



RELAYS

MONOSTABLE MULTISCALE TIMER RELAYS WITH 4 CONTACTS

RDT SERIES

USER SECTORS



Power generation



Nuclear



Power transmission



Rolling stock



Fixed railway installations



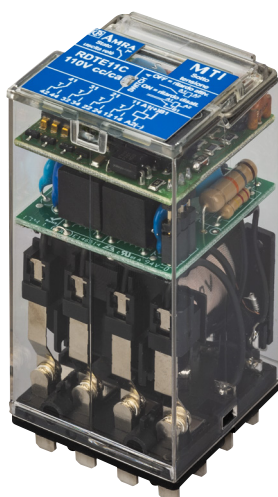
Shipbuilding



Shipbuilding



Heavy industry



RDT

PRODUCT ADVANTAGES

- Plug-in relay with time delay on pick-up or on drop-out
- Only model programmable on pick-up or on drop-out
- High performance, compact dimensions
- Wide time setting range from 0.1s to more than 16 hours, great accuracy over the entire adjustment range
- Led optical indicators monitoring power supply and timer status
- Magnetic arc blow-out for higher breaking capacity
- Self-cleaning knurled contacts
- Relay coupled automatically to socket, with no need for a retaining clip
- Operation with d.c. and/or a.c. power supply
- Wide variety of configurations and customizations
- Transparent cover, pull-out handle
- Label holder in cover for customer's use
- Positive mechanical keying for relay and socket

DESCRIPTION

The **RDT series** is a range of relays with electronic time delay on pick-up or on drop-out, consisting of 6 models with 4 changeover contacts, from 10 A (nominal). RDT relays are created by assembling electromechanical units of the RDM series with a **digital electronic circuit**. The electronic circuit is assembled using a small number of selected professional components for top reliability. The electronics are **immune to strong EMC interference**, typical of high voltage electricity distribution stations.

These monostable relays are capable of switching times ranging from **0.1 second to over 16 hours**, providing **extreme accuracy** over the entire setting range. This is made possible by the fact that the relay offers intermediate scales, which the user can select by means of rotary switches positioned on the front of the enclosure.

The contacts used are of a type designed to give good levels of performance both with high and strongly inductive d.c. loads, and with particularly low loads such as interface signals; inclusion of the magnetic arc blow-out function, when installed, helps to achieve a **considerable increase in breaking capacity**. 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.

The timing function can be utilized in two modes: "on pick-up" or "on drop-out"; models are available with 4 timer contacts or with 2 timer contacts and 2 instantaneous contacts.

The construction of the relays and their simplified mechanical design combine to ensure these products offer **high reliability in operation**, as proven by their use for over **40 years in electrical energy transmission and distribution systems**, and fixed equipment used in the railway sector. Typical sectors of use are among the most demanding, such as, for example, electricity generating stations, electrical transformer stations, fixed equipment for railways, or industries using continuous production processes (chemical and petrochemical, rolling mills, cement factories, etc.).

Like all our relays, the models in the RDT 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**.

Models	Number of contacts		Magnetic arc blow-out	Separate control voltage	Function
	Instantaneous	Time-delayed			
RDT.x1c	-	4			Pick-up / Drop-out
RDT.x7c	-	4	•		Pick-up / Drop-out
RDT.x2c	2	2			Pick-up / Drop-out
RDT.x8c	2	2	•		Pick-up / Drop-out
RDT.x4c	-	4		•	Pick-up / Drop-out
RDT.x9c	-	4	•	•	Pick-up / Drop-out

 **FOR CONFIGURATION OF PRODUCT CODE, SEE "ORDERING SCHEME" TABLE**

Coil specifications	RDT.x1c-x4c-x7c-x9c	RDT.x2c-x8c
Nominal voltages Un	AC / DC: 12-24-48-110-125-132-144-220 ⁽¹⁾	
Consumption at Un (DC/AC)	3.5W	4.5W
Operating range	80...120% Un	
Type of duty	Continuous	
Drop-out voltage ⁽²⁾	> 5% Un	

(1) Other values on request.

(2) Limit value for supply voltage, expressed as % of the nominal value, beneath which the relay is certain to be de-energized.

Contact specifications		
Number and type		4 CO, 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⁾		RDT.x1c-x2c-x4c : 0.2A - 110Vdc - L/R = 40ms - 10 ⁵ operations - 1,800 operations/hour RDT.x7c-x8c-x9c : 0.5A - 110Vdc - L/R = 40ms - 10 ⁵ operations - 1,800 operations/hour
Minimum load	Standard contacts	200mW (10V, 10mA)
	Gold-plated contacts	50mW (5V, 5mA)
Maximum breaking voltage		250 Vdc / 300 Vac
Contact material		AgCdO (moving contacts) - AgNi (fixed contacts)
Operating time at Un (ms) ^{(4) (5)}		DC - AC
Pick-up (NC contact opening)		≤ 10 - ≤ 10
Pick-up (NO contact closing)		≤ 19 - ≤ 18
Drop-out (NO contact opening)		≤ 4 - ≤ 8
Drop-out (NC contact closing)		≤ 16 - ≤ 19

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

(5) Times for instantaneous contacts, if installed.

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 voltage (1.2/50μs - 0.5J)		
between electrically independent circuits and between these 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/hour
Degree of protection		IP40
Dimensions (mm)		40x40x82 ⁽¹⁾
Weight (g)		150

(1) Excluding output terminals



Environmental specifications

Operating temperature	-25 to +55°C
Storage and shipping temperature	-25 to +70°C
Relative humidity	Standard: 75% RH - Tropicalized: 95% RH
Fire behavior	V0



Standards and reference values

EN 61810-1, EN 61810-2, EN 61810-7	Electromechanical elementary relays
EN61812-1	Timer relays
EN 60695-2-10	Fire behavior
EN 61000	Electromagnetic compatibility
EN 60529	Degree of protection provided by enclosures

Unless otherwise specified, products are designed and manufactured according 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 $\pm 7\%$.



Configurations - Options

TROPICALIZATION	Surface treatment of coil with protective coating for use in conditions of RH 95%.
GOLD PLATING	Surface treatment of contacts, blades and output terminals with gold-cobalt alloy, thickness $\geq 2\mu$. This treatment guarantees the contact's ability to cut weaker currents over the long term.



Ordering scheme

Product code	Application ⁽¹⁾	Configuration A	Configuration B	Type of power supply	Nominal voltage(V) ⁽²⁾	Finish ⁽³⁾	Keying position code ⁽⁴⁾
RDT	E: Energy F: Railway Fixed Equipment	1: Standard 4: Gold plating	1C: 4 CO timer contacts 2C: 2 CO timer contacts + 2 CO instantaneous contacts 4C: 4 CO timer contacts with control voltage 7C: 4 CO timer contacts with magnetic arc blow-out 8C: 2 CO timer contacts + 2 CO instantaneous contact with magnetic arc blow-out 9C: 4 CO timer contacts with control voltage and magnetic arc blow-out	C: Vdc A: Vac 50 Hz H: Vac 60 Hz T ⁽⁵⁾ : Vdc + Vac 50 Hz	012 - 024 - 048 110 - 125 - 132 144 - 220	T: Tropicalized coil	xx

Example

RDT	E	1	7C	T	110	T	ZH
RDTE17C-T110/T-ZH = ENERGY series relay with 4 CO timer contacts, magnetic arc blow-out, 110Vdc or Vac (50Hz) tropicalized coil, and keying position ZH							
RDT	F	4	2C	C	024		XG
RDTF42c-C024 = RAILWAY series relay, fixed equipment, with 2 CO timer contacts and 2 instantaneous, gold-plated contacts, and 24Vdc 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 catalog "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 catalog "STATIONS SERIES - LV15-LV16-LV20".

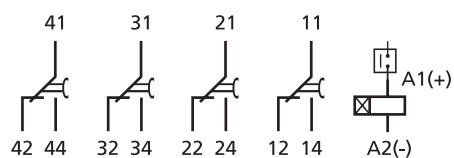
(2) Other values on request.

(3) Optional value.

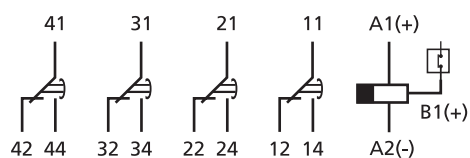
(4) Optional value. The positive mechanical keying is applied according to the manufacturer's model.

(5) AC+DC power input possible only with models RDT.x1C and RDT.x7C

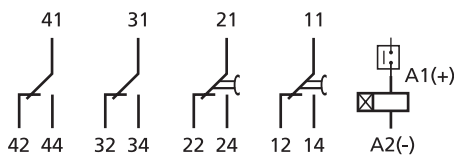
Wiring diagram



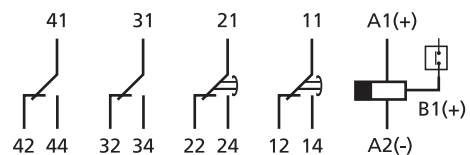
Pick-up diagram RDT.x1c-x7c



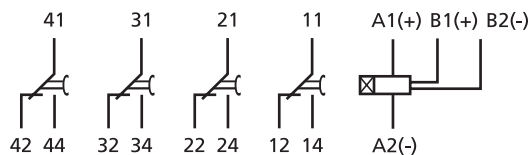
Drop-out diagram RDT.x1c-x7c



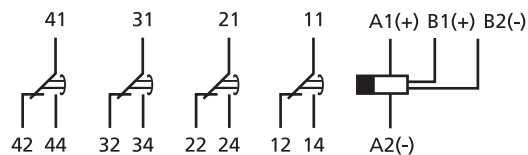
Pick-up diagram RDT.x2c-x8c



Drop-out diagram RDT.x2c-x8c

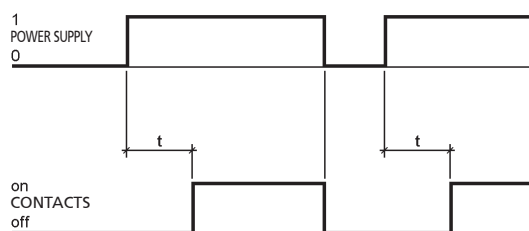


Pick-up diagram RDT.x4c-x9c

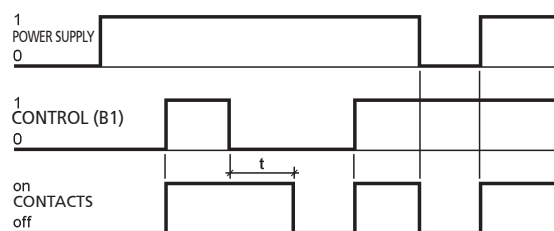


Drop-out diagram RDT.x4c-x9c

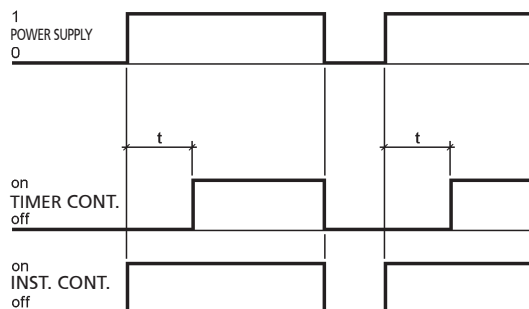
Functional diagram



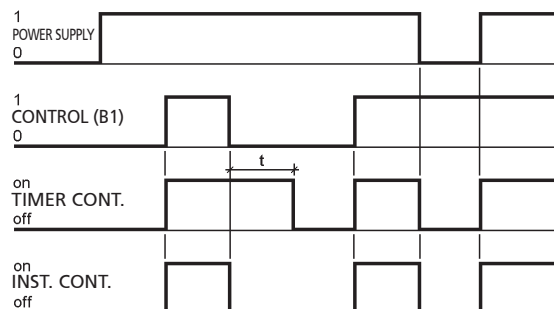
Pick-up delay RDT.x1c-x7c



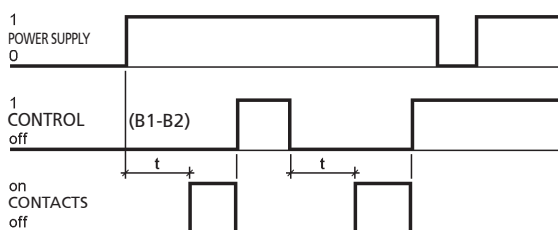
Drop-out delay RDT.x1c-x7c



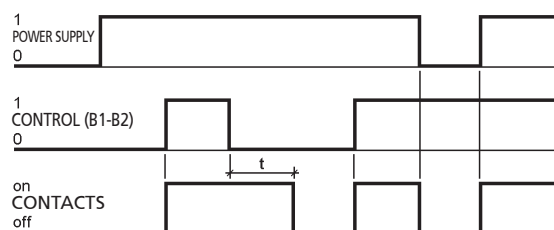
Pick-up delay RDT.x2c-x8c



Drop-out delay RDT.x2c-x8c



Pick-up delay RDT.x4c-x9c Drop-out



Drop-out delay RDT.x4c-x9c



Time delay - Switching time setting

Time setting	By means of DIP switches and selectors
Time setting range	100 ms...990 min
Intermediate scales	6 (0.99 - 9.9 - 99 - 990 secondes / 99 - 990 minutes)
Resolution of switching time setting	1/100 of selected scale
Operating accuracy (0.8...1.1 Un, t=20°C) ⁽¹⁾	± 3 % at low end of scale - ±0.5 % at high end of scale
Accuracy, repeatability	± 2 %
Reset	< 200 ms
Insensitivity to voltage drops	< 100 ms
Indication	Red led = presence of power supply Green led = status of relay outputs (lights up with relay energized)

(1) Additional error for drop-out versions: 100 ms

The timer function and the switching time are set by way of a single 4-bit DIP switch and two rotary selectors adjustable through 10 positions, located on the front of the relay (see "FRONT"). These are accessible by opening the flap on the cover of the relay. The time delay function can be associated either with pick-up or with drop-out; settings range from 100 ms up to 990 minutes.

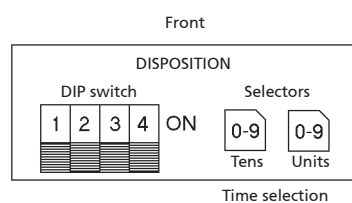
Selection of function: select the OFF or ON position at switch no. 4. OFF: Pick-up - ON: Drop-out.

Selection of operating time: the unit of measure is selected with switches no. 1-2-3, and the desired delay interval by means of the 2 rotary selectors.

To set the switching time correctly, the first step required is to identify and select one of the 6 intermediate scales indicated in table 1. The intermediate scale should be the next higher numerically than the value of the required switching time.

E.g. Switching time: 1'14" (74 seconds), Intermediate scale setting: 99 seconds.

This done, proceed to set the desired value with the two rotary selectors. E.g. 74 seconds, select 7 on the "TENS" selector and 4 on the "UNITS" selector.

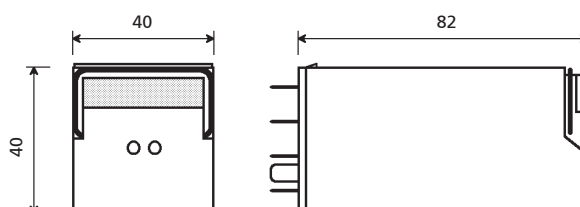


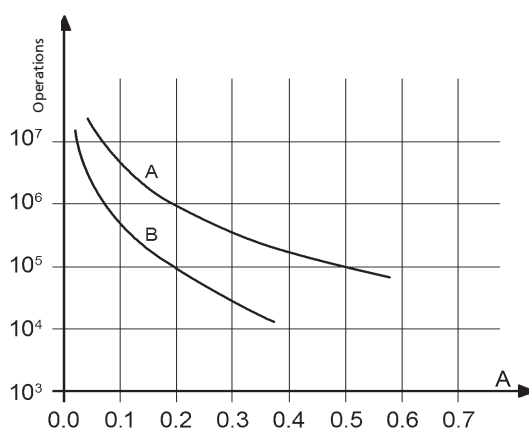
1-2-3 = select scale
4 = select function
OFF = Pick-up
ON = Drop-out

Scales / Setting range			Switch position		
Min	Max	Unit of measure	1	2	3
1	99	Hundredths (0.01s)	OFF	ON	OFF
1	99	Tenths (0.1s)	OFF	ON	ON
1	99	Seconds	ON	OFF	OFF
1	99	Seconds x 10	ON	OFF	ON
1	99	Minutes	ON	ON	OFF
1	99	Minutes x 10	ON	ON	ON

Table 1

Dimensions





Contact loading: 110Vdc, L/R 40 ms

Curve A: RDT_x7-x8-x9

Curve B: RDT_x1-x2-x4

RDT_x1-x2-x4			
U	I (A)	L/R (ms)	Operations
110 Vdc	0.2	40	500,000
220 Vdc	0.2	10	80,000
U	I (A)	cosφ	Operations
110 Vac	1	1	1,200,000
110 Vac	1	0.5	1,000,000
110 Vac	5	1	500,000
110 Vac	5	0.5	300,000
220 Vac	0.5	1	1,200,000
220 Vac	1	0.5	500,000
220 Vac	5	1	400,000
220 Vac	5	0.5	300,000

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

RDT_x7-x8-x9			
U	I (A)	L/R (ms)	Operations
110 Vdc	0.2	40	1,000,000
110 Vdc	0.5	40	150,000
110 Vdc	0.6	10	300,000
110 Vdc	1	10	100,000 (*)
220 Vdc	0.2	10	100,000
U	I (A)	cosφ	Operations
110 Vac	1	1	2,000,000
110 Vac	1	0.5	1,500,000
110 Vac	5	1	950,000
110 Vac	5	0.5	500,000
220 Vac	0.5	1	2,000,000
220 Vac	1	0.5	800,000
220 Vac	5	1	600,000
220 Vac	5	0.5	500,000

Switching frequency: 1,200 operations/hour

Sockets and retaining clips

Type of installation	Type of outputs	Model	Retaining clip
Wall or DIN H35 rail mounting	Screw	PAVD161	VM1823
Flush mounting	Screw	PRVD161	-
PCB-mount	Solder	PRCD161	-

Mounting tips

The preferred mounting position is on the wall, with the relay positioned horizontally in the reading direction on the nameplate.

For correct use of the relays, they should be spaced apart by at least 5 mm in the horizontal direction and 20 mm in the vertical direction. This is to allow correct upward dissipation of the heat generated by the coil. Set these distances according to the socket used. Distances can be reduced depending on the environmental application conditions and on the relay duty cycle.

No special maintenance is required.

Condensation can form inside the relay when powered up and the outside ambient temperature is cold; this is quite normal and does not affect the operation of the relay. The plastic materials of the relay do not possess hygroscopic properties.