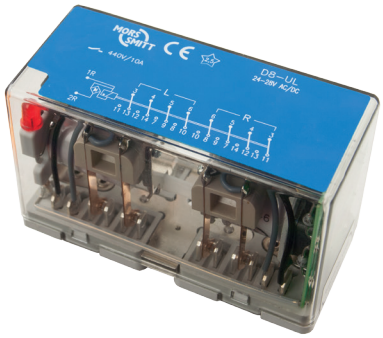
/// Plug-in industrial relay with 8 C/O contacts

Rugged plug-in relays for extreme reliability, within long endurance applications and harsh environments

D8

Industrial power relay, 8 pole



Features

- Instantaneous relay, 8 C/O contacts
- Compact plug-in design
- LED indicator
- Integrated back EMF suppression diode (DC versions)
- Coil voltages 24 to 250 VDC/VAC
- High DC breaking capacity
- Maximum continuous current 10 A
- Maximum switching voltage 250 VDC, 440 VAC
- Minimum switching current 10 mA (optional 1 mA)
- Mechanical life 10 million operations
- Solve-All relay application concept
- Transparent cover for easy visual inspection
- Integrated snap-lock, no external retaining clip needed
- Wide range of sockets for panel, rack or 35 mm rail
- Flexibility with many options
- Optional positive mechanical keying relay to socket

Description

Plug-in industrial power relay with 8 change-over contacts. Standard equipped with a LED indicator and back EMF suppression diode (for DC voltages).

Optionally equipped with magnetic arc blow-out for high breaking capacity and long contact life. No external retaining clip needed as integrated ‘snap-lock’ will hold relay into socket under all circumstances and mounting directions.

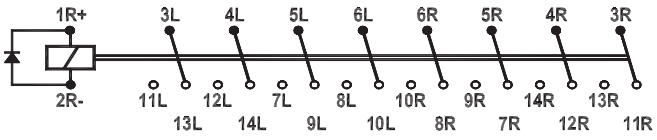
The construction of the relay and choice of materials makes the D8 relay suitable to withstand low and high temperatures, shock & vibrating and dry to very humid environments.

Compact design, choice of many options and a wide range of sockets makes the D8 relay an easy and flexible solution to use.

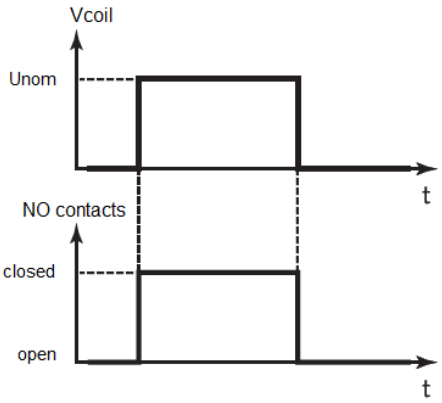
Application

Demanding industrial applications such as power utilities and petrochemical industries. Designed for extreme reliability, within long endurance applications and harsh environments.

Connection diagram



Timing diagram



Compliancy

EN 60255
EN 60947
EN 60947-5-1
IEC 61810

CE

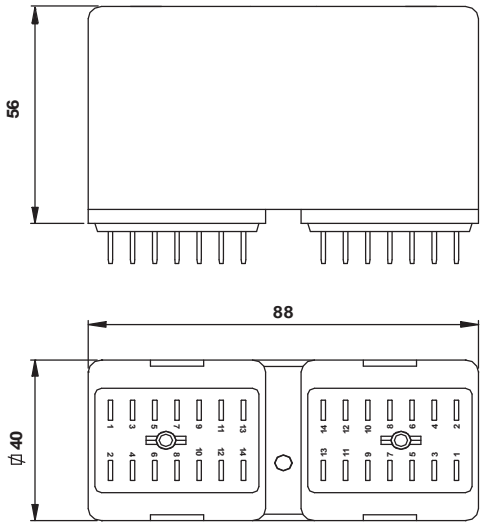
Power relay
D8

Options

- Mechanical trip indicator
- Magnetic arc blow-out
- Lower temperature (-50 °C)
- Gold plated contacts
- Extra dust protection
- High resistance to welding ($AgSnO_2$ contacts)
- Fast switching contacts, 7 C/O contacts
- AC/DC coil
- Operating range: 0.7...1.25 Un
- Ambient temperature: -25 °C...+70 °C
- Double make/double break contacts

Remark: Not all combinations possible

Dimensions (mm)



Solve-All relay application concept

The unique D8 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 D8 relays.

Sockets

		Mounting			
		Surface / Wall	35 mm rail	Panel / Flush	PCB
Terminal connection	Screw	V93	V93	-	-
	Screw - wide terminals	V92BR	V93BR	-	-
	Spring clamp	V99	V99	V88	-
	Faston	-	-	V89	-
	Solder tag	-	-	V96	-
	Crimp	-	-	V97	-
	PCB	-	-	-	2x V32

For more information see the respective datasheets

For more detailed technical specifications, drawings and ordering information, go to the product page on www.morssmitt.com

Over 10 million Mors Smitt relays in use in applications worldwide!

Mors Smitt Asia Ltd.
Unit B & C, 25/F., Casey Aberdeen House
38 Heung Yip Road, Wong Chuk Hang
Hong Kong
Tel: +852 2343 555
sales.msa@wabtec.com

Mors Smitt France SAS
2 Rue de la Mandinière
72300 Sablé-sur-Sarthe, France
Tel: +33 (0) 243 92 82 00
sales.msf@wabtec.com

Mors Smitt UK Ltd.
Graycar Business Park,
Burton on Trent, DE13 8EN, UK
Tel: +44 (0)1283 357 263
sales.msuk@wabtec.com

Wabtec Netherlands B.V.
Vrieslantlaan 6,
3526 AA, Utrecht, Netherlands
Tel: +31 (0)30 288 1311
sales.msbv@wabtec.com

Mors Smitt Technologies Ltd.
1010 Johnson Drive,
Buffalo Grove, IL 60089-6918, USA
Tel: +1 847 777 6497
salesmst@wabtec.com

RMS Mors Smitt
6 Anzed Court,
Mulgrave, VIC 3170, Australia
Tel: +61 (0)3 8544 1200
sales.rms@wabtec.com

Technical specifications

Coil characteristics versions

Operating times at nominal voltage (typical):	
Pull-in time	≤ 20 ms
Release time	≤ 21 ms
Bounce time N/O contacts	DC ≤ 5 ms, AC ≤ 8 ms
Inductance L/R at U_{nom} (typical)	
Energized	11 ms
Released	8 ms
Nominal power consumption	2.5 - 3.5 W at U_{nom}
Operating voltage range	0.8 - 1.1 U_{nom}

Type	U_{nom} (V)	U_{min} (V)	U_{max} (V)
24 VDC	24	19.2	26.4
48 VDC	48	38.4	52.8
60 VDC	60	48.0	66.0
100 VDC	100	80.0	110.0
110 VDC	110	88.0	121.0
125 VDC	125	100.0	137.5
220 VDC	220	176.0	242.0
250 VDC	250	200.0	275.0

Other types on request

Remarks:
- Umin 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
- Always select the nominal voltage as close as possible to the actual voltage in the application

Contact characteristics

Amount and type of contacts		8 C/O
Peak inrush current	NF F62-002	200 A for 10 ms 40 A for 0.5 s 30 A for 1 s
Maximum continuous current		10 A
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)
Contact resistance		<15 mΩ (initial)
Material		Ag standard (optional $AgSnO_2$, Au on Ag)
Contact gap		0.7 mm
Contact force		> 200 mN

Electrical characteristics

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

Power relay
D8

Mechanical characteristics

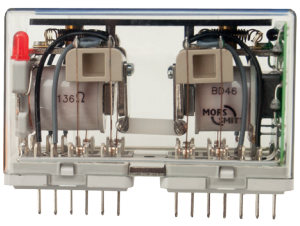
Mechanical life	10 x 10^6 operations
Maximum switching frequency	Mechanical: 3600 ops/hour Electrical: 1200 ops/hour
Weight	330 g (without options)

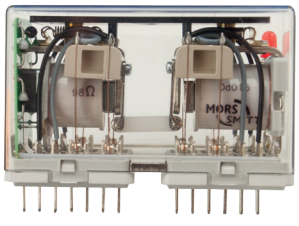
Environmental characteristics

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, NaCi, 35 °C for 4 days
Damp heat	IEC 60068-2-30, Test method Db variant 1
Protection	IEC 60529, IP40 (relay on socket) (with option K: IP50)
Insulation materials	Cover: polycarbonate Base: polyester

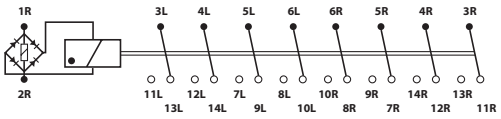
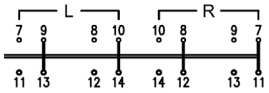
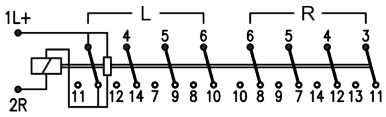
Compliancy

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





Options

Code	Description	Remark	Can not be combined with
Standard options			
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	Gold plated contacts. Low contact resistance and good resistance against corrosive atmospheres. Suitable for switching low level loads. Gold plated contacts characteristics: Material Ag, 10 µm gold plated Max. switching voltage 60 V (higher voltages may be possible, contact Mors Smitt for more info) Max. 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) Min. switching voltage 5 V Min. switching current 1 mA		M
K	Extra dust protection. Cover sealed with sealant.	IP50 Cat 2 for the relays mounted in a Mors Smitt socket. Application PD1/PD2 and contact load > 0.5 A.	A
UL	Universal AC/DC coil voltage.	DC coil with rectifier bridge. 	
V	Wider operating range and ambient temperature. Operating range: 0.7 … 1.25 Unom Ambient temperature: -25 °C…+70 °C	Power consumption 3.0 @ Unom Operating range AC can differ	R
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.	4 C/O DM/DB contacts, -50 °C 	
Keying	Coil coding relay and socket		
Special options:			
A	Mechanical trip indicator (manually resetable). Indicates if the relay has been energized.	No LED	K, R
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 % Unom (guaranteed for temperatures > 20 °C).	DC coil only. No LED. 7 C/O contacts. Mechanical life: 1 million operations. 	A, V

Power relay
D8

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 D8 relays.

Power relays, DC

D8

- 8 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	-

D8-B

- 8 C/O contacts
- Magnetic arc blow-out
- Contact gap: 0.7 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	-

D8-Y

- 4 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	-

D8-BY

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

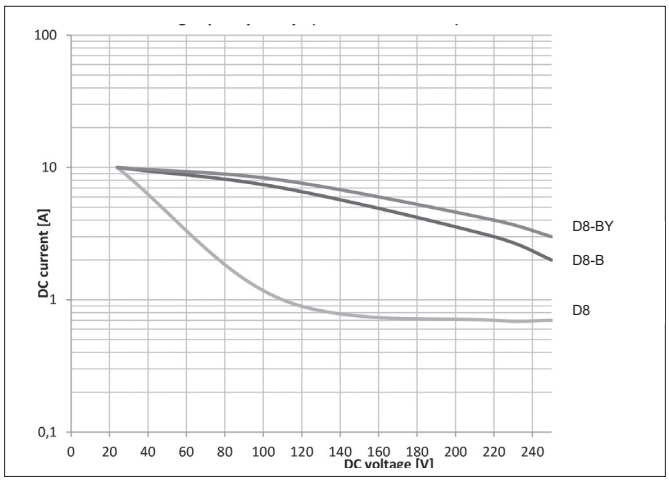
Breaking capacity

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

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) will increase breaking capacity and life expectancy significantly.

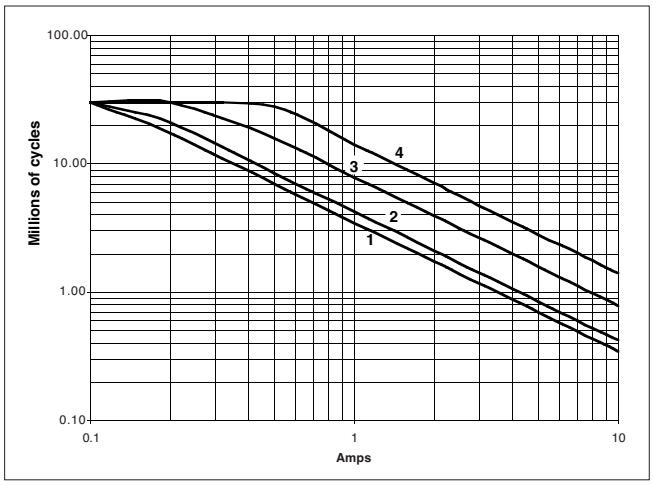
Breaking capacity relays (Resistive load DC1)



AC and DC current breaking capacity versus life expectancy in millions of cycles.
Rate of contacts opening and closing = 1200 operations per hour.

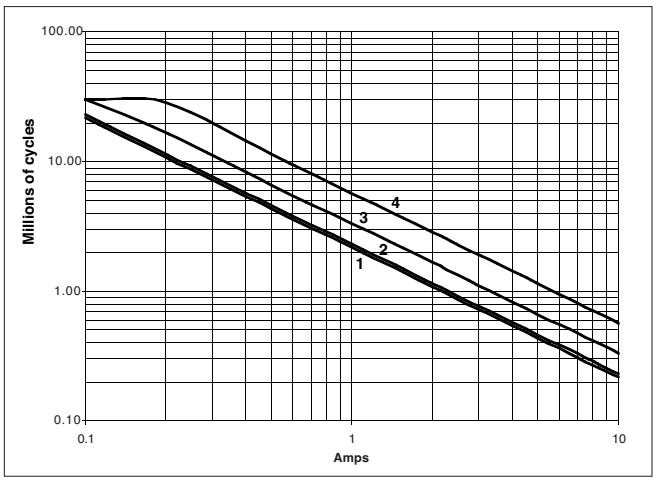
AC Current breaking capacity at cosφ = 1

Curve	1	2	3	4
VAC	220	125	48	24



DC Current breaking capacity at L/R = 0

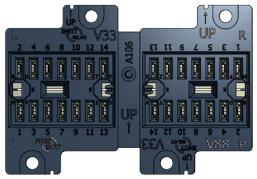
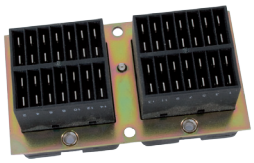
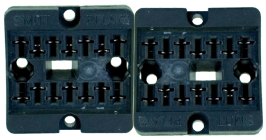
Curve	1	2	3	4
VDC	220	125	48	24



By connecting 2 contacts in series, the DC current breaking capacity is increased by 50%.

Power relay
D8

Mounting possibilities/sockets

 V88	 V89	 V93	 V93BR	 V96
 V97	 V99	 2x V32		

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)
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)
338003950	V99	Spring clamp socket, rail mount, front dual connection (2.5 mm^2)

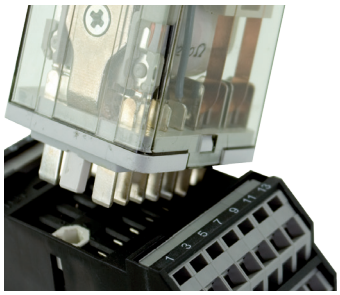
Panel/flush mounting

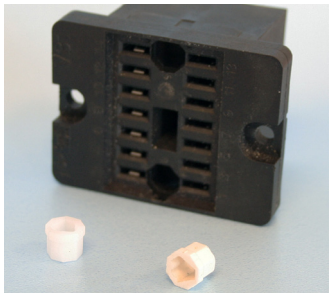
338001700	V88	Spring clamp socket, flush mount, rear dual connection (2.5 mm^2)
328001850	V89	Faston connection socket, rear dual connection (4.8 x 0.8 mm)
338100200	V96	Solder tag socket, panel mount, rear connection
338400100	V97	Crimp contact socket, panel mount, rear connection, A260 crimp contact

No external retaining clip needed as the ‘snap-lock’ will hold the relay into the socket under all circumstances and mounting directions (according shock & vibration requirements IEC 61373, Category I, Class B, Body mounted). If regulations require external retaining clips, these are available as well.

For PCB mount: use 2x V32 according to pin layout
For more details see datasheets of the sockets on www.morssmitt.com

Mechanical keying relay and socket (optional)



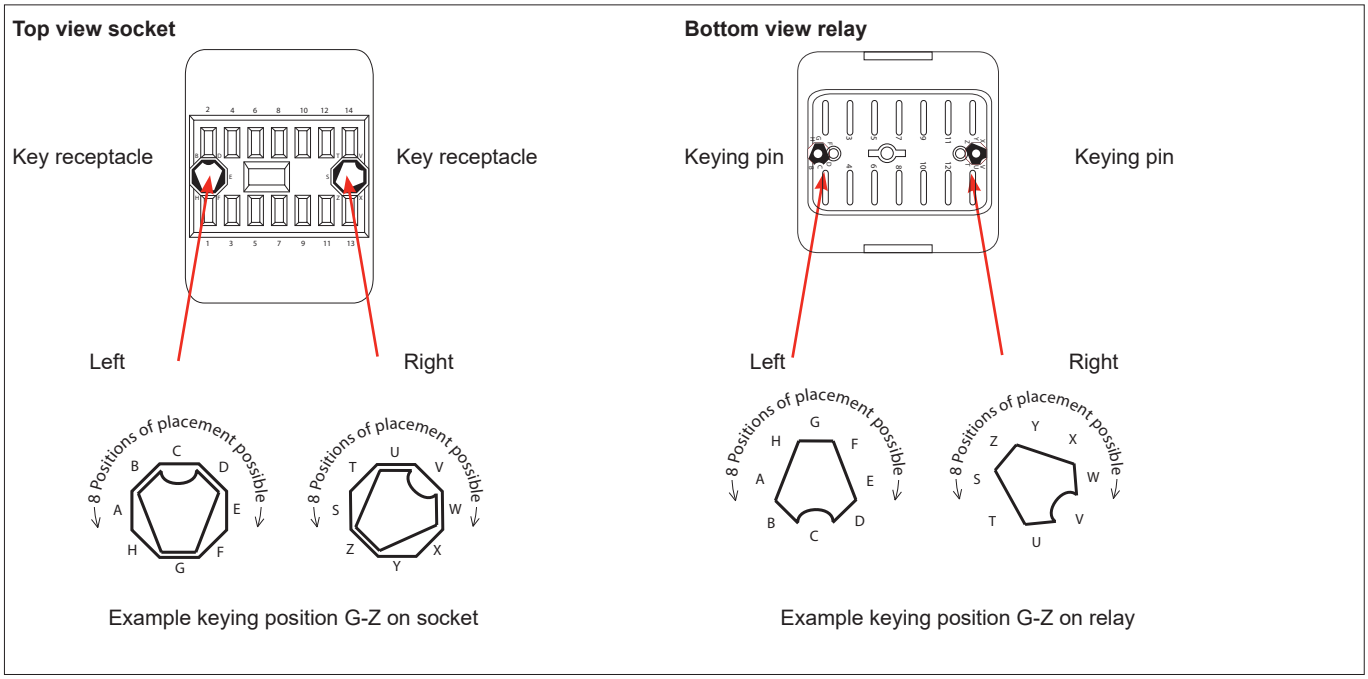


Function:
- To prevent wrong installation
- To prevent damage to equipment
- To prevent unsafe situations

Using keyed relays and sockets prevents a relay is inserted in a wrong socket. For example it prevents that a 24 VDC relay is put in a 110 VDC circuit. Positive discrimination is possible per different function, coil voltage, timing, monitoring, safety and non-safety.

The D relay socket keying option gives 8 x 8 = 64 possibilities. Upon ordering the customer simply indicates the need for the optional keying. Mors Smitt will assign a code to the relay and fix the pins into the relay. The sockets are supplied with loose key receptacles. Inserting the keys into the socket is very simple and self explaining.

Remark: Sockets and relay shown are examples.



Important for relay selection and operation

Make sure the relay is suitable for the application. For critical applications (for example: green loop applications) relays should be checked on correct working during periodic inspection.

Recommendations for long time contact reliability

For relays to enable failure free performance over a very long operational time, it is important to create the right circumstances. In any relay, contact usage and atmospheric conditions influence the contact surface. To counter this effect it is common practice to use a safety factor of > 2 to ensure long time contact reliability.

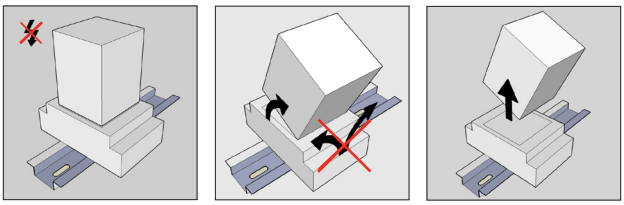
Therefore for long time contact reliability we recommend:
- Silver contacts: a minimum contact current of 20 mA per contact
- Gold contacts: a minimum contact current of 10 mA per contact
- Double Make Double Break contacts: a minimum contact current of 40 mA per contact
- When low currents are switched and not frequently, e.g. 10 mA once a day, it is advised next to gold plated contacts to put similar contacts within the same relay in parallel
- With higher load switching, e.g. 110 VDC and > 1 A, put relay contacts in series
- Rule of thumb: any relay works best with switching currents > 20 mA in DC environment when frequently switched. When not switched frequently a higher switching current like 50 mA is better for a long reliable operational time
- Check relays regularly, for example with the Mors Smitt Portable Relay Tester and visually through the transparent cover

Instructions for use

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. To ensure correct working of the KDN relay, the relay should be mounted in horizontal position as the position indicator will not work correct in vertical position due to gravity. 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 presense 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



- Relays should never be swapped to other circuit positions when taken out of its socket for inspection or fault finding, always place it back into the original position to prevent contact resistance problems. Contact resistance problems can be created when swapping relays between different circuit loads due the contact wear/condition having changed during its operational life.

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 (≤ 15 mΩ when new). When using silver contacts one can clean the contact by switching a contact load a few times using >24 VDC & ~ 2A. Increased contact resistance is not always problematic, as it depends on circuit conditions. In general a contact resistance of 1 Ω is no problem, consult Mors Smitt for more information.

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 / maintenance

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 have been reversed due to the coil connection).

Relays can easily be tested with the Mors Smitt Relay Tester. More information on: www.morssmitt.com.

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.

RMA procedure see www.morssmitt.com

Power relay
D8

Ordering scheme

D8-			Code			Cannot be combined with
Options	B				Magnetic arc blow-out	
(add as many options as needed)	C				Low temperature (-50 °C) - Max contact current 8 A	
	E				Gold plated contacts	M
	K				Extra dust protection, IP50	A
	UL				Universal AC/DC coil voltage	
	V				Wider operation range and ambient temperature	R
	Y				Double make/ double break (-50 °C)	
Special options						
(minimum order quantity: 20)	A				Trip indicator	K, R
	M				$AgSnO_2$ contacts, highly resistant to welding	E
	R				Fast Switching contacts, pull-in time < 7 ms, no LED	A, V
Coil voltages		24 VDC				
		48 VDC				
		60 VDC				
		100 VDC				
		110 VDC				
		125 VDC				
		220 VDC				
		250 VDC				
Keying code (optional, leave blank if not required)					Will be defined by Mors Smitt	

Example: D8-ULY 110 VDC

Description: D8 relay, universal power supply, double make double break contacts, Unom 110 VDC

Mors Smitt Asia Ltd.
Unit B & C, 25/F., Casey Aberdeen House
38 Heung Yip Road, Wong Chuk Hang
Hong Kong
Tel: +852 2343 555
sales.msa@wabtec.com

Mors Smitt France SAS
2 Rue de la Mandinière
72300 Sablé-sur-Sarthe, France
Tel: +33 (0) 243 92 82 00
sales.msf@wabtec.com

Mors Smitt UK Ltd.
Graycar Business Park,
Burton on Trent, DE13 8EN, UK
Tel: +44 (0)1283 357 263
sales.msuk@wabtec.com

Wabtec Netherlands B.V.
Vrieslantlaan 6,
3526 AA, Utrecht, Netherlands
Tel: +31 (0)30 288 1311
sales.msbv@wabtec.com

Mors Smitt Technologies Ltd.
1010 Johnson Drive,
Buffalo Grove, IL 60089-6918, USA
Tel: +1 847 777 6497
salesmst@wabtec.com

RMS Mors Smitt
6 Anzed Court,
Mulgrave, VIC 3170, Australia
Tel: +61 (0)3 8544 1200
sales.rms@wabtec.com