CP-SP-1219E

IP50MSS/MSD
INTELLPAK Monitor Switch
User's Manual

Thank you for purchasing the IP50MSS/MSD. This manual contains information for ensuring correct use of the IP50MSS/MSD. It also provides necessary information for installation, maintenance, and troubleshooting.
This manual should be read by those who design and maintain devices that use the IP50MSS/MSD. Be sure to keep this manual nearby for handy reference.

RESTRICTIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment.
Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

NOTICE

Be sure that the user receives this manual before the product is used.

Copying or duplicating this user's manual in part or in whole is forbidden. The information and specifications in this manual are subject to change without notice.

Considerable effort has been made to ensure that this manual is free from inaccuracies and omissions. If you should find an error or omission, please contact Yamatake Corporation.

In no event is Yamatake Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

SAFETY PRECAUTIONS

Safety precautions are for ensuring safe and correct use of this product, and for preventing injury to the operator and other people or damage to property. You must observe these safety precautions. Also, be sure to read and understand the contents of this user's manual.

⚠ WARNING
Warnings are indicated when mishandling this product might result in death or serious injury to the user.

⚠ CAUTION
Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to this product.

⚠ WARNING

- Before wiring, removing, or mounting the IP50MSS/MSD, be sure to turn the power OFF. Otherwise, touching electrically charged parts could cause electric shock.

⚠ CAUTION

- Use the IP50MSS/MSD within the operating ranges given in the specifications for temperature, humidity, voltage, vibration, shock, mounting direction, atmosphere, etc. Failure to do so could cause malfunction.
- Do not allow lead clippings, chips or water to enter the case. Doing so could cause fire or faulty operation.
- Firmly tighten the terminal screws at the torque listed in the specifications. Insufficient tightening of terminal screws could cause electric shock or fire.
- Do not use unused terminals on the IP50MSS/MSD as relay terminals. Doing so could cause electric shock, fire, or faulty operation.
- Do not block ventilation holes. Doing so could cause fire or faulty operation.
- Do not touch electrically charged parts such as the power terminals. Doing so could cause electric shock.
- Do not disassemble the IP50MSS/MSD. Doing so could cause electric shock or faulty operation.

Conventions Used in This Manual

The following conventions are used in this manual:

! Handling Precautions:
Handling Precautions indicate items that the user should pay attention to when handling the IP50MSS/MSD.

(1), (2), (3): Numbers within parentheses indicate steps in a sequence or parts of an explanation.

1.Outline

The IP50MSS/MSD is a thin, plug-in monitor switch that generates a signal by opening and closing relay contacts or by turning open collector output on and off when a DC input signal passes a preset value.

2.Mounting

■ Mounting locations

Install the IP50MSS/MSD so as to avoid the following:

- High and low temperatures and humidity
- Direct sunlight, outdoor locations exposed to wind and rain
- Splashing liquid such as water, oil, or chemicals
- Corrosive or flammable gases
- Dust and soot
- Mechanical vibration and shock
- Strong electric or magnetic fields
- Sources of electrical noise, such as high voltage ignition devices or welding machines

! Handling Precautions:

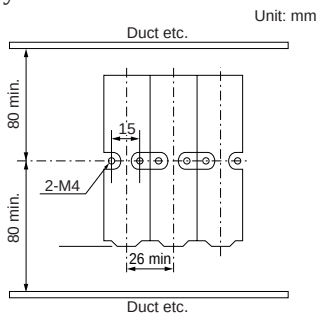
- When installing the IP50MSS/MSD in a place subject to mechanical vibration or shock, attach a damping bracket like the QN718A (sold separately). A damping bracket cannot be attached if the IP50MSS/MSD is mounted on a DIN rail.
- When installing the IP50MSS/MSD in place with much dust or metal powder, mount it in a case designed to be dustproof, and take measures to prevent excessive heat.

■ Installation

The IP50MSS/MSD plugs into a socket which can be attached directly to a wall or to a DIN rail.

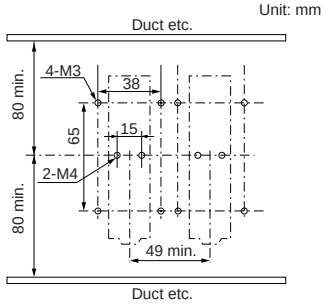
● Lateral installation layout

When installing multiple IP50MSS/MSD units side by side, use the layout shown below.



● Installation layout with damping bracket

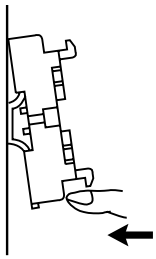
When installing the IP50MSS/MSD with the damping bracket, use the layout shown below. (The QN718A damping bracket is sold separately.)



● How to attach the IP50MSS/MSD to the DIN rail

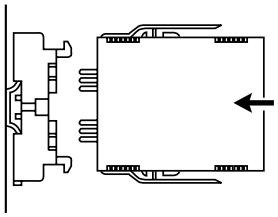
(1) Attach the socket first

With the slider on the base of the socket facing downward, hook the socket onto the DIN rail. Then push in the base of the socket, as shown in the drawing.



(2) Attach the IP50MSS/MSD

Push the IP50MSS/MSD straight into the socket. The label lettering should be pointing the right way. Be sure to push the unit firmly into the socket.

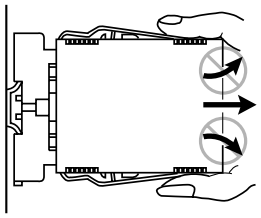


■ Removing

(1) If the damping bracket is attached to the IP50MSS/MSD, remove the damping bracket first. Then remove the IP50MSS/MSD from the socket.

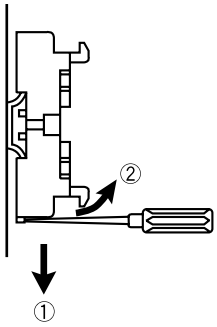
(2) How to remove the IP50MSS/MSD from the socket

First make sure that the IP50MSS/MSD is fully pushed onto the socket. Fully press both upper and lower levers on the IP50MSS/MSD and pull it straight off the socket. Pulling it off when the levers are not sufficiently pressed can damage the socket.



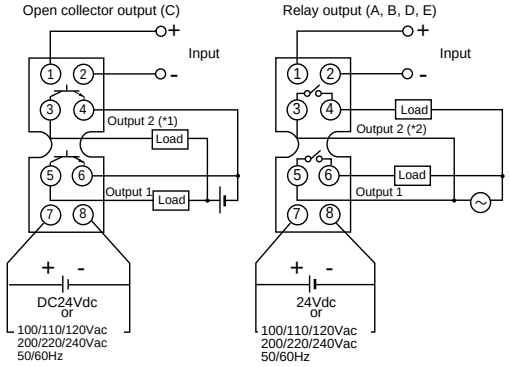
(3) How to remove the socket from the DIN rail

Insert a flat-head screwdriver into the slit of the DIN rail holder, and pull it down. Then lift the socket off the DIN rail in the direction shown by the arrow in the figure right.



3.Wiring

Wire the unit as shown in the figure below. Use M3.5 crimp contacts for wiring.



*1 The IP50MSS does not have output 2.

*2 The IP50MSS has a normally closed contact output.

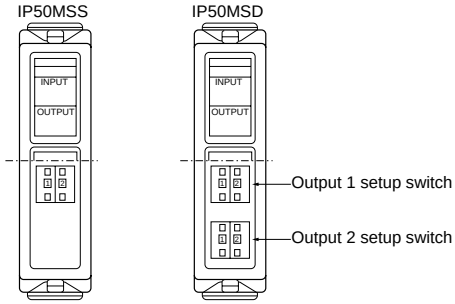
Term.No.	Signal		Content
1	Input 1	+	Connect the required input signal.
2		-	
3	Output 2	+	An on/off signal is output, either by relay contacts or by open collector output.
4		-	
5	Output 1	+	
6		-	
7	Power	+	Connect to a power source having the rated voltage.
8		-	

! Handling Precautions:

- Be sure to use insulated crimp contacts for terminal connections. When installing the IP50MSS/MSD in a place with heavy mechanical vibration or shock, use ring terminals so that they do not come loose.
- Make sure that nearby terminal lugs do not touch each other.
- Keep the input/output signal line 50cm or more away from any power lines carrying over 100V. Do not put them in the same conduit or duct.
- Before wiring double-check the model No. and terminal Nos. on the attached label
- Before turning the power on, be sure that all wiring is correct.
- Though the IP50MSS/MSD is operational as soon as the power is turned on, wait 30 minutes or more to satisfy the accuracy levels stated in the specifications.
- Do not short circuit output terminals on the voltage output model. Doing so could cause damage.
- Do not directly connect terminals 3 or 5 of the IP50MSS/MSD to the + terminal of the external power supply. Doing so might damage the open collector output circuit. (There is no short-circuit protection.)
- When connecting the IP50MSS/MSD to a semiconductor load such as a programmable controller (sequencer), use a module with the same direction of current flow. Also, use a programmable controller that does not control action by the off state leakage current of the IP50MSS/MSD's open collector.

4. How to set

There are 2 digital switches on the front of the IP50MSS/MSD for setting the upper and lower limits. The setting range is 1–99% of the input range in increments of 1%.

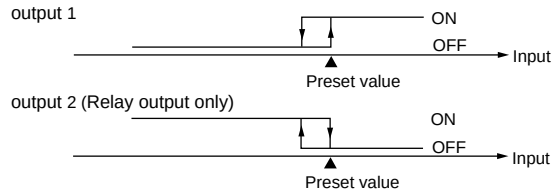


The IP50MSS has 1 output and the IP50MSD has 2 outputs. There are 2 types of output, relay contact and open collector, and control action is ON/OFF.
The relationship between input and output is as shown below. Hysteresis is approximately 0.2% FS.

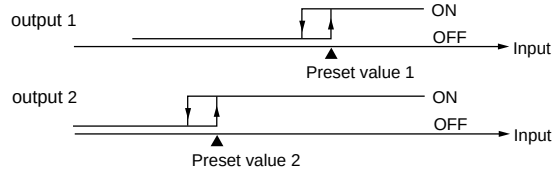
! Handling Precautions:

- Changing the setting on the setup switch may cause the output to turn on. If this could cause a problem, turn the power off before using the setup switch.

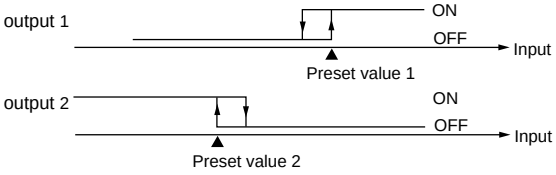
IP50MSS □□A···(Relay output)
IP50MSS □□C···(Open collector output)



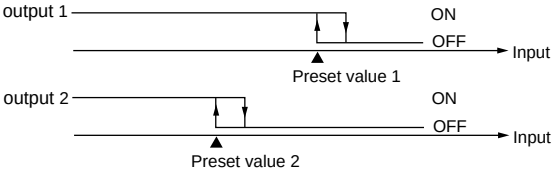
IP50MSD□□A··· (Relay output, HH action)



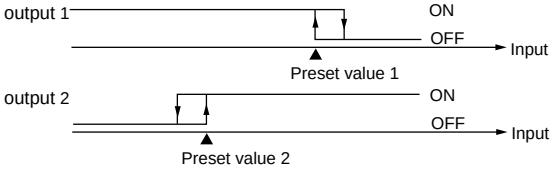
IP50MSD□□B··· (Relay output, HL action)
IP50MSD□□C···(Open collector output, HL action)



IP50MSD□□D···(Relay output, LL action)



IP50MSD□□E··· (Relay output, LH action)



5.Specifications

■ Specifications

Input type	DC voltage and DC current, see table 1.				
Input impedance	See table 1				
Output type code	A	B	C	D	E
Output type	IP50MSS Relay output (1a1a) IP50MSD Relay output (1a1a)	Relay output (1a1a)	IP50MSS Open collector output 1 IP50MSD Open collector output 2	Relay output (1a1a)	Relay output (1a1a)
Output action	IP50MSS H (L) action IP50MSD HH action	HL action	IP50MSS H action IP50MSD HL action	LL action	LH action
Output rating	250Vac 0.5A(resistance road) 30Vdc 2A		30Vdc 50mA ON voltage 0.4V or less	250Vac 0.5A(resistance road) 30Vdc 2A	
Accuracy	±0.2%FS at a reference temperature of 23ºC				
Response time	Relay output 100ms, open collector output 25ms				
Hysteresis	Approximately 0.2% FS				
Power type	AC			DC	
Rated voltage	100/110/120Vac (50/60Hz)	200/220/240Vac (50/60Hz)		24Vdc	
Operating voltage	80 to 132Vac (45 to 65Hz)	170 to 264Vac (45 to 65Hz)		24Vdc±10%	
Power consumption	4.5VA			2.2VA	
Starting current	–			0.11A or less	
Inrash current at power on	10A or less, 1ms			5A or less, 1ms	
Insulation resistance	Between I/O terminal and power terminal, Between I/O terminals (for isolated type) 100MΩ or more by 500Vdc megger				
Dielectric strength	Between I/O terminal and power terminal, Between I/O terminals (for isolated type) 2000Vac 1 minute				
Power characteristics	±0.1% FS/80 to 132Vac or 170 to 264Vac			±0.1% FS/24Vdc±10%	
Temperature characteristics	±0.15% FS/10ºC				
Operating ambient temperature	-5 to +55ºC				
Storage ambient temperature	-20 to +70ºC				
Operating ambient humidity	90% RH or less (without condensation)				
Storage ambient humidity	90% RH or less (without condensation)				
Vibration resistance*	4.9m/s^2 or less 10 to 60Hz X,Y,Z each direction 2h (with damping bracket)				
Shock resistance*	490m/s^2 or less, upward and downward 3 times				
Case material	Heat resistant ABS resin				
Case color	Gray, Munsell color scale 2.5PB3.5/1				
Terminal screw	M3.5				
Terminal screw tightening torque	0.78 to 0.98N•m				
Mounting	Installed on wall or DIN rail				
Mass	200g (Including the base socket)				
Included accessories	Base socket parts number QN719A				
Optional parts (sold separately)	Damping bracket parts number QN718A				

* If unit is mounted on a DIN rail, these specifications do not apply.

■ Key to model numbers Ⅰ Ⅱ Ⅲ Ⅳ Ⅴ : IP50MSD10ADT0

Ⅰ Basic number	Ⅱ Input type	Ⅲ Output type	Ⅳ Power voltage	Ⅴ Additional features	Description
IP50MSS					Monitor switch with 1 output (select either output type A or C only)
IP50MSD					Monitor switch with 2 outputs
	Select from table 1				
		A			1 relay output (1a1b) for IP50MSS 2 relay outputs (1a1a, HH action) for IP50MSD
		B			2 relay outputs (1a1a, HL action)
		C			1 open collector output (H action) for IP50MSS 2 open collector outputs (HL action) for IP50MSD
		D			2 relay outputs (1a1a, LL action)
		E			2 relay outputs (1a1a, HL action)
			A		200/220/240Vac 50/60Hz
			B		100/110/120Vac 50/60Hz
			D		24Vdc
				00	None
				T0	Tropicalization
				D0	With inspection data
				B0	Tropicalization and inspection data
				Y0	With traceability certification

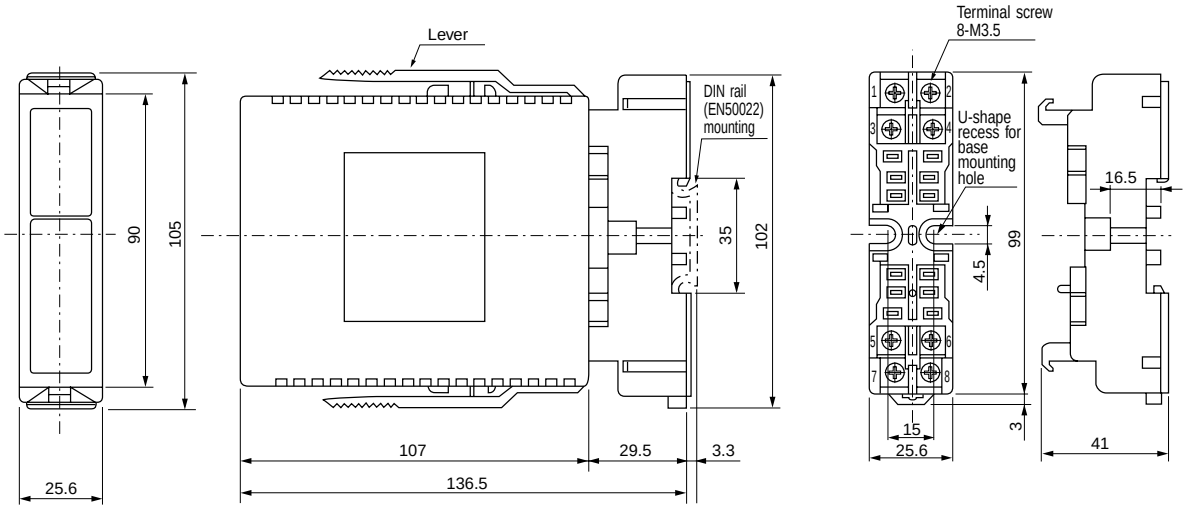
Table 1. Input type

Code	Input type	Input impedance
10	0 to 10mV	1MΩ
11	0 to 100mV	1MΩ
12	0 to1V	1MΩ
13	0 to 5V	1MΩ
14	1 to 5V	1MΩ
15	0 to 10V	1MΩ
16	0 to 50mV	1MΩ
17	0 to 60mV	1MΩ
30	0 to 10μA	1kΩ
31	0 to 100μA	100Ω
32	0 to 1mA	100Ω
33	0 to 10mA	50Ω
34	0 to 16mA	50Ω
35	0 to 20mA	50Ω
36	4 to 20mA	50Ω

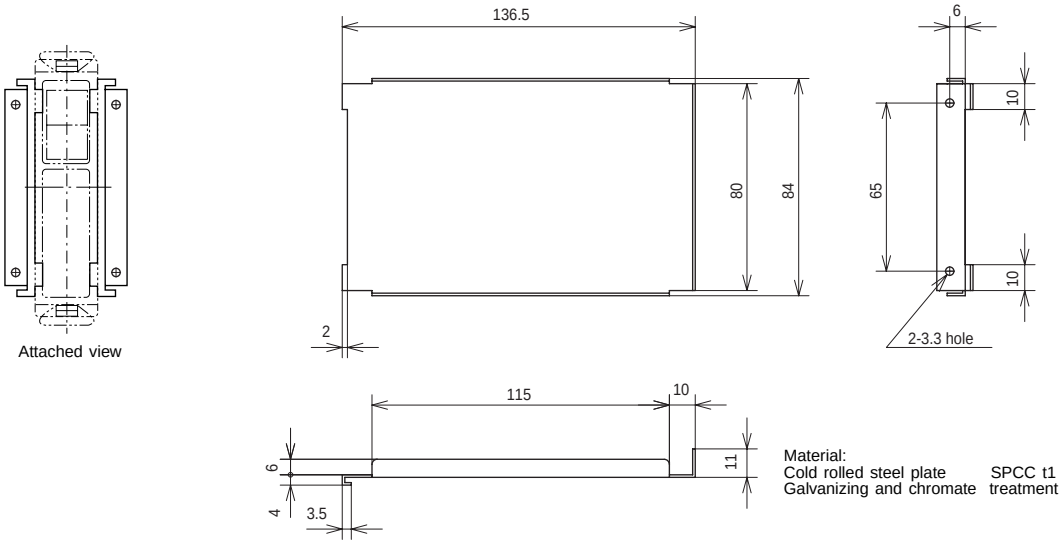
■ External dimensions

Unit: mm

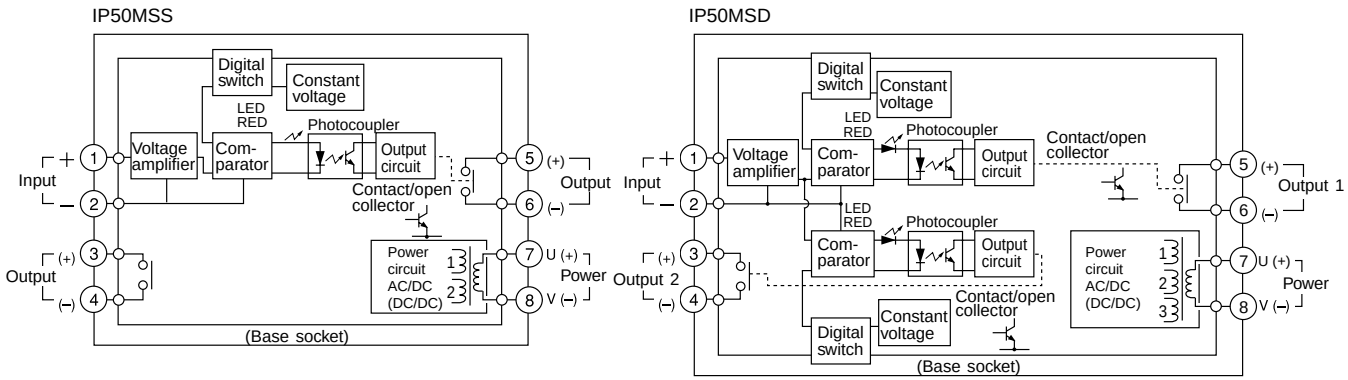
Base socket part number QN719A



Damping bracket part number QN718A



■ Circuit block diagram



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