

# JUMO safetyM STB/STW Ex

Safety temperature limiter, safety temperature monitor  
according to DIN EN 14597 and ATEX

**PED** Pressure  
Equipment  
Directive



Type 701155/8 ... 044

Type 701155/8 ... 045

**Operating manual**  
(English translation of the  
original German manual)

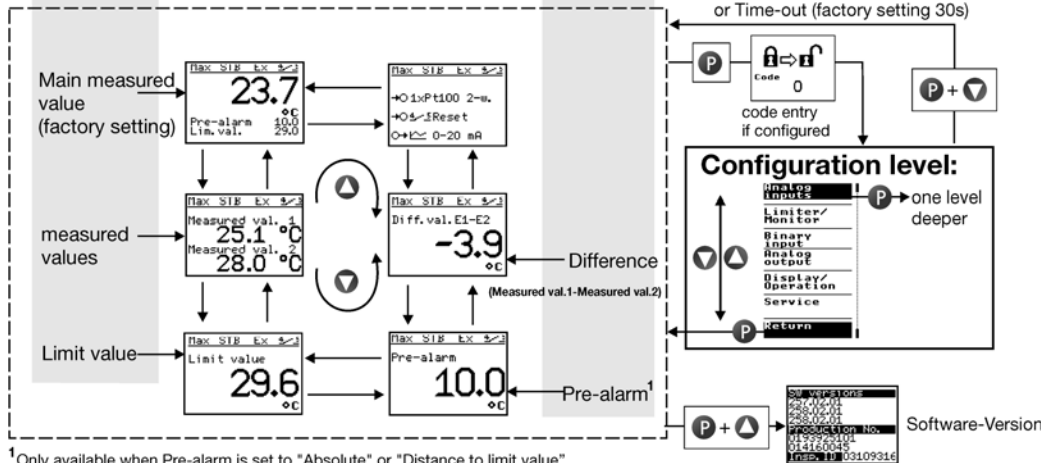
70115500T90Z001K000

**JUMO**

V3.00/EN /00542382

# Operating overview

## Normal display (approx. 5 secs after switch-on)



# Content

---

	<b>Operating overview</b>	<b>2</b>
<b>1</b>	<b>Brief description</b>	<b>12</b>
1.1	1-sensor variant	12
1.2	2-sensor variant	12
1.3	Ignition source monitoring	13
1.4	Safety temperature monitor (STW)	14
1.5	Safety temperature limiter (STB)	14
1.6	Safety information	15
1.7	Safety	15
<b>2</b>	<b>Identifying the device version</b>	<b>16</b>
2.1	Changing the default switching behavior	17
2.2	Scope of delivery	20
2.3	Device software versions	20
2.4	Fabrication number	20
2.5	Service addresses	20
<b>3</b>	<b>Mounting</b>	<b>22</b>
3.1	Dimensions	22
3.2	Mounting site, DIN-rail mounting	23
3.3	Close mounting	23
3.4	Dismounting	24
3.5	Galvanic isolation	25
3.6	Use of the setup interface	25
<b>4</b>	<b>Electrical connection</b>	<b>26</b>

4.1	Installation notes . . . . .	26
4.2	Removing the cover cap . . . . .	27
4.3	Connection diagram. . . . .	28
4.4	Checking the wiring of the intrinsically safe electrical circuit. . . . .	32
<b>5</b>	<b>Startup of the device . . . . .</b>	<b>33</b>
5.1	Display and control elements. . . . .	33
5.2	Setting the display after device is switched on . . . . .	33
5.3	Selecting and editing parameters (plausibility requirement for input values). . . . .	35
5.4	Canceling edit . . . . .	36
5.5	Acknowledging alarms using the reset key (for temperature limiter STB only) . . . . .	36
5.6	Acknowledging alarms using the digital input (for temperature limiter STB only) . . . . .	36
5.7	Functional test . . . . .	37
5.8	Sealing the device . . . . .	38
<b>6</b>	<b>Safety Manual . . . . .</b>	<b>40</b>
6.1	Brief description . . . . .	40
6.2	Safety temperature monitor (STW). . . . .	41
6.2.1	Safe operating status of STW . . . . .	41
6.3	Safety temperature limiter (STB) . . . . .	42
6.3.1	Safe operating status of STB . . . . .	42
6.6	Sensor connection possibilities (SIL) . . . . .	43
6.7	Standards and definitions . . . . .	46
6.8	Safety instrumented parameters related to the temperature monitoring unit . . . . .	50
6.8.1	Failure rates and SFF for type 701155/X-XX-025X-XXXX-23... (AC 230 V). . . . .	50
6.8.2	Failure rates and SFF for type 701155/X-XX-025X-XXXX-25 (AC/DC 24 V) . . . . .	51

# Content

---

6.9	Determining the safety integrity level (SIL) . . . . .	52
6.9.1	Safety integrity of the hardware . . . . .	54
6.9.2	Safety-relevant system properties . . . . .	55
6.10	Determining the achieved performance level PL . . . . .	57
6.11	Sensor connection possibilities (PL) . . . . .	60
6.11.1	Calculations DIN EN ISO 13849-1 Performance Level – low voltage 230 V . . . . .	62
6.11.2	Calculations DIN EN ISO 13849-1 Performance Level – extra low voltage (ELV) 24 V . . . . .	62
6.11.3	Contribution to risk reduction by the control system . . . . .	63
6.12	Performance Level . . . . .	65
6.13	Correlation between the Performance Level (PL) and Safety Integrity Level (SIL) . . . . .	65
6.14	Other applicable device documentation . . . . .	67
6.15	Behavior during operation and in case of malfunction . . . . .	67
6.16	Regular tests . . . . .	67
6.16.1	Recommended tests for temperature probes . . . . .	68
6.17	Intrinsic safety according to DIN EN 60079-11 . . . . .	69
6.18	Ignition source monitoring according to DIN EN 50495 and DIN EN 13463-6 . . . . .	69
<b>7</b>	<b>ATEX ignition protection type "i" . . . . .</b>	<b>70</b>
7.1	Intended use . . . . .	70
7.1.1	<b>Installation regulations . . . . .</b>	<b>71</b>
7.2	Identification marking according to ATEX directive 2014/34/EU and EN standards EN 60079-11 "i", EN 50495, and EN 13463-6 "b":71	
7.2.1	For the 1-sensor variant: . . . . .	71
7.2.2	For the 2-sensor variant: . . . . .	71
7.3	Meaning of the X character in the type examination certificate. . . . .	74

7.4	Associated, intrinsically safe electrical apparatus according to EN 60079-11	75
7.4.1	Function of intrinsic safety	75
7.4.1.1	Definitions of intrinsic safety	75
7.4.1.2	<b>Electrical apparatus:</b>	<b>75</b>
7.4.1.3	<b>Intrinsically safe electrical apparatus:</b>	<b>75</b>
7.4.1.4	<b>Associated electrical apparatus:</b>	<b>75</b>
7.4.2	Probe arrangement in the Ex-area	77
7.4.3	Explanation of probe temperature classes	79
7.5	Safety device according to DIN EN 50495	81
7.5.1	Temperature monitoring unit based on the ignition protection type "e", increased safety, according to EN 60079-7	81
7.5.1.1	<b>Function of increased safety</b>	<b>81</b>
7.5.1.2	<b>Use in the 1-sensor variant</b>	<b>82</b>
7.5.1.3	<b>Use in the 2-sensor variant</b>	<b>82</b>
7.5.1.4	<b>Use of temperature transmitters</b>	<b>83</b>
7.5.2	Monitoring of minimum overpressure for static pressurization on the basis of the ignition protection type "p", pressurized enclosures, according to EN 60079-283	
7.5.2.1	<b>Function of static pressurization</b>	<b>83</b>
7.5.2.2	<b>Safety device for static pressurization</b>	<b>83</b>
7.5.2.3	<b>Use as a safety device for static pressurization</b>	<b>84</b>
7.6	Ignition source monitoring "b" according to EN 13463-6	85
7.6.1	Function of ignition source monitoring	85
7.6.2	IPL (Ignition Prevention Level)	85
7.6.3	Identification marking	85
7.6.4	Use in the 1-sensor variant	85
7.6.5	Use in the 2-sensor variant	86
7.6.6	Use of transmitters	86
8	<b>ATEX ignition protection type "e" and "t"</b>	<b>88</b>

# Content

---

8.1	Intended use	88
8.2	Identification marking according to ATEX directive 2014/34/EU and according to the standards EN 60079-7 "e" and EN 60079-31 "t":89	
8.3	Identification marking according to DIN EN 50495:	90
8.3.1	EUC	90
8.4	JUMO standard nameplate	91
8.4.1	Example of temperature monitoring on a motor with JUMO standard nameplate:	91
8.5	Nameplate according to customer specifications	92
8.5.1	Example of temperature monitoring on a motor according to customer specifications:	92
8.6	Meaning of the X character in the type examination certificate.	95
8.6.1	Probe arrangement in the Ex-area	95
<b>9</b>	<b>IECEx ignition protection type "i"</b>	<b>97</b>
9.1	Intended use	97
9.2	IECEx identification marking according to IEC standards:	97
9.3	Excerpt of important device data.	98
<b>10</b>	<b>Configuration level</b>	<b>100</b>
10.1	Navigation principle	100
10.2	Analog inputs	101
10.2.1	Connection	101
10.2.2	Probe type 1	102
10.2.3	Offset 1	103
10.2.4	Resistivity 1	103
10.2.5	Filter time 1	104
10.2.6	Scaling start 1	104

10.2.7	Scaling end 1 .....	104
10.2.8	Probe type 2 .....	105
10.2.9	Offset 2 .....	106
10.2.10	Resistivity 2 .....	106
10.2.11	Filter time 2 .....	107
10.2.12	Scaling start 2 .....	107
10.2.13	Scaling end 2 .....	107
10.3	Limiter/monitor .....	108
10.3.1	Device function .....	108
10.3.2	Switching behavior .....	109
10.3.3	Limit value, hysteresis .....	111
10.3.4	Pre-alarm function .....	111
10.3.5	Pre-alarm, hysteresis .....	119
10.3.6	Error Pre-alarm, Relay pre-alarm .....	119
10.3.7	Limit value difference, hysteresis .....	119
10.3.8	Setting range min. (formerly ALHI) .....	120
10.3.9	Setting range max. (formerly ALLO) .....	120
10.4	Binary input .....	121
10.4.1	Function .....	121
10.5	Analog output .....	122
10.5.1	Function .....	122
10.5.2	Signal type .....	122
10.5.3	Scaling start .....	122
10.5.4	Scaling end .....	122
10.5.5	Error cases .....	123
10.5.6	Error signal .....	123
10.5.7	Behavior when leaving the scaling range .....	124



# Content

---

10.6	Display/operation . . . . .	126
10.6.1	Language . . . . .	126
10.6.2	Unit . . . . .	126
10.6.3	Decimal place . . . . .	126
10.6.4	Normal display . . . . .	126
10.6.5	Contrast . . . . .	127
10.6.6	Backlight . . . . .	127
10.6.7	Time-out light . . . . .	127
10.6.8	Time-out operation . . . . .	127
10.6.9	Code . . . . .	127
10.7	Service . . . . .	128
10.7.1	Limit switching cycle . . . . .	128
10.7.2	Current switching cycles . . . . .	128
10.7.3	Operating hours . . . . .	128
<b>11</b>	<b>Technical data . . . . .</b>	<b>130</b>
11.1	Analog inputs . . . . .	130
11.2	Analog output . . . . .	133
11.3	Digital input . . . . .	133
11.4	Relay outputs . . . . .	133
11.5	Measuring circuit monitoring . . . . .	134
11.6	Voltage supply . . . . .	134
11.7	Test voltages according to EN 60730, Part 1 . . . . .	135
11.8	Electrical safety . . . . .	135
11.9	Environmental influences . . . . .	135
11.10	Housing . . . . .	136

11.11	Approvals/approval marks . . . . .	137
11.12	Note about the probes in Chapter 11.13 to Chapter 11.15 . . . . .	138
11.13	Probes for the operating medium air . . . . .	139
11.14	Probes for water and oil . . . . .	141
11.15	Probes for air, water, and oil . . . . .	143
<b>12</b>	<b>Setup program . . . . .</b>	<b>144</b>
12.1	Minimum hardware and software requirements: . . . . .	144
12.2	Displaying the device software version . . . . .	144
12.3	Forgotten the code? . . . . .	145
12.4	Special function: thermocouple reverse-polarity protection . . . . .	145
12.5	Displaying a pressure signal via the current input . . . . .	146
12.5.1	Configuration of a pressure signal using the setup program . . . . .	147
<b>13</b>	<b>Alarm messages . . . . .</b>	<b>150</b>
<b>14</b>	<b>Error messages . . . . .</b>	<b>151</b>
<b>15</b>	<b>What to do, if ... . . . .</b>	<b>156</b>
<b>16</b>	<b>Information for devices with extra code 062 GL . . . . .</b>	<b>158</b>
16.1	Technical data . . . . .	158
16.2	Alarm messages . . . . .	158
16.3	Locks . . . . .	158
<b>17</b>	<b>Behavior of outputs . . . . .</b>	<b>160</b>
<b>18</b>	<b>Certificates . . . . .</b>	<b>163</b>
18.1	DIN STB/STW1228 . . . . .	163
18.2	SEBS-A.102606/16-2 V1.0 . . . . .	165
18.3	DGRL . . . . .	167
18.4	DNV GL . . . . .	168

# Content

---

18.5	EG-Type Examination ATEX Page1 . . . . .	171
18.6	IECEx . . . . .	178
18.7	Ex „e“ and „i“ . . . . .	186
18.8	China RoHS . . . . .	197

## 1 Brief description

The device is tested according to ATEX directive 2014/34/EU as associated apparatus with intrinsic safety "i", increased safety "e", and protection by housing "t".

It meets the requirements of the following identification markings:

### 1.1 1-sensor variant

#### Intrinsic safety



II (1) (2) (3) G (b1) [Ex ia Ga] [e pz] IIC

II (1) (2) (3) D (b1) [Ex ia Da] [p Dc] IIIC

#### Increased safety and protection by housing



II (2) G [Ex eb Gb] IIC

II (2) D [Ex tb Db] IIIC

### 1.2 2-sensor variant

#### Intrinsic safety



II (1) (1) (2) G (b2) [Ex ia Ga] [e py] IIC

II (1) (1) (2) D (b2) [Ex ia Da] [p Db] IIIC

## Increased safety and protection by housing



II (2) G [Ex eb Gb] IIC

II (2) D [Ex tb Db] IIIC

### 1.3 Ignition source monitoring

The device is also certified for use according to DIN EN 50495 and DIN EN 13463-6 as an ignition source monitor as specified in the ATEX directive.

The compact and user configurable STB/STW according to ATEX requirements can now also enable early and reliable detection of risks in Ex-areas which could potentially result in personal injuries, environmental damage, or destruction of production plants and production materials.

The task of safety temperature limiters is to reliably monitor thermal processes and to switch plants to a safe operating status in the event of malfunctions.

Along with the existing approvals according to DIN 14597, SIL 3, PL e (Performance Level), GL, the device also has approval according to ATEX and can therefore also be used for measurements in Ex-areas. However, the device itself has to be installed outside the Ex-area.

The inputs are suitable for applications requiring intrinsic safety and increased safety, meaning that relevant probes can be connected directly.

Barriers are no longer required.

The device is also certified according to DIN EN 50495 and DIN EN 13463-6 as an ignition source monitor (IPL 2) as specified in the ATEX directive and can be used to monitor potentially explosive atmospheres containing gas or dust.

The device concept also meets the stringent requirements of DIN EN 61508 and DIN EN 13849. The 1oo2D structure ensures reliable detection of errors, meaning that the device concept can also be used for applications subject to the new Machinery Directive 2006/42/EC.

The measured value at the analog input can be recorded by various probes or standard signals.

If the measured value exceeds the limit value, this is indicated by the installed LEDs K1 and K2 (red) for each channel, and the


installed alarm relay output switches the plant to a safe operating status (**alarm range**).

## 1.4 Safety temperature monitor (STW)

The STW is a safety-component device according to the Machinery Directive which, when activated, resets automatically if the probe temperature has fallen below or risen above the set limit value by an amount equal to the switching differential. Possible settings: monitoring for limit value overrange or underrange.

⇒ Chapter 10.3.2 "Switching behavior"

## 1.5 Safety temperature limiter (STB)






The STB is a safety-component device according to the Machinery Directive which is permanently locked after activation. A manual reset using the  (RESET) key is only possible once the probe temperature has fallen below/has exceeded the limit value by the amount of the switching differential. Possible settings: monitoring for limit value overrange or underrange.

⇒ Chapter 10.3.2 "Switching behavior"

The transparent, sealable protective cover prevents unauthorized operation.

However, the  (RESET) key is still accessible.

## 1.6 Safety information

Symbol	Meaning	Explanation
	Note	This symbol is used to draw your attention to a <b>particular issue</b> .
	Attention	This symbol is used when <b>damage to devices or data</b> may occur if the instructions are disregarded or not followed correctly!
	Caution	This symbol is used when <b>personal injury</b> may occur if the instructions are disregarded or not followed correctly!
	Read	This text contains important information which must absolutely be read before proceeding. Manipulations not described in the operating manual or which are expressly forbidden will jeopardize your warranty rights.
	Reference	This symbol refers to further information in other manuals, chapters, or sections.
abc <sup>1</sup>	Footnote	Remarks at the end of a page that <b>refer to</b> specific text passages and are marked with a number placed in superscript.
*	Action instruction	This symbol marks the description of a <b>required action</b> . The individual steps are marked by this asterisk.

## 1.7 Safety

The device does not implement any "network and system security" measures according to the IEC 62443 standards series. This means that the JUMO STB/STW series only consider the "safety" aspect.







## 2 Identifying the device version

The nameplate is glued laterally to the device.

**Voltage supply AC**  
**110 to 240 V:**

**JUMO GmbH & Co. KG** 36039 Fulda, Germany  
www.jumo.net  
JUMO safetyM STB/STW Ex  
Typ: 701155/8-01-0253-2001-23-044-005/059,062







STB "O"  
2x Pt100 dl  
3A, 230VAC - ohm. Last  
~ AC 110...240V, +10/-15%, 48...63Hz, 12VA

      0036 0044  
STB/STW1228  
F-Nr: 0000000001001010000 TN: 00656802

**Voltage supply AC/DC**  
**20 to 30 V:**

**JUMO GmbH & Co. KG** 36039 Fulda, Germany  
www.jumo.net  
JUMO safetyM STB/STW Ex  
Typ: 701155/8-01-0253-2001-25-044-005/059,062

STB "O"  
2x Pt100 dl  
3A, 230VAC - ohm. Last  
~ AC/DC 20...30V, 48...63Hz, 12VA

      0036 0044  
STB/STW1228  
F-Nr: 0000000001001010000 TN: 00590158

### Ex i identification marking

**JUMO GmbH & Co. KG** 36039 Fulda, Germany  
www.jumo.net  
JUMO safetyM STB/STW Ex

 II (1) (2) (3) G (b1) [Ex ia Ga] [e pz] IIC  
II (1) (2) (3) D (b1) [Ex ia Da] [p Dc] IIC  
II (1) (1) (2) G (b2) [Ex ia Ga] [e py] IIC  
II (1) (1) (2) D (b2) [Ex ia Da] [p Db] IIC  
TÜV 11 ATEX 556139 X

 [Ex ia Ga] IIC  
[Ex ia Da] IIC  
IECEx TUN 15.0036X

Klemmen / Terminals / Borne 1, 2, 3, 6, 7, 8:  
U<sub>0</sub> = 6,0 V C<sub>0</sub> = 36,3 µF \*  
I<sub>0</sub> = 41,2 mA L<sub>0</sub> = 20 mH \*  
P<sub>0</sub> = 61,8 mW \* : see certificate  
0°C ≤ Ta ≤ +55°C

### Ex e and Ex t identification marking

**JUMO GmbH & Co. KG** 36039 Fulda, Germany  
www.jumo.net  
JUMO safetyM STB/STW Ex

 II (2) G (b1) [Ex eb Gb] [Ex eb Gb] IIC  
II (2) G (b2) [Ex eb Gb] [Ex eb Gb] IIC

 II (2) D (b1) [Ex tb Db] [Ex tb Db] IIC  
II (2) D (b2) [Ex tb Db] [Ex tb Db] IIC

SEV 17 ATEX 0161 X

Klemmen / Terminals / Borne 1, 2, 3, 6, 7, 8:  
U<sub>0</sub> = 6,0 V  
I<sub>0</sub> = 41,2 mA  
P<sub>0</sub> = 61,8 mW  
0°C ≤ Ta ≤ +55°C

The voltage supply that is connected must correspond to the voltage specified on the nameplate!

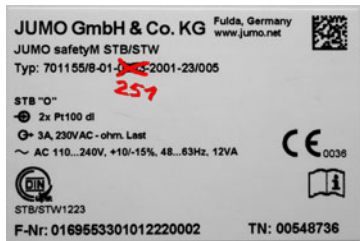




## 2.1 Changing the default switching behavior

If the safety function used according to EN 14597 is changed to, e.g., STW with max. alarm, this should be indicated accordingly on the nameplate. This can be noted manually on the nameplate directly below the order code, for example.

**Example:** Changing a supplied STB with max. alarm (code 0253) to an STW with max. alarm (code 251) should be noted.



701155

## Basic type

Safety temperature limiter / safety temperature monitor (STB)/(STW) Ex with SIL, PL, and IPL approval

## Version

Default setting

Configured according to customer specifications

## National language

German (default setting)

English

French

## Switching behavior

0251 Safety temperature monitor max. alarm [inverse, opening function]

0252 Safety temperature monitor min. alarm [direct, closing function]

0253 Safety temperature limiter max. alarm [inverse, opening function] (default setting)

0254 Safety temperature limiter min. alarm [direct, closing function]

## Measurement input<sup>1</sup> (programmable)

1003 1x Pt100 in 2-wire circuit

2001 2x Pt100 in 3-wire circuit (default setting)

2003 2x Pt100 in 2-wire circuit

2005 2x Pt1000 in 2-wire circuit

2006 2x Pt1000 in 3-wire circuit

2036 2x W5Re-W26Re "C"

2037 2x W3Re-W25Re "D"

2039 2x Cu-CuNi "T"

2040 2x Fe-CuNi "J"

2041	2x Cu-CuNi "U"
2042	2x Fe-CuNi "L"
2043	2x NiCr-Ni "K"
2044	2x Pt10Rh-Pt "S"
2045	2x Pt13Rh-Pt "R"
2046	2x Pt30Rh-Pt6Rh "B"
2048	2x NiCrSi-NiSi "N"
1053	1x 4 to 20 mA
2053	2x 4 to 20 mA

#### Voltage supply

23	AC 110 to 240 V +10 % /-15 %, 48 to 63 Hz
25	AC/DC 20 to 30 V, 48 to 63 Hz

#### Ignition protection type

044	[Ex ia] associated apparatus "i", installation outside the Ex-area
045	[Ex eb, tb] associated apparatus, "e" for gas, "t" for dust, installation outside the Ex-area

#### Analog output (configurable)

001	0 to 20 mA
005	4 to 20 mA (default setting)
040	0 to 10 V
070	2 to 10 V

#### Extra code

059	There is always SIL, PL, and IPL approval
062	GL approval

701155/ 8 - 01 - 0253 - 2001 - 23 - 044 - 005/ , 062

1. The first number on the measurement input means single probe "1" or double probe "2"

## 2.2 Scope of delivery

- JUMO safetyM STB/STW Ex in the ordered version
- Operating manual
- ATEX cover cap for measurement inputs

## 2.3 Device software versions

Diagnostics module version: 257.02.01  
 Analog channel 1 version: 258.02.01  
 Analog channel 2 version: 258.02.01



```
SW-Versionen
257.02.01
258.02.01
258.02.01
Fabrikationsnr.
0193925101
014160045
Prüf-Nr 03109316
```

## 2.4 Fabrication number

The fabrication number is displayed on the device.

\* Press **P** + **▲** keys

Structure:

The first 8 digits are the production order number: 01939251  
 Digit 9 and 10 Fulda manufacturing site: 01  
 Digit 11 (second row) hardware version: 0  
 Digit 12 and 13 year: 2014  
 Digit 14 and 15 calendar week: 16  
 Digit 16 to 19 consecutive number: 0045



```
SW-Versionen
257.02.01
258.02.01
258.02.01
Fabrikationsnr.
0193925101
014160045
Prüf-Nr 03109316
```

## 2.5 Service addresses

See back cover



This operating manual is the translation of the **German manual**.

It is valid for the following hardware and software versions:

Diagnostics module as of version: 257.02.01

Analog channel 1 as of version: 258.02.01

Analog channel 2 as of version: 258.02.01

and replaces the following older versions:

Diagnostics module version: 257.01.XX

Analog channel 1 version: 258.01.XX

Analog channel 2 version: 258.01.XX

The following versions are already available:

b70.1155: 2013-04-01 A400

b70.1155: 2013-04-01 A401

b70.1155: 2015-06-01 A402

b70.1155: 2016-02-01 A403

70115500T90Z000K000: V1.01

**\*** Press **P** + **▲** keys

Keep the operating manual in a place that is accessible to all users at all times.



All the necessary settings are described in the operating manual.

Manipulations that are not described in the operating manual or which are expressly forbidden will jeopardize your warranty rights and may render the safety function inoperative!

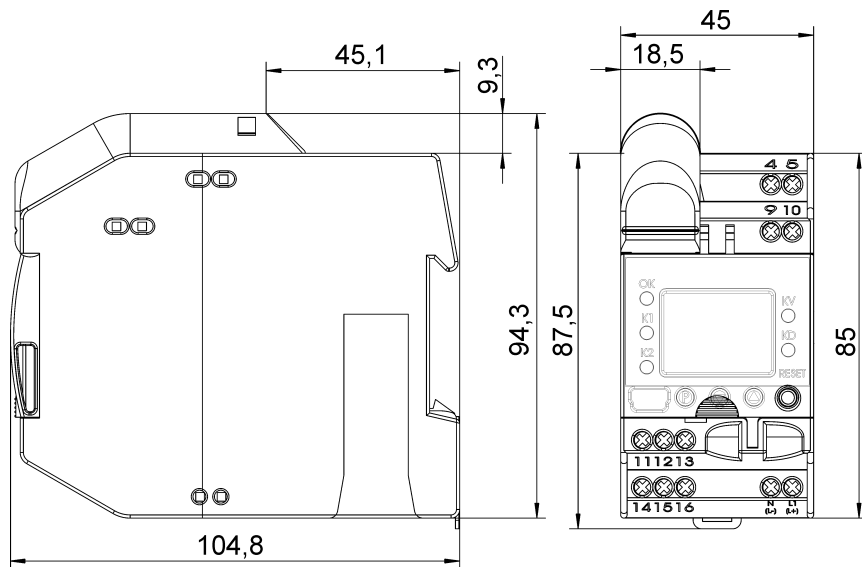
Any interference with the inside of the device is prohibited!

Repairs may only be performed by JUMO in the company's headquarters in Fulda.

If you have any problems, please contact the nearest branch office or the head office.

## 3 Mounting

### 3.1 Dimensions



## 3.2 Mounting site, DIN-rail mounting



The device is not suitable for installation in potentially explosive areas.  
The device is clipped to a 35 mm DIN rail (DIN EN 60715) from the front and locked into place by pressing downwards.

⇒ The ambient conditions at the mounting site must meet the requirements specified in the technical data.

Chapter 11 "Technical data"

- ☐ Should be as vibration-free as possible to prevent the screw connections from working loose!
- ☐ Should be free from aggressive media (e.g. strong acids and lyes), and as free as possible from dust, flour, or other suspended solids to prevent the cooling slots from being blocked!

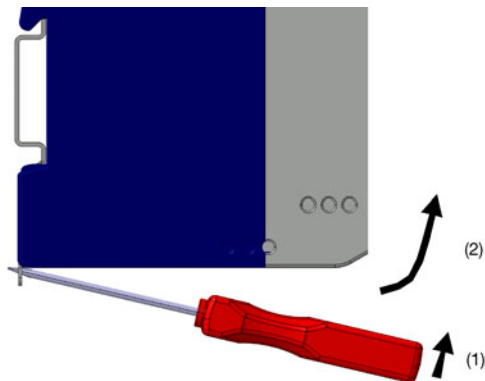


## 3.3 Close mounting

- ☐ Maintain the minimum distance of 20 mm to the top and the bottom.
  1. So that the release slot can still be accessed with a screwdriver from the bottom.
  2. So that when dismantling, the device can be swiveled upwards and removed from the DIN rail.
- ☐ Several devices can be mounted right next to one another without a minimum distance.

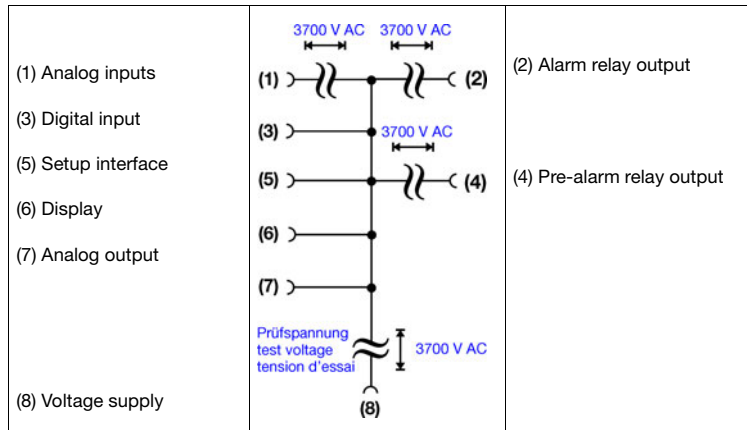
### 3.4 Dismounting

- \* Place screwdriver in release catch at bottom and press upward (1).
- \* Swivel screwdriver and housing upwards at the same time out of the DIN rail (2).





### 3.5 Galvanic isolation



### 3.6 Use of the setup interface

- The USB setup interface is only designed for service use over a limited period (such as the transfer of setup data or during startup).
- The USB setup interface is not suited for perpetual operation in a hard-wired plant because the monitoring function is deactivated during data transfer with the setup program!

## 4 Electrical connection

### 4.1 Installation notes

- ☐ Check to see if the safety temperature limiter is installed in a manner appropriate to the application (temperature measurement) and that it is operated within the admissible plant parameters.
- ☐ The device is intended to be installed in control cabinets, machines, or plants. Ensure that the customer's fuse protection does not exceed 20 A.
- ☐ Disconnect the device from the mains voltage on all poles prior to starting service or repair work.
- ☐ All incoming and outgoing lines without a connection to the power supply network must be laid with shielded and twisted lines. The shield must be grounded on the device side.
- ☐ Do not lay the input and output cables close to components or lines through which current is flowing.
- ☐ Do not connect any additional loads to the screw terminals for the voltage supply of the device.
- ☐ Both the choice of cable material for the installation, as well as the electrical connection of the device must conform to the local requirements of VDE 0100 "Regulations on the Installation of Power Circuits with Nominal Voltages below 1000 V" or the appropriate regulations for the country.
- ☐ Suitable measures must be taken to protect the relay circuit.  
The maximum switching capacity is 230 V/3 A (resistive load).
- ☐ The electromagnetic compatibility conforms to the standards and regulations cited in the technical data.  
⇒ Chapter 11 "Technical data"
- ☐ For startup we recommend that a trial run of the plant up to the temperature shutoff at the set limit is carried out.



#### Hybrid mixtures:

If a dangerous atmosphere could occur at the mounting site – an atmosphere that is potentially explosive due to a mixture of gases, steam, or mist and at the same time through combustible dusts – then the safety-related characteristic parameters of the gases, steam, or mist and the combustible dusts can change.

In such cases the suitability of the intended device is to be checked by an appropriate expert body.



The electrical connection and the configuration settings up to the startup must only be carried out by qualified personnel.



The approval according to DIN EN 14597 is only valid when the correct probe with DIN approval is set in the configuration level and if the probe is connected.

The limit value to be monitored must lie in the admissible temperature range of the DIN probes!

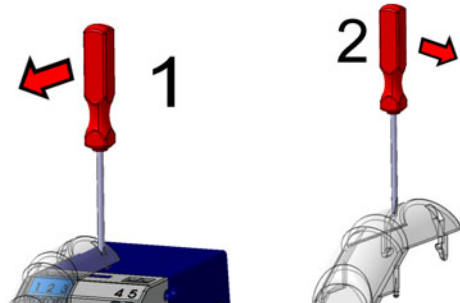
⇒ Chapter 11.13 "Probes for the operating medium air"

⇒ Chapter 11.15 "Probes for air, water, and oil"

The monitoring function is deactivated while data is transmitted over the setup program.

⇒ Chapter 15 "What to do, if ..."

## 4.2 Removing the cover cap

1	* Insert the screwdriver into the right opening of the cover cap and pry up to the left.	
2	* Hold the cover cap and pry up the second catch in the left opening to the right	

### 4.3 Connection diagram

The connection is made via screw terminals.



**Attention:**









The cover cap must be removed prior to wiring and put back on when finished.






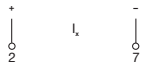
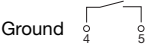

This is necessary for the proper operation of the probes in the Ex-area!



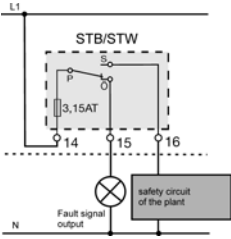
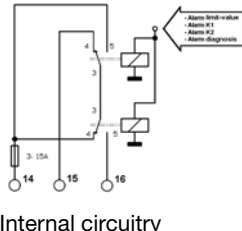
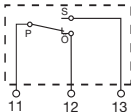


Wire	Admissible cross section
One-wire	$\leq 2.5 \text{ mm}^2$
Fine-strand, with ferrule	$\leq 1.5 \text{ mm}^2$

Tightening torque of the screws: max. 0.5 Nm

Legend	Comment	Screw terminals	Screw terminals
1, 2		Analog input 1 (E1)	Analog input 2 (E2)
	Thermocouple / <b>Double thermocouple</b>		
	 When connecting double thermocouples, the measuring circuits (E1) and (E2) must be isolated. That means that both thermocouples have no electrical connection to the protection fitting and furthermore no electrical connection to each other (isolated assembly).		
	<b>RTD temperature probe Pt100/Pt1000 in two-wire circuit</b>		
	 Enter the line resistance for RTD temperature probes in two-wire circuit when using greater line lengths. ⇒ Setup program: <i>analog inputs</i>		
	<b>RTD temperature probe Pt100/Pt1000 in three-wire circuit</b>		

Legend	Comment	Screw terminals	Screw terminals
	<p>RTD temperature probe Pt100 in two-wire circuit, single sensor for both analog inputs</p> <p><b>Attention:</b> When only one probe (SIL2) is connected, the temperature limiter device is reduced from <b>SIL3 to SIL2!</b> However, the internal 2-channel structure (1oo2D) in the device still remains. Both channels measure the same sensor due to the simplified external wiring.</p>		
	<b>4 to 20 mA</b>		
	<p>4 to 20 mA for both analog inputs</p> <p><b>Attention:</b> When only one probe (SIL2) is connected, the temperature limiter device is reduced from <b>SIL3 to SIL2!</b> However, the internal 2-channel structure (1oo2D) in the device still remains. Both channels measure the same current signal due to the simplified external wiring.</p>		
<b>4</b>	<p><b>Digital input</b> Connection to a potential-free contact</p>		
<b>5</b>	<p><b>Analog output:</b> 0 to 20 mA 4 to 20 mA (default setting) 0(2) to 10 V</p> <p><b>Caution:</b> The analog output is <b>not part of the safety function!</b></p>		

Legend	Comment	Screw terminals	Screw terminals
9	<b>Voltage supply</b> Acc. to nameplate	<b>AC:</b> L1 line conductor N neutral conductor 	<b>DC:</b> (L+) (L-) 
10	<b>Alarm relay output (zero-current state)</b> Relay (changeover contact) with fuse cut-out		
11	<b>Pre-alarm relay output (KV)</b> Relay (changeover contact)		



**Caution:**

The pre-alarm relay output is **not part of the safety function!**

## 4.4 Checking the wiring of the intrinsically safe electrical circuit

**Attention:**

The cover cap that is removed prior to wiring must be put back into place after wiring is complete so that the detent lugs snap back into place!

This is necessary for the proper operation of the probes in the Ex-area!

**Caution:**

All screw terminals in the housing must always be tightened to the maximum torque of 0.5 Nm. This also applies to connections that are not required.

- \* Fine-strand lines in ferrules up to max. 1.5 mm<sup>2</sup> or single-strand lines in ferrules up to max. 2.5 mm<sup>2</sup> can be inserted and tightened.
- \* Switch on the device and test whether the measured value of your choice (e.g. temperature or pressure) is displayed without any problems.
- \* Place the cover cap back in its position and make sure it is securely in place.



## 5 Startup of the device

### 5.1 Display and control elements

- \* When the voltage supply is set up, a testing routine starts during which all LEDs flash and the backlight display shows white pixels for 2 s and black pixels for 2 s.

After the testing routine is complete the device shows the main measured value (default setting).

⇒ If an alarm or error message appears, refer to Chapter 16.2 "Alarm messages".

### 5.2 Setting the display after device is switched on

⇒ Chapter 10.6.4 "Normal display"

The main measured value appears on the screen in German (default setting). The example shows a screen layout in which the maximum value of a safety temperature limiter of 70 °C with a pre-alarm of 60 °C is monitored.



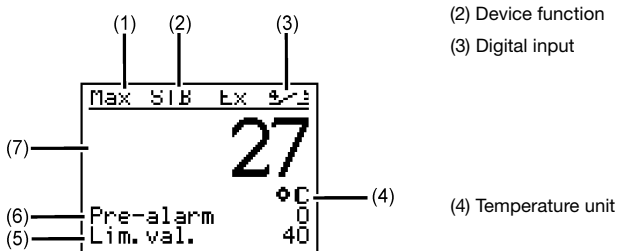
If the main measured value for "Power ON" lies within the hysteresis then the pre-alarm and alarm relay outputs are set to inactive.





(1) Switching behavior

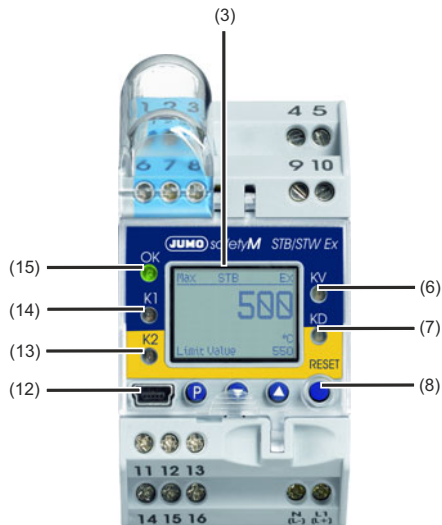
(7) Main measured value

(6) Pre-alarm

(5) Limit value



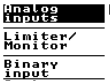


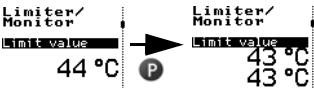


Legend	Comment
3	<b>LCD display</b> Black/white with backlight, 96 x 64 pixels
6	<b>LED KV (yellow)</b> Is lit if the pre-alarm is triggered (pre-alarm relay output active).
7	<b>LED KD (yellow)</b> Is lit if the diagnostic processor has performed a switch-off.
8	<b>Keys</b> (can only be operated when the transparent hood is folded upward) <ul style="list-style-type: none"> <li> Value increase / previous parameter</li> <li> Value reduction / next parameter</li> <li> Programming</li> <li> (RESET)</li> </ul>
12	<b>Setup interface</b>
13	<b>LED K2 (red)</b> Is lit for all errors.
14	<b>LED K1 (red)</b> Is lit for all errors.
15	<b>LED OK</b> Green: valid range, no error Off: error occurred



## 5.3 Selecting and editing parameters (plausibility requirement for input values)

The values are displayed in the normal display.

To edit a value – such as the limit value – perform steps 1 to 4



1	Press <b>P</b>		The first menu item "Analog inputs" is highlighted in black. The vertical line to the right shows the current position.
2	Select limiter/monitor with <b>▼</b> Switch to submenu with <b>P</b>		
3	Press <b>▼</b> 2x until limit value appears Press <b>P</b> (limit value flashes)		
4	Set the value of your choice with <b>▼</b> or <b>▲</b> Acknowledge with <b>P</b> (limit value appears twice)		The limit value flashes twice in the display for checking purposes
5	Briefly press <b>P</b> to confirm. The value is adopted and saved.		Back to normal display: With <b>P</b> + <b>▼</b> , "back" menu item, or automatically after timeout
 If no key is pressed for 30 seconds (timeout) then the device automatically returns to normal display and the value is not stored. The duration of the timeout can be configured. ⇒ See Chapter "Operating overview" on the first inner page of this manual			

## 5.4 Canceling edit

 +  are used to cancel editing and the previous value remains.

## 5.5 Acknowledging alarms using the reset key (for temperature limiter STB only)


\* Press and hold  (RESET) key

Check marks appear behind the errors.	 <pre> ERRORS ! -----RESET Limit value  ✓ Channel 1    ✓ Limit value  ✓ Channel 2           </pre>	The alarm is no longer present and is acknowledged as soon as the bar has run to the end (3 s).
A bell is displayed behind the errors.	 <pre> ERRORS ! -----RESET Probe break  △ Channel 1    △ Probe break  △ Channel 2    △ Diff. value  △ Diagnosis           </pre>	The alarm condition is still present and cannot be acknowledged.

## 5.6 Acknowledging alarms using the digital input (for temperature limiter STB only)

The digital input can be configured so that it is possible, for example, to unlock alarms via a potential-free contact.


The function only responds to the switching edge from "open" to "closed" state.

In that case the contact has the same behavior as the  (RESET) key.

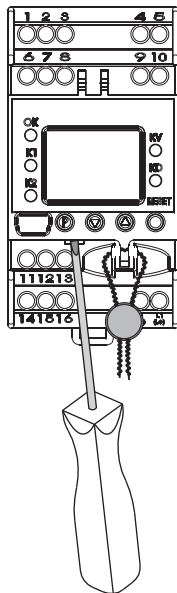
⇒ Chapter 10.4.1 "Function"

## 5.7 Functional test

After the electrical connection in Chapter 4.3 you should proceed with the following steps for your safety:

- \* Set the limit value that the plant must not exceed or drop below.
  - \* When all parameters are in the valid range, press the  (RESET) key until the green OK LED is lit.
  - \* Simulate the limit value being exceeded, initially **without installing the sensors in the potentially explosive area**, and check if the alarm relay output permanently switches off the plant. The K1 and K2 LEDs must light up red even if the measured value is back in the valid range.
  - \* Manually reset the device using RESET until the green OK LED lights up again.
- ⇒ Chapter 5.5 "Acknowledging alarms using the reset key (for temperature limiter STB only)"
- ⇒ Chapter 7.4.2 "Probe arrangement in the Ex-area"

## 5.8 Sealing the device



The device settings must not be changed under operating conditions.

A lead-sealed see-through cover is therefore placed on top to prevent unintentional or unauthorized adjustment.

Two holes are provided to the left and right of the see-through cover through which wire can be guided for lead sealing to connect the cover to the housing. The wire ends are secured with the seal.

### **Opening the see-through cover for close mounting:**

A screwdriver can be used to pry open the see-through cover.



## 6 Safety Manual

### 6.1 Brief description

The safety temperature limiter (**STB**) and safety temperature monitor (**STW**) enable early and reliable detection and prevention of dangers which could potentially result in personal injuries, environmental damage, or the destruction of production plants and production materials.

Its task is to reliably monitor process variables such as temperature or pressure and to switch the plants to a safe operating status in the event of malfunctions. The measured value at the analog input can be recorded by various probes or standard signals. Even when using double sensors (1oo2) only one physical measuring site is monitored at the measuring point.

Even when using double sensors (1oo2) only **one** physical measuring site is monitored at the measuring point.

If the measured value exceeds the limit value, this is indicated by the installed LEDs K1 and K2 (red) for each channel, and the **safety relevant alarm relay output** (terminal 14 and 16) switches the plant to a safe operating status (**alarm range**).

The SIL 3 requirements of DIN EN 61508 or PL d DIN EN ISO 13849 are met by a device concept that has a 1oo2D structure which ensures reliable detection of errors.

The JUMO safetyM STB/STW Ex is tested according to the ATEX directive 2014/34/EU as associated equipment with an intrinsically safe input.

It meets the requirements of the following identification markings:



The JUMO safetyM STB/STW Ex is also certified for use according to DIN EN 50495 and DIN EN 13463-6 as an ignition source monitor as specified in the ATEX directive.



## 6.2 Safety temperature monitor (STW)

The safety temperature monitor is a device which, when activated, resets automatically if the probe temperature has fallen below or risen above the set limit value by an amount equal to the switching differential. Possible settings: monitoring for limit value overrange or underrange.

Modes of operation:


- Minimum requirements: 2B, 2K, 2P
- Requirements additionally fulfilled: 2N, 2D

### 6.2.1 Safe operating status of STW

The safe status is when the alarm relay output between terminals 14 and 16 is switched off (quiescent current principle).

### 6.3 Safety temperature limiter (STB)

The safety temperature limiter is a device which is permanently locked after activation.

A manual reset using the  (RESET) key is possible once the probe temperature has fallen below/has exceeded the limit value by the amount of the switching differential. Possible settings: monitoring for overrange or underrange.

Modes of operation:

- Minimum requirements: 2B, 2J, 2V, 2K, 2P, and adjustable with special tools
- Requirements additionally fulfilled: 2N, 2F, 2D

#### 6.3.1 Safe operating status of STB

The safe status is when the alarm relay output between terminals 14 and 16 is switched off (quiescent current principle).

This status is maintained until manual unlocking in the valid range of the JUMO safetyM STB/STW Ex.

The transparent, sealable protective cover prevents unauthorized operation.

The  (RESET) key can be accessed for manual unlocking with the aid of a tool.

### 6.4 Relevant standards

Failure of the devices could affect the safety of persons and/or the safety of the environment.

Certification according to DIN EN 61508 is provided because of the worldwide use of these systems.

The JUMO safetyM STB/STW Ex temperature monitoring unit with the extra code "059" meets the requirements

- For the safety function up to SIL 3 according to DIN EN 61508 Part 1 to 7:  
Functional safety of electrical/electronic/programmable electronic safety-related systems
- DIN EN 61511 Part 1 to 3:  
Functional safety - Safety instrumented systems for the process industry sector
- DIN EN 14597  
Temperature control devices and temperature limiters for heat generating systems

- DIN EN 60730-2-9:  
Automatic electrical controls for household and similar use - Part 2-9: Particular requirements for temperature sensing controls
- EN 61326
- DIN EN ISO 13849-1 PLe
- According to the Pressure Equipment Directive

## 6.5 Validity of the safety manual



The evaluation described in this Safety Manual in terms of functional safety and display of certificates applies to the specified versions of temperature monitoring units including probe versions.

Specifications that do not take the sensor technology into consideration are identified as such.

## 6.6 Sensor connection possibilities (SIL)

The JUMO safetyM STB/STW Ex evaluation unit is always structured in the same way. Various possibilities are available for sensor connection. These possibilities are listed in the following table along with the achievable SIL level:

Variant	Connected sensors	Architecture		Achievable SIL			
		Sensor technology	Logic				
1	1x Pt100 in two-wire circuit Single sensor	1oo1	1oo2D	2			
1a	2x Pt100/1000 two-wire circuit	1oo2	1oo2D	3			
2	2x Pt100/1000 three-wire circuit	1oo2	1oo2D	3			
3	2x thermocouple	1oo2	1oo2D	3			
4	1x Pt100/1000 Two-wire and three-wire circuit 1x thermocouple	1oo2	1oo2D	3			
5	STB/STW 70.1150 without sensor technology 1oo2D architecture:  No probe or use of 4 to 20 mA (means that the sensor is not taken into account for the calculation).	Sensors connected by the plant operator: architecture 1oo1 or 1oo2 according to connection	1oo2D	SIL (architecture) of the sensor used (HW only)	Systematic suitability (SC) of the sensor used	Max. achievable SIL of the system with 1oo1 sensor technology architecture	Max. achievable SIL of the system with 1oo2 sensor technology architecture
				1	1	1	1
				1	2	1	2
				2	2	2	2
				2	3	2	3
				3	3	3	3

**Note:**

Variants 1 to 4 were evaluated with JUMO probes according to data sheets 901006 and 902006. For variant 5 no sensor technology was included (only the JUMO safetyM STB/STW Ex). In this case, the plant operator selects the sensor technology. For this reason, the plant operator is responsible for evaluating the achieved SIL.

If the used SIL-capable sensor consists of hardware and software (e.g. transmitter), the maximum SIL that can be achieved – irrespective of the architecture – is the one according to which the sensor software was developed (so, for example, if the sensor software has SIL 2, the max. achievable SIL is 2).

The possibility to connect passive sensors such as double thermocouples or Pt100/1000 sensors means that the sensors do not necessarily require a SIL qualification. In this case, the specification of the failure rates for the passive sensors is sufficient for the SIL qualification of the overall system. The plant operator must always determine the  $PFD_{avg}$  and/or PFH value of the overall safety chain to determine the achieved SIL.

The requirements regarding proof-check interval and lifetime apply only in terms of functional safety.

The requirements as specified by DIN EN 14597 are defined in this operating manual B701155.0 and are independent of the requirements of this safety manual.

**Temperature probe**

The admissible measuring ranges must be observed for devices with approval according to DIN EN 14597 and SIL certification. If other temperature probes than those described by JUMO data sheets 90.1006 and 90.2006 are used, their recording and suitability for use must be verified.

**Isolated thermo points on double thermocouples**

For safety reasons, when connecting double thermocouples the measuring circuits must be isolated. That means that the thermo-wires have no connection to the protection fitting, and in the case of double thermocouples also that there is no electrical connection between the two measuring circuits (isolated assembly).

## 6.7 Standards and definitions

**Table 1: Terms and abbreviations according to DIN EN 14597**

Abbreviation	Explanation
Type 2	Mode of operation for which the manufacturing variation and migration of the operating value, operating duration, or operating procedure has been checked.
Type B	Micro disconnection in operation, corresponding contact disconnection at at least one pole to provide functional reliability.
Type D	A free trip mechanism that also cannot be closed temporarily for as long as the error persists.
Type F (STB)	A mode of operation in which, after the RS has been installed, it can only be reset with the aid of a tool.
Type J (STB)	A free trip mechanism with contacts that cannot be prevented from opening and which may not function as an automatically resetting RS if the means of resetting is held in the "Reset" or "On" position.
Type K	A probe mode of operation in which a probe break or a disconnection between the probe head and the switching head does not cause the operating value to increase.
Type N	A mode of operation in which the operating value does not increase as a result of a leak in the probe or in the parts that connect the probe and switching head. This mode is intended for use with electrical error models.
Type V (STB)	A lockout that can only be reactivated through a manual reset.
Type P	A mode of operation that is effective following a specified test through a change in temperature, as specified in 17.101 of DIN EN 60730-2-9.

**Table 2: Terms and abbreviations according to DIN EN 61508 and DIN EN 61511**

<b>Name</b>	<b>Description</b>
Actuator	Part of a safety-related system that intervenes in the process to achieve a safe state.
EUC	EUC (equipment under control) Equipment, machine, apparatus, or system used for manufacturing, shaping materials, for transport, medical purposes, or other activities.
E/E/PE	Electrical/electronic/programmable electronic (E/E/PE): based on electrical (E) and/or electronic (E) and/or programmable electronic (PE) technology
Failure	End of the ability of a functional unit to perform a required function.
Diagnostic coverage	Partial reduction in the probability of critical hardware failures due to the use of automatic diagnostic tests.
Error	A non-normal condition that can cause a reduction or the loss of the ability of a functional unit to perform a required function.
Functional safety	A part of overall safety related to the EUC and EUC control system that depends on the correct function of the E/E/PE safety-relevant system, safety-relevant systems of other technology, and external equipment for risk reduction.
Functional unit	Unit consisting of hardware or software or both that is suitable for performing a specified task.
Dangerous failure	A failure with the potential of placing the safety-related system in a dangerous state or a state without functional capability.
Safe failure	A failure without the potential of placing the safety-related system in a dangerous state or state without functional capability.
Hazard	Potential source of damage
Safety	Absence of unjustifiable risks

**Table 2: Terms and abbreviations according to DIN EN 61508 and DIN EN 61511**

Name	Description
Safety function	A function that is performed by an E/E/PE safety-related system, safety-related system based on other technology, or external equipment for reducing risk with the goal of achieving or maintaining a safe state for the EUC taking into consideration a specified dangerous event
Safety integrity	The probability that a safety-related system will perform the required safety function under all specified conditions within a specified period of time according to requirements.
Safety Integrity Level (SIL)	One of four discrete levels for specifying the requirement for safety integrity of the safety functions assigned to the E/E/PE safety-related system. Safety integrity level 4 represents the highest level of safety integrity, while safety integrity level 1 represents the lowest.
Safety-related system	A system that - performs necessary safety functions that are required to reach or maintain a safe state for the EUC and  - is designed by itself or with other E / E / PE safety-related systems, safety-related systems of other technology, or external equipment for risk reduction to achieve the necessary safety integrity for the required safety functions.
Safety instrumented system (SIS)	Safety instrumented system to perform one or more safety-related functions. A SIS consists of sensor(s), logic system, and actuator(s).
Lambda: $\lambda$	Failure rate per hour
Lambda <b>D</b> angerous: $\lambda_D$	Rate of dangerous failures per hour
Lambda <b>D</b> angerous <b>D</b> etect: $\lambda_{DD}$	Rate of detected dangerous failures per hour
Lambda <b>D</b> angerous <b>U</b> ndetect: $\lambda_{DU}$	Rate of undetected dangerous failures per hour
Lambda: $\lambda_S$	Rate of safe failures per hour



**Table 2: Terms and abbreviations according to DIN EN 61508 and DIN EN 61511**

<b>Name</b>	<b>Description</b>
Lambda: $\lambda_{SD}$	Rate of detected safe failures per hour
Lambda: $\lambda_{SU}$	Rate of undetected safe failures per hour
BPCS	Basic process control system
DC	<b>D</b> iagnostics <b>C</b> overage
FIT	Failures In Time ( $1 \times 10^{-9}$ per h)
HFT	<b>H</b> ardware <b>F</b> ault <b>T</b> olerance
PFD	Probability of Failure on Demand
PFD <sub>avg</sub>	Average Probability of Failure on Demand
MooN	Architecture with M from N channels
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
MRT	Mean Repair Time
SFF	<b>S</b> afe <b>F</b> ailure <b>F</b> raction
SIL	Safety Integrity Level

## 6.8 Safety instrumented parameters related to the temperature monitoring unit

The following parameters were calculated by means of a component FMEDA under the following conditions:

- Error models corresponding to requirements of DIN EN 61508 for conformity with SIL2 or SIL3
- Failure rate of components according to the RDF 2000 UTE C 80-810 standard and SN 29500
- Sensor technology was combined as a subsystem in the following 6 variants:

### 6.8.1 Failure rates and SFF for type 701155/X-XX-025X-XXXX-23... (AC 230 V)

Table 3:

Variant	$\lambda_s$ [FIT]	$\lambda_{dd}$ [FIT]	$\lambda_{du}$ [FIT]	SFF	PFH (1/h)	PFD <sub>avg</sub>
1	985.14	306.75	32.93	96 %	5.18 e <sup>-9</sup>	2.29 e <sup>-4</sup>
1a	985.14	306.75	32.93	96 %	1.66 e <sup>-9</sup>	7.29 e <sup>-5</sup>
2	988.1	303.79	32.93	96 %	1.66 e <sup>-9</sup>	7.29 e <sup>-5</sup>
3	1001.55	324.85	36.68	96 %	1.71 e <sup>-9</sup>	7.46 e <sup>-5</sup>
4	1007.61	341.89	38.58	96 %	1.73 e <sup>-9</sup>	7.55 e <sup>-5</sup>
5	1000.95	318.38	31.75	96 %	1.54 e <sup>-9</sup>	6.74 e <sup>-5</sup>

**Note:**

Variants 1 to 4 were evaluated with JUMO probes according to data sheets 901006 and 902006. For variant 5 no sensor technology was included (only the JUMO safetyM STB/STW Ex). In this case, the plant operator selects the sensor technology.

## 6.8.2 Failure rates and SFF for type 701155/X-XX-025X-XXXX-25 (AC/DC 24 V)

Table 4:

Variant	$\lambda_s$ [FIT]	$\lambda_{dd}$ [FIT]	$\lambda_{du}$ [FIT]	SFF	PFH (1/h)	PFD <sub>avg</sub>
1	919.23	306.82	34.24	96 %	$7.22 \cdot 10^{-9}$	$3.19 \cdot 10^{-4}$
1a	919.23	306.82	34.24	96 %	$3.71 \cdot 10^{-9}$	$1.63 \cdot 10^{-4}$
2	886.19	303.86	34.24	96 %	$3.71 \cdot 10^{-9}$	$1.63 \cdot 10^{-4}$
3	947.18	325.86	37.89	96 %	$3.75 \cdot 10^{-9}$	$1.64 \cdot 10^{-4}$
4	953.24	350.21	40.59	96 %	$3.85 \cdot 10^{-9}$	$1.69 \cdot 10^{-4}$
5	938.89	323.57	36.89	96 %	$3.68 \cdot 10^{-9}$	$1.61 \cdot 10^{-4}$

### Note:

Variants 1 to 4 were evaluated with JUMO probes according to data sheets 901006 and 902006.

For variant 5 no sensor technology was included (only the JUMO safetyM STB/STW Ex).

In this case, the plant operator selects the sensor technology.

The PFH and PFD<sub>avg</sub> values were calculated with the assumption that the time to restore the system is 8 h (MTTR = 72 h). Furthermore, the calculation was based on a lifetime of 10 years ( $T_1 = 10 \text{ y}$ ). The Common Cause Factor was determined according to the tables of DIN EN 61508 for sensor technology and logic.

## 6.9 Determining the safety integrity level (SIL)

The achievable safety integrity level is determined by the following safety-related parameters:

- Average probability of dangerous failures of a safety function on demand ( $PFD_{avg}$ ),
- Hardware fault tolerance (HFT) and
- Safe failure fraction (SFF).

The specific safety-related parameters for the measuring system of the JUMO safetyM STB/STW Ex can be found in the table in the "Safety-related parameters" chapter.

The following table shows how the "safety integrity level" (SIL) depends on the "average probability of dangerous failures of a safety function of the entire safety-related system" ( $PFD_{avg}$ ) according to DIN EN 61508. The "low demand mode" is considered here, i.e. the demand rate for the safety-related system averages once a year.

Table: High Demand Table for PFH

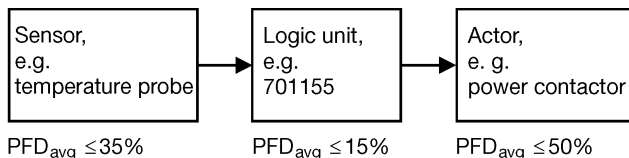
**Table 5: High Demand Table for PFH**

Safety Integrity Level (SIL)	Operating mode with high demand rate PFH (high demand mode)
4	$\geq 10^{-9}$ to $< 10^{-8}$
3	$\geq 10^{-8}$ to $< 10^{-7}$
2	$\geq 10^{-7}$ to $< 10^{-6}$
1	$\geq 10^{-6}$ to $< 10^{-5}$

**Table 6: Low Demand Table PFD**

Safety Integrity Level (SIL)	Operating mode with low demand rate $PFD_{avg}$ (low demand mode)
4	$\geq 10^{-5}$ to $< 10^{-4}$
3	$\geq 10^{-4}$ to $< 10^{-3}$
2	$\geq 10^{-3}$ to $< 10^{-2}$
1	$\geq 10^{-2}$ to $< 10^{-1}$

The sensor, logic unit, and actuator together form a safety-related system that performs a safety function. The "average probability of dangerous failures of the entire safety-related system" ( $PFD_{avg}$ ) is usually divided up into the sensor, logic unit, and actuator subsystems according to the following diagram.

**Figure 1:**

Typical subdivision of the "average probability of dangerous failures of a safety function on demand" ( $PFD_{avg}$ ) into subsystems

The specifications related to functional safety in this safety manual include sensor technology (resistance temperature probe, thermocouples), logic unit (701155) and, as a signal contact, the relay output in the JUMO safetyM STB/STW Ex system.

The actuator (for example a power contactor) is plant-related and must be taken into consideration separately according to the standard for the safety loop.

### 6.9.1 Safety integrity of the hardware

According to DIN EN 61508, a distinction must be made between systems of type A and systems of type B.

A subsystem can be considered to be type A if, for the components required to achieve the safety function,

- the failure behavior of all components used is sufficiently defined; and
- the behavior of the subsystem can be fully determined under error conditions; and
- reliable failure data from experience in the field exists for the subsystem to show that the assumed failure rates for detected and undetected dangerous failures are achieved.

A subsystem can be considered to be type B if, for the components required to achieve the safety function,

- the failure behavior of at least one of the components used is not sufficiently defined, or
- the behavior of the subsystem cannot be fully determined under error conditions, or
- no sufficiently reliable failure data from experience in the field exists for the subsystem to support the utilized failure rates for detected and undetected dangerous failures.

The JUMO safetyM STB/STW Ex corresponds to a type B system.

The following table shows the achievable safety integrity level (SIL) depending on the safe failure fraction (SFF) and the hardware fault tolerance (HFT) for safety-related type B subsystems.

**Table 7: For the JUMO safetyM STB/STW Ex**

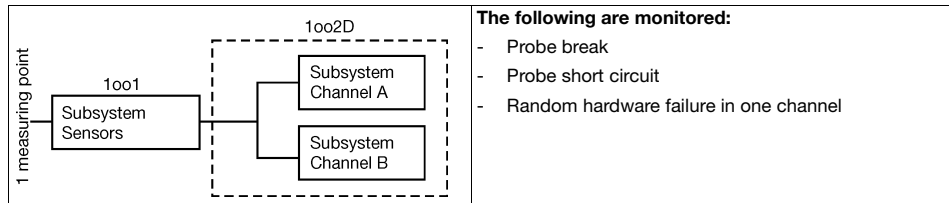
Safe failure fraction (SFF)	Hardware fault tolerance (HFT) for type B		
	0	1	2
<60 %	Not allowed	SIL 1	SIL 2
60 to <90 %	SIL 1	SIL 2	SIL 3
90 to <99 %	SIL 2	SIL 3	SIL 4
≥99 %	SIL 3	SIL 4	SIL 4

## 6.9.2 Safety-relevant system properties

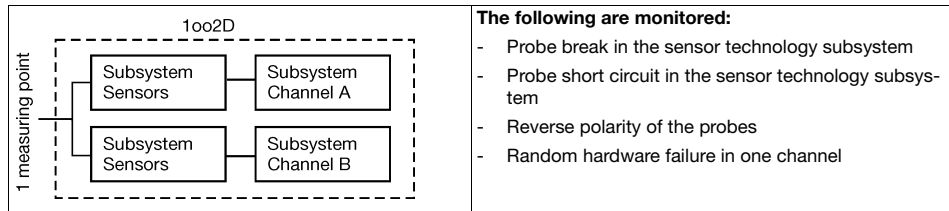
Device versions differ in the following architectures:

The evaluation unit from the JUMO safetyM STB/STW Ex in the STW and STB versions is implemented as 1oo2D architecture.

**Figure 2: The types with a single sensor are executed using one-channel sensor technology (1oo1)**



**Figure 3: The variants with two sensors are consistently structured with two channels.**



The systems have a lifetime of ten years.

The proof check for SIL 2 and SIL 3 certified systems is also ten years.

If the temperature is above/below the admissible limits, the system must switch to the safe state without delay. Premature switching is admissible if a malfunction is detected.

Table 8:

Safety feature	Requirement / comment	
SIL The sensor technology is included in the SIL evaluation	SIL2	SIL3
Operating mode concerning safety function	Operating mode with low and high demand rate possible on a customer-specific basis	
Safety-critical inputs	Temperature sensor inputs 4 to 20 mA current loop	
Safety-relevant inputs	Setup and parameterization	
Safety-critical output	Alarm contact limit value	
Subsystem type	Type B	
Safety architecture (JUMO safetyM STB/STW Ex logic unit)	1oo2D	
Safety architecture (sensor technology)	SIL2 1oo1	SIL3 1oo2
Hardware fault tolerance (JUMO safetyM STB/STW Ex logic unit)	HFT=1	
Hardware fault tolerance (sensor technology)	SIL2: HFT=0	SIL3: HFT=1
Safe failure fraction	SIL2 sensor technology HFT=0: 90 % to <99 %	SIL3 sensor technology HFT=1: 90 % to <99 %
CCF	Calculation according to DIN EN 61508 Part 7 Appendix D and/or DIN EN ISO 13849-1 Table F.1 min. 65 %	



**Table 8:**

Safety feature	Requirement / comment	
Average failure probability of a safety function on demand (overall system)	SIL 2: Low demand: $PFD_{avg} < 10^{-2}$ High demand: $PFH < 10^{-6}$	SIL3: Low demand: $PFD_{avg} < 10^{-3}$ High demand: $PFH < 10^{-7}$
Interval for repeat test	No repeat test	
Planned operating duration	10 years	
Architecture according to DIN EN ISO 13849-1	Sensor technology, one-channel: cat. 2	Sensor technology, two-channel: cat. 3
MTTF <sub>d</sub> -DC <sub>avg</sub> according to DIN EN ISO 13849-1 table K.1	PL d: $\geq 62$ years $DC_{avg} \geq 60\%$	PL e: $\geq 62$ years $DC_{avg} \geq 90\%$
Modes of operation and software class according to DIN EN 14597	The JUMO safetyM STB/STW Ex possesses the following modes of operation: 2B, 2D, 2F, 2K, 2J, 2V, 2N, 2P software class C	

## 6.10 Determining the achieved performance level PL

The following safety-related parameters are required to determine the Performance Level of components/devices:

As further parameters to be observed, operational aspects such as the demand rate and/or the test rate of the safety function can also influence the resulting PL.

Excerpt from DIN EN ISO 13849-1



This excerpt contains references to the complete DIN EN ISO 13849-1 body of standards, which are therefore not reproduced in this chapter.

**Table 9: Terms and abbreviations according to DIN EN ISO 13849**

Formula symbol or abbreviation	Description	Definition or location
PL (a, b, c, d, e)	Designation for the Performance Level	Table 3
AOPD	Active Opto-Electronic Protective Device (e.g. light barrier)	Annex H
B, 1, 2, 3, 4	Designation for the categories	Table 7
B <sub>10d</sub>	Number of cycles in which a dangerous failure occurred in 10 % of a random sample of the observed pneumatic or electromechanical components that are subject to wear (mean time to dangerous failure)	Annex C
Cat.	Category	3.1.2
CC	Current Converter	Annex I
CCF	<b>C</b> ommon <b>C</b> ause <b>F</b> ailure	3.1.6
DC	<b>D</b> iagnostic <b>C</b> overage	3.1.26
DC <sub>avg</sub>	Average diagnostic coverage	E.2
F, F1, F2	Frequency and/or duration of the exposure to danger	A.2.2
FB	Function block	4.6.3
FVL	Programming language with unlimited language range	3.1.35
FMEA	Failure Modes and Effects Analysis	7.2
I, I1, I2	Input device, e.g. sensor	6.2
i, j	Index for counting	Appendix D
I/O	Inputs/outputs	Table E.1
<i>i</i> <sub>ab</sub> , <i>i</i> <sub>bc</sub>	Fasteners	Image 4

**Table 9: Terms and abbreviations according to DIN EN ISO 13849**

Formula symbol or abbreviation	Description	Definition or location
K1A, K1B	Contactors	Annex I
L, L1, L2	Logic	6.2
LVL	Programming language with limited language range	3.1.34
M	Motor	Annex I
MTTF	Mean Time To Failure	Annex C
MTTF <sub>c</sub>	Mean Time to Critical Failure	3.1.25
MTTF <sub>d</sub>	Mean Time to Dangerous Failure	
$n, N, \bar{N}$	Number of units	6.3, D.1
$N_{low}$	Number of SRP/CS with $PL_{low}$ in an SRP/CS combination	6.3
O, O1, O2, OTE	Output device, e.g. drive unit	6.2
P, P1, P2	Possibility of avoiding the danger	A.2.3
PES	Programmable Electronic System	3.1.22
PL	Performance Level	3.1.23
PLC	Programmable Logic Controller	Annex I
$PL_{low}$	Lowest performance level of an SRP/CS in an SRP/CS combination	6.3
$PL_r$	Required Performance Level	3.1.24
$r_a$	Demand rate	3.1.30
RS	Rotary encoder	Annex I
S, S1, S2	Severity of violation	A.2.1

**Table 9: Terms and abbreviations according to DIN EN ISO 13849**

Formula symbol or abbreviation	Description	Definition or location
SW1A, SW1B, SW1	Position switch	Annex I
SIL	Safety Integrity Level	Table 4
SK (cat.)	Category (B, 1, 2, 3, 4), structure as basis to achieve a certain PL	
SRASW	Safety-Related Application Software	4.6.3
SRESW	Safety-Related Embedded Software	4.6.2
SRP	Safety-Related Part	General
SRP/CS	<b>Safety-Related Part</b> of (a) <b>Control System(s)</b>	3.1.1
Sub-PL/Sub-SIL	PL or SIL at subsystem level. A subsystem is a system that – based on a subtask – already adequately performs a safety function (for example, an input module that reliably records the inputs).	
TE	Test facilities	6.2
$T_M$	Functional life	3.1.28
$T_M$	<b>Mission Time</b> (functional life, designated period of utilization)	
$T_{10d}$ value	Reference value for a preventative replacement (10 % of the B10d value). At this value, a dangerous failure has already occurred for approx. 63 % of all components. In this case, the standard DIN EN ISO 13849-1:2006 recommends replacement.	

### 6.11 Sensor connection possibilities (PL)

The JUMO safetyM STB/STW Ex evaluation unit is always structured in the same way. Various possibilities are available for sensor connection. These possibilities are listed in the following table along with the achievable PL level:

**Table 10: Achievable PL**

Variant	Connected sensors	Sensor technology architecture	Logic architecture	Achievable PL		
1	1x Pt100 two-wire circuit	1oo1	1oo2D	PLd		
1a	2x Pt100/1000 two-wire circuit	1oo2	1oo2D	PLe		
2	2x Pt100/1000 three-wire circuit	1oo2	1oo2D	PLe		
3	2x thermocouple	1oo2	1oo2D	PLe		
4	1x Pt100/1000 two-wire and three-wire circuit 1x thermocouple	1oo2	1oo2D	PLe		
5	STB/STW 701155 without sensor technology 1oo2D architecture No probe or use of 4 to 20 mA (means that the sensor is not taken into account for the calculation).	Sensors connected by the plant operator; architecture 1oo1 or 1oo2 according to connection	1oo2D	PL of the sensor used MTTF <sub>d</sub> = 100 years	Max. achievable PL of the system with 1oo1 sensor technology architecture DC <sub>701155</sub> ≥ 90 %	Max. achievable PL of the system with 1oo2 sensor technology architecture DC <sub>701155</sub> ≥ 90 %
				PLb	PLd	PLe
				PLc	PLd	PLe
				PLd	PLd	PLe
				PLe	PLe	PLe

**Note:**

Variants 1 to 4 were evaluated with JUMO probes according to data sheets 901006 and 902006. For variant 5 no sensor technology was included (only the JUMO safetyM STB/STW Ex). In this case, the plant operator selects the sensor technology. For this reason, the plant operator is responsible for evaluating the achieved PL.

### 6.11.1 Calculations DIN EN ISO 13849-1 Performance Level – low voltage 230 V

Table 11:

Variant	MTTF <sub>d</sub>	DC <sub>avg</sub>	CCF	PL
1	100 years <sup>3</sup> (336 years)	90 %	80	PLd
1a	100 years <sup>3</sup> (336 years)	90 %	80	PLe
2	100 years <sup>3</sup> (339 years)	90 %	80	PLe
3	100 years <sup>3</sup> (316 years)	90 %	80	PLe
4	100 years <sup>3</sup> (312 years)	90 %	80	PLe
5	100 years <sup>3</sup> (326 years)	91 %	80	See above table

### 6.11.2 Calculations DIN EN ISO 13849-1 Performance Level – extra low voltage (ELV) 24 V

Table 12:

Variant	MTTF <sub>d</sub>	DC <sub>avg</sub>	CCF	PL
1	100 years <sup>3</sup> (335 years)	90 %	80	PLd
1a	100 years <sup>3</sup> (335 years)	90 %	80	PLe
2	100 years <sup>3</sup> (338 years)	90 %	80	PLe
3	100 years <sup>3</sup> (314 years)	90 %	80	PLe
4	100 years <sup>3</sup> (304 years)	90 %	80	PLe
5	100 years <sup>3</sup> (317 years)	90 %	80	See above table

3. The MTTF<sub>d</sub> value of a subsystem must be limited to 100 years according to the DIN EN ISO 13849-1 requirements.

### 6.11.3 Contribution to risk reduction by the control system

The objective of compliance with the overall design process for the machine is to achieve the safety objectives (see 4.1 in DIN EN 13849-1). The design of the SRP/CS to provide the required risk reduction is an integral part of the overall design process for the machine. The SRP/CS provides the safety function(s) with a PL that achieves the required risk reduction. Through the provision of safety functions, either as an inherently safe part of the construction or as the control of a protective guard or protective device, the design of the SRP/CS is part of the risk reduction strategy. This is an iterative process and is depicted in images 1 and 3 in DIN EN 13849-1.

The features of each safety function (see section 5 in DIN EN 13849-1) and the required Performance Level must be described and documented in the specification of the safety requirements.

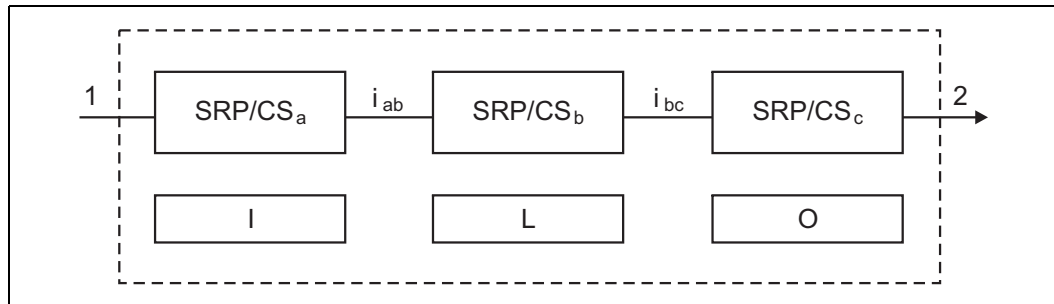
In this part of DIN EN ISO 13849, the Performance Levels are defined in the form of the probability of a dangerous failure per hour. Five Performance Levels (a to e) are specified with defined ranges for the probability of a dangerous failure per hour (see table).

**Table 13:**

Performance Level (PL)	Average probability of a dangerous failure per hour 1/h
a	$\geq 10^{-5}$ to $< 10^{-4}$
b	$\geq 3 \times 10^{-6}$ to $< 10^{-5}$
c	$\geq 10^{-6}$ to $< 3 \times 10^{-6}$
d	$\geq 10^{-7}$ to $< 10^{-6}$
e	$\geq 10^{-8}$ to $< 10^{-7}$
NOTE: in addition to the average probability of a dangerous failure per hour, further measures are required to achieve the PL.	

Schematic representation of a combination of safety related parts of control systems for processing a typical safety function

Figure 4:



I Input

L Logic

O Output

1 Start event, e.g. manual actuation of a key, opening of a protective guard, interruption of the beam of an AOPD

2 Drive unit of the machine, e.g. motor brake



## 6.12 Performance Level

For application in this part of DIN EN ISO 13849, the capability of safety-related parts to perform a safety function is expressed through the determination of a Performance Level.

The PL must be assessed for each selected SRP/CS and/or SRP/CS combination that performs a safety function. The PL of the SRP/CS must be determined by assessing the following aspects:

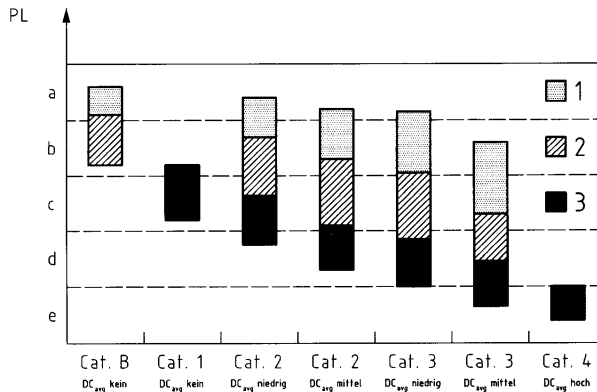
- The  $MTTF_c$  value of individual components (see Appendices C and D)
- The DC (see Appendix E)
- The CCF (see Appendix F)
- The structure (see section 6)
- The behavior of the safety function under failure conditions (see section 6)
- Safety-related software (see 4.6 and Appendix J)
- Systematic failures (see Appendix G)
- The capability to perform a safety function under predictable environmental influences

## 6.13 Correlation between the Performance Level (PL) and Safety Integrity Level (SIL)

PL	SIL (IEC 61508-1, for information) – high/continuous operating mode
a	No equivalent
b	1
c	1
d	2
e	3

The following table depicts the procedure for selecting the categories in combination with  $MTTF_d$  for each channel and the  $DC_{avg}$ , in order to achieve the required PL for each safety function.

**Table 14: Relationship between the categories  $DC_{avg}$ ,  $MTTF_d$  of each channel, and PL**



PL Performance Level

1  $MTTF_d$  of each channel = low

2  $MTTF_d$  of each channel = medium

3  $MTTF_d$  of each channel = high

The figure above shows the different possible combinations for assessing the category with  $DC_{avg}$  (horizontal axis) and the  $MTTF_d$  of each channel (bars). The bars in the diagram show the three  $MTTF_d$  areas of each channel (low, medium and high) that can be selected to achieve the required PL.

Before the simplified procedure from the diagram shown is applied (which shows the results of different Markov models on the basis of intended architectures from section 6), the category of the SRP/CS and the  $DC_{avg}$  and the  $MTTF_d$  of each channel must have been determined (see section 6 and Appendices C to E).

For categories 2, 3, and 4, sufficient measures against failures due to combined failures must be fulfilled (see Appendix F). Taking these parameters into account, the figure presents a graphical procedure for determining the PL achieved by the SRP/CS. The combination of category (including failures due to combined failures) and  $DC_{avg}$  determines which column must be selected in image 5. In accordance with the  $MTTF_d$  of each channel, one of the three differently hatched areas of the applicable column must be selected.

The vertical position of these areas determines the achieved PL, which can be read off the vertical axis. If the area covers two or three possible PLs, the achieved PL is specified in table 7. To select the exact PL on the basis of the precise value of the  $MTTF_d$  of each channel, see Appendix K.

## 6.14 Other applicable device documentation

For the JUMO safetyM STB/STW Ex, the measures, values, and requirements specified in this operating manual regarding mounting, electrical connection, function, and startup must be observed.

## 6.15 Behavior during operation and in case of malfunction

Behavior during operation and in case of malfunction is described in the operating manual.

A functional test must be performed after startup, repair in the safety system, or a change in safety-related parameters. If an error is detected during a functional test, measures must be taken to once again ensure the functional capability of the safety system. This, for example, can be done by replacing the logic unit. Appropriate documentation of the tests performed is recommended.

## 6.16 Regular tests

No test is required for SIL 2 and SIL 3 certified systems since the proof check equals the lifetime.

Each is ten years.



After the lifetime expires, the systems no longer meet the requirements according to their SIL certification.

### 6.16.1 Recommended tests for temperature probes

To ensure safe and reliable operation of the thermometers, the following service and maintenance work must be performed: The following tests are recommended at certain intervals:

- Every 12 months, the insulation resistance of the measuring circuit must be measured against the protection fitting (for thermocouples: only for the insulated measuring circuit; in the case of multiple measuring circuits, the insulation test must also be performed between the individual measuring circuits). The minimal insulation resistance at room temperature should be 100 MΩ at 100 V.
- Damage and corrosion of thermometers – protection tubes
- Corrosion and correct positioning of the contacts and terminals of cable connections
- Seals of terminal heads and cable entries
- Interruptions due to "knocking" on the thermometer/measuring insert

Since the maximum operating temperature influences the drift behavior, the thermometer should be recalibrated or replaced at certain intervals to ensure reliable and precise temperature measurement.

The testing intervals are listed in the table below:

**Table 15: Testing intervals**

Maximum operating temperature	Pt – RTD temperature probe	Thermocouples
200 °C	5 years	5 years
550 °C	2 years	5 years

**Table 15: Testing intervals**

700 °C	1 year	2 years
1000 °C		Non-precious metal: 1 year; precious metal: 2 years
1500 °C		1 year



The testing intervals specified here are recommendations that must be adapted to the particular conditions at the operating location and,

if necessary, the user should perform the tests more regularly.

## **6.17 Intrinsic safety according to DIN EN 60079-11**

⇒ Chapter 7 "ATEX ignition protection type "i" "

## **6.18 Ignition source monitoring according to DIN EN 50495 and DIN EN 13463-6**

⇒ Chapter 7 "ATEX ignition protection type "i" "

## 7 ATEX ignition protection type "i"

### 7.1 Intended use

The JUMO safetyM STB/STW Ex is a safety device designed according to Directive 2014/34/EU, chapter 1(1)(b) for measuring temperatures directly using resistance probes or thermocouple probes, or other physical measurands such as pressure, with the aid of a suitable transmitter and the use of a 4-20 mA current input.

The stipulations and requirements for use specified in this document must be taken into consideration. All specifications below with regard to probes or sensor technology relate to the probes listed in Chapter 11.12 to Chapter 11.15. If other probes are used, their suitability must first be tested.



#### **Important information:**

Thermocouples should be evaluated with at least the requirements of EN 60584 or DIN 43710. RTD temperature probes should be evaluated with at least the requirements of EN 60751. Parameter values such as response rate, temperature stability, age drift, self-heating behavior, failure rates, fault models, etc. should likewise be taken into account.

The JUMO safetyM STB/STW Ex is associated apparatus that may only be used outside the Ex-zone.

Another use or one that goes beyond the specified use - with respect to use in potentially explosive areas - is considered as not being in accordance with the intended use.

Liability for resulting damages cannot be assumed.

The JUMO safetyM STB/STW Ex is built according to the relevant standards and directives as well as to the applicable safety regulations. Nevertheless, improper use may lead to personal injury or material damage.

To avoid danger, the JUMO safetyM STB/STW Ex may only be used:

- For the intended use
- When in good order and condition
- Under consideration of this operating manual

**DANGER!**

The Ex approval becomes null and void in the event of incorrect use of the JUMO safetyM STB/STW Ex or non-compliance with the safety requirements of this operating manual.

### 7.1.1 Installation regulations

If electrical apparatus is used in plants and ambient conditions with the "intrinsic safety" ignition protection type, the obligations of the applicable installation regulations according to EN 60079-14 "Explosive atmospheres – Part 14: Electrical installations design, selection and erection" are to be considered along with other applicable requirements.

## 7.2 Identification marking according to ATEX directive 2014/34/EU and EN standards EN 60079-11 "i", EN 50495, and EN 13463-6 "b":

### 7.2.1 For the 1-sensor variant:



II (1) (2) (3) G (b1) [Ex ia Ga] [e pz] IIC

II (1) (2) (3) D (b1) [Ex ia Da] [p Dc] IIIC


### 7.2.2 For the 2-sensor variant:



II (1) (1) (2) G (b2) [Ex ia Ga] [e py] IIC

II (1) (1) (2) D (b2) [Ex ia Da] [p Db] IIIC

Figure 5: Explanation of the imprinted characters:


1-sensor variant:	Type: 701155f...-044 [Ex J <sup>1</sup> ]
	II (1) (2) (3) G; (b) I; Ex ia GaI; le pzI; IIC II (1) (2) (3) D; (b) I; Ex ia DaI; Ip DaI; IIC
Standard designation according to EN 60079-0 Explosion group II C gases, low ignition energy such as hydrogen IIC C conductive dusts	
Standard designation according to EN 50495 <sup>1)</sup> e-: temperature monitoring unit with SIL 2 and HFT from 0 for category 2 based on ignition protection type "e" increased safety according to EN 60079-7	
pz: minimum overpressure monitoring for static overpressure encapsulation with SIL 2 and HFT from 0 for category 3 based on the ignition protection type "p" overpressure encapsulation according to EN 60079-2	
pDc: minimum overpressure monitoring for static overpressure encapsulation with SIL 2 and HFT from 0 for category 3 based on the ignition protection type "pD" according to EN 61241-4 equivalent to "pz" according to EN 60079-2)	
Standard designation according to standard series EN 60079 for electrical devices ia: related equipment according to ignition protection "I" intrinsically safe according to EN 60079-11, "ia" (2-false) for category 1 "EPL" (Equipment Protection Level) Ga (gases) for category 1 Da (dust) for category 1	
Standard designation according to standard series EN 13463 for non-electrical devices b1*: ignition source monitoring according to EN 13463-6 with IPL 1 (ignition Prevention Level) for category 2	
<b>Standard designation</b>	
Category according to ATEX directive 94/9/EG G: gas explosion protection; D: dust explosion protection	
Safety device according to EN 50495 for category 3 applications for ignition protection type static overpressure encapsulation type "pz" according to EN 60079-2	
Safety devices according to EN 50495 for category 2 applications for ignition protection type increased safety "e" nach EN 60079-7	
Safety device according to EN 13463-6 for category 2 applications for ignition protection: ignition source monitoring of non-electrical ignition dangers "b1" according to EN 13463-6	
Related equipment for intrinsic safety according to EN 60079-11 for category 1 Applications for ignition protection type intrinsic safety "ia"	
Guidelines designation for device group II (non-fired/amp endangered mine workings)	
<b>Designation explosionproof according to ATEX directive 94/9/EG</b>	

<sup>1)</sup> The monitored electrical equipment is not a potential ignition source in standard operation



## 2-sensor variant:

Type: 701155/...-044 [Ex J<sup>1</sup>]

	II (1) (1) (2) G; (b2) [Ex Ia Ga] [e py] IIC III (1) (1) (2) D; (b2) [Ex Ia Da] [p Db] IIIC
	Standard designation according to EN 60079-0 Explosion group II C gases, low ignition energy such as hydrogen III C conductive dusts
	Standard designation according to EN 60486 <sup>1)</sup> e: temperature monitoring unit with SIL 2 and HFT from 0 for category 2 based on ignition protection type "e" increased safety according to EN 60079-7 py: minimum overpressure monitoring for static overpressure encapsulation with SIL 2 and HFT from 1 for category 2 based on the ignition protection type "p" overpressure encapsulation according to EN 60079-2 p Db: minimum overpressure monitoring for static overpressure encapsulation with SIL 2 and HFT from 0 for category 2 based on the ignition protection type "pD" according to EN 61241-4 (equivalent to "py" according to EN 60079-2)
	Standard designation according to standard series EN 60079 for electrical devices Ia: related equipment according to ignition protection "r" intrinsically safe according to EN 60079-11, "a" (2-false) for category 1 "EPL" (Equipment Protection Level) Ga (gases) for category 1 Da (dusts) for category 1 Standard designation according to standard series EN 13463 for non-electrical devices "b2" ignition source monitoring according EN 13463-6 with IPL 2 (ignition Prevention Level) for category 1
	<b>Standard designation</b> Category according to ATEX directive 94/9/EC G: gas explosion protection; D: dust explosion protection
	Safety device according to EN 50495 for category 2 applications for ignition protection type static overpressure encapsulation type "py" according to EN 60079-2 Safety devices according to EN 50495 for category 1 applications for ignition protection type increased safety "e" nach EN 60079-7 Safety device according to EN 13463-6 for category 1 applications for ignition protection: ignition source monitoring of non-electrical ignition dangers "b2" according to EN 13463-6
	Related equipment for intrinsic safety according to EN 60079-11 for category 1 Applications for ignition protection type intrinsic safety "ia"
	Guidelines designation for device group II (non-friedamp endangered mine workings)

### Designation explosionproof according to ATEX directive 94/9/EC

<sup>1)</sup> The monitored electrical equipment is not a potential ignition source in standard operation

### 7.3 Meaning of the X character in the type examination certificate

The particular conditions for which the X follows the test report numbers are as follows:

- Switching operations may be performed on the intrinsically safe electrical circuits only when the JUMO safety**M** STB/STW Ex, including all supply lines, is de-energized.
  - Voltage may only be applied to the JUMO safety**M** STB/STW Ex, including all its supply lines, if the cover cap of the intrinsically safe electrical circuits has been fitted correctly
- ⇒ Chapter 4.2 "Removing the cover cap"
- For the JUMO probes in the ATEX test report, based on JUMO data sheet 901006 and 902006, a safe isolation between the sensor and fitting does not exist. As a result, for the safety evaluation, the sensor connections are to be considered grounded according to ATEX. This means that the user must ensure that, when connecting the intrinsically safe electrical circuit through integration in the local potential (e.g. potential equalization or FB), the intrinsic safety of the JUMO safety**M** STB/STW Ex is not reversed.
  - The probe terminal heads of the probes under consideration do not fulfill the material composition requirements from EN 60079-0 for EPL Ga. Corresponding impact protection must therefore be ensured on site for use in EPL Ga.
- ⇒ Chapter 11.12 "Note about the probes in Chapter 11.13 to Chapter 11.15"
- Only the STB variant (safety temperature limiter) of the JUMO safety**M** STB/STW Ex is admissible as a safety device for monitoring the minimum overpressure in the case of static pressurization.
  - The switch-off limit value must be set depending on the application so that no dangerous state can be adopted even taking into account accuracy, the error tolerance time of the JUMO safety**M** STB/STW Ex, and (if applicable) pressure or temperature over-runs.
  - The safety relevant settings of the JUMO safety**M** STB/STW Ex must be protected against unauthorized changes (e.g. using a seal or password-protected data input).
  - When using the JUMO safety**M** STB/STW Ex in the STW (safety temperature monitor) variant, after the temperature limiter has triggered a shutdown steps must be taken to prevent an automatic restart of the monitored apparatus by a higher-level control system.

- If the JUMO safetyM STB/STW Ex is being used in the single-channel device variant to monitor non-electrical ignition sources and a warning is issued on demand, the user must immediately take the necessary measures to establish a safe status.

## **7.4 Associated, intrinsically safe electrical apparatus according to EN 60079-11**

### **7.4.1 Function of intrinsic safety**

The ignition protection type intrinsic safety "i" makes use of the fact that a certain energy is required in order to ignite a potentially explosive atmosphere. This is dependent upon the composition of the potentially explosive atmosphere.

An electrical circuit is intrinsically safe if it prevents this energy level from being exceeded, thus preventing an ignition either through switching sparks or a thermal effect, under certain test conditions and taking into consideration certain safety margins.

#### **7.4.1.1 Definitions of intrinsic safety**

An intrinsically safe electrical circuit is a circuit in which neither a spark nor a thermal effect occurring under the conditions specified in EN 60079-11, which include uninterrupted operation and defined fault conditions, may cause the ignition of a certain potentially explosive atmosphere.

The energy of the electrical circuit is limited such that it cannot cause an ignition. This applies to both spark formation and thermal effects. The test conditions with specific potentially explosive atmospheres are specified. The tests comprise uninterrupted operation and defined fault conditions.

#### **7.4.1.2 Electrical apparatus:**

Electrical apparatus is the collective term for electrical components and electrical circuits or parts of electrical circuits generally found together within a single housing.

#### **7.4.1.3 Intrinsically safe electrical apparatus:**

Electrical apparatus in which all electrical circuits are intrinsically safe.

#### **7.4.1.4 Associated electrical apparatus:**

Electrical apparatus in which not all electrical circuits are intrinsically safe. However, in terms of the design, the non-intrinsically

safe electrical circuits cannot have an effect on the intrinsically safe electrical circuits.

The associated apparatus is identified through brackets: e.g. II (1) G [Ex ia] II C.

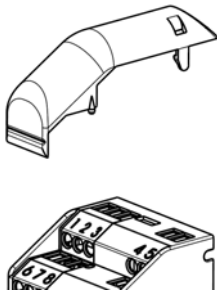
Associated electrical apparatus can be used in potentially explosive areas provided it has the corresponding protection (ignition protection type according to EN 60079-0). In the event of insufficient protection, it must be used outside of the potentially explosive area.

**Example:**

The JUMO safetyM STB/STW Ex is not in the potentially explosive area, however it is connected to a thermocouple located in the potentially explosive area. Only the input circuit of the JUMO safetyM STB/STW Ex is intrinsically safe.

The screw terminals marked in blue and the connected lines are protected with a cover cap.

**Figure 6: Cover cap**



⇒ Chapter 4.2 "Abnehmen der Abdeckkappe"

## 7.4.2 Probe arrangement in the Ex-area

The JUMO safetyM STB/STW Ex has the following maximum output data at the intrinsically safe inputs:

$U_o = 6.0 \text{ V}$ ;  $I_o = 41.2 \text{ mA}$ ;  $P_o = 61.8 \text{ mW}$ ;  $C_o = 36.3 \text{ }\mu\text{F}$ ;  $L_o = 20 \text{ mH}$

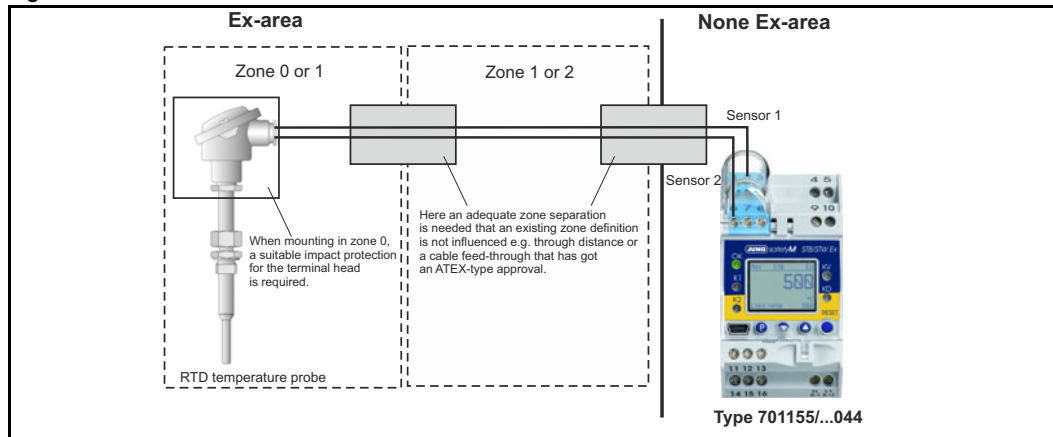
The specified energy values are available as a total amount per device.

The distribution to the inputs is not defined.

Example: Double Pt100 with protection tube constant  $80 \text{ K/W}$ : temperature increase of  $80 \text{ K/W} \times 61.8 \text{ mW} = 4.9 \text{ K}$ .

If a separate temperature increase for dust is specified in the technical data sheet from JUMO, this means that the protection fitting is completely covered in dust.

**Figure 7:**





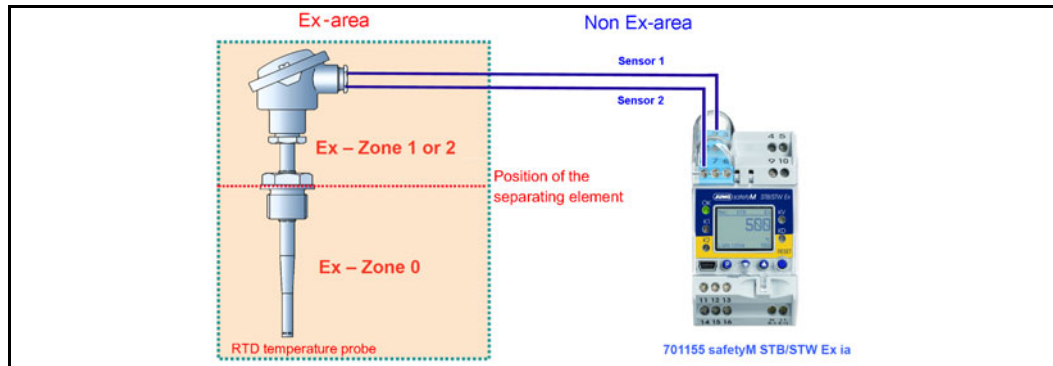
The sensor technology specified in Chapter 11.13, Chapter 11.14 and Chapter 11.15 does not have zone separation.

⇒ Please also see the notes in Chapter 11.12.

The type of zone separation as well as the cable selection must be implemented or selected in such a way that the defined zone classifications and their requirements continue to be in place.

Use of a probe with EPL "Gb" with a separation element (DIN EN 60079-26). The figure shows a probe with active zone separation according to DIN EN 60079-26. Mounting the terminal head in zone 0 is not permitted! However, use in zone 0 is permitted below the separation element. The same requirements as in figure 7 apply for the zone classification.

**Figure 8:**



## 7.4.3 Explanation of probe temperature classes

The listed probes can be used in the temperature classes T1 to T6.

**Table 16: Temperature classes**

Temperature class	Maximum surface temperature of the apparatus <sup>1</sup>	Ignition temperature of the combustible materials
T1	450 °C	> 450 °C
T2	300 °C	> 300 < 450 °C
T3	200 °C	> 200 < 300 °C
T4	135 °C	> 135 < 200 °C
T5	100 °C	> 100 < 135 °C
T6	85 °C	> 85 < 100 °C

### Temperature classes

In EN 60079-0, point 26.5.1.3, type-tested devices of group II (explosive gas atmospheres excluding mines susceptible to fire-damp) require a safety margin for the highest measured surface temperature – 10 K for T1 and T2, and 5 K for T3, T4, T5, and T6.

In RTD temperature probes, a measuring current flows through the sensor element thus heating it up. In the event of a fault in the JUMO safetyM STB/STW Ex, a maximum power of 61.8 mW can also be introduced in the probe through the sensor electrical circuit. This also affects the thermocouple probes.

The maximum temperature rise was calculated through measurements.

The following values represent the worst-case scenario and apply to all probes:

The maximum temperature rise of Pt100 probes is **7.5°K**.

The maximum temperature rise of thermocouple probes is **0.9°K**.

1. Furthermore, the following safety margins must be adhered to:  
Category 1: According to EN 1127-1, point 6.4.2 (hot surfaces), the temperatures of all surfaces of devices...for use in zone 0...which may come into contact with a potentially explosive atmosphere...must not exceed 80 % of the ignition temperature.  
The result is temperature class minus 20 %.

As described above, 10 °C must be subtracted in temperature classes T1 and T2 and 5 °C in temperature classes T3 to T6.

## Example:

A thermocouple is to be used in the temperature class T4 (maximum temperature 135 °C, limit is to be reduced by 5 K for safety);

$T_S$  Maximum admissible temperature at the probe head

$$T_S = 130\text{ °C} - 0.9\text{ °C}$$

$$T_S = 129.1\text{ °C}$$

The maximum temperature (measuring or medium temperature) at the probe head must therefore not exceed a value of 129.1 °C.

The following table provides a summary of the calculations for all temperature classes:

**Table 17:**

	Medium and ambient temperature for applications that require category 2 devices		Medium and ambient temperature for applications that require category 1 devices	
	Sensor with PT100	Sensor with thermocouple	Sensor with PT100	Sensor with thermocouple
T1	439.1 °C	432.5 °C	349.1 °C	342.5 °C
T2	289.1 °C	282.5 °C	229.1 °C	222.5 °C
T3	194.1 °C	187.5 °C	154.1 °C	147.5 °C
T4	129.1 °C	122.5 °C	102.1 °C	95.5 °C
T5	94.1 °C	87.5 °C	74.1 °C	67.5 °C
T6	79.1 °C	72.5 °C	62.1 °C	55.5 °C



## 7.5 Safety device according to DIN EN 50495

The standard DIN EN 50495, harmonized within the scope of Directive 2014/34/EU, stipulates requirements for electrical apparatus that performs one or more safety function(s) for explosion protection. Discrete and complex safety devices whose protective function is controlled by software are evaluated using measures from EN 50595. By means of the Safety Integrity Level (SIL) from EN 61508, DIN EN 50495 defines the necessary safety level for monitoring potential ignition sources.

It is important to note the requirement from DIN EN 50495 in Appendix E, which states the following (paraphrased here): *"If a device contains more than one potential ignition source, suitable measures must be applied for each of these ignition sources. Combined apparatus must comply with the relevant standards EN 60079-0 and EN 61241-0 according to the category to be achieved."*

The JUMO safetyM STB/STW Ex is installed outside the apparatus in a non-potentially explosive area. Using e.g. a probe attached in the apparatus, it monitors the temperature of a bearing, which is considered a potential ignition source in the apparatus. The probe lines protruding into the potentially explosive area are intrinsically safe and the JUMO safetyM STB/STW Ex is therefore identified accordingly as "associated apparatus".

⇒ Chapter 7.2 "Identification marking according to ATEX directive 2014/34/EU and EN standards EN 60079-11 "i", EN 50495, and EN 13463-6 "b":")

It is only admissible to increase the fault tolerance (HFT) and thus increase the device category for the combined apparatus using the JUMO safetyM STB/STW Ex if there are no other ignition hazards other than the one addressed by the JUMO STB/STW, and the higher device category poses no additional requirements on the combined apparatus.

The scope of DIN EN 50495 does not include safety devices for non-electrical apparatus, which are recorded in EN 13463-6 (ignition protection type "b") (see Chapter 7.6 in this operating manual).

### 7.5.1 Temperature monitoring unit based on the ignition protection type "e", increased safety, according to EN 60079-7

#### 7.5.1.1 Function of increased safety

Ignition protection type where additional measures are taken to prevent, with an increased degree of safety, the possibility of excessively high temperatures and the occurrence of sparks or electric arcs on or in parts of the electrical apparatus, in which they do not occur during normal operation.

### 7.5.1.2 Use in the 1-sensor variant

As described in the table in Chapter 6.6 "Sensor connection possibilities (SIL)" of this operating manual, the JUMO safetyM STB/STW Ex evaluation unit always has the same design and its architecture always has a 1oo2D structure. When connecting only one passive sensor, this corresponds to variant 1 in the table.

According to Chapter 6.9.2 "Safety-relevant system properties" in this operating manual, the "sensor technology" subsystem therefore has a 1oo1 architecture and, thus, a HFT of 0. As a result, in conjunction with the monitored apparatus (as combined apparatus), this variant meets the safety requirements according to DIN EN 50495 for systems that are used in category 2 (zone 1) if the monitored apparatus does not represent an ignition source in standard operation. The requirements from table 1 of DIN EN 50495 apply.

The limit value must be determined according to the respective use or application. The value must be set so that no dangerous state can occur when all relevant factors such as response time and, if applicable, temperature over-run of the monitored apparatus including the JUMO safetyM STB/STW Ex are taken into account.

To ensure that no unintended changes can be made to the configured parameters, the JUMO safetyM STB/STW must be sealed according to Chapter 5.8 in this operating manual, or a keyboard lock or level inhibit must be used according to Chapter 10.4.

### 7.5.1.3 Use in the 2-sensor variant

When connecting two passive sensors, this corresponds to variants 1a, 2, 3, and 4 in table 1 in Chapter 6.6 "Sensor connection possibilities (SIL)". According to Chapter 6.9.2 "Safety-relevant system properties" in this operating manual, the "sensor technology" subsystem therefore has a 1oo2 architecture and, thus, a HFT of 1. As a result, in conjunction with the monitored apparatus (as combined apparatus), these variants meet the safety requirements according to DIN EN 50495 for systems that are used in category 1 (zone 0) if the monitored apparatus does not represent an ignition source in standard operation. The requirements from table 1 of DIN EN 50495 apply.

The limit value must be determined according to the respective use or application. The value must be set so that no dangerous state can occur when all relevant factors such as response time and, if applicable, temperature over-run of the monitored apparatus including the JUMO safetyM STB/STW 70155 are taken into account.

To ensure that no unintended changes can be made to the configured parameters, the JUMO safetyM STB/STW must be sealed according to Chapter 5.8 in this operating manual, or a keyboard lock or level inhibit must be used according to Chapter 10.4.

#### **7.5.1.4 Use of temperature transmitters**

When using temperature transmitters, the safety features are described according to variant 5 in the table in Chapter 6.6 "Sensor connection possibilities (SIL)". The necessary features on the basis of DIN EN 50495 must be reported accordingly for the temperature transmitter. The requirements from table 1 of DIN EN 50495 apply. The signal is fed in via the 4 – 20 mA input. The settings are according to point 8.2.2 and the following.

The limit value must be determined according to the respective use or application. The value must be set so that no dangerous state can occur when all relevant factors such as response time and, if applicable, temperature over-run of the monitored apparatus including the JUMO safetyM STB/STW 70155 and the temperature transmitter are taken into account.

To ensure that no unintended changes can be made to the configured parameters, the JUMO safetyM STB/STW must be sealed according to Chapter 5.8 in this operating manual, or a keyboard lock or level inhibit must be used according to Chapter 10.4.

### **7.5.2 Monitoring of minimum overpressure for static pressurization on the basis of the ignition protection type "p", pressurized enclosures, according to EN 60079-2**

#### **7.5.2.1 Function of static pressurization**

Ignition protection type in which the formation of a potentially explosive atmosphere inside a housing is prevented by an inert protective gas that maintains an internal overpressure greater than the external atmosphere. This ignition protection type prevents the potentially explosive atmosphere from coming into contact with the ignition source.

#### **7.5.2.2 Safety device for static pressurization**

TÜV NORD CERT GmbH has verified compliance with the requirements of EN 60079-2 for the JUMO safetyM STB/STW as a safety device for static pressurization with respect to the ignition protection types "py" and "pz" (gas atmospheres) and "p Db" and "p Dc" (dust atmospheres) (in each case with the corresponding number of sensors). Use for static pressurization is admissible only in the "STB" function, as EN 60079-2 stipulates safety devices (for static pressurization) in section 8.5 (paraphrased here): *"The independently functioning safety devices must only be able to be reset with the aid of a tool or a key."*

The requirements of EN 60079-2 for the respective ignition protection type are complied with.

Definition from EN 60079-2 for type "py":

Pressurization that reduces the equipment protection level (EPL) within the pressurized enclosure from Gb to Gc.

Definition from EN 60079-2 for type "pz":

Pressurization that reduces the equipment protection level (EPL) within the pressurized enclosure from Gc to "non-hazardous".

The dust identification markings "p Dc" and "p Db" are given based on EN 60079-0.

The requirements of EN 60079-2 for "py" and "pz" can be found on an equivalent basis in EN 61142-4 for the ignition protection type "pD" (static pressurization for potentially explosive dust atmospheres).

The relationship between gas and dust atmospheres is as follows:

Dust	Gas
"p Dc"	"pz"
"p Db"	"py"

### 7.5.2.3 Use as a safety device for static pressurization

When using pressure transmitters, the safety features are described according to variant 5 in the table in Chapter 6.6 "Sensor connection possibilities (SIL)". The necessary features on the basis of DIN EN 50495 must be reported accordingly for the pressure transmitter. The requirements from table 1 of DIN EN 50495 apply. The signal is fed in via the 4 – 20 mA input. The pressure signal can be depicted by means of the current signal parameterization.

⇒ For this purpose, see Chapter 12.5

According to EN 60079-2, in this case the alarm relay output in Chapter 4.3 "Connection diagram", legend no. 10, is used to initiate the protective measure specified by the user if the overpressure falls below the minimum value specified by the user.

The limit value must be determined according to the respective use or application. The value must be set so that no dangerous state can occur when all relevant factors such as response time and pressure curve of the monitored pressure system including the JUMO safetyM STB/STW and pressure transmitter are taken into account.

To ensure that no unintended changes can be made to the configured parameters, the JUMO safetyM STB/STW must be sealed according to Chapter 5.8 in this operating manual, or a keyboard lock or level inhibit must be used according to Chapter 10.4.

## **7.6 Ignition source monitoring "b" according to EN 13463-6**

### **7.6.1 Function of ignition source monitoring**

Device in non-electrical equipment which, through the installation of sensors, can be used to determine imminent operating statuses that could cause the surrounding atmosphere to ignite. Corresponding countermeasures are taken before the potential ignition source can take effect. These countermeasures can be initiated automatically by direct connections between the sensors and the ignition protection system or, for the 1-sensor variant (ignition prevention level 1 (IPL 1)), manually by issuing a warning to the device operator.

### **7.6.2 IPL (Ignition Prevention Level)**

EN 13463-6 includes the two ignition prevention levels IPL 1 and IPL 2. The use of ignition prevention levels is shown in table 1 of EN 13463-6. The use of IPL 1 and IPL 2 depends on the category and occurrence of the potential ignition source. Accordingly, in category 1 (zone 0) for example, a potential ignition source must be monitored with IPL 2 during a foreseeable malfunction. If the potential ignition source only becomes dangerous during a rare malfunction, ignition prevention level IPL 1 is sufficient. Monitoring a potential ignition source which can become dangerous in normal operation is not admissible for category 1. In this case, the apparatus concept must be revised. The necessary ignition prevention level must be determined according to table 1 of EN 13463-6.

### **7.6.3 Identification marking**

According to EN 13463-6, an ignition protection system that is supplied separately to the apparatus to be monitored must be identified with (b1) or (b2). In this context (b1) stands for IPL 1 and (b2) stands for IPL 2.

### **7.6.4 Use in the 1-sensor variant**

As described in the table in Chapter 6.6 "Sensor connection possibilities (SIL)" of this operating manual, the JUMO safetyM STB/STW Ex evaluation unit always has the same design and its architecture always has a 1oo2D structure. When connecting only one passive sensor, this corresponds to variant 1 in the table in Chapter 6.6 "Sensor connection possibilities (SIL)". This version meets the IPL 1 requirements and is identified with (b1) accordingly. EN 13463-6 stipulates that monitored apparatus must not restart automatically without resetting the JUMO safetyM STB/STW Ex. For this reason, when using the JUMO safety-

**7M STB/STW Ex** as a STW, a higher-level control system must ensure that automatic reactivation is not possible. When used as a STB, the locking is integrated into the JUMO safety**M STB/STW Ex**.

The limit value must be determined according to the respective use or application. The value must be set so that no dangerous state can occur when all relevant factors such as response time and, if applicable, temperature over-run of the monitored apparatus including the JUMO safety**M STB/STW Ex** are taken into account.

To ensure that no unintended changes can be made to the configured parameters, it is possible to seal the JUMO safety**M STB/STW Ex** according to Chapter 5.8 in this operating manual, or a keyboard lock or level inhibit can be used according to Chapter 10.4.

## 7.6.5 Use in the 2-sensor variant

When connecting two passive sensors, this corresponds to variants 1a, 2, 3, and 4 in the table in Chapter 6.6 "Sensor connection possibilities (SIL)". This version meets the IPL 2 requirements and is identified with (b2) accordingly. EN 13463-6 stipulates that monitored apparatus must not restart automatically without resetting the JUMO safety**M STB/STW Ex**. For this reason, when using the JUMO safety**M STB/STW Ex** as a STW, a higher-level control system must ensure that automatic reactivation is not possible. When used as a STB, the locking is integrated into the JUMO safety**M STB/STW Ex**.

The limit value must be determined according to the respective use or application. The value must be set so that no dangerous state can occur when all relevant factors such as response time and, if applicable, temperature over-run of the monitored apparatus including the JUMO safety**M STB/STW Ex** are taken into account.

To ensure that no unintended changes can be made to the configured parameters, it is possible to seal the JUMO safety**M STB/STW Ex** according to Chapter 5.8 in this operating manual, or a keyboard lock or level inhibit can be used according to Chapter 10.4.

## 7.6.6 Use of transmitters

When using transmitters, the safety features are described according to variant 5 in the table in Chapter 6.6 "Sensor connection possibilities (SIL)". The necessary features on the basis of EN 13463-6 must be reported accordingly for the transmitter. The requirements from table 1 of EN 13463-6 apply. The signal is fed in via the 4 – 20 mA input.

⇒ The settings are according to Chapter 10.2.2 and the following

The limit value must be determined according to the respective use or application. The value must be set so that no dangerous state can occur when all relevant factors such as response time and, if applicable, measurand overshoot of the monitored ap-

paratus including the JUMO safetyM STB/STW Ex and transmitter are taken into account.

To ensure that no unintended changes can be made to the configured parameters, it is possible to seal the JUMO safetyM STB/STW Ex according to Chapter 5.8 in this operating manual, or a keyboard lock or level inhibit can be used according to Chapter 10.4.

## 8 ATEX ignition protection type "e" and "t"

### 8.1 Intended use

The JUMO safetyM STB/STW Ex is a safety device designed according to Directive 2014/34/EU, chapter 1(1)(b) for measuring temperatures directly using resistance probes or thermocouple probes, or other physical measurands such as pressure, with the aid of a suitable transmitter and the use of a 4-20 mA current input.

The stipulations and requirements for use specified in this document must be taken into consideration. All specifications below with regard to probes or sensor technology relate to the probes listed in Chapter 11.12 to Chapter 11.15. If other probes are used, their suitability must first be tested.

Consideration only in accordance with ATEX as an [Ex eb, tb] device and not in accordance with IECEx



#### **Important information:**

Thermocouples should be evaluated with at least the requirements of EN 60584 or DIN 43710. RTD temperature probes should be evaluated with at least the requirements of EN 60751. Parameter values such as response rate, temperature stability, age drift, self-heating behavior, failure rates, fault models, etc. should likewise be taken into account.

The JUMO safetyM STB/STW Ex is associated apparatus that may only be used outside the Ex-zone.

Another use or one that goes beyond the specified use - with respect to use in potentially explosive areas - is considered as not being in accordance with the intended use.

Liability for resulting damages cannot be assumed.

The JUMO safetyM STB/STW Ex is built according to the relevant standards and directives as well as to the applicable safety regulations. Nevertheless, improper use may lead to personal injury or material damage.

To avoid danger, the JUMO safetyM STB/STW Ex may only be used:

- For the intended use
- When in good order and condition
- Under consideration of this operating manual



## 8.2 Identification marking according to ATEX directive 2014/34/EU and according to the standards EN 60079-7 "e" and EN 60079-31 "t":



II (2) G [Ex eb Gb] IIC

II (2) D [Ex tb Db] IIIC

### 8.3 Identification marking according to DIN EN 50495:

According to DIN EN 50495, the ignition protection type of the monitoring itself and that of the monitored device must be included in the identification marking.

The identification marking according to DIN EN 50495 must be done on the basis of the ignition protection type identification marking of the EUC as associated apparatus. This is indicated with [xxxx] on the certificate.

Excerpt from the certificate:

(20) Kennzeichnung

⊕ II (2) G [Ex eb Gb] IIC resp. ⊕ II (2) G [Ex db Gb] IIC

⊕ II (2) D [Ex tb Db] IIIC

⊕ II (2) G (b1) [xxxx] resp. ⊕ II (2) G (b2) [xxxx]

⊕ II (2) D (b1) [xxxx] resp. ⊕ II (2) D (b2) [xxxx]

mit:

[xxxx]: Zündschutzart des überwachten Geräts

(b1) : 1 Kanal Typen

(b2) : 2 Kanal Typen

Since there must always be a clear identification marking on the nameplate, JUMO uses a standard identification marking of EN 60079-7 "e" pursuant to DIN EN 50495. [The associated device and monitored apparatus are the same here].

#### 8.3.1 EUC

Example of the identification marking of the apparatus to be monitored:



II (2) G [Ex eb Gb] IIC

II (2) D [Ex tb Db] IIIC

## 8.4 JUMO standard nameplate



Identification marking for associated apparatus (safety device) according to Chapter 8.2

Identification marking for the monitored apparatus according to Chapter 8.3

(associated equipment  
EUC Equipment Under Control)

### 8.4.1 Example of temperature monitoring on a motor with JUMO standard nameplate:

II (2) G	Directive identification marking
[Ex eb Gb]	as associated apparatus type 701155 for an Ex eb thermo probe
[Ex eb Gb]	as monitoring for a <b>motor with the ignition protection type "increased safety"</b> (associated equipment; EUC)
IIC	as gas group

## 8.5 Nameplate according to customer specifications



Identification marking for associated apparatus (safety device) according to Chapter 8.2

Identification marking for the monitored apparatus according to Chapter 8.3  
(associated equipment  
EUC **E**quipment **U**nder **C**ontrol)

### 8.5.1 Example of temperature monitoring on a motor according to customer specifications:

II (2) G Directive identification marking

[Ex eb Gb] as associated apparatus type 701155 for an Ex eb thermo probe

[Ex db Gb] as monitoring for a **motor with the ignition protection type "flameproof enclosure"** (associated equipment; EUC)

IIC as gas group

For the new EUC, the customer must themselves apply a different identification marking, e.g. [Ex db Gb] IIC, pursuant to DIN EN 50495.

In this special case, they must request a new nameplate from JUMO and affix it to the device!

# 1-sensor-variant:

Type: 701155/...-045 [Ex „e“, „t“]



II (2) G (b1) [Ex eb Gb] [Ex eb Gb] IIC  
II (2) D (b1) [Ex tb Db] [Ex tb Db] IIIC

Standard designation according to EN 60079-0  
Explosion group II C gases, low ignition energy such as hydrogen  
III C conductive dusts

Standard designation according to EN 50495  
eb: increased safety b = zone 1 or 2 for gas  
tb: protection with housing b = zone 21 or 22 for dust

Standard designation according to EN 60079 for electrical devices  
ignition protection „e“ increased safety according to EN 60079-7  
ignition protection „t“ dust explosion protection with housing accord. to EN 60079-31  
Equipment Protection Level:  
Gb: for use in zone 1 or 2 for gases  
Db: for use in zone 21 or 22 for dust

Standard designation according to EN 13463 for non electrical devices  
„b1“ ignition source monitoring according to EN 13463-6 with IPL 1 (Ignition Prevention Level)  
for category 2

## Standard designation

Category according to ATEX directive 2014/34/EU

G: gas explosion protection  
D: dust explosion protection

Safety devices according to EN 50495 for category 2 applications for  
ignition protection type increased safety „e“ according to EN 60079-7  
Safety device according to EN 13463-6 for category 2 applications for ignition protection:  
Ignition source monitoring of non-electrical ignition dangers „b1“ according to EN 13463-6

Guidelines designation for device group II (non-firedamp endangered mine workings)

Designation explosionproof according to ATEX directive 2014/34/EU

## 2-sensor-variant:

Type: 701155/...-045 [Ex „e“, „t“]



II (2) G (b2) [Ex eb Gb] [Ex eb Gb] IIC  
II (2) D (b2) [Ex tb Db] [Ex tb Db] IIIC

Standard designation according to EN 60079-0  
Explosion group II C gases, low ignition energy such as hydrogen  
III C conductive dusts

Standard designation according to EN 50495  
eb: increased safety      b = zone 1 or 2 for gas  
tb: protection with housing b = zone 21 or 22 for dust

Standard designation according to EN 60079 for electrical devices  
ignition protection „e“ increased safety according to EN 60079-7  
ignition protection „t“ dust explosion protection with housing accord. to EN 60079-31  
Equipment Protection Level:  
Gb: for use in zone 1 or 2 for gases  
Db: for use in zone 21 or 22 for dust

Standard designation according to EN 13463 for non electrical devices  
„b2“ ignition source monitoring according to EN 13463-6 with IPL 2 (Ignition Prevention Level)  
for category 1

### Standard designation

Category according to ATEX directive 2014/34/EU  
G: gas explosion protection  
D: dust explosion protection

Safety devices according to EN 50495 for category 2 applications for  
ignition protection type increased safety "e" according to EN 60079-7  
Safety device according to EN 13463-6 for category 2 applications for ignition protection:  
Ignition source monitoring of non-electrical ignition dangers "b1" according to EN 13463-6

Guidelines designation for device group II (non-firedamp endangered mine workings)

Designation explosionproof according to ATEX directive 2014/34/EU

## Explanation

## 8.6 Meaning of the X character in the type examination certificate

If the letter "X" is suffixed to the certificate number, this denotes special conditions governing the safe use of the product in the appendix to the type examination certificate.

- Switching operations may be performed on the electrical circuits (Ex eb) only when the JUMO safetyM STB/STW Ex, including all supply lines, is de-energized.
- Only the STB variant (safety temperature limiter) of the JUMO safetyM STB/STW Ex is admissible as a safety device for monitoring the minimum overpressure in the case of static pressurization.
- The safety relevant settings of the JUMO safetyM STB/STW Ex must be protected against unauthorized changes (e.g. using a seal or password-protected data input).
- When using the JUMO safetyM STB/STW Ex in the STW (safety temperature monitor) variant, after the temperature limiter has triggered a shutdown steps must be taken to prevent an automatic restart of the monitored apparatus by a higher-level control system.
- If the JUMO safetyM STB/STW Ex is being used in the single-channel device variant to monitor non-electrical ignition sources and a warning is issued on demand, the user must immediately take the necessary measures to establish a safe status.

### 8.6.1 Probe arrangement in the Ex-area

The JUMO safetyM STB/STW Ex has the following maximum output data at the intrinsically safe inputs:

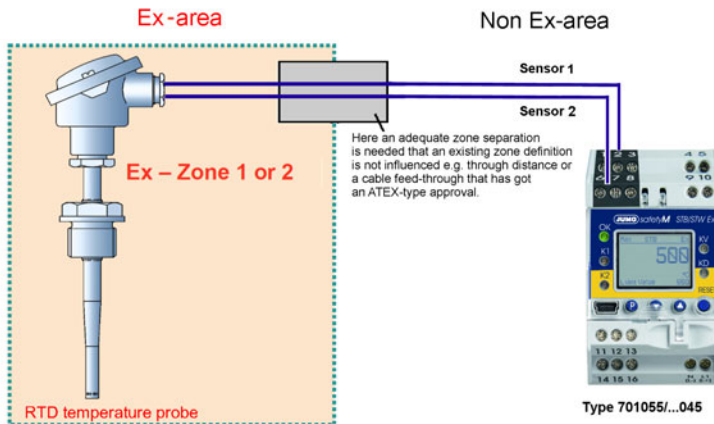
$U_o = 6.0 \text{ V}$ ;  $I_o = 41.2 \text{ mA}$ ;  $P_o = 61.8 \text{ mW}$ ;  $C_o = 36.3 \text{ }\mu\text{F}$ ;  $L_o = 20 \text{ mH}$

The specified energy values are available as a total amount per device.

The distribution to the inputs is not defined.

Example: Double Pt100 with protection tube constant 80 K/W: temperature increase of  $80 \text{ K/W} \times 61.8 \text{ mW} = 4.9 \text{ K}$ .

If a separate temperature increase for dust is specified in the technical data sheet from JUMO, this means that the protection fitting is completely covered in dust.





## 9 IECEx ignition protection type "i"

### 9.1 Intended use

The JUMO safetyM STB/STW Ex is associated apparatus that may only be used outside the Ex-zone. Another use or one that goes beyond the specified use - with respect to use in potentially explosive areas - is considered as not being in accordance with the intended use. Consideration according to ATEX as a [Ex i] device

### 9.2 IECEx identification marking according to IEC standards:

The nameplate is glued laterally to the device.



[Ex ia Ga] IIC

Associated apparatus which is set up outside the gas atmosphere but the intrinsically safe electrical circuit "ia" (protection through 2 protective measures) leads into zone 0.

[Ex ia Da] IIIC

Associated apparatus which is set up outside the dust atmosphere but the intrinsically safe electrical circuit "ia" (protection through 2 protective measures) leads into zone 20.

[Ex ia Ga] IIC  
[Ex ia Da] IIIC

Standard designation according to IEC 60079-0  
Explosion group II C gases, low ignition energy such as hydrogen  
III C conductive dusts

#### Explanation

Standard designation according to standard series IEC 60079 for electrical devices  
ia: related equipment according to ignition protection "i" intrinsically safe according to IEC 60079-11,  
"ia " (2-failsafe) for category 1  
"EPL" (Equipment Protection Level)  
Ga (gases) for category 1  
Da (dust) for category 1

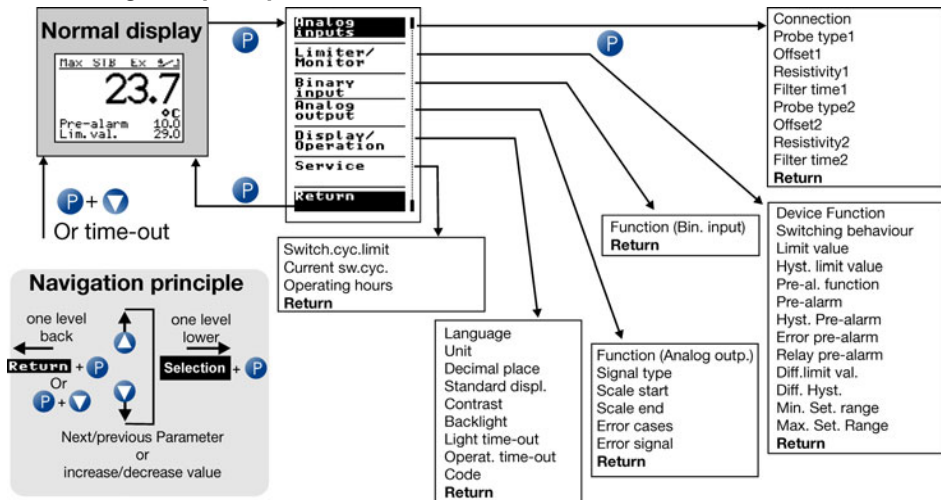
## 9.3 Excerpt of important device data

Contents	Description	Further information
Name of the manufacturer	JUMO GmbH & Co. KG	⇒ See back of this operating manual
Address	Moritz-Juchheim-Straße 1 36039 Fulda Germany	
Description of the test piece Device type	JUMO safetyM STB/STW 701155	⇒ Chapter 2 "Identifying the device version"
Ex identification marking	[Ex ia Ga] IIC [Ex ia Da] IIIC	⇒ Chapter 9.2 "IECEx identification marking according to IEC standards:"
Compilation of the ExTR documents and additional information	IECEx Test Report Cover IECEx Test Report: IEC 60079-0 Edition 6 IECEx Test Report: IEC 60079-11, Edition 6	⇒ Specified standards
Certificate number	IECEx TUN 15.0036X	⇒ Chapter 18.6 "IECEx"
Protection type	Min IP20	⇒ Chapter 11.10 "Housing"
Admissible ambient temperature range (°C)	0 °C to +55 °C	⇒ Chapter 11.9 "Environmental influences"
Special conditions for use of the device	The electrical connection of intrinsically safe electrical circuits must only be established when the device is de-energized.  The device, including its cabling, must only be put into operation if the cover cap of the intrinsically safe connection terminals (blue) has been correctly attached.	⇒ Chapter 4.2 "Removing the cover cap" and Chapter 4.3 "Connection diagram"



## 10 Configuration level

### 10.1 Navigation principle





All the parameters are freely accessible ex works, but they can be locked via the setup program.

⇒ Chapter 12.3 "Forgotten the code?"

Parameters of the configuration level which are not required are automatically hidden depending on the setting.

## 10.2 Analog inputs

10.2.1 Connection		Comment
Two sensors		This setting is provided for dual probes or for two different probes. Each of the two analog inputs is monitored separately for a probe break or probe short-circuit.
Single Pt100 in 2-wire circuit		<b>Caution:</b> When only one probe (SIL2) is connected, the temperature limiter device is reduced from <b>SIL3 to SIL2</b> . However, the internal 2-channel structure (1oo2D) in the device still remains. Both channels measure the same sensor due to the simplified external wiring.
Single 4 to 20 mA		<b>Caution:</b> When only one probe (SIL2) is connected, the temperature limiter device is reduced from <b>SIL3 to SIL2</b> . However, the internal 2-channel structure (1oo2D) in the device still remains. Both channels measure the same current signal due to the simplified external wiring.

■ Factory setting

10.2.2 Probe type 1 For analog input1	Comment	Setting range for limit value: (can be restricted via the setup)	Limits for underrange/ overrange
Pt100 DIN EN 60751	In 3-wire circuit IEC 60751:2008	-1999 to +9999 °C	-205 °C/ +855 °C
Pt1000 DIN EN 60751	In 3-wire circuit IEC 60751:2008	-1999 to +9999 °C	-205 °C/ +855 °C
Pt100 DIN EN 60751	in 2-wire circuit IEC 60751:2008	-1999 to +9999 °C	-205 °C/ +855 °C
Pt1000 DIN EN 60751	in 2-wire circuit IEC 60751:2008	-1999 to +9999 °C	-205 °C/ +855 °C
W3Re-W25Re "D"	Thermocouple ASTM E1751M-09 (bis 2315 °C): 2009	-1999 to +9999 °C	-5 to +2500 °C
W5Re-W26Re „C“	Thermocouple ASTM E230M-11: 2011	-1999 ... +9999°C	-5 ... +2320°C
Cu-CuNi "T"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-205 to +405 °C
Fe-CuNi "J"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-205 to +1205 °C
Cu-CuNi "U"	Thermocouple DIN 43710: 1985-12	-1999 to +9999 °C	-205 to +605 °C
Fe-CuNi "L"	Thermocouple DIN 43710: 1985-12	-1999 to +9999 °C	-205 to +905 °C
NiCr-Ni "K"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-205 to +1377 °C
Pt10Rh-Pt "S"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-55 to +1773 °C
Pt13Rh-Pt "R"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-55 to +1773 °C

<b>10.2.2 Probe type 1</b> For analog input1	<b>Comment</b>	<b>Setting range for limit value: (can be restricted via the setup)</b>	<b>Limits for underrange/ overrange</b>
Pt30Rh-Pt6Rh "B"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	295 to 1825 °C
NiCrSi-NiSi "N"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-105 to +1305 °C
4 to 20 mA	Standard signal	-1999 to +9999 °C	3.6 to 21 mA

■ Factory setting

<b>Parameter</b>	<b>Comment</b>	<b>Value range (factory setting in bold)</b>
<b>10.2.3 Offset 1</b>	Using Offset1, a measured value at the analog input can be corrected by the value entered over the entire measuring range.	-999.9 to <b>0.0</b> to +999.9
<b>10.2.4 Resistivity 1</b>	<b>Analog-input1 lead wire resistance in 2-wire circuit</b> This value is used to compensate the resistance of the probe line and depends on the line length. Enter the ohmic resistance of the probe line here to achieve the best possible temperature measurement.	<b>0.0</b> to 30.0 ohm

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.2.5 Filter time 1</b>	<p><b>Time constant of the digital input filter</b> <b>2nd order for analog input 1</b></p> <p>If the input signal changes suddenly, approx. 26 % of the change is recorded following a period that corresponds to the filter time constant dF (<math>2 \times \text{dF}</math>: approx. 59 %; <math>5 \times \text{dF}</math>: approx. 96 %). Value 0 means: filter switched off</p> <p>If the filter time is long:</p> <ul style="list-style-type: none"><li>- Interfering signals are better absorbed</li><li>- Measured value display responds more slowly to changes</li></ul>	0.0 to <b>0.6</b> to 100 sec
<b>10.2.6 Scaling start 1</b>	<p><b>Important information:</b> This setting only occurs if the sensor type 1 was set to 4 to 20 mA.</p> <p>Here, the user selects which value (i.e. pressure) should be displayed at 4 mA.</p>	-9999 to <b>0</b> to +9999
<b>10.2.7 Scaling end 1</b>	<p>Here, the user selects which value (i.e. pressure) should be displayed at 20 mA.</p>	-9999 to <b>100</b> to +9999



<b>10.2.8 Probe type 2</b>			
For analog input2	Comment	Setting range for limit value: (can be restricted via the setup)	Limits for underrange/ overrange
Pt100 DIN EN 60751	In 3-wire circuit IEC 60751:2008	-1999 to +9999 °C	-205 °C/ +855 °C
Pt1000 DIN EN 60751	In 3-wire circuit IEC 60751:2008	-1999 to +9999 °C	-205 °C/ +855 °C
Pt100 DIN EN 60751	in 2-wire circuit IEC 60751:2008	-1999 to +9999 °C	-205 °C/ +855 °C
Pt1000 DIN EN 60751	in 2-wire circuit IEC 60751:2008	-1999 to +9999 °C	-205 °C/ +855 °C
W3Re-W25Re "D"	Thermocouple ASTM E1751M-09 (bis 2315 °C): 2009	-1999 to +9999 °C	-5 to +2500 °C
W5Re-W26Re „C“	Thermocouple ASTM E230M-11: 2011	-1999 ... +9999°C	-5 ... +2320°C
Cu-CuNi "T"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-205 to +405 °C
Fe-CuNi "J"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-205 to +1205 °C
Cu-CuNi "U"	Thermocouple DIN 43710: 1985-12	-1999 to +9999 °C	-205 to +605 °C
Fe-CuNi "L"	Thermocouple DIN 43710: 1985-12	-1999 to +9999 °C	-205 to +905 °C
NiCr-Ni "K"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-205 to +1377 °C
Pt10Rh-Pt "S"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-55 to +1773 °C
Pt13Rh-Pt "R"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-55 to +1773 °C

<b>10.2.8 Probe type 2</b> For analog input2	<b>Comment</b>	<b>Setting range for limit value: (can be restricted via the setup)</b>	<b>Limits for underrange/ overrange</b>
Pt30Rh-Pt6Rh "B"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	295 to 1825 °C
NiCrSi-NiSi "N"	Thermocouple DIN EN 60584-1: 1996-10	-1999 to +9999 °C	-105 to +1305 °C
4 to 20 mA	Standard signal	-1999 to +9999 °C	3.6 to 21 mA

■ Factory setting

<b>Parameter</b>	<b>Comment</b>	<b>Value range (factory setting in bold)</b>
<b>10.2.9 Offset 2</b>	Using Offset2, a measured value at the analog input can be corrected by the value entered over the entire measuring range.	-999.9 to <b>0.0</b> to +999.9
<b>10.2.10 Resistivity 2</b>	<b>Analog-input2 lead wire resistance in 2-wire circuit</b> This value is used to compensate the resistance of the probe line and depends on the line length. Enter the ohmic resistance of the probe line here to achieve the best possible temperature measurement.	<b>0.0</b> to 30.0 ohm

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.2.11</b> Filter time 2	<p><b>Time constant of the digital input filter 2nd order for analog input 2</b></p> <p>If the input signal changes suddenly, approx. 26 % of the change is recorded following a period that corresponds to the filter time constant <math>dF</math> (<math>2 \times dF</math>: approx. 59 %; <math>5 \times dF</math>: approx. 96 %). Value 0 means: filter switched off</p> <p>If the filter time is long:</p> <ul style="list-style-type: none"> <li>- Interfering signals are better absorbed</li> <li>- Measured value display responds more slowly to changes</li> </ul>	0.0 to <b>0.6</b> to 100 sec
<b>10.2.12</b> Scaling start 2	<p><b>Important information:</b> This setting only occurs if the sensor type 2 was set to 4 to 20 mA.</p> <p>Here, the user must select which value (e.g. pressure) should be displayed at 4 mA.</p>	-9999 to <b>0</b> to +9999
<b>10.2.13</b> Scaling end 2	<p>Here, the user must select which value (e.g. pressure) should be displayed at 20 mA.</p>	-9999 to <b>100</b> to +9999

### 10.3 Limiter/monitor

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.3.1 Device function</b>	<b>Safety temperature limiter (STB) initial startup:</b> Regardless of the switching status of the alarm relay output prior to power failure, the STB remains locked when power returns.	<b>STB initial startup</b> , STB, STW
	The purpose of this factory setting is to ensure that the device will be in a safe switched-off state when the voltage supply is switched on for the first time. After this initial startup, the device function can be set to STB or STW.	
	<b>Safety temperature limiter STB:</b> The device must be manually reset using the keypad or the binary input as soon as the main measured value is back within the valid range.	
	<b>Safety temperature monitor STW:</b> The device is automatically reset as soon as the main measured value is back within the valid range.	

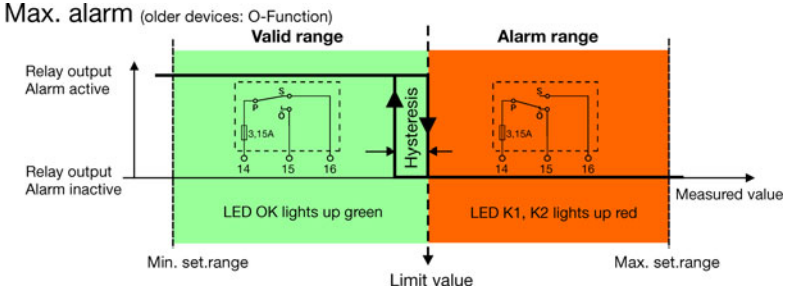

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.3.2 Switching behavior</b>	<b>Min. alarm:</b> If the value falls below the limit value, the alarm relay output switches OFF. LEDs K1 and K2 light up red and the measured values flash on the display.	<b>Max. alarm</b> , min. alarm


**Min. alarm** (older devices: S-Function)

The diagram illustrates the switching behavior of the minimum alarm. It features a horizontal axis for the 'Measured value' and a vertical axis for the 'Relay output alarm' state. The 'Alarm range' is shaded orange and occurs when the measured value falls below the 'Limit Value'. In this state, the relay output is 'alarm active' (switch S is closed), and LEDs K1 and K2 light up red. The 'Valid range' is shaded green and occurs when the measured value is above the 'Limit Value'. In this state, the relay output is 'alarm inactive' (switch S is open), and the 'LED OK lights up green'. A 'Hysteresis' band is shown between the 'Limit Value' and the 'Min. set.range'. Two circuit diagrams for the relay output are shown: one with switch S closed (alarm active) and one with switch S open (alarm inactive). Both diagrams include a 3,15A fuse and terminals 14, 15, and 16.

In the safety temperature limiter (**STB**) setting, this condition remains even when the main measured value is back in the valid range. Only when the **RESET** key is pressed or a switch is activated when the binary input is respectively configured will the alarm relay output switch ON again and the OK LED light up green.

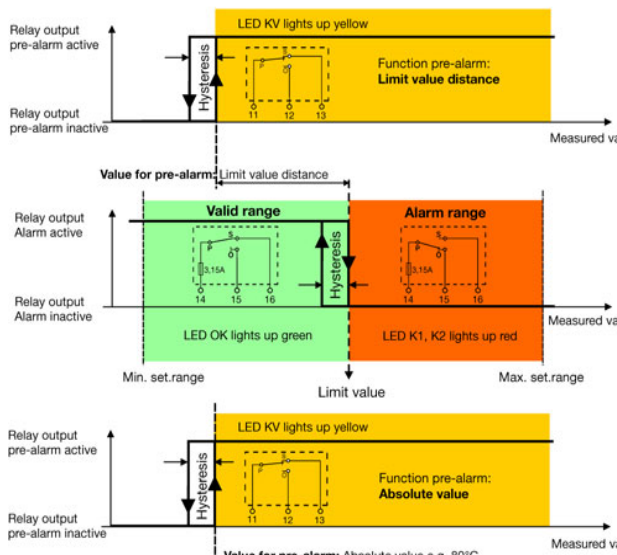
In the safety temperature monitor (**STW**) setting, the alarm relay output automatically switches back to ON as soon as the main measured value is back within the valid range.

Parameter	Comment	Value range (factory setting in <b>bold</b> )
	<p><b>Max. alarm:</b> If the value exceeds the limit value, the alarm relay output switches OFF. LEDs K1 and K2 light up red and the measured values flash on the display.</p> <p><b>Max. alarm</b> (older devices: O-Function)</p>  <p>The diagram illustrates the 'Max. alarm' function. It features a horizontal axis for 'Measured value' with three key points: 'Min. set.range', 'Limit value', and 'Max. set.range'. The area between 'Min. set.range' and 'Limit value' is shaded green and labeled 'Valid range'. The area between 'Limit value' and 'Max. set.range' is shaded orange and labeled 'Alarm range'. A vertical line at 'Limit value' is labeled 'Hysteresis' with arrows pointing in both directions. On the left, a vertical axis shows 'Relay output' (Alarm active) and 'Relay output' (Alarm inactive). In the 'Valid range', the relay is active (switch S is closed), and 'LED OK lights up green'. In the 'Alarm range', the relay is inactive (switch S is open), and 'LED K1, K2 lights up red'. Both relay circuit diagrams show a 3.15A fuse and terminals 14, 15, and 16.</p> <p>In the safety temperature limiter (<b>STB</b>) setting, this condition remains even when the main measured value is back in the valid range. Only when the  RESET key is pressed or a switch is activated when the binary input is respectively configured will the alarm relay output switch ON again and the OK LED light up green.</p> <p>In the safety temperature monitor (<b>STW</b>) setting, the alarm relay output automatically switches back to ON as soon as the main measured value is back within the valid range.</p>	

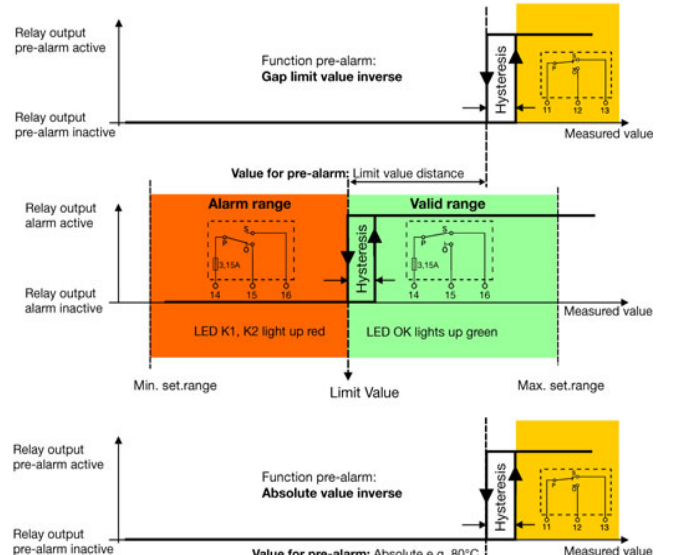
Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.3.3 Limit value, hysteresis</b>	<b>Limit value alarm:</b> If this value is exceeded or not reached, this affects the alarm relay output depending on the switching behavior.	-200 to <b>0</b> to +850 Depends on setting range min. and max.
	<b>Hysteresis limit value:</b> Difference between the switch-off and switch-on threshold, e.g. for rising and falling temperatures.	0 to <b>2</b> to 100
<b>10.3.4 Pre-alarm function</b>   The pre-alarm responds according to its setting to the main measured value	<b>No function</b> Pre-alarm relay output is inactive	<b>No function,</b> Absolute value, Limit val. dist. Absolute value inverse Gap limit value inverse Window Window inverse
	<b>Absolute value:</b> Pre-alarm relay output is triggered if the value for the pre-alarm is exceeded.	
	<b>Limit val. dist.</b> Here, the set value for the pre-alarm is used on a basis that is relative to the limit value. If, for example, a pre-alarm of 10 K is entered, the pre-alarm relay output always switches at 10 K before the limit value, regardless of how the limit value is set.	

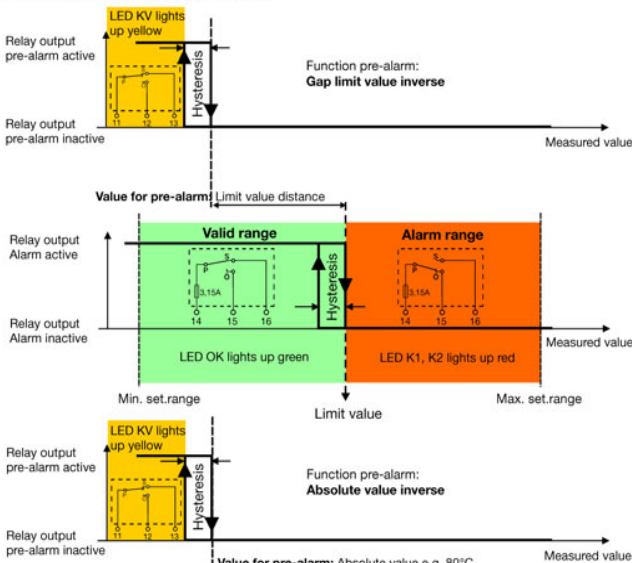
Parameter	Comment	Value range (factory setting in <b>bold</b> )
<p>Switching behavior of the relay output pre-alarm for the Min-Alarm setting</p> <p><b>Min. alarm</b> (older devices: S-Function)</p> <p>The diagrams illustrate the switching behavior of the relay output pre-alarm for the Min-Alarm setting. The top diagram shows the pre-alarm active (yellow) when the measured value is above the limit value distance. The middle diagram shows the alarm active (red) when the measured value is in the alarm range (between min. set range and limit value) and the valid range (between limit value and max. set range). The bottom diagram shows the pre-alarm active (yellow) when the measured value is above the absolute value (e.g., 80°C).</p>		

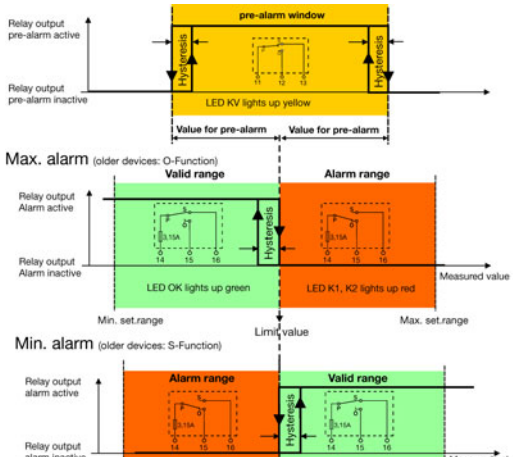


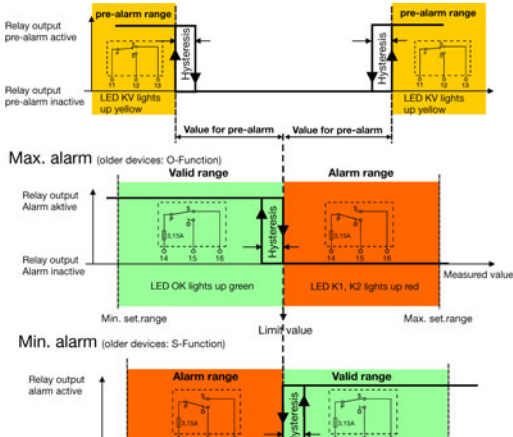

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<p>Switching behavior of the relay output pre-alarm for the Max-Alarm setting</p> <p><b>Max. alarm</b> (older devices: O-Function)</p>  <p>The diagrams illustrate the switching behavior of the relay output pre-alarm for the Max-Alarm setting. The top diagram shows the 'Function pre-alarm: Limit value distance' where the relay output pre-alarm becomes active when the measured value reaches a limit value distance from the set range. The middle diagram shows the 'Valid range' and 'Alarm range' with hysteresis, where the relay output alarm becomes active when the measured value enters the alarm range. The bottom diagram shows the 'Function pre-alarm: Absolute value' where the relay output pre-alarm becomes active when the measured value reaches an absolute value, e.g., 80°C.</p>		

Parameter	Comment	Value range (factory setting in <b>bold</b> )
The behavior of the relay output pre-alarm depends on the setting Min-Alarm or Max-Alarm.	<b>Absolute value inverse:</b> The pre-alarm possesses <b>inverse switching behavior</b> in comparison to the “Absolute value” setting and becomes active if the value for pre-alarm is exceeded.	
	<b>Gap limit value inverse:</b> Here, the set value for pre-alarm is used as a distance to the limit value. The pre-alarm possesses <b>inverse switching behavior</b> in comparison to the “Limit val. dist.” setting.	

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<p>Switching behavior of the relay output pre-alarm for the Min-Alarm setting</p> <p><b>Min-Alarm</b> (older devices: S-Function)</p>  <p>The first graph shows the 'Function pre-alarm: Gap limit value inverse' where the relay output pre-alarm becomes active when the measured value drops below a limit and remains active until it rises above a hysteresis level. The second graph shows the 'Alarm range' and 'Valid range' with 'LED K1, K2 light up red' in the alarm range and 'LED OK lights up green' in the valid range. The third graph shows the 'Function pre-alarm: Absolute value inverse' where the relay output pre-alarm becomes active when the measured value drops below a specific absolute value (e.g., 80°C) and remains active until it rises above a hysteresis level.</p>		

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<p>Switching behavior of the relay output pre-alarm for the Max-Alarm setting</p> <p><b>Max. alarm</b> (older devices: O-Function)</p>  <p>The top graph illustrates the 'Function pre-alarm: Gap limit value inverse' behavior. It shows a hysteresis loop where the relay output pre-alarm becomes active (yellow LED KV lights up) when the measured value reaches a certain point, and remains active until it drops below a lower threshold. The middle graph shows the 'Valid range' (green) and 'Alarm range' (orange) with hysteresis, and LED states (LED OK lights up green, LED K1, K2 lights up red). The bottom graph illustrates the 'Function pre-alarm: Absolute value inverse' behavior, showing a hysteresis loop where the relay output pre-alarm becomes active (yellow LED KV lights up) when the measured value reaches a certain point, and remains active until it drops below a lower threshold.</p> <p>Value for pre-alarm: Limit value distance</p> <p>Value for pre-alarm: Absolute value e.g. 80°C</p>		

Parameter	Comment	Value range (factory setting in <b>bold</b> )
	<p><b>Window:</b></p> <p>The set pre-alarm value determines the window width symmetrically around the limit value.</p> <p>Here it is irrelevant if Min-Alarm or Max-Alarm is set.</p>	
<p>In a window symmetrically around the limit value the pre-alarm relay is active.</p>  <p>The diagrams illustrate the alarm logic based on the measured value relative to the limit value and set ranges.</p> <ul style="list-style-type: none"> <li><b>Pre-alarm window:</b> A yellow shaded region centered on the limit value. The width is determined by the 'Value for pre-alarm' on both sides. The relay output is active (high) within this window, and LED KV lights up yellow. Hysteresis is shown for both activation and deactivation.</li> <li><b>Max. alarm (older devices: O-Function):</b> The 'Valid range' (green) is to the left of the limit value, and the 'Alarm range' (orange) is to the right. LED OK lights up green in the valid range, and LED K1, K2 lights up red in the alarm range. Hysteresis is shown for both activation and deactivation.</li> <li><b>Min. alarm (older devices: S-Function):</b> The 'Alarm range' (orange) is to the left of the limit value, and the 'Valid range' (green) is to the right. LED K1, K2 lights up red in the alarm range, and LED OK lights up green in the valid range. Hysteresis is shown for both activation and deactivation.</li> </ul> <p>Common labels across the graphs include: Relay output (alarm active/inactive), Measured value, Limit value, Min. set.range, and Max. set.range.</p>		

Parameter	Comment	Value range (factory setting in <b>bold</b> )
	<b>Window inverse:</b> The pre-alarm possesses <b>inverse switching behavior</b> in comparison to the “Window“.	
In a window symmetrically around the limit value the pre-alarm relay is inactive.		
		
<div><div></div><div>Caution The pre-alarm function <b>is not part of the safety function!</b></div></div>		

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.3.5 Pre-alarm, hysteresis</b>	<b>Pre-alarm:</b> The value that triggers the pre-alarm relay output as an absolute value or relative to the limit value.	-9999 to <b>0</b> to +9999
	<b>Pre-alarm hysteresis:</b> Difference between the switch-off and switch-on threshold, e.g. for rising and falling temperatures.	0 to <b>2</b> to 100
<b>10.3.6 Error Pre-alarm, Relay pre-alarm</b>	<b>Error pre-alarm:</b> Here the user can define to which errors the pre-alarm should react. - Sensor error: see Chapter 8.5 "Measuring circuit monitoring" - Sens.error&diff.: same as sensor error above with additional errors of differential monitoring. - All errors: additional device errors see Chapter 11.	Sensor error <b>Sens.error&amp;diff.</b> All errors
	<b>Relay pre-alarm:</b> Here the user can set which condition the relay output pre-alarm should have when the errors above occur.	<b>Active</b> Inactive
<b>10.3.7 Limit value difference, hysteresis</b>	<b>Limit value difference monitoring:</b> If the value of the temperature difference of the analog input 1-2 is exceeded, the alarm relay output is switched.	0 to <b>50</b> to 100
	<b>Hysteresis difference monitoring:</b> Difference between the switch-off and switch-on threshold, e.g. for rising and falling differential values.	0 to <b>2</b> to 100
<b>Important information:</b> If, for example, temperature differences arise as a result of the spatial arrangement of a dual probe, an alarm may be triggered by the concurrency monitoring even though the temperature being monitored has not yet been exceeded. In this case, the difference monitoring limit value can be adjusted accordingly.		

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.3.8 Setting range min. (formerly ALHI)</b>  This is the lower limit of the setting range for the limit value.	This value may not be lower than the lower end of the connected probe or unit signal measuring range. It may also not be set higher than the setting for the <b>alarm limit value</b> .	-9999 to <b>-200</b> to limit value °C
<b>10.3.9 Setting range max. (formerly ALLO)</b>  This is the upper limit of the setting range for the limit value.	This value may not be greater than the higher end of the connected probe or unit signal measuring range. It may also not be set lower than the setting for the <b>alarm limit value</b> .	Limit value to <b>850</b> to 9999 °C

The admissible limits for DIN approved probes:

- ⇒ Chapter 11.13 "Probes for the operating medium air" and
- ⇒ Chapter 11.14 "Probes for water and oil"



## 10.4 Binary input

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.4.1 Function</b>	This sets the function that should be controlled by the binary input.	
	The binary input does not have a function	<b>No function</b>
	The binary input performs a reset as described in Chapter 10.3.1 "Device function" The function only responds to the switching edge from "open" to "closed" state.	Unlocking
	Protection against unauthorized key operation	Key lock
	Configuration level is locked.	Level inhibit

■ Factory setting

## 10.5 Analog output

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.5.1 Function</b>	Here, the measured value that is to be shown at the analog output is set.	<b>Main measured value</b> Measured value1 Measured value2 Difference
	<b>Main measured value:</b> With the max. alarm switching behavior, the greater of the two measured values is shown; with the min. alarm, the lower of the two measured values is shown.	
	<b>Measured value1:</b> Measured value of analog input 1 (E1) is shown	
	<b>Measured value2:</b> Measured value of analog input 2 (E2) is shown	
	<b>Difference:</b> E1-E2 is shown The signal that should be output by the analog output can be set with scaling start and end.	
<b>10.5.2 Signal type</b>	4 to 20 mA	<b>4 to 20 mA</b> 0 to 20 mA 2 to 10 V 0 to 10 V
	0 to 20 mA	
	2 to 10 V	
	0 to 10 V	
<b>10.5.3 Scaling start</b>	⇒ Figure in Chapter 10.5.7	-9999 to <b>-200</b> to +9999
<b>10.5.4 Scaling end</b>	⇒ Figure in Chapter 10.5.7	-9999 to <b>800</b> to +9999

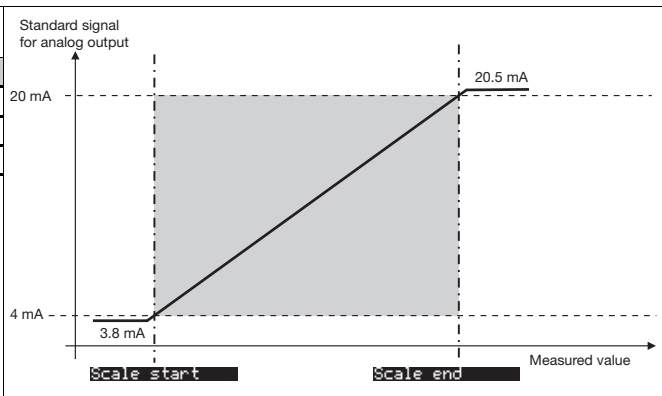
Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.5.5 Error cases</b>	Here the user can set to which errors the analog output relay output should react. <b>Sensor error 2x</b> means: Double sensor error can only be set if the main measured value is set in Chapter 10.5.1 .	Sensor error 2x Sensor error 1x <b>Sens.err. &amp; diff.</b> All Errors
<b>10.5.6 Error signal</b>	If, for the measured value 1 or 2, the value is exceeded, not reached, or a diagnostic error occurs, the current or voltage value set on the analog output is output as a so-called error signal.	
	For signal type 4 to 20 mA	<b>3.4</b> or 21.2 mA
	For signal type 0 to 20 mA	<b>0</b> or 21.2 mA
	For signal type 2 to 10 V	<b>1.7</b> or 10.4 V
	For signal type 0 to 10 V	<b>0</b> or 10.4 V

### **10.5.7 Behavior when leaving the scaling range**

The standard signal range of the analog output is limited as follows according to the recommendation of Namur NE 43:


Signal type	Lower limit	Upper limit
0: 4 to 20 mA	3.8 mA	20.5 mA
1: 0 to 20 mA	0 mA	20.5 mA
2: 2 to 10 V	1.8 V	10.2 V
3: 0 to 10 V	0 V	10.2 V



■ Factory setting



	Caution	The analog output is <b>not part of the safety function</b> .
--	---------	---

## 10.6 Display/operation

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.6.1 Language</b>	German	<b>German</b> , English, French
	English	
	French	
<b>10.6.2 Unit</b>   If the unit is changed to °F, the measured value is converted. All other values referring to the measured value (e.g. limit value) remain unchanged.	A unit for the measured value can be assigned here.	°C, °F, %, text
	°C	
	°F	
	%	
	Text: Via the setup program, 2 characters can be entered here for another unit, e.g. Pa (Pascal).	
<b>10.6.3 Decimal place</b>	No decimal place	<b>No decimal place</b> , One decimal place
	One decimal place	
<b>10.6.4 Normal display</b>	This sets the view that appears after the voltage supply is switched on. ⇒ Chapter "Operating overview"	<b>Main measured value</b> , measured values, limit value, pre-alarm, difference
	Main measured value	
	Measured values	
	Limit value	
	Pre-alarm	
	Difference	

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.6.5 Contrast</b>	<b>Screen contrast:</b> Difference in brightness between black and white pixels	0 to <b>5</b> to 10
<b>10.6.6 Backlight</b>	Here, the background lighting of the display is set.	Off, <b>On</b> , During operation
	<b>Off:</b> Always switched off	
	<b>On:</b> Always switched on	
	<b>During operation:</b> The background lighting is only switched on when the keys are operated and it lights up until the time for the time-out light has expired.	
<b>10.6.7 Time-out light</b>	Here, a waiting period for the switch-off of the background lighting is set.	0 to <b>30</b> to 100 sec
<b>10.6.8 Time-out operation</b>	Here, the waiting period is set for the return from the configuration to normal display.	0 to <b>30</b> to 100 sec
<b>10.6.9 Code</b>	To protect against unauthorized manipulations, a code can be set here for locking the configuration level. 0 means: code request switched off	<b>0</b> to 9999
	 If the code is forgotten, a new code can be transferred to the device via the setup program.  Chapter 12.3 "Forgotten the code?"	

## 10.7 Service

Parameter	Comment	Value range (factory setting in <b>bold</b> )
<b>10.7.1 Limit switching cycle</b>	<b>Limit value for relay switching cycles</b> Here, the limit value for the admissible relay switching cycles is set. If the counter value for <b>Current switching cycles</b> is greater than this value, the display values flash and the alarm relay output drops out. If "0" is set the function is inactive.	<b>0</b> to 99999
<b>10.7.2 Current switching cycles</b>	<b>Relay switching cycle counter</b> Here, the switching cycles for the relay are only counted if the top <b>limit value for relay switching cycles</b> is not set to "0" and is thus inactive. The value can then be adjusted as required and therefore adapted accordingly to the plant. The switching cycle counter remains at 99999.	<b>0</b> to 99999
<b>10.7.3 Operating hours</b>	<b>Operating hours counter</b> The counter adds up the operating hours during which the device was connected to the voltage supply. The value cannot be changed and can be used as a measure of how long the device was actually in operation after leaving the factory.	<b>0</b> to 99999





## 11 Technical data

### 11.1 Analog inputs

#### RTD temperature probe

Designation	Measuring range	Accuracy 2/3-wire circuit <sup>1</sup>	Ambient temperature influence
Pt100 IEC 60751:2008	-200 to +850 °C	0.5 % / 0.1 %	50 ppm/K
Pt1000 IEC 60751:2008	-200 to +850 °C	0.5 % / 0.1 %	50 ppm/K
Connection type	Maximum line resistance in two-wire circuit: 15 Ω; three-wire circuit: 30 Ω		
Sampling rate	210 ms		
Error tolerance time	≤ 5 s time taken into account for all diagnostic tests		
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100 s		
Special features	Individual probe Pt100 2-wire, display can also be programmed in °F		

#### Thermocouples

Designation	Measuring range	Accuracy <sup>1</sup>	Ambient temperature influence
Fe-CuNi "L" DIN 43710: 1985-12	-200 to +900 °C	0.4 %	100 ppm/K
Fe-CuNi "J" DIN EN 60584-1:1996-10	-200 to +1200 °C	0.4 %	100 ppm/K

Cu-CuNi "U" DIN 43710:1985-12	-200 to +600 °C	0.4 %	100 ppm/K
Cu-CuNi "T" DIN EN 60584-1:1996-10	-200 to +400 °C	0.4 %	100 ppm/K
NiCr-Ni "K" DIN EN 60584-1:1996-10	-200 to +1372 °C	0.4 %	100 ppm/K
Pt10Rh-Pt "S" DIN EN 60584-1:1996-10	-50 to +1768 °C	0.4 %	100 ppm/K
Pt13Rh-Pt "R" DIN EN 60584-1:1996-10	-50 to +1768 °C	0.4 %	100 ppm/K
Pt30Rh-Pt6Rh "B" DIN EN 60584-1:1996-10	0 to 1820 °C	0.4 % <sup>2</sup>	100 ppm/K
NiCrSi-NiSi "N" DIN EN 60584-1:1996-10	-100 to 1300 °C	0.4 % <sup>2</sup>	100 ppm/K
W3Re-W25Re "D" ASTM E1751M-09 (up to 2315 °C): 2009	0 to 2495 °C	0.4 %	100 ppm/K
W5Re-W26Re "C" ASTM E230M-11: 2011	0 to 2315 °C	0.4 %	100 ppm/K
Cold junction	Pt100 internal		
Cold junction accuracy	± 1 K		
Sampling rate	210 ms		
Error tolerance time	≤ 5 s time taken into account for all diagnostic tests		
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100 s		

1. The accuracy refers to the maximum measuring range.

2. The accuracy specifications are only guaranteed as of 300 °C.

**Direct current**

Measuring range	Accuracy	Ambient temperature influence
4 to 20 mA, voltage drop < 2 V	0.2 %	150 ppm/K
Scaling	Can be freely programmed within the limits	
Sampling rate	210 ms	
Error tolerance time	≤ 5 s time taken into account for all diagnostic tests	
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100 s	
Special features	Individual probe 4 to 20 mA	

## 11.2 Analog output

	Signal type	Accuracy	Residual ripple	Load influence	Temperature influence	Load resistance
Current	4 to 20 mA	$\leq 0.5 \%$	$\pm 0.5 \%$ at 300 $\Omega$	$\pm 0.05$ mA / 100 $\Omega$	150 ppm/K	$\leq 500 \Omega$
	0 to 20 mA					
Voltage	2 to 10 V	$\leq 0.5 \%$	$\pm 0.5 \%$	$\pm 15$ mV	150 ppm/K	$\geq 500 \Omega$
	0 to 10 V					

## 11.3 Digital input

Connection	Function
1 potential-free contact	Unlocked, keyboard lock, level inhibit can be configured

## 11.4 Relay outputs

Relay output KV	Relay (changeover contact) without contact protection 30000 switching operations at a switching capacity of AC 250 V, 3 A, 50 Hz (resistive load) or max. DC 30 V, 3 A. Minimum current: DC 12 V / 100 mA.
Alarm relay output	Relay (changeover contact) <b>Contact protection circuit:</b> fuse cut-out 3.15 AT, installed in the N/O contact arm 30000 switching operations at a switching capacity of AC 230 V, 3 A, 50 Hz (resistive load) or max. DC 30 V, 3 A. Minimum current: DC 12 V / 100 mA.

## 11.5 Measuring circuit monitoring

	RTD temperature probe in three-wire circuit and double thermocouples	Thermocouples	Current 4 to 20 mA
Out of range	Is detected LED K1, K2, KD, and KV are lit; ">>>>" flashes in the display for overrange, "<<<<" for underrange.		
Probe/cable break	Is detected LED K1, K2, KD, and KV are lit; ">>>>" flashes in the display; alarm relay output is disabled		LED K1, K2, KD, and KV are lit; ">>>>" flashes in the display; alarm relay output is disabled
Probe short circuit	Is detected LED K1, K2, KD, and KV are lit; "<<<<" flashes in the display; alarm relay output is disabled	Is detected by difference monitoring of the analog inputs ⇒ Chapter 10.3.7 "Limit value difference, hysteresis"	LED K1, K2, KD, and KV are lit; "<<<<" flashes in the display; alarm relay output is disabled

## 11.6 Voltage supply

Voltage supply	AC/DC 20 to 30 V, 48 to 63 Hz	AC 110 to 240 V, +10/-15 %, 48 to 63 Hz
Power consumption, power loss	Max. 12 W	Max. 12 W
Power consumption, power loss: For the following operating mode Analog output 10 mA (ohm); display backlight off; limit value relay switched on; pre-alarm relay switched off; sensor: 2xPt100	5 W	5 W

## 11.7 Test voltages according to EN 60730, Part 1

Input and output against voltage supply	
- With a voltage supply AC 110 to 240 V +10 % /-15 %	3.7 kV/50 Hz
- With a voltage supply AC/DC 20 to 30 V, 48 to 63 Hz	3.7 kV / 50 Hz

## 11.8 Electrical safety

	Clearances / creepage distances
Mains voltage to electronic components and probes	$\geq 6 \text{ mm} / \geq 8 \text{ mm}$
Mains voltage to relays	$\geq 6 \text{ mm} / \geq 8 \text{ mm}$
Relays to electronic components and probes	$\geq 6 \text{ mm} / \geq 8 \text{ mm}$
Electrical safety	According to DIN EN 14597 (DIN EN 60730-2-9) Overvoltage category III, pollution degree 2
Protection rating I	With internal isolation from SELV electrical circuits

## 11.9 Environmental influences

Ambient temperature range	0 to +55 °C
Storage temperature range	-30 to +70 °C
Temperature influence	$\leq \pm 0.005 \% / \text{K}$ dev. from 23 °C <sup>1</sup> for RTD temperature probes
	$\leq \pm 0.01 \% / \text{K}$ dev. from 23 °C <sup>1</sup> for thermocouple and current

Terminal temperature range	If the temperature range between -10 °C and +80 °C is exceeded or not reached, the device displays the "Terminal temperature" error message. The output changes to a safe state (quiescent current principle). The message can only be acknowledged if the temperature has moved back into the valid range.
Resistance to climatic conditions	85 % rel. humidity without condensation (3K3 with extended temperature range according to DIN EN 60721-3-3)
EMC	According to DIN EN 14597 and standards from the standards series DIN EN 61326
Interference emission	Class B
Interference immunity	Evaluation criteria FS according to DIN EN 14597, regulation and control devices (RS)

1.All specifications refer to the measuring range end value

### 11.10 Housing

Material	Polycarbonate
Flammability class	UL 94 V0
Electrical connection	On the front via screw terminals up to max. 2.5 mm <sup>2</sup>
Mounting	On 35 mm DIN rail according to DIN EN 60715
Installation position	Vertical
Weight	Approx. 230 g
Protection type	IP 20 according to DIN EN 60529



## 11.11 Approvals/approval marks

Approval mark	Test facility	Certificates/Certification numbers	Inspection basis	Valid for
DIN	DIN CERTCO	STB/STW 1228	DIN EN 14597	All device versions
SIL2, SIL3	TÜV Nord (German Technical Inspection Agency)	SEBS-A.102606/16-2, V1.0	DIN EN 61508	All device versions
PL e			DIN EN ISO 13849	
DNV GL	DNV GL	TAA000017J		Only devices with extra code 062
Pressure Equipment Directive	TÜV Nord (German Technical Inspection Agency)	07 202 1045 Z 0031/14/D0046	Pressure Equipment Directive PED 97/23/EC	All device versions
ATEX "i"	TÜV Nord (German Technical Inspection Agency)	TÜV 11 ATEX 556139 X	Directive 94/9/EC	Devices with <b>blue</b> terminals
IECEx "i"	TÜV Nord (German Technical Inspection Agency)	IECEx TUN 15.0036X	IEC 60079-0 IEC 60079-11	
Ex "e" and "t"	Eurofins / Electrosuisse Product Testing	SEV 17 ATEX 0177 X	Directive 2014/34/EU	Devices with <b>black</b> terminals

---

### 11.12 Note about the probes in Chapter 11.13 to Chapter 11.15

The following should be noted:

- A safe isolation between the sensor and fitting does not exist. As a result, the sensor connections are to be considered grounded for the safety evaluation.
- Among other things, EN 60079-0 requires for the EPL Ga that the mass fraction of aluminum must be less than 10 % for the manufacture of metallic housings. The probe terminal head used by JUMO contains more than 10 % aluminum. The terminal head must therefore be secured by suitable impact protection for the use of EPL Ga (zone 0). The impact protection must reliably prevent friction sparks, contact-breaking sparks, and impact sparks. Otherwise there is a risk of ignitable sparks.

No other precautions have to be taken when used in EPL Gb (zone 1).

## 11.13 Probes for the operating medium air

**Note:** because of the high response accuracy, the use of thermowells (immersion sleeves) is not admissible.

Current type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe data sheet 902006				
902006/65-228-1003-1-15-500-668/922	1 × Pt100	-170 to +700 °C	500	
902006/65-228-1003-1-15-710-668/922			710	
902006/65-228-1003-1-15-1000-668/922			1000	
902006/55-228-1003-1-15-500-254/922	1 × Pt100	-170 to +700 °C	500	
902006/55-228-1003-1-15-710-254/922			710	
902006/55-228-1003-1-15-1000-254/922			1000	
902006/65-228-2003-1-15-500-668/922	2 × Pt100	-170 to +700 °C	500	Stop flange displaceable
902006/65-228-2003-1-15-710-668/922			710	
902006/65-228-2003-1-15-1000-668/922			1000	
902006/55-228-2003-1-15-500-254/922	2 × Pt100	-170 to +700 °C	500	Displaceable screw connection G1/2
902006/55-228-2003-1-15-710-254/922			710	
902006/55-228-2003-1-15-1000-254/922			1000	
Thermocouples data sheet 901006				
901006/65-547-2043-15-500-668/922	2 × NiCr-Ni, type "K"	-35 to +800 °C	500	Stop flange displaceable
901006/65-547-2043-15-710-668/922			710	
901006/65-547-2043-15-1000-668/922			1000	
901006/65-546-2042-15-500-668/922	2 × Fe-CuNi, type "L"	-35 to +700 °C	500	
901006/65-546-2042-15-710-668/922			710	
901006/65-546-2042-15-1000-668/922			1000	
901006/66-550-2043-6-500-668/922	2 × NiCr-Ni, type "K"	-35 to +1000 °C	500	
901006/66-550-2043-6-355-668/922			355	
901006/66-550-2043-6-250-668/922			250	
901006/66-880-1044-6-250-668/922	1 × PT10Rh-PT, type "S"	0 to 1300 °C	250	
901006/66-880-1044-6-355-668/922			355	
901006/66-880-1044-6-500-668/922			500	
901006/66-880-2044-6-250-668/922	2 × PT10Rh-PT, type "S"	0 to 1300 °C	250	Stop flange displaceable
901006/66-880-2044-6-355-668/922			355	
901006/66-880-2044-6-500-668/922			500	

Current type designation	Probe type	Temperature range	Nom. length mm	Process connection
901006/66-953-1046-6-250-668/922	1 × PT30Rh-PT6Rh, type "B"	600 to 1500 °C	250	
901006/66-953-1046-6-355-668/922			355	
901006/66-953-1046-6-500-668/922			500	
901006/66-953-2046-6-250-668/922	2 × PT30Rh-PT6Rh, type "B"	600 to 1500 °C	250	
901006/66-953-2046-6-355-668/922			355	
901006/66-953-2046-6-500-668/922			500	

## 11.14 Probes for water and oil

**Note:** because of the high response accuracy, **the use of thermowells** (immersion sleeves) **is not admissible**.

Current type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe data sheet 902006				
902006/10-226-1003-1-9-250-104/922	1 × Pt100	-40 to +480 °C	250	Screw connection G1/2
902006/10-226-2003-1-9-250-104/922	2 × Pt100		250	
902006/54-227-2003-1-15-710-254/922	2 × Pt100	-170 to 550 °C	65 to 670	Displaceable screw connection G1/2
902006/54-227-1003-1-15-710-254/922	1 × Pt100		65 to 670	
902006/10-402-1003-1-9-100-104/922	1 × Pt100	-170 to 400 °C	100	Screw connection G1/2
902006/10-402-2003-1-9-100-104/922	2 × Pt100		100	
Thermocouples data sheet 901006				
901006/54-544-2043-15-710-254/922	2 × NiCr-Ni, type "K"	-35 to 550 °C	65 to 670	Displaceable screw connection G1/2
901006/54-544-1043-15-710-254/922	1 × NiCr-Ni, type "K"		65 to 670	
901006/54-544-2042-15-710-254/922	2 × FeCuNi, type "L"		65 to 670	
901006/54-544-1042-15-710-254/922	1 × FeCuNi, type "L"		65 to 670	

**Note:** because of the high response accuracy, **only use thermowells** (immersion sleeves) **that are included** in the scope of delivery.

Current type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe data sheet 902006				
902006/53-505-2003-1-12-190-815/922	2 × Pt100	-40 to +400 °C	190	
902006/53-507-2003-1-12-100-815/922	2 × Pt100 (arranged beneath each other in the sheath)	-40 to +480 °C	100	
902006/53-507-2003-1-12-160-815/922			160	
902006/53-507-2003-1-12-190-815/922			190	
902006/53-507-2003-1-12-220-815/922			220	
902006/53-507-1003-1-12-100-815/922	1 × Pt100	-40 to +480 °C	100	Weldable sleeve
902006/53-507-1003-1-12-160-815/922			160	
902006/53-507-1003-1-12-220-815/922			220	
902006/53-505-1003-1-12-190-815/922	1 × Pt100	-40 to +400 °C	190	
902006/53-505-3003-1-12-100-815/922	3 × Pt100	-40 to +400 °C	100	
902006/53-505-3003-1-12-160-815/922			160	
902006/53-505-3003-1-12-220-815/922			220	
902006/40-226-1003-1-12-220-815/922	1 × Pt100	-170 to +480 °C	220	Weldable sleeve
902006/40-226-1003-1-12-160-815/922			160	
902006/40-226-1003-1-12-100-815/922			100	
Thermocouples data sheet 901006				
901006/53-543-1042-12-220-815/922	1 × Fe-CuNi type "L"	-35 to 480 °C	220	Weldable sleeve
901006/53-543-2042-12-220-815/922	2 × Fe-CuNi type "L"		220	

## 11.15 Probes for air, water, and oil

**Note:** because of the high response accuracy, **the use of thermowells** (immersion sleeves) **is not admissible**.

Current type designation	Probe type	Temperature range	Nom. length mm	Process connection
<b>RTD temperature probe data sheet 902006</b>				
902006/10-390-1003-1-8-250-104/22	1 × Pt100	max. 300 °C	250	Screw-in threat G1/2
<b>Thermocouples data sheet 901006</b>				
901006/45-551-2043-2-xxxx-11-xxxx	2 × NiCr-Ni, type "K"	max. 1150 °C	50 to 2000	



### **Attention:**

A probe short circuit can only be detected with a double thermocouple.



### **Note:**

The probes according to data sheet 901006 and 902006 are also certified for the PED.

## 12 Setup program

The program and the connecting cable are available as accessories and offer the following possibilities:

- Simple and convenient parameterization and archiving via PC
- Easy parameter duplication for identical types of devices

### 12.1 Minimum hardware and software requirements:

- PC Pentium III or higher
- 128 MB RAM, 16 MB free on hard disk
- CD-ROM drive
- Free USB interface, mouse connection
- Microsoft<sup>1</sup> Windows 2000/XP
- \* Connect the device to the PC using the USB cable

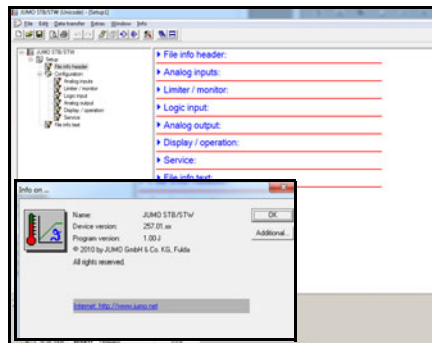
### 12.2 Displaying the device software version

- \* Simultaneously press the **P** and **▲** keys and hold down

This version is also recognized by the setup program and displayed under *Info* ⇒ *Information about setup*.

The software versions of the device and the setup program must be compatible as otherwise an error message will appear!

1. Microsoft is a registered trademark of Microsoft Corporation

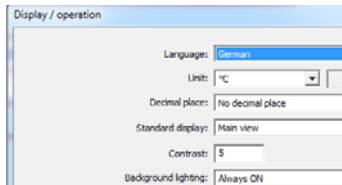




## 12.3 Forgotten the code?

If you forget the code, it can be read out via the USB interface and the setup program.

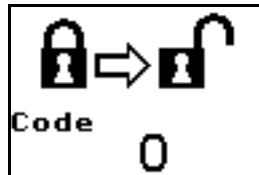
\* Use *Data transfer*  $\Rightarrow$  from device.



The read-out code now appears in the setup program.

It can be kept as it is or changed.

If "0" is set and transferred to the device, the code interrogation is disabled and the configuration level is freely accessible.



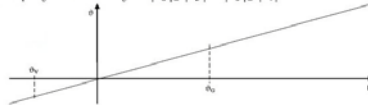
## 12.4 Special function: thermocouple reverse-polarity protection

If the polarity of a thermocouple is reversed, measured values are shown that do not reflect the real situation, for example, negative temperatures may be displayed instead of the expected positive temperatures.

This may lead to the set limit value never being reached. For this purpose, an additional limit value is defined at -205 °C by default, which triggers the alarm relay if the value falls below this.

A suitable value must be selected here so that it is possible to detect potential reverse polarity.

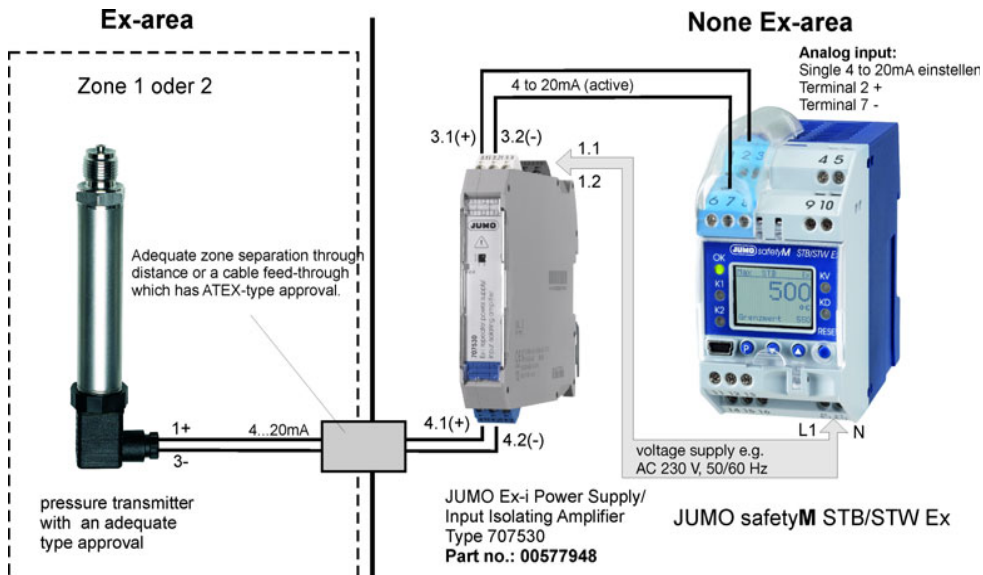
Verpolungsschutz funktionstüchtig wenn  $|\theta_0| \geq |\theta_v|$  und  $|\theta_0| \geq |\theta_v|$



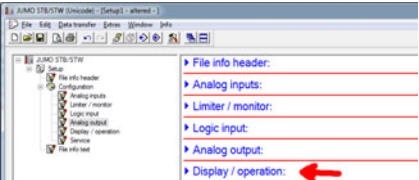
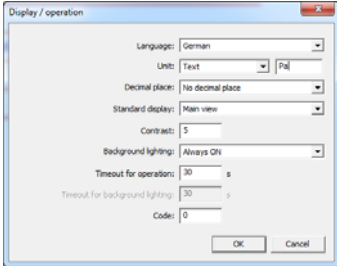
Grenzwert einstellbar:  $\theta_0$  -9999°C bis +9999°C z.B. -50°C  
Grenzwert Verpolungsschutz einstellbar:  $\theta_v$  -205°C bis +200°C z.B. 100°C  
Grenzwert Differenzmessung einstellbar:  $\theta_0$  0°C bis 100°C  
Im Falle der unsymmetrischen Verpolung der Sensoren, schaltet der STB die Anlage beim Erreichen des Differenzgrenzwertes die Anlage sicher ab.  
Im Falle der symmetrischen Verpolung wird dem STB fallende Temperatur auf den redundanten Kanälen signalisiert.  
Wird der Verpolungsgrenzwert erreicht, schaltet der STB sicher die Anlage ab.

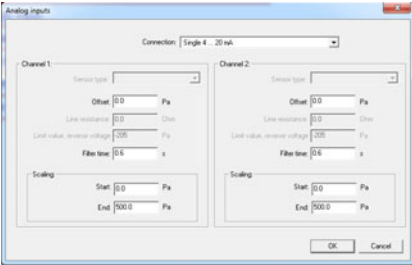
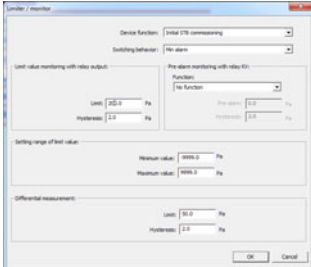
## 12.5 Displaying a pressure signal via the current input

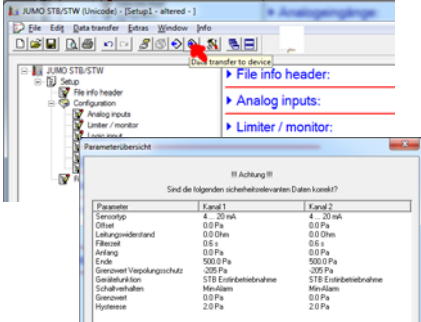
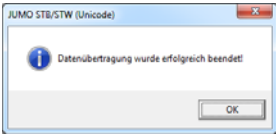
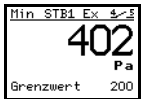
The pressure signal is connected to the JUMO safetyM STB/STW Ex via a pressure transmitter in the form of a 4 to 20 mA standard signal using a supply isolating amplifier.



## 12.5.1 Configuration of a pressure signal using the setup program

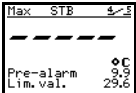
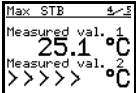

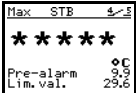
Step	Action	Description
1	* Connect the device to the PC via USB and start the setup program	 <p>The screenshot shows the 'JUMO SIB/STW (Unicode) - [Setup] - altered -' window. The left pane shows a tree structure under 'Setup' with 'Configuration' expanded, listing 'File info header', 'Analog inputs', 'Limiter / monitor', 'Logic input', 'Analog output', 'Display / operation', 'Service', and 'Free info text'. The right pane lists these same items with expandable arrows. A red arrow points to the 'Display / operation' item in the right pane.</p>
2	* In the "Display/Operation" menu, set <b>Text</b> and <b>Pa</b> for the unit and acknowledge with OK	 <p>The screenshot shows the 'Display / operation' dialog box. It contains several settings: 'Language' is set to 'German', 'Units' is set to 'Pa', 'Decimal places' is set to 'No decimal place', 'Standard display' is set to 'Main view', 'Contrast' is set to '5', 'Background lighting' is set to 'Always Off', 'Timeout for operation' is set to '30 s', 'Timeout for background lighting' is set to '30 s', and 'Codes' is set to '0'. There are 'OK' and 'Cancel' buttons at the bottom right.</p>

Step	Action	Description
3	<ul style="list-style-type: none"> <li>* In the "Analog input" menu, set <b>single 4 to 20 mA</b>; further input fields for scaling are then shown</li> <li>* Enter <b>start: 0</b> and <b>end: 500</b> for both channels and acknowledge with OK</li> </ul>	
4	<ul style="list-style-type: none"> <li>* In the "Limiter/Monitor" menu, set <b>STB or Initial STB commissioning</b> and the switching behavior to <b>Min. alarm</b> and acknowledge with OK</li> <li>* Enter the desired <b>limit value</b> (in Pa) and <b>hysteresis</b></li> </ul>	

Step	Action	Description																																				
5	<p><b>* Transfer data to the device</b> A summary of the parameters appears</p>	 <p>► File info header: ► Analog inputs: ► Limiter / monitor:</p> <p>Parameterübersicht</p> <p>!!! Achtung !!! Sind die folgenden sicherheitsrelevanten Daten korrekt?</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Kanal 1</th> <th>Kanal 2</th> </tr> </thead> <tbody> <tr> <td>Sensortyp</td> <td>4 ... 20 mA</td> <td>4 ... 20 mA</td> </tr> <tr> <td>Offset</td> <td>0.0 Pa</td> <td>0.0 Pa</td> </tr> <tr> <td>Leitungswiderstand</td> <td>0.0 Ohm</td> <td>0.0 Ohm</td> </tr> <tr> <td>Füllwert</td> <td>0.6 s</td> <td>0.6 s</td> </tr> <tr> <td>Anfang</td> <td>0.0 Pa</td> <td>0.0 Pa</td> </tr> <tr> <td>Ende</td> <td>500.0 Pa</td> <td>500.0 Pa</td> </tr> <tr> <td>Grenzwert Verkopplungsschutz</td> <td>-205 Pa</td> <td>-205 Pa</td> </tr> <tr> <td>Gesamtfunktion</td> <td>STB Einzelbetriebnahme</td> <td>STB Einzelbetriebnahme</td> </tr> <tr> <td>Schaltverhalten</td> <td>MinAlarm</td> <td>MinAlarm</td> </tr> <tr> <td>Grenzwert</td> <td>0.0 Pa</td> <td>0.0 Pa</td> </tr> <tr> <td>Hysterese</td> <td>2.0 Pa</td> <td>2.0 Pa</td> </tr> </tbody> </table>	Parameter	Kanal 1	Kanal 2	Sensortyp	4 ... 20 mA	4 ... 20 mA	Offset	0.0 Pa	0.0 Pa	Leitungswiderstand	0.0 Ohm	0.0 Ohm	Füllwert	0.6 s	0.6 s	Anfang	0.0 Pa	0.0 Pa	Ende	500.0 Pa	500.0 Pa	Grenzwert Verkopplungsschutz	-205 Pa	-205 Pa	Gesamtfunktion	STB Einzelbetriebnahme	STB Einzelbetriebnahme	Schaltverhalten	MinAlarm	MinAlarm	Grenzwert	0.0 Pa	0.0 Pa	Hysterese	2.0 Pa	2.0 Pa
Parameter	Kanal 1	Kanal 2																																				
Sensortyp	4 ... 20 mA	4 ... 20 mA																																				
Offset	0.0 Pa	0.0 Pa																																				
Leitungswiderstand	0.0 Ohm	0.0 Ohm																																				
Füllwert	0.6 s	0.6 s																																				
Anfang	0.0 Pa	0.0 Pa																																				
Ende	500.0 Pa	500.0 Pa																																				
Grenzwert Verkopplungsschutz	-205 Pa	-205 Pa																																				
Gesamtfunktion	STB Einzelbetriebnahme	STB Einzelbetriebnahme																																				
Schaltverhalten	MinAlarm	MinAlarm																																				
Grenzwert	0.0 Pa	0.0 Pa																																				
Hysterese	2.0 Pa	2.0 Pa																																				
6	<p><b>* Once the data has been successfully transferred, disconnect the USB connection.</b></p>																																					
7	<p>The device now displays a pressure of between 0 and 500 Pa. If the pressure drops to below 200 Pa, the alarm relay output is switched off.</p>																																					


## 13 Alarm messages

They can appear as follows:

Alarm display	Cause	Remedy
5 flashing horizontal lines: 	<b>Measured value error</b> No valid value can be displayed	<ul style="list-style-type: none"> <li>* Check error messages on the device</li> <li>* Contact the JUMO Service department</li> </ul> ⇒ For service addresses see back cover
	<b>Measured value overrange</b> The measured value is too high, is outside the measuring range or the probe is broken.	<ul style="list-style-type: none"> <li>* Change the display to 2 measured values This makes it possible to detect which channel is defective.</li> <li>* Check the probe and connecting cable for damage or short-circuit</li> </ul>
	<b>Measured value underrange</b> The measured value is too low, is outside the measuring range or a short-circuit occurred at the probe.	⇒ Chapter 4.3 "Connection diagram" <ul style="list-style-type: none"> <li>* Check that the correct probe is set or connected</li> </ul> ⇒ Chapter 10.2 "Analog inputs"
5 flashing asterisks: 	<b>Display overflow</b> Value cannot be displayed	<ul style="list-style-type: none"> <li>* Check error messages on the device</li> <li>* Contact the JUMO Service department</li> </ul> ⇒ For service addresses see back cover

## 14 Error messages

These error messages are displayed one below the other.

Error display (Err)	Origin	Cause/remedy
	Internal	<p>The set limit value for relay switching cycles has been reached</p> <ul style="list-style-type: none"><li>* Increase limit value of the relay switching cycles</li></ul> <p>⇒ Chapter 10.7.1 "Limit switching cycle"</p> <p>A check mark appears instead of the bell and the error message can be acknowledged</p>
Terminal temp.	Internal	<p>The internal Pt100 is defective<sup>1</sup>, or the terminal temperature is outside the admissible range (-10 to 80 °C).</p> <p>The message cannot be acknowledged until it is within the valid range again.</p>
Reference volt. <sup>1</sup>	Internal	<p>The reference voltage is outside the valid range.</p> <p>The message cannot be acknowledged until it is within the valid range again.</p>
Calibration const. <sup>1</sup>	Internal	<p>A calibration constant is outside the valid range.</p> <p>The message cannot be acknowledged until it is within the valid range again.</p>
Configuration	Internal	<p>Configuration data outside the value range.</p> <p>The message cannot be acknowledged until it is within the valid range again.</p>
Measured value	Internal	<p>The measured value 1 or 2 is outside the valid range.</p> <p>The message cannot be acknowledged until it is within the valid range again.</p>

Error display (Err)	Origin	Cause/remedy
Measured value missing	Internal	When the error status "Measured value" is signaled by the channel, the diagnosis function tries to show the precise error on the basis of the read measured value.
Probe short-circ.	External	
Meas. overr.		
Meas. underr.		
Probe break		
Operating access <sup>1</sup>	Internal	The diagnosis function is communicating with the STB/STW. The message cannot be acknowledged until communication has finished.
Setup access	Internal	The setup program is communicating with the STB/STW. The message cannot be acknowledged until communication has finished.
CRC calibr. <sup>1</sup>	Internal	Checksum error of the EEPROM calibration data. The message cannot be acknowledged until it is within the valid range again.
CRC config. <sup>1</sup>	Internal	Checksum error of the EEPROM configuration data. The message cannot be acknowledged until it is within the valid range again.
Registry <sup>1</sup>	Internal	A registry error has occurred. The message cannot be acknowledged until the error has been remedied.
RAM defective <sup>1</sup>	Internal	A RAM error has occurred. The message cannot be acknowledged until the error has been remedied.
ROM defective <sup>1</sup>	Internal	A ROM error has occurred. The message cannot be acknowledged until it is within the valid range again.
Program sequence <sup>1</sup>	Internal	A program sequence error has occurred. The message cannot be acknowledged until the error has been remedied.



<b>Error display (Err)</b>	<b>Origin</b>	<b>Cause/remedy</b>
Watchdog <sup>1</sup>	Internal	A watchdog reset has occurred. The message can be acknowledged.
Overvoltage <sup>1</sup>	Internal	The uncontrolled secondary voltage supply is too high. The message can be acknowledged.
Frequency <sup>1</sup>	Internal	Error of the independent time base. The message can be acknowledged
EEPROM defective <sup>1</sup>	Internal	Error during internal communication with the EEPROM. The message can be acknowledged.
Stack <sup>1</sup>	Internal	Error in the memory area reserved for the stack. The message cannot be acknowledged until it is within the valid range again.
AD converter <sup>1</sup>	Internal	Error during internal communication with the A/D converter. The message can be acknowledged
Simulation <sup>1</sup>	Internal	Error during the measured value simulation. The message can be acknowledged.
Zero point <sup>1</sup>	Internal	The zero point voltage of the A/D converter is too low. The message can be acknowledged.
Limit value	Plant	The configured limit value has been exceeded or undershot.

Error display (Err)	Origin	Cause/remedy
Diagnosis function		
FLASH defective <sup>1</sup>	Internal	An error was detected during the cyclic memory test of the ROM.
RAM defective <sup>1</sup>	Internal	An error was detected during the cyclic memory test of the RAM.
CRC config. <sup>1</sup>	Internal	An error was detected by the checksum test (CRC16) in the configuration of the diagnosis function.
CRC calib. <sup>1</sup>	Internal	An error was detected by the checksum test (CRC16) in the calibration data of the diagnosis function.
Configuration	Internal	The configuration contains invalid data.
SW version <sup>1</sup>	Internal	The software versions are invalid.
Editing	Internal	An error has occurred during editing.
V too low	Internal	The internal voltage supply value has fallen below the permitted range.
V too high	Internal	The permitted range of the internal voltage supply has been exceeded.
Int. communic. <sup>1</sup>	Internal	An error has occurred during internal communication.
No access to channels	Internal	One or both channels/the communication to the channels is defective/disrupted.
Difference	Plant	The difference (channel 1 minus channel 2) of the measured values has exceeded the maximum permitted value.
Switching cycles	Internal	<p>The configured limit of the switching cycles has been exceeded. (There is only one counter as all alarm relays always switch)</p> <p>The error can be acknowledged by reducing the current counter or increasing the limit.</p> <p>(So that the switching cycles are not accidentally set to 0 in the event of further errors)</p>

Error display (Err)	Origin	Cause/remedy
USB communic.	Internal	An error has occurred during USB communication.




Footnote 1

If the error cannot be acknowledged despite repeated switching off and on, the device must be repaired by JUMO.

\* Return the device

⇒ For service addresses see back cover

## 15 What to do, if ...

Description	Cause	Remedy
<p>The following appears in the display:</p> 	<p><b>Setup program transmits data.</b> The monitoring function switches off briefly during data transmission and the device re-starts.</p>	<ul style="list-style-type: none"> <li>- Wait until data transmission has finished</li> </ul>
<p>The measured value flashes in the top display.</p> 	<p><b>The device is in the alarm range</b> LEDs K1, K2 are lit red. The measured value flashes in the display and is higher or lower than the limit value depending on the switching behavior set.</p> <ul style="list-style-type: none"> <li>- Measured value too high or too low</li> <li>- Excessive deviation between the temperature values during difference monitoring</li> </ul>	<ul style="list-style-type: none"> <li>* Check the limit value in the configuration level.</li> <li>* Find out the reason for the overrange or under-range</li> <li>* If necessary, correct the limit value</li> <li>* If necessary reduce the excessively high hysteresis, as it may be too far into the valid range.</li> </ul> <p>⇒ Chapter 10.3.3 "Limit value, hysteresis"</p>
<p>LED K1 is lit red, although the measured value is in the valid range</p>	<p><b>The device is set as a safety temperature limiter (STB).</b> Even if the measured value is already back in the valid range after an overrange, the relay of a temperature monitor does not automatically reset. It must be unlocked manually.</p>	<ul style="list-style-type: none"> <li>* Press the  (RESET) key for longer than 3 seconds to manually unlock the relay.</li> </ul> <p>⇒ Chapter 5.5 "Acknowledging alarms using the reset key (for temperature limiter STB only)"</p>

Description	Cause	Remedy
... alarm relay output between terminal 14 and 16 is not closed although the OK LED is lit green (in the valid range).	- The integrated fuse cut-out is defective, caused by an excessive relay current.	<p><b>*</b> Measure terminal 14 and 16 of the relay when the LED K1 is lit green using a continuity test device.</p> <p><b>*</b> The device must be repaired by JUMO if no continuity can be measured.</p> <p>⇒ For service addresses see back cover</p>
... the display is dark, only the LEDs are lit	- Display shut-down after timeout was activated.	<p><b>*</b> Press any key or switch off timeout.</p> <p>⇒ Chapter 10.6.8 "Time-out operation"</p>

## 16 Information for devices with extra code 062 GL

The following information supplements or replaces the existing specifications.

### 16.1 Technical data

**The environmental influences according to application category C for closed areas**

Temperature	0 to 55 °C
Relative humidity	≤100 % rh
Vibration	≤0.7 g

**Inspection basis: GL design specifications & directives:**

**EMC 1**

**Software requirement class: 4**

### 16.2 Alarm messages

⇒ Chapter 13 "Alarm messages"

### 16.3 Locks

The configuration level can be locked with a code.

⇒ Chapter 10.6.9 "Code"

Intentional or unintentional adjustments are not possible without additional measures.

⇒ Chapter 5.8 "Sealing the device"



For servicing, the device must be returned to the main factory.  
According to the recommendation of Germanischer Lloyd, the availability of a replacement device should be ensured for certain applications.



It is recommended to enclose a printout of the configuration parameters (setup program) and the technical documents for the JUMO safetyM STB/STW Ex (connection diagram) on-site (request them if necessary).

## 17 Behavior of outputs

Operating status	Alarm relay output	Pre-alarm relay output KV	Analog output
Initialization			
Initialization phase after mains voltage – ON (for approx. 10 seconds)	Disabled	Disabled	0 mA, 0 V
Setup communication			
During reading-writing of the configuration (for approx. 5 seconds)	Disabled	Pre-alarm monitoring active ⇒ Chapter 10.3.4	Scaled analog signal is output ⇒ Chapter 10.5
Standard operation			
<b>System in error-free state after initialization phase</b> (STB initial startup)	Disabled, unlocking possible	Pre-alarm monitoring active ⇒ Chapter 10.3.4	Scaled analog signal is output ⇒ Chapter 10.5
System in error-free state after initialization phase (STB, STW)	Monitoring of the limit value active ⇒ Chapter 10.3.2		
External error			
Probe break, probe short circuit (e.g. input 1)	Disabled	Pre-alarm error and pre-alarm relay configurable ⇒ Chapter 10.3.6	Malfunctions configurable ⇒ Chapter 10.5.5 Error signal is output ⇒ Chapter 10.5.6



Operating status	Alarm relay output	Pre-alarm relay output KV	Analog output
After probe break, probe short circuit (STW)	Monitoring of the limit value active ⇒ Chapter 10.3.2	Pre-alarm monitoring active ⇒ Chapter 10.3.4	Scaled analog signal is output ⇒ Chapter 10.5
After probe break, probe short circuit (e.g. input 1) (STB)	Disabled, unlocking possible		
After acknowledgement of probe break, probe short circuit (STB)	Monitoring of the limit value active ⇒ Chapter 10.3.2		
Difference monitoring through diagnostics			
Difference – alarm (STW function)	Disabled	Pre-alarm error and pre-alarm relay configurable ⇒ Chapter 10.3.6	Malfunctions configurable ⇒ Chapter 10.5.5 Error signal is output ⇒ Chapter 10.5.6
Difference – alarm disabled again (STW function)	Monitoring of the limit value active ⇒ Chapter 10.3.2	Pre-alarm monitoring active ⇒ Chapter 10.3.4	Scaled analog signal is output ⇒ Chapter 10.5
Difference – alarm (STB function)	Disabled	Pre-alarm error and pre-alarm relay configurable ⇒ Chapter 10.3.6	Malfunctions configurable ⇒ Chapter 10.5.5 Error signal is output ⇒ Chapter 10.5.6

Operating status	Alarm relay output	Pre-alarm relay output KV	Analog output
Difference – alarm disabled again (STB function)	Disabled, unlocking possible	Pre-alarm monitoring active ⇒ Chapter 10.3.4	Scaled analog signal is output ⇒ Chapter 10.5
After acknowledgement of difference – alarm (STB function)	Monitoring of the limit value active ⇒ Chapter 10.3.2		
Internal error			
Internal error – diagnostics channel active	Disabled	Pre-alarm monitoring active ⇒ Chapter 10.3.4	Scaled analog signal is output ⇒ Chapter 10.5
Internal error – diagnostics channel disabled again	Monitoring of the limit value active ⇒ Chapter 10.3.2		
Internal error – safety channel active (STB)	Disabled	Pre-alarm error and pre-alarm relay configurable ⇒ Chapter 10.3.6	Malfunctions configurable ⇒ Chapter 10.5.5 Error signal is output ⇒ Chapter 10.5.6
Internal error – safety channel disabled again (STB)	Disabled, unlocking possible	Pre-alarm monitoring active ⇒ Chapter 10.3.4	Scaled analog signal is output ⇒ Chapter 10.5
Internal error – safety channel after acknowledgement (STB)	Monitoring of the limit value active ⇒ Chapter 10.3.2		

## 18 Certificates

### 18.1 DIN STB/STW1228

 Gesellschaft für Konformitätsbewertung mbH	
<b>Certificate holder</b>	<b>JUMO GmbH &amp; Co. KG</b> Moritz-Juchheim-Str. 1 36039 Fulda GERMANY
<b>Product</b>	Temperature control and limiting devices for heat generating systems
<b>Type, Model</b>	JUMO safetyM STB/STW Ex 701155
<b>Remarks to the type</b>	Electronic Temperature control/Temperature limiter
<b>Testing basis</b>	DIN EN 14597:2012-09 Certification scheme Temperature control and limiting devices for heat generating systems (2009-01)
<b>Mark of conformity</b>	
<b>Registration No.</b>	STB/STW1228
<b>Valid until</b>	2021-11-30
<b>Right of use</b>	This certificate entitles the holder to use the mark of conformity shown above in conjunction with the specified registration number.  See annex for further information.

  
Deutscher  
Anlagenbau  
DIN 1135-1-01

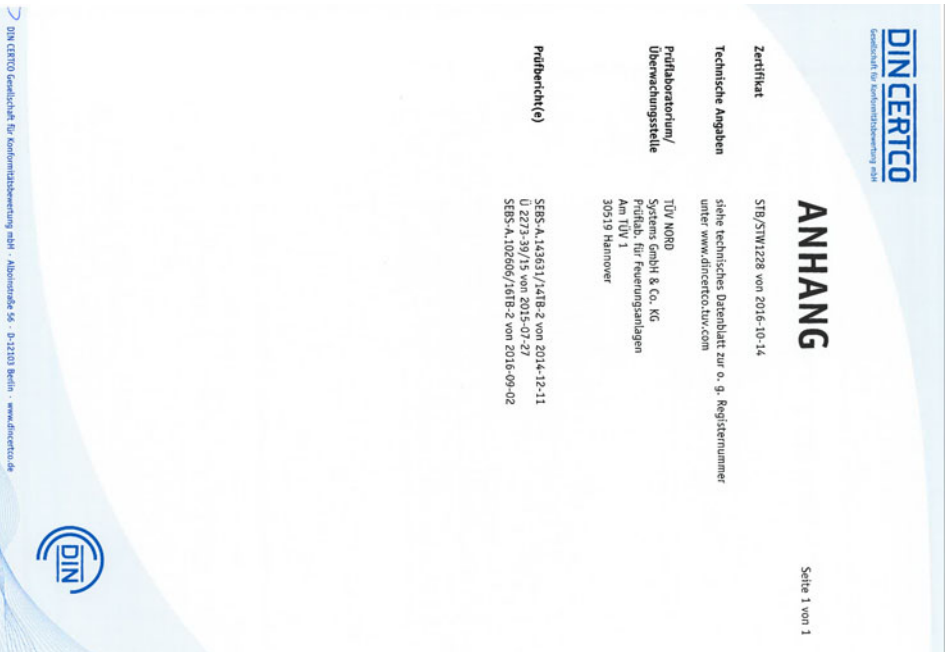
2016-10-14  
Dirk-Phys. Carlo Seiler  
Certifier



  
GESELLSCHAFT FÜR KONFORMITÄTSBEWERTUNG mbH



DIN CERTCO Gesellschaft für Konformitätsbewertung mbH · Altonastraße 55 · D-12110 Berlin · [www.din-certco.de](http://www.din-certco.de)



# Certificate

No. SEBS-A-102606/16-2 V1.0

TÜV NORD Systems GmbH & Co. KG hereby certifies to

**JUMO GmbH & Co. KG**

Moritz-Juchheim-Strasse 1  
36039 Fulda

that the safety related products electronic safety temperature monitor/limiter

**JUMO safetyM STB/STW Ex 701155**

are capable for safety related applications up to SIL 3 and up to PL e respectively and meet the requirements listed in the following standards.

- DIN EN 61508/-1/-2/-3: 2011
- DIN EN 14597: 2015
- DIN EN 60730-2-9: 2011
- DIN EN ISO 13849-1: 2016

The type-list of the products is pictured on the backside of this certificate.

The certification is based on the report No. SEBS-A-102606/16TB-2 in the valid version.

This certificate entitles the holder to use the pictured Safety Approved mark.

Expiry date: 2021-09-04  
Reference No.: 8113652348

Hamburg, 2016-09-05

Bianca Puff

Certification body SEECERT  
TÜV NORD Systems GmbH & Co. KG  
Große Bahnstraße 31, 22525 Hamburg, Germany



Product-TypeList for certificate SEBS-A.102606/16-2, Version V1.0

Types	Connected sensors (Architecture)	SFF	PFD <sub>avg</sub>	PFH [1/m]
230V: JUMO safetyM STB/STW Ex 701155	1PT100 – two-wire-technology (1001)	96%	2,29e-4	5,18e-9
	2 PT100/PT1000 – two-wire-technology (1002)	96%	7,29e-5	1,66e-9
	2 PT100/PT1000 – three-wire-technology (1002)	96%	7,29e-5	1,66e-9
	2 thermal element (1002)	96%	7,46e-5	1,71e-9
	1 PT100/PT1000 – (two- and three-wire technology) (1002)	96%	7,55e-5	1,73e-9
	1 thermal element STB/STW 701155 without sensors has a 1002D architecture	96%	6,74e-5	1,54e-9
24V: JUMO safetyM STB/STW Ex 701155	no sensing device or use of 4...20mA			
	means that the sensing device is not included in the calculations			
	1PT100 – two-wire-technology (1001)	96%	3,19e-4	7,22e-9
	2 PT100/PT1000 – two-wire-technology (1002)	96%	1,63e-4	3,71e-9
	2 PT100/PT1000 – three-wire-technology (1002)	96%	1,63e-4	3,71e-9
	2 thermal element (1002)	96%	1,64e-4	3,75e-9
	1 PT100/PT1000 – (two- and three-wire technology) (1002)	96%	1,69e-4	3,85e-9
	1 thermal element STB/STW 701155 without sensors has a 1002D architecture	96%	1,61e-4	3,68e-9
	no sensing device or use of 4...20mA			
	means that the sensing device is not included in the calculations			

The JUMO safetyM STB/STW Ex 701155 has the following mode of actions according to DIN EN

14597: 2B, 2D, 2F, 2K, 2J, 2V, 2N, 2P, Software class C

Reference No.:8113652348

# ZERTIFIKAT CERTIFICATE

(Konformitätsbescheinigung) / (of conformity)

EG-Baumusterprüfung

EC type-examination

nach Richtlinie 97/23/EG / according to directive 97/23/EC

Zertifikat-Nr. / Certificate No.: 07 202 1045 Z 0031/14/D0046 rev.01

Name und Anschrift des Herstellers

Name and address of breeder/

manufacturer:

**JUMO GmbH & Co. KG**  
Moritz-Juchheim-Strasse 1  
D-36039 Fulda

Hiermit wird bescheinigt, dass das unten genannte EG-Baumuster die Anforderungen der Richtlinie 97/23/EG erfüllt.

We hereby certify that the type examination mentioned below fulfils the requirements of directive 97/23/EC.

Geprüft nach Richtlinie 97/23/EG

Tested according to 97/23/EC

Prüfbericht-Nr./ Test report No.:

**EG-Baumusterprüfung (Modul B)**  
EC type-examination (module B)  
1045P0031/14/D0046, 1045P0038/15/D0046 und  
SEBS-A.1463/14/1B-zw. SEBS-A.1463/14/1B-2

Beschreibung des Baumusters  
(Druckgerät):

Description of type (pressure equipment):

**Elektronische Temperaturwächter, Temperaturbegrenzer, Sicherheitstemperaturbegrenzer**  
**JUMO safetyM STB/STW 701150**  
**JUMO safetyM STB/STW Ex 701155**

Fertigungsstätte/Place of manufacture:

**JUMO GmbH & Co. KG**  
Moritz-Juchheim-Strasse 1  
D-36039 Fulda

Gültig bis/valid until:

31.01.2023

Geßtingen, 09.03.2015

Zertifizierungsstelle für Druckgeräte  
der TÜV NORD Systems  
GmbH & Co. KG

**Rainer Wiedemann, Dipl.-Ing.**  
Betreiber Stelle Notdienst 0365 3100 37

TÜV Nord Systems GmbH & Co. KG  
Groß-Bahrendamm 31  
D-22525 Hamburg

Telefon +49 (0) 551 3655 170  
Fax +49 (0) 551 3655 121  
e-mail goettingen@tuv-nord.de

Zeichner  
Mitglied der  
member of

**CEOC**  
DEUTSCHE ZERTIFIZIERUNGS-UND PRÜFUNGSGESAMTSCHAFT



## 18.4 DNV GL

# DNV·GL

## TYPE APPROVAL CERTIFICATE

Certificate No:  
TAA0000173

**This is to certify:**  
**That the Peripheral Equipment**

with type designation(s)  
**JUMO safetyM STB/STW**

Issued to  
**JUMO GmbH & Co. KG**  
**Fulda Hessen, Germany**

Is found to comply with  
**DNV GL rules for classification – Ships, offshore units, and high speed and light craft**

**Application :**  
**Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

**Location class:**

**Temperature B**  
**Humidity B**  
**Vibration A**  
**EMC B**  
**Enclosure A**

**Issued at Hamburg on 2017-06-30**

**This Certificate is valid until 2022-06-17.**  
**DNV GL local station: Magdeburg**

**Approval Engineer: Klaus-Peter Schröder**



**Digitally Signed By: Rinkel, Marco**  
**for DNV GL**  
**Signing Date: 2017-07-06**  
**Location: Hamburg - On behalf of**

**Joannis Papanuskas**  
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.  
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Form code: TA 351

Revisions: 2016-12

www.dnvgl.com

Page 1 of 3

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.



## Product description

STB: Safety Temperature Limiter  
 STW: Safety Temperature Monitor

Type	701150: JUMO safetyM STB/STW 701155: JUMO safetyM STB/STW Ex
Power supply	110 ... 240 V AC 20 ... 30 V AC/DC
Inputs	2x analogue (Pt100 / Pt1000 2- or 3-wire, thermocouple, 0/4...20mA) 1x digital
Outputs	2x c/o contacts (Pre-alarm / Alarm)
Mounting	Rail
HMI	Display: monochrome with back-light (96x64 Dots) SMD-LED's: 1x green, 2yellow, 2x red Operation: 4-time operator keys: PgM (P), Down, Up, R (Reset)
Electrical connection	On the front via screw terminals up to 2.5 mm <sup>2</sup>
Housing	Polycarbonate Flammability class: UL94 V0

## Place of manufacture

JUMO GmbH & Co. KG  
 Montz-Juchheim-Strasse 1  
 36039 Fuld, Germany

## Application/Limitation

The Type Approval covers hardware listed under Product description.  
 When the hardware is used in applications to be classed by DNV GL, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case.  
 Reference is made to DNV GL RU SHIP Pt.4 Ch.9 Sec. 1.

Ex-certification is not covered by this certificate. Application in hazardous area to be approved in each case according to the Rules and Ex-Certification/ Special Condition for Safe Use listed in valid Ex-Certificates issued by a notified/recognized Certification Body - see:  
 EC-Type Examination Certificate TÜV 11 ATEX S56139 X (31.10.2012)  
 Certificate of Conformity IECEx TUN 15.0036X (13.04.2017)

## Product certificate

If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After the certification the clause for application software control will be put into force.

## Clause for application software control

All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV for evaluation and approval. Major changes in the software are to be approved before being installed in the computer.

## Type Approval documentation

GL-Baumusterprüfung Prüfplan-Umweltprüfungen, Referenzliste (13.05.2012)  
 GL-Baumusterprüfung STB Typenreihe 701150/701155 (29.01.2012)  
 JUMO Test Protocol K/ET0.2785 (05.05.2017)  
 TÜV Nord Certificate No. SEBS-A102606/16-1 V1.0 (05.09.2016)  
 TÜV Nord Inspection report No. SEBS-A102606/16TB-1 (version 1.0 /02.09.2016)  
 TÜV Nord Certificate No. SEBS-A102606/16-2 V1.0 (05.09.2016)

Job Id: **262.1-025657-1**  
 Certificate No.: **TAAD0000173**

TUV Nord Inspection report No. SEBS-A102606/16TB-2 (version 1.0 /02.09.2016)

Data sheet 701150 70115000102004K000 (V1.01/EN/00540116)

Operating Manual 701150 701150007902004K000 (V1.01/EN/00564764)

Data sheet 701155 70115500102001K000 (V2.00/EN/00542385)

Operating Manual 701155 701155007902001K000 (V2.00/EN/00542382)

EC-Type Examination Certificate TUV 11 ATEX 556139 X (31.10.2012)

1. Supplement EC-Type Examination Certificate TUV 11 ATEX 556139 X (09.07.2015)

Certificate of Conformity IECEx TUN 15.0036X (13.04.2017)

Type Approval Assessment Report (15.05.2017)

### Tests carried out

Applicable tests according to Class Guideline DNVGL-CG-0339, Edition November 2016.

### Marking of product

The products to be marked with:

- manufacturer name
- serial number
- type 701150 or 701155

### Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed at least every second year and at renewal of this certificate.  
 END OF CERTIFICATE



## Translation

## (1) EC-Type Examination Certificate

- (2) Equipment and protective systems intended for use in potentially explosive atmospheres, Directive 94/9/EC

- (3) Certificate Number TÜV 11 ATEX 556139 X

- (4) for the component: Safety temperature limiter STB/STW 701155

- (5) of the manufacturer: JUMO GmbH & Co. KG

- (6) Address: Moritz-Luchheim-Straße 1
- 
- 36039 Fulda
- 
- Germany

Order number: 8000556139

Date of issue: 2012-10-31

- (7) This component of an equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

- (8) The TÜV NORD CERT GmbH, notified body No. 0044 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 12 203 556139.

- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2009 EN 60079-11:2007 EN 61241-11:2006  
EN 60079-26:2007 EN 50495:2010 EN 13463-6:2005

- (10) If the sign "U" is placed after the certificate number, it indicates that this certificate must not be confounded with an EC-Type Examination Certificate which is destined for an equipment or protective system. This partial certificate must only be used as a basis for an EC-Type Examination Certificate.

- (11) This EC-type examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

- (12) The marking of the component must include the following:

II (1) (2) (3) G (b1) [Ex Ia Ga] [e pz] IIC and II (1) (2) (3) D (b1) [Ex Ia Da] [p Dc] IIIC  
resp.

II (1) (1) (2) G (b2) [Ex Ia Ga] [e pz] IIC and II (1) (1) (2) D (b2) [Ex Ia Da] [p Db] IIIC

TÜV NORD CERT GmbH, Langemannstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZSt. Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032  
The head of the notified body

Schwedt

Hannover office, Am TÜV 1, 30519 Hannover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590

This certificate may only be reproduced without any change, schedule included.  
Exempts or changes shall be allowed by the TÜV NORD CERT GmbH



## (13) SCHEDULE

## (14) EC-Type Examination Certificate No. TÜV 11 ATEX 556139 X

## (15) Description of component

The device is a safety temperature limiter and a temperature monitor designed as an associated and intrinsically safe apparatus. The intrinsically safe output circuits for the connection of an resistor-type thermometer (PT100 and PT1000) as well as an thermocouple or for the measurement of an standardised signal current (4...20 mA) are intended to be operated in an area with an explosive gas or dust atmosphere.

## Technical data

Permissible range of the ambient temperature: -20 °C to +55 °C

## For type STB/STW 701155 / \* .. .. - 23 / ... , \*\*

Supply circuit.....  $U_N = 110$  to  $240$  V a.c. +10% / -15%, 48 to 63 Hz  
(Terminals N and L1)  $U_0 = 250$  V

## For type STB/STW 701155 / \* .. .. - 25 / ... , \*\*

Supply circuit.....  $U_N = 20$  to  $30$  V d.c. or a.c., 48 to 63 Hz  
(Terminals L- and L+)  $U_0 = 250$  V

## For all types

Supply circuit.....  $U_0 = 6$  V  
(Terminals 1, 2, 3 and 6, 7, 8)  $I_0 = 41.2$  mA  
 $P_0 = 61.8$  mW

Binary connection.....  $U_N = 250$  V  
(Terminals 4 and 5)

Analogue output.....  $U_N = 250$  V  
(Terminals 9 and 9)

Relay output.....  $U_N = 250$  V  
(Terminals 11, 12, 13)  $I_{max} = 3$  A

Relay output.....  $U_N = 250$  V  
(Terminals 14, 15, 16)  $I_{max} = 3$  A

Maximum permissible external reactance for separate occurrence of the inductance and capacitance:

$L_0 = 20$  mH  
 $C_0 = 36.3$  µF

Schedule EC-Type Examination Certificate No. TUV 11 ATEX 556130 X

The maximum permissible external reactance for simultaneous occurrence of the inductance and capacitance for gas group IIC has to be taken from the following table.

$L_e$ [mH]	0,2	0,1	0,05	0,01
$C_e$ [µF]	0,2	1,1	2,2	7,3

For the temperature probes listed below, which have to be considered as simple apparatus and which can be operated with the device, the limit value for the maximum permissible upper limit of the ambient temperature according to the temperature class must be taken from the following table.

Temperature class	Upper limit of the medium and ambient temperature for applications requiring devices of the category 2.		Upper limit of the medium and ambient temperature for applications requiring devices of the category 1.	
	Temperature probes with PT100	Temperature probes with thermocouple	Temperature probes with PT100	Temperature probes with thermocouple
T1	432,5 °C	439,1 °C	342,5 °C	349,1 °C
T2	282,5 °C	289,1 °C	222,5 °C	229,1 °C
T3	187,5 °C	194,1 °C	147,5 °C	154,1 °C
T3	122,5 °C	129,1 °C	95,5 °C	102,1 °C
T5	87,5 °C	94,1 °C	67,5 °C	74,1 °C
T6	72,5 °C	79,1 °C	55,5 °C	62,1 °C

The following temperature probes of the manufacturer with PT100 resistor-type thermometer are intended to be operated with the device:

Type designation of the manufacturer	Replacement character xxx
902006/65-228-1003-1-15-xxx-668/922	500, 710 and 1000
902006/65-228-1003-1-15-xxx-254/922	
902006/65-228-2003-1-15-xxx-668/922	
902006/65-228-2003-1-15-xxx-254/922	
902006/10-402-1003-1-9-xxx-104/922	100
902006/10-402-2003-1-9-xxx-104/922	
902006/10-226-1003-1-9-xxx-104/922	250
902006/10-226-2003-1-9-xxx-104/922	
902006/54-227-1003-1-15-xxx-254/922	710
902006/54-227-2003-1-15-xxx-254/922	
902006/53-505-2003-1-12-xxx-815/922	180
902006/53-505-1003-1-12-xxx-815/922	
902006/53-507-2003-1-12-xxx-815/922	
902006/53-507-1003-1-12-xxx-815/922	
902006/53-505-3003-1-12-xxx-815/922	100, 160 and 220
902006/40-226-1003-1-12-xxx-815/922	

## EG-Type Examination ATEX Page4



Schedule EC-Type Examination Certificate No. TÜV 11 ATEX 556139 X

--	--

The following temperature probes of the manufacturer with thermocouple are intended to be operated with the device:

Type designation of the manufacturer	Replacement character xxx
901006/65-547-2043-15-xxx-668/922 901006/65-546-2042-15-xxx-668/922	500, 710 and 1000
90_1006/66-550-2043-6-xxx-668/922 90_1006/66-880-1044-6-xxx-668/922 90_1006/66-880-2044-6-xxx-668/922 90_1006/66-953-1046-6-xxx-668/922 90_1006/66-953-2046-6-xxx-668/922	250, 355 and 500
901006/54-554-2043-15-xxx-254/922 901006/54-554-1043-15-xxx-254/922 901006/54-554-2042-15-xxx-254/922 901006/54-554-1042-15-xxx-254/922	710
901006/53-543-1042-12-xxx-815/922 901006/53-543-2042-12-xxx-815/922	220

(16) Test documents are listed in the test report No. 12 203 556139 and 12 203 398437.

(17) Special conditions for safe use

Connection or disconnection of the intrinsically safe circuits may only be conducted when the device inclusive of all windings is free of voltage.

The device inclusive of all windings may only be energised when the cover of the intrinsically safe circuits is installed properly.

As a safety device for minimum pressure monitoring for static pressurisation only the STB type (safety temperature limiter) is admissible.

According to the application the limit value for switch of has to be adjusted in a way that no dangerous state can occur if accuracy, fault tolerance time of the device and (if applicable) pressure and temperature overrun has been considered.

The safety relevant settings must be protected against unauthorised modification (e. g. by sealing with leads or password protected input).



Schedule EC-Type Examination Certificate No. TÜV 11 ATEX 556139 X

For the use of the device as STW type (safety temperature monitor) after the switch of by the safety temperature limiter it must be assured that a restart of the device by a superior control is avoided.

For the use of the device as an one-channel type intended to be used for monitoring of non-electrical ignition sources the operator must immediately take measures to achieve a safe state if a warning message is displayed.

(18) Essential Health and Safety Requirements

no additional ones

## 1. Supplement ATEX Page1



# Translation 1. SUPPLEMENT

to Certificate No.	TUV 11 ATEX 556139 X
Equipment:	Safety Temperature Limiter STB/STW 701155
Manufacturer:	JUMO GmbH & Co. KG
Address:	Moritz-Juchheim-Straße 1 36039 Fulda
Order number:	8000445795
Date of issue:	2015-07-09

## Amendments:

Within the scope of the supplement different changes of the software were evaluated and the compliance to the actual standards was checked.

The electrical data will be corrected as follows:

**For types STB/STW 701155 / \* - \*\* - \*\*\* - \*\*\*\* - \*\*\*\* -23 / \*\*\* , \*\*\***

Supply circuit  
(Terminals N and L1)  
 $U_N = 110 \text{ up to } 240 \text{ V AC } +10\% / -15\%$ , 48 up to 63 Hz  
 $U_M = 250 \text{ V}$

**For types STB/STW 701155 / \* - \*\* - \*\*\* - \*\*\*\* -25 / \*\*\* , \*\*\***

Supply circuit  
(Terminals L- and L+)  
 $U_N = 20 \text{ up to } 30 \text{ V DC or AC}$ , 48 up to 63 Hz  
 $U_M = 250 \text{ V}$

## For all types

Supply circuit  
(Terminals 1, 2, 3 and 6, 7, 8)  
 $U_0 = 6 \text{ V}$   
 $I_0 = 41,2 \text{ mA}$   
 $P_0 = 61,8 \text{ mW}$

Maximum permissible external reactance for separate occurrence of the inductance and capacitance:

$L_0 = 20 \text{ mH}$   
 $C_0 = 36,3 \mu\text{F}$

The maximum permissible external reactance for simultaneous occurrence of the inductance and capacitance for gas group IIC has to be taken from the following table.

$L_0$ [mH]	0,2	0,1	0,05	0,01
$C_0$ [µF]	0,2	1,1	2,2	7,3

Binary input  
(Terminals 4 and 5)  
 $U_M = 250 \text{ V}$

Analog output  
(Terminals 9 and 10)  
 $U_M = 250 \text{ V}$





1. Supplement to Certificate No. TÜV 11 ATEX 556139 X

Relay output  
(Terminals 11, 12, 13)

$U_M = 250 \text{ V}$   
 $I_{max} = 3 \text{ A}$

Relay output  
(Terminals 14, 15, 16)

$U_M = 250 \text{ V}$   
 $I_{max} = 3 \text{ A}$

All other data apply unchanged for this supplement.

The permissible ambient temperature range will be corrected as follows:

Permissible ambient temperature in use:  $0^\circ\text{C}$  up to  $+55^\circ\text{C}$   
Permissible ambient temperature for storage:  $-30^\circ\text{C}$  up to  $+70^\circ\text{C}$

The scope of EN 60079-26:2015 no longer applies to the Safety Temperature Limiter STB/STW 701155.

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2012      EN 60079-11:2012      EN 50495:2010  
EN 13463-6:2005

(16) The test documents are listed in the test report No. 15 203 158370.

(17) Special conditions for safe use

no additional ones

(18) Essential Health and Safety Requirements

no additional ones

TÜV NORD CERT GmbH, Langemannstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body

Schweert



Hanover office, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

## 18.6 IECEx

Page 1

IECEx Certificate  
of Conformity

---

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

For rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.:	IECEX TUN 15 0000X	Issue No. 0	Certificate history: <small>Issue No. 0 (2017-04-13)</small>		
Status:	Current	Page 1 of 3			
Date of Issue:	2017-04-13				
Applicant:	JUMO GmbH & Co. KG Horn-Juchacz-Straße 1 36039 Fulda Germany				
Equipment:	JUMO safetyM STRISW Type 701156 / "... - ... - ... - 23 / ... - ..." and type 701156 / "... - ... - ... - 25 / ... - ..."				
Optional accessory:					
Type of Protection:	Intrinsic Safety "i"				
Marking:	[E] s [d] iC resp. [E] x [d] iC				
Approved for issue on behalf of the IECEx Certification Body:	Christian Roder	Deputy Head of the Certification Body			
Signature (for printed version)					
Date:					

- This certificate and schedule may only be reproduced in full.
- This certificate is not transferable and remains the property of the issuing body.
- The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

TUV NORD CERT GmbH  
Hannover Office  
Am TÜV 1  
30519 Hannover  
Germany



## IECEX Certificate of Conformity

Certificate No: IECEx TUN 15.0038X

Issue No: 0

Date of Issue: 2017-04-13

Page 2 of 3

Manufacturer:

JUMO GmbH & Co. KG  
Moritz-Juchaczem-Strasse 1  
36039 Fulda  
Germany

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard set below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

### STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011

Explosive atmospheres - Part 0: General requirements

Edition:6.0

IEC 60079-11 : 2011

Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

Edition:6.0

This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the

Standards listed above.

### TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment tested has successfully met the examination and test requirements as recorded in

Test Report

DE/TUNECTR16.002500

Quality Assessment Report

DE/TUNQART13.000601



## IECEx Certificate of Conformity

Certificate No: IECEx TUN 15.0036X

Issue No: 0

Date of Issue: 2017-04-13

Page 3 of 3

### Schedule

#### EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The JUMCO safetyM STB/STW mentioned above are either a safety temperature limiter or a safety temperature monitor considered as associated safety temperature facilities intended for installation on mounting rails outside the hazardous areas.

For all other data please see attachment.

#### SPECIFIC CONDITIONS OF USE: YES as shown below:

1. Connection or disconnection of the intrinsically safe circuits may only be conducted when the device inclusive of all wirings is free of voltage.

2. The device inclusive of all wirings may only be energized when the cover of the intrinsically safe circuits is installed properly.

#### Annex:

Attachment to IECEx TUN 15.0036X.pdf

701155 / •

Basic Type	
Safety temperature monitor / monitor (STB) / (STN)	
Version	2011/05
F factory set	0
Configured acc. to customer specifications	8
National language	01
German (set at factory)	02
English	03
French	04
Switching behaviour	0251
Safety temperature monitor: max. alarm (prevent opening function)	0252
Safety temperature monitor: min. alarm (prevent closing function)	0253
Safety temperature limiter: max. alarm (prevent opening function) (set at factory)	0254
Safety temperature limiter: min. alarm (prevent closing function)	0255
Measuring input <sup>1</sup> (programmable)	1003
1x Pt100 in 2-wire circuit	2001
2x Pt100 in 3-wire circuit (set at factory)	2002
2x Pt100 in 2-wire circuit	2003
2x Pt1000 in 2-wire circuit	2005
2x Pt1000 in 3-wire circuit	2006
2x W50h-W50Sh „C“	2008
2x W50h-W50Sh „D“	2007
2x Cu-CuNi „T“	2009
2x Fe-CuNi „J“	2010
2x Cu-CuNi „J“	2041
2x Fe-CuNi „L“	2042
2x NiCr-Ni „V“	2043
2x Pt1000 in 3-wire circuit	2044
2x Pt1000 in 2-wire circuit	2046
2x Pt500h-Pt500h „V“	2048
2x NiCrSi-NiSi „V“	2053
1x 4 to 20 mA	2055
2x 4 to 20 mA	2056
Voltage supply	23
AC 110 to 240 V, +10 % / -15 %, 48 to 63 Hz	25
AC/DC 20 to 30 V, 48 to 63 Hz	26
Auxiliary output (configurable)	001
0 to 20 mA	005
4 to 20 mA (factory set)	006
0 to 10 V	007
2 to 10 V	010
Extra output	002
0 to 20 mA, Pt and P <sub>h</sub> approval	003
0 to 10 V, Pt and P <sub>h</sub> approval	004
0 to 20 mA, Pt and P <sub>h</sub> approval	005
0 to 10 V, Pt and P <sub>h</sub> approval	006



Issue 00

The JUMO safetyM STB/STW mentioned above are either a safety temperature limiter or a safety temperature monitor considered as associated safety temperature facilities intended for installation on mounting rails outside the hazardous areas.

The intrinsically safe output circuits are intended to be operated in areas with an explosive gas or dust atmosphere.

For types STB/STW 701155 / ° - °° - °°°° - °°°° - 23 / °°°, °°°°

U<sub>N</sub> = 110 up to 240 V AC +10% / -15%, 48 up to 63 Hz  
U<sub>in</sub> = 250 V

For types STB/STW 701155 / ° - " - . . . . . - 25 / ... , ...

U<sub>N</sub> = 20 up to 30 V DC or AC, 48 up to 63 Hz  
U<sub>E</sub> = 250 V

 $U_m = 250 \text{ V}$  $U_m = 250 \text{ V}$ 
$$U_m = 250 \text{ V}$$

$$I_{\text{max}} = 3 \text{ A}$$
$$U_m = 250 \text{ V}$$

USB connection  
(USB-socket)

only for the connection to a non-intrinsically safe circuit with a safety-related maximum voltage of

$$U_m = 250 \text{ V}$$

Output circuit  
(terminals 1, 2, 3 and 6, 7, 8)

in type of protection intrinsic safety Ex ia IIC resp. IIC with the following maximum values per circuit:

$$U_o = 6 \text{ V}$$

$$I_o = 41.2 \text{ mA}$$

$$P_o = 61.8 \text{ mW}$$

Characteristic line: linear

Permissible maximum external capacitance  $C_o = 36.3 \mu\text{F}$

Permissible maximum external inductance  $L_o = 20 \text{ mH}$

These values are only applicable, if the internal inductance  $L_i$  or the internal capacitance  $C_i$  of the external connected equipment is  $\leq 1 \%$  of the above specified values.

If  $L_i$  as well as  $C_i$  of the external connected equipment are  $> 1 \%$  of the specified values, the specified values of  $L_o$  and  $C_o$  shall be reduced to 50 %.

The reduced capacitance of the external circuit (capacitance of the cable + internal capacitance of the connected equipment) shall not exceed  $1 \mu\text{F}$  for groups IIA, IIB and IIIC and  $600 \text{ nF}$  for group IIC.

For the temperature probes listed below, which have to be considered as simple apparatus and which to be operated with the device, the limit value for the maximum permissible upper limit of the ambient temperature according to the temperature class resp. the maximum surface temperature has to be taken from the following table:

Temperature class resp. maximum surface temperature	Upper limit of the medium and ambient temperature for applications requiring devices of equipment protection level Gb resp. Db	Upper limit of the medium and ambient temperature for applications requiring devices of equipment protection level Ga resp. Da
	Temperature probes with PT100	Temperature probes with thermocouple PT100
T1 / 445 °C	432.5 °C	439.1 °C
T2 / 295 °C	282.5 °C	289.1 °C
T3 / 195 °C	187.5 °C	194.1 °C
T4 / 130 °C	122.5 °C	129.1 °C
T5 / 95 °C	87.5 °C	94.1 °C
T6 / 80 °C	72.5 °C	79.1 °C

The following temperature probes of the manufacturer with PT100 resistor-type thermometer are intended to be operated with the device:

## IECEx Page 7

TÜV NORD CERT GmbH  
Hanover Office  
Am TÜV 1  
30519 Hannover  
Germany

Page 4 of 5  
Attachment to IECEx TUN 15.0036X



Issue 00

Type designation of the manufacturer	Replacement character xxx
902006/65-228-1003-1-15-xxx-668/922	500, 710 and 1000
902006/65-228-1003-1-15-xxx-254/922	
902006/65-228-2003-1-15-xxx-668/922	
902006/65-228-2003-1-15-xxx-254/922	
902006/10-402-1003-1-9-xxx-104/922	100
902006/10-402-2003-1-9-xxx-104/922	
902006/10-226-1003-1-9-xxx-104/922	250
902006/10-226-2003-1-9-xxx-104/922	
902006/64-227-1003-1-15-xxx-254/922	710
902006/64-227-2003-1-15-xxx-254/922	
902006/63-505-2003-1-12-xxx-815/922	190
902006/63-505-1003-1-12-xxx-815/922	
902006/63-507-2003-1-12-xxx-815/922	
902006/63-507-1003-1-12-xxx-815/922	
902006/63-505-3003-1-12-xxx-815/922	100, 160 and 220
902006/40-226-1003-1-12-xxx-815/922	

The following temperature probes of the manufacturer with thermocouple are intended to be operated with the device:

Type designation of the manufacturer	Replacement character xxx
901006/65-547-2043-15-xxx-668/922	500, 710 and 1000
901006/65-546-2042-15-xxx-668/922	
90 1006/66-550-2043-6-xxx-668/922	250, 355 and 500
90 1006/66-890-1044-6-xxx-668/922	
90 1006/66-890-2044-6-xxx-668/922	
90 1006/66-953-1046-6-xxx-668/922	
90 1006/66-953-2046-6-xxx-668/922	710
901006/64-554-2043-15-xxx-254/922	
901006/64-554-1043-15-xxx-254/922	
901006/64-554-2042-15-xxx-254/922	
901006/64-554-1042-15-xxx-254/922	220
901006/63-543-1042-12-xxx-815/922	
901006/63-543-2042-12-xxx-815/922	



TUV NORD CERT GmbH  
Hanover Office  
Am TÜV 1  
30519 Hannover  
Germany



Page 5 of 5  
Attachment to IECEx TUN 15.0036X

Issue 00

**"Specific Conditions of Use"**

Connection or disconnection of the intrinsically safe circuits may only be conducted when the device inclusive of all wirings is free of voltage.  
The device inclusive of all wirings may only be energized when the cover of the intrinsically safe circuits is installed properly.

## 18.7 Ex „e“ and „i“



## EU-Type Examination Certificate

- (1) **EU-Type Examination Certificate**
- (2) Equipment or protective system intended for use in potentially explosive atmospheres - **Directive 2014/34/EU**
- (3) Certificate number: **SEV 17 ATEX 0161 X**
- (4) Product: **Safety temperature limiter and safety temperature monitor JUMO SafetyM STB/STW type 701155 / r - ... - ... - 23 / 045 - ... and type 701155 / r - ... - ... - 25 / 045 - ...**
- (5) Manufacturer: **JUMO GmbH & Co. KG**
- (6) Address: **Moritz-Luthern-Strasse 1, 36039 Fulda, GERMANY**
- (7) The equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- (8) Eurofins, notified body No. 1258, in accordance with article 17 of Directive 2014/34/EU of the European parliament and of the council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive
- The examination and test results are recorded in confidential report no 17-Ex-0025.01
- (9) Compliance with the essential health and safety requirements has been assured by compliance with:  
**EN 60079-0:12 + A11:13** **EN 60079-7:15** **EN 60079-31:14**  
**EN 13463-6:05** **EN 50495:2010**
- (10) Except in respect of those requirements listed at item 18 of the schedule.  
 If the sign «X» is placed after the certificate number, it indicates that the product is subjected to special conditions for sale use specified in the schedule to this certificate.
- (11) This EU type examination certificate relates only to design and construction of the specified product. Further requirements of this directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.
- (12) The marking of the product shall include the following:

See page 3 (20) Marking

Eurofins Electrosuisse Product Testing AG  
 Notified Body ATEX  
 Martin Pilas  
 Product Certification



(13)

## Appendix

(14)

EU-Type Examination Certificate no. SEV 17 ATEX 0161 X

(15) **Description of product**

General product information:

The JUJMO safetyM STB/STW mentioned above are either a safety temperature limiter or a safety temperature monitor considered as associated safety temperature facilities intended for installation on mounting rails outside the hazardous areas.

Each output of the two output circuits of the device is provided to be connected to a resistor-type thermometer (PT100 or PT1000) or to a thermocouple or to measure a standardized signal current (4...20 mA). The output circuits are intended to be operated in areas with an explosive gas or dust atmosphere. And must be installed and protected in a suitable type of protection for the used categories.

Classification of installation and use: stationary

Ingress protection: IP20

Rated ambient temperature range (°C): 0 °C...+55 °C

**Ratings:**

For type 701155 / °...-...-...-23 / 045 -...-... / 8-23  
(Terminals N and L1)

UN = 110 up to 240 V a.c. +10% / -15%, 48 up to 63 Hz

Um = 250 V

For type 701155 / °...-...-...-25 / 045 -...-...

(Terminals L- and L+)

UN = 20 up to 30 V d.c. or a.c., 48 up to 63 Hz

Um = 250 V

**Output:**

Uo = 6 V

Io = 41.2 mA

(16) **Report number**

17-Ex-0025.01

(17) **Specific conditions of use**

- Switching operations may be performed on the electrical circuits (Ex eb) only when the JUMO safetyM STB/STW Ex, including all supply lines, is de-energized.
- Only the STB (safety temperature limiter) variant of the JUMO safetyM STB/STW Ex is admissible for use as a safety device for minimum overpressure monitoring with static pressurized enclosure.
- The safety-relevant settings of the JUMO safetyM STB/STW Ex must be protected against unauthorized changes (e.g. with sealed or password-protected inputs).
- For use of the JUMO safetyM STB/STW Ex in the STW (safety temperature monitor) variant, it must be ensured that after a switch-off by the temperature limiter an automatic restart of the monitored equipment is prevented by a higher-level control system.
- If the JUMO safetyM STB/STW Ex is used in the single-channel device variant to monitor non-electrical ignition sources and a warning is issued on demand, the user must take immediate measures to achieve a safe status.

(18) **Essential health and safety requirements**

In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

Clause	Subject
None	

(19) **Drawings and Documents**

See test report "Manufacturer's Documents"

(20) **Marking**

- |                                 |                           |
|---------------------------------|---------------------------|
| Ⓜ II (2) G [Ex eb Gb] IIC resp. | Ⓜ II (2) G [Ex db Gb] IIC |
| Ⓜ II (2) D [Ex tb Db] IIC       |                           |
| Ⓜ II (2) G (b1) [xxxx] resp.    | Ⓜ II (2) G (b2) [xxxx]    |
| Ⓜ II (2) D (b1) [xxxx] resp.    | Ⓜ II (2) D (b2) [xxxx]    |
- with:  
[xxxx]: Types of protection and EPL of the protected apparatus  
(b1): for 1 Channel Types  
(b2): for 2 Channel Types



**JUMO GmbH & Co. KG**  
Moritz-Juchheim-Straße 1  
36039 Fulda, Germany

E-Mail: [mail@jumo.net](mailto:mail@jumo.net)  
Internet: [www.jumo.net](http://www.jumo.net)



More than **systems & automation**

## EU-Konformitätserklärung

EU declaration of conformity / Déclaration UE de conformité

<b>Dokument-Nr.</b> Document No. / Document n°:	CE 720
<b>Hersteller</b> Manufacturer / Fabricant	JUMO GmbH & Co. KG
<b>Anschrift</b> Address / Adresse	Moritz-Juchheim-Straße 1, 36039 Fulda, Germany

<b>Produkt</b> Product / Produit	<b>Typ</b> Type / Type	<b>Typenblatt-Nr.</b> Data sheet no. / N° Document d'identification
<b>Name</b> Name / Nom		
JUMO safetyM STB STW EX	701155	701155

**Wir erklären in alleiniger Verantwortung, dass das bezeichnete Produkt die Anforderungen der Europäischen Richtlinien erfüllt.**

*We hereby declare in sole responsibility that the designated product fulfils the requirements of the European Directives.*  
*Nous déclarons sous notre seule responsabilité que le produit remplit les Directives Européennes.*

<b>Richtlinie 1</b> Directive / Directive	
<b>Name</b> Name / Nom	EMC
<b>Fundstelle</b> Reference / Référence	2014/30/EU
<b>Bemerkung</b> Comment / Remarque	
<b>Datum der Erstanbringung des CE-Zeichens auf dem Produkt</b> Date of first application of the CE mark to the product / Date de l'ère application du sigle sur le produit	2012

Dokument-Nr. Document No. / Document n°:	CE 720	EU-Konformitätserklärung	Seite: 1 von 8
---	--------	--------------------------	----------------

**JUMO GmbH & Co. KG**

Martin-Juchacz-Straße 1  
38039 Fulda, Germany

Tel.: +49 661 6003-0  
Fax: +49 661 6003-5000

E-Mail: [mail@jumo.net](mailto:mail@jumo.net)  
Internet: [www.jumo.net](http://www.jumo.net)



More than  
sensors & automation

**Angewendete Normen/Spezifikationen**

Standards/Specifications applied / Normes/Spécifications appliquées

<b>Fundstelle</b>	<b>Ausgabe</b>	<b>Bemerkung</b>
<i>Reference / Référence</i>	<i>Edition / Édition</i>	<i>Comment / Remarque</i>
EN 60730-1	2011	
EN 60730-2-9	2010	
EN 61326-1	2013	

**Gültig für Typ**

*Valid for Type / Valable pour le type*  
701 155/...

**Richtlinie 2**

*Directive / Directive*

**Name**

ATEX

*Name / Nom*

**Fundstelle**

2014/34/EU

*Reference / Référence*

**Bemerkung**

Mod. B+D

*Comment / Remarque*

**Datum der Erstanbringung des CE-Zeichens  
auf dem Produkt** 2017

*Date of first application of the CE mark to the product / Date  
de 1ère application du sigle sur le produit*

**Gültig für Typ**

*Valid for Type / Valable pour le type*  
701 155/...

Dokument-Nr.

CE 720

EU-Konformitätserklärung

Seite: 2 von 8

Document No. / Document n°

**JUMO GmbH & Co. KG**  
Merz-Juchacz-Straße 1  
36089 Fulda, Germany

Tel.: +49 661 8003-0  
Fax: +49 661 8003-300

E-Mail: mail@jumo.net  
Internet: www.jumo.net



More than **systems + automation**

## EU-Baumusterprüfbescheinigung 2.1

EU type examination certificate / Certificat d'examen de type UE

### Fundstelle

Reference / Référence

TÜV 11 ATEX 556139 X

### Benannte Stelle

Notified Body / Organisme notifié

TÜV NORD CERT GmbH

### Kennnummer

Identification no. / N° d'identification

0044

## Angewendete Normen/Spezifikationen

Standards/Specifications applied / Normes/Spécifications appliquées

### Fundstelle

Reference / Référence

### Ausgabe

Edition / Édition

### Bemerkung

Comment / Remarque

EN 60079-0

2012

EN 60079-11

2012

EN 50495

2010

EN 13463-6

2005

## Gültig für Typ

Valid for Type / Valable pour le type

701155/...

## EU-Baumusterprüfbescheinigung 2.2

EU type examination certificate / Certificat d'examen de type UE

### Fundstelle

Reference / Référence

SEV 17 ATEX 0161 X

### Benannte Stelle

Notified Body / Organisme notifié

Eurofins Electrosuisse Product Testing AG

### Kennnummer

Identification no. / N° d'identification

1258

Dokument-Nr.

CE 720

EU-Konformitätserklärung

Seite: 3 von 8

Dokument-Nr. / Document n°:

**JUMO GmbH & Co. KG**

Mette-Juchem-Sträße 1  
36039 Fulda, Germany

Tel.: +49 661 8003-0  
Fax: +49 661 8003-900

E-Mail: mail@jumo.net  
Internet: www.jumo.net



More than **100 years** of automation

**Angewendete Normen/Spezifikationen**

Standards/Specifications applied / Normes/Spécifications appliquées

<b>Fundstelle</b>	<b>Ausgabe</b>	<b>Bemerkung</b>
<i>Reference / Référence</i>	<i>Edition / Edition</i>	<i>Comment / Remarque</i>
EN 60079-0	2012+A11:2013	
EN 60079-7	2015	
EN 60079-31	2014	
EN 50495	2010	
EN 13463-6	2005	

**Gültig für Typ**

Valid for Type / Valable pour le type

701155/-+---+---23/045  
701155/-+---+---25/045

**Anerkannte Qualitätssicherungssysteme der Produktion**

Recognized quality assurance systems of production / Systèmes de qualité reconnus de production

**Benannte Stelle**

Notified Body / Organisme notifié

TÜV NORD CERT GmbH

**Kennnummer**

Identification no. / N° d'identification

0044

**Richtlinie 3**

Directive / Directive

**Name**

Name / Nom

PED

**Fundstelle**

Reference / Référence

2014/68/EU

**Bemerkung**

Comment / Remarque

Mod. B+D, Cat. IV

**Datum der Erstanbringung des CE-Zeichens auf dem Produkt**

2012

Date of first application of the CE mark to the product / Date de 1<sup>ère</sup> application du sigle sur le produit

Dokument-Nr.

CE 720

EU-Konformitätsklärung

Seite: 4 von 8

Document No. / Document n°



**JUMO GmbH & Co. KG**

Körber-Juchacz-Straße 1  
36039 Fulda, Germany

Tel.: +49 661 6003-0  
Fax: +49 661 6003-500

E-Mail: [mail@jumo.net](mailto:mail@jumo.net)  
Internet: [www.jumo.net](http://www.jumo.net)



More than  
sensors & automation

### Gültig für Typ

Valid for Type / Valable pour le type  
701155/...

### EU-Baumusterprüfbescheinigung 3.1

EU type examination certificate / Certificat d'examen de type UE

#### Fundstelle

07 202 1045 Z 0031/14/D0046 rev.01

Reference / Référence

#### Benannte Stelle

TÜV NORD Systems GmbH

Notified Body / Organisme notifié

#### Kennnummer

0045

Identification no. / N° d'identification

### Anerkannte Qualitätssicherungssysteme der Produktion

Recognized quality assurance systems of production / Systèmes de qualité reconnus de production

#### Benannte Stelle

**Kennnummer**

Notified Body / Organisme notifié

Identification no. / N° d'identification

TÜV SÜD Industrie Service GmbH

0036

#### Richtlinie 4

Directive / Directive

#### Name

MD

Name / Nom

#### Fundstelle

2006/42/EG

Reference / Référence

#### Bemerkung

Comment / Remarque

**Datum der Erstanbringung des CE-Zeichens auf dem Produkt** 2012

Date of first application of the CE mark to the product / Date  
de première application du sigle sur le produit

Dokument-Nr.  
Document No. / Document n°

CE 720

EU-Konformitätserklärung

Seite 5 von 8

**JUMO GmbH & Co. KG**

Max-Eyth-Str. 1  
36039 Fulda, Germany

Tel.: +49 661 6003-0  
Fax: +49 661 6003-500

E-Mail: mail@jumo.net  
Internet: www.jumo.net



More than **status & automation**

**Angewendete Normen/Spezifikationen**

Standards/Specifications applied / Normes/Spécifications appliquées

**Fundstelle****Ausgabe**

Reference / Référence

Edition / Edition

**Bemerkung**

Comment / Remarque

EN 13849-1

2015

EN 60204-1

2006+A1:2009

**Gültig für Typ**

Valid for Type / Valable pour le type

701150/-+---+\*059

**Richtlinie 5**

Directive / Directive

**Name**

Name / Nom

ROHS

**Fundstelle**

Reference / Référence

2011/65/EU

**Bemerkung**

Comment / Remarque

Datum der Erstarbringung des CE-Zeichens 2017

auf dem Produkt

Date of first application of the CE mark to the product / Date

de l'ère application du sigle sur le produit

**Angewendete Normen/Spezifikationen**

Standards/Specifications applied / Normes/Spécifications appliquées

**Fundstelle****Ausgabe**

Reference / Référence

Edition / Edition

**Bemerkung**

Comment / Remarque

VDE Umweltrelevante Aspekte V1

bei der Produktentwicklung und

-gestaltung

**Gültig für Typ**

Valid for Type / Valable pour le type

701155/...

Dokument-Nr.

CE 720

EU-Konformitätserklärung

Seite: 6 von 8

Document No. / Document n°

**JUMO GmbH & Co. KG**

Neckar-Aller-Don-Straße 1  
36308 Fulda, Germany  
Tel. +49 661 8003-0  
Fax. +49 661 8003-500

E-Mail: [mail@jumo.net](mailto:mail@jumo.net)  
Internet: [www.jumo.net](http://www.jumo.net)



More than 100 years of automation

## **Richtlinie 6**

*Directive / Directive*

### **Name**

*Name / Nom*

LVD

### **Fundstelle**

*Reference / Référence*

2014/35/EU

### **Bemerkung**

*Comment / Remarque*

**Datum der Erstanbringung des CE-Zeichens  
auf dem Produkt** 2012

*Date of first application of the CE mark to the product / Date  
de 1<sup>ère</sup> application du sigle sur le produit*

## **Angewendete Normen/Spezifikationen**

*Standards/Specifications applied / Normes/Specifications appliquées*

### **Fundstelle**

*Reference / Référence*

EN 61010-1

### **Ausgabe**

*Edition / Edition*

2010

### **Bemerkung**

*Comment / Remarque*

## **Gültig für Typ**

*Valid for Type / Valable pour le type*

701155/...

Dokument-Nr.  
Document-Nr. \*

CE 720

EU-Konformitätserklärung

Seite: 7 von 8

**JUMO GmbH & Co. KG**

Mörs-Juchacz-Str. 1  
36039 Fulda, Germany

Tel.: +49 661 6003-0  
Fax: +49 661 6003-500

E-Mail: [ma@jumo.net](mailto:ma@jumo.net)  
Internet: [www.jumo.net](http://www.jumo.net)



More than 100 years of experience

**Aussteller**

*Issued by / Émis par*

**Ort, Datum**

*Place, date / Lieu, date*

**Rechtsverbindliche Unterschriften**

*Legally binding signatures /*

*Signatures juridiquement valable*

JUMO GmbH & Co. KG

Fulda, 2018-06-19

Bereichsleiter Vertrieb Inland / Globales  
Produkt- und Branchennanagement

ppa. Dimitrios Charaladis

Qualitätsbeauftragter und Leiter Qualitätswesen  
i. V. Harald Giesinger


Dokument-Nr.  
*Document No. / Document n°*

CE 720

EU-Konformitätsklärung

Seite: 8 von 8

## 18.8 China RoHS

<div> <div></div> <div>部件名称</div> </div> <div>Product group: 701150/701155</div>	<div>  有毒有害物质或元素 Hazardous substances </div>					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
外壳 Housing (Gehäuse)	○	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	○	○	○	○	○	○
螺母 Nut (Mutter)	○	○	○	○	○	○
螺钉 Screw (Schraube)	○	○	○	○	○	○
本表格依据 SJ/T 11364-2014 的规定编制。 (This table is prepared in accordance with the provisions of SJ/T 11364-2014.) O : 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。 (O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.) X : 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。 (X: Indicates that said hazardous substance contained in one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.)						







**JUMO GmbH & Co. KG**

Street address:  
Moritz-Juchheim-Straße 1  
36039 Fulda, Germany  
Delivery address:  
Mackenrodtstraße 14  
36039 Fulda, Germany  
Postal address:  
36035 Fulda, Germany  
Phone: +49 661 6003-0  
Fax: +49 661 6003-607  
Email: [mail@jumo.net](mailto:mail@jumo.net)  
Internet: [www.jumo.net](http://www.jumo.net)

**JUMO Instrument Co. Ltd.**

JUMO House  
Temple Bank, Riverway  
Harlow, Essex, CM20 2DY, UK  
Phone: +44 1279 63 55 33  
Fax: +44 1279 62 50 29  
Email: [sales@jumo.co.uk](mailto:sales@jumo.co.uk)  
Internet: [www.jumo.co.uk](http://www.jumo.co.uk)

**JUMO Process Control, Inc.**

6733 Myers Road  
East Syracuse, NY 13057, USA  
Phone: +1 315 437 5866  
Fax: +1 315 437 5860  
Email: [info.us@jumo.net](mailto:info.us@jumo.net)  
Internet: [www.jumousa.com](http://www.jumousa.com)

