

# Bestact INPUT/OUTPUT RELAYS

**Medium-Capacity** Type RI-D24MU, -E25MU  
(Standard type)  
**Large-Capacity** Type RI-B14MU, -C15MU  
(Standard type)  
Type RI-B14MHU, -C15MHU  
(High insulation type)

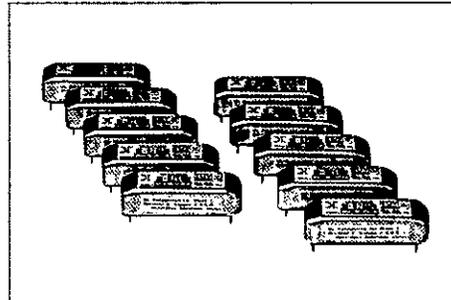
## Highly Reliable Interface Relays for Programmable Controllers, Microcomputer Control Systems

### FEATURES

1. Assures outstanding reliability in circuits of 100VAC/DC or greater as well as in electronic component circuits.
2. Universal output relay capability. Enables direct control over a wide range from TTL electronic level to large magnetic contactors or DC solenoid valves.
3. Requires no output relay board
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 energizing power (Medium-capacity type: 0.4W, Large-capacity type: 0.6W)
8. Recognized in accordance with USA and Canadian standards File No. E154773. For Class I, Division 2 Groups A, B, C, D Hazardous Locations.



Type RI-D24MU (only) Recognized in accordance with TÜV standard.



### TYPICAL APPLICATIONS

- I/O relays for industrial programmable controllers
- I/O relays for microcomputer modification 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-D24MU	RI-D25MU	RI-E25MU	RI-B14MU	RI-B15MU	RI-C14MU	RI-C15MU
	High Insulation Type		—	—	—	RI-B14MHU	RI-B15MHU	RI-C14MHU	RI-C15MHU
Contact Ratings	Contact Arrangement		1NO		1NC	1NO		1NC	
	Incorporated Bestact Type		R24U	R25U		R14U	R15U	R14U	R15U
	Operational Power Ratings (Inductive Load)	AC	200 V 0.5A			240A 1A			
		DC	100 V 0.3A			230V 0.2A, 115V 0.5A			
Minimum Operational Power Ratings		5V 1mA	24V 1mA*3		1V 1mA	24V 1mA*3	1V 1mA	24V 1mA*3	
Characteristics	Vibration Resistance		98.0m/s <sup>2</sup> {10G} or greater (20 to 1000Hz)			98.0m/s <sup>2</sup> {10G} or greater (20G to 1000Hz)			
	Shock Resistance	Erroneous Operation	147.0m/s <sup>2</sup> {15G}			147.0m/s <sup>2</sup> {15G}			
		Breakdown	980.0m/s <sup>2</sup> {100G} or greater			980.0m/s <sup>2</sup> {100G} or greater			
	Withstand Voltage (Across Input and Output)		1500VAC for 1minute (across contacts: 500VAC)			2000VAC for 1minute (across contacts: 800VAC)			
	Ambient Temperature	Operating Temperature	- 40 to +60°C			- 40 to +60°C			
		Storage	- 60 to +80°C			- 60 to +80°C			
Approx. Weight		15g		20g	35g		40g		

Note 1. For details of the contact ratings, service life, characteristics, etc., refer to the Ratings and Specifications, and Electrical Life on page 7, 9 and 10.  
2. Large-capacity can be used at ratings of 115VDC 0.5A or greater. For more information, contact Yaskawa.  
\*3. In circuit with optocoupler, 5V 10mA can be used.

## ☐ 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 $\Omega$	405	1520	5530	295	1160	4060	250	1020	3980	285	1080	3640
Rated Power Consumption W	0.4		0.5	0.45		0.55	0.6			0.6		0.7
Continuous Allowable Rated 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					
Releasing Voltage	8.5%E or greater						8.5%E or greater					

Note 1 Values tabulated indicate operations at ambient temperature of 20°C

2 Coil resistance values can vary by  $\pm 10\%$

3 Type RI-E and -C may erroneously operate if the maximum allowable power or voltage ratings are exceeded for a short period of time

## ☐ Bestact AUXILIARY RELAYS FOR ELECTRICAL POWER FACILITIES Type RI-B14T1U Type RI-C14T1U

### ☐ FEATURES

1 High contact reliability

Bestact products exceeding 2 million units have been employed under severe environmental conditions, and their ultra-high reliability of 4.8 FIT has been obtained from actual field results.

2 Large contact capacity

Since the maximum switching capacity is as large as 30A,

trip coil of power circuit breakers can be directly energized. Quick operating times of 3ms or less enables high-speed breaker actuation.

3. Incomparable use for PCB applications

A reduction in overall system cost can be realized due to compactness of relays and elimination of wiring/protective devices

### ☐ RATINGS AND SPECIFICATIONS

Type	RI-B14T2U	RI-B14T1U	RI-C14T1U
Contact Arrangement	1NO	1NO	1NC
Continuous Carrying Current Capacity	115VDC, 5A		
Closed-Circuit Capacity	115VDC 20A (L/R $\geq 5$ ms), time duration 0.5sec 240VAC 30A (PF=0.7)		
Open-Circuit Capacity	115 VDC 0.5A (L/R=100ms) 240 VAC 1A (PF=0.4)		
Minimum Operational Power Ratings	1V 1mA ( $\lambda_{\text{air}} = 1 \times 10^{-11}$ )		
Insulation Resistance	100M $\Omega$ or greater (500 VDC megger)		
Withstand Voltage	2200 VAC for 1 minute (across contacts) 1000 VAC for 1 minute)		
Thunder Surge Voltage Resistance	5000V 1.2 $\times$ 50 $\mu$ s (excluding across contacts)		
Operating Time	3ms (-20 to +60°C)	5ms or less (20°C)	5ms or less (20°C)
Releasing Time	3ms or less		7ms or less

### ☐ COIL SPECIFICATIONS (With polarity)

Type	RI-B14T2U		RI-B14T1U			RI-C14T1U		
Coil Voltage	12VDC	24VDC	12 VDC	24 VDC	48 VDC	12 VDC	24 VDC	48 VDC
Coil Resistance	130 $\Omega$	465 $\Omega$	250 $\Omega$	1020 $\Omega$	3980 $\Omega$	285 $\Omega$	1080 $\Omega$	3640 $\Omega$
Operational Voltage	75%E or less (-20 to +60°C)		75%E or less (20°C)					
Rated Power Consumption	1.1W		0.6W					
Continuous Allowable Voltage	1.5W (117%E)		1.5W (160%E)			1.3W (150%E)		
Short Time Allowable Voltage	6W, 2 sec						1.3W (150%E)	

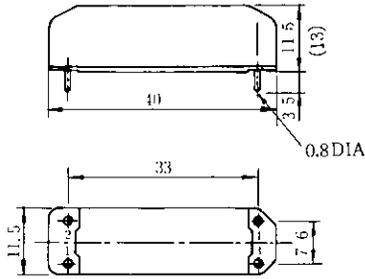
Note 1 Values shown above indicate operation at ambient temperature of 20°C

2 Coil resistance values can vary by  $\pm 10\%$ .

3 Type RI-C may erroneously operate if the continuous allowable voltage are exceeded for a short period of time

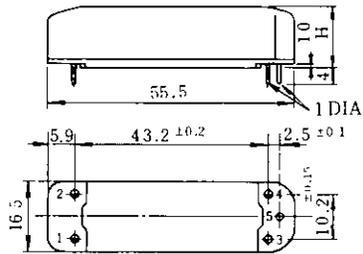
## □ DIMENSIONS in mm

### ● Medium-Capacity Type



• Value in parenthesis is where Type RI-E indicates.

### ● Large-Capacity Type



• Only TYPE RI-B□MU and RI-C□MU have terminal number 5, refer of the connections

Dim	Type	RI-B	RI-C
H		14.5	17

(Dimensions above also applied) to the Auxiliary Relays

## □ NOTE FOR INSTALLATION

### ● Connections

Bestact coils have a polarity. Connect for proper operation, terminal 3 to ⊕, and 4 to ⊖ as shown below.\*

(PIN CONFIGURATION (Bottom View))

RI-D24MU RI-D25MU	
RI-E25MU	
RI-B14MU RI-B15MU	
RI-B14MHU RI-B15MHU	
RI-B14T1U RI-B14T2U	
RI-C14MU RI-C15MU	
RI-C14MHU RI-C15MHU	
RI-C14T1U	

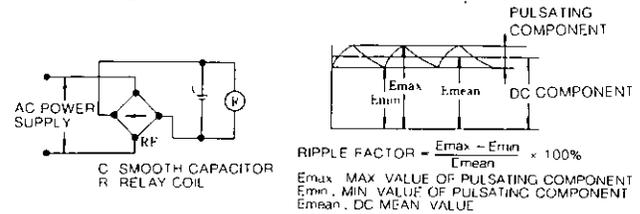
Note. \* Incorporating permanent biasing/helper magnet

### ● Terminal connections for DC loads

Type	Terminal No.		
	2	5	1
RI-D24MU, D25MU	+	—	—
RI-E25MU	+	—	—
RI-14MU, B15MU	+	—	—
RI-B14MHU, B15MHU	+	—	—
RI-B14T1U, B14T2U	+	—	—
RI-C14MU, C15MU	+	—	—
RI-C14MHU, C15MHU	+	—	—
RI-C14T1U	+	—	—

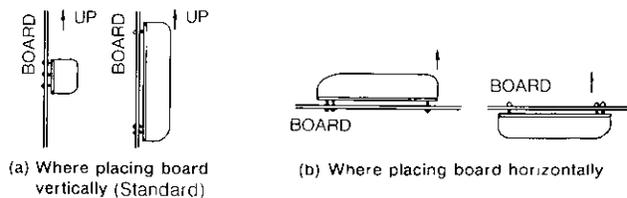
### ● Coil energizing sources

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.



### ● 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.



### ● Handling

Bestact is a hermetically sealed contact in a glass cartridge and it should be handled with special care as per the following :

- (1) To maintain their performance, do not drop or subject to impact shock.
- (2) Do not apply excessive force (3kg or greater tensile force) to the relay terminals.

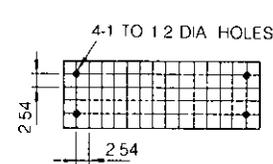
### ● External magnetic field

Since RI relays are magnetically sealed, abutting them does not cause any trouble. However, avoid using them in the strong external magnetic field or erroneous operations may occur.

### ● Mounting on printed circuit board

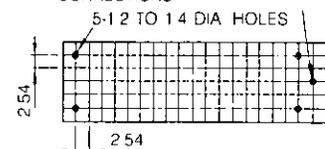
#### ● Medium-Capacity Type

Unit: mm



#### ● Large-Capacity Type

THIS HOLE IS UNNECESSARY FOR TYPE RI-C□H. REFER TO THE CONNECTIONS



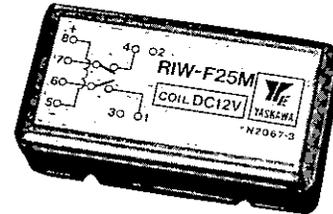
### ● Using without mounting on printed circuit boards

Where not mounted on the printed circuit board, mount and place wiring so as not to apply any force to the relay terminals. Avoid bending the terminal at its neck.

# TWO POLE TYPE INPUT/OUTPUT RELAYS Type RIW-M

## Highly Reliable Relays Solving Contact Problems of Mercury Relays

Two pole type I/O relays can supersede mercury relays that are widely used for vehicles and signals. In addition, these highly reliable relays have solved many contact problems that may occur using mercury relays.



### RATINGS AND SPECIFICATIONS

Type		RIW-F25M	RIW-G25M
Contact Arrangement		1NO1NC	2NO
Incorporated Bestact		R25U	R25U
Rated Operational Current	AC	240V 0.5A (inductive load)	
	DC	115V 0.3A (inductive load)	
Minimum Operational Power Ratings		24V 1mA*	
Vibration Resistance		98.0m/s <sup>2</sup> {10G} (20 to 1000HZ)	
Shock Resistance	Erroneous Operation	147.0m/s <sup>2</sup> {15G}	
	Breakdown	980.0m/s <sup>2</sup> {100G} or greater	
Withstand Voltage	Across Input and Output	1500VAC for 1 minute	
	Across Contacts	500VAC for 1 minute	
Ambient Temperature	Operating Temperature	-20 to +60°C	
	Storage	-25 to +80°C	

Note \*In circuit with optocoupler, maximum 5V 10mA can be used

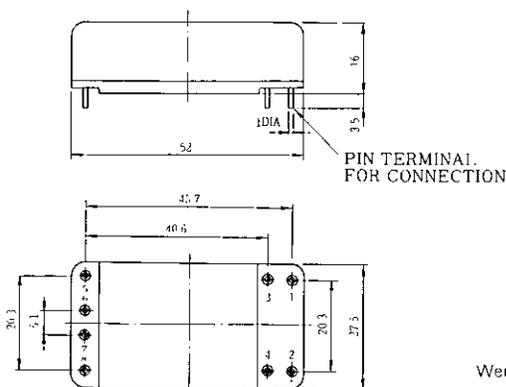
### COIL SPECIFICATIONS (With polarity)

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

Note 1: Values tabulated indicate operations at ambient temperature of 20°C

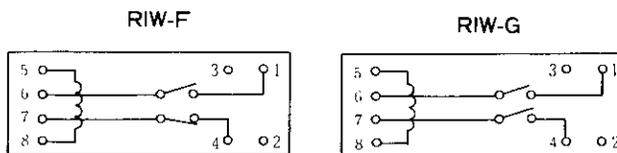
2: Each of NO and NC contact is independent. Therefore, the operating time of NO contact and NC contact may overlap

### DIMENSIONS in mm



Weight: 60g

### • Symbols and terminal markings (bottom view)



Note 1: For connection to coil terminals, connect terminal number 5 to ⊖ and terminal number 8 to ⊕

2: For application to DC circuit, connect terminal number 1 and 4 to ⊕ and terminal number 6 and 7 to ⊖