

EPSILON 48X48

Self Tune PID Process Controller
with Ramp / Soak Profile



Operation Manual

This brief manual is primarily meant for quick reference to wiring connections and parameter searching. For more details on operation and application; please log on to www.ppiindia.net



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CONFIGURATION PARAMETERS : PAGE 12	
Parameters	Settings (Default Value)
Control Output (OP1) Type C.OP	rLy Relay
	SSr SSR
	0-20 0 - 20 mA
	4-20 4 - 20 mA
	0-5 0 - 5 V
	0-10 0 - 10 V (Default : Relay)
Control Action C.Act	OnOff On-Off
	PULS Pulse
	Pid PID (Default : PID)
Control Logic CtrL	rEu Reverse
	dir Direct (Default : Reverse)
Input Type inpT	Refer Table 1 (Default : Type K)
PV Resolution rSLn	Refer Table 1 (Default : 1)
PV Units Unit	0C °C 0F °F (Default : °C)
PV Range Low rLo	-1999 to 9999 (Default : 0)
PV Range High rHi	-1999 to 9999 (Default : 1000)
Setpoint Low Limit SPLo	Min. Range for the selected Input Type to Setpoint High Limit (Default : -199)
Setpoint High Limit SPHi	Setpoint Low Limit to Max. Range for the selected Input Type (Default : 1376)
Offset for PV OFSt	-199 to 999 or -199.9 to 999.9 (Default : 0)
Digital Filter Time Constant Flt	0.5 to 60.0 Seconds (in steps of 0.5 Seconds) (Default : 2.0 Sec.)
Sensor Break Output Power SbOP	-100 to 100 (Default : 0)

Parameters	Settings (Default Value)
Pulse Time PLt	Pulse ON Time to 120.0 Seconds (Default : 2.0 sec.)
ON Time Ont	0.1 to Value set for Pulse Time (Default : 1.0)
* Cool Hysteresis CHYS	1 to 999 (Default : 2)
* Cool Pulse Time CPLt	Cool ON Time to 120.0 Seconds (Default : 2.0)
* Cool ON Time COnt	0.1 to Value set for Cool Pulse Time (Default : 1.0)
Heat Power Low PL	0 to Power High (Default : 0)
Heat Power High PH	Power Low to 100 (Default : 100)
* Cool Power Low CPL	0 to Cool Power High (Default : 0)
* Cool Power High CPH	Cool Power Low to 100 (Default : 100)

* Controller supplied with Bi-Directional control (Heat + Cool) mode option.

SUPERVISORY PARAMETERS : PAGE 13	
Parameters	Settings (Default Value)
Self-Tune Command tUnE	no No YES Yes (Default : No)
Overshoot Inhibit oSh	dSbL Disable EnbL Enable (Default : Disable)
Overshoot Inhibit Factor OihF	1.0 to 2.0 (Default : 1.0)
SP Adjustment on Lower Readout SPLr	dSbL Disable EnbL Enable (Default : Enable)
SP Adjustment on Operator Page SPOP	dSbL Disable EnbL Enable (Default : Enable)
Alarm SP Adjustment on Operator Page ALSP	dSbL Disable EnbL Enable (Default : Disable)
Standby Mode Stby	dSbL Disable EnbL Enable (Default : Disable)
Profile Abort Command on Operator Page Abrt	dSbL Disable EnbL Enable (Default : Disable)
Utility Option Selection OPtn	nonE None SrLc Serial Comm. AUSP Auxiliary Setpoint (Default : Serial Comm.)
Baud Rate BAUD	48 4800 96 9600 192 19200 384 38400 576 57600 (Default : 9.6)

CONTROL PARAMETERS : PAGE 10	
Parameters	Settings (Default Value)
Proportional Band Pb	1 to 999 Units (Default : 50 units)
Integral Time It	0 to 3600 Seconds (Default : 100 Sec.)
Derivative Time dT	0 to 600 Seconds (Default : 16 Sec.)
Cycle Time Ct	0.5 to 100.0 Seconds (in steps of 0.5 secs.) (Default : 10.0 Sec.)
Relative Cool Gain rELC	0.1 to 10.0 (Default : 1.0)
* Cool Cycle Time CCt	0.5 to 100.0 Seconds (in steps of 0.5 secs.) (Default : 10.0 Sec.)
Hysteresis HYSr	1 to 999 (Default : 2)

Parameters	Settings (Default Value)
Communication Parity PARr	nonE None EuEn Even Odd Odd (Default : Even)
Controller ID Number Id	1 to 127 (Default : 1)
Communication Write Enable CoWE	no No YES Yes (Default : No)

OP2 & OP3 FUNCTION PARAMETERS : PAGE 15	
Parameters	Settings (Default Value)
Output-2 Function Selection OP2F	nonE None ALrn Alarm CCon Cool Control EOP End Of Profile CtrL Auxiliary Control blOr Blower (Default : None)
Alarm-1 Logic ALLG	norñ Normal rEu Reverse (Default : Normal)
Output-2 Type OP2t	rLy Relay SSr SSR 0-20 0 - 20mA 4-20 4 - 20mA 0-5 0 - 5 V 0-10 0 - 10 V (Default : Relay)
OP2 Event Status O2ES	On ON OFF OFF (Default : ON)
OP2 Event Time O2Et	0 to 9999 (Default : 0)
OP2 Event Time Units O2Ut	SEC Seconds nIn Minutes HoUr Hours (Default : Seconds)
Offset Value for Auxiliary Control Setpoint SP.2	-199 to 999 or -199.9 to 999.9 (Default : 0)
Auxiliary Control Hysteresis HYS.2	1 to 999 or 0.1 to 999.9 (Default : 2)
Auxiliary Control Logic LOG.2	norñ Normal rEu Reverse (Default : Normal)
Offset Value for Blower Control Setpoint BLSP	0 to 25 or 0.0 to 25.0 (Default : 0)
Auxiliary Control Hysteresis HYS.2	1 to 999 or 0.1 to 999.9 (Default : 2)
Auxiliary Control Logic LOG.2	norñ Normal rEu Reverse (Default : Normal)
Offset Value for Blower Control Setpoint BLSP	0 to 25 or 0.0 to 25.0 (Default : 0)

Parameters	Settings (Default Value)
Blower Control Hysteresis BLHY	1 to 25 or 0.1 to 25.0 (Default : 2)
Blower Control Time Delay EdLY	0.00 to 10.00 Min. Sec (in steps of 5 Seconds) (Default : 0.00)
Output-3 Function Selection OP3F	nonE None ALrn Alarm EOP End Of Profile rEC Recorder (Default : Alarm)
Alarm-2 Logic A2LG	norñ Normal rEu Reverse (Default : Normal)
OP3 Event Status O3ES	On ON OFF OFF (Default : ON)
OP3 Event Time O3Et	0 to 9999 (Default : 0)
OP3 Event Time Units O3Ut	SEC Seconds nIn Minutes HoUr Hours (Default : Seconds)
Select PV or SP for Recorder Transmission trns	Pv Process Value SP Setpoint (Default : Process Value)
Recorder Output Type RECo	0-20 0 - 20mA 4-20 4 - 20mA 0-5 0 - 5 V 0-10 0 - 10 V (Default : 0 to 20mA)
Recorder Low RECL	Min. to Max. Range Specified for the Selected Input Type (Default : -199)
Recorder High RECH	Min. to Max. Range Specified for the Selected Input Type (Default : 1376)

ALARM PARAMETERS : PAGE 11	
Parameters	Settings (Default Value)
Alarm-1 Type AL-1	nonE None P_Lo Process Low P_Hi Process High dE Deviation Band bAnd Window Band (Default : None)
Alarm-1 Setpoint A1SP	Min. to Max. Range specified for the selected Input Type (Default : Min or Max Range)
Alarm-1 Deviation Band A1dE	-999 to 999 or -999.9 to 999.9 (Default : 5)
Alarm-1 Window Band A1bA	3 to 999 (Default : 5)
Alarm-1 Hysteresis A1HY	1 to 999 (Default : 2)
Alarm-1 Inhibit A1h	no No YES Yes (Default : No)

Parameters	Settings (Default Value)
Alarm-2 Type AL-2	nonE None P_Lo Process Low P_Hi Process High dE Deviation Band bAnd Window Band (Default : None)
Alarm-2 Setpoint A2SP	Min. to Max. Range specified for the selected Input Type (Default : Min or Max Range)
Alarm-2 Deviation Band A2dE	-999 to 999 (Default : 5)
Alarm-2 Window Band A2bA	3 to 999 (Default : 5)
Alarm-2 Hysteresis A2HY	1 to 999 (Default : 2)
Alarm-2 Inhibit A2h	no No YES Yes (Default : No)

PROFILE CONFIGURATION PARAMETERS : PAGE 16	
Parameters	Settings (Default Value)
Enabling Profile Feature PrOF	dSbL Disable EnbL Enable (Default : Disable)
Number of Segments nSEG	1 to n (n = 4, 8, 12 or 16 depending on factory configuration) (Default : n)
Number of Repeats nrPt	1 to 9999 (Default : 1)
Common Holdback CoHb	no No YES Yes (Default : Yes)
Output Off OPOF	no No YES Yes (Default : No)
'Power Fail Recovery' Strategy PrFL	Abrt Abort Cont Continue (Default : Continue)

PROFILE SETTING PARAMETERS : PAGE 14	
Parameters	Settings (Default Value)
Segment Number SEGn	1 to n (n = 4, 8, 12 or 16 depending on factory configuration) (Default : 1)
Target Setpoint t.SP	Min. to Max. Range specified for the selected Input Type (Default : -199)
Time Interval t.nE	0 to 9999 Minutes (Default : 0)
Holdback Type Hbty	nonE None UP Up dn Down both Both (Default : None)
Holdback Value HbuL	1 to 999 (Default : 1)

OPERATOR PAGE PARAMETERS : PAGE 0	
Parameters	Settings (Default Value)
End of Profile Acknowledge EOP.A	no No YES Yes (Default : No)
Profile Start Command StEt	no No YES Yes (Default : No)
Profile Abort Command Abrt	no No YES Yes (Default : No)
Profile Pause Command PAUS	no No YES Yes (Default : No)
Segment Skip Command SPIP	no No YES Yes (Default : No)
(De)Activate Standby Mode Stby	no No YES Yes (Default : No)
Control Setpoint SP	Setpoint Low Limit to Setpoint High Limit (Default : -199)
Auxiliary Control Setpoint AUSP	Setpoint Low Limit to Setpoint High Limit (Default : -199)
Alarm-1 Setpoint A1SP	Throughout the range for the selected Input Type (Default : -199 For Process High : 1376)
Alarm-1 Deviation Band A1dE	-999 to 999 (Default : 5)
Alarm-1 Window Band A1bA	3 to 999 (Default : 5)
Alarm-2 Setpoint A2SP	Throughout the range for the selected Input Type (Default : -199 For Process High : 1376)
Alarm-2 Deviation Band A2dE	-999 to 999 (Default : 5)
Alarm-2 Window Band A2bA	3 to 999 (Default : 5)

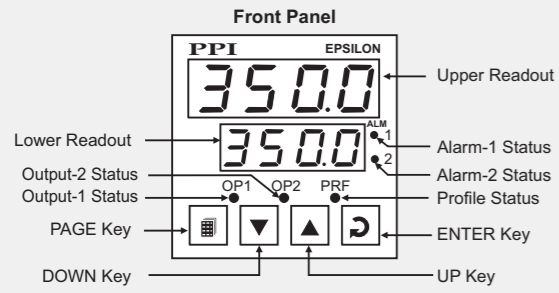
PROFILE STATUS INFORMATION : PAGE 1	
Parameters	Settings (Default Value)
Lower Readout Prompt A.SEG	Active Segment Number
Upper Readout Information StYP	Segment Type rAnP SORP
Target Setpoint t.SP	Target Setpoint
Ramping Setpoint r.SP	Ramping Setpoint
Balance Time b.t.n	Balance Time
Balance Repeats brPt	Balance Repeats

ON-LINE ALTERATION PARAMETERS : PAGE 2	
Parameters	Effect on the running segment
Time Interval t.nE	RAMP - Altering the time interval shall immediately affect the "Ramp Rate" for the current segment. SOAK - Elapsed time so far is ignored and the soak timer starts counting down to 0 from the altered time interval value.
Holdback Type Hbty	The modified Holdback Band Type is applied immediately on the current segment.
Holdback Value HbuL	The modified Holdback Band Value is applied immediately on the current segment.
Balance Repeats brPt	The modified repeats become the new target repeats with immediate effect.

TABLE- 1		
Option	Range (Min. to Max.)	Resolution
tC-U J Type T/C	0 to +960°C / +32 to +1760°F	Fixed 1°C / 1°F
tC-P K Type T/C	-200 to +1376°C / -328 to +2508°F	
tC-t T Type T/C	-200 to +385°C / -328 to +725°F	
tC-r R Type T/C	0 to +1770°C / +32 to +3218°F	
tC-S S Type T/C	0 to +1765°C / +32 to +3209°F	
tC-b B Type T/C	0 to +1825°C / +32 to +3218°F	
tC-n N Type T/C	0 to +1300°C / +32 to +2372°F	User settable 1°C / 1°F or 0.1°C / 0.1°F
rESu	Reserved for customer specific Thermocouple type not listed above.	
rtd RTD Pt100	-199 to +600°C / -328 to +1112°F or -199.9 to 600.0°C / -199.9 to 999.9°F	
0-20 0 to 20mA DC 4-20 4 to 20mA DC 0050 0 to 50mV DC 0200 0 to 200mV DC	-1999 to +9999 units	
125 0 to 1.25V DC 50 0 to 5.0V DC 100 0 to 10.0V DC 1-5 1 to 5.0V DC		User settable 1 / 0.1 / 0.01 / 0.001 units

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FRONT PANEL LAYOUT



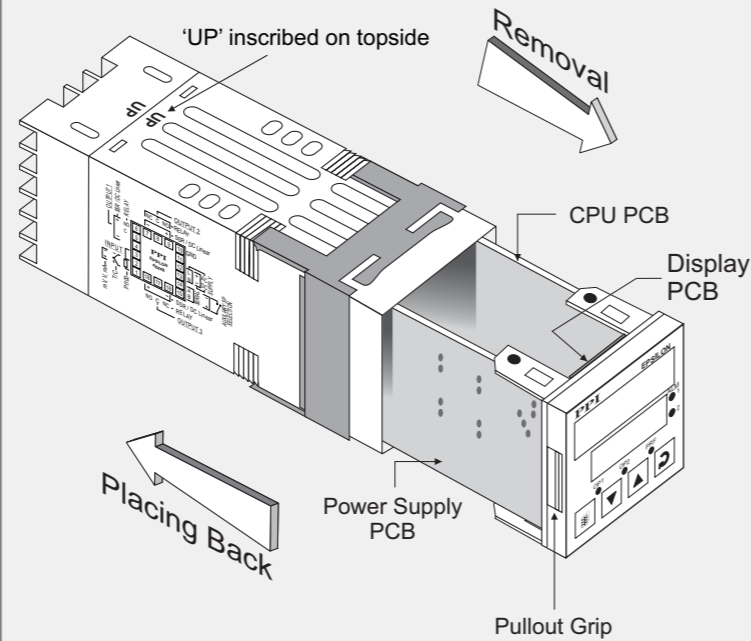
Keys Operation

Symbol	Key	Function
	PAGE	Press to enter or exit set-up mode.
	DOWN	Press to decrease the parameter value. Pressing once decreases the value by one count; keeping pressed speeds up the change.
	UP	Press to increase the parameter value. Pressing once increases the value by one count; holding pressed speeds up the change.
	ENTER	Press to store the set parameter value and to scroll to the next parameter on the PAGE.

PV Error Indications

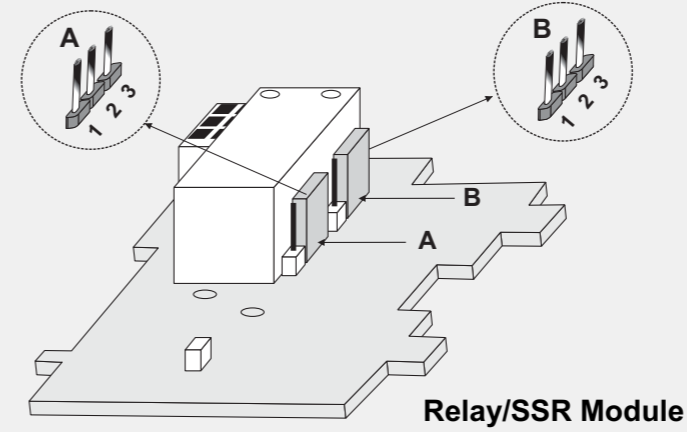
Message	PV Error Type
	Over-range (PV above Max. Range)
	Under-range (PV below Min. Range)
	Open (Sensor open / broken)

ENCLOSURE ASSEMBLY



JUMPER SETTINGS

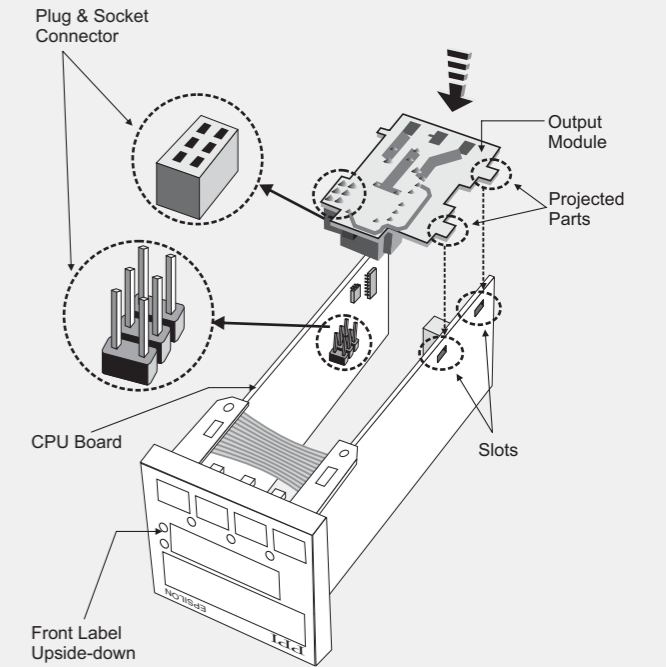
OUTPUT-2 & OUTPUT-3



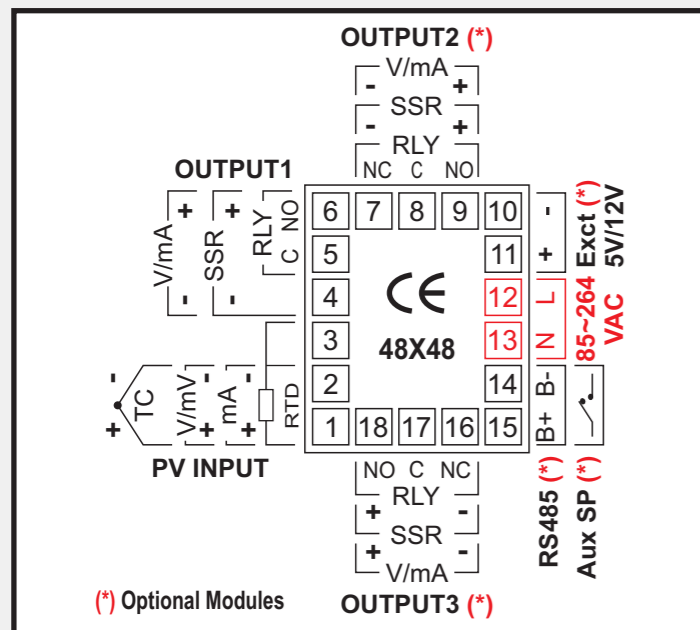
Output Type	Jumper Setting - A	Jumper Setting - B
Relay		
SSR		

MOUNTING DETAILS

OUTPUT-3 MODULE

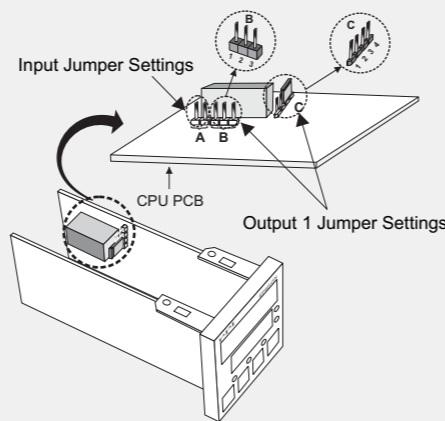


ELECTRICAL CONNECTIONS

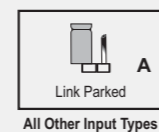
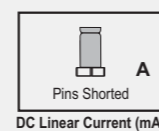


JUMPER SETTINGS

INPUT & OUTPUT-1



Input Jumper Settings

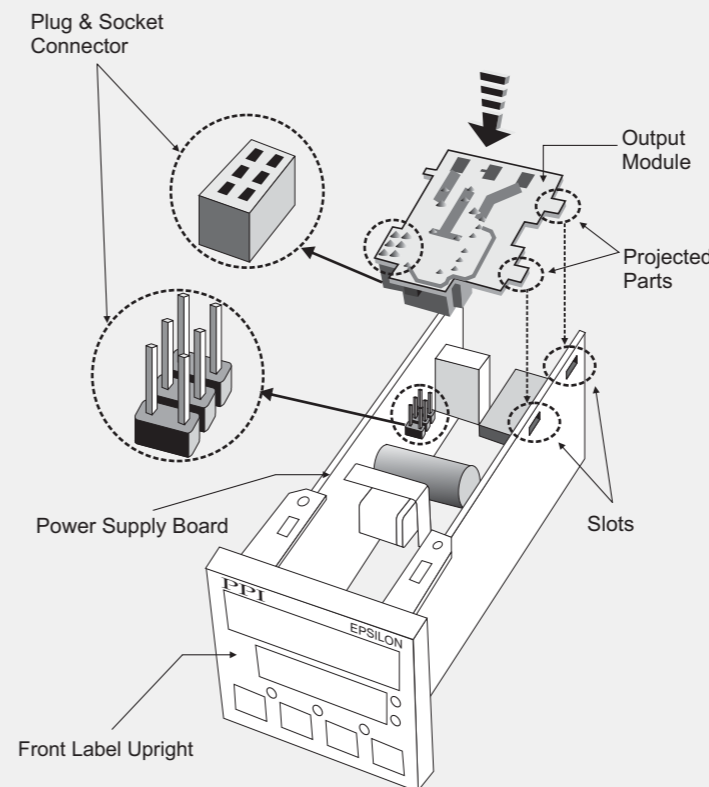


Output - 1 Jumper Settings

Output Type	Jumper Setting - B	Jumper Setting - C
Relay		
SSR Drive		
DC Linear Current (or Voltage)		

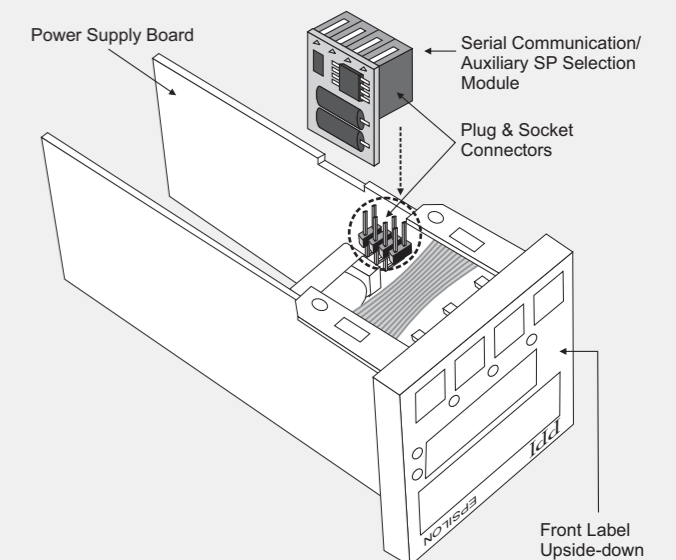
MOUNTING DETAILS

OUTPUT-2 MODULE



MOUNTING DETAILS

SERIAL COMM. MODULE





CONFIGURATION PARAMETERS : PAGE 12

Table with 2 columns: Parameters and Settings (Default Value). Includes Control Output (OP1) Type, Control Action, Control Logic, Input Type, PV Resolution, PV Units, PV Range Low, PV Range High, Setpoint Low Limit, Setpoint High Limit, Offset for PV, Digital Filter Time Constant, Sensor Break Output Power.

CONTROL PARAMETERS : PAGE 10

Table with 2 columns: Parameters and Settings (Default Value). Includes Proportional Band, Integral Time, Derivative Time, Cycle Time, Relative Cool Gain, Cool Cycle Time, Hysteresis.

Table with 2 columns: Parameters and Settings (Default Value). Includes Pulse Time, ON Time, Cool Hysteresis, Cool Pulse Time, Cool ON Time, Heat Power Low, Heat Power High, Cool Power Low, Cool Power High.

* Controller supplied with Bi-Directional control (Heat + Cool) mode option.

SUPERVISORY PARAMETERS : PAGE 13

Table with 2 columns: Parameters and Settings (Default Value). Includes Self-Tune Command, Overshoot Inhibit, Overshoot Inhibit Factor, SP Adjustment on Lower Readout, SP Adjustment on Operator Page, Alarm SP Adjustment on Operator Page, Standby Mode, Profile Abort Command on Operator Page, Utility Option Selection, Baud Rate.

Table with 2 columns: Parameters and Settings (Default Value). Includes Communication Parity, Controller ID Number, Communication Write Enable.

OP2 & OP3 FUNCTION PARAMETERS : PAGE 15

Table with 2 columns: Parameters and Settings (Default Value). Includes Output-2 Function Selection, Alarm-1 Logic, Output-2 Type, OP2 Event Status, OP2 Event Time, OP2 Event Time Units, Offset Value for Auxiliary Control Setpoint, Auxiliary Control Hysteresis, Auxiliary Control Logic, Offset Value for Blower Control Setpoint, Auxiliary Control Hysteresis, Auxiliary Control Logic, Offset Value for Blower Control Setpoint.

Table with 2 columns: Parameters and Settings (Default Value). Includes Blower Control Hysteresis, Blower Control Time Delay, Output-3 Function Selection.

Table with 2 columns: Parameters and Settings (Default Value). Includes Alarm-2 Logic, OP3 Event Status, OP3 Event Time, OP3 Event Time Units, Select PV or SP for Recorder Transmission, Recorder Output Type, Recorder Low, Recorder High.

ALARM PARAMETERS : PAGE 11

Table with 2 columns: Parameters and Settings (Default Value). Includes Alarm-1 Type, Alarm-1 Setpoint, Alarm-1 Deviation Band, Alarm-1 Window Band, Alarm-1 Hysteresis, Alarm-1 Inhibit.

Table with 2 columns: Parameters and Settings (Default Value). Includes Alarm-2 Type, Alarm-2 Setpoint, Alarm-2 Deviation Band, Alarm-2 Window Band, Alarm-2 Hysteresis, Alarm-2 Inhibit.

PROFILE CONFIGURATION PARAMETERS : PAGE 16

Table with 2 columns: Parameters and Settings (Default Value). Includes Enabling Profile Feature, Number of Segments, Number of Repeats, Common Holdback, Output Off, Power Fail Recovery Strategy.

PROFILE SETTING PARAMETERS : PAGE 14

Table with 2 columns: Parameters and Settings (Default Value). Includes Segment Number, Target Setpoint, Time Interval, Holdback Type, Holdback Value.

OPERATOR PAGE PARAMETERS : PAGE 0

Table with 2 columns: Parameters and Settings (Default Value). Includes End of Profile Acknowledge, Profile Start Command, Profile Abort Command, Profile Pause Command, Segment Skip Command, (De)Activate Standby Mode, Control Setpoint, Auxiliary Control Setpoint, Alarm-1 Setpoint, Alarm-1 Deviation Band, Alarm-1 Window Band, Alarm-2 Setpoint, Alarm-2 Deviation Band, Alarm-2 Window Band.

PROFILE STATUS INFORMATION : PAGE 1

Table with 2 columns: Parameters and Settings (Default Value). Includes Lower Readout Prompt, Upper Readout Information, Active Segment Number, Segment Type, Target Setpoint, Ramping Setpoint, Balance Time, Balance Repeats.

ON-LINE ALTERATION PARAMETERS : PAGE 2

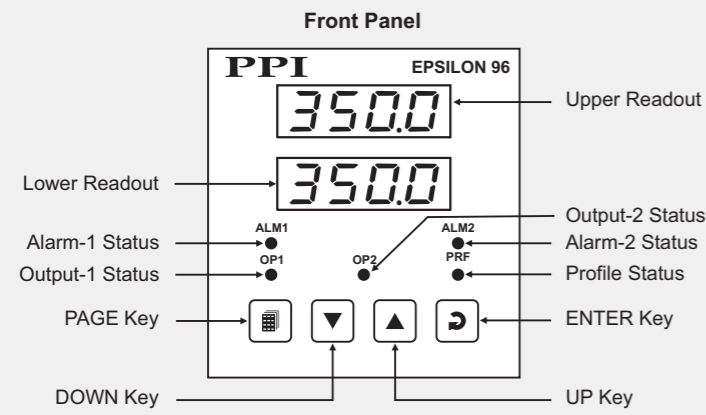
Table with 2 columns: Parameters and Effect on the running segment. Includes Time Interval, Holdback Type, Holdback Value, Balance Repeats.

TABLE- 1

Table with 3 columns: Option, Range (Min. to Max.), Resolution. Lists various temperature and pressure setpoints and their resolutions.

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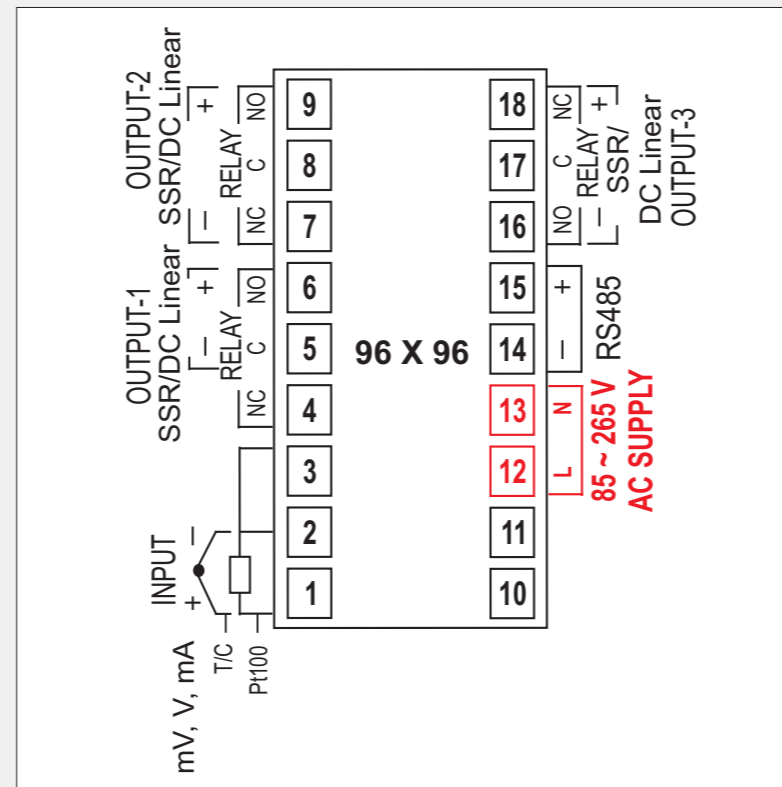
FRONT PANEL LAYOUT



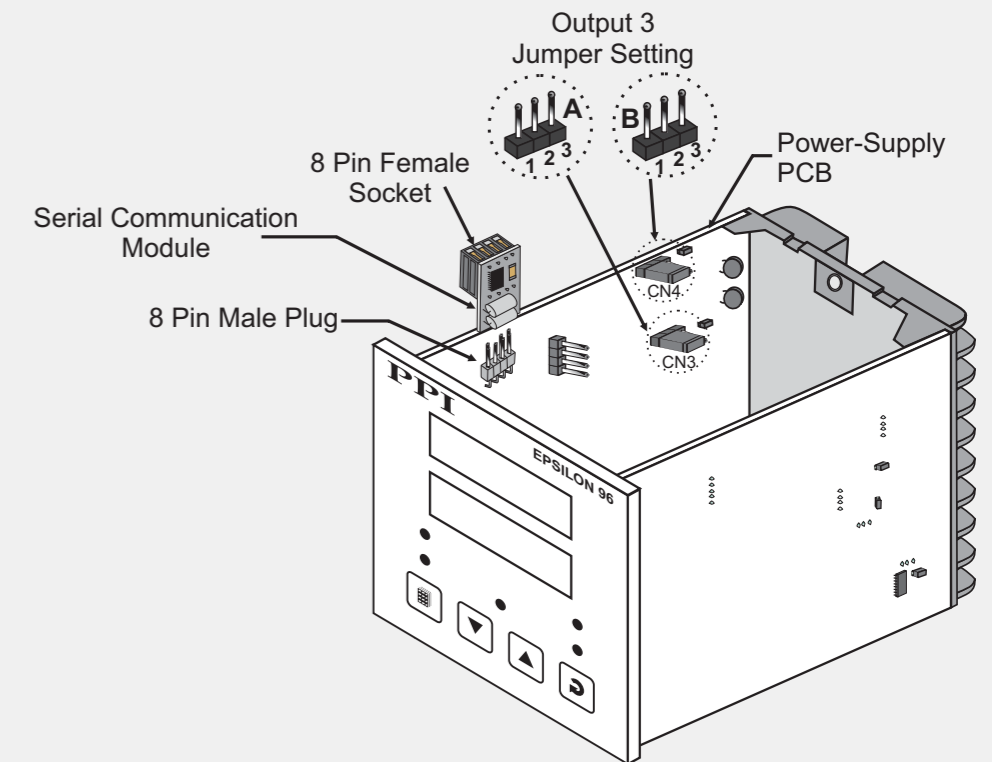
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ELECTRICAL CONNECTIONS



SERIAL COMMUNICATION MODULE



INPUT & OUTPUT HARDWARE JUMPER SETTINGS

Input

Input Type	Jumper 'A' Setting
Thermocouple, RTD Pt100, mV & V	
DC Linear Current (mA)	

Output-1

Output Type	Jumper Setting - B	Jumper Setting - C
Relay		
SSR Drive		
DC Linear Current (or Voltage)		

Output-2

Output Type	Jumper Setting - D	Jumper Setting - E
Relay		
SSR		

Output-3

Output Type	Jumper Setting - A	Jumper Setting - B
Relay		
SSR		

