

AK 400 relay - Weld resistant, 4 contacts

Datasheet



Description

The AK 400 relay has 4 double make / double break C/O contacts (form Z). It is conform the French standard NF F 70-031 section 7.1.2. and 7.1.3. which specified no welding when contacts are closed on a 200 Amps 30 V short circuit protected by 6 A/400 V G1 fuse and no welding when contacts are closed on a 200 μ F capacitor charged at 330 VDC.

The resistance to impact and vibration is conform to standards in force for Railway Transported Equipment.

Positive mechanical keying of relay to socket is built into relay and socket during manufacture and terminal identifications are clearly marked on identification plate that is permanently attached to the relay.

The AK 400 relays is pluggable in the following sockets: EA 102 A, EA 102 AF, EA 103 AF, EA 104 A, EA 104 AF, EA 105 AF, EA 112 AF.

Application

The AK relay is designed heavy duty applications where a high degree of resistance to welding is required. Stationary contacts are silver tin oxide. Mobile contacts are hard silver laminated to copper. In a power interruption situation relay armature will assure a "safe" position. This is due to the strength of the 2 compressed springs which pushes the armature back into the rest position.

Features

- Instantaneous relay
- Optional Weld no transfer contacts for safety critical applications
- Weld resistant
- 4 double make - double break C/O contacts (form Z), 8 A
- Plug-in design with secure locking feature for maximum ease of maintenance
- Contact life (mechanical) of 100 million cycles
- -40 °C...+80 °C operating temperature

Benefits

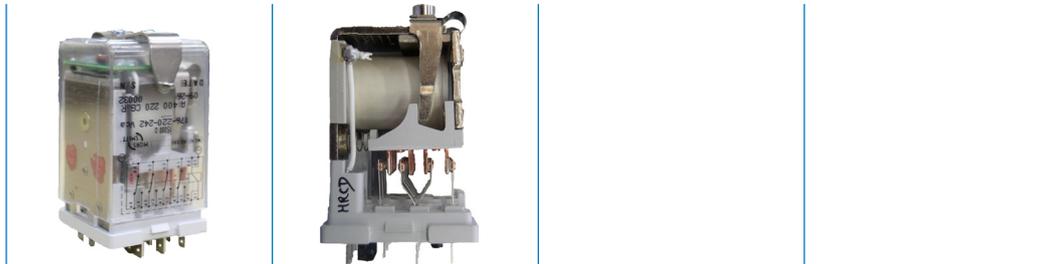
- Proven reliable in heavy duty application
- Optional Weld no transfer
- Long life cycle
- Easy to maintain and replace
- Low life cycle cost
- No maintenance
- Used in safety critical applications

Railway compliancy

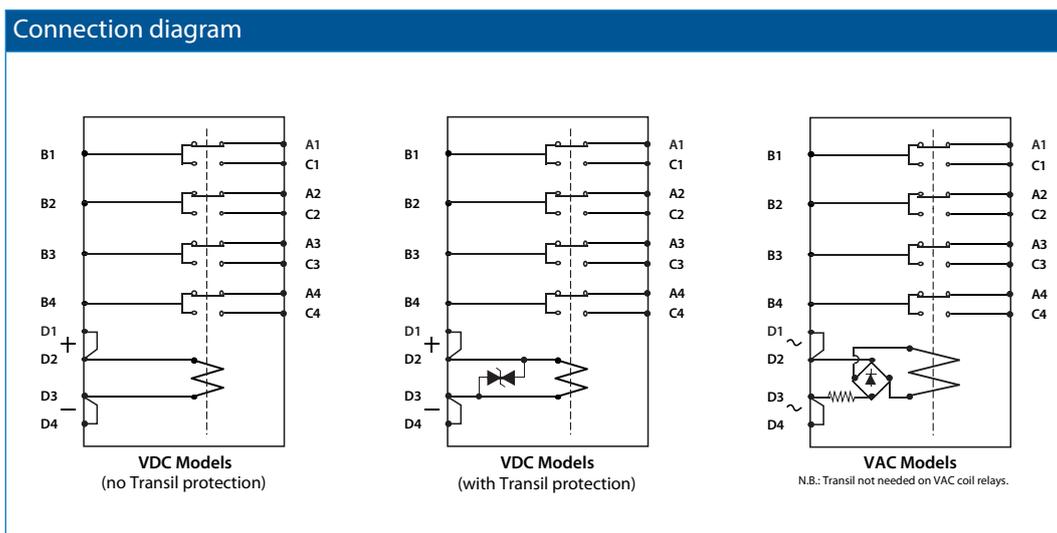
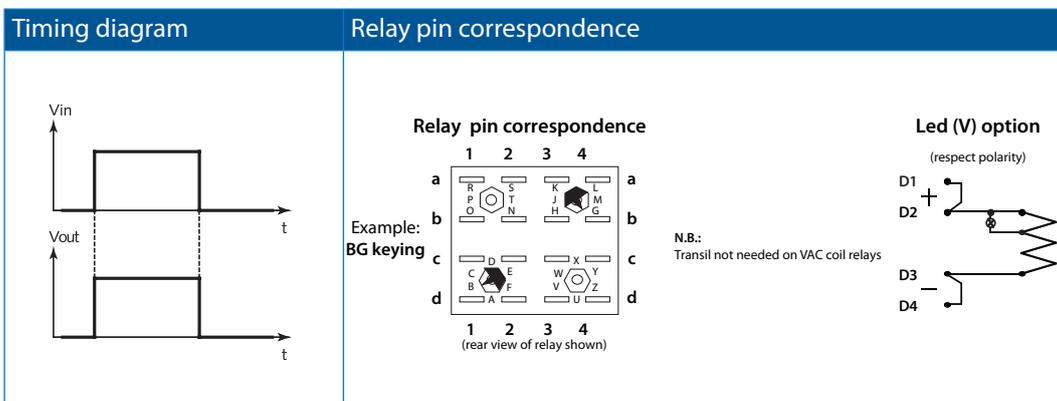
- NF F 62-002 Rolling stock - Instantaneous relays contacts and sockets
- NF F 70031 section 7.1.2 and 7.1.3 (for weld resistant contacts)
- NF F16-101/102 Fire behaviour - Railway rolling stock

AK 400 relay

Technical specifications



Functional and connection diagrams



AK 400 relay

Technical specifications

Coil data - DC and AC versions

Keying	U _{nom}	U _{operating}	P _{nom}	U _{Hold}	U _{Drop-out}	R coil (Ω) ⁽¹⁾	L/R (ms) ⁽²⁾
AG	24 VDC	16 / 33 VDC	3 W	13.5 VDC	2.5 VDC	185	30
FL	36 VDC	25 / 45 VDC	3 W	21 VDC	3.5 VDC	430	30
DG	48 VDC	33 / 60 VDC	3 W	28.5 VDC	4.5 VDC	750	30
BG	72 VDC	48 / 90 VDC	3 W	40.5 VDC	6.5 VDC	1700	30
US	96 VDC	65 / 120 VDC	3 W	50 VDC	9 VDC	3000	30
SV	110 VDC	75 / 138 VDC	3 W	62 VDC	10 VDC	4000	30
EG	125 VDC	88 / 156 VDC	3 W	73 VDC	12 VDC	5700	30
SZ	115 VAC	80 / 140 VAC	3 VA	65 VAC	10 VAC	4000	30
CG	220 VAC	176 / 242 VAC	3 VA	129 VAC	21 VAC	15000	30

(1) Coil resistance tol.: ± 8% at 20 °C

(2) Valid for closed relay.

Contact data - standard version (Ag contacts)

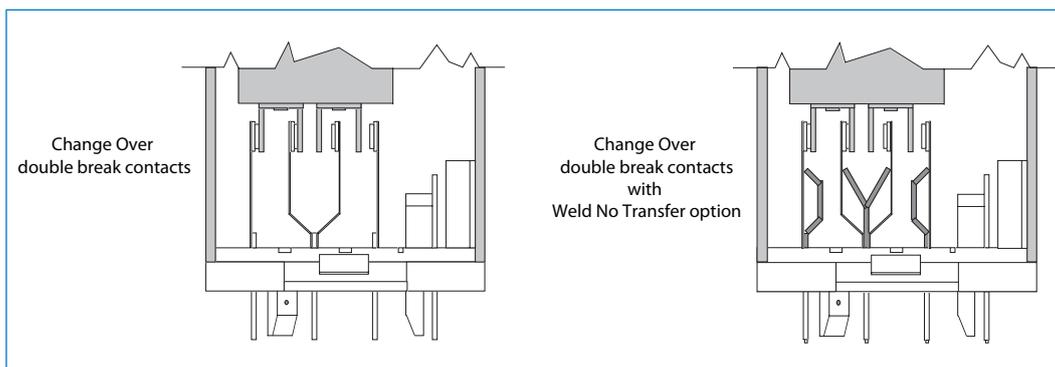
Nominal current	8 A resistive, 5 A resistive according CF62-002		
Nominal breaking capacity and life	1 A at 72 VDC	L/R : 0 ms	Electrical life: 4x10 ⁶ op.
	350 mA at 72 VDC	L/R: 30 ms	Electrical life: 2x10 ⁶ op.
	1 A at 220 VAC 50 Hz	cosØ=1	Electrical life: 2x10 ⁶ op.
	Lamp filament circuit: 120 W at 72 VDC		Electrical life: 4x10 ⁵ op.
Contact overload withstand	At 24 VDC: 100 A at L/R = 0 for 10 ms (10 operations at the rate of 1 operation per minute)		
Contact closure time	Pick-up time N/O < 40 ms	Drop-out* time N/C < 15ms	
Contact opening time	Pick-up time N/C < 35 ms	Drop-out* time N/O < 6 ms	
Minimum contact continuity	20 mA at 110 VDC & 100 mA at 24 VDC		
Number of contacts	4 double make - double break contacts (form Z)		
Contact material	Stationary contacts: Tin silver oxide (10%)		
	Movable contacts: Hard silver overlay laminated to copper		



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Technical specifications

Contact design



Electrical characteristics

Dielectric strength	2000 VAC, 1 min between contacts 2600 VAC, 1 min between contacts, coil and frame
Insulation resistance	≥ 1000 MΩ at 500 VDC

Mechanical & environmental characteristics

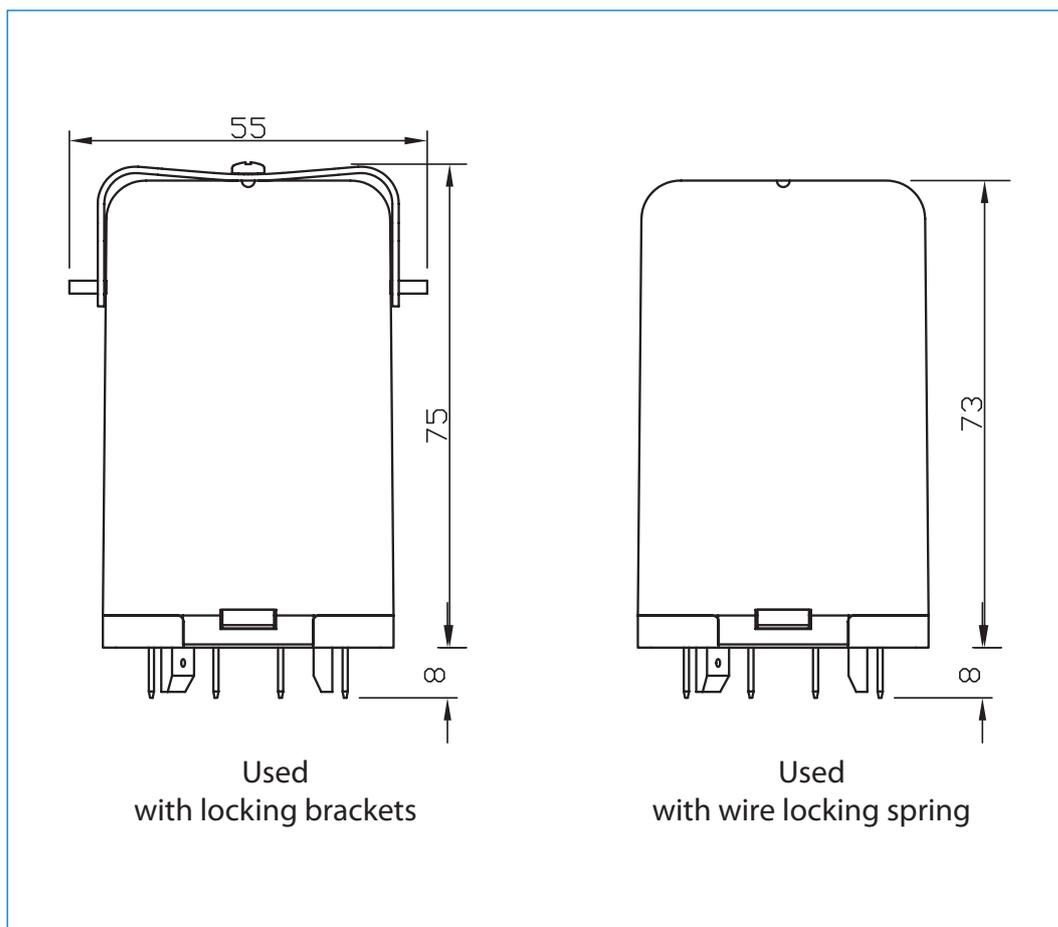
Vibration	NFF62 002 The tests are conducted in the X, Y, Z planes at frequency between 10 & 150 cycles (sinusoidal) at 2 g
Shock	NFF62 002 Tests are applied in both directions in the X, Y & Z planes. Then successive shocks are administered consisting of the positive component of sinusoidal with a value of 30g, 18 ms Other vibration and shock tests can be performed on request
Mechanical life	> 100 x 10 ⁶ operations
Weight	300 g
Temperature	-40 °C...+80 °C
Humidity	93% RH, 40° C for 4 days
Salt mist	5% NaCl, 35° C for 4 days
Protection	IP40 (relay on socket)
Fire & smoke	Materials: Polycarbonate (cover) / polyester melamine (base) Note: These materials have been tested for fire propagation and smoke emission according standards NFF 16101, NFF 16102, ASTM E162 and ASTM E662 and have been approved for use on the English/French train channel shuttle.



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Technical specifications

Dimensions (mm)



AK 400 relay

Technical specifications

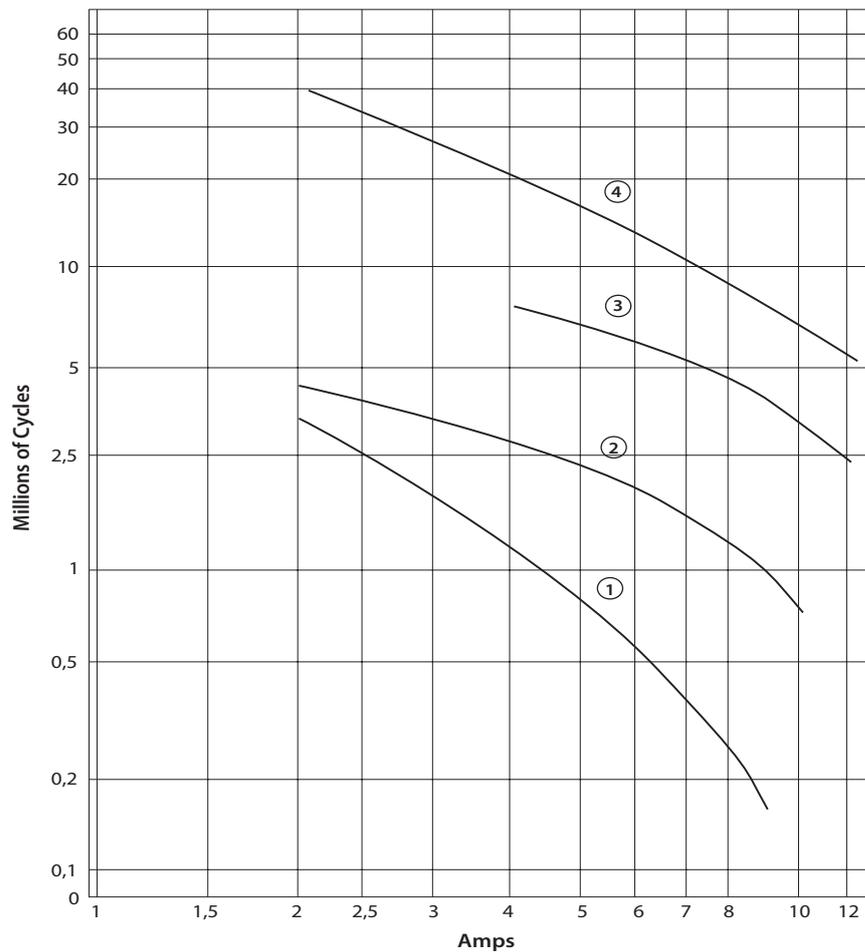
Dynamic relay selection curve No 1

AC Current breaking capacity versus life expectancy in millions of cycles.

Rate of contacts opening and closing = 1200 operations per hour.

Curves shown for resistive load (Power Factor = 1).

Curve	1	2	3	4
VAC	220	125	48	24



AK 400 relay

Technical specifications

Dynamic relay selection curve No 2

DC Current breaking capacity versus life expectancy in millions of cycles.

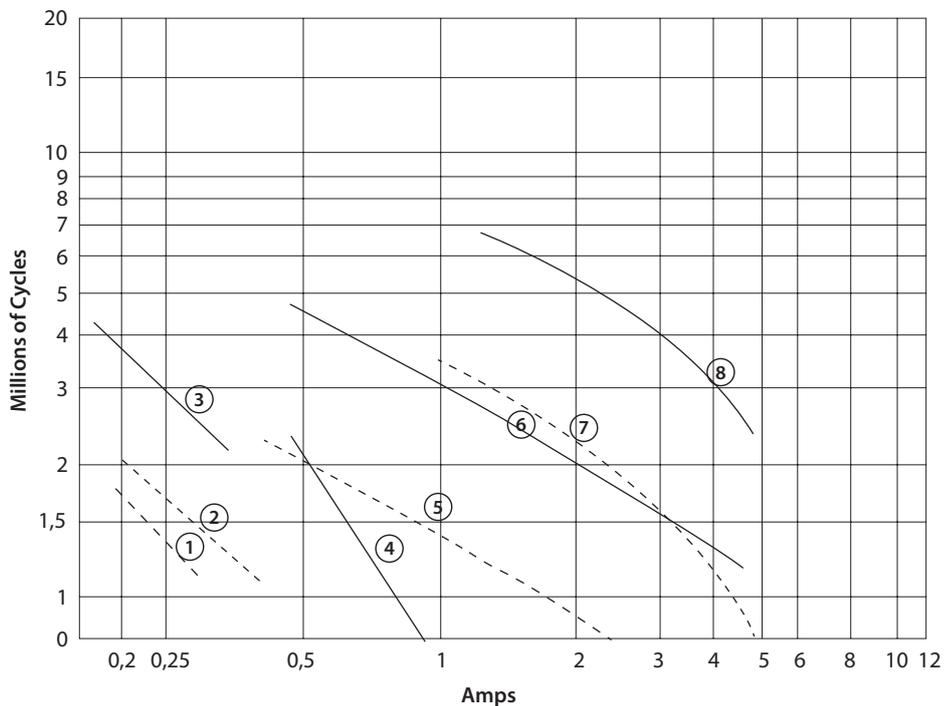
Rate of contacts opening and closing = 1200 operations per hour.

Curves shown for inductive load:

- L/R= 20 ms continuous current
- - - - L/R= 40 ms continuous current

* By connecting 2 contacts in series, DC current breaking capacity increases by 50 %

Curves	1-3	2-4	5-6	7-8
VDC	220	125	48	24



AK 400 relay

Technical specifications

Dynamic relay selection curve No 3

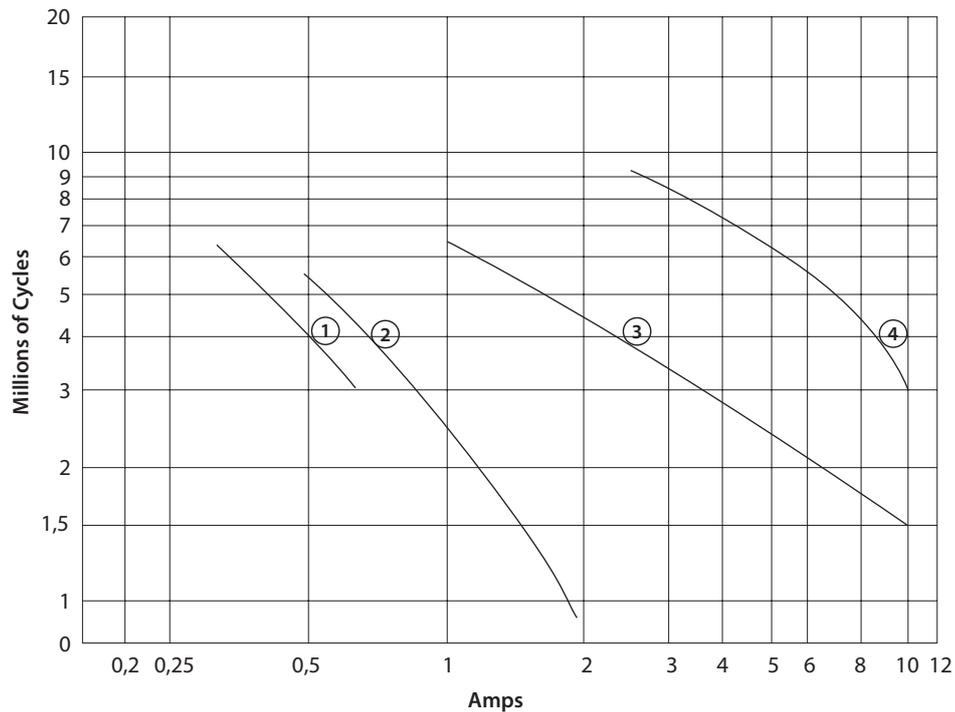
DC Current breaking capacity versus life expectancy in millions of cycles.

Rate of contacts opening and closing = 1200 operations per hour.

Curves shown for resistive load (L/R = 0). Continuous current.

* By connecting 2 contacts in series, DC current breaking capacity increases by 50 %

Curve	1	2	3	4
VDC	220	125	48	24



AK 400 relay

Technical specifications

Dynamic relay selection curve No 4

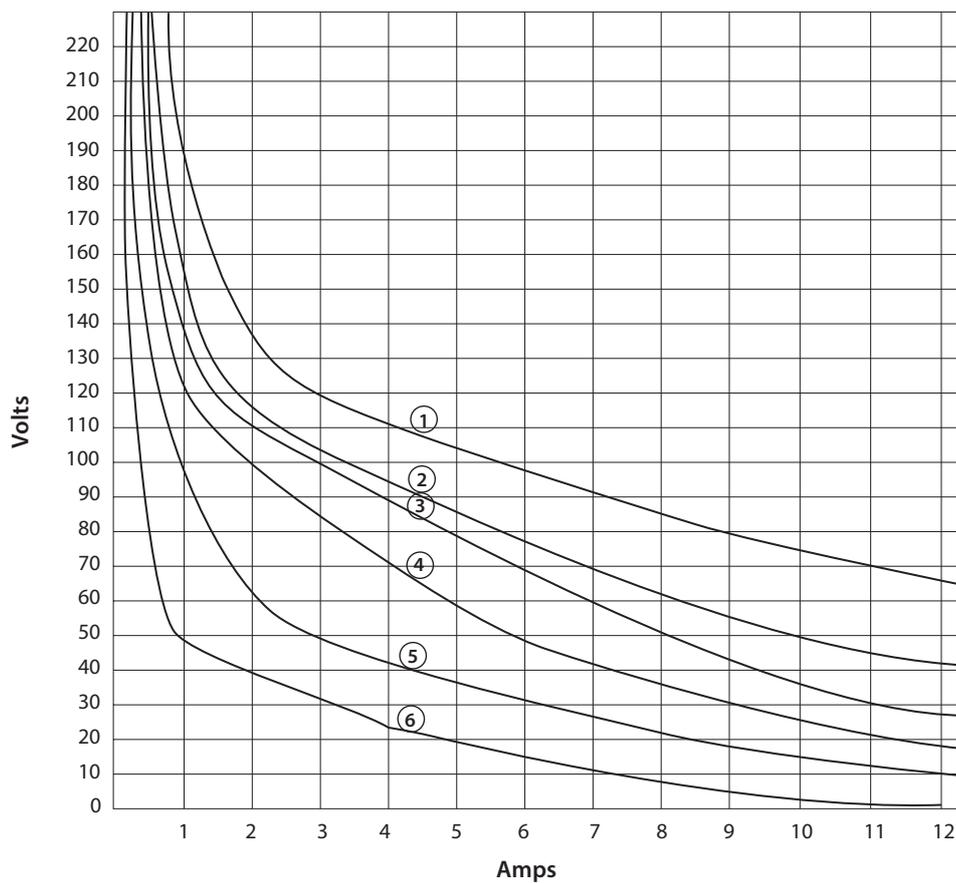
Maximum contact breaking capacity versus voltage for a given L/R.

Rate of contacts opening and closing = 600 operations per hour.

Curves shown for resistive load (L/R=0) and inductive loads. Continuous current.

Life expectancy: 800,000 of Cycles

Curve	1	2	3	4	5	6
L/R=	0ms	15ms	20ms	40ms	60ms	100ms



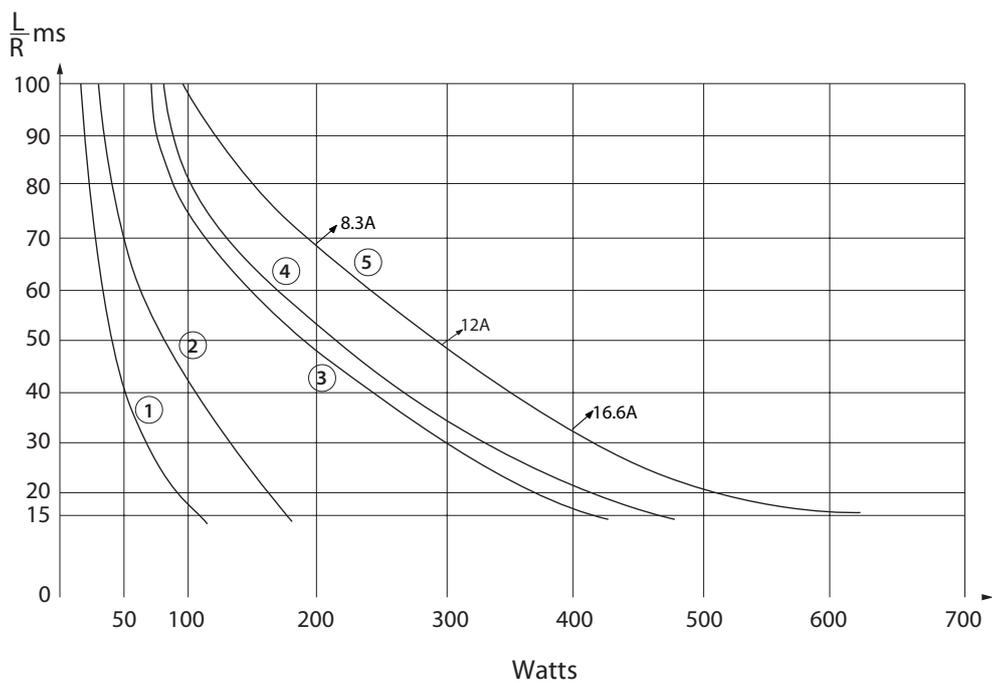
AK 400 relay

Technical specifications

Dynamic relay selection curve No 5

Maximum power interruption versus load time constant (L/R) for a given voltage.
Curves shown for resistive loads. $I = P/V$.

Curve	1	2	3	4	5
VDC	220	125	72	48	24



AK 400 relay

Technical specifications

Dynamic relay selection curve No 6

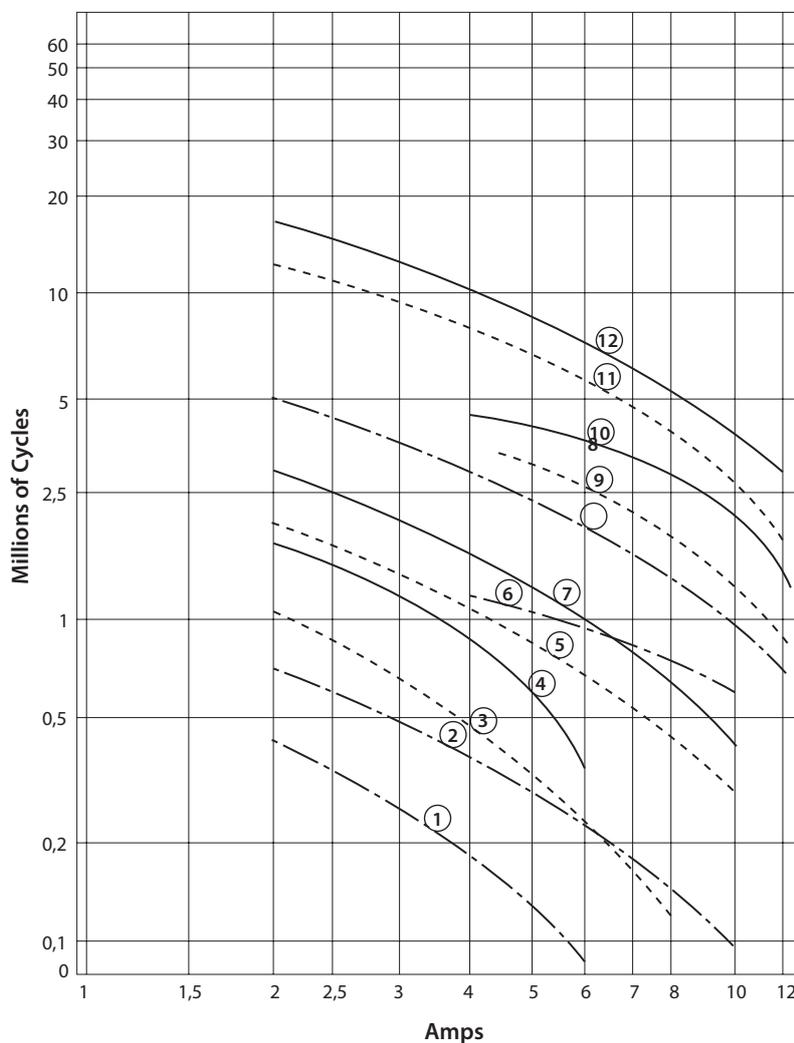
AC Current breaking capacity versus life expectancy in millions of cycles.

Rate of contacts opening and closing = 1200 operations per hour.

Values shown for inductive loads -

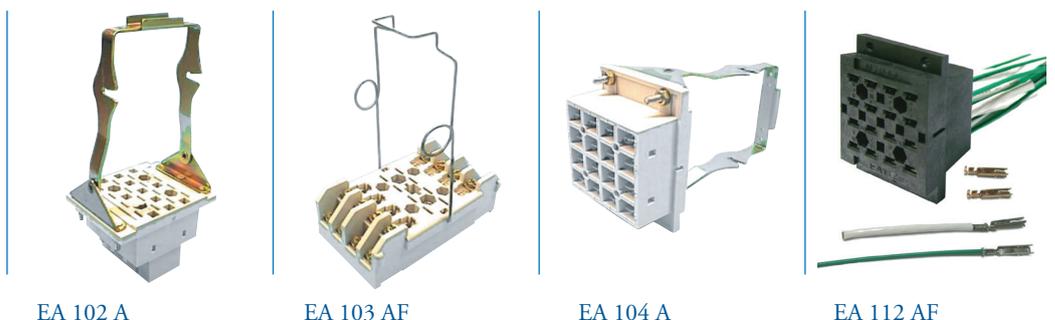
- Cos ϕ = 0.7
- - - Cos ϕ = 0.5
- · - Cos ϕ = 0.3

Curves	1,3 &4	2,5 &7	6,9 &10	8,11 &12
VAC	220	125	48	24



AK 400 relay

Mounting possibilities / sockets



Panel/flush mounting

EA 102 A	Locking bracket (905843), rear connection, double Faston 5 mm
EA 102 AF	Wire locking spring (926853), rear connection, single Faston 5 mm
EA 104 A	Locking bracket (905843), rear connection, single Faston 5 x 0.8 mm
EA 104 AF	Wire locking spring (926853), rear connection, single Faston 5 x 0.8 mm
EA 112 AF	Wire locking spring (926853), rear connection, crimp contact

Surface/wall mounting

EA 103 AF*	Wire locking spring (926853), front connection, M3 screw 6.5 mm ring terminals (2,5 mm ²)
EA 105 AF*	Wire locking spring (926853), front connection, single Faston 5 mm

* Mounting possibility on 35 mm rail EN 50022 by adding suffix D to the part number (see socket datasheet)

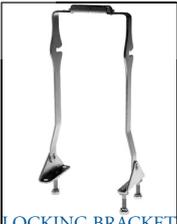
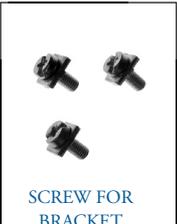
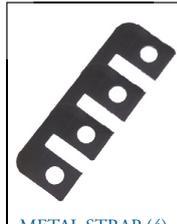
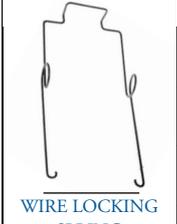
Note: Keying of relay to socket can be specified by adding the keying letters in the part number. See all details in the related socket datasheet.



AK 400 relay

Spare parts

Spare parts - order part numbers

<p>(1)</p>  <p>LOCKING BRACKET 905843</p>	<p>(1)</p>  <p>SCREW FOR BRACKET C927210</p>	<p>(1)</p>  <p>METAL STRAP (2) P928060</p>	<p>(1)</p>  <p>METAL STRAP (4) P928061</p>
<p>(1)</p>  <p>WIRE LOCKING SPRING 926853</p>	<p>(1)</p>  <p>ROUND PLASTIC PLUGS 414928005</p>	<p>(2)</p>  <p>HEX. PLASTIC KEYS 414905678</p>	<p>(3)</p>  <p>LOCK PINS ASSY 2 SCREWS 906364 212903020</p>

(1) Parts only for socket
 (2) Parts for relay and socket
 (3) Parts only for relay



AK 400 relay

Instructions

Installation

Install socket and connect wiring correctly according identification to terminals. Plug relay into socket. Reverse installation into socket not possible due to mechanical blocking by snap-lock.

Don't reverse polarity of coil connection. Relays can be mounted (tightly) next to each other and in any attitude.

Warning! Never use silicon near by relays

Operation

Before operating always apply voltage to coil to check correct operation.

Long term storage may corrode the silver on the relay pins. Just by plugging the relay into the socket, the female bifurcated receivers will automatically clean the corrosion on the pins and guarantee a good connection.

Do not use the relay in places with flammable gas as the arc generated from switching could ignite gasses.

Maintenance

Correct operation of relay can easily be checked as transparent cover gives good visibility on the moving contacts. When the relay doesn't seem to operate correct, please check presence of coil voltage. Use a multimeter. If LED is used, coil presence should be indicated. If coil voltage is present, but the relay doesn't work, a short circuit of suppression diode is possible (The coil connection was reversed). If relay doesn't work after inspection, please replace relay unit by a similar model. Send defective relay back to manufacturer. Normal wear and tear excluded.



AK 400 relay

Ordering scheme

Configuration:



This example represents a **AK 400 24 AG S C V F**.

Description: AK 400 series relay, Unom: 24 VDC, Keying AG, Transil coil protection, Weld no transfer, LED indicator, relay cover for wire locking spring

1. Relay model

AK 400

2 & 3. Nominal voltage and keying

AG	24	
VDC	FL	36
VDC	DG	48
VDC	BG	72
VDC	US	96
VDC	SV	
110 VDC	EG	
125 VDC		
SZ	115 VAC	
CG	220 VAC	
Specific keying		
SVeG	110 VDC	

4. Coil overvoltage protection

–	No coil protection
P	Avalanche diode coil protection
S	Transil coil protection (only 400 type)
Note: no protection for AC coil versions	

6. LED coil voltage indicator

–	No LED
V	LED voltage indicator

5. Weld no transfer option

–	Regular double-break contacts
C	Weld no transfer

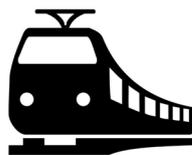
7. Relay cover type

–	Relay cover with lock pins
F	Relay cover for wire locking spring





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