C & S Controls Ltd.
22 Upland Road,
Bexleyheath,
Kent, DA7 4NR.

Tel: +44 (0)208 304 4882
Fax: +44 (0)208 301 1938
Email: sales@candscontrolsltd.com
Web: www.candscontrolsltd.com

D2900 Relay

- High integrity plug-in relays with transparent covers and a choice of front or rear terminal sockets, racks and panel mounting kits.
- 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 relays and sockets can be fitted with fouling pins to prevent interchangeability between different relays.

1. Relay Types

D2900	Up to 4 normally open or closed pairs, or 2 changeover sets.
D2900/FG	Relay with optional flag indication of operational state.
D2900/B	Relay with magnetic arc quenching, for DC power applications.
D2900/LM	Latching relay with manual reset.
D2900/IR	Relays with 'AC withstand' capability to CEGB-CCS (1960) for 50VDC supply.
D2900/PM	Panel Mounted Flag Relay

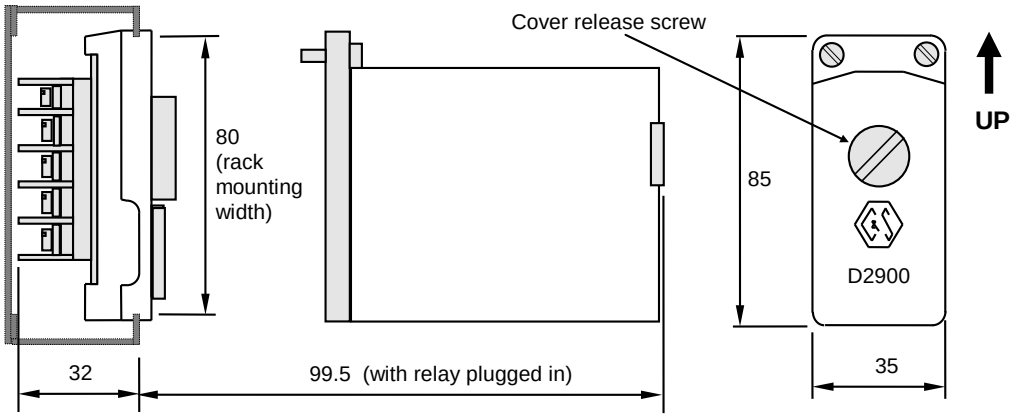
2. Technical Data

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):		2.5W AC or DC (typically 10VA @ 110v 50Hz)
	Coil suppression:		Diodes or VDR's fitted internally if requested.
Operate Times:	Pull-in = 45ms maximum.		Drop-out = 30ms maximum.
Voltage Withstand: [IEC 255-5:1977]	1KV rms 50Hz for 1minute across open contacts		
	2KV rms 50Hz for 1minute between:		a) current carrying parts and frame b) contact sets c) coil and contacts.
Insulation: [IEC 255-5:1977]	Greater than 100Mς @ 500VDC.		
Environment:	Temperature:	Operating:	-20°C to +55°C [BS2011pt 2.1 Ab & Bd (IEC 68-2-2)]
		Storage:	-20°C to +70°C
	Humidity:		12 Cycles to 55°C and 93% RH [BS2011pt2.1 Db (IEC 68-2-30)]
	Shock [IEC 68-2-27]:	Operational:	11ms duration, 100m/s^2 peak (10g), 10 pulses 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.
Electromagnetic:	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:	430g (Standard D2900 relay with D2900/RT socket)		

RELAY OUTLINE DRAWING (shown with RT Socket and rack)

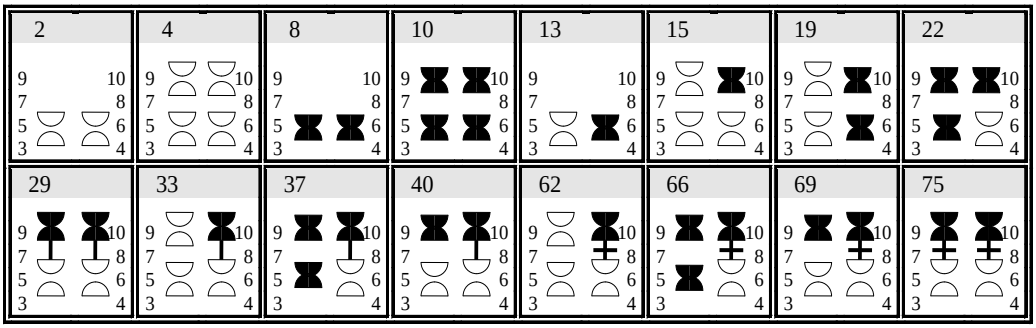
Dimensions (mm)

For other socket types and mounting rack see section 8



3. Contact Arrangements Available (Keycodes)

Relay or socket viewed from the rear.



N/O (MAKE) CONTACTS

N/C (BREAK) CONTACTS

C/O (BREAK BEFORE MAKE) CONTACTS

C/O (MAKE BEFORE BREAK) CONTACTS

Note: Changeover contacts have the two centre pins linked internally as shown. Standard contact arrangements are shown above; other arrangements are available on request.

4. Contact Materials & Ratings

Contacts will be supplied in silver unless specified otherwise (see below for available materials). If mixed materials are required (e.g. keycode 4 with two D54X and two PdCu contact sets) the required combination must be clearly stated on the order.

4.1 Silver Contacts (Ag)

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.

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.

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 allowed switching current.

4.2 Palladium Copper (PdCu)

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 at 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 to D2900/B relays, which have magnetic blow-outs to provide maximum resistance to arcing for heavier inductive DC loads. They will break DC inductive loads of up to 10A at 120V or 5A at 250V, but it is recommended that two contacts are used in series for highly inductive loads above 200VDC. For optimum arc quenching, always connect the more positive supply to the highest number contact of a pair. For changeover contacts this applies to the pair breaking the highest or most inductive current.

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 and Silver Cadmium Oxide contacts are fitted as standard to D2900/B Relays. Blow-outs may also be fitted with Silver or Palladium Copper contacts, where arc

quenching is required to prolong contact life. They should be specified as a D2900/B relay, but the alternative contact material (Ag or PdCu) must also be included in the descriptive code when ordering. 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 Total Current Carrying Capacity

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

$$I_1^2 + I_2^2 \cdots\cdots I_N^2 \leq 100$$

Where I_1^2 etc. are the currents carried simultaneously by individual contacts. Where possible the current should be shared between the 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 by using blow-out magnets where appropriate. Typical contact lives for heavy resistive loads (under laboratory conditions) are:

$>10^6$ 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. For abnormal or critical applications, tests should be carried out to confirm suitability.

5. Latching & Flag Relays

A red indicator flag is fitted to the relay with a corresponding red marking to the bottom section of the armature. In average lighting conditions, the markings can be clearly seen from several metres away, making this relay ideal for applications where a visual indication of relay's status is required. The full range of Keycodes, contact materials and fouling pin options are available.

5.1 D2900/FG – FLAG RELAY

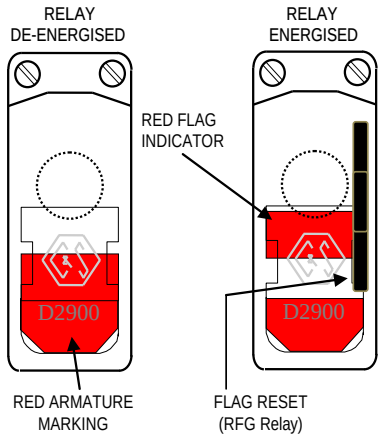
With the relay in the de-energised state, the two red bands form a continuous area of red. When the relay is energised the flag lifts to create two separate bands of red. The flag is self-setting and returns to form the continuous area of red when the relay is de-energised.

5.2 D2900/RFG – REVERSE (TRIP) FLAG RELAY

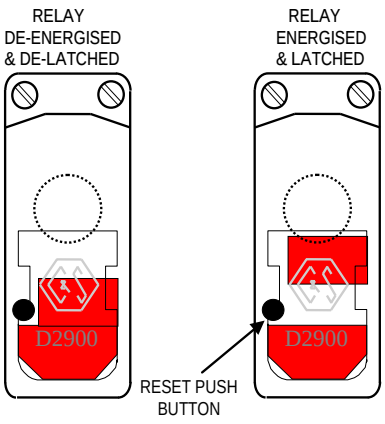
The Flag provides a visual (alarm) indication that the relay has been energised. When the relay is energised the flag is '**TRIPPED**' (LIFTS & HOLDS). The Flag will not reset to the **'DOWN'** (ALARM Cancelled) position when the relay is de-energised. When the relay is in the de-energised state the Flag can be reset to the **'Down'** (Alarm cancelled) position by manually operating the **'FLAG RESET'** slider located on the front cover of the relay. The status of the flag does not affect the normal operation (contact switching) of the relay.

5.3 D2900/LM/FG – LATCHING FLAG RELAY

This relay mechanically latches when energised and remains latched when the coil supply is removed. De-latching the relay and flag resetting is by manual operation of the Reset push button on the front cover. The Flag is self-setting and lifts to indicate the relay has energised and latched, returning to the Down position when the relay de-latches.



Flag & RFG (Trip) Flag Relay



Latch Mechanical Relay with Flag

6. Panel Mounted Flag Relays

The D2900/PM series of Flag Relay's is designed for use on system control panels where the function and status of the relay (system) can be directly monitored and/or controlled. The status of the relay is indicated by a Red Flag or Red Indicator (dependant on type) viewed through a window in the cover. The full range of contact materials, Keycodes and fouling pin option are available.

An optional Panel Mounting kit (sold separately), is available providing a secure mounting point for a plug-in socket connection; full details available on request. For ease of maintenance the relay can be un-plugged from the control panel by releasing the two retaining screws on the front cover.

6.1 D2900/PM Flag Relay

With the relay de-energised the red flag is visible in the bottom segment of the window. When energised the red flag lifts and is visible in the top (main) segment of the window. The flag is self-setting and returns to the initial position with the relay de-energised.

6.2 D2900/TF/PM Trip Flag Relay

The relay is designed to provide a visual indication that the relay has been de-energised (tripped). In the initial de-energised state the Black flag is in the Down position with a RED indicator visible in the top (main) window segment. When the relay is energised the Black flag remains down until manually set by the operator to conceal (cancel) the Red (Trip) indicator. When the relay is de-energised the Flag is 'Tripped' (drops) revealing the Red indicator. The Flag will remain in the Tripped (Down) position when the relay is re-energised until manually reset by the operator. The status of the flag does not affect the normal operation of the relay.

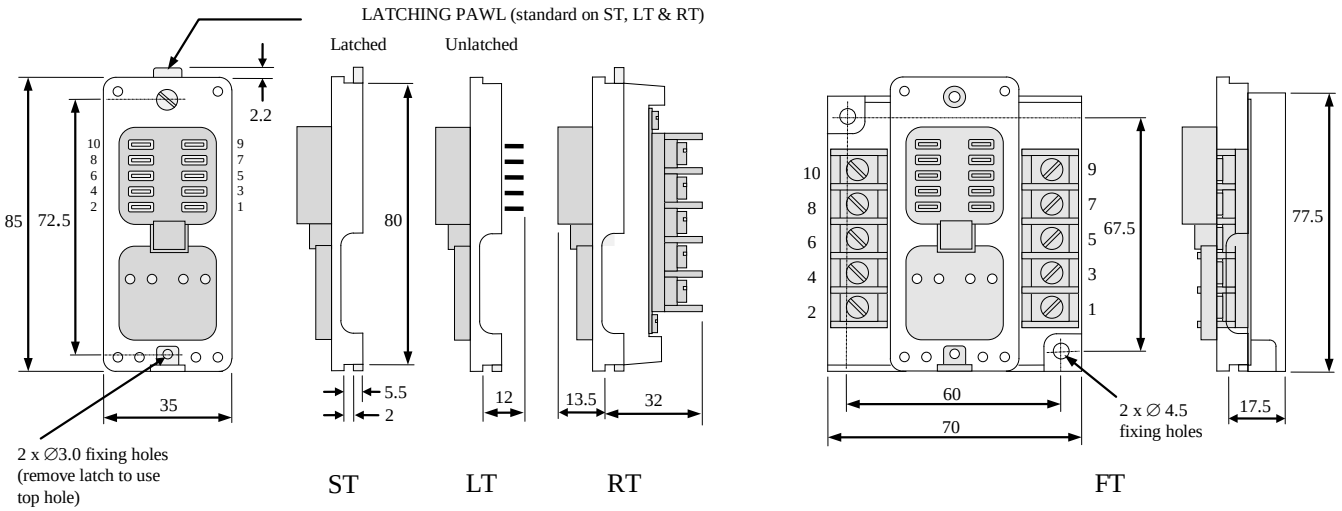
6.3 D2900/LM/FG/PM Latch Mechanical Flag Relay

This relay mechanically latches when energised and remains latched when the coil supply is removed. De-latching the relay is by manual operation of the Reset push button on the front cover. The Flag is self-setting and lifts to indicate the relay has energised and latched, returning to the Down position when the relay de-latches.

7. Interposing Relays

Meeting the requirements of CEGB-CCS (1960) the D2900/IR control relay is 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

8. Relay 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.

D2900/ST & /LT These sockets have solder terminals and are designed for rack mounting by locating onto the lower rail and then turning the latching screw to latch and lock the latching pawl to the upper rail (see below for rack details). They can also be mounted into a panel cut-out of 80mm high x 35mm wide using the same method. Alternatively, they can be mounted directly to a panel by removing the latch and using the two 3mm fixing holes (72.5 centres). A cut-out of 35mm wide x 55mm high (placed centrally between the fixing

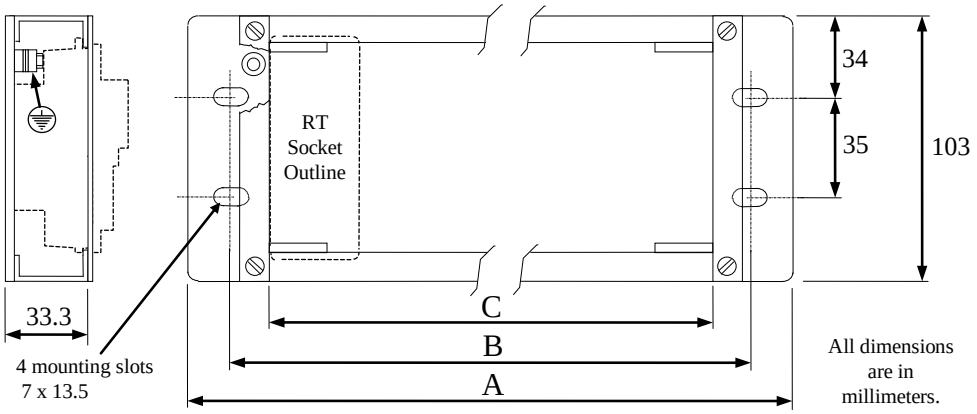
holes) will be required to accommodate the terminals. The cut-out may be omitted for the ST, but in this case the panel must be suitably insulated and the wiring brought out through the side cut-outs in the socket.

D2900/RT The RT socket has rear terminal blocks and can be rack, panel or directly mounted in the same way as the ST and LT sockets. Terminal screws are M4 and there is 8.5mm spacing between barriers to accommodate crimp tags or wires.

D2900/FT This socket is similar to the RT but has front mounted terminals. It is intended for direct surface mounting to a panel using the two diagonal ∅4.5mm fixing holes. The FT socket can also be rack or panel mounted (80mm high x 70mm cut-out required) in the same way as the ST and LT sockets, but their wider profile limits the number that can be accommodated on a single rack.

The sockets should be mounted so that the relay contacts are uppermost as shown on the outline diagram (section 2) For most applications the relays may be mounted close together, but 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 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.

9. Mounting Racks



Part No. D9019/	A	B	C
2	122	96.5	70
3	157	131.5	105
4	192	166.5	140
5	227	201.5	175
6	262	236.5	210
7	297	271.5	245
8	332	306.5	280
9	367	341.5	315
10	408	383.5	175+175
11	443.5	418	210+175
12	478.5	453	210+210
13	513.5	488	245+210
14	548.5	523	245+245
15	583.5	558	280+245
16	618.5	593	280+280
17	653.5	628	315+280
18	688.5	663	315+315
19	723.5	698	350+315
20	758.5	733	350+350

The Rack Part No. suffix is the maximum number of relays that can be fitted to the rack. Where there is adequate ventilation and the relays are not permanently energised, racks can be populated with up to the maximum number of relays. **Where the relays are permanently energised or carrying heavy currents (particularly if mounted in an enclosed cabinet), additional spacing of approximately 10mm should be allowed between relays**. Where two 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 two sections.

10. Relay And Socket Code Recognition

Example of D2900 Relay Descriptive code = D2900/LM/FG/B/19/S/PdCu/FP1/110VDC

D2900 Relay Series	
Variants	
Unspecified	Standard relay, silver (Ag) contacts or material specified
B	Magnetic blow-out, D54X contacts or material specified
PM	Panel mount relay
IR	AC withstand capability. 50VDC coil only
FG	Flag
RFG	Reverse flag with manual reset
LM	Latching relay with manual reset
TF	Trip flag (PM only)
Contact arrangement	
##	Contact code (keycode)
S	Custom configurations, non-standard settings, internal PCB, etc., (contact Sales for full details).
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 = D2900/RT/FP1

D2900 Socket	
Termination	
ST	Short solder tag
LT	Long solder tag
RT	Rear Terminal
FT	Front Terminal
Non-interchangeability	
Unspecified	Standard socket no fouling pin fitted
FP##	Fouling pin code

Notes:-

1) Relays and sockets are allocated a unique computer code (e.g. 2AD295072), which will be quoted on our order acknowledgement. This will be marked on the relay as a shortened reference code (e.g. 9A5072). 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 socket.
2) 2)The order of the descriptive elements in the code may not always be exactly as shown above. This is not critical as long as all relevant elements are included. In certain cases, two or more elements from one category may be included e.g. .../PM/FG/...
3) Other features 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 supply must be included for diodes e.g. positive to pin 1).