LED Constant-current Systems
LED modules, optics and constant-current drivers

LED Modules for Direct Connections to Mains Voltage
Downlights, DecoLEDs and LEDSpots

Components for Luminaire Protection and Power Adjustment

24 V LED Systems
LED modules, converters and colour control units

Emergency Lighting Devices for LED Applications

LED Lamps
Replacement for low-voltage and high-voltage halogen incandescent lamps

LiCS Indoor
Lighting control systems for indoor applications

LiCS Outdoor
Lighting control systems for outdoor applications
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 LED lighting.

Numerous VS project solutions implemented on the basis of entire LED systems are currently satisfying the high requirements placed on energy-efficient lighting all over the world.

Employing approximately 1000 people in more than 20 countries, Vossloh-Schwabe is represented all over the world. As a subsidiary of the Japanese Panasonic Group, VS can draw on extensive resources for R&D as well as for international expansion activities.

A highly motivated workforce, comprehensive market knowledge, profound industry expertise as well as eco-awareness and environmental responsibility show Vossloh-Schwabe to be a reliable partner for the provision of optimum and cost-effective LED lighting solutions.

But Vossloh-Schwabe naturally also continues to provide all components needed in the field of conventional lighting technology.

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

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

Some lighting applications continue to rely on conventional technologies.

Please see our separate Standard Technology Catalogue for product details.
Vossloh-Schwabe is not merely a provider of top-quality system solutions
Systems and Components for Lighting Applications with LEDs.

Thanks to the characteristics and advantages of LED modules over conventional light sources, there is almost no limit to the ways in which LED modules can be used, and new applications are being found on a continual basis.

LED modules are used in a variety of applications from architecture and furniture design right through to creating atmospheric lighting in homes, shops, bars and restaurants. LED modules can be integrated into existing lighting systems or integrated into the respective application as a separate light source. These LED modules are dimmable if used with a suitable LED driver and a matching control unit.

Vossloh-Schwabe develops and manufactures LED modules in different performance classes and shapes using COB and SMD technology with a comparably minimal decrease in luminous flux over a module’s service life and with extremely high colour stability.

Precise optics from Vossloh-Schwabe enable efficient implementation of application-specific light distributions for shops, offices, industrial plants and street lighting.

Vossloh-Schwabe’s high-quality electronic LED control gear, which is available in various performance classes and designs, is designed to supply power to voltage- and constant-current-operated LED applications.
Castle Vollrads, Germany

Surrounded by forest and vineyards, Vollrads Castle lies in the middle of Germany’s beautiful Rheingau region in the federal state of Hesse. Apart from the historical castle itself, the vineyard, restaurant and a broad range of events go to make Vollrads Castle an extremely popular sightseeing destination.

The vineyard at Vollrads Castle is one of the world’s oldest and documentary proof exists that wine was traded here as early as 1211. Nowadays, the Vollrads winery concentrates solely on the cultivation of Riesling vines over an area of some 80 hectares.

Almost the entire outdoor and façade lighting, including the castle’s emblematic and imposing tower, features energy-efficient LED modules and drivers made by Vossloh-Schwabe.

Luminaires and lighting solutions: Arne Fiedler
Photos: Matthias Klenke

Pjatjorotschka Supermarket, Moscow, Russia

Energy efficiency is an important topic in the retail trade and substantial energy savings can be achieved in the area of shop lighting. For that reason, an ever increasing number of retail companies are switching to energy efficient technology. In this vein, the entire lighting system was replaced with energy-saving LED technology in the course of refurbishment work at a shop of the Pjatjorotschka supermarket chain.

One of Russia’s largest supermarket chains is now using one of the most efficient lighting systems on the market. And Vossloh-Schwabe components feature in the entire system – from simple lamps right up to the central controller.

The aim of the project was to install an automated and efficient lighting system that guarantees ideal lighting during business hours, protects the shop from burglars at night and increases shop visibility.

ALU-MAXi-SP luminaires in a length of 2.8 m – fitted with VS LEDLine SMD Kit LED modules, corresponding VS LED drivers and VS optics featuring Standard and Retail SYM beam characteristics – now provide general lighting in the retail area, at the tills and in the fresh vegetable area.
LED System Overview by Application Fields

LED modules
- M-Class: IP20, IP66, IP67, IP69, Allround, LightEngine
- S-Class: IP20, IP66, IP67, IP69, Allround, LightEngine
- AreaLED: IP20, IP66, IP67, IP69, Allround, LightEngine
- LUGA C

LED drivers
- Capacity range: 40–150 W
- Current supply: 350–1400 mA
- Dimming: DALI, PUSH, 1–10 V, power-reduction
- Variants: PrimeLine and ComfortLine
- Functions: 3C, NTC, MFF

Accessories
Optics (silicone, PMMA), luminaire protection device, power switches, switch units

LED modules
- LEDLine Flex SMD Professional Indoor 24 V: White; Standard and High Brightness
- AluLED: IP20, IP64; White and RGB

LED converters
- 24 V: ComfortLine and EasyLine
  Capacity range: 20, 50, 70, 75, 100, 130, 150 W
  Degree of protection: IP20, IP67
- 12 V: ComfortLine and EasyLine
  Capacity range: 6, 12, 50, 70 W
  Degree of protection: IP20, IP67

LED colour control
- DigiLED: Manuell, DALI, DMX, IR, RF, Push, Mono, Slave

LED modules
- SYM I: IP20, IP66, IP67, IP69, Allround, LightEngine
- SYM II: IP20, IP66, IP67, IP69, Allround, LightEngine
- LUGA C

LED drivers
- Capacity range: 19.95–230 W
- Current supply: 350–3200 mA
- Dimming: DALI, PUSH, 1–10 V
- Variants: ComfortLine and EasyLine

Accessories
Optics (silicone, PMMA), luminaire protection device, inrush current limiter, resistor network
LED System Overview

**OFFICE**
- **LED modules**
  - LUGA Line, LUGA Line RX and LUGA Line Food: Linear COB modules
  - LED Line SMD: Kit, Kit 3R, L14/28/56, Slim
  - LED Line Fix: LUGA and SMD
  - LED Line AluFix: LUGA, LUGA RX and SMD
  - LED Line SMD LightBar
  - LED Light Panel SMD
- **LED drivers**
  - Capacity range: 9–107 W
  - Current supply: 60–700 mA
  - Dimming: DALI, PUSH, 1–10 V, power-reduction
  - Variants: PrimeLine and ComfortLine
  - Functions: 3C, NTC, MFF
- **Accessories**
  - Optics, luminaire protection device, power switches, switch units

**RETAIL**
- **LED modules**
  - LUGA Shop
  - LUGA C
- **LEDSpots and Downlights**
  - Shopline, NEXT 111
  - EVO75, EVO90
  - ActiveLine: LUGA, COB 9.1, COB 7.1, COB 6.1, HALO, Quad
  - Downlights Pro and Prime
- **LED drivers**
  - Capacity range: 10–60 W
  - Current supply: 250–1050 mA
  - Dimming: DALI, PUSH, 1–10 V
  - Variants: PrimeLine, ComfortLine and EasyLine
  - Functions: 3C, NTC, MFF

**RESIDENTIAL**
- **LED modules**
  - PowerEmitter
  - TriplePowerEmitter
- **LED drivers**
  - Capacity range: 5.6–36 W
  - Current supply: 150–1050 mA
  - Dimming: Phase-cut dimmable
  - Variants: ComfortLine and EasyLine
- **LED modules for direct connection to mains**
  - NEXT 111 R
  - EVO75 R, EVO90 R
- **LED Lamps**
  - AR111
  - GU10
- **Accessories**
  - Optics, luminaire protection device, inrush current limiter, resistor network

**LED modules**
- LUGA Line, LUGA Line RX and LUGA Line Food: Linear COB modules
- LED Line SMD: Kit, Kit 3R, L14/28/56, Slim
- LED Line Fix: LUGA and SMD
- LED Line AluFix: LUGA, LUGA RX and SMD
- LED Line SMD LightBar
- LED Light Panel SMD

**LED drivers**
- Capacity range: 9–107 W
- Current supply: 60–700 mA
- Dimming: DALI, PUSH, 1–10 V, power-reduction
- Variants: PrimeLine and ComfortLine
- Functions: 3C, NTC, MFF

**Accessories**
- Optics, luminaire protection device, power switches, switch units

**LED modules**
- LUGA Shop
- LUGA C

**LEDSpots and Downlights**
- Shopline, NEXT 111
- EVO75, EVO90
- ActiveLine: LUGA, COB 9.1, COB 7.1, COB 6.1, HALO, Quad
- Downlights Pro and Prime

**LED drivers**
- Capacity range: 10–60 W
- Current supply: 250–1050 mA
- Dimming: DALI, PUSH, 1–10 V
- Variants: PrimeLine, ComfortLine and EasyLine
- Functions: 3C, NTC, MFF

**LED modules for direct connection to mains**
- NEXT 111 R
- EVO75 R, EVO90 R

**LED Lamps**
- AR111
- GU10

**Accessories**
- Optics, luminaire protection device, inrush current limiter, resistor network

**LED modules**
- PowerEmitter
- TriplePowerEmitter

**LED drivers**
- Capacity range: 5.6–36 W
- Current supply: 150–1050 mA
- Dimming: Phase-cut dimmable
- Variants: ComfortLine and EasyLine

**LED modules for direct connection to mains**
- LEDSpot ReadyLine IP and MR16
  - ReadyLine: S, DL and C

**LED Lamps**
- MR16
- GU10

**Accessories**
- Optics, reflectors, heat sinks
The LED modules dealt with in this chapter are constant-current-operated built-in modules whose circuit board does not feature its own power-supply electronics. Circular and linear modules featuring various chip types are available.

Ensuring constant-current control of LED modules benefits permanent operation, efficiency (lm/Watt) and the service life of LEDs. Constant-current control is particularly important for high-performance LEDs, as a module brightness of up to 15,000 lm can be achieved.

Various brightness levels can be set by selecting the requested operating current. In this regard, the maximum admissible current must never be exceeded and heat development must be monitored.

**Typical applications**
- Installation in luminaires for general lighting purposes
- Residential lighting
- Reading lamps and spots
- Entertainment
- Retail lighting
- Architectural lighting
- Street lighting

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

Please read the safety and installation instructions on the individual products as well as further technical information provided in the extensive product descriptions at [www.vossloh-schwabe.com](http://www.vossloh-schwabe.com).
Constant-current LED modules for all applications

Vossloh-Schwabe’s constant-current-operated LED modules are characterised by their extreme efficiency, long service life and colour brilliance. The extensive range of different designs and brightness levels results in a multitude of application options.

Whether they are used for indoor or outdoor applications, VS LED modules can be found as a decorative and functional lighting source in offices, homes, buildings and on our streets. They are:

• highly efficient,
• characterised by a high CRI and
• extremely versatile.

Constant-current drivers for current-operated LED modules

To ensure safe operation of LEDs that are connected in series, the operating current must be kept at a constant value by the driver. It is recommended to operate all high-performance LED modules in combination with an external constant-current driver.

To ensure the same current flows through every LED, high-performance LEDs can only be connected in series. For each respective application, the source of the constant-current must be selected to ensure the required current and sufficient voltage are supplied to the LED modules. The number of LED modules that can be connected to control gear is dependent on the forward voltage of the respective modules.
LUGA Line RX 2015

**Built-in PCB lighting modules**

The new LUGA Line RX 2015 is characterised by its particularly easy-to-use mounting and connection options (ZHAGA-compliant hole spacing).

Thanks to producing a homogeneous light field without any discernible individual light points, these LED modules are ideal for use with reflectors in luminaires constructed for T5 and T8 lamps.

**Technical notes**

- **Dimensions:** 280x18.4 mm and 93x18.4 mm
- **On-board push-in terminals (WAGO 2059)**
- **Allowed operating temperature at tc point:**
  - –40 to 85 °C (> 700 mA)
  - –40 to 105 °C (> 700 mA)
- **Use of external LED constant-current drivers**
- **Efficiency up to 148 lm/W**
- **Colour rendering index R<sub>a</sub>: > 80/> 90**
- **Colour accuracy initially: 3 SDCM; after 50,000 hrs. operating time: 4 SDCM**
- **Lumen maintenance L80/B10:** 50,000 hrs. (IF 700 mA)

**Packaging unit:** 60 pcs.

**Type**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature* K</th>
<th>Typ. luminous flux and efficiency, typical voltage (U&lt;sub&gt;typ&lt;/sub&gt;) and power consumption (P&lt;sub&gt;el&lt;/sub&gt;)**</th>
<th>Beam angle</th>
<th>Typ. CRI R&lt;sub&gt;a&lt;/sub&gt;</th>
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*Emission data at t<sub>tp</sub> = 65 °C | * Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux and efficiency: ±15 % | Min. CRI R<sub>a</sub> > 80 / > 90
LUGA Line 2015
45 Chips

Built-in PCB lighting modules
The linear LED COB modules produce a very high lumen output. The modules are available in warm white, neutral white and cool white; they can also be seamlessly connected (no gaps).

The ceramic PCB ensures optimum thermal management. Thanks to producing a homogeneous light field without any discernible individual light points, these LED modules are ideal for use with reflectors in luminaires constructed for T5 and T8 lamps.

Technical notes
Dimensions: 280x15 mm
On-board push terminal system
Allowed operating temperature at tc point: -40 to 85 °C
Use of external LED constant-current drivers
Ceramic PCB for optimum thermal management
Efficiency up to 160 lm/W
Colour rendering index Ra > 80
Colour accuracy initially: 3 SDCM; after 50,000 hrs. operating time: 4 SDCM
Lumen maintenance 90%/B10: 55,000 hrs. (If 700 mA)
Packaging unit: 60 pcs.

Typical applications
• Office lighting
• Retail lighting
• T5/T8 replacement as built-in module
• Furniture lighting

<table>
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<tr>
<th>Type</th>
<th>Ref. No.</th>
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<th>Colour Correlated Colour Correlated colour temperature* K</th>
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<th>CRI Ra</th>
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<td>1150</td>
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</table>

Emission data at tc = 65 °C | * Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10 %
Min. CRI Ra > 80
LUGA Line 2015 – FOOD

Built-in PCB lighting modules
The linear LED COB modules produce a very high lumen output. The modules can also be seamlessly connected (no gaps).

The ceramic PCB ensures optimum thermal management. Thanks to producing a homogeneous light field without any discernible individual light points, these LED modules are ideal for use with reflectors in luminaires constructed for T5 and T8 lamps.

Technical notes
Dimensions: 280x15 mm
On-board push terminal system
Allowed operating temperature at $t_c$ point: -40 to 85 °C
Use of external LED constant-current drivers
Ceramic PCB for optimum thermal management
Colour rendering index $R_a$: > 80/> 70
Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM
Lumen maintenance L90/B10: 55,000 hrs. (at 700 mA)
Packaging unit: 60 pcs.

Typical applications
• Installation in luminaires for general lighting purposes
• T5/T8 replacement as built-in module
• Retail lighting especially for fresh food (bread, fruits, vegetables, meat)
• Refrigerator lighting

### LUGA Line 2015 – FOOD

<table>
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<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature* [K]</th>
<th>Typ. luminous flux and efficiency, typ. voltage ($U_{up}$) and power consumption ($P_u$)**</th>
<th>Typ. beam angle*</th>
<th>Typ. CRI</th>
<th>Typical applications</th>
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<td>$85$</td>
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<td>4000</td>
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<td>$85$</td>
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<td>“white effect”</td>
<td>4000</td>
<td>$P_u = 790 \text{ m}^{2}/\text{lm}$, $U_{up} = 21.5 \text{ V}$</td>
<td>$51$</td>
<td>$70$</td>
<td>Meat</td>
</tr>
</tbody>
</table>

Emission data at $t_c = 65° \text{ C}$ | Colour tolerance: 3 MacAdam | Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%
Accessories for LUGA Line Modules

Other lead lengths on request

Feed-in connector
Feed in connector for power supply
Colour: – black
+ white
Max. permissible current: 1.5 A
Number of strands: 2
(Strand diameter: 0.09 mm²/AWG28)
Type: 893
Ref. No.: 551131  X = 310 mm
Ref. No.: 550952  X = 610 mm

PCB–PCB connector
Max. permissible current: 1.5 A
Type: 893
Ref. No.: 551129  X = 43 mm
Ref. No.: 549993  X = 61 mm
Ref. No.: 549992  X = 220 mm

End connector
Type: 893
Ref. No.: 551132

Plastic holder for LUGA Line modules
For fixing LUGA Line modules
Fixing hole for countersunk screw M3
With cable holder
Minimum required
3 pcs. per 1 LUGA Line module
5 pcs. per 2 LUGA Line modules
7 pcs. per 3 LUGA Line modules
Ref. No.: 551039

Thermally conductive adhesive tape
Dimensions: 278x13 mm
Ref. No.: 548179
LED Line SMD Kit
Gen. 2

Built-in PCB lighting modules with optics
The LED Line SMD Kit consists of SMD modules in two lengths (280 mm and 560 mm) as well as matching optics. LED modules and optics are an ideal LED solution to replace luminaires with T5/T8 lamps. Both the optics and LED modules are easy to attach using standardised fixing holes (ZHAGA-compliant hole spacing) and screws.

VS also provides optics that are perfect for office, industrial and shop (e.g. supermarket) lighting.

Technical notes
Dimensions [lxW]:
- WU-M-480/G: 280 x 39.6 mm
- WU-M-481/G: 560.6 x 39.6 mm

On-board push terminal system
Allowed operating temperature at tc point:
-20 to 75 °C

Use of external LED constant-current drivers
Efficiency up to 183 lm/W

Colour rendering index Ra: > 80
Lumen maintenance L80/B10: 60,000 hrs. (I 350 mA; tp 50 °C)

Typical applications
- Office lighting
- Retail lighting
- Industrial lighting
- T5/T8 replacement as built-in module

Dimensions of SMD board
WU-M-480-G

WU-M-481-G

WU-M-501-G

WU-M-502-G
Constant-current System – Linear

LED Line SMD Kit Gen. 2

1

Built-in PCB lighting modules with optics
Type

Ref. No.

Number Colour

Correlated

Luminous flux* (lm) and typical efficiency (lm/W),

Beam CRI

of LEDs

colour tem-

typical voltage (Utyp.) and power consumption (Pel)

angle

perature

350 mA

pcs.

K

500 mA

min.

typ.

typ.

lm

lm

lm/W lm

Pel = 4.9 W

min.

700 mA

typ.

typ.

lm

lm/W lm

Pel = 7.2 W

Utyp. = 13.9 V

min.

typ.

typ.

min. typ.

lm

lm/W °

Ra

Ra

Pel = 10.5 W

Utyp. = 14.4 V

Utyp. = 15 V

WU-M-480-G-830

560115

30

warm white

3000

720

780 160

1010 1100 152

1385 1500 143

120

80

85

WU-M-480-G-840

560116

30

neutral white 4000

750

820 168

1055 1150 159

1445 1570 150

120

80

85

280 mm – 30 LEDs

WU-M-480-G-850

560117

30

neutral white 5000

780

890 183

1100 1255 174

1500 1715 164

120

80

85

WU-M-480-G-865

560118

30

cool white

780

860 176

1100 1205 168

1500 1650 158

120

80

85

Pel = 9.8 W

Pel = 14.4 W

Pel = 20.9 W

Utyp. = 27.9 V

Utyp. = 28.8 V

Utyp. = 29.9 V

6500

560 mm – 60 LEDs
WU-M-481-G-830

560123

60

warm white

3000

1440

1565 160

2020 2195 152

2765 3005 143

120

80

85

WU-M-481-G-840

560124

60

neutral white 4000

1500

1635 168

2110 2295 159

2885 3145 150

120

80

85

WU-M-481-G-850

560125

60

neutral white 5000

1565

1785 183

2195 2505 174

3005 3430 164

120

80

85

WU-M-481-G-865

560126

60

cool white

1565

1720 176

2195 2415 168

3005 3300 158

120

80

85

Pel = 3 W

Pel = 4.4 W

Pel = 6.4 W

Utyp. = 8.5 V

Utyp. = 8.8 V

Utyp. = 9.2 V

6500

280 mm – 15 LEDs
560131

15

warm white

3000

430

465

156

600

650 148

815

885 138

120

80

85

WU-M-501-G-840

560132

15

neutral white 4000

445

485

164

625

680 155

850

930 144

120

80

85

WU-M-501-G-850

560133

15

neutral white 5000

465

530

179

650

745 169

885 1010 157

120

80

85

WU-M-501-G-865

560134

15

cool white

465

510

172

650

715 162

885

120

80

85

560 mm – 30 LEDs

975 151

Pel = 6 W

Pel = 8.8 W

Pel = 12.9 W

Utyp. = 17 V

Utyp. = 17.6 V

Utyp. = 18.4 V

WU-M-502-G-830

560135

30

warm white

3000

855

930 156

1200 1300 148

1635 1775 138

120

80

85

WU-M-502-G-840

560136

30

neutral white 4000

895

975 164

1250 1365 155

1705 1855 144

120

80

85

WU-M-502-G-850

560137

30

neutral white 5000

930

1065 179

1300 1485 169

1775 2025 157

120

80

85

WU-M-502-G-865

560138

30

cool white

930

1025 172

1300 1430 162

1775 1950 151

120

80

85

Pel = 14.3 W

Pel = 20.7 W

6500

Pel = 9.7 W
Utyp. = 27.8 V

Utyp. = 28.6 V

Utyp. = 29.6 V

WU-M-480-G-HB-830

560119

30

warm white

3000

1305

1455 149

1835 2040 143

2505 2790 135

120

80

85

WU-M-480-G-HB-840

560120

30

neutral white 4000

1360

1535 158

1910 2155 151

2610 2945 142

120

80

85

WU-M-480-G-HB-850

560121

30

neutral white 5000

1420

1605 165

1990 2255 158

2720 3080 149

120

80

85

WU-M-480-G-HB-865

560122

30

cool white

1420

1570 161

1990 2205 154

2720 3010 145

120

80

85

Pel = 19.5 W

Pel = 28.6 W

Pel = 41.4 W

Utyp. = 55.6 V

Utyp. = 57.1 V

Utyp. = 59.2 V

High Brightness – 280 mm – 30 LEDs

6500

High Brightness – 560 mm – 60 LEDs
WU-M-481-G-HB-830

560127

60

warm white

3000

2610

2905 149

3665 4080 143

5010 5575 135

120

80

85

WU-M-481-G-HB-840

560128

60

neutral white 4000

2720

3070 158

3815 4310 151

5215 5890 142

120

80

85

WU-M-481-G-HB-850

560129

60

neutral white 5000

2840

3210 165

3985 4505 158

5445 6160 149

120

80

85

WU-M-481-G-HB-865

560130

60

cool white

2840

3140 161

3985 4410 154

5445 6025 145

120

80

85

Pel = 8.8 W

Pel = 12.7 W

6500

Pel = 5.9 W

Utyp. = 17.5 V

Utyp. = 18.2 V

WU-M-501-G-HB-830

560139

15

warm white

3000

Utyp. = 16.9 V
775

865

146

1085 1210 139

1480 1645 129

120

80

85

WU-M-501-G-HB-840

560140

15

neutral white 4000

810

915

155

1130 1280 146

1540 1735 137

120

80

85

High Brightness – 280 mm – 15 LEDs

WU-M-501-G-HB-850

560141

15

neutral white 5000

845

955

162

1180 1335 153

1605 1815 143

120

80

85

WU-M-501-G-HB-865

560142

15

cool white

845

935

158

1180 1305 150

1605 1775 140

120

80

85

Pel = 11.8 W

Pel = 17.4 W

Pel = 25.4 W

Utyp. = 33.8 V

Utyp. = 34.9 V

Utyp. = 36.3 V

6500

High Brightness – 560 mm – 30 LEDs
WU-M-502-G-HB-830

560143

30

warm white

3000

1555

1730 146

2175 2420 139

2955 3285 129

120

80

85

WU-M-502-G-HB-840

560144

30

neutral white 4000

1620

1825 155

2260 2555 146

3075 3470 137

120

80

85

WU-M-502-G-HB-850

560145

30

neutral white 5000

1690

1910 162

2360 2670 153

3210 3630 143

120

80

85

WU-M-502-G-HB-865

560146

30

cool white

1690

1870 158

2360 2615 150

3210 3550 140

120

80

85

* Measurement tolerance: ± 7% | CRI > 90 on request

6500

3
4
5

WU-M-501-G-830

6500

2

6
7
8
9
10
11
12
15


LED Line SMD Kit Gen. 2

Technical notes optics
Dimensions: 280x43 mm, can be joined together, for modules 280 mm, 560 mm and module chains
Material: PMMA
Fixation with flat or cylinder head screws (M4) or with fixing clip [see below]
Max. torque: 1.2 Nm (M4)

### Optics type

<table>
<thead>
<tr>
<th>Optics type</th>
<th>Ref. No.</th>
<th>Efficiency %</th>
<th>Weight g</th>
<th>Packaging unit pcs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>555437</td>
<td>95</td>
<td>50</td>
<td>192</td>
</tr>
<tr>
<td>Diffus</td>
<td>559972</td>
<td>88</td>
<td>50</td>
<td>192</td>
</tr>
<tr>
<td>Extra Wide 90°</td>
<td>560570</td>
<td>95</td>
<td>50</td>
<td>192</td>
</tr>
<tr>
<td>Wide 60°</td>
<td>560573</td>
<td>95</td>
<td>50</td>
<td>192</td>
</tr>
<tr>
<td>Narrow 30°</td>
<td>560571</td>
<td>95</td>
<td>50</td>
<td>192</td>
</tr>
<tr>
<td>Retail SYM</td>
<td>555438</td>
<td>95</td>
<td>50</td>
<td>192</td>
</tr>
<tr>
<td>Retail ASYM</td>
<td>555439</td>
<td>95</td>
<td>50</td>
<td>192</td>
</tr>
</tbody>
</table>

**End cap**
Lateral tongue and groove for optics attachment
Weight: 0.9 g, packaging unit: 500 pcs.
Type: 98810
Ref. No.: 555482

Fixing Clip
For fastening LED optics of type 998 and LED PCBs to luminaire sheets without needing screws
Vibration resistant version
Material: PA, natural [UL-94 V-2]
Weight: 0.2 g, Packaging unit: 1000 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>For luminaire sheet thickness [M5]: mm</th>
<th>Length L [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>98002</td>
<td>562558</td>
<td>1.4 - 2.2</td>
<td>9</td>
</tr>
<tr>
<td>98003</td>
<td>562559</td>
<td>2.3 - 3.1</td>
<td>10</td>
</tr>
</tbody>
</table>
LED Line SMD Kit 3R

Built-in PCB lighting modules with optics

The LED Line SMD Kit 3R consists of an SMD module (length: 280 mm) as well as matching optics. LED modules and optics are an ideal LED solution to replace luminaires with T5/T8 lamps.

Both the optics and LED modules are easy to attach using standardised fixing holes (ZHAGA-compliant hole spacing) and screws.

VS also provides optics that are perfect for office, industrial and shop (e.g. supermarket) lighting.

Technical notes

Dimensions: 280x55 mm
On-board push terminal system
Allowed operating temperature at tc point:
-20 to 75 °C
Use of external LED constant-current drivers
Efficiency up to 186 lm/W
Colour rendering index Ra: > 80
Lumen maintenance L80/B10: 60,000 hrs. (Ir 350 mA; tp 50 °C)

Typical applications
- Office lighting
- Retail lighting
- Industrial lighting
- T5/T8 replacement as luminaire built-in module

WU-M-526-BC

WU-M-526-TC
## LED Line SMD Kit 3R

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature</th>
<th>Luminous flux* (lm)</th>
<th>typical efficiency (lm/W)</th>
<th>Beam angle*</th>
<th>CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>min.</td>
<td>typ.</td>
<td>min.</td>
<td>typ.</td>
<td>min.</td>
</tr>
<tr>
<td>WU-M-526 TopConnected (TC)</td>
<td></td>
<td></td>
<td>150 mA</td>
<td>200 mA</td>
<td>350 mA</td>
<td>500 mA</td>
<td>150 mA</td>
</tr>
<tr>
<td>WU-M-526-TC-830</td>
<td>560366</td>
<td>warm white</td>
<td>3000</td>
<td>680</td>
<td>740</td>
<td>163</td>
<td>900</td>
</tr>
<tr>
<td>WU-M-526-TC-840</td>
<td>560680</td>
<td>neutral white</td>
<td>4000</td>
<td>710</td>
<td>775</td>
<td>170</td>
<td>940</td>
</tr>
<tr>
<td>WU-M-526-TC-850</td>
<td>561056</td>
<td>neutral white</td>
<td>5000</td>
<td>740</td>
<td>845</td>
<td>186</td>
<td>975</td>
</tr>
<tr>
<td>WU-M-526-TC-865</td>
<td>561057</td>
<td>cool white</td>
<td>6500</td>
<td>740</td>
<td>815</td>
<td>179</td>
<td>975</td>
</tr>
<tr>
<td>WU-M-526 BottomConnected (BC)</td>
<td></td>
<td></td>
<td>150 mA</td>
<td>200 mA</td>
<td>350 mA</td>
<td>500 mA</td>
<td>150 mA</td>
</tr>
<tr>
<td>WU-M-526-BC-830</td>
<td>561061</td>
<td>warm white</td>
<td>3000</td>
<td>680</td>
<td>740</td>
<td>163</td>
<td>900</td>
</tr>
<tr>
<td>WU-M-526-BC-840</td>
<td>560716</td>
<td>neutral white</td>
<td>4000</td>
<td>710</td>
<td>775</td>
<td>170</td>
<td>940</td>
</tr>
<tr>
<td>WU-M-526-BC-850</td>
<td>561062</td>
<td>neutral white</td>
<td>5000</td>
<td>740</td>
<td>845</td>
<td>186</td>
<td>975</td>
</tr>
<tr>
<td>WU-M-526-BC-865</td>
<td>561063</td>
<td>cool white</td>
<td>6500</td>
<td>740</td>
<td>815</td>
<td>179</td>
<td>975</td>
</tr>
</tbody>
</table>

*Measurement tolerance: ±7%  | CRI > 90 on request

### Technical notes for optics
Dimensions (lxWxH): 285.4x62x11.25 mm can be joined together, for modules 280 mm, 560 mm and module chains.
Material: PMMA
Front-side groove or tongue to attach optics in series
Max. allowed ambient temperature \( t_{\text{max}} = 55 \, ^\circ \text{C} \)
Fixation with flat or cylinder head screws [M4] or fixing clip
Max. torque: 1.2 Nm (M4)

### Optics

```
<table>
<thead>
<tr>
<th>Optics type</th>
<th>Ref. No.</th>
<th>Efficiency %</th>
<th>Weight g</th>
<th>Packaging unit (pcs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra Wide 110°</td>
<td>560371</td>
<td>95</td>
<td>105</td>
<td>120</td>
</tr>
<tr>
<td>Diffuse</td>
<td>562543</td>
<td>85</td>
<td>105.8</td>
<td>120</td>
</tr>
<tr>
<td>Wide 90°</td>
<td>560376</td>
<td>95</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>Wide 60°</td>
<td>560372</td>
<td>95</td>
<td>88</td>
<td>120</td>
</tr>
<tr>
<td>Narrow 30°</td>
<td>560375</td>
<td>95</td>
<td>94</td>
<td>120</td>
</tr>
<tr>
<td>Retail SYM</td>
<td>560373</td>
<td>95</td>
<td>93</td>
<td>120</td>
</tr>
<tr>
<td>Retail ASYM</td>
<td>560374</td>
<td>95</td>
<td>99</td>
<td>120</td>
</tr>
</tbody>
</table>
```

### End cap

Lateral attachment on the optics
(on the side of the groove or tongue)
With fixing clips
Weight: 1.6/1 g, Packaging unit: 250/500 pcs.
Type: 994
Ref. No.: 560377  end cap for tongue side
Ref. No.: 560378  end cap for groove side

### Fixing Clip
For fastening LED optics of type 994 and LED PCBs to luminaires without needing screws
Ref. No.: 562557  For luminaire sheet thickness (MS) 0.5–1.3 mm
Ref. No.: 562558  For luminaire sheet thickness (MS) 1.4–2.2 mm
Ref. No.: 562559  For luminaire sheet thickness (MS) 2.3–3.1 mm

---

**Technical notes for optics**
Dimensions (lxWxH): 285.4x62x11.25 mm can be joined together, for modules 280 mm, 560 mm and module chains.
Material: PMMA
Front-side groove or tongue to attach optics in series
Max. allowed ambient temperature \( t_{\text{max}} = 55 \, ^\circ \text{C} \)
Fixation with flat or cylinder head screws [M4] or fixing clip
Max. torque: 1.2 Nm (M4)
LED Line SMD Gen. 2  
– L14/28/56 W2

Built-in PCB lighting modules
The SMD PCB LED Line SMD L14/28/56 W is optimally suited for use in classic T5/T8 luminaires. Available in three different lengths (140 mm, 280 mm and 560 mm), the LED modules are easy to fix.

Technical notes
Dimensions:
- WU-M-G-507/508: 140x20 mm
- WU-M-G-509/510: 280x20 mm
- WU-M-G-511/512: 560x20 mm
Fixation with M3 screws, screw head: Ø 6 mm
On-board push-in terminals (WAGO 2060)
Allowed operating temperature at tc point:
-20 to 75 °C
Use of external LED constant-current drivers required
Efficiency up to 179 lm/W
Colour rendering index Ra: > 80
Lumen maintenance L80/B10: up to 60,000 hrs. (If 700 mA, tp = 50 °C)

Typical applications
- Installation in luminaires for general lighting purposes
- Office lighting
- Retail, corridor and shelf lighting
- T5/T8 replacement as built-in module
- Furniture lighting
- Backlighting for advertising

Connection example
(RAW TEXT)
# Built-in PCB lighting modules

## Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Number of LEDs</th>
<th>Colour</th>
<th>Correlated colour temperature (K)</th>
<th>Luminous flux* (lm) and typ. efficiency (lm/W), typical voltage (Utyp.) and power consumption (Pel)</th>
<th>Beam angle °</th>
<th>CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Brightness – L14 W2 – 5 SMDs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WUMS07GBHB830</td>
<td>560201 5</td>
<td>white</td>
<td>3000</td>
<td>260 290 146</td>
<td>P&lt;sub&gt;el&lt;/sub&gt; = 1.97 W P&lt;sub&gt;el&lt;/sub&gt; = 5.63 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WUMS07GBHB840</td>
<td>560202 5</td>
<td>white</td>
<td>4000</td>
<td>270 305 155</td>
<td>P&lt;sub&gt;el&lt;/sub&gt; = 2.91 W P&lt;sub&gt;el&lt;/sub&gt; = 5.82 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WUMS07GBHB850</td>
<td>560203 5</td>
<td>white</td>
<td>5000</td>
<td>280 320 162</td>
<td>P&lt;sub&gt;el&lt;/sub&gt; = 4.24 W P&lt;sub&gt;el&lt;/sub&gt; = 6.05 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WUMS07GBHB865</td>
<td>560204 5</td>
<td>white</td>
<td>6500</td>
<td>280 310 158</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High Brightness – L14 W2 – 10 SMDs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WUMS07GBHB830</td>
<td>560189 10</td>
<td>white</td>
<td>3000</td>
<td>520 575 146</td>
<td>P&lt;sub&gt;el&lt;/sub&gt; = 3.94 W U&lt;sub&gt;typ&lt;/sub&gt; = 11.26 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WUMS07GBHB840</td>
<td>560190 10</td>
<td>white</td>
<td>4000</td>
<td>540 610 155</td>
<td>P&lt;sub&gt;el&lt;/sub&gt; = 5.82 W U&lt;sub&gt;typ&lt;/sub&gt; = 12.10 V</td>
<td></td>
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<td>565 635 162</td>
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<td><strong>High Brightness – L28 W2 – 10 SMDs</strong></td>
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<td>3000</td>
<td>520 575 146</td>
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<td>4000</td>
<td>540 610 155</td>
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<td>1080 1220 155</td>
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<td>1035 1153 146</td>
<td>P&lt;sub&gt;el&lt;/sub&gt; = 7.89 W U&lt;sub&gt;typ&lt;/sub&gt; = 22.53 V</td>
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<td>4000</td>
<td>1080 1220 155</td>
<td>P&lt;sub&gt;el&lt;/sub&gt; = 11.64 W U&lt;sub&gt;typ&lt;/sub&gt; = 24.20 V</td>
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<tr>
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<td>5000</td>
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<td>1125 1245 158</td>
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<td><strong>High Brightness – L56 W2 – 40 SMDs</strong></td>
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<td>WUMS07GBHB830</td>
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<td>3000</td>
<td>2075 2303 146</td>
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<td>6500</td>
<td>2250 2490 158</td>
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</table>

* Measuring tolerance of luminous flux: ± 7% | CRI > 90 on request
**LED Line SMD Slim Gen. 2**

**Lighting modules with cover**

LED Line SMD Slim consists of an energy-efficient linear SMD module and a cover with several attachment options. The module was designed for integration into indoor luminaires providing direct or indirect light.

The fast, safe and flexible adhesive-based, click on (ZHAGA-compliant L56W2 hole spacing) or screw-based options for fixing the module within the luminaire constitute an ideal solution for linear lighting applications.

The light module is fitted with either a clear or diffuse cover that serves to protect it and, in the diffuse version, to reduce glare and distribute light in a similar manner to a fluorescent lamp.

**Technical notes**

**Dimensions**
- WU-M-499-G: 280 x 14.5 mm
- WU-M-500-G: 560 x 14.5 mm

**On-board push-in terminals**

Allowed operating temperature at tc point:
-20 at 75 °C

Use of external LED constant-current drivers required

Efficiency up to 183 lm/W

Colour rendering index R<sub>a</sub> min. 80

Lumen maintenance L80/B10:
> 60,000 hrs. (If 700 mA, tp = 50 °C)

**Typical applications**

Built-in luminaires/general illumination:
- Office lighting
- Retail, corridor and shelf lighting
- T5/T8 replacement as built-in module
- Furniture lighting
- Backlighting for advertising

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**Mechanical dimensions of SMD board**

**WU-M-499-G**

**WU-M-500-G**
LED Line SMD Slim Gen. 2

Optical characteristics
at \(T_p = 50\, ^\circ\text{C}\), without secondary optics
The specified values apply only to the version of the LED module without a cover.
The following efficiency levels can be achieved when using a cover: clear (97%), diffuse (90%)

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Luminous flux* (lm)</th>
<th>typ. efficiency, typ. voltage (Utyp.) and power consumption (Pel)</th>
<th>Beam angle</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>350 mA</td>
<td>500 mA</td>
<td>700 mA</td>
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<td></td>
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<td></td>
<td>min. typ.</td>
<td>m/W</td>
<td>min. typ.</td>
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<tr>
<td>280 mm</td>
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<td>780</td>
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<td>WU-M499-G-840</td>
<td>560148</td>
<td>30 neutral white</td>
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<td>750</td>
<td>820</td>
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<td>WU-M499-G-850</td>
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<td>890</td>
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<td>WU-M499-G-865</td>
<td>560150</td>
<td>30 cool white</td>
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<td>860</td>
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<td>560 mm</td>
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<td>WU-M500-G-840</td>
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<td>High Brightness – 280 mm</td>
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<td>1605</td>
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<td>30 cool white</td>
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<td>1420</td>
<td>1570</td>
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<td>2840</td>
<td>3140</td>
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</tbody>
</table>

* Measurement tolerance of luminous flux: ± 7%  | CRI > 90 on request

Reference numbers – Module length: 280 mm

Fixing | For tape fixing - type 89510 | For screw fixing - type 89511 | For clip fixing - type 89512
Cover | Clear | Diffuse | Clear | Diffuse | Clear | Diffuse
280 mm | SMD283000 | 561199 | 561203 | 561207 | 561211 | 561215 | 561219 |
| SMD284000 | 561200 | 561204 | 561208 | 561212 | 561216 | 561220 |
| SMD285000 | 561201 | 561205 | 561209 | 561213 | 561217 | 561221 |
| SMD286500 | 561202 | 561206 | 561210 | 561214 | 561218 | 561222 |

High Brightness – 280 mm | SMD283000 | 561223 | 561227 | 561231 | 561235 | 561239 | 561243 |
| SMD284000 | 561224 | 561228 | 561232 | 561236 | 561240 | 561244 |
| SMD285000 | 561225 | 561229 | 561233 | 561237 | 561241 | 561245 |
| SMD286500 | 561226 | 561230 | 561234 | 561238 | 561242 | 561246 |
LED Line SMD Slim Gen. 2

Reference numbers – Module length: 560 mm

<table>
<thead>
<tr>
<th>Fixing</th>
<th>For tape fixing – type: 89560</th>
<th>For screw fixing – type: 89561</th>
<th>For clip fixing – type: 89562</th>
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</thead>
<tbody>
<tr>
<td>Cover Clear</td>
<td>Clear</td>
<td>Clear</td>
<td>Clear</td>
</tr>
<tr>
<td>Diffuse</td>
<td>Diffuse</td>
<td>Diffuse</td>
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<th>SMD0564000</th>
<th>SMD0565000</th>
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<td>561274</td>
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High Brightness – 560 mm

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<td>561274</td>
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<td>561286</td>
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</table>

LED Line SMD Slim for tape fixing

With cover for tape fixing
With base thermal tapes pre-assembled
Degree of protection: IP20
Weight: 30.3/67 g, packaging unit: 6 pcs.
Type: 89510/89560

<table>
<thead>
<tr>
<th>Module length mm</th>
<th>Drawing</th>
<th>Dimensions [LxWxH] mm</th>
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</thead>
<tbody>
<tr>
<td>280</td>
<td>A</td>
<td>285x24x10.5</td>
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<tr>
<td>560</td>
<td>B</td>
<td>565x24x10.5</td>
</tr>
</tbody>
</table>

LED Line SMD Slim for screw fixing

With cover for screw fixing
Fixing holes for screws M4
Tightening torque: 0.6–0.7 Nm
With base thermal tapes pre-assembled
Degree of protection: IP20
Weight: 31/69 g, packaging unit: 4 pcs.
Type: 89511/89561

<table>
<thead>
<tr>
<th>Module length mm</th>
<th>Drawing</th>
<th>Dimensions [LxWxH] mm</th>
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<tr>
<td>280</td>
<td>C</td>
<td>285x39x10.5</td>
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<tr>
<td>560</td>
<td>D</td>
<td>565x39x10.5</td>
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</table>

LED Line SMD Slim for clip fixing

With cover for clip fixing
Base fixing clips for wall thickness 0.4–1 mm
With base thermal tapes pre-assembled
Degree of protection: IP20
Weight: 30.5/68 g, packaging unit: 6 pcs.
Type: 89512/89562

<table>
<thead>
<tr>
<th>Module length mm</th>
<th>Drawing</th>
<th>Dimensions [LxWxH] mm</th>
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</thead>
<tbody>
<tr>
<td>280</td>
<td>E</td>
<td>285x24x10.5</td>
</tr>
<tr>
<td>560</td>
<td>F</td>
<td>565x24x10.5</td>
</tr>
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</table>
LED Line Fix LUGA 2015

Lighting modules with holder and cover
LED Line Fix LUGA consists of an energy-efficient linear COB module, a holder with various attachment options and a cover. The module was designed for integration into indoor luminaires providing direct or indirect light.

The fast, safe and flexible adhesive-based, click on (ZHAGA-compliant L28/L56W4 hole spacing) or screw-based options for fixing the module within the luminaire constitute an ideal solution for linear lighting applications.

The light module forms a single unit consisting of a holder made of a thermoconductive polymer plus a clear or diffuse cover that protects the LED module and electrically isolates it from the luminaire.

The diffuse cover reduces glare and distributes light in a similar manner to a fluorescent lamp.

Technical notes LUGA Line module
On-board push terminal system: Electrical connection with lateral connection leads 28AWG
Allowed operating temperature at t_c point:
-40 to 85 °C
Efficiency up to 157 lm/W
Colour rendering index R_a > 80
Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM
Lumen maintenance L90/B10:
55,000 hrs. (I 700 mA)

Typical applications
- Office and school lighting
- Retail lighting
- Industrial lighting
- For replacement of T5 and T8 lamps
**LED Line Fix LUGA 2015**

Optical characteristics

at \(t_p = 65 \, ^\circ\text{C}\)

The specified values apply only to the version of the LED module without a cover.

The following efficiency levels can be achieved when using a cover: clear (97%), diffuse (90%)

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of LEDs</th>
<th>Colour</th>
<th>Correlated colour temperature</th>
<th>Typ. luminous flux and efficiency, typical voltage ([U_{typ}]^<em>) and power consumption ([P_{el}]^</em>)</th>
<th>Beam angle</th>
<th>Typ. CRI</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>pcs.</td>
<td></td>
<td></td>
<td>([P_{el}] = 5.1 , \text{W}) ([U_{typ}] = 14.7 , \text{V}) ([P_{el}] = 7.7 , \text{W}) ([U_{typ}] = 15.4 , \text{V}) ([P_{el}] = 11.5 , \text{W}) ([U_{typ}] = 16.4 , \text{V}) ([P_{el}] = 19.1 , \text{W}) ([U_{typ}] = 18.2 , \text{V})</td>
<td></td>
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</tr>
<tr>
<td>280 mm</td>
<td></td>
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<tr>
<td>DM059C27EC</td>
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<td>warm white</td>
<td>2700</td>
<td>725 142</td>
<td>1030 142</td>
<td>1400 122</td>
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<td>DM059C30EC</td>
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<td>warm white</td>
<td>3000</td>
<td>755 148</td>
<td>1075 148</td>
<td>1460 127</td>
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<td>DM059C40EC</td>
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<td>neutral white</td>
<td>4000</td>
<td>800 157</td>
<td>1145 157</td>
<td>1550 135</td>
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<tr>
<td>560 mm (2 wired LED modules per holder)</td>
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<td>2800 122</td>
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<td>warm white</td>
<td>3000</td>
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<td>2150 148</td>
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<td>neutral white</td>
<td>4000</td>
<td>1600 157</td>
<td>2290 157</td>
<td>3100 135</td>
</tr>
</tbody>
</table>

* Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%

Reference numbers – Module length: 280 mm

<table>
<thead>
<tr>
<th>Fixing</th>
<th>For tape fixing - type: 89300</th>
<th>For screw fixing - type: 89301</th>
<th>For clip fixing - type: 89302</th>
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</thead>
<tbody>
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<td>Without Clear Diffuse</td>
<td>Without Clear Diffuse</td>
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<tr>
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<td>558687 558684</td>
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<tr>
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Reference numbers – Module length: 560 mm (2 wired LED modules per holder)

<table>
<thead>
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<th>For tape fixing - type: 89350</th>
<th>For screw fixing - type: 89351</th>
<th>For clip fixing - type: 89352</th>
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<td>Without Clear Diffuse</td>
<td>Without Clear Diffuse</td>
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<td>558692 558695 558698 558701 558704 558707 558710 558713</td>
<td>558693 558696 558699 558702 558705 558708 558711 558714</td>
</tr>
</tbody>
</table>
**LED Line Fix LUGA**

**2015 – 280 mm**

**Technical notes LED Line Fix holder**

Holder material: thermo-conductive resin
Lead exit: lateral or base wiring
When joining linear modules in a row, a minimum clearance of 1 mm between the fixing units must be observed due to thermal expansion.
The LED modules of versions with a cover are already fully wired. Additional connectors must be ordered separately for versions without a cover.

**LED Line Fix LUGA for tape fixing**

**Without cover**
Dimensions (LxWxH): 280 x 23.2 x 4.5 mm
With base thermal tapes pre-assembled
Weight: 43 g, packaging unit: 4 pcs.
Type: 89300, drawing A

**With cover**
Degree of protection: IP40
Dimensions (LxWxH): 284 x 23.2 x 16.1 mm
With base thermal tapes pre-assembled
Weight: 67 g, packaging unit: 4 pcs.
Type: 89300, drawing B

**LED Line Fix LUGA for screw fixing**

**Without cover**
Dimensions (LxWxH): 280 x 40 x 4.5 mm
Fixing holes for screws M4
Tightening torque: 0.6–0.7 Nm
Weight: 43 g, packaging unit: 4 pcs.
Type: 89301, drawing C

**With cover**
Degree of protection: IP40
Dimensions (LxWxH): 284 x 40 x 16.1 mm
Fixing holes for screws M4
Tightening torque: 0.6–0.7 Nm
Weight: 67 g, packaging unit: 4 pcs.
Type: 89301, drawing D

**LED Line Fix LUGA for clip fixing**

**With cover**
Degree of protection: IP40
Dimensions (LxWxH): 284 x 23.2 x 16.1 mm
Base fixing clips for wall thickness 0.4–1 mm
With base thermal tapes pre-assembled
Weight: 67 g, packaging unit: 4 pcs.
Type: 89302, drawing E
LED Line Fix LUGA
2015 – 560 mm

Technical notes LED Line Fix holder
Holder material: thermo-conductive resin
Lead exit: lateral or base wiring
When joining linear modules in a row, a minimum clearance of 1 mm between the fixing units must be observed due to thermal expansion. The LED modules of versions with a cover are already fully wired. Additional connectors must be ordered separately for versions without a cover.

LED Line Fix LUGA for tape fixing
Without cover
Dimensions (LxWxH): 561 x 23.2 x 4.5 mm
With base thermal tapes pre-assembled
Weight: 86 g, packaging unit: 4 pcs.
Type: 89350, drawing F

With cover
Degree of protection: IP40
Dimensions (LxWxH): 565 x 23.2 x 16.1 mm
With base thermal tapes pre-assembled
Weight: 135 g, unit: 4 pcs.
Type: 89350, drawing G

LED Line Fix LUGA for screw fixing
Without cover
Dimensions (LxWxH): 561 x 40 x 4.5 mm
Fixing holes for screws M4
Tightening torque: 0.6–0.7 Nm
Weight: 86 g, packaging unit: 4 pcs.
Type: 89351, drawing H

With cover
Degree of protection: IP40
Dimensions (LxWxH): 565 x 40 x 16.1 mm
Fixing holes for screws M4
Tightening torque: 0.6–0.7 Nm
Weight: 135 g, packaging unit: 4 pcs.
Type: 89351, drawing J

LED Line Fix LUGA for clip fixing
With cover
Degree of protection: IP40
Dimensions (LxWxH): 565 x 23.2 x 16.1 mm
Base fixing clips for wall thickness 0.4–1 mm
With base thermal tapes pre-assembled
Weight: 135 g, packaging unit: 4 pcs.
Type: 89352, drawing K
Covers

Technical notes LED Line Fix cover
Material: PC, clear or diffuse
Efficiency covers: clear 97%, diffuse 90%

Covers for LED Line Fix
for tape and screw fixing
For type: 89300/89301, LED Line Fix 280 mm
Ref. No.: 549585  clear
Ref. No.: 549586  diffuse

For type: 89350/89351, LED Line Fix 560 mm
Ref. No.: 550912  clear
Ref. No.: 550913  diffuse

Covers for LED Line Fix
for clip fixing
Longer fixing clips of cover for fixing the holder into the luminaire sheet
For wall thickness 0.4–1 mm
For type: 89302, LED Line Fix 280 mm
Ref. No.: 549994  clear
Ref. No.: 549995  diffuse

For type: 89352, LED Line Fix 560 mm
Ref. No.: 550914  clear
Ref. No.: 550915  diffuse

Connectors

You will find connectors for the LED Line Fix LUGA on page 13.
LED Line Fix SMD

Lighting modules with holder and cover
LED Line Fix SMD consists of an energy-efficient linear SMD module, a holder with various attachment options and a cover. The module was designed for integration into indoor luminaires providing direct or indirect light.

The fast, safe and flexible adhesive-based, click on (ZHAGA-compliant L28/L56W4) or screw-based options for fixing the module within the luminaire constitute an ideal solution for linear lighting applications.

The light module forms a single unit consisting of a holder made of a thermoconductive polymer plus a clear or diffuse cover that protects the LED module and electrically isolates it from the luminaire.

The diffuse cover reduces glare and distributes light in a similar manner to a fluorescent lamp.

Electrical characteristics
The specified values apply only to the version of the LED module without a cover.

The following efficiency levels can be achieved when using a cover: clear (97%), diffuse (90%)

LED Line Fix SMD

Technical notes LED Line Fix holder
Holder material: thermo-conductive resin
When joining linear modules in a row, a minimum clearance of 1 mm between the fixing units must be observed due to thermal expansion.

LED Line Fix SMD for tape fixing
With base thermal tapes pre-assembled
Weight: 95/142 g, packaging unit: 4 pcs.
Type: 89500/89550

<table>
<thead>
<tr>
<th>Module length mm</th>
<th>Drawing</th>
<th>Degree of protection</th>
<th>Dimensions (LxWxH) mm</th>
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<tbody>
<tr>
<td>Without cover</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>280</td>
<td>A</td>
<td>—</td>
<td>280x23.2x4.5</td>
</tr>
<tr>
<td>560</td>
<td>C</td>
<td>—</td>
<td>561x23.2x4.5</td>
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<tr>
<td>With cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>280</td>
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</tr>
<tr>
<td>560</td>
<td>D</td>
<td>IP20</td>
<td>565x23.2x16.1</td>
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</table>

LED Line Fix SMD for screw fixing
Fixing holes for screws M4
Tightening torque: 0.6–0.7 Nm
Weight: 96/143 g, packaging unit: 4 pcs.
Type: 89501/89551

<table>
<thead>
<tr>
<th>Module length mm</th>
<th>Drawing</th>
<th>Degree of protection</th>
<th>Dimensions (LxWxH) mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>280</td>
<td>E</td>
<td>—</td>
<td>280x40x4.5</td>
</tr>
<tr>
<td>560</td>
<td>G</td>
<td>—</td>
<td>361x40x4.5</td>
</tr>
<tr>
<td>With cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>280</td>
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<td>IP20</td>
<td>284x40x16.1</td>
</tr>
<tr>
<td>560</td>
<td>H</td>
<td>IP20</td>
<td>365x40x16.1</td>
</tr>
</tbody>
</table>

LED Line Fix SMD for clip fixing
With base thermal tapes pre-assembled
Base fixing clips for wall thickness 0.4–1 mm
Weight: 95/142 g, packaging unit: 4 pcs.
Type: 89502/89552

<table>
<thead>
<tr>
<th>Module length mm</th>
<th>Drawing</th>
<th>Degree of protection</th>
<th>Dimensions (LxWxH) mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>With cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>280</td>
<td>K</td>
<td>IP20</td>
<td>284x23.2x16.1</td>
</tr>
<tr>
<td>560</td>
<td>L</td>
<td>IP20</td>
<td>365x23.2x16.1</td>
</tr>
</tbody>
</table>
LED Line Fix SMD

Technical notes LED Line Fix cover
Material: PC, clear or diffuse
Lead exit: lateral push-in holes
Efficiency covers: clear 97%, diffuse 90%

Covers for LED Line Fix 280 mm for tape and screw fixing
For type: 89500/89501
Ref. No.: 554044 clear
Ref. No.: 554045 diffuse

For clip fixing
Longer fixing clips of cover for fixing the holder into the luminaire sheet
For wall thickness 0.4–1 mm
For type: 89502
Ref. No.: 554046 clear
Ref. No.: 554047 diffuse

Covers for LED Line Fix 560 mm for tape and screw fixing
For type: 89550/89551
Ref. No.: 551588 clear
Ref. No.: 551589 diffuse

For clip fixing
Longer fixing clips of cover for fixing the holder into the luminaire sheet
For wall thickness 0.4–1 mm
For type: 89552
Ref. No.: 551590 clear
Ref. No.: 551591 diffuse

Luminaire cut-outs for clip fixing
For type 89502 – LED Line Fix 280 mm

For type 89552 – LED Line Fix 560 mm
LED Line AluFix
LUGA 2015

Lighting modules with holder and cover
LED Line AluFix LUGA consists of an energy-efficient linear COB module, an aluminium holder and a clear cover or, alternatively, optics. The module was designed for integration into indoor luminaires providing direct or indirect light.

The light module is available with up to five pre-wired LUGA modules in lengths of 305 to 1429 mm.

The robust aluminium holder serves to optimise thermal management and is easy to attach using M3 screws. The clear or diffuse cover protects LED modules from environmental factors. The diffuse cover reduces glare and distributes light in a similar manner to a fluorescent lamp.

Enabling the kind of light distribution typically required in offices or shops, the optics versions facilitate luminaire designs that can do without an additional light guidance system. The high-quality optics consist of only one unit, regardless of its length, and therefore provide optimal protection for LED modules and ensure homogenously illuminated surfaces without optical interruptions.

Technical notes
For one to five LUGA Line modules
On-board push terminal system: Electrical connection with lateral connection leads 28AWG
Allowed operating temperature at $t_c$ point:
-40 $\text{°C}$ to 85 $\text{°C}$
Use of external LED constant-current drivers:
for drivers with $U_{OUT} < 150$ V DC
Efficiency up to 157 lm/W
Colour rendering index $R_a > 80$
Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM
Lumen maintenance $L_{90/B10}$:
55,000 hrs. ($I_F$ 700 mA)

Typical applications
- Office and school lighting
- Retail lighting
- Industrial lighting
- For replacement of T5 and T8 lamps

Further shapes and optics on request.
**LED Line AluFix LUGA 2015**

Optical characteristics of LUGA Line LED modules at $T_p = 65\, ^{\circ}\text{C}$ | The following efficiency levels can be achieved when using a cover: see data sheets

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of LEDs</th>
<th>Colour</th>
<th>Correlated colour temperature °C</th>
<th>$350, \text{mA}$</th>
<th>$500, \text{mA}$</th>
<th>$700, \text{mA}$</th>
<th>$1050, \text{mA}$</th>
<th>$U_{\text{typ.}}$ $\pm$</th>
<th>$P_e$ $\pm$</th>
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<tbody>
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<td>305 mm</td>
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<td></td>
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<td>$m$</td>
<td>$n/W$</td>
<td>$m$</td>
<td>$n/W$</td>
<td>$m$</td>
<td>$n/W$</td>
</tr>
<tr>
<td>DML059C27EC</td>
<td>45</td>
<td>warm white</td>
<td>2700</td>
<td>725</td>
<td>14.7</td>
<td>1030</td>
<td>134</td>
<td>1400</td>
<td>122</td>
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<tr>
<td>DML059C30EC</td>
<td>45</td>
<td>warm white</td>
<td>3000</td>
<td>755</td>
<td>14.8</td>
<td>1075</td>
<td>140</td>
<td>1460</td>
<td>127</td>
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<tr>
<td>DML059C40EC</td>
<td>45</td>
<td>neutral white</td>
<td>4000</td>
<td>800</td>
<td>15.7</td>
<td>1145</td>
<td>149</td>
<td>1550</td>
<td>135</td>
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<tr>
<td>586 mm (2 wired LED modules per aluminium profile)</td>
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<td></td>
<td></td>
<td>$m$</td>
<td>$n/W$</td>
<td>$m$</td>
<td>$n/W$</td>
<td>$m$</td>
<td>$n/W$</td>
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<td>2700</td>
<td>1450</td>
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<td>3000</td>
<td>1510</td>
<td>14.8</td>
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<td>140</td>
<td>2920</td>
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<td>DML059C40EC</td>
<td>2x45</td>
<td>neutral white</td>
<td>4000</td>
<td>1600</td>
<td>15.7</td>
<td>2290</td>
<td>149</td>
<td>3100</td>
<td>135</td>
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<td>867 mm (3 wired LED modules per aluminium profile)</td>
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<td></td>
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<td>$n/W$</td>
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<td>$n/W$</td>
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<td>$n/W$</td>
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<td>14.2</td>
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<td>4200</td>
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<td>3000</td>
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<td>14.8</td>
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<td>4380</td>
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<td>4000</td>
<td>2400</td>
<td>15.7</td>
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<td>1148 mm (4 wired LED modules per aluminium profile)</td>
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<td>$n/W$</td>
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<td>$n/W$</td>
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<td>$n/W$</td>
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<td>3020</td>
<td>14.8</td>
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<td>140</td>
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<td>3200</td>
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<td>4580</td>
<td>149</td>
<td>6200</td>
<td>135</td>
</tr>
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<td>1429 mm (5 wired LED modules per aluminium profile)</td>
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<td>$m$</td>
<td>$n/W$</td>
<td>$m$</td>
<td>$n/W$</td>
<td>$m$</td>
<td>$n/W$</td>
</tr>
<tr>
<td>DML059C27EC</td>
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<td>warm white</td>
<td>2700</td>
<td>3525</td>
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<td>15.7</td>
<td>5725</td>
<td>149</td>
<td>7750</td>
<td>135</td>
</tr>
</tbody>
</table>

*Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%*
LED Line AluFix LUGA 2015

Technical notes
Material: Aluminium profile and PMMA cover
Rear connection leads, lead length: 70 mm
with 2-poles connector AMP Micro Mate-N-LOK 1445049-2
Degree of protection: IP40
Rear slots for screws M3
Tightening torque: 0.5 Nm

LED Line AluFix LUGA 2015 – Cover

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit</th>
<th>Weight</th>
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<tbody>
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<td>89001</td>
<td>305 36.2 21.3</td>
<td>15</td>
<td>171 g</td>
</tr>
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<td>586 36.2 21.3</td>
<td>15</td>
<td>330 g</td>
</tr>
<tr>
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<td>867 36.2 21.3</td>
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<td>1148 36.2 21.3</td>
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<td>89005</td>
<td>1429 36.2 21.3</td>
<td>15</td>
<td>815 g</td>
</tr>
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</table>

Reference numbers – LED Line AluFix LUGA 2015 – Cover
The following efficiency levels can be achieved when using a cover: clear (97%), diffuse (90%)

<table>
<thead>
<tr>
<th>Type / Total length</th>
<th>89001 / 305 mm</th>
<th>89002 / 586 mm</th>
<th>89003 / 867 mm</th>
<th>89004 / 1148 mm</th>
<th>89005 / 1429 mm</th>
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</thead>
<tbody>
<tr>
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<td>Clear</td>
<td>Diffuse</td>
<td>Clear</td>
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LED Line AluFix LUGA 2015 – Optics Office

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit</th>
<th>Weight</th>
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<td>586 36.2 15.2</td>
<td>15</td>
<td>316 g</td>
</tr>
<tr>
<td>89013</td>
<td>867 36.2 15.2</td>
<td>15</td>
<td>466 g</td>
</tr>
<tr>
<td>89014</td>
<td>1148 36.2 15.2</td>
<td>15</td>
<td>617 g</td>
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<td>89015</td>
<td>1429 36.2 15.2</td>
<td>15</td>
<td>767 g</td>
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</table>

Reference numbers – LED Line AluFix LUGA 2015 – Optics Office
Efficency optics: 94%

<table>
<thead>
<tr>
<th>Type / Total length</th>
<th>89011 / 305 mm</th>
<th>89012 / 586 mm</th>
<th>89013 / 867 mm</th>
<th>89014 / 1148 mm</th>
<th>89015 / 1429 mm</th>
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<tbody>
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<td>558524</td>
<td>558527</td>
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<tr>
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<td>558529</td>
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<td>558535</td>
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</table>
**LED Line AluFix LUGA 2015**

**Technical notes**
- Material: Aluminium profile and PMMA cover
- Rear connection leads, lead length: 70 mm with 2-poles connector AMP Micro Mate-N-LOK 1445049-2
- Degree of protection: IP40
- Rear slots for screws M3
- Tightening torque: 0.5 Nm

**LED Line AluFix LUGA 2015 – Optics Retail 1-SYM**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit pcs</th>
<th>Weight g</th>
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</thead>
<tbody>
<tr>
<td>89021</td>
<td>305 36.2 15.2</td>
<td>15</td>
<td>165</td>
</tr>
<tr>
<td>89022</td>
<td>586 36.2 15.2</td>
<td>15</td>
<td>316</td>
</tr>
<tr>
<td>89023</td>
<td>867 36.2 15.2</td>
<td>15</td>
<td>466</td>
</tr>
<tr>
<td>89024</td>
<td>1148 36.2 15.2</td>
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</tr>
<tr>
<td>89025</td>
<td>1429 36.2 15.2</td>
<td>15</td>
<td>767</td>
</tr>
</tbody>
</table>

**Reference numbers – LED Line AluFix LUGA 2015 – Optics Retail 1-SYM**
- Efficacy optics: 94%

<table>
<thead>
<tr>
<th>Type</th>
<th>Total length</th>
<th>89021 / 305 mm</th>
<th>89022 / 586 mm</th>
<th>89023 / 867 mm</th>
<th>89024 / 1148 mm</th>
<th>89025 / 1429 mm</th>
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</thead>
<tbody>
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**LED Line AluFix LUGA 2015 – Optics Retail 1-ASYM**

<table>
<thead>
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<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit pcs</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>89031</td>
<td>305 36.2 15.2</td>
<td>15</td>
<td>165</td>
</tr>
<tr>
<td>89032</td>
<td>586 36.2 15.2</td>
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<td>316</td>
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<tr>
<td>89033</td>
<td>867 36.2 15.2</td>
<td>15</td>
<td>466</td>
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<tr>
<td>89034</td>
<td>1148 36.2 15.2</td>
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<td>89035</td>
<td>1429 36.2 15.2</td>
<td>15</td>
<td>767</td>
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**Reference numbers – LED Line AluFix LUGA 2015 – Optics Retail 1-ASYM**
- Efficacy optics: 94%

<table>
<thead>
<tr>
<th>Type</th>
<th>Total length</th>
<th>89031 / 305 mm</th>
<th>89032 / 586 mm</th>
<th>89033 / 867 mm</th>
<th>89034 / 1148 mm</th>
<th>89035 / 1429 mm</th>
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</thead>
<tbody>
<tr>
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<td>558650</td>
<td>558653</td>
<td>558656</td>
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<tr>
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<td>558648</td>
<td>558651</td>
<td>558654</td>
<td>558657</td>
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<tr>
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<td>558652</td>
<td>558655</td>
<td>558658</td>
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</tr>
</tbody>
</table>

**Connection leads**
- 2-poles, ferrule on bare end of cores and AMP Micro Mate-N-LOK 1445022-2

<table>
<thead>
<tr>
<th>Lead length L</th>
<th>Ref. No.</th>
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<tr>
<td>100 mm</td>
<td>554285</td>
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<tr>
<td>200 mm</td>
<td>554286</td>
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<td>300 mm</td>
<td>554287</td>
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<tr>
<td>400 mm</td>
<td>554288</td>
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<tr>
<td>500 mm</td>
<td>554289</td>
</tr>
<tr>
<td>600 mm</td>
<td>554290</td>
</tr>
</tbody>
</table>
LED Line AluFix LUGA RX

Lighting modules with holder and cover
LED Line AluFix LUGA RX consists of an energy-efficient linear COB module, an aluminium holder and a clear cover or, alternatively, optics. The module was designed for integration into indoor luminaires providing direct or indirect light.

The light module is available with up to five pre-wired LUGA RX modules in lengths of 305 to 1429 mm.

The robust aluminium holder serves to optimise thermal management and is easy to attach using M3 screws. The clear or diffuse cover protects LED modules from environmental factors. The diffuse cover reduces glare and distributes light in a similar manner to a fluorescent lamp.

Enabling the kind of light distribution typically required in offices or shops, the optics versions facilitate luminaire designs that can do without an additional light guidance system. The high-quality optics consist of only one unit, regardless of its length, and therefore provide optimal protection for LED modules and ensure homogeneously illuminated surfaces without optical interruptions.

Technical notes
For one to five LUGA Line RX modules
On-board push terminal system: Electrical connection with lateral connection leads 28AWG
Allowed operating temperature at "t" point: -40 to 85 °C
Use of external LED constant-current drivers:
   for drivers with UOUT < 150 V DC
Efficiency up to 146 lm/W
Colour rendering index R_a > 80
Colour accuracy initially: 3 SDCM;
   after 50,000 hrs. operating time: 4 SDCM
Lumen maintenance L80/B10:
   55,000 hrs. (I_F 700 mA)

Typical applications
- Office and school lighting
- Retail lighting
- Industrial lighting
- For replacement of T5 and T8 lamps
**LED Line AluFix LUGA RX**

Optical characteristics of LUGA Line RX LED modules at $T_p = 65\, ^\circ\text{C}$ | The following efficiency levels can be achieved when using a cover: see data sheet

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of LEDs pcs.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Type. luminous flux and efficiency, typical voltage ($U_{\text{typ}}$) and power consumption ($P_e$)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$F_{\text{typ}}$ lm</td>
</tr>
<tr>
<td>305 mm</td>
<td>DML068C27FR</td>
<td>48</td>
<td>warm white</td>
<td>2700</td>
</tr>
<tr>
<td>305 mm</td>
<td>DML068C30FR</td>
<td>48</td>
<td>warm white</td>
<td>3000</td>
</tr>
<tr>
<td>305 mm</td>
<td>DML068C40FR</td>
<td>48</td>
<td>neutral white</td>
<td>4000</td>
</tr>
<tr>
<td>586 mm</td>
<td>DML068C27FR</td>
<td>2x48</td>
<td>warm white</td>
<td>2700</td>
</tr>
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<td>586 mm</td>
<td>DML068C30FR</td>
<td>2x48</td>
<td>warm white</td>
<td>3000</td>
</tr>
<tr>
<td>586 mm</td>
<td>DML068C40FR</td>
<td>2x48</td>
<td>neutral white</td>
<td>4000</td>
</tr>
<tr>
<td>867 mm</td>
<td>DML068C27FR</td>
<td>3x48</td>
<td>warm white</td>
<td>2700</td>
</tr>
<tr>
<td>867 mm</td>
<td>DML068C30FR</td>
<td>3x48</td>
<td>warm white</td>
<td>3000</td>
</tr>
<tr>
<td>867 mm</td>
<td>DML068C40FR</td>
<td>3x48</td>
<td>neutral white</td>
<td>4000</td>
</tr>
<tr>
<td>1148 mm</td>
<td>DML068C27FR</td>
<td>4x48</td>
<td>warm white</td>
<td>2700</td>
</tr>
<tr>
<td>1148 mm</td>
<td>DML068C30FR</td>
<td>4x48</td>
<td>warm white</td>
<td>3000</td>
</tr>
<tr>
<td>1148 mm</td>
<td>DML068C40FR</td>
<td>4x48</td>
<td>neutral white</td>
<td>4000</td>
</tr>
<tr>
<td>1429 mm</td>
<td>DML068C27FR</td>
<td>5x48</td>
<td>warm white</td>
<td>2700</td>
</tr>
<tr>
<td>1429 mm</td>
<td>DML068C30FR</td>
<td>5x48</td>
<td>warm white</td>
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<tr>
<td>1429 mm</td>
<td>DML068C40FR</td>
<td>5x48</td>
<td>neutral white</td>
<td>4000</td>
</tr>
</tbody>
</table>

* Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%
**LED Line AluFix LUGA RX**

**Technical notes**
- Material: Aluminium profile and PMMA cover
- Rear connection leads, lead length: 70 mm
- with 2-poles connector AMP Micro Mate-N-LOK 1445049-2
- Degree of protection: IP40
- Rear slots for screws M3
- Tightening torque: 0.5 Nm

**LED Line AluFix LUGA RX – Cover**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>89001</td>
<td>305 x 36.2 x 21.3</td>
<td>15 pcs</td>
<td>171</td>
</tr>
<tr>
<td>89002</td>
<td>586 x 36.2 x 21.3</td>
<td>15 pcs</td>
<td>330</td>
</tr>
<tr>
<td>89003</td>
<td>867 x 36.2 x 21.3</td>
<td>15 pcs</td>
<td>495</td>
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<td>89004</td>
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<td>89005</td>
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</table>

**Reference numbers – LED Line AluFix LUGA RX – Cover**
- The following efficiency levels can be achieved when using a cover: clear (97%), diffuse (90%)

<table>
<thead>
<tr>
<th>Type / Total length</th>
<th>89001 / 305 mm</th>
<th>89002 / 586 mm</th>
<th>89003 / 867 mm</th>
<th>89004 / 1148 mm</th>
<th>89005 / 1429 mm</th>
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</thead>
<tbody>
<tr>
<td>Cover Clear</td>
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<td>561400</td>
<td>561409</td>
<td>561427</td>
<td>561436</td>
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<tr>
<td>Diffuse Clear</td>
<td>561418</td>
<td>561426</td>
<td>561436</td>
<td>561445</td>
<td>561446</td>
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<tr>
<td>Diffuse Diffuse</td>
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<td>561454</td>
<td>561463</td>
<td>561467</td>
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**LED Line AluFix LUGA RX – Optics Office**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>89011</td>
<td>305 x 36.2 x 15.2</td>
<td>15 pcs</td>
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</tr>
<tr>
<td>89012</td>
<td>586 x 36.2 x 15.2</td>
<td>15 pcs</td>
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</tr>
<tr>
<td>89013</td>
<td>867 x 36.2 x 15.2</td>
<td>15 pcs</td>
<td>466</td>
</tr>
<tr>
<td>89014</td>
<td>1148 x 36.2 x 15.2</td>
<td>15 pcs</td>
<td>617</td>
</tr>
<tr>
<td>89015</td>
<td>1429 x 36.2 x 15.2</td>
<td>15 pcs</td>
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</tr>
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</table>

**Reference numbers – LED Line AluFix LUGA RX – Optics Office**
- Efficiency optics: 94%

<table>
<thead>
<tr>
<th>Type / Total length</th>
<th>89011 / 305 mm</th>
<th>89012 / 586 mm</th>
<th>89013 / 867 mm</th>
<th>89014 / 1148 mm</th>
<th>89015 / 1429 mm</th>
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<tr>
<td>DML068C27FR</td>
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<td>DML068C40FR</td>
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**LEDLine AluFix LUGA RX**

**Technical notes**
- Material: Aluminium profile and PMMA cover
- Rear connection leads, lead length: 70 mm
- with 2-poles connector AMP Micro Mate-N-LOK 1445049-2
- Degree of protection: IP40
- Rear slots for screws M3
- Tightening torque: 0.5 Nm

**LED Line AluFix LUGA RX – Optics Retail 1-SYM**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit</th>
<th>Weight</th>
<th>g</th>
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<tbody>
<tr>
<td>89021</td>
<td>305 36.2 15.2</td>
<td>15</td>
<td>165</td>
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</tr>
<tr>
<td>89022</td>
<td>586 36.2 15.2</td>
<td>15</td>
<td>316</td>
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</tr>
<tr>
<td>89023</td>
<td>867 36.2 15.2</td>
<td>15</td>
<td>466</td>
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<tr>
<td>89024</td>
<td>1148 36.2 15.2</td>
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<td>617</td>
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<tr>
<td>89025</td>
<td>1429 36.2 15.2</td>
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**Reference numbers – LEDLine AluFix LUGA RX – Optics Retail 1-SYM**

<table>
<thead>
<tr>
<th>Type</th>
<th>Total length</th>
<th>89021 / 305 mm</th>
<th>89022 / 586 mm</th>
<th>89023 / 867 mm</th>
<th>89024 / 1148 mm</th>
<th>89025 / 1429 mm</th>
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**LED Line AluFix LUGA RX – Optics Retail 1-ASYM**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit</th>
<th>Weight</th>
<th>g</th>
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<tbody>
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<tr>
<td>89032</td>
<td>586 36.2 15.2</td>
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<tr>
<td>89033</td>
<td>867 36.2 15.2</td>
<td>15</td>
<td>466</td>
<td></td>
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<tr>
<td>89034</td>
<td>1148 36.2 15.2</td>
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</tr>
<tr>
<td>89035</td>
<td>1429 36.2 15.2</td>
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<td>767</td>
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</tr>
</tbody>
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**Reference numbers – LEDLine AluFix LUGA RX – Optics Retail 1-ASYM**

<table>
<thead>
<tr>
<th>Type</th>
<th>Total length</th>
<th>89031 / 305 mm</th>
<th>89032 / 586 mm</th>
<th>89033 / 867 mm</th>
<th>89034 / 1148 mm</th>
<th>89035 / 1429 mm</th>
</tr>
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<tr>
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LED Line AluFix SMD

Lighting modules with holder and cover
LED Line AluFix SMD consists of an energy-efficient linear SMD module, an aluminium holder and a clear or diffuse cover. The module was designed for integration into indoor luminaires providing direct or indirect light.

The light module is available with up to five pre-wired SMD modules in lengths of 305 to 1429 mm and is thus an ideal component for LED lighting strips.

The robust aluminium holder serves to optimise thermal management and is easy to attach using M3 screws. The clear or diffuse cover protects LED modules from environmental factors.

The diffuse cover reduces glare and distributes light in a similar manner to a fluorescent lamp.

Typical applications
- Office and school lighting
- Retail lighting
- Industrial lighting
- For replacement of T5 and T8 lamps

Optical characteristics
at $t_p = 50 \, ^\circ\text{C}$ | The following efficiency levels can be achieved when using a cover: clear (97%), diffuse (90%)

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of LEDs</th>
<th>Colour</th>
<th>Correlated colour temperature</th>
<th>350 mA Typ.</th>
<th>500 mA Typ.</th>
<th>700 mA Typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pcs</td>
<td></td>
<td></td>
<td>lm/W</td>
<td>lm/W</td>
<td>lm/W</td>
</tr>
<tr>
<td>305 mm (1 SMD module 280 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AluFixSMD/305/30</td>
<td>1x30</td>
<td>warm white</td>
<td>3000</td>
<td>243</td>
<td>132</td>
<td>139</td>
</tr>
<tr>
<td>AluFixSMD/305/40</td>
<td>1x30</td>
<td>neutral white</td>
<td>4000</td>
<td>815</td>
<td>166</td>
<td>1105</td>
</tr>
<tr>
<td>586 mm (1 SMD module 560 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AluFixSMD/586/30</td>
<td>2x30</td>
<td>warm white</td>
<td>3000</td>
<td>495</td>
<td>131</td>
<td>2030</td>
</tr>
<tr>
<td>AluFixSMD/586/40</td>
<td>2x30</td>
<td>neutral white</td>
<td>4000</td>
<td>1630</td>
<td>165</td>
<td>2210</td>
</tr>
<tr>
<td>867 mm (2 wired SMD modules 1x560 mm + 1x280 mm per aluminium profile)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AluFixSMD/867/30</td>
<td>3x30</td>
<td>warm white</td>
<td>3000</td>
<td>2240</td>
<td>131</td>
<td>3045</td>
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<tr>
<td>AluFixSMD/867/40</td>
<td>3x30</td>
<td>neutral white</td>
<td>4000</td>
<td>2445</td>
<td>165</td>
<td>3315</td>
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<tr>
<td>1148 mm (2 wired SMD modules 560 mm per aluminium profile)</td>
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<tr>
<td>AluFixSMD/1148/30</td>
<td>4x30</td>
<td>warm white</td>
<td>3000</td>
<td>2990</td>
<td>131</td>
<td>4060</td>
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<tr>
<td>AluFixSMD/1148/40</td>
<td>4x30</td>
<td>neutral white</td>
<td>4000</td>
<td>2260</td>
<td>165</td>
<td>4420</td>
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<td>1429 mm (2 wired SMD modules 2x560 mm + 1x280 mm per aluminium profile)</td>
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<tr>
<td>AluFixSMD/1429/30</td>
<td>5x30</td>
<td>warm white</td>
<td>3000</td>
<td>2735</td>
<td>131</td>
<td>5075</td>
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<tr>
<td>AluFixSMD/1429/40</td>
<td>5x30</td>
<td>neutral white</td>
<td>4000</td>
<td>4075</td>
<td>165</td>
<td>5525</td>
</tr>
</tbody>
</table>

* Measurement tolerance of luminous flux ±7%

Technical notes
Allowed operating temperature at $t_p$ point:
-20 to 75 °C
Use of external LED constant-current drivers:
- for driver with $U_{OUT} < 250 \, \text{V DC}$
Efficiency up to 166 lm/W
Colour rendering index $R_\text{a}$ min. 80
Colour accuracy: 3 SDCM
Lumen maintenance L80/B10 > 60,000 hrs. (If 700 mA, $t_p = 50 \, ^\circ\text{C}$)

Further shapes and optics on request.

Constant-current System – Linear

Technical notes

- Allowed operating temperature at $t_p$ point:
  -20 to 75 °C
- Use of external LED constant-current drivers:
  - for driver with $U_{OUT} < 250 \, \text{V DC}$
- Efficiency up to 166 lm/W
- Colour rendering index $R_\text{a}$ min. 80
- Colour accuracy: 3 SDCM
- Lumen maintenance L80/B10 > 60,000 hrs. (If 700 mA, $t_p = 50 \, ^\circ\text{C}$)

Further shapes and optics on request.
LED Line AluFix SMD – Cover

Technical notes LED Line AluFix SMD – Cover
Material: Aluminium profile and PMMA cover
Rear connection leads: Cu tinned, single-core
0.32 mm² (AWG22), PVC-insulation, red and black, notched lead ends, lead length: L + 80 mm
Degree of protection: IP40
Rear slots for screws M3
Tightening torque: 0.5 Nm

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions [LxWxH] in mm</th>
<th>Packaging unit</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>89001</td>
<td>305 36.2 21.3</td>
<td>15 pcs.</td>
<td>171 g</td>
</tr>
<tr>
<td>89002</td>
<td>586 36.2 21.3</td>
<td>15 pcs.</td>
<td>330 g</td>
</tr>
<tr>
<td>89003</td>
<td>867 36.2 21.3</td>
<td>15 pcs.</td>
<td>495 g</td>
</tr>
<tr>
<td>89004</td>
<td>1148 36.2 21.3</td>
<td>15 pcs.</td>
<td>650 g</td>
</tr>
<tr>
<td>89005</td>
<td>1429 36.2 21.3</td>
<td>15 pcs.</td>
<td>815 g</td>
</tr>
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</table>

Reference numbers – LED Line AluFix SMD – Cover

<table>
<thead>
<tr>
<th>Type / Total length</th>
<th>89001 / 305 mm</th>
<th>89002 / 586 mm</th>
<th>89003 / 867 mm</th>
<th>89004 / 1148 mm</th>
<th>89005 / 1429 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover</td>
<td>Clear</td>
<td>Diffuse</td>
<td>Clear</td>
<td>Diffuse</td>
<td>Clear</td>
</tr>
<tr>
<td>SMD56/30/280</td>
<td>557856</td>
<td>557820</td>
<td>557858</td>
<td>557822</td>
<td>557860</td>
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<td>557862</td>
<td>557826</td>
<td>557864</td>
<td>557828</td>
<td></td>
</tr>
<tr>
<td>SMD56/40/280</td>
<td>557857</td>
<td>557821</td>
<td>557859</td>
<td>557823</td>
<td>557861</td>
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<td>557863</td>
<td>557827</td>
<td>557865</td>
<td>557829</td>
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</tr>
</tbody>
</table>
LED Line AluFix SMD
Gen. 2 – Cover

Lighting modules with holder and cover
LED Line AluFix SMD consists of an energy-efficient linear SMD module, an aluminium holder and a clear or diffuse cover. The module was designed for integration into indoor luminaires providing direct or indirect light.

The light module is available with up to five pre-wired SMD modules in lengths of 305 to 1429 mm and is thus an ideal component for LED lighting strips.

The robust aluminium holder serves to optimise thermal management and is easy to attach using M3 screws. The clear or diffuse cover protects LED modules from environmental factors.

The diffuse cover reduces glare and distributes light in a similar manner to a fluorescent lamp.

Typical applications
• Office and school lighting
• Retail lighting
• Industrial lighting
• For replacement of T5 and T8 lamps

Optical characteristics
at \( t_p = 50 \degree \) C | The following efficiency levels can be achieved when using a cover: clear (97%), diffuse (90%)

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of SMDs</th>
<th>Colour</th>
<th>Correlated colour temperature ( K )</th>
<th>Typ. luminous flux* and efficiency, typ. voltage ( U_{typ} ) and power consumption ( P_{el} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>305 mm (1 SMD module 280 mm)</td>
<td>1x30</td>
<td>warm white</td>
<td>3000</td>
<td>( P_u = 4.9 ) W ( U_{typ} = 13.9 ) V ( P_{el} = 7.2 ) W ( U_{typ} = 14.4 ) V ( P_{el} = 10.5 ) W ( U_{typ} = 15 ) V</td>
</tr>
<tr>
<td>AluFixSMD / 305 / 30</td>
<td>500</td>
<td>890</td>
<td>255</td>
<td>174</td>
</tr>
<tr>
<td>AluFixSMD / 305 / 40</td>
<td>650</td>
<td>860</td>
<td>205</td>
<td>168</td>
</tr>
<tr>
<td>586 mm (1 SMD module 560 mm)</td>
<td>1x60</td>
<td>warm white</td>
<td>3000</td>
<td>( P_u = 9.8 ) W ( U_{typ} = 27.9 ) V ( P_{el} = 14.4 ) W ( U_{typ} = 28.8 ) V ( P_{el} = 20.9 ) W ( U_{typ} = 29.9 ) V</td>
</tr>
<tr>
<td>AluFixSMD / 586 / 30</td>
<td>400</td>
<td>820</td>
<td>168</td>
<td>150</td>
</tr>
<tr>
<td>AluFixSMD / 586 / 40</td>
<td>500</td>
<td>890</td>
<td>183</td>
<td>174</td>
</tr>
<tr>
<td>AluFixSMD / 586 / 50</td>
<td>650</td>
<td>860</td>
<td>205</td>
<td>168</td>
</tr>
<tr>
<td>867 mm (2 wired SMD modules 1x280 mm + 1x560 mm per aluminium profile)</td>
<td>1x30 + 1x60</td>
<td>warm white</td>
<td>3000</td>
<td>( P_u = 14.7 ) W ( U_{typ} = 41.8 ) V ( P_{el} = 21.6 ) W ( U_{typ} = 43.2 ) V ( P_{el} = 31.4 ) W ( U_{typ} = 44.9 ) V</td>
</tr>
<tr>
<td>AluFixSMD / 867 / 30</td>
<td>400</td>
<td>820</td>
<td>168</td>
<td>150</td>
</tr>
<tr>
<td>AluFixSMD / 867 / 40</td>
<td>500</td>
<td>890</td>
<td>183</td>
<td>174</td>
</tr>
<tr>
<td>AluFixSMD / 867 / 50</td>
<td>650</td>
<td>860</td>
<td>205</td>
<td>168</td>
</tr>
</tbody>
</table>

* Measurement tolerance of luminous flux ±7%
## LED Line AluFix SMD Gen. 2 – Cover

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of LEDs</th>
<th>Colour</th>
<th>Correlated colour temperature (K)</th>
<th>Typ. luminous flux* and efficiency, typ. voltage ((U_{\text{typ}})) and power consumption ((P_e))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1148 mm</td>
<td>2x60</td>
<td>warm white</td>
<td>3000</td>
<td>(P_e = 19.6) W  (U_{\text{typ}} = 55.8) V  (P_{el} = 41.8) W  (U_{\text{typ}} = 59.8) V</td>
</tr>
<tr>
<td>1148 mm</td>
<td>2x60</td>
<td>neutral white</td>
<td>4000</td>
<td>(P_e = 17.8) W  (U_{\text{typ}} = 49.0) V  (P_{el} = 38.0) W  (U_{\text{typ}} = 42.0) V</td>
</tr>
<tr>
<td>1148 mm</td>
<td>2x60</td>
<td>neutral white</td>
<td>5000</td>
<td>(P_e = 15.0) W  (U_{\text{typ}} = 41.0) V  (P_{el} = 30.0) W  (U_{\text{typ}} = 35.0) V</td>
</tr>
<tr>
<td>1148 mm</td>
<td>3x60</td>
<td>cool white</td>
<td>6500</td>
<td>(P_e = 24.5) W  (U_{\text{typ}} = 59.7) V  (P_{el} = 52.3) W  (U_{\text{typ}} = 74.8) V</td>
</tr>
<tr>
<td>1429 mm</td>
<td>1x30 + 2x60</td>
<td>warm white</td>
<td>3000</td>
<td>(P_e = 9.7) W  (U_{\text{typ}} = 27.8) V  (P_{el} = 14.3) W  (U_{\text{typ}} = 35.6) V</td>
</tr>
<tr>
<td>1429 mm</td>
<td>1x30 + 2x60</td>
<td>neutral white</td>
<td>2910</td>
<td>(P_e = 16.0) W  (U_{\text{typ}} = 54.6) V  (P_{el} = 28.6) W  (U_{\text{typ}} = 71.0) V</td>
</tr>
<tr>
<td>1429 mm</td>
<td>1x30 + 2x60</td>
<td>neutral white</td>
<td>4000</td>
<td>(P_e = 15.0) W  (U_{\text{typ}} = 54.0) V  (P_{el} = 28.0) W  (U_{\text{typ}} = 71.0) V</td>
</tr>
<tr>
<td>1429 mm</td>
<td>1x30 + 2x60</td>
<td>neutral white</td>
<td>5000</td>
<td>(P_e = 15.0) W  (U_{\text{typ}} = 54.0) V  (P_{el} = 28.0) W  (U_{\text{typ}} = 71.0) V</td>
</tr>
<tr>
<td>1429 mm</td>
<td>1x30 + 2x60</td>
<td>cool white</td>
<td>6500</td>
<td>(P_e = 29.2) W  (U_{\text{typ}} = 83.4) V  (P_{el} = 42.9) W  (U_{\text{typ}} = 88.8) V</td>
</tr>
<tr>
<td>1148 mm</td>
<td>2x60</td>
<td>warm white</td>
<td>3000</td>
<td>(P_e = 39.7) W  (U_{\text{typ}} = 111.2) V  (P_{el} = 72.0) W  (U_{\text{typ}} = 118.4) V</td>
</tr>
<tr>
<td>1148 mm</td>
<td>2x60</td>
<td>neutral white</td>
<td>4000</td>
<td>(P_e = 39.7) W  (U_{\text{typ}} = 111.2) V  (P_{el} = 72.0) W  (U_{\text{typ}} = 118.4) V</td>
</tr>
<tr>
<td>1148 mm</td>
<td>2x60</td>
<td>neutral white</td>
<td>5000</td>
<td>(P_e = 39.7) W  (U_{\text{typ}} = 111.2) V  (P_{el} = 72.0) W  (U_{\text{typ}} = 118.4) V</td>
</tr>
<tr>
<td>1148 mm</td>
<td>3x60</td>
<td>cool white</td>
<td>6500</td>
<td>(P_e = 48.7) W  (U_{\text{typ}} = 139.0) V  (P_{el} = 72.2) W  (U_{\text{typ}} = 148.0) V</td>
</tr>
</tbody>
</table>

* Measurement tolerance of luminous flux: ±7%
LED Line AluFix SMD Gen. 2 – Cover

Technical notes
LED Line AluFix SMD Gen. 2 – Cover
Material: Aluminium profile and PMMA cover
Rear connection leads: Cu tinned, single-core
0.32 mm² (AWG22), PVC insulation, red and black, notched lead ends, lead length: L + 80 mm
Degree of protection: IP40
Rear slots for screws M3
Tightening torque: 0.5 Nm

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (LxWxH) in mm</th>
<th>Packaging unit (pcs.)</th>
<th>Weight g</th>
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<tr>
<td>89001</td>
<td>305 x 36.2 x 21.3</td>
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<td>171</td>
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<td>89002</td>
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<td>330</td>
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<tr>
<td>89003</td>
<td>867 x 36.2 x 21.3</td>
<td>15</td>
<td>495</td>
</tr>
<tr>
<td>89004</td>
<td>1148 x 36.2 x 21.3</td>
<td>15</td>
<td>550</td>
</tr>
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<td>89005</td>
<td>1429 x 36.2 x 21.3</td>
<td>15</td>
<td>815</td>
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</table>

Reference numbers – LED Line AluFix SMD Gen. 2 – Cover

<table>
<thead>
<tr>
<th>Type / Total length</th>
<th>89001 / 305 mm</th>
<th>89002 / 586 mm</th>
<th>89003 / 867 mm</th>
<th>89004 / 1148 mm</th>
<th>89005 / 1429 mm</th>
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<tr>
<td>Cover</td>
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<td>Clear</td>
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For LED Line AluFix SMD Gen. 2 – Cover

<table>
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<tr>
<th>For LED Line AluFix SMD Gen. 2 – Cover – High Brightness</th>
<th>3000K</th>
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<th>6000K</th>
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</tbody>
</table>
LED Line SMD LightBar

LED built-in module
The new SMD LightBar modules constitute a highly effective SMD solution. Available in sets of six, the new modules are particularly suitable for installation in louvered luminaires (600x600 mm).

The SMD LightBar modules come in various shades of white and with a set of 6 leads (Ref. No. 559935) for easy, low-cost and solder-free connection. All six connectors must be attached (in series) to modules.

Technical notes
Dimensions: 520x17 mm
Driving current: up to 300 mA

Typical applications
Built-in luminaires/general illumination:
• Office lighting
• Retail lighting
• T5/T8 replacement as built-in module
• Furniture lighting

Connection lead
Lead with 6 plugs (connected in series)
Lead: UL 1007 22AWG 1C Red / White
JST-PH-3PIN Serial MINI JST PH 3pin Male
Lead length (L): 1325 mm
Lead ends, tinned, 10 mm
All connectors must be attached to modules.
Type: 89520
Ref. No.: 559935

Connection assembly

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>No. of LEDs pcs.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and efficiency, typ. voltage (U_{typ}) and power consumption (P_{el}) at 300 mA [lm/W]</th>
<th>Typ. beam angle *°</th>
<th>CRI Ra min.</th>
<th>typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>89520</td>
<td>559932</td>
<td>7</td>
<td>warm white</td>
<td>3000</td>
<td>595</td>
<td>0°–180°</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>89520</td>
<td>559933</td>
<td>7</td>
<td>neutral white</td>
<td>4000</td>
<td>630</td>
<td>90°–270°</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>89520</td>
<td>557990</td>
<td>7</td>
<td>cool white</td>
<td>5700</td>
<td>665</td>
<td>145</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>89520</td>
<td>559509</td>
<td>7</td>
<td>cool white</td>
<td>5700</td>
<td>700</td>
<td>145</td>
<td>80</td>
<td>85</td>
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<tr>
<td>89520</td>
<td>559934</td>
<td>7</td>
<td>cool white</td>
<td>11000</td>
<td>520</td>
<td>145</td>
<td>70</td>
<td>75</td>
</tr>
</tbody>
</table>

* Measurement tolerance of luminous flux: ±10% | Min. CRI Ra > 70 / > 80
LED Light Panel SMD
250 x 250

Built-in lighting modules
The new LED light panels are a highly effective SMD solution for producing very homogeneous, widely distributed light. They are particularly suitable for integration in louvered luminaires (600 x 600 mm).

These LED SMD modules are available in various shades of white and permit easy, cost-effective and solder-free connection using push-in connectors.

Technical notes
Dimensions: 249 x 249 mm
On-board push-in terminals
Fixing holes: Ø 4.5 mm
Use of external LED constant-current drivers
Efficiency up to 190 lm/W
Colour rendering index Ra, typ. 85
Lumen maintenance L80/B10:
up to 60,000 hrs. (Ir 350 mA, Tp = 70 °C)
Packaging unit: 50 pcs.

Typical applications
• Office lighting
• Retail lighting
• T5/T8 replacement as built-in module
• Furniture lighting
• Backlighting for advertising

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>350 mA min. typ. m/W</td>
<td>500 mA min. typ. m/W</td>
<td>700 mA min. typ. m/W</td>
<td>Pw = 7.1 - 8.5 W</td>
</tr>
<tr>
<td>WUMS20-830</td>
<td>559648</td>
<td>warm white</td>
<td>3000 - 85/130</td>
<td>1160</td>
<td>1260</td>
<td>167</td>
<td>1630</td>
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<td>WUMS20-840</td>
<td>558905</td>
<td>neutral white</td>
<td>4000 - 160/118</td>
<td>1210</td>
<td>1320</td>
<td>174</td>
<td>1700</td>
</tr>
<tr>
<td>WUMS20-850</td>
<td>559649</td>
<td>neutral white</td>
<td>5000 - 125/153</td>
<td>1260</td>
<td>1440</td>
<td>190</td>
<td>1770</td>
</tr>
<tr>
<td>WUMS20-865</td>
<td>559650</td>
<td>cool white</td>
<td>6500 - 165/220</td>
<td>1260</td>
<td>1385</td>
<td>183</td>
<td>1770</td>
</tr>
</tbody>
</table>

Emission data at Tp = 50 °C | Products under development; preliminary technical datas | * Measurement tolerance: ±7%
LED Light Panel SMD
270 x 270

Built-in lighting modules
The new LED light panels are a highly effective SMD solution for producing very homogeneous, widely distributed light. They are particularly suitable for integration in louvered luminaires (600 x 600 mm).

These LED SMD modules are available in various shades of white and permit easy, cost-effective and solder-free connection using push-in connectors.

Technical notes
Dimensions: 269 x 269 mm
On-board push-in terminals
Fixing holes: Ø 4.5 mm
Use of external LED constant-current drivers
Efficiency up to 190 lm/W
Colour rendering index Ra typ. 85
Lumen maintenance L80/B10 up to 60,000 hrs. (Ir 350 mA, tp = 70 °C)
Packaging unit: 50 pcs.

Typical applications
• Office lighting
• Retail lighting
• T5/T8 replacement as builtin module
• Furniture lighting
• Backlighting for advertising

### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Colour temperature K</th>
<th>Luminous flux* and typ. efficiency*, voltage [U] and power consumption [Pel]</th>
<th>Typ. beam angle</th>
<th>CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fd = 7.1–8.5 W</td>
<td>1160</td>
<td>1260</td>
</tr>
<tr>
<td>WUM37830</td>
<td>561098</td>
<td>warm white</td>
<td>3000</td>
<td>–80/+130</td>
<td>204</td>
<td>21.4</td>
</tr>
<tr>
<td></td>
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<td>Fd = 10.5–12.5 W</td>
<td>1210</td>
<td>1320</td>
</tr>
<tr>
<td>WUM37840</td>
<td>561099</td>
<td>neutral white</td>
<td>4000</td>
<td>–160/+115</td>
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<td>WUM37850</td>
<td>561100</td>
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<td>5000</td>
<td>–125/+155</td>
<td>1260</td>
<td>1385</td>
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<tr>
<td>WUM37865</td>
<td>561101</td>
<td>cool white</td>
<td>6500</td>
<td>–165/+250</td>
<td>1260</td>
<td>1385</td>
</tr>
</tbody>
</table>

*Measurement tolerance: ±7%
LUGA Shop 2015 PCB – 1000 lm to 8000 lm

Built-in lighting modules
This PCB version of the LUGA Shop 2015 series provides the option of simply replacing LED modules within their holder.

Simple and secure attachment is enabled with separate holders (see page 53).

Technical notes
Dimensions: 19 x 19 mm, 28 x 28 mm
Light emitting surface (LES): Ø 14 mm, Ø 17 mm, Ø 20 mm
Beam angle: 120°
Allowed operating temperature at tc point:
-40 to 80 °C
Use of external LED constant current driver
Efficiency up to 175 lm/W
Colour rendering index R0, typ. > 70 / > 80 / > 90
Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM
Lumen maintenance L90/B10:
> 52,000 hrs. (If 700 mA, tc = 65 °C)
Packaging unit: 175 pcs. (DMS099),
100 pcs. (DMS120/DMS150)

Typical applications
Integration in
• Reflector luminaires
• Flat surface-mounting luminaires
• Cladding illumination
• Suspended luminaire with external control gear
For use in
• Retail lighting
• Furniture lighting
• Stairway and corridor illumination

DMS099***F

DMS120***F

DMS150***F
LUGA Shop 2015 PCB – 1000 lm to 8000 lm

Characteristics
- Optimized for retail and furniture illumination
- CRI 70 version for industrial and outdoor lighting
- Highly efficient: up to 175 lm/W

LUGA Shop 2015 PCB – CRI Ra > 80 (70)

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature* (K)</th>
<th>Typ. luminous flux and efficiency, typ. voltage (U typ.) and power consumption (P el)** Typ.</th>
</tr>
</thead>
</table>
| DMS099C    | 558922   | warm white   | 2700                                | P typ. = 8.7 W
                                                        | U typ. = 24.7 V |
|            | 558921   | warm white   | 3000                                | P typ. = 12.6 W
                                                        | U typ. = 25.3 V |
|            | 558923   | neutral white| 3500                                | P typ. = 18.1 W
                                                        | U typ. = 25.8 V |
|            | 558924   | neutral white| 3500 [Below BBL]                    | P typ. = 28 W
                                                        | U typ. = 26.7 V |
|            | 558925   | neutral white| 4000                                | P typ. = 38.1 W
                                                        | U typ. = 27.3 V |
| DMS120C / DMS120B | 558932 | warm white | 2700                                | P typ. = 11.5 W
                                                        | U typ. = 32.9 V |
|            | 558933 | neutral white| 3500                                | P typ. = 14.4 W
                                                        | U typ. = 41.1 V |
|            | 558934 | neutral white| 4000 [Below BBL]                    | P typ. = 20.9 W
                                                        | U typ. = 41.8 V |
|            | 558935 | neutral white| 5000 [Below BBL]                    | P typ. = 29.9 W
                                                        | U typ. = 42.7 V |
| DMS150C / DMS150B | 558937 | cool white   | 5000                                | P typ. = 44.6 W
                                                        | U typ. = 44.2 V |
|            | 558938 | cool white   | 5000 [Below BBL]                    | P typ. = 63 W
                                                        | U typ. = 45 V |
|            | 558939 | cool white   | 5000                                | P typ. = 63 W
                                                        | U typ. = 45 V |

Emission data at t_p = 65 °C

* Colour tolerance: 3 MacAdam
** Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%
### LUGA Shop 2015 PCB HiCRI – 1000 lm to 8000 lm

**Characteristics**

- Typ. colour rendering index (CRI): $R_a > 90$

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature* (K)</th>
<th>Typ. luminous flux and efficiency, typ. voltage ($U_{typ}$) and power consumption ($P_{el}$)**</th>
<th>Typ. CRI $R_a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMS099S**F</td>
<td></td>
<td></td>
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<td>$P_{el} = 8.7 \text{ W}$ $U_{typ} = 24.7 \text{ V}$ $P_{el} = 12.6 \text{ W}$ $U_{typ} = 25.8 \text{ V}$ $P_{el} = 18.1 \text{ W}$ $U_{typ} = 25.8 \text{ V}$ $P_{el} = 28 \text{ W}$ $U_{typ} = 26.7 \text{ V}$ $P_{el} = 38.1 \text{ W}$ $U_{typ} = 27.3 \text{ V}$</td>
<td></td>
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<tr>
<td>DMS099S27F</td>
<td>558928</td>
<td>warm white</td>
<td>2700 [below BBL]</td>
<td>$970$ $111$ $1365$ $108$ $1835$ $101$ $2565$ $92$ $3185$ $84$ $95$</td>
<td></td>
</tr>
<tr>
<td>DMS099S30F</td>
<td>558929</td>
<td>warm white</td>
<td>3000 [below BBL]</td>
<td>$1040$ $120$ $1460$ $116$ $1965$ $109$ $2755$ $98$ $3415$ $90$ $95$</td>
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</tr>
<tr>
<td>DMS099S33F</td>
<td>558930</td>
<td>neutral white</td>
<td>3500 [below BBL]</td>
<td>$1105$ $127$ $1560$ $124$ $2090$ $115$ $2930$ $105$ $3630$ $95$ $95$</td>
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<tr>
<td>DMS099S40F</td>
<td>558931</td>
<td>neutral white</td>
<td>4000 [below BBL]</td>
<td>$1145$ $132$ $1615$ $128$ $2165$ $120$ $3035$ $108$ $3750$ $98$ $95$</td>
<td></td>
</tr>
<tr>
<td>DMS120S**F</td>
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<td>$P_{el} = 11.5 \text{ W}$ $U_{typ} = 32.9 \text{ V}$ $P_{el} = 16.7 \text{ W}$ $U_{typ} = 34.1 \text{ V}$ $P_{el} = 23.9 \text{ W}$ $U_{typ} = 34.1 \text{ V}$ $P_{el} = 37 \text{ W}$ $U_{typ} = 35.3 \text{ V}$ $P_{el} = 50.4 \text{ W}$ $U_{typ} = 36.3 \text{ V}$</td>
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<tr>
<td>DMS120S27F</td>
<td>558938</td>
<td>warm white</td>
<td>2700 [below BBL]</td>
<td>$1345$ $117$ $1860$ $111$ $2500$ $105$ $3500$ $95$ $4315$ $86$ $95$</td>
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<td>DMS120S30F</td>
<td>558940</td>
<td>warm white</td>
<td>3000 [below BBL]</td>
<td>$1445$ $126$ $1995$ $119$ $2685$ $112$ $3755$ $101$ $4635$ $92$ $95$</td>
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<tr>
<td>DMS120S35F</td>
<td>558941</td>
<td>neutral white</td>
<td>3500 [below BBL]</td>
<td>$1535$ $133$ $2120$ $127$ $2855$ $119$ $3985$ $108$ $4915$ $98$ $95$</td>
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<tr>
<td>DMS120S40F</td>
<td>558942</td>
<td>neutral white</td>
<td>4000 [below BBL]</td>
<td>$1590$ $138$ $2190$ $131$ $2950$ $123$ $4120$ $111$ $5095$ $101$ $95$</td>
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<tr>
<td>DMS150S**F</td>
<td></td>
<td></td>
<td></td>
<td>$P_{el} = 14.4 \text{ W}$ $U_{typ} = 41.1 \text{ V}$ $P_{el} = 20.9 \text{ W}$ $U_{typ} = 42.7 \text{ V}$ $P_{el} = 29.9 \text{ W}$ $U_{typ} = 42.7 \text{ V}$ $P_{el} = 46.4 \text{ W}$ $U_{typ} = 44.2 \text{ V}$ $P_{el} = 63 \text{ W}$ $U_{typ} = 45.5 \text{ V}$</td>
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<tr>
<td>DMS150S27F</td>
<td>558949</td>
<td>warm white</td>
<td>2700 [below BBL]</td>
<td>$1715$ $119$ $2370$ $113$ $3195$ $107$ $4515$ $97$ $5590$ $89$ $95$</td>
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<tr>
<td>DMS150S30F</td>
<td>558239</td>
<td>warm white</td>
<td>3000 [below BBL]</td>
<td>$1835$ $127$ $2545$ $122$ $3430$ $115$ $4850$ $105$ $5995$ $95$ $95$</td>
<td></td>
</tr>
<tr>
<td>DMS150S35F</td>
<td>558950</td>
<td>neutral white</td>
<td>3500 [below BBL]</td>
<td>$1955$ $136$ $2705$ $129$ $3645$ $122$ $5140$ $111$ $6375$ $101$ $95$</td>
<td></td>
</tr>
<tr>
<td>DMS150S40F</td>
<td>558951</td>
<td>neutral white</td>
<td>4000 [below BBL]</td>
<td>$2020$ $140$ $2800$ $134$ $3775$ $126$ $5320$ $115$ $6585$ $105$ $95$</td>
<td></td>
</tr>
</tbody>
</table>

* Emission data at $t_p = 65 ^\circ C$  
* Colour tolerance: 3 MacAdam  
** Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%  
Min. CRI $R_a > 90$
LUGA Shop 2015 PCB – Pearl White

Characteristics
• Brilliant white light
• For retail lighting, especially fashion lighting
• Similar colour impression like C-HI lamps
• Highly efficient: up to 131 lm/W

LUGA Shop 2015 PCB – Pearl White – CRI Ra > 90

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature* [°C]</th>
<th>Typ. luminous flux and efficiency and typ. voltage (Utyp.) and power consumption (Pel)** Typ. CRI</th>
<th>Typical applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Pel = 8.7 W, Utyp. = 24.7 V</td>
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<td>DMS099S31FP</td>
<td>558233</td>
<td>pearl white</td>
<td>3100</td>
<td>Pel = 11.5 W, Utyp. = 32.9 V</td>
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<tr>
<td>DMS120S31FP</td>
<td>558236</td>
<td>pearl white</td>
<td>3100</td>
<td>Pel = 14.4 W, Utyp. = 41.1 V</td>
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<tr>
<td>DMS150S31FP</td>
<td>558240</td>
<td>pearl white</td>
<td>3100</td>
<td>Pel = 14.4 W, Utyp. = 41.8 V</td>
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</table>

Emission data at t_p = 65 °C | Colour tolerance: 3 MacAdam | Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10% | Min. CRI Ra > 90

LUGA Shop 2015 PCB – FOOD

Characteristics
• Optimized for use in all retail areas - especially for fresh food (bread, fruits, vegetables, meat)

LUGA Shop FOOD

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature* [°C]</th>
<th>Typ. luminous flux and efficiency, typical voltage (Utyp.) and power consumption (Pel)** Typ. CRI</th>
<th>Typical applications</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Pel = 29.9 W, Utyp. = 42.7 V</td>
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<tr>
<td>DMS150G35F</td>
<td>558952</td>
<td>warm white</td>
<td>3000</td>
<td>Pel = 45.4 W, Utyp. = 44.2 V</td>
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<tr>
<td>DMS150G45F</td>
<td>558953</td>
<td>neutral white</td>
<td>4000</td>
<td>Pel = 63 W, Utyp. = 45 V</td>
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<tr>
<td>DMS150P19F</td>
<td>558954</td>
<td>“pink effect”</td>
<td>2000</td>
<td>Pel = 63 W, Utyp. = 45 V</td>
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</tr>
<tr>
<td>DMS150P40F</td>
<td>558955</td>
<td>“white effect”</td>
<td>4000</td>
<td>Pel = 63 W, Utyp. = 45 V</td>
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</tr>
</tbody>
</table>

Emission data at t_p = 85 °C | Colour tolerance: 3 MacAdam | Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%
PCB Holder for LUGA Shop 2015 and LUGA C 2015 Modules

For LUGA Shop 2015:  
DMS099***F / DMS120***F / DMS150***F

For LUGA C 2016:  
DMC124***F / DMC125***F / DMC128***F (1500–4500 lm)
DMC12C***F / DMC18C***F (3000–15,000 lm)

The combination of PCB version and holder provides the option of simply replacing LED modules within their holder. Simple and secure attachment is enabled with a separate holder.

Dependent on the used thermal conductive material and the power classes the expected service life times can differ from the values on the data sheet LUGA C/Shop 2015.

Phase-change thermal pads (PC TIM)
For optimum heat dissipation
Softening temperature: 45 to 55 °C
Solid material at room temperature for easy assembly
Thermal conductivity $R_{th}$: 3 W/mK

Ref. No.: 561002 for Ø 35 mm
Ref. No.: 561003 for Ø 50 mm

Holder
For LUGA C PCB DMC124***F, DMC125***F, DMC128***F and LUGA Shop 2015 DMS099***F
Dimensions [ØxH]: 35 x 4.2 mm
Material: PBT, white
Fixing holes for screws M3
Hole distance: 25 mm
Packaging unit: 250 pcs.
Type: 89721
Ref. No.: 559165 Ø 35 mm

Holder
For LUGA C PCB DMC12C***F, DMC18C***F and LUGA Shop 2015 DMS120***F, DMS150***F
Dimensions [ØxH]: 50 x 4.2 mm
Material: PBT, white
Fixing holes for screws M3
Hole distance: 35 mm
Packaging unit: 250 pcs.
Type: 89720
Ref. No.: 559164 Ø 50 mm

Ring reflector
For PCB holder, type: 89720, Ø 50 mm
For changing the height of the holder
Diameter: Ø 42 mm (incl. clip: 43 mm)
Height incl. holder: 7 mm
Material: PC, white
Beam angle: 90°
Packaging unit: 250 pcs.
Type: 89720
Ref. No.: 560347
LUGA C 2016 – 500 lm to 4500 lm

Built-in lighting modules
Due to their tiny size, the LUGA C modules are particularly suitable as a replacement for mains and low-voltage halogen lamps. As LUGA C modules are capable of delivering lumen packages of up to 4500 lm, they can also be used for retail lighting and in downlights.

Technical notes
Dimensions
- DMC122: 13.5 x 13.5 x 1.7 mm
- DMC124/DMC125:
- DMC128: 19 x 19 x 1.7 mm
Light emitting surface (LES)
- DMC122: Ø 8 mm
- DMC124/DMC125: Ø 11.1 mm
- DMC128: Ø 13.8 mm
Allowed operating temperature at tc point:
- -40 to 85 °C
- -40 to 80 °C (DMC104: > 500 mA)
- -40 to 75 °C (DMC118: > 700 mA)
Use of external LED constant current driver
Efficiency up to 163 lm/W
Colour rendering index Ra: > 80 / > 90
Colour accuracy initially: 3 SDCM; after 50,000 hrs. operating time: 4 SDCM
Lumen maintenance L90/B10
- DMC122: 53,000 hrs. (I<sub>f</sub> 150 mA)
- DMC124: 48,000 hrs. (I<sub>f</sub> 350 mA)
- DMC125/DMC128: 50,000 hrs. (I<sub>f</sub> 350 mA)
Packaging unit:
- 225 pcs. (DMC122)
- 175 pcs. (DMC124/DMC125/DMC118)

Typical applications
Integration in
- Reflector luminaires for replacement of halogen mains and low-voltage lamps
- Flat surface-mounting luminaires
- Downlights
For use in
- Residential lighting
- Furniture lighting
- Stairway and corridor illumination
LUGA C 2016 – 500 lm to 1000 lm

Characteristics

- Optimized for lumen packages ≤ 1000 lm
- Highly efficient: up to 140 lm/W

LUGA C 2016 – CRI Ra > 80

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temp. *</th>
<th>Typ. luminous flux and efficiency, typ. voltage (Utyp.) and power consumption [Pdl]**</th>
<th>Typ. beam angle (*)</th>
<th>Typ. CRI Ra</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>150 mA</td>
<td>200 mA</td>
<td>250 mA</td>
</tr>
<tr>
<td>DMC122C**F</td>
<td>560392</td>
<td>warm white</td>
<td>2700</td>
<td>650</td>
<td>125</td>
<td>830</td>
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<tr>
<td>DMC122C30F</td>
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<td>3000</td>
<td>705</td>
<td>136</td>
<td>900</td>
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<tr>
<td>DMC122C35F</td>
<td>560395</td>
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<td>3500</td>
<td>710</td>
<td>137</td>
<td>905</td>
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<td>DMC122C40F</td>
<td>560396</td>
<td>neutral white</td>
<td>4000</td>
<td>725</td>
<td>139</td>
<td>925</td>
</tr>
<tr>
<td>DMC122C50F</td>
<td>560397</td>
<td>cool white</td>
<td>5000</td>
<td>730</td>
<td>140</td>
<td>935</td>
</tr>
</tbody>
</table>

* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%

LUGA C 2016 – CRI Ra > 90

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temp. *</th>
<th>Typ. luminous flux and efficiency, typ. voltage (Utyp.) and power consumption [Pdl]**</th>
<th>Typ. beam angle (*)</th>
<th>Typ. CRI Ra</th>
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<tbody>
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<td></td>
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<td>150 mA</td>
<td>200 mA</td>
<td>250 mA</td>
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<tr>
<td>DMC122S**F</td>
<td>560449</td>
<td>warm white</td>
<td>2700 (below BBL)</td>
<td>510</td>
<td>98</td>
<td>650</td>
</tr>
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<td>DMC122S30F</td>
<td>560450</td>
<td>warm white</td>
<td>3000 (below BBL)</td>
<td>545</td>
<td>105</td>
<td>700</td>
</tr>
<tr>
<td>DMC122S35F</td>
<td>560451</td>
<td>neutral white</td>
<td>3500 (below BBL)</td>
<td>580</td>
<td>112</td>
<td>740</td>
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<tr>
<td>DMC122S40F</td>
<td>560452</td>
<td>neutral white</td>
<td>4000 (below BBL)</td>
<td>605</td>
<td>116</td>
<td>770</td>
</tr>
</tbody>
</table>

* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%

LUGA C 2016 – Pearl White

LUGA C 2016 – CRI Ra > 80 / > 90

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temp. *</th>
<th>Typ. luminous flux and efficiency, typ. voltage (Utyp.) and power consumption [Pdl]**</th>
<th>Typ. beam angle (*)</th>
<th>Typ. CRI Ra</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
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<td>150 mA</td>
<td>200 mA</td>
<td>250 mA</td>
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<td>DMC122C31FP</td>
<td>560418</td>
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<td>3100</td>
<td>690</td>
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<td>880</td>
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</table>

* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%
## Characteristics

- Optimized for lumen packages from 1500 lm to 4500 lm
- Highly efficient: up to 163 lm/W

### LUGA C 2016 – CRI Ra > 80

<table>
<thead>
<tr>
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<td>Uₜₑ = 34.8 V</td>
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### LUGA C 2016 – CRI Ra > 90

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* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%
**LUGA C 2016 – 1500 lm to 4000 lm – Pearl White**

**Characteristics**
- Brilliant white light

LUGA C 2016 – CRI $R_a > 80$ / $> 90$

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temp. * [K]</th>
<th>Typ. luminous flux and efficiency, typ. voltage $U_{typ.}$ and power consumption $P_{el}$**</th>
<th>Typ. beam angle [°]</th>
<th>Typ. CRI $R_a$</th>
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<td>DMC124’31FP</td>
<td>560419</td>
<td>pearl white</td>
<td>3100</td>
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<td>3100</td>
<td>$P_u = 12$ W, $U_{typ.} = 34.2$ V, $P_{el} = 16.9$ W, $U_{typ.} = 34.7$ V</td>
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</table>

* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux, efficiency, voltage and power consumption: ±10%
LED Industrial and Hall Lighting

These LED modules are suitable for illuminating industrial, production, sports and warehouse facilities as well as for petrol stations (especially SYM II).

These modules are designed for built-in into luminaire casings. They enable a modular luminaire design.

The modules are available in four shapes (4, 8, 16 or 32 LEDs) and in three white colour tones.

Technical notes

LED built-in module for integration into luminaires
4, 8, 16 or 32 high-efficient High Power LEDs
Allowed operating temperature at tc point
at If = 700 mA: –30 to 85 °C
Use of external LED constant current driver
Design for optimum thermal management
Efficiency up to 135 lm/W
Lumen maintenance L80/B10:
50,000 hrs. (If 1050 mA) at tc 60 °C
Colour accuracy initially: 5 SDCM
ESD protection class 2
Surge protection: 4 kV (except WU-M-479)

Typical applications

• Integration in outdoor luminaires
• Indoor lighting
• Industrial lighting for:
  - Production halls
  - Warehouses
• Petrol station lighting
• Lighting for sports facilities
## LED Industrial and Hall Lighting

**Optical characteristics**

at $T_p = 60 \, ^\circ C$

<table>
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<tr>
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<th>IP67 (IP66)</th>
<th>Correlated colour temperature* K</th>
<th>Photometric code</th>
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<td>130</td>
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<td>127</td>
<td>1845</td>
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<td>135</td>
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<td>3905</td>
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* The values mentioned above represent only statistical variables on account of the complex manufacturing process of light emitting diodes.

The values do not necessarily correspond exactly to the actual parameters of every single product which can vary from the typical specification.

** Production tolerance of voltage and power consumption: $\pm 10\%$, $-4\%$; Measuring tolerance of luminous flux $\pm 7\%$.

*** Measuring tolerance of CRI: $\pm 2$ | CRI $> 70$ on request.
LED Industrial Light
SYM I – IP20

Technical notes
Dimensions [incl. optics] LxWxH
- WU-M-479/4: 50x62.3x12 mm
- WU-M-479/8: 50x113.2x12 mm
- WU-M-479/16: 50x215x12 mm
- WU-M-475: 120x120x12 mm

Degree of protection: IP20
Push-in terminals (WAGO series 2060)
Optics for hall lighting
Optimum illumination - installation ratio:
1:1 (height to distance) on the 0–180° layer (lengthwise) or 8.5 (height to distance) on the 90–270° layer (crosswise)

Reference numbers

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<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Number of LEDs</th>
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LED Industrial Light
SYM I – Water Protected

Technical notes
Dimensions (incl. optics) LxWxH
WU-M-425 120 x120 x18.75 mm
WU-M-496 240 x120 x62 mm
Encapsulated for outdoor applications with
degree of protection: IP66/IK05
Pre-assembled leads:
2 leads: + (red), - (blue)
for luminaires of protection class II, length: 500 mm
Optics for hall lighting
Optimum illumination – installation ratio:
1:1 (height to distance) on the 0–180° layer
(lengthwise) or 8:5 (height to distance) on the
90–270° layer (crosswise).

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WU-M-425

WU-M-496
LED Industrial Light
SYM II – IP20

Technical notes
Dimensions [incl. optics] LxWxH
WU-M-479/4: 50x62.3x6.2 mm
WU-M-479/8: 50x113.2x6.2 mm
WU-M-479/16: 50x215x6.2 mm
WU-M-475: 120x120x6.2 mm
Degree of protection: IP20
Push-in terminals (WAGO series 2060)
Optics for hall lighting
Optimum illumination – installation ratio:
1:2 [height to distance]

Reference numbers

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<th>Ref. No.</th>
<th>Number of LEDs</th>
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LED Industrial Light
SYM II – Water Protected

Technical notes
Dimensions [incl. optics] LxWxH
  WU-M-425 120 x120 x14 mm
  WU-M-496 240 x120 x54.6 mm
Encapsulated for outdoor applications
Pre-assembled leads:
  2 leads: + (red), - (blue)
for luminaires of protection class II, length: 500 mm
Optics for hall lighting
Optimum illumination - installation ratio:
1:2 [height to distance]

Reference numbers

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<th>Ref. No.</th>
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<td>IP67/IP69/IK08</td>
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<td>IP67/IP69/IK08</td>
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</tbody>
</table>
**LUGA C 2016 – 3000 lm to 15,000 lm**

**Built-in lighting modules**
LUGA C modules with lumen values ranging from 3000 to 15,000 lm are especially designed as a built-in module for industrial and outdoor lighting.

The wide range of variants (CRI 70/80) make them suitable for indoor as well as for street light applications.

**Technical notes**

**Dimensions**
- DMC12C/DMC18C: 28 x 28 x 1.7 mm
- DMC18Q: 38 x 38 x 1.7 mm

**Light emitting surface (LES)**
- DMC12C/DMC18C: Ø 22 mm
- DMC18Q: Ø 33 mm

**Typ. beam angle:** 120°

**Allowed operating temperature at tc point:**
- -40 to max. 105 °C (at 700 mA)

**Use of external LED constant current driver**

**Efficiency up to 184 lm/W**

**Colour rendering index (Ra):** > 80 / > 65

**Colour accuracy initially:** 3 SDCM; after 50,000 hrs. operating time: 4 SDCM

**Lumen maintenance (L90/B10)**
- DMC12C: 43,000 hrs. (I<sub>F</sub> 1050 mA)
- DMC18C: 44,000 hrs. (I<sub>F</sub> 1050 mA)
- DMC18Q: 54,000 hrs. (I<sub>F</sub> 1050 mA)

**Packaging unit:**
- 100 pcs. (DMC12C/DMC18C)
- 75 pcs. (DMC18Q)

**Typical applications**

Integration in:
- Reflectors luminaires
- Flat surface-mounting luminaires
- Downlights
- Indoor and hall lighting
- Industrial lighting for:
  - Production halls
  - Warehouses
- Petrol station lighting
- Lighting for sports facilities
- Street and outdoor lighting
### LUGA C 2016 – 3000 lm to 15,000 lm

Holder for LUGA C modules DMC12C and DMC18C see page 53.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temp. * (°K)</th>
<th>Typ. luminous flux and efficiency, typ. voltage (U Typ.) and power consumption (P el) **</th>
<th>Typ. CRI Ra</th>
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<tr>
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<td>560427</td>
<td>warm white</td>
<td>3000 (below BBL)</td>
<td><strong>P el = 49.1 W</strong>&lt;br&gt;U Typ. = 33.4 V&lt;br&gt;U Typ. = 34.4 V&lt;br&gt;U Typ. = 35.1 V&lt;br&gt;U Typ. = 35.6 V</td>
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<td><strong>P el = 60.5 W</strong>&lt;br&gt;U Typ. = 33.4 V&lt;br&gt;U Typ. = 34.4 V&lt;br&gt;U Typ. = 35.1 V&lt;br&gt;U Typ. = 35.6 V</td>
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</table>

### Emission data at t<sub>p</sub> = 65 °C
- Colour tolerance: 3 MacAdam
- Production tolerance of luminous flux and efficiency: ±15%; of voltage and power consumption: ±10%; Min. CRI Ra: > 80 / > 65
Optics for LUGA C 2016 – 3000 lm to 15,000 lm

Silicone optics especially designed and optimized for the use of COB modules with IES sizes up to Ø 23 mm (e.g. LUGA C: DMC12C***F and DMC18C***F)

Material: silicone
Self sealing ability (IP65)

**COB silicone optics M-Class (M1)**
M-Class silicone optics
Optical efficiency: 93%
Optimum illumination – installation ratio: 4:1 (pole distance to pole height)
Ref. No.: 559042

**COB silicone optics Area**
Area silicone optics
Optical efficiency: 96%
Optimum illumination – installation ratio: 4.5:1 (distance between luminaire poles to the height of the luminaire pole)
Ref. No.: 562512
* Products under development; preliminary technical data

**COB silicone optics SYM II**
SYM II silicone optics
Optical efficiency: 97%
Optimum illumination – installation ratio: 2:1 (distance to height)
Ref. No.: 562513

**Support for COB silicone optics**
Material: PC, black
Ref. No.: 558607
LED Street and Outdoor Lighting – M-Class, S-Class, Area

These LED modules are suitable for standard-compliant street lighting, paths and squares in accordance with EN 13201.

These modules are designed for built-in into luminaire casings. They enable a modular luminaire design.

The VS ECXd 700/150 W LED driver enables power reduction via phase inversion.

The modules are available in four shapes (4, 8, 16 or 32 LEDs) and in three white colour tones.

Technical notes
LED built-in module for integration into luminaires
4, 8, 16 or 32 high-efficient High Power LEDs
Allowed operating temperature at t_c point
at I_r = 700 mA: -30 to 85 °C
Use of external LED constant current driver
Design for optimum thermal management
Efficiency up to 154 lm/W
Lumen maintenance L80/B10:
50,000 hrs. (I_r 1050 mA) at t_p 60 °C
Colour accuracy initially: 5 SDCM
ESD protection class 2
Surge protection: 4 kV (except WU-M-479)

Typical Applications
• Integration in luminaires
• Streetlighting for ME- and S-classes (acc. to EN 13201)
• Illumination of public places
### LED Street and Outdoor Lighting – M-Class, S-Class, Area

#### Optical Characteristics

at \( t_p = 60 \, ^\circ C \)

<table>
<thead>
<tr>
<th>Type</th>
<th>Colour</th>
<th>Correlated colour temperature* ((K))</th>
<th>Type</th>
<th>correlated colour and power consumption ((P_{el})**)</th>
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<td>Correlated flux ((F_{cd})) (\text{lm})</td>
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<tr>
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<td>(1050 , \text{mA}) (\text{m})</td>
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<td>(1400 , \text{mA}) (\text{m})</td>
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<td>(700 , \text{mA}) (\text{m})</td>
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<td></td>
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<td>(U_{typ}) (\text{V})</td>
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<td>590</td>
<td>154</td>
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<td><strong>8 LEDs</strong></td>
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<td></td>
<td>*<em>21.9 \text{V}*</em></td>
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<td><strong>16 LEDs</strong></td>
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<td>4735</td>
<td>154</td>
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</table>

* The values mentioned above represent only statistical variables on account of the complex manufacturing process of light emitting diodes.

** Production tolerance of voltage and power consumption: \(\pm 10\% / -4\%\); Measuring tolerance of luminous flux: \(\pm 7\%\).

*** Measuring tolerance of CRI: \(\pm 2\) \(\text{CRI} > 80\) on request.
LED Roadway Light

M-Class – IP20

Technical notes

Dimensions (incl. optics) LxWxH
- WU-M-479/4: 50x62.3x10.3 mm
- WU-M-479/8: 50x113.2x10.3 mm
- WU-M-479/16: 50x215x10.3 mm
- WU-M-475: 120x120x10.3 mm

Degree of protection: IP20

Push-in terminals (WAGO series 2060)

Optics for illumination of streets with M-Class (acc. to EN 13201)

Optimum illumination – installation ratio: 4.5:1 (distance between luminaire poles to the height of the luminaire pole)

Reference numbers

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Type</th>
<th>Ref. No.</th>
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</table>
**LED Roadway Light**

**M-Class – Water Protected**

**Technical notes**

- Dimensions (incl. optics) LxWxH:
  - WU-M-425: 120 x 120 x 16 mm
  - WU-M-496: 240 x 120 x 61.7 mm

- Encapsulated for outdoor applications

- Pre-assembled leads:
  - 2 leads: + (red); – (blue)

- for luminaires of protection class II, length: 500 mm

- Optics for illumination of streets with M-Class (acc. to EN 13201)

- Optimum illumination - installation ratio: 4.5:1 (distance between luminaire poles to the height of the luminaire pole)

---

**Reference numbers**

<table>
<thead>
<tr>
<th>Type</th>
<th>Optics direction</th>
<th>Ref. No.</th>
<th>Number of LEDs</th>
<th>Degree of protection</th>
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**LED Roadway Light**

**S-Class – IP20**

**Technical notes**
- Dimensions [incl. optics]: LxWxH
  - WU-M-479/4: 50x62.3x12.4 mm
  - WU-M-479/8: 50x113.2x12.4 mm
  - WU-M-479/16: 50x215x12.4 mm
  - WU-M-475: 120x120x12.4 mm
- Degree of protection: IP20
- Push-in terminals (WAGO series 2060)
- Optics for illumination of streets with S-Class [acc. to EN 13201]
- Optimum illumination – installation ratio: 7.5:1 (distance between luminaire poles to the height of the luminaire pole)

**Reference numbers**

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<tr>
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<th>Number of LEDs</th>
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LED Roadway Light
S-Class – Water Protected

Technical notes
Dimensions [incl. optics] LxWxH
WU-M-425: 120x120x18.4 mm
WU-M-496: 240x120x61.3 mm
Encapsulated for outdoor applications with degree of protection: IP66/IK05
Pre-assembled leads:
2 leads: + (red); – (blue)
for luminaires of protection class II, length: 500 mm
Optics for illumination of streets with S-Class [acc. to EN 13201]
Optimum illumination – installation ratio: 7.5:1
[distance between luminaire poles to the height of the luminaire pole]

Reference numbers

<table>
<thead>
<tr>
<th>Type</th>
<th>Optics direction</th>
<th>Ref. No.</th>
<th>Number of LEDs</th>
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<td>—</td>
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<tr>
<td>WU-M-425-C-740</td>
<td>—</td>
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<tr>
<td>WU-M-425-C-650</td>
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<td>WU-M-496-C-730</td>
<td>562085</td>
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<td>WU-M-496-C-740</td>
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<td>WU-M-496-C-650</td>
<td>562105</td>
<td>562106</td>
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LED Roadway Light
Area – IP20

Technical notes
Dimensions [incl. optics] LxWxH
WU-M479/4: 50x62.3x6.7 mm
WU-M479/8: 50x113.2x6.7 mm
WU-M479/16: 50x215x6.7 mm
WU-M475: 120x120x6.7 mm
Degree of protection: IP20
Push-in terminals (WAGO series 2060)
Optics for illumination of public places
Optimum illumination – installation ratio: 5.5:1 [distance between luminaire poles to the height of the luminaire pole]

Reference numbers

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Number of LEDs</th>
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<tbody>
<tr>
<td>WU-M479/4-C-730</td>
<td>561971</td>
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<td>WU-M479/4-C-740</td>
<td>561978</td>
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<td>WU-M479/4-C-650</td>
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<td>WU-M479/8-C-730</td>
<td>561992</td>
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<td>WU-M479/8-C-740</td>
<td>561999</td>
<td>8</td>
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<td>WU-M479/8-C-650</td>
<td>562006</td>
<td>8</td>
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<td>WU-M479/16-C-730</td>
<td>562013</td>
<td>16</td>
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<td>WU-M479/16-C-740</td>
<td>562020</td>
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<td>WU-M479/16-C-650</td>
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<td>WU-M475-C-730</td>
<td>561903</td>
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<td>WU-M475-C-740</td>
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<td>WU-M475-C-650</td>
<td>561913</td>
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LED Roadway Light
Area – Water
Protected

Technical notes
Dimensions (incl. optics) LxWxH
WU-M-425: 120 x 120 x 12.6 mm
WU-M-496: 240 x 120 x 54.6 mm
Encapsulated for outdoor applications with degree of protection: IP66/IK05
Pre-assembled leads:
2 leads: + (red); – (blue)
for luminaires of protection class II, length: 500 mm
Optics for illumination of public places
Optimum illumination – installation ratio:
5.5:1 [distance between luminaire poles to the height of the luminaire pole].

Reference numbers

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Number of LEDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>WU-M425-C-730</td>
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<td>WU-M425-C-740</td>
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<td>WU-M425-C-650</td>
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<td>WU-M496-C-730</td>
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<td>WU-M496-C-740</td>
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<tr>
<td>WU-M496-C-650</td>
<td>562107</td>
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PowerEmitter XP and XML

**Built-in PCB lighting modules**
Thanks to the use of highly efficient LEDs, PowerEmitter modules guarantee an extremely high lumen output of up to 731 lm at max. 1050 mA. The modules can be safely operated with various constant-current converters (350 mA, 500 mA, 700 mA, 1050 mA). Sufficient cooling must be ensured.

Cables have to be soldered onto the solder pads of PowerEmitter modules, which are available in white, neutral white and warm white, to enable terminal connections to be made. The colours of red, green and blue can be made available on request. To enable the creation of unique light solutions, VS also provides PowerOptics attachments with a variety of beam angle characteristics (see pages 78–80).

**Technical notes**
PCB diameter: 30 mm
Allowed operating temperature at tc point:
- 20 to 60 °C for PowerEmitter XP
- 20 to 65 °C for PowerEmitter XML
Use of external LED constant current driver FR4-PCB with thermal ducts (PowerEmitter XP) or aluminium PCB (PowerEmitter XML) for optimum thermal management
Efficiency up to 132 lm/W
Colour rendering index: white Ra = 75, warm white Ra = 80
ESD protection class 2
Minimum order quantity: 144 pcs.

### PowerEmitter XP

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature* K</th>
<th>Luminous flux* (lm), voltage [U] and power consumption [P]&lt;sub&gt;el&lt;/sub&gt;</th>
<th>Beam angle °</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>350 mA min.</td>
<td>500 mA min.</td>
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<tr>
<td><strong>PowerEmitter XP-C</strong></td>
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<td>100.0</td>
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<tr>
<td>WU421.XPCWW</td>
<td>546676</td>
<td>warm white</td>
<td>2870...3200</td>
<td>67.2</td>
<td>80.6</td>
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<tr>
<td>WU421.XPCNW</td>
<td>546671</td>
<td>neutral white</td>
<td>3700...4250</td>
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<td>87.4</td>
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<tr>
<td>WU421.XPCCW</td>
<td>546673</td>
<td>cool white</td>
<td>5630...6950</td>
<td>100.0</td>
<td>114.0</td>
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<td><strong>PowerEmitter XP-E</strong></td>
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<td>WU421.XPEWW</td>
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<td>2870...3200</td>
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<td>WU421.XPENW</td>
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<td>3700...4250</td>
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<td>3700...4250</td>
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Emission data at t<sub>j</sub> = 25 °C | * Production tolerance of luminous flux ±7% | Suitable thermal tapes for these LED modules see page 82.
PowerEmitter XML

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature * K</th>
<th>Luminous flux* [lm]</th>
<th>Voltage [U] and power consumption [P&lt;sub&gt;el&lt;/sub&gt;]</th>
<th>Beam angle *</th>
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<td>500 mA min. typ.</td>
<td>700 mA min. typ.</td>
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<td>WU.M.424.27K</td>
<td>548032</td>
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<td>2680...2790</td>
<td>260 300 325 375</td>
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<td>300 340 375 425</td>
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Emission data at θ = 85 °C | * Production tolerance of luminous flux: ±7% | Suitable thermal tapes for these LED modules see page 82.

TriplePowerEmitter XP

Built-in PCB lighting modules

Thanks to the use of highly efficient LEDs, TriplePowerEmitter modules guarantee an extremely high lumen output of up to 622 lm at max. 700 mA.

The modules can be safely operated with various constant-current drivers (350 mA, 500 mA or 700 mA). Sufficient cooling must be ensured.

The TriplePowerEmitter modules are available in white, neutral white and warm white.

The modules are available without an optical attachment or with a fixed 10°, 20°, 30° or 40° optical attachment to enable the creation of different lighting scenes.

Technical notes

PCB diameter: 43 mm
Allowed operating temperature at θ<sub>c</sub> point:
-20 to 65 °C
Use of external LED constant current driver
Aluminium PCB for optimum thermal management
Efficiency up to 109 lm/W
Colour rendering index:
- white Ra = 75, warm white Ra = 80
ESD protection class 2
Minimum order quantity: 120 pcs.

Typical applications
- Integration in luminaires
- Architectural lighting
- Marking paths, stairs, etc.
- Furniture lighting
- Light advertising
- Entertainment, retail lighting
**TriplePowerEmitter XP**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature</th>
<th>Luminous flux* [lm], voltage (U) and power consumption [P&lt;sub&gt;el&lt;/sub&gt;]</th>
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<td></td>
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<td></td>
<td>P&lt;sub&gt;e&lt;/sub&gt; = 3.36–4.1 W</td>
<td>P&lt;sub&gt;e&lt;/sub&gt; = 4.95–6 W</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>min.</td>
<td>typ.</td>
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<tr>
<td>Without optics</td>
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<td>WU M 422 XPE WW</td>
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<td>329</td>
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<tr>
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<td>cool white</td>
<td>3650...6950</td>
<td>289</td>
<td>329</td>
</tr>
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</table>

Emission data at tj = 25 °C | * Production tolerance of luminous flux ±7% | Suitable thermal tapes for these LED modules see page 82.
PowerOptics3 for XP/XT Modules

PowerOptics3 were specially developed to supplement VS PowerEmitter making it possible for users to put unique lighting solutions into practice. Use of high-grade optical PMMA enables high efficiency factors of up to 90%.

To guarantee easy mounting on PowerEmitter module, the PowerOptics3 are backed with self-adhesive tape. However, depending on the type of application and ambient conditions, the PowerOptics3 module may require additional fixing to ensure secure mounting.

For fixation of PowerOptics3 on Star LED modules use self-tapping screws acc. to ISO 1481/7049-ST2.9-C/F.

<table>
<thead>
<tr>
<th>Type</th>
<th>Beam angle</th>
<th>Ref. No.</th>
<th>Drawing</th>
<th>Dimensions* (mm)</th>
<th>Ref. No.</th>
<th>Drawing</th>
<th>Dimensions* (mm)</th>
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<tbody>
<tr>
<td>Optics Ø 26 mm</td>
<td>8</td>
<td>547716</td>
<td>A</td>
<td>26/14.6</td>
<td>548868</td>
<td>B</td>
<td>35/14.6</td>
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<td>Optics Ø 26 mm</td>
<td>16</td>
<td>547717</td>
<td>A</td>
<td>26/14.6</td>
<td>548869</td>
<td>B</td>
<td>35/14.6</td>
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<td>Optics Ø 26 mm</td>
<td>26</td>
<td>547718</td>
<td>A</td>
<td>26/14.6</td>
<td>548870</td>
<td>B</td>
<td>35/14.6</td>
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<td>Optics Ø 26 mm</td>
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<td>547719</td>
<td>A</td>
<td>26/14.6</td>
<td>548871</td>
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<td>Optics Ø 35 mm</td>
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<td>550967</td>
<td>C</td>
<td>26/14.6</td>
<td>550971</td>
<td>D</td>
<td>35/14.6</td>
</tr>
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<td>Optics Ø 35 mm</td>
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<td>550968</td>
<td>C</td>
<td>26/14.6</td>
<td>550972</td>
<td>D</td>
<td>35/14.6</td>
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<td>Optics Ø 35 mm</td>
<td>26</td>
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<td>C</td>
<td>26/14.6</td>
<td>550973</td>
<td>D</td>
<td>35/14.6</td>
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<td>Optics Ø 35 mm</td>
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<td>C</td>
<td>26/14.6</td>
<td>550974</td>
<td>D</td>
<td>35/14.6</td>
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</tbody>
</table>

* The values mentioned above represent only statistical variables on account of the complex manufacturing process of light emitting diodes. The values do not necessarily correspond exactly to the actual parameters of every single product which can vary from the typical specification.
PowerOptics for XP Modules

Various attachable optics are available for XP modules to enable different beam characteristics and illumination levels.

PowerOptics are made of PMMA, a material of high optical efficiency, and therefore achieve efficiencies of up to 92%.

The optics are available in various beam angles and are easily attached to the modules using self-adhesive tape. Depending on the type of application or the expected ambient conditions, it may be necessary to supplement this method of fastening to ensure the optics are securely mounted.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Beam angle*</th>
<th>Dimensions* (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>°</td>
<td>diameter x height / width x depth x height</td>
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<tr>
<td>Optics for LED modules of XP series</td>
<td></td>
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</tr>
<tr>
<td>PowerOptics XP 11°</td>
<td>543422</td>
<td>11</td>
<td>16.1 x 10.1</td>
</tr>
<tr>
<td>PowerOptics XP 13° diff</td>
<td>543423</td>
<td>12</td>
<td>16.1 x 10.1</td>
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<tr>
<td>PowerOptics XP 30°</td>
<td>543424</td>
<td>30</td>
<td>16.1 x 10.1</td>
</tr>
<tr>
<td>PowerOptics XP 40°</td>
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<td>16.1 x 10.1</td>
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<tr>
<td>PowerOptics Strada A XP</td>
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<td>100 x 20</td>
<td>19.6 x 15.4 x 10.5</td>
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<tr>
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<td>544038</td>
<td>116 x 44</td>
<td>20 x 15.5 x 5.3</td>
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</table>

* The values mentioned above represent only statistical variables on account of the complex manufacturing process of light emitting diodes. The values do not necessarily correspond exactly to the actual parameters of every single product which can vary from the typical specification.
PowerOptics for XP Modules

For TriplePowerEmitter and Spot modules
Various attachable optics are available for TriplePowerEmitter and the Spot modules of the XP series to enable different beam characteristics and illumination levels.

PowerOptics are made of PMMA, a material of high optical efficiency, and therefore achieve efficiencies of up to 92%.

Fixing
- PowerOptics 3 XP: with glue
- PowerOptics 4 XP: by self tapping screw 2.9 mm x H
  \[ H = 6.8 \text{ mm} + A + B \]

Light distribution curves PowerOptics 3XP

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Beam angle*</th>
<th>Dimensions* (mm) diameter x height</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerOptics 3XP 10°</td>
<td>547591</td>
<td>10</td>
<td>50 x 11.6</td>
</tr>
<tr>
<td>PowerOptics 3XP 20°</td>
<td>547589</td>
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<tr>
<td>PowerOptics 3XP 30°</td>
<td>547587</td>
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<tr>
<td>PowerOptics 3XP 40°</td>
<td>547510</td>
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<td>50 x 11.6</td>
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</table>

Light distribution curves PowerOptics 4XP

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Beam angle*</th>
<th>Dimensions* (mm) diameter x height</th>
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<tbody>
<tr>
<td>PowerOptics 4XP 10°</td>
<td>547592</td>
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<td>547590</td>
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<td>PowerOptics 4XP 30°</td>
<td>547588</td>
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<tr>
<td>PowerOptics 4XP 40°</td>
<td>547511</td>
<td>40</td>
<td>50 x 11.4</td>
</tr>
</tbody>
</table>

* The values mentioned above represent only statistical variables on account of the complex manufacturing process of light emitting diodes.
  The values do not necessarily correspond exactly to the actual parameters of every single product which can vary from the typical specification.
Reflectors for PowerEmitter XP modules
Reflectors generate a high efficiency, round spot with homogeneous light distribution.
Material: PC, with reflective aluminium coating.
The reflectors are available in two beam angles and are easily attached to the modules using self-adhesive tape.
Depending on the type of application or the expected ambient conditions, it may be necessary to supplement this method of fastening to ensure the reflectors are securely mounted.
Ref. No.: 548781  20°
Ref. No.: 546370  45°

Heat Sinks for LED Modules XP and XML
Under no circumstances may heat sinks ever be covered by insulation material or similar.
Air ventilation must be ensured.

Heat sinks for PowerEmitter XP and XML modules
For LED modules with one XP LED up to 700 mA
For LED modules with one XML LED up to 350 mA
Material: thermoconductive resin
Dimensions: (Ø x depth): 32.4 x 20 mm / 48 x 12.8 mm
Fixing: with screws
Weight: 16.4 g
Packaging unit: 250 pcs.
Ref. No.: 548739  Drawing/photo A
Ref. No.: 544804  Drawing/photo B

Heat sink for TriplePowerEmitter XP
For LED modules up to 700 mA
Material: thermoconductive resin
Dimensions: (Ø x depth): 46 x 37.5 mm
Fixing: with screws
Weight: 51 g
Packaging unit: 225 pcs.
Ref. No.: 544805
Thermally Conductive Adhesive Transfer Tapes for LED Modules

*3M™* type 8810 and Bergquist Bond-Ply® 100

Thermally Conductive Adhesive Transfer Tapes are designed to provide a preferential heat transfer path between heat-generating components and heat sinks or other cooling devices.

These tapes are tacky pressure sensitive adhesives loaded with thermally conductive ceramic fillers that do not require a heat cure cycle to form an excellent bond to many substrates. Only pressure is needed to form an excellent bond and thermal interface.

The specialised chemistry renders them modestly soft and able to wet to many surfaces, allowing them to conform well to non-flat substrates, provide high adhesion, and act as a good thermal interface.

The specialised acrylic chemistry of the tapes provides for excellent thermal stability of the base polymer. The thermally conductive tapes are provided on a silicone treated polyester release liner for ease of handling and die cutting. The tapes offer excellent adhesive performance with good wetting and flow onto many substrate surfaces.

Depending on the type of application and/or the expected ambient conditions, the modules must be additionally secured to ensure optimum fixing.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Size mm</th>
<th>Tape thickness mm</th>
<th>Liner thickness μm</th>
<th>Thermal conductive Rₜ K/W</th>
<th>For VS LED modules</th>
<th>Catalogue page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adhesive pad Ø28</td>
<td>536248</td>
<td>9.28</td>
<td>0.25</td>
<td>37.5–30</td>
<td>1.0</td>
<td>PowerEmitter</td>
<td>75–76</td>
</tr>
<tr>
<td>Adhesive pad Ø43</td>
<td>536977</td>
<td>9.43</td>
<td>0.20</td>
<td>76</td>
<td>0.5</td>
<td>TriplePowerEmitter Ø 45 mm, Ø 50 mm</td>
<td>76–77</td>
</tr>
</tbody>
</table>

| Square   |          |         |                   |                    |                         |                    |                |
| Adhesive pad 49x49 | 529157 | 49x49   | 0.25              | 37.5–50            | 0.3                      | TriplePowerEmitter Ø 50 mm | 76–77          |

| Linear   |          |         |                   |                    |                         |                    |                |
| Adhesive pad 278x13 | 548179 | 278x13  | 0.25              | 35.5–50            | 0.3                      | LUGA Line          | 10–12          |
| Adhesive pad 320x35 | 533815 | 320x35  | 0.20              | 76                 | 0.1                      | LEDLine High Power |                |

This technical information for 3M™ Thermally Conductive Adhesive Transfer Tape 8810 or Bergquist Bond-Ply® 100 should be considered representative or typical only and should not be used for specification purposes.

For detailed information and application guidelines see 3M or Bergquist datasheet for thermally conductive adhesive transfer tapes (8805; 8810; 8815; 8820; www.3m.com or Bergquist Bond-Ply® 100; www.bergquistcompany.com).

Type | Ref. No. | Size mm | Thermal conductive Rₜ K/W | For VS LED modules | Catalogue page |
<table>
<thead>
<tr>
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<th></th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>For LED modules WU-M-425 (ME/S, SYM I, SYM II)</td>
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</tr>
</tbody>
</table>
LED Modules for Direct Connection to Mains Voltage 220–240 V

LED MODULES FOR MAINS VOLTAGE

DRIVER-ON-BOARD TECHNOLOGY

READYLINE MODULES

LED modules for direct connection to mains voltage

With so-called Driver-on-Board technology (DoB), the control gear unit is directly integrated into the LED module, which permits direct connection to mains voltage (220–240 V, 50–60 Hz).

The built-in LED modules of the ReadyLine series are suitable for residential and furniture lighting, as a replacement for compact fluorescent downlights and for installation in reflector luminaires.

The range includes both COB as well as SMD modules in various colour temperatures from 2700 K to 5000 K, in square or round designs (of varying diameters), with or without a heat sink as well as with pre-attached leads with and without connectors. Many products are available with cover for protection against electrical contact. Built-in spots and MR16 built-in modules are also available.

Advantages at a glance:
- Direct connection to mains voltage
- More flexible space-saving luminaire designs due to absence of driver
- Direct replacement for conventional lamps in existing luminaires
- High power factor > 0.9
- Long service life: up to 50,000 hours
LED Modules

ReadyLine COB

Built-in LED modules with integrated driver for mains voltage

Technical Notes
Mains voltage: 220–240 V, 50/60 Hz
Power factor: > 0.95
Dimensions [ØxH]: 57x4.7 mm
Light emitting surface (LES)
  Ø 14 mm: 10 W, 15 W, 20 W
  Ø 21 mm: 30 W, 40 W
Aluminium PCB for optimum thermal management
Beam angle: 120°
On-board push-in terminals
Packaging unit: 100 pcs.

Typical Applications
- Residential lighting
- Replacement for CFL downlights
- Integration in reflector luminaires
- Furniture lighting

Typ. Type Ref. No. Voltage AC Colour Correlated Luminous flux (lm) and Luminous \( \text{lm} \) and Typ. beam Typ. Energy
Typ. Colour Correlated Luminous flux (lm) and Typ. beam Typ. Energy
Typ. Typical efficiency * efficiency** angle and Energy
output Typ. Voltage colour temperature* flux (lm) and efficiency*
W 50/60 Hz colour typ. flux (lm) and efficiency* typ. beam CRI efficiency
10 EDC57C_10W827_230A 559771 220–240 warm white 2700 780 850 85 120 80 A+
EDC57C_10W830_230A 559772 220–240 warm white 3000 830 900 90 120 80 A+
EDC57C_10W835_230A 559773 220–240 warm white 3500 910 950 95 120 80 A+
EDC57C_10W840_230A 559774 220–240 neutral white 4000 990 1040 100 120 80 A+
15 EDC57C_15W827_230A 559775 220–240 cool white 5000 930 1000 100 120 80 A+
EDC57C_15W830_230A 559776 220–240 warm white 2700 1170 1275 85 120 80 A+
EDC57C_15W835_230A 559777 220–240 warm white 3000 1245 1350 90 120 80 A+
EDC57C_15W840_230A 559778 220–240 warm white 3500 1290 1395 93 120 80 A+
EDC57C_15W850_230A 559779 220–240 neutral white 4000 1320 1425 95 120 80 A+
20 EDC57C_20W827_230A 559780 220–240 cold white 5000 1395 1500 100 120 80 A+
EDC57C_20W830_230A 559781 220–240 warm white 2700 1560 1700 85 120 80 A+
EDC57C_20W835_230A 559782 220–240 warm white 3000 1660 1800 90 120 80 A+
EDC57C_20W840_230A 559783 220–240 warm white 3500 1720 1860 93 120 80 A+
EDC57C_20W850_230A 559784 220–240 neutral white 4000 1760 1900 95 120 80 A+
30 EDC57C_30W827_230A 560983 220–240 cool white 5000 1860 2000 100 120 80 A+
EDC57C_30W830_230A 560986 220–240 warm white 2700 2340 2550 85 120 80 A+
EDC57C_30W835_230A 560987 220–240 warm white 3000 2490 2700 90 120 80 A+
EDC57C_30W840_230A 560988 220–240 warm white 3500 2571 2781 93 120 80 A+
EDC57C_30W850_230A 560989 220–240 neutral white 4000 2625 2835 95 120 80 A+
40 EDC57C_40W827_230A 560990 220–240 cool white 5000 2747 2957 99 120 80 A+
EDC57C_40W830_230A 560991 220–240 warm white 2700 3120 3400 85 120 80 A+
EDC57C_40W835_230A 560992 220–240 warm white 3000 3320 3600 90 120 80 A+
EDC57C_40W840_230A 560993 220–240 warm white 3500 3428 3708 93 120 80 A+
EDC57C_40W850_230A 560994 220–240 neutral white 4000 3500 3780 95 120 80 A+

* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux and efficiency: ±10% | CRI: ±3
LED Modules for Direct Connection to Mains Voltage 220–240 V

LED Modules
ReadyLine COB
– Accessories

**Holder**
Dimensions [ØxH]: 59.8x6.6 mm
Material: plastic, white
Ref. No.: 559786

**Holder for EVO reflectors**
For COB Type EDC57C
For reflectors see page 119
Cover for LES: PC, transparent
Dimensions [ØxH]: 60x14.65 mm
Material: PC, inner ring: metallized
Packaging unit: 72 pcs.
Ref. No.: 561847

**Thermal pad**
Dimensions [ØxH]: 63x0.5 mm
Thermal conductivity $R_h$: 2 W/mK
Ref. No.: 559883
**LEDSpot**

**ReadyLine IP**

Complete LEDSpot equipped with optics, heat sink, leads and metal frame

**Technical notes**
- Mains voltage: 220–240 V, 50/60 Hz
- Power factor: > 0.95
- Metal frame, round
- Heat sink material: thermoconductive resin
- For cut-out: Ø 56 mm
- Lens with clear glass
- Beam angle: 50°
- With leads: Cu tinned, stranded conductors 0.5 mm², double FEP/FEP-insulation
- MOV – metal-oxide varistor, enclosed
- Protection class II
- RFI suppressed
- Degree of protection: IP54/IP20
- Packaging unit: 45 pcs.

---

**Max. output W** | **Type** | **Ref. No.** | **Voltage AC 50/60 Hz V** | **Number of LEDs pcs.** | **Colour** | **Correlated colour temperature K** | **Luminous flux lm** | **Light intensity Candela** | **Beam angle °** | **CRI Ra** | **Frame colour** | **Energy efficiency**
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
4.3 | LCH024 | 554956 | 220–240 | 12 | warm white | 2900...3200 | 350 | 370 | 330 | 50 | > 80 | silver | A++
| LCH024 | 554957 | white
| LCH024 | 554958 | 220–240 | 12 | neutral white | 3700...4200 | 380 | 400 | 350 | 50 | > 80 | silver | A++
| LCH024 | 554959 | white

**Degree of protection: IP54**

**Degree of protection: IP20**

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LEDSpot
ReadyLine MR16

Complete LEDSpot equipped with optics, heat sink and leads

Technical notes
Mains voltage: 220–240 V, 50/60 Hz
Power factor: > 0.95
Lens diameter: 50 mm
Beam angle: 42°
Heat sink material: aluminium
Leads: Cu tinned, stranded conductors 0.5 mm²,
double FEP/FEP insulation, length: 300 mm
MOV – metal-oxide varistor, enclosed unassembled
Protection class II
RFI suppressed
Packaging unit: 30 pcs.

Max. Type Ref. No. Voltage AC Number Colour Correlated colour temperature Luminous flux Light Intensity Beam CRI Energy
output W 50/60 Hz pcs. K lm min. typ. angle R a efficiency

| 8.7 | LR8W 554960 | 220–240 | 8 | warm white | 2900...3200 | 515 | 600 | 636 | 42 | > 80 | A+ |
| 8.7 | LR8W 554961 | 220–240 | 8 | neutral white | 3700...4200 | 580 | 670 | 680 |  |  |  |

LED Modules for Direct Connection to Mains Voltage 220–240 V
LED Modules

ReadyLine S

**Built-in LED modules with integrated driver for direct connection to mains voltage**

**Technical notes**

Mains voltage: 220–240 V, 50/60 Hz

Power factor: > 0.97

Dimensions:

- with heat sink: 155 x 41 x 32.8 mm
- without heat sink: 132 x 37.4 x 9.25 mm

Aluminium PCB for optimum thermal management

Heat sink made of thermoconductive resin

Protection cover: PC, UV-glued or rivetted (module with heat sink)

Push-in terminals with push-button: 0.2–0.75 mm² [24–18AWG]

Fixation for modules with heat sink: fixing holes for screws M4 or self-tapping screws 3.9

Fixation for modules with cover: fixing holes for screws M3 or self-tapping screws 2.9

For luminaires of protection class II

(For more information see page 229)

RFI suppressed

Weight: 35/140 g (without/with heat sink)

Packaging unit: 80/40 pcs. (without/with heat sink)

**Typical applications**

- Replacement for compact fluorescent lamps
- Integration in luminaries
- Residential lighting
- Architectural lighting
- Retail lighting
- Furniture lighting

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No. with heat sink</th>
<th>Ref. No. without heat sink</th>
<th>Voltage AC 50/60 Hz V</th>
<th>Number of LEDs pcs.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Cover</th>
<th>Luminous flux lm</th>
<th>CRI</th>
<th>Energy efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.7</td>
<td>LUT33</td>
<td>559522</td>
<td>559526</td>
<td>220–240</td>
<td>21</td>
<td>warm white</td>
<td>2600...2900</td>
<td>clear</td>
<td>590</td>
<td>650</td>
<td>&gt; 80 A+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>559523</td>
<td></td>
<td></td>
<td></td>
<td>diffuse</td>
<td>2900...3200</td>
<td>clear</td>
<td>720</td>
<td>780</td>
<td>&gt; 80 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>550439</td>
<td>550441</td>
<td>220–240</td>
<td>21</td>
<td>warm white</td>
<td>3700...4200</td>
<td>diffuse</td>
<td>610</td>
<td>660</td>
<td>&gt; 80 A+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>551983</td>
<td>551989</td>
<td></td>
<td></td>
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<td>3700...4200</td>
<td>diffuse</td>
<td>740</td>
<td>800</td>
<td>&gt; 80 A</td>
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<td>551991</td>
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<td>21</td>
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<td>3700...4200</td>
<td>diffuse</td>
<td>630</td>
<td>680</td>
<td>&gt; 80 A+</td>
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<td>LUT33</td>
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<td>559030</td>
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<td>2600...2900</td>
<td>clear</td>
<td>910</td>
<td>940</td>
<td>&gt; 80 A+</td>
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<td></td>
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<td>559525</td>
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<td>clear</td>
<td>780</td>
<td>800</td>
<td>&gt; 80 A</td>
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<td>550440</td>
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<td>3700...4200</td>
<td>diffuse</td>
<td>935</td>
<td>1010</td>
<td>&gt; 80 A+</td>
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<td>551986</td>
<td>551992</td>
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<td>3700...4200</td>
<td>diffuse</td>
<td>1140</td>
<td>1210</td>
<td>&gt; 80 A+</td>
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<tr>
<td></td>
<td></td>
<td>551987</td>
<td>551993</td>
<td>220–240</td>
<td>30</td>
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<td>3700...4200</td>
<td>diffuse</td>
<td>955</td>
<td>1030</td>
<td>&gt; 80 A+</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Tape thickness</th>
<th>Thermal conductivity</th>
<th>Breakdown voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>—</td>
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</tbody>
</table>

* Average value [not for specification purpose] ** For use in luminaries of protection class I (has to be tested in luminaire)
LED Modules
ReadyLine S IP54

Built-in LED modules with integrated driver for direct connection to mains voltage

Technical notes
Mains voltage: 220–240 V, 50/60 Hz
Power factor: > 0.97
Dimensions:
  with heat sink 155x41x34.25 mm
  without heat sink 132x37.4x10.5 mm
Aluminium PCB for optimum thermal management
Heat sink made of thermoconductive resin
Protection cover: PC, UV-glued or rivetted (module with heat sink)
Leads: Cu tinned, stranded conductors 0.5 mm², double FEP/FEP-insulation, length: 300 mm
Fixation for modules:
  with heat sink: fixing holes for screws M4 or self-tapping screws 3.9
  with cover: fixing holes for screws M3 or self-tapping screws 2.9
For luminaries of protection class II (More information see page 229)
Degree of protection: IP54
RFI suppressed
Weight: 35/140 g (without/with heat sink)
Packaging unit: 80/40 pcs. (without/with heat sink)

Typical applications
• Replacement for compact fluorescent lamps
• Integration in luminaires
• Residential lighting
• Architectural lighting
• Retail lighting
• Furniture lighting

Max. output W  Type  Ref. No. with heat sink  Voltage AC 50/60 Hz V  Number of LEDs pcs.  Colour  Correlated colour temperature K  Cover  Luminous flux lm  typ  CRI  Energy efficiency
8.7
LUT33  559529  559533  220–240  21  warm white  2600...2900  clear  590  650 > 80  A+
LUT33  559530  559534  diffuse  480  530 > 80  A
LUT33  556749  556741  220–240  21  warm white  2900...3200  clear  720  780 > 80  A+
LUT33  556750  556742  diffuse  610  660 > 80  A+
LUT33  556751  556743  220–240  21  neutral white  3700...4200  clear  740  800 > 80  A+
LUT33  556752  556744  diffuse  630  680 > 80  A+
LUT33  556753  556745  220–240  30  warm white  2600...2900  clear  910  940 > 80  A+
LUT33  556754  556746  diffuse  780  800 > 80  A
LUT33  555875  556747  220–240  30  warm white  2900...3200  clear  1100  1190 > 80  A+
LUT33  556755  556748  diffuse  935  1010 > 80  A+
LUT33  556756  556749  220–240  30  neutral white  3700...4200  clear  1140  1210 > 80  A+
LUT33  556757  556750  diffuse  955  1030 > 80  A+

Accessories
Description  Tape thickness  Thermal conductivity  Breakdown voltage*
---  552039  Cord grip with 2 screws for LED modules with heat sink  ---  ---  ---
---  555009  Thermally conductive adhesive transfer tape 132x38 mm  0.25 mm  0.8 W/mK  5.5 kV
---  553427  Thermally conductive transfer tape, non-adhesive 136x36 mm  0.25 mm  2 W/mK  3 kV
---  555008  Thermally conductive transfer tape, adhesive on both sides 136x42 mm  0.19 mm  0.9 W/mK  10.3 kV

* Average value (not for specification purpose)  ** For use in luminaries of protection class I (has to be tested in luminaire)
LED Modules
ReadyLine DL 160

Built-in LED modules with integrated driver
for direct connection to mains voltage

Technical notes
Mains voltage: 220–240 V, 50–60 Hz
Power factor: > 0.9
Dimensions: Ø 164 mm
Allowed operating temperature at t\textsubscript{p} point: -25 to 80 °C
Ambient temperature range t\textsubscript{a} - 25 to 65 °C
Lumen maintenance L70/B50: 55,000 hrs. at t\textsubscript{p} 80 °C
Packaging unit: 36 pcs.

Typical applications
• Downlights
• Replacement for compact fluorescent lamps

<table>
<thead>
<tr>
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<tbody>
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<td>20</td>
<td>WUM498-830</td>
<td>557252</td>
<td>220–240</td>
<td>44</td>
<td>warm white</td>
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<td>80</td>
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<td>WUM498-840</td>
<td>557253</td>
<td>220–240</td>
<td>44</td>
<td>neutral white</td>
<td>4000</td>
<td>2200</td>
<td>110</td>
<td>120</td>
<td>80</td>
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<td>5000</td>
<td>2500</td>
<td>125</td>
<td>120</td>
<td>80</td>
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</tbody>
</table>

* Production tolerance of luminous flux and efficiency: ±15%
LED Modules ReadyLine DL 250

Built-in LED modules with integrated driver for direct connection to mains voltage

Technical notes
Mains voltage: 220–240 V, 50–60 Hz
Power factor: > 0.9
Dimensions: Ø 250 mm
Lumen maintenance L70/B50: 55,000 hrs. at tp 80 °C

Version for emergency lighting
Separate LED circuit of 8 LEDs for operation with local emergency lighting driver.

Typical applications
• Downlights
• Replacement for compact fluorescent lamps

Products under development; preliminary technical datas

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ReadyLine DL – For emergency lighting

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* Production tolerance of luminous flux and efficiency: ±10%
LED Modules
ReadyLine C

Built-in LED modules with integrated driver for direct connection to mains voltage

Technical notes
Mains voltage: 220–240 V, 50/60 Hz
Aluminium PCB for optimum thermal management
Heat sink made of thermoconductive resin
or co-moulded heat sink made of thermoconductive resin and aluminium
Protection cover: PC, UV-glued
or rivetted (module with heat sink)
For luminaires of protection class II
(More information see page 229)
RFI suppressed

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<th>ReadyLine</th>
<th>Heat sink</th>
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Typical applications
- Replacement for compact fluorescent lamps
- Integration in luminaires
- Residential lighting
- Architectural lighting
- Retail lighting
- Furniture lighting
ReadyLine C 10

Technical notes
Power factor: > 0.97
Dimensions: Ø 100 mm, Ø 120 mm with heat sink
Screw terminals for LED module with heat sink: 2.5 mm²
Welded leads for LED module without heat sink: double FEP/FEP-insulation, length: 300 mm, central or lateral lead exit
Fixing holes for screws M3 or self-tapping screws 2.9

With central lead exit

With lateral lead exit

With heat sink, protection cover and 2-poles screw terminals

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type with heat sink</th>
<th>Ref. No. with heat sink</th>
<th>Voltage AC 50/60 Hz V</th>
<th>Number of LEDs pcs</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Luminous flux lm min. typ.</th>
<th>CRI</th>
<th>Lead exit</th>
<th>Energy efficiency</th>
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<td>1010 1120 &gt; 80</td>
<td>central</td>
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</table>

Accessories

Description | Tape thickness | Thermal conductivity W/mK | Breakdown voltage kV
--- | --- | --- | ---
552039 | 0.25 mm | 0.8 | 5.5
555012 | 0.25 mm | 2 | 3
553795 | 0.19 mm | 0.9 | 10.3

* Average value [not for specification purpose] | ** For use in luminaires of protection class I [has to be tested in luminaire]
**ReadyLine C 08**

**Technical notes**
- Power factor: > 0.97
- Dimensions: Ø 81.5 mm, Ø 120 mm with heat sink
- Screw terminals for LED module with heat sink: 2.5 mm²
- Welded leads for LED module without heat sink: double FEP/FEP-insulation, length: 300 mm, central or lateral lead exit
- Fixing holes for screws M3 or self-tapping screws 2.9

### With central lead exit

### With lateral lead exit

### With heat sink, protection cover and 2-poles screw terminals

<table>
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<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No. with heat sink</th>
<th>Voltage AC 50/60 Hz V</th>
<th>Number of LEDs pcs.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Cover</th>
<th>Luminous flux lm</th>
<th>CRI</th>
<th>Lead exit</th>
<th>Energy efficiency</th>
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<td>940</td>
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**Accessories**
- **Description**: Thermally conductive transfer tape Ø 76 mm
- **Tape thickness**: 0.25 mm
- **Thermal conductivity**: 0.8 W/mK
- **Breakdown voltage**: 5.5 kV
- **Description**: Thermally conductive non-adhesive transfer tape Ø 76 mm
- **Tape thickness**: 0.25 mm
- **Thermal conductivity**: 2 W/mK
- **Breakdown voltage**: 3 kV
- **Description**: Thermally conductive transfer tape, adhesive on both sides Ø 82 mm
- **Tape thickness**: 0.19 mm
- **Thermal conductivity**: 0.9 W/mK
- **Breakdown voltage**: 10.3 kV

* Average value [not for specification purpose]  | ** For use in luminaires of protection class I [has to be tested in luminaire]
ReadyLine C 07

Technical notes
- Power factor: > 0.95
- Dimensions: Ø 73.3 mm; Ø 120 mm with heat sink
- Screw terminals for LED module with heat sink: 2.5 mm²
- Welded leads for LED module without heat sink:
  - double FEP/FEP-insulation, length: 300 mm,
  - central or lateral lead exit
- Fixing holes for screws M3 or self-tapping screws 2.9
- Versions for the US market on request

Max. Type | Ref. No. | Voltage AC | Number of | Colour | Correlated colour | Luminous flux | CRI | Lead exit | Energy efficiency
----------|---------|------------|-----------|---------|------------------|---------------|-----|------------|-----------------
17.5       | 558025  | 220–240    | 42        | warm white | 2600…2900 clear | 1140          | 1330 | > 80       | central A+
17.5       | 559559  | 220–240    | 42        | warm white | 2600…2900 diffuse | 930           | 1100 | > 80       | central A
17.5       | 559560  | 220–240    | 42        | warm white | 2900…3200 clear | 1440          | 1530 | > 80       | central A+
17.5       | 559564  | 220–240    | 42        | warm white | 2900…3200 diffuse | 1230          | 1340 | > 80       | central A+
17.5       | 552019  | 220–240    | 42        | warm white | 3700…4200 clear | 1480          | 1590 | > 80       | central A+
17.5       | 552020  | 220–240    | 42        | neutral white | 3700…4200 diffuse | 1260          | 1370 | > 80       | central A+
17.5       | 552021  | 220–240    | 42        | neutral white | 3700…4200 diffuse | 1260          | 1370 | > 80       | central A+
17.5       | 552022  | 220–240    | 42        | neutral white | 3700…4200 diffuse | 1260          | 1370 | > 80       | central A+

Accessories
- 552039 Cord grip with 2 screws for LED modules with heat sink
- 551265 Thermally conductive adhesive transfer tape Ø 71 mm
- 553422 Thermally conductive transfer tape, non-adhesive Ø 68 mm
- 555010** Thermally conductive transfer tape, adhesive on both sides Ø 74 mm

* Average value (not for specification purpose)  |  ** For use in luminaires of protection class I (has to be tested in luminaire)
ReadyLine C 06

Technical notes
Power factor: > 0.95
Dimensions: Ø 60 mm
Welded leads: double FEP/FEP-insulation, length: 300 mm, lateral lead exit
Fixing holes for screws M3

Max. output W | Type | Ref. No. | Voltage AC 50/60 Hz V | Number of LEDs pcs. | Colour | Correlated colour temperature K | Cover | Luminous flux lm | CRI | Energy efficiency |
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Accessories

<table>
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<tr>
<th>Description</th>
<th>Tape thickness mm</th>
<th>Thermal conductivity W/mK</th>
<th>Breakdown voltage kV</th>
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<tr>
<td>Thermally conductive transfer tape, adhesive on both sides Ø 64 mm</td>
<td>0.19</td>
<td>0.9</td>
<td>10.3</td>
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</table>

* Average value (not for specification purpose) | ** For use in luminaires of protection class I (has to be tested in luminaire)
ReadyLine C05 / C03

Technical notes
Power factor: > 0.95
Dimensions:
- C05: Ø 46/50 mm (8.7/13 W)
- C03: Ø 33 mm
Welded leads: double FEP/FEP-insulation, length: 300 mm, central or lateral lead exit
MOV – metal-oxide varistor, enclosed unassembled
Fixing holes for screws M2

8.7 W – With central lead exit
8.7 W – With lateral lead exit
13 W – With central lead exit
13 W – With lateral lead exit

ReadyLine C05

<table>
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<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
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<th>Number of LEDs pcs</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Cover</th>
<th>Luminous flux lm min typ.</th>
<th>CRI</th>
<th>Lead exit</th>
<th>Energy efficiency</th>
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<td>8.7</td>
<td>LR21W</td>
<td>559575</td>
<td>220–240</td>
<td>21</td>
<td>warm white</td>
<td>2600...2900</td>
<td>clear</td>
<td>590 650 &gt; BO</td>
<td>A+</td>
<td>central</td>
<td>A+</td>
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<tr>
<td></td>
<td>LR21W</td>
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<td>21</td>
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<td>2900...3200</td>
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<td>720 780 &gt; BO</td>
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<td>A+</td>
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<td>LR21W</td>
<td>559577</td>
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<td>3700...4200</td>
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<td>740 800 &gt; BO</td>
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<td>630 680 &gt; BO</td>
<td>A+</td>
<td>central</td>
<td>A+</td>
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Versions for the US market on request
### ReadyLine C 05

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<th>Ref. No.</th>
<th>Voltage AC 50/60 Hz V</th>
<th>Number of LEDs pcs</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Cover</th>
<th>Luminous flux lm</th>
<th>CRI</th>
<th>Lead exit</th>
<th>Energy efficiency</th>
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<tr>
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<td>220–240</td>
<td>30</td>
<td>warm white</td>
<td>2600...2900</td>
<td>clear</td>
<td>910</td>
<td>940</td>
<td>&gt; 80</td>
<td>central A+</td>
</tr>
<tr>
<td></td>
<td>LR30W</td>
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<td></td>
<td>central A</td>
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<td>clear</td>
<td>1100</td>
<td>1190</td>
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<td>LR30W</td>
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<td>central A+</td>
</tr>
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<td>30</td>
<td>neutral white</td>
<td>3700...4200</td>
<td>clear</td>
<td>1140</td>
<td>1210</td>
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<td>lateral A+</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Tape thickness</th>
<th>Thermal conductivity</th>
<th>Breakdown voltage*</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>–</td>
<td>Thermoconductive adhesive tape Ø 54 mm</td>
<td>0.25 mm</td>
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<tr>
<td>–</td>
<td>–</td>
<td>Thermoconductive transfer tape, non-adhesive Ø 49 mm</td>
<td>0.25 mm</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>Thermoconductive transfer tape, adhesive on both sides Ø 54 mm</td>
<td>0.19 mm</td>
</tr>
</tbody>
</table>

* Average value (not for specification purpose) | ** For use in luminaires of protection class I (has to be tested in luminaire)

### ReadyLine C 03

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage AC 50/60 Hz V</th>
<th>Number of LEDs pcs</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Cover</th>
<th>Luminous flux lm</th>
<th>CRI</th>
<th>Lead exit</th>
<th>Energy efficiency</th>
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</thead>
<tbody>
<tr>
<td>4.3</td>
<td>IR12W</td>
<td>559690</td>
<td>220–240</td>
<td>12</td>
<td>warm white</td>
<td>2600...2900</td>
<td>clear</td>
<td>290</td>
<td>330</td>
<td>&gt; 80</td>
<td>lateral A+</td>
</tr>
<tr>
<td></td>
<td>IR12W</td>
<td>559691</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>central A+</td>
</tr>
<tr>
<td></td>
<td>IR12W</td>
<td>563935</td>
<td>220–240</td>
<td>12</td>
<td>warm white</td>
<td>2900...3200</td>
<td>clear</td>
<td>330</td>
<td>370</td>
<td>&gt; 80</td>
<td>lateral A+</td>
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<td></td>
<td>IR12W</td>
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<td>central A+</td>
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<td></td>
<td>IR12W</td>
<td>563937</td>
<td>220–240</td>
<td>12</td>
<td>neutral white</td>
<td>3700...4200</td>
<td>clear</td>
<td>380</td>
<td>400</td>
<td>&gt; 80</td>
<td>lateral A+</td>
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<tr>
<td></td>
<td>IR12W</td>
<td>563938</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>central A+</td>
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</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Tape thickness</th>
<th>Thermal conductivity</th>
<th>Breakdown voltage*</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>–</td>
<td>Thermoconductive adhesive tape Ø 37 mm</td>
<td>0.25 mm</td>
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<tr>
<td>–</td>
<td>–</td>
<td>Thermoconductive transfer tape, non-adhesive Ø 32 mm</td>
<td>0.25 mm</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>Thermoconductive transfer tape, adhesive on both sides Ø 37 mm</td>
<td>0.19 mm</td>
</tr>
</tbody>
</table>

* Average value (not for specification purpose) | ** For use in luminaires of protection class I (has to be tested in luminaire)
ADVANTAGES OF
VS LED DOWNLIGHTS

LED Recessed Mounted Downlight and DecoLEDs
The integration of solid state lighting technology into conventional downlights provides optimal light distribution and extended life time, all at an affordable price. LED downlights are fully compatible with existing conventional downlight infrastructure, and are the perfect choice for both new and replacement markets.

- **PRO SERIES**
  - Slim design for easy installation in low false ceiling
  - Integrated driver, direct connection to mains without additional connectors and/or junction box
  - Dimmable with regular phase-cut dimmer

- **PRIME SERIES**
  - Very high efficiency of up to 100 lm/W
  - Slim design for easy installation in low false ceiling
  - High CRI ≥ 90
  - Dimmable with external dimmable drivers

- **DecoLED**
  - Slim design for easy installation in low false ceiling
  - Integrated driver, direct connection to mains
  - Dimmable with regular phase-cut dimmer
  - Swiveling LED module (± 30°)
Pro Series

12 W / 18 W

Voltage supply: 220–240 V AC
Integrated dimmable driver for direct connection to mains voltage
Allowed operating temperature: -10 to 50 °C
Allowed storage temperature: -10 to 50 °C
Screw terminals: 2.5 mm²
Quantity of screw terminals: 1x2-poles primary
Protection class II
SELV
Degree of protection: IP20
Service life time: > 35,000 hours (L50)

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Luminous flux lm</th>
<th>Efficiency lm/W</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Dimming</th>
<th>Power factor</th>
<th>System power W</th>
<th>Energy efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro - 12 W</td>
<td>DLPRO-12.3000-110 550880</td>
<td>warm white 3000 850 71 110 ≥ 80 yes &gt; 0.9</td>
<td>12  A+</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pro - 18 W</td>
<td>DLPRO-18.3000-110 550885</td>
<td>warm white 3000 1350 75 110 ≥ 80 yes &gt; 0.9</td>
<td>18  A</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</table>
**Typical Luminance**

*At 1, 2 and 3 meters*

**Pro**

<table>
<thead>
<tr>
<th>Colour temperature</th>
<th>Pro 12 W</th>
<th></th>
<th>Pro 18 W</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 m</td>
<td>2 m</td>
<td>3 m</td>
<td>1 m</td>
</tr>
<tr>
<td>Warm white 3000 K</td>
<td>335</td>
<td>84</td>
<td>37</td>
<td>510</td>
</tr>
<tr>
<td>Neutral white 4000 K</td>
<td>380</td>
<td>95</td>
<td>42</td>
<td>620</td>
</tr>
</tbody>
</table>
**Prime L Series**

**12 W / 26 W**

Current supply:
- for 12 W downlight: 350 mA DC
- for 26 W downlight: 700 mA DC

Forward voltage: 37 V

Allowed operating temperature: -40 to 45 °C

Allowed storage temperature: -40 to 60 °C

Dimmable (dimmable LED drivers see from page 168 on)

Primary lead: PVC-insulation, length: 200 mm

**Protection class III**

Degree of protection: IP20

Service life time: > 50,000 hours (L70)

---

**Type** | **Ref. No.** | **Colour** | **Luminous flux** (lm) | **Efficiency** (lm/W) | **Beam angle** (°) | **CRI** (Ra) | **Front plate transparency** | **Power** (W) | **Energy efficiency**
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
**Prime L – 12 W**
DL-PRIME-L-12-3000-60-C | 550890 | warm white | 3000 | 1240 | 105 | 45 | ≥ 90 | 99% clear | 12 | A++
DL-PRIME-L-12-3000-80-D | 550891 | warm white | 3000 | 1130 | 95 | 80 | ≥ 90 | 87% diffuse | 12 | A++
DL-PRIME-L-12-4000-60-C | 550892 | neutral white | 4000 | 1390 | 115 | 45 | ≥ 90 | 99% clear | 12 | A++
DL-PRIME-L-12-4000-80-D | 550893 | neutral white | 4000 | 1240 | 105 | 80 | ≥ 90 | 87% diffuse | 12 | A++

**Prime L – 26 W**
DL-PRIME-L-26-3000-50-C | 550894 | warm white | 3000 | 2310 | 92 | 50 | ≥ 90 | 99% clear | 26 | A++
DL-PRIME-L-26-3000-80-D | 550895 | warm white | 3000 | 2200 | 88 | 80 | ≥ 90 | 87% diffuse | 26 | A++
DL-PRIME-L-26-4000-50-C | 550896 | neutral white | 4000 | 2400 | 92 | 50 | ≥ 90 | 99% clear | 26 | A++
DL-PRIME-L-26-4000-80-D | 550897 | neutral white | 4000 | 2250 | 88 | 80 | ≥ 90 | 87% diffuse | 26 | A++

Prime H Series

12 W / 26 W / 38 W and 40 W

Current supply
- for 12 W downlight: 350 mA DC
- for 26 W downlight: 700 mA DC
- for 38 W/40 W downlight: 1050 mA DC

Forward voltage: 37 V

Allowed operating temperature: -40 to 45 °C
Allowed storage temperature: -40 to 60 °C

Dimmable [dimmable LED drivers see from page 168 on]

Primary lead: PVC-insulation, length:
- 200 mm [12 W and 26 W]
- 300 mm [38 W and 40 W]

Protection class III

Degree of protection: IP20

Service life time: > 50,000 hours (L70)

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Colour temperature K</th>
<th>Luminous flux lm</th>
<th>Efficiency lm/W</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Front plate transparency</th>
<th>Power W</th>
<th>Energy efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime H – 12 W</td>
<td>DLPrimeH12-3000-50-C</td>
<td>550898</td>
<td>warm white</td>
<td>3000</td>
<td>895</td>
<td>75</td>
<td>50</td>
<td>≥ 90</td>
<td>99% clear</td>
<td>12</td>
</tr>
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<td>DLPrimeH12-3000-60-D</td>
<td>550899</td>
<td>warm white</td>
<td>3000</td>
<td>765</td>
<td>65</td>
<td>60</td>
<td>≥ 90</td>
<td>87% diffuse</td>
<td>12</td>
</tr>
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<td>DLPrimeH12-4000-50-C</td>
<td>550900</td>
<td>neutral white</td>
<td>4000</td>
<td>1010</td>
<td>85</td>
<td>50</td>
<td>≥ 90</td>
<td>99% clear</td>
<td>12</td>
</tr>
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<td>DLPrimeH12-4000-60-D</td>
<td>550901</td>
<td>neutral white</td>
<td>4000</td>
<td>840</td>
<td>70</td>
<td>60</td>
<td>≥ 90</td>
<td>87% diffuse</td>
<td>12</td>
</tr>
<tr>
<td>Prime H – 26 W</td>
<td>DLPrimeH26-3000-40-C</td>
<td>550902</td>
<td>warm white</td>
<td>3000</td>
<td>2140</td>
<td>85</td>
<td>40</td>
<td>≥ 90</td>
<td>99% clear</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>DLPrimeH26-3000-70-D</td>
<td>550903</td>
<td>warm white</td>
<td>3000</td>
<td>1820</td>
<td>70</td>
<td>70</td>
<td>≥ 90</td>
<td>87% diffuse</td>
<td>26</td>
</tr>
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<td>DLPrimeH26-4000-40-C</td>
<td>550904</td>
<td>neutral white</td>
<td>4000</td>
<td>2170</td>
<td>85</td>
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<td>≥ 90</td>
<td>99% clear</td>
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<tr>
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<td>DLPrimeH26-4000-70-D</td>
<td>550905</td>
<td>neutral white</td>
<td>4000</td>
<td>1915</td>
<td>70</td>
<td>70</td>
<td>≥ 90</td>
<td>87% diffuse</td>
<td>26</td>
</tr>
<tr>
<td>Prime H – 38 W / 40 W</td>
<td>DLPrimeH38-3000-40-C</td>
<td>550906</td>
<td>warm white</td>
<td>3000</td>
<td>3240</td>
<td>85</td>
<td>40</td>
<td>≥ 90</td>
<td>99% clear</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>DLPrimeH38-3000-75-D</td>
<td>550907</td>
<td>warm white</td>
<td>3000</td>
<td>3000</td>
<td>80</td>
<td>75</td>
<td>≥ 90</td>
<td>87% diffuse</td>
<td>38</td>
</tr>
<tr>
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<td>DLPrimeH40-4000-40-C</td>
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<td>4000</td>
<td>3240</td>
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<td>40</td>
<td>≥ 90</td>
<td>99% clear</td>
<td>40</td>
</tr>
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<td>DLPrimeH40-4000-75-D</td>
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<td>neutral white</td>
<td>4000</td>
<td>2930</td>
<td>75</td>
<td>75</td>
<td>≥ 90</td>
<td>87% diffuse</td>
<td>40</td>
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</table>

# Typical Luminance

**At 1, 2 and 3 meters**

## Prime L

<table>
<thead>
<tr>
<th>Colour temperature</th>
<th>Prime L 12 W</th>
<th></th>
<th>Prime L 26 W</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 m</td>
<td>2 m</td>
<td>3 m</td>
<td>1 m</td>
</tr>
<tr>
<td>Warm white 3000 K — 99% clear</td>
<td>1270</td>
<td>318</td>
<td>140</td>
<td>1995</td>
</tr>
<tr>
<td>Warm white 3000 K — 87% diffuse</td>
<td>580</td>
<td>145</td>
<td>65</td>
<td>1065</td>
</tr>
<tr>
<td>Neutral white 4000 K — 99% clear</td>
<td>1395</td>
<td>350</td>
<td>155</td>
<td>2060</td>
</tr>
<tr>
<td>Neutral white 4000 K — 87% diffuse</td>
<td>625</td>
<td>155</td>
<td>70</td>
<td>1075</td>
</tr>
</tbody>
</table>

## Prime H

<table>
<thead>
<tr>
<th>Colour temperature</th>
<th>Prime H 12 W</th>
<th></th>
<th>Prime H 26 W</th>
<th></th>
<th>Prime H 38 W / 40 W</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 m</td>
<td>2 m</td>
<td>3 m</td>
<td>1 m</td>
<td>2 m</td>
<td>3 m</td>
</tr>
<tr>
<td>Warm white 3000 K — 99% clear</td>
<td>1120</td>
<td>280</td>
<td>125</td>
<td>3600</td>
<td>900</td>
<td>400</td>
</tr>
<tr>
<td>Warm white 3000 K — 87% diffuse</td>
<td>600</td>
<td>150</td>
<td>68</td>
<td>1210</td>
<td>302</td>
<td>135</td>
</tr>
<tr>
<td>Neutral white 4000 K — 99% clear</td>
<td>1260</td>
<td>315</td>
<td>140</td>
<td>3600</td>
<td>900</td>
<td>400</td>
</tr>
<tr>
<td>Neutral white 4000 K — 87% diffuse</td>
<td>660</td>
<td>165</td>
<td>74</td>
<td>1290</td>
<td>323</td>
<td>144</td>
</tr>
</tbody>
</table>
VS DecoLED

Complete LEDSpot equipped with optics, heatsink, leads and metal frame

Technical notes
For direct connection to mains voltage
Mains voltage: 220–240 V, 50/60 Hz
Power factor: > 0.9
Metal frame, round
For cut-out: 74 mm
Swiveling LED module (± 30°)
Beam angle: 38°
Allowed operating temperature: -10 to 40 °C
Phase-cut dimmable (trailing-edge dimmers are preferred)
Leads: Cu tinned, stranded conductors 0.5 mm²
Si-insulation and sleeve
With integrated dimmable driver
Degree of protection: IP20
Weight: 160 g

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Colour temperature</th>
<th>Luminous flux</th>
<th>Light intensity at 230 V</th>
<th>Beam angle</th>
<th>CRI</th>
<th>Max. output</th>
<th>Energy efficiency</th>
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<td>690</td>
<td>38</td>
<td>80</td>
<td>7</td>
<td>A+</td>
</tr>
</tbody>
</table>
CONVENIENT LED TECHNOLOGY

As the perfect replacement for halogen lamps, these LED modules are ideal for use in furniture, false ceilings as well as cooker hoods.

These LEDSpots are available with high-power LEDs or with COB technology featuring a capacity range of 3–30 W. These modules are equipped with optics or reflectors depending on the field of application and heat sinks for a proper thermal management of the LED. Some versions also have fixing frames for easy installation.

The package is rounded off by a matching LED driver housed in a compact casing plus a set of cables with pre-assembled plugs for connecting up to five LED modules.

**Typical applications for LEDSpots**
- Replacement of more residential lamps (AR111, MR16, MR11)
- Integration in luminaires (except PRO series)
- Retail lighting
- Marking paths, stairs, etc.
- Furniture lighting (IP54 version for humid rooms)
- Light advertising
- Entertainment

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

Please read the safety and installation instructions on the individual products as well as further technical information provided in the extensive product descriptions at www.vossloh-schwabe.com.
LEDSpots at a Glance

The use of LEDs offers many advantages in comparison to conventional lighting solutions.

**ShopLine series**
- Replacement for HID lamps 20–150 W
- Built-in spot with heat sink based on LUGA modules
- Reflector for homogeneous light distribution

**ActiveLine series**
- Replacement for Halogen lamps up to 75 W and HID lamps 20–35 W (MR16)
- Built-in spot with heat sink based on LUGA or other COB modules
- Reflector or optics for homogeneous light distribution

**Complete LEDspots with frame**
- Replacement for Halogen lamps 20–35 W
- Flat LED spot with heat sink and frame based on COB or SMD modules
- For built-in into ceilings or metal sheets
ShopLine 111

Built-in LEDSpot equipped with a reflector, heat sink and leads – Replacement for AR111

Technical notes

Reflector: Ø 111 mm
Heat sink material: aluminium
Max. operating temperature at tp point:
- 99 °C: Type C125/C128
- 80 °C: Type S150
Lumen maintenance: (L90/B10) 50,000 hrs.
- 60 °C: Type C125/C128
- 70 °C: Type S150

Temperature depends on installation situation and has to be checked by the luminaire manufacturer.

Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM

Use of external LED constant-current drivers

The ceramic PCB ensures optimum thermal management

Plastic clear cover to protect reflector (opaque cover on request)

Fixation

- reflector: front and back of rim
- heat sink: lateral fixation with M5 screws and nuts or rear side fixation with tapping screws ST2.9

Leads: Cu tinned, stranded conductors 0.5 mm², FEP-insulation and neoprene sleeve, length: 300 mm

With integrated cord grip

Packaging unit: 6 pcs.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>H1</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mm</td>
<td>99.65 mm</td>
<td>310</td>
</tr>
<tr>
<td>60 mm</td>
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<td>430</td>
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<td>139.65 mm</td>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature</th>
<th>Typ. luminous flux and typical voltage (U typ.)</th>
<th>Light intensity at max. current</th>
<th>Beam angle</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
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</thead>
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<tr>
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<td>Pd</td>
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<td>1435</td>
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<td>1480</td>
<td>1985</td>
<td>-</td>
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<td>1435</td>
<td>1930</td>
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<td>1400</td>
<td>1885</td>
<td>-</td>
<td>3200</td>
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<td>1445</td>
<td>1940</td>
<td>-</td>
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* Versions with other colour temperature, CRI 95 or pearl white on request | Versions with white reflector for extra wide beam angle on request

* Production tolerance of luminous flux, voltage and power consumption: ±10%
### ShopLine 111

<table>
<thead>
<tr>
<th>Type</th>
<th>Colour</th>
<th>Type</th>
<th>Correlated Colour Temperature</th>
<th>Typ. luminous flux and typical voltage ((U_{typ})) and power consumption (P&lt;sub&gt;el&lt;/sub&gt;)</th>
<th>Light intensity at max. current</th>
<th>Beam angle</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>350 mA m</td>
<td>500 mA m</td>
<td>700 mA m</td>
<td>(P_{el} = 11.6) W</td>
<td>(U_{typ} = 33.2) V</td>
<td>(P_{el} = 16.9) W</td>
<td>(U_{typ} = 33.9) V</td>
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<td>1550</td>
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<td>2175</td>
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<td>1510</td>
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<td>1560</td>
<td>2125</td>
<td>2820</td>
<td>4350</td>
<td>38</td>
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<tr>
<td>H1 = 80 mm (heat sink height)</td>
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<td>3000</td>
<td>1875</td>
<td>2600</td>
<td>3500</td>
<td>21000</td>
<td>18</td>
</tr>
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<td></td>
<td>Shopline 111 S150</td>
<td>neutral white</td>
<td>4000</td>
<td>1945</td>
<td>2700</td>
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<td>1895</td>
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<td>2735</td>
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<td>2735</td>
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<td>7200</td>
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</tbody>
</table>

*Versions with other colour temperature, CRI 95 or pearl white on request | Versions with white reflector for extra wide beam angle on request*

* Production tolerance of luminous flux, voltage and power consumption: ±10%
NEXT 111

Built-in LEDSpot equipped with an interchangeable reflector, heat sink and leads – Replacement for AR111

Technical notes
Reflector: Ø 111 mm, interchangeable
Heat sink material: aluminium
Max operating temperature at tp point:
  99 °C: Type C125/C128
  80 °C: Type S150
Lumen maintenance: L90/B10: 50,000 hrs.
  60 °C: Type C125/C128
  70 °C: Type S150
Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM
Use of external LED constant-current drivers
The ceramic PCB ensures optimum thermal management
Plastic clear cover to protect reflector (opaque cover on request)
Fixation
  reflector: front rim
  heat sink: lateral fixation with M5 screws and nuts
  or rear side fixation with self-tapping screws ST2.9
Leads: Cu tinned, stranded conductors 0.5 mm², FEP-insulation and neoprene sleeve, length: 300 mm
With integrated cord grip
Packaging unit: 6 pcs.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>H1</td>
<td>H</td>
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<tr>
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<td>119.65 mm</td>
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<tr>
<td>80 mm</td>
<td>139.65 mm</td>
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LEDSpots for Retail Lighting – HID Replacement
## LEDSpots for Retail Lighting – HID Replacement

### NEXT 111

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage (U typ.)</th>
<th>Beam angle 10°</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>350 mA</td>
<td>500 mA</td>
<td>700 mA</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>m</td>
<td>m</td>
<td>m</td>
<td></td>
</tr>
<tr>
<td>H1 = 40 mm (heat sink height)</td>
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<td></td>
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<tr>
<td>H1 = 60 mm (heat sink height)</td>
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<td>1600</td>
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<td>2880</td>
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<td>1560</td>
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<tr>
<td>H1 = 80 mm (heat sink height)</td>
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</tbody>
</table>

 Versions with other colour temperature, CRI 95 or pearl white on request. Versions with white reflector for extra wide beam angle on request.

* Production tolerance of luminous flux, voltage and power consumption: ±10%.

### With Zhaga adaptor for aluminium reflectors

**Reflector size**
- top: Ø 94 mm
- bottom: Ø 40 mm
- height: 50 mm

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage (U typ.)</th>
<th>Beam angle 10°</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>350 mA</td>
<td>500 mA</td>
<td>700 mA</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>m</td>
<td>m</td>
<td>m</td>
<td></td>
</tr>
<tr>
<td>H1 = 40 mm (heat sink height)</td>
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<td>H1 = 60 mm (heat sink height)</td>
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<td>H1 = 80 mm (heat sink height)</td>
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</table>

 Versions with other colour temperature, CRI 95 or pearl white on request. Versions with white reflector for extra wide beam angle on request.

* Production tolerance of luminous flux, voltage and power consumption: ±10%.
**NEXT 111 R**

**Built-in LEDSpot equipped with an interchangeable aluminium reflector, heat sink and leads**
- Replacement for AR111

**Technical notes**
For direct connection to mains voltage
Mains voltage: 220–240 V, 50/60 Hz
Power factor: > 0.95
Reflector: Ø 111 mm (with flange), aluminium, bayonet fixing
Heat sink material: aluminium
Max operating temperature at to point: 85 °C
Lumen maintenance:
L70/B50, 50,000 hrs. at 70 °C
Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
Colour accuracy initially: 3 SDCM
Plastic clear cover to protect reflector (opaque cover on request)
Fixation
  - reflector: front rim
  - heat sink: lateral fixation with M5 screws and nuts
  - or rear side fixation with self-tapping screws ST2.9
Leads:
- Cu tinned, stranded conductors 0.5 mm²,
- FEP/FEP-insulation, length: 300 mm
With integrated cord grip
Weight: 430 g
Packaging unit: 6 pcs.

<table>
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<th>Type</th>
<th>Ref. No. for black LEDSpots</th>
<th>Ref. No. for white LEDSpots</th>
<th>Mains voltage AC 50/60 Hz V</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux* lm</th>
<th>Light intensity at 230 V Candela</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Power consumption at 230 V W</th>
<th>Energy efficiency at 230 V</th>
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<td>Next 111 R 20</td>
<td>561716</td>
<td>561722</td>
<td>220–240</td>
<td>neutral white</td>
<td>4000</td>
<td>1520</td>
<td>4100</td>
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<td>20</td>
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<tr>
<td>Next 111 R 20</td>
<td>561717</td>
<td>561723</td>
<td>220–240</td>
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<td>3000</td>
<td>1455</td>
<td>2330</td>
<td>36</td>
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<td>20</td>
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</tr>
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<td>561718</td>
<td>561724</td>
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<td>2480</td>
<td>36</td>
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<td>20</td>
<td>A+</td>
</tr>
</tbody>
</table>

* Production tolerance of luminous flux: ±10%
ShopLine 85

Built-in LEDSpot equipped with a reflector, heat sink and leads

Technical notes
Reflector: Ø 85 mm
Heat sink material: aluminium
Max operating temperature at tp point: 99 °C
Lumen maintenance: L90/B10; 50,000 hrs. at 60 °C
Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM
Use of external LED constant-current drivers
The ceramic PCB ensures optimum thermal management
Fixation
heat sink: lateral fixation with M5 screws and nuts
or rear side fixation with self-tapping screws ST2.9
Leads: Cu tinned, stranded conductors 0.5 mm²,
FEP-insulation and PVC sleeve, length: 300 mm
With integrated cord grip
Weight: 360 g
Packaging unit: 6 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage (Utyp.) and power consumption (Pd)</th>
<th>Light intensity at max. current Candela</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td>ShopLine 85 C125</td>
<td></td>
<td></td>
<td></td>
<td>Pd = 12 W Utyp. = 34.2 V Utyp. = 35.1 V</td>
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<tr>
<td>Shopline B5 C125</td>
<td>561679</td>
<td>warm white</td>
<td>3000</td>
<td>1470 1970 - 30500 10 85 A+</td>
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<tr>
<td>Shopline B5 C125</td>
<td>561680</td>
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<td>1515 2030 - 31600 10 85 A++</td>
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<td>Shopline B5 C125</td>
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<td>3000</td>
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<td>1515 2030 - 6600 24 85 A++</td>
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<td>1435 1930 - 3450 36 85 A+</td>
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<td>4000</td>
<td>1480 1983 - 3600 36 85 A+</td>
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<tr>
<td>ShopLine 85 C128</td>
<td></td>
<td></td>
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<td>Pd = 11.6 W Utyp. = 33.2 V Utyp. = 33.9 V</td>
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<tr>
<td>Shopline B5 C128</td>
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<td>1580 2165 2860 30200 12 85 A++</td>
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<tr>
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<td>4000</td>
<td>1630 2225 2950 8000 24 85 A++</td>
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<td>1600 2175 2880 4800 38 85 A++</td>
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</table>

* Production tolerance of luminous flux, voltage and power consumption: ±10%
EVO90

Built-in LEDSpot equipped with an interchangeable aluminium reflector, heat sink and leads

Technical notes
Reflector: Ø 90 mm, aluminium, bayonet fixing
Holder: PC, inner ring: metallized
Heat sink material: aluminium
Max operating temperature at tp point: 99 °C
Lumen maintenance:
L90/B10: 50,000 hrs. at 60 °C
Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM
Use of external LED constant-current drivers
The ceramic PCB ensures optimum thermal management
Fixation
heat sink: lateral fixation with M5 screws and nuts
or rear side fixation with self-tapping screws ST2.9
Leads: Cu tinned, stranded conductors 0.5 mm²,
FEP insulation and PVC sleeve, length: 300 mm
With integrated cord grip
Weight: 280/360 g (C125/C128)
Packaging unit: 6 pcs.

EVO90 C125

EVO90 C128
### EVO90

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage (U_{typ}) and power consumption (P_{el})* at max. angle at max. temperature</th>
<th>Light intensity at max. current Candela</th>
<th>Beam angle</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EVO90 C125</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| EVO90 C125   | 561745   | warm white   | 3000                            | P_{el} = 12 W
U_{typ} = 34.2 V                                                                                                  | 19200                                  | 12          | 85  | A+                              |
| EVO90 C125   | 561746   | neutral white| 4000                            | P_{el} = 17.6 W
U_{typ} = 35.1 V                                                                                                  | 20000                                  | 12          | 85  | A++                             |
| EVO90 C125   | 561747   | warm white   | 3000                            | —                                                                  | —                                      | —          | —   | —                               |
| EVO90 C125   | 561748   | neutral white| 4000                            | —                                                                  | —                                      | —          | —   | —                               |
| EVO90 C125   | 561749   | warm white   | 3000                            | —                                                                  | —                                      | —          | —   | —                               |
| EVO90 C125   | 561750   | neutral white| 4000                            | —                                                                  | —                                      | —          | —   | —                               |
| **EVO90 C128** |          |              |                                 |                                                                                                                 |                                        |            |     |                                 |
| EVO90 C128   | 561837   | warm white   | 3000                            | P_{el} = 11.6 W
U_{typ} = 33.2 V                                                                                                  | 21000                                  | 14          | 85  | A++                             |
| EVO90 C128   | 561838   | neutral white| 4000                            | P_{el} = 16.9 W
U_{typ} = 33.9 V                                                                                                  | 21900                                  | 14          | 85  | A++                             |
| EVO90 C128   | 561839   | warm white   | 3000                            | P_{el} = 11.6 W
U_{typ} = 33.2 V                                                                                                  | 21000                                  | 14          | 85  | A++                             |
| EVO90 C128   | 561840   | neutral white| 4000                            | P_{el} = 16.9 W
U_{typ} = 33.9 V                                                                                                  | 21900                                  | 14          | 85  | A++                             |
| EVO90 C128   | 561841   | warm white   | 3000                            | P_{el} = 16.9 W
U_{typ} = 33.9 V                                                                                                  | 21900                                  | 14          | 85  | A++                             |
| EVO90 C128   | 561843   | neutral white| 4000                            | P_{el} = 16.9 W
U_{typ} = 33.9 V                                                                                                  | 21900                                  | 14          | 85  | A++                             |

* Versions with other colour temperature, CRI 95 or pearl white on request
* Production tolerance of luminous flux, voltage and power consumption: ±10%
**EVO90 R**

**Built-in LEDSpot equipped with an interchangeable aluminium reflector, heat sink and leads**

**Technical notes**

For direct connection to mains voltage
- Mains voltage: 220–240 V, 50/60 Hz
- Power factor: > 0.95
- Reflector: Ø 90 mm, aluminium, bayonet fixing
- Holder: PC, inner ring: metallized
- Heat sink material: aluminium
- Max. operating temperature at tp point: 85 °C
- Lumen maintenance: L70/B50; 50,000 hrs. at 70 °C
- Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
- Colour accuracy initially: 3 SDCM

**Fixation**
- heat sink: lateral fixation with M5 screws and nuts
- or rear side fixation with self-tapping screws ST2.9
- Leads: Cu tinned, stranded conductors 0.5 mm², FEP/FEP-insulation, length: 350 mm
- With integrated cord grip
- Weight: 360 g
- Packaging unit: 6 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage AC 50/60 Hz</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux* lumen</th>
<th>Light intensity at 230 V Candela</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Power consumption at 230 V W</th>
<th>Energy efficiency at 230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVO90 R 20</td>
<td>561757</td>
<td>220–240</td>
<td>warm white</td>
<td>3000</td>
<td>1515</td>
<td>9200</td>
<td>14</td>
<td>80</td>
<td>20</td>
<td>A</td>
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<tr>
<td>EVO90 R 20</td>
<td>561758</td>
<td>220–240</td>
<td>neutral white</td>
<td>4000</td>
<td>1600</td>
<td>9900</td>
<td>14</td>
<td>80</td>
<td>20</td>
<td>A+</td>
</tr>
<tr>
<td>EVO90 R 20</td>
<td>561759</td>
<td>220–240</td>
<td>warm white</td>
<td>3000</td>
<td>1515</td>
<td>4400</td>
<td>24</td>
<td>80</td>
<td>20</td>
<td>A</td>
</tr>
<tr>
<td>EVO90 R 20</td>
<td>561760</td>
<td>220–240</td>
<td>neutral white</td>
<td>4000</td>
<td>1600</td>
<td>4580</td>
<td>24</td>
<td>80</td>
<td>20</td>
<td>A+</td>
</tr>
<tr>
<td>EVO90 R 20</td>
<td>561761</td>
<td>220–240</td>
<td>warm white</td>
<td>3000</td>
<td>1495</td>
<td>2450</td>
<td>36</td>
<td>80</td>
<td>20</td>
<td>A</td>
</tr>
<tr>
<td>EVO90 R 20</td>
<td>561762</td>
<td>220–240</td>
<td>neutral white</td>
<td>4000</td>
<td>1580</td>
<td>2690</td>
<td>36</td>
<td>80</td>
<td>20</td>
<td>A+</td>
</tr>
</tbody>
</table>

* Production tolerance of luminous flux: ±10%
**EVO75**

**Built-in LEDSpot equipped with an interchangeable aluminium reflector, heat sink and leads**

**Technical notes**
- **Reflector:** Ø 75 mm, aluminium, bayonet fixing
- **Holder:** PC, metalized
- **Heat sink material:** aluminium
- **Max operating temperature at t<sub>p</sub> point:** 99 °C
- **Lumen maintenance:**
  - L90/B10: 50,000 hrs. at 60 °C
  - Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
- **Colour accuracy initially:** 3 SDCM;
  - after 50,000 hrs. operating time: 4 SDCM
- **Use of external LED constant-current drivers**
- **The ceramic PCB ensures optimum thermal management**
- **Fixation**
  - heat sink: lateral fixation with M5 screws and nuts or rear side fixation with self-tapping screws ST2.9
  - Leads: Cu tinned, stranded conductors 0.5 mm², FEP insulation and PVC sleeve, length: 300 mm
- **With integrated cord grip**
- **Weight:** 280 g
- **Packaging unit:** 6 pcs.

### Performance Parameters

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage (U&lt;sub&gt;typ&lt;/sub&gt;) and power consumption (P&lt;sub&gt;e&lt;/sub&gt;)*</th>
<th>Light intensity at max. current Candela</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVO75 C125</td>
<td>561739</td>
<td>warm white</td>
<td>3000</td>
<td>P&lt;sub&gt;e&lt;/sub&gt; = 12 W; U&lt;sub&gt;typ&lt;/sub&gt; = 34.2 V</td>
<td>1470</td>
<td>1970</td>
<td>14100</td>
<td>14</td>
</tr>
<tr>
<td>EVO75 C125</td>
<td>561740</td>
<td>neutral white</td>
<td>4000</td>
<td>P&lt;sub&gt;e&lt;/sub&gt; = 17.6 W; U&lt;sub&gt;typ&lt;/sub&gt; = 35.1 V</td>
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<td>2030</td>
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<tr>
<td>EVO75 C125</td>
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<td>warm white</td>
<td>3000</td>
<td>P&lt;sub&gt;e&lt;/sub&gt; = 14.85 W; U&lt;sub&gt;typ&lt;/sub&gt; = 1993 V</td>
<td>1485</td>
<td>1970</td>
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<tr>
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<td>561742</td>
<td>neutral white</td>
<td>4000</td>
<td>P&lt;sub&gt;e&lt;/sub&gt; = 20.55 W; U&lt;sub&gt;typ&lt;/sub&gt; = 2055 V</td>
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<td>5000</td>
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<tr>
<td>EVO75 C125</td>
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<td>warm white</td>
<td>3000</td>
<td>P&lt;sub&gt;e&lt;/sub&gt; = 34.00 W; U&lt;sub&gt;typ&lt;/sub&gt; = 3380 V</td>
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<td>1970</td>
<td>3400</td>
<td>32</td>
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<tr>
<td>EVO75 C125</td>
<td>561744</td>
<td>neutral white</td>
<td>4000</td>
<td>P&lt;sub&gt;e&lt;/sub&gt; = 34.80 W; U&lt;sub&gt;typ&lt;/sub&gt; = 3840 V</td>
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<td>2030</td>
<td>3480</td>
<td>32</td>
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</tbody>
</table>

*Versions with other colour temperature, CRI 95 or pearl white on request*

* Production tolerance of luminous flux, voltage and power consumption: ±10%
**EVO75 R**

**Built-in LEDSpot equipped with an interchangeable aluminium reflector, heat sink and leads**

**Technical notes**

For direct connection to mains voltage

Mains voltage: 220–240 V, 50/60 Hz

Power factor: > 0.95

Reflector: Ø 75 mm, aluminium, bayonet fixing

Holder: PC, inner ring: metallized

Heat sink material: aluminium

Max operating temperature at tp point: 85 °C

Lumen maintenance:

L70/B50; 50,000 hrs. at 70 °C

Temperature depends on installation situation and has to be checked by the luminaire manufacturer.

Colour accuracy initially: 3 SDCM

The aluminium PCB ensures optimum thermal management

Fixation heat sink: lateral fixation with M5 screws and nuts

or rear side fixation with self-tapping screws ST2.9

Leads: Cu tinned, stranded conductors 0.5 mm², FEP/FEP-insulation and neoprene sleeve, length: 300 mm

With integrated cord grip

Weight: 280 g

Packaging unit: 6 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage AC</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux*</th>
<th>Light intensity at 230 V</th>
<th>CRI</th>
<th>Beam angle</th>
<th>Power consumption at 230 V</th>
<th>Energy efficiency at 230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVO75 R 10</td>
<td>561751</td>
<td>220–240</td>
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<td>3000</td>
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<td>A+</td>
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<td>EVO75 R 10</td>
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<td>4000</td>
<td>760</td>
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<td>760</td>
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<td>760</td>
<td>1430</td>
<td>32</td>
<td>80</td>
<td>10</td>
<td>A+</td>
</tr>
</tbody>
</table>

* Production tolerance of luminous flux ± 10%
Reflectors and Holders for EVO and NEXT 111

Exchangeable aluminum reflectors
Technical notes
Reflectors made of aluminium with bayonet fixation
Surface: anodised
Weight: 27/17 g (D90/D75)
Packaging unit: 18 pcs.

Usage and maintenance
If necessary clean reflectors with mild soap, water and soft cloth.
Never use any commercial cleaning solvents on reflectors, like alcohol.
Please handle or install reflectors with wearing gloves, skin oils may damage reflector or its optical characteristic.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Beam characteristic</th>
<th>Beam angle (*)</th>
<th>EVO 90, EVO 75</th>
<th>EVO 90, EVO 75</th>
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<td>DMC128</td>
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<td>R 20</td>
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<td>Reflector D90 – H = 50</td>
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<tr>
<td>557359</td>
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<td>12</td>
<td>14</td>
<td>14*</td>
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<td>24*</td>
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<td>36*</td>
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<td>557154</td>
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<td>60</td>
<td>60**</td>
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</tr>
</tbody>
</table>

* On request | ** Only for EVO 90 on request

It’s possible to use all the reflectors on the same holder.

Holders
Material: PC, inner ring: metallized
Packaging unit: 72 pcs.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>For COB Type</th>
<th>Protection on LES</th>
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</thead>
<tbody>
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<tr>
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</table>
**ActiveLine LUGA**

Built-in LEDSpot equipped with a reflector, heat sink and leads

**Technical notes**
- Reflector: Ø 50 mm
- Heat sink material: aluminium
- The ceramic PCB ensures optimum thermal management
- Plastic clear cover to protect reflector (opaque cover on request)
- Use of external LED constant-current drivers
- Version with plug on request

---

**ActiveLine**

**9.1 / 7.1 / 6.1 / HALO / Quad**

Built-in LEDSpot equipped with a reflector, heat sink and leads

**Technical notes**
- Reflector: Ø 50 mm
- Heat sink material: aluminium (Quad: thermoconductive resin)
- Aluminium PCB for optimum thermal management
- Plastic clear cover to protect reflector
- Use of external LED constant-current drivers
- Version with plug on request

---

**ActiveLine PRO**

Complete LEDSpots equipped with a reflector or optics, heat sink, leads and metal frame

Type and Ref. No. on request
ActiveLine LUGA C

Technical notes
Reflector: Ø 50 mm
Max operating temperature at tp point: 85 °C
Lumen maintenance: 190/B10: 50,000 hrs.
65 °C (350 mA)
60 °C (500 mA)
Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
Colour accuracy initially: 3 SDCM;
after 50,000 hrs. operating time: 4 SDCM
Leads: Cu tinned, stranded
cable conductors 0.5 mm², FEP-insulation
and neoprene sleeve, length: 200 mm
With integrated cord grip
Weight: 145/260 g [A/B]
Packaging unit: 45/24 pcs. [A/B]

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage (Uₚₑ) and power consumption [Pₑ]*</th>
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</thead>
<tbody>
<tr>
<td>Narrow beam angle: 25°</td>
<td></td>
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<td>Pₑ = 11 W, Uₚₑ = 31.4 V</td>
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<td>3000</td>
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<td>559400</td>
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<td>1275</td>
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<tr>
<td>Luga C 115 40K</td>
<td>559394</td>
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<tr>
<td></td>
<td>559403</td>
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<tr>
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<td></td>
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<td>500 mA m</td>
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<tr>
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<td>Pₑ = 16.3 W, Uₚₑ = 32.6 V</td>
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Versions with white reflector for extra wide beam angle on request

* Production tolerance of luminous flux, voltage and power consumption: ±10%
**ActiveLine LUGA C**

**Technical notes**
- Reflector: Ø 50 mm
- Max operating temperature at t₀ point: 85 °C
- Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
- Colour accuracy initially: 3 SDCM;
  - after 50,000 hrs. operating time: 4 SDCM
- Leads: Cu tinned, stranded conductors AWG22,
  - PVC-insulation, length: 200 mm
- With integrated cord grip
- Weight: 145 g
- Packaging unit: 45 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage (U珺) and power consumption (Pₑ)</th>
<th>Light intensity (I) at max. current (l m)</th>
<th>Beam angle</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
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</thead>
<tbody>
<tr>
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</table>

Versions with white reflector for extra wide beam angle on request

*Production tolerance of luminous flux, voltage and power consumption ±10%*
ActiveLine 9.1 & 7.1

Technical notes
Reflector: Ø 50 mm
Max. operating temperature at tp point: 85 °C
Lumen maintenance: 190/B30, 50,000 hrs. at 70 °C
Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
Colour accuracy initially: 3 SDCM
Heat sink material: aluminium
Leads: Cu tinned, stranded conductors AWG22,
PVC-insulation, length: 200 mm
With integrated cord grip
Weight: 145/95 g (9.1/7.1)
Packaging unit: 45 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage [Utyp.] and power consumption (Pel)*</th>
<th>Light intensity at max. current Candela</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
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</thead>
<tbody>
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<td>Medium beam angle: 36°</td>
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</table>

Versions with white reflector for extra wide beam angle on request

* Production tolerance of luminous flux, voltage and power consumption: ±10%
ActiveLine 6.1

Technical notes
Reflector: Ø 50 mm
Max. operating temperature at tp point: 85 °C
Lumen maintenance:
L90/B30; 50,000 hrs. at 70 °C
Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
Colour accuracy initially: 3 SDCM
Heat sink material: aluminium
Leads: Cu tinned, stranded conductors AWG22, PVC-insulation, length: 200 mm
With integrated cord grip
Weight: 95 g
Packaging unit: 45 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ. luminous flux and typical voltage (U_{typ.}) at 350 mA</th>
<th>Light intensity at max. current 350 mA</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Energy efficiency at max. current</th>
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</table>

Versions with white reflector for extra wide beam angle on request

*Production tolerance of luminous flux, voltage and power consumption: ±10%
**LEDSpot**

**ActiveLine HALO (3000–2000 K)**

Built-in LEDSpot equipped with a reflector, heat sink, leads and plug

**Technical Notes**
- Reflector: Ø 50 mm
- Heat sink material: aluminium
- Allowed operating temperature at t<sub>c</sub> point: -40 to 85 °C
- Lumen maintenance: 190/850, 50,000 hrs. at 70 °C
- Temperature depends on installation situation and has to be checked by the luminaire manufacturer.
- Colour accuracy initially: 3 SDCM
- Use of external LED constant-current drivers
- With analogue dimming function (no PWM)
- Plastic opaque cover to protect reflector (clear cover on request)
- Leads: Cu tinned, stranded conductors AWG22, PVC-insulation, length: 200 mm, with plug
- With integrated cord grip
- Weight: 145/260 g [A/B]
- Packaging unit: 45/24 pcs. [A/B]

**Electrical characteristics**

at t<sub>c</sub> = 25 °C

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage DC* [V]</th>
<th>Power consumption* [W]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 mA</td>
<td>350 mA</td>
<td>50 mA</td>
</tr>
<tr>
<td></td>
<td>min.</td>
<td>typ.</td>
<td>max.</td>
</tr>
<tr>
<td>ActiveLine HALO 6.6 W</td>
<td>all</td>
<td>12</td>
<td>14.3</td>
</tr>
<tr>
<td>ActiveLine HALO 12.8 W</td>
<td>all</td>
<td>26.4</td>
<td>31</td>
</tr>
</tbody>
</table>

**Optical characteristics**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Typ. luminous flux* [lm] and correlated colour temperature [K]</th>
<th>Light intensity at max. current [Candela]</th>
<th>Beam angle [°]</th>
<th>CRI</th>
<th>Drawing</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 mA</td>
<td>350 mA</td>
<td>50 mA</td>
<td>350 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ActiveLine HALO 6.6 W</td>
<td>561865</td>
<td>warm white</td>
<td>46lm/2000K</td>
<td>523lm/2800K</td>
<td>1000</td>
<td>25</td>
<td>90</td>
<td>A</td>
</tr>
<tr>
<td>ActiveLine HALO 6.6 W</td>
<td>561866</td>
<td>warm white</td>
<td>45lm/2000K</td>
<td>511lm/2800K</td>
<td>775</td>
<td>34</td>
<td>90</td>
<td>A</td>
</tr>
<tr>
<td>ActiveLine HALO 6.6 W</td>
<td>561867</td>
<td>warm white</td>
<td>47lm/2000K</td>
<td>530lm/2800K</td>
<td>480</td>
<td>48</td>
<td>90</td>
<td>A</td>
</tr>
<tr>
<td>ActiveLine HALO 12.8 W</td>
<td>559962</td>
<td>warm white</td>
<td>93lm/2000K</td>
<td>890lm/3000K</td>
<td>1800</td>
<td>25</td>
<td>90</td>
<td>B</td>
</tr>
<tr>
<td>ActiveLine HALO 12.8 W</td>
<td>559963</td>
<td>warm white</td>
<td>91lm/2000K</td>
<td>870lm/3000K</td>
<td>1300</td>
<td>34</td>
<td>90</td>
<td>B</td>
</tr>
<tr>
<td>ActiveLine HALO 12.8 W</td>
<td>559645</td>
<td>warm white</td>
<td>95lm/2000K</td>
<td>900lm/3000K</td>
<td>835</td>
<td>48</td>
<td>90</td>
<td>B</td>
</tr>
</tbody>
</table>

 Versions with white reflector for extra wide beam angle on request  
* Production tolerance of luminous flux, voltage and power consumption: ±10%
**ActiveLine Quad**

**Technical notes**
- Optics: Ø 50 mm
- Leads: Cu tinned, stranded conductors AWG22, PVC insulation, length: 300 mm
- ESD protection class 2
- Weight: 90 g
- Packaging unit: 45 pcs.

### Emission data at \( T_j = 85 \degree C \)

#### Production tolerance of luminous flux, voltage and power consumption: ±7%
LEDSpots

Complete LEDSpot equipped with optics, heat sink, leads and frame

As the perfect replacement for halogen lamps, these LED modules are ideal for use in furniture, false ceilings as well as cooker hoods.

These LED modules are available with high-power LEDs and different optics attachments. The circular or square metal frame is available in a white, silver, matt silver or gold finish. Furthermore, flexible snap-in fasteners make it extremely easy and quick to exchange halogen spots, which are still in widespread use.

The package is rounded off by a matching LED driver housed in a compact casing plus a set of cables with pre-assembled plugs for connecting up to five LED modules.

LEDSpot ILine
Metal frame, round
For cut-out: Ø 56 mm
Colour accuracy initially: 3 SDCM
Degree of protection: IP54
CRI: 80

LEDSpot SmartLine
Metal frame, round or square
For cut-out: Ø 56 mm
Colour accuracy initially: 3 SDCM
Degree of protection: IP40
CRI: 80

LEDSpot StartLine
Resin or steel frame, round
For cut-out: Ø 56 mm
Colour accuracy initially: 3 SDCM
Degree of protection: IP20
CRI: 80

LEDSpot FlatLine
Metal frame, round
For cut-out: Ø 56 mm
Degree of protection: IP20 (front part IP67)
CRI: 80

Surface Kit with mounted LEDSpot
Metal frame to use ILine, SmartLine, StartLine or FlatLine as surface mounting spots
Dimensions (ØxH): Ø 67 x 30 mm
Degree of protection: IP20

LEDSpot DiscLine
Metal frame, round
For cut-out: Ø 56 mm
Colour accuracy initially: 3 SDCM
Degree of protection: IP40
CRI: 80

LEDSpot EffectLine
Metal frame, round or square
For cut-out: Ø 37 mm
Colour accuracy initially: 3 SDCM
Degree of protection: IP20
CRI: 80

LEDSpot sets
You will receive complete sets that contain the desired number of LEDSpots, a respective number of cable sets and the required LED drivers

Lead sets for LEDSpots
Lead sets with connector for easy and fast connection
LEDSpot ILine

Complete LEDSpot IP54 equipped with optics, heat sink, leads and metal frame

Technical notes
- Metal frame, round
- For cut-out: Ø 56 mm
- LEDSpot with one LED and with thermoplastic heat sink
- Reflector with clear glass (opaque glass on request)
- Beam angle: 30° or 50° (LCH-022), 40° (LCH-023)
- Leads: Cu tinned, stranded conductors AWG22, PVC insulation, length: 250 mm
- Use of external LED constant-current drivers
- Snap-in clips for easy installation

Degree of protection: IP54
- Weight: 50 g
- Packaging unit: 45 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>LEDSpot version</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Luminous flux (lm) and typical voltage (Utyp.) and power consumption (Pel)*</th>
<th>Light intensity at max. current Candela</th>
<th>Beam angle °</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LEDSpot ILine</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pmd = 1.02 W Utyp. = 2.9 V Pmd = 1.5 W Utyp. = 3 V Pmd = 2.16 W Utyp. = 3.09 V</td>
<td></td>
<td>30°</td>
<td></td>
</tr>
<tr>
<td>LCH-022 LLine 219 3000K</td>
<td>A (warm white)</td>
<td>2870...3200</td>
<td>100</td>
<td>130 140 170 180 320 190 30/50</td>
<td>A++</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCH-022 LLine 219 4500K</td>
<td>B (neutral white)</td>
<td>4250...4750</td>
<td>100</td>
<td>110 140 150 180 190 390 210 30/50</td>
<td>A++</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LEDSpot ILine COB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pmd = 3.5 W Utyp. = 10 V</td>
<td></td>
<td>40°</td>
<td></td>
</tr>
<tr>
<td>LCH-023 LLine COB 3000K</td>
<td>C (warm white)</td>
<td>2920...3070</td>
<td>250</td>
<td>285 320 380 40 A+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCH-023 LLine COB 4200K</td>
<td>D (neutral white)</td>
<td>3850...4650</td>
<td>250</td>
<td>300 380 40 A++</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Emission data at tj = 85 °C (LCH-022) / 25 °C (LCH-023) | Further colour temperatures on request

* Production tolerance of luminous flux, voltage and power consumption: ±7 % (LCH-022) / ±5 % (LCH-023)

Frame colour | Ref. No. 30° | Ref. No. 40°
-------------|--------------|--------------
silver       | 561770       | 561772       |
white        | 561771       | 561773       |

Silver brushed or further colours on request
**LEDSpot SmartLine COB**

Complete LEDSpot equipped with optics, heat sink, leads and metal frame

**Technical notes**
- Metal frame, round or square
- For cut-out: Ø 56 mm
- LEDSpot with one LED and with an aluminium heat sink
- Beam angle: 40°
- Leads: Cu tinned, stranded conductors AWG22, PVC-insulation, length: 250 mm
- Use of external LED constant-current drivers
- Snap-in clips for easy installation
  - for luminaire sheets ([type LCH-017 and -020](#))
  - for ceilings ([type LCH-019 and -021](#))
- Degree of protection: IP40
- Weight: 60 g
- Packaging unit:
  - 45 pcs. ([type LCH-017 and -020](#))
  - 40 pcs. ([type LCH-019 and -021](#))

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>LEDSpot Version</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Luminous flux (lm) and typical voltage ( U_{typ} ) and power consumption ( P_{el} )*</th>
<th>Light intensity at max. current ( I_{max} ) Candela</th>
<th>Frame shape</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td>All types</td>
<td>Smart COB 3000K 40°</td>
<td>A C</td>
<td>warm white</td>
<td>2920...3070</td>
<td>250</td>
<td>285</td>
<td>330</td>
<td>round</td>
</tr>
<tr>
<td>All types</td>
<td>Smart COB 4200K 40°</td>
<td>B D</td>
<td>neutral white</td>
<td>3850...4650</td>
<td>263</td>
<td>300</td>
<td>380</td>
<td>round</td>
</tr>
</tbody>
</table>

Emission data at \( t_c = 25 \, ^\circ C \) | *Production tolerance of luminous flux, voltage and power consumption: ±5% | Further colour temperatures on request

---

<table>
<thead>
<tr>
<th>LEDcolour</th>
<th>Ref. No. for sheets (<a href="#">LCH-017 and LCH-020</a>)</th>
<th>Ref. No. for ceilings (<a href="#">LCH-019 and LCH-021</a>)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (warm white)</td>
<td>548912, 548928</td>
<td>548916, 548932</td>
</tr>
<tr>
<td>B (neutral white)</td>
<td>548913, 548917</td>
<td>548920, 548936</td>
</tr>
<tr>
<td>C (warm white)</td>
<td>548915, 548931</td>
<td>548919, 548935</td>
</tr>
<tr>
<td>D (neutral white)</td>
<td>548920, 548936</td>
<td>548939, 548943</td>
</tr>
</tbody>
</table>

Silver brushed or further colours on request.
**LEDSpot SmartLine**

Complete LEDSpot equipped with optics, heat sink, leads and metal frame

**Technical notes**
- Metal frame, round or square
- For cut-out: Ø 56 mm
- LEDSpot with one LED and with thermoplastic heat sink
- Optics beam angle: 50°
- Leads: Cu tinned, stranded conductors AWG22, PVC-insulation, length: 250 mm
- Use of external LED constant-current drivers
- Snap-in clips for easy installation
  - for luminaire sheets (type LCH-002 and -008)
  - for ceilings (type LCH-004 and -009)
- Degree of protection: IP40
- Weight: 55 g
- Packaging unit:
  - 45 pcs. (Type LCH-002 and -008)
  - 40 pcs. (Type LCH-004 and -009)

---

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>LEDSpot version</th>
<th>Colour</th>
<th>Correlated colour temperature</th>
<th>Luminous flux [lm] and typical voltage ([U_{typ}]) and power consumption ([P_{el}]^*) at max. efficiency</th>
<th>Light intensity at max. current ([Candela])</th>
<th>Frame shape</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCH-002</td>
<td>All Smart 219 3000K 40°*</td>
<td>A</td>
<td>warm white</td>
<td>2870...3200</td>
<td>90</td>
<td>100</td>
<td>130</td>
<td>140</td>
</tr>
<tr>
<td>LCH-004</td>
<td>All Smart 219 4200K 40°*</td>
<td>B</td>
<td>neutral white</td>
<td>4250...4750</td>
<td>100</td>
<td>110</td>
<td>140</td>
<td>150</td>
</tr>
<tr>
<td>LCH-008</td>
<td></td>
<td>C</td>
<td>warm white</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCH-009</td>
<td></td>
<td>D</td>
<td>neutral white</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Emission data at \(\theta = 85 °C\) | * Production tolerance of luminous flux, voltage and power consumption: ±7% | Further colour temperatures on request

---

**For luminaire sheets (LCH-002 and LCH-008)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>silver</td>
<td>561778</td>
<td>561781</td>
<td>561783</td>
<td>561794</td>
</tr>
<tr>
<td>silver mat</td>
<td>561779</td>
<td>—</td>
<td>561809</td>
<td>561795</td>
</tr>
<tr>
<td>white</td>
<td>561780</td>
<td>561782</td>
<td>561785</td>
<td>561796</td>
</tr>
</tbody>
</table>

Silver brushed or further colours on request
**LEDSpot StartLine**

Complete LEDSpot equipped with optics, heat sink, leads and frame

**Technical notes**
- Steel frame: round
- For cut-out: Ø 56 mm
- LEDSpot with one LED and with thermoplastic heat sink
- Optics beam angle: 20° or 40°
- Leads: Cu tinned, stranded conductors 0.5 mm², PVC-insulation, length: 250 mm
- Use of external LED constant-current drivers
- Snap-in clips for easy installation
- Degree of protection: IP20
- Weight: 40 g
- Packaging unit: 45 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Luminous flux (lm) and typical voltage (U typ.) at max. current and power consumption (P el)*</th>
<th>Light intensity at max. current</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>350 mA min.</td>
<td>500 mA min.</td>
<td>700 mA min.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>95</td>
<td>100</td>
<td>130</td>
</tr>
<tr>
<td>LCH016</td>
<td>Start 219 3000K</td>
<td>A</td>
<td>warm white</td>
<td>3000</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>LCH016</td>
<td>Start 219 4500K</td>
<td>B</td>
<td>neutral white</td>
<td>4500</td>
<td>100</td>
<td>110</td>
</tr>
</tbody>
</table>

Emission data at t = 85 °C  | * Production tolerance of luminous flux, voltage and power consumption: ±7%  | Further colour temperatures on request

<table>
<thead>
<tr>
<th>Frame colour</th>
<th>Ref. No.</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A (warm white)</td>
<td>B (neutral white)</td>
</tr>
<tr>
<td>20°</td>
<td>561799</td>
<td>561803</td>
</tr>
<tr>
<td>40°</td>
<td>561801</td>
<td>561805</td>
</tr>
</tbody>
</table>

Silver brushed or further colours on request
LEDSpot FlatLine

Complete LEDSpot equipped with optics, leads and frame

Technical notes
Metal frame: silver, round
For cut-out: Ø 56 mm
LEDSpot with 5 LEDs (LCH027) or 6 LEDs (LCH028)
Beam angle: 40°
With connector
Snap-in clips for easy installation
Degree of protection: IP20 [Front part: IP67]
Weight: 40 g
Packaging unit: 45 pcs.

Constant current

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Luminous flux (lm) and typical voltage (U typ.)</th>
<th>Light intensity at max. current</th>
<th>Energy efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>350 mA typ.</td>
<td>700 mA typ.</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500 mA typ.</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>LCH-027</td>
<td>– 5 LEDs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCH027</td>
<td>flat 757D 3000K bin min P9</td>
<td>561580</td>
<td>warm white</td>
<td>2870...3200</td>
<td>101</td>
<td>190</td>
<td>160</td>
</tr>
<tr>
<td>LCH027</td>
<td>flat 757D 4000K bin min P9</td>
<td>561582</td>
<td>neutral white</td>
<td>3850...4250</td>
<td>105</td>
<td>195</td>
<td>220</td>
</tr>
</tbody>
</table>

Emission data at η = 85 °C | * Production tolerance of luminous flux, voltage and power consumption: ±7% | Further colour temperatures on request

Constant voltage 12 V

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Typ luminous flux*</th>
<th>Light intensity</th>
<th>Max. power consumption W</th>
<th>Energy efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Candela</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCH-028</td>
<td>– 6 LEDs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCH028</td>
<td>flat 2835 3000K bin min P9</td>
<td>561588</td>
<td>warm white</td>
<td>2870...3200</td>
<td>100</td>
<td>90</td>
<td>1.7</td>
<td>A+</td>
</tr>
<tr>
<td>LCH028</td>
<td>flat 2835 4000K bin min P9</td>
<td>561590</td>
<td>neutral white</td>
<td>3850...4250</td>
<td>100</td>
<td>100</td>
<td>1.7</td>
<td>A+</td>
</tr>
</tbody>
</table>

Emission data at η = 85 °C | * Production tolerance of luminous flux: ±7% | Further colour temperatures on request

Cable set
Length: 250 mm
Ref. No.: 561868
Surface Kit with Mounted LEDSpot

Metal frame to use ILine, SmartLine, StartLine or Flatline as surface mounting spots.
Two single pole terminals for electrical connection inside the kit (frame + spot).
Fixation by self tapping screws.
Packaging unit: 90 pcs.
Ref. No.: 554845 Frame colour: white
Ref. No.: 554843 Frame colour: silver

Surface Kit with LEDSpot StartLine
Colour temperature: 3000 K
Beam angle: 40°
Packaging unit: 1 pcs.
Type: StartLine SFK LCH016
Ref. No.: 559621 Frame colour: white
Ref. No.: 557157 Frame colour: silver
Technical details LEDSpots see page 131

Surface Kit with LEDSpot SmartLine
Colour temperature: 3000 K
Beam angle: 50°
Packaging unit: 1 pcs.
Type: SmartLine SFK LCH002
Ref. No.: 557158 Frame colour: white
Ref. No.: 559622 Frame colour: silver
Technical details LEDSpots see page 130

Surface Kit with LEDSpot ILine
Colour temperature: 4500 K
Beam angle: 30°
Packaging unit: 1 pcs.
Type: ILine SFK LCH022
Ref. No.: 559624 Frame colour: white
Ref. No.: 559623 Frame colour: silver
Technical details LEDSpots see page 128

Surface Kit with LEDSpot FlatLine
Colour temperature: 3000 K
Beam angle: 40°
Packaging unit: 1 pcs.
Type: Flatline SFK LCH027 (700 mA)
Ref. No.: 561870 Frame colour: white
Ref. No.: 561871 Frame colour: silver
Technical details LEDSpots see page 132
### Surface Kit with Mounted LEDSpot

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temp. (K)</th>
<th>Luminous flux* (lm)</th>
<th>Light intensity at max. current (Cd)</th>
<th>Beam angle *</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 150 mA typ.</td>
<td>@ 500 mA typ.</td>
<td>@ 700 mA typ.</td>
<td></td>
</tr>
<tr>
<td>StartLine SFK LCH016</td>
<td>SFK LCH016</td>
<td>StartLine 219 3000K Bin</td>
<td>557157</td>
<td>559621</td>
<td>2870...3200</td>
<td>100</td>
<td>140</td>
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<td>SmartLine 219 3000K Bin</td>
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<td>557158</td>
<td>2870...3200</td>
<td>100</td>
<td>140</td>
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<td>IPLine SFK LCH002</td>
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<td>IPLine 219 4500K Bin</td>
<td>559623</td>
<td>559624</td>
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<td>110</td>
<td>150</td>
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<tr>
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<td>FlatLine 757D 4000K bin min P9</td>
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<td>561870</td>
<td>3850...4250</td>
<td>105</td>
<td>140</td>
</tr>
</tbody>
</table>

Emission data at $t = 85\, ^\circ C$ | * Measurement tolerance of luminous flux ±7%
**LEDSpot DiscLine**

Complete LEDSpot equipped with optics, heat sink, leads and metal frame

**Technical notes**

- Metal frame, round
- For cut-out: Ø 56 mm
- LEDSpot with one LED and with thermoplastic heat sink
- Reflector with clear glass (opaque glass on request)
- Beam angle: 30° or 50°
- Leads: Cu tinned, stranded conductors AWG22, PVC-insulation, length: 250 mm
- Use of external LED constant-current drivers
- Snap-in clips for easy installation
  - for luminaire sheets (type LCH-006)
  - for ceilings (type LCH-007)
- Degree of protection: IP40
- Weight: 50 g
- Packaging unit: 45 pcs. (type LCH-006)
  - 40 pcs. (type LCH-007)

### Type Description

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>LEDSpot version for luminaire sheets</th>
<th>Colour</th>
<th>Correlated colour temperature</th>
<th>Luminous flux (lm) and typical voltage (Utyp.) and power consumption (Pel)*</th>
<th>Light intensity at max. current</th>
<th>Energy efficiency at max. current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Disc 219 3000K</td>
<td>A/C</td>
<td>warm/neutral white 3000</td>
<td>Pel = 1.02 W, Utyp. = 2.9 V, Ptyp = 1.5 W</td>
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<td>Disc 219 4500K</td>
<td>B/D</td>
<td>neutral/neutral white 4500</td>
<td>Pel = 2.16 W, Utyp. = 3.09 V, Ptyp = 2.16 W</td>
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Emission data at θ = 85 °C  
*Production tolerance of luminous flux, voltage and power consumption: ±7%
Further colour temperatures on request

### For luminaire sheets (LCH006)

<table>
<thead>
<tr>
<th>Frame colour</th>
<th>Ref. No.</th>
<th>I (cd/klm)</th>
<th>30°</th>
<th>50°</th>
</tr>
</thead>
<tbody>
<tr>
<td>silver</td>
<td>561836</td>
<td>140</td>
<td>130</td>
<td>140</td>
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<tr>
<td>white</td>
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<td>200</td>
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### For ceilings (LCH007)

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<th>I (cd/klm)</th>
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<th>50°</th>
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<tr>
<td>silver</td>
<td>561844</td>
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<td>white</td>
<td>561845</td>
<td>220</td>
<td>220</td>
<td>220</td>
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</tbody>
</table>

Silver brushed or further colours on request
LEDSpot EffectLine

Complete LEDSpot equipped with optics, heat sink, leads and metal frame

Technical notes
- Metal frame, round or square
- For cut-out: Ø 37 mm
- LEDSpot with one LED and with thermoplastic heat sink
- Beam angle: 8°, 16°, 26° or 45°
- Leads: Cu tinned, stranded conductors AWG22, PVC-insulation, length: 250 mm
- Use of external LED constant-current drivers
- Snap-in clips for easy installation
- Degree of protection: IP20
- Weight: 40 g
- Packaging unit: 45 pcs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>LEDSpot version</th>
<th>Colour</th>
<th>Correlated colour temperature</th>
<th>Luminous flux (lm) and typical voltage (U typ.)</th>
<th>Light intensity at max. current</th>
<th>Energy efficiency at max. current</th>
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</thead>
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<td></td>
<td>0.85 I (cd/klm)</td>
<td>1.15 I (cd/klm)</td>
<td>1.5 I (cd/klm)</td>
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<td>Effect 219 3000K</td>
<td>A</td>
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<td>3000</td>
<td>90</td>
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<tr>
<td>All types</td>
<td>Effect 219 4500K</td>
<td>B</td>
<td>neutral white</td>
<td>4500</td>
<td>100</td>
<td>110</td>
<td>140</td>
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Emission data at θ = 85 °C | *Production tolerance of luminous flux, voltage and power consumption: ±7% |

Frame colour | Ref. No. A (warm white) | Ref. No. B (neutral white) |
<table>
<thead>
<tr>
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<td>round 8°</td>
<td>561143</td>
<td>561157</td>
</tr>
<tr>
<td>10°</td>
<td>561144</td>
<td>561158</td>
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<tr>
<td>12°</td>
<td>561145</td>
<td>561160</td>
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<tr>
<td>14°</td>
<td>561146</td>
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<tr>
<td>16°</td>
<td>561147</td>
<td>561164</td>
</tr>
<tr>
<td>18°</td>
<td>561148</td>
<td>561166</td>
</tr>
<tr>
<td>square 8°</td>
<td>566150</td>
<td>566154</td>
</tr>
<tr>
<td>10°</td>
<td>566151</td>
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<td>566164</td>
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<tr>
<td>22°</td>
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<tr>
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<td>566168</td>
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<tr>
<td>26°</td>
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<td>28°</td>
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<tr>
<td>30°</td>
<td>566161</td>
<td>566174</td>
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</tbody>
</table>

Silver brushed or further colours on request
LEDSpot Sets

On request, you will receive complete sets that contain the desired number of LEDSpots, a respective number of cable sets and the required LED drivers. Several examples of such sets can be seen to the right.

Contact us - we will gladly support you when it comes to dimensioning your lighting application.

<table>
<thead>
<tr>
<th>Set No.</th>
<th>Ref. No.</th>
<th>Sets includes</th>
<th>Frame*</th>
<th>Driver</th>
<th>Lead set</th>
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</thead>
<tbody>
<tr>
<td>ActiveLine Pro Kit</td>
<td>1 561726</td>
<td>1 piece ActiveLine 9.1 3000 K 36°</td>
<td>round</td>
<td>silver brushed</td>
<td>186349 inclusive</td>
</tr>
<tr>
<td></td>
<td>2 561728</td>
<td>1 piece ActiveLine 6.1 3000 K 36°</td>
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<td></td>
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<tr>
<td></td>
<td>3 561729</td>
<td>2 pieces ActiveLine 6.1 3000 K 36°*</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>ActiveLine Pro Kit – dimmable</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 561734</td>
<td>1 piece ActiveLine 9.1 3000 K 36°</td>
<td>round</td>
<td>silver brushed</td>
<td>186448 inclusive</td>
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<tr>
<td></td>
<td>5 561731</td>
<td>2 pieces ActiveLine 6.1 3000 K 36°*</td>
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<td></td>
<td>GU10 Kit – dimmable</td>
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</tr>
<tr>
<td></td>
<td>6 561732</td>
<td>6 W GU10 LED lamp, dimmable + frame + lampholder with connection box (3 poles terminal block)</td>
<td>round</td>
<td>silver brushed</td>
<td>- inclusive</td>
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<tr>
<td></td>
<td></td>
<td>StartLine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 554535</td>
<td>2 pieces Startline 3000 K 40°</td>
<td>round</td>
<td>white</td>
<td>186348 inclusive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FlatLine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 561733</td>
<td>2 pieces Flatline 700 mA 3000 K 40°</td>
<td>round</td>
<td>silver</td>
<td>186348 inclusive</td>
</tr>
</tbody>
</table>

* Square shape or other colours on request
Lead Sets

For LEDSpots with connectors

Lead sets with connector
for easy and fast connection
Connector material: PA, natural, UL94V-0
Leads: Cu tinned, stranded conductors 0.5 mm²,
PVC-insulation, with connector,
lead ends: ferrules on bare end of core

Lead sets
Lead sets with connector and lead ends
Leads: H03VVH2-F
Weight: 18/36/58/72/90 g
Packaging unit: 10 pcs.
Ref. No.: 545029 with 1 connector
Ref. No.: 546388 with 2 connectors
Ref. No.: 545315 with 3 connectors
Ref. No.: 554929 with 4 connectors
Ref. No.: 545316 with 5 connectors
LED CONSTANT CURRENT DRIVERS

Electronic converters for LED modules operated with constant current

To ensure the safe operation of LEDs that are wired in series, the operating current must be limited to a constant value by the LED driver.

Light-emitting diodes are semiconductor devices with a light-emitting pn junction. Due to the specific diode characteristics, the current can only flow through an LED in one direction. Coupled with the special properties of a semiconductor, this non-linear behaviour can increase the current and power uptake of an LED as it heats up.

If this effect is not limited, uncontrolled heating can finally destroy the semiconductor junction. For this reason, VS recommends using an external constant current driver to operate all constant current driven LED modules. To ensure that the same current flows through every LED, constant current driven LED modules can only be wired in series.

The constant current source has to be selected to suit the respective application, i.e. it must supply the required current and also provide sufficient voltage for the LED string.

The number of VS LED modules that can be connected to a single operating device is dependent on the forward voltage of the respective modules.
# Product Classification and Overview of LED Drivers

The electronic constant current drivers are optimised to operate constant current driven LED modules. Before connecting LED modules ensure that the power supply is disconnected from mains.

## Primeline
- Programmability
- Intelligent functions
- Maximum flexibility

Up to 100,000 hrs. expected service life time

## ComfortLine
- Convenient
- Intelligent functions

Up to 100,000 hrs. expected service life time

## EasyLine
- Focus on core functions
- Cost-efficient

Up to 50,000 hrs. expected service life time

### Product overview by main application fields

<table>
<thead>
<tr>
<th>Main application field</th>
<th>Capacity range (W)</th>
<th>Output current DC mA</th>
<th>Output voltage DC V</th>
<th>Ref. No.</th>
<th>Version</th>
<th>Current setting</th>
<th>Dimming</th>
<th>Max. service life time (hrs.)</th>
<th>Page</th>
</tr>
</thead>
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<tr>
<td>15/18/21</td>
<td>500/600/700</td>
<td>17–30</td>
<td>186529</td>
<td>EasyLine</td>
<td>Push-in terminal</td>
<td>-</td>
<td>-</td>
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<td>125/150/175</td>
<td>110–220*</td>
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<td>Current setting</td>
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<td>Max. service life (hrs.)</td>
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<td>iProgrammer</td>
<td>186428</td>
<td>The iProgramme is designed to configure LED drivers using the 3C function</td>
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* Depends on the adjusted current output
PrimeLine LED Drivers – Dimmable with Programmable Current

350–700 mA, max. 42 W and max. 84 W

The linear LED constant-current drivers are designed for use in office and retail lighting.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load:
0.95 [ECk7 700.149]
0.97 [ECk7 700.150]
Standby losses: < 0.5 W

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 3 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Programmability
The output current can be freely adjusted in 1 mA steps between 350 mA and 700 mA [factory setting: see table].
An iProgrammer (Ref. No. 186428) and a PC running the respective VS software are required for programming purposes.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198 - 264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
Push-in terminals: 0.2 – 1.5 mm²

<table>
<thead>
<tr>
<th>Max. output</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC programmable mA</th>
<th>Factory setting mA</th>
<th>Voltage output* DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load 5% 230 V</th>
<th>Ambient temperature °C</th>
<th>Casing temperature °C</th>
<th>Weight g</th>
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<td>220–240</td>
<td>410–380</td>
<td>350–700 –5/10 %</td>
<td>130</td>
<td>60–220</td>
<td>&lt; 250</td>
<td>94</td>
<td>75</td>
<td>-25 to 30</td>
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</table>

* Depends on the adjusted current output

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
Product guarantee: 5 years

Expected service life time
at operation temperatures at °C point

<table>
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<tr>
<th>Operation current</th>
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<th>186445</th>
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<td>all</td>
<td>60 °C</td>
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<td>hvs</td>
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</table>
ComfortLine LED Drivers – Dimmable with Selectable Current

350–700 mA, max. 42 W and max. 84 W

The linear LED constant-current drivers are designed for use in office and retail lighting.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: 0.95
Standby losses: < 0.4 W

Dimming
Dimming function is realised by hybrid dimming.
Analogue dimming: < 275 mA
PWM dimming: < 275 mA
Dimming range: 3 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Adjustable
The output current can be freely adjusted in 25 mA steps between 350 mA and 700 mA by using a resistor (according to LEDset standard).

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz (can be reduced to 176 V with reduced service life time)
Push-in terminals: 0.2–1.5 mm²

Expected service life time
at operation temperatures at tc point

<table>
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<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186565</th>
<th>186564</th>
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<tr>
<td>all</td>
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<td>50 °C</td>
<td>70 °C</td>
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Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
Product guarantee: 5 years
Product guarantee: 5 years

See page 235–242

LEDset

Push

Dali

M10 – Dimensions: 359 x 30 x 21 mm

<table>
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<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC programmable mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load full load % (230 V)</th>
<th>Efficiency at full load %</th>
<th>Ambient temperature 45 °C</th>
<th>Casing temperature 70 °C</th>
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<td>210–190</td>
<td>350–700 ±75</td>
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<td>&lt; 250</td>
<td>&gt; 93</td>
<td>25 to 50</td>
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* Depends on the adjusted current output
ComfortLine LED Drivers – Dimmable

2x700 mA / max. 2x70 W
The linear LED constant-current drivers are designed for use in office and retail lighting.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: 0.95
Standby losses: < 0.5 W

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 3 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against “no load” operation
Degree of protection: IP20
Protection class I
SELV
Product guarantee: 5 years

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Expected service life time at operation temperatures at t_c point

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<table>
<thead>
<tr>
<th>M12 – Dimensions: 359 x 40 x 21 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x70</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
ComfortLine LED Drivers – Dimmable

**4x60 mA / max. 4x9 W**
**500 mA / max. 107 W**
The linear LED constant-current drivers are designed for use in office and retail lighting.

**Electrical characteristics**
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.95
Standby losses: < 0.5 W

**Dimming**
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 3 to 100%
If no dimming interface is connected, brightness will stay at 100%.

**Connection details**
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
Push-in terminals: 0.2–1.5 mm²

**Safety features**
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
Product guarantee: 5 years

<table>
<thead>
<tr>
<th>Max. output</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz, 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load 5 (230 V)</th>
<th>Ambient temperature (°C)</th>
<th>Casing temperature (°C)</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x9</td>
<td>ECX6 460.110</td>
<td>186384</td>
<td>198–264 220–240</td>
<td>190–140 170–130</td>
<td>4x60 ±15% 110–130 90–215</td>
<td>&lt; 450 &lt; 450</td>
<td>&gt; 91 &gt; 90</td>
<td>25 to 65 20 to 50</td>
<td>70 70</td>
<td>230 220</td>
<td></td>
</tr>
<tr>
<td>107</td>
<td>ECX6 500.163</td>
<td>186460</td>
<td>198–264 220–240</td>
<td>557–412 502–460</td>
<td>500 ±15% 110% 90–215</td>
<td>&lt; 450 &lt; 450</td>
<td>&gt; 91 &gt; 90</td>
<td>25 to 65 20 to 50</td>
<td>70 70</td>
<td>230 220</td>
<td></td>
</tr>
</tbody>
</table>
ComfortLine LED Drivers – Dimmable

2x350 mA / max. 2x20 W
2x500 mA / max. 2x28.5 W
2x700 mA / max. 2x40 W
and max. 2x70 W

The linear LED constant-current drivers are designed for use in office and retail lighting.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: 0.95

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current (M12) or with an analogue dimming signal (M10/M11).
Dimming range: 3 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at \( t_c \) point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No. 186407</th>
<th>186410</th>
<th>186355</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x350 mA</td>
<td>75 °C, 65 °C</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2x500 mA</td>
<td>–</td>
<td>75 °C, 65 °C</td>
<td>–</td>
</tr>
<tr>
<td>2x700 mA</td>
<td>–</td>
<td>75 °C, 65 °C</td>
<td>85 °C, 75 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

M10.1

M11.1

M12

Max. output W

M10.1 – Dimensions: 359 x 30 x 21 mm
2x20
ECXd 2350 124 186407
198–264
220–240
500–340
400–370
2x350 mA
17–57
42
> 85
> 85
20 to 50
75
270

M11.1 – Dimensions: 425 x 30 x 21 mm
2x28.5/2x40
ECXd 2700 127 186410
198–264
220–240
490–385
480–400
2x500 mA
2x700 mA
17–57
60
> 88
> 88
20 to 50
75
310

M12 – Dimensions: 359 x 40 x 21 mm
2x70
ECXd 2700 088 186355
198–264
220–240
834–625
750–688
2x700 mA
42–100
120
> 90
> 90
20 to 50
85
400
ComfortLine LED Drivers – with Selectable Current

125 to 650 mA / 27.5 W to 85.1 W

The linear LED constant-current drivers are designed for use in office and retail lighting.

Electrical characteristics

Secondary side switching of LED modules is not allowed.

Power factor at full load: 0.97

Selectable current output

The required current output can be chosen by selecting the respective pin at the output terminal.

Connection details

Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.2–1.5 mm²

Safety features

Electronic short-circuit protection
Overtemperature protection
Protection against “no load” operation
Degree of protection: IP20
Protection class I
Product guarantee: 5 years

### Expected service life time

at operation temperatures at $t_c$ point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>$t_c$ °C</th>
<th>$t_a$ °C</th>
<th>$t_{tc}$ °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>125–175 mA</td>
<td>186486</td>
<td>55 °C</td>
<td>65 °C</td>
<td>–</td>
</tr>
<tr>
<td>200–325 mA</td>
<td>186487, 186488</td>
<td>60 °C</td>
<td>80 °C</td>
<td>–</td>
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<tr>
<td>375–550 mA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>65 °C</td>
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<tr>
<td>400–650 mA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>20 °C</td>
</tr>
<tr>
<td>hrs.</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
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</tbody>
</table>

### Max. output

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % [230 V]</th>
<th>Ambient temperature $t_a$ °C</th>
<th>Casing temperature $t_c$ °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.5</td>
<td>ECXE 175.173</td>
<td>186486</td>
<td>220–240</td>
<td>150–140</td>
<td>125 ±5%</td>
<td>155–220</td>
<td>&lt; 250</td>
<td>&gt; 90</td>
<td>20 to 60</td>
<td>70</td>
</tr>
<tr>
<td>33</td>
<td>–</td>
<td>186487, 186488</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>38.5</td>
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<td>–</td>
<td>–</td>
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<td>–</td>
</tr>
<tr>
<td>44</td>
<td>ECXE 250.174</td>
<td>186487</td>
<td>220–240</td>
<td>200–190</td>
<td>175 ±5%</td>
<td>200–220</td>
<td>&lt; 250</td>
<td>&gt; 91</td>
<td>20 to 60</td>
<td>70</td>
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<tr>
<td>47</td>
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<td>47</td>
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<td>–</td>
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<td>–</td>
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</tr>
<tr>
<td>46.8</td>
<td>ECXE 325.175</td>
<td>186488</td>
<td>220–240</td>
<td>225–230</td>
<td>200 ±5%</td>
<td>250–275</td>
<td>&lt; 250</td>
<td>&gt; 92</td>
<td>20 to 60</td>
<td>75</td>
</tr>
<tr>
<td>46.8</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>46.8</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>–</td>
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</tr>
<tr>
<td>82.5</td>
<td>ECXE 425.178</td>
<td>186491</td>
<td>220–240</td>
<td>325–330</td>
<td>300 ±5%</td>
<td>375–400</td>
<td>&lt; 250</td>
<td>&gt; 91</td>
<td>20 to 60</td>
<td>65</td>
</tr>
<tr>
<td>84.8</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>85</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>84.7</td>
<td>ECXE 650.179</td>
<td>186492</td>
<td>220–240</td>
<td>420–430</td>
<td>425 ±5%</td>
<td>500–550</td>
<td>&lt; 250</td>
<td>&gt; 93</td>
<td>20 to 50</td>
<td>65</td>
</tr>
<tr>
<td>84.6</td>
<td>–</td>
<td>–</td>
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<td>–</td>
<td>–</td>
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<td>–</td>
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<td>–</td>
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</tr>
<tr>
<td>85.1</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### M10 – Dimensions: 359 x 30 x 21 mm
ComfortLine LED Drivers – with Selectable Current

350/500/700 mA, max. 40 W and max. 85 W

The linear LED constant-current drivers are designed for use in office and retail lighting.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: 0.97

Selectable current output
The required current output can be chosen by selecting the respective pin at the output terminal.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
Product guarantee: 5 years

Expected service life time
at operation temperatures at t<sub>c</sub> point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186444</th>
<th>186443</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>60 °C</td>
<td>50 °C</td>
<td>70 °C</td>
</tr>
<tr>
<td>500 mA</td>
<td>65 °C</td>
<td>65 °C</td>
<td>75 °C</td>
</tr>
<tr>
<td>700 mA</td>
<td>70 °C</td>
<td>60 °C</td>
<td>80 °C</td>
</tr>
</tbody>
</table>

Max. Type

<table>
<thead>
<tr>
<th>W</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature °C</th>
<th>Casing temperature °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>186444</td>
<td>220–240</td>
<td>200–190</td>
<td>350 ±5%</td>
<td>57–114</td>
<td>&lt; 250</td>
<td>&gt; 90</td>
<td>20 to 50</td>
<td>60</td>
<td>227</td>
</tr>
<tr>
<td>79</td>
<td>186444</td>
<td>220–240</td>
<td>400–370</td>
<td>350 ±5%</td>
<td>120–225</td>
<td>&lt; 250</td>
<td>&gt; 94</td>
<td>20 to 60</td>
<td>70</td>
<td>250</td>
</tr>
<tr>
<td>85</td>
<td>186443</td>
<td>220–240</td>
<td>420–390</td>
<td>500 ±5%</td>
<td>80–170</td>
<td>&lt; 250</td>
<td>&gt; 93</td>
<td>20 to 60</td>
<td>75</td>
<td>250</td>
</tr>
<tr>
<td>85</td>
<td>186443</td>
<td>220–240</td>
<td>420–390</td>
<td>700 ±5%</td>
<td>60–120</td>
<td>&lt; 250</td>
<td>&gt; 92</td>
<td>20 to 60</td>
<td>80</td>
<td>250</td>
</tr>
</tbody>
</table>

M10 – Dimensions: 359 x 30 x 21 mm
ComfortLine LED Drivers

2x350 mA / max. 2x20 W
2x500 mA / max. 2x28.5 W
2x700 mA / max. 2x40 W
and max. 2x70 W

The linear LED constant-current drivers are designed for use in office and retail lighting.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9 C

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC; 0 Hz
(can be reduced to 176 V with reduced service life time)
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at t₀ point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186406</th>
<th>186409</th>
<th>186354</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x350 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2x500 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>75 °C</td>
<td>65 °C</td>
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<tr>
<td>2x700 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>85 °C</td>
<td>75 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
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</table>

Max. Type
<table>
<thead>
<tr>
<th>Ref. No.</th>
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<th>186409</th>
<th>186354</th>
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<tbody>
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<td>M10.1</td>
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<td></td>
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<tr>
<td>M11.1</td>
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</tr>
<tr>
<td>M12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Expected service life time
at operation temperatures at t₀ point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186406</th>
<th>186409</th>
<th>186354</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x350 mA</td>
<td>75 °C</td>
<td>65 °C</td>
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<td>2x500 mA</td>
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<tr>
<td>2x700 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>85 °C</td>
<td>75 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
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<table>
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<th>186406</th>
<th>186409</th>
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<td>M10.1 – Dimensions: 359 x 30 x 21 mm</td>
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<tr>
<td>2x20</td>
<td>186406</td>
<td>198–264</td>
<td>220–240</td>
<td>400–370</td>
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<td>2x350 mA</td>
<td>500–340</td>
<td>420–370</td>
<td>330–360</td>
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<td></td>
<td>17–57</td>
<td>&lt; 60</td>
<td>&gt; 85</td>
<td>-20 to 50</td>
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<td></td>
<td>75 °C</td>
<td>65 °C</td>
<td>85 °C</td>
<td>75 °C</td>
</tr>
<tr>
<td>M11.1 – Dimensions: 425 x 30 x 21 mm</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2x28.5/ 2x40</td>
<td>186409</td>
<td>198–264</td>
<td>220–240</td>
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<td>2x500 mA</td>
<td>260–173</td>
<td>200–190</td>
<td>120–113</td>
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<td></td>
<td>17–57</td>
<td>&lt; 60</td>
<td>&gt; 88</td>
<td>-20 to 50</td>
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<td></td>
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<td>M12 – Dimensions: 359 x 40 x 21 mm</td>
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<td>2x70</td>
<td>186354</td>
<td>198–264</td>
<td>220–240</td>
<td>750–688</td>
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<td></td>
<td>2x700 mA</td>
<td>834–625</td>
<td>750–688</td>
<td>42–100</td>
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<td></td>
<td>42–100</td>
<td>&lt; 120</td>
<td>&gt; 90</td>
<td>-20 to 50</td>
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<td>85 °C</td>
<td>75 °C</td>
<td>85 °C</td>
<td>75 °C</td>
</tr>
</tbody>
</table>
**ComfortLine**

**LED Drivers**

4x60 mA / max. 4x9 W  
500 mA / max. 107 W

The linear LED constant-current drivers are designed for use in office and retail lighting.

**Electrical characteristics**

Secondary side switching of LED modules is not allowed.  
Power factor at full load: 0.96

**Connection details**

- Mains voltage: 220–240 V ±10%  
- Mains frequency: 50–60 Hz  
- DC operation [except 186305]:  
  - 198–264 V DC, 0 Hz  
  - [can be reduced to 176 V with reduced service life time]
- Push-in terminals: 0.2–1.5 mm²

**Safety features**

- Electronic short-circuit protection  
- Overload protection  
- Protection against "no load" operation  
- Degree of protection: IP20  
- Protection class I  
- Product guarantee: 5 years

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains Current</th>
<th>Voltage Output</th>
<th>Max. Voltage</th>
<th>Efficiency</th>
<th>Ambient Temperature</th>
<th>Casing Temperature</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x60 mA</td>
<td>186305</td>
<td>220–240</td>
<td>110–150</td>
<td>&gt; 88</td>
<td>-20 to 60</td>
<td>70</td>
<td>156</td>
<td></td>
<td></td>
</tr>
<tr>
<td>107 W</td>
<td>186315</td>
<td>198–264</td>
<td>90–215</td>
<td>&gt; 94</td>
<td>-25 to 50</td>
<td>70</td>
<td>273</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Expected service life time**

at operation temperatures at $t_c$ point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains Current</th>
<th>Voltage Output</th>
<th>Max. Voltage</th>
<th>Efficiency</th>
<th>Ambient Temperature</th>
<th>Casing Temperature</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>70 °C</td>
<td>60 °C</td>
<td>50,000</td>
<td>100,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**M6.1 – Dimensions: 230 x 30 x 20.9 mm**

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains Voltage 0 Hz</th>
<th>Mains Current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency %</th>
<th>Ambient temperature $t_a$ °C</th>
<th>Casing temperature $t_c$ °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x9</td>
<td>ECx6 460.061</td>
<td>186305</td>
<td>220–240</td>
<td>110–150</td>
<td>&gt; 88</td>
<td>-20 to 60</td>
<td>70</td>
<td>156</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**M10 – Dimensions: 359 x 30 x 21 mm**

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains Voltage 0 Hz</th>
<th>Mains Current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency %</th>
<th>Ambient temperature $t_a$ °C</th>
<th>Casing temperature $t_c$ °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>ECx6 500.068</td>
<td>186315</td>
<td>198–264</td>
<td>90–215</td>
<td>&gt; 94</td>
<td>-25 to 50</td>
<td>70</td>
<td>273</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ComfortLine

LED Drivers

350 mA / max. 15 W
The linear LED constant-current drivers are designed for use in office and retail lighting.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: 0.55 C

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 176–264 V DC, 0 Hz
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at \( t_c \) point

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>186229</td>
<td></td>
</tr>
<tr>
<td>176 °C</td>
<td>70 °C</td>
<td></td>
</tr>
<tr>
<td>50,000 hrs</td>
<td>100,000</td>
<td></td>
</tr>
</tbody>
</table>

K21

K21 – Dimensions: 146.7 x 21 x 18 mm

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz, 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load 150 V</th>
<th>Ambient temperature °C</th>
<th>Casing temperature °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>ECOe</td>
<td>350.031</td>
<td>176–264 DC</td>
<td>140–90</td>
<td>350 ±3/%–10%</td>
<td>42</td>
<td>&gt; 81</td>
<td>-20 to 50</td>
<td>80</td>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>
**ComfortLine**

**LED Drivers**

**500 mA / max. 28.5 W**
The linear LED constant-current drivers are designed for use in office and retail lighting.

**Electrical characteristics**
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.95

**Connection details**
Mains voltage: 120–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.2–1.5 mm²

**Safety features**
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
Product guarantee: 5 years
**EasyLine LED Drivers – with Selectable Current**

150/250/350 mA / max. 14 W
500/600/700 mA / max. 21 W

The linear LED constant-current drivers are designed for use in office and retail lighting.

**Electrical characteristics**
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.94

**Selectable current output**
The required current output can be chosen by selecting the respective pin at the output terminal.

**Connection details**
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.2–1.5 mm²

**Safety features**
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
SELV
Product guarantee: 3 years

### Expected service life time
at operation temperatures at t<sub>c</sub> point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No. 186530</th>
<th>186529</th>
</tr>
</thead>
<tbody>
<tr>
<td>150–350 mA</td>
<td>65 °C</td>
<td>—</td>
</tr>
<tr>
<td>500–700 mA</td>
<td>70 °C</td>
<td>60 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

### Max. output types

<table>
<thead>
<tr>
<th>W</th>
<th>Type</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>186530</td>
</tr>
<tr>
<td>6</td>
<td>ECXe</td>
<td>350.198</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>15</td>
<td>ECXe</td>
<td>700.197</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>—</td>
</tr>
</tbody>
</table>

### M6.1 – Dimensions: 230 x 30 x 20.9 mm

<table>
<thead>
<tr>
<th>W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load %</th>
<th>Ambient temperature t&lt;sub&gt;a&lt;/sub&gt; ºC</th>
<th>Casing temperature t&lt;sub&gt;c&lt;/sub&gt; ºC</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td></td>
<td>186530</td>
<td>220–240</td>
<td>32–29</td>
<td>150 ±7.5%</td>
<td>17.40</td>
<td>&lt; 60</td>
<td>&gt; 84</td>
<td>-20 to 50</td>
<td>65</td>
<td>146</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>53–49</td>
<td>250 ±7.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td>74–68</td>
<td>350 ±7.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>ECXe</td>
<td>186529</td>
<td>220–240</td>
<td>80–73</td>
<td>500 ±7.5%</td>
<td>17.30</td>
<td>&lt; 60</td>
<td>&gt; 84</td>
<td>-20 to 50</td>
<td>70</td>
<td>146</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td>96–88</td>
<td>600 ±7.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td>112–102</td>
<td>700 ±7.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**EasyLine LED Drivers**

350 mA / max. 42 W  
700 mA / max. 60 W  
The linear LED constant-current drivers are designed for use in office and retail lighting.

**Electrical characteristics**  
Secondary side switching of LED modules is not allowed.  
Power factor at full load: > 0.9 C

**Connection details**  
Mains voltage: 220–240 V ±10%  
Mains frequency: 50–60 Hz  
Pushin terminals: 0.2–1.5 mm²

**Safety features**  
Electronic short-circuit protection  
Overload protection  
Protection against "no load" operation  
Degree of protection: IP20  
Protection class I  
SELV [186429]  
Product guarantee: 3 years

**Expected service life time**  
at operation temperatures at $t_c$ point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186414</th>
<th>186429</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>70 °C</td>
<td>60 °C</td>
<td></td>
</tr>
<tr>
<td>700 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
</tr>
<tr>
<td>hrs</td>
<td>30,000</td>
<td>30,000</td>
<td>30,000</td>
</tr>
</tbody>
</table>

**M7.1**  
Dimensions: 280x30x21 mm

<table>
<thead>
<tr>
<th>Max. output</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50-60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature $t_a$ °C</th>
<th>Casing temperature $t_c$ °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>ECXe</td>
<td>186414</td>
<td>220-240</td>
<td>220-200</td>
<td>350 ±5%</td>
<td>80-120</td>
<td>&lt; 130</td>
<td>&gt; 88</td>
<td>1.5 to 45</td>
<td>70</td>
<td>200</td>
</tr>
<tr>
<td>60</td>
<td>ECXe</td>
<td>186429</td>
<td>220-240</td>
<td>305-275</td>
<td>700 ±5%</td>
<td>46-86</td>
<td>&lt; 95</td>
<td>&gt; 89</td>
<td>1.5 to 45</td>
<td>75</td>
<td>200</td>
</tr>
</tbody>
</table>
PrimeLine LED Drivers – with Programmable Current

350–700 mA / max. 24 W and max. 37 W
Compact casing shape with integrated cord grip optional for built-in or independent operation.

Electrical characteristics
Secondary side switching of LED modules is allowed (hot wiring).
Power factor at full load: > 0.95
Standby losses: < 0.5 W

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 1 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Programmability
The output current can be freely adjusted in 1 mA steps between 350 mA and 700 mA [factory setting: see table].
An iProgrammer (Ref. No. 186428) and a PC running the respective VS software are required for programming purposes.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
With integrated through-wiring
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation</th>
<th>Ref. No.</th>
<th>all types</th>
<th>all</th>
<th>75 °C</th>
<th>65 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>hrs</td>
<td>75,000</td>
<td>100,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC programmable mA</th>
<th>Factory setting mA</th>
<th>Voltage output* DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature °C</th>
<th>Casing temperature °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>K2.1</td>
<td>186465</td>
<td>198–264</td>
<td>160–100</td>
<td>330–700 ±5 %</td>
<td>350</td>
<td>14–34</td>
<td>&lt; 45</td>
<td>&gt; 84</td>
<td>-25 to 50</td>
<td>75</td>
<td>145</td>
</tr>
<tr>
<td></td>
<td></td>
<td>186573</td>
<td>220–240</td>
<td>130–120</td>
<td></td>
<td>300</td>
<td></td>
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<td></td>
<td></td>
<td>700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>186574</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>K3.2</td>
<td>186503</td>
<td>198–264</td>
<td>235–155</td>
<td>350–700 ±5 %</td>
<td>350</td>
<td>30–53</td>
<td>&lt; 60</td>
<td>&gt; 87</td>
<td>-25 to 50</td>
<td>75</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td></td>
<td>186571</td>
<td>220–240</td>
<td>200–180</td>
<td></td>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>700</td>
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<td></td>
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<td>186572</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

K2.1 – Dimension: 103,6 x 67,4 x 31 mm
K3.2 – Abmessungen: 123,4 x 79,4 x 32,6 mm
ComfortLine LED Drivers – Dimmable

700 mA / max. 24 W and max. 37 W
Compact casing shape with integrated cord grip optional for built-in or independent operation.

Electrical characteristics
Secondary side switching of LED modules is allowed (hot wiring).
Power factor at full load: > 0.9
Standby losses: < 0.5 W

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 1 to 100%.
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
With integrated through-wiring
Pushin terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>75 °C</th>
<th>65 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref. No.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100.000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

K2.1 – Dimensions: 103.6 x 67.4 x 31 mm

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz, 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load (230 V) %</th>
<th>Ambient temperature tc °C</th>
<th>Casing temperature tc °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>186280</td>
<td>198–264</td>
<td>160–100</td>
<td>700 ±5%</td>
<td>14–34</td>
<td>&lt; 45</td>
<td>&gt; 84</td>
<td>-25 to 50</td>
<td>75</td>
<td>145</td>
</tr>
<tr>
<td>220–240</td>
<td></td>
<td></td>
<td>130–120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

K3.2 – Dimensions: 123.4 x 79.4 x 32.6 mm

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz, 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load (230 V) %</th>
<th>Ambient temperature tc °C</th>
<th>Casing temperature tc °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>186308</td>
<td>198–264</td>
<td>235–155</td>
<td>700 ±5%</td>
<td>30–53</td>
<td>&lt; 60</td>
<td>&gt; 87</td>
<td>-25 to 50</td>
<td>75</td>
<td>190</td>
</tr>
<tr>
<td>220–240</td>
<td></td>
<td></td>
<td>200–180</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ComfortLine LED Drivers – Dimmable

700 mA / max. 34 W and max. 40 W, 1050 mA / max. 60 W

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: 0.97
Standby losses: < 0.5 W

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 0.5 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 176–264 V DC, 0 Hz
Pushin terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
SELV equivalent
Product guarantee: 5 years

Expected service life time
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>t_c °C</th>
<th>t_a °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>all types</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1050 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td></td>
</tr>
</tbody>
</table>

K3 – Dimensions: 123.4x79.4x33 mm
34 W
- ECxld 700.017
186177
176–264
220–240
190–170
230–160
700 mA
9–48
> 85
no
-30 to 50
75
180
40 W
- ECxld 700.026
186221
176–264
220–240
230–200
280–185
700 mA
20–57
> 85
yes
-30 to 50
75
186
60 W
- ECxld 1050.020
186196
176–264
220–240
305–275
380–232
1050 mA
20–57
> 85
yes
-30 to 50
80
220

K3 with cord grip – Dimensions: 139.4x79.4x33 mm
34 W
- ECxld 700.017
186195
176–264
220–240
190–170
230–160
700 mA
9–48
> 85
no
-30 to 50
75
215
40 W
- ECxld 700.026
186222
176–264
220–240
230–200
280–185
700 mA
20–57
> 85
yes
-30 to 50
75
223
60 W
- ECxld 1050.020
186197
176–264
220–240
305–275
380–232
1050 mA
20–57
> 85
yes
-30 to 50
80
250
ComfortLine LED Drivers

700 mA / max. 37 W

Electrical characteristics
Secondary side switching of LED modules is allowed. (hot wiring)
Power factor at full load: > 0.9

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
With integrated through-wiring for L/N/PE Pushin terminals: 0.25–2.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Operator current</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>186556</td>
</tr>
<tr>
<td>t_c: 75 °C</td>
<td>100,000</td>
</tr>
</tbody>
</table>

K3 with cord grip

<table>
<thead>
<tr>
<th>Mains voltage O Hz, 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature t_a °C</th>
<th>Casing temperature t_c °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>K3 with cord grip – Dimensions: 159.4 x 79.4 x 33 mm</td>
<td>186556</td>
<td>198–264</td>
<td>233–135</td>
<td>30–53</td>
<td>&lt; 60</td>
<td>&gt; 87</td>
<td>.25 to 50</td>
<td>75</td>
</tr>
</tbody>
</table>
ComfortLine LED Drivers – Dimmable

700 mA / max. 24 W
Compact casing shape with integrated cord grip optional for built-in or independent operation.

Electrical characteristics
Secondary side switching of LED modules is allowed (hot wiring).
Power factor at full load: > 0.9

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 1 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz (can be reduced to 176 V with reduced service life time)
With integrated through-wiring
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

---

Expected service life time
at operation temperatures at \( t_c \) point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>186279</td>
</tr>
<tr>
<td>75 °C</td>
<td>&gt; 84</td>
</tr>
<tr>
<td>55 °C</td>
<td>&gt; 84</td>
</tr>
</tbody>
</table>

K2.1

---

| Max. output W | Type | Ref. No. | Mains voltage 0 Hz, 50–60 Hz V | Mains current mA | Current output DC mA | Voltage output DC V | Max. voltage without load DC V | Efficiency at full load % (230 V) | Ambient temperature \( t_a \) °C | Casing temperature \( t_c \) °C | Weight g |
|---------------|------|----------|---------------------------------|------------------|----------------------|---------------------|-------------------------------|---------------------------------|-------------------------------|-----------|
| 24            | E51d 700.043 | 186279   | 198–264                        | 160–100          | 130–120              | 702 ±5%              | 14.34                         | 25 to 50                        | 75               | 145       |

K2.1 – Dimensions: 103.6 x 67.4 x 31 mm
ComfortLine
LED Drivers

700 mA / max. 24 W and max. 37 W
Compact casing shape with integrated cord grip
optional for built-in or independent operation.

Electrical characteristics
Secondary side switching of LED modules
is allowed (hot wiring).
Power factor at full load: > 0.9

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced
service life time)
With integrated through-wiring
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against “no load” operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>Volts</th>
<th>Mains voltage</th>
<th>Mains current</th>
<th>Voltage output</th>
<th>Current output</th>
<th>Max voltage without load DC</th>
<th>Ambient temperature at full load</th>
<th>Casing temperature</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>186278</td>
<td>37</td>
<td>198–264 DC</td>
<td>220–240</td>
<td>160–100</td>
<td>700 ±10%</td>
<td>14–34</td>
<td>&gt; 84</td>
<td>-25 to 50</td>
<td>75</td>
</tr>
<tr>
<td>37</td>
<td>186306</td>
<td>37</td>
<td>198–264 DC</td>
<td>220–240</td>
<td>235–155</td>
<td>700 ±10%</td>
<td>30–53</td>
<td>&gt; 87</td>
<td>-25 to 50</td>
<td>75</td>
</tr>
</tbody>
</table>

Max. output 24 W
Type ECXe 700.042
Ref. No. 186278
Mains voltage 198–264 DC
Mains current 220–240
Voltage output 160–100
Current output 700 ±10%
Max voltage without load DC 14–34
Efficiency< 45
Ambient temperature at full load > 84
Casing temperature -25 to 50
Weight 75

Max. output 37 W
Type ECXe 700.062
Ref. No. 186306
Mains voltage 198–264 DC
Mains current 220–240
Voltage output 235–155
Current output 700 ±10%
Max voltage without load DC 30–53
Efficiency< 60
Ambient temperature at full load > 87
Casing temperature -25 to 50
Weight 75
**ComfortLine**

**LED Drivers**

700 mA / max. 40 W  
1050 mA / max. 60 W  
With 12 V interface

**Electrical characteristics**

Secondary side switching of LED modules is not allowed.  
Power factor at full load: 0.98

**Connection details**

Mains voltage: 220–240 V ±10%  
Mains frequency: 50–60 Hz  
DC operation: 176–264 V DC, 0 Hz  
Pushin terminals: 0.2–1.5 mm²

**Safety features**

Electronic short-circuit protection  
Overload and overtemperature protection  
Protection against "no load" operation  
Degree of protection: IP20  
Protection class I  
SELV equivalent  
Product guarantee: 5 years

---

**Expected service life time**

at operation temperatures at t<sub>c</sub> point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186266</th>
<th>186267</th>
<th>186268</th>
<th>186269</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1050 mA</td>
<td></td>
<td>80 °C</td>
<td>70 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
<td></td>
</tr>
</tbody>
</table>

---

**Max. output W**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz, 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load mA</th>
<th>Efficiency at full load % (230 V)</th>
<th>12 V interface</th>
<th>Ambient temperature t&lt;sub&gt;a&lt;/sub&gt; °C</th>
<th>Casing temperature t&lt;sub&gt;c&lt;/sub&gt; °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>ECx 700.034</td>
<td>186266</td>
<td>176–264</td>
<td>280–185</td>
<td>700 175</td>
<td>20–57</td>
<td>60</td>
<td>&gt; 85</td>
<td>yes</td>
<td>-20 to 50</td>
<td>75</td>
</tr>
<tr>
<td>60</td>
<td>ECx 1050.035</td>
<td>186268</td>
<td>176–264</td>
<td>380–232</td>
<td>1050 175</td>
<td>20–57</td>
<td>60</td>
<td>&gt; 85</td>
<td>yes</td>
<td>-20 to 50</td>
<td>80</td>
</tr>
</tbody>
</table>

---

**K3 with cord grip**

**Dimensions: 123.4 x 79.4 x 33 mm**

| 40   | ECx 700.034 | 186267 | 176–264 | 280–185 | 700 175 | 20–57 | 60 | > 85 | yes | -20 to 50 | 75 | 220 |
| 60   | ECx 1050.035 | 186269 | 176–264 | 380–232 | 1050 175 | 20–57 | 60 | > 85 | yes | -20 to 50 | 80 | 248 |
EasyLine LED Drivers – with Selectable Current

500/600/700 mA / max. 40 W
800/925/1050 mA / max. 45 W
Compact casing shape with integrated cord grip optional for built-in or independent operation.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.93

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Pushin terminals: 0.2–1.5 mm²

Selectable current output
The required current output can be chosen by selecting the respective pin at the output terminal.

Safety features
Temporary electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 3 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>all types</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>all</td>
<td>80 °C</td>
</tr>
<tr>
<td>tC 30,000</td>
<td>50,000</td>
<td></td>
</tr>
</tbody>
</table>

Max. Type Ref. No.
Mains voltage Mains Current Voltage Max. voltage Efficiency Ambient Casing Weight
output 50–60 Hz current output output without load at temperature temperature
DC DC DC full load t a tc
W V mA mA V V % (230 V) °C °C g

K2.1 – Dimensions: 103.6 x 67.4 x 31 mm

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage V 50–60 Hz</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature tA °C</th>
<th>Casing temperature tC °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.5</td>
<td>ECKe 700 199</td>
<td>186531</td>
<td>220–240</td>
<td>145–130</td>
<td>500 37.75%</td>
<td>25.57</td>
<td>&lt; 60</td>
<td>&gt; 89</td>
<td>-20 to 50</td>
<td>80</td>
<td>135</td>
</tr>
<tr>
<td>34.2</td>
<td>ECKe 1050 200</td>
<td>186532</td>
<td>220–240</td>
<td>185–160</td>
<td>800 37.75%</td>
<td>25.43</td>
<td>&lt; 60</td>
<td>&gt; 89</td>
<td>-20 to 50</td>
<td>80</td>
<td>135</td>
</tr>
<tr>
<td>40.0</td>
<td>ECKe 700 199</td>
<td>186531</td>
<td>220–240</td>
<td>175–160</td>
<td>600 37.75%</td>
<td>25.57</td>
<td>&lt; 60</td>
<td>&gt; 89</td>
<td>-20 to 50</td>
<td>80</td>
<td>135</td>
</tr>
<tr>
<td>39.8</td>
<td>ECKe 1050 200</td>
<td>186532</td>
<td>220–240</td>
<td>200–185</td>
<td>700 37.75%</td>
<td>25.43</td>
<td>&lt; 60</td>
<td>&gt; 89</td>
<td>-20 to 50</td>
<td>80</td>
<td>135</td>
</tr>
</tbody>
</table>
EasyLine LED Drivers – with Selectable Current

250/350/500 mA / max. 20 W
500/600/700 mA / max. 21 W
Compact casing shape with integrated cord grip optional for built-in or independent operation.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.93

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.2–1.5 mm²

Selectable current output
The required current output can be chosen by selecting the respective pin at the output terminal.

Safety features
Temporary electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 3 years

Expected service life time
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>all</th>
<th>80 °C</th>
<th>70 °C</th>
<th>hrs</th>
<th>30,000</th>
<th>50,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. output DC V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

K2.1 – Dimensions: 103.6 x 67.4 x 31 mm

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature t_a °C</th>
<th>Casing temperature t_c °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>ECXe</td>
<td>186463</td>
<td>220–240</td>
<td>53–48</td>
<td>250 ±7.5%</td>
<td>17–40</td>
<td>&lt; 60</td>
<td>&gt; 83</td>
<td>&gt; 20 to 50</td>
<td>75</td>
<td>145</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td>73–67</td>
<td>350 ±7.5%</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td>104–95</td>
<td>500 ±7.5%</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>ECXe</td>
<td>186464</td>
<td>220–240</td>
<td>80–71</td>
<td>500 ±7.5%</td>
<td>17–30</td>
<td>&lt; 60</td>
<td>&gt; 85</td>
<td>&gt; 20 to 40</td>
<td>75</td>
<td>145</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td>94–86</td>
<td>600 ±7.5%</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td>110–100</td>
<td>700 ±7.5%</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ComfortLine LED Drivers – Dimmable

700 mA / max. 30 W
1050 mA / max. 36 W

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9

Dimming (except 186393)
Dimmable with phase-cutting trailing-edge dimmer
Minimum dimmer load has to be observed.
The compatibility of the driver and the dimmer has to be confirmed prior to installation to avoid flickering and/or noises.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186393</th>
<th>186394</th>
<th>186395</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1050 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186393</th>
<th>186394</th>
<th>186395</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1050 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

K35 – Dimensions: 96x50x31.5 mm

<table>
<thead>
<tr>
<th>W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains current</th>
<th>Current output DC</th>
<th>Voltage output DC</th>
<th>Max. voltage without load DC</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature t_i °C</th>
<th>Casing temperature t_c °C</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>ECXe</td>
<td>700.112</td>
<td>220–240</td>
<td>155–140</td>
<td>700 ±5%</td>
<td>17–42</td>
<td>³⁄₄ ³⁄₄</td>
<td>&gt; 88</td>
<td>-25 to 50</td>
<td>75</td>
<td>130</td>
</tr>
</tbody>
</table>

K35 – Dimmable – Dimensions: 96x50x31.5 mm

<table>
<thead>
<tr>
<th>W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains current</th>
<th>Current output DC</th>
<th>Voltage output DC</th>
<th>Max. voltage without load DC</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature t_i °C</th>
<th>Casing temperature t_c °C</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>ECXd</td>
<td>1050.113</td>
<td>220–240</td>
<td>200–180</td>
<td>1050 ±10%</td>
<td>18–36</td>
<td>³⁄₄ ³⁄₄</td>
<td>&gt; 85</td>
<td>-10 to 40</td>
<td>75</td>
<td>140</td>
</tr>
</tbody>
</table>

K35 with cord grip – Dimmable – Dimensions: 127x50x31.5 mm

<table>
<thead>
<tr>
<th>W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains current</th>
<th>Current output DC</th>
<th>Voltage output DC</th>
<th>Max. voltage without load DC</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature t_i °C</th>
<th>Casing temperature t_c °C</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>ECXd</td>
<td>1050.113</td>
<td>220–240</td>
<td>200–180</td>
<td>1050 ±10%</td>
<td>18–36</td>
<td>³⁄₄ ³⁄₄</td>
<td>&gt; 85</td>
<td>-10 to 40</td>
<td>75</td>
<td>155</td>
</tr>
</tbody>
</table>

* Phase-out products (available until October 2016)
ComfortLine
LED Drivers
350 mA / max. 8 W and max. 11 W
500 mA / max. 16 W
700 mA / max. 17 W
1050 mA / max. 20 W

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.55 C (186180: > 0.6)

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 176–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
Screw terminals: 2.5 mm²
With integrated cord grip (except 186180)

Safety features
Electronic short-circuit protection
Overload protection
Protection against “no load” operation
Degree of protection: IP20
Protection class II
SELV equivalent
Product guarantee: 5 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186180</th>
<th>186424</th>
<th>186425</th>
<th>186426</th>
<th>186427</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>80 °C</td>
<td>70 °C</td>
<td>70 °C</td>
<td>60 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>700 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1050 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs.</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

K29 – Dimensions: 65 x 30.7 x 21.5 mm

<table>
<thead>
<tr>
<th>Max. output</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains current</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load [%]</th>
<th>Ambient temperature t₀ °C</th>
<th>Casing temperature tₚ °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 W</td>
<td>ECXe</td>
<td>186180</td>
<td>176–264</td>
<td>50–60 Hz V</td>
<td>60–40</td>
<td>350 ±15%</td>
<td>2–24</td>
<td>25</td>
<td>&gt; 78</td>
<td>-20 to 50</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33</td>
</tr>
</tbody>
</table>

K39 – Dimensions: 128 x 37 x 28 mm

<table>
<thead>
<tr>
<th>Max. output</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains current</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load [%]</th>
<th>Ambient temperature t₀ °C</th>
<th>Casing temperature tₚ °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 W</td>
<td>ECXe</td>
<td>186424</td>
<td>176–264</td>
<td>75–51 Hz V</td>
<td>500 ±15%</td>
<td>2–32</td>
<td>34</td>
<td>&gt; 87</td>
<td>-20 to 50</td>
<td>120–200</td>
<td>70</td>
</tr>
<tr>
<td>16 W</td>
<td>ECXe</td>
<td>186425</td>
<td>176–264</td>
<td>75–51 Hz V</td>
<td>500 ±15%</td>
<td>2–32</td>
<td>34</td>
<td>&gt; 88</td>
<td>-20 to 50</td>
<td>120–200</td>
<td>70</td>
</tr>
<tr>
<td>17 W</td>
<td>ECXe</td>
<td>186426</td>
<td>176–264</td>
<td>117–79 Hz V</td>
<td>700 ±15%</td>
<td>2–25</td>
<td>34</td>
<td>&gt; 87</td>
<td>-20 to 50</td>
<td>120–200</td>
<td>70</td>
</tr>
<tr>
<td>20 W</td>
<td>ECXe</td>
<td>186427</td>
<td>176–264</td>
<td>137–92 Hz V</td>
<td>1050 ±15%</td>
<td>2–19</td>
<td>34</td>
<td>&gt; 87</td>
<td>-20 to 45</td>
<td>120–200</td>
<td>70</td>
</tr>
</tbody>
</table>

* Phase-out products (available until October 2016)
ComfortLine
LED Drivers

350 mA / max. 8.75 W

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.6

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
Screw terminals: 2.5 mm²

Safety features
Protection against transient main peaks up to 1 kV (between L and N)
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operator current</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>186519</td>
</tr>
</tbody>
</table>

hₚs  50,000 100,000

K29 – Dimensions: 65 x 30.7 x 21.5 mm

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.75</td>
<td>ECExe 350.192</td>
<td>186519</td>
</tr>
<tr>
<td></td>
<td>176–264</td>
<td>60–39</td>
</tr>
<tr>
<td></td>
<td>220–240</td>
<td>79–73</td>
</tr>
<tr>
<td>350 mA</td>
<td>3–25</td>
<td></td>
</tr>
<tr>
<td>Max. voltage DC output</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Efficiency at full load</td>
<td>&gt; 78</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature at tc</td>
<td>-20 to 50</td>
<td></td>
</tr>
<tr>
<td>Casing temperature</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Weight g</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>
ComfortLine
LED Drivers

1050 mA / max. 32 W

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads
  primary: 2 x 0.5 mm², length: approx. 201 mm
  secondary: 2 x 0.5 mm², length: approx. 116 mm

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV

Expected service life time
at operation temperatures at t_{c} point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1050 mA</td>
<td>186479</td>
</tr>
<tr>
<td>50 °C</td>
<td>55 °C</td>
</tr>
<tr>
<td>50,000 hrs</td>
<td>100,000 hrs</td>
</tr>
</tbody>
</table>

K35 with leads – Dimensions: 78 x 50 x 31.5 mm

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50 – 60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature t_{a} °C</th>
<th>Casing temperature t_{c} °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>ECI x</td>
<td>1050.117</td>
<td>220–240</td>
<td>165–140</td>
<td>1050 ±10%</td>
<td>20–31</td>
<td>&lt; 60</td>
<td>&gt; 85</td>
<td>25 to 50</td>
<td>75</td>
<td>170</td>
</tr>
</tbody>
</table>
EasyLine LED Drivers
– Dimmable

150–700 mA / max. 6–36 W

Electrical characteristics
Secondary side switching of LED modules
is not allowed.
Power factor at full load: > 0.85

Dimming
Dimmable with phase-cutting trailing-edge dimmer.
Minimum dimmer load has to be observed.
The compatibility of the driver and the dimmer
has to be confirmed prior to installation to avoid
flickering and/or noises.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Screw terminals: 0.5–2.5 mm²

Safety features
Electronic short-circuit protection
Overload protection
Protection against “no load” operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 3 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186415</th>
<th>186416</th>
<th>186451</th>
<th>186447</th>
<th>186448</th>
<th>186449</th>
<th>186450</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>80 °C</td>
<td>70 °C</td>
<td>70 °C</td>
<td>60 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs</td>
<td>30,000</td>
<td>50,000</td>
<td>30,000</td>
<td>50,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature ta °C</th>
<th>Casing temperature tc °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>K52 – Dimensions: 122.8x45x19 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>ECXd 130.151</td>
<td>186447</td>
<td>220–240</td>
<td>40–35</td>
<td>150 abs</td>
<td>27–41</td>
<td>60</td>
<td>&gt; 78</td>
<td>-15 to 45</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>10</td>
<td>ECXd 500.152</td>
<td>186448</td>
<td>220–240</td>
<td>60–50</td>
<td>500 abs</td>
<td>13–20</td>
<td>30</td>
<td>&gt; 80</td>
<td>-15 to 45</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>12</td>
<td>ECXd 250.153</td>
<td>186449</td>
<td>220–240</td>
<td>70–60</td>
<td>250 abs</td>
<td>27–48</td>
<td>60</td>
<td>&gt; 80</td>
<td>-15 to 45</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>K53 – Dimensions: 153x41.4x32 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>ECXd 350.130</td>
<td>186415</td>
<td>220–240</td>
<td>100–90</td>
<td>350 abs</td>
<td>32–52</td>
<td>60</td>
<td>&gt; 85</td>
<td>-15 to 45</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>18</td>
<td>ECXd 700.134</td>
<td>186450</td>
<td>220–240</td>
<td>95–85</td>
<td>700 abs</td>
<td>16–26</td>
<td>35</td>
<td>&gt; 85</td>
<td>-15 to 45</td>
<td>70</td>
<td>140</td>
</tr>
<tr>
<td>23</td>
<td>ECXd 700.131</td>
<td>186416</td>
<td>220–240</td>
<td>140–120</td>
<td>700 abs</td>
<td>22–36</td>
<td>60</td>
<td>&gt; 85</td>
<td>-15 to 45</td>
<td>80</td>
<td>140</td>
</tr>
<tr>
<td>36</td>
<td>ECXd 700.155</td>
<td>186451</td>
<td>220–240</td>
<td>190–170</td>
<td>700 abs</td>
<td>32–52</td>
<td>60</td>
<td>&gt; 83</td>
<td>-15 to 45</td>
<td>80</td>
<td>170</td>
</tr>
</tbody>
</table>
EasyLine LED Drivers

350 mA / max. 7 W
700 mA / max. 5.6 W

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.5

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads
  primary: 2x0.75 mm², length: 180 mm
  secondary: 2x0.5–0.75 mm², length: 180 mm

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 3 years

Expected service life time
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>75 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>30,000</td>
</tr>
</tbody>
</table>

K51 – Dimensions: 81.6 x 42.5 x 23 mm

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load %</th>
<th>Ambient temperature °C</th>
<th>Casing temperature °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>ECXe 700.081</td>
<td>220–240</td>
<td>45–30</td>
<td>700 ±5%</td>
<td>2.8–8</td>
<td>&lt; 60</td>
<td>&gt; 70</td>
<td>-15 to 45</td>
<td>75</td>
<td>45</td>
</tr>
<tr>
<td>7</td>
<td>ECXe 350.072</td>
<td>220–240</td>
<td>50–36</td>
<td>350 ±5%</td>
<td>8.4–20</td>
<td>&lt; 60</td>
<td>&gt; 70</td>
<td>-15 to 45</td>
<td>75</td>
<td>45</td>
</tr>
</tbody>
</table>
EasyLine LED Drivers

350 mA / max. 20 W
500 mA / max. 12 W
The LED constant-current drivers are designed for use in residential lighting.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Screw terminals: 0.5–2.5 mm²

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
Product guarantee: 3 years

Products under development; preliminary technical datas

<table>
<thead>
<tr>
<th>Max. output (W)</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz (V)</th>
<th>Mains current (mA)</th>
<th>Current output DC (mA)</th>
<th>Voltage output DC (V)</th>
<th>Max. voltage without load DC (V)</th>
<th>Efficiency at full load [%] (230 V)</th>
<th>Ambient temperature (°C)</th>
<th>Casing temperature (°C)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>ECx6</td>
<td>186508</td>
<td>220–240</td>
<td>64.58</td>
<td>500 ±5 %</td>
<td>8.24</td>
<td>&lt; 60</td>
<td>&gt; 85</td>
<td>-15 to 45</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>20</td>
<td>ECx6</td>
<td>186507</td>
<td>220–240</td>
<td>107.98</td>
<td>350 ±5 %</td>
<td>40.57</td>
<td>&lt; 60</td>
<td>&gt; 85</td>
<td>-15 to 45</td>
<td>75</td>
<td>70</td>
</tr>
</tbody>
</table>

Expected service life time
at operation temperatures at tₖ point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186508</th>
<th>186507</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 mA</td>
<td></td>
<td>75 °C</td>
<td>65 °C</td>
</tr>
<tr>
<td>hrs</td>
<td></td>
<td>30,000</td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

K52

Products under development; preliminary technical datas

<table>
<thead>
<tr>
<th>Max. output (W)</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz (V)</th>
<th>Mains current (mA)</th>
<th>Current output DC (mA)</th>
<th>Voltage output DC (V)</th>
<th>Max. voltage without load DC (V)</th>
<th>Efficiency at full load [%] (230 V)</th>
<th>Ambient temperature (°C)</th>
<th>Casing temperature (°C)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>ECx6</td>
<td>186508</td>
<td>220–240</td>
<td>64.58</td>
<td>500 ±5 %</td>
<td>8.24</td>
<td>&lt; 60</td>
<td>&gt; 85</td>
<td>-15 to 45</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>20</td>
<td>ECx6</td>
<td>186507</td>
<td>220–240</td>
<td>107.98</td>
<td>350 ±5 %</td>
<td>40.57</td>
<td>&lt; 60</td>
<td>&gt; 85</td>
<td>-15 to 45</td>
<td>75</td>
<td>70</td>
</tr>
</tbody>
</table>
**EasyLine LED Drivers**

350 mA / max. 12.6 W and 20 W
500 mA / max. 15 W
700 mA / max. 20.3 W and 25.2 W

The LED constant-current drivers are designed for use in residential lighting.

**Electrical characteristics**

Secondary side switching of LED modules is not allowed.

Power factor at full load: > 0.5 or > 0.95 (186353)

**Connection details**

- Mains voltage: 220–240 V ±10%
- Mains frequency: 50–60 Hz
- Screw terminals: 0.5–2.5 mm²

**Safety features**

- Electronic short-circuit protection
- Overload protection
- Protection against "no load" operation
- Degree of protection: IP20
- Protection class II
- SELV
- Product guarantee: 3 years

**Expected service life time**

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186341</th>
<th>186349</th>
<th>186431</th>
<th>186350</th>
<th>186353</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>70 °C</td>
<td>60 °C</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>500 mA</td>
<td>—</td>
<td>75 °C</td>
<td>65 °C</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>700 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>70 °C</td>
<td>60 °C</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>700 mA</td>
<td>30,000</td>
<td>50,000</td>
<td>30,000</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

**Max. Type**

<table>
<thead>
<tr>
<th>W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load V</th>
<th>Efficiency at full load %</th>
<th>Ambient temperature °C</th>
<th>Casing temperature °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.6</td>
<td>K52</td>
<td>186341</td>
<td>220–240</td>
<td>100–70</td>
<td>350 ±5%</td>
<td>8.4–36</td>
<td>&lt; 60</td>
<td>&gt; 83</td>
<td>-15 to 45</td>
<td>75</td>
<td>65</td>
</tr>
<tr>
<td>13</td>
<td>K52</td>
<td>186349</td>
<td>220–240</td>
<td>90–70</td>
<td>500 ±5%</td>
<td>8.3–30</td>
<td>&lt; 60</td>
<td>&gt; 83</td>
<td>-15 to 45</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>20</td>
<td>K54</td>
<td>186431</td>
<td>220–240</td>
<td>110–95</td>
<td>350 ±5%</td>
<td>16–37</td>
<td>&lt; 60</td>
<td>&gt; 83</td>
<td>-15 to 45</td>
<td>70</td>
<td>140</td>
</tr>
<tr>
<td>20.3</td>
<td>K54</td>
<td>186350</td>
<td>220–240</td>
<td>115–100</td>
<td>700 ±5%</td>
<td>8–29</td>
<td>&lt; 60</td>
<td>&gt; 83</td>
<td>-15 to 45</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>25.2</td>
<td>K54</td>
<td>186353</td>
<td>220–240</td>
<td>130–115</td>
<td>700 ±5%</td>
<td>22–36</td>
<td>&lt; 60</td>
<td>&gt; 88</td>
<td>-15 to 45</td>
<td>70</td>
<td>140</td>
</tr>
</tbody>
</table>

**K52**

**K54**

---

**Expected service life time**

at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186341</th>
<th>186349</th>
<th>186431</th>
<th>186350</th>
<th>186353</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>70 °C</td>
<td>60 °C</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>500 mA</td>
<td>—</td>
<td>75 °C</td>
<td>65 °C</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>700 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>70 °C</td>
<td>60 °C</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>700 mA</td>
<td>30,000</td>
<td>50,000</td>
<td>30,000</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

---

**K52 – Dimensions:** 122.8x45x19 mm

**K54 – Dimensions:** 166x52x24 mm
**EasyLine LED Drivers**

350–1050 mA / max. 30–60 W

The LED constant-current drivers are designed for use in residential lighting.

**Electrical characteristics**

Secondary side switching of LED modules is not allowed.

Power factor at full load: > 0.95

**Connection details**

Mains voltage: 220–240 V ±10%

Mains frequency: 50–60 Hz

Screw terminals: 0.5–2.5 mm²

**Safety features**

Electronic short-circuit protection

Overload protection

Protection against "no load" operation

Degree of protection: IP20

Protection class II

SELV

Product guarantee: 3 years

---

### Expected service life time

at operation temperatures at t<sub>c</sub> point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186430</th>
<th>186351</th>
<th>186522</th>
<th>186548</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>70 °C</td>
<td>60 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>750 mA</td>
<td></td>
<td></td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
</tr>
<tr>
<td>1050 mA</td>
<td></td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs</td>
<td>30,000</td>
<td>50,000</td>
<td>30,000</td>
<td>50,000</td>
<td>30,000</td>
</tr>
</tbody>
</table>

---

### K53

**Dimensions:** 153x41.4x32 mm

| Max. output W | Type | Ref. No. | Mains voltage 50–60 Hz V | Mains current mA | Current output DC mA | Voltage output DC V | Max. voltage without load DC V | Efficiency at full load % (230 V) | Ambient temperature t<sub>a</sub> °C | Casing temperature t<sub>c</sub> °C | Weight g |
|---------------|------|----------|---------------------------|-----------------|----------------------|------------------|-------------------------------|---------------------------------|----------------------------------|-----------|
| 30            | ECx6 | 350.141  | 186430                    | 220–240         | 160–140              | 350.141          | 57–86                         | < 90                            | -15 to 45                         | 70        | 200       |
| 31.5          | ECx6 | 1030.084 | 186351                    | 220–240         | 150–145              | 1030.084         | 20–30                         | < 60                            | -15 to 45                         | 75        | 140       |
| 60            | ECx6 | 700.206  | 186548*                   | 220–240         | 320–294              | 700.206          | 43–86                         | < 120                           | -15 to 45                         | 75        | 180       |
| 60            | ECx6 | 1030.183 | 186522*                   | 220–240         | 320–294              | 1030.183         | 40–58                         | < 70                            | -15 to 45                         | 75        | 180       |

* Products under development; preliminary technical datas
PrimeLine LED Drivers – Dimmable with Programmable Current

350–1050 mA / max. 75 W
350–1050 mA / max. 150 W

These electronic LED constant current drivers are especially designed for use in street lighting systems.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.95
Constant lumen output

Dimming
The dimming function is achieved by applying an analogue dimming signal to the nominal current.
Dimming range: 10 to 100% If no dimming interface is connected, brightness will stay at 100%.

Programmability
The output current can be freely adjusted in 1 mA steps between 350 mA and 1050 mA (factory setting: 350 mA).
An iProgrammer (Ref. No. 186428) and a PC running the respective VS software are required for programming purposes.

Connection details
Mains voltage: 220–240 V
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
   primary: 0.75 mm², length: 300 mm
   secondary: 0.75 mm², length: 300 mm

Dimensions: 240.8x60x40.3 mm

<table>
<thead>
<tr>
<th>Max. output</th>
<th>Ref. No.</th>
<th>Type</th>
<th>Mains voltage</th>
<th>Mains current</th>
<th>Current output DC</th>
<th>Voltage output DC</th>
<th>Max. voltage without load DC</th>
<th>Efficiency at full load %</th>
<th>Ambient temperature tₐ °C</th>
<th>Casing temperature tₜ °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>ECDx 1035G-146</td>
<td>186442</td>
<td>220–240</td>
<td>757–694</td>
<td>350–1050 ±5%</td>
<td>85–260</td>
<td>&lt; 310</td>
<td>&gt; 91</td>
<td>-40 to 60</td>
<td>80</td>
<td>1050</td>
</tr>
</tbody>
</table>

* Depends on the adjusted current output

Safety features
Protection against transient main peaks up to 6 kV (between L and N)
Double isolated
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP65

Protection class II
The LEDs are thermally protected by the driver's NTC interface, which ensures the current will be reduced when a critical temperature is reached.
Product guarantee: 5 years

Expected service life time
at operation temperatures at tₐ point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>all types</th>
</tr>
</thead>
<tbody>
<tr>
<td>350–1050 mA</td>
<td>80 °C</td>
<td>70 °C</td>
</tr>
<tr>
<td>hrs.</td>
<td>50,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>
PrimeLine LED Drivers – Dimmable

700, 1000, 1400 mA / max. 90 W
The nominal current can be set to 700 mA, 1000 mA, 1400 mA with a dip switch or it can be adjusted with a DALI signal.

Electrical characteristics
Secondary side switching of LED modules is allowed (hot wiring).
Power factor at full load: > 0.98

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 10 to 100%
If no dimming interface is connected, brightness will stay at 100%.

MidNight – Multi-Step dimming
The MidNight concept is based on dimmable ballasts for integration in lampposts; these ballasts can be programmed to create different light scenes with different dimm settings.

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.75–2.5 mm²

Safety features
Protection against transient main peaks up to 2 kV (between L and N) and up to 4 kV (between L, N and PE)
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
Product guarantee: 5 years

Expected service life time
at operation temperatures at t°C point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>186367</td>
</tr>
<tr>
<td>1000 mA</td>
<td>186367</td>
</tr>
<tr>
<td>1400 mA</td>
<td>186367</td>
</tr>
</tbody>
</table>

K37 – Dimensions: 240 x 60 x 40 mm

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load %</th>
<th>Ambient temperature t°C</th>
<th>Casing temperature t°C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>ECxl 1400.096</td>
<td>186367</td>
<td>220–240</td>
<td>450–150</td>
<td>700 mA</td>
<td>43–117</td>
<td>&lt; 120</td>
<td>&gt; 90</td>
<td>-40 to 50</td>
<td>-40 to 45</td>
<td>70</td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>80</td>
</tr>
</tbody>
</table>
ComfortLine LED Drivers – Dimmable

700 mA / max. 75, 100 and 150 W
These electronic LED constant current drivers are especially designed for use in street lighting systems.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9

Dimming
The dimming function is achieved by applying an analogue dimming signal to the nominal current.
Dimming range: 10 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 120–277 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
   primary: 2x0.75 mm²
   secondary: 4x0.75 mm²

Safety features
Protection against transient main peaks up to 6 kV (between L and N)
Electronic short-circuit protection
Overload protection
Overtemperature protection (186402)
Protection against "no load" operation
Degree of protection: IP65
Protection class II
Product guarantee: 5 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>M59.1</th>
<th>M59.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>85 °C</td>
<td>75 °C</td>
</tr>
<tr>
<td>V</td>
<td>80 °C</td>
<td>70 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
</tr>
<tr>
<td>% without load</td>
<td>50,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

Max. Type

<table>
<thead>
<tr>
<th>Max. Voltage</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains current</th>
<th>Current output DC</th>
<th>Voltage output DC</th>
<th>Max. voltage without load DC</th>
<th>Efficiency at full load (% (230 V))</th>
<th>Ambient temperature °C</th>
<th>Casing temperature °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>ECXd 700G.117</td>
<td>186400</td>
<td>120–277</td>
<td>700–304</td>
<td>700 mA</td>
<td>54–107°</td>
<td>&lt; 250</td>
<td>&gt; 88</td>
<td>-40 to 55</td>
<td>85</td>
</tr>
<tr>
<td>100</td>
<td>ECXd 700G.118</td>
<td>186401</td>
<td>120–277</td>
<td>917–398</td>
<td>700 mA</td>
<td>70–143°</td>
<td>&lt; 250</td>
<td>&gt; 88</td>
<td>-40 to 55</td>
<td>80</td>
</tr>
<tr>
<td>150</td>
<td>ECXd 700G.119</td>
<td>186402</td>
<td>120–277</td>
<td>1363–591</td>
<td>700 mA</td>
<td>107–210°</td>
<td>&lt; 250</td>
<td>&gt; 88</td>
<td>-40 to 55</td>
<td>85</td>
</tr>
</tbody>
</table>

See page 264
ComfortLine LED Drivers – Dimmable

1050 mA / max. 60 W
These electronic LED constant current drivers are especially designed for use in street lighting systems.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.96

Dimming
The dimming function is achieved by applying an analogue dimming signal to the nominal current.
Dimming range: 10 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 220–240 V ± 10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
  primary: 2x0.75 mm², length: 300 mm
  secondary: 6x0.75 mm², length: 300 mm

Safety features
Protection against transient main peaks up to 4 kV (between L and N)
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP67
Protection class II
SELV
Product guarantee: 5 years

Expected service life time
at operation temperatures at \( t_c \) point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>80 °C</th>
<th>70 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1050 mA</td>
<td>186316</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1050 mA</td>
<td></td>
<td>50,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

M57 – Dimensions: 201x60x34 mm

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Max. voltage at full load % (230 V)</th>
<th>Efficiency %</th>
<th>Ambient temperature ( t_a ) °C</th>
<th>Casing temperature ( t_c ) °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>ECXd 1050.069</td>
<td>186316</td>
<td>220–240</td>
<td>310–280</td>
<td>1050 ±5%</td>
<td>28–57</td>
<td>&lt; 60</td>
<td>&gt; 88</td>
<td>-40 to 50</td>
<td>80</td>
<td>730</td>
<td></td>
</tr>
</tbody>
</table>
ComfortLine LED Drivers – Dimmable

700 mA / max. 40 W
These electronic LED constant current drivers are especially designed for use in street lighting systems.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.96

Dimming
The dimming function is achieved by applying an analogue dimming signal to the nominal current.
Dimming range: 10 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 120–277 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
  primary: 2x0.75 mm², length: 228 mm
  secondary: 4x0.75 mm², length: 228 mm

Safety features
Protection against transient main peaks up to 6 kV (between L and N)
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP54
Protection class II
Product guarantee: 5 years

Expected service life time
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Operation</th>
<th>Ref. No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>186490</td>
</tr>
<tr>
<td>700 mA</td>
<td>80 °C</td>
</tr>
<tr>
<td>0%</td>
<td>70 °C</td>
</tr>
</tbody>
</table>

M59 – Dimensions: 241.3 x 33 x 25.3 mm

<table>
<thead>
<tr>
<th>M59 – Type</th>
<th>Mains voltage 50–60 Hz</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature t_a °C</th>
<th>Casing temperature t_c °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 ECx700G.177</td>
<td>120–277</td>
<td>700</td>
<td>32.55</td>
<td>60</td>
<td>&gt; 85</td>
<td>-30 to 55</td>
<td>80</td>
<td>398</td>
<td></td>
</tr>
</tbody>
</table>
ComfortLine
LED Drivers – for Power Reduction

700/400 mA / max. 75, 100 and 150 W

These electronic LED constant current drivers are especially designed for use in street lighting systems. They provide a simple power-reduction option by connecting a further phase, which makes it possible to switch between 700 mA and 400 mA.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9

Connection details
Mains voltage: 120–277 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
primary: 3x0.75 mm²
secondary: 2x0.75 mm²

Power reduction
The nominal current output will be reduced by connecting the control phase (LST) to 57%.
Connecting L (black) and LST (orange) to the mains voltage reduces output by lowering the output current. If this function is not used, an additional terminal should be provided in the luminaire to fix the LST wire.

Safety features
Protection against transient main peaks up to 6 kV (between L and N)
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP65
Protection class II
Product guarantee: 5 years

Expected service life time
at operation temperatures at Ic point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No. 186397</th>
<th>186509</th>
<th>186398</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>85 °C</td>
<td>75 °C</td>
<td>80 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

* Products under development; preliminary technical datas
ComfortLine
LED Drivers

700 mA / max. 40 W
These electronic LED constant current drivers are especially designed for use in street lighting systems.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9

Connection details
Mains voltage: 120–277 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
  primary: 2x0.75 mm², length: 228 mm
  secondary: 2x0.75 mm², length: 228 mm

Safety features
Protection against transient main peaks up to 6 kV (between L and N)
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP54
Protection class II
Product guarantee: 5 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation</th>
<th>Ref. No.</th>
<th>Current</th>
<th>Voltage</th>
<th>Full load</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>80 °C</td>
<td>70 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Max. Type Ref. No. Mains voltage Mains Current Voltage Max. voltage Efficiency Ambient Casing Weight
output 50–60 Hz output output without load at temperature temperature
DC DC DC full load t a tc
W V mA mA V V % (230 V) °C °C g

M59 – Dimensions: 241.3x33x25.3 mm

<table>
<thead>
<tr>
<th>W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz</th>
<th>Mains current</th>
<th>Current output DC</th>
<th>Voltage output DC</th>
<th>Max. voltage without load DC</th>
<th>Efficiency at full load 70°C</th>
<th>Ambient temperature tA</th>
<th>Casing temperature tC</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>ECXe 700G.176</td>
<td>186489</td>
<td>120–277</td>
<td>700 mA</td>
<td>72–55</td>
<td>60</td>
<td>&gt; 85</td>
<td>-30 to 55</td>
<td>80</td>
<td>393</td>
<td></td>
</tr>
</tbody>
</table>
**ComfortLine**
**LED Drivers**

**700 mA / max. 150 W**
These electronic LED constant current drivers are especially designed for use in street lighting systems.

**Electrical characteristics**
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9

**Connection details**
Mains voltage: 120–277 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
  - primary: 2x0.75 mm², length: 450 mm
  - secondary: 2x0.75 mm², length: 180 mm

**Safety features**
Protection against transient main peaks up to 6 kV (between L and N)
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP65
**Protection class II**
Product guarantee: 5 years

**Expected service life time**
at operation temperatures at $t_c$ point

<table>
<thead>
<tr>
<th>Operation</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Mains Current</th>
<th>Voltage output</th>
<th>Max. voltage without load</th>
<th>Efficiency</th>
<th>Ambient temperature $t_a$ °C</th>
<th>Casing temperature $t_c$ °C</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>186399</td>
<td>120–277 V</td>
<td>700 mA</td>
<td>107–210 V</td>
<td>&lt; 250</td>
<td>&gt; 88</td>
<td>-40 to 55</td>
<td>85</td>
<td>1070</td>
</tr>
</tbody>
</table>

**M59.2 – Dimensions:** 240.1x60x41.1 mm

---

Max. output: 130 W
Type: ECXe
Ref. No.: 700G.116
186399
Mains voltage: 120–277 V
Mains current: 700 mA
Current output: 107–210 mA
Voltage output: 107–210 V
Max. voltage without load: < 250 V
Efficiency: > 88%
Ambient temperature: -40 to 55 °C
Casing temperature: 85 °C
Weight: 1070 g
**ComfortLine**

**LED Drivers**

350 mA / max. 40 W  
700 mA / max. 40 W  
1050 mA / max. 40 W

These electronic LED constant current drivers are especially designed for use in street lighting systems.

**Electrical characteristics**

Secondary side switching of LED modules is not allowed.  
Power factor at full load: > 0.9

**Connection details**

Mains voltage: 120–277 V ±10%  
Mains frequency: 50–60 Hz  
Push terminals: 0.75–2.5 mm²

**Safety features**

Protection against transient main peaks up to 4 kV (between L and N)  
Electronic short-circuit protection  
Overload protection  
Protection against "no load" operation  
Degree of protection: IP20  
Protection class II  
Product guarantee: 5 years

**Expected service life time**

at operation temperatures at \(t_c\) point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>(t_c) °C</th>
<th>(t_c) °C</th>
<th>Max. voltage V</th>
<th>Efficiency at full load %</th>
<th>Ambient temperature (t_a) °C</th>
<th>Casing temperature (t_c) °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 mA</td>
<td>186550</td>
<td>70</td>
<td>60</td>
<td>78–114</td>
<td>&lt; 120</td>
<td>&gt; 86</td>
<td>-25 to 50</td>
<td>70</td>
</tr>
<tr>
<td>700 mA</td>
<td>186551</td>
<td>70</td>
<td>60</td>
<td>39–57</td>
<td>&lt; 60</td>
<td>&gt; 86</td>
<td>-25 to 50</td>
<td>70</td>
</tr>
<tr>
<td>1050 mA</td>
<td>186552</td>
<td>75</td>
<td>65</td>
<td>26–38</td>
<td>&lt; 60</td>
<td>&gt; 86</td>
<td>-25 to 50</td>
<td>75</td>
</tr>
</tbody>
</table>

**K39.2**

**Products under development; preliminary technical datas**

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % (230 V)</th>
<th>Ambient temperature (t_a) °C</th>
<th>Casing temperature (t_c) °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>ECXe 350.207</td>
<td>186550</td>
<td>120–277</td>
<td>350.207</td>
<td>387.168</td>
<td>78.114</td>
<td>&lt; 120</td>
<td>&gt; 86</td>
<td>-25 to 50</td>
<td>70</td>
<td>160</td>
</tr>
<tr>
<td>40</td>
<td>ECXe 700.208</td>
<td>186551</td>
<td>120–277</td>
<td>700.208</td>
<td>387.168</td>
<td>39.57</td>
<td>&lt; 60</td>
<td>&gt; 86</td>
<td>-25 to 50</td>
<td>70</td>
<td>160</td>
</tr>
<tr>
<td>40</td>
<td>ECXe 1050.209</td>
<td>186552</td>
<td>120–277</td>
<td>1050.209</td>
<td>387.168</td>
<td>26.38</td>
<td>&lt; 60</td>
<td>&gt; 86</td>
<td>-25 to 50</td>
<td>75</td>
<td>160</td>
</tr>
</tbody>
</table>

Dimensions: 184 x 37 x 33 mm
ComfortLine
LED Drivers

350 mA / max. 42 W

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.97

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Push-in terminals: 0.75–2.5 mm²

Safety features
Protection against transient main peaks up to 3 kV (between L and N) and up to 4 kV (between L, N and PE)
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I

SELV equivalent
Product guarantee: 5 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>350</th>
<th>70 °C</th>
<th>60 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>186175</td>
<td>50,000</td>
<td>100,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

K30 – Dimensions: 187 x 60 x 36 mm

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load %</th>
<th>Ambient temperature 95 °C</th>
<th>Casing temperature 125 °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>ECXe</td>
<td>186175*</td>
<td>220–240</td>
<td>210–190</td>
<td>350 ± 5%</td>
<td>40–115</td>
<td>120</td>
<td>&gt; 90</td>
<td>30 to 60</td>
<td>70</td>
<td>270</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Phase-out products (available until October 2016)
ComfortLine LED Drivers – Dimmable

700 mA / max. 112 W
1050 mA / max. 126 W
With 12 V interface

These electronic LED constant current drivers are designed for use in industrial hall lighting systems.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.95
Standby losses: < 0.5 W

Dimming
The dimming function is achieved by applying a PWM signal to the nominal current.
Dimming range: 3 to 100%
If no dimming interface is connected, brightness will stay at 100%.

Connection details
Mains voltage: 220–240 V ± 10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
The LEDs are thermally protected by the driver’s NTC interface, which ensures the current will be reduced when a critical temperature is reached.
Product guarantee: 5 years

### NTC at LED module 10 kΩ

<table>
<thead>
<tr>
<th>R (kΩ)</th>
<th>Nominal current (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>&lt; 1.49</td>
<td>60</td>
</tr>
<tr>
<td>&lt; 1.13</td>
<td>0 (off)</td>
</tr>
</tbody>
</table>

### Expected service life time

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186299</th>
<th>186303</th>
<th>186300</th>
<th>186304</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>70 °C</td>
<td>60 °C</td>
<td>–</td>
<td>80 °C</td>
<td>70 °C</td>
</tr>
<tr>
<td>1050 mA</td>
<td>–</td>
<td>75 °C</td>
<td>65 °C</td>
<td>–</td>
<td>90 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

See page 235–242

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**See page 264**

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### M36 – Dimensions: 149.5×75×30 mm

<table>
<thead>
<tr>
<th>Max. output (W)</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage (V)</th>
<th>Mains current (mA)</th>
<th>Current output DC (mA)</th>
<th>Voltage output DC (V)</th>
<th>Max. voltage without load (V)</th>
<th>Efficiency at full load (%230 V)</th>
<th>12 V interface max. 2 W</th>
<th>Ambient temperature (°C)</th>
<th>Casing temperature (°C)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>112</td>
<td>EOXd 700.058</td>
<td>186300</td>
<td>198–264</td>
<td>595–445</td>
<td>850–160</td>
<td>&lt; 4.50</td>
<td>&gt; 91</td>
<td>yes</td>
<td>25 to 50</td>
<td>70</td>
<td>288</td>
<td></td>
</tr>
<tr>
<td>126</td>
<td>EOXd 1050.060</td>
<td>186304</td>
<td>198–264</td>
<td>660–495</td>
<td>1050</td>
<td>&lt; 4.50</td>
<td>&gt; 91</td>
<td>yes</td>
<td>25 to 50</td>
<td>75</td>
<td>288</td>
<td></td>
</tr>
</tbody>
</table>

### K38 with cord grip – Dimensions: 210×83×32 mm

<table>
<thead>
<tr>
<th>Max. output (W)</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage (V)</th>
<th>Mains current (mA)</th>
<th>Current output DC (mA)</th>
<th>Voltage output DC (V)</th>
<th>Max. voltage without load (V)</th>
<th>Efficiency at full load (%230 V)</th>
<th>12 V interface max. 2 W</th>
<th>Ambient temperature (°C)</th>
<th>Casing temperature (°C)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>112</td>
<td>EOXd 700.058</td>
<td>186300</td>
<td>198–264</td>
<td>595–445</td>
<td>850–160</td>
<td>&lt; 4.50</td>
<td>&gt; 91</td>
<td>yes</td>
<td>25 to 50</td>
<td>80</td>
<td>335</td>
<td></td>
</tr>
<tr>
<td>126</td>
<td>EOXd 1050.060</td>
<td>186304</td>
<td>198–264</td>
<td>660–495</td>
<td>1050</td>
<td>&lt; 4.50</td>
<td>&gt; 91</td>
<td>yes</td>
<td>25 to 50</td>
<td>90</td>
<td>335</td>
<td></td>
</tr>
</tbody>
</table>
ComfortLine LED Drivers – Dimmable and Adjustable

900/1050/1200/1400 mA / max. 60.2 W

The dial can be used to set the current output to 900 mA [1], 1050 mA [2], 1200 mA [3] or 1400 mA [4].

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.95

Dimming
The dimming function is achieved by applying a PWM signal.
Dimming range: 3 to 100%
If no dimming interface is connected, brightness will stay at 100%

Connection details
Mains voltage: 220–240 V ± 10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
Push-in terminals: 0.2–1.5 mm²
(NTC interface: 0.2–0.5 mm²)

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
SELV
The LEDs are thermally protected by the driver’s NTC interface, which ensures the current will be reduced when a critical temperature is reached.
Product guarantee: 5 years

<table>
<thead>
<tr>
<th>NTC at LED module</th>
<th>R (kΩ)</th>
<th>Nominal current [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>0 [off]</td>
<td></td>
</tr>
</tbody>
</table>

Expected service life time at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>tc</th>
<th>Nominal current [W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>186208</td>
<td>85 °C</td>
<td>75 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>100,000</td>
<td>50,000</td>
<td></td>
</tr>
</tbody>
</table>

Max. output W

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. output (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K3</td>
<td>38.7 / 45.1 / 51.6 / 60.2</td>
</tr>
</tbody>
</table>

K3 – Dimensions: 123.4 x 79.4 x 33 mm
ComfortLine LED Drivers – Dimmable and Adjustable

350/500/600/700 mA / max. 39.9 W

The dial can be used to set the current output to 350 mA [1], 500 mA [2], 600 mA [3] or 700 mA [4].

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: 0.95

Dimming
The dimming function is achieved by applying a PWM signal.
Dimming range: 3 to 100%
If no dimming interface is connected, brightness will stay at 100%

Connection details
Mains voltage: 220-240 V ±10%
Mains frequency: 50-60 Hz
DC operation: 176-264 V DC, 0 Hz
Pushin terminals: 0.2-1.5 mm²
(NTC interface: 0.2-0.5 mm²)

Safety features
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV
The LEDs are thermally protected by the driver’s NTC interface, which ensures the current will be reduced when a critical temperature is reached.
Product guarantee: 5 years

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>all</th>
<th>75 °C</th>
<th>65 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>75,000</td>
<td>100,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

K2 – Dimensions: 103.6x67.4x31 mm

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz, 50/60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % / 230 V</th>
<th>Ambient temperature tc °C</th>
<th>Casing temperature tC °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>K2</td>
<td>ECxd 700.024</td>
<td>176-264</td>
<td>265-175</td>
<td>350 +5/–10% / 500 +5/–10% / 600 +5/–10% / 700 +5/–10%</td>
<td>20-57</td>
<td>60</td>
<td>&gt; 85</td>
<td>-20 to 50</td>
<td>75 220</td>
<td>190</td>
</tr>
</tbody>
</table>

K2 with cord grip – Dimensions: 140x67.4x31 mm

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz, 50/60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load DC V</th>
<th>Efficiency at full load % / 230 V</th>
<th>Ambient temperature tc °C</th>
<th>Casing temperature tC °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>K2</td>
<td>ECxd 700.024</td>
<td>176-264</td>
<td>265-175</td>
<td>350 +5/–10% / 500 +5/–10% / 600 +5/–10% / 700 +5/–10%</td>
<td>20-57</td>
<td>60</td>
<td>&gt; 85</td>
<td>-20 to 50</td>
<td>75 220</td>
<td>190</td>
</tr>
</tbody>
</table>
ComfortLine
LED Drivers

700 mA / max. 112 W
1050 mA / max. 126 W
With 12 V interface

These electronic LED constant current drivers are designed for use in industrial hall lighting systems.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.95

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
DC operation: 198–264 V DC, 0 Hz
(can be reduced to 176 V with reduced service life time)
Push-in terminals: 0.2–1.5 mm²

Safety features
Electronic short-circuit protection
Overload and overtemperature protection
Protection against "no load" operation
Degree of protection: IP20
Protection class I
The LEDs are thermally protected by the driver’s NTC interface, which ensures the current will be reduced when a critical temperature is reached.

---

**Expected service life time**

at operation temperatures at \( t_c \) point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No.</th>
<th>186297</th>
<th>186301</th>
<th>186298</th>
<th>186302</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mA</td>
<td>70 °C</td>
<td>50 °C</td>
<td>80 °C</td>
<td>70 °C</td>
<td>70 °C</td>
</tr>
<tr>
<td></td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
</tr>
<tr>
<td>1050 mA</td>
<td>75 °C</td>
<td>65 °C</td>
<td>90 °C</td>
<td>80 °C</td>
<td>80 °C</td>
</tr>
<tr>
<td></td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

---

**NTC at LED module 10 kΩ**

<table>
<thead>
<tr>
<th>( R (kΩ) )</th>
<th>Nominal current (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>&lt; 1.49</td>
<td>60</td>
</tr>
<tr>
<td>&lt; 1.13</td>
<td>0 (off)</td>
</tr>
</tbody>
</table>

---

**Max. output W**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz, 50–60 Hz V</th>
<th>Mains current mA</th>
<th>Current output DC mA</th>
<th>Voltage output DC V</th>
<th>Max. voltage without load 12 V % (230 V)</th>
<th>Efficiency at full load 12 V %</th>
<th>12 V interface max. 2 W</th>
<th>Ambient temperature ( t_a ) °C</th>
<th>Casing temperature ( t_c ) °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>M36</td>
<td>186297</td>
<td>198–264</td>
<td>595–445</td>
<td>1050</td>
<td>660–495</td>
<td>85–120</td>
<td>&gt; 91</td>
<td>yes</td>
<td>25 to 30</td>
<td>70</td>
<td>288</td>
</tr>
<tr>
<td></td>
<td>186301</td>
<td>198–264</td>
<td>660–495</td>
<td>1050</td>
<td>630–590</td>
<td>85–120</td>
<td>&gt; 91</td>
<td>yes</td>
<td>25 to 30</td>
<td>75</td>
<td>288</td>
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<tr>
<td>K38</td>
<td>186298</td>
<td>198–264</td>
<td>595–445</td>
<td>1050</td>
<td>660–495</td>
<td>85–120</td>
<td>&gt; 91</td>
<td>yes</td>
<td>25 to 30</td>
<td>80</td>
<td>335</td>
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<td></td>
<td>186302</td>
<td>198–264</td>
<td>660–495</td>
<td>1050</td>
<td>630–590</td>
<td>85–120</td>
<td>&gt; 91</td>
<td>yes</td>
<td>25 to 30</td>
<td>90</td>
<td>335</td>
</tr>
</tbody>
</table>

---

**M36 – Dimensions: 149.5 x 75 x 30 mm**

**K38 with cord grip – Dimensions: 210 x 83 x 32 mm**
EasyLine LED Drivers

700–3200 mA / max. 50–230 W
These electronic LED constant current drivers are especially designed for use in industrial hall lighting systems as well as for use in street lighting systems.

Electrical characteristics
Secondary side switching of LED modules is not allowed.
Power factor at full load: > 0.9

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
   primary: 3 x 2.08 mm², length: 320 mm
   secondary: 2 x 2.08 mm², length: 320 mm

Safety features
Protection against transient main peaks up to 1.5 kV (between L and N)
Electronic short-circuit protection
Overload protection
Protection against "no load" operation
Degree of protection: IP67
Protection class I

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Operation current</th>
<th>Ref. No</th>
<th>all types</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>75 °C</td>
<td>65 °C</td>
</tr>
<tr>
<td>hrs</td>
<td>30,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M56 – Dimensions: 185.5x49.4x40.6 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 ECx 700.156</td>
</tr>
<tr>
<td>186452</td>
</tr>
<tr>
<td>220–240 255–235 700 ±5% 35–72 75 &gt; 88 –30 to 50 75 520</td>
</tr>
<tr>
<td>75 ECx 1050.157</td>
</tr>
<tr>
<td>186453</td>
</tr>
<tr>
<td>220–240 380–350 1050 ±5% 35–72 75 &gt; 88 –30 to 50 75 520</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M58 – Dimensions: 216x68.6x46.3 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 ECx 1400.158</td>
</tr>
<tr>
<td>186454</td>
</tr>
<tr>
<td>220–240 510–470 1400 ±5% 30–72 75 &gt; 90 –30 to 50 75 600</td>
</tr>
<tr>
<td>125 ECx 1700.159</td>
</tr>
<tr>
<td>186455</td>
</tr>
<tr>
<td>220–240 625–580 1700 ±5% 30–72 75 &gt; 90 –30 to 50 75 600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M58.1 – Dimensions: 206x68.6x37 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 ECx 2100.160</td>
</tr>
<tr>
<td>186456</td>
</tr>
<tr>
<td>220–240 750–690 2100 ±5% 45–72 85 &gt; 90 –30 to 50 75 840</td>
</tr>
<tr>
<td>175 ECx 2400.167*</td>
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<tr>
<td>186510*</td>
</tr>
<tr>
<td>220–240 910–850 2400 ±5% 45–72 85 &gt; 85 –30 to 50 75 840</td>
</tr>
<tr>
<td>200 ECx 2800.168*</td>
</tr>
<tr>
<td>186477*</td>
</tr>
<tr>
<td>220–240 1040–960 2800 ±5% 45–72 85 &gt; 85 –30 to 50 75 840</td>
</tr>
<tr>
<td>230 ECx 3200.169*</td>
</tr>
<tr>
<td>186478*</td>
</tr>
<tr>
<td>220–240 1200–1100 3200 ±5% 45–72 85 &gt; 85 –30 to 50 75 840</td>
</tr>
</tbody>
</table>

*Products under development
### iProgrammer

**For programming LED drivers**

The iProgrammer is designed to let you configure LED drivers using the 3C function.

Using DALI commands, the iProgrammer enables various functions to be configured on all VS LED drivers that feature the "3C" symbol. As an example, not only can the current be set to a precise level, but programming functions for the street lighting zone can also be transferred. Please refer to the manual at product page under www.vossloh-schwabe.com for detailed configuration procedures.

**Technical notes**

- Configuration interface: DALI
- Ambient temperature \( t_a \): 5 to 50 °C
- Push-in terminals: 0.2–1.5 mm²
- Degree of protection: IP20

**Connections**

- Mains connection: 220–240 V AC/50–60 Hz
- Max. power consumption: 5 W
- USB 2.0

**Software download**

See product page under www.vossloh-schwabe.com

**Functions**

Configuring "3C" LED drivers

### Connection

- **USB 230 V**
- **iProgrammer**
- **DALI 230 V**
- **LED Driver**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Connection to PC/Laptop</th>
<th>Functions</th>
<th>Dimensions (LxWxH) mm</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>iProgrammer</td>
<td>186428</td>
<td>USB 2.0</td>
<td>Configuring &quot;3C&quot; LED drivers</td>
<td>123.4x79.4x32.6</td>
<td>135</td>
</tr>
</tbody>
</table>
LUMINAIRE PROTECTION AND POWER ADJUSTMENT

This chapter presents inrush current limiters, electronic components to protect luminaires against mains surges, power reduction products and components with which the output current of LED drivers can be adjusted.
Luminaire Protection Device

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

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

The protection unit reduces over-voltages at the connection terminals of electronic components. The remaining residual voltage is then reduced to a respective protective level, based on the discharge current.

SP 230/10 K
Suitable for luminaires of protection class II
Dimensions (LxWxH): 32 x 22 x 13 mm
Weight: 20 g
Connecting: solid wire, length: 50 mm
Ref. No.: 147230

SPC 230/10 K
If the protective luminaire component overloads, the connected lighting circuit will be interrupted. This cut-out function makes it easier to detect the end of life of the protective component, facilitates quick replacement by maintenance staff and provides reliable protection for lighting components.

Suitable for luminaires of protection class II
Type 3 product
Dimensions (LxWxH): 53 x 28 x 27 mm
Weight: 50 g
Screw terminals: 0.5 – 1.5 mm²
Ref. No.: 142736

SP 3/230/10 K
Suitable for luminaires of protection class I
Type 3 product
Dimensions (ØxH): Ø 36 x 75 mm
Weight: 60 g
Screw terminals: 0.75 – 4 mm²
Ref. No.: 147233

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage (50/60 Hz, ± 10%) V</th>
<th>Max. load current A</th>
<th>Max. impulse voltage U₈/₂₀ μs [V]</th>
<th>Discharge current Iₘ₉₅ [A]</th>
<th>Protection level of discharge current Iₘ₉₅ [A] ≤ 850 V</th>
<th>Fuse max. A</th>
<th>Max. permitted casing temperature °C</th>
<th>Min. permitted ambient temperature °C</th>
<th>Fixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP 230/10 K</td>
<td>147230</td>
<td>220 – 240</td>
<td>10000</td>
<td>5000</td>
<td>10000</td>
<td>≤ 850 V</td>
<td>25</td>
<td>80</td>
<td>-30</td>
<td></td>
</tr>
<tr>
<td>SPC 230/10 K</td>
<td>142736</td>
<td>220 – 240</td>
<td>16</td>
<td>10000</td>
<td>5000</td>
<td>10000</td>
<td>≤ 850 V</td>
<td>16</td>
<td>80</td>
<td>-30</td>
</tr>
<tr>
<td>SP 3/230/10 K</td>
<td>147233</td>
<td>100 – 277</td>
<td>10000</td>
<td>5000</td>
<td>10000</td>
<td>≤ 1000 V</td>
<td>25</td>
<td>80</td>
<td>-30</td>
<td>M8 х 10</td>
</tr>
</tbody>
</table>
Luminaire Protection Device

For electronic devices
These protective components are fitted with an LED indicator. Once the end of the component’s life has been reached, the green LED goes out or the red LED lights up and the protective component has to be replaced.

SPC 230/10 K/i
If the protective luminaire component overloads, the connected lighting circuit will be interrupted. This cut-out function makes it easier to detect the end of life of the protective component, facilitates quick replacement by maintenance staff and provides reliable protection for lighting components.
Suitable for luminaires of protection class II
Type 3 product
These protective luminaire components feature a green indicator LED that goes out if the protective function fails.
With an integrated thermal fuse
Dimensions (LxWxH): 79x34x27 mm
Weight: 100 g
Screw terminals: 0.5–2.5 mm²
Ref. No.: 142737

SP 3/230/10 K/i
Suitable for luminaires of protection class I
Type 3 product
These protective luminaire components feature an indicator LED that lights up in red if the protective function fails.
With an integrated thermal fuse
Dimensions (LxWxH): 76x34x30 mm
Weight: 105 g
Screw terminals: 1–2.5 mm² for solid leads
Ref. No.: 147239

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage Max. load</th>
<th>Max. load voltage</th>
<th>Max. impulse voltage</th>
<th>Discharge current (8/20 &amp; A</th>
<th>Protection level at discharge current of 1000 A</th>
<th>Fuse max. A</th>
<th>Max. permitted casing temperature</th>
<th>Min. permitted ambient temperature</th>
<th>Fixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC 230/10 K/i</td>
<td>142737</td>
<td>220-240</td>
<td>16</td>
<td>10000</td>
<td>5000</td>
<td>1000 A</td>
<td>10000</td>
<td>100 V</td>
<td>L8x10</td>
<td></td>
</tr>
<tr>
<td>SP 3/230/10 K/i</td>
<td>147239</td>
<td>100-277</td>
<td>6</td>
<td>10000</td>
<td>5000*</td>
<td>1000 A</td>
<td>10000</td>
<td>100 V</td>
<td>L8x10</td>
<td></td>
</tr>
</tbody>
</table>

* Discharge current at 5000 A up to 10 strikes; at 10000 A up to 1 strike
Luminaire Protection Device

**For electronic devices**
These protective components are fitted with an LED indicator. Once the end of the component’s life has been reached, the LED goes out and the protective component has to be replaced.
With an integrated thermal fuse

**SPC 3/230/10 K/i**
Suitable for luminaires of protection class I
Type 3 product
At the end of the service life time of a protective luminaire component, the voltage supply to the LED driver is permanently disrupted; this status is shown by the green indicator LED going out.
Dimensions (LxWxH): 74 x 34 x 27 mm, Weight: 100 g
Screw terminals: 0.75–2.5 mm²
Lead ground terminal: stranded conductor, 2.5 mm², silicone insulation, length: 150 mm
Ref. No.: 142738

**SP230/10 K/HS/i**
The green LED light will go out if the protective function fails.
Dimensions (LxWxH): 90 x 17.2 x 63 mm, Weight: 45 g
Screw terminals: 0.5–2.5 mm²
Fixation on DIN installation rail
Ref. No.: 147240

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage 50/60 Hz V ±10%</th>
<th>Max. load current (A)</th>
<th>Protection level at discharge current of 1000 A</th>
<th>L-N (V)</th>
<th>LPE (V)</th>
<th>Max. impulse voltage Ucc (V)</th>
<th>Max. impulse current (8/20 μs) Ii [A]</th>
<th>Iimin [A]</th>
<th>Fuse max. A</th>
<th>Max. permitted casing temperature (°C)</th>
<th>Min. permitted ambient temperature (°C)</th>
<th>Fixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC 3/230/10 K/i</td>
<td>142738</td>
<td>100–277</td>
<td>16</td>
<td>1100</td>
<td>1520</td>
<td>10000</td>
<td>5000</td>
<td>10000</td>
<td>16</td>
<td>80</td>
<td>80</td>
<td>30</td>
<td>M8 x 10</td>
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<tr>
<td>SP230/10 K/HS/i</td>
<td>147240</td>
<td>220–240</td>
<td>16</td>
<td>&lt; 1000</td>
<td>10000</td>
<td>10000</td>
<td>10000</td>
<td>10000</td>
<td>16</td>
<td>80</td>
<td>80</td>
<td>30</td>
<td>–</td>
</tr>
</tbody>
</table>

* Discharge current: at 5000 A up to 10 strikes; at 10000 A up to 1 strike
Inrush Current Limiter ESB-6K

Limits capacitive inrush currents of electronic ballasts, LED driver and converters

Due to their capacitive nature, these products generate high inrush currents. By temporarily activating a limiting resistor, the inrush current is reduced to an uncritical value (see graph below).

Several LED drivers or electronic ballasts can be connected downstream under consideration of the maximum permissible continuous current of the inrush current limiter.

The device thus prevents any automatic circuit breakers from being triggered or any damage from being caused to upstream relay contacts.

ESB-6K
Casing: PC
Dimensions (LxWxH): 55 x 28 x 27 mm
Weight: 61 g
Screw terminals: 0.5 – 1.5 mm²
Ref. No.: 149820

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Nominal voltage 50–60 Hz V ±10%</th>
<th>Power consumption W</th>
<th>Max. direct current A</th>
<th>Limiting resistor Ω</th>
<th>Period of limitation ms</th>
<th>Max. permissible continuous current A</th>
<th>Min. permissible ambient temperature °C</th>
<th>Fixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESB-6K</td>
<td>149820</td>
<td>220–240</td>
<td>0.25</td>
<td>6</td>
<td>20</td>
<td>approx. 18</td>
<td>80</td>
<td>-30</td>
<td>M8x10</td>
</tr>
</tbody>
</table>

Example using an 150 W LED driver
Brown: with ICL (ESB)
Blue: without ICL (ESB)
1 V = 1 A
**Power Switch PS 16 K**

For electronic LED drivers

Given centralised control of an LED driver’s LST control input, the existing cable capacities of the control line can lead to switching errors. This can be prevented by installing a PS 16 K power switch, which features a potential-free and galvanically isolated switching contact.

The PS 16 K power switch complies with EN 61347 and is also suitable for use in luminaires of protection class I and II.

The power switch complies with the specification of DIN EN 61347.

**PS 16 K**

Casing: PC

Dimensions (LxWxH): 74x34x27 mm

Weight: 100 g

Screw terminals: 0.75–2.5 mm²

Ref. No.: 142185

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Control voltage</th>
<th>Max. switching capacity (VA)</th>
<th>Max. switching voltage (V)</th>
<th>Max. contact current A</th>
<th>λ = 1</th>
<th>λ = 0.6</th>
<th>Inherent heating K</th>
<th>Max. permitted casing temperature (°C)</th>
<th>Min. permitted ambient temperature (°C)</th>
<th>Fixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS 16 K</td>
<td>142185</td>
<td>230 V/50 Hz</td>
<td>4000</td>
<td>400</td>
<td>16</td>
<td>10</td>
<td>&lt; 25</td>
<td>80</td>
<td>-30</td>
<td>M8x10</td>
<td></td>
</tr>
</tbody>
</table>
**Automatical Power Switch**

**for LED Drivers – PR 12 K LC**

The PR 12 K LC can be used for power switching of LED drivers with LST control input. A control phase is not needed. Once it’s connected to the mains supply voltage, the power switch will switch automatically.

The power switch complies with the specification of DIN EN 61347 and is suitable for the application in luminaires of protection class I and II.

**PR 12 K LC**

- **Casing:** PC
- **Dimensions (LxWxH):** 76 x 34 x 30 mm
- **Weight:** 100 g
- **Screw terminals:** 0.75 – 2.5 mm²

**Ref. No.: 142170**

**Wiring diagram**

For example with VS LED drivers ECXd 700.023 (Ref. No. 186509)

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Nominal voltage/ frequency V ±10%</th>
<th>Max. switching capacity (VA)</th>
<th>Max. contact current (A)</th>
<th>Internal loss W</th>
<th>Inherent heating K</th>
<th>Switching time selectable</th>
<th>Max. permitted casing temperature (°C)</th>
<th>Min. permitted ambient temperature (°C)</th>
<th>Fixation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PR 12 K LC</strong></td>
<td><strong>142170</strong></td>
<td>220–230 V/50 Hz 220 V/60 Hz*</td>
<td>3000</td>
<td>8</td>
<td>12 &lt; 1 &lt; 12</td>
<td>80</td>
<td>-30</td>
<td>M8x10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 120–240 V ±10% available on request
Programmable Power Switch for LED Drivers – PR 12 KD

The PR 12 KD can be used for power switching of LED drivers with LST control input. A control phase is not needed. The constant switching-time is selectable.

The left side of the rotary switch is used for reset to full power after eleven hours; the right side is for continuous power reduction after programmed time has been reached.

The power switch complies with the specification of DIN EN 61347 and is suitable for the application in luminaires of protection class I and II.

PR 12 KD
Casing: PC
Dimensions (LxWxH): 76 x 34 x 30 mm
Weight: 100 g
Screw terminals: 0.75–2.5 mm²
Ref. No.: 142150

Wiring diagram
For example with VS LED drivers ECXd 700.023 (Ref. No. 186509)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PR 12 KD</td>
<td>142150</td>
<td>220 - 230 V/50 Hz 220 V/60 Hz**</td>
<td>3000</td>
<td>8</td>
<td>12</td>
<td>&lt; 1</td>
<td>selectable</td>
<td>80</td>
<td>-30</td>
<td>M8 x 10</td>
</tr>
</tbody>
</table>

* Switching-time selectable: 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 hrs. at 50 Hz
** 120 - 240 V ±10% available on request
Switch Units for Electronic Operating Devices with 1–10 V Interface

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

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

Dimensions (LxWxH): 56x28x27 mm
Casing: PC
Screw terminals: 0.75–2.5 mm²
Max. permissible casing temperature tc: 80 °C
Min. permissible ambient temperature ta: –30 °C
Fastening: plastic male nipple M8 x 10 with pre-assembled washer and nut

Power reduction SU 1–10 V K for lighting systems featuring an LST control phase
The switch unit employs a positive switching to reduce power, i.e. power is reduced when the control phase is switched off (LST = 0 V).

The 1–10 V interface of the electronic ballast is addressed at the moment that power reduction is effected.

Power reduction PR 1–10 V K LC for lighting systems without a control phase
This switch unit can be used to effect power reduction in lighting systems that do not feature a control phase.

The 1–10 V interface is addressed on the basis of the fundamental operating principle used by Vossloh-Schwabe’s PR 12 K LC power switch [details of which can be made available on request]. This power switch is capable of determining the starting time of reduced-power operation over the measured operating time of a lighting system. As a result, it is no longer necessary to spend valuable time modifying the power-reduction unit to suit the continually changing day-night cycle; changing the clocks in line with daylight saving measures in the summer and winter is equally unnecessary. The 1–10 V interface of the electronic ballast is addressed as soon as the system is switched to reduced power.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Control voltage LST V ±10%, 50/60 Hz</th>
<th>Externally connected resistor ( R_{\text{ext}} ) ( \Omega ) ( \text{min.} \ 0.1 \text{ W} )</th>
<th>Inherent heating ( K )</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>For lighting systems with control phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SU 1–10 V K</td>
<td>149992</td>
<td>220–240</td>
<td>1–70</td>
<td>&lt; 10</td>
<td>50</td>
</tr>
<tr>
<td>For lighting systems without control phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR 1–10 V K LC</td>
<td>149993</td>
<td></td>
<td>1–70</td>
<td>&lt; 10</td>
<td>50</td>
</tr>
</tbody>
</table>
Resistor Network for LED Drivers

This resistor network is used to adjust the output currents of LED drivers. 255 different resistance values can be adjusted in 10-Ohm steps within a range from 0 to 2550 Ohm by connecting the SU 1–10 V K and PR 1–10 V K LC power switches. As an example, this makes it possible to even out differences in luminous flux common to LED luminaires.

The component is designed for use in protection class II luminaires.

R10-1280
Casing: PC
Dimensions (LxWxH): 32x25x15 mm
Weight: 20 g
Connection leads, solid: 0.5 mm²
Lead length: 50 mm
Ref. No.: 149800

R6,25K-70K
Resistor network for LEDset interfaces
Casing: PC
Dimensions (LxWxH): 32x25x15 mm
Weight: 20 g
Connection leads, solid: 0.5 mm²
Lead length: 50 mm
Ref. No.: 149802

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Number of dip switch</th>
<th>Max. internal loss of resistors W</th>
<th>Max. voltage of resistors V</th>
<th>Max. permitted casing temperature °C</th>
<th>Min. permitted ambient temperature °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>R10-1280</td>
<td>149800</td>
<td>8</td>
<td>0.25</td>
<td>200</td>
<td>80</td>
<td>-30</td>
</tr>
<tr>
<td>R6,25K-70K</td>
<td>149802</td>
<td>8</td>
<td>0.25</td>
<td>200</td>
<td>80</td>
<td>-30</td>
</tr>
</tbody>
</table>
With its 24 V system, Vossloh-Schwabe is responding to the trend towards market harmonisation and simplification of LED control technology.

The modules are operated at 24 V DC converters and the constant-current control is effected on the LED circuit board.

**Typical applications**
- General lighting
- Furniture lighting
- Architectural lighting
- Lighting of complex structures
- Entertainment
- Shop design

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

Please read the safety and installation instructions on the individual products as well as further technical information provided in the extensive product descriptions at [www.vossloh-schwabe.com](http://www.vossloh-schwabe.com).
LEDLine Flex SMD Professional Indoor White

Built-in PCB lighting modules
The LEDLine Flex SMD Professional Indoor is fitted with SMD LEDs on a flexible printed circuit board of only approx. 0.4 mm thickness. Even the most complex structures can be illuminated thanks to the use of an extremely pliable foil. LEDLine Flex SMD Professional Indoor can be separated into segments of 100 mm lengths without loss of function. This product is available in a continuous length of up to 10 m. Installation is achieved via double-sided adhesive tape affixed to the rear of the PCB.

Technical notes
Dimensions LEDLine Flex SMD Professional Indoor

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Current A</th>
<th>Typ. luminous flux m</th>
<th>Beam angle °</th>
<th>Max. power W</th>
<th>CRI Ra</th>
</tr>
</thead>
<tbody>
<tr>
<td>WU45627K</td>
<td>551700</td>
<td>warm white</td>
<td>2700 (120°/170°)</td>
<td>2.2</td>
<td>4100</td>
<td>120</td>
<td>53</td>
<td>&gt; 80</td>
</tr>
<tr>
<td>WU45630K</td>
<td>550532</td>
<td>warm white</td>
<td>3000 (130°/220°)</td>
<td>2.2</td>
<td>4200</td>
<td>120</td>
<td>53</td>
<td>&gt; 80</td>
</tr>
<tr>
<td>WU45640K</td>
<td>550533</td>
<td>neutral white</td>
<td>4000 (290°/250°)</td>
<td>2.2</td>
<td>4600</td>
<td>120</td>
<td>53</td>
<td>&gt; 80</td>
</tr>
<tr>
<td>WU45650K</td>
<td>550534</td>
<td>cool white</td>
<td>5000 (255°/230°)</td>
<td>2.2</td>
<td>4900</td>
<td>120</td>
<td>53</td>
<td>&gt; 80</td>
</tr>
<tr>
<td>WU45665K</td>
<td>550535</td>
<td>cool white</td>
<td>6500 (180°/140°)</td>
<td>2.2</td>
<td>5200</td>
<td>120</td>
<td>53</td>
<td>&gt; 80</td>
</tr>
</tbody>
</table>

* The values mentioned above represent only statistical variables on account of the complex manufacturing process of light emitting diodes. The values do not necessarily correspond exactly to the actual parameters of every single product which can vary from the typical specification.
LEDLine Flex SMD Professional Indoor White – High Brightness

Built-in PCB lighting modules
The LEDLine Flex SMD Professional Indoor High Brightness is fitted with SMD LEDs on a flexible printed circuit board of only approx. 0.4 mm thickness. Even the most complex structures can be illuminated thanks to the use of an extremely pliable foil. LEDLine Flex SMD Professional Indoor High Brightness can be separated into segments of 80 mm lengths without loss of function. This product is available in a continuous length of up to 3.2 m. Installation is achieved via double-sided adhesive tape affixed to the rear of the PCB.

Technical notes
Dimensions LEDLine Flex SMD Professional Indoor

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Correlated colour temperature K</th>
<th>Current A</th>
<th>Typ. luminous flux* lm</th>
<th>Beam angle* °</th>
<th>Max. power W</th>
<th>CRI Ra</th>
</tr>
</thead>
<tbody>
<tr>
<td>WU-M465-27K</td>
<td>554932</td>
<td>warm white</td>
<td>1700 –15/990</td>
<td>1.7</td>
<td>3500</td>
<td>120</td>
<td>40.8</td>
<td>&gt; 80</td>
</tr>
<tr>
<td>WU-M465-30K</td>
<td>554933</td>
<td>warm white</td>
<td>3000 –15/125</td>
<td>1.7</td>
<td>3600</td>
<td>120</td>
<td>40.8</td>
<td>&gt; 80</td>
</tr>
<tr>
<td>WU-M465-40K</td>
<td>554934</td>
<td>neutral white</td>
<td>4000 –16/100</td>
<td>1.7</td>
<td>3800</td>
<td>120</td>
<td>40.8</td>
<td>&gt; 80</td>
</tr>
<tr>
<td>WU-M465-50K</td>
<td>554935</td>
<td>cool white</td>
<td>5000 –120/150</td>
<td>1.7</td>
<td>3900</td>
<td>120</td>
<td>40.8</td>
<td>&gt; 80</td>
</tr>
<tr>
<td>WU-M465-65K</td>
<td>554936</td>
<td>cool white</td>
<td>6500 –263/220</td>
<td>1.7</td>
<td>3900</td>
<td>120</td>
<td>40.8</td>
<td>&gt; 80</td>
</tr>
</tbody>
</table>

* The values mentioned above represent only statistical variables on account of the complex manufacturing process of light emitting diodes. The values do not necessarily correspond exactly to the actual parameters of every single product which can vary from the typical specification.
**AluLED IP66/IP67**

AluLED IP66/IP67 is ideal for outdoor protected applications under humid conditions (excluding direct UV and water exposure) and the slim & flat design is extremely flexible for low profile lighting design mounting. It is available in different CCTs and RGB to suit different application needs.

**Technical notes**

Voltage supply: 24 V DC  
Beam angle: 120°  
Allowed ambient temperature $t_a$: -30 to 85 °C  
Allowed storage temperature: -40 to 85 °C  
Degree of protection: IP66/IP67  
Maximum bridging current load: 3 A  
Lumen maintenance for white AluLED  
L70/B20: > 50,000 hrs. at $t_p/t_c = 50°C$

**White Modules**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Length (mm)</th>
<th>No. of LEDs</th>
<th>Current (mA)</th>
<th>Colour</th>
<th>Colour temperature (K)</th>
<th>Luminous flux (lm)</th>
<th>Beam angle (°)</th>
<th>Power (W)</th>
<th>Packaging unit (pcs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AluLED-320-2700-II Fully Coated</td>
<td>571125</td>
<td>320</td>
<td>18</td>
<td>140</td>
<td>warm white</td>
<td>2700 ±300</td>
<td>200</td>
<td>120</td>
<td>3.4</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-920-2700-II Fully Coated</td>
<td>571126</td>
<td>920</td>
<td>54</td>
<td>420</td>
<td>warm white</td>
<td>2700 ±300</td>
<td>600</td>
<td>120</td>
<td>10.1</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-1220-2700-II Fully Coated</td>
<td>571127</td>
<td>1220</td>
<td>72</td>
<td>560</td>
<td>warm white</td>
<td>2700 ±300</td>
<td>800</td>
<td>120</td>
<td>13.5</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-320-3000-II Fully Coated</td>
<td>561698</td>
<td>320</td>
<td>18</td>
<td>140</td>
<td>warm white</td>
<td>3000 ±300</td>
<td>240</td>
<td>120</td>
<td>3.4</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-920-3000-II Fully Coated</td>
<td>561699</td>
<td>920</td>
<td>54</td>
<td>420</td>
<td>warm white</td>
<td>3000 ±300</td>
<td>720</td>
<td>120</td>
<td>10.1</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-1220-3000-II Fully Coated</td>
<td>561700</td>
<td>1220</td>
<td>72</td>
<td>560</td>
<td>warm white</td>
<td>3000 ±300</td>
<td>960</td>
<td>120</td>
<td>13.5</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-320-6000-II Fully Coated</td>
<td>571115</td>
<td>320</td>
<td>18</td>
<td>140</td>
<td>cool white</td>
<td>6000 ±300</td>
<td>280</td>
<td>120</td>
<td>3.4</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-920-6000-II Fully Coated</td>
<td>571116</td>
<td>920</td>
<td>54</td>
<td>420</td>
<td>cool white</td>
<td>6000 ±300</td>
<td>840</td>
<td>120</td>
<td>10.1</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-1220-6000-II Fully Coated</td>
<td>571117</td>
<td>1220</td>
<td>72</td>
<td>560</td>
<td>cool white</td>
<td>6000 ±300</td>
<td>1120</td>
<td>120</td>
<td>13.5</td>
<td>20</td>
</tr>
</tbody>
</table>

**RGB Modules**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Length (mm)</th>
<th>No. of LEDs</th>
<th>Current (mA)</th>
<th>Luminous flux (lm) red</th>
<th>Luminous flux (lm) green</th>
<th>Luminous flux (lm) blue</th>
<th>Dom. wavelength (nm) red</th>
<th>Dom. wavelength (nm) green</th>
<th>Dom. wavelength (nm) blue</th>
<th>Beam angle (°)</th>
<th>Power (W)</th>
<th>Packaging unit (pcs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AluLED-320-RGB-II Fully Coated</td>
<td>571130</td>
<td>320</td>
<td>18</td>
<td>140</td>
<td>25</td>
<td>75</td>
<td>15</td>
<td>620-630</td>
<td>520-535</td>
<td>465-475</td>
<td>120</td>
<td>3.4</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-920-RGB-II Fully Coated</td>
<td>571131</td>
<td>920</td>
<td>54</td>
<td>420</td>
<td>75</td>
<td>225</td>
<td>45</td>
<td>620-630</td>
<td>520-535</td>
<td>465-475</td>
<td>120</td>
<td>10.1</td>
<td>20</td>
</tr>
<tr>
<td>AluLED-1220-RGB-II Fully Coated</td>
<td>571132</td>
<td>1220</td>
<td>72</td>
<td>560</td>
<td>100</td>
<td>300</td>
<td>60</td>
<td>620-630</td>
<td>520-535</td>
<td>465-475</td>
<td>120</td>
<td>13.5</td>
<td>20</td>
</tr>
</tbody>
</table>

Further colours for AluLED are available upon request.
EasyConnect Cable for AluLED
Max. permissible current: 3 A
Number of strands: 2/4
(Strand diameter: 0.35 mm²/22 AWG)
For monochrome modules with 2 strands
Ref. No.: 543426 25 cm, feed-in connector
Ref. No.: 543427 50 cm, PCB to PCB connector
For RGB modules with 4 strands
Ref. No.: 543428 25 cm, feed-in connector
Ref. No.: 543429 50 cm, PCB to PCB connector

Shrink caps
For sealing exposed connection wires
(Strand diameter: 0.35 mm²/22 AWG)
Adhesive coating on the inside
Ref. No.: 571150 transparent
Ref. No.: 571151 black

Colour Control Modules – DigiLED CA

The DigiLED CA series is based on a system design that combines simplicity, flexibility and reliability. The DigiLED CA series is suitable for operating both high-power RGB CA modules and low-power RGB CA modules.

In the simplest case, a keypad enables manual colour control. In addition to custom colour control, it is also possible to call up pre-set colour programs for example colour sequences.

DigiLED Manual CA
Colour controls via key pads (6 keys)
Individual colour control or selection of pre-set programs
\( t_c = 55 \, ^\circ \text{C} \text{ max.} \)
Max. current per control channel: 1.25 A
Type: WU-ST-001-Digi-manuell-CA
Ref. No.: 186136

DigiLED DALI CA
Digital colour controls via DALI light management
\( t_c = 60 \, ^\circ \text{C} \text{ max.} \)
Max. current per control channel: 1.25 A
Type: WU-ST-004-Digi-DALI-CA
Ref. No.: 186138

The CA series of VS colour control modules are available with both a manual operating pad and a DALI interface or "PUSH" or DMX variant.

Furthermore the DigiLED Mono is available. The DigiLED Mono enables the dimming of single-colour (e.g. white) LED modules.

All DigiLED not suitable for the US market.

Technical notes
Dimensions (LxWxH): 93 x 58 x 29 mm
Ambient temperature \( t_a: 0 \text{ to } 45 \, ^\circ \text{C} \)
Operating voltage: 24 V
Max. current on the supply line: 5 A
Push-in terminals: 0.25–1.5 mm², grid: 3.5 mm
DigiLED DMX CA
Digital colour controls via DMX light management
\( t_c = 60 °C \) max.
Max. current per control channel: 1.25 A
Type: WU-ST-003-Digi-DMX-CA
Ref. No.: 186153

DigiLED IR CA
Colour adjustment by a portable remote control
Call up of pre-adjusted setting possible
Data transfer via infrared
\( t_c = 55 °C \) max.
Max. current per control channel: 1.25 A
Type: WU-ST-005-Digi-IR-CA
Ref. No.: 186154

DigiLED RF CA
Easy operation possible via radio frequency (RF) and a keypad with 7 buttons. The operation via radio frequency (RF) enables a flexible installation. Optical "line of sight" or cables are not necessary due to RF operation.
Ambient temperature \( t_a \): -20 to 45 °C
Max. current per control channel: 1.25 A
Type: WU-ST-012-DigiLED-RF CA
Ref. No.: 186181

Walltransmitter
Required to activate the programs in the DigiLED RF
Dimensions (LxWxH): 86x86x15 mm
Colour: white
Type: WU-ST-009-Walltransmitter
Ref. No.: 536843

DigiLED Push CA
Colour adjustment by separate push button
Permits retrieval of pre-set programs
\( t_c = 55 °C \) max.
Max. current per control channel: 1.25 A
Type: WU-ST-006-DigiLED-Push CA
Ref. No.: 186144
DigiLED Mono CA
For dimming of single-colour LED modules
Dimming via 1–10 V interface or external
PWM signal
 tc = 55 °C max.
Max. current per control channel: 5 A
Type: WU-ST010DigiLED-Mono CA
Ref. No.: 186155

DigiLED Slave CA
Increase of the system performance
for 24 V CA LED built-in system
Signal amplification on channels RGB(W)
 tc = 65 °C max.
Max. current per control channel per slave: 1.25 A
Type: WU-ST002DigiLED-Slave CA
Ref. No.: 186142

Passive Slave CA
Increase of the system performance
for 24 V CA LED built-in system
No signal amplification on channels RGB(W)
 tc = 65 °C max.
Type: WU-ST011Passive-Slave CA
Ref. No.: 186172

Passive Slave PCB CA
PCB for increase of the system performance
for 24 V CA LED built-in system
Without casing
No signal amplification on channels RGB(W)
 tc = 65 °C max.
Type: WU-VB004Slave-PCB CA
Ref. No.: flatband cable

Table 1: Terminal connection

<table>
<thead>
<tr>
<th>Pole</th>
<th>Colour coding</th>
<th>Function</th>
<th>Max. current-carrying capacity</th>
<th>Colour coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>red</td>
<td>supply line for LED built-in modules (+24 V)</td>
<td>5 A</td>
<td>blue</td>
</tr>
<tr>
<td>2</td>
<td>orange</td>
<td>PWM signal line for channel 1</td>
<td>1.25 A</td>
<td>grey</td>
</tr>
<tr>
<td>3</td>
<td>green</td>
<td>PWM signal line for channel 2</td>
<td>1.25 A</td>
<td>grey</td>
</tr>
<tr>
<td>4</td>
<td>blue</td>
<td>PWM signal line for channel 3</td>
<td>1.25 A</td>
<td>grey</td>
</tr>
<tr>
<td>5</td>
<td>light grey</td>
<td>PWM signal line for channel 4</td>
<td>1.25 A</td>
<td>grey</td>
</tr>
<tr>
<td>6</td>
<td>black</td>
<td>supply line for LED built-in modules (GND)</td>
<td>5 A</td>
<td>grey</td>
</tr>
</tbody>
</table>
ComfortLine
LED Constant Voltage Drivers

24 V / max. 20 W
These flat LED constant-voltage drivers are designed for use in applications with small capacity range of up to 20 W.

Electronic characteristics
Power factor at full load: > 0.5

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
With connection lead on primary side

Safety features
Electronic short-circuit protection
Overload and temperature protection: reversible
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV equivalent

Expected service life time
at operation temperatures at \( t_c \) point

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>( t_c ) temperature</th>
<th>( t_a ) temperature</th>
<th>hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>186129</td>
<td>75 °C</td>
<td>65 °C</td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>50,000</td>
<td>100,000</td>
<td></td>
</tr>
</tbody>
</table>

K62 with cord grip

Max. output W | Type | Ref. No. | Mains voltage 50–60 Hz V ±10% | Output voltage V | Mains current mA | Current output A | Ambient temperature \( t_a \) °C | Casing temperature \( t_c \) °C | Weight g |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>K62 with cord grip – Dimensions: 182 x 42 x 18 mm</td>
<td>20</td>
<td>EDx 120/24.009 186129</td>
<td>220–240</td>
<td>243</td>
<td>230–210</td>
<td>0.0–0.85</td>
<td>-20 to 45</td>
<td>75</td>
<td>155</td>
</tr>
</tbody>
</table>
**ComfortLine**  
**LED Constant Voltage Drivers**  

24 V / max. 50 W, max. 70 W and max. 130 W  
These LED constant-voltage drivers are designed for use in applications with medium and high capacity range of up to 50 W, 70 W or 130 W.

**Electronic characteristics**  
Power factor at full load: > 0.97

**Connection details**  
Mains voltage: 220–240 V ±10%  
Mains frequency: 50–60 Hz  
DC operation: 176–264 V DC; 0 Hz  
(only EDXe 150)

**Safety features**  
Electronic short-circuit protection  
Overload and temperature protection: reversible  
Protection against "no load" operation  
Degree of protection: IP20  
Protection class I  
SELV

---

**Expected service life time**  
at operation temperatures at t<sub>c</sub> point

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>186103</th>
<th>186104</th>
<th>186218</th>
<th>186219</th>
<th>186131</th>
<th>186132</th>
</tr>
</thead>
<tbody>
<tr>
<td>L temperature</td>
<td>70 °C</td>
<td>60 °C</td>
<td>75 °C</td>
<td>65 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hrs.</td>
<td>50,000</td>
<td>100,000</td>
<td>50,000</td>
<td>100,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**K30 / K30.1**

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**K30 with cord grip**

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**Table: Max. output, Type, Reference Number, Mains voltage, Output voltage, Mains current, Current output, Ambient temperature t<sub>a</sub>, Casing temperature t<sub>c</sub>, Weight**

<table>
<thead>
<tr>
<th>Max. output (W)</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 0 Hz 50–60 Hz ±10% (V)</th>
<th>Output voltage (V)</th>
<th>Mains current (mA)</th>
<th>Current output (A)</th>
<th>Ambient temperature t&lt;sub&gt;a&lt;/sub&gt; (°C)</th>
<th>Casing temperature t&lt;sub&gt;c&lt;/sub&gt; (°C)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>EDXe 150/24.035</td>
<td>186218</td>
<td>176–264</td>
<td>24 ± 0.72</td>
<td>325–218</td>
<td>0.0–2.1</td>
<td>-40 to 45</td>
<td>70</td>
<td>320</td>
</tr>
<tr>
<td>70</td>
<td>EDXe 170/24.010</td>
<td>186103</td>
<td>220–240</td>
<td>24 ± 0.08</td>
<td>360–310</td>
<td>0.0–2.9</td>
<td>-20 to 45</td>
<td>70</td>
<td>340</td>
</tr>
<tr>
<td>130</td>
<td>EDXe 1130/24.014</td>
<td>186131</td>
<td>220–240</td>
<td>24 ± 0.08</td>
<td>440–585</td>
<td>0.0–5.4</td>
<td>-20 to 45</td>
<td>75</td>
<td>370</td>
</tr>
<tr>
<td>50</td>
<td>EDXe 150/24.035</td>
<td>186219</td>
<td>176–264</td>
<td>24 ± 0.72</td>
<td>325–218</td>
<td>0.0–2.1</td>
<td>-40 to 45</td>
<td>70</td>
<td>370</td>
</tr>
<tr>
<td>70</td>
<td>EDXe 170/24.010</td>
<td>186104</td>
<td>220–240</td>
<td>24 ± 0.08</td>
<td>360–310</td>
<td>0.0–2.9</td>
<td>-20 to 45</td>
<td>70</td>
<td>390</td>
</tr>
<tr>
<td>130</td>
<td>EDXe 1130/24.013</td>
<td>186132</td>
<td>220–240</td>
<td>24 ± 0.08</td>
<td>440–585</td>
<td>0.0–5.4</td>
<td>-20 to 45</td>
<td>75</td>
<td>390</td>
</tr>
</tbody>
</table>
ComfortLine
LED Constant
Voltage Drivers

24 V / max. 70 W and max. 130 W – IP67
These LED constant-voltage drivers are designed for use in IP67 applications with medium and high capacity range of up to 70 W or 130 W.

Electronic characteristics
Power factor at full load: > 0.97

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads
  primary side: 5x1 mm², length: 200 mm
  secondary side: 2x1 mm², length: 200 mm

Safety features
Electronic short-circuit protection
Overload and temperature protection: reversible
Protection against "no load" operation
Degree of protection: IP67
Protection class I
SELV

Expected service life time
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>186105, 186133</th>
</tr>
</thead>
<tbody>
<tr>
<td>t_c °C</td>
<td>70 °C, 60 °C</td>
</tr>
<tr>
<td>hrs.</td>
<td>50,000, 100,000</td>
</tr>
</tbody>
</table>

K37 with cord grip

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V ±10%</th>
<th>Output voltage V</th>
<th>Mains current mA</th>
<th>Current output A</th>
<th>Ambient temperature t_a °C</th>
<th>Casing temperature t_c °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>EDxe 170/24.010</td>
<td>186105</td>
<td>220–240</td>
<td>24 ± 0.08</td>
<td>360–330</td>
<td>0.0–2.9</td>
<td>-20 to 45</td>
<td>70</td>
<td>515</td>
</tr>
<tr>
<td>130</td>
<td>EDxe 1130/24.016</td>
<td>186133</td>
<td>220–240</td>
<td>24 ± 0.08</td>
<td>640–585</td>
<td>0.0–5.4</td>
<td>-20 to 45</td>
<td>70</td>
<td>545</td>
</tr>
</tbody>
</table>
EasyLine
LED Constant Voltage Drivers

24 V / max. 75 W, max. 100 W and max. 150 W – IP67

These LED constant-voltage drivers are designed for use in IP67 applications with high capacity range of up to 75 W, 100 W or 150 W.

Electronic characteristics
Power factor at full load: > 0.95

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads:
K30.2: H05RN-F
primary: 2x0.75 mm²
secondary: 2x1 mm²
M58.1:
primary: 2x2.08 mm²
secondary: 2x2.08 mm²

Safety features
Short-circuit protection: electronic
Overload protection
Protection against "no load" operation
Degree of protection: IP67
Protection class I
Protection class II (186432)
SELV

Expected service life time
at operation temperatures at tc point

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>t&lt;sub&gt;c&lt;/sub&gt; temperature (°C)</th>
<th>t&lt;sub&gt;0&lt;/sub&gt; temperature (°C)</th>
<th>hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>all types</td>
<td>80 °C</td>
<td>70 °C</td>
<td>30,000</td>
</tr>
</tbody>
</table>

K30.2

M58.1

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V ±10%</th>
<th>Output voltage V</th>
<th>Mains current mA</th>
<th>Output current A</th>
<th>Ambient temperature t&lt;sub&gt;a&lt;/sub&gt; [°C]</th>
<th>Casing temperature t&lt;sub&gt;c&lt;/sub&gt; [°C]</th>
<th>Efficiency at full load % (230 V)</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>EDxe 175/24.040</td>
<td>186432</td>
<td>220–240</td>
<td>24 ± 0.5</td>
<td>385–355</td>
<td>0.0–3.125</td>
<td>-15 to 45</td>
<td>80</td>
<td>89</td>
<td>440</td>
</tr>
<tr>
<td>100</td>
<td>EDxe 1100/24.041</td>
<td>186433</td>
<td>220–240</td>
<td>24 ± 0.5</td>
<td>505–465</td>
<td>0.0–4.2</td>
<td>-15 to 45</td>
<td>80</td>
<td>90</td>
<td>840</td>
</tr>
<tr>
<td>150</td>
<td>EDxe 1150/24.042</td>
<td>186434</td>
<td>220–240</td>
<td>24 ± 0.5</td>
<td>760–700</td>
<td>0.0–6.25</td>
<td>-15 to 45</td>
<td>80</td>
<td>90</td>
<td>840</td>
</tr>
</tbody>
</table>

K30.2 – Dimensions: 180x49x32 mm

M58.1 – Dimensions: 206x68.6x37 mm
ComfortLine
LED Constant Voltage Drivers

12 V / max. 12 W
The compact LED constant-voltage drivers are designed for use in applications with small capacity range of up to 12 W.

Electronic characteristics
Power factor at full load: > 0.57

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz

Safety features
Electronic short-circuit protection
Overload and temperature protection: reversible
Protection against "no load" operation
Degree of protection: IP20
Protection class II
SELV-equivalent

Expected service lifetime
at operation temperatures at \( t_c \) point

<table>
<thead>
<tr>
<th>Ref. No</th>
<th>75 °C</th>
<th>65 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>186204</td>
<td>50,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

K39.1

Max. output W | Type | Ref. No. | Mains voltage 50–60 Hz V ±10% | Output voltage V | Mains current mA | Current output A | Ambient temperature \( t_a \) °C | Casing temperature \( t_c \) °C | Weight g |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>EDXe 112/12 033 186204</td>
<td>220–240</td>
<td>12.3–0.6</td>
<td>120</td>
<td>0.0–1.0</td>
<td>-20 to 50</td>
<td>75</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

K39.1 – Dimensions: 103.5 x 36 x 22 mm
EasyLine  
LED Constant Voltage Drivers  

12 V / max. 6 W  
This LED constant-voltage driver is designed for use in applications with capacity range of up to 6 W.

Electronic characteristics  
Power factor at full load: > 0.55 C

Connection details  
Mains voltage: 220–240 V ±10%  
Mains frequency: 50–60 Hz  
Pre-assembled connection leads  
  primary: 2 × 0.75 mm², length: 180 mm  
  secondary: 2 × 0.5–0.75 mm², length: 180 mm

Safety features  
Short-circuit protection: electronic  
Overload protection  
Protection against "no load" operation  
Degree of protection: IP20  
Protection class II  
SELV

Expected service life time  
at operation temperatures at t_c point

<table>
<thead>
<tr>
<th>Model</th>
<th>Ref. No.</th>
<th>t_c temperature</th>
<th>t_c life time</th>
</tr>
</thead>
<tbody>
<tr>
<td>K51</td>
<td>186412</td>
<td>80 °C</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 °C</td>
<td>30,000</td>
</tr>
</tbody>
</table>

K51 – Dimensions: 81.6x42.5x23 mm

Max. output W | Type | Ref. No. | Mains voltage 50–60 Hz V ±10% | Output voltage V | Mains current mA | Output current A | Ambient temperature t_a °C | Casing temperature t_c °C | Efficiency at full load % (230 V) | Weight g |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>EDXe 106/12.037</td>
<td>186412</td>
<td>220–240</td>
<td>12.5±0.5</td>
<td>70–60</td>
<td>0.0–0.5</td>
<td>-15 to 45</td>
<td>65</td>
<td>72</td>
<td>44</td>
</tr>
</tbody>
</table>
**ComfortLine**

**LED Constant Voltage Drivers**

**12 V / max. 50 W and max. 70 W**

The compact LED constant-voltage drivers are designed for use in applications with medium capacity range of up to 50 W or 70 W.

**Electronic characteristics**

- Power factor at full load: > 0.97

**Connection details**

- Mains voltage: 220–240 V ±10%
- Mains frequency: 50–60 Hz
- DC operation: 176–264 V DC, 0 Hz

**(only EDXe 150)**

**Safety features**

- Electronic short-circuit protection
- Overload and temperature protection: reversible
- Protection against "no load" operation
- Degree of protection: IP20
- Protection class I
- SELV

**Expected service life time**

at operation temperatures at \( t_c \) point

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>L, ( t_c ) / °C</th>
<th>50,000</th>
<th>100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>all types</td>
<td>70 °C</td>
<td>50 °C</td>
<td></td>
</tr>
</tbody>
</table>

**K30 / K30.1**

<table>
<thead>
<tr>
<th>Max. output</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Output voltage</th>
<th>Mains current</th>
<th>Current output</th>
<th>Ambient temperature ( t_a )</th>
<th>Casing temperature ( t_c )</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td></td>
<td></td>
<td>0 Hz</td>
<td>V</td>
<td>mA</td>
<td>A</td>
<td>°C</td>
<td>°C</td>
<td>g</td>
</tr>
<tr>
<td>50</td>
<td>EDXe 150/12.034</td>
<td>186216</td>
<td>176–264</td>
<td>12.1 ± 0.24</td>
<td>325–218</td>
<td>0.0–4.2</td>
<td>-40 to 45</td>
<td>70</td>
<td>375</td>
</tr>
<tr>
<td>70</td>
<td>EDXe 170/12.011</td>
<td>186112</td>
<td>220–240</td>
<td>12.1 ± 0.24</td>
<td>365–335</td>
<td>0.0–5.8</td>
<td>-20 to 45</td>
<td>70</td>
<td>340</td>
</tr>
<tr>
<td>50</td>
<td>EDXe 150/12.034</td>
<td>186217</td>
<td>176–264</td>
<td>12.1 ± 0.24</td>
<td>325–218</td>
<td>0.0–4.2</td>
<td>-40 to 45</td>
<td>70</td>
<td>425</td>
</tr>
<tr>
<td>70</td>
<td>EDXe 170/12.012</td>
<td>186113</td>
<td>220–240</td>
<td>12.1 ± 0.24</td>
<td>365–335</td>
<td>0.0–5.8</td>
<td>-20 to 45</td>
<td>70</td>
<td>360</td>
</tr>
</tbody>
</table>

**K30 / K30.1 with cord grip**

<table>
<thead>
<tr>
<th>Max. output</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage</th>
<th>Output voltage</th>
<th>Mains current</th>
<th>Current output</th>
<th>Ambient temperature ( t_a )</th>
<th>Casing temperature ( t_c )</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td></td>
<td></td>
<td>0 Hz</td>
<td>V</td>
<td>mA</td>
<td>A</td>
<td>°C</td>
<td>°C</td>
<td>g</td>
</tr>
<tr>
<td>50</td>
<td>EDXe 150/12.034</td>
<td>186216</td>
<td>176–264</td>
<td>12.1 ± 0.24</td>
<td>325–218</td>
<td>0.0–4.2</td>
<td>-40 to 45</td>
<td>70</td>
<td>425</td>
</tr>
<tr>
<td>70</td>
<td>EDXe 170/12.012</td>
<td>186113</td>
<td>220–240</td>
<td>12.1 ± 0.24</td>
<td>365–335</td>
<td>0.0–5.8</td>
<td>-20 to 45</td>
<td>70</td>
<td>360</td>
</tr>
</tbody>
</table>
ComfortLine
LED Constant Voltage Drivers

12 V / max. 70 W – IP67
These LED constant-voltage drivers are designed for use in IP67 applications with medium capacity range of up to 70 W.

Electronic characteristics
Power factor at full load: > 0.97

Connection details
Mains voltage: 220–240 V ±10%
Mains frequency: 50–60 Hz
Pre-assembled connection leads
   primary side: 5x1 mm², length: 200 mm
   secondary side: 2x1 mm², length: 200 mm

Safety features
Electronic short-circuit protection
Overload and temperature protection: reversible
Protection against "no load" operation
Degree of protection: IP67
Protection class I
SELV equivalent

Expected service life time
at operation temperatures at $t_c$ point

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>$t_a$ °C</th>
<th>$t_c$ °C</th>
<th>hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>186114</td>
<td>70</td>
<td>50</td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td></td>
<td>100,000</td>
</tr>
</tbody>
</table>

K37 with cord grip

<table>
<thead>
<tr>
<th>Max. output W</th>
<th>Type</th>
<th>Ref. No.</th>
<th>Mains voltage 50–60 Hz V ±10%</th>
<th>Output voltage V</th>
<th>Mains current mA</th>
<th>Current output A</th>
<th>Ambient temperature $t_a$ °C</th>
<th>Casing temperature $t_c$ °C</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>EDK1 170/12.013</td>
<td>186114</td>
<td>220–240</td>
<td>12.1 ± 2.34</td>
<td>365–335</td>
<td>0.0–5.8</td>
<td>-20 to 45</td>
<td>70</td>
<td>515</td>
</tr>
</tbody>
</table>
Emergency lighting systems spring to life any time normal main lighting systems fail. Emergency lighting is designed to ensure that staff can safely leave any rooms and that there is sufficient lighting to illuminate rescue paths/routes as well as to avoid panic situations.

VS emergency lighting devices are designed for use with LED applications and can be operated as part of a combined system with electronic LED drivers.

VS emergency lighting devices test the presence of and the charge left on batteries during regular cycles and display the existing status via a bi-colour LED (self-testing function). This both simplifies battery maintenance and ensures necessary emergency lighting in the event of a mains power cut. During normal operation, the batteries are recharged with mains power.
Emergency Lighting Modules for 3 Hours Operating Time

50, 130 or 220 V voltage output
VS emergency lighting modules are suitable for LED luminaires.
Ambient temperature: 5 to 50 °C

Electrical characteristics
- Power consumption: 4 VA
- Constant output: > 3 W
- Weekly automatic self-diagnosis and daily testing of system status
- Battery charge is checked during regular testing cycles.
- Optical status display via two-colour LED

Connection details
- Mains voltage: 220–240 V ± 10%
- Mains frequency: 50–60 Hz
- LED emergency light devices must be connected in line with the installation manual.

Technical notes – Rechargeable batteries
- Choice of rechargeable battery depends on the operating device.
- Charging time of rechargeable batteries: max. 24 hrs.
- Rechargeable batteries: nickel-cadmium (NiCd)

Safety features
- Protection class I
- Degree of protection: IP20
- SELV [186498]

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No. EL Module</th>
<th>Ref. No. Battery</th>
<th>Battery type</th>
<th>Nominal operating period (hrs.)</th>
<th>Mains current at 230 V (mA)</th>
<th>Current output (mA)</th>
<th>Voltage output (V)</th>
<th>Weight (g)</th>
<th>Battery type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL module</td>
<td>186498</td>
<td>188824</td>
<td>4.8 V/4.5 Ah</td>
<td>3</td>
<td>22</td>
<td>250–60</td>
<td>12–50</td>
<td>145</td>
<td>490</td>
</tr>
<tr>
<td>EMc 180.034</td>
<td>186499</td>
<td>188824</td>
<td>4.8 V/4.5 Ah</td>
<td>3</td>
<td>22</td>
<td>150–23</td>
<td>20–130</td>
<td>145</td>
<td>490</td>
</tr>
<tr>
<td>EMc 180.035</td>
<td>186500</td>
<td>188824</td>
<td>4.8 V/4.5 Ah</td>
<td>3</td>
<td>22</td>
<td>100–13</td>
<td>30–220</td>
<td>145</td>
<td>490</td>
</tr>
</tbody>
</table>

Holders for rechargeable batteries
for emergency LED lighting modules
- It is recommended to use two holders per rechargeable battery to ensure optimum hold.
- Material: PBT
- For rechargeable battery type: 4.8 V/4.5 Ah NiCd
- Ref. No.: 188828
**Emergency Lighting Modules for 1 Hour Operating Time**

50, 130 or 220 V voltage output

VS emergency lighting modules are suitable for LED luminaires.

Ambient temperature: 5 to 50 °C

**Electrical characteristics**

- Power consumption: 3.5 VA
- Constant output: > 3 W
- Weekly automatic self-diagnosis and daily testing of system status
- Battery charge is checked during regular testing cycles.
- Optical status display via two-colour LED

**Connection details**

- Mains voltage: 220–240 V ±10%
- Mains frequency: 50–60 Hz
- LED emergency light devices must be connected in line with the installation manual.

**Technical notes – Rechargeable batteries**

Choice of rechargeable battery depends on the operating device.

Charging time of rechargeable batteries: max. 24 hrs.

Rechargeable batteries: nickel-cadmium (NiCd)

**Safety features**

- Protection class I
- Degree of protection: IP20
- SELV [186495]

---

**Type** | **Ref. No. EL Module** | **Ref. No. Battery** | **Battery type** | **Nominal operating period at 230 V (hrs.)** | **Mains current at 230 V (mA)** | **Current output (mA)** | **Voltage output (V)** | **Weight (g) EL Module** | **Battery**
---|---|---|---|---|---|---|---|---|---
M5.1 – Dimensions EL module: 210 x 31.4 x 21.5 mm
EMCc 60.000 | 186495 | 188823 | 4.8V/1.8Ah | 1 | 16 | 250–60 | 12–50 | 145 | 200
EMCc 60.001 | 186496 | 188823 | 4.8V/1.8Ah | 1 | 16 | 150–23 | 20–130 | 145 | 200
EMCc 60.002 | 186497 | 188823 | 4.8V/1.8Ah | 1 | 16 | 100–13 | 30–220 | 145 | 200

**Holders for rechargeable batteries for emergency LED lighting modules**

It is recommended to use two holders per rechargeable battery to ensure optimum hold.

Material: PC

For rechargeable battery type: 4.8V/1.8Ah NiCd

Ref. No.: 188827
LED – THE GREEN FUTURE LIGHTING

LEDs contain no mercury and are low on energy consumption, as a result of which they lead the field when it comes to “green lighting”. Thanks to their eco-friendly properties, they can make a valid contribution to reducing your carbon footprint and countering the greenhouse effect. Moreover, LEDs start instantaneously at full brightness and are available in many colours.

In addition to providing UV- and IR-free light, LEDs are vibration-proof and have a very long service life that further increases the overall efficiency of any lighting system. As LED lamps are now powerful enough to replace both incandescent and low-voltage halogen lamps, they are becoming increasingly popular beyond the field of decorative lighting.
Low-voltage LED Lamps

Suitable for magnetic halogen transformers, electronic halogen converters (12 V AC) and electronic LED drivers (12 V DC)

**MR16 – 5.5 W**
Design style: COB lens
Operating temperature: 0 to 40 °C
Storage temperature: −20 to 60 °C
Input voltage: 12 V AC/DC
Non dimmable
Base: GU5.3

**MR16 – 7 W**
Design style: COB reflector
Operating temperature: 0 to 40 °C
Storage temperature: −20 to 60 °C
Input voltage: 12 V AC/DC
Dimmable [Magnetic with leading-edge dimmers/
Electronic preferred with trailing-edge dimmers]
Base: GU5.3

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MR16 – 5.5 W</td>
<td>553212</td>
<td>warm white</td>
<td>3000</td>
<td>350</td>
<td>1300</td>
<td>24</td>
<td>48</td>
<td>≥ 80</td>
<td>0.7</td>
<td>5.5</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>553213</td>
<td>warm white</td>
<td>3000</td>
<td>350</td>
<td>700</td>
<td>36</td>
<td>72</td>
<td>≥ 80</td>
<td>0.7</td>
<td>5.5</td>
<td>A+</td>
</tr>
<tr>
<td>MR16 – 7 W</td>
<td>553214</td>
<td>warm white</td>
<td>3000</td>
<td>500</td>
<td>1280</td>
<td>24</td>
<td>48</td>
<td>≥ 80</td>
<td>0.9</td>
<td>7</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>553215</td>
<td>warm white</td>
<td>3000</td>
<td>500</td>
<td>1000</td>
<td>36</td>
<td>72</td>
<td>≥ 80</td>
<td>0.9</td>
<td>7</td>
<td>A</td>
</tr>
</tbody>
</table>

Note: Further colour temperatures are available on request.

Typical luminance of MR16 at 1, 2 and 3 meters

<table>
<thead>
<tr>
<th>Intensity (lux)</th>
<th>Colour temperature</th>
<th>MR16 – 5.5 W</th>
<th>MR16 – 7 W</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24°</td>
<td>36°</td>
<td>24°</td>
</tr>
<tr>
<td></td>
<td>1 m</td>
<td>2 m</td>
<td>3 m</td>
</tr>
<tr>
<td>Warm White 3000 K</td>
<td>1300</td>
<td>325</td>
<td>140</td>
</tr>
</tbody>
</table>

Typical light distribution curves


LED Lamps

Replacement for low-voltage incandescent lamps

Suitable for 12 V AC magnetic transformers, 12 V DC electronic drivers and 12 V AC electronic converters

**AR111 – 16 W**
- Operating temperature: -20 to 40 °C
- Storage temperature: -40 to 60 °C
- Input voltage: 12 V AC/DC
- Not dimmable
- Base: G53

**AR111 – 13 W**
- Operating temperature: -20 to 40 °C
- Storage temperature: -40 to 60 °C
- Input voltage: 12 V AC/DC
- Phase-cut dimmable (trailing-edge dimmers are preferred)
- Base: G53

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AR111 – 16 W</td>
<td>AR111.16-3000-24-III 556794</td>
<td>warm white</td>
<td>3000</td>
<td>1000</td>
<td>1200</td>
<td>24</td>
<td>48</td>
<td>≥ 80</td>
<td>&gt; 0.9</td>
<td>16</td>
<td>A</td>
</tr>
<tr>
<td>AR111 – 13 W</td>
<td>AR111.16-3000-36-III 556795</td>
<td>warm white</td>
<td>3000</td>
<td>1000</td>
<td>1600</td>
<td>36</td>
<td>72</td>
<td>≥ 80</td>
<td>&gt; 0.9</td>
<td>13</td>
<td>A</td>
</tr>
<tr>
<td>AR111 – 13 W</td>
<td>AR111.16-3000-24-III 556796</td>
<td>warm white</td>
<td>3000</td>
<td>800</td>
<td>2600</td>
<td>24</td>
<td>48</td>
<td>≥ 80</td>
<td>&gt; 0.9</td>
<td>13</td>
<td>A</td>
</tr>
<tr>
<td>AR111 – 13 W</td>
<td>AR111.16-3000-36-III 556797</td>
<td>warm white</td>
<td>3000</td>
<td>800</td>
<td>1400</td>
<td>36</td>
<td>72</td>
<td>≥ 80</td>
<td>&gt; 0.9</td>
<td>13</td>
<td>A</td>
</tr>
</tbody>
</table>

Further colour temperatures are available on request.

Typical luminance of AR111 at 1, 2 and 3 meters

<table>
<thead>
<tr>
<th>Intensity (lux)</th>
<th>Colour temperature</th>
<th>AR111 – 16 W</th>
<th>AR111 – 13 W</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24° 36° 24° 36°</td>
<td>1 m 2 m 3 m</td>
<td>1 m 2 m 3 m</td>
</tr>
<tr>
<td>Warm White 3000 K</td>
<td>3200 800 350 1600</td>
<td>2600 650 250 1400</td>
<td>350 160</td>
</tr>
</tbody>
</table>

**Typical light distribution curves**
Electronic Converters for LED Lamps 12 V

You will find LED converters for the LED lamps MR16 and AR111 on page 210-213.

Important Notice for LED Lamps

For replacement of low-voltage halogen incandescent lamps
- Do not connect more than one unit to one transformer
- Do not use in ambient temperatures of more than 40 °C
- Unsuitable for installation in enclosed or airtight luminaires
- For indoor use only
- Unsuitable for use outdoors or in high-moisture environments

For replacement of mains voltage incandescent lamps
- Unsuitable for operation with an additional driver
- Integrated high-frequency driver
- Do not use in ambient temperatures of more than 40 °C
- Unsuitable for installation in enclosed or airtight luminaires
- For indoor use only
- Unsuitable for use outdoors or in high-moisture environments
- Dimmable with phase-cutting dimmers (designated lamps only), minimum dimmer load has to be respected.
  The compatibility of the lamp to the dimmer has to be confirmed prior to installation to avoid flickering and/or noises. Trailing-edge dimmers are preferred.

Caution: Always disconnect equipment from the mains before replacing lamps!
LED Lamps

With integrated driver for replacement of high-voltage halogen incandescent lamps

**GU10 – 4 W**
Design style: SMD reflector
Operating temperature: -20 to 40 °C
Storage temperature: -40 to 60 °C
Input voltage: 220–240 V AC
Non dimmable
Base: GU10

**GU10 – 4.5 W and 6 W**
Design style: SMD reflector
Operating temperature: -20 to 40 °C
Storage temperature: -40 to 60 °C
Input voltage: 220–240 V AC
Phase-cut dimmable (trailing-edge dimmers are preferred)
Base: GU10

**GU10 – 5.5 W**
Design style: COB lens
Operating temperature: -20 to 40 °C
Storage temperature: -40 to 60 °C
Input voltage: 220–240 V AC
Non dimmable
Base: GU10

**GU10 – 7 W**
Design style: COB reflector
Operating temperature: -20 to 40 °C
Storage temperature: -40 to 60 °C
Input voltage: 220–240 V AC
Phase-cut dimmable (trailing-edge dimmers are preferred)
Base: GU10

**GU10 – 7 W**
Design style: SMD lens
Operating temperature: 0 to 35 °C
Storage temperature: -20 to 85 °C
Input voltage: 220–240 V AC
Non dimmable
Base: GU10
LED Lamps

With integrated driver for replacement of high-voltage halogen incandescent lamps

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Colour</th>
<th>Colour temperature K</th>
<th>Light intensity cd</th>
<th>Beam angle °</th>
<th>CRI</th>
<th>Power factor</th>
<th>Power W</th>
<th>Energy efficiency</th>
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</thead>
<tbody>
<tr>
<td>4 W – SMD reflector</td>
<td>GU10-4.300036-R</td>
<td>warm white</td>
<td>3000</td>
<td>290</td>
<td>550</td>
<td>36</td>
<td>72</td>
<td>2 80 0.4</td>
<td>4</td>
</tr>
<tr>
<td>4.5 W – SMD reflector</td>
<td>GU10-4.5-270036-R</td>
<td>warm white</td>
<td>2700</td>
<td>230</td>
<td>520</td>
<td>36</td>
<td>72</td>
<td>2 80 0.4</td>
<td>4.5</td>
</tr>
<tr>
<td>5.5 W – COB lens</td>
<td>GU10-5.3000-24-III</td>
<td>warm white</td>
<td>3000</td>
<td>330</td>
<td>1300</td>
<td>24</td>
<td>48</td>
<td>2 80 0.5</td>
<td>5.5</td>
</tr>
<tr>
<td>6 W – SMD reflector</td>
<td>GU10-6-300036-R</td>
<td>warm white</td>
<td>3000</td>
<td>380</td>
<td>680</td>
<td>36</td>
<td>72</td>
<td>2 80 0.6</td>
<td>6</td>
</tr>
<tr>
<td>7 W – COB reflector</td>
<td>GU10-7.3000-24-III</td>
<td>warm white</td>
<td>3000</td>
<td>450</td>
<td>1000</td>
<td>24</td>
<td>48</td>
<td>2 80 0.9</td>
<td>7</td>
</tr>
<tr>
<td>7 W – SMD lens</td>
<td>GU10-7.270036-R</td>
<td>warm white</td>
<td>2700</td>
<td>460</td>
<td>1250</td>
<td>36</td>
<td>72</td>
<td>2 80 0.5</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>GU10-7.300036-R</td>
<td>cool white</td>
<td>5000</td>
<td>520</td>
<td>1500</td>
<td>36</td>
<td>72</td>
<td>2 80 0.5</td>
<td>7</td>
</tr>
</tbody>
</table>

Further colour temperatures are available on request.

Typical luminance of GU10 at 1, 2 and 3 meters

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 m</td>
<td>1 m</td>
<td>2 m</td>
<td>3 m</td>
<td>1 m</td>
<td>2 m</td>
<td>3 m</td>
<td>1 m</td>
<td>2 m</td>
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<tr>
<td>Warm white 2700 K</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>520</td>
<td>130</td>
<td>60</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Warm white 3000 K</td>
<td>550</td>
<td>140</td>
<td>60</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1300</td>
<td>325</td>
</tr>
<tr>
<td>Cool white 5000 K</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1300</td>
<td>325</td>
<td>140</td>
<td>700</td>
<td>175</td>
</tr>
</tbody>
</table>

Typical light distribution curves

- 4 / 4.5 / 6 W – 36°
- 5.5 W – 24°
- 5.5 W – 36°
- 7 W – 24°, COB
- 7 W – 36°, COB
- 7 W – 36°, SMD
General information on LED technology

Thanks to the constant developmental progress made in LED semiconductor technology, the fields of application for LEDs are growing continuously. Mood and architectural lighting, for instance, are already benefiting from the saturated colours and possibilities afforded by RGB colour control. Ever higher light efficiency levels at higher currents are making white LEDs increasingly attractive for general lighting. Among others, further decisive advantages are great longevity, low energy consumption, neither UV or IR beam nor any hazardous substances.

The key basis of modern optoelectronics is the availability of high-performance LEDs in the three primary colours red, green and blue as well as white and warm white. By assembling these on circuit boards and in combination with converters and control systems, lighting systems can be created for the most diverse areas of use.

Vossloh-Schwabe’s production of LED modules is based on tried-and-tested COB and SMD technology. This makes it possible to design modules in various dimensions and performance classes. COB (Chip On Board) technology enables super-flat designs with very high chip densities. SMD (Surface Mounted Device Technology) enables convenient, quick and simultaneous assembly of LED and electronics devices.

Working principle of light emitting diodes (LEDs)

An LED semiconductor chip is a semiconductor component that is made up of two differently doped crystal layers, one of which positive (p) and the other negative (n). Light is emitted at the depletion-layer pn boundary for a current flow in forward direction.

An LED converts applied electric energy into visible electromagnetic radiation. The construction and doping of a semiconductor depends on the desired wavelength $\lambda$ (colour), which can only be monochromatic (red, orange, yellow, green or blue). Colour blends are created by varying the number of LEDs in the individual colours. By adding certain converter materials, LEDs can also produce white and warm white light. This type of light generation using a semiconductor is generally referred to as luminescence, i.e. the generation of cold light whose rays contain no warmth and are emitted without infrared (IR).

Semiconductor materials for LED chips

Irrespective of the specific model, an LED always consists of the following components: leadframe, LED chip and contacting using conductive adhesive and bonding.

While the leadframe can be made of a PCB or ceramics, plastics and other materials, the LED chips are mounted on a die-cut reflector (cathode) using conductive adhesive to achieve higher light intensities with a focused beam of light. The anode is connected using bonding wire.

The optical viewing angle ($\varphi$) of an LED is determined by the geometry of the casing including reflector and the position of the chip within the casing.

Small in size and highly resistant against mechanical impact/stress, LEDs are an ideal component for lighting applications. Special modular solutions are also available for applications involving differing ambient conditions (humidity, ambient temperature, etc.)
Visible light within the electromagnetic spectrum

Visible light only accounts for a small part of the electromagnetic spectrum. The part of the electromagnetic spectrum that is visible for humans ranges from ultraviolet ($\lambda = 380 \text{ nm}$) to dark red ($\lambda = 780 \text{ nm}$). Light sensitivity of the human eye

By day, the maximum light sensitivity ($K_m$) of the human eye for green is at $\lambda = 555 \text{ nm}$ and drops to $\lambda = 510 \text{ nm}$ by night. Light sensitivity falls off sharply for both higher and lower wavelengths and only totals 1% of day vision for blue at $\lambda = 430 \text{ nm}$ and dark red at $\lambda = 720 \text{ nm}$. Thus, in order for the human eye to perceive light of these wavelengths at the same intensity as yellow-green light, its luminance $L_V$ needs to be 100 times greater.

Service life of LEDs

The service life of an LED is determined by various factors:

- the degradation rate of the semiconductor material and the encapsulation material
- the applied operating current $I_F$
- the ambient temperature $T_a$ during operation and
- the thermal resistance

The term degradation describes the decrease in brightness of an LED chip as a result of the applied forward current during normal operation. Given normal operating conditions ($T_a = 25^\circ \text{C}$ at $I_F = 10-30 \text{ mA}$), LEDs will provide a service life of up to 100,000 operating hours (typically 50,000 hours for High Power applications), after which time the brightness of the LED will have dropped typically to 70% of its original value.
LED efficiency

In theory, the internal efficiency of an LED chip is 90%, meaning that 90% of the applied electrical energy is converted into visible light at the pn junction layer.

However, a part of the light emitted at the pn junction layer cannot pass through the semiconductor structure and it remains a major technological challenge to optimise the coupling of light out of the chip with the help of innovative designs. These processes determine the external degree of LED efficiency, which denotes the magnitude of visible output that can pass through the semiconductor structure when, for instance, 1 W of electrical power is applied to an LED.

Colour design with LEDs

CIE Chromaticity Chart (CIE 1931 according to DIN 5033)

The CIE chromaticity triangle [standardised CIE 1931 chromaticity chart according to DIN 5033] makes it possible to precisely plot the colours of light sources and objects using two standardised (and previously gauged) chromaticity coordinates, the x and y values. Every point in this chart represents the chromaticity location of a certain chroma. Colours of the same chromaticity only differ from each other in terms of their intensity (colour saturation). The so-called “no-colour point” (white, grey and black, depending on brightness) is situated in the middle of the chart at $x = 0.33$ and $y = 0.33$.

The boundary of the chromaticity chart is made up of the gamut of spectral colours from 380 nm (blue-violet) to 780 nm (dark red) and the so-called purple boundary. As a result of additive mixing of two or more coloured light sources the chromaticity coordinates are always along a direct line between the starting coordinates.
When using LED lighting, different colours can be created using additive colour mixing (RGB) or by transforming the wavelengths a diode emits by adding a luminescent material in a manner similar to fluorescent lamps. In the case of additive colour mixing/control, appropriate control devices are used to adjust the brightness of the individual LED colours (RGB) to create the desired light colour.

**LED system components**
- LED modules
- LED optics
- LED operating devices
- LED control modules
- LED connection technology

When selecting LED components, it is important to take account of their technical specifications, especially with regard to voltage range, current and temperature. VS provides a large range of components for the various areas that all go to build a perfectly matched system. The technical specifications of the various components can be found on the product pages.

**Assembly Instructions for LEDs**

For mounting and installing LED components

**Mandatory regulations**

- **DIN VDE 0100**  Erection of low voltage installations
- **EN 60598-1**  Luminaires – part 1: general requirements and tests
- **EN 60838-2-2**  Miscellaneous lampholders – part 2-2: particular requirements – connectors for LED modules
- **EN 61347-1**  Lamp controlgear – part 1: general and safety requirements
- **EN 61347-2-11**  Controlgear – part 2-11: particular requirements for miscellaneous electronic circuits used with luminaires
- **EN 61347-2-13**  Lamp controlgear – part 2-13: particular requirements for DC or AC supplied electronic controlgear for LED modules
- **EN 62031**  LED modules for general lighting – safety specifications
- **EN 62384**  DC or AC supplied control gear for LED modules – performance requirements
- **EN 55015**  Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
- **EN 61000-3-2**  Electromagnetic compatibility (EMC) – part 3-2: limits – limits for harmonic current emissions (equipment input current = 16 A per phase)
- **EN 61000-3-3**  Electromagnetic compatibility (EMC) – part 3-3: limits – limitation of voltage fluctuations and flicker (equipment input current = 16 A per phase)
- **EN 61547**  Equipment for general lighting purposes – EMC immunity requirements
- **EN 62471**  Photobiological safety of lamps and lamp systems
Mechanical mounting of LED operating devices

Surface
Solid, flat surface for good heat discharge required.
Avoid mounting protruding surfaces.

Mounting location
Converters must be protected against moisture and heat.

Installation in external luminaires
Luminaire requires water protection rate of = 4 [e.g. IP54 required].

Heat transfer
If the converter is destined for installation in a luminaire, sufficient heat transfer must be ensured between the converter and the luminaire casing. Converters should be mounted with the greatest possible clearance to sources of heat.
During operation, the temperature measured at the tc point of the converter must not exceed the specified maximum value.

Additional mounting instructions for independent LED operating devices

Mounting position
Any

Clearance
Min. of 0.10 m from walls, ceilings, insulation
Min. of 0.10 m from other electronic ballasts
Min. of 0.25 m from sources of heat (LEDs or other lamps)

Surface
Solid; device must not be allowed to sink into insulation materials

Safety, assembly and handling information for LED modules

Installation and maintenance must always be performed by a qualified fitter in accordance with relevant legislation. The following instructions must be strictly observed. Vossloh-Schwabe Deutschland GmbH accepts no liability for any possible inaccuracies during installation, any non-compliance with these instructions or for any possible omissions in this publication.

In addition, Vossloh-Schwabe Deutschland GmbH reserves the right to make modifications at any time and without prior notification. This data sheet is an integral part of the equipment and its safety devices and should therefore be kept in a safe place for easy reference. The equipment must always be disconnected from the mains prior to undertaking any maintenance work. The safety instructions on the type plate of the components must be strictly observed.

Installation must be conducted at zero potential after disconnection from the line. Modules can have sharp edges or corners. Please take special care during installation to avoid injury. The modules can get hot. Please provide warning notices at the luminaire body if necessary.

LED modules and all PCB components must not be subjected to undue mechanical stress:
• LED modules must not be handled as bulk cargo.
• Shear and pressure stress must be avoided on SMD LEDs and the grouting material of COB LEDs during assembly and handling.

The circuit path must not be damaged or interrupted. We recommend using clips or plastic screws for installation purposes to avoid short circuits and damage to the modules.

The LED modules are not protected against short-circuiting, overloading or overheating. The use of Vossloh-Schwabe electronic power supply units is therefore absolutely essential. Using other power supply units is not recommended. Please ensure you choose the correct electronic power supply unit for the module in question and that the respective output parameters (current, voltage, wattage) are correct [see www.vossloh-schwabe.com].
Safe operation is only possible by the use of external constant-current sources. Power supply units must be used for operation, in which the following protective measures are ensured:

- Short-circuit protection
- Overload protection
- Overheating protection
- SELV (Safety Extra Low Voltage)

Please ensure standard ESD (electrostatic discharge) protection measures are employed when handling and installing LED modules. Electrostatic discharge can damage LEDs.

Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.

The maximum output of the power supply must be observed.

For optimal load of used constant-current driver, the LEDSpots can only be connected in series. The quantity of LEDSpots is limited by the sum of forward voltage and the capacity of used constant-current driver.

A parallel connection of the modules is not allowed.

The modules are not protected against dust or moisture (except LEDLine Flex SMD Professional Outdoor, LEDSpots IP54, Roadway Light and Industrial Light IP66/IP67). When LED modules are operated in unduly moist or dusty environments, care must be taken to ensure each module is built into a protective casing in compliance with the correct IP classification or provided with corrosion protection. Damage caused by moisture and/or corrosion will not be recognised as a material or manufacturing defect.

To ensure smooth module operation, care must be taken that module temperatures at the $T_c$ point never exceed the maximum values stipulated in the data on catalogue pages.

Due to the numerous installation options and differing operating conditions, no precise installation guidelines can be provided that will ensure the maximum temperature values are never exceeded. In principle, the LED modules can be mounted on a flat metal surface (heat sink) that must, however, provide a large enough surface area to ensure the generated heat can be dissipated to the surroundings.

Under no circumstances may LED modules ever be covered by insulation material or similar. Air ventilation must be ensured.

Please ensure adhesive pads or other products with adhesive areas (LEDLine Flex SMD Professional, LEDLine Flex SMD Professional Outdoor) are only used on dry and clean surfaces that are free of grease, oil, silicone and dirt particles. Owing to the varying application options and different types of surface as well as ambient conditions, VS accepts no liability for the quality of the adhesive bond achieved when mounting these products.
Tests have shown the following chemicals to be harmful to LEDs used on the modules. It is recommended not to use the under-mentioned chemicals anywhere in an LED system. The fumes from even small amounts of these chemicals may damage the LEDs.

- Chemicals that might outgas aromatic hydrocarbons (e.g., toluene, benzene, xylene)
- Methyl acetate or ethyl acetate (i.e., nail polish remover)
- Cyanoacrylates (i.e., “Superglue”)
- Glycol ethers (including Radio Shack®, Precision Electronics Cleaner – dipropylene glycol monomethyl ether)
- Formaldehyde or butadiene (including Ashland PLIOBOND® adhesive)
- Dymax 984LVUF conformal coating
- Loctite Sumo glue
- Gorilla glue
- Clorox bleach
- Clorox Clean-Up cleaner spray
- Loctite 384 adhesive
- Loctite 7387 activator
- Loctite 242 threadlocker

**Safety, assembly and handling information for ReadyLine modules**

The ReadyLine LED modules are designed for direct mains operation (230 V AC). Installation must be carried out under observation country specific relevant safety regulations and standards.

The LED module is a built-in lighting module to assemble into luminaires. Clearance and creepage distances of the LED module are designed for class II luminaires.

Additional insulating material could be required in order to reach the sufficient isolation acc. country specific standards (e.g. EN 60598 and EN61547 Tab. 10 for Europe).
INTELLIGENT INDOOR LIGHTING

With its new XSW Wireless Light Controllers, Vossloh-Schwabe has opened up a new chapter in light control. The Wireless Light Controller offers users particularly easy and flexible integration of light control options into a system or luminaire – with a special emphasis on simple, intuitive operation.

The VS Light Controllers are light management systems that were developed as a convenient means of controlling and regulating light.

Communication between the Light Controller and the luminaire is achieved using the standard DALI protocol. The Light Controllers comply with the IEC 62386:2008 DALI standard. The Light Controllers of the LiCS System Network series automatically interconnect to form a centrally controllable TCP/IP network.

The entire lighting system was designed to permit easily comprehensible configuration. Any later modifications to the system can thus be carried out without any problems.

Light Controllers provide users with a convenient means of integrating numerous control options, from controlling individual luminaires via a smartphone right up to a light management system.

Typical applications

- Offices, industrial spaces and warehouses
- Shops, supermarkets and malls
- Hotels and gastronomy
- Public buildings (e.g. museums, schools and hospitals)
- Stairwells and hallways
- Sanitary facilities
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# Overview of the LiCS Indoor System

## Product matrix

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>L / LS</th>
<th>LW / LSW</th>
<th>S</th>
<th>XS</th>
</tr>
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<tbody>
<tr>
<td>For integration into the distribution board</td>
<td>For integration into the distribution board – EnOcean wireless version</td>
<td>For independent operation</td>
<td>For built-in into luminaires</td>
<td></td>
</tr>
</tbody>
</table>

### MultiSensors

- MultiSensors (movement and brightness)

### High Bay Sensors

- High Bay Sensors (movement) or brightness (constant light control)

### Extender

- Input devices

<table>
<thead>
<tr>
<th>Functions</th>
<th>Light Controller</th>
<th>Light Controller</th>
<th>Light Controller</th>
<th>Light Controller</th>
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<tr>
<td></td>
<td>L</td>
<td>LS</td>
<td>LW</td>
<td>LSW</td>
</tr>
<tr>
<td>Control options</td>
<td>single and group</td>
<td>group</td>
<td>single and group</td>
<td>group</td>
</tr>
<tr>
<td>No. of groups</td>
<td>max. 16</td>
<td>max. 16</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>No. of operating devices (DALI-EBs, LiCS-Extender, HB sensors)</td>
<td>max. 64</td>
<td>max. 64</td>
<td>max. 64</td>
<td>max. 10</td>
</tr>
<tr>
<td>No. of MultiSensors</td>
<td>max. 36</td>
<td>max. 36</td>
<td>max. 36</td>
<td>max. 4</td>
</tr>
<tr>
<td>Motion detection (automatic and semi-automatic)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Constant light control</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Scene settings</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Push function (on/off, up and down)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Dimming (only up or only down)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>ON/OFF function</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Overriding central control</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Stairwell function (timer)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>With integrated timer clock</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Discourage burglaries</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>System analysis software</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Password protection</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Minimising standby losses</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Menu navigation in</td>
<td>German, English, French, Italian, Spanish</td>
<td>German, English, French, Italian, Spanish</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Configuration using</td>
<td>rotary push key and screen</td>
<td>rotary push key and screen</td>
<td>dip switch</td>
<td>dip switch</td>
</tr>
</tbody>
</table>
## Overview of the LiCS Indoor System Network

<table>
<thead>
<tr>
<th>Product matrix</th>
<th>Light Controller IP/DALI</th>
<th>Light Controller IP/DALI W</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image1" alt="Light Controller IP/DALI" /></td>
<td><img src="image2" alt="Light Controller IP/DALI W" /></td>
</tr>
</tbody>
</table>

**MultiSensors**
![MultiSensors](image3) (movement and brightness)

**High Bay Sensors**
![Industrial Sensors](image4) (movement or constant light control)

**Extender**

<table>
<thead>
<tr>
<th>Input devices</th>
<th>8 buttons (mains voltage-compatible)</th>
<th>8 buttons (mains voltage-compatible), EnOcean wireless modules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DALI buttons (4 channel)</td>
<td>DALI buttons (4 channel)</td>
</tr>
</tbody>
</table>

* Functionality limitations of the system possible; please observe the notes in the controller operation manuals.

---

### SYSTEM INFORMATION

**Server** [Win 7] or LightBox

Optional: Access Point for operating elements

### FUNCTIONS LIGHT CONTROLLER IP/DALI

- **Network-compliant:**
  - Intelligent networking of DALI devices
- **Lighting control:**
  - 3 level motion detection (automatic and semi-automatic)
  - Constant light control
  - Intelligent day- and time-dependent switching functions
  - Astro function
  - Scene settings
  - Push function (on/off, up and down)
  - Chain command (push button-controlled sequence of commands)
  - Dimming (only up or only down)
  - ON function, OFF function
  - Light value
  - Stairway function (timer)
  - Retrieval of various sensor-gauged values
  - Logic functions
  - Push-key and operating element:
    - Classic push buttons
    - TouchLight
    - Tablet
    - EnOcean
    - DALI buttons
  - Documentation:
    - Device documentation
    - Save/Load
    - Automated error detection (email report)
    - User accounts (password protection)
  - Language:
    - German
    - English
    - Further language on request
  - Further functions:
    - Minimising standby losses
    - Intelligent device exchange
Overview of the LiCS Indoor System Wireless

General Functions

- Selection of the operating mode via a dip switch (for the XSW-E6 Light Controller)
- Scalable systems – from standalone right up to interlinked network operation
- Maintenance-free EnOcean wireless communication
- Connection to standard-compliant DALI luminaires
- An independent version (XSW-E64 Light Controller) and a version for integration into a luminaire (XSW-E6 Light Controller) are available
- All the functions of a wired system plus the advantages of flexible installation

Operating Mode 1 – Network

Functions

- Wireless integration into a LiCS system network: commissioning, configuration and control
- Wireless integration of a further DALI universe per IPW Light Controller

Operating Mode 2 – Mesh Network

Functions

- Wireless integration into a LiCS system network: commissioning, configuration and control
- Larger range thanks to mesh functionality

Operating Mode 3 – Standalone

Functions

- Configuration via PC/Laptop
- Control via wireless push buttons (EnOcean)
- Definition of scenes and groups
Light Controller
IP/DALI

For installation in a distribution board
This light control gear (gateways) is designed for installation in a distribution board.

Technical notes
Configuration interface: via browser via tablet/PC
Ambient temperature $t_a$: 5 to 50 °C
(186484, 186485 $t_a$: 5 to 45 °C)
Push-in terminals with lever opener: 0.5–2.5 mm²
Degree of protection: IP20, Protection class I
RFI-suppressed
The MultiSensors and DALI push-button interfaces are connected directly to the DALI bus.

Connections
- Mains connection: 220–240 V AC, 50–60 Hz
- Max. power consumption 12 W
- 2xRJ45 (Ethernet TCP/IP) 10/100MBit/s, Daisy Chain
- 1 DALI bus: max. current on DALI bus = 200 mA
  (see the respective data sheet for current consumption of individual components)
- As a standard DALI bus is not SELV-compliant, the DALI cable must be rated for mains voltage.
- The DALI bus features reversible electronic overload and short-circuit protection.
- 8 independently configurable push button inputs, cables must be rated for mains voltage
- Minimising standby losses

Software download
See product page under www.vossloh-schwabe.com

System architecture

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>Ref. No.</th>
<th>Max. No. of operating devices (pcs./controller)</th>
<th>No. of MultiSensors or DALI push-button interfaces (pcs./controller)</th>
<th>EnOcean</th>
<th>Dimensions (LxWxH) mm</th>
<th>Horizontal pitches (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP/DALI 2CH</td>
<td>186484</td>
<td>2x64</td>
<td>2x36</td>
<td>no</td>
<td>180x90x71</td>
<td>10</td>
<td>340</td>
</tr>
<tr>
<td>IP/DALI</td>
<td>186339</td>
<td>64</td>
<td>36</td>
<td>no</td>
<td>180x90x71</td>
<td>10</td>
<td>340</td>
</tr>
<tr>
<td>IP/DALI W 2CH</td>
<td>186485</td>
<td>2x64</td>
<td>2x36</td>
<td>yes</td>
<td>180x90x71</td>
<td>10</td>
<td>340</td>
</tr>
<tr>
<td>IP/DALI W</td>
<td>186340</td>
<td>64</td>
<td>36</td>
<td>yes</td>
<td>180x90x71</td>
<td>10</td>
<td>340</td>
</tr>
</tbody>
</table>
LightBox

For operating Light Controllers of the IP/DALI series
The LightBox serves to manage the tasks performed of up to ten Light Controllers IP and is pre-configured for plug-and-play operation.

Technical notes
• Mains switch for powering up the LightBox (activates automatically once mains power is restored following a power cut).
• Indicator: green status LED at the front
• As an alternative to client-based configuration (e.g. using a tablet, etc.), a monitor or input device can be connected during operation for configuration purposes.
• Optional Mailserver, Internet remote access
• The Windows 8.1N operating system merely needs to be personalised and activated by telephone.

Connections
• Mains switch
• Mains connection with power supply unit
• RJ45 connection [Ethernet]
• 6 x USB
• HDMI output
• Display port
• WiFi antenna

System architecture
LightBox with DHCP

System architecture
LightBox without DHCP

<table>
<thead>
<tr>
<th>Type</th>
<th>Suitable for</th>
<th>Ref. No.</th>
<th>Max. No. of Light Controller per LightBox (pcs.)</th>
<th>Dimensions (LxWxH) mm</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LightBox network- and internet-based operation (as a DHCP client)</td>
<td>186512</td>
<td>10</td>
<td>127x127x45</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>LightBox DHCP stand-alone light management (as a DHCP server)</td>
<td>186513</td>
<td>10</td>
<td>127x127x45</td>
<td>600</td>
<td></td>
</tr>
</tbody>
</table>

DALI Push-button Interface

For extension of up to 4 push buttons to a Light Controller IP/DALI

DALI push-button interfaces make it possible to install additional push-buttons at any point along the DALI bus without needing to connect an additional power supply source.

For built-in into flushtype boxes
Control input: DALI acc. to IEC 62386:2008
DALI current consumption: 4 mA
With built-in LED (red) for configuration
Dimensions (LxWxH): 32 x 22 x 13 mm, weight: 30 g
Connection leads: 0.5 mm², ferrules on bare end of core
Protection class II
Ref. No.: 186476
Light Controller
XSW-E6

Suitable for installation in luminaires/on mounting rails
These light controllers are suitable for installation in luminaires or on mounting rails.

Technical notes
Configuration interface: wireless (EnOcean) and mode dip switch
Ambient temperature ta: 5 to 50 °C
Push-in terminals with lever opener: 0.5–1.5 mm²
Degree of protection: IP20
For luminaires of protection class II
RFI-suppressed
The MultiSensors are connected directly to the DALI bus.

Connections
- Mains connection: 220–240 V AC, 50–60 Hz
- Max. power consumption 1 W
- 1 DALI bus: max. current on DALI bus = 20 mA (see the respective data sheet for current consumption of individual components)
- As a standard DALI bus is not SELV-compliant, the DALI cable must be rated for mains voltage.
- The DALI bus features reversible electronic overload and short-circuit protection.

Operating modes
1. Network
2. Mesh network
3. Standalone

Functions of the Network version
Wireless training and coupling of the system, integration into Light Controller IP network (Ref. No.: 186485 and 186340), centralised configuration

Functions of Standalone mode
Teach-in function of EnOcean modules, ON/OFF function, individual addressing option, group formation, scenes, light values
Software available for download:
see product page under www.vossloh-schwabe.com
Requirement for Standalone mode:
EnOcean USB drive (available on request)

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>Ref. No.</th>
<th>Max. No. of operating devices pcs./controller</th>
<th>Max. No. of MultiSensors pcs./controller</th>
<th>EnOcean</th>
<th>Dimensions (LxWxH) mm</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSW-E6</td>
<td>186516</td>
<td>6</td>
<td>1</td>
<td>yes</td>
<td>146.7x21x18</td>
<td>40</td>
</tr>
</tbody>
</table>
Light Controller
XSW-E64

**Wireless light controller**
These light control devices are suitable for independent operation (e.g. in false ceilings).

**Technical notes**
Configuration interface: wireless [EnOcean]
Ambient temperature $t_a$: 0 to 50 °C
Max. casing temperature $t_c$: 65 °C
Screw terminals: 0.75–2.5 mm²
Degree of protection: IP20, Protection class II
RFI-suppressed
The MultiSensors are connected directly to the DALI bus.

**Connections**
- Mains connection: 220–240 V AC/50–60 Hz
- Max. power consumption: 6.7 W
- 1 DALI bus: max. current on DALI bus = 200 mA
  (see the respective data sheet for current consumption of individual components)
- As a standard DALI bus is not SELV-compliant, the DALI cable must be rated for mains voltage.
- The DALI bus features reversible electronic overload and short-circuit protection.

**Operating modes**
1. Network

**Functions**
Wireless training and coupling of the system, integration into Light Controller IP network
(Ref. No.: 186485 and 186340), centralised configuration

**Addional notes**
- 4 XSW-E64 devices (max.) per IP DALI controller.
- Full integration of sensors and DALI bush buttons.

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>Ref. No.</th>
<th>Max. No. of operating devices</th>
<th>Max. No. of MultiSensors</th>
<th>EnOcean</th>
<th>Dimensions (LxWxH)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSW-E64</td>
<td>186517</td>
<td>64</td>
<td>36</td>
<td>yes</td>
<td>175x42x31.5</td>
<td>127</td>
</tr>
</tbody>
</table>
Light Controller L/LW and LS/LSW

For installation in a distribution board

This light control gear is designed for installation in a distribution board.

Technical notes

Configuration interface: display and rotary push key (on the controller)
Ambient temperature \( t_a \): 5 to 50 °C
Push-in terminals with lever opener: 0.5–1.5 mm²
Degree of protection: IP20, Protection class I
RFI-suppressed
The MultiSensors are connected directly to the DALI bus.

Connections

- Mains connection: 220–240 V AC, 50–60 Hz
- Max. power consumption 9 W
- 1 DALI bus to 3 pairs of terminals: max. current on DALI bus = 200 mA (see the respective data sheet for current consumption of individual components)
- As a standard DALI bus is not SELV-compliant, the DALI cable must be rated for mains voltage.
- The DALI bus features reversible electronic overload and short-circuit protection.
- 6 independently configurable push button inputs, cables must be rated for mains voltage
- Minimising standby losses

General functions

Automatic and semi-automatic motion detection, constant light control, push function, ON/OFF function, stairwell function (timer), system analysis software, password protection
Software languages: German, English, French, Italian, Spanish

Additional functions

- Scene settings, control options (single and/or group) (Light Controller L/LW)
- Discourage burglaries, timer clock, control options (group) (Light Controller LS/LSW)

Lighting Control System for Indoor Applications

Light Controller LW/LWS

Suitable for wireless operation with EnOcean
No. of wireless modules: 16 pcs.
Radio signal with a frequency of 868 MHz
Antenna needed

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>Ref. No.</th>
<th>Max. No. of operating devices</th>
<th>Max. No. of MultiSensors</th>
<th>EnOcean</th>
<th>Dimensions (LxWxH)</th>
<th>Horizontal pitch</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>186189</td>
<td>64</td>
<td>36</td>
<td>no</td>
<td>126x90x68</td>
<td>7</td>
<td>250</td>
</tr>
<tr>
<td>LS</td>
<td>186276</td>
<td>64</td>
<td>36</td>
<td>no</td>
<td>126x90x68</td>
<td>7</td>
<td>250</td>
</tr>
<tr>
<td>LW</td>
<td>186190</td>
<td>64</td>
<td>36</td>
<td>yes</td>
<td>126x90x68</td>
<td>7</td>
<td>250</td>
</tr>
<tr>
<td>LSW</td>
<td>186323</td>
<td>64</td>
<td>36</td>
<td>yes</td>
<td>126x90x68</td>
<td>7</td>
<td>250</td>
</tr>
</tbody>
</table>

DALI Group Configuration Tool

FMH4-rw Ref. No.: 555534
Antennas

To supplement LiCS Indoor System

To ensure faultless wireless operation, an antenna must be connected that is set to the respective frequency.

When fitting the antenna, care must be taken that it is not shielded by metal objects, e.g. steel cabinets, radiators, ventilation shafts etc., to ensure optimum signal reception.

The requisite antenna is provided in two models: the screw-base model comes with a detachable connection cable, while the magnetic-base model is fitted with a non-detachable connection cable.

**Magnetic-base antenna with connection cable**

- Antenna dimensions (ØxH): 29x88 mm
- Cable diameter: Ø 6 mm, length: 2.5 m
- Min. bending radius of the cable: 50 mm
- Impedance: 50 Ω
- Capacity: 10 W pulsed
- Ambient temperature ta: -40 to 80 °C
- Storage temperature: -40 to 80 °C
- Degree of protection: IP66
- Weight: 62 g
- Ref. No.: 186211

**Screw-base antenna**

- Antenna dimensions (ØxH): 33x89 mm
- Impedance: 50 Ω
- Capacity: 8 W pulsed
- Ambient temperature ta: -40 to 70 °C
- Storage temperature: -40 to 80 °C
- Degree of protection: IP66
- Weight: 41 g
- Ref. No.: 186212

**Connection cable for the screw-base antenna**

- Cable diameter: Ø 6 mm, length: 1.5 m
- Min. bending radius of the cable: 50 mm
- Weight: 66 g
- Ref. No.: 186213
Light Controller S

For independent operation
These light control devices are suitable for independent operation (e.g. in false ceilings).

Technical notes
Configuration interface: dip switch (on the device)
Ambient temperature $t_a$: 0 to 50 °C
Max. casing temperature $t_c$: 65 °C
Screw terminals: 0.75–2.5 mm²
Degree of protection: IP20, Protection class II
RFI-suppressed
The MultiSensors are connected directly to the DALI bus.

Connections
• Mains connection: 220–240 V AC/DC, 0/50–60 Hz
• Max. power consumption 6.5 W
• 1 DALI bus: max. current on DALI bus = 200 mA
  (see the respective data sheet for current consumption of individual components)
• As a standard DALI bus is not SELV-compliant, the DALI cable must be rated for mains voltage.
• The DALI bus features reversible electronic overload and short-circuit protection.
• 1 configurable push button input: cables must be rated for mains voltage

Functions
Automatic and semi-automatic motion detection, constant light control, push function (64 EBs synchronously), ON/OFF function, stairwell function (timer), control option (broadcast)

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>Ref. No.</th>
<th>Max. No. of operating devices/pcs./controller</th>
<th>Max. No. of MultiSensors/pcs./controller</th>
<th>EnOcean</th>
<th>Dimensions (LxWxH)/mm</th>
<th>Weight/g</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>186210</td>
<td>64</td>
<td>36</td>
<td>no</td>
<td>175x42x31.5</td>
<td>150</td>
</tr>
</tbody>
</table>
**Light Controller XS**

**For luminaire installation**
These light control devices are suitable for operation in luminaires.

**Technical notes**
- Configuration interface: dip switch (on the device)
- Ambient temperature $t_a$: 5 to 50 °C
- Max. casing temperature $t_c$: 60 °C
- Service life time: 50,000 hrs.
- Push-in terminals with lever opener: 0.5–1.5 mm²
- Degree of protection: IP20
- RFI-suppressed
- For luminaires of protection class I and II
- The MultiSensors are connected directly to the DALI bus.

**Connections**
- Mains connection: 220–240 V AC/DC, 0/50–60 Hz
- Max. power consumption 0.8 W
- 1 DALI bus: max. current on DALI bus = 20 mA
  (see the respective data sheet for current consumption of individual components)
- As a standard DALI bus is not SELV-compliant, the DALI cable must be rated for mains voltage.
- The DALI bus features reversible electronic overload and short-circuit protection.
- 1 configurable push button input

**Functions**
- Automatic and semi-automatic motion detection,
- constant light control, push function (10 EBs synchronously),
- ON/OFF function, control option (broadcast)

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>Ref. No.</th>
<th>Max. No. of operating devices</th>
<th>Max. No. of MultiSensors</th>
<th>EnOcean</th>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>XS</td>
<td>186220</td>
<td>10</td>
<td>4</td>
<td>no</td>
<td>83x30x19</td>
<td>30</td>
</tr>
</tbody>
</table>
Extender

To extend LiCS Indoor system

An extender enables the maximum number of DALI-compliant control gear units within a standard DALI system to be increased.

This means the DALI extender is installed and addressed in instead of the ballast. Up to 64 DALI control gear units can be connected to an extender output. All of these control gear units will either respond in the same way to an incoming signal (Ref. No.: 186194) or, given changed characteristics, will transfer values to the addressed DALI control gear units (Ref. No.: 186481).

The extender for DALI systems can only be used in combination with a DALI controller. When DALI commands are received, the extender behaves just like a DALI-compliant ballast.

Technical notes
Configuration interface:
via a DALI controller
Ambient temperature $t_a$: 0 to 50 °C
Max. casing temperature $t_c$: 65 °C
Screw terminals: 0.75–2.5 mm²
Degree of protection: IP20, Protection class II
RFI-suppressed

Connections
- Mains connection: 220–240 V AC/DC, 0/50–60 Hz
- Max. power consumption: 6.5 W
- For DALI signals in acc. with IEC 62386
- DALI current consumption: 2 mA
- 1 DALI bus to 3 terminal pairs: max. current on the DALI bus = 200 mA
- As a standard DALI bus is not SELV-compliant, the DALI cable must be rated for mains voltage.
- The DALI bus features reversible electronic overload and short-circuit protection.

Functions
Connection of up to 64 ballasts to a single DALI address
Extender Flex serves to transfer characteristics, which permit light to be staged in a more flexible manner, to the connected DALI addresses.
Example: group devices can be dimmed to varying degrees.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Max. No. of secondary control gear units per Extender pcs./Extender</th>
<th>Functions</th>
<th>Dimensions [LxWxH]</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extender</td>
<td>186194</td>
<td>64</td>
<td>Broadcast Classic</td>
<td>175x42x31.5</td>
<td>150</td>
</tr>
<tr>
<td>Extender Flex</td>
<td>186481</td>
<td>64</td>
<td>Broadcast Flexible; a compilation of characteristics can be made available on request</td>
<td>175x42x31.5</td>
<td>150</td>
</tr>
</tbody>
</table>
MultiSensors

To supplement LiCS Indoor system
Daylight and motion sensors increase both energy savings and convenience.

VS MultiSensors detect both light levels and motion. In addition, MultiSensors feature a space-saving design and were specifically developed to work with VS Light Controllers. No external power supply is required, as the sensors are supplied via the DALI bus.

Technical notes
Configuration interface:
via the Light Controller
Ambient temperature ta: 0 to 50 °C
Push-in terminals with lever opener: 0.5–1.5 mm²
DALI current consumption: 4 mA

Functions
Motion detection and monitoring of lighting levels. With built-in LED (red): the light flashes during configuration when the sensor is selected.

MultiSensor SM-E
For surface mounting
Dimensions [ØxH]: 53 x 48.5 mm
Weight: 30 g
Ref. No.: 186320

MultiSensor FM-E
For ceiling installation
With cord grip
Dimensions [ØxH]: 40 x 43.8 mm
Weight: 30 g
Ref. No.: 186321

MultiSensor IL-E
For luminaire installation
Dimensions [ØxH]: 45 x 31.9 mm
Weight: 30 g
Ref. No.: 186322
Industrial Sensors High Bay for Industrial Applications

To supplement LiCS Indoor system
Using DALI MovementSensors increases both energy savings and application flexibility.

Vossloh-Schwabe MovementSensors are even capable of detecting motion in rooms with high ceilings (up to 8 m in height). Specifically developed for use with VS Light Controllers, these MovementSensors have been optimised for unprotected installation (HB 65) and to deal with obstructions in the detection field.

VS BrightnessSensors detect light levels in difficult environments that require an IP65 degree of protection. The Brightness systems do not require an external power supply as the DALI lead can simply be connected through.

MovementSensor HB 65
For surface mounting
With cord grip
Degree of protection: IP65
Protection class II
DALI current consumption: 2 mA
Weight: 151 g
Ref. No.: 186311

The fact that the sensors are connected via the DALI bus now makes it possible - and for the very first time - to manage an entire warehouse with just one Light Controller and to define individually adjustable or uniform lighting levels.

Technical notes
Configuration interface: via the Light Controller
Ambient temperature \( t_a \): -5 to 50 °C
Dimensions (LxWxH): 98 x 73.2 x 34 mm
Push-in terminals with lever opener: 0.5-1.5 mm²

Functions
Reliable HF motion detection with indication LED (red) [MovementSensor]
Reliable monitoring of light levels with indication LED (red) [BrightnessSensor]

BrightnessSensor IP65
For surface mounting
With cord grip
Degree of protection: IP65
Protection class II
DALI current consumption: 4 mA
Weight: 140 g
Ref. No.: 186370
General safety information

- LiCS products may only be installed and commissioned by authorised and fully qualified staff.
- These instructions must be carefully read before installing and commissioning the system, as this is the only way to ensure safe and correct handling.
- Before any work is carried out on the equipment, it must be disconnected from the mains.
- All valid safety and accident-prevention regulations must be observed.
- The products should never be inexpertly opened as this poses lethal danger due to electrical shock. Repairs may only be undertaken by the manufacturer.
- On no account may the DALI control lead be used to carry mains voltage or any other external voltage as this can destroy individual system components.

Light Controller IP/DALI

Installation
- In a distribution board on a 35-mm mounting rail in acc. with DIN 43880.
  Required installation space: 10 hp (horizontal pitches) (180 mm)
- Hook the light controller over the upper edge of the rail using the two mounting notches. Then carefully press the controller onto the lower part of the rail until the mounting spring on the controller snaps into place over the rail. If required, use a screwdriver to help you with the spring.

Removal
To remove the controller from the mounting rail, use a screwdriver to loosen the spring and ease the controller over the rail flange from the bottom.

Installation instructions
- Conductor cross-section for all terminals: 0.5–2.5 mm² for rigid or flexible conductors
- Cable preparation (see right)
- To protect the equipment, a 10 A or 16 A, Type B automatic circuit breaker must be fitted.
- Push button inputs 1–8: cables must be rated for mains voltage; max. cable length = 100 m.
- As a standard DALI bus is not SELV-compliant, the DALI lead must be rated for mains voltage.
- A max. of 64 DALI operating devices in aggregate can be connected as well as up to 36 MultiSensors or DALI push-button interfaces, which in total must not exceed 200 mA. The exact number of components can be found in the manual.
- The power supply and the DALI lead can be laid in a single cable provided the cable does not exceed a maximum length of 100 m, e.g. using 5 x 1.5 mm².
- Please observe the maximum lengths of the DALI lead during installation:

<table>
<thead>
<tr>
<th>Cross-section</th>
<th>2.5 mm²</th>
<th>1.5 mm²</th>
<th>1 mm²</th>
<th>0.75 mm²</th>
<th>0.5 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>max. cable length</td>
<td>300 m</td>
<td>300 m</td>
<td>180 m</td>
<td>130 m</td>
<td>80 m</td>
</tr>
</tbody>
</table>
- The relay contact is a potential-free closing contact. The current load of the relay contact must not exceed an Ohmic load of $I_{\text{max}} = 3$ A. When using the standby contact, an additional external power relay should be used.
- Connection to the LightBox is effected via RJ45 (Ethernet TCP/IP) 10/100 Mbit/s.
- The two RJ45 ports can be used as a (daisy chain) switch.
- It is not recommended to connect atypical network components of a light management system (e.g. printers) directly to the Light Controller.
Additional information

- To ensure faultless wireless operation, an antenna must be connected that is set to the respective frequency. This antenna is not included in the scope of delivery.
- Please refer to the manual at www.vossloh-schwabe.com for exact instructions on how to configure the system using the controller.
- The outputs of different controllers must not be connected with each other.
- To ensure safe operation of the controller, the maximum ambient temperature must not be exceeded.
- Integration of VS Extenders limits the whole system to its basic functions for control. Please observe the notes in the appendix of the controller operation manuals.

Circuit diagram of Light Controller IP/DALI

Technical details Light Controller PI/DALI

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>IP/DALI</th>
<th>IP/DALI W</th>
<th>IP/DALI 2 CH</th>
<th>IP/DALI W 2 CH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref. No.</td>
<td>186339</td>
<td>186340</td>
<td>186484</td>
<td>186485</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>220–240 V AC, 50–60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>12 W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature $t_a$</td>
<td>5 to 50 °C</td>
<td>5 to 45 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DALI output $d_{a+}$</td>
<td>Max. 200 mA current drain</td>
<td>2 x max. 200 mA current drain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of operating devices</td>
<td>DALI-EBs, LiCS-Extender, HB sensors</td>
<td>Max. 64 pcs. per Controller (expandable with the Extender)</td>
<td>Max. 2 x 64 pcs. per Controller (expandable with the Extender)</td>
<td></td>
</tr>
<tr>
<td>No. of MultiSensors or DALI push-button interfaces</td>
<td>Max. 36 pcs.</td>
<td>Max. 2 x 36 pcs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF input</td>
<td>Antenna for a reception range of 868 MHz</td>
<td>Antenna for a reception range of 868 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless modules</td>
<td>All radio buttons with PT radio sensors by EnOcean with 868 MHz</td>
<td>All radio buttons with PT radio sensors by EnOcean with 868 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of wireless modules</td>
<td>Max. 16 pcs. with up to 4 buttons</td>
<td>Max. 16 pcs. with up to 4 buttons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relais (Output a1, a2)</td>
<td>250 V, max. 3 A ohmic load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push inputs 1–8</td>
<td>220–240 V AC, 50–60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>340 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE requirements</td>
<td>EMC in acc. with EN 61547, RF in acc. with EN 53015, Safety in acc. with EN 61347:2.11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Light Controller L/LS and LW/LSW

**Installation**
- In a distribution board on a 35-mm mounting rail in acc. with DIN 43880;
  required installation space: 7 hp (horizontal pitches) (126 mm)
- The controller must be installed so the display screen is in the upper left corner.
- Hook the light controller over the upper edge of the rail using the two mounting notches.
  Then carefully press the controller onto the lower part of the rail until the mounting spring
  on the controller snaps into place over the rail. If required, use a screwdriver to help you
  with the spring.

**Removal**
To remove the controller from the mounting rail, use a screwdriver to loosen the spring and
ease the controller over the rail flange from the bottom.

**Installation instructions**
- Conductor cross-section for all terminals: 0.5–1.5 mm² for rigid or flexible conductors
- Cable preparation (see right)
- To protect the equipment, a 10 A or 16 A Type B automatic circuit breaker must be fitted.
- Push button inputs 1–6: cables must be rated for mains voltage;
  max. cable length = 100 m.
- As a standard DALI bus is not SELV compliant, the DALI cable must be rated for mains
  voltage.
- A max. of 64 DALI operating devices in aggregate can be connected
  as well as up to 36 MultiSensors, which in total must not exceed 200 mA.
  The exact number of components can be found in the manual.
- The power supply and the DALI lead can be laid in a single cable provided the cable
  does not exceed a maximum length of 100 m, e.g. using 5 x 1.5 mm².
- Three electrically connected DALI outputs make it easier to connect DALI control gear.
  Please observe the maximum lengths of the DALI bus during installation:

<table>
<thead>
<tr>
<th>0.75 mm²</th>
<th>0.5 mm²</th>
<th>1 mm²</th>
<th>1.5 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 m</td>
<td>80 m</td>
<td>180 m</td>
<td>300 m</td>
</tr>
</tbody>
</table>

- The relay contact is a potential-free closing contact. The current load of the relay contact
  must not exceed an Ohmic load of \( I_{\text{max}} = 3 \, \text{A} \). When using the standby contact, an
  additional external power relay should be used.
- Although models of the Light Controller L/LS and LW/LSW feature an antenna-connection
  jack (located top right on the front), only the jack on the LW/LSW model is functional.
  This is where the antenna is connected to enable wireless operation (EnOcean) of the
  Light Controller LW/LSW.

**Additional information**
- To ensure faultless wireless operation, an antenna must be connected that is set to the
  respective frequency. This antenna is not included in the scope of delivery.
- Please refer to the manual at [www.vossloh-schwabe.com](http://www.vossloh-schwabe.com) for exact instructions
  on how to configure the system using the controller.
- The outputs of different controllers must not be connected with each other.
- To ensure safe operation of the controller, the maximum ambient temperature must not
  be exceeded.
Circuit diagram of Light Controller L/LS and LW/LSW

Technical details Light Controller L/LS and LW/LSW

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>L</th>
<th>LS</th>
<th>LW</th>
<th>LSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref. No.</td>
<td>186189</td>
<td>186276</td>
<td>186190</td>
<td>186323</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>220–240 V AC, 50–60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>9 W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature t&lt;sub&gt;a&lt;/sub&gt;</td>
<td>5 to 50 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DALI output [da+]</td>
<td>max. 200 mA current drain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of operating devices (DALI-EBs, LiCS-Extender, HB sensors)</td>
<td>max. 64 pcs. per Controller (expandable with the Extender)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of MultiSensors</td>
<td>max. 36 pcs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF input</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless modules</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of wireless modules</td>
<td>max. 16 pcs. with up to 4 buttons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relays (Output a1, a2)</td>
<td>250 V, max. 3 A ohmic load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push inputs 1–6</td>
<td>220–240 V AC, 50–60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>250 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE requirements</td>
<td>EMC in acc. with EN 61547, RFI in acc. with EN 55015, Safety in acc. with EN 61347-2-11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Light Controller S

**Installation**
- Independent installation, e.g. in false ceilings
- Easy and time-saving installation thanks to end caps that snap into place without needing tools
- Clearance: min. 0.1 m to walls, ceilings, insulation and other electronic devices; min. 0.25 m to sources of heat (e.g. lamps)
- Surface: solid, must not let the controller sink into insulation material
- Fastening: using 4-mm screws

**Installation instructions**
- Conductor cross-section for all terminals: 0.75–2.5 mm²
- Cable preparation (see right)
- Screw terminals: max. tightening torque = 0.4 Nm
- A standard DALI bus only features basic insulation. All DALI cables must be rated for mains voltage.
- A max. of 64 DALI operating devices in aggregate can be connected as well as up to 36 MultiSensors, which in total must not exceed 200 mA. The exact number of components can be found in the manual.
- The power supply and the DALI lead can be laid in a single cable provided the cable does not exceed a maximum length of 100 m, e.g. using NYM 5 x 1.5 mm². Please observe the maximum lengths of the DALI bus during installation:

<table>
<thead>
<tr>
<th>Conductor Size</th>
<th>1.5 mm²</th>
<th>1 mm²</th>
<th>0.75 mm²</th>
<th>0.5 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (m)</td>
<td>300</td>
<td>180</td>
<td>130</td>
<td>80</td>
</tr>
</tbody>
</table>

- Push button inputs: cables must be rated for mains power, maximum 100 m.

Light Controller XS

**Installation**
- Any installation location
- Suitable for installation only in dry rooms or in luminaires, cases, casings or similar. If destined for use in outdoor applications or spaces subject to higher degrees of moisture, the Light Controller XS must be installed in a casing with a suitable degree of protection.
- Fastening with 3 mm or 4 mm screw
- Take care to ensure a solid, flat surface.

**Application/Function**
- Suitable only for installation in a luminaire; unsuitable for independent operation.
- For constant light control or motion detection, or a combination of both.
- In addition, a target value for constant light control can be set via manual dimming.

**Installation instructions**
- Conductor cross-section for all terminals: 0.5–1.5 mm²
- Cable preparation (see right)
- A standard DALI bus only features basic insulation. All DALI cables must be rated for mains voltage.
- Operation without sensors:
  - A max. of 10 DALI operating devices can be connected; no MultiSensors are allowed.
- Operation with sensors:
  - If one VS MultiSensor is connected a max of 8 DALI ballasts can be connected in addition.
- Push button inputs: cables must be rated for mains power; maximum 15 m.
- Please observe the maximum lengths of the DALI bus during installation:
  - The DALI lead does not exceed a maximum length of 95 m, e.g. using NYM 5 x 1.5 mm².
- The power supply and the DALI lead can be laid in a single cable, e.g. using 5 x 1.5 mm².
Additional information

- The outputs of different Light Controllers S/XS must not be connected with each other.
- All control gear that is connected to the output of the DALI Extender is synchronously operated in “broadcast” mode, the output side is not addressed.
- To ensure safe operation of the Light Controller S/XS, the maximum casing temperature at the measuring point (tC) must not be exceeded.
- Please refer to the manual at www.vossloh-schwabe.com for exact instructions on how to configure the system using the controller.

Circuit diagram of Light Controller S

Circuit diagram of Light Controller XS
Technical Details – Lighting Control System for Indoor Applications

Technical details Light Controller S and XS

<table>
<thead>
<tr>
<th>Light Controller</th>
<th>S</th>
<th>XS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref. No.</td>
<td>186210</td>
<td>186220</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>220-240V AC/DC, 0/50-60 Hz</td>
<td>220-240V AC/DC, 0/50-60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>6.5 W</td>
<td>0.8 W</td>
</tr>
<tr>
<td>Ambient temperature $t_a$</td>
<td>0 to 50 °C</td>
<td></td>
</tr>
<tr>
<td>DALI output (da+–)</td>
<td>Max. 200 mA current drain</td>
<td>Max. 20 mA current drain</td>
</tr>
<tr>
<td>No. of operating devices</td>
<td>Max. 64 pcs. per Controller (expandable with the Extender)</td>
<td>Max. 10 pcs. per Controller (without sensors)</td>
</tr>
<tr>
<td>No. of MultiSensors</td>
<td>Max. 36 pcs.</td>
<td>Max. 4 pcs.</td>
</tr>
<tr>
<td>RF input</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Wireless modules</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>No. of wireless modules</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Relais (Output a1, a2)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Push input</td>
<td>220-240V AC/DC, 0/50-60 Hz</td>
<td>–</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP20</td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>II and I</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>150 g</td>
<td>30 g</td>
</tr>
<tr>
<td>CE requirements</td>
<td>EMC in acc. with EN 61547, RFI in acc. with EN 55015, Safety in acc. with EN 61347-2-11</td>
<td></td>
</tr>
</tbody>
</table>

Extender

Installation
- Independent installation, e.g. in false ceilings
- Easy and time-saving installation due to end caps that snap into place without needing tools
- Clearance: min. 0.1 m to walls, ceilings, insulation and to other electronic devices; min. 0.25 m to sources of heat (e.g. lamps)
- Surface: solid, must not permit the extender to sink into insulation material
- Fastening: using 4-mm screws

Installation instructions
- Cross-section of primary/secondary conductor: 0.75-2.5 mm²
- Cable preparation (see right)
- Screw terminals: max. tightening torque = 0.4 Nm
- Length of the secondary bus cable: max. 300 m
- A standard DALI bus only features basic insulation. All DALI cables must be rated for mains voltage. The power supply and the DALI lead can be laid in a single cable (max. 100 m).
- Mains power cables and DALI cables should not be laid directly parallel to lamp cables (min. clearance = 0.25 m).
- A maximum of 64 DALI operating devices in total can be connected.

Additional information
- The extender can only be operated if connected to a DALI control unit. Please refer to the respective operating instructions for information on the control unit.
- The DALI extender is integrated into the DALI system using the “random address” assignment method.
- Three electrically connected DALI outputs make it easier to connect DALI ballasts.
- A maximum of 64 DALI operating devices in total can be connected.
- The outputs of several extenders must not be connected with each other.
- All control gear that is connected to the output of the DALI Extender is synchronously operated in “broadcast” mode; the output side is not addressed.
- To ensure safe operation of the Extender, the maximum casing temperature at the measuring point $t_C$ must not be exceeded.
Circuit diagram of the Extender

<table>
<thead>
<tr>
<th>Technical details Extender</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extender</strong></td>
</tr>
<tr>
<td>Ref. No.</td>
</tr>
<tr>
<td>Supply voltage</td>
</tr>
<tr>
<td>Power consumption</td>
</tr>
<tr>
<td>Control input</td>
</tr>
<tr>
<td>DALI output</td>
</tr>
<tr>
<td>Ambient temperature $t_a$</td>
</tr>
<tr>
<td>Casing temperature $t_c$</td>
</tr>
<tr>
<td>Degree of protection</td>
</tr>
<tr>
<td>Protection class</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>CE requirements</td>
</tr>
</tbody>
</table>

**MultiSensors**

**Installation**  
**SM-E (Surface Mounted)**  
Prepare the cable accordingly and thread it through the back plate of the sensor at the side or from behind. Attach the back plate in the selected position using the two screws provided, then connect the cable to the sensor. Use two fingers to lightly press the springs of the sensor cover together and allow to lock into place along the guide rails inside the sensor’s bottom face [see Fig. 1].

**FM-E (Flush Mounted), with or without cord grip**  
Prepare the cable, connect to the sensor and attach cord grip if appropriate. Use two fingers to lightly press the sensor together and allow to lock into place in the pre-drilled hole [35 mm] in the selected position [see Fig. 2].

**IL-E (In Luminaire)**  
Heed the dimension of the drilling template when inserting the sensor in the metal plate, which is 0.5-1 mm thick. Allow the sensor to lock into place in the precisely pre-drilled hole in the metal plate. Allow the sensor cover ring to lock into place from the other side in the recesses provided [see Fig. 3].
**Installation instructions**

- Conductor cross-section of all terminals: 0.5–1.5 mm² for both rigid and flexible conductors
- Preparation of the sensor cables (see right)
- As a standard DALI bus is not SELV-compliant, cables must be rated for mains voltage.
- The power supply and the DALI lead can be laid in a single cable provided the cable does not exceed a maximum length of 100 m, e.g. using NYM 5 x 1.5 mm².

Please observe the maximum lengths of the DALI bus during installation:

<table>
<thead>
<tr>
<th>Conductor Size</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 mm²</td>
<td>300</td>
</tr>
<tr>
<td>1.0 mm²</td>
<td>180</td>
</tr>
<tr>
<td>0.75 mm²</td>
<td>130</td>
</tr>
<tr>
<td>0.5 mm²</td>
<td>80</td>
</tr>
</tbody>
</table>

**Additional information**

- VS MultiSensors can only be operated in combination with a VS Light Controller from the LiCS indoor range.
- Please refer to the manual at www.vossloh-schwabe.com for exact instructions on how to configure the sensors.
- To ensure safe operation of the sensors, the maximum permitted ambient temperature must not be exceeded.
- The sensor must be positioned to ensure its reception range is not obstructed by objects, furniture, etc.
- See Fig. 4 for the sensor range.

The height specified in Fig. 4 is a reference value. For other and specifically greater heights, it may be necessary to test the sensitivity of the sensors on site as the sensitivity of the motion sensor decreases the higher up it is mounted.

**Technical Details MultiSensors**

<table>
<thead>
<tr>
<th>MultiSensor</th>
<th>SM-E</th>
<th>FM-E</th>
<th>ILE</th>
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<tbody>
<tr>
<td>Ref. No.</td>
<td>186320</td>
<td>186321</td>
<td>186322</td>
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<tr>
<td>Control input</td>
<td>DALI in acc. with IEC 62386</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DALI current consumption</td>
<td>4 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature $t_a$</td>
<td>0 to 50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casing temperature $t_c$</td>
<td>max. 50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>30 g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE requirements</td>
<td>Safety in acc. with EN 61347-2-11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Fig. 4: Diagram showing the sensor range with a maximum height of 3.5 m and a minimum distance of 6 m.

---

**Technical Details – Lighting Control System for Indoor Applications**

---

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>186320</th>
<th>186321</th>
<th>186322</th>
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</thead>
<tbody>
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<td>Control input</td>
<td>DALI in acc. with IEC 62386</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DALI current consumption</td>
<td>4 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature $t_a$</td>
<td>0 to 50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casing temperature $t_c$</td>
<td>max. 50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>II</td>
<td></td>
<td></td>
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<tr>
<td>Weight</td>
<td>30 g</td>
<td></td>
<td></td>
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<tr>
<td>CE requirements</td>
<td>Safety in acc. with EN 61347-2-11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**MovementSensors HB**

**Installation MovementSensor HB 65**

Prepare the cable accordingly. Open the housing cover and the protective caps for the connections. Thread the connection cables (230 V L, N + DALI control cable) through the protective cap closure and connect with push terminals. Close the protective caps. Before the housing cover is closed, attach the housing with the aid of 4 mm screws in the holes provided. During installation make sure that the sensor component is not touched.

**Installation position:** any

**Installation instructions**

- To protect the device, please use a Type B circuit breaker (10 A or 16 A).
- Conductor cross-section of all terminals: 0.5–1.5 mm² for both rigid and flexible conductors.
- Preparation of the sensor cables (see on the right).
- As a standard DALI bus is not SELV-compliant, cables must be rated for mains voltage.
- The power supply and the DALI lead can be laid in a single cable provided the cable does not exceed a maximum length of 100 m, e.g. using NYM 5 x 1.5 mm².

Please observe the maximum lengths of the DALI bus during installation:

<table>
<thead>
<tr>
<th>Conductor Cross-Section</th>
<th>max.</th>
<th>1.5 mm²</th>
<th>1 mm²</th>
<th>0.75 mm²</th>
<th>0.5 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2 Ω max.</td>
<td>300 m</td>
<td>180 m</td>
<td>130 m</td>
<td>80 m</td>
<td></td>
</tr>
</tbody>
</table>

- The sensor must never be placed inside a luminaire.
- The sensor must be installed with a clearance of 1 m to the respective luminaire.

**Additional information**

- VS HB sensors can only be operated in combination with a VS Light Controller from the LiCS indoor range.
- Please refer to the controller manual for exact instructions on how to configure the sensor.
- To ensure safe operation of the sensors, the maximum permitted ambient temperature must not be exceeded.
- The sensor must be positioned to ensure its reception range is not obstructed by objects, furniture, etc.
- Moving objects e.g. fans may be enough to lead to movement detection.
- See Fig. 1 to 3 for detection range.
Circuit diagram of MovementSensors HB

Technical details MovementSensors HB

<table>
<thead>
<tr>
<th>MovementSensor HB 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref. No.</td>
</tr>
<tr>
<td>Control input</td>
</tr>
<tr>
<td>DALI current consumption</td>
</tr>
<tr>
<td>Ambient temperature $t_a$</td>
</tr>
<tr>
<td>Degree of protection</td>
</tr>
<tr>
<td>Protection class</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>CE requirements</td>
</tr>
</tbody>
</table>
**BrightnessSensors IP65**

**Installation BrightnessSensors IP65**

Prepare the cable accordingly. Open the housing cover and the protective caps for the connections. Thread the connection cables (DALI control cable) through the protective cap closure and connect with push terminals. Close the protective caps. Before the housing cover is closed, attach the housing with the aid of 4 mm screws in the holes provided. During installation make sure that the sensor component is not touched. Installation position: any

**Installation instructions**

- Conductor cross-section of all terminals: 0.5–1.5 mm² for both rigid and flexible conductors
- Preparation of the sensor cables (see Fig. 1)
- As a standard DALI bus is not SELV-compliant, cables must be rated for mains voltage.
- The power supply and the DALI lead can be laid in a single cable provided the cable does not exceed a maximum length of 100 m, e.g. using NYM 5 x 1.5 mm².

Please observe the maximum lengths of the DALI bus during installation:

<table>
<thead>
<tr>
<th>Cross-section</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 mm²</td>
<td>300 m</td>
</tr>
<tr>
<td>1 mm²</td>
<td>180 m</td>
</tr>
<tr>
<td>0.75 mm²</td>
<td>130 m</td>
</tr>
<tr>
<td>0.5 mm²</td>
<td>80 m</td>
</tr>
</tbody>
</table>

6.2 Ω max.

**Additional information**

- VS sensors can only be operated in combination with a VS Light Controller from the LiCS indoor range.
- Please refer to the controller manual for exact instructions on how to configure the sensor: [www.vossloh-schwabe.com](http://www.vossloh-schwabe.com)
- To ensure safe operation of the sensors, the maximum permitted ambient temperature must not be exceeded.
- Installation location: the sensor must detect the differences in the artificial light.
Technical Details – Lighting Control System for Indoor Applications

Circuit diagram of BrightnessSensors IP65

Technical details BrightnessSensors IP65

<table>
<thead>
<tr>
<th>BrightnessSensor</th>
<th>IP65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref. No.</td>
<td>186370</td>
</tr>
<tr>
<td>Control input</td>
<td>DALI in acc. with IEC 62386</td>
</tr>
<tr>
<td>DALI current consumption</td>
<td>4 mA</td>
</tr>
<tr>
<td>Ambient temperature $t_{a}$</td>
<td>-5 to 50 °C</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP65</td>
</tr>
<tr>
<td>Protection class</td>
<td>II</td>
</tr>
<tr>
<td>Weight</td>
<td>140 g</td>
</tr>
<tr>
<td>CE requirements</td>
<td>Safety in acc. with EN 61347-1 and EN 61347-2-11</td>
</tr>
</tbody>
</table>
ECO-FRIENDLY AND ECONOMICAL LIGHTING

Many street lighting facilities are outdated and are therefore highly inefficient. This not only results in higher energy requirements, but also more maintenance work and higher investment costs. All this adds up to street lighting accounting for approx. 30–50% of the entire power consumption recorded by municipal and other types of local authority – which amounts to a huge cost factor for public budgets to cover.

The lighting solutions provided by Vossloh-Schwabe ensure that local authorities can save energy, achieve sustainable cost reductions and at the same time make a valuable contribution to reducing CO₂ output. Using various lighting situations as examples, energy savings of up to 80% can be achieved.

Vossloh-Schwabe’s light management systems enable centralised control of individual luminaires with the advantage of a constant online link and the ability to monitor the lighting system. But these intelligent, multifunctional VS controllers provide the same savings potential and high flexibility even without online connectivity.

Typical applications
- General lighting in public spaces
- Lighting in the vicinity of buildings
- Lighting in tunnels
- Lighting for sports’ venues
- Industrial lighting
Targeted use of light and optimisation of maintenance processes

Vossloh-Schwabe’s LiCS Outdoor system makes it possible to dim individual luminaires or entire luminaire groups. Depending on the requirements, the degree to which the lighting level is dimmed can be sensor-controlled or can comply with a preset level; the burn-in periods of discharge lamps can also be taken into consideration.

Considerable savings potential can be harnessed by need-driven programming and/or lighting control. Thanks to the system’s convenient remote monitoring functions, it is possible to optimise maintenance processes as well as better plan maintenance work and budget for it in more detail.

Flexible structure

The complete LiCS Outdoor system is suitable both for new installations as well as for classic retrofits. The particularly flat designs of the controllers enable installation in almost all luminaires, especially luminaires featuring LED technology.

The system enables control of luminaires operated with magnetic ballasts as well as luminaires with up to four dimmable electronic ballasts with a 1–10 V or DALI interface.
Vossloh-Schwabe’s LiCS Outdoor System is based on mature system technology that has already proved itself in millions of applications around the world in the most diverse of areas.

**Overview of functions**

Independent functions form an integral part of the LiCS Outdoor controller and are common to almost all products. The parameters of these functions can be (re)set at any time by the customer using various tools or via the power-line carrier network.

**DOO (Dimmed ON/OFF)**

Lighting can be faded up to the desired brightness level after being switched on and can also be faded down before being switched off; the duration of the fade-in/-out can be set to suit.

**DPC (Delayed Switching for Pedestrian Crossing)**

Delayed switching on and/or earlier switching off of lighting in the vicinity of pedestrian crossings.

**BBT (Burn-in Block Time)**

Adjustable dimming block for conventional light sources (discharge lamps) to prevent the lamp from being dimmed during its burn-in period (function can later be deactivated again).

**MFF (Maintenance Factor Function)**

With prolonged service life, light sources suffer a decrease in luminous flux and, as a result, in brightness. But thanks to the maintenance factor function, this can be compensated by the light management system so as to ensure luminous flux remains stable over the lamp’s service life and, additionally, save energy. The flux reduction curve can be adjusted to the real luminous flux reduction by 3 support points.

**ISD (Intelligent Switching Time Dimming)**

During any one night phase, brightness and with that the output of the lighting system can be altered or the luminaire can be switched on/off up to a maximum of 10 times.

**LST (Control input)**

In addition, using a control input (e.g. with a push button or motions sensor) the system can be switched to a certain lighting level for a freely configurable period of time.

**RCR (Ripple Control Receiver)**

Sound frequency reception module for typical sound frequencies of 100 Hz to 1.7 kHz; TFR protocols on request.
**Smart Night**

Independent, pre-programmed controllers are used for lighting control purposes. These controllers can also be individually reconfigured at a later point in time. In this regard, up to 4 lighting profiles can be transferred to the handheld control unit and then transferred to each individual controller on site. In this case, data transfer is purely unidirectional.

iMCU – intelligent Multifunctional Controller Unit 264
iCTI – intelligent Configuration Tool 265
iCTI-USB – intelligent Configuration Tool with USB interface 265

**Flex Night**

New lighting profiles can be transferred to several iMCU-series controllers at the same time. All iMCUs that are installed on the same supply line are then programmed with a new profile, while still allowing individual iMCUs to be excluded from receiving the new profile.

This can be achieved on site using a laptop and the iCTT, or using the iCTT connection at the control point of the street lighting or, remotely, using the iMICO, in which case the iMICO controller would be firmly installed at the control point.

iCTT – intelligent configuration technician tool 266
iMICO – intelligent MidNight controller 267
iSITE MidNight – system software 268
iMCU – intelligent Multifunctional Controller Unit 264
iCTI – intelligent Configuration Tool 265
iCTI-USB – intelligent Configuration Tool with USB interface 265

**Managed Night**

Power-line technology enables bidirectional data transfer using the 230 V supply line. As a result, controllers can be grouped together to form a high-performance network using just the cables provided *(without needing any additional control lines)* in almost any environment.

Data can thus be transferred to each controller connected to the network with a very high degree of reliability; if necessary, signal strength is automatically boosted, thus removing any restrictions in terms of distance.

iLC – intelligent luminaire controller *(built-in)* 269
iPC – intelligent pole controller 270
iDC – intelligent data concentrator 271
iCT – intelligent configuration software for iDC 271
iLUX – intelligent lux meter with a power-line carrier interface 272
iPL-NI – power-line network interface 272
iCCU – intelligent, capacitive coupling unit 273
iBRIDGE – wireless bridge 273
iLIC – intelligent luminaire information centre 274
iOPC – intelligent OPC DA Server 274

**Accessories**

iHFS – intelligent high-frequency sensor 275
iSCT – intelligent tablet PC 276
iMCU – intelligent Multifunctional Controller Units

For outdoor luminaire control

These light controllers were specifically designed for independent operation to enable control of street lighting or lighting close to buildings.

Depending on the given task, the product can replace one or more individual products. The controllers are suitable for use with almost all electronic ballasts and LED drivers with a DALI or a 1–10 Volt interface. They also enable control of conventional magnetic ballasts that are with coil tapping points without needing any other components.

The control input LST can be used to connect a control phase, a motion detector, a key switch or a light sensor, but can also be used to receive simple data protocols.

Technical notes
Control output: DALI, 1–10 V or PWM for max. 1 EB, short-circuit-proof
Relay contacts: potential-free (input, opener, closing contact)
Storage temperature: -25 to 85 °C
Operating temperature: -25 to 80 °C
Humidity: non-condensing
Degree of protection: IP20 or IP67
Upgradeable firmware

Galvanic isolation
The electronic ballast does not feature potential isolation between input and output: as soon as the electronic ballast is connected to the controller, the control input of the electronic ballast is not potential-free.

Typical applications
Street lighting or lighting in the vicinity of buildings

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage AC V, Hz</th>
<th>Power consumption mW</th>
<th>Control input LST V</th>
<th>Switching current A (I = 0.8)</th>
<th>Connection</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP20 – Dimensions (LxWxH): 83x30x19 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iMCU IP20</td>
<td>186232</td>
<td>220–230, 50</td>
<td>&lt; 500</td>
<td>230</td>
<td>4</td>
<td>Pushin terminals: 0.5–1.5 mm²</td>
<td>30</td>
</tr>
<tr>
<td>iMCU IP20</td>
<td>186558</td>
<td>220–230, 60</td>
<td>&lt; 500</td>
<td>230</td>
<td>4</td>
<td>Pushin terminals: 0.5–1.5 mm²</td>
<td>30</td>
</tr>
<tr>
<td>IP67 – Dimensions (LxØ): 85x45 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>iMCU IP67</td>
<td>186338</td>
<td>220–230, 50</td>
<td>&lt; 500</td>
<td>230</td>
<td>4</td>
<td>9-core lead, 600 mm</td>
<td>250</td>
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<tr>
<td>iMCU IP67</td>
<td>186559</td>
<td>220–230, 60</td>
<td>&lt; 500</td>
<td>230</td>
<td>4</td>
<td>9-core lead, 600 mm</td>
<td>250</td>
</tr>
</tbody>
</table>
**iCTI – intelligent**

**Hand-held Operating Device**

For subsequent controller configuration

The iCTI features 4 memory cells for different lighting situations.

Standard connection: USB 2
OS: upgradeable firmware
The continually updated programming software can be downloaded at www.vossloh-schwabe.com
Dimensions (LxWxH): 180x65x40 mm
Weight: 0.2 kg
Ref. No.: 186246

For subsequent controller configuration especially for luminaire manufacturing and maintenance
Standard connection: USB 2
OS: upgradeable firmware
The continually updated programming software can be downloaded at www.vossloh-schwabe.com
Ref. No.: 186392  iCTI-USB
iCTT – intelligent Configuration Technician Tool

For subsequent configuration of lighting scenes

The push-in terminal delivered along with this portable configuration tool is located on a DIN rail (top-hat section) in the distribution board and is connected to the lighting circuit.

Reconfiguring lighting scenes at a later point in time involves using the push-in terminal and the iCTT’s connector to make a connection to a laptop or PC. The MidNight Configurator software is then used to adjust the relevant settings and transfer these new values to the lighting system.

Once the configuration process has been completed, the iCTT is disconnected again and the protective cover of the push-in terminal is replaced.

Technical notes

Portable use

Dimensions (LxWxH): 114 x 36.5 x 25.5 mm

Connection to the lighting system:
- Push-in terminal with protection cover: MSTB 2.5/4-ST-5.08
- Plug: MSTBVK 2.5/4-G-5.08

Connection to a laptop/PC:
- RS-232 One DB9 male (Standard EIA),
- Operating temperature: -20 to 70 °C
- Humidity: 5–90% RH at max. 50 °C
- Degree of protection: IP20

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage AC V, Hz</th>
<th>Power consumption kW</th>
<th>Control input V</th>
<th>Switching current A (λ = 0.8)</th>
<th>Weight g</th>
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</thead>
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<tr>
<td>iCTT</td>
<td>186241</td>
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<td>&lt; 500</td>
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<td>250</td>
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<tr>
<td>iCTT Terminal Block</td>
<td>186391</td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
iMICO – intelligent Multifunctional Controller Units

For outdoor luminaire control

By installing the iMICO in a street-side distribution board and using the MidNight function, it is possible to update the lighting profiles of an iMCU controller or of a dimmable electronic ballast from a central location without needing to install any additional wiring in the street.

This function is typically used in cases that require the lighting profile to be changed several times per year or if it needs to remain possible to deactivate dimmed output periods of a city’s lighting system in a targeted manner, e.g. during city festivals or other events.

The web-based iMICO works on the iSITE web platform. To reconfigure a lighting profile, the server sends a text message to the iMICO via the mobile phone network. The iMICO then transfers the new configuration to the connected controllers or MidNight electronic ballasts by switching the mains phase or another free phase on and off. These controllers will even prevent any flickering in luminaires during signal transfer.

Technical notes

- Operating temperature: -20 to 50 °C
- Storage temperature: -25 to 75 °C
- Humidity during operation: 5–75%
- Protection class I
- 1 relay contact: potential-free [input, opener, closing contact]
- Material: aluminium AlSi12 (Fe)
- Drill holes for cables for iMICO-BI:
  - 2 PG metric fittings (25x1.5 mm)
  - 2 PG metric fittings (32x1.5 mm)
  - 1 PG metric fittings (20x1.5 mm)
  - 1 fixing hole for antenna connection

Interfaces

- Transmission: mobile phone network, requires Quad band SIM card
- Protocols: SMS, GPRS
- Internal modem: Telit 862
- Internal and external antenna: MMCX

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage AC V, Hz</th>
<th>Max. switching output A/V</th>
<th>Overvoltage protection kV</th>
<th>Degree of protection</th>
<th>Dimensions [LxWxH] mm</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>iMICO-BI</td>
<td>186250</td>
<td>220–230, 50</td>
<td>16/230</td>
<td>4</td>
<td>IP65</td>
<td>280x230x111</td>
<td>4400</td>
</tr>
<tr>
<td>iMICO</td>
<td>186240</td>
<td>220–230, 50</td>
<td>-</td>
<td>2</td>
<td>IP20</td>
<td>83x64x32</td>
<td>430</td>
</tr>
</tbody>
</table>
iSITE MidNight – intelligent Configuration Software

For programming lighting situations using iMICO

iSITE can be accessed using any PC with an internet browser (preferably Google Chrome) and was developed to configure the iMICO controller. This convenient and quick method enables all luminaires to be reprogrammed with new lighting profiles. The server-based supports Windows Server operating systems. The following actions can be controlled using the software:

- Creating various timer programs
- Group allocation of various iMICOs
- Assignment of groups and timer programs
- Graphic representation (maps) showing the positions of luminaires and iMICOs
- Sending text messages to groups or to individual iMICOs to transfer settings
- Generating notifications (text messages) to confirm that settings were successfully transmitted

Ref. No.: 186244

System requirements

- Memory RAM: 4GB
- Memory HD: 2TB
- CPU: min. Dual Core depending on the scope of the project
- Operating system: Windows server
- Data security: min. RAID 1 recommended RAID 5
iLC – intelligent Luminaire Controller (built-in)

Vossloh-Schwabe’s light control units of the “Managed Night” series work with power-line communication using the C/B CENELEC band. Communication occurs in accordance with standardised directives EN 14908-1, EN 14908-3 and the Lonmark® OLC profile (outdoor luminaire controller profile).

iLC can be used as independent control unit in a light management system. The controller is integrated into a LON power-line light management system that requires a network connection to a central module (iDC).

Once installed in a light management system, the controller delivers various performance data and status reports, for example voltage, current, power factor, energy consumption, lighting hours and temperature. Limits must be defined for each measured value, which are then monitored in the controller with a report being transmitted to the master system if limits are exceeded. As a result, the controller itself already intelligently monitors the luminaire. The calibrated performance data are available within a tolerance of 1%.

Technical notes

Dimensions (LxWxH): 93 x 58 x 29 mm
Control output: DALI or 1 – 10 V for max. 4 EBs, short-circuit-proof
Bistable relay output: closing contact
Low-voltage control input: 1 x 5 V DC for sensors with “open collector” output or potential-free relay
Connection terminals: 0.5 – 1.5 mm²
Storage temperature: –25 to 85 °C
Operating temperature: –25 to 80 °C
Humidity: non-condensing
Degree of protection: IP20

Control input LST can be used for a control phase, a motion detector, a key switch, a light sensor or, if operated independently, to receive simple protocols.

Galvanic isolation

The electronic ballast does not feature potential isolation between input and output: as soon as the electronic ballast is connected to the controller, the control input of the electronic ballast is not potential-free.

Typical applications

Lighting for public spaces
Lighting in the vicinity of buildings
Lighting for tunnels

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage AC V, 50 Hz</th>
<th>Power consumption W</th>
<th>Control input LST V</th>
<th>Switching output V</th>
<th>Switching current A (λ = 0.8)</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>iLC</td>
<td>186233</td>
<td>110 – 250</td>
<td>&lt; 1</td>
<td>230</td>
<td>230</td>
<td>4</td>
<td>100</td>
</tr>
</tbody>
</table>
iPC – intelligent Pole Controller

This light controller was developed for installation in a luminaire pole and features the same functions (and in full scope) as the iLC Controller on page 269.

Technical notes
Dimensions (LxWxH): 227.2x59x37.6 mm
Control output: DALI or 1–10 V for max. 4 EBs, short-circuit-proof
Bistable relay output: closing contact
Control output ECO ballast: 10 mA for power reduction relays
Connection cable: 1 m (special configurations are available on request)
Storage temperature: -25 to 85 °C
Operating temperature: -25 to 80 °C
Humidity: non-condensing
Degree of protection: IP65

Galvanic isolation
The electronic ballast does not feature potential isolation between input and output: as soon as the electronic ballast is connected to the controller, the control input of the electronic ballast is not potential-free.

Typical applications
Lighting for public spaces
Lighting in the vicinity of buildings

<table>
<thead>
<tr>
<th>Type</th>
<th>Suitable for</th>
<th>Ref. No.</th>
<th>Voltage AC V, 50 Hz</th>
<th>Power consumption W</th>
<th>Control input LiSt V</th>
<th>Switching output* V</th>
<th>Switching current A</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPC Controller</td>
<td>Controller</td>
<td>186234</td>
<td>110-230</td>
<td>&lt; 1</td>
<td>230</td>
<td>230</td>
<td>4</td>
<td>360</td>
</tr>
<tr>
<td>iPC-Lux</td>
<td>iLUX light sensors</td>
<td>186235</td>
<td>110-230</td>
<td>&lt; 1</td>
<td>230</td>
<td>230</td>
<td>4</td>
<td>360</td>
</tr>
<tr>
<td>iPC-RC</td>
<td>Ripple-control sound frequency**</td>
<td>186236</td>
<td>110-230</td>
<td>&lt; 1</td>
<td>230</td>
<td>230</td>
<td>4</td>
<td>360</td>
</tr>
<tr>
<td>iPC-HFS</td>
<td>iHFS high frequency sensor</td>
<td>186357</td>
<td>110-230</td>
<td>&lt; 1</td>
<td>230</td>
<td>230</td>
<td>4</td>
<td>360</td>
</tr>
</tbody>
</table>

** Protocols on request
* Optionally available with a second switching output on request
The iDC forms the master of the "Managed Night" light management system and functions as the central connection interface to the software of the master system. The iDC can be programmed and also features application programs that are perfect for controlling lighting systems.

The following functions are an integral part of the product: timer programs, monitoring of limit values plus alarm function and alarm transmission, data conversion, data logging and email client.

Fitted with various interfaces such as SO for counter registration, the M-bus for remote counter reading or the MOD bus for extended sensor and actuating functions, the iDC can adapt to suit almost any control task.

**Technical notes**

Dimensions (BxHxT): 280x230x111 mm  
Material: aluminium AlSi12 (Fe)  
Drill holes for cables:  
2 PG metric fittings (25x1.5 mm)  
2 PG metric fittings (32x1.5 mm)  
1 PG metric fittings (20x1.5 mm)  
1 fixing hole for antenna connection  
Interfaces for power-line carriers  
Inputs: 2 digital inputs 30 V DC  
Optionally extendable using a cutoff relay for  
230 V AC 2 impulse-counter inputs typ. of SO  
Outputs: 2 relay outputs 230 V AC; 10 A  
Ethernet Port 10/100BaseT, auto-selecting,  
RS232 Interface for GSM/GPRS modem,  
for up to 200 controllers  
LON power-line carrier communication:  
Protocols: in acc. with ANSI CEA 709.1 / EN 14908-1  
on the supply voltage [tri/single phase]  
Transmission: in acc. with ANSI CEA 709.3 / EN 14908-3  
IP communication: XML / SOAP, http, FTP, UDP  
FME antenna connection: Male  
Storage temperature: -25 to 85 °C  
Operating temperature: -25 to 60 °C  
Humidity: non-condensing  
Degree of protection: IP65, Protection class I

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Voltage AC V, Hz</th>
<th>Average power consumption W</th>
<th>Transmission mode VA</th>
<th>Weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>iDC-GPRS.3G</td>
<td>186230</td>
<td>230±10%, 50±1%</td>
<td>7</td>
<td>12</td>
<td>4400</td>
</tr>
<tr>
<td>iDC-IP</td>
<td>186237</td>
<td>230±10%, 50±1%</td>
<td>6.5</td>
<td>12</td>
<td>4400</td>
</tr>
<tr>
<td>iDC-5G</td>
<td>186546</td>
<td>230±10%, 50±1%</td>
<td>7</td>
<td>12</td>
<td>4400</td>
</tr>
<tr>
<td>iDCFOM-M</td>
<td>186238</td>
<td>230±10%, 50±1%</td>
<td>7</td>
<td>12</td>
<td>4400</td>
</tr>
<tr>
<td>iDCFOM-SM</td>
<td>186239</td>
<td>230±10%, 50±1%</td>
<td>7</td>
<td>12</td>
<td>4400</td>
</tr>
<tr>
<td>ICT</td>
<td>186242</td>
<td></td>
<td>12000</td>
<td></td>
<td>4400</td>
</tr>
<tr>
<td>iLC</td>
<td>186243</td>
<td></td>
<td>20000</td>
<td></td>
<td>4400</td>
</tr>
<tr>
<td>iOPC</td>
<td>186...</td>
<td></td>
<td>30000</td>
<td></td>
<td>4400</td>
</tr>
</tbody>
</table>

The iDC also provides a very well documented, web-based XML/SOAP interface or an optionally available OPC driver (open process control) to the SCADA (Supervisory Control and Data Acquisition) system. This makes it possible to integrate the iDC also into any BA [Building Automation] or control system.

The iLIC software was specifically developed to enable control of the iDC. Various extension options are available to suit common communication requirements: GPRS, G3, IP [CAT5], Fibre optic (FO) Single Mode, Fibre optic [FO] Multi Mode, and optionally also WIAN on request.

The iCT – intelligent Configuration Software

- Specifically developed for commissioning an iDC
- Convenient and quick installation of all controllers in a network segment
- Quick commissioning thanks to clear identification of every controller with a barcode (scanner optional)
- The controller is configured in accordance with OLC Lonmark® conventions

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- Convenient and quick installation of all controllers in a network segment
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- The controller is configured in accordance with OLC Lonmark® conventions
iLUX – intelligent Lux Meter with Power-line Interface

The high-quality light sensor directly measures and delivers digital light metrics in lux to a light management system for the purpose of lighting control.

Lighting systems operated with or without a light management system can be switched on or off at a specific lux value via internal relays. The measured lux values can then be transmitted to the lighting system via the power-line. Depending on the respective lighting level required in each case, it is therefore possible to independently control luminaires in different areas, e.g. at major and minor roads, pedestrian crossings and in parks.

The compact sensor can be fixed to the luminaire pole or a wall using the enclosed mounting bracket.

Technical notes
Sensor casing: aluminium with a PC cover, sensor unit protected by opal glass
Connection cable to the controller: 10 m (special configurations available on request)
Storage temperature: –25 to 85 °C
Operating temperature: –25 to 80 °C
Humidity: non-condensing
Degree of protection: IP65
Weight of mounting bracket: 300 g
Casing and connection details of the iPC controller (intended for installation in luminaire poles), see page 270

Typical applications
Lighting for public spaces
Lighting in the vicinity of buildings

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Note</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>iLUX</td>
<td>186231</td>
<td>Use only in combination with iPC-LUX (Ref. No.: 186235)</td>
<td>1000</td>
</tr>
</tbody>
</table>

iPL-NI Power-line Network Interface
For subsequent iLUX configuration without network operation
Data communication: notebook / PC and iLUX using a 230 V AC power supply cable
Operating system: XP and higher
For parameter configuration and firmware updates
Ref. No.: 186265
iCCU – intelligent, Capacitive Coupling Unit

Intelligent, capacitive coupling unit for power-line communication. Power-line signals are transferred using the B/C frequency range in acc. with Cenelec specifications. The unit is suitable for direct installation without requiring configuration and is transparent for data transfer purposes. The unit draws no power when operated in standby mode. No software-based configuration required. Connection with an NH fuse possible on request.

Technical notes
Casing: PC
Dimensions (LxWxH): 180x94x60 mm
Mains voltage: 230 V AC ±10%, 50 Hz
Power consumption: 0.0 W
Leads: High-voltage silicone cable, stranded conductors 1 mm², length: 80 mm
Storage temperature: -25 to 85 °C
Operating temperature: -25 to 65 °C
Degree of protection: IP65, Protection class I
Weight: 770 g
Resistance against surge voltage: 3 kV
Ref. No.: 186345

iBRIDGE – intelligent Wireless Bridge

For wireless signal transfer

iBRIDGE enables wireless transfer of control signals of the power-line network to adjacent lighting circuits without requiring a cable connection. This makes it possible to jointly control several smaller, independent circuits within a larger lighting network and serves to reduce the number of required iDCs (data concentrators) since a larger number of controllers can be configured using a single iDC.

Sections of the lighting cable that are not suitable for power-line communication due to severe local interference can also be bridged using iBRIDGE.

Just like a controller, iBRIDGE is commissioned using the light management system and does not require any special software installation.

Technical notes
Dimensions (ØxH): 105x120 mm
Mains voltage: 120–277 V AC ±10%
Mains frequency: 50–60 Hz
Wireless frequency: 2.4 GHz
Power-line communication frequency: Dual 115 kb/s and 132 kb/s
Wireless output: 10 mW
Operating temperature: -40 to 85 °C
Humidity during the operation: non-condensing
Connection: in acc. with NEMA Socket Standard BS5972
Degree of protection: IP66
Weight: 190 g
Ref. No.: 186275
iLIC – intelligent Luminaire Information Centre

For outdoor luminaire control

The luminaire information centre is the central control instrument of a light management system. All connected luminaires can be controlled, monitored and displayed using a web-based server application.

The server-based software supports both Windows and Linux operating systems. Firefox or Internet Explorer are the frontend applications to operate, control or display the light management system. The following actions can be controlled via the software:

- Switching individual luminaires on or off ahead of defined luminaire groups
- Defining the most diverse timer settings
- Evaluation and display of the lighting system status depending on various types of error message
- Evaluation of energy consumption at individual luminaire and luminaire-group level
- Graphic display of all acquired data over time (voltage, current, power, temperature, power factor, lighting hours, ...)

Ref. No.: 186243

System requirements

- Server: state-of-the-art
- Memory RAM: 4GB
- Memory HD: 2TB
- CPU: min. Dual Core, depending on the scope of the project
- Operating system: XP, Windows 7, Linux, Distribution, VM operation is possible
- Data security: min. RAID 1 recommended RAID 5

iOPC – intelligent OPC DA Server

iOPC DA Server for connecting iDCs to typical control technology systems

The iOPC Server is used to integrate iDCs into standardised SCADA/control technology systems. The software runs on Microsoft® operating systems and provides a standard interface for integrating data points.

OPC DA specification: DA 2.05
Type: iOPC 1.001 Tool
Ref. No.: 186358 for max. 3 iDC
Ref. No.: 186359 for max. 10 iDC
Ref. No.: 186385 for max. 20 iDC

System requirements

- Server: state-of-the-art
- Memory RAM: 4GB
- Memory HD: 2TB
- CPU: min. Dual Core, depending on the scope of the project
- Operating system: XP, Windows 7, Linux, Distribution, VM operation is possible
- Data security: min. RAID 1 recommended RAID 5
iHFS – intelligent High-Frequency Sensor

Motion sensor for street lighting

The iHFS enables energy-efficient and need-driven control of street lighting and lighting in the vicinity of buildings using intelligent high-frequency-based object detection. The sensor system functions reliably at all times irrespective of light and weather conditions.

The iHFS is available as a modular and an integrated system. With the modular version, up to 3 sensor modules can be attached to the luminaire pole, which enables simultaneous detection of objects from different directions. The detection field can be individually defined via the sensor’s mounting angle.

With the integrated version, one sensor is typically mounted per luminaire. The sensor is installed directly in the luminaire.

Technical notes
For Light Controller iPC-HFS (s. p. 270)
Dimensions (LxWxH): 83x75x67 mm
plus holder
Operating temperature: -20 to 70 °C
HF technology: 5.8 GHz
Cable length: 10 m

<table>
<thead>
<tr>
<th>Type</th>
<th>Note</th>
<th>Ref. No.</th>
<th>Power consumption</th>
<th>Reach</th>
<th>Opening angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>iHFS-120.1</td>
<td>Sensor</td>
<td>186253</td>
<td>0.7 - 1.5 (1-3 sensors)</td>
<td>up to 22 m</td>
<td>120°</td>
</tr>
</tbody>
</table>

Sensor for built-in luminaires on request.

Detection area

Installation
The sensors are attached to the luminaire pole using stainless steel tension bands (included in the scope of delivery). The direction of a sensor’s detection field can be individually adjusted via the swivel-head holder.

Lighting Control System for Outdoor Applications – Accessories
iSCT – intelligent
Software
Configurations Tool

The Managed Night power-line system as well as the two Smart and Flex Night systems can be controlled using the extremely robust tablet PC made by Panasonic and the associated software.

Panasonic toughpad FZ-G1 for software configuration

- Full-ruggedized Windows 8 Tablet
- Intel® Core™ i5-3437U vPro processor
- Windows 8 Pro, Intel HD 4000 Graphic
- Daylight-readable 10.1“ WUXGA outdoor display with IPSa technology (1920 x 1200) with up to 800 cd/m²
- Capacitive 10-point multi-touch screen and digitizer
- Standard connections: USB 3.0, HDMI and headphones
- Pre-configurable port (serial, LAN, microSD or USB 2.0)
- Up to 8 hours of battery life; battery can be changed by user
- Protected against water and dust
- Will survive being dropped from a height of up to 120 cm without suffering damage (as tested by Panasonic)
- With preinstalled and configured light management software

Dimensions (LxWxH): 270x188x9 mm
Weight: approx. 1.1 kg
Ref. No.: 186251

Further details can be found under: business.panasonic.co.uk/computer-product/toughpad/fz-g1
Whenever an electric light goes on around the world, Vossloh-Schwabe is likely to have made a key contribution to ensuring that everything works at the flick of a switch.

Headquartered in Germany, Vossloh-Schwabe has been a member of the global Panasonic group since 2002 and counts as a technology leader within the lighting sector. Top-quality, high-performance products form the basis of the company’s success.

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