



YASKAWA  
CONTROL



### SAFETY PRECAUTION

Although the product(s) are produced under strict quality control and should not malfunction, if there is any chance for bodily harm or property damage while in use you must apply a safety device or other necessary measure to prevent this from happening.

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# Electric Power Facilities With Bestact



## Bestact for Electric Power Facilities

The sales department is not included in the environmental management system.

SIE-C542-27  
September 2008 08-9 0.5WA



ISO9001 JQA-0792  
ISO14001 JQA-EM0498

# Bestact's high reliability provides stability for electrical utility applications.

Since Bestact, a hermetically sealed glass contact power reed switch; was placed in service over 30 years ago; over 18 million have been used worldwide in applications such as transit train control, elevators and electric power facilities. High reliability is a fundamental requirement for electric transmissions lines with voltages of 500kV, long-distance power distribution monitoring systems and the electric substation facilities of railway/transit applications with around the clock stability.

These facilities are often exposed to adverse outside environments. Inclement weather such as typhoons, earthquakes or human disasters can affect the power transmission section in the affected area and must be stopped immediately for safety reasons while surrounding areas must continue to operate as before. Thus high reliability is required for electric power products.

Large scale systems are automated via computer control and the component reliability of the interface parts between the computer and the power device are becoming more and more important for secure and

safe operation.

In the case of short circuit faults, etc., computer control will trip the breaker, via "highly reliable contacts designed for infrequent use, quick reactive speed and large making/breaking capacity". High-frequency use and high contact reliability are required for reply relays in long distance distribution monitoring systems that monitor stable electric power supplies. Moreover, devices that confirm making / breaking operation of the disconnecting switch in a substation are obligated to transmit information of "ON" and "OFF" status to prevent maintenance personnel from electric shock hazards.

We believe that Bestact is the optimum solution in the field of electric power facilities that need safety, high reliability and maintainability. Bestact is often used in the aforementioned applications as high reliable power interface module. The following showcases our examples of use:

## Digital Protective Relay Devices

Digital protective relay devices are often used as protective relays (trip relays for breaker) to detect the breakdown in the power line and the distribution line

correctly and to separate the breakdown section from an active system quickly.

### Features of the Bestact relay as a protective device

- 1) Quick operating time; 3ms or less to help isolate the breakdown section.
- 2) Large contact closing capacity; 10,000 times or more, energizing the load of 110VDC, 15A ( L/R 5ms ) for 0.5 seconds for tripping coil excitation.
- 3) Large contact opening capacity; 100,000 times or more, energizing the load of 110VDC, 0.5A ( L/R = 40ms ) to break the holding coil current in the breaker.
- 4) High contact reliability making it suitable for infrequent use.



Protective relay devices in generating / transmission substation

- Relays mounted on PCB  
RI-B14T series  
RZDR-DT series  
RZDR-HT series



- Plug-in type relay  
RB-2PT series
- Fixed type relay  
RB-2DT series

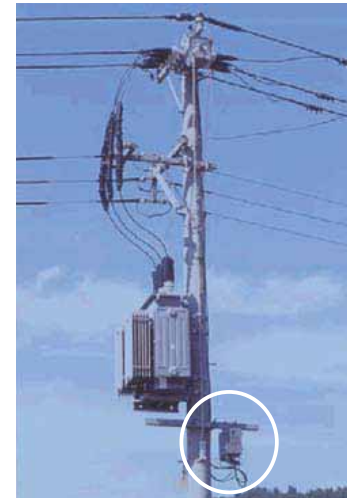


Trip relays utilizing Bestact for breakers

## Protective relays for monitoring distribution control systems

Monitoring the state of distribution lines is a requirement for stable electric power supply. Protective relays are used as a reply relay in the mobile unit of the monitoring control system for long-distance power distribution lines that provide detecting function of ground faults and short circuit faults. The mobile unit is

mounted on the electric pole and operates the switch via long-distance control from the branch office, so faults can be detected early. Relays incorporating Bestact are often used for this application.



Monitoring system mounted on utility pole

- Relays mounted on PCB  
RI-B14T1  
RI-D24T2  
RZDR-F20T



Reply relays incorporated Bestact



PCB mounted RI-D24T2 type relays for the reply function in the monitoring system

## ON / OFF confirmation (disconnect switch)

This switch provides indication of the ON or OFF state of disconnect switches to the power distribution board

correctly, and plays a vital role for safe operation for maintenance workers.

### Features of the switch incorporating Bestact that confirm ON / OFF operation

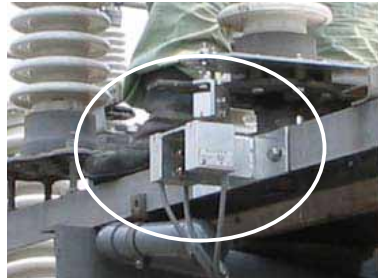
- 1) No trouble in the mechanism because there are no moving parts to wear out.
- 2) Extremely high contact reliability.
- 3) Very strong for adverse environments (dust, corrosion gas, rain water, salt damage, etc.) as sealed with an inert gas
- 4) Long life



Breakers mounted indoor / outdoor



Breaker-mounted switch incorporating Bestact



Switch incorporating Bestact that can confirm ON / OFF status



( Certified by Kyushu Electric Power Co, Inc. )

## Features of Bestact

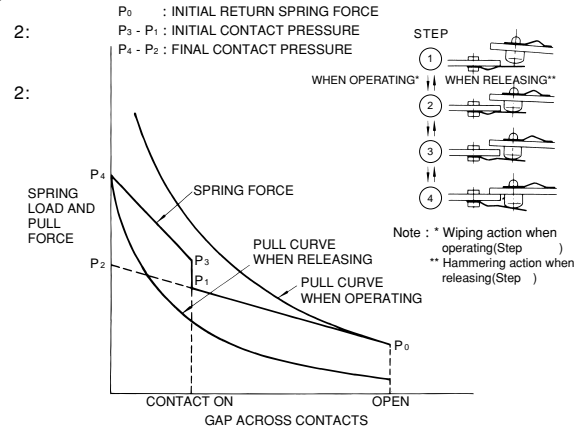
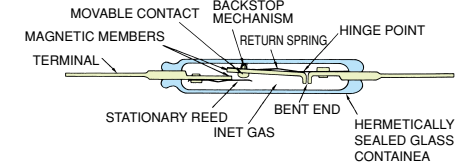
Highly Reliable Contact Employing New Materials and Innovative Designs such as Wiping and Hammering Action, Bifurcated Contact and Back-Stop Mechanism.

### Features

1. Sealed with an inert gas, ensuring freedom from aging and influences exerted by an adverse environment.
2. The twin contact and wiping effect assures outstanding contact reliability.
3. Hammering action and back-stop mechanism permits a larger make and break capacity and longer service life.

Bestact elements are manufactured according to IEC, EN, UL and CSA certification.  
 IEC 62246-2: Reed contact units - Part 2: Heavy-duty reed switches ( issued in Oct 2007 )  
 EN 62246-2: Reed contact units - Part 2: Heavy-duty reed switches ( issued in Dec 2007 )  
 UL & CSA File No. E159361

### CONSTRUCTION AND OPERATING MECHANISM



### Reliability and main applications

Reliability problems which have eluded even semi-conductor or photo-electric devices can be solved with Bestact.




Extensive investigation of the field failure rate of the reply relays utilizing Bestact for long distance distribution monitoring systems with severe environments and high frequency usage for 204 months (~17 years) from 1990 to 2007.

No trouble occurred in this period with over 180,000 relays in use.

- Industrial automatic control systems
- Computer and peripheral devices
- Transportation equipment and devices
- Waterworks and sewage equipment
- Electric power equipment, nuclear power facilities, extra-high voltage electric power facilities
- Shinkansen railway application
- Elevators
- Continuous casting machines
- Marine development application
- Various limit switches
- Thermal switches
- Cylinder position detection switches
- Low-level command and control switches
- Over-current and over-voltage detection switches
- Motor vehicle electrical instruments
- Valve position detection switches for liquid level control
- Explosion-protection equipments
- Machine safety switches

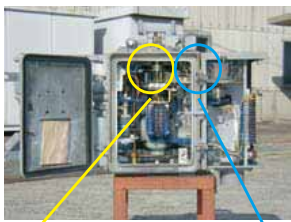
## Electrical Utility Usage

Over 2 million installed units from 1981 to April, 2007.

Application	Product Type	Approx. Accumulated	Main Customer
Trip relay for breaker	<ul style="list-style-type: none"> <li>Relay mounted on PCB</li> <li>RI-B14T series</li> <li>RZDR-DT series</li> <li>RZDR-HT series</li> <li>Plug-in type relay</li> <li>RB-2PT series</li> <li>Fixed type relay</li> <li>RB-2DT series</li> </ul> 	1,800,000	<ul style="list-style-type: none"> <li>Mitsubishi</li> <li>Hitachi</li> <li>Toshiba</li> <li>Fuji Electric Systems</li> <li>Meidensha</li> <li>Takaoka</li> <li>Nissin</li> <li>Yokogawa Electric</li> </ul> <p>End user</p> <ul style="list-style-type: none"> <li>Domestic and foreign electric power companies</li> <li>Japan Railways</li> <li>Private railway companies</li> </ul>
Reply relay for long-distance power distribution monitoring system	<ul style="list-style-type: none"> <li>Relay mounted on PCB</li> <li>RI-B14T1 series</li> <li>RI-D24T2 series</li> <li>RZDR-H20T2 series</li> </ul> 	180,000	<ul style="list-style-type: none"> <li>Yaskawa Electric</li> <li>KYUKI</li> <li>Seiko Electric</li> <li>Nishimu Electronics</li> </ul> <p>End user</p> <ul style="list-style-type: none"> <li>Kyushu Electric power</li> <li>Chugoku electric power</li> </ul>
ON / OFF confirmation (disconnect switch)	<ul style="list-style-type: none"> <li>Magnetic proximity switch</li> <li>PSMS-R2E/M215</li> <li>PSMS-RV1G1T/MV10T</li> </ul> 	3,000	<ul style="list-style-type: none"> <li>Seiko Electric</li> <li>Koudensha</li> </ul> <p>End user</p> <ul style="list-style-type: none"> <li>Kyushu electric power</li> <li>Hokkaido electric power</li> </ul>

Proposal of Bestact;

### Bestact auxiliary contacts improve reliability for disconnect switch



Auxiliary Contact that confirms operation (PPMU-E23 type)

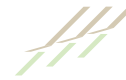


#### Features

- Maintenance-free for contacts
- High contact reliability employing glass sealed contact Bestact (No corrosion/oxidation due to hermetic seal)
- No contact failure from condensation
- Compatible mounting footprint.



Limit switch for self-holding circuit

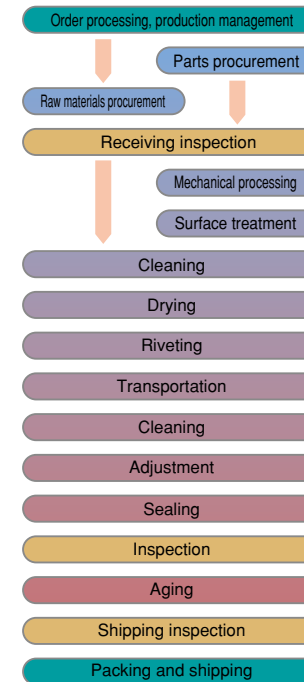


## High Reliability, Inherent in Stringent Quality Control

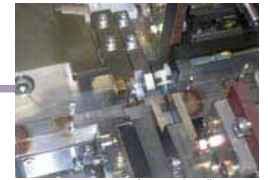
Bestact products are manufactured in the most advanced facilities, utilizing the expertise we have gained from years of ongoing research and development as well as empirical field data under a stringent quality control system. As example of this would be our production equipment, which automatically adjusts the spring load to the optimum value, thereby maximizing contact life and reliability.



### Quality management on the Bestact production line



Automatic contact riveting



Automatic adjustment



Sealing



Function testing