19.0	89.0	1.000	1.270	0.40	0.449	0.599	9	75	105	195.0	180.0	1.10

Notes

- Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps. Ballasts for other wattage ratings available on request.

230 V 50 Hz and 240 V 50 Hz – EC ballasts

Lamp			Ballast		Electrical								Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF0.9PF	Δt	stack mm	length mm	mtg centres mm	weight kg
W	V	A															
230 V 50 Hz																	
High-pressure mercury vapour																	
50	95	0.61	EMV50-03		13.5	63.5	0.610	0.800	0.45	0.307	0.422	6	65	90	195.0	180.0	1.00
80	115	0.80	EMV80-05		16.5	96.5	0.800	1.200	0.52	0.466	0.734	7	60	120	205.0	190.0	1.25
125	125	1.15	EMV125		21.0	146.0	1.150	1.660	0.55	0.705	1.070	9	70	160	245.0	230.0	1.55
Metal-halide																	
35	85	0.53	EPS35		11.8	46.8	0.530	0.653	0.38	0.226	0.292	6	55	90	195.0	180.0	1.00
50	95	0.61	EMV50-03		13.5	63.5	0.610	0.800	0.45	0.307	0.422	6	65	90	195.0	180.0	1.00
70	90	1.00	EPS70A-05		23.5	93.5	1.000	1.240	0.41	0.452	0.588	10	75	140	225.0	210.0	1.40
70	90	1.00	EPS70A (TH) ¹		23.5	93.5	1.000	1.240	0.41	0.452	0.588	10	75	140	225.0	210.0	1.40
High-pressure sodium																	
35	85	0.53	EPS35		11.8	46.8	0.530	0.653	0.38	0.226	0.292	6	55	90	195.0	180.0	1.00
50	85	0.76	EPS50		17.0	67.0	0.760	0.930	0.38	0.324	0.416	8	65	120	205.0	190.0	1.25
70	90	1.00	EPS70A-05		23.5	93.5	1.000	1.240	0.41	0.452	0.588	10	75	140	225.0	210.0	1.40
70	90	1.00	EPS70A (TH) ¹		23.5	93.5	1.000	1.240	0.41	0.452	0.588	10	75	140	225.0	210.0	1.40
240 V 50 Hz																	
High-pressure mercury vapour																	
50	95	0.61	EMV50		14.0	64.0	0.610	0.791	0.44	0.296	0.403	6	65	90	195.0	180.0	1.00
75	130	0.64	EMV75		12.5	87.5	0.640	0.972	0.57	0.405	0.646	5	50	90	195.0	180.0	1.00
80	115	0.80	EMV80-00		17.0	97.0	0.800	1.110	0.51	0.449	0.654	7	60	120	205.0	190.0	1.25
125	125	1.15	EMV125	89000605	24.0	149.0	1.150	1.610	0.54	0.690	1.010	9	70	160	245.0	230.0	1.55
175	130	1.50	EMV175.5 ³		29.0	204.0	1.500	2.500	0.57	0.944	1.650	11	60	90	195.0	180.0	1.00
Metal-halide																	
35	85	0.53	EPS35		12.2	47.2	0.530	0.642	0.37	0.219	0.278	6	55	90	195.0	180.0	1.00
50	95	0.61	EMV50		14.0	64.0	0.610	0.791	0.44	0.296	0.403	6	65	90	195.0	180.0	1.00
70	90	1.00	EPS70A	89000630	24.5	94.5	1.000	1.220	0.39	0.438	0.560	10	75	140	225.0	210.0	1.40
70	90	1.00	EPS70A-01(TH) ¹		24.5	94.5	1.000	1.220	0.39	0.438	0.560	10	75	140	225.0	210.0	1.40
150	100	1.80	EPS150.5 ³		38.5	188.5	1.800	2.120	0.44	0.873	1.080	18	75	140	225.0	210.0	1.40
150	100	1.80	EPS150.5-01(TH) ^{1 3}		38.5	188.5	1.800	2.120	0.44	0.873	1.080	18	75	140	225.0	210.0	1.40
175	130	1.50	EMV175.5 ³		29.0	204.0	1.500	2.500	0.57	0.944	1.650	11	60	90	195.0	180.0	1.00
High-pressure sodium																	
35	85	0.53	EPS35		12.2	47.2	0.530	0.642	0.37	0.219	0.278	6	55	90	195.0	180.0	1.00
50	85	0.76	EPS50		17.5	67.5	0.760	0.915	0.37	0.313	0.395	8	65	120	205.0	190.0	1.25
70	90	1.00	EPS70A	89000630	24.5	94.5	1.000	1.220	0.39	0.438	0.560	10	75	140	225.0	210.0	1.40
70	90	1.00	EPS70A-01(TH) ¹		24.5	94.5	1.000	1.220	0.39	0.438	0.560	10	75	140	225.0	210.0	1.40
150	100	1.80	EPS150.5 ³		38.5	188.5	1.800	2.120	0.44	0.873	1.080	18	75	140	225.0	210.0	1.40
150	100	1.80	EPS150.5-01(TH) ^{1 3}		38.5	188.5	1.800	2.120	0.44	0.873	1.080	18	75	140	225.0	210.0	1.40
Low-pressure sodium																	
18	57	0.35	ECLS18 ²		10.5	28.5	0.350	0.390	0.90	0.145	0.170	5	60	50	150.0	135.0	0.55
18	57	0.35	ECLS18-01 ²	89000003	10.5	28.5	0.350	0.390	0.90	0.145	0.170	5	60	50	110.0	101.5	0.55

Notes

- Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
- Capacitor - dual function - power factor correction and starting aid.
- Split ballast, two required.
Ballasts for other wattage ratings available on request.

OM type ballasts

- Compact size
- Varnish impregnation and short heat paths
- Long service life
- Very low noise level
- Glass-fibre filled nylon coil end covers
- Winding insulation Class H materials
- Nomex fixed air gap ensuring permanent calibration
- Integral terminals
- tw130 winding temperature rating
- Resistant to moisture and corrosion

100% final testing

- continuity
- winding short circuit
- insulation
- impedance



Figure 1

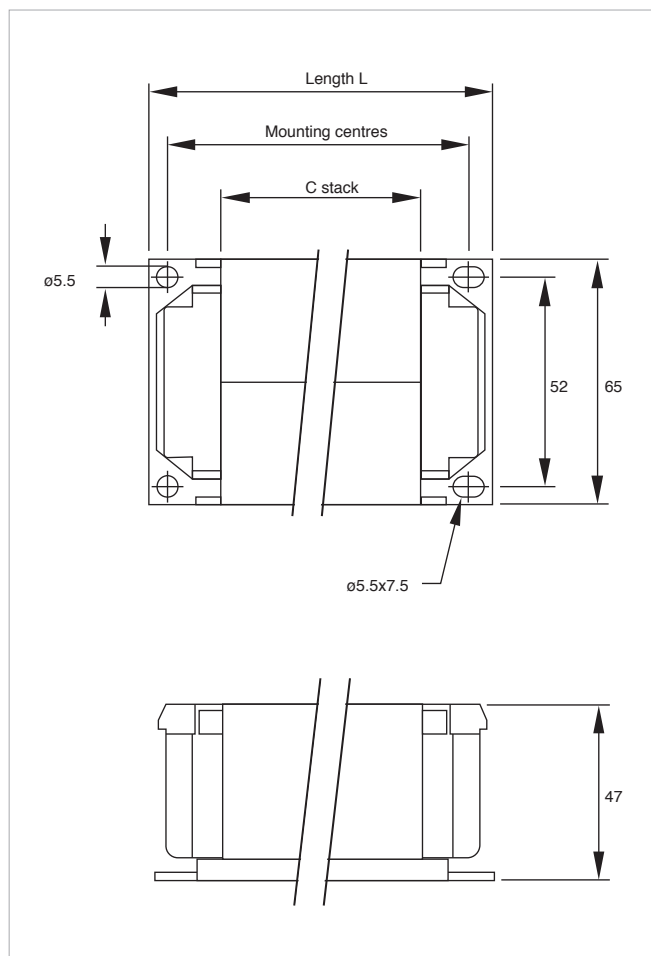
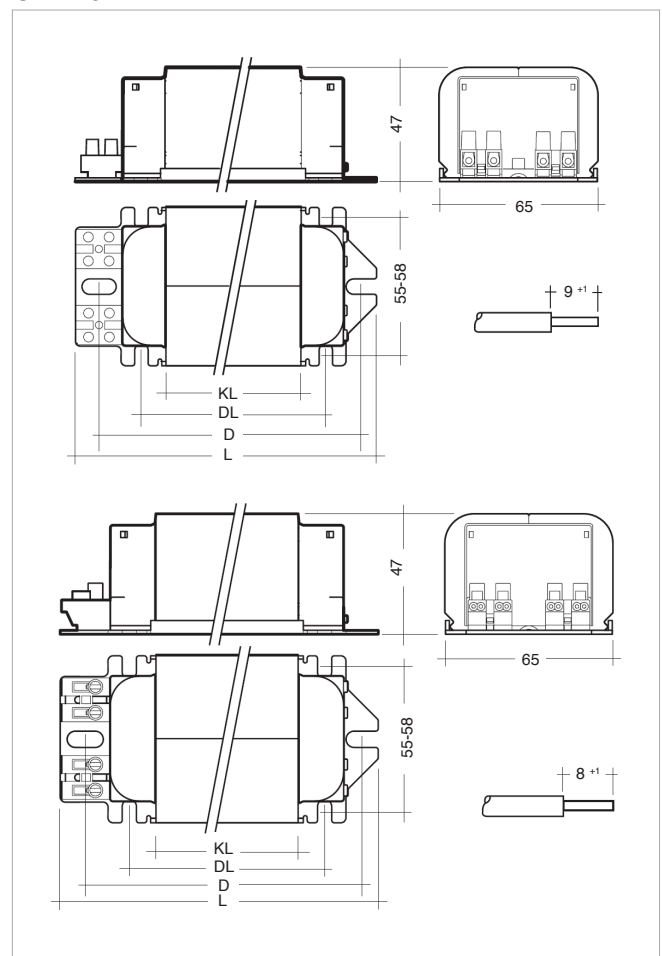


Figure 2
OM Pro



220 V 50 Hz – OM ballasts

Lamp			Ballast		Electrical								Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF0.9PF	Δt	stack mm	length mm	mtg centres mm	weight kg
W	V	A															
High-pressure mercury vapour																	
40	90	0.53	OMB40-01		8.0	48.0	0.53	0.66	0.41	0.24	0.32	6	65	30	65	51	0.8
50	95	0.61	OMB50-04		8.5	58.5	0.61	0.80	0.44	0.30	0.41	7	60	30	65	51	0.8
80	115	0.80	OMB80-06	89001036	9.0	89.0	0.80	1.10	0.51	0.45	0.65	8	65	35	70	56	1.0
80	115	0.80	OMB80-11		13.0	93.0	0.80	1.15	0.53	0.47	0.71	7	70	30	70	56	0.9
100	130	0.85	OMB100-01		8.5	108.5	0.85	1.35	0.58	0.55	0.91	7	45	55	90	76	1.3
100	130	0.85	OMB100-03		11.5	111.5	0.85	1.50	0.60	0.56	1.04	7	65	40	90	76	1.2
100	115	1.00	OMB100A-06		11.5	111.5	1.00	1.36	0.51	0.56	0.80	9	65	55	90	76	1.3
125	125	1.15	OMB125-06	89000981	11.5	136.5	1.15	1.66	0.54	0.69	1.04	10	55	55	90	76	1.3
125	125	1.15	OMB125-10		14.5	139.5	1.15	1.91	0.55	0.70	1.23	10	70	40	90	76	1.2
175	130	1.50	OMB175-01		14.5	189.5	1.50	2.48	0.57	0.96	1.66	12	65	75	110	96	1.7
175	130	1.50	OMB175-09		17.5	192.5	1.50	2.56	0.58	0.97	1.74	12	70	55	110	96	1.6
250	130	2.13	OMB250-02		19.5	269.5	2.13	3.25	0.58	1.36	2.18	18	65	105	140	126	2.4
250	130	2.13	OMB250-04		21.0	271.0	2.13	3.50	0.58	1.37	2.36	18	70	85	140	126	2.1
250	130	2.13	OMB250-06		22.0	272.0	2.13	3.60	0.58	1.37	2.44	18	75	75	140	126	1.8
400	135	3.25	OMB400-01		31.0	431.0	3.25	5.64	0.60	2.18	3.97	25	75	120	180	166	2.9
Metal-halide																	
35	85	0.53	OMS35-01	89001137	8.0	43.0	0.53	0.65	0.37	0.22	0.28	6	55	30	65	51	0.8
35	85	0.53	OMS35-03 (TH) ¹		8.0	43.0	0.53	0.65	0.37	0.22	0.28	6	55	30	65	51	0.8
50	95	0.61	OMB50-04		8.5	58.5	0.61	0.80	0.44	0.30	0.41	7	60	30	65	51	0.8
70	90	1.00	OMS70A-04		13.0	83.0	1.00	1.16	0.38	0.42	0.51	11	60	55	90	76	1.3
70	90	1.00	OMS70A-08 (TH) ¹		13.0	83.0	1.00	1.16	0.38	0.42	0.51	11	60	55	90	76	1.3
70	90	1.00	OMS70A-16	89001172	15.0	85.0	1.00	1.29	0.39	0.43	0.58	11	65	40	90	76	1.2
70	90	1.00	OMS70A-20 (TH) ¹		15.0	85.0	1.00	1.29	0.39	0.43	0.58	11	65	40	90	76	1.2
100	100	1.10	OMH100-03 (TH) ¹	89001058	13.0	113.0	1.10	1.45	0.47	0.57	0.79	11	65	65	100	86	1.5
100	100	1.10	OMH100-06		16.0	116.0	1.10	1.50	0.48	0.59	0.84	11	70	55	100	86	1.4
150	100	1.80	OMS150-26 ²	89001109	18.5	168.5	1.80	2.30	0.43	0.85	1.14	20	55	105	155	141	2.5
150	100	1.80	OMS150-08	89001100	20.0	170.0	1.80	2.32	0.43	0.86	1.16	20	65	85	140	126	2.1
150	100	1.80	OMS150-10 (TH) ¹	89001102	20.0	170.0	1.80	2.32	0.43	0.86	1.16	20	65	85	140	126	2.1
150	100	1.80	OMS150-27	89001110	22.0	172.0	1.80	2.35	0.43	0.87	1.19	18	70	75	140	126	1.8
175	130	1.50	OMB175-01		14.5	189.5	1.50	2.48	0.57	0.96	1.66	12	65	75	110	96	1.7
175	130	1.50	OMB175-09		17.5	192.5	1.50	2.56	0.58	0.97	1.74	12	70	55	110	96	1.6
250	130	2.13	OMB250-02		19.5	269.5	2.13	3.25	0.58	1.36	2.18	18	65	105	140	126	2.4
250	130	2.13	OMB250-04		21.0	271.0	2.13	3.50	0.58	1.37	2.36	18	70	85	140	126	2.1
250	130	2.13	OMB250-06		22.0	272.0	2.13	3.60	0.58	1.37	2.44	18	75	75	140	126	1.8
250	100	3.00	OMS250-01	89001132	35.0	285.0	2.95	3.67	0.44	1.44	1.88	30	75	120	180	166	2.9
400	135	3.25	OMB400-01		31.0	431.0	3.25	5.64	0.60	2.18	3.97	25	75	120	180	166	2.9
High-pressure sodium																	
35	85	0.53	OMS35-01	89001137	8.0	43.0	0.53	0.65	0.37	0.22	0.28	6	55	30	65	51	0.8
35	85	0.53	OMS35-03 (TH) ¹		8.0	43.0	0.53	0.65	0.37	0.22	0.28	6	55	30	65	51	0.8
50	85	0.76	OMS50-02		10.5	60.5	0.76	0.90	0.36	0.31	0.38	9	65	40	75	61	1.1
70	90	0.95	OMS70-03		11.5	81.5	0.94	1.16	0.39	0.41	0.53	10	60	55	90	76	1.4
70	90	1.00	OMS70A-04		13.0	83.0	1.00	1.16	0.38	0.42	0.51	11	60	55	90	76	1.3
70	90	1.00	OMS70A-08 (TH) ¹		13.0	83.0	1.00	1.16	0.38	0.42	0.51	11	60	55	90	76	1.3
70	90	1.00	OMS70A-16	89001172	15.0	85.0	1.00	1.29	0.39	0.43	0.58	11	65	40	90	76	1.2
70	90	1.00	OMS70A-20 (TH) ¹		15.0	85.0	1.00	1.29	0.39	0.43	0.58	11	65	40	90	76	1.2
100	100	1.20	OMS100-01	89001078	13.5	113.5	1.20	1.50	0.43	0.57	0.75	13	70	65	100	86	1.5
150	100	1.80	OMS150-26 ²	89001109	18.5	168.5	1.80	2.30	0.43	0.85	1.14	20	55	105	155	141	2.5
150	100	1.80	OMS150-08	89001100	20.0	170.0	1.80	2.32	0.43	0.86	1.16	20	65	85	140	126	2.1
150	100	1.80	OMS150-10 (TH) ¹	89001102	20.0	170.0	1.80	2.32	0.43	0.86	1.16	20	65	85	140	126	2.1
150	100	1.80	OMS150-27	89001110	22.0	172.0	1.80	2.35	0.43	0.87	1.19	18	70	75	140	126	1.8
150	100	1.80	OMS150/100		20.0	170.0	1.80	2.30	0.43	0.86	1.15	20	55	105	155	141	2.5
250	100	3.00	OMS250-01	89001132	35.0	285.0	2.95	3.67	0.44	1.44	1.88	30	75	120	180	166	2.9

Notes

- Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
- With multiple voltage tapings
Ballasts for other wattage ratings available on request.

220 V 60 Hz – OM ballasts

Lamp			Ballast		Electrical								Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF@0.9PF	Δt	stack mm	length mm	mtg centres mm	weight kg
W	V	A			W	W	A	A		A	A	μF	°C	mm	mm	mm	kg
High-pressure mercury vapour																	
40	90	0.53	OMB40-02		8.0	48.0	0.53	0.65	0.41	0.24	0.31	5	65	30	65	51	0.8
50	95	0.61	OMB50-05		8.0	58.0	0.61	0.84	0.43	0.29	0.42	6	60	30	65	51	0.8
80	115	0.80	OMB80-07		8.5	88.5	0.80	1.30	0.50	0.45	0.76	6	65	30	65	51	0.8
100	130	0.85	OMB100-02		9.0	109.0	0.85	1.50	0.58	0.55	1.02	6	65	40	75	61	1.1
100	115	1.00	OMB100A-05		10.0	110.0	1.00	1.60	0.50	0.56	0.93	8	65	40	75	61	1.1
125	125	1.15	OMB125-08		10.0	135.0	1.15	1.80	0.53	0.68	1.12	9	65	55	90	76	1.3
125	125	1.15	OMB125-16		13.0	138.0	1.15	1.90	0.55	0.70	1.21	8	70	35	90	76	1.1
175	130	1.50	OMB175-03	89000993	13.5	188.5	1.50	2.35	0.57	0.95	1.57	10	65	75	110	96	1.7
250	130	2.13	OMB250-09		16.5	266.5	2.13	3.15	0.57	1.35	2.09	15	60	105	140	126	2.4
250	130	2.13	OMB250-05		18.0	268.0	2.13	3.20	0.57	1.35	2.14	15	65	85	140	126	2.1
250	130	2.13	OMB250-10	89001014	19.5	269.5	2.13	3.25	0.58	1.36	2.18	15	70	75	140	126	1.8
400	135	3.25	OMB400-02		26.0	426.0	3.25	5.00	0.60	2.15	3.48	25	65	120	180	166	2.9
400	135	3.25	OMB400-03		27.5	427.5	3.25	5.30	0.60	2.16	3.70	25	70	105	180	166	2.5
Metal-halide																	
35	85	0.53	OMS35-08	89002543	8.0	43.0	0.53	0.65	0.37	0.22	0.28	5	55	30	65	51	0.8
35	85	0.53	OMS35-05 (TH) ¹	89001141	8.0	43.0	0.53	0.65	0.37	0.22	0.28	5	55	30	65	51	0.8
50	95	0.61	OMB50-05		8.0	58.0	0.61	0.84	0.43	0.29	0.42	6	60	30	65	51	0.8
70	90	1.00	OMS70A-01		11.5	81.5	1.00	1.30	0.37	0.41	0.56	9	60	40	75	61	1.1
70	90	1.00	OMS70A-09 (TH) ¹	89001167	11.5	81.5	1.00	1.30	0.37	0.41	0.56	9	60	40	75	61	1.1
70	90	1.00	OMS70A-32		13.0	83.0	1.00	1.45	0.38	0.42	0.64	9	70	35	75	61	1.1
100	100	1.10	OMH100-04		14.0	114.0	1.10	1.46	0.47	0.58	0.80	9	70	45	90	76	1.3
100	100	1.10	OMH100-12 (TH) ¹	89001065	14.0	114.0	1.10	1.46	0.47	0.58	0.80	9	70	45	90	76	1.3
150	100	1.80	OMS150-02		18.5	168.5	1.80	2.26	0.43	0.85	1.12	16	65	75	120	106	1.8
150	100	1.80	OMS150-09 (TH) ¹	89001101	18.5	168.5	1.80	2.26	0.43	0.85	1.12	16	65	75	120	106	1.8
150	100	1.80	OMS150-32		20.5	170.5	1.80	2.26	0.43	0.86	1.14	16	70	65	120	106	1.6
175	130	1.50	OMB175-03	89000993	13.5	188.5	1.50	2.35	0.57	0.95	1.57	10	65	75	110	96	1.7
250	130	2.13	OMB250-09		16.5	266.5	2.13	3.15	0.57	1.35	2.09	15	60	105	140	126	2.4
250	130	2.13	OMB250-05		18.0	268.0	2.13	3.20	0.57	1.35	2.14	15	65	85	140	126	2.1
250	130	2.13	OMB250-10	89001014	19.5	269.5	2.13	3.25	0.58	1.36	2.18	15	70	75	140	126	1.8
250	100	3.00	OMS250-02		31.0	281.0	2.95	3.70	0.43	1.42	1.87	25	80	105	180	166	2.5
250	100	3.00	OMS250		31.0	281.0	2.95	3.70	0.43	1.42	1.87	25	80	105	155	141	2.4
400	135	3.25	OMB400-02		26.0	426.0	3.25	5.00	0.60	2.15	3.48	25	65	120	180	166	2.9
400	135	3.25	OMB400-03		27.5	427.5	3.25	5.30	0.60	2.16	3.70	25	70	105	180	166	2.5
High-pressure sodium																	
35	85	0.53	OMS35-08	89002543	8.0	43.0	0.53	0.65	0.37	0.22	0.28	5	55	30	65	51	0.8
35	85	0.53	OMS35-05 (TH) ¹	89001141	8.0	43.0	0.53	0.65	0.37	0.22	0.28	5	55	30	65	51	0.8
50	85	0.76	OMS50-04		10.0	60.0	0.76	0.92	0.36	0.30	0.39	7	60	35	70	56	1.0
70	90	0.95	OMS70-04		10.5	80.5	0.94	1.16	0.39	0.41	0.53	9	60	40	75	61	1.1
70	90	1.00	OMS70A-01		11.5	81.5	1.00	1.30	0.37	0.41	0.56	9	60	40	75	61	1.1
70	90	1.00	OMS70A-09 (TH) ¹	89001167	11.5	81.5	1.00	1.30	0.37	0.41	0.56	9	60	40	75	61	1.1
70	90	1.00	OMS70A-32		13.0	83.0	1.00	1.45	0.38	0.42	0.64	9	70	35	75	61	1.1
70	90	1.00	OMS70A/50 ²		12.3	82.3	1.00	1.30	0.37	0.42	0.57	9	65	40	75	61	1.1
100	100	1.20	OMS100-05		12.5	112.5	1.20	1.50	0.43	0.57	0.75	11	60	55	90	76	1.3
150	100	1.80	OMS150-02		18.5	168.5	1.80	2.26	0.43	0.85	1.12	16	65	75	120	106	1.8
150	100	1.80	OMS150-09 (TH) ¹	89001101	18.5	168.5	1.80	2.26	0.43	0.85	1.12	16	65	75	120	106	1.8
150	100	1.80	OMS150-32		20.5	170.5	1.80	2.26	0.43	0.86	1.14	16	70	65	120	106	1.6
250	100	3.00	OMS250-02		31.0	281.0	2.95	3.70	0.43	1.42	1.87	25	80	105	180	166	2.5
250	100	3.00	OMS250		31.0	281.0	2.95	3.70	0.43	1.42	1.87	25	80	105	155	141	2.4

Notes

- Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
- With power tapplings
Ballasts for other wattage ratings available on request.

230 V 50 Hz – OM ballasts

Lamp			Ballast		Electrical								Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF@0.9PF	Δt	stack mm	length mm	mtg centres mm	weight kg
W	V	A															
High-pressure mercury vapour																	
50	95	0.61	OMB50-01		9.0	59.0	0.61	0.78	0.42	0.29	0.38	6	65	30	65	51	0.8
80	115	0.80	OMB80-05		9.5	89.5	0.80	1.20	0.49	0.43	0.68	8	65	40	75	61	1.1
80	115	0.80	OMB80-08		13.0	93.0	0.80	1.25	0.51	0.45	0.74	7	70	30	75	61	0.9
125	125	1.15	OMB125-03		12.0	137.0	1.15	1.66	0.52	0.66	1.00	10	60	55	90	76	1.4
125	125	1.15	OMB125-09		14.5	139.5	1.15	1.92	0.53	0.67	1.18	10	65	45	90	76	1.3
175	130	1.50	OMB175-02		15.0	190.0	1.50	2.34	0.55	0.92	1.50	12	65	85	120	106	2.0
250	130	2.13	OMB250-15		19.5	269.5	2.13	3.15	0.55	1.30	2.02	18	65	105	140	126	2.4
250	130	2.13	OMB250-07		23.0	273.0	2.13	3.60	0.56	1.32	2.34	18	70	85	140	126	2.1
Metal-halide																	
35	85	0.53	OMS35-02 (TH) ¹		9.0	44.0	0.53	0.64	0.36	0.21	0.27	6	60	30	65	51	0.8
50	95	0.61	OMB50-01		9.0	59.0	0.61	0.78	0.42	0.29	0.38	6	65	30	65	51	0.8
70	90	1.00	OMS70A-15		13.5	83.5	1.00	1.11	0.36	0.40	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-11 (TH) ¹		13.5	83.5	1.00	1.11	0.36	0.40	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-23	89001179	15.5	85.5	1.00	1.25	0.37	0.41	0.54	11	65	45	100	86	1.3
100	100	1.10	OMH100		13.5	113.5	1.10	1.43	0.45	0.55	0.75	11	65	65	100	86	1.5
100	100	1.10	OMH100-02 (TH) ¹		13.5	113.5	1.10	1.43	0.45	0.55	0.75	11	65	65	100	86	1.5
150	100	1.80	OMS150-15		19.0	169.0	1.80	2.34	0.41	0.82	1.11	18	50	105	155	141	2.5
150	100	1.80	OMS150-05 (TH) ¹		21.0	171.0	1.80	2.34	0.41	0.83	1.13	18	60	105	155	141	2.5
150	100	1.80	OMS150-28		21.5	171.5	1.80	2.39	0.41	0.83	1.16	18	65	85	155	141	2.1
175	130	1.50	OMB175-02		15.0	190.0	1.50	2.34	0.55	0.92	1.50	12	65	85	120	106	2.0
250	130	2.13	OMB250-15		19.5	269.5	2.13	3.15	0.55	1.30	2.02	18	65	105	140	126	2.4
250	130	2.13	OMB250-07		23.0	273.0	2.13	3.60	0.56	1.32	2.34	18	70	85	140	126	2.1
35	85	0.53	OMS35-02 (TH) ¹		9.0	44.0	0.53	0.64	0.36	0.21	0.27	6	60	30	65	51	0.8
50	95	0.61	OMB50-01		9.0	59.0	0.61	0.78	0.42	0.29	0.38	6	65	30	65	51	0.8
70	90	1.00	OMS70A-15		13.5	83.5	1.00	1.11	0.36	0.40	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-11 (TH) ¹		13.5	83.5	1.00	1.11	0.36	0.40	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-23		15.5	85.5	1.00	1.25	0.37	0.41	0.54	11	65	45	100	86	1.3
100	100	1.10	OMH100		13.5	113.5	1.10	1.43	0.45	0.55	0.75	11	65	65	100	86	1.5
High-pressure sodium																	
35	85	0.53	OMS35-02 (TH) ¹		9.0	44.0	0.53	0.64	0.36	0.21	0.27	6	60	30	65	51	0.8
50	85	0.76	OMS50-15		10.5	60.5	0.76	0.84	0.35	0.29	0.34	9	65	55	90	76	1.3
70	90	0.95	OMS70-02		12.0	82.0	0.94	1.14	0.38	0.40	0.50	10	70	55	90	76	1.4
70	90	1.00	OMS70A-15		13.5	83.5	1.00	1.11	0.36	0.40	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-11 (TH) ¹		13.5	83.5	1.00	1.11	0.36	0.40	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-23	89001179	15.5	85.5	1.00	1.25	0.37	0.41	0.54	11	65	45	100	86	1.3
100	100	1.20	OMS100-04		14.0	114.0	1.20	1.52	0.41	0.55	0.73	12	65	75	110	96	1.7
150	100	1.80	OMS150-15		19.0	169.0	1.80	2.34	0.41	0.82	1.11	18	50	105	155	141	2.5
150	100	1.80	OMS150-05 (TH) ¹		21.0	171.0	1.80	2.34	0.41	0.83	1.13	18	60	105	155	141	2.5
150	100	1.80	OMS150-28		21.5	171.5	1.80	2.39	0.41	0.83	1.16	18	65	85	155	141	2.1

Notes

- Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
Ballasts for other wattage ratings available on request.

240 V 50 Hz – OM ballasts

Lamp			Ballast		Electrical								Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF@0.9PF	Δt	stack mm	length mm	mtg centres mm	weight kg
W	V	A			W	W	A	A		A	A	μF	°C	mm	mm	mm	kg
High-pressure mercury vapour																	
40	90	0.53	OMB40		8.0	48.0	0.53	0.65	0.38	0.22	0.29	6	65	30	65	51	0.8
50	95	0.61	OMB50	89001024	9.0	59.0	0.61	0.76	0.40	0.27	0.36	6	65	30	65	51	0.8
75	130	0.64	OMB75		9.5	84.5	0.64	0.92	0.55	0.39	0.59	5	65	35	70	56	1.0
80	115	0.80	OMB80	89001030	9.5	89.5	0.80	1.11	0.47	0.41	0.60	7	65	40	75	61	1.1
80	115	0.80	OMB80-00		13.5	93.5	0.80	1.33	0.49	0.43	0.76	7	70	30	75	61	0.9
100	130	0.85	OMB100		10.0	110.0	0.85	1.21	0.54	0.51	0.76	7	60	55	90	76	1.3
100	130	0.85	OMB100-00		13.0	113.0	0.85	1.22	0.55	0.52	0.79	7	65	45	90	76	1.3
100	115	1.00	OMB100A		12.0	112.0	1.00	1.36	0.47	0.52	0.74	9	65	55	90	76	1.3
100	115	1.00	OMB100A-00		15.0	115.0	1.00	1.40	0.48	0.53	0.78	9	70	45	90	76	1.3
125	125	1.15	OMB125	89000974	12.0	137.0	1.15	1.66	0.50	0.63	0.96	10	60	65	100	86	1.5
125	125	1.15	OMB125-00	89000976	15.5	140.5	1.15	1.90	0.51	0.65	1.13	10	65	45	100	86	1.3
175	130	1.50	OMB175	89000990	16.0	191.0	1.50	2.29	0.53	0.88	1.42	12	65	85	120	106	2.0
175	130	1.50	OMB175-00		20.0	195.0	1.50	2.12	0.54	0.90	1.34	12	75	65	120	106	1.6
250	130	2.13	OMB250	89001000	19.5	269.5	2.13	3.15	0.53	1.25	1.94	18	65	120	155	141	2.8
250	130	2.13	OMB250-00	89001004	24.5	274.5	2.13	3.60	0.54	1.27	2.26	18	70	85	155	141	2.1
Metal-halide																	
35	85	0.53	OMS35	89001136	9.0	44.0	0.53	0.60	0.35	0.20	0.24	6	55	40	75	61	1.1
35	85	0.53	OMS35-04 (TH) ¹	89001140	9.0	44.0	0.53	0.60	0.35	0.20	0.24	6	55	40	75	61	1.1
35	85	0.53	OMS35-00		10.0	45.0	0.53	0.61	0.35	0.21	0.25	6	60	30	75	61	0.9
35	85	0.53	OMS35 (TH) ¹		10.0	45.0	0.53	0.61	0.35	0.21	0.25	6	60	30	75	61	0.9
50	95	0.61	OMB50	89001024	9.0	59.0	0.61	0.76	0.40	0.27	0.36	6	65	30	65	51	0.8
70	90	1.00	OMSL70A-01 ⁶	89001195	8.2	78.2	1.00	1.12	0.33	0.36	0.43	11	30	85	120	106	2.0
70	90	1.00	OMS70A	89001157	14.0	84.0	1.00	1.16	0.35	0.39	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-02 (TH) ¹	89001160	14.0	84.0	1.00	1.16	0.35	0.39	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-00	89001158	16.0	86.0	1.00	1.22	0.36	0.40	0.51	11	70	45	100	86	1.3
70	90	1.00	OMS70A-21 (TH) ¹	89001177	16.0	86.0	1.00	1.22	0.36	0.40	0.51	11	70	45	100	86	1.3
100	100	1.10	OMH100	89001055	14.0	114.0	1.10	1.40	0.43	0.53	0.71	11	70	65	100	86	1.5
100	100	1.10	OMH100-01 (TH) ¹	89001056	14.0	114.0	1.10	1.40	0.43	0.53	0.71	11	70	65	100	86	1.5
150	100	1.80	OMS150	89001093	20.0	170.0	1.80	2.30	0.39	0.79	1.06	18	55	105	155	141	2.4
150	100	1.80	OMS150-26 ⁶	89001109	20.0	170.0	1.80	2.30	0.39	0.79	1.06	18	55	105	155	141	2.5
150	100	1.80	OMS150-04 (TH) ¹	89001096	22.0	172.0	1.80	2.30	0.40	0.80	1.07	18	60	105	155	141	2.4
150	100	1.80	OMS150-00	89001094	22.5	172.5	1.80	2.35	0.40	0.80	1.09	18	65	85	155	141	2.1
150	100	1.80	OMS150-17 (TH) ¹	89001105	22.5	172.5	1.80	2.35	0.40	0.80	1.09	18	65	85	120	106	2.0
150	100	1.80	OMS150-22 (TH) ¹		22.5	172.5	1.80	2.35	0.40	0.80	1.09	18	65	85	155	141	2.1
175	130	1.50	OMB175	89000990	16.0	191.0	1.50	2.29	0.53	0.88	1.42	12	65	85	120	106	2.0
175	130	1.50	OMB175-00		20.0	195.0	1.50	2.12	0.54	0.90	1.34	12	75	65	120	106	1.6
250	130	2.13	OMB250	89001000	19.5	269.5	2.13	3.15	0.53	1.25	1.94	18	65	120	155	141	2.8
250	130	2.13	OMB250-00	89001004	24.5	274.5	2.13	3.60	0.54	1.27	2.26	18	70	85	155	141	2.1
250	100	3.00	OMS250.5 ⁵		36.0	286.0	3.00	3.60	0.40	1.32	1.67	30	65	85	120	106	2.1

Notes

- Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
- Capacitor – dual function – power factor correction and starting aid.
- Use with ZRM36-LP/B.
- Use with suitable ignitor.
- Split ballast, two required.
- With multiple voltage tappings
Ballasts for other wattage ratings available on request.

240 V 50 Hz – OM ballasts

Lamp			Ballast		Electrical								Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF@0.9PF	Δt	stack mm	length mm	mtg centres mm	weight kg
W	V	A															
High-pressure mercury vapour																	
35	85	0.53	OMS35	89001136	9.0	44.0	0.53	0.60	0.35	0.20	0.24	6	55	40	75	61	1.1
35	85	0.53	OMS35-04 (TH) ¹	89001140	9.0	44.0	0.53	0.60	0.35	0.20	0.24	6	55	40	75	61	1.1
35	85	0.53	OMS35-00		10.0	45.0	0.53	0.61	0.35	0.21	0.25	6	60	30	75	61	0.9
35	85	0.53	OMS35 (TH) ¹		10.0	45.0	0.53	0.61	0.35	0.21	0.25	6	60	30	75	61	0.9
50	85	0.76	OMS50	89001144	11.5	61.5	0.76	0.87	0.34	0.28	0.34	8	65	55	90	76	1.4
50	85	0.76	OMS50-00		14.0	64.0	0.76	0.90	0.35	0.30	0.37	8	75	35	90	76	1.1
70	90	0.95	OMS70	89001151	12.5	82.5	0.94	1.14	0.37	0.38	0.49	10	70	55	90	76	1.4
70	90	1.00	OMSL70A-01 ⁶	89001195	8.2	78.2	1.00	1.12	0.33	0.36	0.43	11	30	85	120	106	2.0
70	90	1.00	OMS70A	89001157	14.0	84.0	1.00	1.16	0.35	0.39	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-02 (TH) ¹	89001160	14.0	84.0	1.00	1.16	0.35	0.39	0.47	11	65	65	100	86	1.5
70	90	1.00	OMS70A-00	89001158	16.0	86.0	1.00	1.22	0.36	0.40	0.51	11	70	45	100	86	1.3
70	90	1.00	OMS70A-21 (TH) ¹	89001177	16.0	86.0	1.00	1.22	0.36	0.40	0.51	11	70	45	100	86	1.3
100	100	1.20	OMS100	89001077	14.5	114.5	1.20	1.50	0.40	0.53	0.70	12	65	75	110	96	1.7
100	100	1.20	OMS100-00		18.0	118.0	1.20	1.45	0.41	0.55	0.69	12	75	55	110	96	1.5
150	100	1.80	OMS150	89001093	20.0	170.0	1.80	2.30	0.39	0.79	1.06	18	55	105	155	141	2.4
150	100	1.80	OMS150-26 ⁶	89001109	20.0	170.0	1.80	2.30	0.39	0.79	1.06	18	55	105	155	141	2.5
150	100	1.80	OMS150-04 (TH) ¹	89001096	22.0	172.0	1.80	2.30	0.40	0.80	1.07	18	60	105	155	141	2.4
150	100	1.80	OMS150-00	89001094	22.5	172.5	1.80	2.35	0.40	0.80	1.09	18	65	85	155	141	2.1
150	100	1.80	OMS150-17 (TH) ¹	89001105	22.5	172.5	1.80	2.35	0.40	0.80	1.09	18	65	85	120	106	2.0
150	100	1.80	OMS150-22 (TH) ¹		22.5	172.5	1.80	2.35	0.40	0.80	1.09	18	65	85	155	141	2.1
150	100	1.80	OMS150/100 (TH) ^{1,7}	89003580	22.5	172.5	1.80	2.30	0.40	0.80	1.07	18	55	105	155	141	2.5
250	100	3.00	OMS250.5 ⁵		36.0	286.0	3.00	3.60	0.40	1.32	1.67	30	65	85	120	106	2.1
Low-pressure sodium																	
18	57	0.35	OMLS18 ²		7.5	25.5	0.35	0.36	0.30	0.12	0.13	4	55	30	65	51	0.8
26	84	0.35	OMLS26 ³		6.5	32.5	0.35	0.40	0.39	0.15	0.18	3.5	50	30	65	51	0.8
35	70	0.60	OMLS35/55 ³		10.0	45.0	0.60	0.64	0.31	0.21	0.23	7	55	40	75	61	1.1
55	109	0.59	OMLS35/55 ³		10.0	65.0	0.59	0.64	0.46	0.30	0.34	6	55	40	75	61	1.1
90	112	0.94	OMLS90 ⁴		12.5	102.5	0.94	0.99	0.45	0.47	0.52	9	60	65	100	86	1.5

Notes

1. Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
2. Capacitor – dual function – power factor correction and starting aid.
3. Use with ZRM36-LP/B.
4. Use with suitable ignitor.
5. Split ballast, two required.
6. With multiple voltage tapplings
7. With power tapplings

Ballasts for other wattage ratings available on request.

250 V 50 Hz – OM ballasts

Lamp			Ballast		Electrical								Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF0.9PF	Δt	stack mm	length mm	mtg centres mm	weight kg
W	V	A			W	W	A	A		A	A	μF	°C	mm	mm	mm	kg
High-pressure mercury vapour																	
40	90	0.53	OMB40		10.7	50.7	0.53	0.64	0.38	0.23	0.29	5	65	30	65	51	0.8
50	95	0.61	OMB50-02	89001025	11.7	61.7	0.61	0.75	0.40	0.27	0.35	6	65	30	65	51	0.8
75	130	0.64	OMB75		10.2	85.2	0.64	0.88	0.53	0.38	0.55	5	65	35	70	56	1.0
80	115	0.80	OMB80-03	89001033	12.4	92.4	0.80	1.05	0.46	0.41	0.57	7	65	40	75	61	1.1
100	130	0.85	OMB100		11.9	111.9	0.85	1.17	0.53	0.50	0.72	7	60	55	90	76	1.3
100	115	1.00	OMB100A		14.1	114.1	1.00	1.31	0.46	0.51	0.70	9	65	55	90	76	1.3
125	125	1.15	OMB125-05	89000980	14.2	139.2	1.15	1.58	0.48	0.62	0.89	10	60	65	100	86	1.5
175	130	1.50	OMB175		17.6	192.6	1.50	2.08	0.51	0.86	1.25	12	65	85	120	106	2.0
250	130	2.13	OMB250		23.3	273.3	2.13	2.96	0.51	1.21	1.77	18	65	120	155	141	2.8
Metal-halide																	
50	95	0.61	OMB50-02	89001025	11.7	61.7	0.61	0.75	0.40	0.27	0.35	6	65	30	65	51	0.8
70	90	1.00	OMSL70A-01 ³	89001195	8.6	78.6	1.00	1.12	0.31	0.35	0.41	11	30	85	120	106	2.0
70	90	1.00	OMSL70A (TH) ¹	89002558	8.6	78.6	1.00	1.12	0.31	0.35	0.41	11	30	85	120	106	2.0
70	90	1.00	OMS70A-05	89001163	15.3	85.3	1.00	1.20	0.34	0.38	0.48	10	65	65	100	86	1.5
70	90	1.00	OMS70A (TH) ¹		15.3	85.3	1.00	1.20	0.34	0.38	0.48	10	65	65	100	86	1.5
100	100	1.10	OMH100		15.7	115.7	1.10	1.37	0.42	0.51	0.67	10	70	65	100	86	1.5
100	100	1.10	OMH100 (TH) ¹		15.7	115.7	1.10	1.37	0.42	0.51	0.67	10	70	65	100	86	1.5
150	100	1.80	OMS150-11	89001103	21.5	171.5	1.80	2.20	0.38	0.76	0.98	18	60	105	155	141	2.4
150	100	1.80	OMS150 (TH) ¹		23.0	173.0	1.80	2.20	0.38	0.77	0.99	18	65	105	155	141	2.4
175	130	1.50	OMB175		17.6	192.6	1.50	2.08	0.51	0.86	1.25	12	65	85	120	106	2.0
250	130	2.13	OMB250		23.3	273.3	2.13	2.96	0.51	1.21	1.77	18	65	120	155	141	2.8
250	100	3.00	OMS250.5 ²		38.4	288.4	3.00	3.73	0.38	1.28	1.67	30	65	85	120	106	2.1
High-pressure sodium																	
50	85	0.76	OMS50-03	89001146	12.5	62.5	0.76	0.90	0.33	0.28	0.35	8	65	55	90	76	1.4
70	90	0.95	OMS70		15.2	85.2	0.94	1.15	0.36	0.38	0.49	10	70	55	90	76	1.4
70	90	1.00	OMSL70A-01 ³	89001195	8.6	78.6	1.00	1.12	0.31	0.35	0.41	11	30	85	120	106	2.0
70	90	1.00	OMSL70A (TH) ¹	89002558	8.6	78.6	1.00	1.12	0.31	0.35	0.41	11	30	85	120	106	2.0
70	90	1.00	OMS70A-05	89001163	15.3	85.3	1.00	1.20	0.34	0.38	0.48	10	65	65	100	86	1.5
70	90	1.00	OMS70A (TH) ¹		15.3	85.3	1.00	1.20	0.34	0.38	0.48	10	65	65	100	86	1.5
100	100	1.20	OMS100-02	89001079	16.6	116.6	1.20	1.49	0.39	0.52	0.68	12	65	75	110	96	1.7
150	100	1.80	OMS150-11	89001103	21.5	171.5	1.80	2.20	0.38	0.76	0.98	18	60	105	155	141	2.4
150	100	1.80	OMS150 (TH) ¹		23.0	173.0	1.80	2.20	0.38	0.77	0.99	18	65	105	155	141	2.4
250	100	3.00	OMS250.5 ²		38.4	288.4	3.00	3.73	0.38	1.28	1.67	30	65	85	120	106	2.1

Notes

1. Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
2. Split ballast, two required.
3. With multiple voltage tapings
Ballasts for other wattage ratings available on request.

OG type HID ballasts

- varnish impregnation
- very low noise level
- long service life
- glass fibre filled nylon coil covers
- 24A double-screw terminals
- winding insulation Class H materials
- fixed air gap ensuring permanent calibration
- tw150 winding temperature rating
- resistant to moisture and corrosion

100% final testing

- continuity
- winding short circuit
- insulation
- impedance

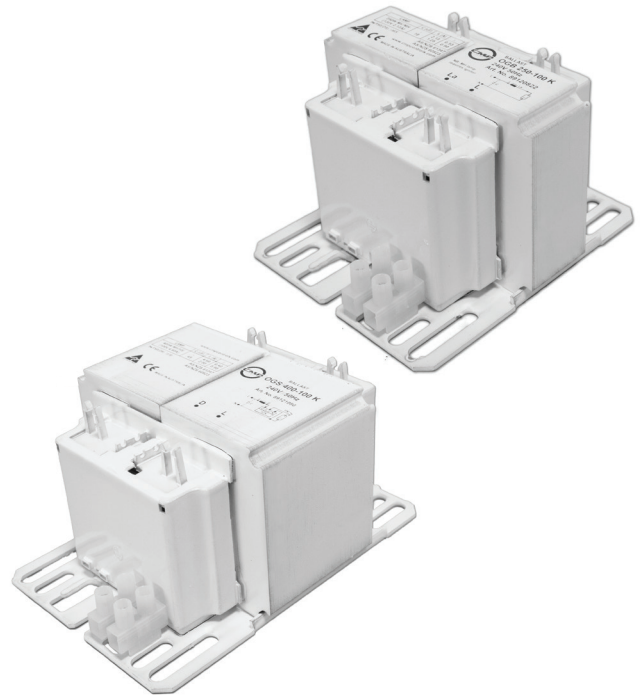


Figure 1

OG type ballasts with stack sizes 30–160 mm

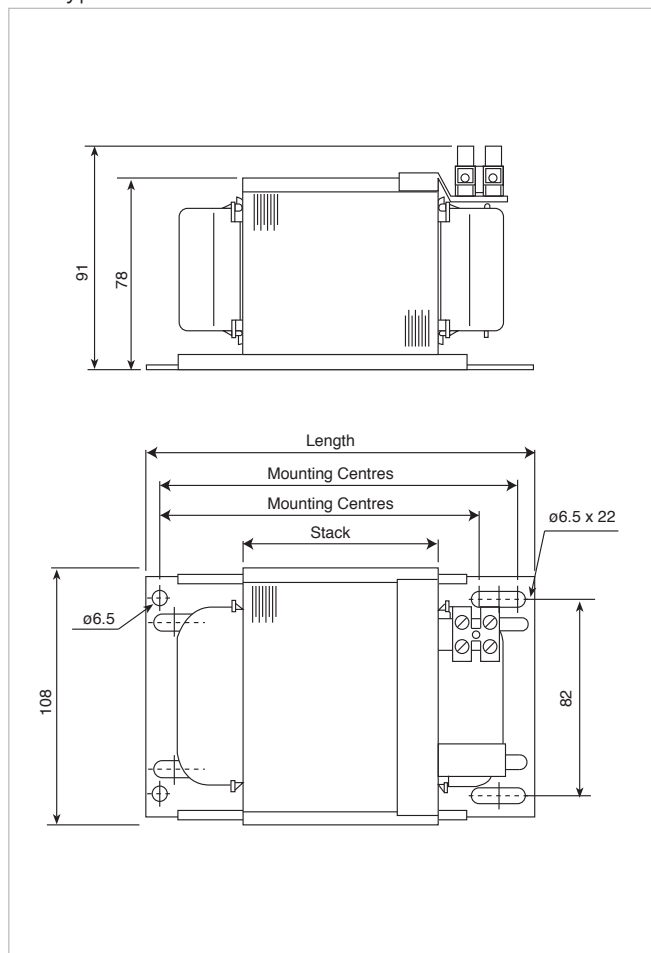
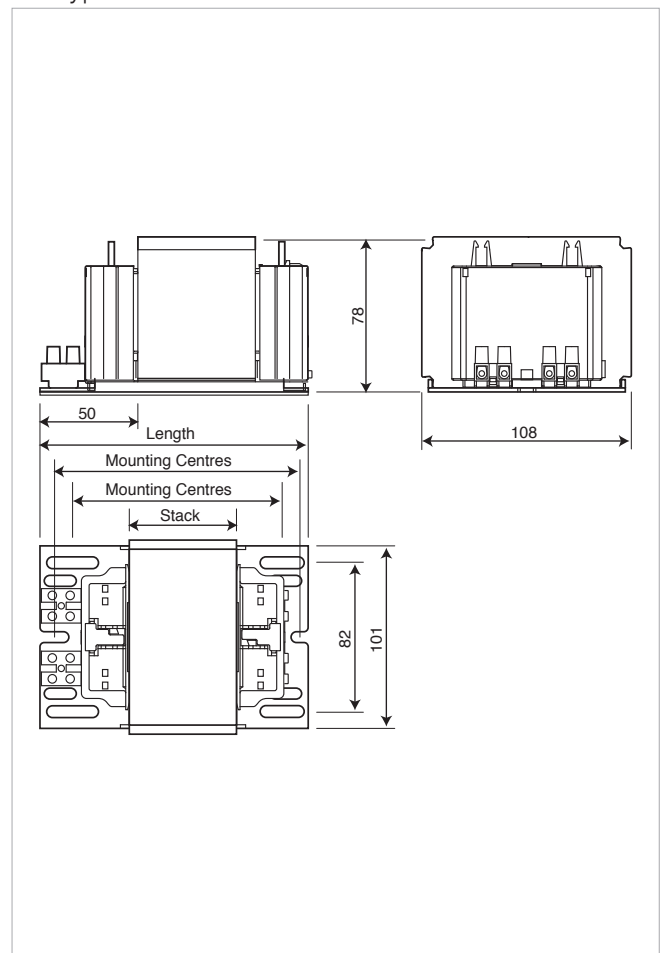


Figure 2

OG type ballasts with stack sizes 30–100 mm



220 V 50 Hz – OG ballasts

Lamp			Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF@0.9PF	winding Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	A																
High-pressure mercury vapour																		
250	130	2.13	OGB250-102		19	269	2.13	3.40	0.57	1.36	2.28	18	60	30	2	120	91-107	2.4
250	130	2.13	OGB250/125 ²		18	268	2.13	3.30	0.57	1.35	2.20	18	60	30	1	110	81-97	2.4
400	135	3.25	OGB400-125	89122648	26	426	3.25	5.30	0.60	2.15	3.68	25	70	40	2	130	101-117	3.1
400	135	3.25	OGB400-108		22	422	3.25	5.40	0.59	2.13	3.72	25	55	50	2	140	111-127	3.7
400	135	3.25	OGB400/250 ²		24	424	3.25	5.10	0.59	2.14	3.53	25	70	50	1	120	91-107	3.7
700	140	5.40	OGB700-05		30	730	5.40	9.10	0.61	3.69	6.52	40	55	80	1	160	131-147	5.5
1,000	145	7.50	OGB1000-05		44	1,044	7.50	12.30	0.63	5.27	9.08	55	55	110	1	190	161-177	7.0
Metal-halide																		
150	100	1.80	OGS150-103		17	167	1.80	2.30	0.42	0.84	1.13	20	55	30	2	120	91-107	2.4
150	100	1.80	OGS150-110 (TH) ¹		17	167	1.80	2.30	0.42	0.84	1.13	20	55	30	2	120	91-107	2.4
250	130	2.13	OGB250-102		19	269	2.13	3.40	0.57	1.36	2.28	18	60	30	2	120	91-107	2.4
250	100	3.00	OGS250-103	89121030	24	274	3.00	4.00	0.42	1.38	1.94	35	65	40	2	130	101-117	3.1
250	100	3.00	OGS250-108 (TH) ¹		24	274	3.00	4.00	0.42	1.38	1.94	35	65	40	2	130	101-117	3.1
400	135	3.25	OGB400-125	89122648	26	426	3.25	5.30	0.60	2.15	3.68	25	70	40	2	130	101-117	3.1
400	135	3.25	OGB400-108		22	422	3.25	5.40	0.59	2.13	3.72	25	55	50	2	140	111-127	3.7
400	120	3.50	OGH400-102		25	425	3.50	5.80	0.55	2.15	3.73	30	60	45	2	140	111-127	3.4
400	100	4.60	OGS400-102	89121082	34	434	4.60	6.70	0.43	2.19	3.35	50	65	60	2	150	121-137	4.3
1,000	130	8.25	OGH1000-05		48	1,048	8.25	12.80	0.58	5.29	8.62	65	55	120	1	200	171-187	7.5
1,000	120	9.50	OGH1000A-06		62	1,062	9.50	14.00	0.51	5.36	8.30	85	70	120	1	200	171-187	7.5
High-pressure sodium vapour																		
150	100	1.80	OGS150-103		17	167	1.80	2.30	0.42	0.84	1.13	20	55	30	2	120	91-107	2.4
150	100	1.80	OGS150-110 (TH) ¹		17	167	1.80	2.30	0.42	0.84	1.13	20	55	30	2	120	91-107	2.4
250	100	3.00	OGS250-103	89121030	24	274	3.00	4.00	0.42	1.38	1.94	35	65	40	2	130	101-117	3.1
250	100	3.00	OGS250-108 (TH) ¹		24	274	3.00	4.00	0.42	1.38	1.94	35	65	40	2	130	101-117	3.1
250	100	3.00	OGS250/150-101 ²	89121017	24	274	3.00	3.90	0.42	1.38	1.89	35	70	50	2	140	111-127	3.7
400	100	4.60	OGS400-102	89121082	34	434	4.60	6.70	0.43	2.19	3.35	50	65	60	2	150	121-137	4.3
400	100	4.60	OGS400/250-101 ²	89121071	34	434	4.60	6.20	0.43	2.19	3.10	50	60	70	2	160	131-147	4.9
600	110	6.20	OGS600-04		40	640	6.20	8.15	0.47	3.23	4.46	60	60	90	1	170	141-157	6.0
1,000	110	10.30	OGS1000-06		58	1,058	10.30	13.90	0.47	5.34	7.57	100	65	140	1	220	191-207	8.9

Notes

1. Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
2. With power tapings
Ballasts for other wattage ratings available on request.

220 V 60 Hz – OG ballasts

Lamp			Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos ø	line current A@0.9PF	line start current A@0.9PF	capacitor µF0.9PF	winding Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	A																
High-pressure mercury vapour																		
250	130	2.13	OGB250-103	89120825	18	268	2.13	3.20	0.57	1.35	2.14	15	60	30	2	120	91-107	2.4
400	135	3.25	OGB400-104		25	425	3.25	5.90	0.59	2.15	4.09	25	70	30	2	120	91-107	2.4
400	135	3.25	OGB400-109		22	422	3.25	5.30	0.59	2.13	3.65	25	60	40	2	130	101-117	3.1
700	140	5.40	OGB700-06		33	733	5.40	8.40	0.62	3.70	6.05	35	60	70	1	150	121-137	5.0
1,000	145	7.50	OGB1000-04		43	1,043	7.50	12.10	0.63	5.27	8.89	45	55	100	1	190	151-167	6.5
Metal-halide																		
150	100	1.80	OGS150-104	89120994	17	167	1.80	2.20	0.42	0.84	1.08	16	55	30	2	120	91-107	2.4
250	130	2.13	OGB250-103	89120825	18	268	2.13	3.20	0.57	1.35	2.14	15	60	30	2	120	91-107	2.4
250	100	3.00	OGS250-104	89121031	25	275	3.00	4.20	0.42	1.39	2.04	30	65	30	2	120	91-107	2.4
400	135	3.25	OGB400-104		25	425	3.25	5.90	0.59	2.15	4.09	25	70	30	2	120	91-107	2.4
400	135	3.25	OGB400-109		22	422	3.25	5.30	0.59	2.13	3.65	25	60	40	2	130	101-117	3.1
400	120	3.50	OGH400-103		26	426	3.50	5.55	0.55	2.15	3.58	25	70	40	2	130	101-117	3.1
400	100	4.60	OGS400-103	89121083	34	434	4.60	6.20	0.43	2.19	3.10	40	65	50	2	140	111-127	3.7
1,000	130	8.25	OGH1000-03		48	1,048	8.25	12.90	0.58	5.29	8.69	55	60	100	1	180	151-167	6.5
1,000	120	9.50	OGH1000A-02		60	1,060	9.50	13.20	0.51	5.35	7.81	75	65	120	1	200	171-187	7.5
High-pressure sodium vapour																		
150	100	1.80	OGS150-104	89120994	17	167	1.80	2.20	0.42	0.84	1.08	16	55	30	2	120	91-107	2.4
250	100	3.00	OGS250-104	89121031	25	275	3.00	4.20	0.42	1.39	2.04	30	65	30	2	120	91-107	2.4
400	100	4.60	OGS400-103	89121083	34	434	4.60	6.20	0.43	2.19	3.10	40	65	50	2	140	111-127	3.7
600	110	6.20	OGS600-05		39	639	6.20	8.15	0.47	3.23	4.45	50	55	80	1	160	131-147	5.5
1,000	110	10.30	OGS1000-01		56	1,056	10.30	14.00	0.47	5.33	7.61	85	55	120	1	200	171-187	7.5

Notes

- Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
Ballasts for other wattage ratings available on request.

230 V 50 Hz – OG ballasts

Lamp			Ballast		Electrical								Thermal	Physical					
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos ø	line current A@0.9PF	line start current A@0.9PF	capacitor µF@0.9PF	winding Δt	stack mm	figure	length mm	mtg centres mm	weight kg	
W	V	A																	
High-pressure mercury vapour																			
250	130	2.13	OGB250-104		20	270	2.13	3.20	0.55	1.30	2.06	18	65	30	2	120	91-107	2.4	
400	135	3.25	OGB400-105		27	427	3.25	5.20	0.57	2.06	3.47	25	70	40	2	130	101-117	3.1	
400	135	3.25	OGB400-107		23	423	3.25	5.10	0.57	2.04	3.37	25	60	50	2	140	111-127	3.7	
700	140	5.40	OGB700-04		32	732	5.40	8.80	0.59	3.54	6.05	40	60	80	1	160	131-147	5.5	
1,000	145	7.50	OGB1000-02		48	1,048	7.50	11.90	0.61	5.06	8.43	55	60	110	1	190	161-177	7.0	
Metal-halide																			
150	100	1.80	OGS150-105		18	168	1.80	2.30	0.41	0.81	1.09	18	60	30	2	120	91-107	2.4	
150	100	1.80	OGS150 TH ¹	89003641	18	168	1.80	2.30	0.41	0.81	1.09	18	60	30	2	120	91-107	2.4	
250	130	2.13	OGB250-104		20	270	2.13	3.20	0.55	1.30	2.06	18	65	30	2	120	91-107	2.4	
250	133	2.10	OGH250-101PS ^{1,2}	89003532	19	269	2.10	3.22	0.56	1.30	2.09	18	60	30	2	130	101-117	2.4	
250	133	2.10	OGH250/160 ^{1,2,3}	89003756	19.5	269.5	2.10	3.22	0.56	1.30	2.10	18	60	30	2	130	101-117	2.4	
250	100	3.00	OGS250-105	89121032	25	275	3.00	3.90	0.40	1.33	1.81	35	65	40	2	130	101-117	3.1	
250	100	3.00	OGS250 TH ¹		25	275	3.00	3.90	0.40	1.33	1.81	35	65	40	2	130	101-117	3.1	
300	133	2.45	OGH300-103PS ^{1,2}	89003638	20	320	2.45	3.75	0.57	1.55	2.48	20	65	40	2	130	101-117	3.1	
300	133	2.45	OGH300/190 ^{1,2,3}		22	322	2.45	3.90	0.57	1.56	2.60	20	65	40	2	130	101-117	3.1	
320	135	2.63	OGH320-103PS ^{1,2}	89003637	23	343	2.63	3.96	0.57	1.66	2.62	20	55	40	2	130	101-117	3.1	
320	135	2.63	OGH320/200 ^{1,2,3}		24	344	2.63	3.96	0.57	1.66	2.63	20	55	40	2	130	101-117	3.1	
350	135	2.80	OGH350-103PS ^{1,2}	89003530	28	378	2.80	4.40	0.59	1.83	3.01	25	60	40	2	130	101-117	3.1	
350	135	2.80	OGH350/220-101W ^{1,2,3}	89122894	26	376	2.80	4.30	0.58	1.82	2.93	25	50	50	2	140	111-127	3.7	
400	135	3.25	OGB400-105		27	427	3.25	5.20	0.57	2.06	3.47	25	70	40	2	130	101-117	3.1	
400	135	3.25	OGB400-107		23	423	3.25	5.10	0.57	2.04	3.37	25	60	50	2	140	111-127	3.7	
400	120	3.50	OGH400-101		25	425	3.50	5.55	0.53	2.05	3.42	30	60	45	2	140	111-127	3.4	
400	135	3.20	OGH400-101W ^{1,2}	89003521	28	428	3.20	4.95	0.58	2.07	3.36	25	60	40	2	130	101-117	3.1	
400	135	3.20	OGH400/250-101W ^{1,2,3}	89003634	26	426	3.20	4.96	0.58	2.06	3.35	25	50	60	2	140	111-127	4.3	
400	100	4.60	OGS400-104	89121084	35	435	4.60	6.10	0.41	2.10	2.93	50	65	60	2	150	121-137	4.3	
400	100	4.60	OGS400 TH ¹	89003596	35	435	4.60	6.10	0.41	2.10	2.93	50	65	60	2	150	121-137	4.3	
450	135	3.70	OGH450 ^{1,2}		36	486	3.70	5.72	0.57	2.35	3.81	30	60	50	2	140	111-127	3.7	
450	135	3.70	OGH450/280-101W ^{1,2,3}	89122895	34	484	3.70	5.70	0.57	2.34	3.78	30	50	60	2	140	111-127	4.3	
1,000	130	8.25	OGH1000-07		50	1,050	8.25	12.60	0.55	5.07	8.13	65	55	120	1	200	171-187	7.5	
1,000	120	9.50	OGH1000A-03		63	1,063	9.50	14.10	0.49	5.14	8.00	85	70	120	1	200	171-187	7.5	
1,000	120	9.50	OGS1000 ^{2,4}	89070074	57	1057	9.50	14.1	0.48	5.11	7.96	85	70	140	2	220	191-207	8.9	
High-pressure sodium vapour																			
150	100	1.80	OGS150-105		18	168	1.80	2.30	0.41	0.81	1.09	18	60	30	2	120	91-107	2.4	
150	100	1.80	OGS150 TH ¹	89003641	18	168	1.80	2.30	0.41	0.81	1.09	18	60	30	2	120	91-107	2.4	
250	100	3.00	OGS250-105	89121032	25	275	3.00	3.90	0.40	1.33	1.81	35	65	40	2	130	101-117	3.1	
250	100	3.00	OGS250 TH ¹		25	275	3.00	3.90	0.40	1.33	1.81	35	65	40	2	130	101-117	3.1	
400	100	4.60	OGS400-104	89121084	35	435	4.60	6.10	0.41	2.10	2.93	50	65	60	2	150	121-137	4.3	
400	100	4.60	OGS400 TH ¹	89003596	35	435	4.60	6.10	0.41	2.10	2.93	50	65	60	2	150	121-137	4.3	
600	110	6.20	OGS600-03		42	642	6.20	8.25	0.45	3.10	4.33	60	65	90	1	170	141-157	6.0	
1,000	110	10.30	OGS1000 ^{2,5}	89070074	60	1060	10.3	14.1	0.45	5.12	7.36	100	75	140	2	220	191-207	8.9	

Notes

1. Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
 2. With multiple voltage tapplings
 3. With power tapplings
 4. With ignitor tap suitable for use with ATIG-16 or ZRM 4000 powerPULSE ignitor
 5. With ignitor tap suitable for use with ATIG-11 or ZRM 4000 powerPULSE ignitor
- Ballasts for other wattage ratings available on request.

240 V 50 Hz – OG ballasts

Lamp			Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos φ	line current A@0.9PF	line start current A@0.9PF	capacitor μF0.9PF	winding Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	A																
High-pressure mercury vapour																		
250	130	2.13	OGB250-100	89120822	21	271	2.13	3.10	0.53	1.25	1.92	18	65	30	2	120	91-107	2.4
250	130	2.13	OGB250/125 ³		20	270	2.13	3.10	0.53	1.25	1.91	18	60	30	1	110	81-97	2.4
400	135	3.25	OGB400-100	89120854	29	429	3.25	5.00	0.55	1.99	3.21	25	75	40	2	130	101-117	3.1
400	135	3.25	OGB400-106		24	424	3.25	4.90	0.54	1.96	3.11	25	65	50	2	140	111-127	3.7
400	135	3.25	OGB400-114	89120867	22	422	3.25	4.90	0.54	1.95	3.09	25	55	60	2	150	121-137	4.3
400	135	3.25	OGB400/250 ³		27	427	3.25	4.90	0.55	1.98	3.13	25	70	50	1	120	91-107	3.7
700	140	5.40	OGB700	89120895	34	734	5.40	9.00	0.57	3.40	5.95	40	60	80	2	160	131-147	5.3
1,000	145	7.50	OGB1000	89120808	41	1,041	7.50	12.00	0.58	4.82	8.10	55	65	120	2	200	171-187	7.5
Metal-halide																		
150	100	1.80	OGS150-100	89120990	18	168	1.80	2.20	0.39	0.78	1.00	18	60	30	2	120	91-107	2.4
150	100	1.80	OGS150-102 (TH) ¹	89120992	18	168	1.80	2.20	0.39	0.78	1.00	18	60	30	2	120	91-107	2.4
150	100	1.80	OGS150-108	89120996	14	164	1.80	2.10	0.38	0.76	0.93	18	45	50	2	140	111-127	3.7
250	130	2.13	OGB250-100	89120822	21	271	2.13	3.10	0.53	1.25	1.92	18	65	30	2	120	91-107	2.4
250	133	2.10	OGH250-101PS ^{1 2}	89003532	21	271	2.10	3.15	0.54	1.25	1.98	18	60	30	2	130	101-117	2.4
250	133	2.10	OGH250/160 ^{1 2 3}	89003756	21.5	271.5	2.10	3.15	0.54	1.26	1.98	18	60	30	2	130	101-117	2.4
250	100	3.00	OGS250-100	89121027	26	276	3.00	3.90	0.38	1.28	1.74	30	70	40	2	130	101-117	3.1
250	100	3.00	OGS250-102 (TH) ¹		26	276	3.00	3.90	0.38	1.28	1.74	30	70	40	2	130	101-117	3.1
250	100	3.00	OGS250-IG ⁴	89122907	26	276	3.00	3.90	0.38	1.28	1.74	30	70	40	2	120	91-107	3.1
250	100	3.00	OGS250-107		22	272	3.00	3.70	0.38	1.26	1.63	30	60	50	2	140	111-127	3.7
300	133	2.45	OGH300-103PS ^{1 2}	89003638	22	322	2.45	3.68	0.55	1.49	2.35	20	65	40	2	130	101-117	3.1
300	133	2.45	OGH300/190 ^{1 2 3}		24	324	2.45	3.80	0.55	1.50	2.44	20	65	40	2	130	101-117	3.1
320	135	2.63	OGH320-103PS ^{1 2}	89003637	25	345	2.63	3.90	0.55	1.60	2.49	20	55	40	2	130	101-117	3.1
320	135	2.63	OGH320/200 ^{1 2 3}		26	346	2.63	3.90	0.55	1.60	2.49	20	55	40	2	130	101-117	3.1
350	135	2.80	OGH350-103PS ^{1 2}	89003530	30	380	2.80	4.30	0.57	1.76	2.84	25	60	40	2	130	101-117	3.1
350	135	2.80	OGH350/220-101W ^{1 2 3}	89122894	28	378	2.80	4.20	0.56	1.75	2.76	25	50	50	2	140	111-127	3.7
400	135	3.25	OGB400-100	89120854	29	429	3.25	5.00	0.55	1.99	3.21	25	75	40	2	130	101-117	3.1
400	135	3.25	OGB400-106		24	424	3.25	4.90	0.54	1.96	3.11	25	65	50	2	140	111-127	3.7
400	135	3.25	OGB400-114	89120867	22	422	3.25	4.90	0.54	1.95	3.09	25	55	60	2	150	121-137	4.3
400	120	3.50	OGH400-100	89120942	27	427	3.50	5.60	0.51	1.98	3.32	30	65	45	2	140	111-127	3.4
400	135	3.20	OGH400-101W ^{1 2}	89003521	30	430	3.20	4.88	0.56	1.99	3.19	25	60	40	2	130	101-117	3.1
400	135	3.20	OGH400/250-101W ^{1 2 3}	89003634	28	428	3.20	4.88	0.56	1.98	3.17	25	50	60	2	140	111-127	4.3
400	100	4.60	OGS400-100	89121080	37	437	4.60	6.10	0.40	2.02	2.82	45	70	60	2	150	121-137	4.3
400	100	4.60	OGS400-109 (TH) ¹		37	437	4.60	6.10	0.40	2.02	2.82	45	70	60	2	150	121-137	4.3
400	100	4.60	OGS400-129	89003531	37	437	4.60	6.10	0.40	2.02	2.82	45	70	60	2	140	111-127	4.3
400	100	4.60	OGS400-IG ⁴	89122906	37	437	4.60	6.10	0.40	2.02	2.82	45	70	60	2	140	111-127	4.9
400	100	4.60	OGS400-106	89121086	34	434	4.60	5.80	0.39	2.01	2.66	45	60	70	2	160	131-147	4.9
400	100	4.60	OGS400 ²	89070014	34	434	4.60	5.80	0.39	2.01	2.66	45	60	70	2	150	121-137	4.9
450	135	3.70	OGH450 ^{1 2}		38	488	3.70	5.66	0.55	2.26	3.63	30	60	50	2	140	111-127	3.7
450	135	3.70	OGH450/280-101W ^{1 2 3}	89122895	36	486	3.70	5.63	0.55	2.25	3.59	30	50	60	2	140	111-127	4.3
1,000	130	8.25	OGH1000	27020903	53	1,053	8.25	12.10	0.53	4.88	7.51	65	60	120	1	200	171-187	7.5
1,000	120	9.50	OGH1000A	27020913	64	1,064	9.50	13.00	0.47	4.93	7.05	85	70	140	2	220	191-207	8.9
1,000	120	9.50	OGH1000A-07 ⁴		64	1,064	9.50	13.00	0.47	4.93	7.05	85	70	140	1	220	191-207	8.9
1,000	120	9.50	OGS1000 ^{2 4}	89070074	57	1,057	9.50	13.10	0.46	4.89	7.09	85	70	140	2	220	191-207	8.9

Notes

1. Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
2. With multiple voltage tapplings
3. With power tapplings
4. With ignitor tap suitable for use with ATIG-16 or ZRM 4000 powerPULSE ignitor
5. With ignitor tap suitable for use with ATIG-11 or ZRM 4000 powerPULSE ignitor

Ballasts for other wattage ratings available on request.

240 V 50 Hz – OG ballasts

Lamp			Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos ø	line current A@0.9PF	line start current A@0.9PF	capacitor µF0.9PF	winding Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	A			W	W	A	A		A	A	µF	Δt	mm		mm	mm	kg
High-pressure sodium vapour																		
150	100	1.80	OGS150-100	89120990	18	168	1.80	2.20	0.39	0.78	1.00	18	60	30	2	120	91-107	2.4
150	100	1.80	OGS150-102 (TH) ¹	89120992	18	168	1.80	2.20	0.39	0.78	1.00	18	60	30	2	120	91-107	2.4
150	100	1.80	OGS150-108	89120996	14	164	1.80	2.10	0.38	0.76	0.93	18	45	50	2	140	111-127	3.7
250	100	3.00	OGS250-100	89121027	26	276	3.00	3.90	0.38	1.28	1.74	30	70	40	2	130	101-117	3.1
250	100	3.00	OGS250-102 (TH) ¹		26	276	3.00	3.90	0.38	1.28	1.74	30	70	40	2	130	101-117	3.1
250	100	3.00	OGS250-IG ⁵	89122907	26	276	3.00	3.90	0.38	1.28	1.74	30	70	40	2	120	91-107	3.1
250	100	3.00	OGS250-107		22	272	3.00	3.70	0.38	1.26	1.63	30	60	50	2	140	111-127	3.7
250	100	3.00	OGS250/150-100 ³		28	278	3.00	3.70	0.39	1.29	1.67	30	70	50	2	140	111-127	3.7
400	100	4.60	OGS400-100	89121080	37	437	4.60	6.10	0.40	2.02	2.82	45	70	60	2	150	121-137	4.3
400	100	4.60	OGS400-109 (TH) ¹		37	437	4.60	6.10	0.40	2.02	2.82	45	70	60	2	150	121-137	4.3
400	100	4.60	OGS400-129	89003531	37	437	4.60	6.10	0.40	2.02	2.82	45	70	60	2	140	111-127	4.3
400	100	4.60	OGS400-IG ⁵	89122906	37	437	4.60	6.10	0.40	2.02	2.82	45	70	60	2	140	111-127	4.3
400	100	4.60	OGS400-106	89121086	34	434	4.60	5.80	0.39	2.01	2.66	45	60	70	2	160	131-147	4.9
400	100	4.60	OGS400 ²	89070014	34	434	4.60	5.80	0.39	2.01	2.66	45	60	70	2	150	121-137	4.9
400	100	4.60	OGS400/250-100 ³		37	437	4.60	5.80	0.40	2.02	2.68	45	60	70	2	160	131-147	4.9
600	110	6.20	OGS600-100	89122873	45	645	6.20	8.00	0.43	2.99	4.05	60	70	80	2	160	131-147	5.3
600	110	6.20	OGS600-106		41	641	6.20	8.00	0.43	2.97	4.02	60	65	90	1	180	151-167	6.0
660	140	5.40	OGS660-100	89003853	32	692	5.40	8.00	0.53	3.20	4.98	45	65	80	2	170	141-157	5.3
940	145	7.50	OGS940		41	981	7.50	12.00	0.55	4.54	7.63	60	65	120	1	220	191-207	7.5
1,000	110	10.30	OGS1000	89120955	60	1060	10.3	13.1	0.43	4.91	6.55	95	75	140	2	220	191-207	8.9
1,000	110	10.3	OGS1000-11 ⁵	89120965	60	1060	10.3	13.1	0.43	4.91	6.55	95	75	140	2	220	191-207	8.9
1,000	110	10.3	OGS1000 ^{2 5}	89070074	60	1060	10.3	13.1	0.43	4.91	6.55	95	75	140	2	220	191-207	8.9

Notes

1. Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
2. With multiple voltage tapplings
3. With power tapplings
4. With ignitor tap suitable for use with ATIG-16 or ZRM 4000 powerPULSE ignitor
5. With ignitor tap suitable for use with ATIG-11 or ZRM 4000 powerPULSE ignitor

Ballasts for other wattage ratings available on request.

250 V 50 Hz – OG ballasts

Lamp			Ballast		Electrical								Thermal	Physical				
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	circuit P F cos ø	line current A@0.9PF	line start current A@0.9PF	capacitor µF0.9PF	winding Δt	stack mm	figure	length mm	mtg centres mm	weight kg
W	V	A																
High-pressure mercury vapour																		
250	130	2.13	OGB250-112	89120829	23.5	273.5	2.13	3.02	0.51	1.22	1.81	18	65	30	2	120	91-107	2.4
250	130	2.13	OGB250-23		15	265	2.13	3.01	0.50	1.18	1.75	18	55	50	1	120	91-107	3.7
400	135	3.25	OGB400-112	89120866	31	431	3.25	4.69	0.53	1.92	2.90	25	75	40	2	130	101-117	3.1
400	135	3.25	OGB400	89122905	31	431	3.25	4.69	0.53	1.92	2.90	25	75	40	2	120	91-107	3.1
400	135	3.25	OGB400	89122904	20.5	420.5	3.25	4.69	0.52	1.87	2.83	25	60	60	2	140	111-127	4.3
700	140	5.40	OGB700-01		33.5	733.5	5.40	7.75	0.54	3.26	4.91	40	60	80	1	160	131-147	5.3
Metal-halide																		
150	100	1.80	OGS150	89070022	18.5	168.5	1.80	2.21	0.37	0.75	0.97	18	60	30	2	120	91-107	2.4
250	130	2.13	OGB250-112	89120829	23.5	273.5	2.13	3.02	0.51	1.22	1.81	18	65	30	2	120	91-107	2.4
250	130	2.13	OGB250-23		15	265	2.13	3.01	0.50	1.18	1.75	18	55	50	1	120	91-107	3.7
250	100	3.00	OGS250	89070002	27	277	3.00	3.65	0.37	1.23	1.57	30	70	40	2	120	91-107	3.1
250	100	3.00	OGS250-04		21	271	3.00	3.67	0.36	1.20	1.55	30	60	60	1	140	111-127	4.3
400	135	3.25	OGB400-112	89120866	31	431	3.25	4.69	0.53	1.92	2.90	25	75	40	2	130	101-117	3.1
400	135	3.25	OGB400	89122905	31	431	3.25	4.69	0.53	1.92	2.90	25	75	40	2	120	91-107	3.1
400	135	3.25	OGB400	89122904	20.5	420.5	3.25	4.69	0.52	1.87	2.83	25	60	60	2	140	111-127	4.3
400	100	4.60	OGS400-112		36	436	4.60	5.53	0.38	1.94	2.45	45	70	60	2	150	121-137	4.3
400	100	4.60	OGS400 ²	89070014	34	434	4.60	5.45	0.38	1.93	2.40	45	60	70	2	150	121-137	4.9
1,000	130	8.25	OGH1000-10		51.5	1051.5	8.25	11.3	0.51	4.67	6.72	65	60	140	1	220	191-207	8.9
High pressure sodium																		
150	100	1.80	OGS150	89070022	18.5	168.5	1.80	2.21	0.37	0.75	0.97	18	60	30	2	120	91-107	2.4
250	100	3.00	OGS250	89070002	27	277	3.00	3.65	0.37	1.23	1.57	30	70	40	2	120	91-107	3.1
250	100	3.00	OGS250-04		21	271	3.00	3.67	0.36	1.20	1.55	30	60	60	1	140	111-127	4.3
400	100	4.60	OGS400-112		36	436	4.60	5.53	0.38	1.94	2.45	45	70	60	2	150	121-137	4.3
400	100	4.60	OGS400 ²	89070014	34	434	4.60	5.45	0.38	1.93	2.40	45	60	70	2	150	121-137	4.9
1,000	110	10.3	OGS1000-02		55	1055	10.2	12.6	0.41	4.69	6.08	95	75	140	1	220	191-207	8.9

Notes

1. Ballasts have built-in thermal cutout devices specifically for short-arc metal-halide lamps.
2. With multiple voltage tapings
Ballasts for other wattage ratings available on request.

HQI / CSI / MHD 1000 – 2000 W

IEC 61347 / IEC 60923 RoHS

For 220V & 380V 50Hz/60Hz,
240V & 415V 50Hz

Product Description

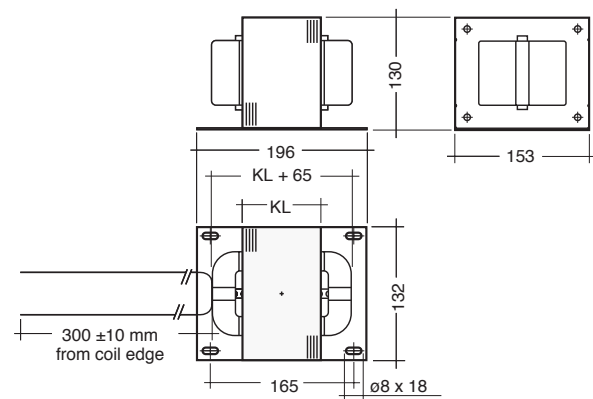
- Long service life
- Vacuum impregnation
- Fixed air gap ensuring permanent calibration
- Resistant to moisture and corrosion
- Very low noise level
- 100% final testing, including continuity, high voltage, winding short-circuit and operating values

Technical data

Max. winding temperature tw 130°C



HQI / CSI / MHD 1000 – 2000 W
Metal halide lamps



Ordering data				
Weight	Packaging, carton	Type	Article Number	
220 V 50 Hz				
15.15 kg	1 piece	CSI 1000-26-01 220/240 50/60 105A210	89122891	
15.16 kg	1 piece	HQI 2000L-11 220/50 095A196	89120366	
220 V 60 Hz				
15.15 kg	1 piece	CSI 1000-26-01 220/240 50/60 105A210	89122891	
14.51 kg	1 piece	HQI 2000L-02 220/60 095A196	89120364	
240 V 50 Hz				
15.15 kg	1 piece	CSI 1000-26-01 220/240 50/60 105A210	89122891	
14.73 kg	1 piece	CSI 1000-05 240/50 092A255	89122701	
15.30 kg	1 piece	HQI 2000L-09 240/50 100A196	89120365	
380 V 50 Hz				
15.60 kg	1 piece	MHD 1800H-08 380/50 100A196	89121945	
14.78 kg	1 piece	HQI 2000/D-17-FL 380/50 095A196	89120344	
14.02 kg	1 piece	HQI 2000-17-FL 380/50 093A196	89120358	
380 V 60 Hz				
14.35 kg	1 piece	HQI 2000/D-41 380/60 095A255	89120349	
14.43 kg	1 piece	HQI 2000/D-31 380/60 095A196	89121773	
415 V 50 Hz				
15.03 kg	1 piece	HQI 2000/D-4-FL 415/50 095A196	89120350	
14.45 kg	1 piece	HQI 2000-05 415/50 093A255	89120353	
14.43 kg	1 piece	HQI 2000-4-FL 415/50 093A196	89120360	
14.80 kg	1 piece	HQI 2000-4-FL-IG 415/50 093A196	89122893	

Specific technical data

															Compensation, parallel (cos φ > 0.9)		
Lamp wattage	Lamp type	Rated lamp current	Type ³	Article number	Voltage	Mains frequency	Thermal protection	Length L	Hole spacing D1	Core length KL	ΔT	Losses	Circuit power	λ	Capacitor μF ± 10%	Mains current	Mains start current
220 V 50 Hz																	
1,000 W	HI	15.0 A	CSI 1000-26-01 ²	89122891	220 V	50 Hz	no	210 mm	186 mm	105 mm	90 K	95 W	1,095 W	0.33	170 μF	5.5 A	6.4 A
2,000 W	HI	16.5 A	HQI 2000L-11	89120366	220 V	50 Hz	no	196 mm	132–165 mm	95 mm	70 K	72 W	2,072 W	0.57	130 μF	10.5 A	16.3 A
220 V 60 Hz																	
1,000 W	HI	15.0 A	CSI 1000-26-01 ²	89122891	220 V	60 Hz	no	210 mm	186 mm	105 mm	90 K	93 W	1,093 W	0.33	145 μF	5.5 A	6.5 A
2,000 W	HI	16.5 A	HQI 2000L-02	89120364	220 V	60 Hz	no	196 mm	132–165 mm	95 mm	65 K	73 W	2,073 W	0.57	110 μF	10.5 A	16.7 A
240 V 50 Hz																	
1,000 W	HI	15.0 A	CSI 1000-26-01 ²	89122891	240 V	50 Hz	no	210 mm	186 mm	105 mm	90 K	102 W	1,102 W	0.31	160 μF	5.1 A	5.8 A
1,000 W	HI	15.0 A	CSI 1000-05	89122701	240 V	50 Hz	no	255 mm	230 mm	92 mm	65 K	90 W	1,090 W	0.30	165 μF	5.0 A	5.9 A
2,000 W	HI	16.5 A	HQI 2000L-09	89120365	240 V	50 Hz	no	196 mm	132–165 mm	100 mm	65 K	77 W	2,077 W	0.52	135 μF	9.6 A	15.4 A
380 V 50 Hz																	
1,800 W	HI	10.5 A	MHD 1800H-08	89121945	380 V	50 Hz	no	196 mm	132–165 mm	100 mm	75 K	77 W	1,927 W	0.48	60 μF	5.6 A	8.1 A
2,000 W	HI	11.3 A	HQI 2000/D-17-FL	89120344	380 V	50 Hz	no	196 mm	132–165 mm	95 mm	75 K	90 W	2,040 W	0.48	65 μF	6.0 A	8.6 A
2,000 W	HI	10.3 A	HQI 2000/D-17-FL	89120344	380 V	50 Hz	no	196 mm	132–165 mm	95 mm	65 K	78 W	2,078 W	0.53	55 μF	6.1 A	9.6 A
2,000 W	HI	8.8 A	HQI 2000-17-FL	89120358	380 V	50 Hz	no	196 mm	132–165 mm	93 mm	65 K	72 W	2,072 W	0.62	40 μF	6.1 A	10.3 A
380 V 60 Hz																	
2,000 W	HI	11.3 A	HQI 2000/D-41	89120349	380 V	60 Hz	no	255 mm	230 mm	95 mm	75 K	90 W	2,040 W	0.48	55 μF	6.0 A	8.8 A
2,000 W	HI	10.3 A	HQI 2000/D-41	89120349	380 V	60 Hz	no	255 mm	230 mm	95 mm	65 K	78 W	2,078 W	0.53	45 μF	6.1 A	9.8 A
2,000 W	HI	11.3 A	HQI 2000/D-31	89121773	380 V	60 Hz	no	196 mm	132–165 mm	95 mm	75 K	90 W	2,040 W	0.48	55 μF	6.0 A	8.8 A
2,000 W	HI	10.3 A	HQI 2000/D-31	89121773	380 V	60 Hz	no	196 mm	132–165 mm	95 mm	65 K	78 W	2,078 W	0.53	45 μF	6.1 A	9.8 A
415 V 50 Hz																	
2,000 W	HI	11.3 A	HQI 2000/D-4-FL	89120350	415 V	50 Hz	no	196 mm	132–165 mm	95 mm	80 K	98 W	2,048 W	0.44	60 μF	5.5 A	7.4 A
2,000 W	HI	10.3 A	HQI 2000/D-4-FL	89120350	415 V	50 Hz	no	196 mm	132–165 mm	95 mm	70 K	85 W	2,085 W	0.49	55 pF	5.6 A	8.3 A
2,000 W	HI	8.8 A	HQI 2000-05	89120353	415 V	50 Hz	no	255 mm	230 mm	93 mm	70 K	80 W	2,080 W	0.57	40 μF	5.6 A	9.0 A
2,000 W	HI	8.8 A	HQI 2000-4-FL	89120360	415 V	50 Hz	no	196 mm	132–165 mm	93 mm	70 K	80 W	2,080 W	0.57	40 μF	5.6 A	9.0 A
2,000 W	HI	8.8 A	HQI 2000-4-FL-IG ¹	89122893	415 V	50 Hz	no	196 mm	132–165 mm	93 mm	70 K	80 W	2,080 W	0.57	40 μF	5.6 A	9.0 A

¹ With pulse tapping suitable for ZRM powerPULSE.

² Terminated.

³ Other wattages available on request.

CWMH 175 – 400 W

IEC 61347 / IEC 60923 RoHS

For 240V & 415V 50Hz

Product Description

- Long service life
- Vacuum impregnation
- Fixed air gap ensuring permanent calibration
- Resistant to moisture and corrosion
- Very low noise level
- 100% final testing, including continuity, high voltage, winding short-circuit and operating values



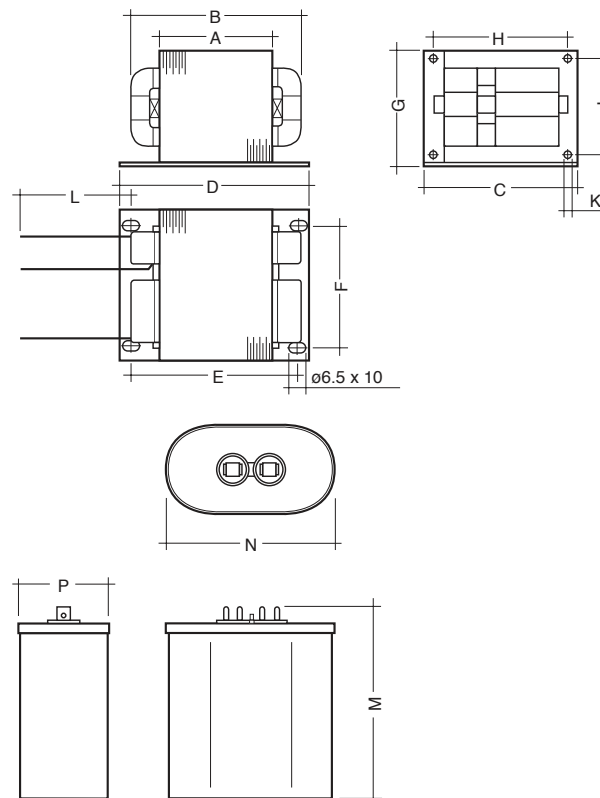
CWMH 175 – 400 W

Mercury vapour lamps, metal halide lamps



Technical data

Max. winding temperature tw 130°C



Ordering data

Weight	Packaging, carton	Type	Article Number
240 V 50 Hz			
4.059 kg	1 piece	CWMH 175-06 240/50 068A111	89120247
4.569 kg	1 piece	CWMH 250-06 240/50 076A111	89120256
6.234 kg	1 piece	CWMH 400-19 240/50 106A146	89120272
415 V 50 Hz			
7.505 kg	1 piece	CWMH 400-4-FL 415/50 071A121	89120275

Specific technical data

Lamp wattage	Lamp type	Rated lamp current	Type ¹	Article number	Voltage	Mains frequency	Thermal protection	Δ T	Losses	λ	Capacitor	Mains current	Mains start current
240 V 50 Hz													
175 W	HM / HI	1.50 A	CWMH 175-06	89120247	240 V	50 Hz	no	75 K	40 W	0.96	1x12 μF / 440 V	0.90 A	0.6 A
250 W	HM / HI	2.10 A	CWMH 250-06	89120256	240 V	50 Hz	no	70 K	44 W	0.95	1x16 μF / 525 V	1.30 A	0.9 A
400 W	HM / HI	3.25 A	CWMH 400-19	89120272	240 V	50 Hz	no	75 K	58 W	0.95	1x24 μF / 480 V	2.00 A	0.8 A
415 V 50 Hz													
400 W	HM / HI	3.25 A	CWMH 400-4-FL	89120275	415 V	50 Hz	no	75 K	63 W	0.95	1x24 μF / 480 V	1.16 A	0.5 A

¹ Other wattages available on request

Type	Ballast dimensions										Capacitor dimensions			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
240 V 50 Hz														
CWMH 175-06	68 mm	102 mm	101 mm	111 mm	94 mm	82 mm	78 mm	88.5 mm	62 mm	5 mm	270 mm	91 mm	70 mm	41 mm
CWMH 250-06	76 mm	112 mm	101 mm	111 mm	94 mm	84 mm	78 mm	88.5 mm	62 mm	10x6.5 mm	270 mm	95 mm	75 mm	50 mm
CWMH 400-19	106 mm	142 mm	101 mm	146 mm	129 mm	82 mm	78 mm	88.5 mm	62 mm	5 mm	270 mm	110 mm	75 mm	50 mm
415 V 50 Hz														
CWMH 400-4-FL	71 mm	111 mm	126 mm	121 mm	100 mm	105 mm	111 mm	111 mm	99 mm	7x5.5 mm	220 mm	110 mm	75 mm	50 mm

CWMH / CWBL 1000 – 2000 W

IEC 61347 / IEC 60923 RoHS

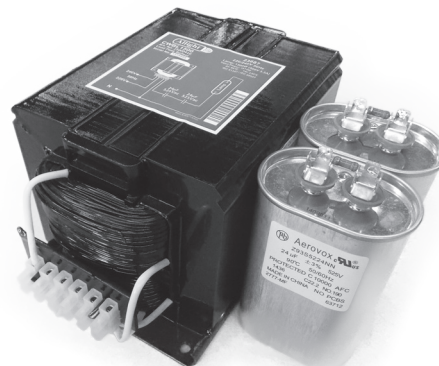
For 220V, 230V & 240V 50Hz
400V & 415V 50Hz

Product Description

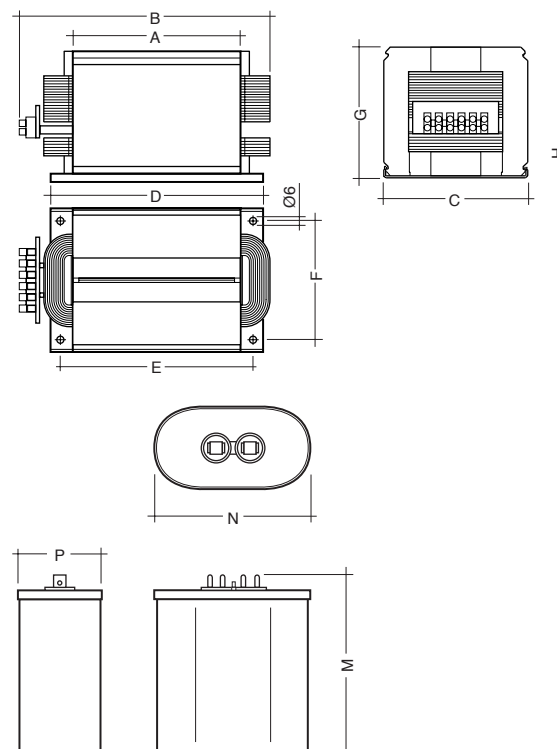
- Long service life
- Vacuum impregnation
- Fixed air gap ensuring permanent calibration
- Resistant to moisture and corrosion
- Very low noise level
- 100% final testing, including continuity, high voltage, winding short-circuit and operating values



CWMH / CWBL 1000 – 2000 W
Mercury vapour lamps, metal halide lamps



Technical data	
Max. winding temperature tw	130°C
Screw terminal	1.5 – 6 mm ²



Ordering data

Weight	Packaging, carton	Type	Article Number
Ballasts with multi-voltage tapings			
9.71 kg	1 piece	CWMH 1000 11K 220-240/50 085A125	25000405
16.29 kg	1 piece	CWBL 1500 11K 220-240/50 150A190	25000403
15.93 kg	1 piece	CWMH 1500 11K 220-240/50 105A145	25000450
9.71 kg	1 piece	CWMH 1000 11K 230-240/50 085A125	25000406
9.79 kg	1 piece	CWMH 1000 11K 400-415/50 085A125	25000407
15.93 kg	1 piece	CWMH 1500 11K 400-415/50 105A145	25000408
16.67 kg	1 piece	CWBL 1500 11K 400-415/50 150A190	25000412
18.34 kg	1 piece	CWBL 2000 11K 400-415/50 165A205	25000413

Specific technical data

Lamp wattage	Lamp type	Rated lamp current	Type 1	Article number	Voltage	Mains frequency	Thermal protection	Δ T	Losses	λ	Capacitor	Mains current	Mains start current
Ballasts with multi-voltage tapplings													
1,000 W	HM / HI	4.2 A	CWMH 1000 11K	25000405	220 / 240 V	50 Hz	no	75 K	71 W	0.96	1x32 µF / 525 V	4.7 A	3.75 A
1,500 W	HI	3.3 A	CWBL 1500 11K	25000403	220 / 240 V	50 Hz	no	85 K	126 W	0.95	2x24 µF / 525 V	7.0 A	3.00 A
1,500 W	HI	6.2 A	CWMH 1500 11K	25000450	220 / 240 V	50 Hz	no	75 K	93 W	0.96	2x22 µF / 660 V	6.9 A	5.10 A
1,000 W	HM / HI	4.2 A	CWMH 1000 11K	25000406	230 / 240 V	50 Hz	no	75 K	68 W	0.96	1x32 µF / 525 V	4.9 A	3.90 A
1,000 W	HM / HI	4.2 A	CWMH 1000 11K	25000407	400 / 415 V	50 Hz	no	85 K	82 W	0.96	1x32 µF / 525 V	2.7 A	2.15 A
1,500 W	HI	6.2 A	CWMH 1500 11K	25000408	400 / 415 V	50 Hz	no	85 K	111 W	0.96	2x22 µF / 660 V	4.0 A	2.70 A
1,500 W	HI	3.3 A	CWBL 1500 11K	25000412	400 / 415 V	50 Hz	no	85 K	119 W	0.95	2x24 µF / 525 V	4.0 A	1.80 A
2,000 W	HI	8.5 A	CWBL 2000 11K	25000413	400 / 415 V	50 Hz	no	85 K	139 W	0.98	2x35 µF / 540 V	5.1 A	4.10 A

¹ Other wattages available on request

Type	Ballast dimensions								Capacitor dimensions			
	A	B	C	D	E	F	G	H	Mounting Hole	M	N	P
Ballasts with multi-voltage tapplings												
CWMH 1000 11K	85 mm	160 mm	127 mm	125 mm	107 mm	104 mm	118 mm	49 mm	6 mm	110 mm	95 mm	50 mm
CWBL 1500 11K	150 mm	225 mm	127 mm	190 mm	172 mm	104 mm	118 mm	49 mm	6 mm	123 mm	75 mm	50 mm
CWMH 1500 11K	105 mm	180 mm	127 mm	145 mm	127 mm	104 mm	118 mm	49 mm	6 mm	110 mm	95 mm	50 mm
CWMH 1000 11K	85 mm	160 mm	127 mm	125 mm	107 mm	104 mm	118 mm	49 mm	6 mm	110 mm	95 mm	50 mm
CWMH 1000 11K	85 mm	160 mm	127 mm	125 mm	107 mm	104 mm	118 mm	49 mm	6 mm	110 mm	95 mm	50 mm
CWMH 1500 11K	105 mm	180 mm	127 mm	145 mm	127 mm	104 mm	118 mm	49 mm	6 mm	110 mm	95 mm	50 mm
CWBL 1500 11K	150 mm	225 mm	127 mm	190 mm	172 mm	104 mm	118 mm	49 mm	6 mm	123 mm	75 mm	50 mm
CWBL 2000 11K	165 mm	240 mm	127 mm	205 mm	187 mm	104 mm	118 mm	57 mm	6 mm	110 mm	95 mm	50 mm

CWHS 400 – 1000 W

IEC 61347 / IEC 60923 RoHS

For 240V & 415V 50Hz

Product Description

- Long service life
- Vacuum impregnation
- Fixed air gap ensuring permanent calibration
- Resistant to moisture and corrosion
- Very low noise level
- 100% final testing, including continuity, high voltage, winding short-circuit and operating values

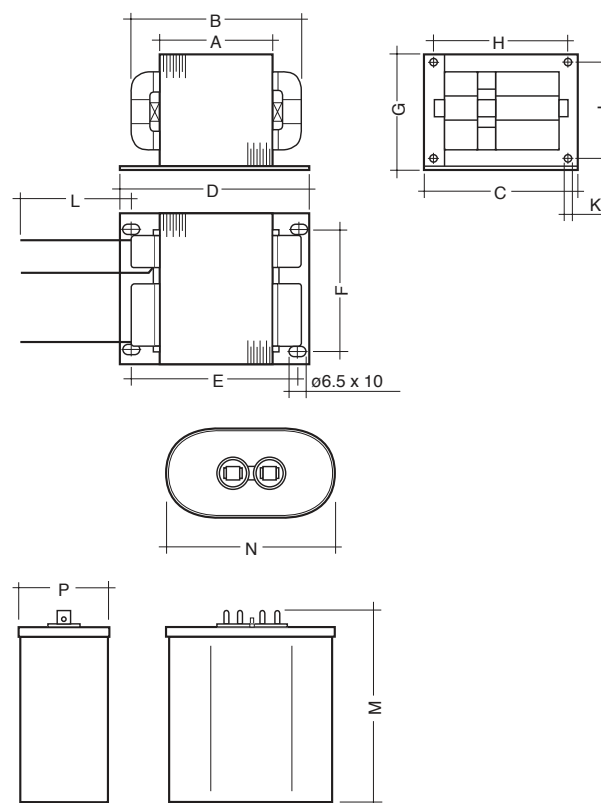


CWHS 400 – 1000 W
Sodium vapour lamps



Technical data

Max. winding temperature tw 130°C



Ordering data

Weight	Packaging, carton	Type	Article Number
240 V 50 Hz			
8.85 kg	1 piece	CWHS 400-2-FL 240/50 084A146	89120183
18.33 kg	1 piece	CWHS 1000-2-FL 240/50 131A197	89120158
415 V 50 Hz			
8.92 kg	1 piece	CWHS 400-4-FL 415/50 084A146	89120184
18.33 kg	1 piece	CWHS 1000-4-FL 415/50 131A197	89120159

Specific technical data

Lamp wattage	Lamp type	Rated lamp current	Type ¹	Article number	Voltage	Mains frequency	Thermal protection	Δ T	Losses	λ	Capacitor	Mains current	Mains start current
240 V 50 Hz													
400 W	HS	4.6 A	CWHS 400-2-FL	89120183	240 V	50 Hz	no	75 K	70 W	0.96	1x48 µF / 330 V	2.04 A	1.15 A
1,000 W	HS	4.7 A	CWHS 1000-2-FL	89120158	240 V	50 Hz	no	70 K	92 W	0.98	2x15 µF / 660 V	4.64 A	3.00 A
415 V 50 Hz													
400 W	HS	4.6 A	CWHS 400-4-FL	89120184	415 V	50 Hz	no	70 K	70 W	0.96	1x48 µF / 330 V	1.18 A	0.75 A
1,000 W	HS	4.7 A	CWHS 1000-4-FL	89120159	415 V	50 Hz	no	75 K	95 W	0.98	2x15 µF / 660 V	2.70 A	1.60 A

¹ Other wattages available on request

Type	Ballast dimensions										Capacitor dimensions			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
240 V 50 Hz														
CWHS 400-2-FL	84 mm	130 mm	125 mm	146.0 mm	125.0 mm	104 mm	111 mm	111 mm	99 mm	7x5.5 mm	220 mm	110 mm	75 mm	50 mm
CWHS 1000-2-FL	131 mm	191 mm	153 mm	196.5 mm	170.5 mm	132 mm	117 mm	136 mm	98 mm	6.35 mm	310 mm	110 mm	75 mm	50 mm
415 V 50 Hz														
CWHS 400-4-FL	84 mm	130 mm	125 mm	146.0 mm	125.0 mm	104 mm	111 mm	111 mm	99 mm	7x5.5 mm	220 mm	110 mm	75 mm	50 mm
CWHS 1000-4-FL	131 mm	191 mm	153 mm	196.5 mm	170.5 mm	132 mm	117 mm	136 mm	98 mm	6.35 mm	270 mm	110 mm	75 mm	50 mm

OM PAK assemblies

Lamp			Ballast		Electrical						Thermal	Physical			
wattage	voltage	current	type	article number	loss hot	input power	lamp current	lamp start current	line current	line start current	max. amb. Temperature	length	mtg centres	weight	carton
W	V	A			W	W	A	A	A@0.9PF	A@0.9PF	°C	mm	mm	kg	qty
220 V 50 Hz															
Metal halide and High-pressure sodium vapour lamps															
35	85	0.53	OM PAK 35 M A712 220V 50HZ W		8.0	43.0	0.53	0.65	0.22	0.28	40	210	193.0	1.4	4
220 V 60 Hz															
Metal halide and High-pressure sodium vapour lamps															
35	85	0.53	OM PAK 35 M A712 220V 60HZ W		8.0	43.0	0.53	0.65	0.22	0.28	40	210	193.0	1.4	4
70	90	1.00	OM PAK 70 M A712 220V 60HZ K		13.0	83.0	1.00	1.45	0.42	0.64	40	210	193.0	1.8	4
150	100	1.80	OM PAK 150 M A712 220V 60HZ W		20.5	170.5	1.80	2.26	0.86	1.14	40	260	243.5	2.6	3
230 V 50 Hz															
Metal halide and High-pressure sodium vapour lamps															
150	100	1.80	OM PAK 150 M A713 230V 50HZ W		21.5	171.5	1.80	2.39	0.83	1.16	40	260	243.5	2.6	3
240 V 50 Hz															
High-pressure sodium vapour lamps															
50	95	0.61	OM PAK 50 Q A604 240V 50HZ K		9.0	59.0	0.61	0.76	0.27	0.36	40	210	193.0	1.4	4
80	115	0.80	OM PAK 80 Q A604 240V 50HZ K		13.5	93.5	0.80	1.33	0.43	0.76	40	210	193.0	1.4	4
125	125	1.15	OM PAK 125 Q A604 240V 50HZ K		15.5	140.5	1.15	1.90	0.65	1.13	40	210	193.0	1.8	4
250	130	2.13	OM PAK 250 Q A604 240V 50HZ K		24.5	274.5	2.13	3.60	1.27	2.26	40	260	243.5	2.6	3
Metal-halide lamps															
100	100	1.10	OM PAK 100 M A614 240V 50HZ W	89002914	14.0	114.0	1.10	1.40	0.53	0.71	40	210	193.0	1.8	4
100	100	1.10	OM PAK 100 M A634 240V 50HZ W	89003613	14.0	114.0	1.10	1.40	0.53	0.71	40	210	193.0	1.8	4
Metal-halide lamps															
35	85	0.53	OM PAK 35 M A014 240V 50HZ K	89003610	9.0	44.0	0.53	0.60	0.20	0.24	40	210	193.0	1.4	4
35	85	0.53	OM PAK 35 M A614 240V 50HZ W	89002912	9.0	44.0	0.53	0.60	0.20	0.24	40	210	193.0	1.4	4
35	85	0.53	OM PAK 35 M A634 240V 50HZ W	89003309	9.0	44.0	0.53	0.60	0.20	0.24	40	210	193.0	1.4	4
35	85	0.53	OM PAK 35 M AA34 240V 50HZ W	89003651	9.0	44.0	0.53	0.60	0.20	0.24	40	210	193.0	1.4	4
70	90	1.00	OM PAK 70 M A014 240V 50HZ K ¹	89003484	16.0	86.0	1.00	1.22	0.40	0.51	40	210	193.0	1.5	4
70	90	1.00	OM PAK 70 M A014 240V 50HZ W ¹	89002860	16.0	86.0	1.00	1.22	0.40	0.51	40	210	193.0	1.5	4
70	90	1.00	OM PAK 70 M A034 240V 50HZ W ¹	89002910	16.0	86.0	1.00	1.22	0.40	0.51	40	210	193.0	1.5	4
70	90	1.00	OM PAK 70 M A614 240V 50HZ W ¹	89002862	16.0	86.0	1.00	1.22	0.40	0.51	40	210	193.0	1.8	4
70	90	1.00	OM PAK 70 M A634 240V 50HZ W ¹	89002913	16.0	86.0	1.00	1.22	0.40	0.51	40	210	193.0	1.8	4
70	90	1.00	OM PAK 70 M AA34 240V 50HZ W ¹	89003652	16.0	86.0	1.00	1.22	0.40	0.51	40	210	193.0	1.8	4
150	100	1.80	OM PAK 150 M A014 240V 50HZ K	89003485	22.5	172.5	1.80	2.35	0.80	1.09	40	260	243.5	2.3	4
150	100	1.80	OM PAK 150 M A014 240V 50HZ W	89002861	22.5	172.5	1.80	2.35	0.80	1.09	40	260	243.5	2.3	4
150	100	1.80	OM PAK 150 M A034 240V 50HZ W	89002911	22.5	172.5	1.80	2.35	0.80	1.09	40	260	243.5	2.3	4
150	100	1.80	OM PAK 150 M A604 240V 50HZ W		22.5	172.5	1.80	2.35	0.80	1.09	40	260	243.5	2.6	3
150	100	1.80	OM PAK 150 M A614 240V 50HZ W	89002863	22.5	172.5	1.80	2.35	0.80	1.09	40	260	243.5	2.6	3
150	100	1.80	OM PAK 150 M A634 240V 50HZ W	89002915	22.5	172.5	1.80	2.35	0.80	1.09	40	260	243.5	2.6	3
150	100	1.80	OM PAK 150 M AA34 240V 50HZ W	89003653	22.5	172.5	1.80	2.35	0.80	1.09	40	260	243.5	2.6	3

Notes

Control gear for other voltage, frequency and wattage ratings available on request.

1. Double-ended high-pressure sodium vapour lamps with ignition voltage 4.0 - 5.0 kV

Gear tray assemblies

Standard gear tray assemblies are available to suit a large range of lamps. The smaller gear tray is also designed to fit the standard D430 enclosure.

Features

- zinc sealed steel
- folded sides for mechanical strength and to provide clearances for component fasteners, such as nuts, screws and rivets (stand-off height - 12 mm)
- provision for two position mounting

Applications

- switchboard type cubicles
- base of light poles for street or sports lighting

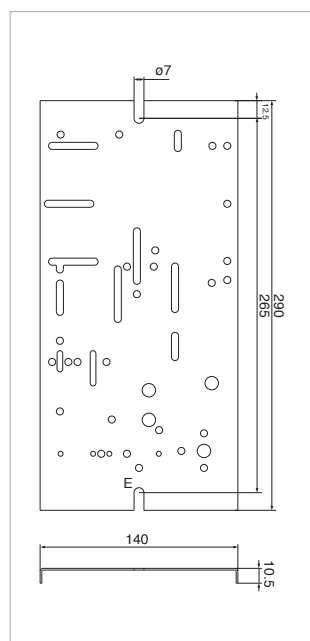
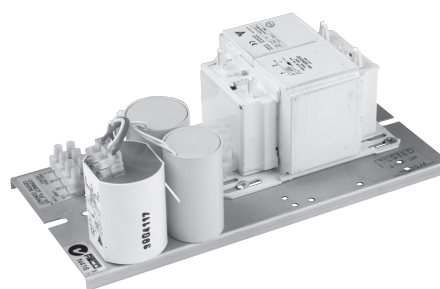
Typical configurations are:

- 80 W to 1,000 W high-pressure mercury vapour lamps
- 70 W to 2,000 W metal halide lamps
- 70 W to 1,000 W high-pressure sodium vapour lamps

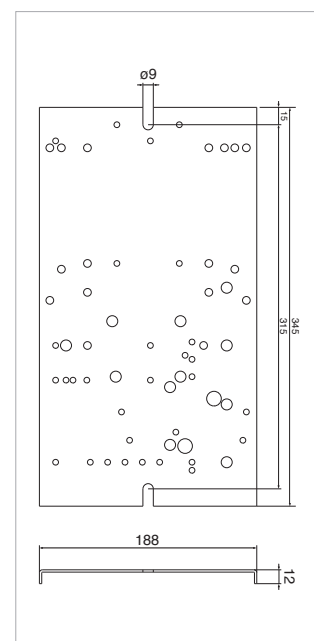
Optional extras include:

- HRC fuses
- blocking inductors
- ignitors – subject to mounting distance from lamp
- multi-voltage tapped ballasts

100% final testing



Gear tray to fit D430 box



Gear tray for other applications

Gear tray assemblies

Lamp		Ballast			Electrical						Thermal	Physical			
wattage	voltage	current	type	article number	loss hot	input power	lamp current	lamp start current	line current	line start current	max. amb. temperature	length	mtg centres	weight	carton
W	V	A			W	W	A	A	A@0.9PF	A@0.9PF	°C	mm	mm	kg	qty
240 V 50 Hz															
High-pressure mercury vapour lamps															
80	115	0.80	MV80GT		9.5	89.5	0.80	1.11	0.414	0.604	40	290	265	2.0	1
125	125	0.53	MV125GT		12.0	137.0	1.15	1.66	0.634	0.961	40	290	265	2.0	1
250	130	2.13	MV250GT		21.0	271.0	2.13	3.10	1.250	1.920	40	290	265	3.0	1
400	135	3.25	MV400GT-2	89120752	29.0	429.0	3.25	5.00	1.990	3.210	40	290	265	4.0	1
Metal-halide lamps															
175	130	1.50	MH175GT		16.0	191.0	1.50	2.29	0.884	1.420	40	290	265	3.0	1
250	130	2.13	MH250GT		21.0	271.0	2.13	3.10	1.250	1.920	40	290	265	3.5	1
400	135	3.25	MH400GT	89120726	29.0	429.0	3.25	5.00	1.990	3.210	40	290	265	4.0	1
1,000	130	8.25	MH1000GT-01	89120704	53.0	1,053.0	8.25	12.10	4.880	7.510	40	345	315	9.0	1
1,000	120	9.50	MH1000AGT-02	89121928	64.0	1,064.0	9.50	13.00	4.930	7.080	40	345	315	10.0	1
1,000	265	4.20	CWMH1000GT	89120217	79.0	1,079.0	4.20	5.82	4.700	2.100	40	345	315	13.5	1
1,500	500	3.30	CWBL1500GT	89120139	120.0	1,620.0	3.30	5.00	6.800	3.000	40	345	315	20.5	1
2,000	135	16.50	MH2000LGT	89120431	77.0	2,077.0	16.50	25.10	9.620	15.400	40	345	315	17.5	1
High-pressure sodium vapour lamps															
70	90	1.00	HS70AGT		14.0	84.0	1.00	1.16	0.389	0.474	40	290	265	2.5	1
150	100	1.80	HS150GT		18.0	168.0	1.80	2.20	0.778	1.000	40	290	265	3.5	1
250	100	3.00	HS250GT		26.0	276.0	3.00	3.90	1.280	1.740	40	290	265	4.0	1
400	100	4.60	HS400GT		37.0	437.0	4.60	6.10	2.020	2.820	40	290	265	5.5	1
1,000	110	10.30	HS1000GT-01	89120557	60.0	1,060.0	10.30	13.10	4.910	6.550	40	345	315	10.0	1
1,000	250	4.70	CWHS1000GT-2	89120168	92.0	1,092.0	4.70	6.80	4.640	3.000	40	345	315	20.5	1
415 V 50 Hz															
Metal-halide lamps															
1,000	265	4.20	CWMH1000GT-4	89120222	79.0	1,079.0	4.20	5.82	4.700	2.100	40	345	315	14.0	1
1,500	500	3.30	CWBL1500GT-4-01	89120143	120.0	1,620.0	3.30	5.00	6.800	3.000	40	345	315	20.5	1
2,000	205	11.30	MH2000DGT-01 400/415/430V 50Hz	89120406	98.0	2,048.0	11.30	14.60	5.480	7.440	40	345	315	17.5	1
2,000	230	10.30	MH2000DGT-01 400/415/430V 50Hz	89120406	85.0	2,085.0	10.30	14.60	5.580	8.310	40	345	315	17.5	1
2,000	245	8.80	MH2000GT	89120424	80.0	2,080.0	8.80	13.50	5.570	9.000	40	345	315	16.5	1
High-pressure sodium vapour lamps															
1,000	250	4.70	CWHS1000GT-4-SP1	89120173	95.0	2,045.0	4.70	6.80	2.700	1.600	40	345	315	21.0	1

Notes

Control gear for other voltage, frequency and wattage ratings available on request.

Components

Type	Article Number
GT (D430n)	9000210
GT (D150)	9000250
GT (400 x 200 x 12 mm)	9010482

D430 weatherproof assemblies

The D430 cast aluminium box is a heavy duty IP65 rated enclosure intended for either wall or pole mounting. The box has provision for 2 x 20 mm conduit entries.

Features

- cast aluminium alloy 401
- mounting strap - aluminium alloy 6063 or similar.
- weatherproof seal - neoprene rubber gasket
- tamperproof stainless steel allen key screw lid fastener
- deep lid providing easy access to the control gear for quick connection and troubleshooting

Applications

- primarily used to house lighting control gear but is also suitable for transformers, swimming pool controls, alarms, contactors, thermostats and the like

Typical configurations are

- 80 W to 400 W high-pressure mercury vapour lamps
- 70 W to 400 W metal halide lamps
- 70 W to 400 W high-pressure sodium vapour lamps

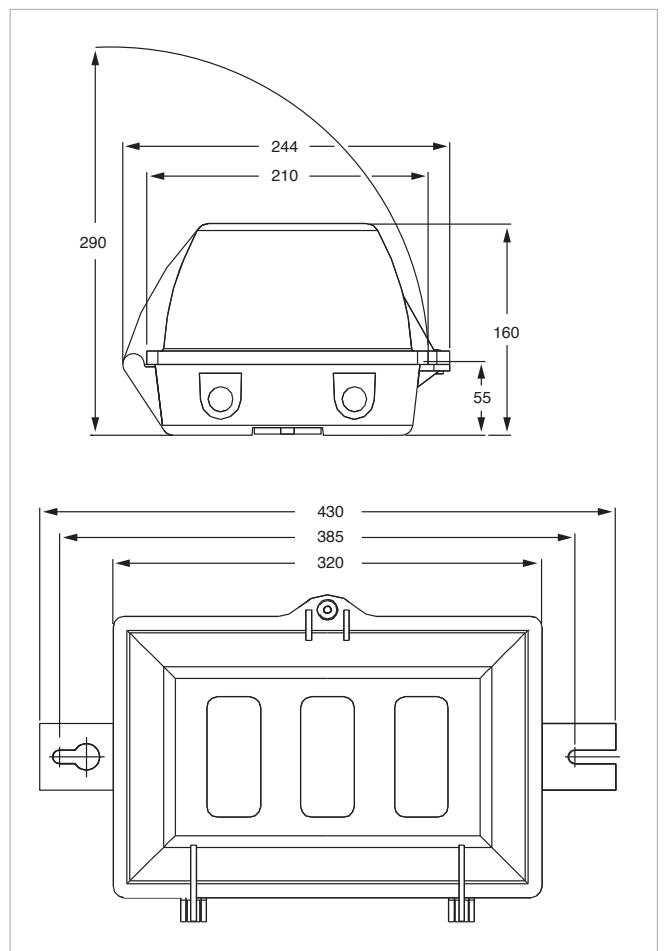
In some instances an economical solution can be offered by using the D430 enclosure to accommodate two complete sets of control gear, bearing in mind there are thermal limitations depending on lamp wattage.

Optional extras include

- HRC fuses
- blocking inductors
- ignitors – subject to mounting distance from lamp
- multi-voltage tapped ballasts

100% final testing

D430 weatherproof (IP65) enclosure



D430 weatherproof assemblies

Lamp			Ballast	Electrical							Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	line current A@0.9PF	line start current A@0.9PF	max. amb. Temperature °C	length mm	mtg centres mm	weight kg	carton qty
W	V	A													

240 V 50 Hz

High-pressure mercury vapour lamps

80	115	0.80	MV80D430		9.5	89.5	0.80	1.11	0.414	0.604	40	430	385	3.5	1
125	125	0.53	MV125D430		12.0	137.0	1.15	1.66	0.634	0.961	40	430	385	3.5	1
250	130	2.13	MV250D430		21.0	271.0	2.13	3.10	1.250	1.920	40	430	385	4.5	1
400	135	3.25	MV400D430		29.0	429.0	3.25	5.00	1.990	3.210	40	430	385	5.5	1

Metal-halide lamps

175	130	1.50	MH175D430		16.0	191.0	1.50	2.29	0.884	1.420	40	430	385	4.5	1
250	130	2.13	MH250D430		21.0	271.0	2.13	3.10	1.250	1.920	40	430	385	5.0	1
400	135	3.25	MH400D430		29.0	429.0	3.25	5.00	1.990	3.210	40	430	385	5.5	1

High-pressure sodium vapour lamps

70	90	1.00	HS70AD430		14.0	84.0	1.00	1.16	0.389	0.474	40	430	385	4.0	1
150	100	1.80	HS150D430		18.0	168.0	1.80	2.20	0.778	1.000	40	430	385	5.0	1
250	100	3.00	HS250D430		26.0	276.0	3.00	3.90	1.280	1.740	40	430	385	5.5	1
400	100	4.60	HS400D430	89120577	37.0	437.0	4.60	6.10	2.020	2.820	40	430	385	7.0	1

Notes

Control gear for other voltage, frequency and wattage ratings available on request.

Components

Type	Article Number
D430GTn	89003605
D430n	9009939
GT (D430n)	9000210

D96 weatherproof assemblies

The D96 cast aluminium box is a heavy duty IP65 rated enclosure designed and developed in Australia for harsh environmental conditions. It is intended for either wall or pole mounting and has provision for 3x20 mm conduit entries. The clever compartmental design allows the operation of two 1,000 W control gear in a single enclosure at high ambient temperatures.

Features

- die-cast aluminium alloy
- mounting strap – aluminium alloy 6063 or similar
- weatherproof seal – neoprene rubber gasket
- tamperproof stainless steel allen key screw lid fastener
- deep lid providing easy access to the control gear for quick connection and troubleshooting

Typical configurations are

- 400 W to 1,000 W high-pressure mercury vapour lamps
- 400 W to 2,000 W metal halide lamps
- 400 W to 1,000 W high-pressure sodium vapour lamps

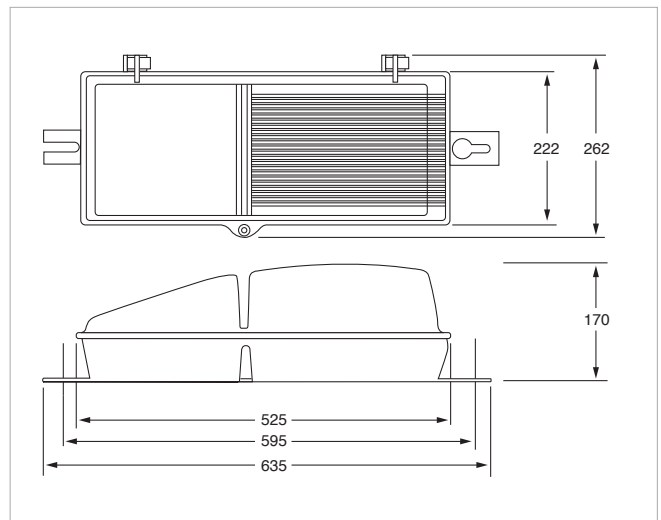
Twin control gear configurations are also available in the one D96 enclosure offering an economical solution for floodlighting applications.

Optional extras include

- HRC fuses
- blocking inductors
- ignitors – subject to mounting distance from lamp
- multi-voltage tapped ballasts
- step dimming (bi-level switching)

100% final testing

D96 weatherproof (IP65) enclosure



D96 weatherproof assemblies

Lamp			Ballast		Electrical						Thermal	Physical			
wattage	voltage	current	type	article number	loss hot W	input power W	lamp current A	lamp start current A	line current A@0.9PF	line start current A@0.9PF	max. amb. temperature °C	length mm	mtg centres mm	weight kg	carton qty
W	V	A													
220 V 60 Hz															
Metal halide lamps															
1,000	120	9.50	MH1000AD96-11	89120668	60	1,060	9.50	13.20	4.91	7.16	45	635	595	14.5	1
240 V 50 Hz															
Metal halide lamps															
400	135	3.25	MH400D96	89122879	29	429	3.25	5.00	1.99	3.21	45	635	595	9.5	1
400	135	3.25	MH2X400D96		58	858	6.50	10.00	3.97	6.42	45	635	595	12.5	1
400	135	3.25	CWMH400D96		58	458	3.25	3.73	2.00	0.80	45	635	595	13.5	1
1,000	130	8.25	MH1000D96	89120694	53	1,053	8.25	12.10	4.88	7.51	45	635	595	14.5	1
1,000	120	9.50	MH1000AD96-12	89120689	64	1,064	9.50	13.00	4.93	7.08	45	635	595	15.5	1
1,000	75	15.00	CSI1000D96	89120378	90	1,090	15.00	16.80	4.90	5.90	40	635	595	22.5	1
1,000	265	4.20	CWMH1000D96	89120212	79	1,079	4.20	5.82	4.70	2.10	40	635	595	19.0	1
1,500	265	6.30	CWMH1500D96	89120232	136	1,636	6.30	8.80	7.10	4.50	35	635	595	27.0	1
2,000	135	16.50	MH2000LD96-05	89120430	77	2,077	16.50	25.10	9.62	15.40	40	635	595	23.0	1
High-pressure sodium vapour lamps															
400	100	4.60	HS2X400D96		74	874	9.20	12.20	4.05	5.63	45	635	595	15.5	1
400	100	4.60	CWHS400D96		70	470	4.60	5.60	2.04	1.15	40	635	595	16.5	1
600	110	6.20	HS2X600D96		90	1,290	12.40	16.00	5.97	8.09	40	635	595	18.0	1
1,000	110	10.30	HS1000D96	89120547	60	1,060	10.30	13.10	4.91	6.55	45	635	595	15.5	1
1,000	110	10.30	HS2X1000D96		120	2,120	20.60	26.20	9.81	13.11	40	635	595	25.5	1
1,000	250	4.70	CWHS1000D96	89120161	92	1,092	4.70	6.80	4.64	3.00	40	635	595	26.0	1
380 V 60 Hz															
Metal halide lamps															
2,000	205	11.30	MH2000DD96-15	89121675	90	2,040	11.30	15.80	5.46	8.02	40	635	595	23.0	1
2,000	230	10.30	MH2000DD96-15	89121675	78	2,078	10.30	15.80	5.56	8.96	40	635	595	23.0	1
415 V 50 Hz															
Metal halide lamps															
400	135	3.25	CWMH400D96-4		63	463	3.25	3.73	1.16	0.50	45	635	595	14.5	1
1,000	265	4.20	CWMH1000D96-4	89120216	79	1,079	4.20	5.82	4.70	2.10	40	635	595	19.5	1
1,500	265	6.30	CWMH1500D96-01	89120233	136	1,636	6.30	8.80	7.10	4.50	35	635	595	27.0	1
1,500	500	3.30	CWBL1500D96-04	89120135	120	1,620	3.30	5.00	6.80	3.00	35	635	595	26.0	1
2,000	205	11.30	MH2000DD96-06	89120398	98	2,048	11.30	14.60	5.48	7.44	40	635	595	23.0	1
2,000	230	10.30	MH2000DD96-06	89120398	85	2,085	10.30	14.60	5.58	8.31	40	635	595	23.0	1
2,000	235	9.60	MH2000D96-12	89121809	78	2,078	9.60	14.30	5.56	8.70	40	635	595	23.5	1
2,000	245	8.80	MH2000D96	89120385	80	2,080	8.80	13.50	5.57	9.00	40	635	595	22.0	1
High-pressure sodium vapour lamps															
1,000	250	4.70	CWHS1000D96-4		95	2,045	4.70	6.80	2.70	1.60	40	635	595	26.5	1

Notes

Control gear for other voltage, frequency and wattage ratings available on request.

Components	
Type	Article Number
D96GT	89110019
D96	89120091
GT (D96t)	9000073
GT (D96b)	9000069



Accessories

Ignitors	106
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Blocking inductors for HPF lighting circuits	125

Ignitors

Reliable Ignition Under Any Condition

Whether in industry or in sports- or shop lighting, high intensity discharge lamps are ignited safely and reliably since 1967 with the ignitors from BAG electronics. With more than 40 years experience in the development and production of ignitors the range of BAG igniter ensures always reliable lamp ignition gentle, guaranteeing always good lighting.

Applications

Industry. Ideal for outdoor storage and security-related areas in industrial complexes – highbay and flood lighting applications.

Outdoor. Optimum safety for streets (street lighting), public places (sports lighting) and safety-related areas.

Shop. High reliability and high temperature applications possible.

Features

- Insensitive to overvoltages
- High ambient temperature applications possible
- Very high reliability in conjunction with magnetic ballasts
- Low maintenance costs

Ignition Pulses

To ignite a high-pressure discharge lamp, it is necessary to provide the lamp with a defined ignition voltage to ionise the discharge path. The level of the ignition voltage required depends on the type of lamp used.

High-pressure mercury vapour lamps (HM) need no more than mains voltage, but high-pressure sodium vapour (HS) and metal halide lamps (HI) usually need much higher voltage impulses to be superimposed to the lamps' open circuit voltage, and this voltage impulse is generated by the use of ignitors.

The crucial points in the successful ignition of a lamp are the peak value and the width, number and phase position of the ignition impulses. The ignition voltages of normal high-pressure discharge lamps lie in the range between 1 kV and 5 kV.

MZN 1000/2000

Description

- Superimposed igniter for metal halide (HI) and high-pressure sodium vapour (HS) lamps
- Designed for long distances (up to 24 m) for a supply line capacity of 85 pF
- Not suitable for HQI-NDL/WDL or HS-S-lamps (Super, Deluxe, Plus, Comfort)

Lamps

HS:

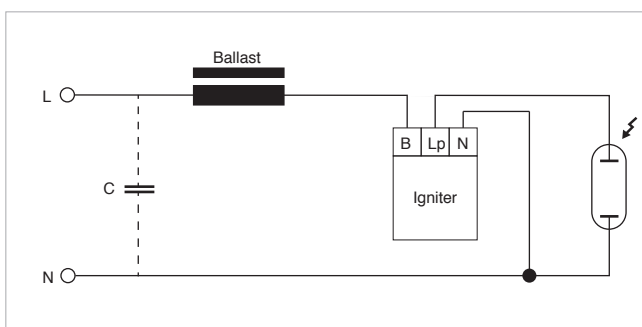
- HS 400 W
- HS 1000 W

HI:

- HI 400 W
- HI 1000 W

Technical Data

Article No.		9070006
Approved mains voltage	V	198 (207) ... 264
Approved mains frequency	Hz	50 (60)
Max. continuous lamp current	A	10.3
Connecting terminals	mm ²	4
Response / cut-out voltage	V	≤198 (207) / ≥170
Ignition voltage	kV	3.0 ... 5.0
Timer ignition time	s	–
Phase position	°el	50 ... 90
Pulses per cycle	–	≥1
Approved load capacity	pF	750 ... 2000
Internal losses at 25°C ambient temperature	W	<6 (10.3 A) <2 (4.6 A)
Rise in temperature at 25°C ambient temperature	K	<30 (10.3 A) <6 (4.6 A)
Max. housing temperature t _c	°C	95
Approved ambient temperature t _a	°C	-30 ... + 60 (10.3 A) -30 ... + 85 (4.6 A)
Weight	kg	0.35



NP 603

Description

- Pulse igniter for metal halide lamps (HI) with low ignition voltages
- For application in combination with ballasts for high-pressure mercury lamps (HM)

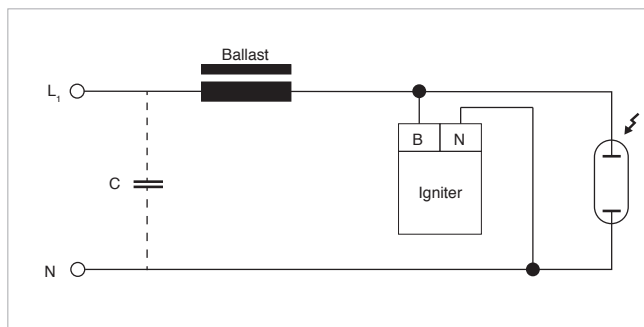
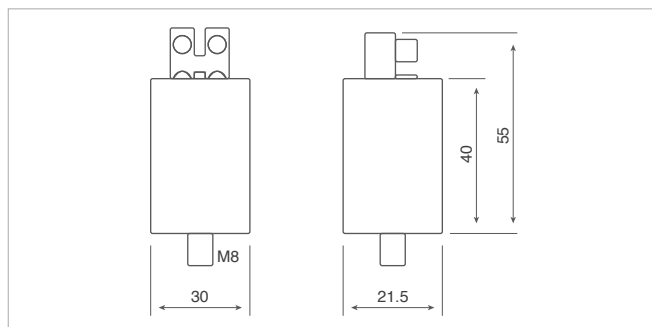
Lamps

HI

- HPI Plus 250 (Philips)
- HPI Plus 400 (Philips)
- HPI Plus 1000 (Philips)
- HQI 250 W/N/SI (Osram)
- HQI 400 W/N/SI (Osram)

Technical Data

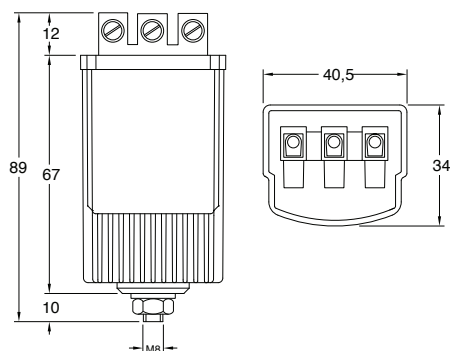
Article No.		9070022
Approved mains voltage	V	198 ... 264
Approved mains frequency	Hz	50/60
Max. continuous lamp current	A	–
Connecting terminals	mm ²	2.5
Response / cut-out voltage	V	≤198 / ≥160
Ignition voltage	kV	0.7 ... 1.0
Timer ignition time	s	–
Phase position	°el	60 ... 90
Pulses per cycle	–	≥1
Approved load capacity	pF	20 ... 1000
Internal losses at 25°C ambient temperature	W	<1
Rise in temperature at 25°C ambient temperature	K	<20
Max. housing temperature t _c	°C	105
Approved ambient temperature t _a	°C	-30 ... + 85
Weight	kg	0.045



AVS 400

Ignitor for high pressure sodium vapour and metal halide lamps

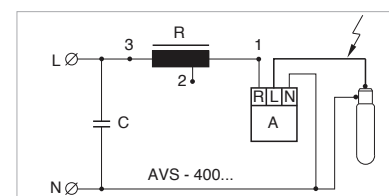
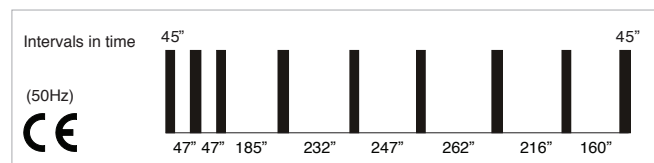
Lamps: Na 70 (DE), 100, 150, 250 y 400 W
Hgl 35 - 400 W.
I máx. 4,6A



Model		AVS 400-D	AVS 400-DP ⁽¹⁾
Article No.		89070060	89070061
Ref. No.		3210232	3210233
Lamp		Na 70 (DE) – 100, 150, 250, 400 W Hgl 35 – 400 W	
Switch-on voltage	V	≤198	
Switch-off voltage	V	>170	
Main voltage	V	198 ÷ 264	
Peak voltage	kV	3,5 ÷ 5	
Impulse width at	2,5kV – μsec.	≥0,6	≥0,75
Pulse No. per cycle	N.º	6	
Impulse position	ºe	60–90 240–270	
Load capacitance	pF	150	
Losses	W	2,6	
Max.temp. at tc point	tc (°C)	105	
Minimum ambient temp.	ta (°C)	-30	
Cut-off time	@ 50Hz – min	–	 30'±6%
Approvals			

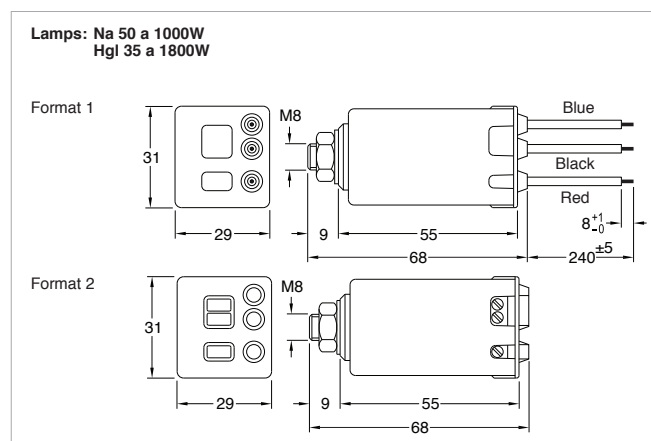
Notes

- ¹ AVS 400-DP. Pulse-pause ignitor.
Independent ignitor. Superimposed system.
Universal use up to 4,6A.
Insulating self-extinguishing casing with fastening shank M-8.
Terminal block in polyamide 0,75 ÷ 2,5 mm².
Encapsulated in polyurethane resin.



AVS 100

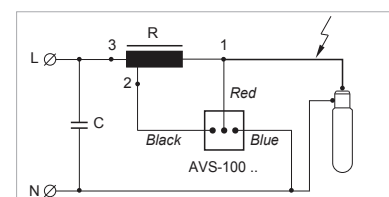
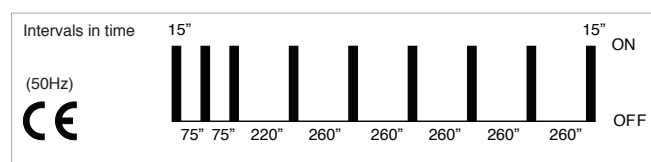
Ignitor for high pressure sodium vapour and metal halide lamps



Model		AVS 100-D	AVS 100-DP ⁽¹⁾	AVS 100-DP-40 ⁽¹⁾
Article No.		89070063 (Format 1) 89070056 (Format 2)	89070064 (Format 1) 89070057 (Format 2)	89070065 (Format 1) 89070058 (Format 2)
Ref. No.		3210113 (Format 1) 3210112 (Format 2)	3210111 (Format 1) 3210442 (Format 2)	3211053 (Format 1) 3211054 (Format 2)
Lamp		Na 50 a 1000W Hgl 100 a 1000W (exc. 150W)	Na 50 a 1000W Hgl 35 a 1800W	
Switch-on voltage	V	≤198		
Switch-off voltage	V	>160		
Main voltage	V	220 ÷ 240		
Peak voltage	kV	1,8 ÷ 2,3 3 ÷ 4		
Impulse width at	2,5kV - μsec.	≥2		
Pulse No. per cycle	N.º	1		
Impulse position	ºe	80 ÷ 100		
Load capacitance	pF	1000	2000	1500 – 4000
Losses at 4,6A	W	<1		
Max. temp. at tc point	tc (°C)	90		
Minimum ambient temp.	ta (°C)	 -30		
Cut-off time	@50Hz - min	–	30	
Approvals		–		

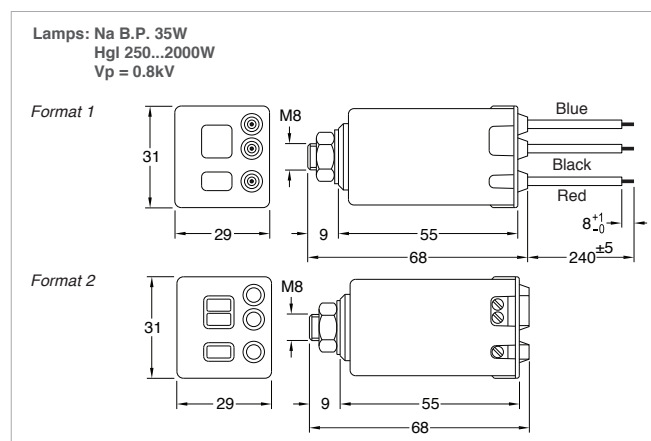
Notes

- 1 AVS 100-DP / AVS 100-DP-40. Pulse-pause digital ignitor
Impulse transformer system.
Operate with ELT ballasts with an adequate outlet.
Insulating, self-extinguishing casing with M8 fastening shank.
0.75 and 1 mm², 0.45/0.7 and 0.6/1kV connections.
Available with double insulated wires upon request.



AH 002

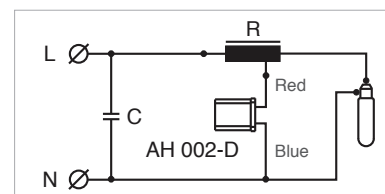
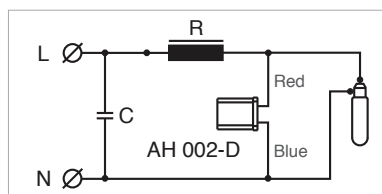
Ignitor for low pressure sodium and metal halide lamps-0,8kV



Model		AH 002-D
Article No.		89070062 (Format 1) 89070053 (Format 2)
Ref. No.		3210132 (Format 1) 3210131 (Format 2)
Lamp		Na B.P. 35W Hgl 250...2000W. VP = 0,8kV
Switch-on voltage	V	≥198
Switch-off voltage	V	>170
Main voltage	V	198 ÷ 264
Peak voltage	kV	0,9
Impulse width at	0,6kV - μsec.	800
Pulse No. per cycle	N.º	1
Impulse position	ºe	80 ÷ 110
Load capacitance	pF	10000
Losses	W	<1
Max.temp. at tc point	tc (°C)	 01
Minimum ambient temp.	ta (°C)	-30
Approvals		

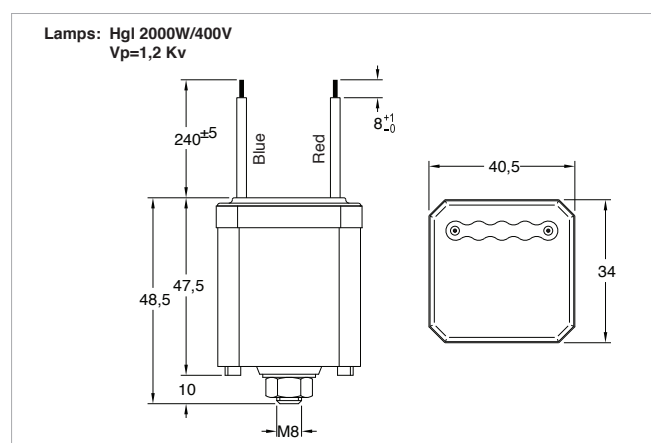
Notes

Independent ignitor with two wires. Parallel connection.
Insulating self-extinguishing casing with M8 fastening shank.
0.75 mm² flexible connections
Suitable for metal halide lamps with 0.8kV ignition voltage.
Available with double insulated wires upon request.



AH 005/380 DP

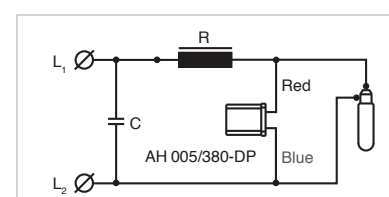
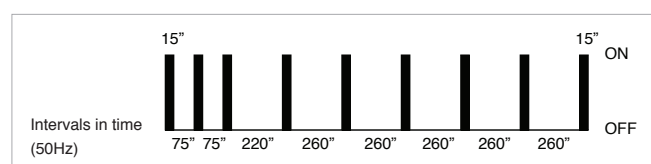
Ignitor for metal halide lamps–1,2kV



Model	AH 002-D	
Article No.	89070054	
Ref. No.	3210191	
Lamp	Hgl 2000W/400V VP= 1,2kV	
Switch-on voltage	V	≤340
Switch-off voltage	V	>300
Main voltage	V	342 ÷ 440
Peak voltage	kV	1,2
Impulse width at	1kV - μsec.	>130
Pulse No. per cycle	N.º	1
Impulse position	ºe	80 ÷ 110
Load capacitance	pF	10.000
Losses	W	1
Max.temp. at tc point	tc (°C)	90
Minimum ambient temp.	ta (°C)	-30
Cut-off time	@50Hz - min	30

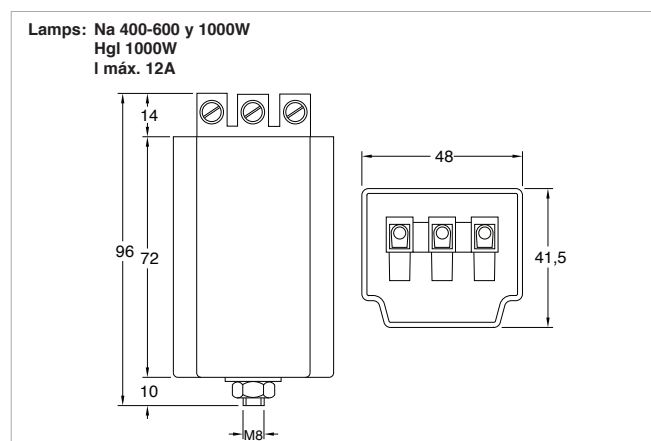
Notes

- Independent ignitor with two wires. Parallel connection.
- Insulating self-extinguishing casing with fastening shank M-8.
- Flexible connections 0,75 mm².
- Suitable for lamps with 1,2 kV ignition voltage.



AVS 1000 and AH 1000

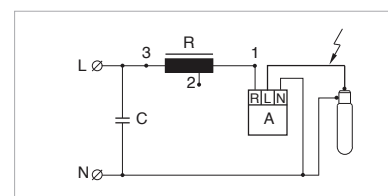
Ignitor for high pressure sodium and metal halide



Model	AVS 1000	AH 1000
Article No.	89070055	89070052
Ref. No.	3210211	3210212
Lamp	Na 400, 600 y 1000W	Na 1000W Hgl 1000W
Switch-on voltage	V	≤198
Switch-off voltage	V	>170
Main voltage	V	198 ÷ 264
Peak voltage	kV	4 ÷ 5
Impulse width at	2,5kV - μsec.	≥0,9
Pulse No. per cycle	N.º	4
Impulse position	ºe	60-90 240-270
Load capacitance	pF	200
Losses at 12A	W	6
Max. temp. at tc point	tc (°C)	105
Minimum ambient temp.	ta (°C)	
Approvals		

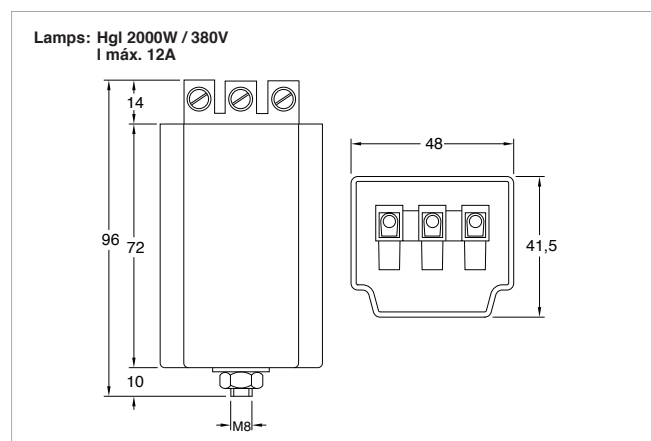
Notes

Independent ignitor. Superimposed system.
Universal use up to 12A.
Insulating self-extinguishing casing with fastening shank M-8.
Terminal block in polyamide 0,75 ÷ 2,5 mm².
Encapsulated in polyurethane resin.



AVS 2000/380

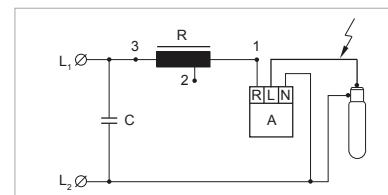
Ignitor for metal halide lamps



Model		AVS 2000/380
Article No.		89070059
Ref. No.		3210241
Lamp		Hgl 2000W / 380V I máx. 12A
Switch-on voltage	V	≤ 340
Switch-off voltage	V	> 300
Main voltage	V	$340 \div 456$
Peak voltage	kV	$3,5 \div 5$
Impulse width at	2,5kV - $\mu\text{sec.}$	$\geq 0,8$
Pulse No. per cycle	N.º	2
Impulse position	ºe	60-90 240-270
Load capacitance	pF	200
Losses at 12A	W	5
Max. temp. at tc point	tc (°C)	105
Minimum ambient temp.	ta (°C)	
Approvals		

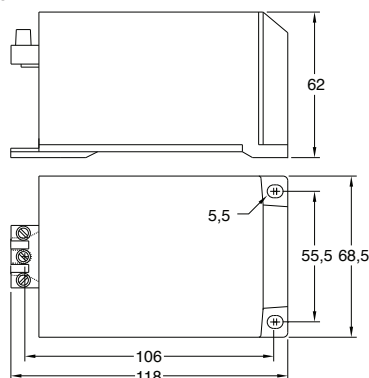
Notes

Independent ignitor. Superimposed system.
Universal use up to 12A.
Insulating self-extinguishing casing with fastening shank M-8.
Terminal block in polyamide 0,75 ÷ 2,5 mm².
Encapsulated in polyurethane resin.



AH 2000/220

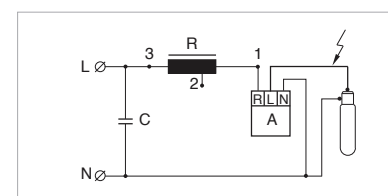
Ignitor for metal halide lamps

Lamps: Hgl 1000-2000W / 220V
I máx. 18A

Model		AH 2000/220
Article No.		89070066
Ref. No.		3210251
Lamp		Hgl 1000-2000W / 220V I máx. 18A
Switch-on voltage	V	≤198
Switch-off voltage	V	>170
Main voltage	V	198 ÷ 264
Peak voltage	kV	3,5 ÷ 5
Impulse width at	2,5kV - μsec.	≥0,6
Pulse No. per cycle	N.º	4
Impulse position	ºe	70-90 250-270
Load capacitance	pF	250
Losses at 18A	W	10
Max. temp. at tc point	tc (°C)	90
Minimum ambient temp.	ta (°C)	-30

Notes

Independent ignitor. Superimposed system.
Universal use up to 18A.
Thermoplastic material casing.
Terminal block in polyamide 1,5 ÷ 4 mm².
Encapsulated in polyurethane resin.



AVS 2000/480

Performance

- Independent ignitor (superimposed system)
- Suitable for 1000W and 2000W ballasts at 480V.

Lamps

For 1000W 4,7 A high pressure sodium and 2000W metal halide lamps to 480V which require voltage of 3,5–5 kV .

Physical Characteristics

- Housing: Insulating self-extinguishing, grey colour. Metal pin.
- Connections:
 - Terminal block minimum 2,5mm² .
 - Terminal size (2) with protection specification 90048
- Encapsulated : Polyurethane or epoxy resin.

Technical Data

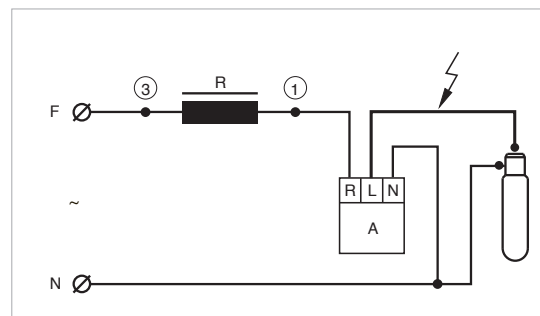
Article No.	89070070
Permanent maximum current	12A
Ignition voltage	≤430V
Cut-off voltage	≥300V
Open load max. Voltage	528V
Peak voltage ¹	3,5–5kV
Pulse duration at 2,5kV	≥0,8μseg.
Number of pulses per mains cycle	≥2
Phase position	60-90° & 240-270°
Maximum load capacity supported	20 ... 200pF
Own losses	≤5W
Heating under normal operation	<35°C
Temperature permitted in the housing (tc)	- 30 + 105°C

¹ Make sure that with the maximum load capacity and lower supply voltage, at least the lowest voltage specified crest is obtained.

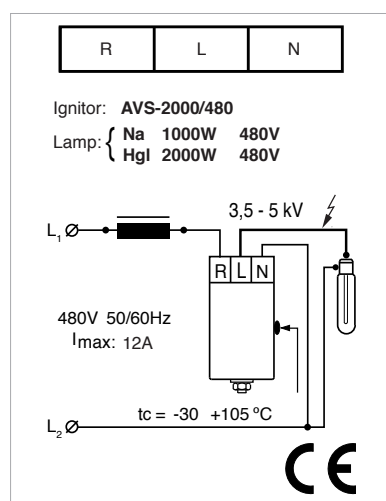
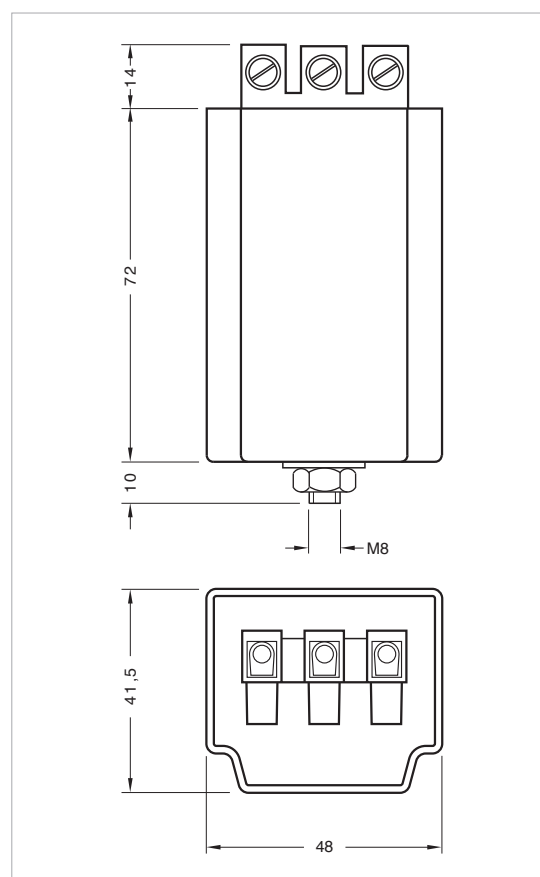
Marking

Technical data Label. Real size. Black color.

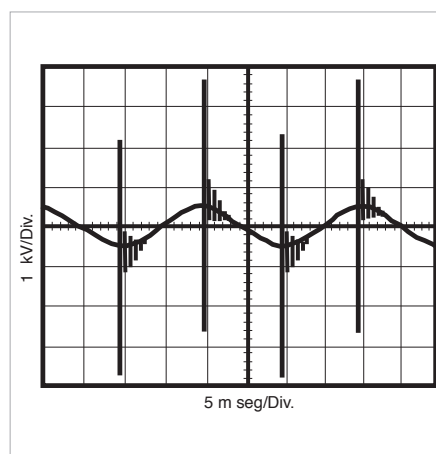
Wiring Diagram



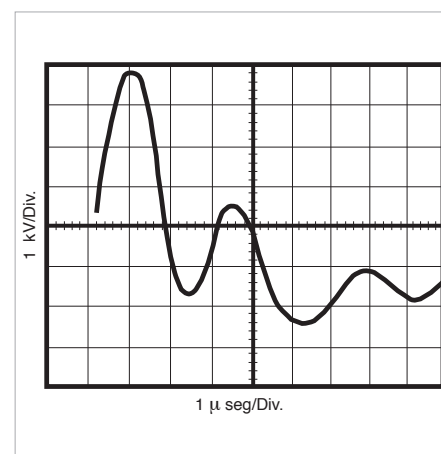
Dimensions



Pulse's Position



Pulse's Form



Lamp reignition monitor

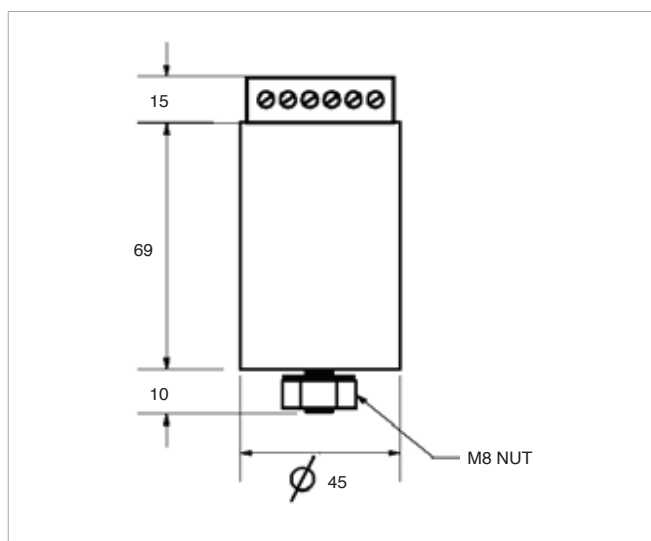
All HID lamps, in particular, high-pressure mercury vapour and metal halide lamps, require long ignition times following power interruption. Furthermore, it takes some time until they produce full light output.

There are applications where it is extremely important to have some degree of illumination immediately after the power is applied, and this is where an incandescent lamp installed in the same HID luminaire can be switched on by a change-over light switch, while the HID lamp is running up to full light output.

When power is applied (or reapplied in the case of a power interruption), the incandescent lamp switches on immediately. The change-over light switch senses the voltage drop across the ballast; the incandescent lamp will remain on until the HID lamp runs up to 70–80% of the nominal light output.

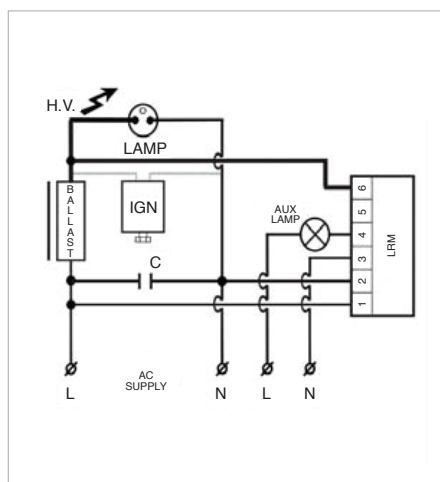
If the HID lamp fails to ignite for whatever reason, the changeover switch will keep the incandescent lamp on indefinitely.

Lamp reignition monitor LRM 1000 S

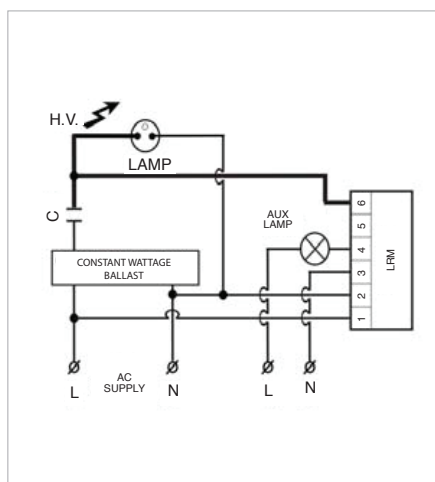


Type		LRM 1000 S
Article number		89003657
Line voltage	V	220–240 (380–415 V if neutral connection is available)
Mains frequency	Hz	50
Maximum HID lamp voltage	V	160
Maximum ignitor peak voltage	kV	5
Auxiliary lamp wattage	W	5-1000 (4 A 250 V)
Max. ambient temperature	C	90

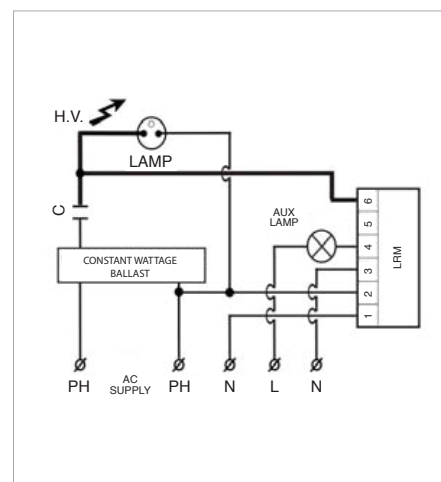
The LRM 1000 S is an electronic changeover light switch for constant wattage or impulser-type ignitor circuits. It is also recommended for circuits using HID lamps with an in-built ignitor.



A) Impulser-type ignitor circuit or lamps with an in-built ignitor (single-phase)



B) Constant wattage type circuit (single person)



C) Constant wattage type circuit (3 phase)

Capacitors

Power factor

For a pure resistive load in an electrical circuit, the voltage (V) and current (I) are in phase with each other and the overall power factor ($\cos \phi$) has a value of unity. It can also be said that the average power (P) of the resistive circuit is equal to the apparent power (S), ie. $P = V \times I$.

However, in a pure reactive electrical circuit, there is no resistive component, the voltage and current are 90° out of phase, ie. $\cos \phi = 0$.

Electrical circuits containing a combination of both resistive and reactive elements display both average power and apparent power components.

Power factor is therefore the ratio by which the apparent power is multiplied in order to obtain the average power actually being consumed in the circuit, ie. $P = V \times I \times \cos$.

For example, a power factor of 0.5 indicates that the circuit has a reactive component having a phase angle of $+60^\circ$ or -60° .

In common practice most loads are inductive and therefore the current lags the voltage (lagging power factor), whereas a typical capacitive load has a leading power factor.

The major causes of low power factor in a circuit are lightly loaded electric motor and discharge lamp circuits in which the inductance of the control equipment, such as ballasts, results in a power factor usually in the range of 0.3 to 0.5.

When a capacitor is connected across an inductive load, it cancels the lagging effect of the inductance, increasing the power factor closer to unity.

Fluorescent and HID lamp circuits

Fluorescent and HID lamp circuits have an inherent low power factor (around 0.4 to 0.5), due to the control gear inductance. The inductance is in the circuit limit the current through the lamp, however, in lighting installations where many lamps are used, high input current increases the cost of mains reticulation.

Raising the power factor by means of the inclusion of a capacitor (opposite effect to an inductor) substantially reduces the current drawn from the mains, giving improvement in the reticulation efficiency, which in turn enables a reduction in copper wire size and transformer sizes (the generating equipment).

Most power distribution authorities have a requirement of high power factor (HPF) for lighting installations of generally 0.85 to 0.95 minimum.

A typical discharge lighting circuit without power factor correction, eg. 400 W high-pressure sodium, has a power factor of approximately 0.4. Figure 1 shows the relationship of current and voltage in this application.

This power factor characteristic can be corrected to approximately 0.9 by adding a capacitor (leading) to the lagging line current to cancel the phase shift. Figure 2 illustrates this.

In common application therefore, by connecting a capacitor into the lighting circuit, the power factor can be improved to the values normally prescribed by the Regulatory Authorities so that practically inductance free operation results.

Figure 1

Fluorescent lamp circuit with parallel power factor correction capacitor

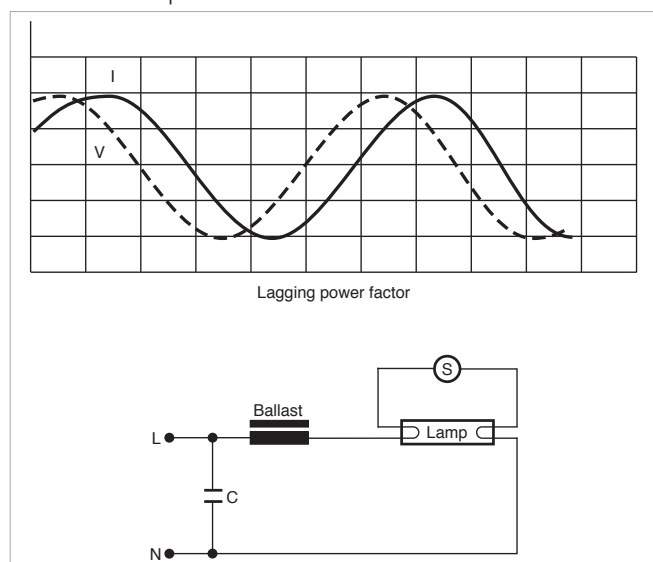
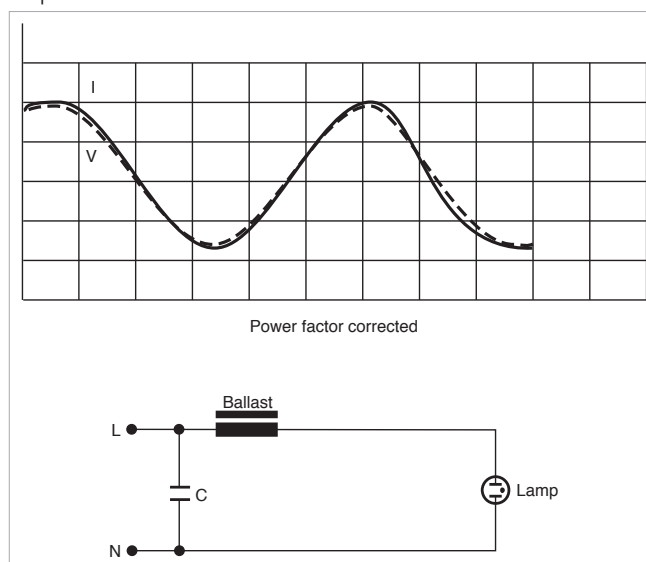


Figure 2

HID lamp circuit with parallel power factor correction capacitor.



Capacitors

Features of Metallised Polypropylene

Low Capacitance Loss

Polypropylene is an extremely efficient dielectric. The losses (or heating effects) are mainly restricted to internal connections and electrode resistance.

The temperature rise is typically about 1°C. This means that higher ambient temperatures can be reached without the risk of thermal runaway.

Self Healing

The capacitor electrodes of a metallised polypropylene capacitor are thin layers of metal deposited on to the polypropylene under varnish.

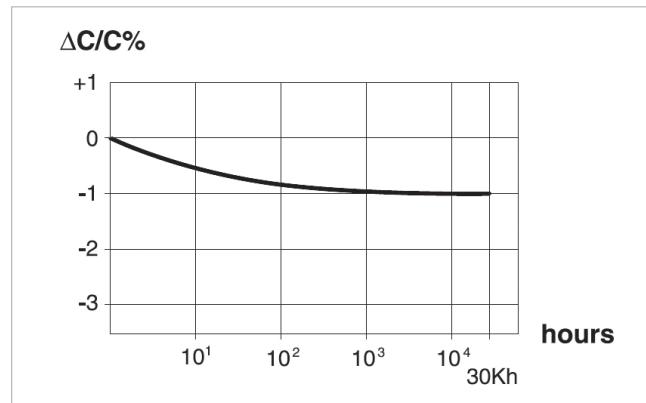
An isolated dielectric breakdown within the capacitor windings is “repaired” by vapourisation of the metal deposits around the “fault” area. The capacitor remains unchanged except for an insignificant capacitance loss.

High Insulation Resistance

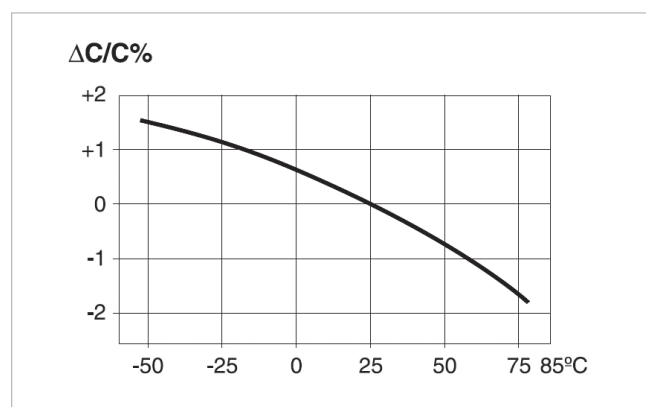
Some special applications demand high insulation resistance which can be satisfied with a metallised polypropylene capacitor. This means that the capacitor is capable of holding an electric charge for long periods. Resistance values are typically greater than 1,000 MΩ.

Capacitance versus Time

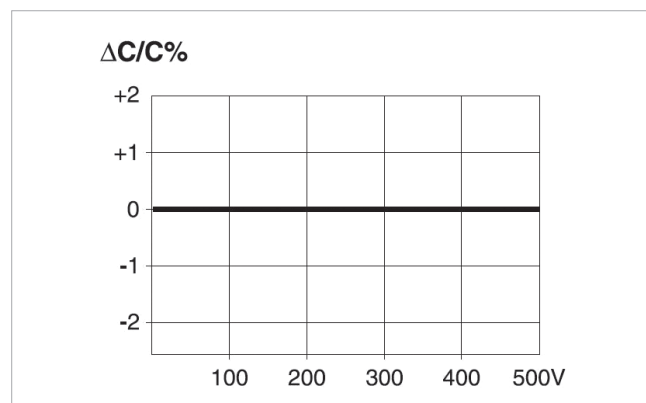
Under normal working conditions



Capacitance versus Temperature



Capacitance versus Voltage



Capacitors

Quality

Assured quality of capacitors is first and foremost and cannot be compromised. CMP uses accepted IEC and BSI Standards as the minimum measure of quality.

All CMP capacitors are manufactured in accordance to Australian and International Standards assuring the customer of the highest quality.

Service Life

The quality of the raw materials, the manufacturing technique and processes and the operating conditions determine the service life of the capacitor.

In accordance with relevant applicable standards, the stated operating life of a capacitor allows for a limited degradation of the capacitance of up to 10% and a failure rate of up to 3%. To demonstrate this performance there are a series of prescribed tests, which includes thermal cycling, application of voltage at elevated temperatures where the duration of this test at elevated voltage simulates the equivalent of 30,000 hr operation.

Thermal stress above the limiting temperature of the capacitor, voltages above the rating of the capacitor, harmonic distortion and excessive humidity can have an influence on the service life expectancy or cause premature failures.

Capacitors shall not be mounted in the close vicinity of heat sources (such as conventional ballasts, lamps, etc.) as high ambient temperatures may cause premature ageing. Every 10°C above the limiting temperature at the surface of the capacitor case will halve its service life.

The capacitors have been designed for continuous operation at the rated voltage marked on the label. Operating the capacitor 5% above the rated voltage will result in a 35% decrease in its service life.

280 V capacitors

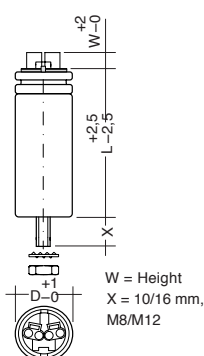


Product Description

- Can: Aluminium
- Self healing polypropylene winding film
- Filling material: Liquid, based on vegetable oil, non-PCB
- Protection class: B, with overpressure protection
- Max. operating temperature of case: 100°C
- Test class: 40/100/21
- Discharge resistor: yes, <50 V within <60s
- Conforming with IEC/EN 61048 and IEC/EN 61049

For product data sheet go to www.cmpcontrols.com, or available on request

CP 2 – 45 µF
Supply voltage up to 250 V



Technical Data

Rated supply voltage	280 V
Mains frequency	50 / 60 Hz
Capacitor tolerance	±5%
Operating temperature	-40 ... +100°C
Push-in terminal	0.5 – 1.5 mm ² for rigid wires

Ordering Data

Weight	Packaging, carton	Type	Article Number
0.036 kg	98 pieces	CP 2.0 280V P2 AL 25x048 PI M8 OIL	9100621
0.037 kg	98 pieces	CP 4.0 280V P2 AL 25x048 PI M8 OIL	9100625
0.043 kg	98 pieces	CP 6.0 280V P2 AL 25x058 PI M8 OIL	9100622
0.047 kg	98 pieces	CP 8.0 280V P2 AL 25x068 PI M8 OIL	9100623
0.054 kg	98 pieces	CP 10.0 280V P2 AL 25x078 PI M8 OIL	9100624
0.050 kg	72 pieces	CP 12.0 280V P2 AL 30x058 PI M8 OIL	9100613
0.090 kg	50 pieces	CP 18.0 280V P2 AL 35x078 PI M8 OIL	9100615
0.090 kg	50 pieces	CP 20.0 280V P2 AL 35x078 PI M8 OIL	9100616
0.110 kg	36 pieces	CP 25.0 280V P2 AL 40x078 PI M8 OIL	9100617
0.110 kg	36 pieces	CP 30.0 280V P2 AL 40x093 PI M8 OIL	9100618
0.110 kg	36 pieces	CP 35.0 280V P2 AL 40x093 PI M8 OIL	9100619
0.200 kg	32 pieces	CP 45.0 280V P2 AL 45x119 PI M8 OIL	9100620

Specific Technical Data

Capacity	Type	Article Number	Mounting	Diameter d	Length L	Height
2 µF	CP 2.0 280V P2 AL 25x048 PI M8 OIL	9100621	M8	25 mm	48 mm	22 mm
4 µF	CP 4.0 280V P2 AL 25x048 PI M8 OIL	9100625	M8	25 mm	48 mm	22 mm
6 µF	CP 6.0 280V P2 AL 25x058 PI M8 OIL	9100622	M8	25 mm	58 mm	22 mm
8 µF	CP 8.0 280V P2 AL 25x068 PI M8 OIL	9100623	M8	25 mm	68 mm	22 mm
10 µF	CP 10.0 280V P2 AL 25x078 PI M8 OIL	9100624	M8	25 mm	78 mm	22 mm
12 µF	CP 12.0 280V P2 AL 30x058 PI M8 OIL	9100613	M8	30 mm	58 mm	20 mm
18 µF	CP 18.0 280V P2 AL 35x078 PI M8 OIL	9100615	M8	35 mm	78 mm	16 mm
20 µF	CP 20.0 280V P2 AL 35x078 PI M8 OIL	9100616	M8	35 mm	78 mm	16 mm
25 µF	CP 25.0 280V P2 AL 40x078 PI M8 OIL	9100617	M8	40 mm	78 mm	16 mm
30 µF	CP 30.0 280V P2 AL 40x093 PI M8 OIL	9100618	M8	40 mm	93 mm	16 mm
35 µF	CP 35.0 280V P2 AL 40x093 PI M8 OIL	9100619	M8	40 mm	93 mm	16 mm
45 µF	CP 45.0 280V P2 AL 45x119 PI M8 OIL	9100620	M8	45 mm	119 mm	16 mm

440 V capacitors

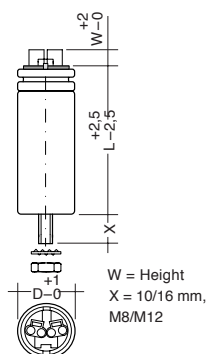


Product Description

- Can: Aluminium
- Self healing polypropylene winding film
- Filling material: Liquid, based on vegetable oil, non-PCB
- Protection class: B, with overpressure protection
- Max. operating temperature of case: 85°C
- Test class: 25/85/21
- Discharge resistor: yes, <50 V within <60s
- Conforming with IEC/EN 61048 and IEC/EN 61049

For product data sheet go to www.cmpcontrols.com, or available on request

CP 20 – 50 µF
Supply voltage up to 440 V



Technical Data

Rated supply voltage	440 V
Mains frequency	50 / 60 Hz
Capacitor tolerance	±5%
Operating temperature	-25 ... +85°C
Push-in terminal	0.5 – 1.5 mm ² for rigid wires

Ordering Data

Weight	Packaging, carton	Packaging pallet	Type	Article Number
0.287 kg	21 pieces	1,890 pieces	CP 20.0 440V P2 AL 40x093 PI M8 OIL	9010019
0.175 kg	36 pieces	3,600 pieces	CP 30.0 440V P2 AL 40x119 PI M8 OIL	9100101
0.800 kg	32 pieces	960 pieces	CP 35.0 440V P2 AL 45x119 PI M8 OIL	9100103
0.224 kg	32 pieces	3,200 pieces	CP 40.0 440V P2 AL 45x119 PI M8 OIL	9100104
0.253 kg	21 pieces	1,890 pieces	CP 45.0 440V P2 AL 50x124 PI M12 OIL	9100075
0.287 kg	21 pieces	1,890 pieces	CP 50.0 440V P2 AL 50x124 PI M12 OIL	9100106

Specific Technical Data

Capacity	Type	Article Number	Mounting	Diameter d	Length L	Height
20 µF	CP 20.0 440V P2 AL 40x093 PI M8 OIL	9010019	M8	40 mm	93 mm	16 mm
30 µF	CP 30.0 440V P2 AL 40x119 PI M8 OIL	9100101	M8	40 mm	119 mm	16 mm
35 µF	CP 35.0 440V P2 AL 45x119 PI M8 OIL	9100103	M8	45 mm	119 mm	16 mm
40 µF	CP 40.0 440V P2 AL 45x119 PI M8 OIL	9100104	M8	45 mm	119 mm	16 mm
45 µF	CP 45.0 440V P2 AL 50x124 PI M12 OIL	9100075	M12	50 mm	124 mm	16 mm
50 µF	CP 50.0 440V P2 AL 50x124 PI M12 OIL	9100106	M12	50 mm	124 mm	16 mm

Mounting accessories

Capacitor mounting accessories

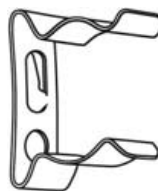
Right angle mounting bracket, Article number 09000932

- Cat. No. 60067



Clip, Article number 09006767

- Cat. No. 60071
- For 30–35 mm diameter capacitors
- To suit 7 mm diameter hole, 0.50–0.53 mm metal thickness



Clip, Article number 09000933

- Cat. No. 60072
- For 40–45 mm diameter capacitors



Blocking inductors for HPF lighting circuits

Blocking inductors are used to stop high frequency signals from being excessively attenuated by shunt power factor correction capacitors. Such signals are superimposed on the mains network in certain areas to switch meter tariffs and loads.

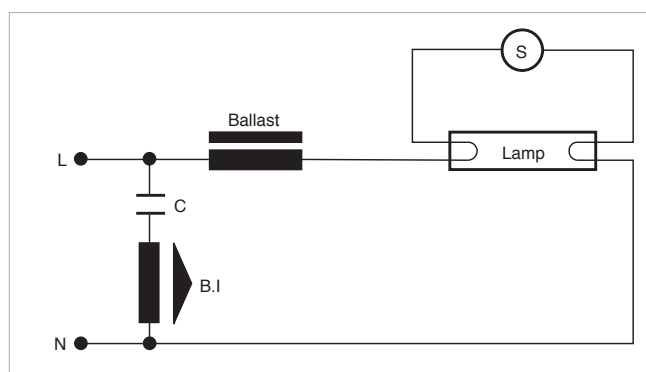
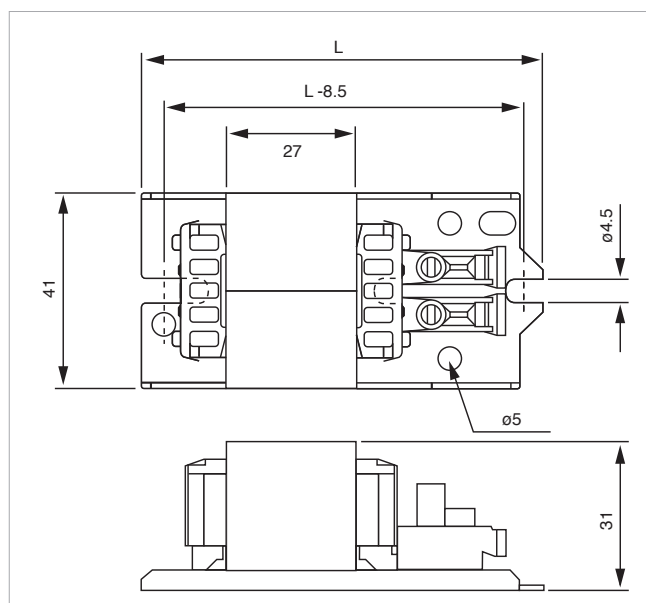
The blocking inductor must match the capacitor size to work correctly. To make selection easier, the description contains the suitable capacitor size in μF , eg. BE12 is suitable for a 12 μF capacitor.

Product Description

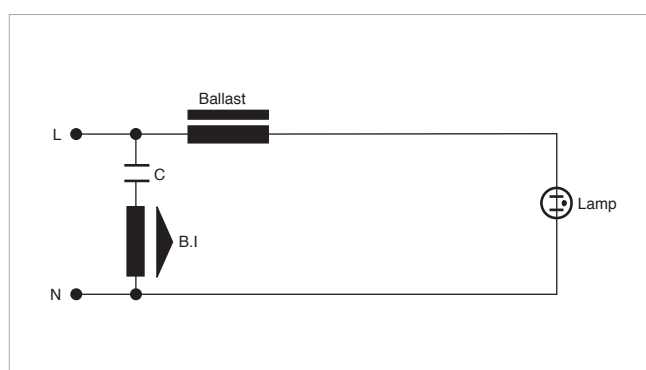
- supply voltage frequency: 240 V to 250 V 50 Hz
- blocking frequency: 750 Hz to 1,050 Hz
- series resonance frequency: 320 Hz nominal
- maximum capacitor tolerance: +10% -5%
- terminals: screw

Ordering Data

Weight	Length (mm)	Packaging, carton	Type	Article Number
0.330 kg	110	36 pieces	BE 4	89000706
0.330 kg	110	36 pieces	BE 8	89000715
0.330 kg	110	36 pieces	BE 9	89000716
0.330 kg	110	36 pieces	BE 10-02	20888387
0.330 kg	85	40 pieces	BE 11-01	89000692
0.330 kg	110	36 pieces	BE 12	89000693
0.330 kg	110	36 pieces	BE 18	89000697
0.330 kg	85	40 pieces	BE 20-01	89002745
0.330 kg	110	36 pieces	BE 25	89000700
0.330 kg	110	36 pieces	BE 30	89000705
0.330 kg	110	36 pieces	BE 35-02	20888286
0.330 kg	110	36 pieces	BE 40	89000708
0.330 kg	110	36 pieces	BE 45	89000709



Fluorescent lamp circuit with power factor correction capacitor and blocking inductor.



Fluorescent lamp circuit with power factor correction capacitor and blocking inductor.



Magnetic transformers

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Magnetic transformers for low-voltage halogen lamps

In principle, operation of low-voltage halogen lamps, which are universally popular for accent lighting, requires a transformer which adapts the mains voltage to a 12 V operating voltage. All transformers also ensure that the protective measures required by relevant standards are met, for instance in the event of a short-circuit or voltage interruption.

LVL D427



Magnetic transformers are a rugged, extremely affordable solution offering long service life together with excellent thermal endurance.

CMP's diversified range of units for integration in luminaires and remote-mounted applications covers all relevant uses. The transformers guarantee operation of lamps in accordance with specifications, thereby enabling lamps to achieve their maximum luminous flux and service life.

Essentially, all CMP magnetic transformers are characterised by minimal power consumption, compact winding, optimised dimensions and high-quality materials. They are continuously controllable using phase-control dimmers for inductive loads.

Designed for Long Service Life

Thanks to their high-quality insulating material, coil form and the quality of the copper wire used, ECT, OMT and OGT open type transformers for integration in luminaires and LVL enclosed types for remote-mounted applications achieve a maximum service life of approximately 100,000 hours of operation, i.e. roughly 10 years of continuous operation with a winding temperature of 130°C. The winding temperature is calculated from the ambient temperature and the temperature increase due to intrinsic consumption. An upward or downward change in temperature of 10°C causes halving or doubling of the life of the unit respectively.

The transformers can be protected on the line side either by a time-delay fuse or by a built-in current sensitive thermal cutout appropriate to the transformer type. Protection on the secondary side against overload and short-circuit trips if the lamp becomes faulty.

Magnetic transformers for low-voltage halogen lamps

Consistent High Quality

Certified to ISO 9001, the production process and equipment guarantee a consistent high quality standard. All finished goods are 100% end of line tested and only the highest quality raw materials are used.

Protection and Approval

It is mandatory under the Australian and New Zealand wiring rules that transformers for remote mounting are housed in a suitable enclosure and as a prescribed item must be approved by the Statutory Authority to AS/NZS 61558. The approval number must be clearly marked on the enclosure.

The enclosed transformer must be located in the installation in a position where it is easily accessible for inspection and maintenance.

The transformer enclosure and wiring to the light fitting must have adequate ventilation. If the wiring and the transformer enclosure are covered with building insulation material then substantial derating and overheating may occur.

The Specialist for Integrated Applications

ECT magnetic transformers are characterized by especially compact dimensions (31x42 mm) and an excellent price/performance ratio. This model is available with power ratings from 20 to 100 VA.

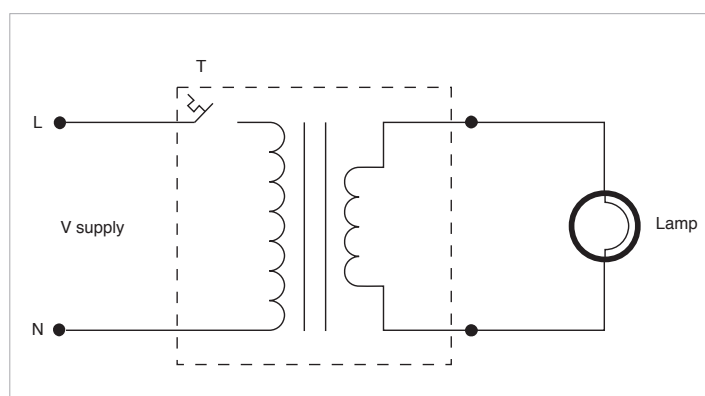
OMT transformers are compactly designed units of reduced length. The device has a cross-sectional area of 65x47 mm. Thanks to its high efficiency, the OMT model, which is available in versions from 25 to 200VA, is also suitable for use at relatively high ambient temperatures.

OGT transformers reveal their full potential in situations where several lamps are connected. Power ratings range from 180 to 1,200VA versions.

Technical tips for low-voltage lighting circuits

Symptom	Possible fault	Test and remedy
Lamp appears to be intact but will not light	Failed lamp	Replace lamp
	Supply fault	Check supply volts and circuit fuse or breaker
	Wiring fault	Check for loose connections on input and output of transformer and the lampholder connections.
	Transformer fault	Check output voltage of transformer, if no voltage measured, substitute transformer
Blowing fuses or tripping circuit breakers	Short circuit	Disconnect secondary at the transformer and re-energise the circuit. Should short circuit re-occur immediately (fuse blows), then try substituting the transformer. If short circuit does not immediately re-occur then replace the secondary wiring and/or the light fitting
Lamp cycling on/off	Loose connection	Check for loose connection at supply source on primary and secondary connections of the transformer and also at the lamp
	Poor contact in lamp holder	Check the lamp contact condition and if necessary replace lampholder
	Transformer cycling	Check that transformer is installed in a ventilated area on a flat surface. Remove transformer away from heat source such as the lamp. Remove any insulation which may be around or covering the transformer.
	Lamp and transformer incompatible	Check lamp wattage is the same as the transformer rating.
Short lamp life	High lamp power	Check voltage at lamp is the same as the transformer nominal secondary voltage rating. Note: The voltage measurement must be recorded over time to check voltage fluctuations.
	Lamp and transformer incompatible	Check lamp wattage is the same as the transformer rating. Also check the secondary voltage at the lamp, that it matches the lamp nominal voltage rating.
	Over temperature of lamp	Check the light fitting and ensure the lamp is well ventilated.
High or low light output	Incorrect lamp wattage	Check lamp wattage is the same as the transformer rating.
	Supply voltage	Check supply voltage is correct and is the same as the transformer nominal voltage rating. Note: The supply voltage measurement should be taken over time to check voltage fluctuations.
	Incorrect wiring	Electrical practice guidelines must be followed in selection of conductor rating to avoid the impact of voltage drop.
	Lamp voltage	Check secondary voltage of transformer, it must match the lamp rated voltage.
Audible noise	Lamp noise	Check if lamp filament is generating noise due to dimmer controller
	Transformer noise	Check with the dimmer supplier or manufacturer to ensure the phase control dimmer is suitable for dimming inductive loads such as transformers. If dimmer switching is asymmetrical it can induce a DC wave form into the transformer winding which can lead to overheating, noise and possible damage or failure of the transformer.

Low Voltage Lighting Transformer Circuit



ECT transformers, 20-100 VA 50/60 Hz

Figure 1

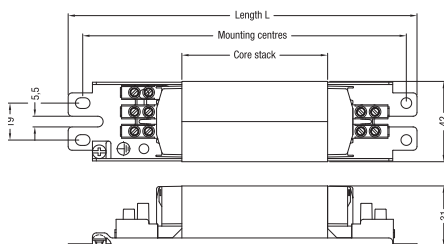
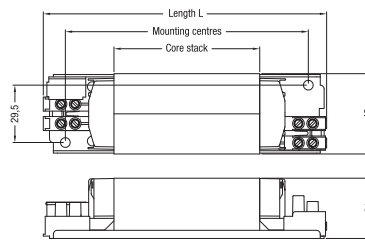


Figure 2



- slim cross-section and compact
- low magnetic stray field
- excellent load weight ratio
- varnish impregnation
- insulation class "H"
- long service life
- mains voltage: 240 V 50/60 Hz (other voltages and frequencies on request)
- standard secondary voltage 12 V, VA quoted at full resistive load 100% duty cycle (other voltages and VA ratings on request)

- screw terminals
- high current on secondary may require alternative connector or flying leads at the discretion of CMP
- recommended total load is 70 to 100% of the VA rating
- short-circuit protection via built-in self-resetting thermal cutout or external fuse

Approved to

- AS/NZS 61558

100% final testing

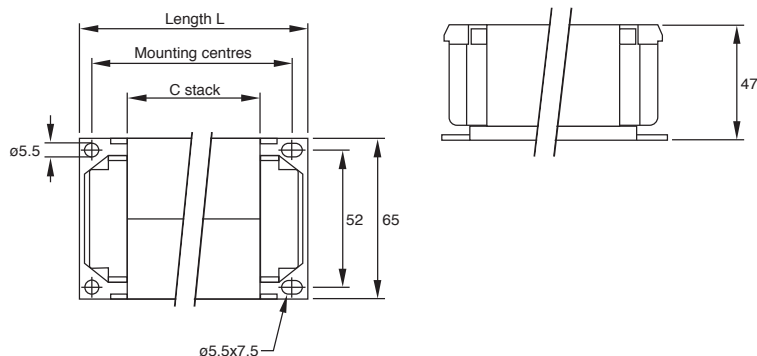
- high voltage
- winding short circuit
- secondary voltage

VA	type	article no.	thermal cutout	recommended primary fuse (mA)	U_1/U_0	losses	stack	length	mounting centres	weight
50	ECT 75 127/12 V ¹		-	500	83	12.9	75	142	125	0.85
105	ECT 160 127/12 V		-	1,000	83	27.1	160	265	250	1.50
50	ECT 75 220/12 V ¹	89000772	-	315	83	12.9	75	142	125	0.85
100	ECT 160 220/12 V	89000741	-	600	84	25.3	160	265	250	1.50
100	ECT 160 220/24 V		-	600	84	25.3	160	265	250	1.50
50	ECT 75 230/11.4 V ¹	89003588	120	-	83	12.9	75	142	125	0.85
50	ECT 75 230/12 V ¹		-	250	83	12.9	75	142	125	0.85
50	ECT 90-15-01 230/12 V	89000781	-	315	86	11.9	90	195	180	1.00
50	ECT 90-230/12 V	89000786	120	-	86	11.9	90	195	180	1.00
105	ECT 160 230/11.4 V		-	600	83	27.1	160	265	250	1.50
20	ECT 35 240/11.4 V		120	-	83	5.2	35	140	125	0.45
35	ECT 50 240/11.4 V		120	-	83	9.0	50	155	140	0.55
35	ECT 60 240/12 V		120	-	86	8.8	60	165	150	0.65
50	ECT 75 240/11.4 V	89000769	120	-	83	12.9	75	180	165	0.85
50	ECT 75 240/12 V ¹	89000767	-	250	83	12.9	75	142	125	0.85
50	ECT 90 240/12 V		120	-	86	11.9	90	195	180	1.00
70	ECT 105 240/11.4 V	89000717	120	-	83	18.1	105	210	195	1.10
80	ECT 120 240/11.4 V		120	-	83	20.7	120	225	210	1.20
80	ECT 140 240/12 V		120	-	86	19.0	140	245	230	1.40
100	ECT 160 240/12 V	89000739	120	-	84	25.3	160	265	250	1.50

Notes

1. refer to figure 2

OMT transformers, 25-200 VA 50/60 Hz



- high power density relative to low weight
- low magnetic stray field
- excellent load weight ratio
- varnish impregnation
- insulation class "H"
- long service life
- mains voltage: 240 V 50/60 Hz (other voltages and frequencies on request)
- standard secondary voltage 12 V, VA quoted at full resistive load 100% duty cycle (other voltages and VA ratings on request)
- integrated screw terminals
- high current on secondary may require alternative connector or flying leads at the discretion of CMP
- recommended total load is 40 to 100% of the VA rating
- short-circuit protection requires external fuse

Approved to

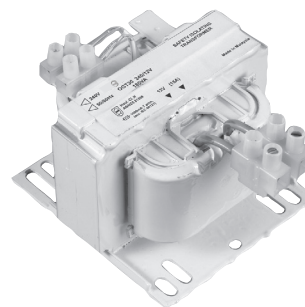
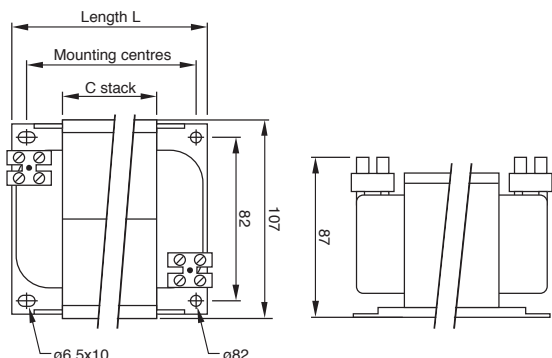
- AS/NZS 61558

100% final testing

- high voltage
- winding short circuit
- secondary voltage

VA	type	article no.	thermal cutout	recommended primary fuse (mA)	U_L/U_o	losses	stack	length	mounting centres	weight
100	OMT 75 220/12 V	89001399	140	800	93	13.0	75	110	96	1.80
100	OMT 75 220/24 V	89001569	140	800	93	13.0	75	110	96	1.80
100	OMTM 55-6-01 220/12 V	89001689	-		90	14.9	55	90	76	1.30
200	OMT 120 220/12 V	89001396	140	1,600	93	25.9	120	155	141	2.65
200	OMT 120 220/24 V	89001454	140	1,600	93	25.9	120	155	141	2.65
25	OMT 30 240/12 V	89001501	140	315	93	3.2	30	65	51	0.75
25	OMT 30 240/24 V	89001502	140	315	93	3.2	30	65	51	0.75
40	OMT 40 240/24 V	89001521	140	400	93	5.2	40	75	61	1.00
40	OMT 40 240/32 V	89001522	140	400	93	5.2	40	75	61	1.00
50	OMTM 40-2-SP01 240/12 V	89001665	140	400	92	7.5	40	75	61	1.00
50	OMTM 40-2-SP03 240/24 V		140	400	92	7.5	40	75	61	1.00
50	OMTM 55-2-SP09 240/32 V	89001686	140	630	95	5.5	55	90	76	1.30
65	OMT 55 240/115 V	89001537	140	630	93	8.4	55	90	76	1.30
65	OMT 55 240/12 V		140	630	93	8.4	55	90	76	1.30
65	OMT 55 240/24 V	89001541	140	630	93	8.4	55	90	76	1.30
80	OMT 65 240/12 V		140		93	10.4	65	100	86	1.55
100	OMT 75 240/110 V	89001580	140	800	93	13.0	75	110	96	1.80
100	OMT 75 240/12 V	89001582	140	800	93	13.0	75	110	96	1.80
100	OMT 75 240/24 V	89001589	140	800	93	13.0	75	110	96	1.80
100	OMT 75 240/32 V	89001593	140	800	93	13.0	75	110	96	1.80
150	OMTM 75-2-SP17 240/12 V	89001710	140	800	90	22.4	75	110	96	1.80
160	OMT 105 240/12 V	89001415	140	1,250	93	20.7	105	140	126	2.40
160	OMT 105 240/24 V	89001420	140	1,250	93	20.7	105	140	126	2.40
200	OMT 120 240/12 V	89001461	140	1,600	93	25.9	120	155	141	2.65
200	OMT 120 240/24 V	89001468	140	1,600	93	25.9	120	155	141	2.65
200	OMT 120 240/32 V	89001473	140	1,600	93	25.9	120	155	141	2.65
25	OMT 30 415/240 V	89001510	-	160	93	3.2	30	65	51	0.75
25	OMT 30 415/24 V	89001511	-	160	93	3.2	30	65	51	0.75
40	OMT 40 415/240 V	89001528	-	200	93	5.2	40	75	61	1.00
40	OMT 40 415/24 V		-	200	93	5.2	40	75	61	1.00
100	OMT 75 415/240 V	89001608	-	400	93	13.0	75	110	96	1.80
100	OMT 75 415/24 V	89001609	-	400	93	13.0	75	110	96	1.80
120	OMTM 75-4-03 415/32 V		-	400	92	17.9	75	120	106	1.80
200	OMT 120 415/240 V	89001484	-	1,000	93	25.9	120	155	141	2.65

OGT transformers, 180-1200 VA 50/60 Hz



- excellent regulation 5%
- high power density
- low magnetic stray field
- excellent load weight ratio
- varnish impregnation
- insulation class "H"
- long service life
- mains voltage: 240 V 50/60 Hz (other voltages and frequencies on request)
- standard secondary voltage 12 V, VA quoted at full resistive load 100% duty cycle (other voltages and VA ratings on request)

- screw terminals
- high current on secondary may require alternative connector or flying leads at the discretion of CMP
- recommended total load is 20 to 100% of the VA rating
- short-circuit protection requires external fuse

Approved to

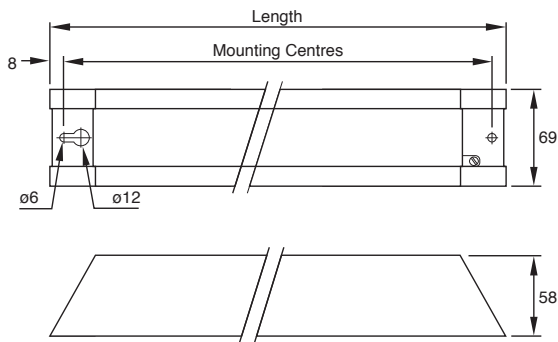
- AS/NZS 61558

100% final testing

- high voltage
- winding short circuit
- secondary voltage

VA	type	article no.	thermal cutout	recommended primary fuse (mA)	U_i/U_o	losses	stack	length	mounting centres	weight
320	OGT 50 220/12 V	27021259	-	1,600	95	26.4	50	130	101-117	3.5
320	OGT 50 220/24 V		-	1,600	95	26.4	50	130	101-117	3.5
400	OGT 60 220/12 V	27002332	-	2,000	95	33.0	60	140	111-127	4.0
400	OGT 60 220/24 V	27002333	-	2,000	95	33.0	60	140	111-127	4.0
500	OGT 70 220/12 V	27021328	-	2,500	95	41.3	70	150	121-137	5.0
500	OGT 70 220/24 V	27021329	-	2,500	95	41.3	70	150	121-137	5.0
550	OGTM 70 230/24 V	27003523	-	2,500	95	56.0	70	150	121-137	5.0
180	OGT 30 240/12 V		-		95	14.9	30	110	81-97	2.5
250	OGT 40 240/12 V		-	1,250	95	20.7	40	120	91-107	3.0
250	OGT 40 240/115 V	27021224	-	1,250	95	20.7	40	120	91-107	3.0
250	OGT 40 240/24 V	27021227	-	1,250	95	20.7	40	120	91-107	3.0
320	OGT 50 240/12 V	27021275	-	1,600	95	26.4	50	130	101-117	3.5
320	OGT 50 240/24 V	27021279	-	1,600	95	26.4	50	130	101-117	3.5
400	OGT 60 240/12 V		-	2,000	95	33.0	60	140	111-127	4.0
400	OGT 60 240/24 V	27021313	-	2,000	95	33.0	60	140	111-127	4.0
500	OGT 70 240/115 V	27021334	-	2,500	95	41.3	70	150	121-137	5.0
500	OGT 70 240/12 V	27021336	-	2,500	95	41.3	70	150	121-137	5.0
550	OGTM 70 240/24 V	27003524	-	2,500	95	56.0	70	150	121-137	5.0
550	OGT 80 240/12 V		-		95	45.4	80	160	131-147	5.5
650	OGT 90 240/12 V		-		95	53.7	90	170	141-157	6.0
750	OGT 100 240/12 V	27002335	-	4,000	95	62.0	100	180	151-167	6.5
800	OGT 110 240/12 V		-		95	66.1	110	190	161-177	7.0
900	OGT 120 240/12 V		-		95	74.3	120	200	171-187	7.5
1,000	OGT 140 240/12 V		-	5,000	95	82.6	140	220	191-207	8.5
1,000	OGT 140 240/115 V	27021163	-	5,000	95	82.6	140	220	191-207	8.5
1,000	OGT 140 240/24 V	27021166	-	5,000	95	82.6	140	220	191-207	8.5
1,200	OGT 160 240/12 V		-		95	99.1	160	240	211-227	9.5

LVL (D427) indoor transformers, 65-200 VA 50/60 Hz



Enclosure type D427



- robust extruded aluminium enclosure (58x69 mm)
- IP 31 protection rating
- high power density relative to low weight
- long service life
- mains voltage: 240 V 50/60 Hz (other voltages and frequencies on request)
- standard secondary voltage 12 V, VA quoted at full resistive load 100% duty cycle (other voltages and VA ratings on request)
- screw terminals; 160VA and above have stud output terminals
- recommended total load is 40 to 100% of the VA rating
- short-circuit protection via secondary fuse

Approved to

- AS/NZS 61558

100% final testing

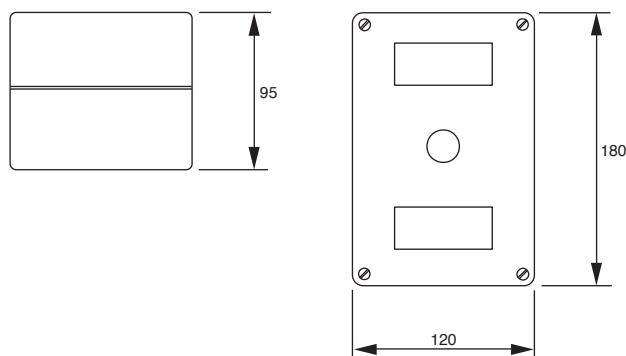
- high voltage
- winding short circuit
- secondary voltage

Flex and plug version available

- LVL13A-2
- LVL14A-2
- LVL11A-2
- LVL 8A-2

VA	type	article no.	thermal cutout	recommended secondary fuse (A)	U_i/U_o	losses	length	mounting centres	weight
65	LVL13-2 240/12 V		Y	10.0	93	8.4	320	300	1.9
100	LVL14-2 240/12 V	89000918	Y	15.0	93	13.0	340	320	2.3
100	LVL14-2-24 V 240/24 V		Y	7.5	93	13.0	340	320	2.3
100	LVL14A-2-24 V 240/24 V	89000923	Y	7.5	93	13.0	320	300	2.3
160	LVL11-2 240/12 V	89000904	Y	25.0	93	20.7	360	340	3.0
160	LVL11-2-24 V 240/24 V	89000906	Y	12.0	93	20.7	360	340	3.0
200	LVL8-2 240/12 V	89000938	Y	30.0	93	25.9	360	340	3.3
200	LVL8-2-24 V 240/24 V	89000939	Y	15.0	93	25.9	360	340	3.3
200	LVL8A-2 240/12 V	89000941	Y	30.0	93	25.9	340	320	3.3

LVL (D490) weatherproof transformers, 50-200 VA 50/60 Hz



Enclosure type D490



- high impact green polycarbonate enclosure (180x120x95 mm)
- IP 24 protection rating
- 4x16 mm (knock-out) conduit entries
- high power density relative to low weight
- long service life
- mains voltage: 240 V 50/60 Hz (other voltages and frequencies on request)
- standard secondary voltage 12 V, VA quoted at full resistive load 100% duty cycle (other voltages and VA ratings on request)

- screw terminals; 160 VA and above have stud output terminals
- recommended total load is 40 to 100% of the VA rating
- short-circuit protection via secondary fuse

Approved to

- AS/NZS 61558

100% final testing

- high voltage
- winding short circuit
- secondary voltage

VA	type	article no.	thermal cutout	recommended secondary fuse (A)	U_i/U_o	losses	length	mounting centres	weight
50	LVL10-2-SP22 240/12 V	89000891	Y	7.5	93	6.5	180	165	2.2
75	LVL10-2-SP23 240/12 V		Y	10.0	93	9.7	180	165	2.4
100	LVL10-2-SP24 240/12 V	89000893	Y	15.0	93	13.0	180	165	2.6
160	LVL10-2-SP20 240/12 V	89000890	Y	25.0	93	20.7	180	165	3.0
200	LVL6-2-24-01 240/24 V	89120673	-	15.0	96	12.6	180	165	3.8
200	LVL6-2-SP01 240/12 V	89120677	-	25.0	96	12.6	180	165	3.8

LVL 48 below ground transformers, 50-200 VA 50/60 Hz

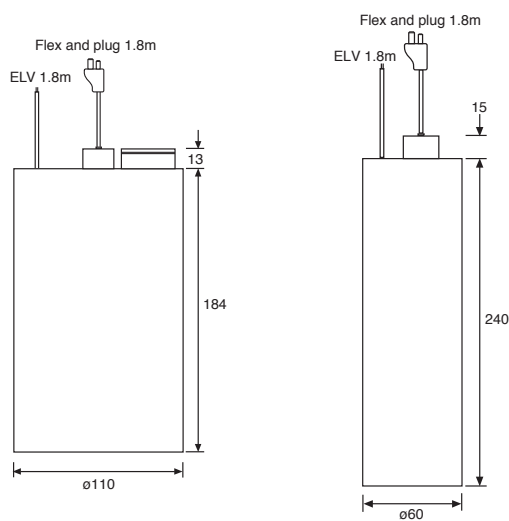


figure 1

figure 2



- Designed for buried applications when installed by a licenced electrical contractor in accordance with AS/NZS 3000.
- encapsulated construction
- IP 67 protection rating
- long service life
- mains voltage: 240 V 50/60 Hz (other voltages and frequencies on request)
- standard secondary voltage 12 V, VA quoted at full resistive load 100% duty cycle (other voltages and VA ratings on request)
- short-circuit protection via built-in self-resetting thermal cutout (50 VA) or secondary fuse (100-200 VA)

Approved to

- AS/NZS 61558

100% final testing

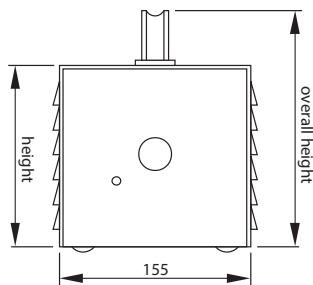
- high voltage
- winding short circuit
- secondary voltage

VA	type	article no.	thermal cutout	recommended secondary fuse (A)	U_L/U_0	losses	length	mounting centres	weight
50	LVL48A-2-01 240/12V	89000930	Y	-	91	10.8	240	-	3.0
50	LVL48A-2-13 240/12V *	89000933	Y	-	91	10.8	240	-	3.0
100	LVL48A-2-02 240/12V	89120661	-	20	97	6.3	184	-	5.5
200	LVL48A-2-03 240/12V	89120662	-	30	97	12.6	184	-	6.5

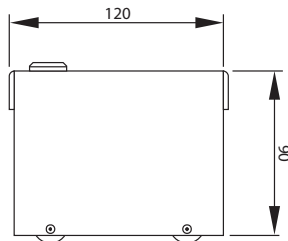
Notes

* input flex, no plug

LVL (D600) indoor transformers, 250-650 VA 50/60 Hz



LVL4-2, LVL17-2, LVL19-2



LVL21-2



- fabricated metal enclosure
- IP 31 protection rating
- excellent regulation 5%
- high power density
- long service life
- mains voltage: 240 V 50/60 Hz (other voltages and frequencies on request)

- standard secondary voltage 12 V, VA quoted at full resistive load 100% duty cycle (other voltages and VA ratings on request)
- stud output terminals
- recommended total load is 20 to 100% of the VA rating
- short-circuit protection via secondary fuse

Approved to

- AS/NZS 61558

100% final testing

- high voltage
- winding short circuit
- secondary voltage

Flex and plug version available

- LVL13A-2
- LVL14A-2
- LVL11A-2
- LVL 8A-2

VA	type	article no.	thermal cutout	recommended secondary fuse (A)	U_L/U_o	losses	length	width	height	weight
250	LVL4-2 240/12 V	89120659	-	30	95	20.7	230	155	170	4.6
250	LVL4-2-24 V 240/24 V	89120660	-	12	95	20.7	230	155	170	4.6
320	LVL21-2 240/12 V	89120641	-	35	95	26.4	240	120	90	4.8
320	LVL21-2-24 V 240/24 V	89120642	-	20	95	26.4	240	120	90	4.8
320	LVL21A-2 240/12 V	89120646	-	35	95	26.4	240	120	90	4.8
500	LVL19-2 240/12 V	89120632	-	50	95	41.3	320	155	190	7.9
650	LVL17-2 240/12 V	89120626	-	63	95	53.7	320	155	190	8.9
650	LVL17-2-24 V 240/24 V	89120627	-	35	95	53.7	320	155	190	8.9

Transformers

Principles of Operation

A transformer transfers electrical energy from one circuit to another through the medium of a magnetic field. The transformer may step up voltage, step it down or deliver energy at the same voltage.

Safety Isolating Transformer

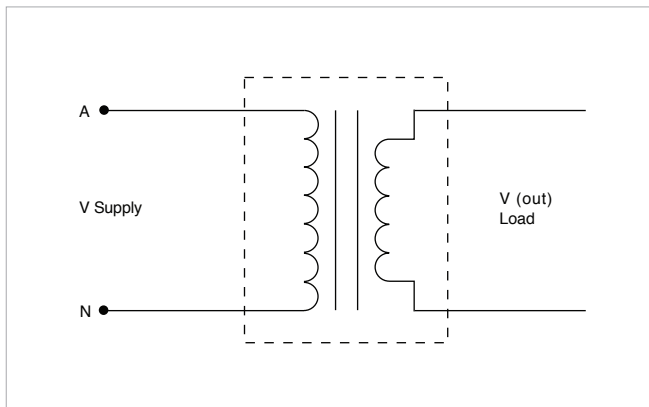
The safety isolating transformer is one of the most widely used of all transformers. It is designed to achieve an accurate voltage ratio within a specific load range.

There is no direct connection between the windings. They are only connected by the intangible lines of magnetic flux in the core. In some types of circuits the transformers may have 1:1 ratio—that is to say no step-up or step-down function. The only reason for this transformer is to isolate the load currents from the supply.

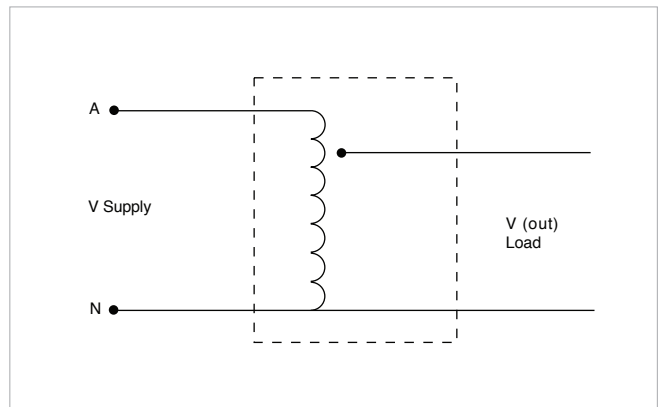
Autotransformers

Autotransformers use a tapped winding therefore the valuable isolation feature of the standard transformer is lost. Autotransformers are generally used to obtain small increments of voltage above or below the input voltage and the closer the output to input voltage ratio comes to 1:1, the greater the reduction in size.

Connection for Safety Isolating Transformer



Autotransformer, Tapped Winding



Useful Formulae

Single Phase Power	Watts = VA x Power Factor (pf) VA = Secondary Volts x Secondary Amps
Three Phase Power	VA = 1.73 x Secondary Voltsline-line x Secondary Ampsline
Auto transformers	

$$\text{Effective Core Size} = VA_{\text{actual}} \left[1 - \left(\frac{V_{\text{minimum}}}{V_{\text{maximum}}} \right) \right]$$

"TX" PW Series

- 50/60 Hz
- Long service life
- Class "F" insulation system (25 VA – 320 VA)
- Class "H" insulation system (0.65 kVA – 6 kVA)
- Self leads 300 mm long
- Clear Finish (25 VA – 320 VA) / Black Finish (0.65 kVA – 6 kVA)
- Other voltages and VA ratings on request

Installation:

- Transformers must be protected by either a Primary or Secondary fuse
- The fuses specified for Primary side are Semi-delay Miniature fuses. Use the fuse specified or an equivalent

Fuse Description:

- TL – Time Lag/Low breaking capacity (IEC 127-2 Sheet 3)
- TH – Time lag/High breaking capacity (IEC 127-2 Sheet 3)
- TE – Time lag/Enhanced breaking capacity (IEC 127-2 Sheet 6)
- HRC – High rupturing capacity (Type gG)

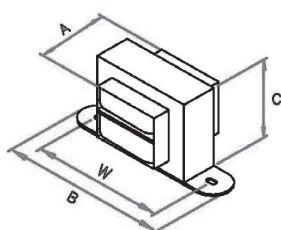


Manufactured to AS/NZS61558

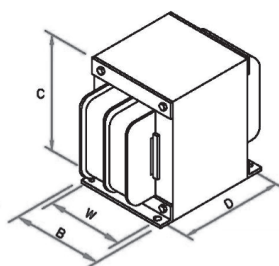
100% final testing

- High potential test
- Voltage ratio test
- Resistance test
- Short-circuit test

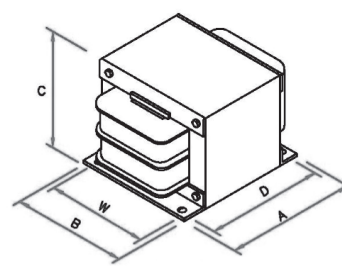
Rating		Recommended fuse protection		Vertical Mtg. Dimensions (mm)					Horizontal Mtg. Dimensions (mm)					Weight (kg)
VA	Primary Voltage	Primary	Secondary	DWG	A	B	C	Mounting Centres (DxWxø)	DWG	A	B	C	Mounting Centres (DxWxø)	
25	110 (115)	TL 0.4A		--	--	--	--	--	A	50	85	55	72xø4/6.5	0.6
	230 (240)	TL 0.2A												
	400 (415)		(will be advised)											
70	110 (115)	TL 0.8A		B	52	65	80	40.5x37.5xø4.5	C	57	80	65	47.0x63.5xø4.5	1.7
	230 (240)	TL 0.4A												
	400 (415)		(will be advised)											
150	110 (115)	TL 1.6A		B	65	80	100	49.5x50.5xø6.0	C	65	100	80	52.0x79.5xø5.5	2.0
	230 (240)	TL 0.8A												
	400 (415)		(will be advised)											
320	110 (115)	TL 4.0A		B	80	95	115	63.5x63.5xø5.5	C	80	115	95	58.0x75.0xø5.0	3.6
	230 (240)	TL 1.6A												
	400 (415)		(will be advised)											



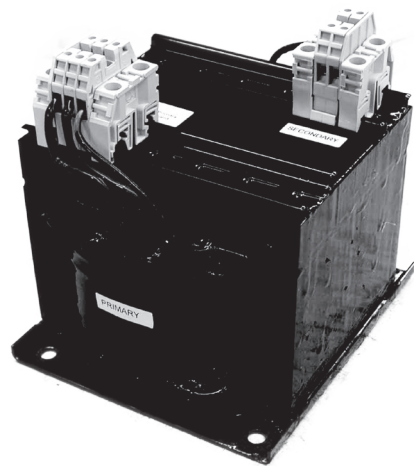
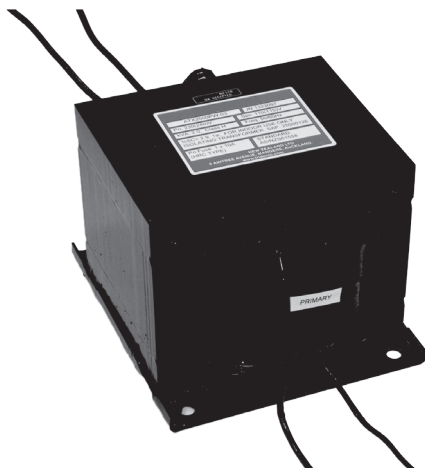
DWG A



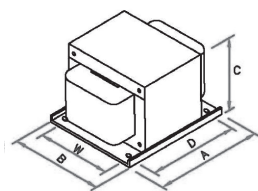
DWG B



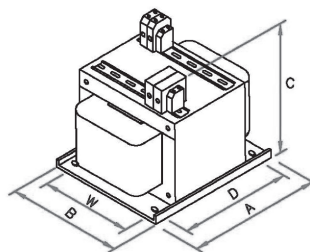
DWG C



Rating		Recommended fuse protection			Dimensions (mm)					Weight (kg)
VA	Primary Voltage	Primary	Secondary		DWG	A	B	C	Mounting Centres (DxWxø)	
0.65	110 (115)	TE 6.3A	110(115)V	230(240)V	A	170	120	105	95x58xø5.5	6
	230 (240)	TH 3.15A								
	400 (415)		(TBA)	(TBA)						
1.2	110 (115)	TL 15A			A	230	120	105	155x58xø5.5	11
	230 (240)	TE 6.3A								
	400 (415)		(TBA)	(TBA)						
2	110 (115)	HRC 20A			A	175	160	130	150x128xø9.0	19
	230 (240)	HRC 10A								
	400 (415)	HRC 6A								
4	110 (115)	HRC 40A			B	295	195	220	270x165xø9.0	38
	230 (240)	HRC 20A								
	400 (415)	HRC 10A								
6	110 (115)	HRC 63A			B	295	195	220	270x165xø9.0	50
	230 (240)	HRC 32A								
	400 (415)	HRC 16A								



DWG A



DWG B

"TX" PWE Series

- 50/60Hz
- Long service life
- Class "H" insulation system
- Cable entry 2 x Ø25.mm Bush
- Powder coated Case in Black Finish (earthed)
- Other voltages and VA ratings on request

* Products can be manufactured to UL recognized Insulation system

Fuse Description:

- TL – Time Lag/Low breaking capacity (IEC 127-2 Sheet 3)
- TH – Time lag/High breaking capacity (IEC 127-2 Sheet 3)
- TE – Time lag/Enhanced breaking capacity (IEC 127-2 Sheet 6)
- HRC – High rupturing capacity (Type gG)

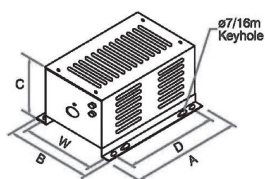


Manufactured to AS/NZS61558

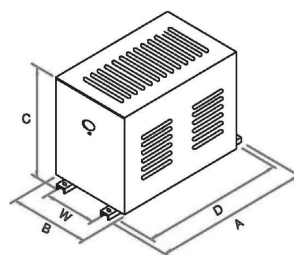
100% final testing

- High potential test
- Voltage ratio test
- Resistance test
- Short-circuit test

Rating		Recommended fuse protection			Dimensions (mm)					Weight (kg)
VA	Primary Voltage	Primary	Secondary		DWG	A	B	C	Mounting Centres (DxWxø)	
0.65	110 (115)	TE 6.3A			A	310	210	170	280x184xø8.0	9
	230 (240)	TH 3.15A								
	400 (415)									
1.2	110 (115)	TL 15A			A	310	210	170	280x184xø8.0	14
	230 (240)	TE 6.3A								
	400 (415)									
2	110 (115)	HRC 20A			A	310	255	175	270x230xø8.0	22
	230 (240)	HRC 10A								
	400 (415)	HRC 6A								
4	110 (115)	HRC 40A			B	390	210	295	365x128xø9.0	43
	230 (240)	HRC 20A								
	400 (415)	HRC 10A								
6	110 (115)	HRC 63A			B	460	230	295	435x165xø9.0	60
	230 (240)	HRC 32A								
	400 (415)	HRC 16A								



DWG A



DWG B

"TX" FPE Series

- 50/60Hz
- Long service life
- Class "H" insulation system
- Single Output Socket (0.65 kVA – 1.2 kVA)
- Dual output sockets (2 kVA)
 - 110 V (115 V) secondary versions have USA style sockets
- Socket-earths are connected together
- Flex & plug:
 - 3-core 2.1 M x 1.0 mm² (230/240 V Primary)
- Flex no plug:
 - 3-core 2.1 M x 1.0 mm² (400/415 V Primary)
- Powder coated Case in Black Finish (earthed)
- Other voltages and VA ratings on request



*Products can be manufactured to UL recognized Insulation

Fuse Description:

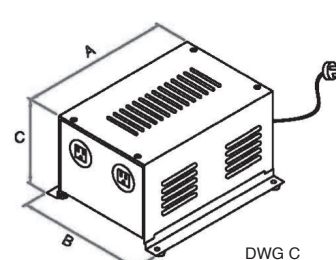
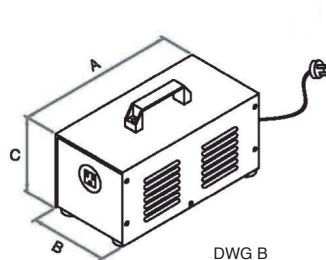
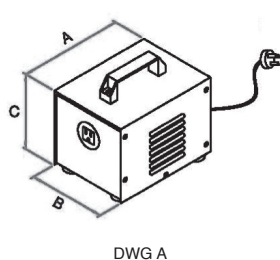
- TL – Time Lag/Low breaking capacity (IEC 127-2 Sheet 3)
- TH – Time lag/High breaking capacity (IEC 127-2 Sheet 3)
- TE – Time lag/Enhanced breaking capacity (IEC 127-2 Sheet 6)
- HRC – High rupturing capacity (Type gG)

Manufactured to AS/NZS61558

100% final testing

- High potential test
- Voltage ratio test
- Resistance test
- Short-circuit test

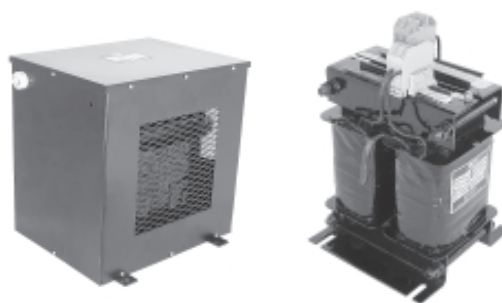
Rating		Recommended fuse protection			Dimensions (mm)				Weight (kg)
VA	Primary Voltage	Primary	Secondary		DWG	A	B	C	
0.65	110 (115)	TE 6.3A	110(115)V	230(240)V	A	210	153	150	9
	230 (240)	TH 3.15A							
	400 (415)		(TBA)	(TBA)					
1.2	110 (115)	TL 15A			B	320	153	150	14
	230 (240)	TE 6.3A							
	400 (415)		(TBA)	(TBA)					
2	110 (115)	HRC 20A			C	300	254	170	22
	230 (240)	HRC 10A							
	400 (415)	HRC 6A							



Single phase open and enclosed 8.0KVA to 200KVA 50/60Hz

- Class "H" insulation system.
- Terminal type depends on current rating of the transformer:
 - DIN rail mounting terminal block.
 - DIN rail mounting stud terminals.
 - Crimp terminal lugs.
- Case 28S and 25S $\phi 25$ mm, 2 x bushes for cable entry (opposite ends).
- Case 9S $\phi 44$ mm, 2 x bushes for cable entry (opposite ends).
- Case 10S, 2 x aluminium gland plates for cable entry (opposite ends).
- Case 11S, 2 x aluminium gland plates for cable entry (bottom).
- Weight, Core loss, Copper loss are approximate values only.
- Powder coated Case in Black Finish

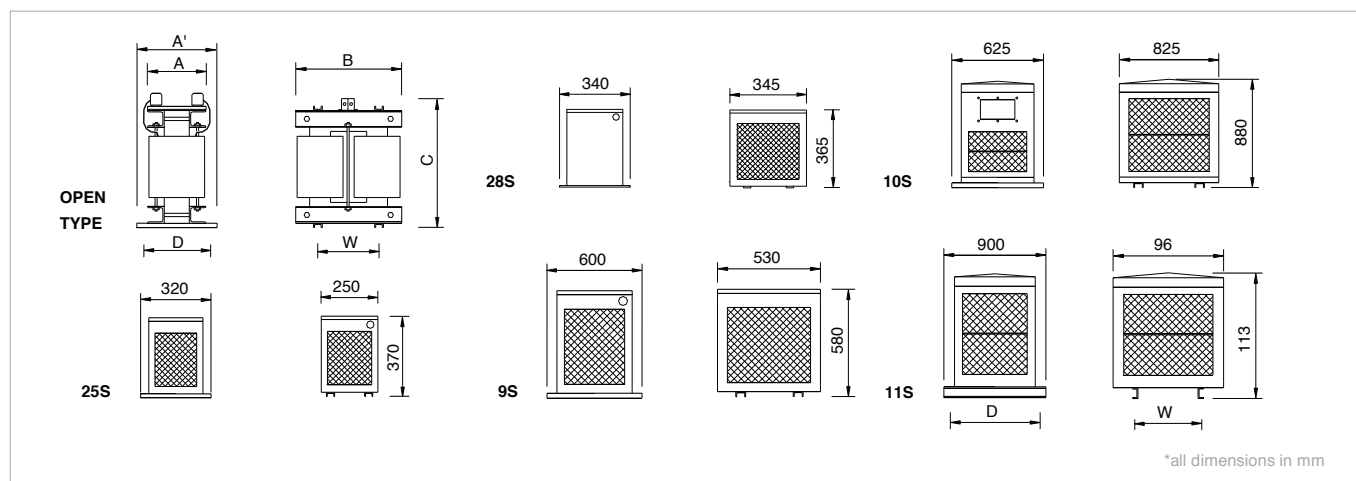
* Products can be manufactured to UL recognized Insulation system



Manufactured to AS/NZS61558 & AS60076.11

100% final testing

- High potential test
- Voltage ratio test
- Resistance test
- Short-circuit test



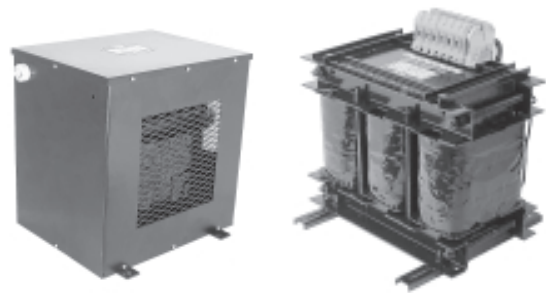
KVA	Open Type						Enclosed Type			Typical Core Loss (Watts)	Typical Copper Loss @ 115°C (Watts)
	A	A'	B	C	Mounting Centres (D x W x ϕ)	Weight (kg)	Diagram No.	Mounting Centres (D x W x ϕ)	Weight (kg)		
200	400	445	540	920	395x280x $\phi 13$	540	11S	840x560x $\phi 13$	580	560	3330
167	360	445	540	920	395x280x $\phi 13$	460	11S	840x560x $\phi 13$	500	490	3210
133	330	445	540	920	395x280x $\phi 13$	390	11S	840x560x $\phi 13$	430	400	2960
100	310	445	540	920	395x280x $\phi 13$	340	11S	840x560x $\phi 13$	380	360	2240
93	390	430	390	690	380x205x $\phi 13$	300	10S	575x500x $\phi 13$	330	330	2230
83	360	405	390	690	355x205x $\phi 13$	280	10S	575x500x $\phi 13$	310	300	1970
67	310	360	390	690	310x205x $\phi 13$	230	10S	575x500x $\phi 13$	260	240	1820
50	265	315	390	690	265x205x $\phi 13$	190	10S	575x500x $\phi 13$	220	180	1650
40	235	290	390	690	240x205x $\phi 13$	160	10S	575x500x $\phi 13$	190	150	1520
33	405	490	270	500	450x160x $\phi 9$	190	9S	565x300x $\phi 13$	210	480	490
27	340	425	270	500	385x160x $\phi 9$	160	9S	565x300x $\phi 13$	180	380	440
20	280	425	270	500	325x160x $\phi 9$	120	9S	565x300x $\phi 13$	140	290	380
17	250	340	270	500	325x160x $\phi 9$	110	9S	565x300x $\phi 13$	130	240	350
13	215	310	270	500	260x160x $\phi 9$	90	9S	565x300x $\phi 13$	110	190	320
10	185	310	270	500	260x160x $\phi 9$	80	9S	565x300x $\phi 13$	100	150	270
8	310	425	220	340	355x130x $\phi 9$	80	28S	315x245x $\phi 10$	90	220	140

* Other voltages and KVA ratings on request

Three phase open and enclosed 9.0KVA to 300KVA 50/60 Hz

- Class "H" insulation system.
- Terminal type depends on current rating of the transformer:
 - DIN rail mounting terminal block.
 - DIN rail mounting stud terminals.
 - Crimp terminal lugs.
- Case 8S and 9S $\phi 44$ mm, 2 x bushes for cable entry (opposite ends).
- Case 10S, 2 x aluminium gland plates for cable entry (opposite ends)
- Case 11S, 2 x aluminium gland plates for cable entry (bottom).
- Standard winding connecting Dyn11 (unless otherwise specified)
- Weight, Core loss, Copper loss are approximate values only.
- Powder coated Case in Black Finish

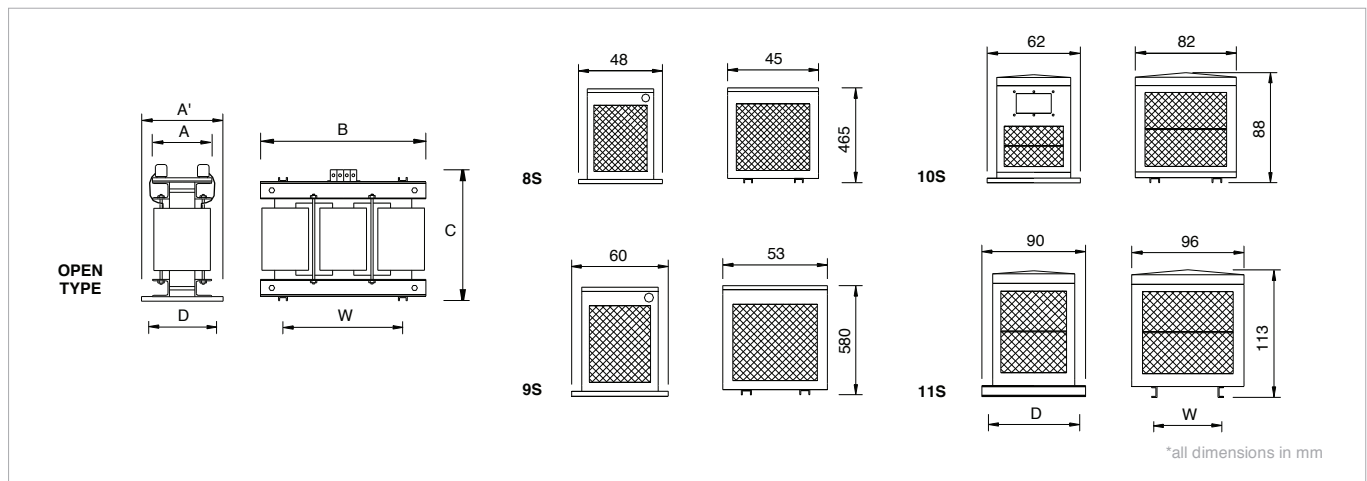
* Products can be manufactured to UL recognized Insulation system



Manufactured to AS/NZS61558 & AS60076.11

100% final testing

- High potential test
- Voltage ratio test
- High Frequency test
- Resistance test
- Short-circuit test



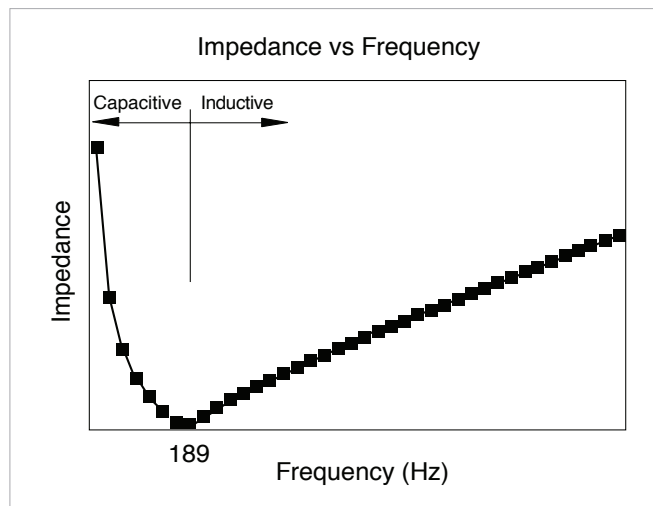
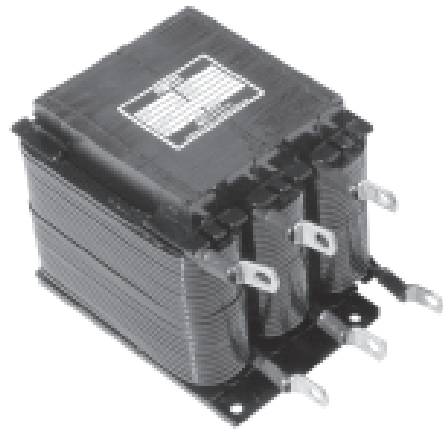
KVA	Open Type						Enclosed Type			Typical Core Loss (Watts)	Typical Copper Loss @ 115°C (Watts)
	A	A'	B	C	Mounting Centres (D x W x ϕ)	Weight (kg)	Diagram No.	Mounting Centres (D x W x ϕ)	Weight (kg)		
300	400	445	820	920	395x560x ϕ 13	850	11S	840x560x ϕ 13	890	860	5200
250	360	445	820	920	395x560x ϕ 13	710	11S	840x560x ϕ 13	750	760	4800
200	330	445	820	920	395x560x ϕ 13	630	11S	840x560x ϕ 13	670	600	4490
150	310	445	820	920	395x560x ϕ 13	520	11S	840x560x ϕ 13	560	540	3470
140	390	430	595	690	380x410x ϕ 13	480	10S	575x500x ϕ 13	510	510	3110
125	360	405	595	690	355x410x ϕ 13	440	10S	575x500x ϕ 13	470	460	3100
100	310	360	595	690	310x410x ϕ 13	360	10S	575x500x ϕ 13	390	370	2730
75	265	315	595	690	265x410x ϕ 13	300	10S	575x500x ϕ 13	330	280	2450
60	235	290	595	690	240x410x ϕ 13	240	10S	575x500x ϕ 13	270	230	2310
50	405	490	420	500	450x300x ϕ 9	280	9S	565x300x ϕ 13	300	730	750
40	340	425	420	500	385x300x ϕ 9	240	9S	565x300x ϕ 13	260	600	650
30	280	425	420	500	325x300x ϕ 9	190	9S	565x300x ϕ 13	210	440	560
25	250	340	420	500	325x300x ϕ 9	170	9S	565x300x ϕ 13	190	380	500
20	215	310	420	500	260x300x ϕ 9	140	9S	565x300x ϕ 13	160	300	480
15	185	310	420	500	260x300x ϕ 9	110	9S	565x300x ϕ 13	130	230	460
12.5	310	425	360	340	355x250x ϕ 9	110	8S	445x250x ϕ 13	120	350	190
9.0	255	340	360	340	300x250x ϕ 9	90	8S	445x250x ϕ 13	100	260	160

* Other voltages and KVA ratings on request

Harmonic Suppression Chokes (Reactors)

- Rated voltage: 0.66/2.5 kV.
- Resonant frequency: 189 Hz (7%)
- Inductance tolerance: $\pm 5\%$.
- Max over current: 1.6 x rated I.
- Self supporting lugs
- Black finish
- Other voltages and ratings on request (Single Phase / Three Phase)

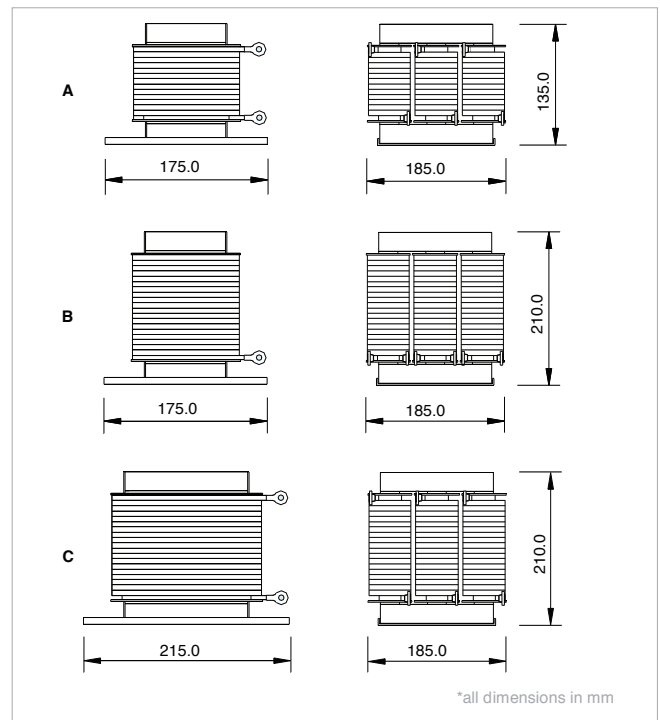
* Products can be manufactured to UL recognized Insulation system
** For PWM Reactors, DC Chokes and Specials please contact Sales



Manufactured to AS/NZS60076.6

100% final testing

- High potential test
- Inductance test
- Resistance test



kVAR @ 400	Capacitor Current (Amp)	Dimension Drawing	Mounting Centres (mm)	Weight (kg)
10	14.4	A	150x128xφ9.0	14
15	21.6	A	150x128xφ9.0	17
20	27.8	A	150x128xφ9.0	20
25	36.1	B	150x128xφ9.0	22
30	41.8	B	150x128xφ9.0	24
40	55.6	B	150x128xφ9.0	28
50	69.5	C	190x128xφ9.0	35
60	83.4	C	190x128xφ9.0	39

* Other voltages and KVAR ratings on request (Single Phase or Three Phase)



Copper and aluminium enamelled wire

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Copper and aluminium magnet wire

With a solid technical background, the CMP Group offers a comprehensive range of insulated winding wire, which provides a solution for every electric motor, transformer and coil manufacturer.

The magnet winding wire is at the heart of any such product and its quality greatly influences the reliability and performance. With extensive international technical and manufacturing associations, the CMP Group offers its customers the benefit of over thirty years' experience in know-how, development and production in the ferromagnetic and electrical industries.

CMP's reputation for quality and competitive product pricing is due to its highly experienced and qualified management and staff and to its utilisation of high technology product development and advanced manufacturing technology.

The CMP range of magnet winding wire, for both domestic and export markets, is presented in this catalogue complete with full technical details.

The CMP Group of companies is engaged in the manufacture of electro technology products. It trades internationally providing products and services of the highest quality for the electrical industry.

CMP Controls Pty. Ltd. is a manufacturer of high performance copper and aluminium winding wire, through the use of advanced manufacturing technology and insulation materials.

The CMP magnet wire manufacturing capacity range covers specialised manufacturing of bare and insulated wires for electrical engineering purposes as follows:

Enamelled copper and aluminium round wire from diameters 0.05 mm to 5.00 mm



Bare copper and aluminium rectangular strip, finished section from 1.00 mm to 5.00 mm thickness to width 3.00 mm to 20.00 mm.

Enamelled copper and aluminium rectangular strip, finished section from 1.00 mm to 5.00 mm diameter, width 3.00 mm to 20.00 mm

The production experience, continuous investment in Research and Development, advanced manufacturing technology and commitment to assured Quality allows CMP Controls Pty. Ltd. to offer services and solutions to its customers.



Choice of conductor

Copper wire is the most common choice as conductor used throughout the Electrical Industry. Electrical conductivity is the most important characteristic of any conductor. Choices are usually restricted to unalloyed pure metals rather than to alloys.

For equal diameters, aluminium, the second choice of conductor, has about 61% greater resistance than copper. Furthermore, aluminium has a lower thermal conductivity, which reduces the efficiency of cooling by thermal conduction to heat sinks or by convection of moving air.

When considering volume, particularly in small sealed motors, copper is a more efficient material.

A comparison between copper and aluminium

POSITIVE

Copper	Aluminium
High electrical conductivity	Lower density
High thermal conductivity	Lower costs
Low cost	Higher temperature
Volume Efficient	Enamelled rating
Easy to solder	Weight efficient
Easy to work	
Good corrosion resistance	
Easy to coat	

NEGATIVE

Copper	Aluminium
Low strength	Lower strength
Low oxidation resistance	Lower conductivity
Difficult to machine	Lower corrosion resistance
Some brazing problems	Poor stress relaxation
Gas diffusion	Poor solderability
High temperature creep	

A comparison between copper and aluminium

Characteristics	Copper	Aluminium
Specific Weight (g/cm ³)	8.89	2.70
Melting Point (°C)	1,083	658
Specific Heat (cal/g °C)	0.093	0.0220
Coefficient of linear expansion (1/°C)	0.000017	0.000023
Tensile Strength (MPa)	262	82.7
Elongation at break (%)	15–35	10–30
Conductivity IACS at 20°C (%)	101	61.5
Resistivity at 20°C (Ω mm ² /m)	0.01707	0.02803
Temperature coefficient of resistivity at 20°C (1/°K)	0.00397	0.00406

For the Same Voltage Drop

Diameters ratio	1	1.27
Cross section ratio	1	1.63
Weight ratio	1	0.50

For the Same Intensity of Current (thermal exchange)

Diameters ratio	1	1.19
Cross section ratio	1	1.42
Weight ratio	1	0.40

Magnet wire characteristics

The characteristics of magnet wire can be divided broadly into the categories of mechanical, electrical, thermal and chemical.

Most thermal and chemical behaviours are related closely to the enamel formulations used.

Mechanical and electrical parameters are more closely related to possible causes for failure of the wire to withstand the rigours of winding.

The following are considered to be the most important characteristics for general coil winding:

Mechanical

- Conductor diameter
- Overall diameter
- Springiness
- Flexibility and adherence
- Coefficient of friction
- Bond strength

Electrical

- Continuity of covering
- Breakdown voltage
- Resistance

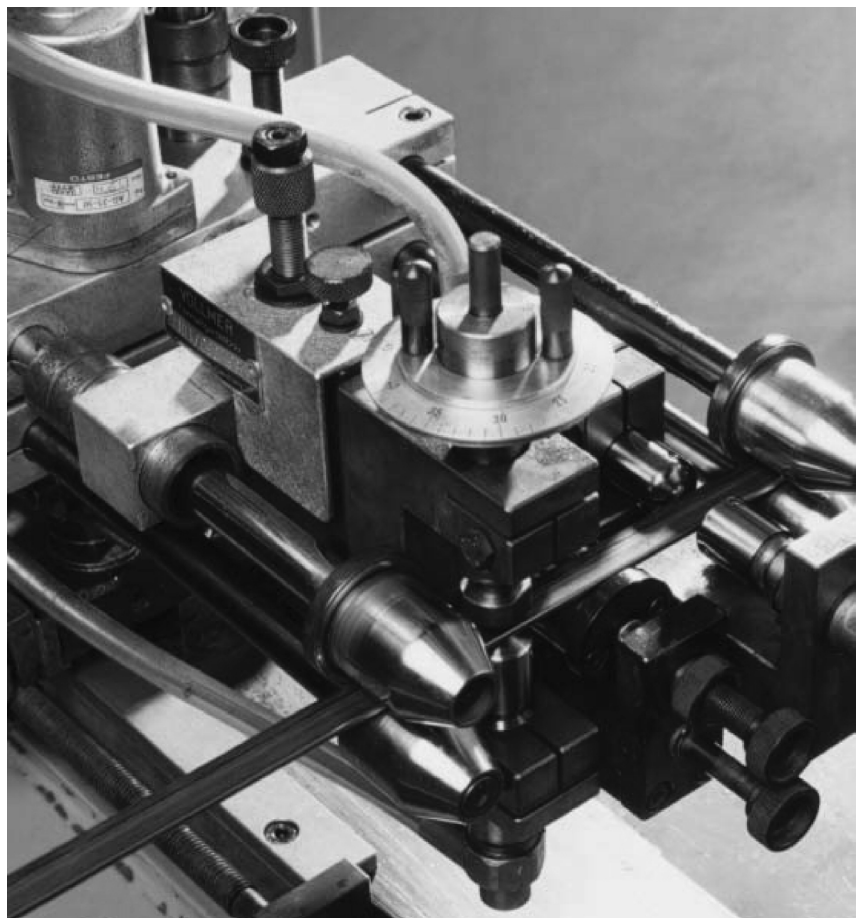
Thermal

- Heat shock
- Tan delta

There are many types of winding wire each having its own features, properties and performances.

Common requirements of all however, are;

- Good electrical performance
- Low yield strength
- Insulation uniformity
- Low springback
- Good flexibility
- High electrical conductivity
- High coating strength
- High thermal rating
- High elastic modulus
- Chemical resistance
- High low stress elongation
- High purity copper and aluminium
- Good conformability
- Stability at high temperature





General information

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Additional services



Product Design / Technical Support

CMP provides fast and reliable product design and technical support to all our customers for a diverse range of lighting and electrical products and applications.

With dedicated design and electrical testing divisions, in both Australia and New Zealand, CMP provides innovative product design services, combined with technical and troubleshooting support to all our local and international customers, along with compliance services to assist customers achieve certification across all markets, including China, Japan, Singapore, Malaysia, Philippines, Vietnam, through to Europe, USA and South America.



Plastic Injection Moulding

As a quality accredited, UL certified, Australian Manufacturer for over 15 years, CMP has the expertise and the facility to take your project from initial idea all the way through to finished product. Offering the most innovative rapid prototyping and plastic injection moulding in Australia.

Our quality management systems ensure our customers requirements are always exceeded. Developing processes and procedures aimed at continuously improving operations and meeting the ever-changing demands of the manufacturing sector.

Our machine capacity dynamically tailors to a variety of requirements, ranging from 50 to 350 tonne capacity. Our ability to process all plastics is further highlighted through a specialised focus on engineering plastics. At CMP, our facility is equipped with the latest in automation and robotics, to ensure a lean manufacturing process for optimal production efficiency.



3D Printing

CMP 3D printing offers customers the experience of producing innovative, economical components in minutes, at the fraction of the price. As an early adopter of the technology, both in marketing and application, CMP developed an entire department dedicated to 3D printing, titled 3D Plastics back in 2013.

3D plastics, which has now come back under the CMP group of companies, has R&D departments both in Melbourne, Australia and in Makati, Philippines, and is a fully functional 3D printing lab, providing rapid prototyping and digital manufacturing.



Tooling & Engineering

CMP has developed as one of Australia's leading producers of Moulds, Dies and Tooling. Experienced in both the design and development of moulding tools, the team at CMP can handle all your moulding requirements. Understanding the importance of timely delivery, our one-stop quality service will design and develop your moulding tools for optimum production runs.

Combining a state of the art facility, with engineering and design expertise, enables CMP to offer the best all-in-one solution, focusing on cutting costs, while producing the highest quality precision tooling.

Manufacturing moulds exclusively in Australia, we pride ourselves on providing the very best. With strict quality control systems, and a team of specialist designers, engineers and toolmakers, CMP is ready to take your project from initial idea all the way through to finished product.



Warehousing

Demonstrating our commitment to our clients, CMP offers both short and long term warehousing of finished goods, as an additional service to compliment our manufacturing department. CMP Warehouse is a facility designed and built with one thing in mind; to service the needs of our customers, providing an effortless production process exceeding industry standards.

To ensure the supply chain of our customers is always running smoothly, our warehousing facility runs 24 hours a day, 7 days a week. Offering express services to and from all cities, interstate and overseas. Our inventory system is yet another measure we take to manage all stock levels, accommodating to the fluctuating demands of the markets our customers service.



Assembly

Our components-to-product system has been developed to ensure the right training, processes and procedures are in place to deliver the right assembly solution for your business. Working with our customers specifications, CMP develops assembly lines of sequential operations to supply products precisely to requirements. Driving optimal efficiency and delivering products ready for distribution.

Offering both semi and fully assembled services, our objective is to optimise your production process. Reducing the need for excess facility space and minimising handling time.

Adhering to the strictest of quality standards, we guarantee our clients quality assembly services and packaging that will surpass current operations.

Lamps and lighting control equipment

The factors governing the growth of the electric lamp industry include the initial cost and the lamp life. The efficiency with which the input energy is converted into visible light is also important and it is interesting to look at the efficacy of improved light sources.

In discharge lamps, a gas or vapour is contained in an arc tube. When a stream of electrons pass through the arc tube, the gas or vapour is ionised, it becomes excited and emits radiant energy. The energy radiated is distributed over wavelengths characteristic of the particular gas or vapour mix in which the discharge takes place.

The market requirements of modern light sources are defined essentially by economy and design. In lamp technology, design means size, shape and photometric performance such as luminance and colour. Discharge lamps in the form of compact fluorescent, metal halide and sodium lamps have been developed for general lighting applications, specifically in response to the market requirements of economy, design and energy efficacy.

The function of control equipment

The correct operation of discharge lamps depends largely on the properties of the control gear and poor or incompatible equipment will inevitably result in imperfect functioning of the lamp. The control equipment and the lamp must be compatible in all respects. The control gear must limit the electric current passing through the lamp to a specified value prescribed for that particular lamp and this match is the prime criteria for ensuring compatibility between control gear and lamp. Therefore, each type and rating of discharge lamp requires compatible control gear to ensure the lamp operates within its specified electrical parameters.

Inevitably, watts losses occur in any current limiting device, therefore the question of how much power is lost (or in other words the efficiency of the control equipment) is an important factor when considering the performance of a lighting system.

The improved efficiency of only a few watts per control gear set can rapidly add up to kilowatts in large project applications. There are different types of control equipment technologies and methods of current limitation, each having its own advantages and disadvantages.

Requirements of the control equipment

Discharge lamps cannot function directly on main supply voltage. Certain devices have to be built into the circuit in the form of what we call control equipment. Depending on the type of lamp, the control equipment performs one or more of the following primary functions:

- it provides the ignition voltage higher than the normal operating voltage to enable initial lamp starting
- it ensures that the lamp continues to operate despite the fact that twice during each AC cycle the voltage is zero
- it prevents the self destruction of the lamp by limiting and stabilising the lamp current. This is a necessary measure in view of the negative resistance characteristic of discharge lamps.

In addition to these primary functions, lighting control equipment must also fulfil a number of other important requirements:

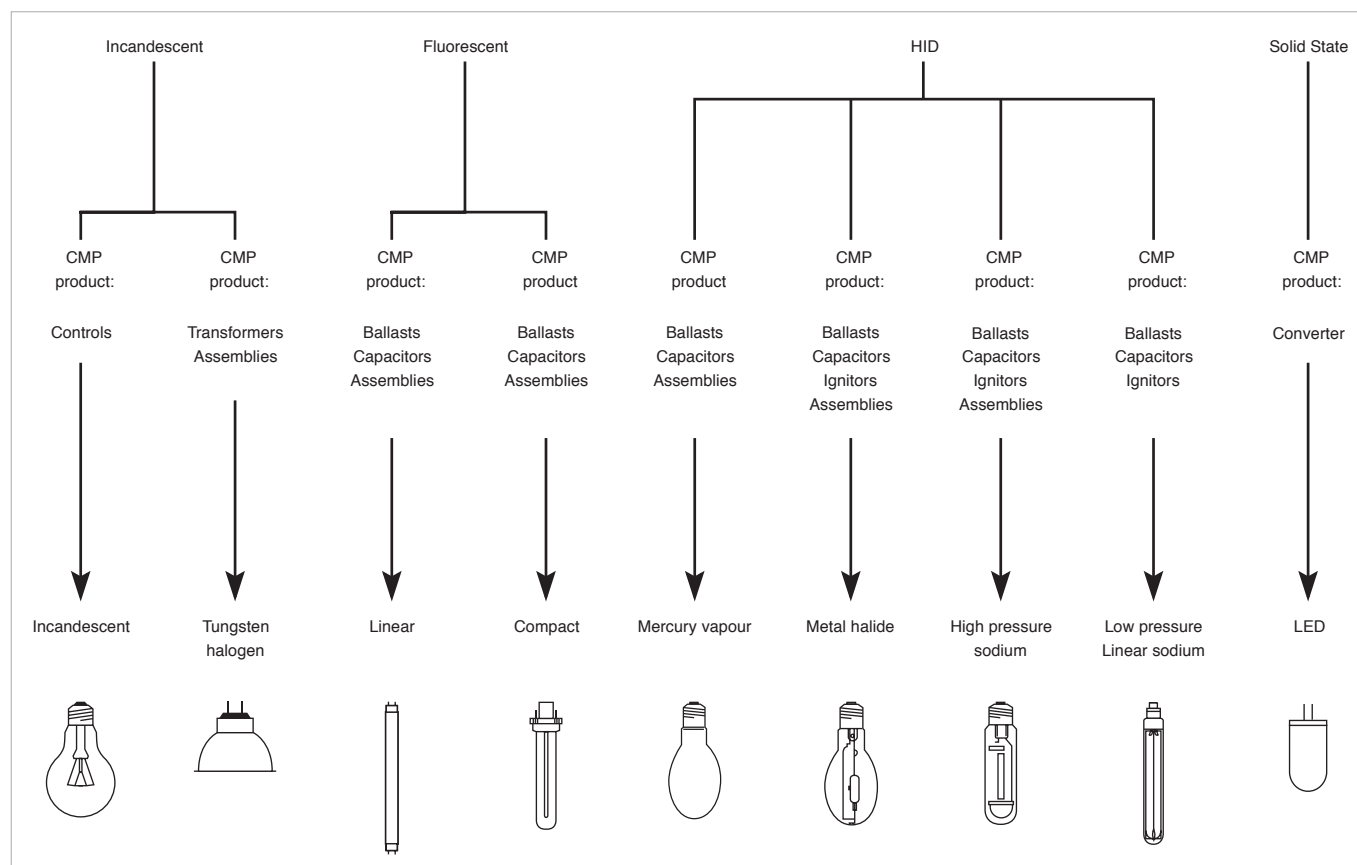
- it must ensure a sufficiently high power factor
- it must limit the generation of harmonics
- it must offer adequate suppression of any radio
- interference that might be produced by the lighting system.

Finally, the control equipment must satisfy other requirements dictated by both the luminaire manufacturer and the user:

- to have control components of compact dimensions
- to have low watts loss, high efficiency characteristics which also impact the control equipment temperature
- to have low operating noise level and long service life
- to have a high impedance to frequencies used for ripple switching (if required)

Light source	Efficacy (lumens/watt)
Candle	0.1
Gas mantle	2.0
Carbon arc	7.0
Early carbon filament	2.0
Cellulose filament	3.0
Tungsten varnish	9.0
Tungsten gas-filled coiled coil	15.0
Mercury vapour	40–60
LED white	50–70
Fluorescent lamp	64–104
Metal halide	70–90
High pressure sodium	90–125
Low pressure sodium	120–200

Lamp Families



Make light work, better

CMP is internationally recognised as a world class manufacturer and supplier of energy saving lighting control equipment. “Make light work, better” is synonymous with energy saving lighting and optimized performance of lamps and systems for industrial, commercial, as well as domestic applications.

Even though the long-term environmental effects of greenhouse gas emissions on the earth’s climate remain uncertain, the responsibility to explore and develop economically viable opportunities to reduce emissions through energy efficiency improvements is of paramount importance to CMP.

Energy efficiency is really about cost management. In the big picture, for every unit of energy demand saved, three or four units of fuel are saved back at the power plant, plus the pollution that goes with burning that fuel. The application of energy efficient lighting ultimately leads to significant savings in electricity demand, particularly in commercial and industrial installations. Reducing energy demand, is therefore both economically sensible and environmentally responsible.

Lighting

A lighting system should enable people to see effectively and comfortably; energy performance considerations should not detract from this primary objective. The energy load of a system depends on the use of efficient lamps operating in efficient luminaires, using efficient control equipment. Ballasts for fluorescent lamps may offer the most sustainable improvement in the energy demand of commercial and industrial lighting systems. This is because the ballast is a hard-wired component that is not easily tampered with, it lasts the life of a light fitting and its energy performance is maintenance free.

Ballasts

Initially the EC ballast was the most reliable, economical, Australian made ferromagnetic ballast. It was developed and manufactured to cater for the insatiable demands of lighting markets, wanting a quality, affordable product. This has been achieved, far exceeding expectations for sustainability, and more than accommodating the needs of the industry.

As the requirements became more sophisticated, and to establish itself at the forefront of energy efficient lighting, the Low Loss Energy Control LLEC ballast was developed. The CMP LLEC ballast set a new industry standard for lighting efficiency.

The CMP range of ferro-magnetic ballasts offer a choice of watts loss efficiency characteristics (the unproductive power consumed by the ballast) when operated in accordance with International (IEC) Standards.

CMP is proud to be associated with the development and manufacture of exciting and innovative products, helping to take the lighting industry into the future.

CMP has a full range of magnetic ballasts and transformers, for fluorescent, high intensity discharge and low voltage halogen lamps.

Energy savings in a commercial building

Lighting is a significant proportion of the energy demand. For example, in a multi-story office building, it can account for up to 40% of a n annual power bill. Incorporating an energy efficient lighting system will significantly reduce energy costs.

Low Loss Ferro-magnetic Ballasts Offer:

- permanent reduction in energy use
- a long and reliable life
- no maintenance
- short payback – small capital outlay

Consider a medium sized commercial building. Savings can be calculated when using LLEC ferro-magnetic ballasts in lieu of standard ballasts.

A Solid Investment

An analysis of the cost difference using LLEC low loss over EC standard ferro-magnetic ballasts relative to the energy savings in our typical medium sized commercial building example reveals a very solid investment opportunity.

For low loss, the initial outlay is repaid in one year and the investment outlay is returned more than ninefold in the first 10 years. Even with low energy costs, this represents an excellent return on investment and a sound commercial business decision.

Added Bonus

An added bonus is significant saving in air-conditioning costs. In the case of our example of 10,000 LLEC low loss ferro-magnetic ballasts generating 4 watts less heat per circuit, that means 40kW of heat load does not have to be extracted from the building space. The additional running cost saving on the air-conditioning, taking into account heating requirements in cooler months, can be calculated and in this case would be typically in excess of A\$ 8,800 minimum per year. This represents another significant saving and ensures the payback period is even more commercially acceptable.

In Australia and New Zealand, CMP has been at the forefront of development of energy efficient ballasts that comply with the Australian and New Zealand Minimum Energy Performance Standards (MEPS).

Look to the Future

CMP ballasts offer a technology that is easily applied providing significant permanent load reduction. When looking at life cycle costs, CMP ballasts introduce savings that cannot be ignored, and actually offer a very profitable investment opportunity. Consider the energy cost of yesterday, the energy cost of today and forecast the energy cost of tomorrow, and then decide. Whatever the decision, CMP has the right Lighting Control Equipment for the application.

Criteria	Unit	EC (EEI = C)	LLEC (EEI = B1)
Quantity of ballasts		10,000	10,000
Input power		46	42
Energy savings	W	–	4
Operating period	hours/day	10	–
	days/week	5.5	–
	weeks/year	50	–
Energy costs*	A\$/kWh	0.16	–
Annual savings	A\$	–	17,600
Added savings+	A\$	–	8,800

* based on average commercial user (subject to variation)

+ HVAC: air-conditioning

Quality Policy

Our Quality Policy is founded on the importance that our customers, people, processes and suppliers play in the overall quality of products and services we provide. To achieve this:

- We strive to exceed customer expectations by understanding customer requirements and building a sustainable customer relationship.
- We develop a progressive culture where people enjoy working, are continually trained and take ownership as part of our continuous improvements.
- We strive for continuous quality improvement and excellence through continued development of our Quality System.
- We have structured procedures that are simple and easy to use that add value to the organization and are geared towards our customer requirements.
- We use only those key suppliers that have demonstrated that they have a Quality Assurance system appropriate to the reliable supply of the products.
- We conform to the Quality system requirements of AS/NZS ISO 9001:2008.
- We use internationally recognised benchmarks to continually guide and review our progress.

Recognition of international excellence

A commitment to quality

As the leading manufacturer of lighting control equipment, CMP success is built on a philosophy of always striving to achieve excellence in every field. This not only applies to levels of excellence in control equipment and component engineering, but also in our service to the customer.

Our commitment is manifested in benchmark standards of product reliability, customer relations, product support and attention to detail. Our aim is to be recognized as a customer focused, quality-oriented organisation.

ISO9001 Standard Certified

A key element of commitment to quality is the establishment, implementation and maintenance of an internationally recognized quality system, consistent with the requirements of the Quality System Standard.

This is our commitment to providing a total quality system supporting CMP components from conception, through manufacture to the customer.



**Quality
Endorsed
Company**

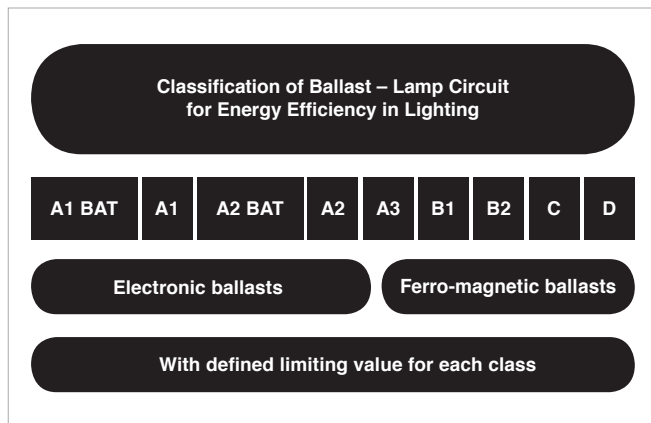
Standards Australia
ISO 9001
Lic QEC 22895

Minimum Energy Performance Standards (MEPS)

The Australian (and New Zealand) Government introduced a program of Minimum Energy Performance Standard (MEPS) for fluorescent lamp ballasts within the framework of the National Appliance Equipment Efficiency Program early 2003. From that time, State and Territory laws have required fluorescent lamp ballasts to be registered by the manufacturer, or the importer, as to their Energy Efficiency Index (EEI) within the MEPS efficiency requirements.

MEPS Classifications (Energy Efficiency Index)

The corrected total input power of the lamp-ballast circuit is defined as “Energy Efficiency Index” (EEI) of the lamp-ballast combination. There are 7 classifications of efficiency with every class defined by a limiting value of total input power related to the pertinent ballast lumen factor. A BLF of 1.00 is defined for high frequency electronic ballasts and 0.95 for ferromagnetic ballasts.



What are the technical requirements in Australia?

In Australia, MEPS is applied to ballasts used with linear fluorescent lamps (type T) from 15W and above. There is no mandatory requirement for ballasts used with compact fluorescent lamps but such ballasts can be voluntarily marked.

The Australian MEPS levels are essentially harmonized with the European Commission requirements drafted in late 2000 (EU directive 2000/55/EC). The E U requirements cover a wider range of lamps, including most compact fluorescent lamps, except integral types.

Full details are contained in AS/NZS 4783.2, Energy Labelling and Minimum Energy Performance Standards Requirements and AS/NZS 4783.1, Method of Measurement to Determine Energy Consumption and Performance of Ballast-Lamp Circuits.

Benefits

From Government studies, the impact of the MEPS Regulation suggests that the standard Class C ballast will disappear from the Australian market, replaced by more efficient Class A (electronic) and B1 and B2 (lower watts loss) ballasts.

In so doing, the community will have saved almost \$270 million by 2010. At the same period, the annual abatement of greenhouse gas derived from this measure will be in the order of 350,000 tonnes.

Lamp type	Lamp power		EEI-Class							
	50 Hz	HF	Ilcos code	A1 ²	A2	A3	B1	B2	C	D
T			maximum corrected total input power – watts							
	15 W	13.5 W	FD-15-E-G13-26/450	18 W	≤ 16 W	≤ 18 W	≤ 21 W	≤ 23 W	≤ 25 W	> 25 W
	18 W	16 W	FD-18-E-G13-26/600	21 W	≤ 19 W	≤ 21 W	≤ 24 W	≤ 26 W	≤ 28 W	> 28 W
	30 W	24 W	FD-30-E-G13-26/895	30 W	≤ 31 W	≤ 33 W	≤ 36 W	≤ 38 W	≤ 40 W	> 40 W
	36 W	32 W	FD-36-E-G13-26/1200	38 W	≤ 36 W	≤ 38 W	≤ 41 W	≤ 43 W	≤ 45 W	> 45 W
	58 W	50 W	FD-58-E-G13-26/1500	59 W	≤ 55 W	≤ 59 W	≤ 64 W	≤ 67 W	≤ 70 W	> 70 W

Notes

- Values are for 230 V rated ballasts, an additional 0.5 and 1.0 W is added for the 240 and 250 V rated ballasts respectively.
- A ballast marked with classification EE = I A1 shall be dimmable and the values in the table refer to the maximum total input power at 100%. The total circuit power at 25% light output shall not exceed 50% of the value stated for Class A3 of the same lamp.

Energy classification table for lighting systems

(in accordance with ErP directive 2009/125/EC)

Lamp data					Ballast Efficiency (P _{lamp} / P _{input})				
					Non-dimmable				
Lamp type	Nominal wattage	ILCOS code	Rated / typical wattage		A2 BAT	A2	A3	B1	B2
			50 Hz	HF					
		W		W	W				
T8	15	FD-15-E-G13-26/450	15	13.5	87.8%	84.4%	75.0%	67.9%	62.0%
T8	18	FD-18-E-G13-26/600	18	16	87.7%	84.2%	76.2%	71.3%	65.8%
T8	30	FD-30-E-G13-26/900	30	24	82.1%	77.4%	72.7%	79.2%	75.0%
T8	36	FD-36-E-G13-26/1200	36	32	91.4%	88.9%	84.2%	83.4%	79.5%
T8	38	FD-38-E-G13-26/1050	38.5	32	87.7%	84.2%	80.0%	84.1%	80.4%
T8	58	FD-58-E-G13-26/1500	58	50	93.0%	90.9%	84.7%	86.1%	82.2%
T8	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%
TC-L	24	FSD-24-E-2G11	24	22	90.7%	88.0%	81.5%	76.0%	71.3%
TC-L	36	FSD-36-E-2G11	36	32	91.4%	88.9%	84.2%	83.4%	79.5%
TCF	18	FSS-18-E-2G10	18	16	87.7%	84.2%	76.2%	71.3%	65.8%
TCF	24	FSS-24-E-2G10	24	22	90.7%	88.0%	81.5%	76.0%	71.3%
TCF	36	FSS-36-E-2G10	36	32	91.4%	88.9%	84.2%	83.4%	79.5%
TC-D / DE	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-D / 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%
TC-D / DE	18	FSQ-18-E-G24q=2 FSQ-18-I-G24d=2	18	16.5	89.8%	86.8%	78.6%	71.3%	65.8%
TC-D / DE	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 / TE	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-T / 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%
TC-T / TC-TE	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 / DDE	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-DD / DDE	16	FSS-16-E-GR10q FSS-16-I-GR8 FSS-16-L/P/H-GR10q	16	15	87.0%	83.3%	75.0%	72.4%	66.1%
TC-DD / DDE	21	FSS-21-E-GR10q FSS-21-L/P/H-GR10q	21	19.5	89.7%	86.7%	78.0%	73.9%	68.8%
TC-DD / DDE	28	FSS-28-E-GR10q FSS-28-I-GR8 FSS-28-L/P/H-GR10q	28	24.5	89.1%	86.0%	80.3%	78.2%	73.9%
TC-DD / DDE	38	FSS-38-E-GR10q FSS-38-L/P/H-GR10q	38.5	34.5	92.0%	89.6%	85.2%	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%
TC	7	FSD-7-I-G23 FSD-7-E-2G7	7.1	6.5	77.6%	72.2%	65.0%	55.7%	47.8%
TC	9	FSD-9-I-G23 FSD-9-E-2G7	8.7	8	78.0%	72.7%	66.7%	60.3%	52.6%
TC	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%
T5	6	FD-6-E-G5-16/225	6	5.4	71.3%	65.1%	58.1%	51.8%	43.8%
T5	8	FD-8-E-G5-16/300	7.1	7.5	69.9%	63.6%	58.6%	48.9%	42.7%
T5	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%
T9-C	32	FSC-32-E-G10q-29/300	32	30	88.9%	85.7%	81.1%	80.0%	76.0%
T9-C	40	FSC-40-E-G10q-29/400	40	32	89.5%	86.5%	82.1%	82.6%	79.2%
T2	6	FDH-6-L/P-W4.3x8.5d-7/220		5	72.7%	66.7%	58.8%		
T2	8	FDH-8-L/P-W4.3x8.5d-7/320		7.8	76.5%	70.9%	65.0%		
T2	11	FDH-11-L/P-W4.3x8.5d-7/420		10.8	81.8%	77.1%	72.0%		
T2	13	FDH-13-L/P-W4.3x8.5d-7/520		13.3	84.7%	80.6%	76.0%		

Energy classification table for lighting systems in accordance with ErP directive 2009/125/EC (cont'd.)

Lamp data					Ballast Efficiency (P _{lamp} / P _{input})				
					Non-dimmable				
					Lamp type	Nominal wattage W	ILCOS code	Rated / typical wattage	
50 Hz W	HF W								
T2	21	FDH-21-L/P-W4.3x8.5d-7/		21	88.9%	85.7%	79.2%		
T2	23	FDH-23-L/P-W4.3x8.5d-7/		23	89.8%	86.8%	80.7%		
T5-E	14	FDH-14-G5-L/P-16/550		13.7	84.7%	80.6%	72.1%		
T5-E	21	FDH-21-G5-L/P-16/850		20.7	89.3%	86.3%	79.6%		
T5-E	24	FDH-24-G5-L/P-16/550		22.5	89.6%	86.5%	80.4%		
T5-E	28	FDH-28-G5-L/P-16/1150		27.8	89.8%	86.9%	81.8%		
T5-E	35	FDH-35-G5-L/P-16/1450		34.7	91.5%	89.0%	82.6%		
T5-E	39	FDH-39-G5-L/P-16/850		38	91.0%	88.4%	82.6%		
T5-E	49	FDH-49-G5-L/P-16/1450		49.3	91.6%	89.2%	84.6%		
T5-E	54	FDH-54-G5-L/P-16/1150		53.8	92.0%	89.7%	85.4%		
T5-E	80	FDH-80-G5-L/P-16/1150		80	93.0%	90.9%	87.0%		
T5-E	95	FDH-95-G5-L/P-16/1150		95	92.7%	90.5%	84.1%		
T5-E	120	FDH-120-G5-L/P-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%		
T5-C	40	FSCH-40-L/P-2GX13-16/300		39.9	91.4%	88.9%	83.3%		
T5-C	55	FSCH-55-L/P-2GX13-16/300		55	92.4%	90.2%	84.6%		
T5-C	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%		
TC-LE	55	FSDH-55-L/P-2G11		55	92.4%	90.2%	84.6%		
TC-LE	80	FSDH-80-L/P-2G11		80	93.0%	90.9%	87.0%		
TC-TE	32	FSMH-32-L/P-2GX24q=3		32	91.4%	88.9%	82.1%		
TC-TE	42	FSMH-42-L/P-2GX24q=4		43	93.5%	91.5%	86.0%		
TC-TE	57	FSM6H-57-L/P-2GX24q=5 FSM8H-57-L/P-2GX24q=5		56	91.4%	88.9%	83.6%		
TC-TE	70	FSM6H-70-L/P-2GX24q=6 FSM8H-70-L/P-2GX24q=6		70	93.0%	90.9%	85.4%		
TC-TE	60	FSM6H-60-L/P-2G8=1		63	92.3%	90.0%	84.0%		
TC-TE	62	FSM8H-62-L/P-2G8=2		62	92.2%	89.9%	83.8%		
TC-TE	82	FSM8H-82-L/P-2G8=2		82	92.4%	90.1%	83.7%		
TC-TE	85	FSM6H-85-L/P-2G8=1		87	92.8%	90.6%	84.5%		
TC-TE	120	FSM6H-120-L/P-2G8=1 FSM8H-120-L/P-2G8=1		122	92.6%	90.4%	84.7%		
TC-DD	55	FSSH-555-L/P-GRY10q3		55	92.4%	90.2%	84.6%		

CMP Controls guarantee conditions

CMP Controls stands for high quality products and services. Guarantee for lighting components exceeds usual legal guarantee.

CMP Controls offers a 5-year guarantee on all devices with a rated life of at least 50,000 hours of operation. A guarantee of 2 years is offered on devices with a rated life of less than 50,000 hours of operation.

1. Products

This guarantee applies to all control gear supplied by CMP Controls (magnetic ballasts for fluorescent and HID lamps, magnetic transformers, capacitors and control gear assemblies).

2. Duration of the guarantee

The guarantee period for CMP Controls products is 2 or 5 years depending on the rated life of the product.

2a. Basic guarantee

For products with a physical rated life of $\geq 50,000$ hours of operation or more, CMP Controls offers a guarantee for a period of 5 years under the following conditions. To ensure that the product guarantee matches the guarantee offered by the luminaire manufacturer, the guarantee is extended by a further 6 months from the date of manufacture indicated on the product, up to a maximum of 66 months from the date of manufacture.

This applies to those products for which a rated life of $\geq 50,000$ hours of operation is indicated in the data sheets.

2b. Limited guarantee

For products with a physical rated life of less than 50,000 hours of operation, CMP Controls offers a guarantee for a period of 2 years under the following conditions. To ensure that the product guarantee matches the guarantee offered by the luminaire manufacturer, the guarantee is extended by a further 6 months from the date of manufacture indicated on the product, up to a maximum of 30 months from the date of manufacture. This applies to those products for which a rated life of $< 50,000$ hours of operation is indicated in the data sheets, e.g. capacitors.

3. Guarantee conditions

The guarantee offered by CMP Controls is valid under the following conditions:

The products from CMP Controls must be used in accordance with the relevant product and application specifications. Limit values for temperatures and voltages must not be exceeded and the product not exposed to any mechanical stresses.

The guarantee for the devices applies only if the product is installed with lamps that comply with the relevant IEC specifications.

The guarantee covers solely product failures caused by material, design or production faults and failure rates that exceed the rated failure rate. The rated life

and rated failure rate of a device are considered to be the values defined in the technical documentation.

Additional conditions for magnetic ballasts of fluorescent lamps in case of extreme conditions (stuck starter) the increased temperature on the ballast will lead to a reduced lifetime, if failed components are not replaced within a short time. The guarantee conditions therefore only apply upon use in combination with safety starters or proof of immediate lamp and starter replacement.

4. Execution of the guarantee

In the event of failures exceeding the nominal failure rate, CMP Controls on its sole discretion might decide to repair defective components or products, supply adequate products as replacement or reimburse products to original customers. The customers or end customers bear the costs for demounting and remounting as well as for sending in and returning products. Any other costs, e.g. replacement costs upon installation, costs caused from failures of the installation or other damage and/or consequential damage are not covered by this guarantee.

The indicated lifetime is achieved by operating lighting components according to the conditions specified by the manufacturers, to the relevant international standards and in accordance with local regulations.

In designing and installing luminaries, it should be remembered that the ballast and/or other components may have to be replaced before the luminaire comes to the end of its life. The products must therefore be easy to access at all times. When installing the products, the requirements of easy maintenance must therefore be taken into consideration to keep maintenance costs down.

5. Utilisation of the Guarantee

The guarantee has to be claimed immediately by returning the defective product in order to check the validity of the claim.

6. Applicable Law

See the conditions supplied with the invoice.

Terms and conditions of sale

Unless otherwise agreed to in writing, all goods ("Goods") sold or offered for sale by CMP Controls Pty. Ltd. ("Supplier") are done so subject to the following conditions:

1. Quotations

Quotations given are valid for deliveries within 30 days from date of quotation. Orders placed within this period for delivery after the 30 days are subject to rise and fall adjustments. Prices are free into store Adelaide, Brisbane, Melbourne and Sydney for deliveries in excess of one (1) tonne loads. For export shipments, unless otherwise agreed to in writing, all prices quoted are ex works Melbourne for less than container load shipments or free on board Melbourne for full container load shipments.

2. Prices

2.1 Australian Domestic Prices: All prices are quoted excluding GST, and any GST applicable will be charged to the Buyer on a Tax Invoice (as defined in the GST Act).

2.2 Export Prices: All export prices are quoted excluding all Government taxes, charges and/or imposts charged outside Australia.

3. Delivery

Late delivery or non-delivery due to any circumstances or events beyond the Supplier's control shall not constitute a breach of contract by the Supplier and the Supplier shall not be liable for any loss or damage howsoever arising through such late delivery or non-delivery. The choice of the carrier and method of transport remains with the Supplier, unless transport is paid for by the Buyer.

4. Warranties

The Warranties: Subject to paragraphs 5 and 6, unless otherwise agreed between the parties in writing, Goods manufactured, or sold, by the Supplier under any of the Brand Names, are warranted against faulty materials and/or workmanship:

4.1 for one year from date of delivery; or

4.2 in the case of Components, for two years from the date of manufacture of the Component.

5. Conditions of Warranty

The warranties set out in paragraph 4 are subject to compliance with the following conditions:

5.1 Goods must be used and handled with due care, under normal operating conditions and in accordance with the Relevant Standards and good practices.

5.2 Goods must be mounted, installed and connected with due care and in accordance with the Relevant Standards and good practices.

5.3 IEC compliant lamps must be utilised for all Components.

5.4 Goods must be returned to the Supplier's local office within 14 days of the detection of the alleged fault in their then current condition. Willfully damaged

or defaced Goods are excluded from this warranty.

5.5 The Supplier reserves the right to request that the complete piece of equipment containing the allegedly faulty component be returned to the Supplier for inspection and testing.

5.6 In the case of any dispute under this warranty, the Supplier reserves the right to obtain the opinion of a suitably qualified independent expert whose opinion as to any question of fact under this warranty shall be binding on the parties.

6. Limitation of Liability

6.1 The Supplier will not be liable for any loss or damage incurred by the Buyer or End User for Goods damaged as a result of negligence, alteration, accident, use of the Goods in a way which is not in compliance with the Relevant Standards or use of the Goods in any way for which the Goods were not designed or approved by the Supplier or as a result of improper fitting, repair or replacement.

6.2 The liability of the Supplier in respect of faulty materials or workmanship shall, at the option of the Supplier, be limited to one of the following:

(a) the replacement of the Goods;

(b) the supply of equivalent Goods;

(c) the repair of the Goods; or

(d) the payment of the cost of having the Goods repaired.

6.3 The Supplier will not be liable for any special indirect or consequential damage arising out of the supply of the Goods.

6.4 If a claim is made by a Buyer or End User under one of the warranties set out in paragraph 4, the Supplier will not accept any claim for costs, charges or expenses incurred by the Buyer or End User in relation to replacement, supply or repair of the Goods.

6.5 Except for any warranties and conditions which cannot be excluded under any Act, all warranties and conditions with regard to the Goods sold which are implied by common law, statute or trade usage are excluded to the full extent legally permissible.

7. Payments

Unless otherwise agreed to in writing, all invoices are net payable thirty (30) days following the month of delivery to the Supplier's head office. All payments received by the Supplier must, in all cases, be allocated to the oldest account due for payment. Installments or part delivery of Goods shall be paid for separately and payment shall be made on or before the due date as stated above. An account-keeping fee of one and a half percent (1.5%) per month (or part thereof) will be charged (minimum of \$10.00 per month) on all accounts which are unpaid within the above terms. For export orders, unless otherwise agreed to in writing, the payment terms must be via an unconditional and irrevocable letter of credit drawn at sight.

8. Return of Goods

Goods will not be accepted for return without prior written consent from the Supplier. Goods manufactured to Buyer's requirements and/or specification cannot be returned for credit.

9. Patents etc.

In all cases where the design is provided by the Buyer, the Supplier does not accept any responsibility for infringement of any patent, design, copyright, electronic layout or any other intellectual property or any other right of any other party. The Supplier undertakes that no disclosure of the design will be knowingly made to any other party unless with the Buyer's expressed or implied consent. The Buyer by acceptance of this quotation agrees to indemnify the Supplier absolutely in respect of all or any liability which the Supplier may incur in respect of any infringement of any of the rights referred to in this paragraph which might arise as a result of the Buyer's order.

10. Location of Contract (Legal Domicile)

Any contract with the Supplier shall be deemed to have been executed and entered into in the State of Victoria, Australia and the same shall be construed enforced and performed in accordance with the laws thereof. Any proceedings shall be brought and heard in the courts of the State of Victoria.

11. Title and Risk

The Supplier supplies Goods on condition that,

11.1 Property in the Goods does not pass to the Buyer until they have been paid in full and the Supplier has been paid for all other moneys then owing to the Supplier by the Buyer.

11.2 Notwithstanding paragraph 11.1, the Goods are at the risk of the Buyer as soon as they have been delivered to or into the custody of the Buyer or the Buyer's agent.

11.3 Until property in the Goods passes to the Buyer under paragraph 11.1, the Goods are merely entrusted to the Buyer as fiduciary and the Supplier remains the legal and beneficial owner of the Goods with full power to re-sell and regain possession of them if the Buyer defaults in payment of the purchase price.

11.4 If the Buyer defaults in payment of the purchase price or if the Buyer becomes insolvent, the Supplier and/or its authorized agents may at any time without notice to the Buyer enter onto the Buyer's premises and any other premises at which the Goods are situated for the purpose of recovering possession of them.

The Buyer agrees to indemnify the Seller against all costs, losses and expenses (including without limitation legal costs) incurred by the Seller as a result of or in connection with any default or breach of these Terms and Conditions of Sale by the Buyer.

11.5 If the Buyer receives any proceeds from the sale of the Goods from any other party, the Buyer receives those proceeds on trust for the Supplier to be applied

in payment of the purchase price for the Goods and shall remit such sum forthwith to the Supplier. All such payments received by the Supplier shall be allocated to the oldest account due for payment.

12. Conflict with Buyer's terms

If any purchase order or other trading terms of the Buyer conflict with or are inconsistent with any of the Supplier's terms and conditions of sale, then the Supplier's terms and conditions of sale as amended from time to time prevail and will apply notwithstanding any conflicting or inconsistent terms of the Buyer. The Buyer acknowledges that the sale by the Supplier of any Goods will not constitute acceptance of any conditions of purchase of the Buyer which conflict or are inconsistent with any of the Supplier's terms and conditions of sale, even where the Supplier acknowledges the Buyer's conditions prior to, upon or by delivery of Goods.

13. Non-Waiver

A waiver by the Supplier with respect to any breach or default by the Buyer shall not constitute a continuing waiver of any other breach or default or of any other right or remedy. A failure or delay by the Supplier in exercising a right or remedy does not operate as a waiver of that right or remedy.

14. Variation

The Supplier reserves the right to update the Terms and Conditions of Sale from time to time. A variation of these Terms and Conditions of Sale shall be ineffective unless it is in writing and signed by the Supplier.

15. Severability

If a Court determines that a condition or part of these conditions is unenforceable, illegal or void then it shall be severed and the remainder of these Terms and Conditions of Sale shall remain operative.

16. Definitions

In these Terms and Conditions of Sale the following terms shall have the following meanings:

16.1 "Brand Names" means, "CMP Controls", "CMP", or any predecessor brand names;

16.2 "Buyer" means the buyer of the Goods;

16.3 "Component" means a component designed for use in the control of lighting;

16.4 "End User" means a person or business which purchases or uses Goods supplied directly or indirectly by the Buyer;

16.5 "Goods and Services Tax" or "GST" has the same meaning as given in the GST Act;

16.6 "GST Act" means the A New Tax System (Goods and Services Tax) Act 1999 (Commonwealth);

16.7 "Relevant Standards" means the relevant International Organisation for Standardisation ("ISO") standard and the relevant International Electrotechnical Commission ("IEC") standard applicable to the Goods.



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