DCL 531

Stainless Steel Probe with RS485 Modbus RTU

Stainless Steel Sensor

accuracy according to IEC 61298-2:
0.25 % FSO

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 250 mH_2O

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

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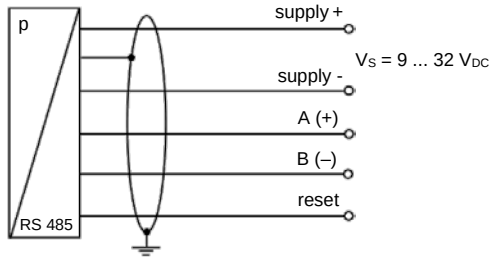
Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Max. ambient pressure (housing): 40 bar														

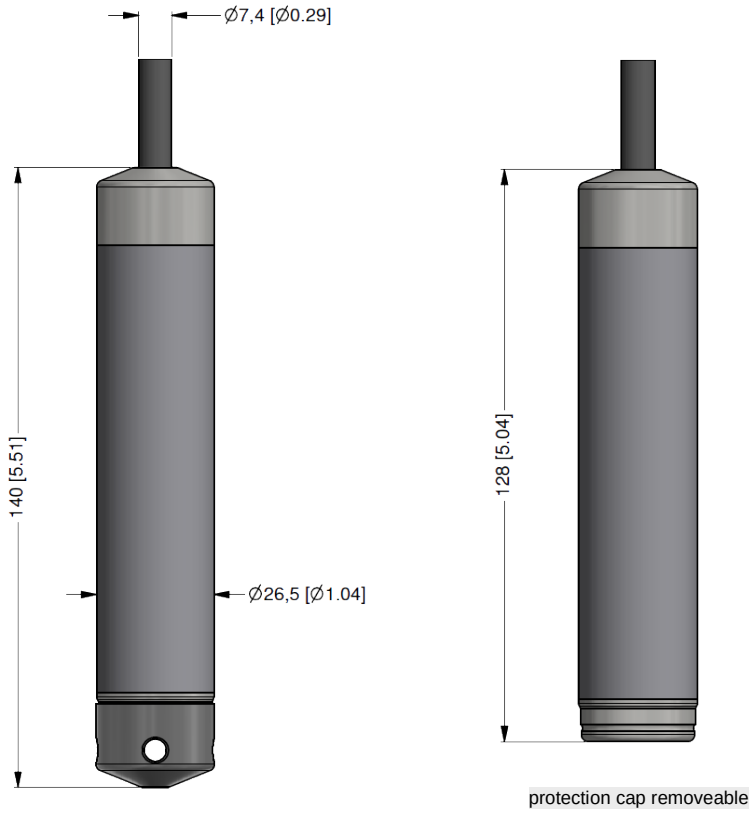
Output signal	
Digital (pressure)	RS485 with Modbus RTU Protocol
Supply	
Direct current	V_S = 9 … 32 V_{DC}
Performance	
Accuracy [1]	≤ ± 0.25 % FSO
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Measuring rate	500 Hz
Delay time	500 msec
[1] accuracy according to IEC IEC 61298-2 – limit 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 [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[2] 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 [3]	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
[3] 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 [4]	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Adjustable units	pressure: mmH_2O, mmHg, psi, bar, mbar, g/cm^2, kg/cm^2, Pa, kPa, torr, atm, mH_2O, 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
[4] 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)

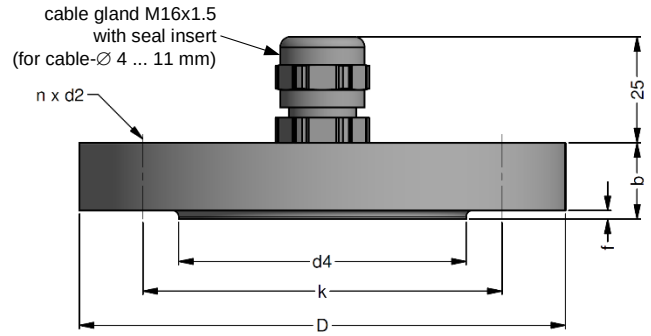
Dimensions (mm / in)



Configuration Modbus RTU					
Standard configuration	001	-	1	-	1
Address					
address	001				
	…				
	247				
Baud Rate					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
Parity					
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 ∅ 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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pressure measurement

Ordering code DCL 531

DCL 531 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

		Code	
Pressure			
	in bar	4 5 0	
	in mH_2O	4 5 1	
Input [mH_2O]	[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 9	consult
Housing			
	stainless steel 1.4404 (316L)	1	
	customer	9	consult
Diaphragm			
	stainless steel 1.4435 (316L)	1	
	customer	9	consult
Output			
	RS485 Modbus RTU	L5	
Seals			
	FKM	1	
	EPDM	3	
DVGW/KTW:	EPDM [1]	3T	
	customer	9	consult
Accuracy			
	0.25 % FSO	2	
	customer	9	consult
Electrical connection			
	PUR-cable (black, Ø 7.4 mm) [2]	2	
	FEP-cable (black, Ø 7.4 mm) [2]	3	
DVGW/KTW:	TPE-U cable (blue, Ø 7.4 mm) [1, 2]	F	
	customer	9	consult
Cable length			
	in m		
Special version			
	standard	0 0 0	
	customer	9 9 9	consult

[1] drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F)
[2] shielded cable with integrated ventilation tube for atmospheric pressure reference

01.04.2022

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