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# Contact Dial Thermometers

## Type 608425

### Special features

- Class 1
- Display ranges from -40°C to +600°C
- Temperature controller with actual value display as built-in or add-on device in the stainless steel case with a bayonet connection
- Case sizes: Ø 100 mm and Ø 160 mm, front panel 96 x 96 mm
- Protection type IP 65

### Brief description

Contact dial thermometers are devices with an actual value display for temperature measurement, control, and monitoring and can be used universally.

The temperature-dependent volume change in a measuring system filled with liquid or the temperature-dependent pressure change in a measuring system filled with gas is converted to a rotational movement of the actual value indicator by a bourdon tube; no transmission gear is required. The switching output is actuated by the rotational movement of the indicator shaft.

The overall system is extremely warp resistant due to the direct connection of the indicator to the measuring system. Oscillations are transferred to the indicator only to a limited degree.

The switching output can be designed as a slow-action contact, a magnetic snap contact, or an inductive contact. The slow-action or magnetic snap contact is an auxiliary current switch, which opens or closes an electrical circuit using a contact arm that is moved with the actual value indicator, depending on the direction of movement with the set limit values.

The inductive contact is an electronic limit contact with a contact-free displacement transducer (proximity switch).



Type 608425/2316



Type 608425/2496

### Technical data

	Round built-in and add-on case	Square built-in device
<b>Case</b>	Stainless steel case with bayonet connection (1.4301)	Zinc-plated sheet steel case, case fastening at rear with bar; front panel made of stainless steel (1.4301)
<b>Protection type</b>	IP 65 according to DIN EN 60529	On the front: IP 51 according to DIN EN 60529 On the rear: IP 00 according to DIN EN 60529
<b>Electrical connection</b>	Junction box: conductor cross-section up to 2.5 mm <sup>2</sup> Cable fitting, suitable for cable Ø from 6.5 to 13 mm	Screw terminals: conductor cross-section up to 2.5 mm <sup>2</sup>
<b>Front pane</b>	Polycarbonate	Acrylic glass (PMMA)
<b>Scale</b>	White, with black lettering	
<b>Display</b>	Class 1 according to DIN EN 13190	
<b>Strain relief spring</b>	For capillary devices on the case and the temperature probe	
<b>Setpoint value adjustment</b>	By setpoint adjuster in the front pane	
<b>Display correction</b>	On the rear, no display correction with design type 01 and design type 20 (Ø 100 mm)	
<b>Limit value temperatures</b>	For transport and storage -20°C to +70°C (for display range 0 to +60°C up to max. 65°C)	
<b>Rated position (NL)</b>	Any	
	<b>Liquid filling</b>	<b>Gas filling</b>
<b>Measuring system</b>	Display range (AB) ≤ 350°C	Display range (AB) ≥ 400°C
<b>Time constant</b> t <sub>0.632</sub>	Approx. 12 s, measured in water, with a probe Ø of 6 mm made of copper	Approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel
<b>Influential effect of the ambient temperature</b>	In % of the display range (referring to the deviation from the reference value +23°C)	
<b>On case</b>	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
<b>On capillary (per m)</b>	0.03% of the display range per K ambient temperature change	No influence
	Higher ambient temperature – higher temperature display – lower switching point	



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	Standard	Extra code (TZ) 442
<b>Electrical contact</b>		
<b>Contact type</b>	Electromechanical slow-action contact with single-pole touch-dependent N/O contacts	Electromechanical slow-action contact with single-pole touch-dependent N/O contacts
<b>Switching capacity</b>	AC / DC 230 V, +10/-15%, 48 to 63 Hz, $\cos \varphi = 1$ (0.6) max. 18 VA / 10 W	max. 50 VA / 30 W
<b>Switching differential</b>	$\leq 0.5\%$ of the display range	approx. 2% of the display range
<b>Switching point accuracy</b>	$\pm 0.5\%$ of the display range referring to the switch-off point with rising temperature	
<b>Switching reliability</b>	To ensure a high switching reliability, we recommend a minimum voltage of: 24 V and a minimum current of 20 mA	

	Electromechanical limit contact	Inductive limit contact
<b>Switching output</b>	01 to 11	30 and 31
		The inductive limit contact operates contact-free (proximity switch). The coil body (initiator) is fitted to the setpoint value indicator. The control lug is moved by the actual value indicator. If the control lug moves into the air gap in the coil body, the internal resistance increases (active surface attenuated, initiator has high resistance – relay drops). The resulting change in the current strength is the input signal for the switching amplifier of the control unit. Mode of operation with switching behavior according to the "open circuit principle". Control lug not in the air gap in the coil body, relay engages:
		 Current consumption $\geq 3$ mA (active surface free, oscillator oscillates).
		Control lug in the air gap in the coil body, relay drops:
		 Current consumption $\leq 1$ mA (active surface attenuated, oscillator off). Inductive limit contact according to Directive 94/9 EC (ATEX), suitable for II 2 G EEx ia IIC T6
	For switching sequence and circuit diagrams, see order details	

**Safety relays**

In the case of electromechanical limit contacts, we recommend the use of multifunctional relays in the MSR (measurement and control technology) series from: Wiebrock Mess- und Regeltechnik GmbH, www.wiebrock.de.

These switching amplifiers improve the switching reliability and the switching capacity of slow-action and magnetic snap contacts and reduce their contact load.

Unintentional switching operations in the limit contacts, caused by vibrations, are reduced considerably by an OFF delay.

In the case of inductive limit contacts, transistor relays, type KFA6-SR2-Ex up to W (II (1) G D [EEx ia] IIC) from Pepperl & Fuchs, www.pepperlfuchs.de, can be used. The intrinsic safety II 2 G EEx ia IIC T6 is guaranteed only in connection with the above-mentioned transistor relay.

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in K (+/-)
643	-20 to +120	0 to +100	2.0
357	-50 to +50	-40 to +40	1.0
810	0 to +80	+10 to +70	1.0
814	0 to +100	+10 to +90	1.0
818	0 to +120	+20 to +100	1.0
826	0 to +160	+20 to +140	2.0
832	0 to +200	+20 to +180	2.0
834	0 to +250	+30 to +220	2.5
840	0 to +300	+30 to +270	5.0
854	0 to +500	+50 to +450	5.0

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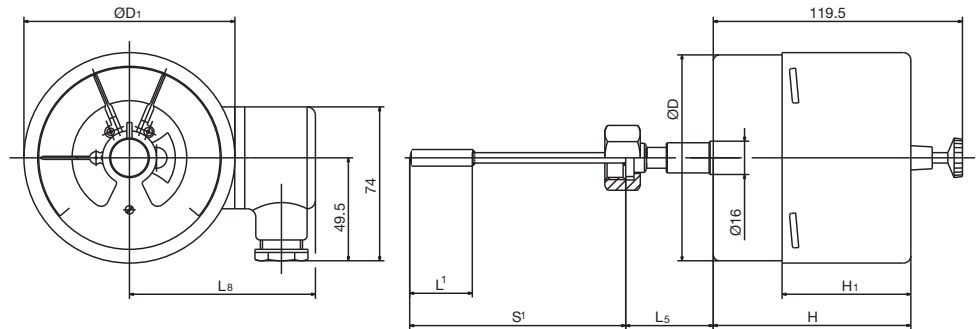
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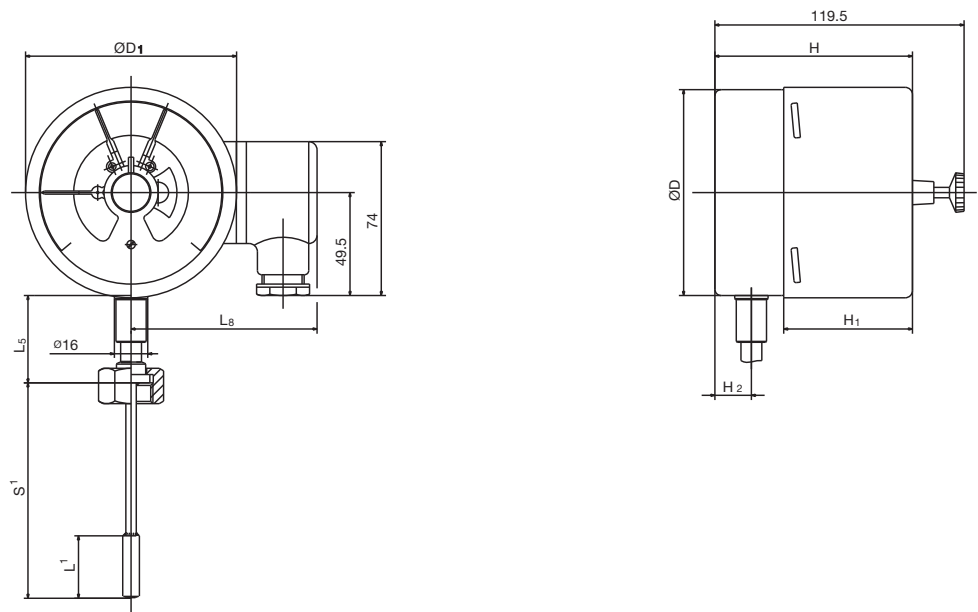


## Dimensions

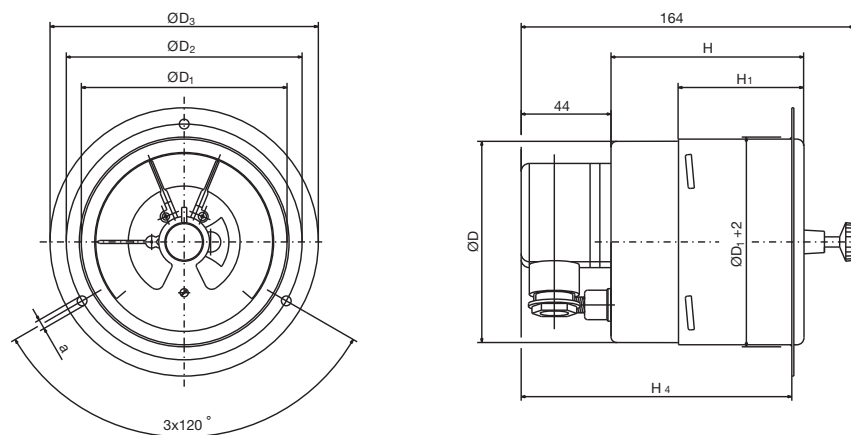
Types: 608425/0110  
 608425/0116



Types: 608425/1010  
 608425/1016



Types: 608425/2010  
 608425/2016



Panel cut-out for case  
 $\varnothing 100\text{mm} = 105.5^{+0.5}\text{mm}$   
 $\varnothing 160\text{mm} = 165.5^{+0.5}\text{mm}$

<sup>1</sup> For length specifications, see data sheet 608730

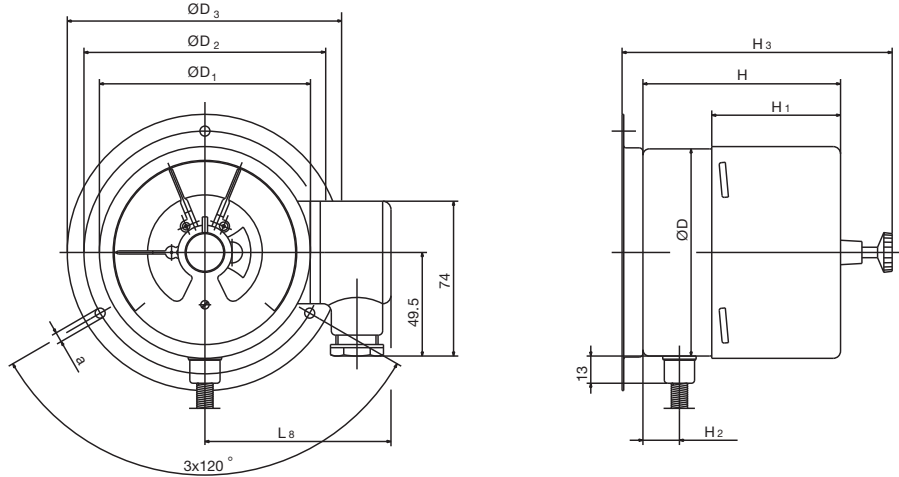
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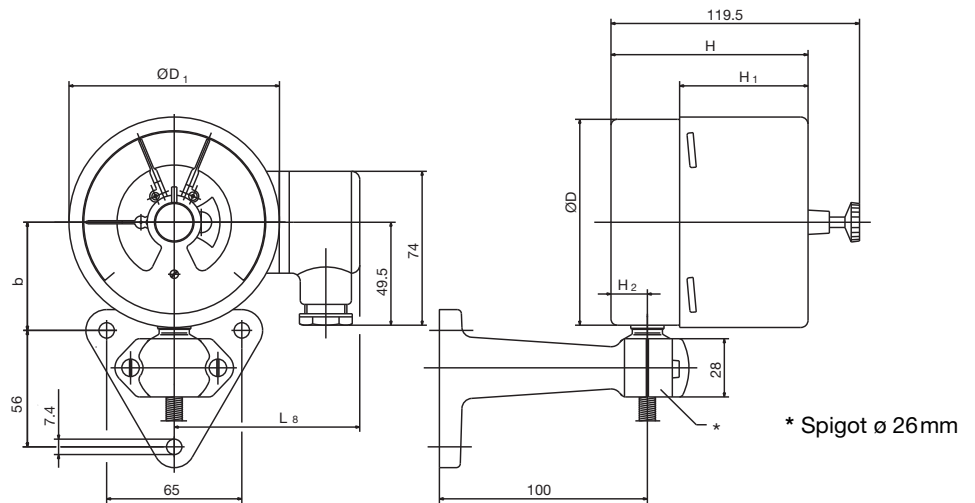
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Types: 608425/2210  
 608425/2216



Types: 608425/2310  
 608425/2316

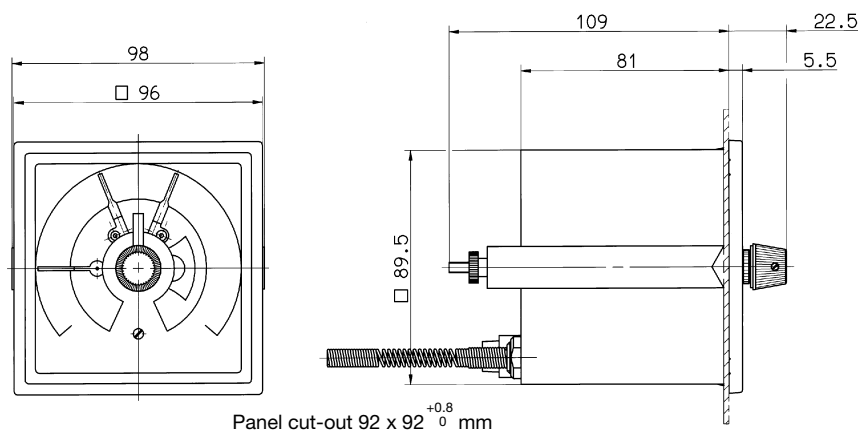


Bracket for measuring device according to DIN 16281

Case Ø	H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	D	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	a	b	L <sub>5</sub>	L <sub>8</sub>
100	95	62	17.5	129.5	129	99	101.5	116	132	4.8	52	40 <sup>1</sup>	90
160	96	63		121	130	159	161.5	178	196	5.8	82		120

<sup>1</sup> With protection tube connection type TA 02, L<sub>5</sub> is ≤ 69 mm

Type: 608425/2496



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## Order details

### Contact dial thermometer class 1, type 608425

Order code		(1) Basic type		
608425		Mechanical contact dial thermometer class 1 (round built-in and add-on device)		
608425		Mechanical contact dial thermometer class 1 (square built-in device)		
		<b>(2) Basic type extension</b>		
X	0110	Design type: 01; case size: ø 100 mm		
X	0116	Design type: 01; case size: ø 160 mm		
X	1010	Design type: 10; case size: ø 100 mm		
X	1016	Design type: 10; case size: ø 160 mm		
X	2010	Design type: 20; case size: ø 100 mm		
X	2016	Design type: 20; case size: ø 160 mm		
X	2210	Design type: 22; case size: ø 100 mm		
X	2216	Design type: 22; case size: ø 160 mm		
X	2310	Design type: 23; case size: ø 100 mm		
X	2316	Design type: 23; case size: ø 160 mm		
X	2496	Design type: 24; case size: 96 x 96 mm		
		<b>(3) Display range (AB)</b>		
X	X	469	-40 to +40°C;	
X	X	566	-30 to +50°C;	
X	X	807	0 to +60°C;	
X	X	810	0 to +80°C;	
X	X	814	0 to +100°C;	
X	X	818	0 to +120°C;	
X	X	826	0 to +160°C;	
X	X	832	0 to +200°C;	
X	X	834	0 to +250°C;	
X	X	840	0 to +300°C;	
X	X	843	0 to +350°C;	
X	X	848	0 to +400°C;	
X	X	854	0 to +500°C;	
		<b>(4) Capillary type (FL)<sup>1</sup></b>		
X		00	Without (with rigid shaft)	
X	X	04	FL04Stainless steel capillary (1.4571), ø 2.2 mm	
		<b>(5) Capillary length<sup>1</sup></b>		
X		0	Without (with rigid connection)	
X	X	1000	1000 mm	
X	X	2000	2000 mm	
X	X	3000	3000 mm	
X	X	4000	4000 mm	
X	X	5000	5000 mm	
X	X	...	Special length (specifications in plain text: 1,000 mm increments, maximum length 10,000 mm)	
		<b>(6) Process connection (PC)<sup>1</sup></b>		
X	X	750	TF01 Temperature probe with stepped support tube	
X	X	753	TF05 Temperature probe with plane support tube	
X	X	752	TF11 Temperature probe without support tube	
X	X	843	TA02 Protection tube with union nut and loose screw connection <sup>2</sup>	
X	X	161	TA03 Protection tube with loose union nut (with TF01)	
X	X	846	TA04 Protection tube with fixed hexagon male connector <sup>2</sup>	
X	X	847	TA06 Displaceable threaded fitting on support tube <sup>2</sup>	
X	X	891	SH05 Screw-in sleeve, multi-sectional <sup>2</sup> (only with ø 14 mm)	
X	X	913	SH07 Screw-in sleeve, multi-sectional, with clamping piece and fixing screw <sup>2</sup>	

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### Contact dial thermometer class 1, type 608425

			<b>(7) Diameter of process connection (PC)<sup>1</sup></b>	
X	X	6	∅ 6 mm	
X	X	8	∅ 8 mm	
X	X	10	∅ 10 mm	
X	X	14	∅ 14 mm (only for SH05)	
			<b>(8) Thread type of process connection (PC)<sup>1</sup></b>	
X	X	000	Without thread (for TF 01, TF 05, and TF 11)	
X	X	103	Screw connection G 3/8	
X	X	104	Screw connection G 1/2	
X	X	105	Screw connection G 3/4	
			<b>(9) Material of process connection (PC)<sup>1</sup></b>	
X	X	26	Stainless steel (CrNi, 1.4571)	
X	X	97	Stainless steel (CrNi, 14571) – TF / Brass (CuZn) – TA, SH	
			<b>(10) Insertion length, process connection (PC)<sup>1</sup> (dimension "EL" or "S")</b>	
X	X	0	Minimum insertion length TF 11 (active probe dimension)	
X	X	50	50 mm	
X	X	100	100 mm	
X	X	150	150 mm	
X	X	200	200 mm	
X	X	...	Special length (specifications in plain text – 50 mm increments)	
			<b>(11) Switching output (SA)</b>	
X	X	01	With increasing temperature, contact 1 (N/C) opens (2) <sup>3</sup>	
X	X	02	With increasing temperature, contact 1 (N/O) closes (1) <sup>3</sup>	
X	X	03	With increasing temperature, contact 1 (N/C) opens and contact 2 (N/O) closes (21) <sup>3</sup>	
X	X	04	With increasing temperature, contact 1 and contact 2 (N/O) closes (11) <sup>3</sup>	
X	X	05	With increasing temperature, contact 1 and contact 2 (N/C) opens (22) <sup>3</sup>	
X		10	With increasing temperature, contact 1 (N/C) opens and contact 2 (N/O) closes (with isolated electrical circuit) (21) <sup>3</sup>	
X		11	With increasing temperature, contact 1 and contact 2 (N/O) closes (with isolated electrical circuit) (11) <sup>3</sup>	
X	X	30	Control lug moving in when the temperature rises, N/C (2) <sup>3</sup>	
X	X	31	Control lug moving out when the temperature rises, N/O contact (1) <sup>3</sup>	
			<b>(12) Extra codes (TZ)</b>	
X	X	000	Without extra code	
X	X	442	Electromechanical magnetic snap contact	
X		509	Setpoint value adjustment with key	
X	X	522	Customized scale	

Special versions upon request!

**Order code** 608425 / [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] / [ ] , ...  
**Order example** 608425 / 2010 - 818 - 04 - 2000 - 750 - 8 - 000 - 26 - 100 - 01 / 000<sup>4</sup>

<sup>1</sup> For description and special features refer to data sheet 608730

<sup>2</sup> Screw-in spigot according to DIN 3852 form A

<sup>3</sup> Bracketed values ( . . . ) correspond to the key indicator specifications according to DIN 16196

<sup>4</sup> List extra codes in sequence, separated by commas