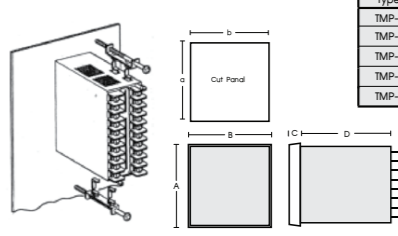




TECHNICAL SPECIFICATION

Technical specification table with categories: Power Supply, Power Consumption, Display, Input, Output, Function Control, Communication, Ambient Operation, Ambient Storage, Protection Degree, Installation, Material, Size/Weight.

DIMENSION



Dimension Table (mm.) with columns for Type, A, B, C, D, a, b.

DESCRIPTION

- TMP-Series is digital temperature or control controller shows 7-Segment 4 Digits.
• Receive Thermocouple, PT100, 4-20mA, 0-10 VDC input.
• ON/OFF, P, PD, PID Auto Tuning Control function.
• Relay, SSR 0-10 VDC, 4-20 mA, 0-10 VDC output.
• RS-485 Communication MODBUS RTU Protocol.
• Auto Tuning calculate PID automatic.
• Bar graph show % Output.
• Heater break function.
• Can choose Output to operate in Heating and Cooling mode.

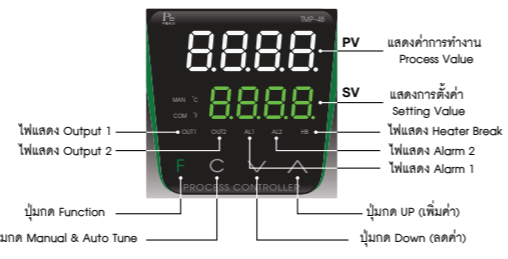
OPERATION

TMP-Series is digital temperature and process controller that can receive Input signal both thermocouple, PT100, 4-20 mA and 0-10 VDC by Thermocouple and PT100 can choose type K, J, R, T, N, S, E, PT100 and 0-100 mV by pressing Keypad Switch can control Heating system is Output will be ON when value from measure lower than Setpoint or Cooling system is output will ON when value from measure more than Setpoint value.

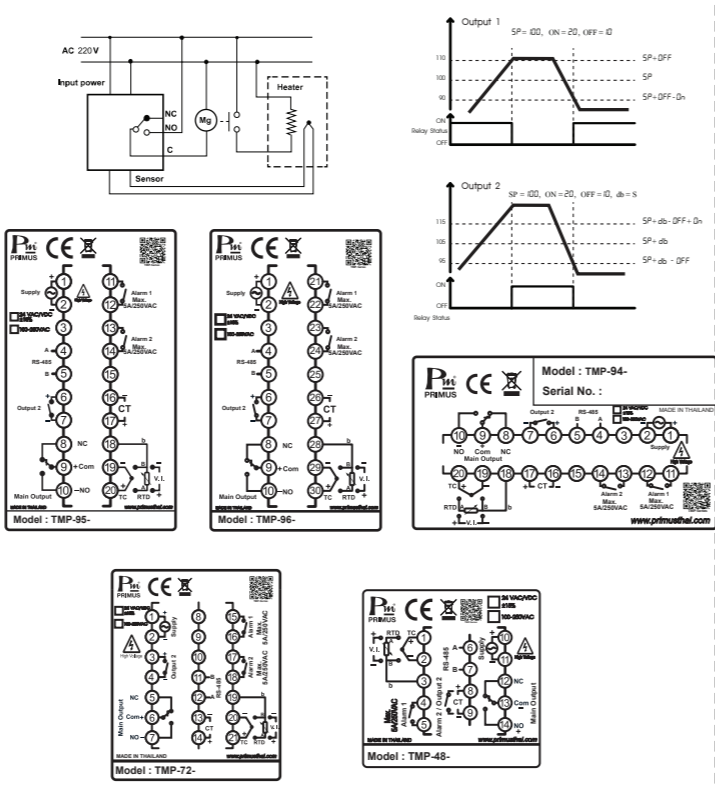
TMP-Series can choose model that has 2 Output are Output 1 will has duty to be Heating and Output 2 will be Cooling by reference same Setpoint for more stable controlling such as Output 1 control Heater for heating and Output 2 control fan for heat ventilation except TMP-48 (48x48 mm.) no Output 2.

Heater Break is Heater break checking function by there are CT lasso at heater wire to measure current in case that no current flows through means Heater break and Alarm Heater Break will operate which made user knows heater break status.

Application Suitable with plastic machine, packaging machine, Food Machine, Oven, Electronic Machine.



WIRING DIAGRAM



Register table with columns: Contents, Address Decimal, Word, Format, Access. Lists registers such as PV, SV, INPUT, PV ADJUST, PV GAIN, PV HIGH, PV LOW, PV FILTER, DECIMALPOINT, UNIT\_REG, LOCKKEY, FUNCTION KEY, BANDRATE, Type Communication, SLAVE ADDRESS, SV LIMIT HIGH, SV LIMIT LOW, CONTROL, REVERSE, AUTOTUNE OUTPUT, AUTOTUNE FACTOR, OUTPUT 1, OUTPUT LIMIT HIGH 1, OUTPUT LIMIT LOW 1, PROROTIONNABAND 1, INTEREGRTIME 1, DERIVATIVE 1, CYCLE TIME 1, OUTPUT 2, OUTPUT LIMIT HIGH 2, OUTPUT LIMIT LOW 2, PROROTIONNABAND 2, INTREGRTIME 2, DERIVATIVE 2, CYCLE TIME 2, MANUAL RESET, POSITION ON 1, POSITION OFF 1, POSITION ON 2, POSITION OFF 2, DEAD BAND, SET POINT RAMP TIME, AUTO CONTROL BACKUP, ALARM FUNCTION 1, ALARM LIMIT HIGH 1, ALARM LIMIT LOW 1, HYSTERESIS 1, DELAY TIME ALARM 1, AB NORMAL FUNCTION 1, CT MONITOR 1, CT AB NORMAL 1, ALARM FUNCTION 2, ALARM LIMIT HIGH 2, ALARM LIMIT LOW 2, HYSTERESIS 2, DELAY TIME ALARM 2, AB NORMAL FUNCTION 2, CT MONITOR 2, CT AB NORMAL 2, OUTPUT TIME 1, TIMER FUNCTION, TIMER UNITS, SETPOINT TIME FUNCTION, SET TIME, TIME MONITOR.

\*R = Read Only, R/W = Read and Write

Register table for Modbus Function code with columns: Contents, Address Decimal, Word, Format, Access. Lists registers like PV, SV, DP, OUTPUT 1, OUTPUT 2, LED OUTPUT 1, LED OUTPUT 2, LED ALARM 1, LED ALARM 2, LED HB, LED UNIT F, LED UNIT C, LED MANUAL.

Modbus Function code

Modbus Function code table with columns: Function code, Operation, Broadcast.

Example of a client request and server exception response

Table showing Request (Field Name, Hex) and Response (Field Name, Hex) for Modbus Exception code.

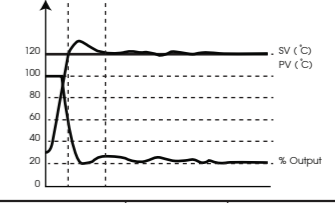
Modbus Exception code

Modbus Exception code table with columns: Code, Name, Meaning.

Register Calculation

Register Calculation table comparing Mode Decimal Point dp 1(0.0) calculation and Mode Non Decimal Point dp 0(0) calculation.

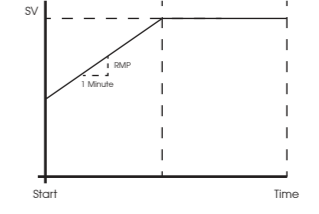
การควบคุมการทำงานแบบ PID



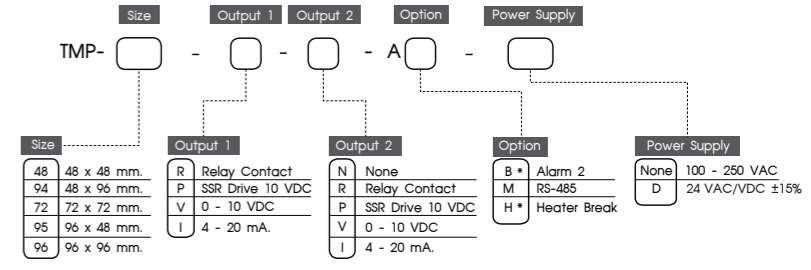
Control parameter table with columns: Decrease variable, Rise Time, Over Shoot, Setting Time, Setady-State Error value.

Ramp Control

is temperature controlling by using Setpoint (SV) changing in rate that we specify via variable Ramp Time Setting rPI by setting unit is °C, °F/min and there are control pattern as follow.



ORDERING CODE



\*TMP-48 model if it have Output 2 will can not choose Option B.H.

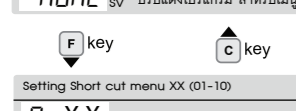
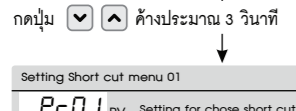
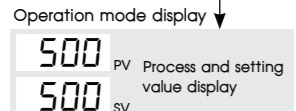
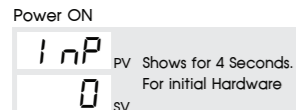
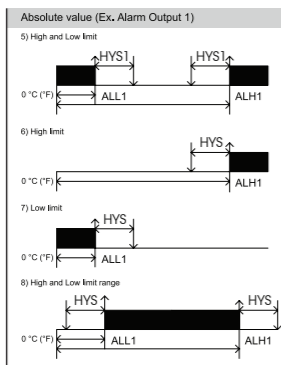
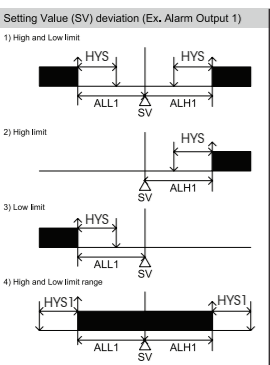


Table 1. Select Input sensors and setting range.

Table with 4 columns: Symbol, Input Type, Setting Range / Display Range (Non-decimal point, decimal point). Rows include Thermocouple Type K, J, R, T, N, S, E, DC 0 - 100 mV, PT100, DC 4 - 20 mA, DC 0 - 10 VDC.

ALARM OUTPUT : Process value (PV) to be used as Alarm Output

PV abnormal : Input indicates "Over" or "Under" by the cut-off of wire and short circuit alarm output turn on. Heater abnormal : Input C1 "Over current at output ON" or "Not current at output OFF" by Heater abnormal or cut-off of wire , alarm output turn on.



1. Input Type Setting / เลือกชนิดของอินพุต. Select input type refer to Table 1. 1nP PV, 0 SV.

2. PV Correction / ค่าชดเชย. When Measurement Value Error Set the Correction Value (Addition). PUS PV, 0.0 SV.

3. PV Correction Gain / ค่าชดเชย. When Measurement Value Comes an Error, Set the Correction Value (Multiplication). PUG PV, 1.00 SV.

4. PV High Display. The Highest of Process Value and set the value that you want to display. Puh PV, 0.0 SV.

5. PV Low Display. The Low of Process Value and set the value that you want to display. Pul PV, 0.0 SV.

6. Filter Input / ตัวกรองสัญญาณอินพุต. Filter Effects Operational on Software to Process Value (PV). PUF PV, 0 SV.

7. Decimal Point Setting / เลือกจุดทศนิยม. Thermocouple, PT100. dP PV, 0.0 SV.

8. Unit Display Setting / เลือกตั้งค่า C/F. Select Temperature Unit (C or F). C/PF PV, 0C SV.

9. Key Lock Setting / การตั้งค่า LOCK ปุ่มกด. Select Below Function. Loc PV, 0 SV.

10. Func Key Setting / กำหนดปุ่ม C ด้านหน้า. Select Below Function. Func PV, nonE SV.

11. Speed Setting / ตั้งค่าความเร็ว. Select Below Function. bPS PV, 9.6 SV.

12. Type Communication Setting / ตั้งค่ารูปแบบการสื่อสาร. Select Below Function. b.c.o.v PV, b8n1 SV.

13. Address Setting / ตั้งค่าหมายเลขของ Temp. Select Range 1 - 127.Adr PV, 1 SV.

14. SV High Setting / ตั้งค่าสูงสุดในการตั้งค่า SV. Sets Scaling High Limit Value. SLH PV, 400.0 SV.

15. SV Low Setting / ตั้งค่าต่ำสุดในการตั้งค่า SV. Sets Scaling Low Limit Value. SLL PV, 0.0 SV.

16. Control Type Setting / ตั้งค่าการควบคุม. Selectable Below Control Modes. Cnt PV, 10 SV.

17. Change of Normal or Reverse for Output 1. Switchable Below. rAdR PV, 0 SV.

18. Setting for PID Tuning Type. การตั้งค่า PID Tuning. tUn PV, 1 SV.

19. Auto-Tuning Coefficient Setting. การตั้งค่าสัมประสิทธิ์ในการปรับแบบอัตโนมัติ. AEF PV, 1.0 SV.

20. Manipulated Value for Output 1 (%). Show Control Output Value (0.0 - 100.0 %). MV1 PV, 100.0 SV.

21. High Limit Setting of Manipulated Value for Output 1. For Setting of Manipulated High Limit Value. MVH1 PV, 100.0 SV.

22. Low Limit Setting of Manipulated Value for Output 1. For Setting of Manipulated Low Limit Value. MVL1 PV, 0.0 SV.

23. Proportional Band Setting for Output 1. Adjust Proportional Band for Output 1 (% Per SL-SLH). P b1 PV, 1.0 SV.

24. Integral Time Setting for Output 1. Adjust Integral Time for Output 1 (0-300 (Seconds)). tI1 PV, 200 SV.

25. Derivative Time Setting for Output 1. Adjust Derivative Time for Output 1 (0-300 (Seconds)). tD1 PV, 20 SV.

26. Proportional Cycle Setting for Output 1. Adjust Proportional Cycle Time for Output 1 (1-120 (Seconds)). tC1 PV, 10 SV.

27. Manipulated Value for Output 2 (%). Show Control Output Value (0.0-100.0 %). MV2 PV, 100.0 SV.

28. High Limit Setting of Manipulated Value for Output 2. For Setting of Manipulated High Limit Value. MVH2 PV, 100.0 SV.

29. Low Limit Setting of Manipulated Value for Output 2. For Setting of Manipulated Low Limit Value. MVL2 PV, 0.0 SV.

30. Proportional Band Setting for Output 2. Adjust Proportional Band for Output 2 (% Per SL-SLH). P b2 PV, 1.0 SV.

31. Integral Time Setting for Output 2. Adjust Integral Time for Output 2 (0-300 (Seconds)). tI2 PV, 0 SV.

32. Derivative Time Setting for Output 2. Adjust Derivative Time for Output 2 (0-300 (Seconds)). tD2 PV, 0 SV.

33. Proportional Cycle Setting for Output 2. Adjust Proportional Cycle Time for output 2 (1-120 (Seconds)). tC2 PV, 10 SV.

34. Manual Reset Setting / การกำหนดค่า Reset. Setting For Proportional Band 0.0 - 100 (%). Pbb PV, 25.0 SV.

35. Control Sensitivity Setting for Output 1. Adjusts Control Sensitivity of ON/OFF Control For Output 1. On1 PV, 0.0 SV.

36. OFF Position Setting for Output 1. Setting for OFF Position for Output 1. OFF1 PV, 0.0 SV.

37. Control Sensitivity Setting for Output 2. Adjusts Control Sensitivity of ON/OFF Control for Output 2. On2 PV, 0.0 SV.

38. OFF Position Setting for Output 2. For Setting OFF Position for Output 2. OFF2 PV, 0.0 SV.

39. Dead Band Setting / กำหนดช่วงการทำงาน. For Heating and Cooling Control (C). db PV, 0.0 SV.

40. Ramp Time Setting. Ramp Time Setting. rPI PV, 0.0 SV.

41. Control Backup Function / บันทึกค่าการควบคุม. Select Rang 0.0-10.0 ตั้งค่าบันทึก. P b12 PV, 0.0 SV.

42. Function Setting for Alarm 1. Select Below Functions. ALF1 PV, 00 SV.

43. High Limit Setting for Alarm 1. Set High Limit Value for Alarm 1. ALH1 PV, 0.0 SV.

44. Low Limit Setting for Alarm 1. Set Low Limit Value for Alarm 1. ALL1 PV, 0.0 SV.

45. Control Sensitivity Setting for Alarm 1. Sensitivity When Required. HYS1 PV, 0.0 SV.

46. Delay Time High & Low Limit Alarm 1. Delay Time High & Low Limit Alarm 1. dt1 PV, 0 SV.

47. Abnormal Setting for Alarm 1. For Outbreak of Sensor and Heater Abnormal. ALb1 PV, 00 SV.

48. CT Input Monitor for Alarm 1. Monitor Current Value of Heater Current Deflector. 1-30 A. Ct1 PV, 1.0 SV.

49. Abnormal Current Value of Heater for Alarm 1. Setting for Current Value When Heater is Abnormal. 0.1-50 A. CtI1 PV, 1.0 SV.

50. Function Setting for Alarm 2. Setting Below Function. ALF2 PV, 00 SV.

51. High Limit Setting for Alarm 2. Set High Limit Value for Alarm 2. ALH2 PV, 0.0 SV.

52. Low Limit Setting for Alarm 2. Set Low Limit Value for Alarm 2. ALL2 PV, 0.0 SV.

53. Control Sensitivity Setting for Alarm 2. Set Sensitivity When Required. HYS2 PV, 0.0 SV.

54. Delay Time High & Low Limit Alarm 2. Delay Time High & Low Limit Alarm 2. dt2 PV, 0 SV.

55. Abnormal Setting for Alarm 2. For Outbreak of Sensor and Heater Abnormal. ALb2 PV, 00 SV.

56. CT Input Monitor for Alarm 2. Monitor Current Value of Heater Current Deflector. 1-30 A. Ct2 PV, 1.0 SV.

57. Abnormal Current Value of Heater for Alarm 2. Setting for Current Value When Heater is Abnormal. 0.1-50 A. CtI2 PV, 1.0 SV.

58. Timer Output Setting. Setting for Select Hardware Output Timer. tO PV, 0 SV.

59. Function Timer. Setting for Select Function Output Timer. tF PV, 1 SV.

60. Unit Timer Setting. ตั้งหน่วยเวลา. Unit Timer กำหนดหน่วยเวลา. HPS PV, 1 SV.

61. Start Sv Permissible Range. ช่วงอุณหภูมิเริ่มทำงาน. กำหนดช่วงเริ่มทำงานของ Function Sv Start หน่วย "C" หรือ "F". tS PV, 0 SV.

62. Timer Setting. ตั้งเวลาการทำงาน. กำหนดค่าเวลาการทำงาน Timer. tT PV, 00.00 SV.

63. Remaining Time Monitor. แสดงเวลาการทำงานของ Timer. Time Monitor แสดงเวลาที่เหลือในการทำงานของ Function Timer. tR PV, 00.00 SV.

64. Delay Time High & Low Limit Alarm 2. Delay Time High & Low Limit Alarm 2. dt2 PV, 0 SV.

65. Manual Reset Setting / การกำหนดค่า Reset. Setting For Proportional Band 0.0 - 100 (%). Pbb PV, 25.0 SV.

66. Proportional Band Setting for Output 1. กำหนดค่า P ของเอาต์พุต 1. P b1 PV, 1.0 SV.

67. Integral Time Setting for Output 1. กำหนดค่า I ของเอาต์พุต 1. tI1 PV, 200 SV.

68. Derivative Time Setting for Output 1. กำหนดค่า D ของเอาต์พุต 1. tD1 PV, 20 SV.

69. Proportional Cycle Setting for Output 1. กำหนดค่า Cycle Time ของเอาต์พุต 1. tC1 PV, 10 SV.

70. Manual Reset Setting / การกำหนดค่า Reset. Setting For Proportional Band 0.0 - 100 (%). Pbb PV, 25.0 SV.

71. Control Sensitivity Setting for Output 1. กำหนดค่าไวของเอาต์พุต 1. On1 PV, 0.0 SV.

72. OFF Position Setting for Output 1. กำหนดตำแหน่งหยุดทำงานของเอาต์พุต 1. OFF1 PV, 0.0 SV.

73. Control Sensitivity Setting for Output 2. กำหนดค่าไวของเอาต์พุต 2. On2 PV, 0.0 SV.

74. OFF Position Setting for Output 2. กำหนดตำแหน่งหยุดทำงานของเอาต์พุต 2. OFF2 PV, 0.0 SV.

75. Ramp Time Setting. ตั้งอัตราการเปลี่ยนแปลงของ SV. rPI PV, 0.0 SV.

76. Control Backup Function / บันทึกค่าการควบคุม. บันทึกค่าการควบคุม. P b12 PV, 0.0 SV.

77. Function Setting for Alarm 1. กำหนดฟังก์ชันของ Alarm 1. ALF1 PV, 00 SV.

78. High Limit Setting for Alarm 1. กำหนดค่าสูงสุดของ Alarm 1. ALH1 PV, 0.0 SV.