

TEMPERATURE

Mechanical Temperature Switches



switch



measure



control

Barksdale

CONTROL PRODUCTS

CRANE

Barksdale, Inc./Barksdale GmbH
A Subsidiary of Crane Co.

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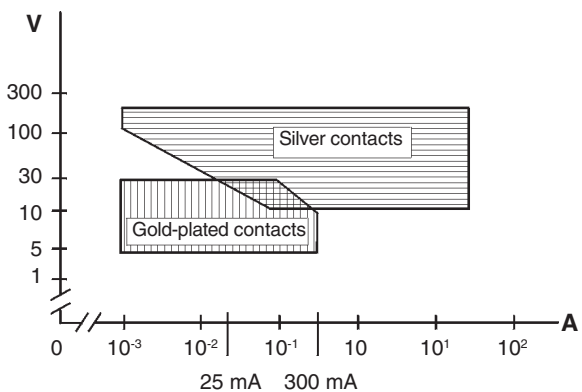
Contact materials

Barksdale pressure switches have silver contact microswitches. On request, we also supply microswitches with gold-plated contacts. Gold-plated contacts are almost exclusively used on microswitches that are only exposed to low electrical loads. Fig. 4 depicts the standard values of silver or gold-plated contacts. We would gladly assist you in the selection of the material best suited for your application.

Summary

Current and voltage should not exceed 0.12 VA. Recommended values: the current should range at <400 mA and the voltage at <30 V. If operated on alternating current the above values are peak values.

Range of application of the various contact materials



Specifications are subject to changes without notice.

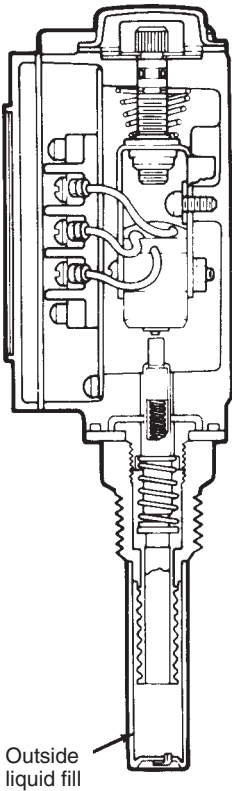
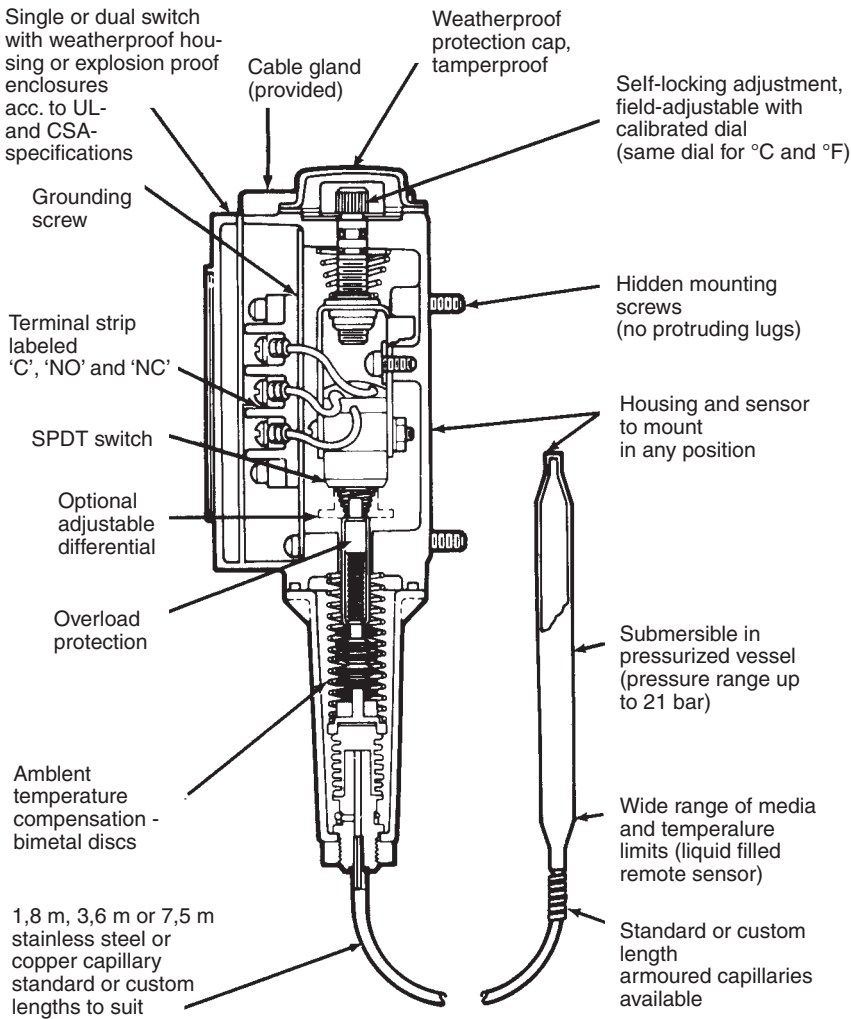
Introduction

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Description

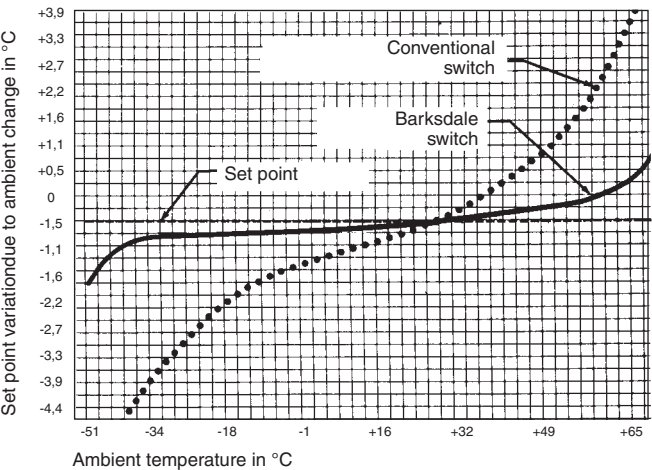
Remote sensor and capillary type

Local mount type



Pressure - Temperature limit see „Accessories“ page 16

Ambient Temperature Compensation and switching accuracy



Barksdale Temperature Switches incorporate a compensating device to cancel out the adverse effects of ambient fluctuation. Curves reflect averages of a series of tests. Results of specific conditions are available on request. Barksdale switches are designed for $\pm 1/2$ percent accurate response through the mid 60% of the adjustable range ($\pm 2\%$ at min. or max. adjustable set point).

Example:

In conventional switches an ambient temperature fluctuation between $-50\text{ }^{\circ}\text{C}$ and $+75\text{ }^{\circ}\text{C}$ produces a swing of 10 degrees or more - in Barksdale switches extreme fluctuation of ambient may result in a 2 to 3 degrees swing.

Specifications are subject to changes without notice.

MT1H

with capillary

Features

- Single switch with remote sensor
- Weatherproof housing
- Covered terminal strip and set point adjustment
- Protection class IP65
- Optional:
 - Manual reset G-microswitch
 - Adjustable hysteresis (reset difference) S-microswitch

Measuring Ranges

-45 °C...+66 °C bis +160 °C...+316 °C

Applications

Temperature monitoring in machine and machine tool industry, shipbuilding, railcars, antifreeze, heating systems, compressor monitoring



Technical Data

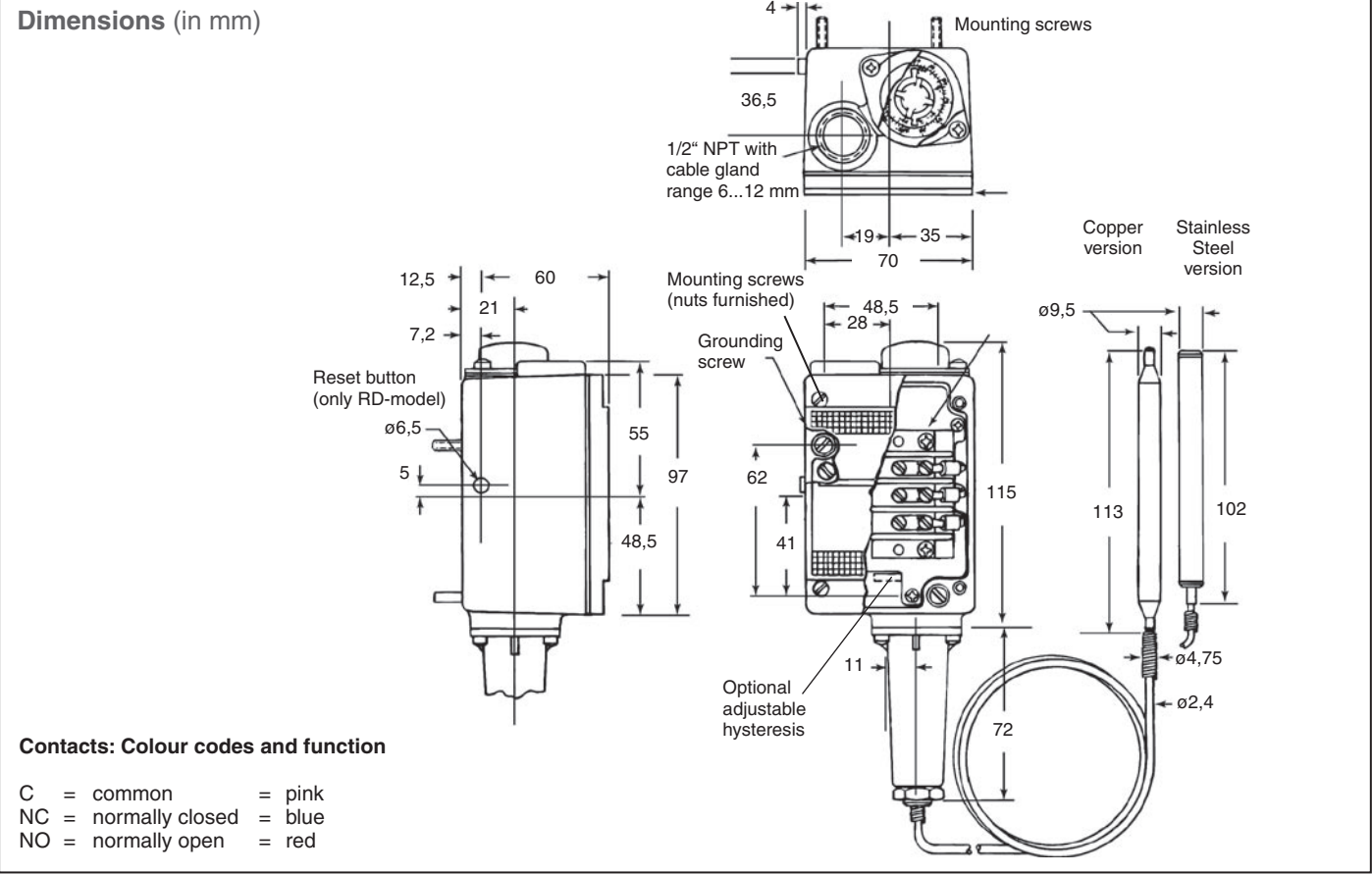
Housing material	: Die-cast aluminum
Temperature sensor material	: Stainless steel (316SS)
Temperature sensor	: Capillary length 1,8 m or 3,6 m (optional 7,5 m), armoured Sensor without thermowell is applicable up to 21 bar only
Electrical characteristics	: All models are SPDT
Microswitch	: H, M, GH, GM (G only with RD-model), S (adjustable hysteresis), J (microswitch with O-Ring seal)
Contact rating	: - AC: 125 V AC to 250 V AC, 10 A 480 V AC, 3 A - DC: 6 V DC to 24 V DC, 0,5 A
Electrical connection	: 1/2" NPT female, internal screw terminal, cable gland in PA, range 6...12 mm is provided
Protection class	: IP65, intrinsically safe acc. EEx ia II C for gases and dust
Set point adjustment	: Turn adjustment knob clockwise to increase actuation point
Standards	: The instruments fulfill the requirements of following harmonized european standards: EN 60014 1977 + A1 to A4 and EN 500120 1977 + A1
Electrical characteristics Exi-model	: Umax = 28 V DC or 20 Veff, Imax = 50 mA DC or 35 mAeff To comply with the intrinsically safe approval, IS circuits with the following maximum ratings have to be used: Umax = 28 V and Imax = 50 mA
Approvals	: Various approvals on request
Weight	: appr. 750 g

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Specifications are subject to changes without notice.

MT1H

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Order number example

Type	Microswitch		Code adjustment range	Sensor length	Option	
MT1H	—	G	251	S-A	—	RD

Your order number

MT1H				
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Microswitch	Max. temperat. at sensor (°C)	Adjustm. range (°C)	Hysteresis (°C)*	Order code	Sensor length	Option
(H) Silver contact, small hysteresis	-73 ... +93	-45 ... +66	(for microswitch „H“)	154	(S-A) 1,8 m, armoured, VA	(RD) Manual reset
(J) Silver contact, sealed, small hysteresis	-73 ... +149	+10 ... +121	0,5 ... 1,1	251		
(M) Silver contact, medium hyst.	-73 ... +205	+66 ... +177	0,5 ... 1,1	351	(S-12-A) 3,6 m, armoured, VA	(Exi) Exi-protection version
(GH) Gold plated contact, small hyst.	-18 ... +343	+149 ... +227	1,1 ... 2,2	601		
(GM) Gold plated contact, medium hyst.	-18 ... +343	+160 ... +316	1,1 ... 2,2	603		
(S) Silver contact, adjustable hyst.			(for microswitch „S“)	351	(S-25-A) 7,5 m, armoured, VA	
(G...RD) manual reset			2,2 ... 8,2	603		
			3,8 ... 13,8			
			2,8 ... manual (RD)			

* Depends on medium.

T2H

with capillary

Features

- Dual switch with remote sensor and weatherproof housing
- integrated terminal strip and covered set point adjustment
- Protection class IP65
- For use as two-position controller
- Optional for 1st contact:
 - Manual reset G-microswitch
 - Adjustable hysteresis (reset difference) S-microswitch
- The second contact can also be used for max.- or min.- monitoring or for sensor monitoring

Measuring Ranges

-45 °C...+66 °C to +160 °C...+316 °C

Applications

Temperature monitoring in industry, shipbuilding, railcars

Technical Data



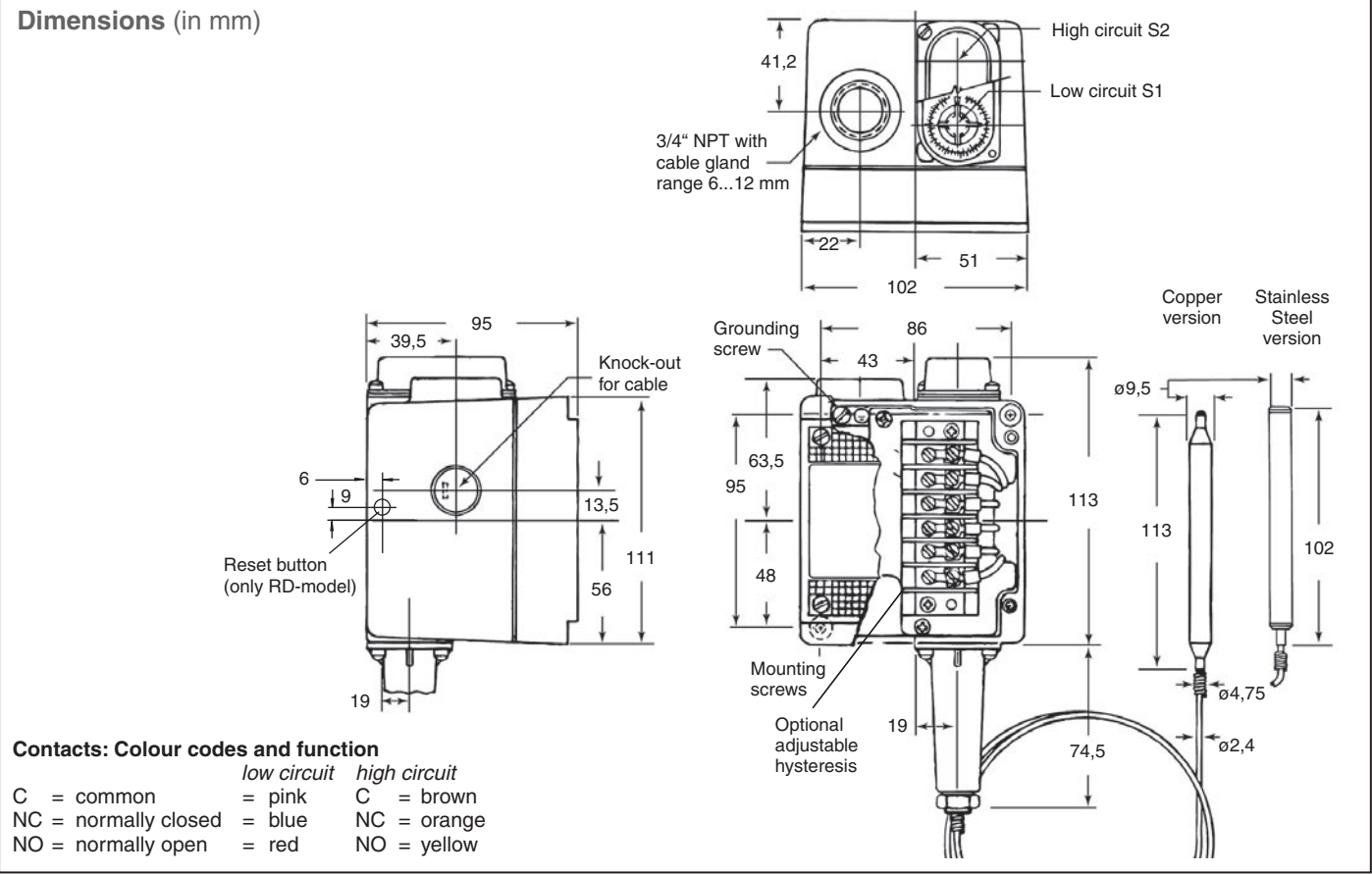
Housing material	: Die-cast aluminum
Temperature sensor material	: Stainless steel (316SS)
Temperature sensor	: Capillary length 1,8 m or 3,6 m (optional 7,5 m), armoured Sensor without thermowell is applicable up to 21 bar only
Electrical characteristics	: All models are SPDT
Microswitch	: H, M, GH, GM (optional with RD manual reset for the 1st low circuit switching contact only)
Contact rating	: - AC: 125 V AC to 250 V AC, 10 A 480 V AC, 3 A - DC: 6 V DC to 24 V DC, 0,5 A
Electrical connection	: 3/4" NPT female, internal screw terminal, cable gland in PA, range 6...12 mm is provided
Protection class	: IP65, intrinsically safe acc. EEx ia II C for gases and dust
Set point adjustment	: Turn adjustment knob clockwise to increase actuation point
Standards	: The instruments fulfill the requirements of following harmonized european standards: EN 60014 1977 + A1 to A4 and EN 500120 1977 + A1
Electrical characteristics Exi-model	: Umax = 28 V DC or 20 Veff, Imax = 50 mA DC or 35 mAeff To comply with the intrinsically safe approval, IS circuits with the following maximum ratings have to be used: Umax = 28 V and Imax = 50 mA
Approvals	: Various approvals on request
Weight	: appr. 1,5 Kg

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Specifications are subject to changes without notice.

T2H

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Order number example

Type	Microswitch	Code adjustment range	Sensor length	Option
T2H	—	M	251	S-A

Your order number

T2H				
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Microswitch	Max. temperat. at sensor (°C)	Adjustm. range (°C)	Hysteresis (°C)*	Order code	Sensor length	Option
(H) Silver contact, small hysteresis	-73 ... +93	-45 ... +66	(for microswitch „H“) 0,5 ... 1,1	154	(S-A) 1,8 m, armoured, VA	(RD) Manual reset
(J) Silver contact, sealed, small hysteresis	-73 ... +149	+10 ... +121	0,5 ... 1,1	251		
(M) Silver contact, medium hyst.	-73 ... +205	+66 ... +177	0,5 ... 1,1	351	(S-12-A) 3,6 m, armoured, VA	(Exi) Exi-protection version
(GH) Gold plated contact, small hyst.	-18 ... +343	+149 ... +227	1,1 ... 2,2	601		
(GM) Gold plated contact, medium hyst.	-18 ... +343	+160 ... +316	1,1 ... 2,2	603		
(S) Silver contact, adjustable hyst.			(for microswitch „S“) 2,2 ... 8,2 3,8 ... 13,8	351 603	(S-25-A) 7,5 m, armoured, VA	
(G...RD) manual reset			2,8 ... manual (RD)			

* Depends on medium.

T1X / T1X-Ex / T2X / T2X-Ex

with capillary

Features

- Single switch T1X, T1X-Ex and dual switch T2X, T2X-Ex with remote sensor
- Weatherproof housing
- Covered terminal strip and set point adjustment
- Protection class NEMA 4 / 7 / 9
- Optional:
 - T2X: Manual reset, G-microswitch with one contact,
 - T1X: Adjustable hysteresis (reset difference), S-microswitch with one contact
- Special version for track heating systems with ratings up to 32 A / 220 V

Measuring Ranges

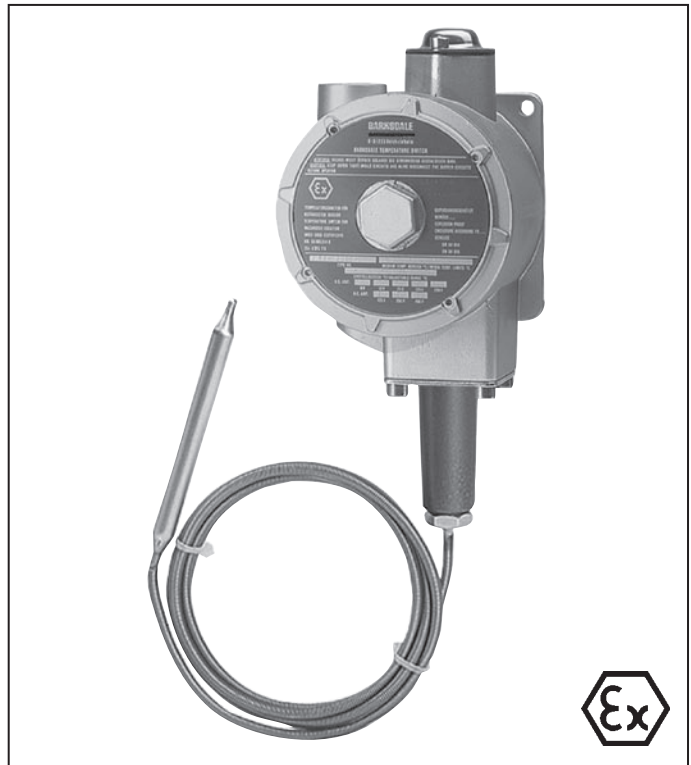
-45 °C...+66 °C to +160 °C...+316 °C

Applications

Temperature monitoring and control in chemical industry and oil industry, offshore

Technical Data

Housing material	: Die-cast aluminum
Temperature sensor material	: Stainless steel (316SS)
Temperature sensor	: Capillary length 1,8 m or 3,6 m (optional 7,5 m), armoured Sensor without thermowell is applicable up to 21 bar only
Electrical characteristics	: All models are SPDT
Microswitch	: H, M, GH, GM, S with adjustable hysteresis
Contact rating	: - AC: 125 V AC to 250 V AC, 10 A 480 V AC, 3 A - DC: 6 V DC to 24 V DC, 0,5 A
Electrical connection	: From the terminal strip through a 1/2" NPT conduit connection (T1X / T1X-Ex) resp. 3/4" NPT conduit connection (T2X / T2X-Ex) outside.
Protection class	: NEMA 4 / 7 / 9 (T1X and T2X), intrinsically safe acc. EEx ia II C for gases and dust
Ex-Protection class	: EEx-d (flameproof)
Set point adjustment	: Turn adjustment knob clockwise to increase actuation point
Standards	: The instruments fulfill the requirements of following harmonized european standards: EN 60014 1977 + A1 to A4 and EN 500120 1977 + A1
Electrical characteristics Exi-model	: $U_{max} = 28 \text{ V DC}$ or 20 Veff , $I_{max} = 50 \text{ mA DC}$ or 35 mAeff To comply with the intrinsically safe approval, IS circuits with the following maximum ratings have to be used: $U_{max} = 28 \text{ V}$ and $I_{max} = 50 \text{ mA}$
Approvals	: Various approvals on request
Weight	: appr. 2 kg

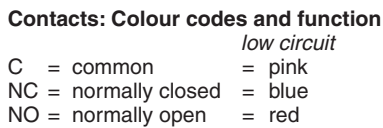


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Dimensions (in mm)



Typ	Microswitch		Code adjustment range		Sensor material *		Option 1	Option 2		
L1X	—	G	—	251	—		—	RD	—	WS

* no code: brass/copper, option: S = stainless steel 316SS

L1X	-		-		-		-		-	
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* Depends on medium.

ML1H

Local mount type

Features

- Single switch with remote sensor
- Weatherproof housing
- Covered terminal strip and set point adjustment
- Protection class IP65
- Optional:
 - Manual reset G-microswitch
 - Adjustable hysteresis (reset difference) S-microswitch
- Thermowell in VA and brass 3/4" NPT
- Option thermowell:
W = brass, WS = CrNi-steel SS316Ti, 1.4571

Measuring Ranges

-45 °C...+24 °C to +66 °C...+232 °C

Applications

Temperature monitoring in machine and machine tool industry, shipbuilding, antifreeze, heating systems, compressor monitoring

Technical Data

Housing material	: Die-cast aluminum
Process connection	: Standard 1/2" NPT, Option W/WS 3/4" NPT
Temperature sensor material	: Standard: brass / copper, model S: CrNi-steel (304SS, 1.4301), pressure values see table on page 16 „Accessories“
Electrical characteristics	: All models are SPDT
Microswitch	: H, M, GH, GM (G only with RD-model), S (adjustable hysteresis), J (microswitch with O-Ring seal)
Contact rating	: - AC: 125 V AC to 250 V AC, 10 A 480 V AC, 3 A - DC: 6 V DC to 24 V DC, 0,5 A
Electrical connection	: 1/2" NPT female, internal screw terminal, cable gland in PA, range 6...12 mm is provided
Protection class	: IP65, intrinsically safe acc. EEx ia II C for gases and dust
Set point adjustment	: Turn adjustment knob clockwise to increase actuation point
Standards	: The instruments fulfill the requirements of following harmonized european standards: EN 60014 1977 + A1 to A4 and EN 500120 1977 + A1
Electrical characteristics Exi-model	: Umax = 28 V DC or 20 Veff, Imax = 50 mA DC or 35 mAeff To comply with the intrinsically safe approval, IS circuits with the following maximum ratings have to be used: Umax = 28 V and Imax = 50 mA
Approvals	: Various approvals on request
Weight	: appr. 750 g



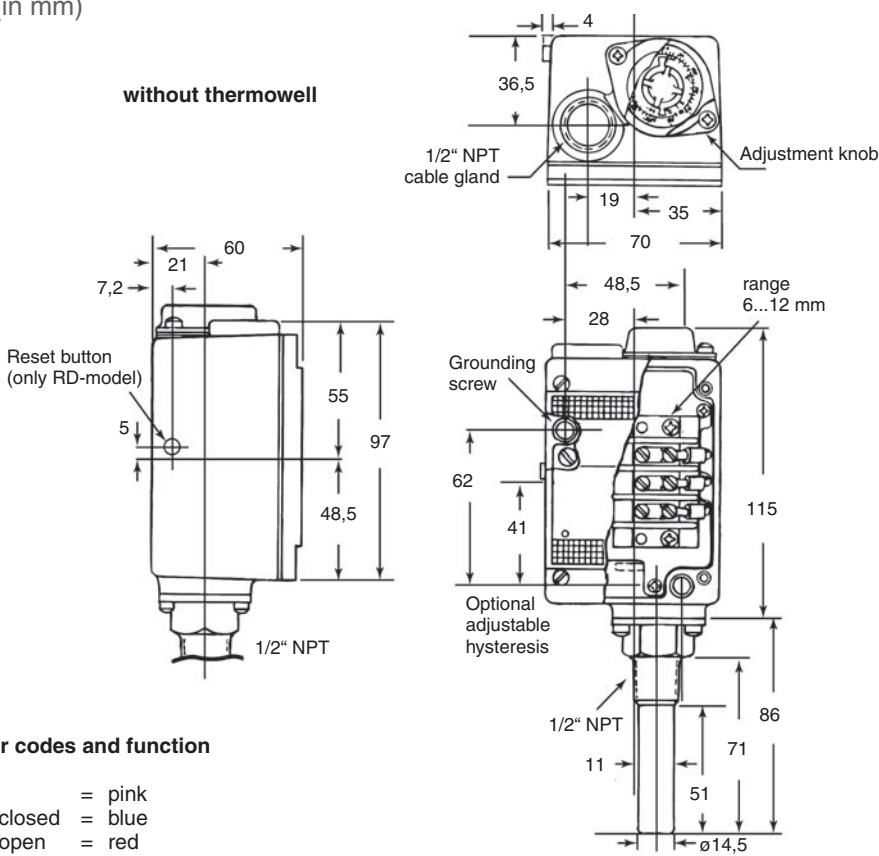
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Specifications are subject to changes without notice.

ML1H

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Dimensions (in mm)



Contacts: Colour codes and function

- C = common = pink
- NC = normally closed = blue
- NO = normally open = red

Thermowell models only

Socket set screws (secures switch in thermowell). Switch can be rotated 360° in well.

Order number example

Type	Microswitch	Code adjustment range	Sensor material *	Option 1	Option 2
ML1H	—	G	251	—	Exi — WS

Your order number

ML1H	—				—	
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* no code: brass/copper, option: S = stainless steel 316SS

Microswitch	Max. temperatur. at sensor (°C)	Adjustm. range (°C)	Hysteresis (°C)*	Order code	Option 1	Option 2
(H) Silver contact, small hysteresis	-73 ... +121	-45 ... +24	(for microswitch „H“) 0,5 ... 1,6	201	(RD) Manual reset	(W) Thermowell brass
(J) Silver contact, sealed, small hysteresis	-73 ... +121	-9 ... +60	0,5 ... 1,6	202		
(M) Silver contact, medium hyst.	-73 ... +205	+24 ... +93	0,5 ... 1,6	203	(Exi) Exi-protection version	(WS) Thermowell VA (1.4571, 315SS Ti)
(GH) Gold plated contact, small hyst.	-73 ... +121	+38 ... +107	0,5 ... 1,6	351		
(GM) Gold plated contact, medium hyst.	-73 ... +205	-45 ... +93	0,5 ... 1,6	204		
(S) Silver contact, adjustable hyst.	-73 ... +205	+38 ... +177	0,5 ... 1,6	354		
(G...RD) manual reset	-18 ... +260	+66 ... +232	1,6 ... 3,3	454		
			(for microswitch „S“) 3,3 ... 11,0	351/354		
			5,5 ... 16,5	454		
			2,8 ... manual (RD)			

* Depends on medium.

L2H

Local mount type

Features

- Dual switch with remote sensor and weatherproof housing
- integrated terminal strip and covered set point adjustment
- Protection class IP65
- For use as two-position controller optional with one microswitch for temperature control with adjustable hysteresis
- The second contact can also be used for max.- or min.- monitoring or for sensor monitoring
- Optional for 1st contact:
 - Manual reset G-microswitch
 - Adjustable hysteresis (reset difference) S-microswitch
- Option Thermowell: W = brass ,
 WS = CrNi-steel SS316Ti, 1.4571

Measuring Ranges

-54...+24 °C to +149...+232 °C

Applications

Temperature monitoring in industry, shipbuilding, railcars

Technical Data

Housing material	: Die-cast aluminum
Process connection	: Standard 1/2" NPT, Option W/WS 3/4" NPT
Temperature sensor material	: Standard: brass / copper, model S: CrNi-steel (304SS, 1.4301), pressure values see table on page 16 „Accessories“
Electrical characteristics	: All models are SPDT
Microswitch	: H, M, GH, GM (optional with RD manual reset for the 1st switching contact only)
Contact rating	: - AC: 125 V AC to 250 V AC, 10 A 480 V AC, 3 A - DC: 6 V DC to 24 V DC, 0,5 A
Electrical connection	: 3/4" NPT female, internal screw terminal, cable gland in PA, range 6...12 mm is provided
Protection class	: IP65, intrinsically safe acc. EEx ia II C for gases and dust
Set point adjustment	: Turn adjustment knob clockwise to increase actuation point
Standards	: The instruments fulfill the requirements of following harmonized european standards: EN 60014 1977 + A1 to A4 and EN 500120 1977 + A1
Electrical characteristics Exi-model	: Umax = 28 V DC or 20 Veff, Imax = 50 mA DC or 35 mAeff To comply with the intrinsically safe approval, IS circuits with the following maximum ratings have to be used: Umax = 28 V and Imax = 50 mA
Approvals	: Various approvals on request
Weight	: appr. 1,5 kg



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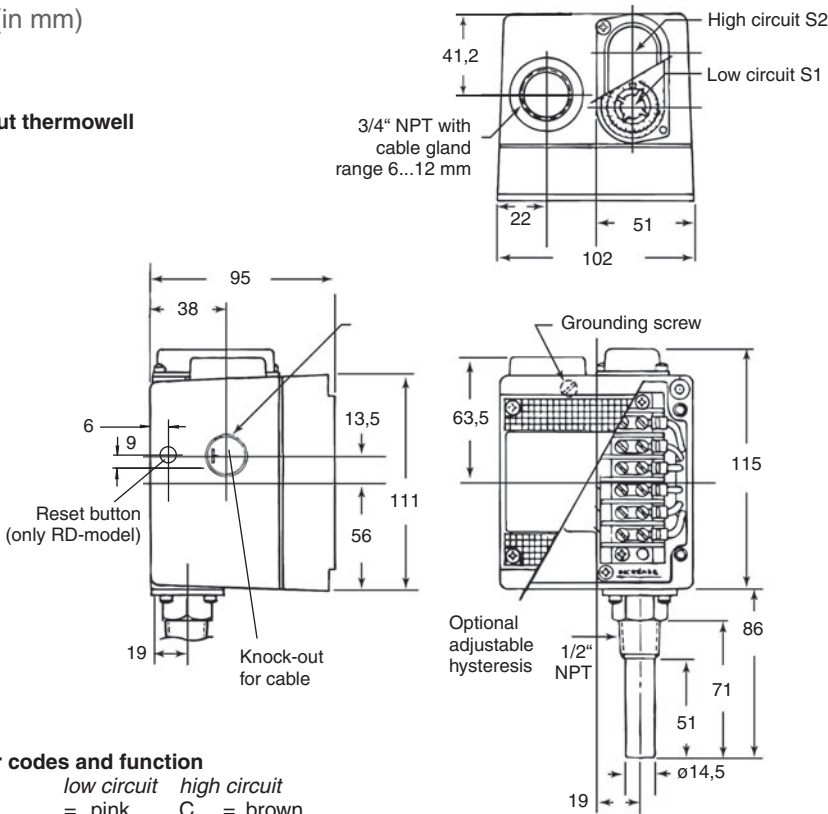
Specifications are subject to changes without notice.

L2H

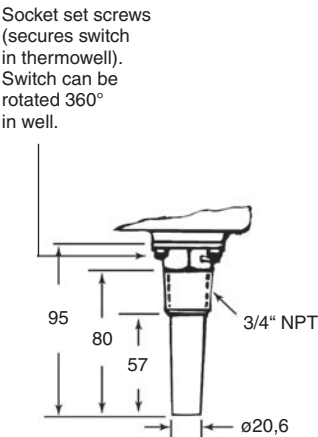
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Dimensions (in mm)

without thermowell



Thermowell models only



Contacts: Colour codes and function

	low circuit	high circuit
C = common	= pink	C = brown
NC = normally closed	= blue	NC = orange
NO = normally open	= red	NO = yellow

Order number example

Typ	Microswitch		Code adjustment range	Sensor material *	Option 1		Option 2	
L2H	—	G	251		—	RD	—	WS

Your order number

L2H	—				—		
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* no code: brass/copper, option: S = stainless steel 316SS

Microswitch	Max. temperatur. at sensor (°C)	Adjustm. range (°C)	Hysteresis (°C)*	Order code	Option 1	Option 2
(H) Silver contact, small hysteresis	-73 ... +121	-45 ... +24	(for microswitch „H“) 0,5 ... 1,6	201	(RD) Manual reset	(W) Thermowell brass
(J) Silver contact, sealed, small hysteresis	-73 ... +121	-9 ... +60	0,5 ... 1,6	202		
(M) Silver contact, medium hyst.	-73 ... +205	+24 ... +93	0,5 ... 1,6	203	(Exi) Exi-protection version	(WS) Thermowell VA (1.4571, 315SS Ti)
(GH) Gold plated contact, small hyst.	-73 ... +121	-45 ... +93	0,5 ... 1,6	351		
(GM) Gold plated contact, medium hyst.	-73 ... +205	+38 ... +107	0,5 ... 1,6	204		
(S) Silver contact, adjustable hyst.	-73 ... +205	+38 ... +177	0,5 ... 1,6	354		
(G...RD) manual reset	-18 ... +260	+66 ... +232	1,6 ... 3,3	454		
			(for microswitch „S“) 3,3 ... 11,0	351/354		
			5,5 ... 16,5	454		
			2,8 ... manual (RD)			

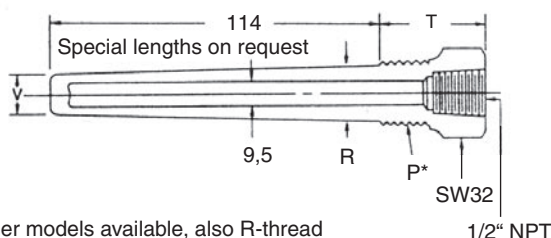
* Depends on medium.

Accessories

Thermowells

for remote sensor and capillary models

Note: Thermowells for 'local mount' models are treated on the respective pages.



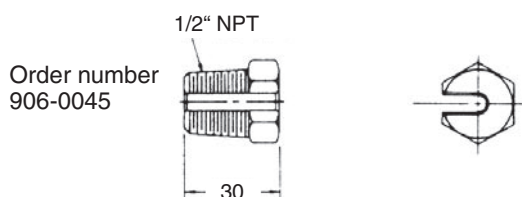
* Other models available, also R-thread

1/2" NPT

Order number	P*	R	T	V
Brass 906-0044	1/2" NPT	17,5	47,5	16
906-0042	3/4" NPT	22,2	47,5	19
Stainless steel 906-0043	1/2" NPT	17,5	47,5	16
906-0041	3/4" NPT	22,2	47,5	19

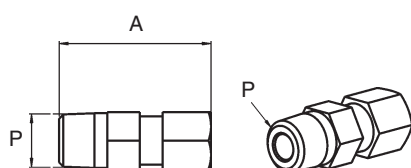
Split nut

Used to hold sensor in standard thermowell.



Union connector

Union contains compression discs and will seal up to 21 bar



Order number	Material	P* NPT	A
926-0046	Brass	1/2"	57
906-0033	Brass	3/4"	63,5
926-0047	Stainless steel	1/2"	57
906-0032	Stainless steel	3/4"	63,5

Thermal conductive paste

Order number	Description
0699-002	Tube 50 g

Thermowell pressure- and temperature velocity limitations

Maximum fluid velocity in m/sek.

Material	Insertion length in mm							
	63,5	114	190	267	343	419	495	572
Brass	98 (45)	39 (25)	14	7	4,5	3	2	1,5
Steel	125 (82)	76 (45)	27	14	8,5	5,5	4	3
Stainl. steel	147 (106)	83 (63)	30	15	9	6	4,5	3

The values in brackets represent safe values for water flow. Other values are for steam, air, gas or similar low density media.

Pressure - temperature rating (in bar)

Material thermowell	Temperature in °C				
	+22	+94	+210	+320	+430
Brass	350	295	70	*	*
Steel	365	350	335	320	245
Stainl. steel	490	435	390	380	365

* Stainless steel recommended

Armoured capillaries

(Standard lengths)

Description	Order number suffix
Stainless steel capillary stainless steel armoured	S - A (add to order number)

Example without (o) manual reset:
o: T2H-H152-S-A, T2H-H601S-12-A
Example with (m) manual reset:
m: MT1H-G152-S-A-RD etc.

Capillaries in special lengths

Stainless steel sensor and 7,50 m stainless steel capillary and stainless steel armour:	S-25-A (add to any standard order number for capillary lengths of 180 cm)
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Example without (o) and with (m) manual reset:
o: MT1H-H153 S-25-A, T2H-H251 S-25-A
m: MT1H-G153 S-25-A-RD, T2H-H251 S-25-A-RD

Certificate

Order number	Description
998-9991	Work certificate EN 10204-2.1
998-9991	Work certificate EN 10204-2.2

In addition to the Mechanical Temperature Switches listed in this catalog our product range includes various other instrumentation and control equipment to monitor, measure and control

 **Pressure**

 **Temperature**

 **Level**

 **Flow**

We have the right solution for your measuring tasks.

Just contact us.

Our Products



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Represented by

Barksdale

CONTROL PRODUCTS

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