

Monostable multiscale timer relay - 4 contacts

2.10

RDT SERIES



RDT

OVERVIEW

- 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

APPLICATIONS



Shipbuilding



Petroleum industry



Heavy industry



Power generation



Power distribution



Railway equipment

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 change-over 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 transport 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 AMRA relays, models of 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 data	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 data		
Number and type		4 SPDT, form C
Current	Nominal ⁽¹⁾ Maximum peak ⁽²⁾ Maximum pulse ⁽²⁾	10A 13A for 1min - 20A for 1s 100A for 10ms
Example of electrical life expectancy ⁽³⁾		RDT.x1c-x2c-x4c : 0.2A - 110Vdc - L/R = 40ms - 10 ⁵ operations - 1800 operations/hour RDT.x7c-x8c-x9c : 0.5A - 110Vdc - L/R = 40ms - 10 ⁵ operations - 1800 operations/hour
Minimum load	Standard contacts Gold-plated contacts	200mW (10V, 10mA) 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.) - 2.2kV (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	3 kV

Mechanical specifications		
Mechanical life expectancy		20x10 ⁶ operations
Maximum switching rate	Mechanical	3600 operations/hour
Degree of protection		IP40
Dimensions (mm)		40x40x82 ⁽¹⁾
Weight (g)		230

(1) Output terminals excluded

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 behaviour	V0

Standards and reference values

EN 61810-1, EN 61810-2, EN 61810-7 EN61812-1 EN 60695-2-10 EN 50082-2 EN 60529	Electromechanical elementary relays Timer relays Fire behaviour Electromagnetic compatibility Degree of protection provided by enclosures
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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 ensures long-term capacity of the contact to conduct lower currents.

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 SPDT timer contacts 2C: 2 SPDT timer contacts + 2 SPDT instantaneous contacts 4C: 4 SPDT timer contacts with control voltage 7C: 4 SPDT timer contacts with magnetic arc blow-out 8C: 2 SPDT timer contacts + 2 SPDT instantaneous contacts with magnetic arc blow-out 9C: 4 SPDT 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 SPDT 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 SPDT 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 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".

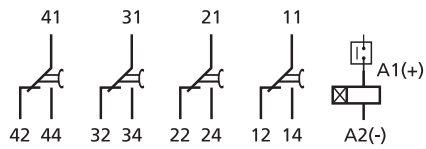
(2) Other values on request.

(3) Optional value.

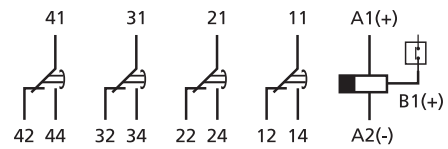
(4) Optional value. The positive mechanical keying is applied according to the manufacturer's model.

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

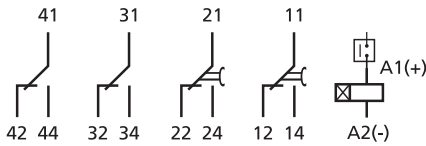
Wiring diagram



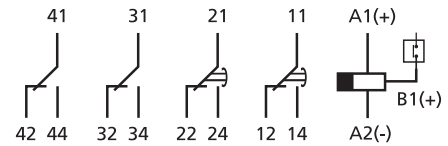
Pick-up diagram RDT.x1c-x7c



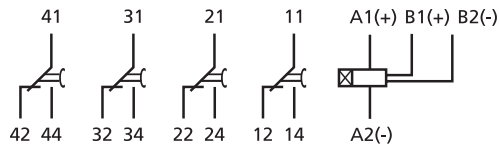
Drop-out diagram RDT.x1c-x7c



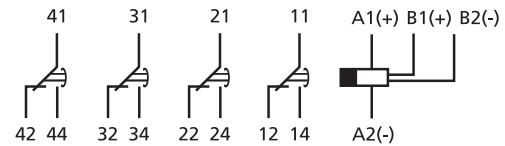
Pick-up diagram RDT.x2c-x8c



Drop-out diagram RDT.x2c-x8c

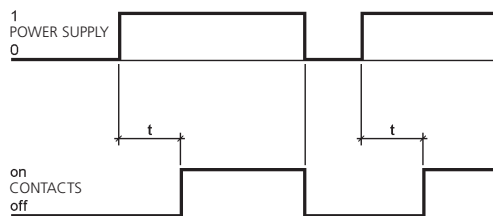


Pick-up diagram RDT.x4c-x9c

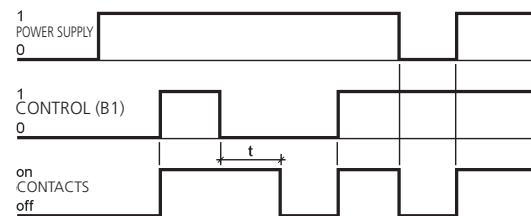


Drop-out diagram RDT.x4c-x9c

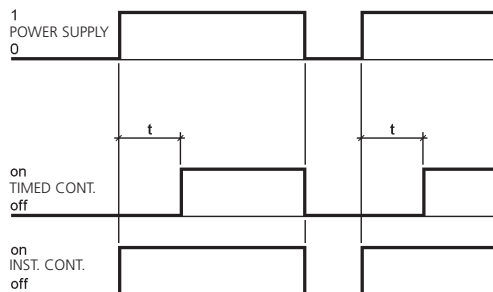
Functional diagram



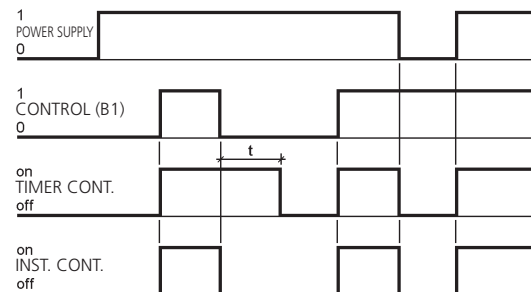
Pick-up delay RDT.x1c-x7c



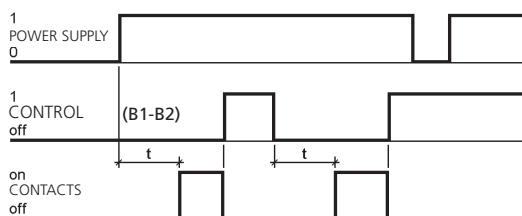
Drop-out delay RDT.x1c-x7c



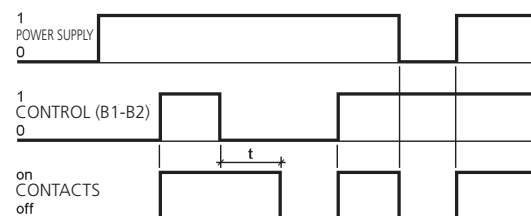
Pick-up delay RDT.x2c-x8c



Drop-out delay RDT.x2c-x8c



Pick-up delay RDT.x4c-x9c



Drop-out delay RDT.x4c-x9c



Time setting	By means of DIP switches and selectors
Time setting range	100ms...990min
Intermediate scales	6 (0.99 - 9.9 - 99 - 990 seconds / 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	< 200ms
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.

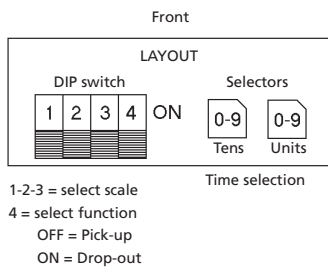
Selection of operating time: the unit of measure is selected with switches no. 1-2-3, and the desired delay interval by means of the 2 rotary selectors.

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.

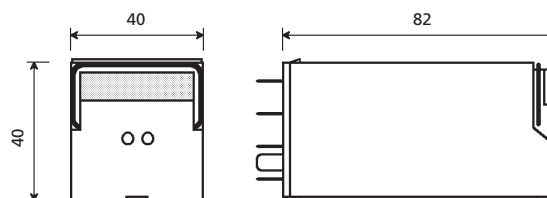
This done, proceed to set the desired value with the two rotary selectors. E.g. 74 seconds, select 7 on the "TENS" selector and 4 on the "UNITS" selector.

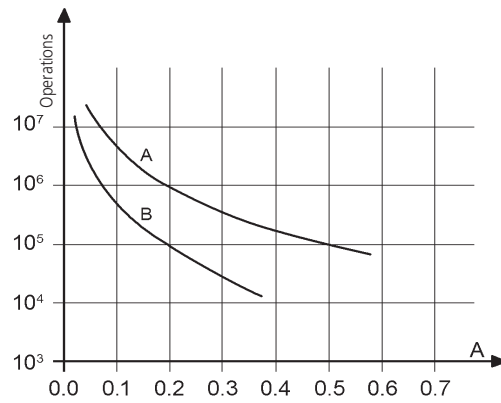


Scales / Setting range			Switch position		
Min	Max	Unit of measure	1	2	3
1	99	Hundredths (0.01s)	OFF	ON	OFF
1	99	Tenths (0.1s)	OFF	ON	ON
1	99	Seconds	ON	OFF	OFF
1	99	Seconds x 10	ON	OFF	ON
1	99	Minutes	ON	ON	OFF
1	99	Minutes x 10	ON	ON	ON

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
110Vdc	0.2	40	500,000
220Vdc	0.2	10	80,000
U	I (A)	cosφ	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

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

RDT_x7-x8-x9			
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)	cosφ	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

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.