

RMB

SERIES

INSTANTANEOUS BISTABLE (LATCHING) RELAYS 7 TO 20 CONTACTS

APPLICATIONS



Shipbuilding



Petroleum industry



Heavy industry



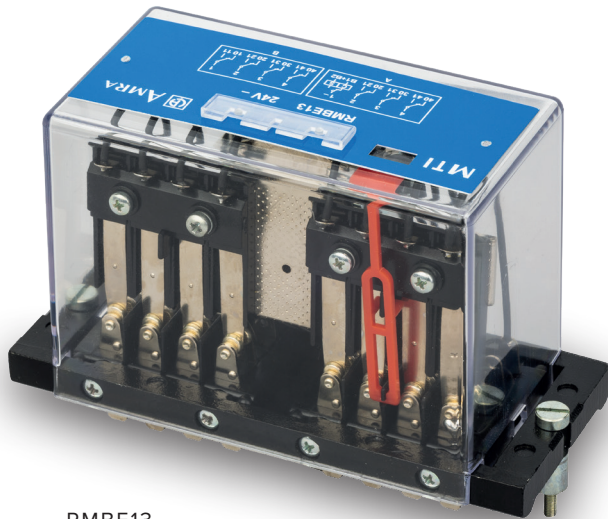
Power generation



Power distribution



Railway equipment



RMBE13

OVERVIEW

- Plug-in instantaneous bistable relay
- Solid and rugged construction for heavy or intensive duty
- Very high electrical life expectancy and exceptional endurance
- Pulsed or permanent power supply, AC or DC
- Self-cleaning knurled contacts
- Fitted with mechanical optical contact status indicator as standard
- Lever for manual operation (optional)
- Wide variety of configurations and customizations
- Transparent cover, fixing/pulling screws
- Label holder in cover for customer's use
- Positive mechanical keying for relay and socket

DESCRIPTION

RMB relays are multipole bistable types sharing the same basic mechanical design as those of the RGB series, and offering the same specifications and performance.

Available in versions with from 7 to 20 change-over contacts, these highly reliable products provide top performance and are suitable for applications in particularly harsh and unsettled environments, such as high voltage electricity distribution stations and medium voltage substations.

An automatic coil de-energization system ensures that power consumption of the relay reduces to zero once the operating cycle has been completed. Versatility in manufacture allows the production of relays with any voltage from 12 to 250VDC / 440VAC, and with a variety of operating ranges adaptable to different application requirements.

The contacts used are of a type designed to give notable levels of performance both with high and strongly inductive loads, and with particularly low loads; knurled contacts ensure not only better self-cleaning characteristics, but also lower ohmic resistance thanks to multiple points of electrical connection, thereby extending the electrical life expectancy of the component.

All models offer the facility of manual operation, so that tests can be performed even in the absence of electrical power.

To ensure that the relay remains firmly anchored to the sockets, these are equipped with fixing screws, so that there is no need for the use of retaining clips.

A product of proven reliability, as demonstrated by its use for over 40 years in electrical energy transport and distribution systems, and fixed equipment used in the railway sector.

Like all AMRA relays, models of the RMB series are assembled as part of a controlled manufacturing process in which every step of production is verified by the next step in succession. In effect, each relay is calibrated and tested individually, by hand, in such a way as to guarantee top reliability.

STANDARD COMPLIANCY

EN 60695-2-10

EN 60529

EN 61810-1

EN 61810-2

EN 61810-7



MODELS	NUMBER OF CONTACTS	POWER INPUT TO COILS
RMB.x3	7	Common negative
RMBZ12	8	Coils galvanically separated
RMB.x5	11	Common negative
RMBZ13	12	Coils galvanically separated
RMB.x7	19	Common negative
RMBZ14	20	Coils galvanically separated



FOR PRODUCT CODE CONFIGURATION, SEE THE "ORDERING SCHEME" TABLE



COIL DATA	RMB.x3	RMB.x5 - RMB.x7	RMBZ12	RMBZ13 - RMBZ14
Nominal voltages at Un ⁽¹⁾	DC / AC: 12 - 24 - 48 - 110 - 125 - 132 - 144 - 230 - 250 - 380 ⁽²⁾ - 440 ⁽²⁾			
Consumption at Un (DC/AC) ⁽³⁾	15 W / 15 VA	30 W / 30 VA	19 W / 19 VA	36 W / 36 VA
Operating range	DC: 80...120% Un - AC: 85...110% Un			
Type of duty	Continuous			

Minimum control pulse 50ms

(1) Other values on request

(2) Maximum value, AC = 380V 50Hz - 440V 60Hz

(3) Only on latch and unlatch stage. After relay switching, power consumption is zero, as the coil de-energizes automatically



CONTACT DATA	RMB.x3	RMBZ12	RMB.x5	RMBZ13	RMB.x7	RMBZ14
Number and type	7 SPDT, form C	8 SPDT, form C	11 SPDT, form C	12 SPDT, form C	19 SPDT, form C	20 SPDT, form C
Current	10A					
Nominal ⁽¹⁾	20A for 1min - 40A for 1s					
Maximum peak ⁽²⁾	150A for 10ms					
Maximum pulse ⁽²⁾	0.5A - 110Vdc - L/R 40ms - 10 ⁵ operations - 1,200 operations/hour					
Example of electrical life expectancy ⁽³⁾	200mW (10V, 10mA)					
Minimum load ⁽⁴⁾ Standard contacts	50mW (5V, 5mA)					
Gold-plated contacts ⁽⁵⁾	350 VDC / 440 VAC					
Maximum breaking voltage	AgCdO					
Contact material	RMB.x3	RMBZ12	RMB.x5	RMBZ13	RMB.x7	RMBZ14
Operating time at Un (ms) ⁽⁶⁾	DC - AC	DC - AC	DC - AC	DC - AC	DC - AC	DC - AC
Pick-up (NC contact opening)	≤ 8 - ≤ 20	≤ 9 - ≤ 20	≤ 9 - ≤ 20	≤ 10 - ≤ 20	≤ 8 - ≤ 20	≤ 8 - ≤ 20
Pick-up (NO contact closing)	≤ 30 - ≤ 35	≤ 26 - ≤ 37	≤ 32 - ≤ 37	≤ 33 - ≤ 37	≤ 25 - ≤ 35	≤ 25 - ≤ 36
Drop-out (NO contact opening)	≤ 9 - ≤ 25	≤ 8 - ≤ 25	≤ 8 - ≤ 20	≤ 9 - ≤ 22	≤ 8 - ≤ 25	≤ 9 - ≤ 27
Drop-out (NC contact closing)	≤ 56 - ≤ 65	≤ 40 - ≤ 60	≤ 50 - ≤ 60	≤ 36 - ≤ 57	≤ 43 - ≤ 53	≤ 43 - ≤ 58

(1) On all contacts simultaneously, reduction of 30%

(2) Maximum peak and pulse currents are those currents that can be handled, for a specified time, by the contact. They do not refer to steady or interrupted currents

(3) For other examples, see electrical life expectancy curves

(4) Values referred to a new product, measured in laboratory. The ability to maintain this performance over the time depends on the environmental conditions and the contact' frequency use
The use of gold plated contacts is recommended in the case of very low loads. For a correct contact use, refer to the chapter "Installation, operation and maintenance".

(5) A gold contact, if subjected to high loads, degrades superficially. In this case, the characteristics of the standard contact must be considered. This does not affect the operation of the relay

(6) Unless specified otherwise, operating times are understood as comprising stabilization of the contact (inclusive of bounces)



INSULATION	
Insulation resistance (at 500Vdc)	
between electrically independent circuits and between these circuits and ground	> 10,000 MΩ
between open contact parts	> 10,000 MΩ
Withstand voltage at industrial frequency	
between electrically independent circuits and between these circuits and ground	2 kV (1 min) - 2.2 kV (1 s)
between open contact parts	2 kV (1 min) - 2.2 kV (1 s)
between adjacent contacts	2 kV (1 min) - 2.2 kV (1 s)
Impulse withstand (1.2/50μs - 0.5J)	
between electrically independent circuits and ground	5 kV
between open contact parts	5 kV

MECHANICAL SPECIFICATIONS		RMB.x3 - RMBZ12	RMB.x5 - RMBZ13	RMB.x7 - RMBZ14
Mechanical life expectancy		20x10 ⁶ operations		
Maximum switching rate	Mechanical	900 operations/hour		
Degree of protection		IP40		
Dimensions (mm)		132x58x84 ⁽¹⁾	188x58x84 ⁽¹⁾	300x58x84 ⁽¹⁾
Weight (g)		450	760	1,140

(1) Output terminals excluded.

ENVIRONMENTAL CHARACTERISTICS	
Operating temperature	-25 ÷ +55°C
Storage and shipping temperature	-25 ÷ +70°C
Relative humidity	Standard: 75% RH - Tropicalized: 95% RH
Fire behaviour	V0

STANDARDS AND REFERENCE VALUES	
EN 61810-1, EN 61810-2, EN 61810-7	Electromechanical elementary relays
EN 60695-2-10	Fire behaviour
EN 60529	Degree of protection provided by enclosures

Unless otherwise specified, the products are designed and manufactured according to the requirements of the above-mentioned European and International standards.

In accordance with EN 61810-1, all technical data are referred to ambient temperature of 23°C, atmospheric pressure of 96kPa and 50% humidity.

Tolerance for coil resistance and nominal power is ±7%.

CONFIGURATIONS - OPTIONS	
TROPICALIZATION	Surface treatment of the coil with protective coating for use with RH 95%.
GOLD PLATING	Surface treatment of the contacts, with gold-cobalt alloy ≥ 5μ (since 2023, May). This treatment ensures long-term ability of the contact to conduct lower currents.
FLYBACK DIODE	Component connected in parallel to the coil designed to dampen overvoltages generated by the coil when de-energized.
LEVER FOR MANUAL OPERATION	Allows manual operation of the relay, with the cover closed, using a screwdriver.

ORDERING SCHEME

PRODUCT CODE	APPLICATION ⁽¹⁾	CONFIGURATION A	CONFIGURATION B	TYPE OF POWER SUPPLY	NOMINAL VOLTAGE (V) ⁽²⁾	FINISH ⁽³⁾	KEYING POSITION CODE ⁽⁴⁾
RMB	E: Energy F: Railway Fixed equipment	1: Standard	3: 3 SPDT contacts	C: Vdc A: Vac 50 Hz H: Vac 60 Hz	012 - 024 - 048 110 - 125 - 132 144 - 220 - 230 250 - 380 - 440	T: Tropicalized coil M: Manual operation ⁽⁶⁾	XX
		3: Diode //	5: 11 SPDT contacts				
		4: Gold plating	7: 19 SPDT contacts				
		6: Gold plating + Diode //					
		Z12 - 8 SPDT contacts ⁽⁵⁾					
		Z13 - 12 SPDT contacts ⁽⁵⁾					
		Z14 - 20 SPDT contacts ⁽⁵⁾					

RMB	E	4	3	C	110		SAH
RMBE43-C110-SAH = ENERGY series relay, with 7 SPDT gold-plated contacts, 110Vdc coil and keying position SAH							
RMB	F	1	4	C	110		
RMBF15-C110 = RAILWAY series relay, fixed equipment, with 11 SPDT contacts, 110VDC coil							
RMB	Z	1	2	C	110	T	
RMBZ12-C220 = Relay with 8 SPDT contacts, 110VDC tropicalized coil							

1. **ENERGY:** All applications except for railway.

RAILWAYS, FIXED EQUIPMENT: application on fixed power systems and electrical railway traction.

For list of RFI compliant and type-approved products, consult dedicated catalogue "RAILWAY SERIES - RFI APPROVED".

Also available is the **STATIONS** series, with ENEL approved material meeting LV15/LV16 specifications.

For list of ENEL compliant and type-approved products, consult dedicated catalogue "STATIONS SERIES - LV15-LV16-LV20"

2. Other values on request. Voltages 380V and 440V available as Vac only.

3. Optional value. Multiple selection possible (e.g. TM).

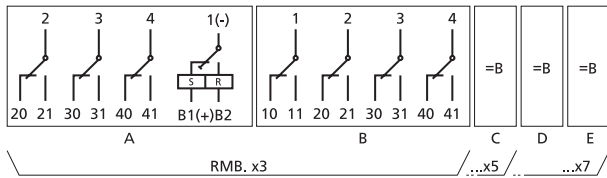
4. Option value. The positive mechanical keying is applied according to the manufacturer's model.

5. Suitable for "E" and "F" applications. Gold-plated (2μ) contacts and terminals available on request.

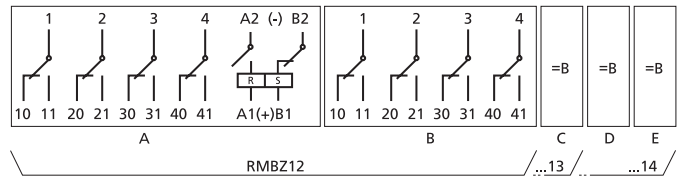
6. With manual operation, no optical indicator.



WIRING DIAGRAM



RMB.x3 - RMB.x5 - RMB.x7



RMBZ12 - RMBZ13 - RMBZ14

NOTE:

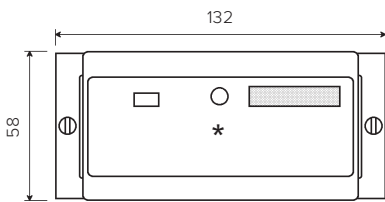
Coils nomenclature change from 2024/05

S = SET (it was C)

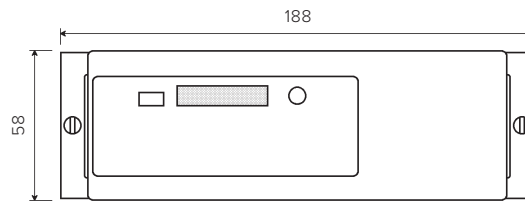
R = RESET (it was S)



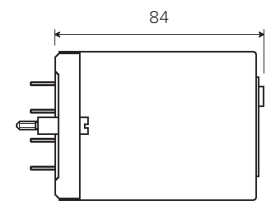
DIMENSIONS



RMB.x3 - RMBZ12



RMB.x5 - RMBZ13



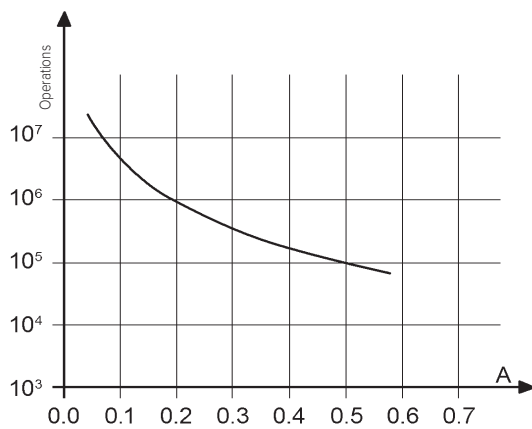
RMB.x7 - RMBZ14

(*) Models with manual operating lever (optional) are provided with a hole at the front giving access to the lever.

The position of the data plate holder and the mechanical optical indicator can vary depending on the version.



ELECTRICAL LIFE EXPECTANCY



Contact loading: 110Vdc, L/R 40 ms

Switching frequency: 1,200 operations/hour

U	I (A)	L/R (ms)	Operations
110Vdc	0.5	40	100,000
110Vdc	0.6	10	300,000
110Vdc	1	40	350,000 ⁽¹⁾
120Vdc	0.7	40	50,000
125Vdc	1.2	0	1,000,000
220Vdc	0.1	40	100,000
220Vdc	0.25	10	100,000
U	I (A)	cosφ	Operations
110Vac	1	1	2,000,000
110Vac	1	0.5	1,500,000
110Vac	5	1	1,000,000
110Vac	5	0.5	500,000
220Vac	0.5	1	2,000,000
220Vac	1	0.5	600,000
220Vac	5	1	650,000
220Vac	5	0.5	600,000

⁽¹⁾ 2 Series contacts

SOCKETS AND RETAINING CLIPS		RMB.x3 - RMBZ12	RMB.x5 - RMBZ13	RMB.x7 - RMBZ14
Type of installation	Type of outputs	Retaining clip		
Wall or DIN rail mounting	Screw	PAVM321	PAVM481	PAVM801
Flush mounting	Double faston (4.8 x 0.8 mm)	PRDM321	PRDM481	PRDM801
	Screw	PRVM321	PRVM481	PRVM801

INSTALLATION, OPERATION AND MAINTENANCE

Installation

Before installing the relay on a wired socket, disconnect the power supply.

The preferential mounting position is on the wall, with the relay positioned horizontally in the "reading orienting" of marking so that the label is readable in the correct sense.

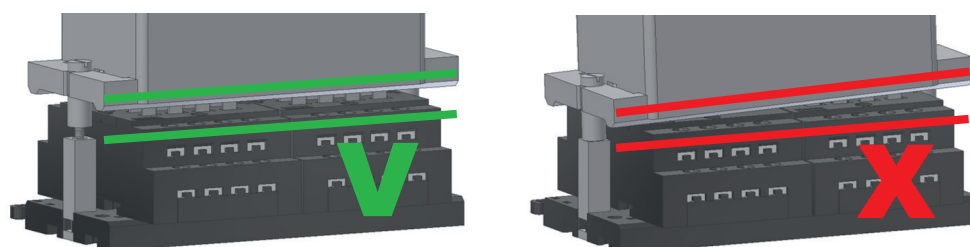
Spacing: these relays can be mounted without distance between one relay and the next.

Mounting of the relay on the socket:

the relays are equipped at their ends with 2 screws that allow to obtain the correct insertion in the socket and to hold the relay in the correct mounting position.

Place the relay against the socket, making a slight pressure to center the relay terminals over the socket terminals. Screw the two screws progressively and alternately, moving the relay evenly towards the socket.

Avoid screwing/unscrewing completely one screw and then the other one.



Operation

Before use: if relay is not used, for example after long storage periods, contact resistance may increase due to a natural and slight oxidation or polluting deposits.

In order to restore the optimal conductivity and for standard contacts (NOT gold plated) it is recommended to switch several time a load of at least 110Vdc - 100mA or 24Vdc - 2A. The contacts will be "cleaned" thanks to the electric arc generated during the current interruption and the mechanical self-cleaning action.

The common contact rubs against the fixed poles (NO and NC contacts) both when opening and when closing, which ensures a self-cleaning action.

An increase in contacts' resistance, in most cases, does not represent a problem. Many factors contribute to the correct use of contact and consequently to the relay' long-term reliability:

- **Load:** the current switching generates an electric arc with cleaning effects. For proper electrical cleaning and performance keeping we recommend:
 - o Standard contacts: Minimum current = 20mA (20V)
 - o Gold plated contacts: Minimum current = 10mA (20V)
- **Operating frequency:** relays are components that can operate with a wide range of switching frequency. High frequency operation also allows a continuous cleaning effect by "sliding" (mechanical cleaning). In case of low frequency operation (for example few time a day), we advise:
 - o Use of contact with currents twice compared to those indicated.
 - o For currents lower than 10mA, use gold plated contacts and connect 2 contacts in parallel, in order to reduce the equivalent contact resistance
- **Pollution:** the presence of pollution can cause impurities on contact surface. Electric charges attract organic molecules and impurities that are deposited on the contact surface. Electrical and mechanical cleaning, respectively, burn and remove such impurities. In pollution presence, the minimum recommended currents must be respected. In extreme cases, provide double the cleaning current.

While a contact open high loads, impurities develop inside the relay due to the formation and interruption of the electric arc. These impurities are greater the higher the load and the more frequent the switching operation. These impurities could deposit on the adjacent contacts and alter the initial conductivity characteristics. If all contacts are used with similar loads, this is not a problem.

Please, contact AMRA for further informations.

Condensation is possible inside the relay when energized and the outside ambient temperature is cold; this is quite normal and does not affect the operation of the relay. Plastic materials of relay do not possess hygroscopic properties.

Maintenance

No maintenance is required.

In case of normal relay wear (reaching the end of electrical or mechanical life), the relay cannot be restored and must be replaced.

Unmounting of the relay from the socket:

as for the installation, it is necessary to unscrew the relay on the 2 anchor screws of the product in a progressive and alternating way, extracting the relay evenly from the socket.

Avoid screwing/unscrewing completely one screw and then the other one.

Often the malfunctions are caused by power supply with inverted polarity, by external events or by use with loads exceeding the contact performance.

In case of suspected malfunction, energize relay and observe if mechanical operation of contacts / relay mechanism is performed. Pay attention to the power supply polarity, if relay is equipped with polarized components (example: diode, led).

- In case of expected operation, clean the contacts (see paragraph "OPERATION") and check if the circuit load ranges within the contact performance. If necessary, replace with relays with gold contacts. Note: the electrical continuity of contacts must be checked with adequate current.
- If it does not work, we recommend to use a relay of the same model and configuration.

If an investigation by AMRA is required, pull-out the relay from the socket, don't remove the cap, avoid any other manipulation and contact us. You will be asked for the following data: environmental conditions, power supply, switching frequency, contact load, number of operations performed.

The fault can be described through the "TECHNICAL SUPPORT" section of the website www.amra-chauvin-arnoux.it.

In any case, the relay cannot be repaired by the user.

Storage

Storage conditions must guarantee the environmental conditions (temperature, humidity and pollution) required for the product conservation, in order to avoid deterioration.

The product must be stored in an environment sheltered from atmospheric agents and not polluted, with an ambient temperature between -25 and +70°C with max 75% RH. Humidity can reach peaks of 95%. In any case, there must be no condensation. Before use, please read carefully "OPERATION" section.