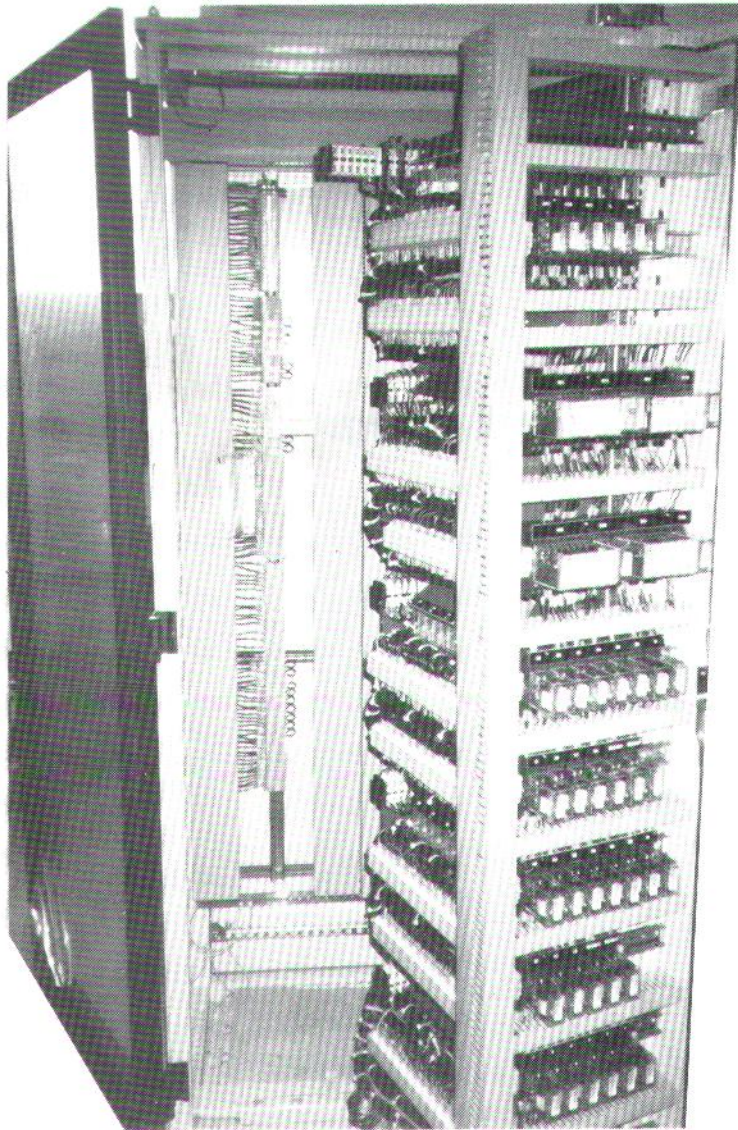


RAG - RAT- RADE

*Instantaneous
time-lag
and bistable
auxiliary
relays*



The ultimate in power network supervision

Instantaneous, time-lag and bistable auxiliary relays

RAG - RAT - RADE

The auxiliary relays RAG, RAT and RADE are three families of signalling and control relays whose mode of operation is respectively, instantaneous, time-delayed and electrically resettable (bistable) for circuit breaker tripping duties.

The relay reference corresponds to the following code :

First letter : R : Relay

Second letter : A : Attracted armature/auxiliary

Third letter : G : General applications

: T : Time-delay applications

: D : Latching

Fourth letter : M : Time-delay pick-up

: R : Time-delay on drop-off

: E : Electrical reset

First number : Case type

Second and third number: Number of instantaneous contacts

Fourth number : Number of time-delayed contacts

Major advantages

- Operation guaranteed over a wide temperature range.
- Rated for continuous operation.
- Contact alignment ensures simultaneous operation of contacts.
- Manufactured using self extinguishing materials with limited absorption of humidity and good thermal stability. All mechanical parts are treated in order to avoid oxidation and ageing.
- Relays may be supplied with diodes in parallel with their coils to avoid voltage surges. This version may be required in automation circuits including sensitive electronic components.

Conformity to normal standard

- Dielectric tests according to IEC 255-5.
- Impulse voltage withstand according to IEC 255-4 Annex E Class III - 1.2/50 μ s.
- Contacts performance according to IEC 255-0-20.
- Insensitive to seismic shocks, tests according to IEEE 501.

Quality control

The quality control for the manufacture of the relays is divided into three separate stages :

- control of the raw materials and items brought from outside,
 - control of the sub-assemblies manufactured at the factory,
 - control of the finished relays.
-

Instantaneous auxiliary relays RAG

RAG relays are employed as auxiliary relays associated with protection relays where it is necessary to multiply control contacts. This is also particularly true in telecontrol and automatic switching schemes which require a large number of repeat contacts. These relays can be equipped with 2 (RAG 1020), 4 (RAG 2040), 8 (RAG 3080) or 16 (RAG 4160) change over contacts.

Description

This series of relays is manufactured with plug and socket mounting arrangements. A transparent cover is provided to protect the relay against humidity and hostile environments.

Main parts of the relay (see figure 1) are :

- 1) Bichromate passivated hinged armature fitted with nickel plated contact holders and silver contacts.
- 2) Coil of enamelled copper wire wound on to a spool manufactured from fibre glass filled Phenylene polyoxide (NORYL GFN3SE1).
- 3) Bichromate passivated iron magnetic circuit.
- 4) NORYL frame supporting the magnetic circuit and the fixed contacts.
- 5) Transparent cover of polycarbonate Makrolon.
- 6) Nameplate.

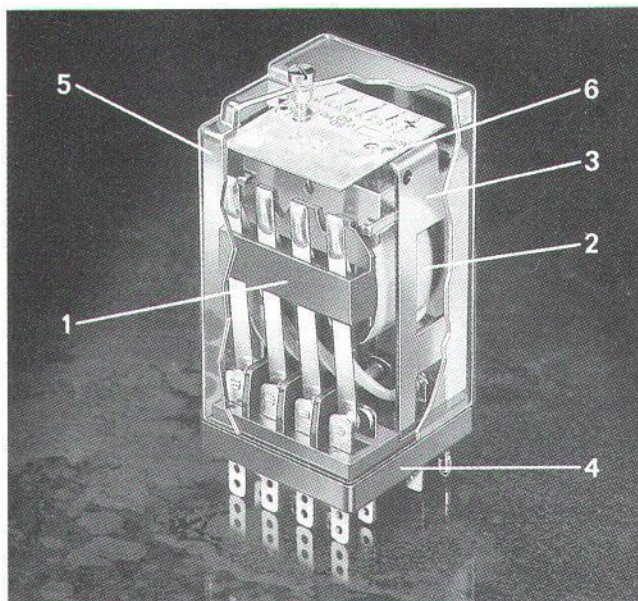
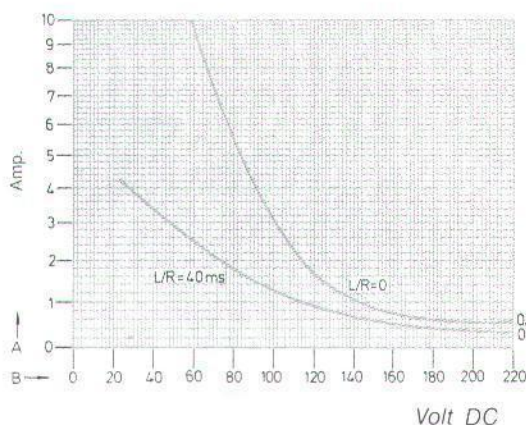


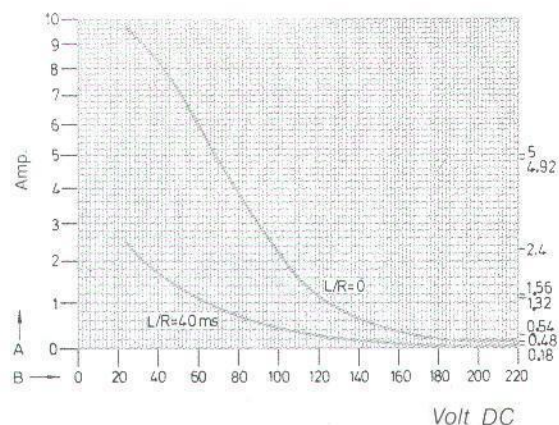
Figure 1

DC maximum interrupting capacity



RAG 1020-2040-3080

see note on page 12

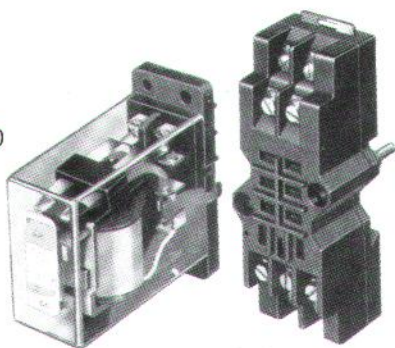


RAG 4160

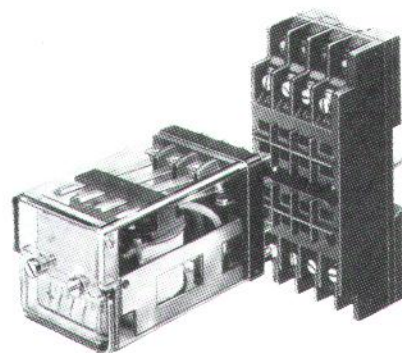
Coil characteristics relays RAG

Coil voltage (V)	Resistance $\pm 10\%$ Ohm				Burden mA			
	RAG1020	RAG2040	RAG3080	RAG4160	RAG1020	RAG2040	RAG3080	RAG4160
DC								
12	65	45	20	—	180	260	520	—
24	245	180	95	—	100	130	250	—
48	1030	720	390	—	47	57	123	—
72	2260	1620	880	—	32	45	22	—
110	5350	3800	2100	1050	20	30	52	105
125	6800	4850	2500	1250	18	26	50	100
220	21300	15550	8200	4100	10	14	27	54
Burden DC (W)								
					2.3	3.2	6	12
AC								
24	46	18	65	—	145	240	290	—
48	180	75	270	—	76	118	145	—
63	310	130	510	—	58	90	105	—
110	940	375	1540	770	33	50	60	120
127	1285	500	2100	1050	28	45	50	100
220	3785	1675	6440	3220	16	25	30	60
380	11750	4750	19000	9500	10	15	17	34
Burden DC (W)								
					3,6	5,8	6,7	13,5

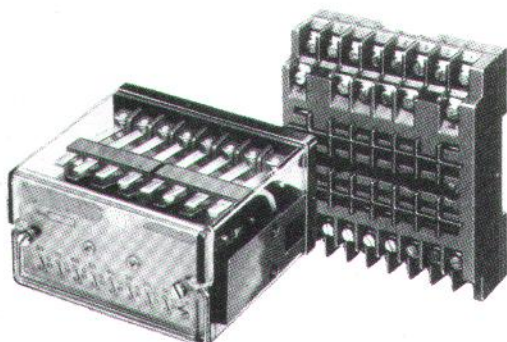
RAG 1020



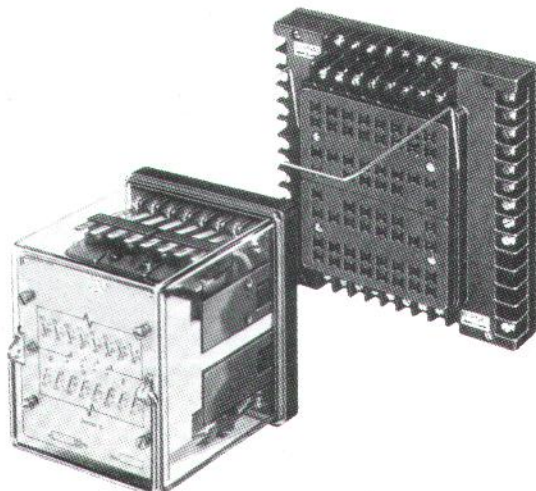
RAG 2040



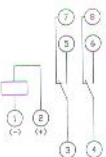
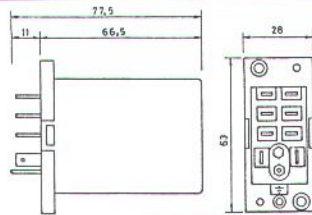
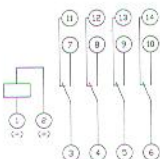
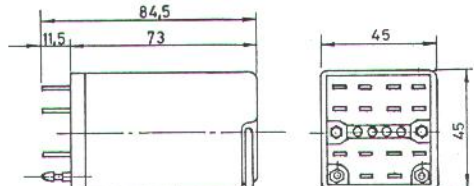
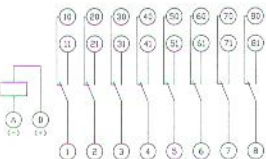
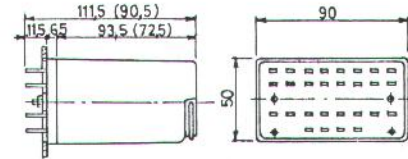
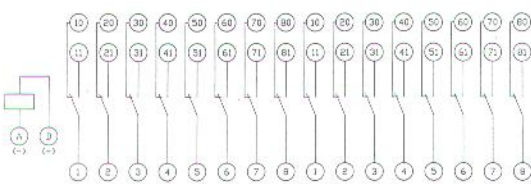
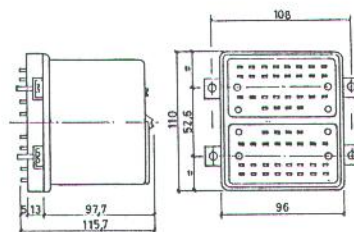
RAG 3080



RAG 4160



Standard range of relays RAG

Type	Number of change over contacts	Rated voltages	Burdens		Operating time		Weights	
			AC	DC	Pick-up	Drop-out	Relay	Socket
RAG 1020	2	12-24-48-110-125 220 V/DC 24-48-110-127-220 380 V/AC - 50/60 Hz	3,6 VA	2,3 W	20 ms	10 ms DC 15 ms AC	170 g	50 g
								
RAG 2040	4	12-24-48-110-125 220 V/DC 24-48-110-127-220 380 V/AC - 50/60 Hz	5,8 VA	3,2 W	20 ms	10 ms DC 15 ms AC	250 g	120 g
								
RAG 3080	8	12-24-48-110-125 220 V/DC 24-48-110-127-220 380 V/AC - 50/60 Hz	6,7 VA	6 W	20 ms	10 ms DC 80 ms AC	530 g	250 g
								
RAG 4160	16	12-24-48-110-125 220 V/DC 24-48-110-127-220 380 V/AC - 50/60 Hz	13,5 VA	12 W	30 ms	15 ms DC 80 ms AC	1100 g	1000 g
								

temporisés RAT / Time-lag relays RAT

RAT relays are employed in sequential control schemes requiring either a time-delay on pick-up (energisation: the output contacts change position at the end of the preset time initiated by the closure of a control contact external to the relay), or a time-delay on drop-off (de-energisation: the same operation occurs at the end of the preset time initiated by the opening of a control contact external to the relay). The rating and clearances used for the output contacts allow them to be used directly control switching equipment. These relays can be equipped with 2 (RATM/R 2002) or 8 (RATM 3008) change over time delayed contacts, or 4 two way time delayed and 4 change over instantaneous contacts (RATM 3044).

Mode of operation

The electronic circuit of these relays consists of a high precision oscillator and a programmable counter (figure 3).

When the time-lag unit is energised the light emitting diode (LED) on the front is lit, and the relay starts counting the time. The time-lag is adjusted by a potentiometer controlling the oscillator.

The electronic circuit, at the end of the time-lag, causes operation of the output relay.

The RAT 2002 and RAT 3008 have one output relay only on the time-lag circuit, but the RAT 3044 also has an instantaneous output relay.

All time-lag relays are of the draw-out type and are protected against humidity and accidental contact by a transparent cover.

The relays may be used on AC or DC supplies (polarity is unimportant).

Description (see figure 2)

- 1) Adjustable potentiometer.
- 2) Light (LED) showing that the relay is energised.
- 3) Switch to select the scale multiplying factor.
- 4) Switch to select the scale magnitude (seconds or minutes).
- 5) Nameplate.
- 6) Output relay fitted with high breaking capacity contacts.
- 7) Printed circuit with electronic components.

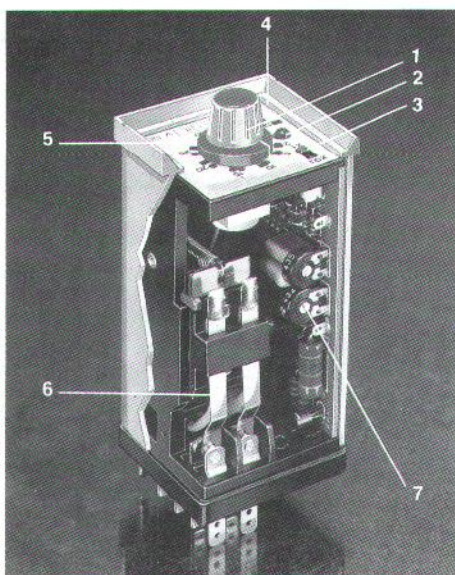


Fig. 2

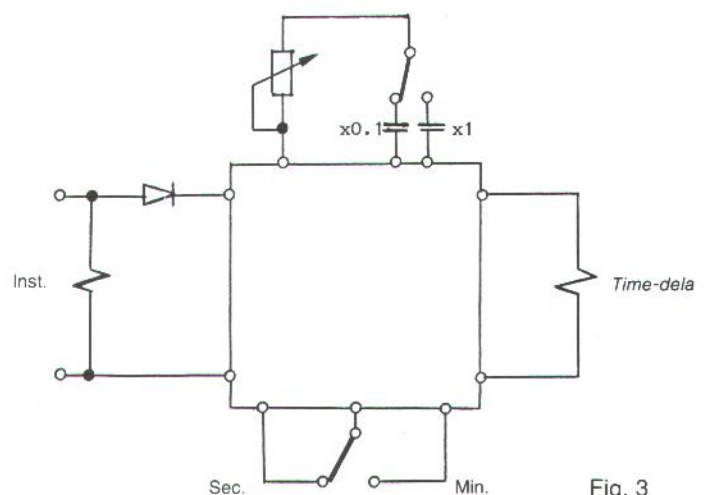


Fig. 3

Connection diagram RAT 3044 relay

Standard range of relays RAT

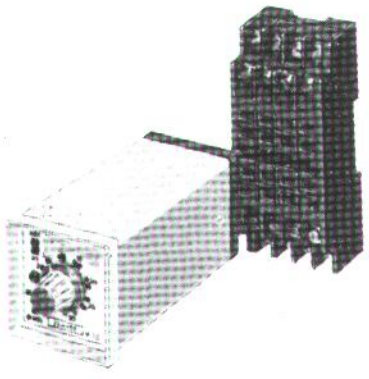
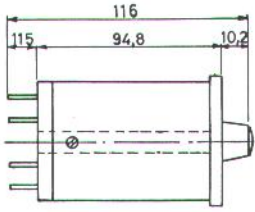
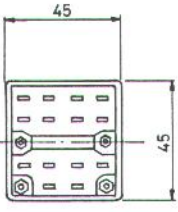
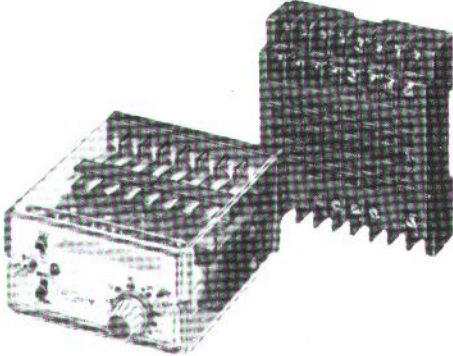
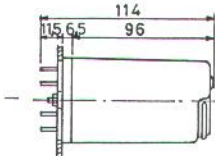
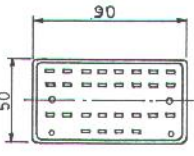
Type	Number of change over contacts	Nominal voltage (+10% -20% Un)	Time-delay	Drop-out time
RATM 2002	2 time-lag pick-up	DC or AC 12-24-48-110-125-220 V 50/60 Hz (relays identical for DC/AC)	0,2 s – 30 mn	100 ms
RATR 2002	2 time-lag drop out	DC or AC 12-24-48-110-125-220 V 50/60 Hz (relays identical for DC/AC)	0,2 s – 30 mn	100 ms
RATM 3044	4 instantaneous + 4 time-lag pick-up	DC or AC 12-24-48-110-125-220 V 50/60 Hz (relays identical for DC/AC)	0,2 s – 30 mn 5 mn – 60 mn 1 – 12H	100 ms 100 ms 100 ms
RATM 3008	8 time-lag pick-up	DC or AC 12-24-48-110-125-220 V 50/60 Hz (relays identical for DC/AC)	0,2 s – 30 mn 5 mn – 60 mn 1 – 12H	100 ms 100 ms 100 ms

Legend



* The operating contact M should not operate on any other relay or device.

Standard range of relays RAT

Type	Burden		Weight	CASE DIMENSIONS
	During time delay	After time delay		
RATM 2002	0,5 W	3 W	200 g	  
RATR 2002	0,5 W	3 W	200 g	
RATM 3044	3,5 W	6,5 W	530 g	  
RATM 3008	1 W	6,5 W	530 g	

NOTA :

1. Time delay 0.2 s to 30 mn is obtained by 4 ranges : 0.2 s to 3 s - 2 s to 30 s - 0.2 to 3 mn - 2 to 30 mn
2. Repetition error limit : $\pm 1\%$
3. Time error limit : $\pm 10\%$

Electrical reset (bistable) auxiliary relays RADE

These relays are mainly used as contact multipliers in control systems, where two different stable positions are required, such as: YES/NO, OPEN/CLOSED, AUTOMATIC/MANUAL, etc...

Other important uses are :

- electrical or hand reset tripping relays,
- remote control relays.

These relays may need several output contacts :

- RADE 2030 : 3 change-over contacts
- RADE 3080 : 8 change-over contacts
- RADE 4160 : 16 change-over contacts

Mode of operation

These bistable relays use two coils, each fitted with a series cut-off contact. The relay is held in either of the two stable positions by means of a permanent magnet (figure 5).

The flux generated by the permanent magnet (Φ_P) closes through the leg which is in contact with the armature. To switch the relay to the other position, the coil corresponding to the leg in contact with the armature is energised. The coil generates a flux (Φ_B or Φ_A) in opposition to Φ_P , causing the armature to be rejected into the other stable position, where it is now held by the flux of the permanent magnet (Φ_P).

The use of the permanent magnet to hold the relay in either of the two stable positions is an effective solution against intermediate positions or bounce, giving great security and a long, safe service life, with zero burden except during switching.

An indicator, showing the position of the armature, can also be used for manual switching of the relay.

Description (see figure 4)

- 1) Nameplate.
- 2) Position indicator.
- 3) Transparent cover.
- 4) Output relay with high breaking capacity contacts.

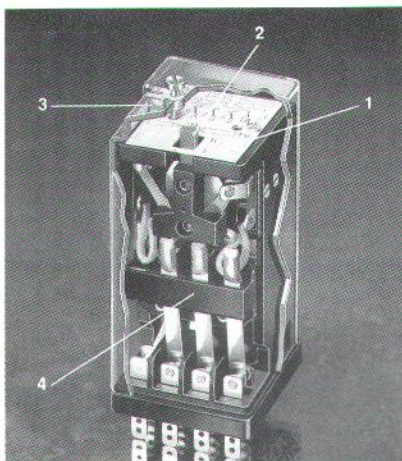


Fig. 4

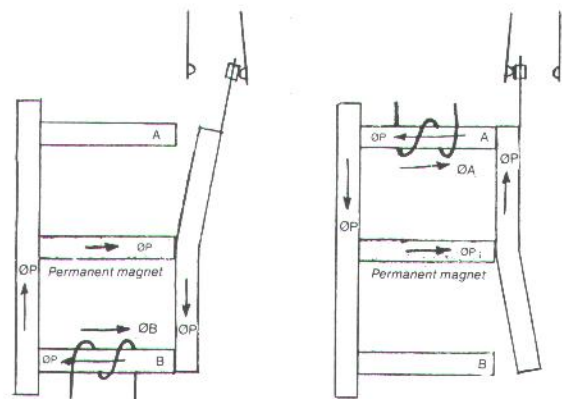
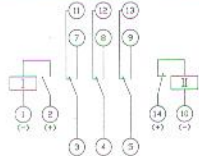
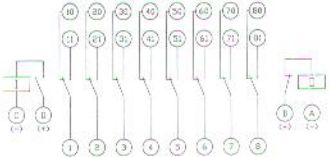
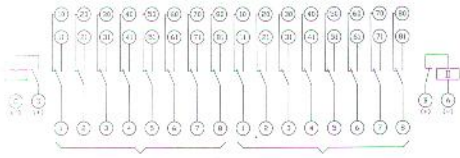


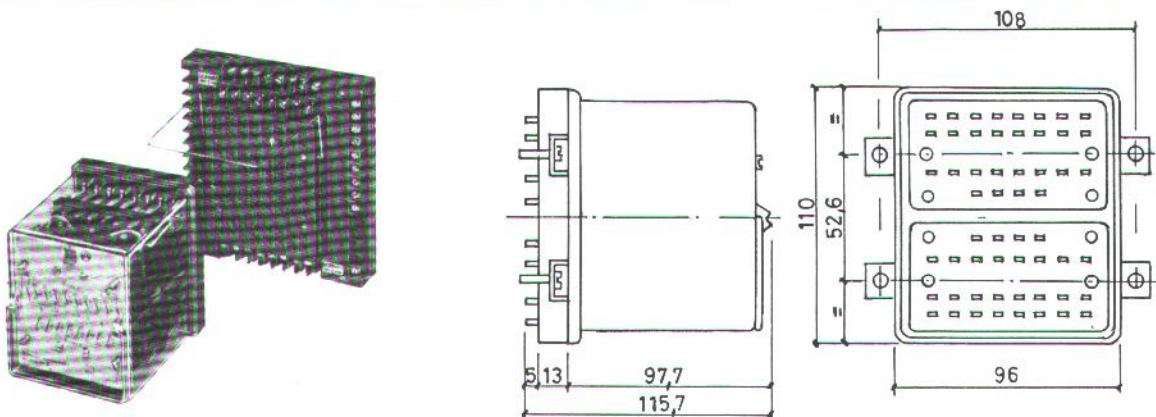
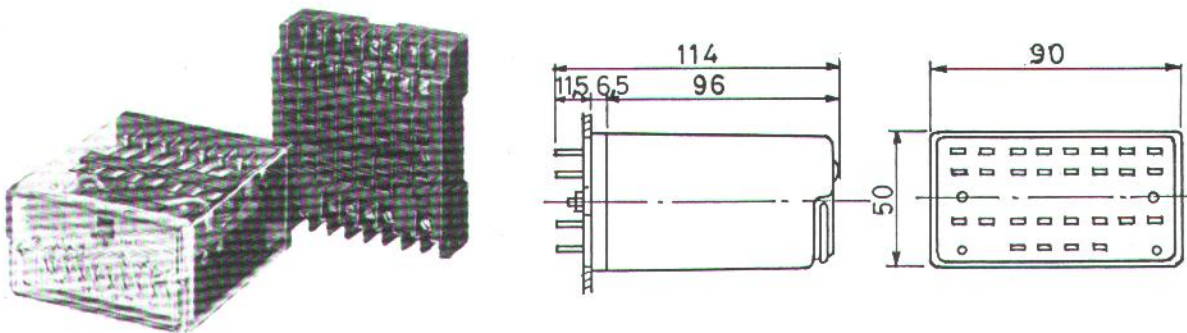
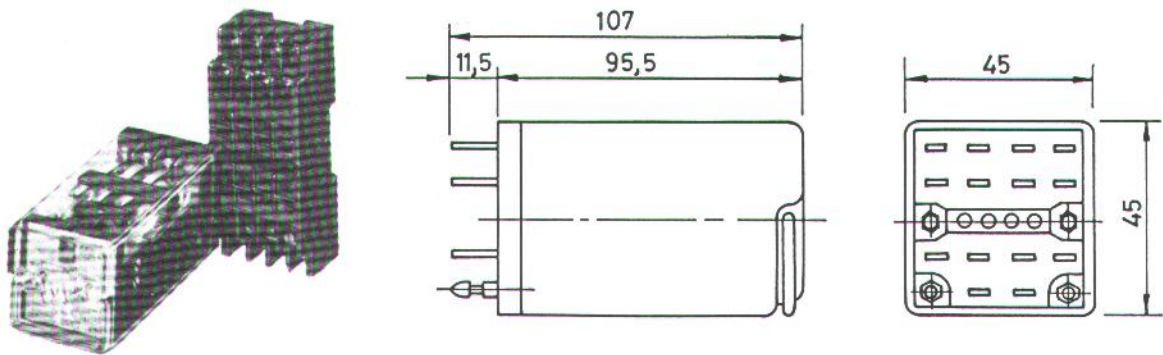
Fig. 5

Range relays RADE

Type	Number of change over contacts	Rated voltage	Pick up Burden		Operating time (excitation)	Weight
			AC	DC		
RADE 2030	3 instantaneous	DC : 12-24-48-110-125-220 V +10% - 20% AC : 24-48-110-127-220-380 V 50/60 Hz +10% - 20%	6 VA	6 W	20 ms	400 g
						
RADE 3080	8 instantaneous	DC : 12-24-48-110-125-220 V +10% - 20% AC : 24-48-110-127-220-380 V 50/60 Hz +10% - 20%	10 VA	12 W	20 ms	690 g
						
RADE 4160	16 instantaneous	DC : 12-24-48-110-125-220 V +10% - 20% AC : 24-48-110-127-220-380 V 50/60 Hz +10% - 20%	24 VA	24 W	20 ms	1400 g
	 <p>Terminal "A" Terminal "B"</p>					

Standard range of relays RADE

CASE DIMENSIONS



• Standard	IEC 255
• Mechanical life	20 × 10 ⁶ operations based on 1200 operations per hour
• Climatic tests :	
— storage temperature	-25 +85°C
— damp heat test	93% relative humidity at 40°C 144 hours according to IEC 68-2-30
— dry heat test	55°C, for 96 hours according to IEC 68-2-2
— cold test	-25°C, for 96 hours according IEC 68-2-1
• Degree of protection { Relay	IP40 according to IEC 144
base	IP20
• Seismic qualification tests IEEE 501	The FRT (Fragility upon Test) has a ZPA (Zero period acceleration > at 33 Hz) at 6 g.
• Insulation test	IEC 255-5
— dielectric test	2 kV / 1 mn - 50 Hz
— insulation resistance	> 10.000 Mohm
— insulation class	380 V, Series C
• Impulse voltage withstand test	5 kV - 1.2 / 50 µs
— insensitive to high frequency disturbance	2.5 kV - 1 MHz
• Ambient conditions :	
— temperature	-20°C +60°C at Un (RAG) -20°C +70°C at Un (RADE) 0°C +55°C at Un (RAT)
— humidity	75% at 40°C at Un (RAG and RADE) 75% at 40°C at Un (RAT)
• Contacts :	
— continuous current carrying capacity	10 A.
• Breaking capacity	1.2A / 125V / DC resistive 10A / 127V / CA Cos Ø = 0.7 } see curves (on page 3)
• Making capacity	40A - 0.5 s.
• Short circuit capability	250A for 10 ms.
• Case types	
— RAG 1020	Type 1
— RAG 2040, RATM 2002, RATR 2002, RADE 2030	Type 2
— RAG 3080, RATM 3044, RATM 3008, RADE 3080	Type 3
— RAC 4160, RADE 4160	Type 4
• Socket types	
— Case type 1 : front connection	PAV-1 : connecting by screw M3
rear connection	PAR-1 by screw M3
— Case type 2 : front connection	PARC-i : by push-on connector 6.35 mm
rear connection	PAV-2 : by screw M3
— Case type 3 : front connection	PAR-2 : by screw M3
rear connection	PARC-2 : by push-on connector 6.35 mm
— Case type 4 : front connection	PAV-3 : by screw M3
rear connection	PAR-3 : by screw M3
— Case type 4 : front connection	PARC-3 : by push-on connector 6.35 mm
rear connection	EPAR-3 : screw M3 flush mounting
— Case type 4 : front connection	PAV-4 : by screw M3
rear connection	PAR-4 : by screw M3

Installation

All auxiliary relays are of the draw-out type. According to the case type, they may be mounted as projecting front connection or rear connection, mounted by screws or on DIN bars, connection by screws or by clips. Case type 3 may be supplied for flush rear connection.

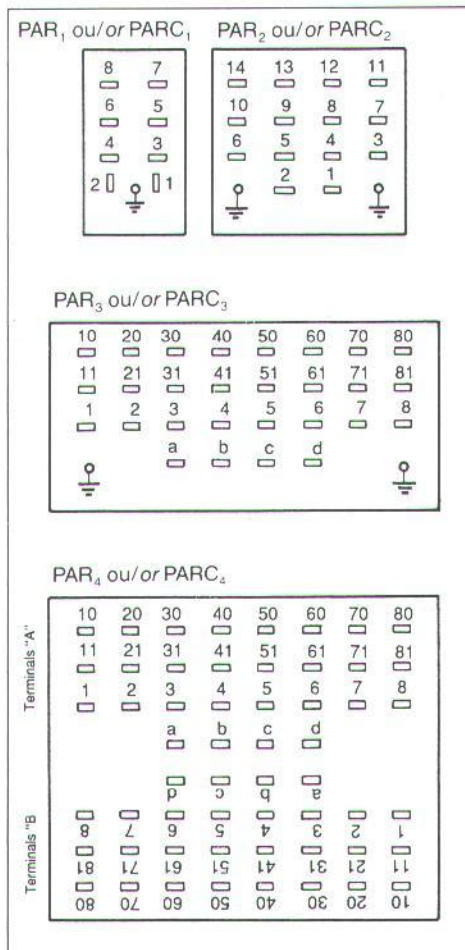
Relays may be mounted in all positions, guaranteed characteristics are for relays installed in their normal position on a vertical panel.

Minimum distances between relays are indicated under "Drillings and cut-out" on page 15.

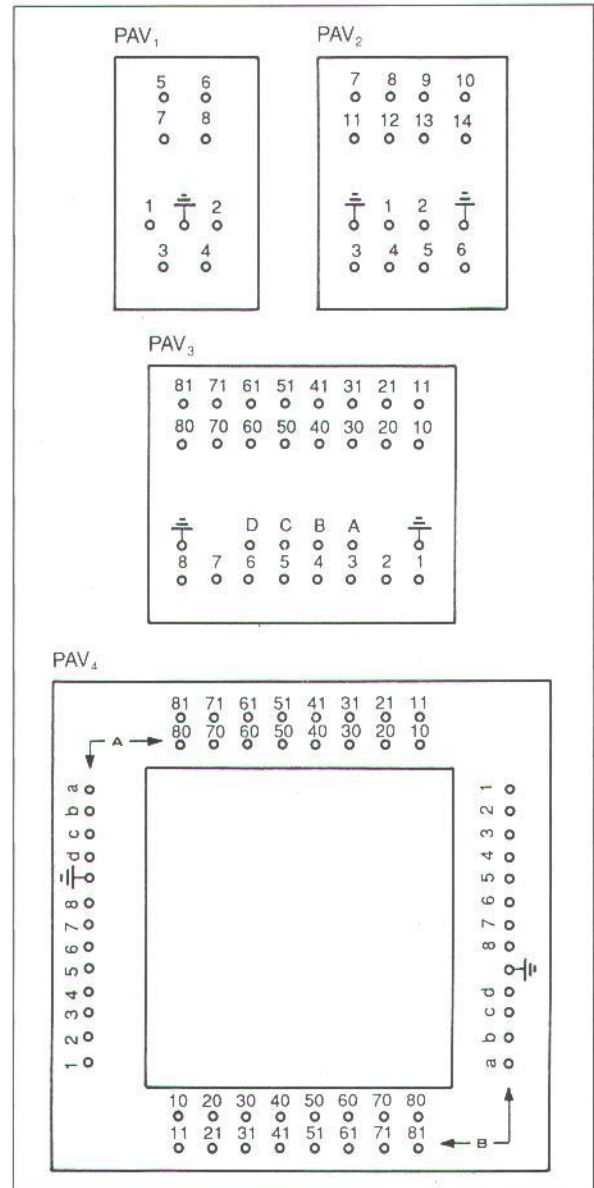
On option, pre-drilled mounting bars may be supplied for relays type 1 and 2 (figure 6). Retaining springs may be supplied for relays for high vibration level environments (figure 7).

Sockets

In relays and sockets Rear connections (rear view)



In sockets front connections (front view)



Accessories

Relay	Socket	Connection terminals	Panel fixation
RAG1020	PAV ₁ * PAR ₁ * PARC ₁ *	by M3 screws by M3 screws by 6,35 mm quick terminals	M3 screw or DIN 46.277 DIN 46.277 See cut outs drawing See cut outs drawing
RAG2040	PAV ₂ * PAV ₂ PAR ₂ * PARC ₂ PARC ₂	by M3 screws by double 6,35 mm quick terminals by M3 screws by 6,35 mm quick terminals by double 6,35 mm quick terminals	M3 screw or DIN 46.277 M3 screw or DIN 46.277 See cut outs drawing See cut outs drawing See cut outs drawing
RAG3080 RADE3020	PAV ₃ * PAV ₃ PAR ₃ * PARC ₃ PARC ₃	by M3 screws by double 6,35 mm quick terminals by M3 screws by 6,35 mm quick terminals by double 6,35 mm quick terminals	M3 screw or DIN 46.277 M3 screw or DIN 46.277 See cut outs drawing See cut outs drawing See cut outs drawing
RAG4160	PAV ₄ * PAR ₄	by M3 screws by M3 screws	M3 screw See cut outs drawing

* PAV : Front connected

PAR : Rear connected

Special arrangements

Relays which are to be installed in places submitted to vibrations or where seismic disturbances can occur, are available with retaining springs, that secures the relay into the socket.

Mounting bars

Type	Length	Number of drilling	Socket types
1400	400 mm	10	PAR ₁ /PARC ₁
1700	700 mm	15	PAR ₁ /PARC ₁
2400	400 mm	7	PAR ₂ /PARC ₂
2700	700 mm	12	PAR ₂ /PARC ₂
2900	900 mm	13	PAR ₂ /PARC ₂

Socket

	A	B	C	D
1)	⊗	⊗	○	○
2)	○	○	⊗	⊗
3)	○	⊗	⊗	○
4)	⊗	○	○	⊗
5)	○	⊗	○	○
6)	⊗	○	⊗	○
7)	○	⊗	○	⊗

Relay

A	B	C	D
○	○	⊗	⊗
⊗	⊗	○	○
⊗	○	○	⊗
○	⊗	⊗	○
○	⊗	○	⊗
○	⊗	○	⊗
⊗	○	⊗	○

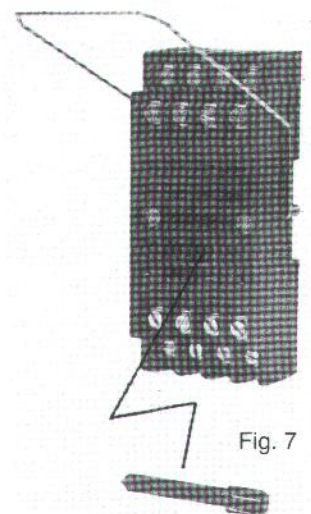


Fig. 7

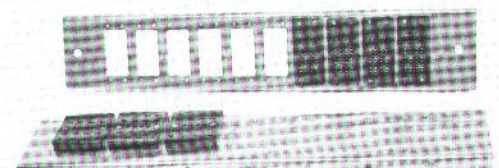


Fig. 6

Security pins

Red security pins are available for obtaining inter-lock possibilities.

Purchased separately, can be plugged into socket and relays to obtain, different codes.

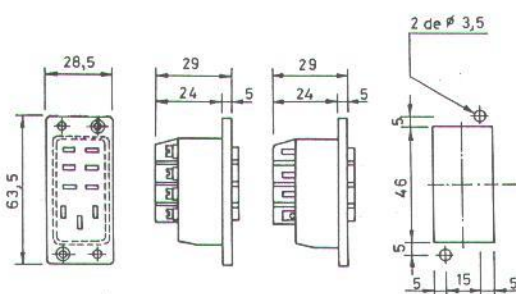
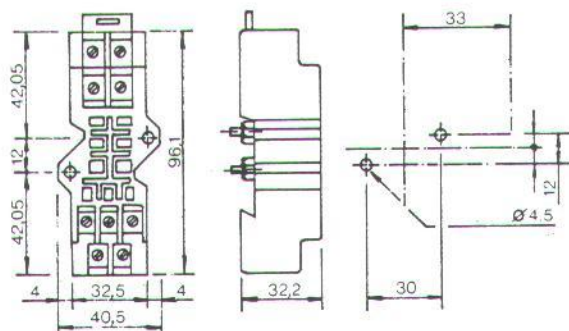
Four holes are available in the sockets and relays for these purposes.

Drilling and cut-outs

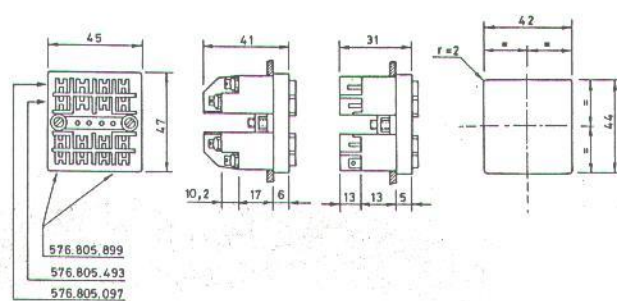
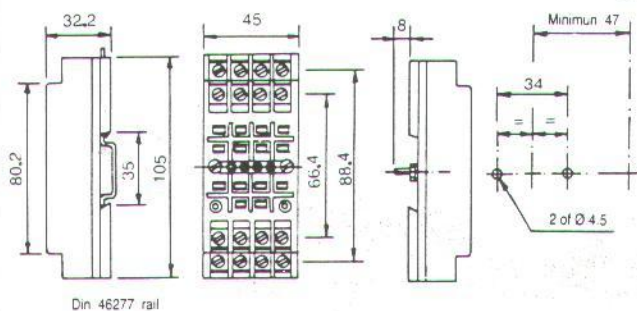
Front connection

Rear connection

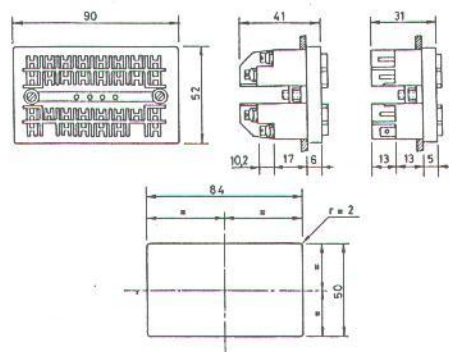
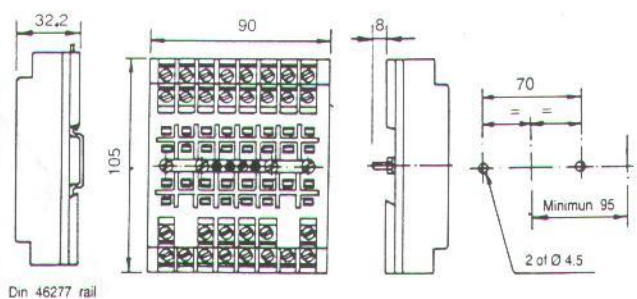
CASE 1



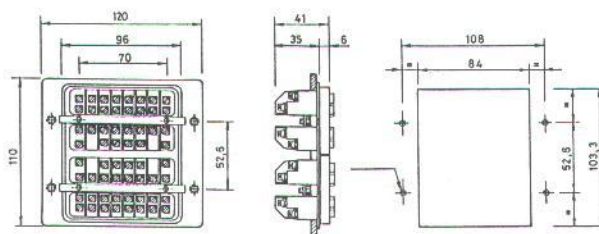
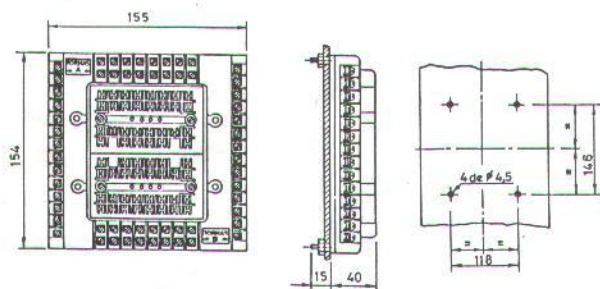
CASE 2



CASE 3



CASE 4



Only documents supplied with our acknowledgement are to be considered as binding.



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