

SSR (Solid State Relays)

Universal Relays, Terminal Blocks

Soldered Terminals

M5SSR (SSR)
No.10, 20

No.45

MHS (Heatsinks)
No.1

No.2

④ For wiring with temperature controller, See P1670

Part Number		Output Side Rated Current	Output Side Rated Voltage	Input Voltage Range (V)	* Max. load when 1 heater is used (reference)	Weight (g)	Applicable Heatsinks	Unit Price Qty. 1 ~ 9	Volume Discount Rate 10~20
Type	No.								
M5SSR	10	10A acrms	120/240 V acrms	DC4~32	6A(①)10A	50	MHS1, 2		
	20	20A acrms		DC3~30	7A(①)13A(②)16A	53	MHS1, 2		
	45	45A acrms			7A(①)24A(②)36A		MHS1, 2		

*The values of the maximum load current (reference) are those measured when 1 heater is used without a heatsink. In (), 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.

*Refer to the following load current characteristics.

④ For orders larger than indicated quantity, please check with WOS.

Part Number		Thermal Resistance (°C/W)	Unit Price Qty. 1 ~ 9	Volume Discount Rate 10~20
Type	No.			
MHS	1	1.52		
	2	0.85		

④ For orders larger than indicated quantity, please check with WOS.

Rating

Item	Unit	M5SSR10	M5SSR20	M5SSR45
Rated Load Voltage	V acrms	120/240		
Rated Load Current (Resistance Load)	A acrms	10	20	45
Rated Frequency	Hz	50/60		
Peak Repeatability Off Voltage	V	AC600		
Maximum Input Voltage	V	DC32		
Input Current	mA	① or less (Built-in fixed current circuit) 7.0mA or Less*		
Withstand Voltage	V acrms	①k 1 minute interval or more (Input - Output - Grounding)		
Insulation Resistance	MΩ	DC500 V/100 or more (Input - Output - Grounding)		
Operating Temperature Range	°C	-20~+80		
Storage Temperature Range	°C	-30~+100		

* Built-in fixed current circuit

Properties

Item	Unit	M5SSR10	M5SSR20	M5SSR45
Operating Load Voltage Range	V acrms	50~264	85~264	85~264
Leakage Current at Open Circuit	mA acrms	3 or less**		12 or Less***
Contact Voltage Drop	V acrms	1.5 or Less (Operating Temperature Range=25°C)		
Minimum Load Current	mA acrms	400		
Input Voltage Range	V	DC4~32		DC3.0~30
Pick Up Voltage	V	DC4.0 or less		
Drop Out Voltage	V	DC1.0 or less		
Response Speed	-	1/2 cycle + 1ms or less		
Capacitance	pF	150 or less (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 even when the input signal disappears, SSR is not turned off immediately thereafter. When the output current decreases and comes closer to zero, SSR is turned off through the effect of SSR internal element.

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

DC Input

Waveform Varistor (Resistive Load)

AC Voltage

Input Signal

Load Current

SSR Output Terminal Voltage

①-② Between Terminals

- 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.

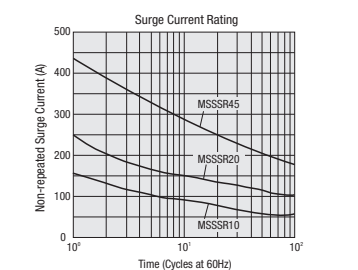
① Overvoltage Protection

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 varistor voltage, it is recommended to use 200 to 300V for power supply voltage 110V, and 350 to 450V for power supply voltage 220V.

② Overcurrent Protection

For SSR, there is a provided over-current rating. If current over the rated current flows, this may cause permanent breakage of SSR. 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).

Universal Relays - Soldered Terminals

MURH

Cautions for Safety

- Shut off the power before attaching, detaching, wiring, maintaining and examining. There may be danger of fire or electrical shock.
- Comply with the rated specification range and the specification. There may be danger of fire or electrical shock.
- Use wires suitable for the applied voltage and current. Tighten the terminal screws using appropriate torque.

Part Number	Type	Rated Coil *1		Rated Voltage AC (V)	Coil Resistance (Ω) ±10% (at 20°C)	Number of Poles	Allowable Contact Current	Contact Rating		Load Current with Resistive Load	Unit Price	
		Rated Current (mA)	50Hz					60Hz	60Hz		Allowable Contact Power (Resistance Load)	Qty. 1 ~ 9
MURH	10	9.2~11.0		100~110	3,460	2 Poles	10A	AC250 DC30	AC2500VA DC300W	10A		
	20	4.6~5.5		200~220	14,080							

* 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. ④ For orders larger than indicated quantity, please check with WOS. Note) The rated current value includes the current of operation indicator LED.

Properties

Item	Value
Contact Material	Ag Alloy
Contact Resistance *1	50mΩ or Less
Minimum Operation Load *2	DC24V, 5mA (Reference Value)
Response Time *3	20ms or Less
Recovery Time *3	20ms or Less
Power Consumption	0.9-1.2VA(60Hz) 1.1-1.4VA(50Hz)
Insulation Resistance	100MΩ or more DC500V mega
Withstand Voltage	AC2500V, 1min (between the same pole contact circuit, AC1000V, 1min)
Maximum ON/OFF Frequency	Electrical: 1,800 times/h; Mechanical: 18,000 times/h
Vibration Resistance	Endurance: Frequency 10 ~ 55Hz, Half Wave 0.5mm; Malfunction: Frequency 10~55Hz, Half Wave 0.5mm
Impact Resistance	Endurance: 1,000m/s ² ; Malfunction: 150m/s ²
Mechanical Durability	AC: 50 million times or more, DC: 100 million times or more
Electrical Durability *3	AC250V, Resistive Load 10A~100,000, 5A~500,000 times
Operating Ambient Temp. *4	-55 ~ +60°C (No Freezing)
Operating Ambient Humidity	5 ~ 85%RH (No Condensation)
Mass (approx.)	35g

*1. Measurement Condition: DC5V, 1A, depending on the voltage descent method.
*2. M measurement Condition: The value at ON/OFF frequency 120 times/min. Failure modulus P level (Reference)
*3. Measurement Condition: When rated voltage is applied (at 20°C), Bounce is excluded.
*4. When 100% of rated voltage is applied.

Terminal Blocks

MSNDTD MSNDTK (Cover Type)

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.
- 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.
- Tighten the terminal screw regularly (approx. once a year).

No.	Name of Parts	Material	Surface Treatment	Standards
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 (MSNDTK only)	Phenol Plate (Black)	-	-

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

Part Number	Type	No.	A	P	Terminal Screws	Mass (g)	MSNDTD		MSNDTK	
							MSNDTD	MSNDTK	MSNDTD	MSNDTK
MSNDTD	MSNDTK	2	48.5	35.5	4	72	79			
		3	60.5	47.5	6	91	99			
		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					

Rating and Performance

Rated Insulation Voltage	250V	Rated Current	20A	Applicable Wire	5.5mm ²	Terminal Screw	M4 (Recommended Tightening Torque: 1.4 ~ 1.8N·m)
Insulation Resistance	DC500V mega 100MΩ or more	Withstand Voltage	AC2000V, Normal for 1 minute				
Operating Temp., Humidity Range	-10~150°C, 45~85%RH (No Freezing or Condensation)						
Conforming Standard	JIS C 2811 Industrial Terminal Block						

④ Use under atmospheric pressure (at an altitude 2,000m or less).

