


DIWITHERM

RTD with Digital Display

Electronic Temperature Measurement**Battery Powered • Model DR210, DR111
Output 4 ... 20 mA • Model DR220, DR121**

- LCD display, 18 mm high figures
- Battery powered, operating duration at least 3 years
- Measuring range
 - 50 ... + 199.9 °C,
 - 50 ... + 400 °C,
 - 50 ... + 750 °F
- Measuring deviation 0.5 % of measuring span
- Case nominal size 100 mm
 - fixed (radial connection),
 - adjustable every angle,
 - panel mounting with cable probe
- Degree of protection IP 65

optional:

- Analog output 4 ... 20 mA, 2 wire design
-  intrinsically safe (battery powered version)

Important features of the DIWITHERM

The DIWITHERM is an ideal combination of a digital indicator and a resistance thermometer. This compact temperature measuring instrument can be used for a variety of applications and works without external power supply. The large-scale LCD display enables reading from a distance.

The DIWITHERM can be offered with all standard process connections. The models with extension neck and probe can be combined with a variety of thermowell designs. Particular attention must be paid to the dimensioning of the probe for fitting with thermowells. Adequate heat transfer between thermowell and probe is only ensured when the probe is of correct length and diameter. The DIWITHERM with cable probe is especially suited for the installation in control panels.


The DIWITHERM can also be supplied in explosion proof design, or with an optional 4 ... 20 mA output signal (2 wire system). The power supply required by the DIWITHERM with output signal is provided by the 4 ... 20 mA loop.



Specification
DIWITHERM

Measuring range		
display in °C		- 50 ... + 199.9 °C
		- 50 ... + 400 °C
display in °F		- 50 ... + 750 °F
Display		
principle		3½ digit, LCD, 18 mm high figures
resolution		0.1 °C with measuring range - 50 ... + 199.9 °C 1 °C with measuring range - 50 ... + 400 °C 1 °F with measuring range - 50 ... + 750 °F
measuring deviation ¹⁾ per DIN IEC 770, 23 °C ± 5 K		± (0.5 K + 0.5 % of measured value in °C + 1 digit)
temperature coefficient		± 0.02 % of measuring span / K _{Tamb} ²⁾
Case		
DIWITHERM without thermowell		
connection from case to extension neck	standard option	fixed, radial adjustable every angle (rotatable on extension neck 360°)
DIWITHERM with cable probe		for panel mounting, with mounting flange
nominal size		100 mm
material		stainless steel
degree of protection		IP 65 EN 60529 / IEC 529
bezel		bayonet lock bezel
window		acrylic plastic
Electromagnetic compatibility (EMC)		
CE - Conformity per		DIN EN 61326-1 (1998-01)
Special features		
sensor		Pt 1000
ambient and storage temperature	battery powered design	- 10 ... + 60 °C
	with output 4 ... 20 mA	- 10 ... + 70 °C
vibration		10 ... 500 Hz 5 g IEC 68 2-6
shock		DIN IEC 68 2-27 g _N = 15
guarantee		3 years for performance
weight		approx. 1 kg
dimensions		see drawings

DIWITHERM battery powered
Model DR210 and Model DR111

Power supply U _B		DC 3.6 V by battery ³⁾
operating duration		at least 3 years
 protection	option	Ex i
permissible ambient temperature		see certificate of conformity
maximum values for connection to certified IS circuits		see certificate of conformity

DIWITHERM with output 4 ... 20 mA
Model DR220 and Model DR121

Analog output		4 ... 20 mA, 2 wire design
load R _A		R _A ∈ (U _B - 10 V) / 0.02 A with R _A in Ohm and U _B ⁴⁾ in Volt
load effect		± 0.05 % of measuring span / 100 W
measuring deviation per DIN IEC 770, 23 °C ± 5 K		± (0.5 K + 0.5 % of measured value)
temperature coefficient		± 0.02 % of measuring span / K _{Tamb} ²⁾
rising time t ₉₀		< 500 ms
power supply effect		± 0.025 % of measuring span / V
signalling of	sensor burnout	up scale > 21 mA
	sensor short circuit	down scale < 3.6 mA
Power supply U _B		DC 10 ... 30 V by 4 ... 20 mA-loop
residual ripple		10 %
electric connection		terminal box (screw terminals up to 2.5 mm ²)
input power supply protection		reverse polarity, overvoltage, and short circuiting

1) in defined measuring range
2) T_{amb} = ambient temperature

3) lithium battery with 3.6 V size AA (Mignon) is included in the standard of delivery
4) U_B = loop power supply voltage, see power supply

DIWITHERM for fitting with a thermowell

It is important that, when fitting with a thermowell the length of the neck (measurement H), length of thermowell and length of probe (dimension FL) all match. Adequate heat transfer between thermowell and probe, and as a result safe, reliable measuring is only ensured when the dimensions are correct. When determining these lengths you must be aware that the probe is spring loaded (spring travel: 0 to 10 mm) in order to ensure that the probe presses against the bottom of the thermowell.

Probe diameter and length

The diameter of the probe should be approx. 1 mm less than the diameter of the thermowell hole in which the probe is to be fitted. Gaps greater than 0.5 mm between hole and probe have a negative effect on the heat transfer and lead to inaccuracies.

The following relationship is should be applied to determine the necessary length of probe:

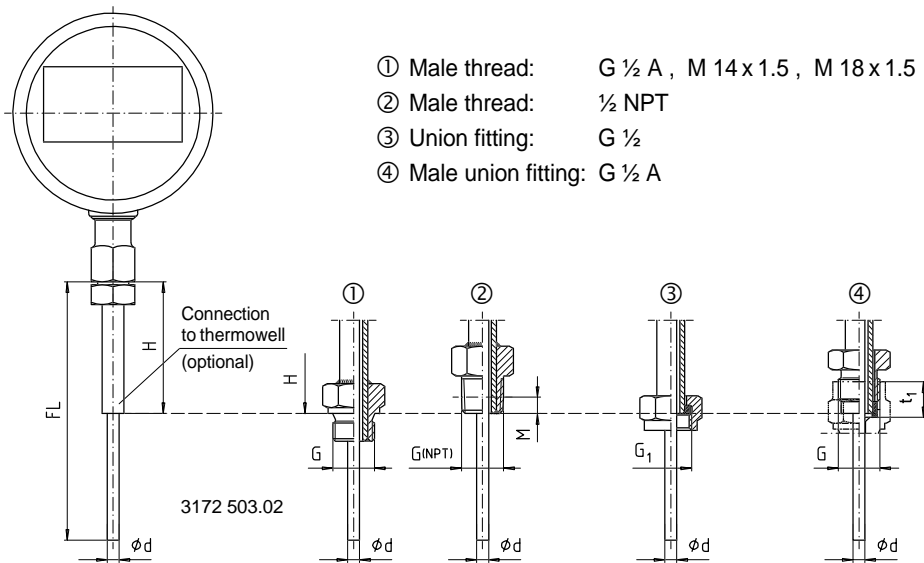
$$\text{probe length} = (\text{thermowell length} - M \text{ or } t_1) + \text{neck length}$$

Tip thickness of thermowells in excess of 5 mm must be considered when determining the length of the probe.

Probe diameter in mm	Standard length in mm									
3	250	290	350	380	410	500	530			
6	250	290	350	380	410	500	530	630	710	1000

special lengths are possible

Connection to thermowell



- ① Male thread: G 1/2 A , M 14 x 1.5 , M 18 x 1.5
- ② Male thread: 1/2 NPT
- ③ Union fitting: G 1/2
- ④ Male union fitting: G 1/2 A

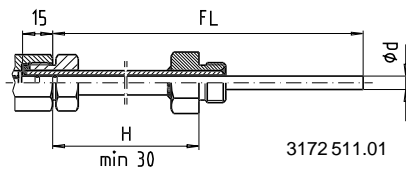
- Legend:
- ø d Probe diameter
 - FL Probe length
 - H Neck length
 - G Male thread
 - G₁ Female thread
 - t₁ Threaded hole depth in thermowell
 - M Screw-in length by hand, with 1/2 NPT approx. 8.1 mm

Extension neck length

Length: 145 mm or 165 mm
Material: stainless steel 1.4571

We recommend that a neck length be selected to give a standard length for the probe of DIWITHERM.

$$\text{extension neck length} = \text{neck length (measurement H)} + 15 \text{ mm}$$



DIWITHERM for installation in a control panel

The diameter of the probe should be approx. 1 mm less than the diameter of the hole in which the probe is to be fitted. Gaps greater than 0.5 mm between hole and probe have a negative effect on the heat transfer and lead to inaccuracies.

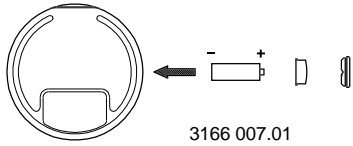
Probe

Diameter: 6 mm or 8 mm
Length: from 50 mm up to 150 mm
Material: stainless steel 1.4571

Cable

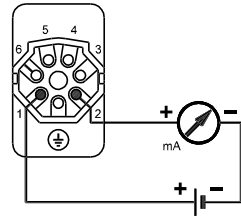
Insulation: PVC (max. 105 °C)
Silicon (max. 200 °C)
PTFE (max. 200 °C)
glass filament (max. 400 °C)
Length: to customer's specification

Changing of battery
(battery powered design only)



Access to the bayonet catch of the battery case is provided after removal of the inspection plug. View represents the back of the case.

Designation of terminal connectors
(output 4 ... 20 mA only)



4 ... 20 mA loop
Terminal 1: +
Terminal 2: -

3165 991.01

Order code for resistance thermometer DIWITHERM without thermowell

Field No.	Code	Instrument design
		Model
1	<input type="text"/>	DR210 DR210, DIWITHERM battery powered
	<input type="text"/>	DR220 DR220, DIWITHERM with output 4 ... 20 mA
		Explosion protection
2	<input type="text"/>	Z without
	<input type="text"/>	9 EEx i <i>only Model DR210, battery powered design</i>
		Measuring range
3	<input type="text"/>	EL -50 ... +199.9 °C
	<input type="text"/>	EQ -50 ... +400 °C
	<input type="text"/>	ER -50 ... +750 °F
		Connection from case to extension neck
4	<input type="text"/>	R fixed, radial
	<input type="text"/>	S adjustable every angle
		Probe diameter
5	<input type="text"/>	1 3 mm
	<input type="text"/>	3 6 mm
	<input type="text"/>	? other
		Probe length
6	<input type="text"/>	A 250 mm
	<input type="text"/>	B 290 mm
	<input type="text"/>	C 350 mm
	<input type="text"/>	D 380 mm
	<input type="text"/>	E 410 mm
	<input type="text"/>	F 500 mm
	<input type="text"/>	G 530 mm
	<input type="text"/>	H 630 mm
	<input type="text"/>	? other
		Connection to thermowell / Extension neck diameter
7	<input type="text"/>	A1 male thread G 1/2 A / diameter 11 mm
	<input type="text"/>	B1 male thread M 14 x 1.5 / diameter 11 mm
	<input type="text"/>	C1 male thread M 18 x 1.5 / diameter 11 mm
	<input type="text"/>	D1 male thread 1/2 NPT / diameter 11 mm
	<input type="text"/>	E1 union nut M 27 x 2 / diameter 11 mm
	<input type="text"/>	F1 union nut G 1/2 / diameter 11 mm
	<input type="text"/>	G1 male union fitting G 1/2 A / diameter 11 mm
	<input type="text"/>	?? other
		Extension neck length
8	<input type="text"/>	2 145 mm <i>equivalent to neck length H = 130 mm</i>
	<input type="text"/>	4 165 mm <i>equivalent to neck length H = 150 mm</i>
	<input type="text"/>	? other
		Extension neck material
9	<input type="text"/>	1 stainless seel 1.4571
	<input type="text"/>	? other
		Quality Assurance Documentation
10	<input type="text"/>	Z without
	<input type="text"/>	1 with <i>Please state in clearly understandable text !</i>
		Additional order details
11	<input type="text"/>	YES NO
	<input type="text"/>	T Z additional text <i>Please state in clearly understandable text !</i>

Order code for Model DR210 and Model DR220

1	2	3	4	5	6	7	8	9	10	11
<input type="text"/>	- <input type="text"/>	- <input type="text"/>	- <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Additional text: _____

Order code for cable resistance thermometer DIWITHERM for panel mounting

Field No.	Code	Instrument design
Model		
1	DR111	DR111, DIWITHERM battery powered
	DR121	DR121, DIWITHERM with output 4 ... 20 mA
Explosion protection		
2	Z	without
	9	Ex i <i>only Model DR111, battery powered design</i>
Measuring range		
3	EL	-50 ... +199.9 °C
	EQ	-50 ... +400 °C
	ER	-50 ... +750 °F
Process connection		
4	ZZ	without
	K1	G 1/4 A, compression fitting, stainless steel
	??	other
Probe diameter		
5	3	6 mm
	4	8 mm
	?	other
Probe length		
6	1	50 mm
	?	other <i>max. 150 mm</i>
Probe material		
7	1	stainless steel 1.4571
	?	other
Cable		
8	P	PVC, 0.22 mm ²
	S	Silicon, 0.22 mm ²
	T	PTFE, 0.22 mm ²
	G	glass filament, 0.22 mm ²
	?	other
Cable length		
9		enter length in mm to max. 9999 mm, enter as four digits e.g. 0850 for 850 mm
	????	length greater than 9999 mm <i>please state as additional text</i>
Quality Assurance Documentation		
10	Z	without
	1	with <i>Please state in clearly understandable text !</i>
Additional order details		
11	YES	NO
	T	Z

Order code for Model DR111 and Model DR121

1	2	3	4	5	6	7	8	9	10	11		
<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	-	<input type="text"/>

Additional text: _____

Specifications and dimensions given in this leaflet are correct at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.

