

Panel Meters and Controllers

Controller for AC/DC Current Measurements

Type MDI 40 A

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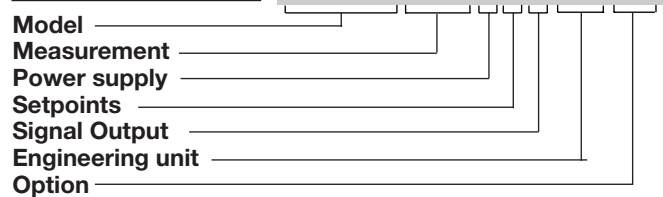
- 3 3/4-dgt multi-range μ P-based controller for AC/DC current measurements
- Ranges from 2 mA to 5 A
- All software functions selectable by key-pad
- Peak/valley function
- Password protection of programming parameters
- 2 independent alarm setpoints
- Alarm for over-range, up-alarm, down-alarm, down alarm with disabling at power-on, up/down-alarm with latch
- Degree of protection: IP 65
- Optional analogue output (20 mA/10 VDC)
- Optional serial RS 485 output
- MODBUS, JBUS protocol

Product Description

3 3/4-dgt multi-range μ P-based controller for AC/DC current measurements. Scaling and setpoints are fully programmable by user-friendly key-pad. The MDI 40 A in-

cludes peak/valley function and password protection. The housing is easy to mount and ensures a protection degree of IP 65.

Ordering Key **MDI40A0BD2A XXIX**



Type Selection

Measurements	Power supply	Signal output	Options
A0B: Standard (40 - 400 Hz) 2 mA 20 mA 2 A 5 A A4X: Std, input: 200 mA A0T: TRMS (40 - 1000 Hz) 2 mA 20 mA 2 A 5 A	A: 24 VAC, -15% +10%, 50/60 Hz ¹⁾ B: 48 VAC, -15% +10%, 50/60 Hz ¹⁾ C: 115 VAC, -15% +10%, 50/60 Hz ¹⁾ D: 230 VAC, -15% +10%, 50/60 Hz (standard) E: 120 VAC, -15% +10%, 50/60 Hz ¹⁾ F: 240 VAC, -15% +10%, 50/60 Hz ¹⁾ 3: 9 to 32 VDC with galvanic insulation ¹⁾ 6: 40 to 150 VDC with galvanic insulation ¹⁾	X: None A: Analogue: 0 to 20 mA/ 0 to 10 V R: Serial: RS 485 unidirectional S: Serial: RS 485 bidirectional W: Analogue (A) + serial (R) Y: Analogue (A) + serial (S)	IX: Degree of protection IP 65 (standard) 01: Interactive setpoints + IP 65 ¹⁾ XT: Tropicalization + IP 65 ¹⁾

¹⁾On request

Input Specifications

Rated input	2 mA, 20 mA, 200 mA, 2 A, 5 A, 40-400 Hz	Sampling rate	4 times/second, dual slope 16 bits A/D converter
Accuracy		Display	7-segment LED, h 14.2 mm
DC		Max. and min. indication	
DC current measurements, (@ 25°C \pm 5°C)	± 0.1 % f.s., ± 1 dgt	DC	Max. 3999, min. -1999
AC Standard		AC Standard and TRMS	Max. 3999, min. 0
AC current measurements, (@ 25°C \pm 5°C, 5-100% f.s.)	± 0.1 % f.s., ± 2 dgt	AC Measurements	
AC TRMS		Standard	Measurement of the average value resulting from the sine half-wave rectification of the input voltage by rms calibration
AC current measurements, (@ 25°C \pm 5°C, 5-100% f.s.)	± 0.2 % f.s., ± 2 dgt		
Temperature drift			
DC	± 150 ppm/°C		
AC Standard and TRMS	± 200 ppm/°C		

Specifications are subject to change without notice (28.10.99)

Input Specifications (cont.)

Measurements (cont.) TRMS	True rms Coupling type : AC Crest factor: ≥ 3	Input ranges (cont.) 2 A	-1.999 to 1.999 ADC 0 to 1.999 AAC Input impedance: 50 m Ω
Input ranges 2 mA	-1.999 to 1.999 mADC 0 to 1.999 mAAC Input impedance: 50 Ω	5 A	-1.99 A to 5 ADC 0 A to 5 AAC Input impedance: 50 m Ω
20 mA	-19.99 to 19.99 mADC 0 to 19.99 mAAC Input impedance: 50 Ω	Overload protection Continuous For 1s	1.2 x rated input 2 x rated input
200 mA (on request)	-199.9 to 199.9 mADC 0 to 199.9 mAAC Input impedance: 1 Ω	Keyboard	4 keys: "S" for menu selection; "UP" and "DOWN" for value programming/function selection; "F" for special functions

Output Specifications

Alarms Number of setpoints Alarm type	2 independent (standard) Over-range, up alarm, down alarm, down alarm with dis- abling at power-on, up alarm with latch, down alarm with latch	Analogue output (cont.) Accuracy/response time Temperature drift Load: 20 mA output 10 V output Insulation	$\pm 0.3\%$ f.s. (@ 25°C) ≤ 500 ms ± 200 ppm/°C ≤ 500 Ω ≥ 10 k Ω By means of optocouplers, 500 V _{rms} output to measuring input 4000 V _{rms} output to supply input
Special function	Interaction of the two set- points (on request)	Serial output (on request) Type Multidrop	RS485; Uni-directional (std), bidirectional (on request) 2 or 4 wires, max. distance 1200m, termination and/or line biasing directly on the instrument
Setpoint adjustment	0 to 100% of the displayed range	Connections	255, selectable by key-pad/ MODBUS, JBUS
Limits of setpoint adjustment	Programmable minimum and maximum values	Adresses/protocol	Measurement, data hold of minimum value, data hold of maximum value, alarm status All programming data
Hysteresis	0 to 100% of the displayed range	Data (uni-directional) Dynamic (reading only)	Measurement, data hold of minimum value, data hold of maximum value, alarm status. All programming data, min./ max. data hold reset, reset of alarm set-points with latch
On-time delay	0 to 255 s	Static (reading only)	1-start bit, 8-data bit, no parity, 1 stop bit
Off-time delay	0 to 255 s	Data (bidirectional, on request) Dynamic (reading only)	1200, 2400, 4800 and 9600 selectable bauds
Relay status	Normally energized/de-ener- gized	Static (reading/writing)	By means of optocouplers, 500 V _{rms} output to measuring inputs 4000 V _{rms} output to supply input
Output type Contact Rating	2 x SPDT 5A, 250 VAC/VDC, 40 W / 1200 VA, 130.000 cycles	Data format	
Min. response time	≤ 400 ms, filter excluded setpoint on-time delay: "0"	Baud-rate	
Insulation	2000 V _{rms} between output and measuring inputs, excita- tion output	Insulation	
Excitation output Voltage	15 VDC non-stabilized/ 40 mA max		
Insulation	100 V _{rms} output to measuring input 4000 V _{rms} output to AC supply input 500 V _{rms} output to DC supply input		
Analogue output (on request) Range Scaling factor	0 to 20 mADC, 0 to 10 VDC Programmable within the whole range of the signal output; it allows the mana- gement of all values from 0 to 20 mA / from 0 to 10 V		

Software Functions

Peak and valley values	Automatic storage (RAM only) of the min. and max. value measured from the last reset	Scaling factor (cont.) Electrical scale	Programmable within the whole measuring range Programmable within the displaying range Programmable within the whole displaying range
Password	Numeric code of max. 3 digits; 3 protection levels of the programming data	Decimal point position	
1st level 2nd level 3rd level	Password "0", no protection Password from 1 to 127, all data are protected Password for 128 to 255, all data protected except for the alarm setpoints	Displayed scale	
Measurement selection	AC/DC current	Diagnostics	The display flashes when the limits of the displayed range are exceeded, the data are updated up to the maximum read-out EEE indication (AC/DC) -EE indication (DC)
Scaling factor Operating mode	Electrical scale compression, compression/expansion of the displayed scale (max. 2 without filter, > 2 with filter).	Over range Under range	
Filter		Filter operating range Filtering coefficient	From 0 to 3999 From 1 to 255

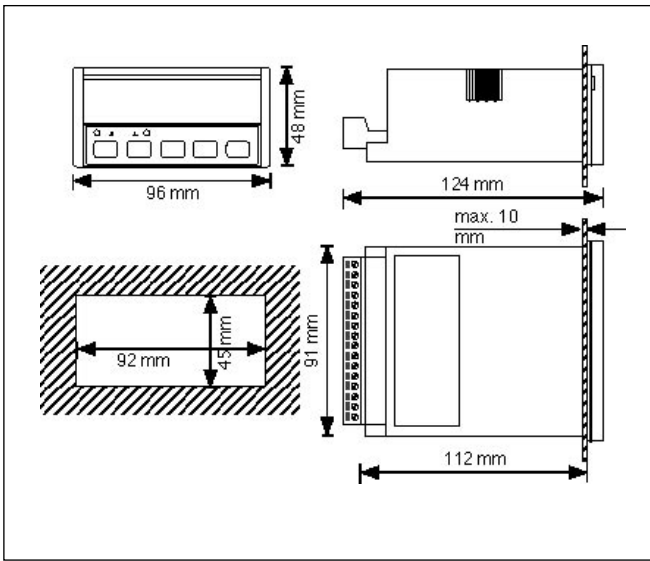
Supply Specifications

AC voltage	230 VAC -15%+10% 50/60 Hz, (standard) 24 VAC, 48 VAC, 115 VAC, 120 VAC, 240 VAC, -15%+10% 50/60 Hz (on request)
Insulation	4000 V _{ms} supply input to all the other inputs/outputs
DC supply	9 to 32 VDC, galvanic insulation, max. inrush current: ≤ 1.2 A/200 ms (on request)
Insulation	40 to 150 VDC, galvanic insulation, max. inrush current: ≤ 0.6 A/200 ms (on request) 500 V _{ms} supply input to all other inputs/outputs
Power consumption	5 VA (basic instrument), 7 VA max. with signal output

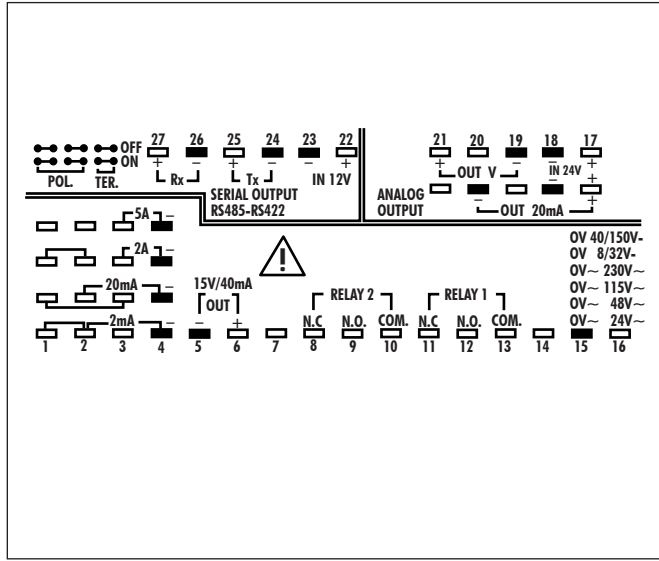
General Specifications

Operating temperature	0° to +50°C, 32° to 122°F (R.H. < 90% non-condensing)
Storage temperature	-10° to +60°C, 14° to 140°F (R.H. < 90% non-condensing)
Insulation reference voltage	300 V _{ms} to ground
Dielectric strength	4000 V _{ms} for 1 minute
Noise rejection NMRR CMRR	40 dB, 40 to 60 Hz. 100 dB, 40 to 60 Hz
EMC	IEC 60801-2, IEC 60801-3, IEC 60801-4 (level 3), EN 50081-1, EN 50082-1
Safety standards	EN 61 010-1, IEC 61010-1, VDE 0411
Connector	Screw-type, detachable
Housing Dimensions Material	1/8 DIN, 48 x 96 x 124 mm ABS, self-extinguishing: UL 94 V-0
Degree of protection	IP 65 (standard)
Weight	Approx 520 g (signal output and packing included)
Approvals	UL, CSA, CE

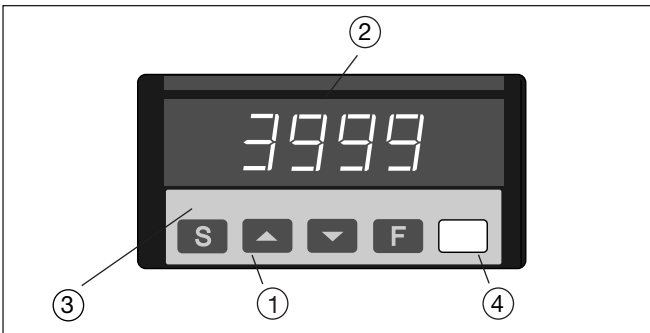
Dimensions



Terminal Board



Front Panel Description



1. Key-pad

Set-up and programming procedures are easily controlled by the 4 pushbuttons.

“S”

- Selection key to select programming function (instrument configuration) or measurement and alarm detection.

” ▲ ” and ” ▼ ”

- Up and down keys for increasing or decreasing programming values.
- Selecting programming functions and instrument configuration together with the ”S” key.

“F”

- Special function key for interaction between the two set-points and for alarm latch reset.

2. Display

3 3/4-digit (maximum read-out 3999).

Alphanumeric indication by means of 7-segment display for:

- Displaying of the measured value, over-range and programming indications.
- Indication of programming parameters.

3. LED

- ”1” and ”2” LED indicators for alarm conditions

4. Engineering unit

Screen for interchangeable unit label. The symbols in the shaded areas are those available on the set of engineering unit labels supplied with the MDI (engineering unit label to be inserted by customer).

	W = 08	MΩ = 16	% = 24	mm HG = 32	cm = 40
mV = 01	kW = 09	Hz = 17	mbar = 25	l/min = 33	m = 41
V = 02	MW = 10	kHz = 18	bar = 26	l/h = 34	kg = 42
kV = 03	var = 11	RPM = 19	psi = 27	kg/min = 35	ppm = 43
μA = 04	kvar = 12	m/s = 20	ata = 28	ton/h = 36	kA = 44
mA = 05	Mvar = 13	m/min = 21	ate = 29	m ³ /min = 37	cos φ = 45
A = 06	Ω = 14	°C = 22	kg/cm ² = 30	m ³ /h = 38	m ² = 46
mW = 07	kΩ = 15	°F = 23	mm H ₂ O = 31	mm = 39	μs = 47