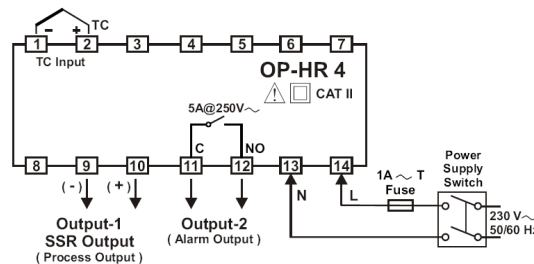**OP-HR 4**

OP-HR 4

Hot Runner Controller

- 4 digit process (PV) and 4 digit set (SV) display
- Process input (TC)
- Programmable ON/OFF, P, PI, PD and PID control forms
- Adaptation of PID Coefficients to the system with Self-Tune operation (Step Response Tuning)
- Alarm functions

SPECIFICATIONS :

Process Input: TC
Termocupl (TC): **J** (IEC584.1)(ITS90)
Measurement Range : 0 - 500°C
Accuracy: ± %0.25 of Scale
Cold Junction Compensation : Automatically ±0.1°C/1°C
Sensor Break Protection: Upscale
Sampling Cycle : 4 samples per second
Input Filter: 1.0 second.
Control Form: ON/OFF, P, PI, PD or PID (Control form can be programmed by the user.)

OUTPUT
Process Output: SSR driver output (Maximum 20mA @12V ⎓)
Alarm Output: Relay (5A@250V∿ at resistive load)

SUPPLY VOLTAGE

230V ∿ (±15%) 50/60 Hz - 3VA
115V ∿ (±15%) 50/60 Hz - 3VA
24V ∿ (±15%) 50/60 Hz - 3VA
(It must be determined in order)

DISPLAY
Process Display :
10.1 mm Red 4 digits LED Display
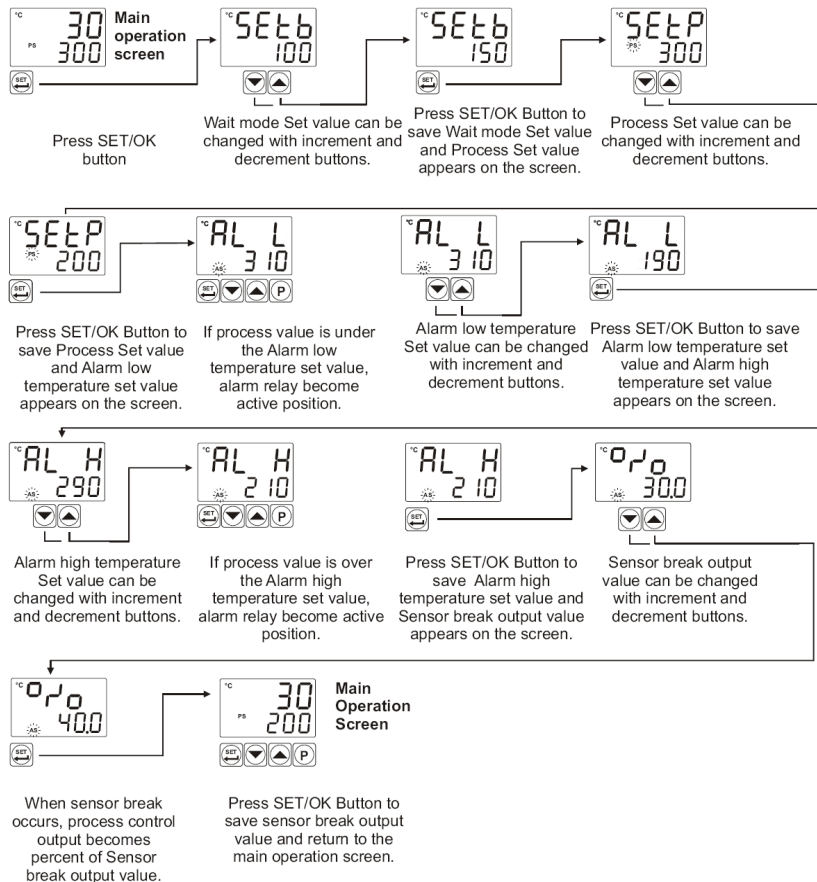**Set Value Display :**
8 mm Green 4 digits LED Display
Leds:
PS (Process Set value), PO (Process output status Led) , AS (Alarm Set value), AO (Alarm output status Led) , °C , °F Leds

ENVIRONMENTAL RATINGS and PHYSICAL SPECIFICATIONS
Operating Temperature: 0...50°C
Humidity : 0-90%RH (none condensing)
Protection Class : IP65 at front, IP20 at rear
Weight: : 220 gr.
Dimension   : 48 x 48mm, Depth:95 mm
Panel CutOut   : 46 x 46mm

ELECTRICAL WIRINGS

Accessing and changing the Process Set, Alarm Set, Wait Mode Set and Sensor Break Output value

Press SET/OK button

Wait mode Set value can be changed with increment and decrement buttons.

Press SET/OK Button to save Wait mode Set value and Process Set value appears on the screen.

Process Set value can be changed with increment and decrement buttons.

Press SET/OK Button to save Process Set value and Alarm low temperature set value appears on the screen.

If process value is under the Alarm low temperature set value, alarm relay become active position.

Alarm low temperature Set value can be changed with increment and decrement buttons.

Press SET/OK Button to save Alarm low temperature set value and Alarm high temperature set value appears on the screen.

Alarm high temperature Set value can be changed with increment and decrement buttons.

If process value is over the Alarm high temperature set value, alarm relay become active position.

Press SET/OK Button to save Alarm high temperature set value and Sensor break output value appears on the screen.

Sensor break output value can be changed with increment and decrement buttons.

When sensor break occurs, process control output becomes percent of Sensor break output value.

Press SET/OK Button to save sensor break output value and return to the main operation screen.
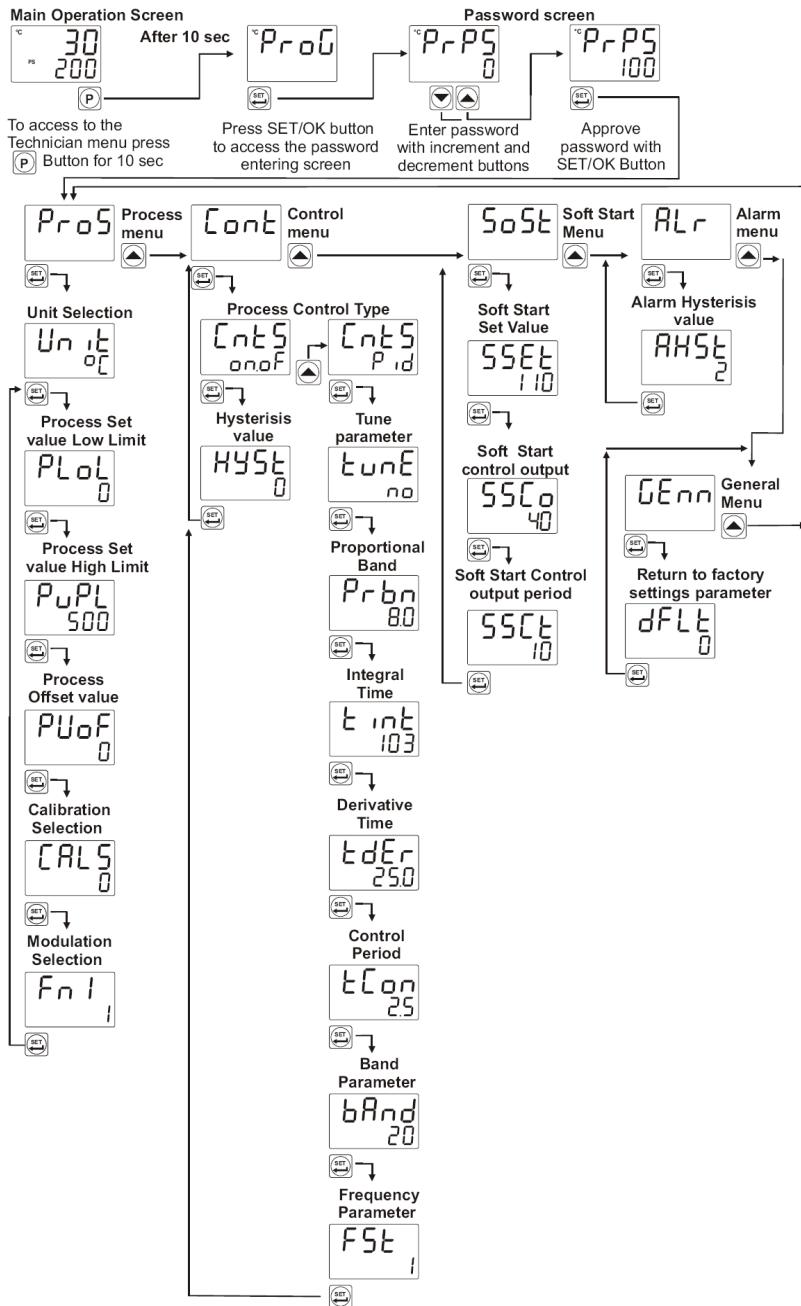
Note-1: To exit changing Set menu without saving the set value, press program button ⊡
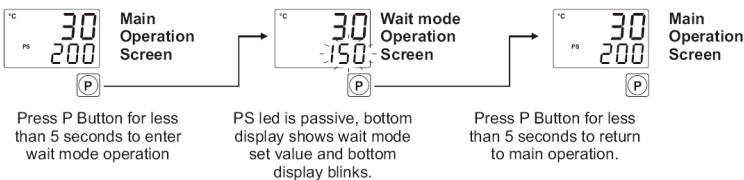
Note-2: While on the main operation screen, heating set value can be changed with ⏷ and ⏶ buttons. New set value will be saved after 15 seconds.

Not-3: If Sensor break occur, "--tC" seen on top display. If user press ⏶ button, then device give a % of sensor break output value to the process output. "--tC" disappear and "%" appears on top display. Process output value shown on bottom display. Although Sensor is fixed, until user press ⏶ button, device is not turn normal operation. If the same button is pressed again, process output will passive and "--tC" is shown on top display.

Easy Access Diagram of Technician Parameters

Main Operation Screen

°C 30
PS 200

(P)

To access to the Technician menu press (P) Button for 10 sec

After 10 sec → `ProG`

Press SET/OK button to access the password entering screen

Password screen

`PrPS` 0

Enter password with increment and decrement buttons

`PrPS` 100

Approve password with SET/OK Button

`ProS` — **Process menu** → `Cont` — **Control menu** → `SoSt` — **Soft Start Menu** → `ALr` — **Alarm menu**

Unit Selection
`Unit` °C

Process Set value Low Limit
`PLoL` 0

Process Set value High Limit
`PuPL` 500

Process Offset value
`PUoF` 0

Calibration Selection
`CALS` 0

Modulation Selection
`Fn1` 1

Process Control Type
`CntS` onoF → `CntS` Pid

Hysterisis value
`HYSt` 0

Tune parameter
`tunE` no

Proportional Band
`Prbn` 8.0

Integral Time
`t int` 103

Derivative Time
`tdEr` 25.0

Control Period
`tCon` 2.5

Band Parameter
`bAnd` 20

Frequency Parameter
`FSt` 1

Soft Start Set Value
`SSEt` 110

Soft Start control output
`SSCo` 40

Soft Start Control output period
`SSCt` 10

Alarm Hysterisis value
`AHSt` 2

General Menu
`GEnn`

Return to factory settings parameter
`dFLt` 0

To enter Wait mode operation

°C 30
PS 200
(P)
Main Operation Screen

°C 30
-150
(P)
Wait mode Operation Screen

°C 30
PS 200
(P)
Main Operation Screen

Press P Button for less than 5 seconds to enter wait mode operation

PS led is passive, bottom display shows wait mode set value and bottom display blinks.

Press P Button for less than 5 seconds to return to main operation.

Parameter Definition

`ProS` : Process Menu Parameters

`Unit` : Unit Selection. It can be adjusted as °C or °F display type.

`PLoL` : Process Set value Low Limit. It can be adjusted from low limit of input type scale low limit to PuPL value.

`PuPL` : Process Set value High Limit. It can be adjusted from PLoL to high limit of input type scale high limit.

`PUoF` : Display offset for process value. It can be adjusted -10% to +10% of scale. The defined value is added to process value.

`CALS` : Device input(sensor) read type. It can be adjusted from 0(factory) to 1(user).

`Fn1` : Device Output modilation type selection parameter. It can be adjusted from 0 (no modulation) to 1 (modulation).

`Cont` : Control Menu Parameters

`CntS` : Heating Control Type Selection. It can be adjusted from `onoF` to `Pid`.

`tunE` : If Tune parameter is adjusted to `YES`, then device starts to calculate PID parameters automatically. This parameter is shown when `CntS` = `Pid`

`Prbn` : Heating Proportional Band. It can be adjusted from %1 to %100.

`t int` : Heating Integral Time. It can be adjusted from 0 to 3600 second.

`tdEr` : Heating Derivative Time. It can be adjusted from 0.0 to 999.9 second.

`tCon` : Heating output Control Period. It can be adjusted from 0.1 to 150.0 second.

`HYSt` : Hysterisis parameter. It can be adjusted from %0 to %50 of defined scale (`PuPL`-`PLoL`)

`bAnd` : Band parameter. After Soft Start operation, this parameter determine that how much degree is remaining to set value for the continious power operation.

`FSt` : If the device output is modulated, this parameter determine it's modulation frequency. If the parameter value is decreasing, modulation frequency is increasing. If the parameter value is increasing, modulation frequency is decreasing.

`SoSt` : Soft Start Menu Parameters

`SSEt` : Soft Start operation is working until process value reach this parameter value.

`SSCo` : Soft Start operation control output percent.

`SSCt` : Soft Start operation output period.

`ALr` : Alarm Menu Parameter
`AHSt` : Alarm Hysterisis value.

`GEnn` : General Menu Parameter
`dFLt` : Return to factory settings. It can be adjusted from 0 to 1. After the user adjust the parameter to 1 and save it, on the new power on the device, the factory settings is downloaded the device.

Note-1: In the Program menu, the parameters can be changed with increment and decrement buttons.

Note-2: To exit without saving the parameter value, press (P) button. Thus, you can return on the top of the menu list.

Note-3: In the Program menu, if you do not press any button for 20 seconds, the device exit from program menu and return to the main operation screen.

Tune Operation

To start Tune operation:
1- Enter the Program menu.
2- In the `Cont` menu, adjust `tunE` parameter to `YES` and press SET/OK button to approve the parameter and return the main operation screen
3- Observe " `tunE` " blinks in Set display.
Note- For starting the Tune operation,
Heating Tune Operation: Process value must be lower than process set value at least 5% of full scale
Cooling Tune Operation : Process value must be greater than process set value at least 5% of the full scale . If this condition is not okay, `tErr` blinks on the screen for 10 seconds.

To cancel Tune operation :
1- If sensor breaks ;
2- If **Self Tune** operation can not be completed in 8 hours ;
3- While heating **Self Tune** is running, if process value becomes greater than Process Set value
4- While cooling **Self Tune** is running, if process value becomes lower than Process Set value
5- While **Self Tune** operation is running, if user changes the process set value;
Then **Self Tune** operation is canceled, device continues to run with former PID parameters without changing PID parameters.

Order Information

OP-HR 4 (48x48 DIN 1/16)	A	BC	D	E	/	FG	HI	/	U	V	W	Z
		23	0		/	01	00	/	0	0	0	0

A	Power Supply	
3	24V ∿ (± %15) 50/60Hz	
4	115V ∿ (± %15) 50/60Hz	
5	230V ∿ (± %15) 50/60Hz	

BC	Input Type	Scale
23	J ,Fe CuNi IEC584.1(ITS90)	-200°C,900°C -328°F,1652°F

D	Communication
0	None

E	Process Output
1	Relay Output (5A@250V∿ on Resistive Load)
2	SSR Driver Output Max. 20mA @12V ⎓

FG	Alarm Output
01	Relay Output (5A@250V∿ on Resistive Load)