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Temperature Controllers

Please refer to FAQ on **P.3771**.

Temperature Controllers Guide

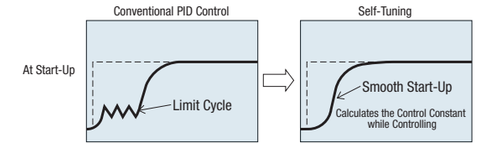
Misumi's Temperature Controllers can operate up to 20A in 100/200V on single phase or up to 30A in 200V on three-phase.

Features

Various types of temperature sensors and various types of input ranges can be set, therefore precise temperature control is possible. Also the control value has some fluctuations due to interference, the regulator can tune automatically and converge (stabilize) the fluctuation of control value because it has specific self-tuning function.

Moreover, when thermocouple or temperature measurement resistance burns out, protection circuit may work and prevent over-heating.

Difference Between Conventional PID Control & Self-Tuning



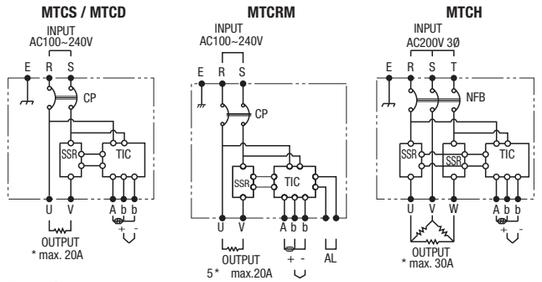
Specification

Control	PID Control (With Self-turning Function)		
Rating	MTCS / MTCRM	AC100V~240V 1Ø	*20A
	MTCD	AC100V~240V 1Ø	*20A x 2 Circuits
	MTCH	AC200V 3Ø	*30A

* Resistance load without inrush current (Max. Value)

Input Type	Thermocouple(K / J / R / T / N / S / B) Temperature Measuring Resistor (Pt100Ω, JPt100Ω) * Switchable depending on the panel setting * Thermocouple at the time of shipment (K)
Conditions of Operating Temperature	0~30°C (No condensation)
Over Current Cut-off Breaker	Switch

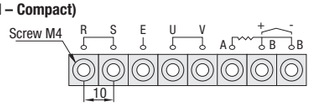
Circuit (MTCD has two identical circuits)



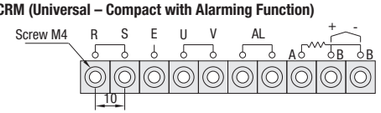
* Maximum current is heat resistance load.

Connection

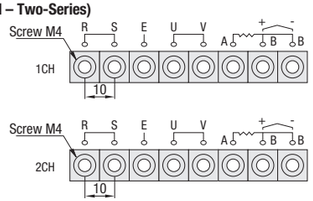
MTCS (Universal – Compact)



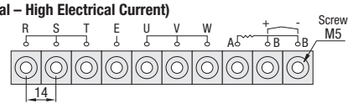
MTCRM (Universal – Compact with Alarming Function)



MTCD (Universal – Two-Series)



MTCH (Universal – High Electrical Current)



Connection with Sensors

Thermocouple
+ – Red
- – White or Black
Temperature Measuring Resistor
A – Red
B – Black or White
b – White or Black
(B and b have a choice between black and white.)

Connection with Alarm Operation

(MTCRM Only)
AL – For alarm

Connection with Power Supply

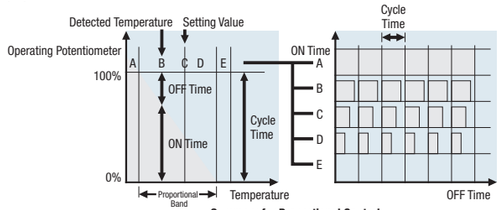
Single-Phase 100V/200V
R, S – Power Connection
E – Grounding Connection
U, V – Heater Connection

Three-Phase 200V
R, S, T – Power Connection
E – Grounding Connection
U, V, W – Heater Connection

Universal Type, Temperature sensor selectable, is available, for a simple and compact line up of three kinds, such as compact, dual and high current type. And a new product "Universal and Compact Type with Alarm Function" have alarm output terminals. Specification of alarm output is same as the temperature controller **(P.3772).**

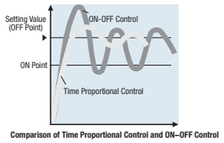
Control by Solid State Relay (SSR)

This is the control method where using proportional control (time proportional control) in the form of ON-OFF control, change the length of ON and OFF times in proportion to the variation against the setting value in the proportional band.



Summary for Proportional Control

This one set of ON and OFF cycle is constant, and is called a Cycle Time. Suppose one cycle time is 10 seconds. If the present value is lower than the Proportional Band, the controller output will remain ON. On the other hand if the present value is higher than the Proportional Band, the controller output will remain OFF.



Comparison of Time Proportional Control and ON–OFF Control

Within the proportional band, the time proportion between ON and OFF may change in proportion to the variation against the setting value depending on the temperature. For example, when the current value is lower than the setting value and ON time is 7 seconds, OFF time can be 3 seconds and ON time can be longer than OFF time.

Warranty

Warranty Period: One year from the shipping date

Warranty Condition: Please present the guarantee card included at the time of delivery.

Coverage of Warranty: Problems or damages arising through the normal usage in compliance with the instruction manual included at the time of delivery.

If trouble occurs during the warranty period even though the unit has been operated in the normal manner, we will recover and repair or replace the unit.

In the following cases, repairs are for consideration. We will recover the product and make an quotation.

(1) When the damage caused by the factors out of warranty range and the product is repairable.

(2) When the damage has occurred beyond the warranty period and the product is repairable.

Contact for Repairs

MISUMI Corporation, Fluid Control Business Division, Fluid Control Business Team
TEL:03-3647-7300 FAX:03-3647-7481

Precautions for Safety

Although this product is designed and manufactured with safety in mind, safety cannot be guaranteed for everything about it.

For example, when the SSR (load switch) incorporated in the product is damaged, the incidents, i.e. temperature increase, can be caused in spite of being controlled by TIC (temperature controller). To ensure safety in such a case when the temperature exceeds a preset level, consideration that a safety circuit may be provided to cut off primary power of this product is necessary.

The closer the current of the product approaches to the maximum rating level, the higher its temperature becomes. This can affect other equipment or shorten the service life, etc. (Expected service life can be doubled by a temperature drop of 10°C according to Arrhenius' Law.)

Be sure to keep sufficient allowance, considering each rating and safety in mind. Wire connection should be conducted by someone with expertise.

Electrical power plug and cord are not included. Select them according to the capacity of the heater you use.

Safety precautions are particularly required in the following cases.

– Use under operating conditions not specified in the instruction manual.

– Use in nuclear power systems, trains, motor vehicles, combustion and medical equipment.

– Use that may seriously affect human life or property and that particularly requires safety considerations.

– MTCRM (Universal-Compact with Alarming Function)

– MTCD (Universal-Dual Outputs)

– MTCH (Universal-High Electrical Current)

Temperature Controllers

Universal (Compact with Alarming Function / Two-Series / High Electrical Current)

Temperature Controllers – Universal (Compact)
Temperature Controllers – Universal (Compact with Alarming Function)



Temperature Controllers – Universal (Dual Outputs)



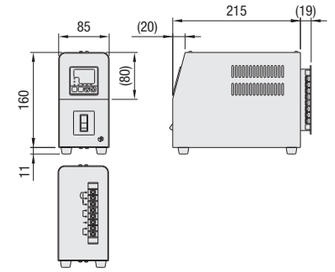
RoHS 10

Univeral – Compact

MTCS Single Phase, AC100V–240V, 20A Max.

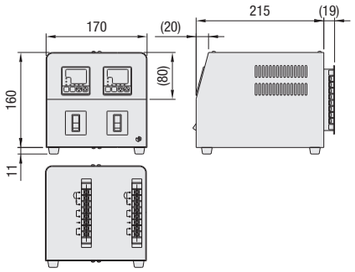
Univeral – Compact with Alarming Function

MTCRM Single Phase, AC100V–240V, 20A Max.



Universal – Dual Outputs

MTCD Single Phase, AC100V–240V, 20Ax2 Max.



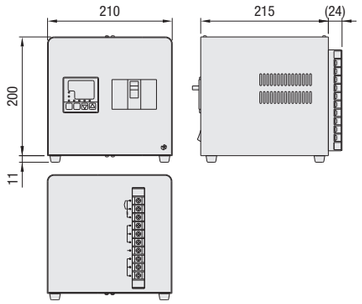
Temperature Controllers – Universal (High Electrical Current)



RoHS 10

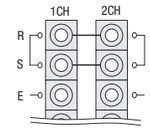
Universal-High Electrical Current

MTCH Three-Phase, AC200V, 30A Max.



Part Number	Input Type
MTCS	Swivel
MTCRM	
MTCD	
MTCH	

MTCD (Dual Outputs)



For power source of 1CH and 2CH, be sure to wire separately. Avoid using by shortening the space of terminals of 1CH and 2CH shown below. Heat generation and ignition may occur when power source capacity of 1CH and 2CH are added and allowable power source value exceeds.

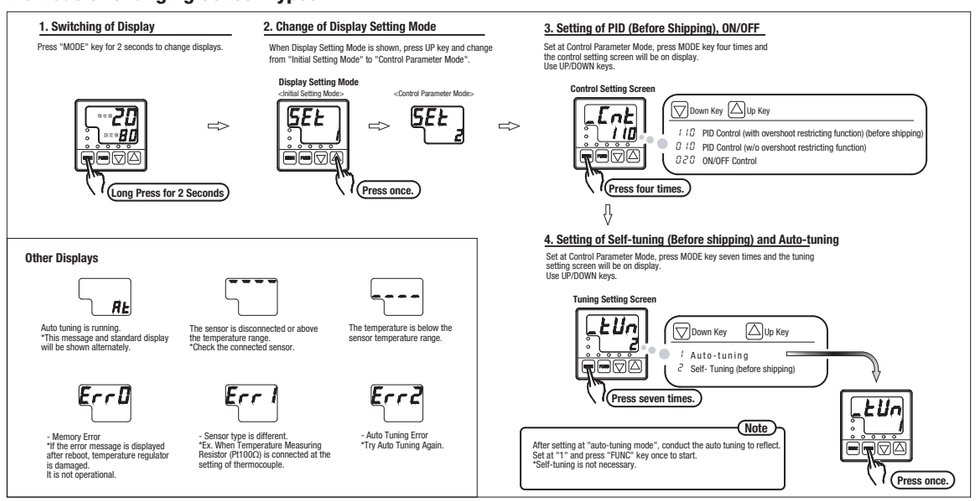
Be sure to avoid the wiring shown above.
Power cord supplied by user.

Part Number Example Part Number: MTCH

Types of Sensors

Thermocouples (K, J, R, T, N, S, B) and Pt100Ω, JPt100Ω sensors can be used for the universal type.
* Thermocouple K is used before shipping.

Methods of Changing Sensor Types



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