

JUMO GmbH & Co. KG

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JUMO Instrument Co. Ltd.

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JUMO Process Control, Inc.

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JUMO MIDAS S19 R

OEM Pressure Transmitter – Railway

Applications

- Compressors
- Braking systems
- Climate control
- Sanitary equipment
- Hydrodynamic gears
- Water supply
- Fire extinguisher systems

Brief description

The pressure transmitter JUMO MIDAS S19 R has been especially designed and qualified for use in rail vehicles.

The fully welded measuring system (without seals) made of high-grade stainless steel allows this device to be used in almost all media, even in harsh conditions. The device features a silicon sensor that is extremely resistant to overloading even in the lowest measuring ranges and is capable of handling millions of pressure cycles.



Type 401008 with cable socket

Customer benefits

Tested according to typical standards for the railway industry:

- DIN EN 50155 "Electronic equipment used on rolling stock"
- DIN EN 61373 "Railway applications - rolling stock equipment", shock and vibration tests, category 1, class A + B
- DIN EN 50121-3-2 "Railway applications - electromagnetic compatibility"
- DIN EN/TS 45545-2 "Fire protection on railway vehicles"

Special features

- Tested acc. to railway standards
- Vibration and shock resistant
- Fulfills maximum EMC requirements
- Highly resistant to overload
- Welded stainless steel measuring system
- Suitable for HVAC applications

Approvals and approval marks (see technical data)



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Technical data

General Information

| | |
|--------------------------|--|
| Reference conditions | DIN 16086 and DIN EN 60770 |
| Sensor | |
| Measuring principle | Silicon sensor with stainless steel separating diaphragm (piezo-resistive) |
| Pressure transfer medium | Synthetic oil |
| Admissible load changes | > 10 million, 0 % to 100 % measuring range |
| Mounting position | Any |
| Calibration position | Device upright, process connection at the bottom |

Measuring range and accuracy

| Measuring range bar | Linearity ^a % MSP ^f | Accuracy at | | Long-term stability ^b % MSP per year | Overload capacity ^c bar | Burst pressure bar |
|--------------------------------------|--|-----------------------------|---|---|--|--------------------------|
| | | 20 °C ^d % MSP | -20 °C to +100 °C ^e % MSP | | | |
| 0 bar to 1.6 bar relative pressure | 0.25 | 0.5 | 1.5 | 0.2 | 6 | 10 |
| 0 bar to 2.5 bar relative pressure | 0.25 | 0.5 | 1.5 | | 10 | 15 |
| 0 bar to 4 bar relative pressure | 0.25 | 0.5 | 1.2 | | 16 | 24 |
| 0 bar to 6 bar relative pressure | 0.25 | 0.5 | 1.2 | | 24 | 36 |
| 0 bar to 10 bar relative pressure | 0.25 | 0.5 | 1.0 | | 40 | 60 |
| 0 bar to 16 bar relative pressure | 0.25 | 0.5 | 1.0 | | 60 | 100 |
| 0 bar to 25 bar relative pressure | 0.25 | 0.5 | 1.0 | | 150 | 250 |
| 0 bar to 40 bar relative pressure | 0.25 | 0.5 | 1.0 | | 300 | 400 |
| 0 bar to 60 bar relative pressure | 0.2 | 0.5 | 1.0 | | 300 | 400 |
| 0 bar to 100 bar relative pressure | 0.25 | 0.5 | 1.0 | | 300 | 400 |
| -1 bar to +1.5 bar relative pressure | 0.3 | 0.6 | 1.6 | | 10 | 15 |
| -1 bar to +3 bar relative pressure | 0.3 | 0.5 | 1.3 | | 16 | 24 |
| -1 bar to +5 bar relative pressure | 0.25 | 0.5 | 1.3 | | 24 | 36 |
| -1 bar to +9 bar relative pressure | 0.25 | 0.5 | 1.2 | | 40 | 60 |
| -1 bar to +15 bar relative pressure | 0.25 | 0.5 | 1.2 | | 60 | 100 |
| -1 bar to +24 bar relative pressure | 0.25 | 0.5 | 1.2 | | 150 | 250 |
| 0 bar to 1.6 bar absolute pressure | 0.25 | 0.5 | 1.5 | | 6 | 10 |
| 0 bar to 2.5 bar absolute pressure | 0.25 | 0.5 | 1.5 | | 10 | 15 |
| 0 bar to 4 bar absolute pressure | 0.25 | 0.5 | 1.2 | | 16 | 24 |
| 0 bar to 6 bar absolute pressure | 0.25 | 0.5 | 1.2 | | 24 | 36 |
| 0 bar to 10 bar absolute pressure | 0.25 | 0.5 | 1.0 | 40 | 60 | |
| 0 bar to 16 bar absolute pressure | 0.25 | 0.5 | 1.0 | 60 | 100 | |
| 0 bar to 25 bar absolute pressure | 0.25 | 0.5 | 1.0 | 150 | 250 | |
| 0 bar to 40 bar absolute pressure | 0.25 | 0.5 | 1.0 | 300 | 400 | |

^a Linearity according to limit point setting

^b Reference conditions DIN EN 61298-1

^c All pressure transmitters are vacuum-proof.

^d Includes: linearity, hysteresis, repeatability, deviation of measuring range initial value and measuring range end value

^e Includes: linearity, hysteresis, repeatability, deviation of measuring range initial value and measuring range end value, thermal effect on measuring range start and measuring span

^f MSP = measuring span

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Output

| | |
|---------------------------------|--|
| Analog output Output 405 | 4 mA to 20 mA, 2-wire |
| Step response T_{90} | ≤ 3 ms |
| Burden 4 mA to 20 mA, 2-wire | $R_L \leq (U_B - 10 \text{ V}) \div 0.02 \text{ A} (\Omega)$ |

Mechanical features

| | |
|--------------------|---|
| Material | |
| Process connection | Stainless steel 316 Ti |
| Membranes | Stainless steel 316 L |
| Case | Stainless steel 304 |
| Round plug M12 × 1 | Diecast zinc, nickel-plated, PA, stainless steel 303 |
| Bayonet connector | Stainless steel 304 |
| Plug connector | PBT-GF30 |
| Line socket | PBT-GF30, PA, silicone |
| Process seal | The measuring system is welded and therefore entirely free of seals. ^a |
| Weight | 135 g with process connection G 1/4 |

^a Pressure transmitters with process connection G 1/4 according to DIN 3852-1121 are supplied with an FPM seal. Ensure the medium durability of the seal material!

Environmental influences

| | |
|---|--|
| Admissible temperatures | |
| Medium | -40 °C to +125 °C |
| Ambient | -40 to +100 °C |
| Storage | -50 to +100 °C |
| Admissible air humidity | |
| Operation | 100 % relative humidity including condensation on the device outer case |
| Storage | 90 % relative humidity without condensation |
| Admissible mechanical load | |
| Vibration resistance | 0.1 g, 5 Hz to 150 Hz, according to DIN EN 61373, chapter 8, category 1, class B, 20 g, 15 Hz to 2,000 Hz, according to IEC 60068-2-6 |
| Shock resistance | 3 g for 30 ms, according to DIN EN 61373, chapter 10, category 1, class A + B, 100 g for 1 ms, according to IEC 60068-2-27 |
| Electromagnetic compatibility (EMC) | |
| Interference emission | Class B ^a , according to DIN EN 50121-3-2 |
| Interference immunity | Evaluation criterion A, according to DIN EN 61373, chapter 10, category 1, class A + B |
| Protection type for electrical connection | According to DIN EN 60529 |
| Round plug M12 × 1 ^b | IP66/IP67 |
| Bayonet connector ^d | IP66/IP67 |
| Plug connector | IP50 |
| Line socket ^c | IP65 |

^a The product is suitable for industrial use as well as for households and small businesses.

^b The protection type is only achieved with a suitable mounted counter piece.

^c Connecting cable diameter, minimum 6 mm, maximum 8 mm

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Electrical data

| | |
|---|--|
| Voltage supply U_B^a 4 mA to 20 mA, 2-wire | DC 10 V to 30 V, rated voltage supply DC 24 V |
| Current consumption 4 mA to 20 mA, 2-wire | ≤ 25 mA |
| Reverse voltage protection | Yes |
| Electrical circuit Requirements | SELV The device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to "Limited-energy circuits". |

^a Residual ripple: the voltage peaks must not exceed or fall below the specified voltage supply values!

Approvals and approval marks

| | |
|--|--|
| EAC Testing agency Certificates/certification numbers Inspection basis Valid for | «Промтехконтроль» EAЭС N RU Д-DE.PA01.B.80830/21 TR TS 020/2011 Type 401008 |
|--|--|

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Certificate

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More than **sensors + automation**

CERTIFICATE
Environmental Testing

According to DIN EN 50155 / DIN EN 50121

Certificate no. 024000
Date of issue October 12, 2014
Number of pages 2 pages
Applicants name JUMO GmbH & Co. KG
Address Moritz-Juchheim-Straße 1, 36039 Fulda, Germany
Manufacturer JUMO GmbH & Co. KG
Address Moritz-Juchheim-Straße 1, 36039 Fulda, Germany
Product description Pressure sensor JUMO MIDAS S19 R / 401008
Trademark JUMO
Model and/or type list Railway application

Applied tests to JUMO MIDAS S19 R / 401008

| Test | Standard | Result |
|--|--------------------------------|--------|
| 1 Cold, - 50 °C, 2 h | EN 60068-2-1:2007 | Passed |
| 2 Damp heat cyclic, 25 °C / 55 °C, 95 % r.H., 2 cycles à 24 h | EN 60068-2-30:2005 | Passed |
| 3 Salt mist, 336 h | EN 60068-2-11:1999 | Passed |
| 4 Dry heat, 100 °C, 6 h | EN 60068-2-2:2007 | Passed |
| 5 EMC | | |
| Electrical fast transient burst +/- 4 KV | EN 61000-4-4:2004 | Passed |
| RF conducted disturbances 10 V RMS | EN 61000-4-6:2009 | Passed |
| SURGE Asymmetrically +/- 1 KV (42 ohm), line to earth | EN 61000-4-5:2006 | Passed |
| Radiated electromagnetic field 80 to 1000 MHz; 20 V/m 1000 to 2700 MHz; 10 V/m | EN 61000-4-3:2006 + A1:2008 | Passed |
| Electrostatic discharge +/- 6 KV contact, +/- 8 KV air | EN 61000-4-2:2009 | Passed |

continued on next page

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CERTIFICATE

Environmental Testing

According to DIN EN 50155 / DIN EN50121

| Test | Standard | Result |
|---|---|--------|
| 6 Vibration and shock test | | |
| Half sine puls Acceleration 30 m/s ² , 18 shocks (3 each positive and negative in the corresponding direction) | EN 61373:1999 Cat. 1B | Passed |
| Simulated lifetime test RMS acceleration 7.9 m/s ² , frequency range 5 Hz ≤ f ≤ 150 Hz, 5 hours per orientation | EN 61373:1999 Cat. 1B | Passed |
| Broadband noise RMS acceleration 1.0 m/s ² , frequency range 5 Hz ≤ f ≤ 150 Hz, approx. 10 minutes per orientation | EN 61373:1999 Cat. 1B | Passed |
| 7 IP protection type | | |
| valve connector, DIN EN 175301-803 Form A IP 65 | EN 60529:1991 + A1:2000 | Passed |
| round plug connector, M12x1 IP 66/67 | EN 60529:1991 + A1:2000 | Passed |
| bayonet connector, VG 95234A - 10SL IP 66/67 | EN 60529:1991 + A1:2000 | Passed |
| 8 Accelerated lifetime test (lifetime: 190,000 h) | Lifetime [h] / 2 ^Δ (temperature increase /10)= test time [h] | Passed |
| 9 Accelerated ageing 150,000 pressure cycles, 0 to 60 bar, 3 Hz | | Passed |

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July 11, 2016

Joachim Vollmer
 Product Management Sensors

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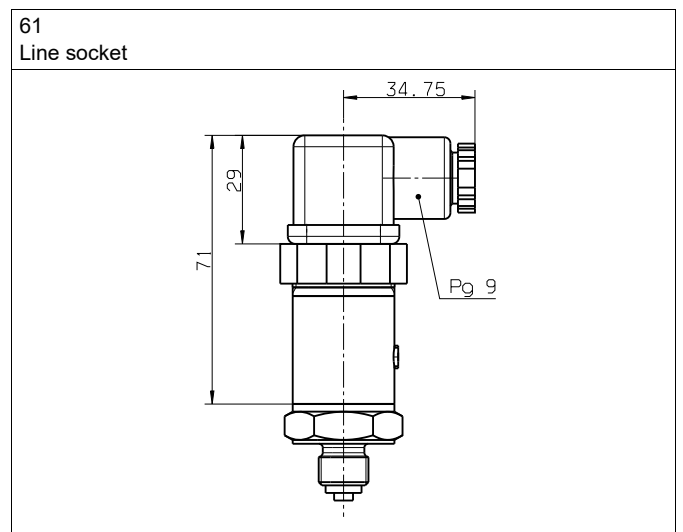
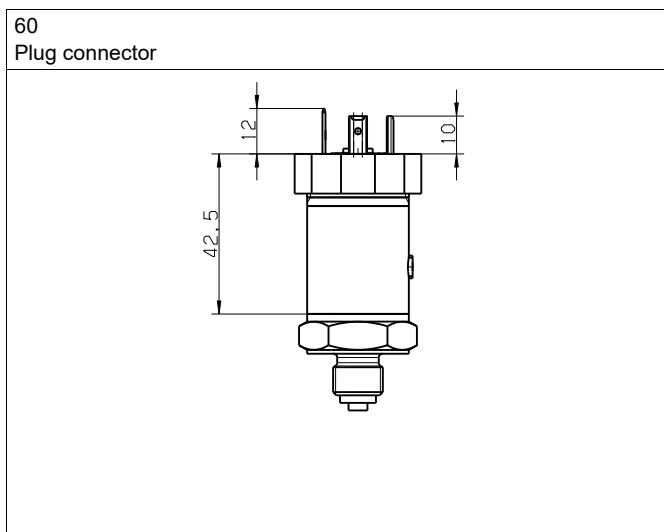
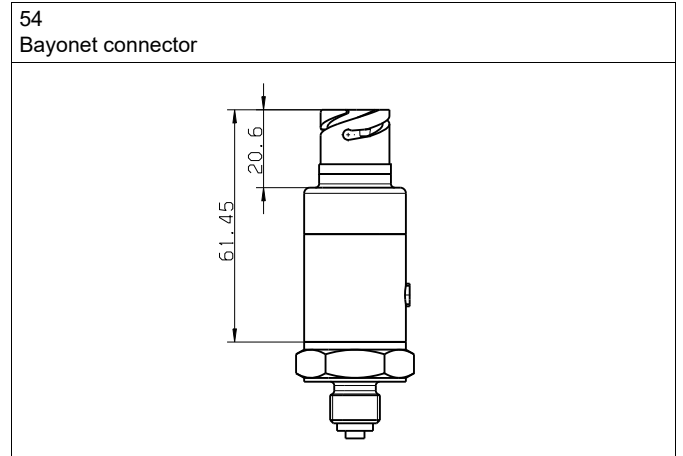
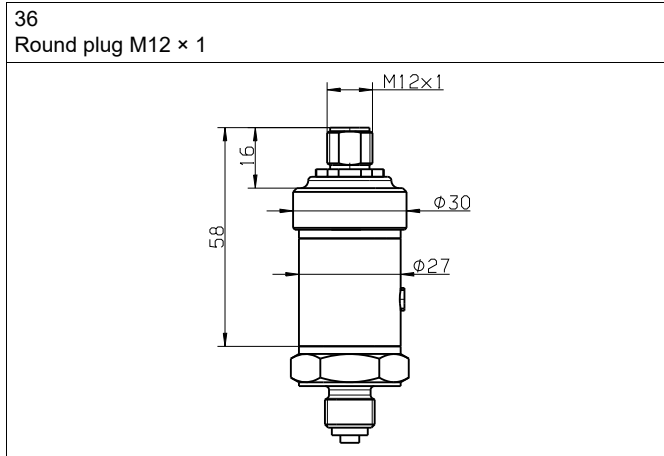
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Dimensions

Electrical connection



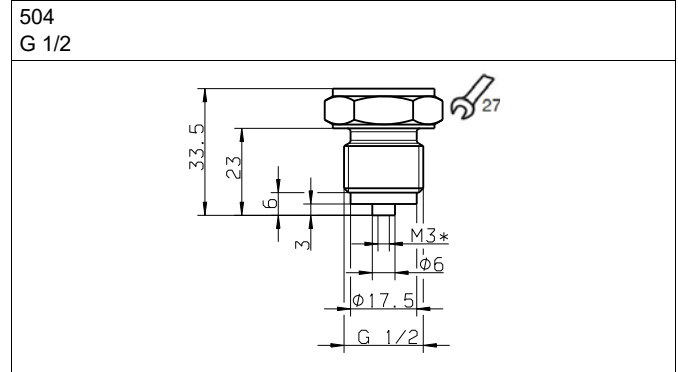
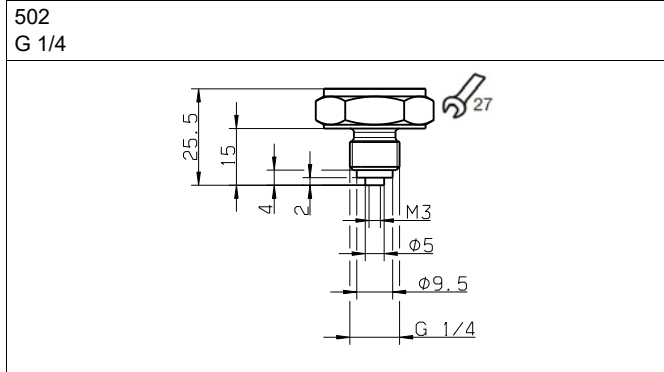
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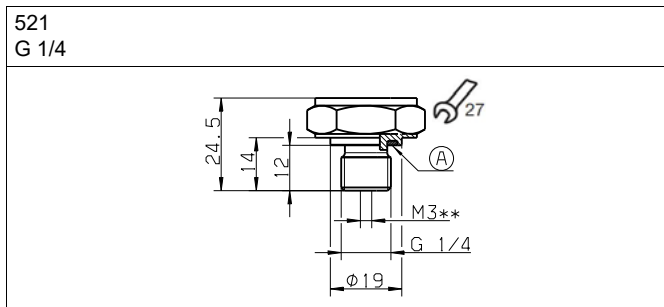
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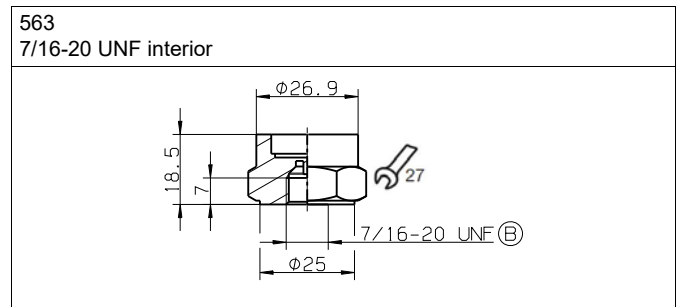
Process connection



* Extra code 630 pressure channel Ø 12 mm



A Profile seal G 1/4
 ** Extra code 630 pressure channel Ø 8 mm



B With valve core handle

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Connection diagram

The connection diagram in the data sheet provides preliminary information about the connection options. For the electrical connection, only use the installation instructions or the operating manual. The knowledge and the correct technical compliance with the safety information and warnings contained in these documents are mandatory for mounting, electrical connection, and startup as well as for safety during operation.

| Connection | | Terminal assignment ^a | | |
|--|--------------------|----------------------------------|-------------------------|---|
| | | | | |
| | | 36 Round plug M12 × 1 | 54 Bayonet connector | 60 Plug connector 61 Line socket |
| 4 mA to 20 mA, 2-wire | | | | |
| Voltage supply DC 10 V to 30 V | U _B /S+ | 1 | 1 | 1 |
| | 0 V/S- | 3 | 2 | 2 |
| Functional bonding conductor FB ^b | | 2 | 3 | |

^a Figure: Connection to the pressure transmitter

^b The pressure transmitter has to be connected to the potential equalization system of the plant via the electrical connection or process connection.

| Color coding: connecting cable round plug M12 × 1 | | |
|---|------|-------|
| | 1 BN | Brown |
| | 2 WH | White |
| | 3 BU | Blue |
| | 4 BK | Black |

The color coding is **only** valid for A-coded standard cables!

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Order details

| | |
|------------|---|
| | (1) Basic type |
| 401008/000 | JUMO MIDAS S19 R – OEM pressure transmitter – Railway |
| | (2) Input |
| 455 | 0 bar to 1.6 bar relative pressure |
| 456 | 0 bar to 2.5 bar relative pressure |
| 457 | 0 bar to 4 bar relative pressure |
| 458 | 0 bar to 6 bar relative pressure |
| 459 | 0 bar to 10 bar relative pressure |
| 460 | 0 bar to 16 bar relative pressure |
| 461 | 0 bar to 25 bar relative pressure |
| 462 | 0 bar to 40 bar relative pressure |
| 463 | 0 bar to 60 bar relative pressure |
| 464 | 0 bar to 100 bar relative pressure |
| 480 | -1 bar to +1.5 bar relative pressure |
| 481 | -1 bar to +3 bar relative pressure |
| 482 | -1 bar to +5 bar relative pressure |
| 483 | -1 bar to +9 bar relative pressure |
| 484 | -1 bar to +15 bar relative pressure |
| 485 | -1 bar to +24 bar relative pressure |
| 489 | 0 bar to 1.6 bar absolute pressure |
| 490 | 0 bar to 2.5 bar absolute pressure |
| 491 | 0 bar to 4 bar absolute pressure |
| 492 | 0 bar to 6 bar absolute pressure |
| 493 | 0 bar to 10 bar absolute pressure |
| 494 | 0 bar to 16 bar absolute pressure |
| 495 | 0 bar to 25 bar absolute pressure |
| 505 | 0 bar to 40 bar absolute pressure |
| 998 | Special measuring range for absolute pressure |
| 999 | Special measuring range for relative pressure |
| | (3) Output |
| 405 | 4 mA to 20 mA, 2-wire |
| | (4) Process connection |
| 502 | G 1/4 according to DIN EN 837 |
| 504 | G 1/2 according to DIN EN 837 |
| 521 | G 1/4 according to DIN 3852-11 |
| 563 | 7/16-20 UNF interior, with valve core handle |
| | (5) Process connection material |
| 20 | CrNi (stainless steel) |
| | (6) Electrical connection |
| 36 | Round plug M12 × 1 |
| 54 | Bayonet VG 95234A - 10SL |
| 60 | Plug connector DIN EN 174301-803, Form A (without cable socket) |
| 61 | Line socket DIN EN 175301-803, Form A |

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| (7) Extra codes | |
|------------------------|--|
| 000 | None |
| 591 | Choke in the pressure channel |
| 624 | Oil and grease free |
| 630 | Enlarged pressure channel ^a |
| 950 | For railway applications ^b |

^a Diameter 8 mm for process connection G 1/4 according to DIN 3852-11, diameter 12 mm for process connection G 1/2 according to DIN EN 837

^b Railway application is standard and must always be indicated.

Order code (1) (2) (3) (4) (5) (6) (7)
 - - - - - / 950, ...^a
Order example 401008/000 - 455 - 405 - 504 - 20 - 61 / 950

^a List extra codes in sequence, separated by commas.