

RMBX

SERIES

INSTANTANEOUS BISTABLE (LATCHING) RELAYS WITH 7-8 CHANGE-OVER CONTACTS

APPLICATIONS



Shipbuilding



Petroleum
industry



Heavy
industry



Power
generation



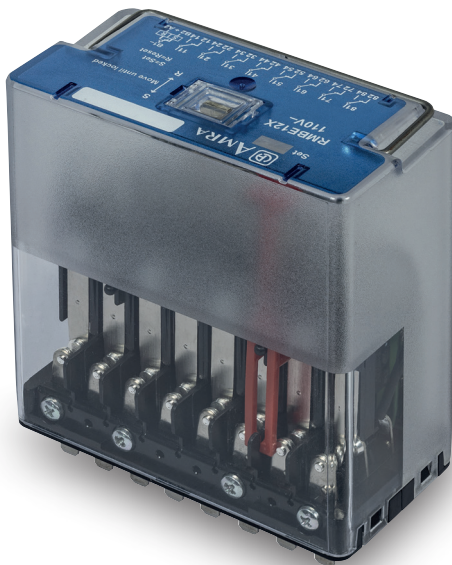
Power
distribution



Railway
equipment



Rolling
Stock



OVERVIEW

- Compact plug-in monostable instantaneous relay
- Compact dimensions than RMB Series
- Solid and rugged construction for intensive duty, IP50 protection
- Self-cleaning knurled contacts, C/O type
- Pulsed or permanent power supply and de-energization system
- High electrical life expectancy and exceptional endurance
- Fitted with mechanical optical contact status indicator as standard
- Wide variety of configurations and customizations
- Retaining clip for secure locking of relay on socket
- Transparent cover, with access for manual operation (standard) and pull-out handle

DESCRIPTION

RMBX relays, with 7 & 8 changeover contacts, are highly reliable products featuring high performance, suitable for applications in very harsh and disturbed environments, such as per electrical transformer stations, rail equipment and rolling stock.

The construction of the relays and careful choice of the materials ensure long life and considerable ruggedness even in harsh operating environments and in the presence of strong temperature fluctuations.

Wide range of coil's nominal voltage are available.

The manufacturing versatility allows to adapt power supply to customer needs.

The IP50 protection allows the relay to be used even in dusty environments, protecting contact's surface against harmful deposits, with great benefit in conducting very low loads.

RMBX relays are equipped with an automatic coil de-energization system, operated mechanically, designed to reduce the power consumption of the device to zero on completion of the cycle.

Contacts are designed to obtain remarkable performances both for high, inductive loads or very low loads. Contact is able to switch from (10mA - 10V at new relay).

The knurled surface ensures an excellent self-cleaning effect, lower ohmic resistance thanks to the various points of electrical contact, improving also the electrical life of the component.

Thanks to its exceptional breaking capacity, the relay is suitable for controlling heavy duty loads where safety and continuity of operation are all-important.

Manual operation is foreseen for all models, allowing tests to be conducted in the absence of any power supply.

Available options: flyback coil protection diode and gold plated contacts.

A wide range of sockets allow to find the optimal solutions for any electrical panel's construction need.

As per all AMRA relays, RMBX relays are assembled under controlled manufacturing process in which every step of production is verified by the next step in succession. 100% of relay are tested at the end of production stage.

STANDARD COMPLIANCY

EN 60077	EN 61810-1
EN 61373	EN 61810-7
EN 45545-2	EN 60695-2-10
ASTM E162, E662	EN 60529



MODELS	NUMBER OF CONTACTS	POWER INPUT TO COILS
RMB.x3X	7	Common negative
RMB.x2X ⁽¹⁾	8	Common negative

(1) Model RMBR.x2X suitable for rolling stock applications



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



COIL DATA	RMB.x3X, RMB.x2X	RMBR.x2X
Nominal voltages Un	DC: 12-24-48-110-125-132-220-250 ⁽¹⁾ - AC: 12-24-48-110-125-230-250-380-440 ⁽¹⁻²⁾	DC: 24-36-72-96-110-250 ⁽³⁾
Consumption at Un (DC/AC) ⁽²⁾	RMB.x3X: 15W / 15VA - RMB.x2X: 19W / 19VA	19W / 19VA
Operating range	DC: 80÷120% Un - AC: 85÷110% Un	DC: 70÷125 % Un
Type of duty	Continuous	

Minimum control pulse: 50ms.

(1) Other values on request.

(2) Latch and unlatch. Power consumption is zero on completion of the operating cycle, as the coil de-energizes automatically.

(3) Suitable for rolling stock applications. Operating range in compliance with EN 60077 standard.



CONTACT DATA	RMB.x3X	RMB.x2X
Number and type	7 SPDT, form C	8 SPDT, form C
Current	Nominal ⁽¹⁾ 10A Maximum peak ⁽²⁾ 20A for 1min - 40A for 1s Maximum pulse ⁽²⁾ 150A for 10ms	
Example of electrical life expectancy ⁽³⁾	0.7A - 132Vdc - L/R 40ms - 10 ⁵ operations - 600 operations/hour	
Minimum load ⁽⁴⁾	Standard contacts 200mW (10V, 10mA) Gold-plated contacts ⁽⁵⁾ 50mW (5V, 5mA)	
Maximum breaking voltage	350 VDC / 440 VAC	
Contact material	AgCdO	
Operating time at Un (ms) ⁽⁶⁾	DC - AC Pick-up (NC contact opening) ≤ 10 - ≤ 25 Pick-up (NO contact closing) ≤ 25 - ≤ 40 Drop-out (NO contact opening) ≤ 10 - ≤ 25 Drop-out (NC contact closing): ≤ 45 - ≤ 55	

(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, the operating time signifies until stabilization of the contact (including bounces).



INSULATION		
Insulation resistance (at 500VCD)		
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.) - 2.2kV (1 s)
between open contact parts		2 kV (1 min.) - 2.2kV (1 s)
between adjacent contacts		2 kV (1 min.) - 2.2kV (1 s)
Impulse withstand voltage (1.2/50μs - 0.5J)		
between electrically independent circuits and between these circuits and ground		5 kV
between open contact parts		4 kV

MECHANICAL SPECIFICATIONS

Mechanical life expectancy	10x10 ⁶ operations
Maximum mechanical switching rate	900 operations/hour
Degree of protection	IP50 fitted to socket
Dimensions (mm) ⁽¹⁾	45x90x100 ⁽¹⁾
Weight (g)	RMB.x3X: 400 RMB.x2X: 410

(1) Output terminals excluded.

ENVIRONMENTAL SPECIFICATIONS

Standard operating temperature	standard	-25 to +55°C
Version for railways, rolling stock (RMBR)		-25 to +70°C (+85°C for 10 min) -40°C as option
Storage and shipping temperature		-25 to +85°C
Relative humidity		Standard: 75% RH - Tropicalized: 95% RH
Fire behaviour		V0

See the "Operation" chapter of this document for more information and operating notes.

STANDARDS AND REFERENCE VALUES

EN 61810-1, EN 61810-2, EN 61810-7	All-or-nothing relays
EN 60695-2-10	Fire behaviour
EN 60529	Degree of protection provided by enclosures

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

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

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

RAILWAYS, ROLLING STOCK - STANDARDS APPLICABLE TO RMBR MODEL

EN 60077	Electric equipment for rolling stock - General service conditions and general rules
EN 61373 ⁽¹⁾	Shock and vibration tests, Cat 1, Class B
EN 45545-2	Fire behaviour, Cat E10, requirement R26, V0
ASTM E162, E662	Fire behaviour

(1) Opening of NC contacts allowed only at de-energized relay t<3ms.

CONFIGURATIONS - OPTIONS

TROPICALIZATION	Surface treatment of coil with protective coating for use in conditions of RH 95%. This treatment serves to give the coil added protection against corrosion that could occur as a result of moisture reacting with certain chemical agents such as those found in acid or saline atmospheres.
GOLD PLATING	Surface treatment of contacts, with gold, thickness ≥ 5μ (since 2023, May). This treatment ensures long-term capacity of the contact to conduct low levels of current, even in adverse ambient conditions.
FLYBACK DIODE	Component connected in parallel with the coil designed to suppress overvoltages generated by the coil when de-energized.
LOW TEMPERATURE	Minimum operating temperature -40°C, only for rolling stock version (option "L")

ORDERING SCHEME

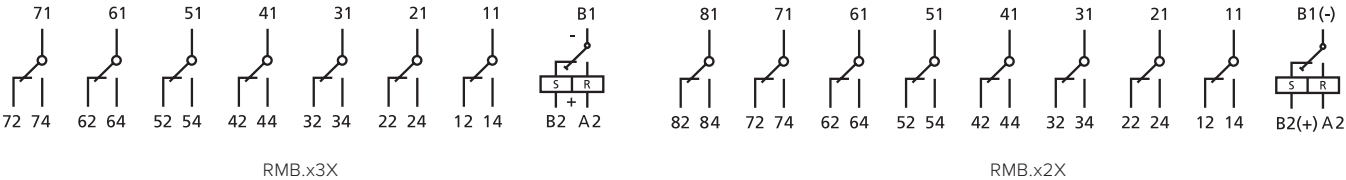
PRODUCT CODE	APPLICATION ⁽¹⁾	CONFIGURATION A	CONFIGURATION B	TYPE OF POWER SUPPLY	NOMINAL VOLTAGE (V) ⁽²⁾	FINISH ⁽³⁾	KEYING POSITION CODE ⁽⁴⁾
RMB	E: Energy F: Railway Fixed Equipment R: Railway Rolling stock	1: Standard 3: Diode // 4: Gold plating 6: Gold plating + Diode //	2X: 8 SPDT contacts 3X: 7 SPDT contacts	C: Vdc A: Vac 50 Hz H: Vac 60 Hz	012 - 024 - 048 072 - 096 - 110 125 - 132 - 220 230 - 250 - 380 440	T: Tropicalized coil L: Low temperature	XX

Example	RMB	E	4	3X	C	110	
	RMBE43X-C110 = ENERGY series relay, with 7 SPDT gold-plated contacts and 110Vac coil.						
	RMB	R	1	2X	C	072	T
	RMBR12X-C072T = RAILWAY, rolling stock series, relay with 8 SPDT contacts and 72Vdc tropicalized coil						

- 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".
RAILWAYS, ROLLING STOCK: Application on board rolling stock. Electrical characteristics according to EN60077.
- Other values on request. Voltages 380V and 440V available as Vac only.
- Optional value.
- Optional value. The positive mechanical keying is applied according to the manufacturer's model.



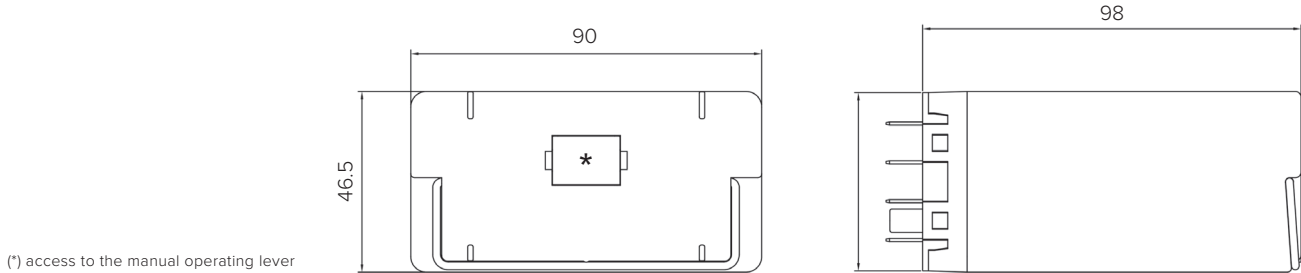
WIRING DIAGRAM



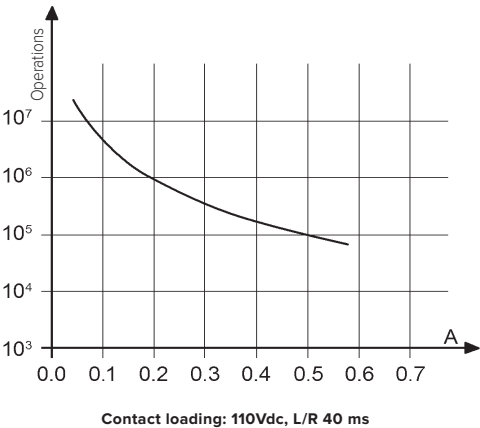
NOTE:
Coils nomenclature change from 2024/05
S = SET (it was C)
R = RESET (it was S)



DIMENSIONS



ELECTRICAL LIFE EXPECTANCY



Switching frequency: 1,200 operations/hour

U	I (A)	L/R (ms)	Operations
110Vdc	0.5	40	150,000
110Vdc	0.6	10	300,000
132Vdc	0.7	40	100,000
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



SOCKETS AND RETAINING CLIPS

RETAINING CLIP

Type of installation	Type of outputs	Model	
Wall or DIN rail mounting	Screw	96IP20-I DIN	RMC48
	Spring clamp	PAIR320	
Flush mounting	Double faston (4.8 x 0.8 mm)	ADF4	
	Spring clamp	PRIR320	



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.

Spacing: no relay spacing is required.

For a safe use, the retaining clip is recommended. For use on rolling stock, relays have been tested to EN 61373 standard equipped with retaining clip(s).

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.

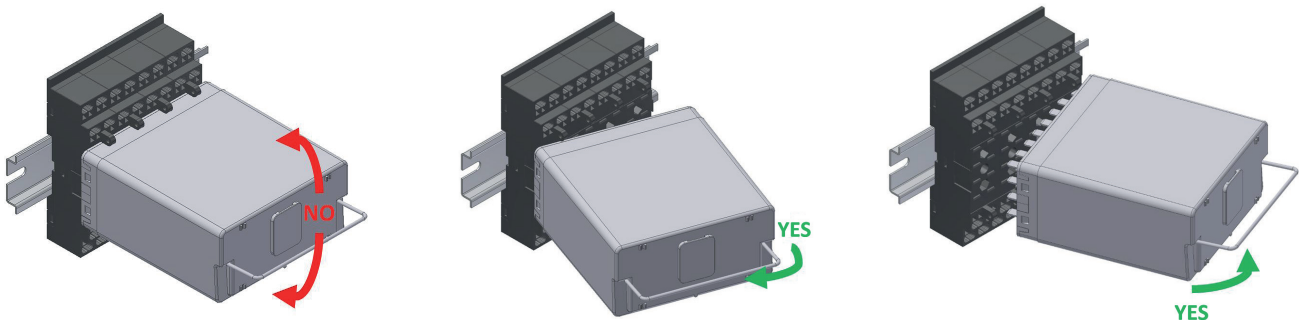
The possible formation of condensation inside the relay, when it is powered and the external ambient temperature is cold, is a normal phenomenon that has no effect on the electrical safety of the relay. In case of polluted or saline atmosphere, any condensation deposits on the contacts can degrade their performance in terms of conductivity.

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.

To check the component, relay removal must be carried out with slight lateral movements. An "up and down" movement can cause terminals damage.



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 +85°C with max 75% RH. In any case, there must be no condensation. Before use, please read carefully "OPERATION" section.