« F&F »®

F&F Filipowski sp. j.
Konstantynowska 79/81 95-200 Pabianice
phone/fax: (+48 42) 215 23 83 / 227 09 71 POLAND
http://www.fif.com.pl e-mail: fif@fif.com.pl

DIGITAL TEMPERATURE REGULATOR	**CRT-05**

5 908312 592662

CE

PURPOSE
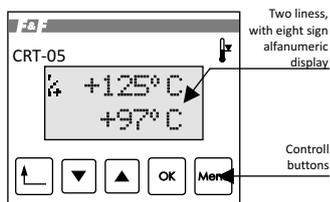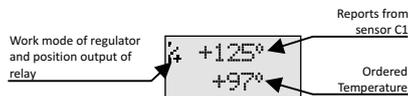
The CRT-05 controller is multi-function, programmable electronic devices which enable control of heating or cooling devices in order to maintain a stable room temperature, as well as to control ambient and substance temperatures in industrial conditions, with the option of supervising technological processes.

- 1 -

CRT-05 is equipped to:
- controlling panel use for programming and monitor to work of regulator;
- possibility of connection temperature probe PT-100;
- output of relay 1P with current load 16A.

CONTROLLERS FEATURES

- control panel for programming and monitoring;
- 2 operations modes: WARMING and COOLING;
- 2 regulated HYSTERESIS values lower and upper limits;
- AUTOMATIC mode operation with one selected function;
- MANUAL mode permanent closing or opening of the contact without a temperature measurement;
- CORRECTION related to the temperature read-out error against the model thermometer;
- WARNING - visual signalisation of the temperature sensor failure, range exceed and speed riasing or falling temperature exceed;
- limiting access to program menu using PIN code;
- LIGHT selection of display illumination mode;
- LANGUAGE program menu in three languages: Polish, English or Russian.

DESCRIPTION OF CONTROL PANEL

To work and programming of regulator CRT-05 is use control panel. It include two line with eight sign on alfanumerical display and keyboard with five buttons, which is situated under the display.

- 2 -

Two liness, with eight sign alfanumeric display

Controll buttons

In standard work mode on display is present value of temperature which is measure by sensor C1. Additional in automatic work mode is displaied ordered value of temperature.

Work mode of regulator and position output of relay

Reports from sensor C1

Ordered Temperature

Signs on the left side of display, signalize work mode of regulator in position of output relay. This sign present:

	Work in automatic mode WARMING - open contact
	Work in automatic mode WARMING - close contact
	Work in automatic mode COOLING - open contact
	Work in automatic mode COOLING - close contact

- 3 -

	Work in mode CONTINUOUS - open contact
	Work in mode CONTINUOUS - close contact
	Value of task temperature was increase at handwork to respect value from program.
	Value of task temperature was reduce at handwork to respect value from program.

BUTTONS FUNCTIONS

Mode	In programming mode button MODE make to return main menu. If button will be push at edition mode, then program return to main menu without save all registry. At standard work of regulator button MODE enable to quick change of work mode. Button MODE enable to delete information about errors.
▲ ▼	At programming mode buttons UP and DOWN make to possibility to select position of menu and to increase or reduce value of edited parameter. At standard work this buttons enable to quick change value of task temperature Tzad.
OK	In programming system mode button OK enable to pass to selected position from menu and enter the changes. In standard work push button OK cause present actual date and time.
Menu	Button Menu enable to pass to programming mode of regulator.

- 4 -

PROGRAMMING

Pass to programming mode is possible by push button MENU.

Structure of main menu:
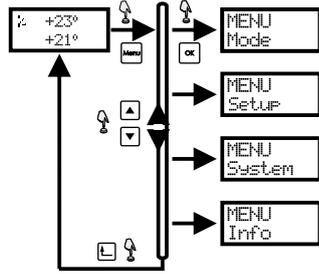
To select position from menu we use buttons „UP" and „DOWN". If you want pass to selected position then you need push button OK. Pass to main menu is possible by push button return.

Menu -> MODE

This mode is use to set mode of work: automatic or handwork. In automatic work position of output relay is depend of reprts from sensor which is connect to regulator and executed program. Hadwork mode make possibility set of output relay independent of reports from sensor.

Instruction to select work mode:
1. By button Menu pass to main menu.
2. Press button OK, to entered pass to menu.
3. By buttons „UP" or „DOWN" select work mode: MANUAL or AUTO, enter by OK.
4. If will choosen handwork mode, will displaied additional menu to set position out of relay (open or close). Select by buttons „UP" or „DOWN" and enter by OK. Pass to main menu without save all settings is possible by push button return.

ATTENTION!

Choose handwork mode is signalise by sign R near sings which present position of relays.

Manual P1 ON	P1 ON - joint of relay is close.
Manual P1 OFF	P1 OFF - joint of relay is open.
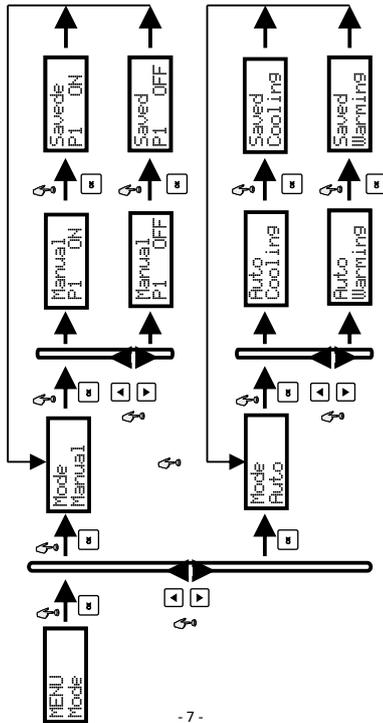
5. In automatic work will displaied menu to select program „COOLING" or „WARMING". By buttons „UP" or „DOWN" select correct program and enter by button OK. Pass to main menu without save all settings is possible by push button return.

Regulator in COOLING mode:

Regulator work with sensor C1 for which is definited ordered value of temperature T1 and high (H1) and low (H2) threshold of hysteresis.
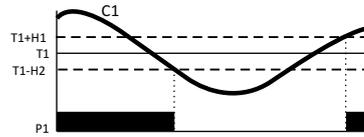
If temperature on input of sensor C1 increase to higher than value (T1+ H1), it cause close of joint P1. Open a joint P1 will make after the temperature on input C1 will be lower than temperature (T1 - H2).

Regulator in WARMING mode:

Regulator work with sensor C1 for which is definited ordered value of temperatureT1 and high (H1) and low (H2) threshold of hysteresis.
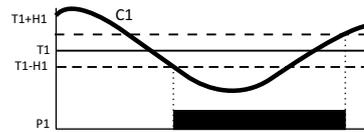
If temperature on input of sensor C1 low to under than value (T1- H2), it cause close of joint P1. Open a joint P1 will make after the temperature on input C1 will be higher than temperature (T1 + H1).
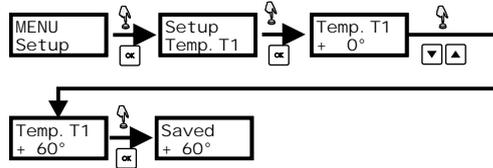
Menu -> SETUP

This menu is use to configuration parameters of regulator in automatic work. If you need edit parameters follow with procedure:
1. By button Menu pass to main menu.
2. By buttons „UP" or „DOWN" select menu Menu -> Settings and enter OK.
3. By buttons „UP" or „DOWN" select parameter to edition and press OK.
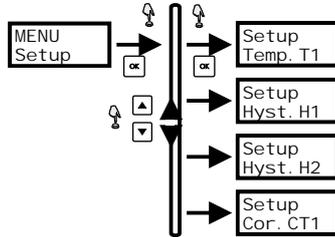
4. By buttons „UP" or „DOWN" set value of parameter and enter by OK.
5. Entered of change is signalize by raport: Saved with value of saving parameter.
6. Possible is out from edition mode to main menu without save all changes by button return.

Example of change parameter value.

EXPLAIN OF ALL SETTINGS

| Setup Temp.T1	**Ordered value of temperature T1** Temperature could be set in range: -100÷400°C with precision 1°C. **ATTENTION!** Possible is quick change value of ordered temperature T1 without pass to menu-> settings. You need in standard work push button OK. It cause display actual value. Next by buttons „UP" or „DOWN" set new value and enter by OK. Push a button return cause out from edition mode without save all changes.
Setup Hyst.H1	**High hysteresis threshold to temperature T1** Hysteresis could be set in range 1 ÷ 100°C with precision 1°C.
Setup Hyst.H2	**Low hysteresis threshold to temperature T1** Hysteresis could be set in range 1 ÷ 100°C with precision 1°C.
Setup Cor.CT1	**Correction reports from sensor C1** Sensor reports could be corrected ±20°C with precision 1°C.

Menu -> System

This menu is use to set settings which were leave, independent of work mode and executing program.
1. By button Menu pass to main menu.
2. By buttons „UP" or „DOWN" select menu Menu -> Settings and enter OK.
3. By buttons „UP" or „DOWN" select option (one of seventh) and enter OK.
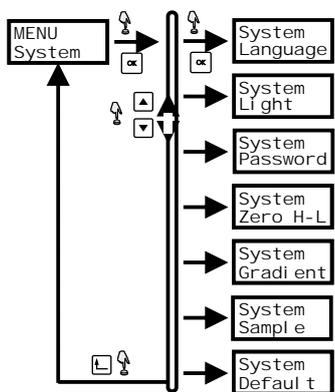
4. System->Language. This parameter make possiblity to choose on of three language in which will be display reports. If you need change language you need pass to menu System -> Language by buttons "UP" or "DOWN" select language and enter by button OK. Return to main menu is possible by push button return.
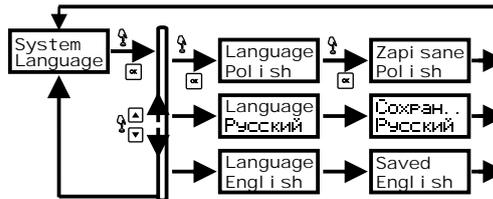
5. System->Light. This parameter make possibility to lighting a display of regulator. Possible is set lighting for all the time for display or lighting only for some second after push any button.
If you need way of lighting you need to pass menu System -> Light and select by buttons „UP" or „DOWN" correct option and enter by button OK. Return to main menu is possible by push button Return.
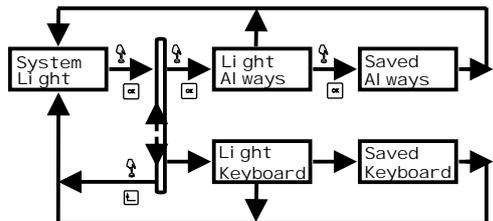
6. System-> Password. This parameter is use to safe acces for all user to menu. Password is a number from range 0 to 999,but save password to 0 unlock a menu. set password anothet tan 0, cause pass timer to safe mode. In cause change of PIN need to pass menu System -> Language and by buttons "UP" or "DOWN" set the first digit of PIN code. Push a button Menu cause pass to edit the next digit of PIN code. After set all PIN enter by button OK, Possible is out from edition PIN code mode without save changes by button return.
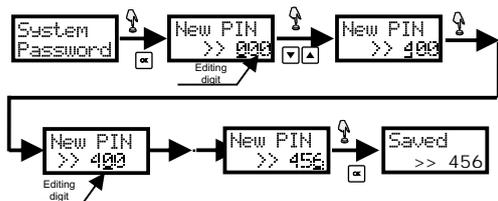
ATTENTION

Work in safe mode is signalize by dispailed a sign ⊊ . In this cause pass to setting of regulator (press button MENU) is previuos by key correct a pin code.

Example of key PIN code:

- 13 -
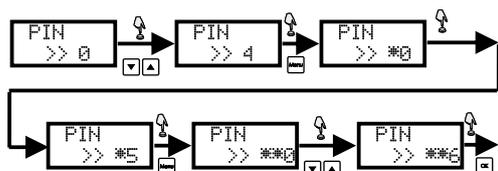
PIN code is keied only once for all time to edit parameters from edition mode. After out from edition mode regulator stay in unlock position about 10sec, (it is signalize by blinking key sign in display). At this time could return to edition mode (button MENU) without key PIN code.
ATTENTION In safe mode possible is quick change ordered temperature T1 i T2 (press button OK in standark work).

7. System -> Zero H-L. This mode is use to delete min and max temperature (which could be read from Menu->Info) registered by sensor. In cause delete min and max value of temperature need pass to menu System -> Zero H-L and enter by OK. Next by buttons „UP" or „DOWN" select value YES and enter by OK.
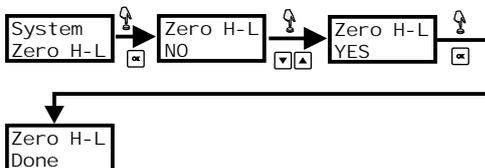

8. System -> Gradient. This parameter make possibility to set max value of change temperature spped. Cross this value will be signalize by ERROR of regulator. If want to change gradient pass to menu System -> Gradient and by buttons „UP" or „DOWN" set gradient value (option list is present under) and enter by OK. Possible is out to main menu without save changes by button return.

- 14 -
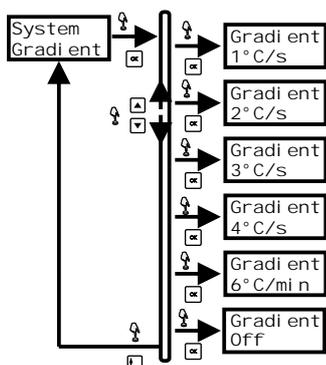
ATTENTION!

Cross acteable speed teperature change value cause error with code 02.

9. System -> Sample. This parameter is use to set frequency wiht will be update reprts from temerature sensor. frequency could be change from range 1÷120 samples for minute. To change sample frequency need to pass menu System -> Samples , by buttons "UP" or "DOWN" set frequency and enter by OK Return to main menu without save all changes is possible by button return.

- 15 -
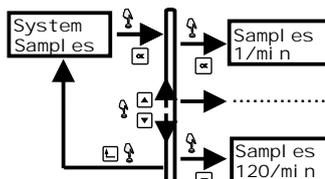
10. System-> Default. Default settings make possibility to return all settings of regulator to target values. If you need restore default settings pass to menu System -> default settings and enter by button OK. Next by buttons „UP" or „DOWN" set value YES and push button OK.
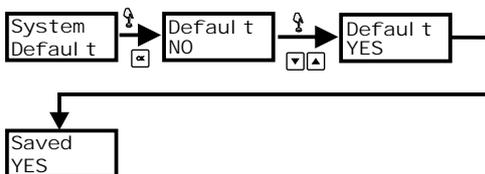

ATTENTION!

Return to default settings cause delete all earlier configurations with saved programs.

Rest of parameters of regulators are set with values:

- 16 -

Mode	Handwork
T1	25,0°C
H1	0,0°C
H2	0,0°C
Correction sensor	0,0°C
Password	Lack
Display illumination	All time
Gradient	Off
Sampling	30 samples/min.
Language	polski

Menu -> Info

This Menu -> Info is use to display max and min values which were registered by temperature sensor.

```
┌──────────┐      ☼   ┌──────────┐
│ MENU     │  →       │ Hi +54°  │
│ Info     │      ☒   │ Lo-23°   │
└──────────┘          └──────────┘
```
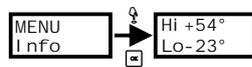
Error codes

Wrong work of regulator is signallise by blinking display illumination and display error number code. Delete information abuot error (if break will be fixed) possible is by push button return.

Explain of error codes:

Error Code: 01	Cross acceptable range for reports from sensor C1. Lack or break sensor C1.
Error Code: 02	Cross acceptable speed change temperature value for sensor C1.

TECHNICAL DATA

CRT-05

supply	230V AC
current load	<16A
joint	separated 1P
range of regulation temperature	-100÷400°C
hysteresis setting range	0÷100°C
precision	1°C
model correction	±20°C
gradient	4°C/s ÷ 6°C/min.
sample frequency	1÷120 samples/min.
power consumption	1,5W
working temperature	-20÷40°C
terminal	screw terminals 2,5mm²
dimensions	3 modules (52,5mm)
fixing	on rail TH-35

PROBE RT4

sensor	PT100
dimensions of sensor	Ø4; h=85mm
sensor isolation	steel bush
cable	PC 3×0,34mm²; l=1,5m

ASSEMBLY

1. Take OFF the power.
2. Regulator put on the rail in the switchgearbox.
3. Connect supply: L to joint 1; N to joint 2.
4 Out cable of temperature probe connect to relay with marks RED cables (7 and 9) to joint 7 and 9, WHITE cable (8) to joint 8 .
5. System of enclose receiver connect in line to joints 4-3.
6. Set program to regulation temperature.

ATTENTION!

For use separated reconnection of joint 1P, were accept in instruction configuration:

JOINT	pos. 3-4	pos. 4-5
OPEN	open	close
CLOSE	close	open

WIRING DIAGRAM

«F&F»®