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D2600 Relay

- **High integrity plug-in relays with transparent covers and a choice of front or rear terminal sockets and racks.**
- **Extensively used throughout the Power Industry for power, switchgear and safety related systems.**
- **Available with a choice of contact combinations and materials to suit most applications.**
- **All relay and sockets can be fitted with fouling pins to prevent interchangeability between different relays.**

1. Relay Types

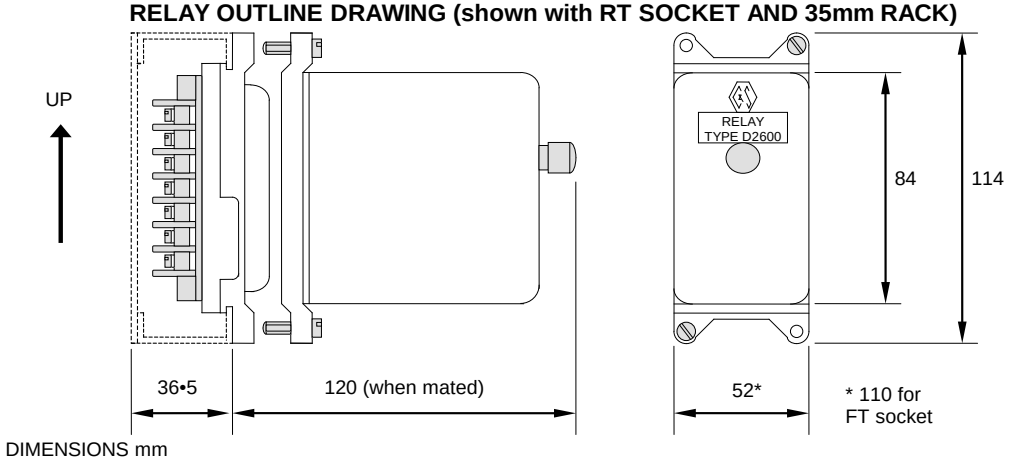
D2600	Up to 6 normally open or closed pairs, or 4 changeover sets.
D2600/B	Relay with magnetic arc quenching, for DC power applications.
D2600/LES & LE	Latching relay with electrical reset.
D2600/LM	Latching relay with manual reset.
D2600/FG	Relay with flag indication of operational state.
D2600/CF	One contact set with fleeting operation when relay energised or de-energised.
D2600/IR	50VDC Relays with 'AC withstand' capability.
D2600/S	Relay customisation, e.g. internal PCB (series C+R circuit), anti-residual, etc.
B7 Timing Relay	Refer to D5455/B7 Datasheet
FR70 Flashing relay	Refer to D4970/FR70 Datasheet

2. Technical Data

Coil Data	Max. Coil Voltage:	440v 50Hz or 250VDC.
	Voltage Tolerances:	AC-15% to +10%, DC -20% to +10%.
	Release (approx% of Min. Op Volts):	AC 70% (or less), DC 25% (or less).
	Coil Power (nominal):	3.5W DC or AC (typically 10VA @ 110V 50Hz).
	Coil Suppression:	Diodes or VDR's fitted internally if requested.
Operate Times	Pull in = 45ms Maximum, Drop out = 35ms Maximum.	
Voltage Withstand: (IEC 255-5:1977)	1KV rms 50Hz for 1 minute across open contacts.	
	2KV rms 50Hz for 1 minute between:	a) current carrying parts and frame b) contact sets c) coil and contacts.
Insulation (IEC 225-5:1977)	Greater than 100M© @ 500VDC.	
Environment (IEC 68-2-2)	Temperature:	Operating: -20°C to +55°C, Storage -20°C to +70°C
	Humidity:	12 Cycles to 55°C and 93% RH.
	Shock:	Operational: 11ms duration, 100m/s^2 peak (10g), 10 pulses in each plane, no contact separation.
	Survival:	11ms duration, 150m/s^2 peak (15g) 10 pulses in 3 directions.
	Vibration:	IEC 255-21-1, Class 1.
	Seismic:	IEEE 344-1975 para 6.3.1.
Electro Magnetic Compatibility	Radiated Immunity & Fast Transient: EN 50082-1 & EN 50082-2 Radiated & Conducted Emissions: EN 50081-1 & EN 50081-2.	
Mechanical Life	6 x 10^6 operations for standard relay	
Weight	750g (Standard D2600 relay with D2600/RT socket)	

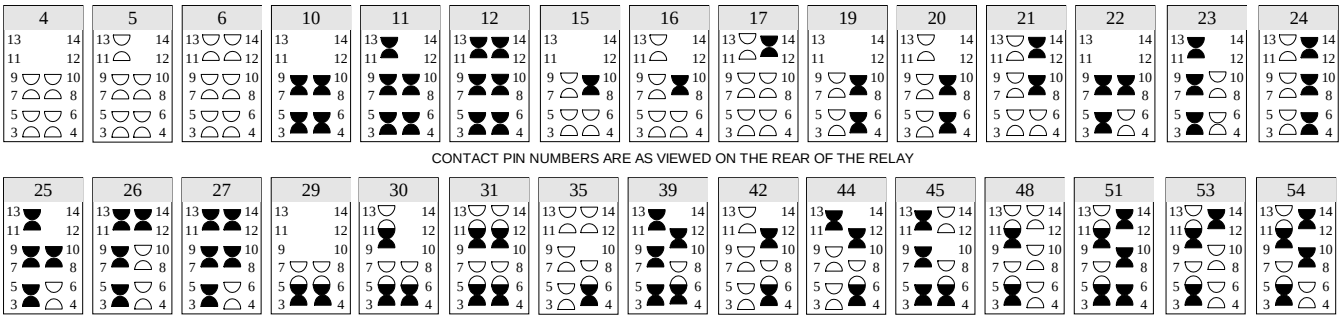
For Mounting Racks and other Socket types see sections 10 and 11.

RELAY OUTLINE DRAWING (shown with RT SOCKET AND 35mm RACK)



DIMENSIONS mm

3. Contact arrangements available (Keycodes)



Note: Only the most popular arrangements are shown above – other arrangements are available on request. Changeover contacts are break-before-make on above codes. Make-before-break keycodes are also available, but the connections are different to standard changeovers. Contacts will be supplied in silver unless specified otherwise (see below for available materials).

4. Contact Materials & Ratings

4.1 Silver Contacts

These are the standard contacts for most applications. Each contact pair is capable of switching the loads given in the table, but subject to the 'Relay Total Current Carrying Capacity' as defined below.

AC LOADS	
250VAC @ 10A max. With a power factor of not less than 0.8	For more inductive loads multiply the max. current (10A) by the power factor to determine the switching current.
DC LOADS (Non-inductive)	
250VDC @ 0.5A max 130VDC @ 0.5A max 85VDC @ 1.5A max 50VDC @ 5A max 35VDC @ 7A max	For intermediate values interpolate between the nearest two levels

4.2 Palladium Copper

These contacts are virtually tarnish-free in normal atmospheres. They have a smaller contact dome to provide higher contact pressure and more wiping action. Mainly used for low energy switching (typically 5V @ 10mA), but they will handle up to 2A (subject to a maximum of 40W or 40VA), specified by adding PdCu to the relay descriptive code.

4.3 Silver Cadmium Oxide (D54X)

These contacts are fitted as standard with magnetic blow-outs to provide maximum resistance to arcing for heavier inductive DC loads. They will break DC inductive loads of up to 10A @ 120V or 5A @ 250V, but it is recommended that two contacts are used in series for highly inductive loads.

- For optimum arc quenching always connect the more positive supply to the highest numbered contact of a pair.
- For changeover contacts this applies to the pair breaking the highest or most inductive current.
- Silver Cadmium Oxide contacts with magnetic blow-out are specified by adding 'B' to the relay descriptive code.
- Silver Cadmium Oxide may also be used without blow-out magnets for AC loads and for intermediate DC loads (add 'D54X' to relay descriptive code). Switching capacity is the same as for silver contacts above, but contact life will be improved due to the greater arc resistance of these contacts.

4.4 Arc Suppression

Blow-out magnets are fitted as standard to relays with Silver Cadmium Oxide contacts (see above). They may also be fitted with other contact materials, where arc quenching is required to improve contact life. External arc suppression (e.g. diodes or VDR's) should also be considered for inductive loads where contact arcing is likely to occur.

4.5 Relay Total Current Carrying Capacity

To limit internal heating, relays are subject to a maximum overall relay current calculated as follows:

$$I_1^2 + I_2^2 \cdots\cdots I_N^2 \text{ d } 100$$

Where I_1^2 etc. are the currents carried simultaneously by individual contacts.

Where possible the current should be shared between two contact stacks for optimum heat distribution within the relay. Individual contact loading must not exceed the specified limit for the contact material.

4.6 Electrical Contact Life

For light loads the contact life will approach the mechanical life of the relay. This will be reduced in more arduous duty depending on load (particularly breaking of heavy inductive DC loads), frequency & number of operations and local environmental conditions.

Greater reliability and contact life can be obtained by sharing heavy loads between contacts and using blow-out magnets where appropriate. Typical contact lives for heavy resistive loads (under laboratory conditions) are as follows:

- $>10^6$ operations @ 4A and 127VDC
  for all contact types with blow-out magnet fitted.
- $>10^5$ operations @ 7A and 120VDC
  for silver cadmium oxide or silver contacts with blow-out magnets fitted.
- $>3x10^4$ operations @ 10AA and 120VDC
  for silver cadmium oxide contacts with blow-out magnets fitted.

The information given above is for guidance only and derives from tests on contacts used under 'normal' operating conditions. For abnormal or critical applications, tests should be carried out to confirm suitability.

5. Latching Relays with Electrical Reset

Externally identical to the D2600 relay (sections 1-4) and compatible with the standard sockets and racks (sections 10 & 11). Contact materials and types are as the standard relay. Blow-out magnets are available on relays fitted with N/O or N/C contacts. All types require a minimum pulse of 80ms to operate the relay and 100ms to reset. Coils are available for operation on DC voltages between 6V and 240V, with AC operation provided via a bridge rectifier. Coils can be wired as CIRCUIT A (internally commoned on one side - three wire) or CIRCUIT B (independent - four wire). Suppression diodes (specify polarity when ordering) or VDR's are available on request.

5.1 D2600/LES - Suicide contacts on both coils

Bi-stable relay with suicide contact protection for both operate and reset coils. Coils are rated for intermittent operation and the specified minimum voltage must be applied to ensure the relay changes state and breaks the associated suicide contact. Current drain from the supply is limited to approximately 100ms from application to either coil. **Supply must not be applied to both coils simultaneously or the relay will malfunction or overheat resulting in damage.**

Relays are available with a combination of N/O, N/C or C/O volt free contacts, up to a maximum of 5 N/O or N/C contacts (4 for circuit B) or 3 C/O contacts (refer to circuit diagrams opposite for standard keycodes). One set of N/O contact on the main stack of the relay are reserved as suicide contacts for the reset coils. Keycodes refer to volt free (user) contacts only, do not include suicide contacts when determining keycode required. Contact sales for advice on available contact combinations.

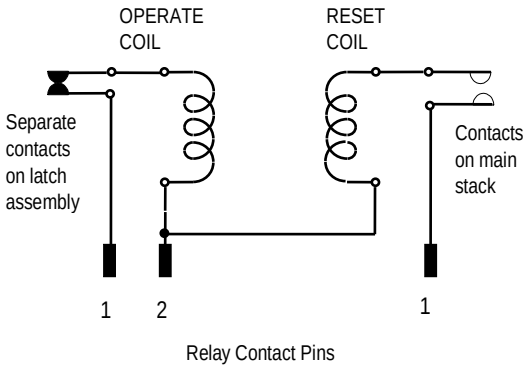
5.2 D2600/LE- Suicide contacts on reset coil only

Similar to the D2600/LES relay, but the suicide contact is omitted from the operate coil circuit. The operate coil can be continuously energised, but **supply must not be applied to both circuits simultaneously or the reset coil may overheat resulting in damage.**

Internal Relay Wiring

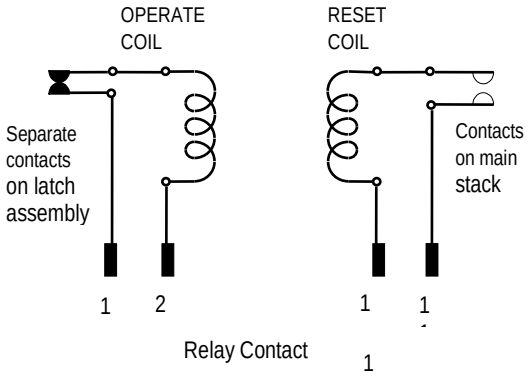
Relays are shown in the de-latched state with no power to either coil. LES Types are shown – LE is similar but without contacts in the operate circuit. Contact arrangements for each keycode are detailed in section 3. Different contact arrangements are available on request.

CIRCUIT 'A' WIRING (3-WIRE)



STANDARD KEYCODES AVAILABLE
5,11,16, 20, 23, 25 & 30

CIRCUIT 'B' WIRING (4-WIRE)

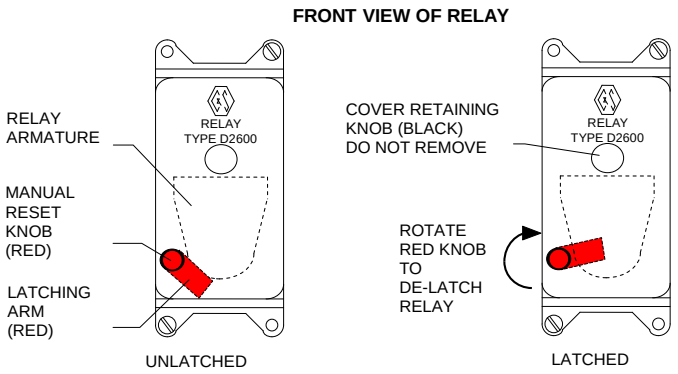


STANDARD KEYCODES AVAILABLE
4,10,15,19, 22 & 29

6. Latching Relays with Manual Reset

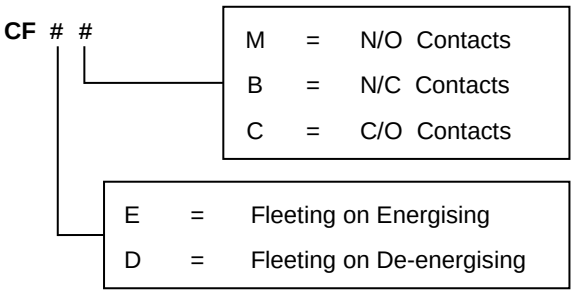
D2600/LM

Latching relays type D2600/LM are externally similar to the D2600 relay (sections 1-4) and are compatible with the standard sockets and racks (section 10 & 11). Contact materials and types are the same as the standard relay and the full number of contacts and blow-out magnets can be fitted. On energising a spring loaded latch arm moves across the armature, there by locking it in the energised position when the coil is de-energised. The latching arm can be reset by rotating the red knob on the front of the relay. The latching arm is coloured red to give a clear indication of the relay state.



7. Fleeting contact relay – D2600/CF**

One set of contacts operates for a brief time when the relay is energised, de-energised or both, irrespective of how long the main coil remains energised. The fleeting contacts can be specified as N/O or N/C, with C/O contacts available on request. To specify this relay, the code should be completed as follows:



Pulse length: Fleeting contacts operate for between 100 to 300ms (not adjustable)

Recovery time: Less than 500ms.

Supply voltages: 24V, 50V, 110V, 250V (+10% - 20%) DC or AC 50Hz to 110Hz. Full wave rectified internally

Fleeting contact rating: 110VAC 5A (non-inductive). 100VDC 30W (non-inductive).

Non-Fleeting contacts: Can be supplied in all available materials (see § 4) to the following keycodes. Blow-out magnets are not available.

Non-Interchangeability: Relay can be fitted with the full range of fouling pins

Fleeting contacts on relay pins	Non-Fleeting contacts keycodes available
11 & 13	4, 14, 15, 19, 22 & 29
12 & 14	5, 11, 16, 20, 23, 25 & 30

8. Interposing Relay - D2600/IR

Meeting the requirements of CEGB-CCS (1960) the D2900/IR range of control relays are designed to be operated from a 50VDC supply where there is a possibility of AC pick-up from adjacent circuits. The relays are tested to confirm that the relay contacts do not make when 110VAC rms 50Hz is applied to the coil. Contact Sales for full details of relays and options available.

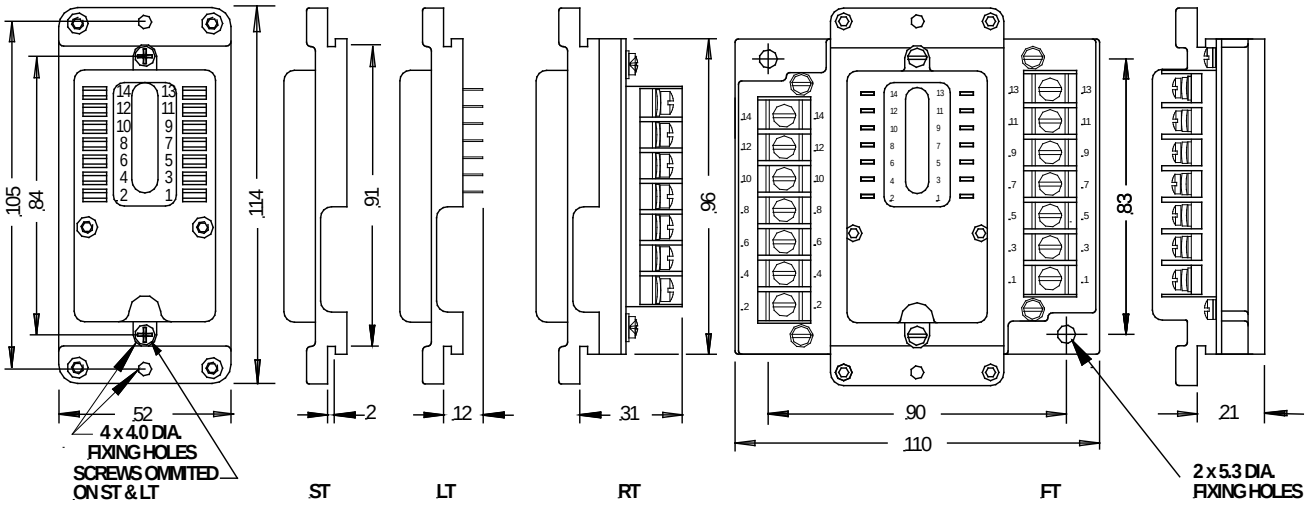
9. Relay Customisation - D2600/S

In addition to the wide range of standard options available, the C&S range of D2600, D2900 & D3300 series of relays accommodate a wide range of custom build, setting and contact configuration options. Typical examples: - twin coils, anti-residual stud, C+R circuit (delayed drop out), non-standard contact arrangements etc. For details and support contact Sales.

10. D2600 Sockets

- All Sockets are rated at 250VDC or 440VAC.
- Anti-tracking barriers are provided between the Socket tags, but the leads should be sleeved for Voltages above 250V.
- The sockets should be mounted so that the relay contacts are uppermost as shown on the outline diagram below.
- For most applications the relays may be mounted close together.
- Where they are likely to be energised for long periods (and particularly if the contacts are also carrying heavy currents) a gap must be left between sockets to allow air to circulate freely. A minimum spacing of 10mm between sockets has been found to be the optimum for relays at maximum dissipation.
- Adequate heat transfer methods/ventilation must be provided for enclosed cabinets.

Dimensions (mm)



10.1 D2600/RT (Rear terminals)

The RT socket has rear mounted terminals and can be slide mounted to the 35mm rack. Terminal screws are M4 and there is 8mm spacing between barriers to accommodate tags or wires. The inner holes are not available for panel mounting this socket, but the outer holes (105 centres) can be used for mounting to plain rails if required.

10.2 D2600/FT (Front terminals)

This socket is similar to the RT but has front mounted terminals, and can be directly mounted to a panel using the two diagonal holes. The FT socket can be slide mounted to the 35mm rack, but their wider profile limits the number that can be accommodated on a single rack.

10.3 D2600/ST (Short tags) & LT (Long tags)

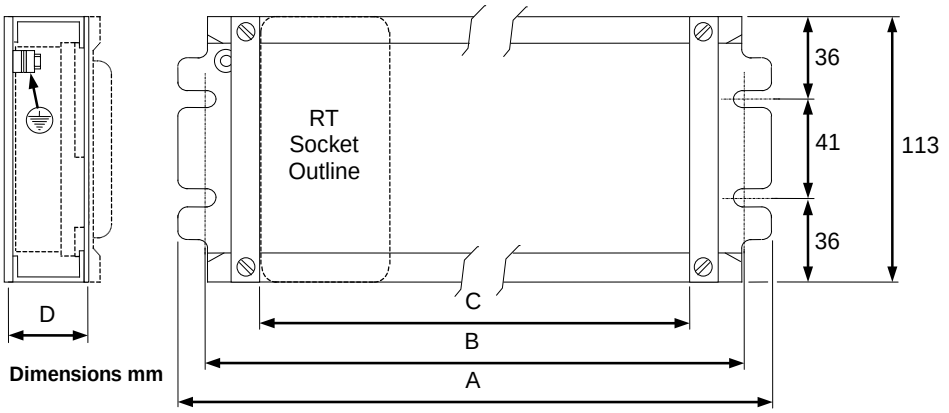
These sockets are designed for slide mounting on the racks shown below. The ST and LT types have solder terminals and can be fitted to either rack type (19 or 35mm). They can also be mounted directly to a panel using the inner holes (84 centres) but the panel must be insulated from the terminals for the ST and a cut out provided for the terminals for the LT. The outer holes (105 centres) can be used for mounting both types to plain rails if required.

11. Mounting Racks

Where there is adequate ventilation and the relays are not permanently energised, racks can be populated with up to the maximum number of relays stated above.

Where the relays are permanently energised, or carrying heavy current (particularly if mounted in an enclosed cabinet), additional spacing of approximately 10mm should be allowed between relays.

Where 2 dimensions are given for C in the table, there is an additional cross-rail fitted, which must be retained to prevent bowing of the channels. The relay spacing must therefore be calculated separately for the 2 sections.



Rack Part Number	D2630	D4532
Accepts Socket Types	D2600/ST & LT	D2600/ST, LT & RT. *
Depth D	19	35

** also accepts FT but with reduced number of relays.*

Maximum Number of Relays	A	B	C
1	128	103	52
2	180	156	104
3	232	208	156
4	285	260	208
5	337	311	260
6	389	364	312
7	441	416	208+156
8	493	468	208+208
9	545	521	260+208
10	597	572	260+260
11	649	624	312+260
12	701	676	312+312
13	753	728	364+312

12. Relay and Socket Code Recognition

Example of Relay Descriptive code = D2600/TC/FG/B/24/S/PdCu/FP1/110VDC

Relay Type	D2600
Variants	
Unspecified	Standard relay, silver (Ag) contacts or material specified
B	Magnetic blow-out, D54X contacts or material specified
FG	Flag
LE	Latching relay – reset coil with suicide contacts
LES	Latching relay – operate & reset coils with suicide contacts
LM	Latching relay manual reset
CF##	Fleeting contact relay, (## see section 8)
TC	Twin coil
IR	AC withstand capability. 50VDC coil only
Contact Arrangement	
##	Contact code (keycode)
S	Custom configurations, internal PCB etc., (see section 10)
CCT.A	LE & LES variants only (see section 5)
CCT.B	LE & LES variants only (see section 5)
Contact Material	
Unspecified	See **Variants** 'Unspecified' and 'B' above
Ag	Silver
PdCu	Palladium Copper
D54X	Silver Cadmium Oxide (without magnetic blow-out)
Non-interchangeability	
Unspecified	No fouling pin
FP##	Fouling pin code
Coil Voltage	
##*	Coil voltage (DC or AC + frequency Hz)
**descriptive text (custom configurations) e.g.* DIODE +VE TO PIN 1	

Example of Socket Descriptive code = D2600/RT/FP1

Socket type	D2600
Termination	
ST	Short Tag (rear solder terminal)
LT	Long Tag (rear solder terminal)
RT	Rear Terminal
FT	Front Terminal
Non-interchangeability	
Unspecified	Standard socket no fouling pin fitted
FP##	Fouling pin code number

Notes

1) Relays and sockets are allocated a unique computer code (e.g. 2LD265008), which will be quoted on our order acknowledgment. This will be marked on the relay as a shortened reference code (e.g. 6L5008). These codes must be quoted whenever possible to ensure that the correct relay is supplied, particularly for replacement or spares orders. If fouling pins are specified, the FP code will be marked on both the relay and the socket.
2) The order of the descriptive elements in the code is not always exactly as shown above, this is not critical as long as all the relevant elements are included. In certain cases, 2 or more elements from one category may be included (e.g. ~~~/PM/FG/~~~).
3) Other features are not covered by the relay code system should be included in the relay description e.g. diodes or VDR's to be fitted across coil (polarity of coil must be included for diodes).