

## DCL 531

### Stainless Steel Probe with RS485 Modbus RTU

Stainless Steel Sensor

accuracy according to IEC 60770:  
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
- ▶ 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

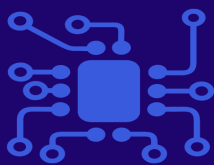


##### Fuel and oil

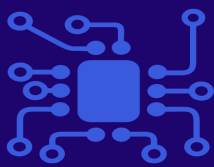
fuel storage  
tank farm



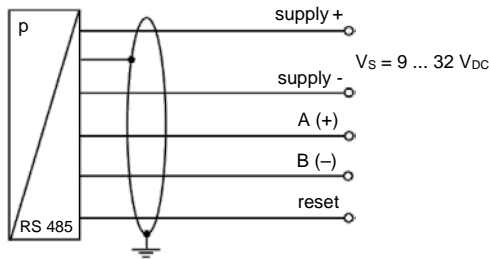
Modbus®



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>		≤ ± 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)															
Tolerance band		≤ ± 0.75 % FSO													
in compensated range		-20 ... 85 °C													
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															

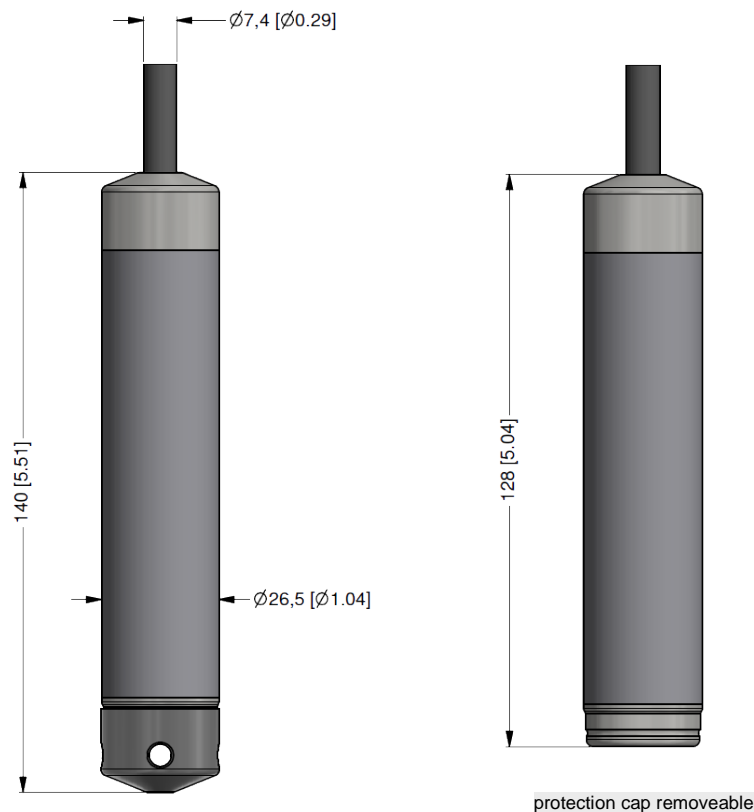


## Wiring diagram / pin configuration



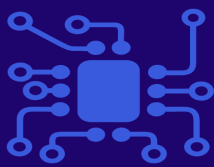
Electrical connection		cable colours (IEC 60757)
Supply +		WH (white)
Supply -		BN (brown)
A (+)		GN (green)
B (-)		YE (yellow)
Reset		PK (pink)
Shield		GNYE (green-yellow)

## Dimensions (mm / in)

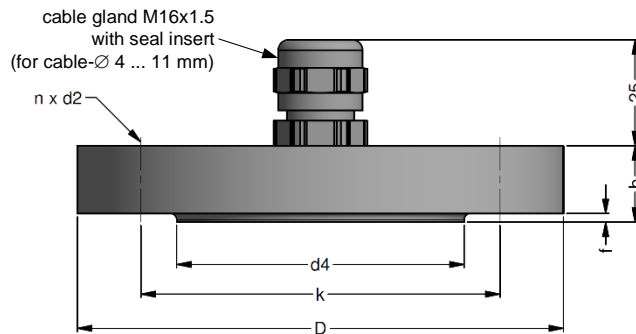


## Configuration Modbus RTU

Standard configuration	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
Configuration code (to specify with order)		-		-	



## 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 Ø 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		

## Stainless Steel Probe with RS485 Modbus RTU

Ordering code DCL 531

DCL 531

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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
	1.6	0.16	1	6	0
	2.5	0.25	2	5	0
	4.0	0.40	4	0	0
	6.0	0.60	6	0	0
	10	1.0	1	0	1
	16	1.6	1	6	1
	25	2.5	2	5	1
	40	4.0	4	0	1
	60	6.0	6	0	1
	100	10	1	0	2
	160	16	1	6	2
	250	25	2	5	2
		customer	9	9	9
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		
Accuracy					
	0.25 % FSO		2		
	customer		9		
Electrical connection					
	PUR-cable (black, Ø 7.4 mm) <sup>2</sup>		2		
	FEP-cable (black, Ø 7.4 mm) <sup>2</sup>		3		
DVGW/KTW:	TPE-U cable (blue, Ø 7.4 mm) <sup>1, 2</sup>		F		
	customer		9		
Cable length					
	in m				
Special version					
	standard		0	0	0
	customer		9	9	9

<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