

DCL 531i



Precision Stainless Steel Probe with RS485 Modbus RTU

Stainless Steel Sensor

accuracy according to IEC 60770:
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		RS485 with Modbus RTU protocol (pressure & temperature)												
Supply		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 60770 – 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	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>

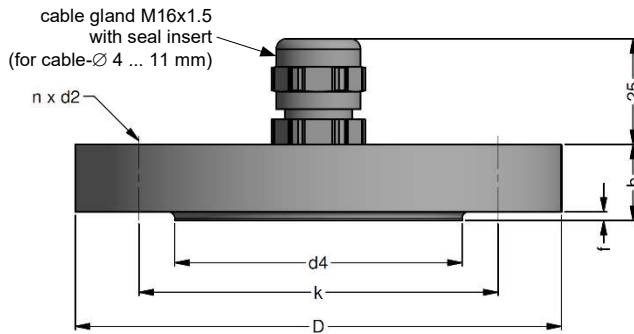
Configuration Modbus RTU					
Standard configuration	001	-	1	-	1
Address					
address	001				
	...				
	247				
Baud Rate					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
Parity					
None					0
Odd					1
Even					2
Configuration code (to specify with order)		-		-	

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Accessories

Mounting flange with cable gland



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		

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BD|SENSORS
pressure measurement

Ordering code DCL 531i

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	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												
	customer								9												consult
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												consult
Electrical connection																					
	PUR-cable (black, Ø 7.4 mm) ¹									2											
	FEP-cable (black, Ø 7.4 mm) ¹									3											
	customer									9											consult
Cable length																					
	in m																				
Special version																					
	standard										1	1	1								
	customer										9	9	9								consult

¹ shielded cable with integrated ventilation tube for atmospheric pressure reference

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