

# Voltage Measuring Transducer for DC Voltage

## MCR-VDC-UI-B-DC

### 1. Description

- 3-way electrical isolation
- TRMS measurement
- Adjustable voltage ranges
- ZERO/SPAN adjustment  $\pm 20\%$

MCR voltage transducers measure DC voltages in several signal ranges 0... $\pm 24$  V DC to 0... $\pm 550$  V DC and convert them into standardized analog signals. DC voltages can be processed with both positive and negative polarity.

The input voltage ranges of input terminals ①...⑦ can be adjusted by  $\pm 20\%$  using an adjustment potentiometer.

Upon delivery, the voltage transducer is set to 0... $\pm 24$  V input and 0... $\pm 10$  V output and is ready for operation. If you set the device to other input/output values you must carry out a ZERO/SPAN adjustment using the potentiometer on the front plate.



### 2. Method of Operation

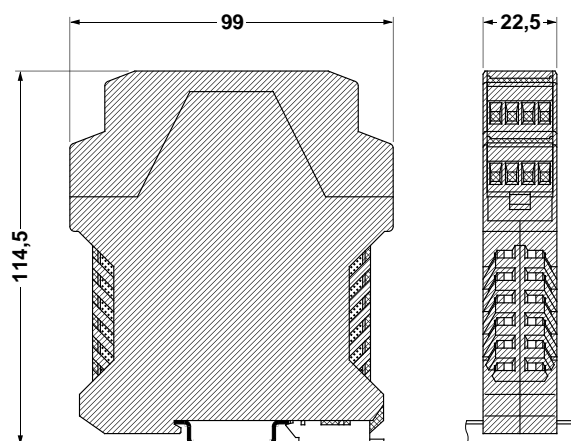
The input circuit divides the DC voltage at terminals ①...⑦. The resultant signal is transmitted electrically isolated to the output circuit and is available as a standardized analog signal at the output.

### 3. Area of Application

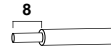
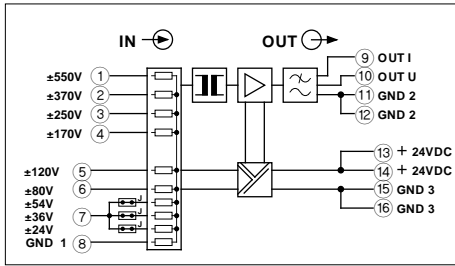
When using the voltage transducer, ensure that the potential difference between terminal ①...⑦ and ground potential PE, and terminal ⑧ and ground potential PE does not exceed  $U = \pm 660$  V (prerequisite for ungrounded circuits).

In DC voltage networks, this potential difference should not exceed  $U = \pm 100$  V (prerequisite for grounded circuits).

If all of these conditions are met, **safe isolation** is provided between the input, output, and supply.



4. Technical Data



**MCR-VDC-UI-B-DC**

for converting DC voltages  
from 0...±20 V DC to 0...±660 V DC

rigid flexible  
[mm<sup>2</sup>] AWG

Connection data	0.2-2.5	0.2-2.5	24-14
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Description	Output signal
<b>MCR voltage measuring transducer,</b> for DC voltages from 0...±20 V AC to 0...±660 V AC	±10 V/±20 mA

**Technical Data**

**Input**

Input voltage range  
Input resistance  
Input voltage range  
Input resistance  
Adjustment options:  
  
Frequency response  
Nominal voltage ungrounded  
Nominal voltage to ground <sup>1)</sup>

ZERO  
SPAN

**Output**

Output signal  
Maximum output signal  
Load  
Ripple

Voltage/current  
Voltage/current  
Voltage/current

**General Data**

Supply voltage  
Current consumption  
Transmission error  
Temperature coefficient  
Limit frequency (3 dB)  
Step-response (10 - 90%)  
Test voltage:  
  
Ambient operating temperature range  
Electromagnetic compatibility  
• Noise emission  
• Immunity to interference

Input/output  
Power supply/output



Type	Order No.	Pcs. Pkt.
<b>MCR-VDC-UI-B-DC</b>	<b>28 11 11 6</b>	<b>1</b>

±550 V DC	±370 V DC	±250 V DC	±170 V DC	±120 V DC
550 kΩ	370 kΩ	250 kΩ	170 kΩ	120 kΩ
±80 V DC	±54 V DC	±36 V DC	±24 V DC	
80 kΩ	54 kΩ	36 kΩ	24 kΩ	
±20%				
±20%				
–				
±660 V DC				
±100 V DC				

±10 V/±20 mA  
±15 V/±30 mA  
> 10 kΩ / < 500 Ω  
< 50 mV<sub>pp</sub>

18.5...30.2 V DC  
< 50 mA  
< 1% of the final value  
< 0.015%/K  
40 Hz  
12 ms  
1.5 kV, 50 Hz, 1 minute  
1.0 kV, 50 Hz, 1 minute  
-25°C to +50°C (-13°F to +131°F)  
CE Conformance with EMC Directive 89/336/EEC  
EN 50 081-2  
EN 50 082-2

<sup>1)</sup> If these values are observed, safe isolation (EN 50 178/DIN EN 50 178/VDE 0160) is provided between the input, output, and supply.

## Voltage Measuring Transducer for DC Voltage – MCR-VDC-UI-B-DC



### Conformance With EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC

#### EMC (Electromagnetic Compatibility)

Noise immunity in accordance with EN 50082-2

- Electrostatic discharge (ESD)

- Electromagnetic HF field  
Amplitude modulation  
Pulse modulation

- Fast transients (burst)

- Surge current loads (surge)

- Conducted interference

Noise emission in accordance with EN 50081

EN 61000-4-2	8 kV air discharge <sup>2)</sup>
EN 61000-4-3	10 V/m <sup>1)</sup> 10 V/m <sup>1)</sup>
EN 61000-4-4	Input/output/supply 2 kV/5 kHz <sup>2)</sup>
EN 61000-4-5	Input/output: 2 kV/42 Ω <sup>2)</sup> Supply: 0.5 kV/2 Ω <sup>2)</sup>
EN 61000-4-6	Input/output/supply 10 V <sup>1)</sup>
EN 55011	Class A

EN 61000 corresponds to IEC 1000/  
EN 55011 corresponds to CISPR11

<sup>1)</sup>Criterion A: Normal operating characteristics within the specified limits.

<sup>2)</sup> Criterion B: Temporary adverse effects on the operating characteristics, which the device corrects automatically.

Class A: Industrial application, without special installation measures

## Voltage Measuring Transducer for AC Voltage MCR-VAC-UI-0-DC

- ① ZERO/SPAN potentiometer
- ② Plug-in screw-cage terminal blocks
- ③ Housing cover, can be removed to set the jumpers
- ④ Metal lock for fastening on the DIN rail
- ⑤ Plug-in screw-cage terminal block

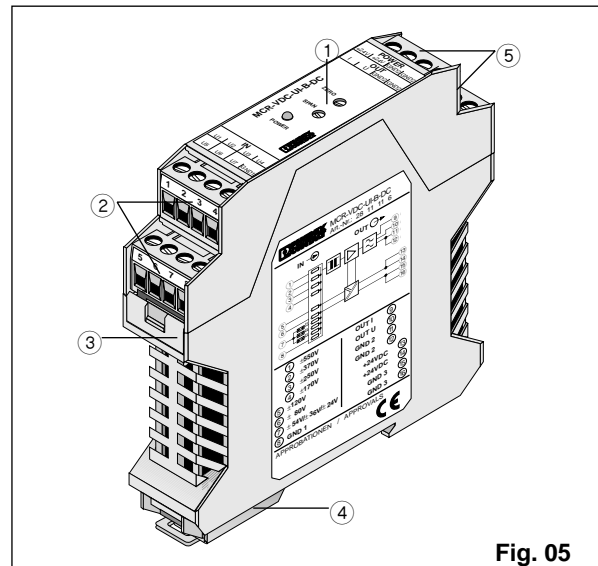
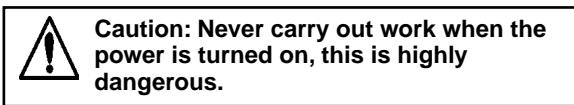


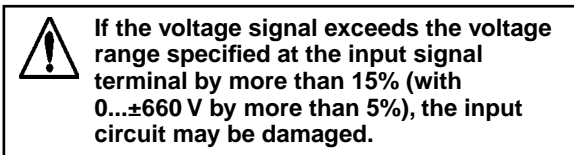
Fig. 05

## 5. Connection Notes



**Table 1:**  
Selecting the input voltage range (see also Fig. 07)

Input Voltage	Adjustment Range ( $\pm 20\%$ ) [V AC]	Input Terminal	Jumper/Setting
0... $\pm 550$ V	(440 - 660)	①	
0...370 V	(296 - 444)	②	
0...250 V	(200 - 300)	③	
0...170 V	(136 - 204)	④	
0...120 V	(96 - 144)	⑤	
0...80 V	(64 - 96)	⑥	
0...54 V	(43 - 65)	⑦	J1/setting 1
0...36 V	(28 - 43)	⑦	J1/setting 2
0...24 V	(19 - 29)	⑦	J1/setting 3 Factory setting



### 5.1. Opening the Device (Fig. 06)

The locked housing cover is released on both sides using a screwdriver ①. The housing cover and electronics can now be pulled out about 3 cm (1.181 in.) ②.

### 5.2. Jumper Setting (Fig. 07)

Insert jumper J in the desired position to set the input voltage.

Finally, close the housing until it engages with a click.

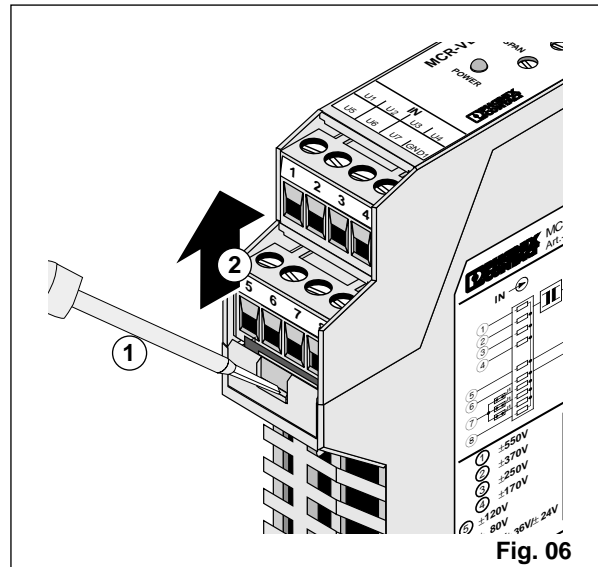
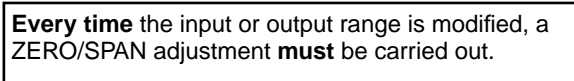


Fig. 06

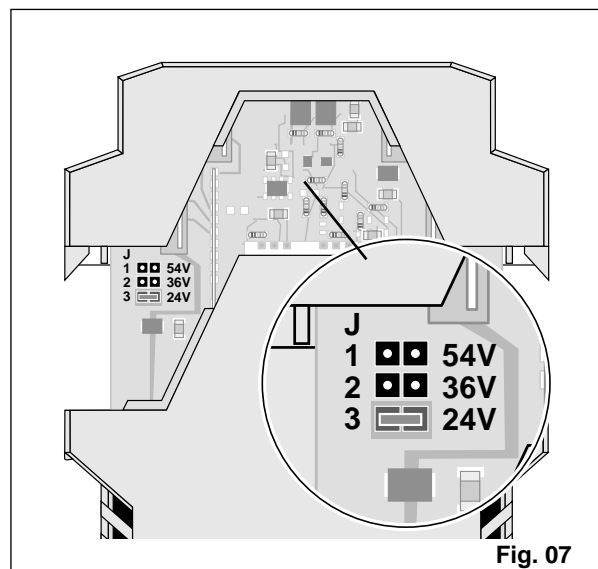
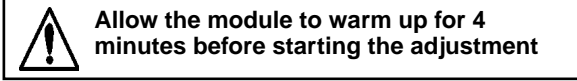


Fig. 07

## 6. ZERO/SPAN Adjustment



Upon delivery, the module is set to 0...±24 V input and 0...±10 V output.

Two potentiometers are available on the front side of the module for adjustment (Fig. 08):

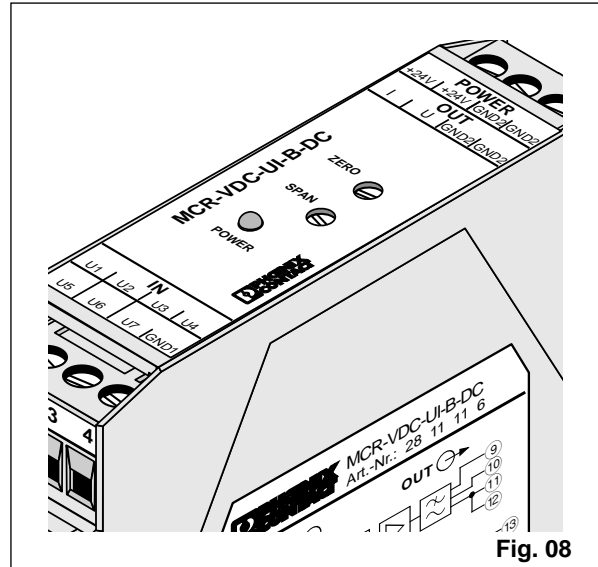
**ZERO:** Zero point adjustment  
**SPAN:** Final value adjustment

### d) Zero point adjustment

- Connect a calibration source to the input terminals ( $U_{(1-7)}$  and GND1) and specify a voltage of 0 mV.
- Set the output signal value using the **ZERO** potentiometer.  
 Voltage output (0...±10 V):  $U_{OUT} = 0\text{ V}$   
 Current output (0...±20 mA):  $I_{OUT} = 0\text{ mA}$

### b) Final value adjustment

- Use the calibration source to specify the maximum voltage used in the framework of the input voltage range (table 1).
- Set the output signal value ( $U_{OUT} = 10\text{ V}$  and  $I_{OUT} = 20\text{ mA}$ ) using the **SPAN** potentiometer.



**Fig. 08**