



VS Lighting Solutions for Household Appliances

**For Household
Appliances**

LED Solutions and Lampholders
for Ovens, Steam Ovens, Pyrolytic
Ovens and Microwaves

LED Solutions and Lampholders
for Cooker Hoods

LED Solution for Dishwasher
Applications

LED Lamp and Lampholders
for Refrigerators

LED Constant-voltage and
Constant-current Drivers

UPDATE!
Edition 2020.1

Vossloh-Schwabe

Vossloh-Schwabe is not merely a provider of top-quality system solutions for the lighting industry, but above all makes a competent and innovative contribution to setting market trends in the field of lighting for household appliances.

Employing approximately 1000 people in more than 20 countries, Vossloh-Schwabe is represented all over the world. VS can draw on extensive resources for R&D as well as for international expansion activities. A highly motivated workforce, comprehensive market knowledge, profound industry expertise as well as eco-awareness and environmental responsibility show Vossloh-Schwabe to be a reliable partner for the provision of optimum and cost-effective lighting solutions. Vossloh-Schwabe's dedication to delivering superior quality is reflected in its ISO 9001 certification.

■ CUSTOMISED SOLUTIONS

Your project, our solution

We collaborate with our customers and pay attention to their needs in order to develop customised lighting solutions. Whether the task involves the realisation of a single LED module or the creation of a turnkey system, our advanced R&D departments ensure the wishes of our customers come true.

R&D – ideas take shape

Our R&D departments are constantly engaged in testing new materials and innovative technologies in order to offer cutting-edge solutions to create optimum lighting conditions. Using product ideas provided by our customers as a basis, our R&D teams design bespoke solutions that suit the given requirements, that can later be finessed into detailed features and ultimately guide the implementation process to create the customised product.

One stop, one shop – In-house creation of complete products

We offer complete solutions that are made entirely within the Vossloh-Schwabe Group using perfectly matched components with very high efficiency ratings.

In-house photometric testing

All necessary photometric test can be carried out at VS. Cutting-edge equipment is used to measure all optical, chromatic and radiometric values as well as to carry out thermal simulations. These kinds of thermal and optical simulations can help to gear the development of a lighting solution to suit the respective customer specific applications at a very early stage in the planning process. The continuous monitoring process during every single project development step allows us to ensure top quality standards.

Know-how and global presence at your disposal

Using our experience and expertise, we carefully assist our customers – from first prototype production straight through to the final product. In addition, our consolidated production processes make for a highly flexible manufacturing service, enabling anything from just a few pieces right up to a mass production. Moreover, our widespread global presence reflects the importance we attach to staying close to both our customers and the market, which allows us to provide first-class customer and highly efficient logistics services.

www.vossloh-schwabe.com

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LED Solutions and Lampholders

For Ovens, Steam Ovens, Pyrolytic Ovens and Microwaves

■ OVERVIEW OF PICTOGRAMS

The following overview of all used pictograms in this chapter should support you to find the right meaning:

Application field



For ovens, steam ovens, pyrolytic ovens



For microwaves

Assembly information



Cut-out Ø 35.5 mm / 1.398 in



Cut-out Ø 48 mm / 1.890 in



Cut-out 55x70 mm / 2.165x2.756 in

Approvals



CE conformity



ENEC approved



UL recognized

Beam angle types



Narrow
Beams up to 30°



Medium
Beams up to 60°



Wide
Beams up to 90°



Extra Wide
Beams starting from 91°



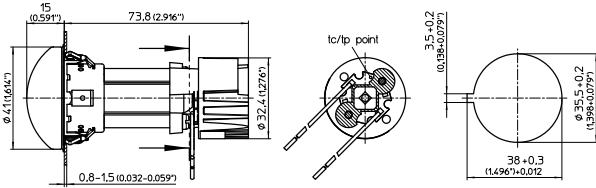
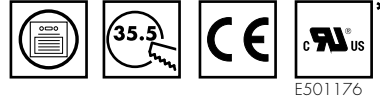
ASYM
Asymmetrical beam

OVENS

LEDSpots for Ovens

For cut-out 35.5 mm / 1.398 in

Colour rendering: $R_a > 80$
Fixing: click-in



Extreme O

For cavity lighting

Lens material: frosted borosilicate glass
Beam angle: 90°
Colour temperatures
LO 004: 3000 K or 4000 K
LO 001/LO 012: 3000 K or 4500 K
 t_c max.: 120 °C / 248 °F
Lumen maintenance: L70/B50 5,000 hrs.
($t_p = 110$ °C / 230 °F)
FEP 0.50 mm² / AWG21
Leads:
Packaging unit: 45 pcs.

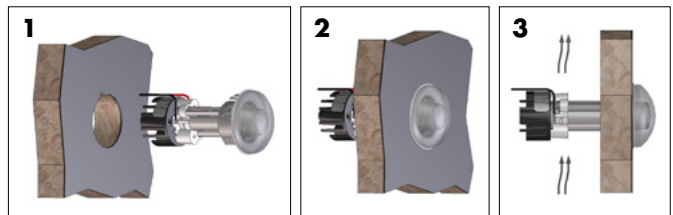


Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LO 004*	12 V	85	175	—	2.1
LO 012	5 V	105	700	—	3.4
LO 001	700 mA	105	—	3.0	2.1

Tolerances of electrical and optical data: $\pm 10\%$
Emission data at $t_p = 85$ °C / 185 °F (4000/4500 K)
The values contained in this data sheet can change due to technical innovations.
Any such changes will be made without separate notification.

Mounting instructions

1. Push the LED oven lamp into position until it clicks.
2. With that firmly in place, connect the leads.
3. Make sure that the LED oven lamp's heat sink is skimmed by the air flow at proper temperature.





OVENS

LEDSpots for Ovens

For cut-out 55x70 mm / 2.165x2.756 in

Colour rendering: $R_a > 80$

Fixing: click-in



Extreme RL

For cavity lighting

Lens material: frosted borosilicate glass
(clear glass on request)

Beam angle: 60°

Colour temperatures

LO 010: 3000 K or 4000 K

LO 011: 3000 K or 4500 K

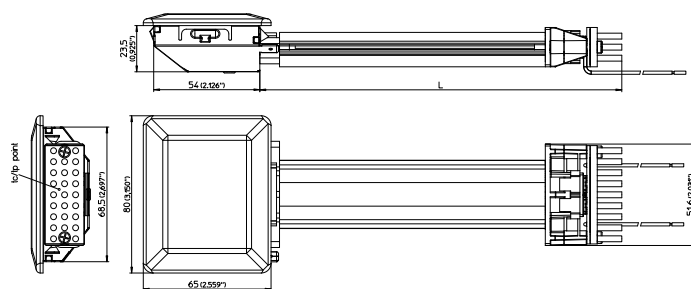
t_c max.: 120 °C / 248 °F

Lumen maintenance: L70/B50 5,000 hrs.

($t_p = 110$ °C / 230 °F)

Leads: FEP 0.50 mm² / AWG21

Packaging unit: 32 pcs. (H195) / 16 pcs. (H318)



Type	Input supply	Typ. luminous flux (lm)	Typ. current mA	Typ. voltage V	Power consumption W
LO 010 (H195)	12 V	115	367	—	4.3
LO 010 (H318)	12 V	110	367	—	4.3
LO 011 (H195)	700 mA	160	—	5.9	4.2
LO 011 (H318)	700 mA	150	—	5.9	4.2

Tolerances of electrical and optical data: ±10%

Emission data at $t_p = 85$ °C / 185 °F (4000/4500 K)

The values contained in this data sheet can change due to technical innovations.

Any such changes will be made without separate notification.

	Length L	
	mm	inch
H195	195	7.68
H318	316	12.44

Mounting instructions

1. Push the LED oven lamp into position until it clicks.
2. With that firmly in place, connect the leads.
3. Make sure that the LED oven lamp's heat sink is skimmed by the air flow at a proper temperature.



OVENS

Accessories for LED Solutions

For replacement

Colour rendering: $R_a > 80$
 Fixing: click-in



LED Engine Replacement

For Extreme RL

Colour temperatures
 LO 017: 3000 K or 4000 K
 LO 018: 3000 K or 4500 K
 t_c max.: 120 °C / 248 °F
 Lumen maintenance: please refer to Extreme RL (p. 6)
 Leads: FEP 0.50 mm² / AWG21
 Packaging unit: 72 pcs.

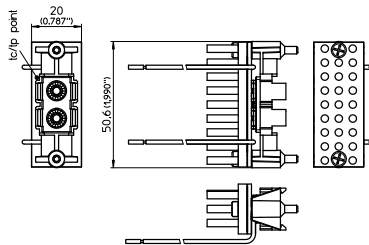
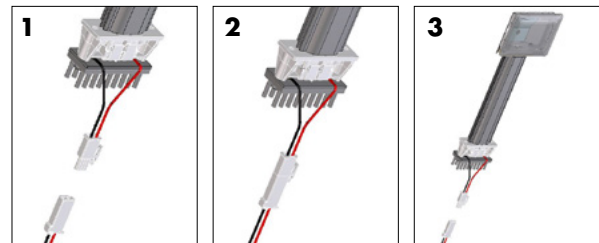
Type	Input supply	Power consumption (W)	Only compatible with
LO 017	12 V	4.3	LO 010
LO 018	700 mA	4.2	LO 011

Tolerances of electrical data: $\pm 10\%$
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.

Mounting instructions

In case of replacement, follow these steps to use Extreme RL again:

1. Disconnect the leads
2. Bend or break the little four wings and then pull the old engine
3. Push the new engine into position until it clicks.
 With that firmly in place, connect the leads.





Lampholders for Ovens

For cut-out 35.5 mm / 1.398 in

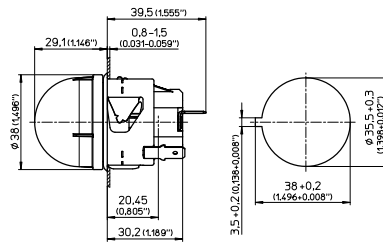
Nominal rating G9: 2/250
 Contacts: earth spade connector 6.3x0.8
 Fixing: click-in



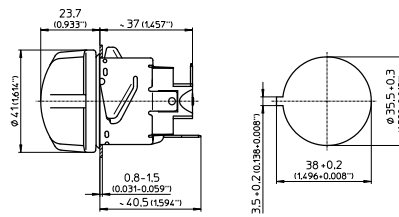
OVENS

G9 Lampholders

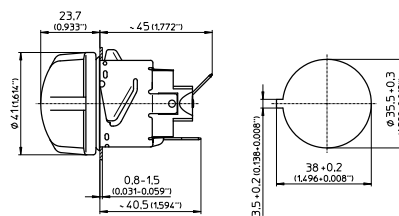
Temperature rating: T300 (572 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: soda-lime glass
 Connection: spade connectors
 Packaging unit: 200 pcs.
Type: 34400



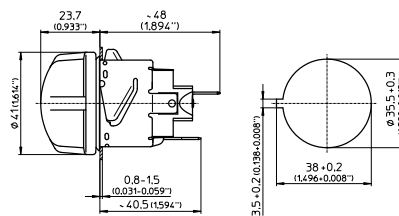
Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: soda-lime glass
 Connection: spade connectors
 Packaging unit: 96 pcs.
Type: 33850



Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: soda-lime glass
 Connection: spade connectors
 Packaging unit: 96 pcs.
Type: 33855



Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: soda-lime glass
 Connection: spade connectors
 Packaging unit: 96 pcs.
Type: 33860



OVENS, STEAM OVENS, PYROLYTIC OVENS, MICROWAVES

OVENS

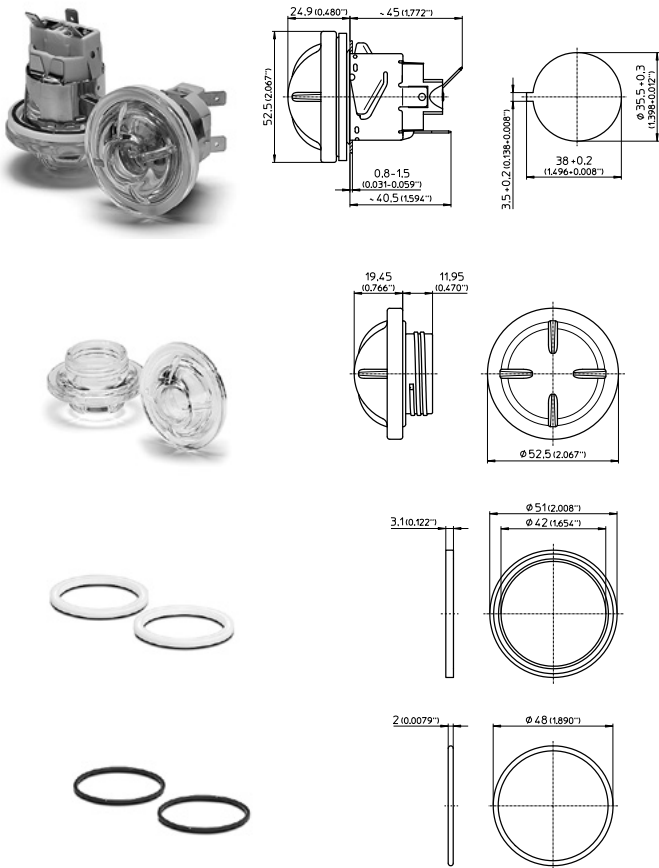
Lampholders for Steam Ovens

For cut-out 35.5 mm / 1.398 in

Nominal rating G9: 2/250
 Nominal rating G4: 10/24
 Contacts: earth spade connector 6.3x0.8
 Fixing: click-in



Assembled example – Round steam kit



Compatible Lampholders

Suitable for lampholders

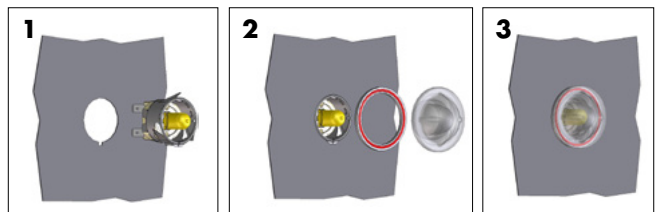
Type	Base	Material	Rating	Connection	Lamp
34400	G9	steatite	T300 (572 °F)	spade connectors	25 W / 40 W
33850	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W
33855	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W
33860	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W

Accessories

- Pagoda glass
 Material: borosilicate glass
 Fixing: screw
Type: 94052
- O-ring housing
 Material: PTFE
Type: 98092
- O-ring gasket
 Material: high-temperature silicone
Type: 98093

Mounting instructions

1. Push the lampholder into position until it clicks.
2. Push the o-ring gasket into the o-ring housing's groove. Fit this assembly together with the pagoda glass and screw in.
3. With that firmly in place, connect the leads.



OVENS, STEAM OVENS, PYROLYTIC OVENS, MICROWAVES

Lampholders for Ovens

For cut-out 48 mm / 1.890 in

Nominal rating E14, G9: 2/250

Contacts: earth spade connector 6.3x0.8

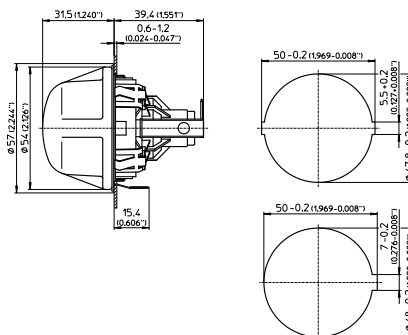
Fixing: click-in



OVENS

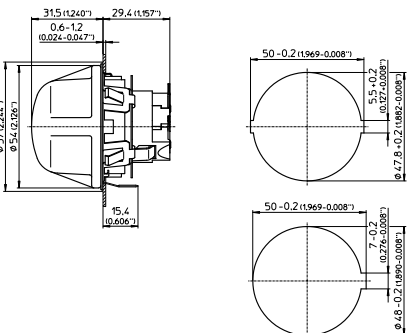
E14 Lampholders

Temperature rating: T270 (518 °F)
 Housing material: LCP
 Lamp: 25 W
 Lens: soda-lime glass
 Connection: spade connectors
 Packaging unit: 180 pcs.
Type: 64336



G9 Lampholders

Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: soda-lime glass
 Connection: spade connectors
 Packaging unit: 150 pcs.
Type: 33865



OVENS

Lampholders for Ovens

For cut-out 55x70 mm / 2.165x2.756 in

Nominal rating G9: 2/250
 Contacts: earth spade connector 6.3x0.8
 Reflector: aluminium plated steel
 Fixing: click-in



G9 Lampholders

Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: borosilicate glass
 Connection: spade connectors
 Packaging unit: 70 pcs.
Type: 33840



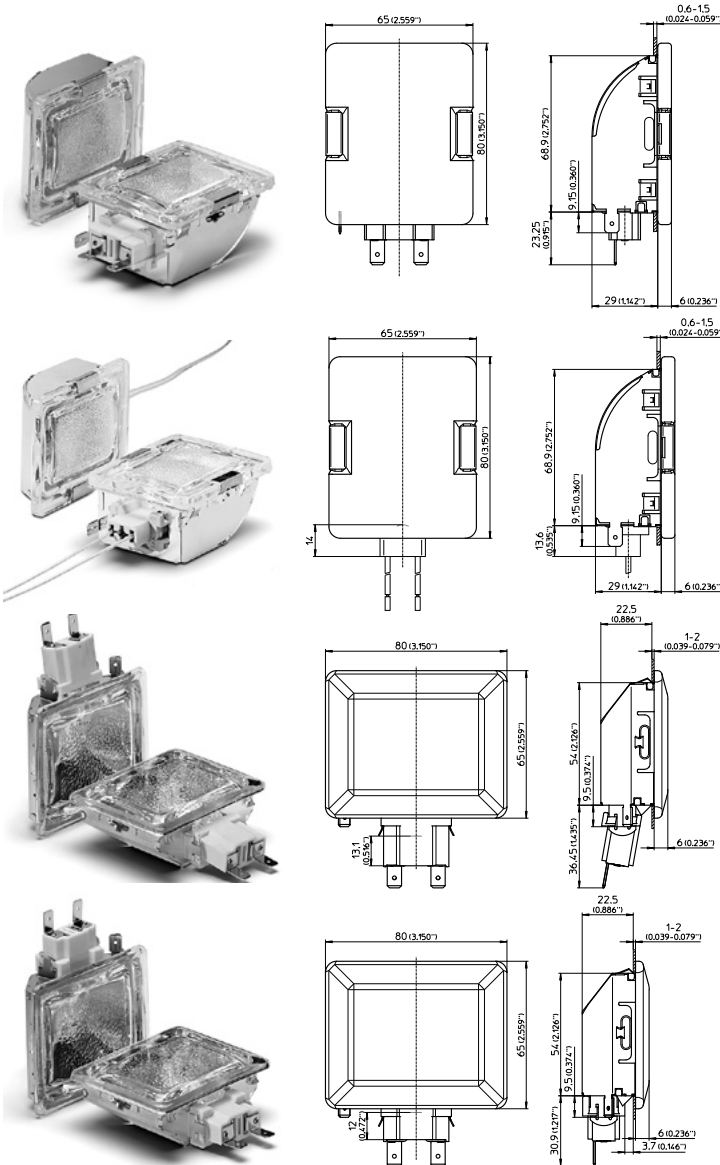
Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: borosilicate glass
 Leads: PTFE 0.75 mm² / AWG20
 Packaging unit: 70 pcs.
Type: 33940



Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: borosilicate glass
 Connection: spade connectors
 Packaging unit: 70 pcs.
Type: 33880



Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: borosilicate glass
 Connection: spade connectors
 Packaging unit: 75 pcs.
Type: 33885



OVENS, STEAM OVENS, PYROLYTIC OVENS, MICROWAVES

Lampholders for Ovens

For cut-out 55x70 mm / 2.165x2.756 in

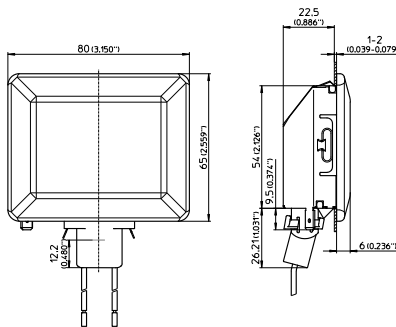
Nominal rating G9: 2/250
 Nominal rating G4: 10/24
 Contacts: earth spade connector 6.3x0.8
 Reflector: aluminium plated steel
 Fixing: click-in



OVENS

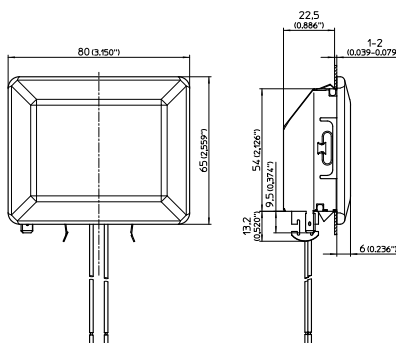
G9 Lampholders

Temperature rating: T350 (662 °F)
 Housing material: steatite
 Lamp: 25 W/40 W
 Lens: borosilicate glass
 Leads: PTFE 0.75 mm² / AWG20
 Packaging unit: 75 pcs.
Type: 33980



G4 Lampholders

Temperature rating: T300 (572 °F)
 Housing material: porcelain
 Lamp: 20 W
 Lens: borosilicate glass
 Leads: PTFE 0.75 mm² / AWG20
 Packaging unit: 36 pcs.
Type: 32777





STEAM OVENS

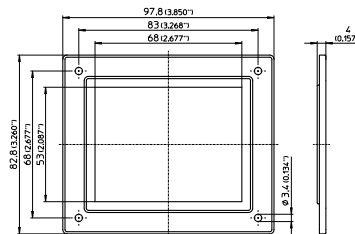
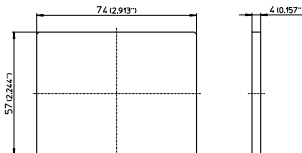
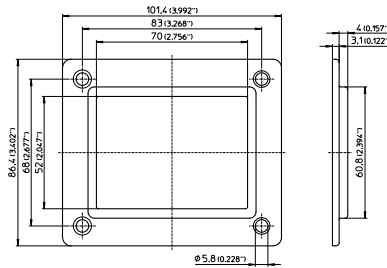
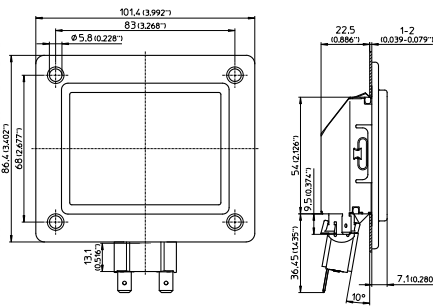
Lampholders and Accessories for Steam Ovens

For cut-out 55x70 mm / 2.165x2.756 in

Nominal rating G9: 2/250
 Nominal rating G4: 10/24
 Contacts: earth spade connector 6.3x0.8
 Fixing: click-in



Assembled example - Rectangular steam kit



Compatible Lampholders

Type	Base	Material	T-rating	Connection	Lamp
33840	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W
33940	G9	steatite	T350 (662 °F)	leads	25 W / 40 W
33880	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W
33885	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W
33980	G9	steatite	T350 (662 °F)	leads	25 W / 40 W
32777	G4	porcelain	T300 (572 °F)	leads	20 W

Accessories

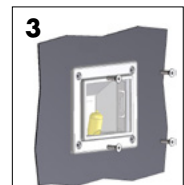
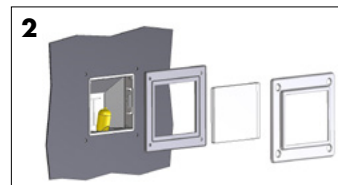
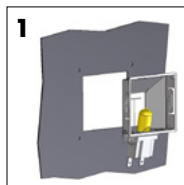
Metal frame
 Material: CrNi
Type: 93195

Flat glass
 Material: tempered glass
Type: 94090

Silicone gasket
 Material: high-temperature silicone
Type: 98090

Mounting instructions

1. Push the lampholder into position until it clicks.
2. Fit the flat glass and the silicone gasket together into the metal frame's slot with the four screws, and fasten the assembly at the oven wall.
3. With that firmly in place, connect the leads.

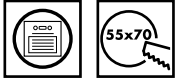


OVENS, STEAM OVENS, PYROLYTIC OVENS, MICROWAVES

Lampholders and Accessories for Pyrolytic Ovens

For cut-out 55x70 mm / 2.165x2.756 in

Nominal rating G9: 2/250
 Nominal rating G4: 10/24
 Contacts: earth spade connector 6.3x0.8
 Fixing: click-in

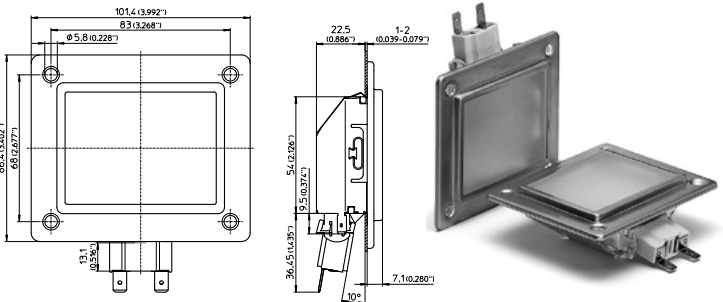


PYROLYTIC OVENS

Compatible Lampholders

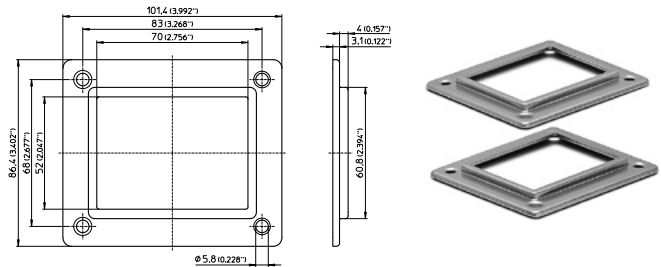
Suitable for lampholders					
Type	Base	Material	T-rating	Connection	Lamp
33840	G9	steatite	T350	spade connectors	25 W / 40 W
33940	G9	steatite	T350	leads	25 W / 40 W
33880	G9	steatite	T350	spade connectors	25 W / 40 W
33885	G9	steatite	T350	spade connectors	25 W / 40 W
33980	G9	steatite	T350	leads	25 W / 40 W
32777	G4	porcelain	T300	leads	20 W

Assembled example - Rectangular lytherm kit

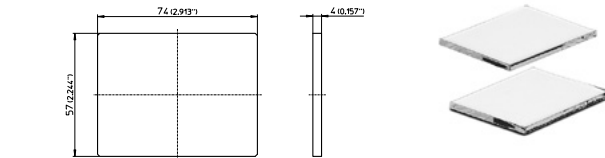


Accessories

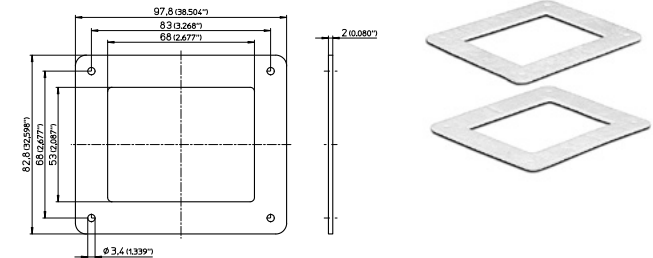
Metal frame
 Material: CrNi
Type: 93195



Flat glass
 Material: tempered glass
Type: 94090

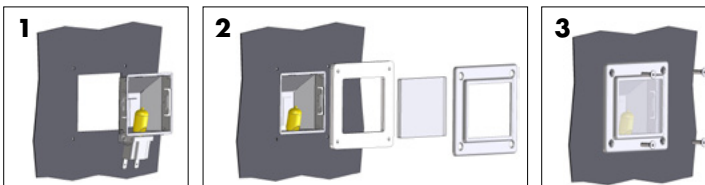


lytherm gasket
 Material: lytherm
Type: 98096



Mounting instructions

1. Push the lampholder into position until it clicks.
2. Fit the flat glass and the lytherm gasket together into the metal frame's slot with the four screws, and fasten the assembly at the oven wall.
3. With that firmly in place, connect the leads.





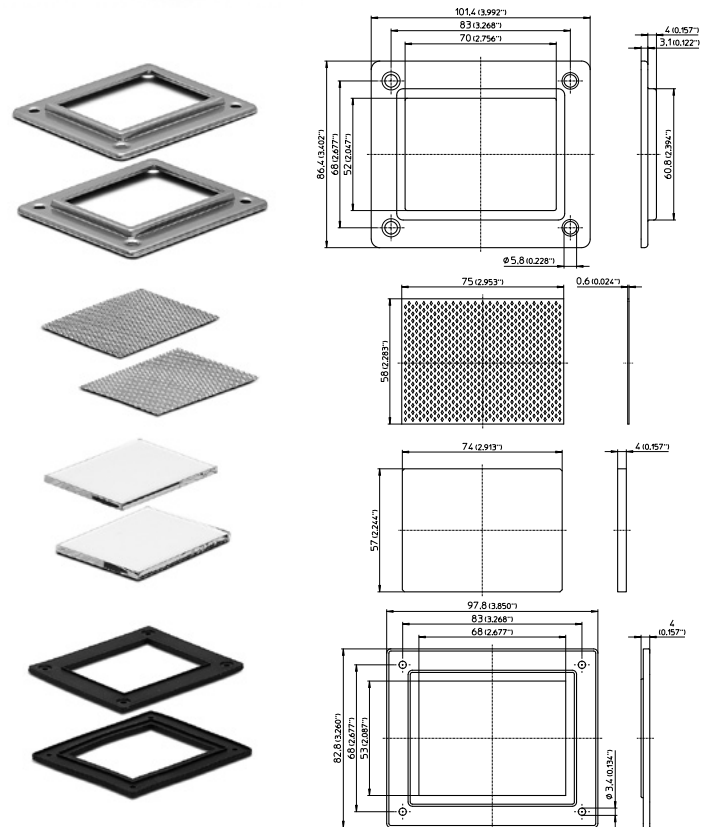
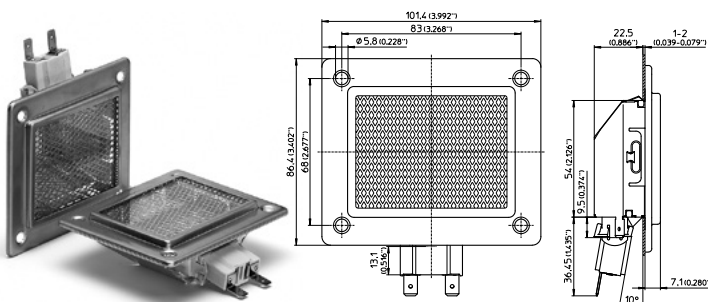
Lampholders and Accessories for Microwaves

For cut-out 55x70 mm / 2.165x2.756 in

Nominal rating G9: 2/250
 Nominal rating G4: 10/24
 Contacts: earth spade connector 6.3x0.8
 Fixing: click-in



Assembled example - Rectangular microwave kit



Compatible Lampholders

Suitable for lampholders

Type	Base	Material	T-rating	Connection	Lamp
33840	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W
33940	G9	steatite	T350 (662 °F)	leads	25 W / 40 W
33880	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W
33885	G9	steatite	T350 (662 °F)	spade connectors	25 W / 40 W
33980	G9	steatite	T350 (662 °F)	leads	25 W / 40 W
32777	G4	porcelain	T300 (572 °F)	leads	20 W

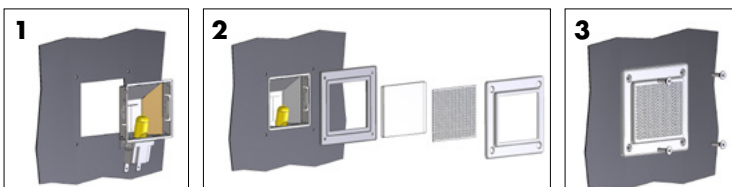
Accessories

Metal frame
 Material: CrNi
Type: 93195

Metal grid
 Material: inox
Type: 93198

Flat glass
 Material: tempered glass
Type: 94090

Silicone gasket
 Material: high-temperature silicone
Type: 98090



Mounting instructions

1. Push the lampholder into position until it clicks.
2. Fit the metal grid, the flat glass and the silicone gasket together into the metal frame's slot with the four screws, and fasten the assembly at the oven wall.
3. With that firmly in place, connect the leads.



LED Solutions and Lampholders

For Cooker Hoods

■ OVERVIEW OF PICTOGRAMS

The following overview of all used pictograms in this chapter should support you to find the right meaning:

Application field



For cooker hoods



Common anode technology

Safety information



IP20 protection



IP40 protection



IP54 protection

Approvals



CE conformity



ENEC approved



UL recognized

Beam angle types



Narrow
Beams up to 30°



Medium
Beams up to 60°



Wide
Beams up to 90°



Extra Wide
Beams starting from 91°



LEDSpots for Cooker Hoods

For cut-out 67.5x25.5 mm / 2.657x1.004 in

Colour rendering: $R_a > 80$

Fixing:

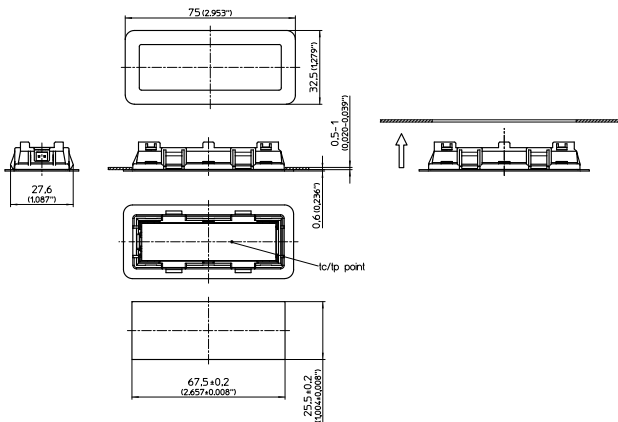
snap-in clips



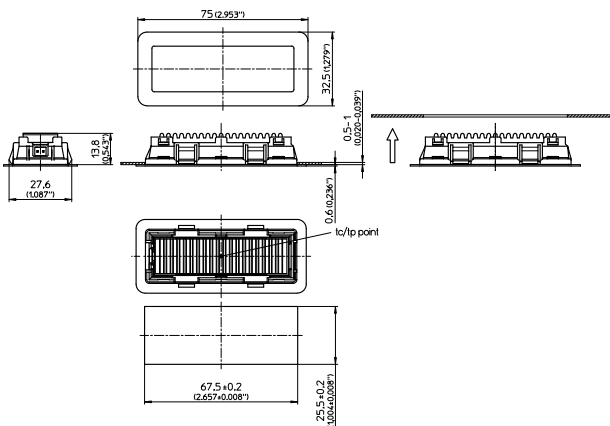
COOKER HOODS



LCH035 / LCH053 (350 mA)



LCH041 (700 mA)



Revo

Lens material:

PC

Beam angle:

100°

Colour temperatures:

3000 K or 4000 K

tc max.:

100 °C / 212 °F

Lumen maintenance:

L70/B50 50,000 hrs.

($t_p = 85\text{ °C} / 185\text{ °F}$)

Leads on request:

PVC 0.35 mm² / AWG22

Packaging unit:

162 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH035	12 V	120	114	—	1.4
LCH053	350 mA	110	—	3.2	1.1
LCH041	700 mA	210	—	3.2	2.3

Tolerances of electrical and optical data: $\pm 10\%$

Emission data at $t_p = 85\text{ °C} / 185\text{ °F}$ (4000 K)

The values contained in this data sheet can change due to technical innovations.

Any such changes will be made without separate notification.

LEDSpots for Cooker Hoods

For cut-out 63.5x20.5 mm / 2.500x0.807 in

Colour rendering: $R_a > 80$
 Fixing: stick-on



COOKER HOODS

Revo G

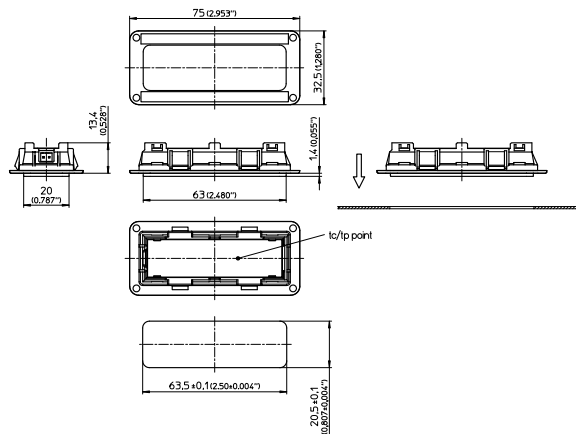
Lens material: PC
 Beam angle: 100°
 Colour temperatures: 3000 K or 4000 K
 tc max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85\text{ °C} / 185\text{ °F}$)
 Leads on request: PVC 0.35 mm² / AWG22
 Packaging unit: 162 pcs.



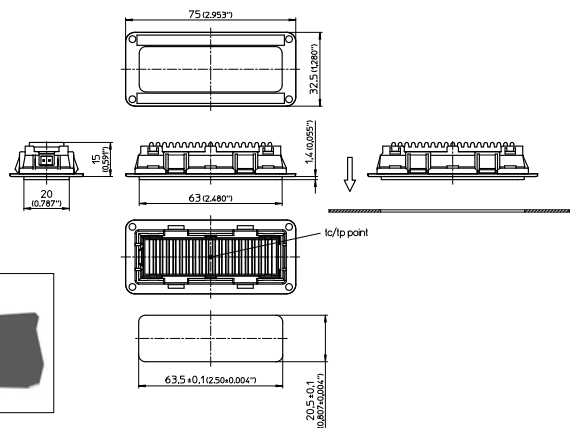
Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH036	12 V	120	114	—	1.4
LCH042	350 mA	110	—	3.2	1.1
LCH054	700 mA	210	—	3.2	2.3

Tolerances of electrical and optical data: $\pm 10\%$
 Emission data at $t_p = 85\text{ °C} / 185\text{ °F}$ (4000 K)
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.

LCH036 / LCH042 (350 mA)



LCH054 (700 mA)



Mounting instructions

1. Peel off the cover tape
2. Stick the tape on the cooker hood's metal surface and press down.
3. With that firmly in place, connect the leads.



COOKER HOODS

LEDSpots for Cooker Hoods

For cut-out 67.5x25.5 mm / 2.657x1.004 in

Colour rendering: $R_a > 80$
 Fixing: snap-in clips

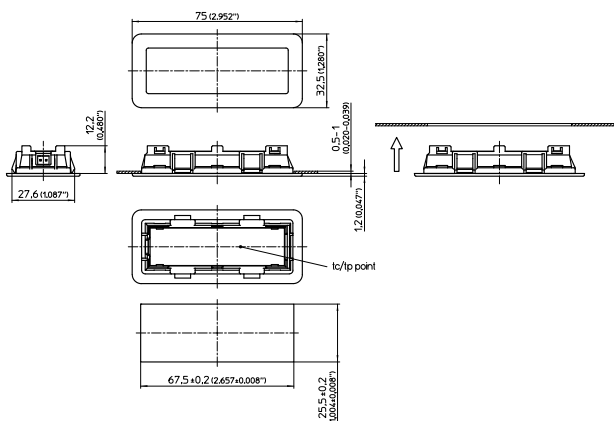


Revo P

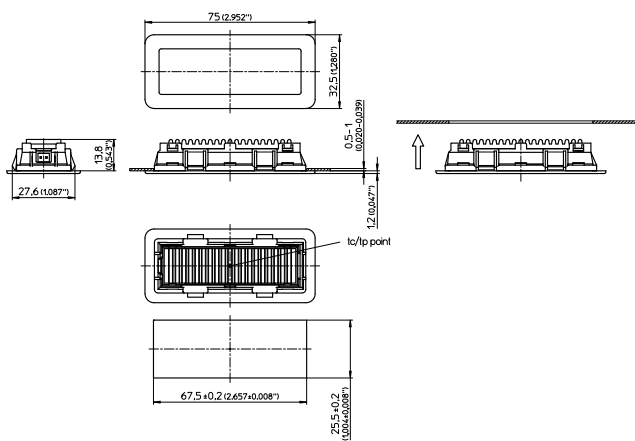
Lens material: PC
 Beam angle: 100°
 Colour temperatures: 3000 K or 4000 K
 tc max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85\text{ °C} / 185\text{ °F}$)
 Leads on request: PVC 0.35 mm² / AWG22
 Packaging unit: 162 pcs.



LCH034 / LCH058 (350 mA)



LCH040 (700 mA)



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH034	12 V	120	114	—	1.4
LCH058	350 mA	110	—	3.2	1.1
LCH040	700 mA	210	—	3.2	2.3

Tolerances of electrical and optical data: ±10%
 Emission data at $t_p = 85\text{ °C} / 185\text{ °F}$ (4000 K)
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.

LEDSpots for Cooker Hoods

For cut-out 67.5x25.5 mm / 2.657x1.004 in

Colour rendering: $R_a > 80$

Fixing: snap-in clips



COOKER HOODS

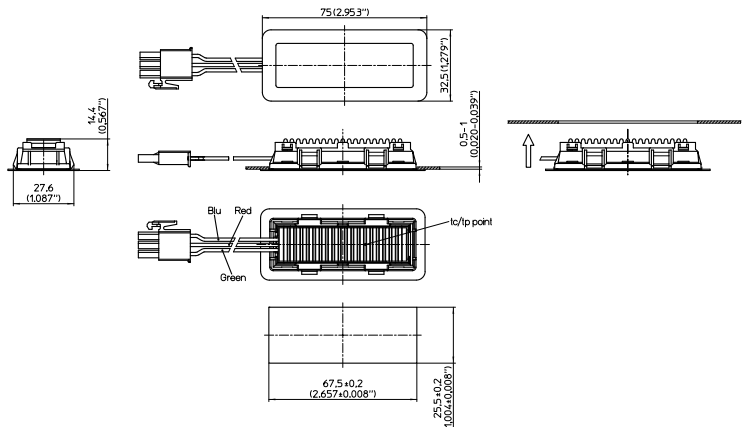
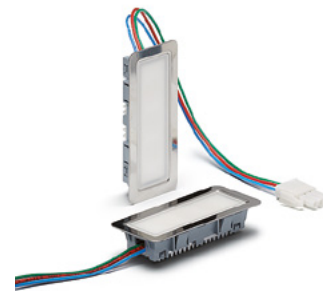
Revo TW

Lens material: PC
 Beam angle: 100°
 Colour temperatures: tuneable white 2700–4000 K
 tc max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85\text{ °C} / 185\text{ °F}$)
 Leads on request: PVC 0.35 mm² / AWG22
 Packaging unit: 162 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH046	12 V	120/135	185/191	—	2.2/2.3

Tolerances of electrical and optical data: $\pm 10\%$
 Emission data at $t_p = 85\text{ °C} / 185\text{ °F}$ (4000 K)
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.
 For further technical information for TW technology see page 42



COOKER HOODS

LEDSpots for Cooker Hoods

For cut-out 63.5x20.5 mm / 2.500x0.807 in

Colour rendering: $R_a > 80$

Fixing: stick-on



Revo G TW

Lens material: PC
 Beam angle: 100°
 Colour temperatures: tuneable white 2700–4000 K
 tc max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85\text{ °C} / 185\text{ °F}$)
 Leads on request: PVC 0.35 mm² / AWG22
 Packaging unit: 162 pcs.

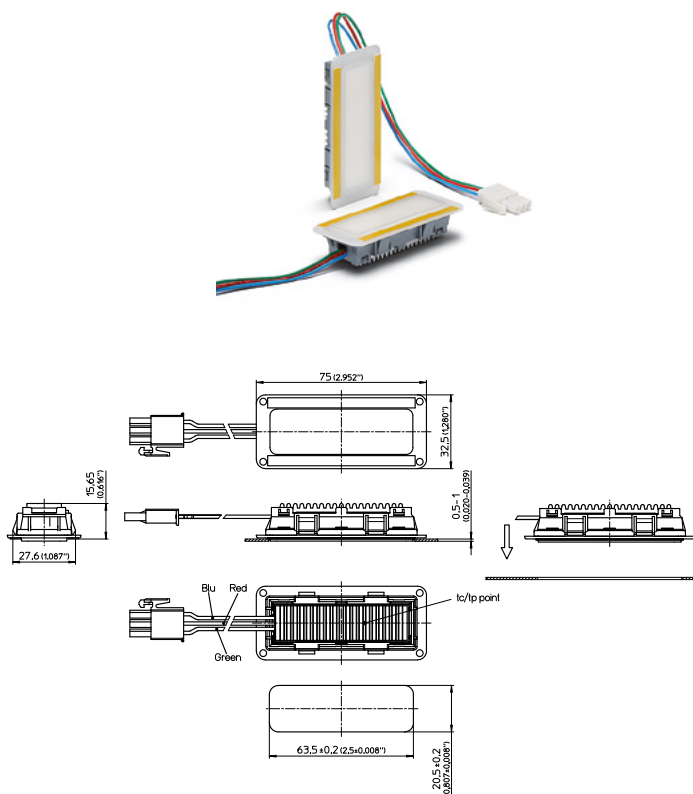
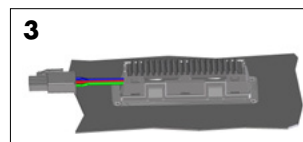
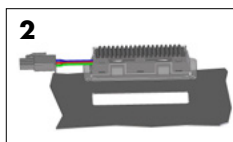
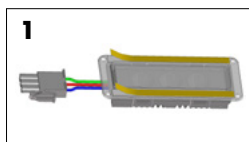


Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH047	12 V	120/135	185/191	—	2.2/2.3

Tolerances of electrical and optical data: $\pm 10\%$
 Emission data at $t_p = 85\text{ °C} / 185\text{ °F}$ (4000 K)
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.
 For further technical information for TW technology see page 42

Mounting instructions

1. Peel off the cover tape
2. Stick the tape on the cooker hood's metal surface and press down.
3. With that firmly in place, connect the leads.



LEDSpots for Cooker Hoods

For cut-out 67.5x25.5 mm / 2.657x1.004 in

Colour rendering: $R_a > 80$

Fixing: snap-in clips



COOKER HOODS

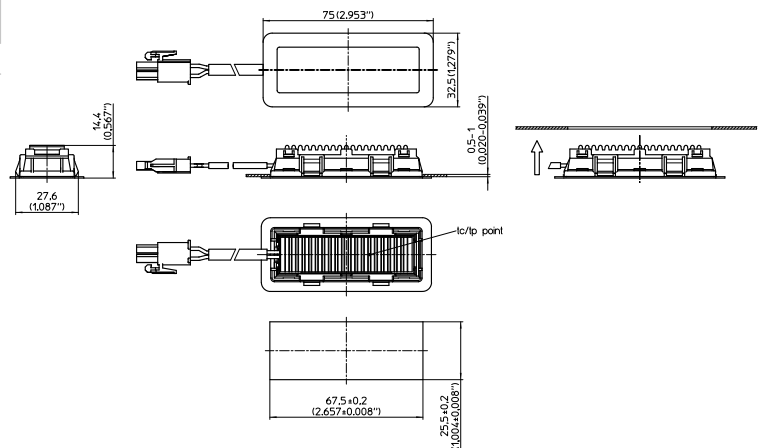
Revo S

Lens material: PC
 Beam angle: 100°
 Colour temperatures: 3000 K or 4000 K
 tc max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85\text{ °C} / 185\text{ °F}$)
 Leads on request: PVC 0.35 mm² / AWG22
 Packaging unit: 162 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH048	12 V	215	210	—	2.5

Tolerances of electrical and optical data: $\pm 10\%$
 Emission data at $t_p = 85\text{ °C} / 185\text{ °F}$ (4000 K)
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.
 For further technical information for TW technology see page 42



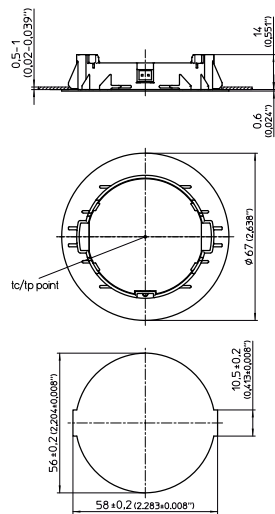


COOKER HOODS

LEDSpots for Cooker Hoods

For cut-out \varnothing 56 mm / 2.204 in

Colour rendering: $R_a > 80$
 Fixing: snap-in clips



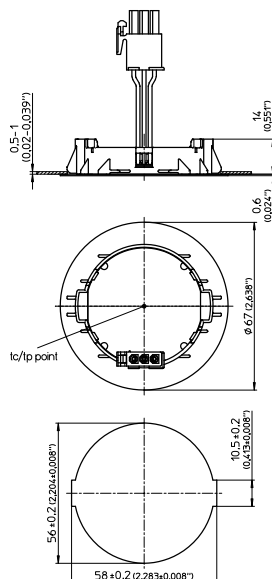
FlatLine

Lens material: PC
 Beam angle: 120°
 Colour temperatures: 3000 K or 4000 K
 tc max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85$ °C / 185 °F)
 Leads on request: PVC 0.35 mm² / AWG22
 Packaging unit: 90 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH028	12 V	105	118	—	1.4
LCH027	350 mA	125	—	3.0	1.1
LCH027	700 mA	235	—	3.1	2.2

Tolerances of electrical and optical data: \pm 10%
 Emission data at $t_p = 85$ °C / 185 °F (4000 K)
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.



FlatLine TW

Lens material: PC
 Beam angle: 120°
 Colour temperatures: 2700-4000 K
 tc max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85$ °C / 185 °F)
 Leads: PVC 0.35 mm² / AWG22
 Packaging unit: 90 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH049	12 V	160/170	99/101	—	2.4/2.4

Tolerances of electrical and optical data: \pm 10%
 Emission data at $t_p = 85$ °C / 185 °F
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.

LEDSpots for Cooker Hoods

For cut-out \varnothing 56 mm / 2.204 in (FlatLine)

For cut-out \varnothing 26 mm / 1.024 in (Tiny)

Colour rendering: $R_a > 80$
Fixing: snap-in clips



COOKER HOODS

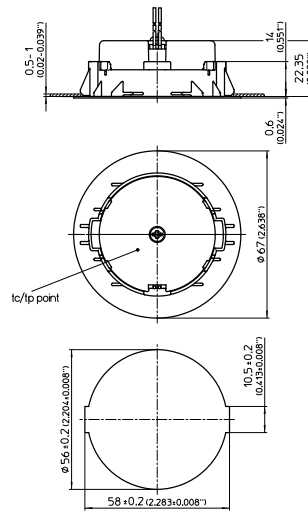
FlatLine AC

Lens material: PC
Beam angle: 120°
Colour temperatures: 3000 K or 4000 K
tc max.: $100^\circ\text{C} / 212^\circ\text{F}$
Lumen maintenance: L70/B50 50,000 hrs.
($t_p = 70^\circ\text{C} / 158^\circ\text{F}$)
Leads: FEP/FEP double-insulation
0.25 mm²
Packaging unit: 90 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH029	230 V	125	—	—	1.5

Tolerances of electrical and optical data: $\pm 10\%$
Emission data at $t_p = 85^\circ\text{C} / 185^\circ\text{F}$ (4000 K)
The values contained in this data sheet can change due to technical innovations.
Any such changes will be made without separate notification.



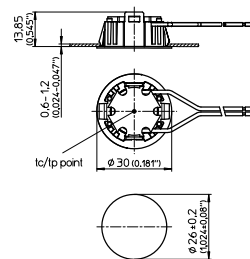
Tiny

Lens material: PC
Beam angle: 45°
Colour temperatures:
LCH050: 3000 K or 4000 K
LCH044: 3000 K, 4500 K or 5000 K
tc max.: $100^\circ\text{C} / 212^\circ\text{F}$
Lumen maintenance: L70/B50 50,000 hrs.
($t_p = 85^\circ\text{C} / 185^\circ\text{F}$)
Leads on request: PVC 0.35 mm² / AWG22
Packaging unit: 40 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH050	12 V	100	100	—	1.2
LCH044	350 mA	125	—	2.8	1

Tolerances of electrical and optical data: $\pm 10\%$
Emission data at $t_p = 85^\circ\text{C} / 185^\circ\text{F}$ (4000 K)
The values contained in this data sheet can change due to technical innovations.
Any such changes will be made without separate notification.

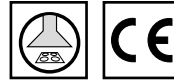


COOKER HOODS

LEDSpots for Cooker Hoods

For cut-out \varnothing 56 mm / 2.204 in

Colour rendering: $R_a > 80$
 Fixing: snap-in clips



StartLine

Lens material: PC
 Beam angle: 45°
 Colour temperatures
 LCH052: 3000 K or 4000 K
 LCH016: 3000 K or 4500 K
 tc max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85\text{ °C} / 185\text{ °F}$)
 PVC 0.35 mm² / AWG22
 Leads:
 Packaging unit: 45 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH052	12 V	140	167	—	2.0
LCH016	350 mA	110	—	3.0	1.1
LCH016	700 mA	200	—	3.0	2.1

Tolerances of electrical and optical data: $\pm 10\%$
 Emission data at $t_p = 85\text{ °C} / 185\text{ °F}$ (4000/4500 K)
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.

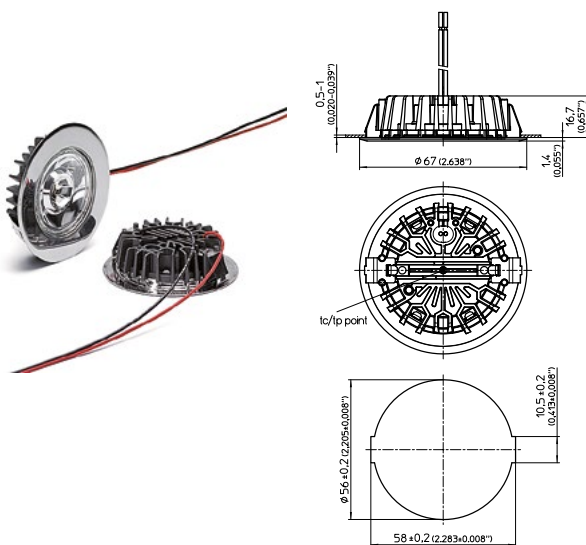
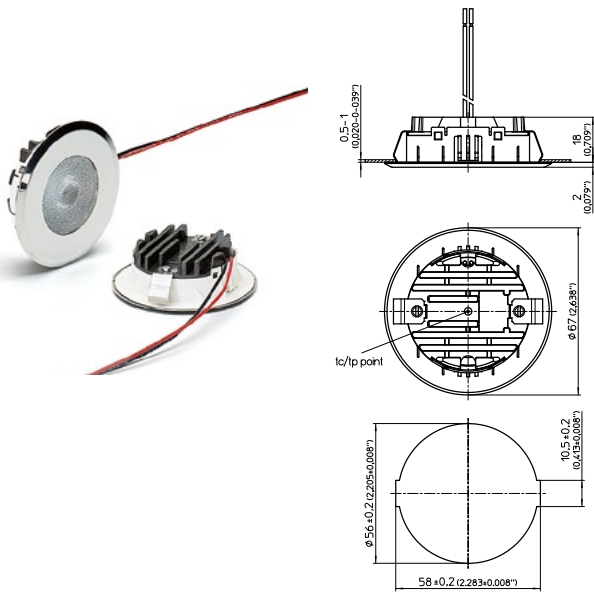
IPLine COB

Lens material: glass
 Beam angle: 40°
 Colour temperatures: 3000 K or 4000 K
 tc max.: 95 °C / 203 °F
 Lumen maintenance: L70/B50 55,000 hrs.
 ($t_p = 80\text{ °C} / 176\text{ °F}$)
 Leads:
 Packaging unit: 45 pcs.



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LCH023	350 mA	310/330	—	9.0	3.0

Tolerances of electrical and optical data: $\pm 10\%$
 Emission data at $t_p = 80\text{ °C} / 176\text{ °F}$ (3000 K / 4000 K) at 25 °C / 77 °C
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.



Lampholders for Cooker Hoods

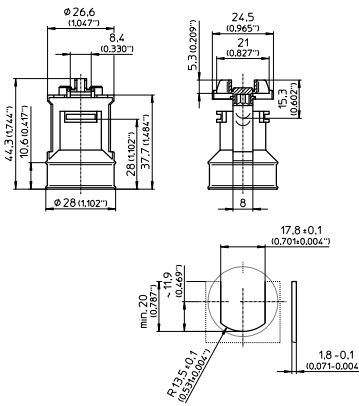
Nominal rating: 2/250
 Connection: For solid and stranded conductors
 0.5–1.5 mm² /
 AWG20/AWG15



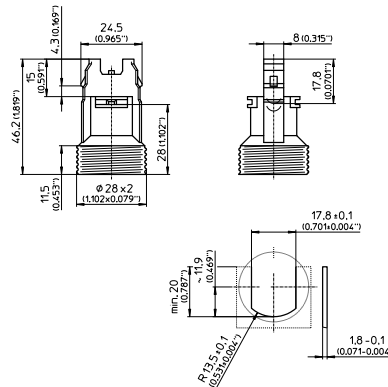
COOKER HOODS

E14 Lampholders

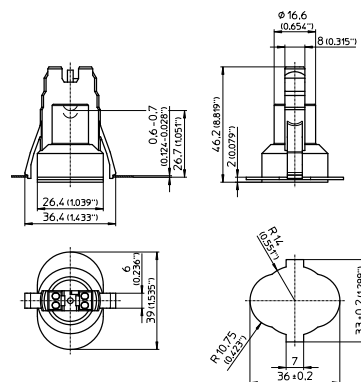
Temperature rating: T210 (410 °F)
 Housing material: PET GF
 Colour: black or white
 Connection: push-in twin terminals
 Fixing: insertion
 Packaging unit: 1000 pcs.
Type: 64365



Temperature rating: T210 (410 °F)
 Housing material: PET GF
 Colour: black or white
 Connection: push-in twin terminals
 Fixing: insertion
 Packaging unit: 1000 pcs.
Type: 64305



Temperature rating: T210 (410 °F)
 Housing material: PET GF
 Colour: natural white
 Connection: push-in twin terminals
 Fixing: click-in
 Packaging unit: 200 pcs.
Type: 64314



COOKER HOODS

Lampholders and Accessories for Cooker Hoods

Nominal rating: 2/250
 Connection: For stranded conductors with ferrule on bare end of core
 Ø 1.4–1.8 mm / AWG15/AWG13



GZ10/GU10 Lampholders

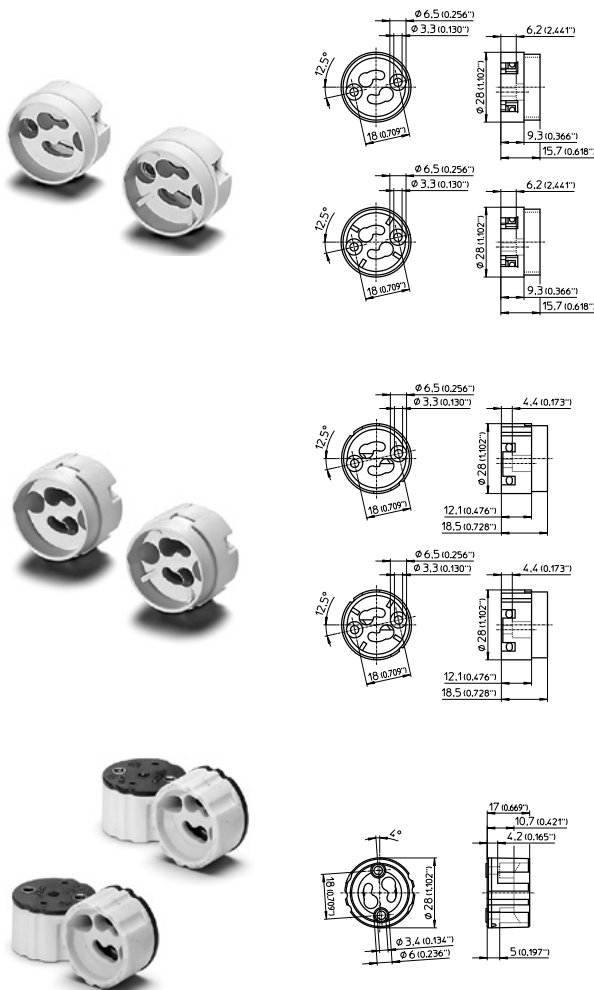
Temperature rating: T270 (518 °F)
 Housing material: LCP
 Colour: natural white
 Connection: push-in twin terminals
 Fixing: holes for screws M3
 Packaging unit: 1000 pcs.
Type - GU10: 31000
Type - GZ10/GU10: 31010



Temperature rating: T180 (356 °F) / T270 (518 °F)
 Housing material: PBT GF / LCP*
 Colour: natural white
 Connection: push-in twin terminals
 Fixing: holes for screws M3
 Packaging unit: 1000 pcs.
Type - GU10: 31020
Type - GZ10/GU10: 31030



Temperature rating: T240 (464 °F)
 Housing material: steatite
 Cover plate material: PPS
 Connection: push-in twin terminals
 Fixing: holes for screws M3
 Packaging unit: 500 pcs.
Type - GU10: 31705
Type - GZ10/GU10: 31755





LED Solution

For Dishwasher Applications

■ OVERVIEW OF PICTOGRAMS

The following overview of all used pictograms in this chapter should support you to find the right meaning:

Application field



For dishwasher applications

Approvals



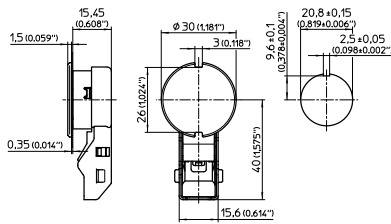
CE conformity

DISHWASHERS

LEDSpots for Dishwashers

For cut-out $\varnothing 20.8 \text{ mm} / 0.819 \text{ in}$

Colour rendering: $R_a > 80$
 Fixing: bayonet



DW

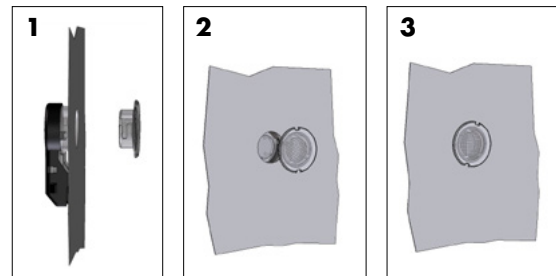
Lens material: PSU
 Gasket: silicone
 Colour temperatures: 6500 K
 t_c max.: 100 °C / 212 °F
 Lumen maintenance: L70/B50 50,000 hrs.
 ($t_p = 85 \text{ °C} / 185 \text{ °F}$)
 Electrical connection: RAST 2.5 – 3 ways
 Packaging unit: 160 pcs.

Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
LDW002	6 V	35	122	—	0.7

Tolerances of electrical and optical data: $\pm 10\%$
 Emission data at $t_p = 85 \text{ °C} / 185 \text{ °F}$ (4000 K)
 The values contained in this data sheet can change due to technical innovations.
 Any such changes will be made without separate notification.

Mounting instructions

1. Put the back assembly in place behind of the dishwasher wall.
2. Fit the lens and back assembly together, and screw the lens clockwise until it stops.
3. With that firmly in place, connect the leads.





LED Lamp and Lampholders

For Refrigerators

■ OVERVIEW OF PICTOGRAMS

The following overview of all used pictograms in this chapter should support you to find the right meaning:

Application field



For refrigerators

Safety information



IP40 protection

Approvals



CE conformity



ENEC approved

Beam angle types



Narrow
Beams up to 30°



Medium
Beams up to 60°



Wide
Beams up to 90°



Extra Wide
Beams starting from 91°



ASYM
Asymmetrical beam

REFRIGERATORS

LED Lamps for Refrigerators

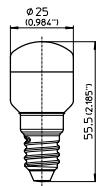
With E14 screwfix

Colour rendering: $R_a > 80$
 Fixing: E14 base



LED Lamp

Beam angle: 120°
 Colour temperatures: 6500 K
 Allowed operation temperature: -15 to 45 °C / -5 to 113 °F
 Packaging unit: 100 pcs.
 Lumen maintenance: L70/B50 25,000 hrs. (t_p = 25 °C / 77 °F)



Type	Input supply	Typ. luminous flux (lm)	Typ. current (mA)	Typ. voltage (V)	Power consumption (W)
T26-1	110-240 V	160	—	—	1.5

Tolerances of electrical and optical data: ±10%

Emission data at t_p = 25 °C / 77 °F

The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.

Lampholders and Accessories for Refrigerators

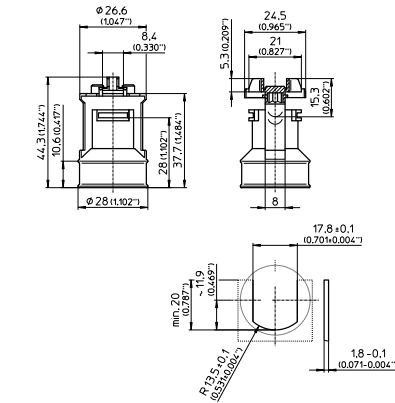
Nominal rating: 2/250
 Temperature: for applications up to -20 °C / -4 °F
 Connection: For solid and stranded conductors 0.5-1.5 mm² / AWG20/AWG15



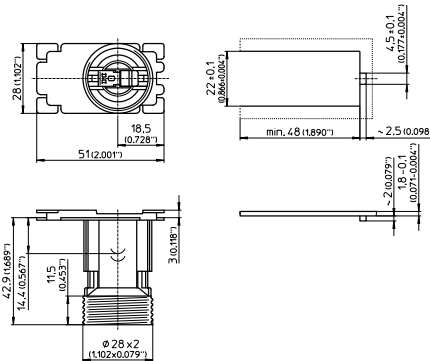
REFRIGERATORS

E14 Lampholders

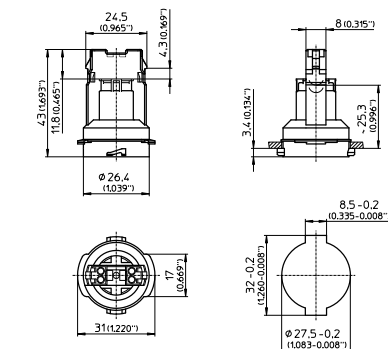
Temperature rating: T180 (356 °F)
 Housing material: PBT GF
 Connection: push-in twin terminals
 Fixing: insertion
 Packaging unit: 1000 pcs.
Type: 64365



Temperature rating: T180 (356 °F)
 Housing material: PBT GF
 Connection: push-in twin terminals
 Fixing: click-in
 Packaging unit: 500 pcs.
Type: 64312



Temperature rating: T180 (356 °F)
 Housing material: PBT GF
 Connection: push-in twin terminals
 Fixing: clipping-in, bayonet
 Packaging unit: 1000 pcs.
Type: 64316



REFRIGERATORS

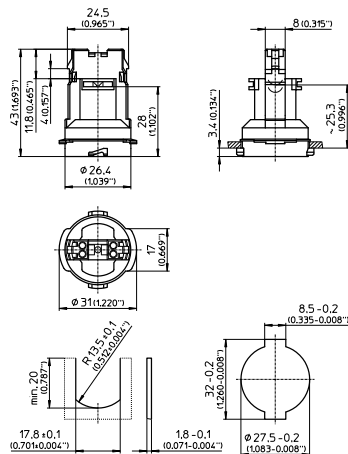
Lampholders and Accessories for Refrigerators

Nominal rating: 2/250
 Temperature: for applications up to $-20\text{ }^{\circ}\text{C}$ / $-4\text{ }^{\circ}\text{F}$
 Connection: For solid and stranded conductors
 0.5–1.5 mm² / AWG20/AWG15

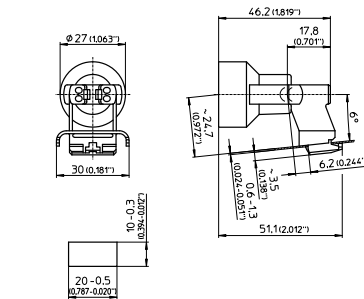


E14 Lampholders

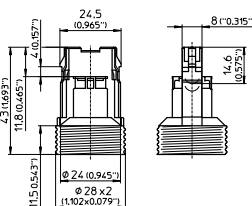
Temperature rating: T180 (356 °F)
 Housing material: PBT GF
 Connection: push-in twin terminals
 Fixing: insertion, clipping-in, bayonet
 Packaging unit: 1000 pcs.
Type: 64308



Temperature rating: T180 (356 °F)
 Housing material: PBT GF
 Connection: push-in twin terminals
 Fixing: lateral push-fit foot
 Packaging unit: 1000 pcs.
Type: 64307



Temperature rating: T210 (410 °F)
 Housing material: PET GF
 Connection: push-in twin terminals
 Fixing: clipping-in
 Packaging unit: 1000 pcs.
Type: 64360



LED Constant-voltage and Constant-current Drivers

■ OVERVIEW OF PICTOGRAMS

The following overview of all used pictograms in this chapter should support you to find the right meaning:

Technology

12 V Constant-voltage operation
12 V

Safety information


IP20 IP protection (f.e. IP20)

SELV SELV (Safety Extra Low Voltage)


 Protection class I

 Protection class II

 Independent operation

 Doubled short-circuit protection

 Temperature protection up to 100 °C

 Temperature protection up to 110 °C



Suitable for installation in furniture and on combustible surfaces



Overload protection



Overtemperature protection



Protection against "no load" operation

Service life and warranty



Minimum service life 50,000 hrs.



Minimum service life 30,000 hrs.



Product guarantee 5 years

Approvals



CE conformity



EAC conformity



ENEC approved



RCM approved



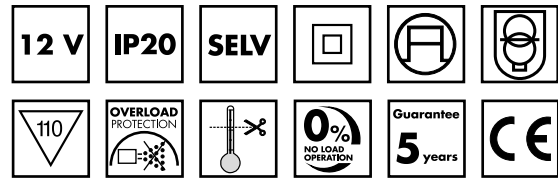
TÜV approved

12 V CV Drivers

LED Drivers CV 12 V

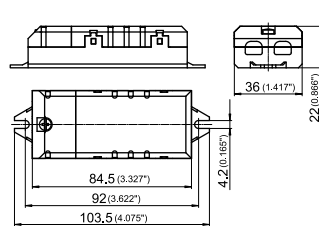
Output: max. 12 W or 20 W
 Mains voltage: 220–240 V, 50–60 Hz
 Safety functions: electronic short-circuit protection, overload protection, protection against "no load" operation

Degree of protection: IP20
 Protection class II

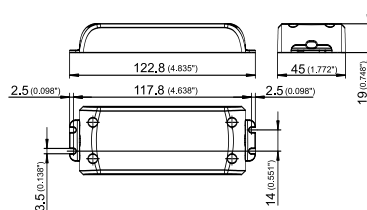


Capacity range	Ref. No.	Output voltage	Output current	Power factor at full load	Efficiency at full load	Max. service life at t_p	t_c max.	Ambient temperature	Connection
W		V \pm 5%	A	(230 V)	% (230 V)	65 °C / 149 °F	°C / °F	t_a (°C / °F)	Screw terminals
12	186204	12	0–1	> 0.57 C	> 89	100,000 h	75 / 167	-20 to +50 / -4 to +122	0.2–1.5 mm ² / AWG24/AWG15
20	186620	12	0–1.68	> 0.5 C	> 85	50,000 h	75 / 167	-15 to +45 / +5 to +113	0.5–1.5 mm ² AWG24/AWG15

186204



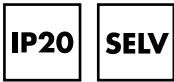
186620



LED CC Drivers

Output: max. 8.75 W or 9 W
 Mains voltage: 220–240 V, 50–60 Hz
 Safety functions: electronic short-circuit protection, overload protection, protection against "no load" operation

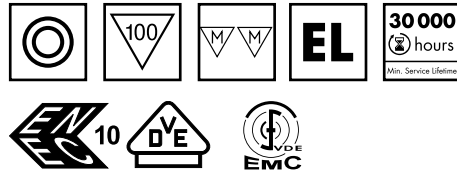
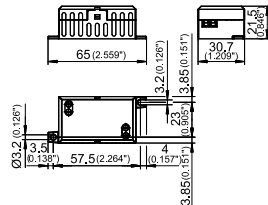
Degree of protection: IP20
 Protection class: II



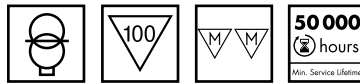
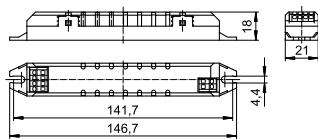
LED CC Drivers

Capacity range	Ref. No.	Output current	Voltage output	Power factor at full load	Efficiency at full load	Max. service life at max. t_p point temp.	t_c max.	Ambient temperature	Connection terminals/ leads
W		mA	DC (V)	(230 V)	% (230 V)	hrs.	°C/°F	t_a (°C/°F)	
350 mA									
8.75	186519	350 ±5%	3–25	> 0.6	> 78	100,000	70/158	80/176	-25 to +50 / -13 to +122 screw 2.5 mm ² / AWG13
14	186229	350 ±5%	2–40	> 0.55	> 81	100,000	70/158	80/176	-25 to +50 / -13 to +122 push-in 0.2–1.5 mm ² / AWG24/AWG15
700 mA									
9	186916	700 ±7.5%	5–13	> 0.93	83.5	50,000	65/149	75/167	-15 to +45 / 5 to +113 push-in 0.5–1.5 mm ² / AWG20/AWG15

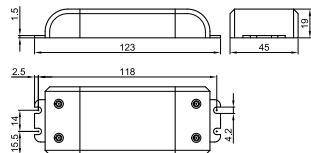
186519



186229



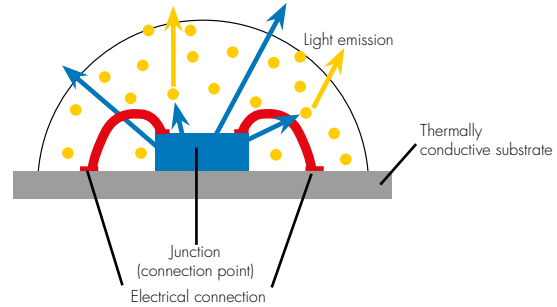
186916



TECHNICAL DETAILS

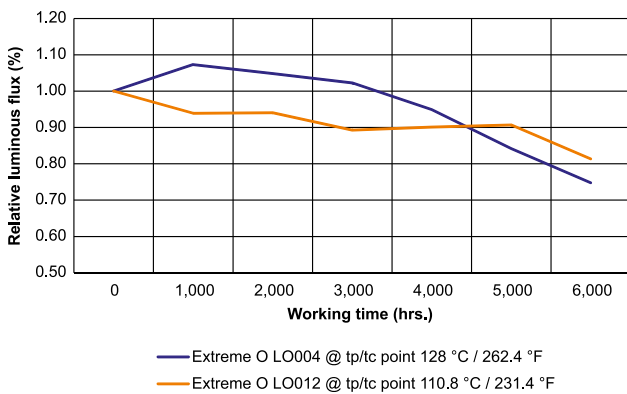
Service life of an LED in extreme conditions

An LED – or Light Emitting Diode – is a semiconductor component that only lets current pass in one direction. If forward current is applied, the LED will emit light, dependent on the semiconductor material and doping (i.e. the inclusion of "foreign atoms").



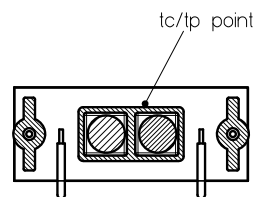
The decrease in luminous flux over the service life determines the quality of an LED solution. Based on the tests carried out in Vossloh-Schwabe's laboratory, the LED solutions' service life, even in extreme conditions such as ovens, exceeds 5,000 hrs.

Due to chemical and physical changes, LEDs lose some of their luminance over their service life. This process (known as degradation) is denoted by L, and a common value for L is approx. 30%. Consequently, 70% of the initial luminous flux will be retained after 5,000 hours (L70). The B value is directly dependent on the L value and denotes how many LEDs (in percentage) are permitted to fall short of the L value. A common value is B50, which means that 50% of all LEDs can fall short of the L70 value after 5,000 hours.



Degradation

A comparison between "Extreme O" LO 004 and LO012. The graph shows that the relative luminous flux is dependent on the LED module (different LED, different PCB construction) and t_p/t_c point temperature. The decrease in luminous flux is affected by material's degradation as well.



Which temperature must be measured to guarantee the proper functioning of the LED?

The temperature on the t_c/t_p point as showed in the figure below must be measured. This measurement should be equal or below the t_p in the lumen maintenance section of each lighting solution and must never overstep t_c max. to guarantee its integrity.

Technical Details

Conductors for installations

All conductors must be selected to suit the lighting application conditions (see table) in terms of material, cross-section and insulation. Testing these conductors under worst case conditions is essential as the commonly occurring high temperatures considerably reduce the conductivity of the conductor and hence its current-carrying capacity.

TECHNICAL DETAILS

Insulation	Conductor Material	Cross-section mm ²	Mains voltage V	Max. temperature °C / °F
PVC	Cu/Cu tin-plated	0.35	300	105 / 221
SI	Cu tin-plated	0.75	300	180 / 356
FEP	Cu tin-plated	0.75	300	180 / 356
FEP/FEP	Cu tin-plated	0.25	450/750	180 / 356
PTFE	Cu tin-plated	0.50	500	180 / 356
PTFE	Cu nickel-plated	0.75	500	250 / 482
PTFE	Cu nickel-plated	1	500	250 / 482
PTFE	Ni	1	500	250 / 482
PTFE	Ni	1.5	500	250 / 482

For consultation only

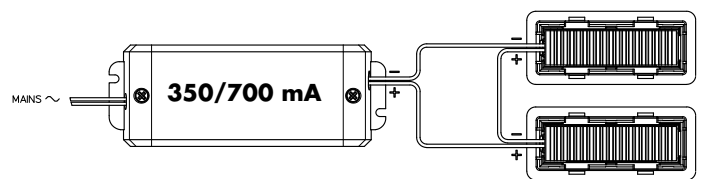
Wiring Diagrams for LED

LED spotlights driven by a constant current source are highlighted with the 350 mA or 700 mA lettering. The constant current driven LED spotlights must be connected in series.

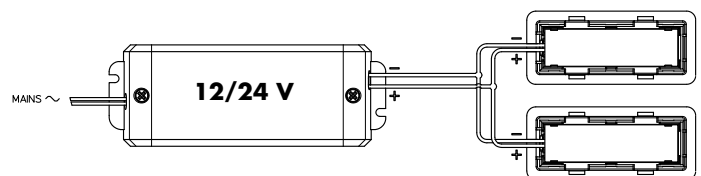
LED spotlights driven by a constant voltage source are highlighted with the 12 V or 24 V lettering. The constant voltage driven LED spotlights must be connected in parallel.

Failing to observe these directions lead to irreparable LED damage. LED spotlights may be destroyed if the polarity of the converter's output and LED's input is incorrect. Installation must be carried out in a voltage-free state (i.e. disconnected from the mains).

LED spotlights connected in series



LED spotlights connected in parallel



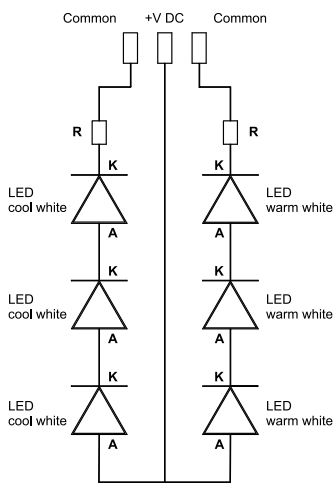
Tuneable White (Common Anode)

The dynamic white or tuneable white technology allows spotlights to change colour from one temperature to another depending on one's preferences.

All products with the CA mark are tuneable white technology ready and are designed according to the **C**ommon **A**node (CA) principle, which means that the common anode is connected directly to the positive source and one driving element is connected to each LED array cathode.

For example, the TW driver could apply a PWM signal variable on both channels (warm and cool) to change colour temperature.

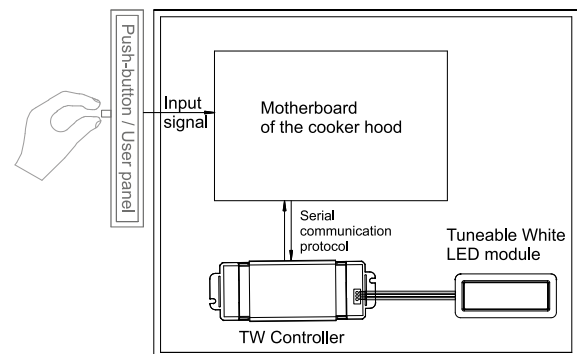
Diagram of a common anode configuration



Possible configurations to drive a TW CA spotlight

1. Through an external TW controller that communicates with the cooker hood's motherboard by a predefined digital protocol (typical serial data protocol). The cooker hood's motherboard takes the input from the user panel and sends data to the TW controller device. This configuration it is necessary to know the cooker hood's motherboard serial data protocol.

Diagram of an external TW CA control device connection



2. Through a built-in TW CA controller on the cooker hoods' motherboard. For this configuration we recommend to ask your electronic partner for more information.

Contacts

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South America Panasonic do Brasil Limitada Guilherme Covas Frighetto Sales	Av. Do Cafe, 277 – Bloco – A, 8 andar – Jabaquara CEP: 04311-900 Sao Paulo, SP, Brasil	Office: +55 11 3889 4137 Mobile: +55 11 95968 9099 frighetto.guilherme@br.panasonic.com

Whenever an electric light goes on around the world, Vossloh-Schwabe is likely to have made a key contribution to ensuring that everything works at the flick of a switch.

Headquartered in Germany, Vossloh-Schwabe is a technology leader within the lighting sector. Top-quality, high-performance products form the basis of the company's success.

Vossloh-Schwabe's extensive product portfolio covers all lighting components: LED systems with matching control gear units and state-of-the-art control systems (Blu2Light and LiCS) as well as electronic and magnetic ballasts and lampholders.



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