OPKON OP-EX 4

226
O1 SV
300

Extruder Controller

SET ↵   ▽   △   P

CE

OP-EX 4

Extruder Controller

- **4 digit process value(PV) and 4 digit set value(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)**
- **Programmable Heating or Cooling Functions for Control Output**
- **Run output**

SPECIFICATIONS :

Process Input: TC
Termocupl (TC): **J** (IEC584.1)(ITS90)
Measurement Range : 0 - 500°C
Accuracy: Skalanın ± %0.25'i,
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
Heating Output: SSR Driver Output (Maximum 20mA @12V ⎓)
Cooling Output: Relay (5A@250V∿ at resistive load)
Run 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 :
SV (Heating Set value), O1 (Heating output Status Led) , O2 (Cooling output status Led), O3 (Run output Status Led), °C , °F Leds

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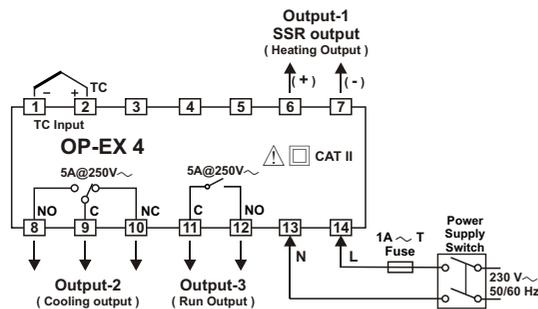**Operating Temperature:** 0...50°C
Humidity : 0-90%RH (none condensing)
Protection Class : IP65 at front, IP20 at rear
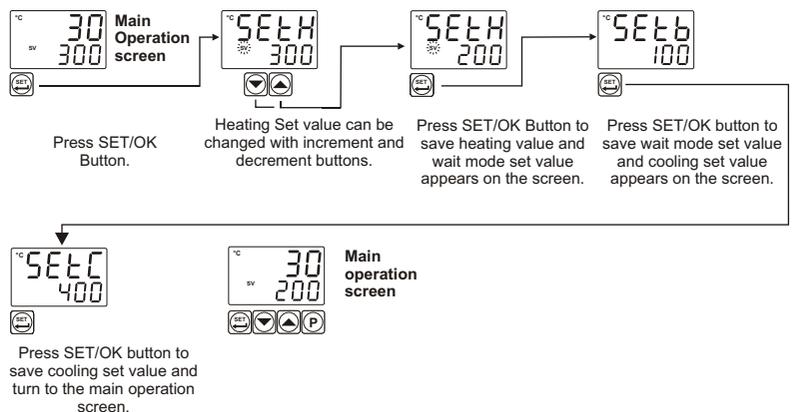**Weight:**   : 220 gr.
Dimension   : 48 x 48mm, Depth:95 mm
Panel CutOut : 46 x 46mm

ELECTRICAL WIRING

Changing Heating Set value, Wait Mode Set value and Cooling Set values

Turn to the Wait Mode
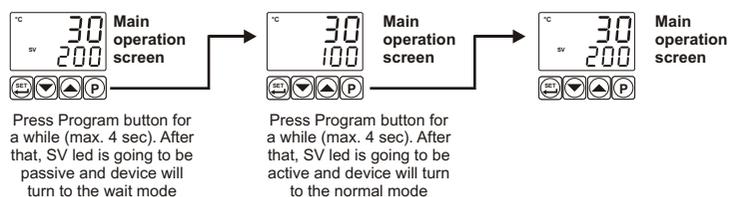
Note-1: To exit changing Set menu without saving the set value, press program button [P]

Note-2: While on the main operation screen, heating set value can be changed with [▽] and [△] buttons. New set value will be saved after 3 seconds.

Note-3: On the top display "--tC" appears, if the sensor breaks.

Note-4: Cooling Set value SEtC is shown, if CSEt = idEP

Easy Access Diagram of Technician Parameters

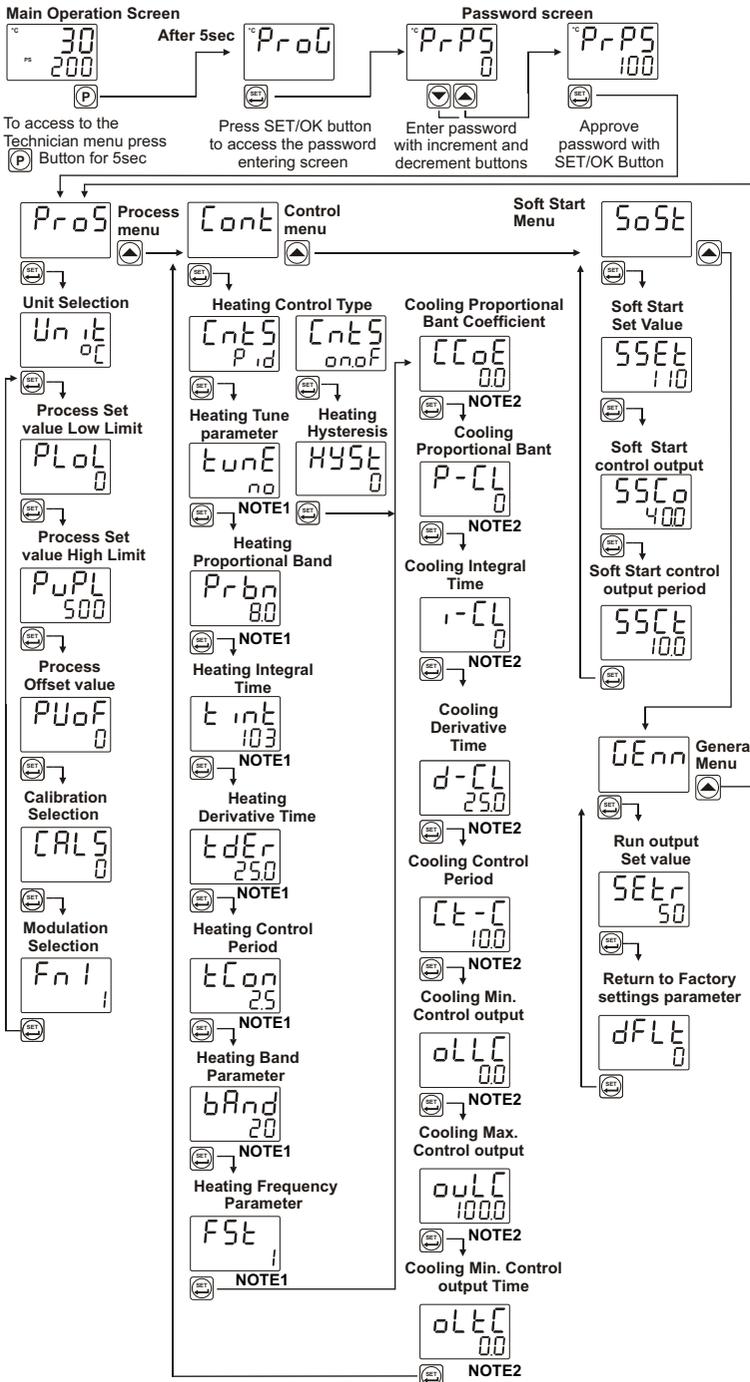**Main Operation Screen**

```
°C    30
PS   200
     (P)
```
To access to the Technician menu press (P) Button for 5sec

After 5sec → `ProG`

Press SET/OK button to access the password entering screen

`PrPS 0` (Password screen)

Enter password with increment and decrement buttons

`PrPS 100`

Approve password with SET/OK Button

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

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`

Heating Control Type
`CntS Pid` / `CntS onoF`

Heating Tune parameter
`tunE no` — NOTE1

Heating Hysteresis
`HYSt 0`

Heating Proportional Band
`Prbn 8.0` — NOTE1

Heating Integral Time
`tint 103` — NOTE1

Heating Derivative Time
`tdEr 25.0` — NOTE1

Heating Control Period
`tCon 2.5` — NOTE1

Heating Band Parameter
`bAnd 20` — NOTE1

Heating Frequency Parameter
`FSt 1` — NOTE1

Cooling Proportional Bant Coefficient
`CCoE 0.0` — NOTE2

Cooling Proportional Bant
`P-CL 0` — NOTE2

Cooling Integral Time
`i-CL 0` — NOTE2

Cooling Derivative Time
`d-CL 25.0` — NOTE2

Cooling Control Period
`Ct-C 10.0` — NOTE2

Cooling Min. Control output
`oLLC 0.0` — NOTE2

Cooling Max. Control output
`ouLC 100.0` — NOTE2

Cooling Min. Control output Time
`oLtC 0.0` — NOTE2

Soft Start Set Value
`SSEt 110`

Soft Start control output
`SSCo 400`

Soft Start control output period
`SSCt 10.0`

`GEnn` **General Menu**

Run output Set value
`SEtr 50`

Return to Factory settings parameter
`dFLt 0`

Technician Parameter Definitions

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.

`tint` : 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` : Hysteresis 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 continios 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.

`CCoE` : Cooling Proportional Band Coefficient. Cooling proportional parameter P-CL is calculated with heating proportional band value Prbn and coefficient CCoE

`P-CL` : Cooling Proportional Band . It can be adjusted from %1 to %100.

`i-CL` : Cooling Integral Time. It can be adjusted from 0 to 3600 second.

`d-CL` : Cooling Derivative Time. It can be adjusted from 0.0 to 999.9 second.

`Ct-C` : Cooling output Control Period. It can be adjusted from 0.1 to 150.0 second.

`oLLC` : Cooling Minimum Control output. It can be adjusted from %0.0 to ouLC

`ouLC` : Cooling Maximum Control output. It can be adjusted from oLLC to %100.0.

`oLtC` : Cooling Minimum Control output time. It can be adjusted from 0.0 second to Ct-C

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.

GEnn : General Menu Parameters

`SEtr` : Run output set value. While the process value is higher than this parameter value, run output is active.

`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) butonuna basınız. 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 **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.

Easy Access Diagram of Operator Parameters

Main Operation screen
```
°C    30
PS   200
     (P)
```
To access to the Technician menu press (P) Button for 5sec

After 5sec → `ProG`

Press SET/OK button to access the password entering screen

`PrPS 0` (Password screen)

Enter password with increment and decrement buttons

`PrPS 10` (Password screen)

Approve password with SET/OK Button

Cooling menu
`CooL LiSt`

Cooling Control Type
`CtYP Pid`

Cooling Set Hysteresis
`CHYS 0` — NOTE3

Cooling Set operation type
`CSEt idEP`

Proportional Band Shifting
`tdiF 0` — NOTE4

NOTE1: If Heating Control Type CntS is selected as ON.OF, then these parameters are not shown.
NOTE2: If Cooling Control Type CtYP is selected as ON.OF, then these parameters are not shown.
NOTE3: If Cooling Control Type CtYP is selected as PID, then this parameter is not shown.
NOTE4: If Cooling Set Operation Type CSEt is selected as idEP, then this parameter is not shown.

Operator Parameters Definitions

`CtYP` : Cooling operation type selection parameter. It can be adjusted as ON/OFF or PID.

`CHYS` : Cooling Set Hysteresis value. It is active when Cooling type is selected as ON/OFF.

`CSEt` : Cooling Set operation. If it is selected as dEP, cooling set value = SetH-tdıF. If it is selected as Idep, cooling set value = SetC.

`tdiF` : Cooling Proportional Band Shifting. If CSEt parameter is dEP, it is shown.

Order Information

OP-EX 4 (48x48 DIN 1/16)

A	BC	D	E	/	FG	HI	/	U	V	W	Z
	23	0	2	/	01	01	/	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	Yok

E	Heating Output
2	SSR Driver output Max. 20mA @12V ⎓

FG	Cooling Output
01	Relay Output (5A@250V∼ on Resistive Load)

HI	Run Output
01	Relay Output (5A@250V∼ on Resistive Load)