OP088-V06

selec **PID528**
Operating Instructions

48 x 48 CE

AUTOTUNE PID TEMPERATURE CONTROLLER

FEATURES

SENSOR

Sensor type	Temperature range (^{o}C)	Resolution (^{o}C)
J	-99 to 750	0.1
K	-99 to 1350	0.1
T	-99 to 400	0.1
R	-99 to 1750	1
S	-99 to 1750	1
RTD	-99 to 850	0.1

DISPLAY TYPE 7 segment LED
Upper Display: 10mm high
Red (Process value)
Lower Display: 7mm high
Green(Set value)

MAIN CONTROL

CONTROL Set1 is in PID or ON/OFF
Set2 is in ON/OFF

OUTPUT Time Proportioning or
Linear DC

A) PROPORTIONAL BAND 0 to 400 ^{o}C (Programmable)
Cycle time : Auto/Manual
(1 to 100 sec Programmable)

B) ON/OFF CONTROL Hysteresis from 0.1 to 99.9^{o}C

AUTO TUNE Via Keys on front Panel

MANUAL RESET For 1^{o} resolution (-99 to 99^{o}C)
For 0.1^{o} : -99.9 to 99.9^{o}C

ACCURACY ± 0.25 % of full scale/ ±1^{o}C
(Whichever is greater)

***SET POINT LIMIT** High limit settable by user

RELAY ACTION a) Forward- for Cooling
b) Reverse - for Heating

SENSOR BREAK Indicated on display,

TC REVERSE Indicated on display,

OUTPUT One relay per set point
(SSR drive models available on request)
Relay rating: For SET1 : 5A,
For SET2 : 5A

POWER SUPPLY 85 to 270 VAC / DC @ 50/60Hz, 24 VAC / DC models available on request

OPERATING TEMP. 0 - 50^{o}C

HUMIDITY 95% RH

WEIGHT 200 grams

COMPLIANCE CE

SAFETY SUMMARY

This manual is meant for the personnel involved in wiring, installation, operation, and routine maintenance of the equipment. All safety related codifications; symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not handled in a manner specified by the manufacturer it might impair the protection provided by the equipment.

⚠ **CAUTION:** Read complete instructions prior to installation and operation of the unit.

⚠ **CAUTION:** Risk of electric shock.

INSTALLATION GUIDELINES

⚠CAUTION:

1.This equipment, being built-in-type,normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.

2.Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.

3.Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to an operator.

⚠CAUTION

1.The equipment shall not be installed in environmental conditions other than those specified in this manual.

2.Fuse Protection**:** The equipment does not contain built-in fuse. Installation of external fuse for electrical circuitry is highly recommended. Recommended rating of such fuse is supposed to be 275 VAC/1 Amp.

3.Since this is a built-in-type equipment (finds place in main control panel), its output terminals get connected to host equipment. Such equipment shall also comply with basic EMI/EMC and safety requirements like BS EN 61326-1 and BS EN 61010 respectively.

4.Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Such ventilation holes shall not be obstructed else it can lead to a safety hazard.

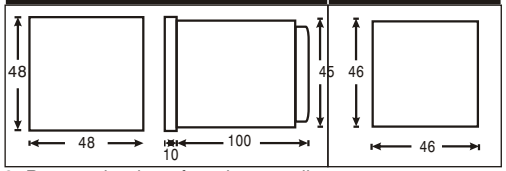
5.The output terminals shall be strictly loaded to the manufacturer specified values/range.

MECHANICAL INSTALLATION:

For installing the controller

1. Prepare the panel cutout with proper dimensions as shown

Outline Dimensions (in mm)	Panel Cutout Dimensions (in mm)



2. Remove the clamp from the controller.

3. Push the controller into the panel cutout. Secure the controller in its place by pushing the clamp on the rear side.

⚠ CAUTION:

The equipment in its installed state must not come in close proximity to any heating sources, caustic vapours, oils, steam, or other unwanted process by-products.

EMC Guidelines:

1. Use proper input power cables with shortest connections and twisted type.

2. Layout of connecting cables should be away from any internal EMI source.

WIRING GUIDELINES

⚠CAUTION

1.To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.

2.Terminals and electrically charged parts must not be touched when the power in ON.

3.Wiring shall be done strictly according to the terminal layout with shortest connections. Confirm that all connections are correct.

4.Use lugged terminals to meet M3.5 screws.

5.To eliminate electromagnetic interference use of short wire with adequate ratings and twists of the same in equal size can be made.

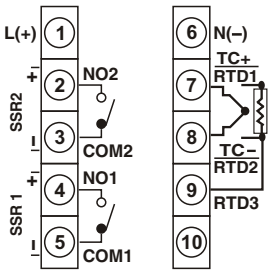
6.Cable used for connection to power source, must have a cross section of 1 or greater. These wires should have insulation capacity made of at least 1.5KV.

MAINTENANCE

1.The equipment should be cleaned regularly to avoid blockage of ventilating parts.

2.Clean the equipment with a soft cloth. Do not use Isopropyl alcohol or any other cleaning agent.

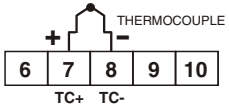
TERMINAL CONNECTIONS



TERMINAL DESCRIPTION	NO.
LIVE (SUPPLY)	1
NO of relay 2	2
COM of relay 2	3
NO of relay 1	4
COM of relay 1	5
NEUTRAL (SUPPLY)	6
Positive of thermocouple or RTD1 (Pt100)	7
Negative of thermocouple or RTD2 (Pt100)	8
Third wire of RTD (PT-100)	9

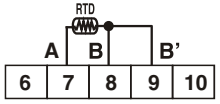
CONNECTION DIAGRAM :

1) FOR THERMOCOUPLE



Connect Thermocouple (T/C) according to polarity shown. Positive of TC at terminal no 7 & Negative of TC at terminal no 8

2) FOR RTD (PT-100) 2 WIRE / 3 WIRE

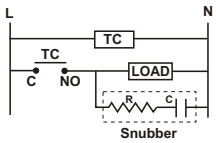


1) FOR 2 WIRE PT-100: Short terminals 8 & 9. Connect PT100 between terminal no. 7 & 8

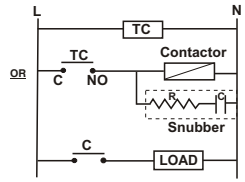
2) FOR 3 WIRE PT-100: Connect RTD1 & RTD2 of 3 wire PT100 to terminal no. 7 & 8. Connect RTD3 of 3 wire PT100 to terminal no. 9.

TYPICAL CONNECTIONS FOR LOADS :

1) For load current less than 0.5A



2) For bigger loads; use interposing relay/contactor.



NOTE: Use snubber as shown above to increase life of internal relay of temperature controller.

CONFIGURATION SCHEME
(parameter setting)

To enter configuration: Press ▲ & ▼ for 3 seconds.

Key press	Display Upper	Display Lower	Name	Description
Press ▲ + ▼ for 3 sec.	SEt2	0000	Set Point 2	- 99 to max. range of sensor for 1° C resl - 99.9 to 999.9 for 0.1°C resl
Press ▲	tUNE	OFF	* Tuning mode	Autotune : To tune the instrument select Tune on and come out of config. Tune LED will blink indicating tune is in progress.
Press ▲	ANL	00	* Manual reset	Programmable from -99.9 to 99.9 for 0.1°C
Press ▲	LOCK	0000	* Config lock code	Fixed Lock Code : 0085. Refer user guide for explanation
Press ▲	INPt	J	Input sensor	Select input sensor type options: J (J) / K (K) / T (t) / R (r) / S (S)/ RTD(rtd)
Press ▲	rESL	1	Display resolution	Resolution 0.1 or 1°C [Valid only for J (J) / K (K) / RTD(rtd)]
Press ▲	rLY1	rE	Output mode of relay 1	Select reverse rE for heating & forward Fd for cooling application
Press ▲	rLY2	rE	Output mode of relay 2	Select reverse rE for heating & forward Fd for cooling application
Press ▲	SEt2	Abs	Set Point 2	Absolute/Deviation Toggle between Abs / dEU mode by pressing of ■ + ▲ keys
Press ▲	HYS2	01.0	Hysteresis of Set2	Programmable from 0.1 to 99.9°C
Press ▲	Pb	010	Proportional band	Proportional band programmable from 0.0 to 400.0 °C

Note : To operate in ON/OFF mode make Pb = 00

Key press	Display Upper	Display Lower	Name	Description
Press ▲	Int.t	0120	Integral time	Integral time (reset) programmable from 0 to 3600 sec. This parameter is prompted only in PID mode. i.e. When PB>0
Press ▲	dEr.t	030	Derivative time	Derivative time (rate) programmable from 0 to 200 sec. This parameter is prompted only in PID mode. i.e. When PB>0
Press ▲	CYC	020	Cycle time	Range: 1 to 100 sec
Press ▲	HYS1	01.0	Hysteresis of Set1	Valid only for ON/ OFF mode Programmable from 0.1 to 99.9
Press ▲	HIGH	0750	High Level Limit	Select the maximum limit of setpoint.
Press ▲	LSP1	no	Lock set point	Lock setpoint1 Toggle between no / YES with each press of ■ + ▲ keys
Press ▲	LSP2	no	Lock set point	Lock setpoint1 Toggle between no / YES with each press of ■ + ▲ keys
Press ▲	rSEt	no	Reset	Reset all parameters to default values. Toggle between no / YES with each press of ■ + ▲ keys

Press ▲ + ▼ for 3 sec. to come out of programming.

NOTE: * mark explain in user guide.

Programming Set Point

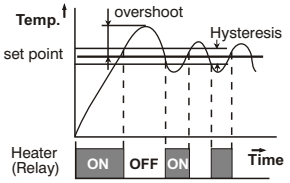
A) To view set point : Press ■ key

B) To increase / decrease set point : Press ■ + ▲ / ▼

Continuous operation of above makes update speed faster in 3 stages after 7 seconds.

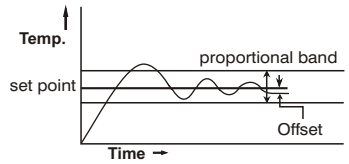
USER GUIDE:

1. ON/OFF control action (For heating):
The relay is 'ON' up to the set temperature and cuts 'OFF' above the set temperature. As the Temperature of the system drops, the relay is switched 'ON' at a temperature slightly lower than the Set point.



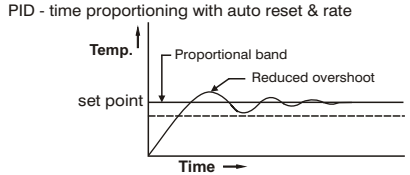
HYSTERESIS: The difference between the temperature at which relay switches 'ON' and at which relay switches 'OFF' is the hysteresis or dead band.

2. Time proportional control: In time proportional control, the relay 'ON' time and relay 'OFF' time varies in proportion to the deviation of the actual temperature from the set value. The proportional action occurs within a band about the set point. The proportional mode of control gives closer control than ON/OFF type.



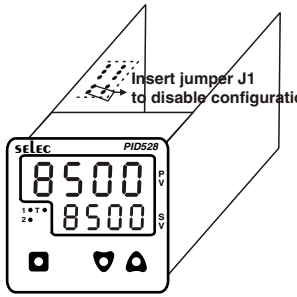
3. Off set adjustment (manual reset): After some time the process temperature settles at some point and there is a difference between the set temperature & the controlled temperature. This difference can be removed by setting the manual reset value equal & opposite to the offset.

4. Auto tuning: The auto tuning function automatically measures, compute and sets the proportional band (P), integral time (I) and Derivative time (D). While Auto tuning, the controller performs proportional Control and determine proper P.I.D. Values.



5. Set point limit:
All set points are programmable from low to high limit. For 0.1° resolution set points are programmable from low to high limit between -99.0 to + 999.9 °C/°F

6. Configuration lock code: To enable configuration lock first remove the housing and then remove the jumper J1. To scroll through next functions set lock = 0085.



CALIBRATION CERTIFICATE

Date:

Model No: _____

Sr. No.: _____

Claimed Accuracy: ± 0.25% of full scale ±1 digit
(After 20min warmup time)

Sources calibrated against:
Kusam-meco, model 405, Sr.No.:104446

Multimeter calibration report no:
CC/FCL/1131/09-10 IDEMI

The calibration of this unit has been verified at the following values:

SENSOR	CALIBRATION TEMP (°C) (0.1 resolution)	DISPLAY VALUE (°C)
K	35.0	35.0
	700.0	700.0
	1350	1350
PT100	0.0	0.0
	500.0	500.0
	800.0	800.0

The thermocouple / RTD curves are linearised in this microprocessor based product; and hence the values interpolated between the readings shown above are also equally accurate; at every point in the curve.

Unit is accepted as accuracy is within the specified limit of claimed accuracy and certificate is valid upto one year from the date of issue.

CHECKED BY:

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(Specifications subject to change as development is a continuous process).

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