

HANDBUCH / MANUAL / MANUEL

VDM18-100/32/105/122

VDM18-300/32/105/122



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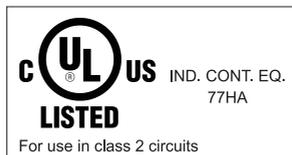
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## 1 Signs and Symbols



### Warning

This symbol signals passages in the manual which must be observed at all times. Non-compliance can cause injuries or material damage.



### Warning Laser

This symbol appears in front of warning passages concerning the danger of laser beams.



### Information

This symbol signals passages with useful information.

## 2 Safety information



**It is essential that this manual is read, thoroughly understood and observed before setting the VDM18 sensor into operation.**

The VDM18 sensor may only be connected, mounted and adjusted by qualified personnel.

**Interventions and alterations to the device are not permissible!**

The VDM18 sensor is not a safety component as described by EU machine directives.



The VDM18 sensor complies with laser protection class 2 according to DIN EN 60825/1, status 2001. The technical requirements comply with EN 60947-5-2, 2000 edition.



**Never look into the path of the laser. Do not suppress the reflex to close the eyelids. Gazing into the beam path for longer periods can damage the retina of the eye.**

When mounting the sensor, ensure if possible that the beam path is sealed off at the end.

The laser must not be directed at people (head height).

When aligning VDM18, ensure that there are no reflections on reflective surfaces.

Should the safety label on the VDM18 sensor be partly covered due to its installation position, other safety labels are to be positioned on visible parts of the sensor. When applying the new safety label, make sure that you cannot look into the laser beam whilst reading it.





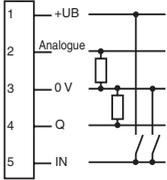
## 5 Electrical installation

Turn the sensor connector plug according to the installation position (Illustr. 1) so that the connection cable can be freely connected without being bent.

Insert the socket of the connection cable into the VDM18 connector and screw tight.

For example, secure the connection cable from sliding with a cable tie.

Connect VDM18 as shown in figure 5.



Illustr. 5 Connection diagram

Connection	Use	
1	+ UB = supply voltage	
2	QA = analogue output (4...20 mA)	
3	- UB = supply voltage	
4	Q = switching output	
5	IN = control input	
	Laser-Disable* Button lock Free running	when HIGH (+UB) when LOW (-UB) when open

\* Laser-Disable:

A measurement is only made if the input is connected to -UB (buttons are locked) or is open.

The laser is switched off when +UB is applied to the input. The switching output and the analogue output retain their last status.

Switch on the operating voltage (note the permissible operating voltage).

The sensor is ready to operate after a delay ( $\leq 300$  ms). LED BA (green) must light.

For maximum precision, please allow for a heating period (approx. 5 minutes).

## 6 Operation and Setting

### 6.1 Possible Settings and Operating Modes

The VDM18 is ready to operate after applying the operating voltage.

However, the following settings can be made if necessary:

- Set the switching point or switching window
- Scale the analogue output
- Set the operating mode (Speed Mode / Averaging Mode)
- Set the switching type (light/dark)
- Reset the sensor to the factory state
- Laser off and measured value hold (via electrical connection)
- Lock buttons „S“ and „T“ (via electrical connection)

### 6.2 Factory State:

- Switching output:  
Switching output is active when the object is in the operating range and reliably detected.  
Switching type = light on
- Analogue output (4...20 mA): 4 mA = end of operating range, 20 mA = beginning of operating range
- Operating mode = speed mode (shortest response time)
- Operation = free running (normal mode)

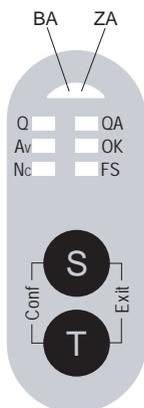
### 6.3 Indicators and Setting Elements

The VDM18 is set with the buttons S and T.

- S** Set button: Change or confirm setting or teach in switching point.
- T** Toggle button: Select setting, jumps one setting forward.
- S** and **T** Conf and Exit: Pressing both buttons simultaneously causes:  
3 s Conf => activate set mode  
1x press Exit => data are saved and the setting mode exited

The LEDs indicate the selected settings.

LED	Colour	Use	Description
BA	Green	Operating indicator	On: ready for operation (Run mode) Flashing: Set mode is active
ZA	Red	Status indicator (only active in the Set mode)	Lights: selected setting is active
Q	Yellow	Indicates status of output Q	Lights: switching output active
QA	Yellow	Indicates status of output QA	Lights: object is within the set 0% and 100 % range
Av	Green	Signals operating mode (speed/averaging)	Lights: operation set with averaging
OK	Green	Stability indicator (good target)	Lights: object safely detected and in the operating range
Nc	Green	Signals switching type light/dark switching for output Q	Lights: switching type dark on set
FS	Green	Factory Setting (only active in Set mode)	Lights: factory setting selected



Illustr. 6

## 6.4 Make settings

### 6.4.1 Activating the Set Mode (conf):

Press the buttons „S“ and „T“ simultaneously for 3 s (or longer) until the LED BA (green) flashes (LED flashes when time lock open and Set mode activated).

### 6.4.2 Setting the Sensor

No. LED	Description	Factory setting
1	<p> <input type="checkbox"/> Q <input checked="" type="checkbox"/> QA <input type="checkbox"/> Av <input type="checkbox"/> OK <input type="checkbox"/> Nc <input type="checkbox"/> FS                 </p> <p><b>Set switching point for switching output Q:</b> Position the object at the desired switching point. The „OK“ LED must light. Press <b>T</b> until the „Q“ LED lights. Press <b>S</b> once. If the object is detectable and in the operating range, the „ZA“ LED (red) flashes with 1 Hz. Exit the Set menu (<b>T</b> + <b>S</b>) or go to the next setting with the <b>T</b> button.</p> <p><b>Set the switching window for switching output Q:</b> Position the object at the desired first switching window limit. The „OK“ LED must light. Press <b>T</b> until the „Q“ LED lights. Press <b>S</b> once. If the object is detectable and in the operating range, the „ZA“ LED (red) flashes with 1 Hz. Position the object at the desired second switching window limit. The „OK“ LED must light. Press <b>S</b> once. The distance is saved as the second switching window limit if the object is detectable and in the operating range. The „ZA“ LED lights for confirmation for as long as <b>S</b> is pressed. Exit the Set menu (<b>T</b> + <b>S</b>) or go to the next setting with the <b>T</b> button.</p> <p> If the object was not moved after teaching the first switching window limit, a minimum switching window (1% of the operating range) is laid around the teach point.</p>	Switching window over the whole operating range, i.e. switching output is active when the object is in the operating range and reliably detected.
2	<p> <input type="checkbox"/> Q <input checked="" type="checkbox"/> QA <input type="checkbox"/> Av <input type="checkbox"/> OK <input type="checkbox"/> Nc <input type="checkbox"/> FS                 </p> <p><b>Scaling of the analogue output QA</b> Position the object at the desired 0% point (4mA). The „OK“ LED must light. Press <b>T</b> until the „QA“ LED lights. Press <b>S</b> once. If the object is detectable and in the operating range, the distance is saved as the 0% point (4mA). The „ZA“ LED (red) flashes with 1 Hz. If no 100% point is to be set, exit the Set menu (<b>T</b> + <b>S</b>) or go to the next setting with <b>T</b>. If a 100% point is to be set, place the object at the desired distance. The „OK“ LED must light. Press <b>S</b> once. If the object is detectable and in the operating range, the distance is saved as the 100% point (20mA). The „ZA“ LED lights for confirmation for as long as <b>S</b> is pressed. Exit the Set menu (<b>T</b> + <b>S</b>) or go to the next setting with the <b>T</b> button.</p> <p> If the distance between the 0% point is less than 5% of the operating range, the analogue output is automatically scaled to 5% of the max. operating range. The middle of the range is placed between the set 0% and 100% points.</p>	Maximum operating range

No. LED	Description	Factory setting
3	<p>Q <input type="checkbox"/> <input type="checkbox"/> QA            Av <input type="checkbox"/> <input type="checkbox"/> OK            Nc <input type="checkbox"/> <input type="checkbox"/> FS</p> <p><b>Switch operating mode (speed mode / averaging mode)</b></p> <p>Press <b>⏏</b> until the „Av“ LED lights up.            The operating mode (speed / averaging) is changed by pressing <b>Ⓢ</b> repeatedly.            Look at the „ZA“ LED (red). „ZA“ lights = averaging mode is active.            „ZA“ does not light = speed mode is active.</p> <p>Exit the Set menu (<b>⏏ + Ⓢ</b>) or            go to the next setting with the <b>⏏</b> button.</p> <p> Averaging Mode: for detecting rough surfaces. The arithmetic (floating) average of 100 measured values is taken. This smoothes the measuring result.            Speed Mode: for shortest response time and max. switching frequency without averaging.</p>	speed mode
4	<p>Q <input type="checkbox"/> <input type="checkbox"/> QA            Av <input type="checkbox"/> <input type="checkbox"/> OK            Nc <input checked="" type="checkbox"/> <input type="checkbox"/> FS</p> <p><b>Light/dark switching</b></p> <p>Press <b>⏏</b> until the „Nc“ LED lights.            The switching function (light/dark switching) is changed by pressing <b>Ⓢ</b> repeatedly.            Look at the „ZA“ LED (red): „ZA“ lights = switching type dark on is active.            „ZA“ does not light = switching type light on is active.</p> <p>Exit the Set menu (<b>⏏ + Ⓢ</b>) or            go to the next setting with the <b>⏏</b> button..</p>	light on
5	<p>Q <input type="checkbox"/> <input type="checkbox"/> QA            Av <input type="checkbox"/> <input type="checkbox"/> OK            Nc <input type="checkbox"/> <input checked="" type="checkbox"/> FS</p> <p><b>Activate Factory Setting</b></p> <p>Press <b>⏏</b> until the „FS“ LED lights.            Press <b>Ⓢ</b> once.            The sensor is reset to the factory state.            The „ZA“ LED lights for confirmation for as long as <b>Ⓢ</b> is pressed.            Exit the Set mode (<b>⏏ + Ⓢ</b>) or            go to the next setting with the <b>⏏</b> button.</p>	

### 6.4.3 Deactivating the Set Mode (Exit):

First press **⏏**, then **Ⓢ**. All settings are then saved. The sensor is in the Run mode after releasing the buttons. The operating indicator „BA“ (green) lights steadily



## Optical data (typ.)

Operating range VDM18-100	30 ... 100 mm
Measuring range VDM18-100	70 mm
Operating range VDM18-300	80 ... 300 mm
Measuring range VDM18-300	220 mm
Resolution*1	< 0.1% of measuring range
Light used	Pulsed laser light, red 650 nm, MTBF>50,000h *2
Size of light spot VDM18-100	1.5 mm x 3 mm at 30 mm / 1.5 mm x 3.25 mm at 100 mm
Size of light spot VDM18-300	1.5 mm x 3.5 mm at 80 mm / 2 mm x 4.5 mm at 300 mm
Ambient light	Constant light 5000 lux as per EN 60947-5-2
Laser protection class	2 (EN 60825/1)

## Electrical data (typ.),

Operating voltage $U_b$	18-30 V DC *3
Power consumption (no load)	≤ 40 mA at 24 V DC
Signal output Q	(PNP, light/dark ON switchable)
Output current Q	≤ 100 mA
Switching frequency Q	≤ 1 kHz (speed mode) / ≤ 10 Hz (averaging mode)
Response time Q, $Q_A$	0.4 ms (speed mode) / 40 ms (averaging mode)
Maximum capacitive load Q	< 100 nF
Analogue output $Q_A$	4-20 mA*4
Control input IN	Laser-Disable*                      when HIGH (+UB) Button lock                        when LOW (-UB) Free running                        when open
Linearity	< 0.25% of measuring range
Temperature drift	< 0.02% / °C =
Protective circuits	Reverse battery protection, short-circuit protection
VDE protection class *5	<input type="checkbox"/>
Stand-by delay	≤ 300 ms

## Mechanical data

Housing material	ABS, shock-resistant
Front screen	PMMA
Protection	IP 67*6
Ambient temperature range	-10 to +60 °C
Storage temperature range	-20 to +80 °C
Connection	M12 connector, 5-pin
Weight	approx. 43 g

\*1 smallest, measurable difference

\*2 at ambient temperature : +40 °C

\*3 limit values

\*4 recommended burden ≤ 500 Ohm (apparent ohmic resistance)

\*5 rating 50V DC

\*6 with attached connector

# FACTORY AUTOMATION – SENSING YOUR NEEDS



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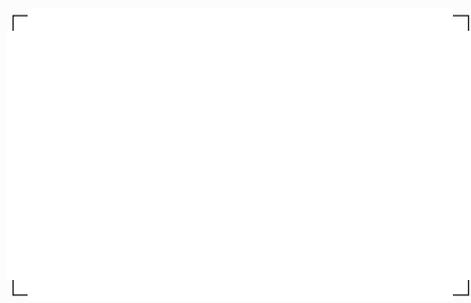
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