# ZQ1-MagicLine

## The compact high-performance laser with perfect visibility

The brand new line lasers ZQ1-MagicLine has been designed for the most demanding positioning applications on the market: a perfectly visible long line even in very bright surroundings outside while maintaining in laser class 2M.

Wherever high output power within class 2M, excellent visibility and industrial-grade design are required, the ZQ1-ML is the right choice. Thanks to the tool-free focusing, the user can optimally adjust the working distance of the module to the application requirements.

Combined with its intelligent monitoring functions, the laser allows for high power stability even in harsh environments. The integrated active peltier cooling supports this function by keeping the laser diode constantly in the optimal temperature range. The laser needs to be adapted to a cooling plate or else.

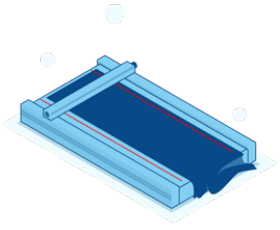

Wavelengths: 520 nm 640 nm

Perfect visibility | Laser class 2M | Output Power up to 700mW | High Process Reliability | IP 67 | Active cooling integrated

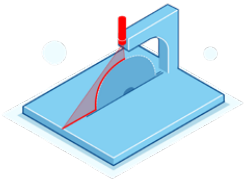
## Highlights

- Perfect visibility
- Output power up to 700mW with laser class 2M
- IP 67
- Active cooling integrated
- Repeatable product performance due to automated production processes
- Wavelength 520nm und 640nm
- Manually focusable
- Analog intensity control
- Certified according to the railway standard: DIN EN 61373:2011-04
- PC control via Graphical User Interface (GUI)

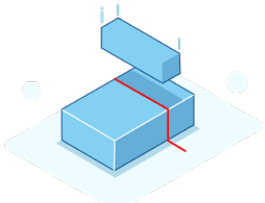
long perfect visible projections (~30m)



Textile positioning table



Projection along the cutting edge



Positioning in daylight

### Order Code

| Z?? | - | Q1 | - | F | - | ? | - | MLx |
|---|---|---|---|---|---|---|---|---|
| Power | | Product family | | F-Focusable | | Wavelength | | Optics |

## System specification

| | | 520 nm | 640 nm |
|---|---|---|---|
| Wavelength | nm | | |
| Wavelength tolerance | nm (typical) | ±10 nm | ±5 nm |
| Wavelength drift | nm (temperature stabilized, over total operating temperature) | < 1 nm | |
| Output power | mW | *≤600 mW** | ≤700 mW |
| Spatial mode | | Multi Transverse Mode | |
| RMS noise | (20 Hz to 20 MHz) | < 0.5 % | |
| Peak-to-Peak Noise | (20 Hz to 20 MHz) | < 1 % | |
| Boresight error (1) | mrad (in x and y) | < 5 mrad | |
| Line orientation (2) | mrad | < 10 mrad \| Orientation parallel to base plate | |
| Pointing stability over temp. | µrad / K | < 6 µrad / K | |
| Emission point height (3) | mm | 28.3 mm | |
| Long-term power stability | (24 h) | < 1 % | |
| Warm-up time | min | < 2 min | |
| Laser operation mode | | APC | |

## Electrical specification

| | | |
|---|---|---|
| Operating voltage | | 12 - 24 VDC |
| Operating current | (max. at 25 °C) | < 4 A |
| Protection | | Over temperature protection and LED pre-failure indicator, reverse polarity and transient protection (ESD, burst & surge) |
| Electrical isolation of housing | | high-impedance to GND (1MΩ) |
| Connection | | 5-pin M12 plug; 8-pin M12 plug (communication) |
| Power consumption | | < 40 W |
| Communication interfaces | | $I^2C$, RS-232 |

## Optical specification

| | | |
|---|---|---|
| Fan angles (4) | Degrees | 40°, 60°, 100° (Gaussian line profile) |
| Line straightness (5) | % (of line length) | < 0.1 % (typ. 0,05%) |
| Focus range | mm | 100 mm up to 10,000 mm |

## Keynotes

| | |
|---|---|
| (1) Boresight error | Also known as pitch and skew |
| (2) Line orientation | Also known as roll, with reference to the ground plate |
| (3) Emission point height | Offset of optical axis to ground plate |
| (4) Line length / fan angle | at > 13.5 % Imax |
| (5) Line straightness | Deviation from best fit line over the middle 80% of the line, for homogeneous lines |
| (6) Line uniformity | Maximum relative optical power variation over the middle 80% of the line, for homogeneous lines |

## Digitale modulation

| | |
|---|---|
| Maximum frequency | up to 200 kHz |
| Rise time (Mod High ➡ 90 %) | < 500 ns |
| Fall time (Mod Low ➡ 10 %) | < 350 ns |
| Signaling levels | VIL_max < +1.1 V<br>VIH_min > +2.5 V |
| Operation range | 0 - 30 VDC |

## Analoge modulation

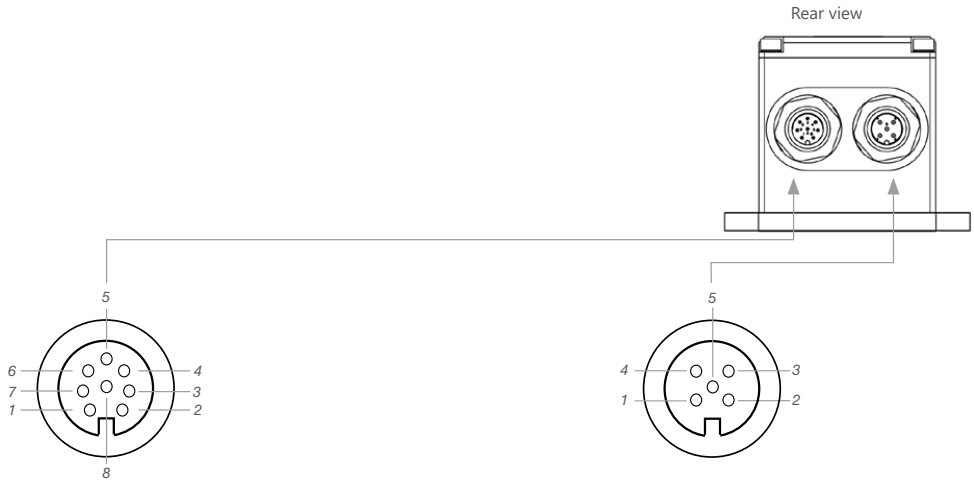
| | |
|---|---|
| Maximum bandwidth | < 10 Hz |
| Linearity | <5 % (from 10 % to 100 % of laser power) |
| Active range | 0 - 2 VDC |
| Impedance | 240 kΩ to internal VCC (3.6 V) |
| Operation range | 0 - 30 VDC |

## Environmental conditions

| | | |
|---|---|---|
| Operating temperature | °C / °F | -10 °C to +50 °C / 14 °F to +122 °F |
| Storage temperature | °C / °F | -40 °C to +85 °C / -40 °F to +185 °F |
| Humidity | % | < 90 %, non-condensing |
| Dissipated heat | W | Max. 35 W |
| Shock and vibration | | According to DIN EN 61373:2011-04, cat. 2, Railway applications – Rolling stock equipment – Shock and vibration tests (IEC 61373:2010) |

## Mechanical Specifications

| | | |
|---|---|---|
| Weight | kg | n.a. |
| Dimension | mm | n.a. |
| Diameter head Ø | mm | 50 mm |
| Material | | Aluminum (black anodized/blue-lacquered), |
| Protection class | | IP 67 |
| Mounting | | 4x M4 screws |




## M12 8-Pin: A-Coding Male Connector

| | |
|---|---|
| X 2.1 | RX IN (RS-232) |
| X 2.2 | TX OUT (RS-232) |
| X 2.3 | SCL ($I^2C$) |
| X 2.4 | SDA ($I^2C$) |
| X 2.5 | RDY FAIL OUT |
| X 2.6 | System Enable OUT |
| X 2.7 | GND |
| X 2.8 | System Enable IN |

## M12 5-Pin: A-Coding Male Connector

| | |
|---|---|
| **X 1.1** | 12-24 VDC, 40 VA |
| **X 1.2** | Digital-Modulation TTL |
| **X 1.3** | GND |
| **X 1.4** | Analog-Modulation (0-2 VDC) |
| **X 1.5** | Fail out (open-drain) |

CE CE-Conformity according to the directives 2014/30/EU, 2011/65/EU and 2006/25/EU. Subject to technical change. Version: July 2021