JUMO

More than sensors + automation

# Ex Devices

Reliable products for potentially explosive areas
according to EU Directive 94/9/EC

# Dear Reader,

The expression ATEX is an acronym from ATmosphères EXplosibles, which is French for potentially explosive atmospheres. The abbreviation serves as a short designation for two European directives which refer to sections of the European Treaty:

EU Directive 94/9/EC (ATEX) refers to devices and protective systems intended for operation in potentially explosive atmospheres. It applies to both electrical and mechanical devices. This directive is intended primarily for manufacturers of devices as well as plants and has been in full force since July 1, 2003.

EU Directive 1999/92/EC (ATEX 137) deals with the safety of plants as well as protecting the health and safety of employees who could be endangered by potentially explosive atmospheres. This directive defines the minimum requirements for plant operators who ultimately bear full responsibility. Plant operators are also required to draw up explosion protection documents.

**IECEx Certificates of Conformity (IECEx CoC)**
As part of the internationalization process, JUMO has begun the process of having the product range certified for the explosion-protected area according to IECEx.

**Project design/application**
Neatly declared components such as those offered by JUMO are highly beneficial in designing measuring circuits for use in potentially explosive areas and creating explosion protection documents. These components give the operator the legal certainty that is essential. They also facilitate cost-optimal, efficient project design with no ifs, ands, or buts.

Zones with potentially explosive dust atmospheres (dust Ex) require special consideration. We are also able to offer suitable products in this area.

This brochure will give you an overview of our ATEX products. Of course, we are also happy to work with you to create customized solutions for your individual requirements.

In addition we offer a reference book and seminar entitled "Explosion Protection in Europe" on the subject of ATEX. For further information go to: www.jumo.net.

# Content

# ATEX and IECEx identification marking

## Potentially explosive areas and zone classification according to EU Directive 94/9/EC


### Device category

I Mining
II Area susceptible to gas explosion
III Area susceptible to dust explosion

| | | |
|---|---|---|
| 1 | Very high level of safety<br>Two independent errors<br>Two redundant protection measures | |
| 1G | Gases, mist, vapors | Zone 0 |
| 1D | Dust | Zone 20 |
| 2 | High level of safety | |
| 2G | Gases, mist, vapors | Zone 1 |
| 2D | Dust | Zone 21 |
| 3 | Normal level of safety | |
| 3G | Gases, mist, vapors | Zone 2 |
| 3D | Dust | Zone 22 |

### Zone classification

| Gases, mist, vapors | Dust | Potentially explosive atmosphere is present | Equipment Protection Level (EPL) Gases | Dust |
|---|---|---|---|---|
| Zone 0 | Zone 20 | Continuously, long-term, or frequently > 1000 hr/yr | Ga | Da |
| Zone 1 | Zone 21 | Occasionally > 10 hr/yr ⩽ 1000 hr/yr | Gb + Ga | Da + Db |
| Zone 2 | Zone 22 | Rarely and briefly > 0 hr/yr ⩽ 10 hr/yr | Ga, Gb + Gc | Da, Db + Dc |

### Ignition protection types with the corresponding standards

| | |
|---|---|
| EN 60079-0 | General requirements |
| **Gas** | |
| EN 60079-1 | d Flameproof enclosure |
| EN 60079-2 | p Pressurized enclosure |
| EN 60079-5 | q Powder filling |
| EN 60079-6 | o Oil immersion |
| EN 60079-7 | e Increased safety |
| EN 60079-11 | ia, ib, ic Intrinsic safety |
| EN 60079-15 | n Non-sparking |
| EN 60079-18 | ma, mb, mc Diecast enclosure |
| EN 60079-25 | i-Intrinsically safe system Electr. systems |
| **Dust** | |
| EN 60079-18 | maD, mbD Diecast enclosure |
| EN 60079-31 | ta, tb, tc Protection by enclosure |
| EN 61241-4 | pD Pressurized enclosure |
| EN 60079-11 | ia, ib, ic Intrinsic safety |

**Protection level**

a Two countable errors simultaneously
b One countable error
c Operation without faults (no errors)

### Related electrical apparatus

[... is outside the potentially explosive area.
The signal lines lead to the Ex-area
(for example supply isolators for transmitters)]

# IIC T6 Ga

# IIIC $T_{150}$ Da

## Explosion groups

I Electrical apparatus for mines susceptible to firedamp (for example mining with coal dust, methane gas)

II Electrical apparatus for all areas susceptible to gas explosions except for mines susceptible to firedamp (for example chemical industry: dyes, acetylene)

III Subdivision into IIA, IIB, IIC depending on ignitability.
Electrical apparatus for all areas susceptible to dust explosions

- IIIA = Combustible lint
- IIIB = Non-conductive dust
- IIIC = Conductive dust

## Temperature classes

| Tem-perature class | Max. surface temperature of the apparatus | Ignition temperature for combustible substances |
|---|---|---|
| T1 | 450 °C | > 450 °C |
| T2 | 300 °C | > 300 °C < 450 °C |
| T3 | 200 °C | > 200 °C < 300 °C |
| T4 | 135 °C | > 135 °C < 200 °C |
| T5 | 100 °C | > 100 °C < 135 °C |
| T6 | 85 °C | > 85 °C < 100 °C |

### Temperature classes / explosion protection groups (excerpt)

| | T1 | T2 | T3 | T4 | T5 | T6 |
|---|---|---|---|---|---|---|
| I | Methane | – | – | – | – | – |
| IIA | Acetone<br>Ethane<br>Acetic acid<br>Ammonia<br>Phenol<br>Propane* | Ethyl alcohol<br>n-Butane<br>n-Butyl alcohol | Benzine<br>Heating oil<br>Diesel fuel | Acetal-dehyde | – | – |
| IIB | City gas | Ethyl alcohol<br>Ethylene* | Hydrogen sulfide | Ethyl ether | – | – |
| IIC | Hydrogen* | Acetylene | | | | Carbon disulfide |

*Typical ignitable gas

## Ex ia
Intrinsic safety

## Ex d / Ex e / Ex p
Combinations

Binary/analog

**Non Ex-area**

AC 400 V, 16 A

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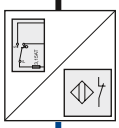

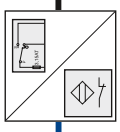

Binary signal

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Pt100

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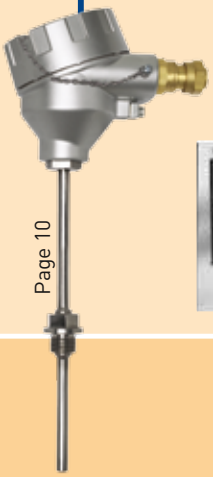



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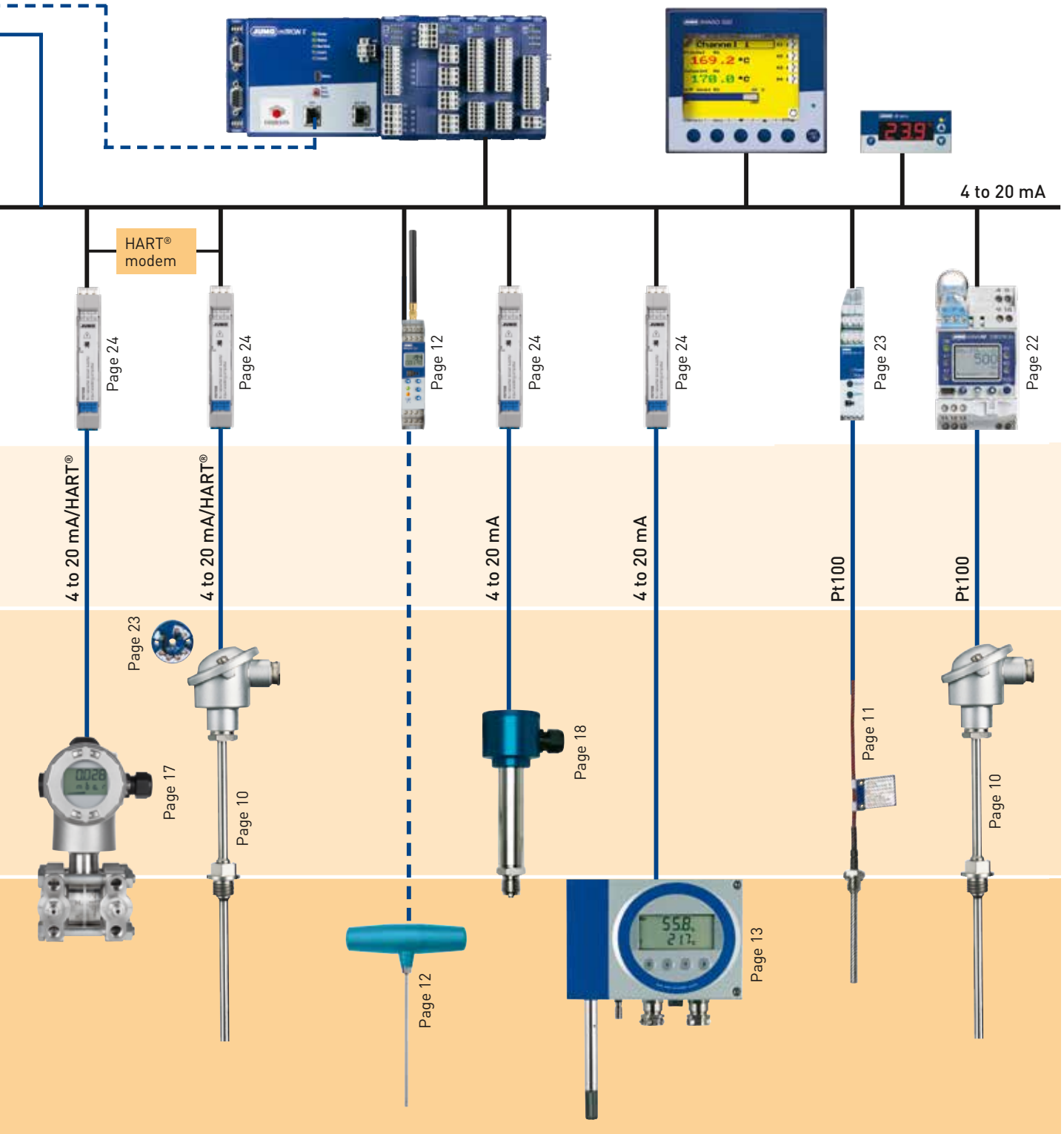
**Zone 2/22**

**Zone 1/21**

**Zone 0/20**

# Ex Devices

ATEX Temperature and humidity Pressure, level, and flow Recording, automation, and monitoring



# Temperature measuring devices

RTD temperature probes are used as intrinsically safe apparatus and/or apparatus with flameproof enclosure for temperature measurements in liquid and gaseous media as well as with dust. Depending on the needs of the application and the measurement task, RTD temperature probes are available with different terminal heads, various process connections, matching thermowells, with or without exchangeable measuring inserts, or with the connecting cable mounted.

All fittings (parts in contact with the process) are subjected to a pressure test. Pt100 temperature sensors according to DIN EN 60751 are inserted in the fittings in tolerance class AA, A, or B in a two-wire, three-wire, or four-wire circuit. Under certain conditions the probe tube is also permitted to extend into zone 0 (zone isolation). RTD temperature probes with ignition protection type Ex "i" are certified for connection to intrinsically safe electrical circuits of category ia/ib (for applications in zones 1 and 2, with separating element in zone 0) and of category ia (for use of probe tube in zones 0, 1, and 2).

RTD temperature probes in flameproof enclosure (terminal head and cable gland) are also fitted with measuring inserts (intrinsically safe version) for connection to intrinsically safe electrical circuits. When connecting to non-intrinsically safe electrical circuits, the power introduced must be restricted from the user side to ensure that the maximum surface heating – according to the temperature class minus the safety clearance resulting from the protection tube constant (K/W) declared by JUMO – is not exceeded!

# We bring knowledge and experience, you get safety.

## Humidity measuring devices

Measuring probes of this intrinsically-safe design series were especially developed for potentially explosive areas and can be installed directly in the Ex-area as a whole unit.

In addition, various probe modules provide versatile possibilities for nearly all applications. The intelligent probe module can also be easily removed for calibration purposes or replaced if necessary. Saving all the calibration coefficients directly in the probe module eliminates the otherwise burdensome process of manual entry and the measuring probe can also remain mounted in place. The calculations of dew point temperature, absolute humidity, mixing ratio, and wet bulb temperature are possible as options. Last but not least, an LCD display with user keyboard can be integrated. This outstanding feature makes configuration on the measuring probe even easier.

**Contact:**

Phone: +49 661 6003-465

Email: christoph.schneider@jumo.net

# Screw-in thermocouples / RTD temperature probes

| Type | 901820 | 902820 | | |
|---|---|---|---|---|
| Feature | Thermocouple with ceramic protection tube | RTD temperature probe with continuous protection tube, with stepped protection tube (not shown) | RTD temperature probe with continuous protection tube (not shown); with stepped protection tube | RTD temperature probe with thermowell DIN 43767 |
| ATEX/IECEx identification marking | Ⓔx II 2 G Ex ia IIC T1 to T6 Ga/Gb<br>Ⓔx II 2 D Ex ia IIIC T60 °C to T400 °C Da/Db | Ⓔx II 1/2 G Ex ia IIC T1 to T6 Ga/Gb<br>Ⓔx II 1/2 D Ex ia IIIC T60 °C to T400 °C Da/Db<br>Version for each terminal head Ex d; Ex ia/d, Ex tb | | |
| Temperature range | –100 to +1200 °C | (–200) –50 to +600 °C<br>–100 to +600 °C | | |
| Measuring insert | Type "J", "K", "N", "B", "S" | With/without replaceable measuring insert, as single or double Pt100, Pt500, Pt1000 with and without programmable (Ex "i") head transmitter | | |
| Tolerance class | Class 1/2 according to DIN 43710/60584 | B, A, AA (according to DIN EN 60751) | | |
| Connection | – | In two-wire, three-wire, or four-wire circuit | | |
| Connection heads | – Form B (BUZ, BUZH) made of aluminum diecast, protection type IP54 (IP65) | | | |
| | – | – Form BBKS made of plastic, protection type IP54<br>– With flameproof enclosure Ex "d"<br>– Others upon request | | |
| Protection tube/ thermowell | Steel, ceramic C799, KER 610 | Protection tube made of stainless steel 1.4571, titanium, Inconel®, HASTELLOY®; with PTFE or HALAR coating | Protection tube made of stainless steel 1.4571, titanium, tantalum, Inconel®, HASTELLOY®; with PTFE or HALAR coating | Thermowell D1/D2, D4/ D5 made of stainless steel 1.4571, steel 1.7335, titanium, tantalum, Inconel®, HASTELLOY®; with PTFE or HALAR coating |
| Process connection | Flange/screw connection/ thread | Screw connection/thread G1/2, G1, NPT, others upon request | Flange, C DN 25, C DN 40, others upon request | Thermowell |
| Special features | Inspection certificate 3.1 available upon request for material, pressure test, leak test, leakage resistance, electrical tolerance/calibration | | | |

# RTD temperature probes/thermocouples

| Type | 902815 | 902821 | | |
|---|---|---|---|---|
| Feature | Compact RTD temperature probe | Screw-in thermometer | Push-in thermometer, push-in mineral-insulated thermometer | Push-in mineral-insulated thermocouple |
| ATEX/IECEx identification marking | Ⓔx II1/2 G Ex ia IIC T6 Ga/Gb<br>Ⓔx II1/2 D Ex ia IIIC T80 °C Da/Db | Ⓔx II 1/2 G Ex ia IIC T6 Ga/Gb<br>Ⓔx II 1/2 D Ex ia IIIC T80 °C IP65 Da/Db | | |
| Temperature range | –70 to +260 °C | –100 to +260 °C,<br>–100 to +600 °C (mineral-insulated thermometer) | | –200 to +1200 °C |
| Measuring insert | Pt100, Pt1000 | Pt100, Pt500, Pt 1000, Pt2000, NTC | | Type: "J", "K", "L", "S", "B" |
| Tolerance class | 1/3 DIN class B | B, A, AA (according to DIN EN 60751) | | Class 1/2 according to DIN 43710/60584 |
| Connection | Four-wire circuit | Two-wire circuit, three-wire circuit, four-wire circuit | | – |
| Terminal head | M12 connector | Silicone, PTFE, PVC, FEP, Radox®, BETAFLAM®, FPM, PEEK®, or PUR connecting cable<br>(also available with shielding/armoring) | | |
| Protection tube | – | Stainless steel 1.4571, 1.4435, or others upon request | | Stainless steel 1.4541 |
| Process connection | Screw connection/ thread G1/2, G1, clamp DN 25/DN 32/DN 40, or others upon request | Various threads | – | |
| Special features | Without transmitter | For universal application | | For universal application, flexible protection tube |

# Head thermocouples and RTD temperature probes

| Type | 903510/40 | 903520/40 | 903510/50 | 903520/50 |
|---|---|---|---|---|
| Description | Thermocouple<br>I.T.C., I.T.C 420 | RTD temperature probe<br>I.I.R and I.I.R.420 | Thermocouple<br>C97 EEX | RTD temperature probe<br>C97 EEX |
| Identification marking ATEX/IECEx* | Ⓔx II 1/1G 1/1D for I.T.C. and I.I.R<br>Ⓔx II 1/1 G 1/2D for I.T.C.420 and I.I.R420<br>Ex ia IIC T1 to T6 or xxx °C/T6 Ga/Ga<br>Ex ia/tb III CT xxx °C/T85 °C Da/Db | | Ⓔx II 2/2 G 1/2 D*<br>Ex e II T1 to T6 or xxx °C/T6 Gb/Gb<br>Ex ta/tb IIIC T xxx °C/T85 °C Da/Db | |
| Temperature range | –200 to +1300 °C | –200 to +800 °C | –200 to +1300 °C | –200 to +800 °C |
| Measuring insert | Type "T", "J", "L", "K", "N", thermowell or process connection, sheath cable version | Pt100, Pt1000, NTC, PTC | Type "T", "J", "L", "K", "N", thermowell or process connection, sheath cable version | Pt100, Pt1000, NTC, PTC |
| Terminal head | Form BUZ 72<br>Form BUZ 85<br>Form BUSH<br>Form CNI-3 | | Form DN AG<br>Form BUZ 85<br>Form BUSH<br>Form XD-AD | |
| Protection tube | Solid material or welded version made of steel, stainless steel, nickel alloy, titanium. | | | |
| Process connection | Thread, flange, clamp | | | |
| Ambient temperature | –40 to +80 °C | | | |
| Special features | Approval only in conjunction with ATEX/IECEx-approved transmitters for I.T.C420 and I.I.R420 | | | |

* IECEx version optional

# Thermocouples and RTD temperature probes

| Type | 903510/30 | 903520/30 | 903515/40 | 903525/40 |
|---|---|---|---|---|
| Description | Thermocouple TB.97-XDT/CT | RTD temperature probe TB.97-XDR/CR | Thermocouple TXI.03 | RTD temperature probe TXI.03 |
| Identification marking ATEX/IECEx* | Ⓔx II 2/2 G d IIC T1 to T6 or xxx°C/T6 Gb/Gb | | Ⓔx II 1 G 1 D<br>Ex ia IIC T1 to T6 Ga<br>Ex ia IIIC T xxx °C Da | |
| Temperature measuring range | –200 to +1300 °C | –200 to +800 °C | Depending on connecting cable | |
| Measuring insert | Type "T", "J", "L", "K", "N", thermowell or process connection, sheath cable version | Pt100, Pt1000, NTC | Type "T", "J", "L", "K", "N", thermowell or process connection, sheath cable version | Pt100, Pt1000, NTC, PTC |
| Terminal head/ connecting cable | Form XD-AD<br>Form CNI-3 ADF | | PVC –5 to +80 °C<br>PUR –5 to +105 °C<br>Silicone –50 to +180 °C<br>PTFE –50 to +260 °C<br>Extra code: additional protection with metal protection tube | |
| Transmitter | Intrinsic safety according to EN 60079-11 | | – | |
| Protection tube | Solid material or welded version made of steel, stainless steel, nickel alloy, titanium. | | | |
| Process connection | Thread, flange, clamp | | – | |
| Ambient temperature | –40 to +60 °C max. +80 °C | | – | |

* IECEx version optional

# Special solutions

| Type | 903515/60 | 903525/60 | 903515/50 | 903525/50 |
|---|---|---|---|---|
| Description | Thermocouple C.D.E | RTD temperature probe C.D.E | Thermocouple Ch.P | RTD temperature probe Ch.P |
| Identification marking ATEX/IECEx* | Ⓔx II 2/2 G – II 1/1 D<br>Ex e II T1 to T6 to xxx °C/T6 Gb/Gb<br>Ex ta IIIC Txxx °C/T85 °C Da/Da | | Ⓔx II 2/2 G – II 1/1 D<br>Ex e IIC T1 to T6 or xxx °C/T6 Gb/Gb<br>Ex ta IIIC Txxx °C/T85 °C Da/Da | |
| Cable entry | Certificate II 2GD – Ex e II according to EN 60079-7 | | Certificate II 2GD – Ex e II according to EN 60079-7 | |
| Temperature measuring range | –200 to +1300 °C | –200 to +800 °C | –200 to +1300 °C | –200 to +800 °C |
| Measuring insert | Type "T", "J", "L", "K", "N", thermowell or process connection, sheath cable version | Pt100, Pt1000, NTC, PTC | Type "T", "J", "L", "K", "N", thermowell or process connection, sheath cable version | Pt100, Pt1000, NTC, PTC |
| Connecting cable | PVC –5 to +80 °C<br>PUR –5 to +105 °C<br>Silicone –50 to +180 °C<br>PTFE –50 to +260 °C<br>Extra code: additional protection with metal protection tube | | | |
| Protection tube | Solid material or welded version made of steel, stainless steel, nickel alloy, titanium. | | | |
| Process connection | Thread, flange, clamp | | – | |
| Ambient temperature | –20 to +60 °C | | | |
| Special features | – | | Certificate II 2GD – Ex e II according to EN 60079-7 and EN 60079-31 | |

* IECEx version optional

| Type | 903530 | 903540 |
|---|---|---|
| Description | Multipoint RTD temperature probe (silo monitoring) | Hot-point RTD temperature probe |
| ATEX identification marking | Ⓔx II 1 D - Ex ta IIIC T85 °C Da | Ⓔx II 2/2 D - Ex tb IIIC T... °C/T85 °C Db/Db |
| Position | Different versions for mounting on a concrete slab or internal and external metallic construction | – |
| Temperature measuring range | +5 to +80 °C | –20 to +440 °C |
| Measuring insert | Pt100, Pt1000, NTC, Replaceable measuring insert | |
| Connecting cable | PVC –5 to +80 °C<br>Extra code: additional protection with metal protection tube | M12 connector |
| Protection tube | External: polypropylene/stainless steel material no. 1.4306<br>Fitting cable:<br>24 wires: galvanized steel/75 wires: stainless steel<br>Internal: polyamide/PVDF | Solid material or welded version made of steel, stainless steel, nickel alloy, titanium. |
| Special features | For specific version<br>Certificate II 2 D – Ex t II according to EN 60079-31 | – |

# RTD temperature probes for wireless data transmission

| Type | 902930/15/17/55 |
|---|---|
| Description | JUMO Wtrans transmitter T03 |
| ATEX identification marking Without zone isolation | Ⓔx II 1 G Ex ia IIB T4 Ga<br>Ⓔx II 1 D Ex ia IIIB T130 °C Da |
| ATEX identification marking With zone isolation | Ⓔx II 1/2 G Ex ia IIB T4 Ga/Gb<br>Ⓔx II 1/2 D Ex ia IIIB T130 °C Da/Db |
| Special features | - For mobile or stationary temperature measurements<br>- Wiring expenses are eliminated with modern wireless technology<br>- Fail-safe transmission with telegram coding |
| Transmission frequency | 868.4 MHz (Europe); 915 MHz (USA, Australia, Canada, New Zealand, and other countries); ten frequencies can be configured in the 915 MHz frequency band |
| Transmission interval | Adjustable from 1 to 3600 s<br>Factory setting for basic type 902930/15, 902930/17, and 902930/55 = 20 s adjustable via DIP switch to 5 s, 10 s, 20 s, or 45 s |
| Open air range | Up to 300 m if a holder for wall mounting is used on the receiver side and with an antenna cable 3 m long |
| Transmitter detection (transmitter ID) | 5-digit ID, set in the factory<br>Customer-specific configuration also possible |
| Measuring input | Pt1000 according to DIN EN 60751, in three-wire circuit |
| Protection type | IP67 according to DIN EN 60529; (for basic type 902930/55*) |
| Lithium battery | Voltage: 3.6 V; rated capacity: 2.2 Ah/1.7 Ah |

| Type | 902931 |
|---|---|
| Description | JUMO Wtrans receiver |
| Special feature | Receiver must be placed in non Ex-area |
| Input | Wireless signal from transmitters |
| Accuracy | 0.1 % |
| Output | (0)4 to 20 mA<br>0 to 10 V relay |
| Frequency | 868.4 (Europe)/ 915 MHz (USA/ Canada) |
| Range | Up to 300 m if a holder for wall mounting is used on the receiver side and with an antenna cable 3 m long |
| Voltage supply | AC 110 to 240 V<br>AC/DC 20 to 30 V |

* Only with screwed-on machine connector M12 × 1

# Industrial measuring probes for humidity and temperature

| Type | 907025 |
|---|---|
| Description | Intrinsically safe industrial measuring probe for humidity, temperature, and derived variables |
| ATEX identification marking | Ex II 1 G EEx ia IIC T4 Ga<br>Ex II 1 D IP65 T=70 °C Da (with protection cover) |
| Measuring ranges | Humidity = 0 to 100 %RH<br>Temperature = –40 to +180 °C (depending on the probe selected) |
| Output variables | RH + T, (optional) RH + T + Td + a + Tw + x |
| Measuring output | 4 to 20 mA, (optionally 2 channels) |
| Voltage supply | DC 15 to 28 V (via zener barrier or Ex "i" supply isolator) |
| Design type/protection type | - For wall mounting (907025/61)<br>- With small sensor head on 2 m sensor line (907025/63)<br>- With stainless steel sensor head on 2 m sensor line (907025/65)<br>- With flameproof stainless steel sensor head on 2 m sensor line for process pressures from 0 to 10 MPa (100 bar) (907025/64)<br>- With flameproof stainless steel sensor head on 2 m sensor line for process pressures from 0 to 4 MPa (40 bar), sensor head with movable clamping screw connection (907025/68) |
| Enclosure/protection type | G-AlSi10Mg/IP66 (NEMA 4X) |
| Humidity measurement method | Capacitive |
| Probes | Universally replaceable (without recalibration)<br>All calibration coefficients are saved in the probe itself |
| Operating temperature (probe) | –40 to + 60 °C (907025/61), –40 to +120 °C (907025/63)<br>–40 to +180 °C (907025/65), –40 to +180 °C (907025/64)<br>–40 to +180 °C (907025/68) |
| Application | Pharmaceuticals, petrochemicals, food |
| Special features | Second analog output 4 to 20 mA; case with display/ operator panel; addition: derived variables; probes with cable length 2, 5, or 10 m; various protective filters and accessories |

# Measuring devices for pressure, level, and flow

Measuring pressure, level, and flow are among the most important tasks in almost all sectors of industry.
High-quality measuring devices ensure safe and reliable measurement results: JUMO has the right solution for your application – whether that means highly precise measurements for the process industry, hygienic measurements for food and pharmaceuticals, or universal applications for plant and mechanical engineering. These solutions are available in large quantities for the OEM market and even as modules for the competition.

### Maximum precision and reliability

This is the result of the many years of experience of our employees in development and production. We are familiar with complex interrelationships and therefore see quality as a process to be continuously examined and improved: starting with new product development based on internally manufactured sensors we safeguard our manufacturing process with the very latest production lines and finally subject each device to a 100 % final inspection.

### Flexibility

JUMO develops, tests, and manufactures new products or customer-specific versions internally. Our great manufacturing depth safeguards the quality process and gives us more flexibility, allowing us to pay special attention to customer needs and specific application-oriented features.

# The right solution for every task

We adapt the sensor itself, the basis of every measuring device, to your individual applications and preferences. You can chose not only between different measuring systems such as silicon (piezoresistive), metal (thin-film strain gauge), ceramic (thick film), or ceramic (capacitive), but also apply selection criteria such as size and materials.


**Contact:**
Phone: +49 661 6003- 336
Email: thomas.reus@jumo.net

# Process pressure transmitters

| Type | 404382 | 404385 | 403022 |
|---|---|---|---|
| Description | JUMO dTRANS p02 DELTA | JUMO dTRANS p02 | JUMO dTRANS p20 DELTA |
| ATEX identification marking | Ex II 1/2G Ex ia IIC T6 Ga/Gb | | Ex II 1G Ex ia IIC T4 Ga<br>Ex II 1D Ex ia IIIC T105 °C Da |
| Measuring range (measuring span) min./max. | Differential pressure<br>60 mbar/25 bar | Relative/absolute<br>100 mbar/600 bar | Differential pressure<br>10 mbar/600 bar |
| Accuracy | 0.1 % | | 0.07 % |
| Measuring output | 4 to 20 mA (two-wire), additionally HART® | | 4 to 20 mA (two-wire), additionally HART® |
| Voltage supply | DC 11.5 to 36 V | | DC 11.5 to 36 V |
| Ambient temperature | –50 to +85 °C | | –50 to +85 °C |
| Design type/protection type | IP65 field housing according to EN 60529, aluminum | | IP67 field housing according to EN 60529, stainless steel |
| Process connection | 2 × ¼-18NPT female thread or with pressure separator | Various threads or front-flush connections | 2 × ¼-18NPT female thread or with pressure separator |
| Electrical connection | Cable gland | | Cable gland or round plug M12 × 1 |
| Medium temperatures | Max. +100 °C | Max. +120 °C<br>Optionally max. +200 °C | Max. +110 °C |
| Application | Level, flow, process pressure | | |
| Special features | Various accessories, complete selection of pressure separators, programming via keypad/LCD or PC setup program | Pressure connection also front flush, various accessories, complete selection of pressure separators, programming via keypad/LCD display or PC setup program | Various accessories, complete selection of pressure separators, programming via keypad/LCD or PC setup program |



| Type | 403023 | 403025 | 403026 |
|---|---|---|---|
| Description | JUMO dTRANS p20 DELTA Ex d | JUMO dTRANS p20 | JUMO dTRANS p20 Ex d |
| ATEX identification marking | II 1/2G Ex d IIC T6 to T4 Ga/Gb<br>II 2D Ex t IIIC T105 °C Db | II 1/2G Ex ia IIC T6 to T3 Ga/Gb<br>II 1/2D Ex ia IIIC T105 °C Da/Db | II 1/2G Ex d IIC T6 to T4 Ga/Gb<br>II 1/2D Ex t IIIC T105 °C Da/Db |
| Measuring range (measuring span) min./max. | Differential pressure<br>10 mbar/100 bar | Relative/absolute<br>600 mbar/600 bar | |
| Accuracy | 0.07 % | 0.05 % | |
| Measuring output | 4 to 20 mA (two-wire), additionally HART® | | |
| Voltage supply | DC 11.5 to 36 V | | |
| Ambient temperature | –50 to +85 °C | | |
| Design type/protection type | IP67 field housing according to EN 60529, stainless steel | | |
| Process connection | 2 × ¼-18NPT female thread<br>or with pressure separator | Various threads or front-flush connections | |
| Electrical connection | Cable gland | Cable gland<br>or round plug M12 × 1 | Cable gland |
| Medium temperatures | Max. +110 °C | Max. +120 °C<br>Optionally max. +200 °C | Max. +115 °C |
| Application | Level, flow,<br>process pressure | Level, process pressure | |
| Special features | Various accessories, complete selection of pressure separators, programming via keypad / LCD display or PC setup program | Pressure connection also front flush, various accessories, complete selection of pressure separators, programming via keypad / LCD display or PC setup program | |

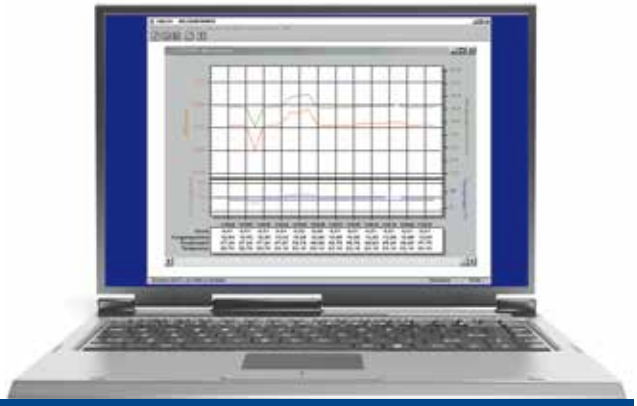
# Pressure transmitter and level probe

| Type | 404753 | 404753 |
|---|---|---|
| Description | JUMO dTRANS p33<br>pressure transmitter | JUMO dTRANS p33<br>level probe |
| ATEX<br>identification marking | Ⓔx II 1/2 G Ex ia IIC T4 to T6<br>Ⓔx II 1/2 D Ex ia IIIC T100 °C to T60°C | Ⓔx II 2 G Ex ia IIC T4 to T6<br>Ⓔx II 1 G Ex ia IIB T4 to T6 |
| Measuring range<br>(measuring span)<br>min./max. | Relative/absolute<br>0.25 bar/600 bar | Relative<br>0.25 bar/600 bar |
| Accuracy | 0.5 % | 0.5 % |
| Measuring output | 4 to 20 mA (two-wire) | 4 to 20 mA (two-wire) |
| Voltage supply | DC 11 to 28 V | DC 11 to 28 V |
| Ambient temperature | –40 to +85 °C | 0 to 70 °C |
| Design type/protection type | IP65 stainless steel case<br>according to EN 60529 | IP68 stainless steel case<br>according to EN 60529 |
| Process connection | Various threads or<br>front-flush connections | Threads, open/closed<br>system |
| Electrical connection | Cable socket, attached cable,<br>M12, terminal head | Attached cable made of PE, PUR,<br>or FEP;<br>tube fitting for protection tube |
| Medium temperatures | –40 to +85 °C<br>optionally –40 to +200 °C | 0 to 70 °C |
| Application | Process pressure, level | Level |
| Special features | Hygienic connections for food and<br>pharmaceuticals;<br>complete selection of pressure<br>separators | Connection to protection tube for<br>zone 0 |

# Convenient operation with minimal effort

## JUMO setup program for the HART® interface

Parameterizing a device with the setup program



Recording measured values

**JUMO dTRANS p02**
Process pressure transmitter
Type 404385

**JUMO dTRANS p20**
Process pressure transmitter
Type 403025

### Startup in just a few easy steps

You can perform startup quickly and easily with the rotary knob or the membrane keys. The devices are also easy to operate at any time in the Ex-area. And you don't even have to open the case to do it.

### A few essential device features:

- Standard LCD display featuring clear, concise presentation of information
- High accuracy and stability
- Low temperature drift
- Variable setting on the device means reduced stockkeeping
- Wide temperature range
- Sturdy aluminum or stainless steel case

### Our setup programs offer numerous functions for operation via interface:

- Convenient parameterization for all device parameters
- Device parameters can be saved or printed for project documentation
- Actual values and device status are displayed clearly online
- Pressure measurement value and sensor temperature can be recorded and documented for an extended period of time
- All status messages are displayed in plain text

# Recording, automation, and monitoring

Life in our modern industrial society is shaped by the rapid progress of technology. Each step of progress requires an increase in safety at the same time. Explosion hazards exist in many industries, not just in the petrochemicals sector. These industries in particular must make selective use of explosion-protected products and perform associated measures because of the seriousness of possible accidents. JUMO offers innovative products for this purpose for reliable monitoring of machines and plants.

To be able to reach the full potential of your core expertise in mechanical and plant engineering efficiently, you need an expert partner to cover the safety-relevant aspects of measurement and control technology, including explosion protection. Always in touch with the latest trends, we develop and produce a range of products to cover all requirements placed on modern explosion-protected measurement and control technology. Our expertise lies in controlling and regulating electrical energy in potentially explosive environments. JUMO products reflect the latest state of the art. They stand for safety, reliability, and innovation in a challenging market that is constantly changing with new requirements. Extensive quality control measures also ensure the high standard of our products. This process demonstrates time and again that our products always measure and regulate thermal processes reliably, even under extreme environmental conditions.

# Maximum system availability and optimum process reliability

Continuous contact with customers who use our products allows us to respond to new demands with pinpoint accuracy in a challenging business segment. This way we can supplement our products with custom-fit new developments.


**Contact:**
**Electronic products**
Phone: +49 661 6003-369
Email: bodo.schmitt@jumo.net

**Electromechanical products**
Phone: +49 661 6003-326
Email: rainer.staaf@jumo.net

# Certified temperature measuring chain

## Up to SIL3 with JUMO safetyM

## Safety temperature limiters/safety temperature monitors with temperature sensor for functional safety – also for use in Ex-areas

- Safe monitoring and switch-off of temperature processes
- Functional safety up to SIL3
- Performance level up to PL e
- Simple to configure and individually adjustable to the respective application
- Explosion-protected variant according to ATEX directive
- Broad spectrum of temperature sensors available (thermocouples and RTD temperature probes)

With the JUMO safetyM device JUMO now has a wide variety of temperature probes available in its product range. Along with the manufacturer's declaration JUMO delivers a certified safety system with which the most diverse measuring tasks, with the respectively matching sensors, can be carried out safely without requiring additional SIL calculations.

**Herstellererklärung**

*Manufacturer's declaration*

# Safety temperature limiters/monitors

DGRL 97/23/CE

| Type | 701155 |
|---|---|
| Description | JUMO safetyM STB/STW Ex |
| ATEX identification marking | 1-sensor variant<br>Ⓔx II (1) (2) (3) G (b1) [Ex ia Ga] [e pz] IIC<br>Ⓔx II (1) (2) (3) D (b1) [Ex ia Da] [p Dc] IIIC<br><br>2-sensor variant<br>Ⓔx II (1) (1) (2) G (b2) [Ex ia Ga] [e py] IIC<br>Ⓔx II (1) (1) (2) D (b2) [Ex ia Da] [p Db] IIIC |
| Analog inputs | Thermocouple: type "L", "J", "U", "T", "K", "N", "S", "R", "B", "D",<br>RTD temperature probe: Pt100, Pt1000, current (4 to 20 mA)<br>configurable |
| Analog outputs | 0 to 20 mA, 4 to 20 mA, 2 to 4 V, 0 to 10 V<br>Can be used as actual value output<br>for main measured value, measured value 1, 2, differential |
| Binary input | 1 floating contact – for unlocking, key inhibit,<br>level inhibit |
| Relay outputs | KV – can be used as pre-alarm<br>Alarm – limit alarm evaluated for temperature limiter |
| Voltage supply | AC/DC 20 to 30 V, 48 to 63 Hz, AC 110 V 240 V +10 % /-15 %, 48 to 63 Hz |
| Protection type | IP20 according to EN 60529 |
| Mounting site | Outside the Ex-area |
| Transmission behavior | Temperature-linear |
| Operation | LCD plain text display |
| Special features | SIL3, PL e, IPL 2 |

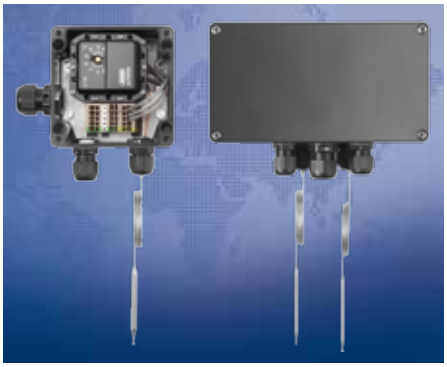
# Paperless recorders

| Type | 706581 | 706585 |
|---|---|---|
| Description | JUMO LOGOSCREEN nt<br>with stainless steel front | JUMO LOGOSCREEN fd<br>with stainless steel front |
| ATEX<br>identification marking | Ⓔx II 2G Ex px IIC<br>Ⓔx II 2D Ex pD 21 IP65 | |
| Modular<br>hardware concept | Up to 18 internal analog inputs,<br>up to 24 binary I/Os, additionally up to 54 external analog inputs and 24 binary I/Os as well as 18 math and logic channels | |
| Operation | Via sensor operator panel | |
| Interfaces on the rear | RS232/485 (Modbus), ETHERNET, two USB connections,<br>RS232 (barcode reader), PROFIBUS-DP (optional) | |
| Mounting site | The device is suitable for installation in control cabinets with pressurized enclosure. Under these conditions, use in a potentially explosive area (zone 1 or 21) is admissible from the front. | |
| Batch reports | Up to three batches can be recorded simultaneously and independent of each other | |
| Special features | 27 counters/integrators, web server with online-visualization,<br>stainless steel front with laminated glass panel | 27 counters/integrators, web servers with online visualization, stainless steel front with laminated glass panel, FDA-compliant according to Title 21 CFR Part 11, horizontal recorder image |

# Temperature transmitters

| Type | 707025 | 707015 | 707016 |
|---|---|---|---|
| Description | JUMO dTRANS T02 Ex | JUMO dTRANS T01 Ex | JUMO dTRANS T01 HART®/Ex |
| ATEX identification marking | Ⓔx II (1) G [Ex ia] IIC<br>Ⓔx II (1) D [Ex iaD] | Ⓔx II 1G Ex ia IIC T6 | Ⓔx II 1/2G Ex ia IIC T6/T5/T4 |
| Inputs | Thermocouple, Pt100, Pt500, Pt1000, resistance transmitter, potentiometer, current (–20 to +20 mA), voltage (–10 to +10 V) | Thermocouple: type "L", "J", "U", "T", "K", "E", "N", "S", "R", "B", "D", "C", Pt100, Pt500, Pt1000, Ni100, Ni500, Ni1000, in two-wire, three-wire, or four-wire circuit | |
| Outputs | 0 to 20 mA, 4 to 20 mA, 0 to 10 V, 2 to 10 V | 4 to 20 mA | |
| Voltage supply | AC/DC 20 to 53 V, AC 230 V ±10 % | DC 8 to 30 V with reverse voltage protection | DC 11.5 to 30 V with reverse voltage protection |
| Operating temperature | –10 to +60 °C | –40 to +85 °C | |
| Storage temperature | –10 to +70 °C | –40 to +100 °C | |
| Case width | 22.5 mm | ∅ 44 mm | |
| Protection type | IP20 according to EN 60529 | IP54 in the terminal head, open mounting IP00 according to EN 60529 | |
| Mounting site | Outside the Ex-area | In the Ex-area | |
| Transmission behavior | Temperature-linear, customer-specific linearization | | |
| Operation | Fine adjustment via device keys, device configuration via setup program | Completely configurable via setup program | Completely configurable via setup program with HART® modem |
| Special features | Galvanic isolation between measuring input, output, and auxiliary voltage, compact design | Flexible application possibilities with free configuration and galvanic isolation, output simulation | Communication in Ex-area via HART® communicator |

# Electromechanical thermostats, contact dial thermometers, and bimetal thermal switches



| Type | 605055 |
|---|---|
| Description | JUMO exTHERM-AT<br>Explosion-proof surface-mounted thermostat |
| ATEX/IECEx identification marking | Ex II 2G Ex d e IIC T4/T5/T6 Gb<br>Ex II 2D Ex tb IIIC T85 °C/T100 °C/T130 °C Db |
| Control ranges | Available from –50 to +500 °C |
| Operating temperature | –55 to +70 °C |
| Switching capacity on the N/C contact | AC 230 V, 16(2.5) A, cos φ = 1(0.6)<br>optionally AC 400 V, 16 A<br>optionally AC 230 V, 25(4) A, cos φ = 1(0.6) |
| Switching function | Temperature monitor, safety temperature monitor, safety temperature limiter |
| Probe diameter | 4 to 6 mm |
| Capillary length | Up to 5000 mm possible |
| Protection type | IP65 according to EN 60529 |
| Case material | Polyester (reinforced)<br>Stainless steel (optional) |
| Special feature | Thermowells for zone isolation<br>Type 605057 |

| Type | 608301 | 608520 |
|---|---|---|
| Description | Bimetal temperature switch | Contact dial thermometer |
| ATEX identification marking | For use only in combination with an Ex i switching amplifier in zone 2/22 | |
| Control ranges | 70 to 140 °C | |
| Operating temperature | 120 °C | |
| Switching capacity on the N/C contact | Switching capacity depends on the Ex i switching amplifier type | |
| Probe diameter | 11.5 mm (standard) | |
| Protection type | IP67 (standard) | |

# Accessories: Ex-i supply isolator for Ex two-wire transmitter

| Type | 707530 |
|---|---|
| Description | JUMO Ex-i repeater power supply / input isolating amplifier |
| ATEX identification marking | Ⓔx II (1) G [Ex ia Ga] IIC/IIB<br>Ⓔx II (1) D [Ex ia Da] IIIC<br>Ⓔx II 3 (1) G Ex nA [ia Ga] IIC/IIB T4 Gc |
| Input | 0 to 20 mA or 4 to 20 mA |
| Output | 0 to 5 V, 1 to 5 V, 0 to 20 mA, 4 to 20 mA (active/passive) |
| Voltage supply | AC/DC 24 to 230 V |
| Operating temperature | –20 to +60 °C |
| Storage temperature | –40 to +80 °C |
| Case width | 17.5 mm |
| Protection type | IP20 according to EN 60529 |
| Mounting site | Outside the Ex-area |
| Transmission behavior | Linear |
| Configuration | Via DIP switch |
| Special features | HART®-capable, SIL2 |

# Accessories: thermowells

| Type | 605057 |
|---|---|
| Description | Thermowell |
| ATEX identification marking | Ⓔx II 1/2 G Ex Ga<br>Ⓔx II 1/2 D Ex Da |
| Material | CrNi 1.4571 |
| Version | Screw-in<br>Weld-in |
| Pipe diameter | 10 x 1.5 mm |
| Insertion lengths | 100 to 500 mm |

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