EV3402 PTC/NTC — Universal controllers with two regulation outputs for industrial applications

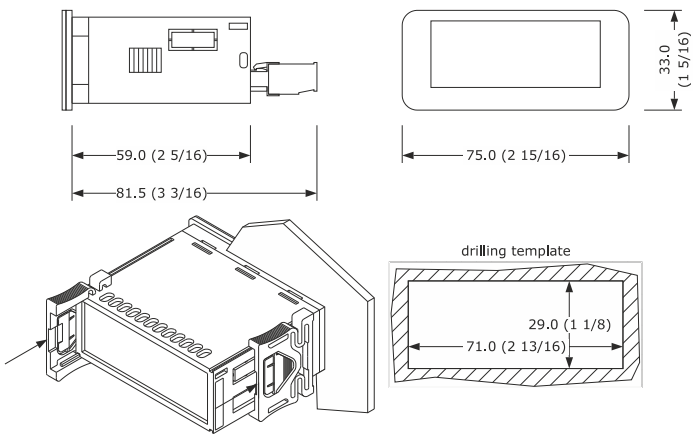
PLEASE READ CAREFULLY and save this document
CONSIDER THE ENVIRONMENT

EN ENGLISH

- 230 VAC, 115 VAC or 12-24 VAC/DC power supply (according to the model)
- analogue input (PTC/NTC/Pt 1000)
- multi-purpose input
- K1 relay, 16 A res. @ 250 VAC, K2 relay, 8 A res. @ 250 VAC
- alarm buzzer
- TTL MODBUS slave port for TTL/RS-485 serial interface
- hot or cold mode regulation
- neutral zone regulation.

1 MEASUREMENTS AND INSTALLATION

Measurements in mm (inches). To be fitted to a panel, snap-in brackets provided.

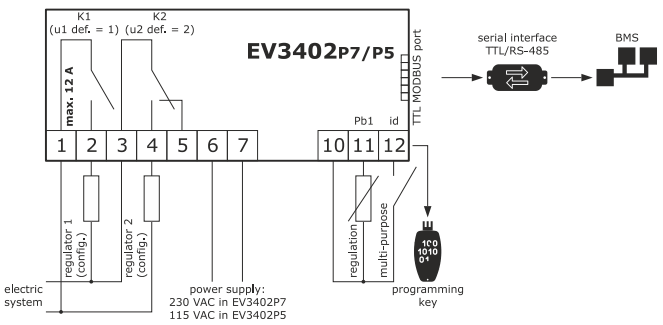


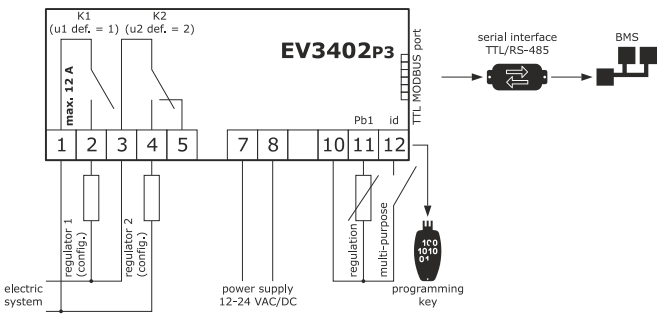
INSTALLATION PRECAUTIONS

- the thickness of the panel must be between 0.8 and 2.0 mm (1/32 and 1/16 in);
- ensure that the working conditions are within the limits stated in the *TECHNICAL SPECIFICATIONS* section;
- do not install the device close to heat sources, equipment with a strong magnetic field, in places subject to direct sunlight, rain, damp, excessive dust, mechanical vibrations or shocks;
- in compliance with safety regulations, the device must be installed properly to ensure adequate protection from contact with electrical parts. All protective parts must be fixed in such a way as to need the aid of a tool to remove them.

2 ELECTRICAL CONNECTION

N.B.
- Use cables of an adequate section for the current running through them.
- To reduce any electromagnetic interference connect the power cables as far away as possible from the signal cables.





PRECAUTIONS FOR ELECTRICAL CONNECTION

- if using an electrical or pneumatic screwdriver, adjust the tightening torque;
- if the device has been moved from a cold to a warm place, humidity may have caused condensation to form inside. Wait about an hour before switching on the power;
- make sure that the supply voltage, electrical frequency and power are within the set limits. See the section *TECHNICAL SPECIFICATIONS*;
- disconnect the power supply before carrying out any type of maintenance;
- do not use the device as safety device;
- for repairs and for further information, contact the EVCO sales network.

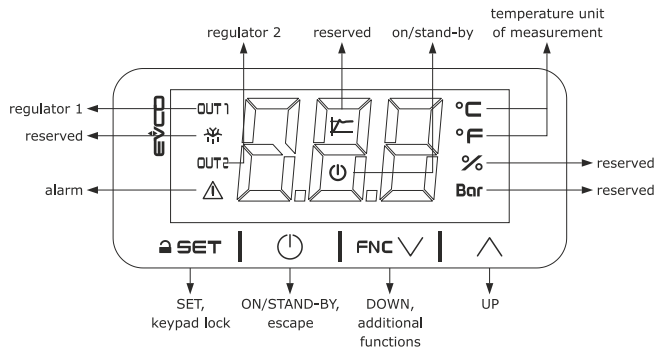
3 FIRST-TIME USE

1. Install following the instructions given in the section *MEASUREMENTS AND INSTALLATION*.
2. Power up the device as set out in the section *ELECTRICAL CONNECTION*: an internal test will start up.
   The test normally takes a few seconds; when it is finished the display will switch off.
3. Configure the device as shown in the section *Setting configuration parameters*.
   Recommended configuration parameters for first-time use.

PAR.	DEF.	PARAMETER	MIN... MAX.
SP	**0.0**	setpoint 1	r1... r2
SP2	**0.0**	setpoint 2	r7... r8
P0	**0**	type of probe	0 = PTC 1 = NTC 2 = Pt 1000 2-wire
P2	**0**	temperature measurement unit	0 = °C 1 = °F
u0	**0**	operating logic	0 = 1 setpoint (SP) 1 = 1 absolute setpoint and 1 relative setpoint (SP2 relative to SP) 2 = 2 absolute setpoints (SP and SP2) 3 = neutral zone (SP) 4 = 2 steps (SP)
r5	**0**	hot or cold mode regulation setpoint 1	0 = cold mode 1 = hot mode
r10	**0**	hot or cold mode regulation setpoint 2	0 = cold mode 1 = hot mode

   Then check that the remaining settings are appropriate; see the section *CONFIGURATION PARAMETERS*.
4. Disconnect the device from the mains.
5. Make the electrical connection as shown in the section *ELECTRICAL CONNECTION* without powering up the device.
6. When connecting to an RS-485 network, connect the EVIF22TSX interface; see the relevant instruction sheet.
7. Power up the device.

4 USER INTERFACE AND MAIN FUNCTIONS



4.1 Switching the device on/off

1. SET | ⏻ | FNC | — If POF = 1 (default), touch the ON/STAND-BY key for 2 s.

If the device is switched on, the display will show the P5 value ("regulation temperature" default); if the display shows an alarm code, see the section ALARMS.

LED	ON	OFF	FLASHING
OUT1	regulator 1 active	-	- regulator 1 protection active - setpoint 1 being set
❄	unused	-	-
OUT2	regulator 2 active	-	- regulator 2 protection active - setpoint 2 being set
⚠	alarm active	-	-
⚿	unused	-	-
⏻	device switched off	device switched on	device being switched on/off
°C/°F	temperature display	-	-
%	unused	-	-
Bar	unused	-	-

When 30 s have elapsed without the keys being pressed, the display will show the "**Loc**" label and the keypad will lock automatically.

4.2 Unlocking the keypad

Touch a key for 1 s: the display will show the label "**UnL**".

4.3.1 Setting the setpoint

Check that the keypad is not locked.

1. SET — Touch the SET key: the display will show the label "**SP**".
2. FNC — Touch the UP or DOWN key within 15 s to set the value within the limits r1 and r2 (default "0... 35").
3. SET — Touch the SET key (or take no action for 15 s).

4.3.2 Setting setpoint 1 and setpoint 2 (if u0 = 1 or 2)

Check that the keypad is not locked.

1. SET — Touch the SET key: the display will show the label "**SP**".
2. FNC — Touch the UP or DOWN key within 15 s to set the setpoint 1 value within the limits r1 and r2 (default "0... 35").
3. SET — Touch the SET key: the display will show the label "**SP2**".
4. FNC — Touch the UP or DOWN key within 15 s to set the setpoint 2 value within the limits r7 and r8 (default "0... 35").
5. SET — Touch the SET key (or take no action for 15 s).

4.4 Silencing the buzzer

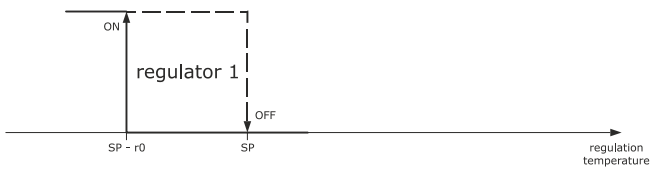
Touch a key.
If u1 or u2 = 3, the alarm output is deactivated.

5 OPERATING LOGIC

5.1 1 regulator (u0 = 0, default)

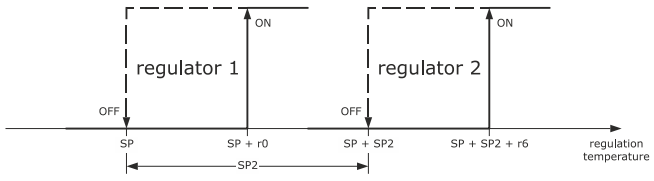
Cold mode regulation (r5 = 0).

Hot mode regulation (r5 = 1).

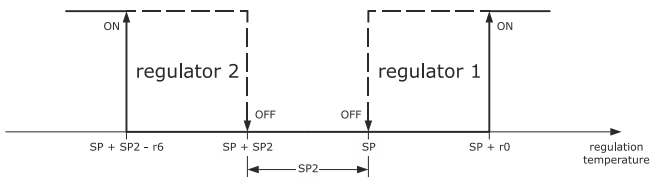


5.2 2 regulators with second setpoint relative to the first (u0 = 1)

Cold mode regulation setpoint 1 (r5 = 0) and cold mode regulation setpoint 2 (r10 = 0).

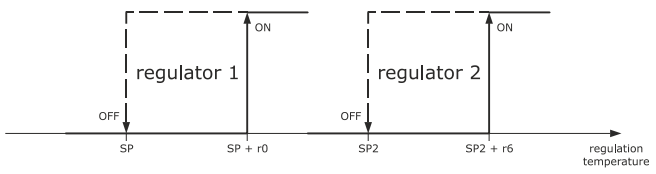


Cold mode regulation setpoint 1 (r5 = 0) and hot mode regulation setpoint 2 (r10 = 1).

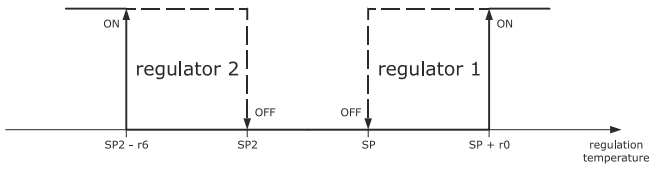


5.3 2 regulators with 2 independent setpoints (u0 = 2)

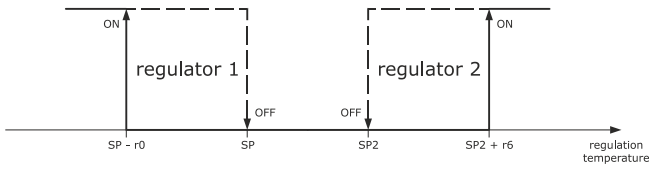
Cold mode regulation setpoint 1 (r5 = 0) and cold mode regulation setpoint 2 (r10 = 0).



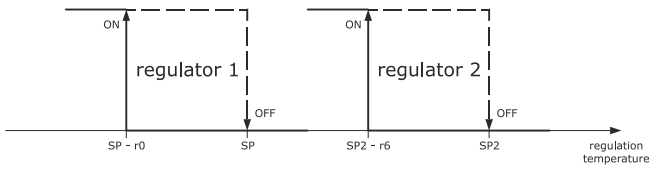
Cold mode regulation setpoint 1 (r5 = 0) and hot mode regulation setpoint 2 (r10 = 1).



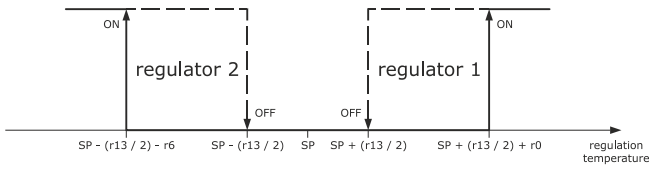
Hot mode regulation setpoint 1 (r5 = 1) and cold mode regulation setpoint 2 (r10 = 0).



Hot mode regulation setpoint 1 (r5 = 1) and hot mode regulation setpoint 2 (r10 = 1).

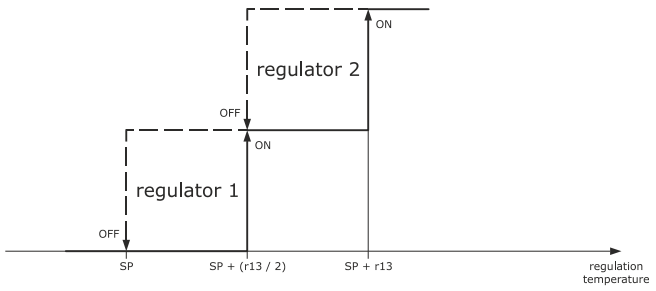


5.4 Neutral zone regulation (u0 = 3)



5.5 2 step regulation (u0 = 4)

Cold mode regulation (r5 = 0).



Hot mode regulation (r5 = 1).

6 ADDITIONAL FUNCTIONS

6.1 Displaying the number of start ups of the relays

Check that the keypad is not locked.

1. FNC — Touch the DOWN key for 4 s.
2. FNC — Touch the UP or DOWN key within 15 s to select a label.

LAB.	DESCRIPTION
nS1	display of the number of start ups of the K1 relay in thousands
nS2	display of the number of start ups of the K2 relay in thousands

3. SET — Touch the SET key.
4. ⏻ — Touch the ON/STAND-BY key (or take no action for 60s) to exit the procedure.

6.2 Displaying the temperature detected by the regulation probe

Check that the keypad is not locked.

1. FNC — Touch the DOWN key for 4 s.
2. FNC — Touch the UP or DOWN key within 15 s to select a label.

LAB.	DESCRIPTION
Pb1	regulation temperature

3. SET — Touch the SET key.

4.	⏻	Touch the ON/STAND-BY key (or take no action for 60s) to exit the procedure.

7 SETTINGS

7.1 Setting configuration parameters

1.	SET	Touch the SET key for 4: the display will show the label "**PA**".
2.	SET	Touch the SET key.
3.	FNC ∧ ∨	Touch the UP or DOWN key within 15 s to set the PAS value (default "**-19**").
4.	SET	Touch the SET key (or take no action for 15 s): the display will show the label "**SP**".
5.	FNC ∧ ∨	Touch the UP or DOWN key to select a parameter.
6.	SET	Touch the SET key.
7.	FNC ∧ ∨	Touch the UP or DOWN key within 15 s to set the value.
8.	SET	Touch the SET key (or take no action for 15 s).
9.	SET	Touch the SET key for 4 s (or take no action for 60s) to exit the procedure.

7.2 Restoring factory settings (default) and saving customised settings

N.B.
- Check that the factory settings are appropriate; see the section *CONFIGURATION PARAMETERS*.
- saving customised settings overwrites the factory settings.

1.	SET	Touch the SET key for 4 s: the display will show the label "**PA**".
2.	SET	Touch the SET key.
3.	FNC ∧ ∨	Touch the UP or DOWN key within 15 s to set the value.

VAL.	DESCRIPTION
149	value for restoring factory information (default)
161	value for saving customised settings

4.	SET	Touch the SET key (or take no action for 15 s): the display will show the label "**dEF**" (for setting the "**149**" value) or the label "**MAP**" (for setting the "**161**" value)
5.	SET	Touch the SET key.
6.	FNC ∧ ∨	Touch the UP or DOWN key within 15 s to set "**4**".
7.	SET	Touch the SET key (or take no action for 15 s): the display will show "- - -" flashing for 4 s, after which the device will exit the procedure.
8.	Disconnect the device from the power supply.	
9.	SET	Touch the SET key for 2s before action 6 to exit the procedure beforehand.

8 CONFIGURATION PARAMETERS

No.	PAR.	DEF.	SETPOINT	MIN... MAX.
2	SP	**0.0**	setpoint 1	r1... r2
3	SP2	**0.0**	setpoint 2	r7... r8 not available if u0 = 0, 3 or 4
No.	PAR.	DEF.	ANALOGUE INPUTS	MIN... MAX.
4	CA1	**0.0**	regulation probe offset	-25... 25 °C/°F
5	P0	**0**	type of probe	0 = PTC 1 = NTC 2 = Pt 1000 2-wire
6	P1	**0**	enable decimal point °C	0 = no 1 = yes
7	P2	**0**	temperature measurement unit	0 = °C 1 =°F
8	P5	**0**	value displayed	0 = regulation temperature 1 = setpoint 1
9	P8	**5**	display refresh time	0... 250 s : 10
No.	PAR.	DEF.	DIGITAL OUTPUTS	MIN... MAX.
10	u0	**0**	operating logic	0 = 1 regulator 1 = 2 regulators with second setpoint relative to the first 2 = 2 regulators with 2 independent setpoints 3 = neutral zone regulation 4 = 2-step regulation
11	U1	**1**	K1 output configuration type	0 = disabled 1 = regulator 1 2 = regulator 2 3 = alarm
12	U2	**2**	K2 output configuration type	0 = disabled 1 = regulator 1 2 = regulator 2 3 = alarm
No.	PAR.	DEF.	REGULATION	MIN... MAX.
13	r0	**2.0**	setpoint 1 differential	1... 99 °C/°F if u0 = 3, cold mode regulation differential
14	r1	**0.0**	setpoint 1 minimum	-99 °C/°F... r2
15	r2	**35.0**	setpoint 1 maximum	r1... 300 °C/°F
16	r5	**0**	hot or cold mode regulation regulator 1	0 = cold mode 1 = hot mode
17	r6	**2.0**	setpoint 2 differential	1... 99 °C/°F if u0 = 3, hot mode regulation differential
18	r7	**0.0**	setpoint 2 minimum	-99 °C (r8 °F).
19	r8	**35.0**	setpoint 2 maximum	r7... 300 °C/°F
20	r9	**0**	block setpoint 2 adjustment	0 = no 1 = yes
21	r10	**0**	hot or cold mode regulation regulator 2	0 = cold mode 1 = hot mode
22	r11	**0.0**	digital input second setpoint 1	-99... 199 °C/°F setpoint 1 + r11
23	r12	**0.0**	digital input second setpoint 2	-99... 199 °C/°F setpoint 2 + r12
24	r13	**5.0**	neutral zone value	-99... 199 °C/°F if u0 = 4, two steps
No.	PAR.	DEF.	REGULATOR PROTECTION	MIN... MAX.
25	C1	**0**	minimum time between two power-ons of regulator 1	0... 240 min
26	C2	**0**	minimum time off and delay from power-on of regulator 1	0... 240 min
27	C3	**0**	minimum time on regulator 1	0... 240 s
28	C4	**0**	regulator 1 activity during regulation probe alarm	0 = off 1 = on
29	C5	**0**	minimum time between two power-ons of regulator 2	0... 240 min
30	C6	**0**	minimum time off and delay from power-on of regulator 2	0... 240 min
31	C7	**0**	minimum time on regulator 2	0... 240 s
32	C8	**0**	regulator 2 activity during regulation probe alarm	0 = off 1 = on
No.	PAR.	DEF.	ALARMS	MIN... MAX.
33	A1	**0.0**	temperature 1 alarm threshold	-99... 300 °C/°F
34	A2	**0**	temperature 1 alarm type	0 = disabled 1 = absolute minimum 2 = absolute maximum 3 = minimum relative to SP 4 = maximum relative to SP
35	A3	**0**	temperature 1 alarm delay	0... 999 min
36	A4	**0.0**	temperature 2 alarm threshold	-99... 300 °C/°F
37	A5	**0**	temperature 2 alarm type	0 = disabled 1 = absolute minimum 2 = absolute maximum 3 = minimum relative to SP2 4 = maximum relative to SP2
38	A6	**0**	temperature 2 alarm delay	0... 999 min
39	A7	**0**	temperature alarm delay after modifying setpoint and power-on	0... 999 min
40	A8	**0**	additional alarm signal delay after silencing if the condition persists	0... 999 min
41	A9	**0**	alarm relay activation	0 = with alarm active 1 = with alarm not active
42	A11	**2.0**	temperature alarm switch off differential	1... 99 °C/°F
No.	PAR.	DEF.	DIGITAL INPUTS	MIN... MAX.
43	i5	**0**	multi-purpose input function	0 = disabled 1 = alarm iA 2 = alarm iA + regulator 1 off + regulator 2 off 3 = alarm iA1 + regulator 1 off 4 = alarm iA2 + regulator 2 off 5 = switches device on/off 6 = modifies setpoint 1 and setpoint 2
44	i6	**0**	multi-purpose input activation	0 = with contact closed 1 = with contact open
45	i7	**0**	multi-purpose input alarm delay	0... 999 s
No.	PAR.	DEF.	SECURITY	MIN... MAX.
46	POF	**1**	enable ON/STAND-BY key	0 = no 1 = yes
47	PAS	**-19**	password	-99... 999
No.	PAR.	DEF.	MODBUS	MIN... MAX.
48	LA	**247**	MODBUS address	1... 247
49	Lb	**2**	MODBUS baud rate	0 = 2,400 baud 1 = 4,800 baud 2 = 9,600 baud 3 = 19,200 baud even

9 ALARMS

CODE	DESCRIPTION	RESET	TO CORRECT
Pr1	regulation probe alarm	automatic	- check P0 - check probe integrity - check electrical connection
AL1	temperature 1 alarm	automatic	check A1, A2 and A3
AL2	temperature 2 alarm	automatic	check A4, A5 and A6
iA	multi-purpose input alarm	automatic	check i5 and i6
iA1	regulator 1 protection alarm	automatic	check i5 and i6
iA2	regulator 2 protection alarm	automatic	check i5 and i6

10 TECHNICAL SPECIFICATIONS

Purpose of the control device:			operating control.
Construction of the control device:			incorporated control.
Container:			black, self-extinguishing.
Category of heat and fire resistance			D.
Measurements:			
75.0 x 33.0 x 59.0 mm (2 15/16 x 1 5/16 x 2 5/16 in) with fixed screw terminal blocks			75.0 x 33.0 x 81.5 mm (2 15/16 x 1 5/16 x 3 3/16 in) with plug-in screw terminal blocks.
Mounting methods for the control device:			to be fitted to a panel, snap-in brackets provided.
Degree of protection provided by the covering:			IP65 (front).
Connection method:			
fixed screw terminal blocks for wires up to 2.5 mm²	plug-in screw terminal blocks for wires up to 2.5 mm²: on request		Pico-Blade connector.
Maximum permitted length for connection cables:			
power supply: 10 m (32.8 ft)			analogue inputs: 10 m (32.8 ft)
digital inputs: 10 m (32.8 ft)			digital outputs: 10 m (32.8 ft).
Operating temperature:			From -5 to 55 °C (from 23 to 131 °F)
Storage temperature:			From -40 to 70 °C (from -40 to 158 °F)
Operating humidity:			relative humidity without condensate from 10 to 90%.
Pollution status of the control device:			2.
Compliance:			
RoHS 2011/65/EC	WEEE 2012/19/EU		REACH (EU) regulation No 1907/2006
EMC 2014/30/EU			LVD 2014/35/EU.
Power supply:			
230 VAC (+10% -15%), 50/60 Hz (±3 Hz), max. 4 VA insulated in EV3... P7			
115 VAC (+10% -15%), 50/60 Hz (±3 Hz), max. 4 VA insulated in EV3... P5			
12-24 VAC/DC (+10% -15%), 50/60 Hz (±3 Hz), max. 5 VA/3W in EV3... P3.			
Earthing methods for the control device:			none.
Rated impulse-withstand voltage:			2.5 KV.
Over-voltage category:			II.
Software class and structure:			A.
Analogue inputs:			1 for PTC, NTC or Pt 1000 probes (regulation probe).
PTC probes:	Sensor type:		KTY 81-121 (990 Ω @ 25 °C, 77 °F)
	Measurement range:		from -50 to 150 °C (from -58 to 302 °F)
	Resolution:		0.1 °C (1 °F).
NTC probes:	Sensor type:		ß3435 (10 KΩ @ 25 °C, 77 °F)
	Measurement range:		from -40 to 105 °C (from -40 to 121 °F)
	Resolution:		0.1 °C (1 °F).
Pt 1000 probes:	Measurement range:		from -120 to 155 °C (from -184 to 311 °F)
	Resolution:		0.1 °C (1 °F).
Digital inputs:		1 dry contact (multi-purpose).	
Dry contact:		Contact type:	5 VDC, 1.5 mA
		Power supply:	none
		Protection:	none.
Digital outputs:		2 with electromechanical relay (K1 relay and K2 relay).	
K1 relay:			SPST, 16 A res. @ 250 VAC
K2 relay:			SPDT, 8 A res. @ 250 VAC.
Type 1 or Type 2 Actions:			type 1.
Additional features of Type 1 or Type 2 actions:			C.
Displays:			LED display, 3 digit, with function icons.
Alarm buzzer:			built-in.
Communications ports:			1 TTL MODBUS slave port for TTL/RS-485 serial interface.

WARNING
The device must be disposed of in accordance with local regulations governing the collection of electrical and electronic equipment.

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