

## QUICK START GUIDE

# Distance Measurement Devices VDM100/G2



With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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# 1 Introduction

## 1.1 Purpose of this quick start guide

This quick start guide contains basic instructions for operating the device. However, the manual takes priority over the quick start guide.

## 1.2 Product documentation on the internet

You can view all the relevant documentation and additional information on your product at <http://www.pepperl-fuchs.com>. Simply enter the product name or model number in the **Product/Key word search** box and click **Search**.



Select your product from the list of search results. Click on the information you require in the product information list, e.g., **Technical documents**.



A list of all available documents is displayed.

## 1.3 Intended Use

The VDM100 Series distance measurement devices are used for the accurate positioning of stock feeders, moving carriages, cranes, and handling machines, as well as length measurements in the wood processing industry, with concrete saws, and in elevator construction.

Make sure that the devices are used only for their intended purpose.

## 2 Safety

### 2.1 Laser Class 2 Safety Information

#### Class 2 Laser Product



#### Standards

IEC 60825-1:2007 certified. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.



#### **Warning!**

Visible and invisible class 2 laser light

Caution: visible and invisible laser light. Do not look into the beam!

The laser light can be an irritant, especially in a dark environment. Do not point lasers at people!

Maintenance and repairs must be carried out by authorized service personnel only!

Install the device so that the warning is clearly visible and readable.

Caution: Using controls or adjustments, or performing procedures other than those specified herein may result in harmful laser beam exposure.

Only use recommended original accessories.

The operating company bears responsibility for observing locally applicable safety regulations.

Installation and commissioning of all devices must be performed by a trained professional only.

User modification and or repair are dangerous and will void the warranty and exclude the manufacturer from any liability. If serious faults occur, stop using the device. Secure the device against inadvertent operation. In the event of repairs, return the device to your local Pepperl+Fuchs representative or sales office.

### 3 Product Description

#### 3.1 Indicators and Operating Controls

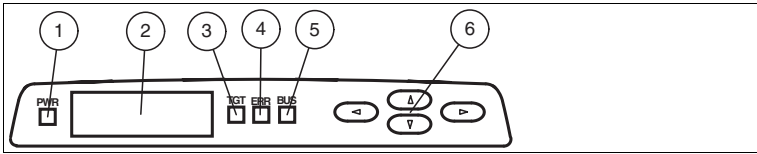


Figure 3.1 Displays and controls

No.	Designation	Color	Description
1	POWER LED	Green	Lights up when supplied with operating voltage
2	Display		Lights up when the device has detected a reflector see chapter 4.3
3	TARGET LED	Green	Lights up when there is an error; flashes in the event of a warning
4	ERROR LED	Red	Lights up when there is active communication at the bus interface
5	BUS LED	Green	
6	Operating buttons		

Table 3.1 Indicators and operating controls

#### 3.2 Scope of Delivery

The scope of delivery includes:

- VDM100
- Quick start guide
- Functional grounding (preassembled)
- Protective cover

### 3.3 Accessories

The following products are available as accessories:

No.	Designation	Illustration	Description
1	OMH-VDM100-01		Mounting bracket with deviation mirror
2	OMH-LS610-01		Mounting bracket
3	OMH-LS610-02		Direct mounting set (4 M4 threaded inserts)
5	Functional grounding LS610		Functional grounding
6	Protective cover LS610		M12 sealing caps
7	ICZ-TR-V15B		PROFIBUS terminal resistor
8	VDM01 reflector		Plastic reflector 500 mm x 500 mm
9	VDM02 reflector In conjunction with VDM01 reflector only		Plastic reflector 500 mm x 250 mm



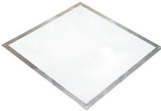



No.	Designation	Illustration	Description
10	Reflector 250 mm x 250 mm		Foil reflector 250 mm x 250 mm on metal panel
11	Reflector 500 mm x 500 mm		Foil reflector 500 mm x 500 mm on metal panel
12	Reflector 1000 mm x 1000 mm		Foil reflector 1000 mm x 1000 mm on metal panel
13	V15SB-G		Single-ended male cordset, M12 x 1, B-coding, 5-pin for bus cable
14	V15B-G		Single-ended female cordset, M12 x 1, B-coding, 5-pin for bus cable
15	V1-G		Single-ended female cordset, M12 x 1, 4-pin for power supply

Table 3.2 Accessories



## 4 Commissioning



1. Connect the distance measurement device to the power supply.
  - ↳ The device starts an initialization phase of a maximum of 10 seconds.
2. The red error LED (ERR) goes out and the green target LED (TGT) lights up when the device has been positioned correctly on the reflector and valid measured values are determined. If the LEDs do not do this, please note the messages that appear on the display ().
  - ↳ The device is ready for operation.
3. Allow a warm-up phase of 30 minutes for the distance measurement device.
  - ↳ The distance measurement device has achieved optimal measurement accuracy after this 30-minute warm-up phase. The device has been tested and calibrated before delivery. It can be put into operation immediately.

### 4.1 Device Connection



Put protective covers on unused M12 connectors.

↳ The IP65 protection class is achieved. The protective covers can be ordered as accessories.

The device conforms to protection class III. This means that the power has to be supplied as a low protective voltage (PELV).

The grounding of the cable shields on the metallic flush-type connectors is not protective grounding in the sense of personal protection, but is rather a functional grounding (please refer to the "Grounding/Shielding" chapter).

The VDM100 power supply uses a direct current of 18 V – 30 VDC. The VDM100 has two I/O ports, which can be configured individually as input or output (). For an input connection, an electrical level  $U_e < 6 \text{ V}$  is low, and a level  $U_e > 16 \text{ V}$  is high. A connection configured as output, at a maximum load of 200 mA, has a level  $U_a < 1 \text{ V}$  with electrical low, and a level of  $U_a = U_B - 1 \text{ V}$  for a high, in which  $u_B$  designates the supply voltage applied to the device. Both I/Os can be configured both as high-active and low-active. The maximum cable length is 30 m.

The pin assignment is as follows:

**VDM100-SSI:**

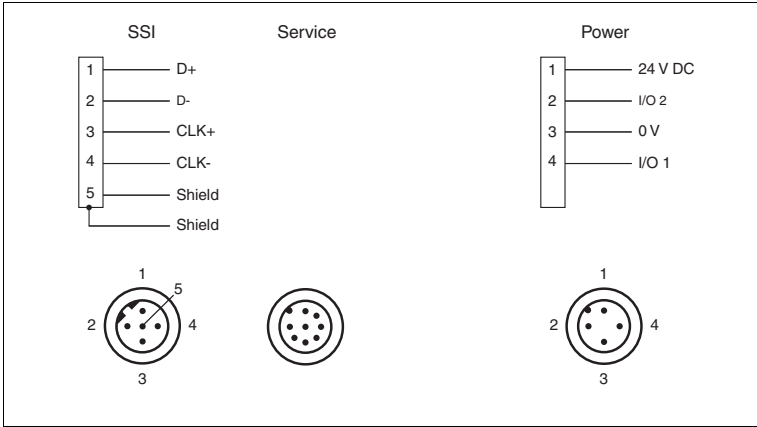


Figure 4.1 SSI interface pin assignment and RS422 interface



**Note!**

**Terminator**

If there is no terminator connected on the interface card, you must connect a 100  $\Omega$  terminator (0.25 W) between Data+ and Data- on the control computer. A double-sided screen mounting is recommended.

**VDM100-EIP:**

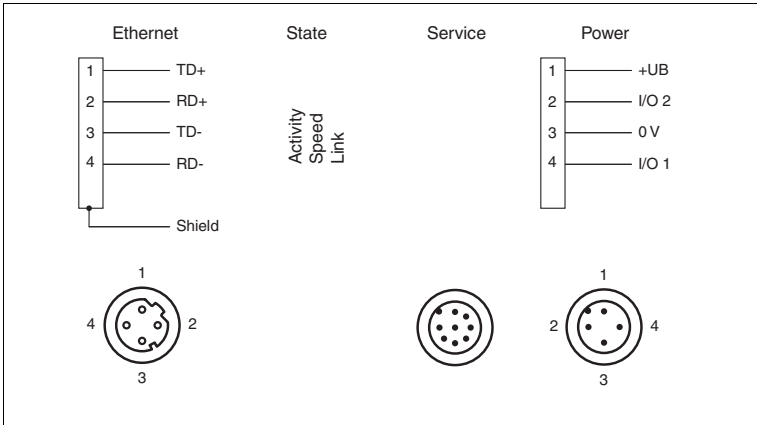


Figure 4.2 EtherNet/IP interface pin assignment

**VDM100-P:**

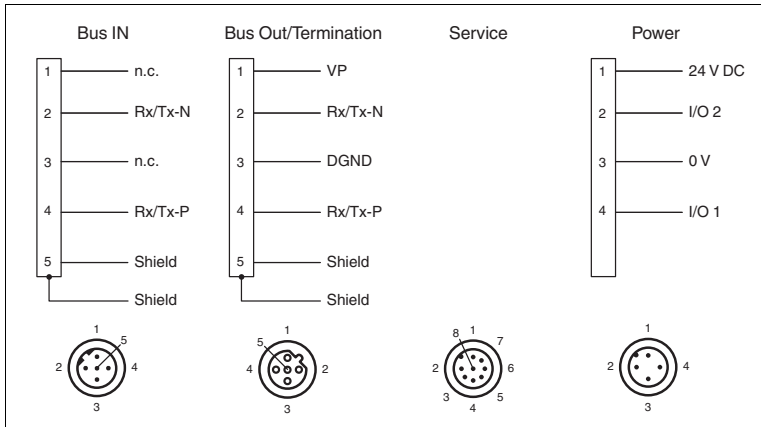


Figure 4.3 PROFIBUS-DP interface pin assignment



**Note!**

**Terminator**

The last PROFIBUS subscriber must be completed with a terminator. For this purpose, the PROFIBUS terminal resistor (see chapter 3.3) is to be screwed to the terminal resistor connector. Fit the cable screen on both sides.

**VDM100-IBS:**

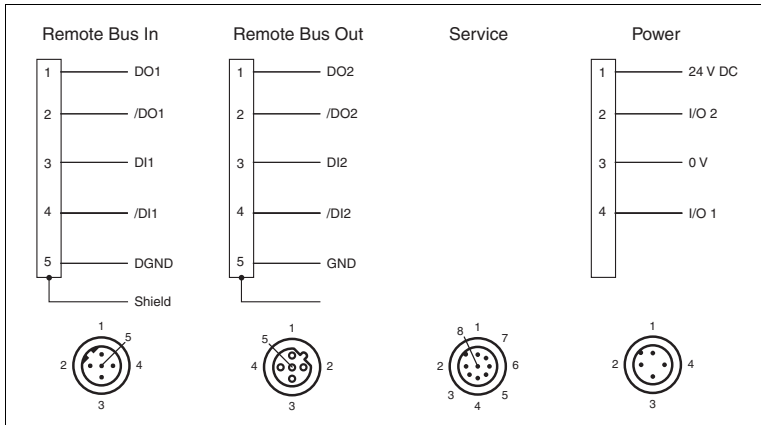


Figure 4.4 INTERBUS interface pin assignment

## 4.2 Grounding/Shielding

Functional grounding of the cable shields is recommended, since the housings do not have grounding. If the shields must be grounded because of EMC, basically section 3.3.3 of the PROFIBUS PNO guideline and the "Conformance test and certification V2.0" of the INTERBUS club must be followed.



### Shield Grounding

For shield grounding, use the preassembled insertion prong, which is screwed onto the bus connector.

Functional grounding can be ordered as an accessory. (See the "Accessories" chapter)



Figure 4.5 Preassembled insertion prong



### **Warning!**

Do not open the primary mounting nut for the receptacle connector.

If you do, the connector assembly may be damaged and the housing may leak.

### **INTERBUS Interface:**

The cable shield must be attached on both sides. The input (REMOTE BUS IN) is completely isolated from the operating voltage and the output (REMOTE BUS OUT). The output shield should be placed on PE.

If the IN and OUT shields are connected, they must be placed on PE. At the same time, 10 mm<sup>2</sup> equipotential bonding must be used parallel to the shield.

## 4.3 Adjustment

An alignment laser pointer, which is visible from a long distance, is located on the front of the device as an alignment aid. You can optimally align the distance measurement device with the reflector using the alignment laser pointer.

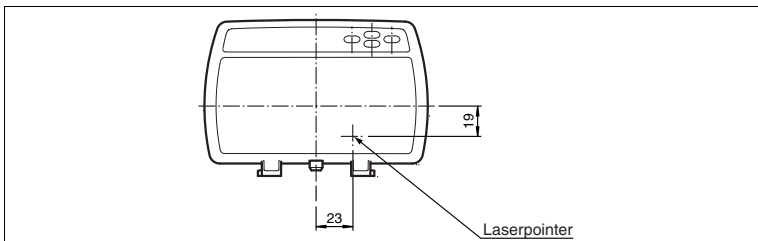


Figure 4.6 Alignment aid

## 5 Appendix

### 5.1 Technical Data

#### General data

Measurement range	<b>VDM100-300:</b> 0.3 m ... 300 m <b>VDM100-150:</b> 0.3 m ... 150 m <b>VDM100-50:</b> 0.3 m ... 50 m
Reference object	<b>VDM100-300:</b> VDM01 reflector <b>VDM100-150:</b> Foil reflector 500 mm x 500 mm <b>VDM100-50:</b> Foil reflector 500 mm x 500 mm
Light source	Laser diode
Laser nominal ratings	
Note	VISIBLE AND INVISIBLE LASER LIGHT. Do not look into the beam
Laser class	Measuring laser: 1 Alignment laser: 2
Wavelength	Measuring laser: 905 nm Alignment laser: 660 nm
Beam divergence	Measuring laser: 2 mrad Alignment laser: 1 mrad
Pulse length	Measuring laser: 4 ns
Repeat rate	Measuring laser: 20 kHz
Maximum optical power output	Alignment laser: 0.6 mW
Max. pulse energy	Measuring laser: 12 ms
Measuring method	Pulse ranging technology (PRT)
Maximum travel speed	15 m/s
Alignment aid	Laser class 2 laser pointer
Service life	> 100000 h
Diameter of the light spot	<b>VDM100-300:</b> < 70 cm at 300 m <b>VDM100-150:</b> < 35 cm at 150 m <b>VDM100-50:</b> < 15 cm at 50 m
Extraneous light limit	> 100000 Lux
Resolution	0.1 mm, adjustable
Temperature influence	0.03 mm/K

#### Functional safety data

MTTF <sub>d</sub>	120 a
Life time (T <sub>M</sub> )	20 a
Diagnostic coverage (DC)	0%

#### Indicators/controls

Function indicator	4 LEDs
Operating controls	Operating panel (4 foil buttons) to set parameters
Parameterizing display	Illuminated display for measured value display and parameterization

### Electrical data

Operating voltage	18 VDC ... 30 VDC
No-load current	250 mA (18 V) ... 150 mA (30 V)
Protection class	III (rated voltage 50 V)
Time delay before availability	< 10 s

### Input/output

Input/output type	Two PNP inputs/outputs, independently configurable, short-circuit proof, protected against polarity reversal
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### Input

Switching threshold	low: $U_e < 6\text{ V}$ , high: $U_e > 16\text{ V}$
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### Output

Switching threshold	low: $U_a < 1\text{ V}$ , high: $U_a > U_b - 1\text{ V}$
Switching current	200 mA per output

### Measurement accuracy

Measured value output	1 ms
Average measured value age	3 ms, 6 ms, 12 ms, 25 ms, 50 ms, adjustable
Offset	max. 2 mm (between two devices)
Absolute accuracy	$\pm 2.5\text{ mm}$ (> 3 m); $\pm 3.5\text{ mm}$ (0.3 m ... 3 m)
Repeatability	< 0.5 mm

### Conformity with standards and directives

Directive conformity	EMC guideline 2004/108/EG
Conformity with standards	
Product standard	EN 60947-5-2:2007
Laser class	IEC 60825-1:2007

### Approvals and certificates

UL approval	cULus-listed
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### Ambient conditions

Ambient temperature	-10 °C ... 50 °C (263 K ... 323 K) Version/146: -30 °C ... 50 °C (243 K ... 323 K)
Storage temperature	-20 °C ... 70 °C (253 K ... 343 K) Version/146: -30 °C ... 70 °C (243 K ... 343 K)
Relative humidity	95%, no condensation

**Mechanical data**

Housing length	170 mm
Housing width	140 mm
Housing height	100 mm
Protection class	IP65
<b>Material</b>	
Housing	ABS/PC
Optical face	PMMA, hard-coated
Weight	Approx. 700 g



**Note!**

Information at 23 °C air temperature, 977 hPa and minimum duty cycle 30 min. In version/146 and -30 °C, the minimum duty cycle is 90 min.

5.1.1 SSI/RS422 Interface

**SSI**

Interface	
Transfer rate	4000/s pulse frequency: 100 kHz ... 1 MHz

Table 5.1 SSI technical data interface

**RS422**

Interface	
Transfer rate	4.8 kBit/s ... 115.2 kBit/s

Table 5.2 RS422 technical data

5.1.2 EtherNet/IP interface

Interface	
Transfer rate	1000/s @ 100 Mbit/s

Table 5.3 EtherNet/IP interface technical data

5.1.3 PROFIBUS DP Interface

Interface	
Transfer rate	9.6 kBit/s ... 12 Mbit/s, adjustable

Table 5.4 PROFIBUS DP interface technical data

5.1.4 INTERBUS Interface

Interface	
Transfer rate	500 kBit/s

Table 5.5 INTERBUS interface technical data

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