# 4-Channel Measuring Amplifier BSC4A


Operating Manual

Released June 19, 2023

## 4-channel strain gage measuring amplifier BSC4A


- 4mV/V, 2 mV/V, 1mV/V, 0.5mV/V configurable via jumpers
- Output signals ±10V AND 12mA+-8mA on 15 pin Sub-D
- Integrated half and quarter bridge completion for 350-ohm strain gage
- Tare function individually via control cables and together via control cables and switches

### Description

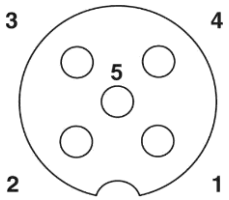
The measuring amplifier BSC4A is a measuring amplifier with 4 independent channels for sensors with strain gages such as force sensors, torque sensors, acceleration sensors or extension sensors.
This measuring amplifier is also suitable for connecting strain gage full and half bridges from 87.5 ohm to 5000 ohm and strain gage quarter bridges with 350-ohm.
The measuring amplifier BSC4A is supplied with a plug-in 18V power supply and SUB-D mating plugs.
The voltage and current outputs are at the 15-pin Sub-D socket and one ground for each analog output. Both outputs have been calibrated and can be used at the same time.

The sensor inputs, bridge competitions and the inputs for automatic zero adjustment of the individual channels are at the 37-pin Sub-D socket.
The bridge completion resistance with 0.1% tolerance for 350-ohm strain gage is maintained. The quarter or half bridge mode can be set by the customer at the 37-pin Sub-D socket (see wiring diagram for 37-pin Sub-D socket).
As an option, it is possible to use the 6-wire technology. The use of 6-wire technology must be configured to the circuit board so this is a separate request that must be made at time of purchase.

BSC4D M12 socket variant

The BSC4D M12 is optionally equipped with round connectors for the sensor connection.

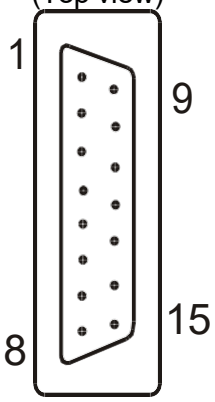
Wiring diagram for 5-pin socket M12x1, type 763

| | 5-pin | Description | Color code for cable | |
|---|---|---|---|---|
|  | 2 | -$U_S$ negative bridge power supply | white | white |
| | 1 | +$U_S$ positive bridge power supply | brown | brown |
| | 3 | +$U_D$ positive differential input | green | blue |
| | 4 | -$U_D$ negative differential input | yellow | black |
| View of socket side | 5 | AUX connected to quarter bridge 350 ohm (QB) | grey | grey |

Six-wire technology is not possible for M12 socket variant.

In quarter bridge and half bridge mode, the internal half bridge completion must be activated via the solder bridge on the circuit board (also possible in the factory as a free order option).

Wiring diagram for output socket 15-pin Sub-D socket

| Socket **Spring contacts** | **BSC4A assignment** | **15-pin SUB-D (PIN No.)** | | | |
|---|---|---|---|---|---|
| (Top view)<br>  | GNDio | 1<br>black | | | |
| | Zero-point adjustment (joint) | 8<br>purple | | | |
| | Supply voltage | 9<br>gray | | | |
| | | **Channel 1** | **Channel 2** | **Channel 3** | **Channel 4** |
| | Output voltage | 2<br>brown | 5<br>yellow | 15<br>red-white | 12<br>light green |
| | Output current | 3<br>red | 6<br>green | 14<br>brown-white | 11<br>pink |
| | Ground | 4<br>orange | 7<br>blue | 13<br>black-white | 10<br>white |

The colors correspond to the core colors of the supplied 3-meter cable with 15-pin connector SubD15.

Automatic Zero Adjustment

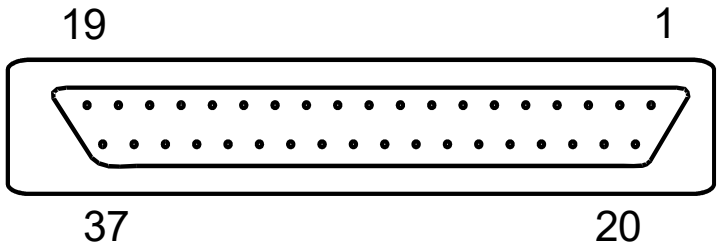
Automatic Zero-adjustment is operated via push button or via digital input. Advice: the GNDio PIN 1 for digital input with PIN 8 is isolated from analog Ground PIN4.
Analog grounds PIN4, PIN7, PIN13, PIN10 are connected.
Connect GNDio (PIN1) permanently with Ground (PIN4) and connect Supply Voltage (PIN9) via Relays or button with PIN8 for remote-controlled zero adjustment.

| | |
|---|---|
| GNDio for digital input | black, 1 |
| Zero-adjustment input | purple, 8 |
| Supply Voltage output | grey, 9 |

The colors correspond to the core colors of the supplied 3-meter cable with 15-pin connector SubD15.

Wiring diagram for 37-pin Sub-D socket

37-pin Sub D, female




Terminal assignment 37 pin Sub D, female

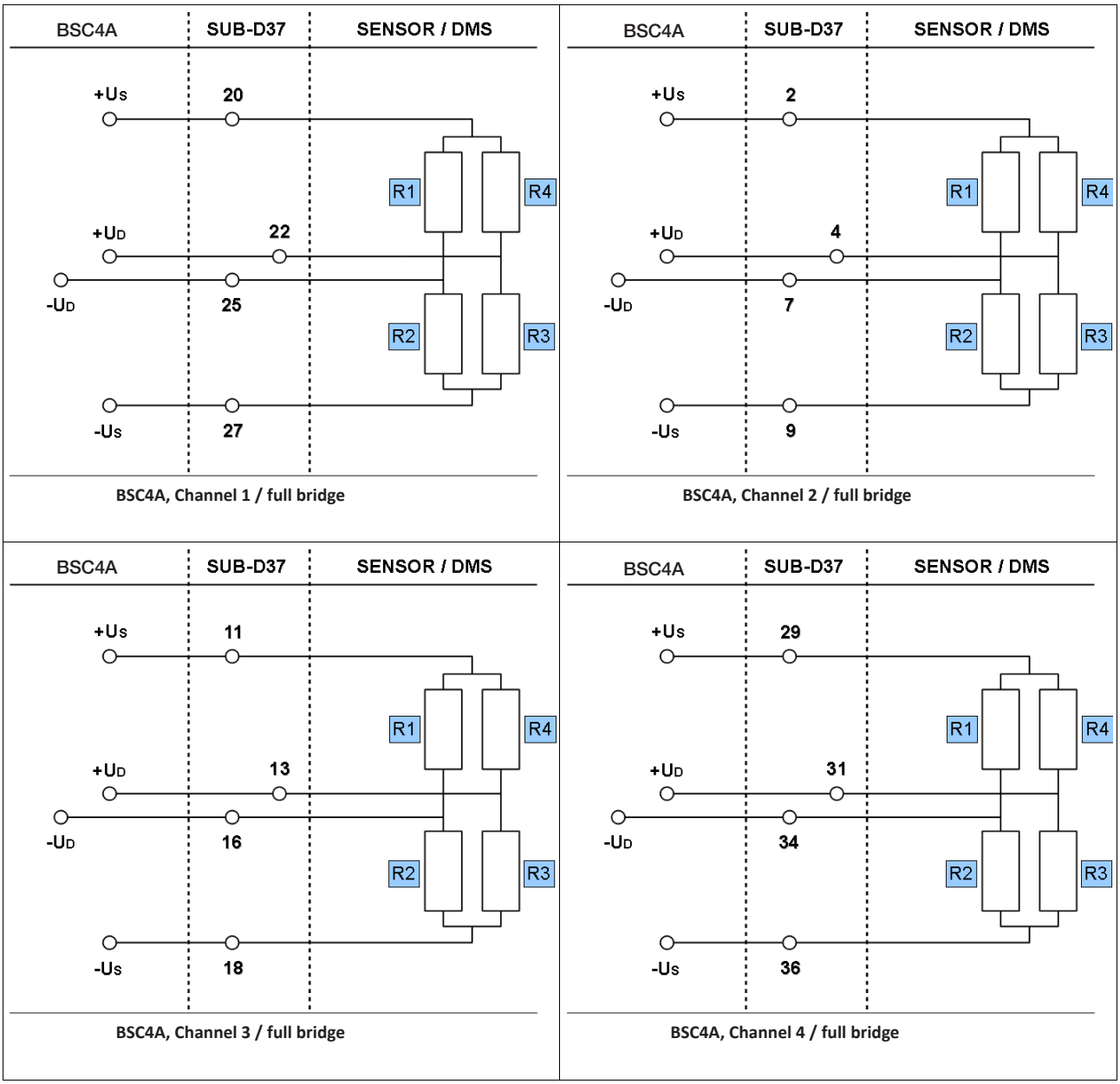
| | **BSC4A assignment** | **37-pin SUB-D (PIN No.)** | | | |
|---|---|---|---|---|---|
| GND | Ground/shield | 1 | | | |
| | | **Channel 1** | **Channel 2** | **Channel 3** | **Channel 4** |
| +$U_S$ | positive sensor power supply | 20 | 2 | 11 | 29 |
| +$U_F$ | positive sensor input | 21 | 3 | 12 | 30 |
| +$U_D$ | positive differential input | 22 | 4 | 13 | 31 |
| QB350 | quarter bridge completion 350Ω 1) | 23 | 5 | 14 | 32 |
| HB | half bridge completion 2) | 24 | 6 | 15 | 33 |
| -$U_D$ | negative differential input 2) | 25 | 7 | 16 | 34 |
| -$U_F$ | negative sensor input | 26 | 8 | 17 | 35 |
| -$U_S$ | negative sensor power supply | 27 | 9 | 18 | 36 |
| Tare | automatic zero-point adjustment | 28 | 10 | 19 | 37 |

1) Half bridge completion must be activated at the same time.

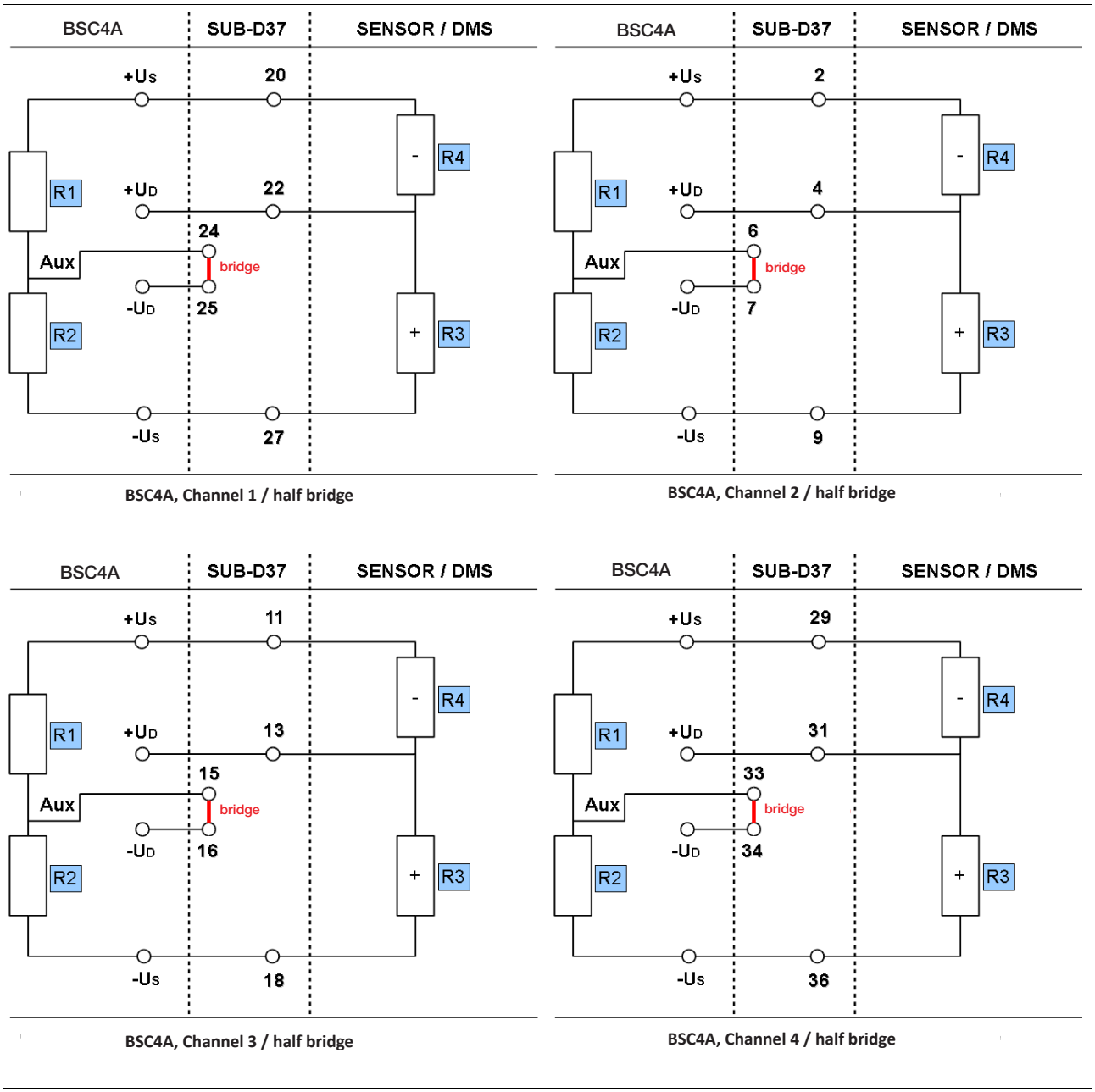
2) The negative differential input ( 25, 7,16, 34 ) must be connected to the corresponding half bridge completion ( 24, 6,15, 33 ).

The automatic zero-point setting is done via push buttons or via the digital input. PIN 28 or 10 or 19 or 37. Note: The GNDio PINs for the automatic zero adjustment are separated from the analog ground. Permanently connect GNDio (PIN1) to the ground of the supply voltage and connect the supply voltage, but at least 3.5V with PIN 28 or 10 or 19 or 37 for remote zero setting.

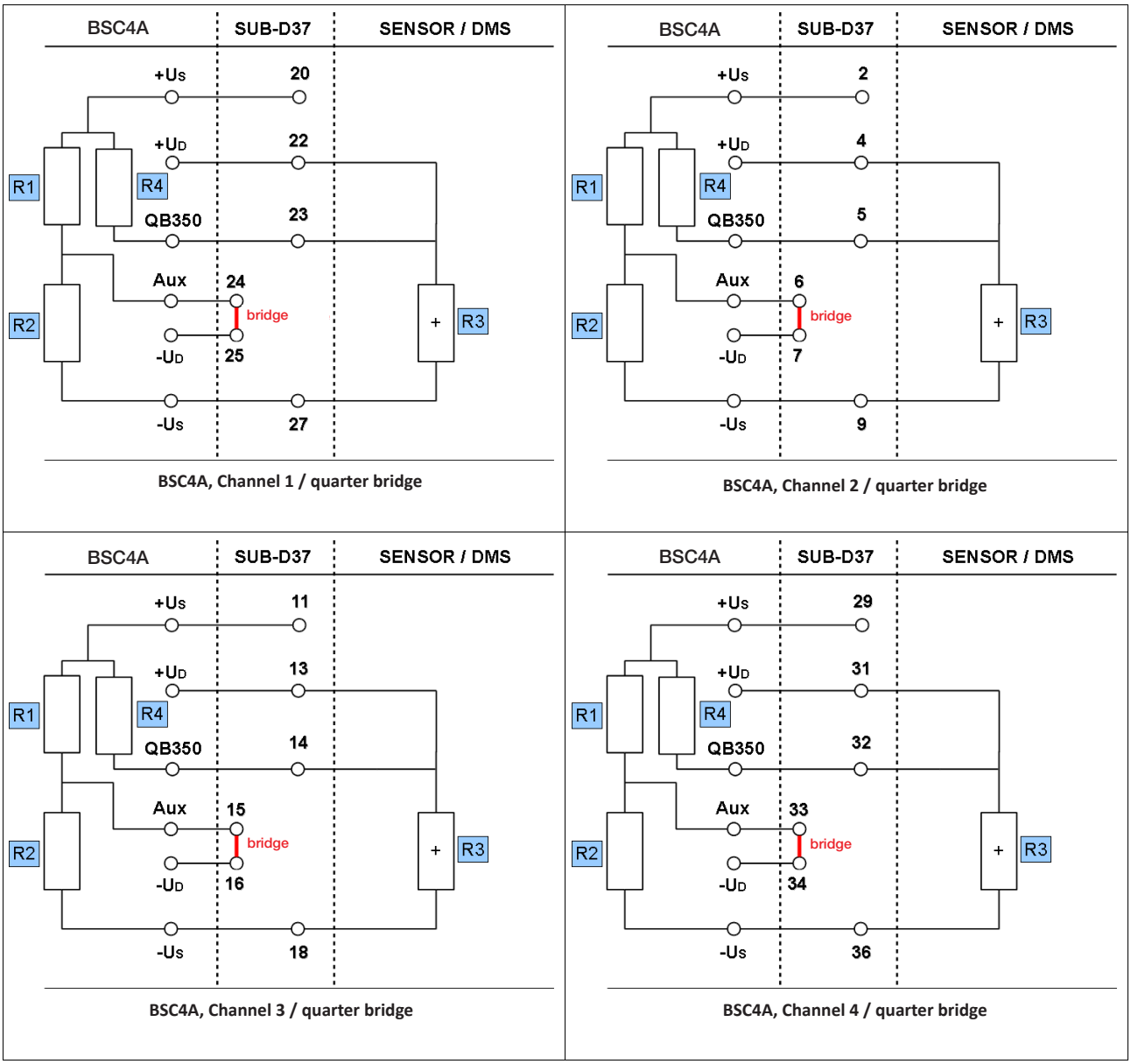
## Wiring diagram of a full bridge to Sub-D-37, channel 1-4



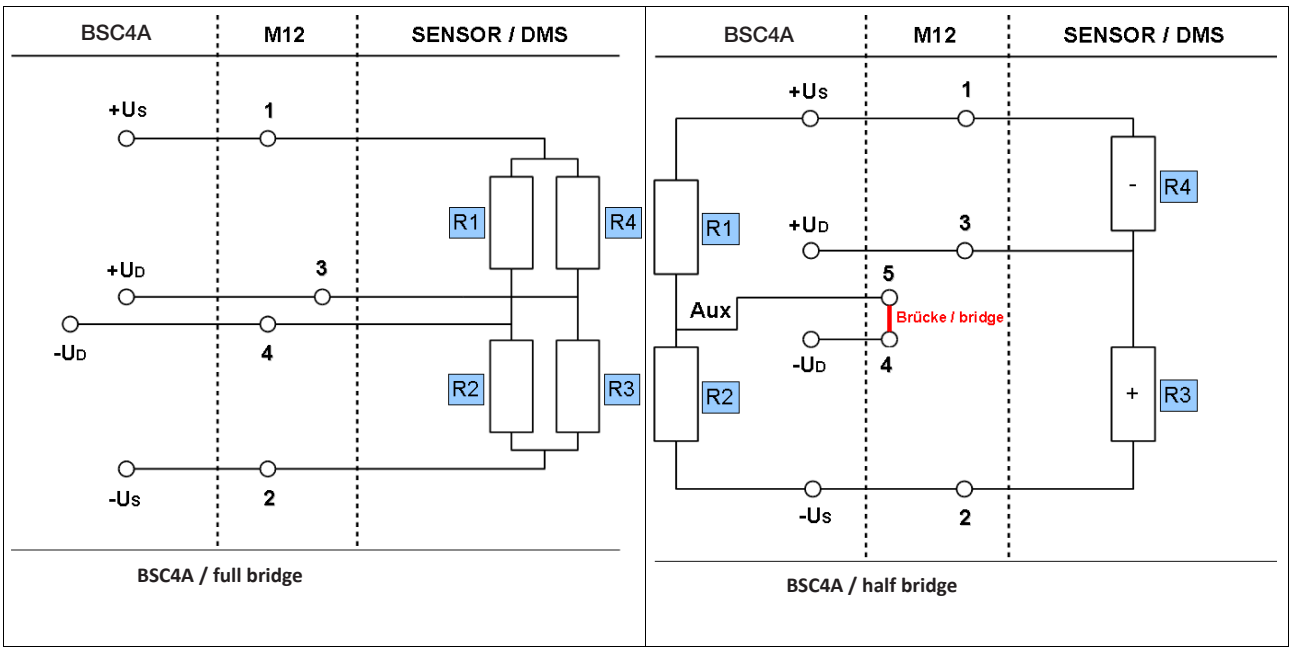
## Wiring diagram of a half bridge to Sub-D-37, channel 1-4



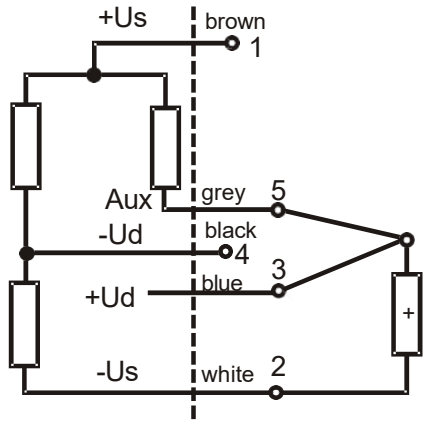
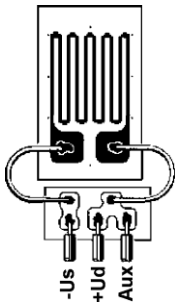
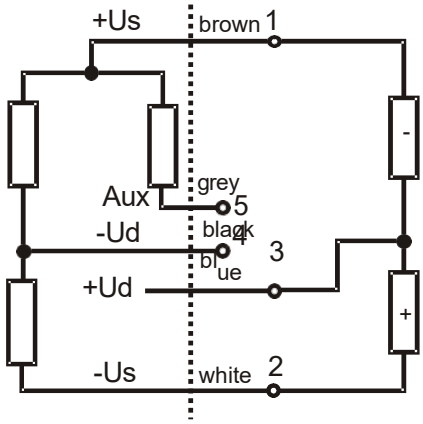
## Wiring diagram of a quarter bridge to Sub-D-37, channel 1-4



## Wiring diagram for a full bridge M12 variant




## Wiring diagram for quarter bridges and half bridges M12 variant

| Quarter bridge | | Half bridge |
|---|---|---|
|  |  |  |
| 5-pin round connector | | 5-pin round connector |

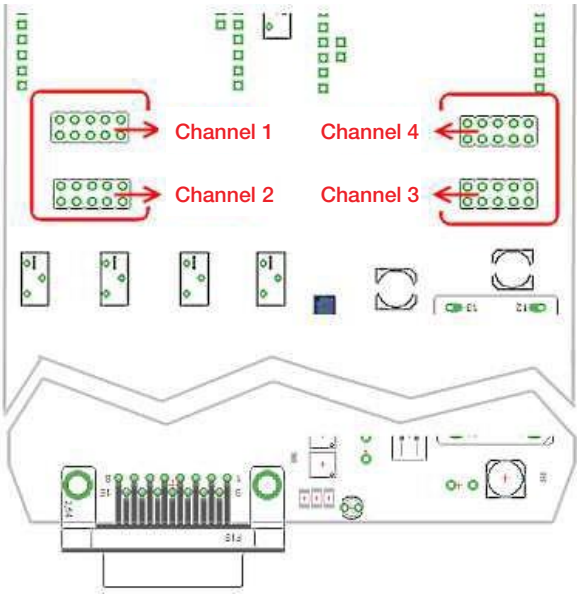


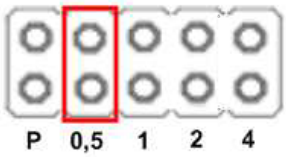
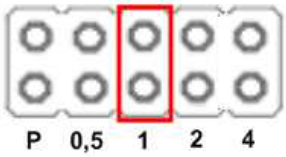
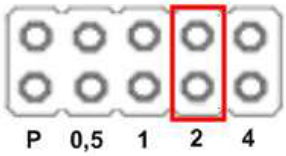
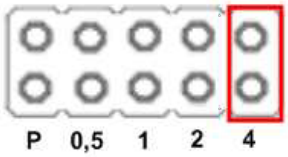
Please note:

For quarter and half-bridge operation, the internal half-bridge supplement must be activated by solder bridges on the printed circuit board (also possible at the factory).

## Adjusting the sensitivity

The sensitivity of channels 1 to 4 can be adjusted. On the circuit board of the BSC4A, each channel has a jumper post field with 4 plug options in total.




| Sensitivity | Jumper position |
|---|---|
| 0.5 mV/V |  |
| 1 mV/V |  |
| 2 mV/V |  |
| 4 mV/V |  |

## Opening the device

1. All 4 screw covers and the fastening screws on each end cover should be removed.
2. The cover with the (37-pin Sub-D socket) must be loosened using the two hexagonal bolts.
3. The circuit board is unplugged from the side of the 15-pin Sub-D socket.
4. In the M12 socket version, the cover is pushed through the housing slightly slanted.

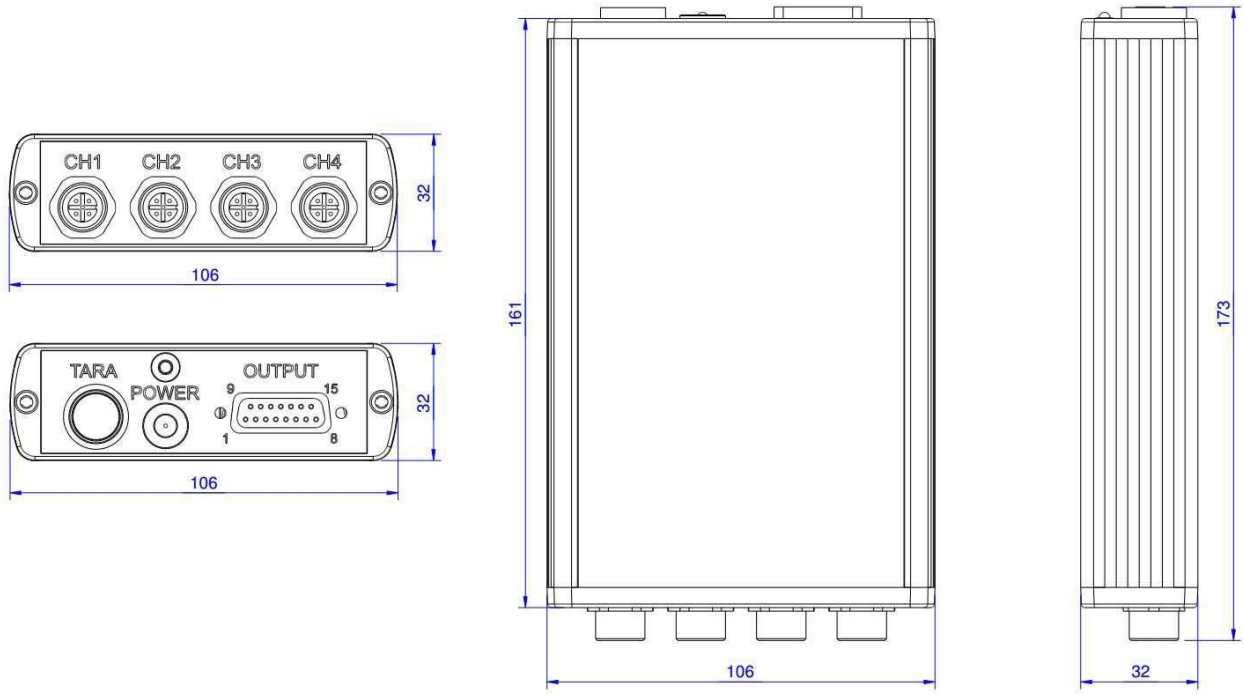
## Technical data

| Version | BSC4A | Unit |
|---|---|---|
| Accuracy class | 0.1 | % |
| Measurement range<br>configurable by jumper | <br>±4; ±2 ±1.0; ±0.5 | <br>mV/V |
| Connectible full bridge | 87..5000<br>See note limit below* | ohm |
| Bridge supply voltage | 5 | V |
| Input impedance | >20 / 300pF | Mohm |
| Linearity deviation | <0.02 | % of unit |
| Influence of temperature on the zero point per 10K in relation to the measuring range (of unit) | < 0.2<br>type 0.05 | % of unit<br>% of unit |
| Influence of temperature on the measurement sensitivity per 10K referring to the measured value (RD) | < 0.1<br>type 0.05 | % RD<br>% RD |
| Output filter analog output<br>3dB analog cut-off frequency, Bessel, 2nd order | 250 | Hz |
| Resolution | >20000 parts | |
| Analog output voltage<br>Nominal range<br>Operating range<br>Output resistance | <br>±10<br>±10.5<br>35 | <br>V<br>V<br>ohm |
| Analog output current<br>Nominal range<br>Operating range<br>Output resistance | <br>12 ± 8 (alternatively 4-20)<br>12 ± 8 (alternatively 4-20)<br>35 | <br>mA<br>mA<br>ohm |
| **Supply voltage**<br>Nominal range<br>Operating range | <br>12 ... 24<br>10.5 ... 32 | <br>V<br>V |
| Power input max. | 6 | W |
| Zero adjustment<br>Tolerance<br>Duration<br>Resolution on falling edge after at least 4ms high level (3.5V ... 30V or supply voltage) | <br><5, type <2.5<br><90 | <br>mV<br>ms |
| Memory | Last zero position | |
| Nominal temperature range<br>Storage temperature range | -10…+65<br>-40…+85 | °C<br>°C |

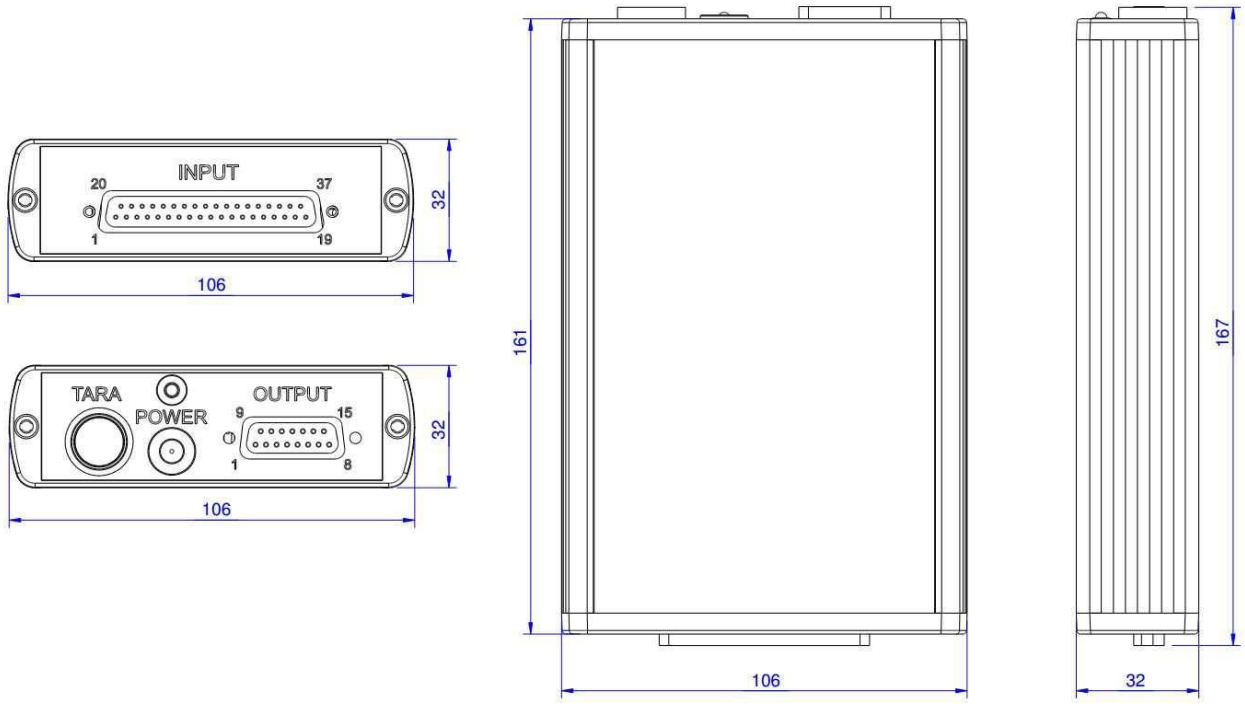
* Max. 2 channels can be operated with minimum sensor load of 87 ohm. The other 2 channels can be loaded with minimum 350 ohm. If the current outputs cannot be used, all

channels with a minimum sensor load of 120 ohm can be operated. This limit is necessary for reasons of thermal stability.

## Dimensions BSC4A M12




## Dimensions BSC4A SubD37



## Warranty

All instrument products from Interface Inc., ('Interface') are warranted against defective material and workmanship for a period of (1) one year from the date of dispatch. If the 'Interface' product you purchase appears to have a defect in material or workmanship or fails during normal use within the period, please contact your Distributor, who will assist you in resolving the problem. If it is necessary to return the product to 'Interface' please include a note stating name, company, address, phone number and a detailed description of the problem. Also, please indicate if it is a warranty repair. The sender is responsible for shipping charges, freight insurance and proper packaging to prevent breakage in transit. 'Interface' warranty does not apply to defects resulting from action of the buyer such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorized modification. No other warranties are expressed or implied. 'Interface' specifically disclaims any implied warranties of merchantability or fitness for a specific purpose. The remedies outlined above are the buyer's only remedies. 'Interface' will not be liable for direct, indirect, special, incidental or consequential damages whether based on the contract, tort or other legal theory. Any corrective maintenance required after the warranty period should be performed by 'Interface' approved personnel only.