

# DCL 531

## Stainless Steel Probe with RS485 Modbus RTU

Stainless Steel Sensor

accuracy according to IEC 60770:  
standard: 0.35 % FSO  
option: 0.25 % FSO



### Nominal pressure

from 0 ... 1 mH<sub>2</sub>O up to 0 ... 250 mH<sub>2</sub>O

### Output signal

RS485 with Modbus RTU protocol

### Special characteristics

- ▶ pressure value
- ▶ diameter 26.5 mm
- ▶ small thermal effect
- ▶ excellent accuracy
- ▶ good long term stability
- ▶ reset function

### Optional versions

- ▶ drinking water certificate according to DVGW and KTW
- ▶ cable protection via corrugated pipe
- ▶ different kinds of cables and elastomers

The stainless steel probe DCL 531 with RS485 interface uses the communication protocol Modbus RTU which has found the way in industrial communication as an open protocol. The Modbus protocol is based on a master slave architecture with which up to 247 slaves can be questioned by a master – the data are transferred in binary form.

Basic element is a high quality stainless steel sensor with high requirements for exact measurement with good long term stability.

### Preferred areas of use are

#### Water / filtrated sewage

drinking water system, ground water level measurement, rain spillway basin  
pump and booster stations  
level measurement in container  
water treatment plants  
water recycling



#### Fuel and oil

fuel storage  
tank farm



Modbus®

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Technical Data

Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Max. ambient pressure (housing): 40 bar														
Output signal														
Digital (pressure)	RS485 with Modbus RTU Protocol													
Supply														
Direct current	V <sub>S</sub> = 9 ... 32 V <sub>DC</sub>													
Performance														
Accuracy <sup>1</sup>	standard:	nominal pressure	< 0.4 bar:	≤ ± 0.50 % FSO										
		nominal pressure	≥ 0.4 bar:	≤ ± 0.35 % FSO										
	option:	nominal pressure	≥ 0.4 bar:	≤ ± 0.25 % FSO										
Long term stability	≤ ± 0.1 % FSO / year at reference conditions													
Measuring rate	500 Hz													
Delay time	500 msec													
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)														
Thermal effects (offset and span)														
Pressure range P <sub>N</sub>	[bar]	< 0.40										≥ 0.40		
Error band	[% FSO]	≤ ± 1										≤ ± 0.75		
In compensated range	[°C]	0 ... 70												
Permissible temperatures														
Permissible temperatures	medium:	-10 ... 70 °C												
	storage:	-25 ... 70 °C												
Electrical protection <sup>2</sup>														
Short-circuit protection	permanent													
Reverse polarity protection	no damage, but also no function													
Electromagnetic compatibility	emission and immunity according to EN 61326													
<sup>2</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request														
Electrical connection														
Cable with sheath material <sup>3</sup>	PUR (-10 ... 70 °C)	black	Ø 7.4 mm											
	FEP (-10 ... 70 °C)	black	Ø 7.4 mm											
	TPE-U (-10 ... 70 °C)	blue	Ø 7.4 mm (with drinking water approval)											
Cable capacitance	signal line/shield also signal line/signal line: 160 pF/m													
Cable inductance	signal line/shield also signal line/signal line: 1 µH/m													
Bending radius	static installation:	10-fold cable diameter												
	dynamic application:	20-fold cable diameter												
<sup>3</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference														
Materials (media wetted)														
Housing	stainless steel 1.4404 (316L)													
Seals	FKM; EPDM (without / with drinking water approval)											others on request		
Diaphragm	stainless steel 1.4435 (316L)													
Protection cap	POM-C													
Cable sheath	PUR, FEP, TPE-U													
Miscellaneous														
Drinking water certificate <sup>4</sup>	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)													
Adjustable units	pressure: mmH <sub>2</sub> O, mmHg, psi, bar, mbar, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Pa, kPa, torr, atm, mH <sub>2</sub> O, MPa													
Read out	serial number; date of calibration, min- and max-value for pressure													
Current consumption	max. 10 mA													
Weight	approx. 200 g (without cable)													
Ingress protection	IP 68													
CE-conformity	EMC Directive: 2014/30/EU													
<sup>4</sup> only possible with EPDM seal in combination with TPE-U cable														

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Technical Data

Wiring diagram / pin configuration		
	Electrical connection	cable colours (IEC 60757)
	Supply +	WH (white)
Supply -	BN (brown)	
A (+)	GN (green)	
B (-)	YE (yellow)	
Reset	PK (pink)	
Shield	GNYE (green-yellow)	

Dimensions (mm / in)	
	<p>protection cap removeable</p>

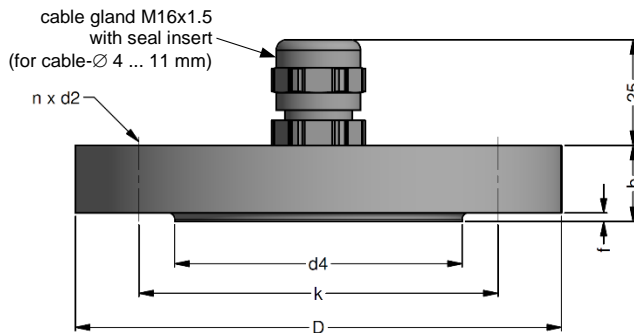
Configuration Modbus RTU					
<b>Standard configuration</b>	001	-	1	-	1
<b>Address</b>					
address	001				
	...				
	247				
<b>Baud Rate</b>					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
<b>Parity</b>					
None					0
Odd					1
Even					2
<b>Configuration code</b> (to specify with order)		-		-	

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Accessories

## Mounting flange with cable gland



dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

### Technical data

Suitable for	all probes		
Flange material	stainless steel 1.4404 (316L)		
Material of cable gland	standard: brass, nickel plated      on request: stainless steel 1.4305 (303); plastic		
Seal insert	material: TPE (ingress protection IP 68)		
Hole pattern	according to DIN 2507		
Ordering type	Ordering code	Weight	
DN25 / PN40 with cable gland brass, nickel plated	ZMF2540	1.4 kg	
DN50 / PN40 with cable gland brass, nickel plated	ZMF5040	3.2 kg	
DN80 / PN16 with cable gland brass, nickel plated	ZMF8016	4.8 kg	

## Terminal clamp



### Technical data

Suitable for	all probes with cable $\varnothing$ 5.5 ... 10.5 mm		
Material of housing	standard: steel, zinc plated      optionally: stainless steel 1.4301 (304)		
Material of clamping jaws	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		
Ordering type	Ordering code	Weight	
Terminal clamp, steel, zinc plated	Z100528	approx. 160 g	
Terminal clamp, stainless steel 1.4301 (304)	Z100527		

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**BDSENSORS**  
pressure measurement

## Ordering code DCL 531

DCL 531



Pressure																				
	in bar	4	5	0																
	in mH <sub>2</sub> O	4	5	1																
Input	[mH <sub>2</sub> O]	[bar]																		
	1.0	0.10	1	0	0	0														
	1.6	0.16	1	6	0	0														
	2.5	0.25	2	5	0	0														
	4.0	0.40	4	0	0	0														
	6.0	0.60	6	0	0	0														
	10	1.0	1	0	0	1														
	16	1.6	1	6	0	1														
	25	2.5	2	5	0	1														
	40	4.0	4	0	0	1														
	60	6.0	6	0	0	1														
	100	10	1	0	0	2														
	160	16	1	6	0	2														
	250	25	2	5	0	2														
	customer		9	9	9															consult
Housing																				
	stainless steel 1.4404 (316L)					1														
	customer					9														
Diaphragm																				
	stainless steel 1.4435 (316L)					1														
	customer					9														
Output																				
	RS485 Modbus RTU							L5												
Seals																				
	FKM							1												
	EPDM							3												
DVGW/KTW:	EPDM <sup>1</sup>							3T												
	customer							9												consult
Accuracy																				
	standard for P <sub>N</sub> ≥ 0.4 bar:	0.35 % FSO						3												
	standard for P <sub>N</sub> < 0.4 bar:	0.50 % FSO						5												
	option for P <sub>N</sub> ≥ 0.4 bar:	0.25 % FSO						2												
	customer							9												consult
Electrical connection																				
	PUR-cable (black, Ø 7.4 mm) <sup>2</sup>																			
	FEP-cable (black, Ø 7.4 mm) <sup>2</sup>																			
DVGW/KTW:	TPE-U cable (blue, Ø 7.4 mm) <sup>1,2</sup>																			
	customer																			consult
Cable length																				
	in m																			
Special version																				
	standard																			
	customer																			consult

<sup>1</sup> drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F)

<sup>2</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference

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