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Ingenuity for life

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Sigmaguard[®]
LED-ZS

Retrofittable and long lifetime

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High availability signals and improved visibility



LED lamp

Demands on the availability of signals are increasing continuously. The incandescent bulbs currently used in dwarf signals have a relatively short lifetime of around one year, meaning they need to be replaced regularly. The effort involved in replacing them increases for unmanned stations. Furthermore, replacing the bulbs is made more difficult as the dwarf signals are often positioned high up on masts or on station roofs.

In addition to the above factors, the outlook is that incandescent bulbs will either disappear from the market in the long term or that they will not be available at an acceptable price and at the required quality.

For this reason, Siemens Switzerland Ltd has developed a cost-efficient, low-maintenance LED retrofit solution to the standard incandescent bulb used in dwarf signals, which boasts a lifetime of at least 15 years: SigmaGuard LED-ZS.

Design and functionality

The LED-ZS system is designed as a retrofit solution for dwarf signals, where long-life LEDs replace the traditional incandescent bulbs without requiring any interface modifications to the interlocking. Furthermore, we fit new dwarf signals with the LED-ZS system.

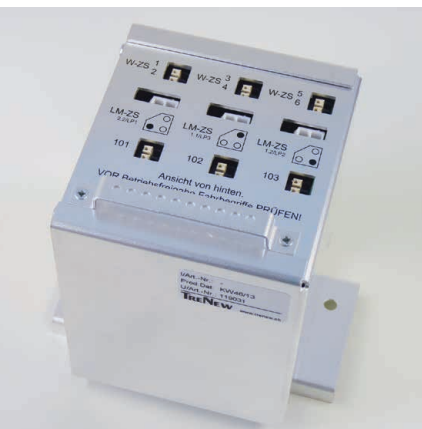
The LED-ZS retrofit kit consists of the following modules for each dwarf signal:

- **3 LED lamps**
These replace the 40V/20W incandescent bulbs and include an LED chip, optics and base.
- **1 controller**
Includes three interface modules which control the LED lamps and the resistor module. The interface module reproduces the interface to the interlocking. The controller makes installation easier in terms of mechanical and electrostatic factors.
- **1 resistor module**
It absorbs the excess current outside the dwarf signal housing and is usually mounted in the existing signal base.

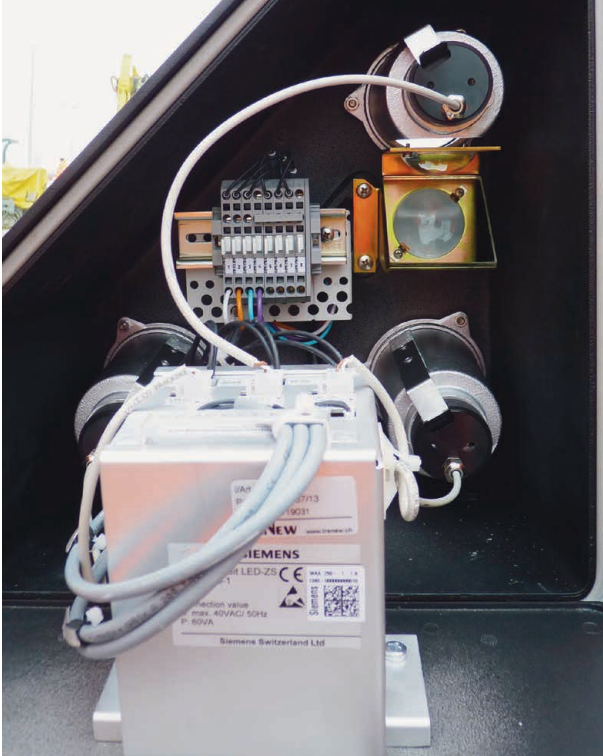
The LED-ZS system substitutes the 40V/20W incandescent bulb system and is approved for the electronic interlocking Simis W and the relay interlocking Domino 67. The LED-ZS system can be retrofitted to an existing dwarf signal without any modification to the interlocking's indoor installation. It is controlled by the interlocking in the same way as a dwarf signal fitted with incandescent bulbs.

In terms of construction, we currently support three housing types:

- LHA 1003-3 dwarf signals with a light spot distance of 180 mm (standard housing)
- LHA 1002-1 dwarf signals with a light spot distance of 200 mm (standard housing up to the 1980s)
- LHB 516-1 dwarf signals with a light spot distance of 150 mm



Controller



LED dwarf signal connected and in operation



Resistor module integrated into the signal base

Investing in the LED-ZS system is worth it

The special design of the LED-ZS system makes it ideal for connecting to both electronic and relay interlockings.

It is electrically, mechanically and optically compatible with the existing dwarf signal housings LHA 1003-3, LHA 1002-1 and LHB 516-1, which are currently equipped with incandescent bulbs. Both systems have the same interfaces to the interlocking's electrical signal circuit, making the process of replacing them easy and straightforward without the need for special tools. It takes 1.5 hours maximum to retrofit a dwarf signal on site.

The LED-ZS system provides rail operators with a cutting-edge optical system that offers them the following benefits:

- Very long lifetime of at least 15 years
- Improved visibility
- Low life-cycle costs thanks to maintenance-free signal units
- Return on investment after approx. 5 years
- LED signals can be fitted to new dwarf signals and retrofitted to existing dwarf signals either by customers themselves or by Siemens
- Compatible electrically, mechanically and optically with existing signal housings
- No interlocking modifications required

Technical Data

Light intensity day operation	250 ± 15 % cd
Light intensity night operation	21 ± 15 % cd
Colour	White E as per DIN 6163 part 4/CIE 004 E 2001; colour temperature 3000K
Day voltage	29-40 V _{eff}
Night voltage	19-30 V _{eff}
Safety integrity level	SIL 3 as per EN 50129

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Order-No.: MOMM B10117-00-76CH | HTS 9092/316
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Printed in Germany | Subject to change

