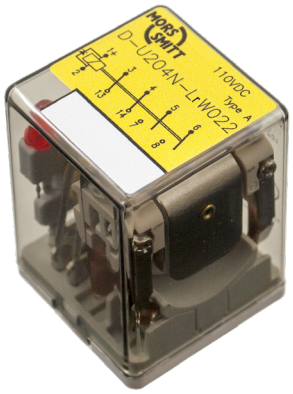
/// Instantaneous railway relay with 4 contacts

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

D-U200N-W

Instantaneous relay, weld-no-transfer

Part of D-platform



Features

- Ultra compact safety critical relay
- 4 Weld-no-transfer contacts, self-cleaning
- Integrated back EMF suppression diode
- Magnetic arc blow-out ensuring long contact life
- Minimum switching current 1 mA
- Maximum continuous current 10 A
- Proven reliable
- Wide temperature range -50 ºC...+85 ºC
- Mechanical life > 50 million operations
- Electrical life e.g. > 10 million operations at 0.5 A, 24 VDC
- Data matrix with serial number for traceability
- Integrated snaplock, no external retaining clip needed
- Transparent cover for visual inspection
- Red or green LED optional
- Many options and sockets available

Description

The D-U200N-W is the improved version of the famous D-U200-W 4-pole instantaneous safety critical relay.

The dimensions, pinning and specifications are identical but it is much more reliable switching very low currents (1 mA @ 5 VDC). It is therefore the perfect relay to switch mixed loads.

Weld-no-transfer contacts are standard. The built-in magnetic arc blow-out ensures adequate DC breaking capacity resulting in long contact life and the now integrated contact separation prevents cross pollution of contacts better.

The operating temperature range is now -50 to + 85 Celsius. The IP40 dust ingress protection offers adequate protection allowing the relay to “breath” ensuring long life whilst switching higher DC and inductive loads. The back EMF coil protection diode comes standard with the D-U200N-W series. The information on the relay cover is extended with serial no. and data matrix code for ease of traceability.

The mechanical design and construction of the D-U200N-W relay is so rugged that it is fit to last in salt laden atmospheres, low and high temperatures, very dry and very high humidity, shock and vibrations and high altitudes.

Several operators use this relay since the 1970’s and without a single incident. Indeed proven reliable and designed to survive train life!

The ultra-compact design, light weight, many options and the wide choice of sockets makes this the most flexible solution and preferred choice of many customers.

Application

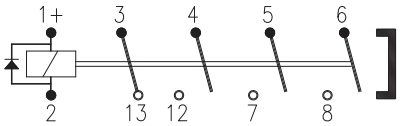
Relays keep on playing a vital role in reliable train operation. A key function is galvanic isolation between control (computers/ PLC’s) and power circuits providing isolation between systems, contact multiplication and amplification.

Other unique features are predictable failure behavior (Fail Safe) making system safety validation a lot more simple than using computer based solutions like PLC’s, long term availability = no obsolescence and easy maintenance by plug-in feature and transparent cover. Unlike more sensitive electronics relays are insensitive to EMI.

Using these features one can build a hardwired, fail safe control system which is cyber security safe and insensitive to electro magnetic disturbances and surges! Relays are ideal to use in trains for signal transfer/repeat, safety interlocking functions (brake - doors), load on-off switching and sub-system isolation.

Connection diagram

6 different contact combinations possible (see page 3)



D-U200N-W013 relay contact combination 1 N/C 3 N/O

Railway compliancy

EN 50155: 2017
IEC 60571: 2012
IEC 60077-1: 2017
IEC 60947-5-1: 2016
IEC 61373: 2010
EN 50121-3-2: 2016
EN 45545-2: 2015
NF F16-101/102
IEC 60947-5-4: 2002
IEC 61810-3

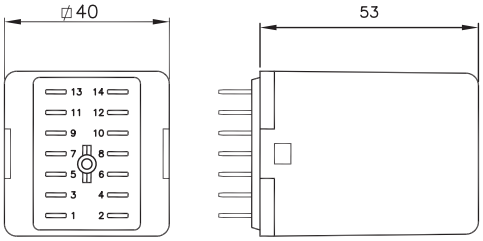
Instantaneous relay
D-U200N-W

Options

- IP50 dust protection
- Red or green LED coil indicator
- Bipolar LED indicator
- 4 gold plated contacts
- 4 $AgSnO_2$ contacts, weld resistant to capacitive loads
- Polarisation diode
- Double zener diode
- Coil for both AC and DC
- Double make / double break contacts
- No diode
- Keying (coding relay to connect socket)

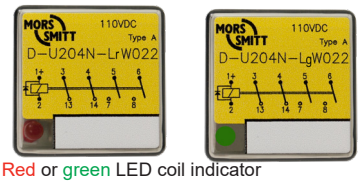
Remark: Not all combinations possible

Dimensions (mm)



Weight

~ 140 g



Red or green LED coil indicator

Serializing

Each relay is marked with a unique serial number to which all important production information and test results are linked. The GTIN (Global Trade Item Number) and part number is printed on each relay in both text and data matrix code according the worldwide recognized GS1 standard, being able to scan each relay for logistical and traceability purposes.

Sockets

		Mounting			
		Surface / Wall	35 mm rail	Panel / Flush	PCB
Terminal connection	Screw	V23	V23	-	-
	Screw - wide terminals	V22 BR	V23 BR	-	-
	Spring clamp	V29	V29	V33	-
	Faston	-	-	V31	-
	Crimp	-	-	V26	-
	Solder tag	-	-	V3	-
	PCB	-	-	-	V32

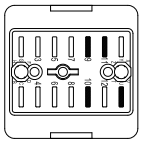
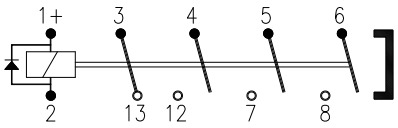
For more information see the respective datasheets

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

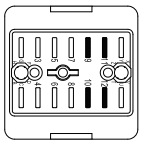
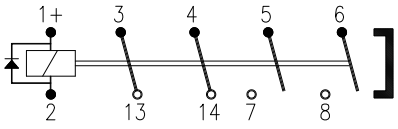
Technical specifications

Connection diagram

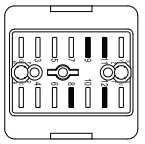
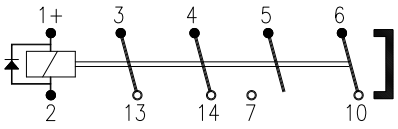
Bottom view relay

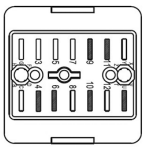
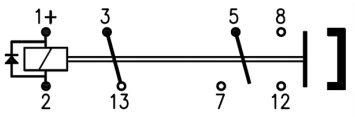
D-U200N-W013
relay contact combination 1 N/C 3 N/O

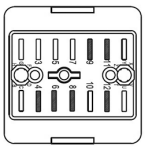
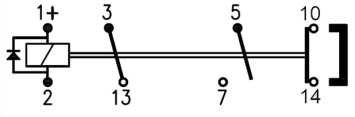
D-U200N-W022
relay contact combination 2 N/C 2 N/O

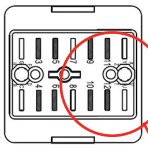
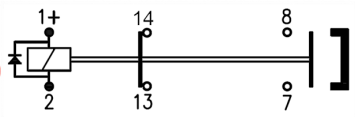
D-U200N-W031
relay contact combination 3 N/C 1 N/O

D-U200N-W012Y
relay contact combination 1 N/C 1 N/O
1 N/O double make

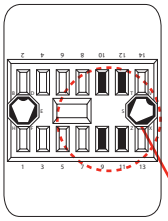



D-U200N-W021Y
relay contact combination 1 N/C 1 N/O
1 N/C double break

D-U200N-W011Y
relay contact combination 1 N/C double break
1 N/O double make

No relay pins at the black marked pin positions.



Mechanical keying

At the black marked positions the holes in the socket are blocked, so no relay pin can enter.
Only correct contact configuration of the D-U200N-W0XX model will fit.

Top view socket

Example: for relay D-U204N-W013 code AV use socket V23 code AV013

Additional standard keying see page 11

Technical specifications

Instantaneous relay
D-U200N-W

Coil characteristics

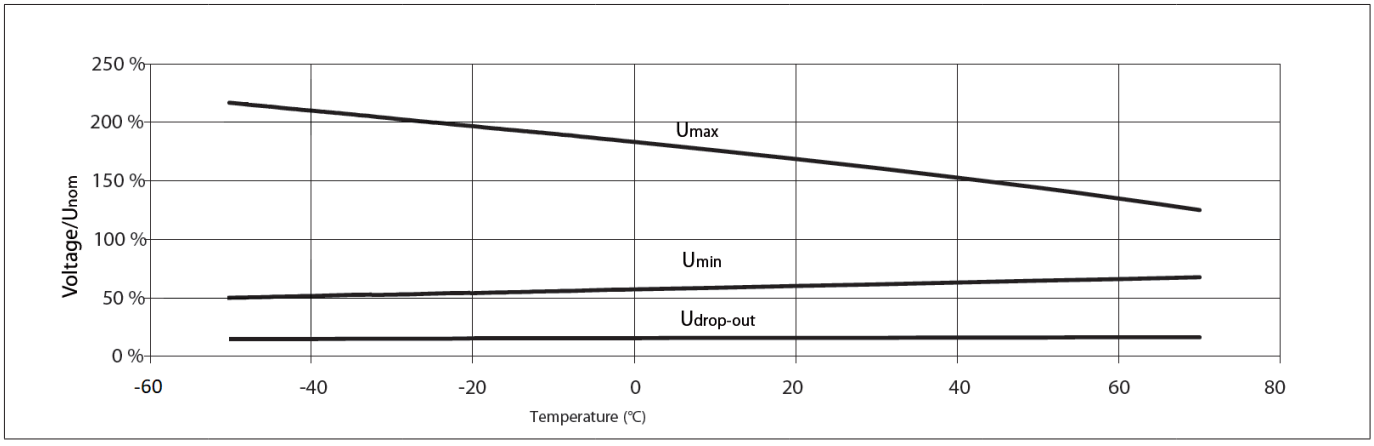
Inductance L/R at Unom (typical value):		
Energized		11 ms
Released		8 ms
Nominal power consumption		2.2 W @ Unom
Operating voltage range	EN 50155	0.7 - 1.25 Unom
DC power supply fluctuation range	EN 50155	0.6 - 1.4 Unom
Interruptions of power supply voltage	EN 50155	Class S2 (10 ms)

Type	U_{nom} (VDC)	U_{min} (VDC)	U_{max} (VDC)	$U_{drop-out}$ (VDC)	R_{coil} * (Ω)	$I_{coil-nom}$ (mA)
D-U201N-W	24	16.8	30	2.4	270	89
D-U202N-W	48	33.6	60	4.8	1046	46
D-U203N-W	72	50.4	90	7.2	2406	30
D-U204N-W	110	77	137.5	11	5330	21
D-U205N-W	96	67.2	120	9.6	4150	23
D-U206N-W	12	8.4	15	1.2	72	167
D-U207N-W	36	25.2	45	3.6	562	64
D-U208N-W	55	38.5	69	5.5	1300	42
D-U210N-W	120	84	150	12	6160	19
D-U213N-W	125	87.5	156.25	12.5	7634	16
D-U215N-W	220	154	275	22	21776	10
D-U220N-W	250	175	312.5	25	23850	10

Other types on request
* The Rcoil is measured at room temperature and has a tolerance of ± 10%, with option L (LED) the value can differ

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
- Udrop-out is the must-release voltage at which the relay has dropped-out in all circumstances (worst-case situation), in practice the relay drops out at a higher voltage
- Always select the nominal voltage as close as possible to the actual voltage in the application

Operating range at various temperatures

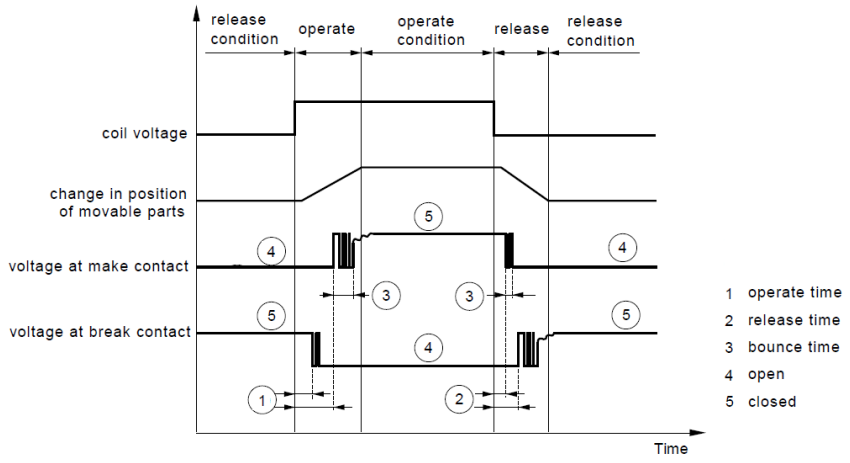


Contact characteristics

Contact configuration	4 N/O - N/C
Peak inrush current NF F 62-002	200 A (withstand > 10 x 200 A @ 10 ms, 1 min) 80 A (withstand > 10 x 80 A @ 200 ms, 1 min) 40 A (withstand > 10 x 40 A @ 500 ms, 1 min) 30 A (withstand > 10 x 30 A @ 1000 ms, 1 min)
Continuous current	10 A
Maximum switching voltage	250 VDC, 440 VAC
Minimum switching voltage*	5 V
Minimum switching current*	1 mA
Maximum breaking capacity (> 50.000 operations)	110 VDC, 10 A (resistive load) 72 VDC, 5 A (L/R ≤ 40 ms) 110 VDC, 0.5 A (L/R ≤ 40 ms)
Contact resistance	15 mΩ (initial)
Material	Ag standard (optional $AgSnO_2$, Au on Ag)
Contact gap	≥ 1.5 mm
Contact force	> 200 mN

* Standard silver contacts tested in lab conditions. We strongly advice to always use gold plated contacts when switching very low currents, as long time reliable operation depends also on switching frequency and environmental conditions. Take recommendations for long time reliability on page 12 into account.

Operating times (ms) at nominal voltage (typical value)	
Operate time	22
Release time	40
Bounce time N/O contacts	10
Bounce time N/C contacts	20



Contact reliability according IEC 60947-5-4

Contact switching load	Contact material	Failure rate λ_c*	Mean number of operating cycles to contact failure m_c*
1 mA, 5 VDC resistive	Gold (option E)	$5x10^{-8}$	20.000.000
5 mA, 24 VDC resistive	Gold (option E)	$4x10^{-8}$	25.000.000
10 mA, 50 VDC resistive	Silver (standard)	$2x10^{-8}$	50.000.000

*at confidence level 90%

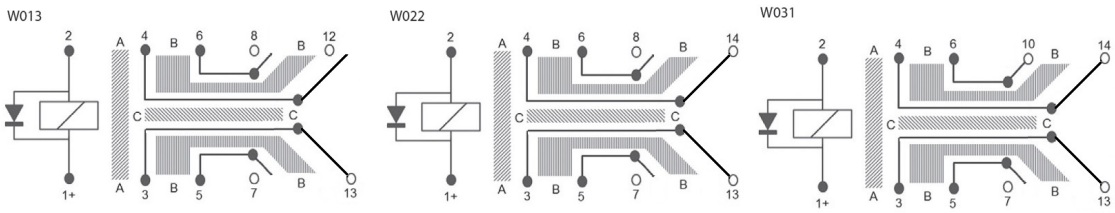
Note: tested in factory environment at ambient temperature 20 ºC. To underline the reliability of low current switching with the new D-U200N-W relay in parallel a 1 mA / 5 V test was done using standard silver contacts. The result was the same reliability. But since real train conditions are far different from Lab conditions we always recommend gold contacts for such low contact ratings.

Instantaneous relay
D-U200N-W

Electrical characteristics

Dielectric strength	Pole-pole Cont-coil Open contacts	4 kV, 50 Hz, 1 min 2.5 kV, 50 Hz, 1 min 2.5 kV; 50 Hz; 1 min

Clearance and creepage according IEC 60664-1 / EN 50124-2



Section	Clearance	Creepage	Material group	Unom*
A	≥ 2.2 mm	≥ 3.0 mm	I (CTI600)	≤ 220 V
B	≥ 3.0 mm	≥ 3.0 mm	I (CTI600)	≤ 300 V
C	≥ 6.1 mm	≥ 6.1 mm	I (CTI600)	≤ 696 V

*For basic insulation, PD2 and OV3

Pulse withstanding	IEC 60255-5	5 kV (1.2/50 µs)
Insulation resistance	EN 50155	> 20 MΩ (test voltage 500 VDC)

Environmental characteristics

Vibration	IEC 61373, Category I, Class B, Body mounted
Shock	IEC 61373, Category I, Class B, Body mounted
Operating temperature	-50 °C...+85 °C (+70 °C according EN 50155)
Operating temperature class	OT4 (tested with -50 °C instead of -40 °C)
Humidity	98%
Maximum altitude	2000 meter. Higher altitudes are possible but have consequences mentioned in IEC 60664 (for example 5000 meter with bigger clearance distance)
Salt mist	IEC 60068-2-11, class ST4
Dry heat	IEC 60068-2-2 test Be
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 F 16-102, EN 45545-2: HL3 for requirements R22, R23, R26
Insulation materials	Cover: polycarbonate Base: nylon
Natural cooling or forced ventilation constraints for the equipment	None: no extra measures necessary, relays can be mounted tightly together to save space
REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals	European Regulation No 1907/2006

Instantaneous relay
D-U200N-W

RAMS features

Life class	L4 (Useful life 20 years, take electrical life cycle curves into account)
Repairability	Non-repairable
Maintenance instructions	See inspection/maintenance on page 12
Reliability / lifetime Mechanical lifetime Low energy electrical lifetime High energy electrical lifetime	 > 50 million operations, maximum switching frequency 1 Hz (1 million operations at -50 °C) 5 million operations, maximum switching frequency 1 Hz See electrical life expectancy on page 9
Storage precautions	Storage temperature: -50 °C … +85 °C Store in original packaging

Product labeling

Part number identification	Part number mentioned on top side relay
Serial number identification	Serial number mentioned on top side relay Serial number = Lot number + year + week + reference number
Data matrix code	According GS1 standard, placed on top side relay 01 Global Trade Item Number 240 Part number 21 Serial number Example: 01123456789012324012345678921 1234562209001
Revision index identification	Linked to serial number
Terminals	Identification on bottom plate relay Relay to be used with Mors Smitt relay sockets which have clear terminal identification on each socket

Railway compliancy

EN 50155: 2017	Railway applications - Rolling stock - Electronic equipment
IEC 60571: 2012	Railway applications - Electronic equipment used on rolling stock
IEC 60077-1: 2017	Railway applications - Electric equipment for rolling stock
IEC 60947-5-1: 2016 / IEC 60947-5-4: 2012	Low-voltage switchgear and controlgear
IEC 61373: 2010	Railway applications - Rolling stock equipment - Shock and vibration tests
EN 50121-3-2: 2016	Railway applications - Electromagnetic compatibility
NF F16-101/102	Railway rolling stock - Fire behavior
EN 45545-2: 2015	Railway applications - Fire protection on railway vehicles Part 2: Requirements for fire behavior of materials and components

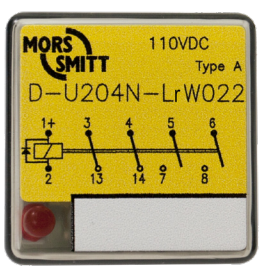
Instantaneous relay
D-U200N-W

Options

Code	Description	Remark	Cannot be combined with:
Standard options:			
E*	Au; Gold plated contacts		M
K	Extra dust protection	IP50 Cat 2 for the relays mounted in a Mors Smitt socket. Application PD1/PD2 and contact load > 0.5 A.	
Lg**	Green LED integrated in coil	For 24/72/110 VDC. (Other voltages on request)	X, X2
Lr**	Red LED integrated in coil		X, X2
Q	Double zener diode over coil	Unom ≤ 120 V. Maximum allowed peak voltage 180 V, higher voltage will damage the diode. Replaces back EMF diode.	X2, Z
Y	Double make/double break contacts, contact gap 3.0 mm	6 different contact combinations, see page 3	
Z	No diode	Polarity independent	P, Q, X2
Keying	Coil coding relay and socket		
Special options:			
M	$AgSnO_2$; “non-weldable” contacts	Icontact > 100 mA	E
P	Polarisation diode		X, X2, Z
X	Bipolar LED	Only in combination with Q or Z	Lr/Lg, P, X2
X2	AC/DC rectifier bridge	Replaces back EMF diode. Unom must be minimal 24 V.	Lr/Lg, P, Q, X, Z

* Gold plated contacts characteristics	
Material	Ag, 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
** LED in series with coil: besides ON/OFF information also indicator when relay coil wire is broken, then LED always OFF. When LED is broken the relay still works correct.	

Remark: For application support or technical product support, contact your local Mors Smitt sales office (see contact details on last page).



Electrical life expectancy

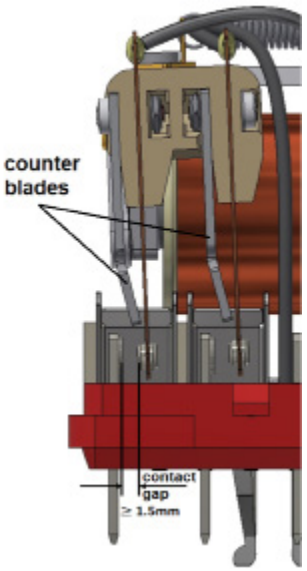
Due to the safety nature of the D-U200N-W relays, please contact Mors smitt with detailed contact load data. With this information, Mors Smitt can provide a correct advice in line with your specific application.

Required contact data:
- Voltage
- Current
- Inductance of load
- Kind of suppression used on load
- Required number of operations
- Switching frequency

Weld-no-transfer

The most obvious difference to standard relays is the so called forcibly guided contacts. The minimum requirement for such a relay is that it consists of at least one N/C contact and one N/O contact. The contacts are mechanically linked, so that N/O and N/C contacts can never be closed at the same time.

Weld-no-transfer (forcibly guided) contacts make it impossible to close the normally closed and normally open contact simultaneously. If a normally closed contact becomes welded, it is impossible for the normally open contacts to close when the coil is energized. If a normally open contact becomes welded, it is impossible for the normally closed contacts to close when the coil is de-energized.



If a contact welds, a guide (counter blades) stops movement of the contact block to ensure other contacts cannot close.

Weld-no-transfer relays are the connecting link between the load and monitoring circuits; they act as a monitoring element in electronics for functional safety.

Weld-no-contact feature is primarily required for safety circuits and redundant control systems. With a forcibly guided relay its welding state can be detected and allows determination by the control circuit if contacts are welded together.

When the N/O contact carries the load, a N/C contact can be used as monitoring contact. The monitoring contact will not close when the N/O contact is welded.

The D-U200N-Wxxx relay with weld-no-transfer contacts complies to the standards NF F62-002 (§12.3.10) and meets the technical requirements listed in the IEC 61810-3 standard as described below.

Testing according to NF F62002 §12.3.10:
- With one N/C contact kept closed, none of the N/O contacts may close a test circuit of 10 mA @ 220 V 50 Hz when the coil is energized with 150 % of the maximum specified coil voltage (= 150 % * 125 % U_{nom} = 188 % U_{nom}). The other N/C contacts may open.
- With one N/O contact kept closed, none of the N/C contacts may close a test circuit of 10 mA @ 220 V 50 Hz when the coil is de-energized. The other N/O contacts may open.

Testing according to IEC 61810-3:
- If one N/C contact fails to open, all N/O contacts must maintain a contact gap ≥ 0.5 mm when the coil is energized with the maximum energizing quantity which can occur under worst case conditions:
  - maximum coil voltage
  - minimum ambient temperature
  - minimum coil resistance
- If one N/O contact fails to open, all N/C contacts must maintain a contact gap ≥ 0.5 mm when the coil is de-energized
- All tests must be performed under worst case conditions
- Above requirements apply throughout the specified endurance and under reasonable foreseeable single failure conditions
- Failure mode and effect analysis (FMEA) has been performed to verify the design

Safety related application condition
In case the relays are used in safety relevant application conditions the relays shall be used in applications where the contacts are read back within a two channel safety structure.

Instantaneous relay
D-U200N-W

Mounting possibilities/sockets

 V3	 V22BR	 V23	 V23BR	 V26
 V29	 V31	 V32	 V33	

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 (4.8 x 0.8 mm)
338000670	V33	Push-in terminal socket, panel mount, rear dual connection (3.3 mm^2)

PCB mounting

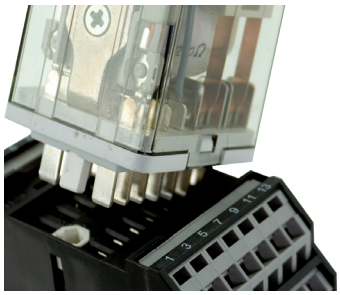
338000561	V32	PCB soldering socket

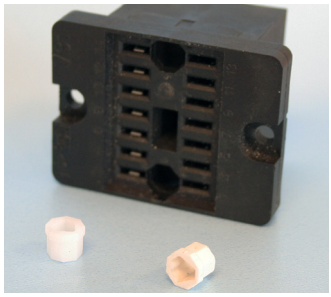
No external retaining clip needed as the ‘snap-lock’ will hold the relay into the socket under all circumstances and mounting directions (according shock & vibration requirements IEC 61373, Category I, Class B, Body mounted). If regulations require external retaining clips, these are available as well.

For more details see datasheets of the sockets on www.morssmitt.com

Instantaneous relay
D-U200N-W

Mechanical keying relay and socket (optional)





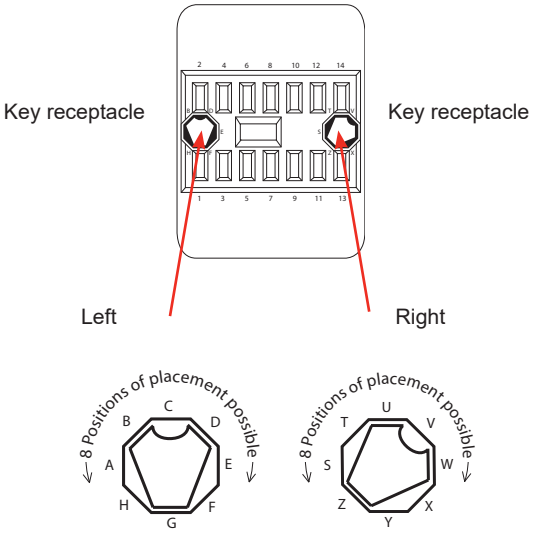
Function:
- To prevent wrong installation
- To prevent damage to equipment
- To prevent unsafe situations

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.

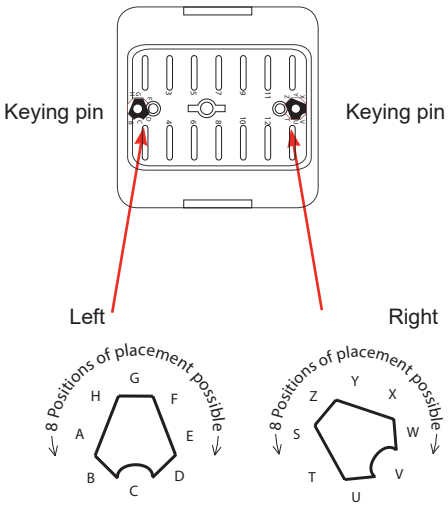
Remark: Sockets and relay shown are examples.

Top view socket



Example keying position G-Z on socket

Bottom view relay



Example keying position G-Z on relay

Instantaneous relay
D-U200N-W

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.

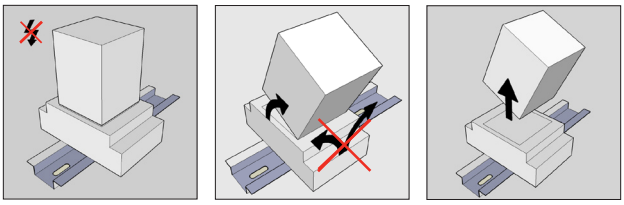
Therefore for long time contact reliability we recommend:
- Silver contacts: a minimum contact current of 20 mA per contact
- Gold contacts: a minimum contact current of 10 mA per contact
- Double Make Double Break contacts: a minimum contact current of 40 mA per contact
- When low currents are switched 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. 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 (likely caused by reversed 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

Instantaneous relay
D-U200N-W

Ordering scheme

D-U2 [ ] N - [ ] [ ] Code [ ]					
Coil voltages	01				24 VDC
	02				48 VDC
	03				72 VDC
	04				110 VDC
	05				96 VDC
	06				12 VDC
	07				36 VDC
	08				55 VDC
	10				120 VDC
	13				125 VDC
	15				220 VDC
	20				250 VDC
Options (add as many options as needed, always in alphabetical order)		E			Gold plated contacts
		K			Extra dust protection, IP50
		Lg			Green LED coil indicator
		Lr			Red LED coil indicator
		Q			Double zener diode
		Y			Double make/ double break
		Z			No diode
Special options (minimum order quantity: 20)		M			$AgSnO_2$ contacts, highly resistant to welding
		P			Polarisation diode
		X			Bipolar LED
		X2			Coil for both DC and AC
Contact information			W013		Weld-no-transfer, 1 N/C - 3 N/O
			W022		Weld-no-transfer, 2 N/C - 2 N/O
			W031		Weld-no-transfer, 3 N/C - 1 N/O
			W012Y		Weld-no-transfer, 1 N/C - 1 N/O - 1 N/O double make
			W021Y		Weld-no-transfer, 1 N/C - 1 N/O - 1 N/C double break
			W011Y		Weld-no-transfer, 1 N/C double break - 1 N/O double make
Keying code (optional, leave blank if not required)					**Standard, silver contacts**
				AS	24 VDC
				AY	36 VDC
				AT	48 VDC
				AU	72 VDC
				AV	110 VDC
					Option E, gold contacts
				DT	24 VDC
				FV	36 VDC
				HU	48 VDC
				AZ	72 VDC
				HV	110 VDC
					Option M, silver tin oxide contacts
				GT	24 VDC
				HT	36 VDC
				GU	48 VDC
				GV	72 VDC
				GW	110 VDC

Cannot be combined with:
M
X, X2
X, X2
X2, Z
P, Q, X2
E
X, X2, Z
Lg/Lr, P, X2
Lg/Lr, P, Q, X, Z

Remark: keying codes are available for all possible coil voltages.

Ordering scheme - examples

Options always in alphabetical order.

Examples:
D-U204N-LgW013 code AV
Description: D-U200N-W relay, Unom 110 VDC, green LED coil indicator, weld-no-transfer 1 N/C - 3 N/O contacts, keying code AV

D-U201N-EKLrW022
Description: D-U200N-W relay, Unom 24 VDC, gold plated contacts, extra dust protection, red LED coil indicator, weld-no-transfer 2 N/C - 2 N/O contacts

Over 11 million Mors Smitt relays in use in rail transport applications worldwide!

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