YASKAWA

Bestact

YASKAWA HERMETICALLY SEALED CONTACT

JQA-0792
ISO 9001
Certified

KAE-C542-0P〈2〉

Hermetically Sealed Contact Bestact Provides High Reliability, Maintenance-Free Operation and Minimized Size in Industrial / Control Systems.

Bestact is a hermetically sealed power switching contact unit having an excellent reputation in a great number of actual applications as an interface element for control systems. Customer-proven features of Bestact include maximum reliability as well as unsurpassed environmental immunity and durability under adverse conditions such as high temperature, high humidity, existance of gas or vapor, vibration and surge.

Large- and medium-capacity types are available depending on the customer's applications. 10 series of products are available : I/O Relays, Multipole Relays, Relays for Electric Power, Relays for Railway Signals, Multipole Relays for Rolling stocks, Limit Switches, Magnetic Proximity Switches, Push button Switches, Selector Switches and Auxiliary Contact Units.

Realizing small machine/peripheral equipment requirements,Yaskawa has expanded the line-up of products for these applications, particularly medium-capacity Bestact products. We are ready to provide customers the engineering assistance for new applications.

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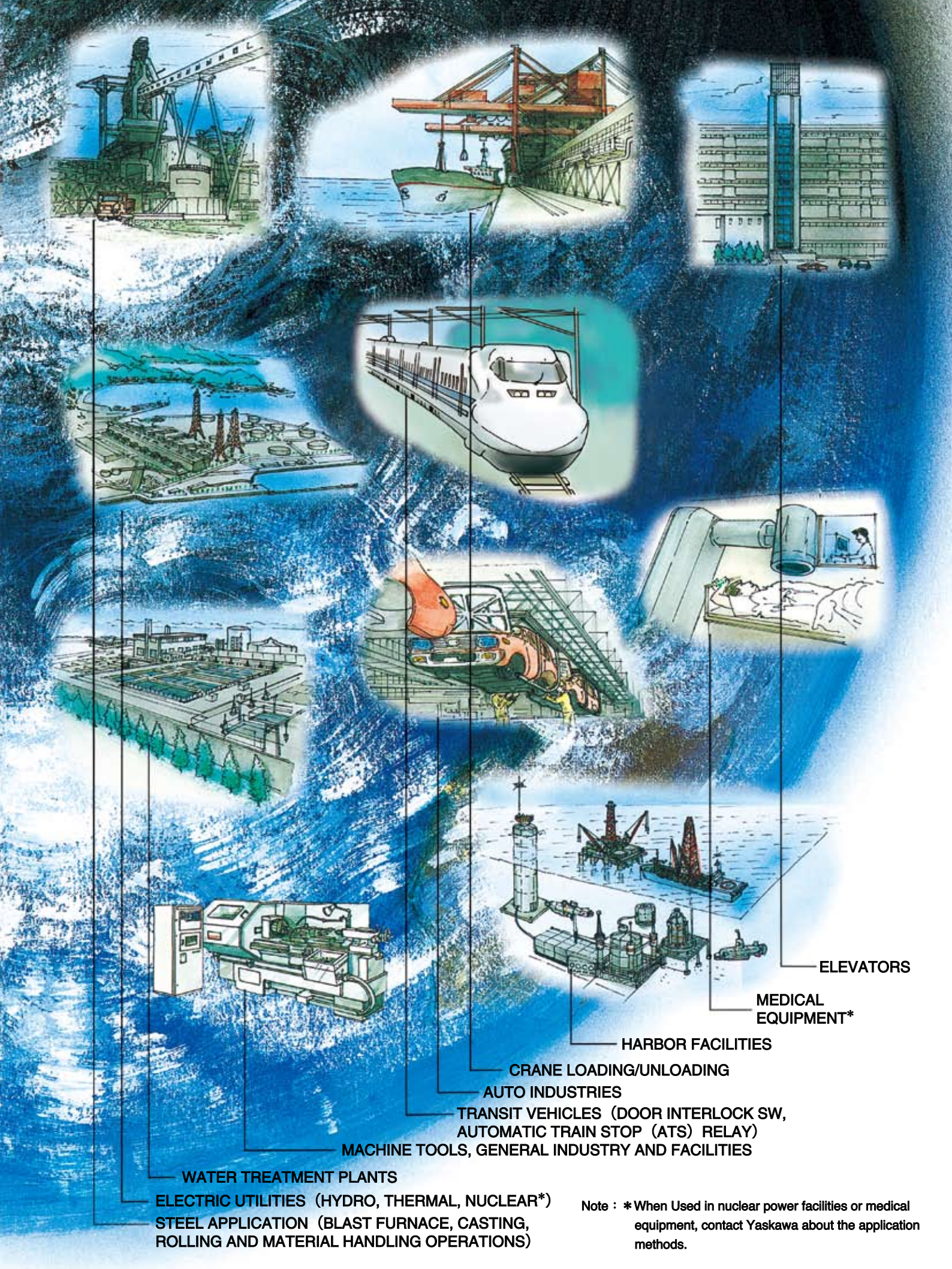


Note : * When Used in nuclear power facilities or medical equipment, contact Yaskawa about the application methods.

BESTACT IMPROVES RELIABILITY FOR VARIOUS SYSTEMS AND EQUIPMENTS.

● FEATURES OF THE BESTACT SERIES OF PRODUCTS

Bestact = Conventional Reed Switches + Mechanical Power Relays

Bestact can perform the jobs of both conventional reed switches and power relays.
Because a single Bestact replaces both, circuitry is simplified and entire circuit reliability rises significantly. A substantial cost savings can be achieved in that no contact protection (snubbers/diodes) is needed, minimal connections and reduced wiring circuitry are needed in the actual circuit design.

Bestact can switch both AC and DC loads from logic to electromagnetic

Bestact has universal relay switching applicability from logic level loads 5V 10mA up to 240VAC 1A (inductive), making it ideal as the contact of an input/output module for programmable controllers. Consideration of voltage and current within this range is not needed. Furthermore, 50VA DC solenoid valves can be switched directly without the use of an interposing relay.

Vibration and Impact (Shock)Resistance

In its weakest axis (when the direction of contact movement and the applied vibration/impact coincide), the vibration/impact resistance is 196m/s^2 {20G}/392m/s^2 {40G} (for large capacity type), respectively.
The movable contact is small compared with conventional switches, and a leaf spring armature holds it (through the use of a specially designed backstop mechanism) against the glass tube wall making it especially strong against vibration and impact, even when not energized.

Outstanding operational characteristics under the most punishing environmental conditions

Because Bestact is a hermetically sealed contact in a glass tube, it remains entirely unaffected by external factors such as gas, humidity, water, oil, dust, high/Low temperature, vibration, shock, high inrush current, voltage surge and noise. This is especially ideal for applications with infrequent use where the contact absolutely must operate and not fail.

High Reliability of Equipment/Devices and Total Cost Reduction

Bestact Series of Products for Severe Duty and Application Reliability.

(I/O Relays, Multipole Relays, Detection Switches, Command Switches)

Universal Control Load Applicability allows Standardization around One Contact for all your Switching Needs

It's wide range switching capability from 240V AC 1A (10A inductive load inrush) to 5V 10mA allows you to standardize around one switch, thus reducing the inventory stock for different loads without sacrificing performance.

Absolutely no Protective Circuitry (R-C Snubbers, Varistors or Diodes) and separate Power Supply (for photo-electric, inductive/capacitive proximity switches) are needed

Decreases Control Panel Area

No amplifying circuitry is needed.

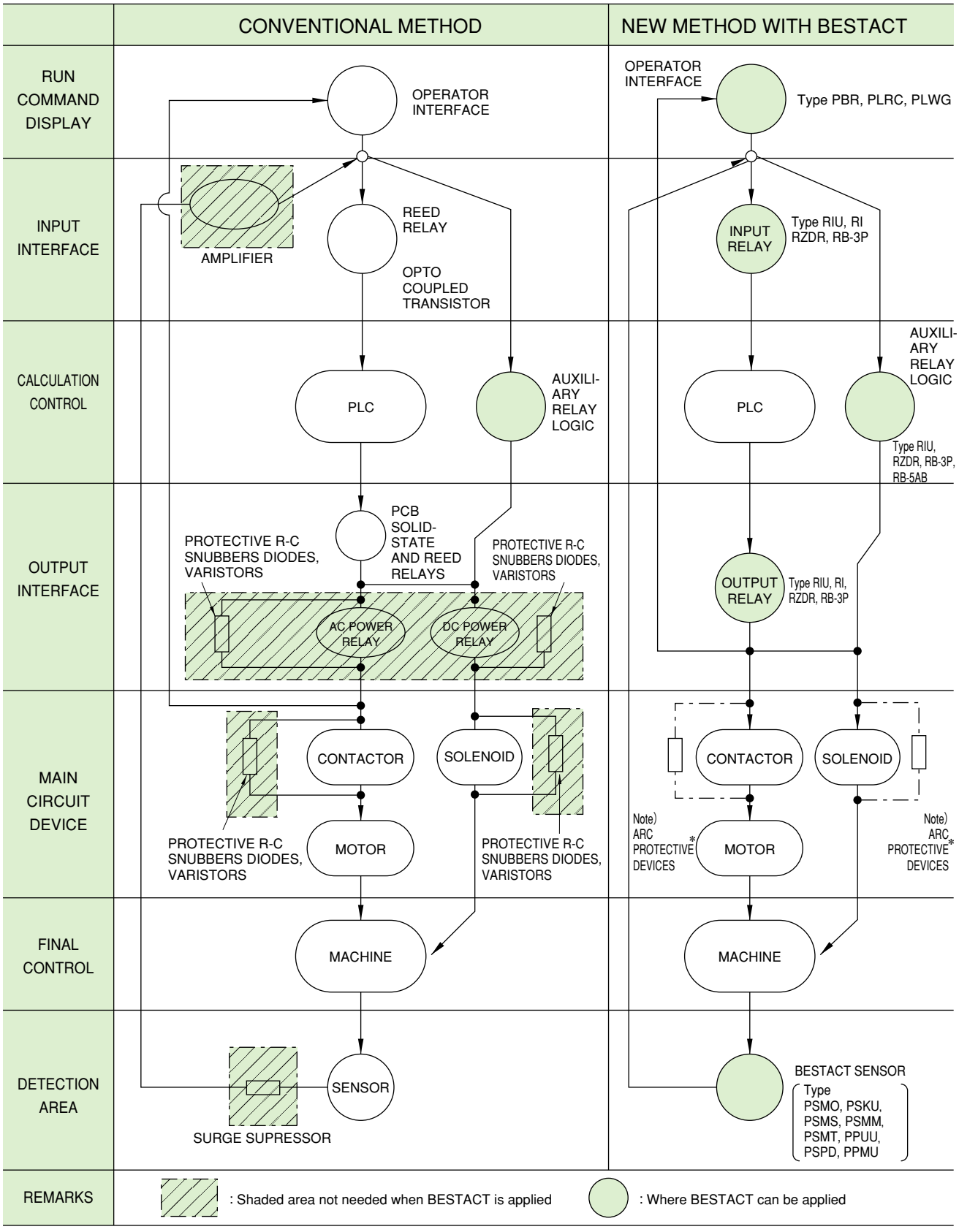
Simplifies Protective Enclosure

Maintenance Free

REFERENTIAL TEST STANDARD

- IEC62246-1 Ed.2: Reed switches–Part 1: Generic specification
- MIL-STD-202G: Test method standard electronic and electrical component parts
- IEC 61000-4: Electromagnetic compatibility (EMC)
- IEC 61373: Railway applications - Rolling stock equipment - Shock and vibration tests
- IEC PAS 62246-2-1: Reed contact units - Part 2-1: Heavy-duty reed switches - Quality assessment specification
- IEC60529: Degrees of protection provided by enclosures (IP Code)
- IEC 60947-5-1: Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices
- IEC 61810-1: Electromechanical elementary relays- Part 1 : General and safety requirements
- JIS C4523: Control reed relays
- JIS C5442: Test methods of low power electromagnetic relays for industrial control circuits
- JEC 174D: Auxiliary relays for electric power systems
- JEC 2500: Protective relays for electric power systems
- JIS E 4031: Rolling stock equipment -- Shock and vibration tests
- JIS C5003: General test procedure of failure rate for electronic components
- JIS E 5004-1: Electric equipment for rolling stock -- Part 1: General service conditions and general rules
- JIS C4530: Hinge type electromagnetic relays
- JIS C8201-5-1: Low-voltage switchgear and controlgear -- Part 5-1: Control circuit devices and switching elements -- Electromechanical control circuit devices
- JIS C0920: Degrees of protection provided by enclosures (IP Code)
- JIS C5010 to 5035: General rules for printed wiring boards, etc.

SIMPLIFICATION OF CONTROL SYSTEM WHEN UTILIZING BESTACT



Note: ∗Normally, arc protective circuitry is not needed. However, if applied, extremely long life can be obtained.

Hermetically Sealed Contact

Bestact

Medium-Capacity (Element)
Type R25
Large-Capacity (Element)
Type R15

Highly Reliable Contact Employing New Materials and Innovative Designs such as Wiping and Hammering Action, Bifurcated Contact and Back-Stop Mechanism

FEATURES

1. Sealed with an inert gas, ensuring freedom from aging and influences exerted by the external environment.
2. The twin contact and wiping effect assures outstanding contact reliability; failure rate is extremely low.
3. Quick action permits a larger make and break capacity and longer service life.
4. Can switch both AC and DC, permitting direct control over a wide range from low level load to electromagnetic power load.

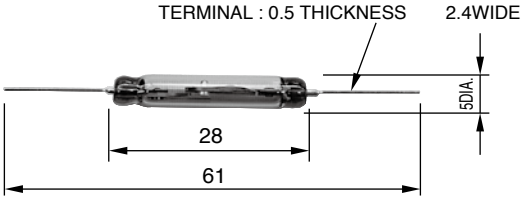
Note: ＊Refer to page 8.

Medium-capacity type : 24V 1mA to 240VAC 0.5A
(5A making)
NEMA Contact Ratings : C300 (AC) and Q150 (DC)
NEMA HP Ratings : 1/10HP (120Vac) , 1/8HP (240Vac)
Large-capacity type : 24V 1mA to 240VAC 1A
(10A making)
230VDC 40W (Solenoid valve)
NEMA Contact Ratings : C600, B300 (AC) , Q300 (DC)
NEMA HP Ratings : 1/6HP (120Vac) , 1/2HP (240Vac)

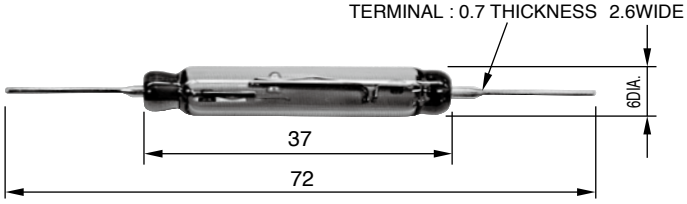
5. Small surge/noise during switching of inductive load.

DIMENSIONS in mm

・Medium-Capacity Type

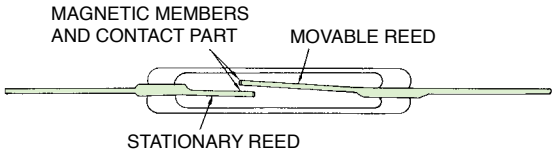


・Large-Capacity Type

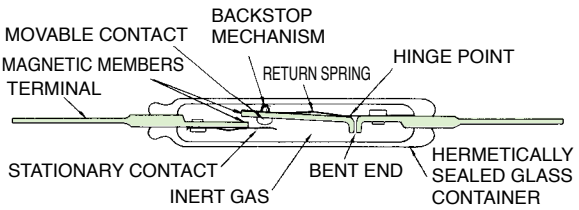


CONSTRUCTION AND OPERATION MECHANISM

Conventional reed switches are constructed simply. The contact for disconnecting current also serves as a magnetic member which constitutes part of a magnetic circuit.

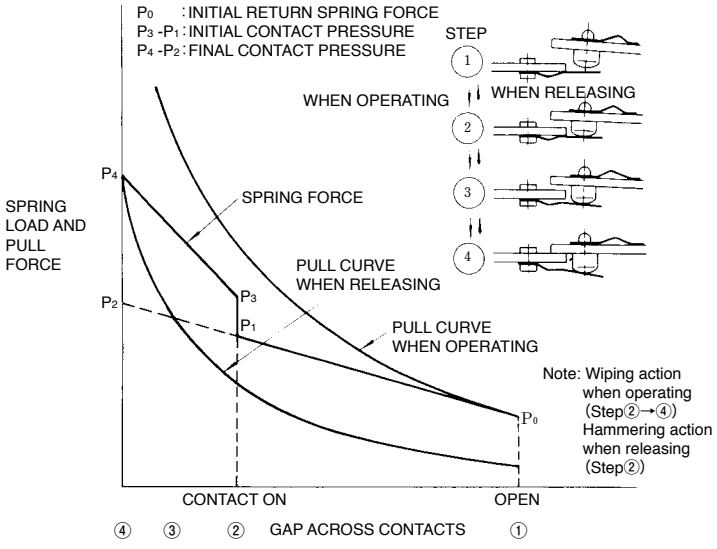


〈Conventional Reed Switch〉



〈Bestact (Large-capacity type)〉

Bestact uses a separate magnetic member and contact unit (carrying current arcing section), each using different materials and designs suited for their functions.



RATINGS AND SPECIFICATIONS

Application			Medium - Capacity Type	Large - Capacity Type	Remarks
Type			R 25	R 15	
Contact Arrangement			1NO	1NO	——
Contact Performance	Rated Insulation Voltage *1		250VAC	250VAC	Power Frequency
	Rated Continuous Current *2		3A	5A	
	Rated Operational Current *3	AC	240V 0.5A	240V 1A	Inductive Load (AC50/60Hz)
		DC	115V 0.3A	115V 0.5A, 230V 0.2A	Inductive Load (Medium-capacity : L/R=40ms, Large-capacity : L/R=100ms)
	Maximum Making Current *4		240VAC 15A	240VAC 30A	Power factor 0.3 to 0.4 (AC50/60Hz)
	Maximum Breaking Current *5	AC	240V 15A	240V 30A	Power factor 0.3 to 0.4 (AC50/60Hz)
		DC	115V 0.5A	115V 0.6A 230V 0.4A	Medium-capacity : L/R=40ms Large-capacity : L/R=100ms
	Minimum Operational Power Ratings *6		24V 1mA	24V 1mA	Failure Rate $\lambda_{60}=4.6\times10^{-9}$ (/time) or less *7
	Withstand Voltage Across Contacts		500VAC for 1minute	800VAC for 1minute	Power Frequency, Leakage Current : 5mA
	Insulation Resistance		10^9 Ω or greater	10^9 Ω or greater	with 500VDC Megger
	Initial Contact Resistance		500mΩ or less	500mΩ or less	6VDC 1A
Operating Characteristics	Pick-up Magnetmotive Force		100 to 130A	180 to 230A	Yaskawa standard coil is of 3000 turns, 33.5mm long, 10.5mm I.O. with 0.2mm dia. wire
	Drop-out Magnetmotive Force		50A or greater	60A or greater	
	Operating Time		4ms or less (Bounce Time not included)	5ms or less (Bounce Time not included)	at 150% of pick-up ampare turn using standard coil (Equipped with a flywheel diode)
	Releasing Time		2ms or less	3ms or less	
Mechanical Life			Over 100,000,000 operations	Over 100,000,000 operations	——
Mechanical Performance	Vibration Resistance		147m/s² {15G}	196m/s² {20G}	20 to 1000Hz
	Shock Resistance		196m/s²{20G} (980m/s²{100G})	392m/s²{40G} (980m/s²{100G})	Value in parenthesis indicates breakdown G
	Terminal Drawing Force		98N {10kg f}	98N {10kg f}	——
Ambient Temperature	Operating Temperature		−50 to +150℃	−50 to +150℃	——
	Storage		−60 to +180℃	−60 to +180℃	——

Note: Ratings and specifications are defined according to IEC 62246-1.

*1. Rated insulation voltage is the voltage value which is the standard of insulation design and defined by the withstand voltage test.

*2. Rated continuous current is the current value which can be energized continuously without exceeding the allowable temperature rise under the condition without breaking contacts.

*3. Rated operational current is the current value which is combined with a rated operational voltage and used in regulated conditions (making/breaking current, switching frequency and electric switching durability).
At 240VAC, the current is set at 10 times this value upon making (PF: 0.6 to 0.7) and 1 times this value upon breaking (PF: 0.3 to 0.4). Rated operational current 1A means 10A making and 1A breaking. At 115VDC, the current is set at 1 times making and 1times breaking and indicated by inductive load (L/R=40ms and 100ms).

*4. Maximum making current is the current value which enables 10 times making at 240VAC and PF: 0.3 to 0.4 by referring to IEC PAS 62246-2-1.

*5. Maximum breaking current is the current value which enables 10 times breaking at 240VAC and PF: 0.3 to 0.4 by referring to IEC PAS 62246-2-1.

*6. Minimum operational power ratings are the values which can be surely energized under the regulated load conditions that the class of contact reliability keeps a failure rate 0.005 (time/10^6) or less. In circuit with photo coupler, 5V 10mA can be used for digital application.

*7. Refer to page 11.

TYPICAL APPLICATIONS

Problems on reliability which cannot be solved even by semi-conductors or photo-electric switches can be solved with Bestact.

(1) Rolling stocks and railway signals (Refer to the application examples in our catalogue 'Railway Control Devices with Bestact' .)
- Main circuit devices (Pantographs, main breakers, VVVF inverter drives) and auxiliary contacts
- Control relays for Automatic Train Stop (ATS), Automatic Train Control (ATC) and Automatic Train Operation (ATO)
- Door control devices (Door interlock switches and semiautomatic door switches)
- Position detecting switches and pushbutton switches for Threshold obstruction detectors
- Pushbutton switches and control relays for obstruction warning devices for level crossing

(2) Electric power facilities (Refer to the application examples in our catalogue 'Electric Power Facilities with Bestact' .)
- Digital protective relay devices (Trip relays for breaker)
- Protective relays for monitoring distribution control system
- Electric power plant equipment (ON/OFF confirmation disconnect switches and control devices for breakers)

(3) Elevators (Refer to the application examples in our catalogue 'Elevators and Parking Machines with Bestact' .)
- Safety devices for elevators (landing-zone/door-zone detector switches)
- Stop position detectors of car pallets in parking structures

(4) Iron and steel facilities (Refer to the application examples in our catalogue 'Harbor Facility, Iron, Steel and Cement making plants with Bestact' .)
- Harbor facilities (Selector switches and position detecting switches for loader/unloader, crane and belt conveyor)
- Raw material yard equipment (Selector switches and position detecting switches for conveyor and tramcar)
- Iron making plant equipment (Selector switches and position detecting switches for hot strip mill, cold strip mill and hot-dip galvanization)

(5) Explosion protection
- Oil pipeline equipment (Selector switches)
- Chemical factory equipment (Valve open/close position detecting switches)

(6) Machinery safety switches
- Food processing, semiconductor manufacturing and metal cutting machines (Guard interlock switches)
- Industrial robots

(7) General industries
- Waterworks and sewage equipment (Control relays)
- Medical equipment (Foot switches)
- Aircraft avionics
- Cylinder position detection switches

ELECTRICAL LIFE

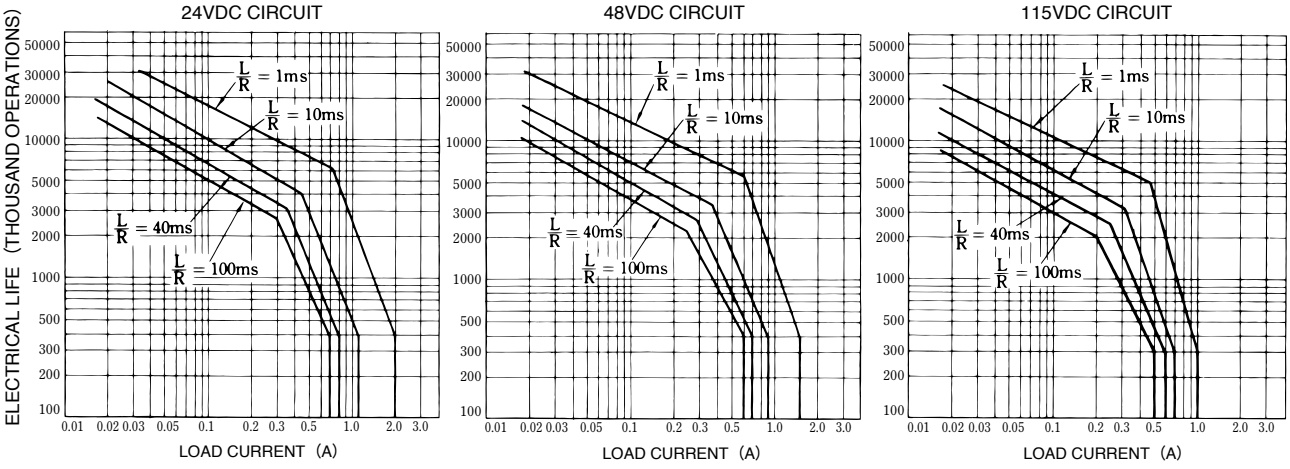
Electrical life tabulated below is B_{10} value in a single test (at the condition shown in IEC PAS 62246-2-1) at Yaskawa. It is not a value in a multiple environment such as temperature and vibration. It is necessary to test actual products before initial operation.
The circuit that drives coils adopts a direct making method which applies rated coil voltage (instant ON and instant OFF). In the circuit where the voltage applied to coils gradually increases or decreases, electrical life might decrease.

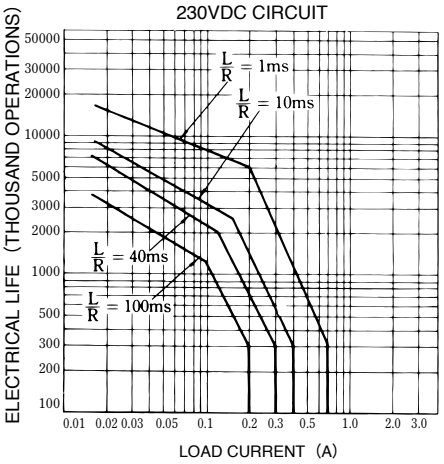
1. ELECTRICAL LIFE WHEN APPLYING TYPICAL LOADS

Voltage	Marking		Breaking		Life (Thousand Operations)	
	Current (A)	Power Factor or Time Constant	Current (A)	Power Factor or Time Constant	R25	R15
240VAC (Inductive Load)	10	PF=0.7	1	PF=0.4	—	800
	5		0.5		1000	1500
	2.5		0.25		2000	3000
110VAC (Inductive Load)	10	PF=0.7	1	PF=0.4	—	800
	5		0.5		1000	2000
	2.5		0.25		2000	4000
110VAC (Resistive Load)	3	PF=1.0	3	PF=1.0	—	200
	2		2		200	1000
	1		1		500	2000
115VDC (Inductive Load)	0.5	L/R =100ms *2 (L/R =40ms)	0.5	L/R =100ms *2 (L/R =40ms)	—	300
	0.3		0.3		300	900
115VAC (Inductive Load)	0.02	Relay coil	0.012	Relay coil	30000	60000
24VDC (Inductive Load)	0.037	Relay coil	0.037	Relay coil	15000	30000

Note: 1. Values of DC inductive loads tabulated above are the ones where stationary contact side is of positive polarity.
*2. Life in R25 is based on a time constant of 40ms.

2. ELECTRICAL LIFE WHEN APPLYING DC CIRCUIT (Type R15)





Note: 1. For inductive load, L/R = 1ms or the like is attained if equipped with surge suppressor.
2. Electrical life of medium capacity type R25 when it is applied to a DC circuit
(1) Calculate electrical life of R25 by derating the load current by 50%.
Example: Electrical life of type R25 at 0.1A is equal to that of type R15 at 0.2A.
(2) Type R25 cannot be used in 115VDC circuit (L/R = 100ms) or any 230VDC circuit.

PRODUCT TYPES LOAD CONTROL

□ : Appliacable scope

・Medium-Capacity Type

Type	AC Power Control	DC Power Control	AC Relay Control	DC Relay Control	Electronic Circuit Control
	240VAC 120 VA	115VDC 30W	24 to 240VAC	24 to 115VDC	24V 1mA or greater＊
R25					

Note: ＊In photo-coupler circuits, R25 type can be used at more than 5V 10mA.

・Large-Capacity Type

Type	AC Power Control	DC Power Control	AC Relay Control	DC Relay Control	Electronic Circuit Control
	240VAC 240 VA	115VDC 50W 230VDC 40W	24 to 240VAC	24 to 230VDC	24V 1mA or greater＊
R15					

Note: ＊In photo-coupler circuits, R15 type can be used at more than 5V 10mA.

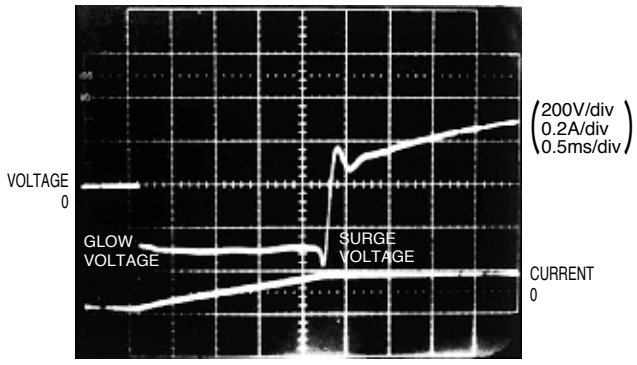
SURGE VOLTAGE AT BREAKING OF INDUCTIVE LOADS

・Breaking AC inductive load

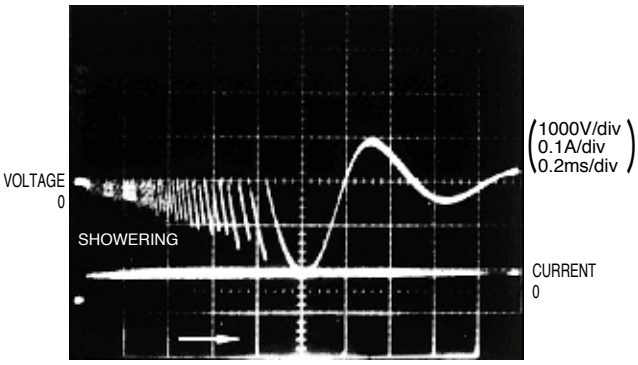
Load:240VAC, 60Hz		Surge Voltage (V)		
Contactor Type		NEMA Size0	NEMA Size2	NEMA Size4
Sample	Bestact	500	450	500
	Conventional Relays	1700 to 2000	1000 to 1500	800 to 1200

・Breaking DC inductive load

Load:115VDC		Surge Voltage (V)	
		Valve Loads I=0.2A γ=130ms	Yaskawa's Relay Type RAP-6G I=27mA γ=25ms
Sample	Bestact	400 to 500	500 to 600
	Conventional Relays	Unstable breaking	1500 to 1700



Breaking Waveform of Bestact



Breaking Waveform of Conventional Relay

Typical Waveforms at Breaking AC Inductive Loads

Bestact
INPUT/OUTPUT RELAYS

Medium-Capacity Type RI-D25MC, -E25MC (Standard type)

Large-Capacity Type RI-B15MC, -C15MC (Standard type)
Type RI-B15MHC, -C15MHC (High insulation type)

Highly Reliable Interface Relays for Programmable Controllers and Microcomputer Control Systems

FEATURES

1. Assures outstanding reliability in circuits of 100VAC/DC or greater as well as in electronic component circuits.
2. Directly controls over a wide range from TTL electronic level to large magnetic contactors or DC solenoid valves.
3. No output relay board needed.
4. Quick action in 5ms or less.
5. Excellent insulation characteristics. Withstand voltage across coil and contact: 2000VAC or greater.
   (Medium-capacity type: 1500VAC or greater)
6. Automatic wave-soldering and cleaning possible.
7. Small driving power.
   (Medium-capacity type: 0.4W, Large-capacity type: 0.6W)

TYPICAL APPLICATIONS

- I/O relays for industrial programmable controllers
- I/O relays for microcomputer modified equipment
- Trip relays for circuit breakers
- Recording and transmitting relays for electric power facilities
- I/O relays for NC/MC controllers

RATINGS AND SPECIFICATIONS

Type	Capacity		Medium-Capacity Type		Large-Capacity Type	
	Standard Type		RI-D25MC	RI-E25MC	RI-B15MC	RI-C15MC
	High Insulation Type		—	—	RI-B15MHC	RI-C15MHC
Contact Arrangement			1NO	1NC	1NO	1NC
Incorporated Bestact			R25		R15	R15
Rated Insulation Voltage			250VAC (Power Frequency)		250VAC (Power Frequency)	
Contact Performance			Refer to page 7.			
Characteristics	Vibration Resistance		98m/s^2 {10G} (20 to 1000Hz)		98m/s^2 {10G} (20 to 1000Hz)	
	Shock Resistance	Erroneous Operation	147m/s^2 {15G}		147m/s^2 {15G}	
		Breakdown	980m/s^2 {100G}		980m/s^2 {100G}	
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)		100MΩ or greater (with 500VDC Megger)	
	Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)		2000VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)	
Ambient Temperature		Operating Temperature	–40 to +60℃		–40 to +60℃	
		Storage	–60 to +80℃		–60 to +80℃	
Approx. Weight			15g	20g	35g	40g

Note: When you order UL recognized products, add letter "U" to the end of the type names. (Example: RI-D25MCU)

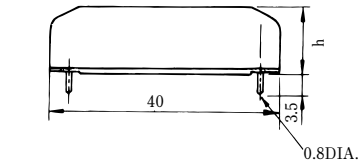
COIL SPECIFICATIONS (With polarity)

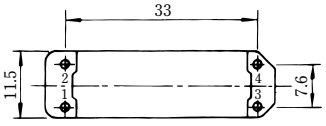
Type	Medium-Capacity						Large-Capacity					
	RI-D			RI-E			RI-B			RI-C		
Rated Voltage (E) V	12	24	48	12	24	48	12	24	48	12	24	48
Coil Resistance Ω	405	1520	5530	295	1160	4060	250	1020	3980	285	1080	3640
Rated Power Consumption W	0.4		0.5	0.5		0.6	0.6			0.6		0.7
Maximum Allowable Voltage	170%E Approx. 1.2W			150%E Approx. 1.1W			220%E Approx. 3W			150%E Approx. 1.3W		
Operating Voltage	75%E or less			75%E or less			75%E or less			75%E or less		
Releasing Voltage	8.5%E or greater			8.5%E or greater			8.5%E or greater			8.5%E or greater		

Note: 1. Values tabulated above indicate operations at ambient temperature of 20℃.
2. Coil resistance values can vary by ±10%.
3. Maximum allowable voltage is the maximum value that can be applied to the coil in consideration of its thermal degradation and insulators in the relays.
This is not a continuous allowable voltage.
4. Type RI- E and -C may erroneously operate if the maximum allowable voltage is exceeded even for a short time.

DIMENSIONS in mm

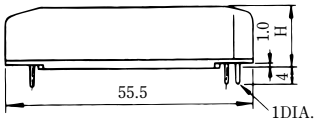
・Medium-Capacity Type

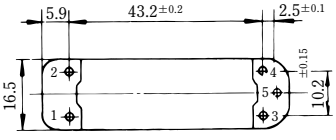




Din \ Type	RI-D	RI-E
h	11.5	13

・Large-Capacity Type





Din \ Type	RI-B	RI-C
H	14.5	17

Note: Only TYPE RI-□□MC have terminal number5, Refer to the connection diagram in the next page.

Failure rate(λ)

Rate of failures per unit time during continuous number of operations under individually specified test types and loads. (Refer to JIS C 5003)

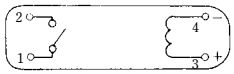
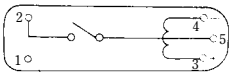
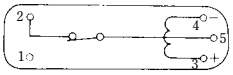
$$\text{Failure rate } (\lambda) = \frac{\text{No. of failures}}{\text{No. of tested contacts} \times \text{number of operations}} [\text{ / time}]$$

＊Tested hour (H) × 10^{-9} can be used instead of number of operations. (Unit: Fit)

NOTES FOR INSTALLATION

(1) Connections

Coils have a polarity. Connect as shown below for proper operation. Refer to (2) for a polarity of the connecting terminals.

RI-D25MC	
RI-D25T1C	
RI-E25MC	
RI-B15MC	
RI-B15MHC	
RI-B15T1C RI-B15T2C	
RI-C15MC	
RI-C15MHC	
RI-C15T1C	
RR-1EAC	

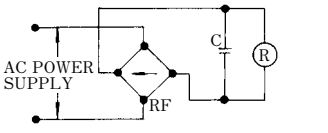
＊BOTTOM VIEW

(2) Terminal connections for DC loads

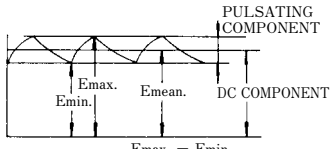
Type	Terminal No.		
	2	5	1
RI-D25MC	+		−
RI-D25T1C	+		−
RI-E25MC	+		−
RI-B15MC	+	−	
RI-B15MHC	+		−
RI-B15T1C, B15T2C	+		−
RI-C15MC	+	−	
RI-C15MHC	+		−
RI-C15T1C	+		−
RR-1EAC	+		−

(3) Coil energizing sources

For proper coil excitation, use a genuine DC power supply such as battery or three-phase full-wave rectified source whose ripple factor is 5% or less. If single-phase full-wave rectified source is used, a smoothing capacitor is needed to control the ripple to 5% or less.



C:SMOOTH CAPACITOR
R:RELAY COIL



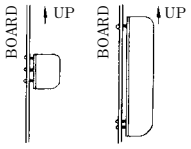
$$\text{RIPPLE FACTOR} = \frac{\text{Emax.} - \text{Emin.}}{\text{Emean.}} \times 100\%$$

Emax. :MAX. VALUE OF PULSATING COMPONENT
Emin. :MIN. VALUE OF PULSATING COMPONENT
Emean.:DC MEAN. VALUE

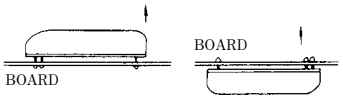
(4) Direction of mounting

The standard mounting direction is shown in figure (a) below.

Where placing the relay mounting board horizontally as shown in figure (b), the operational voltage and releasing voltage may change as much as 5% compared with the standard mounting direction.



(a) Where placing board vertically (Standard)



(b) Where placing board horizontally

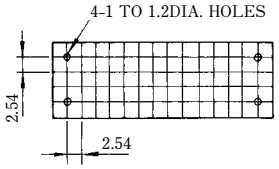
(5) External magnetic field

Since RI relays are magnetically sealed, mounting them closely does not cause any trouble. However, avoid using them in the strong external magnetic field. That might result in erroneous operations.

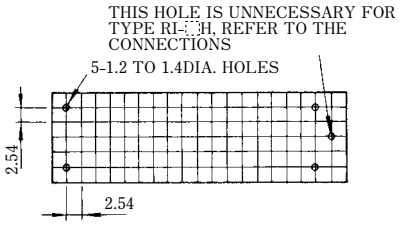
(6) Mounting on printed circuit board

・Medium-Capacity Type

Unit: mm



・Large-Capacity Type



(7) Usage except for mounting on printed circuit boards

Where not mounted on the printed circuit boards, mount and wire so as not to apply any force to the relay terminals.

Avoid bending the ends of the terminals.

(8) Making / Breaking ratings

Contact welding and glass crack might occur when these relays are used beyond the range of rated current such as maximum making current and maximum breaking current. Use these relays within the range of rated current.

⚠ CAUTION

Do not apply excessive force (29.4N {3kgf} or greater tensile force) to the relay terminals.

⃠ RESTRICTION

Use coils and contacts within the range of ratings. Coil breaking, burnout, contact welding and contact meltdown might occur when used at the value exceeding ratings.

TWO POLE TYPE INPUT/OUTPUT RELAYS

Type RIW

Bestact Two Pole Type I/O Relays are widely used for railway signals.

These highly reliable relays have solved many contact problems that may occur by using mercury relays.

RATINGS AND SPECIFICATIONS

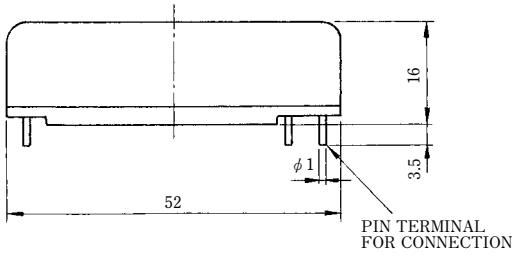
Type		RIW-F25MC	RIW-G25MC
Contact Arrangement		1NO1NC	2NO
Incorporated Bestact		R25	R25
Rated Insulation Voltage		250VAC (Power Frequency)	
Contact Performance		Refer to page 7.	
Vibration Resistance		98m/s^2 {10G} (20 to 1000Hz)	
Shock Resistance	Erroneous Operation	147m/s^2 {15G}	
	Breakdown	980m/s^2 {100G}	
Insulation Resistance		100MΩ or greater (with 500VDC Megger)	
Withstand Voltage		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts:500VAC)	
Ambient Temperature	Operating Temperature	–20 to +60℃	
	Breakdown	–25 to +80℃	

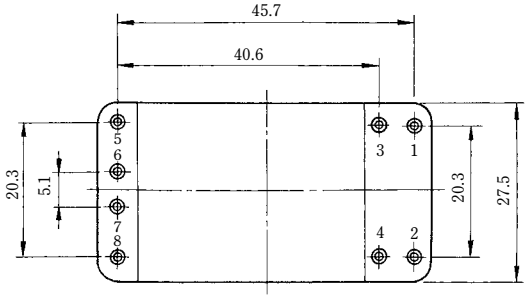
COIL SPECIFICATIONS (With polarity)

Type	RIW-F		RIW-G	
Rated Voltage (E)	12V	24V	12V	24V
Rated Power Consumption	1W		1W	
Maximum Allowable Voltage	130%E 1.7W		130%E 1.7W	
Operating Voltage	75%E or less		75%E or less	
Releasing Voltage	5%E or greater		5%E or greater	

Note: 1. Values tabulated above indicate operations at ambient temperature of 20℃.
2. Each of NO and NC contact is independent. Therefore, the operating time of NO contact and NC contact may overlap.
3. Maximum allowable voltage is the maximum value that can be applied to the coil in consideration of its thermal degradation and insulators in the relays. This is not a continuous allowable voltage. Relays incorporating NC contact may erroneously operate if the maximum allowable voltage is exceeded even for a short time.

DIMENSIONS in mm

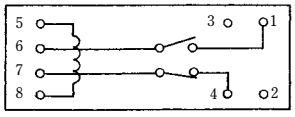




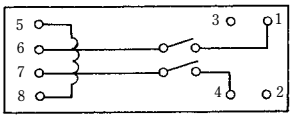
Weight: 60g

・Symbols and terminal markings (bottom view)

RIW-F



RIW-G



Note: 1. For connection to coil terminals, connect terminal number 5 to ⊖ and terminal number 8 to ⊕.
2. For application to a DC circuit, connect terminal number 1 and 4 to ⊕ and terminal number 6 and 7 to ⊖.

PRECAUTION FOR USE

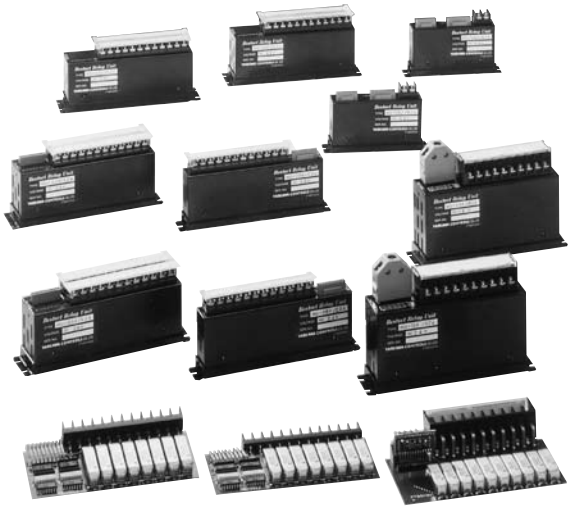
Refer to (3), (4), (5), (7), (8), CAUTION and RESTRICTION on page 12.

RELAY UNIT RIU SERIES

High Density Mounting Design Incorporating High Reliable Relays. Best Suited to I/O Relay Units for Microcomputer Boards, PC and NC Control Boards.

FEATURES

1. 4, 8, 10 and 16 contacts per unit, high density mounting design.
2. Can be energized using TTL electronic level signals or open collector input.
3. Also available in a photocoupler isolation type.
4. Minimum space needed due to compact size.
5. Provided with operational display (LED).
6. Features of the incorporated relay units:
   - Hermetically sealed contacts assure long-term reliability even in adverse environments.
   - Large-capacity switching permits direct switching of large magnetic contactors, DC solenoid valves, etc.
   - Surgeless switching
     The unique breaking mechanism minimizes surge when magnetic coil is opened.



RELAY UNIT RIU SERIES

COMMON SPECIFICATIONS

- Operating voltage: 24VDC or 12VDC
- Voltage fluctuation range: Rated voltage –15% to +10%
- Operating temperature range: –10 to +60℃
- Operating humidity range: 85%RH or less
- Storage temperature range: –25 to +80℃
- Vibration resistance: 19.6m/s^2 {2G} (10 to 55Hz)
- Shock resistance: 98.0m/s^2 {10G}

Note: When using contacts in a DC circuit, please connect these units in connect polarity according to "PRECAUTIONS FOR USE" 4 on page 25.

TYPE DESIGNATION

R I U - □□□ C / □□□ - □□

Rohs compliant

FIGURE
- A B ····· Encased-type; connector input
- C ····· Encased-type; screw terminal input
- E ····· Open-type; screw terminal input
- F G ····· Open-type; connector input

NUMBER OF CIRCUITS
- 0 4 ····· 4 circuits
- 0 8 ····· 8 circuits
- 1 0 ····· 10 circuits
- 1 6 ····· 16 circuits

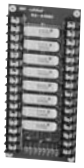
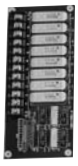
INPUT SPECIFICATIONS
- E ····· TTL input (non-isolated)
- F ····· TTL input (isolated)
- G ····· Open collector input (non-isolated)
- H ····· Open collector input (isolated)

SUPPLY VOLTAGE
- 1 2 ····· 12VDC
- 2 4 ····· 24VDC

CONTACT SPECIFICATIONS
- None ····· All circuits use NO contact relays
- 2 2 ····· 2NO contact relays 2NC contact relays
- 4 4 ····· 4NO contact relays 4NC contact relays
- 6 2 ····· 6NO contact relays 2NC contact relays

Note: Although various combinations are imaginable, all we manufacture for standard types are the ones shown in "CONTACT CONFIGURATION DIAGRAM" on page 18 to 23.

MODEL LIST

Appearance	Figure	Supply Voltage	Contact Configuration	Input Circuit Configuration	Input Signal	Weight (g)
 RIU-04EC	Open	12VDC 24VDC	· 4NO · 2NO 2NC	2 circuits common × 2	· Open collector type (or contact)	200
 RIU-08AC	Encased	12VDC 24VDC	· 8NO · 4NO 4NC · 6NO 2NC	8 circuits common × 1	· TTL type · Open collector type (or contact)	600
 RIU-08BC	Encased	12VDC 24VDC	· 8NO	8 circuits common × 1	· TTL type · Open collector type (or contact)	500
 RIU-08CC	Encased	12VDC 24VDC	· 8NO · 4NO 4NC · 6NO 2NC	8 circuits common × 1	· TTL type · Open collector type (or contact)	600
 RIU-08EC	Open	12VDC 24VDC	· 8NO · 4NO 4NC · 6NO 2NC	2 circuits common × 4	· Open collector type (or contact)	300
 RIU-08FC	Open	12VDC 24VDC	· 8NO · 4NO 4NC · 6NO 2NC	8 circuits common × 1	· Open collector type (or contact)	300
 RIU-08GC	Open	12VDC 24VDC	· 8NO · 4NO 4NC · 6NO 2NC	8 circuits common × 1	· TTL type · Open collector type (or contact)	300
 RIU-10AC	Encased	12VDC 24VDC	· 10NO	10 circuits common × 1	· Open collector type (or contact)	800
 RIU-16AC/G24	Encased	24VDC	· 16NO	16 circuits common × 1	· Open collector type (or contact)	950
 RIU-16FC/G24	Open	24VDC	· 16NO	4 circuits common × 4	· Open collector type (or contact)	600

RATINGS AND SPECIFICATIONS

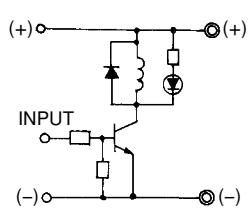
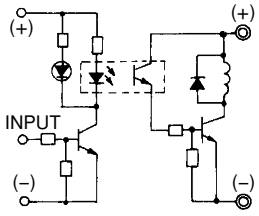
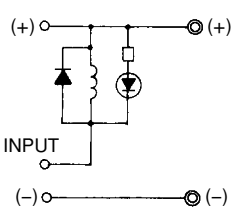
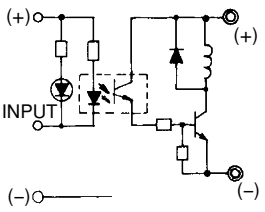
・ENCASED TYPE

Specifications \ Type		RIU-08AC/□	RIU-08BC/□	RIU-08CC/□	RIU-10AC/G□	RIU-16AC/G24
Number of Circuits		8	8	8	10	16
Output Specifications	Rated Carrying Current Capacity	2.5A per circuit	2A per circuit 4A for common line		2.5A per circuit	
	Contact Capacity	240VAC 0.5A 115VDC 0.3A				
	Terminal Style	Screw terminal				
	Power Supply	24VDC or 12VDC				24VDC
Input Specifications	Circuit Configuration	8 circuits common × 1			10 circuits common × 1	16 circuits common × 1
	Input Signal	・TTL type ・Open collector type (or contact)			Open collector type (or contact)	
	Terminal Style	Connector		Screw terminal	Connector	
	Operation Display	With operation display (LED)				

・OPEN TYPE

Specifications \ Type		RIU-04EC/G□	RIU-08EC/□	RIU-08FC/□	RIU-08GC/□	RIU-16FC/G24
Number of Circuits		4	8			16
Output Specifications	Rated Carrying Current Capacity	2.5A per circuit		2A per circuit 4A for common line		
	Contact Capacity	240VAC 0.5A 115VDC 0.3A				
	Terminal Style	Screw terminal				
	Power Supply	24VDC or 12VDC				24VDC
Input Specifications	Circuit Configuration	2 circuits common × 2	2 circuits common × 4	8 circuits common × 1		4 circuits common × 4
	Input Signal	Open collector type (or contact)			・Open collector type (or contact) ・TTL type	Open collector type (or contact)
	Terminal Style	Screw terminal		Connector		
	Operation Display	With operation display (LED)				

INPUT SPECIFICATIONS

Input Specifications		CMOS, TTL Drive Type		Open Collector, Contact Drive Type	
		Non-isolated	isolated	Non-isolated	isolated
Type	For 4 Circuits	—	—	RIU-04□C/G□	—
	For 8 Circuits	RIU-08□C/E□	RIU-08□C/F□	RIU-08□C/G□	RIU-08□C/H□
	For 10 Circuits	—	—	RIU-10□C/G□	—
	For 16 Circuits	—	—	RIU-16□C/G24	—
Isolation		—	Photocoupler isolated	—	Photocoupler isolated
Input Level		H-2.5V or greater L-1.0V or less		24VDC 25mA (per circuit) 12VDC 50mA (per circuit)	24VDC 10mA 12VDC 5mA
Input Impedance		10.5kΩ		—	
Input Power Supply		—	12 to 24VDC	—	12 to 24VDC
Relay Power Supply		24VDC or 12VDC*			
1 Circuit Diagram (○ shows an input terminal ◎ shows an output terminal)					

Note: ＊Relay power supply of type RIU-16□C/G24 is only 24VDC.

OUTPUT SPECIFICATIONS (RELAY RATINGS)

	Specifications	
Contact Arrangement	NO	NC
Type of Relay	RI-D25MC	RI-E25MC
Incorporated Bestact	R25	
Rated Insulation Voltage	250VAC (Power Frequency)	
Contact Performance	Refer to page 7.	
Operating time	OFF→ON time: 5ms or less ON→OFF time: 5ms or less	

FIGURE SPECIFICATIONS

Two types of the relay units are available: encased type that incorporates printed circuit boards in cases and open type that is not encased. Select either type according to the mounting area and operational environment.

Figure Specification / No of Circuits	Encased Type			Open Type		
	Connector Input	Connector Input	Screw Terminal Input	Screw Terminal Input	Connector Input	Connector Input
4 circuits	—	—	—	RIU-04EC/□	—	—
8 circuits	RIU-08AC/□	RIU-08BC/□	RIU-08CC/□	RIU-08EC/□	RIU-08FC/□	RIU-08GC/□
10 circuits	RIU-10AC/□	—	—	—	—	—
16 circuits	RIU-16AC/G24	—	—	—	RIU-16FC/G24	—

CONTACT SPECIFICATIONS

4, 8, 10 and 16 circuit types are available. Both NO and NC contact relays are available in the units.
Select the unit best suited for your application.

Relay Type	Relay Configuration	Relay No. in Circuit Diagram	
		Relay No. of NO	Relay No. of NC
RIU-04EC/□	4NO	RY 1 to RY 4	—
	2NO 2NC	RY 1 to RY 2	RY 3 to RY 4
RIU-08AC/□ RIU-08CC/□ RIU-08EC/□ RIU-08FC/□ RIU-08GC/□	8NO	RY 1 to RY 8	—
	6NO 2NC	RY 1 to RY 4	RY 5 to RY 8
	4NO 2NC	RY 1 to RY 6	RY 7 to RY 8
RIU-08BC/□	8NO	RY 1 to RY 8	—
RIU-10AC/□	10NO	RY 1 to RY 10	—
RIU-16AC/G24 RIU-16FC/G24	16NO	RY 1 to RY 16	—

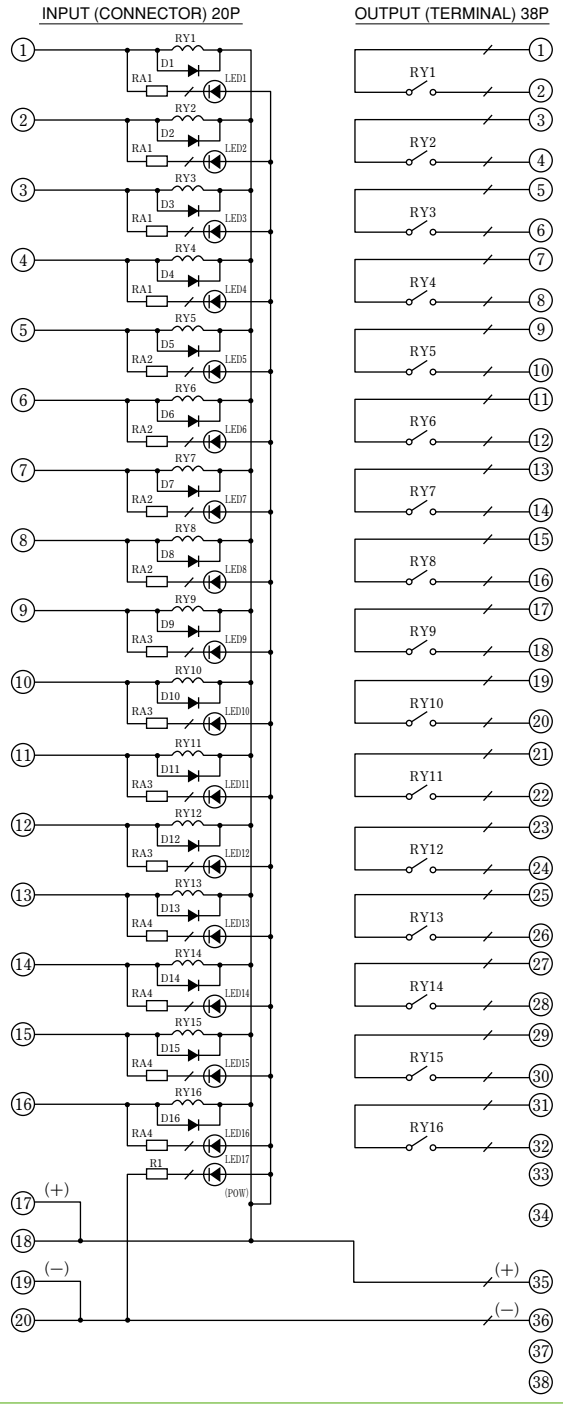
Note: 1. In the 8 circuit series, NC contact type is not available for Type RIU-08BC/□ . In that case, select the Type RIU-08AC/ □ or RIU-08CC/□.
2. Type RIU-08AC/□, -10AC/□, -16AC/G24, -04EC/G□ and -08EC/□ have independent output contacts. All other series have common output contacts.
For details, refer to the circuit configration diagram.

CIRCUIT CONFIGURATION DIAGRAM

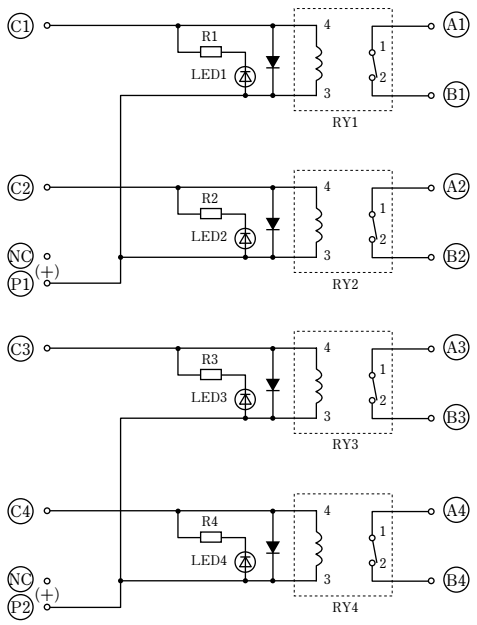
When NC contacts are combined, dashed boxes (⬚) in all the circuit configuration diagrams will be NC relays.

Type \ Relay Specification	NO Contact Relays	NC Contact Relays
RIU-⬚	All Circuits	—
RIU-⬚-22	RY 1 to RY 2	RY 3 to RY 4
RIU-⬚-44	RY 1 to RY 4	RY 5 to RY 8
RIU-⬚-62	RY 1 to RY 6	RY 7 to RY 8

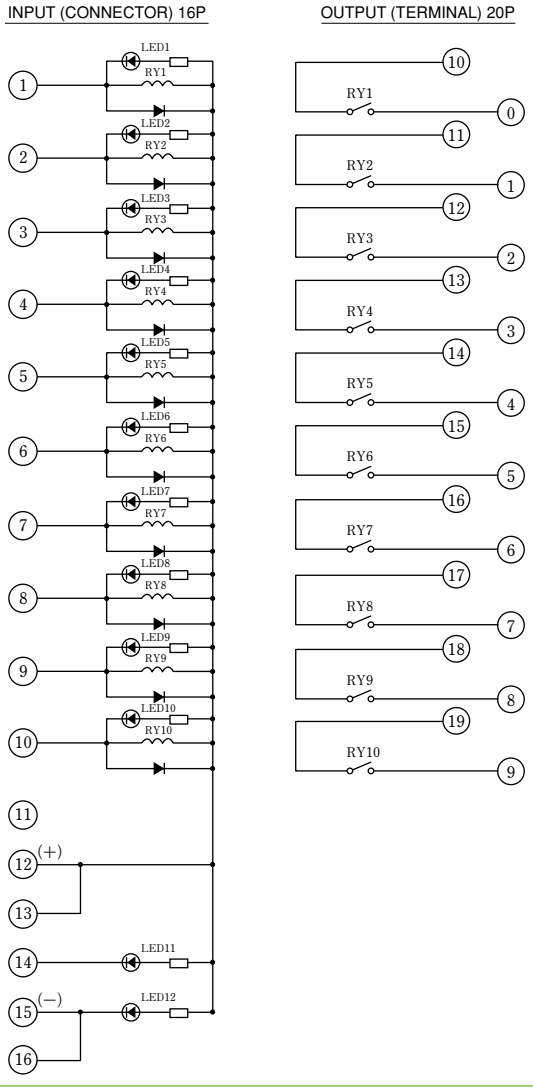
・Type RIU-16AC/G⬚⬚



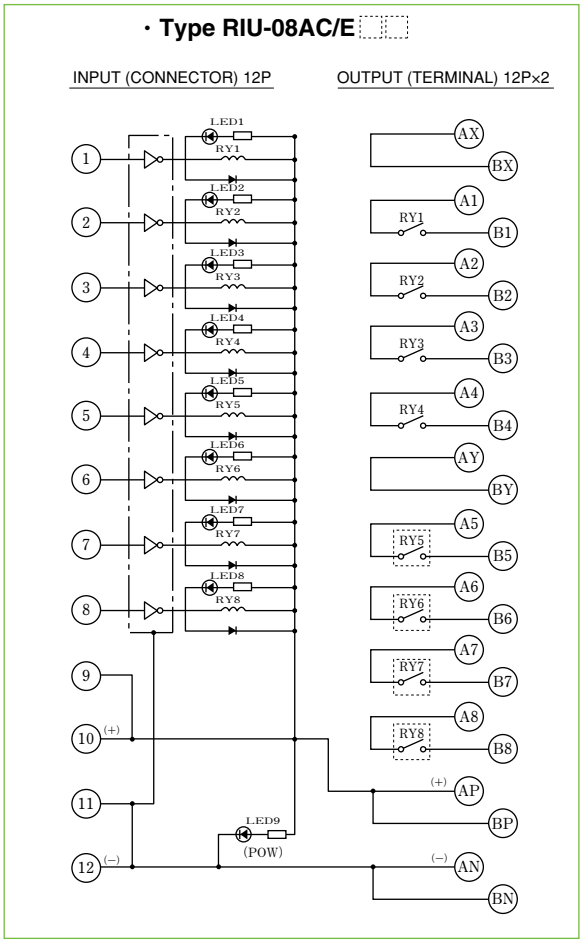
・Type RIU-04EC/G⬚⬚



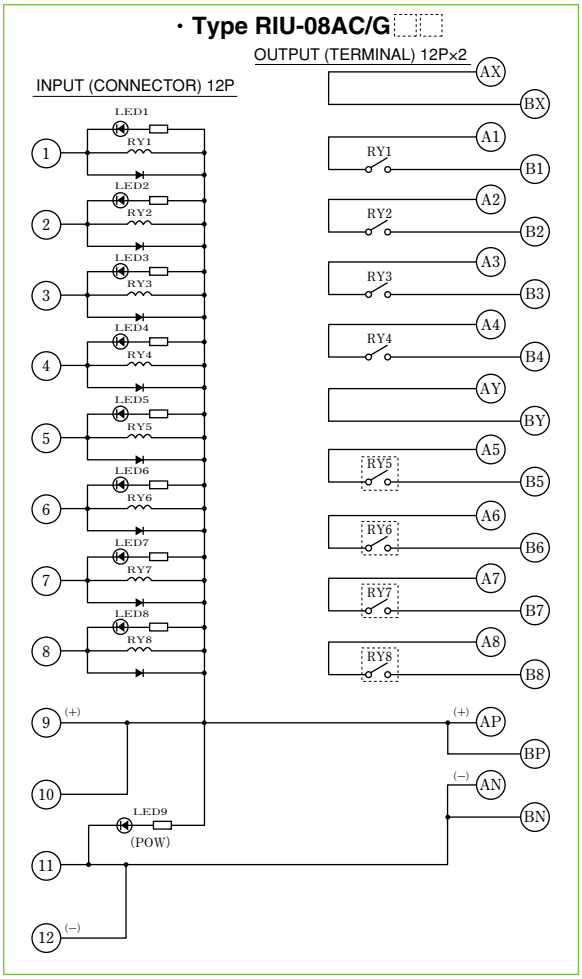
・Type RIU-10AC/G⬚⬚



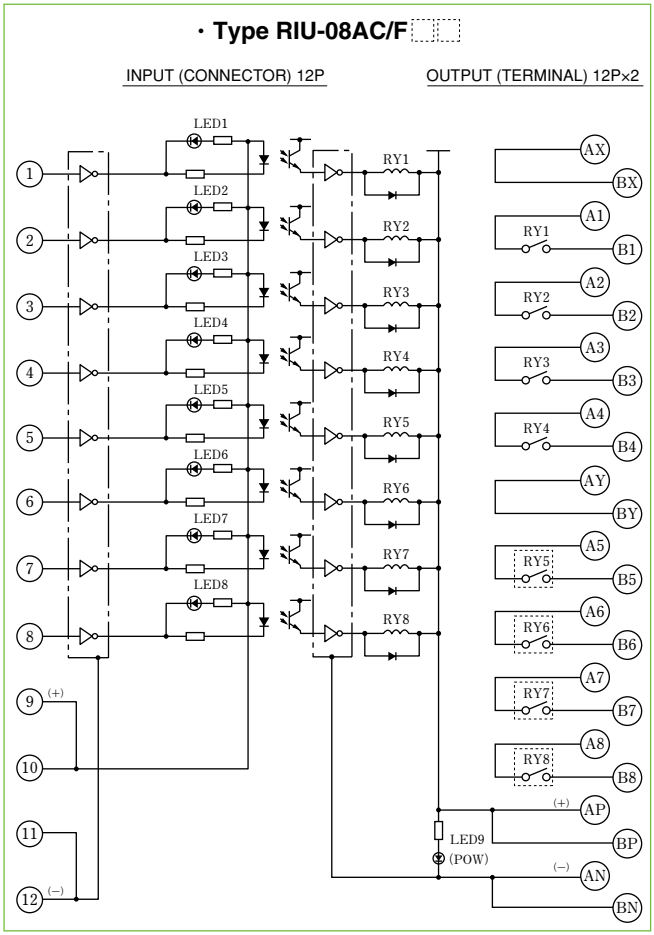
・Type RIU-08AC/E



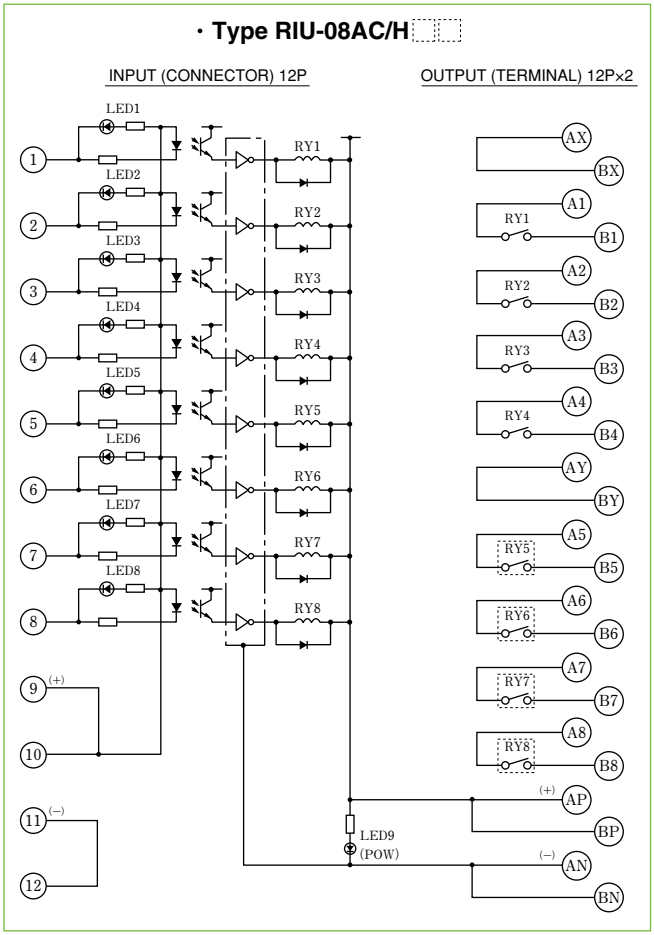
・Type RIU-08AC/G



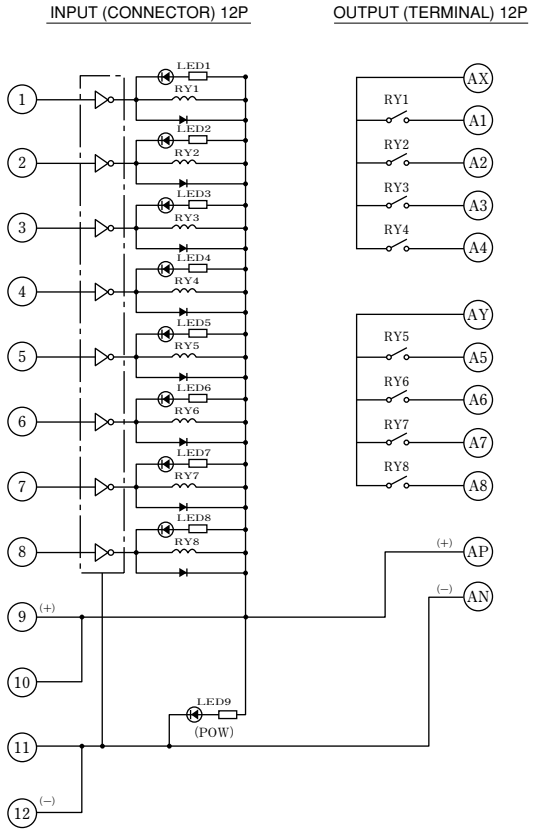
・Type RIU-08AC/F



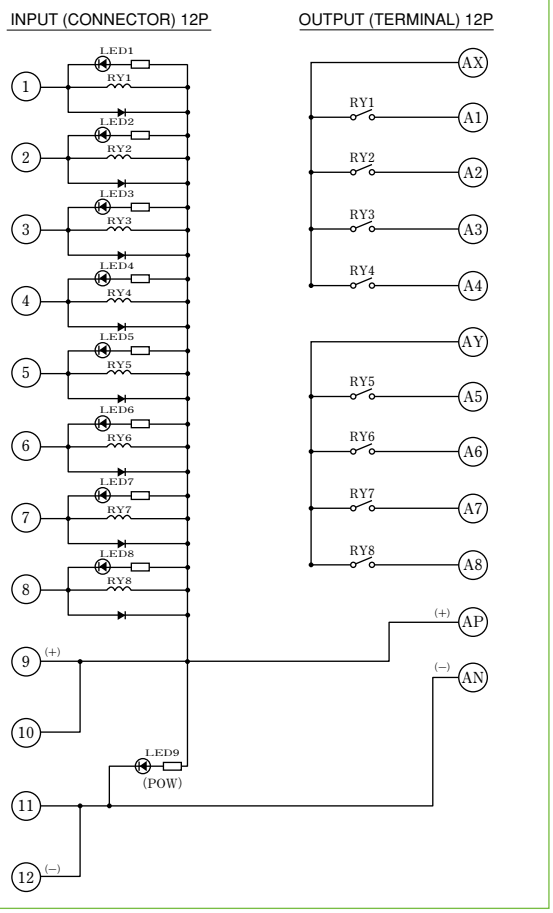
・Type RIU-08AC/H



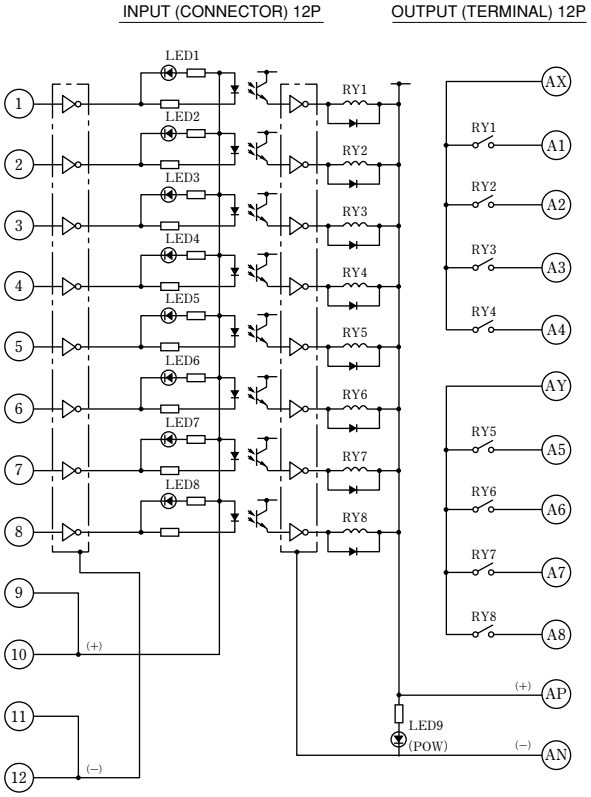
・Type RIU-08BC/E□□



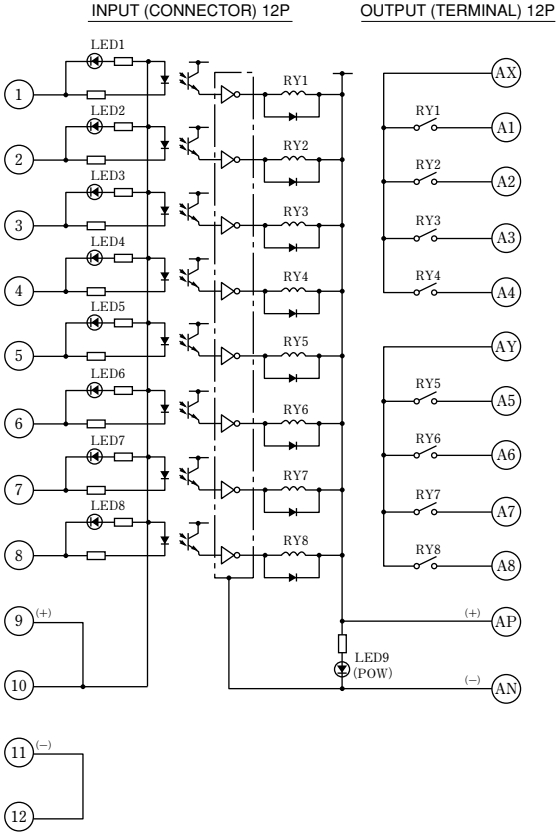
・Type RIU-08BC/G□□



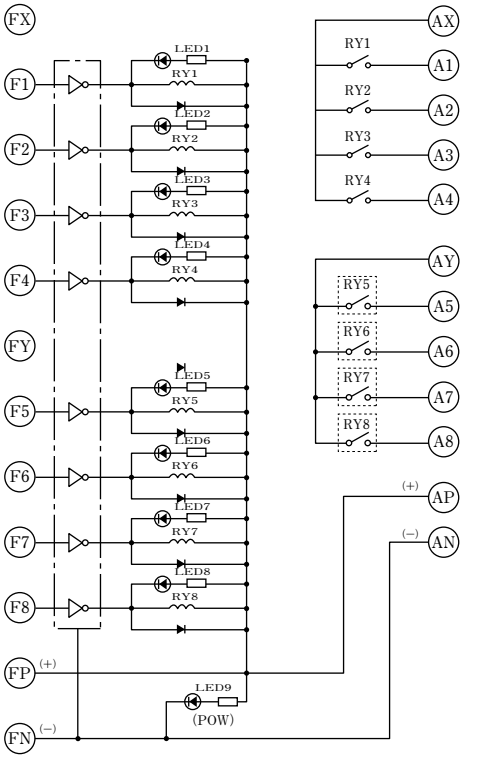
・Type RIU-08BC/F□□



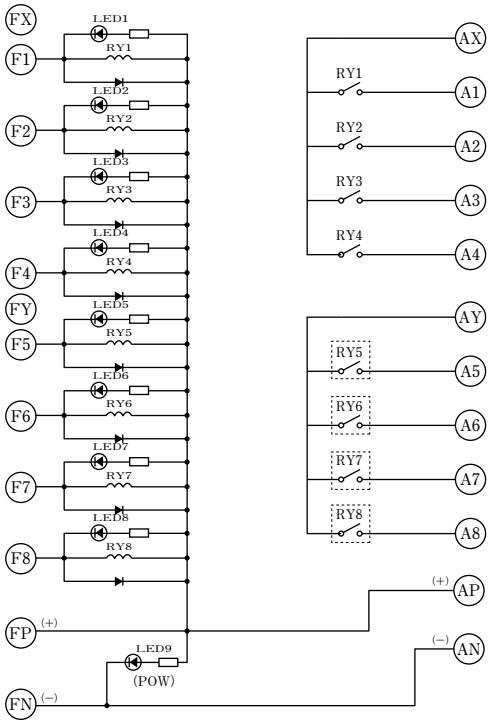
・Type RIU-08BC/H□□



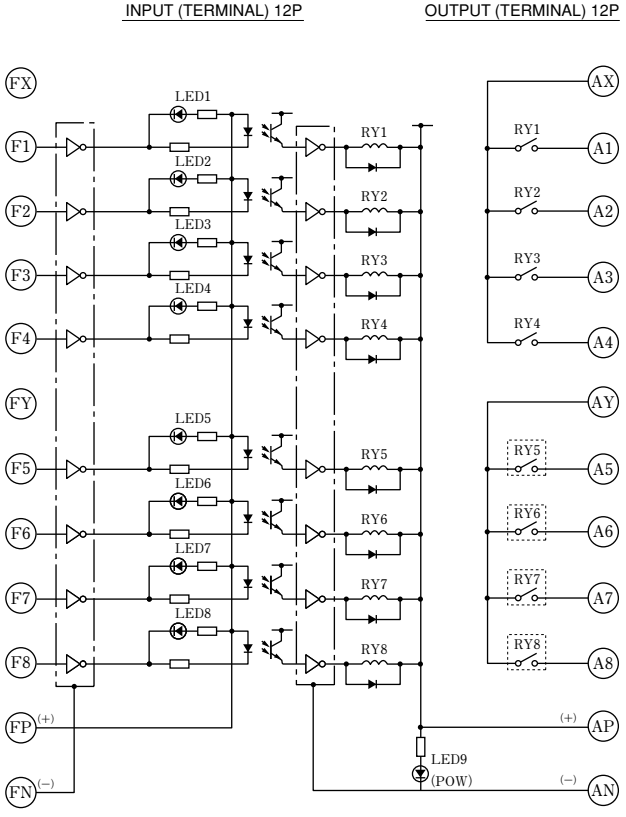
・Type RIU-08CC/E□□



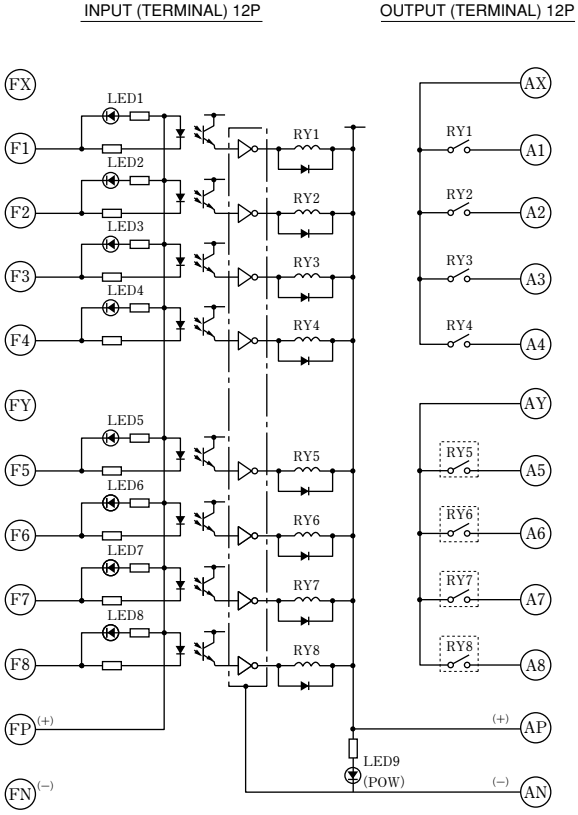
・Type RIU-08CC/G□□



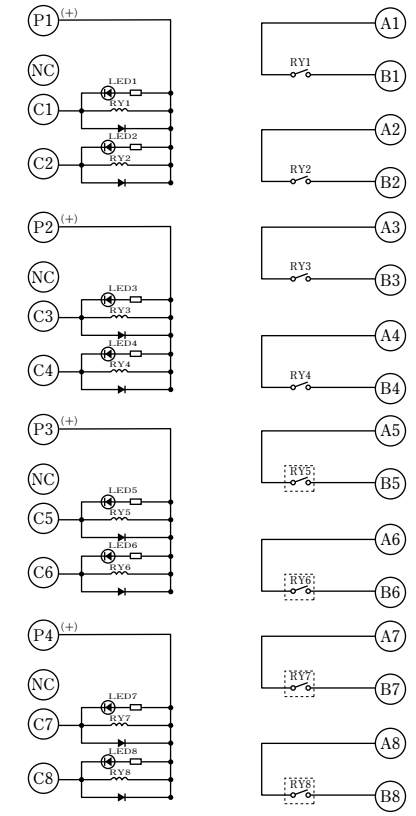
・Type RIU-08CC/F□□



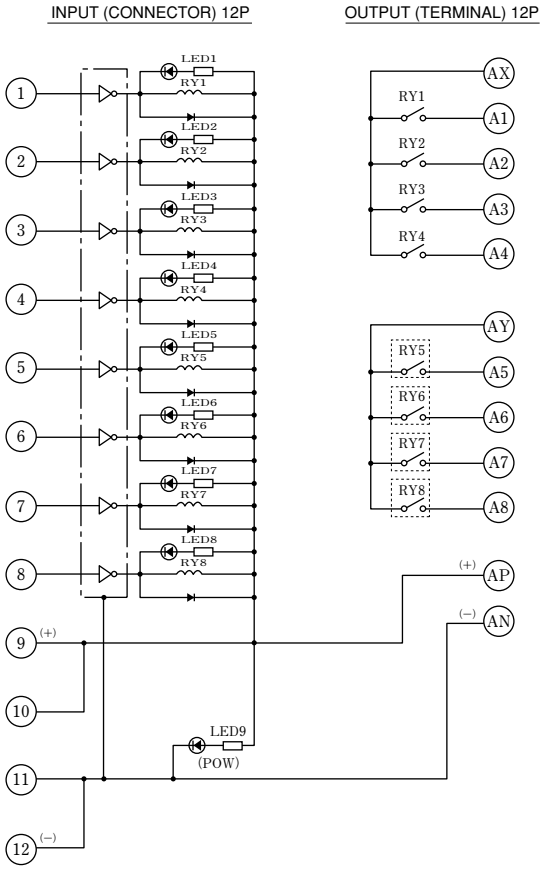
・Type RIU-08CC/H□□



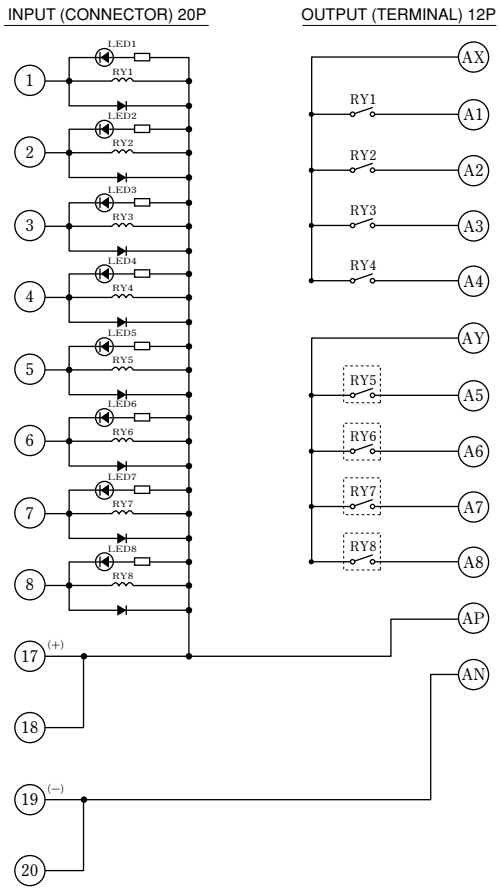
・Type RIU-08EC/G



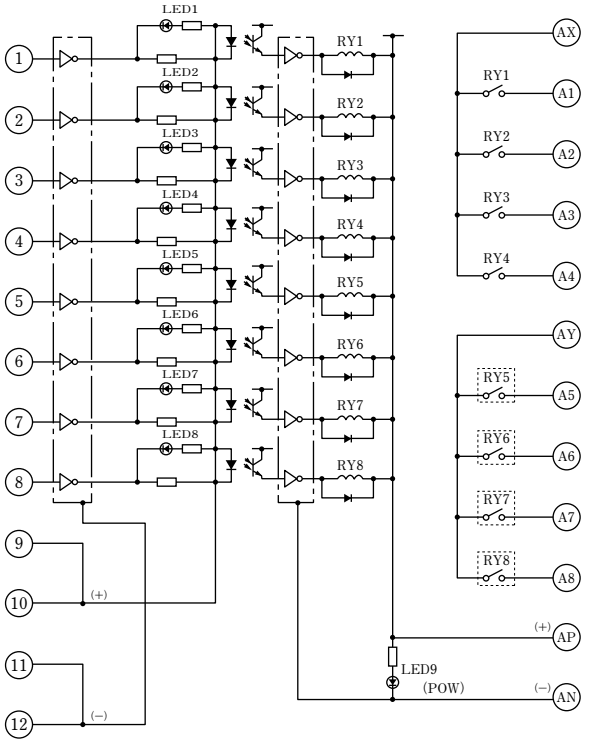
・Type RIU-08GC/E



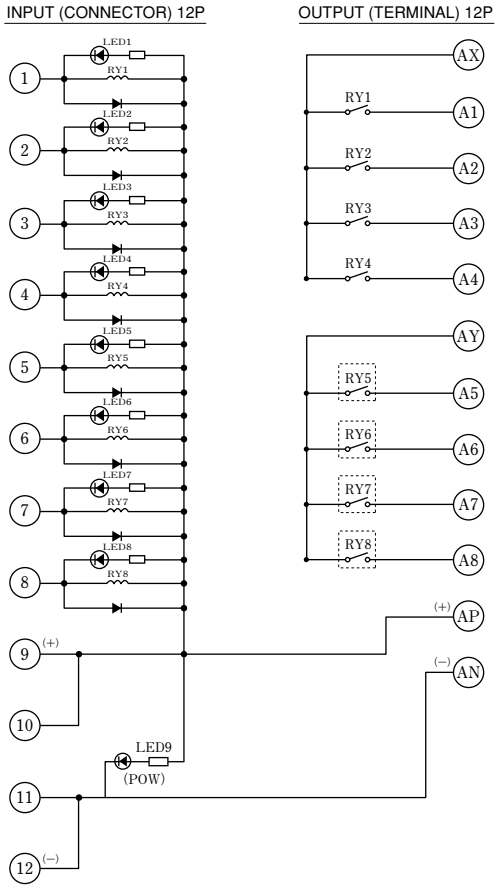
・Type RIU-08FC/G



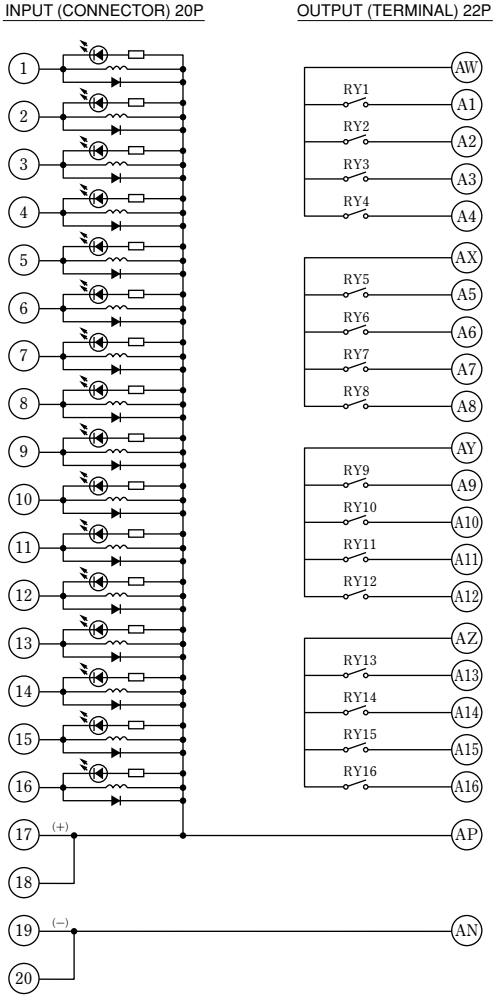
・Type RIU-08GC/F



・Type RIU-08GC/G□□

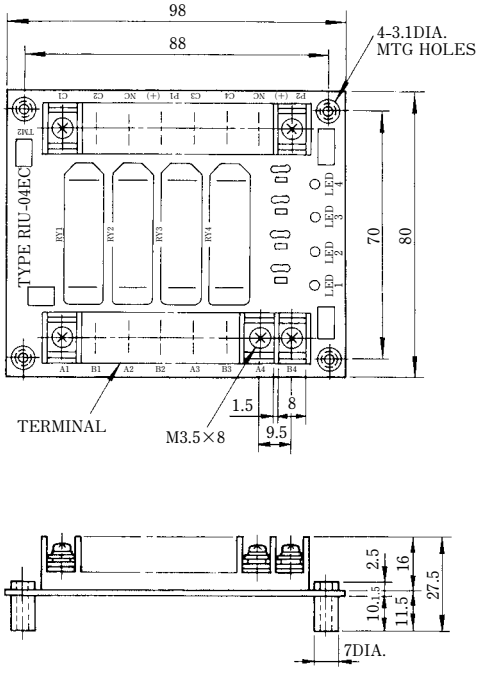


・Type RIU-16FC/G24

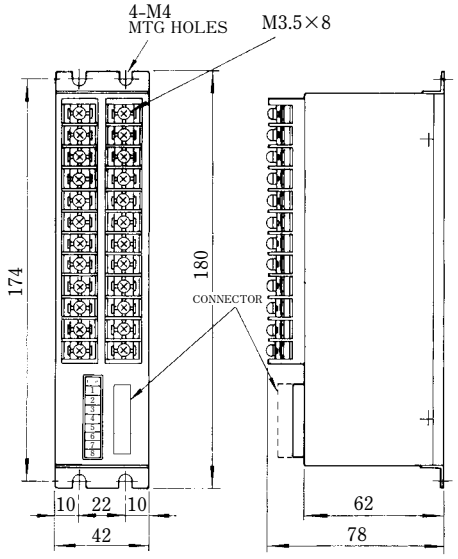


DIMENSIONS in mm

・Type RIU-04EC/G□□ (For 4 circuits)

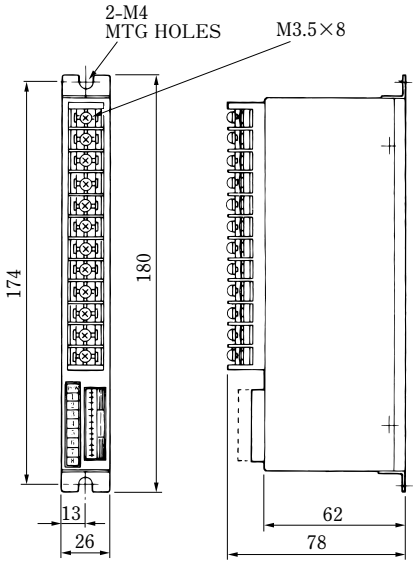


・Type RIU-08AC/□□, -08CC/□□ (For 8 circuits)

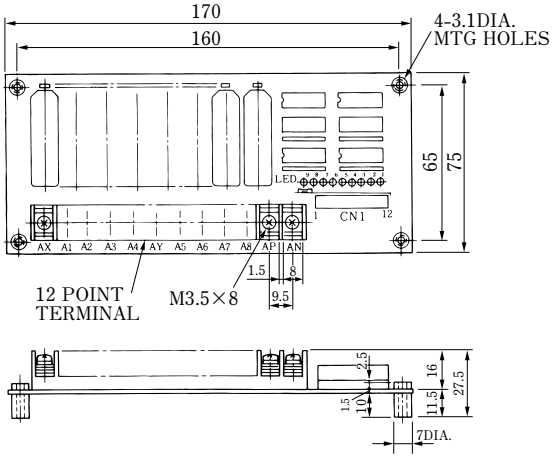


Note: Type -08CC doesn't have any connector.

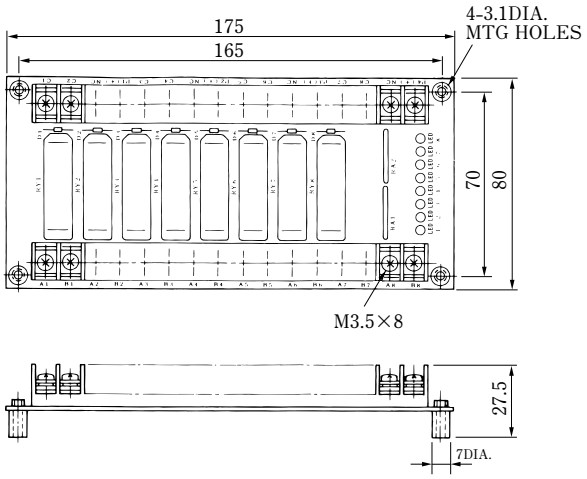
・**Type RIU-08BC/** □ (For 8 circuits)



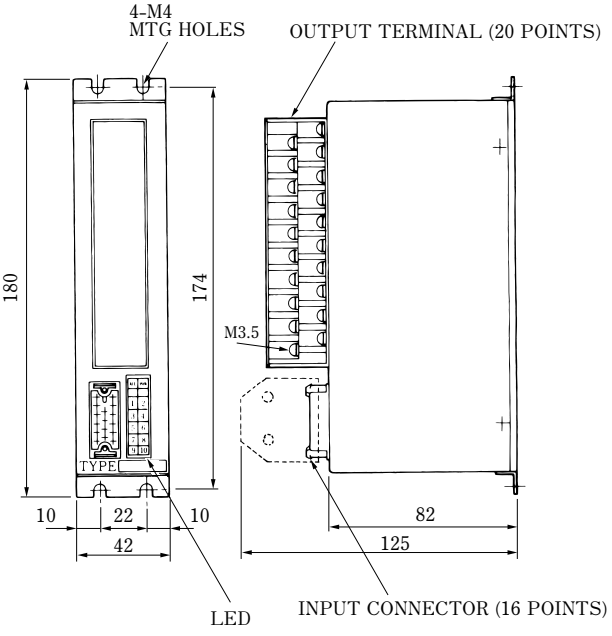
・**Type RIU-08GC/** □ (For 8 circuits)



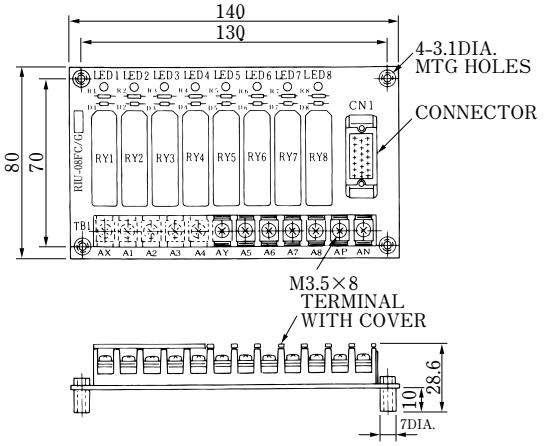
・**Type RIU-08EC/** □ (For 8 circuits)



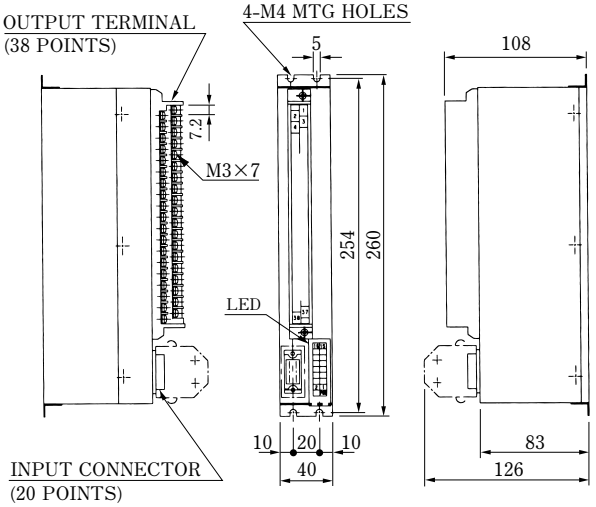
・**Type RIU-10AC/** □ (For 10 circuits)



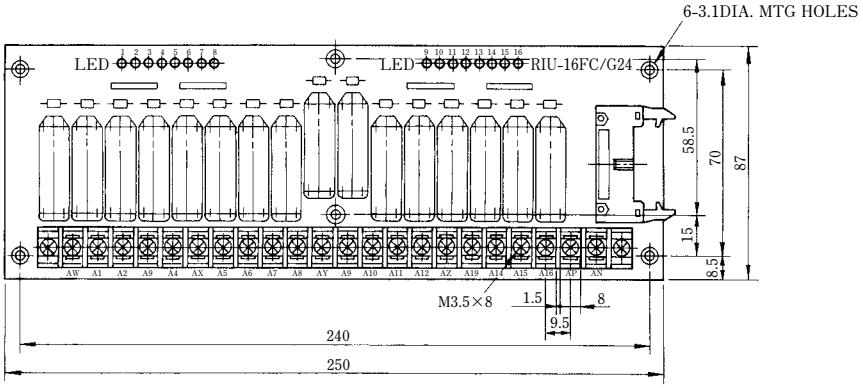
・**Type RIU-08FC/** □ (For 8 circuits)

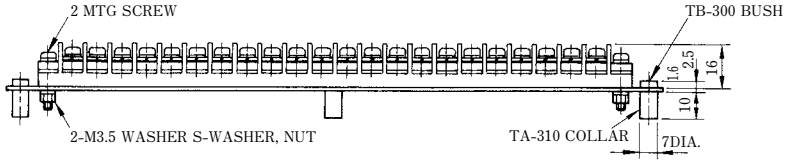


・**Type RIU-16AC/G24** (For 16 circuits)



・**Type RIU-16FC/24** (For 16 circuits)





PRECAUTIONS FOR USE

1. When wiring connector contacts of Type RIU-08AC, -08BC, -08GC, use the following tools manufactured by Japan Aviation Electronics Industry, Limited.

・Wiring
Manual type crimping tool
Type CR150-1B-IL
(Connector Type IL)
(Wire size: 0.13 to 0.20mm^2)
・Contact drawing
Drawing tool Type JET-IL-NO1
・Latch up
Latch up tool
Type JLU-IL-NO1

2. Type RIU-08FC, -16AC and RIU-10AC use a soldering type connector manufactured by Honda Tsushin Kogyo Co.,Ltd.

・Type RIU-08FC, -16AC
Connector Type MR-20LF
・Type RIU-10AC
Connector Type MR-16LF
Both of the connectors are attached to the products.

3. The input part of Type RIU-16FC uses an angle pin header, Type PS-20PE-D4LT manufactured by Japan Aviation Electronics industry, Limited.

・Suitable Socket Housing
PS-D4C20 manufactured Japan Aviation Electronics Industry, Limited.
or equivalent products.

4. When using DC circuits on the output (terminal) side, refer to the polarity table below for correct wiring. Reverse polarity wiring will cause significant reduction in contact lifetime.

Relay No.	Polarity on Output (terminal) side														
	Type														signal
	-04EC/□		-08BC/□ -08CC/□ -08FC/□ -08GC/□		-08AC/□		-08EC/□		-10AC/□		-16AC/□		-16FC/□		
	+	−	+	−	+	−	+	−	+	−	+	−	+	−	
1	B1	A1	A1	AX	B1	A1	B1	A1	0	10	2	1	A1	AW	
2	B2	A2	A2	AX	B2	A2	B2	A2	1	11	4	3	A2	AW	
3	B3	A3	A3	AX	B3	A3	B3	A3	2	12	6	5	A3	AW	
4	B4	A4	A4	AX	B4	A4	B4	A4	3	13	8	7	A4	AW	
5	−	−	A5	AY	B5	A5	B5	A5	4	14	10	9	A5	AX	
6	−	−	A6	AY	B6	A6	B6	A6	5	15	12	11	A6	AX	
7	−	−	A7	AY	B7	A7	B7	A7	6	16	14	13	A7	AX	
8	−	−	A8	AY	B8	A8	B8	A8	7	17	16	15	A8	AX	
9	−	−	−	−	−	−	−	−	8	18	18	17	A9	AY	
10	−	−	−	−	−	−	−	−	9	19	20	19	A10	AY	
11	−	−	−	−	−	−	−	−	−	−	22	21	A11	AY	
12	−	−	−	−	−	−	−	−	−	−	24	23	A12	AY	
13	−	−	−	−	−	−	−	−	−	−	26	25	A13	AZ	
14	−	−	−	−	−	−	−	−	−	−	28	27	A14	AZ	
15	−	−	−	−	−	−	−	−	−	−	30	29	A15	AZ	
16	−	−	−	−	−	−	−	−	−	−	32	31	A16	AZ	
	−	−	AP	−	AP	−	−	−	−	−	35	−	AP	−	+com
	−	−		−	BP	−	−	−	−	−		−		−	
	−	−	−	AN	−	AN	−	−	−	−	−	36	−	AN	−com
	−	−	−		−	BN	−	−	−	−	−		−		

Bestact

MULTIPOLE RELAYS

I/O Helper
Medium-Capacity Type RB -2D2520C
Large-Capacity Type RB-2D520C
Plug-in Type RB-3PC (3-poles)
Stationary Type RB-5ABC (5-poles)

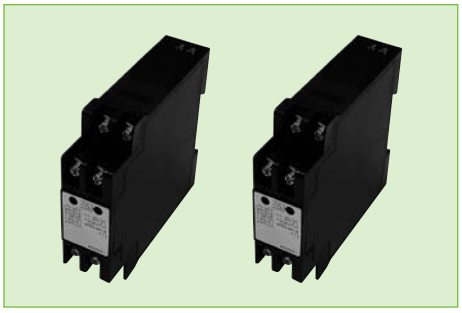
I/O HELPER

Medium-Capacity Type RB-2D2520C
Large-Capacity Type RB-2D520C

Covers a Wide Range of Applications from Low Level Loads to Power Loads.
Best Suited to Additional Relays for PC and Microcomputer Equipment.

FEATURES

1. Can be energized by small-capacity transistor output by integrating a flywheel diode and a LED lamp. Small power consumption of 0.7 W per circuit.
2. Directly controls a wide range of loads. Can compensate for insufficient output capacity of a general purpose PC relay.
3. Best suited for infrequent use applications by incorporating the hermetically sealed contact which has no aging. Also suited for frequent switching which is impossible with conventional contact relays.
4. Can reduce manufacturing time due to the fast operating time of 5ms or less.



TYPICAL APPLICATIONS

- Additional relays for programmable controllers
- Dry contact input for servo amplifiers, measuring instruments, etc.
- I/O interfaces for microcomputer logic
- Output relays for photoelectric switches and proximity switches.

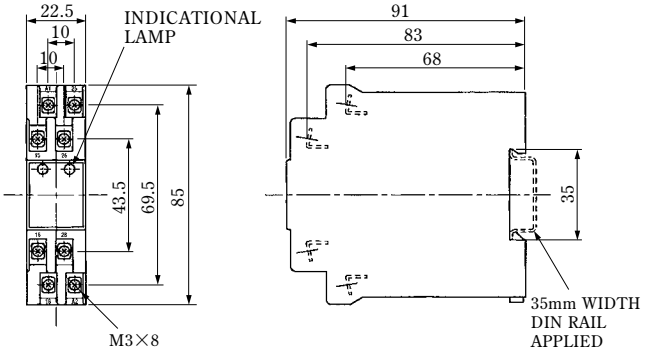
COIL SPECIFICATIONS (With polarity)

Coil Voltage	12, 24, 48 VDC
Coil Power Consumption	0.7 W × 2 Circuits (Large-capacity type) 0.6 W × 2 Circuits (Medium-capacity type)
Operating Time	5ms or less
Releasing Time	5ms or less
Ambient Temperature	–10 to +60℃

RATINGS AND SPECIFICATIONS

Type			Medium-Capacity Type	Large-Capacity Type
			RB-2D2520C	RB-2D520C
Incorporated Bestact			R25	R15
Rated Insulation Voltage			250VAC (Power Frequency)	250VAC (Power Frequency)
Contact Performance			Refer to page 7.	
Characteristics	Operating Time		5ms or less	5ms or less
	Releasing Time		5ms or less	5ms or less
	Vibration Resistance Erroneous Operation		98m/s^2 {10G} (20 to 1000Hz)	98m/s^2 {10G} (20 to 1000Hz)
	Shock Resistance	Erroneous Operation	147m/s^2 {15G}	147m/s^2 {15G}
		Breakdown	980m/s^2 {100G}	980m/s^2 {100G}
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)	100MΩ or greater (with 500VDC Megger)
	Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)	2000VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)
Ambient Temperature		Operating Temperature	–10 to +60℃	–10 to +60℃
		Storage	–25 to +80℃	–25 to +80℃
Approx. Weight			110g	150g

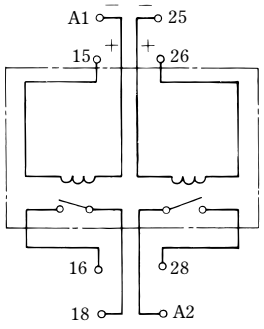
DIMENSIONS in mm



・Follow the mounting direction as shown in the above diagram.

(Same dimensions for both medium- and large-capacity types)

CONNECTIONS



・Bestact coils have a polarity. Connect terminal number 15 and 26 to ⊕.

・For DC loads, connect terminals 16 and 28 to ⊕.

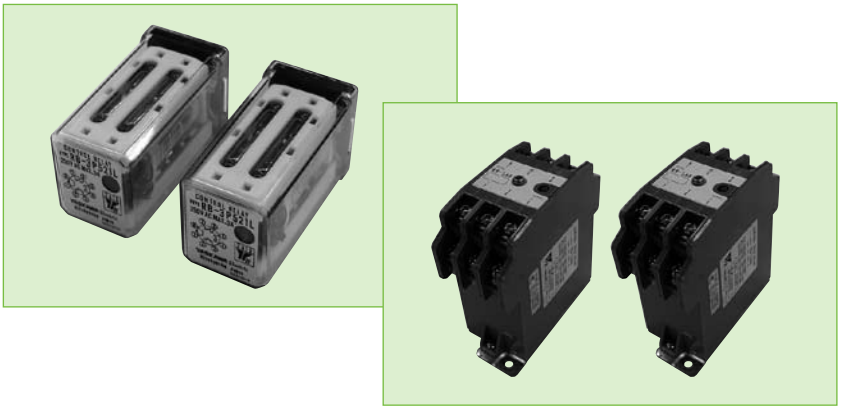
MULTIPOLE RELAYS

Plug-in Type RB-3PC (3-poles)
Stationary Type RB-5ABEC (5-poles)

Best Suited for Control Relays which require High Reliability. Widely Used in Severe Operating Conditions Such as Steel Plant Equipment, Electric Power Facilities, Rolling Stock Cars and Low Level Signals.

FEATURES

1. Provides excellent performance when used for DC solenoid valves and solenoid loads.
2. Assures maximum reliability for infrequent use.
3. Direct DC control from 5V 10mA to 230VAC.
4. A hermetically sealed contact does not deteriorate even in a corrosive environment.
5. AC actuated types are also available.



TYPICAL APPLICATIONS

- Auxiliary sequence
- Emergency interlock
- For DC solenoid load control (Especially 100VDC or greater)
- For adverse atmospheres
- For rolling stock cars
- For signals
- For elevators

RATINGS AND SPECIFICATIONS

			Plug-in Type		Stationary Type
Type	Type				
	Contact Arrangement		2NO1NC	3NO	5NO, 3NO2NC, 2NO3NC
	Incorporated Bestact	R15	RB-3P521LC	RB-3P530LC	RB-5ABEC
Rated Insulation Voltage			250VAC (Power Frequency)		250VAC (Power Frequency)
Contact Performance			Refer to page 7.		
Characteristics	Operating Time *1		40ms or less *2		40ms or less *2
	Releasing Time *1		40ms or less *2		40ms or less *2
	Vibration Resistance		44.1m/s² {4.5G} (10 to 55Hz) *3		49m/s² {5G}
	Shock Resistance	Erroneous Operation	147m/s² {15G}*3		147m/s² {15G}
		Breakdown	490m/s² {50G}		490m/s² {50G}
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)		100MΩ or greater (with 500VDC Megger)
	Withstand Voltage (Power Frequency)		2000VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)		2000VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)
Ambient Temperature		Operating Temperature	–10 to +60℃		–10 to +60℃
		Storage	–25 to +70℃		–25 to +70℃
Approx. Weight			120g		430g

Note: ＊1. Operating and releasing time are the values at rated voltage (20℃)
＊2. Each of NO and NC contact operates independently. Therefore, the operating time of NO contact and NC contact may overlap.
＊3. Values of vibration/shock resistance are obtained when Bestact is equipped with a relay retaining band. (Plug-in type).

COIL SPECIFICATIONS

・Plug-in Type RB-3PC (Ambient temperature 20℃)

Rated Voltage (E) V	Rated Power Consumption	Maximum Allowable Voltage *2	Operating Characteristics	
			Minimum Operating Voltage	Release Voltage
100 (AC)	Approx. 2VA	130%E	NO contact 68%E or less NC contact 82%E or less	15%E or greater
200 (AC)	Approx. 2.8VA			
24 (DC)	Approx. 1.9W	130%E	NO contact 72%E or less NC contact 82%E or less	10%E or greater
48 (DC)				
100 (DC)				
200 (DC)	Approx. 3W			

・Stationary Type RB-5ABEC (Ambient temperature 20℃)

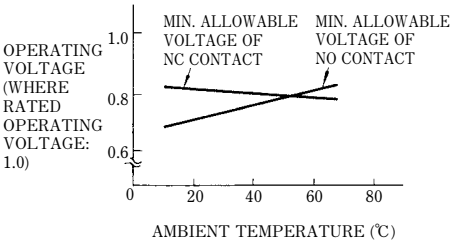
Rated Voltage (E) V	Rated Power Consumption	Maximum Allowable Voltage *2	Operating Characteristics	
			Minimum Operating Voltage	Release Voltage
100AC	2.2 to 2.7 VA	130%E	NO contact 75%E or less NC contact 78%E or less	8%E or greater
200				
24DC	2.2W	130%E	NO contact 76%E or less NC contact 78%E or less	8%E or greater
48				
100	2.3W			
200	2.6W			

Note: 1. All the products are available as custom-order products (Plug-in type and Stationary type).

*2. Maximum allowable voltage is the maximum value that can be applied to the coil in consideration of its thermal degradation and insulators in the relays. This is not a continuous allowable voltage.
The relay incorporating NC contact may erroneously operate if the maximum allowable voltage is exceeded even for a short time.

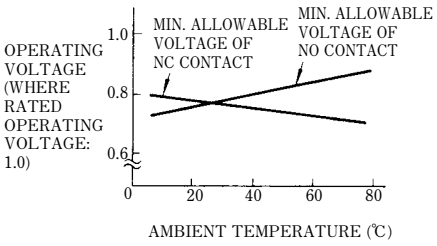
AMBIENT TEMPERATURE AND OPERATING VOLTAGE (DC Coil)

・Plug-in Type RB-3PC



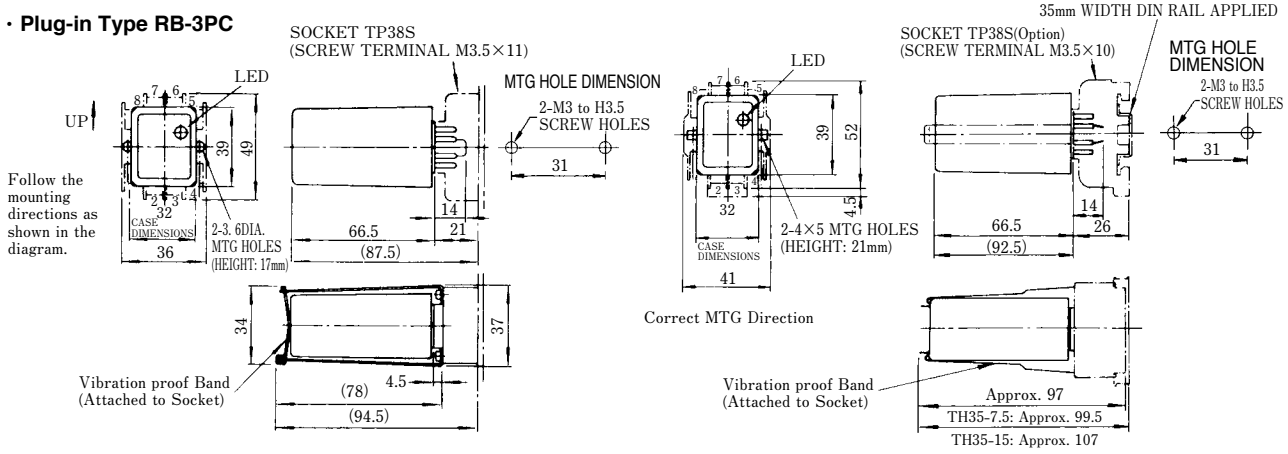
Note:
Minimum allowable voltage under no load.

・Stationary Type RB-5ABEC

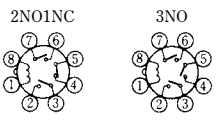


DIMENSIONS in mm

・Plug-in Type RB-3PC



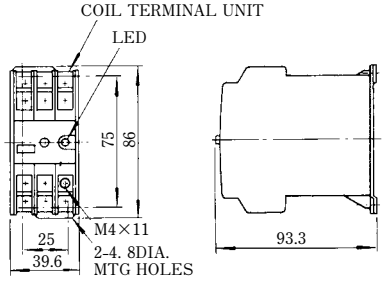
Symbols and Terminal marking



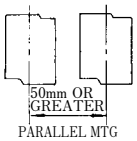
Note: 1. When Type RB-3PC and RB-5ABEC are used in a DC circuit, connect the even-numbered terminals to ⊕ and odd-numbered terminals to ⊖ .

2. When mounting relays in parallel, provide a mounting interval of 42mm or greater.

・Stationary Type RB-5ABEC



Note:
1. Do not change the contact arrangement. Otherwise, the operating characteristics may change.
2. The unit is color-coded as follows:
Gray: NO contact unit, coil terminal units and idle unit.
Yellow: NC contact unit.
3. When mounting the relays in parallel, provide a mounting interval of 50mm or greater.



Bestact
RELAYS FOR ELECTRIC POWER

Auxiliary Relays Type	RI-B15T□C, -C15T1C RI-D25T1C
Electric Current Relays Type	RR-1EAC
Plug-in Relays Type	RB-2PET□C
Delayed Releasing Relays Type	RR-2EPC
Relay Unit Type	RB-4LE□C

Mercury relays and plug-in relays have been used for trip relays in electric power breakers. However, no relay could directly control 100VDC and there were some problems such as too low current rating, limitation of mounting direction and potential of mercury pollution.
Bestact relays for electric power can solve those problems and can be used as auxiliary relays. They are highly reliable relays provided in PCB mounted type, Plug-in type and Encased type.

FEATURES

1. High contact reliability
   Highly reliable “Bestact” employing twin contacts and the wiping operation mechanism.
2. Large Contact Capacity
   Large making current enables the driving of trip coils in electric breakers directly.
3. Quick operating time
   Operating time is 5ms or less (except for the delayed releasing type relays), suitable for high-speed breakers.
4. Small size relays
   Can reduce mounting space.

MODEL LIST

Structure	Name	Type	Contact Arrangement	Appearance	Application Example	Advantage Compared with Convention Relays
PCB Type	Auxiliary Relays for Electric Power	RI-B15T1C	1NO		・Auxiliary Relays for Electric Power ・Relay for Driving Trip Coils of Electric Breakers	・High Contact Reliability. ・Large Contact Capacity. ・Large VA Effect by the PCB Mounted type.
		RI-B15T2C				
		RI-C15T1C	1NC			
		RI-D25T1C	1NO			
	Electric Current Relay	RR-1EAC	1NO		・Relay for Driving Trip Coils of Electric Breakers	・No External Operating Power Supply Needed due to a Direct Connection to the Main Circuit. ・High Contact Reliability.
Plug-in Type	Plug-in Relays for Electric Power	RB-2PET1C	1NO		・Auxiliary Relays for Electric Power	・High Contact Reliability. ・Reduction of Mounting Space. ・Reduction of Wining.
		RB-2PET2C	1NO1NC			
		RB-2PET6C	2NO			
		RB-2PET6HC				
		RB-2PET7C	2NC			
		RB-2PET7HC				
	Delayed Releasing type Relay	RR-2EPC	2NO		・For Trip Circuit of Breakers in Electric Power Facilities ・For DC Circuit of Distribution Board and Control Board ・For Replacement of Telephone Relay	・No External Operating Power Supply Needed. ・High Contact Reliability Compared with the Air Break Contact type. ・Reduction of Mounting Space. ・Reduction of Wining
Encased	Relay Unit for Electric Power	RB-4LEC	4NO 2NO2NC		・Auxiliary Relays for Electric Power	・High Contact Reliability ・Wide Range of the Load Control ・Large Contact Capacity ・Reduction of Mounting Space

RATINGS AND SPECIFICATIONS

Type			RI-B15T1C	RI-B15T2C	RI-C15T1C	RI-D25T1C
Contact Arrangement			1NO		1NC	1NO
Rated Insulation Voltage			250VAC (Power Frequency)			250VAC (Power Frequency)
Contact Performance	Incorporated Bestact		R15			R25
	Making Capacity		115VDC 20A (L/R≧5ms) Current-Carrying time: 0.5s 240VAC 30A (PF=0.7)			—
	Breaking Capacity		115VDC 0.5A (L/R=100ms) 240VAC 1A (PF=0.4)			—
	Other Contact Performance		Refer to page 7.			
Characteristics	Operating Time		5ms or less (20℃)	3ms (–20 to +60℃)	5ms or less (20℃)	5ms or less (20℃)
	Releasing Time		3ms or less		7ms or less	3ms or less
	Vibration Resistance		98m/s² {10G} (20 to 1000Hz)			98m/s² {10G} (20 to 1000Hz)
	Shock Resistance	Erroneous Operation	147m/s² {15G}			147m/s² {15G}
		Breakdown	980m/s² {100G}			980m/s² {100G}
	Withstand Voltage (Power Frequency)		2200VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 1000VAC)			2200VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)			100MΩ or greater (with 500VDC Megger)
Ambient Temperature	Operating		–40 to +60℃	–20 to +60℃	–40 to +60℃	–20 to +60℃
	Storage		–40 to +80℃			–40 to +80℃
Approx. Weight			35g		40g	15g

Note: 1. Values tabulated above are the ones at ambient temperature of 20℃ unless especially described.

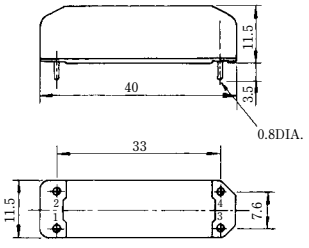
COIL SPECIFICATIONS

Type	RI-B15T1C			RI-B15T2C		RI-C15T1C			RI-D25T1C			
Rated Voltage (E)	12VDC	24VDC	48VDC	12VDC	24VDC	12VDC	24VDC	48VDC	5VDC	12VDC	24VDC	48VDC
Coil Resistance*2 (Ω)	250	1020	4030	130	465	290	1080	3700	70	400	1500	5500
Rated Power Consumption (W)	0.6			1.1		0.6			0.5			
Continuous Allowable Voltage *3	160%E 1.5W			117%E 1.5W		150%E 1.3W			170%E 1.2W			
Operating Voltage	75%E or less			75%E or less (–20 to +60℃)		75%E or less			75%E or less			
Releasing Voltage	10%E or greater			10%E or greater (–20 to +60℃)		10%E or greater			8.5%E or greater			

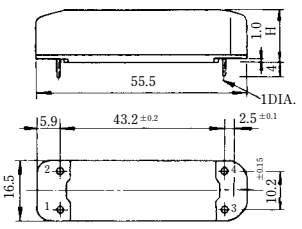
Note: 1. Coil specifications tabulated above are the ones at ambient temperature of 20℃ unless especially described.
*2. Coil resistance can vary ±10%.
*3. Continuous allowable voltage is the value that can be applied infrequently within 3 hours. Relays incorporating NC contact may erroneously operate if the continuous allowable voltage is exceeded even for a short time.

DIMENSIONS in mm

・Type RI-D25T1C



・Type RI-B15T1C, -B15T2C, -C15T1C



Dimensions \ Type	RI-B	RI-C
H	14.5	17

・Refer to NOTES FOR INSTALLATION on page 12.

AUXILIARY RELAYS FOR ELECTRIC POWER (MULTIPOLE PCB RELAYS)

Type RZDR-E□TC

Auxiliary Relays for electric power incorporating the hermetically sealed contact element "Bestact" has a good reputation in the electric market. Our product lineup covers 2NO and 4NO output up to 110VDC coil voltage.

Conventional relays were applicable to only a narrow range because they had just one contact output.
However, our relays are suitable for wide range employing a 4 contact arrangement and can directly control logic circuits and power circuits at the same time.

FEATURES

1. High contact reliability for infrequent use.
2. Multi-contact output.
   - Applicable to a variety of use.
   - Maximum 4 outputs per 1 input.
3. Suitable for a wide range of DC load.
   - Can drive trip coils for electric breakers.
4. Space-saving
   - PCB relays can reduce mounting space and wiring.

APPEARANCE

COIL RATINGS AND SPECIFICATIONS

1. Coil specifications for 4 contact relays

Product Type	Coil Specifications*1			Operating Characteristics*2		
4NO contacts	Rated Voltage	Coil Resistance	Power Consumption	Continuous Allowable Voltage*3	Operating Voltage	Releasing Voltage
RZDR-E40TC/D24	24VDC	310Ω	1.9W	130%E	80%E or less	10%E or greater
RZDR-E40TC/D48	48VDC	1200Ω	1.9W	130%E	80%E or less	10%E or greater
RZDR-E40TC/D1H	110VDC	5550Ω	2.2W	130%E	80%E or less	10%E or greater

2. Coil specifications for 2 contact relays

Product Type	Coil Specifications*1			Operating Characteristics*2		
2NO contacts	Rated Voltage	Coil Resistance	Power Consumption	Continuous Allowable Voltage*3	Operating Voltage	Releasing Voltage
RZDR-E20TC/D24	24VDC	525Ω	1.1W	130%E	80%E or less	10%E or greater
RZDR-E20TC/D48	48VDC	1610Ω	1.4W	130%E	80%E or less	10%E or greater
RZDR-E20TC/D1H	110VDC	7400Ω	1.6W	130%E	80%E or less	10%E or greater

Note: ＊1. Coil resistance can vary ±10% at ambient temperature of 20˚C.
＊2. Operating voltage and releasing voltage is the values at ambient temperature of 40˚C without preheating. E shows rated voltage.
＊3. Continuous allowable voltage is the value that can be applied infrequently within 3 hours.
4. Coil specifications might be changed. For details, contact Yaskawa.

CONTACT RATINGS AND SPECIFICATIONS

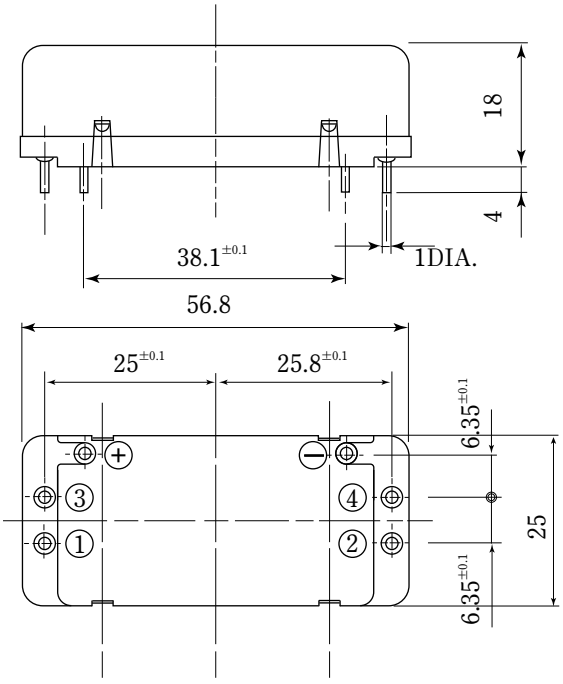
Product Type			RZDR-E40TC	RZDR-E20TC
Contact Arrangement			4NO	2NO
Incorporated Bestact			R15	
Rated Insulation Voltage			250VAC (Power Frequency)	
Contact Ratings	Making Capacity		240VAC, 30A (PF=0.7) 115VDC, 20A (L/R≧5ms) Over 20,000 operations energizing 0.5 sec	
	Breaking Capacity		240VAC, 1A (PF=0.4) 115VDC, 0.5A (L/R=100ms)	
	Other Contact Performance		Refer to page 7.	
Operating Time Characteristics	Operating Time Difference of Each Contact		Approx. 1ms	
	Operating Time		5ms or less (Bounce Time not included)*1	
	Releasing Time		3ms or less*1	
	Contact Bounce Time		3ms or less	
Insulation Characteristics	Insulation Resistance		100MΩ or greater (with 500VDC Megger)	
	Withstand Voltage (Power Frequency)		2200VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts:1000VAC)	
	Impulse Withstand Voltage		Across Input and Output: 1.2×50μs 4500V	
Vibration and Shock Characteristics		Vibration Resistance	98m/s² {10G} (20 to 1000Hz)	
		Shock Resistance	Erroneous Operation: 147m/s² {15G} Breakdown: 980m/s² {100G}	
Ambient Temperature		Operating Temperature	–40 to +60℃	
		Storage	–40 to +80℃	
Approx. Weight			130g	60g

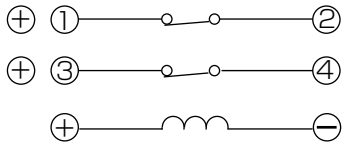
Note: ＊1. Time characteristics are the values under the condition that rated coil voltage is applied and no flywheel diode connected at ambient temperature of 20℃.

2. Contact ratings is the specifications of 1 contact.

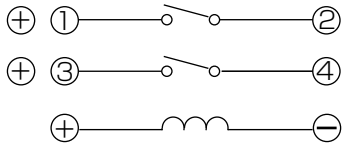
DIMENSIONS in mm

Type RZDR-E20TC





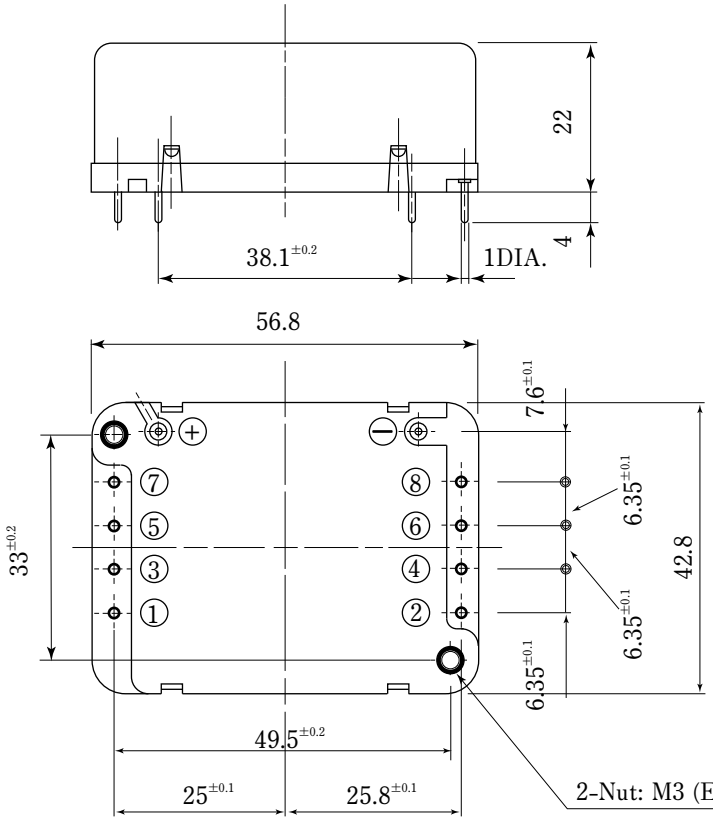
Type RZDR-E02TC

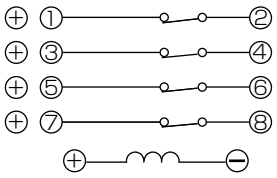


Type RZDR-E20TC

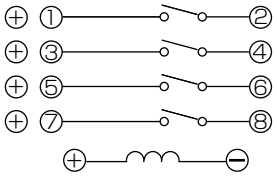
Terminal Markings and Contact Arrangement (Top View)

Type RZDR-E40TC





Type RZDR-E04TC



Type RZDR-E40TC

Terminal Markings and Contact Arrangement (Top View)

PRECAUTIONS FOR USE

- Follow the above polarity when using coils and contacts.
- Refer to (3), (4), (5), (7), (8), CAUTION and RESTRICTION on page 12.

AUXILIARY RELAYS FOR ELECTRIC POWER Type RZDR - H□TC
(MEDIUM-CAPACITY TYPE MULTIPOLE RELAYS FOR HIGH WITHSTAND VOLTAGE)

Small type relays for breaker trip control incorporating Bestact elements for high withstand voltage. Available up to 2NO contact arrangement, applicable to breaker trip control relays and I/O relays.

FEATURES

1. Space-Saving
   - Can reduce PCB mounting space by about 45% compared with our conventional products.
   - Can reduce the number of PCBs by half .
2. Two Contact Output
   - Applicable to main trip circuits and answer back circuits.
   - Best suited for I/O relays.
3. High Contact Reliability
   - Not influenced by external atmosphere due to a hermetically sealed contact.
   - Extremely high reliability for infrequent use.

APPEARANCE

RATINGS AND SPECIFICATIONS

1. Coil Specifications and Operating Characteristics of Relays (24 and 48V coil Ratings)

Type	Coil Specifications*1			Operating Characteristics*2	
1NO	Rated Voltage	Coil Resistance	Power Consumption	Operating Voltage	Releasing Voltage
RZDR-H10TC/D24	24VDC	1520Ω	0.4W	19.2V or less	2.4V or greater
RZDR-H10TC/D48	48VDC	5530Ω	0.5W	38.4V or less	4.8V or greater

Type	Coil Specifications*1			Operating Characteristics*2	
1NC	Rated Voltage	Coil Resistance	Power Consumption	Operating Voltage	Releasing Voltage
RZDR-H01TC/D24	24VDC	1160Ω	0.45W	19.2V or less	2.4V or greater
RZDR-H01TC/D48	48VDC	4060Ω	0.55W	38.4V or less	4.8V or greater

Type	Coil Specifications*1			Operating Characteristics*2	
2NO	Rated Voltage	Coil Resistance	Power Consumption	Operating Voltage	Releasing Voltage
RZDR-H20TC/D24	24VDC	700Ω	0.9W	19.2V or less	2.4V or greater
RZDR-H20TC/D48	48VDC	2700Ω	0.9W	38.4V or less	4.8V or greater

Note: ＊1. Coil resistance can vary ±10% at ambient temperature of 20℃.
＊2. Operating voltage is at ambient temperature of 40℃. Releasing voltage is at ambient temperature of 20℃.
3. Coil specifications might be changed. For details, contact Yaskawa.
4. 5V coils of different voltages are available as custom-order products.

CONTACT RATINGS AND SPECIFICATIONS

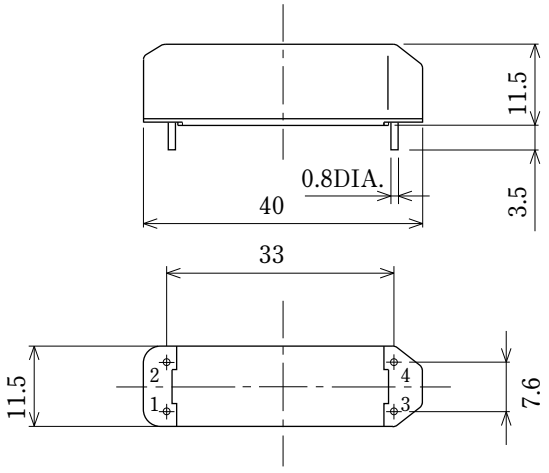
Type		RZDR-H10TC	RZDR-H01TC	RZDR-H20TC
Contact Arrangement		1NO	1NC	2NO
Incorporated Bestact		Medium-capacity high withstand voltage type R25H		
Rated Insulation Voltage		250VAC (Power Frequency)		
Contact	Rated Continuous Current	3A		
	Maximum Making Current	115VDC, 15A (L/R=5ms)		
	Making Capacity	115VDC, 15A (L/R=5ms), 10,000 operations energizing 0.5 sec		
	Maximum Breaking Current	115VDC, 0.5A (L/R=40ms)		
	Breaking Capacity	115VDC, 0.3A (L/R=40ms), 100,000 operations		
	Mechanical Life	10,000,000 operations		
	Contact Resistance	500mΩ or less with 6VDC, 1A		
	Minimum Operating Current	24V, 1mA Failure rate per contact: $\lambda 60=4.6\times10^{-9}$ (1/times) or less		
Operating Time Characteristics	Operating Time*1	5ms or less (Bounce Time not included)	4ms or less	5ms or less (Bounce Time not included)
	Releasing Time*1	3ms or less	5ms or less (Bounce Time not included)	3ms or less
	Contact Bounce Time	3ms or less		
Insulation Resistance	Insulation Resistance	Between Terminals: 5MΩ or greater To Ground: 10MΩ or greater (with 500VDC Megger)		
	Withstand Voltage (Power Frequency)	2200VAC for 1minute, Leakage Current: 5mA (Across Open Contacts: 1000VAC)		
Impulse Withstand Voltage	Between Input and Output	1.2×50μs 4500V		
Vibration and Shock Characteristics	Vibration Resistance	98m/s² {10G} (20 to 1000Hz)		
	Shock Resistance	Erroneous Operation: 147m/s² {15G} , Breakdown: 980m/s² {100G}		
Ambient Temperature	Operating Temperature	−20 to +60℃ (Operating Time at +30 to +60℃ differs from specifications)		
	Storage	−40 to +80℃		
Approx. Weight		15g	20g	30g

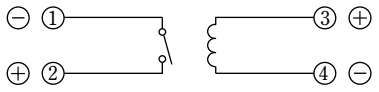
Note: ＊1. Time characteristics are the values under the condition that coil rating voltage is applied and no flywheel diode connected.
2. Contact ratings is the specifications of 1 contact.
3. Maximum breaking current is the value of 1 contact and can switch 25 times.

DIMENSIONS in mm

Type RZDR-H10TC

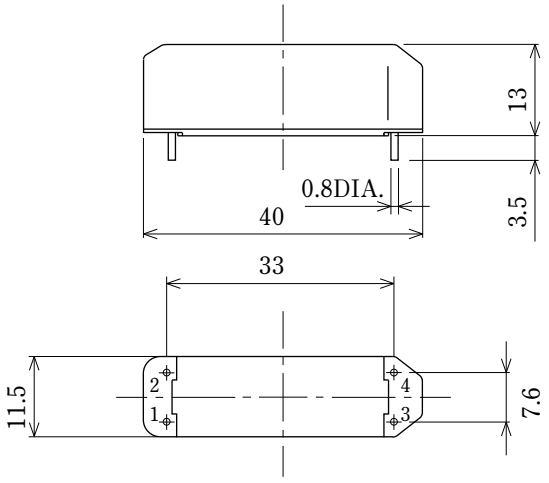
Note: When mounting many relays in parallel, provide a mounting interval of 1mm or greater.

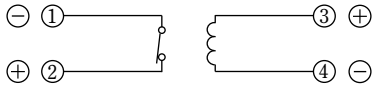




Terminal Markings and Contact Arrangement (Top View)

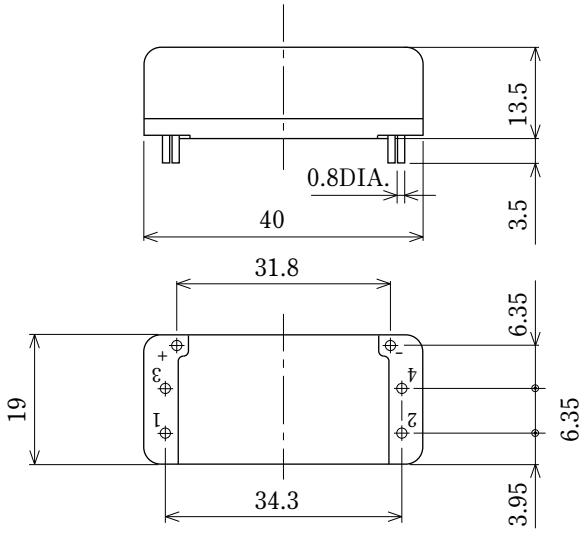
Type RZDR-H01TC

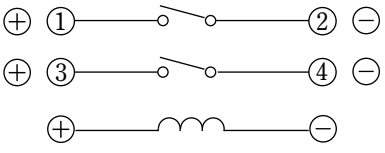




Terminal Markings and Contact Arrangement (Top View)

Type RZDR-H20TC





Terminal Markings and Contact Arrangement (Top View)

PRECAUTIONS FOR USE

- Follow the above polarity when using coils and contacts.
- Refer to (3), (4), (5), (7), (8), CAUTION and RESTRICTION on page 12.

CURRENT RELAYS

Type RR-1EAC

RATINGS AND SPECIFICATIONS

Type			RR-1EAC
Contact Arrangement			1NO
Rated Insulation Voltage			250VAC (Power Frequency)
Incorporated Bestact			R15
Contact Ratings	Making Capacity		115VDC, 20A (L/R≧5ms), Current-Carrying Time: 0.5s 240VAC 30A (PF=0.7)
	Breaking Capacity		115VDC 0.5A (L/R=100ms) 240VAC 1A (PF=0.4)
	Mechanical Life		Over 10,000,000 operations
	Other Contact Performance		Refer to page 7.
Characteristics	Operating Time		5ms or less
	Releasing Time		3ms or less
	Vibration Resistance		98m/s^2 {10G} (20 to 1000Hz)
	Shock Resistance	Erroneous Operation	147m/s^2 {15G}
		Breakdown	980m/s^2 {100G}
	Withstand Voltage (Power Frequency)		2200VAC for 1minute, Leakage Current: 5mA (Across Open Contacts: 1000VAC)
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)
Ambient Temperature		Operating Temperature	–20 to +50℃
		Storage	–40 to +80℃
Approx. Weight			35g

Note: 1. Values of ratings and characteristics tabulated above are the ones at ambient temperature of 20℃.

COIL SPECIFICATIONS

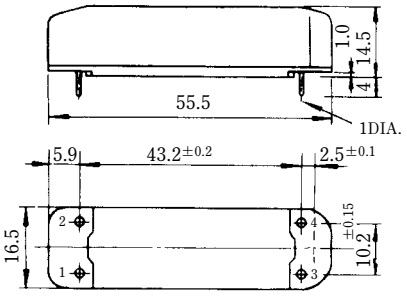
Rated Current	2A
Pick-up Current	1A or less
Drop-out Current	0.1A or greater
Coil Resistance	0.6Ω or less (at 20℃)
Current Allowable for a short time	15ADC 0.5s or less

Note: Coil specifications tabulated above are the ones at ambient temperature of 20℃.

PRECAUTION FOR USE

Refer to page 12.

DIMENSIONS in mm



RATINGS AND SPECIFICATIONS

Type			RB-2PET1C	RB-2PET2C	RB-2PET6C	RB-2PET6HC	RB-2PET7C	RB-2PET7HC
Contact Arrangement			1NO	1NO1NC	2NO		2NC	
Rated Insulation Voltage			250VAC (Power Frequency)					
Contact Ratings	Incorporated Bestact		R15					
	Making Capacity		115VDC 20A (L/R≧5ms), Current-Carrying Time: 0.5s 240VAC 30A (PF=0.7)					
	Breaking Capacity		115VDC 0.5A (L/R=100ms) 240VAC 1A (PF=0.4)					
	Other Contact Performance		Refer to page 7.					
Characteristics	Operating Time		5ms or less	5ms or less	5ms or less		5ms or less	
	Releasing Time		3ms or less	NO contact: 3ms or less NC contact: 7ms or less	3ms or less		7ms or less	
	Vibration Resistance *2		19.6m/s² {2G} (10 to 150Hz)					
	Shock Resistance *2	Erroneous Operation	147m/s² {15G}					
		Breakdown	294m/s² {30G}					
	Withstand Voltage (Power Frequency)		2200VAC for 1minute, Leakage Current: 5mA (Across Open Contacts: 1000VAC)					
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)					
Ambient Temperature		Operating Temperature	–20 to +60℃			–20 to +50℃	–20 to +60℃	–20 to +50℃
		Storage	–40 to +80℃					
Approx. Weight			140g					

Note: 1. Values of ratings and specifications tabulated above are the ones at ambient temperature of 20℃.
＊2. Values of vibration/shock resistance are obtained when Bestact is equipped with a relay retaining band.

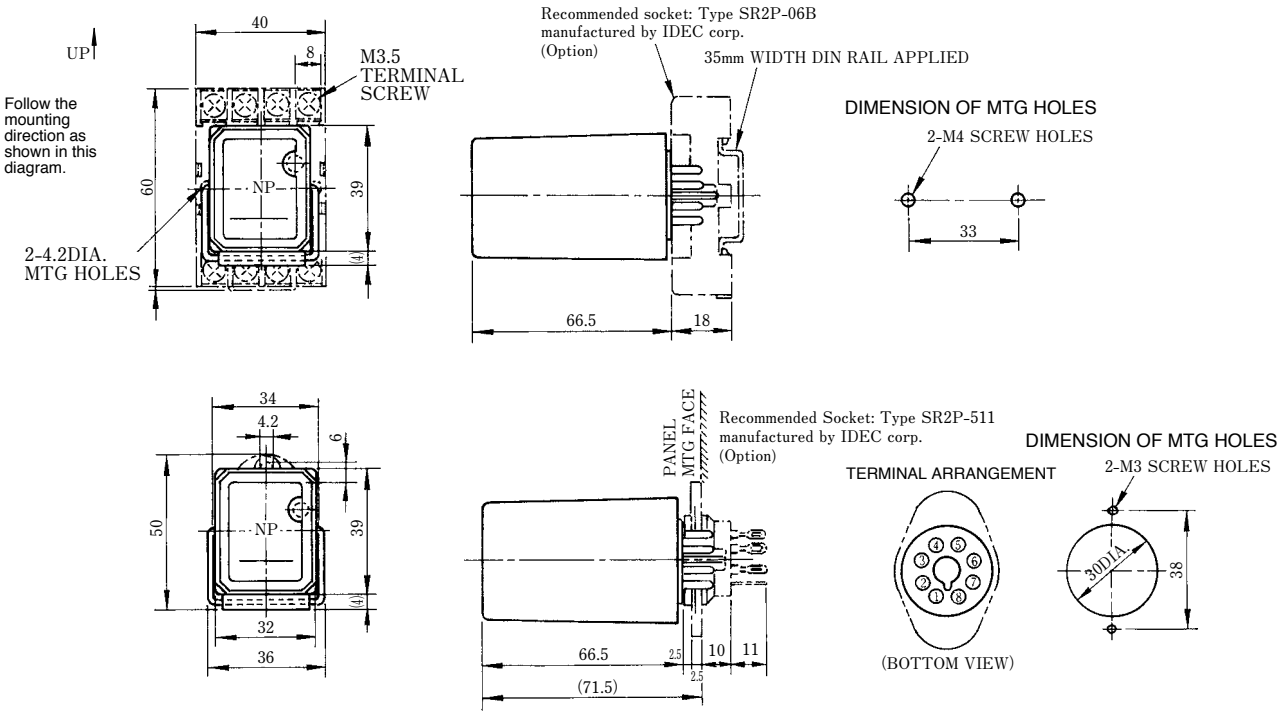
COIL SPECIFICATIONS

Type	RB-2PET1C	RB-2PET2C	RB-2PET6C		RB-2PET6HC	RB-2PET7C		RB-2PET7HC
Rated Voltage (E)	12VDC	12VDC	24VDC	48VDC	110VDC	24VDC	48VDC	110VDC
Rated Current (mA) *2	26	50	50	27	13	48	29	14
Rated Power Consumption (W)	0.35	0.7	1.3		2.5	1.2	1.4	2.7
Continuous Allowable Voltage *3	150%E	150%E	150%E		150%E	150%E		150%E
Operating Voltage	75%E or less	75%E or less	75%E or less		65%E or less	75%E or less		68%E or less
Releasing Voltage	10%E or greater	10%E or greater	10%E or greater		8.5%E or greater	10%E or greater		8.5%E or greater

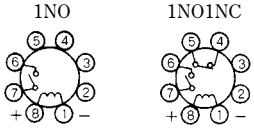
Note: 1. Coil specifications tabulated above are the ones at ambient temperature of 20℃.
＊2. Coil rated current can vary ±10%.
＊3. Continuous allowable voltage is the value which can be applied infrequently within 3 hours. Relays incorporating NC contact may erroneously operate if the continuous allowable voltage is exceeded even for a short time.

DIMENSIONS in mm

・Type RB-2PET1C, -2PET2C



Symbols and terminal markings

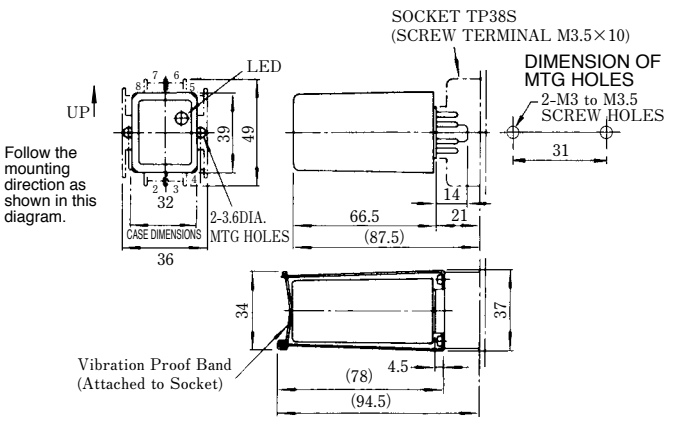


Note: 1. Recommended socket is Type SR2P-06B (for front side) and SR2P-511 (for back side) manufactured by IDEC corp. There are some available sockets other than these, so contact other manufactures. Prepare sockets by yourself.

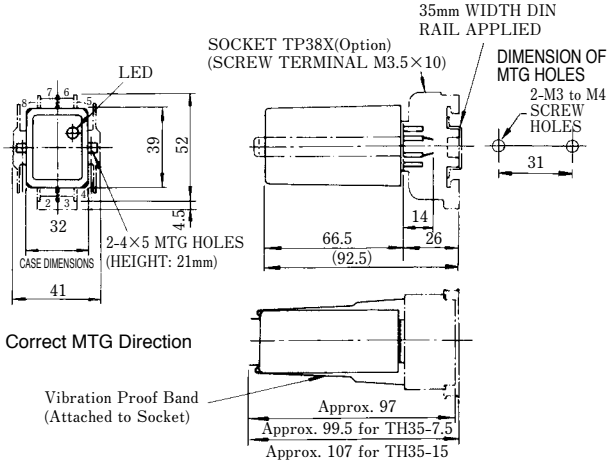
2. When Type RB-2PT1C is used in a DC circuit, connect terminal No.6 to ⊕ and No.7 to ⊖. When Type RB-2PT2C is used in a DC circuit, connect terminal No.4 and 6 to ⊕ and No.5 and 7 to ⊖.

・Type RB-2PET6C, -2PET6HC, -2PET7C, -2PET7HC

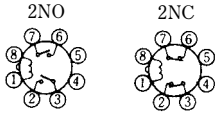
<SOCKET TP38S>



<SOCKET TP38X>



Symbols and terminal markings



Note: When used in a DC circuit, connect terminal No.2 and 6 to ⊕ and No.3 and 7 to ⊖.

DELAYED RELEASING RELAYS

Type RR-2EPC

RATINGS AND SPECIFICATIONS

Type			RR-2EPC
Contact Arrangement			2NO
Rated Insulation Voltage			250VAC (Power Frequency)
Contact Ratings	Incorporated Bestact		R15
	Making Capacity		115VDC 20A (L/R≧5ms), Current-Carrying Time: 0.5s 240VAC 30A (PF=0.7)
	Breaking Capacity		115VDC 0.5A (L/R=100ms), 240VAC 1A (PF=0.4)
	Other Contact Performance		Refer to page 7.
Characteristics	Operating Time		10ms or less
	Maintaining Time		60ms or greater
	Vibration Resistance		19.6m/s^2 {2G} (16.7Hz)
	Shock Resistance	Erroneous Operation	98m/s^2 {10G}
		Breakdown	196m/s^2 {20G}
	Withstand Voltage (Power Frequency)		2000VAC for 1minute, Leakage Current: 5mA (Across Open Contacts: 1000VAC)
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)
Ambient Temperature		Operating Temperature	−10 to +60℃
		Storage	−30 to +85℃
Approx. Weight			400g

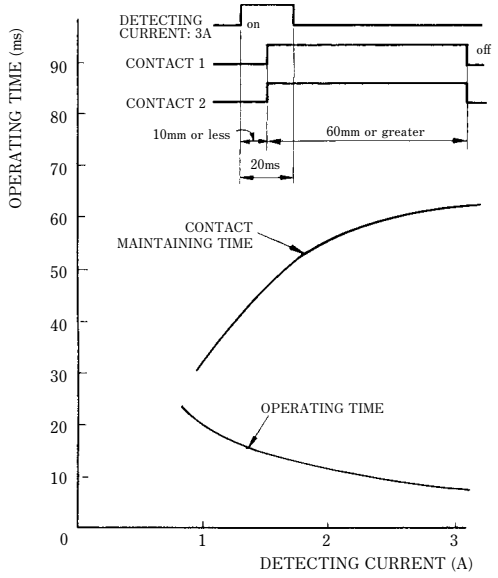
Note: 1. Values of ratings and characteristics tabulated above are the ones at ambient temperature of 20℃.

COIL SPECIFICATIONS

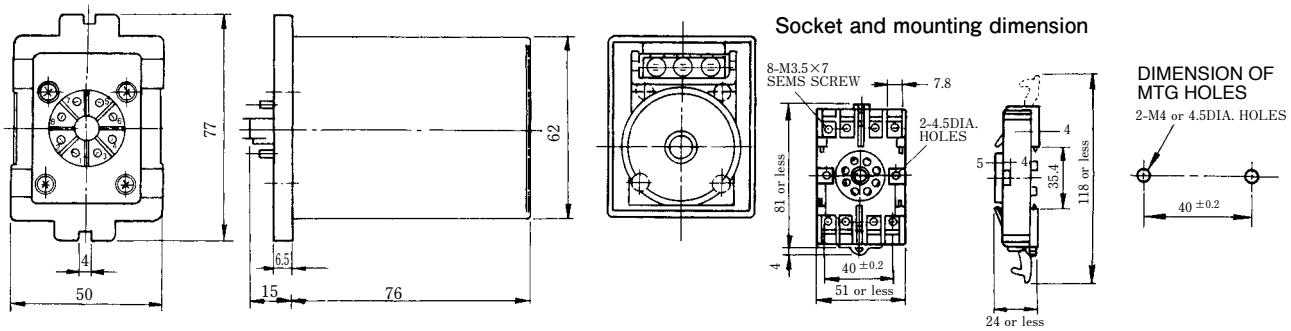
Conditioning Current	1 to 3A (Rated Detecting Current: 1A)
Pick-up Current	0.5A
Drop-out Current	10mA or greater
Maintaining Current	200mA (Maintaining ON after operating contact)
Coil Resistance	1.5Ω or less (at 20℃)
Short-time Allowable Current	6ADC, 30s or less

Note: Coil specification tabulated above are the ones at ambient temperature of 20℃.

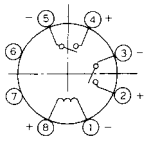
OPERATING TIME SPECIFICATION (EXAMPLE)



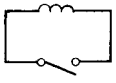
DIMENSIONS in mm



Symbols and terminal markings



Coil for delay



Type 8PFA
(Option)

Note: 35mm WIDTH DIN RAIL APPLIED

Note: Connect the terminal No.8 of detecting coils to ⊕.
When used only in a DC circuit, connect terminal No.2 and 4 of output contacts to ⊕.

RELAY UNITS FOR ELECTRIC POWER

Type RB-4LE□C

RATINGS AND SPECIFICATIONS

Type			RB-4LE40C	RB-4LE22C
Contact Arrangement			4NO	2NO2NC
Rated Insulation Voltage			250VAC (Power Frequency)	
Contact Ratings	Incorporated Bestact		R15	
	Making Capacity		115VDC 20A (L/R≧5ms), Current-Carrying Time: 0.5s 240VAC 30A (PF=0.7)	
	Breaking Capacity		115VDC 0.5A (L/R=100ms), 240VAC 1A (PF=0.4)	
	Other Contact Performance		Refer to page 7.	
Characteristics	Operating Time		5ms or less	
	Releasing Time		3ms or less	NO contact: 3ms or less NC contact: 7ms or less
	Vibration Resistance		19.6m/s² {2G} (10 to 55Hz)	
	Shock Resistance	Erroneous Operation	98m/s² {10G}	
		Breakdown	294m/s² {30G}	
	Withstand Voltage (Power Frequency)		2000VAC for 1minute, Leakage Current: 5mA (Across Open Contacts: 1000VAC)	
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)	
Ambient Temperature		Operating Temperature	−20 to +60℃	
		Storage	−40 to +80℃	
Approx. Weight			500g	

Note: 1. Values of rating and characteristics tabulated above are the ones at ambient temperature of 20℃.

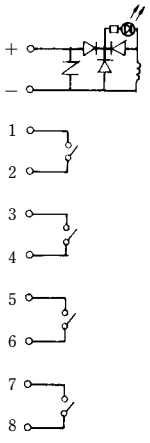
COIL SPECIFICATIONS

Type	RB-4LE40C	RB-4LE22C
Rated Voltage (E)	115VDC	
Rated Current	25mA	
Rated Power Consumption	2.5W	2.7W
Continuous Allowable Voltage	150%E	
Operating Voltage	74%E to less	
Releasing Voltage	8.5%E or greater	

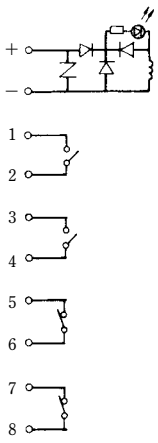
Note: 1. Coil specifications tabulated above are the values at ambient temperature of 20℃.
2. Continuous allowable voltage is the value which can be applied infrequently within 3 hours. Relays incorporating NC contact may erroneously operate if the continuous allowable voltage is exceeded even for a short time.

CONTACT CONFIGRATION DIAGRAM

・RB-4LE40C

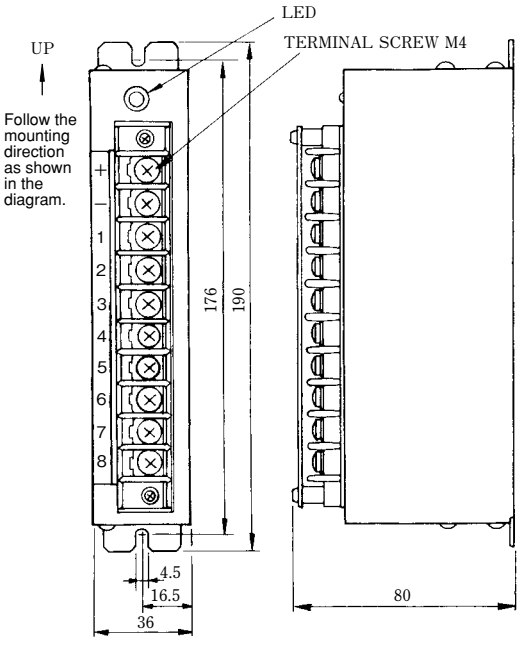


・RB-4LE22C



Note: When used in a DC circuit, connect the odd number terminals to ⊕ and even number terminals to ⊖.

DIMENSIONS in mm



Bestact
RELAYS FOR RAILWAY SIGNALS

ATS WAYSIDE COIL CONTROL RELAYS: Type RS-B18C

Relays for railway signal switching incorporated in ATS (Automatic Train Stop) wayside coil. Extremely high resistance to vibration, external magnetic fields and inductive interference.

FEATURES

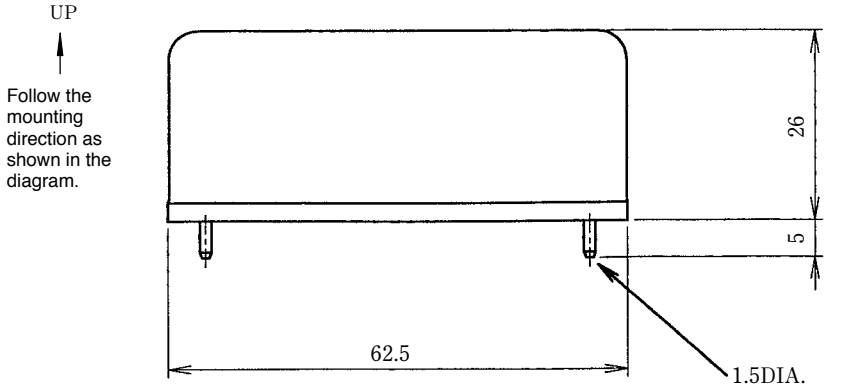
1. 150G (1470m/s²: X, Y axis, Double Amplitude) vibration resistance against the vibrations occurred from running trains.
2. Magnetic circuit arrangement which can withstand magnetic influence from rolling stock devices and inductive interference.

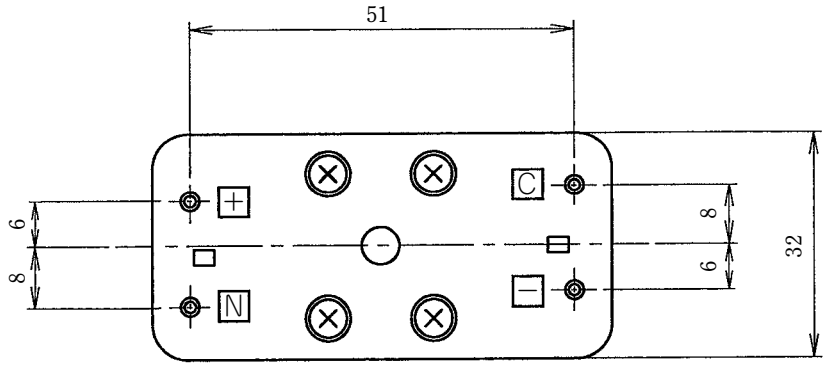
RATINGS AND SPECIFICATIONS

Type			RS-B18C
Contact Arrangement			1NO
Contact Ratings	Rated Continuous Current		3A
	Incorporated Bestact		Bestact for Relays Incorporated in Wayside coil
	Rated Switching Capacity		24VDC, 0.1A resistance load, 5,000,000 operations
	Rated Insulation Voltage		250VAC (50/60Hz)
	Maximum Switching Capacity	AC	240VAC, 10A Making (PF=0.65) 1A Breaking (PF=0.35), 500,000 operations
		DC	115VDC, 0.5A (L/R=100ms), 300,000 operations
	Contact Resistance		500mΩ or less at Ohm meter
	Mechanical Life		10,000,000 operations
Operational Characteristics	Minimum Operating Current (20℃)		20.2mA or less
	Dropping Current (20℃)		3.2mA or greater
	Operating Time (20℃)		15ms or less
	Releasing Time (20℃)		15ms or less
	Bounce Time		3ms or less
Insulation	Insulation Resistance		Across Open Contacts, Between Coil and Contact, Between Terminal and Cover: 10MΩ or greater (with 500VDC Megger)
	Withstand Voltage (Power Frequency)		Across Open Contacts: 800VAC for 1 minute (Leakage Current: 5mA) Between Coil and Contact: 1000VAC for 1 minute (Leakage Current: 5mA) Between Terminal and Cover: 3000VAC for 1 minute (Leakage Current: 5mA)
Vibration Characteristics			Double Amplitude 150G (1470m/s²: 200Hz to 1500Hz)
			Z axis: Double Amplitude 50G (490m/s²: 100Hz to 1500Hz)
Shock Characteristics			X, Y axis: 200G (1960m/s)
Characteristics for external magnetic field			Change of operational characteristics in magnetic field of 150 gauss (15mT): within ±1mA of initial operating current
Characteristics for inductive interference			No erroneous operation occurs when applying 50Hz and 15V to coils.
Terminal Strength			Tensile strength: 20kg, Flexural Strength: 5kg
Storage Temperature			–40 to +80℃
Operating Temperature			–30 to +60℃
Coil Voltage			24VDC
Coil Resistance (20℃)			820Ω±10%

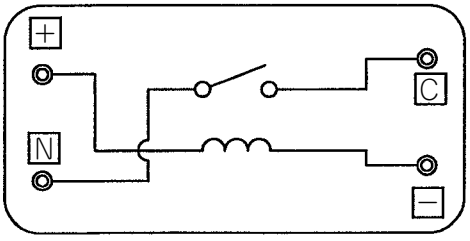
Note: For detailed specifications and characteristics, contact Yaskawa.

DIMENSIONS in mm





Symbols and terminal markings



Connect C terminal to ⊕.

Bestact
MULTIPOLE RELAYS FOR ROLLING STOCKS

PCB MOUNTED Type RZDR-E□DC
(Large-Capacity, 2-poles, 4-poles)
PLUG-IN Type RB-3P□V2C
(Large-Capacity, 3-poles)
RB□P-G□DC
(Medium-Capacity, 3-poles, 4-poles)

Widely used to control various loads for railway rolling stocks and railroad signals.
Providing high reliability and maintenance-free operation for railway systems.
Large-capacity PCB mounted type, Large-capacity Plug-in type and Medium-capacity Plug-in type are available.
Suitable for various applications.

FEATURES

1. Extremely high performance for DC magnetic valves and solenoid loads.
2. High contact reliability, suitable for severe environments.
3. Wide range for coil input voltage corresponding to changes in rolling stock electric power.
4. Can control various loads and sequences by employing a multi-contact output.

AUXILIARY RELAYS FOR ROLLING STOCKS

Type RZDR - E□DC

Can reduce wiring and space for PCB mounted relays.

PRODUCT APPEARANCE

RATINGS AND SPECIFICATIONS

1. Coil Specifications for 4 Pole Relays

	Type	Coil Specifications*1		
		Rated Voltage	Resistance	Power Consumption
4NO	RZDR-E40DC/D1H	100VDC	4010Ω	Approx. 2.5W
	RZDR-E40DC/D50	50VDC	1170Ω	Approx. 2.2W
	RZDR-E40DC/D24	24VDC	310Ω	Approx. 1.9W
4NC	RZDR-E04DC/D1H	100VDC	4010Ω	Approx. 2.5W
	RZDR-E04DC/D50	50VDC	1170Ω	Approx. 2.2W
	RZDR-E04DC/D24	24VDC	310Ω	Approx. 1.9W

2. Coil Specifications for 2 Pole Relays

	Type	Coil Specifications*1		
		Rated Voltage	Resistance	Power Consumption
2NO	RZDR-E20DC/D1H	100VDC	6350Ω	Approx. 1.6W
	RZDR-E20DC/D50	50VDC	1610Ω	Approx. 1.6W
	RZDR-E20DC/D24	24VDC	410Ω	Approx. 1.4W
2NC	RZDR-E02DC/D1H	100VDC	6350Ω	Approx. 1.6W
	RZDR-E02DC/D50	50VDC	1610Ω	Approx. 1.6W
	RZDR-E02DC/D24	24VDC	410Ω	Approx. 1.4W

3. Operating Characteristics

Operating Voltage	Operating Ambient Temperature
70～110% E of Rated Voltage	–25 to +60℃
Minimum Operating Voltage	**Ambient Temperature**
70% E of Rated Voltage or less	+60℃ Hot Condition
Releasing Voltage	**Ambient Temperature**
10% E of Rated Voltage or greater	+20℃ Cold Condition

Note: ＊1. Coil resistance is the value at ambient temperature of 20℃. This value can vary ±10%.
2. Coil specification might be changed without notice. Contact Yaskawa before you order.

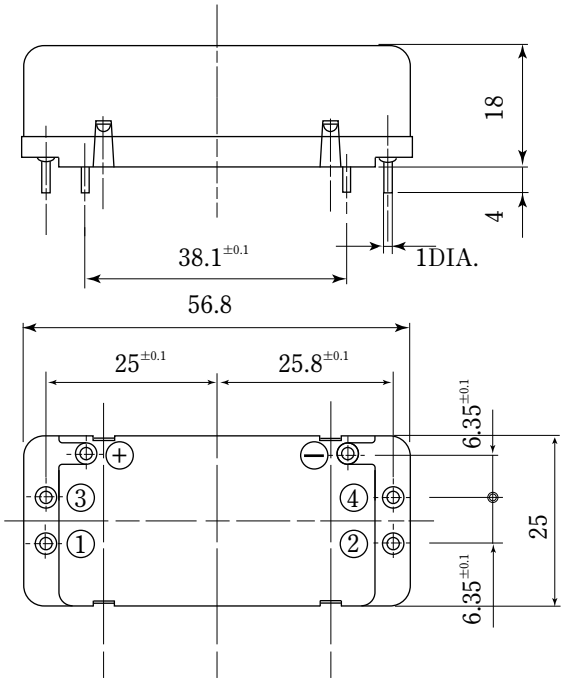
CONTACT RATINGS AND SPECIFICATIONS

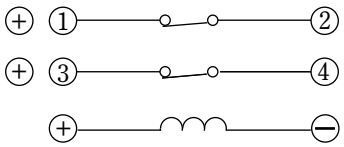
Product Type		RZDR-E40DC	RZDR-E04DC	RZDR-E20DC	RZDR-E02DC
Contact Arrangement		4NO	4NC	2NO	2NC
Incorporated Bestact		R15			
Rated Insulation Voltage		250VAC (Power Frequency)			
Contact Performance		Refer to page 7.			
Operating Time Characteristics*1	Operating Time Difference of Each Contact	Approx. 1ms			
	Operating Time	NO contacts: Approx. 5ms (Without Bounce), NC contacts: Approx. 3ms			
	Releasing Time	NO contacts: Approx. 6ms, NC contacts: Approx. 8ms (Bounce Time not included)			
Insulation Characteristics	Insulation Resistance	100MΩ or greater (with 500VDC Megger)			
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)			
Vibration and Shock Characteristics	Vibration Resistance	Refer to JIS E 4031 Annex JA Category 2 Class B			
	Shock Resistance	Refer to JIS E 4031 Annex JB Category 2 Class B			
Ambient Temperature	Operating Temperature	–25 to +60℃			
	Storage	–40 to +80℃			
Approx. Weight		130g		60g	

Note: ＊1. Operating time characteristics are the values when coil ratings voltage is applied at ambient temperature of 20℃.

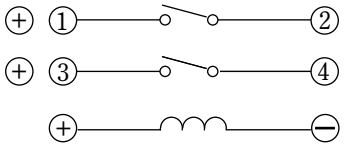
DIMENSIONS in mm

Type RZDR-E20DC





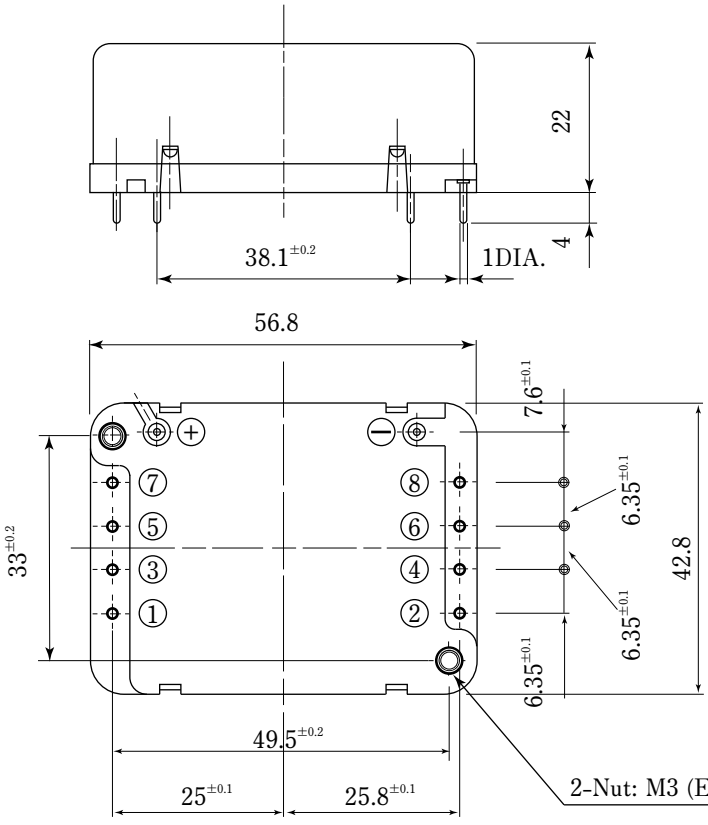
Type RZDR-E02DC

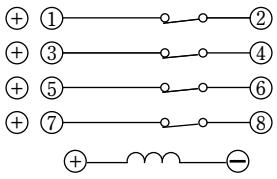


Type RZDR-E20DC

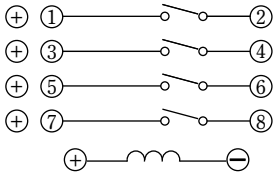
Terminal Markings and Contact Arrangement (Top View)

Type RZDR-E40DC





Type RZDR-E04DC



Type RZDR-E40DC

Terminal Markings and Contact Arrangement (Top View)

PRECAUTIONS FOR USE

- Follow the above polarity when using coils and contacts.
- Refer to (3), (4), (5), (7), (8), CAUTION and RESTRICTION on page 12.

PLUG-IN TYPE RELAYS FOR ROLLING STOCKS

Large-Capacity: Type RB-3P□V2C

- **Plug-in type relays enable easy replacement.**
- **Easy circuit change and addition.**
- **Easy routine replacement when used frequently.**

RATINGS AND SPECIFICATIONS

・Coil Specifications for Relays

Type	Contact Arrangement	Rated Voltage	Rated Power Consumption	Operating Characteristics*1		
				Voltage Variation Range	Operating Voltage	Releasing Voltage
RB-3P530V2C/D1H	3NO	100VDC	Approx.2.5W	70VDC to 110VDC	70VDC or less	5VDC or greater
RB-3P521V2C/D1H	2NO1NC					

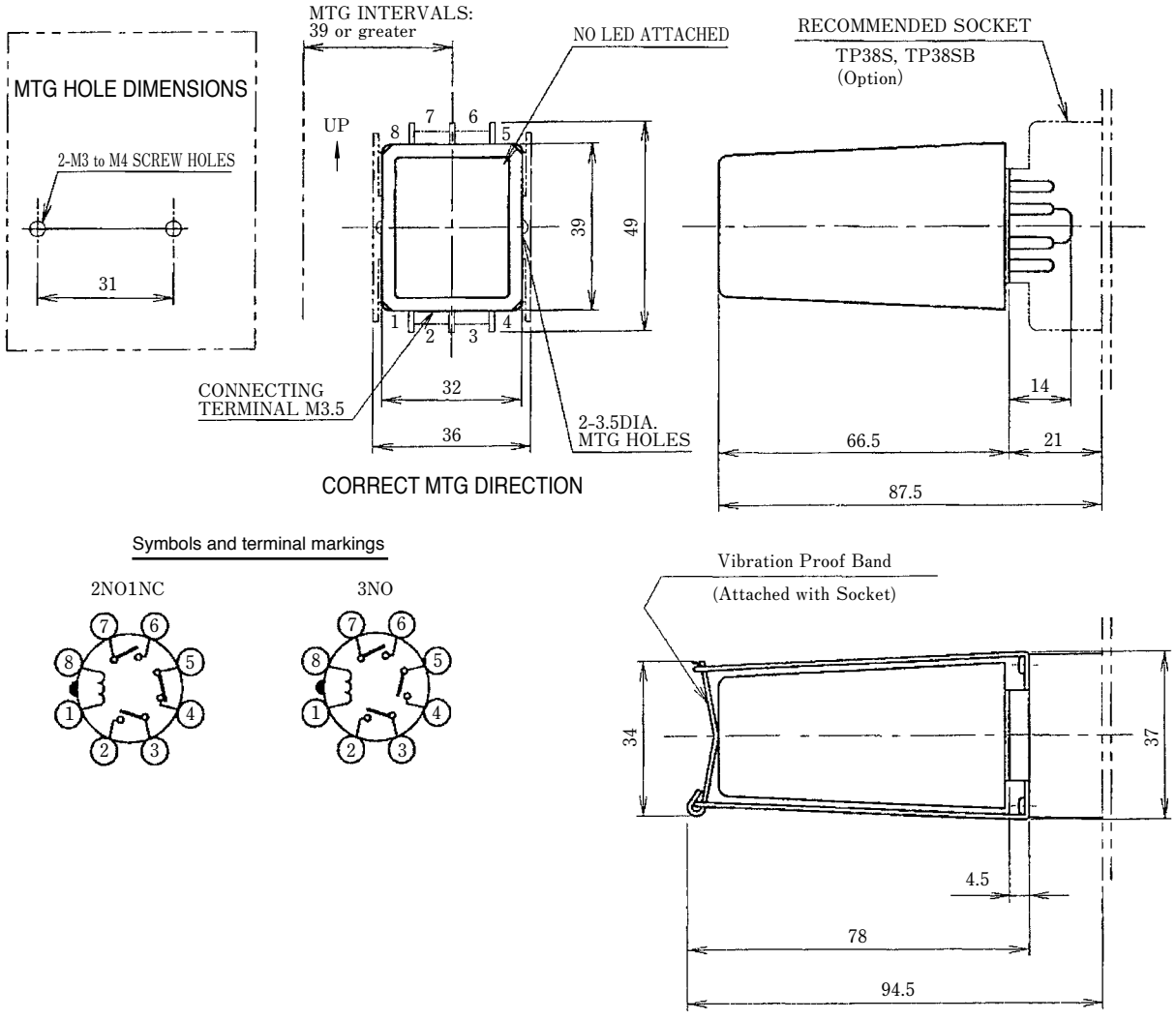
Note: ＊1. Operating characteristics are at the condition including hot start of coils at ambient temperature of –25 to +55℃

CONTACT RATINGS AND SPECIFICATIONS

Type		RB-3P530V2C/D1H	RB-3P521V2C/D1H
Contact Arrangement		3NO	2NO1NC
Incorporated Bestact		R15	
Rated Insulation Voltage		250VAC (Power Frequency)	
Contact Performance		Refer to page 7.	
Time Characteristics*1	Operating Time	40ms or less (Bounce Time not inclueded)	
	Releasing Time	40ms or less	
Insulation Characteristics	Insulation Resistance	100MΩ or greater (with 500VDC Megger)	
	Withstand Voltage (Power Frequency)	2000VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)	
Vibration Resistance*2		44.1m/s^2 {4.5G} (10 to 55Hz)	
Shock Resistance*2	Erroneous Operation	147m/s^2 {15G}	
	Breakdown	490m/s^2 {50G}	
Temperature Characteristics*3	Operating Temperature	–25 to +55℃	
	Storage	–25 to +75℃	

Note: ＊1. Time characteristics are the values when coil ratings voltage is applied at ambient temperature of 20℃.
＊2. Values of vibration/shock resistance are obtained when Bestact is equipped with a vibration proof band.
＊3. Temperature characteristics are the values at the condition without condensation.

DIMENSIONS in mm



Note: 1. Mount a vibration proof band to protect relays from vibration and shock during transportation.
2. Mount a vibration proof band to a socket with screws for socket mounting.
3. When mounting relays in parallel, provide a mounting interval of 39mm or greater.
4. When relays are used in a DC circuit, connect terminal number 2, 4 and 6 to ⊕ and number 3, 5 and 7 to ⊖ .
5. Follow the correct mounting direction as shown in the above diagram to protect relays from vibration and shock.

PLUG-IN TYPE MULTIPOLE RELAYS **Medium-Capacity Type:** RB3P-G□DC

RATINGS AND SPECIFICATIONS

・Coil Specifications for Relays

Type		Coil Specifications (+20℃)	
2NO1NC	3NO	Rated Voltage	Power Consumption
RB3P-G21DC/D1H	RB3P-G30DC/D1H	100VDC	Approx. 1.9W
RB3P-G21DC/D50	RB3P-G30DC/D50	50VDC	Approx. 2.5W
RB3P-G21DC/D26	RB3P-G30DC/D26	26VDC	Approx. 1.7W
RB3P-G21DC/D24	RB3P-G30DC/D24	24VDC	Approx. 2.5W
RB3P-G21DC/D12	RB3P-G30DC/D12	12VDC	Approx. 1.9W

Note: 1. Coils for other voltages not tabulated above and cold district type are also available as option. For details, contact Yaskawa.
2. 60% or less of minimum operating voltage/rated voltage and +60℃ coil hot condition are also available as option.

・Operating Characteristics

Operating Characteristics	Conditions
Operating Voltage: 70 to 110% of Coil Ratings	Operating Ambient Temperature: –25 to +60℃
Minimum Operating Voltage: 70% or less of Coil Ratings	Operating Ambient Temperature: +60℃, Coil hot condition
Minimum Operating Voltage: 70% or less of Coil Ratings	Operating Ambient Temperature: –25℃, Coil cold condition
Releasing Voltage: 10% or greater of Coil Ratings	Operating Ambient Temperature: +20℃, Coil cold condition

CONTACT RATINGS AND SPECIFICATIONS

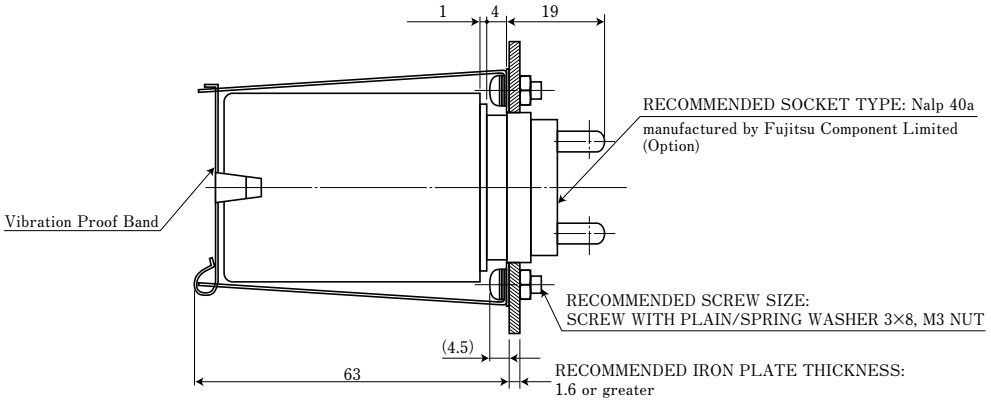
Type			RB3P-G21DC	RB3P-G30DC
Contact Arrangement			2NO1NC	3NO
Rated Insulation Voltage			250VAC (Power Frequency)	
Incorporated Bestact			R25	
Rated Continuous Current			2A	
Contact Performance			Refer to page 7.	
Operating Time Characteristics	Operating Time		NO contact: Approx. 7ms, NC contact: Approx. 10ms	
	Releasing Time		NO contact: Approx. 16ms, NC contact: Approx. 10ms	
Insulation Characteristics	Insulation Resistance		100MΩ or greater (with 500VAC Megger)	
	Withstand Voltage (Power Frequency)		1500VAC for 1 minute,Leakage Current: 5mA (Across Open Contacts: 500VAC)	
Vibration Characteristics			Refer to JIS E 4031 Annex JA Category 2 Class B	
Shock Characteristics			Refer to JIS E 4031 Annex JB Category 2 Class B	
Temperature Characteristics	Operating Temperature		−25 to +60℃	
	Storage		−40 to +60℃	
Enclosure			IP50 (Bestact should be visible from outside)	
Approx. Weight			110g	
Connecting Method			Recommended Socket Type: Nalp 40a manufactured by Fujitsu Component Limited	

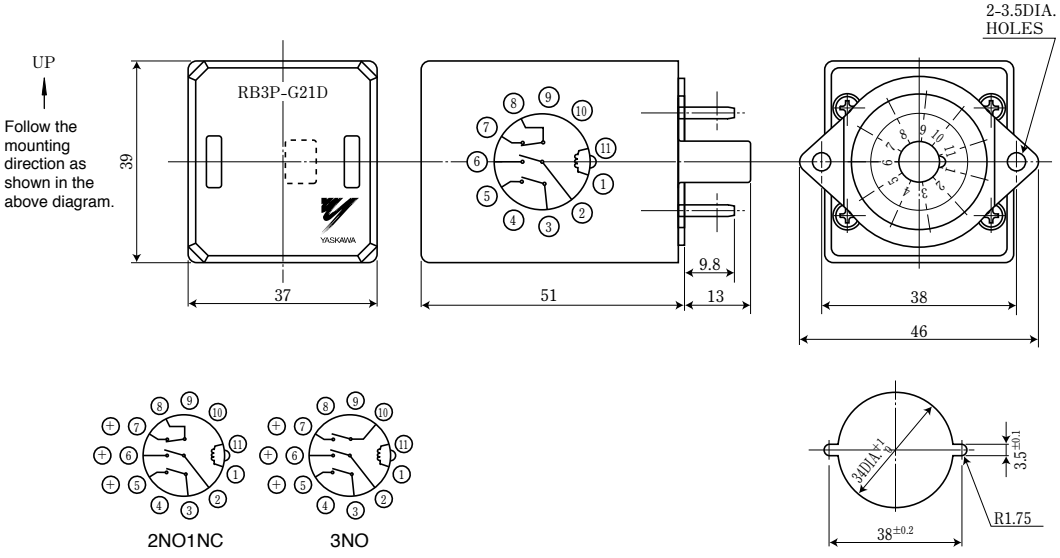
ELECTRICAL LIFE EXAMPLES WHEN APPLIED IN 100VDC CIRCUIT

Condition: Type VM13 valve load

No. of loads connected	Silicone varister connection	No. of Tested Samples	Operations and Test Result for Contact Life
Connected 3pcs in parallel 100VDC, 0.51A L/R=40ms Armature is sealed	Connected between loads	7	・Test was closed at 3,100,000 operations. ・Sticking failure: 4pcs, closing failure: 1pc ・B_{10} Life: B_{10} =1,200,000 operations. ・Shape parameter: friction failure of m =3.0
	Not connected	12	・Test was closed at 500,000 operations. ・Sticking failure: 1pc, closing failure: 5pcs ・B_{10} Life: B_{10} =160,000 operations. ・Shape parameter: friction failure of m =1.9
Connected 2pcs in parallel 100VDC, 0.34A L/R=40ms Armature is sealed	Connected between loads	10	・Test was closed at 3,080,000 operations. ・Sticking failure: 8pcs, closing failure: 2pcs ・B_{10} Life: B_{10} =1,470,000 operations. ・Shape parameter: friction failure of m =3.7
	Not connected	10	・Test was closed at 3,470,000 operations. ・All failures result from sticking. ・B_{10} Life: B_{10} =850,000 operations. ・Shape parameter: friction failure of m =2.9
1pc 100VDC, 0.17A L/R=40ms Armature is sealed	Connected between loads	3	・Test was closed at 6,000,000 operations. ・All failures result from sticking. ・B_{10} Life: B_{10} =3,700,000 operations. ・Shape parameter: friction failure of m =5.3
	Not connected	3	・Test was closed at 5,200,000 operations. ・All failures result from sticking. ・B_{10} Life: B_{10} =2,400,000 operations. ・Shape parameter: friction failure of m =3.3

DIMENSIONS in mm





Symbols and terminal markings (BOTTOM VIEW)

・When used in a DC circuits, connect terminal No.5, 6 and 7 to ⊕.

・Coils don't have polarity designation.

Panel diagram (Mounted from panel surface)

Minimum MTG intervals for relays: 50mm×45mm

Note: Vibration proof bands are available as option.

PLUG-IN TYPE MULTIPOLE RELAYS **Medium-Capacity Type:** RB4P-G□DC

RATINGS AND SPECIFICATIONS

1. Coil Specifications for Relays

Type		Coil Specifications (+20℃)	
2NO2NC	4NO	Rated Voltage	Power Consumption
RB4P-G22DC/D24	RB4P-G40DC/D24	24VDC	Approx. 2.5W
RB4P-G22DC/D50	RB4P-G40DC/D50	50VDC	Approx. 2.5W
RB4P-G22DC/D1H	RB4P-G40DC/D1H	100VDC	Approx. 1.9W

Note: 1. Coil specifications tabulated are the values at ambient temperature of 20℃.

2. Operating Characteristics

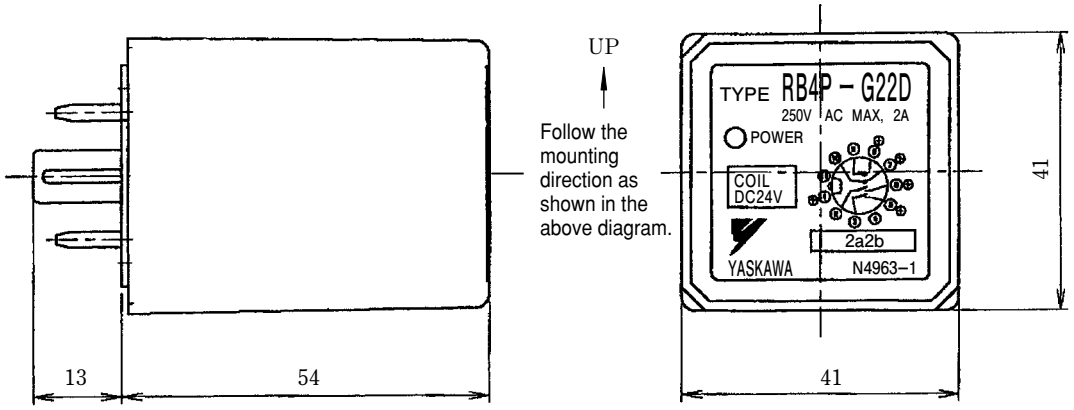
Operating Characteristics	Conditions
Operating Voltage: 70 to 110% of Coil Ratings	Operating Ambient Temperature: –25 to +60℃
Minimum Operating Voltage: 70% or less of Coil Ratings	Operating Ambient Temperature: +60℃, Coil hot condition
Minimum Operating Voltage: 70% or less of Coil Ratings	Operating Ambient Temperature: –25℃, Coil cold condition
Releasing Voltage: 10% or greater of Coil Ratings	Operating Ambient Temperature: +20℃, Coil cold condition

CONTACT RATINGS

Type		RB4P-G22DC	RB4P-G40DC
Contact Arrangement		2NO2NC	4NO
Rated Insulation Voltage		250VAC (Power Frequency)	
Incorporated Bestact		R25	
Rated Continuous Current		2A	
Other Contact Performance		Refer to page 7.	
Operating Time Characteristics	Operating Time	NO contact: 20ms or less, NC contact: 20ms or less	
	Releasing Time	NO contact: 20ms or less, NC contact: 20ms or less	
Insulation Characteristics	Insulation Resistance	100MΩ or greater (with 500VDC Megger)	
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)	
Vibration Characteristics*1		Refer to JIS E 4031 Annex JA Category 2 ClassB	
Shock Characteristics*1		Durability: 490m/s^2 {50G} 3 directions 3 times each Contact malfunction: 88.2m/s^2 {9G} 3 directions 3 times each	
Temperature Characteristics	Operating Temperature	–25 to +60℃	
	Storage	–40 to +60℃	
Enclosure		IP50 (Bestact should be visible from outside)	
Approx. Weight		150g	
Connecting Method		Recommended Socket Type: Nalp 40a manufactured by Fujitsu Component Limited	

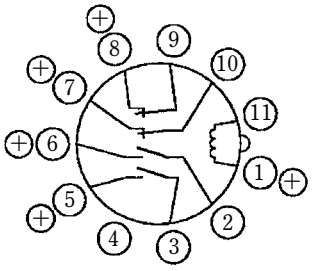
Note: ＊1. Vibration proof band is also available. For more information, contact Yaskawa.

DIMENSIONS in mm

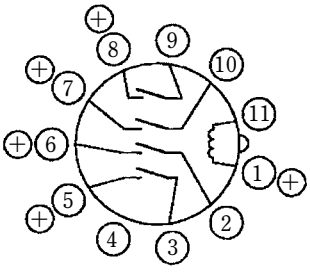


Relays Type and Contact Arrangement (Symbols and Terminal Markings: BOTTOM VIEW)

Type RB4P-G22D



Type RB4P-G40D



・Use coils and contacts according to the above polarity.

Bestact
HEAVY DUTY LIMIT SWITCHES

Spring Return Type PSKU-□R25C□
(Medium-Capacity type)

Maintained Type PIKU-□R25C□
(Medium-Capacity type)

High Reliability Superior to That of Non-Contact Type by Employing Double and Triple Barriers. Best Suited for Heavy Duty Application due to Outstanding Environmental Immunity.

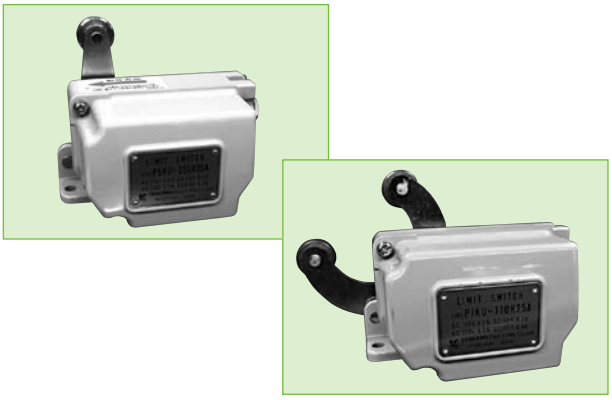
FEATURES

1. Complete floodtight and gas resistance:
Outstanding environmental immunity is assured by employing floodtight, corrosion-resistant construction and hermetically sealed contacts.

2. Long-term maintenance free:
The combination of the actuator with high mechanical strength and Bestact switch with high electrical reliability provides long-term maintenance-free operation.

3. Powerful contact:
Directly controls inductive load of 115VDC 0.3A without using any amplifying relay or protective circuit.

4. No contact chattering:
The switches are not ill-affected by operational shock or vibration by employing large actuator movement and enable simple electrical circuit design.



TYPICAL APPLICATIONS

Steel plant equipment, Large type transportation machinery, Material handling equipment and Cement producing equipment.

RATINGS AND SPECIFICATIONS

Type of Actuation	Roller Lever	Cylindrical Roller Lever (Horizontal Mounting)	Cylindrical Roller Lever (Vertical Mounting)	Pull Lever	Pull Lever (Crane Drum Over-Winding Protection)	Fork Lever	Pull Lever (One Direction Pull)
Type*1	PSKU-＊R25C	PSKU-＊R25CB	PSKU-＊R25CV	PSKU-＊R25CE	PSKU-＊R25CO	PIKU-＊R25C□	PIKU-＊R25CE
Switch Action	Spring return					Maintained	
Incorporated Bestact	R25						
Contact Arrangement Available	2NO 1NO1NC 2NC	2NO, 1NO1NC, 2NC (1-way operation)				2NO *4 1NO1NC	2NO, 1NO1NC, 2NC (1-way operation)
Common Specifications	・Enclosure: Flood tight type (IP 56*7) ・Rated Insulation Voltage: 250VAC (Power Frequency) ・Insulation Resistance: 5MΩ or greater (with 500VDC Megger) ・Withstand Voltage (Power Frequency) 1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC) ・Operating Temperature: −10 to +80℃ (without freezing) ・Maximum recommended speed of actuation: 100m/min*5・6 ・Operating Frequency: 1200 times/hour ・Mechanical Life: 5,000,000 operations or greater ・Lead-in method: PF 1/2 (13 diameter hole) Refer to page 7 for Contact performance.						

Note: ＊1. Types with ＊ such as PSKU-＊R25C can vary depending on the contact arrangement.
2NO: 200 2NC: 020 1NO1NC: 110
2. Do not change of NO contact to NC contact.
3. For DC circuit, connect odd-numbered terminals to ⊕ and even-numbered terminals to ⊖ .
＊4. When contact arrangement is 2NO, specify the operating direction. If it should turn on in clockwise operation, specify “R” in the square, in counter clockwise operation, specify “L”.
＊5. Type PSKU-＊R25CO for crane drum over-winding protection doesn't have speed restriction. However, after the contact is turned off, effective measures should be taken to prevent the effect of accidental turning on due to shock or vibration.
＊6. As for type PIKU-＊R25C□, minimum operating speed can vary depending on operating conditions. For more information, contact Yaskawa.
＊7. Refer to page 59 for degrees of protection. These switches provide IP56 when they are wired, piped and mounted correctly. They cannot provide IP56 if they are not wired, piped and mounted correctly.

1. Notes for Use

⃠ RESTRICTION

(1) Do not use these products in places where condensation, corrosive gas and flammable gas are present.
(Failure to follow this instruction may result in electric shock, fire and explosion.)
(2) Do not modify/ rebuild products.
(Failure to follow this instruction may result in breakdown, fire and electric shock.)
(3) Do not add excessive force to levers.
(Failure to follow this instruction may result in breakdown and damage.)
(4) Do not exceed the range of ratings and specifications for these products.
(Failure to follow this instruction may result in fire, breakdown and electric shock.)

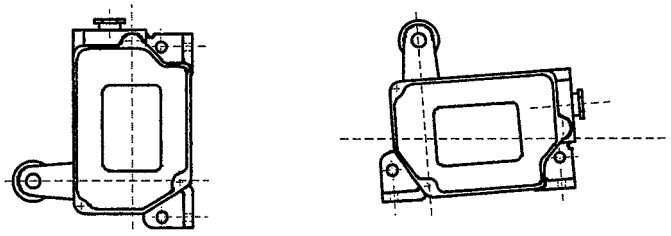
2. Notes for Installation

⃠ RESTRICTION

Products achieve IP56 when they are wired and piped correctly.
They cannot achieve IP56 if they are not wired and piped correctly.
Don't leave them in a place where they are exposed to ambient air, water and dust when they are only mounted and are not wired nor piped.
(Failure to follow this instruction may result in corrosion flood, breakdown and performance degradation.)
If they are mounted temporarily without wiring, make sure to give them waterproof and dustproof treatment such as waterproofing for the lead entrance and covering them with waterproof seats.

⚠ CAUTION

(1) Mount the products at flat and strong locations. Make sure to tighten mounting screws securely not to drop the products.
(Failure to follow this instruction may result in malfunction.)
(2) Do not hold moving parts such as levers when the products are carried.
(Failure to follow this instruction may result in damage and breakdown.)
(3) Do not mount them so that the lead entrance aims above horizontal. Read "Note for wiring" carefully before you wire them.
(Failure to follow this instruction may result in malfunction and breakdown due to water.)



Wrong Wrong

DIAGRAM 1 Mounting Directions

3. Notes for Wiring

⚠ WARNING

Before wiring, make sure that no electricity is supplied to the products.
(Failure to follow this instruction may result in electric shock.)

⚠ CAUTION

(1) Products achieve IP56 when they are wired and piped correctly.
They cannot achieve IP56 if they are not wired and piped correctly.
Make sure to tighten cover screws (adequate torque: approx. 3.92N・m (40kgf・cm)), cable gland and wire way after wiring and piping.
(Failure to follow this instruction may result in product malfunction due to water and dust.)
(2) Make sure that wires don't touch moving parts.
(Failure to follow this instruction may result in damaging wires.)
(3) Where they are used in a DC circuit, connect odd-numbered terminals to ⊕ and even-numbered terminals to ⊖.
(Failure to follow this instruction may result in malfunction, performance decrement, breakdown and fire.)
(4) Do not leave wire waste and screws in the products.
(Failure to follow this instruction may result in malfunction, performance decrement, breakdown and fire.)

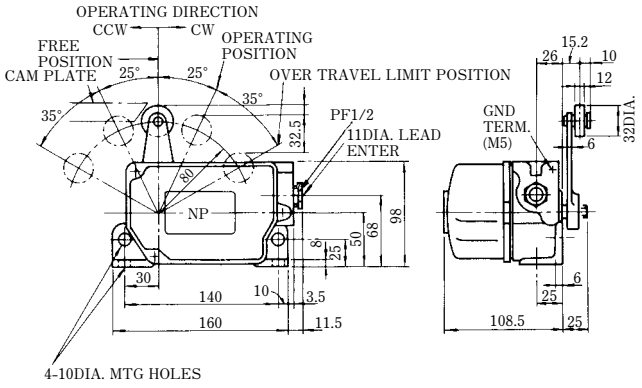
4. Notes for storage

⃠ RESTRICTION

Products achieve IP56 when they are wired and piped correctly.
They cannot achieve IP56 when they are stored. Do not store them in places where they are exposed to harmful gases/liquids, rain or ambient air.
(Failure to follow this instruction may result in corrosion, flood, breakdown and performance decrement.)

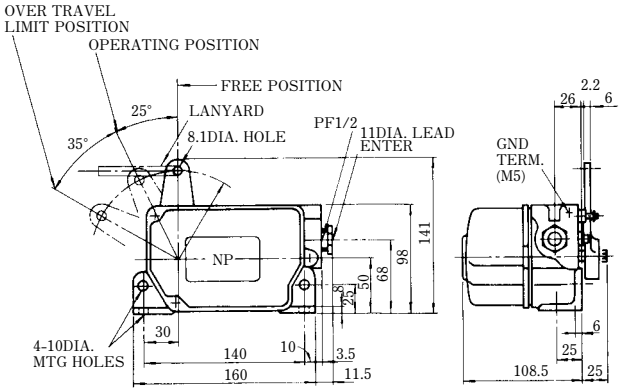
DIMENSIONS in mm

・Roller Lever Type PSKU-□R25C (Spring return)



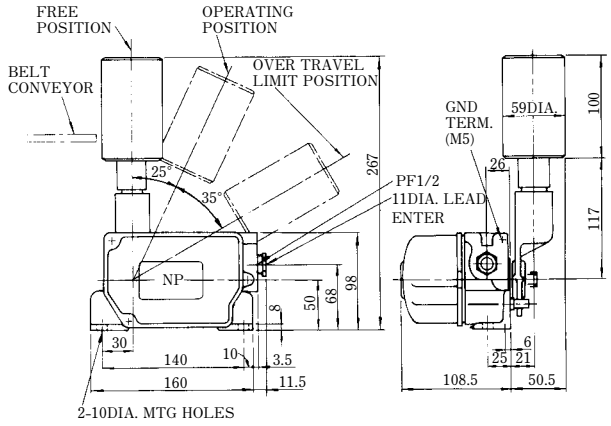
APPROX. WEIGHT: 2kg

・Pull Lever Type PSKU-□R25CE (Spring return)



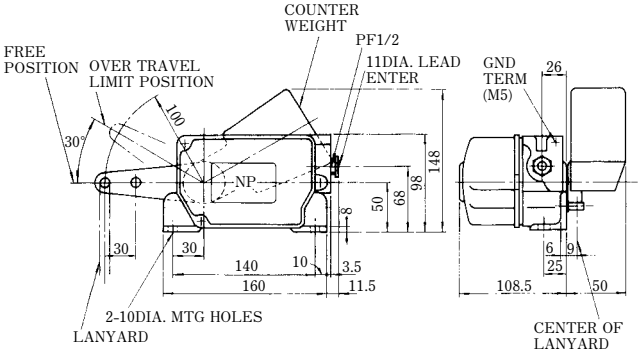
APPROX. WEIGHT: 2kg

・Cylindrical Roller Lever (Horizontal mounting) Type PSKU-□R25CB (Spring return)



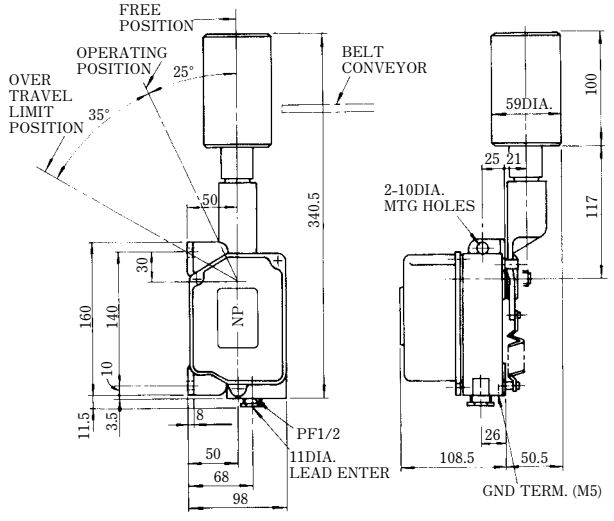
APPROX. WEIGHT: 4kg

・Pull Lever (Crane drum over-winding protection) Type PSKU-□R25CO (Spring return)



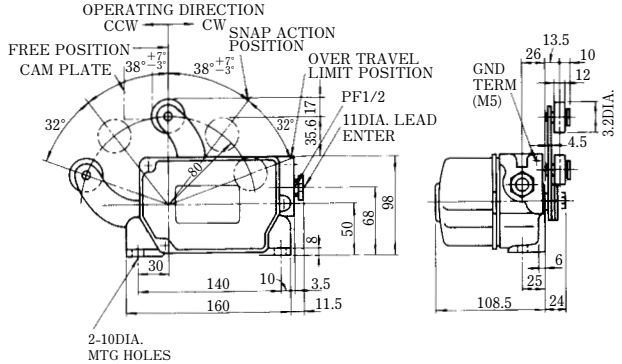
APPROX. WEIGHT: 5kg

・Cylindrical Roller Lever (Vertical mounting) Type PSKU-□R25CV (Spring return)



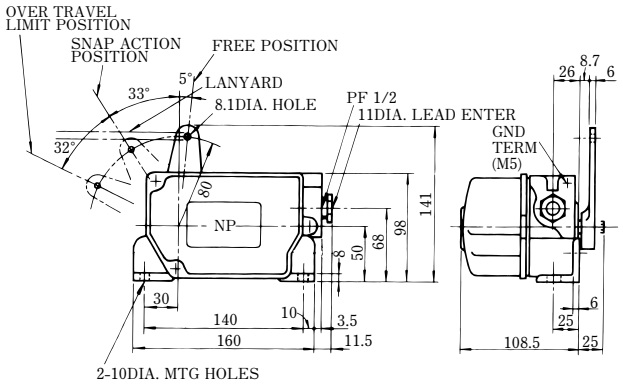
APPROX. WEIGHT: 4kg

・Roller Fork Lever Type PIKU-□R25C (Maintained)



APPROX. WEIGHT: 2kg

・**Pull Level (One direction pull)**
Type PIKU-□R25AE (Maintained)



APPROX. WEIGHT: 2kg

●DEGREES OF PROTECTION

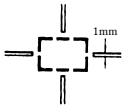
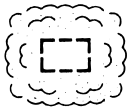
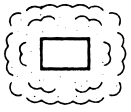
■**IEC** (International Electrotechnical Commission) **Standard: IEC60529**

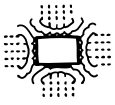
I P - □ □

International Protection

Protection of the equipment inside the enclosure against harmful ingress of water

Protection that the enclosure provides against access to hazardous parts and the ingress of solid foreign objects

Degree	Definition	
4		Wires or screws of thickness greater than 1.0mm. Solid objects exceeding 1.0mm in diameter.
5		Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment.
6		No ingress of dust

Degree	Definition	
0	Non-protected	No special protection
2		Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position.
3		Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect.
6		Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.
7		Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time.
8		The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer. Normally, this will mean that the equipment is hermetically sealed. However, with certain types of equipment, it can mean· that water can enter but only in such a manner that it produces no harmful effects.

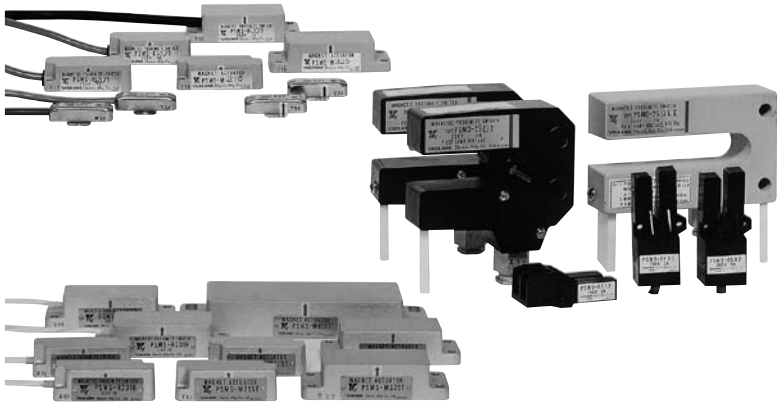
Bestact
MAGNETIC PROXIMITY SWITCHES

Vane Type PSMO
Separate Type PSMS
Memory Type PSMM
Column Type PSMS_RV□
Omnidirectional Sensor Type PSMT

A Wide Variety of Types Available to Meet Applications/Specifications for General Purpose, High Temperature, etc. The Two-Wire System Provides a Wide Power Range.

FEATURES

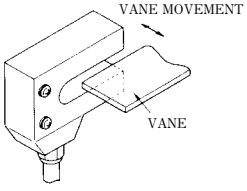
1. Completely sealed construction makes this switch best suited for adverse environments.
2. Direct control for loads of 100VDC or greater. No power supply or amplifying relay needed.
3. No protective circuit needed even for long cable wiring or inductive load.
4. No erroneous operation or breakdown due to noise and surge.
5. The contactless design assures a long service life and maintenance-free operation.
6. Economical proximity switches.



TYPES AND HOW TO USE

Magnetic proximity switches are usually classified into two types: an integrated type such as vane type and a separate type. Switch operation principle is described below.

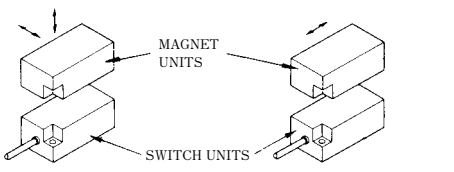
《Vane type》



Vane type

- Vane type switches detect materials without any physical contact. Materials enter into or pass by the groove of U-shaped structure. In general, the detected materials are made of flat shape and ferromagnetic materials such as iron plates.
- The switches provide high detecting accuracy even if the detected materials have play. They have only a few constrained conditions and very easy to use.

《Separate type》 (Memory type)



Separate type

- The switch unit is fixed, and the magnet unit is mounted on the moving object to be detected. Approach or passage of the magnet unit will be detected without contact.
- Separate type doesn't need any separately-mounted detecting unit. Moreover, one magnet unit can energize several switch units. Various detecting methods are available to match your specifications.

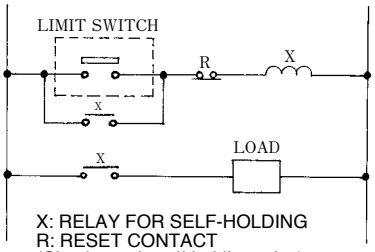
Magnet characteristics for Bestact Operation

In various detecting devices incorporating Bestact, Yaskawa selected and designed carefully the materrials that energize contacts to maintain long-term high operation accuracy.

- Permanent magnets used for Yaskawa's detecting devices are rare earth magnets and anisotropic ferrite magnets which have high coercive force and large energy product.
  Yaskawa designed the optimum magnet shapes and the magnets are highly stable without demagnetization.
- Demagnetization due to aging is 2% or less for a 10 year period.

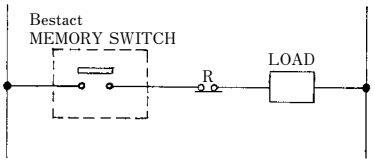
APPLICATION EXAMPLES

Circuit Example Using Conventional Limit Switch



X: RELAY FOR SELF-HOLDING
R: RESET CONTACT
(Circuit needs self-holding relay).

Circuit Example Using Bestact Memory Type Switch



(Logic circuit is simplified because no self-holding relays needed.)

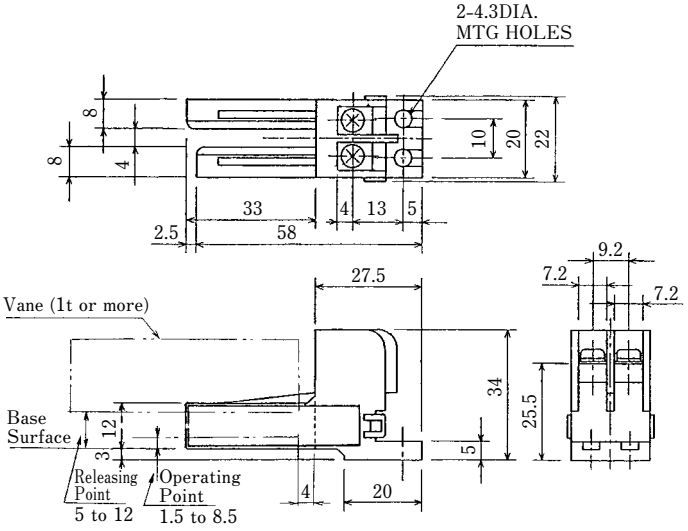
VANE TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMO-04G2

RATINGS AND SPECIFICATIONS

Type		PSMO-04G2
Contact Arrangement		1NO
Incorporated Bestact		R25
Rated Insulation Voltage		250VAC (Power Frequency)
Contact Performance		Refer to page 7.
Insulation Resistance		100MΩ or greater (with 500VDC Megger)
Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)
Vibration Resistance		9.8m/s^2 {1G}
Shock Resistance	Erroneous Operation	98m/s^2 {10G}
	Breakdown	980m/s^2 {100G}
Operating Temperature		−10 to +50℃
Connecting Terminal		Screw Size: 3.5×8(Screw With Plain/Spring Washer)

DIMENSIONS in mm



Note: When switche is used in a DC circuit, connect terminal 1 to ⊕ and number 2 to ⊖.

VANE TYPE MAGNETC PROXIMITY SWITCHES

Type PSMO-□G□ (Medium-Capacity)
Type PSMO-□E□ (Large-Capacity)

High Detecting Accuracy against Unstable Moving Materials and Easy to Use

- Can control circuits of 100VDC or greater without any power supply unit or amplifying relay
- No erroneous operation or circuit failure due to noise or surge
- Contactless design assures long service life and maintenance-free operation

RATINGS AND SPECIFICATIONS

・Medium-Capacity Type

Type	PSMO-25G1	PSMO-25G1T	PSMO-25G2	PSMO-25G2T
Groove Width mm	24	24	24	24
Groove Depth mm	52	52	52	52
Contact Arrangement	1NO	1NO	1NC	1NC
Incorporated Bestact	R25	R25	R25	R25
Enclosure*1	IP50	IP67	IP50	IP67
Common Ratings and Specifications	・Operating Temperature: –10 to +50℃ ・Storage Temperature: –25 to +70℃ ・Rated Insulation Voltage: 250VAC (Power Frequency) ・Insulation Resistance: 5MΩ or greater (with 500VDC Megger) ・Withstand Voltage (Power Frequency): 1500VAC for 1 minute*3 , Leakage Current: 5mA (Across Open Contacts: 500VAC)		・With Indicating Lamp, available on order. (For 100 or 200V only)*2 ・Cable: 0.75mm² 2 conductors 1m long. (Dustproof type IP 50 without lamp: 2.5m long) ・Standord Vane Detected mm: t1.6×60×100 (t1.2 or greater) Refer to page 7 for Contact Performance.	

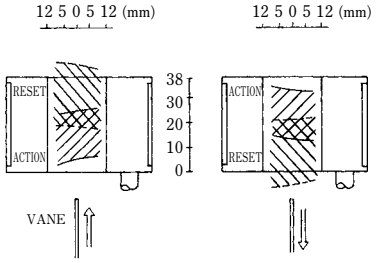
Note: ＊1. Refer to page 59 for Degrees of Protection.
＊2. Models with indicating lamps have the following symbol.
PSMO-25G1T/L□
4: For 100V
5: For 200V
＊3. Except for the model with an indicating lamp.

・Large-Capacity Type

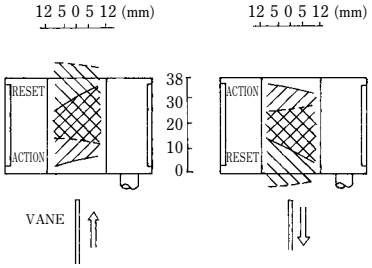
Type	PSMO-05E2*1	PSMO-25E1*1	PSMO-25E2*1	PSMO-25E1T	PSMO-25E2T
Groove Width mm	5	25	25	25	25
Groove Depth mm	36	90	90	120	120
Contact Arrangement	1NC	1NO	1NC	1NO	1NC
Incorporated Bestact	R15	R15	R15	R15	R15
Connecting Method	Screw terminal or cable (1m)	Screw terminal or cable (1m)	Screw terminal or cable (1m)	Cable (2m)	Cable (2m)
Standard Vane Detected*2 mm	t1.6×15×45	t2.3×50×100	t2.3×50×100	t2.3×50×135	t2.3×50×135
Common Ratings and Specifications	・Enclosure: Waterproof type IP 67*3 ・Operating Temperature: –10 to +80℃ (with cable: –10 to +60℃) ・Storage Temperature: –25 to +70℃ ・Switching Frequency: 3600 times/hour (7200 times/hour*4) ・Rated Insulation Voltage: 250VAC (Power Frequency) ・Insulation Resistance: 5MΩ or greater (with 500VDC Megger)		・Withstand Voltage (Power Frequency): 1500VAC for 1 minute*5, Leakage Current: 5mA (Across Open Contacts: 800VAC) ・With an Indicating Lamp, available on order. (For type PSMO-25, 100 or 200V only)*6 ・Cable: 1.25mm² 2 conductors. Refer to page 7 for Contact Performance.		

Note: ＊1. Models with cables have suffix “P” in type names.
<Example> PSMO-05E2/P
＊2. Vane size of ferromagnetic structural iron plate.
＊3. Screw terminal of type PSMO-05E2 cannot be used as waterproof type since the screw terminal is exposed.
＊4. Only applicable for light loads such as power relays.
＊5. Except for the models with indicating lamps.
＊6. Models with indicating lamps has the following symbol.
PSMO-25E1/PL□
4: For 100V
5: For 200V

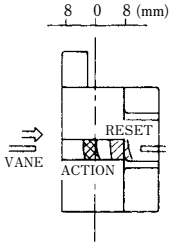
OPERATING CHARACTERISTICS



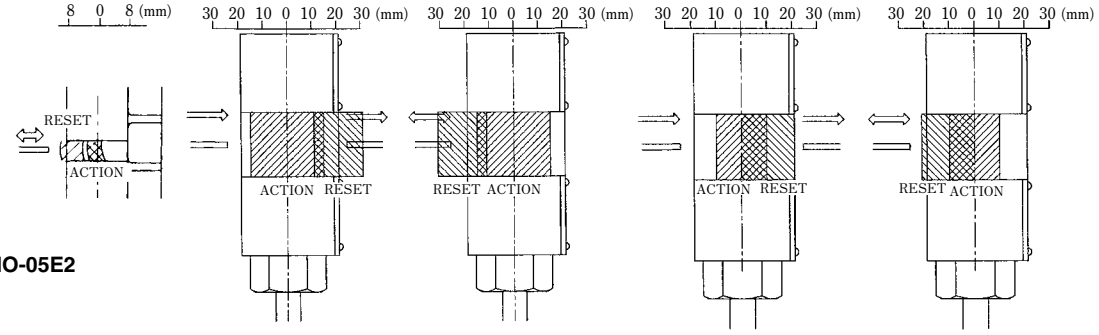
Type PSMO-25G1



Type PSMO-25G2



Type PSMO-05E2



Type PSMO-25E1, -25E1T, and -25E1TH

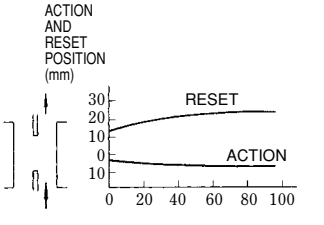
Type PSMO-25E2, -25E2T, and -25E2TH

Note: 1. ⟹ : Pass-through detection type
⟺ : Type that returns to the original position after operation.
2. When a vane moves from the right, the operating characteristics are axisymmetric to the above characteristics.
3. Action and reset range shown above indicates the difference of each switch. However, this is not the difference of each operation at repetitive detections. Repetitive detecting accuracy is ±0.2mm.

INFLUENCE BY ENVIRONMENTAL CONDITIONS

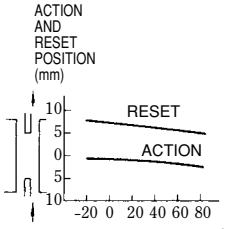
- **Operating characteristics when iron particles are adhered**

Adhesion of iron particles (60g) (If iron particles are adhered as shown in this picture, influence is only a little bit.)

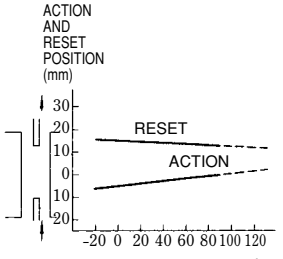


Example of Type PSMO-25E1

- **Ambient temperature and operating characteristics**

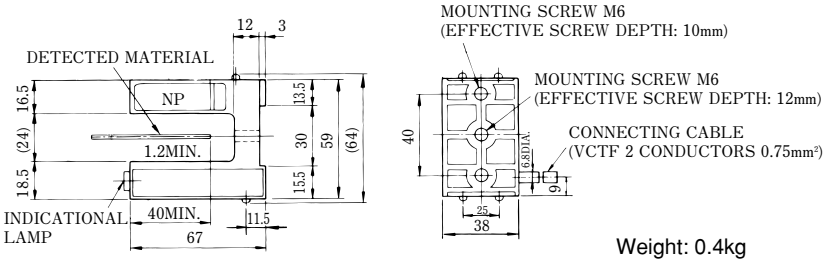


Type PSMO-05E2



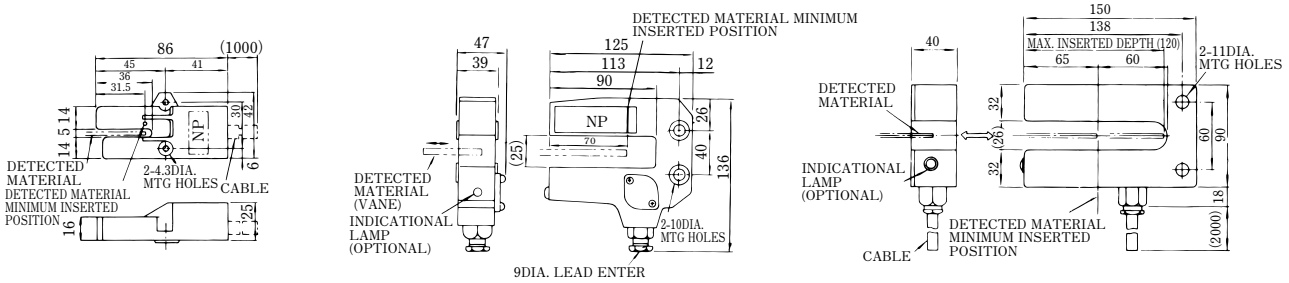
Type PSMO-25E1, -25E1T (-25E1TH)

DIMENSIONS in mm



Weight: 0.4kg

Type PSMO-25G□□



Weight: 0.7kg

Type PSMO-05E2

Weight: 0.8kg

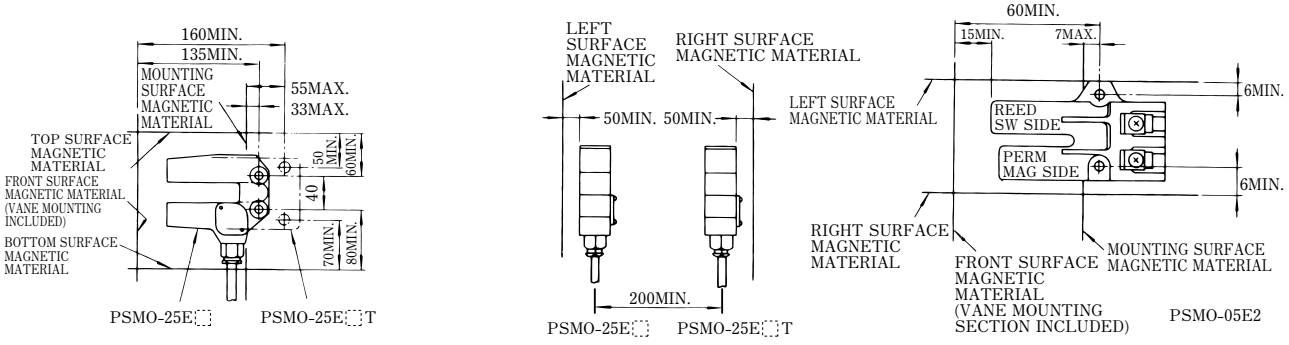
Type PSMO-25E□

Weight: 1kg

Type PSMO-25E□T

HOW TO USE

(1) Mounting on magnetic materials Where the magnetic materials are outside of the range as illustrated below, normal switch operation should occur.



(2) Vane configuration

Standerd vane size should be bigger than shoown in ratings and specifications on page62. Insertion depth of the vane should be at least beyond the red line. The switch shouldn't contact the vane in the groove.

(3) Operation speed of vane

The faster the vane passes, the quicker the switch will operate. To assure the operating speed of 30ms or greater with the standard vane, use it at the following speeds.

- Types PSMO-25D1, -25D1T 100m/min or less
- Types PSMO-25D2, -25D2T 150m/min or less

For higher speeds than these, the vane should be wider. Minimum speed is not particularly limited.

(4) Mounting of more than one switch

When a mounting interval of type PSMO switches is larger than the above-mentioned allowable mounting dimension on magnetic materials, the normal operating function should not be affected.

(5) Connections of leads

When the switch is used in a DC circuit, connect a black lead wire of connection cable or terminal code 1 to ⊕ and a white lead wire or terminal code 2 to ⊖.

(6) Influence of external field

Use proper shielding when using in the vicinity of large external magnetic fields (near large power cables, magnet cranes, magnetic stirrers, etc. where leakage flux of 1 mT or greater exists) to avoid erroneous operation.

(7) Indicating lamp

When a indicating lamp is provided, leakage current should be in consideration.

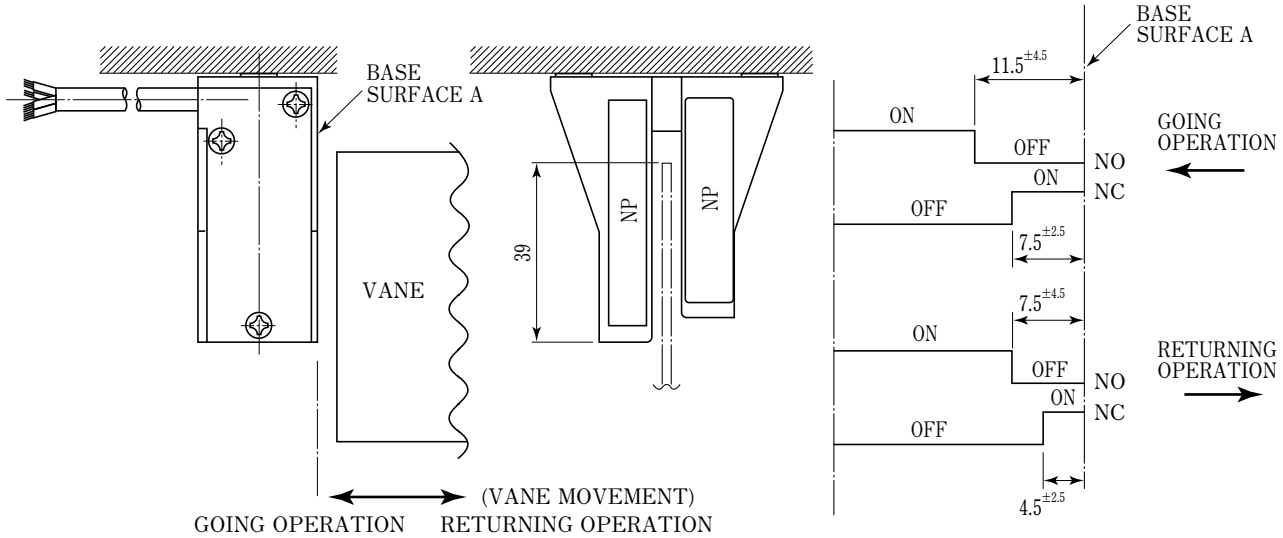
VANE TYPE MAGNETIC PROXIMITY SWITCHES Type PSMO-06G11J

2 outputs with 1NO1NC contact included while conventional vane type switches have only 1 output due to vane passage.
Can save mounting space and allow 2 different kinds of voltage circuits.
High contact reliability, best suited for use in an adverse environment.

FEATURES

- **Space saving**
  Incorporated 1NO1NC contact can save space. Optimum for rolling stock door interlock system.
- **Maintenance-free**
  Achieves high-frequency switching and long-term durability/ maintenance-free operation by employing a non-contact detection mechanism.
- **No protection circuit needed**
  No protection circuit needed unlike conventional reed switches.
  Free from sticking, achieves high durability for surge voltage and noise.
- **Total cost reduction**
  No power supply or amp needed unlike contact-less type.
  Makes the circuit simple and easy to use while providing significant cost reduction.

MOUNTING AND OPERATING CHARACTERISTICS



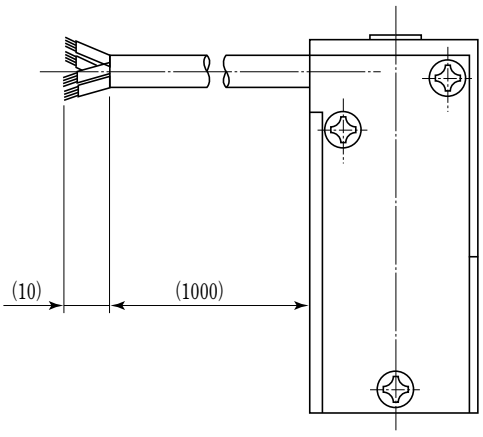
Recommended vane material: SPCC&SPHC (Magnetic material), Thickness: 1.2mm, width 50mm or greater
Recommended vane inserted depth: 39mm or greater

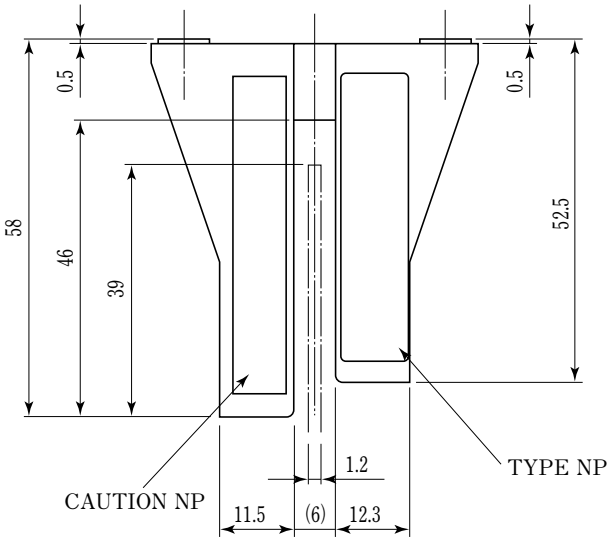
CONTACT RATINGS AND SPECIFICATIONS

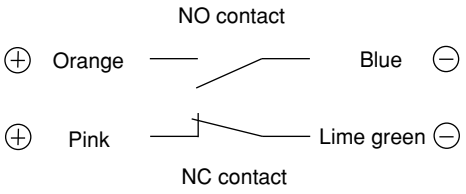
Type		PSMO-06G11J
Contact Arrangement		1NO1NC
Incorporated Bestact		R25
Rated Insulation Voltage		250VAC (Power Frequency)
Contact Performance		Refer to page 7.
Insulation Characteristics	Insulation Resistance	100MΩ or greater (with 500VDC Megger)
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)
Vibration Malfunction		10 to 240Hz, 19.6m/s^2 {2G} (Double Amplitude) 3 directions
Withstand Vibration		Refer to JIS E 4031 Annex JA Category 2 Class B
Shock Malfunction		59m/s^2 {6G} 3 directions
Dropping Shock		Refer to JIS E 4031 Annex JA Category 2 Class B
Operating Ambient temperature		−10 to +50℃
Cable		UL 2464 4 conductors cable (A WG 20) 1m

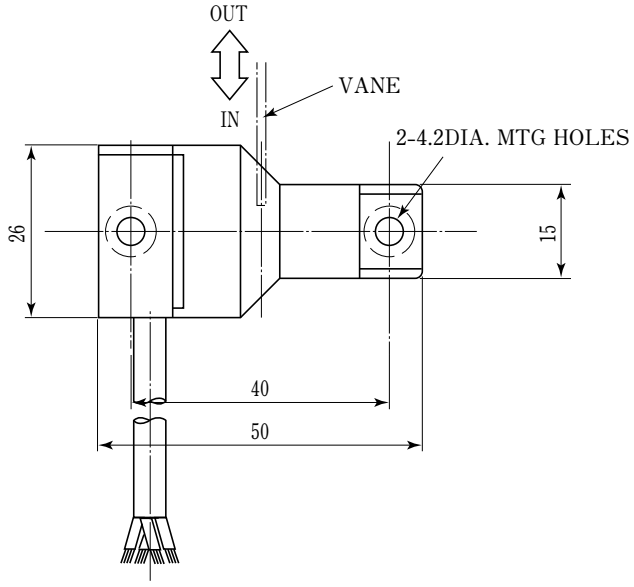
Note: 1. Degrees of protection is dust-proof type (standard). Contact Yaskawa for waterproof type (IP67).

DIMENSIONS in mm









Contact	Cable color	Connecting Wires in DC circuit
NO	Orange	⊕
	Blue	⊖
NC	Pink	⊕
	Lime green	⊖

・Recommended Insertion Depth: 39mm or greater

HIGH-PRECISION VANE TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMO-15G□
(Medium-capacity)

Easy Adjustment for Stop Levelling of Hydraulic Low-Speed Elevators. This High-Precision Products provide Adjustment-Free Operation.

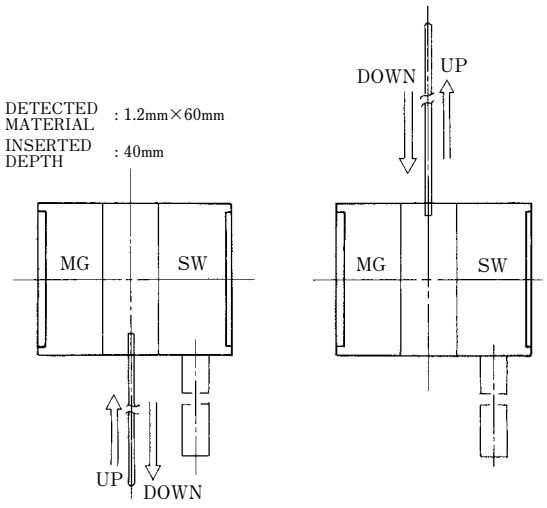
RATINGS AND SPECIFICATIONS

Type		PSMO-15G1	PSMO-15G2	PSMO-15G2S	PSMO-15G1T	PSMO-15G2T
Contact Arrangement		1NO	1NC	1NC	1NO	1NC
Incorporated Bestact		R25	R25	R25	R25	R25
Operating Characteristics (mm) *1	UP-ON	9 to 20	20 to 29	20 to 29	9 to 20	20 to 29
	UP-OFF	26 to 35	14 to 24	—	26 to 35	14 to 24
	DOWN-ON	18 to 29	9 to 18	9 to 18	18 to 29	9 to 18
	DOWN-OFF	3 to 12	14 to 24	—	3 to 12	14 to 24
	Response *2	12 or less	12 or less	6 or less	12 or less	12 or less
Enclosure *3		Dust-proof type IP50			Waterproof type IP67	
Common Ratings and Specifications		・Operating temperature: –10 to +50℃ ・Storage temperature: –25 to +70℃ ・Rated Insulation Voltage: 250VAC (Power Frequency) ・Insulation Resistance: 5MΩ or greater (with 500VDC Megger) ・Withstand Voltage (Power Frequency): 1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC) ・Cable: 0.75mm² 2 conductors 1m long.			Refer to page 7 for Contact Performance.	

Note: ＊1. Operating characteristics are nearly symmetric to vane passage direction (vertical).
Values tabulated are the ones at insertion depth of 40mm.
＊2. Response shows the difference between the operating point and releasing point (absolute value) as shown in figure below.

(1) After the switch is operated in UP direction, it is released in DOWN direction.

(2) After the switch is operated in DOWN direction, it is released in UP direction.



TYPICAL APPLICATIONS

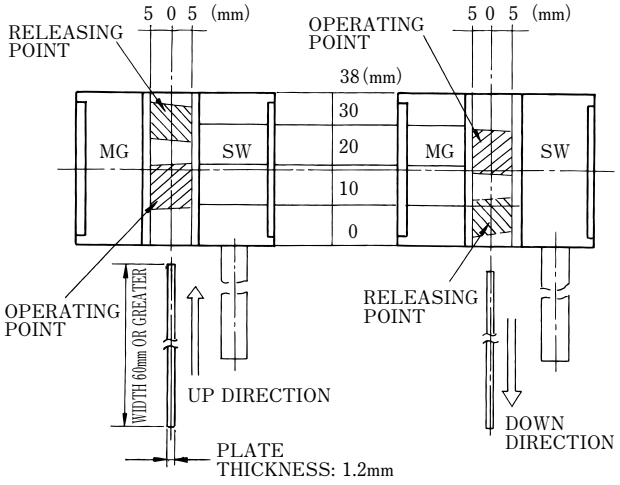
Stop level detecting switches and door-open command switches for passenger and freight elevators, stop level detecting switches for vertical parking garages, passage point detecting switches for transport machineries and passage detector switches for general industrial machineries.

＊3. Refer to page 59 for degrees of protection.
4. Ultra-high precision products with even narrower operational range are also available. For details, contact Yaskawa.

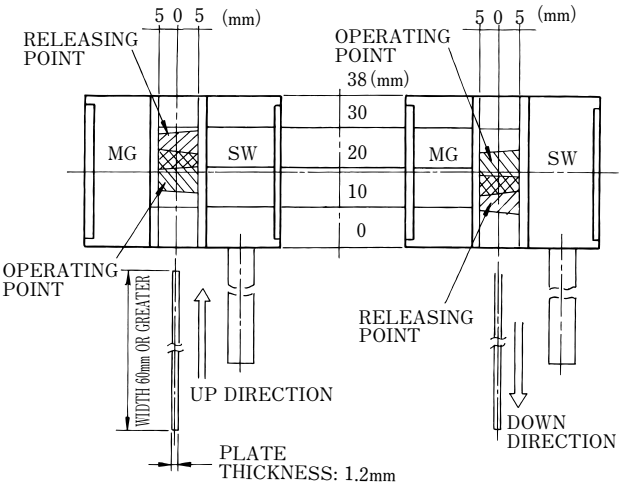
OPERATING CHARACTERISTICS

(Actuating range when the vane passes through in a horizontal direction at insertion depth of 40mm.)

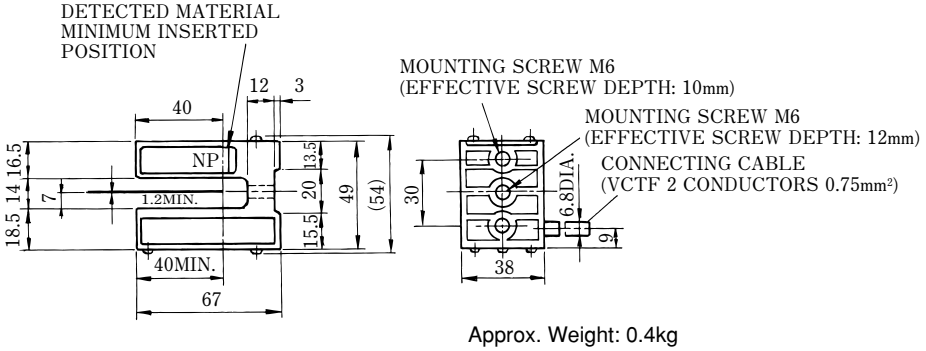
・Type PSMO-15G1□



・Type PSMO-15G2□



DIMENSIONS in mm



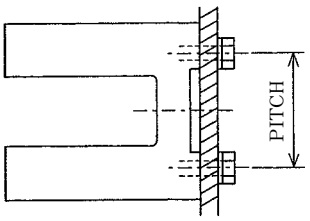
Approx. Weight: 0.4kg

Note: 1. This switch operates by passage of magnetic materials. Provide insertion depth of 40mm or greater.
2. When the switch is used in a DC circuit, connect the black lead to ⊕ and the white lead to ⊖.

NOTE FOR INSTALLATION

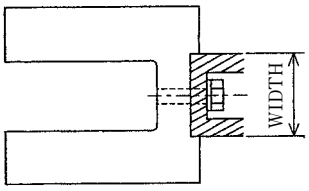
⚠CAUTION

●MTG screw torque for M6 must be 3.2 to 3.9 (N・m) {33 to 40 (kgf・cm)}



PSMO-15 Series:
30mm Pitch

Use two screws for mounting when mounting surface is flat.
Effective screw depth is 10mm.

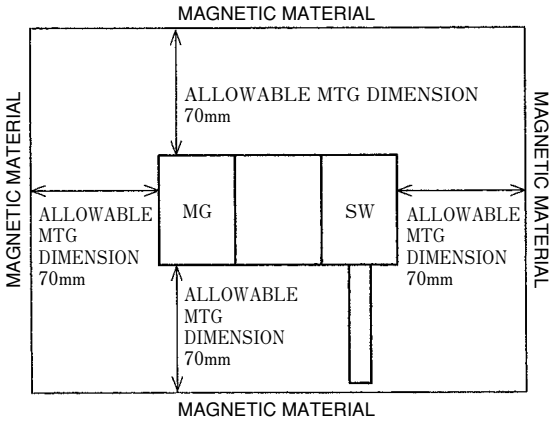


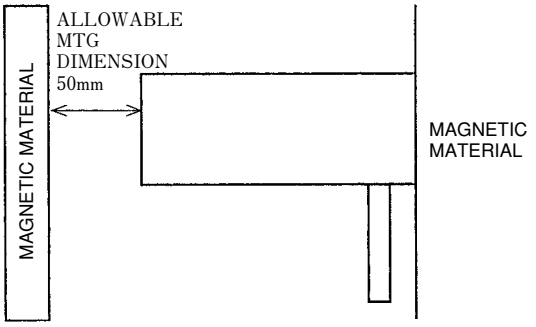
PSMO-15 Series:
20mm Width

Only one screw is needed for mounting when attachment (20mm width) is used.
Effective screw depth is 12mm.

⚠CAUTION

●Allowable mounting dimension for magnetic material
Operational characteristic can be changed when magnetic material is too close to these switches. Magnetic material should be outside of the range as illustrated below.

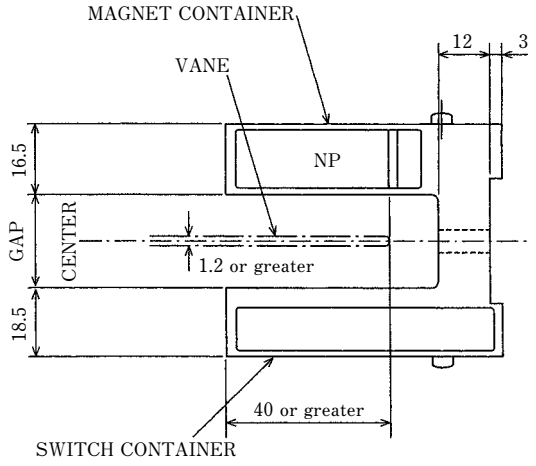




●Vane mounting
Vanes must be mounted securely so they will not contact the switches or be bent by permanent magnets incorporated in the switches.

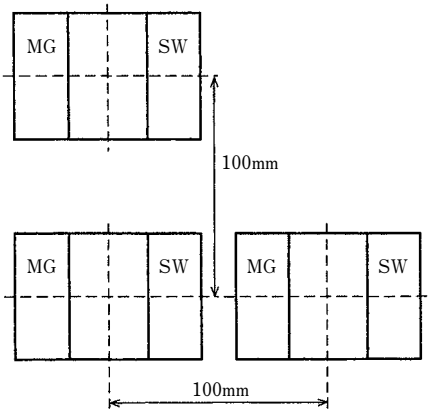
❗OBLIGATION

●Vane mounting position
Contacts incorporated in these switches operate and release by passage of vanes (Iron plates).
Use magnetic materials (Plate thickness: 1.2 to 2.3mm, Width: 60mm or greater) such as ferromagnetic structure iron plate.
The insertion depth in the detecting groove must be set further than the red line indicated on NP.



PSMO-15 SERIES: 14mm GAP

●Allowable mounting pitch
Allowable mounting pitch is 100mm or greater when more than one switch is mounted in parallel or multistage. (Operating characteristics can be changed. Confirm them after mounting.)



SEPARATE TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMS (Medium-capacity) (Large-capacity)

A Great Number of Combinations of Switch Units and Magnet Units Available to Set up an Best-Suited Detecting System

- Directly controls 100VDC or greater without any power supply unit or amplifying relay
- No erroneous operations or circuit failure due to noise and surge
- Contactless detection assures maintenance-free operation and long life

RATINGS AND SPECIFICATIONS

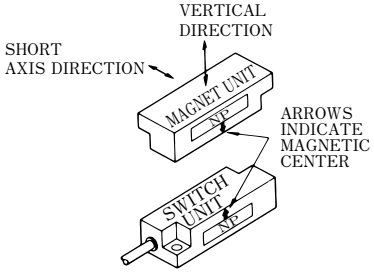
・Medium-Capacity Type

Type	Switch Unit	PSMS-R1G1
	Magnet Unit	PSMS-MP10
Rated Sensitive Distance mm		10
Maximum Sensitive Distance mm		10 to 12
Contact Arrangement		1NO
Incorporated Bestact		R25
Enclosure*1		Dustproof type IP50
Switching Frequency		3600 times/hour
Rated Insulation Voltage		250VAC (Power Frequency)
Contact Performance		Refer to page 7.
Insulation Resistance		5MΩ or greater (with 500VDC Megger)
Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)
Ambient Temperature	Operating Temperature	–10 to +60℃
	Storage	–25 to +80℃

Note: ＊1. Refer to page 59.

OPERATING METHOD

Two actuation directions of the magnet available to operate the switch.



● Short axis direction

Easy to mount and the most stable operating characteristics are assured.

● Vertical direction

Operating characteristics are stable. However, a special mounting method should be taken depending on the stop condition.

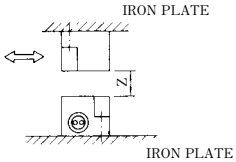
・Large-Capacity Type

Type	Switch Unit (Incorporated Bestact) *1	PSMS-R1E1	PSMS-R2E1	PSMS-R3E1	PSMS-R4E1	
	Magnet Unit	PSMS-M105	PSMS-M215	PSMS-M325	PSMS-M450	PSMS-MX70
Rated Sensitive Distance*2 mm		5	15	25	50	70
Maximum Sensitive Distance*3 mm		8 to 11	16 to 24	30 to 40	65 to 85	100 to 110
Common Ratings and Specifications*3		・Contact Arrangement: 1NO ・Enclosure: Waterproof type IP67*5 ・Operating Ambient Temperature: –10 to +60℃ ・Storage Ambient Temperature: –25 to +80℃ ・Rated Insulation Voltage: 250VAC (Power Frequency) ・Withstand Voltage (Power Frequency) 1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC) Refer to page 7 for Contact Performance.				

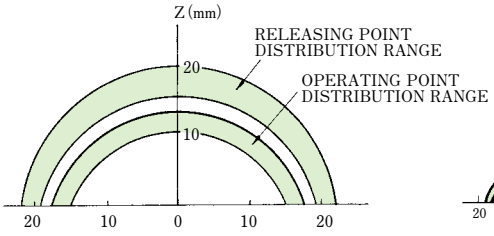
Note: ＊1. Incorporated Bestact type is R15
＊2. Detectable distance when both switches and magnet units are mounted on iron plates at ambient temperature of 20℃.
＊3. This shows the maximum interval between units when the switches are mounted on non-magnetic materials at 20℃. (Value range shows performance variation of each product but not the variation due to repetitive operations.)
4. Only switch units are equipped with a cable of 1 meter long.
＊5. Refer to page 59.

OPERATING CHARACTERISTICS

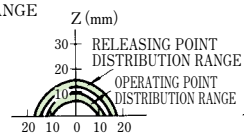
<Short axis direction, vertical stroke range>



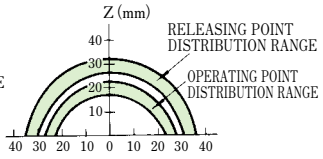
Detection in Short Axis Direction



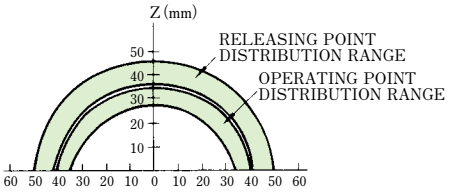
R1G1 AND MP10



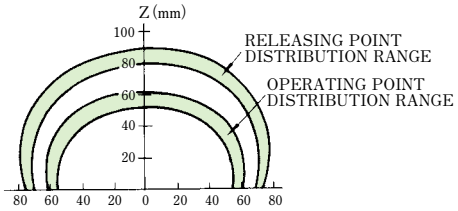
R1E1 AND M105



R2E1 AND M215



R3E1 AND M325

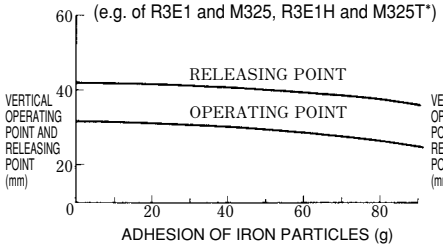


R4E1 AND M450

INFLUENCE BY ENVIRONMENTAL AND OPERATING CONDITIONS

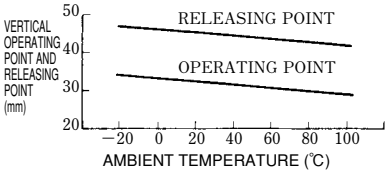
- **Operating characteristics when iron particles are adhered**

Adhesion of iron particles (30g)
(If iron particles are adhered as shown in this picture, influence is only a little bit.)



- **Ambient temperature and operating characteristics**

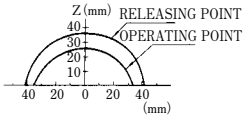
(e.g. of R3E1 and M325)



- **Comparison of performance when mounting on magnetic and non-magnetic materials**

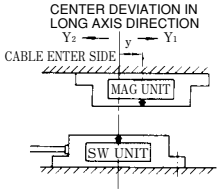
(e.g. of R3E1 and M325)

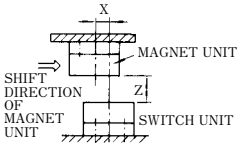
<IRON PLATE MOUNTING>
(BOTH SWITCH UNIT AND MAGNET UNIT)

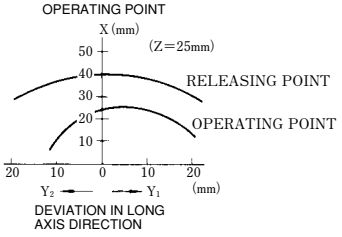


- **Influence by deviance in long axis direction during short axis movement**

(e.g. of R3E1 and M325, R3E1H and M325T*)

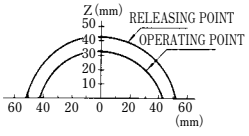






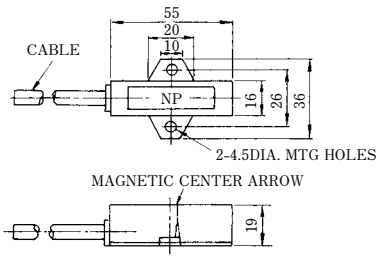
DEVIATION IN LONG AXIS DIRECTION

<NON-MAGNET MATERIAL MOUNTING>
(BOTH SWITCH UNIT AND MAGNET UNIT)



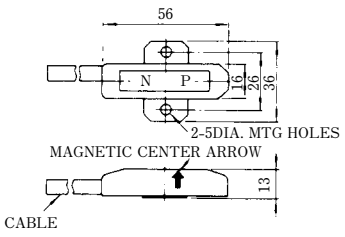
∗ Refer to page 77.

DIMENSIONS in mm



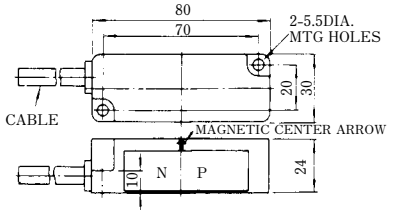
Weight: 0.08kg

Type PSMS-R1G1



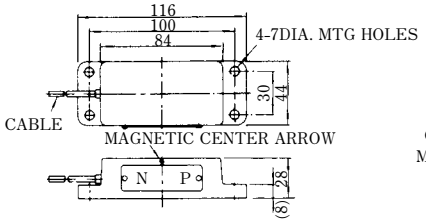
Weight: 0.13kg

Type PSMS-R1E1



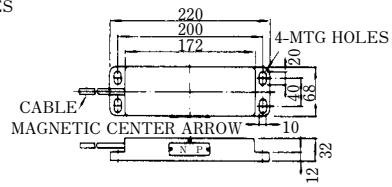
Weight: 0.22kg

Type PSMS-R2E1



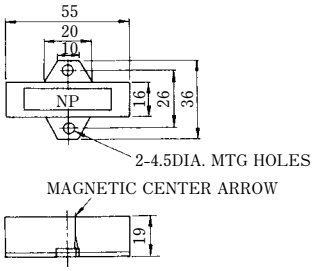
Weight: 0.35kg

Type PSMS-R3E1



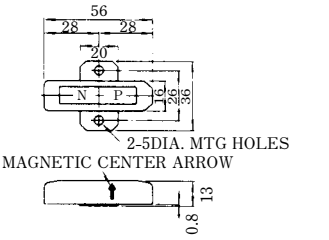
Weight: 0.9kg

Type PSMS-R4E1



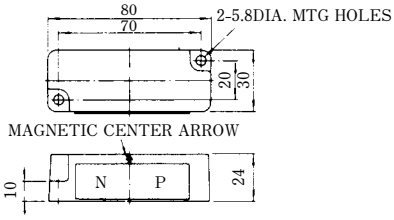
Weight: 0.04kg

Type PSMS-MP10



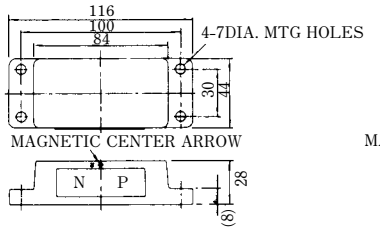
Weight: 0.03kg

Type PSMS-M105



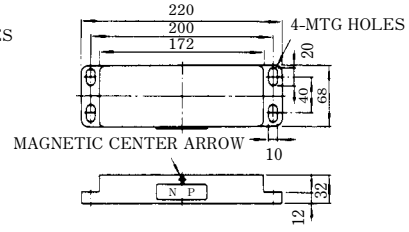
Weight: 0.16kg

Type PSMS-M215



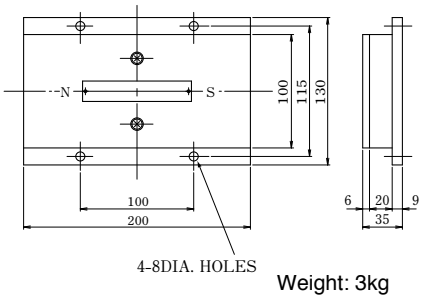
Weight: 0.45kg

Type PSMS-M325



Weight: 1.4kg

Type PSMS-M450



Weight: 3kg

Type PSMS-MX70

HOW TO USE

● Repetitive detection accuracy

If detecting distance does not vary after mounting the product, repetitive operation accuracy is within ±1mm at temperature change of ±20℃. When the detecting distance varies repetitively, the accuracy will also change.

● Allowable magnet unit speed of detected materials (at 20℃)

Operating Conditions		Allowable Magnet Unit Speed in Short Axis Direction (mm/s)
Type of Magnet Unit	Detecting Distance (mm)	
PSMS-M105	5	320 or less
PSMS-M215	15	625 or less
PSMS-M325	25	770 or less

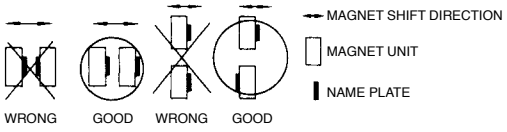
Note: 1. Values tabulated above are based on the switch unit ON time: 50ms.
2. When the speed is faster than above, mount the magnet units in parallel.

● Connection

When the switch is used in a DC circuit, connect the black lead wire to ⊕ terminal.

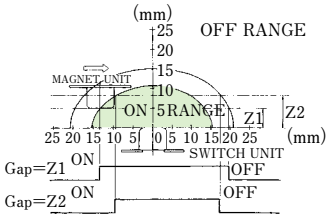
● Mounting

(1) Unit can even be mounted to flat magnetic materials such as iron plates. However, do not mount the units so that they are surrounded by magnetic materials.
(2) When mounting the units, align the magnetic center arrows each other to adjust the misalignment in long axis direction.
(3) There is no interference with each other if two or more switch units are mounted in parallel. Thus, it is possible to determine the required mounting pitch in combination for individual actuation range.
(4) When mounting two or more magnet units in parallel, follow the instruction illustrated below for the direction of magnet polarity (N or S). The nameplate are good indications for the direction.



● How to adjust the gap

The contact operates when the center of the magnet unit passes ON and OFF area.



MEMORY TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMM

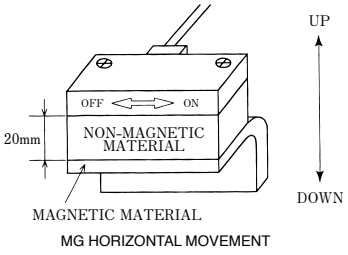
Self-Holding Type Magnetic Proximity Switches Make Sequencing Simple

RATINGS AND SPECIFICATIONS

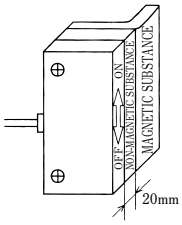
Type	Switch Unit	PSMM-RPE1U
	Magnet Unit	PSMM-MP15U
Incorporated Bestact		R15
Rated Sensitive Distance*1 mm		15 (when mounted on non-magnetic materials)
Operational Gap Range*1 mm		8～16 (when mounted on non-magnetic materials)
Enclosure*2		Drip-proof type IP52 (NEMA 2)
Shock Resistance*3 (malfumction)		98m/s² {10G}
Vibration Resistance*3 (malfumction)		49m/s² {5G} (10 to 55Hz)
Maximum Response Speed		200m/min
Rated Insulation Voltage		250VAC (Power Frequency)
Contact Performance		Refer to page 7.
Insulation Resistance		100MΩ or greater (with 500VDC Megger)
Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)
Ambient Temperature	Operating Temperature	–10 to +60℃
	Storage	–25 to +80℃

Note: ＊1. At ambient temperature of 20℃. Sensitive distance where ambient temperature T (℃) can be calculated by the following equation.
Sensitive distance (mm) = Rated sensitive distance × {1-0.0018 (T-20)}
＊2. Refer to page 59.
＊3. Values when the switch unit is mounted correctly on a non-magnetic material. These values can decline depending on a magnetic material and mounting direction.

MOUNTING

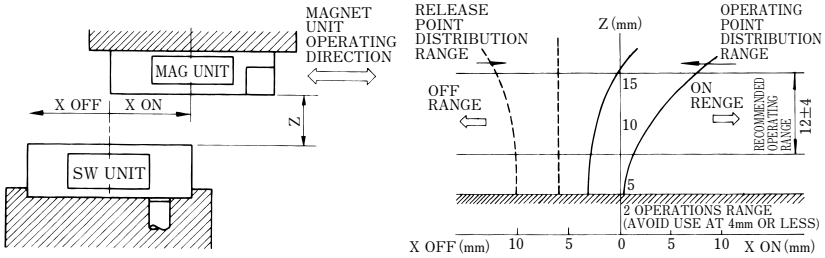


MG HORIZONTAL MOVEMENT



MG VERTICAL MOVEMENT

OPERATING CHARACTERISTICS

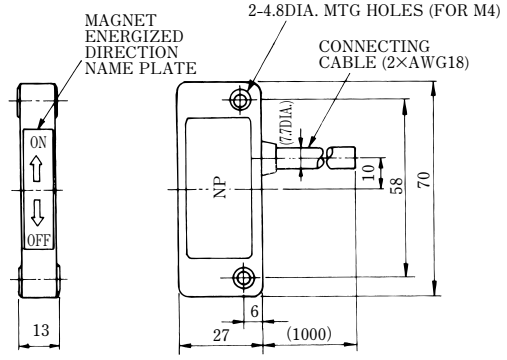


OPERATING METHOD

The magnet unit that switches the contact moves in long axis direction. When the magnet moves to ON side, the contact is turned on and maintained.

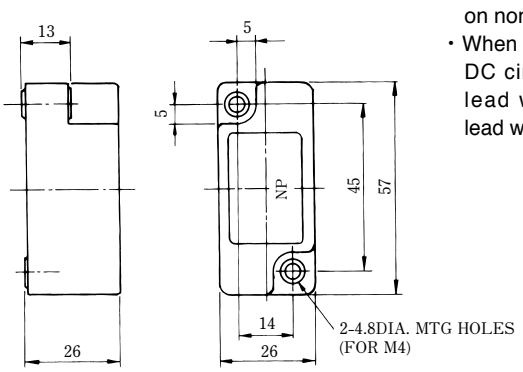
DIMENSIONS in mm

Type PSMM-RPE1U (Switch Unit)



Weight: 0.12kg

Type PSMM-MP15U (Magnet Unit)



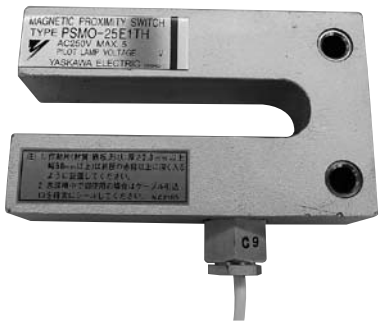
Weight: 0.1kg

- This unit should be mounted on non-magnetic materials.
- When the switch is used in a DC circuit, connect brown lead wire to ⊕, and blue lead wire to ⊖.

VANE TYPE HIGH-TEMPERATURE-USE MAGNETIC PROXIMITY SWITCHES

Type PSMO-H

Unsurpassed Performance at High Temperature, Humidity Atmosphere; Exceeding any Non-Contact Types. 130°C Continuous or 180°C for Short Time (10 Minutes or Less)



- Direct control of 100VDC or greater, no power supply unit or amplifying relay needed
- No erroneous operation or breakdown in circuit due to noise and surge
- Contactless design assures long service life and maintenance-free operation

RATINGS AND SPECIFICATIONS

Type		PSMO-25E1TH	PSMO-25E2TH
Contact Arrangement		1NO	1NC
Incorporated Bestact		R15	
Groove Width		25mm	
Groove Depth		120mm	
Enclosure*2		Flood tight type IP67*2	
Standard Vane Size		Structural iron plate (SPCC, etc.) t 2.3×50×135mm	
Ambient Temperature	Operating Temperature	–25 to +130℃	
	Storage	–40 to +150℃	
Rated Insulation Voltage		250VAC (Power Frequency)	
Contact Performance		Refer to page 7.	
Insulation Characteristics	Insulation Resistance	5MΩ or greater (with 500VDC Megger)	
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)	
Cable		Heatproof cable (4.6DIA. 0.75mm² 2 conductors) 3m long	

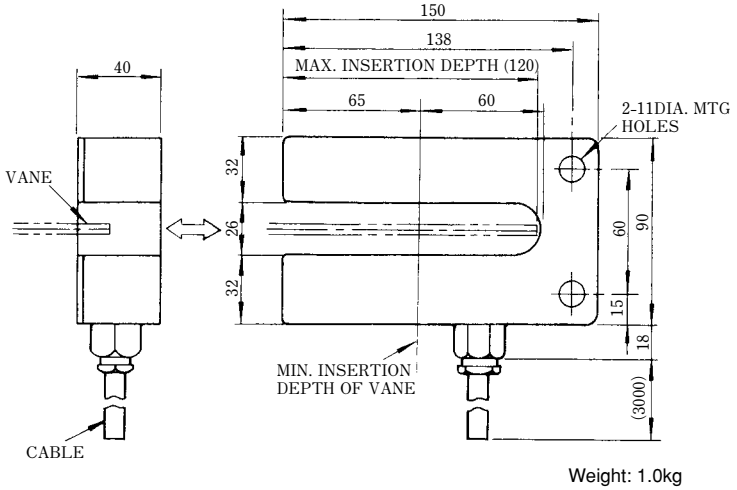
Note: 1. As for ratings and specifications other than tabulated above, refer to those of standard types on page 62.
*2. Refer to page 59.

TYPICAL APPLICATIONS

Continuous casting machines, coke ovens, converters, rolling mills, cement curing ovens, equipment in refrigerators.

DIMENSIONS in mm

- **Type PSMO-25E□TH**



Weight: 1.0kg

Influence of ambient temperature and compensation

Where temperature varies widely from the beginning and during operation, the actuating point and return point may change a little due to the thermal characteristics of the magnetic unit. Therefore, for applications requiring higher accuracy, compensate for the change before mounting.

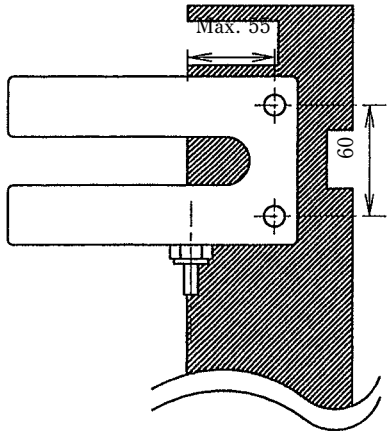
Connection

- When the switch is used in a DC circuit, connect black lead wire to ⊕, and white lead wire to ⊖.

NOTE FOR INSTALLATION

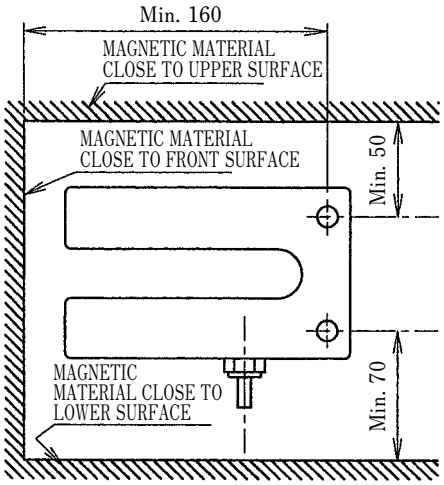
⚠CAUTION

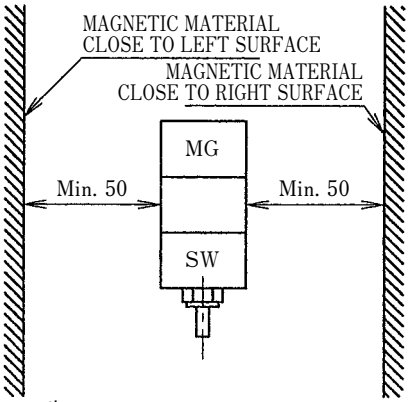
●Allowable mounting dimension for these switches.
These switches must be mounted with the center of the mounting holes less than 55mm from the edge of the mounting surface.



⚠CAUTION

●Allowable mounting dimension for magnetic material
Operating characteristics can be changed when magnetic material is approaching to these switches. Magnetic material should be outside of the range as illustrated below.

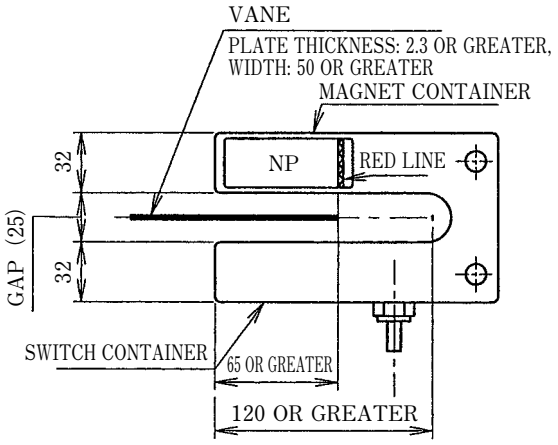




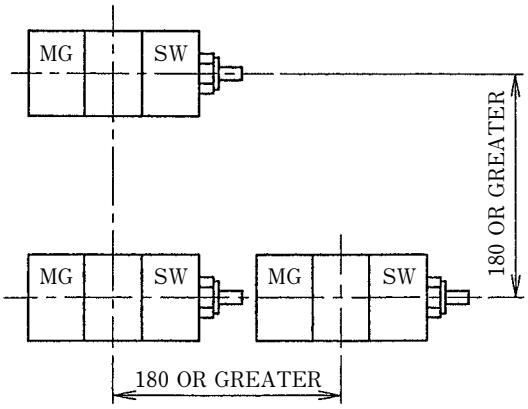
●Vane mounting
Vanes must be mounted securely so they will not contact the switches or be bent by permanent magnets incorporated in the switches.

❗OBLIGATION

●Vane mounting position
Contacts incorporated in these switches operate and release by passage of vanes (Iron plates).
Use magnetic materials (Plate thickness: 2.3mm or greater, Width: 50mm or greater) such as ferromagnetic structure iron plate.
The insertion depth in the detecting groove must be set further than the red line indicated on NP.



●Allowable mounting pitch
Allowable mounting pitch is 180mm or greater when more than one switch is mounted in parallel or multistage. (Operating characteristics can be changed. Confirm them after mounting.)



SEPARATE TYPE HIGH-TEMPERATURE-USE MAGNETIC PROXIMITY SWITCHES

Type PSMS-H, T

Designed for High Temperature, High Humidity Atmosphere; Exceeding any Non-Contact Types. Resistant to 130℃ for Continuous Duty or 180℃ for Short Time (10 Minutes or Less)

- Direct control of 100VDC or greater, no power supply unit or amplifying relay needed
- No erroneous operation or breakdown in circuit due to noise and surge
- Contactless design assures long service life and maintenance-free operation

RATINGS AND SPECIFICATIONS

Type					
Type	Switch Unit	PSMS-R2E1H	PSMS-R3E1H		
	Magnet Unit	PSMS-M215T	PSMS-M325T	PSMS-M450T	PSMS-MX70T
Rated Sensitive Distance*1 mm		15	25	50	70
Maximum Sensitive Distance*2 mm		16 to 24	30 to 40	65 to 80	100 to 110
Contact Arrangement		1NO			
Incorporated Bestact		R15			
Rated Insulation Voltage		250VAC (Power Frequency)			
Enclosure*4		Waterproof type IP67			
Insulation Characteristics	Insulation Resistance	5MΩ or greater (with 500VDC Megger)			
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute,Leakage Current: 5mA (Across Open Contacts: 800VAC)			
Ambient Temperature	Operating Temperature	–25 to +130℃			
	Storage	–40 to +150℃			
Cable		3m long heat-resistant cable (4.6mm outer dia, 0.75mm² 2 conductors)			

Note: ＊1. Detectable distance at ambient temperature of 20℃ when both the switches and the magnet units are mounted on iron plates. Setting gap where ambient temperature T (℃) can be calculated by the following equation.
Setting gap (mm) =Rated sensitive distance × {1-0.0018 (T-20) }
＊2. Maximum detectable distance when the switch is mounted on a non-magnetic material. (Value range shows performance variation of each product but not the variation due to repetitive operations.)
3. As for ratings and specifications other than tabulated above, refer to those of standard types on page 71.
＊4. Refer to page 59.

TYPICAL APPLICATIONS

Continuous casting machines, coke ovens, converters, rolling mills, cement curing ovens, equipment in refrigerators.

Influence of ambient temperature and compensation

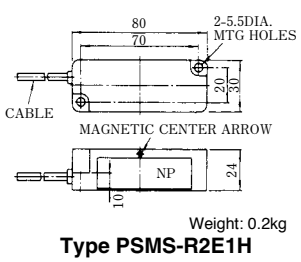
Where temperature varies widely from the beginning and during operation, the actuating point and return point may change a little due to the thermal characteristics of the magnetic unit.

For applications requiring higher accuracy, compensate for the change before mounting.

Connection

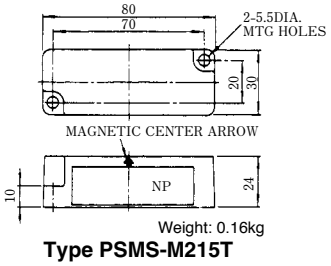
- When the switch is used a in DC circuit, connect black lead wire to ⊕, and white wire to ⊖.

DIMENSIONS in mm



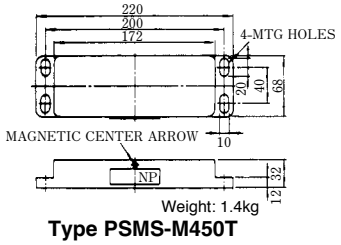
Weight: 0.2kg

Type PSMS-R2E1H



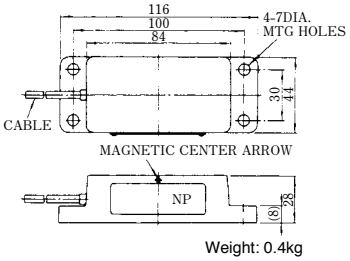
Weight: 0.16kg

Type PSMS-M215T



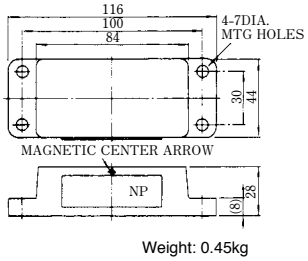
Weight: 1.4kg

Type PSMS-M450T



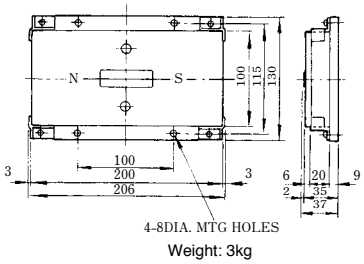
Weight: 0.4kg

Type PSMS-R3E1H



Weight: 0.45kg

Type PSMS-M325T



Weight: 3kg

Type PSMS-MX70T

MEMORY TYPE HIGH-TEMPERATURE-USE MAGNETIC PROXIMITY SWITCHES

Type PSMM-H, T

Stable Self-Holding Performance at High Temperature and Humid Atmosphere

- Resistant to continuous duty at 130℃
- Simplified sequence circuit with no external self-holding circuit needed.

RATINGS AND SPECIFICATIONS

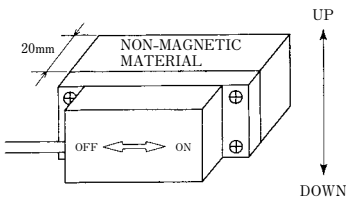
Type				
Type	Switch Unit	PSMM-R3E1H		
	Magnet Unit	PSMM-M325T	PSMM-M450T	PSMM-MX70T
Rated Sensitive Distance*1 mm		25	50	70
Operational Gap Range*1 mm		10 to 35	10 to 60	10 to 85
Incorporated Bestact		R15		
Rated Insulation Voltage		250VAC (Power Frequency)		
Ambient Temperature	Operating Temperature	–25 to +130℃		
	Storage	–40 to +150℃		
Enclosure*3		Waterproof type IP67		
Shock Resistance (Malfunction)*4		98m/s² {10G}		
Vibration Resistance (Malfunction)*4		48m/s² {5G} (10 to 55Hz)		
Maximum Response Speed		200m/min		
Insulation Resistance		5MΩ or greater (with 500VDC Megger)		
Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)		
Cable		3m long heat-resistant cable (4.6mm outer dia, 0.75mm² 2 conductors)		

Note: ＊1. Detectable distance at ambient temperature of 20℃ when both the switches and the magnet units are mounted on iron plates. Setting gap where ambient temperature T (℃) can be calculated by the following equation.
Setting gap (mm) =Rated sensitive distance × {1-0.0018 (T-20) }
2. As for ratings and specifications other than tabulated above, refer to standard types on page 74.
＊3. Refer to page 59.
＊4. Values when the switch unit is mounted correctly on a non-magnetic material.
These values can decline depending on mounting of a magnetic material and mounting direction.

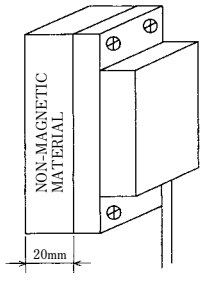
TYPICAL APPLICATIONS

Continuous casting machines, coke ovens, converters, rolling mills, cement cure ovens, equipment in refrigerators.

MOUNTING



MG HORIZONTAL MOVEMENT



MG VERTICAL MOVEMENT

Influence of ambient temperature and compensation

Where temperature varies widely from the beginning and during operation, the actuating point and return point may change a little due to the thermal characteristics of the magnetic unit.

For applications requiring higher accuracy, compensate for the change before mounting.

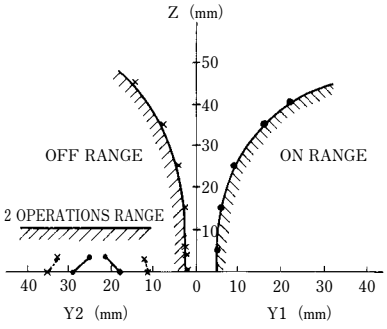
Connection and Mounting

- When the switch is used in a DC circuit, connect black lead wire to ⊕, and white wire to ⊖.

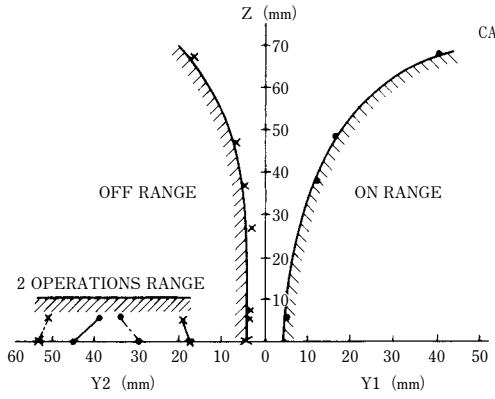
OPERATING CHARACTERISTICS

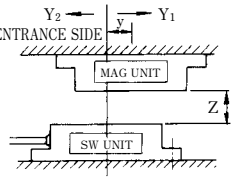
(The switch unit is mounted on a non-magnetic material, and the magnet unit is on a ferromagnetic material.)

(1) Type PSMM-M325T

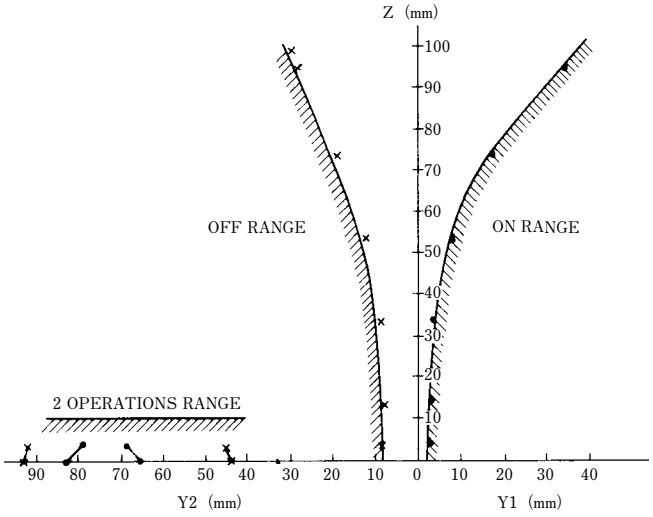


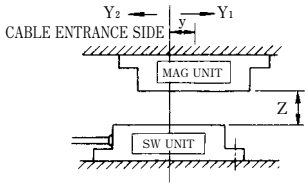
(2) Type PSMM-M450T





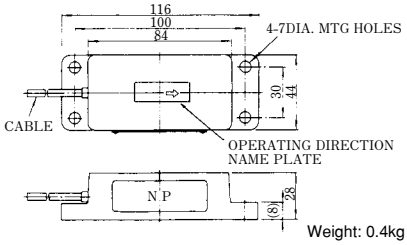
(3) Type PSMM-MX70T





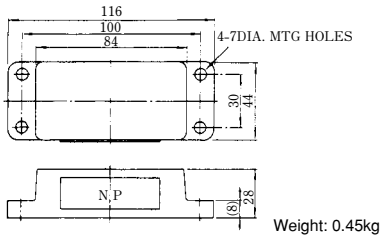
Note:
Shown here are typical examples. ON and OFF points vary depending on each product and mounting condition.
Where the switch unit is mounted on a ferromagnetic material, the operating characteristics may change.

DIMENSIONS in mm



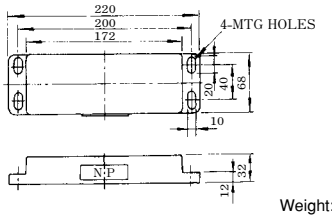
Weight: 0.4kg

Type PSMM-R3E1H



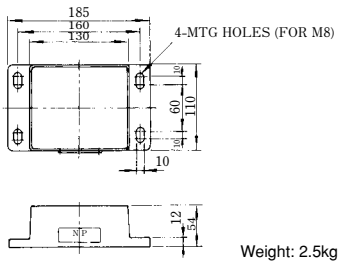
Weight: 0.45kg

Type PSMM-M325T



Weight: 1.6kg

Type PSMM-M450T



Weight: 2.5kg

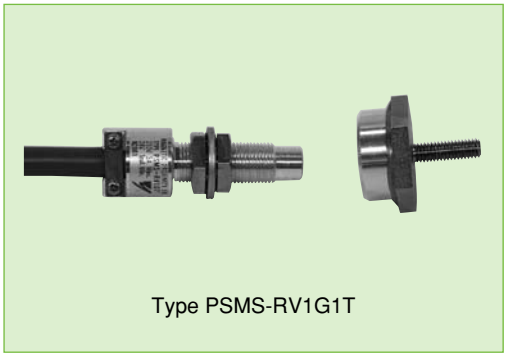
Type PSMM-MX70T

COLUMN TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMS-RV□

Superior Space/Cost Saving Performance Especially in High Temperature when Compared with Conventional Column Type Inductive Proximity Switches.

- Type PSMS-RV incorporating Bestact is best suited for position detectors in an adverse environment such as high temperature, high humidity or direct sunlight.
- Misalignment is allowed in all directions within the operating curve. The end user can adjust the mounting of the parts within the operating curve as needed.
- No power supply unit or amplifying relay needed.



Type PSMS-RV1G1T

RATINGS AND SPECIFICATIONS

Purpose			General Purpose	High Temperature			
Type	Switch Unit		PSMS-RV1G1T	PSMS-RV1G1TH	PSMS-RV3G1TH	PSMS-RV3G1THL	PSMS-RV4G1THL
	Magnet Unit		PSMS-MV10TH (M6 STUD) · PSMS-MV10THA (M8 SCREW)				
Rated Sensitive Distance (mm)			10				
Contact Arrangement			1NO				
Rated Insulation Voltage			250VAC (Power Frequency)				
Incorporated Bestact			R25				
Contact Performance			Refer to page 7.				
Characteristics	Vibration Resistance		49m/s^2 {5G} (16.7 to 1000Hz)				
	Shock Resistance	Erroneous Operation	98m/s^2 {10G}				
		Breakdown	980m/s^2 {100G}				
	Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)				
	Insulation Resistance		5MΩ or greater (with 500VDC Megger)				
Ambient Temperature		Operating Temperature	–10 to +60℃	–25 to +130℃			
		Storage	–20 to +80℃	–30 to +130℃			
Enclosure*			Waterproof type IP67				
Unit Case Material			Aluminum				
Switch Unit Cable			General Cable 1m long	Heatproof Cable 1m long			

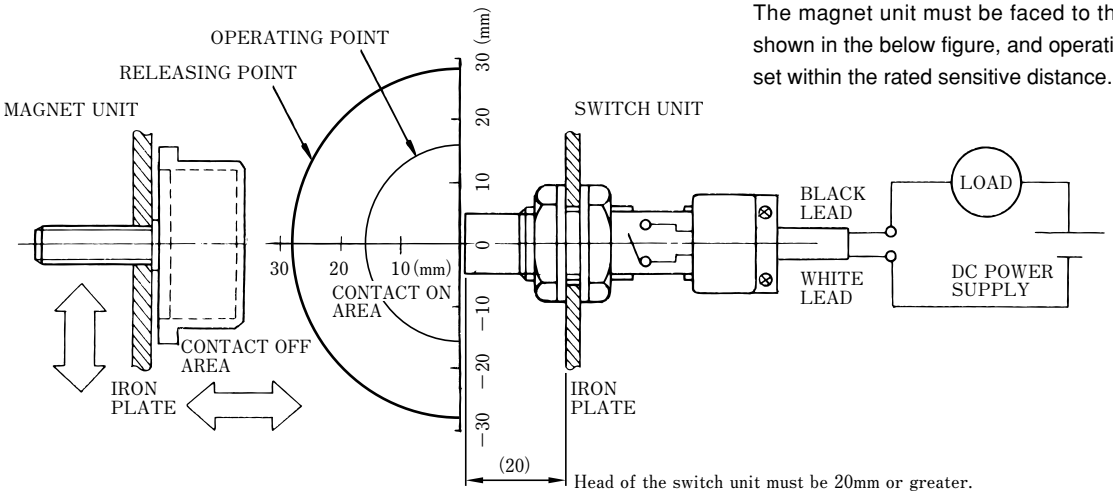
Note: * Refer to page 59.

TYPICAL APPLICATIONS

- Position detectors for an adverse atmosphere in steel plant/cement producing equipment
- Door-zone detectors for elevators
- Position detectors for escalators
- Position detectors for general industrial machinery like vertical parking garages
- Auxiliary contacts for heavy machinery like disconnectors

DRIVING METHOD AND SENSITIVE DISTANCE

The magnet unit must be faced to the switch unit as shown in the below figure, and operating point must be set within the rated sensitive distance.

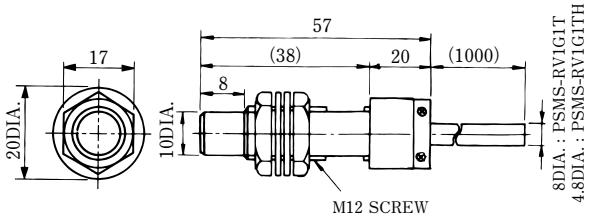


DIMENSIONS in mm

SWITCH UNIT

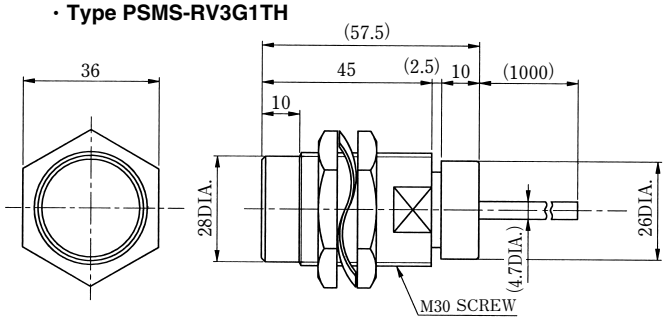
・Type PSMS-RV1G1T: with General Cable

・Type PSMS-RV1G1TH: with Heatproof Cable



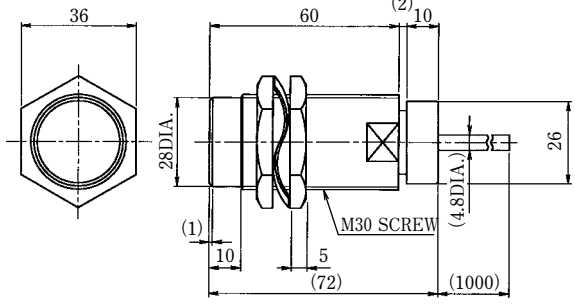
Weight: 120g

・Type PSMS-RV3G1TH



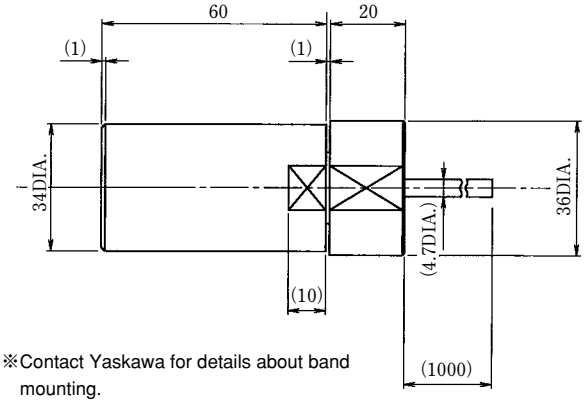
Weight: 170g

・Type PSMS-RV3G1THL



Weight: 250g

・Type PSMS-RV4G1THL



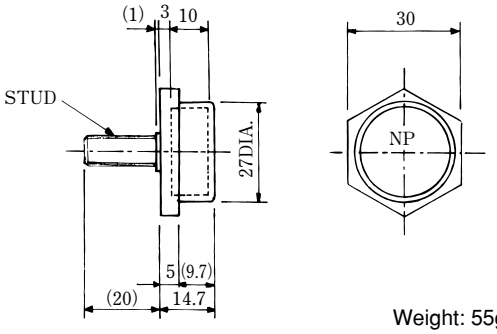
※Contact Yaskawa for details about band mounting.

Weight: 250g

MAGNET UNIT

・Type PSMS-MV10TH: M6 STUD

・Type PSMS-MV10THA: M8 STUD



Weight: 55g

Note: where the switch is used in a DC circuit, connect the black lead wire to ⊕ and white lead wire to ⊖.

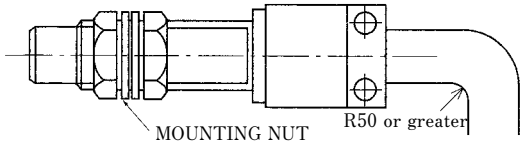
●NOTE FOR INSTALLATION

⚠CAUTION

●Tightening torque of the mounting nut

PSMS-RV1G1T (H) ···16.6 to 23.5 (N・m) {170 to 240 (kgf・cm)}

PSMS-RV3G1TH (L) ···49 to 78 (N・m) {500 to 800 (kgf・cm)}



・Do not twist the cable less than R50.

TILT SWITCHES

Type PSMT

Reliably Detects Gradient Angles and Outputs Contact Signals.

- Tilt switches incorporating Bestact, magnetic fluid and a permanent magnet can detect gradient angles of the equipment and remove the contact signal. They provide higher response accuracy and longer mechanical life in addition to improvement of the contact reliability when compared with mercury switches and capacitance method switches.
- Output contacts have an applicable range from 5VDC (photo coupler) to 200VAC 100VA, so they can give feedback of angle information to computers and open and close emergency switches or electromagnetic valves directly.
- They are very easy to handle because the sensor itself has a switching function, so no outside driving power source needed; all you need is to mount the switches on the object whose tilt is to be detected and connect the output terminals to loads.

RATINGS AND SPECIFICATIONS

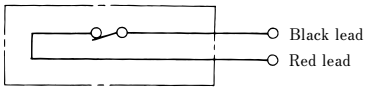
Type		PSMT-A302	PSMT-A452
Responsing Angle (25℃)		30°±5°	45°±5°
Returning Angle (25℃)		15° or greater	15° or greater
Contact Arrangement		1NC	
Incorporated Bestact		R25	
Rated Insulation Voltage		250VAC (Power Frequency)	
Contact Performance		Refer to page 7.	
Insulation Resistance		100MΩ or greater (with 500VDC Megger)	
Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)	
Shock Resistance	Erroneous Operation	9.8m/s² {1G}	
	Breakdown	490m/s² {50G}	
Vibration Resistance	Erroneous Operation	98m/s² {1G} (10 to 500Hz)	
	Breakdown	100,000 times vibration for upper and lower, right and left at 9.8m/s² {1G} acceleration	
Ambient Temperature	Operating Temperature	–30 to +70℃	
	Storage	–40 to +80℃	

TYPICAL APPLICATIONS

- Gradient detectors for cranes, gondolas and business cookers
- Limit obstacle detectors for rolling stocks
- For yards in steel and heavy chemical industry
- Detectors for onboard materials

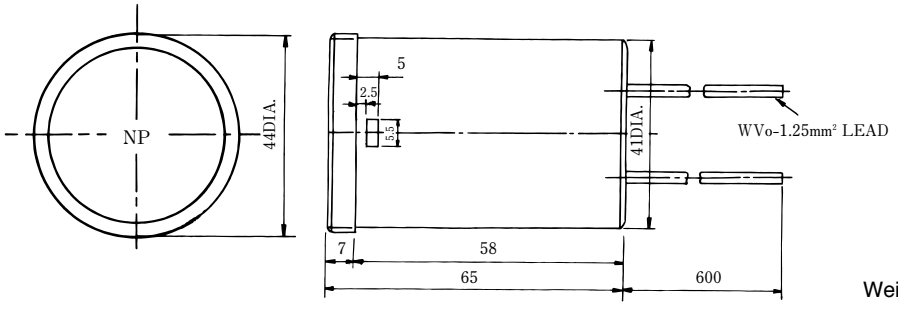
OUTPUT CONTACT

- 1NC contact output



Note: Where the switch is used in a DC circuit, connect the black lead wire to ⊕ and white lead wire to ⊖.

DIMENSIONS in mm



Weight: 80g

Bestact
PUSHBUTTON SWITCHES

PANEL MOUNT SWITCHES: Type PBR
SLIM PUSHBUTTON SWITCHES: Type PBRU

PANEL MOUNT SWITCHES

Type PBR

FEATURES

- High contact reliability.
- Applicable to a large making current up to 15A, no surge supressor needed when wiring long-distance cables or no spark-killer circuit when switching inductive loads needed.
- No contact aging, suitable for infrequent use.
- Direct control over a wide range from electronic circuits to electromagnetic power.
  24VAC 1mA to 240VAC 0.5A
  24VDC 1mA to 115VDC 0.3A

TYPICAL APPLICATIONS

- Industrial automatic control systems
- Computer and peripheral equipment
- Water supply and sewage treatment plants

RATINGS AND SPECIFICATIONS

Incorporated Bestact		R25
Rated Insulation Voltage		250VAC (Power Frequency)
Contact Performance		Refer to page 7.
Mechanical Life	Pushbutton Switches	Over 5,000,000 operations
	Illuminated Pushbutton Switches	Over 2,500,000 operations
	Selector Switches	Over 500,000 operations
Insulation Characteristics	Insulation Resistance	100MΩ or greater (with 500VDC Megger)
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)
Mechanical Characteristics	Vibration Resistance (Erroneous Operations)	49m/s^2 {5G} (20 to 55Hz)
	Shock Resistance (Erroneous Operations)	196m/s^2 {20G} (Breakdown: 980m/s^2 {100G})
Terminal	Screw Size	M3.5
	Connecting Wire Size	2.0mm^2 or less
Ambient Temperature	Operating Temperature	–25 to +50℃
	Storage	–25 to +70℃

UL STANDARD SUMMARY OF CLASSIFICATION CHART

Class	Division	Group
1. GAS 	1. HAZARD MAY EXIST May Exist In Atmosphere Under Normal Operating Conditions	A. Acetylene
		B. Hydrogen and Manufactured Gases containing Hydrogen
		C. Petrochemicals (e.g. ethylene)
		D. Petrochemicals (e.g. alcohol)
	2. POTENTIAL HAZARD A. May Be Present In Atmosphere Only Under Abnormal Circumstances B. Location Adjacent To Division 1 Location	A. Acetylene
		B. Hydrogen and Manufactured Gases Containing Hydrogen
		C. Petrochemicals (e.g. ethylene)
		D. Petrochemicals (e.g. alcohol)

TYPE DESIGNATION

P B R - □ - □ □

・Type of Button
1: Flush
2: Salient
5: Flush Head with Cylinder Lock
7: Half Shrouded
52: Cylinder Lock 2-Position
62: Knob 2-Position

・Contact Arrangement

10: 1NO	11: 1NO1NC
20: 2NO	12: 1NO2NC
30: 3NO	13: 1NO3NC
40: 4NO	21: 2NO1NC
01: 1NC	22: 2NO2NC
02: 2NC	31: 3NO1NC
03: 3NC	
04: 4NC	

MODEL LIST

Appearance	Operator	Color of Button	Type	Remarks
	Flush head	Red Green Black	PBR-1-□	General Purpose
	Salient head	Red[*4] Green Black	PBR-2-□	General Purpose
	Half shrouded head	Red[*4] Green Black	PBR-7-□	Protection against accidental contact
	Knob 2-position	〈Knob〉 Black	PBR-62-□	1NC Unit 1NO Unit
	Cylinder lock 2-position	〈Cylinder〉 Chrome plated	PBR-52-□	1NC Unit 1NO Unit

Appearance	Operator	Color of Button	Type	Remarks
	Illuminated lamp head	〈Globe〉 Red Green	PBLR-□□□ *1	・Transformer type ・Lamp: 6.3V 1W ・Not approved by UL
	Flush head with cylinder lock	〈Cylinder〉 Chrome plated	PBR-5-□	・Turn the key to the left for normal operation. ・The contact is locked as operated when the key is turned right by pushing the button. ・The contact is unlocked when the key is turned left. ・The button cannot be operated when the key is turned right in a normal position.

Note: ＊1. Illuminated lamp head type has the following significance.

P B L R - □ □ □

・Voltage
1: 100 to 110V
2: 200 to 220V

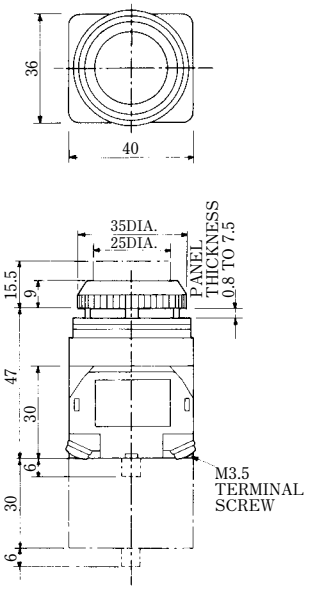
・Contact Arrangement
20: 2NO　11: 1NO1NC
02: 2NC　13: 1NO3NC
40: 4NO　22: 2NO2NC
04: 4NC　31: 3NO1NC

・Globe Color
R: Red
G: Green

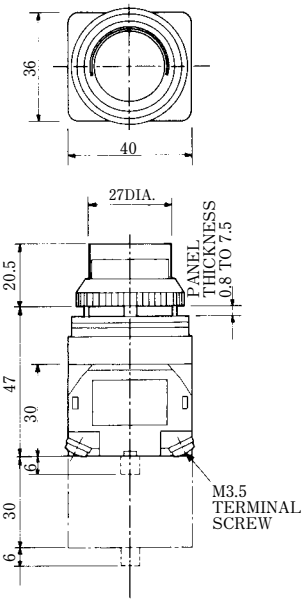
2. Knob 3-position unit is not available.
3. When used in a DC circuit, connect odd number terminals to ⊕, and even number terminals to ⊖.
＊4. Specify a color when you order.

DIMENSIONS in mm

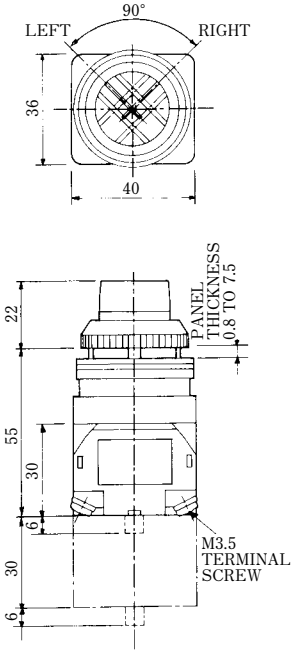
Type PBR-1-□
Type PBR-2-□



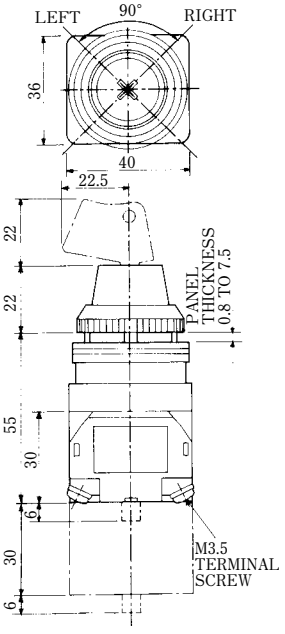
Type PBR-7-□



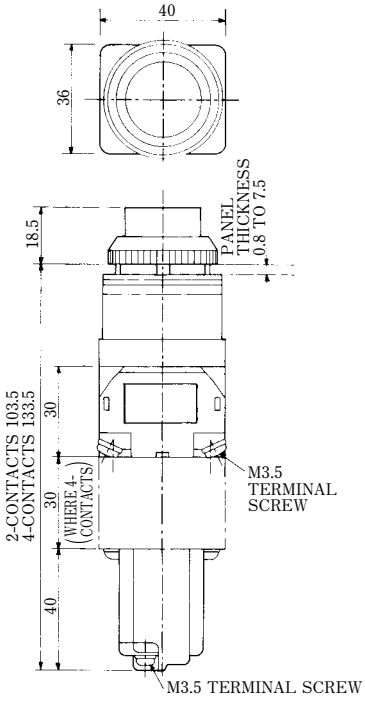
Type PBR-62-□



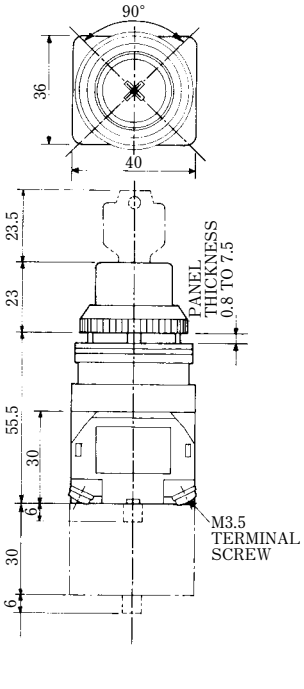
Type PBR-52-□



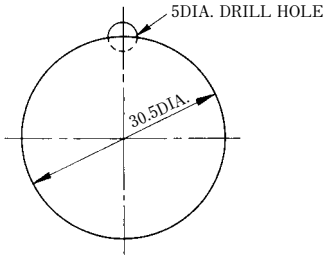
Type PBLR-□□□



Type PBR-5-□



• DRILLING PLAN FOR MOUNTING HOLE

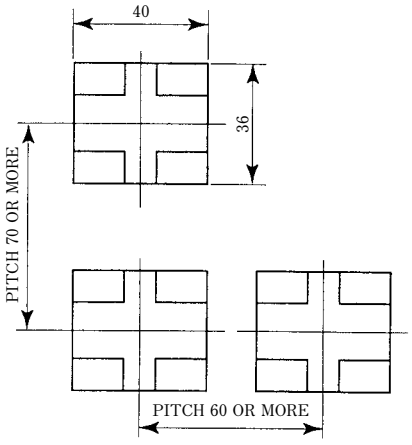


Note: The 5mm hole is used to stop whirl. If nameplates are not used or nameplate does not have any whirl-stop, the hole is not required.

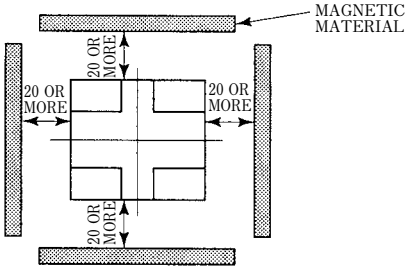
Diameter of Mounting Part: 30mm

• MOUNTING PITCH

・To avoid interference when mounting units in close proximity to one another, refer to the dimensions specified below for proper separation. Units mounted closer together than specified may affect operations and result in unsatisfactory performance.



・Refer to the dimensions specified below for proper mounting and separation from other magnetic materials. Units mounted closer together than specified may affect operations and result in unsatisfactory performance.



●PRECAUTIONS FOR MOUNTING

⚠ CAUTION

●Switch mounting screw torque must be 3.09N・m (31.5kgf・cm) ±10%.
(Do not tighten screws too firmly to prevent them from damaging.)
●Operate push-buttons in control part at 2.16N (0.22kgf) or less.
(Do not push them too strong to prevent them from damaging.)

⃠ RESTRICTION

●This switch cannot be used where dust and cutting powder are present.
(They might come into gear in the switch and lock it.)

●PRECAUTIONS FOR WIRING

⚠ CAUTION

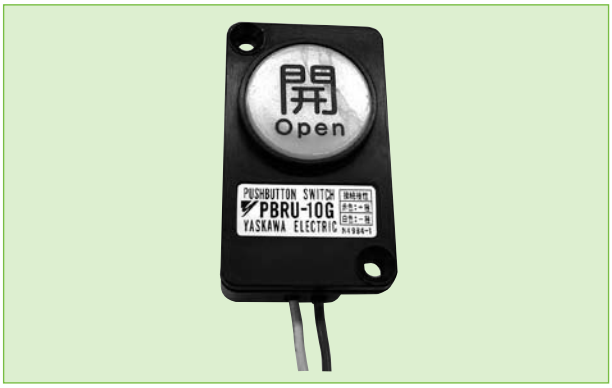
●Connecting wires must be 2mm² or less.
●Terminal screw torque must be 0.65N・m (6.5kgf・cm) ±10%.
(Do not tighten screws too firmly to prevent them from damaging.)

SLIM PUSHBUTTON SWITCHES

Type PBRU

FEATURES

1. High contact reliability in low level interface circuits at 24VDC.
2. Slim size by employing short stroke length (4mm).
3. 1NO and 1NC contact arrangement.



TYPICAL APPLICATIONS

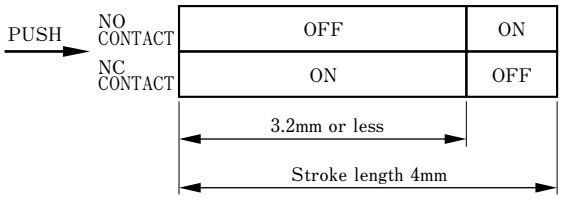
・Applicable as semiautomatic door switches for doors operated by passengers in rolling stocks.

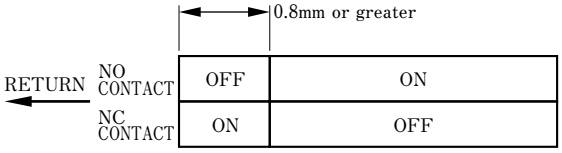
RATINGS AND SPECIFICATIONS

Type		PBRU-10G	PBRU-01G
Contact Arrangement		1NO	1NC
Incorporated Bestact		R25	
Rated Insulation Voltage		250VAC (Power Frequency)	
Operating Characteristics	Operate	3.2mm or less	3.2mm or less
	Release	0.8mm or greater	0.8mm or greater
Contact Performance		Refer to page 7.	
Mechanical Life		1,000,000 times or greater	
Insulation Characteristics	Insulation Resistance	20MΩ or greater (with 500VDC Megger)	
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)	
Vibration Malfunction		19.6m/s^2 {Double Amplitude 2G} (10 to 240Hz)	
Shock Malfunction		98m/s^2 {10G}	
Ambient Operating Temperature		–25 to +60℃ with no freezing	
Control Power		7.8 to 11.8N {0.8 to 1.2kg}	
Enclosure		Waterproof type IP67*1	
Approx. Weight		70g	

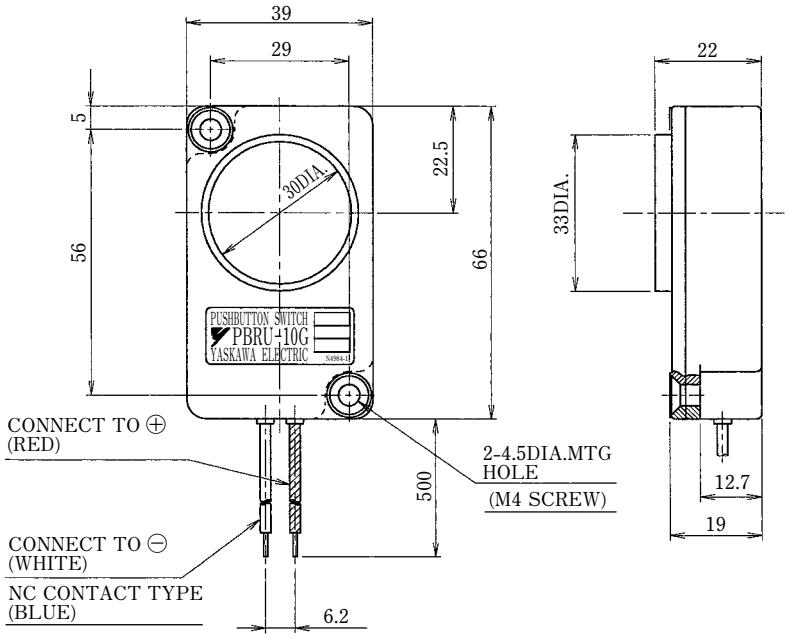
Note: ∗1. Enclosure satisfies IP56 for continuous use and IP67 for test specification.

OPERATING CHARACTERISTICS

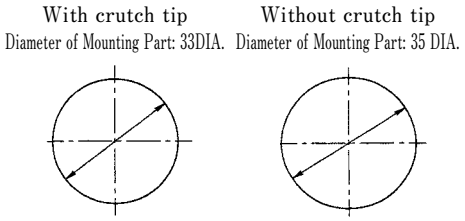




DIMENSIONS in mm



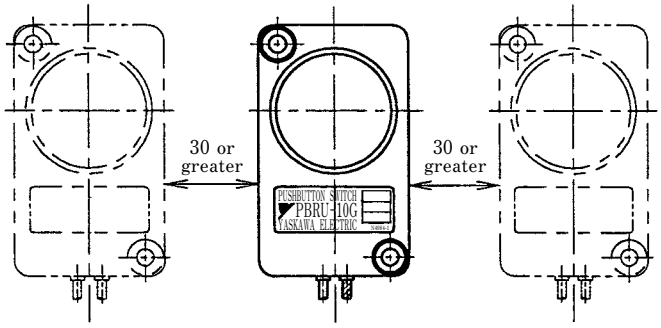
●DRILLING PLAN FOR PUSHBUTTON HOLE



●Mounting pitch

Operating characteristics of this switch are adjusted for the independent condition of both NO contact type and NC contact type.

To avoid interference when mounting units in close proximity to one another, refer to the dimensions specified below for proper separation. Units mounted closer together than specified may affect operations and result in unsatisfactory performance.



・There must be 30mm or greater separation between the switch unit and other magnetic materials.
The unit and magnetic materials that are mounted closer together than specified may affect operations and result in unsatisfactory performance.

●PRECAUTION FOR MOUNTING

⚠CAUTION

●Operate push-buttons in control part at 14.7N {1.5kg} or less. (Do not push them too strong to prevent them from damaging.)

Bestact
SELECTOR SWITCHES

INCORPORATED SELECTOR SWITCHES: Type PLRC-G
RAINPROOF SELECTOR SWITCHES: Type PLWG

INCORPORATED SELECTOR SWITCHES Type PLRC-G

Drastically reduces contact failure and contact bounce in low-voltage applications by employing "The Highly Reliable Hermetically Sealed Contact Bestact" .
Two product series available with maximum 16 contacts output (8 steps) and notch angle of 90° (2 notches) or 45° (3 notches).
Best for an adverse environment and infrequent use applications for the control/operation of devices for general industry and rolling stocks.

FEATURES

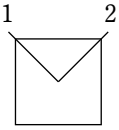
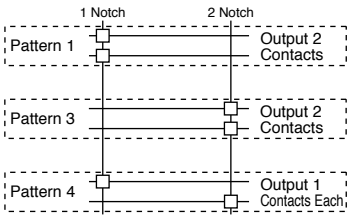
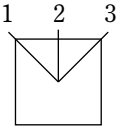
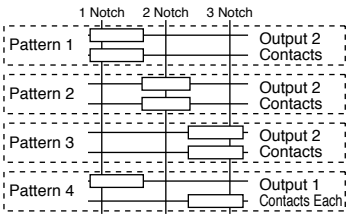
1. Applicable for an adverse environment. (Maintenance-free)
- Suitable for use under an adverse environment with dust, stain, vibration, and shock.

2. High mechanical robustness
- Incorporated element is contact-less type that uses a driving magnet where the camshaft penetrates through both ends.

3. Well suited for infrequent use applications
- Can input directly to the sequencer input circuit. (Applicable to 5VDC and photo coupler inputs.)

APPEARANCE

STANDARD SPECIFICATIONS

Switch Action	Type	Combination of Contact, steps and notches				Notch Interval	Contact Operation Pattern
		2 notch type		3 notch type			
		Contact Unit Steps	Output Contact	Contact Unit Steps	Output Contact		□shows operating stage.
Maintained	PLRC-G2□	Max 8 steps Available	Max 16	—	—	2 notch (Notch Angle: 90°) 	
	PLRC-G3□	—	—	Max 8 steps Available	Max 16	3 notch (Notch Angle: 45°) 	

Note: When using 3 notches type, contact overlap might occur while the notches are being switched depending on a contact arrangement. Contact Yaskawa if you don't want the overlap.

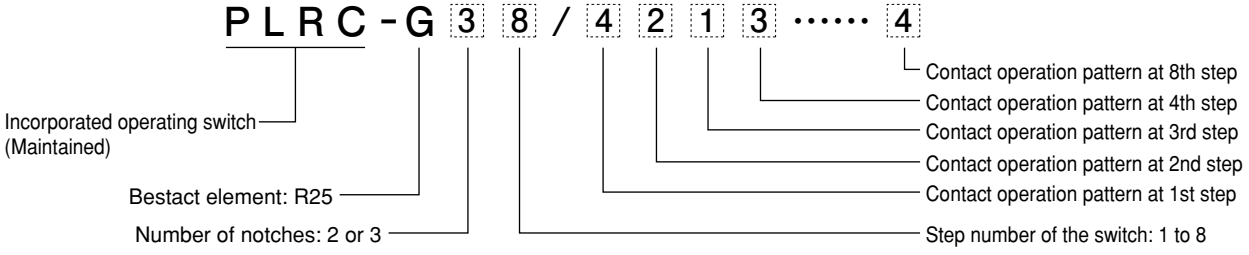
CONTACT RATINGS AND SPECIFICATIONS

Product Type		PLRC-G □□/□□□□□□□□
Contact Arrangement		Min. 1 step (2 contacts), Max. 8 steps (16 contacts)*
Incorporated Bestact		R25
Rated Insulation Voltage		250VAC (Power Frequency)
Contact Performance		Refer to page 7.
Insulation Characteristics	Insulation Resistance	100MΩ or greater (with 500VDC Megger)
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)
Vibration Resistance		Refer to JIS E 4031 Annex JA Category 2 Class B
Shock Resistance		Refer to JIS E 4031 Annex JB Category 2 Class B
Mechanical Life		500,000 operations or greater
Ambient Temperature	Operating Temperature	–20 to +60℃
	Storage	–30 to +70℃
Connecting Method		Electrical Cable or Amp Terminal (Recommended Amp: 4-1.25SQ)

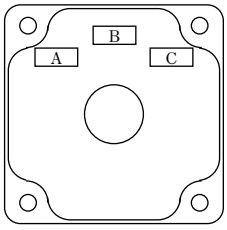
Note: ＊The even-numbered step is a standard type. A dummy step unit is mounted for the odd-numbered step to make it even-numbered step before shipment.

TYPE DESIGNATION

＊Please refer to the previous page for contact operation pattern.



NAME PLATES

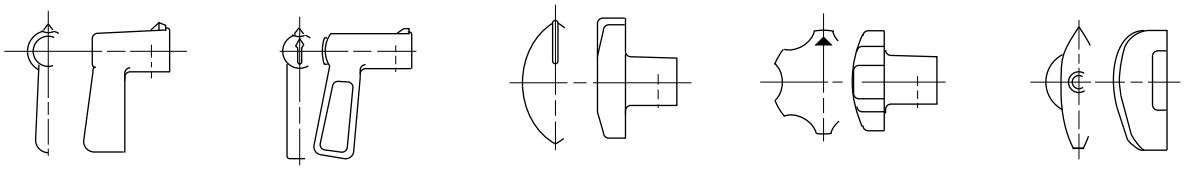


Material: Brass

Position	A	B	C
2 Notches	OFF	—	ON
3 Notches	1	2	3

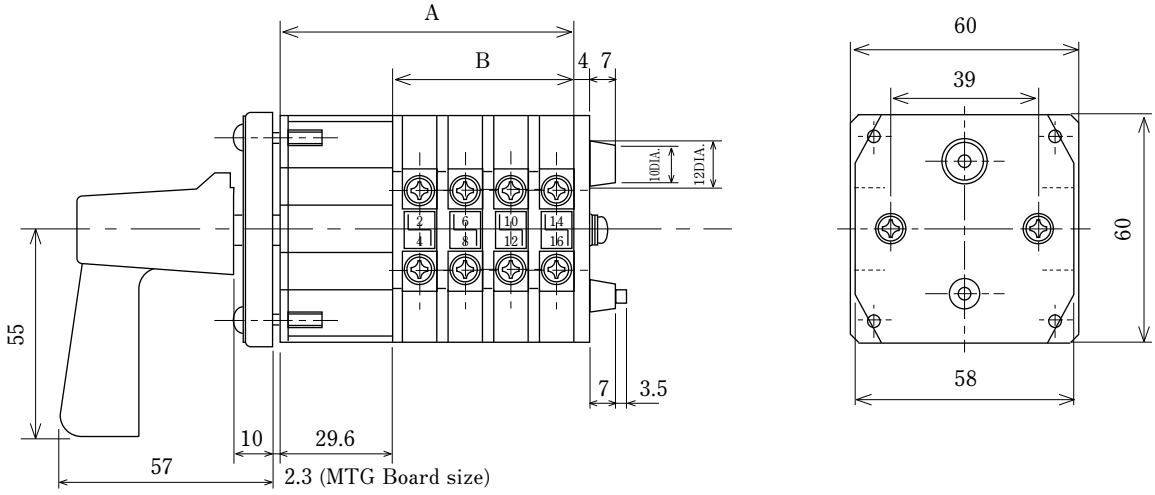
∗ Name plates other than tabulated above are available by order made.

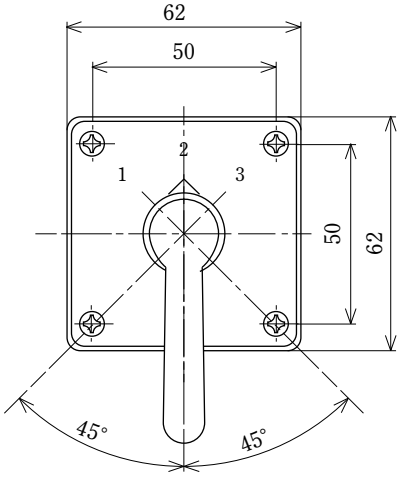
SELECTOR HANDLES ∗ All types except for pistol type will be order made.



Pistol Type | Pistol Type (Big Size) | Egg Shaped Type | Flower Shaped Type | Knob Type

DIMENSIONS in mm

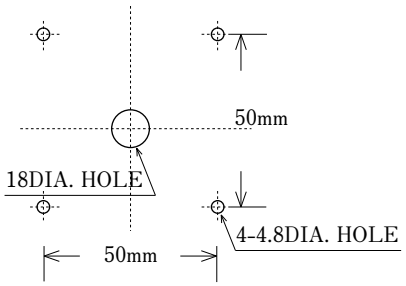




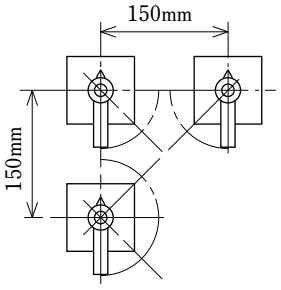
Type	A	B	Weight (g)
PLRC-G□1	53.6	24	280
PLRC-G□2	53.6	24	330
PLRC-G□3	77.6	48	425
PLRC-G□4	77.6	48	480
PLRC-G□5	101.6	72	575
PLRC-G□6	101.6	72	630
PLRC-G□7	125.6	96	725
PLRC-G□8	125.6	96	780

MOUNTING

・Drilling Plan for Mounting Hole



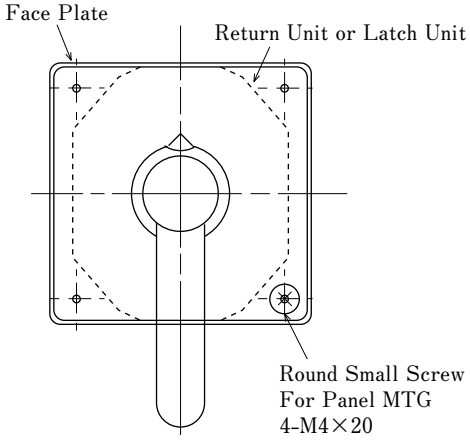
・Recommended Mounting Pitch

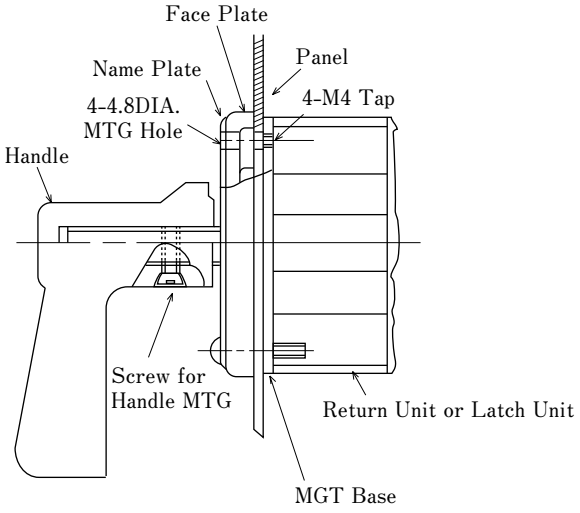


・Mounting method

This switch should be mounted from the back side of the mounting panels such as the control tables and switch boards. Then a base is inserted (It has returning mechanism and a contact unit), and the face plates are combined from the face side. (Refer to the figure below).

It is tightened from the face plate side with a round small screw of M4 by using the M4 tap of the mounting base.





●PRECAUTIONS FOR MOUNTING

⚠CAUTION

●Make sure to hold a lever in a control part and turn it.
(Do not hit it strong to prevent it from damaging.)

⃠ RESTRICTION

●This switch cannot be used where dust and cutting powder are present.
(They might come into a gear in the switch and lock it.)

●PRECAUTIONS FOR MOUNTING

⚠CAUTION

●When used in a DC circuit, connect ⊕ with the line of terminal number 1 (1, 5, 9, 13, 17, 21, 25, 29) and the line of terminal number 4 (4, 8, 12, 16, 20, 24, 28, 32) according to the step number of the switch unit.
●Connecting wire must be 2mm² or less.
●Terminal screw torque must be 0.88N・m (9kgf・cm) ±10%.
(Do not tighten screws too firmly to prevent them from damaging.)

RAINPROOF SELECTOR SWITCHES

Type PLWG

FEATURES

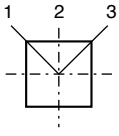
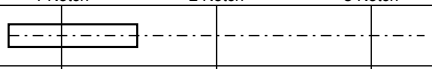
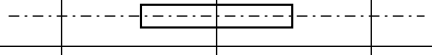
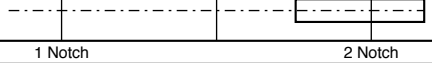
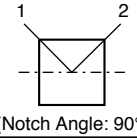
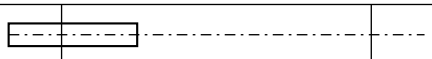
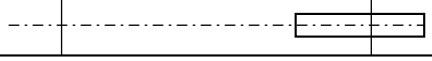
- Provides high reliability in an adverse environment by incorporating the hermetically sealed glass contact.
- Enables long-term maintenance-free operations.

TYPICAL APPLICATIONS

- Selector switches in an adverse environment such as in steel plants and cement making equipment.

RATINGS AND SPECIFICATIONS

Product Name		RAINPROOF SELECTOR SWITCHES
Type		PLWG-G☐☐
Contact Arrangement		Min. 1 step (1 contact), Max. 4 steps (4 contacts)
Incorporated Bestact		R25
Rated Insulation Voltage		250VAC (Power Frequency)
Contact Performance		Refer to page 7.
Insulation Characteristics	Insulation Resistance	5MΩ or greater (with 500VDC Megger)
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)
Vibration Resistance		50Hz Single Amplitude 0.2mm X, Y and Z axis 1H each (Refer to JIS C 60068-2-6)
Shock Resistance		15G X, Y and Z axis 3 times each (Refer to JIS C 60068-2-27)
Mechanical Life		3,000,000 operations or greater
Enclosure		IP56
Ambient Temperature		–10 to +80℃
Contact Operation		See table below

Notch Interval	Contact operation pattern (☐ is the range where contacts are ON.)	
 (Notch Angle: 45°)		1 Notch / 2 Notch / 3 Notch
	Pattern 1	
	Pattern 2	
	Pattern 3	
 (Notch Angle: 90°)		1 Notch / 2 Notch
	Pattern 1	
	Pattern 3	

Any contact arrangement other than shown above is not available.

Note: When using 3 notch type, contact overlap might occur while the notches are being switched depending on a contact operation pattern. Contact Yaskawa if you don't want the overlap.

TYPE DESIGNATION

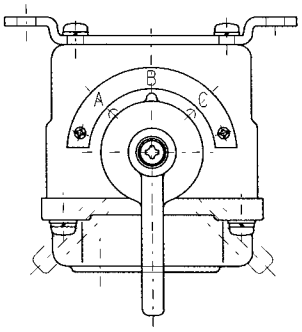
P L W G - G S P 3 4 / 1 2 1 2
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

Symbol description

① Mechanical switch
② L: Maintained
O: Automatic return
③ Selector switch for indoor/outdoor
④ Bestact element: Type R25
⑤ Mounting pitch S: 92mm
Y: 100mm
⑥ External stop mechanism P: With stop mechanism (handle removable)
B: With stop mechanism (handle not removable)
K: Without stop mechanism (handle removable)
Blank: Without stop mechanism (handle not removable)
⑦ Notch number 2: 2 Notches
3: 3 Notches
⑧ Contact number 1 to 4: 1 to 4 contacts
⑨ Contact operation pattern at 1st step
⑩ Contact operation pattern at 2nd step
⑪ Contact operation pattern at 3rd step
⑫ Contact operation pattern at 4th step (Select contact operation pattern from table 1.)

Note: Symbols of ① to ⑧ are indicated on the products. However,contact operation patterns of ⑨ to ⑫ are not indicated.

・NAME PLATE LETTER



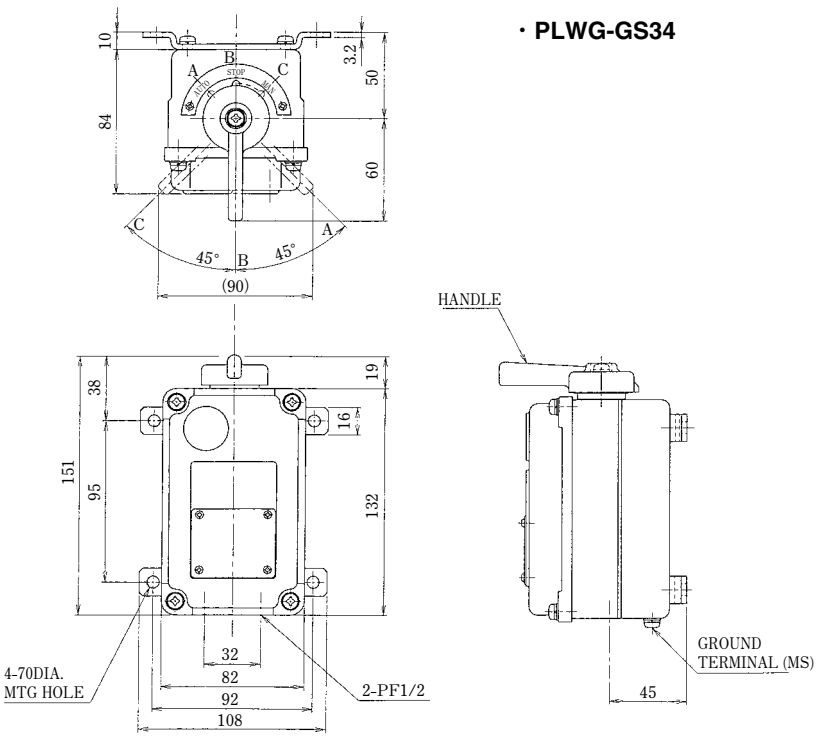
NAME PLATE LETTER

LETTER POSITION	A	B	C
2 NOTCH	DIRECT	—	REMOTE
3 NOTCH	MAN	STOP	AUTO

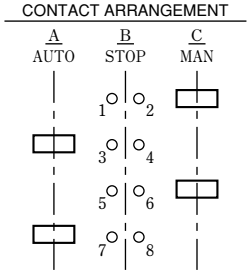
Note: Contact Yaskawa for types not shown above.

DIMENSIONS in mm

・PLWG-GS34

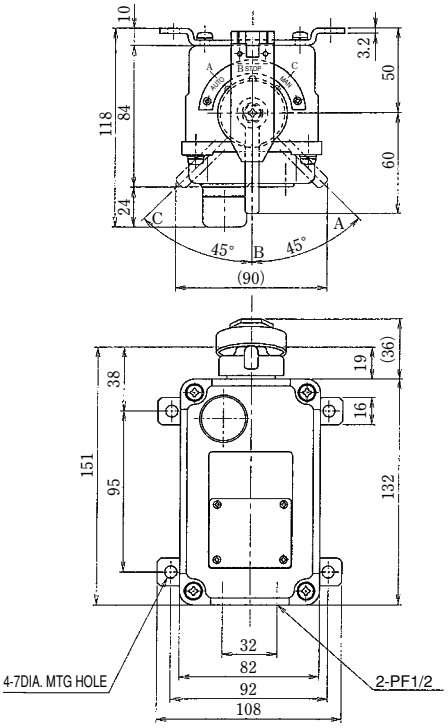


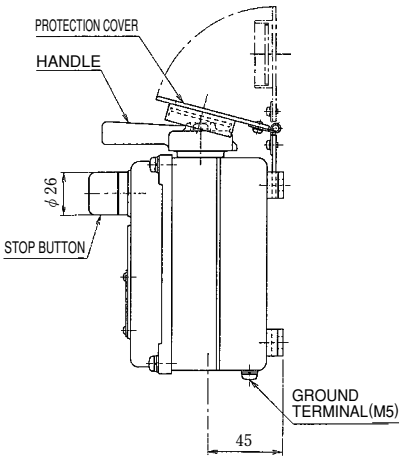
CONTACT ARRANGEMENT

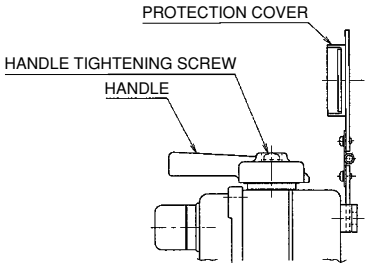


Note: when the switch is used in a DC circuit, connect odd number to ⊕, and even number to ⊖.

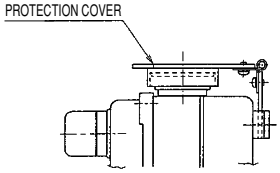
• PLWG-GSP34





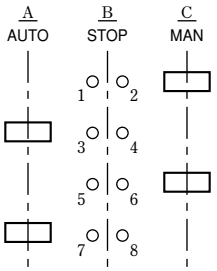


HANDLE CONTROL CONDITION



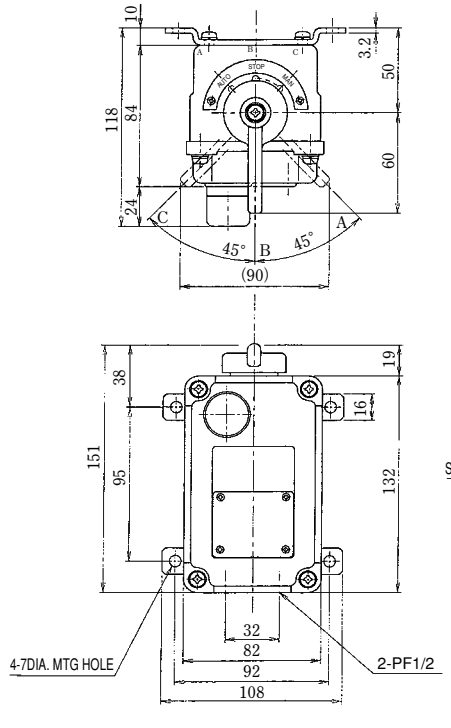
HANDLE REMOVED CONDITION

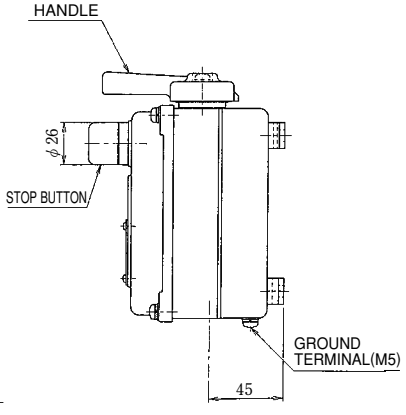
CONTACT ARRANGEMENT



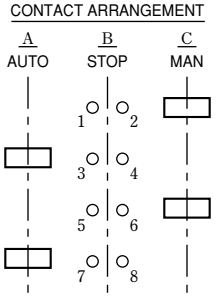
Note: 1. Control the handle with the protection cover opened up.
The protection cover automatically returns to the initial position by a spring power when it is released.
2. The handle is removable by loosening screws.
(Shaft parts are protected by protection covers.)
3. When the handle is removed by operating to direction A, the inner mechanism can be returned to position B by pushing the stop button.
(When the handle is operated to direction C, it cannot be returned by the button.)
4. When the switch is used in a DC circuit, connect odd number to ⊕, and even number to ⊖.

• PLWG-GSB34



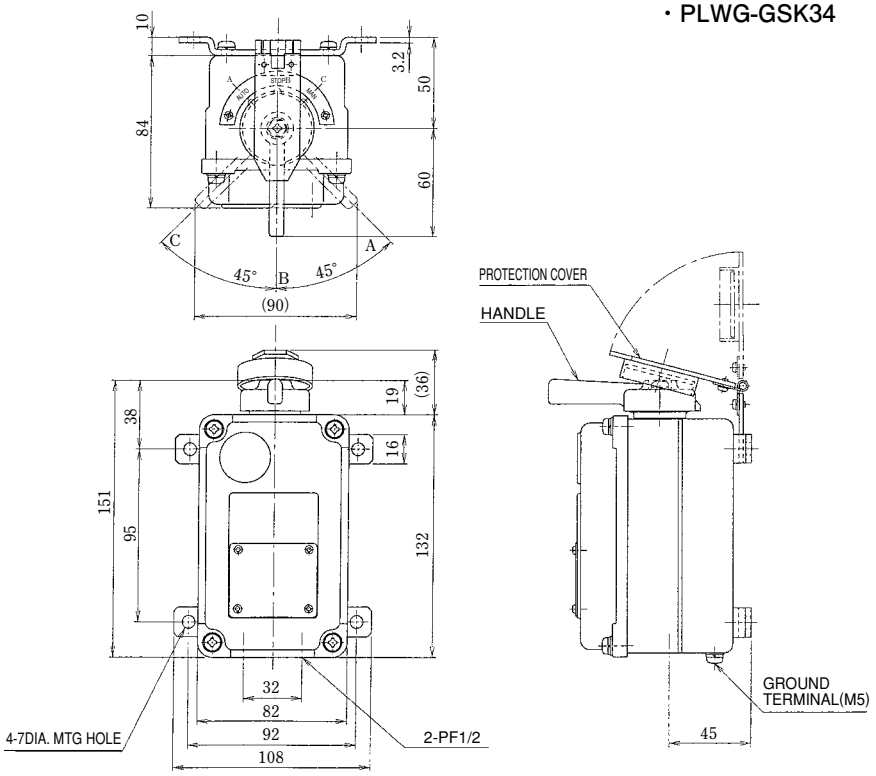


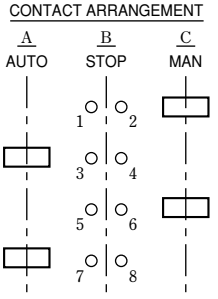
CONTACT ARRANGEMENT

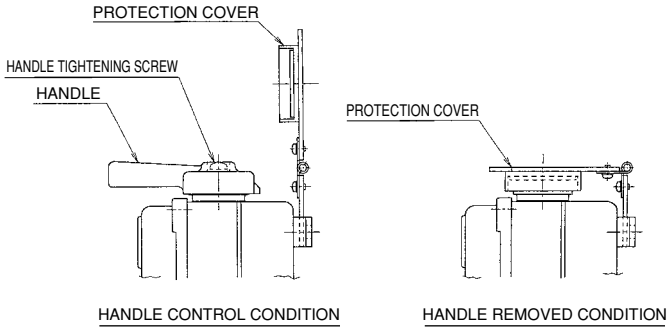


Note: 1. When the handle is removed by operating to direction A, the inner mechanism can be returned to position B by pushing the stop button.
(When the handle is operated to direction C, it cannot be returned by the button.)
2. When the switch is used in a DC circuit, connect odd number to ⊕, and even number to ⊖.

・PLWG-GSK34







Note: 1. Control the handle with the protection cover opened up.
The protection cover automatically returns to the initial position by a spring power when it is released.
2. The handle is removable by loosening screws.
(Shaft parts are protected by protection covers.)
3. When the switch is used in a DC circuit, connect odd number to ⊕, and even number to ⊖.

Bestact
AUXILIARY CONTACT UNIT

SWITCH UNIT: Type PBP-G11S
MICRO SWITCH: Type PPUU
ROD PLUNGER: Type PSPD-07G
PPMU-G
PPMU-E

SWITCH UNIT

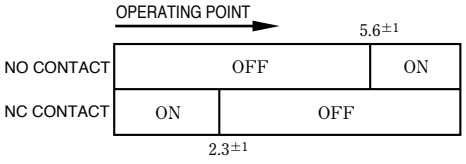
Type PBP-G11S

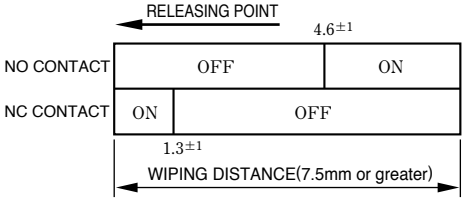
Provides high reliability in an adverse environment by incorporating the hermetically sealed contact "Bestact". These units have been used widely as auxiliary contacts for rolling stock master controllers and as electricity-saving switches to turn on power when a telephone booth is opened in a telephone facility mounted beside a railway / roadway.

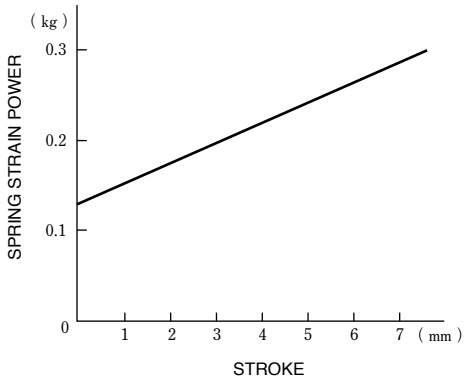
RATINGS AND SPECIFICATIONS

Type			PBP-G11S
Contact Arrangement			1NO1NC
Incorporated Bestact			R25
Rated Insulation Voltage			250VAC(Power Freqnency)
Contact Performance			Refer to page7.
Machanical Life			5,000,000 times or greater
Characteristics	Vibration Resistance		49m/s^2 {5G} (10 to 55Hz)
	Shock Resistance	Erroneous Operation	98m/s^2 {10G}
		Breakdown	980m/s^2 {100G}
	Insulation Resistance		100MΩ or greater (with 500VDC Megger)
	Withstand Voltage (Power Frequency)		1500VAC for 1 minute, Leakage Current:5mA (Across Open Contacts:500VAC)
Ambient Temperature	Operating Temperature		−10 to +50°C
	Storage		−25 to +80°C

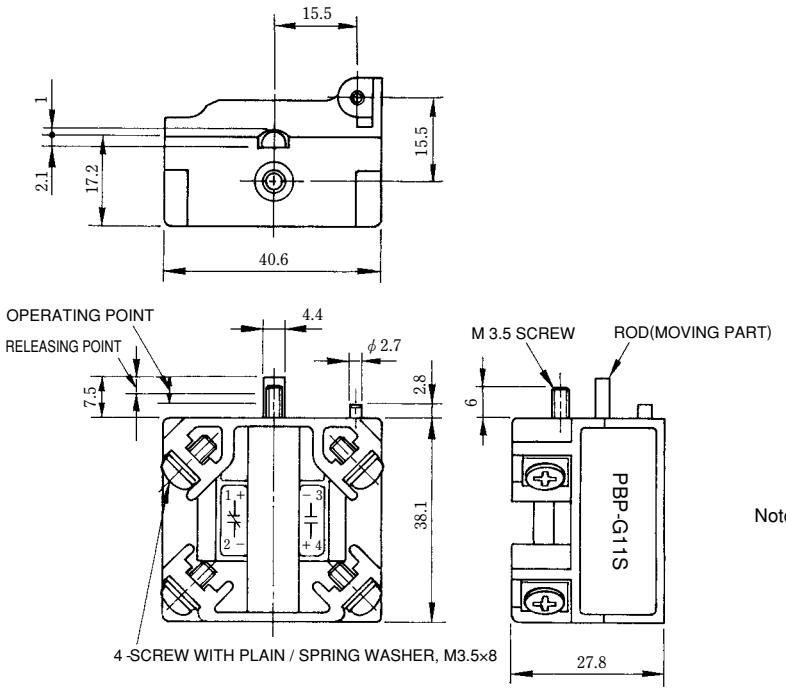
OPERATING CHARACTERISTICS







DIMENSIONS in mm



Note:1. M3.5 screw torque: 0.8 N･m(8kgf･cm)±10%
2. When the switch is used in a DC circuit, connect terminal No.1 and 4 to ⊕,and No.2 and 3 to ⊖.

MICRO SWITCHES INCORPORATING Bestact Type PPUU

In recent years, high contact reliability in low-level signals has been required for micro switches used in field equipments.
However, general air break contacts cannot meet the requirements for use in field environments and the low-level voltages of control circuits.
Micro switches incorporating the hermetically sealed glass contact "Bestact" can solve these problems.

APPEARANCE

FEATURES

- **High contact reliability**
  Hermetically sealed glass contact "Bestact" provides high contact reliability with no aging.

- Contact arrangement
  1NO and 1NC contact arrangement. (It can be identified by roller color even after mounting.)

- Applicable for a wide range of control loads
  Best suited for use in power circuits and also infrequently used low-level signal circuits.
  (From inductive load control of 220 VAC, 0.5A or 110VDC, 0.3A to direct input for 5VDC photo-coupler.)

- Compact size
  12.4mm(w)×50mm(h)×45mm(l)

CONTACT RATINGS AND SPECIFICATIONS

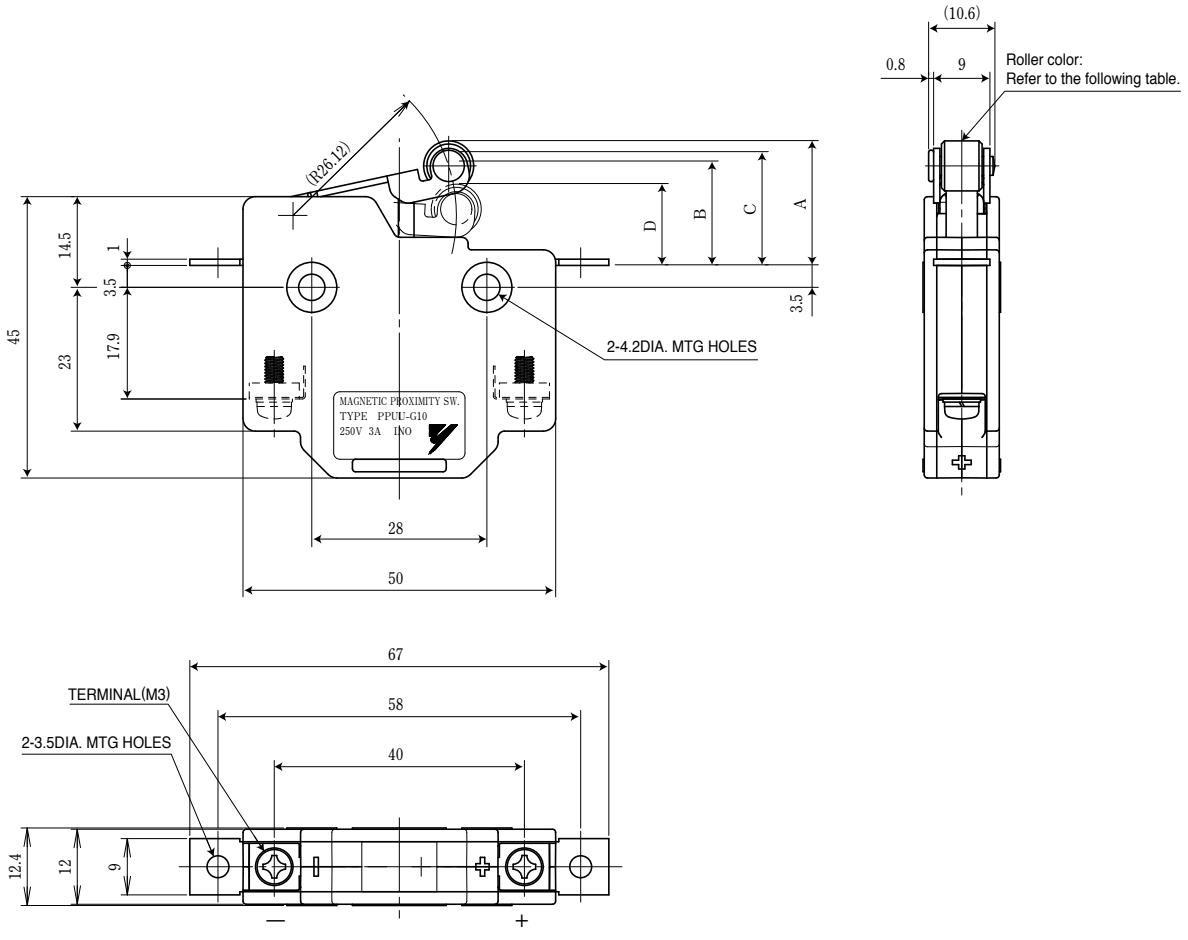
Type		PPUU-G10	PPUU-G01
Contact Arrangement		1NO	1NC
Incorporated Bestact		R25	
Rated Insulation Voltage		250VAC (Power Frequency)	
Contact Performance		Refer to page 7.	
Mechanical Life		1,000,000 operations or greater (with no rapid release when pushing a lever)	
Insulation Characteristics	Insulation Resistance	20MΩ or greater (with 500VDC Megger)	
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current:5mA (Across Open Contacts:500VAC)	
Vibration Characteristics		Refer to JIS E 4031 Appendix JA Class 2:B (Double Amplitude 14m/s^2 (1.4G))	
Shock Characteristics		Refer to JIS E 4031 Appendix JB Class 2:B (59m/s^2 (6G): 40 times)	
Ambient Operating Temperature		–25 to +80°C with no condensation	
Connecting Terminal		Screw size : M3×8	
Approx, Weight		30g	

PRECAUTIONS FOR USE

1.Bestact incorporated in the switch is a glass sealed contact. Do not drop it and do not add any excessive force to it. Failure to follow this instruction may result in a change of operating characteristics and performance degradation by damaging a glass.

2.Contacts have a polarity. When the switch is used in a DC circuits, connect cables according to the polarity ⊕/⊖ indicated on a terminal screw part.

DIMENSIONS in mm



Operating Characteristics

Size	Remarks
A=19.5 or greater	Stationary Position
B=15.0 or greater	Operating Position
C=19.0 or less	Releasing Position
D=13.0	Limit Position When Pushing Levers

Identification of Contact Arrangement

Type	PPUU-G10	PPUU-G01
Roller Color	White	Black

●PRECAUTIONS FOR MOUNTING

⚠CAUTION

●Switch mounting screw torque must be 3.9 N·m (31.5 kg f·cm) ±10%(Do not tighten screws too firmly to prevent them from damaging.)

⃠RESTRICTION

●This switch cannot be used where dust and cutting powder are present.
(They might come into a gear in the switch and lock it.)

●PRECAUTIONS FOR WIRING

⚠CAUTION

●Connecting wire must be 2mm^2 or less.
●Terminal screw torque must be 0.45 N·m (4.5Kg f·cm)±10%.
(Do not tighten screws too firmly to prevent them from damaging.)

ROD PLUNGER TYPE AUXILIARY CONTACTS

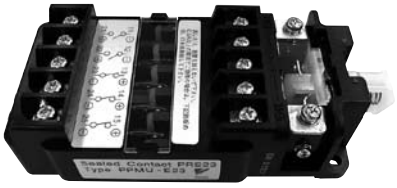
Type PSPD-07G
Type PPMU-G
Type PPMU-E

FEATURES

- High contact reliability with no aging by incorporating a glass sealed contact.
- Long-term maintenance-free operation.

TYPICAL APPLICATIONS

- Auxiliary contact units
- Door control devices for rolling stocks
- Auxiliary contacts for breakers(Type PPMU-E)



RATINGS AND SPECIFICATIONS

- Type PSPD-07G

Type		PSPD-07G20	PSPD-07G11	PSPD-07G02
Contact Arrangement		2NO	1NO1NC	2NC
Incorporated Bestact		R25		
Rated Insulation Voltage		250VAC (Power Frequency)		
Contact Performance		Refer to page 7.		
Mechanical Life		1,000,000 operations or greater (with no rapid release when pushing a pole)		
Insulation Characteristics	Insulation Resistance	20MΩ or greater (with 500VDC Megger)		
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)		
Vibration Characteristics		Refer to JIS E 4031 Appendix JA Class 1:A		
Shock Characteristics		Refer to JIS E 4031 Appendix JB Class 1:A		
Operating Ambient Temperature		–10 to +60°C with no freezing		
Operating Force		3.2N(0.33kg)±1N(0.1kg) (Initial pressure), 5.5N(0.56kg) ±2N(0.2kg) (Stroke: 6.5mm)		
Connecting Terminal		Screw size : M4×6, Connect amp for M4 screw		
Approx, Weight		70g		

· Type PPMU-G

Type		PPMU-G40	PPMU-G31	PPMU-G22	PPMU-G13	PPMU-G04
Contact Arrangement		4NO	3NO1NC	2NO2NC	1NO3NC	4NC
Incorporated Bestact		R25				
Rated Insulation Voltage		250VAC (Power Frequency)				
Contact Performance		Refer to page 7.				
Mechanical Life		1,000,000 operations or greater (with no rapid release when pushing a pole)				
Insulation Characteristics	Insulation Resistance	20MΩ or greater (with 500VDC Megger)				
	Withstand Voltage (Power Frequency)	1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC)				
Vibration Characteristics		Refer to JIS E 4031 Appendix JA Class 2:B				
Shock Characteristics		Refer to JIS E 4031 Appendix JB Class 2:B				
Operating Ambient Temperature		−10 to +60°C with no freezing				
Operating Force		2.9N(0.3kg)±1N(0.1kg) (Initial pressure), 4.9N(0.5kg) ±2N(0.2kg) (Stroke: 7mm)				
Connecting Terminal		Screw size : M4×8, Connect amp for M4 screw				
Approx, Weight		120g				

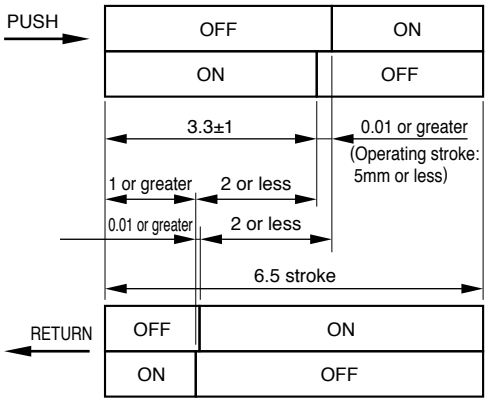
· Type PPMU-E

Type			PPMU-E □□ (First □ shows NO contact number and second □ shows NC contact number.)		
Contact Arrangement			1db + Glass sealed contact (5contacts) {NO or NC}		
Contact Structure			Open contact with magnetic blow (1contact) · Glass sealed contact (5contacts)		
Rated Insulation Voltage			250VAC (Power Frequency)		
Contact Performance	Incorporated Contact Type		Open contact	Bestact Type R15	
	Rated Continuous Current*1		5A	Refer to page 7 for Contact Performance.	
	Rated Operating Current	AC	250V, 3A		
		DC	110V, 0.5A (Time Constant : 100ms)		
	Maximum Breaking Current		110VDC, 5A (Time Constant : 100ms)		
	Contact Resistance		100mΩ or less		
	Minimum Operating Current		100VDC 10mA		
Operating Characteristics	Contact		1db (Air Break Contact)	NC	NO
	All Strokes		9mm or greater (Efficient stroke : 7mm)		
	Operating Point Distance		4.5±0.7mm	3.5±0.7mm	5.5±0.7mm
	Releasing Point Distance		4.5±0.7mm	1mm or greater	2.8mm or greater
	Contact Operation Order		—	With no overlap of NO/NC contact	
Insulation Characteristics	Insulation Resistance		100MΩ or greater (with 500VDC Megger)		
	Withstand Voltage (Power Frequency)		2500VAC for 1 minute, Leakage Current : 5mA	2500VAC for 1 minute, Leakage Current : 5mA (Across Open Contacts: 800VAC)	
Vibration Characteristics			Refer to JIS E 4031 Appendix JA Class 2:B		
Shock Characteristics			Refer to JIS E 4031 Appendix JB Class 2:B		
Mechanical Life			2,500,000 operations or greater under the condition at normal temperature / humidity in a general factory atmosphere.		
Operating Ambient Temperature			−20 to +80°C		
Operating Force			Initial pressure : 2.9N (300gf), Terminal pressure : 7.8N (800gf) (Stroke : 9mm)		
Enclosure			IP50 (Except for 1db contact)		
Approx, Weight			250g		
Connecting Method			With external connecting terminal M4×8 screw with plain / spring washer		

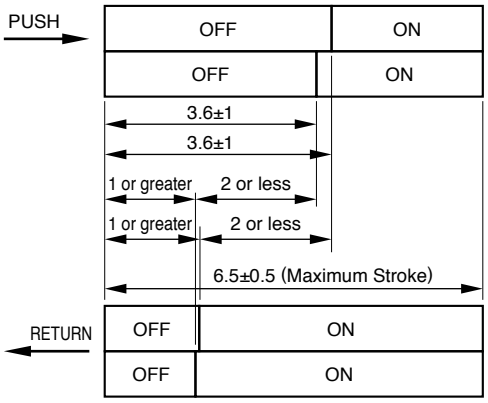
Note: *1. This is the current that can be energized to switching part continuously without exceeding the allowable temperature rise of each part under the condition without contact switching.

Operating Characteristics

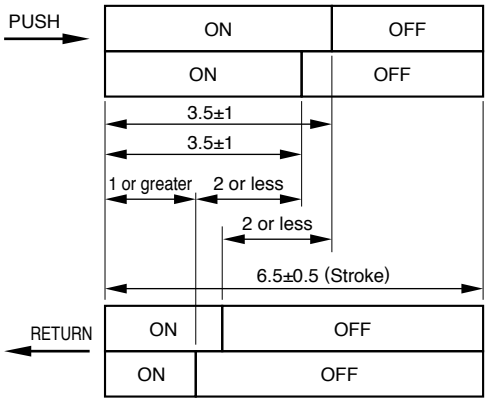
・Type PSPD-07G11



・Type PSPD-07G20



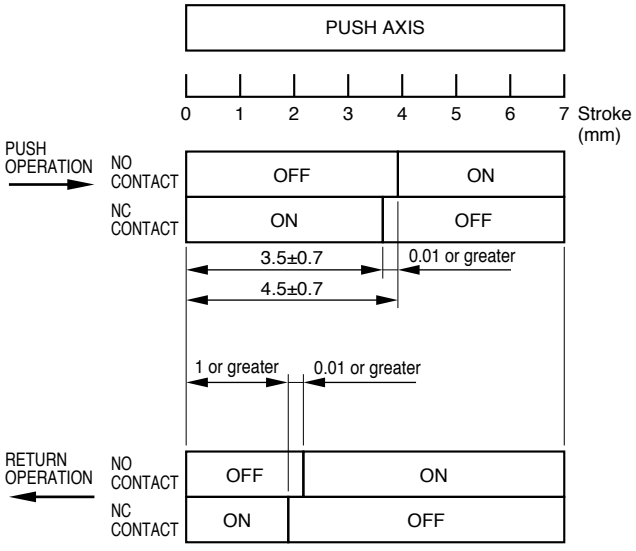
・Type PSPD-07G02



Note:Operate the plunger within the speed that the plunger can follow.
(Do not release the plunger rapidly.)

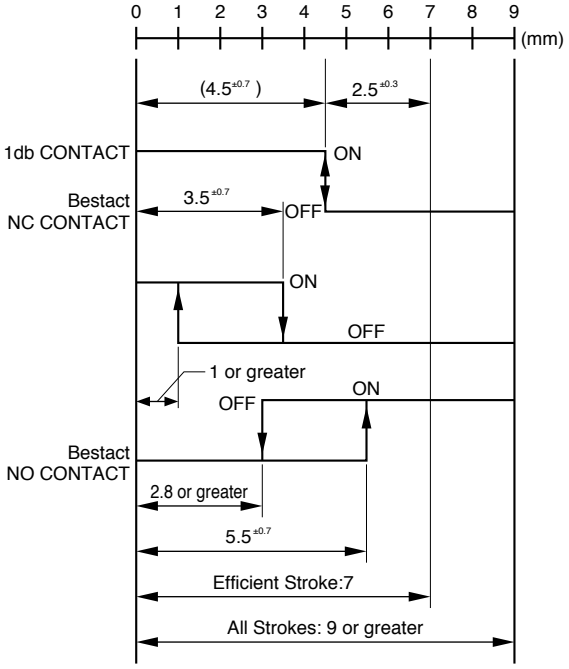
・Example of representative

Type PPMU-G
(Operation of NO contact and NC contact)



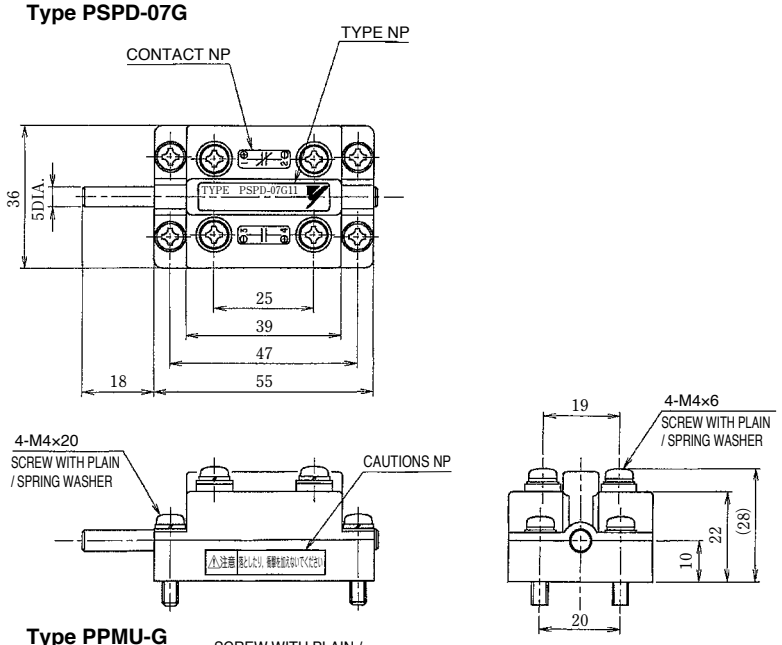
Note:Operate the plunger within the speed that the plunger can follow.
(Do not release the plunger rapidly.)

Type PPMU-E

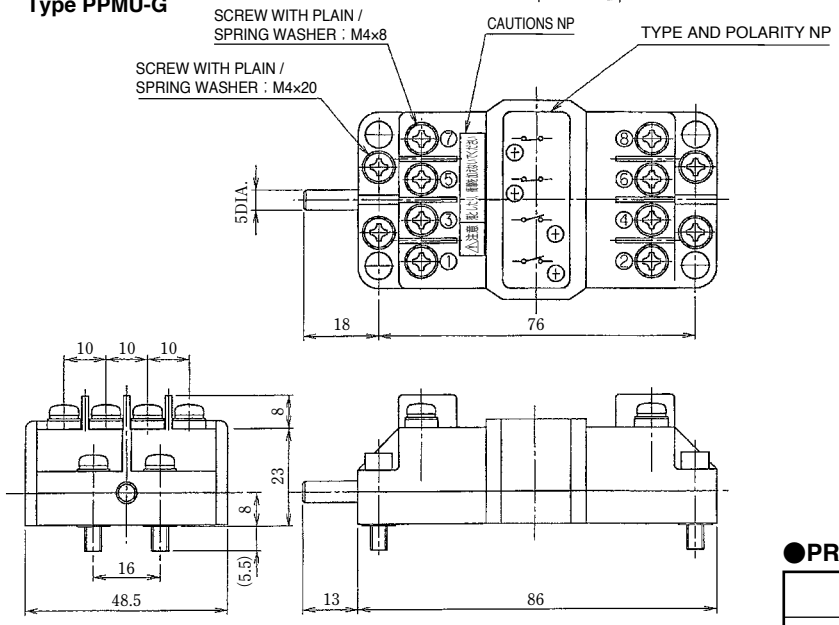


DIMENSIONS in mm

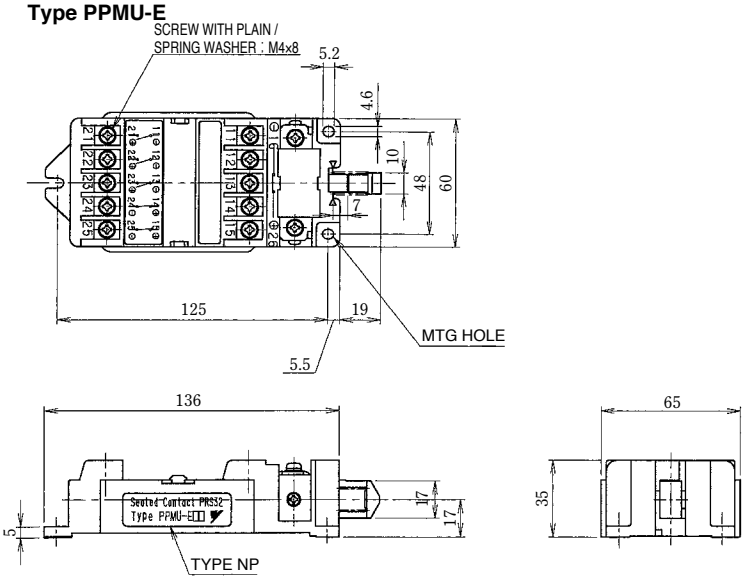
Type PSPD-07G



Type PPMU-G



Type PPMU-E



●PRECAUTIONS FOR MOUNTING

⚠CAUTION

●Switch mounting screw torque must be 0.98N·m (10kgf·cm)±10%. (Do not tighten screws too firmly to prevent them from damaging.)

⃠RESTRICTION

●This switch cannot be used where dust and cutting powder are present.
(They might come into a gear in the switch and lock it.)

●PRECAUTIONS FOR WIRING

⚠CAUTION

●When the switch is used in a DC circuit, connect cables to ⊕ /⊖according to the direction on NP.
(Failure to follow this instruction may result in cut-down of contact life.)
●Connecting wire must be 2mm² or less.
●Terminal screw torque must be 0.88N·m(9kgf·cm)±10%.
(Do not tighten screws too firmly to prevent them from damaging.)

RECOGNIZED / CERTIFIED PRODUCT LIST

UL Recognition

●Bestact Element

Type	Ratings	Standard No.	File No.
R25U	C300/Q150 120Vac 1/10HP　240Vac 1/8HP	UL508	E159361
R15U, R15T1	C600, B300/Q300 120Vac 1/6HP　240Vac 1/2HP		

●Magnetic Proximity Switches

Type	Ratings	Standard No.	File No.
PSMM-RPE1U	B300/Q300	UL508	E158813

●Relays

Type	Ratings	Standard No.	File No.
RI-B RI-C	C600, B300/Q300 120Vac 1/6HP　240Vac 1/2HP	UL508	E154773
RI-D RI-E	C300/Q150 120Vac 1/10HP　240Vac 1/8HP		

●Push Button Switches

Type	Ratings	Standard No.	File No.
PBR	C300/Q150 240Vac 360VA	UL508	E87146

CSA Certification

●Push Button Switches

Type	Ratings	Standard No.	File No.
PBR	C300/Q150 32Vac, 30Vdc 0.2A Resistive Load 32Vac, 30Vdc 0.1A Inductive Load 120Vac, 100Vdc 8VA Resistive Load 120Vac, 100Vdc 3VA Inductive Load	CAN/CSA-C22.2 No.0-M91 C22.2 No.14-05 C22.2 No.213-M1987	166980（LR21376）

TÜV SÜD Certification

●Relays

Type	Ratings	Standard No.	File No.
RI-D25MU/D12 RI-D25MU/D24 RI-D25MU/D48	C300/Q150 120Vac 1/10HP　240Vac 1/8HP	IEC 255-1-00:1975	B 96 10 23987 002

CCC Certification

●Magnetic Proximity Switches

Type	Ratings	Standard No.	File No.
PSMO-25G1, -25G2	AC15 220V/0.5A DC13 110V/0.3A	GB14048.5-2008	2011010305492940
PSMO-25D	AC12 220V/1A DC13 110V/0.5A	GB14048.5-2008	2009010305380877
PSMS-R3D1 PSMM-R3D1, -RPE1	AC12 220V/1A DC13 110V/0.5A	GB14048.5-2008	2009010305380870
PSMS-RV	AC12 220V/0.5A DC13 110V/0.3A	GB14048.5-2008	2009010305380871

●Push Button Switches

Type	Ratings	Standard No.	File No.
PBR, PBLR	AC15 220V/0.5A DC13 110V/0.3A	GB14048.5-2008	2009010305380872

●Selector Switches

Type	Ratings	Standard No.	File No.
PLRC-G	AC15 220V/0.5A DC13 110V/0.3A	GB14048.5-2008	2009010305380873
PLWG	AC15 220V/0.5A DC13 110V/0.3A	GB14048.5-2008	2009010305380875

●Relays

Type	Ratings	Standard No.	File No.
RI-B, -C	AC15 220V/1A DC13 110V/0.5A	GB14048.5-2008	2009010303377671
RI-D, -E	AC15 220V/0.5A DC13 110V/0.3A	GB14048.5-2008	2009010303377667
RZDR-E	AC15 220V/1A DC13 110V/0.5A	GB14048.5-2008	2009010303377669
RB-3P	AC15 220V/1A DC13 110V/0.5A	GB14048.5-2008	2009010303377670
RB3P-G, RB4P-G	AC15 220V/0.5A DC13 110V/0.3A	GB14048.5-2008	2009010303377668

Note: When you need the products with CCC certified markings, contact us before you order.

EN/IEC CERTIFIED OR CONFORMED TYPE LIST CE

●Bestact Element

Type	CE Marking	Low Voltage Directive			EMC Directive
		Certification No.	Certification Organization	File No.	
R25U	—	IEC 60947-5-1	TUV Product Service	TYOMAE15394A	Not Corresponding
R15U	Self Declaration is in preparation.				

●Relays

Type	CE Marking	Low Voltage Directive			EMC Directive
		Certification No.	Certification Organization	File No.	
RB-5AB	○	EN 61810-1 EN 60947-5-1	TUV Rheinland	AN 50128312 0001	Not Corresponding
RZDR-E	○	EN 61810-1 EN 60947-5-1	Self Declaration	—	Not Corresponding
RI	Self Declaration is in preparation.				
RB-2D	Self Declaration is in preparation.				
RB-3P	Self Declaration is in preparation.				
RB3P-G, RB4P-G	Self Declaration is in preparation.				

●Magnetic Proximity Switches

Type	CE Marking	Low Voltage Directive			EMC Directive
		Certification No.	Certification Organization	File No.	
PSMS-RV	○	EN 60947-1 EN 60947-5-1	Self Declaration	—	Not Corresponding
PSMO	○	EN 60947-1 EN 60947-5-1	Self Declaration	—	Not Corresponding
PSMS	○	EN 60947-1 EN 60947-5-1	Self Declaration	—	Not Corresponding
PSMM	○	EN 60947-1 EN 60947-5-1	Self Declaration	—	Not Corresponding

●Limit Switches

Type	CE Marking	Low Voltage Directive			EMC Directive
		Certification No.	Certification Organization	File No.	
PSKU, PIKU	○	EN 60947-1 EN 60947-5-1	Self Declaration	—	Not Corresponding

●Push Button Switches

Type	CE Marking	Low Voltage Directive			EMC Directive
		Certification No.	Certification Organization	File No.	
PBR, PBRU	○	EN 60947-1 EN 60947-5-1	Self Declaration	—	Not Corresponding

●Auxiliary Contact Switches

Type	CE Marking	Low Voltage Directive			EMC Directive
		Certification No.	Certification Organization	File No.	
PPUU, PSPD	Self Declaration is in preparation.				

〈COMMON PRECAUTIONS FOR USE〉

1 Handling ⚠CAUTION

Bestact is a hermetically sealed glass contact. Note the following when handling Bestact products.

(1) Do not hit the products, do not strike them against any instruments and do not drop them.
If the glass is cracked, they will not operate or their performance will decrease drastically.

(2) Do not apply excessive force to the terminals and cables.

2 Appication to direct current loads ⚠CAUTION

When the products are applied to DC loads, connect the contacts according to the specified polarity.
Electrical life might decrease drastically if the contacts are connected with the wrong polarity.

(1) For type RI, RB-3P and RB-5AB relays, connect even number to ⊕ and odd number to⊖.
For other relay units, connect the contacts at correct polarity described in the cautions.

(2) For detection switches, connect them at correct polarity according to the cautions for each connection.

3 Contact switching ratings ⃠ RESTRICTION

(1) When a current exceeding the maximum making current is applied, the contact might weld or the glass might crack.

(2) When a current exceeding the maximum breaking current is applied, the contact might weld or fuse and the glass might crack.
Do not apply voltage nor current exceeding the contact switching ratings to the contacts.

4 External magnetic field ⚠CAUTION

Do not use the products where there is external magnetic field of 1mT (10Gauss) or greater.
This might cause contact malfunction. (Except for Type RS-B18C on page 43)

5 Mounting ⃠ RESTRICTION

(1) When mounting magnetic proximity switches with lead entrances, do not mount them with the lead entrance pointing up.
Insulation characteristics might deteriorate if rain water enters the switches.

(2) When wiring magnetic proximity switches, do not change connecting cables.
Do not pull cables strongly.

6 Storage

⃠ RESTRICTION

Do not store the products in a place where they are exposed to rain water, high temperature / humidity, drastic temperature change, harmful gases / liquids or direct sunlight.

❗ REQUIREMENT

Contact Yaskawa or our local representatives if the products have been stored for a long time (three years or longer at normal storage condition).

Bestact

YASKAWA HERMETICALLY SEALED CONTACT

SAFETY PRECAUTION

- Before initial operation, read through the product's instruction manual and other attached document（s）thoroughly and use the product properly.
- Although the product is produced under strict quality control, you must apply a safety device if the product is applied to a machine for which malfunction can risk human life or may seriously damage facility.
- Wiring must be done by an expert of electrical wiring.
- Do not modify the product under any circumstances.

In this instruction, The NOTES FOR SAFE OPERATION are classified as "WARNING", "CAUTION" "RESTRICTION" or "REQUIREMENT"

⚠ WARNING	: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious personal injury.
⚠ CAUTION	: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate personal injury and/or damage to the equipment. In some instances, items described in ⚠CAUTION may also result in a serious accident. In either case, follow these important items.
RESTRICTION	: Indicates an action which must not be taken.
REQUIREMENT	: Indicates customer action is required.

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※ The sales departments are not included in the QMS.

Contact Us（Bestact & Control Equipment Division）

Email address : cbes@yaskawa.co.jp

Homepage URL

http://yaskawa-control.co.jp/english/index.html

YASKAWA

YASKAWA CONTROLS CO.,LTD.

Due to ongoing product modification/improvement, data subject to change without notice.

KAE-C542-0P〈2〉