

# Temperature Controllers

Instruction manual is available online:  
<http://fa.misumi.jp/ht/>  
 Refer to a collection of FAQ which compiled frequently asked questions.

Please refer to FAQ on P.1668.

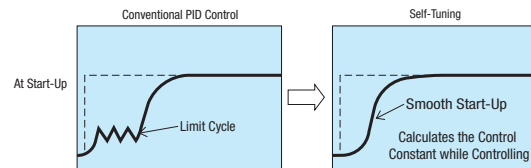
## Temperature Controllers - Overview

MISUMI's Temperature Controllers can operate up to 20A in 100/240V on single-phase or up to 30A in 200V on three-phase. 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 - Compact with Alarming Function" have alarm output terminals. Specification of alarm output is same as the temperature adjuster (P.1669).

### Features

Various types of temperature sensors and various types of input ranges can be set, therefore precise temperature control is possible. Also when the control value fluctuates 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.

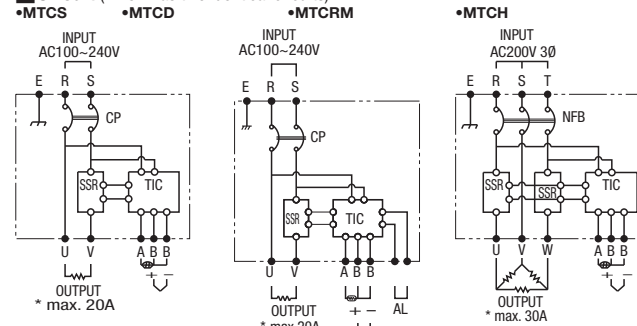
### Difference between Conventional PID Control and Self-tuning



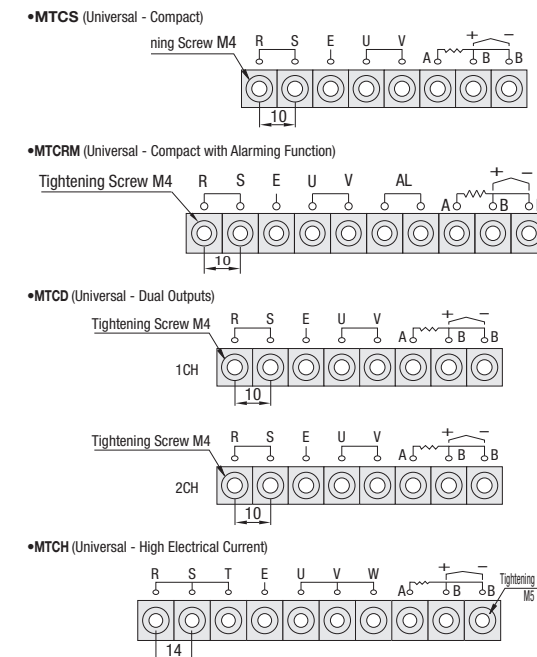
### Specification

Control	PID Control (with Self-tuning Function)	Input Type	Thermocouple (K, J, R, T, N, S, B) Temperature Measuring Resistor (Pt1000, JPt1000)
Rating	MTCS, MTCRM AC100V~240V 10 *20A MTCD AC100V~240V 10 *20A X 2 Circuits MTCH AC200V 30 *30A	* Switchable depending on the panel setting	* Thermocouple at the time of shipment (K)
	* Resistance load without inrush current (Max. Value)	Conditions of Operating Temperature	0 ~ 30°C (No Freezing) Over Current Cut-off Breaker Switch

### Circuit (MTCD has two identical circuits)

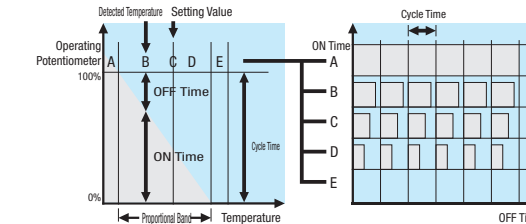


### Connection

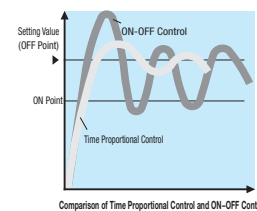


### Control by Solid State Relay (SSR)

This is a control method which is based on the proportional control (time proportional control) in the form of ON-OFF control in order to change the length of ON and OFF times in proportion to the variation against the setting value in the proportional band with central focus on the setting value.



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.



Within the proportional range, the time proportion between ON and OFF changes according to the temperature and in proportion to the variation against the setting value. 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 used in the proper manner, we will collect and repair/replace the unit. In the following cases, repairs are fare-paying services. We will collect the product and make an quotation.  
 ① When the damage is caused by a factor other than covered by the warranty and the product is repairable.  
 ② When the damage has occurred beyond the warranty period and the product is repairable.

### Contact for Repairs

Temperature Controllers/Related Products, MISUMI Corporation  
 TEL:03-5805-7470 FAX:03-5805-7318

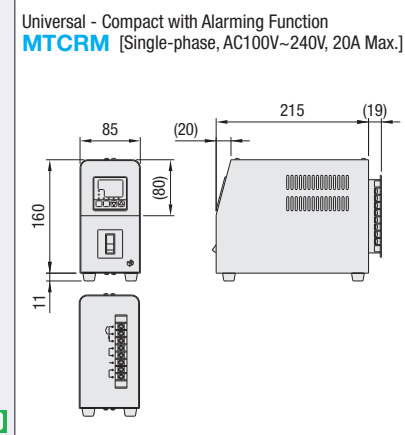
### Precautions for Safety

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). In such a case, measure should be taken to provide a safety circuit to cut off primary power of this product when the temperature exceeds a preset level. 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.

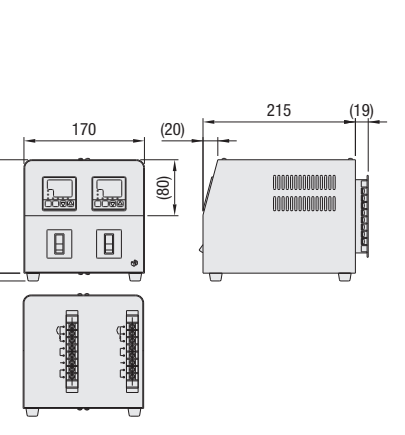
## Universal - Compact Universal - Compact with Alarming Function



## Universal - Dual Outputs MTCS [Single-phase, AC100V~240V, 20A Max.]



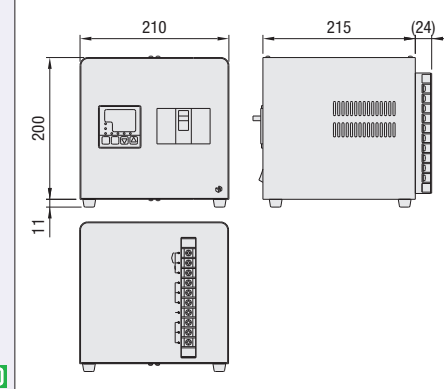
## Universal - High Electrical Current MTCH [Three-phase, AC200V, 30A Max.]



## Universal - High Electrical Current



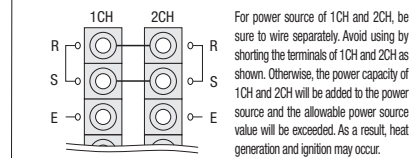
## Universal - High Electrical Current MTCH [Three-phase, AC200V, 30A Max.]



Part Number	Input Type	Unit Price Qty. 1 ~ 4
MTCS	Swivel	
MTCRM		
MTCD		
MTCH		

\* For orders larger than indicated quantity, please check with WOS.

### Cautions on MTCD (Double Output Type)



For power source of 1CH and 2CH, be sure to wire separately. Avoid using by shorting the terminals of 1CH and 2CH as shown. Otherwise, the power capacity of 1CH and 2CH will be added to the power source and the allowable power source value will be exceeded. As a result, heat generation and ignition may occur.

\* Be sure to avoid the wiring shown above.

Ordering Example: **Part Number MTCH**

### Type of Sensor

The Universal Type can be used as the sensor for Thermocouples (K, J, R, T, N, S, B) and Pt100Ω / JPt100Ω. \* Set for thermocouple K at the time of shipping.

## How to Set the Controls

#### 1 Switching of Display

Press "MODE" key for 2 seconds to change displays.

#### 2 Change of Display Setting Mode

When display Setting Mode is shown, press UP key and change from "Initial Setting Mode" to "Control Parameter Mode".

#### 3 PID (Time of Shipping) and ON / OFF Settings

Set to Control Parameter Mode, press MODE key four times and the control setting screen will be on display. Use UP/DOWN keys.

#### 4 Setting of Self-tuning (Time of Shipping) and Auto-tuning

Set to Control Parameter Mode, press MODE key seven times and the tuning setting screen will be on display. Use UP/DOWN keys.

#### Other Display

- Auto tuning is executing. \* If the error message is displayed after reboot, temperature regulator is damaged. It is not operational.
- The sensor is disconnected or the allowable temperature range is exceeded. \* Check the sensor connections.
- The temperature is below the sensor temperature range.
- Memory Error
- Sensor type is incorrect. Ex. If a Temperature Measuring Resistor (Pt100Ω) is connected instead of a thermocouple for the thermocouple setting.
- Auto Tuning Error \* Execute Auto Tuning Again.

**Note**  
 After setting to "auto-tuning mode", execute the auto tuning to be reflected. Set at "I" and press "FUNC" key once to start. \* Self-tuning is not necessary.