Operation manual CAM 100

Digital panel meter for Voltage / Current DC

About this manual:

Read this manual carefully for safety instructions and operating guidance before installation!

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1 Description

1.1 General

With the digital panel meter **CAM 100** almost all similar DC signals are measurable. The desired measuring range (200 mV, 2V, 20V, 200 V, standard signals: 0 ... 10 V and 0 (4) ... 20 mA), including decimal place, scale themselves by solder pads under the clamps to find. Similar input signals within the range of - 1999... + 1999 can be scaled by means of resistance at the clamps at will. Despite the small dimensions the LED display can be read off even from larger distance well.

1.2 Safety instructions

This equipment is built and according to quality standards examined in accordance with European guidelines. It left the work in safety-relevant perfect condition. The references and warning notes contained in this operating instructions must be considered around a safe enterprise to ensure. Without impairment of its working reliability the equipment can be operated within the certified site conditions. See chapter 3. This equipment may be taken only by a specialist in enterprise, which is familiar with the associated dangers and/or the relevant regulations.

1.3 Maintenance

All repairs of the device may only be carried out by a specialist workshop. In case it is inevitable to carry out repairs on the opened device which is still supply voltage this may only be effected by trained specialist who knows about the dangers usually related to any such procedure. In case of misuse or wrong operation of the device we do not assume any liability for any damages that might occur.

1.4 Mounting

The equipment is to be inserted from the front into the cutout planned for it (according to DIN 43,700). Dimensions of the cutout: 45 x 22.2 [mm]. The attachment takes place with the help of enclosed fastening parts. The tightening screws are to be tightened mutually, until the equipment sticks. During the placement of the equipment is the radiant heat of neighbouring devices to consider (consider permissible ambient temperature!). The electrical connection is to be made according to appropriate regulations (e.g. VDE 0100). Supply voltage is indicated and to the clamps 5 and 6 is put on on the vehicle identification plate.

2. Operation

2.1 Starting

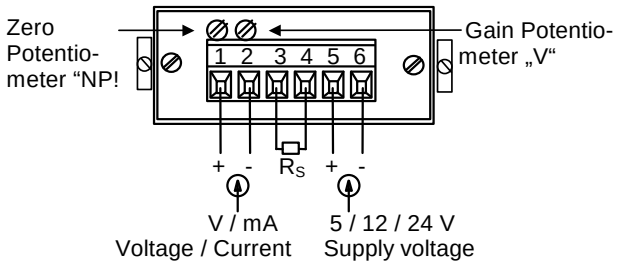
Standard input & display ranges at the **CAM 100** can be selected through solder pads as shown in table 1. With the resistor Rs any display range can be realised for voltage and current measurements. Also the decimal point is selected through a solder pad. The gain can be changed about ± 20% through the gain potentiometer „V“. The offset range is ± 500 digits related to the input signal of 0 VDC or 0 mA. It can be changed by potentiometer „Np“.

2.2 Adjustment of measuring U/I

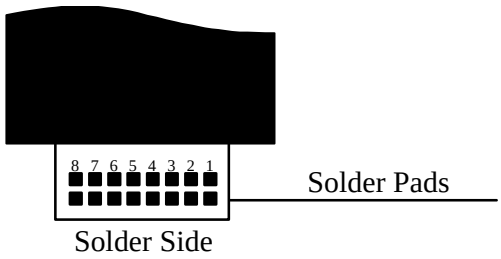
1. Standard input & display ranges can be selected through solder pads (see table 1) or calculate resistor Rs appropriate table 2. Close solder pads (see pict. 2) and connect Rs at pin 3 / 4 at the terminal block (see pict. 1)
2. Apply the voltage or current for span start to terminal block pin 1 / 2.
3. Bring the display to the required value for span start using the zero potentiometer “NP” (see pict. 1).
4. Apply the voltage or current for span end to the input terminal.
5. Bring the display to the required value for span end using the gain potentiometer „V“ (see pict. 1).
6. Repeat step 2 to 5 until the display corresponds to the required measuring range.

2.3 Rear view and solder pads

Picture 1: Connecting diagram



Picture 2: Solder Pads



Picture 3: Display-ranges

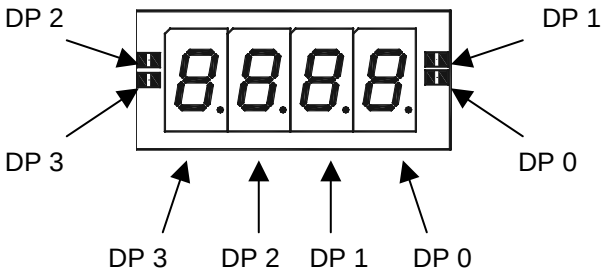


Table 1:
Selection of measuring ranges:

Input	Display range min.	Display range max.	Solder Pads closed
Current	variable	variable	1 and Rs
0 ... 20 mA	155	240	2
0 ... 20 mA	500	760	3
0 ... 20 mA	760	1140	4
0 ... 20 mA	1140	1710	5
0 ... 20 mA	1710	1999	2 u.8
4 ... 20 mA	400	605	3
4 ... 20 mA	605	910	4
4 ... 20 mA	910	1370	5
4 ... 20 mA	1370	1999	2 u. 8
Voltage	variable	variable	only Rs
0 ... ± 200 V	± 1600	± 1999	7
0 ... ± 20 V	± 1600	± 1999	6
0 ... ± 2 V	± 1600	± 1999	all open [1)]
0 ... ± 200 mV	± 1600	± 1999	8

1) Preset delivery configuration.

Table 2:
Formula to calculate the scaling resistor Rs:

Voltage measurement:

$$Rs[k\Omega] = \frac{1}{\frac{\text{input voltage}[V]}{\text{required display}[\text{digit}]} - 0{,}001}$$

Example 1: Input voltage 0 ... 30 V, required display 20,0 ... 120,0:

$$Rs[k\Omega] = \frac{1}{\frac{30}{1000} - 0{,}001} = 34{,}48\ k\Omega \approx 34{,}8\ k\Omega$$

Current measurement:

$$Rs[\Omega] = \frac{\text{required display}[\text{digit}]}{\text{input current}[mA]}$$

Example 2: Input current 0 ... 20 mA, required display -1,80 ... 14,20:

$$Rs[\Omega] = \frac{1600}{20} = 80\ \Omega \approx 80{,}6\ \Omega$$

3 Technical data

Display	
Display	7 – Segment display, 8 mm LED red
Display range	± 1999 digits
Decimal point	via jumper
Measurement range	Display „1“ at overrange or sensor break Display „-1“ at underrange
Measurement functions	
Measurement range attitude	via solder bridge
Meas. method	Dual Slope
Meas. rate	approx. 2,5 / sec.
Response time	< 2 sec. (at 100% Stepp)
Input signals	Voltage, Current (DC)
Input range	0 ... 10 V_{DC}, 0 (4) ... 20mA ± 0,2 / ±2 / ±20 / ±200 V / mA Accuracy: ≤ ± 1 Digit ± 0,15 % of display value Temp. effect: ≤ ± 0,08 digit / K (reference +25°C) Gain adjustment: max. ± 20 % „V“ Offset adjustment: max. ± 500 Digit „NP“
Supply voltage	
Supply volltage	$5V_{DC}$ 4,5-5,5V_{DC} , $12V_{DC}$ 12-13,2V_{DC} , $24V_{DC}$ 22,3-26,4 V_{DC}, galvanivally separated, ripple max. 100 $mV_{SS.}$
Protection	Protection against pole reversal
Power consumption max.	50 mA
EMC References	According to European Directive 89/336/EWG „Electromagnetic Compatibility“ and 73/23/EWG “Low Voltage Directive”. Meets with EN 50081, EN 50082 and EN 61010 for unrestricted industrial use
Dimensions	
Dimension (W x H x L)	appr. 48 x 24 x 78 [mm]
Recommended panel cut-our	45 x 22,2 [mm]
Mounting depth	appr. 72 mm
Material	Glass-fibre reinforced Noryl, hardly inflammable, removable front frame
Weight	appr. 50 g
Panel thickness	max. 5mm
Attachment	via 2 attachment elements
Environment	
Ambient temperature	0 ... 50 °C, no dew allowed
Protection	Front panel IP 50, Terminal block IP 20 (DIN 40050, IEC 144)
Protective class	II (prot. isolation)
Connections	
Interconnection technology	Terminal screws with wire protection for max. 1.5 mm^2