
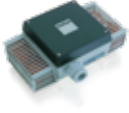



















# Temperature monitoring

	A/AS/ASE 645/650	ADS 319	A2/A2S 198/199	IA/IAS 409/419	MSK 624/634	MP/MSP 663/664	
	page 19	page 24	page 29	page 34	page 39	page 44	
							
<b>Designation of application</b>	Room thermostat	Double room thermostat	Multistage room thermostat	Industrial room thermostat	Duct thermostat	Pipe mounting thermostat	
<b>Measuring range</b>	-45°C ... +15°C to 0°C ... +60°C	-30°C ... +30°C to 0°C ... +60°C	-45°C ... +15°C to 0°C ... +60°C	-30°C ... +30°C to 0°C ... +60°C	-30°C ... +40°C to +20°C ... +110°C	-10°C ... +35°C to +20°C ... +110°C	
<b>Output signal</b>	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	
<b>Switching differential</b>	Adjustable / not adjustable	Adjustable / not adjustable	Not adjustable	Adjustable / not adjustable	Adjustable / not adjustable	Adjustable / not adjustable	
<b>Ambient temperature</b>	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	
<b>Protection</b>	IP54	IP54	IP54	IP65	IP54	IP54	
<b>Applications</b>	HVAC Refrigeration	HVAC Refrigeration	HVAC Refrigeration	HVAC	HVAC	Process technology Water treatment	
<b>Approval / conformity</b>	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	
<b>Type of protection</b>							
<b>Data sheet</b>	<a href="http://www.trafag.com/H72170">www.trafag.com/H72170</a>	<a href="http://www.trafag.com/H72146">www.trafag.com/H72146</a>	<a href="http://www.trafag.com/H72137">www.trafag.com/H72137</a>	<a href="http://www.trafag.com/H72116">www.trafag.com/H72116</a>	<a href="http://www.trafag.com/H72177">www.trafag.com/H72177</a>	<a href="http://www.trafag.com/H72175">www.trafag.com/H72175</a>	
<b>Instructions</b>	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>	<a href="http://www.trafag.com/H73170">www.trafag.com/H73170</a>	<a href="http://www.trafag.com/H70311">www.trafag.com/H70311</a>	<a href="http://www.trafag.com/H73111">www.trafag.com/H73111</a>	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>	<a href="http://www.trafag.com/H73663">www.trafag.com/H73663</a>	



MST 624/634	M/MS 624/634	MS...R 630/632	F/F...R 990/991/992/993	GS 657/658	D...R 302	M2S 104/114
page 49	page 54	page 60	page 65	page 69	page 74	page 79
						
Direct mounting thermostat	Remote sensing thermostat	Remote sensing thermostat with limiter	Frost protection thermostat	Remote sensing thermostat	Double thermostat with remote sensor and limiter	Multistage thermostat with remote sensor
-30°C ... +40°C to +70°C ... +350°C	-30°C ... +40°C to +70°C ... +350°C	-30°C ... +40°C to +70°C ... +350°C	-5°C ... +15°C	+5°C ... +95°C and +20°C ... +150°C	-30°C ... +40°C to +70°C ... +350°C	-30°C ... +40°C to +70°C ... +350°C
Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact
Adjustable / not adjustable	Adjustable / not adjustable	Not adjustable	Not adjustable	Not adjustable	Adjustable / not adjustable	Not adjustable
-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	Max. operating temperature: +70°C Min. operating temperature: switch point + 2°C	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C
IP54	IP54	IP54	IP 54	IP54	IP54	IP54
Machine tools HVAC Process technology Water treatment	Railways Machine tools HVAC Refrigeration Process technology	Railways Machine tools HVAC Refrigeration Process technology	HVAC Refrigeration	Process technology	HVAC Refrigeration	Machine tools HVAC Refrigeration Process technology
EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H
<a href="http://www.trafag.com/H72174">www.trafag.com/H72174</a>	<a href="http://www.trafag.com/H72172">www.trafag.com/H72172</a>	<a href="http://www.trafag.com/H72173">www.trafag.com/H72173</a>	<a href="http://www.trafag.com/H72123">www.trafag.com/H72123</a>	<a href="http://www.trafag.com/H72179">www.trafag.com/H72179</a>	<a href="http://www.trafag.com/H72142">www.trafag.com/H72142</a>	<a href="http://www.trafag.com/H72139">www.trafag.com/H72139</a>
<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>	<a href="http://www.trafag.com/H70821">www.trafag.com/H70821</a>	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>	<a href="http://www.trafag.com/H73170">www.trafag.com/H73170</a>	<a href="http://www.trafag.com/H70311">www.trafag.com/H70311</a>

# Temperature monitoring

	L/LF 736/754	L...R 755	I/IS 404/414	IS...R 410/412	ISN/ISNT 471/472	ISP/ISPT 474	
	page 85	page 90	page 95	page 101	page 107	page 113	
							
<b>Designation of application</b>	Remote sensing thermostat, skeleton type	Remote sensing thermostat with limiter, skeleton type	Industrial thermostat with remote sensor	Industrial thermostat with remote sensor and limiter	Thermostat for shipbuilding	Compact thermostat for shipbuilding	
<b>Measuring range</b>	-30°C ... +40°C to +70°C ... +350°C	-30°C ... +40°C to +70°C ... +350°C	-30°C ... +40°C to +70°C ... +350°C	-30°C ... +40°C to +70°C ... +350°C	-20°C ... +110°C to +40°C ... +300°C	+5°C ... +95°C to +20°C ... +150°C	
<b>Output signal</b>	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact	
<b>Switching differential</b>	Adjustable / not adjustable	Not adjustable	Adjustable / not adjustable	Not adjustable	Not adjustable	Not adjustable	
<b>Ambient temperature</b>	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	-30°C ... +70°C	
<b>Protection</b>	IP00	IP00	IP65	IP65	IP65	IP65	
<b>Applications</b>	Machine tools	Machine tools	Railways Machine tools	Machine tools Process technology	Shipbuilding Engine manufacturing Railways	Shipbuilding Engine manufacturing Railways Hydraulics HVAC	
<b>Approval / conformity</b>	EN60730-1/ EN60730-2-9: Typ 2.B.H	EN60730-1/ EN60730-2-9: Typ 2.B.H	EN60730-1/ EN60730-2-9: Type 2.B.H	EN60730-1/ EN60730-2-9: Typ 2.B.H	ABS, BV, CCS, DNV-GL, KRS, LRS, RINA, RMRS EN60730-1/ EN60730-2-9: Typ 2.B.H	ABS, BV, CCS, DNV-GL, KRS, LRS, NKK, RINA, RMRS EN60730-1/ EN60730-2-9: Type 2.B.H	
<b>Type of protection</b>							
<b>Data sheet</b>	<a href="http://www.trafag.com/H72122">www.trafag.com/H72122</a>	<a href="http://www.trafag.com/H72124">www.trafag.com/H72124</a>	<a href="http://www.trafag.com/H72110">www.trafag.com/H72110</a>	<a href="http://www.trafag.com/H72138">www.trafag.com/H72138</a>	<a href="http://www.trafag.com/H72111">www.trafag.com/H72111</a>	<a href="http://www.trafag.com/H72113">www.trafag.com/H72113</a>	
<b>Instructions</b>	<a href="http://www.trafag.com/H70211">www.trafag.com/H70211</a>	<a href="http://www.trafag.com/H70211">www.trafag.com/H70211</a>	<a href="http://www.trafag.com/H73111">www.trafag.com/H73111</a>	<a href="http://www.trafag.com/H73111">www.trafag.com/H73111</a>	<a href="http://www.trafag.com/H73111">www.trafag.com/H73111</a>	<a href="http://www.trafag.com/H73113">www.trafag.com/H73113</a>	

EXS 404/414	EXAS 409/419	«Simple Apparatus» conformity to ATEX 414	«Simple Apparatus» conformity to ATEX 419
page 119	page 125	page 130	page 136
			
Ex Industrial thermostat with remote sensor	Ex Industrial room thermostat	Industrial room thermostat with remote sensor	Industrial room thermostat
-30°C ... +40°C to +70°C ... +350°C	-30°C ... +30°C to 0°C ... +60°C	-30°C ... +40°C to +70°C ... +350°C	-30°C ... +30°C to 0°C ... +60°C
Floating change-over contact	Floating change-over contact	Floating change-over contact	Floating change-over contact
Not adjustable	Not adjustable	Not adjustable	Not adjustable
-30°C ... +70°C	-30°C ... +60°C	-30°C ... +70°C	-30°C ... max. +65°C
IP65	IP65	IP65	IP65
II 2G / D	II 2G / D	Potentially hazardous areas	Potentially hazardous areas
SEV 15 ATEX 0156 X IECEx SEV 17.0010X	SEV 15 ATEX 0156 X IECEx SEV 17.0010X	EN60730-1/ EN60730-2-9: Type 2.B.H EN60079-0, EN60079-11 Zone 1 and 2, 21 and 22	EN60730-1/ EN60730-2-9: Type 2.B.H EN60079-0, EN60079-11 Zone 1 and 2, 21 and 22
Areas with gas explosion hazards: II 2G Ex db eb IIC T6 Gb; Areas with dust explosion hazards: II 2D Ex tb IIIC T80°C Db	Areas with gas explosion hazards: II 2G Ex db eb IIC T6 Gb; Areas with dust explosion hazards: II 2D Ex tb IIIC T80°C Db		
<a href="http://www.trafag.com/H72108">www.trafag.com/H72108</a>	<a href="http://www.trafag.com/H72128">www.trafag.com/H72128</a>	<a href="http://www.trafag.com/H72183">www.trafag.com/H72183</a>	<a href="http://www.trafag.com/H72182">www.trafag.com/H72182</a>
<a href="http://www.trafag.com/H73172">www.trafag.com/H73172</a>	<a href="http://www.trafag.com/H73172">www.trafag.com/H73172</a>	<a href="http://www.trafag.com/H73173">www.trafag.com/H73173</a>	<a href="http://www.trafag.com/H73173">www.trafag.com/H73173</a>

# Temperature transmitter

	DTP 8180	T 8100
	page 139	
		
<b>Measuring principle</b>	PT 1000, DIN EN 60751 class A, 2 conductors	PT100 (with/without)
<b>Measuring range</b>	-50°C ... +150°C / -58°F ... 302°F adjustable 50 ... 100 % FS	-50°C to +200°C
<b>Output signal</b>	4 ... 20 mA, 0 ... 5 VDC, 1 ... 6 VDC, 0 ... 10 VDC, switchable mA or V	4 ... 20 mA
<b>Accuracy @ 25°C typ.</b>	± 0.5 % FS typ. + temperature sensor error	
<b>Ambient temperature</b>	-25°C ... +85°C	-40°C ... +85°C
<b>Media temperature</b>		-50°C ... +200°C
<b>Protection</b>	IP67	Min. IP65
<b>Sensor (wetted parts)</b>	1.4404/1.4435 (AISI316L)	1.4435/316L, MgO
<b>Pressure connection (wetted parts)</b>		
<b>Housing</b>	Steel, die cast metal galvanised display housing plastic	AlSi10Mg / Epoxy coated
<b>Process connections</b>	G1/8" m; G1/4" m; G1/2" m; 1/4" NPT m; 1/2" NPT m; Tri-Clamp DIN32676; Sanitary fitting DIN11851	
<b>Electrical connections</b>	Male electrical connector M12x1, 5-pole; Male electrical connector M12x1, 4-pole	Spring terminal 0.1...2.5 mm <sup>2</sup>
<b>Applications</b>	Machine tools Hydraulic power units Cooling and lubrication systems HVAC Process technology	Shipbuilding Railways HVAC Refrigeration
<b>Approval / conformity</b>		ABS
<b>Data sheet</b>	<a href="http://www.trafag.com/H72352">www.trafag.com/H72352</a>	<a href="http://www.trafag.com/H72102">www.trafag.com/H72102</a>
<b>Instructions</b>	<a href="http://www.trafag.com/H73352">www.trafag.com/H73352</a>	<a href="http://www.trafag.com/H73102">www.trafag.com/H73102</a>

# AMBISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- HVAC
- Refrigeration

## Features

- Switching differential adjustable or fixed
- Short response time
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Room thermostat	Switching differential	Adjustable / not adjustable
Measuring range	-45°C ... +15°C to 0°C ... +60°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX	XX	XX	XXX	XX	XX
<b>Custom build code</b>	External adjustment	645					
	Internal adjustment	650					
<b>Microswitch</b>	Small switching differential, not adjustable		10				
	Average switching differential, not adjustable		11				
	With gold plated contacts, not adjustable		21				
	Adjustable large switching differential		24				
	Adjustable standard switching differential		25				
<b>Range</b>	<b>Range [°C]</b>	<b>Operating temperature [°C]</b>					
	-45 ... +15 <sup>1)</sup>	-45 ... +30		05			
	-30 ... +30	-30 ... +40		02			
	-20 ... +40 <sup>1)</sup>	-30 ... +50		06			
	0 ... +30	-30 ... +50		03			
	+10 ... +40	-30 ... +70		04			
	0 ... +60	-30 ... +70		12			
<b>Sensor</b>	Stainless steel (1.4435 / AISI316L)				401		
	Copper				402		
	Copper nickel plated				403		
<b>Fixing <sup>2)</sup></b>	Console					19	
<b>Accessories</b>	Switchpoint locking <sup>1)</sup>						15
	Switchpoint fixed and sealed upon customer's request <sup>1)</sup>						88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>1)</sup>						83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing						
	Railway version IEC 61373, category 2						28
	Outdoor application (vented)						44
	Cover with window						77

<sup>1)</sup> Only with type 650 internal adjustment

<sup>2)</sup> See data sheet H72106

## Standard products (extra short lead time)

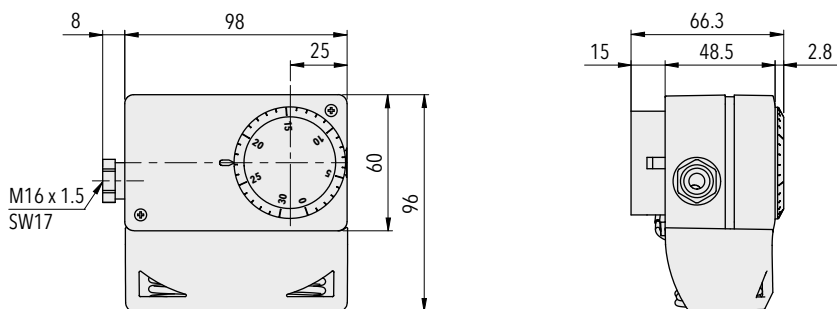
Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Operating temperature [°C]
A30	645 2503 402 19	0 ... +30	0.7 ... 6 (adjustable)	-30 ... +50
A33	645 2502 402 19	-30 ... +30	0.7 ... 6 (adjustable)	-30 ... +40
A40	645 2504 402 19	+10 ... +40	0.7 ... 6 (adjustable)	-30 ... +70
A60	645 2512 402 19	0 ... +60	0.7 ... 6 (adjustable)	-30 ... +70
AS30	650 2503 402 19	0 ... +30	0.7 ... 6 (adjustable)	-30 ... +50
AS33	650 2502 402 19	-30 ... +30	0.7 ... 6 (adjustable)	-30 ... +40
AS40	650 2504 402 19	+10 ... +40	0.7 ... 6 (adjustable)	-30 ... +70
AS60	650 2512 402 19	0 ... +60	0.7 ... 6 (adjustable)	-30 ... +70
ASE40	650 2404 402 19 0000 0000 00 00 00 01	+10 ... +40	5 (fixed)	-30 ... +70

Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	see table
<b>Environmental conditions</b>	Ambient temperature	see ordering information
	Storage temperature	Range < +40°C: -30...+50°C Range > +40°C: -30...+85°C
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	see ordering information
	Filling	Liquid
	Housing	PC/ABS-Blend V0
	Screwed cable gland	PA, Polyamid
	Installation	any position
	Weight	~ 300 g
<b>Microswitch</b>	Rating	see table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	U ≤ 250V: 1.45 kV U ≤ 500V: 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11/25: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles Microswitch 24: 0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M16x1.5 Cable-Ø 4...9 mm
	Terminal screw	3 x 1...2.5 mm <sup>2</sup>

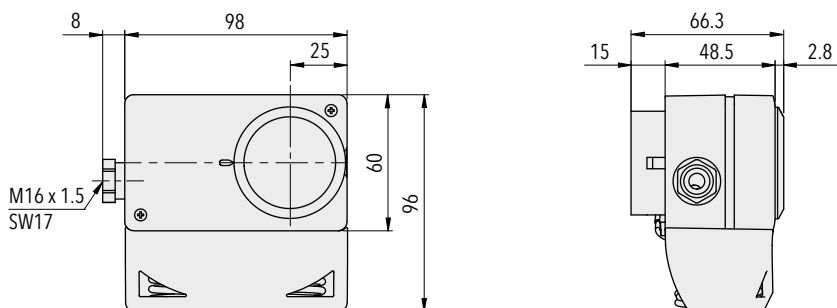
Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72170">www.trafag.com/H72170</a>
	Instructions	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>
	Flyer	<a href="http://www.trafag.com/H70961">www.trafag.com/H70961</a>



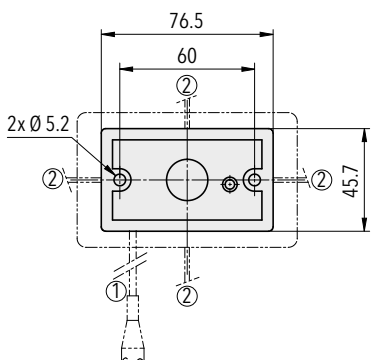
## Dimensions



645.XXXX.XXX.XX.XX



650.XXXX.XXX.XX.XX

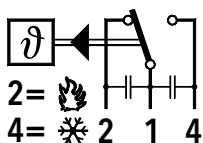


6XX.XXXX.XXX.19.XX

Switching differential typ.		
<b>Range</b>	[°C]	-45 ... +15 -30 ... +30 -20 ... +40 0 ... +30 +10 ... +40 0 ... +60
<b>Microswitch 10</b> Switching differential (fixed value, not adjustable)	[°C]	0.3
<b>Microswitch 11</b> Switching differential (fixed value, not adjustable)	[°C]	0.7
<b>Microswitch 21</b> Switching differential (fixed value, not adjustable)	[°C]	0.7
<b>Microswitch 24</b> Switching differential (adjustable value)	[°C]	3 ... 10
<b>Microswitch 25</b> Switching differential (adjustable value)	[°C]	0.7 ... 6

Electrical data switch			
Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A
<b>25</b>	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A
<b>24</b>	Adjustable large switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3 (0.2) A 125 V, 0.75 (0.4) A 30 V, 15 (1.5) A 14 V, 15 (1.5) A

## Electrical Connection



645/650

# AMBI DUOSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- HVAC
- Refrigeration

## Features

- With 2 individual measuring systems
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Double room thermostat	Switching differential	Adjustable / not adjustable
Measuring range	-30°C ... +30°C to 0°C ... +60°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		319 .	XX	XX	XXX	XX	XX
<b>Microswitch</b>	Small switching differential, not adjustable		10				
	Average switching differential, not adjustable		11				
	With gold plated contacts, switching differential not adjustable		21				
	Adjustable standard switching differential		25				
<b>Range</b>	<b>Range</b> [°C]	<b>Operating temperature</b> [°C]					
	-30 ... +30	-30 ... +40			02		
	-20 ... +40	-30 ... +50			06		
	0 ... +30	-30 ... +50			03		
	+10 ... +40	-30 ... +70			04		
	0 ... +60	-30 ... +70			12		
<b>Sensor</b>	Copper				402		
	Copper nickel plated				403		
<b>Fixing <sup>2)</sup></b>	Mounting bracket						19
<b>Accessories</b>	Switchpoint locking						15
	Switchpoint fixed and sealed upon customer's request						88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy						83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing						
	Railway version IEC 61373, category 2						28
	Outdoor application (vented)						44

<sup>2)</sup> See data sheet H72106

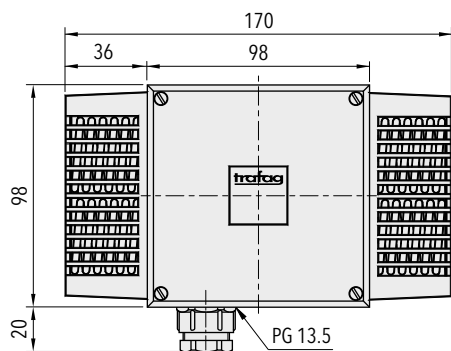
## Standard products (extra short lead time)

Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Operating temperature [°C]
ADS30	319 2503 402 19	0 ... +30	0.7 ... 6 (adjustable)	-30 ... +50
ADS33	319 2502 402 19	-30 ... +30	0.7 ... 6 (adjustable)	-30 ... +40
ADS60	319 2512 402 19	0 ... +60	0.7 ... 6 (adjustable)	-30 ... +70

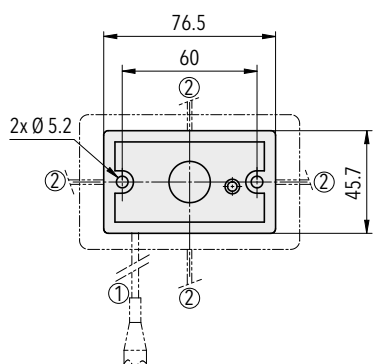
Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5\%$ FS typ.
	Scale accuracy typ.	$\pm 2\%$ FS typ.
	Switching differential	see table
<b>Environmental conditions</b>	Ambient temperature	see ordering information
	Storage temperature	Range $< +40^{\circ}\text{C}$ : $-30\dots+50^{\circ}\text{C}$ Range $> +40^{\circ}\text{C}$ : $-30\dots+85^{\circ}\text{C}$
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	see ordering information
	Filling	Liquid
	Housing	Noryl
	Screwed cable gland	PA, Polyamid
	Installation	any position
	Weight	$\sim 220$ g
<b>Microswitch</b>	Rating	see table
	Resistance of insulation	$> 2\text{ M}\Omega$
	Dielectric strength	$U \leq 250\text{V}$ : 1.45 kV $U \leq 500\text{V}$ : 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11/25: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles
<b>Electrical connection</b>	Cable gland	PG13.5 Cable- $\varnothing$ 5...12.5 mm
	Terminal screw	3 x 1...2.5 mm <sup>2</sup>

Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72146">www.trafag.com/H72146</a>
	Instructions	<a href="http://www.trafag.com/H73170">www.trafag.com/H73170</a>
	Flyer	<a href="http://www.trafag.com/H70960">www.trafag.com/H70960</a>

## Dimensions



319.XXXX.XXX.XX.XX

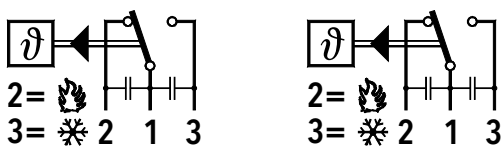


319.XXXX.XXX.19.XX

Switching differential typ.		
<b>Range</b>	[°C]	-30 ... +30 -20 ... +40 0 ... +30 +10 ... +40 0 ... +60
<b>Microswitch 10</b> Switching differential (fixed value, not adjustable)	[°C]	0.3
<b>Microswitch 11</b> Switching differential (fixed value, not adjustable)	[°C]	0.7
<b>Microswitch 21</b> Switching differential (fixed value, not adjustable)	[°C]	0.7
<b>Microswitch 25</b> Switching differential (adjustable value)	[°C]	0.7 ... 6

Electrical data switch			
Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1(0.1)A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1(0.1)A 12 V, 1 (1) A 5 V, 2 (2) A
<b>25</b>	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A

## Electrical Connection



# ALTERO AMBISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- HVAC
- Refrigeration

## Features

- With 1 adjustable step between 2 stages
- Short response time
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Multistage room thermostat	Switching differential	Not adjustable
Measuring range	-45°C ... +15°C to 0°C ... +60°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change



## Ordering information/type code

		XXX	XX	XX	XXX	XX	XX
<b>Custom build code</b>	Internal adjustment	198					
	External adjustment	199					
<b>Microswitch</b>	Small switching differential, not adjustable		10				
	Average switching differential, not adjustable		11				
	With gold plated contacts, switching differential not adjustable		21				
<b>Range</b>	<b>Range [°C]</b>	<b>Operating temperature [°C]</b>					
	-45 ... +15	-45 ... +30		05			
	-30 ... +30	-30 ... +40		02			
	-20 ... +40	-30 ... +50		06			
	0 ... +30	-30 ... +50		03			
	+10 ... +40	-30 ... +70		04			
	0 ... +60	-30 ... +70		12			
<b>Sensor</b>	Stainless steel (1.4435 / AISI316L)				401		
	Copper				402		
	Copper nickel plated				403		
<b>Fixing <sup>2)</sup></b>	Mounting bracket						19
<b>Accessories</b>	Switchpoint locking <sup>1)</sup>						15
	Switchpoint fixed and sealed upon customer's request <sup>1)</sup>						88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>1)</sup>						83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing						
	Railway version IEC 61373, category 2						28
	Outdoor application (vented)						44
	Desired stage difference to be indicated when ordering (without indication = switches synchronous) Switch 1 on scale, difference switch 2 to scale -6 °C...+15 °C Minimum distance between switches: Switch 10: ±1 °C Switch 11/21: ±2 °C						

<sup>1)</sup> Only with type 198, internal adjustment

<sup>2)</sup> See data sheet H72106

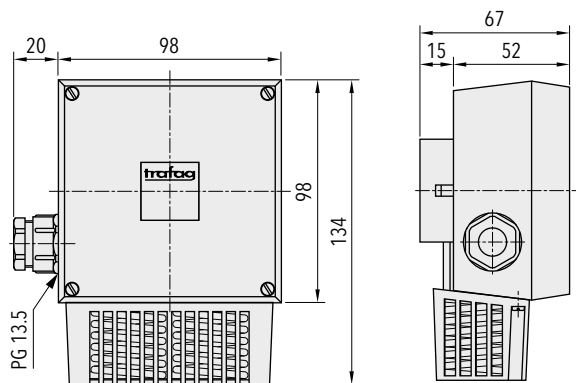
## Standard products (extra short lead time)

Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Smallest stage difference [°C]	Largest stage difference [°C]	Operating temperature [°C]
A230	199 1103 402 19	0 ... +30	0.7 (fixed)	-6	15	-30 ... +50
A233	199 1102 402 19	-30 ... +30	0.7 (fixed)	-6	15	-30 ... +40
A260	199 1112 402 19	0 ... +60	0.7 (fixed)	-6	15	-30 ... +70
A2S30	198 1103 402 19	0 ... +30	0.7 (fixed)	-6	15	-30 ... +50
A2S33	198 1102 402 19	-30 ... +30	0.7 (fixed)	-6	15	-30 ... +40
A2S60	198 1112 402 19	0 ... +60	0.7 (fixed)	-6	15	-30 ... +70

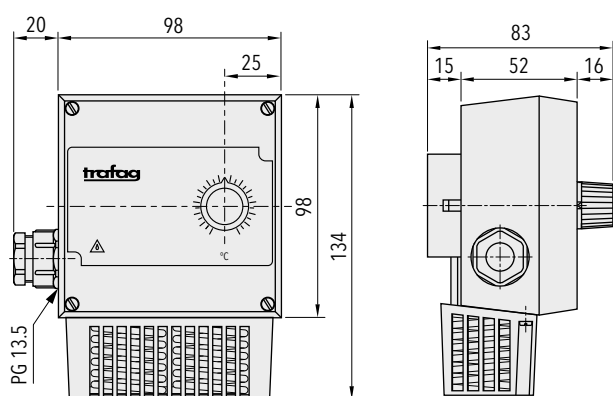
Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	see table
<b>Environmental conditions</b>	Ambient temperature	see ordering information
	Storage temperature	Range < +40°C: -30...+50°C Range > +40°C: -30...+85°C
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	see ordering information
	Filling	Liquid
	Housing	Noryl
	Screwed cable gland	PA, Polyamid
	Installation	any position
	Weight	~ 480 g
<b>Microswitch</b>	Rating	see table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	U ≤ 250V: 1.45 kV U ≤ 500V: 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles
<b>Electrical connection</b>	Cable gland	PG13.5 Cable-Ø 5...12.5 mm
	Terminal screw	6 x 1...2.5 mm <sup>2</sup>

Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72137">www.trafag.com/H72137</a>
	Instructions	<a href="http://www.trafag.com/H70311">www.trafag.com/H70311</a>
	Flyer	<a href="http://www.trafag.com/H70962">www.trafag.com/H70962</a>

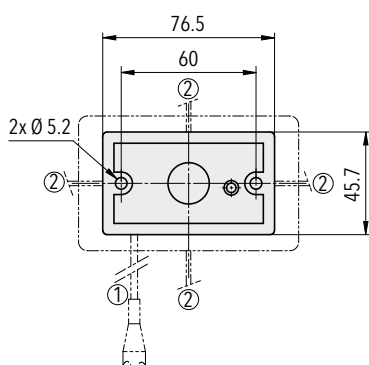
## Dimensions



198.XXXX.XXX.XX.XX



199.XXXX.XXX.XX.XX

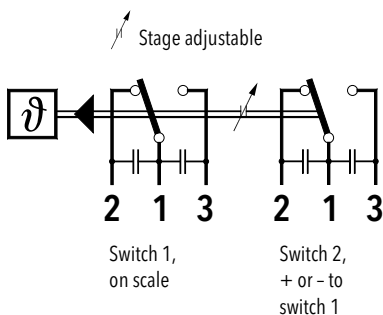


19X.XXXX.XXX.19.XX

Switching differential typ.		
<b>Range</b>	[°C]	-45 ... +15 -30 ... +30 -20 ... +40 0 ... +30 +10 ... +40 0 ... +60
<b>Microswitch 10</b> Switching differential (fixed value, not adjustable)	[°C]	0.3
<b>Microswitch 11</b> Switching differential (fixed value, not adjustable)	[°C]	0.7
<b>Microswitch 21</b> Switching differential (fixed value, not adjustable)	[°C]	0.7

Electrical data switch			
Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A

## Electrical Connection



# INDU AMBISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- HVAC

## Features

- Compact design
- Rugged housing
- Protection IP65
- Any mounting position possible

Technical Data			
Designation of application	Industrial room thermostat	Switching differential	Adjustable / not adjustable
Measuring range	-30°C ... +30°C to 0°C ... +60°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX	XX	XX	XXXXXX	XX
<b>Custom build code</b>	External adjustment	409				
	Internal adjustment	419				
<b>Microswitch</b>	Small switching differential, not adjustable		10			
	Average switching differential, not adjustable		11			
	With gold plated contacts, switching differential not adjustable		21			
	Adjustable standard switching differential		25			
<b>Range</b>	<b>Range</b> [°C]	<b>Operating temperature</b> [°C]				
	-30 ... +30	-30 ... +40		02		
	-20 ... +40	-30 ... +50		06		
	+5 ... +35	-30 ... +70		10		
	0 ... +60	-30 ... +70		12		
<b>Sensor<sup>1)</sup> / Fixing<sup>2)</sup></b>	Sensor: Copper; Fixation: Bracket (open sensor coil)				522.27	
	Sensor: Copper nickel plated; Fixation: Bracket (open sensor coil)				523.27	
	Sensor: Copper; Fixation: Bracket, with protection tube L=215mm, steel nickel plated				422.27.2743.0215	
	Sensor: Copper nickel plated; Fixation: Bracket, with protection tube L=215mm, steel nickel plated				423.27.2743.0215	
<b>Accessories</b>	Switchpoint locking <sup>3)</sup>					15
	Switchpoint fixed and sealed upon customer's request <sup>3)</sup>					88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>3)</sup>					83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing					
	Railway version IEC 61373, category 2					28
	Outdoor application (vented)					44

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Only with type 419, internal adjustment

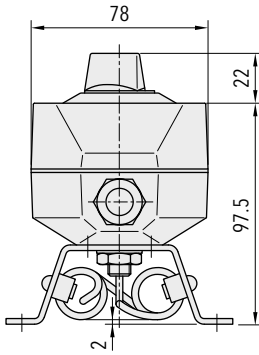
## Standard products (extra short lead time)

Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Operating temperature [°C]
IA33	409 2502 522 27	-30 ... +30	0.7 ... 6 (adjustable)	-30 ... +40
IA35	409 2510 522 27	+5 ... +35	0.7 ... 6 (adjustable)	-30 ... +50
IA60	409 2512 522 27	0 ... +60	0.7 ... 6 (adjustable)	-30 ... +70
IAS33	419 2502 522 27	-30 ... +30	0.7 ... 6 (adjustable)	-30 ... +40
IAS35	419 2510 522 27	+5 ... +35	0.7 ... 6 (adjustable)	-30 ... +50
IAS60	419 2512 522 27	0 ... +60	0.7 ... 6 (adjustable)	-30 ... +70

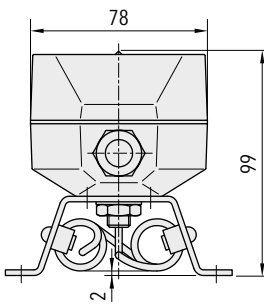
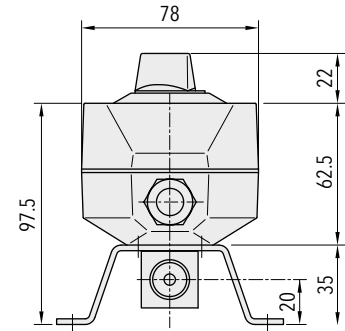
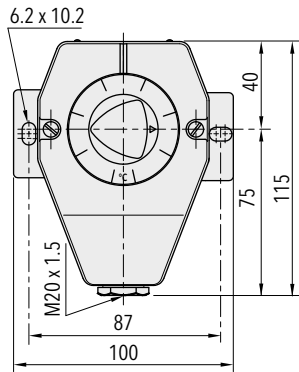
Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5\%$ FS typ.
	Scale accuracy typ.	$\pm 2\%$ FS typ.
	Switching differential	See table
<b>Environmental conditions</b>	Ambient temperature	see ordering information
	Storage temperature	Range $\leq +40^{\circ}\text{C}$ : $-30 \dots +50^{\circ}\text{C}$ Range $> +40^{\circ}\text{C}$ : $-30 \dots +85^{\circ}\text{C}$
	Protection	IP65
	Humidity	Max. 95% relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	AlSi9Cu3, coated
	Screwed cable gland	Brass nickel plated
	Installation	any position
	Weight	$\sim 950\text{ g}$
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2\text{ M}\Omega$
	Dielectric strength	$U \leq 250\text{V}$ : 1.45 kV / $U \leq 500\text{V}$ : 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11/25: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5 Cable- $\varnothing$ 4...10 mm
	Terminal screw	3 x 1...2.5 mm <sup>2</sup>

Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72116">www.trafag.com/H72116</a>
	Instructions	<a href="http://www.trafag.com/H73111">www.trafag.com/H73111</a>
	Flyer	<a href="http://www.trafag.com/H70964">www.trafag.com/H70964</a>

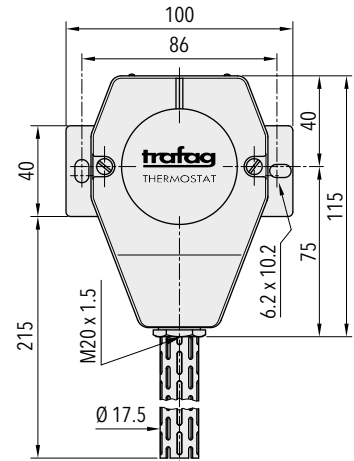
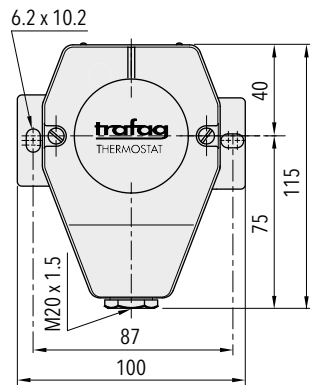
## Dimensions



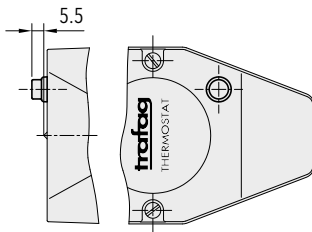
409.XXXX.52X.27...



419.XXXX.52X.27...



4X9.XXXX.42X.27.2743.0215



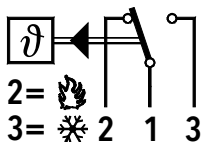
Accessory 14



Switching differential typ.		
<b>Range</b>	[°C]	-30 ... +30 -20 ... +40 +5 ... +35 0 ... +60
<b>Microswitch 10</b> Switching differential (fixed value, not adjustable)	[°C]	0.3
<b>Microswitch 11</b> Switching differential (fixed value, not adjustable)	[°C]	0.7
<b>Microswitch 21</b> Switching differential (fixed value, not adjustable)	[°C]	0.7
<b>Microswitch 25</b> Switching differential (adjustable value)	[°C]	0.7 ... 6

Electrical data switch			
Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1(0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1(0.1) A 12 V, 1 (1) A 5 V, 2 (2) A
<b>25</b>	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A

## Electrical Connection



409 / 419

# DUCT THERMOSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- HVAC

## Features

- Short response time
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Duct thermostat	Switching differential	Adjustable / not adjustable
Measuring range	-30°C ... +40°C to +20°C ... +110°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX	XX	XX	XXX	XX	XX	
<b>Custom build code</b>	External adjustment	624						
	Internal adjustment	634						
<b>Microswitch</b>	Small switching differential, not adjustable		10					
	Average switching differential, not adjustable		11					
	With gold plated contacts, not adjustable		21					
	Adjustable large switching differential		24					
	Adjustable standard switching differential		25					
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]						
	-30 ... 40	45		01				
	-10 ... 25 <sup>3)</sup>	50		07				
	0 ... 35	50		09				
	15 ... 30	60		17				
	10 ... 45	85		11				
	10 ... 80 <sup>3)</sup>	100		13				
	5 ... 95	105		20				
	20 ... 110 <sup>3)</sup>	115		23				
<b>Sensor<sup>1)</sup></b>	<b>Range</b>	<b>Sensor diameter</b> [mm]	<b>Sensor material</b>	<b>322</b>	<b>Range</b>	<b>Sensor diameter</b> [mm]	<b>Sensor material</b>	<b>422</b>
	20,23	Ø7	Copper	322	01, 07, 09, 11, 13, 17	Ø7	Copper	422
	20,23	Ø9	Copper	332	01, 07, 09, 11, 13, 17	Ø9	Copper	432
<b>Fixing<sup>2)</sup></b>	With spring tube and flange, for direct mounting, Ø 16.5 x 200mm						30	
<b>Accessories</b>	Switchpoint locking <sup>3)</sup>							15
	Switchpoint fixed and sealed upon customer's request <sup>3)</sup>							88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>3)</sup>							83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing							
	Condensator over Pin 1-2							12
	Condensator over Pin 1-3							13
	Condensators over Pin 1-2 / 1-3							23
	Railway version IEC 61373, category 2							28
	Outdoor application (vented)							44
	Cover with window							77

<sup>1)</sup> See data sheet H72114/H72163

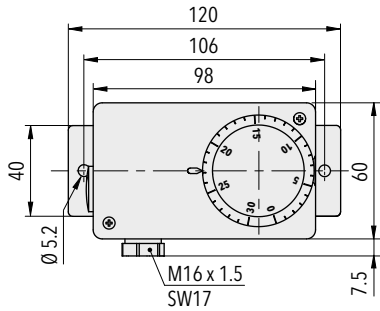
<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Only with type 634 internal adjustment

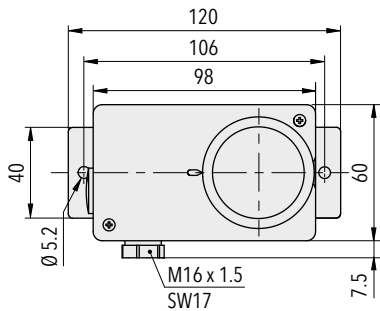
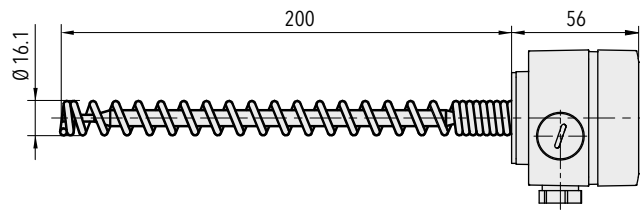
Standard products (extra short lead time)

Product No.	Type Code	Sensor material	Temperature range [°C]	Switching differential [°C]	Sensor max. [°C]
MSK35	634 2509 432 30	Copper	0 ... +35	0.7 ... 10 (adjustable)	50
MSK40	634 2501 432 30	Copper	-30 ... +40	0.7 ... 10 (adjustable)	45
MSK80	634 2513 432 30	Copper	+10 ... +80	0.7 ... 10 (adjustable)	100

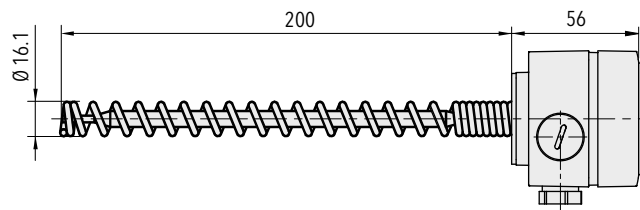
## Dimensions



624.XXXX.XXX.XX.XX



634.XXXX.XXX.XX.XX



Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5$ % FS typ.
	Scale accuracy typ.	$\pm 2$ % FS typ.
	Switching differential	see table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	-30 ... +70°C (important: Temperature at sensor may not exceed maximum sensor temperature)
	Storage temperature	Range $\leq +45^\circ\text{C}$ : -30...+50°C Range $> +45^\circ\text{C}$ : -30...+85°C
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	PC/ABS-Blend V0
	Screwed cable gland	PA, Polyamid
	Installation	Any position
	Weight	~ 220 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2$ M $\Omega$
	Dielectric strength	$U \leq 250\text{V}$ : 1.45 kV $U \leq 500\text{V}$ : 2 kV terminal ground
	Life time (mechanical)	Microrupteur 10/11/25: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles Microswitch 24: 0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M16x1.5 Cable- $\varnothing$ 4...9 mm
	Terminal screw	3 x 1...2.5 mm <sup>2</sup>

#### Additional information

<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72177">www.trafag.com/H72177</a>
	Instructions	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>
	Flyer	<a href="http://www.trafag.com/H70957">www.trafag.com/H70957</a>

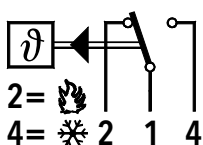
## Switching differential typ.

<b>Range</b>	[°C]	-30 ... +40 -10 ... +25 0 ... +35 +15 ... +30 +10 ... +45 +10 ... +80	+5 ... +95 +20 ... +110
<b>Microswitch 10</b> Switching differential (fixed value, not adjustable)	[°C]	0.3	0.8
<b>Microswitch 11/21</b> Switching differential (fixed value, not adjustable)	[°C]	0.7	2
<b>Microswitch 24</b> Switching differential (adjustable value)	[°C]	4 ... 21	5.5 ... 26
<b>Microswitch 25</b> Switching differential (adjustable value)	[°C]	0.7 ... 10	2 ... 12

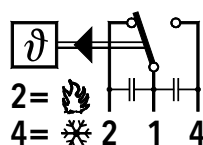
## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A
<b>25</b>	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A
<b>24</b>	Adjustable large switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3 (0.2) A 125 V, 0.75 (0.4) A 30 V, 15 (1.5) A 14 V, 15 (1.5) A

## Electrical Connection



624/634



with accessory 23

# PIPE MOUNTING THERMOSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- Process technology
- Water treatment

## Features

- For pipe or barrel mounting
- Short response time
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Pipe mounting thermostat	Switching differential	Adjustable / not adjustable
Measuring range	-10°C ... +35°C to +20°C ... +110°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX	XX	XX	XXX	XX	XX
<b>Custom build code</b>	External adjustment	663					
	Internal adjustment	664					
<b>Microswitch</b>	Small switching differential, not adjustable		10				
	Average switching differential, not adjustable		11				
	Adjustable standard switching differential		25				
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]					
	-10 ... 35	50		94			
	-10 ... 80 <sup>1)</sup>	85		95			
	0 ... 45 <sup>1)</sup>	85		93			
	10 ... 55 <sup>1)</sup>	85		22			
	5 ... 95	105		20			
	20 ... 110 <sup>1)</sup>	115		23			
<b>Sensor</b>	Copper				502		
	Copper nickel plated				503		
<b>Fixing</b>	Standard with strap					00	
<b>Accessories</b>	Switchpoint locking <sup>1)</sup>						15
	Switchpoint fixed and sealed upon customer's request <sup>1)</sup>						88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>1)</sup>						83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing						
	Condensator over Pin 1-2						12
	Condensator over Pin 1-3						13
	Condensators over Pin 1-2 / 1-3						23
	Outdoor application (vented)						44
	Cover with window						77

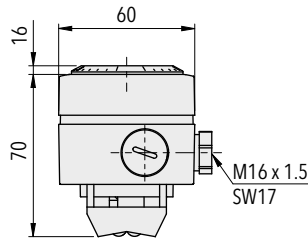
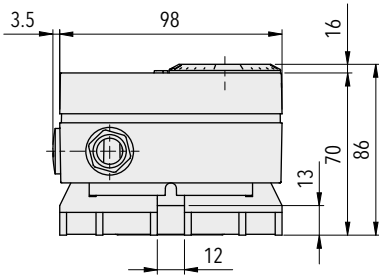
<sup>1)</sup> Only with type 664 internal adjustment



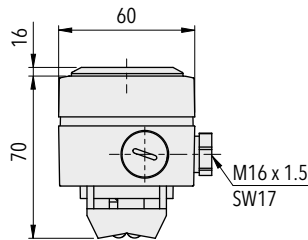
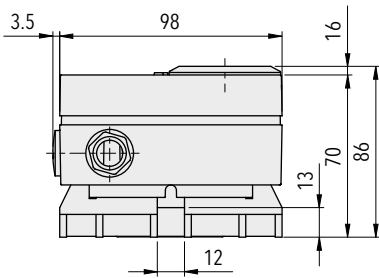
**Standard products (extra short lead time)**

Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Sensor max. [°C]
MSP35	664 2594 502 00	-10 ... +35	3.7 ... 14 (adjustable)	50
MSP80	664 2595 502 00	-10 ... +80	3.7 ... 14 (adjustable)	85
MSP95	664 2520 502 00	+5 ... +95	3.7 ... 14 (adjustable)	105
MSP110	664 2523 502 00	+20 ... +110	3.7 ... 14 (adjustable)	115

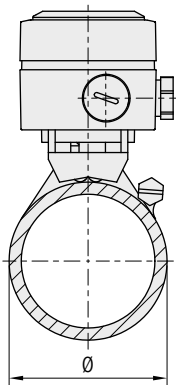
## Dimensions



663.XXXX.XXX.XX.XX



664.XXXX.XXX.XX.XX



The supplied strap (500mm) is sufficient for double winding upto pipe diameter of 65mm (2"), single winding upto pipe diameter 160mm.

Determination of strap length:

Strap length [mm]

$$= 180 \text{ [mm]} + 5 \times \varnothing_{\text{Pipe}} \text{ [mm]} \text{ (twice wound)}$$

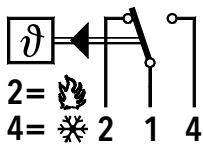
Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	Microswitch 10 (not adjustable): 2.5oC 11 (not adjustable): 3.7oC 25 (adjustable): 3.7...14oC
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	-30 ... +70°C (important: Temperature at sensor may not exceed maximum sensor temperature)
	Storage temperature	Range ≤ +45°C: -30...+50°C Range > +45°C: -30...+85°C
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	PC/ABS-Blend V0
	Screwed cable gland	PA, Polyamid
	Installation	Any position
	Weight	~ 220 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	U ≤ 250V: 1.45 kV U ≤ 500V: 2 kV terminal ground
	Life time (mechanical)	20 Mio. cycles
<b>Electrical connection</b>	Cable gland	M16x1.5 Cable-Ø 4...9 mm
	Terminal screw	3 x 1...2.5 mm <sup>2</sup>

Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72175">www.trafag.com/H72175</a>
	Instructions	<a href="http://www.trafag.com/H73663">www.trafag.com/H73663</a>
	Flyer	<a href="http://www.trafag.com/H70958">www.trafag.com/H70958</a>

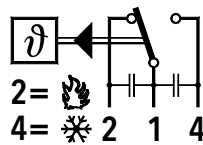
## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
10	Small switching differential, not adjustable	125 V, 10 (1.5) A	250 V, 0.2 (0.02) A
		250 V, 10 (1.25) A	125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
11	Average switching differential, not adjustable	125 V, 15 (1.5) A	250 V, 0.25 (0.03) A
		250 V, 15 (1.25) A	125 V, 0.5 (0.05) A
		500 V, 10 (0.75) A	30 V, 6 (1.5) A 14 V, 15 (1.5) A
25	Adjustable standard switching differential	125 V, 15 (1.5) A	250 V, 0.25 (0.03) A
		250 V, 15 (1.25) A	125 V, 0.5 (0.05) A
		500 V, 10 (0.75) A	30 V, 6 (1.5) A
			14 V, 15 (2.5) A

## Electrical Connection



663/664



with accessory 23

# MINISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Machine tools
- HVAC
- Process technology
- Water treatment

## Features

- Short response time
- Protection IP54
- Electrical connection on terminal screw

Technical Data			
Designation of application	Direct mounting thermostat	Switching differential	Adjustable / not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX	XX	XXXXXXXXXX	XXXX	XXXX	XX
<b>Custom build code</b>	External adjustment	624					
	Internal adjustment	634					
<b>Microswitch</b>	Small switching differential, not adjustable		10				
	Average switching differential, not adjustable		11				
	With gold plated contacts, switching differential not adjustable		21				
	Adjustable large switching differential		24				
	Adjustable standard switching differential		25				
<b>Range</b>	<b>Sensor material</b>	<b>Sensor diameter [mm]</b>	<b>Range [°C]</b>	<b>Sensor max. [°C]</b>			
	Cu	7	-30...+40	45	01.422.12		
	Cu <sup>2)</sup>	7	-10...+25	50	07.422.12		
	Cu	7	0...+35	50	09.422.12		
	Cu	7	+10...+45	85	11.422.12		
	Cu <sup>2)</sup>	7	+10...+80	100	13.422.12		
	Cu	7	+15...+30	60	17.422.12		
	Cu	7	-10...+35	50	94.322.12		
	Cu <sup>2)</sup>	7	-10...+80	85	95.322.12		
	Cu	7	+5...+95	105	20.322.12		
	Cu <sup>2)</sup>	7	+20...+110	115	23.322.12		
	Cu	7	+20...+150	165	31.122.12		
	Cu	7	+20...+230	250	24.022.35		
	Cu <sup>2)</sup>	7	+30...+300	330	53.022.35		
	Cu	7	+70...+350	380	54.022.35		
<b>Protection tube</b>	For fixing option 12, brass nickel plated, G1/2" <sup>1)</sup>				1216		
	For fixing option 12, stainless steel, G1/2" <sup>1)</sup>				1211		
	For fixing option 35, brass nickel plated, G1/2" <sup>1)</sup>				8316		
	For fixing option 35, stainless steel, G1/2" <sup>1)</sup>				8411		
<b>Protection tube length</b>	<b>Suitable for sensor</b>			<b>Protection tube length [mm]</b>			
	XX.122.XX <sup>1)</sup>			110		0110	
	XX.122.XX; XX.322.XX <sup>1)</sup>			150		0150	
	XX.122.XX; XX.322.XX; XX.422.XX <sup>1)</sup>			200		0200	
	XX.122.XX; XX.322.XX; XX.422.XX <sup>1)</sup>			400		0400	
<b>Accessories</b>	Switchpoint locking <sup>2)</sup>						15
	Switchpoint fixed and sealed upon customer's request <sup>2)</sup>						88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>2)</sup>						83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing						
	Condensator over Pin 1-2						12
	Condensator over Pin 1-3						13
	Condensators over Pin 1-2 / 1-3						23
	Railway version IEC 61373, category 2						28
	Outdoor application (vented)						44
	Cover with window						77

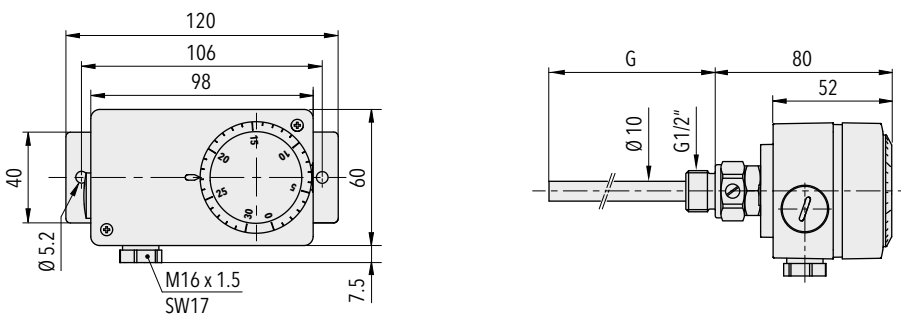
<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> Only with type 634 internal adjustment

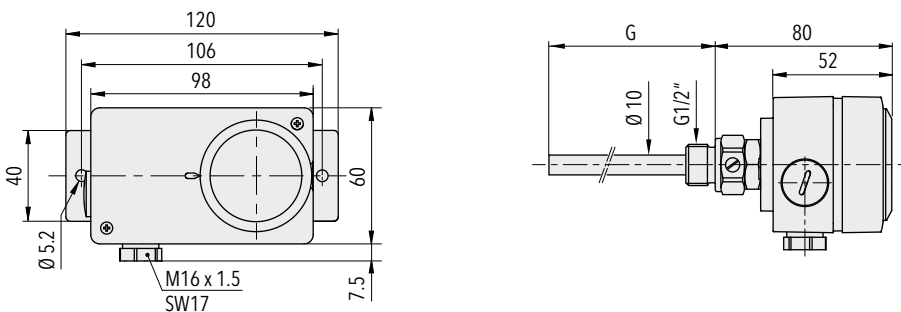
Standard products (extra short lead time)

Product No.	Type Code	Temperature range [°C]	Protection tube length [mm]	Switching differential [°C]	Sensor max. [°C]
MST8015	634 2595 322 12 1216 0150	-10 ... +80	150	2 ... 12 (adjustable)	85
MST8040	634 2595 322 12 1216 0400	-10 ... +80	400	2 ... 12 (adjustable)	85
MST9511	634 2520 332 12 1217 0110	+5 ... +95	110	2 ... 12 (adjustable)	105
MST9515	634 2520 322 12 1216 0150	+5 ... +95	150	2 ... 12 (adjustable)	105
MST9540	634 2520 322 12 1216 0400	+5 ... +95	400	2 ... 12 (adjustable)	105
MST15015	634 2531 122 12 1216 0150	+20 ... +150	150	2.5 ... 16 (adjustable)	165
MST15040	634 2531 122 12 1216 0400	+20 ... +150	400	2.5 ... 16 (adjustable)	165

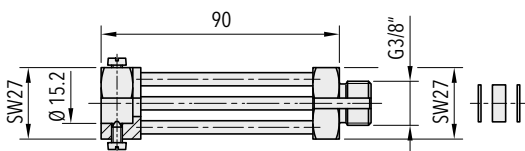
## Dimensions



624.XXXX.X22.12...



634.XXXX.X22.12...



Fixation 35

Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range ≤ +45°C: -30°C ... +50°C Range +45°C ... +250°C: -30°C ... +70°C Range > + 250°C: -10°C ... +70°C (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range ≤ +45°C: -30°C ... +50°C Range > +45°C: -30°C ... +85°C
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Protection tube	See ordering information
	Housing	PC/ABS-Blend V0
	Screwed cable gland	Polyamide (PA)
	Installation	any position
	Weight	~ 430 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	U ≤ 250V: 1.45 kV U ≤ 500V: 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11/25: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles Microswitch 24: 0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M16x1.5 Cable-Ø 4...9 mm
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>

Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72174">www.trafag.com/H72174</a>
	Instructions	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>
	Flyer	<a href="http://www.trafag.com/H70955">www.trafag.com/H70955</a>

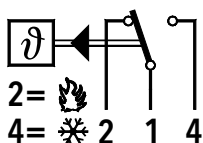
## Switching differential typ.

<b>Measuring range</b>	[°C]	-30 ... +40 -10 ... +25 0 ... +35 +15 ... +30 +10 ... +45 +10 ... +80	-10 ... +35 -10 ... +80 +5 ... +95 +20 ... +110	+20 ... +150	+20 ... +230	+40 ... +300 +70 ... +350
<b>Microswitch 10:</b> Switching differential not adjustable	[°C]	0.3	0.8	1	1.2	2
<b>Microswitch 11/21:</b> Switching differential not adjustable	[°C]	0.7	2	2.5	3	4
<b>Microswitch 24:</b> Switching differential adjustable	[°C]	4 ... 21	5.5 ... 26	7 ... 34	15 ... 65	18 ... 84
<b>Microswitch 25:</b> Switching differential adjustable	[°C]	0.7 ... 10	2 ... 12	2.5 ... 16	3 ... 32	4 ... 40

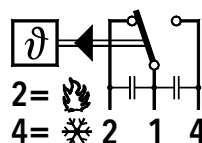
## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1(0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1(0.1) A 12 V, 1 (1) A 5 V, 2 (2) A
<b>25</b>	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A
<b>24</b>	Adjustable large switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3 (0.2) A 125 V, 0.75 (0.4) A 30 V, 15 (1.5) A 14 V, 15 (1.5) A

## Electrical Connection



624/634



with accessory 23



# MINISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Railways
- Machine tools
- HVAC
- Refrigeration
- Process technology

## Features

- Short response time
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Remote sensing thermostat	Switching differential	Adjustable / not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX	XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Custom build code</b>	External adjustment	624							
	Internal adjustment	634							
<b>Microswitch</b>	Small switching differential, not adjustable		10						
	Average switching differential, not adjustable		11						
	With gold plated contacts, switching differential not adjustable		21						
	Adjustable large switching differential		24						
	Adjustable standard switching differential		25						
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]		<b>Range</b> [°C]	<b>Sensor max.</b> [°C]				
	-30 ... 40	45	01	-10 ... 80 <sup>4)</sup>	85	95			
	-10 ... 25 <sup>4)</sup>	60	07	5 ... 95	105	20			
	0 ... 35	70	09	20 ... 110 <sup>4)</sup>	115	23			
	10 ... 45	85	11	20 ... 150	165	31			
	10 ... 80 <sup>4)</sup>	100	13	20 ... 230	250	24			
	15 ... 30	60	17	40 ... 300 <sup>4)</sup>	330	53			
	-10 ... 35	70	94	70 ... 350	380	54			
<b>Sensor<sup>1)</sup></b>	See table "Ordering-no. for sensors"						XXX		
<b>Fixing<sup>2)</sup></b>	Nut M10 (for remote sensing version)						10		
	Grubscrew locked, lateral (direct mounting version) <sup>5)</sup>						12		
	Cap nut (for direct mounting version) <sup>5)</sup>						14		
	Angle bracket (for remote sensing version)						17		
	Grubscrew locked with spacer (cooling element) (for direct mounting version)						18		
	Mounting bracket (for remote sensing version)						19		
<b>Protection tube</b>	See data sheet H72114/H72163						XXXX.XXXX		
<b>Accessories</b>	Switchpoint locking <sup>4)</sup>								15
	Switchpoint fixed and sealed upon customer's request <sup>4)</sup>								88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>4)</sup>								83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing								
	Condensator over Pin 1-2								12
	Condensator over Pin 1-3								13
	Condensators over Pin 1-2 / 1-3								23
	Railway version IEC 61373, category 2								28
	Outdoor application (vented)								44
	Cover with window								77
	Capillary tube protection: Flexible metal tube, brass nickel plated								90
	Capillary tube protection: Flexible metal tube 1.4541/V2A								91
	Capillary tube protection: PVC tube								92
	<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>							

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Overlengths upon request

<sup>4)</sup> Only with type 634 internal adjustment

<sup>5)</sup> Media max. 150°C in continuous operation

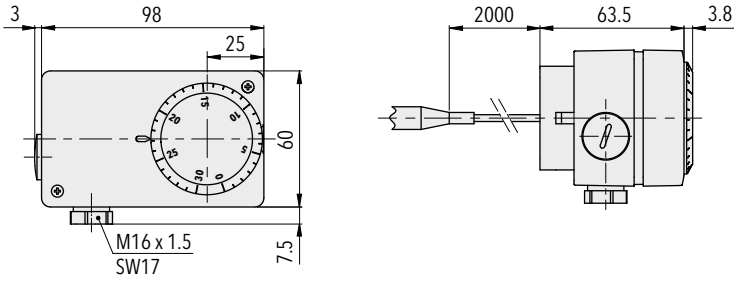
Ordering no. for sensors					
Range	Sensor-Ø	Sensor material			
		Stainless steel	Copper	Copper nickel plated	
01, 07, 09, 11, 13, 17	4.7 mm		412	413	
	7.0 mm	421	422	423	
	9.0 mm		432	433	
94, 95, 20, 23	4.7 mm	311	312	313	
	7.0 mm	321	322	323	
	9.0 mm	331	332	333	
31	4.7 mm	111	112	113	
	7.0 mm	121	122	123	
	9.0 mm	131	132	133	
24, 53, 54	4.7 mm	011	012	013	
	7.0 mm	021	022	023	
	9.0 mm	031	032	033	

Standard products (extra short lead time)					
Product No.	Type Code	Sensor material	Temperature range [°C]	Switching differential [°C]	Sensor max. [°C]
M35	624 2509 422 19	Copper	0 ... +35	0.7 ... 10 (adjustable)	70
M40	624 2501 422 19	Copper	-30 ... +40	0.7 ... 10 (adjustable)	45
M95	624 2520 322 19	Copper	+5 ... +95	2 ... 12 (adjustable)	105
M150	624 2531 122 19	Copper	+20 ... +150	2.5 ... 16 (adjustable)	165
M230S	624 2524 021 19	1.4435 (AISI316L)	+20 ... +230	3 ... 32 (adjustable)	250
M350S	624 2554 021 19	1.4435 (AISI316L)	+70 ... +350	4 ... 40 (adjustable)	380
MS35	634 2509 422 19	Copper	0 ... +35	0.7 ... 10 (adjustable)	70
MS40	634 2501 422 19	Copper	-30 ... +40	0.7 ... 10 (adjustable)	45
MS95	634 2520 322 19	Copper	+5 ... +95	2 ... 12 (adjustable)	105
MS150	634 2531 122 19	Copper	+20 ... +150	2.5 ... 16 (adjustable)	165
MS230S	634 2524 021 19	1.4435 (AISI316L)	+20 ... +230	3 ... 32 (adjustable)	250
MS350S	634 2554 021 19	1.4435 (AISI316L)	+70 ... +350	4 ... 40 (adjustable)	380

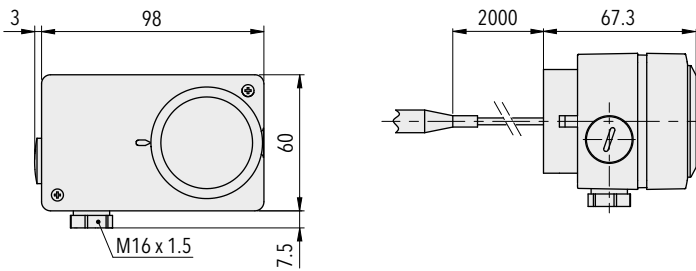
Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range ≤ +45°C: -30°C ... +50°C Range +45°C ... +250°C: -30°C ... +70°C Range > + 250°C: -10°C ... +70°C (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range ≤ +45°C: -30°C ... +50°C Range > +45°C: -30°C ... +85°C
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	PC/ABS-Blend V0
	Screwed cable gland	Polyamide (PA)
	Installation	any position
	Weight	~ 380 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	U ≤ 250V: 1.45 kV U ≤ 500V: 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11/25: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles Microswitch 24: 0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M16x1.5 Cable-Ø 4...9 mm
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>

Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72172">www.trafag.com/H72172</a>
	Instructions	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>
	Flyer	<a href="http://www.trafag.com/H70954">www.trafag.com/H70954</a>

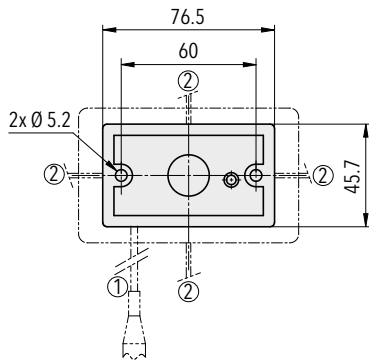
## Dimensions



624.XXXX.XXX.XX...



634.XXXX.XXX.XX...

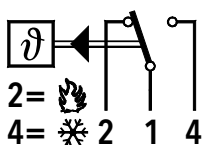


6X4.XXXX.XXX.19...

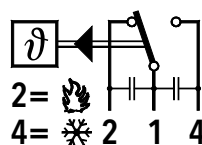
Switching differential typ.						
<b>Measuring range</b>	[°C]	-30 ... +40 -10 ... +25 0 ... +35 +15 ... +30 +10 ... +45 +10 ... +80	-10 ... +35 -10 ... +80 +5 ... +95 +20 ... +110	+20 ... +150	+20 ... +230	+40 ... +300 +70 ... +350
<b>Microswitch 10:</b> Switching differential not adjustable	[°C]	0.3	0.8	1	1.2	2
<b>Microswitch 11/21:</b> Switching differential not adjustable	[°C]	0.7	2	2.5	3	4
<b>Microswitch 24:</b> Switching differential adjustable	[°C]	4 ... 21	5.5 ... 26	7 ... 34	15 ... 65	18 ... 84
<b>Microswitch 25:</b> Switching differential adjustable	[°C]	0.7 ... 10	2 ... 12	2.5 ... 16	3 ... 32	4 ... 40

Electrical data switch		Rating Resistive Load (Inductive Load)	
Type	Features	AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A
<b>25</b>	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A
<b>24</b>	Adjustable large switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3 (0.2) A 125 V, 0.75 (0.4) A 30 V, 15 (1.5) A 14 V, 15 (1.5) A

## Electrical connection



624/634



with accessory 23

# MINI LIMISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Railways
- Machine tools
- HVAC
- Refrigeration
- Process technology

## Features

- External or internal resetting
- Short response time
- Protection IP54
- Electrical connection on terminal screw

Technical Data			
Designation of application	Remote sensing thermostat with limiter	Switching differential	Not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

					XXX . XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Custom build code</b>	For increasing temperatures, internal resetting				630 . 12						
	For increasing temperatures, external resetting				632 . 12						
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]		<b>Range</b> [°C]	<b>Sensor max.</b> [°C]						
	-30 ... 40	45	<b>01</b>	-10 ... 80	85						<b>95</b>
	-10 ... 25	60	<b>07</b>	5 ... 95	105						<b>20</b>
	0 ... 35	70	<b>09</b>	20 ... 110	115						<b>23</b>
	10 ... 45	85	<b>11</b>	20 ... 150	165						<b>31</b>
	10 ... 80	100	<b>13</b>	20 ... 230	250						<b>24</b>
	15 ... 30	60	<b>17</b>	40 ... 300	330						<b>53</b>
	-10 ... 35	70	<b>94</b>	70 ... 350	380						<b>54</b>
<b>Sensor</b> <sup>1)</sup>	See table "Ordering-no. for sensors"									XXX	
<b>Fixing</b> <sup>2)</sup>	Nut M10 (for remote sensing version)										<b>10</b>
	Mounting bracket (for remote sensing version)										<b>19</b>
	Grubscrew locked, lateral (direct mounting version) <sup>4)</sup>										<b>12</b>
	Cap nut (for direct mounting version) <sup>4)</sup>										<b>14</b>
	Grubscrew locked with spacer (cooling element) (for direct mounting version)										<b>18</b>
<b>Protection tube</b>	See data sheet H72114/H72163									XXXX.XXXX	
<b>Accessories</b>	Switchpoint locking		<b>15</b>	Condensators over Pin 1-2 / 1-3							<b>23</b>
	Switchpoint fixed and sealed upon customer's request		<b>88</b>	Railway version IEC 61373, category 2							<b>28</b>
	Switchpoint preset upon customer's request, no guarantee on switching accuracy		<b>83</b>	Outdoor application (vented)							<b>44</b>
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing			Cover with window							<b>77</b>
	Condensator over Pin 1-2		<b>12</b>	Capillary tube protection: Flexible metal tube, brass nickel plated							<b>90</b>
	Condensator over Pin 1-3		<b>13</b>	Capillary tube protection: Flexible metal tube 1.4541/V2A							<b>91</b>
				Capillary tube protection: PVC tube							<b>92</b>
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>										

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Overlengths upon request

<sup>4)</sup> Media max. 150°C in continuous operation

## Ordering no. for sensors

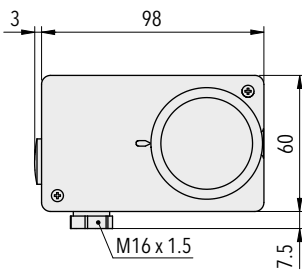
Range	Sensor-Ø	Sensor material		
		Stainless steel	Copper	Copper nickel plated
01, 07, 09, 11, 13, 17	4.7 mm		412	413
	7.0 mm	421	422	423
	9.0 mm		432	433
94, 95, 20, 23	4.7 mm	311	312	313
	7.0 mm	321	322	323
	9.0 mm	331	332	333
31	4.7 mm	111	112	113
	7.0 mm	121	122	123
	9.0 mm	131	132	133
24, 53, 54	4.7 mm	011	012	013
	7.0 mm	021	022	023
	9.0 mm	031	032	033



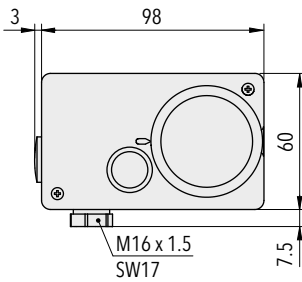
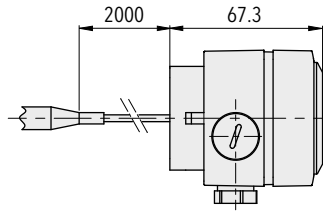
Standard products (extra short lead time)

Product No.	Type Code	Sensor material	Temperature range [°C]	Sensor max. [°C]
MS95R	632 1220 322 19	Copper	+5 ... +95	105
MS150R	632 1231 122 19	Copper	+20 ... +150	165
MS230SR	632 1224 021 19	1.4435 (AISI316L)	+20 ... +230	250
MS350SR	632 1254 021 19	1.4435 (AISI316L)	+70 ... +350	380

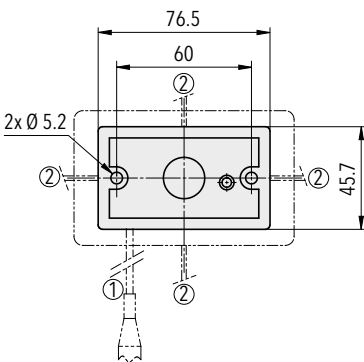
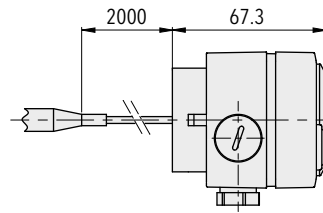
## Dimensions



630.12XX.XXX.XX...



632.12XX.XXX.XX...



63X.12XX.XXX.19...

Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5$ % FS typ.
	Scale accuracy typ.	$\pm 2$ % FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $+45^{\circ}\text{C} \dots +250^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +70^{\circ}\text{C}$ Range $> +250^{\circ}\text{C}$ : $-10^{\circ}\text{C} \dots +70^{\circ}\text{C}$ (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $> +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	PC/ABS-Blend V0
	Screwed cable gland	Polyamide (PA)
	Installation	any position
	Weight	$\sim 250$ g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2$ M $\Omega$
	Dielectric strength	2 kV terminal ground
	Life time (mechanical)	0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M16x1.5 Cable- $\varnothing$ 4...9 mm
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>

Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72173">www.trafag.com/H72173</a>
	Instructions	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>
	Flyer	<a href="http://www.trafag.com/H70956">www.trafag.com/H70956</a>

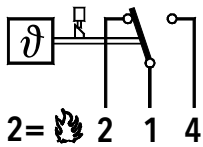
## Switching differential typ.

Measuring range	[°C]	-30 ... +40	-10 ... +35	+20 ... +150	+20 ... +230	+40 ... +300
		-10 ... +25	-10 ... +80			+70 ... +350
		0 ... +35	+5 ... +95			
		+15 ... +30	+20 ... +110			
		+10 ... +45				
		+10 ... +80				
<b>Microswitch 12:</b>	[°C]	2.0	6.0	7.5	9.0	12.0
Switching differential not adjustable						

## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
12	Average switching differential, high vibration resistance	125 V, 15 (1.5) A	250 V, 0.3 (0.2) A
		250 V, 15 (1.25) A	125 V, 0.75 (0.4) A
		500 V, 10 (0.75) A	30 V, 15 (1.5) A
			14 V, 15 (1.5) A

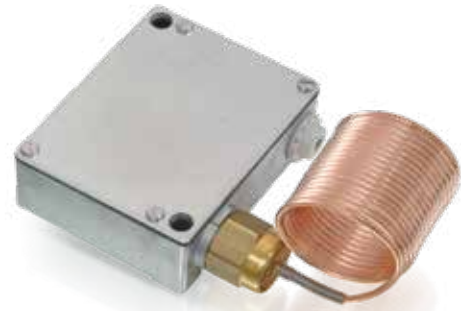
## Electrical connection



630/632

# FROSTSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature. The Froststat was specifically designed as single stage temperature controller for monitoring temperature around 0°C, i. e. to prevent ice build-up on air heaters.



## Applications

- HVAC
- Refrigeration

## Features

- Rugged aluminium housing
- Short response time
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Frost protection thermostat	Switching differential	Not adjustable
Measuring range	-5°C ... +15°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX . XXXX	XXXXXX
<b>Custom build code</b>	Sensor 3m	990 . 1299	
	Sensor 6m	991 . 1299	
	Sensor 3m, limiter	992 . 1299	
	Sensor 6m, limiter	993 . 1299	
<b>Accessories</b>	Protection level IP65		20
	6 pcs. Capillary holder		K80140

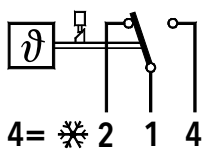
## Standard products (extra short lead time)

Product No.	Type Code	Sensor material	Set point adjustment
F15	991 1299 000	Copper capillary tube, L=6m	Internal setpoint adjustment
F153	990 1299	Copper capillary tube, L=3m	Internal setpoint adjustment
F15R	993 1299 000	Copper capillary tube, L=6m	Internal setpoint adjustment and external reset knob
F153R	992 1299	Copper capillary tube, L=3m	Internal setpoint adjustment and external reset knob

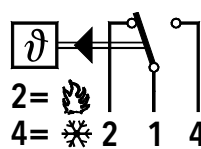
Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 1.5 % FS typ.
	Switching differential	2.0°C typ.
<b>Environmental conditions</b>	Media temperature	Sensor temperature max.: 140°C Sensor response length : ~ 30 cm
	Ambient temperature	Max. operating temperature: +70°C Min. operating temperature: switch point + 2°C
	Storage temperature	-30°C ... +70°C
	Protection	IP 54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	Copper (Cu)
	Filling	Freon R 134, gaseous
	Housing	AlSi9Pb3
	Screwed cable gland	Polyethylen (PE)
	Installation	any position
	Weight	~ 850 g
<b>Microswitch</b>	Rating	See table below
	Resistance of insulation	> 2 MΩ
	Dielectric strength	2 kV terminal ground
	Life time (mechanical)	0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5 Cable-Ø 8...13 mm
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>

Electrical data switch			
Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
12	Average switching differential, high vibration resistance	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3(0.2) A 125 V, 0.75(0.4) A 30 V, 15(1.5) A 14 V, 15 (1.5) A

## Electrical Connection

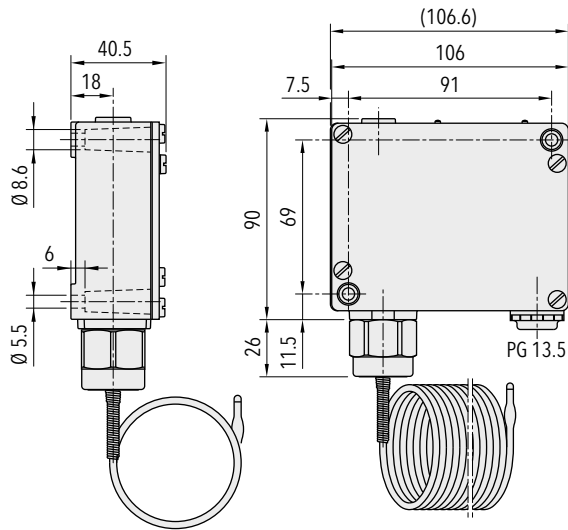


992/993  
Limiter, decreasing

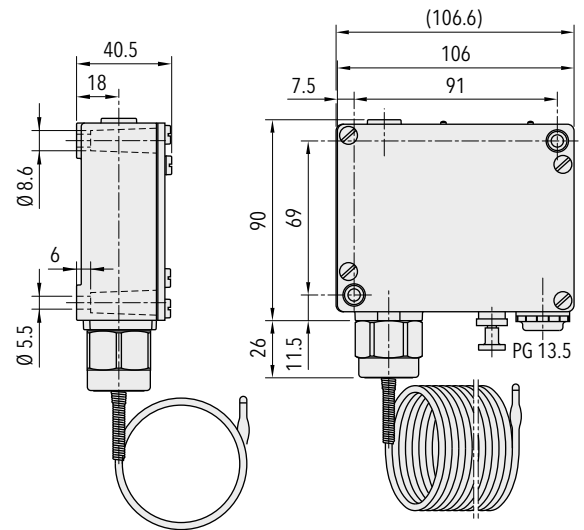


990/991

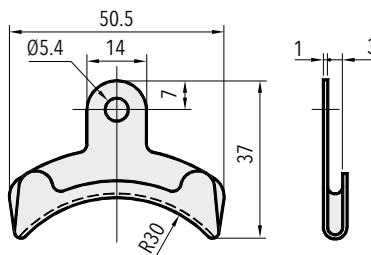
## Dimensions



990/991.XXXX.XX



992/993.XXXX.XX



99X.XXXX.K80140

### Additional information

#### Documents

Data sheet	<a href="http://www.trafag.com/H72123">www.trafag.com/H72123</a>
Instructions	<a href="http://www.trafag.com/H70821">www.trafag.com/H70821</a>
Flyer	<a href="http://www.trafag.com/H70952">www.trafag.com/H70952</a>

# GALVANOSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Process technology

## Features

- Short response time
- Protection IP54
- Electrical connection on terminal screw
- Coated capillary tube 1500 mm

### Technical Data

Designation of application	Remote sensing thermostat	Switching differential	Not adjustable
Measuring range	+5°C ... +95°C and +20°C ... +150°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change



## Ordering information/type code

		XXX	XX	XX	XXX	XX	XX	XX
<b>Custom build code</b>	External adjustment	657						
	Internal adjustment	658						
<b>Microswitch</b>	Small switching differential, not adjustable		10					
	Average switching differential, not adjustable		11					
	With gold plated contacts, switching differential not adjustable		21					
<b>Range</b>	<b>Range [°C]</b>							
	+5 ... +95	105		20				
	+20 ... +150	165		31				
<b>Sensor</b>	Copper with protection tube Teflon FEP, range 20				326			
	Copper with protection tube Teflon FEP, range 31				126			
<b>Fixing</b>	Angle PVC					26		
<b>Accessories</b>	Switchpoint locking <sup>2)</sup>							15
	Switchpoint fixed and sealed upon customer's request <sup>2)</sup>							88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>2)</sup>							83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing							
	Condensator over Pin 1-2							12
	Condensator over Pin 1-3							13
	Condensators over Pin 1-2 / 1-3							23
	Outdoor application (vented)							44
	Cover with window							77
	<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>1)</sup>						

<sup>1)</sup> Overlengths upon request

<sup>2)</sup> Only with type 658, internal adjustment

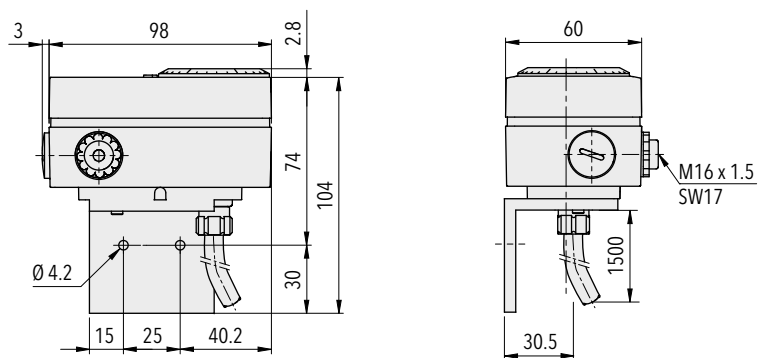
## Standard products (extra short lead time)

Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Sensor max. [°C]
GS95	658 1120 326 26	+5 ... +95	2.5 (fixed)	105
GS150	658 1131 126 26	+20 ... +150	3.0 (fixed)	165

Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5 \% \text{ FS typ.}$
	Scale accuracy typ.	$\pm 3 \% \text{ FS typ.}$
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	$-30^{\circ}\text{C} \dots +70^{\circ}\text{C}$
	Storage temperature	$-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	PC/ABS-Blend V0
	Screwed cable gland	Polyethylen (PE)
	Installation	any position
	Weight	$\sim 380 \text{ g}$
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2 \text{ M}\Omega$
	Dielectric strength	$U \leq 250\text{V}: 1.45 \text{ kV}$ $U \leq 500\text{V}: 2 \text{ kV}$ terminal ground
	Life time (mechanical)	Microswitch 10/11: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles
<b>Electrical connection</b>	Cable gland	M16x1.5 Cable- $\varnothing$ 4...9 mm
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>

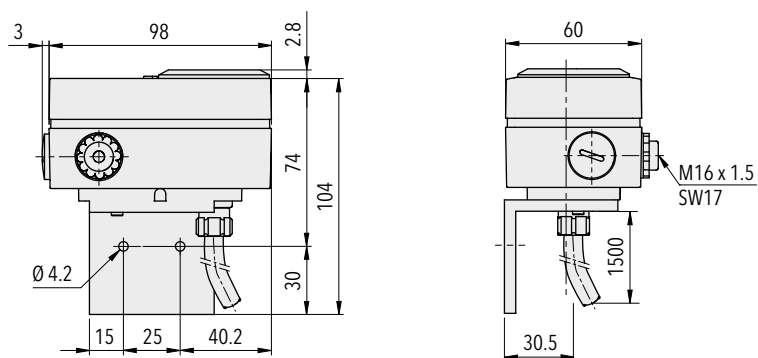
Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72179">www.trafag.com/H72179</a>
	Instructions	<a href="http://www.trafag.com/H73624">www.trafag.com/H73624</a>
	Flyer	<a href="http://www.trafag.com/H70959">www.trafag.com/H70959</a>

## Dimensions



657.XXXX.326.26...

G...



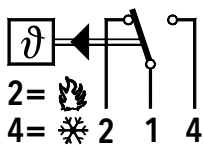
658.XXXX.326.26...

GS...

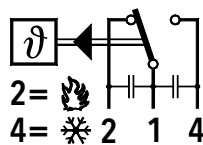
Switching differential typ.			
<b>Measuring range</b>	[°C]	+5 ... +95	+20 ... +150
<b>Microswitch 10:</b> Switching differential not adjustable	[°C]	0.3	0.8
<b>Microswitch 11/21:</b> Switching differential not adjustable	[°C]	2.5	3.0

Electrical data switch			
Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1(0.1) A 12 V, 1 (1) A 5 V, 2 (2) A

## Electrical Connection



657/658



with accessory 23

# DUO LIMISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- HVAC
- Refrigeration

## Features

- Two individual measuring systems
- Short response time
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Double thermostat with remote sensor and limiter	Switching differential	Adjustable / not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		302 . XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Microswitch</b>	Small switching differential, not adjustable (Microswitch 10, Limiter Switch 12)	38						
	Standard switching differential, not adjustable (Microswitch 11, Limiter Switch 12)	37						
	Adjustable standard switching differential (microswitch 25, limiter switch 12)	58						
<b>Range</b>	<b>Temperature controller and limiter [°C]</b>	<b>Sensor max. [°C]</b>	<b>Temperature controller [°C]</b>	<b>Limiter [°C]</b>				
	-30 ... +40	+50			01			
	-10 ... +25	+60			07			
	0 ... +35	+70			09			
	+10 ... +45	+85			11			
	+10 ... +80	+100			13			
	+15 ... +30	+60			17			
	-10 ... +35	+70			94			
	-10 ... +80	+85			95			
	+5 ... +95	+105			20			
	+20 ... +110	+115			23			
	+20 ... +150	+165			31			
	+20 ... +230	+250			24			
	+40 ... +300	+330			53			
	+70 ... +350	+380			54			
			+5 ... +95	+20 ... +110		36		
		+20 ... +150	+35 ... +175		42			
		+40 ... +300	+70 ... +350		39			
<b>Sensor <sup>1)</sup></b>	See table "Ordering-no. for sensors"					XXX		
<b>Fixing <sup>2)</sup></b>	Mounting bracket (for remote sensing version)						19	
	For direct mounting on protection tube						21	
<b>Protection tube</b>	See data sheet H72114/H72163							XXXX.XXXX
<b>Accessories</b>	Condensator over Pin 1-2							12
	Condensator over Pin 1-3							13
	Condensators over Pin 1-2 / 1-3							23
	Railway version IEC 61373, category 2							28
	Outdoor application (vented)							44
	Capillary tube protection: Flexible metal tube, brass nickel plated							90
	Capillary tube protection: Flexible metal tube 1.4541/V2A							91
	Capillary tube protection: PVC tube							92
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>							

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Overlengths upon request

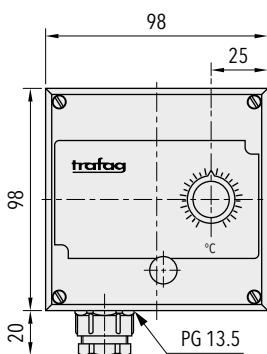
## Ordering no. for sensors

Range	Sensor-Ø	Sensor material		
		Stainless steel	Copper	Copper nickel plated
01, 07, 09, 11, 13, 17	4.7 mm		412	413
	7.0 mm	421	422	423
	5.5 / 11 mm		462	463
94, 95, 20, 23, 36	4.7 mm	311	312	313
	7.0 mm	321	322	323
	5.5 / 11 mm		362	363
31, 42	4.7 mm	111	112	113
	7.0 mm	121	122	123
	5.5 / 11 mm		162	163
24, 53, 54, 39	4.7 mm	011	012	013
	7.0 mm	021	022	023
	5.5 / 11 mm		062	063

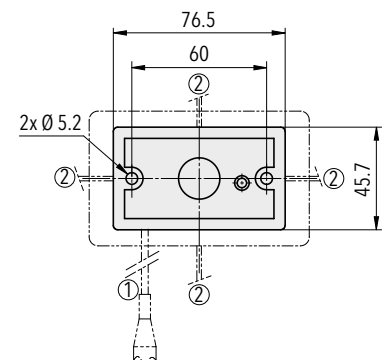
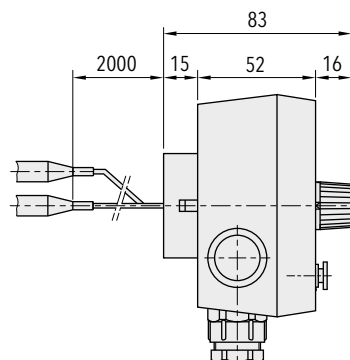
## Standard products (extra short lead time)

Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Measuring range limiter [°C]	Sensor max. [°C]
D95R	302 5836 362 19	+5 ... +95	2 ... 12 (adjustable)	+20 ... +110	105
D150R	302 5842 162 19	+20 ... +150	2.5 ... 16 (adjustable)	+35 ... +175	165
D300R	302 5839 062 19	+40 ... +300	4 ... 40 (adjustable)	+70 ... +350	380

## Dimensions



302.XXXX.XXXX.XX...



Fixation 19

Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range ≤ +45°C: -30°C ... +50°C Range +45°C ... +250°C: -30°C ... +70°C Range > + 250°C: -10°C ... +70°C (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range ≤ +45°C: -30°C ... +50°C Range > +45°C: -30°C ... +85°C
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	Noryl
	Screwed cable gland	Polyamide (PA)
	Installation	any position
	Weight	~ 620 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	U ≤ 250V: 1.45 kV U ≤ 500V: 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11/25: 20 Mio. cycles Microswitch 12: 0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	PG13.5 Cable-Ø 5...12.5 mm
	Terminal screw	6 x 1 ... 2.5 mm <sup>2</sup>

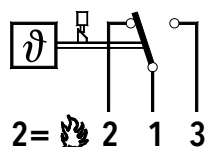
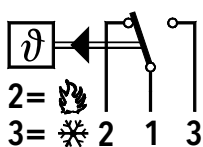
Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72142">www.trafag.com/H72142</a>
	Instructions	<a href="http://www.trafag.com/H73170">www.trafag.com/H73170</a>
	Flyer	<a href="http://www.trafag.com/H70963">www.trafag.com/H70963</a>



Switching differential typ.						
<b>Measuring range</b>	[°C]	-30 ... +40 -10 ... +25 0 ... +35 +15 ... +30 +10 ... +45 +10 ... +80	-10 ... +35 -10 ... +80 +5 ... +95 +20 ... +110	+20 ... +150	+20 ... +230	+40 ... +300 +70 ... +350
<b>Microswitch 10:</b> Switching differential not adjustable	[°C]	0.3	0.8	1	1.2	2
<b>Microswitch 11:</b> Switching differential not adjustable	[°C]	0.7	2	2.5	3	4
<b>Microswitch 12:</b> Switching differential not adjustable	[°C]	2	6	7.5	9	12
<b>Microswitch 25:</b> Switching differential adjustable	[°C]	0.7 ... 10	2 ... 12	2.5 ... 16	3 ... 32	4 ... 40

Electrical data switch		Rating Resistive Load (Inductive Load)	
Type	Features	AC	DC
10	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
11	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
12	Large switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3(0.2) A 125 V, 0.75(0.4) A 30 V, 15 (1.5) A 14 V, 15 (1.5) A
25	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25(0.03) A 125 V, 0.5(0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A

## Electrical Connection



# ALTEROSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Machine tools
- HVAC
- Refrigeration
- Process technology

## Features

- With 1 adjustable step between 2 stages
- Short response time
- Protection IP54
- Electrical connection on terminal screw

### Technical Data

Designation of application	Multistage thermostat with remote sensor	Switching differential	Not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN 60730-1/ EN 60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

				XXX	XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Custom build code</b>	External adjustment			104							
	Internal adjustment			114							
<b>Microswitch</b>	Small switching differential, not adjustable				10						
	Average switching differential, not adjustable				11						
	With gold plated contacts, switching differential not adjustable				21						
<b>Range</b>	<b>Range</b>	<b>Sensor max.</b>		<b>Range</b>	<b>Sensor max.</b>						
	[°C]	[°C]		[°C]	[°C]						
	-30 ... +40	45	01	-10 ... +80	85	95					
	-10 ... +25	60	07	+5 ... +95	105	20					
	0 ... +35	70	09	+20 ... +110	115	23					
	+10 ... +45	85	11	+20 ... +150	165	31					
	+10 ... +80	100	13	+20 ... +230	250	24					
	+15 ... +30	60	17	+40 ... +300	330	53					
-10 ... +35	70	94	+70 ... +350	380	54						
<b>Sensor <sup>1)</sup></b>	See table "Ordering-no. for sensors"						XXX				
<b>Fixing <sup>2)</sup></b>	Nut M10 (for remote sensing version)									10	
	Angle bracket (for remote sensing version)									17	
	Mounting bracket (for remote sensing version)									19	
	Grubscrew locked, lateral (direct mounting version) <sup>5)</sup>									12	
	Cap nut (for direct mounting version) <sup>5)</sup>									14	
	Grubscrew locked with spacer (cooling element) (for direct mounting version)									18	
<b>Protection tube</b>	See data sheet H72114/H72163								XXXX.XXXX		
<b>Accessories</b>	Switchpoint locking <sup>4)</sup>										15
	Switchpoint fixed and sealed upon customer's request <sup>4)</sup>										88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>4)</sup>										83
	Switchpoint adjustment please indicate when ordering:										
	- Switchpoint [°C]										
	- Increasing or decreasing										
	Condensator over Pin 1-2										12
	Condensator over Pin 1-3										13
	Condensators over Pin 1-2 / 1-3										23
	Railway version IEC 61373, category 2										28
	Outdoor application (vented)										44
	Capillary tube protection: Flexible metal tube, brass nickel plated										90
Capillary tube protection: Flexible metal tube 1.4541/V2A										91	
Capillary tube protection: PVC tube										92	
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>										
<b>Steps between stages</b>	Desired stage difference to be indicated when ordering (without indication = switches synchronous)										
	Switch 1 on scale, difference switch 2 to scale -6 °C...+15 °C										
	Minimum distance between switches:										
	Switch 10: ±1 °C Switch 11/21: ±2 °C										

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Overlengths upon request

<sup>4)</sup> Only with type 114, internal adjustment

<sup>5)</sup> Media max. 150°C in continuous operation

Ordering no. for sensors						
Range	Sensor-Ø	Sensor material				
		Stainless steel	Copper	Copper nickel plated		
01, 07, 09, 11, 13, 17	4.7 mm		412	413		
	7.0 mm	421	422	423		
	9.0 mm		432	433		
94, 95, 20, 23	4.7 mm	311	312	313		
	7.0 mm	321	322	323		
	9.0 mm	331	332	333		
31	4.7 mm	111	112	113		
	7.0 mm	121	122	123		
	9.0 mm	131	132	133		
24, 53, 54	4.7 mm	011	012	013		
	7.0 mm	021	022	023		
	9.0 mm	031	032	033		

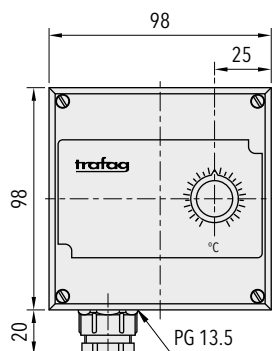
Standard products (extra short lead time)						
Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Smallest stage difference [°C]	Largest stage difference [°C]	Sensor max. [°C]
M2S40	114 1101 422 19	-30 ... +40	1.8 (fixed)	0.8	25	45
M2S35	114 1109 422 19	0 ... +35	1.8 (fixed)	0.8	15	50
M2S95	114 1120 322 19	+5 ... +95	2.5 (fixed)	1.2	35	105
M2S150	114 1131 122 19	+20 ... +150	3 (fixed)	1.5	40	165
M2S230S	114 1124 021 19	+20 ... +230	4.5 (fixed)	2	70	250
M2S350S	114 1154 021 19	+70 ... +350	5 (fixed)	2.5	80	380

Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5 \% \text{ FS typ.}$
	Scale accuracy typ.	$\pm 2 \% \text{ FS typ.}$
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $+45^{\circ}\text{C} \dots +250^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +70^{\circ}\text{C}$ Range $> +250^{\circ}\text{C}$ : $-10^{\circ}\text{C} \dots +70^{\circ}\text{C}$ (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $> +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$
	Protection	IP54
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	Noryl
	Screwed cable gland	Polyamide (PA)
	Installation	any position
	Weight	$\sim 480 \text{ g}$
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2 \text{ M}\Omega$
	Dielectric strength	$U \leq 250\text{V}$ : 1.45 kV $U \leq 500\text{V}$ : 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles
<b>Electrical connection</b>	Cable gland	PG13.5 Cable- $\varnothing$ 5 ... 12.5 mm
	Terminal screw	6 x 1 ... 2.5 mm <sup>2</sup>

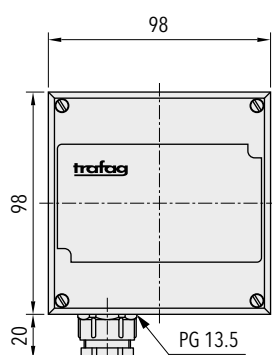
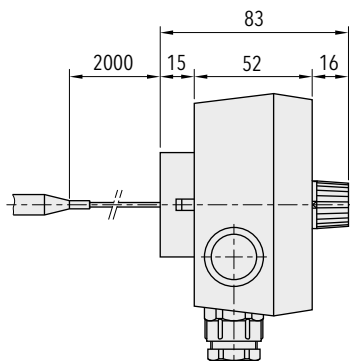
#### Additional information

<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72139">www.trafag.com/H72139</a>
	Instructions	<a href="http://www.trafag.com/H70311">www.trafag.com/H70311</a>
	Flyer	<a href="http://www.trafag.com/H70965">www.trafag.com/H70965</a>

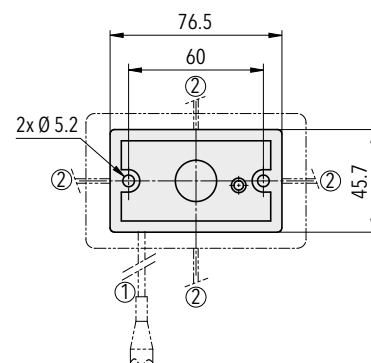
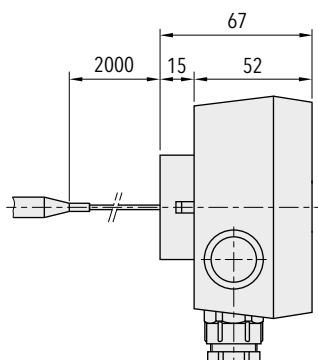
## Dimensions



104.XXXX.XXX.XX...

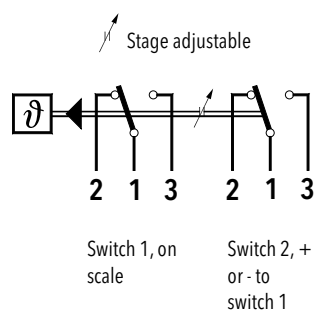


114.XXXX.XXX.XX...



Fixation 19

## Electrical connection



Switching differential typ.					
<b>Measuring range</b>	[°C]	-30 ... +40 +10 ... +80	-10 ... +25 0 ... +35 +10 ... +45	+15 ... +30	-10 ... +35
<b>Microswitch 10:</b> Switching differential not adjustable	[°C]	0.7	0.7	0.7	1.5
<b>Microswitch 11:</b> Switching differential not adjustable	[°C]	1.8	1.8	1.8	2.5
<b>Microswitch 21:</b> Switching differential not adjustable	[°C]	1.8	1.8	1.8	2.5
Steps between stages from switch S2 to switch S1 (S1 on scale): <b>S1 &lt; S2</b>	[°C]	0.8 ... 25	0.8 ... 15	0.8 ... 10	1.2 ... 25
Steps between stages from switch S2 to switch S1 (S1 on scale): <b>S1 &gt; S2</b>	[°C]	0.8 ... 12	0.8 ... 6	0.8 ... 4	1.2 ... 8
<b>Measuring range</b>	[°C]	-10 ... +80 +5 ... +95 +20 ... +110	+20 ... +150	+20 ... +230	+40 ... +300 +70 ... +350
<b>Microswitch 10:</b> Switching differential not adjustable	[°C]	1.5	1.8	2	2.5
<b>Microswitch 11:</b> Switching differential not adjustable	[°C]	2.5	3	4.5	5
<b>Microswitch 21:</b> Switching differential not adjustable	[°C]	2.5	3	4.5	5
Steps between stages from switch S2 to switch S1 (S1 on scale): <b>S1 &lt; S2</b>	[°C]	1.2 ... 35	1.5 ... 40	2 ... 70	2.5 ... 80
Steps between stages from switch S2 to switch S1 (S1 on scale): <b>S1 &gt; S2</b>	[°C]	1.2 ... 15	1.5 ... 20	2 ... 30	2.5 ... 40

Electrical data switch			
Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A

# LABORSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Machine tools

## Features

- Without housing
- Short response time
- Electrical connection on terminal screw

Technical Data			
Designation of application	Remote sensing thermostat, skeleton type	Switching differential	Adjustable / not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change



## Ordering information/type code

		XXX	XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Custom build code</b>	Front panel mounting, screw terminal	736							
	Screw terminal	754							
<b>Microswitch</b>	Small switching differential, not adjustable		10						
	Average switching differential, not adjustable		11						
	With gold plated contacts, switching differential not adjustable		21						
	Adjustable large switching differential		24						
	Adjustable standard switching differential		25						
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]		<b>Range</b> [°C]	<b>Sensor max.</b> [°C]				
	-30 ... +40	45	01	+20 ... +110	115	23			
	-10 ... +80	85	95	+20 ... +150	165	31			
	0 ... +35	70	09	+20 ... +230	250	24			
	+5 ... +95	105	20	+40 ... +300	330	53			
	+10 ... +45	85	11	+70 ... +350	380	54			
<b>Sensor</b> <sup>1)</sup>	See table "Ordering-no. for sensors"					XXX			
<b>Fixing</b> <sup>2)</sup>	Nut M10 (for remote sensing version) <sup>4)</sup>						10		
	Angle bracket (for remote sensing version) <sup>4)</sup>						17		
	Bracket (for remote sensing version) <sup>4)</sup>						27		
	Grubscrew locked, lateral (direct mounting version) <sup>4) 5)</sup>						12		
	Cap nut (for direct mounting version) <sup>4) 5)</sup>						14		
	Grubscrew locked with spacer (cooling element) (for direct mounting version) <sup>4)</sup>						18		
	Standard directly mounted on protection tube, only for type 736						00		
<b>Protection tube</b>	See data sheet H72114/H72163						XXXX.XXXX		
<b>Accessories</b>	Switchpoint locking <sup>4)</sup>	15		Condensators over Pin 1-2 / 1-3			23		
	Switchpoint fixed and sealed upon customer's request <sup>4)</sup>	88		Railway version IEC 61373, category 2			28		
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>4)</sup>	83		Capillary tube protection: Flexible metal tube, brass nickel plated			90		
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C]			Capillary tube protection: Flexible metal tube 1.4541/V2A			91		
	- Increasing or decreasing			Capillary tube protection: PVC tube			92		
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>								

<sup>1)</sup> See data sheet H72114/H72163<sup>2)</sup> See data sheet H72106<sup>3)</sup> Overlengths upon request<sup>4)</sup> Only for type 754<sup>5)</sup> Media max. 150°C in continuous operation

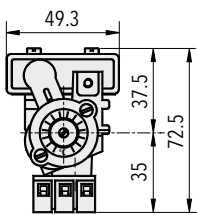
## Ordering no. for sensors

Range	Sensor-Ø	Sensor material		
		Stainless steel	Copper	Copper nickel plated
01, 09, 11	4.7 mm		412	413
	7.0 mm	421	422	423
	9.0 mm		432	433
95, 20, 23	4.7 mm	311	312	313
	7.0 mm	321	322	323
	9.0 mm	331	332	333
31	4.7 mm	111	112	113
	7.0 mm	121	122	123
	9.0 mm	131	132	133
24, 53, 54	4.7 mm	011	012	013
	7.0 mm	021	022	023
	9.0 mm	031	032	033

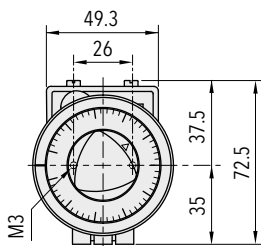
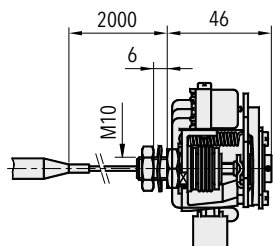
## Standard products (extra short lead time)

Product No.	Type Code	Sensor material	Temperature range [°C]	Switching differential [°C]	Sensor max. [°C]
L35	754 2509 422 10	Copper	0 ... +35	0.7 ... 10 (adjustable)	60
L40	754 2501 422 10	Copper	-30 ... +40	0.7 ... 10 (adjustable)	45
L95	754 2520 322 10	Copper	+5 ... +95	2 ... 12 (adjustable)	105
L150	754 2531 122 10	Copper	+20 ... +150	2.5 ... 16 (adjustable)	165
L230S	754 2524 021 10	1.4435 (AISI316L)	+20 ... +230	3 ... 32 (adjustable)	250
L350S	754 2554 021 10	1.4435 (AISI316L)	+70 ... +350	4 ... 40 (adjustable)	380

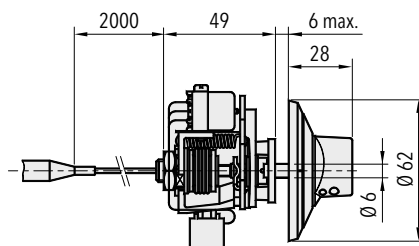
## Dimensions



754.XXXX.XXX.XX...



736.XXXX.XXX.XX...



Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5\%$ FS typ.
	Scale accuracy typ.	$\pm 2\%$ FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $+45^{\circ}\text{C} \dots +250^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +70^{\circ}\text{C}$ Range $> +250^{\circ}\text{C}$ : $-10^{\circ}\text{C} \dots +70^{\circ}\text{C}$ (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $> +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$
	Protection	IP00
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Installation	any position
	Weight	754: $\sim 250$ g 736: $\sim 300$ g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2\text{ M}\Omega$
	Dielectric strength	$U \leq 250\text{V}$ : 1.45 kV $U \leq 500\text{V}$ : 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11/25: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles Microswitch 24: 0.3 Mio. cycles
<b>Electrical connection</b>	Terminal screw	$3 \times 1 \dots 2.5\text{ mm}^2$

## Additional information

<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72122">www.trafag.com/H72122</a>
	Instructions	<a href="http://www.trafag.com/H70211">www.trafag.com/H70211</a>
	Flyer	<a href="http://www.trafag.com/H70967">www.trafag.com/H70967</a>

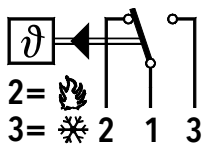
## Switching differential typ.

Measuring range	[°C]	-30 ... +40 0 ... +35 +10 ... +45	-10 ... +80 +5 ... +95 +20 ... +110	+20 ... +150	+20 ... +230	+40 ... +300 +70 ... +350
<b>Microswitch 10:</b> Switching differential not adjustable	[°C]	0.3	0.8	1	1.2	2
<b>Microswitch 11/21:</b> Switching differential not adjustable	[°C]	0.7	2	2.5	3	4
<b>Microswitch 24:</b> Switching differential adjustable	[°C]	4 ... 21	5.5 ... 26	7 ... 34	15 ... 65	18 ... 84
<b>Microswitch 25:</b> Switching differential adjustable	[°C]	0.7 ... 10	2 ... 12	2.5 ... 16	3 ... 32	4 ... 40

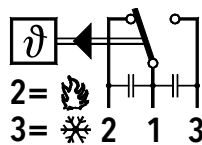
## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
10	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
11	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
21	Gold plated contacts, not adjustable	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A
25	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A
24	Adjustable large switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3 (0.2) A 125 V, 0.75 (0.4) A 30 V, 15 (1.5) A 14 V, 15 (1.5) A

## Electrical connection



736/754



with accessory 23

# LABOR LIMISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Machine tools

## Features

- Without housing
- Short response time
- Electrical connection on terminal screw

### Technical Data

Designation of application	Remote sensing thermostat with limiter, skeleton type	Switching differential	Not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		L...R .	XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Custom build code</b>	For increasing temperatures, screw terminal	755 .	12						
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]		<b>Range</b> [°C]	<b>Sensor max.</b> [°C]				
	-30 ... +40	45	<b>01</b>	-10 ... +80	85	<b>95</b>			
	-10 ... +25	60	<b>07</b>	+5 ... +95	105	<b>20</b>			
	0 ... +35	70	<b>09</b>	+20 ... +110	115	<b>23</b>			
	+10 ... +45	85	<b>11</b>	+20 ... +150	165	<b>31</b>			
	+10 ... +80	100	<b>13</b>	+20 ... +230	250	<b>24</b>			
	+15 ... +30	60	<b>17</b>	+40 ... +300	330	<b>53</b>			
	-10 ... +35	70	<b>94</b>	+70 ... +350	380	<b>54</b>			
<b>Sensor <sup>1)</sup></b>	See table "Ordering-no. for sensors"					XXX			
<b>Fixing <sup>2)</sup></b>	Nut M10 (for remote sensing version)								<b>10</b>
	Angle bracket (for remote sensing version)								<b>17</b>
	Bracket (for remote sensing version)								<b>27</b>
	Grubscrew locked, lateral (direct mounting version) <sup>4)</sup>								<b>12</b>
	Cap nut (for direct mounting version) <sup>4)</sup>								<b>14</b>
	Grubscrew locked with spacer (cooling element) (for direct mounting version)								<b>18</b>
<b>Protection tube</b>	See data sheet H72114/H72163							XXXX.XXXX	
<b>Accessories</b>	Switchpoint locking								<b>15</b>
	Switchpoint fixed and sealed upon customer's request								<b>88</b>
	Switchpoint preset upon customer's request, no guarantee on switching accuracy								<b>83</b>
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing								
	Condensator over Pin 1-2								<b>12</b>
	Condensator over Pin 1-3								<b>13</b>
	Condensators over Pin 1-2 / 1-3								<b>23</b>
	Railway version IEC 61373, category 2								<b>28</b>
	Capillary tube protection: Flexible metal tube, brass nickel plated								<b>90</b>
	Capillary tube protection: Flexible metal tube 1.4541/V2A								<b>91</b>
	Capillary tube protection: PVC tube								<b>92</b>
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>								

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

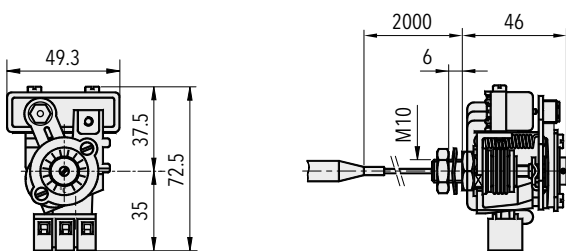
<sup>3)</sup> Overlengths upon request

<sup>4)</sup> Media max. 150°C in continuous operation

Ordering no. for sensors				
Range	Sensor-Ø	Sensor material		
		Stainless steel	Copper	Copper nickel plated
01, 07, 09, 11, 13, 17	4.7 mm		412	413
	7.0 mm	421	422	423
	9.0 mm		432	433
94, 95, 20, 23	4.7 mm	311	312	313
	7.0 mm	321	322	323
	9.0 mm	331	332	333
31	4.7 mm	111	112	113
	7.0 mm	121	122	123
	9.0 mm	131	132	133
24, 53, 54	4.7 mm	011	012	013
	7.0 mm	021	022	023
	9.0 mm	031	032	033

Standard products (extra short lead time)				
Product No.	Type Code	Sensor material	Temperature range [°C]	Sensor max. [°C]
L95R	755 1220 322 10	Copper	+5 ... +95	105
L150R	755 1231 122 10	Copper	+20 ... +150	165
L230SR	755 1224 021 10	1.4435 (AISI316L)	+20 ... +230	250
L350SR	755 1254 021 10	1.4435 (AISI316L)	+70 ... +350	380

## Dimensions



755.12XX.XXX.XX...

Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5$ % FS typ.
	Scale accuracy typ.	$\pm 2$ % FS typ.
	Switching differential	See table below
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $+45^{\circ}\text{C} \dots +250^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +70^{\circ}\text{C}$ Range $> +250^{\circ}\text{C}$ : $-10^{\circ}\text{C} \dots +70^{\circ}\text{C}$ (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $> +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$
	Protection	IP00
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Filling	Liquid
	Housing	See ordering information
	Installation	any position
	Weight	$\sim 250$ g
<b>Microswitch</b>	Rating	See table below
	Resistance of insulation	$> 2$ M $\Omega$
	Dielectric strength	2 kV terminal ground
	Life time (mechanical)	0.3 Mio. cycles
<b>Electrical connection</b>	Terminal screw	$3 \times 1 \dots 2.5$ mm <sup>2</sup>

Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72124">www.trafag.com/H72124</a>
	Instructions	<a href="http://www.trafag.com/H70211">www.trafag.com/H70211</a>
	Flyer	<a href="http://www.trafag.com/H70968">www.trafag.com/H70968</a>



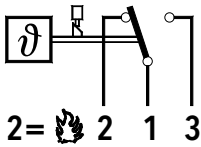
## Switching differential typ.

<b>Measuring range</b>	<b>[°C]</b>	-30 ... +40 -10 ... +25 0 ... +35 +15 ... +30 +10 ... +45 +10 ... +80	-10 ... +35 -10 ... +80 +5 ... +95 +20 ... +110	+20 ... +150	+20 ... +230	+40 ... +300 +70 ... +350
<b>Microswitch 12:</b> Switching differential not adjustable	<b>[°C]</b>	2.0	6.0	7.5	9.0	12.0

## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>12</b>	Average switching differential, high vibration resistance	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3 (0.2) A 125 V, 0.75 (0.4) A 30 V, 15 (1.5) A 14 V, 15 (1.5) A

## Electrical Connection



755.12

# INDUSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- Railways
- Machine tools

## Features

- Compact design
- Rugged housing
- Protection IP65
- Any mounting position possible

### Technical Data

Designation of application	Industrial thermostat with remote sensor	Switching differential	Adjustable / not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX	XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Custom build code</b>	External adjustment	404							
	Internal adjustment	414							
<b>Microswitch</b>	Small switching differential, not adjustable		10						
	Average switching differential, not adjustable		11						
	With gold plated contacts, switching differential not adjustable		21						
	Adjustable large switching differential		24						
	Adjustable standard switching differential		25						
<b>Range</b>	<b>Range</b>	<b>Sensor max.</b>		<b>Range</b>	<b>Sensor max.</b>				
	[°C]	[°C]		[°C]	[°C]				
	-30 ... 40	50	01	-10 ... 80	85	95			
	-10 ... 25	60	07	5 ... 95	105	20			
	0 ... 35	70	09	20 ... 110	115	23			
	10 ... 45	85	11	20 ... 150	165	31			
	10 ... 80	100	13	20 ... 230	250	24			
	15 ... 30	60	17	40 ... 300	330	53			
-10 ... 35	70	94	70 ... 350	380	54				
<b>Sensor <sup>1)</sup></b>	See table "Ordering-no. for sensors"					XXX			
<b>Fixing <sup>2)</sup></b>	Nut M10 (for remote sensing version)							10	
	Flange connection (for remote sensing version)							16	
	Angle bracket (for remote sensing version)							17	
	Bracket (for remote sensing version)							27	
	Grubscrew locked, lateral (direct mounting version) <sup>5)</sup>							12	
	Cap nut (for direct mounting version) <sup>5)</sup>							13	
	Cap nut (for direct mounting version) <sup>5)</sup>							14	
Grubscrew locked with spacer (cooling element) (for direct mounting version)							18		
<b>Protection tube</b>	See data sheet H72114/H72163							XXXX.XXXX	
<b>Accessories</b>	Switchpoint locking <sup>4)</sup>								15
	Switchpoint fixed and sealed upon customer's request <sup>4)</sup>								88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>4)</sup>								83
	Switchpoint adjustment please indicate when ordering:								
	- Switchpoint [°C]								
	- Increasing or decreasing								
	Condensator over Pin 1-2								12
	Condensator over Pin 1-4								13
	Condensators over Pin 1-2 / 1-4								23
	Railway version IEC 61373, category 2								28
	Outdoor application (vented)								44
	Capillary tube protection: Flexible metal tube, brass nickel plated								90
	Capillary tube protection: Flexible metal tube 1.4541/V2A								91
Capillary tube protection: PVC tube								92	
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>								

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Overlengths upon request

<sup>4)</sup> Only with type 414, internal adjustment

<sup>5)</sup> Media max. 150°C in continuous operation

Ordering no. for sensors				
Range	Sensor-Ø	Sensor material		
		Stainless steel	Copper	Copper nickel plated
01, 07, 09, 11, 13, 17	4.7 mm		412	413
	7.0 mm	421	422	423
	9.0 mm		432	433
94, 95, 20, 23	4.7 mm	311	312	313
	7.0 mm	321	322	323
	9.0 mm	331	332	333
31	4.7 mm	111	112	113
	7.0 mm	121	122	123
	9.0 mm	131	132	133
24, 53, 54	4.7 mm	011	012	013
	7.0 mm	021	022	023
	9.0 mm	031	032	033

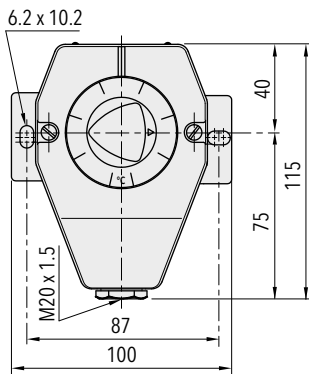
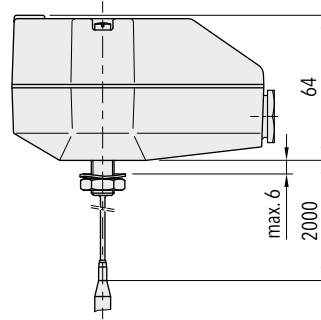
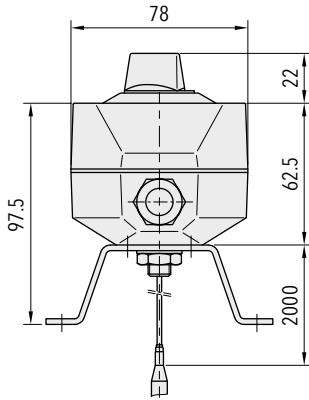
Standard products (extra short lead time)					
Product No.	Type Code	Sensor material	Temperature range [°C]	Switching differential [°C]	Sensor max. [°C]
I35	404 2509 422 27	Copper	0 ... +35	0.7 ... 10 (adjustable)	60
I40	404 2501 422 27	Copper	-30 ... +40	0.7 ... 10 (adjustable)	45
I95	404 2520 322 27	Copper	+5 ... +95	2 ... 12 (adjustable)	105
I150	404 2531 122 27	Copper	+20 ... +150	2.5 ... 16 (adjustable)	165
I230S	404 2524 021 27	1.4435 (AISI316L)	+20 ... +230	3 ... 32 (adjustable)	250
I350S	404 2554 021 27	1.4435 (AISI316L)	+70 ... +350	4 ... 40 (adjustable)	380
IS35	414 2509 422 27	Copper	0 ... +35	0.7 ... 10 (adjustable)	60
IS40	414 2501 422 27	Copper	-30 ... +40	0.7 ... 10 (adjustable)	45
IS95	414 2520 322 27	Copper	+5 ... +95	2 ... 12 (adjustable)	105
IS150	414 2531 122 27	Copper	+20 ... +150	2.5 ... 16 (adjustable)	165
IS230S	414 2524 021 27	1.4435 (AISI316L)	+20 ... +230	3 ... 32 (adjustable)	250
IS350S	414 2554 021 27	1.4435 (AISI316L)	+70 ... +350	4 ... 40 (adjustable)	380

Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5$ % FS typ.
	Scale accuracy typ.	$\pm 2$ % FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $+45^{\circ}\text{C} \dots +250^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +70^{\circ}\text{C}$ Range $> +250^{\circ}\text{C}$ : $-10^{\circ}\text{C} \dots +70^{\circ}\text{C}$ (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $> +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$
	Protection	IP65
	Humidity	Max. 95 % relative
	Vibration	5...25 Hz: $\pm 1.6$ mm 25...100 Hz: 4g
	Shock	50 g / 11 ms
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	AlSi9Cu3, coated
	Screwed cable gland	Brass nickel plated
	Installation	any position
	Weight	$\sim 950$ g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2$ M $\Omega$
	Dielectric strength	$U \leq 250\text{V}$ : 1.45 kV / $U \leq 500\text{V}$ : 2 kV terminal ground
	Life time (mechanical)	Microswitch 10/11/25: 20 Mio. cycles Microswitch 21: 0.5 Mio. cycles Microswitch 24: 0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5 Cable- $\varnothing$ 4...10 mm
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>

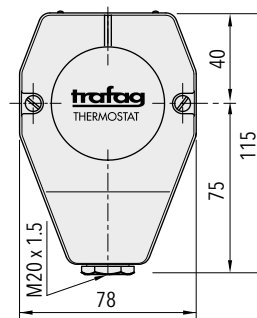
#### Additional information

<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72110">www.trafag.com/H72110</a>
	Instructions	<a href="http://www.trafag.com/H73111">www.trafag.com/H73111</a>
	Flyer	<a href="http://www.trafag.com/H70951">www.trafag.com/H70951</a>

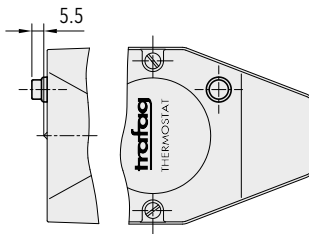
## Dimensions



404.XXXX.XXX.27.XXXX.XXXX.XX



414.XXXX.XXX.10.XXXX.XXXX.XX



Accessory 14

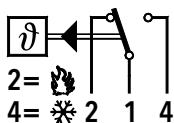
## Switching differential typ.

<b>Measuring range</b>	[°C]	-30 ... +40 -10 ... +25 0 ... +35 +15 ... +30 +10 ... +45 +10 ... +80	-10 ... +35 -10 ... +80 +5 ... +95 +20 ... +110	+20 ... +150	+20 ... +230	+40 ... +300 +70 ... +350
<b>Microswitch 10:</b> Switching differential not adjustable	[°C]	0.3	0.8	1	1.2	2
<b>Microswitch 11/21:</b> Switching differential not adjustable	[°C]	0.7	2	2.5	3	4
<b>Microswitch 24:</b> Switching differential adjustable	[°C]	4 ... 21	5.5 ... 26	7 ... 34	15 ... 65	18 ... 84
<b>Microswitch 25:</b> Switching differential adjustable	[°C]	0.7 ... 10	2 ... 12	2.5 ... 16	3 ... 32	4 ... 40

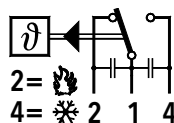
## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
<b>10</b>	Small switching differential, not adjustable	125 V, 10 (1.5) A 250 V, 10 (1.25) A	250 V, 0.2 (0.02) A 125 V, 0.4 (0.03) A 30 V, 2 (1) A 14 V, 15 (2.5) A
<b>11</b>	Average switching differential, not adjustable	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (1.5) A
<b>21</b>	Gold plated contacts, not adjustable	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A	24 V, 0.1 (0.1) A 12 V, 1 (1) A 5 V, 2 (2) A
<b>25</b>	Adjustable standard switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.25 (0.03) A 125 V, 0.5 (0.05) A 30 V, 6 (1.5) A 14 V, 15 (2.5) A
<b>24</b>	Adjustable large switching differential	125 V, 15 (1.5) A 250 V, 15 (1.25) A 500 V, 10 (0.75) A	250 V, 0.3 (0.2) A 125 V, 0.75 (0.4) A 30 V, 15 (1.5) A 14 V, 15 (1.5) A

## Electrical Connection



404/414



with accessory 23

# INDU LIMISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Machine tools
- Process technology

## Features

- Compact design
- Rugged housing
- Protection IP65
- Any mounting position possible

Technical Data			
Designation of application	Industrial thermostat with remote sensor and limiter	Switching differential	Not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change



## Ordering information/type code

		XXX . XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Custom build code</b>	For increasing temperatures, internal resetting	410 . 12						
	For increasing temperatures, external resetting	412 . 12						
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]		<b>Range</b> [°C]	<b>Sensor max.</b> [°C]			
	-30 ... +40	45	<b>01</b>	-10 ... +80	85	<b>95</b>		
	-10 ... +25	60	<b>07</b>	+5 ... +95	105	<b>20</b>		
	0 ... +35	70	<b>09</b>	+20 ... +110	115	<b>23</b>		
	+10 ... +45	85	<b>11</b>	+20 ... +150	165	<b>31</b>		
	+10 ... +80	100	<b>13</b>	+20 ... +230	250	<b>24</b>		
	+15 ... +30	60	<b>17</b>	+40 ... +300	330	<b>53</b>		
	-10 ... +35	70	<b>94</b>	+70 ... +350	380	<b>54</b>		
<b>Sensor</b> <sup>1)</sup>	See table "Ordering-no. for sensors"					XXX		
<b>Fixing</b> <sup>2)</sup>	Nut M10 (for remote sensing version)							<b>10</b>
	Flange connection (for remote sensing version)							<b>16</b>
	Angle bracket (for remote sensing version)							<b>17</b>
	Bracket (for remote sensing version)							<b>27</b>
	Grubscrew locked, lateral (direct mounting version) <sup>4)</sup>							<b>12</b>
	Cap nut (for direct mounting version) <sup>4)</sup>							<b>14</b>
	Grubscrew locked with spacer (cooling element) (for direct mounting version)							<b>18</b>
<b>Protection tube</b>	See data sheet H72114/H72163					XXXX.XXXX		
<b>Accessories</b>	Switchpoint locking		<b>15</b>	Condensator over Pin 1-3				<b>13</b>
	Switchpoint fixed and sealed upon customer's request		<b>88</b>	Condensators over Pin 1-2 / 1-3				<b>23</b>
	Switchpoint preset upon customer's request, no guarantee on switching accuracy		<b>83</b>	Railway version IEC 61373, category 2				<b>28</b>
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C]			Outdoor application (vented)				<b>44</b>
	- Increasing or decreasing			Capillary tube protection: Flexible metal tube, brass nickel plated				<b>90</b>
	Condensator over Pin 1-2		<b>12</b>	Capillary tube protection: Flexible metal tube 1.4541/V2A				<b>91</b>
				Capillary tube protection: PVC tube				<b>92</b>
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>							

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Overlengths upon request

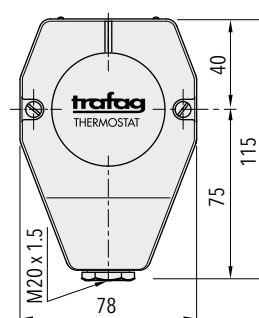
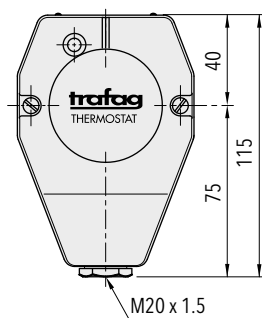
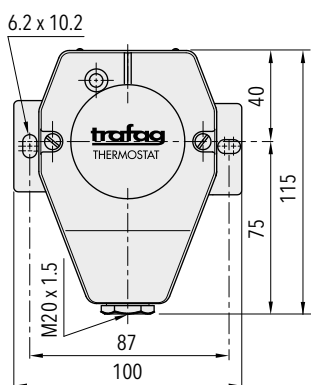
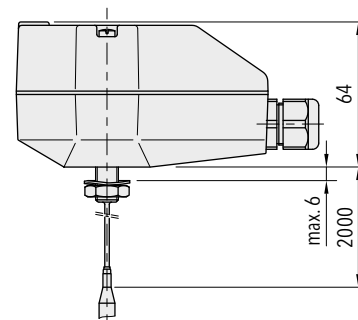
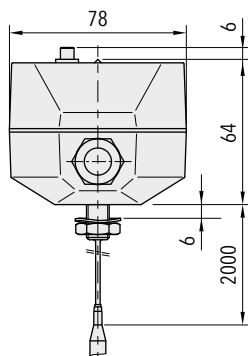
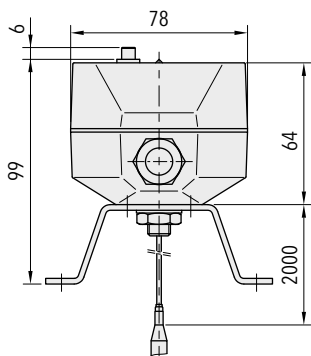
<sup>4)</sup> Media max. 150°C in continuous operation

Ordering no. for sensors				
Range	Sensor-Ø	Sensor material		
		Stainless steel	Copper	Copper nickel plated
01, 07, 09, 11, 13, 17	4.7 mm		412	413
	7.0 mm	421	422	423
	9.0 mm		432	433
	12.0 mm	441	442	443
94, 95, 20, 23	4.7 mm	311	312	313
	7.0 mm	321	322	323
	9.0 mm	331	332	333
31	4.7 mm	111	112	113
	7.0 mm	121	122	123
	9.0 mm	131	132	133
24, 53, 54	4.7 mm	011	012	013
	7.0 mm	021	022	023
	9.0 mm	031	032	033

Standard products (extra short lead time)				
Product No.	Type Code	Sensor material	Temperature range [°C]	Sensor max. [°C]
IS95R	412 1220 322 27	Copper	+5 ... +95	105
IS150R	412 1231 122 27	Copper	+20 ... +150	165
IS230SR	412 1224 021 27	1.4435 (AISI316L)	+20 ... +230	250
IS350SR	412 1254 021 27	1.4435 (AISI316L)	+70 ... +350	380

Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5$ % FS typ.
	Scale accuracy typ.	$\pm 2$ % FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range $\leq +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $+45^{\circ}\text{C} \dots +250^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +70^{\circ}\text{C}$ Range $> +250^{\circ}\text{C}$ : $-10^{\circ}\text{C} \dots +70^{\circ}\text{C}$ (Important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range $< +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$ Range $> +45^{\circ}\text{C}$ : $-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$
	Protection	IP65
	Humidity	Max. 95 % relative
	Vibration	5...25 Hz: $\pm 1.6$ mm 25...100 Hz: 4g
	Shock	50 g / 11 ms
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	AlSi9Cu3, coated
	Screwed cable gland	Brass nickel plated
	Installation	any position
	Weight	$\sim 950$ g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2$ M $\Omega$
	Dielectric strength	2 kV terminal ground
	Life time (mechanical)	0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5 Cable- $\varnothing$ 4...10 mm
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>

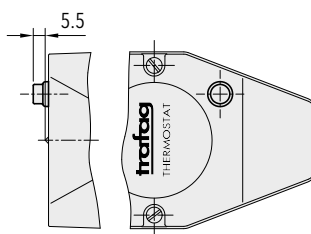
## Dimensions



412.12XX.XXX.27...

412.12XX.XXX.10...

410.12XX.XXX.10...



Accessory 14

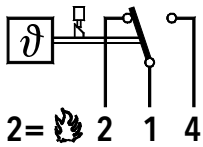
## Switching differential typ.

<b>Measuring range</b>	<b>[°C]</b>	-30 ... +40	-10 ... +35	+20 ... +150	+20 ... +230	+40 ... +300
		-10 ... +25	-10 ... +80			+70 ... +350
		0 ... +35	+5 ... +95			
		+15 ... +30	+20 ... +110			
		+10 ... +45				
		+10 ... +80				
<b>Microswitch 12:</b>	<b>[°C]</b>	2.0	6.0	7.5	9.0	12.0
Switching differential not adjustable						

## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
12	Average switching differential, high vibration resistance	125 V, 15 (1.5) A	250 V, 0.3 (0.2) A
		250 V, 15 (1.25) A	125 V, 0.75 (0.4) A
		500 V, 10 (0.75) A	30 V, 15 (1.5) A
			14 V, 15 (1.5) A

## Electrical connection



410/412.12

Limiter for increasing temperatures

## Additional information

<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72138">www.trafag.com/H72138</a>
	Instructions	<a href="http://www.trafag.com/H73111">www.trafag.com/H73111</a>
	Flyer	<a href="http://www.trafag.com/H70966">www.trafag.com/H70966</a>

# NAVISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- Shipbuilding
- Engine manufacturing
- Railways



## Features

- Compact design
- Rugged housing
- High repeatability
- Protection IP65
- Any mounting position possible

Technical Data			
Designation of application	Thermostat for shipbuilding	Switching differential	Not adjustable
Measuring range	+20°C ... +110°C to +40°C ... +300°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	ABS, BV, CCS, DNV, GL, KRS, LRS, RINA, RMRS EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		XXX . XX	XX	XXX	XX	XXXX	XXXX	XX	XX
<b>Custom build code</b>	Controller, increased vibration resistance	471 . 23							
	Controller, high vibration resistance <sup>1)</sup>	471 . 26							
	Temperature switch with locking, high vibration resistance <sup>2)</sup>	472 . 12							
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]							
	+20 ... 110	115						23	
	+20 ... 150	165						31	
	+40 ... 300	330						53	
<b>Sensor</b>	<b>Range</b> [°C]	<b>Sensor diameter</b> [mm]							
	+20 ... 110	Ø7						322	
	+40 ... 300	Ø7						122	
	+20 ... 150 / +40 ... 300	Ø9						132	
	+20 ... 150 / +40 ... 300	Ø12						142	
<b>Fixing</b>	Version B (remote sensing version)							27	
	Version K (direct mounting version)							14	
<b>Protection tube</b>	<b>Suitable for sensor</b>	<b>Protection tube diameter</b> [mm]	<b>Protection tube length</b> [mm]	<b>Electrical connection</b>					
	322	10/8	min. 150	K, Stainless steel				1411	
	132 <sup>3)</sup>	12/10	min. 110	K, Stainless steel				1412	
	142 <sup>3)</sup>	15/13	min. 65	K, Stainless steel				1414	
	322	10/8	min. 150	K, Brass nickel plated				1416	
	132 <sup>3)</sup>	12/10	min. 110	K, Brass nickel plated				1417	
	142 <sup>3)</sup>	15/13	min. 65	K, Brass nickel plated				1419	
	322	10/8	min. 150	B, Brass nickel plated				8316	
	122		min. 110						
	332	12/10	min. 110	B, Brass nickel plated				8317	
	132		min. 90						
	342	15/13	min. 65	B, Brass nickel plated				8319	
	142		min. 65						
	322	10/8	min. 150	B, Stainless steel				8411	
	122		min. 110						
332	12/10	min. 110	B, Stainless steel				8412		
132		min. 90							
342	15/13	min. 65	B, Stainless steel				8414		
142		min. 65							
<b>Protection tube length</b>	Length G, see data sheet H72114/H72163							XXXX	
<b>Accessories</b>	Switchpoint fixed and sealed upon customer's request							88	
	Switchpoint preset upon customer's request, no guarantee on switching accuracy							83	
	Switchpoint adjustment please indicate when ordering:								
	- Switchpoint [°C]								
	- Increasing or decreasing								
	Screwed cable gland M20x1.5 (EN 50262)								07
	Screwed cable gland M24x1.5 (DIN 89280)								27
	Screwed cable gland M18x1.5 (DIN 89280)								40
Capillary tube protection: Flexible metal tube, brass nickel plated								90	
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L = XXXX								
	Standard length: L = 3000 mm with flexible metal tube								

<sup>1)</sup> Without ship approval GL

<sup>2)</sup> Without ship approval LRS

<sup>3)</sup> Only for range +20°C ... 150°C (Ordering no. 31)

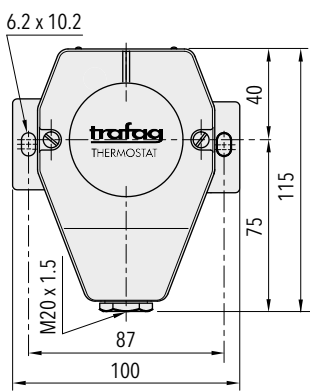
## Standard products (extra short lead time)

Product No.	Type Code	Temperature range [°C]	Protection tube diameter [mm]	Protection tube length [mm]	Switching differential [°C]	Sensor max. [°C]
ISN11011	471 2323 332 27 8317 0110 90	+20 ... +110	12	110	4.5 (fixed)	115
ISN11015	471 2323 322 27 8316 0150 90	+20 ... +110	10	150	4.5 (fixed)	115
ISN11065	471 2323 342 27 8319 0065 90	+20 ... +110	15	65	4.5 (fixed)	115
ISN15011	471 2331 132 27 8317 0110 90	+20 ... +150	12	110	5 (fixed)	165
ISN15015	471 2331 122 27 8316 0150 90	+20 ... +150	10	150	5 (fixed)	165
ISN15065	471 2331 142 27 8319 0065 90	+20 ... +150	15	65	5 (fixed)	165
ISNT11011	471 2323 332 14 1417 0110	+20 ... +110	12	110	4.5 (fixed)	115
ISNT11015	471 2323 322 14 1416 0150	+20 ... +110	10	150	4.5 (fixed)	115
ISNT11065	471 2323 342 14 1419 0065	+20 ... +110	15	65	4.5 (fixed)	115
ISNT15011	471 2331 132 14 1417 0110	+20 ... +150	12	110	5 (fixed)	165
ISNT15015	471 2331 122 14 1416 0150	+20 ... +150	10	150	5 (fixed)	165
ISNT15065	471 2331 142 14 1419 0065	+20 ... +150	15	65	5 (fixed)	165

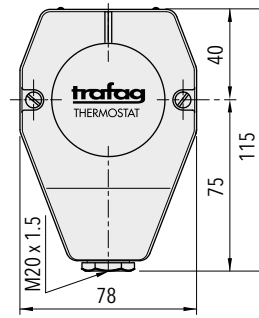
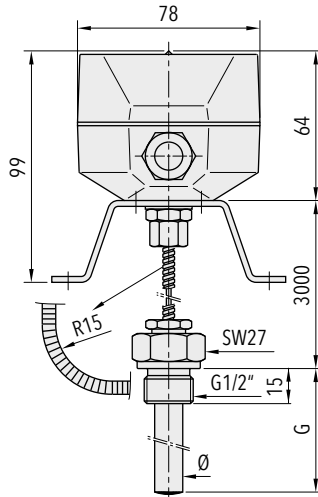


Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Stability typ.	± 1 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	see table
	Switching point	Temperatur compensated with bimetal switch lever
<b>Environmental Conditions</b>	Ambient temperature	Range ≤ +45°C: -30 ... +50°C Range +45 ... +250°C: -30 ... +70°C Range > +250°C: -10 ... +70°C
	Storage temperature	-40°C ... +85°C
	Protection	IP65
	Humidity	Max. 95% relative
	Vibration	5...25 Hz: ±1.6 mm 25...100 Hz: 4g
	Shock	50g/ 11ms
<b>Mechanical Data</b>	Housing	Copper (Cu)
	Filling	Liquid
	Protection tube	See ordering information
	Housing	AlSi9Cu3, coated
	Screwed cable gland	Brass nickel plated
	Installation	Any position
	Weight	~ 950 g
<b>Microswitch</b>	Rating	see table
	Resistance of insulation	> 10 MΩ
	Dielectric strength	2 kV terminal ground
	Life time (mechanical)	Microswitch 12/23/26: 0.3 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5 Cable-Ø 4...10 mm
	Terminal screw	3 x 1...2.5 mm <sup>2</sup>

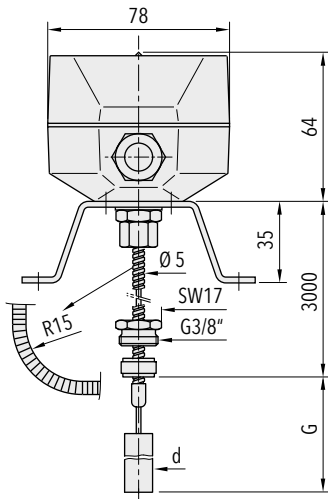
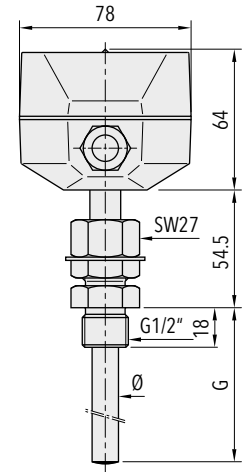
## Dimensions



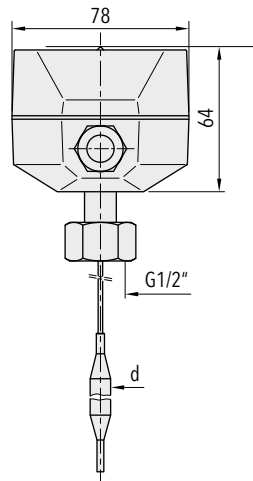
47X.XXXX.XXX.27.831X.XX



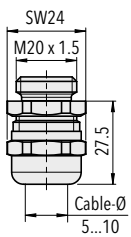
47X.XXXX.XXX.14.141X.XX



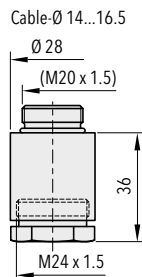
Version B / without protection tube



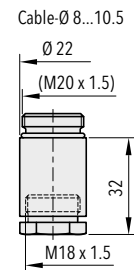
Version K / without protection tube



47X.XXXX.XXX.XX.XXXX.XXXX.07  
M 20x1.5



47X.XXXX.XXX.XX.XXXX.XXXX.27  
M 24x1.5



47X.XXXX.XXX.XX.XXXX.XXXX.40  
M 18x1.5

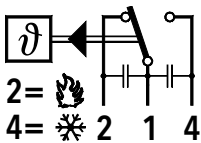
## Switching differential typ.

Range	[°C]	+20 ... +110	+20 ... +150	+40 ... +300
Sensor max.	[°C]	115	165	330
Switching differential micro switch 23 (fixed value, not adjustable)	[°C]	4.5	5	8
Switching differential micro switch 26 (fixed value, not adjustable)	[°C]	7.5	8	14
Switching differential micro switch 12 (limiter)	[°C]	(7.5)	(8)	(14)

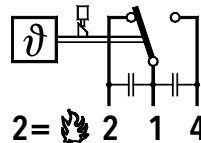
## Electrical data switch

Type	Features	Rating	
		AC	DC
12	Temperature switch with locking	125 V 15 (1.5) A 250 V 15 (1.25) A 500 V 10 (0.75) A	250 V 0.3 (0.2) A 125 V 0.75 (0.4) A 30 V 15 (1.5) A 14 V 15 (1.5) A
23	Controller; average switching differential	125 V 15 (1.5) A 250 V 15 (1.25) A 500 V 10 (0.75) A	250 V 0.3 (0.05) A 125 V 0.6 (0.1) A 30 V 15 (1.5) A 14 V 15 (1.5) A
26	Controller; large switching differential	125 V 15 (1.5) A 250 V 15 (1.25) A 500 V 10 (0.75) A	250 V 0.3 (0.2) A 125 V 0.75 (0.4) A 30 V 15 (1.5) A 14 V 15 (1.5) A

## Electrical Connection



Switch 23/26



Switch 12/Limiter

## Additional information

### Documents

Data sheet	<a href="http://www.trafag.com/H72111">www.trafag.com/H72111</a>
Instructions	<a href="http://www.trafag.com/H73111">www.trafag.com/H73111</a>
Flyer	<a href="http://www.trafag.com/H70950">www.trafag.com/H70950</a>

# PICOTHERM

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Shipbuilding
- Engine manufacturing
- Railways
- Hydraulics
- HVAC



## Features

- Compact design
- Rugged housing
- High repeatability
- Protection IP65
- Any mounting position possible

### Technical Data

Designation of application	Compact thermostat for shipbuilding	Switching differential	Not adjustable
Measuring range	+5°C ... +95°C to +20°C ... +150°C	Repeatability	± 1 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	ABS, BV, CCS, DNV-GL, KRS, LRS, NKK, RINA, RMRS EN60730-1/ EN60730-2-9: Typ 2.B.H

Subject to change

## Ordering information/type code

		474 . XX	XX	XXX	XX	XXXX	XXXX	XX	XX
<b>Micro-switch</b>	Standard, switching differential not adjustable	03							
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]							
	+5 ... +95	100	20						
	+20 ... +110	115	23						
	+20 ... +150	165	31						
<b>Sensor</b>	<b>Sensor diameter</b> [mm]	<b>Range</b>							
	Ø7	20, 23	322						
	Ø9	20, 23	332						
	Ø12	20, 23	342						
	Ø7	31	122						
	Ø9	31	132						
	Ø12	31	142						
<b>Fixing</b>	Flange connection (for remote sensing version)		00						
	Cap nut (for direct mounting version)		14						
<b>Protection tube</b>	<b>Mounting</b>	<b>Suitable for sensor</b>	<b>Protection tube diameter</b> [mm]						
	For direct mounting on protection tube	122, 322	10	1416					
	For direct mounting on protection tube	142, 342	15	1419					
	For remote sensing version	122, 322	10	8316					
	For remote sensing version	142, 342	15	8319					
<b>Protection tube length</b>	Length G, see data sheet H72163						XXXX		
<b>Accessories</b>	Female electrical connector EN 175301-803-A (DIN43650-A)							58	
	Capillary tube protection: Flexible metal tube, brass nickel plated							90	
	Fixing set							V3	
	Cover with window							77	
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L = XXXX Standard length: L = 3000 mm with flexible metal tube								

## Standard products (extra short lead time)

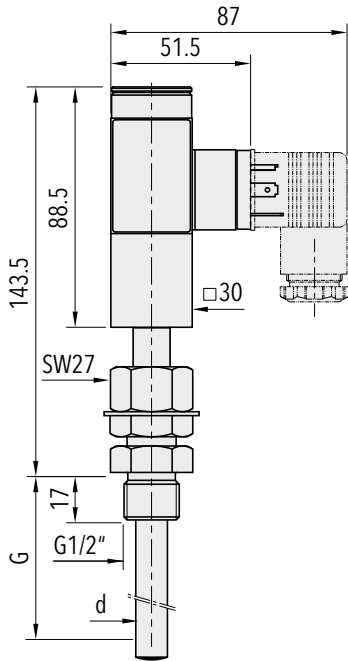
Product No.	Type Code	Temperature range [°C]	Protection tube diameter [mm]	Protection tube length [mm]	Switching differential [°C]	Sensor max. [°C]
ISPT9515	474 0320 322 14 1416 0150 58 V3	+5 ... +95	10	150	4 (fixed)	100
ISPT9565	474 0320 342 14 1419 0065 58 V3	+5 ... +95	15	65	4 (fixed)	100
ISPT11015	474 0323 322 14 1416 0150 58 V3	+20 ... +110	10	150	4 (fixed)	115
ISPT11065	474 0323 342 14 1419 0065 58 V3	+20 ... +110	15	65	4 (fixed)	115
ISPT15015	474 0331 122 14 1416 0150 58 V3	+20 ... +150	10	150	5 (fixed)	165
ISPT15065	474 0331 142 14 1419 0065 58 V3	+20 ... +150	15	65	5 (fixed)	165
ISP9515	474 0320 322 00 8316 0150 58 90 V3	+5 ... +95	10	150	4 (fixed)	100
ISP9565	474 0320 342 00 8319 0065 58 90 V3	+5 ... +95	15	65	4 (fixed)	100
ISP11015	474 0323 322 00 8316 0150 58 90 V3	+20 ... +110	10	150	4 (fixed)	115
ISP11065	474 0323 342 00 8319 0065 58 90 V3	+20 ... +110	15	65	4 (fixed)	115
ISP15015	474 0331 122 00 8316 0150 58 90 V3	+20 ... +150	10	150	6 (fixed)	165
ISP15065	474 0331 142 00 8319 0065 58 90 V3	+20 ... +150	15	65	6 (fixed)	165

Specifications		
<b>Accuracy</b>	Repeatability	$\pm 1\%$ FS typ.
	Stability typ.	$\pm 1\%$ FS typ.
	Scale accuracy typ.	$\pm 4\%$ FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	-30°C ... +70°C
	Storage temperature	-40°C ... +85°C
	Protection	IP65
	Humidity	Max. 95 % relative
	Vibration	5...25 Hz: $\pm 1.6$ mm 25...100 Hz: 4g
	Shock	50 g / 11 ms
<b>Mechanical Data</b>	Sensor housing	Copper (Cu)
	Filling	Liquid
	Protection tube	Brass nickel plated
	Housing	AlMgSi1 anodized
	Male electrical plug	Polyamide (PA)
	Installation	any position
	Weight	~ 260 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	> 10 M $\Omega$
	Dielectric strength	2 kV terminal ground
	Life time (mechanical)	10 Mio. cycles
<b>Electrical connection</b>	Cable gland	Cable- $\emptyset$ : 6...13 mm
	Terminal screw	4 x 0.5...1.5 mm <sup>2</sup>

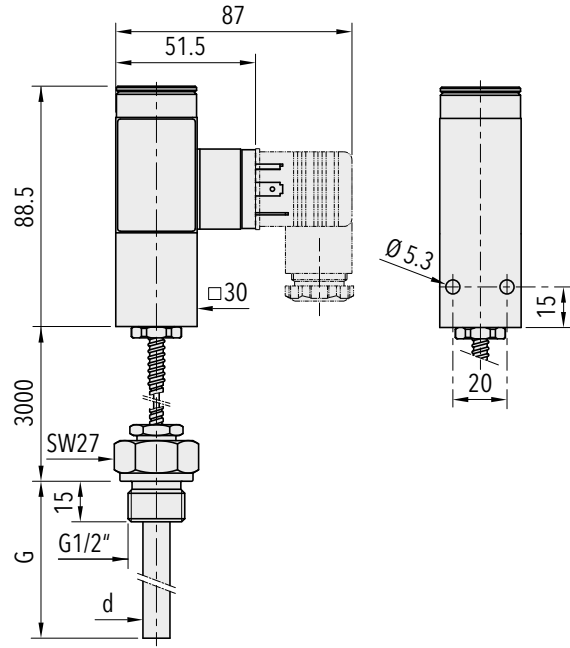
#### Additional information

<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72113">www.trafag.com/H72113</a>
	Instructions	<a href="http://www.trafag.com/H73113">www.trafag.com/H73113</a>
	Flyer	<a href="http://www.trafag.com/H70953">www.trafag.com/H70953</a>

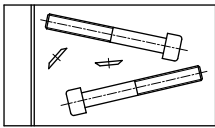
## Dimensions



474.XXXX.XXX.14.14XX...



474.XXXX.XXX.00.83XX...



M5x40 ISO4762

474...V3



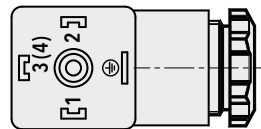
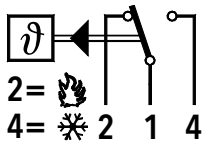
## Switching differential typ.

<b>Measuring range</b>	[°C]	<b>+5 ... +95</b>	<b>+20 ... +110</b>	<b>+20 ... +150</b>
<b>Sensor max.</b>	[°C]	100	115	165
<b>Microswitch 03:</b>	[°C]	4.0	4.0	6.0
Switching differential not adjustable				

## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
03	Silver contacts	250 V, 3 (1) A	250 V, 0.1 (0.05) A 220 V, 0.25 (0.2) A 110 V, 0.5 (0.3) A 24 V, 2.0 (1.0) A

## Electrical Connection



DIN 43650-A

# EX INDUSTRISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Ex II 2 G / D

## Features

- Compact design
- Rugged housing
- Any mounting position possible
- Ex db eb IIC T6 Gb
- Ex tb IIIC T80°C Db

### Technical Data

Designation of application	Ex Industrial thermostat with remote sensor	Switching differential	Not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	SEV 15 ATEX 0156 X IECEX SEV 17.0010X

Subject to change

## Ordering information/type code

		XXX	XX	XX	XXX	XX	XXXXXXXXXX	XX	XX	
<b>Custom build code</b>	External adjustment	404								
	Internal adjustment	414								
<b>Microswitch</b>	Standard, switching differential not adjustable		91							
<b>Range</b>	<b>Range</b> [°C]	<b>Sensor max.</b> [°C]		<b>Range</b> [°C]	<b>Sensor max.</b> [°C]					
	-30 ... +40	50	01	-10 ... +80	85	95				
	-10 ... +25	60	07	+5 ... +95	105	20				
	0 ... +35	70	09	+20 ... +110	115	23				
	+10 ... +45	85	11	+20 ... +150	165	31				
	+10 ... +80	100	13	+20 ... +230	250	24				
	+15 ... +30	60	17	+40 ... +300	330	53				
	-10 ... +35	70	94	+35 ... +175	200	56				
	+10 ... +70	85	59	+20 ... +270	330	55				
	+20 ... +85	100	58	+70 ... +350	380	54				
	+20 ... +115	130	57							
	<b>Sensor <sup>1)</sup></b>	See table "Ordering-no. for sensors"					XXX			
<b>Fixing <sup>2)</sup></b>	Nut M10 (for remote sensing version)							10		
	Bracket (for remote sensing version)							27		
	Grubscrew locked, lateral (direct mounting version) <sup>5)</sup>							12		
	Cap nut (for direct mounting version) <sup>5)</sup>							14		
	Grubscrew locked with spacer (cooling element) (for direct mounting version)							18		
<b>Protection tube</b>	See data sheet H72114/H72163							XXXX.XXXX		
<b>Accessories</b>	Switchpoint locking <sup>4)</sup>								15	
	Switchpoint fixed and sealed upon customer's request <sup>4)</sup>								88	
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>4)</sup>								83	
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing									
	Capillary tube protection: Flexible metal tube, brass nickel plated									90
	Capillary tube protection: Flexible metal tube 1.4541/V2A									91
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>									

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Overlengths upon request

<sup>4)</sup> Only with type 414, internal adjustment

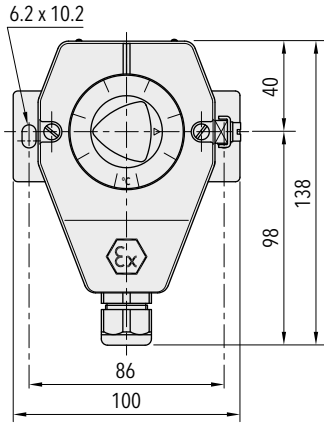
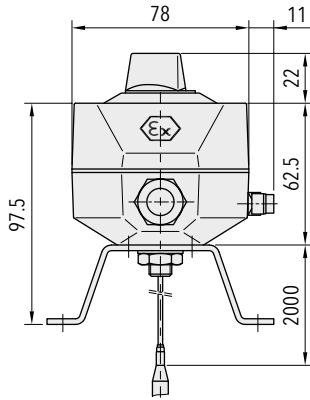
<sup>5)</sup> Media max. 150°C in continuous operation

Ordering no. for sensors					
Range	Sensor-Ø	Sensor material			
		Stainless steel	Copper	Copper nickel plated	
01, 07, 09, 11, 13, 17, 58, 59	4.7 mm		412	413	
	7.0 mm	421	422	423	
	9.0 mm		432	433	
94, 95, 20, 23, 57	4.7 mm	311	312	313	
	7.0 mm	321	322	323	
	9.0 mm	331	332	333	
31, 56	4.7 mm	111	112	113	
	7.0 mm	121	122	123	
	9.0 mm	131	132	133	
24, 53, 54, 55	4.7 mm	011	012	013	
	7.0 mm	021	022	023	
	9.0 mm	031	032	033	

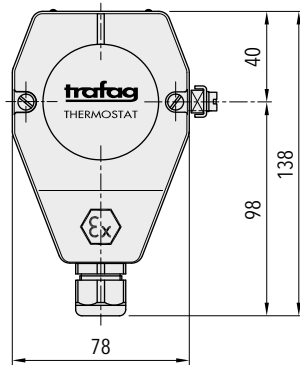
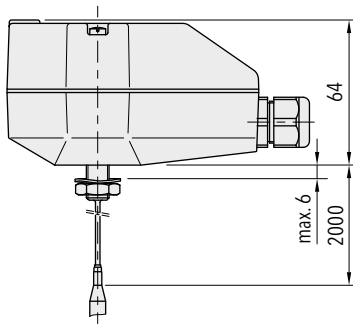
Standard products (extra short lead time)					
Product No.	Type Code	Sensor material	Temperature range [°C]	Switching differential [°C]	Sensor max. [°C]
EXS35	414 9109 423 27 0000 0000 02	Copper nickel plated	0 ... +35	2.5 (fixed)	50
EXS40	414 9101 423 27 0000 0000 02	Copper nickel plated	-30 ... +40	2.5 (fixed)	45
EXS95	414 9120 323 27 0000 0000 02	Copper nickel plated	+5 ... +95	3.5 (fixed)	105
EXS150	414 9131 123 27 0000 0000 02	Copper nickel plated	+20 ... +150	5.5 (fixed)	165
EXS230S	414 9124 021 27 0000 0000 02	1.4435 (AISI316L)	+20 ... +230	8 (fixed)	250
EXS350S	414 9154 021 27 0000 0000 02	1.4435 (AISI316L)	+70 ... +350	10 (fixed)	380

Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	See table
	Switching point	Temperature compensated with bimetal switch lever
<b>Environmental conditions</b>	Ambient temperature	Range ≤ +45°C: -30°C ... +50°C Range +45°C ... +250°C: -30°C ... +60°C Range > + 250°C: -10°C ... +60°C
	Storage temperature	Range ≤ +45°C: -30°C ... +50°C Range > +45°C: -30°C ... +60°C
	Protection	IP65
	Humidity	Max. 95 % relative
	Vibration	5...25 Hz: ±1.6 mm 25...100 Hz: 4 g
	Shock	50 g / 11 ms
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	AlSi9Cu3, coated
	Screwed cable gland	Polyamide (PA)
	Installation	any position
	Weight	~ 950 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	1.5 kV
	Life time (mechanical)	1 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5/SW24 Cable-Ø 5.5...13 mm Approval: PTB 99 ATEX 3128 X
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>

## Dimensions



404.XXXX.XXX.27...



414.XXXX.XXX.10...

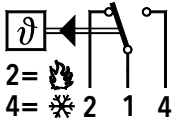
## Switching differential typ.

<b>Measuring range</b>	<b>[°C]</b>	-30 ... +40	-10 ... +35	+20 ... +150	+35 ... +175	+40 ... +300
		-10 ... +25	-10 ... +80		+20 ... +230	+70 ... +350
		0 ... +35	+5 ... +95			
		+15 ... +30	+20 ... +110			
		+10 ... +45	+20 ... +115			
		+10 ... +70				
		+10 ... +80				
<b>Microswitch 91:</b>	<b>[°C]</b>	2.5	3.5	5.5	8	10
Switching differential not adjustable						

## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
91	Standard Ex	250V 5(5) A 125V 5(5) A	250 V 0.25 (0.03) A 125 V 0.5 (0.06) A 75 V 0.75 (0.25) A 50 V 1 (1) A 30 V 5 (3) A 15 V 5 (3) A

## Electrical connection



404 / 414

## Additional information

<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72108">www.trafag.com/H72108</a>
	Instructions	<a href="http://www.trafag.com/H73172">www.trafag.com/H73172</a>
	Flyer	<a href="http://www.trafag.com/H70970">www.trafag.com/H70970</a>

# EX INDU AMBISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- Ex II 2 G / D

## Features

- Compact design
- Rugged housing
- Protection IP65
- Ex db eb IIC T6 Gb
- Ex tb IIIC T80°C Db

Technical Data			
Designation of application	Ex Industrial room thermostat	Switching differential	Not adjustable
Measuring range	-30°C ... +30°C to 0°C ... +60°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	SEV 15 ATEX 0156 X IECEx SEV 17.0010X

Subject to change



## Ordering information/type code

		XXX	XX	XX	XXXXXX	XX
<b>Custom build code</b>	External adjustment	409				
	Internal adjustment	419				
<b>Microswitch</b>	Standard, not adjustable		91			
<b>Range</b>	<b>Range [°C]</b>	<b>Operating temperature [°C]</b>				
	-30 ... +30	-30 ... +40		02		
	+5 ... +35	-30 ... +50		10		
	0 ... +60	-30 ... +60		12		
<b>Sensor<sup>1)</sup> / Fixing<sup>2)</sup></b>	Sensor: Copper; Fixation: Bracket (open sensor coil)				522.27	
	Sensor: Copper nickel plated; Fixation: Bracket (open sensor coil)				523.27	
<b>Accessories</b>	Switchpoint locking <sup>3)</sup>					15
	Switchpoint fixed and sealed upon customer's request <sup>3)</sup>					88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy <sup>3)</sup>					83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing					

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

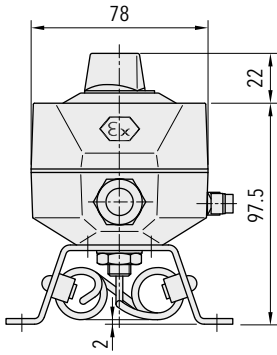
<sup>3)</sup> Only with type 419, internal adjustment

## Standard products (extra short lead time)

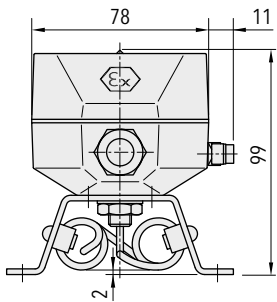
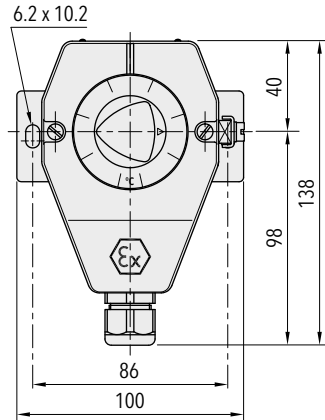
Product No.	Type Code	Temperature range [°C]	Switching differential [°C]	Operating temperature [°C]
EXAS33	419 9102 523 27 0000 0000 02	-30 ... +30	2.5 (fixed)	-30 ... +40
EXAS35	419 9110 523 27 0000 0000 02	+5 ... +35	2.5 (fixed)	-30 ... +50
EXAS60	419 9112 523 27 0000 0000 02	0 ... +60	2.5 (fixed)	-30 ... +60

Specifications		
<b>Accuracy</b>	Repeatability	$\pm 0.5$ % FS typ.
	Scale accuracy typ.	$\pm 2$ % FS typ.
	Switching differential	2.5°C (not adjustable)
<b>Environmental conditions</b>	Ambient temperature	-30°C ... +60°C
	Storage temperature	Range $\leq +45^\circ\text{C}$ : -30°C ... +50°C Range $> +45^\circ\text{C}$ : -30°C ... +60°C
	Protection	IP65
	Humidity	Max. 95 % relative
	Vibration	5...25 Hz: $\pm 1.6$ mm 25...100 Hz: 4 g
	Shock	50g/ 11ms
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	AlSi9Cu3, coated
	Screwed cable gland	Polyamide
	Installation	any position
	Weight	~ 950 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	$> 2$ M $\Omega$
	Dielectric strength	1.5 kV
	Life time (mechanical)	1 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5/SW24 Cable- $\emptyset$ 5.5...13 mm Approval: PTB 99 ATEX 3128 X
	Terminal screw	3 x 1...2.5 mm <sup>2</sup>

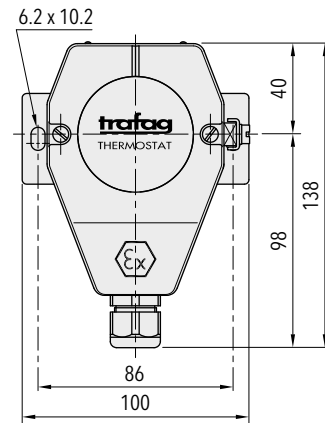
## Dimensions



409.91XX.XXX.27...



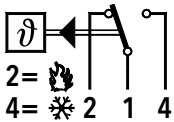
419.91XX.XXX.27...



## Electrical data switch

Type	Features	Rating	
		Resistive Load (Inductive Load)	
		AC	DC
91	Standard Ex	250V 5(5) A 125V 5(5) A	250 V 0.25 (0.03) A 125 V 0.5 (0.06) A 75 V 0.75 (0.25) A 50 V 1 (1) A 30 V 5 (3) A 15 V 5 (3) A

## Electrical connection



409/419

## Additional information

### Documents

Data sheet	<a href="http://www.trafag.com/H72128">www.trafag.com/H72128</a>
Instructions	<a href="http://www.trafag.com/H73172">www.trafag.com/H73172</a>
Flyer	<a href="http://www.trafag.com/H70969">www.trafag.com/H70969</a>

# «Simple Apparatus» conformity to ATEX 414

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# INDUSTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Potentially hazardous areas

## Features

- Compact design
- Rugged housing
- Protection IP65
- Any mounting position possible
- May be used as „simple apparatus“ in zones at risk of explosions

## Technical Data

Designation of application	Industrial room thermostat with remote sensor	Switching differential	Not adjustable
Measuring range	-30°C ... +40°C to +70°C ... +350°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H EN60079-0, EN60079-11 Zone 1 and 2, 21 and 22

Subject to change

# «Simple Apparatus» conformity to ATEX 414

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## Ordering information/type code

		XXX	XX	XX	XXX	XX	XXXXXXXXXX	XX	XX
<b>Custom build code</b>	Internal adjustment	414							
<b>Microswitch</b>	With gold plated contacts, switching differential not adjustable		71						
<b>Range</b>	<b>Range [°C]</b>								<b>Sensor max. [°C]</b>
	-30 ... +40								01
	-10 ... +25								07
	0 ... +35								09
	+10 ... +45								11
	+10 ... +80								13
	+15 ... +30								17
	-10 ... +35								94
	-10 ... +80								95
	+5 ... +95								20
	+20 ... +110								23
	+20 ... +150								31
	+20 ... +230								24
	+40 ... +300								53
	+70 ... +350								54
<b>Sensor <sup>1)</sup></b>	See table "Ordering-no. for sensors"					XXX			
<b>Fixing <sup>2)</sup></b>	Nut M10 (for remote sensing version)								10
	Flange connection (for remote sensing version)								16
	Angle bracket (for remote sensing version)								17
	Bracket (for remote sensing version)								27
	Grubscrew locked, lateral (direct mounting version) <sup>4)</sup>								12
	Cap nut (for direct mounting version) <sup>4)</sup>								13
	Cap nut (for direct mounting version) <sup>4)</sup>								14
	Grubscrew locked with spacer (cooling element) (for direct mounting version)								18
<b>Protection tube</b>	See data sheet H72114/H72163							XXXX.XXXX	
<b>Accessories</b>	Switchpoint locking								15
	Switchpoint fixed and sealed upon customer's request								88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy								83
	Switchpoint adjustment please indicate when ordering: - Switchpoint [°C] - Increasing or decreasing								
	Capillary tube protection: Flexible metal tube, brass nickel plated								90
	Capillary tube protection: Flexible metal tube 1.4541/V2A								91
<b>Capillary tube length</b>	Capillary tube length up to 5000 mm (no specification required for direct mounting on protection tube) L=XXXX <sup>3)</sup>								

<sup>1)</sup> See data sheet H72114/H72163

<sup>2)</sup> See data sheet H72106

<sup>3)</sup> Overlengths upon request

<sup>4)</sup> Media max. 150°C in continuous operation

# «Simple Apparatus» conformity to ATEX 414

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## Optional accessories of third party supplier

Ex-i barriers are suitable for intrinsically safe applications. The device transmits binary signals from the hazardous area into the safe area.

Ex-i-barriers: 24 VDC  $U_0 = 10.5\text{ V}$  /  $I_0 = 13\text{ mA}$  /  $P_0 = 34\text{ mW}$

ZEN24VDC

Ex-i-barriers: 230 VAC  $U_0 = 10.6\text{ V}$  /  $I_0 = 19.1\text{ mA}$  /  $P_0 = 51\text{ mW}$

ZEN230VAC



Thermostats, when combined with a certified Ex-barrier (see "optional accessories of third party supplier"), can be used as "simple electrical apparatus" in Zone 1 and 2, as well as in Zone 21 and 22, according to IEC/EN 60079-14. These thermostats are not suitable for Zone 0 and Zone 20. Use in safety relevant applications (approved electrical apparatus) is not permitted.

## Ordering no. for sensors

Range	Sensor-Ø	Sensor material		
		Stainless steel	Copper	Copper nickel plated
01, 07, 09, 11, 13, 17	4.7 mm		412	413
	7.0 mm	421	422	423
	9.0 mm		432	433
94, 95, 20, 23	4.7 mm	311	312	313
	7.0 mm	321	322	323
	9.0 mm	331	332	333
31	4.7 mm	111	112	113
	7.0 mm	121	122	123
	9.0 mm	131	132	133
24, 53, 54	4.7 mm	011	012	013
	7.0 mm	021	022	023
	9.0 mm	031	032	033

# «Simple Apparatus» conformity to ATEX 414

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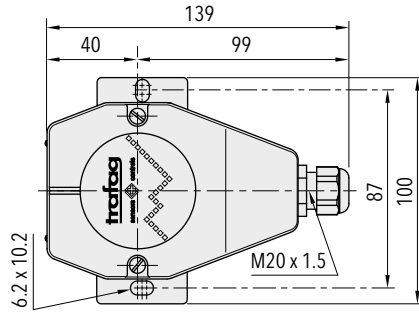
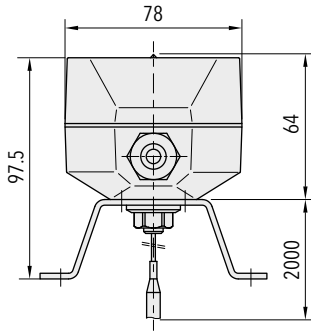
Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	See table
<b>Environmental conditions</b>	Ambient temperature	Range ≤ +45°C: -30°C ... +50°C Range > +45°C: -30°C ... +65°C (important: Temperature at sensor may not exceed maximum sensortemperature)
	Storage temperature	Range ≤ +45°C: -30°C ... +50°C Range > +45°C: -30°C ... +70°C
	Protection	IP65
	Humidity	Max. 95 % relative
	Vibration	5...25 Hz: ±1.6 mm 25...100 Hz: 4g
	Shock	50 g / 11 ms
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	AlSi9Cu3, coated
	Screwed cable gland	Polyamide (PA), light blue
	Installation	Any position Recommendation: screwage pointing downwards
	Weight	~ 950 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	1.25 kV terminal ground
	Life time (mechanical)	1 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5 Cable-Ø 4...10 mm, max. cable length according to EN60079-11
	Terminal screw	3 x 1 ... 2.5 mm <sup>2</sup>



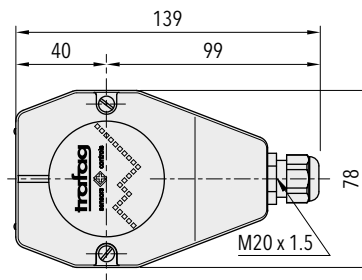
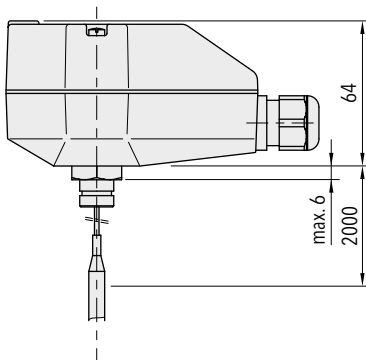
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## Dimensions



414.71.XX.XXX.XX.XX...



414.71.XX.XXX.XX.XX...

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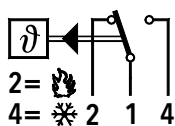
## Switching differential typ.

Measuring range	[°C]	-30 ... +40	-10 ... +35	+20 ... +150	+20 ... +230	+40 ... +300
		-10 ... +25	-10 ... +80			+70 ... +350
		0 ... +35	+5 ... +95			
		+15 ... +30	+20 ... +110			
		+10 ... +45				
		+10 ... +80				
<b>Microswitch 71:</b>	[°C]	0.7	2	2.5	3	4
Switching differential not adjustable						

## Electrical data switch

Type	Features	Rating
71	With gold plated contacts, switching differential not adjustable	$U_0 = 24 \text{ V}$ $I_0 = 100 \text{ mA}$ $P_0 = 600 \text{ mW}$

## Electrical connection



## Additional information

Documents		
	Data sheet	<a href="http://www.trafag.com/H72183">www.trafag.com/H72183</a>
	Instructions	<a href="http://www.trafag.com/H73173">www.trafag.com/H73173</a>
	Flyer	<a href="http://www.trafag.com/H70971">www.trafag.com/H70971</a>

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# AMBISTAT

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for the measurement of pressure and temperature.



## Applications

- Potentially explosive atmosphere

## Features

- Compact design
- Rugged housing
- Protection IP65
- Any mounting position possible
- May be used as „simple apparatus“ in zones at risk of explosions

## Technical Data

Designation of application	Industrial room thermostat	Switching differential	Not adjustable
Measuring range	-30°C ... +30°C to 0°C ... +60°C	Repeatability	± 0.5 % FS typ.
Output signal	Floating change-over contact	Approval / conformity	EN60730-1/ EN60730-2-9: Typ 2.B.H EN60079-0, EN60079-11 Zone 1 and 2, 21 and 22

Subject to change

# «Simple Apparatus» conformity to ATEX 419

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## Ordering information/type code

		XXX	XX	XX	XXXXXX	XX
<b>Custom build code</b>	Internal adjustment	419				
<b>Microswitch</b>	With gold plated contacts, switching differential not adjustable		71			
<b>Range</b>	<b>Range [°C]</b>	<b>Operating temperature [°C]</b>				
	-30 ... +30	-30 ... +40			02	
	-20 ... +40	-30 ... +50			06	
	+5 ... +35	-30 ... +50			10	
	0 ... +60	-30 ... +65			12	
<b>Sensor / Fixing</b>	Sensor: Copper; Fixation: Bracket (open sensor coil)				522.27	
	Sensor: Copper nickel plated; Fixation: Bracket (open sensor coil)				523.27	
<b>Accessories</b>	Switchpoint locking					15
	Switchpoint fixed and sealed upon customer's request					88
	Switchpoint preset upon customer's request, no guarantee on switching accuracy					83
	Switchpoint adjustment please indicate when ordering:					
	- Switchpoint [°C]					
	- Increasing or decreasing					

### Optional accessories of third party supplier

Ex-i barriers are suitable for intrinsically safe applications. The device transmits binary signals from the hazardous area into the safe area.

Ex-i-barriers: 24 VDC  $U_0 = 10.5$  V /  $I_0 = 13$  mA /  $P_0 = 34$  mW

ZEN24VDC

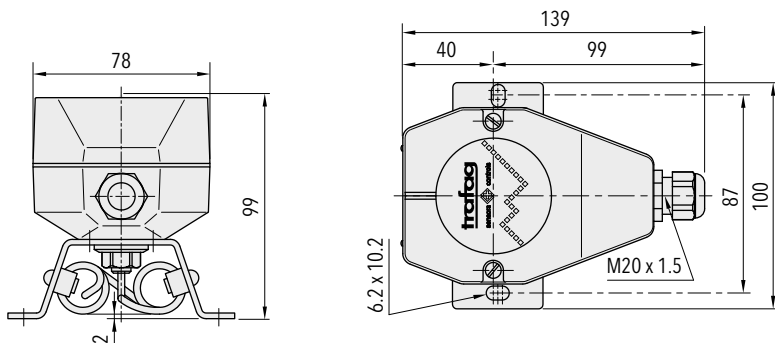
Ex-i-barriers: 230 VAC  $U_0 = 10.6$  V /  $I_0 = 19.1$  mA /  $P_0 = 51$  mW

ZEN230VAC



Thermostats, when combined with a certified Ex-barrier (see "optional accessories of third party supplier"), can be used as "simple electrical apparatus" in Zone 1 and 2, as well as in Zone 21 and 22, according to IEC/EN 60079-14. These thermostats are not suitable for Zone 0 and Zone 20. Use in safety relevant applications (approved electrical apparatus) is not permitted.

## Dimensions



419.71.XX.52X.27.XX

**trafaa**

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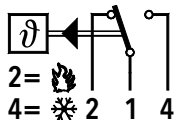
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Specifications		
<b>Accuracy</b>	Repeatability	± 0.5 % FS typ.
	Scale accuracy typ.	± 2 % FS typ.
	Switching differential	0.7°C (not adjustable)
<b>Environmental conditions</b>	Ambient temperature	-30°C ... max. +65°C
	Storage temperature	Range ≤ +40°C: -30 ... +50°C Range > +40°C: -30 ... +70°C
	Protection	IP65
	Humidity	Max. 95 % relative
<b>Mechanical Data</b>	Sensor housing	See ordering information
	Filling	Liquid
	Housing	AlSi9Cu3, coated
	Screwed cable gland	PA, Polyamide, light blue
	Installation	Any position Recommendation: screwage pointing downwards
	Weight	~ 950 g
<b>Microswitch</b>	Rating	See table
	Resistance of insulation	> 2 MΩ
	Dielectric strength	500 V AC terminal ground
	Life time (mechanical)	1 Mio. cycles
<b>Electrical connection</b>	Cable gland	M20x1.5 Cable-Ø 4...10 mm, max. cable length according to EN60079-11
	Terminal screw	3 x 1...2.5 mm <sup>2</sup>

Electrical data switch		
Type	Features	Rating
71	Gold plated contacts	U <sub>0</sub> = 24 V I <sub>0</sub> = 100 mA P <sub>0</sub> = 600 mW

## Electrical connection



Additional information		
<b>Documents</b>	Data sheet	<a href="http://www.trafag.com/H72182">www.trafag.com/H72182</a>
	Instructions	<a href="http://www.trafag.com/H73173">www.trafag.com/H73173</a>
	Flyer	<a href="http://www.trafag.com/H70972">www.trafag.com/H70972</a>

# TEMPERATURE SWITCH

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



## Applications

- Machine tools
- Hydraulic power units
- Cooling and lubrication systems
- HVAC
- Process technology

## Features

- Parameterization also via NFC-smartphone App (Android)
- Display and electrical connection are independently rotatable 335°/343°
- Analogue output switchable mA or V
- Integrated datalogger
- Temperature measuring range adjustable, 50 ... 100 % of the nominal range

Technical Data			
Measuring principle	PT 1000, DIN EN 60751 class A, 2 conductors	Accuracy @ 25°C typ.	± 0.5 % FS typ. + temperature sensor error
Measuring range	-50°C ... +150°C / -58°F ... 302°F adjustable 50 ... 100 % FS	Ambient temperature	-25°C ... +85°C
Output signal	4 ... 20 mA, 0 ... 5 VDC, 1 ... 6 VDC, 0 ... 10 VDC, switchable mA or V	Temperature unit for display	°C, °F, K, user scale
Switching output	2 transistors PNP	Logger	Ring buffer: 3518 data points Sampling time: 0.1 ... 999.9 s, Off (0)

Subject to change

## Ordering information/type code

		8180 .	XX	XX	XX	XX	XX
<b>Operating temperature media</b>	<b>Measuring range</b>						
	-50°C ... +150°C (-58°F ... 302°F)		50				
<b>Sensor</b>	Sensor DIN EN 60751, class 1, wetted parts 1.4404 (AISI316L)			21			
	Sensor DIN EN 60751, class 1, wetted parts 1.4404 (AISI316L), shorter response time <sup>1)</sup>			22			
<b>Process connections</b>	See table below "Ordering no. for process connections"						
<b>Electrical connection</b>	Male electrical plug M12x1, 4-pole, Mat. PA (Accessories P3, P4)					32	
	Male electrical plug M12x1, 5-pole, Mat. PA (Accessories P1, P2)					35	
<b>Output signal</b>	Switching output PNP, current output 4 ... 20 mA, switchable to 0 ... 10 VDC; output detail see accessories P1, P2, P3						PA
	Switching output PNP, voltage output 1 ... 6 VDC; output detail see accessories P1, P2, P3						PU
	Switching output PNP, voltage output 0 ... 10 VDC; output detail see accessories P1, P2, P3						PV
	Switching output PNP, voltage output 0 ... 5 VDC; output detail see accessories P1, P2, P3						PW
	Switching output PNP; output detail see accessory P4						PS
<b>Accessories</b>	Pin configuration 5-pole.; 1: U+, 2: analogue, 3: U-, 4: SP1, 5: SP2						P1
	Pin configuration 5-pole.; 1: U+, 2: SP2, 3: U-, 4: SP1, 5: analogue						P2
	Pin configuration 4-pole.; 1: U+, 2: analogue, 3: U-, 4: SP1						P3
	Pin configuration 4-pole.; 1: U+, 2: SP2, 3: U-, 4: SP1						P4
	Female electrical plug M12x1, 5-pole						33
	Parametrisation standard (see table Parameter)						ZS
	Parametrisation according to customer specifications (see table Parameter)						ZC
	Function package 1: Temperature offset correction / Measuring range zero point adjustment (included as basic function)						Z1
	Function package 2: User scale unit / analogue output adjustment						Z2
	Protective cap, 1 pc. F89051, package of 5 pcs. F89052, package of 25 pcs. F89075						

<sup>1)</sup> Upon request

## Ordering no. for process connections

Sensor length	50 mm	100 mm	150 mm	200 mm *	250 mm *
G1/8" male	11	21	31	41	51
G1/4" male	12	22	32	42	52
G1/2" male	13	23	33	43	53
G1/8" male, compression fitting	14	24	34	44	54
G1/4" male, compression fitting	15	25	35	45	55
G1/2" male, compression fitting	16	26	36	46	56
1/4" NPT male	1B	2B	3B	4B	5B
1/2" NPT male	1C	2C	3C	4C	5C
1/4" NPT male, compression fitting	1D	2D	3D	4D	5D
1/2" NPT male, compression fitting	1E	2E	3E	4E	5E
Tri-Clamp DIN 32676, DN25/DN40 *	1G	2G	3G	4G	5G
Tri-Clamp DIN 32676, DN50 *	1J	2J	3J	4J	5J
Sanitary fitting DIN 11851, DN25 *	1L	2L	3L	4L	5L
Sanitary fitting DIN 11851, DN40 *	1M	2M	3M	4M	5M
Sanitary fitting DIN 11851, DN50 *	1N	2N	3N	4N	5N

\* Upon request

Parameters				
Name	Standard setting (accessory ZS)	Value range	Short name	Customer adjustment (accessory ZC)
Switch point SP1 (hysteresis mode) Upper switch point FH1 (window mode)	75 % Measuring range	SP1 > RP1 FH1 > FL1 Hysteresis $\geq$ 1 % FS	SP1	
Reset point RP1 (hysteresis mode) Lower switch point FL1 (window mode)	25 % Measuring range	RP1 < SP1 FL1 < FH1 Hysteresis $\geq$ 1 % FS	RP1	
Switch point SP2 (hysteresis mode) Upper switch point FH2 (window mode)	75 % Measuring range	SP2 > RP2 FH2 > FL2 Hysteresis $\geq$ 1 % FS	SP2	
Reset point RP2 (hysteresis mode) Lower switch point FL2 (window mode)	25 % Measuring range	RP2 < SP2 FL2 < FH2 Hysteresis $\geq$ 1 % FS	RP2	
Switch point delay time SP1 (hysteresis mode) Switch point delay time FH1 (window mode)	0	0 ... 99.99 s	dS1	
Switch point delay time RP1 (hysteresis mode) Switch point delay time FL1 (window mode)	0	0 ... 99.99 s	dR1	
Switch point delay time SP2 (hysteresis mode) Switch point delay time FH2 (window mode)	0	0 ... 99.99 s	dS2	
Switch point delay time RP2 (hysteresis mode) Switch point delay time FL2 (window mode)	0	0 ... 99.99 s	dR2	
Functions switching output 1	Hysteresis, closer (Hno)	Hysteresis NO (Hno), Hysteresis NC (Hnc) Window NO (Fno), Window NC (Fnc)	ou1	
Functions switching output 2	Hysteresis, closer (Hno)	Hysteresis NO (Hno), Hysteresis NC (Hnc) Window NO (Fno), Window NC (Fnc)	ou2	
Temperature units	°C	°C, °F, K	uni	
Measuring range adjustment	100 % Nominal temperature	50 ... 100 % Nominal	T_EP	
Damping (analogue output)	0.01 s	0.01 ... 3.00 s (time constant)	dAA	
Display rotation	No	no, yes (180°)	disr	
Display mode	Current measuring value	Measuring value: current, highest, lowest, display off Current value: decimal places selectable (max. 3)	dis	
Display actualisation	2	1, 2, 5, 20 Hz	duTd	



Specifications		
<b>Electrical Data</b>	Output / supply voltage	4 ... 20 mA: 24 (15 ... 30) VDC 0 ... 5 VDC: 24 (15 ... 30) VDC 1 ... 6 VDC: 24 (15 ... 30) VDC 0 ... 10 VDC: 24 (15 ... 30) VDC
	Switch-on-delay	Typ. 200 ms
	Inverse-polarity protection, short-circuit strength @ 25°C during 5 min.	integrated
	Current consumption	≤ 30 mA
<b>Environmental conditions</b>	Ambient temperature	-25°C ... +85°C
	Protection <sup>1)</sup>	IP67
	Humidity	Max. 95 % relative
	Vibration	10 g (10 ... 2000 Hz) for sensor length ≤ 150 mm
	Shock	50 g / 3 ms
<b>EMC Protection</b>	Emission	EN/IEC 61000-6-3
	Immunity	EN/IEC 61000-6-2
<b>Mechanical Data</b>	Sensor (wetted parts)	1.4404/1.4435 (AISI316L)
	Housing	Steel, die cast metal galvanised display housing plastic
	Sealing	FPM, EPDM
	Male electrical plug	See ordering information
	Weight	~ 189 g, depending on process connector
	Mounting torque	20 Nm
	Housing alignment	Display 335° rotatable, max. 2.5 Nm Electrical connection 343° rotatable, max. 5 Nm

<sup>1)</sup> See electrical connection

Accuracy	
Analogue output	± 0.5 % FS typ. + Temperature sensor error
Switch point	± 0.3 % FS typ. + Temperature sensor error
Display	± 0.3 % FS typ. + Temperature sensor error + 1 digit
Temperature sensor error	For °C: ± (0.15 K + 0.002   t  ) according to EN 60751 For °F: ± [1.8*(0.15 + 0.002 (t - 32) / 1.8)]
Time constant	T <sub>60</sub> = 12.5 s, in air T <sub>90</sub> = 33 s, in air

Analogue output	
Output signal	Switchable 4 ... 20 mA or voltage
Current limiting output signal	4 ... 20 mA: 25 mA (overload) 0 ... 10 VDC: < 40 mA (short-circuit)
Damping (rise time)	0.01 ... 3.00 s / 10 ... 90 % Nominal temperature
Offset correction of analogue output and display indication	$\pm 5^\circ\text{C}$
Measuring range zero point adjustment (T_nP)	0 ... 50 % FS <sup>2)</sup>
Measuring range end point adjustment (T_EP)	50 ... 100 % FS <sup>2)</sup>
Zero point adjustment analogue output (o_nP) <sup>1)</sup>	Voltage output: 0 ... 2 VDC Current output: 3.9 ... o_EP - 8 mA
End point adjustment analogue output (o_EP) <sup>1)</sup>	Voltage output: o_nP + 4 ... 10.5 VDC Current output: o_nP + 8 ... 20.1 mA

<sup>1)</sup> Available with optional function package, see "Accessories"

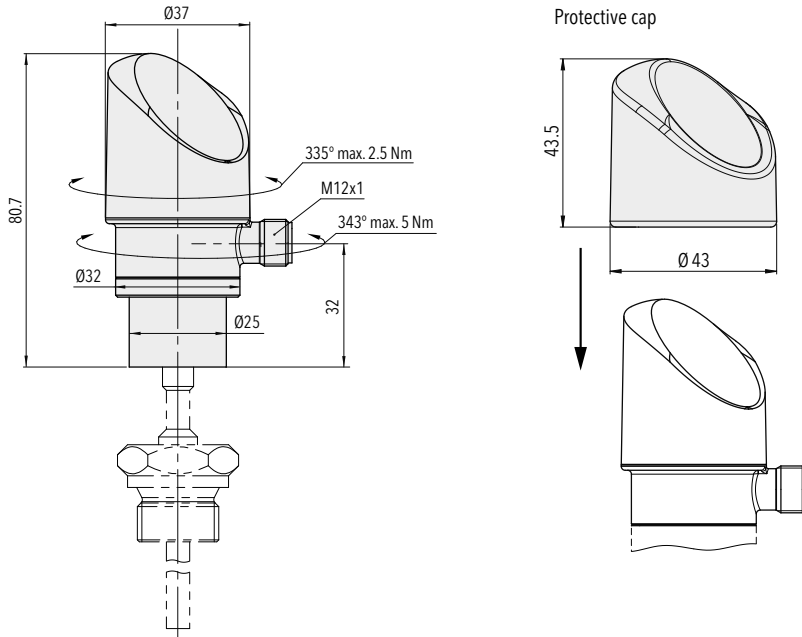
<sup>2)</sup> T\_EP - T\_nP  $\geq$  50 % FS

Switching output	
Adjustment range of switchpoints	0 ... 100 % FS
Switching hysteresis	$\geq 1$ % FS Switchpoint > reset point
Switching resistance	$\leq 3 \Omega$
Output function	Hysteresis, Window; normally closed (NO), normally open (NC)
Switching current	$\leq 0.5$ A each switching output
Current limiting	$\leq 2$ A each switching output
Delay time	0 ... 99.99 s

Display	
Display	4-digit 7-segment display 180° flippable with disable function decimal place: 1
Switching status indication	2 LED, red
Operation	With 3 buttons and menu navigation according to VDMA 24574-1
Display resolution	0.1 K
Display range	-3 ... 103 % FS
Setting parameters	See table Parameters
User scale unit; User defined values for display indication zero point and end point <sup>1)</sup>	Display zero point: -999 ... 9998 Display end point: -998 ... 9999

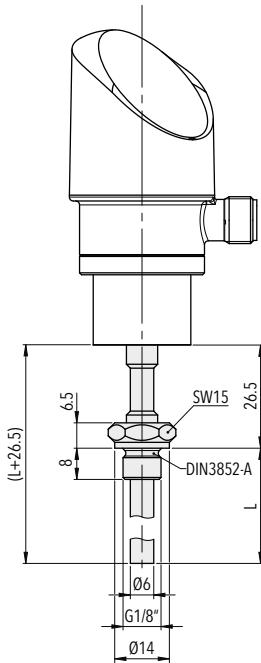
<sup>1)</sup> Available with optional function package, see "Accessories"

## Dimensions

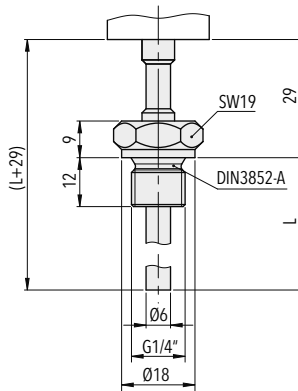


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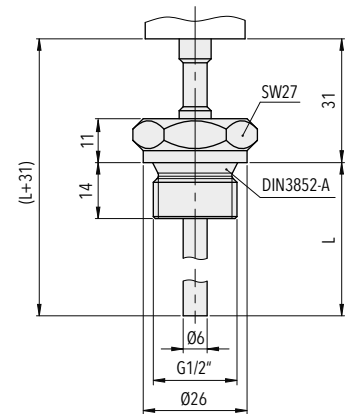
## Standard process connection



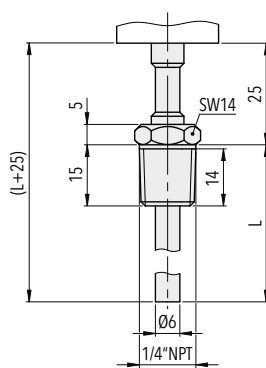
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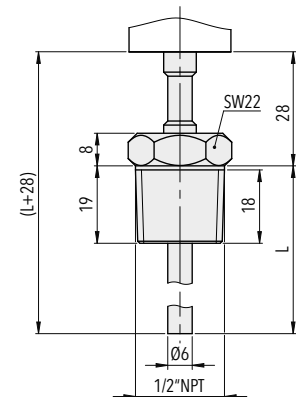
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8180.XX.XX13/23/33/43/53.XX...

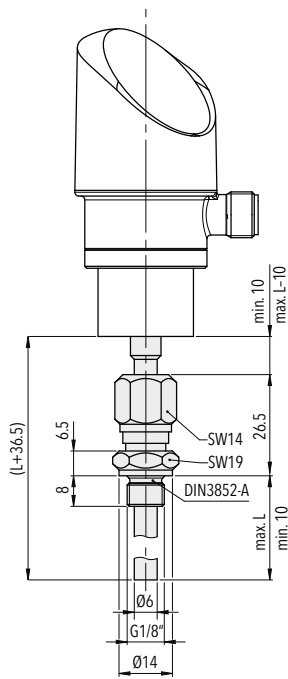


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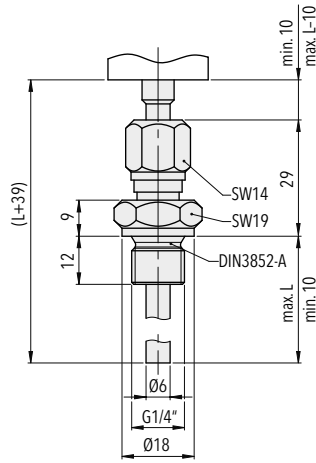


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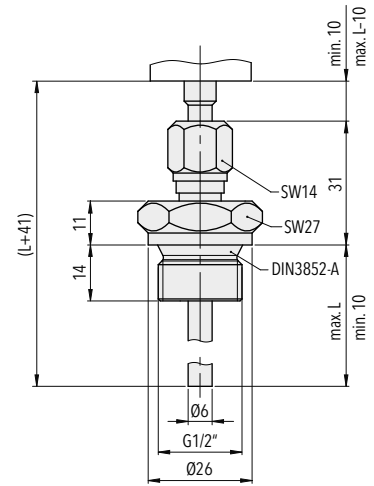
## Adjustable process connections



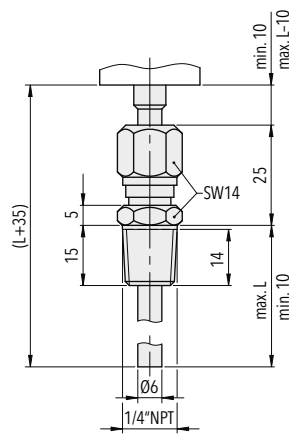
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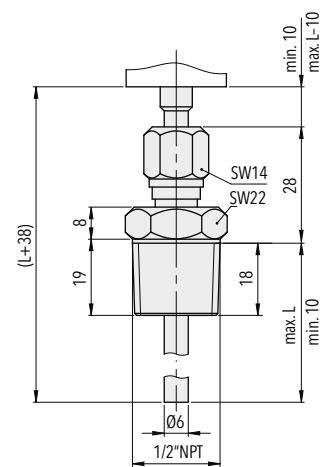
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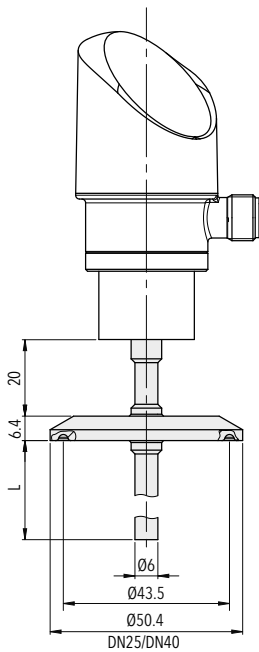


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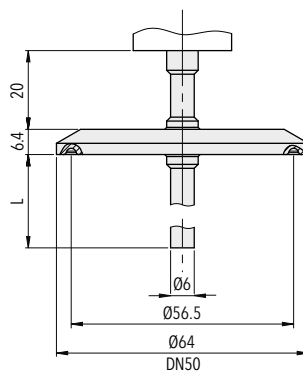


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## Tri-Clamp Process connections

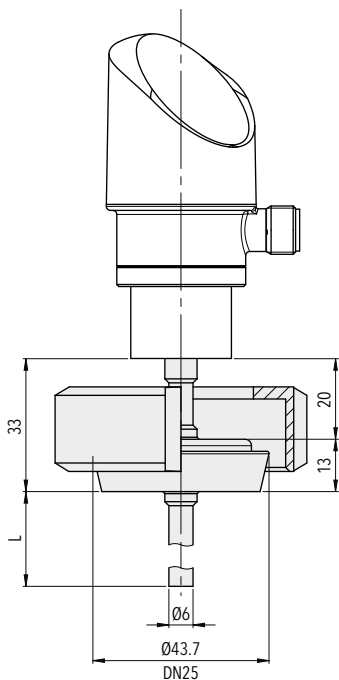


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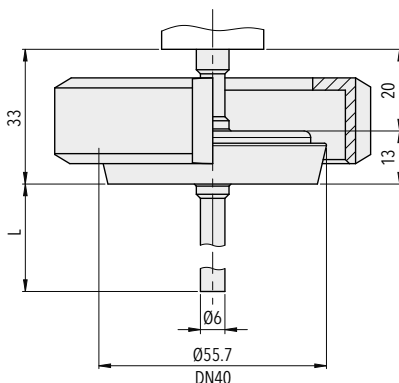


8180.XX.XX1J/2J/3J/4J/5J.XX...

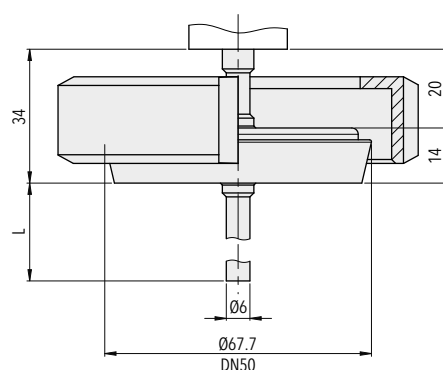
## Sanitary fittings



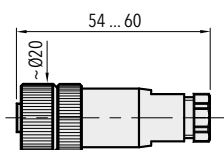
8180.XX.XX1L/2L/3L/4L/5L.XX...



8180.XX.XX1M/2M/3M/4M/5M.XX...

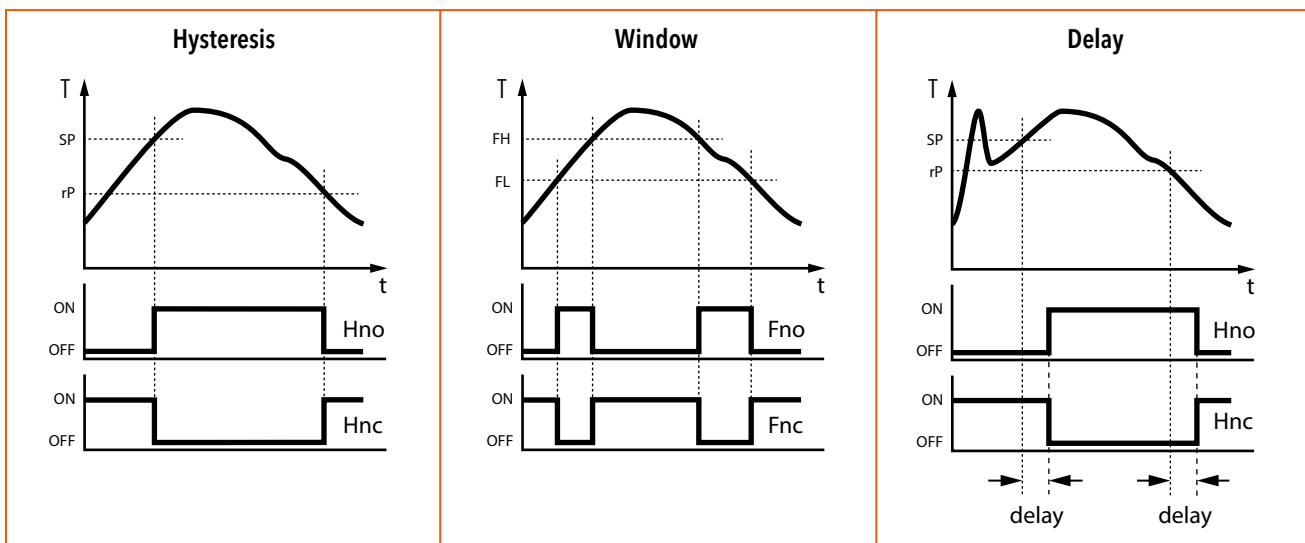


8180.XX.XX1N/2N/3N/4N/5N.XX...



8180.XX.XXXX.XX.XX.33

## Functions switching output

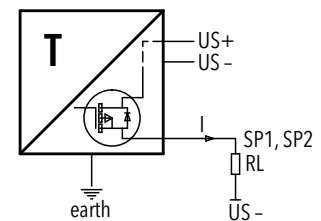
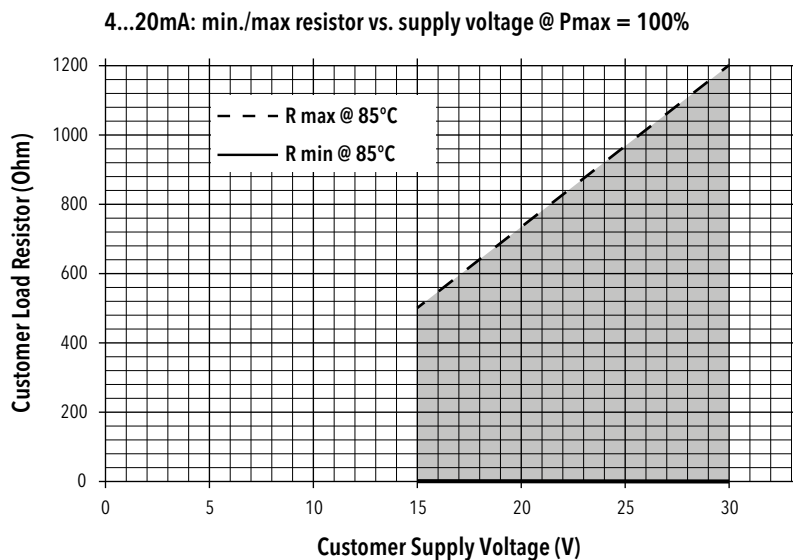


## Electrical connection

		Protection / electrical connection			
		IP65*)			
		M12x1			
		5-pole <b>35</b>		4-pole <b>32</b>	
Output signal		P1	P2	P3	P4
	PA	✓	✓	✓	
	PU	✓	✓	✓	
	PV	✓	✓	✓	
	PW	✓	✓	✓	
	PS				✓
Pin Configuration		P1	P2	P3	P4
		1 3 2 4 5  Shield ***)	1 3 5 4 2  Shield ***)	1 3 2 4  Shield ***)	1 3 - 4 2
<b>8180.xx.xxxx.xx.PA/PU/PV/PW/PS</b>					

\*) Provided female connector is mounted according to instructions

\*\*\*) The use of a shielded cable is recommended



Connection of loads to switching output

### Additional information

#### Documents

Data sheet	<a href="http://www.trafaq.com/H72352">www.trafaq.com/H72352</a>
Instructions	<a href="http://www.trafaq.com/H73352">www.trafaq.com/H73352</a>
Flyer	<a href="http://www.trafaq.com/H70605">www.trafaq.com/H70605</a>

# Safety temperature limiter KTSB

PTB 14  
ATEX 3025



## Features

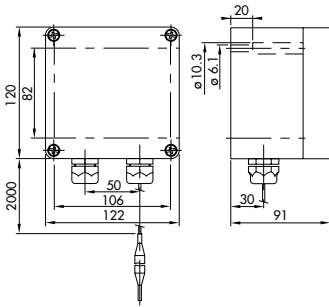
- High current ratings 16 A
- With mechanical reset
- Internal switchpoint adjustment

## Technical Data

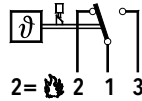
Sensor technology	Capillary tube with remote sensor
Sensor material	1.4435/316L
Output signal	Microswitch
Electrical connection	Screw terminal

## Standard products (extra short lead time)

Product No.	Range T [°C]	Operating temperature [°C]	Media temperature [°C]	Capillary tube length [m]
KTSB150S	+20 ... +150	-50 ... +60	max. 165	2
KTSB230S	+20 ... +230	-50 ... +60	max. 250	2
KTSB350S	+70 ... +350	-50 ... +60	max. 380	2



AC 400 V, 16 A



- Areas with gas explosion hazards Ex II 2G Ex db e IIC T6 Gb
- Areas with dust explosion hazards Ex II 2D Ex tb IIIC T80°C Db



Data sheet [www.trafag.com/H72181](http://www.trafag.com/H72181)

# Marine transmitter for PT100 sensors T...



## Features

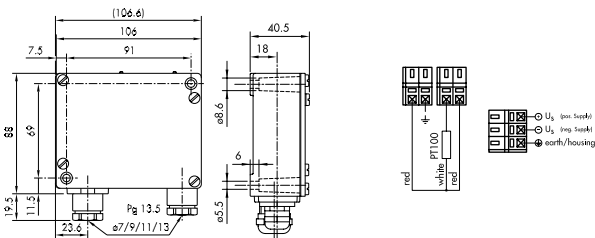
- Excellent long-term stability
- Protection IP65
- EMC protection, IEC 61000
- Complies with IEC 60571 (railway)

## Technical Data

Sensor type	PT100
Operating temperature	-40 ... +85 °C
Electrical connection	Screw terminal
Output signal	4 ... 20 mA

## Standard products (extra short lead time)

Product No.	Type code	Range T [°C]	Supply [VDC]	Product No.	Type code	Range T [°C]	Supply [VDC]
T50	8100 01 0003 01	-50 ... +50	12 ... 30	T200	8100 05 0003 01	0 ... +200	12 ... 30
T100	8100 02 0003 01	0 ... +100	12 ... 30	T400	8100 06 0003 01	0 ... +400	12 ... 30



Data sheet [www.trafag.com/H72102](http://www.trafag.com/H72102)  
 Instructions [www.trafag.com/H73102](http://www.trafag.com/H73102)

# Temperature sensor PT100



## Features

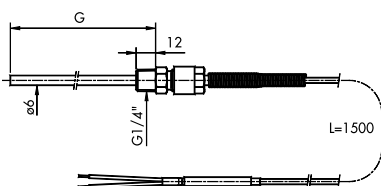
- 2-wire temperature sensor
- Incl. mounting stopper
- Protection IP65

## Technical Data

Sensor type	PT100 (IEC751)
Protection tube material	1.4435/316L
Immersion	Adjustable
Electrical connection	2 wires

## Standard products (extra short lead time)

Product No.	Range T [°C]	Protection tube length G [mm]	Class (IEC751)
PT100L15	-50 ... +250	150	B





# Temperature sensor PT100/1000



## Features

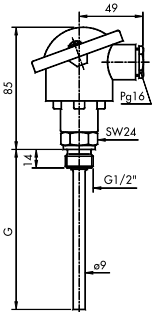
- 3-wire temperature sensor in DIN B head
- Protection IP65

## Technical Data

Sensor type	PT100 (IEC751) or 1000
Protection tube material	1.4435/316L
Immersion	Adjustable
Electrical connection	3 wires

## Standard products (extra short lead time)

Product No.	Range T [°C]	Protection tube length G [mm]	Class (IEC751)	Product No.	Range T [°C]	Protection tube length G [mm]	Class (IEC751)
PT100L12	-50 ... +250	120	B	PT100L40	-50 ... +250	400	B
PT1000L12	-50 ... +250	120	B				



# Temperature sensor



## Features

- High Precision
- Compliant with DIN 43760
- Measuring current 5 mA

## Technical Data

Sensor material	Nickel thin film on ceramic
Temperature range	-60°C ... +200°C
Response time water flow	0.3 s (@ 0.2m/s)
Response time airflow	27 s (@ 0.2m/s)

## Description

Resistivity $R_0$ @ 0°C [Ohm]	Electrical connection
100	lead frames
1000	lead frames

## Electronic thermostat with display and relay LTR



### Features

- 1 Panel mounting
- Single stage thermostat with display
- 1 Relay (SPDT)
- Protection IP54

### Technical Data

Sensor type	PTC1000
Output signal	1 Relay
Electrical connection	Screw terminal
Operating temperature	-10°C ... +50°C

### Standard products (extra short lead time)

Product No.	Range T [°C]	Relay Output	U-Supply [VAC]	Dimensions [mm]	Cutout of panel
LTR5TSRE	-50 ... +150	240V/16 (4)A	240	76 x 35 x 77	71 x 29

## Electronic controller with display ATR



### Features

- Supply voltage: 24 ... 230 VAC/VDC
- 17 Sensor inputs to select
- 2 Relays and 1 SSR output, configurable

### Technical Data

Inputs (to be selected)	Thermocouples: K,S,R,J Thermoresistors: PT100, PT500, PT1000, NI100, PTC, NTC, Potentiometers Linear signals: 0...10V, 0...20mA, 4...20mA, 0...40mV
Protection	IP65 front panel (with gasket) IP30 housing IP20 terminals
Operating temperature	0°C ... +45°C

### Standard products (extra short lead time)

Product No.	Output signal	Supply voltage	Dimensions [mm]	Cutout of panel [mm]
ATR142	Relay 1: 8A - 250 VAC Resistive Load Relay 2: 5A - 250 VAC Resistive Load SSR 1: Configurable as command output and / or alarm output 12 VDC, 30 mA	24 ... 230 VAC/VDC ±15 %	77 x 35 x 60	28.5 x 70.5

# Hygrostat HMH



## Features

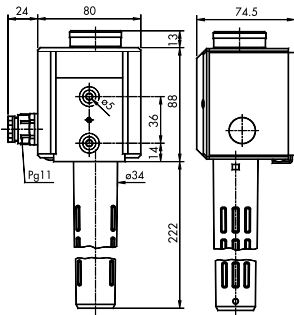
- With adjustable switch point
- rH 10 ... 100 %

## Technical Data

Protection	IP54
Operating temperature	-20°C... +60°C
Output signal	1 Microswitch 250 V / 10 A
Electrical connection	Screw terminal

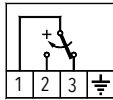
## Standard products (extra short lead time)

Product No.	Humidity [%rH]	Hysteresis [d%rH]	Sensor T max. [°C]
HMH	10 ... 100	approx. 1.5	+70



AC 250 V, 10 A (25 °C)  
8 A (60 °C)

2= dehumidifying  
3= humidifying



Data sheet [www.trafag.com/H72402](http://www.trafag.com/H72402)



## Accessories

Trafag offers a wide range of original accessories which are ideally matched to our products. These include devices for monitoring or configuring transmitters such as hand pumps with precision pressure gauge or the Sensor Communicator, a handheld device which provides direct access to the calibration values of the transmitter in the Trafag ASIC. Trafag also offers a wide range of accessories meet specific application requirements and also make installation easier. They include diagnostic valve manifolds, snubbers and pressure peak damping elements for measuring pressure, or protective pipes for thermostats.

### Accessories for temperature measuring instruments

- Protection tubes for direct mounting and remote sensors
- Duct mounting bracket
- Capillary tube holder
- Mounting brackets
- Screwed cable glands, ship approved, for retrofit



# MB31

## Mounting Plate

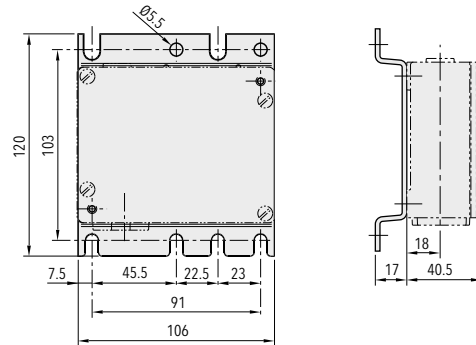


### Features

- For pressure transmitters and pressure switches

### Technical Data

Material	Steel galvanised
----------	------------------



### Standard products (extra short lead time)

Product No	Suitable for type	Material
MB31	N, ND, P, PS, PV, PD, PK, PVF, EXP, EXPK, EXPD	Steel galvanised

# CG

## Screwed cable gland



### Features

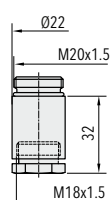
- DIN 8280 for shipbuilding
- Retrofit for pressure transmitters, pressure switches and thermostats

### Technical Data

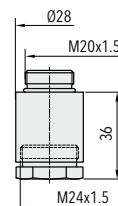
Material	Brass
Connection	M18x1.5, M24x1.5
Cable	Ø 10.5 mm, 16.5 mm

### Standard products (extra short lead time)

Product No		Material
CG18	M18x1.5 for 8 ... 10.5 mm cable diameter	Brass
CG24	M24x1.5 for 14 ... 16.5 mm cable diameter	Brass



CG18



CG24

# 83../84..

## Protection tubes for remote sensors

### Features

- For liquid media
- Pressure proof up to 25 bar (types 83xx)
- Pressure proof up to 40 bar (types 84xx)



### Technical Data

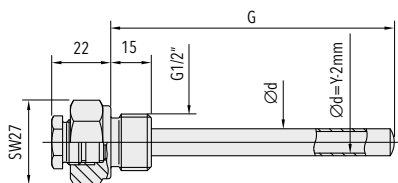
Material	Stainless steel 1.44435/316L, brass nickel plated
Media temperature	See table



Data sheet [www.trafag.com/H72163](http://www.trafag.com/H72163)

### Standard products (extra short lead time)

Product No	Suitable for type	Material	Protection tube diameter [mm]	Protection tube length [mm]
83160110K	M, MS, M2S, L, I, IS, ISP	Brass nickel plated	10	110
83160150K	M, MS, M2S, L, I, IS, ISP, ISN	Brass nickel plated	10	150
83160200K	I, IS	Brass nickel plated	10	200
83160300K	M, MS, M2S, L, I, IS	Brass nickel plated	10	300
83160400K	M, MS, M2S, L, I, IS	Brass nickel plated	10	400
83170110	ISP, ISN	Brass nickel plated	12	110
83180150K	D ... R	Brass nickel plated	14	150
83190065	ISP, ISN	Brass nickel plated	15	65
84110110K	M, MS, M2S, L, I, IS, ISP	1.4435 (AISI316L)	10	110
84110150K	M, MS, M2S, L, I, IS, ISP, ISN	1.4435 (AISI316L)	10	150
84110200K	I, IS	1.4435 (AISI316L)	10	200
84110400K	M, MS, M2S, L, I, IS	1.4435 (AISI316L)	10	400
84120110	ISP, ISN	1.4435 (AISI316L)	12	110
84140065	ISP, ISN	1.4435 (AISI316L)	15	65



### Operating temperature

Length G [mm]	Range T [°C]	Sensor-Ø [mm]
200	-30 ... +40, 0 ... +35, +10 ... +80	7
150	+5 ... +95, +20 ... +150, +20 ... +110	7
110	+20 ... +230, +70 ... +350	7
180	-30 ... +40, 0 ... +35	5.5/11
150	+5 ... +95, +20 ... +150	5.5/11
110	+20 ... +230, +70 ... +350	9
65	+5 ... +95, +20 ... +150, +20 ... +110	12

# 121.../141...

## Protection tubes for direct mounting

### Features

- For thermostats type MST and ISPT/ISNT
- Lateral clamp mounting (type MST)
- Pressure proof up to 40 bar (types 141x)
- With captive nut (types 141x)



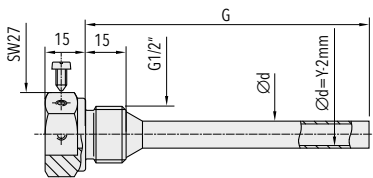
### Technical Data

Material	Stainless steel 1.44435/316L, brass nickel plated
Media temperature	See table

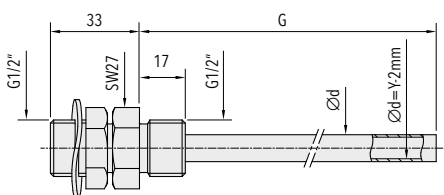
**i** Data sheet [www.trafag.com/H72163](http://www.trafag.com/H72163)

### Standard products (extra short lead time)

Product No	Suitable for type	Material	Protection tube diameter [mm]	Protection tube length [mm]
12110150K	MST ... 15	1.4435 (AISI316L)	10	150
12110400K	MST ... 40	1.4435 (AISI316L)	10	400
12160150K	MST ... 15	Brass nickel plated	10	150
12160400K	MST ... 40	Brass nickel plated	10	400
14110150K	ISNT ... 150	1.4435 (AISI316L)	10	150
14120110K	ISNT ... 110	1.4435 (AISI316L)	12	110
14140065K	ISP/ISNT ... 65	1.4435 (AISI316L)	15	65



121X..



141X..

### Operating temperature

Length G [mm]	Range T [°C]	Sensor-Ø [mm]
200	-30 ... +40, 0 ... +35, +10 ... +80	7
150	+5 ... +95, +20 ... +150, +20 ... +110	7
110	+20 ... +230, +70 ... +350	7
180	-30 ... +40, 0 ... +35	5.5/11
150	+5 ... +95, +20 ... +150	5.5/11
110	+20 ... +230, +70 ... +350	9
65	+5 ... +95, +20 ... +150, +20 ... +110	12



## W.../K...

### Thermostat sensor duct holder



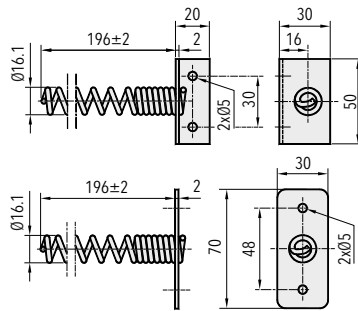
#### Features

- For HVAC
- For retrofitting of thermostats

Technical Data	
Material	Steel galvanised

 Data sheet [www.trafag.com/H72106](http://www.trafag.com/H72106)

Standard products (extra short lead time)		
Product No	Suitable for type	Material
K200	L, LF, M, MS	Steel galvanised
W200	I, IS, M2, M2S	Steel galvanised



## K80140

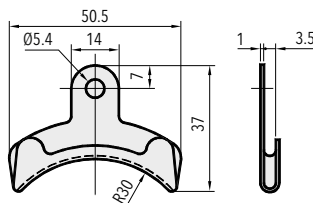
### Capillary tube holder



#### Features

- For Froststats F/F...R

Technical Data	
Material	Steel galvanised



Standard products (extra short lead time)		
Product No	Material	
K80140	Steel galvanised	Package size 6 pcs.

# Information about Ex products

Trafag draws from decades of experience in the design and manufacturing of pressure and temperature measuring instruments for hazardous area applications. We continuously meet the rising expectations in respect of safety and reliability of our products. These products provide reliable functionality in various hazardous zones with ATEX and in many cases also IECEx certification.

### CE - Designation and marking

**CE 1258 Ex II 2 GD**

Control No. of notified body for the supervision of the quality assurance system	I: Mining II: All other applications	Category (see below)	G = Gas D = Dust
--	---	----------------------	---------------------

- Category 1: Can be used in zone 0 (gas) and 20 (dust)
  - Potentially explosive atmosphere: Permanent
  - Two independent failures - safety
- Category 2: Can be used in zone 1 (gas) and 21 (dust)
  - Potentially explosive atmosphere: Regularly
  - One failure - safety
- Category 3: Can be used in zone 2 (gas) and 22 (dust)
  - Potentially explosive atmosphere: Unlikely or for very short time

### IEC/EN 60079-0 - Gases

**Ex ia IIC T6 Ga**

Type of protection	Equipment groups (for gases)	Temperature class	Equipment protection level
--------------------	------------------------------	-------------------	----------------------------

- Type of protection: Intrinsically safe
- Equipment group (gases): IIC = Hydrogen, Acetylene
- Temperature level: Defines ignition temperature and permissible temperature of equipment surface
- Protection level: Referring to installation zone (Ga = Zone 0 = Category 1 in ATEX)

### IEC/EN 60079-0 - Dust

**Ex ia IIIC T130 °C Da**

Type of protection	Equipment groups (for dust)	Surface temperature	Equipment protection level
--------------------	-----------------------------	---------------------	----------------------------

- Type of protection: Intrinsically safe, powder filling, encapsulation, ...
- Equipment group (dust): IIIC = Conductive dust
- Temperature level: Defines maximum surface temperature
- Protection level: Referring to installation zone (Da = Zone 20 = Category 1 in ATEX)

### EN 50303 - Mining

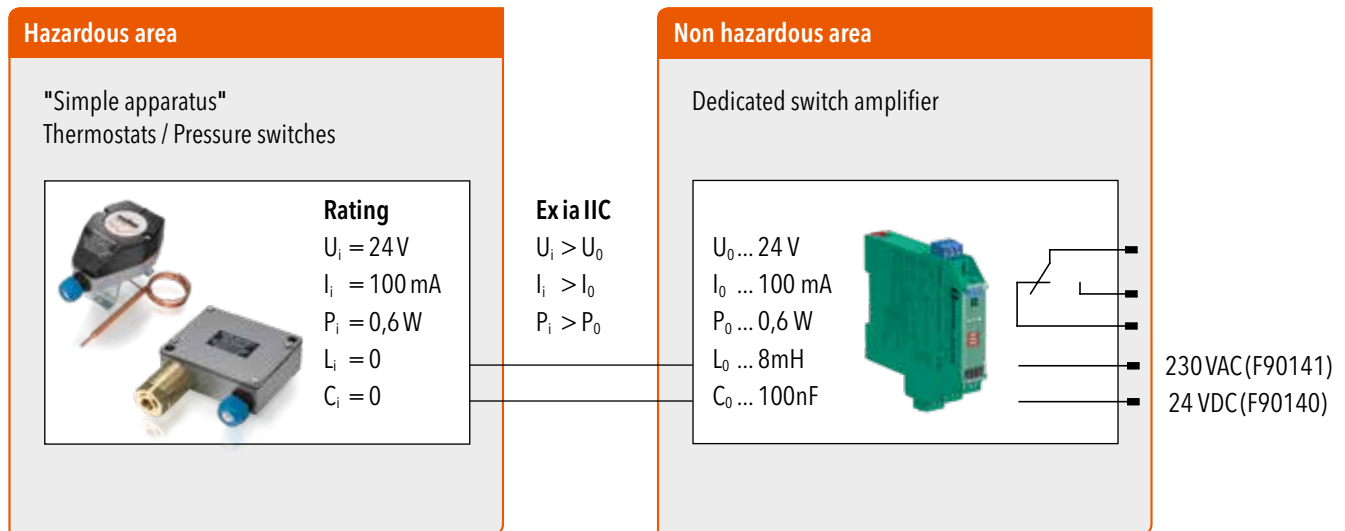
**Ex ia I Ma**

Type of protection	Equipment for mining	Equipment protection level
--------------------	----------------------	----------------------------

- Category and Protection level:
  - Category M1 / Protection level Ma: Fully functional and safe when explosive atmosphere is present. Requires means to cope with two independent failures
  - Category M2 / Protection level Mb: These products are intended to be deenergised in the presence of an explosive atmosphere

## Simple Apparatus

Pressostats and Thermostats, when combined with a certified switch amplifier (Zener barrier/Zener relay), can be used as "simple electrical apparatus" in Zone 1 and 2, as well as in Zone 21 and 22, according to IEC/EN 60079-11. These pressostats and thermostats are not suitable for Zone 0 and Zone 20. The use in safety relevant applications (approved electrical apparatus) is not permitted. Switch amplifiers are suitable for intrinsically safe applications. The device transmits signals from the hazardous area into the safe area.



Recommended switch amplifier (see chapter „Accessories“):

Trafag parts no.: ZEN230VAC (230 VAC)

ZEN24VDC (24 VDC)

If another type of switch amplifier is used, make sure its electrical rating limits are within the specification of the „Simple Apparatus“ thermostat or pressostat.