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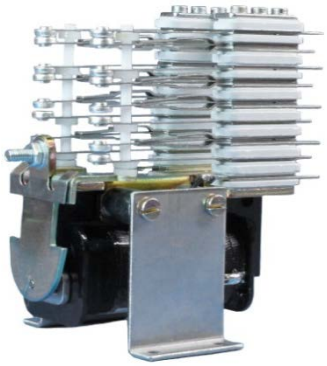
D3300 Open Frame Relay



- High integrity multi contact directly wired relay.
- 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.
- Choice of single or double mounting brackets.

The D3300 Relay combines the functional capabilities and advantages of the D2600 series of relays in an open framed relay and is suitable for applications that require a larger number of contacts, or where a directly wired or open style relay is preferred. The D3300 Relay can be customised to meet a wide range of applications and can incorporate most of the custom option available on the D2600 Relay.

1. Relay Types

D3300	Up to 10 normally open or 10 normally closed or 6 changeover contact sets.
D3300/B	Relay with magnetic arc quenching, for DC power applications.
D3300/LES & LE	Latching relay with electrical reset coil.
D3300/PB	Latching relay with mechanical reset push button
D3300/LM	Latching relay with mechanical reset
D3300/S	Relay customisation e.g. custom settings, anti-residual, mounting options, etc.

2. Technical Data

Supply voltages:	**DC supplies up to 250VDC:**	Up to 6 C/O or 10 N/O or N/C sets may be fitted on each relay. All standard D2600 keycodes are supported. Option – rectifier fitted for operation from AC supplies.
	AC supplies up to 450V 50Hz:	Operation on AC supplies is limited (due to the extra armature loading) to the number of contacts specified below. All standard D2600 keycodes are supported.
	AC supplies up to 250VAC:	Up to 6 C/O or 10 N/O or N/C contact sets may be fitted on each relay, but if a total of more than 6 sets are fitted, then no more than 5 of these can be C/O or N/C contacts.
	AC supplies above 250VAC:	Up to 4 C/O or 6 N/O or N/C sets may be fitted to each relay.
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:	Optional - Diode or VDR fitted on request.
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: EEE 344-1975 para 6.3.1.
Electro Magnetic:	Radiated Immunity & Fast Transient: EN 50082-1 & EN 50082-2
Compatibility:	Radiated & Conducted Emissions: EN 50081-1 & EN 50081-2.
Mechanical Life:	6 x 10^6 operations for standard relay
Weight:	570g (with the maximum number of contacts)

3. Contact Materials & Ratings

3.1 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

3.2 Silver Cadmium Oxide (D54X)

These contacts offer improved contact life due to greater arc resistance than silver. When used without magnetic blow-outs the switching capacity is the same as for silver contacts above and can be used to switch AC loads and intermediate DC loads. When fitted with magnetic blow-outs (see section 3.4) for maximum arc resistance the contacts 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.

- Blow-out magnets (when fitted), will only be effective on the contact sets nearest to the coil, up to a maximum of 4 C/O or 6 N/O or N/C.
- 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.

3.3 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.

3.4 Arc Suppression

Blow-out magnets can be fitted as an option to all standard relays and most latching relays (see section 4) where arc quenching is required to improve contact life. Magnetic arc quenching will only be effective on the contact sets nearest to the coil, up to a maximum of 4 C/O or 6 N/O or N/C. External arc suppression (e.g. diodes or VDR's) should also be considered for inductive loads where contact arcing is likely to occur.

3.5 Relay Total Current Carrying Capacity

As a guide to limiting internal heating of enclosures, relays are subject to a maximum recommended overall relay current calculated as follows:

$$I_1^2 + I_2^2 \cdots I_N^2 \; d \; 100$$

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 dissipation within an enclosure. Individual contact loading must not exceed the specified limit for the contact material. For relays that are permanently energised or carrying heavy currents (particularly when mounted in sealed enclosures) adequate air circulation, ventilation or alternative cooling should be provided.

3.6 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 @ 10A 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 on D2600 Relays. For abnormal or critical applications, tests should be carried out to confirm suitability.

4. Latching Relays with Electrical Reset

The D3300 Latching Relay is mechanically identical in operation and function to the D2600/LE & LES relays. The D3300/LE & LES relays are suitable for applications that require a larger number of contacts, or where a directly wired or open style relay is preferred. In addition to custom contact configurations, standard D2600/LES & LE keycodes (contact arrangements) can be specified. Blow-out magnets are available on relays fitted with N/O or N/C contacts. Arc quenching will only be effective on the 6 contacts closest to the operate coil. 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.

4.1 D3300/LES - Suicide contacts on both coils

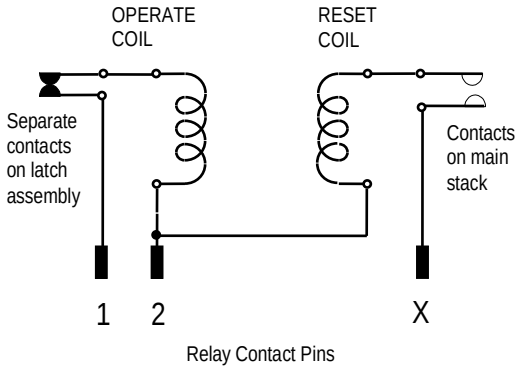
Bi-stable relay with suicide contact protection for both operate and reset coils. Coils are rated for intermittent operation and the specified minimum voltage must be applied to ensure the relay changes state and breaks the associated suicide contact. Current drain from the supply is limited to approximately 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 (refer to D2600 datasheet for standard keycodes details). 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 and Keycodes.

4.2 D3300/LE - Suicide contacts on reset coil only

Similar to the D3300/LES relay, the suicide contact is omitted from the operate coil circuit. The operate coil is rated for continuously operation (100% rated) and can be energised for extended periods of time without risk of the operate coil overheating. The reset coil is rated for intermittent operation only. **Supply must not be applied to both coils simultaneously or the relay will malfunction or overheat resulting in damage.**

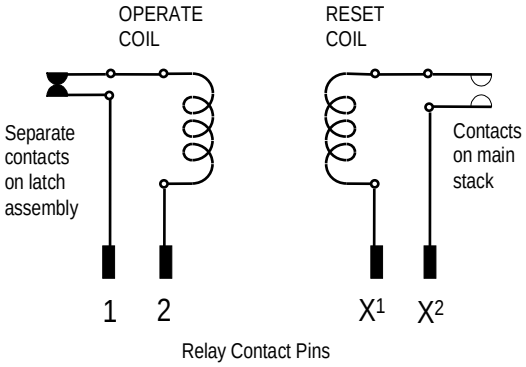
CIRCUIT 'A' WIRING (3-WIRE)



X = Contact pin assigned to reset coil

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. Specify contact pin polarity when ordering suppression diodes e.g. –VE to pin 2.

CIRCUIT 'B' WIRING (4-WIRE)



X* = Contact pins assigned to reset coil

5. Latching Relays with Mechanical Reset

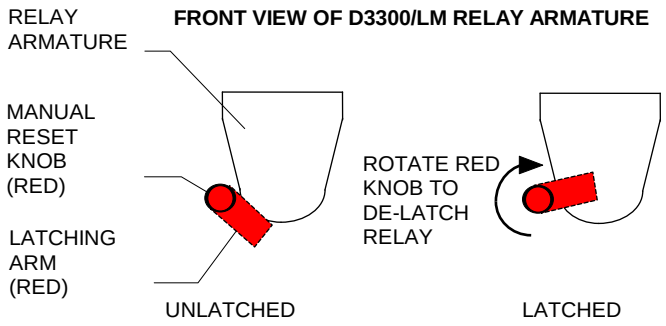
NOTE: the manual resets must not be operated with the supply applied to the operate coil circuit

5.1 D3300/PB – Push Button Reset

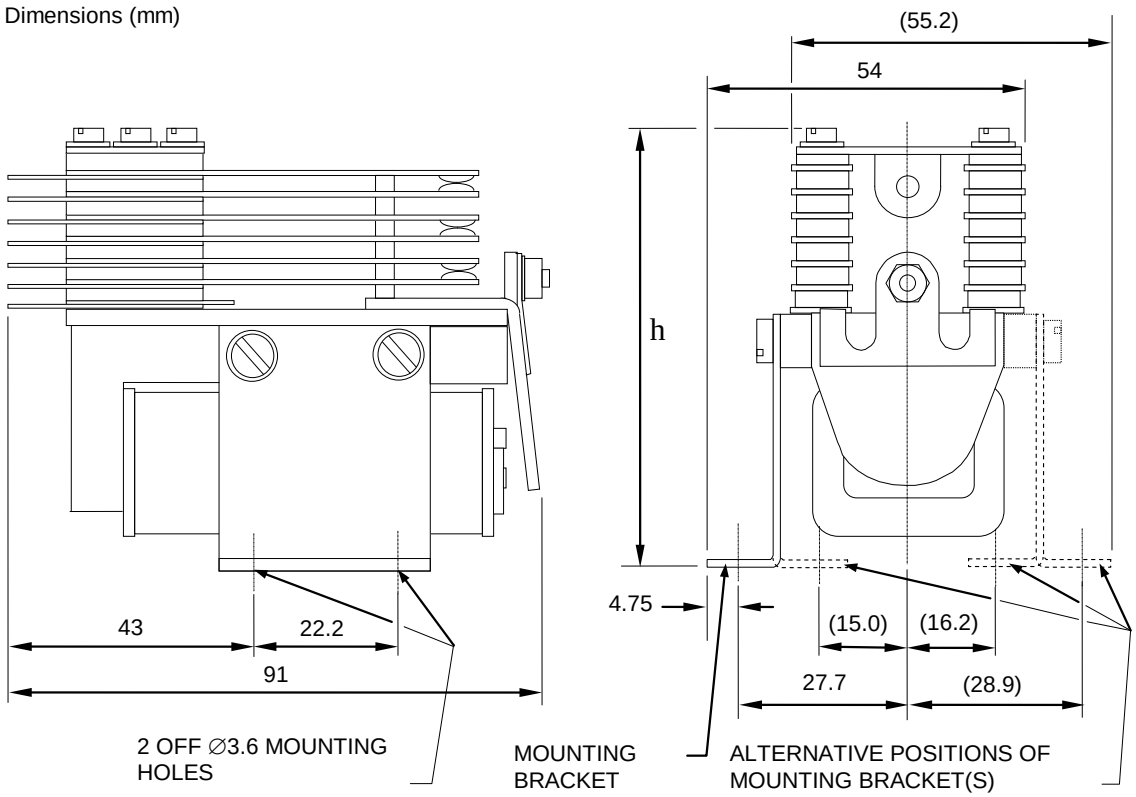
Relay is mechanically similar to the D3300/LES and LE circuit B relay described in section 4. The reset coil (and associated suicide contact) is replaced by a manual reset mechanism to actuate the de-latch armature. On energising the operate coil the main armature closes and is held and locked in the energised state by the de-latch armature when the coil is de-energised. The relay is reset manually by pressing the RED reset button on the front of the relay. The reset button operates and unlocks the de-latch armature releasing the main armature to return to the de-energised state. The reset push button mechanism can be fitted as an option to D3300/LES & LE relays as an auxiliary manual reset.

5.2 D3300/LM – Latch Mechanical

(Single RH bracket mount)
Similar to a standard D3300 Relay, 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



6. D3300 Relay Diagram



7. Relay Code Recognition

Example of Relay Descriptive code = D3300/LES/4M2B/CCT.B/PdCu/110VDC

Relay Type	**D3300**
Variants	
Unspecified	Standard relay, silver (Ag) contacts or material specified
B	Magnetic blow-out
LE	Latching relay – reset coil with suicide contacts
LES	Latching relay – operate & reset coils with suicide contacts
PB	Latching relay – Push button reset
LM	Latch Mechanical
TC	Twin coil
Contact Arrangement (# insert number of contact or keycode)	
##	Contact code number (D2600 keycode)
#M	Make
#B	Break
#C	Changeover
S	Custom configurations, VDR, internal PCB etc.,
CCT.A	LE & LES variants only (see section 4)
CCT.B	LE & LES variants only (see section 4)
Contact Material	
Unspecified	Standard relay, silver (Ag)
Ag	Silver (specified on custom configurations)
PdCu	Palladium Copper
D54X	Silver Cadmium Oxide (without magnetic blow-out)
Coil Voltage	
##*	Coil voltage (DC or AC + frequency Hz)
**descriptive text (custom configurations) e.g.* DIODE +VE TO PIN 1	

Notes:

1) Relays are allocated a unique computer code (e.g. 2LD333003), which will be quoted on our order acknowledgment. This will be marked on the relay as a shortened reference code (e.g. 3L3003). These codes must be quoted whenever possible to ensure that the correct relay is supplied, particularly for replacement or spares orders.
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. ~~~/LES/B/~~~).
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).