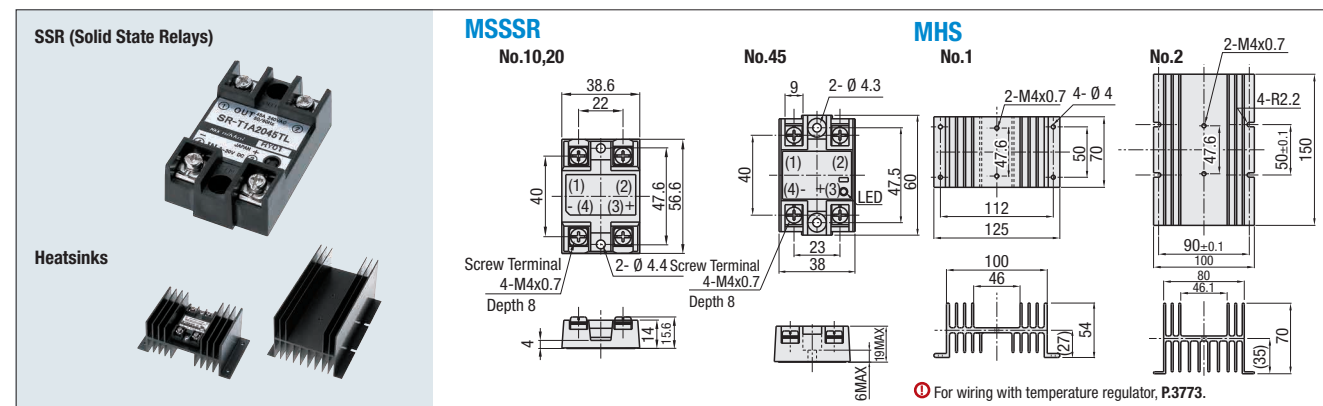


SSR (Solid State Relays) / Heatsinks



SSR						
Part Number	Output Side Rated Load Current	Output Side Rated Voltage	Input Voltage Range (V)	*Max. Load When One Heater is Used (Reference)	Weight (g)	Applicable Heatsinks
MSSSR	10	10A Acrms	120/240 V Acrms	DC4-32	50	MHS1, 2
	20	20A Acrms				
	45	45A Acrms				
			DC3-30	7A (1) 10A 7A (1) 13A (2) 16A 7A (1) 24A (2) 36A	53	MHS1, 2

*The values of the maximum load current (reference) is of when 1 heater is used without a heatsink. In (1), (1) when MHS1 is used; (2) when MHS2 is used. No. 10 and 20 are for ambient temperature 40°C or less, while No. 45 is for ambient temperature 30°C or less. (1) (2)
*Refer to the following load current characteristics.

Rating					
Item	Unit	MSSSR10	MSSSR20	MSSSR45	DC Input Signal of SSR
Output	Rated Load Voltage	V	120/240		1) Connect it correctly without altering the polarity (+, -, or terminal number). 2) For input voltage, apply the normal starting voltage. 3) The input power supply (signal) should be direct current. When commutating from AC power, always use a smoothing circuit and reduce the ripple so that each voltage of the ripple may be within the operating voltage range. 4) Note that noise near the input terminal may cause the malfunction. 5) When input line receives inducement easily, use shielded wire.
	Rated Load Current (Resistance Load)	A	10	20	
	Rated Frequency	Hz	50/60		
Input	Peak Repeatability Off Voltage	V	AC600		
	Maximum Input Voltage	V	DC32	DC30	
Common	Input Current	mA	11 or less (Built-in fixed current circuit)	7.0mA or Less*	
	Withstand Voltage	V	3k 1 minute interval or more (Input-Output-Grounding)		
	Insulation Resistance	MΩ	DC500V 100 or more (Input-Output-Grounding)		
	Operating Temperature Range	°C	-20~+80		
	Storage Temperature Range	°C	-30~+100		

Properties					
Item	Unit	MSSSR10	MSSSR20	MSSSR45	Notes on Heat Sink Use
Output	Operating Load Volt. Range	V Acrms	50-264	85-264	To enhance the heat radiation effect of SSR, deburr and smooth the surface of SSR, then lightly apply silicon compound. If not applied, the heat will accumulate and SSR may break. (Ex.) Shinetsu Chemicals Ind. Corp. KS609, etc.
	Leakage Current at Open Circuit	mA	3 or Less**	12 or Less***	
	Contact Voltage Drop	V Acrms	1.5 or Less (Operating Temp. Range=25°C)		
Input	Minimum Load Current	mA	50	400	
	Input Voltage Range	V	DC4-32	DC3.0-30	
	Pick Up Voltage	V	DC4.0 or Less	DC3.0 or Less	
Common	Drop Out Voltage	V	DC1.0 or Less	DC1.0 or Less	
	Response Speed	—	1/2 cycle +1 ms or Less		
	Capacitance	pF	150 or More (Input-Output)		

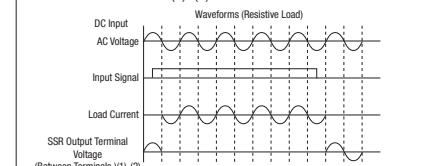
V0=240V *V0=200V

Cautions on Operation Wave and Use for SSR

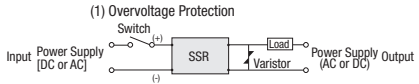
Operation Wave
In case of resistance load
Although the input voltage is applied near the AC power voltage, the current doesn't flow to the output side load of SSR at once, due to the effect of zero cross circuit.

When the AC power voltage decreases gradually till about zero voltage, the output side enters ON state. And when it is not turned off immediately even though the input signal disappears and output current decreases close to zero, the effect of SSR internal element will turn it off.

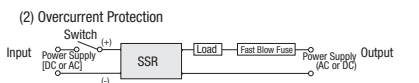
When the load current reaches zero, power supply voltage appears between the terminals (1)-(2) of TRIAC.



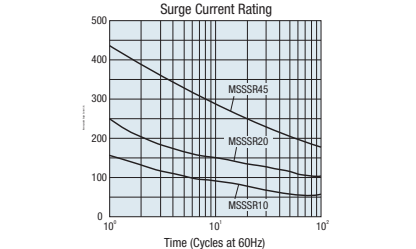
In Case of Inductive Load
The voltage starts quickly (Magnetic field off voltage increase rate dv/dt is large at the commutation), and it is likely to cause malfunction, when the inductive load of reactance is especially large.



It is likely to malfunction if the noise environment on the power supply side is bad and the big surge voltage is applied to SSR. In such a case, connect varistor as figure shown above.



For SSR, there is a provided over-current rating. It may result in permanent breakage of SSR if current over the rated current flows. Therefore, use of fast fuse is recommended to protect SSR from surge current, when there is a possibility that a load may be short-circuited or abnormal current may flow for some causes.



(3) Parallel Connection
SSR cannot be used by connected in parallel to increase the current. However, it can be connected in parallel to compensate the trouble of open mode.

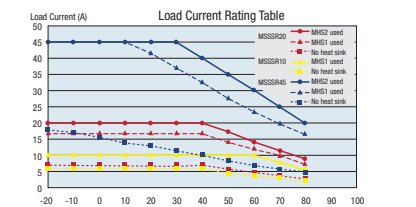
[Important] Malfunction
It is usually in the short mode in many cases when the element of SSR is destroyed by over-voltage or over-current, although two failure modes of the open mode and the short mode may occur. Do not use it exceeding the maximum rating even just for a moment. Avoid SSR malfunction by taking the measure such as circuit protection. It is recommended to use in combination of SSR protection and fail safe (safety measures for malfunction).

Heatsinks		
Part Number	Type	Thermal Resistance (°C/W)
MHS	1	1.52
	2	0.85

Part Number Example: MSSSR 10

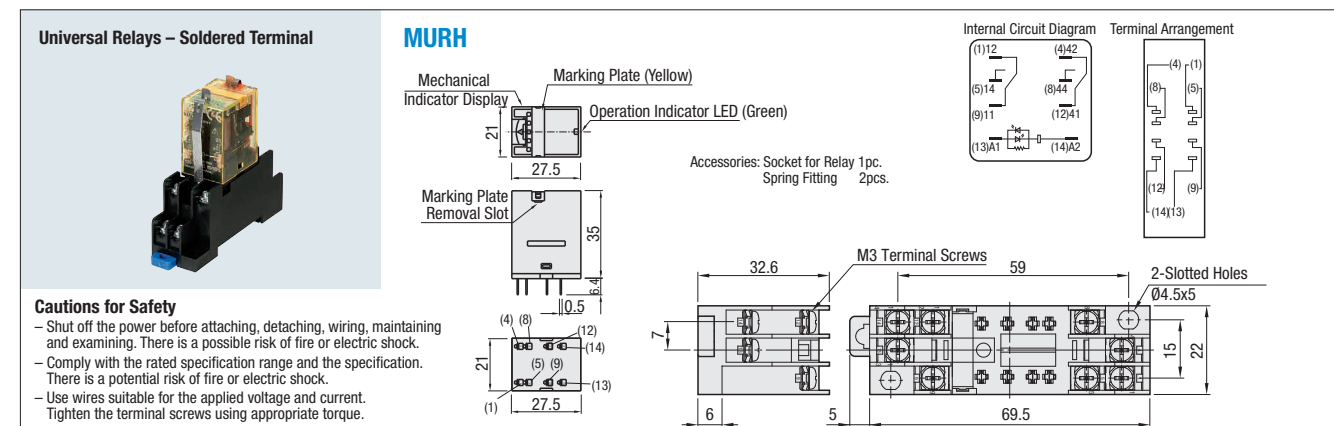
Cautions on Installation
① When the ambient temperature is high, it is necessary to decrease the load current. Pay attention to the relation of the mounting place and the load current.
② Tighten the mounting screws firmly, so that they should not be loosened from vibration, impact, etc.

Notes on Wiring
① It is recommended to use round or Y-shaped crimping terminals to wire more securely, although single or stranded wires can be connected directly.



Universal Relays / Terminal Blocks

Soldered Terminal



Part Number	Type	Rated Coil *1				Contact Rating			
		Rated Current (mA)±15%	Rated Voltage AC (V)	Coil Resistance (Ω) ±10% (at 20°C)	Number of Poles	Allowable Contact Current	Contact Rating Voltage (V)	Allowable Contact Power (Resistance Load)	Load Current with Resistive Load
MURH	10	9.2-11.0	7.8-9.0	100-110	2 Poles	10A	AC250	AC2500VA	10A
	20	4.6-5.5	4.0-4.6	200-220			DC30		

*Operating Properties of One Rated Coil (rated values at 20°C): Maximum Applied Voltage: 110%; Minimum Rated Operation: 80% or less; Return Voltage: 30% or more.
Note The rated current value includes the current of operation indicator LED.

Properties			
Contact Material	Ag Alloy	Maximum ON/OFF Frequency	Electrical: 1,800 times/h, Mechanical: 1,800 times/h
Contact resistance*1	50mΩ or Less	Vibration Resistance	Endurance: Frequency 10-55 Hz, Half Wave 0.5 mm Malfunction: Frequency 10-55 Hz, Half Wave 0.5 mm
Minimum Operation Load*2	DC24V - 5mA (Reference Value)	Impact Resistance	Endurance: 1,000m/s², Malfunction: 150 m/s²
Response Time*3	20ms or Less	Mechanical Durability	AC: 50 million times or more, DC: 100 million times or more
Recovery Time*3	20ms or Less	Electrical Durability*3	AC250V: Resistance Load 10A=100,000, 5A=500,000 times.
Power Consumption	0.9-1.2VA (60Hz) 1.1-1.4VA (50Hz)	Operating Ambient Temp.*4	-55~+60°C (Not to be frozen)
Insulation Resistance	100MΩ or More DC500V mega	Operating Ambient Humidity	5-85%RH (No condensation)
Withstand Voltage	AC2500V, 1min (Between the same pole contact circuit, AC1000V, 1min.)	Mass (approx.)	35 g

Terminal Blocks

MSNDTD MSNDTK Cover Type

Part Number	Type	No.	A	P	Terminal	Mass (g)	
						MSNDTD	MSNDTK
MSNDTD	MSNDTK	2	48.5	35.5	4	72	79
		3	60.5	47.5	6	91	99
MSNDTK		4	73	60	8	110	119
		6	97	84	12	148	159
		8	121.5	108.5	16	187	201
		10	146	133	20	225	241

① No. indicates number of poles.

Application Example

One temperature controller can be connected to several heaters.

② Two crimping terminal can be used for one terminal.

Part Number Example: MSNDTD8

Features
- The terminal block is made of special resin (unsaturated polyester resin), which can be used at high temperature.
- Use it when several heater lead wires are connected with the temperature controller.
① Although the use in atmosphere with temperature over 80°C causes product label to discolor and the terminal block to be loosened, there is no mechanical problem. Also, use heat resistant wires (more than 200°C) for wiring.
② Tighten the terminal screw regularly (approx. once a year).

No.	Name of Parts	Material	Surface Treatment	Standard
(1)	Terminal Block	Unsaturated Polyester Resin	—	UL94V-0
(2)	Terminal Screw	Carbon Steel	Zinc Plating (Trivalent Chromate)	—
(3)	Terminal Metal Fitting	Brass	Nickel Plating	—
(4)	Signature Label	Fiber (White)	—	—
(5)	Cover	Phenol Plate (Black)	—	—

③ MSNDTK (Cover Type) is included with 4 pcs of M3 screws.