

D8-UL relay - Industrial power relay, Datasheet

8 pole



Description

Plug-in industrial power relay with 8 change-over contacts. Standard equipped with a LED indicator and rectifier bridge for AC/DC coil voltage. Optionally magnetic arc-blowout, double make/double break contacts and increased contact gaps for high breaking capacity and long contact life.

Proven reliable operation in switching high DC voltage / inductive loads and low currents. No external retaining clip needed as integrated 'snap-lock' will hold relay into socket under all circumstances and mounting directions. The construction of the relay and choice of materials makes the D8-UL relay suitable to withstand corrosive atmospheres, low and high temperatures, shock & vibrating and dry to very humid environments. Compact design, choice of many options and a wide range of sockets makes the D8-UL-relay an easy and flexible solution to use.

Application

Rugged plug-in relays for extreme reliable, long endurance applications in harsh environment. These relay series are designed for demanding industrial applications such as power utilities and petrochemical industries.

Features

- Compact plug-in design
- Instantaneous, 8 C/O contacts
- AC/DC coil voltage
- LED indicator
- Flat, square silver plated relay pins for excellent socket connection
- Wide range of sockets for panel, rack or 35 mm rail
- Integrated snap-lock
- High DC breaking capacity
- Solve-All relay application concept
- Optional positive mechanical keying relay to socket
- Optional trip indicator

Benefits

- Proven reliable
- Long term availability
- Used in safety critical applications
- Low life cycle cost
- No maintenance

Industry compliancy

- IEC 61810 Electromechanical elementary relays
- IEC 60947 Low voltage switch gear and control gear
- IEC 60947-5-1 Electromechanical control circuit devices and switching elements
- IEC 60255 Relay design and environmental conditions
- CE

D8-UL relay

Technical specifications



Standard LED



Smitt style pinning



Magnetic arc blow-out

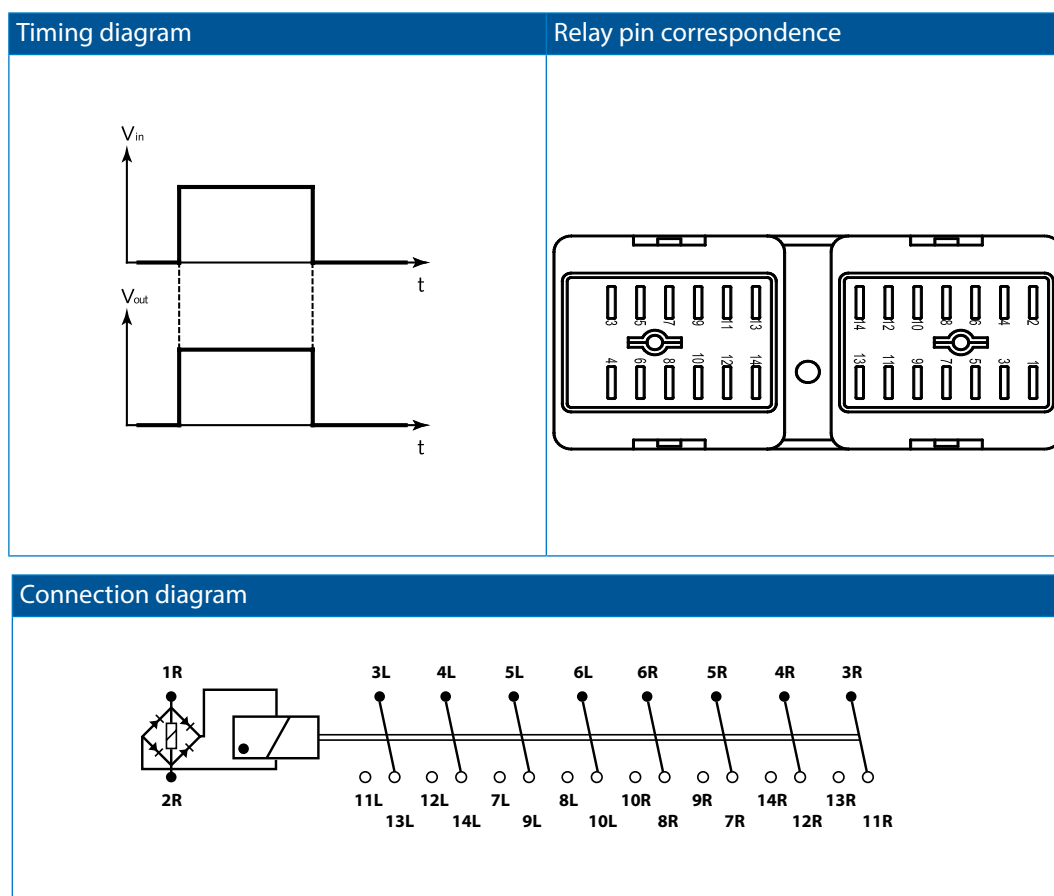


Transparent cover

Solve-All relay application concept

The unique D-relay with all its options has been designed in close cooperation with customers from the power utility industry. The Solve-All relay application concept offers ultimate flexibility to design and supply tailor made D-relays.

Functional and connection diagrams



D8-UL relay

Technical specifications

Coil data

Operating times at nominal voltage:	
Pull-in time	≤ 20 ms
Release time	≤ 12 ms
Bounce time DC	≤ 5 ms
Bounce time AC	≤ 8 ms
Inductance L/R at U_{nom} :	
Energized	11 ms
Released	8 ms
Nominal power consumption	2.5 - 3.5 W/VA at U_{nom}
Operating voltage range	0.8 - 1.1 U_{nom}

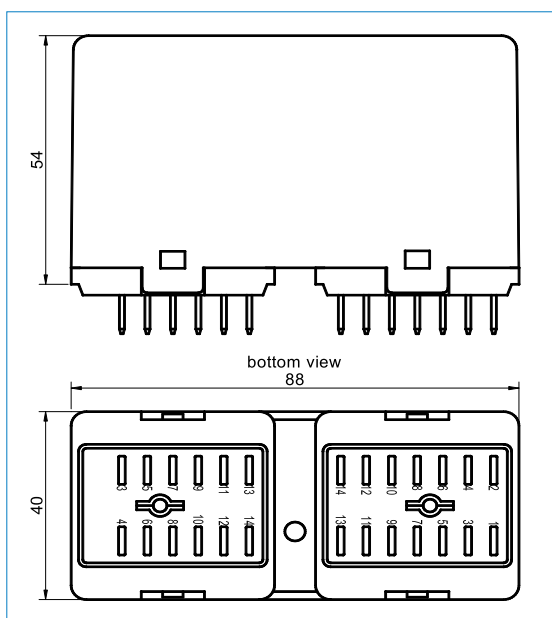
Type	U_{nom} (VDC/VAC)	U_{min} (VDC/VAC)	U_{max} (VDC/VAC)
24-28 VDC/VAC	24-28	19.2	30.8
42-48 VDC/VAC	42-48	33.6	52.8
60-70 VDC/VAC	60-70	48	77
100-110 VDC/VAC	100-110	80	121
110-120 VDC/VAC	110-120	88	132
115-125 VDC/VAC	115-125	92	137.5
220-230 VDC/VAC	220-230	176	253
230-240 VDC/VAC	230-240	184	264
250 VDC/VAC	250	200	275

Other types on request

Remarks:

- U_{min} is the must-operate voltage at which the relay has picked up in all circumstances (worst case situation), in practice the relay picks up at a lower voltage

Dimensions



D8-UL relay

Technical specifications

Contact data

Amount and type of contacts	8 C/O
Peak inrush current (make and carry)	200 A for 10 ms 40 A for 0.5 s 30 A for 1 s
Maximum continuous current	10 A (AC1; IEC 60947)
Maximum switching voltage	250 VDC, 440 VAC
Minimum switching voltage	12 V (5 V with option E)
Minimum switching current	10 mA (1 mA with option E)
Material	Ag standard (optional AgSnO ₂ , Au on Ag)
Contact gap	0.7 mm (up to 4 mm for YX5 option)
Contact force	> 200 mN
Contact resistance	<15 mΩ (initial)

Electrical characteristics

Dielectric strength	Pole-pole	IEC 61810-1	4 kV, 50 Hz, 1 min
	Cont-coil	IEC 61810-1	2.5 kV, 50 Hz, 1 min
Insulation between open contacts			2.5 kV; 50 Hz; 1 min
Pulse withstanding		IEC 60255-5	5 kV (1.2/50 μs)

Mechanical characteristics

Mechanical life	10 x 10 ⁶ operations
Maximum switching frequency	Mechanical: 3600 ops/h Electrical: 1200 ops/h
Weight	330 g (without options)

Environmental characteristics

Environmental	IEC 61810
Vibration	IEC 61373, Category I, Class B, Body mounted
Shock	IEC 61373, Category I, Class B, Body mounted
Operating temperature	-25 °C...+55 °C (with option C and option Y: -50 °C) -25 °C...+70 °C (with option V)
Humidity	95% (condensation is permitted temporarily)
Salt mist	IEC 60068-2-11, NaCl, 35 °C for 4 days
Damp heat	IEC 60068-2-30, Test method Db variant 1
Protection	IEC 60529, IP40 (relay on socket)
Insulation materials	Cover: polycarbonate Base: polyester

D8-UL relay

Technical specifications

Options

Available options for D8-UL relay according the *Solve-All* relay application concept

Code	Description	Remark	Can not be combined with
A	Mechanical trip indicator (manually resettable). Indicates if the relay has been energized.		K, L
B	Magnetic arc blow-out. Ensures a high DC breaking capacity and longer contact life.		
C	Lower temperature (-50 °C).	Max contact current 8A	E*
E	Gold plated contacts. Low contact resistance and good resistance against corrosive atmospheres. Suitable for switching low level dry circuit loads. Gold plated contacts characteristics Material Ag, 10 µm gold plated Maximum switching voltage 60 V (higher voltages may be possible, contact Mors Smitt for more information) Maximum switching current 400 mA (at higher rate gold will evaporate, then the standard silver contact rating of minimum 10 mA and 12 V is valid) Minimum switching voltage 5 V Minimum switching current 1 mA		C*, M
K	Extra dust protection. Cover sealed with sealant.		
L	LED integrated in coil.	Standard (not necessary to add code L to product code)	A
M	AgSnO ₂ contacts. Highly resistant to welding, for safety and vital applications.	Min. contact current 100 mA	E
R	Faster switching contacts, pull in time < 7 ms For reduction of total switching time in critical circuits. Suitable for energy controlling systems. No normally open contact will make below 50 % U _{nom}	DC coil only 3 C/O contacts	L
S	Mechanical on/off position indicator. (following the contacts) Indicates visual the position of the contacts.		
U	Universal AC/DC coil because of rectifier circuit	Standard	
V	Wider operating range and ambient temperature. Operating range: 0.7 ... 1.25 U _{nom} Ambient temperature: -25 °C...+70 °C	Power consumption 3.0 W @ U _{nom} Operating range AC can differ	
Y	Double break / double make contacts. Breaking capacity increased by 50% and longer contact life. To increase the breaking capacity and contact life more this option can be combined with option B and X5.	4 C/O DM/DB contacts -50 °C	

* Options C & E combined is possible depending on the application. Contact Mors Smitt for more information.



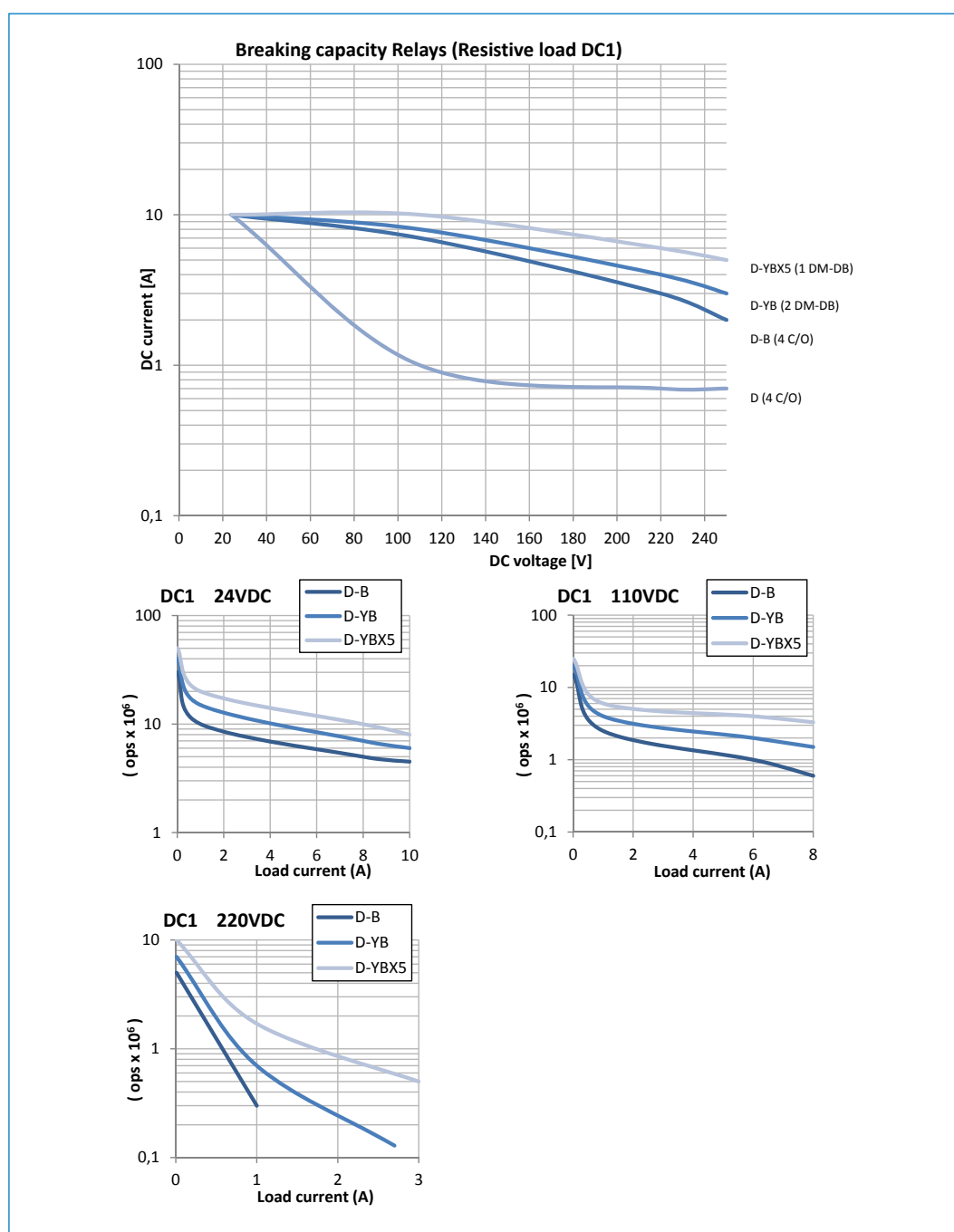
D8-UL relay

Technical specifications

Electrical life expectancy and breaking capacity

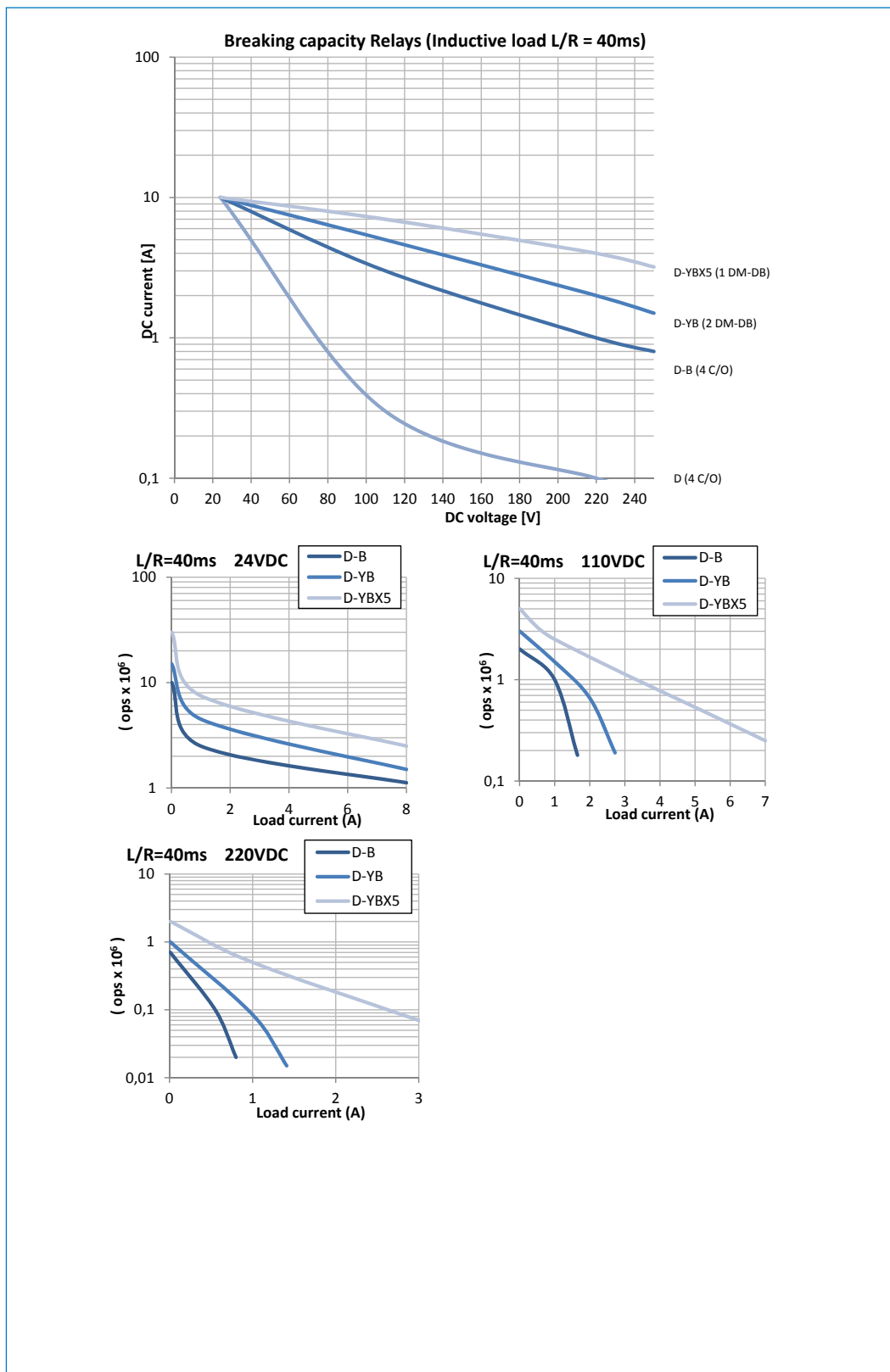
The life expectancy values shown below are based on factory tests (test frequency at 1/3 Hz). These values could be different in real life applications as environmental conditions, switching frequencies and duty cycles will influence these values. Putting more contacts in series (Y) and increasing contact gap (X5) will increase breaking capacity and life expectancy significantly.

In the following graphs D-relays are mentioned. The D8-UL relays have similar values.



D8-UL relay

Technical specifications

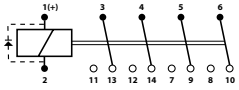


D8-UL relay

Technical specifications

In this section the most common breaking capacity for DC-voltage / inductive load possibilities are presented with the different options and contact configurations within the D-relays. In the following graphs D-relays are mentioned. The D8-UL relays have similar values.

D

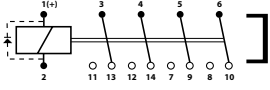


- 4 C/O contacts
- Contact gap : 0.7 mm

Breaking capacity

DC1	110 VDC	1 A
	220 VDC	0.7 A
L/R=40 ms	110 VDC	0.3 A
	220 VDC	0.1 A
DC13	110 VDC	-
	220 VDC	-

D-B

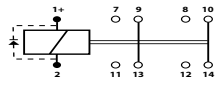


- 4 C/O contacts
- Magnetic arc blow out
- Contact gap : 0.8 mm

Breaking capacity

DC1	110 VDC	7 A
	220 VDC	3 A
L/R=40 ms	110 VDC	3 A
	220 VDC	1 A
DC13	110 VDC	-
	220 VDC	-

D-Y

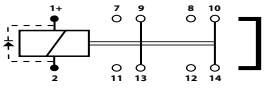


- 2 C/O contacts
- Double make double break
- Contact gap : 1.4 mm

Breaking capacity

DC1	110 VDC	1.5 A
	220 VDC	1 A
L/R=40 ms	110 VDC	0.5 A
	220 VDC	0.2 A
DC13	110 VDC	-
	220 VDC	-

D-YB

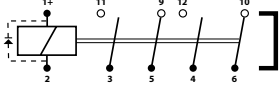


- 2 C/O contacts
- Double make double break
- Magnetic arc blow out
- Contact gap : 1.4 mm

Breaking capacity

DC1	110 VDC	8 A
	220 VDC	4 A
L/R=40 ms	110 VDC	5 A
	220 VDC	2 A
DC13	110 VDC	1.5 A
	220 VDC	0.5 A

D-BX5

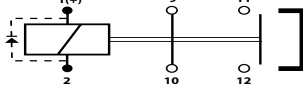


- 2 N/O + 2 N/C contacts
- Magnetic arc blow out
- Contact gap : 2 mm

Breaking capacity

DC1	110 VDC	10 A
	220 VDC	5 A
L/R=40 ms	110 VDC	6 A
	220 VDC	3 A
DC13	110 VDC	3 A
	220 VDC	1 A

D-YBX5



- 1 N/O + 1 N/C contacts
- Double make double break
- Magnetic arc blow out
- Contact gap : 4 mm

Breaking capacity

DC1	110 VDC	12 A
	220 VDC	6 A
L/R=40 ms	110 VDC	7 A
	220 VDC	4 A
DC13	110 VDC	4 A
	220 VDC	2 A

D8-UL relay Sockets

Mounting possibilities/sockets



Surface/wall mounting

338002920	V92BR	Screw socket, wall mount, front connection (9 mm terminals)
338003900	V93	Screw socket, wall mount, front connection (7.5 mm terminals)
338300300	V94	Faston connection socket, wall mount, front connection (6.3 mm or 2 x 2.8 mm)
338003950	V99	Spring clamp socket, wall mount, front dual connection (2.5 mm ²)

Rail mounting

338003900	V93	Screw socket, rail mount, front connection (7.5 mm terminals)
338003925	V93BR	Screw socket, rail mount, front connection (9 mm terminals)
338300100	V95	Faston connection socket, rail mount, front connection (6.3 mm or 2 x 2.8 mm)
338003950	V99	Spring clamp socket, rail mount, front dual connection (2.5 mm ²)

Panel/flush mounting

338001700	V88	Cage clamp socket, flush mount, rear dual connection (2.5 mm ²)
338001850	V89	Faston connection socket, rear dual connection (6.3 x 2.8 mm)
328100200	V96	Solder tag socket, panel mount, rear connection
338400100	V97	Crimp contact socket, panel mount, rear connection, A260 crimp contact

For PCB mount: use 2x V32 according to pin layout

For more details see datasheets of the sockets

D8-UL relay

Instructions

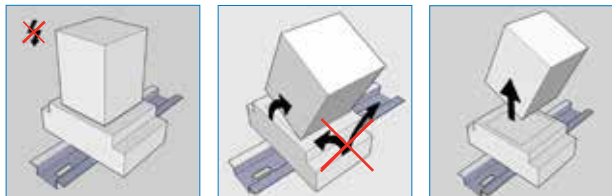
Installation, operation & inspection

Installation

Before installation or working on the relay: disconnect the power supply first (no hot swapping)! Install socket and connect wiring according to the terminal identification. Plug relay into the socket ensuring there is no gap between the bottom of relay and the socket. Reverse installation into the socket is not possible due to the mechanical blocking snap-lock feature. Check to ensure that the coil connection polarity is not reversed. Relays can be mounted tightly together to save space. When rail mounting is used, always mount the socket in the direction of the UP arrow, to have proper fixation of the socket on the rail.

Warning!

- Never use silicon in the proximity of the relays.
- Do not use the relay in the presence of flammable gas as the arc generated from switching could cause ignition.
- To remove relays from the socket, employ up and down lever movements. Sideway movement may cause damage to the coil wires.



Operation

After installation always apply the rated voltage to the coil to check correct operation.

Long term storage may corrode the silver on the relay pins. When plugging the relay into the socket, the female bifurcated or trifurcated receivers will automatically cut through the corrosion on the pins and guarantee a reliable connection.

Before actual use of relays, it is advised to switch the load several times with the contacts. The contacts will both be electrically and mechanically cleaned due to the positive wiping action. Sometimes a contact can build up increased contact resistance ($\leq 15 \text{ mW}$ when new). When using silver contacts one can clean the contact by switching a contact load a few times using $>24 \text{ VDC}$ & $\sim 2\text{A}$. Increased contact resistance is not always problematic, as it depends on circuit conditions.

Condensation in the relay is possible when the coil is energised (warm) and the outside, environmental temperature is cold. This is a normal phenomenon and will not affect the function of the relay. Materials in the relay have no hygroscopic properties.

Inspection

Correct operation of the relay can easily be checked as the transparent cover provides good visibility of the moving contacts. If the relay does not seem to operate correctly, check for presence of the appropriate coil voltage and polarity using a suitable multimeter. If a LED is fitted, it indicates voltage presence to the coil. If coil voltage is present, but the relay does not operate, a short circuit of the suppression diode is possible (This may be due to the coil connection having been reversed).

If the relay doesn't work after inspection, replace the relay unit with a similar model. Do not attempt to open the relay cover or try to repair. Contacts are calibrated and in balance, touching can affect proper operation. Also resoldering may affect correct operation. Since 2009 relays have tamper proof seals fitted and once broken, warranty is void.

Most relay defects are caused by installation faults such as overvoltage, spikes/transients, high/short current far exceeding the relay specifications. When returning the relays for investigation, please provide all information on the RMA form. Send defective relays back to the manufacturer for repair or replacement. Normal wear and tear or external causes are excluded from warranty.

D8-UL relay

Ordering scheme



1. Relay model 2. Options 3. Coil voltage

This example represents a D8-ULA-220 VDC/VAC.

Description: D8-relay, U_{nom} : 220 VDC/VAC, including trip indicator.

1. Relay model

D8-UL

2. Options

A	Trip indicator
B	Magnetic arc blow-out
C	Low temperature (-50°C)
E	Gold plated contacts
K	Cover sealed, special dust protection
L	LED integrated in coil (standard)
M	AgSnO ₂ contacts, highly resistant to welding
R	Fast switching
U	Rectifier circuit (standard)
V	Wider operation range and ambient temperature

Keying Coil coding for relay and socket

3. Coil voltage

24-48 VDC/VAC
42-48 VDC/VAC
60-70 VDC/VAC
100-110 VDC/VAC
110-120 VDC/VAC
115-125 VDC/VAC
220-230 VDC/VAC
230-240 VDC/VAC
250 VDC/VAC

Other voltages on request

