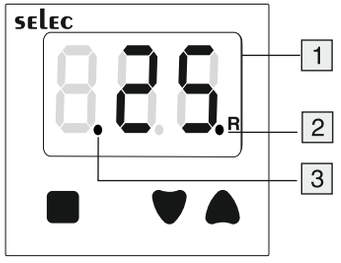
- **Use only the correct thermocouple wire or compensating cable from the probe to instrument terminals avoiding joints in the cable if possible.**
  Failure to use the correct wire type will lead to inaccurate readings.

  Ensure that the input sensor connected at the terminals and the input type set in the temperature controller configuration are the same.

FRONT PANEL DESCRIPTION



1 Process-value (PV) / Parameter name display	1) Displays a process value (PV). 2) Displays the parameter symbols at parameter setting mode for 1 sec and then parameter values. 3) Displays PV error conditions. (refer Table 2)
Set-value (SV)	4) Displays a set value (SV) when ■ key pressed.
2 Control output indication	Decimal point Lit When control output is on
3 Tune	1) Auto tune : Blinking at faster speed.

WARNING: Please check the power supply voltage and controllers output type ordered (with reference to the order code) before installation.

FRONT KEYS DESCRIPTION

Functions	Key press
Online	
To view Level 1	Press ▼ key for 3 seconds.
To view Level 2	Press ▲ key for 3 seconds.
To view Protection Level	Press ▲+▼keys for 3 seconds.
To view and change set point value	Press ■ to view the set point. Press ■ +▲ / ▼ key to change the set point.
Programming Mode	
To view parameters on the same level.	▲ or ▼ key once to view the next or previous function in operational menu.
To increase or decrease the value of a particular parameter.	■ + ▲ to increase and ■ + ▼ to decrease the function value. **Note:** Parameter value will not alter when respective level is locked.
NOTE: The unit will auto exit programming mode after 30 seconds of inactivity. OR By pressing the ▲ or ▼ or ▲ +▼keys for 3 seconds.	

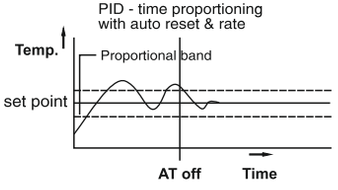
USER GUIDE

1. Display Bias:
This function is used to adjust the PV value in cases where it is necessary for PV value to agree with another recorder or indicator, or when the sensor cannot be mounted in correct location.

2. Filter Time Constant
The input filter is used to filter out quick changes that occur to the process variable in a dynamic or quick responding application which causes erratic control. The digital filter also aids in controlling processes where the electrical noise affects the input signal. Larger the value of FTC entered, greater the filter added and the slower the controller reacts to the process and vice versa.

3. Auto tuning:
The Auto-tuning function automatically computes and sets the proportional band (P), integral time (I), Derivative time (D), ARW% and cycle time (CY.T) as per process characteristics.

- ***Decimal point of LSD flashes at faster speed while auto-tuning is being performed.***
- ***At the completion of Auto-tuning, the decimal point stops blinking.***

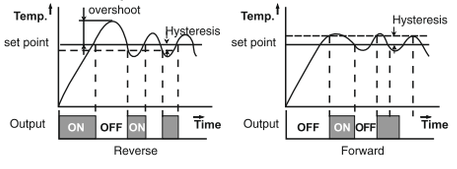


- If the power goes OFF before auto-tuning is completed, auto-tuning will be restarted at next power ON.

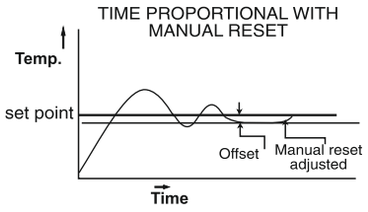
- If auto-tuning is not completed after 3-4 cycles, the auto-tuning is suspected to fail. In this case, check the wiring & parameters such as the control action, input type, etc.
- Carry out the auto-tuning again, if there is a change in setpoint or process parameters.

4. ON / OFF control action (For Reverse Mode) :
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. temperature slightly lower than the set point.

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

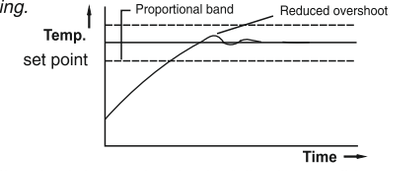


5. Manual Reset (for PID control & I=0):
After some time the process temperature settles at some point and there is a difference between the set temperature & the controlled temperature. This difference can be removed by setting the manual reset value equal & opposite to the offset.



6. Self Tune (ST) : It is used where modification of PID parameters is required repeatedly due to frequent change in process condition eg. Setpoint.

- *Tune LED blinks at slower rate when Self-tuning is in progress.*
- *At the completion of self-tuning, Tune LED stop blinking.*



- Self-tuning is initiated under the following conditions :
  1) When setpoint is altered.
  2) When tune mode is altered. (TUNE=ST)
- ST will start only if PV < 50% of setpoint.
- ST will work only when ACT=RE.

INPUT TYPE	RANGE	
	Resolution: 1	UNIT
J	-199 to 750	°C
	-199 to 999	°F
K	-199 to 999	°C
	-199 to 999	°F
RTD*	-150 to 850	°C
	-238 to 999	°F

NOTE: * Not Applicable for TC Model

Table 2 : ERROR DISPLAY

When an error has occurred, the display indicates error codes as given below.

Error	Description	Control Output Status
S.br	Sensor break / Over range condition	OFF
S.rE	Sensor reverse / Under range condition	OFF

CALIBRATION CERTIFICATE

Model No : DTC503 / DTC231 / DTC331

Claimed Accuracy :
For TC inputs :
0.25% of FS ±1°C
(30 min of warm up time for TC input)
*For RTD inputs: 0.1% of FS ±1°

Standard used for Calibration of product is traceable to NABL

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

SENSOR SELECTION	VERIFICATION VALUE (°C)
K	25.0
	475.0
	975.0
RTD*	0.0
	323.5
	800.0

Note :-1.The verification values are approximate values with ± 5°C range.
2.* Not Applicable for TC Model

The thermocouple curves are linearized in this microprocessor based product; and hence the values interpolated across the input range 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.

(Specifications are subject to change, since development is a continuous process.)

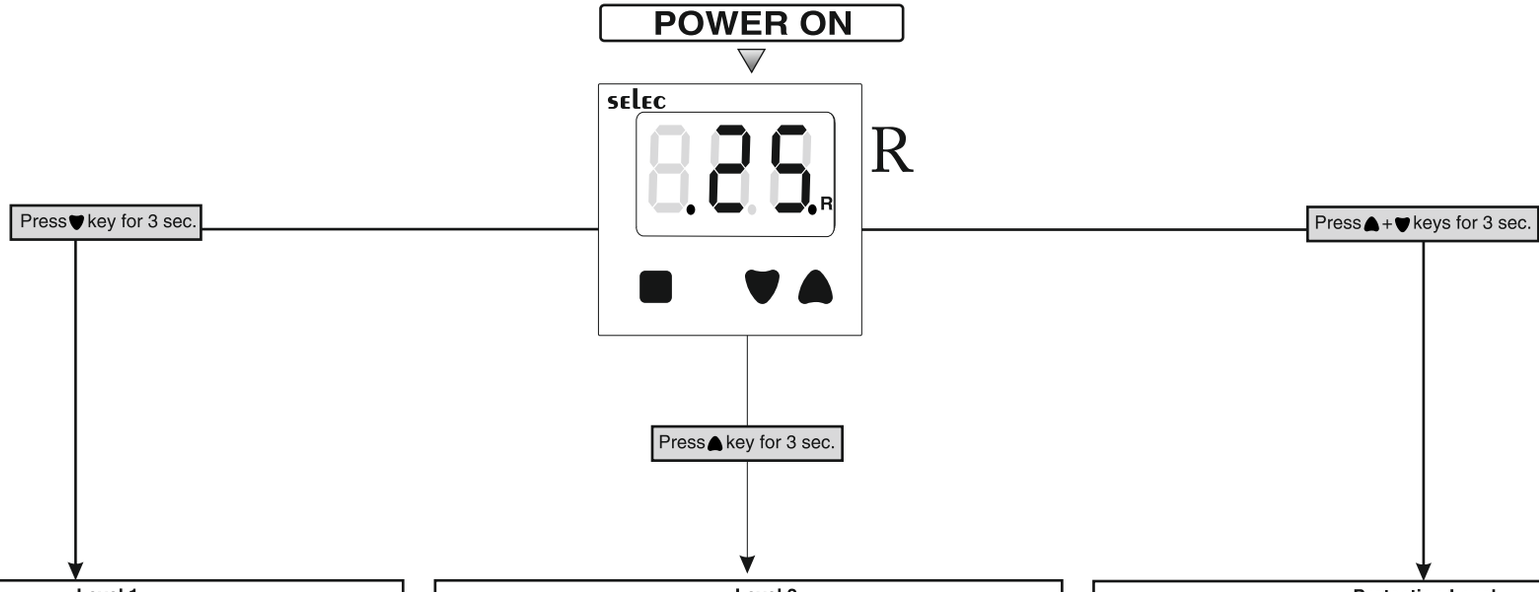
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CONFIGURATION INSTRUCTIONS

KEY FUNCTIONS

▲ ⇨	Press for 3 sec to enter Level 2
	Press once to view next parameter in configuration menu
▼ ⇨	Press for 3 sec to enter Level 1
	Press once to view previous parameter in configuration menu
▲ + ▼ ⇨	Press for 3 sec to enter protection Level
■ + ▲ or ■ + ▼ ⇨	Allows the user to increase or decrease associated parameter value
▲ or ▼ or ▲ + ▼ ⇨	To exit configuration menu press any of these keys for 3 sec

OPERATIONAL MENU



Level 1

Display (For 1sec)	Description	Default Value	Range	Display Condition
INP	Input type (Refer Table 1)	J/PtD*	J / K / RTD*	—
Unt	Temperature unit	°C	°C / °F	—
SP.L	Set point low limit	-199	Min range of sensor selected to SP.H	—
SP.H	Set point high limit	750	SP.L to Max range of sensor selected	—
FtC	Filter time constant (Refer user guide)	1.0	0.2 to10.0 sec	—
Act	Control action	rE	RE / FD	—
Cnt	Control logic	ONF	PID / ONF	—
Ary	Anti reset windup%	25	1 to 100 %	For CNT=PID
rSt	Factory default (Reset all)	no	NO / YES	—

NOTE: * Not Applicable for TC Model

Level 2

Display (For 1sec)	Description	Default Value	Range	Display Condition
tUn	Tune (Refer user guide)	OFF	OFF / AT	For CNT=PID
P	Proportional band	10	1 to 400°	For CNT=PID
I	Integral time	2.0	0.0 to 99.9 min	For CNT=PID
d	Derivative time	30	0 to 999 sec	For CNT=PID
Cyt	Cycle time	15.0	0.1 to 99.9 sec	For CNT=PID
HyS	Hysteresis	1.0	0.1 to 99.9°	For CNT=ONF
mn.r	Manual reset (Refer user guide)	0.0	-19.9 to 19.9°	For CNT=PID & I=0
dS.b	Display bias (Refer user guide)	0.0	-19.9 to 19.9°	—

Protection Level

Display (For 1sec)	Description	Default Value	Range	Display Condition
SP	Lock setpoint	UnL	UNK / LCK	—
LU1	Lock Level 1	UnL	UNK / LCK	—
LU2	Lock Level 2	UnL	UNK / LCK	—

Note

1. Locking parameters (LV1 or LV2 or SP) will not permit change in the value of respective level parameters.
2. Continuos operation of ■ +▲/▼keys for SP or other parameters makes Update speed faster in 3 stages after 3 seconds.

Programming Setpoint (Online): Default: 50

Range: SP.L to SP.H

To view setpoint: Press the ■ key.
To increase/decrease setpoint: Press ■ +▲/▼keys.