



Digital Temperature Controller

SPECIFICATIONS

Input type	Range	Input type	Range
E	-200 to 1000 °C	PT100 (0.1 °C)	-199.9 to 850.0 °C
J	-200 to 1200°C	-10 to 20mV	-1999 to 9999 (Field Scalable)
K	-200 to 1370°C	0 to 75mv	
T	-200 to 400°C	0 to 100mV	
B	450 to 1800 °C	0 to 2V	
R	0 to 1750°C	0.4 to 2V	
S	0 to 1750°C	0 to 5V/0 to 20mA	
N	-200 to 1300 °C	1 to 5V/4 to 20mA	
C	0 to 2310°C	0 to 10V	
G	0 to 2310°C		

Table 1.1

Inputs

Input Type	Thermocouple (E, J, K, T, B, R, S, N, C, G), RTD (Pt100), Current, Voltage
Accuracy T /C and RTD : TC(B,R,S): Linear:	±0.1% of FS ± 1 degree ±0.2% of FS ± 1 degree ±0.1% of FS ± 1 count
Resolution	ADC:17bits,Display:0.1°C/1°C
Sampling Rate	4 Samples/Sec
CJC Error	±2.0 °C Max
Sensor Burnout current	0.25uA
RTD excitation current	1mA Max
Allowable wiring resistance for RTD	Maximum 15 ohms/wire (Conductor resistance between three wires should be equal)
NMRR	> 40 dB
CMRR	> 120 dB
Input Impedance	> 1MΩ
Max Voltage	20VDC

Display & Keys

PV	4-Digit, 7-Segment, 0.56" High, Red
SV	4-Digit, 7-Segment, 0.4" High, Green
Status LEDs	Red LEDs for RELAY, Alarm status & Set Point selection 1, 2 and 3.
Keys	Menu, Escape, Shift, Increment and ACK

Output Types

Relay/ Alarm Output	
Relays	4(Configurable for control/Alarm)
Type	Single Change over (C, NO, NC)
Rating	5A @ 230VAC / 30VDC

Mode	Proportional*or ON/OFF control(field selectable)
Note: * proportional control settable for relay No.1 only.	
Control Output (Field Programmable)	
Output Type	ON/OFF or Proportional
Proportional Band	0.1 to 999.9
Cycle time	1 to 250 Sec
MR (Manual Reset)	-50% to 50%
Hysteresis	1 to 250 (on/off mode)
Retransmission Output (Optional)	
Current	0/4-20mA @ 500 ohms max.
Voltage	0/1-5V,0-10V @ 3Kohms min.
Accuracy	±0.25% of FS
Communication Output	
Interface	RS485 (2 Wire)
Protocol	Modbus-RTU
Baud rate	9600, 19200 bps
Loop Power Supply	
LPS	24VDC (±1V) @30mA with Inbuilt Short Circuit Protection

Power Supply

Standard	85-265VAC/ 100-300VDC
Power consumption	<12 VA
Optional	18-36VDC

Isolation (Withstanding voltage)

- Between primary terminals* and secondary terminals**:
- At least 1500 V AC for 1 minute
- Between primary terminals* and grounding terminal:
- At least 1500 V AC for 1 minute
- Between grounding terminal and secondary terminals**:
- At least 1500 V AC for 1 minute

- Between secondary terminals**:
- At least 500 V AC for 1 minute

* Primary terminals indicate power terminals and relay output terminals.

** Secondary terminals indicate analog I/O signal and Communication O/P.

Insulation resistance: 20MΩ or more at 500 V DC between power terminals and grounding terminal.

Advance Feature

- Input scalability for linear input

Physical

Dimension(H x W x D)mm	96 x 96 x 110
Front Bezel(H x W)mm	96 x 96
Panel Cutout mm(H x W)	92.5 + 0.8 x 92.5 + 0.8
Depth Behind Panel mm	110
Weight (Approx.)	500g.
Installation	Panel-mounting
Enclosure Material	Molded ABS
Enclosure Protection	IP 20
Terminal Cable Size	2.5mm ²

Environmental Conditions

TEMPCO	
Input to PV Display	< 100ppm/°C
Display to RX	< 100ppm/°C
Humidity	20% to 95% RH (Non-Condensing)
Instrument Warm-up Time	Approx. 15 minutes
Ambient temperature	0 to 55°C
Storage Temperature	0 to 80°C

Special Feature

Square RootExtraction
Input Scalability (For Linear Input type)

SAFETY/WARNING PRECAUTIONS

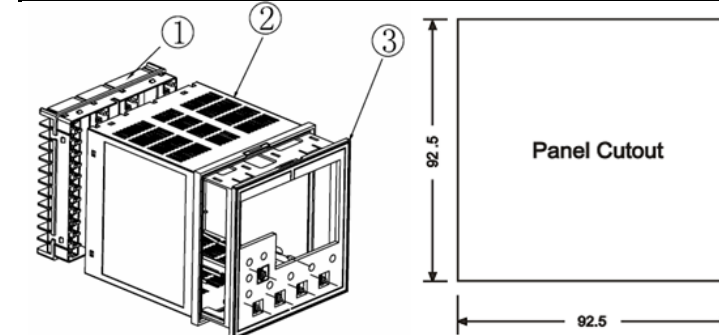
To ensure that the device can be operated safely and all functions can be used, please read these instructions carefully.

Installation and Start-up must be carried out by qualified personnel only. The relevant county-specific regulations must also be observed.

Before start-up it is particularly important to ensure:

- Terminal wiring: check that all cables are correctly connected according to the connection diagram
- All wiring must confirm to appropriate standards of good practice and local codes and regulations. Wiring must be suitable for voltage, current and temperature rating of the system.
- Unused control terminals should not be used as jumper points as they may be internally connected, which may cause damage to the unit.

MOUNTING DETAILS

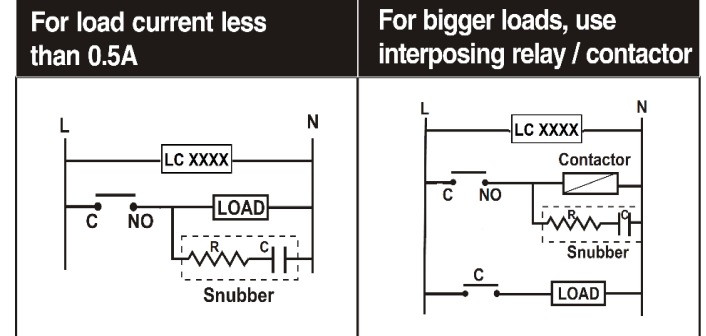


FRONT PANEL DESCRIPTION

Symbol	Function
	- It is used to increment the parameter for selection. - Value of parameter can be incremented by pressing this key. - When first time increment key pressed, DP (decimal point) in SV display blink, so user can modify the value with increment key. - It is used to increment the value in particular digit. Value can be incremented from 0- 9 and from '9' again it rollovers to '0'.
	- It is used to Shift the digit to set the parameter as describe in increment key when DP (decimal point) started to blink. - Menu key is used to go forward to show next parameter and Shift key is used to go backward to show previous parameter.
	It is used to enter in the sub menu (various levels) and save the parameters to nonvolatile memory, when user setting a proper data by Increment and shift key for parameter configuration.
ESC	It is used to come out from any sub menu (various levels) to the run mode.
ACK	It is used as Acknowledgement key for Alarm type relay.
Process Value Display	4 digit 0.56 inch RED Display - Display process value. - Display parameter name when user set parameter. - Display error message when an error occurs.
Set Value Display	4 digit 0.4 inch GREEN Display - Display set value. - Display parameter value of parameter in process value field when user set parameter.

RL1, RL2	- In Heat action, RL1 lamp will indicate the on status of the heat output. - When Alarm 1 & 2 Occurs, Respective Alarm lamp will light (In Red).
RL3, RL4	When Alarm 3 & 4 occurs, respective Alarm lamp (RL3 & RL4) will light (In Red).
T,R	Indicator lamps will blink when the communication is on.
SP-1	Indicator lamp will on when Set Point for Alarm 1 is selected. All controller action with respect to SP-1
SP-2	Indicator lamp will on when Set Point of Alarm 2 is selected.
SP-3	Indicator lamp will on when Set Point of Alarm 3 is selected

LOAD CONNECTION



Electrical precautions during use

Electrical noise generated by switching of inductive loads can create momentary disruption, erratic display, and latch up, data loss or permanent damage to the instrument. Use of snubber circuits across loads as shown above, is recommended.

CONTROL FUNCTION

Direct/Reverse Control (Output Direction):

For Heat (Reverse Action) and Cool (Direct Action) type Proportional control logic, user has to program the proportional band for proper control. They can be changed manually as explained in control parameters.

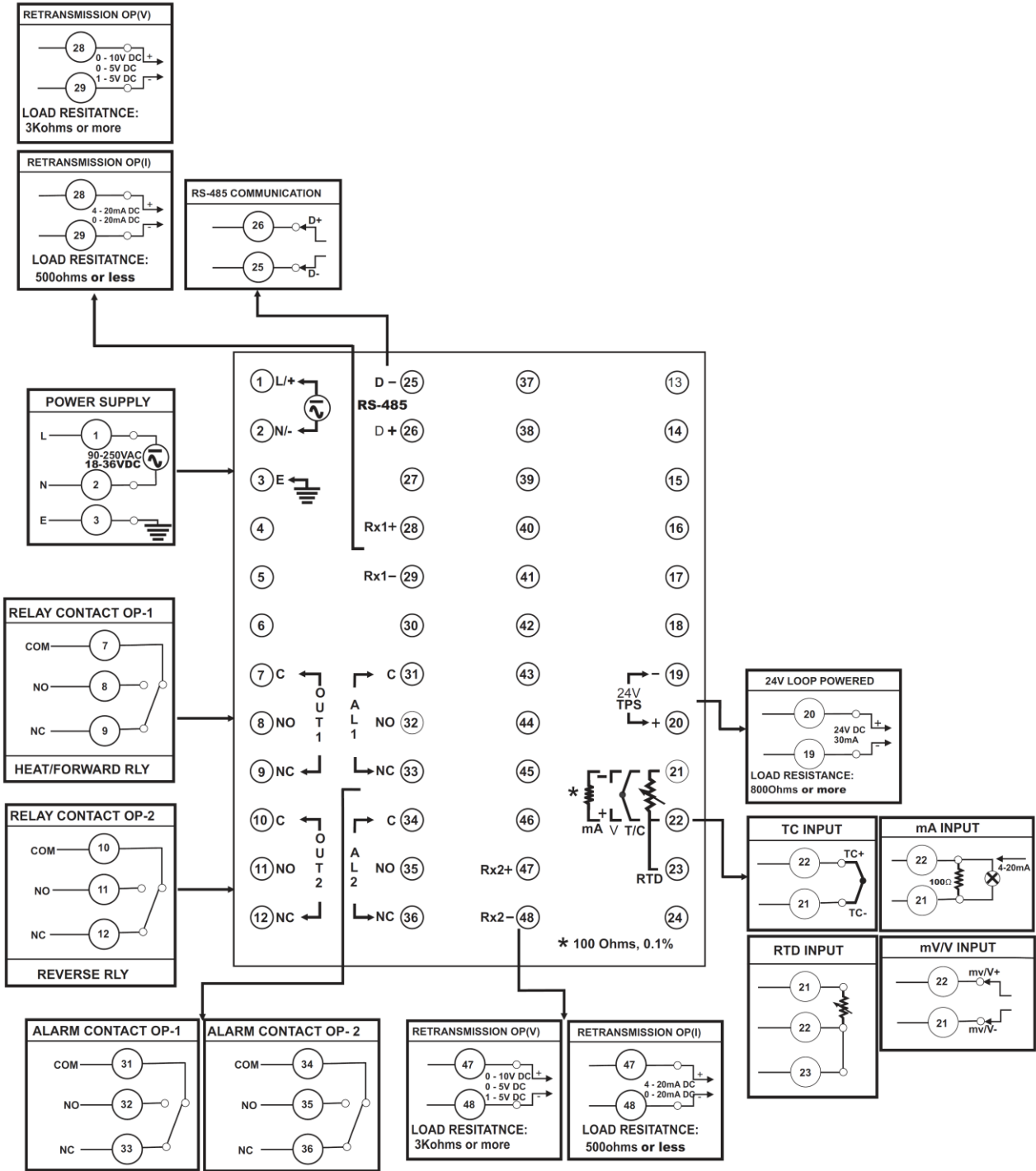
Control Parameter:

Proportional Band:

Proportional action is the action which the control output varies in proportion to the deviation between the setting value and the processing temperature. If the proportional band is narrowed, even if the output changes by a slight variation of the processing temperature, better control results can be obtained as the offset decreases. However, if when the proportional band is narrowed too much, even slight disturbances may cause variation in the processing temperature, and control action changes to ON/OFF action and the so called hunting phenomenon occurs. Therefore, when the processing temperature comes to a balanced position near the setting value and a constant temperature is maintained, the most suitable value is selected by gradually narrowing the proportional band while observing the control results.

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. Range for the manual reset is -50.0% to +50.0% of proportional band.

TERMINAL CONNECTIONS

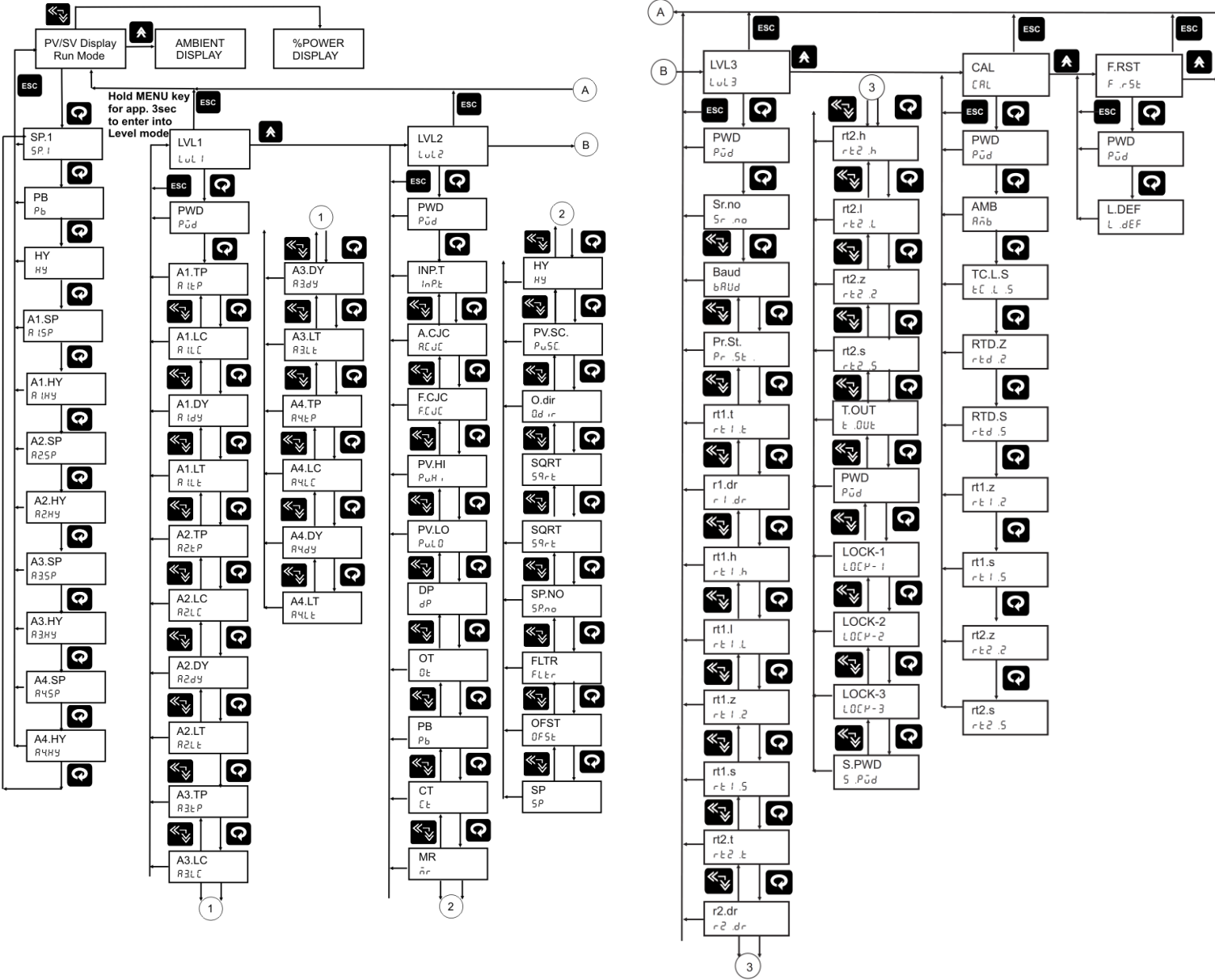


ORDERING CODE

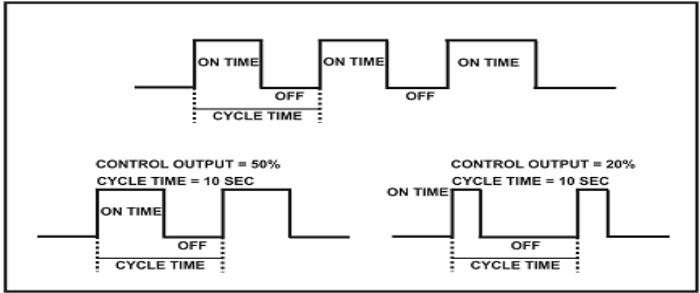
Model	Input			Power Supply		Retransmission o/p		Communication o/p	
5002U-P	X			X		X		X	
	1	E	9	Pt-100	U1	85-265VAC /100-300 VDC	N	None	N
	2	J	A	-10 to 20 mV	U2	18-36VDC	1	4-20 mA	Y
	3	K	B	0 to 75mV			2	0-20 mA	
	4	T	C	0 to 100 mV			3	1-5V	
	5	B	D	0.4 to 2V			4	0-5V	
	6	R	E	0 to 2V			5	0-10V	
	7	S	F	0 to 5V					
	8	N	G	1 to 5V					
	P	C	H	0 to 10 V					
	Q	G	S	Special+					

+: Consult Factory

MENU LAYOUT



Cycle Time: The Cycle time for output is the time where the output is on for percentage of that time and off for a percentage of that time, creating a portioning effect. The cycle time is only used where PI, PD or PID control action is used. The shorter the cycle time, the higher the proportionate resolution is, and better is the control. For Relay output: Set to 10 to 300 seconds or more



Digital Filter (FLTR):- In certain application the process value is too unstable to be read. To improve this, a programmable low pass filter incorporated in the controller can be used. This is a first

order IIR filter with time constant specified by **FLTR** (**FLTR**) parameter of **LEVEL-3**. The input filter will reduce the oscillation or fluctuation of the process value. Excessive filter can be dangerous, may produce an unstable process.

For operation manual please visit www.masibus.com
 Specifications are subject to change without notice due to Continuous improvements.
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