



YOKOGAWA
Yokogawa Electric Corporation
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EU Declaration of conformity and Manual retrieval

TC10 is a panel mounting, Class II instrument. It has been designed with compliance to the European Directives. All information about the controller use can be found in the Engineering Manual: IM 05C01E81-02EN and the Communication Manual: IM 05C01E81-03EN and General Specification: GS 05C01E81-01EN.

The EU Declaration of Conformity and the manual of the controller can be downloaded (free of charge) from the web-site: www.yokogawa.com/ns/tc10/im/

In relation to CE marking, the authorized representative for this product in EEA:

Yokogawa Europe B.V.

Europeweg 2, 3825 HD Amersfoort, The Netherlands
and the importer for this product into the EU/EEA market via the YOKOGAWA sales channel is:

Yokogawa Europe B.V.

Europeweg 2, 3825HD Amersfoort, The Netherlands
In relation to UKCA marking, the importer for this product into the Great Britain market via the YOKOGAWA sales channel is:

Yokogawa United Kingdom Limited

Sturt Road Manor Park Runcorn, WA7 1TR, United Kingdom.

Safety Precautions

The following general safety precautions must be observed during all phases of operation, service and repair of this instrument. If this instrument is used in a manner not specified in this manual, the protection provided by this instrument may be impaired. Also, YOKOGAWA Electric Corporation assumes no liability for the customer's failure to comply with these requirements. The following symbol is used on the instrument.

This manual is an essential part of the product; keep it in a safe place for future reference. This manual is intended for the following personnel:

- Engineers responsible for installation, wiring, and maintenance of the equipment.
- Personnel responsible for normal daily operation of the equipment.

WARNING

Calls attention to actions or conditions that could cause serious or fatal injury to the user or damage to the instrument, and indicates precautions that should be taken to prevent such occurrences. The user must refer to the Engineering manual for special instructions.

AC

AC/DC

The equipment wholly protected by double insulation or reinforced insulation.

WARNING

- Whenever a failure or a malfunction of the device may cause dangerous situations for persons, things or animals, please remember that the plant must be equipped with additional devices which will guarantee safety.

- We warrant that the products will be free from defects in material and workmanship for 18 months from the date of manufacturing. Products and components that are subject to wear due to conditions of use, service life and misuse are not covered by this warranty.

Safety, Protection, and Modification of the Product

- In order to protect the system controlled by this product and the product itself, and to ensure safe operation, observe the safety precautions described in the Engineering manual. Use of the instrument in a manner not prescribed herein may compromise the product's functions and the protection features inherent in the device. We assume no liability for safety, or responsibility for the product's quality, performance or functionality should users fail to observe these instructions when operating the product.

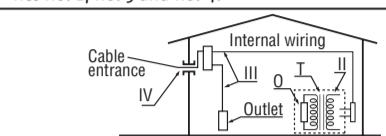
- Installation of protection and/or safety circuits with respect to a lightning protector; protective equipment for the system controlled by the product and the product itself; foolproof or failsafe design of a process or line using the system controlled by the product or

the product itself; and/or the design and installation of other protective and safety circuits are to be appropriately implemented as the customer deems necessary.

- This product is not designed or manufactured to be used in critical applications that directly affect or threaten human lives. Such applications include nuclear power equipment, devices using radioactivity, railway facilities, aviation equipment, air navigation facilities, aviation facilities, and medical equipment. If so used, it is the user's responsibility to include in the system additional equipment and devices that ensure personnel safety.
- Modification of the product is strictly prohibited.
- This product is intended to be handled by skilled/trained personnel for electric devices.
- Overvoltage category: II.

WARNING

- This instrument is for Measurement Category No. 1. Do not use it for measurements in locations falling under Measurement Categories No. 2, No. 3 and No. 4.



No.	EN 61010-2-030	Description
No. 1	0 (Other)	For measurements performed on circuits not directly connected to MAINS.
No. 2	Measurement Category II	For measurements performed on circuits directly connected to the low-voltage installation.
No. 3	Measurement Category III	For measurements performed in the building installation.
No. 4	Measurement Category IV	For measurements performed at the source of the low-voltage installation.

How to Connect Wires

WARNING

- Wiring work must be carried out by a person with basic electrical knowledge and practical experience.
- Be sure to turn OFF the power supply to the controller before wiring to avoid an electric shock. Use a tester or similar device to ensure that no power is being supplied to a cable to be connected.
- As a safety measure, always install a circuit breaker (an IEC 60947 compatible product, 5 A, 100 V or 220 V AC) in an easily accessible location near the instrument. Moreover, provide indication that the switch is a device for turning off the power to the instrument.
- Install the power cable keeping a distance of more than 1 cm from other signal wires.
- The power cable is required to meet the IEC standards concerned or the requirements of the area in which the instrument is being installed.
- Wiring should be installed to conform to NEC (National Electrical Code: ANSI/NFPA-70) or the wiring construction standards in countries or regions where wiring will be installed.
- For control relay output, alarm relay output, and power terminal connections, use heat-resistant cables.
- Do not short-circuit the terminals of the SSR output.
- Recommended tightening torque: 0.5 Nm.

Model and suffix codes

Model Code	Suffix codes	Description
TC10	-N C D F	Temperature Controller
Fixed code	-N	Always "-N"
Power supply	L H	24 VAC/DC (Custom order) 100 to 240 VAC
Fixed code	-C	Always "C"
OUT1 - 3	R N N R R R V N N V R R V V R	Relay output for ON/OFF control Relay output with 2 alarm relays, for ON/OFF or Heat/Cool control with 1 alarm DC Output for SSR DC Output for SSR with 2 alarm relays or DCV and Relay output for Heat/Cool control with 1 alarm 2 DCV outputs for SSR with 1 relay (Custom order)
IN/OUT4 (Fixed code)	D	Analog output with 2 alarm Relays, or analog output and Relay output for Heat/Cool control with 1 alarm Always "D" - Selectable I/O (logic input / 12 V SSR drive output / 12VDC 20 mA transmitter power supply)
Serial communication	S	RS485 Modbus
Fixed code	:F	Always "F"
Option Code	/JK	Panel gasket for IP65

HOW TO SET THE CONFIGURATION CODE



Press **■** for 3 seconds to access the configuration mode



Press **▼** and **▲** to enter the configuration Password 4 (default 300)



Press **▼** and **▲** to enter **Cod1** (Input Type and Control Mode)



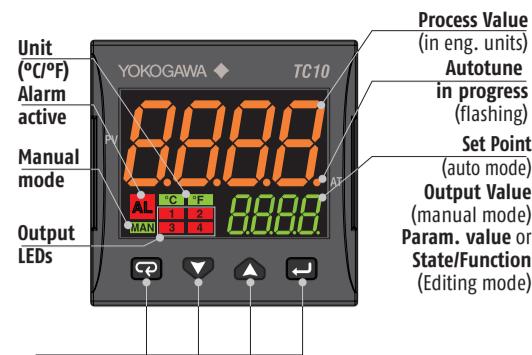
Press **▼** and **▲** to enter **Cod2** (Alarms and Service Functions)



Press **■** to store the Configuration code

Note: To leave the Configuration session without saving the settings made, press the **■** button

DISPLAY AND KEYS



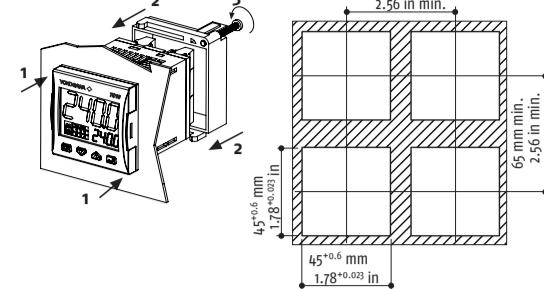
Operator Mode	Editing Mode
Access to: - Operator Commands - Parameters - Configuration	Confirm and go to Next parameter
Access to: - Operator additional information (Output value, running time ...)	Increase the displayed value or select the next element of the parameters list
Access to: - Set Point	Decrease the displayed value or select the previous element
Programmable key: Start the programmed function (Autotune, Auto/Man, Timer ...)	Exit from Operator commands/Parameter setting/Configuration

DIMENSIONS

Overall dimensions (L x H x D): 48 x 48 x 73 mm
(1.89 x 1.89 x 2.87 in.)

Panel Cut-out (L x H): 45+0.6 x 45+0.6 mm
(1.78+0.023 x 1.78+0.023 in.)

MOUNTING



Mounting requirements

This instrument is intended for permanent installation, for indoor use only, in an electrical panel which encloses the rear housing, exposed terminals and wiring on the back. Select a mounting location having the following characteristics:

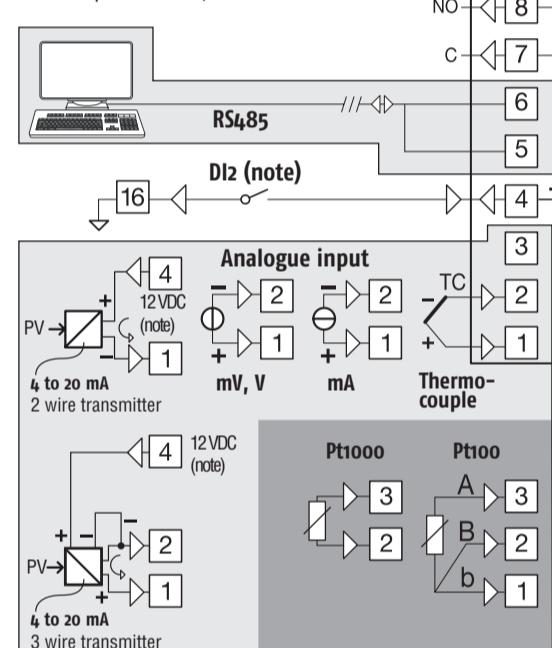
1. It should be easily accessible;
2. There is minimum vibrations and no impact;
3. There are no corrosive gases;
4. There are no water or other fluids (i.e. condensation);
5. The ambient temperature is in accordance with the operative temperature (0 to 50°C);
6. The relative humidity is in accordance with the instrument specifications (20 to 85%);
7. Installation altitude: less than 2000 m on sea level;
8. Pollution category 2.

The instrument can be mounted on panel with a maximum thickness of 8 mm. When the maximum front protection (IP65) is desired, the optional gasket must be mounted.

ELECTRICAL CONNECTIONS

Outputs

Relay Output 1: 4 A, 250Vac resistive load;
Relay outputs 2, 3: 2 A, 250Vac resistive load;
Linear output: 0/20 mA, 0/10 Vdc



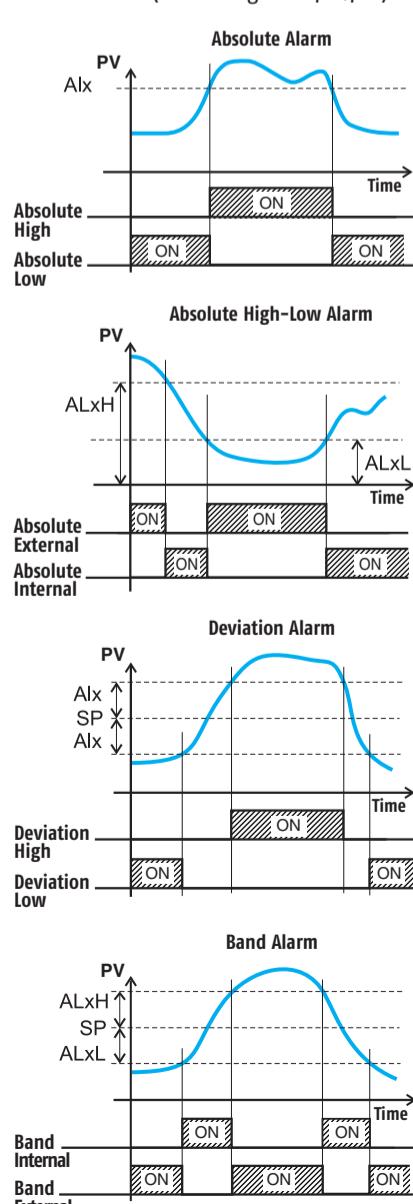
TERMINALS

Pin connector L: 1.4 mm max. (0.055 in.)	10 V 6 mA
Stripped wire L: 5.5 mm (0.21 in.)	24 Vac/dc (±10%) 5.5 VA max. 100 to 240 Vac (-15 to +10%), 6.5 VA max. 50/60 Hz
12VDC (note)	4 to 20 mA 2 wire transmitter
12VDC (note)	4 to 20 mA 3 wire transmitter
TC	Pt1000 Pt100

Note: Terminal 4 can be programmed as:

- **Digital Input (D12)** connecting a free of voltage contact between terminals 4 and 16;
- **to 12 V SSR Drive Output (OP4)** connecting the load between terminals 4 and 16;
- **12 Vdc (20 mA) transmitter power supply** connecting the 2 wire transmitter between terminals 4 and 1; for 3 wire transmitter connect terminal 4 to transmitter power supply input and terminal 1 and 2 to transmitter signal output.

ALARM TYPES (Cod2 digits: P, Q, R)

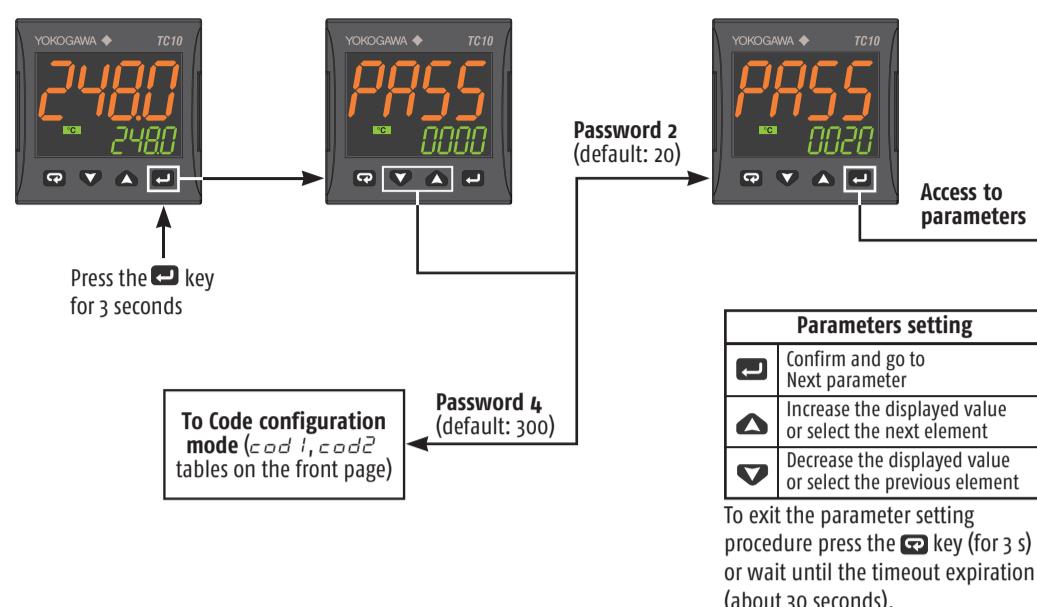


Note: As default, when the alarms are active, only Al1 threshold is available at "Operator Command" level to perform non critical tasks. To protect the Al2 and Al3 thresholds against undesired changes, they are available only at "Parameters list" level (password: 20). For different configurations, see the Engineering Manual.

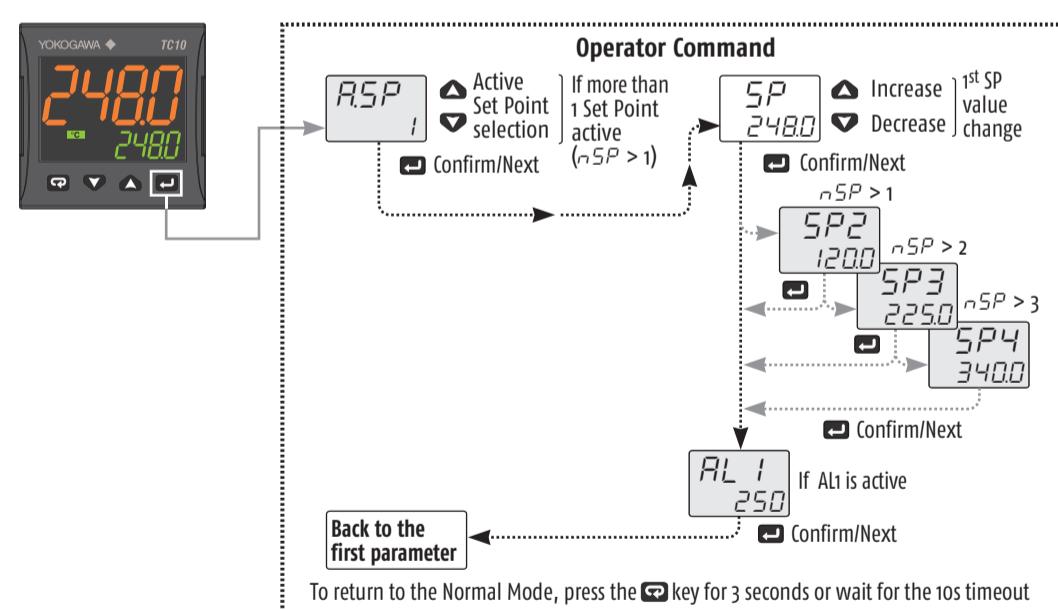
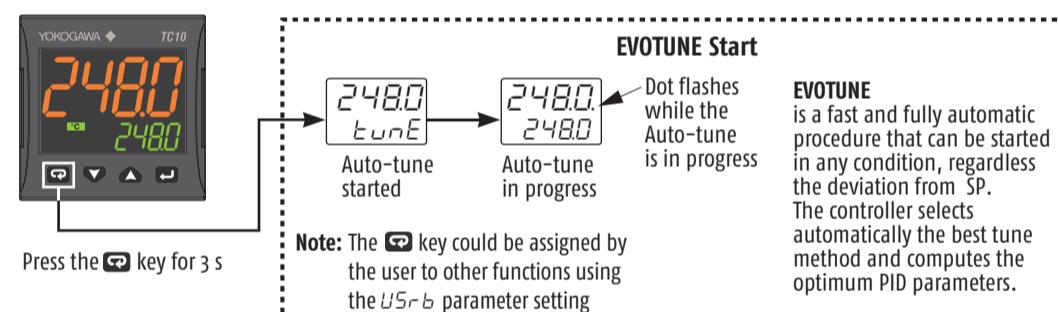
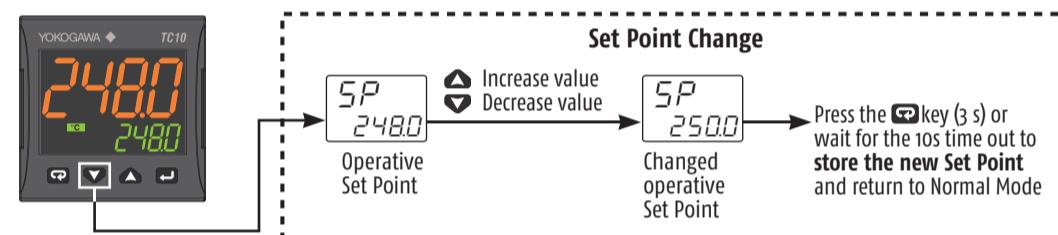
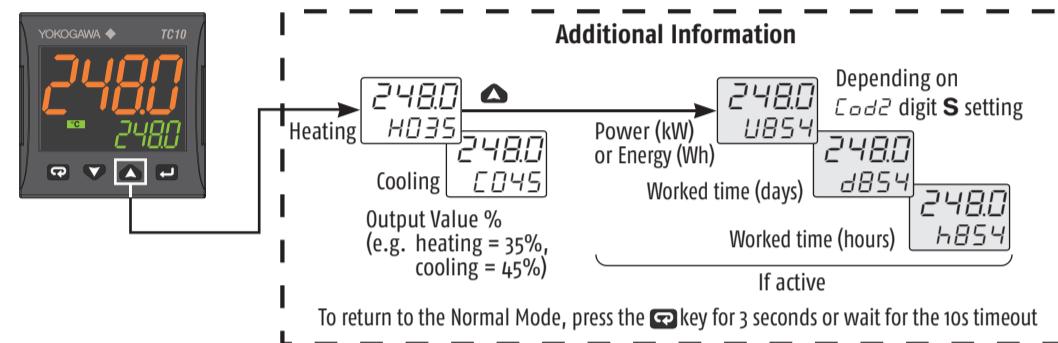
Notes:

1. **Wattmeter Instantaneous power** is continuously computed as multiplication of the Load Voltage, Load Current parameter and the controller output instantaneous value.
2. **Wattmeter power consumption** is the estimated hourly energy consumption (using Load Voltage and Load Current parameter values), computed on the previous 15 minutes. The readout is updated every 15 minutes.
3. **Worked Time counter** is continuously increased when the controller is turned ON.

PARAMETERS SETTING



CONTROLLER OPERATION



Parameters List (PASS: 20) (Parameters of RS485 Modbus Serial Communications are shown in gray cells in the below table)

Group	Param.	Description	Range value or selection list elements	Default	User value	Note
Commands	oPEr	Operative Mode Selection	auto = Auto; opl0 = Manual; stdy = Standby			
	RSP	Set Point Selection	0 = SP, 1 = SP2, 2 = SP3, 3 = SP4	0 = SP		
	tunE	Start Auto Tune	0 = OFF, 1 = start	0 = OFF		evoTUNE
Control	Pb	Proportional Band	1 to 9999 (Engineering Units = E.U.)	50		
	t_i	Integral Time	0 to 10000 s	200		Cod1 Digit N = 1
	td	Derivative Time	0 to 9999 s	50		
	HSEt	Hysteresis ON/OFF Control	0 to 9999 (E.U.)	1		Cod1 Digit N = 0
	tCH	Heating output cycle time	0.1 to 130 s	20.0		Cod1 Digit N = 1
	rCG	Relative Cooling Gain	0.01 to 99.99	1.00		Cod1 Digit N = 1
Set Point	tCC	Cooling output cycle time	0.1 to 130 s	20.0		Cod1 Digit O > 4
	SP	Set Point 1	-1999 to +9999 (E.U.)			
	SP2	Set Point 2				If nSP > 1
	SP3	Set Point 3	-1999 to +9999 (E.U.)			If nSP > 2
	SP4	Set Point 4				If nSP > 3
	SPLL	Set Point min. Value	-1999 to SPHL (E.U.)			
Alarms	SPHL	Set Point max. Value	SPLL to 9999 (E.U.)			
	nSP	No. of Set Points	1 to 4	1		
	RL1	Alarm 1 threshold	AL1L to AL1H			
	RL1L	Alarm 1 low threshold/Low limit	-1999 to +9999 (E.U.)	-1999		If digit P of Cod2 is > 1
	RL1H	Alarm 1 high threshold/High limit	9999			
	HRL1	Al1 hysteresis	1 to 9999 (E.U.)	1		
Soft Start	RL2	Alarm 2 threshold	AL2L to AL2H			
	RL2L	Alarm 2 low threshold/Low limit	-1999 to +9999 (E.U.)	-1999		If digit Q of Cod2 is > 1
	RL2H	Alarm 2 high threshold/High limit	9999			
	HRL2	Al2 hysteresis	1 to 9999 (E.U.)	1		
	RL3	Alarm 3 threshold	AL3L to AL3H			
	RL3L	Alarm 3 low threshold/Low limit	-1999 to +9999 (E.U.)	-1999		If digit R of Cod2 is > 1
Input	RL3H	Alarm 3 high threshold/High limit	9999			
	HRL3	Al3 hysteresis	1 to 9999 (E.U.)	1		
	StP	Soft Start Output value	-100 to 100%	0		
	SSt	Soft Start Time	0.00 to 8.00 (hh:mm)	0		
	SSc	Low Scale readout	-1999 to 9999	-1999		
	FSc	High Scale readout	-1999 to 9999	9999		For linear Input types only
I/O	dP	Number of decimals	0 to 3 (linear inputs); 0 to 1 (other inputs)	0		
	FIL	Measured value Digital filter	OFF; 0.1 to 20.0 s	1.0		
	IO4F	I/O 4 Function	ON = Transmitter Power Supply; OUT4 = SSR out; Di2c = Dig. In. from contact; Di2u = 24 VDC Digital Input;	OUT4		
	d1F1	Digital Input 1 Function	0 to 21	0		
	d1F2	Digital Input 2 Function	0 to 21	0		See the D1, D2 functions table
	d1R	Digital Inputs Action	0 = Di1 direct action, Di2 direct action; 1 = Di1 reverse action, Di2 direct action; 2 = Di1 direct action, Di2 reverse action; 3 = Di1 reverse action, Di2 reverse action.	0		Di2 only if configured
Digital Inputs	USrb	Key Function	nonE, tunE, opl0, aac, asi, chsp, stby, str.t	tunE		See the Key function table
	d1cL	Color of the Process Value display	0 = Change; 1 = Red; 2 = Green; 3 = Orange	2		If Change, the color is green if PV differs from SP less than RdE, red if higher than RdE and orange if lower than RdE
	RdE	Display change color threshold (when d1cL = 0)	0 (OFF) to 9999 (e.u.)			
	d1sL	Display Power OFF time (mm:ss)	0FF (display ON) 0.1 to 99.59	0FF		
	Serial comms	Instrument Address	1 to 254	1		Modbus RTU slave protocol
	bRud	Baud rate	1200, 2400, 9600 baud, 19.2, 38.4 kbaud	9600		
Wattmeter	UoL	Load Voltage	1 to 999 (V)	230		If digit S of Cod2 is > 1
	cur	Load Current	1 to 9999 (A)			
Password	PR54	Configuration access Password	201 to 400	300		
	PR52	Parameters access Password	0 to 200	20		

Note: To access all the instrument features, please see the "Complete configuration procedure" in the "Engineering Manual".

d1F - Digital Inputs D1 and D2 Functions

Code displayed	Description
0	Disabled (OFF) (default)
1	Alarm Reset
2	Alarm Acknowledge (ACK)
3	Hold of the measured value
4	Stand by mode
5	Manual Mode
6	Heat with "SP" and Cool with "SP2"
7 to 17	Reserved
18	Sequential Set Point selection [on transition]
19	SP/SP2 selection
20	Binary coding for Set Point selection on D1 and D2 (00 = SP, 01 = SP2, 10 = SP3, 11 = SP4)
21	Digital inputs in parallel to the UP and Down keys (D1 = UP key, D2 = DOWN key)

USrb Key Function

Code displayed	Description
nonE	Not used
tunE	Starts auto tuning functions (default)
opl0	Manual mode
RRc	Alarm Reset
RS	Alarm Acknowledge
chSP	Circular Set Point Selection (shows SP, SP2, SP3)
stby	Stand-by mode

关于产品有害物质限制使用管理

Control of Concentration Limits for Certain Restricted Substances by the Product

根据中华人民共和国电器电子产品有害物质限制使用管理办法对本产品进行了说明。

This is an explanation for the product based on "Requirements of concentration limits for certain restricted substances in electrical and electronic products" in the People's Republic of China.

产品中有害物质的名称及含有信息表

部件名称	有害物质									
	铅(Pb)	汞(Hg)	镉(Cd)	六价铬(Cr6+)	多溴联苯(PBB)	多溴二苯醚(PBDB)	邻苯二甲酸二正丁酯(DBP)	邻苯二甲酸二异丁酯(DIBP)	邻苯二甲酸丁基苄酯(BBP)	邻苯二甲酸二(2-乙基)己酯(DEHP)
框架 (塑料)	×	×	×	○	○	○	○	○	○	○
框架 (金属)	×	×	×	○	○	○	○	○	○	○
内部接线材料	×	×	×	○	○	○	○	○	○	○
电源	×	×	×	○	○	○	○	○	○	○

注1: ○: 表示该有害物质在该部件所有均质材料中的含量均不超出电器电子产品有害物质限制使用国家规定要求。
×: 表示该有害物质至少在该部件的某一均质材料中含量超出电器电子产品有害物质限制使用国家规定要求。
注2: 以上未列出的部件, 表明其有害物质含量均不超出电器电子产品有害物质限制使用国家规定要求。

环保使用期限

该标识适用于SJ/T11364中所述, 在中华人民共和国销售的电器电子产品的环保使用期限。
注释) 该年数为“环保使用期限”, 并非产品的质量保证期。零件更换的推荐周期, 请参照使用说明书。

本产品的部分部件包含RoHS指令中的限用物质, 但是其使用方法不受该指令限制。

Some parts of this product include the restricted substances of RoHS Directive, but their applications are under the exemption of the directive.

