Model 40 Series
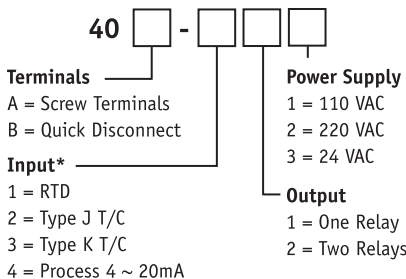
ON-OFF single output digital thermoregulator Installation and Operation Manual

Revision 0 03-01-03

0   MODEL IDENTIFICATION

40 ☐ - ☐ ☐ ☐

Terminals
A = Screw Terminals
B = Quick Disconnect

Input*
1 = RTD
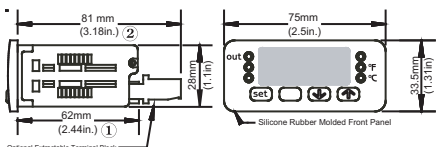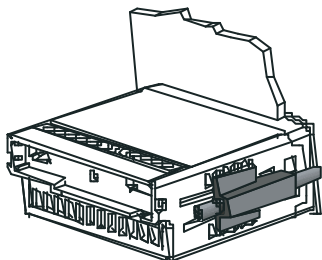2 = Type J T/C
3 = Type K T/C
4 = Process 4 ~ 20mA

*Ranges
Pt 100 DIN RTD, 2 or 3 wire, -50 to 600 ˚C (-58 to 999 ˚F)
Type J thermocouple, 0 to 700 ˚C (32 to 999 ˚F)
Type K thermocouple, 0 to 999 ˚C (32 to 999 ˚F)
Process, 4 ~ 20 mADC, scalable from -99 to +999

Power Supply
1 = 110 VAC
2 = 220 VAC
3 = 24 VAC

Output
1 = One Relay
2 = Two Relays

1   PREPARATIONS

1.1   How to install the instrument

Panel mounting, panel cut out 71 x 29 mm (2.79 x 1.14 in), with the supplied screw brackets.

81 mm (3.18in.) ②
62mm (2.44in.) ①
28mm (1.1in)
Optional Extractable Terminal Block

75mm (2.5in.)
out
set
˚C ˚F
33.5mm (1.31in)
Silicone Rubber Molded Front Panel

① maximum depth with screw terminal blocks.
② maximum depth with extractable terminal blocks.

2   OPERATION

2.1   Preliminary information

During the normal operation the instrument displays the room temperature.

2.2   To silence the buzzer

If you have to silence the buzzer:
• press ⬇

3   WORKING SETPOINT

3.1   To set the working setpoint

If you have to modify the working setpoint value:
• press [set]
• press ⬆ or ⬇ within 2 seconds 00:02 (3) (4)
• press [set]

(3)   You can set the working setpoint between the temperature limits you have set with the parameters rA1 and rA2

(4)   If the parameter rAS is set to 0, you can not modify the working setpoint.

4   CONFIGURATION PARAMETERS

4.1   To set the configuration parameters

There are two levels of configuration parameters.

To gain access to the first level:
• press ⬆ and ⬇ for 4 seconds 00:04
        The instrument will display PA

To select a parameter:
• press ⬆ or ⬇

To modify the value of the parameter:
• press [set]
• press ⬆ or ⬇ within 2 seconds 00:02
• press [set]

To gain access the second level:
• Gain access the first level
• press ⬆ or ⬇ to select PA
• press [set]
• press ⬆ or ⬇ within 2 seconds 00:02
        Enter the value -19
• press [set]
• press ⬆ and ⬇ for 4 seconds 00:04
        The instrument will display rO

To exit the configuration selections:
• press ⬆ and ⬇ for 4 seconds 00:04
        or perform further operations for 60 sec.

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5   SIGNALS

5.1   Signals - LED Indicators

LED	MEANING
out	Load LED
	if it is lighted, the load will be ON
	if it flashes, a load delay will be running (see parameters *CA0*, *CA1*, *CA2* and *CA4*)
°F	Fahrenheit degree LED
	if lighted, the unit of temperature measure is in Fahrenheit
°C	Celsius degree LED
	if lighted, the unit of temperature measure is in Celsius

INDICAT.	MEANING
- - -	you can not modify the working setpoint (see parameter *rAS*)

6   ALARMS

6.1   Alarms

CODE	CAUSES	REMEDIES	EFFECTS
E2 corrupted memory data	configuration data in instrument memory is corrupted	switch off power to the instrument: if alarm persists, return for service.	• you can not gain access to the setting procedures • the load will be forced OFF
E0 room probe alarm	• incorrect sensor • sensor reading is high • the connection between instrument and probe is wrong • ambient temperature is outside the specified limits	• see parameter *r0* • test probe the probe • test probe connection • test temperature close to the probe. it must be between the range limits	the load will be forced to the status you have set with the parameter *CA3*
E0C cold jct./ third wire alarm	• if the instrument has been preset for thermocouple input, the cold junction compensation circuit may be damaged. • if the instrument has been preset for RTD input, the third wire of the RTD may be open.	• switch off the power supply for the instrument: if alarm persists, return instrument for repair. • test connection between the instrument & probe.	the load is forced to the status set with the parameter *CA3*
AL1 first temperature alarm	room temperature is outside limit set with the parameter *AA1*	test temperature near probe (see parameters *AA0*, *AA1*, and *AA4*)	no effects
AL2 second temperature alarm	room temperature is outside limit set with the parameter *Ab1*	test temperature near probe (see parameters *Ab0*, *Ab1*, and *Ab4*)	no effects

The instrument shows the indications above alternating with room temperature, except error codes *E2*, *E0*, and *E0C*, which flash and are accompanied by intermittent beep from the buzzer.

7   SPECIFICATIONS

7.1 Technical Data

Box: self-extinguishing grey.

Size: 75 x 33.5 x 81 mm (2.95 x 1.31 x 3.18 in) the model with extractable terminal blocks, 75 x 33.5 x 62 mm (2.95 x 1.31 x 2.44 in) the model with screw terminal blocks.

Installation: panel mounting, panel cut out 71 x 29 mm (2.79 x 1.14 in), with screw brackets.

Frontal Panel protection: IP 65.

Connections: extractable terminal blocks with 5 mm (0.19 in) pitch for cables up to 2.5 mm² (0.38 sq in.) for power supply, input and output; or screw terminal blocks with 5 mm (0.19 in.) pitch for cables up to 2.5 mm² (0.38 sq in.), power supply, input and output.

Ambient temperature: 0 to 55 C (32 to 131°F), 0 to 90% Relative Humidity, non-condensing).

Power supply: 230 Vac, 50/60 Hz, 1.5 VA or 115 Vac, 50/60 Hz, 1.5 VA.

Alarm buzzer: included.

Sensor input: 1 sensor, depending on the model, for PTC or NTC, "J" , "K" or "S" thermocouples, 2 or 3 wire Pt 100 RTD, 0-20 or 4-20 mA current transducers.

Note: At terminal 9, 12 V is available for customer supplied transducer.

Working range: -50 to 150°C (-58 to 302°F) for PTC probe, -40 to 110°C (-40 to 230°F) for NTC probe, 0 to 700°C (32 to 999°F) for "J" thermocouple, 0 to 999°C (32 to 999°F) for "K" thermocouple, 0 to 999°C (32 to 999°F) for "S" thermocouple, -50 to 600°C (-58 to 999°F) for 2 or 3 wires Pt 100 probe.

Setpoint range: from -99 to 999°C (-99 to 999°F).

Resolution: 1°F with unit of measure in Fahrenheit, 0.1°C (except the instruments preset for working with "J" , "K" or "S" thermocouples) or 1°C with unit of measure in Celsius.

Display: one red LED 3-digit display 13.2 mm (0.51 in) high, output status indicator, temperature unit of measure indicators.

Outputs: one 10 A @ 250 Vac SPDT relay (change-over contact).

8 WORKING SETPOINT AND CONFIGURATION PARAMETERS

8.1 Working setpoint

LABEL	MIN.	MAX.	U.M.	DEF.	WORKING SETPOINT
rА1	rА1	rА2	°C/°F [5]	0.0	working setpoint

8.2 First level parameters

LABEL	MIN.	MAX.	U.M.	DEF.	PASSWORD
PА	-90	100	–	0	password

LABEL	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
r1	-25	25.0	°C/°F [5]	0.0	room probe calibration

LABEL	MIN.	MAX.	U.M.	DEF.	REGULATOR
rА0	-99	99.9	°C/°F [5]	-0.2	hysteresis (differential, it is relative to the working setpoint); look at rA4 as well [6]

8.3 Second level parameters

LABEL	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
r0	01	31	–	[7]	kind of probe (01 = PTC, 03 = NTC, 10 = "J" Tc, 11 = "K" Tc, 12 = "S" Tc, 20 = 3 wires Pt 100, 21 = 2 wires Pt 100, 30 = 4-20 mA, 31 = 0-20 mA)
r1	-25	25.0	°C/°F [5]	0.0	room probe calibration
r2	0	6	–	3	probe reading speed (0 = fast, ... , 6 = slow)
r5	0	1	–	1	temperature resolution (0 = 1 degree, 1 = 0.1 degrees) [8] [9]
r6	-99	999	points	-20	minimum value of the range of the transducer [10]
r7	-99	999	points	80	maximum value of the range of the transducer [10]
r8	0	1	–	1	temperature unit of measure (0 = Fahrenheit degree, 1 = Celsius degree) [11]

LABEL	MIN.	MAX.	U.M.	DEF.	REGULATOR
rА0	-99	99.9	°C/°F [5]	-0.2	hysteresis (differential, it is relative to the working setpoint); see also rА4 . [6]
rА1	-99	rА2	°C/°F [5]	[7]	minimum value you can assign to the working setpoint
rА2	rА1	999	°C/°F [5]	[7]	maximum value you can assign to the working setpoint
rА3	0	1	–	1	cooling or heating action (0 = cooling action)
rА4	0	1	–	0	kind of hysteresis (0 = asymmetrical, 1 = symmetrical)
rА5	0	1	–	0	working setpoint modification lock-out (1 = YES)

LABEL	MIN.	MAX.	U.M.	DEF.	LOAD PROTECTION
СА0	0	999	s	0	minimum delay between you turn the instrument ON and the first load activation
СА1	0	999	s	0	minimum delay between two load activation in succession
СА2	0	999	s	0	minimum delay between the load gets OFF and the following activation
СА3	0	1	–	0	load status during the room probe alarm (0 = it will be forced OFF, 1 = it will be forced ON)
СА4	0	1	–	0	fixed delay since the load gets ON and OFF (1 = YES, for 3 s)

| LABEL	MIN.	MAX.	U.M.	DEF.	FIRST ALARM
$AA0$	0.1	999	°C/°F [5]	0.1	hysteresis (differential, it is relative to $AA1$, it is important if $AA4 \neq 1$)
$AA1$	-99	999	°C/°F [5]	0.0	first temperature alarm threshold (it is important if $AA4 \neq 1$); see also $AA4$.
$AA3$	0	999	seconds	0	first temperature alarm exclusion time since you turn the instrument ON (it is important if $AA4 \neq 1$)
$AA4$	1	7	—	1	kind of temperature alarm (1 = it will never be activated, 2 = absolute lower temperature alarm, 3 = absolute upper temperature alarm, 4 = lower temperature alarm relative to the working setpoint, 5 = upper temperature alarm relative to the working setpoint, 6 = lower temperature alarm relative to the working setpoint with automatic calculation and enabling, 7 = upper temperature alarm relative to the working setpoint with automatic calculation and enabling)

LABEL	MIN.	MAX.	U.M.	DEF.	SECOND ALARM
$Ab0$	0.1	999	°C/°F [5]	0.1	hysteresis (differential, it is relative to $Ab1$, it is important if $Ab4 \neq 1$)
$Ab1$	-99	999	°C/°F [5]	0.0	second temperature alarm threshold (it is important if $Ab4 \neq 1$); see also $Ab4$.
$Ab3$	0	999	seconds	0	second temperature alarm exclusion time since you turn the instrument ON (it is important if $Ab4 \neq 1$)
$Ab4$	1	7	—	1	kind of temperature alarm (1 = it will never be activated, 2 = absolute lower temperature alarm, 3 = absolute upper temperature alarm, 4 = lower temperature alarm relative to the working setpoint, 5 = upper temperature alarm relative to the working setpoint, 6 = lower temperature alarm relative to the working setpoint with automatic calculation and enabling, 7 = upper temperature alarm relative to the working setpoint with automatic calculation and enabling)

LABEL	MIN.	MAX.	U.M.	DEF.	SERIAL NETWORK (EVCOBUS)
$L1$	1	15	—	1	instrument address
$L2$	0	7	—	0	instrument group
$L4$	0	3	—	1	baud rate (0 = 1,200 baud, 1 = 2,400 baud, 2 = 4,800 baud, 3 = 9,600 baud)

(5) the unit of measure depends on the parameter /8

(6) if the parameter $rA3$ has value 0, you have to set the parameter $rA0$ with positive sign; if the parameter $rA3$ has value 1, you have to set the parameter $rA0$ with negative sign

(7) the value depends on the kind of measure input the instrument has been preset

(8) if the instrument has been preset for working with "J" , "K" or "S" thermocouples, the parameter will not be shown

(9) unless the parameter $r8$ has value 1, the parameter will not be shown

(10) unless the instrument has been preset for working with 0-20 or 4-20 mA current transducers, the parameter will not be shown

(11) if the instrument has been preset for working with 0-20 or 4-20 mA current transducers, the parameter will not be important.
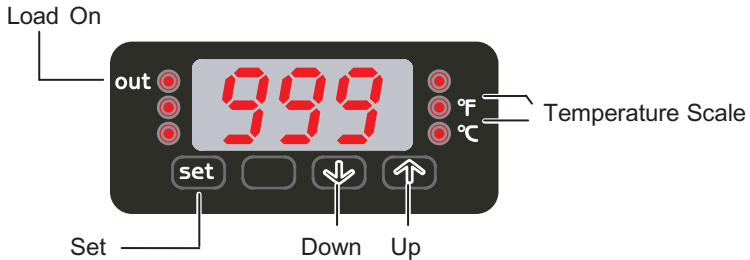
9.1 Electrical connection

| 2 and 3 wire | J, K, and S | for 0-20 or 4-20 mA |
| PT100 probes | thermocouples | current transducers |
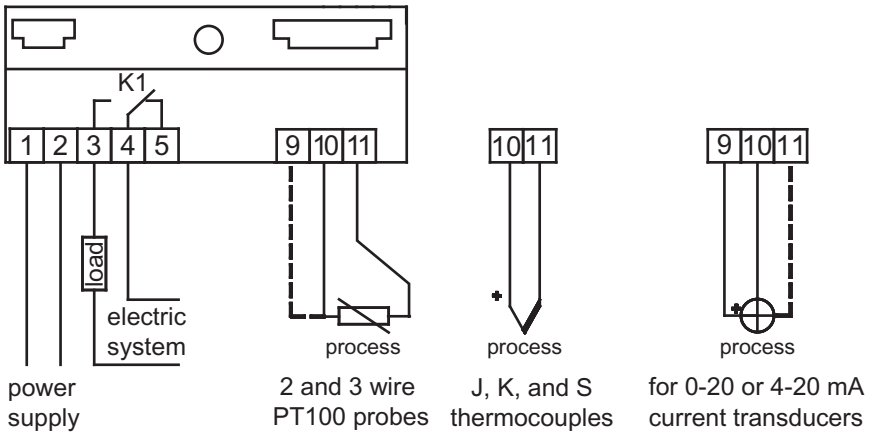
(12) provide the probe with a protection able to protect it against contacts with metal parts or use insulated probes.

10   MECHANICAL

10.1 Front Panel Features

10.2 Panel Cutout

71 x 29 mm
(2.79 x 1.14 in)

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