


Remote Breaker Reset Catalogue



Powering Business Worldwide

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Product Overview

The Remote Breaker Reset (RBR) is a product offering complementary to Eaton Heinemann Hydraulic Magnetic Circuit Breakers (HMCBs).

Eaton HMCBs already provided the capability to remotely trigger (open) the circuit breaker by sending a voltage signal to it. With the addition of RBR series, it can now trigger and reset the circuit breaker remotely.

The delocalization of electrical protections to less-accessible areas is now possible with the RBR technology, that allows users to reset remotely a circuit breaker after it has been triggered-opened.

Hydraulic magnetic circuit breakers allow for more precise, and secure electrical protection in harsh environments than traditional circuit breakers (resistance to shocks, vibrations, temperature variations, moisture, and atmospheric salinity), but in certain cases such as in overload or short circuit conditions, during testing exercises, when exposed to extreme conditions, or when a fault is detected, the system may still trip. This is where the RBR complements the Eaton HMCB product range perfectly and plays a key role.

By sending a pulse signal remotely to the RBR, a piston resets the breaker. Now, the user can safely reset the breaker from a distance without interacting directly with the critical function. Also, the critical function can now be placed out of location where space needs to be maximized for convenience, comfort, or profit (maximizing revenue) purposes.

Remote reset of circuit breakers is not compatible with Mid-Trip functionality offered on certain types of circuit breakers. The Mid-Trip function puts the handle in horizontal position in case of electrical triggering and requires a manual action to push the handle to "off" position before being closed again.

Typical Applications

Eaton RBR covers the widest range of applications in:

- Public Transport
- Rail
- Telecommunication
- Renewable Energy

Key Features

- **Wide Operating Voltage (24-48-72-110VDC):** Supports a broad range of applications.
- **Front Panel Mounting:** Simplifies installation and maintenance in compact spaces, utilizing only vertical space.
- **Available in 2 Sizes:** for mono and multipole circuit breakers.
- **Possible Hot Reset:** The speed of actuation allows a rapid closing of circuit breaker avoiding internal arcing and damages of contacts if circuit is powered.
- **Standalone Ordering:** More flexibility by enabling individual purchase for simplified ordering and stocking, without needing to bundle with the breaker.

Benefits



Decrease total cost of ownership

Reduce downtime and service repair costs by controlling breakers remotely.



Increase comfort and convenience

Now that the function can be delocalized, more space is available to increase comfort and convenience.



Function optimization

Optimize weight, size, and cost of the function by replacing contactors, motorized switches and protection devices.



Enhance revenue potential

Depending on the application, more space translates to more revenue. For rolling stock, increased seating space or passenger comfort can be maximized as critical functions are now placed into less-accessible places.

Principle of Operation

The sequence of events during a reset is shown in Figure 1. During normal operation, the circuit breaker is closed, allowing current to flow within the protected circuit. The handle is in the up position, and the breaker can remain in this state indefinitely. The RBR solenoid is not energized, and the piston is held in a retracted position by gravity.

If a short circuit or extended overload event on the protected circuit occurs, the breaker will trip to cut the current flow, and the handle will drop into the off position.

The RBR can then be activated by a signal pulse sent from the remote-control location. This energizes the solenoid, which pulls the piston upwards to strike the circuit breaker handle and reset it, allowing current to flow again in the protected circuit. As the pulse signal returns to zero, the solenoid de-energizes and simply returns to the retracted position by gravity.

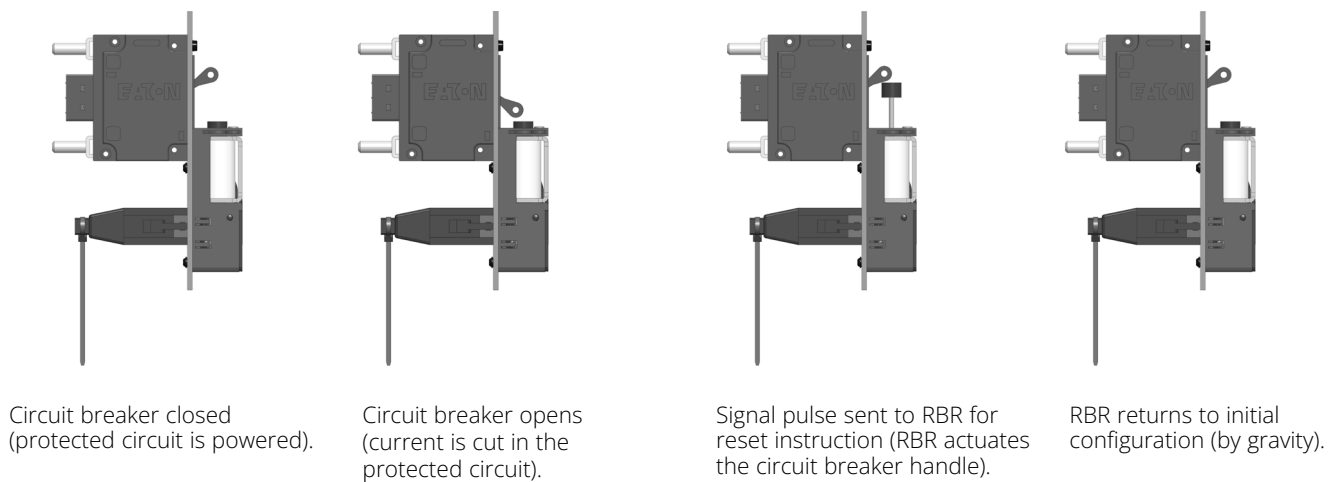
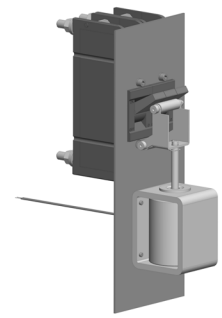
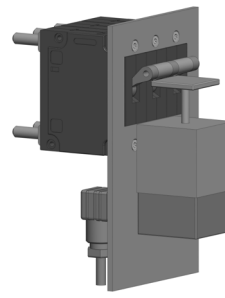
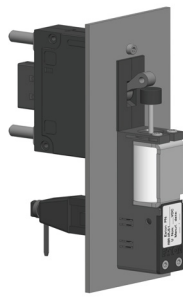


Figure 1: Sequence of RBR operation



Technical Specifications



Series	ARJS-1 (for AR or JS series)	ARJS-4 (for AR or JS series)	GJ-4 (for GJ or GJ1P series)
Maximum number of poles to reset			
	1 pole	up to 4 poles	up to 4 poles
Electrical characteristics			
Operating voltage Un (VDC) Power Current (A)	24 (11.8A) – 72VDC (4.6A) 110 VDC (3.4A)	24 (7.6A) – 48VDC (3.9A) 72 (2.5A) – 110VDC (1.9A)	24VDC (12.6A)
Voltage range	-30% to +25% of Un		
Type of signal	Voltage pulse		
Voltage withstand	Min. 500VAC (RBR rated 24 and 48VDC) or min. 1000VAC (RBR rated 72 and 110VDC)		
Insulation resistance	>20 MΩ		
Operating conditions, standards and approvals			
Approvals - Rail	Design conforms to EN 50155, IEC 61373 (Cat 1, class B), EN 45545-2 (HL3 R26)		
Electromagnetic compatibility	Design conforms to EN 50121-3-2		
Endurance	Min 10'000 cycles		
Voltage pulse duration on CMD	0.2 to 0.8s	0.8 to 2s	0.8 to 2s ¹
Duty cycle of coil	1% (3s out of 300s)	5% (15s out of 300s)	5% (15s out of 300)
Resting time between 2 pulses	Recommended 30s		
Self-protection against long pulse	No	Yes	Yes (only with PPC-24 ²)
IP level (IEC 60529)	IP41	IP64	IP02
Environmental regulations and directives	REACH and RoHS		
Climatic environment			
Operating temperature	OT4 according EN 50155 (-40°C to +70°C or -40°F to +158°F)		
Low temperature, Dry heat and Cyclic damp heat	EN 60068-2-1; EN 60068-2-2; EN 60068-2-30		
Salt spray test	EN IEC 60068-2-11, test Ka (48 hours minimum)		
Physical characteristics			
Dimensions WxHxD (mm)	19x 60x 20mm	35 x 61.5 x 35mm	60 x 195 x 70mm
Dimensions WxHxD (inches)	0.75" x 2.36" x 0.79"	1.38" x 2.42" x 1.38"	2.36" x 7.68" x 2.75"
Weight	65 g (2.29 oz)	300 g (10.6 oz)	2'100 g (74 oz)
Mounting, Terminals			
Power Connection	SMS 3 pin	SMS 3 pin / Hirschmann 4 Faston	Flying leads
Mounting plate thickness	1.5 to 2.5mm (0.059" to 0.098")	2.0 to 5.0mm (0.079" to 0.197")	2.0 to 5.0mm (0.079" to 0.197")
Mounting direction	Vertical	Vertical	Vertical

Note: Technical information may differ by product variation. Please contact your Eaton representative for more detailed information.

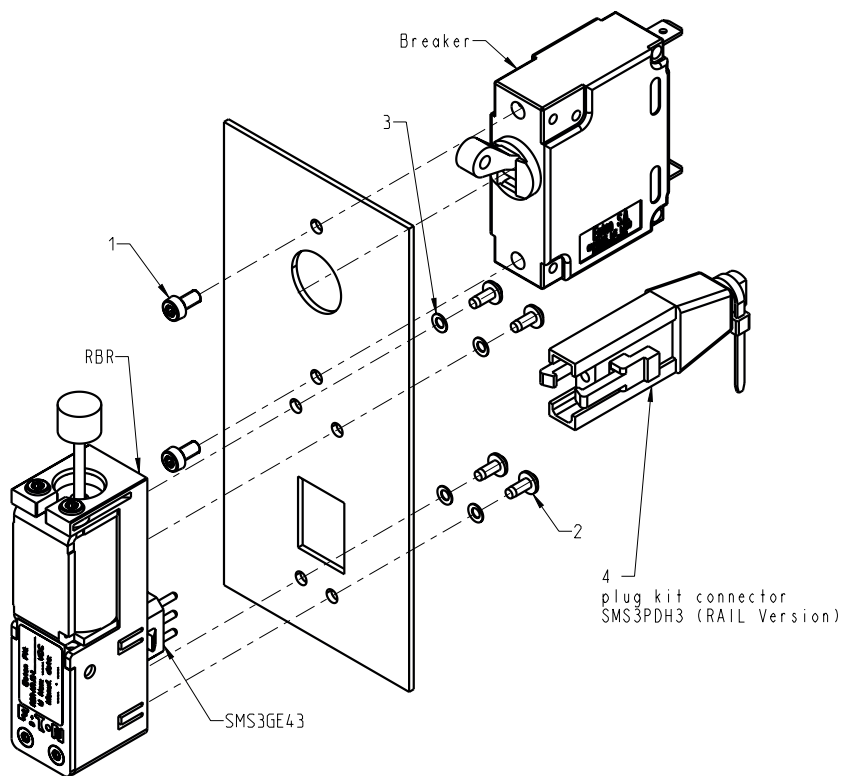
In the interest of continual product improvement, all specifications are subject to change without notice.

¹ Pulse not generated by RBR. Requires external device (i.e. PPC-24 or another controller).

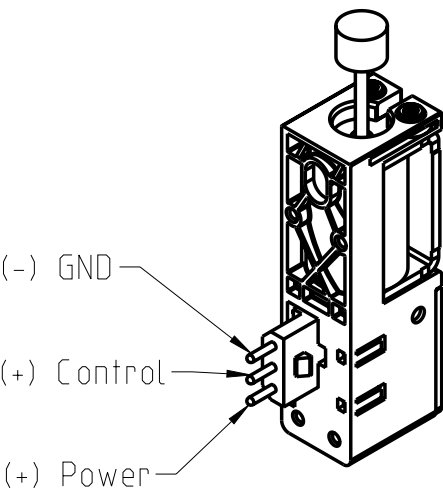
² The PPC-24 is a controller designed to work with the RBR system and GJ series circuit breakers. It generates 1 to 1.5-second calibrated pulses to power the RBR for remote resetting and to switch off the circuit breaker using an optional release coil. The controller reduces current consumption for controlling coils and addresses issues with switching on self-inductive circuits.

Technical Drawings: ARJS-1 (JS series)

Exploded View



Connection Interface



Mounting Hardware

	Item (1)	Item (2)	Item (3)	Item (4)
Front Plate Thickness	Screw ISO 14580	Screw WN 5451	Washer DIN 137 A	Plug Kit
1.5 mm to 2.5 mm	M3x6 EATON P/N: K10722LL	M2.5x6 EATON P/N: K10541LL	M2.5 EATON P/N: K10542LL	EATON P/N: K20000LL

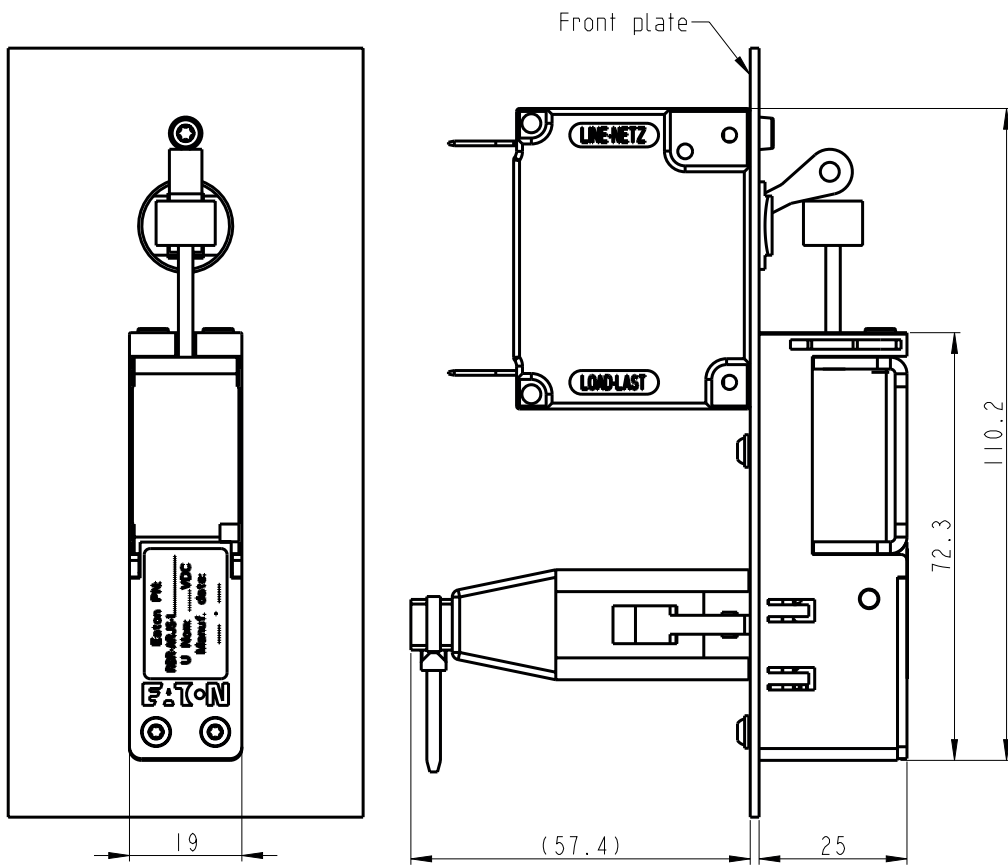
The control remote is delivered with items 2, 3 and 4.

Item 4 includes plug, female contact, and clamp.

Notes: contact Eaton for panel cut-out and for all technical information.

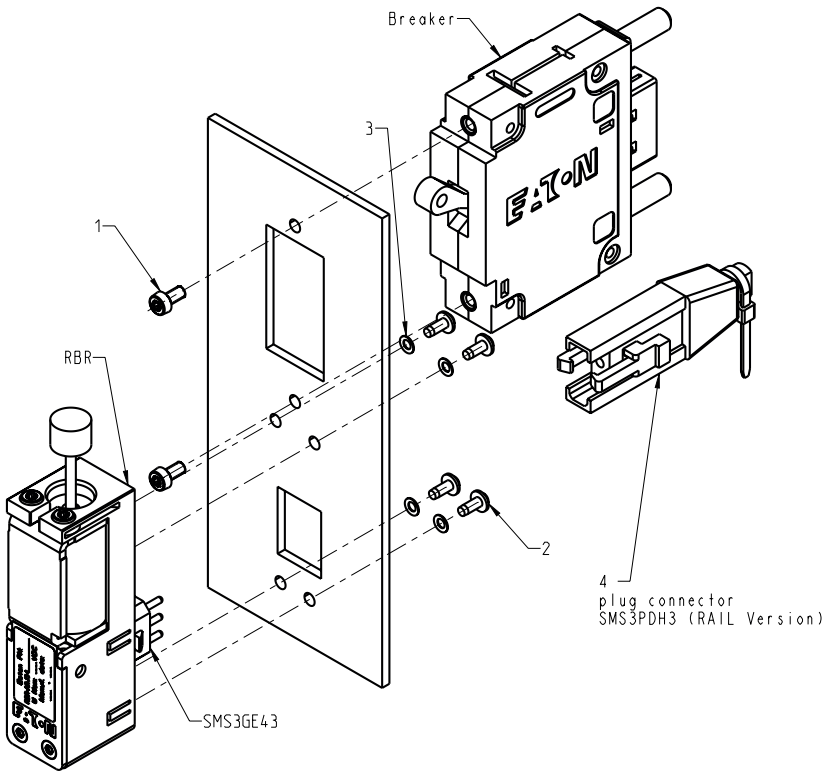


Front and Side View

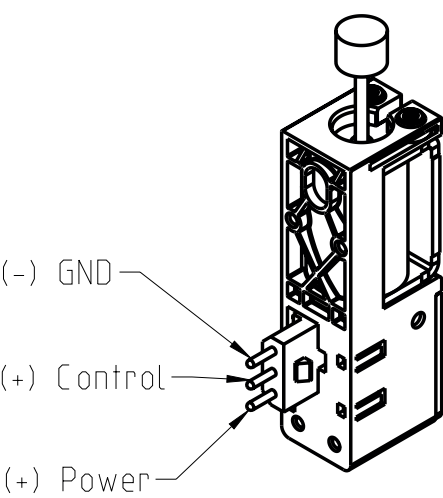


Technical Drawings: ARJS-1 (AR series)

Exploded View



Connection Interface



Mounting Hardware

	Item (1)	Item (2)	Item (3)	Item (4)
Front Plate Thickness	Screw ISO 14580	Screw WN 5451	Washer DIN 137 A	Plug Kit
1.5 mm to 2.5 mm	M3x6 EATON P/N: K10722LL	M2.5x6 EATON P/N: K10541LL	M2.5 EATON P/N: K10542LL	EATON P/N: K20000LL

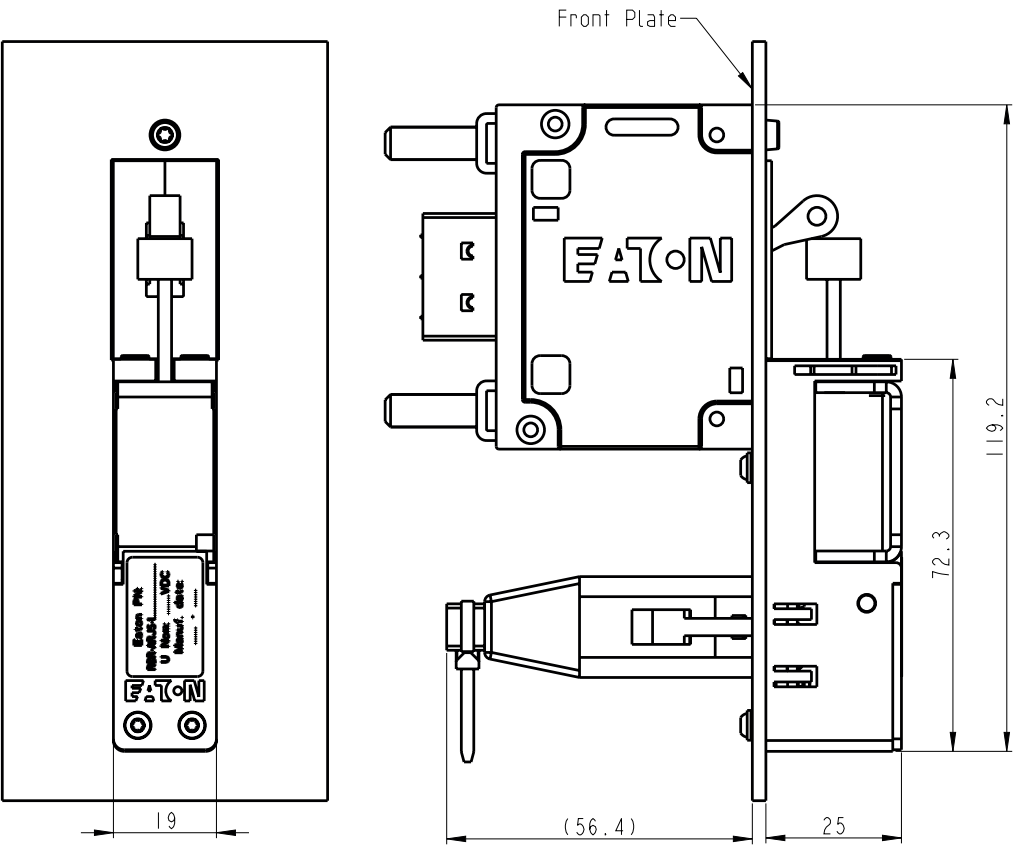
The control remote is delivered with items 2,3 and 4.

Item 4 includes plug, female contact and clamp.

Notes: contact Eaton for panel cut-out and for all technical information.



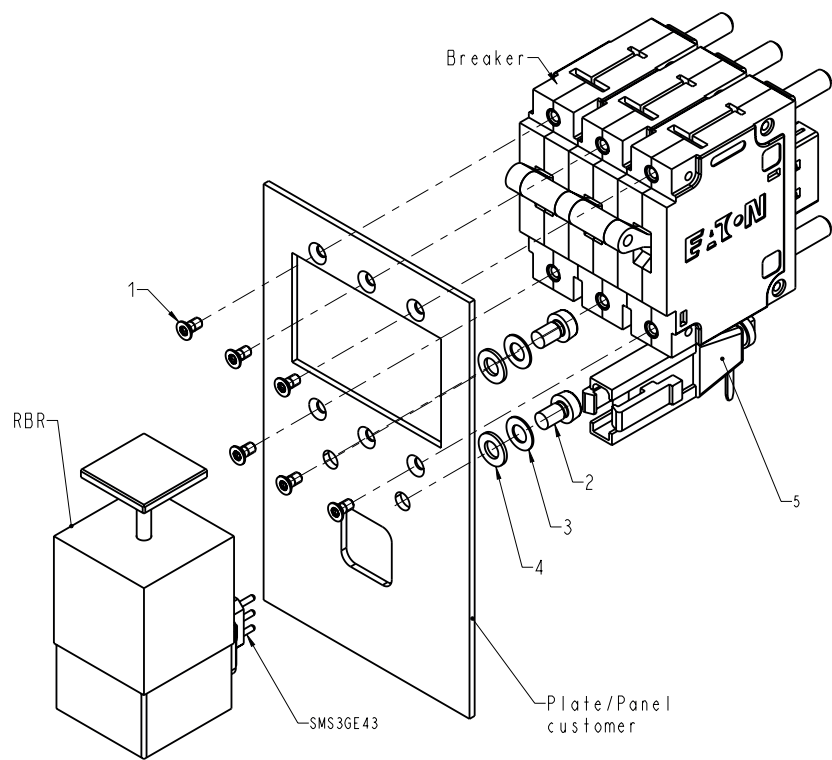
Front and Side View



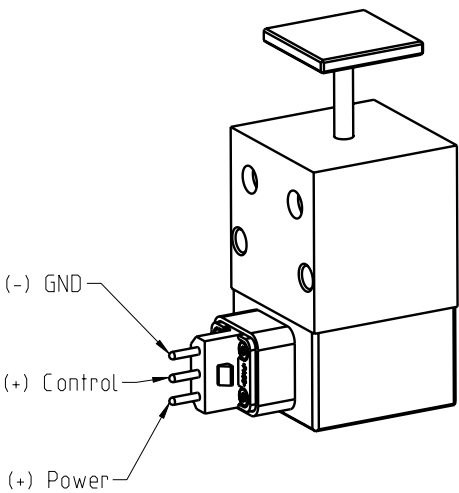
Technical Drawings: ARJS-4 (SMS 3 pin connector)

ARJS-4 (SMS 3 pin connector)

Exploded View



Connection Interface



Recommended Mounting Hardware

	Item (1)	Item (2)	Item (3)	Item (4)	Item (5)
Front Plate Thickness	Screw ISO 14581	Screw ISO 14580	Security Washer	Flat Washer	Plug Connector
2.0 mm	M3x8	M5x8	M5 DIN 137 A (DIN 137 B) NFE 27-260 or NFE 25-511	M5 ISO 7089 (DIN 125 A)	SMS3PDH3 (Housing) EATON P/N: RC16M23K (Female contact) or *EATON P/N: K20000LL
3.0 mm	M3x8	M5x10			
4.0 mm	M3x10	M5x10			
5.0 mm	M3x10	M5x12			

Eaton recommends using flat washers + security washers to fix the RBR on the plate.

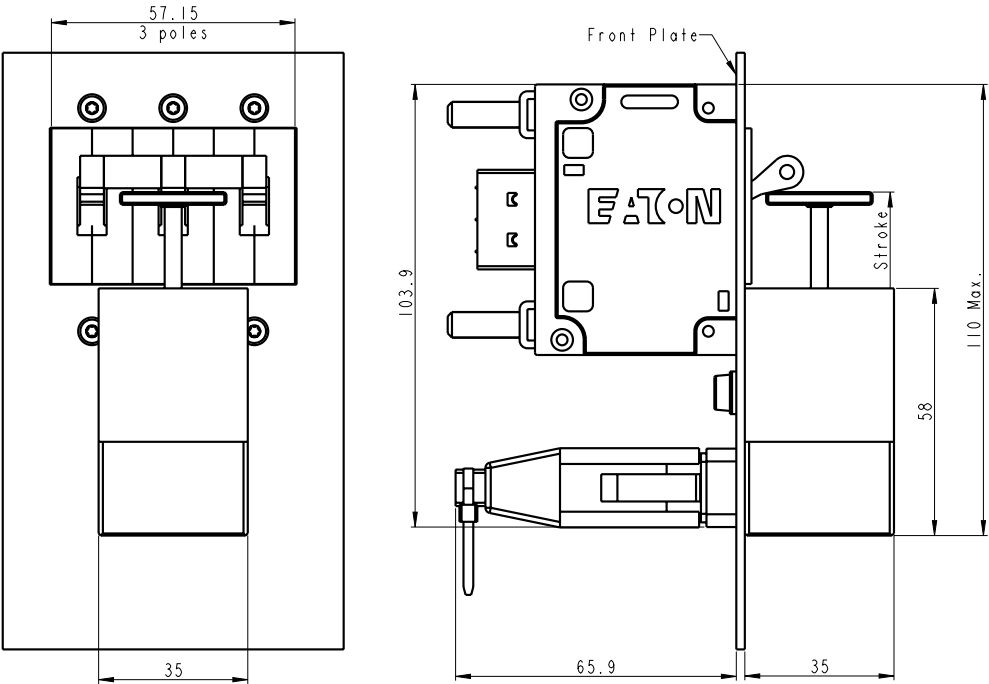
Length of screw to be adapted according to washer thickness.

*Plug connector kit (Item 5) can be ordered using Eaton P/N K20000LL.

Notes: contact Eaton for panel cut-out and for all technical information.

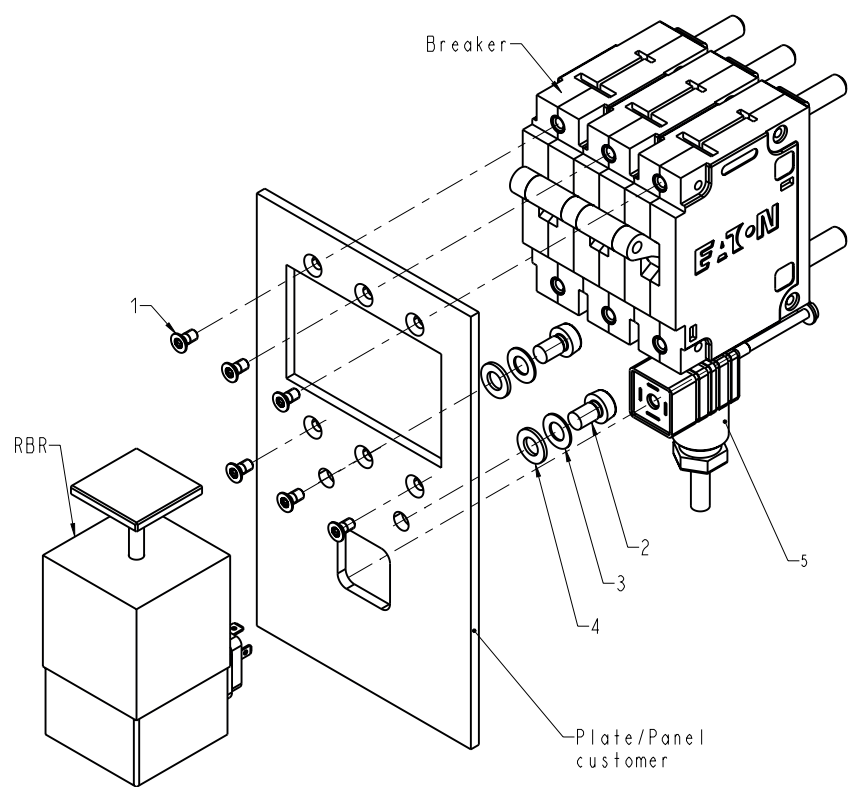


Front and Side View

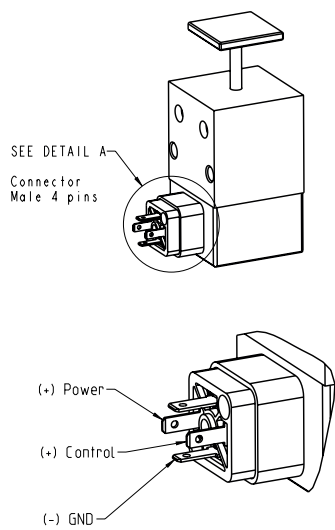


Technical Drawings: ARJS-4 (Hirschmann 4 Faston connector)

Exploded View



Connection Interface



Recommended Mounting Hardware

		Item (1)	Item (2)	Item (3)	Item (4)	Item (5)
Front Plate Thickness	Dimension "A"	Screw ISO 14581	Screw ISO 14580	Security Washer	Flat Washer	Plug Connector
2.0 mm	66.80 mm	M3x8	M5x8	M5 DIN 137 A (DIN 137 B) NFE 27-260 or NFE 25-511	M5 ISO 7089 (DIN 125 A)	GDS 307 includes fixing screw
3.0 mm	66.20 mm	M3x8	M5x10			
4.0 mm	65.60 mm	M3x10	M5x10			
5.0 mm	65.00 mm	M3x10	M5x12			

Eaton recommends using flat washers + security washers to fix the RBR on the plate.

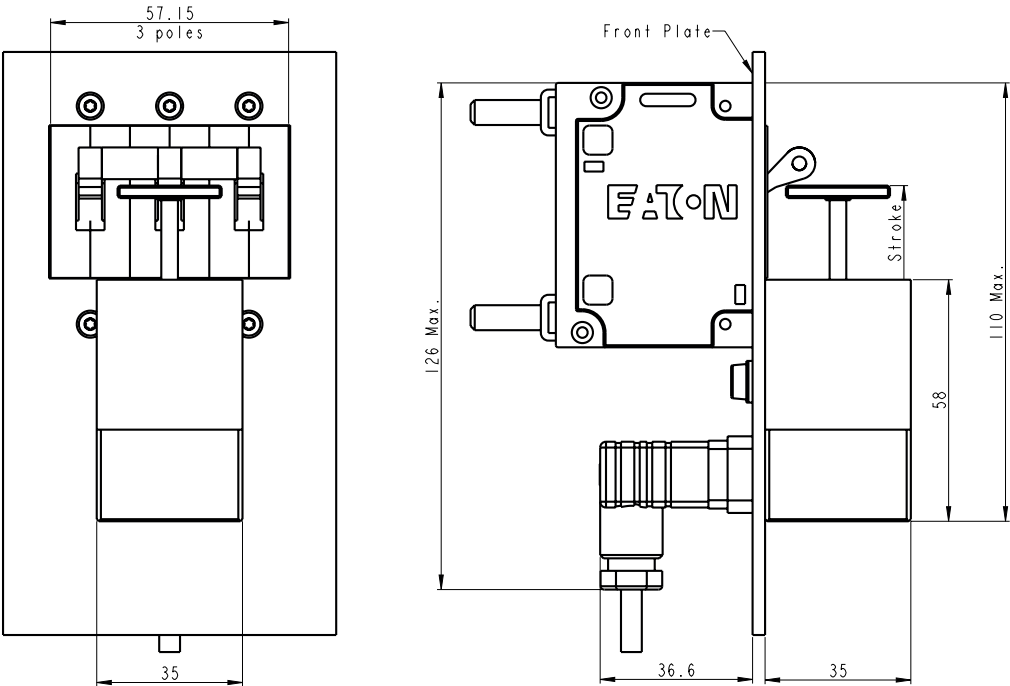
The control remote is delivered with item 5.

Length of screw to be adapted according to washer thickness.

Notes: contact Eaton for panel cut-out and for all technical information.

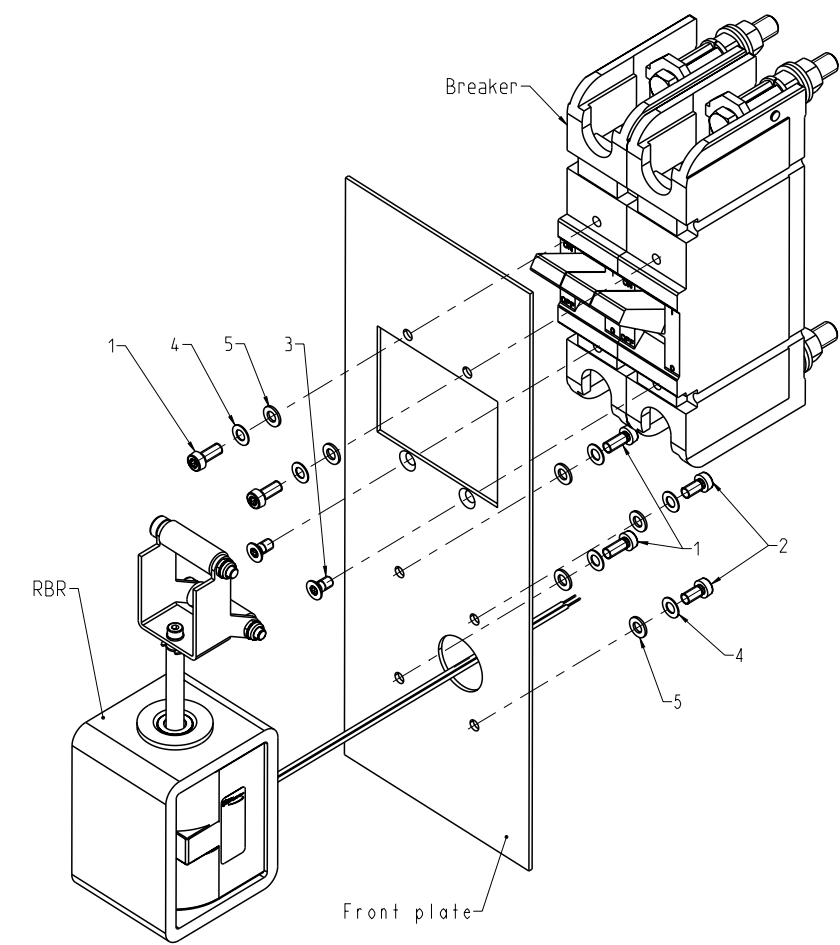


Front and Side View



Technical Drawings: GJ-4

Exploded View



Mounting Hardware

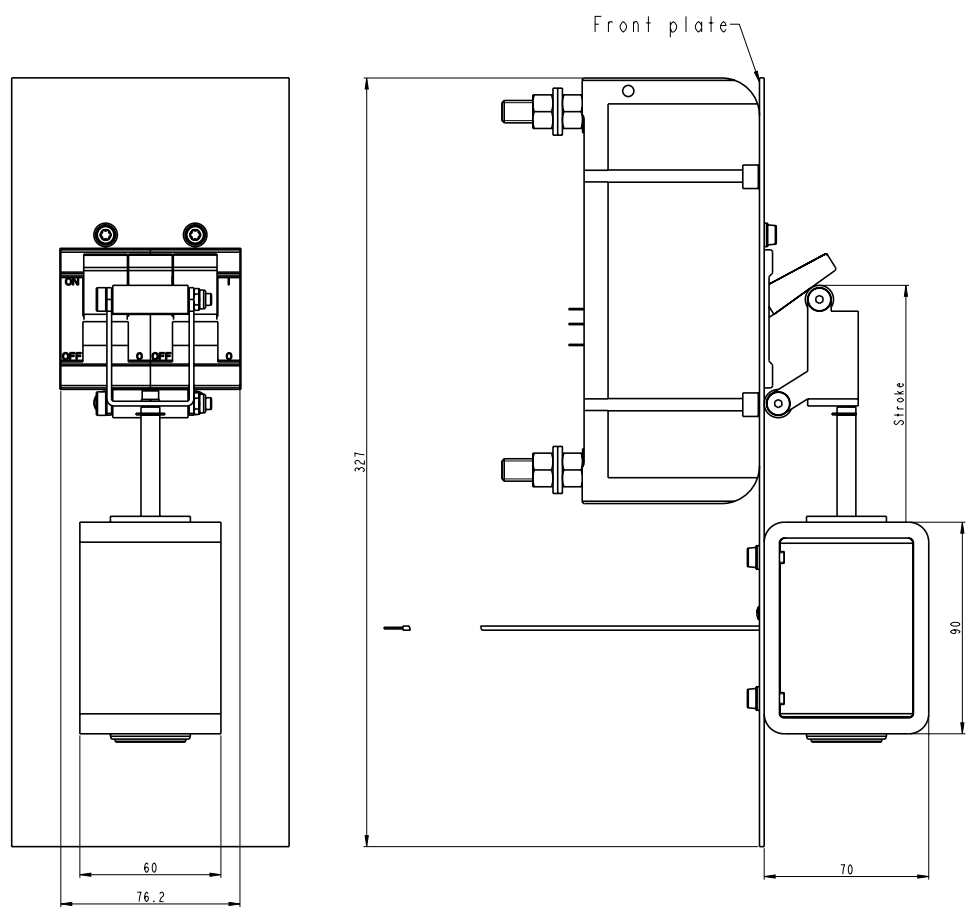
	Item (1)	Item (2)	Item (3)	Item (4)	Item (5)
Front Plate Thickness	Screw ISO 14580	Screw ISO 14580	Screw ISO 14581	Security Washer	Flat Washer
2.0 mm	M5x12	M5x10	M5x10	M5 DIN 137 A (DIN 137 B) NFE 27-620 or NFE 25-511	M5 ISO 7089 (DIN 125 A)

Length of screw to be adapted according to front plate thickness.

Notes: contact Eaton for panel cut-out and for all technical information.



Front and Side View



Application Examples



Every saved Kilogram counts

Industry: Public transport

Heinemann RBR products have been confirmed by a customer in France who aimed to improve efficiencies by reducing weight in trams in multiple cities in France. As part of this load-reduction exercise, they started this exercise by optimizing the critical function.

Results: With the successful implementation of the RBR in combination of Heinemann HMCBs, a 75% reduction in volume size and a reduction of 30% in weight of the critical function was achieved by replacing contactors, motorized switches, and protection devices, without affecting performance.

Increasing operator profitability

Industry: Rail

A train operator in China aimed to increase their profitability by including more seats per car without jeopardizing on passenger comfort, safety, and keeping the level of control of electrical protection cabinets.

Results: Pairing Heinemann HMCBs with the RBR was the solution to save more space inside the cars and delocalizing the electrical cabinet to outside the coach. This not only allowed the technicians to keep a total remote control (triggering and resetting of breakers), but also enabled the operator to place two extra seats per car, which in turn generated additional income of up to USD 0.5M per train (for an 8-car train).

Ready for Retrofit

Industry: Rail

A train operator in France aimed to improve the operation of the motor fan protection system responsible for cooling the main transformer in a renovation project for regional trains. The main transformer, motor fan, and circuit breaker are located in a high-voltage cabinet that is only accessible to expert technicians. Train personnel are not allowed to open this cabinet. If there's an electrical fault or a significant overload on the motor fan, the circuit breaker will trip to protect the equipment. When this happens, the main transformer stops being cooled, which brings the train to a halt, requiring either an expert to reset the circuit breaker or a locomotive to tow the train to the nearest technical center.

Results: The RBR was proposed to allow for the remote reset of the circuit breaker protecting the motor fan. The RBR was installed inside the high-voltage cabinet, with a button for operation placed outside. This action restores power to the motor fan, ensuring the cooling of the main transformer and allowing the train to continue to the nearest technical center. The costs of a towing service are saved, as well as time for an expert technician to arrive and access the cabinet to manually reset the breakers.

Keeping Wind Turbines Spinning

Industry: Renewable Energy

A wind farm operator spends thousands of dollars daily, due to unplanned maintenance from failures in the pitch subsystem in wind turbines, which is responsible for controlling how much energy a turbine extracts.

Since some turbine towers reached heights of up to 150 meters, the conditions turbines need to endure are harsh and include significant temperature fluctuations, vibrations and even shocks.

Results: Heinemann HMCBs were proposed in combination with Remote Breaker system to protect critical equipment in the nacelle (housing that protects the components that convert wind into electricity), thanks to their proven resistance to shocks and vibrations and their ability to work within a temperature range of -40°C to 85°C without derating.

These breakers offer consistent and exact tripping points regardless of ambient temperature variations, allowing for precise rating settings that ensure best protection of equipment and infrastructure (such as cables) without the need for oversizing, which is a common issue in electrical designs.

Additionally, to minimize unnecessary climbs into the nacelle by technicians, Heinemann breakers were coupled with RBRs to control them remotely (triggered or reset with a pulse signal). Costs were saved now that there is no need for technicians to climb the turbine towers to manually reset breakers that trip. Since it is estimated that failures in the pitch subsystem contribute to 20% of wind turbine downtime, Eaton Heinemann can help mitigate these related costs.

Breaker Automation for Telecom Efficiency

Industry: Telecommunications

In Spain, a telecommunications and internet provider sought to optimize the time and type of tasks technicians would perform on the field, such as disconnecting and reconnecting data services to certain customers who would consume all their data allowance, as per their contract, or whenever a contract would come to an end, or restart. This is a very cumbersome and repetitive task which needs to be automated.

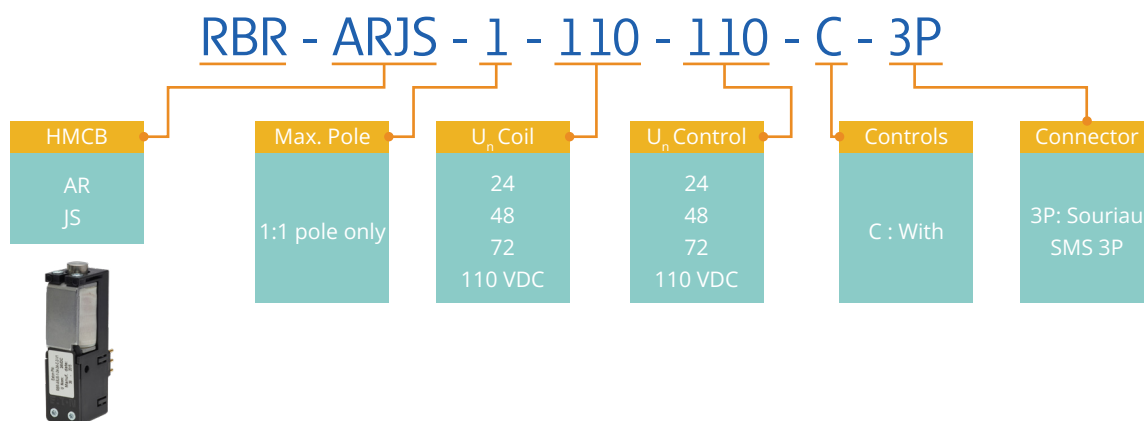
Results: HMCBs are already necessary for telecommunication panels which are usually placed outdoors and need to withstand fluctuating temperature variations, so in addition, RBRs were proposed to control the breakers remotely. Think of it as an ON/OFF switch thanks to a pulse signal that can activated remotely to trip the breaker, therefore "switching off" the services, and then a shorter pulse signal that activated the RBR so that the data service can be restored. This solution is cost and time effective, since no technicians are needed to intervene, but also avoids the use of sophisticated and expensive equipment to do the same job. Sometimes the simplest solution is the best one to take.



Placing an order for the RBR

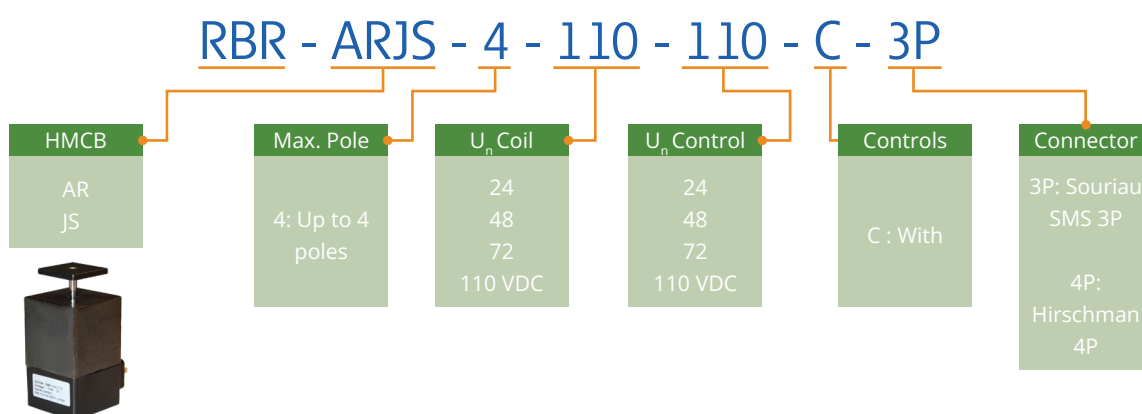
This information is presented as a tool to develop catalogue numbers for selecting RBR units.

For AR and JS series : 1 pole



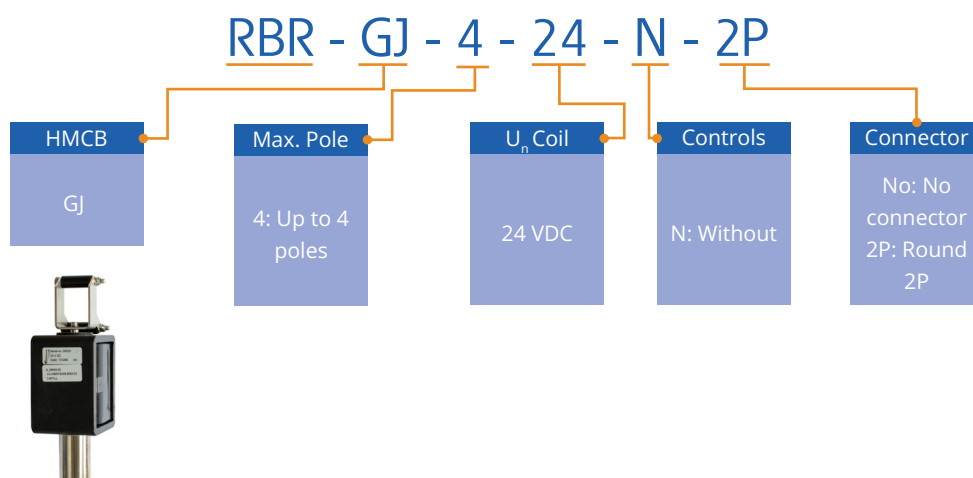
Note: Not delivered with female connector.

For AR and JS series: up to 4 poles



Note: Female connector only delivered when combined with a Hirschmann connector.

For GJ series: up to 4 poles



We make what matters work. *

- * At Eaton, we believe that power is a fundamental part of just about everything people do. Technology, transportation, energy and infrastructure—these are things the world relies on every day. That's why Eaton is dedicated to helping our customers find new ways to manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. To improve people's lives, the communities where we live and work, and the planet our future generations depend upon. Because that's what really matters. And we're here to make sure it works.

See more at Eaton.com/whatmatters

For more information, visit
Eaton.com/HMCB

For more information on a specific application,
pricing and custom orders on RBR series,
contact us at: LeLieuSwitzerland@eaton.com

