MTI Line

RELAYbility

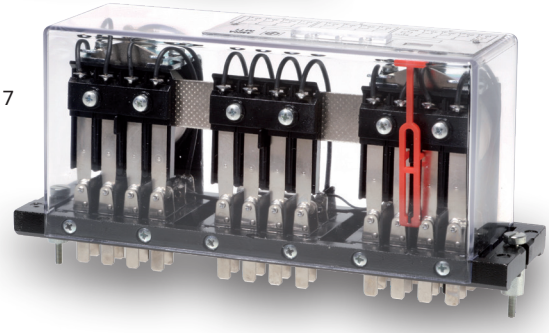
AMRA®
CHAUVIN ARNOUX GROUP

RMM

SERIES

INSTANTANEOUS MONOSTABLE RELAYS, WITH 8-12-20 CHANGE-OVER CONTACTS

RMME16



RMME17

APPLICATIONS

Shipbuilding · Petroleum industry · Heavy industry · Power generation · Power distribution · Railway equipment

OVERVIEW

- Plug-in monostable instantaneous relays
- Solid and rugged construction for intensive duty
- Very high electrical life expectancy and exceptional endurance
- Fitted with mechanical optical contact status indicator as standard
- Lever for manual operation (optional)
- Self-cleaning knurled contacts, C/O type with long travel
- Operation using DC or AC power supply
- Wide variety of configuration and customization
- Transparent cover, fixing/pulling screws
- Label holder in cover for customer's use
- Positive mechanical keying for relay and socket

DESCRIPTION

Relays of the RMM series are monostable multipole types with 8, 12 and 20 change-over contacts.

RMM relays share the same basic mechanical design as those of the RGM series, and offer the same specifications and performance.

These are highly reliable products providing top performance, suitable for applications in particularly harsh and unsettled environments, such as high voltage electricity distribution stations and medium voltage substations.

The mechanical design of the relay is such as to allow the development of numerous custom solutions, in the event that the standard models do not fully respond to the required performance parameters.

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

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.

Benefiting also from careful selection of materials, coupled with the technical and professional skills of human resources involved in design and production, this family of relays has found favour with many important and high profile customers.

Versatility in manufacture allows the production of relays with any voltage in the range 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 good levels of performance both with high and strongly inductive DC loads, and with particularly low loads.

Inclusion of the magnetic arc blow-out function (optional) helps to achieve a considerable increase in breaking capacity, whilst the 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.

Like all AMRA relays, models of the RMM 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 the maximum level of reliability possible.

STANDARD COMPLIANCY

EN 60695-2-10
EN 60529

EN 61810-1
EN 61810-2
EN 61810-7

MODELS	NUMBER OF CONTACTS	MAGNETIC ARC BLOW-OUT
RMM.x2	8	
RMM.x6	8	•
RMM.x3	12	
RMM.x7	12	•
RMM.x4	20	
RMM.x8	20	•

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

COIL DATA	RMME.x2 - RMME.x6	RMME.x3 - RMME.x4 - RMME.x7 - RMME.x8
Nominal voltages at Un	DC: 12-24-48-110-125-132-144-220 (1) - AC: 12-24-48-110-125-220-230-380-440 (1-2)	
Consumption at Un	3W / 5VA (3) - 11.5VA (4)	6W / 15VA (3) - 25VA (4)
Operating range	DC: 80...120% Un - AC: 85...110% Un	
Type of duty	Continuous	
Drop-out voltage (5)	DC: > 5% Un - AC: > 15% Un	

(1) Other values on request.

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

(3) In operation.

(4) On pick-up.

(5) Limit value for supply voltage, expressed as % of the nominal value, beneath which the relay is certainly de-energized.

CONTACT DATA

Number and type		8 - 12 - 20 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)		RMM.x2-x3-x4 : 0.5A - 110Vdc - L/R 40ms - 10^5 operations - 1,800 operations/hour RMM.x6-x7-x8 : 1A - 110 Vdc - L/R 40ms - 10^5 operations - 1,800 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)		RMM. 12-16-42-46	RMM. 13-17-43-47	RMM. 14-18-44-48	RMM. 32-36-62-66	RMM. 33-37-63-67	RMM. 34-38-64-68
		DC - AC	DC - AC	DC - AC	DC	DC	DC
Pick-up (NC contact opening)		≤ 15 - ≤ 10	≤ 13 - ≤ 18.5	≤ 14 - ≤ 25	≤ 15	≤ 13	≤ 14
Pick-up (NO contact closing)		≤ 40 - ≤ 32	≤ 37 - ≤ 38	≤ 45 - ≤ 70	≤ 40	≤ 37	≤ 40
Drop-out (NO contact opening)		≤ 12 - ≤ 30	≤ 12 - ≤ 68	≤ 8 - ≤ 70	≤ 104	≤ 31	≤ 35
Drop-out (NC contact closing)		≤ 64 - ≤ 110	≤ 70 - ≤ 75	≤ 42 - ≤ 65	≤ 150	≤ 80	≤ 75

(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		RMM.x2 - RMM.x6	RMM.x3 - RMM.x7	RMM.x4 - RMM.x8
	Mechanical life expectancy	$20x10^6$ operations		
Maximum switching rate	Mechanical	3,600 operations/hour		
	Degree of protection	IP40		
	Dimensions (mm)	132x58x84 (1)	188x58x84 (1)	300x58x84 (1)
	Weight (g)	430	720	1,100

(1) Output terminals excluded.

ENVIRONMENTAL CHARACTERISTICS	
Operating temperature Storage and shipping temperature	-25 ÷ +55°C -25 ÷ +70°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	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.
LED	LED indicator showing presence of power supply. Flyback diode mounted as standard.
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. If the lever is fitted, there will be no luminous optical indicator.

ORDERING SCHEME

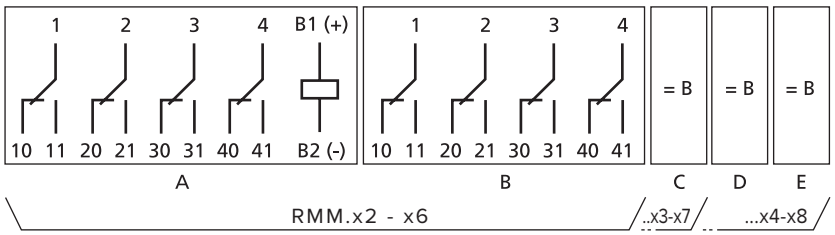
PRODUCT CODE	APPLICATION (1)	CONFIGURATION A	CONFIGURATION B	TYPE OF POWER SUPPLY	NOMINAL VOLTAGE (V) (2)	FINISH (3)	KEYING POSITION CODE (4)
RMM	**E:** Energy **F:** Railway Fixed equipment	**1:** Standard **3:** Diode // **4:** Gold plating **5:** Led **6:** Gold plating + Diode // **7:** Diode //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

Example

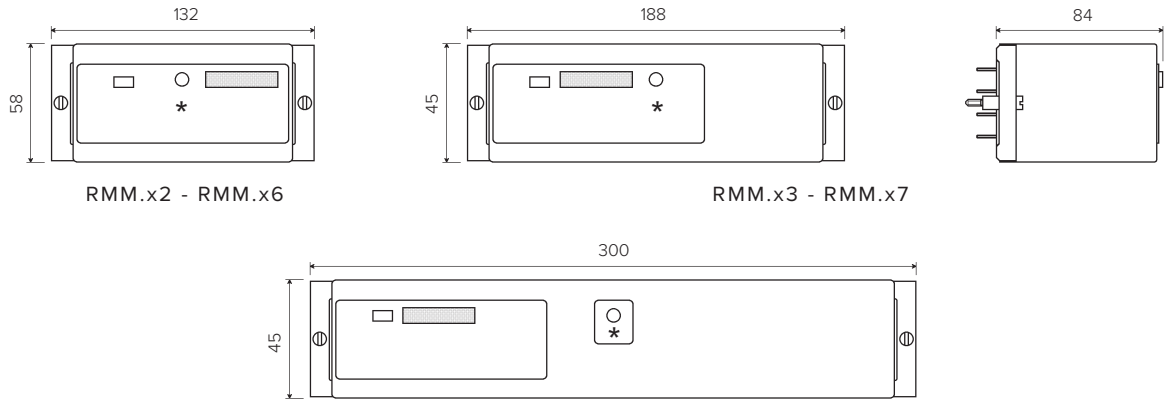
RMM	E	4	7	A	024	M	
RMME47-A024/M = ENERGY series relay with 20 gold-plated contacts, magnetic arc blow-out, 24Vac coil and manual operating lever.							
RMM	**F**	**1**	**3**	**C**	**110**	**T**	
RMMF13-C110/T = RAILWAY series relay, fixed equipment, 12 contacts with 110Vdc tropicalized coil.							

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 dediated 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. With manual operation, no optical indicator.

WIRING DIAGRAM



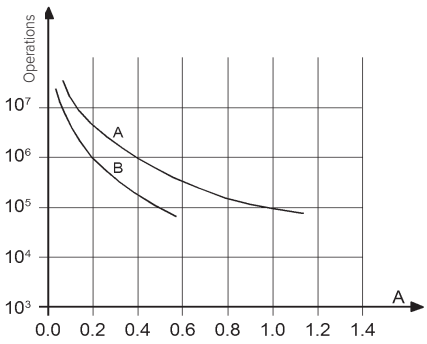
DIMENSIONS



(*) 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
Curve A: RMM.x6-7-8
Curve B: RMM.x2-3-4

RMM.x2 - RMM.x3 - RMM.x4			
U	**I (A)**	**L/R (ms)**	**Operations**
110Vdc	0.5	40	100,000
110Vdc	0.6	10	300,000
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

Switching frequency: 1,200 operations/hour

RMM.x6 - RMM.x7 - RMM.x8			
U	**I (A)**	**L/R (ms)**	**Operations**
24Vdc	1	0	7,000,000
24Vdc	1	40	3,000,000
24Vdc	2	40	2,000,000
24Vdc	5	0	3,000,000
24Vdc	5	40	200,000
24Vdc	9	0	800,000
48Vdc	5	20	200,000
110Vdc	0.4	40	1,000,000
110Vdc	1	40	350,000 [1]
110Vdc	1	40	100,000
110Vdc	10	0	100,000
U	**I (A)**	**cosφ**	**Operations**
220Vac	5	0.5	100,000
220Vac	10	1	100,000
230Vac	1	0.7	2,500,000
230Vac	3	0.7	1,200,000

[1] 2 series contacts

SOCKETS AND RETAINING CLIPS		RMM.x2 - RMM.x6	RMM.x3 - RMM.x7	RMM.x4 - RMM.x8
Type of installation	**Type of outputs**	**Model**		
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

AMRA
CHAUVIN ARNOUX GROUP

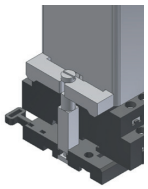
INSTALLATION, OPERATION AND MAINTENANCE

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.

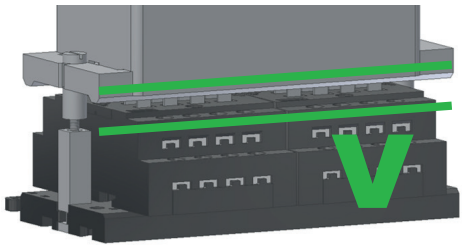


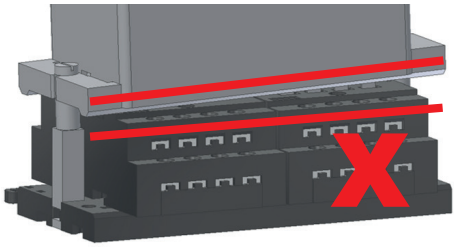
Mounting of the relay on the socket:

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 adiacent 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.

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. In any case, there must be no condensation. Before use, please read carefully “OPERATION” section.

AMRA® CHAUVIN ARNOUX GROUP

A.M.R.A. SpA
Via Sant’Ambrogio, 23/25 - 20846 Macherio (MB) - Italy
☎ +39 039.245.75.45
✉ **info@amra-chauvin-arnoux.it** 🌐 **www.amra-chauvin-arnoux.it**