KDN relay - Bi-stable / latching, 8 contacts, 10 A

Datasheet

Application

Rugged plug-in relay for extreme reliable, long endurance applications in harsh environment. Proven reliable operation in switching high DC voltage / inductive loads. Compact design, choice of many options and a wide range of sockets makes the KDN relay concept an easy and flexible solution to use.

Description

The KDN relay series are designed for demanding applications such as power utilities and petrochemical industries. The construction of the relay and choice of materials makes the KDN relay suitable to withstand corrosive atmospheres, low and high temperatures and vibrating environments. No external retaining clip needed as integrated 'snap-lock' will hold the relay into the socket under all circumstances and mounting directions. All relays are equipped position indicator.

Magnetic arc blowout (option B) and/or putting contacts in series (option Y) will increase contact performance drastically in applications were a high DC-voltage inductive load breaking capacity is required.

Features

- Standard AC and DC coil voltages
- Latching, 8 CO contacts
- Standard with position indicator
- Flat, square and silver relay pins for excellent connection
- Wide range sockets
- Integrated snap lock
- Transparent cover
- High DC breaking capacity
- Flexibility by many options
- Solve-all™ relay application concept

Benefits

- Proven reliable
- Long term availability
- No maintenance
- Less energy consumption

Industry compliancy

- EN 60255 - Relay design and environmental conditions
- EN 60947 - Low voltage switch gearand control gear
- EN 60947-5-1 - Electromechanical control circuit devices and switching elements
- IEC 61810 - Electromechanical elementary relays
- CE, CB approved
- CCC approval pending

KDN relays
Technical specifications


Position indicator


"Smitt-style" pinning

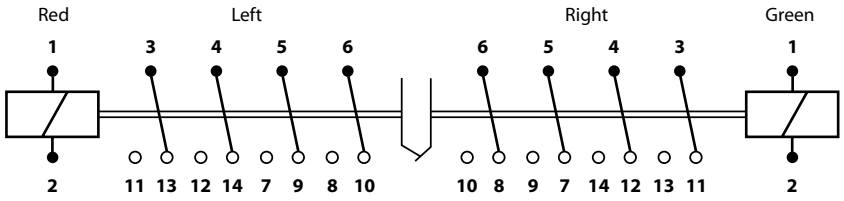

Magnetic arc blowout

Solve-All™ relay application concept

The KDN relay with all its options has been designed in close cooperation with customers from power utility undustry. The following relay models as can be derived from this datasheet.

KDN-B KDN-D KDN-BD	KDN-E KDN-Q

Connection Diagram



KDN relays
Technical specifications

Coil data AC versions

Operating times at nominal voltage		Inductance L/R at Unom	
Minimum impuls time	50 ms	energized	11 ms
		released	8 ms
Bounce time N/O contacts	DC: 4 ms	Nominal power consumption	3.2 W
	AC: 4 ms		
Operating voltage range in %	0.8 - 1.1 Unom		

Type	Unom(V)	Upull-in (V)	Umax (V) 40°C	Rcoil (Ω) *
24 VAC	24	19.2	26.4	34
42 VAC	42	33.6	46.2	135
110 VAC	110	92	121	830
220 VAC	220	176	242	3200

Other voltages on request

* The coil resistance of the KDN relays is measured at room temperature and has a tolerance of ± 10%.

Coil data DC versions

Operating times at nominal voltage		Inductance L/R at Unom	
Minimum impuls time	50 ms	energized	11 ms
		released	8 ms
Bounce time N/O contacts	DC: 4 ms	Nominal power consumption	3.5 VA
	AC: 4 ms		
Operating voltage range in %	0.8 - 1.1 Unom		

Type	Unom(V)	Upull-in (V)	Umax (V) 40°C	Rcoil (Ω) *
12 VDC	12	9.6	13.2	44
24 VDC	24	19.2	26.4	172
48 VDC	48	38.4	52.8	691
60 VDC	60	48	66	1070
110 VDC	110	88	121	4055
125 VDC	125	100	137.5	4864
220 VDC	220	176	242	15000

Other voltages on request

* The coil resistance of the KDN relays is measured at room temperature and has a tolerance of ± 10%.

KDN relays
Technical specifications

Contact data

Maximum make current	16 A
Maximum continuous current	10 A (AC1; IEC 60947)
Peak inrush current	200 A (withstand ≥10 x 200 A @ 10 ms,1 min.)
Maximum switching voltage	350 VDC, 440 VAC
Minimum switching voltage / current	Ag: 12 V, 10 mA (Au: 1µV, 1µA)
Material	Ag standard (optional $AgSnO_2$, Au on Ag)
Contact gap	0,7 mm.
Contact force	> 200 mN
Contact resistance	< 15 mΩ (initial)

Performance characteristics

Mechanical life	10^2 x 10^6 cycles (unpowered)
Rated switching frequency	1200 ops/hour
Dielectric strength	IEC 61810-1, 4 kV 50 Hz 1 min (between contacts) IEC 61810-1 2,5 kV 50 Hz 1 min (between coil-contact)
Pulse withstanding	IEC 60255-5 5 kV (1.2/50 µs)

Mechanical data

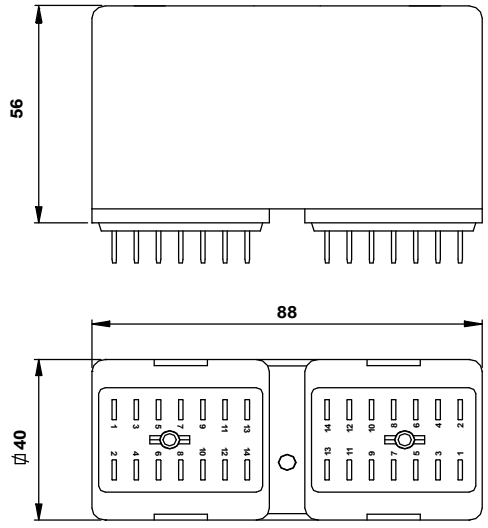
Dimensions (d, w, h)	40 x 88 x 53 mm
Weight	320 g
Materials non toxic. heat & fire resistant	Polycarbonate polyester

Environment conditions

Operating temperature	-25 °C…+55 °C (-50 °C when using option Y)
Shock	IEC 60068-2-27 - 5g, 11ms 6 directions
Vibration	IEC 60068-2-6 - 2 g, 5-150 Hz, 6 directions
Humidity	IEC 60068-2-11 90% RH / +40 °C temporary condensation permitted
Salt mist	IEC 60529 5% NaCl, 35 °C for 4 days
Degree of protection	IP40

KDN relays
Technical specifications

Dimensions



Options

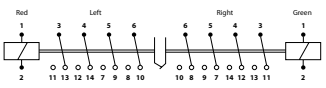
Code	Description	Remark	Cannot be combined with:
B	Magnetic arc blow out		
C	Lower temperature (-40 °C)	Max contact current 8 A (AC1;IEC 60947)	
E	Au; Gold plated contacts (10 µm)		
K	Extra dust protection cover sealed with sealant		M
M	High resistance to welding ($AgSnO_2$ contacts)	Min. contact current 100 mA	
	For safety and vital applications		E
V	Operating range: 0.7...1.25 Un Ambient temperature: -25 °C...+70 °C	Power consumption 2.22 W	
Y	Double make/double break 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.	2 C/O DM/DB contacts	
Keying	Coil coding relay and socket		
Colour coding	Coloured cover for coil voltage coding		

KDN relays
Technical specifications

In this section increasing breaking capacity for DC voltage / inductive load possibilities are presented with the different options and contact configurations within the KDN relay series.

Power relays, DC

KDN

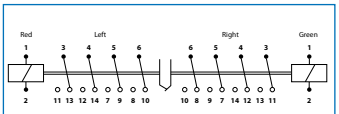


- 8 CO contacts
- Contact gap : 0,7 mm

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	-

KDN-B



- 8 CO contacts
- Magnetic arc blowout
- Contact gap : 0,7 mm

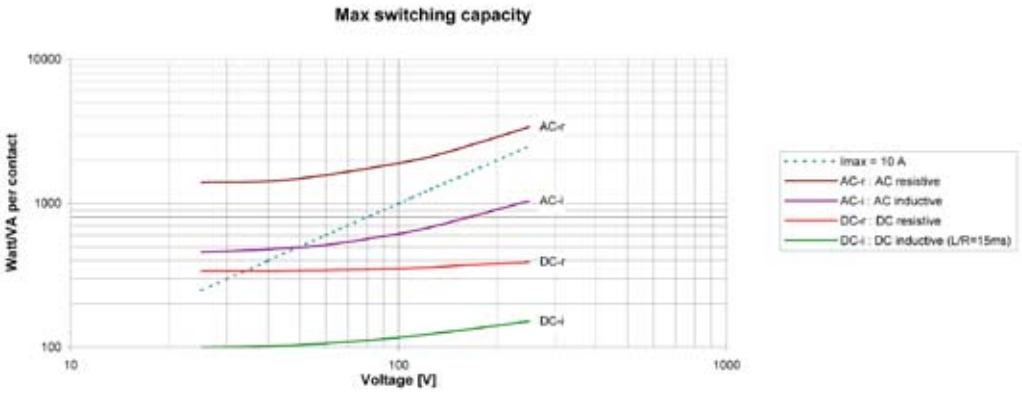
Breaking capacity

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	-

KDN relays
Technical specifications

Electrical life expectancy

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.



KDN relays
Sockets

Mounting possibilities/sockets

V91

V93

V95

V99

Surface/wall mounting

338001900	V91	Bush connection screw socket, wall mount, front connection (2.5 mm^2)
338003900	V93	Screw socket, wall mount, front connection (7.5 mm terminals)
338300300	V94	Faston connection socket, wall mount, front connection (6.3 mm)
338003950	V99	Spring terminal socket, wall mount, front dual connection (2.5 mm^2)

Rail mounting

338001900	V91	Bush connection screw socket, rail mount, front connection (2.5 mm^2)
338003900	V23	Screw socket, rail mount, front connection (7.5 mm terminals)
338300400	V95	Faston connection socket, rail mount, front connection (6.3 mm)
338003910	V99	Spring terminal socket, rail mount, front dual connection (2.5 mm^2)

Panel/flush mounting

338100200	V96	Solder tag socket, panel mount, rear connection
338400100	V97	Crimp contact socket, panel mount, rear connection
338001800	V89	Faston connection socket, rear dual connection (5 mm)

KDN relays
Notes

KDN relays
Instructions

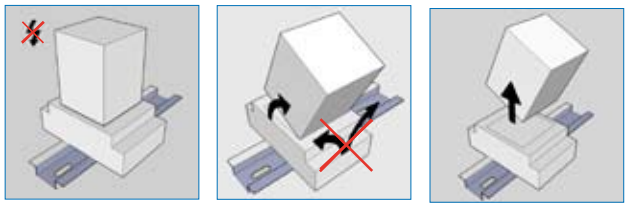
Installation

Before installation or working on the relay: disconnect the power supply first!

Install socket and connect wiring according to the terminal identification. Plug relay into the socket ensuring there is no gap between the bottom of the 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 surface/rail mounting is used, always mount the socket in the direction of the UP arrow.

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



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 the 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 mΩ when new). When using silver contacts one can clean the contact by switching a contact load a few times using >24 VDC & ~ 2 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 coil voltage is present, but the relay does not operate, a short circuit of the suppression diode if present is possible (This may be due to the reversed connection of the coil).

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.

KDN relays
Ordering scheme

KDN	-	B	110 VDC
1. Relay model		2. Options	3. Voltage

This example represents a KDN-B-110 VDC.
Description: KDN latching relay, Unom 100-110 VDC, 8 C/O contacts.

1. Relay model

KDN

2. Options

B	Magnetic arc blow out
C	Lower temperature features (-40 °C)
E	Au; gold plated contacts (10 µm)
K	Extra dust protection cover sealed with sealant
M	High resistance to welding ($AgSnO_2$ contacts)
Q	Coil protection against transient voltage
V	Operating range: 0.7...1.25 Un, Ambient temperature: -25 °C...+70 °C
Y	Double make/double break contacts
Keying	Coil coding relay and socket
Colour coding	Coloured cover for coil voltage coding

3. Coil voltage

6 VDC	6 VAC, 50-60 Hz
12 VDC	12 VAC, 50-60 Hz
24 VDC	24 VAC, 50-60 Hz
48 VDC	48 VAC, 50-60 Hz
60 VDC	60 VAC, 50-60 Hz
75 VDC	75 VAC, 50-60 Hz
100 VDC	100 VAC, 50-60 Hz
110 VDC	110 VAC, 50-60 Hz
125 VDC	125 VAC, 50-60 Hz
220 VDC	220 VAC, 50-60 Hz
250 VDC	250 VAC, 50-60 Hz

* Other voltages on request

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