

JUMO GmbH & Co. KG
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
Internet: 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
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
6724 Joy Road
East Syracuse, NY 13057, USA
Phone: +1 315 437 5866
Fax: +1 315 437 5860
Email: info.us@jumo.net
Internet: www.jumousa.com



JUMO CEROS C02 M

Digital Low Energy pressure measuring cell

Applications

- Module for the production of pressure transmitters, level probes, data loggers, digital manometers, valve blocks and pumps
- Battery-powered low-energy applications, e.g. handheld or wireless devices

Brief description

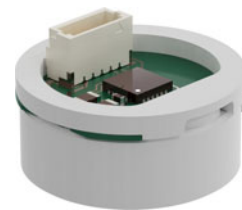
The digital pressure measuring cell is used to measure the pressure of liquid and gaseous media. In contrast to conventional pressure measuring cells, it is an active component that supplies a factory temperature-compensated and calibrated digital output signal (I²C). The ceramic thick film sensor with integrated signal processing is hermetically encapsulated and provides stable and precise linearity and accuracy values even under adverse conditions.

The digital pressure measuring cells use standard measuring ranges for relative pressure measurements. In addition, individual adjustments of the measuring range can be taken into consideration.

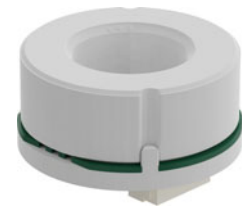
The compact design type of the digital pressure measuring cell and the low current consumption open up applications as a module of a pressure transmitter, a level probe or the direct integration into customer applications such as handheld devices or battery operated devices of any kind. For electric connection to downstream electronic components, versions with JST connector or edge connector are possible.

The pressure measuring cell can be accessed using an I²C interface and setup program. The setup program visualizes the actual process values. In addition, various configurations and offset correction can also be carried out.

A digital signature can be read out, enabling unambiguous traceability.



Type 405106
(rear view)



Type 405106
(front view)



Customer benefits

- Suitable for battery operation
- Factory calibrated and temperature compensated
- Simple zero point correction possible by using the setup program (e.g. after installation)
- Pressure and temperature values as a digital signal
- Direct mounting on circuit board possible (without additional connector)
- Traceability of the sensor with a clear digital signature

Special features

- Measuring ranges from 1,6 bar (232 psi) up to 60 bar (870 psi)
- Operating temperature depending on the electrical connection from -40 to +120 °C
- High signal resolution with up to 16 Bit
- Low current consumption (operating mode < 1 mA, sleep mode < 50 nA)
- Low input voltage of 1.68 to 3.6 V
- Fast wake-up time <1 ms
- Digital output signal (I²C)

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Technical data

Input

Measuring range and accuracy

Pressure

The reference conditions according to DIN EN 61298-1 apply. Observe the calibration position ⇨ "Mechanical features", Page 3.

| Measuring range | Linearity ^a | Accuracy at 20 °C ^c | 0 to 85 °C ^d | -20 to +100 °C ^d | Long-term stability | Overload capacity ^b | Burst pressure |
|---------------------------------|------------------------|--------------------------------|-------------------------|-----------------------------|---------------------|--------------------------------|----------------|
| | % MSP ^e | % MSP | | % MSP | % MSP per year | bar | bar |
| 0 to 1,6 bar relative pressure | < 0.2 | < 0.4 | < 0.5 | < 1 | < 0.2 | 6 | 12 |
| 0 to 2,5 bar relative pressure | | | | | | 6 | 12 |
| 0 to 4 bar relative pressure | | | | | | 12 | 25 |
| -1 to +1 bar relative pressure | | | | | | 6 | 10 |
| -1 to +3 bar relative pressure | | | | | | 12 | 25 |
| -1 to +6 bar relative pressure | | | | | | 24 | 36 |
| -1 to +10 bar relative pressure | | | | | | 40 | 60 |
| -1 to +16 bar relative pressure | | | | | | 50 | 75 |
| -1 to +25 bar relative pressure | | | | | | 100 | 150 |
| -1 to +40 bar relative pressure | | | | | | 120 | 200 |

^a According to limit point setting.

^b All pressure measuring cells are vacuum proof.

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

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

^e MSP = measuring span

Temperature

The integrated temperature sensor maps the internal temperature of the pressure measuring cell and provides indications of the medium temperature.

| | |
|-----------------|---------------|
| Measuring range | -20 to +80° C |
| Accuracy | ±2 K |

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Interface

Communication details ⇒ [JUMO CEROS Series 02 - Interface Description](#).

| | |
|---|--|
| Digital output 523 | I ² C, DC 3.3 V |
| Transmission type | Serial transmission (master-slave communication) |
| Standard address | 0x2C in 7-bit addressing, 0x58 including R / W bit |
| I ² C signal level | |
| Low level input for SCL and SCD | < 25 % V _{DD} |
| High level input for SCL and SCD | > 75 % V _{DD} |
| Pull-up resistor | R _{Pull-up} 1 to 10 kΩ |
| Signal resolution | up to 16 bit |
| I ² C clock frequency | max. 3.4 MHz |
| Operational readiness time | < 2.5 ms |
| Conversion time ^a | < 3 ms |
| Response time t _{0,9} ^b | 3 up to max. 6 ms |

^a Time from signal acquisition via signal processing to signal output.

^b Time required for the output signal to reach 90% of an instantaneous full scale pressure change.

Electrical data

| | |
|---------------------|------------------|
| Voltage supply | DC 1,68 to 3,6 V |
| Current consumption | |
| Operating mode | < 1 mA |
| Sleep mode | < 50 nA |

Mechanical features

| | |
|-------------------------|---|
| Reference conditions | DIN 16086, DIN EN 60770 |
| Measuring principle | Ceramic thick film (relative pressure sensor) |
| Admissible load changes | > 10 million |
| Mounting position | Any |
| Calibration position | Measuring cell vertically upright, membrane downwards |

Materials

| | |
|--|--|
| Components in contact with the medium ^a | |
| Sensor | Ceramic Al ₂ O ₃ 96 % (C795) |
| Process connection | AISI 304 (1.4301) |
| O-ring | FPM |

^a Observe the resistance of the components in contact with the medium.

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Environmental influences

| | |
|--|---|
| Admissible operating temperature ^a | |
| Electrical connection | |
| 39 JST connector | -25 to +85 °C |
| 42 Edge Connector | -40 to +120 °C |
| Admissible humidity | |
| Storage | <90 % relative humidity, without condensate formation |
| Electromagnetic compatibility (EMC) of the integrated ICs: | |
| EMC protection ^b | According to ESD human body model (MIL883, method 3015.7) |
| GND, U _B | ≥ 4 kV |
| Vibration resistance | DIN EN 60068-2-6, DIN EN 60068-2-27 |
| Vibration resistance | 20 g for 5 to 2000 Hz |
| Shock resistance | 75 g for 11 ms, 100 g for 1 ms |
| Insulation voltage | DC 700 V |
| Insulation resistance | > 50 MΩ at DC 500 V |

^a Medium temperature, ambient temperature, storage temperature.

^b Further measures must be taken in a terminal device in order to fulfil application-specific EMC requirements.

Placing onto market

The component does not meet the requirements of "equipment with safety function" according to Pressure Equipment Directive 2014/68/EU.

The pressure measuring cell is a component and not an end device and is therefore not subject to application-specific EMC requirements.

Placing the resulting end product onto the market in the European Economic Area (EEA) means that testing according to with standards mentioned, a declaration of conformity, and affixing CE marking can be carried out independently.

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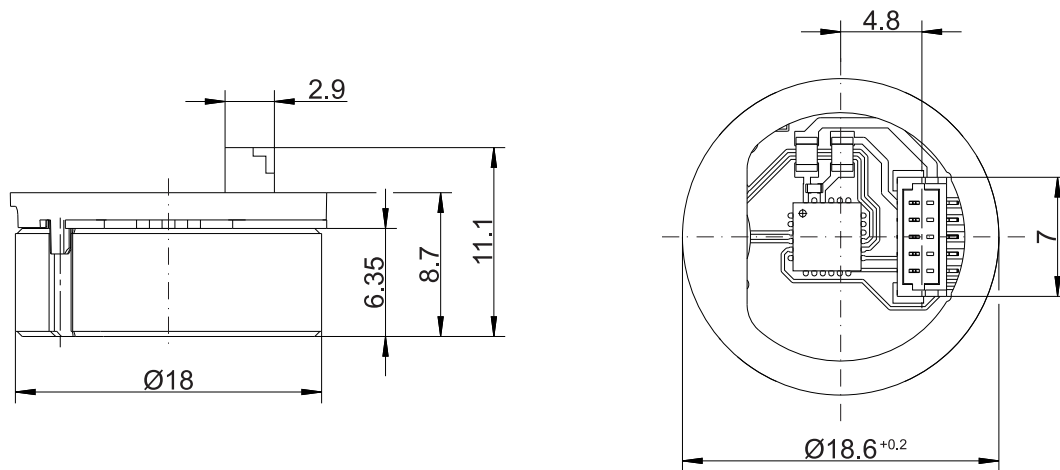
Dimensions

General tolerances for linear and angular dimensions without individual tolerance indications according to DIN ISO 2768-m.

Pressure measuring cell

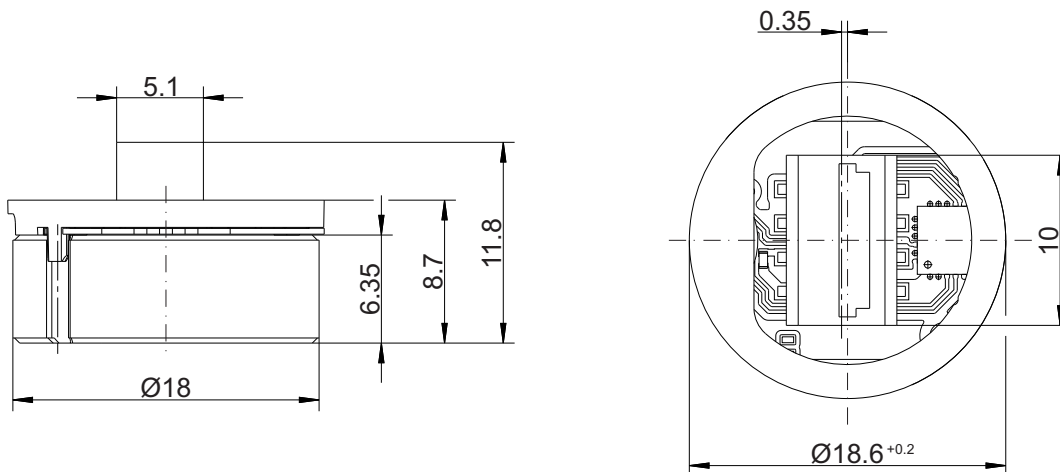
231, 39

Sensor element Ceramic with JST connector (Type BM05B-SRSS-TB)



231, 42

Sensor element Ceramic with Edge Connector



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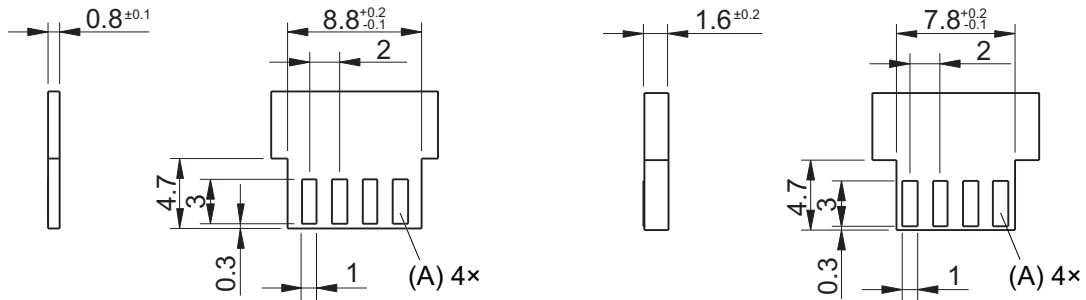
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Plug-in PCB for Edge Connector

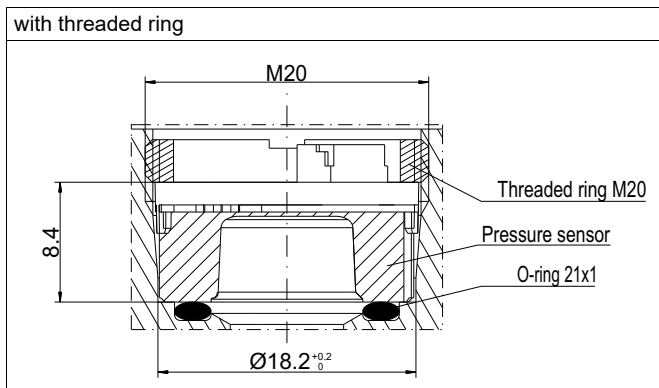
Layout (recommended)



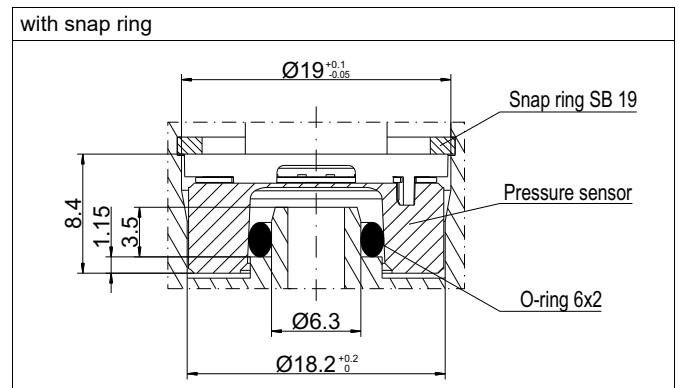
(A) Contact surface: Galvanic Nickel-Gold (recommended)

Installation examples

with threaded ring



with snap ring



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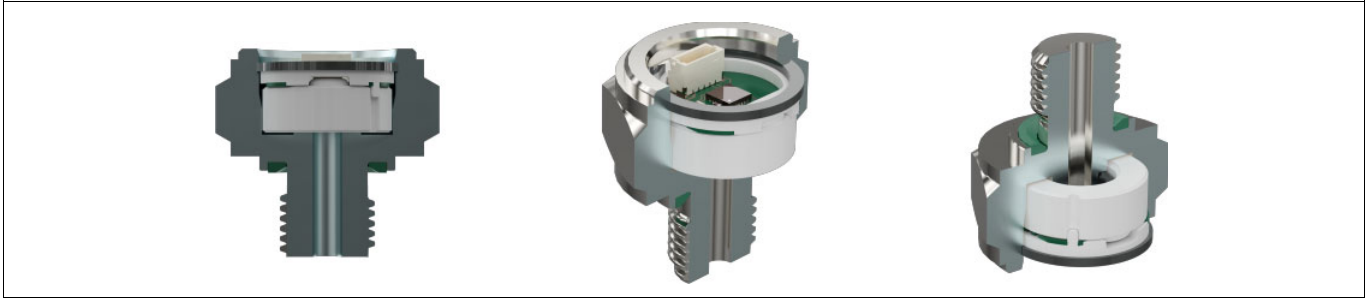
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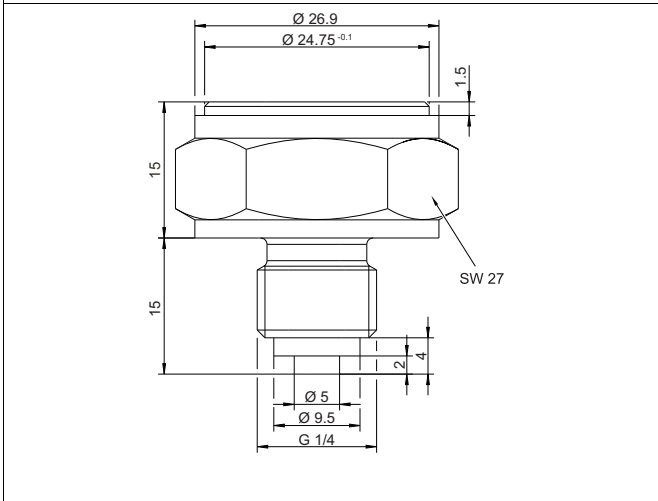
Process connections

521 – Section views (examples)



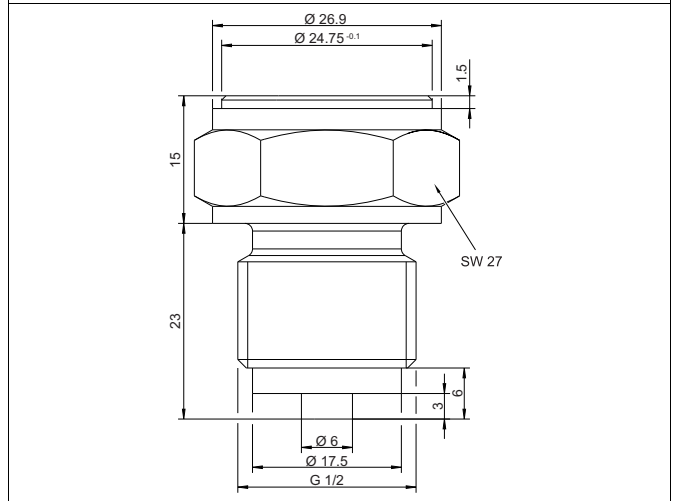
502

G 1/4 DIN EN 837



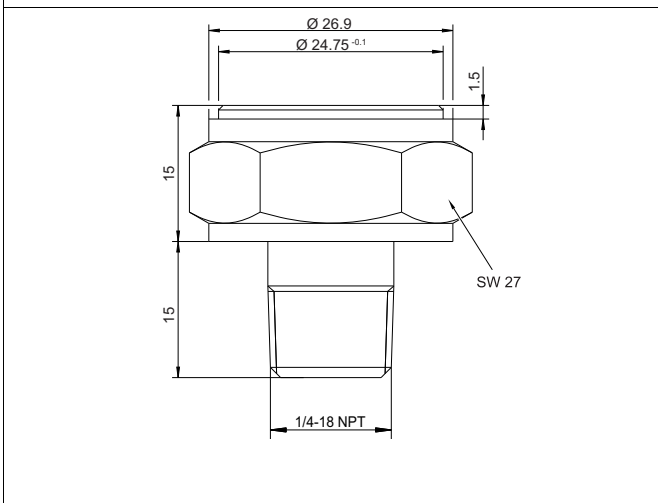
504

G 1/2 DIN EN 837



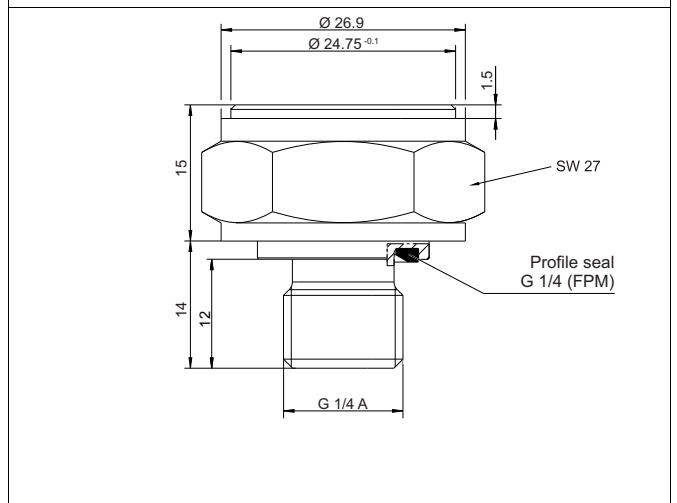
511

1/4-18 NPT DIN EN 837



521

G 1/4 DIN 3852-11



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 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
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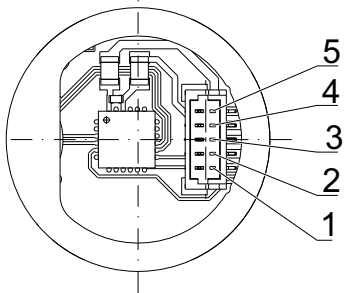
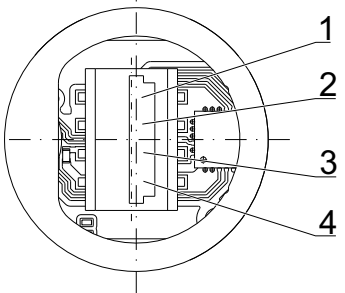
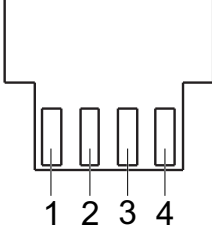
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Connection diagram

The connection diagram in the data sheet provides information on product selection.

For the electrical connection, only use the installation instructions or the operating manual.

| Electrical connection | 39 | 42 | |
|-----------------------|---|--|---|
| | JST connector (type BM05B SRSS-TB) | Edge Connector | Plug-in PCB for Edge Connector |
| |  |  |  |
| EOC | 5 | - | - |
| GND | 4 | 4 | 4 |
| U _B | 3 | 3 | 3 |
| SCL | 2 | 2 | 2 |
| SDA | 1 | 1 | 1 |

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Order details

| | |
|--------|---|
| | (1) Basic type |
| 405106 | JUMO CEROS C02 M – digital pressure measuring cell |
| | (2) Basic type extension |
| 000 | None |
| | (3) Input |
| 455 | 0 to 1,6 bar relative pressure |
| 456 | 0 to 2,5 bar relative pressure |
| 457 | 0 bis 4 bar relative pressure |
| 449 | -1 to +1 bar relative pressure |
| 481 | -1 to +3 bar relative pressure |
| 545 | -1 to +6 bar relative pressure |
| 472 | -1 to +10 bar relative pressure |
| 434 | -1 to +16 bar relative pressure |
| 514 | -1 to +25 bar relative pressure |
| 546 | -1 to +40 bar relative pressure |
| 547 | -1 to +60 bar relative pressure |
| | (4) Measuring cell |
| 231 | Sensor element Ceramic |
| 232 | Sensor element Ceramic with process connection and FPM seal |
| | (5) Process connection |
| 000 | No process connection |
| 502 | G 1/4 according to DIN EN 837 |
| 504 | G 1/2 according to DIN EN 837 |
| 511 | 1/4-18 NPT according to DIN EN 837 |
| 521 | G 1/4 DIN 3852-11 |
| | (6) Output |
| 523 | I ² C, 3.3 V supply |
| | (7) Electrical connection |
| 39 | JST connector |
| 42 | Edge Connector |
| | (8) Extra codes |
| 983 | Test report |

Order code (1) (2) (3) (4) (5) (6) (7) (8)
 Order example 405106 / 000 - 472 - 231 - 000 - 523 - 42 / 983, ...^a

^a List extra codes in sequence and separate using commas.

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Accessories

| Designation | Part no. |
|--|----------|
| Setup JUMO CEROS Series 02 (PC setup software) | 00759752 |
| PC-Interface with Converter USB/I ² C 3,3 V JST (for connection to JST version) | 00772261 |

Further information and downloads



qr-405106-en.jumo.info