AUTOTUNE PID CONTROLLER — X48V1

FLAMEPROOF, IP66

- **Universal input**
- **1 / 2 / 3 setpoints**
- **Isolated 0/4~20 mA or 0-10V DC for control / retransmission output**
- **24 V DC transmitter supply**
- **RS485 / MODBUS RTU**
- **85~265 V AC SMPS**
- **Autotuning : From cold start**
  At setpoint
- **Auto / Manual selection**
- **PID, Proportional and ONOFF control**
- **PID versions**
  - **Standard - relay or analog control output**
  - **VMD open + close relay outputs**

SPECIFICATIONS

All specifications at ambient of 25 °C, unless specified otherwise

INPUT

Input group 1	
Thermocouple	B, E, J, K, N, R, S, T
RTD	Pt100, 3-wire
Voltage	0~50 mV
Current	0~20 mA, 4~20 mA
Input group 2	
Thermocouple	B, C, D, E, G, J, K, N, R, S, T
RTD	Pt100, 3-wire, Cu53
Voltage	0~50 mV
Current	0~20 mA, 4~20 mA, square root
Transmitter supply	22 V nominal, 30 mA max
Range limits	See Table 1
Accuracy	See Table 1
Cold junction compensation	Automatic
Sensor break protection	User programmable

INDICATION

Process variable	Upper : 4 digit, 7 segment 1” (25.4 mm) red LED display
Setpoint	Lower : 4 digit, 7 segment 0.39” (9.9 mm) red LED display
Status indication	LEDs for relay status LED for auto/manual status

OUTPUTS

No. of relays	1 / 2 /3
Relay contact type	NO-C-NC (RL1) NO-C (RL2, RL3)
Relay contact rating	5A / 230V AC, resistive
SSR drive	12 V DC drive signal for external SSR
No. of analog outputs	0 / 1 (current or voltage)
Current output	4~20 mA / 0~20 mA / 20~4 mA / 20~0 mA isolated from input
Maximum load for current output	500 ohms
Voltage output	0-10 V / user specified
Load for voltage output	>10 Kohms

AUTO/MANUAL OPERATION

Function	Output power is increased / decreased by UP/DOWN keys in manual mode
Auto / Manual transfer	Bumpless

COMMUNICATION

Port	RS485
Protocol	Modbus RTU
Slave ID	User programmable (1~256)

PROGRAMMABLE PARAMETERS

Setpoint	Full range (See Table 1)
Unit	°C, °F, EU
Resolution	User selectable 0.01, 0.1 or 1 for linear input, 0.1 or 1 for temperature
High scale	Full range (See Table 1)
Low scale	Full range (See Table 1)
Digital filter	A (minimum) ~ F (maximum)
Hysteresis (ONOFF control)	0~25% span
Bias (for process variable)	-50 to 50% of range limit
Band (P)	0.1~999.9%
Integral time (I)	Off, 1~9999 seconds
Derivative time (D)	Off, 1~9999 seconds
Cycle time for SP1/SP2	1~640 second
Upper limit for output power	0~100%
Lower limit for output power	0~100%
Relay logic	a. Heat b. Cool c. Fullscale high alarm d. Full scale low alarm e. Deviation high alarm f. Deviation low alarm g. Inband alarm h. Outband alarm (e. to h. available for SP2, SP3 only)
Alarm types	Self reset or latched and can be disabled at power on
Alarm acknowledge	Front panel function used to reset relay in alarm condition
Setpoint lock	ON, OFF
Level lock	ON, OFF
Relay action	Reverse / direct

OTHER

Enclosure	Certified flameproof for gas groups I, IIA & IIB
Protection	IP66
Keyboard	Tactile, 3 keys, inside enclosure
Material	Aluminium alloy
Dimensions (in mm)	138(H) x 138(W) x 220(D) mm
Mounting	2” pipe mounting
Mounting accessories	Included
Cable entries *	3/4” ET, maximum 5
Connection, single/ stranded wires	≤ 2.5 mm^2, AWG 14
Supply voltage	a) 85~265 V AC, 50/60 Hz b) 20~35 V DC (factory option)
Power consumption	3 watts maximum
Operating ambient temperature	0 ~ 50 °C
Relative humidity	Below 90%, non condensing

* Note: Cable glands to be ordered separately

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TABLE 1

SENSOR / INPUT	RANGE LIMITS (°C / EU)		RANGE IN WHICH ACCURACY IS SPECIFIED		TYPICAL ACCURACY AT 30 °C (°C / EU)	WORST CASE ACCURACY (°C / EU)
	LOW SCALE	HIGH SCALE	LOW SCALE	HIGH SCALE		
Input Group 1						
Pt - 6% Rh / Pt - 30% Rh (B)	400	1820	400	1820	± 3	± 5
Chromel / Constantan (E)	-270	850	0	850	± 1	± 3
Iron / Constantan (J)	-210	760	0	760	± 1	± 3
Chromel / Alumel (K)	-270	1372	-50	1200	± 1	± 3
Nicrosil / Nisil (N)	-270	1300	-50	1200	± 1	± 3
Pt / Pt - 13% Rh (R)	0	1760	400	1760	± 2	± 5
Pt / Pt - 10% Rh (S)	0	1760	400	1760	± 2	± 5
Copper / Constantan (T)	-270	400	-200	400	± 1	± 3
Pt100, 3-wire	-200	850	-200	600	± 0.3	± 1.0
Linear (0~50 mV, 0~20 mA, 4~20 mA)	-1999	9999	-1999	9999	± 5 EU	± 20 EU
Input Group 2						
The following inputs are available in Input Group 2 in addition to inputs of Input Group 1.						
Tungsten - 5% Rh / Tungsten - 26% Rh (C)	0	2320	0	2320	± 3	± 5
Tungsten - 3% Rh / Tungsten - 25% Rh (D)	0	2310	0	2310	± 3	± 5
Tungsten / Tungsten - 26% Rh (G)	0	2310	0	2310	± 3	± 5

ORDERING INFORMATION

X48V1 will be supplied with the following standard specifications :

1.	Input	Input group 1
2.	Supply voltage	85~265 VAC
3.	RS485	Not provided

ORDER CODE	
2181	A

A	Configuration	
	Relay	4~20 mA output
01	2	0
02	2	1

Ordering Options
The following ordering options are available on request.
Minimum order quantity and/or minimum order value may apply.

	Option	Details
1.	Analog output	0~10 V DC
2.	Supply voltage	24 V DC
3.	Input	Input group 2
4.	Communication	RS485

Note 1 : Transmitter supply can be given only if Relay 3 / Analog o/p is absent.
Note 2 : For supply voltage = 24 VDC, Relay 3 cannot be provided.

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