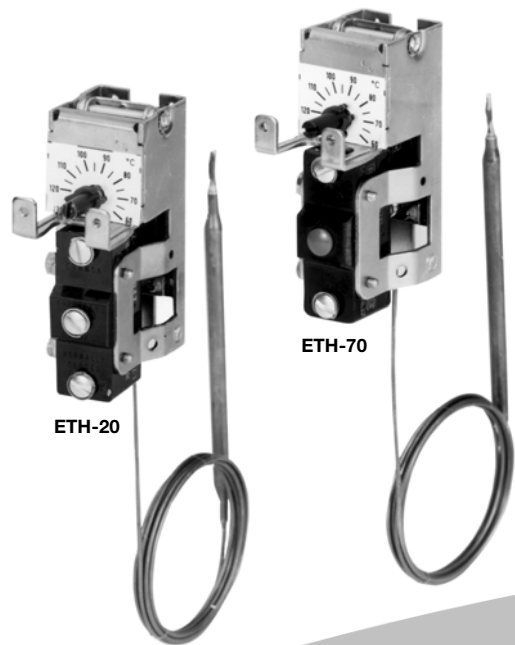


# Fitted thermostat Type series ETH



ETH-70

ETH-20

## B 60.2010.0 Operating Manual

2009-03-06/00073781

Please read these operating instructions before placing the instrument in service. Keep the manual in a place which is accessible to all users at all times. Please assist us in improving these operating instructions where necessary. Your comments will be appreciated.  
Telephone +49 661 6003-716  
Fax +49 661 6003-504

All necessary settings and manual changes within the device (if required) are described in these operating instructions. If any difficulties should nevertheless arise during startup, please do not manipulate the unit in any way. By doing so, you could endanger your rights under the instrument warranty! Please contact the nearest subsidiary or the head office in such a case.

The instruments are maintenance-free. In the event of malfunction, please return the instrument to the supplier with precise details of the fault. The staff at our field offices, branches, and agencies are always available to provide service and advice.



### JUMO GmbH & Co. KG

Company address: Moritz-Juchheim-Strasse 1  
36039 Fulda, Germany

Delivery address: Mackenrodtstrasse 14  
36039 Fulda, Germany

Postal address: 36035 Fulda, Germany  
Phone: +49 661 6003-716  
Fax: +49 661 6003-504  
E-mail: mail@jumo.net  
Internet: www.jumo.net

**JUMO Mess- und Regelgeräte Ges.m.b.H.**  
Pfarrgasse 48, 1232 Vienna, Austria  
Phone: +43 1 610610  
Fax: +43 1 6106140  
E-mail: info@jumo.at  
Internet: www.jumo.at

**JUMO Mess- und Regeltechnik AG**  
Laubisrütstrasse 70, 8712 Stäfa, Switzerland  
Phone: +41 928 24 44  
Fax: +41 928 24 48  
E-mail: info@jumo.ch  
Internet: www.jumo.ch

JUMO GmbH & Co. KG  
Moritz-Juchheim-Strasse 1  
36039 Fulda, Germany  
Telephone: +49 661 6003-0  
E-Mail: mail@jumo.net  
Internet: www.jumo.net

**EU Konformitätserklärung**  
EU Declaration of Conformity / Déclaration CE de conformité

Dokument-Nr. / Document n°: CE 202

Hersteller / Manufacturer / Etabl par: JUMO GmbH & Co. KG

Anschrift / Address / Adresse: Moritz-Juchheim-Strasse 1  
36039 Fulda

Produkt / Product: Beschreibung / Typ / Serie: Einbausthermostat ETH-... 60.2010

Wir erklären in alleiniger Verantwortung, dass das bezeichnete Produkt die Schutzanforderungen der Europäischen Richtlinien erfüllt.  
We hereby declare in sole responsibility that the designated product fulfills the safety requirements of the European directives.  
Nous déclarons sous notre seule responsabilité que le produit remplit les directives européennes.

Richtlinie / Directive: 2004/108/EG [EMV-Richtlinie] 05.1996  
2006/95/EG [Niederspannungs-Richtlinie] 05.1996  
97/23/EG [Druckgeräterichtlinie, Modul B+D] Kategorie IV 11.2002

Angewandete Normen / Standards applied / Normes appliquées: EN 61 326 Ausgabe: 05.2001  
EN 60 730-1 Ausgabe: 03.2002  
VDE 0631 Ausgabe: 12.1983  
DIN EN 14597 Ausgabe: 12.2005  
AD 2000 Merkblätter Ausgabe: 10.2000

Anerkante Qualitätssicherungssysteme der Produktion / Recognized quality assurance systems used in production / Organisme notifié agréé

nach / to / suivant: EU-Richtlinie 94/9/EG / EU directive 94/9/EC / Directive européenne 94/9/CE  
TUV Hannover, Am TÜV 1, D 30519 Hannover, Germany  
Kennummer 0032, Mittelungsnummer TÜV 99 ATEX 1454 Q, Identification No. 0032, Notification No. TÜV 99 ATEX 1454 Q / N° d'identification 0032, N° de notification TÜV 99 ATEX 1454 Q

nach / to / suivant: EU-Richtlinie 97/23/EG Modul D / EU directive 97/23/EC Module D / Directive européenne 97/23/CE module D  
TUV Industrie Service GmbH, D 68167 Mannheim, Germany  
Kennummer 0036, Zertifikat-Nr. DGR-0036-QS-179-02, Identification No. 0036, Certificate No. DGR-0036-QS-179-02 / N° d'identification 0036, N° de certificat DGR-0036-QS-179-02

Aussteller: / Issued by / Etabli par: Firma / Company / Société: JUMO GmbH & Co. KG, Fulda

Ort, Datum: / Place, date / Lieu, date: Fulda, 2008-02-18

Rechtsverbindliche Unterschrift / Legally binding signature / Signature juridiquement valable: Geschäftsbereich Vertrieb und Produktion / Head of Division Sales and Production / Directeur du département Ventes et Production  
ppa. Wolfgang Vogl

Seite/Page: 1 / 1

## 1. Introduction / Application

ETH series fitted thermostats are approved as:

- safety temperature limiters (STB).
- safety temperature monitors STW (STB)
- Type examination to:
  - DIN EN 14597
  - Pressure Equipment Directive 97/23/EC

Fitted thermostats of type series ETH comply with VDE 0631.

## Safety instructions

Physical and toxicological properties of substances which may escape, should the system fracture:

End of scale	Dangerous reactions	Fire/explosion hazard		Water contamination	Toxicology		
		Ignition temperature °C	Explosion limit % v/v		irritant	danger to health	toxic
liquid-filled							
< +200 °C	no	+355 °C	0.6 - 8	yes	yes	1	no
≥ +200 °C ≤ +350 °C	no	+490 °C	--	yes	yes	1	no
gas-filled							
≥ +400 °C ≤ +500 °C				no			

Should the measuring system fracture, the fill fluid may escape. At present, there is no restrictive statement from the health authorities concerning danger to health in the event of short-term exposure at low concentration, for example, should the measuring system fracture.

## 2. Instrument identification / type declaration

### Type designation

ETH . . . /

ETH Fitted thermostat with microswitch with capillary

-20 safety temperature monitor STW (STB), with changeover contact

-70 Safety temperature limiter (STB) with break contact and restart lockout

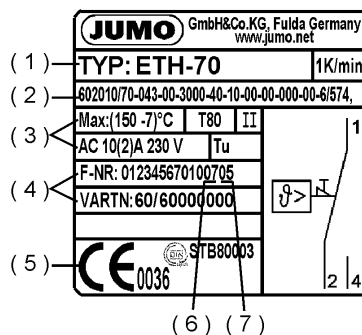
/au gold-plated snap-action switch contact

/U only with STB, microswitch with normally-closed contact, restart lockout, and additional signal contact

### Nameplate

(reference example)

- (1) Type
- (2) Order code
- (3) Limit value/max. housing temperature/contact rating
- (4) Manufacturing number/sales number
- (5) Mark of approval/connection diagram
- (6) Year of manufacture
- (7) Week of manufacture



## 3. Mounting / general information

### Capillary / temperature probe / pocket

#### General information

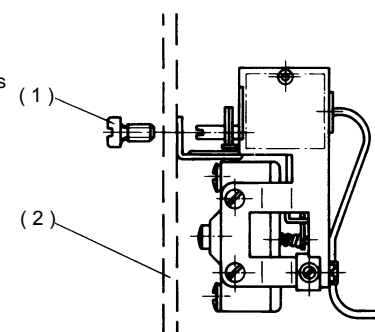
- If the capillary of the surface-mounting thermostat is cut through or becomes kinked, this could result in permanent device failure!
- The minimum bending radius allowed for the capillary is 5 mm.
- JUMO pockets must be used when installing the temperature probe, if the approval for the surface-mounting thermostat is to remain valid.
- The temperature probe must be fully immersed in the measurement medium.
- When air is the measurement medium, you must choose a process connection without a pocket.
- To ensure the general accuracy of the operating value, the instruments must only be used with the pockets supplied on delivery (diameter D = 8, 10 mm).
- Only a probe of diameter d = 8 mm may be used in pockets of D = 10 mm.
- Multiple assignments of pockets are only allowed with 2 or 3 cylindrical probes of Ø 6 mm and pockets of 15 x 0.75 mm.
- If two probes are assigned, the spring clip provided on delivery must be installed in the pocket.
- With pockets U, US, E, ES, and EZS made from St 35.81/16Mo 3 materials, the permitted operating period at operating temperatures above 420 °C is limited to 200,000 hours. Compliance with TRD 508 is essential for applications in this range.

### Mounting the thermostat head

#### Any installation position

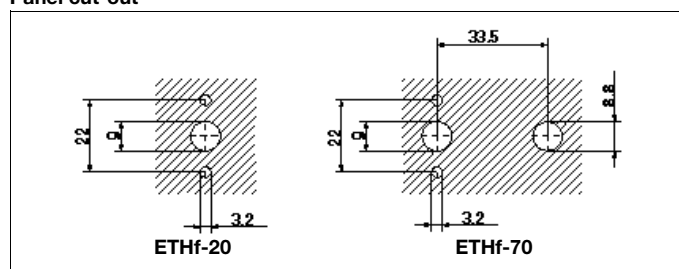
Mount the thermostat head  
On the chassis with 2 M3 screws

- (1) screw
- (2) panel

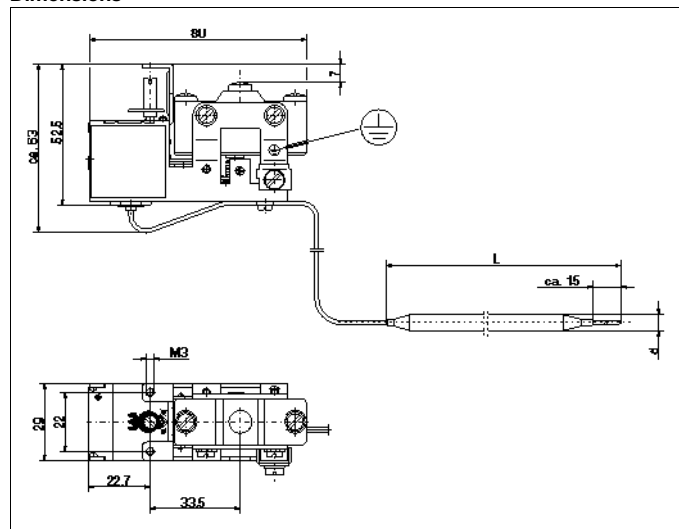


## 4. Dimensions

### Panel cut-out



### Dimensions



## Approved probes and pockets

<b>A</b> Plain cylindrical probe	<b>U</b> Screw-in pocket with screw-in spigot Form A to DIN 3852/2. With fixing screw	<b>UO</b> Pocket as screw-in pocket, with screw-in spigot Form "A" to DIN 3852/2, with fixing screw	<b>US</b> Weld-in pocket with fixing screw and clamp	<b>ES</b> For code "f" pocket as weld-in pocket, with welding shoulder; pocket secured with union nut, connection "C".
<b>E</b> For code "f" pocket as screw-in pocket, with screw-in spigot Form A to DIN 3852/2; pocket secured with union nut, probe mounting "C".	<b>B</b> Probe mounting "C" with loose coupling, threaded at both ends	<b>C</b> Plain cylindrical probe with shoulder and union nut. Shoulder brazed or welded to capillary	<b>D</b> Plain cylindrical probe, threaded connector brazed or welded to capillary	<b>Q</b> For code "f" double threaded coupling for subsequent capillary mounting. Probe temperature max. +200 °C
				<b>V</b> For code "f" clamping gland for subsequent capillary mounting. Probe temperature max. +200 °C

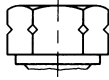
(A) = washer / (B) = seal

## Permissible loading on the pocket U, US, UZ, UZS, E, ES, and EZS pockets

The values below refer to the maximum loading on the probe mounting concerned. The actual maximum sealable pressure depends on the mounting conditions and may possibly be lower.

### Steel pocket

**Materials:**  
 Tube: St 35.8 I  
 Screw-in nipple up to 300 °C: 9 SMnPb.28 K  
 Screw-in nipple up to 450 °C: 16 Mo 3 (turned groove)  
 Weld-in nipple: 16 Mo 3 (without turned groove)

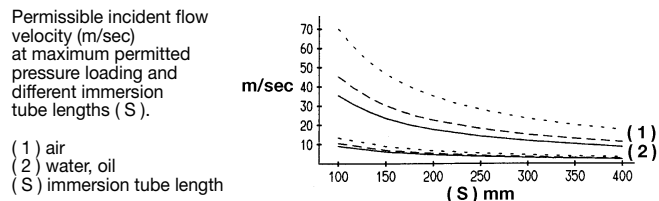


### Loading

Temperature	Tube diameter "D"		
	8 x 0.75 mm or conical	10 x 0.75 mm	15 x 0.75 mm
	maximum permissible pressure		
100 °C	89 bar	72 bar	48 bar
150 °C	83 bar	67 bar	45 bar
200 °C	78 bar	63 bar	42 bar
300 °C	59 bar	47 bar	32 bar
350 °C	50 bar	40 bar	27 bar
400 °C	46 bar	37 bar	25 bar
450 °C	24 bar	19 bar	13 bar

### Permissible incident flow velocity

Temperature: +200 °C  
 Heat carrier: air (1), water, oil (2)  
 Tube diameter "D": 8 mm, 10 mm, 15 mm



## 5. Installation

### Regulations and notes

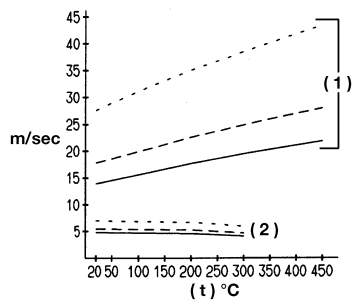
- The electrical connection must only be carried out by qualified personnel.
- The choice of cable, the installation and the electrical connection must conform to the requirements of VDE 0100 "Regulations on the Installation of Power Circuits with Nominal Voltages below 1000 V" and the appropriate local regulations.
- If contact with live parts is possible when working on the device, it must be completely disconnected from the electrical supply.
- Ground the instrument to the protective earth at the PE terminal. The cross-section of this cable must be at least the same as that of the supply cables. Wire the grounding conductors in a star configuration to a common earth point that is connected to the PE conductor of the electrical supply. Do not loop the grounding cables, that is, do not run them from one instrument to another.
- Apart from faulty installation, incorrect settings on the thermostat may also adversely affect the proper functioning of the subsequent process or cause other damage. It should only be possible for qualified personnel to make these settings. Please observe the relevant safety regulations for such matters.

The values below refer to the maximum loading on the probe mounting concerned. The actual maximum sealable pressure depends on the mounting conditions and may possibly be lower.

Immersion tube length Material: steel  
 200 mm:  
 Temperature: +200 °C  
 Heat carrier: air (1), water, oil (2)  
 Tube diameter "D": 8 mm, 10 mm, 15 mm

Permissible incident flow velocity (m/sec) at maximum permitted pressure loading and different immersion tube temperatures (t).

(1) air  
 (2) water, oil  
 (t) temperature



### Pocket

Temperature	Tube diameter "D"		
	8 x 0.75 mm or conical	10 x 0.75 mm	15 x 0.75 mm
	maximum permissible pressure		
100 °C	92 bar	74 bar	50 bar
150 °C	88 bar	71 bar	48 bar
200 °C	83 bar	67 bar	45 bar
300 °C	72 bar	58 bar	39 bar
400 °C	67 bar	54 bar	36 bar

Temperature	Tube diameter "D"		
	8 x 0.75 mm	10 x 0.75 mm	15 x 0.75 mm
	maximum permissible pressure		
100 °C	50 bar	40 bar	27 bar
150 °C	48 bar	39 bar	26 bar

## Probe mountings B, C, D

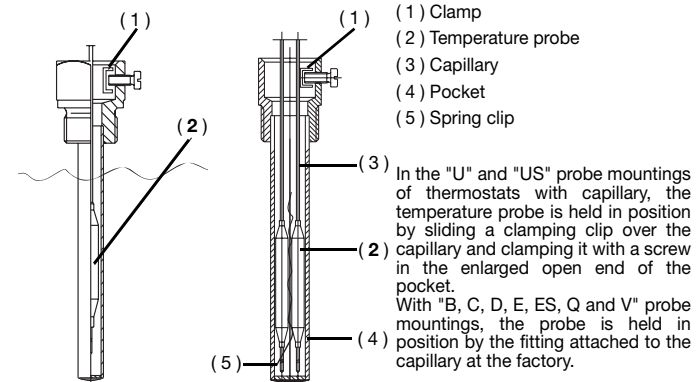
(probe in direct contact with medium)

Probe material	Nipple material		
	CuZn 39	9 SMnPb.28K	X 6 CrNiMoTi 17 122
	Max. temperature		
	200 °C	300 °C	400 °C
	Ø mm	Device function	
		TW	STB, STW (STB)
Cu-DHP	4	6 bar	2 bar
	5	5 bar	
	6	4 bar	
	7	3 bar	
	8	3 bar	
	9	3 bar	
10	3 bar		
1.4571 (V4A); St 35	4 - 10	10 bar	2 bar

Process connections A, H, UO, Q and V must only be used in unpressurized media.

## Mounting the probe

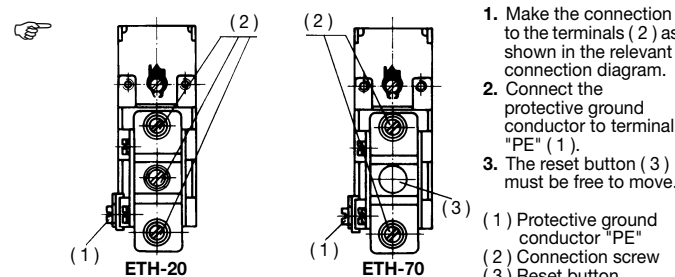
The temperature probe (2) must be fully immersed in the medium, otherwise there will be appreciable variations in the switching point.



In the "U" and "US" probe mountings of thermostats with capillary, the temperature probe is held in position by sliding a clamping clip over the capillary and clamping it with a screw in the enlarged open end of the pocket. With "B, C, D, E, ES, Q and V" probe mountings, the probe is held in position by the fitting attached to the capillary at the factory.

## Electrical connection

The instrument complies with Protection Class I.

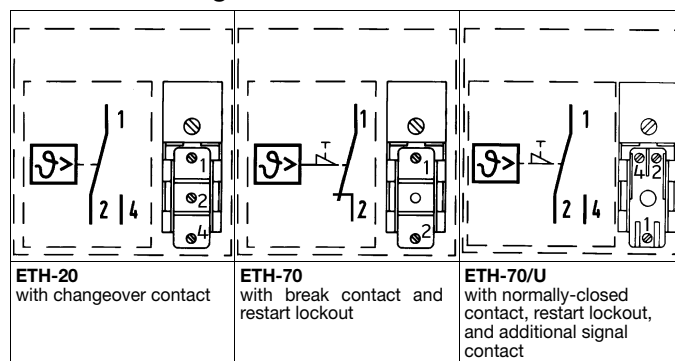


- The connection is suitable for fixed wiring. Cable entry is without fixed strain relief. Attachment type "X" (no special tools).
- Screw terminal for conductor cross-section up to 2.5 mm<sup>2</sup>.

### Cu capillary tube with PE function

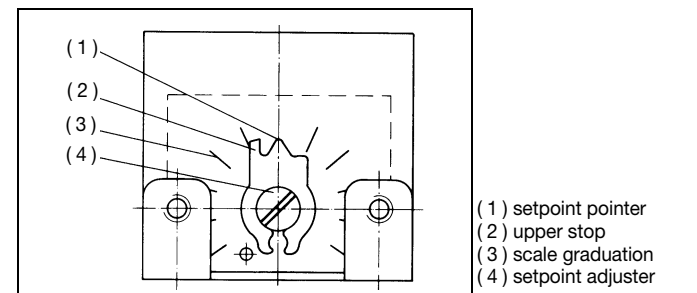
With CrNi capillary tubes "longer than 1000 mm", it is the user's responsibility to provide the requisite protective measures against electric shock.

## Connection diagrams



## 6. Setpoint/limit setting

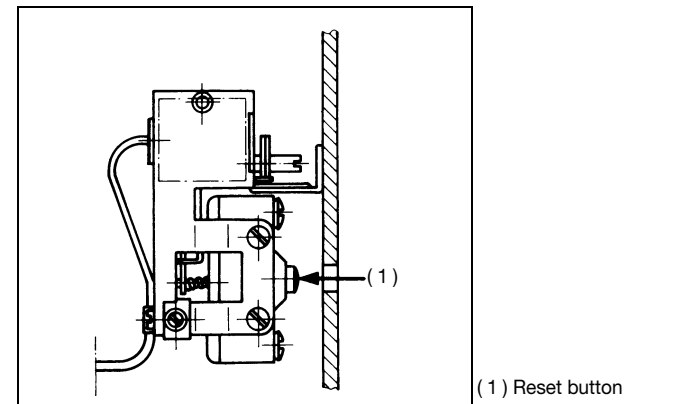
Use a screwdriver to set the switching point on the setpoint adjuster before installation.



## Resetting the STB

Once the temperature has fallen below the set limit (safe temperature limit) by about 10% of the scale range, the microswitch can be reset.

Press the reset button (1).



1. Press and hold the reset button (1) until the microswitch is reset

## 7. Self-monitoring

### Response to a fracture of the measuring system

With the STB and STW (STB), a fracture of the measuring system (leaking) causes the circuit to stay open permanently. With the STB, the microswitch is also reset.

### Response to low temperature

With the STW (STB) and STB, if the probe temperature falls below the minimum value of -20 °C, the circuit opens. Once the probe temperature has reached the minimum value, the STB must be reset manually. With the STW, reset is automatic.

### Using the STW (STB) as an STB

The required lockout function must be ensured by the downstream circuit. This circuit must comply with VDE 0116.

## 8. Technical data

**Mode of operation**  
 per DIN EN 60730-1, DIN EN 60730-2-9, and DIN EN 14597  
 STW(STB) 2 BKLNP  
 STB 2 BFHKLNPV

### Permissible ambient temperature in operation

	Capillary	Thermostat head	At end of scale
max.	+80 °C	+80 °C	
min.	-40 °C	0 °C	< 200 °C
	-20 °C	0 °C	≥ 200 °C ≤ 350 °C
	-40 °C	0 °C	> 350 °C ≤ 500 °C

**Permissible probe temperature:** max. end of scale +15%

**Permissible storage temperature:** max. 50 °C, min. -50 °C

### Switching point accuracy

as % of scale range, relative to limit value at T<sub>U</sub> +22 °C

STB, STW (STB)	in top third of scale	+0 %
	at start of scale	-5 %
		-10 %

### Mean ambient temperature effect

as % of scale range, relative to limit value.

If the ambient temperature at the thermostat head housing and/or capillary deviates from the calibration ambient temperature value of +22 °C in, the switching point is shifted.  
 Higher ambient temperature = lower switching point  
 Lower ambient temperature = higher switching point

Fitted thermostats with end of scale	
< +200 °C	≥ +200 °C ≤ +350 °C
STB/STW (STB)	STB/STW (STB)
effect on thermostat head	
0.17% per °C	0.13%/K
effect on capillary per meter	
0.054 %/K	0.11 %/K

Fitted thermostats with end of scale
≥ +350 °C ≤ +500 °C
STB/STW (STB)
effect on thermostat head
0.12%/K
effect on capillary per meter
0.03 %/K

### Maximum permissible contact rating

(additional info to details on nameplate)  
 AC 230 V +10%, 10(2) A, cos φ = 1(0.6)  
 DC 230 V +10%, 0.25 A  
 or  
 AC 230 V +10%, 6(1.2) A, cos φ = 1(0.6)  
 for gold-plated microswitch, extra code /au  
 AC/DC 24 V, 0.1 A

### Contact reliability

To ensure maximum switching reliability, we recommend a minimum loading of:  
 24 V AC/DC, 20 mA for silver contacts (standard)  
 10 V AC/DC, 10 mA for gold-plated contacts (code /au)

### Rated surge voltage

2500 V (over the switching contacts: 400 V)

### Overvoltage category II

For required fusing, see maximum switching current

### Operating medium

water, oil, air, superheated steam

### Time constant t<sub>0.632</sub>

in water	in oil	in air / superheated steam
≤ 45 s	≤ 60 s	≤ 120 s

### Protection

EN 60 529 - IP 00