Control Solutions

LÜTZE Relays

LCIS Mechanical Series

LCIS Solid State Series

Microplug Series

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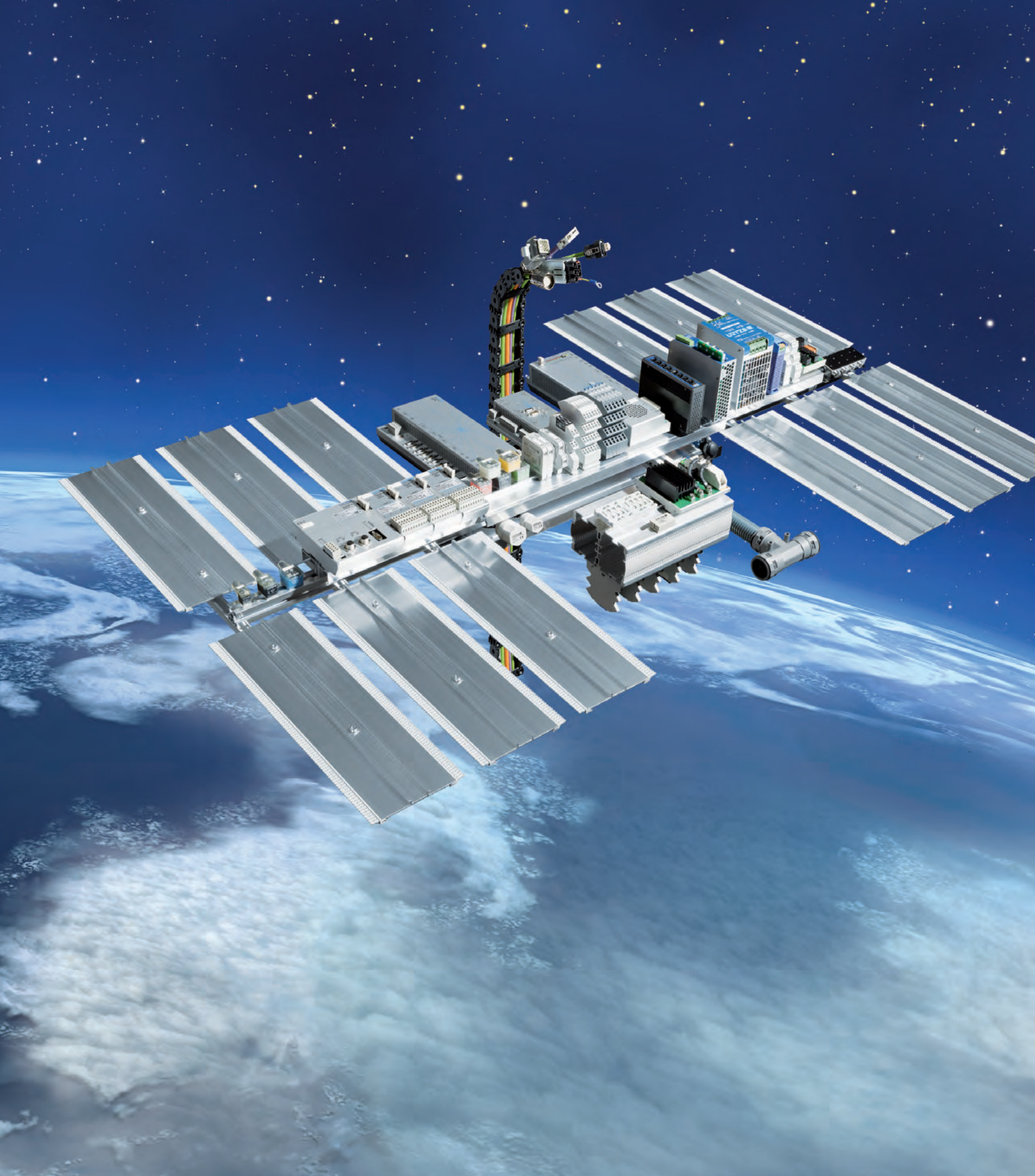
Efficiency in Automation

Cable • Connectivity • Cabinet • Control



Welcome to LÜTZE

Cable Solutions

Connectivity Solutions

Cabinet Solutions

Control Solutions

Transportation Solutions

LÜTZE - Efficiency in Automation

A tradition in automation for over 60 years, with countless pioneering achievements and patents, the international LÜTZE Group is today one of the leading companies in the automation industry. LÜTZE supplies very efficient electronic and electrotechnical components, system solutions for automation and high tech for rail engineering.

The comprehensive and coordinated supply program ranges from highly flexible cables and pre-fabricated cables, to energy efficient *Air***STREAM** wiring systems for control cabinets through to intelligent Industry 4.0 solutions from the fields of interface technology, current monitoring, power supply and Ethernet infrastructure.

The Lütze Group has sales companies throughout Europe, Asia and the USA and numerous sales partners across the world to provide global product availability and service to our customers in all markets.

LÜTZE is one of the leading suppliers in the rail technology field. LÜTZE transportation solutions are installed in numerous locomotives, city rail and underground rail systems, as well as high-speed trains across the world.

LÜTZE®

SYSTEMATIC TECHNOLOGY

Business Management:
Sustainable and forwa

The future is blue

Sustainable enterprise means thinking and planning ahead, understanding and embedding the belief that long lasting success is more important than short-term profit maximisation.

This is an attitude that has existed within LÜTZE for quite some time. Economic and environmental responsibilities complement each other well and are reflected in the sustainable management and product policy - and from now in the *Sky***BLUE** campaign.

We manufacture our products in a resourceful and energy-conscious manner. We use long lasting, environmentally-friendly materials. And our products, in turn, help our customers save energy and resources.
Good for everyone: for us, for the environment, for our customers a win-win-win situation.

SkyBLUE

:
ard-looking

„The competitiveness of our industry and of its suppliers depends quite substantially on how we succeed in developing practical results. The results that we produce together today, are our competitive advantages in the future.“
Udo LÜTZE,
Member of the Executive Committee of the Green Carbody Innovation Alliance

Goods with real value

The value of a product or a solution from LÜTZE is determined by its sustainable qualities as well. Every innovation is only as successful in the future if it has a long-term positive effect. Therefore, we provide long lasting as well as highly efficient components.
We are incorporating the necessary knowledge and manufacturing competence in numerous joint projects with the objective of improving energy efficiency and sustainable technologies and industries. Thus, LÜTZE provides answers and demonstrates how to handle resources responsibly, with our environment and our future in mind.

Innovations-Allianz Green Carbody Technologies

BLUECOMPETENCE Alliance Member
Partner of the Engineering Industry Sustainability Initiative

RoHS

What moves us:
Quality, innovation, effi

The people at LÜTZE

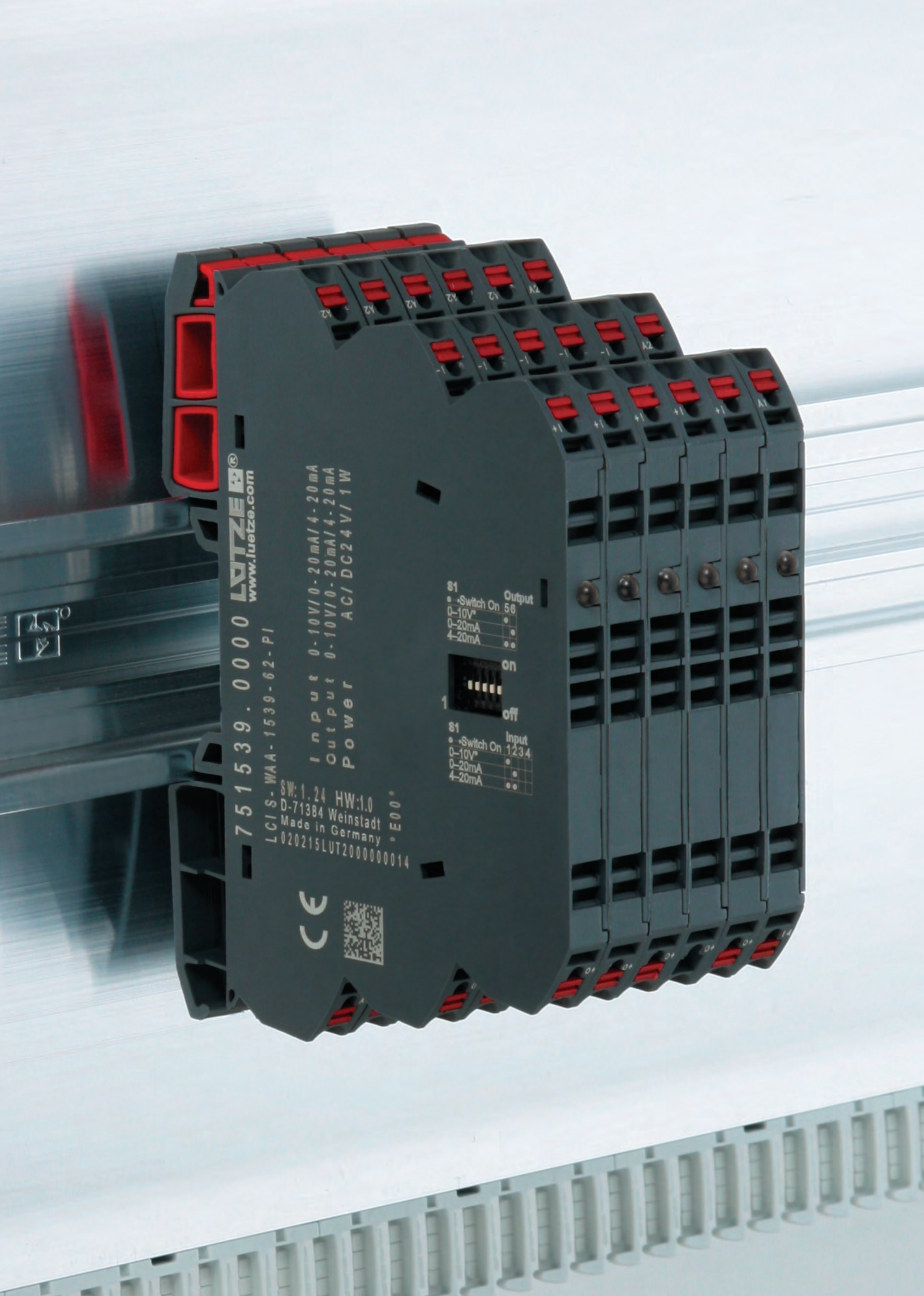
Quality, innovation and efficiency begin with people. We would not be where we are today without our highly qualified and motivated employees. An uncompromising focus on quality, nearly 60 years of experience in automation technology and of course a common desire for greater innovation and efficiency – that's what makes LÜTZE so successful.

The people at LÜTZE are familiar with automation applications and technologies across all disciplines, as they are involved with our broad range of products comprising four product areas Cable, Connectivity, Cabinet and Control.

ficiency

A prime example of competence in cables: In addition to manufacturing expertise, our cable assembly specialists are familiar with all cable types and offer genuine added value. The decisive advantage: We're cable experts – since 1958.

LÜTZE SUPERFLEX®
connected


LÜTZE
www.luetze.com
751539.0000
LCIS-WAA-1539-62-PI
Input 0-10V/0-20mA/4-20mA
Output 0-10V/0-20mA/4-20mA
Power AC/DC24V/1W
SW:1.24 HW:1.0
D-71384 Weinstadt
Made in Germany
020215LUT2000000014
S1
Switch On
Output
56
0–10V*
0–20mA
4–20mA
on
off
Input
1234

Interface Technology • Product Overview

LCIS

Output relay, 1 changeover contact / SPDT, pluggable, $AgSnO_2$

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Output relay, 1 changeover contact / SPDT, pluggable, $AgSnO_2$ + 5 µm HV

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Output relay, 1 changeover contact / SPDT, $AgSnO_2$

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Output relay, 1 changeover contact / SPDT, $AgSnO_2$, + 5 µm HV

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Input-relay, 1 changeover contact / SPDT, $AgSnO_2$

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Input-relay, 1 changeover contact / SPDT, $AgSnO_2$, + 5 µm HV

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Solid state relay, 2-conductor technology

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Solid state relay, 2-conductor technology, pluggable

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Solid state relay, 3-conductor technology

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Solid state relay, 3-conductor technology, automatic manual-off

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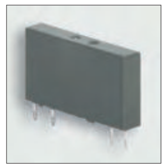

Replacement relay, 1 changeover contact / SPDT

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Labeling system

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Insulated jumper combs

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Microplug

Relay socket for mini and industrial relay

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Pluggable microplug protection modules

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Mini relay, 1 changeover contact / SPDT, AgNi

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Mini relay, 2 changeover contacts / DPDT, AgNi, AgNi+5 µm HV

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Industrial relay, 4 changeover contacts / 4PDT, AgNi, AgNi+5 µm HV

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DC relay, 1 changeover contact / SPDT, pluggable, AgNi

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DC relay, 2 changeover contacts / DPDT, pluggable, AgNi, AgNi +5 µm HV

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DC relay, 2 changeover contacts / DPDT, pluggable, AgNi

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DC relay, 4 changeover contacts / 4PDT, pluggable, AgNi, AgNi +5 µm HV

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Compact, simple, function
LCIS: LÜTZE Compact Interfa

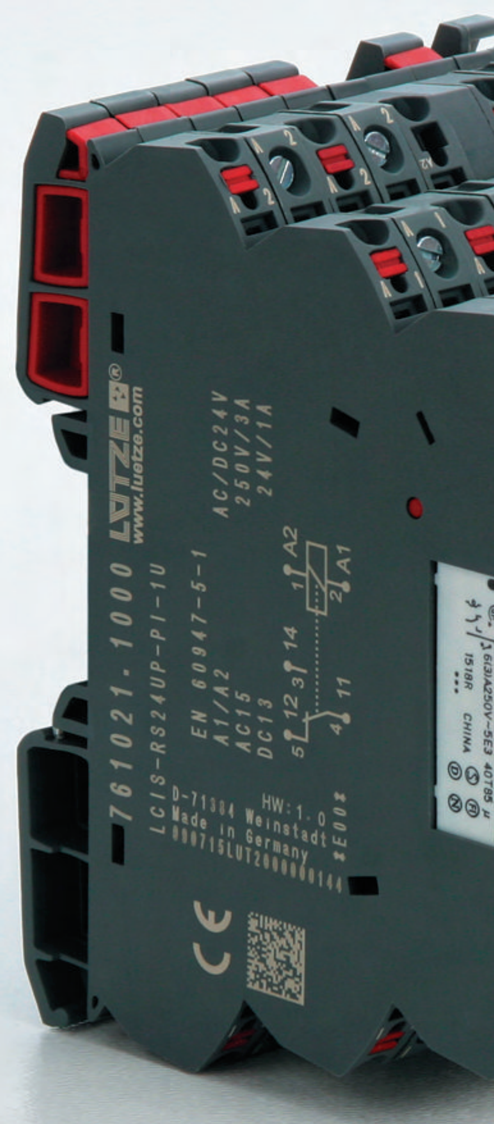
Compact
With the very low housing depth of just 71mm, LCIS devices can be used in low depth distribution enclosures.

Device coding
Each device can be individuality labeled between 15 to 24 characters, depending on label type.

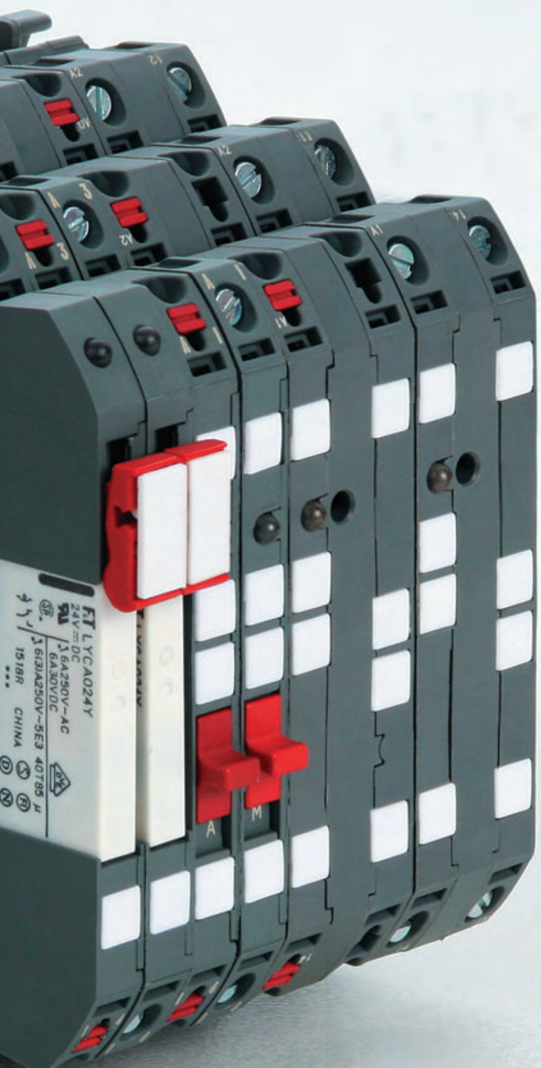
Terminal point coding
All individual termination markings are clearly visible for ease of accuracy and for simplified wiring.

Simplified installation
Features like isolated jumper connections and multiple number of pole options simplify installation.

Environmental conditions
Temperature ratings ranging between -40° to +85°C and flammability approvals like UL94 V0 and NFF I2/F2 provide installation options for harsh environments.



n al and innovative:
a ce Solutions



Universal connection technology
Available in two options: push-in or screw termination.

Universal Mounting
The innovative symmetrical housing design and mounting clip allow for an input or output configuration in the same unit.

Labeling
The laser printer label design provides a clean, permanent professional marking appearance.

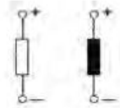
Push-In test socket
A 2mm Push-In test socket on all units provides a quick and convenient method for testing equipment measurements.

Product Range and Beyond
Our mechanical and solid state relays offer isolation voltage ranges up to 4kV. Features which are possible with LCIS!

Approvals
Worldwide approvals like UL and GL allow for use in global applications.

Relays - Terminology

Coil (also referred to as exciter coil)

Monostable relay		Bistable relay with 1 coil	Bistable relay with 2 coils	
non-polarized	polarized		4 connections	3 connections
 or 				 or 

1. Switching characteristic
Black coils represent the excited state. In schematic drawings, the coil polarity for bistable relays is generally specified for the reset state. This applies to both coils.

2. Coil nominal voltage
This is the voltage provided to excite the coil, due to the design.

3. Rated operating current
This is the current that flows through the coil at nominal voltage.

4. Rated operating power
This is the power consumed in the coil at nominal voltage. In case of direct current, this value is indicated in watts; for alternating current, it is indicated in volt-amperes. Rated power (W or VA) = rated current x nominal voltage.

5. Coil resistance
This is the coil's resistance in the direct current relay at the temperature indicated in the catalogue. (Please note that the coil resistance for some relays deviates from the normal ambient temperature of 20°C.)

6. Response voltage
This is the voltage at which all contacts switch to their active operating state.

7. Drop-out voltage
This is the voltage at which all contacts return to their idle state.

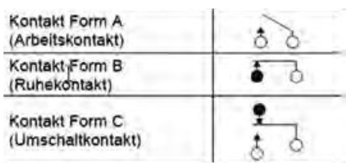
8. Maximum continuous voltage
This is the voltage that can be constantly applied to the coil without causing any damage. Short-term spikes of a higher voltage can be permitted.

Contacts

1. Contact types

The contact type identifies the contact mechanism.

2. Contact symbols



Form A contacts are also called N.O. (normally open) contacts, make contacts or closed-circuit contacts. Form B contacts are also called N.C. (normally closed) contacts, break contacts or open-circuit contacts. Form C contacts are also called changeover contacts or switch contacts.

3. MBB contacts

Abbreviation for uninterrupted switch contacts or series switch contacts (MBB = make before break). This is a contact mechanism in which the make contacts close before the break contacts open.

4. Rated switching capacity

The rated switching capacity is the power in watts (direct current) or volt-amperes (alternating current) which, depending on design, can be safely switched from the contacts. Its value results from multiplying the switching voltage by the switching current and is less than the product of maximum voltage and maximum current.

5. Maximum switching voltage

The max. switching voltage is the highest voltage that can be safely switched from the contacts. In most cases, the value differs for direct current and alternating current.

6. Maximum switching current

The maximum switching current is the highest current level that can be safely switched from the contacts. Maximum alternating current and maximum direct current can differ from one another.

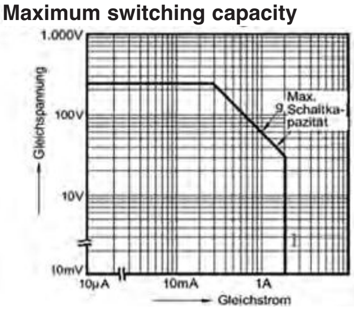
7. Max. switching capacity

The maximum switching capacity is the highest power level that can be switched from the contacts. The maximum switching capacity should not be exceeded.

8. Maximum switching capacity

The maximum switching capacity is indicated as the maximum value of contact capacity for each relay and represents a correlation between the maximum switching capacity, the maximum switching voltage and the maximum switching current. The switching current and switching voltage are indicated in a diagram. If, for example, the switching voltage is defined in a specific application, the maximum switching current can be found on the axis through the maximum switching capacity.

Maximum switching capacity



Example: when using a relay with a switching voltage of 60 V DC, the maximum switching current amounts to 1 A. (The maximum switching capacity is indicated as ohm resistive load. Check the momentary load prior to use.)

9. Minimum switching capacity

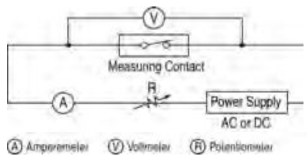
The minimum switching capacity refers to the minimum values of voltage and current that can reliably be switched from the contacts. These values are different depending on the relay type. These minimum values are influenced by the switching frequency, the ambient conditions and the contact friction travel. For low-level loads or a contact resistance of max. 100 mΩ, contact our authorized personnel.

10. Contact resistance

Is indicated as total resistance from the resistance of the contacts and the resistance of the connections and contact springs. The contact resistance is measured using the voltage drop method set out below.

Relays - Terminology

The measurement currents are shown.



Measurement currents

Nominal contact current or switching current (A)	Measurement current (mA)
< 0.01	1
0.01 - 0.1	10
0.1 - 1	100
> 1	1,000

Relays are generally measured as from a switching current of 1A using the voltage drop method at 1A, 6V DC.

11. Maximum continuous current

The maximum continuous current is the current which can be safely carried after the contacts close or before they open without causing an impermissible temperature rise in the contacts or other temperature-sensitive components in the relay (coil, springs, insulation, etc.).
Its value is normally above the maximum switching current.

12. Contact capacity

This value is measured between the terminals with a measurement current of 1kHz and 20C.

Relay characteristic data

1. Insulation resistance

The insulation resistance is measured between mutually insulated conductive components of the relay: between open contacts and between the coil or contacts against the magnetic circuit or base body with earth potential. This value is normally termed "initial insulation resistance", and may decrease over time due to ageing or deposits of contact burn-off.

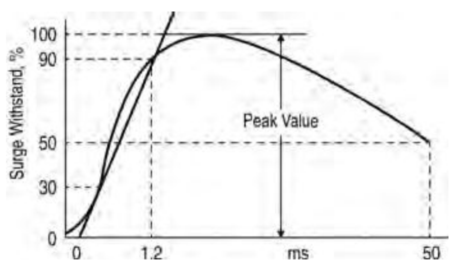
- Between coil and contacts
- Between open contacts
- Between contact sets
- Between exciter coil and reset coil

2. Voltage resistance

Voltage which can be connected to the relay without voltage breakdown for a certain time is normally measured at the same points as the insulation resistance. The specified value in Veff is applied for one minute.

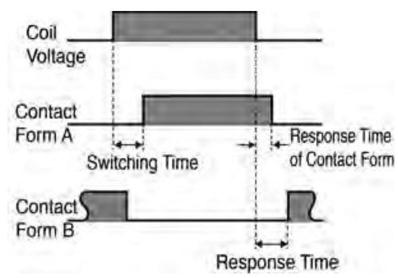
3. Surge voltage resistance

Capacity of the relay to resist an external surge voltage, such as a lightning strike or other phenomenon. For test purposes a characteristic curve is applied in which the rise time, the peak value and the reset time are defined.



4. Set time

Time from the start of excitation of the coil until the working contact of form A closes. (In the case of multi-contact relays it is the time until the last contact closes.) The set time contains no bounce time.



5. Reset time

Time from the end of excitation until a normally-open contact of form B closes again. (In the case of multi-contact relays it is the time until the last contact closes again.)
The reset time contains no bounce time.

6. Contact bounce

Contact bounce is given in milliseconds. The bounce time produces an intermittent contact release resulting from the collision of the moving contacts during setting or resetting.

Mechanical properties and service life

1. Impact resistance

1) Functional

Acceleration which the relay resists during operation without the closed contacts opening for longer than the specified time (mostly 10 s).

2) Destructive

Acceleration which the relay is able to resist during shipping or installation without damage and without altering its characteristic data. The impact resistance is given in "g". The test was performed a total of 18 times - six times in each of the three axis directions.

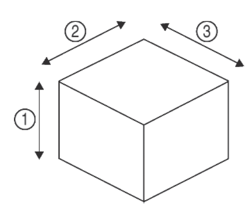
2. Vibration resistance

1) Functional

Vibration which the relay resists during operation without closed contacts opening for longer than the specified time.

2) Destructive

Vibration which the relay resists during shipping, installation or use without damage and without altering its characteristic data. The vibration resistance is given as acceleration in "g" or as displacement with a specific frequency range. The test was performed for a total of six hours; two hours for each of the three axis directions.



Relays - Terminology

3. Mechanical service life

Minimum number of operations for which the relay can be operated under nominal conditions (coil voltage, temperature, humidity, etc.) without placing load on the contacts.

4. Electrical service life

Minimum number of operations of the relay under nominal conditions at the specified contact load.

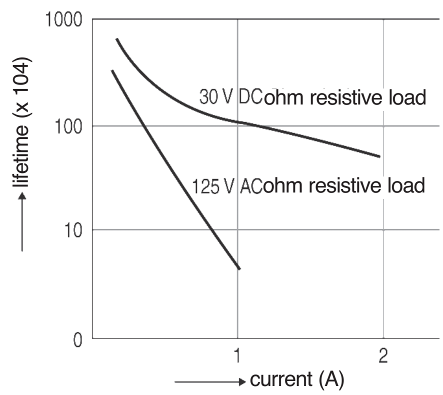
5. Maximum switching frequency

Highest possible switching frequency at which the mechanical or electrical service life can be attained under nominal excitation of the coil.

6. Life curve

The life curve is given for each relay type in the Data column. The service life (number of operations) is dependent on the switching voltage and switching current.
For a DC relay with the following data: switching voltage = AC 125 V and switching current = 0.6 A the service life is 300,000 switching cycles. This value relates to the ohmic load. Check the momentary load prior to use.

Life curve



Methods for selecting the correct relay

Methods for selecting the correct relay

For proper operation of the relay it is essential to know the properties and application conditions of the selected relay in detail in order to match it to the specified ambient conditions.
The coil and contact properties of the relay used must be precisely matched to the prevailing ambient conditions. The table below summarises the key points in relay selection.

It can be used as a reference in searching for the repair instructions product under the specified conditions.

	Rules	Product selection
Coil	a) Rating b) Pick-up voltage (current) c) Drop-out voltage (current) d) max. continuous voltage (current) e) Coil voltage f) Impedance g) Temperature rise	1) Take into account the ripple of the exciter voltage. 2) Take into account the ambient temperature and temperature rise of the coil 3) If the relay is operated in conjunction with semiconductors, the associated circuit must also be considered. Take care to avoid voltage drops on power-up.
Contacts	a) Contact arrangement b) Contact load c) Contact material d) Service life e) Contact resistance	1) It is advisable to use a product containing more contacts than the essential minimum. 2) Relays must provide the service life expected in the specific application case at hand. 3) Does the contact material match the load type? This is particularly neces-sary in relation to minimum values. 4) The service life may be shortened in operation at high temperatures. It should be tested for the specific environment. 5) Depending on the circuit, the relay actuation may be synchronised by the alternating current load. As this dramatically reduces the service life, the application case at hand should be checked.
Switching time	a) Switching time b) Set time c) Reset time d) Switching frequency	
Mech. properties	a) Vibration resistance b) Impact resistance c) Ambient temperature d) Service life	1) Take into account the vibration and impact load at the operating location. 2) Particularly at high temperatures, a relay with coil insulation of class B or F may be required.
Additional aspects	a) Voltage resistance b) Mounting method c) Size d) Protection types	1) For operation in aggressive atmospheres sealed relays should be select-ed. 2) Do special conditions apply?

Relays - Terminology

Basic rules for use of relays

• Avoid subjecting the relay to shock impact.

• Relay housings should not be removed. The values might be changed as a result. That is to say, the data sheet specifications apply only to the complete relay.

• Relays should wherever possible be operated in an environment of normal temperature and humidity, with little dust, and free of SO_2, H_2S or organic gases. For operation in aggressive atmospheres sealed relays should be selected. Silicone residues close to the relay may cause contact failures. (This also applies to plastic-sealed relays.)

• In the case of polarised relays, ensure that the correct polarity (+/–) is connected to the coil.

• For correct application the nominal voltage should be applied to the coil. Use square waves for DC coils and sine waves for AC coils.

• The coil voltage should not exceed the permissible maximum.

• The switching load and service life specifications are merely guide values. The physical phenomena in switching, and thus the service life, depend heavily on the type of load and the other operating conditions.

So you should check all parameters prior to use.

• Do not operate the relay at temperatures above those specified on the data sheet.

• Use flux-tight or sealed washable relays for automatic soldering.

• Use alcohol-based cleaning products to clean the sealed relays. Avoid ultrasound cleaning of all kinds of relays.

Precautions at the relay coil input

The applied nominal voltage is key to correct operation of the relay. The relay will work if the applied voltage is above the pick-up voltage, but it is necessary to apply only the specified nominal voltage to the coil to avoid changes in coil resistance which might occur due to differing current feed, voltage fluctuations and temperature rise. Care should also be taken because problems such as winding shorts and coil burn-off can occur when the maximum applied continuous voltage is exceeded. The following section sets out precautions for the coil input. Observe these instructions in order to avoid problems.

1. Basic rules relating to the relay coil

• **AC relays**

AC relays are almost always operated on a voltage source with a frequency of 50 or 60 Hz and standard voltages of 6, 12, 24, 48, 115, 120, 230 and 240 V. So those standard voltages should be used wherever possible. Losses also occur in AC coils due to short circuit rings, eddy current and hysteresis losses. Furthermore, the coil efficiency is reduced, resulting in greater coil heat-up than in the case of DC relays. Also, relays start to hum even at voltages below the minimum operating voltages. It must be ensured that the output voltage from the voltage source does not fluctuate excessively. Voltage drops may occur when actuating a motor for example. If a relay hums, and as a result is returned to its initial state, the contacts may be damaged. AC relays need a higher operating current than that specified to power-up because the inductance - and thus the impedance - is lower when the relay armature is open than when the armature is connected. This must be considered especially when multiple relays are operated in parallel.

• **DC relays**

To operate DC relays there are standard voltages: DC 5, 6, 12, 24,48 and 100 V. The catalogue specifies the setting current. That current is just about enough, however, to move the relay armature. Taking into account resistance tolerances and increased coil resistance due to temperature, between 1.5 and 2 times the value of the setting voltage should be selected as the operating voltage.

If relays are operated at the upper limit of their capacity, fluctuations in the injected coil current will occur, and the contact movement may be delayed. This poses a risk that the specified switching capacities will not be reached. These aspects should be carefully considered. The coil resistance is increased by a factor of 0.4%/C both in the event of internal heat-up and if the ambient temperature increases. The setting and resetting voltage is increased by the same factor. (For some polarised relays this rate of change is much less however.)

2. Maximum continuous voltage and rise in coil temperature

In correct application, the relays must be operated at nominal voltage. Note that a coil voltage greater than the permitted maximum may result in excessive coil heating, leading to winding short and ultimately causing burn-off of the coil. Do not operate the relay at temperatures above those specified on the data sheet.

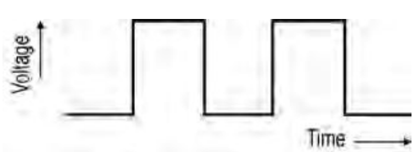
• **Maximum continuous voltage**

In correct application, the relays must be operated at nominal voltage. Note that a coil voltage greater than the permitted maximum may result in excessive coil heating, leading to winding short and ultimately causing burn-off of the coil.

• **Temperature rise in pulsed operation**

In the case of voltage pulses shorter than 2 minutes, the coil heat-up depends not only on the time but also on the duty cycle. It is relatively low compared to the heat-up in continuous operation. The various relays are essentially identical in this respect.

Duty cycle	%
Continuous operation	100 % coil heat-up
ON : OFF = 3 : 1	approx. 80 %
ON : OFF = 1 : 1	approx. 50 %
ON : OFF = 1 : 3	approx. 35 %



Relays - Terminology

• Change in pick-up voltage due to rise in coil temperature (warm start)

After a certain constant voltage in the coil followed by switching the current off and back on, the pick-up voltage of DC relays increases slightly in line with the temperature rise. This is comparable to operation in a higher ambient temperature. The ratio between the increases in resistance and temperature for copper wire is approximately 0.4% per 1C. The coil resistance is increased by that ratio.
For operation of the relay it is therefore necessary for the voltage to be higher than the pick-up voltage, and that the pick-up voltage rises in line with the insulation resistance. For some polarised relays that rate of change is much lower however.

3. Applied coil voltage and switching time

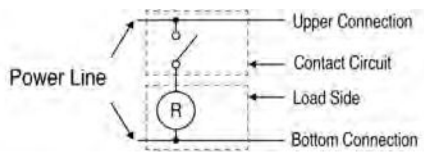
In AC operation the set time is heavily dependent on the momentary phase angle at which the coil is being excited. For miniature relays it is in most cases one half-wave. For the larger relay it is 7 to 16 ms; the reset time is 9 to 18 ms.The set time for large coils is too fast in DC operation too. However, an excessively fast operating time will also increase the bounce time of contact "A".

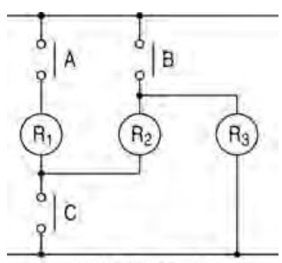
Note that the load conditions (particularly in case of heavy inrush current or under a load close to rated load) may result in reduced service life and minor fusing.

4. Stray circuits

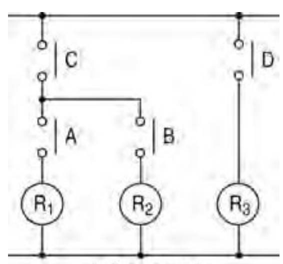
(Shunts) In follow-up circuits it must be ensured that no shunts are created, so as to avoid false or irregular operations. As shown in the following diagram, two terminals must be provided as power supply to prepare for follow-up circuits; the top terminal is always "+" and the bottom "–". (The same applies in AC operation).– So the "+" side is always the side on which contact circuits (contacts for relays, timers, limit switches, etc.) are constructed and the "–" side is the load side (for relay coil, timer coil, solenoid, cylinder coil, motor, lamp, etc.).

The next diagram illustrates stray circuits. The closed contacts A, B and C, after operation of relays R1, R2 and R3. If contacts B and C are open, a follow-up circuit is created by A, R1, R2 and R3, and the relays may hum or they may be prevented from dropping out. The circuit (b) is correctly executed. In DC operation stray circuits can be avoided by using an isolating diode.





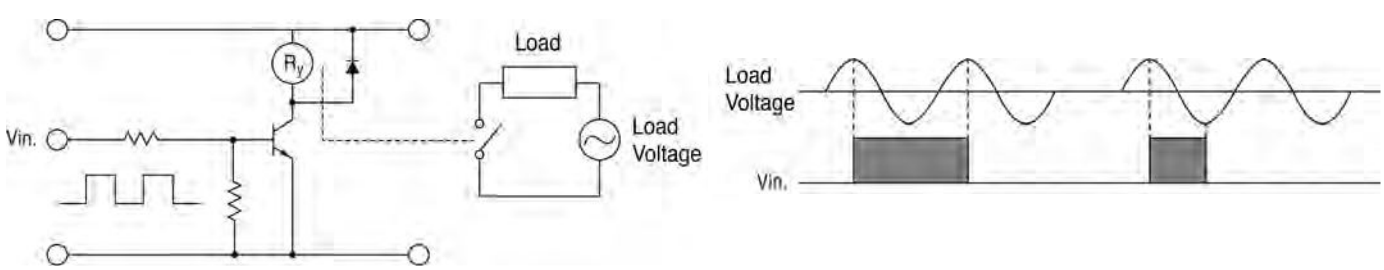
(a) Unfavorably



(b) Favorably

5. Phase synchronisation when switching AC loads

If the relay always switches at the same phase angle due to feedback from the load to the actuation, this may shorten the electrical life and cause fusing or locking of the contacts as a result of material migration. So the relay should be observed on the basis of the specific application case. When operating relays with timers, microcomputers or thyristors etc., there may be synchronisation with the power supply.



6. False switching due to inductive coupling

In the case of long lines: If the load and control feeds use the same electrical cable, the induction from the current line may produce an induction voltage on the coil. It is irrelevant whether the control signal is on or off. In this case relays and timers are not reset. Note that cables covering long stretches may suffer false relay switching due to problems in capacity distribution. External influences such as lightning strikes etc. may also cause equipment failure.

Relays - Terminology

7. Long-term current flow

In applications involving long operations (such as emergency lights, anti-theft security systems and test mechanisms) it is advisable to preferentially use normally-open contacts for continuous operation. Continuous and long-term voltage on the coil may impair the coil insulation, and increased coil heat-up may shorten the service life. Bi-stable relays should be used for these applications. If you use a single stable relay, you should select a plastic-sealed variant which is not as responsive to ambient conditions, and a more fail-safe circuit arrangement.

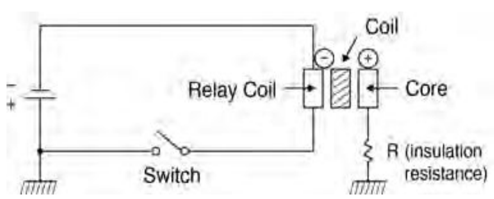
8. Rare switching operations

If a switch is executed only once a month, or even less, you should carry out regular contact testing. If the contacts are not switched for a lengthy period of time, deposits may form on the surface, leading to instability of the contacts.

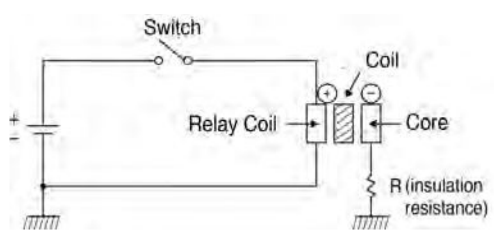
9. Electrolytic corrosion of the coils

When using relays with comparatively high coil voltage, electrolytic corrosion may occur, especially in conditions of high humidity. To avoid open circuits, you should pay particular attention to the following points.

- The "+" side of the voltage source should be connected to the base plate. (See Fig. a) – This applies to all relays)

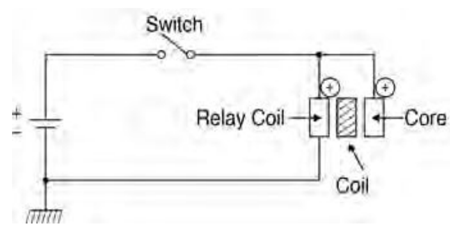


- Where earthing of the "+" side is unavoidable, or where earthing is not possible: Set the contacts (or the switch) on the "+" side of the voltage source. (See Fig. b – This applies to all relays)



b) Evaluation: ok

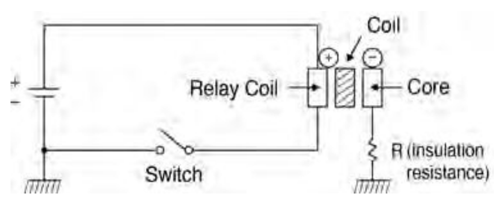
- If earthing is not required, connect the earth connection to the "-" side of the coil. (See Fig. c – LF and R relay with earth connection)



c) Evaluation: ok

- If the "-" side of the voltage source is earthed, avoid using the contacts (and switches) on the "+" side. (See Fig. d – This applies to all relays)

- If the relay has an earth connection which is not needed for operation, it should not be connected, so as to prevent electrolytic corrosion.



Note: The diagram shows that the insulation resistor has been inserted between the iron core and chassis earth. In a relay with earth connection the iron core could be earthed directly on the chassis.

Precautions on the contact

- **Contacts**

The contacts are the most important components of the relay. The performance capability of the contact is dictated primarily by the contact material, the switching voltage and current (particularly at the point of switching on and off), the type of load, the switching frequency, the ambient atmosphere, the contact form, the switching speed and the contact bounce. The following points should be considered in order to avoid material migration, contact fusing, excessive burn-off, increased contact resistance and various other causes of failure: *It is advisable to clarify the usage in advance with our sales offices.

Relays - Terminology

Basic rules relating to the relay contact

· AC/DC

If the load contains an inductive component, a quite high counter-EMF (induction voltage) will be generated which increases the switch-off voltage. The energy discharged on the contacts causes burn-off and material migration. So it is not necessary to suppress the arc by means of a suitable RC element. With direct voltage there is no zero crossing where the arc self-extinguishes. Once an arc has been generated, it is difficult to suppress. The extended arc dwell time poses the main problem for the contacts. Also, the direction of the current is pre-determined, resulting in increased material migration (on one side). The approximate value of the RC element is usually specified in the catalogue or data sheet, but that value alone is mostly not sufficient. Customers will create a circuitry configuration best suited to their specific application case.

For inductive loads it is generally advisable to use relays suitable for switching 125 VAC. The catalogue specifies the minimum loads, though they only apply as a guideline for the switching capacity of the relay and do not represent exact values. These minimum values are influenced by the switching frequency, the ambient conditions and the contact friction travel.

· Switching current

The current is a key influencing factor in both the closing and opening of the contacts. If a motor or lamp is switched as the load for example, the higher inrush current causes a correspondingly greater burn-off and material migration.
So after a while a contact response or fusing occurs.

Properties of commonly used contact materials

Contact material	Typical properties	Typical applications	Guide values for application field
Ag (silver)	The electrical and thermal conductivity of silver is higher than that of any other material. Silver has a low contact resistance and is cheap and widely available. A disadvantage is that silver readily forms sulphide film in sulphide atmosphere. Care needs to be taken at low voltage and current.	Universally usable under medium load as an alloy with nickel (AgNi0,15) Usable for DC circuits with medium to high load	≥ 12 V ≥ 10 mA
$AgSnO_2$ (silver/tin)	The resistance to fusing of silver/tin is even better than silver/cadmium. As in the case of silver, a sulphide film forms in sulphide atmosphere.	Application heavily dependent on relay type Usable for high switch-on and switch-off loads	≥ 12 V ≥ 100 mA
AgW (silver/tungsten)	The hardness and melting point of silver/tungsten are high, its resistance to arcing is excellent, and the material migration extremely low. A high contact pressure is required however. The contact resistance is relatively high and the resistance to corrosion poor.	Specially for loads with very high inrush currents e.g. in building lighting applications	≥ 60 V ≥ 1000 mA
AgNi (silver/nickel)	Silver/nickel has a similar electrical conductivity to silver. It has arc-extinguishing properties.	Usable for DC circuits with medium to high load, inductive loads	≥ 12 V ≥ 10 mA
Contact surface	**Typical properties**	**Typical applications**	**Guide values for application field**
Au coating (gilding)	Gilding has a similar effect to gold plating. Depending on the galvanisation method employed, it is very important to monitor the process, because there is a risk of pores and cracks forming. The use of gilded contacts in existing relays is relatively simple.	For low loads only	μV to 30 V μA to 200 mA
Gold-flashing (application of a thin gold layer) 01 to 0.5	The purpose of gilding is to protect the contact base material during storage of the relays or of the device in which the relay is installed. A degree of contact stability can be attained in load switching however.	Purely in-storage protection	

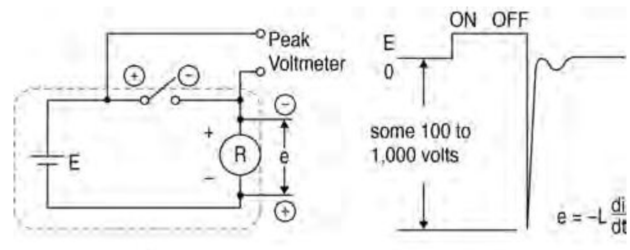
Relays - Terminology

Contact protection

• Self-induction voltage

When switching inductive loads with a relay, such as in relay sequence circuits, DC motors, DC clutches and DC solenoids, it is always important to absorb surge voltages (e.g. with a diode) so as to protect the contacts. If those inductive loads are switched off, a self-induction voltage of several hundred to thousand Volts develops which may seriously damage the contacts and severely shorten service life.

If the current in those loads is relatively low, and around 1 A, the self-induction voltage may cause ignition of a glow or arc discharge. During discharging organic material in the air decomposes and produces black residues (oxides, carbides) which are deposited on the contacts. This may result in contact failure.
In Figure (a) a self-induction voltage (e = –L di/dt) with a steep wave form above the coil has been generated, with the polarity shown in Figure (b) being switched off at the point the inductive load is applied.



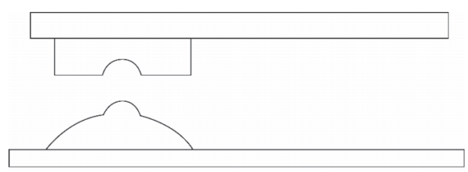
(a) (b)

The self-induction voltage is carried through the power supply cable and reaches the two contacts. The electrical ignition voltage at standard temperature and air pressure is generally approximately 200 to 300 Volts. If the self-induction voltage exceeds this value, a discharge takes place on the contacts which consumes the energy stored in the coil (1/2Li2). For this reason it is desirable to absorb the self-induction voltage, so that it is a maximum of 200 V.

• Material migration phenomenon

Material migration on contacts takes place when a contact melts and the contact material transfers to other contacts. As the number of switching operations increases, uneven contact surfaces develop. After a certain time, the uneven contacts are solidly joined together as if they were fused. This happens, for example, when discharges occur due to inductive or capacitive loads. As a countermeasure, contact circuits and materials resistant to material migration are used, such as $AgSnO_2$, AgW or AgCu. Generally a concave form appears on the cathode and a convex form on the anode.

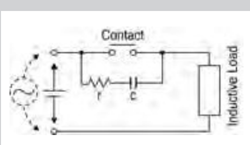
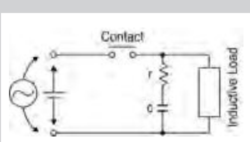
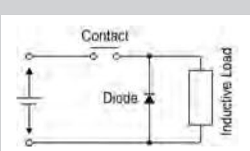
For DC capacitive loads (several Amperes up to several tens of Amperes) it is always necessary to perform confirmation tests under real conditions.



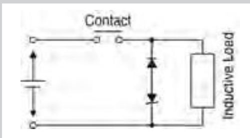
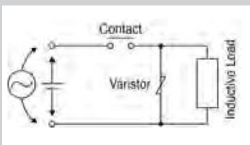
Material migration on contacts

• Contact protection circuit

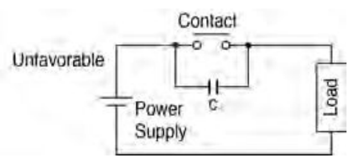
Induction voltages can be reduced by contact protection circuits. Note, however, that incorrect application may have the opposite effect.
The following table sets out typical circuits of this kind.

Circuit		Use AC	Use DC	Properties/Other	Component selection
RC circuit		X*	X	If the load is a timer element, the stray current flows through the RC circuit and causes misoperation.* In an application with alternating voltage make sure the impedance of the load is sufficiently smaller than the RC circuit.	As a guideline in selecting r and c: c: 0.5 to 1µF per 1A switching current; r: 0.5 to 1 Ω per 1V switching voltage. The values are dependent on the load and the variations in the relay properties. The capacitor C suppresses the discharge on contact opening. The resistor limits the current on the next switching operation. Please perform confirmation tests. Use a capacitor with a voltage resistance (dielectric strength) of 200 to 300 V. For AC circuits you need an unpolarised AC capacitor.
RC circuit		X	X	If the load is a relay or solenoid, the reset time is extended. The circuit is effective if connected to both contacts as soon as the supply voltage is 24 or 48 V and the voltage via the load is 100 to 200V.	
Diode circuits		-	X	The diode switched on in the reverse direction parallel to the load shorts the self-induction voltage created when the contacts open. In the process the energy stored in the inductive load is converted into heat in the ohmic component of the inductor. This circuit further extends the reset time compared to the RC circuit (two to five times the reset time specified in the catalogue).	Use a diode with a breakdown voltage in reverse direction corresponding to at least ten times the switching voltage. In electronic circuits in which the voltage is not so high, a diode with a breakdown voltage in reverse direction of approximately two to three times the switching voltage can be used.

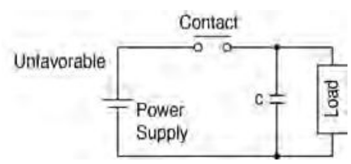
Relays - Terminology

	Circuit	Use AC	Use DC	Properties/Other	Component selection
Diode circuits		-	X	The circuit is effective when the reset time in the diode circuit is too long.	Please use a Zener diode with a Zener voltage roughly matching the switching voltage.
Varistor circuit		X	X	Using the constant voltage properties of the varistor, this circuit prevents particularly high voltages over the contacts. This circuit also slightly extends the reset time. The circuit is effective when connected to both contacts as soon as the switching voltage via the load is 100 to 200V.	

• Avoid using the protective circuits shown in the diagrams on the right. As inductive DC loads are more difficult to switch than ohmic loads, use of a protective circuit is recommended.



Although they are extremely effective in arc suppression when contacts open, the contacts are subject to fusing, as energy is stored in C which causes a short when the contacts close.



Although they are extremely effective in arc suppression when contacts open, the contacts are subject to fusing, as energy is stored in C which causes a short when the contacts close.

• **Mounting the protective device**

In the circuit it is necessary to locate the protective device (diode, resistor, capacitor, varistor, etc.) in the immediate vicinity of the load or the contact. If the protective device is too far away, its efficiency may decrease. As a guideline, a distance up to 50 cm should be applied.

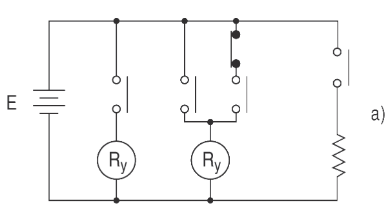
• **Anomalous corrosion during high-frequency switching of DC loads (sparking)**

If a DC valve or clutch, for example, is switched at high frequency, corrosion may develop. It is produced by reaction with the nitrogen in the air when a discharge occurs during switching. So care must be taken if discharges at high

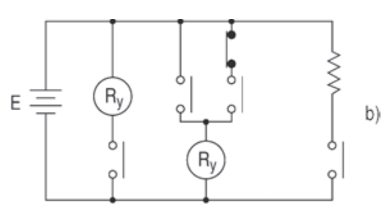
Precautions when switching inductive loads

• **Switching of load and contacts**

Switch the load on one side of the power feed - see following Figure a) - and switch the contacts on the other side. This will prevent high voltages occurring between the contacts. If the contacts are switched on both sides of the power feed - Figure b) - there is a risk of short-circuit in the event of flash-over when contacts are located very close together for design reasons.



a) Good example



b) Bad example

Relays - Terminology

• Impedance

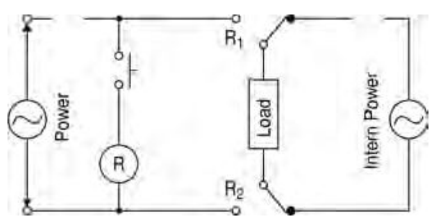
As the voltage level on contacts used in low current circuits (dry circuits) is low, this frequently results in low conductivity. Stability can be improved by adding an impedance parallel to the load so as to purposely increase the load current applied to the contacts.

• Avoidance of short-circuits between working and normally-open contacts

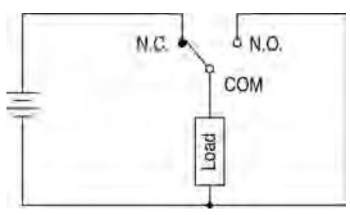
1) In compact devices the distance between the contacts of form A and B may be small. The occurrence of short-circuits due to flash-over must be assumed.

2) Even if the three N.C., N.O. and COM contacts are configured so that they can short, no possibility of blow-out may exist.

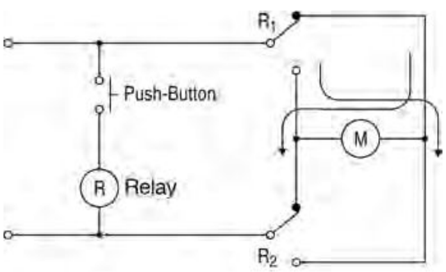
3) Circuits to reverse the direction of rotation of motors must not be constructed with normally-open contacts and working contacts of the same contact set.



1) R1, R2: Relay contacts
R: Relay with 2 switches



2)



3) R1, R2: Relay contacts
R: Relay with 2 switches

• Short-circuits between contact sets

Although there is a clear trend towards the miniaturisation of electronic circuits, special attention must be paid to selection of suitable relay types. This applies in particular to multiple relays between which different voltages are switched. This problem is not detectable from diagrams for follow-up circuits. Instead, the entire design of the device must be investigated and adequate safety reserves must be ensured in terms of creepages and clearances, voltage resistance, contact pitch, etc.

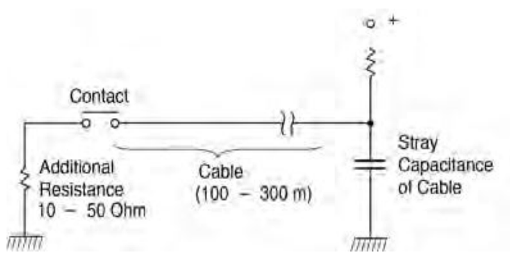
• Load type and inrush current

The load type and inrush current, together with the switching frequency, are key factors in terms of contact life. Particularly in the case of loads with inrush currents, the continuous current and the inrush current should be measured. Select a relay with an adequate safety factor. The table on the right shows the relationship between typical loads and their inrush currents. Also check the differing momentary polarity according to the specific relay, as the service life depends on the polarity of the COM and NO contacts.

Load type	Inrush current
Ohmic load	Continuous current
Inductive load / solenoid load (e.g. solenoid valves)	10 to 20 times the continuous current
Motor load	5 to 10 times the continuous current
Bulb load	10 to 15 times the continuous current
Mercury lamp load	3 times the continuous current
Sodium-vapour lamp load	1 to 3 times the continuous current
Capacitive load	20 to 40 times the continuous current
Transformer load	5 to 15 times the continuous current

• When using long cables

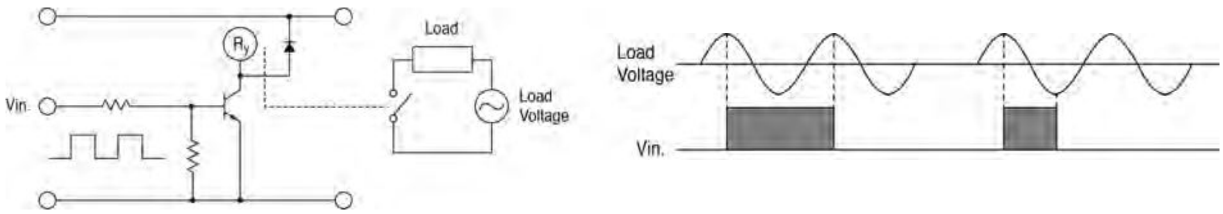
If long cables (100 to 300 m) are used in a relay contact circuit, the inrush current may cause problems due to the stray capacitance between the cables. So please insert a resistor (approximately 10 to 50 Ω) in series with the contacts.



Relays - Terminology

· Phase synchronisation when switching AC loads

If the relay always switches at the same phase angle due to feedback from the load to the actuation, this may shorten the electrical life and cause fusing or locking of the contacts as a result of material migration. So the relay should be observed on the basis of the specific application case. When operating relays with timers, microcomputers or thyristors etc., there may be synchronisation with the power supply.



· Service life at high temperatures

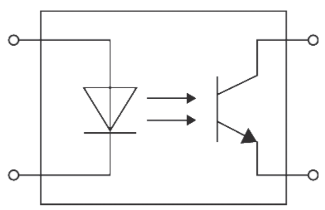
Check under the momentary load whether the service life is influenced by use at high temperatures

Notes

Solid State Relays - Terminology

Control side

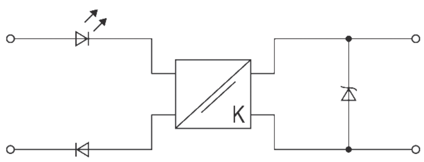
Semiconductor relays - also known as solid state relays (SSRs) - are an alternative to mechanical relays in many applications. Although these devices belong to the general category of relays, they are actually not relays. They are in fact electronic devices. The basis of a solid state relay is very often an optocoupler with a downstream additional electronic switching element in the form of a transistor, triac or MOSFET.



Optical coupler

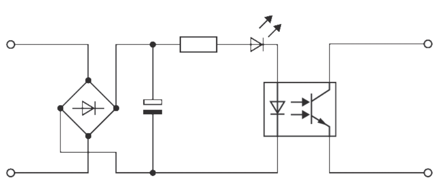
DC input

Thanks to the LED in the input circuit of the optocoupler, different voltage levels can be adapted to by adding a specially selected electronics unit. To prevent the electronics unit from being destroyed by an incorrectly connected operating voltage, an anti-polarity reversal protective diode is additionally inserted into the control circuit.



AC input

Safe operation with an alternating voltage requires an upstream electronics unit to generate a stable control voltage. This is attained by means of a rectifier and a smoothing capacitor. The smoothing capacitor reduces the possible switching frequency to a maximum of half the mains frequency. At higher frequencies the input circuit would continually switch through.



Load side

A wide variety of demands are placed on the output circuit depending on the application case and load type. Decisive factors here are:

– Power amplification

– Adaptation to switching voltage/current (AC/DC)

– Short-circuit protection

Here, too, an upstream electronics unit must be installed.

DC output

To attain the specified output power, the optocoupler output is provided with a power stage. To that end, bipolar transistors or MOSFETs are used in DC operation. That is irrelevant for practical operation, however, as the terminals can still be regarded as conventional switch connections. Only the specified polarity must be observed as a mandatory requirement.

Solid State Relays - Terminology

To select the correct switching output the following criteria should be applied:

1. Operating voltage range

The specified minimum and maximum values must be observed in order to ensure safe function. In order to protect the switching transistor, the upper value must not be exceeded.

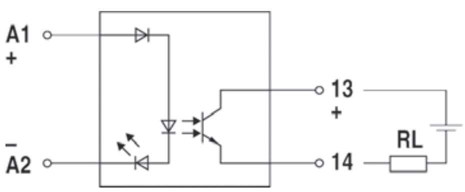
2. Maximum continuous current

This value dictates the maximum permissible continuous current. Note in this context that the current is dependent on the ambient temperature. The actual continuous current is derived from the available derating curves. Overranging of the continuous current will in a short time result in destruction of the switching element.

3. Output circuit

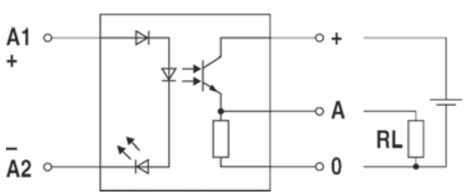
In DC operation a distinction is made between a 2-conductor and a 3-conductor output.

The 2-conductor output can be considered equivalent to a mechanical contact. As opposed to a relay, here the polarity must be observed.



Principle: 2-conductor circuit

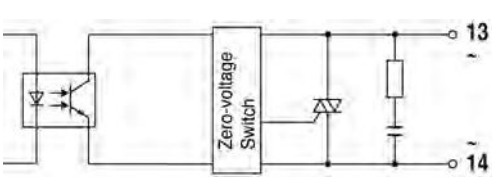
By contrast, a 3-conductor output is potential-specific. For safe operation it requires connection of both potentials of the output-side voltage source. In the off state a fixed link to the negative potential (earth) is made. The advantage lies in an almost constant internal resistance.



Principle: 3—conductor circuit

AC output

To switch alternating voltages, a semiconductor element for alternating voltage applications (triac) is installed downstream of the optical coupler element. Here, too, the same restrictions on the maximum operating voltage and continuous current ranges dependent on ambient temperature apply as in the case of the DC output. The maximum peak reverse voltage of the triac (e.g. 800 V) must additionally be considered in executing the alternating voltage. It must not be exceeded, in the event of either voltage fluctuations or interference voltage spikes, without destroying the triac. Consequently, all switching inductors must be wired accordingly.



Principle: AC output

Solid State Relays - Terminology

Protective circuits

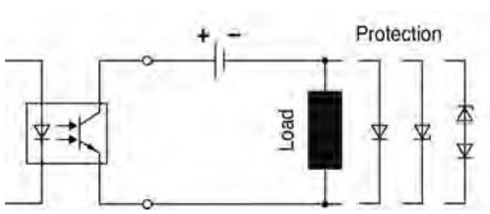
Switching of inductive consumers such as contactors, valves, motors etc. always results in a high induction overvoltage with a very steep rising edge at the moment of switch-off. The voltage, which can reach very high amplitudes, is additionally overlaid with a more or less broad high-frequency spectrum. Electronic devices respond particularly sensitively to that. So a general protection against this interference is required. Protective circuits are configured parallel to the load in order to restrict harmful induction voltages to a safe level. Different methods are available depending on the optocoupler design and application case (load).

– RC elements for AC operation

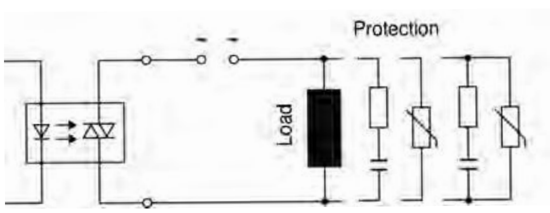
– Varistors for AC and DC operation

– Free-wheeling/suppressor diode for DC operation

The correct protective circuit for the specific application guarantees problem-free, safe functioning of all LÜTZE optical coupler modules.

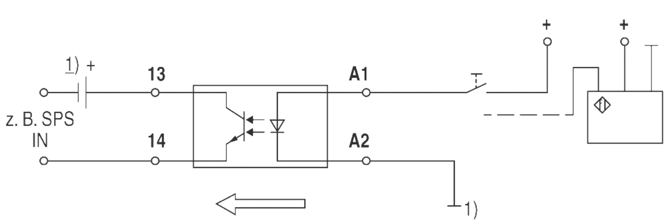


Protective circuit with DC voltage output

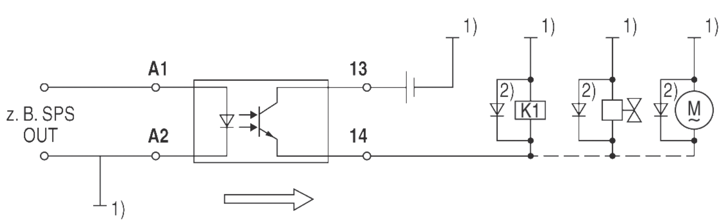


Protective circuit with AC voltage output

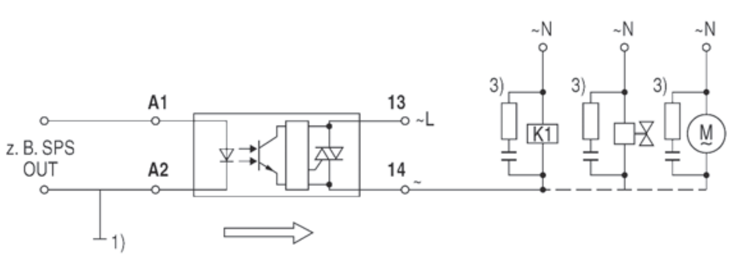
Application notes



e.g. position sensing with end contact or initiator



e.g. switching of contactor, solenoid valve or motor (AC load)



e.g. switching of contactor, solenoid valve or motor (DC load)

General

What is product reliability?

1. Reliability in a narrow sense of the term

In the industrial space, reliability is a measure of how long a particular product operates without failure.

2. Product reliability in a broad sense of the term

Every product has a finite service lifetime. This means that no product can continue normal service infinitely. When a product has broken down, the user may throw it away or repair it. The reliability of reparable products is recognised as "reliability in a broad sense of the term". For reparable products, their serviceability or maintainability is another problem. In addition, reliability of product design is becoming a serious concern for the manufacturing industry. In short, reliability has three senses: i.e. reliability of the product itself, serviceability of the product, and reliability of product design.

3. Intrinsic reliability and reliability of use

Reliability is "built in" to products. This is referred to as intrinsic reliability which consists mainly of reliability in the narrow sense. Product reliability at the user's site is called "reliability of use", which consists mainly of reliability in the broad sense. In the relay industry, reliability of use has a significance in aspects of servicing.

Reliability (broad sense)

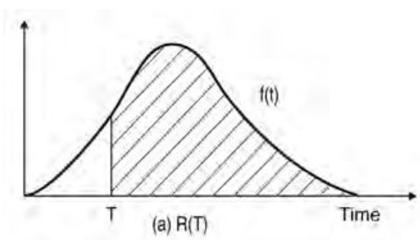
- **1. Reliability (narrow sense), durability**
  - Long life: MTTF, B10, R(T)
  - Low failure rate: Lambda (l), MTBF
- **2. Maintainability**
  - MTTR
  - Preventive maintenance, predicted maintenance
- **3. Design reliability**
  - Human factor, redundancy, fool-proof, fail-safe

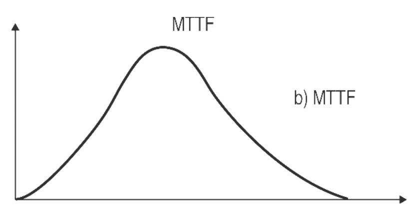
Availability

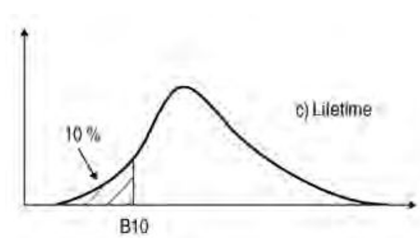
Reliability measures

The following list contains some of the most popular reliability measures.

Reliability measures	Sample representation
Degree of reliability R(T)	99.9%
MTBF	100 hours
MTTF	100 hours
Failure rate Aλ	20 FIT, 1%/hr.
Life B_{10}	50 hours







1.Degree of reliability

Degree of reliability represents percentage ratio of reliability. For example: if none of 10 light bulbs has failed for 100 hours, the degree of reliability defined in 100 hours of time is 10/10 = 100%. If only three bulbs remained alive, the degree of reliability is 3/10 = 30 %. The JIS Z8115 standard defines the degree of reliability as follows: The probability at which a system, equipment, or part provides the specified functions over the intended duration under the specified conditions.

2. MTBF

MTBF stands for Mean Time Between Failures. It designates the mean time between two failures in a system, equipment unit or part. The MTBF can only be used for repairable products. The MTBF value indicates how long a product can be used for without being repaired. Sometimes the MTBF is also used to specify the service life between repairs.

3. MTTF

MTTF stands for Mean Time To Failure. It designates the mean time until a fault occurs in the product. The MTTF is used for irreparable products such as components and materials. The MTTF is normally applied to relays.

4. Failure rate

Failure rate includes mean failure rate and momentary failure rate. Mean failure rate is defined as follows: Mean failure rate = total failures/total operating time In general, failure rate refers to momentary failure rate. This represents the probability at which a system, equipment, or part, which has continued normal operation to a certain point of time, becomes faulty in the subsequent specified time period. Failure rate is most often represented in the unit of percent/hours. For parts with low failure rates, "failure unit (Fit) = 10–9/hour" is often used instead of failure rate. Percent/count is normally used for relays.

General

5. Safe life

Safe life is an inverse of degree of reliability. It is given as value B which makes the following equation true: $1 - R(B) = t\ \%$
In general, „B[1 – R(B)] = 10 %“ is more often used. In some cases this represents a more practical value of reliability than MTTF.

Failure

1. What is failure?

Failure is defined as a state of system, equipment, or component in which part of all of its functions are impaired or lost.

2. Bathtub curve

A product's failure rate throughout its lifetime is depicted as a bathtub curve (see diagram). Failure rate is high at the beginning and end of its service lifetime.

(I) Initial failure period

The high failure rate in the initial failure period is derived from latent design errors, process errors, and many other causes. Initial failures are screened at the manufacturer's site through burn-in processes. This process is called debugging, performing aging or screening.

(II) Accidental failure period

The initial failure period is followed by a long period with low, stable failure rate. In this period, called accidental failure period, failures occurs at random along the time axis. While zero accidental failure rate is desirable, this is actually not practical in the real world.

(III) Wear-out failure period

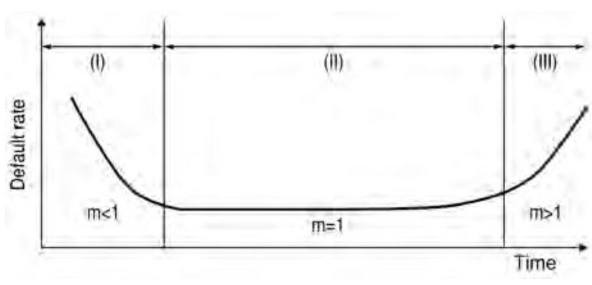
In the final stage of the product's service lifetime comes the wear-out failure period, in which the life of the product expires due to wear or fatigue. Preventive maintenance is effective for this type of failure. The timing of a relay's wear-out failure can be predicted with a certain accuracy from the past record of uses. The use of a relay is intended only in the accidental failure period, and this period virtually represents the service lifetime of the relay.

3. Weibull analysis

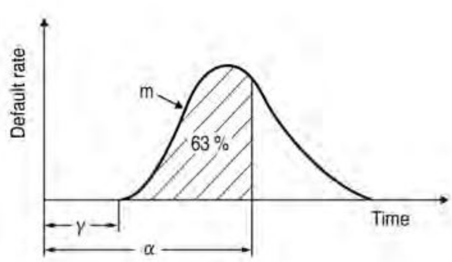
Weibull analysis is often used for classifying a product's failure patterns and to determine its lifetime. Weibull distribution is expressed by the following equation:

$$f(x) = \frac{m}{\alpha}(\chi-\gamma)^{m-1} e^{-\frac{(\chi-\gamma)^{m}}{\alpha}}$$

m: Figure parameter α: Measurement parameter: γ: Position parameter



Bathtub curve



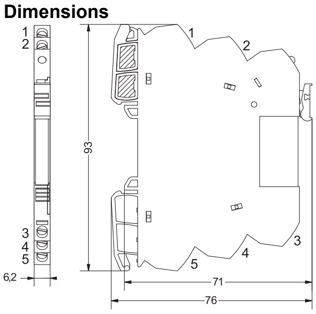
Weibull distribution can be adopted to the actual failure rate distribution if the three variables are estimated.
The Weibull probability chart is a simpler alternative to complex calculation formulas. The chart provides the following advantages:

- The Weibull distribution has the closest proximity to the actual lifetime distribution.
- The Weibull probability chart is easy to use.
- Different types of failures can be identified on the chart. The following describes the correlation with the bathtub curve. The value of the parameter "m" represents the type of failure.

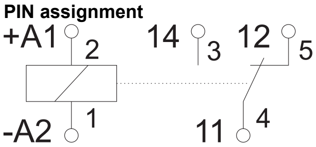
- When $m < 1$: Initial failure
- When $m = 1$: Accidental failure
- When $m > 1$: Wear-out failure

Output Relay Interface, relay with 1 directional contact / SPDT relay, pluggable
AC/DC 250 V, 6 A, 1500 VA / 144 W
Screw terminal / Push-In, contact material: $AgSnO_2$

Dimensions



PIN assignment



Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 12 V	760019.1000	**A***	LCIS-RS12DC-S-1U	5
Push-In					
Rated voltage U_N	DC 12 V	761019.1000	**S***	LCIS-RS12DC-PI-1U	5

Input	**DC 12 V**
Input voltage range	9.6 – 15 V
Rated current I_N	17.2 mA
Interrupting voltage	<1.2 V
Protection device Input	Varistor Reverse diode
Max. length of connecting lead	1000 m
Status display input	LED green
Rated frequency f_N	–
Output	
Contact type	1 changeover contacts / SPDT
Min. switching voltage	AC/DC 17 V
Max. switching voltage	AC/DC 250 V
Min. switching current	AC/DC 5 mA
Max. switching current	AC/DC 6 A
Switching capacity AC 15	3 A
Switching capacity DC 13	1 A @ 24 V 200 mA @ 125 V 100 mA @ 250 V
Max. switching capacity	1500 VA / 144 W
Contact material	$AgSnO_2$
Mechanical service life	> 10 x 10^6 operations
Switch-on delay	7 ms
Shutdown delay	13 ms
Clearance/creepage dist. (control/load side)	>5.5 mm
General	
Housing material	PA 6.6 (UL 94 V-0)
Color of the housing	RAL 7012 basalt grey
Protection class	IP20
Mounting	DIN rail mountable TS35 (EN 60715)
Installation position	any
Insulation voltage input / output	4.0 kV_{eff}
Rated insulation voltage (EN 50178)	300 V
Safe isolation	yes
Operation temperature range	-25 °C … +60 °C
Storage temperature range	-40 °C … +80 °C
Dimensions (w × h × d)	6.2 × 93.0 × 76.0 mm
Weight	0.030 kg/piece
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16 Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1
Approvals	cULus in preparation, DNV GL in preparation

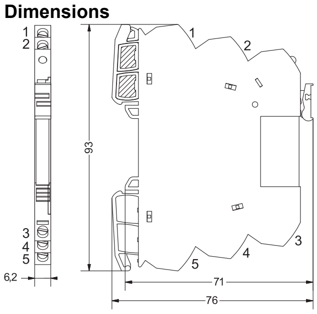
* **S** Article from stock
A Available with a lead time
R Available on request

Output Relay Interface, relay with 1 directional contact / SPDT relay, pluggable
AC/DC 250 V, 6 A, 1500 VA / 144 W
Screw terminal / Push-In, contact material: $AgSnO_2$

Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	760020.1000	**S***	LCIS-RS24DC-S-1U	5
	AC/DC 24 V	760021.1000	**S***	LCIS-RS24UP-S-1U	5
	AC/DC 115 V	760051.1000	**A***	LCIS-RS120UP-S-1U	5
	AC/DC 230 V	760061.1000	**S***	LCIS-RS230UP-S-1U	5
Push-In					
Rated voltage U_N	DC 24 V	761020.1000	**S***	LCIS-RS24DC-PI-1U	5
	AC/DC 24 V	761021.1000	**S***	LCIS-RS24UP-PI-1U	5
	AC/DC 115 V	761051.1000	**A***	LCIS-RS120UP-PI-1U	5
	AC/DC 230 V	761061.1000	**S***	LCIS-RS230UP-PI-1U	5

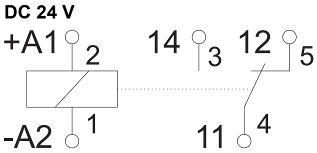
Input	DC 24 V	AC/DC 24 V	AC/DC 115 V	AC/DC 230 V
Input voltage range	19.2 – 30 V		92 – 126.5 V	184 – 253 V
Rated current I_N	10.7 mA	10.6 mA	3.7 mA	3.6 mA
Interrupting voltage	<1.7 V	<2.0 V	<7.7 V	<12.8 V
Protection device Input	Reverse diode	Bridge rectifier		
Max. length of connecting lead	DC: 1000 m	DC: 1000 m / AC: 500 m		
Status display input	LED green			
Rated frequency f_N	–	50 Hz / 60 Hz		
Output				
Contact type	1 changeover contacts / SPDT			
Min. switching voltage	AC/DC 17 V			
Max. switching voltage	AC/DC 250 V			
Min. switching current	AC/DC 5 mA			
Max. switching current	AC/DC 6 A			
Switching capacity AC 15	3 A			
Switching capacity DC 13	1 A @ 24 V 200 mA @ 125 V 100 mA @ 250 V			
Max. switching capacity	1500 VA / 144 W			
Contact material	$AgSnO_2$			
Mechanical service life	> 10 x 10^6 operations			
Switch-on delay	6 ms	AC: 10 ms, DC: 6 ms	8 ms	
Shutdown delay	13 ms	AC: 10 ms, DC: 10 ms	13 ms	
Clearance/creepage dist. (control/load side)	>5.5 mm			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Color of the housing	RAL 7012 basalt grey			
Protection class	IP20			
Mounting	DIN rail mountable TS35 (EN 60715)			
Installation position	any			
Insulation voltage input / output	4.0 kV_{eff}			
Rated insulation voltage (EN 50178)	–			
Safe isolation	yes			
Operation temperature range	-25 °C … +60 °C			
Storage temperature range	-40 °C … +80 °C			
Dimensions (w × h × d)	6.2 × 90.0 × 76.0 mm			
Weight	0.035 kg/piece			
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16		Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	
Standards	EN 60947-5-1			
Approvals	cULus, DNV GL			

Dimensions

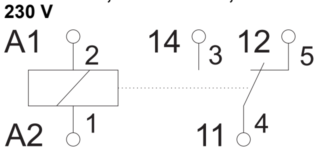


PIN assignment

DC 24 V



AC/DC 24 V, AC/DC 115 V, AC/DC 230 V



Output Relay Interface, relay with 1 directional contact / SPDT relay, pluggable
AC/DC 250 V, 6 A, 1500 VA / 144 W
Screw terminal / Push-In, contact material: $AgSnO_2$+ 5 µm HV

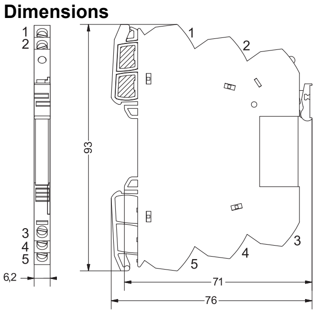
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	760020.1010	S*	LCIS-RS24DC-S-1U-HTV	5
	AC/DC 24 V	760021.1010	S*	LCIS-RS24UP-S-1U-HTV	5
	AC/DC 115 V	760051.1010	A*	LCIS-RS120UP-S-1U-HTV	5
	AC/DC 230 V	760061.1010	S*	LCIS-RS230UP-S-1U-HTV	5
Push-In					
Rated voltage U_N	DC 24 V	761020.1010	S*	LCIS-RS24DC-PI-1U-HTV	5
	AC/DC 24 V	761021.1010	S*	LCIS-RS24UP-PI-1U-HTV	5
	AC/DC 115 V	761051.1010	A*	LCIS-RS120UP-PI-1U-HTV	5
	AC/DC 230 V	761061.1010	S*	LCIS-RS230UP-PI-1U-HTV	5

Input	**DC 24 V**	**AC/DC 24 V**	**AC/DC 115 V**	**AC/DC 230 V**
Input voltage range	19.2 – 30 V		92 – 126.5 V	184 – 253 V
Rated current I_N	10.7 mA	10.6 mA	3.7 mA	3.6 mA
Interrupting voltage	<1.7 V	<2.0 V	<7.7 V	<12.8 V
Protection device Input	Reverse diode	Bridge rectifier		
Max. length of connecting lead	DC: 1000 m	DC: 1000 m / AC: 500 m		
Status display input	LED green			
Rated frequency f_N	–	50 Hz / 60 Hz		
Output				
Contact type	1 changeover contacts / SPDT			
Min. switching voltage	AC/DC 1 V			
Max. switching voltage	AC/DC 250 V			
Min. switching current	AC/DC 1 mA			
Max. switching current	AC/DC 6 A			
Switching capacity AC 15	3 A			
Switching capacity DC 13	1 A @ 24 V 200 mA @ 125 V 100 mA @ 250 V			
Max. switching capacity	1500 VA / 144 W			
Contact material	$AgSnO_2$ + 5 µm HV			
Mechanical service life	> 10 x 10^6 operations			
Shutdown delay	4 ms	AC: 15 ms, DC: 14 ms	13 ms	
Clearance/creepage dist. (control/load side)	>5.5 mm			
Inrush current	–			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Color of the housing	RAL 7012 basalt grey			
Protection class	IP20			
Mounting	DIN rail mountable TS35 (EN 60715)			
Installation position	any			
Insulation voltage input / output	4.0 kV_{eff}			
Rated insulation voltage (EN 50178)	300 V			
Safe isolation	yes			
Operation temperature range	-25 °C … +60 °C			
Storage temperature range	-40 °C … +80 °C			
Dimensions (w × h × d)	6.2 × 93.0 × 76.0 mm			
Weight	0.030 kg/piece			
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16		Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	
Standards	EN 60947-5-1			
Approvals	cULus, DNV GL			

Comments

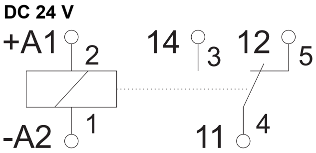
Hard gold-plated contacts: In order to avoid damage to the gold layered contacts, do not exceed product specifications as permanent damage or sparking could occur between the coil and the contacts.

Dimensions

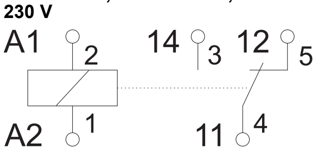


PIN assignment

DC 24 V



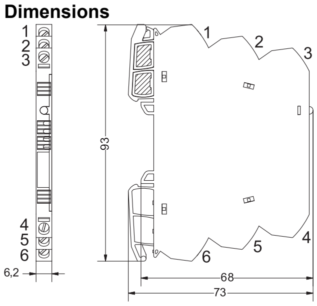
AC/DC 24 V, AC/DC 115 V, AC/DC 230 V



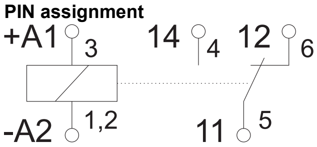
* **S** Article from stock
A Available with a lead time
R Available on request

Output Relay Interface, relay with 1 directional contact / SPDT relay, pluggable AC/DC 250 V, 6 A, 1500 VA / 144 W Screw terminal / Push-In, contact material: $AgSnO_2$

Dimensions



PIN assignment

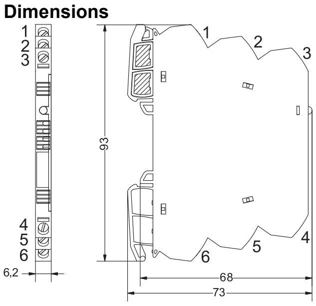


Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 12 V	760019.0000	**A***	LCIS-RGA12DC-S-1U	5
Push-In					
Rated voltage U_N	DC 12 V	761019.0000	**S***	LCIS-RGA12DC-PI-1U	5

Input	**DC 12 V**
Input voltage range	9.6 – 15 V
Rated current I_N	17.2 mA
Interrupting voltage	<1.2 V
Protection device Input	Varistor Reverse diode
Max. length of connecting lead	1000 m
Status display input	LED green
Rated frequency f_N	–
Output	
Contact type	1 changeover contacts / SPDT
Min. switching voltage	AC/DC 17 V
Max. switching voltage	AC/DC 250 V
Min. switching current	AC/DC 5 mA
Max. switching current	AC/DC 6 A
Switching capacity AC 15	3 A
Switching capacity DC 13	1 A @ 24 V 200 mA @ 125 V 100 mA @ 250 V
Max. switching capacity	1500 VA / 144 W
Contact material	$AgSnO_2$
Mechanical service life	> 10 x 10^6 operations
Switch-on delay	7 ms
Shutdown delay	13 ms
Clearance/creepage dist. (control/load side)	>5.5 mm
General	
Housing material	PA 6.6 (UL 94 V-0)
Color of the housing	RAL 7012 basalt grey
Protection class	IP20
Mounting	DIN rail mountable TS35 (EN 60715)
Installation position	any
Insulation voltage input / output	4.0 kV_{eff}
Rated insulation voltage (EN 50178)	300 V
Safe isolation	yes
Operation temperature range	-25 °C … +60 °C
Storage temperature range	-40 °C … +80 °C
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm
Weight	0.030 kg/piece
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16 Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1
Approvals	cULus in preparation, DNV GL in preparation

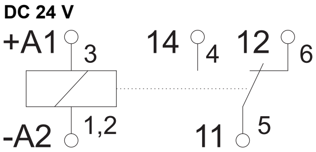
Output Relay Interface, relay with 1 directional contact / SPDT relay, pluggable
AC/DC 250 V, 6 A, 1500 VA / 144 W
Screw terminal / Push-In, contact material: $AgSnO_2$

Dimensions

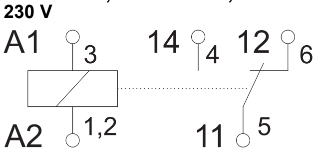


PIN assignment

DC 24 V



AC/DC 24 V, AC/DC 115 V, AC/DC 230 V



Description		**Part-No.**		**Type**	**PU**
Screw terminal					
Rated voltage U_N	DC 24 V	760020.0000	**S***	LCIS-RGA24DC-S-1U	5
	AC/DC 24 V	760021.0000	**S***	LCIS-RGA24UP-S-1U	5
	AC/DC 115 V	760051.0000	**A***	LCIS-RGA120UP-S-1U	5
	AC/DC 230 V	760061.0000	**S***	LCIS-RGA230UP-S-1U	5
Push-In					
Rated voltage U_N	DC 24 V	761020.0000	**S***	LCIS-RGA24DC-PI-1U	5
	AC/DC 24 V	761021.0000	**S***	LCIS-RGA24UP-PI-1U	5
	AC/DC 115 V	761051.0000	**A***	LCIS-RGA120UP-PI-1U	5
	AC/DC 230 V	761061.0000	**S***	LCIS-RGA230UP-PI-1U	5

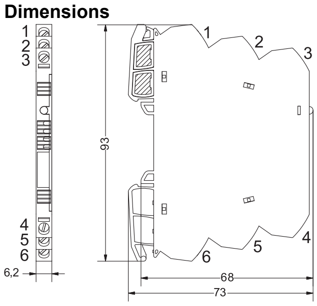
Input	**DC 24 V**	**AC/DC 24 V**	**AC/DC 115 V**	**AC/DC 230 V**
Input voltage range	19.2 – 30 V		92 – 126.5 V	184 – 253 V
Rated current I_N	10.7 mA	10.6 mA	3.7 mA	3.6 mA
Interrupting voltage	<1.7 V	<2.0 V	<7.7 V	<12.7 V
Protection device Input	Reverse diode	Bridge rectifier		
Max. length of connecting lead	DC: 1000 m	DC: 1000 m / AC: 500 m		
Status display input	LED green			
Rated frequency f_N	–	50 Hz / 60 Hz		
Output				
Contact type	1 changeover contacts / SPDT			
Min. switching voltage	AC/DC 17 V			
Max. switching voltage	AC/DC 250 V			
Min. switching current	AC/DC 5 mA			
Max. switching current	AC/DC 6 A			
Switching capacity AC 15	3 A			
Switching capacity DC 13	1 A @ 24 V 200 mA @ 125 V 100 mA @ 250 V			
Max. switching capacity	1500 VA / 144 W			
Contact material	$AgSnO_2$			
Mechanical service life	> 10 x 10^6 operations			
Switch-on delay	5 ms			10 ms
Shutdown delay	4 ms	10 ms		15 ms
Clearance/creepage dist. (control/load side)	>5.5 mm			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Color of the housing	RAL 7012 basalt grey			
Protection class	IP20			
Mounting	DIN rail mountable TS35 (EN 60715)			
Installation position	any			
Insulation voltage input / output	4.0 kV_{eff}			
Rated insulation voltage (EN 50178)	300 V			
Safe isolation	yes			
Operation temperature range	-25 °C … +60 °C			
Storage temperature range	-40 °C … +80 °C			
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm			
Weight	0.030 kg/piece			
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16		Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	
Standards	EN 60947-5-1			
Approvals	cULus, DNV GL			

* **S** Article from stock
A Available with a lead time
R Available on request

Output Relay Interface, relay with 1 directional contact / SPDT relay, pluggable AC/DC 250 V, 6 A, 1500 VA / 144 W Screw terminal / Push-In, contact material: $AgSnO_2$+ 5 µm HV

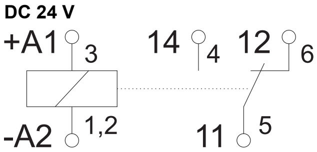
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	760020.0010	**S***	LCIS-RGA24DC-S-1U-HTV	5
	AC/DC 24 V	760021.0010	**S***	LCIS-RGA24UP-S-1U-HTV	5
	AC/DC 115 V	760051.0010	**A***	LCIS-RGA120UP-S-1U-HTV	5
	AC/DC 230 V	760061.0010	**S***	LCIS-RGA230UP-S-1U-HTV	5
Push-In					
Rated voltage U_N	DC 24 V	761020.0010	**S***	LCIS-RGA24DC-PI-1U-HTV	5
	AC/DC 24 V	761021.0010	**S***	LCIS-RGA24UP-PI-1U-HTV	5
	AC/DC 115 V	761051.0010	**A***	LCIS-RGA120UP-PI-1U-HTV	5
	AC/DC 230 V	761061.0010	**S***	LCIS-RGA230UP-PI-1U-HTV	5

Dimensions

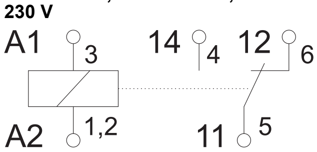


PIN assignment

DC 24 V



AC/DC 24 V, AC/DC 115 V, AC/DC 230 V



Input	**DC 24 V**	**AC/DC 24 V**	**AC/DC 115 V**	**AC/DC 230 V**
Input voltage range	19.2 – 30 V		92 – 126.5 V	184 – 253 V
Rated current I_N	10.7 mA	10.6 mA	3.7 mA	3.6 mA
Interrupting voltage	<1.7 V	<2.0 V	<7.7 V	<12.7 V
Protection device Input	Reverse diode	Bridge rectifier		
Max. length of connecting lead	DC: 1000 m	DC: 1000 m / AC: 500 m		
Status display input	LED green			
Rated frequency f_N	–	50 Hz / 60 Hz		
Output				
Contact type	1 changeover contacts / SPDT			
Min. switching voltage	AC/DC 1 V			
Max. switching voltage	AC/DC 250 V			
Min. switching current	AC/DC 1 mA			
Max. switching current	AC/DC 6 A			
Switching capacity AC 15	3 A			
Switching capacity DC 13	1 A @ 24 V 200 mA @ 125 V 100 mA @ 250 V			
Max. switching capacity	1500 VA / 144 W			
Contact material	$AgSnO_2$ + 5 µm HV			
Mechanical service life	> 10 x 10^6 operations			
Shutdown delay	10 ms			15 ms
Clearance/creepage dist. (control/load side)	>5.5 mm			
Inrush current	16 A (4 ms)			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Color of the housing	RAL 7012 basalt grey			
Protection class	IP20			
Mounting	DIN rail mountable TS35 (EN 60715)			
Installation position	any			
Insulation voltage input / output	4.0 kV_{eff}			
Rated insulation voltage (EN 50178)	300 V			
Safe isolation	yes			
Operation temperature range	-25 °C … +60 °C			
Storage temperature range	-40 °C … +80 °C			
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm			
Weight	0.030 kg/piece			
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16		Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	
Standards	EN 60947-5-1			
Approvals	cULus, DNV GL			

Comments

Hard gold-plated contacts: So that the gold layer is not damaged, the specified values are not permitted to be exceeded. At higher switching capacity, the gold layer vaporizes. The deposition in the housing can lead to sparkovers between the coil and contact.

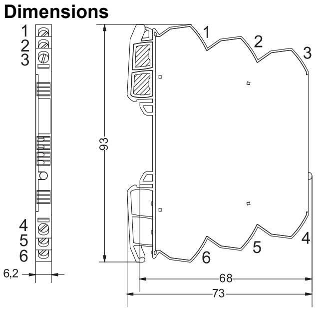
* **S** Article from stock
A Available with a lead time
R Available on request

Input Relay Interface, relay with 1 directional contact / SPDT relay, pluggable
AC/DC 250 V, 6 A, 1500 VA / 144 W
Screw terminal / Push-In, contact material: $AgSnO_2$

Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	760023.0000	**A***	LCIS-RGE24DC-S-1U	5
	AC/DC 24 V	760024.0000	**A***	LCIS-RGE24UP-S-1U	5
	AC/DC 115 V	760054.0000	**A***	LCIS-RGE120UP-S-1U	5
	AC/DC 230 V	760064.0000	**A***	LCIS-RGE230UP-S-1U	5
Push-In					
Rated voltage U_N	DC 24 V	761023.0000	**A***	LCIS-RGE24DC-PI-1U	5
	AC/DC 24 V	761024.0000	**A***	LCIS-RGE24UP-PI-1U	5
	AC/DC 115 V	761054.0000	**A***	LCIS-RGE120UP-PI-1U	5
	AC/DC 230 V	761064.0000	**A***	LCIS-RGE230UP-PI-1U	5

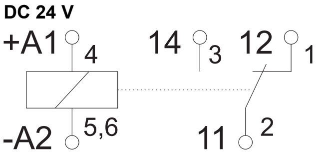
Input	**DC 24 V**	**AC/DC 24 V**	**AC/DC 115 V**	**AC/DC 230 V**
Input voltage range	19.2 – 30 V		92 – 126.5 V	184 – 253 V
Rated current I_N	10.7 mA	10.6 mA	3.7 mA	3.6 mA
Interrupting voltage	<1.7 V	<2.0 V	<7.7 V	<12.7 V
Protection device Input	Reverse diode	Bridge rectifier		
Max. length of connecting lead	DC: 1000 m	DC: 1000 m / AC: 500 m		
Status display input	LED green			
Rated frequency f_N	–	50 Hz / 60 Hz		
Output				
Contact type	1 changeover contacts / SPDT			
Min. switching voltage	AC/DC 17 V			
Max. switching voltage	AC/DC 250 V			
Min. switching current	AC/DC 5 mA			
Max. switching current	AC/DC 6 A			
Switching capacity AC 15	3 A			
Switching capacity DC 13	1 A @ 24 V 200 mA @ 125 V 100 mA @ 250 V			
Max. switching capacity	1500 VA / 144 W			
Contact material	$AgSnO_2$			
Mechanical service life	> 10 x 10^6 operations			
Switch-on delay	5 ms			10 ms
Shutdown delay	4 ms	10 ms		15 ms
Clearance/creepage dist. (control/load side)	>5.5 mm			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Color of the housing	RAL 7012 basalt grey			
Protection class	IP20			
Mounting	DIN rail mountable TS35 (EN 60715)			
Installation position	any			
Insulation voltage input / output	4.0 kV_{eff}			
Rated insulation voltage (EN 50178)	300 V			
Safe isolation	yes			
Operation temperature range	-25 °C … +60 °C			
Storage temperature range	-40 °C … +80 °C			
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm			
Weight	0.030 kg/piece			
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16		Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	
Standards	EN 60947-5-1			
Approvals	cULus, DNV GL			

Dimensions

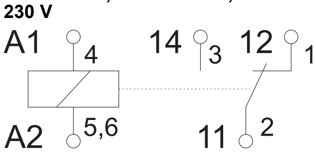


PIN assignment

DC 24 V



AC/DC 24 V, AC/DC 115 V, AC/DC 230 V

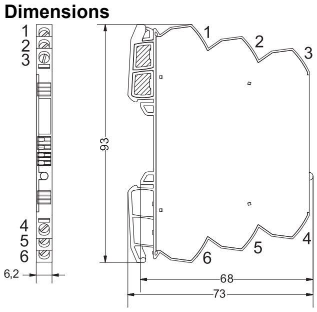


* **S** Article from stock
A Available with a lead time
R Available on request

Input Relay Interface, relay with 1 directional contact / SPDT relay, pluggable AC/DC 250 V, 6 A, 1500 VA / 144 W Screw terminal / Push-In, contact material: $AgSnO_2$+ 5 µm HV

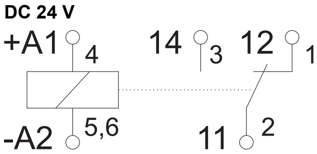
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	760023.0010	**A***	LCIS-RGE24DC-S-1U-HTV	5
	AC/DC 24 V	760024.0010	**A***	LCIS-RGE24UP-S-1U-HTV	5
	AC/DC 115 V	760054.0010	**A***	LCIS-RGE120UP-S-1U-HTV	5
	AC/DC 230 V	760064.0010	**A***	LCIS-RGE230UP-S-1U-HTV	5
Push-In					
Rated voltage U_N	DC 24 V	761023.0010	**A***	LCIS-RGE24DC-PI-1U-HTV	5
	AC/DC 24 V	761024.0010	**A***	LCIS-RGE24UP-PI-1U-HTV	5
	AC/DC 115 V	761054.0010	**A***	LCIS-RGE120UP-PI-1U-HTV	5
	AC/DC 230 V	761064.0010	**A***	LCIS-RGE230UP-PI-1U-HTV	5

Dimensions

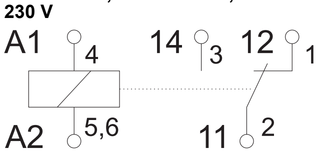


PIN assignment

DC 24 V



AC/DC 24 V, AC/DC 115 V, AC/DC 230 V



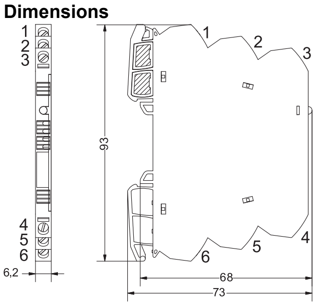
Input	**DC 24 V**	**AC/DC 24 V**	**AC/DC 115 V**	**AC/DC 230 V**
Input voltage range	19.2 – 30 V		92 – 126.5 V	184 – 253 V
Rated current I_N	10.7 mA	10.6 mA	3.7 mA	3.6 mA
Interrupting voltage	<1.7 V	<2.0 V	<7.7 V	<12.7 V
Protection device Input	Reverse diode	Bridge rectifier		
Max. length of connecting lead	DC: 1000 m	DC: 1000 m / AC: 500 m		
Status display input	LED green			
Rated frequency f_N	–	50 Hz / 60 Hz		
Output				
Contact type	1 changeover contacts / SPDT			
Min. switching voltage	–			
Max. switching voltage	AC/DC 250 V			
Min. switching current	–			
Max. switching current	AC/DC 6 A			
Switching capacity AC 15	3 A			
Switching capacity DC 13	1 A @ 24 V 200 mA @ 125 V 100 mA @ 250 V			
Max. switching capacity	1500 VA / 144 W			
Contact material	$AgSnO_2$ + 5 µm HV			
Mechanical service life	> 10 x 10^6 operations			
Shutdown delay	10 ms			15 ms
Clearance/creepage dist. (control/load side)	>5.5 mm			
Inrush current	16 A (4 ms)			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Color of the housing	RAL 7012 basalt grey			
Protection class	IP20			
Mounting	DIN rail mountable TS35 (EN 60715)			
Installation position	any			
Insulation voltage input / output	4.0 kV_{eff}			
Rated insulation voltage (EN 50178)	300 V			
Safe isolation	yes			
Operation temperature range	-25 °C … +60 °C			
Storage temperature range	-40 °C … +80 °C			
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm			
Weight	0.030 kg/piece			
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16		Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	
Standards	EN 60947-5-1			
Approvals	cULus, DNV GL			

Comments

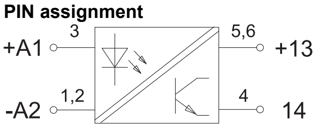
Hard gold-plated contacts: So that the gold layer is not damaged, the specified values are not permitted to be exceeded. At higher switching capacity, the gold layer vaporizes. The deposition in the housing can lead to sparkovers between the coil and contact.

Solid state relay, 2-conductor technology
Switching element max. DC 60 V / 0,5 A, DC 60 V / 2 A
Screw terminal / Push-In

Dimensions



PIN assignment



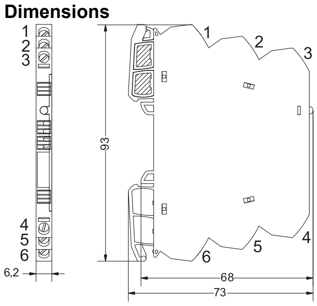
Description		Part-No.		Type	PU
Screw terminal					
Nominal voltage load	DC 24 V DC 60 V / 2 A	763020.0120	A*	LCIS-SR-DC-2L-200120-S	5
	DC 24 V DC 60 V / 0.5 A	763020.0110	A*	LCIS-SR-DC-2L-200110-S	5
Push-In					
Nominal voltage load	DC 24 V DC 60 V / 2 A	764020.0120	S*	LCIS-SR-DC-2L-200120-PI	5
	DC 24 V DC 60 V / 0.5 A	764020.0110	S*	LCIS-SR-DC-2L-200110-PI	5

Input	**763020.0120**	**763020.0110**	**764020.0120**	**764020.0110**
Input voltage range	11 – 30 V			
Rated current I_N	>4 mA			
Interrupting voltage	–			
Protection device Input	Varistor			
Status display input	LED green			
Rated frequency f_N	–			
Output				
Switching element	MosFet N/O contact			
Min. switching voltage	DC 10 V			
Max. switching voltage	DC 60 V			
Min. switching current	1 mA			
Max. switching current	2 A	0.5 A	2 A	0.5 A
Inrush current	10 A/20 ms @ 1 Hz			
Leak current	<10 µA			
Switch-on delay	<400 µs			
Shutdown delay	<2 ms			
Switching frequency	max. 50 Hz			
Clearance/creepage dist. (control/load side)	>5 mm			
Protection device	Varistor			
Short circuit	non short-circuit proof			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Color of the housing	RAL 7012 basalt grey			
Protection class	IP20			
Mounting	DIN rail mountable TS35 (EN 60715)			
Installation position	any			
Insulation voltage input / output	4.0 kV_{eff}			
Safe isolation	yes			
Operation temperature range	-25 °C … +60 °C			
Storage temperature range	-40 °C … +80 °C			
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm			
Weight	0.030 kg/piece			
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16		Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	
Standards	EN 60947-5-1			
Approvals	cULus, DNV GL			

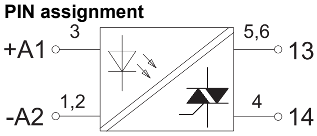
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 2-conductor technology
Switching element max. AC 230 V / 2 A
Screw terminal / Push-In

Dimensions



PIN assignment



Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763020.0220	**A***	LCIS-SR-DC/AC-2L-200220-S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.0220	**S***	LCIS-SRDC/AC2L-200220-PI	5

Input	**763020.0220**	**764020.0220**
Input voltage range	11 V – 30 V	
Rated current I_N	9 mA	
Interrupting voltage	<9 V	
Protection device Input	Varistor	
Status display input	LED green	
Rated frequency f_N	–	
Output		
Switching element	Triac N/O contact	
Min. switching voltage	AC 20 V	
Max. switching voltage	AC 264 V	
Min. switching current	5 mA	
Max. switching current	2 A	
Inrush current	20 A/20 ms @ 1 Hz	
Leak current	1 mA	
Switch-on delay	<10 ms	
Shutdown delay	<10 ms	
Switching frequency	max. 10 Hz	
Clearance/creepage dist. (control/load side)	>5.5 mm	
Protection device	Varistor	
Short circuit	non short-circuit proof	
General		
Housing material	PA 6.6 (UL 94 V-0)	
Color of the housing	RAL 7012 basalt grey	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Insulation voltage input / output	4.0 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-25 °C … +60 °C	
Storage temperature range	-40 °C … +80 °C	
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm	
Weight	0.030 kg/piece	
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1	
Approvals	cULus, DNV GL	

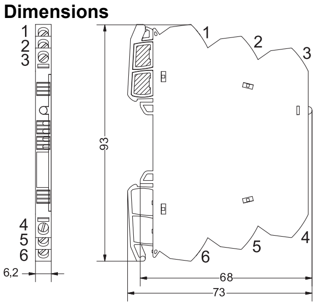
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 2-conductor technology
Switching element AC/DC 240 V / 2A
Screw terminal / Push-In

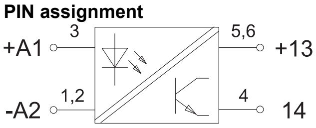
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763020.0500	**A***	LCIS-SR-DC/UC2L-200500-S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.0500	**S***	LCIS-SR-DC/UC2L-200500-P	5

Input	**763020.0500**	**764020.0500**
Input voltage range	DC 16.8 V – 30 V	
Rated current I_N	DC 9 mA	
Interrupting voltage	<10 V	
Activation voltage	>16.8 V	
Protection device	Varistor, Reverse diode	
Status display input	LED green	
Rated frequency f_N	–	
Output		
Switching element	MosFet N/O contact	
Min. switching voltage	AC/DC 2 V	
Max. switching voltage	AC/DC 253 V	
Min. switching current	AC/DC 1 mA	
Max. switching current	AC/DC 2 A @ 100 % ED	
Inrush current	10 A/20 ms @ 1 Hz	
Leak current	AC: <0.2 mA, DC: <1µA	
Switch-on delay	<150 µs @ I_{max}	
Shutdown delay	<100 µs @ I_{max}	
Switching frequency	500 Hz	
Clearance/creepage dist. (control/load side)	>5.5 mm	
Protection device	Varistor	
Short circuit	non short-circuit proof	
General		
Housing material	PA 6.6 (UL 94 V-0)	
Color of the housing	RAL 7012 basalt grey	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Insulation voltage input / output	4.0 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-25 °C … +60 °C	
Storage temperature range	-40 °C … +80 °C	
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm	
Weight	0.030 kg/piece	
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1	
Approvals	cULus in preparation, DNV GL in preparation	

Dimensions



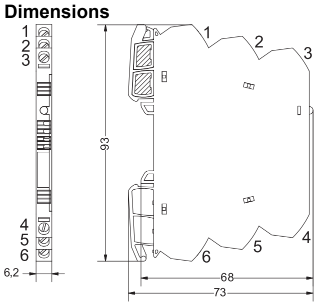
PIN assignment



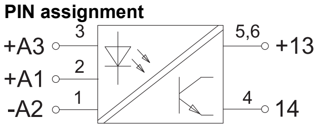
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 2-conductor technology
Switching element DC 24 V / DC 0,5 A / 20 kHz
Screw terminal / Push-In

Dimensions



PIN assignment



Description		**Part-No.**		**Type**	**PU**
Screw terminal					
Rated voltage U_N	DC 24 V	763020.0091	**A***	LCIS-SR-DC-2L-200091-S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.0091	**S***	LCIS-SR-DC-2L-200091-PI	5

Input	**763020.0091**	**764020.0091**
Input voltage	+A1: 19.2 - 30 V / +A3: 4.2 - 30 V	
Rated current I_N	+A1: DC 12 mA / +A3: DC 0.7 mA	
Interrupting voltage	<2.7 V	
Activation voltage	>4.2 V	
Protection device	Varistor, Reverse diode	
Status display input	LED green	
Rated frequency f_N	–	
Output		
Switching element	Transistor N/O contact	
Min. switching voltage	DC 5 V	
Max. switching voltage	DC 31.2 V	
Min. switching current	DC 10 mA	
Max. switching current	DC 0.5 A @ 100 % ED	
Inrush current	2.5 A/20 ms @ 1 Hz	
Leak current	<10 µA	
Switch-on delay	<15 µs @ I_{max}, U_N	
Shutdown delay	<20 µs @ I_{max}, U_N	
Switching frequency	approx. 20 kHz	
Clearance/creepage dist. (control/load side)	>5.5 mm	
Protection device	Suppressor diode	
Short circuit	non short-circuit proof	
General		
Housing material	PA 6.6 (UL 94 V-0)	
Color of the housing	RAL 7012 basalt grey	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Insulation voltage input / output	3.75 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-25 °C … +60 °C	
Storage temperature range	-40 °C … +80 °C	
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm	
Weight	0.030 kg/piece	
Connection device	Screw terminal single wire .25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1	
Approvals	cULus in preparation, DNV GL in preparation	

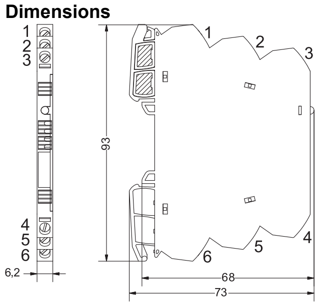
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 2-conductor technology
Switching element DC 60 V / DC 5 A
Screw terminal / Push-In

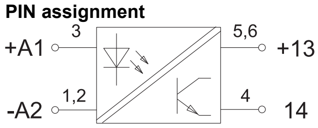
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763020.0130	**A***	LCIS-SR-DC-2L-200130-S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.0130	**S***	LCIS-SR-DC-2L-200130-PI	5

<table>
<tr><th>Input</th><th>763020.0130</th><th>764020.0130</th></tr>
<tr><td>Input voltage range</td><td colspan="2">DC 19.2 V – 30 V</td></tr>
<tr><td>Rated current I_N</td><td colspan="2">DC 10 mA</td></tr>
<tr><td>Interrupting voltage</td><td colspan="2"><14 V</td></tr>
<tr><td>Activation voltage</td><td colspan="2">>16.8 V</td></tr>
<tr><td>Protection device</td><td colspan="2">Varistor, Reverse diode</td></tr>
<tr><td>Status display input</td><td colspan="2">LED green</td></tr>
<tr><td>Rated frequency f_N</td><td colspan="2">–</td></tr>
<tr><td>Output</td><td></td><td></td></tr>
<tr><td>Switching element</td><td colspan="2">MosFet N/O contact</td></tr>
<tr><td>Min. switching voltage</td><td colspan="2">DC 10 V</td></tr>
<tr><td>Max. switching voltage</td><td colspan="2">DC 60 V</td></tr>
<tr><td>Min. switching current</td><td colspan="2">DC 1 mA</td></tr>
<tr><td>Max. switching current</td><td colspan="2">DC 5 A @ 100 % ED</td></tr>
<tr><td>Inrush current</td><td colspan="2">25 A/20 ms @ 1 Hz</td></tr>
<tr><td>Leak current</td><td colspan="2"><1 µA</td></tr>
<tr><td>Switch-on delay</td><td colspan="2"><250 µs @ I_{max}</td></tr>
<tr><td>Shutdown delay</td><td colspan="2"><150 µs @ I_{max}</td></tr>
<tr><td>Switching frequency</td><td colspan="2">1 kHz</td></tr>
<tr><td>Clearance/creepage dist. (control/load side)</td><td colspan="2">>5.5 mm</td></tr>
<tr><td>Protection device</td><td colspan="2">Varistor</td></tr>
<tr><td>Short circuit</td><td colspan="2">non short-circuit proof</td></tr>
<tr><td>General</td><td></td><td></td></tr>
<tr><td>Housing material</td><td colspan="2">PA 6.6 (UL 94 V-0)</td></tr>
<tr><td>Color of the housing</td><td colspan="2">RAL 7012 basalt grey</td></tr>
<tr><td>Protection class</td><td colspan="2">IP20</td></tr>
<tr><td>Mounting</td><td colspan="2">DIN rail mountable TS35 (EN 60715)</td></tr>
<tr><td>Installation position</td><td colspan="2">any</td></tr>
<tr><td>Insulation voltage input / output</td><td colspan="2">4.0 kV_{eff}</td></tr>
<tr><td>Safe isolation</td><td colspan="2">yes</td></tr>
<tr><td>Operation temperature range</td><td colspan="2">-25 °C … +60 °C</td></tr>
<tr><td>Storage temperature range</td><td colspan="2">-40 °C … +80 °C</td></tr>
<tr><td>Dimensions (w × h × d)</td><td colspan="2">6.2 × 93.0 × 73.0 mm</td></tr>
<tr><td>Weight</td><td colspan="2">0.030 kg/piece</td></tr>
<tr><td>Connection device</td><td>Screw terminal single wire
0.25 mm^2–2.5 mm^2 / AWG 20–14
fine stranded wire with ferrule
0.25 mm^2–1.5 mm^2 / AWG 20–16</td><td>Push-In single wire
0.25 mm^2–2.5 mm^2 / AWG 20–14
fine stranded wire with ferrule
0.25 mm^2–1.5 mm^2 / AWG 20–16</td></tr>
<tr><td>Standards</td><td colspan="2">EN 60947-5-1</td></tr>
<tr><td>Approvals</td><td>cULus in preparation,
DNV GL in preparation</td><td>cULus, DNV GL in preparation</td></tr>
</table>

Dimensions



PIN assignment



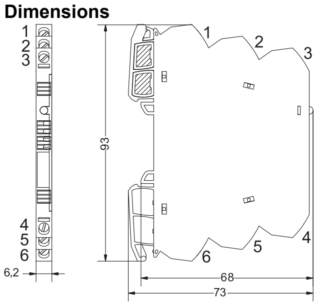
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 2-conductor technology
Switching element DC 24 V / DC 10 A
Screw terminal / Push-In

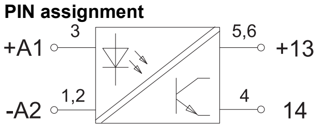
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763050.0140	**A***	LCIS-SR-DC-2L-500140-S	5
Push-In					
Rated voltage U_N	DC 24 V	764050.0140	**S***	LCIS-SR-DC-2L-500140-PI	5

<table>
<tr><th>Input</th><th>763050.0140</th><th>764050.0140</th></tr>
<tr><td>Input voltage range</td><td colspan="2">DC 19.2 V – 30 V</td></tr>
<tr><td>Rated current I_N</td><td colspan="2">DC 10 mA</td></tr>
<tr><td>Interrupting voltage</td><td colspan="2"><14 V</td></tr>
<tr><td>Activation voltage</td><td colspan="2">>16.8 V</td></tr>
<tr><td>Protection device</td><td colspan="2">Varistor, Reverse diode</td></tr>
<tr><td>Status display input</td><td colspan="2">LED green</td></tr>
<tr><td>Rated frequency f_N</td><td colspan="2">–</td></tr>
<tr><td>Output</td><td colspan="2"></td></tr>
<tr><td>Switching element</td><td colspan="2">MosFet N/O contact</td></tr>
<tr><td>Min. switching voltage</td><td colspan="2">DC 10 V</td></tr>
<tr><td>Max. switching voltage</td><td colspan="2">DC 30 V</td></tr>
<tr><td>Min. switching current</td><td colspan="2">DC 1 mA</td></tr>
<tr><td>Max. switching current</td><td colspan="2">DC 10 A @ 100 % ED</td></tr>
<tr><td>Inrush current</td><td colspan="2">50 A/20 ms @ 1 Hz</td></tr>
<tr><td>Leak current</td><td colspan="2"><10 µA</td></tr>
<tr><td>Switch-on delay</td><td colspan="2"><250 µs @ I_{max}</td></tr>
<tr><td>Shutdown delay</td><td colspan="2"><150 µs @ I_{max}</td></tr>
<tr><td>Switching frequency</td><td colspan="2">1 kHz</td></tr>
<tr><td>Clearance/creepage dist. (control/load side)</td><td colspan="2">>5.5 mm</td></tr>
<tr><td>Protection device</td><td colspan="2">Varistor</td></tr>
<tr><td>Short circuit</td><td colspan="2">non short-circuit proof</td></tr>
<tr><td>General</td><td colspan="2"></td></tr>
<tr><td>Housing material</td><td colspan="2">PA 6.6 (UL 94 V-0)</td></tr>
<tr><td>Color of the housing</td><td colspan="2">RAL 7012 basalt grey</td></tr>
<tr><td>Protection class</td><td colspan="2">IP20</td></tr>
<tr><td>Mounting</td><td colspan="2">DIN rail mountable TS35 (EN 60715)</td></tr>
<tr><td>Installation position</td><td colspan="2">any</td></tr>
<tr><td>Insulation voltage input / output</td><td colspan="2">4.0 kV_{eff}</td></tr>
<tr><td>Safe isolation</td><td colspan="2">yes</td></tr>
<tr><td>Operation temperature range</td><td colspan="2">-25 °C … +60 °C</td></tr>
<tr><td>Storage temperature range</td><td colspan="2">-40 °C … +80 °C</td></tr>
<tr><td>Dimensions (w × h × d)</td><td colspan="2">6.2 × 93.0 × 73.0 mm</td></tr>
<tr><td>Weight</td><td colspan="2">0.030 kg/piece</td></tr>
<tr><td>Connection device</td><td>Screw terminal single wire
0.25 mm^2–2.5 mm^2 / AWG 20–14
fine stranded wire with ferrule
0.25 mm^2–1.5 mm^2 / AWG 20–16</td><td>Push-In single wire
0.25 mm^2–2.5 mm^2 / AWG 20–14
fine stranded wire with ferrule
0.25 mm^2–1.5 mm^2 / AWG 20–16</td></tr>
<tr><td>Standards</td><td colspan="2">EN 60947-5-1</td></tr>
<tr><td>Approvals</td><td colspan="2">cULus in preparation, DNV GL in preparation</td></tr>
</table>

Dimensions



PIN assignment



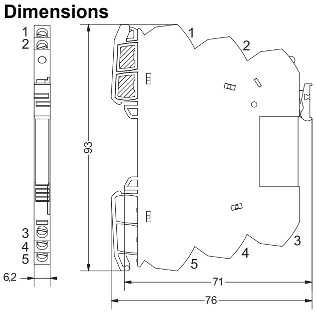
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 2-conductor technology, pluggable
Switching element DC 30 V / DC 3 A
Screw terminal / Push-In

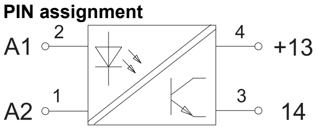
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763020.1020	**A***	LCIS-SRS-DC-2L-201020-S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.1020	**S***	LCIS-SRS-DC-2L-201020-PI	5

<table>
<tr><th>Input</th><th>763020.1020</th><th>764020.1020</th></tr>
<tr><td>Input voltage range</td><td colspan="2">DC 19.2 V – 30 V</td></tr>
<tr><td>Rated current I_N</td><td colspan="2">DC 11.3 mA</td></tr>
<tr><td>Interrupting voltage</td><td colspan="2"><9.4 V</td></tr>
<tr><td>Protection device Input</td><td colspan="2">Varistor Bridge rectifier</td></tr>
<tr><td>Status display input</td><td colspan="2">LED green</td></tr>
<tr><td>Rated frequency f_N</td><td colspan="2">–</td></tr>
<tr><td>Output</td><td colspan="2"></td></tr>
<tr><td>Switching element</td><td colspan="2">MosFet N/O contact</td></tr>
<tr><td>Min. switching voltage</td><td colspan="2">DC 10 V</td></tr>
<tr><td>Max. switching voltage</td><td colspan="2">DC 30 V</td></tr>
<tr><td>Min. switching current</td><td colspan="2">DC 1 mA</td></tr>
<tr><td>Max. switching current</td><td colspan="2">DC 3 A</td></tr>
<tr><td>Leak current</td><td colspan="2"><1 mA</td></tr>
<tr><td>Switch-on delay</td><td colspan="2"><150 µs</td></tr>
<tr><td>Shutdown delay</td><td colspan="2"><600 µs</td></tr>
<tr><td>Switching frequency</td><td colspan="2">10 Hz</td></tr>
<tr><td>Clearance/creepage dist. (control/load side)</td><td colspan="2">>5.5 mm</td></tr>
<tr><td>Protection device</td><td colspan="2">Suppressor diode</td></tr>
<tr><td>Short circuit</td><td colspan="2">non short-circuit proof</td></tr>
<tr><td>General</td><td colspan="2"></td></tr>
<tr><td>Housing material</td><td colspan="2">PA 6.6 (UL 94 V-0)</td></tr>
<tr><td>Color of the housing</td><td colspan="2">RAL 7012 basalt grey</td></tr>
<tr><td>Protection class</td><td colspan="2">IP20</td></tr>
<tr><td>Mounting</td><td colspan="2">DIN rail mountable TS35 (EN 60715)</td></tr>
<tr><td>Installation position</td><td colspan="2">any</td></tr>
<tr><td>Insulation voltage input / output</td><td colspan="2">2.5 kV_{eff}</td></tr>
<tr><td>Safe isolation</td><td colspan="2">yes</td></tr>
<tr><td>Operation temperature range</td><td colspan="2">-20 °C … +60 °C</td></tr>
<tr><td>Storage temperature range</td><td colspan="2">-25 °C … +80 °C</td></tr>
<tr><td>Dimensions (w × h × d)</td><td colspan="2">6.2 × 93.0 × 76.0 mm</td></tr>
<tr><td>Weight</td><td colspan="2">0.030 kg/piece</td></tr>
<tr><td>Connection device</td><td>Screw terminal single wire
0.25 mm²–2.5 mm² / AWG 20–14
fine stranded wire with ferrule
0.25 mm²–1.5 mm² / AWG 20–16</td><td>Push-In single wire
0.25 mm²–2.5 mm² / AWG 20–14
fine stranded wire with ferrule
0.25 mm²–1.5 mm² / AWG 20–16</td></tr>
<tr><td>Standards</td><td colspan="2">EN 60947-5-1</td></tr>
<tr><td>Approvals</td><td colspan="2">cULus in preparation, DNV GL in preparation</td></tr>
</table>

Dimensions



PIN assignment

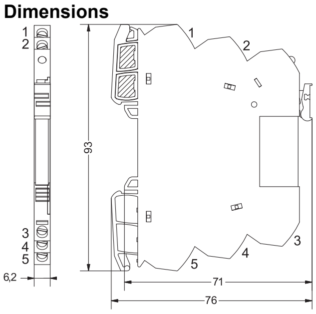


(5 = n.c.)

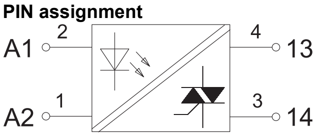
*	**S**	Article from stock
	A	Available with a lead time
	R	Available on request

Solid state relay, 2-conductor technology, pluggable
Switching element AC 240 V / AC 0.75 A
Screw terminal / Push-In

Dimensions



PIN assignment



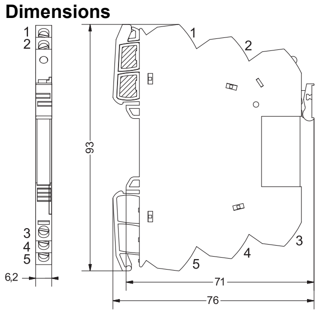
(5 = n.c.)

Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763020.1210	**A***	LCIS-SRS-AC-2L-201210-S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.1210	**S***	LCIS-SRS-AC-2L-201210-PI	5

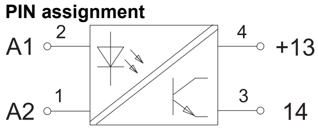
Input	**764020.1210**	**763020.1210**
Input voltage range	DC 19.2 V – 30 V	
Rated current I_N	DC 11.3 mA	
Interrupting voltage	<1.9 V	
Protection device Input	Varistor Bridge rectifier	
Status display input	LED green	
Rated frequency f_N	–	
Output		
Switching element	Triac (Zero crossing switch) N/O contact	
Min. switching voltage	AC 24 V	
Max. switching voltage	AC 253 V	
Min. switching current	AC 0.05 A	
Max. switching current	AC 0.75 A	
Leak current	<AC 1.5 mA	
Switch-on delay	1 ms + 1/2 period	
Shutdown delay	1 ms + 1/2 period	
Switching frequency	10 Hz	
Clearance/creepage dist. (control/load side)	>5.5 mm	
Protection device	RC-Snubber	
Short circuit	non short-circuit proof	
General		
Housing material	PA 6.6 (UL 94 V-0)	
Color of the housing	RAL 7012 basalt grey	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Insulation voltage input / output	3.5 kV_{eff}	
Safe isolation	no	
Operation temperature range	-20 °C … +60 °C	
Storage temperature range	-40 °C … +70 °C	
Dimensions (w × h × d)	6.2 × 93.0 × 76.0 mm	
Weight	0.030 kg/piece	
Connection device	Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	Screw terminal single wire .25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1	
Approvals	cULus in preparation, DNV GL in preparation	

Solid state relay, 2-conductor technology, pluggable
Switching element DC 30 V / DC 2 A
Screw terminal / Push-In

Dimensions



PIN assignment



(5 = n.c.)

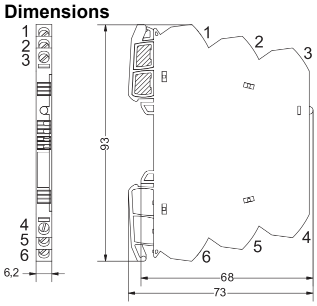
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	AC 230 V	763070.1020	**A***	LCIS-SRS-AC/DC-2L-701020-S	5
Push-In					
Rated voltage U_N	AC 230 V	764070.1020	**S***	LCIS-SRS-AC/DC-2L-701020-PI	5

Input	**763070.1020**	**764070.1020**
Input voltage range	AC 184 V – 253 V	
Rated current I_N	AC 3.3 mA	
Interrupting voltage	<AC 80 V	
Protection device Input	Bridge rectifier	
Status display input	LED green	
Rated frequency f_N	50 Hz / 60 Hz	
Output		
Switching element	MosFet N/O contact	
Min. switching voltage	DC 10 V	
Max. switching voltage	DC 30 V	
Min. switching current	DC 1 mA	
Max. switching current	DC 2A	
Leak current	<DC 1 mA	
Switch-on delay	6 ms (@DC)	
Shutdown delay	15 ms (@DC)	
Switching frequency	10 Hz	
Clearance/creepage dist. (control/load side)	>5.5 mm	
Protection device	Suppressor diode	
Short circuit	non short-circuit proof	
General		
Housing material	PA 6.6 (UL 94 V-0)	
Color of the housing	RAL 7012 basalt grey	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Insulation voltage input / output	2.5 kV_{eff}	
Safe isolation	no	
Operation temperature range	-20 °C … +60 °C (40°C at block operation)	
Storage temperature range	-40 °C … +80 °C	
Dimensions (w × h × d)	6.2 × 93.0 × 76.0 mm	
Weight	0.030 kg/piece	
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1	
Approvals	cULus in preparation, DNV GL in preparation	

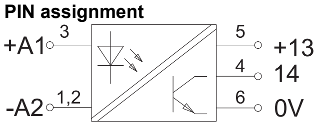
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 3-conductor technology
Switching element max. DC 30 V / 3 A
Screw terminal / Push-In

Dimensions



PIN assignment



Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	AC/DC 110–230 V	763080.0350	**A***	LCIS-SRKFAC/DC3L-800350S	5
Push-In					
Rated voltage U_N	AC/DC 110–230 V	764080.0350	**S***	LCIS-SRKFAC/DC3L-800350PIn	5

Input	**763080.0350**	**764080.0350**
Input voltage range	110 V – 230 V	
Rated current I_N	4 mA	
Interrupting voltage	<46 V	
Protection device Input	Varistor	
Status display input	LED green	
Rated frequency f_N	–	
Output		
Switching element	MosFet N/O contact	
Min. switching voltage	DC 10 V	
Max. switching voltage	DC 30 V	
Min. switching current	1 mA	
Max. switching current	3 A	
Inrush current	20 A/20 ms @ 1 Hz	
Leak current	<100 µA	
Switch-on delay	<0.3 ms	
Shutdown delay	<0.4 ms	
Switching frequency	max. 10 Hz	
Clearance/creepage dist. (control/load side)	>5.5 mm	
Protection device	Suppressor diode	
Short circuit	short circuit protection	
General		
Housing material	PA 6.6 (UL 94 V-0)	
Color of the housing	RAL 7012 basalt grey	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Insulation voltage input / output	4.0 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-25 °C … +60 °C	
Storage temperature range	-40 °C … +80 °C	
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm	
Weight	0.030 kg/piece	
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1	
Approvals	cULus, DNV GL	

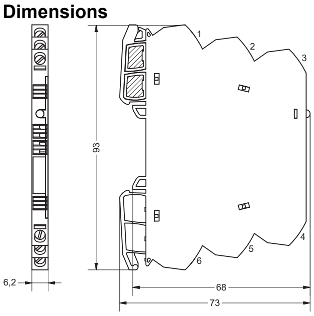
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 3-conductor technology
Switching element DC 30 V / 5 A
Screw terminal / Push-In

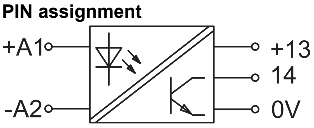
Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763020.0320	**A***	LCIS-SRKF-DC-3L-200320-S	5
	DC 24 V	763020.0330	**A***	LCIS-SRKF-DC-3L-200330-S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.0320	**S***	LCIS-SRKF-DC-3L-200320-PI	5
	DC 24 V	764020.0330	**S***	LCIS-SRKF-DC-3L-200330-PI	5

Input	**763020.0320**	**763020.0330**	**764020.0320**	**764020.0330**
Input voltage range	11 – 30 V			
Rated current I_N	DC 8 mA			
Interrupting voltage	<6 V			
Protection device	Suppressor diode			
Status display input	LED green			
Rated frequency	–			
Output				
Switching element	MosFet N/O contact			
Min. switching voltage	DC 10 V			
Max. switching voltage	DC 30 V			
Min. switching current	1 mA			
Max. switching current	2 A	5 A	2 A	5 A
Inrush current	–			
Leak current	<100 µA	1 mA	<100 µA	1 mA
Switch-on delay	<0.3 ms			
Shutdown delay	<0.4 ms			
Switching frequency	max. 100 Hz			
Clearance/creepage. dist. (control/load side)	5,5 mm			
Protection device	Suppressor diode			
Short circuit	short circuit protection			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Colour of the housing	RAL 7012 basalt grey			
Protection class	IP20			
Mounting	DIN rail mountable TS35 (EN 60715)			
Installation position	any			
Insulation voltage input / output	4.0 kV_{eff}			
Safe isolation	yes			
Operation temperature range	-25 °C … +60 °C			
Storage temperature range	-40 °C … +85 °C			
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm			
Weight	0.030 kg/piece			
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16		Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	
Standards	EN 60947-5-1			
Approvals	cULus, DNV GL			

Dimensions



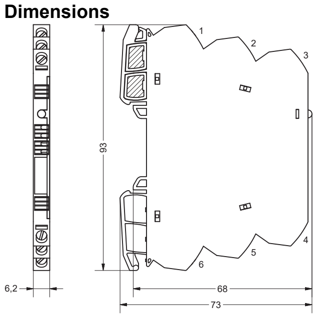
PIN assignment



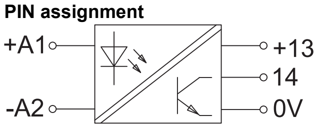
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 3-conductor technology
Switching element DC 24 V / DC 10 A
Screw terminal / Push-In

Dimensions



PIN assignment



Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763020.2340	**A***	LCIS-SRKF-DC-3L-202340-S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.2340	**S***	LCIS-SRKF-DC-3L-202340-PI	5

Input	**763020.2340**	**764020.2340**
Input voltage range	DC 19.2 – 30 V	
Rated current I_N	DC 6.5 mA	
Interrupting voltage	<5 V	
Activation voltage	>15 V	
Protection device	Varistor, Reverse diode	
Status display input	LED green	
Rated frequency	–	
Output		
Switching element	MosFet	
Min. switching voltage	DC 10 V	
Max. switching voltage	DC 30 V	
Min. switching current	DC 1 mA	
Max. switching current	DC 10 A @ 100 % ED	
Inrush current	50 A/20 ms @ 1 Hz	
Leak current	<100 µA	
Switch-on delay	<0,2 ms @ I_{max}	
Shutdown delay	<0,4 ms @ I_{max}	
Switching frequency	50 Hz (Derating)	
Clearance/creepage. dist. (control/load side)	>5.5 mm	
Protection device	Suppressor diode	
Short circuit	short circuit protection	
Status output		
Switching voltage monitoring max.		
Switching current monitoring max.		
Monitored functions	–	
General		
Housing material	PA 6.6 (UL 94 V-0)	
Colour of the housing	RAL 7012 basalt grey	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Insulation voltage input / output	4.0 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-25 °C … +70 °C	
Storage temperature range	-40 °C … +80 °C	
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm	
Weight	0.030 kg/piece	
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 ine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1	
Approvals	cULus in preparation, DNV GL in preparation	

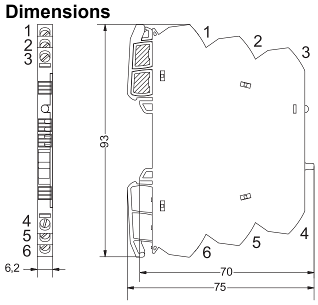
* **S** Article from stock
A Available with a lead time
R Available on request

Solid state relay, 3-conductor technology, manual off automatic
Switching element max. DC 30 V / 5A
Screw terminal / Push-In

Description		Part-No.		Type	PU
Screw terminal					
Rated voltage U_N	DC 24 V	763020.0360	**A***	LCIS-SRKFDC3L-200360-SH0S	5
Push-In					
Rated voltage U_N	DC 24 V	764020.0360	**A***	LCIS-SRKFDC3L-200360-PIH0S	5

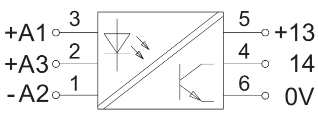
Input	**763020.0360**	**764020.0360**
Input voltage range	11 V – 30 V	
Rated current I_N	8 mA	
Interrupting voltage	<6 V	
Protection device Input	Suppressor diode	
Status display input	LED green	
Rated frequency f_N	–	
Output		
Switching element	MosFet N/O contact	
Min. switching voltage	DC 10 V	
Max. switching voltage	DC 30 V	
Min. switching current	5 mA	
Max. switching current	5 A	
Inrush current	20 A/20 ms @ 1 Hz	
Leak current	1 mA	
Switch-on delay	<0.3 ms	
Shutdown delay	<0.4 ms	
Switching frequency	max. 100 Hz	
Clearance/creepage dist. (control/load side)	>5.5 mm	
Protection device	Suppressor diode	
Short circuit	non short-circuit proof	
General		
Housing material	PA 6.6 (UL 94 V-0)	
Color of the housing	RAL 7012 basalt grey	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Insulation voltage input / output	4.0 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-25 °C … +60 °C	
Storage temperature range	-40 °C … +80 °C	
Dimensions (w × h × d)	6.2 × 93.0 × 73.0 mm	
Weight	0.030 kg/piece	
Connection device	Screw terminal single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 fine stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16	Push-In single wire 0.25 mm^2–2.5 mm^2 / AWG 20–14 ne stranded wire with ferrule 0.25 mm^2–1.5 mm^2 / AWG 20–16
Standards	EN 60947-5-1	
Approvals	cULus, GL	cULus, DNV GL

Dimensions

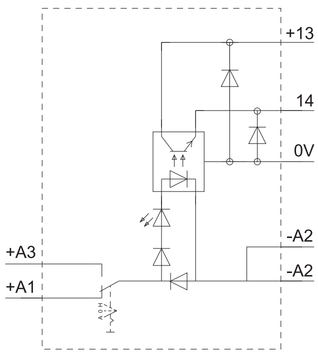


PIN assignment

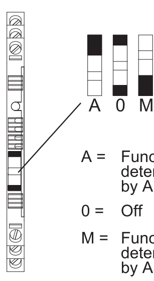
DC 24 V



DC 24 V, DC 24 V, DC 24 V



Switch position



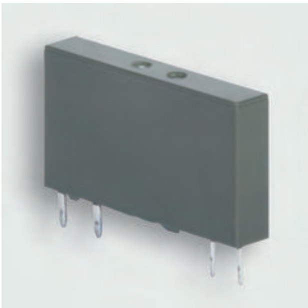
A = Function determined by A1

0 = Off

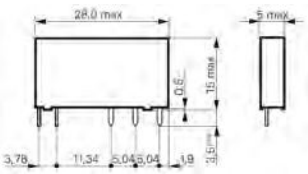
M = Function determined by A3

* **S** Article from stock
A Available with a lead time
R Available on request

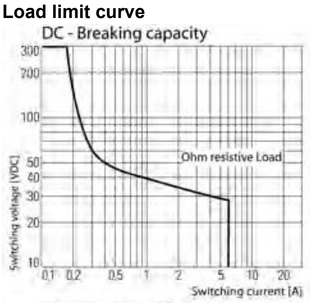
Replacement relay, 1 CO contact / SPDT relay, AC/DC 250 V, 6 A, 1500 VA / 144 W Contact material: $AgSnO_2$, $AgSnO_2$+5 µm HV

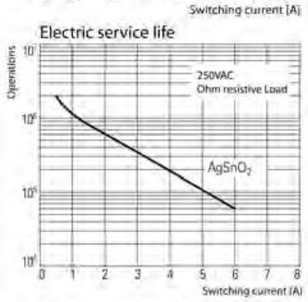


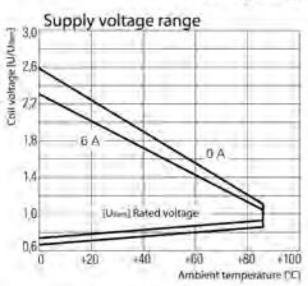
Dimensions



Load limit curve







Description		Part-No.		Type	PU
Relay with $AgSnO_2$					
Rated voltage U_N	DC 12 V	768001	**S***	Relais-SNR 12V 1W	20
	DC 24 V	768002	**S***	Relais-SNR 24V 1W	20
	DC 60 V	768003	**S***	Relais-SNR 60V 1W	20
Relay with $AgSnO_2$ + 5 µm HV					
Rated voltage U_N	DC 12 V	768005	**S***	Relais-SNR 12V 1W htv	20
	DC 24 V	768006	**S***	Relais-SNR 24V 1W htv	20
	DC 60 V	768007	**S***	Relais-SNR 60V 1W htv	20

Input	**Relay with $AgSnO_2$**			**Relay with $AgSnO_2$ + 5 µm HV**		
Rated voltage U_N	DC 12 V	DC 24 V	DC 60 V	DC 12 V	DC 24 V	DC 60 V
Input voltage	DC: ±30 %					
Power consumption	DC: 170 mW					
Interrupting voltage	DC: >0.1 U_N					
Rated current I_N	–					
Input resistance	–					
Status display input	–					
Output						
Contact type	1 changeover contacts / SPDT					
Min. switching voltage	AC/DC 17 V			AC/DC 1 V		
Max. switching voltage	AC/DC 250 V					
Min. switching current	AC/DC 5 mA			AC/DC 1 mA		
Max. switching current	6 A					
Switching capacity DC 13	1 A @ 24 V, 200 mA @ 115 V, 100 mA @ 250 V					
Switching capacity AC 15	3 A					
Inrush current	–					
Max. switching capacity	1500 VA / 144 W					
Resistor	<100 mΩ			<30 mΩ		
Contact material	$AgSnO_2$			$AgSnO_2$ + 5 µm HV		
Switching frequency	with load: 6 cycles/minute, without load 1,200 cycles/minute					
Mechanical service life	> 10 x 10^6 operations					
Switch-on delay	5 ms					
Shutdown delay	2.5 ms					
Clearance/creepage dist. (control/load side)	Air clearance: >6 mm, creepage clearance: >8 mm					
Rated insulation voltage (EN 50178)	AC 250 V					
Over voltage category	III					
Degree of polution	3					
General						
Protection class	RTIII – wash-tight					
Shock resistance	5g					
Vibration resistance	6 g, 10...150 Hz					
Insulation voltage input / output	4.0 kV_{eff}					
Safe isolation	yes					
Operation temperature range	-25 °C … +60 °C					
Storage temperature range	-40 °C … +80 °C					
Dimensions (w × h × d)	5.0 × 28.0 × 15.0 mm					
Weight	0.006 kg/piece					
Approvals	VDE, cULus					
Connection device	plug-in					

Labeling system
200 Labeling tabs 5 × 5 mm

Description		Part-No.		Type	PU
Labelling plates					
Color	white	716431	**S***	LOCC-Box-BZW 7-6431	1
	white	780981.000.2	**S***	LCOS-ZB-BZS-white-00	10
	red	716432	**S***	LOCC-Box-BZR 7-6432	1
	red	780982.000.2	**S***	LCOS-ZB-BZS-red-00	10
	blue	716433	**S***	LOCC-Box-BZB 7-6433	1
	blue	780983.000.2	**S***	LCOS-ZB-BZS-blue-00	10
	yellow	716434	**A***	LOCC-Box-BZG 7-6434	1
	white	780985.000.2	**S***	LCOS-ZB-BZS-white-12/6	10

General	**716431** **780981.000.2**	**716432** **780982.000.2**	**716433** **780983.000.2**	**716434**	**780985.000.2**
Color	white	red	blue	yellow	white
Design	200 tabs				120 tabs
Material	PA 6.6 (UL 94 V0, NNF I2, F2)				
Operation temperature range	-40 °C … +80 °C				
Storage temperature range	-40 °C … +80 °C				
Weight	0.010 kg/piece				
Dimensions	5 × 5 mm				12 × 6mm

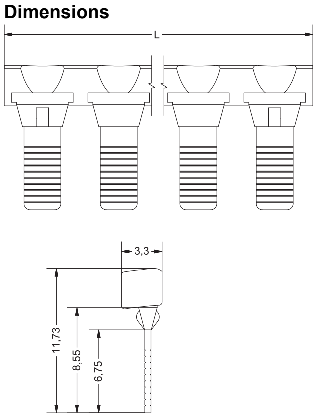
* **S** Article from stock
A Available with a lead time
R Available on request

Insulated jumper combs
2 to 16-pin
white

Description		Part-No.		Type	PU
Jumper comb					
Color	white	762803.1000	**S***	LCIS-BKW-2-polig	10
	white	762813.1000	**S***	LCIS-BKW-4-polig	10
	white	762823.1000	**S***	LCIS-BKW-8-polig	10
	white	762833.1000	**S***	LCIS-BKW-16-polig	10

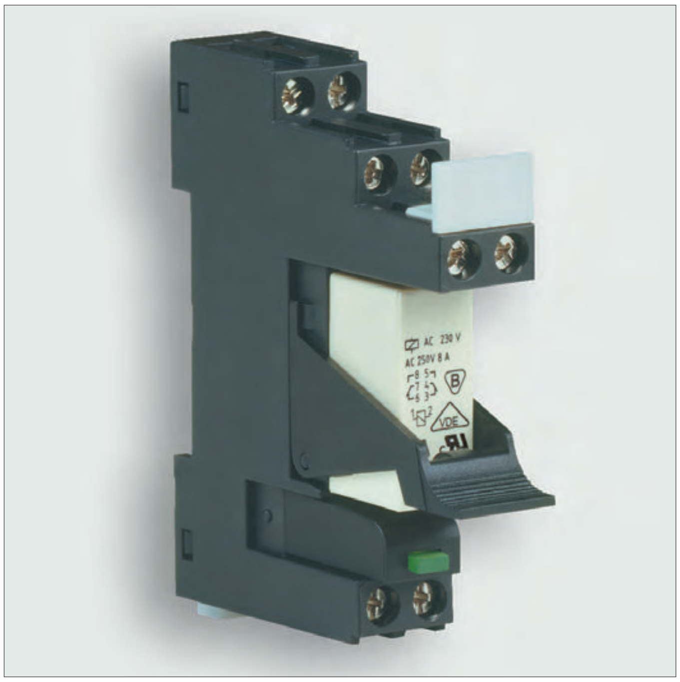
General	**762803.1000**	**762813.1000**	**762823.1000**	**762833.1000**
Pole number	2	4	8	16
Connection device	plug-in			
Rated current	DC 6 A			
Contact design	Flat contact 0.5 mm Ribbing on the sides			
Pin spacing	6.2 mm			
Length	12.4 mm	24.8 mm	49.6 mm	99.2 mm
Contact material	CuZn			
Material	Vectra C 1330			
Color	white			
Flamability according to UL 94	V0			
Operation temperature range	-40 °C … +80 °C			
Storage temperature range	-40 °C … +80 °C			
Weight	0.0005 kg/piece	0.001 kg/piece	0.002 kg/piece	0.004 kg/piece

Dimensions



* **S** Article from stock
A Available with a lead time
R Available on request

Microplug Series



The Microplug series offers particularly good value for money, and consists of relays, pluggable suppressor modules at the input, locking levers, description plate and a universally usable jumper.

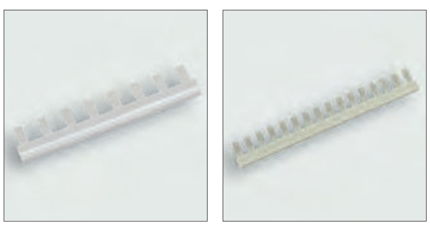
All modules are largely compatible with market standards, and all are UL listed.

The Microplug series offers the following features:

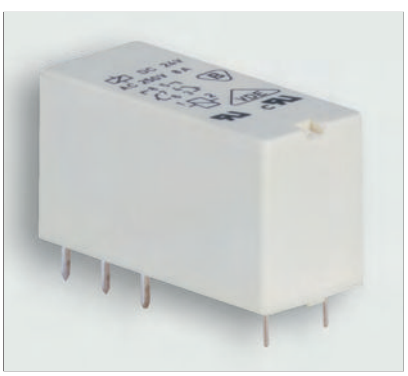
- Switching current up to 16 A
- LED status indicator
- Suppressor modules of different types
- Manual control

Suppressor modules
All AC/DC 6 V – 230 V

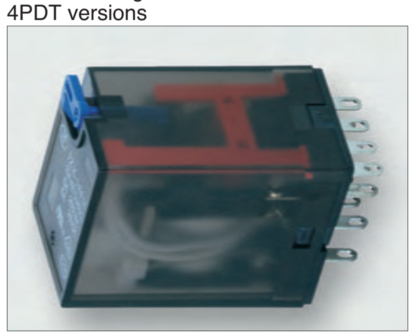
Comb-type jumper bar
Connect up to 6 modules



Relay versions Type 1
1 and 2 changeover contact / SPDT and DPDT versions

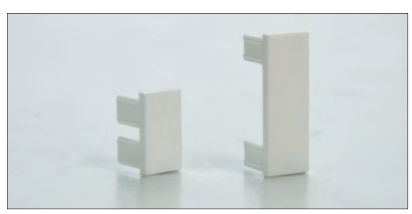


Relay versions Type 2
2 and 4 changeover contact/DPDT and 4PDT versions



Locking system
Mechanically stable and shock-proof

Labelling system
Large description plates allow labeling with up to 18 characters.



Relay socket for mini and industrial relay
AC/DC 300 V
Screw terminal

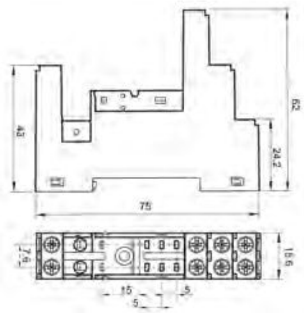
Description		Part-No.		Type	PU
Relay socket for mini relay					
Contact type	1 / 2 changeover contacts / SPDT/ DPDT	770900	**S***	RES-0900	5
Relay socket for industrial relay					
Contact type	2 changeover contacts / DPDT	770903	**A***	RES2W-0903	5
	4 changeover contacts / 4PDT	770905	**S***	RES4W-0905	5

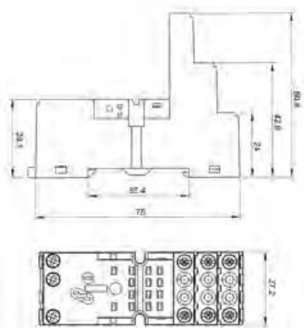
General	Relay socket for mini relay	Relay socket for industrial relay
Rated voltage U_N	AC/DC 300 V	
Rated current I_N	AC/DC 12 A pro pin	
Protection class	IP20	
Operation temperature range	-40 °C … +85 °C	
Dimensions (w × h × d)	16.5 × 75.0 × 66.5 mm (incl. release lever)	27.2 × 75.0 × 82.0 mm (incl. release lever)

Accessories

Tag holder auxiliary relay, transparent: Part-No. 770902 | REM 0902 | PU: 10 units
Mounting bracket auxiliary relay: Part-No. 770901 | REE-0901 | PU: 10 units
Mounting bracket industrial relay: Part.-No.770906 | REE-0906 | PU: 10 units
Tag holder industrial relay: Part.-No. 770907 | REM 0907 | PU: 10 units

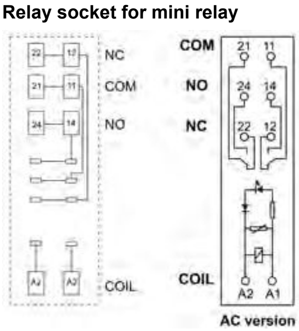
Dimensions



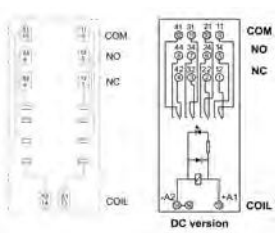


PIN assignment

Relay socket for mini relay



Relay socket for industrial relay



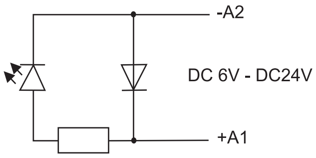
Pluggable microplug protection modules
AC/DC 6 – 230 V
with LED indication

Description		Part-No.		Type	PU
Mini relay with AgNi					
Rated voltage U_N	DC 6/24 V	770911	**S***	PM41G-0911	10
	AC 6/24 V	770913	**A***	PM91G-0913	10
	DC 110 V	770916	**A***	PM43G-0916	10
	AC/DC 110/230 V	770917	**S***	PM93G-0917	10

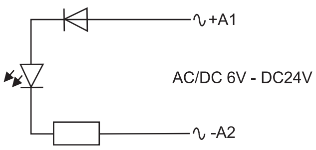
General	**DC 6/24 V**	**AC 6/24 V**	**DC 110 V**	**AC/DC 110/230 V**
Protection device	Free-wheeling diode	Varistor	Free-wheeling diode	Varistor
Status indication	LED green			

PIN assignment

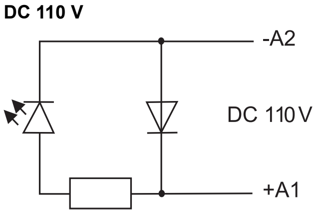
DC 6/24 V



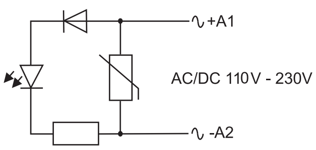
AC 6/24 V



DC 110 V

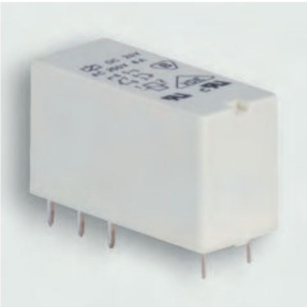


AC/DC 110/230 V



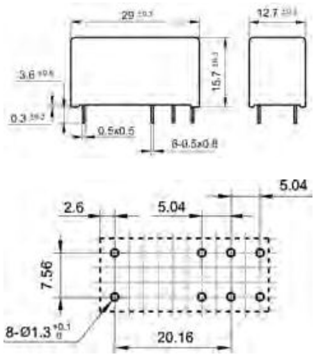
* **S** Article from stock
A Available with a lead time
R Available on request

Mini relay, 1 changeover contact / SPDT
AC 400 V/DC 300 V, 16 A, 4000 VA
Contact material: AgNi



Description		Part-No.		Type	PU
Relay with AgNi					
Rated voltage U_N	DC 12 V	770100	**A***	RE1W-0100 DC12V	10
	DC 24 V	770101	**S***	RE1W-0101 DC24V	10
	DC 120 V	770106	**A***	RE1W-0106 DC110V	10
	AC 12 V	770110	**A***	RE1W-0110 AC12V	10
	AC 24 V	770111	**A***	RE1W-0111 AC24V	10
	AC 120 V	770116	**A***	RE1W-0116 AC120V	10
	AC 230 V	770117	**A***	RE1W-0117 AC230V	10

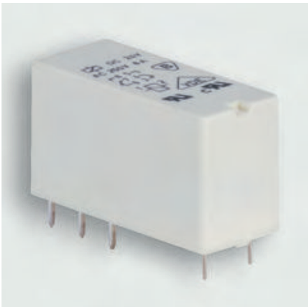
Dimensions



Input	**Relay with AgNi**						
Rated voltage U_N	DC 12 V	DC 24 V	DC 120 V	AC 12 V	AC 24 V	AC 120 V	AC 230 V
Input voltage	DC: ±20 %			AC: ±30 %			
Power consumption	DC: 0.4 W			AC: 0.75 VA			
Interrupting voltage	DC: >0.1 U_N			AC: ≥0.15 U_N			
Rated current I_N	–						
Input resistance	–						
Status display input	–						
Output							
Contact type	1 changeover contacts / SPDT						
Min. switching voltage	AC/DC 5 V						
Max. switching voltage	AC 400 V / DC 300 V						
Min. switching current	AgNi: AC/DC 5 mA						
Max. switching current	AC1: AC 16 A/250 V, DC1: DC 16 A/24 V						
Switching capacity DC 13	2 A @ 24 V, 300 mA @ 115 V, 150 mA @ 150 V						
Switching capacity AC 15	3.3 A						
Inrush current	30 A (4 ms)						
Max. switching capacity	4000 VA						
Resistor	<100 mΩ						
Contact material	AgNi						
Switching frequency	AC1: 600 cycles/hour, without load 72,000 cycles/hour						
Mechanical service life	> 3 x 10^7 operations						
Switch-on delay	15 ms						
Shutdown delay	8 ms						
Clearance/creepage dist. (control/load side)	>10 mm						
Rated insulation voltage (EN 50178)	AC 400 V (C 250/ B 400)						
Over voltage category	III						
Degree of polution	3						
General							
Protection class	RTII – flux-tight						
Shock resistance	10g						
Vibration resistance	10 g, 10 – 150 Hz						
Insulation voltage input / output	5.0 kV_{eff}						
Safe isolation	yes						
Operation temperature range	-40 °C … +70 °C						
Storage temperature range	-40 °C … +85 °C						
Dimensions (w × h × d)	29.0 × 15.7 × 12.7 mm						
Weight	0.014 kg/piece						
Approvals	UL, VDE						
Connection device	plug-in						

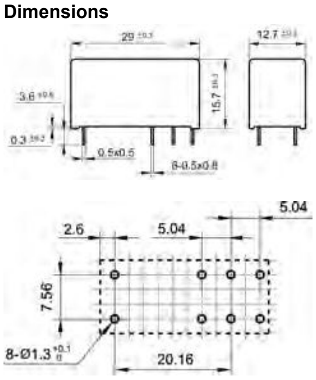
* **S** Article from stock
A Available with a lead time
R Available on request

Mini relay, 2 changeover contact DPDT
AC 400 V/DC 300 V, 8 A, 2000 VA
Contact material: AgNi, AgNi+5 µm gold-plating



Description		Part-No.		Type	PU
Relay with AgNi					
Rated voltage U_N	DC 12 V	770918	**A***	RE2W-0918 DC12V	10
	DC 24 V	770920	**S***	RE2W-0920 DC24V	10
	DC 120 V	770922	**A***	RE2W-0922 DC110V	10
	AC 12 V	770926	**A***	RE2W-0926 AC12	10
	AC 24 V	770928	**A***	RE2W-0928 AC24V	10
	AC 120 V	770930	**A***	RE2W-0930 AC120	10
	AC 230 V	770924	**A***	RE2W-0924 AC230V	10
Relay with AgNi + 5 µm HV					
Rated voltage U_N	DC 12 V	770919	**A***	RE2WHV-0919 DC12V	10
	DC 24 V	770921	**S***	RE2WHV-0921 DC24V	10
	DC 120 V	770923	**A***	RE2WHV-0923 DC110V	10

Dimensions



Input	**AC 12 V**	**AC 24 V**	**AC 120 V**	**AC 230 V**	**DC 12 V**	**DC 24 V**	**DC 120 V**
Rated voltage U_N	AC 12 V	AC 24 V	AC 120 V	AC 230 V	DC 12 V	DC 24 V	DC 120 V
Input voltage	AC: ±30 %				DC: ±20 %		
Power consumption	AC: 0.75 VA				DC: 0.4 W		
Interrupting voltage	AC: ≥0.15 U_N				DC: >0.1 U_N		
Rated current I_N	–						
Input resistance	–						
Status display input	–						
Output	**Relay with AgNi**				**Relay with AgNi + 5 µm HV**		
Contact type	2 changeover contacts / DPDT						
Min. switching voltage	AC/DC 5 V						
Max. switching voltage	AC 400 V / DC 300 V						
Min. switching current	AgNi: AC/DC 5 mA				AgNi + 5 µm HV: AC/DC 2 mA		
Max. switching current	AC1: AC 8 A/250 V, DC1: DC 8 A/24 V						
Switching capacity DC 13	2 A @ 24 V, 300 mA @ 115 V, 150 mA @ 150 V						
Switching capacity AC 15	3.3 A						
Inrush current	15 A (4ms)						
Max. switching capacity	2000 VA						
Resistor	<100 mΩ						
Contact material	AgNi				AgNi + 5 µm HV		
Switching frequency	AC1: 1200 cycles/hour, without load 18,000 cycles/hour						
Mechanical service life	> 3 x 10^7 operations						
Switch-on delay	15 ms						
Shutdown delay	8 ms						
Clearance/creepage dist. (control/load side)	>10 mm						
Rated insulation voltage (EN 50178)	AC 400 V (C 250/ B 400)						
Over voltage category	III						
Degree of polution	3						
General							
Protection class	RTII – flux-tight						
Shock resistance	10g						
Vibration resistance	10 g, 10 – 150 Hz						
Insulation voltage input / output	5.0 kV_{eff}						
Safe isolation	yes						
Operation temperature range	-40 °C … +70 °C						
Storage temperature range	-40 °C … +85 °C						
Dimensions (w × h × d)	29.0 × 15.7 × 12.7 mm						
Weight	0.014 kg/piece						
Approvals	UL, VDE						
Connection device	plug-in						

Comments

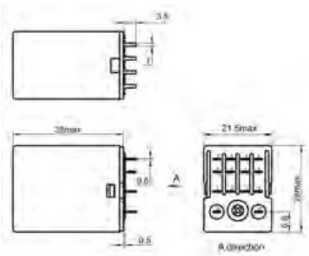
Hard gold-plated contacts: In order to avoid damage to the gold layered contacts, do not exceed product specifications as permanent damage or sparking could occur between the coil and the contacts.

* **S** Article from stock
A Available with a lead time
R Available on request

Industrial relay, 4 changeover contacts / 4PDT
AC/DC 250 V, 5 A, 1250 VA
Contact material: AgNi, AgNi+5 µm gold-plating

Description		Part-No.		Type	PU
Relay with AgNi					
Rated voltage U_N	DC 12 V	770400	**A***	RE4W-0400 DC12V	10
	DC 24 V	770401	**S***	RE4W-0401 DC24V	10
	DC 120 V	770406	**A***	RE4W-0406 DC110V	10
	AC 12 V	770410	**A***	RE4W-0410 AC12V	10
	AC 24 V	770411	**S***	RE4W-0411 AC24V	10
	AC 120 V	770416	**A***	RE4W-0416 AC120V	10
	AC 230 V	770417	**S***	RE4W-0417 AC230V	10
Relay with AgNi + 5 µm HV					
Rated voltage U_N	DC 12 V	770420	**A***	RE4WHV-0420 DC12V	10
	DC 24 V	770421	**S***	RE4WHV-0421 DC24V	10
	DC 120 V	770426	**A***	RE4WHV-0426 DC110V	10

Dimensions



Input	**AC 12 V**	**AC 24 V**	**AC 120 V**	**AC 230 V**	**DC 12 V**	**DC 24 V**	**DC 120 V**
Rated voltage U_N	AC 12 V	AC 24 V	AC 120 V	AC 230 V	DC 12 V	DC 24 V	DC 120 V
Input voltage	AC: ±20 %				DC: ±10 %		
Power consumption	AC: 1.2 VA				DC: 0.9 W		
Interrupting voltage	AC: ≥0.20 U_N				DC: >0.1 U_N		
Rated current I_N	–						
Input resistance	–						
Status display input	–						
Output	**Relay with AgNi**				**Relay with AgNi + 5 µm HV**		
Contact type	4 changeover contacts / 4PDT						
Min. switching voltage	AC/DC 5 V						
Max. switching voltage	AC/DC 250 V						
Min. switching current	AgNi: AC/DC 5 mA				AgNi + 5 µm HV: AC/DC 2 mA		
Max. switching current	AC1: AC 5 A/250 V, DC1: DC 5 A/24 V						
Switching capacity DC 13	2 A @ 24 V, 300 mA @ 115 V, 150 mA @ 230 V						
Switching capacity AC 15	3.3 A						
Inrush current	10 A (4 ms)						
Max. switching capacity	1250 VA						
Resistor	<100 mΩ						
Contact material	AgNi				AgNi + 5 µm HV		
Switching frequency	AC1: 1200 cycles/hour, without load 18,000 cycles/hour						
Mechanical service life	> 2 x 10^7 operations						
Switch-on delay	25 ms						
Shutdown delay	25 ms						
Clearance/creepage dist. (control/load side)	Air clearance: >1.6 mm, creepage clearance: >3.2 mm						
Rated insulation voltage (EN 50178)	AC 250 V (B 250)						
Over voltage category	III						
Degree of polution	3						
General							
Protection class	RTI – dust proof						
Shock resistance	10g						
Vibration resistance	5 g, 10 – 55 Hz						
Insulation voltage input / output	1.5 kV_{eff}						
Safe isolation	–						
Operation temperature range	-40 °C … +70 °C						
Storage temperature range							
Dimensions (w × h × d)	28.0 × 21.2 × 35.0 mm						
Weight	0.037 kg/piece						
Approvals	cULus, TÜV, CQC						
Connection device	plug-in						

Comments

Hard gold-plated contacts: In order to avoid damage to the gold layered contacts, do not exceed product specifications as permanent damage or sparking could occur between the coil and the contacts.

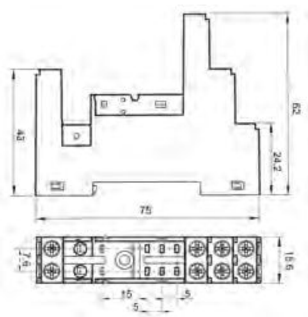
DC-Relay-Interface, 1 CO contact / SPDT, pluggable
AC 400 V/DC 300 V, 16 A, 4000 VA
Screw terminal, contact material: AgNi

Description		Part-No.		Type	PU
Relay Module with AgNi					
Rated voltage U_N	DC 12 V	770140	**A***	REP-0140 1W DC12V	5
	DC 24 V	770141	**S***	REP-0141 1W DC24V	5

Input	**DC 12 V**	**DC 24 V**
Input voltage range	8.4 – 18 V	16.8 – 36 V
Rated current I_N	0.034 A	0.017 A
Rated voltage U_N	DC 12 V	DC 24 V
Power consumption	0.4 W	
Interrupting voltage	<1.2 V	<2.4 V
Protection device Input	Free-wheeling diode	
Max. length of connecting lead	–	
Status display input	LED green	
Output		
Contact type	1 changeover contacts / SPDT	
Min. switching voltage	AC/DC 5 V	
Max. switching voltage	AC 400 V / DC 300 V	
Min. switching current	AgNi: AC/DC 5 mA	
Max. switching current	AC/DC 16 A	
Switching capacity DC 13	2 A @ 24 V, 300 mA @ 115 V, 150 mA @ 230 V	
Switching capacity AC 15	3.3 A	
Max. switching capacity	4000 VA	
Contact material	AgNi	
Mechanical service life	$>10^7$ operations	
Switch-on delay	15 ms	
Shutdown delay	8 ms	
Clearance/creepage dist. (control/load side)	Air clearance: > 10 mm, creepage clearance: > 10 mm	
Rated insulation voltage (EN 50178)	AC 400 V (category C 250)	
General		
Housing material	PA 6.6 + GF V0 (UL)	
Protection class	IP20	
Mounting	DIN rail mountable TS35 (EN 60715)	
Insulation voltage input / output	5.0 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-40 °C … +85 °C	
Storage temperature range	-40 °C … +85 °C	
Dimensions (w × h × d)	15.6 × 75.0 × 67.0 mm (including mounting bracket)	
Weight	0.062 kg/piece	
Approvals	cULus	
Connection device	Screw terminal 0.20 mm^2 – 4.0 mm^2	
Accessories		

Jumper comb 8-pin, axilliary relay, black: Part-No. 770908 | REP-0908 | PU: 10 units
Tag holder auxiliary relay, transparent: Part-No. 770902 | REM 0902 | PU: 10 units
Mounting bracket auxiliary relay: Part-No. 770901 | REE-0901 | PU: 10 units

Dimensions



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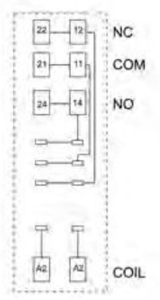


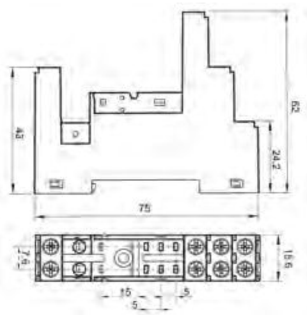
* **S** Article from stock
A Available with a lead time
R Available on request

Interface Technology · Microplug Relay Module

DC-Relay-Interface, 2 CO contact / DPDT, pluggable
AC 400 V / DC 300 V, 8 A, 2000 VA
Screw terminal, Contact material: AgNi, AgNi 5 µm HV

Description		Part-No.		Type	PU
Relay Module with AgNi					
Rated voltage U_N	DC 24 V	770041	**S***	REP-0041 2W DC24V	5
Relay Module with AgNi + 5µm HV					
Rated voltage U_N	DC 24 V	770241	**A***	REP-0241 2W HTV DC24V	5

Dimensions



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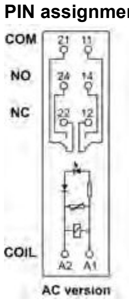


Input	**DC 24 V**	
Input voltage range	16.8 – 31.2 V	
Rated current I_N	0.016 A	
Rated voltage U_N	DC 24 V	
Power consumption	0.4 W	
Interrupting voltage	<2.4 V	
Protection device Input	Free-wheeling diode	
Max. length of connecting lead	–	
Status display input	LED green	
Output	**Relay Module with AgNi**	**Relay Module with AgNi + 5µm HV**
Contact type	2 changeover contacts / DPDT	
Min. switching voltage	AC/DC 5 V	
Max. switching voltage	AC 400 V / DC 300 V	
Min. switching current	AgNi: AC/DC 5 mA	AgNi + 5 µm HV: AC/DC 2 mA
Max. switching current	AC/DC 8 A	
Switching capacity DC 13	2 A @ 24 V, 300 mA @ 115 V, 150 mA @ 230 V	
Switching capacity AC 15	3.1 A @ 24 V, 2 A @ 230 V	
Max. switching capacity	2000 VA	
Contact material	AgNi	AgNi + 5 µm HV
Mechanical service life	$>10^7$ operations	
Switch-on delay	15 ms	
Shutdown delay	5 ms	
Clearance/creepage dist. (control/load side)	Air clearance: > 10 mm, creepage clearance: > 10 mm	
Rated insulation voltage (EN 50178)	AC 400 V (category C 250)	
General		
Housing material	PA 6.6 + GF V0 (UL)	
Protection class	IP20	
Mounting	DIN rail mountable TS35	
Insulation voltage input / output	5.0 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-40 °C … +85 °C	
Storage temperature range	-40 °C … +85 °C	
Dimensions (w × h × d)	15.6 × 75.0 × 67.0 mm (including mounting bracket)	
Weight	0.062 kg/piece	
Approvals	cULus	
Connection device	Screw terminal 0.20 mm^2 – 4.0 mm^2	

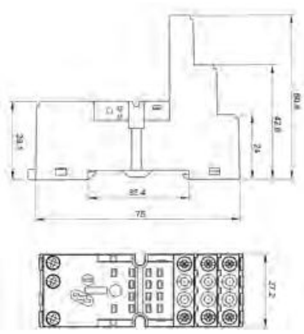
Comments

Hard gold-plated contacts: In order to avoid damage to the gold layered contacts, do not exceed product specifications as permanent damage or sparking could occur between the coil and the contacts.

* **S** Article from stock
A Available with a lead time
R Available on request

DC-Relay-Interface, 2 CO contact / DPDT, pluggable
AC/DC 250 V, 7 A, 1750 VA
Screw terminal, contact material: AgNi

Dimensions



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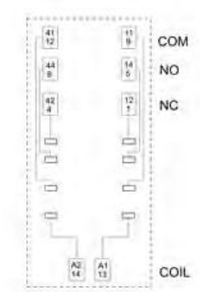


Description		Part-No.		Type	PU
Relay Module with AgNi					
Rated voltage U_N	DC 24 V	770541	**A***	REI2-0541 2W DC24V	5

Input	**DC 24 V**
Input voltage range	19.2 – 26.4 V
Rated current I_N	0.037 A
Rated voltage U_N	DC 24 V
Power consumption	0.9 W
Interrupting voltage	<2.4 V
Protection device Input	Free-wheeling diode
Max. length of connecting lead	–
Status display input	LED green
Output	
Contact type	2 changeover contacts / DPDT
Min. switching voltage	AC/DC 5 V
Max. switching voltage	AC/DC 250 V
Min. switching current	AgNi: AC/DC 5 mA
Max. switching current	AC/DC 7 A
Switching capacity DC 13	1,8 A @ 24 V, 300 mA @ 115 V, 150 mA @ 230 V
Switching capacity AC 15	2.5 A @ 24 V, 1.5 A @ 230 V
Max. switching capacity	3000 VA
Contact material	AgNi
Mechanical service life	> 2 x 10^7 operations
Switch-on delay	25 ms
Shutdown delay	25 ms
Clearance/creepage dist. (control/load side)	Air clearance: >2 mm, creepage clearance: >3 mm
Rated insulation voltage (EN 50178)	AC 250 V (category C 250)
General	
Housing material	PA 6.6 + GF V0 (UL)
Protection class	IP20
Mounting	DIN rail mountable TS35
Insulation voltage input / output	1.5 kV_{eff}
Safe isolation	yes
Operation temperature range	-40 °C … +70 °C
Storage temperature range	-40 °C … +85 °C
Dimensions (w × h × d)	27.2 × 75.0 × 82.0 mm (including mounting bracket)
Weight	0.097 kg/piece
Approvals	cULus
Connection device	Screw terminal 0.20 mm^2 – 4.0 mm^2

* **S** Article from stock
A Available with a lead time
R Available on request

DC-Relay-Interface, 4 CO contact / 4PDT, pluggable
AC/DC 250 V, 5 A, 1250 VA
Screw terminal, Contact material: AgNi, AgNi + 5 µm HV

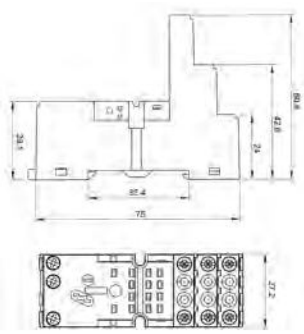
Description		Part-No.		Type	PU
Relay Module with AgNi					
Rated voltage U_N	DC 24 V	770441	**S***	REI4-0441 4W DC24V	5
Relay Module with AgNi + 5µm HV					
Rated voltage U_N	DC 24 V	770461	**A***	REI4-0461 4W HTV DC24V	5

Input	**DC 24 V**	
Input voltage range	19.2 – 26.4 V	
Rated current I_N	0.037 A	
Rated voltage U_N	DC 24 V	
Power consumption	0.9 W	
Interrupting voltage	<2.4 V	
Protection device Input	Free-wheeling diode	
Max. length of connecting lead	–	
Status display input	LED green	
Output	**Relay Module with AgNi**	**Relay Module with AgNi + 5µm HV**
Contact type	4 changeover contacts / 4PDT	
Min. switching voltage	AC/DC 5 V	
Max. switching voltage	AC/DC 250 V	
Min. switching current	AgNi: AC/DC 5 mA	AgNi + 5 µm HV: AC/DC 2 mA
Max. switching current	AC/DC 5 A	
Switching capacity DC 13	1,8 A @ 24 V, 300 mA @ 115 V, 150 mA @ 230 V	
Switching capacity AC 15	2.5 A @ 24 V, 1.5 A @ 230 V	
Max. switching capacity	1250 VA	
Contact material	AgNi	AgNi + 5 µm HV
Mechanical service life	> 2 x 10^7 operations	
Switch-on delay	25 ms	
Shutdown delay	25 ms	
Clearance/creepage dist. (control/load side)	Air clearance: >2 mm, creepage clearance: >3 mm	
Rated insulation voltage (EN 50178)	AC 250 V (category C 250)	
General		
Housing material	PA 6.6 + GF V0 (UL)	
Protection class	IP20	
Mounting	DIN rail mountable TS35	
Insulation voltage input / output	1.5 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-40 °C … +70 °C	
Storage temperature range	-40 °C … +85 °C	
Dimensions (w × h × d)	27.2 × 75.0 × 82.0 mm (including mounting bracket)	
Weight	0.097 kg/piece	
Approvals	cULus	
Connection device	Screw terminal 0.20 mm^2 – 4.0 mm^2	

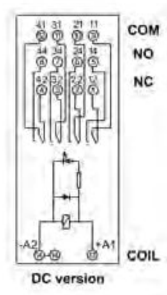
Comments

Hard gold-plated contacts: In order to avoid damage to the gold layered contacts, do not exceed product specifications as permanent damage or sparking could occur between the coil and the contacts.

Dimensions



PIN assignment



Part number index

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