MTI Line

RELAYbility

AMRA®
CHAUVIN ARNOUX GROUP

RCM | RDM

SERIES

INSTANTANEOUS MONOSTABLE RELAYS
2-4 CONTACTS

RCME

RDME

APPLICATIONS

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

OVERVIEW

- Compact plug-in monostable instantaneous relays
- High performance, compact dimensions, light weight
- Solid and rugged construction for intensive duty, IP50 protection
- Self-cleaning knurled contacts, C/O type
- High electrical life expectancy
- Maximum continuous current 10A
- New “HIGH POWER” magnetic arc blow-out for IMPROVED breaking capacity
- Fitted with mechanical optical contact status indicator as standard
- Wide variety of configurations and customizations
- Retaining clip for secure locking of relay on socket
- Cover with matte finishing

DESCRIPTION

RCM & RDM relay, with 2 & 4 changeover contacts, are highly reliable products featuring high performance, suitable for applications in very harsh and disturbed environments, such as per electrical transformer stations.

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.

RCM and RDM can operate in environment with high thermal shocks.

Contacts are designed to obtain remarkable performances both for high, inductive loads or very low loads.

Contact is able to switch from 5mA – 10V (at new relay).

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

The magnetic arc blow-out contributes to increase breaking capacity: the relay is suitable for controlling heavy duty loads with intensive switching frequency.

Many options are available: flyback coil protection diode, led, 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, RCM and RDM 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 COMPLIANCE

EN 61810-1
EN 61810-2
EN 61810-7
EN 60695-2-10
EN 60529

MODELS	NUMBER OF CONTACTS	MAGNETIC ARC BLOW-OUT	PCB-mount
RCME.x2 - RCMF.x2	2		
RCMM.x2	2		•
RCME.x6 - RCMF.x6	2	•	
RCMM.x6	2	•	•
RDME.x2 - RDMF.x2	4		
RDMM.x2	4		•
RDME.x6 - RDMF.x6	4	•	
RDMM.x6	4	•	•

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

COIL DATA	RCM	RDM
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	2 W (3) / 3.2 VA (4) - 4 VA (5)	2.5 W / 5 VA (4) - 7.5 VA (5)
Operating range	DC: 80...120% Un - AC: 85...110% Un	
Type of duty	Continuous	
Drop-out voltage (6)	DC: > 5% Un - AC: > 15% Un	

(1) Other values on request.
(2) Maximum value, AC = 380V 50Hz - 440V 60Hz.
(3) 2.3W for 220Vdc
(4) In operation.
(5) On pick-up.
(6) Limit value for supply voltage, expressed as % of the nominal value, beneath which the relay is certainly de-energized.

CONTACT DATA		RCM		RDM	
Number and type		**2 SPDT, form C**		**4 SPDT, form C**	
Current	Nominal (1)	10A			
	Maximum peak (2)	13A for 1min - 20A for 1s			
	Maximum pulse (2)	100A for 10ms			
Example of electrical life expectancy (3)		RCM.x2 - RDM.x2 : 0.2A - 110Vdc - L/R 40ms - 500,000 operations – 1,800 operations/hour RCM.x6 - RDM.x6 : 0.5A - 110Vdc - L/R 40ms - 150,000 operations – 1,800 operations/hour			
Minimum load (4)	Standard contacts	200mW (10V, 5mA)			
	Gold-plated contact (5)	50mW (5V, 5mA)			
Maximum breaking voltage		250Vdc / 300Vac			
Contact material		AgCdO (moving contacts) - AgNi (fixed contacts)			
		RCM.12-16-42-46	**RCM.32-36-62-66**	**RDM.12-16-42-46**	**RDM.32-36-62-66**
Operating time at Un (ms) (6)		**DC - AC**	**DC**	**DC - AC**	**DC**
Pick-up (NC contact opening)		≤ 10 - ≤ 10	≤ 10	≤ 14 - ≤ 10	≤ 14
Pick-up (NO contact closing)		≤ 19 - ≤ 18	≤ 19	≤ 23 - ≤ 17	≤ 23
Drop-out (NO contact opening)		≤ 4 - ≤ 8	≤ 11	≤ 5 - ≤ 8	≤ 32
Drop-out (NC contact closing)		≤ 16 - ≤ 19	≤ 28	≤ 14 - ≤ 19	≤ 45

(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	> 1,000 MΩ
between open contact parts	> 1,000 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	3 kV

MECHANICAL SPECIFICATIONS

Mechanical life expectancy		20x10^6 operations	
Maximum switching rate	Mechanical	3,600 operations / h	
Degree of protection (with relay mounted)		IP50 (mounted on socket)	
		RCM	RDM
Dimensions (mm)		40x20x50 (1)	40x40x50 (1)
Weight (g)		60	115

(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 ≥ 2µ. 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 (type BYW56) designed to dampen overvoltages generated by the coil when de-energized.

ORDERING SCHEME

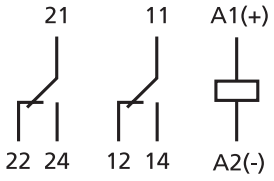
PRODUCT CODE	APPLICATION (1)	CONFIGURATION A	CONFIGURATION B	TYPE OF POWER SUPPLY	NOMINAL VOLTAGE (V) (2)	FINISH (3)	KEYING POSITION CODE (4)
RCM (2 contacts)	**E:** Energy **F:** Railway Fixed equipment	**1:** Standard **3:** Diode // **4:** Gold plating **5:** Led **6:** Gold plating + Diode // **7:** Diode // + Led	**2:** Standard **6:** 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	XX
RDM (4 contacts)	**M:** For PCB						

Example

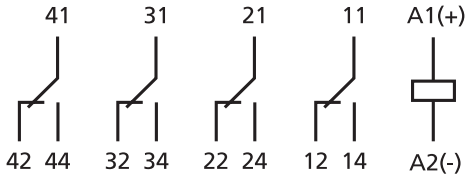
RCM	E	4	2	A	048	T	
RCME42-A048/T = ENERGY series relay with 2 SPDT gold-plated contacts, 48V 50Hz tropicalized coil							
RDM	F	1	6	C	110		DH
RDMF16-C110-DH = RAILWAY series relay, fixed equipment, with 4 SPDT gold-plated contacts, magnetic arc blow-out, 110Vdc coil and keying position DH							

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".
   M: PCB-mount models. Specifications as per "Energy" application but with output terminals suitable for soldering to PCB.
   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.
4. Option value. The positive mechanical keying is applied according to the manufacturer's model.

WIRING DIAGRAM

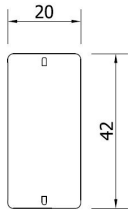


RCM

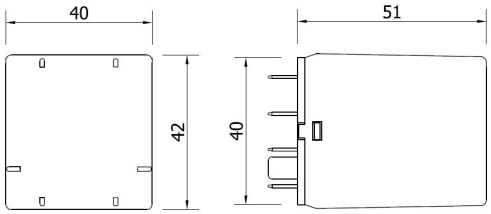


RDM

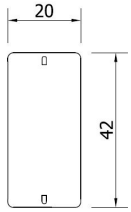
DIMENSIONS



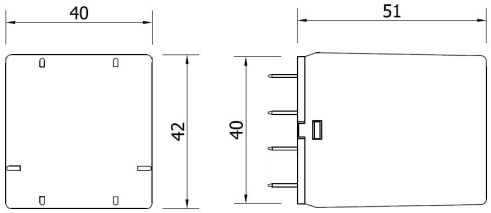
RCME



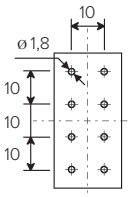
RDME



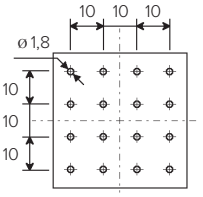
RCMM
(for PCB)



RDMM (for PCB)

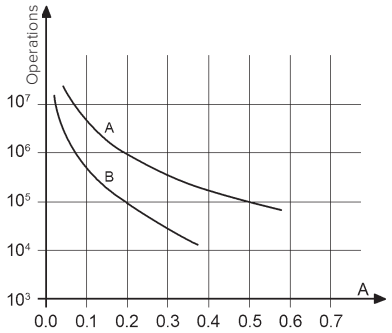


RCMM (for PCB)
Hole layout
(from solder side)



RDMM (for PCB)
Hole layout
(from solder side)

ELECTRICAL LIFE EXPECTANCY



Contact loading: 110Vdc, L/R 40 ms
Curve A: RCM.x6, RDM.x6
Curve B: RCM.x2, RDM.x2

RCM.12, RDM.12			
U	**I (A)**	**L/R (ms)**	**Operations**
110Vdc	0.2	40	500,000
220Vdc	0.2	10	80,000
U	**I (A)**	**L/R (ms)**	**Operations**
110Vac	1	1	1,200,000
110Vac	1	0.5	1,000,000
110Vac	5	1	500,000
110Vac	5	0.5	300,000
220Vac	0.5	1	1,200,000
220Vac	1	0.5	500,000
220Vac	5	1	400,000
220Vac	5	0.5	300,000

RCM.16, RDM.16			
U	**I (A)**	**L/R (ms)**	**Operations**
110Vdc	0.2	40	1,000,000
110Vdc	0.5	40	150,000
110Vdc	0.6	10	300,000
110Vdc	1	10	100,000 (*)
220Vdc	0.2	10	100,000
U	**I (A)**	**L/R (ms)**	**Operations**
110Vac	1	1	2,000,000
110Vac	1	0.5	1,500,000
110Vac	5	1	950,000
110Vac	5	0.5	500,000
220Vac	0.5	1	2,000,000
220Vac	1	0.5	800,000
220Vac	5	1	600,000
220Vac	5	0.5	500,000

Switching frequency: 1,200 operations/hour
(*) = 600 operations/hour

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SOCKETS AND RETAINING CLIPS		RCME - RCMF	RDME - RDMF	RETAINING CLIPS
Type of installation	**Type of outputs**	**Model**		
Wall or DIN H35 rail mounting	Screw	PAVC081	PAVD161	VM1821
Flush mounting	Double faston (4.8 x 0.8 mm)	PRDC081	-	-
	Screw	PRVC081	PRVD161	-
PCB-mount	Solder	PRCC081	PRCD161	-

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: the distance between adjacent relays depends on use' conditions.

If a relay is used in the "less favorable" conditions that occur with "simultaneously":

- Power supply: the maximum allowed, permanently
- Ambient temperature: the maximum allowed, permanently
- Current on the contacts: the maximum allowed, permanently
- Number of contacts used: 100%

it is strongly recommended to space relay at least 5 mm horizontally and 20 mm vertically, to allow for proper upward heat' dissipation and increase the longevity of the component.

Actually, relays could be used in less severe conditions. In this case, the distance between adjacent relays can be reduced or abolished.
A correct interpretation of the use' conditions allows the optimization of the available spaces. Contact AMRA for more information.

To increase relay' longevity, we recommend mounting relays intended for “continuous use” (permanent power supply), alternating them with relays intended for less frequent use.

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 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.

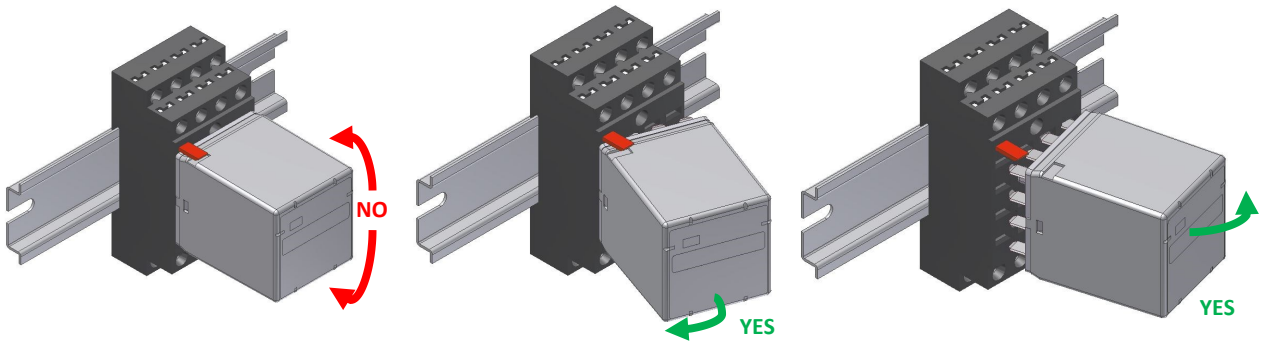
Condensation is possible inside the relay when energized and the outside ambient temperature is cold; this is quite normal and does not affect the operation of the relay. Plastic materials of relay do not possess hygroscopic properties.

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.

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.

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.

ST-GB-848 Ed. 06/23 - Non-contractual document - Specifications are to be confirmed at time of ordering and subject to change without notice.