IC 912 Pt100-TC

single stage electronic controller

USER INTERFACE

The user has a display and four keys for controlling status and programming of the instrument.

KEYS AND MENUS

UP key		Scrolls through the menu items Increases the values
DOWN key		Scrolls through the menu items Decreases the values
fnc key		ESC function (exit)
set key		Accesses the setpoint Accesses the menus Confirms the commands Displays the alarms (if active)

At start-up the instrument performs a Lamp Test; for five (5) seconds the display and the leds blink, in order to verify their integrity and correct operation; afterwards it will appear the label “Lod” (Loading) for ten (10) seconds. The instrument has two main menus: the “Machine Status” and “Programming” menu.

ACCESSING AND USING MENUS

Resources are arranged in a menu, which can be accessed by pressing and quickly releasing the “set” key (“Machine Status” menu) or by holding down the “set” key for more than 5 seconds (“Programming” menu).
To access the contents of each folder, indicated by the relevant label, just press the “set” key once.
You can now scroll through the contents of each folder, modify it or use its functions. If you do not use the keyboard for over 15 seconds (time-out) or if you press the “fnc” key once, the last value shown on the display is confirmed and you return to the previous screen mask.

MACHINE STATUS MENU

To access the “Machine Status” menu Press and quickly release the “set” key.
The label “SP1” appears.
By using the “UP” and “DOWN” keys you can scroll through the other folders in the menu:
-AL: alarm folder (if alarms present);
-SP1: Setpoint 1 setting folder.

Setpoint Setting

Access the “Machine Status” menu by pressing and quickly releasing the “set” key. The label of the “SP1” folder appears.
To display the Setpoint value press the “set” key again.
The value appears on the display.
To change the Setpoint value, use the “UP” and “DOWN” keys within 15 seconds.
If the parameter is LOC = y the Setpoint cannot be changed.

PROGRAMMING MENU

To enter the “Programming” menu, press the “set” key for more than 5 seconds.
If specified, the access PASSWORD will be requested, (parameter “PA1”), and the label of the first folder will follow.
To scroll through the other folders, use the “UP” and “DOWN” keys.
To enter the folder, press “set”. The label of the first visible parameter appears. To scroll through the other parameters, use the “UP” and “DOWN” keys; to change the parameter, press and release “set”, then set the desired value using the “UP” and “DOWN” keys, and confirm with the “set” key to move to the next parameter.
PLEASE NOTE: It is strongly recommended to switch off and switch on again the controller anytime parameters have been changed to prevent malfunctioning on configuration and/or ongoing timings.

PASSWORD

The password “PA1” allows access to level 1 parameters. In the standard configuration passwords are not present.
To enable them and assign them the desired value, access the “Programming” menu, within the folder with the “diS” label. If passwords are enabled, you will see it at the entrance of the “Programming” menu.

COPY CARD

The Copy Card is an accessory connected to the TTL serial port which allows programming quickly the instrument parameters (upload and download parameter’s map). The operation is performed as follows:

Format

This command allows copy card formatting, an operation necessary in case of first use or to copy maps with different models.
Warning: if the copy card has been programmed, using the “Fr” the data entered are erased. This operation cannot be cancelled.

Upload

This operation loads the programming parameters from the instrument.

Download

This operation downloads to the instrument the programming parameters.
The operations are performed accessing the folder identified by the “FPr” label and selecting, according to the case, “UL”, “dL” or “Fr” commands; the operation is confirmed by pressing the “set” key. If the operation is successful an “y” is displayed, on the contrary, if it fails a “n” will be displayed.

Download “from reset (instrumennt OFF”

Connect the Copy Card with the instrument OFF (not under voltage).
When the instrument is switched on the programming parameters will be downloaded into the instrument (this operation takes about 15 seconds); after the lamptest the diplay will show for about 5 seconds:
• label dLY if copy operation successful
• label DLn if not

PLEASE NOTE:

• after the download operation the instrument will immediately work with the new parameters map setting

KEYBOARD LOCKING

The instrument includes a facility for disabling the keyboard, by programming the “LOC” parameter (see folder with “diS” label). If the keyboard is locked, you can still access the programming menu by pressing the “set” key.
The Setpoint can also be viewed.

LED

Position	Related Function	Status
OUT1	relay 1 (OUT1)	ON when the regulator is started up; blinking in case of delay, protection or blocked enabling
	Alarm	ON when the alarm is enabled;

DIAGNOSTICS

The alarm condition is always signalled by the led of the alarm icon (((•)))
The alarm signal (referred to the analogue input) is shown as E1 on the instrument display for a faulty analogue input error or for reading values outside the viewing range.
When the analogue input detects an error condition:
• the code E1 is displayed
• the regulator is activated as indicated by the "On1" and "OF1" parameters if programmed for the duty cycle or:

On1	OF1	regulator output
0	0	OFF
0	>0	OFF
>0	0	ON
>0	>0	D.C.

PLEASE NOTE: In case of wrong connection of the 3rd wire (Pt100 sensor) in "AL" folder it will appear the label "Pt3".
For few seconds the display will shows a uncorrect temperature.

INSTALLATION

The instrument is designed for panel mounting. Make a hole of 29x71 mm, insert the instrument and fix it using the brackets provided. Do not mount the instrument in humid and/or dirty places; it is suitable for use in ordinary polluted places. Ventilate the place in proximity to the instrument colling slits.

ELECTRICAL WIRING

Attention! Never work on electrical connections when the machine is switched on.
The instrument is equipped with screw terminal boards for connection of electrical cables with a diameter of 2.5 mm^2 (one conductor only per terminal for power connections).
For the capacity of the terminals, see the label on the instrument.
The relay contacts are voltage free. Do not exceed the maximum current allowed; in case of higher loads, use an appropriate contactor. Make sure the power supply voltage complies with the one required by the instrument.
In 12V versions the power supply must be provided by a security transformer with the protection of a delayed 250 mA fuse.
Probe cable **(Pt100 model)**, power supply cables and the TTL serial cables should be distant from power cables.
(Pt100 model)
Probe can be extended using a regular bipolar cable (note that the extension of the probes affects the EMC electromagnetic compatibility of the instrument: pay extreme attention to wiring).

CONDITIONS OF USE

PERMITTED USE
For safety reasons the instrument must be installed and used according to the instruction provided and in particular, under normal conditions, parts bearing dangerous voltage levels must not be accessible.
The device must be adequately protected from water and dust as per the application and must also only be accessible via the use of tools (with the exception of the frontlet).
The device is ideally suited for use on household appliances and/or similar refrigeration equipment and has been tested with regard to the aspects concerning European reference standards on safety. It is classified as follows:
• according to its manufacture: as an automatic electronic control device to be incorporated by independent mounting;
• according to its automatic operating features: as a 1 B-type operated control type;
• as a Class A device in relation to the category and structure of the software

UNPERMITTED USE
Any other use other than that permitted is de facto prohibited. It should be noted that the relay contacts provided are of a practical type and therefore subject to fault. Any protection devices required by product standards or dictated by common sense due to obvious safety reasons should be applied externally.

LIABILITY AND RESIDUAL RISKS

Invensys Controls Italy S.r.L. shall not be liable for any damages deriving from:
- installation/use other than that prescribed and, in particular, that which does not comply with safety standards anticipated by regulations and/or those given herein;
- use on boards which do not guarantee adequate protection against electric shock, water or dust under the conditions of assembly applied;
- use on boards which allow access to dangerous parts without the use of tools;
- tampering with and/or alteration of the products;

TECHNICAL DATA

Frontal panel protection: IP65.
Casing: plastic body in resin type PC+ABS UL94 V-0, inspection window in polycarbonate, buttons in thermoplastic resin.
Dimensions: frontal panel 74x32 mm, depth 59 mm (without wirings).
Installation: on panel, with drilling template 71x29 mm (+0.2/–0.1 mm).
Use temperature: –5...55 °C.
Storage temperature.: –30...85 °C.
Use environment humidity: 10...90 % RH (not condensing).
Storage environment humidity: 10...90% RH (not condensing).
Viewing range:
• Pt100 model : -150...650°C, with decimal point, selectable through parameter ndt
• TcJ model -40...750°C*
• TcK model -40...1350°C*
*without decimal point
on 3 digit & $^1/_2$ + mark display.
PLEASE NOTE: viewing is 1/10 •C for model Pt100 and 1•C for models TcJ/TcK
Serial: TTL for connection to Copy Card.
Analogue input: one PT100 input or TcJ or TcK depending on model.
Digital outputs: 2 SPST outputs on 8(3)A 1/2 hp 250V~, (for relay capabilities see label on the instrument)
Measuring range: from -150 to 1350.
Accuracy:
• Pt100 model : 0,5% for all scale + 1 digit; 0,2% from -150 to 300°C.
• TcJ model: 0,4% for all scale + 1 digit;
• TcK model 0,5% for all scale + 1 digit; 0,3% from -40 to 800°C.
Resolution:
• Pt100 model: 0,1°C (0,1°F) within 199,9 °C, 1°C (1°F) over
• TcJ/TcK model 1°C (1°F).
Consumption
• model 230V: 3 VA max.
• model 12V: 1,5 VA max.
Power supply: 12 V~/⎓ ±10% or 230V~ ±10% 50/60 Hz.

Warning: check the power supply specified on the instrument label; for relay and power supply capacities, contact the Sales Office).

Tab. 1 Parameter Table

PARAMETER	DESCRIPTION	RANGE	DEFAULT*	VALUE*	U.M.
	REGULATOR 1 (folder with "rE1" label)				
HC1	Heat/Cool Mode. If set to H the generic regulator actuates for hot operation. If set to C the generic regulator actuates for cold operation	H/C	H/C*		flag
dF1	diFferential. Relay 1 tripping differential. The regulator stops on reaching the Setpoint value (as indicated by the adjustment probe), and restarts at temperature value equal to the Setpoint 1 plus (o minus depending on HC1) the value of the differential. **see ON-OFF regulation diagram**	0.0...30.0	0 (n.z. models)* 1*		°C/°F
HS1	Higher SEt. Maximum possible setpoint 1 value.	LS1..HdL	*		°C/°F
LS1	Lower SEt. Minimum possible setpoint 1 value.	LdL..HS1	*		°C/°F
	REGULATOR 1 PROTECTIVE DEVICE (folder with "rE1" label)				
dn1	Delay time in activating the regulator relay after switch-on of instrument.	0...250	1		sec
do1	Delay after switch off. The indicated time must elapse between switch-off of the regulator relay and the successive switch-on.	0...250	0		min
di1	Delay between switch-ons. The indicated time must elapse between two successive switch-ons of the regulator.	0...250	0		min
dE1	Delay before switch-off. The indicated time must elapse between switch-off request and the switch-off of the regulator.	0...250	0		sec
On1	On time (regulator 1). Regulator activation time in the event of faulty probe. If set to "1" with OF1 at "0" the regulator is always on, while at OF1 >0 it functions always in duty cycle mode. .**see Duty Cycle Diagram**	0...250	0		min
OF1	OFF time (regulator 1). Regulator in disabled state time in the event of a faulty probe. If set to "1" with On1 at "0" the regulator is always off, while at On1 >0 it functions always in duty cycle mode. **see Duty Cycle Diagram**	0...250	1		min
	DISPLAY (folder with "diS" label)				
LOC	(keyboard) LOCk (set and keys). Keyboard locking. However, you can enter parameter programming modify them along with the status of this parameter in order to allow keyboard locking. y = yes; n = no	n/y	n		flag
PA1	PAssword 1. When enabled (value other than 0) it constitutes the access key for level 1 parameters.	0...250	0		num
ndt	number display type. View with decimal point. y = yes; n = no **PLEASE NOTE: for modelsTcJ/TcK only n value.**	n/y	n		flag
CA1	CAlibration 1.Calibration 1. Positive or negative temperature value added to the value read by probe 1,	-30.0...30.0	0		°C/°F
dro	display read-out. Select °C or °F for displaying the temperature read by the probe. **PLEASE NOTE: the switch between °C and °F DO NOT modify setpoint, differential, etc. (for example set=10°C become 10°F).**	°C/°F	°C		flag
	CONFIGURATION (folder with "CnF" label)				
H00 (1) (!)	**PLEASE NOTE: PARAMETER VISIBLE ONLY INTcJ/TcK MODELS** Probe type selection: Pt1 for Pt100; JtC: for TcJ; HtC for Tck	Pt1/JtC/HtC	Pt1/JtC/HtC*		num
H10	delay time in activating the outputs after switch-on WARNING! If set = 0 it is not active; if set ≠0 output will not be activated before this time	0...250	0		min
rEL	reLease firmware. Device version: read only parameter.	/	/		/
tAb	tAble of parameters. Reserved: read only parameter.	/	/		/
	COPY CARD (folder with "Fpr"label)				
UL	Up load. Programming parameter transfer from instrument to Copy Card.	/	/		/
dL	Down load. Programming parameter transfer from Copy Card to instrument	/	/		/
Fr	Format. Erasing all data in the Copy Card. **PLEASE NOTE using "Fr" parameter (copy card formatting) the data within the copy card will be lost permenently. The operation cannot be cancelled. After using the copy Card device the controller must be switch off and switch on again**	/	/		/

(1) **PARAMETER VISIBLE ONLY INTcJ/TcK MODELS. Pt100 Model works only with Pt100 sensor (3 wires) while TcJ and TcK Models work also with Pt100 sensor selectable by this parameter**

* DEFAULT column: for parameters HC1, HS1, LS1, DF1, H00/10 the default depends don the model.
* VALUE column: to be filled manually, with customized settings (if different from the default value).

(!) WARNING!

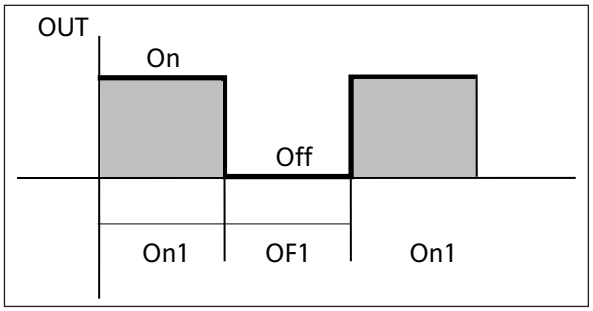
• If one or more of these parameters highlighted with (!) are modified, teh controller must be switched off and switched on again to ensure correct operation.
• It is strongly recommended, anyway to switch off and switch on again the controller anytime parameters have been changed to prevent malfunctioning on configuration and/or ongoing timings

Duty Cycle Diagram

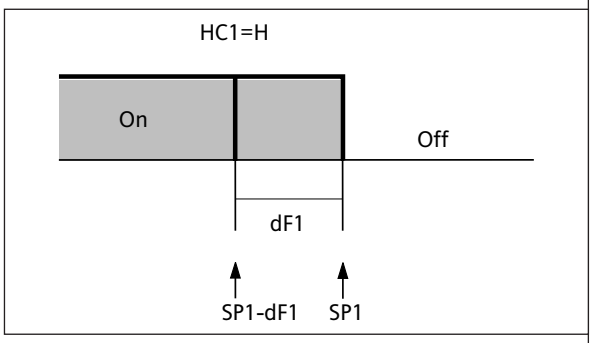
parameters On1 ed OF1 programmed for the duty cycle

On1	OF1	regulator output
0	0	OFF
0	>0	OFF
>0	0	ON
>0	>0	D.C.

When the analogue input detects an error condition:
• the code E1 is displayed
• the regulator is activated as indicated by the "On1)" and "OF1" parameters if programmed for the duty cycle



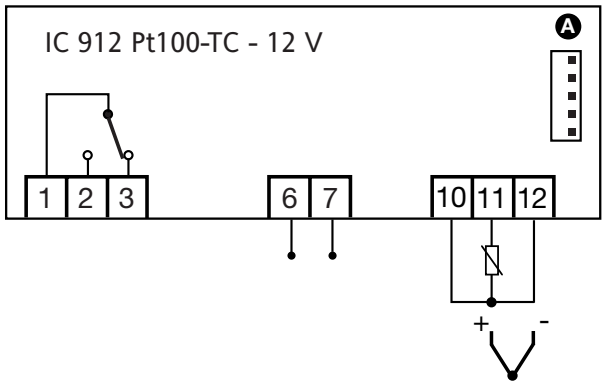
ON-OFF Regulation Diagram

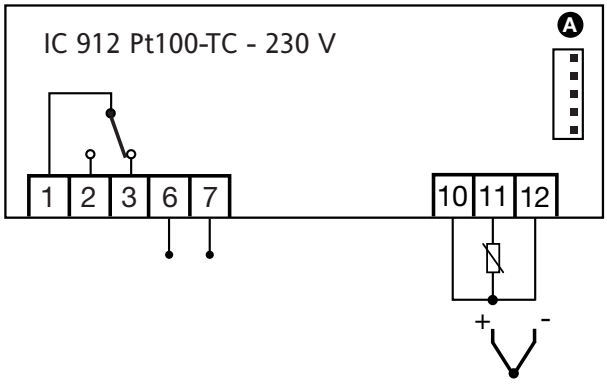


Wiring diagram

WIRING

1 - 2	N.O. regulator 1 relay output (OUT1)
1 - 3	N.C. regulator 1 relay output (OUT1)
6 - 7	Power supply 1,5 VA max. (12V version) Power supply 3 VA max. (230V version)
*10-11-12	Pt100 3 wires input
*11-12	TcJ/TcK input (11 = +; 12 = -)
A	TTL input for Copy Card





PLEASE NOTE:

* depending on model
• User Default Settings
• for relay capacities check on the instrument label
In the diagram it is shown relays with 8(3) 1/2 hp 250V capability

Invensys Controls Italy s.r.l
via dell'Industria, 15 Zona Industriale Paludi
32010 Pieve d'Alpago (BL) ITALY
Telephone +39 0437 986111
Facsimile +39 0437 989066
Internet http:/www.climate-eu.invensys.com

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