



DCL 531i

Precision Stainless Steel Probe with RS485 Modbus RTU

Stainless Steel Sensor

accuracy according to IEC 61298-2:
0.1 % FSO

Nominal pressure

from 0 ... 1 mH₂O up to 0 ... 250 mH₂O

Output signal

RS485 with Modbus RTU protocol

Special characteristics

- ▶ transfer of pressure and temperature value
- ▶ excellent accuracy
- ▶ diameter 26.5 mm
- ▶ perfect thermal behaviour
- ▶ excellent long term stability
- ▶ reset function

Optional versions

- ▶ different kinds of cables
- ▶ different kinds of elastomers

The DCL 531i is characterized by very good accuracy and excellent temperature behaviour and is therefore ideally suited for applications where precise level measurement is necessary. The stainless steel probe DCL 531i 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



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®

DCL 531i

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Technical Data

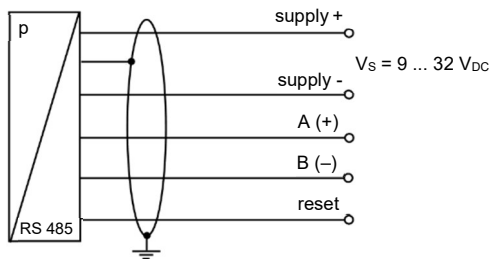
Input pressure range															
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	
Level	[mH ₂ O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80	
Max. ambient pressure (housing): 40 bar															
Output signal															
Digital		RS485 with Modbus RTU protocol (pressure & temperature)													
Supply															
Direct current		V _S = 9 ... 32 V _{DC}													
Performance															
Accuracy ¹		nominal pressure ≥ 0.25 bar: ≤ ± 0.10 % FSO nominal pressure < 0.25 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 61298-2 – limit point adjustment (non-linearity, hysteresis, repeatability)															
Thermal effects (offset and span)															
Thermal error		≤ ± 0.02 % FSO / 10 K													
In compensated range		-10 ... 70 °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										
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										others on request			
Diaphragm		stainless steel 1.4435 (316L)													
Protection cap		POM-C													
Cable sheath		PUR; FEP										others on request			
Miscellaneous															
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													

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Technical Data

Wiring diagram / pin configuration



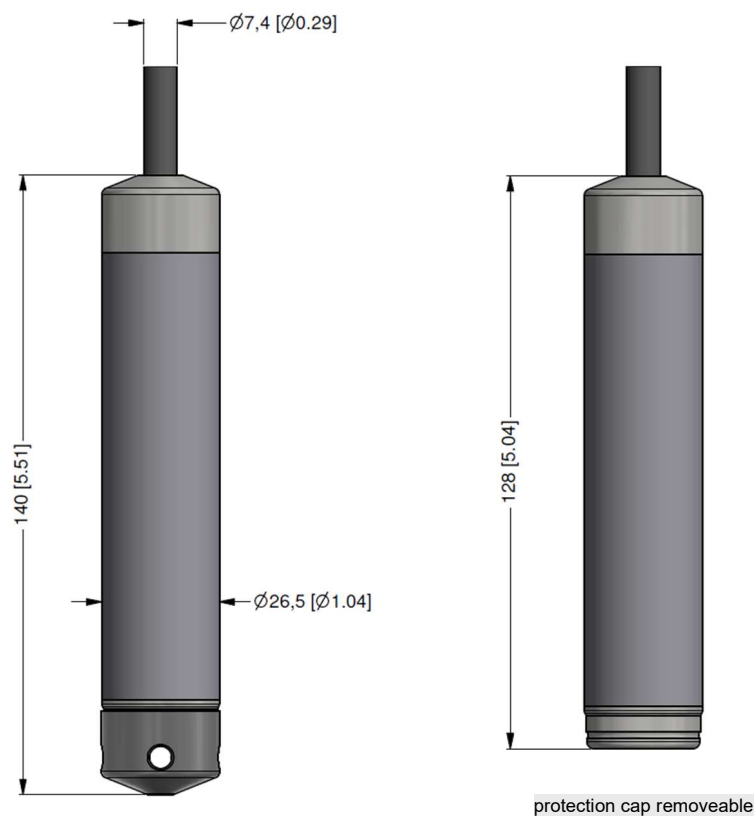
Electrical connection

Supply +
Supply -
A (+)
B (-)
Reset
Shield

cable colours (IEC 60757)

WH (white)
BN (brown)
GN (green)
YE (yellow)
PK (pink)
GNYE (green-yellow)

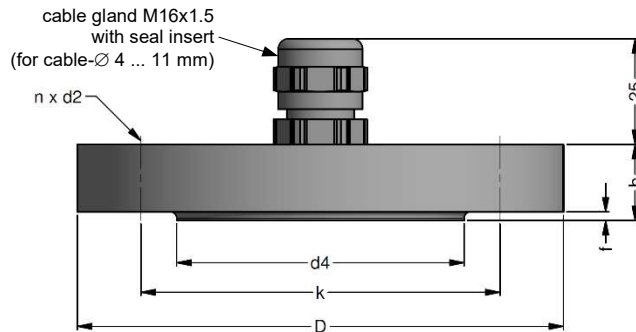
Dimensions (mm / in)



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



size	dimensions in mm		
	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	

Ordering code DCL 531i

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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
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		
	customer		9		
Accuracy					
standard for p _N ≥ 0.25 bar:	0.10 % FSO		1		
standard for p _N < 0.25 bar:	0.25 % FSO		2		
	customer		9		
Electrical connection					
	PUR-cable (black, Ø 7.4 mm) ¹		2		
	FEP-cable (black, Ø 7.4 mm) ¹		3		
	customer		9		
Cable length					
	in m				
Special version					
	standard		1	1	1
	customer		9	9	9

¹ shielded cable with integrated ventilation tube for atmospheric pressure reference