

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 mH₂O up to 0 ... 250 mH₂O

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



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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 ₂ 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
Output signal														
Digital (pressure)		RS485 with Modbus RTU Protocol												
Supply														
Direct current		V _s = 9 ... 32 V _{DC}												
Performance														
Accuracy ¹		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												
¹ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)														
Thermal effects (offset and span)														
Pressure range P _N	[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 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 ₂ O, mmHg, psi, bar, mbar, g/cm ² , kg/cm ² , Pa, kPa, torr, atm, mH ₂ 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												
⁴ 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>

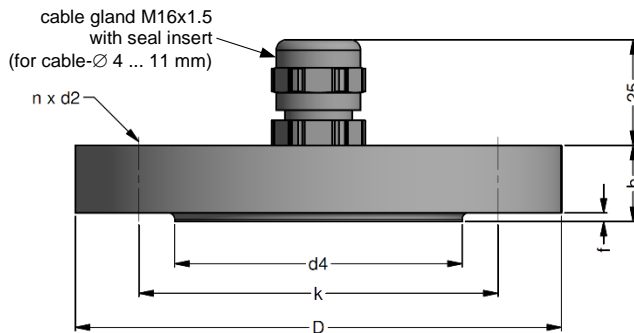
Configuration Modbus RTU					
Standard configuration	001	-	1	-	1
Address					
address	001				
	...				
	247				
Baud Rate					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
Parity					
None					0
Odd					1
Even					2
Configuration code (to specify with order)		-		-	

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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

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Pressure															
	in bar		4	5	0										
	in mH ₂ O		4	5	1										
Input	[mH ₂ 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										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															
	standard for P _N ≥ 0.4 bar:	0.35 % FSO										3			
	standard for P _N < 0.4 bar:	0.50 % FSO										5			
	option for P _N ≥ 0.4 bar:	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