DEWETRON

DEWE-MSI

TECHNICAL REFERENCE MANUAL

WELCOME TO THE WORLD OF DEWETRON!

Congratulations on your new device! It will supply you with accurate, complete and reproducible measurement results for your decision making.
Look forward to the easy handling and the flexible and modular use of your DEWETRON product and draw upon more than 25 years of DEWETRON expertise in measurement engineering.

ISO9001

EN ISO 14001

CUSTOMIZED

MODULAR

COMPETENT

COMMITTED

APPROVED

Content

Table of content

Notice

The information contained in this document is subject to change without notice.

DEWETRON GmbH (DEWETRON) shall not be liable for any errors contained in this document. DEWETRON MAKES NO WARRANTIES OF ANY KIND WITH REGARD TO THIS DOCUMENT, WHETHER EXPRESS OR IMPLIED. DEWETRON SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. DEWETRON shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory, in connection with the furnishing of this document or the use of the information in this document.

Warranty Information

A copy of the specific warranty terms applicable to your DEWETRON product and replacement parts can be obtained from your local sales and service office.

Support

For any support please contact your local distributor first or DEWETRON directly.

For Asia and Europe, please contact:

DEWETRON GmbH
Parkring 4
8074 Grambach
AUSTRIA
Tel.: +43 316 3070
Fax: +43 316 307090
Email: support@dewetron.com
Web: http://www.dewetron.com

The telephone hotline is available
Monday to Friday between
08:00 and 17:00 CET (GMT +1:00)

For the Americas, please contact:

DEWETRON, Inc.
10 High Street, Suite K
Wakefield, RI 02879
U.S.A.
Tel.: +1 401 284 3750
Toll-free: +1 877 431 5166
Fax: +1 401 284 3755
Email: support@dewamerica.com
Web: http://www.dewamerica.com

The telephone hotline is available
Monday to Friday between
08:00 and 17:00 GST (GMT -5:00)

Restricted Rights Legend

Use austrian law for duplication or disclosure.

DEWETRON GmbH
Parkring 4
8074 Grambach / Austria

Printing History

Please refer to the page bottom for printing version.

Safety instructions

Safety symbols in the manual

	*Indicates hazardous voltages.*

WARNING	*Calls attention to a procedure, practice, or condition that could cause bodily injury or death.*

CAUTION	*Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.*

WARNINGS

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. DEWETRON Elektronische Messgeraete Ges.m.b.H. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as option and will not be shipped as standard parts.

Safety instructions for all DEWETRON systems

- The DEWETRON data acquisition systems may only be installed by experts.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal),a non interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals or supplied power cable.
- DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to a DEWETRON sales and service office for service and repair to ensure that safety features are maintained.
- Keep away from live circuits: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers or shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.
- No modifications are allowed at the instrument. The fuse in the power module has to be replaced by the same type. For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type. DO NOT use repaired fuses or short-circuited fuse holder labels and print on the power module may not be removed.
- DO NOT service or adjust alone. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to a DEWETRON sales and service office for service and repair to ensure that safety features are maintained.
- Before opening the instrument (experts only) or exchanging the fuse in the power module disconnect power!
- Don’t touch internal wiring!
- Don’t use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- Install filler-panels in unused slots.
- The power-cable and -connector serve as Power-Breaker. The cable must not exceed 10 feet, disconnect function must be possible without tools.
- Safety of the operator and the unit depend on following these rules.

General System Information

Calibration information

All DEWETRON MSIs are calibrated at 25 °C and meet their specifications when leaving the factory.
The time interval for recalibration depends on environmental conditions. Dewetron recommends a two year calibration interval.

General MSI specifications

Environmental:
Temp. range storage: -30 °C to +85 °C (-22 °F to 185 °F)
Temp. range operating: -5 °C to +60 °C (23 °F to 140 °F)
Relative humidity
(MIL202): 0 to 95 % at 60 °C, non-condensing
RFI susceptibility: ±0.5 % span error at 400 MHz, 5 W, 3 m

All specifications within this manual are valid at 25 °C!
All MSIs are produced according ISO9001 and ISO14001.

Environmental Considerations

Information about the environmental impact of the product.

Product End-of-Life Handling

Observe the following guidelines when recycling a DEWETRON system:

System and Components Recycling

Production of this components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at it's end of life! Please recycle this product in an appropriate way to avoid an unnecessary pollution of the environment and to keep natural resources.

This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further informations about recycling on the DEWETRON web site www.dewetron.com

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment, and is outside the scope of the 2002/95/EC RoHS Directive. This product is known to contain lead.

MSI series overview

- Expand functionality of bridge and voltage inputs
- Automatically detected, easy channel setup in the right engineering units
- Versions for voltage, thermocouple, RTD, IEPE® and charge sensors

Modular Smart Interfaces (MSI) bring an expanded level of flexibility to your measurement system. MSIs expand the functionality of many amplifier modules and enable you to use a bridge amplifier (e.g. DAQP-STG) for measuring also IEPE®, Thermocouple, Pt100 to Pt2000, charge or voltage up to 200 V.

All MSI's are the size of a SUB-D 9 housing, which contains the electronics as well as the sensor connector.

The miniature electronics of each MSI sensor also contain an EEPROM, in which the identification and calibration data of the MSI are stored. Both are read automatically by the DEWESoft software and entered accordingly into the setup.

Compatibility overview

MSI series overview							
	DAQP-LV-D	DAQP-STG-D	MDAQ-SUB-V-200-D	MDAQ-SUB-BRIDGE-D	MDAQ-SUB-STG-D	DEWE-43	DEWE-101
MSI-BR-TH-x		■		■	■	■	■
MSI-BR-ACC		■		■	■	■	■
MSI-BR-RTD		■*		■	■	■	■
MSI-BR-V200		■		■	■	■	■
MSI-BR-CH-x		■		■	■	■	■
MSI-V-ACC	■		■				
MSI-V-RTD	■		■				
MSI-V-CH-50	■		■				

*) possible, but use DAQP-STG directly.

■ = possible

IEPE® is a trademark of PCB Piezotronics, Inc.

Overview

Notes

RTD amplifier for temperature measurement with MDAQ-BRIDGE /-STG, DAQP-STG and DEWE-43 / DEWE-101

- Support of Pt100, Pt200, Pt500, Pt1000, Pt2000
- Resistor measurement from 8 to 6000 Ohm
- Temperature range from -200 to 850 °C
- 2-, 3- or 4-wire sensor connection
- Automatical identification by TEDS (Transducer Electronic Datasheet)

Specifications

	MSI-BR-RTD		
Sensor connection:	5-pin BINDER connector series 712		
Supported sensors:	Resistance; Pt100; Pt200; Pt500; Pt1000; Pt2000;		
Temperature range:	-200 °C to 850 °C		
Input offset:	50 µV		
Constant current:	1.25 mA		
Constant current accuracy:	±0.02 % from calibrated value		
Constant current drift:	22 ppm/ °C		
Linearisation:	Through software according to sensor type		
Connection types:	2-, 3- or 4-wire		
Host amplifier:	**DAQP-STG*** **	**MDAQ-STG / -BRIDGE**	**DEWE-43 / DEWE-101**
Isolation:	350 V_{DC}	not isolated	not isolated
Bandwidth:	10 kHz	10 kHz	10 kHz
Lowpass filter:	10 Filter: 10 Hz to 300 kHz	10 Hz,100 Hz, MDAQ-FILT	10 Hz,100 Hz
Accuracy:			
Resistance			
Ranges:	Accuracy:		
2, 4, 6, 8, 16 Ω	±0.07 % of reading ±50 mΩ	±0.05 % of reading ±50 mΩ	
20, 40, 60, 80, 160 Ω	±0.07 % of reading ±80 mΩ	±0.05 % of reading ±90 mΩ	±0.07 % of reading ±120 mΩ
200, 400, 800* Ω	±0.07 % of reading ±200 mΩ	±0.05 % of reading ±400 mΩ	±0.07 % of reading ±200 mΩ
1k6**, 2 k, 4 k, 6 kΩ*	±0.07 % of reading ±0.03% of range	±0.05 % of reading ±0.04 % of range	±0.07 % of reading ±840 mΩ
Pt100 (DIN EN 60751)			
Ranges:	Accuracy:		
-200 to 850 °C	±0.1 % of reading ±0.51 °C	±0.1 % of reading ±1.05 °C	±0.11 % of reading ±0.69 °C
-200 to 260 °C	±0.1 % of reading ±0.40 °C	±0.1 % of reading ±1.05 °C	n.a.
-200 to 150 °C	n.a.	±0.07 % of reading ±0.35 °C	n.a.
Pt200 (DIN EN 60751)			
Ranges:	Accuracy:		
-200 to 850 °C	±0.1 % of reading ±0.45 °C	±0.08 % of reading ±0.59 °C	±0.10 % of reading ±0.44 °C
-200 to 260 °C	±0.1 % of reading ±0.34 °C	±0.08 % of reading ±0.59 °C	n.a.
Pt500 (DIN EN 60751)			
Ranges:	Accuracy:		
-200 to 850 °C	±0.1 % of reading ±0.41 °C	±0.08 % of reading ±0.56 °C	±0.11 % of reading ±0.61 °C
-200 to 260 °C	±0.1 % of reading ±0.29 °C	±0.07 % of reading ±0.31 °C	n.a.
-200 to 150 °C	±0.1 % of reading ±0.24 °C	±0.07 % of reading ±0.31 °C	±0.09 % of reading ±0.28 °C
Pt1000 (DIN EN 60751)			
Ranges:	Accuracy:		
-200 to 850 °C	±0.1 % of reading ±0.40 °C	±0.08 % of reading ±0.45 °C	±0.10 % of reading ±0.39 °C
-200 to 260 °C	±0.1 % of reading ±0.29 °C	±0.07 % of reading ±0.34 °C	n.a.
Pt2000 (DIN EN 60751)			
Ranges:	Accuracy:		
-200 to 260 °C	±0.1 % of reading ±0.29 °C	±0.07 % of reading ±0.29 °C	±0.09 % of reading ±0.29 °C
Typical noise:			
100 Hz bandwidth	0.1 °C	0.03 °C	0.03 °C
Supply voltage:	±5 V (±1 %)		
Power consumption	max 30 mW		
TEDS:	For adapter identification and calibration data		
Amplifier settings:	Excitation: 10 V; Measurement: Voltage; Range: ±0.2 to ±10 V; automatically selected by software		

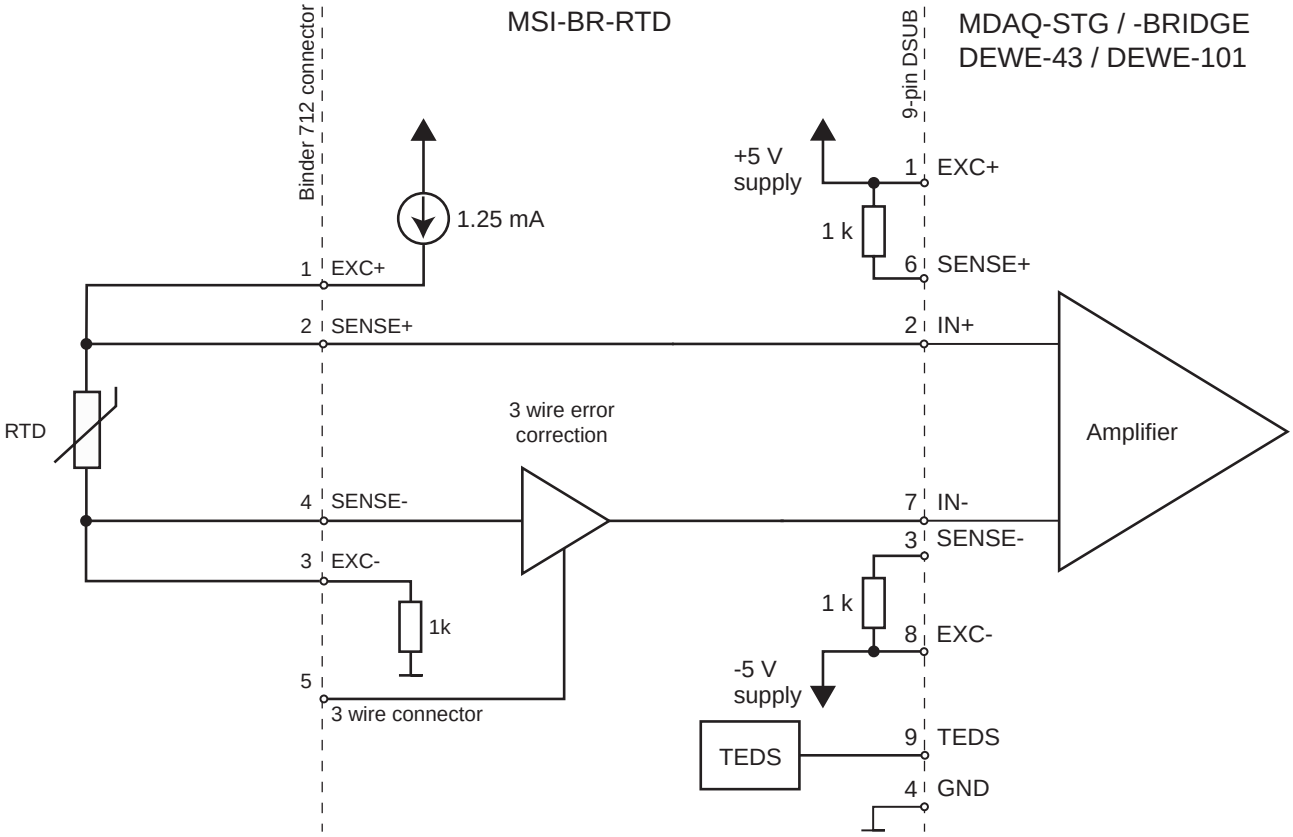
*) These ranges are supported by DEWE-43.
**) These ranges are not supported by DAQP-STG.
***) DAQP-STG natevly supports RTD and resistance measurement; still MSI-BR-RTD could be used.

MSI-BR-RTD

Functional description

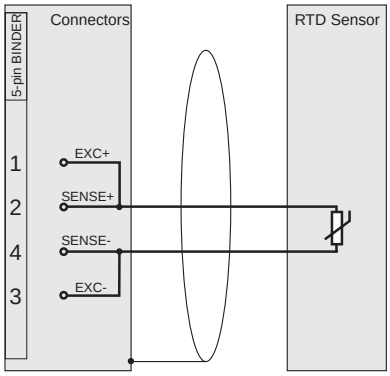
The MSI-BR-RTD allows temperature and resistor measurement with MDAQ amplifiers as well as DEWE-43 or DEWE-101. All common RTD types (Pt100, Pt200, Pt500, Pt1000, Pt2000) are supported. The heart of the adapter is a high precision current source, which provides the excitation current of 1.25 mA. When a 3-wire connection is used, an amplifier compensates the lead resistance completely if all three wires have the same diameter and length. The non linearity of the RTD is compensated by the software. A TEDS chip (transducer electronic datasheet) provides automatical adaptor identification by software and calibration data.
The adapter is placed in a small D-SUB housing, which is directly connected to the D-SUB input connector of the MDAQ amplifier, the DEWE-43 or DEWE-101.

The picture below shows the principal MSI-BR-RTD circuit.

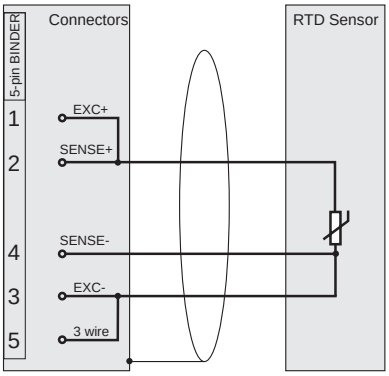


Sensor connection

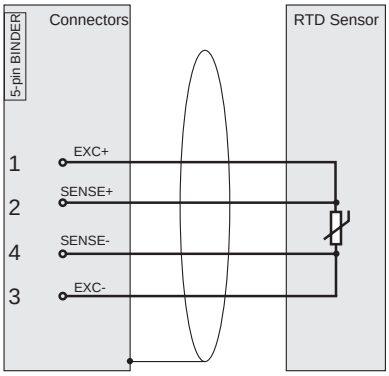
2-wire sensor connector



3-wire sensor connector

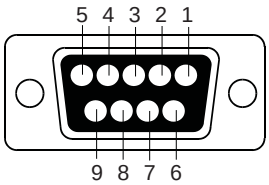


4-wire sensor connector



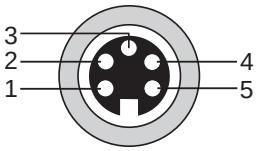
Measuring temperature with Pt100 or similar sensors is based on simple resistor measurements. Keep in mind that the resistance of the lead will influence the measurement result. The resistance changes with the temperature, the length and the diameter of the lead.
The 4-wire connection will completely remove all the measurement errors caused by lead resistance.
Using 2-wire connection the lead resistance will be within the measurement result. Especially using long and thin wires from the Adapter to the temperature sensors will distort the measurement result.
The 3-wire connection will also compensate the lead resistance completely if all three wires have the same diameter and length. In that case it is safe to assume that the lead resistance of all three wires is the same. Therefore the resistance of only one wire has to be measured for eliminating the lead resistance influence.

Pin assignment of 9-pin SUB-D connector



Pin assignment:
1.) EXC+
2.) IN+
3.) SENSE-
4.) GND
5.) n.c.
6.) SENSE+
7.) IN-
8.) EXC-
9.) TEDS

Pin assignment of 5-pin BINDER connector



Pin assignment:
1.) EXC+
2.) SENSE+
3.) EXC-
4.) SENSE-
5.) 3 wire connector

Notes

Thermocouple amplifier for temperature measurement with MDAQ-BRIDGE /-STG, DAQP-STG and DEWE-43 / DEWE-101

- Internal cold junction compensation
- Automatical identification by TEDS (Transducer Electronic Datasheet)

Specifications

	MSI-BR-TH-x		
Sensor connection:	1 m cable with standard miniature thermocouple connector according to TC type		
Thermocouple types:	MSI-BR-TH-K: Type K; MSI-BR-TH-J: Type J; MSI-BR-TH-T: Type T; MSI-BR-TH-C: Type C;		
Cold junction compensation:	Integrated		
CJC accuracy:	1.0 °C		
Input impedance:	> 10 MΩ		
BIAS current:	50 nA		
Open TC detection:	Yes		
Linearization:	Through software according to sensor type		
Host amplifier:	**DAQP-STG**	**MDAQ-STG / -BRIDGE**	**DEWE-43 / DEWE-101**
Isolation:	350 V_{DC}	not isolated	not isolated
Bandwidth:	300 kHz**	30 kHz	44 kHz
Lowpass filter:	10 Hz to 300 kHz	10 Hz,100 Hz or MDAQ-FILT	10 Hz,100 Hz
Accuracy including CJC error:			
MSI-BR-TH-K for thermocouple type K (DIN EN 60584-1)			
Input range:	Accuracy @ actual reading		
-120 to 120 °C*	±1.8 °C @ -120 to 0 °C ±1.3 °C @ 0 to 120 °C	±2.0 °C @ -120 to 0 °C ±1.4 °C @ 0 to 120 °C	n.a. n.a.
-200 to 1370 °C -200 to 1290 °C* -200 to 640 °C* -200 to 250 °C*	Specs apply to 4 ranges ±4.6 °C @ -200 to -100 °C ±2.4 °C @ -100 to 0 °C ±1.9 °C @ 0 to 500 °C ±2.5 °C @ 500 to 1000 °C ±3.0 °C @ >1000 °C	Specs apply to 4 ranges ±4.6 °C @ -200 to -100 °C ±2.4 °C @ -100 to 0 °C ±1.8 °C @ 0 to 500 °C ±2.1 °C @ 500 to 1000 °C ±2.5 °C @ >1000 °C	Specs for -200 to 1370 °C range ±9 °C @ -200 to -100 °C ±4.6 °C @ -100 to 0 °C ±3.5 °C @ 0 to 500 °C ±4.1 °C @ 500 to 1000 °C ±5.0 °C @ >1000 °C
MSI-BR-TH-J for thermocouple type J (DIN EN 60584-1)			
Input range:	Accuracy @ actual reading		
-180 to 180 °C	±2.4 °C @ -180 to 0 °C ±1.3 °C @ 0 to 180 °C	±2.5 °C @ -180 to 0 °C ±1.3 °C @ 0 to 180 °C	n.a. n.a.
-210 to 1200 °C -210 to 900 °C* -210 to 450 °C* -210 to 360 °C*	Specs apply to 4 ranges ±4.0 °C @ -210 to -100 °C ±2.0 °C @ -100 to 0 °C ±1.6 °C @ 0 to 300 °C ±2.0 °C @ 300 to 1200 °C	Specs apply to 4 ranges ±4.0 °C @ -210 to -100 °C ±1.7 °C @ -100 to 0 °C ±1.6 °C @ 0 to 300 °C ±1.8 °C @ 300 to 1200 °C	Specs for -210 to 1200 °C range ±7 °C @ -210 to -100 °C ±3.7 °C @ -100 to 0 °C ±3.0 °C @ 0 to 300 °C ±3.2 °C @ 300 to 1200 °C
MSI-BR-TH-T for thermocouple type T (DIN EN 60584-1)			
Input range:	Accuracy @ actual reading		
-240 to 240 °C* -270 to 400 °C	Specs apply to 2 ranges ±7.0 °C @ -250 to -100 °C ±1.8 °C @ -100 to 0 °C ±1.3 °C @ 0 to 100 °C ±1.0 °C @ 100 to 400 °C	Specs apply to 2 ranges ±7.0 °C @ -250 to -100 °C ±1.8 °C @ -100 to 0 °C ±1.3 °C @ 0 to 100 °C ±1.0 °C @ 100 to 400 °C	Specs for -270 to 400 °C range ±19 °C @ -250 to -100 °C ±5.0 °C @ -100 to 0 °C ±3.6 °C @ 0 to 100 °C ±3.0 °C @ 100 to 400 °C
MSI-BR-TH-C for thermocouple type C (ASTM E988-96)			
Input range:	Accuracy @ actual reading		
0 to 150 °C* 0 to 310 °C* 0 to 620 °C*	Specs apply to 3 ranges ±2.0 °C @ 0 to 620 °C	Specs apply to 3 ranges ±2.0 °C @ 0 to 620 °C	n.a.
0 to 1240 °C* 0 to 1560 °C* 0 to 2300 °C	Specs apply to 3 ranges ±3.0 °C @ 0 to 1000 °C ±4 °C @ 1000 to 1600 °C ±6.7 °C @ 1600 to 2300 °C	Specs apply to 3 ranges ±3.0 °C @ 0 to 1000 °C ±4 °C @ 1000 to 1600 °C ±6.7 °C @ 1600 to 2300 °C	Specs for 0 to 2300 °C range ±8.0 °C @ 0 to 1000 °C ±8.6 °C @ 1000 to 1600 °C ±14 °C @ 1600 to 2300 °C
Typical peak to peak noise with sensor type K:			
30 kHz bandwidth	0.50 °C	0.50 °C	0.44 °C
100 Hz bandwidth	0.25 °C	0.25 °C	0.22 °C
1 Hz bandwidth	0.02 °C	0.02 °C	0.02 °C
TEDS:	For adapter identification and calibration data		
Amplifier settings:	Excitation: 10 V; Measurement: Voltage; Range: ±2 to ±100 mV; automatically selected by software		

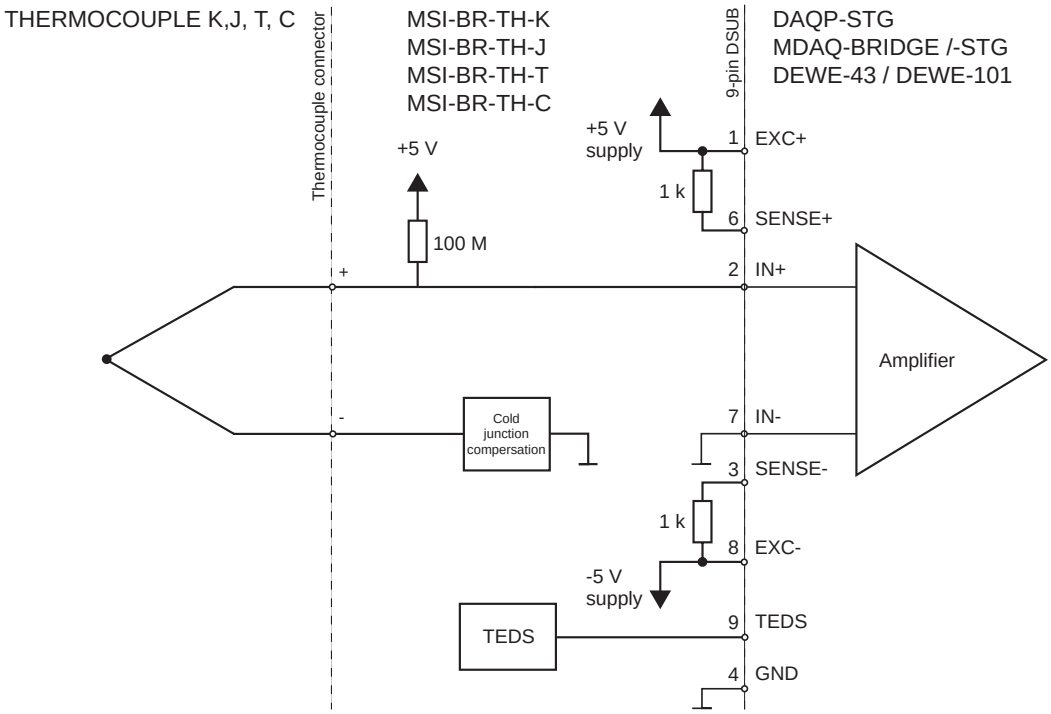
*) ranges NOT supported by DEWE-43 / DEWE-101 card
**) might be limited through A/D card

MSI-BR-TH-x

Functional description

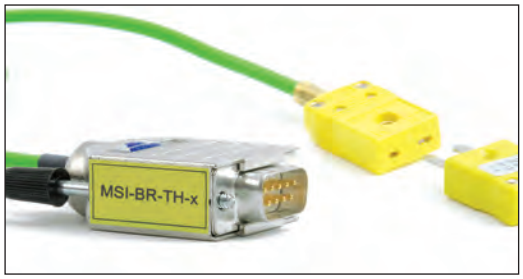
The MSI-BR-TH-x allows thermo couple temperature measurement with DAQP and MDAQ amplifiers as well as the DEWE-43 / DEWE-101. The common thermo couples types K, J and T are supported. For high temperature application also type C is supported. A high precision cold junction compensation is included in the adapter. The nonlinearity of the thermo couple is compensated in software. A TEDS chip (transducer electronic datasheet) provides automatical adaptor identification by software and calibration data. In operation with DAQP-STG you will get fully isolated thermocouple amplifier. In operation with the MDAQ only isolated thermocouple should be used, because the input is not electrically isolated.

The picture below shows the principal MSI-BR-TH-x circuit.

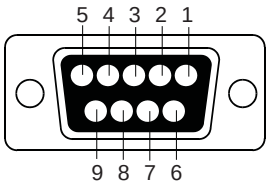


Sensor connection

1 m cable with standard miniature thermocouple connector according to TC type.



Pin assignment of 9-pin SUB-D connector



1.) EXC+
2.) IN+
3.) SENSE-
4.) GND
5.) n.c.
6.) SENSE+
7.) IN-
8.) EXC-
9.) TEDS

Adapter for voltage measurement (up to 200 V) with MDAQ-BRIDGE /-STG, DAQP-STG and DEWE-43 / DEWE-101

- programmable ranges from ±0.4 V to ±200 V
- Differential input
- Bandwith: up to 200 kHz
- High signal to noise ratio
- Automatical identification by TEDS (Transducer Electronic Datasheet)

Specifications

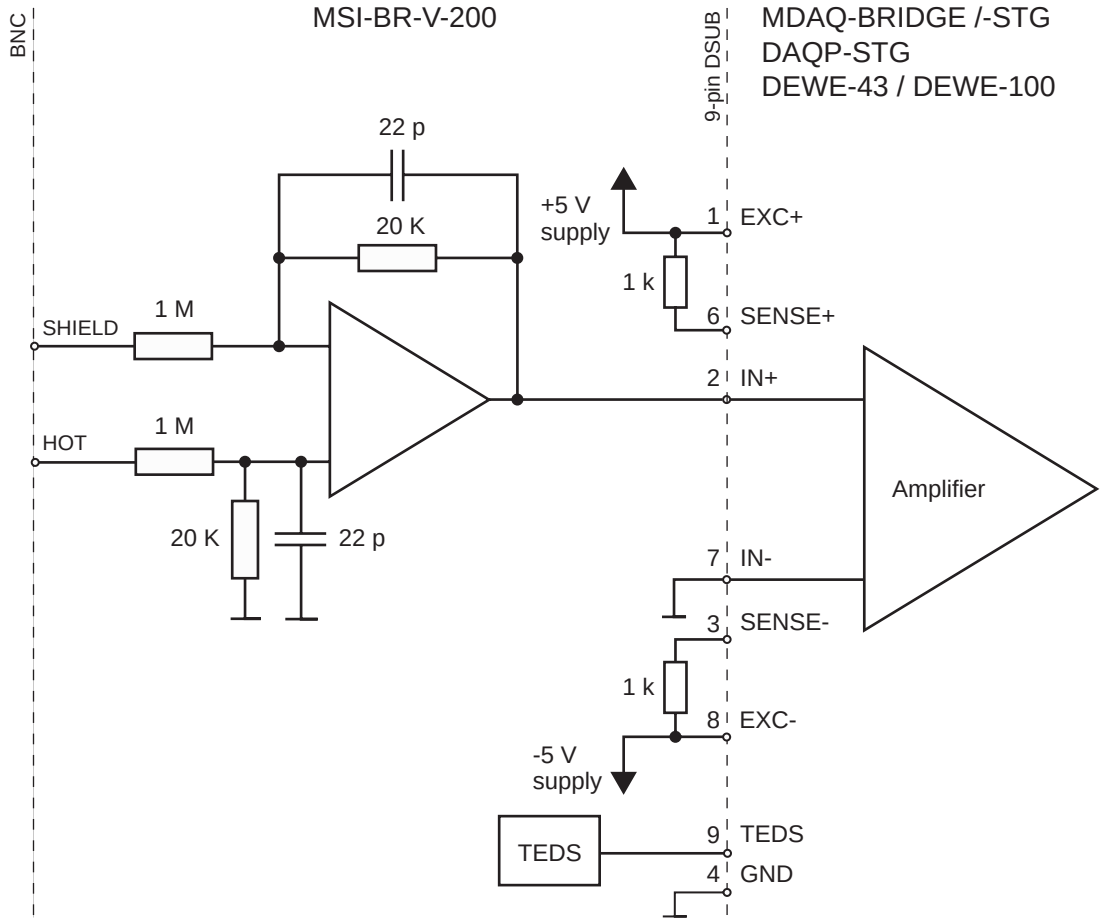
	MSI-BR-V-200		
Sensor connection:	BNC		
Input attenation:	±50 ±0.5 %		
Input type:	differential		
Common mode voltage range:	± 200 V		
Input overvoltage protection:	± 250 V		
Input impedance In+:	1 MΩ		
Input impedance In-:	1 MΩ		
Gain drift:	typ. 25 ppm/K (max. 40 ppm/K)		
Input Offset drift:	200 µV/K		
Host amplifier:	**DAQP-STG**	**MDAQ-BRIDGE /-STG**	**DEWE-43 / DEWE-101**
Isolation:	350 V_{DC}	not isolated	not isolated
Bandwidth (-3dB):	200 kHz	30 kHz	44 kHz
Lowpass filter:	10 Hz to 300 kHz	with MDAQ-FILT	n.a.
Ranges:	±200 V; ±100 V; ±50 V; ±40 V; ±20 V*; ±10 V*; ±8 V*; ±4 V*; ±2 V*; ±1 V*; ±0.8 V*; ±0.4 V*	±200 V; ±100 V; ±50 V; ±40 V; ±20 V*; ±10 V*; ±8 V*; ±4 V*; ±2 V*; ±1 V*; ±0.8 V*; ±0.4 V*	±200 V; ±40 V; ±4 V
DC accuracy: ±5 V to ±40 V ±50 V to ±150 V ±150 V to ±200 V	 ±0.5 % of reading ±20 mV ±0.04 % of reading ±0.04 % of range ±1 % of reading ±0.04 % of range	 ±0.5 % of reading ±20 mV ±0.04 % of reading ±0.04 % of range ±1 % of reading ±0.04 % of range	 ±0.07 % of reading ± 10mV ±0.07 % of reading ±0.04 % of range ±1 % of reading ±0.04 % of range
Typical SNR @ 30 kHz BW (1 kHz BW):	82 dB (100 dB) @ 200 V range	101 dB (106 dB) @ 200 V range 97 dB (106dB) @ 50 V range 90 dB (103dB) @10 V range	98 dB @ 200 V range 98 dB @ 40 V range 79 dB @ 4 V range
Typical CMR:	160 dB DC 110 dB @ 1 kHz	100 dB @ 100 Hz 60 dB @ 10 kHz	100 dB @ 100 Hz 70 dB @ 10 kHz
TEDS:	For adapter identification and calibration data.		
Amplifier settings:	Excitation: 10 V; Measurement: Voltage; Range: ±0.1 to ±10 V; automatically selected by software		

***) For ranges below 10 V use DAQP-STG or MDAQ-STG directly!**

For safety reasons max. 50 V may be applied to the BNC input-connectors!
Refer to the regulation of maximum allowable touch potential.

Functional Description

Basically the adapter consist of an active voltage divider (50:1), which allows an input range up to ±200 V on MDAQ-SUB-BRIDGE and MDAQ-SUB-STG. The picture below shows the basic configuration of the amplifier circuit.



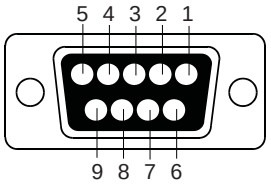
Common Mode voltage

The common voltage range is limited to 200V.

Examples for common voltages:

In (+) = +100 V, In (-) = 50 V, voltage difference = 50V, allowed
In (+) = +220 V, In (-) = +170 V, voltage difference = 15 V,not allowed (In (+) exceeds 200 V)

Pin assignment of 9-pin DSUB connector



1.) EXC+
2.) IN+
3.) SENSE-
4.) GND
5.) n.c
6.) SENSE+
7.) IN-
8.) EXC-
9.) TEDS

Accelerometer amplifier for MDAQ-BRIDGE /-STG, DAQP / HSI-STG and DEWE-43 / DEWE-101

- Support of IEPE® sensors
- AC coupled measurement
- Automatical identification by TEDS (Transducer Electronic Datasheet)

Specification

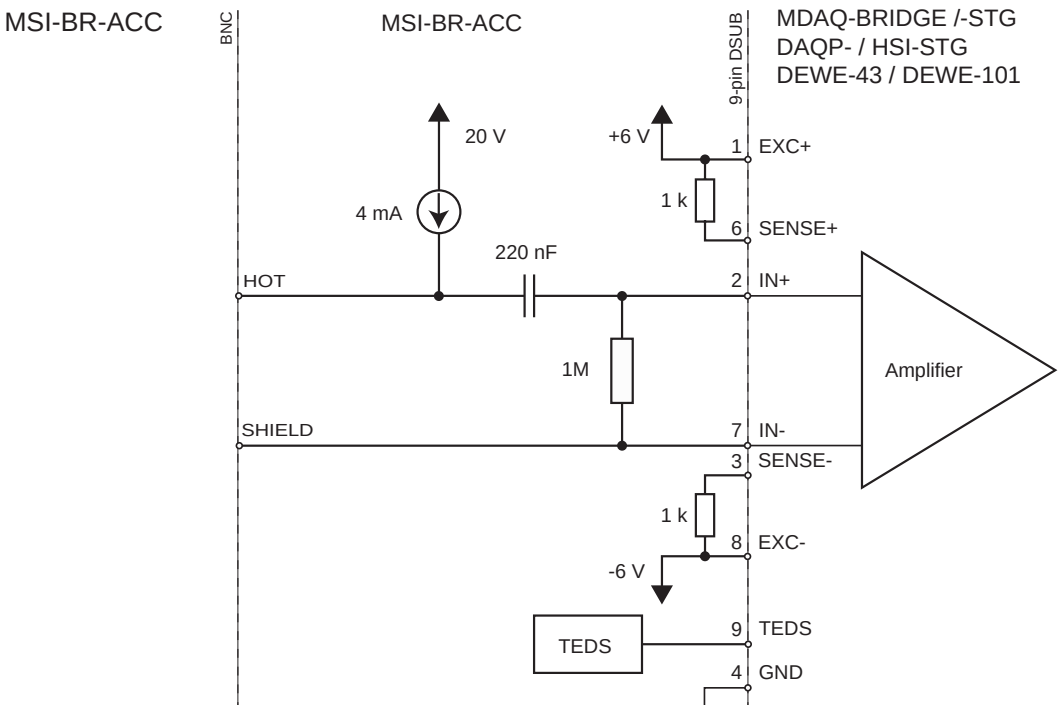
	MSI-BR-ACC				
Sensor connection	BNC				
Supported sensors	IEPE®				
Sensor excitation	4 mA ±10 % (MSI-BR-ACC-S2/-S3: 6 mA)				
Compliance voltage	>23 V				
Input coupling	AC				
Accuracy 30 Hz to 30 kHz	0.2 %**				
Gain drift	50 ppm/ °C				
Max. input offset	12 mV				
Input impedance	1 MΩ				
Supply voltage	±5 V (±1 %)				
Power consumption	max. 380 mW				
Host amplifier	**DAQP-STG**	**HSI-STG**	**MDAQ-STG**	**MDAQ-BRIDGE**	**DEWE-43 / DEWE-101**
Isolation	350 V_{DC}		not isolated	not isolated	not isolated
Bandwidth	300 kHz	2 MHz	2.5 mV to 200 mV: 30 kHz 250 mV to 2.5 V: 190 kHz 5 V and 10 V: 100 kHz (190 kHz small signal bandwidth)	2.5 mV to 200 mV: 30 kHz 250 mV to 2.5 V: 190 kHz 5 V and 10 V: 100 kHz (190 kHz small signal bandwidth)	44 kHz
Lowpass filter	10 Hz to 300 kHz	100 Hz to 2 MHz	with MDAQ-FILT	with MDAQ-FILT	n.a.
Ranges	±10000 mV; ±5000 mV; ±2000 mV; ±1000 mV ±500 mV; ±200 mV; ±100 mV		±10000 mV; ±5000 mV; ±2500 mV; ±1250 mV ±1000 mV; ±500 mV ±250 mV; ±200 mV; ±100 mV	±10000 mV; ±5000 mV; ±2500 mV; ±1250 mV ±1000 mV; ±500 mV ±250 mV; ±200 mV; ±100 mV	±10000 mV; ±1000 mV; ±100 mV
Typical SNR					
200 mV	80 dB @ 30 kHz	42 dB @ 2 MHz	80 dB @ 30 kHz	80 dB @ 30 kHz	80 dB @ 30 kHz
1000 mV	90 dB @ 30 kHz	66 dB @ 2 MHz	95 dB @ 30 kHz	95 dB @ 30 kHz	105 dB @ 30 kHz
High pass filter					
MSI-BR-ACC	1.4 Hz; 3 Hz*; 10 Hz*		1.4 Hz; 3 Hz*; 10 Hz*	3.2 Hz; 10 Hz*	1.4 Hz; 3 Hz*; 10 Hz*
MSI-BR-ACC-S1	0.16 Hz; 3 Hz*; 10 Hz*		0.16 Hz; 3 Hz*; 10 Hz*	0.32 Hz; 3 Hz*; 10 Hz*	0.16 Hz; 3 Hz*; 10 Hz*
MSI-BR-ACC-S2	1.4 Hz; 3 Hz*; 10 Hz*		1.4 Hz; 3 Hz*; 10 Hz*	3.2 Hz; 10 Hz*	1.4 Hz; 3 Hz*; 10 Hz*
MSI-BR-ACC-S3	1.4 Hz; 3 Hz*; 10 Hz*		1.4 Hz; 3 Hz*; 10 Hz*	3.2 Hz; 10 Hz*	1.4 Hz; 3 Hz*; 10 Hz*
TEDS	For adapter identification and calibration data; IEPE® sensor TEDS is not supported.				
Amplifier settings	Excitation: 10 V; Measurement: Voltage; Range: ±0.1 to ±10 V; automatically selected by software				

*) Software filter available in DEWESoft 7 only.
**) might be reduced through A/D card accuracy or system bandwidth.

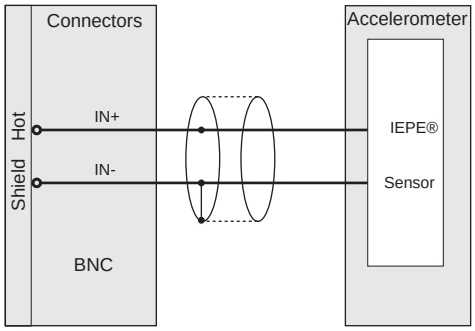
MSI-BR-ACC

Functional description

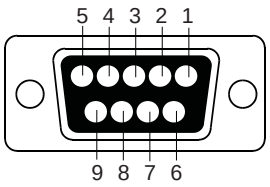
The MSI-BR-ACC is designed to operate with IEPE® sensors and IEPE® compatible sensors. The adapter provides a 4 mA constant current source. A TEDS chip (transducer electronic datasheet) allows automatical adaptor identification by software. The pictures below show the principal adapter circuits.



Typical sensor connection



Pin assignment of 9-pin SUB-D connectors



1.) EXC+
2.) IN+
3.) SENSE-
4.) GND
5.) n.c
6.) SENSE+
7.) IN-
8.) EXC-
9.) n.c

Charge amplifier for MDAQ-SUB-BRIDGE /-STG, DAQP-STG and DEWE-43 / DEWE-101

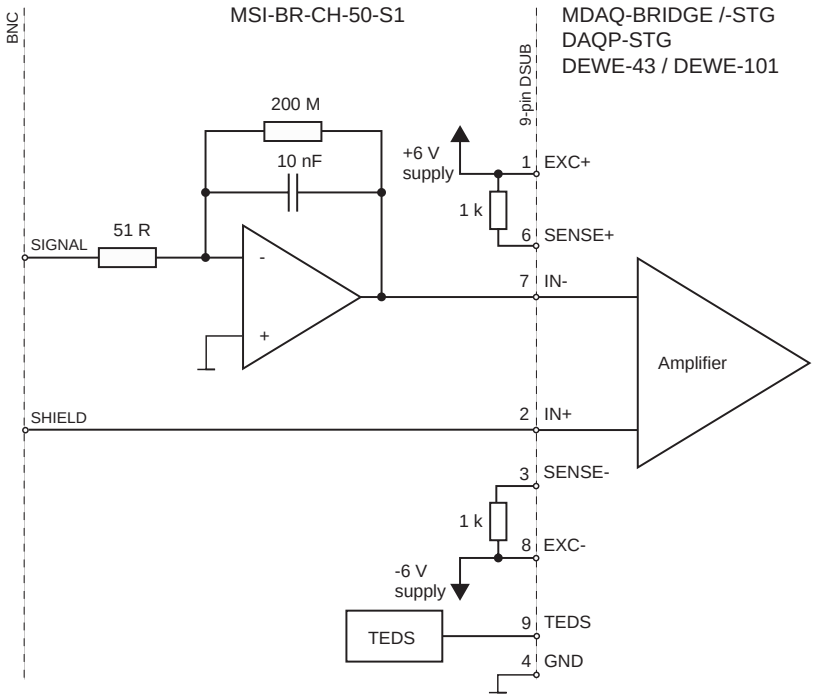
- Range form 200 pC to 50000 pC
- Support of charge sensors
- Automatical identification by TEDS (Transducer Electronic Datasheet)

Specification

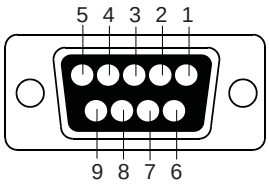
	MSI-BR-CH-x		
Sensor connection:	BNC		
Accuracy:	0.5 %		
Gain drift:	100 ppm/ °C		
Supply voltage:	±5 V (±1 %)		
Power consumption:	max. 100 mW		
Host amplifier:	**DAQP-STG**	**MDAQ-STG / -BRIDGE**	**DEWE-43 / DEWE-101**
Isolation:	350 V_{DC}	not isolated	not isolated
Bandwidth:	0.08 Hz to 45 kHz	0.08 Hz to 30 kHz	0.08 Hz to 44 kHz
Lowpass filter:	10 Hz to 300 kHz	with MDAQ-FILT	n.a.
MSI-BR-CH-50			
Ranges:	±50000 pC; ±20000 pC; ±10000 pC ±5000 pC; ±2500 pC; ±1000 pC ±500 pC; ±250 pC	±50000 pC; ±25000 pC; ±12500 pC ±10000 pC; ±5000 pC; ±2500 pC ±1000 pC; ±500 pC; ±250 pC; ±200 pC	±50000 pC; ±10000 pC; ±1000 pC
Typical SNR @ 30 kHz bandwidth: 1000 pC 50000 pC	 80 dB 90 dB	 89 dB 100 dB	 85 dB 100 dB
Highpass filter:	0.08 Hz; 1 Hz*; 10 Hz*	0.08 Hz; 1 Hz*; 10 Hz*	0.08 Hz; 1 Hz*; 10 Hz*
Max. input DC offset	20 pC		
MSI-BR-CH-100			
Ranges:	±100000 pC; ±40000 pC; ±20000 pC ±10000 pC; ±5000 pC; ±2000 pC ±1000 pC; ±500 pC	±100000 pC; ±50000 pC; ±25000 pC; ±20000 pC; ±10000 pC; ±5000 pC ±2000 pC; ±1000 pC; ±500 pC; ±400 pC	±100000 pC; ±20000 pC; ±2000 pC
Typical SNR @ 100000 pC	90 dB	100 dB	100 dB
Highpass filter:	0.08 Hz; 1 Hz*; 10 Hz*	0.08 Hz; 1 Hz*; 10 Hz*	0.08 Hz; 1 Hz*; 10 Hz*
Max. input DC offset	40 pC		
TEDS:	For adapter identification and calibration data		
Amplifier settings:	Excitation: 10 V; Measurement: Voltage; Range: ±0.2 to ±10 V; automatically selected by software		
*) Software filter available in DEWESoft 7 only.			

Functional description

The picture below shows the principal adapter circuit.



Pin assignment of 9-pin SUB-D connector



1.) EXC+
2.) IN+
3.) SENSE-
4.) GND
5.) n.c
6.) SENSE+
7.) IN-
8.) EXC-
9.) TEDS

Accelerometer amplifier for DAQP-LV and MDAQ-V-200

- Support of IEPE® sensors
- AC coupled measurement
- Automatical identification by TEDS (Transducer Electronic Datasheet)

Specification

	MSI-V-ACC	
Sensor connection:	BNC	
Supported sensors:	IEPE®	
Sensor excitation:	4 mA ±10 %	
Compliance voltage:	>23 V	
Input coupling:	AC	
Accuracy 30 Hz to 30 kHz:	0.2 %**	
Gain drift:	50 ppm/ °C	
Max. input offset:	12 mV	
Input impedance:	1 MΩ	
Supply voltage:	9 V to 15 V	
Power consumption:	max. 350 mW	
Host amplifier:	**DAQP-LV**	**MDAQ-V-200**
Isolation:	not isolated	not isolated
Bandwidth:	300 kHz	300 kHz
Lowpass filter:	10 Hz to 300 kHz	with MDAQ-FILT
Ranges:	±10000 mV; ±5000 mV; ±2000 mV; ±1000 mV; ±500 mV; ±200 mV; ±100 mV	±10000 mV; ±5000 mV; ±2500 mV; ±1250 mV; ±1000 mV; ±500 mV; ±250 mV; ±125 mV
Typical SNR @ 30 kHz bandwidth:		
200 mV	80 dB	83 dB
1000 mV	90 dB	93 dB
High pass filter:		
MSI-V-ACC	1.4 Hz; 3 Hz*; 10 Hz*	1.4 Hz; 3 Hz*; 10 Hz*
MSI-BV-ACC-S1	0.16 Hz; 3 Hz*; 10 Hz*	0.16 Hz; 3 Hz*; 10 Hz*
TEDS:	For adapter identification and calibration data; IEPE® sensor TEDS is not supported.	
Amplifier settings:	Excitation: 10 V; Measurement: Voltage; Range: ±0.1 to ±10 V; automatically selected by software	

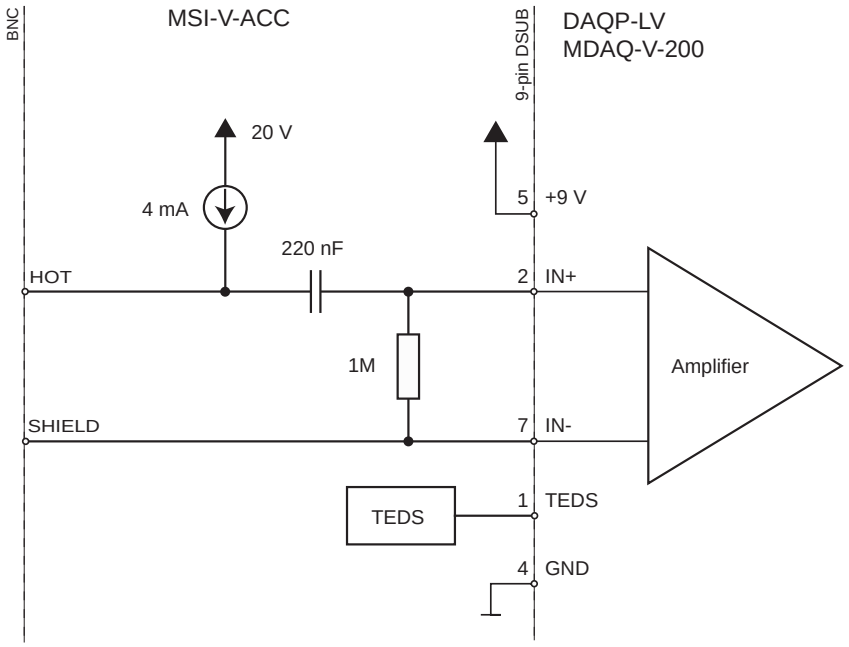
*) Software filter available in DEWESoft 7 only.
**) might be reduced through A/D card accuracy or system bandwidth.

IEPE® is a trademark of PCB Piezotronics, Inc.

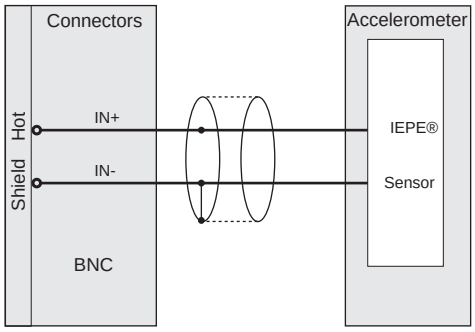
MSI-V-ACC

Functional description

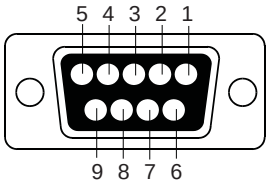
The adapter is designed to operate with IEPE® sensors. Basically the adapter consists of a 4 mA constant current source and an AC coupled output.
The picture below shows the principal adapter circuit.



Typical sensor connection



Pin assignment of 9-pin SUB-D connector



1.) TEDS
2.) IN+
3.) n.c.
4.) GND
5.) +9 V
6.) +12 V
7.) IN-
8.) n.c.
9.) -9 V

IEPE® is a trademark of PCB Piezotronics, Inc.

Charge amplifier for MDAQ-V200 and DAQP-LV

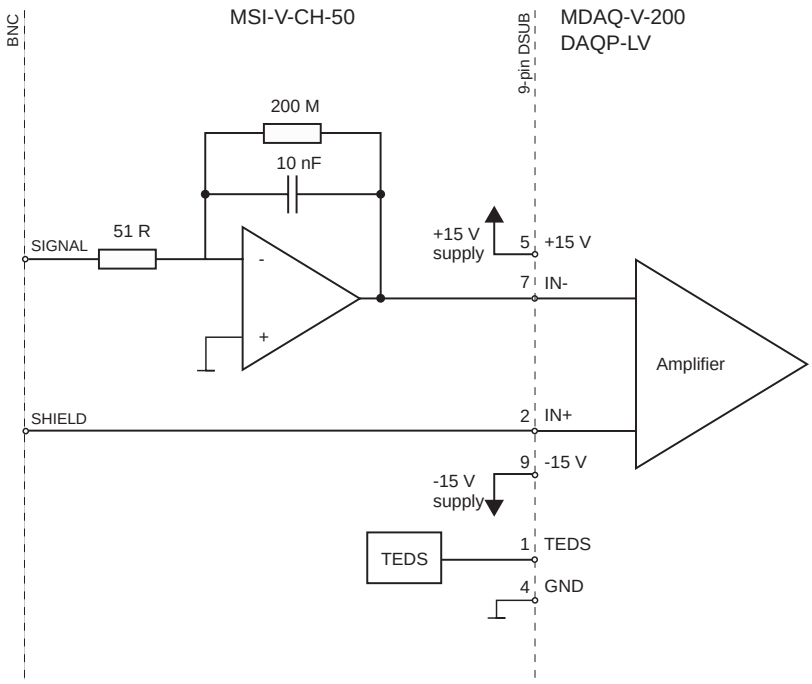
- Range form 500 pC to 50000 pC
- Support of charge sensors
- Automatical identification by TEDS (Transducer Electronic Datasheet)

Specification

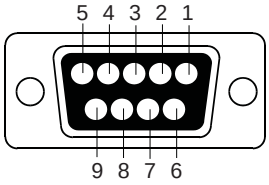
	MSI-V-CH-50	
Sensor connection:	BNC	
Accuracy:	0.05 %	
Gain drift:	100 ppm/ °C	
Supply voltage:	±9 V to ±15 V	
Power consumption:	max. 300 mW	
Host amplifier:	**DAQP-LV**	**MDAQ-V-200**
Isolation:	not isolated	not isolated
Bandwidth:	0.08 Hz to 45 kHz	0.08 Hz to 45 kHz
Lowpass filter:	10 Hz to 300 kHz	with MDAQ-FILT
Ranges:	±50000 pC; ±25000 pC; ±10000 pC ±5000 pC; ±2000 pC; ±1000 pC; ±500 pC	±50000 pC; ±25000 pC; ±12500 pC; ±10000 pC; ±5000 pC; ±2500 pC; ±1250 pC
Typical SNR @ 1000 pC 50000 pC	 84 dB 90 dB	 86 dB 100 dB
High pass filter:	0.08 Hz; 1 Hz*; 10 Hz*	0.08 Hz; 1 Hz*; 10 Hz*
Max. input DC offset:	20 pC	
TEDS:	For adapter identification and calibration data	
Amplifier settings:	Excitation: 10 V; Measurement: Voltage; Range: ±0.2 to ±10 V; automatically selected by software	
*) Software filter available in DEWESoft 7 only.		

Functional description

The picture below shows the principal adapter circuit.



Pin assignment of 9-pin SUB-D connector



1.) TEDS
2.) IN+
3.) n.c.
4.) GND
5.) +15 V
6.) n.c.
7.) IN-
8.) n.c.
9.) -15 V

RTD amplifier for temperature measurement with DAQP-LV and MDAQ-V-200

- Support of Pt100, Pt200, Pt500, Pt1000, Pt2000
- Resistor measurement from 8 Ω to 4 kΩ
- Temperature range from -200 to 850°C
- 2-, 3- or 4-wire sensor connection
- Automatic adapter detection by TEDS (Transducer Electronic Datasheet)

Specifications

	MSI-V-RTD	
Sensor connection:	5-pin BINDER connector series 712	
Supported sensors:	Resistance; Pt100; Pt200; Pt500; Pt1000; Pt2000;	
Temperature range:	-200 °C to 850 °C	
Input offset:	50 µV	
Constant current:	1.25 mA	
Constant current accuracy:	±0.02 % from calibrated value	
Constant current drift:	22 ppm/ °C	
Linearisation:	Through software according to sensor type	
Connection types:	2-, 3- or 4-wire	
Host amplifier:	**DAQP-LV**	**MDAQ-V-200**
Isolation:	not isolated	not isolated
Bandwidth:	10 kHz	10 kHz
Lowpass filter:	10 Filter: 10 Hz to 300 kHz	10 Hz,100 Hz
Accuracy:		
Resistance	[±x.xx % of reading ±Ω]	
Ranges:	Accuracy:	
8 to 80 Ω	±0.04 % of reading ±90 mΩ	n.a.
100 to 200 Ω	±0.04 % of reading ±130 mΩ	±0.05 % of reading ±360 mΩ
400 to 800 Ω	±0.04 % of reading ±500 mΩ	±0.05 % of reading ±360 mΩ
1000 to 4000 Ω	±0.04 % of reading ±0.07 % of range	±0.05 % of reading ±0.05 % of range
Pt100	DIN EN 60751	
Ranges:	Accuracy:	
-200 to 850 °C	±0.08 % of reading ±0.74 °C	±0.1 % of reading ±1.05 °C
-200 to 260 °C	n.a.	±0.1 % of reading ±1.05 °C
-200 to 150 °C	±0.06 % of reading ±0.43 °C	n.a.
Pt200	DIN EN 60751	
Ranges:	Accuracy:	
-200 to 850 °C	±0.07 % of reading ±0.68 °C	±0.08 % of reading ±0.59 °C
-200 to 260 °C	±0.06 % of reading ±0.42 °C	±0.08 % of reading ±0.59 °C
Pt500	DIN EN 60751	
Ranges:	Accuracy:	
-200 to 850 °C	±0.07 % of reading ±0.64 °C	±0.08 % of reading ±0.56 °C
-200 to 260 °C	n.a.	±0.07 % of reading ±0.31 °C
-200 to 150 °C	±0.06 % of reading ±0.23 °C	n.a.
Pt1000	DIN EN 60751	
Ranges:	Accuracy:	
-200 to 850 °C	±0.07 % of reading ±0.63 °C	±0.08 % of reading ±0.45 °C
-200 to 260 °C	±0.06 % of reading ±0.24 °C	±0.07 % of reading ±0.34 °C
Pt2000	DIN EN 60751	
Ranges:	Accuracy:	
-200 to 260°C	±0.06 % of reading ±0.36 °C	±0.07 % of reading ±0.29 °C
Typical noise:		
100 Hz bandwidth	0.1 °C	0.03 °C
Supply voltage:	±9 V (±5 %)	±15 V (±5 %)
Power consumption	max. 30 mW	max. 500 mW
TEDS:	For adapter identification and calibration data	
Amplifier settings:	Excitation: 10 V; Measurement: Voltage; Range: ±0.2 to ±10 V; automatically selected by software	

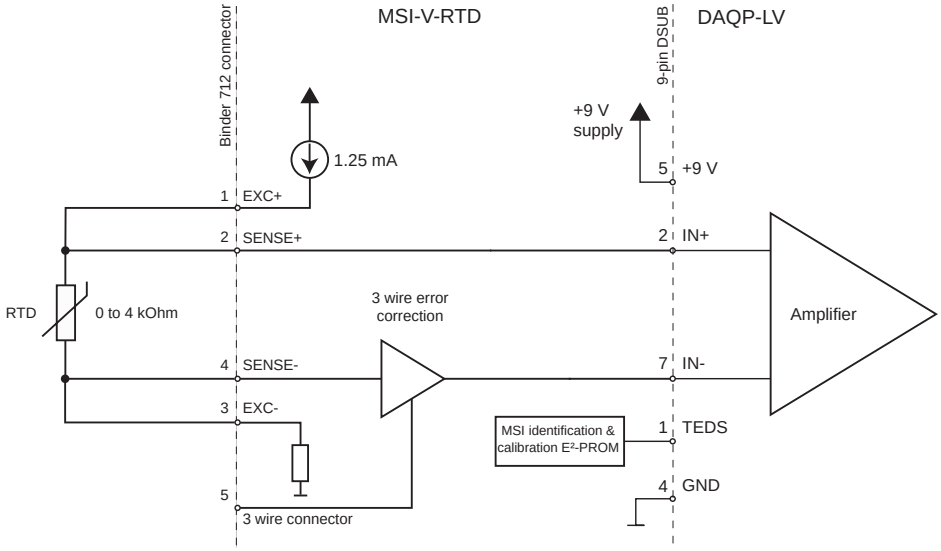
MSI-V-RTD

Functional description

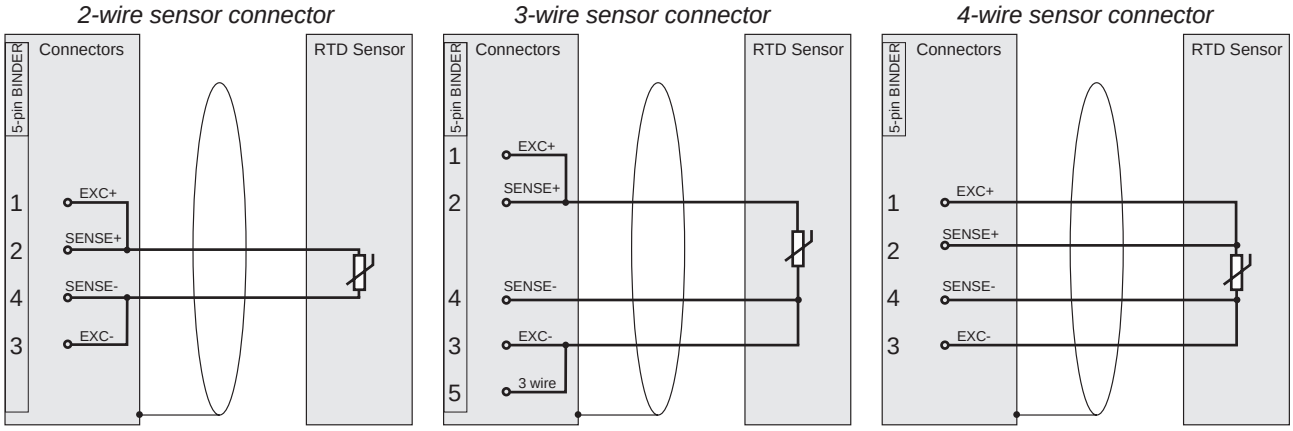
The MSI-BR-RTD allows temperature and resistor measurement with DAQP amplifiers. All common RTD types (PT100, PT200, PT500, PT1000, PT2000) are supported. The heart of the adapter is a high precision current source, which provides the excitation current of 1.25 mA. When a 3-wire connection is used, an amplifier compensates the lead resistance completely if all three wires have the same diameter and length. The non-linearity of the RTD is compensated in software. A TEDS chip (transducer electronic datasheet) provides automatical adaptor identification by software and calibration data.

The adapter is placed in a small D-SUB housing, which is directly connected to the DSUB input connector of the DAQP amplifier.

The picture below shows the principal MSI-BR-RTD circuit.



Sensor connection

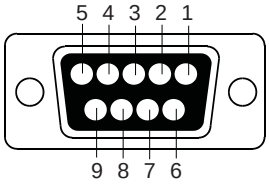


Measuring temperature with Pt100 or similar sensors is based on simple resistor measurements. Keep in mind that the resistance of the lead will influence the measurement result. The resistance changes with the temperature, the length and the diameter of the lead.The 4-wire connection will completely remove all the measurement errors caused by lead resistance.

Using 2-wire connection the lead resistance will be within the measurement result. Especially using long and thin wires from the Adapter to the temperature sensors will distort the measurement result.

The 3-wire connection will also compensate the lead resistance completely if all three wires have the same diameter and length. In that case it is safe to assume that the lead resistance of all three wires is the same. Therefore the resistance of only one wire has to be measured for eliminating the lead resistance influence.

Pin assignment of the 9-pin SUB-D connector



1.) TEDS
2.) IN+
3.) n.c.
4.) GND
5.) +9 V
6.) n.c.
7.) IN-
8.) n.c.
9.) n.c.

Notes

CE-Certificate of conformity

Manufacturer:

Address:

DEWETRON GmbH

Parkring 4
8074 Grambach, Austria

Tel.: +43 316 3070 0
Fax: +43 316 3070 90
e-mail: sales@dewetron.com
http://www.dewetron.com

Name of product: **DEWE-MSI**

Kind of product: *Modular smart interfaces*

The product meets the regulations of the following EC-directives:

73/23/EEC
"Directive on the approximation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits amended by the directive 93/68/EEC"

89/336/EEC
"Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility amended by the directives 91/263/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC

The accordance is proved by the observance of the following standards:

LV	**Safety**	IEC/EN 61010-1:1992/93 IEC/EN 61010-2-031	IEC 61010-1:1992/300 V CATIII Pol. D. 2 IEC 1010-2-031
EMC	**Emissions**	EN 61000-6-4	EN 55011 Class B
	Immunity	EN 61000-6-2	Group standard

Graz, April 28, 2010

Place / Date of the CE-marking

Dipl.-Ing. Roland Jeutter / Managing director

Notes