

Panel Meters and Controllers

Controller for Pulse Signals

Type MDI 40 TF



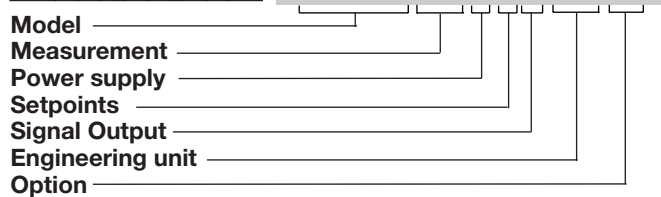
- 4-dgt multi-range μ P-based controller
- 2 independent measuring channels
- For rate, speed, frequency and period measurements
- Ranges from 0.001Hz to 50kHz/20 μ s to 1000s
- Programmable time base from 0.1 to 999.9s
- Programmable pre-scaler from 9999 x 10⁻⁹ to 9999 x 10⁹
- Special calculation functions
- NPN, PNP, NAMUR, TTL, Pick-up, free of voltage contacts and AC signal inputs
- 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

4-dgt multi-range μ P-based controller for rate, speed, frequency and period measurements. Scaling and setpoints are fully programmable by user-friendly key-pad. The MDI

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

Ordering Key **MDI40TF1D2A XXIX**



Type Selection

Measurements	Power supply	Signal output	Options
TF1: 0.001 Hz to 500 Hz 0.1 Hz to 50 kHz for DC signals: PNP, NPN NAMUR, TTL, free of voltage contacts, voltages up to 30 VDC TF2: 0.001 Hz to 500 Hz 0.1 Hz to 50 kHz for AC signals: pick-up, voltages up to 500 VAC	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: from 0 to 20 mA /from 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) XT: Tropicalization + IP 65 ¹⁾

¹⁾ On request

Input Specifications

Number of inputs	2 independent measuring channels	Temperature drift	± 100 ppm/ $^{\circ}$ C
Rated input		Time base	Programmable from 0.1 to 999.9 s
Frequency	0.001 Hz to 500 Hz (ON signal min. time duration: 500 μ s) 0.1 Hz to 50 kHz (ON signal min. time duration: 9 μ s)	Response time	Time base + ≤ 200 ms
Period	20 μ s to 10 s (ON signal min. time duration: 9 μ s) 2 ms to 1000 s (ON signal min. time duration: 500 μ s)	Display	7-segment LED, h: 14.2 mm
Accuracy (@ 18 to 23$^{\circ}$C)		Max. and min. indication	
Frequency measurement	$\pm 0.001\%$ rdg ± 3 dgt	DC	Max. 9999 min. -1999
		AC	Max. 9999 min. 0
		Type of input	
		NPN (DC)	Signal level: ON < 2 VDC, OFF open collector (current leakage ≤ 1 mA)
		PNP (DC)	Signal level: ON > 10 VDC, OFF open collector (current leakage ≤ 1 mA)



Input Specifications (cont.)

NAMUR (DC)	Signal level: ON \leq 1 mADC, OFF \geq 2.2 mADC	Activation time	Programmable from 20 ms to 255 ms
TTL (DC)	Signal level: ON $>$ 4 VDC, OFF \leq 2 VDC	Key-pad	4 keys: “S” for menu selection; “UP” and “DOWN” for value programming/function selection; “F” for special functions.
Free of voltage Contact (DC)	Input load: ON $<$ 1 k Ω , OFF $>$ 20 k Ω		
Pick-up (AC)	Signal level: ON $>$ 2 VAC, OFF $<$ 1 VAC		
Voltage (AC)	Up to 100 VAC, signal level: ON $>$ 2 VAC, OFF $<$ 1 VAC Up to 500 VAC, signal level: ON $>$ 9 VAC, OFF $<$ 6 VAC		
Auxiliary commands	Available on the back screw terminal One input selectable as: display HOLD command or key-pad disabling		

Output Specifications

Alarms			
Number of setpoints	2 independent (standard)	Accuracy	to 20 mA/ from 0 to 10 V \pm 0.3% f.s.
Alarm types	Over-range, up alarm, down alarm, down alarm with disabling at power-on, up alarm with latch, down alarm with latch	Response time (@ 25°C)	\leq 500 ms
Setpoint adjustment	0 to 100% of the displayed range	Temperature drift	\pm 200 ppm/°C
Limits of setpoint adjustment	Programmable minimum and maximum values	Load: 20 mA output 10 V output	\leq 500 Ω \geq 10 k Ω
Hysteresis	0 to 100% of the displayed range	Insulation	By means of optocouplers, see the relevant table
On-time delay	0 to 255 s	Serial output	
Off-time delay	0 to 255 s	Type	RS 485
Relay status	Normally energized/de-energized	Connections	Unidirectional (std), bidirectional (on request) 2 or 4 wires, max. distance 1200 m, termination and/or line biasing directly on the instrument
Output type		Addresses/protocol	255, selectable by key-pad/ MODBUS, JBUS
Contact	2 x SPST	Data (unidirectional)	
Rating	5 A, 250 VAC/VDC, 40 W / 1200 VA, 130.000 cycles	Dynamic (reading only)	Measurement, data hold of minimum value, data hold of maximum value, alarm status
Min. response time	\leq 400 ms, filter excluded, set-point on-time delay: “0”	Static (reading only)	All programming data
Insulation	See the relevant table	Data (bidirectional, on request)	
Excitation output		Dynamic (reading only)	Measurement, data hold of minimum value, data hold of maximum value, alarm status
Voltage	15 VDC non-stabilized/40 mA max. (60 mA @ 12 VDC)	Static (reading/writing)	All programming data, min./max. data hold reset, reset of alarm set-points with latch
Insulation	100 V _{ms} output to measuring input 4000 V _{ms} output to AC supply input 500 V _{ms} output to DC supply input	Data format	1-start bit, 8-data bit, no parity, 1 stop bit
Analogue output		Baud-rate	1200, 2400, 4800 and 9600 bauds selectable
Range	0 to 20 mADC, 0 to 10 VDC	Insulation	By means of optocouplers, see the relevant table
Scaling factor	Programmable within the whole range of the signal output; it allows the management of all values from 0		

Software Functions

Scaling parameters Pulses per revolution Prescaler	Programmable and independent per channel from 1 to 9999 Programmable and independent per channel from 9999×10^{-9} to 9999×10^9	1st 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 setpoints
		2nd level	
		3rd level	
Management of the input signals	Channel A: $F_a \cdot P_{S1}$ Pu1 Channel B: $F_b \cdot P_{S2}$ Pu2 Where: F_a and F_b are the frequency signals Pu1 and Pu2 are the pulses per revolution PS1 and PS2 are the prescalers	Range selection	0.001 to 500Hz 0.1Hz to 50kHz
		Operating mode Single channel Dual channel	Display parameters Operating mode Decimal point position Displayed scale
Peak and valley values	Automatic storage (RAM only) of the min. and max. value measured from the last reset	Diagnostics Over range Under range	The display flashes when the limits of the displayed range are exceeded, the data are updated up to the maximum read-out EEE (AC) - EE (DC)
Password	Numeric code of max. 3 digits; 3 protection levels of the programming data	Filter Filter operating range Filtering coefficient	From 0 to 9999 From 1 to 255

Supply Specifications

AC supply	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) See the relevant table
Insulation	See the relevant table
DC supply	9 to 32 VDC, galvanic insulation, max. inrush current: $\leq 1.2 \text{ A}/200 \text{ ms}$ (on request) 40 to 150 VDC, galvanic insulation, max. inrush current: $\leq 0.8 \text{ A}/200 \text{ ms}$ (on request) see the relevant table
Insulation	see the relevant table
Power consumption	5 VA (basic instrument), 8 VA max. with signal output

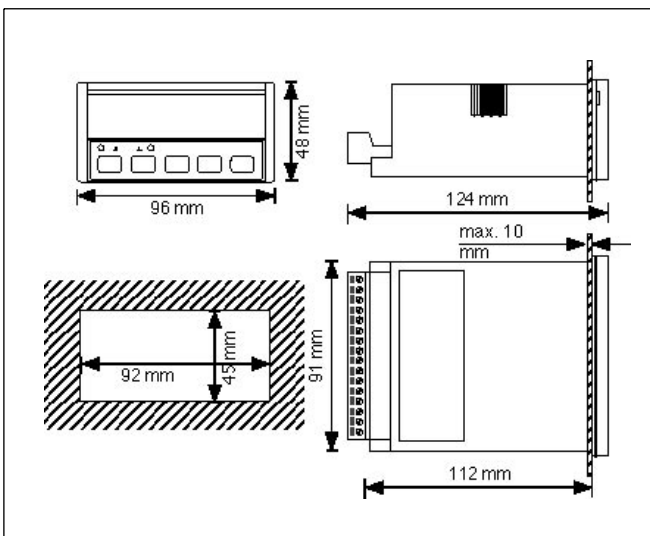
General Specifications

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_{rms} to ground, cat. III
Dielectric strength	4000 V_{rms} for 1 minute
EMC	IEC 801-2, IEC 801-3, IEC 801-4 (level 3), EN 50 081-1, EN 50 082-1
Safety standards	EN 61010-1, IEC 1010-1, 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)
CE-marking	Yes

Insulation Table

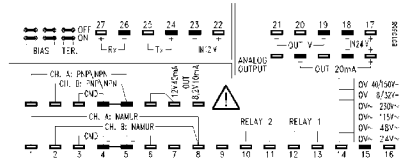
	AC Supply	Meas. Input	RL1 output	RL2 output	Anal. output	DC Supply	RS-485
AC Supply	---	4KV	4KV	4KV	4KV	---	4kV
Input	4KV	---	2KV	2KV	500V	2kV	500V
RL1 output	4KV	2KV	---	2KV	2KV	2kV	2kV
RL2 output	4KV	2KV	2KV	---	2KV	2kV	2kV
Analogue output	4KV	500V	2KV	2KV	---	2kV	500V
DC Supply	---	2kV	2kV	2kV	2kV	---	2kV
RS-485	4kV	500V	2kV	2kV	500V	2kV	---

Dimensions

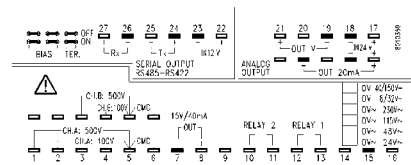


Terminal Board

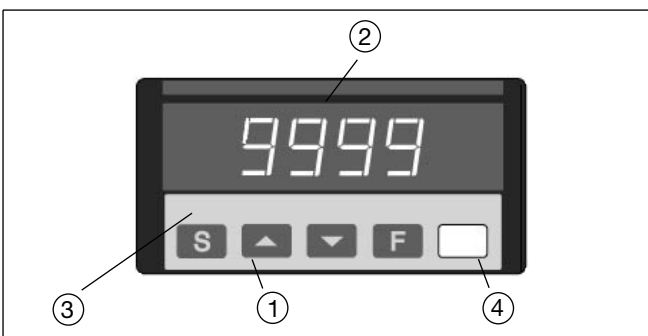
(TF1) NPN/PNP/NAMUR (DC type) input connections



(TF2) PICK-UP (AC type) input connections



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 to exit from the programming procedure and for alarm latch reset (those selected with latch function)

2. Display

4-digit (maximum read-out 9999).

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 available on the set of engineering unit labels supplied with the MDI (engineering unit label to be inserted by customer).

RPS	RPM	RPH	MPH	ms	sec
min	h	Hz	kHz	%	rad
mm/s	cm/s	m/s	mm/min	cm/min	m/min
cm ³	m ³	km/h	m/h	cm/h	mm/h
mm ³	kg/m ³	g/cm ³	l/s	l/min	l/h
m ³ /s	m ³ /min	m ³ /h	t/h	kg	% speed