

FDA-U300 relay - Flashing, AC input, 2 pole

Datasheet



(FDA-U200 shown)

Description

Plug-in electronic railway pulsing relay with two change-over contacts, suitable for AC coil voltages with a frequency of 50/60 Hz. When the relay is activated the coil starts with an interval. The pulse time and interval time are equal. The pulsing frequency is adjustable with a lockable knob. The relay can also be supplied with a fixed pulsing frequency (no knob). The relay is standard equipped with double zener diode coil protection.

The construction of the relay and choice of materials makes the FDA-U300 relay suitable to withstand low and high temperatures, shock & vibrating and dry to humid environments.

No external retaining clip needed as integrated 'snap-lock' will hold relay into socket under all circumstances and mounting directions.

Compact design, choice of many options and a wide range of sockets makes the FDA-U300 relay an easy and flexible solution to use.

Application

These relay series are designed for demanding train borne applications. The FDA-U300 is used in applications where a pulse frequency in output is necessary after activating the relay.

Features

- Flashing relay (symmetrical)
- Duty cycle: 1/2
- AC input
- Compact plug-in design
- 2 C/O contacts
- Pulse time adjustable with a lockable knob
- Pulse times between 0.5 s...3 s
- Also available with fixed pulse time
- Double zener diode coil protection
- Flat, square and silver plated relay pins for excellent socket connection
- Integrated snap lock
- Optional positive mechanical keying relay to socket

Benefits

- Proven reliable
- Long term availability
- Easy to maintain
- Low life cycle cost
- No maintenance

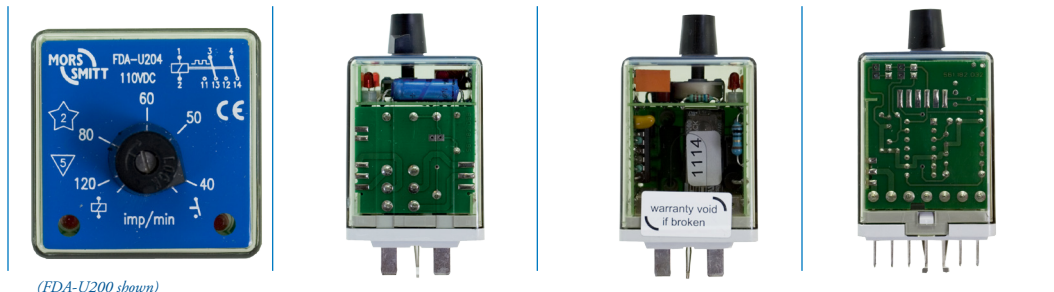
Railway compliancy

- EN 50155 Electronic equipment used on rolling stock for railway applications
- IEC 60571 Electronic equipment used on railway vehicles
- IEC 60077 Electrical equipment for rolling stock in railway applications
- IEC 60947 Low voltage switch gear and control gear
- IEC 61373 Rolling stock equipment - Shock and vibration test
- IEC 60947-5-4 Electromechanical components for control applications. This standard examines both coil and contact specifications in depth
- EN 50121 Electromagnetic compatibility for railway applications
- NF F 16-101/102, EN 45545-2 Fire behaviour - Railway rolling stock
- NF F 62-002 On-off contact relays and fixed connections



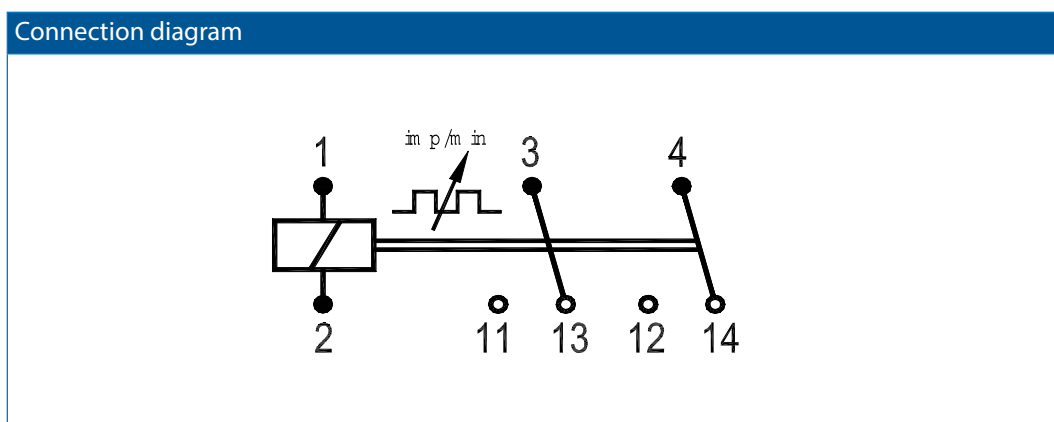
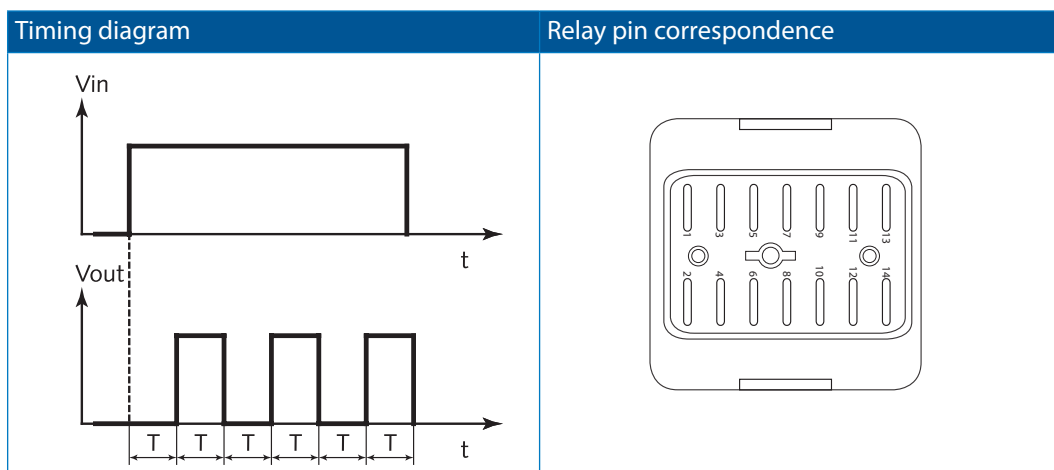
FDA-U300 relay

Technical specifications



(FDA-U200 shown)

Functional and connection diagrams



FDA-U300 relay

Technical specifications

Pulse specifications

Pulse function	Flashing (symmetrical) ; duty cycle 1/2
Pulse rate (xx)	20...60 imp/min adjustable per lockable knob 40...120 imp/min adjustable per lockable knob Fixed without knob (set in factory)
Accuracy - adjustment	< 10 %
After adjusting / fixed pulse frequency	No variation in set point
Accuracy - repeatability	± 0.5 %
Time variation - vs voltage variation	± 0.05 % / % U _{nom}
Time variation - vs temperature variation	± 0.02 % / K
Maximum permissible ripple	50 %
Example pulse time: Pulse time set on 2 s : it will be between 1.8 s...2.2 s For example: 2.0 s. The ambient temperature is 40 degrees Celsius which is 20 degrees different compared to the standard 20 degrees Celsius. This results in 0.4 % pulse time variation. The applied voltage is 30 % lower than the nominal voltage. This results in 1.5 % extra time variation. The total time variation is then 0.5 % (repeatability) + 0.4 % (time variation) + 1.5 % (voltage variation) = 2.4 %. In this case the pulse time will be between 1.95 s and 2.05 s.	

Coil data

Operating voltage range	0.8...1.2 U _{nom}
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Type	U _{nom} (VAC)	U _{min} (VAC)	U _{max} (VAC)
FDA-U301-xx	24	19.2	28.8
FDA-U303-xx	220	176	264
FDA-U305-xx	110	88	132

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

Contact data

Amount and type of contacts	2 C/O instantaneous
Maximum make current	14 A
Maximum continuous current	8 A (AC1 ; IEC 60947)
Maximum switching voltage	DC 300 V AC 250 V
Minimum switching voltage / current	12 V, 100 mA
Maximum switching capacity and contact life	see graph page 6
Material	AgCdO

Note : contacts cannot have a different position (Forced contacts, Weld-no-transfer)



FDA-U300 relay

Technical specifications

Electrical characteristics

Dielectric strength	EN 50155
Cont-coil	IEC 60077 2.5 kV, 50 Hz, 1 min
Insulation between open contacts	1 kV; 50 Hz; 1 min

Mechanical characteristics

Mechanical life	20 x 10 ⁶ operations
Maximum switching frequency	Mechanical: 3600 ops/h Electrical: 1200 ops/h
Maximum torque value screw to lock knob	0.15 Nm
Weight	90 g (without options)

Environmental characteristics

Environmental	EN 50125-1 and IEC 60077-1
Vibration	IEC 61373, Category I, Class B, Body mounted
Shock	IEC 61373, Category I, Class B, Body mounted
Operating temperature	-25 °C...+70 °C (with option C : -40 °C)
Humidity	95 %
Salt mist	IEC 60068-2-11, class ST4
Damp heat	IEC 60068-2-30, Test method Db variant 1
Protection	IEC 60529, IP40 (relay on socket) (with option K: IP50)
Fire & smoke	NF F 16-101, NF F16-102, EN 45545-2
Insulation materials	Cover: polycarbonate Base: polyester

Options

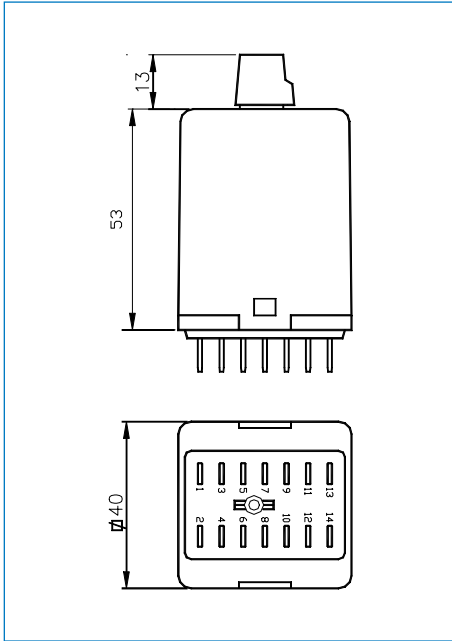
Code	Description	Remark	Cannot be combined with:
C	Low temperature (-40 °C)		
K	Dust protection	IP50**	
Keying	Coil coding relay and socket		
Colour coding	Coloured cover for coil voltage coding		
** IP50 Cat2 for relays mounted in a Mors Smitt socket, application PD1/PD2 and contact load >0.5A.			



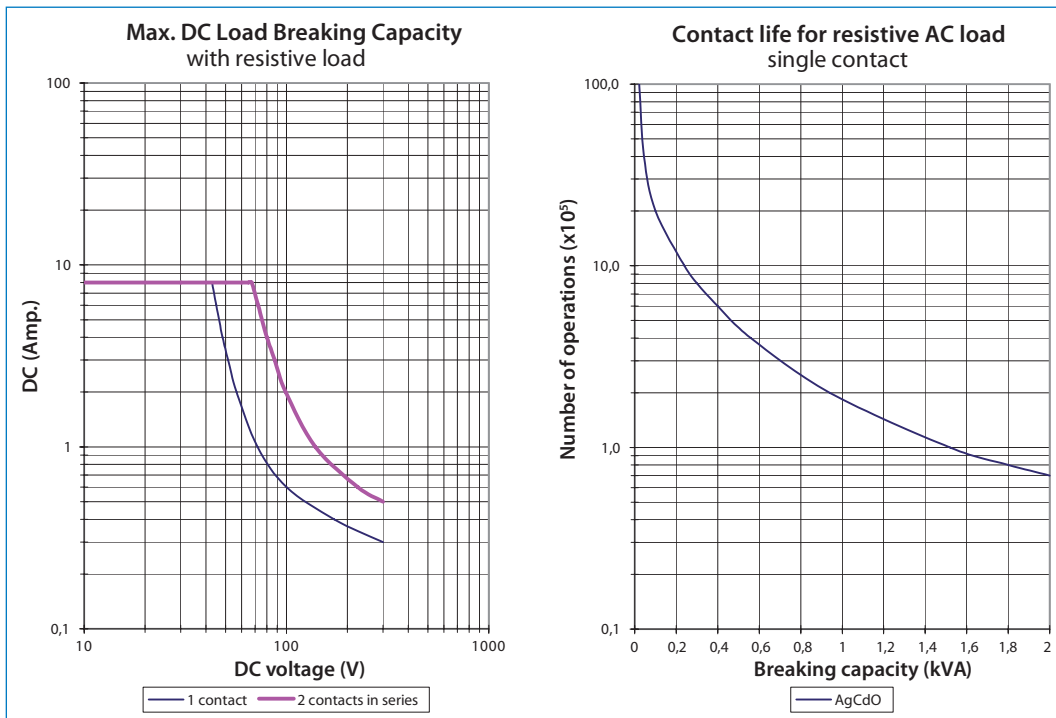
FDA-U300 relay

Technical specifications

Dimensions (mm)



Maximum switching capacity and contact life



FDA-U300 relay Sockets

Mounting possibilities/sockets



Surface/wall mounting

338000302	V22BR	Screw socket, wall mount, front connection (9 mm terminals)
338000580	V23	Screw socket, wall mount, front connection (7.5 mm terminals)
338000610	V29	Spring clamp socket, wall mount, front dual connection (2.5 mm ²)

Rail mounting

338000580	V23	Screw socket, rail mount, front connection (7.5 mm terminals)
338000402	V23BR	Screw socket, rail mount, front connection (9 mm terminals)
338000610	V29	Spring clamp socket, rail mount, front dual connection (2.5 mm ²)

Panel/flush mounting

338100100	V3	Solder tag socket, panel mount, rear connection
328400100	V26	Crimp contact socket, panel mount, rear connection, A260 crimp contact
338000560	V31	Faston connection socket, rear dual connection (6.3 mm)
338000570	V33	Spring clamp socket, flush mount, rear dual connection (2.5 mm ²)

PCB mounting

338000561	V32	PCB soldering socket
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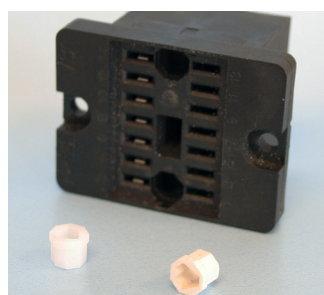
For more details see datasheets of the sockets



FDA-U300 relay

Keying

Mechanical keying relay and socket (optional)



Function:

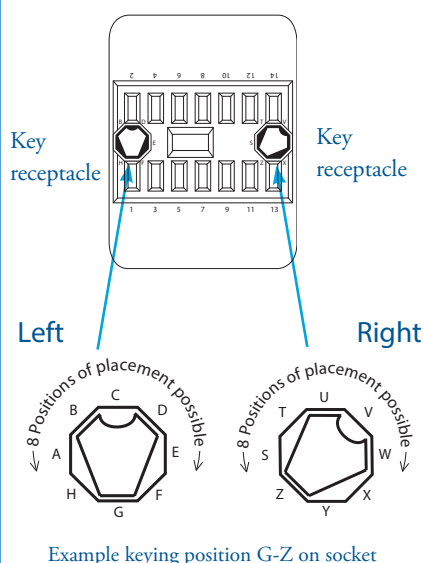
- To prevent wrong installation
- To prevent damage to equipment
- To prevent unsafe situations

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.

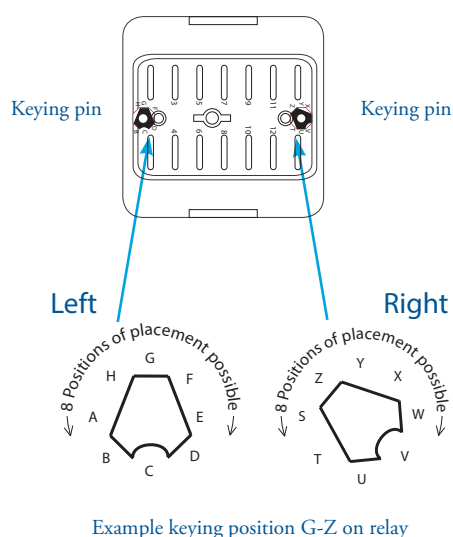
The D-relay socket keying option gives $8 \times 8 = 64$ possibilities. Upon ordering the customer simply indicates the need for the optional keying. Mors Smitt will assign a code to the relay and fix the pins into the relay. The sockets are supplied with loose key receptacles. Inserting the keys into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

Remark: Sockets and relay shown are only examples.

Top view socket



Bottom view relay



FDA-U300 relay

Instructions

Installation, operation & inspection

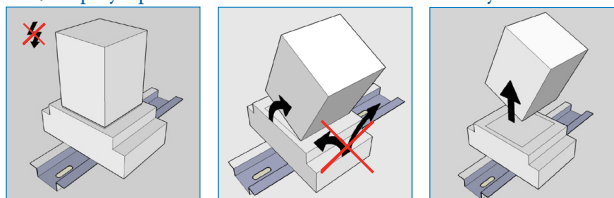
Installation

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 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 ($\leq 15 \text{ m}\Omega$ 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. In general a contact resistance of 1Ω 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

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 re soldering 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 over voltage, 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.



FDA-U300 relay

Ordering scheme



1. Relay model

2. Coil voltage

3. Options

4. Pulse time

This example represents a **FDA-U301-C 40-120**

Description: FDA-U300 relay, U_{nom} : 24 VAC, low temperature, 40-120 imp/min

1. Relay model

FDA - U3

2. Coil voltages

01	24 VAC, 50/60 Hz
03	220 VAC, 50/60 Hz
05	110 VAC, 50/60 Hz

3. Options

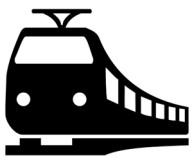
C	Low temp. (-40 °C)
K	Dust protection, IP50

Upon ordering indicate keying if necessary.

4. Pulse time

20-60 imp/min
40-120 imp/min
or fixed (no knob)





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