XT141C - XT145C - XT141R - XT145R

Temperature Controller with 2 Set Points and PID Action on Output 1

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1. GENERAL WARNING

1.1 ⚠ PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

1.2 ⚠ SAFETY PRECAUTIONS

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "SAE s.r.l." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

2. GENERAL DESCRIPTION

The XT141C, XT145C (32x74 format), and the XT141R, XT145R (72x72 format), are temperature controllers with 2 set points which can be dependent or independent. Output 1 can be programmed by the installer for PID, PD, or ON/OFF control. At start up SOFT START function can be activated which enables the set point to be reached in a gradually. Output 2 is always ON/OFF control. There are 5 different types of input sensor available which must be specified at time of order: PTC, RTD (Pt100 or Ni100) thermo-couple (J, K, S) current (4÷20mA), voltage (0÷1V or 0÷10V). Alarm conditions are signalled visually on the display, audibly by the internal buzzer and by the remote alarm output relay.

3. Front panel commands

SET1: **TO DISPLAY TARGET SET POINT1**: by pressing and releasing this key the set point 1 is displayed for 5s.
TO MODIFY SET POINT 1: by holding the key pressed for at least 2s set point 1 change mode is entered: the set point 1 is displayed and the LED 1 blinks. To change the value use the "**UP**" and "**DOWN**" keys. The new value can be stored either by pressing the **"SET"** key (the instrument restores temperature display) or by waiting the exit time-out to expire (15s).

TO SWITCH THE INSTRUMENT ON/OFF: If the function is enabled (par. OnF=1), by pressing the SET1 key for more than 4s the controller is switched OFF. To switch the instrument on again press the SET1 key.

SET2: **TO DISPLAY TARGET SET POINT2**: by pressing and releasing this key the set point 2 is displayed for 5s.

TO MODIFY SET POINT 2: by holding the key pressed for at least 2s set point 2 change mode is entered: the set point 2 is displayed and the LED 1 blinks. To change the value use the "**UP**" and "**DOWN**" keys. The new value can be stored either by pressing the **"SET"** key (the instrument restores temperature display) or by waiting the exit time-out to expire (15s).

▲ (**UP**): In programming mode or in "**Function Menu**" it browses the parameter codes or increases the value of the displayed variable. Hold pressed for a faster change.

▼ (**DOWN**): in programming mode or in "Function Menu" it browses the parameter codes or decreases the value of the displayed variable. Hold pressed for a faster change.

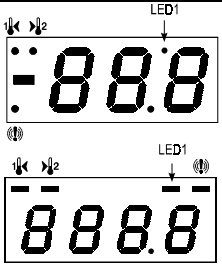
KEY COMBINATIONS:

▲+ ▼ TO UNLOCK THE KEYBOARD: when held pressed for 3s the keyboard is unlocked (see "LOC" function).

SET1 + ▼ TO ENTER ON FUNCTION MENU: when held pressed for 3s the Function Menu is entered.

SET1 + ▲ TO RETURN TO THE PROCESS VARIABLE DISPLAY: programming end, return to the process variable display.

3.1 USE OF LEDS



A series of light points on the front panels is used to monitor the loads controlled by the instrument. Each LED function is described in the following table.

LED	MODE	FUNCTION
1	ON	Load 1 enabled
2	ON	Load 2 enabled
LED1	FLASHING	- Programming Phase
	ON	- ALARM signal - In "Pr2" indicates the parameter is also present in "Pr1"

4. Function and parameters' programming Menu

4.1 FUNCTION MENU

Includes all the main functions controlled by the instrument.

Access procedure:

- The menu is entered by holding the **SET1** and **DOWN** keys pressed for three seconds. The label of the first function is displayed.
- The **UP** and **DOWN** keys are used to cycle backwards or forward in the menu.
- By pressing the **SET1** key the currently displayed function is enabled.

4.2 LIST OF FUNCTIONS

1. "**Pr1**": includes all user accessible parameters.
2. "**Pr2**": includes all the instrument's parameters (at installer level). It can be accessed through a security code. Hence it is possible to modify all parameters and add or remove parameters from "Pr1" (user level) by pressing **"SET1"** + **"DOWN"**. When a parameter is enabled at user level, Alarm LED is on, during programming mode in Pr2.
3. **"LOC"**: keyboard lock. When enabled the "POF" flashing message is displayed for a few seconds then the keys are locked . Only the set points display is enabled.
4. **"Out"**: exits from menu.

4.3 EXIT TIMEOUT

If no key is pressed for more than 15 seconds the instrument reverts to normal display mode.

4.4 ACCESSING "PR2" AND SECURITY CODE INPUT

To access parameters in "**Pr2**" a security code is required.

1. Enter Function Menu, select label "Pr2" and press the "**SET1**" key. The "PAS" flashing message is displayed, shortly followed by "0 - -" with a flashing zero.
2. Use **"UP"** or **"DOWN"** to input the security code in the flashing digit;
3. Confirm the figure by pressing "**SET1**".
4. Repeat operations 2 and 3 for the other digits.
5. If the security code is correct the access to "Pr2" is enabled by pressing "**SET1**" on the last digit, otherwise the security code input process restarts from the beginning.

If no key is pressed for more than 15 seconds the instrument reverts to normal display mode.

SECURITY CODE is 321

NOTE: each parameter in "**Pr2**" can be removed and put into "**Pr1**" (user level) by pressing **"SET1"** + **"DOWN"**. When a parameter is present in "Pr1" ALARM LED is on, during programming mode in Pr2.

4.5 CHANGING A PARAMETER'S VALUE

Each parameter is identified by a special alphanumeric code.
To change the parameter's value operate as follows:

1. Enter the Function Menu and select the parameters' list you require: "**Pr1**" or "**Pr2**".
2. Browse the parameters' list using "**UP**" or "**DOWN**" until the required parameter is displayed.
3. Press the "**SET1**" key to display its value.
4. Use "Up" or "**DOWN**" to change its value.
5. Press "**SET1**" to store the new value and move to the following parameter.

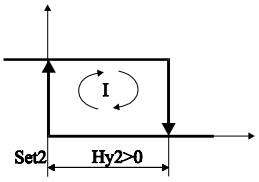
To exit: Press **SET1 + UP** or wait 15s without hitting a key.
NOTE: the set value is stored even when the procedure is exited by waiting the timeout to expire.

5. List of Parameters

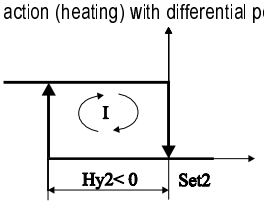
5.1 MAXIMUM MEASURING RANGE

Probe	Down Scale	Full Scale
PTC	-70.0 °C / -94°F	170.0 °C / 338°F
Pt100	-200 °C / -348 °F	700.0 °C / 1292 °F
Ni100	-70.0 °C / -94°F	170.0°C / 338 °F
TcK *	-50 °C / -58 °F	1500 °C / 2732 °F
TcJ *	-50 °C / -58 °F	800 °C / 1472 °F
TcS *	-50 °C / -58 °F	1500 °C / 2732 °F

Hy1 Differential1: (Down SC./Full Sc). The temperature differential relating to Set Point 1 is used only when the ON/OFF function is selected. The mark shows if the differential is above (positive mark) or below (negative mark) the SET 1. This parameter cannot be set to zero. The type of action inverse for heating or direct for cooling, can be selected using parameter S1C.
Parameter S1C=0 for Inverse action (Heating)
Parameter S1C=1 for Direct action (Cooling)



Inverse action (heating) with differential positive



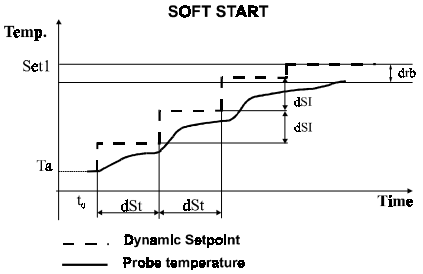
Inverse action (heating) with differential negative

Hy2 Differential 2: (Down SC./Full Sc.) Intervention differential for set point 2. It can be set with positive value or with negative value. The kind of action (direct or inverse) is set by the S2C parameter.
LS1 Minimum set point1: (Down Sc./ Set1) Sets the minimum acceptable value for the set point.1
LS2 Minimum set point 2: (Down Sc./ Set2) Sets the minimum acceptable value for the set point 2.
US1 Maximum set point1: (Set1/ Full Sc.) Sets the maximum acceptable value for set point1.
US2 Maximum set point 2: (Set2/ Full Sc.) Sets the maximum acceptable value for set point 2.
ALU Maximum alarm:
with ALC=0: alarm relative to set point1, (0÷|Full Sc.-Set1|) Maximum alarm is enabled when the temperature exceeds the "SET1+ALU" value.
with ALC=1: absolute alarm, (Set÷Full Sc.) Maximum alarm is enabled when the temperature exceeds the "ALU" value.
ALL Minimum alarm: (Down Sc./ Full Sc.) **with ALC=0:** relative to set point1, (0÷|Down Sc.-Set1|) this value is subtracted from the set point1. The alarm signal is enabled when the temperature goes below the "SET1-ALL" value.
with ALC=1 (absolute) minimum alarm is enabled when the temperature goes below the "ALL" value.
AId Alarm delay: (0÷999 min) time interval between the detection of an alarm condition and alarm signalling.
dAO Delay of alarm at start-up: (0÷999 min) time interval between the detection of the alarm condition after instrument power on and alarm signalling.
Pb Proportional band: (1÷ Full Sc.) is the band around the Set Point 1 within which the proportional action is activated. When the probe signal is below Set1-Pb/2 the relay output 1 is always on, when the probe signal is above the Set1+Pb/2 the relay output 1 is always off. See also "Proportional Function".
IntIntegral action time: (0÷ 999sec for 3 digit models; 0÷3600sec for 4 digit models) it determines how strong is the integral contribution during the PID regulation. The lower "Int" value is the higher power supplied to the system becomes, as a result the temperature (or the controlled signal) will reach the SET1 faster. Int=0 excludes the integral action and the controller will work as PD (proportional-derivative).
DEt Derivative action time: (0÷ 999sec for 3 digit models; 0÷3600sec for 4 digit models) it determines how strong is the derivative contribution during the PID regulation. The higher "dEt" value is the lower response time of the controller becomes during a suddend temperature change. dEt=0 excludes the derivative action and the controller will work as PI (proportional-integral).
Sr Derivative sampling time: (1 to 10sec) time between two successive readings for the calculation of the derivative function.
rS Proportional band reset: (Down Sc./ Full Sc.) permits to calibrate up and down the proportional band to adjust the regulation when the display read-out is not exactly Set point value.
Ar Integral band limit: (0°C to Pb/2) if during the PID function the difference between the Set Point1 and the temperature is greater than Ar, the contribution of the integral time is not increased. Therefore at higher values it corresponds to a greater incisiveness of the integral action. Suggested initial value : Ar =Pb/2, if Ar=0 this control is disabled.
od Output delay: (0÷500 sec) minimum interval between the load stop and the following restart.
Cyt Cycle time: (1 to 500sec) minimum time between two successive relay activation's, once the PID action has been started. Suggested initial value Cyt=13.
drb Soft Start restart band: (0 to Pb/2) value in degrees of the band below the Set point 1 within which the SOFT Start function is disabled. When the controlled signal decreases under the Set point 1 - drb, the Soft Start function restart working.
dSi Set point increment during the Soft Start function: (0 to Full Sc.) value, in degrees, of the dynamic increase of the Set Point.
dSt Dynamic Set Point increment interval: (1 to 999sec for 3 digit models; 1 to 3600sec for 4 digit models) time between two successive increments of the dynamic set Point.
LCI Start of scale with current or voltage input: (3 digit: -999÷999; 4 digit: -999÷7000). Adjustment of read out corresponding to 4mA or 0V input signal.
UCI End of scale with current or voltage input (3 digit:
-999÷999; 4 digit: -999÷7000). Adjustment of read out corresponding to 20mA or 1V or 10V input signal.
LAO Lower analog output limit: (only for models with analog output) minimum value of temperature associated to the 4mA (or 0V) analog output. This value can be absolute or relative to the Set Point 1 by setting the AOC parameter.
UAO Upper analog output limit: (only for models with analog output) maximum value of temperature associated to the 20mA (or 1V) analog output. This value can be absolute or relative to the Set Point 1 by setting the AOC parameter.
Opb Probe calibration: (-999÷999) allows to adjust possible offset of the probe.
Ad1..Ad2: RS485 serial address (0÷94): identifies the instrument within a control or supervising system.
Ft Regulation type: (ON/OFF; PID)
0 = ON/OFF regulation
1 = PID regulation
PbC Probe selection: input type. For RTD or Thermocouples only: 0=Tc J; 1=Tc K (Ni100); 2=Tc S (Pt100).
AOC Analog output configuration: (only for models with analog output) **AOC=0** Probe reading. The analog output parameters LAO and UAO are independent and correspond to the absolute read-out probe signal.
AOC=1 Probe-Set Point. the analog output parameters LAO and UAO are related to the Set Point 1.
AOC=2 the analog output parameters LAO and UAO are expressed as % of power given by the PID function (only for Ft=1). Suggested values are LAO=0% and UAO=100%.
Note1: If PID control is not selected, AOC=2 is not enabled.
Note2: If PID control is changed to ON/OFF the AOC will default to 1 "Probe reading".
OUC Output connections (0=dependent; 1=independent)**:** select if the SET2 depends on SET1 (so SET2= SET1 + SET2), or if SET2 is independent from SET1.
S1C Action type: S1C=0 inverse action (heating); S1C=1 direct action (cooling)
S2C Action type output 2: S2C=0 inverse action (heating); S1C=2 direct action (cooling)
So1 Relay 1 status with faulty probe: So1=0 open; So1=1 closed
So2 Relay 2 status with faulty probe: So2=0 open; So2=1 close
Hdd Half digit display: (Hdd=0 OFF; Hdd=1 ON) the right hand digit can be set to read out only 0 or 5 , or to read out all values from 0 to 9.
E.g. if **Hdd= 0** the displayed values could be: 231, 232, 233...
if **Hdd= 1** the displayed values could be 230, 235, 240...
rES Decimal point ON/OFF: (0=no decimal point; 1=with d. p.) select the resolution of the controller: with decimal point or without decimal point.
NOTE1: on all models, if a unit is changed from "without decimal point" into "with decimal point", all parameters values expressed in degrees (**SET1, SET2, HY1, HY2, LS1, US1, LS2, US2, ALU, ALL, Pb, rS, Ar, drb, dSi, LCI, UCI, LAO, UAO, OPb**) will automatically be **divided by 10.**
To restore the right behaviour multiplie by 10 the above parameters.
NOTE2: the decimal point selection is not available on models with thermocouple input.
CF Temperature measurement unit (no on models with current or voltage input): 0 = Celsius; 1 = Fahrenheit.
Note: after modifying this parameter all the parameters expressed in degrees, must be checked and updated for the new unit of measurement.
ALC Set point alarms configuration:
0 = the alarm parameters are related to set point.
1 = the alarm parameters are referred to absolute values of the read-out.
SAO Analog output safety with probe fault: (only for models with analog output) determines what state the analog output should assume when the probe is faulty: SAO = 0; analog output = 20mA or 5Vdc.
SAO = 1; analog output = 4mA or 0Vdc.
OnF Switching ON/OFF enabling from keyboard: (0 = disabled; 1=enabled) It permits the switching ON/OFF of the instrument by pressing the SET key for more than 4s.
Ptb Parameters table: (read only) Shows the factory default settings.
rEL Software release: (read only)

6. SOFT START FUNCTION

At start up or when the input signal value is lower than the "Set point 1 – drb", the controller uses a dynamic set point to control the system. The step of the dynamic set

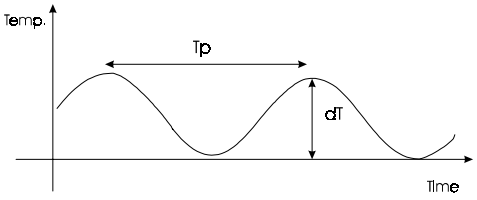
point is given by the "dSi" parameter value and each step of temperature is controlled during the "dSt" interval time. For example at the start up, the controller added to the probe value Ta (usually the ambient temperature) the "dSi" value then for the successive time, set with "dSt" parameter, the controller will work to reach this first dynamic set point. This procedure will be repeated until the probe signal value reaches the "Set point – drb" value, at this point the Soft Start is disabled and the PID function will control the system. When the controlled signal goes out of the band then the Soft Start function restarts.
By setting "drb=0" the Soft Start function is manually disabled, in this case the relay output is always on until the temperature will enter within the Proportional Band value.



7. Proportional Function

The PID function modulates the activation of the first output using an appropriate ON/OFF cycle: the duration of the cycle is imposed by the parameter "Cyt". If the factory set values of the parameters relating to the PID control are not are not optimised for the process being controlled, you can utilise the following method to find more appropriate parameter values:

1) Select ON/OFF control Ft=1.
2) Impose Set 1 = 10% less than the normal working temperature (as long as it is compatible with the characteristic of the process being controlled).
3) Impose the hysterisis Hy1 = 3% of the value of the SET 1.
4) Start the process from the start up and wait until the temperature control settles and cycles regularly.
5) Monitor the process temperature (possibly with a chart recorder) recording the values at regular intervals. In this way it is possible to determine the time between 2 successive maximum (Tp) and maximum variations in temperature (dT) see fig.



Values for "Pb", "Int", "dEt", "Cyt" will be obtained by the following method: Pb = 2xdT, Int = Tp/2, dEt = Tp/8, Cyt = Tp/20.
Other adjustments around these values can be made bearing in mind that:

- **Proportional action** depends on the deviation between the set point and the relative value.
- **Derivative action** takes account the speed of the variations of the controlled process.
- **Integral action** integrates the deviation of the process in time.

NOTE:
An increase of the proportional band reduces the oscillations but increases the deviation, use "Rs" parameter to adjust the band.
An excessive decrease of the proportional band reduces the deviation but increases the system oscillations.
A decrease in the value of "Integral action time" leads to an increased incisiveness of the integral action and annuls the deviation at full speed.
A small but constant deviation can lead to a large contribution of the integral action.

8. Installation and mounting

Instruments **XT141C, XT145C** are panel mounted, in a 29x71 mm hole, and fixed using the special bracket supplied.
Instruments **XT141R, XT145R** are panel mounted, in a 68x68 mm hole, and fixed using the special bracket supplied.
The ambient temperature range allowed for correct operation is 0÷60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. Let air circulate by the cooling holes.

9. Electrical connections

The instruments are provided with screw terminal block to connect cables with a cross section up to 2,5 mm^2. Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the input connection cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay.

9.1 PROBES CONNECTION

The PTC probes shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration.

10. ALARM SIGNALS

Message - Mode	Cause	Outputs
"ooo" Flashing	Probes break or absence	Alarm output ON; Relay output according to parameters "So1"
"CCC" Flashing	Probe shorted circuit	Alarm output ON; Relay output according to parameters "So1"
"HA" Alternating with normal display	Maximum temperature alarm	Alarm output ON; Other outputs unchanged.
"LA" Alternating with normal display	Minimum temperature alarm	Alarm output ON; Other outputs unchanged.

10.1 STATUS OF THE ALARM RELAY

MODE	RELAY STATUS
Instrument OFF	Closed
Normal operating mode	Open
Alarm occurring	Closed

10.2 SILENCING BUZZER / ALARM RELAY OUTPUT

Once the alarm signal is detected the buzzer and the alarm output can be disabled by pressing any key. The display signal remains as long as the alarm condition remains.

10.3 ALARM RECOVERY

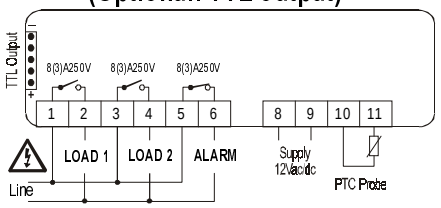
Probe alarms "**ooo**", "**CCC**" start 30 seconds after the fault in the probe; they automatically stop 30 seconds after the probe restarts normal operation. Check connections before replacing the probe.
Max. and min. alarms "**HA**" and "**LA**" automatically stop as soon as the variable returns to normal values.

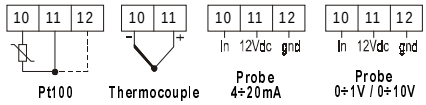
11. Technical data

Housing: self extinguishing ABS.
Case:
XT141C, XT145C frontal 32x74 mm; depth 60mm;
XT141R, XT145R: frontal 72x72, depth 100mm
Mounting:
XT141C, XT145C panel mounting in a 71x29 mm panel cut-out.
XT141R, XT145R: panel mounting in a 68x68 mm panel cut-out.
Frontal protection: IP65
Connections: Screw terminal block ≤ 2,5 mm^2 wiring.
Power supply:
XT141C, XT145C 12Vac/dc, -10% +15% 50/60Hz.
XT141R, XT145R: 110/230Vac 50/60Hz
Power absorption: XT141C, XT141R 3VA max; **XT145C, XT145R**: 5VA max
Display
XT141C, XT141R: 3 digits, red LED, 14,2 mm high.
XT145C, XT145R: 4 digits, red LED, 12,5 mm high.
Inputs: according to the order: PTC or Pt100 or Thermocouple (J, K, S) or 4÷20mA or 0÷1V or 0÷10V
Relay outputs:
Load1: SPST or SPDT relay, 8(3)A, 250Vac see electrical connections
Load2: SPST or SPDT relay, 8(3)A, 250Vac see electrical connections
Alarm: XT141C, XT145C, XT141R, XT145R: SPST relay, 8(3)A, 250Vac
Other features
XT141C, XT145C, XT141R, XT145R: buzzer for acoustical alarm
Data storing: on the non-volatile memory (EEPROM).
Operating temperature: 0÷60 °C (32÷140°F).
Relative humidity: 20÷85% (no condensing)
Storage temperature: -30÷85 °C (-22÷185°F).
Measuring range: according to the probe
Controller Accuracy a 25°C: better than ±0,5% of full scale

12. CONNECTIONS

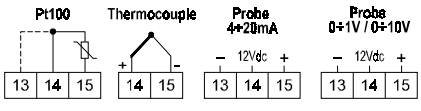
XT141C, XT145C (Optional: TTL output)

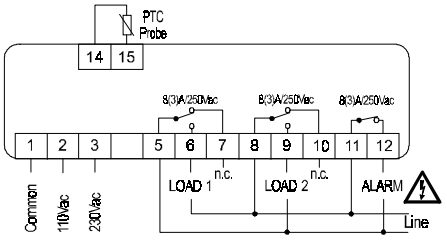




Power supply 24Vac/dc: connect to the terminals 8-9
Pt100 with 2 wires: the terminals 11 and 12 must be short circuited.

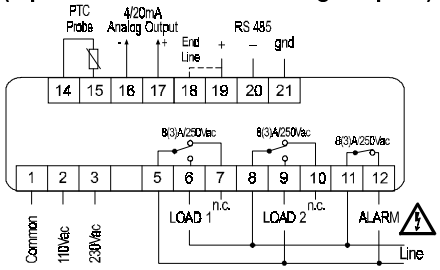
XT141R, XT145R (no RS485)

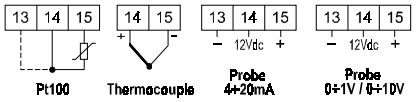




Power supply 24Vac/dc: connect to the terminals 1-3
Pt100 with 2 wires: the terminals 13 and 14 must be shorted circuit.

XT141R, XT145R
(Optional: RS485 and analog outputs)





Power supply 24Vac/dc: connect to the terminals 1-3
Pt100 with 2 wires: the terminals 13 and 14 must be shorted circuit.

13. DEFAULT SETTING VALUES

COD	PARAMETERS	RANGE	Lev.	Value °C/°F
Set1	Set point1	LS1÷US1	Pr1	0/32
Set2	Set point2	LS2÷US2	Pr1	1/34
Hy1	Differential set point 1	Down Sc./ Full Sc.	Pr1	-1/-2
Hy2	Differential set point 2	Down Sc./ Full Sc.	Pr1	-1/-2
LS1	Minimum set point 1	Down Sc./ Set1	Pr2	min
LS2	Minimum set point 2	Down Sc./ Set2	Pr2	min
US1	Maximum set point 1	Set1/ Full Sc.	Pr2	max
US2	Maximum set point 2	Set2/ Full Sc.	Pr2	max
ALU	MAXIMUM alarm with ALC=0 with ALC=1	0 ÷ |Full Sc.-Set| Set ÷ Full Scale	Pr2	30/54
ALL	Minimun alarm with ALC=0 with ALC=1	0 ÷ |Set- Down Sc.| Down Sc. ÷ Set	Pr2	30/54
Ald	Alarm delay	0÷999 min	Pr2	15
dAO	Alarm delay at start up	0÷999 min	Pr2	60
Pb	Proportional Band	(0.1) 1÷Full Sc.	Pr2	10
Int	Integral time	0÷999 s	Pr2	500
dEt	Derivative Time	0÷999s	Pr2	30
Sr	Derivative sampling rate	1÷10s	Pr2	2
rS	Proportional band reset	Down Sc./ Full Sc.	Pr2	0
Ar	Integral band limit	0÷Full Scale	Pr2	10
od	Output delay	0÷500 sec	Pr2	0
Cyt	Cycle time	1÷500s	Pr2	30
drb	Soft start restart band	0÷Full Scale	Pr2	20
dSI	Increment of dynamic Set point	0÷Full Scale	Pr2	10
dSt	Interval of dynamic Set point increment	1÷999s	Pr2	120
LCI	Lower current input	Depends on probe	Pr2	various
UCI	Higher current input	Depends on probe	Pr2	various
LAO	Lower An. Output limit (AOC=0: probe) (AOC=1 Probe - set1) (AOC=2: PID)	Down Sc./ Full Sc. Down Sc./ Full Sc. 0÷100	Pr2	Down Sc. (AOC=2)
UAO	Upper An. Output limit (AOC=0: probe) (AOC=1: Probe - set1) (AOC=2: PID)	Down Sc./ Full Sc. Down Sc./ Full Sc. 0÷100	Pr2	Full Scale
Opb	Probe Calibration	Down Sc./ Full Sc.	Pr2	0
Ad1	Serial address	0÷94 num	Pr2	0
Ad2	Serial address	0÷94 num	Pr2	1
Ft	Regulation Type (ON/OFF, PDI)	0=ON÷OFF 1 = PDI	Pr2	1
PbC	Probe selection	(0=Tc J) 1=Ni100 (Tc K) 2=Pt100 (Tc S)	Pr2	-
AOC	Analog Output Configuration.	0 = Probe 1 = Probe -set1, 2 = PID	Pr2	0
OUC	Output connections	0 = dependent 1 = independent	Pr2	1
S1C	Inverse/Direct action	0=Inverse(heating) 1=Direct (cooling)	Pr2	0
S2C	Inverse/Direct action	0=Inverse(heating) 1=Direct (cooling)	Pr2	0
So1	Relay1 status with faulty probe	0=open 1=closed	Pr2	0
So2	Relay2 status with faulty probe	0=open; 1=closed	Pr2	0

COD	PARAMETERS	RANGE	Lev.	Value °C/°F
Hdd	Half digit display ON/OFF	0=OFF; 1=ON	Pr2	0
rES	Decimal point ON/OFF	0=OFF; 1=ON	Pr2	0
CF*	Measurement unit (°C/°F)	0=Celsius 1= Farehnehit	Pr2	0/1
ALC	Alarms configuration	0= relative 1= absolute	Pr2	0
OnF	Switching OFF	0=Disabled 1=Enabled	Pr2	0
SAO	An. Output Safety	0 = OFF; 1 = ON	Pr2	0
Ptb	Parameters table	---	Pr2	--
rEL	software release	--	Pr2	--

c UL us
XT141C wih PTC, RTD or Thermocouple J, K, S input

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