Operating instructions

GSV-6T3

3-channel measuring amplifier with USB port and CANbus

Variant	Sensor Input	Signal-Output
GSV-6T3 CAN/M12	Front: 3x M12	1xUSB, CAN
GSV-6T3 CAN/SubD44HD	Front: 1x SubD44HD	1xUSB, CAN
GSV-6T3 Digi-IO/M12	Front 3x M12, Back: 1x SubD15	1xUSB
GSV-6T3 Digi-IO/SubD44HD	Front: 1x SubD44HD, Back: 1x SubD15	1xUSB
GSV-6T3 IEPE/M12	Front: 3x M12, Back: 3x BNC	1xUSB
GSV-6T3 IEPE/SubD44HD	Front: 1x SubD44HD, Back: 3x BNC	1xUSB

Front:
GSV-6T3 CAN/M12,
GSV-6T3 Dig-IO/M12,
GSV-6T3 IEPE/M12

Front:
GSV-6T3 CAN/SubD44HD,
GSV-6T3 Dig-IO/SubD44HD,
GSV-6T3 IEPE/SubD44HD

Back:
GSV-6T3 CAN/...

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf

Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69

Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Table of contents

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Description

The GSV-6T3 CAN/M12 measuring amplifier is a 3-channel strain gauge amplifier with a CAN interface and USB-C port. Sensors with full-bridge strain gauges are connected via the 5-pin M12 connectors on the front panel.
On the back there is an M12 socket and an M12 plug for connecting the CAN bus cable.

The GSV-6T3 CAN/M12 measuring amplifier is powered via the CAN bus line with 10 V DC to 28 V DC. Alternatively, the GSV-6T3 CAN/M12 can be powered via the USB-C interface with 5 V DC.

Measurement data can be recorded both via the integrated USB port and via CANbus using the GSVmulti software. The GSVmulti software allows reading, recording, and visualizing measurement data and configuration via CANbus using a "PCAN-USB" converter.

The CANbus protocol can be switched to the standardized CANopen application protocol, which, however, is not compatible with GSVmulti. This is described in a separate manual. Switching back to the GSVmulti-compatible ME-CAN protocol is also possible via CANopen.

The measuring amplifier GSV-6T3 CAN/M12 is factory-configurable for the connection of strain gauge quarter bridges 120 Ohm, 350 Ohm or 1 kOhm in three-wire technology.

When using the model GSV-6T3 CAN/SubD44HD, strain gauge full, half and quarter bridges 120 Ohm, 350 Ohm or 1 kOhm can be directly connected. Single-ended inputs are available for all 3 channels and one PT1000 RTD can alternatively used on channel 3 to measure temperature[1]. The power supply, interface properties and dimensions are similar to GSV-6T3 CAN/M12.

When using the models GSV-6T3 Digi-IO/M12, GSV-6T3 Digi-IO/SubD44HD, incremental encoders such as rotary encoder sensors can be evaluated.
Digital square-wave signals can also be counted, e.g. for angular or linear position measurement. Likewise, frequency and quantities derived from it (e.g. rotational speed, velocity) can be acquired with the GSV-6T3.

When using the models GSV-6T3 IEPE/M12, GSV-6T3 IEPE/SubD44HD, IEPE / ICP® piezoelectric sensors such as IEPE industrial accelerometer, High-g shock accelerometer, bearing condition sensors can be evaluated. This amplifier is optimized for industrial IEPE piezoelectric sensors measuring medium to high vibration or shock levels.

[1] feature available from GSVmulti v.2.03

Features

There are 3 simultaneous analog inputs available. They are individually configurable as:

– Strain gauge input for full bridges in 4 wire technology or
– Strain gauge input for half bridges or
– Strain gauge input for quarter bridges 120 ohm, 350 ohm, 1 kOhm or
– Single-ended input ±10 V or
– Input for PT1000 temperature sensor (channel 3 only)

The strain gauge input sensitivity range can be scaled to 0,1… 8mV/V with GSVmulti software from hardware input sensitivity steps of 1mV/V, 2mV/V, 4mV/V, 8mV/V

An option for connecting IEPE Sensors to the 3 analog inputs is available as factory configuration instead of the CAN connection.

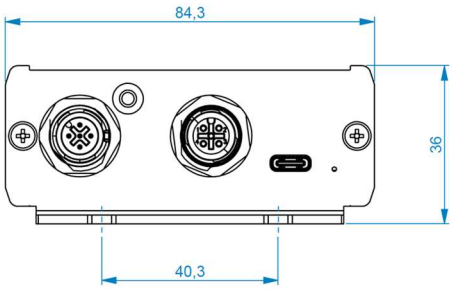
An optional (4th) input for digital sensors with TTL square wave signals for counter / frequency / speed measurement (3,3V/5V) is also available as factory configuration instead of the CAN connection.
This option also includes additional functions:

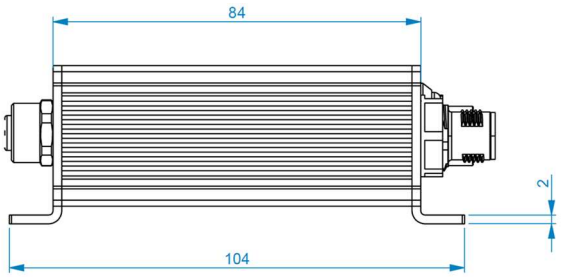
- The simultaneous zeroing of all channels can be triggered via a digital input („tare“).
- 3 open drain digital outputs can be configured for switching loads on measurement threshold.
- 2 configurable digital inputs (3,3V/5V)

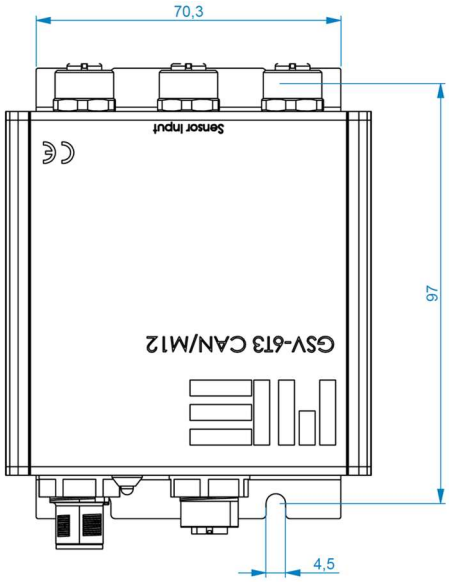
ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Dimensions

GSV-6T3 CAN/M12

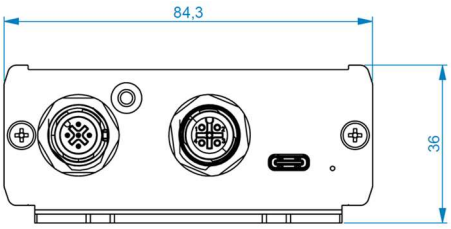


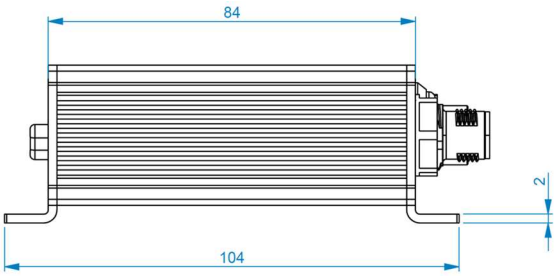


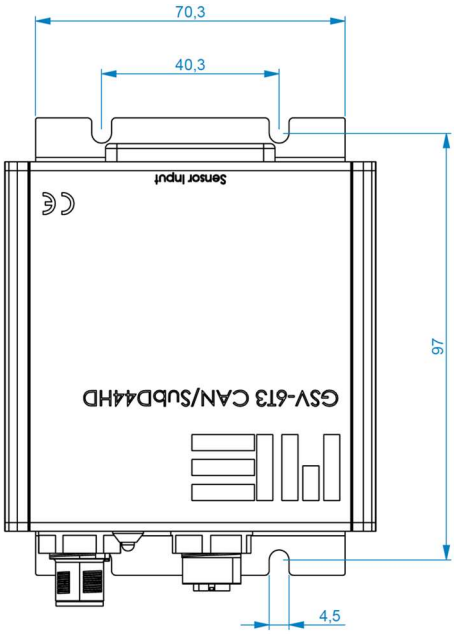


ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

GSV-6T3 CAN/SubD44HD







ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Connection assignment

M12 sensor connector with A-coding

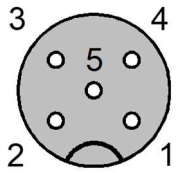


Figure 1: Pin configuration of M12 socket for sensor connection

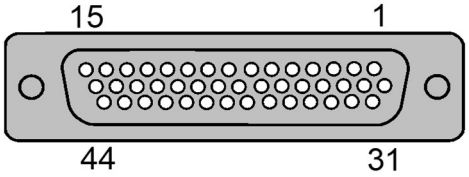
5-pin socket

Pin-No.	Pin assignment	ME (Type 1)	ME (Type 2)	Phoenix SAC-5P
1	+U_S positive bridge supply	brown	red	brown
2	-U_S negative bridge supply	white	black	white
3	+U_D positive bridge output / differential input	green	green	blue
4	-U_D negative bridge output / differential input	yellow	white	black
5	Analog input UE[2]/ TEDS connection (CH1)/ Quarter bridge QB / Temperature sensor PT1000 input (CH3)	gray		gray

A memory chip written with TEDS data (IEEE 1451.4, Template 33) can be connected to pin 5 of **channel 1** (CH1), and ground is connected to pin 2 (-Us). Temperature sensor PT1000 can be connected to pin 5 of **channel 3** (CH3), and ground is connected to pin 2 (-Us). Minimum required wiring: Pins 1-4 for bridge sensors.

[2]At delivery state, pin5 of all 3 channels is configured as analog voltage input ±10 V

Sub-D44 HD sensor connector

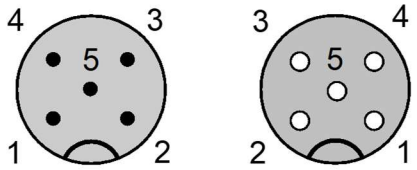


Channels 1,2,3, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
Shield	PE	Earth (housing)	-
1	TEDS	Transducer Electronic Data according IEEE 1451.4	1
2	US-	Negative bridge supply	1
3	US+	Positive bridge supply	1
4	Q350	Quarter bridge completion 350 Ohm	1
5	UD+	Positive differential input	1
6	GNDE	Ground, analog input	1
7	US-	Negative bridge supply	1
8	US+	Positive bridge supply	1
9	Q120	Quarter bridge completion 120 Ohm	1
10	UD-	Negative differential input	1
11	Q1k	Quarter bridge completion 1000 Ohm	1
12	HB	Half bridge completion	1
13	UE	Analog input voltage, single ended ±10V	1
14	nc	not connected	-
15	PE	Earth (housing)	-
16	PT1000in	Temperature sensor PT1000 input	3
17	US-	Negative bridge supply	2
18	US+	Positive bridge supply	2
19	Q350	Quarter bridge completion 350 Ohm	2
20	UD+	Positive differential input	2
21	GNDE	Ground, analog input	2
22	US-	Negative bridge supply	2
23	US+	Positive bridge supply	2
24	Q120	Quarter bridge completion 120 Ohm	2

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Channels 1,2,3, Sub-D HD 44			
Pin	**Signal**	**Description**	**Channel**
25	UD-	Negative differential input	2
26	Q1k	Quarter bridge completion 1000 Ohm	2
27	HB	Half bridge completion	2
28	UE	Analog input voltage, single ended ±10V	2
29	PT1000out	PT1000 selector output	3
30	nc	not connected	-
31	GNDE	Ground, analog input	3
32	US-	Negative bridge supply	3
33	US+	Positive bridge supply	3
34	Q350	Quarter bridge completion 350 Ohm	3
35	UD+	Positive differential input	3
36	GNDE	Ground, analog input	3
37	US-	Negative bridge supply	3
38	US+	Positive bridge supply	3
39	Q120	Quarter bridge completion 120 Ohm	3
40	UD-	Negative differential input	3
41	Q1k	Quarter bridge completion 1000 Ohm	3
42	HB	Half bridge completion	3
43	UE	analog input voltage, single ended ±10V	3
44	nc	not connected	-

CANbus M12 5-pin socket/plug A-coded

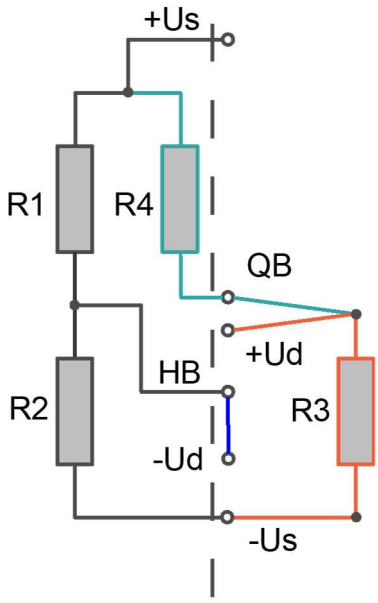


Pin	Name	Meaning
1	Shield	Shielding
2	V+	Power (UB+)
3	V-	GND (0V)
4	CAN_H	Dominant High
5	CAN_L	Dominant Low
	Housing	Shield

The two parallel CAN ports allow for easy cascading of multiple devices on the CAN bus. Connecting a 120 ohm terminating resistor to the last device on the bus is recommended; suitable M12 terminating resistors are available.

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Connection strain gauge quarter bridge



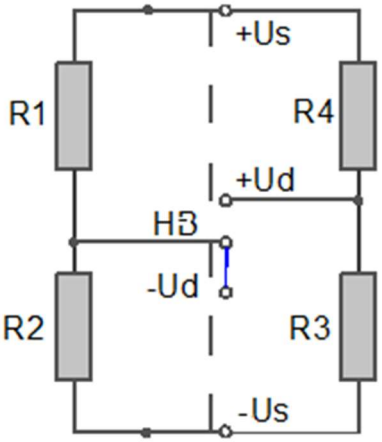
The active strain gauge R3 is connected by 3-wire technology.

The internal completion resistors 120 Ohm (QB = Q120), 350 Ohm (QB = Q350) and 1 kOhm (QB = Q1k) are selected with the connection "QB" and shall match the strain gauge resistance.

The internal half bridge R1, R2 is activated with a wire jumper from HB to -Ud.

Using model with M12 input plugs, some internal solder jumpers have to be closed, see p.15

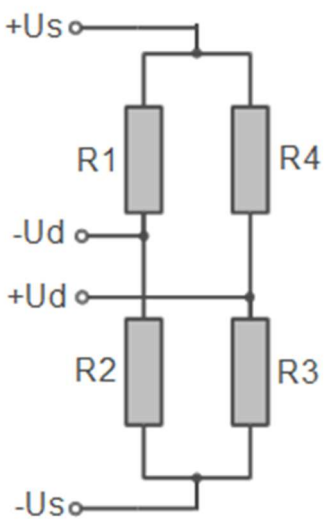
Connection strain gauge half bridge



The active strain gauges R3 and R4 are connected to **+Us, +Ud** and **-Us**.

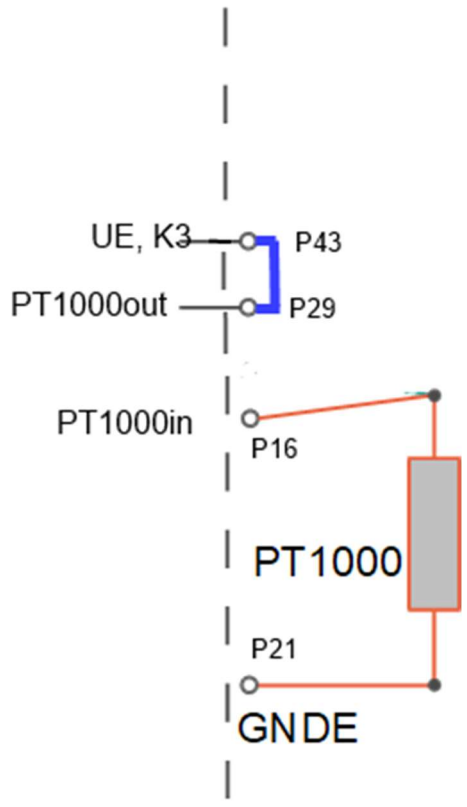
The internal half bridge R1, R2 is activated with a wire jumper from HB to -Ud.

Connection strain gauge full bridge



The active strain gauges R1 to R4 are connected on +Us,, -Us, +Ud, -Ud.

Connection of PT1000 sensor



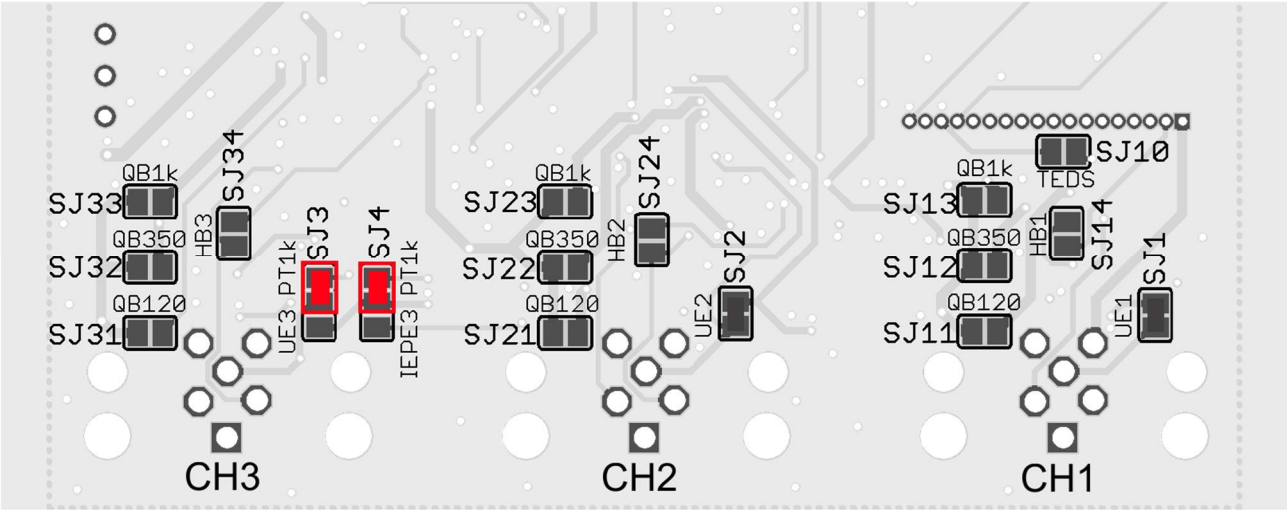
The temperature sensor PT1000 is connected to the terminals PT1000in and GNDE.

A wire jumper has to be set to connect pins 29 and 43.

To measure temperature, the input type "PT1000" must be activated once by software.

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Connecting PT1000 sensor to GSV-6T3 CAN/M12

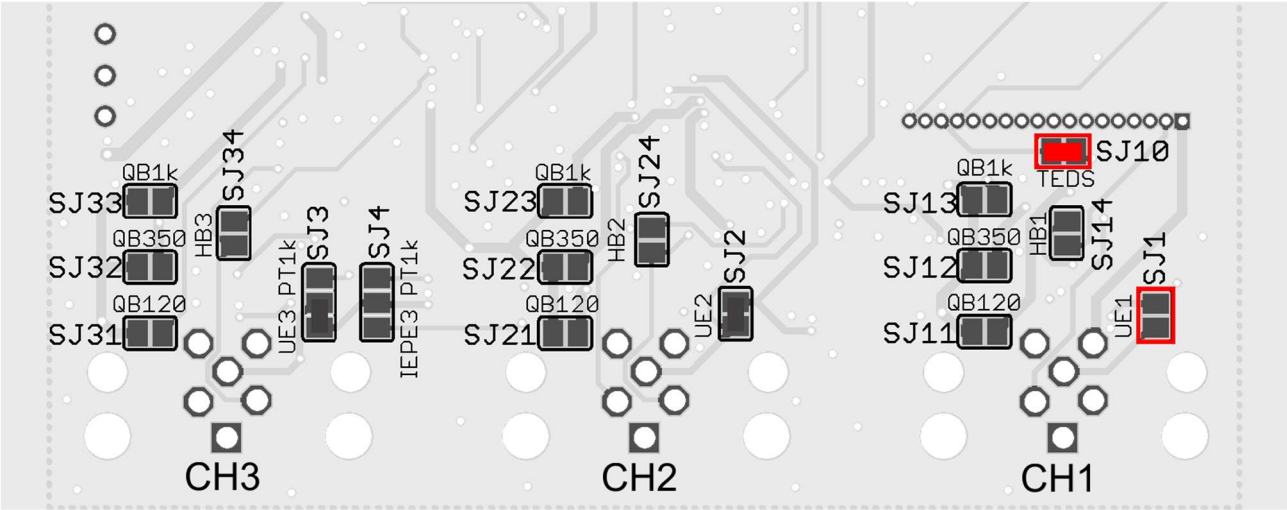


When connecting half- or quarter bridges to the GSV-6T3 CAN/M12, the housing has to be opened at the sensor input by loosening the two small screws. Then, that side can be pulled out a few centimeters, together with the PCB.

Behind the M12 connectors, on the bottom side of the PCB, there are 2 3-pad solder jumpers on channel 3: UE3/PT1k, IEPE3/PT1k (SJ3, SJ4) they have to be closed on the “PT1k” side. The alternative positions (UE3/IEPE3) have to be open. **Do not close both positions of each 3-pad solder jumper at the same time to prevent damaging the device.**

After setting the jumpers temperature sensor PT1000 can be connected between pin 5 (AUX), and pin 2 (-Us) on the M12 socket of channel 3 (CH3)

Connecting TEDS to GSV-6T3 CAN/M12



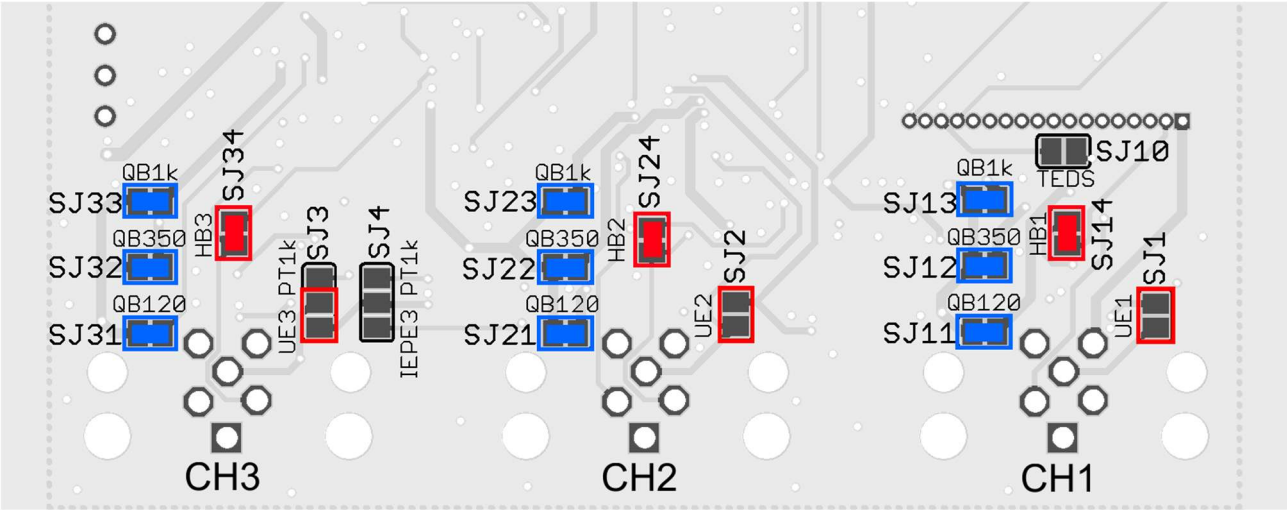
When connecting half- or quarter bridges to the GSV-6T3 CAN/M12, the housing has to be opened at the sensor input by loosening the two small screws. Then, that side can be pulled out a few centimeters, together with the PCB.

Behind the M12 connectors, on the bottom side of the PCB, 2 solder jumpers on channel 3 have to be set. The “UE1” jumper (SJ1) has to be opened and “TEDS” jumper (SJ10) has to be closed.

After setting the jumpers TEDS memory device can be connected between pin 5 (AUX), and pin 2 (-Us) on the M12 socket of channel 1 (CH1)

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Connecting Strain Gauge Half- and Quarter bridges to GSV-6T3 CAN/M12



When connecting half- or quarter bridges to the GSV-6T3 CAN/M12, the housing has to be opened at the sensor input by loosening the two small screws. Then, that side can be pulled out a few centimeters, together with the PCB.

Behind the M12 connectors, on the bottom side of the PCB, there are 3 solder jumpers “UE”1..3 (SJ1, SJ2, SJ3) one for each channel. All of them have to be opened.

Then, the jumper "HB"1..3 (SJ14, SJ24, SJ34) has to be closed for both half- and quarter bridges. Only in case of quarter bridges, additionally one of the three solder jumpers for each channel "QB120", "QB350" or "QB1k" (SJ11, SJ12, SJ13, SJ21, SJ22, SJ23, SJ31, SJ32, SJ33) has to be closed, too. It must match the resistance of the single grid strain gauge used (e.g. QB350 for 350 Ohms or QB1k for 1000 Ohms).

Wiring diagram for position sensors

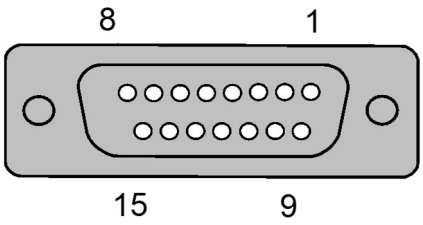
The position sensor's wiper is connected to the measuring amplifier's "Aux" input (M12) or "UE" (SubD44HD). The position sensor supplies via the sensor supply +Us and -Us.

The potentiometric position sensor is supplied with 3 V.

Label	5-pin M12 port	44-pin D-SUB port			
			CH 1	CH 2	CH 3
positive supply +Us	1	positive supply +Us	3	23	33
negative supply -Us	2	negative supply -Us	2	22	32
"Aux" input	5	UE input	13	28	43

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

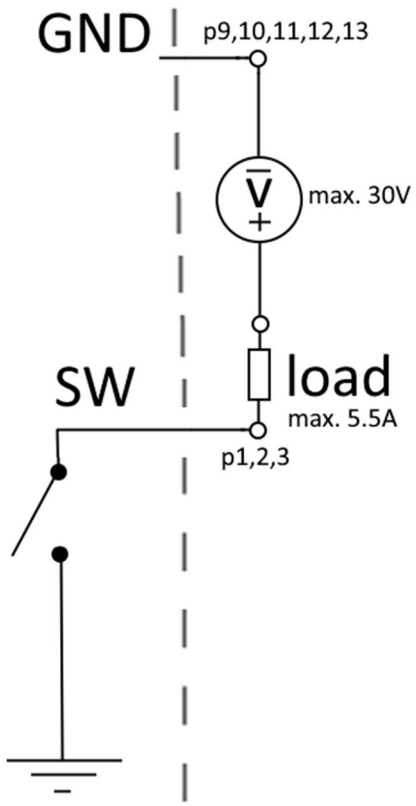
Connection diagram for I/O socket:



15-pin Sub-D, version DigIO

Pin	Signal	Description
1	SW1	Digital output threshold switch 1
2	SW2	Digital output threshold switch 2
3	SW3	Digital output threshold switch 3
4	TARA	Zero Setting, software configurable. To trigger set zero, connect with GND for at least 2s
5	TRIGGER	General purpose input, software configurable
6	INDEX	Incremental encoder index input
7	A	Incremental encoder A input
8	B	Incremental encoder B input
9	GND	Electrical ground
10	GND	Electrical ground
11	GND	Electrical ground
12	GND	Electrical ground
13	GND	Electrical ground
14	3,3V	Positive voltage output 3,3V
15	5V	Positive voltage output 5V

Connecting digital threshold output

	The load is connected to the terminal SW(1, 2, 3) and to the positive terminal of the voltage source. The negative terminal of the voltage source is connected to GND terminal. Positive voltage output 5V (Pin 15) and positive voltage output 3,3V (Pin 14) can be used as voltage source as well as an external voltage source max. 30V. Load current should not exceed 5,5A.

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Technical data

Analogue input	Value	Unit
Accuracy Class	0,1	%
Resolution	16	Bit
Strain Gauge Input, Full Bridge	80[3] ... 10000	Ohm
Strain gauge bridge completions	120, 350, 1000	Ohm
Strain Gauge Measuring Range (FS)	0,1 ... 8 (configurable)	mV/V
Strain gauge bridge supply	3	V
Common Mode Rejection DC-60Hz 5 kHz	 110 100	 dB dB
RMS Noise Amplitude 10 Hz 100 Hz 1 kHz	 0,1 µV/V (2 mV/V / 20000) 0,3 µV/V (2 mV/V / 7000) 0,6 µV/V (2 mV/V / 3000)	µV/V
Zero Point Drift (at 2 mV/V FS)	<0,05 %FS/10K (1 µV/V / 10K)	
Sensitivity Drift (at 2 mV/V FS)	< 0,01%RD/10K	
Input voltage, single-ended	±10	V
Input resistance	>1,6	MOhm
PT1000 Measuring Range	-50 … +360	°C
Excitation voltage PT1000	3	V
Measurement Data Rate	1 ... 1389 (configurable)	Hz

[3]Total load of all three channels connected in parallel

IEPE Input (IEPE-Option)		
Number of inputs	3	
Input type	IEPE / ICP® compatible	
Resolution	16	Bit
Excitation current	4.0 ±10 %	mA
Sensor supply voltage	24 nominal (compliance ≥ 20)	V
Coupling	AC-coupled	
Input impedance	100 kΩ ‖ 10 µF	
Lower cutoff frequency	0.16	Hz
Upper bandwidth	460	Hz
Maximum AC input range	±10	V
Input noise (RMS)	180	µV
Dynamic range	92	dB
Typical sensor sensitivity range	10 … 100	mV/g
Connector	BNC, coaxial	
Digital Input (Digi-IO Option)		
Number of inputs	2	
Input type	Tare, General-Purpose Pull-Up	
Absolute maximum input voltage	-0.5…6.5	V
Operating input Voltage	0…5.5	V
Positive going input threshold voltage	MIN: 1,48 MAX: 1,92	V
Negative going input threshold voltage	MIN: 0,89 MAX: 1,5	V
Counter / Frequency Input		
Measuring range counter	± 8.388.608 (internally: 32-Bit)	
Measuring range frequency	1/60s = 16,667 mHz to 4 MHz	
Sampling rate	= configured data frequency 1…1389 /s	
Supply voltage for encoders	3.3; 5	V

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Digital Output (Digi-IO Option)		
Number of outputs	3	
Output type	Threshold switch open-drain	
max voltage	30	V
max. load current per output	5,5	A
Voltage Source Output (Digi-IO Option)		
Number of outputs	2	
5V		
Max. current	350	mA
3,3V		
Max. current	145	mA
M12 Power Supply		
Nominal Voltage, DC Max. Current Consumption Min. Supply Voltage Max. Supply Voltage	24 80 10 28	V mA V V
USB-C Power Supply		
Nominal Voltage, DC Max. Current Consumption	5 150	V mA
Operating temperature		
Nominal temperature	-10°C ...65°C	
Operating temperature	-20°C ... 70°C	
Dimensions		
L x B x H	104 x 84 x 36	mm x mm x mm
Protection class		
	IP50	

Appendix

Factory settings

Measuring range	±2 mV/V
Physical measuring range	±4 mV/V
Data frequency	10 Hz

Factory settings CANbus

CAN bit rate (protocol-independent)	1000 kBits/s
CAN protocol	ME-CAN (proprietary, but published)
CAN ID command requests (ME-CAN)	256
CAN ID command responses (ME-CAN)	257
CAN ID measured values (ME-CAN)	257
CANopen factory settings:	
Node-ID	0x40
Transmission-Type (Obj. 180n.2, n=0..2)	255
Event-Timer (Obj. 180n.5, n=0..2)	0x03E8, i.e. 1 (or. 3) PDO /s
Producer Heartbeat Time (Obj. 1017)	0, i.e., heartbeat disabled. The bootup frame is sent once after power-up and after a reset..
Mapping TxPDO 1	Analog input channels 1 and 2 PV
Mapping TxPDO 2	Analog input channels 3 and 4 PV
Mapping TxPDO 3	Analog input channels 5 and 6 PV

Table 1: Default settings CANbus

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Change log

Version	Changes
07/10/2024	First version
02/27/2025	Some corrections and additions (SW)
11/12/2025	GSV-6T3 CAN/SubD44HD added (SW)
12/01/2025	M12 Half/ quarter bridge added (SW)
12/11/2025	Updated technical drawings (DK)
01/30/2025	Updated IEPE/Digi-IO Options (DK)
02/24/2026	Corrections(DK)

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
16761 Hennigsdorf
Phone.: +49 3302 89824 10
Fax: +49 3302 89824 69
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de