Control Solutions

LÜTZE Compact Interface Solutions

Relays

Semiconductor relay

Isolation Transformers

SYSTEMATIC TECHNOLOGY

Efficiency in Automation

Cable • Connectivity • Cabinet • Control

Welcome to LÜTZE

Cable Solutions

Connectivity Solutions

Cabinet Solutions

Control Solutions

Transportation Solutions

Efficiency in Automation - A reflection of our company philosophy

As an experienced specialist in automation technology, with solutions for flexible and high flexing cables, cable assemblies, interfaces, current control and cabinet wiring, we have had a focus on efficiency for many years.

LÜTZE defines Efficiency in Automation field as the use of sustainable products and solutions to further increase the performance of our products in our customers applications.

We realise this by using components for highly efficient control systems, products with above average life cycles and raising energy efficiency in control cabinets by means of the LSC wiring system.

Efficiency in Automation reflects our efforts in striving for efficient working relationships with our customers: in a medium sized family owned company we have short communcation channels and a high level of manufacturing competence.

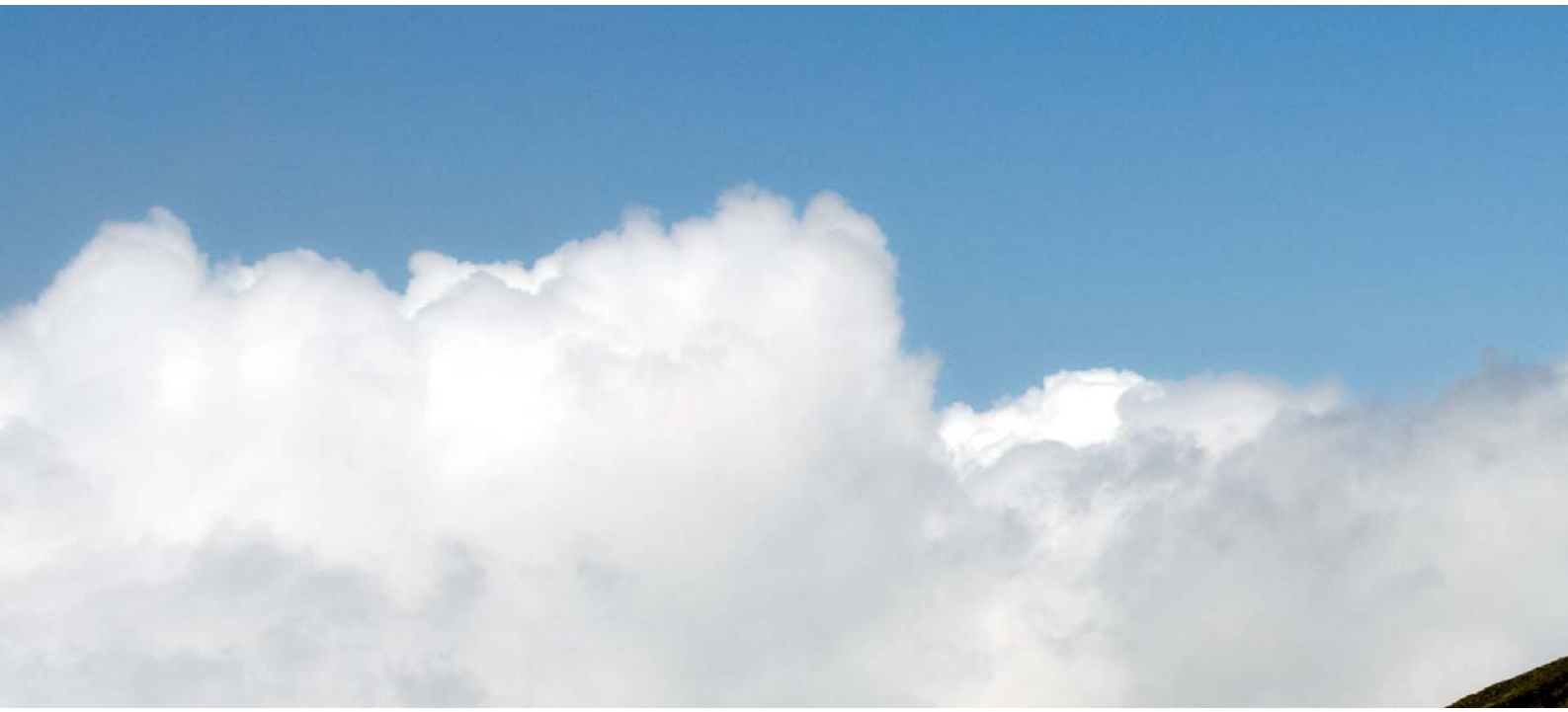
The value of a product or a solution from LÜTZE is determined by its sustainable qualities. Every innovation will only be successful in the future if it has a long term positive effect. Therefore, we provide long lasting as well as highly efficient components.

Thus LÜTZE creates value through efficiency. LÜTZE provides answers and demonstrates how to handle resources responsibly, with our environment and our future in mind.
LÜTZE - Efficiency in Automation

For more information on our solutions, please visit www.luetze.com or www.lutze.com

LÜTZE®
SYSTEMATIC TECHNOLOGY

Business Management:
Sustainable and forw



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
LÜTZE

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 and demonstrates how to handle resources responsibly, with our environment and our future in mind.

Innovations-Allianz
Green Carbody Technologies

ISO 14001

BLUEcoMPETENCE
Alliance Member
Partner of the Engineering Industry Sustainability Initiative

RoHS

What moves us:
Quality, innovation, eff

The people at LÜTZE

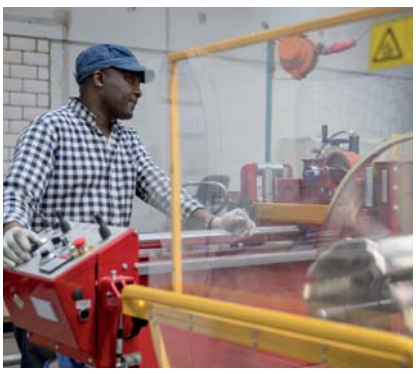
Quality, innovation and efficiency begin with people. We would not be where we are today without our highly qualified and motivated employees. An uncompromising focus on quality, nearly 60 years of experience in automation technology and of course a common desire for greater innovation and efficiency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

iciency

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



751539.0000
LOTZE
www.lutze.com
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
5 6
0-10V
0-20mA
4-20mA
on
off
1
S1
Switch On
Input
1 2 3 4
0-10V
0-20mA
4-20mA

Interface Technology • Product Overview

LCIS

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

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

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Output relay, 1 changeover contact, $AgSnO_2$

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

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Input-relay, 1 changeover contact, $AgSnO_2$

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

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Semiconductor relay, 2-conductor technology

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Semiconductor relay, 3-conductor technology

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Semiconductor relay, 3-conductor technology, automatic manual-off

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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, AgNi

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

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Industrial relay, 2 changeover contacts, AgNi

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

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DC relay, 1 changeover contact, pluggable, AgNi

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AC relay, 1 changeover contact, pluggable, AgNi

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

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AC relay, 2 changeover contacts, pluggable, AgNi

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DC relay, 2 changeover contacts, pluggable, AgNi

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

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AC relay, 4 changeover contacts, pluggable, AgNi

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Compact, simple, function
LCIS: LÜTZE Compact Interfa

Compact
The compact installation height of just 71 mm means that the units can also be fitted into distribution boxes

Device coding
Every unit can be labelled via respective markers. It is possible, depending on the type, to apply between 15 and 24 characters.

Terminal point coding
Every terminal point is clearly labelled and is always visible during installation. This simplifies installation and prevents faulty wiring.

Simplified installation
Bridges instead of wiring! Plugable bridging combs to easily connect multiple terminals.

Environmental conditions
-40 °C to +85 °C or more, V0 and the approval NFF I2,F2 allow applications in tough environments!

Control Solutions

al and innovative:
ce Solutions

Universal connection technology
Be it push-in or screw, the customer decides what he needs.

Universal
Only one casing is necessary thanks to the universal mounting foot with symettrical design!

Laser instead of label
No soiling, permanently legible and individual labelling

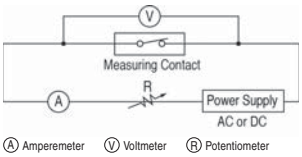
Push-in and inspection opening
Every push-in connection has a freely accessible test point with a diameter of 2mm. This now allows secure signal tracking.

Uniform family
Be it relays, semiconductor relays or converters up to an insulation voltage of 4 kV - LCIS makes it possible

Approvals
World-wide operation thanks to UL, CSA and GL approval

Relays - Terminology

measured using the voltage drop method set out below. The measurement currents are shown.



Ⓐ Amperemeter Ⓥ Voltmeter Ⓡ Potentiometer

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

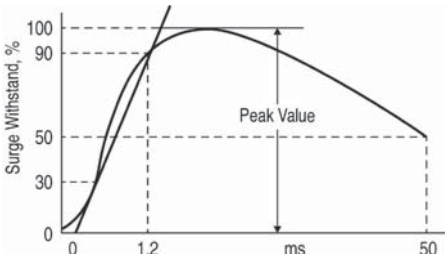
The insulation resistance is measured between mutually insulated conductive components of the relay: between open contacts and between the coil or contacts against the magnetic circuit or base body with earth potential. This value is normally termed "initial insulation resistance", and may decrease over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

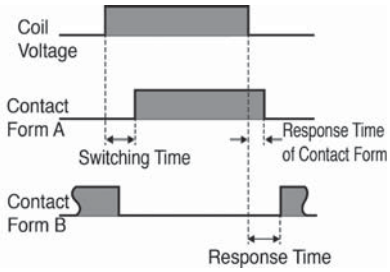
3. Surge voltage resistance

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.

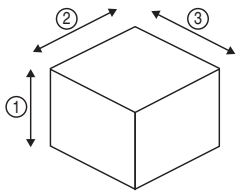
2. Vibration resistance

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.

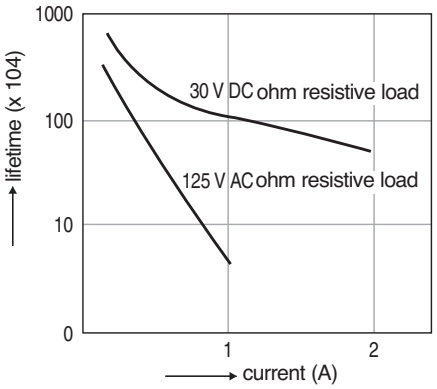
5. Maximum switching frequency

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 necessary 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 selected. 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.

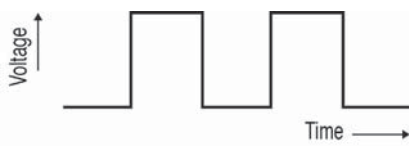
• Maximum continuous voltage

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

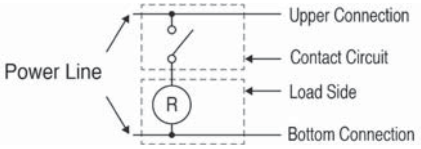
In AC operation the set time is heavily dependent on the momentary phase angle at which the coil is being excited. For miniature relays it is in most cases one half-wave. For the larger relay it is 7 to 16 ms; the reset time is 9 to 18 ms.The set time for large coils is too fast in DC operation too.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

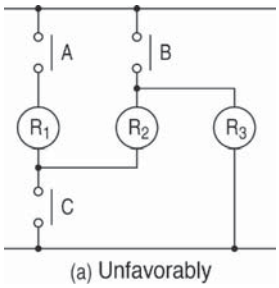
Note that the load conditions (particularly in case of heavy inrush current or under a load close to rated load) may result in reduced service life and minor fusing.

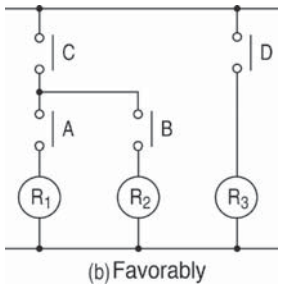
4. Stray circuits

(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.

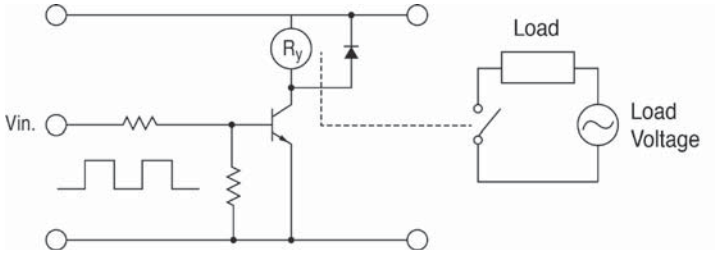


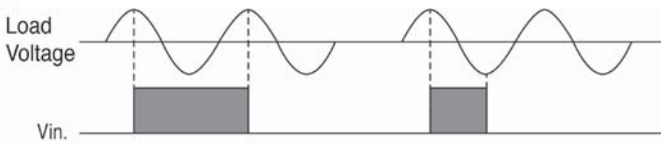




5. Phase synchronisation when switching AC loads

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.

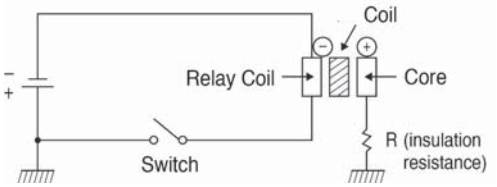
8. Rare switching operations

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.

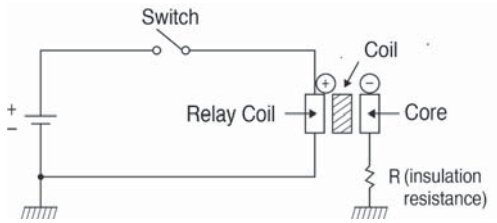
8. Electrolytic corrosion of the coils

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)

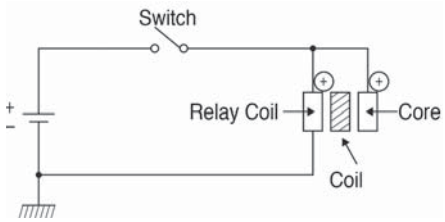


- Where earthing of the "+" side is unavoidable, or where earthing is not possible: Set the contacts (or the switch) on the "+" side of the voltage source. (See Fig. b – This applies to all relays)



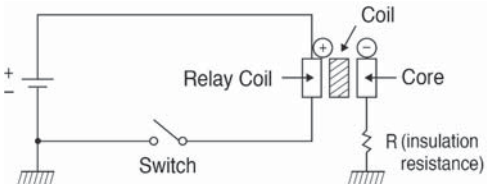
b) Evaluation: ok

- 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	

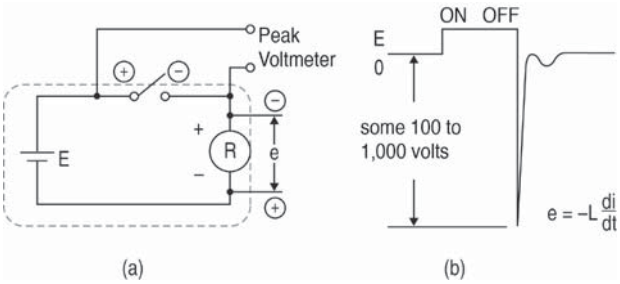
Relays - Terminology

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.

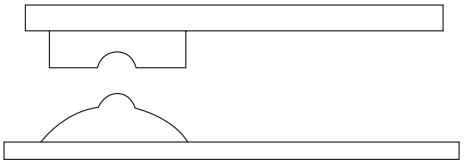


The self-induction voltage is carried through the power supply cable and reaches the two contacts. The electrical ignition voltage at standard temperature and air pressure is generally approximately 200 to 300 Volts. If the self-induction voltage exceeds this value, a discharge takes place on the contacts 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.

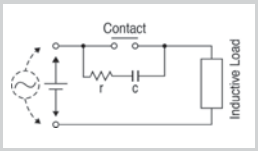
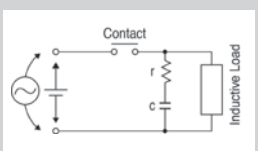
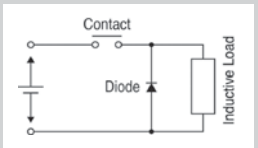
For DC capacitive loads (several Amperes up to several tens of Amperes) it is always necessary to perform confirmation tests under real conditions.



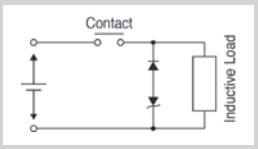
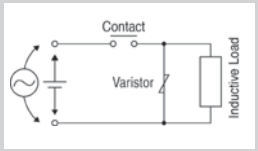
Material migration on contacts

· Contact protection circuit

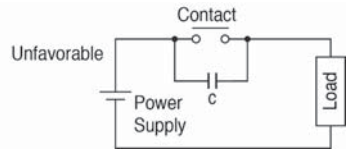
Induction voltages can be reduced by contact protection circuits. Note, however, that incorrect application may have the opposite effect. The following table sets out typical circuits of this kind.

	Circuit	Use AC	Use DC	Properties/Other	Component selection
RC circuit		B*	O	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.
		O	O	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	O	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.

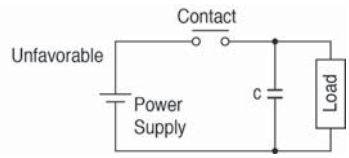
Relays - Terminology

Circuit		Use AC	Use DC	Properties/Other	Component selection
Diode circuits		X	O	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		O	O	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.

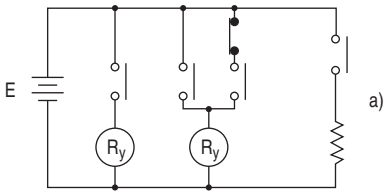
· Anomalous corrosion during high-frequency switching of DC loads (sparking)

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

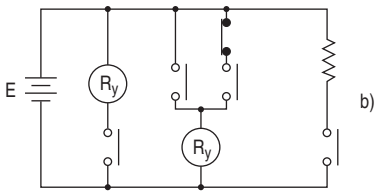
Precautions when switching inductive loads

· 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

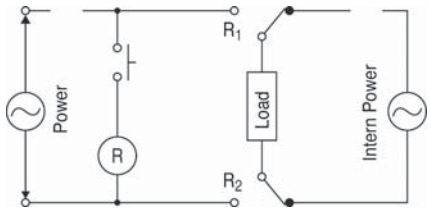
As the voltage level on contacts used in low current circuits (dry circuits) is low, this frequently results in low conductivity. Stability can be improved by adding an impedance parallel to the load so as to purposely increase the load current applied to the contacts.

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

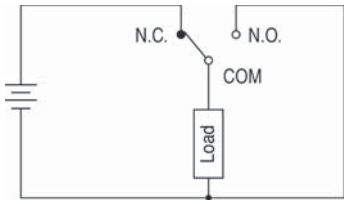
1) In compact devices the distance between the contacts of form A and B may be small. The occurrence of short-circuits due to flash-over must be assumed.

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.

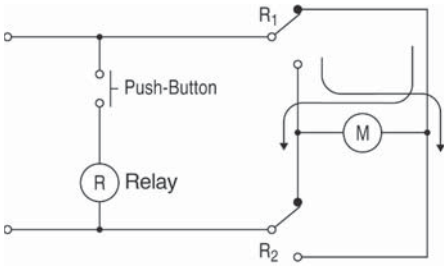
3) Circuits to reverse the direction of rotation of motors must not be constructed with normally-open contacts and working contacts of the same contact set.



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.

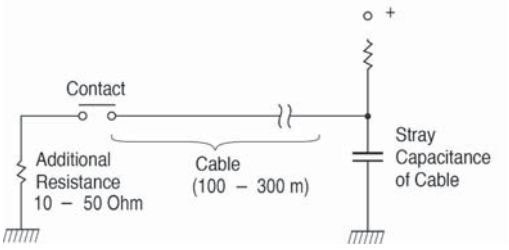
· Load type and starting current

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.

MDI-X	Inrush current
Ohmic load	Continuous current
Solenoid load	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

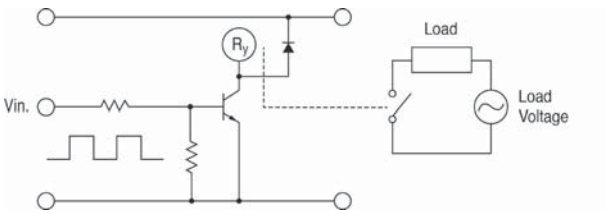
If long cables (100 to 300 m) are used in a relay contact circuit, the inrush current may cause problems due to the stray capacitance between the cables. So please insert a resistor (approximately 10 to 50 Ω) in series with the contacts.

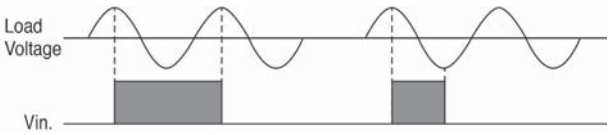


Relays - Terminology

· 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

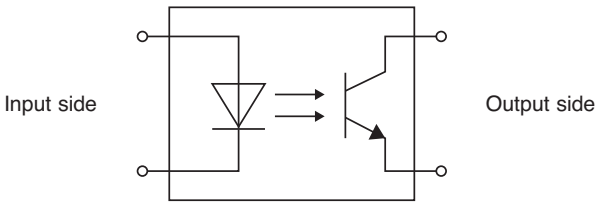
Check under the momentary load whether the service life is influenced by use at high temperatures

Notes

Solid State Relays - Terminology

Control side

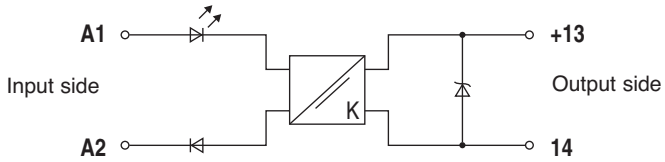
Semiconductor relays - also known as solid state relays (SSRs) - are an alternative to mechanical relays in many applications. Although these devices belong to the general category of relays, they are actually not relays. They are in fact electronic devices. The basis of a solid state relay is very often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



Optical coupler

DC input

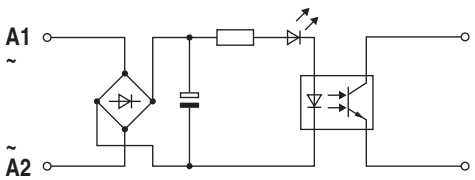
Thanks to the LED in the input circuit of the optocoupler, different voltage levels can be adapted to by adding a specially selected electronics unit. To prevent the electronics unit from being destroyed by an incorrectly connected operating voltage, an anti-polarity reversal protective diode is additionally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



Reverse diode

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.

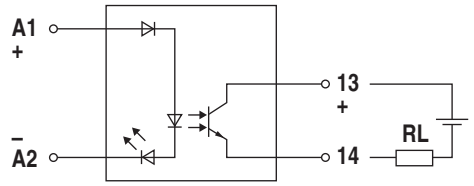
2. Maximum continuous current

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

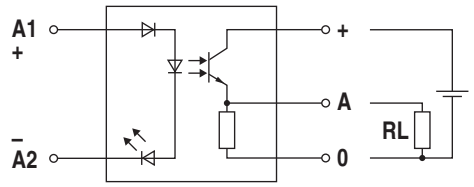
In DC operation a distinction is made between a 2-conductor and a 3-conductor output.

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

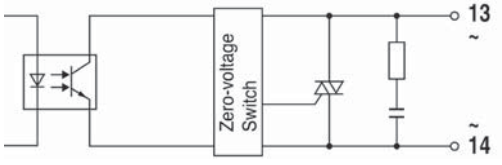
By contrast, a 3-conductor output is potential-specific. For safe operation it requires connection of both potentials of the output-side voltage source. In the off state a fixed link to the negative potential (earth) is made. The advantage lies in an almost constant internal resistance.



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

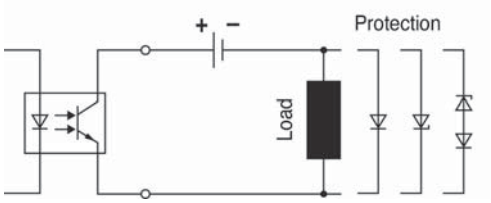
Switching of inductive consumers such as contactors, valves, motors etc. always results in a high induction overvoltage with a very steep rising edge at the moment of switch-off. The voltage, which can reach very high amplitudes, is additionally overlaid with a more or less broad high-frequency spectrum. 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

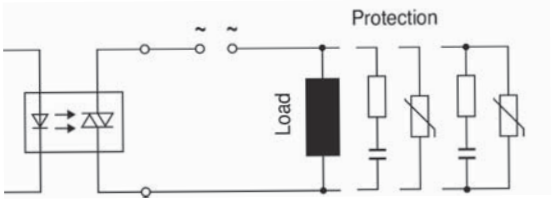
– Varistors for AC and DC operation

– 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.

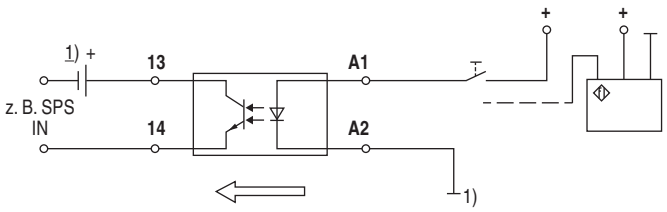


Protective circuit with DC voltage output

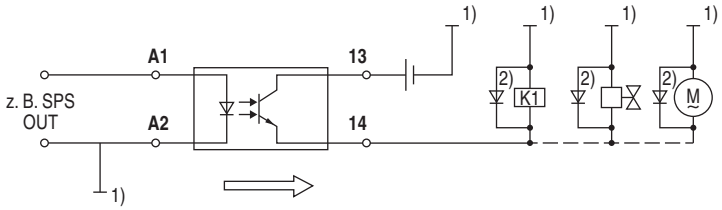


Protective circuit with AC voltage output

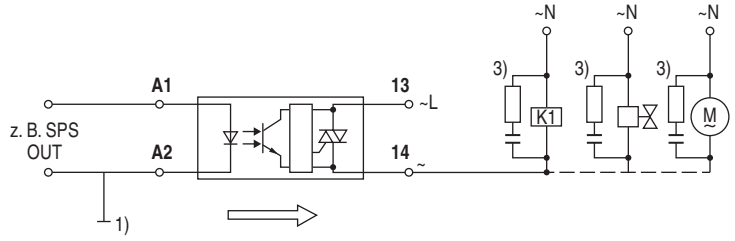
Application notes



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

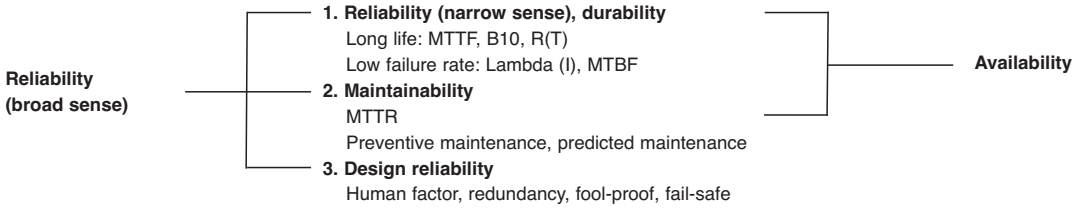
In the industrial space, reliability is a measure of how long a particular product operates without failure.

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

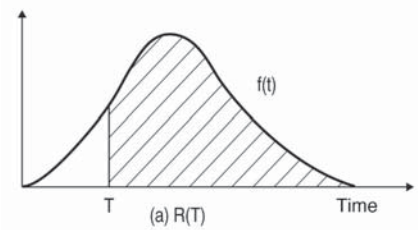
Reliability is "built in" to products. This is referred to as intrinsic reliability which consists mainly of reliability in the narrow sense. Product reliability at the user's site is called "reliability of use", which consists mainly of reliability in the broad sense. In the relay industry, reliability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

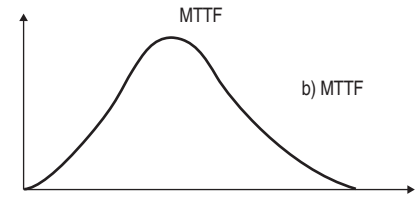


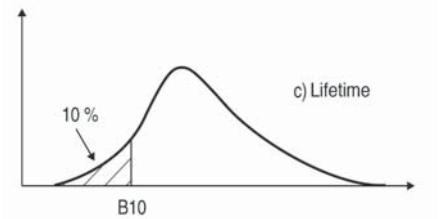
Reliability measures

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

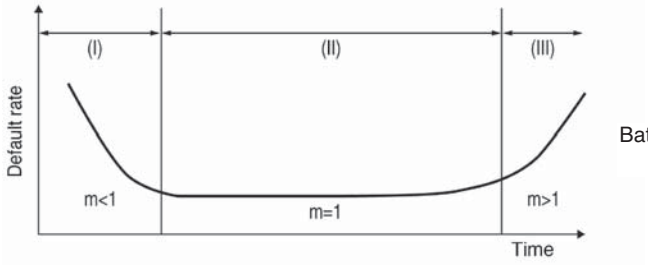
In the final stage of the product's service lifetime comes the wear-out failure period, in which the life of the product expires due to wear or fatigue. Preventive maintenance is effective for this type of failure. The timing of a relay's wear-out failure can be predicted with a certain accuracy from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

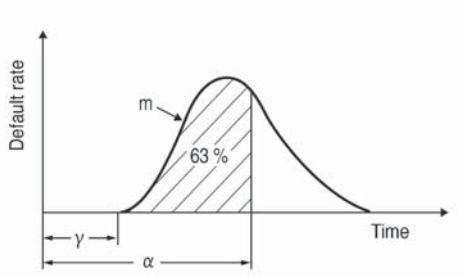
Weibull analysis is often used for classifying a product's failure patterns and to determine its lifetime. Weibull distribution is expressed by the following equation:

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

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



Bathtub curve



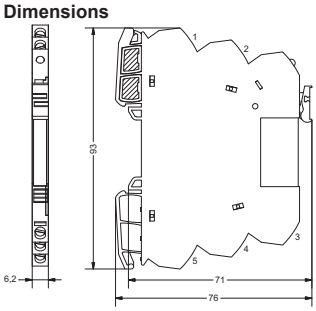
Weibull distribution can be adopted to the actual failure rate distribution if the three variables are estimated.
The Weibull probability chart is a simpler alternative to complex calculation formulas. The chart provides the following advantages:

- 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

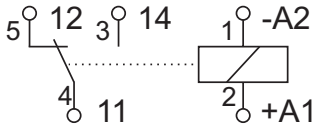
Output Relay Interface, relay with 1 directional contact, pluggable
AC/DC 250 V, 6 A, 1500 VA
Screw terminal / Push-In, contact material: $AgSnO_2$

Dimensions

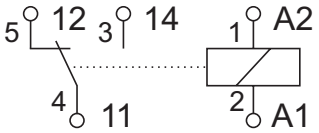


PIN assignment

DC 24 V



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



Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	760020.1000	LCIS-RS24DC-S-1U	5
	AC/DC 24 V	760021.1000	LCIS-RS24UP-S-1U	5
	AC/DC 115 V	760051.1000	LCIS-RS120UP-S-1U	5
	AC/DC 230 V	760061.1000	LCIS-RS230UP-S-1U	5
Push-In				
Nominal voltage	DC 24 V	761020.1000	LCIS-RS24DC-PI-1U	5
	AC/DC 24 V	761021.1000	LCIS-RS24UP-PI-1U	5
	AC/DC 115 V	761051.1000	LCIS-RS120UP-PI-1U	5
	AC/DC 230 V	761061.1000	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 – 30.0 V		92.0 – 126.5 V	184.0 – 253.0 V
Rated current	11.0 mA	13.0 mA	5.0 mA	3.5 mA
Interrupting voltage	< 2.4 V		<11 V	<23 V
Protection device	Reverse diode		Bridge rectifier	
Max. length of connecting lead	DC 1000 m / AC 500 m			
Status Indication	LED green			
Rated frequency	–	50–60 Hz		
Output	–			
Contact type	1 change over contact			
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	at 24 V: 1 A, at 125 V: 200 mA, at 250 V: 100 mA			
Max. switching capacity	1500 VA			
Contact material	$AgSn0_2$			
Mechanical service life	> 5 × 10^7 operations			
Switch-on delay	6 ms	DC: 6 ms AC: 10 ms	8 ms	
Switch-off delay	13 ms	DC: 10 ms AC: 10 ms	13 ms	
Clearance/creep. dist. (control/load side)	>5.5 mm			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 60175)			
Insulation voltage input/output	4.0 kV_{eff}			
Rated insulation voltage (EN 50178)	– V			
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 (kg/piece)	0.035			
Approvals	CSA and GL in preparation, UL			
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	

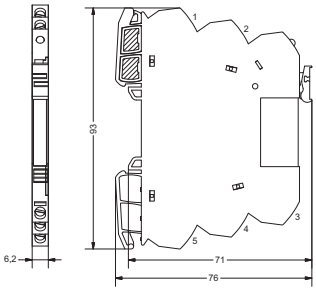
Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

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

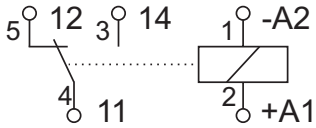
Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	760020.1010	LCIS-RS24DC-S-1U-HTV	5
	AC/DC 24 V	760021.1010	LCIS-RS24UP-S-1U-HTV	5
	AC/DC 115 V	760051.1010	LCIS-RS120UP-S-1U-HTV	5
	AC/DC 230 V	760061.1010	LCIS-RS230UP-S-1U-HTV	5
	AC/DC 230 V			5
Push-In				
Nominal voltage	DC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

Dimensions

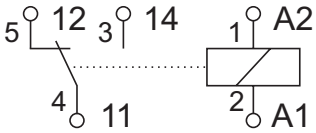


PIN assignment

DC 24 V



AC/DC 24 V, AC/DC 115 V, AC/DC 230 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 – 30.0 V		92.0 – 126.5 V	184.0 – 253.0 V
Rated current	11.0 mA	13.0 mA	5.0 mA	3.5 mA
Interrupting voltage	< 2.4 V		<11 V	<23 V
Protection device	Free-wheeling diode		Bridge rectifier	
Max. length of connecting lead	DC 1000 m / AC 500 m			
Status Indication	LED green			
Rated frequency	–		50–60 Hz	
Output				
Contact type	1 change over contact			
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	at 24 V: 1 A, at 125 V: 200 mA, at 250 V: 100 mA			
Max. switching capacity	1500 VA			
Contact material	$AgSn0_2$ + 5 µm HV			
Mechanical service life	> 5 × 10^7 operations			
Switch-on delay	5 ms	DC: 6 ms AC: 12 ms	8 ms	
Switch-off delay	4 ms	DC: 14 ms AC: 15 ms	13 ms	
Clearance/creep. dist. (control/load side)	>5.5 mm			
Inrush current	–			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 60175)			
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 (kg/piece)	0.035			
Approvals	CSA and GL in preparation, UL			
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	

Accessories	Color	2-pole	4-pole	8-pole	16-pole	PU
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

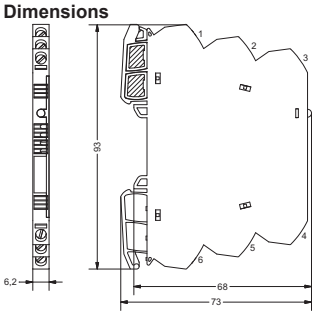
Accessories	Color	Article number	Type	PU
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

Comments

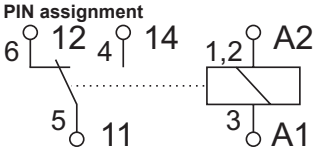
Hard gold-plated contacts: So that the gold layer is not damaged, the specified values are not permitted to be exceeded. At higher switching capacity, the gold layer vaporizes. The deposition in the housing can lead to sparkovers between the coil and contact.

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

Dimensions



PIN assignment



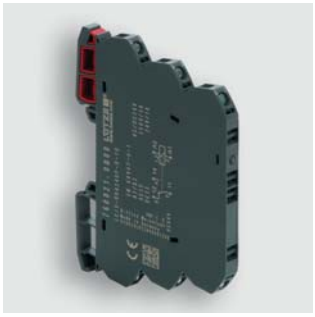
Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	760020.0000	LCIS-RGA24DC-S-1U	5
	AC/DC 24 V	760021.0000	LCIS-RGA24UP-S-1U	5
	AC/DC 115 V	760051.0000	LCIS-RGA120UP-S-1U	5
	AC/DC 230 V	760061.0000	LCIS-RGA230UP-S-1U	5
Push-In				
Nominal voltage	DC 24 V	761020.0000	LCIS-RGA24DC-PI-1U	5
	AC/DC 24 V	761021.0000	LCIS-RGA24UP-PI-1U	5
	AC/DC 115 V	761051.0000	LCIS-RGA120UP-PI-1U	5
	AC/DC 230 V	761061.0000	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 – 30.0 V		92.0 – 126.5 V	184.0 – 253.0 V
Rated current	11.0 mA	13.0 mA	7.0 mA	3.5 mA
Interrupting voltage	< 2.4 V	<2.4 V	<11 V	<23 V
Protection device	Reverse- / over-load diode	Bridge rectifier		
Max. length of connecting lead	DC 1000 m / AC 500 m			
Status Indication	LED green			
Rated frequency	50–60 Hz			
Output	–			
Contact type	1 change over contact			
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	at 24 V: 1 A, at 125 V: 200 mA, at 250 V: 100 mA			
Max. switching capacity	1500 VA			
Contact material	AgSnO2			
Mechanical service life	> 5 × 10^7 operations			
Switch-on delay	5 ms			10 ms
Switch-off delay	4 ms	10 ms		15 ms
Clearance/creep. dist. (control/load side)	>5.5 mm			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 60175)			
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 (kg/piece)	0.035			
Approvals	CSA and GL in preparation, UL			
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	

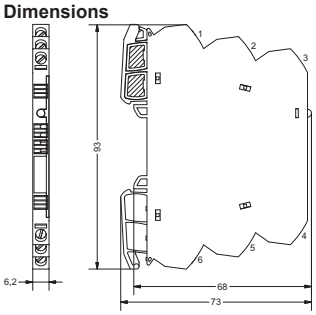
Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

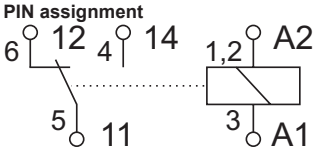
Output Relay Interface, relay with 1 directional contact
AC/DC 250 V, 6 A, 1500 VA
Screw terminal / Push-In, contact material: $AgSnO_2$+ 5 µm HV



Dimensions



PIN assignment



Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	760020.0010	LCIS-RGA24DC-S-1U-HTV	5
	AC/DC 24 V	760021.0010	LCIS-RGA24UP-S-1U-HTV	5
	AC/DC 115 V	760051.0010	LCIS-RGA120UP-S-1U-HTV	5
	AC/DC 230 V	760061.0010	LCIS-RGA230UP-S-1U-HTV	5
Push-In				
Nominal voltage	DC 24 V	761020.0010	LCIS-RGA24DC-PI-1U-HTV	5
	AC/DC 24 V	761021.0010	LCIS-RGA24UP-PI-1U-HTV	5
	AC/DC 115 V	761051.0010	LCIS-RGA120UP-PI-1U-HTV	5
	AC/DC 230 V	761061.0010	LCIS-RGA230UP-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 – 30.0 V		92.0 – 126.5 V	184.0 – 253.0 V
Rated current	11.0 mA	13.0 mA	7.0 mA	3.5 mA
Interrupting voltage	< 2.4 V	<2.4 V	<11 V	<23 V
Protection device	Bridge rectifier			
Max. length of connecting lead	DC 1000 m / AC 500 m			
Status Indication	LED green			
Rated frequency	50–60 Hz			
Output				
Contact type	1 change over contact			
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	at 24 V: 1 A, at 125 V: 200 mA, at 250 V: 100 mA			
Max. switching capacity	1500 VA			
Contact material	AgSnO2+ 5 µm HV			
Mechanical service life	> 5 × 10^7 operations			
Switch-on delay	5 ms			appr. 10 ms
Switch-off delay	10 ms			appr. 15 ms
Clearance/creep. dist. (control/load side)	>5.5 mm			
Inrush current	16 A, 4 ms			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 60175)			
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 (kg/piece)	0.025			
Approvals	CSA and GL in preparation, UL			
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	

Accessories	Color	2-pole	4-pole	8-pole	16-pole	PU
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

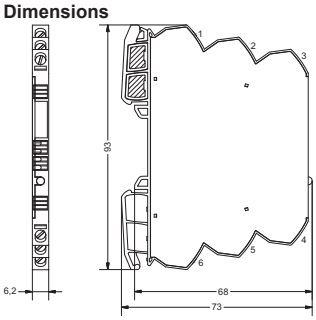
Accessories	Color	Article number	Type	PU
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

Comments

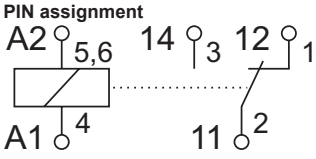
Hard gold-plated contacts: So that the gold layer is not damaged, the specified values are not permitted to be exceeded. At higher switching capacity, the gold layer vaporizes. The deposition in the housing can lead to sparkovers between the coil and contact.

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

Dimensions



PIN assignment



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

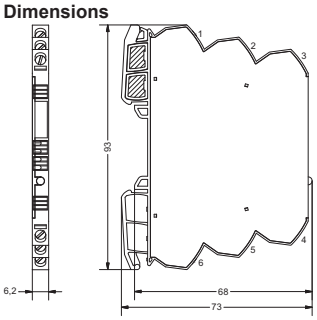
Input	**DC 24 V**	**AC/DC 24 V**	**AC/DC 115 V**	**AC/DC 230 V**
Input voltage range	19.2 – 30.0 V		92.0 – 126.5 V	184.0 – 253.0 V
Rated current	11.0 mA	13.0 mA	7.0 mA	3.5 mA
Interrupting voltage	< 2.4 V	<2.4 V	<11 V	<23 V
Protection device	Reverse- / over-load diode		–	
Max. length of connecting lead	DC 1000 m / AC 500 m			
Status Indication	LED green			
Rated frequency	50–60 Hz			
Output	–			
Contact type	1 change over contact			
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	at 24 V: 1 A, at 125 V: 200 mA, at 250 V: 100 mA			
Max. switching capacity	1500 VA			
Contact material	AgSnO2			
Mechanical service life	> 5 × 10^7 operations			
Switch-on delay	5 ms			10 ms
Switch-off delay	4 ms	10 ms		15 ms
Clearance/creep. dist. (control/load side)	>5.5 mm			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 60175)			
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 (kg/piece)	0.035			
Approvals	CSA and GL in preparation, UL			
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

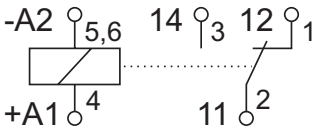
Input Relay Interface, relay with 1 directional contact
AC/DC 250 V, 6 A, 1500 VA
Screw terminal / Push-In, contact material: $AgSnO_2$+ 5 µm HV

Dimensions

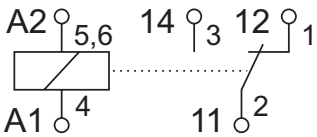


PIN assignment

DC 24 V



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



Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	760023.0010	LCIS-RGE24DC-S-1U-HTV	5
	AC/DC 24 V	760024.0010	LCIS-RGE24UP-S-1U-HTV	5
	AC/DC 115 V	760054.0010	LCIS-RGE120UP-S-1U-HTV	5
	AC/DC 230 V	760064.0010	LCIS-RGE230UP-S-1U-HTV	5
Push-In				
Nominal voltage	DC 24 V	761023.0010	LCIS-RGE24DC-PI-1U-HTV	5
	AC/DC 24 V	761024.0010	LCIS-RGE24UP-PI-1U-HTV	5
	AC/DC 115 V	761054.0010	LCIS-RGE120UP-PI-1U-HTV	5
	AC/DC 230 V	761064.0010	LCIS-RGE230UP-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 – 30.0 V		92.0 – 126.5 V	184.0 – 253.0 V
Rated current	11.0 mA	13.0 mA	7.0 mA	3.5 mA
Interrupting voltage	< 2.4 V	<2.4 V	<11 V	<23 V
Protection device	Bridge rectifier			
Max. length of connecting lead	DC 1000 m / AC 500 m			
Status Indication	LED green			
Rated frequency	50–60 Hz			
Output				
Contact type	1 change over contact			
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	at 24 V: 1 A, at 125 V: 200 mA, at 250 V: 100 mA			
Max. switching capacity	1500 VA			
Contact material	AgSnO2+ 5 µm HV			
Mechanical service life	> 5 × 10^7 operations			
Switch-on delay	5 ms		appr. 10 ms	
Switch-off delay	10 ms		appr. 15 ms	
Clearance/creep. dist. (control/load side)	>5.5 mm			
Inrush current	16 A, 4 ms			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 60175)			
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 (kg/piece)	0.025			
Approvals	CSA and GL in preparation, UL			
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	

Accessories	Color	2-pole	4-pole	8-pole	16-pole	PU
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

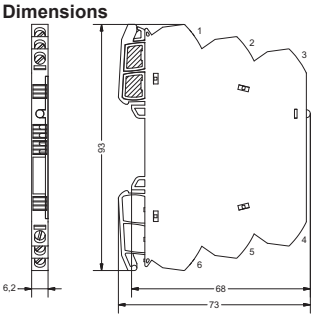
Accessories	Color	Article number	Type	PU
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

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.

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

Dimensions



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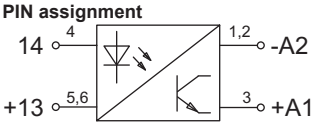


Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage load	DC 24 V DC 60 V / 2 A	763020.0120	LCIS-SR-DC-2L-200120-S	5
	DC 24 V DC 60 V / 0,5 A	763020.0110	LCIS-SR-DC-2L-200110-S	5
Push-In				
Nominal voltage load	DC 24 V DC 60 V / 2 A	764020.0120	LCIS-SR-DC-2L-200120-PI	5
	DC 24 V DC 60 V / 0,5 A	764020.0110	LCIS-SR-DC-2L-200110-PI	5

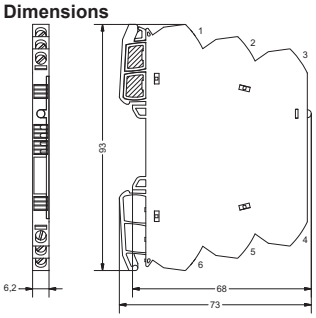
Input	763020.0120	763020.0110	764020.0120	764020.0110
Input voltage range	11.0 – 30.0 V			
Rated current	> 4 mA			
Interrupting voltage	–			
Protection device	Varistor			
Status Indication	LED green			
Rated frequency	–			
Output				
Switching element	MosFet, NO contact			
Min. switching voltage	DC 10 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	–			
Leakage current	< 10 µA			
Switch-on delay	< 150 µs	< 250 µs	< 150 µs	< 250 µs
Switch-off delay	< 300 µs	< 2 µs	< 300 µs	< 2 µs
Switching frequency	1 kHz	50 Hz	1 kHz	50 Hz
Clearance/creep. dist. (control/load side)	–			
Protection device output	Varistor			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 60175)			
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 (kg/piece)	0.030			
Approvals	CSA and GL in preparation, UL			
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	

Accessories	Color	2-pole	4-pole	8-pole	16-pole	PU
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	Color	Article number	Type	PU
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

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

Dimensions



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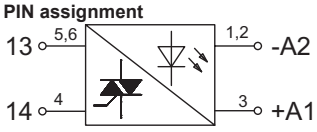


Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	763020.0220	LCIS-SR-DC/AC-2L-200220-S	5
Push-In				
Nominal voltage	DC 24 V	764020.0220	LCIS-SRDC/AC2L-200220-PI	5

Input	**DC 24 V**
Input voltage range	11.0 – 30.0 V
Rated current	9.0 mA
Interrupting voltage	<9 V
Protection device	Varistor
Status Indication	LED green
Rated frequency	–
Output	
Switching element	Triac, NO contact (zero-voltage switching)
Min. switching voltage	AC 20 V
Max. switching voltage	AC 264 V
Min. switching current	5 mA
Max. switching current	2 A
Inrush current	–
Leakage current	1 mA
Switch-on delay	< 10 ms
Switch-off delay	< 10 ms
Switching frequency	10 Hz
Clearance/creep. dist. (control/load side)	>5.5 mm
Protection device output	Varistor
General	
Housing material	PA 6.6 (UL 94 V-0)
Protection class	IP 20
Field installation	rail TS 35 (EN 60175)
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 (kg/piece)	0.030
Approvals	CSA and GL in preparation, UL

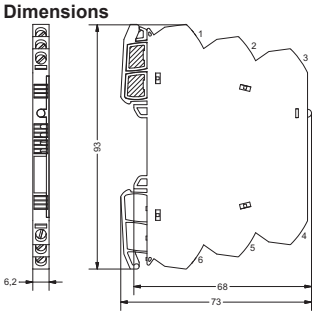
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm	Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

Semiconductor relay, 3-conductor technology
Switching element max. AC 30 V / 3 A
Screw terminal / Push-In

Dimensions



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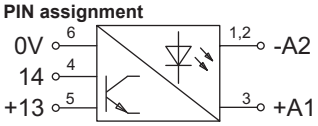


Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	AC/DC 110–230 V	763080.0350	LCIS-SRKFAC/DC3L-800350S	5
Push-In				
Nominal voltage	AC/DC 110–230 V	764080.0350	LCIS-SRKFAC/DC3L-800350PIn	5

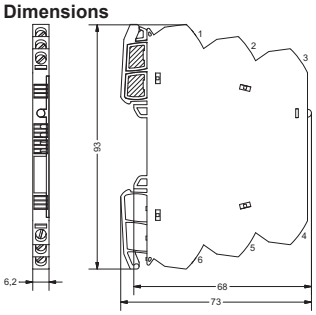
Input	**AC/DC 110–230 V**
Input voltage range	110.0 – 230.0 V
Rated current	– mA
Interrupting voltage	–
Protection device	Varistor
Status Indication	LED green
Rated frequency	–
Output	
Switching element	MosFet, NO contact
Min. switching voltage	DC 10 V
Max. switching voltage	DC 30 V
Min. switching current	1 mA
Max. switching current	3 A
Inrush current	–
Leakage current	<100 µA
Switch-on delay	< 0.3 ms
Switch-off delay	< 0.4 ms
Switching frequency	10 Hz
Clearance/creep. dist. (control/load side)	–
Protection device output	Suppressor diode
General	
Housing material	PA 6.6 (UL 94 V-0)
Protection class	IP 20
Field installation	rail TS 35 (EN 60175)
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 (kg/piece)	0.030
Approvals	CSA and GL in preparation, UL
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

Semiconductor relay, 3-conductor technology
Switching element max. DC 30 V / 2 A, DC 30 V / 5 A
Screw terminal / Push-In

Dimensions



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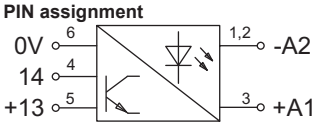


Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	763020.0320	LCIS-SRKF-DC-3L-200320-S	5
	DC 24 V	763020.0330	LCIS-SRKF-DC-3L-200330-S	5
Push-In				
Nominal voltage	DC 24 V	764020.0320	LCIS-SRKFDC3L-200320-PI	5
	DC 24 V	764020.0330	LCIS-SRKFDC3L-200330-PI	5

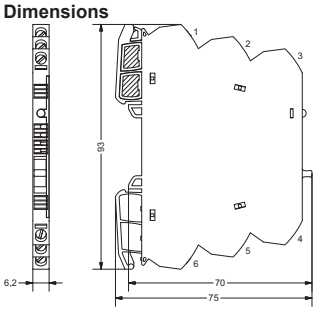
Input	**763020.0320**	**763020.0330**	**764020.0320**	**764020.0330**
Input voltage range	11.0 – 30.0 V			
Rated current	– mA			
Interrupting voltage	–			
Protection device	Supressor diode			
Status Indication	LED green			
Rated frequency	–			
Output				
Switching element	MosFet, NO contact			
Min. switching voltage	DC 10 V			
Max. switching voltage	DC 30 V			
Min. switching current	5 mA			
Max. switching current	2 A	5 A	2 A	5 A
Inrush current	–			
Leakage current	< 100 µA	1 mA	< 100 µA	1 mA
Switch-on delay	< 0,3 ms			
Switch-off delay	< 0,4 ms			
Switching frequency	100 Hz			
Clearance/creep. dist. (control/load side)	–			
Protection device output	Supressor diode			
General				
Housing material	PA 6.6 (UL 94 V-0)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 60175)			
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 (kg/piece)	0.030			
Approvals	CSA and GL in preparation, UL			
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

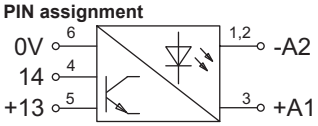
Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

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

Dimensions



PIN assignment



Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	763020.0360	LCIS-SRKFDC3L-200320-SH0S	5
Push-In				
Nominal voltage	DC 24 V	764020.0360	LCIS-SRKFDC3L-200320-PIH0S	5

Input	**DC 24 V**
Input voltage range	11.0 – 30.0 V
Rated current	– mA
Interrupting voltage	–
Protection device	Supressor diode
Status Indication	LED green
Rated frequency	–
Output	
Switching element	MosFet, NO 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	–
Leakage current	1 mA
Switch-on delay	< 0,3 ms
Switch-off delay	< 0,4 ms
Switching frequency	100 Hz
Clearance/creep. dist. (control/load side)	–
Protection device output	Supressor diode
General	
Housing material	PA 6.6 (UL 94 V-0)
Protection class	IP 20
Field installation	rail TS 35 (EN 60175)
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 (kg/piece)	0.030
Approvals	CSA and GL in preparation, UL
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

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 approved.

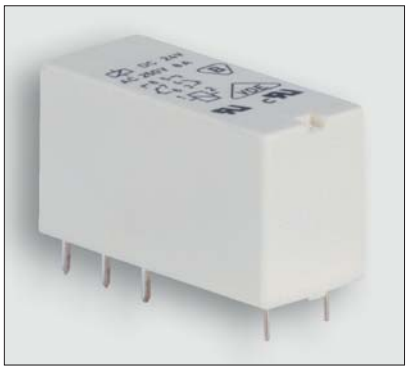
The Microplug series offers the following features:

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

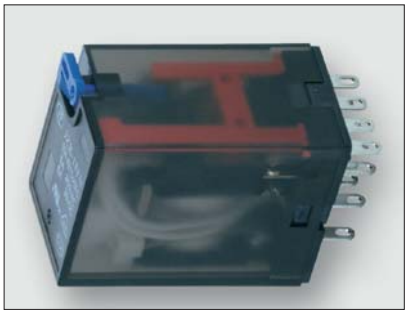
Suppressor modules
All AC/DC 6 V – 230 V

Comb-type jumper bar
Connect up to 6 modules

Relay versions Type 1
1 and 2 changeover contact versions

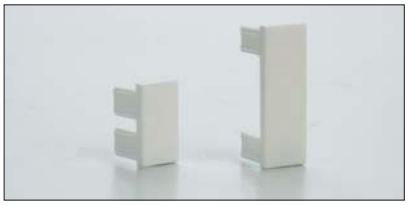


Relay versions Type 2
2 and 4 changeover contact versions



Locking system
Mechanically stable and shock-proof

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



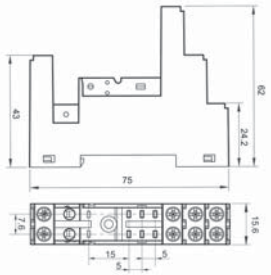
Relay socket for mini and industrial relay
AC/DC 300 V
Screw terminal

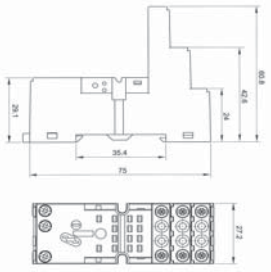
Description		Part-No.	Type	PU
Relay socket for mini relay				
	1/2 change over contact	770900	RES-0900	5
Relay socket for industrial relay				
	2 change over contact	770903	RES-0903	5
	4 change over contact	770905	RES-0905	5

General	Relay socket for mini relay	Relay socket for industrial relay
Nominal voltage	AC/DC 300 V	
Rated current	AC/DC 12 A pro pin	
Insulation voltage	AC 5000 V	
Protection class	IP 20	
Ambient temperature	-40 °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	Article number	Type	PU
Jumper comb 10 A (mini relay)	770908	REP-0908	10
Tag holder (mini relay)	770902	REM- 902	10
Mounting bracket relay (mini relay)	770901	REE-0901	10
Mounting bracket relay (industrial relay)	770906	REE-0906	10
Jumper comb 10 A (industrial relay)	770909	REI-0909	10
Tag holder (industrial relay)	770907	REM WT-0907	10

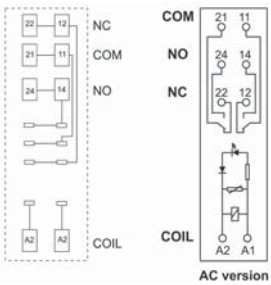
Dimensions



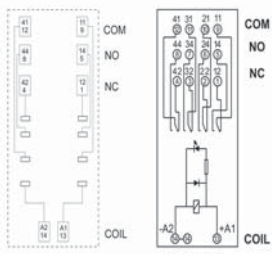


PIN assignment

Relay socket for mini relay



Relay socket for industrial relay



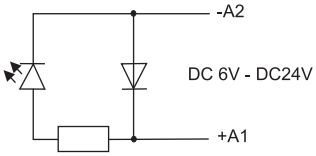
Pluggable microplug protection modules
AC/DC 6 – 230 V
with LED indication

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

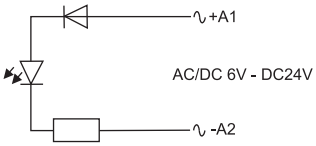
General	DC 6/24 V		DC 110 V	AC/DC 110/230 V
Protection device	Overload diode	Varistor	Overload diode	Varistor
Status Indication	LED green			

PIN assignment

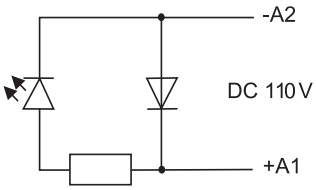
DC 6/24 V



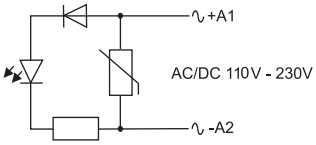
DC 6/24 V



DC 110 V



AC/DC 110/230 V

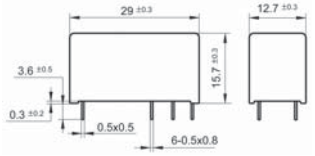


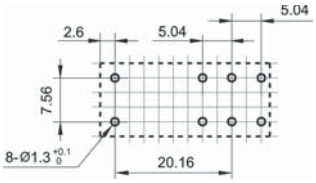
Mini relay, 1 changeover contact
AC 400 V/DC 300 V, 16 A, 4000 VA
Contact material: AgNi

Description		Part-No.	Type	PU
Relay with AgNi				
Nominal voltage	DC 12 V	770100	RE1W-0100 DC12	10
	DC 24 V	770101	RE1W-0101 DC24	10
	DC 120 V	770106	RE1W-0106 DC120	10
	AC 12 V	770110	RE1W-0110 AC12	10
	AC 24 V	770111	RE1W-0111 AC24	10
	AC 120 V	770116	RE1W-0116 AC120	10
	AC 230 V	770117	RE1W-0117 AC230	10

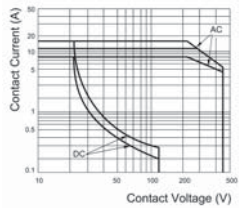
Input	**Relay with AgNi**
Nominal voltage	AC: 12 to 240 V, DC: 12 to 120 V
Input voltage	AC: ±30 %, DC: ±20 %
Rated current	– A
Power comsumption	AC: 0.75 VA DC: 0.4 W
Interrupting voltage	AC: ≥0.15 Un DC: >0.1 Un
Input characteristic impedance	–
Status Indication	–
Output	
Contact type	1 change over contact
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: 16 A / 250 V AC, DC1: 16 A / 24 V DC
Switching capacity DC 13	24 V: 2 A, 115 V: 300 mA, 230 V: 150 mA
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 × 10^7 operations
Switch-on delay	15 ms
Switch-off delay	8 ms
Clearance/creep. dist. (control/load side)	> 10 mm
Rated insulation voltage (EN 50178)	AC 400 V (C 250/ B 400)
Overvoltage category	III
Pollution degree	3
General	
Protection class	RTII - flux-tight
Shock resistance	10 g
Vibration resistance	10g, 10...150 Hz
Insulation voltage input/output	5.0 kV_{eff}
Safe isolation	yes
Operation temperature range	-40 – 70 °C
Storage temperature range	-40 – 85 °C
Dimensions (w × h × d)	29.0 × 15.7 × 12.7 mm
Weight (kg/piece)	0.014
Approvals	UL, CSA, VDE
Termination	plug-in

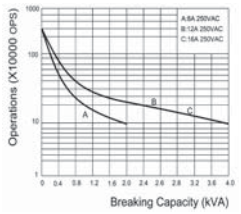
Dimensions

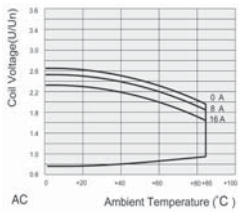


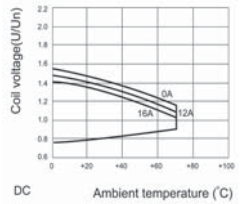


Limit curve





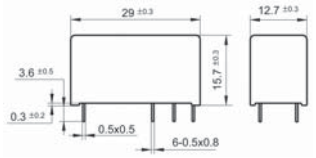


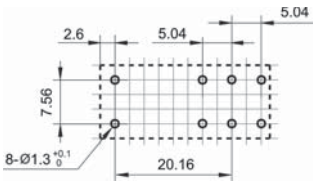


Mini relay, 2 changeover contact
AC 400 V/DC 300 V, 8 A, 2000 VA
Contact material: AgNi, AgNi+5 µm gold-plating

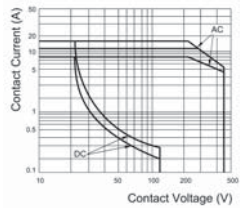
Description		Part-No.	Type	PU
Relay with AgNi				
Nominal voltage	DC 12 V	770918	RE2W-0918 DC12	10
	DC 24 V	770920	RE2W-0920 DC24	10
	DC 120 V	770922	RE2W-0922 DC120	10
	AC 12 V	770926	RE2W-0926 AC12	10
	AC 24 V	770928	RE2W-0928 AC24	10
	AC 120 V	770930	RE2W-0930 AC120	10
	AC 230 V	770924	RE2W-0924 AC230	10
Relay with AgNi + 5 µm HV				
Nominal voltage	DC 12 V	770919	RE2WHV-0919 DC12	10
	DC 24 V	770921	RE2WHV-0921 DC24	10
	DC 120 V	770923	RE2WHV-0923 DC120	10

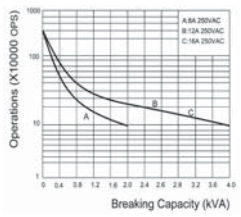
Dimensions

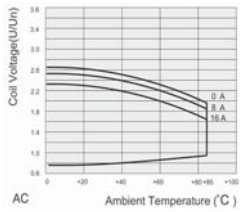


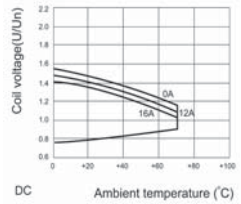


Limit curve







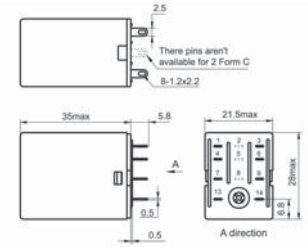


Input	Relay with AgNi	Relay with AgNi + 5 µm HV
Nominal voltage	AC: 12 to 240 V, DC: 12 to 120 V	
Input voltage	AC: ±30 %, DC: ±20 %	
Rated current	– A	
Power comsumption	DC: 0.4 W / AC: 0.75 VA	DC: 0.4 W
Interrupting voltage	DC: >0.1 Un / AC: ≥0.15 Un	DC: >0.1 Un
Input characteristic impedance	–	
Status Indication	–	
Output		
Contact type	2 change over contact	
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: 8 A / 250 V AC, DC1: 8 A / 24 V DC	
Switching capacity DC 13	24 V: 2 A, 115 V: 300 mA, 230 V: 150 mA	
Switching capacity AC 15	3.3 A	
Inrush current	15A (4ms)	
Max. switching capacity	2000 VA	
Resistor	< 100 mΩ	
Contact material	AgNi	AgNi+5 µm HV
Switching frequency	AC1: 600 cycles/hour, without load 72,000 cycles/hour	
Mechanical service life	>3 × 10^7 operations	
Switch-on delay	15 ms	
Switch-off delay	8 ms	
Clearance/creep. dist. (control/load side)	> 10 mm	
Rated insulation voltage (EN 50178)	AC 400 V (C 250/ B 400)	
Overvoltage category	III	
Pollution degree	3	
General		
Protection class	RTII - flux-tight	
Shock resistance	10 g	
Vibration resistance	10 g, 10...150 Hz	
Insulation voltage input/output	5.0 kV_{eff}	
Safe isolation	yes	
Operation temperature range	-40 – 70 °C	
Storage temperature range	-40 – 85 °C	
Dimensions (w × h × d)	29.0 × 15.7 × 12.7 mm	
Weight (kg/piece)	0.014	
Approvals	UL, CSA, VDE	
Termination	plug-in	

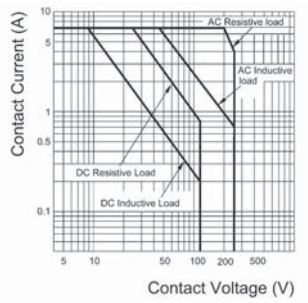
Comments
To prevent damage to the gold layer, the stated values should not be exceeded.
At higher switching capacity, the gold layer vaporizes. The undercurrent in the housing can result in flashovers between coil - contact.

Industrial relay, 2 changeover contact
AC/DC 250 V, 7 A, 1750 VA
Contact material: AgNi

Dimensions



Limit curve



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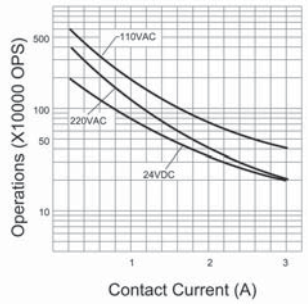


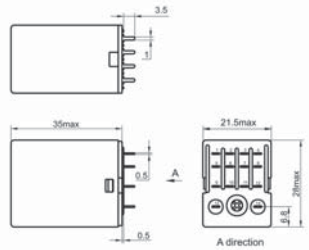
Description		Part-No.	Type	PU
Relay with AgNi				
Nominal voltage	DC 12 V	770500	RE2W-0500 DC12	10
	DC 24 V	770501	RE2W-0501 DC24	10
	DC 120 V	770506	RE2W-0506 DC120	10

Input	**Relay with AgNi**
Nominal voltage	DC: 12 to 110 V
Input voltage	DC: ±10 %
Rated current	– A
Power comsumption	DC: 0.9 W
Interrupting voltage	DC: >0.1 Un
Input characteristic impedance	–
Status Indication	–
Output	
Contact type	2 change over contact
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	AC1: 7 A / 250 V AC, DC1: 7 A / 30 V DC
Switching capacity DC 13	24 V: 2 A, 115 V: 300 mA, 230 V: 150 mA
Switching capacity AC 15	3.3 A
Inrush current	20 A (4 ms)
Max. switching capacity	1750 VA
Resistor	< 100 mΩ
Contact material	AgNi
Switching frequency	AC1: 1,200 cycles/hour, without load 18,000 cycles/hour
Mechanical service life	>2 × 10^7 operations
Switch-on delay	25 ms
Switch-off delay	25 ms
Clearance/creep. dist. (control/load side)	Air clearance: >2.5 mm, creep clearance: >4 mm
Rated insulation voltage (EN 50178)	AC 250 V (C 250)
Overvoltage category	III
Pollution degree	3
General	
Protection class	RTI - dust proof
Shock resistance	10 g
Vibration resistance	5 g, 10...55 Hz
Insulation voltage input/output	1.5 kV_{eff}
Safe isolation	–
Operation temperature range	-40 – 70 °C
Storage temperature range	-40 – 85 °C
Dimensions (w × h × d)	28.0 × 21.2 × 35.0 mm
Weight (kg/piece)	0.037
Approvals	cULus, TÜV, CQC
Termination	plug-in

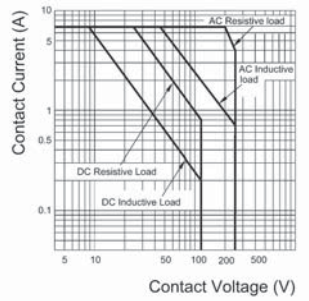
Industrial relay, 4 changeover contacts
AC/DC 250 V, 5 A, 1250 VA
Contact material: AgNi, AgNi+5 µm gold-plating

Description		Part-No.	Type	PU
Relay with AgNi				
Nominal voltage	DC 12 V	770400	RE4W-0400 DC12	10
	DC 24 V	770401	RE4W-0401 DC24	10
	DC 120 V	770406	RE4W-0406 DC120	10
	AC 12 V	770410	RE4W-0410 AC12	10
	AC 24 V	770411	RE4W-0411 AC24	10
	AC 120 V	770416	RE4W-0416 AC120	10
	AC 230 V	770417	RE4W-0417 AC230	10
Relay with AgNi + 5 µm HV				
Nominal voltage	DC 12 V	770420	RE4WHV-0420 DC12	10
	DC 24 V	770421	RE4WHV-0421 DC24	10
	DC 120 V	770426	RE4WHV-0426 DC120	10

Dimensions



Limit curve



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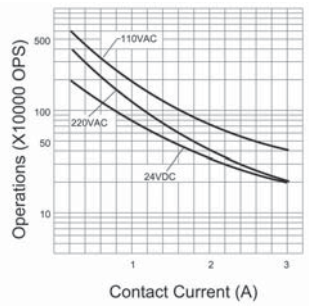
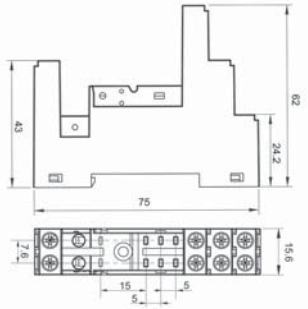


Input	Relay with AgNi		Relay with AgNi + 5 µm HV
Nominal voltage	AC: 12 to 240 V, DC: 12 to 120 V		
Input voltage	AC: ±20 %, DC: ±10 %		
Rated current	– A		
Power comsumption	DC: 0.9 W	AC: 1.2 VA	DC: 0.9 W
Interrupting voltage	DC: >0.1 Un	AC: ≥0.2 Un	DC: >0.1 Un
Input characteristic impedance	–		
Status Indication	–		
Output			
Contact type	4 change over contact		
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: 5 A / 250 V AC, DC1: 5 A / 24 V DC		
Switching capacity DC 13	24 V: 2 A, 115 V: 300 mA, 230 V: 150 mA		
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: 1,200 cycles/hour, without load 18,000 cycles/hour		
Mechanical service life	>2 × 10^7 operations		
Switch-on delay	25 ms		
Switch-off delay	25 ms		
Clearance/creep. dist. (control/load side)	Air clearance: >1.6 mm, creep clearance: >3.2 mm		
Rated insulation voltage (EN 50178)	AC 250 V (B 250)		
Overvoltage category	III		
Pollution degree	3		
General			
Protection class	RTI - dust proof		
Shock resistance	10 g		
Vibration resistance	5 g, 10...55 Hz		
Insulation voltage input/output	1.5 kV_{eff}		
Safe isolation	–		
Operation temperature range	-40 – 70 °C		
Storage temperature range	-40 – 85 °C		
Dimensions (w × h × d)	28.0 × 21.2 × 35.0 mm		
Weight (kg/piece)	0.037		
Approvals	cULus, TÜV, CQC		
Termination	plug-in		

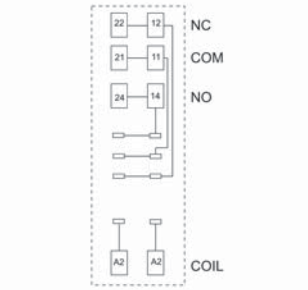
Comments
To prevent damage to the gold layer, the stated values should not be exceeded.
At higher switching capacity, the gold layer vaporizes. The undercurrent in the housing can result in flashovers between coil - contact.

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

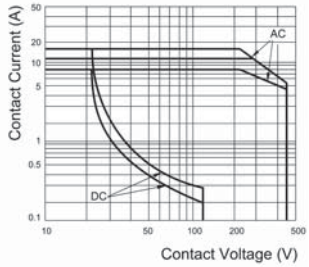
Dimensions

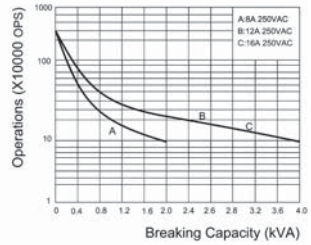


PIN assignment



Limit curve





Description		Part-No.	Type	PU
Relay Module with AgNi				
Nominal voltage	DC 12 V	770140	REP-0140 1W DC 12 V	5
	DC 24 V	770141	REP-0141 1W DC 24 V	5
	DC 115 V	770146	REP-0146 1W DC 115 V	5

Input	**DC 12 V**	**DC 24 V**	**DC 115 V**
Input voltage range	8.4 – 18.0 V	16.8 – 36.0 V	77.0 – 165.0 V
Rated current	34.0 mA	17.0 mA	5.0 mA
Nominal voltage	DC 12 V	DC 24 V	DC 115 V
Power comsumption		0.40 W	
Interrupting voltage	<1.2 V	<2.4 V	<11 V
Protection device		overload diode	
Max. length of connecting lead		–	
Status Indication		LED green	
Output			
Contact type		1 change over contact	
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 AC 15		3.3 A	
Switching capacity DC 13		at 24 V: 2A; at 115 V: 300 mA; at 230 V, 150 mA	
Max. switching capacity		4000 VA	
Contact material		AgNi	
Mechanical service life		>1 × 10^7 operations	
Switch-on delay		15 ms	
Switch-off delay		8 ms	
Clearance/creep. dist. (control/load side)		Clearance distance: > 10 mm; creepage distance: > 10mm	
Rated insulation voltage (EN 50178)		AC 400 V (category C 250)	
General			
Housing material		PA66+GF V0 (UL)	
Protection class		IP 20	
Field installation		rail TS 35 (EN 50022)	
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 (kg/piece)		0.062	
Approvals		cULus	
Termination		Screw terminal: 0.2–4.0 mm^2	

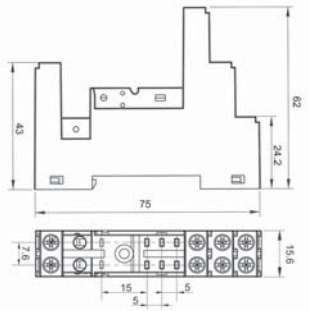
Accessories	**Color**	**Article number**	**Type**	**PU**
Jumper comb 10A	black	770908	REP-0908	10
Plate		770902	REM-0902	10
Mounting bracket relay		770901	REE-0901	10

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

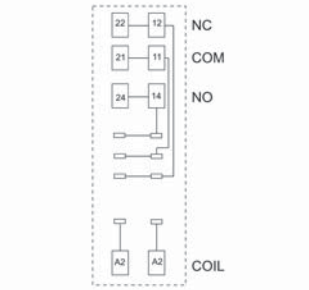
Description		Part-No.	Type	PU
Relay Module with AgNi				
Nominal voltage	AC 12 V	770150	REP-0150 1W AC 12 V	5
	AC 24 V	770151	REP-0151 1W AC 24 V	5
	AC 120 V	770156	REP-0156 1W AC 120 V	5
	AC 230 V	770157	REP-0157 1W AC 230 V	5

Input	**AC 12 V**	**AC 24 V**	**AC 120 V**	**AC 230 V**
Input voltage range	9.6 – 14.0 V	19.2 – 28.2 V	96.0 – 144.0 V	184.0 – 276.0 V
Rated current	130.0 mA	68.0 mA	14.0 mA	7.0 mA
Nominal voltage	AC 12 V	AC 24 V	AC 120 V	AC 230 V
Power comsumption	0.75 VA			
Interrupting voltage	<1.2 V	<3.6 V	<17.3 V	<34.5 V
Protection device	varistor			
Max. length of connecting lead	–			
Status Indication	LED green			
Output				
Contact type	1 change over contact			
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 AC 15	3.3 A			
Switching capacity DC 13	at 24 V: 2 A, at 115 V: 300 mA, at 230 V: 150 mA			
Max. switching capacity	4000 VA			
Contact material	AgNi			
Mechanical service life	>1 × 10^7 operations			
Switch-on delay	15 ms			
Switch-off delay	5 ms			
Clearance/creep. dist. (control/load side)	Clearance distance: > 10 mm; creepage distance: > 10mm			
Rated insulation voltage (EN 50178)	AC 400 V (category C 250)			
General				
Housing material	PA66+GF V0 (UL)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 50022)			
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)	15.6 × 75.0 × 67.0 mm (including mounting bracket)			
Weight (kg/piece)	0.062			
Approvals	cULus			
Termination	Screw terminal: 0.2–4.0 mm^2			

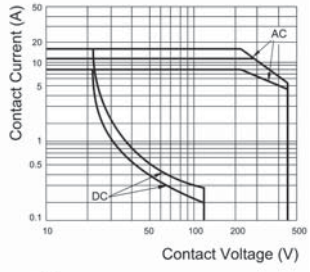
Dimensions

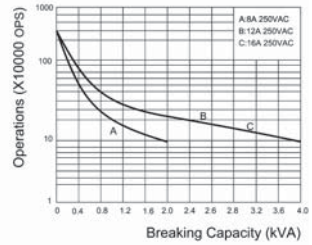


PIN assignment



Limit curve





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

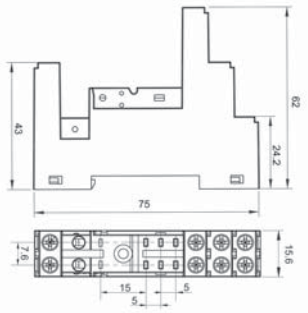
Description		Part-No.	Type	PU
Relay Module with AgNi				
Nominal voltage	DC 12 V	770040	REP-0040 2W DC 12 V	5
	DC 24 V	770041	REP-0041 2W DC 24 V	5
	DC 115 V	770046	REP-0046 2W DC 115 V	5
Relay Module with AgNi + 5µm HV				
Nominal voltage	DC 12 V	770240	REP-0240 2W HTV DC 12 V	5
	DC 24 V	770241	REP-0241 2W HTV DC 24 V	5
	DC 115 V	770246	REP-0246 2W HTV DC 115 V	5

Input	**DC 12 V**	**DC 24 V**	**DC 115 V**
Input voltage range	8.4 – 18.0 V	16.8 – 31.2 V	77.0 – 165.0 V
Rated current	34.0 mA	16.0 mA	4.0 mA
Nominal voltage	DC 12 V	DC 24 V	DC 115 V
Power comsumption		0.40 W	
Interrupting voltage	<1.2 V	<2.4 V	<11 V
Protection device		Free-wheeling diode	
Max. length of connecting lead		–	
Status Indication		LED green	

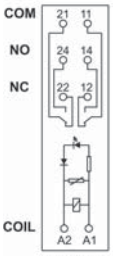
Output	**Relay Module with AgNi**	**Relay Module with AgNi + 5µm HV**
Contact type	2 change over contact	
Min. switching voltage	AC/DC 5 V	
Max. switching voltage	AC 400 V / DC 300 V	
Min. switching current	AgNi: AC/DC 5 mA	AgNi+5 µm HV: AC/DC 2 mA
Max. switching current	AC/DC 8 A	
Switching capacity AC 15	at 24 V: 3.1 A, at 230 V: 2 A	
Switching capacity DC 13	at 24 V: 2A, at 115 V: 300 mA, at 230 V: 150 mA	
Max. switching capacity	2000 VA	
Contact material	AgNi	AgNi + 5 µm HV
Mechanical service life	>1 × 10^7 operations	
Switch-on delay	15 ms	
Switch-off delay	5 ms	
Clearance/creep. dist. (control/load side)	Clearance distance: >10 mm; Creepage distance: >10 mm	
Rated insulation voltage (EN 50178)	AC 400 V (category C 250)	
General		
Housing material	PA66+GF V0 (UL)	
Protection class	IP 20	
Field installation	rail TS 35 (EN 50022)	
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 (kg/piece)	0.062	
Approvals	cULus	
Termination	Screw terminal: 0.2–4.0 mm^2	

Comments
To prevent damage to the gold layer, the stated values should not be exceeded.
At higher switching capacity, the gold layer vaporizes. The undercurrent in the housing can result in flashovers between coil - contact.

Dimensions

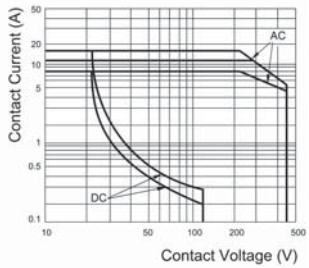


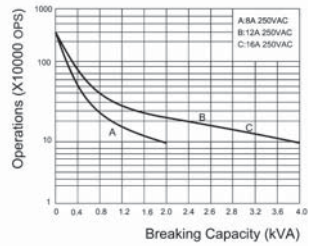
PIN assignment



AC version

Limit curve



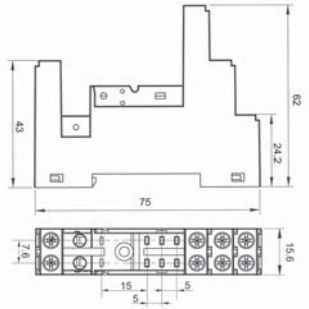


AC-Relay-Interface,2 CO contact, pluggable
AC 400 V/DC 300 V, 8 A, 2000 VA
Screw terminal, contact material: AgNi

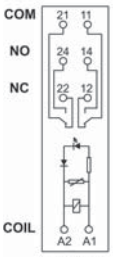
Description		Part-No.	Type	PU
Relay Module with AgNi				
Nominal voltage	AC 12 V	770050	REP-0050 2W AC 12 V	5
	AC 24 V	770051	REP-0051 2W AC 24 V	5
	AC 120 V	770056	REP-0056 2W AC 120 V	5
	AC 230 V	770047	REP-0047 2W AC 230 V	5

Input	**AC 12 V**	**AC 24 V**	**AC 120 V**	**AC 230 V**
Input voltage range	9.6 – 14.0 V	19.2 – 28.2 V	96.0 – 144.0 V	184.0 – 276.0 V
Rated current	130.0 mA	68.0 mA	14.0 mA	7.0 mA
Nominal voltage	AC 12 V	AC 24 V	AC 120 V	AC 230 V
Power comsumption	0.75 VA			
Interrupting voltage	<1.2 V	<3.6V	<17.3 V	<34.5 V
Protection device	Varistor			
Max. length of connecting lead	–			
Status Indication	LED green			
Output				
Contact type	2 change over contact			
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 8 A			
Switching capacity AC 15	at 24 V: 3.1 A, at 230 V: 2 A			
Switching capacity DC 13	at 24 V: 2A, at 115 V: 300 mA, at 230 V: 150 mA			
Max. switching capacity	2000 VA			
Contact material	AgNi			
Mechanical service life	>1 × 10^7 operations			
Switch-on delay	15 ms			
Switch-off delay	5 ms			
Clearance/creep. dist. (control/load side)	Clearance distance: >10 mm; Creepage distance: >10 mm			
Rated insulation voltage (EN 50178)	AC 400 V (category C 250)			
General				
Housing material	PA66+GF V0 (UL)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 50022)			
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)	15.6 × 75.0 × 67.0 mm (including mounting bracket)			
Weight (kg/piece)	0.062			
Approvals	cULus			
Termination	Screw terminal: 0.2–4.0 mm^2			

Dimensions

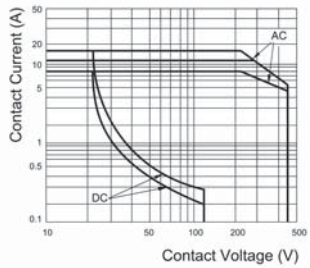


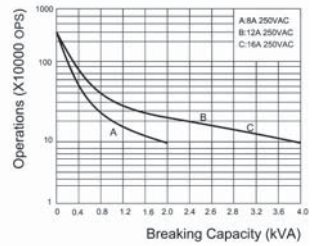
PIN assignment



AC version

Limit curve



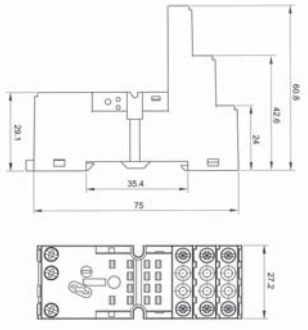


DC-Relay-Interface, 2 CO contact, pluggable
AC/DC 250 V, 7 A, 1750 VA
Screw terminal, contact material: AgNi

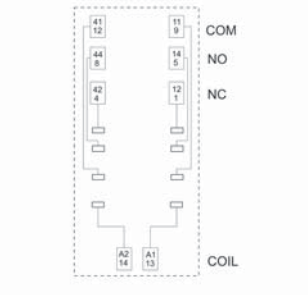
Description		Part-No.	Type	PU
Relay Module with AgNi				
Nominal voltage	DC 12 V	770540	REI2-0540 2W DC 12 V	5
	DC 24 V	770541	REI2-0541 2W DC 24 V	5
	DC 115 V	770546	REI2-0546 2W DC 115 V	5

Input	**DC 12 V**	**DC 24 V**	**DC 115 V**
Input voltage range	9.6 – 13.2 V	19.2 – 26.4 V	88.0 – 121.0 V
Rated current	75.0 mA	37.0 mA	11.0 mA
Nominal voltage	DC 12 V	DC 24 V	DC 115 V
Power comsumption		0.9 W	
Interrupting voltage	<1.2 V	<2.4 V	<11 V
Protection device		Free-wheeling diode	
Max. length of connecting lead		–	
Status Indication		LED green	
Output			
Contact type		2 change over contact	
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 AC 15		at 24 V: 2.5 A; at 230 V: 1.5 A	
Switching capacity DC 13		at 24 V: 1.8A, at 115 V: 300 mA, at 230 V: 150 mA	
Max. switching capacity		3000 VA	
Contact material		AgNi	
Mechanical service life		>2 x 10^7 operations	
Switch-on delay		25 ms	
Switch-off delay		25 ms	
Clearance/creep. dist. (control/load side)		Clearance distance: > 2 mm; creepage distance: > 3mm	
Rated insulation voltage (EN 50178)		AC 250 V (category C 250)	
General			
Housing material		PA 66+GF V0 (UL)	
Protection class		IP 20	
Field installation		rail TS 35 (EN 50022)	
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 (kg/piece)		0.097	
Approvals		cULus	
Termination		Screw terminal: 0.2–4.0 mm^2	

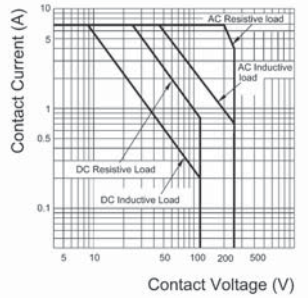
Dimensions

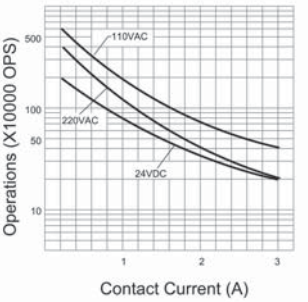


PIN assignment



Limit curve





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

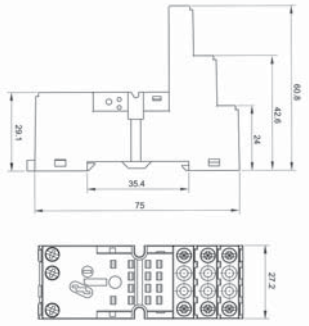
Description		Part-No.	Type	PU
Relay Module with AgNi				
Nominal voltage	DC 12 V	770440	REI4-0440 4W DC 12 V	5
	DC 24 V	770441	REI4-0441 4W DC 24 V	5
	DC 115 V	770446	REI4-0446 4W DC 115 V	5
Relay Module with AgNi + 5µm HV				
Nominal voltage	DC 12 V	770460	REI4-0460 4W HTV DC 12 V	5
	DC 24 V	770461	REI4-0461 4W HTV DC 24 V	5
	DC 115 V	770466	REI4-0466 4W HTV DC 115 V	5

Input	**DC 12 V**	**DC 24 V**	**DC 115 V**
Input voltage range	9.6 – 13.2 V	19.2 – 26.4 V	88.0 – 121.0 V
Rated current	75.0 mA	37.0 mA	11.0 mA
Nominal voltage	DC 12 V	DC 24 V	DC 115 V
Power comsumption		0.9 W	
Interrupting voltage	<1.2 V	<2.4 V	<11 V
Protection device		Overload diode	
Max. length of connecting lead		–	
Status Indication		LED green	

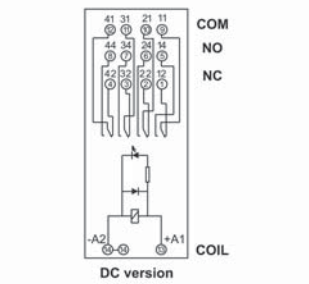
Output	**Relay Module with AgNi**	**Relay Module with AgNi + 5µm HV**
Contact type	4 change over contact	
Min. switching voltage	AC/DC 5 V	
Max. switching voltage	AC/DC 250 V	
Min. switching current	AgNi: AC/DC 5 mA	AgNi+5 µm HV: AC/DC 2 mA
Max. switching current	AC/DC 5 A	
Switching capacity AC 15	at 24 V: 2.5 A, at 230 V: 1.5 A	
Switching capacity DC 13	at 24 V: 1.8A, at 115 V: 300 mA, at 230 V: 150 mA	
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	
Switch-off delay	25 ms	
Clearance/creep. dist. (control/load side)	Clearance distance: > 2 mm; creepage distance: > 3mm	
Rated insulation voltage (EN 50178)	AC 250 V (category B 250)	
General		
Housing material	PA 66+GF V0 (UL)	
Protection class	IP 20	
Field installation	rail TS 35 (EN 50022)	
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 (kg/piece)	0.108	
Approvals	cULus	
Termination	Screw terminal: 0.2–4.0 mm^2	

Comments
To prevent damage to the gold layer, the stated values should not be exceeded.
At higher switching capacity, the gold layer vaporizes. The undercurrent in the housing can result in flashovers between coil - contact.

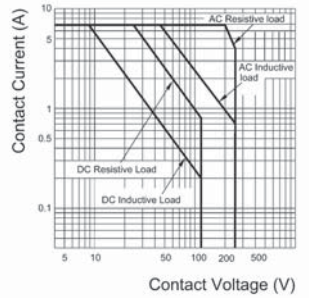
Dimensions

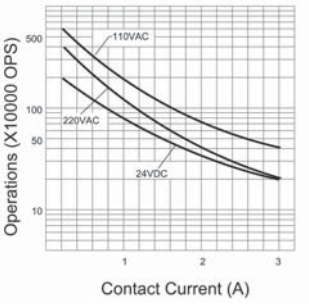


PIN assignment



Limit curve



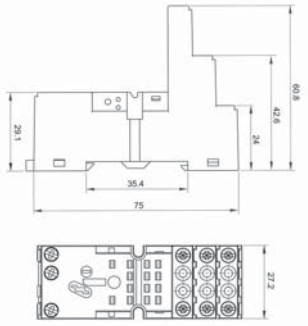


AC-Relay-Interface, 4 CO contact, pluggable
AC/DC 250 V, 5 A, 1250 VA
Screw terminal, contact material: AgNi

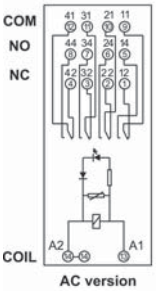
Description		Part-No.	Type	PU
Relay Module with AgNi				
Nominal voltage	AC 12 V	770450	REI4-0450 4W AC 12 V	5
	AC 24 V	770451	REI4-0451 4W AC 24 V	5
	AC 120 V	770456	REI4-0456 4W AC 120 V	5
	AC 230 V	770457	REI4-0457 4W AC 230 V	5

Input	**AC 12 V**	**AC 24 V**	**AC 120 V**	**AC 230 V**
Input voltage range	9.6 – 13.2 V	19.2 – 26.4 V	96.0 – 132.0 V	184.0 – 253.0 V
Rated current	260.0 mA	130.0 mA	26.0 mA	16.0 mA
Nominal voltage	AC 12 V	AC 24 V	AC 120 V	AC 230 V
Power comsumption	1.2 VA			
Interrupting voltage	<3.6 V	<7.2 V	<36 V	<66 V
Protection device	Varistor			
Max. length of connecting lead	–			
Status Indication	LED green			
Output				
Contact type	4 change over contact			
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 5 A			
Switching capacity AC 15	at 24 V: 2.5 A, at 230 V: 1.5 A			
Switching capacity DC 13	at 24 V: 1.8A, at 115 V: 300 mA, at 230 V: 150 mA			
Max. switching capacity	1250 VA			
Contact material	AgNi			
Mechanical service life	>2 x 10^7 operations			
Switch-on delay	25 ms			
Switch-off delay	25 ms			
Clearance/creep. dist. (control/load side)	Air clearance: >2 mm, creep clearance: >3 mm			
Rated insulation voltage (EN 50178)	AC 250 V (category B 250)			
General				
Housing material	PA 66+GF V0 (UL)			
Protection class	IP 20			
Field installation	rail TS 35 (EN 50022)			
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			
Weight (kg/piece)	0.108			
Approvals	UL, CSA			
Termination	Screw terminal: 0.2–4.0 mm^2			

Dimensions

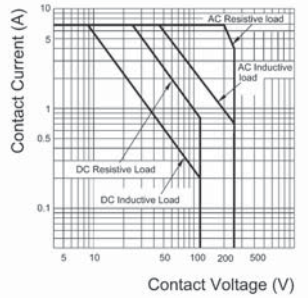


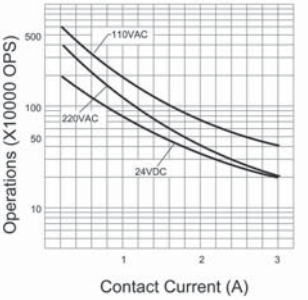
PIN assignment

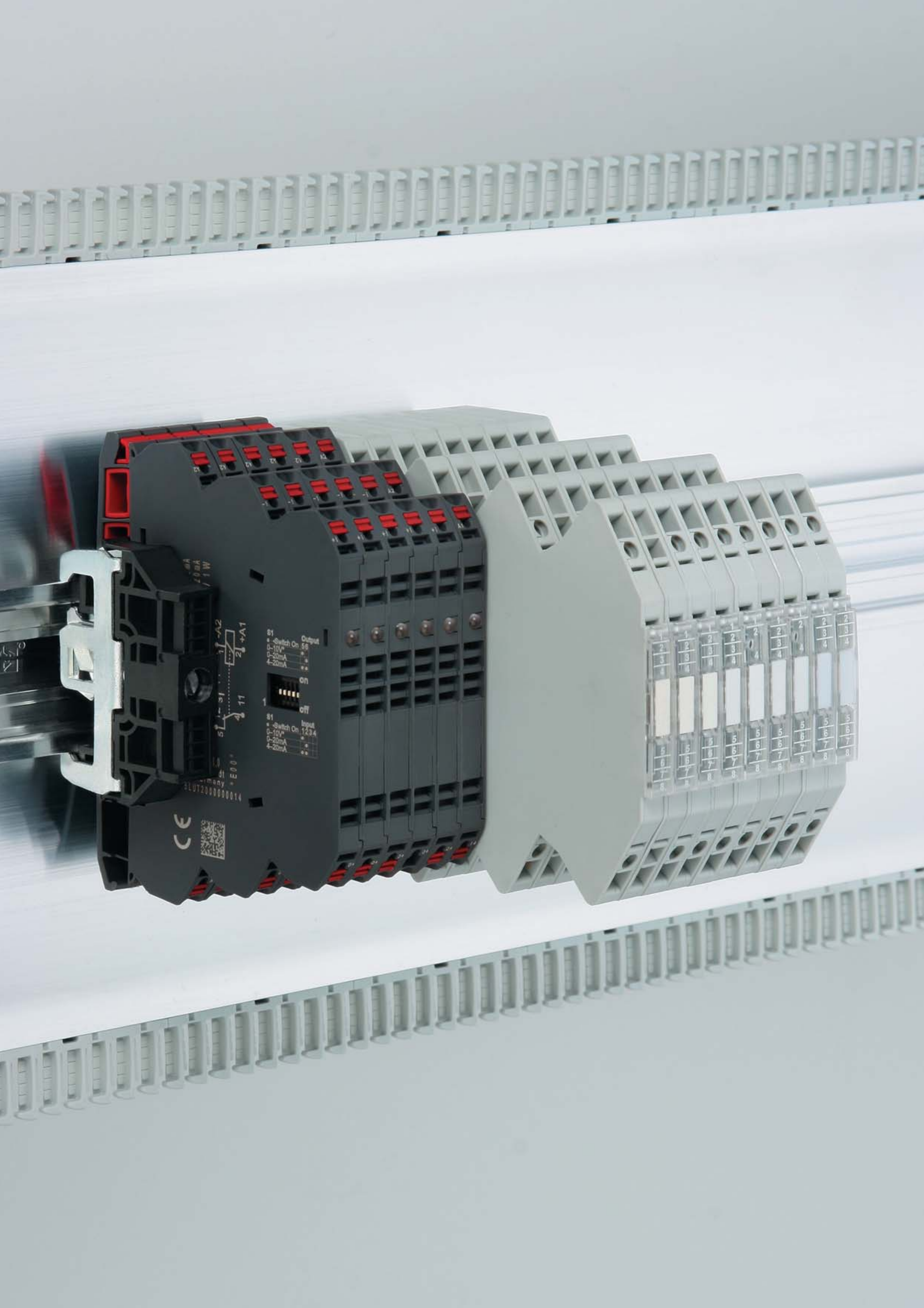


AC version

Limit curve






Output 56
-Switch On
0–10V*
0–20mA
4–20mA
on
off
Input 1234

Signal Isolation Transformers · Product Overview

LCIS

Analogue/analogue converter passive

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Analogue/analogue converter

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LCON

Analogue/analogue converter

Page 72

Temperature/analogue converter

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Analogue / limit value switch

Page 74

Temperature / limit value switch

Page 75

Analogue/analogue splitter

Page 76

Analogue/analogue limit value switch

Page 77

Signal Isolation Transformers · Basics

General description of converters

Converters are needed in a wide variety of areas in industry in order to perform the following basic tasks:

1. Signal conversion
2. Signal amplification
3. Signal isolation
4. Signal filtering

A converter is normally constructed as shown in the following schematic:

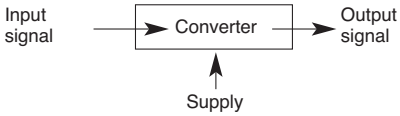


Figure : Schematic of a converter

Input signals may be:

- Voltages
- Currents
- Frequencies
- Other adapted physical quantities (e.g. pressure, temperature, humidity, PH values, etc.).

Output signals may be:

- Voltages
- Currents
- Frequencies
- Signals for field bus interfaces

A further distinction is made between analog and digital signals, which may be both input and output signals.

The input signals must be converted from the required output signals. In this context conversion means:

- Actual conversion of signals (e.g. from voltage into current)
- Amplification of signals (e.g. from low-level signals to standard signals)
- Electrical isolation and where appropriate amplification of signals (e.g. of analog-signals)
- Filtering of interference (e.g. of HF interference from analog signals)

The supply feeds power to the converter. It is required as additional auxiliary power to implement active isolation.

Transmitters

These kinds of converter transform input signals into other physical quantities.

The following lists some examples:

Input signal	Output signal
Voltage	Current/Frequency
Current	Voltage/Frequency
Frequency	Voltage/Current

Various input signals in analog or digital form, as are outputted by puls generators, thermo-couples or resistance pick-ups for example, are converted in the transmitters into the desired standardised outputs.

Standard signals (unit signals)

Unit signals are standardised electrical signals in process automation.

Commonly used unit signals include current signals to DIN IEC 60381-1:

- 0 to 20 mA
- 4 mA to 20 mA (live zero)

and voltage signals to DIN IEC 60381-2:

- 0 to 10 V
- 2 V to 10 V (live zero)

Live-zero signals are used in almost all industrial applications. If the start of the measuring range is assigned an electrical signal other than 0 (zero), a wire break monitor can be implemented. The non-zero initial signal is also termed “live zero“. A 0 mA signal is thus always a reliable indicator of a fault.

Current signals are preferred over voltage signals because the current signal is immune to electromagnetic interference (switch-on of adjacent consumers) and voltage losses due to the line resistance.
The maximum length of the signal line is limited only by the maximum load impedance which can be operated by the current source. The 4 mA… 20 mA unit of current signal offers the additional major advantage that the signal circuit is continuously powered. That power can be used by transmitters for their own supply. In this case the PLC must power the signal circuit (passive sensor). An active sensor needs an external power supply for its own demand.

General technical information

Input protection

Describes the protection measures taken and indicates the maximum possible input signal.

Suppressor diodes are mostly used to limit voltage and PTC resistors to limit current.

Input resistance

To ensure low load on the input signal, current inputs are always executed as low-resistance and voltage inputs as high-resistance:

I: <100 Ω; U:> 10kΩ

Voltage drop

This relates to passive converters. The voltage drop is dependent on the load impedance and on the device’s own power demand. For the applicable values refer to the relevant data sheets.

True RMS measurement

The RMS (root mean square) value indicates the value of a direct current or voltage which converts the same electrical energy - so also on average over time the same electrical power - on an ohmic converter in a representative period of time. The RMS value depends on the peak value and on the curve form. Lütze current or voltage converters offer true RMS measurement as standard, so non-sinusoidal input quantities can also be correctly measured.

Zero/Span

On conventional devices a zero/span balance must be carried out. This is done by means of two separate potentiometers. Vibration, temperature and other influences alter the set values, so periodically a recalibration is required.
Zero-balancing adjusts the zero setting of the output relative to the input. The output signal is amplified relative to the input signal by way of the span balance.
This balancing must also be carried out when the range is changed, such as by DIP switches.

Lütze converters feature automatic, non-temperature-dependent balancing. Recalibration is not necessary, even in the event of a range change.

Load impedance

The load impedance indicates the load capacity of the converter.

Signal Isolation Transformers · Basics

400 Ω to 750 Ω. The values for voltage outputs are in the range from 1 kΩ to 10 kΩ.

Wire break and short-circuit

As already described under "Standard signals", a wire break can be detected by way of a live-zero signal. In monitoring of connected sensors (such as temperature), monitoring for wire break or short-circuit is effected by an internal electronics unit. Such faults can be indicated in different ways:

- LED
- Defined output signal
- Separate output

Linearity error

Linearity error refers to a deviation from the ideal transmission accuracy without zero/span errors. The figure is given as a percentage.

Accuracy (FSR)

The value indicates the deviation of the output signal relative to the input signal. The figure is always given as a percentage referred to the maximum signal output value, e.g. 10V (full scale range) at room temperature (23°C). The linearity error is built-in to this value.

Temperature coefficient

Describes the deviating accuracy dependent on the ambient temperature. The figure is normally given in ppm/K (parts per million/Kelvin).

Example:
30 ppm/K corresponds to 0.003 %/K

Transmission error

The total deviation of the output signal from the input signal is the sum of the accuracy + temperature coefficient.

Transfer frequency

DC signals are normally transmitted. Signal changes demand a dynamic response however. The transmission frequency indicates the frequency up to which alternating current or voltage can also be transmitted.

Rise time (10-90 %)

The response time of the output signal to a change in the input signal from 10% to 90% of the nominal value.

Settling time

The time taken by the output to reach a value with an inaccuracy of 1%. This value already takes account of the rise time.

Ambient-temperature range

The values specified by Lütze relate to a 100% duty cycle. Normally condensation is ruled out. For devices which allow condensation, the fact will be indicated on the "Relative humidity" line or it will be stipulated that the device in question conforms to EN 50155.

Basics of transmission interference

Interference on signal transmission

Error-free, undisturbed, secure signal transmission is vital to the reliable control of processes. Analog signals transmitted between the control side (PLC or instrumentation and control system) and the sensors/actuators are almost always subject to
external interference. There is considerable potential for interference especially given the rough industrial environment and long transmission distances.

Electromagnetic interference

The best known and most widespread interference is that caused by capacitive and inductive effects. In these also cross-cable coupling processes overvoltages may occur which, for example, can destroy input/output modules of a PLC or an industrial computer. To protect those expensive downstream components, it is advisable to use A/A modules. They ensure a defined transition from peripherals and evaluation electronics.

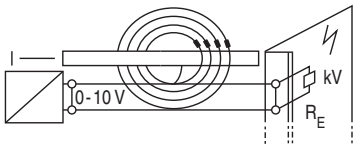
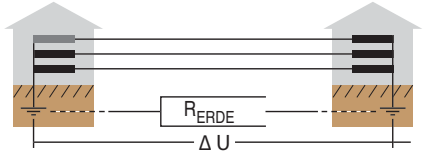


Figure: Electromagnetic interference

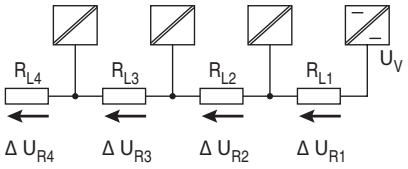
Potential differences

Potential differences occur as a result of earth or chassis loops. If signal transmitters and receivers refer to the earth potential - i.e. the earth is used as a return conductor in signal transmission - this is known as an earth loop. As the distance between the transmitter and receiver increases, the earth resistance increases as the line gets longer. As a result voltage differences of as much as 200 V can occur.



Potential differences due to earth loops

In sequenced measuring circuits potential differences occur due to earth loops. Interconnecting multiple measuring circuits increases the reference voltage with possibly fatal consequences for the data transfer.



Potential differences due to chassis loops

A/A modules are a simple means of bypassing this interference. They electrically isolate the signal input and output, decoupling the measuring circuits. As well as isolating the signal, this also filters out interference. The signals are amplified for longer transmission distances and adapted to the desired output quantities for the evaluation electronics.
For optimum functional reliability, as well as the converters shielded cable with twisted-pair wires should additionally be used.

Isolation techniques

There are various way of isolating potential.

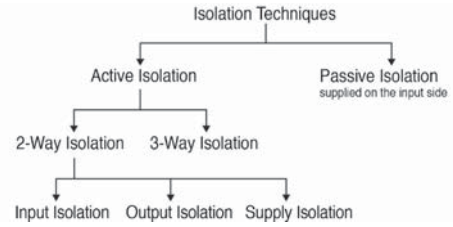


Diagram: Isolation techniques

Active isolation

An additional supply voltage is required for all kinds of active isolation.

3-way disconnection

A characteristic feature of 3-way isolation is complete insulation of all the components from each other, so protecting against mutual interference.

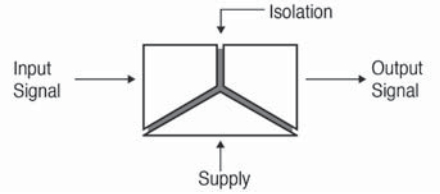


Diagram: 3-way isolation

Signal Isolation Transformers · Basics

The input, output and supply - and thus also all equipment connected to them - are mutually electrically isolated. In this way the input and output circuits are decoupled from the supply and the input and output circuits are decoupled from each other. The input signals must be active signals. The output signal is an amplified filtered signal.

2-way isolation: Input isolation

In this form of isolation the input is electrical isolated from the output and the supply, which are both connected to the same potential.

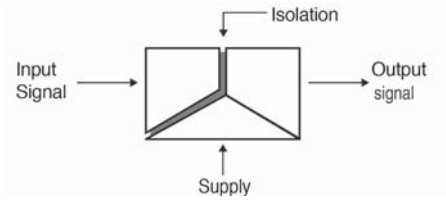


Figure: 2-way input isolation

By this isolation method equipment connected to the output can be effectively protected against interference. The input signals must be active signals. The output signal is an amplified filtered signal.

2-way isolation: Output isolation

In this form of isolation the output is electrically isolated from the input and the supply, which are both connected to the same potential.

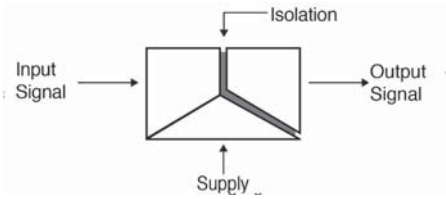


Figure: 2-way output isolation

By this isolation method, equipment connected to the input can be effectively protected against interference. The input signals must be active signals. The output signal is an amplified filtered signal.

2-way isolation: Supply isolation

In this form of isolation an additional supply is provided at the input. This auxiliary power is used to operate passive sensors connected on the input side. The structure of this isolation method is identical to that of input isolation. The supply and output are again connected to the same potential.

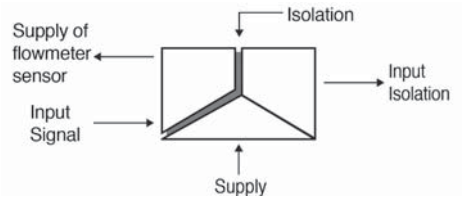


Figure: 2-way supply isolation

By this isolation method, equipment connected to the output can be effectively protected against interference and the auxiliary power described above is additionally provided. The output signal is an amplified filtered signal.

Passive isolation

In contrast to active isolation, no additional supply voltage is required for passive isolation. The power required for electrical isolation and signal transmission is drawn from the input circuit. A minor voltage drop at the input of the isolation module is used for this. The input measurement signal is burdened with this voltage drop. The responding current for the function of the modules is just a few Amperes. The resultant transmission error is negligible. By this isolation method no signal amplification is possible. Also, these isolation modules do not operation reaction-free. This means that every load on the output places an equal load on the input signal. Isolation modules without auxiliary power transmit unipolar current signals at a ratio of 1:1. The possible load impedance voltage at the output is lower than the load capacity of the input signal by the amount of voltage drop at the input in the event of an output short-circuit (own voltage demand).

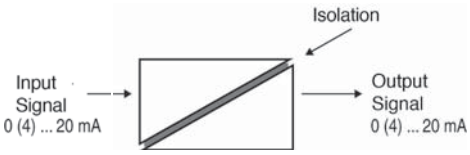


Figure: Passive isolation, supply input

By this isolation method, earth loops can be isolated and signals filtered for example. The input signals must be active current signals. The output signal is likewise a current signal.

Open FDT Technology

FDT technology, what is it?

FDT standardizes the communication and configuration interface between all field devices and host systems. FDT provides a common environment for accessing the devices' most sophisticated features. Any device can be configured, operated, and maintained through the standardized user interface – regardless of supplier, type or communication protocol.

The FDT interface – Integration standard

The FDT interface is the specification describing the standardized data exchange between devices and control system or engineering or asset management tools.

DTM – Device driver

DTMs are classified into two categories:
• Device DTMs which connect to the field device configuration components
• CommDTMs which connect to the software communication components.

The DTM provides a unified structure for accessing device parameters, configuring and operating the devices, and diagnosing problems. DTMs can range from a simple Graphical User Interface for setting device parameters to a highly sophisticated application capable of performing complex real-time calculations for diagnosis and maintenance purposes.

DeviceDTM

Provided by the device manufacturer
Represents the whole logic and parameters of a device
Standardized interface to the FDT Frame Application
Can be used in any FDT Frame Application
DTM Style Guide

CommDTM

Represents communication components like PC communication cards, couplers, gateways, remote I/Os, and linking devices.

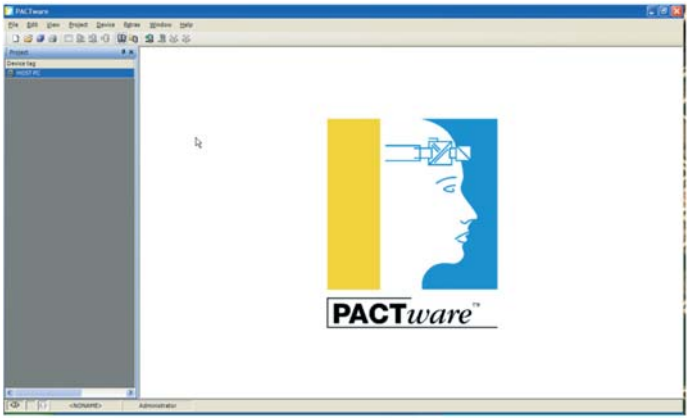
FDT Frame Application – Host system

The Frame Application is a software program that implements Device DTMs and CommDTMs. The Frame Application provides:

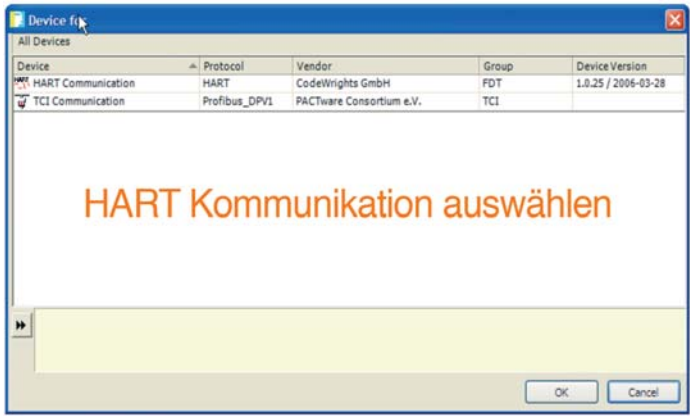
• Common environment
• User Management
• DTM Management
• Data Management
• Network Configuration
• Navigation

Open FDT Technology

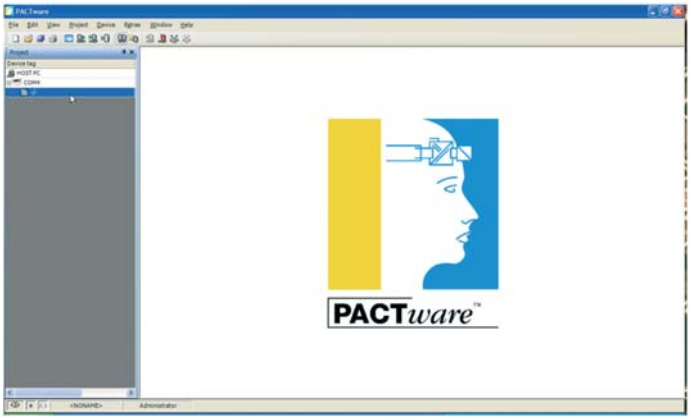
Example to implement Lütze DTM´s into PACTware™



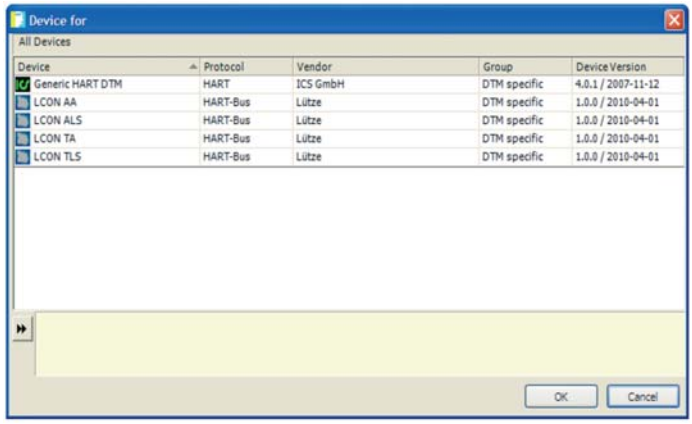
1. Add device



2. Select the communication channel

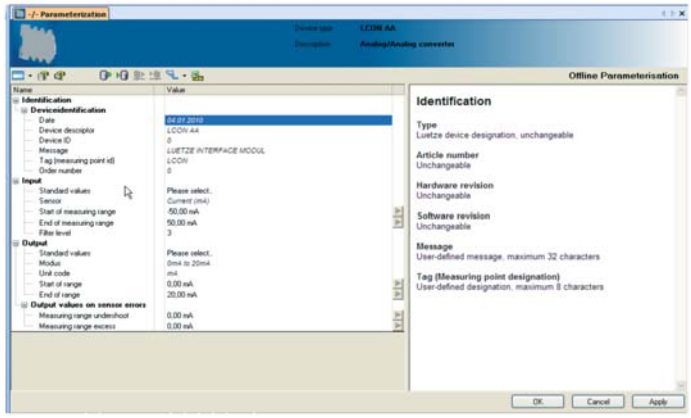


3. Again, add device



4. Select needed Lütze DTM

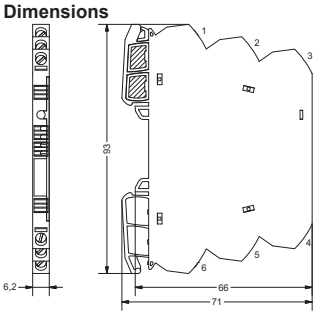
5. Device is displayed



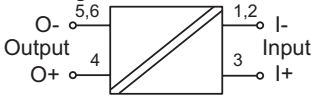
6. Double clic on the device open the list of parameter

Input: 4-20 mA
Output: 4-20 mA
Insulation: 1.5 kV, 2-way disconnection, passive converter

Dimensions



PIN assignment



Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	passive	750528.0000	LCIS-P1K-0528-62-S	1
Push-In				
Nominal voltage	passive	751528.0000	LCIS-P1K-0528-62-PI	1

Input	
Input signal	4–20 mA
Galvanic insulation I/O	2-way isolation
Output	
Output signal	4–20 mA
Max. load impedance at I-output	1000 Ω (R_B)
Output current	–
Ripple	<5 mV_{eff} (working resistance 100 Ω)
General	
Nominal voltage	passive
Status Indication	LED green
Input/output protection	Suppressor diode (33 V)
Accuracy	0.1 % FSR (23 °C)
Build-up time (Accuracy 1%)	6 ms (for working resistance 500 Ω and 20 mA)
Burden error	<0.06 % from measured value / 100 Ω working resistance
Temperature drift /K	<150 ppm / K FSR
Temperature drift (working resistance >600R)	<100 ppm / K FSR
Temperature drift (working resistance >600R)	<150 ppm / K FSR
Insulation voltage input/output	1.5 kV_{eff}
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2
Field installation	rail TS 35 (EN 60175)
Protection class	IP 20
Installation postition	Optional
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm
Operation temperature range	-25 °C – 60 °C
Storage temperature range	-40 °C – 80 °C
Dimensions (w × h × d)	6.2 × 93.0 × 71.0 mm
Weight (kg/piece)	0.040
Approvals	CSA and GL in preparation, UL

Accessories	Color	2-pole	4-pole	8-pole	16-pole	PU
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

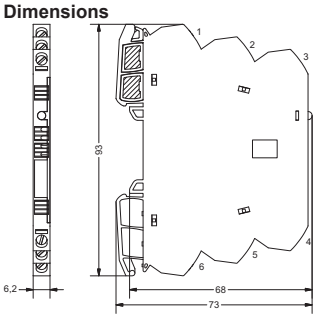
Accessories	Color	Article number	Type	PU
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

Comments

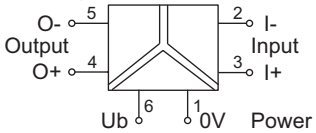
With connection: This passive isolator has a non-reactive transmission, so that the current in the input circuit is not interrupted for an output interruption.

Input: 0-10 V / 0-20 mA / 4-20 mA
Output: 0-10 kHz
Insulation: 2.5 kV, 3-way disconnection

Dimensions



PIN assignment



Range adjustment

S1 Switch On	Input 1	2	3	4
0–10 V*	●			
0–20 mA		●		
4–20 mA	●	●		

S1 Switch On	Output 5	6
0–50 Hz*		
0–100 Hz	●	
0–1000 Hz		●
0–10000 Hz	●	●

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	AC/DC 24 V	750511.0000	LCIS-WAF-0511-62-S	1
Push-In				
Nominal voltage	AC/DC 24 V	751511.0000	LCIS-WAF-0511-62-PI	1

Input	**0/10 V**	**0–20 mA**	**4–20 mA**
Input resistance	>330 kΩ	<100 Ω	
Input signal	adjustable via DIP switch S1		
Galvanic insulation I/O	3-Wege Trennung		
Zero /Span	Production comparison		
Transmission frequency	–		

Output	**0 – 50 Hz**	**0 – 100 Hz**	**0 – 1 kHz**	**0 – 10 kHz**
Output signal	adjustable via DIP switch S1			
Ripple	–			

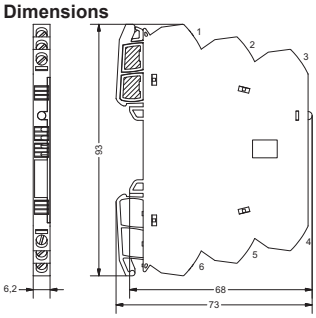
General		
Nominal voltage	AC/DC 24 V	
Operation voltage range	DC: 19.2–26.4 V, AC: 19.2–26.4 V	
Status Indication	LED green	
Input/output protection	Overvoltage AC/DC 26.4 V, PTC fuse, Output short circuit-proof	
Accuracy	0.1 % FSR (23 °C)	
Linearity error	0.05 % FSR	
Rise time (10 - 90%)	frequency-dependent	
Build-up time (Accuracy 1%)	–	
Transmission frequency	–	
Temperature coefficient	<150 ppm / K FSR	
Insulation voltage input/output	2.5 kV_{eff}	
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2	
Field installation	rail TS 35 (EN 50022)	
Protection class	IP 20	
Installation postition	Optional	
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm	Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm
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 (kg/piece)	0.029	
Approvals	UCSA and GL in preparation, UL	

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

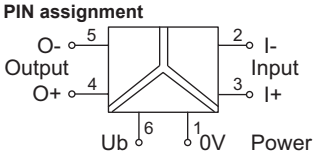
Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

Input: 0-10 V / 0-20 mA / 4-20 mA
Output: 0-10 V / 0-20 mA / 4-20 mA
Insulation: 2.5 kV, 3-way disconnection

Dimensions



PIN assignment



Range adjustment

S1	Input			
●→Switch On	1	2	3	4
0–10V*	●			
0–20mA		●		
4–20mA	●	●		

S1	Output	
●→Switch On	5	6
0–10V*	●	
0–20mA		●
4–20mA	●	●

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	AC/DC 24 V	750539.0000	LCIS-WAA-0539-62-S	1
Push-In				
Nominal voltage	AC/DC 24 V	751539.0000	LCIS-WAA-1539-62-PI	1

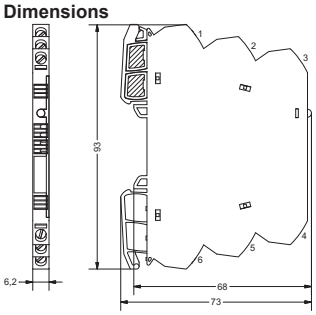
Input	**0/10 V**	**0–20 mA**	**4–20 mA**
Input resistance	>330 kΩ	<100 Ω	
Input signal	adjustable via DIP switch S1		
Galvanic insulation I/O	3-way isolation		
Zero /Span	Production comparison		
Output	**0/10 V**	**0–20 mA**	**4–20 mA**
Max. load impedance at I-output	–	500 Ω	
Min. load impedance at U-output	2 kΩ	–	
Output current	max. 5 mA	–	
Output voltage	–	max 16 V	
Output signal	adjustable via DIP switch S1		
Ripple	<20 mV_{eff}		
General			
Nominal voltage	AC/DC 24 V		
Operation voltage range	DC: 19.2–26.4 V, AC: 19.2–26.4 V		
Status Indication	LED green		
Input/output protection	Overvoltage AC/DC 26.4 V, PTC fuse, Output short circuit-proof		
Accuracy	0.1 % FSR (23 °C)		
Linearity error	0,05 % FSR		
Rise time (10 - 90%)	6 ms		
Build-up time (Accuracy 1%)	17 ms		
Transmission frequency	30 Hz at 3 dB		
Temperature coefficient	<150 ppm / K FSR		
Insulation voltage input/output	2.5 kV_{eff}		
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2		
Field installation	rail TS 35 (EN 60175)		
Protection class	IP 20		
Installation postition	Optional		
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm	Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	
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 (kg/piece)	0.030		
Approvals	CSA and GL in preparation, UL		

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

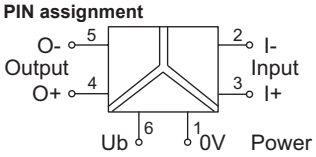
Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

Input: 0-10 V
Output: 0-10 V / 0-20 mA / 4-20 mA
Insulation: 2.5 kV, 3-way disconnection

Dimensions



PIN assignment



Description		Part-No.	Type	PU
Screw terminal				
Output signal	0 – 10 V	750530.0000	LCIS-WAA-0530-62-S	1
	0–20 mA	750531.0000	LCIS-WAA-0531-62-S	1
	4–20 mA	750532.0000	LCIS-WAA-0532-62-S	1
Push-In				
Output signal	0 – 10 V	751530.0000	LCIS-WAA-1530-62-PI	1
	0–20 mA	751531.0000	LCIS-WAA-1531-62-PI	1
	4–20 mA	751532.0000	LCIS-WAA-1532-62-PI	1

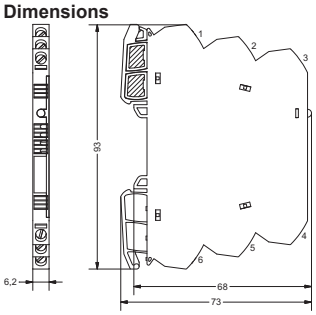
Input			
Input signal	0–10 V		
Galvanic insulation I/O	3-way isolation		
Zero /Span	Production comparison		
Output			
Output signal	0 – 10 V	0–20 mA	4–20 mA
Ripple	<20 mV_{eff}		
Max. load impedance at I-output	–	500 Ω	
General			
Nominal voltage	AC/DC 24 V		
Operation voltage range	DC: 19.2–26.4 V, AC: 19.2–26.4 V		
Status Indication	LED green		
Input/output protection	Overvoltage AC/DC 26.4 V, PTC fuse, Output short circuit-proof		
Accuracy	0.1 % FSR (23 °C)		
Linearity error	0.05 % FSR		
Rise time (10 - 90%)	6 ms		
Build-up time (Accuracy 1%)	17 ms		
Transmission frequency	30 Hz at 3 dB		
Temperature coefficient	<150 ppm / K FSR		
Insulation voltage input/output	2.5 kV_{eff}		
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2		
Field installation	rail TS 35 (EN 60175)		
Protection class	IP 20		
Installation postition	Optional		
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm	Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	
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 (kg/piece)	0.029		
Approvals	CSA and GL in preparation, UL		

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

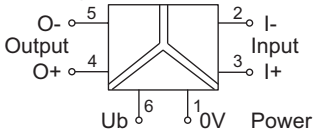
Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	10
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	10
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	10
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	10

Input: 0-20 mA
Output: 0-10 V / 0-20 mA / 4-20 mA
Insulation: 2.5 kV, 3-way disconnection

Dimensions



PIN assignment



Description		Part-No.	Type	PU
Screw terminal				
Output signal	0 – 10 V	750533.0000	LCIS-WAA-0533-62-S	1
	0–20 mA	750534.0000	LCIS-WAA-0534-62-S	1
	4–20 mA	750535.0000	LCIS-WAA-0535-62-S	1
Push-In				
Output signal	0 – 10 V	751533.0000	LCIS-WAA-1533-62-PI	1
	0–20 mA	751534.0000	LCIS-WAA-1534-62-PI	1
	4–20 mA	751535.0000	LCIS-WAA-1535-62-PI	1

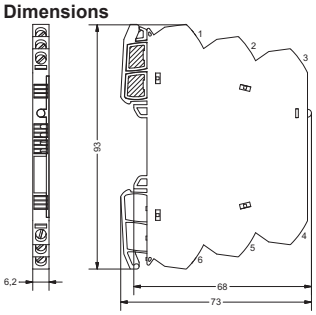
Input			
Input signal	0–20 mA		
Galvanic insulation I/O	3-way isolation		
Zero /Span	Production comparison		
Output			
Output signal	0 – 10 V	0–20 mA	4–20 mA
Ripple	<20 mV_{eff}		
Max. load impedance at I-output	–	500 Ω	
General			
Nominal voltage	AC/DC 24 V		
Operation voltage range	DC: 19.2–26.4 V, AC: 19.2–26.4 V		
Status Indication	LED green		
Input/output protection	Overvoltage AC/DC 26.4 V, PTC fuse, Output short circuit-proof		
Accuracy	0.1 % FSR (23 °C)		
Linearity error	0.05 % FSR		
Rise time (10 - 90%)	6 ms		
Build-up time (Accuracy 1%)	17 ms		
Transmission frequency	30 Hz at 3 dB		
Temperature coefficient	<150 ppm / K FSR		
Insulation voltage input/output	2.5 kV_{eff}		
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2		
Field installation	rail TS 35 (EN 60175)		
Protection class	IP 20		
Installation postition	Optional		
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm	Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	
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 (kg/piece)	0.029		
Approvals	CSA and GL in preparation, UL		

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

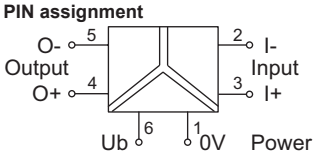
Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	1
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	1
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	1
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	1

Input: 4-20 mA
Output: 0-10 V / 0-20 mA / 4-20 mA
Insulation: 2.5 kV, 3-way disconnection

Dimensions



PIN assignment



Description		Part-No.	Type	PU
Screw terminal				
Output signal	0–10 V	750536.0000	LCIS-WAA-0536-62-S	1
	0–20 mA	750537.0000	LCIS-WAA-0537-62-S	1
	4–20 mA	750538.0000	LCIS-WAA-0538-62-S	1
Push-In				
Output signal	0–10 V	751536.0000	LCIS-WAA-1536-62-PI	1
	0–20 mA	751537.0000	LCIS-WAA-1537-62-PI	1
	4–20 mA	751538.0000	LCIS-WAA-1538-62-PI	1

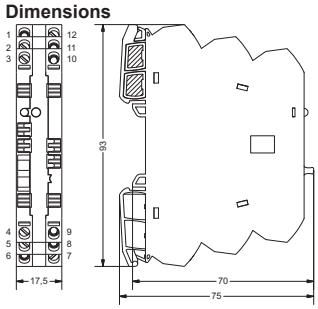
Input			
Input signal	4–20 mA		
Galvanic insulation I/O	3-way isolation		
Zero /Span	Production comparison		
Output			
Output signal	0–10 V	0–20 mA	4–20 mA
Ripple	<20 mV_{eff}		
Max. load impedance at I-output	–	500 Ω	
General			
Nominal voltage	AC/DC 24 V		
Operation voltage range	DC: 19.2–26.4 V, AC: 19.2–26.4 V		
Status Indication	LED green		
Input/output protection	Overvoltage AC/DC 26.4 V, PTC fuse, Output short circuit-proof		
Accuracy	0.1 % FSR (23 °C)		
Linearity error	0.05 % FSR		
Rise time (10 - 90%)	6 ms		
Build-up time (Accuracy 1%)	17 ms		
Transmission frequency	30 Hz at 3 dB		
Temperature coefficient	<150 ppm / K FSR		
Insulation voltage input/output	2.5 kV_{eff}		
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2		
Field installation	rail TS 35 (EN 60175)		
Protection class	IP 20		
Installation postition	Optional		
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm	Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm	
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 (kg/piece)	0.029		
Approvals	CSA and GL in preparation, UL		

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

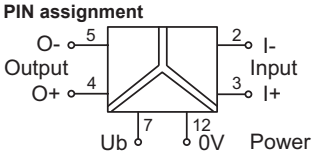
Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	1
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	1
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	1
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	1

Input: 0-10 V / 0-20 mA / 4-20mA, manual off automatic
Output: 0-10 V / 0-20 mA / 4-20 mA
Insulation: 2,5 kV / 4 kV, 3-way disconnection, Wide range input

Dimensions



PIN assignment



Range adjustment

S1	Input			
●→Switch On	1	2	3	4
0–10V*	●			
0–20mA		●		
4–20mA	●	●		

S1	Output	
●→Switch On	5	6
0–10V*	●	
0–20mA		●
4–20mA	●	●

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	AC/DC 24 V	750518.0000	LCIS-WAA-MA-0518-175-S	1
	AC/DC 24–240 V	750519.0000	LCIS-WP-WAA-MA-0519-S	1
Push-In				
Nominal voltage	AC/DC 24 V	751518.0000	LCIS-WAA-MA-0518-175-PI	1
	AC/DC 24–240 V	751519.0000	LCIS-WP-WAA-MA-0519-PI	1

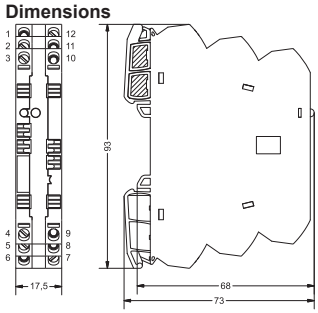
Input	**0/10 V**	**0–20 mA**	**4–20 mA**
Input resistance	>330 kΩ	<100 Ω	
Input signal	adjustable via DIP switch S1		
Galvanic insulation I/O	3-way isolation		
Zero /Span	Production comparison		
Output	**0/10 V**	**0–20 mA**	**4–20 mA**
Max. load impedance at I-output	–	500 Ω	
Min. load impedance at U-output	2 kΩ	–	
Output current	max. 5 mA	–	
Output voltage	–	max 18 V	
Output signal	adjustable via DIP switch S1		
Ripple	<20 mV_{eff}		
General	**AC/DC 24 V**	**AC/DC 24–240 V**	
Operation voltage range	DC: 19.2–26.4 V, AC: 19.2–26.4 V	DC: 19.2–264 V, AC: 19.2–264 V	
Status Indication	LED green		
Input/output protection	Overvoltage AC/DC 26.4 V, PTC fuse, Output short circuit-proof	Overvoltage AC/DC 264 V, PTC fuse, Output short circuit-proof	
Accuracy	0.1 % FSR (23 °C)		
Linearity error	0,05 % FSR		
Rise time (10 - 90%)	6 ms		
Build-up time (Accuracy 1%)	17 ms		
Transmission frequency	30 Hz at 3 dB		
Temperature coefficient	<150 ppm / K FSR		
Insulation voltage input/output	2.5 kV_{eff}	4.0 kV_{eff}	
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2		
Field installation	rail TS 35 (EN 60175)		
Protection class	IP 20		
Installation postition	Optional		
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		
Operation temperature range	-25 °C – 60 °C		
Storage temperature range	-40 °C – 80 °C		
Dimensions (w × h × d)	17.5 × 93.0 × 75.0 mm		
Weight (kg/piece)	0.059		
Approvals	CSA and GL in preparation, UL		

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

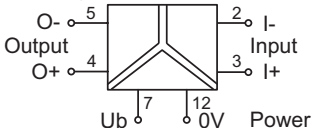
Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	1
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	1
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	1
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	1

Input: 0-10 V / 0-20 mA / 4-20 mA
Output: 0-10 V / 0-20 mA / 4-20 mA
Insulation: 4 kV, 3-way disconnection, Wide range input

Dimensions



PIN assignment



Range adjustment

S1	Input			
●→Switch On	1	2	3	4
0–10V*	●			
0–20mA		●		
4–20mA	●	●		

S1	Output	
●→Switch On	5	6
0–10V*	●	
0–20mA		●
4–20mA	●	●

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	AC/DC 24–240 V	750510.0000	LCIS-WP-WAA-0510-175-S	1
Push-In				
Nominal voltage	AC/DC 24–240 V	751510.0000	LCIS-WP-WAA-0510-175-PI	1

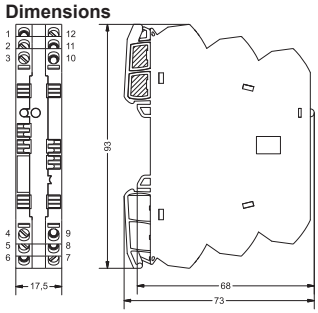
Input	**0/10 V**	**0–20 mA**	**4–20 mA**
Input resistance	>330 kΩ	<100 Ω	
Input signal	adjustable via DIP switch S1		
Galvanic insulation I/O	3-way isolation		
Zero /Span	Production comparison		
Output	**0/10 V**	**0–20 mA**	**4–20 mA**
Max. load impedance at I-output	–	500 Ω	
Min. load impedance at U-output	2 kΩ	–	
Output current	max. 5 mA	–	
Output voltage	–	max 18 V	
Output signal	adjustable via DIP switch S1		
Ripple	<20 mV_{eff}		
General			
Nominal voltage	AC/DC 24–240 V		
Operation voltage range	DC: 16.8–264 V, AC: 19.2–264 V		
Status Indication	LED green		
Input/output protection	Overvoltage AC/DC 264 V, PTC fuse, Output short circuit-proof		
Accuracy	0.1 % FSR (23 °C)		
Linearity error	0,05 % FSR		
Rise time (10 - 90%)	6 ms		
Build-up time (Accuracy 1%)	17 ms		
Transmission frequency	30 Hz at 3 dB		
Temperature coefficient	<150 ppm / K FSR		
Insulation voltage input/output	4.0 kV_{eff}		
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2		
Field installation	rail TS 35 (EN 60175)		
Protection class	IP 20		
Installation postition	Optional		
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm		Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm
Operation temperature range	-25 °C – 60 °C		
Storage temperature range	-40 °C – 80 °C		
Dimensions (w × h × d)	17.5 × 93.0 × 73.0 mm		
Weight (kg/piece)	0.059		
Approvals	CSA and GL in preparation, UL		

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	1
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	1
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	1
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	1

Input: 0-10 V / 0-20 mA / 4-20mA
Output: 0-10 kHz
Insulation: 4 kV, 3-way disconnection, Wide range input

Dimensions



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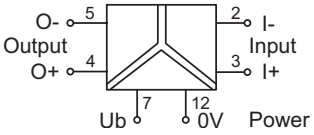


Range adjustment

S1	Input			
●→Switch On	1	2	3	4
0–10 V*	●			
0–20 mA		●		
4–20 mA	●	●		

S1	Output	
●→Switch On	5	6
0–50 Hz*		
0–100 Hz	●	
0–1000 Hz		●
0–10000 Hz	●	●

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	AC/DC 24–240 V	750512.0000	LCIS-WP-WAF-0512-175-S	1
Push-In				
Nominal voltage	AC/DC 24–240 V	751512.0000	LCIS-WP-WAF-0512-175-PI	1

Input	**0/10 V**	**0–20 mA**	**4–20 mA**
Input resistance	>330 kΩ	<100 Ω	
Input signal	adjustable via DIP switch S1		
Galvanic insulation I/O	3-way isolation		
Zero /Span	Production comparison		
Transmission frequency	30 Hz at 3 dB		

Output	**0 – 50 Hz**	**0 – 100 Hz**	**0 – 1 kHz**	**0 – 10 kHz**
Output signal	adjustable via DIP switch S1			
Ripple	–			

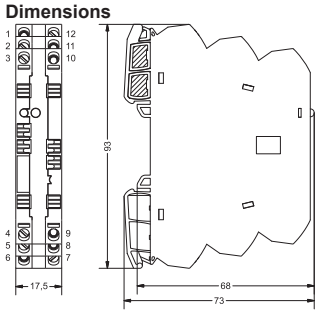
General	
Nominal voltage	AC/DC 24–240 V
Operation voltage range	DC: 16.8–264 V; AC: 19.2–264 V
Status Indication	LED green
Input/output protection	Overvoltage AC/DC 264 V, PTC fuse, Output short circuit-proof
Accuracy	0.1 % FSR (23 °C)
Linearity error	0,05 % FSR
Rise time (10 - 90%)	frequency-dependent
Build-up time (Accuracy 1%)	frequency-dependent
Transmission frequency	frequency-dependent
Temperature coefficient	<150 ppm / K FSR
Insulation voltage input/output	4.0 kV_{eff}
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2
Field installation	rail TS 35 (EN 60175)
Protection class	IP 20
Installation postition	Optional
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm Push-In: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 8 mm Screw driver: 3.5 x 0.5 mm
Operation temperature range	-25 °C – 60 °C
Storage temperature range	-40 °C – 80 °C
Dimensions (w × h × d)	17.5 × 93.0 × 73.0 mm
Weight (kg/piece)	0.058
Approvals	CSA and GL in preparation, UL

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	1
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	1
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	1
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	1

Input: 16 selectable ranges
Output: 0-10 V / 0-20 mA / 4-20mA
Insulation: 2.5 kV / 4 kV, 3-way disconnection, Wide range input

Dimensions



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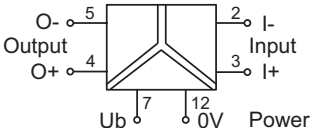


Range adjustment

S1 ●→Switch On	Input 1	2	3	4
0–60 mV				
0–100 mV	●			
0–300 mV		●		
0–500 mV	●	●		
0–1 V			●	
0–2 V	●		●	
0–5 V		●	●	
0–10 V*	●	●	●	
2–10 V				●
0–20 V	●			●
0–5 mA		●		●
0–10 mA	●	●		●
±5 mA			●	●
±20 mA	●		●	●
0–20 mA		●	●	●
4–20 mA	●	●	●	●

S1 ●→Switch On	Output 5	6
0–10 V*	●	
0–20 mA		●
4–20 mA	●	●

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	AC/DC 24 V	750516.0000	LCIS-WUAA-0516-175-S	1
	AC/DC 24–240 V	750517.0000	LCIS-WP-WUAA-0517-175-S	1
Push-In				
Nominal voltage	AC/DC 24–240 V	751517.0000	LCIS-WP-WUAA-0517-175-PI	1
	AC/DC 24 V	751516.0000	LCIS-WUAA-0516-175-PI	1

Input	**mV, V**	**mA**
Input signal	0–60, 0–100, 0–300, 0–500 mV 0–1, 0–2, 0–5, 0–10, 0–20, 2–10 V adjustable via DIP switch S1	0–5, 0–10, 0–20, 4–20, ±5, ±20 mA adjustable via DIP switch S1
Input resistance	>330 kΩ	<100 Ω
Input signal	–	
Galvanic insulation I/O	3-way isolation	
Zero /Span	Production comparison	

Output	**0/10 V**	**0–20 mA**	**4–20 mA**
Max. load impedance at I-output	–	500 Ω	
Min. load impedance at U-output	2 kΩ	–	
Output current	max. 5 mA	–	
Output voltage	–	max 18 V	
Output signal	Adjustable via switch		
Ripple	<20 mV_{eff}		

General	**AC/DC 24 V**	**AC/DC 24–240 V**
Operation voltage range	DC: 19.2–26.4 V, AC: 19.2–26.4 V	DC: 19.2–264 V, AC: 19.2–264 V
Status Indication	LED green	
Input/output protection	Overvoltage AC/DC 26.4 V, PTC fuse, Output short circuit-proof	Overvoltage AC/DC 264 V, PTC fuse, Output short circuit-proof
Accuracy	0.1 % FSR (23 °C)	
Linearity error	0,05 % FSR	
Rise time (10 - 90%)	6 ms	
Build-up time (Accuracy 1%)	17 ms	
Transmission frequency	30 Hz at 3 dB	
Temperature coefficient	<150 ppm / K FSR	
Insulation voltage input/output	2.5 kV_{eff}	4.0 kV_{eff}
Housing material	PA 6.6 (UL 94 V-0) / NFF I2 F2	
Field installation	rail TS 35 (EN 60175)	
Protection class	IP 20	
Installation postition	Optional	
Termination	Screw terminal: solid 0.25 – 2.5 mm^2/ AWG 20 – 14 fine stranded with ferrule 0.25 – 1.5 mm^2/ AWG 20 – 16 Stripping length: 6 mm Screw driver: 3.5 x 0.5 mm	
Operation temperature range	-25 °C – 60 °C	
Storage temperature range	-40 °C – 80 °C	
Dimensions (w × h × d)	17.5 × 93.0 × 73.0 mm	
Weight (kg/piece)	0.059	
Approvals	CSA and GL in preparation, UL	

Accessories	**Color**	**2-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	white	762803.1000	762813.1000	762823.1000	762833.1000	10

Accessories	**Color**	**Article number**	**Type**	**PU**
Tag holder (quantity 200)	white (5×5 mm)	780981.000.2	LCOS-ZB-BZS-white-00	1
Tag holder (quantity 200)	red (5×5 mm)	780982.000.2	LCOS-ZB-BZS-red-00	1
Tag holder (quantity 200)	blue (5×5 mm)	780983.000.2	LCOS-ZB-BZS-blue-00	1
Tag holder (quantity 120)	white (12×6 mm)	780985.000.2	LCOS-ZB-BZS-white-12/6	1

Notes

Compact, flexible, safe: The new Signal Microcompact Converter of

Save space
6,2 mm width offer highest
building density

For extreme applications
New applications via extended
Temperature range of -25°C…+70°C

Fast response
Via 1ms response time is it
also possible to transmit AC signals!

High load impedance
All current outputs are qualified
for 750 Ohm loads!

Safety isolation
All devices offer „Safety isolation“
with 2,5kV-isolation voltage acc. EN 61140

Easy installation
Jumper combs instead of wiring via complete
isolated jumper combs in all termination levels

Automation Solutions

w intelligent
the LCON series

Leading, open technology

The parametrization via FDT software is the leading technology for engineering, Management & Life Cycle Support in automation applications

Worldwide using - Class I Div 2

Each LÜTZE signal converter can be used worldwide because of excisting approvals

Quality not only in function

Each LÜTZE signal converter offer UL 94-V0 and NFF 12, F2

Free selection

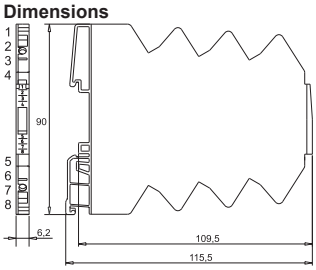
Screw or spring termination fullfill all customer requirements

Power bridging

Bridge every potential with isolated jumper bars

Input: ±30 V, ±50 mA, ±DC 5 A adjustable
Output: 0–20 mA / 4–20 mA / 0–10 V / -10–10 V / 2–10 V / 0–5 V / 1–5 V
Isolation: 2.5 kV, 3-way isolation

Dimensions



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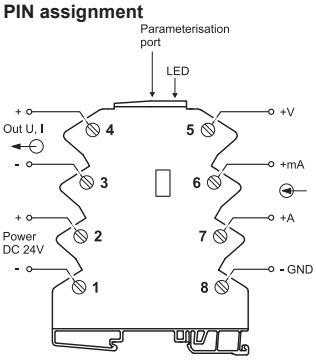
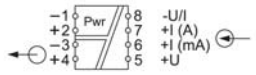




Range adjustment

S1 ● → Switch On

Range*	1	2	3	4	5	Range*	1	2	3	4	5
0 – 50mV	●					0 – 10mA					●
0 – 100mV		●				0 – 20mA	●				●
0 – 200mV	●	●				0 – 50mA		●			●
0 – 500mV			●			4 – 20mA	●	●			●
0 – 1V	●		●			0 – 0.5A			●		●
0 – 2V		●	●			0 – 1A	●		●		●
0 – 5V	●	●	●			0 – 2A		●	●		●
0 – 10V				●		0 – 5A	●	●	●		●
0 – 20V	●			●		±1V				●	●
0 – 30V		●		●		±5V	●			●	●
1 – 5V	●	●		●		±10V		●		●	●
2 – 10V			●	●		±5mA	●	●		●	●
0 – 1mA	●		●	●		±20mA			●	●	●
0 – 2mA		●	●	●		±2A	●		●	●	●
0 – 5mA	●	●	●	●		±5A		●	●	●	●

S1 1-8 off: FDT/DTM

*See instruction leaflet

Output	6	7	8
0 – 20mA	●		
4 – 20mA		●	
0 – 10V	●	●	
±10V			●
2 – 10V	●		●
0 – 5V		●	●
1 – 5V	●	●	●

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	750320	LCON AA DFDT 806210	1
Spring terminal				
Nominal voltage	DC 24 V	751320	LCON AA DFDT 806211	1

Input	**+30/-30V**	**+50/-50mA**	**DC +5A/-5A**
Measurement input	+30/-30 V, +50/-50 mA, DC +5 A/-5 A, adjustable via switch and software FDT/DTM, connection via micro USB		
Galvanic insulation I/O	3-way isolation		
Step response (10–90%)	1.5 ms – 750 ms (adjustable by means of filter stage 1–5, default: filter stage 4 = 200 ms)		
Transmission frequency	-		
Input characteristic impedance	> 800 kΩ	30 Ω	10 mΩ
Zero /Span	freely adjustable		

Output	**0 – 10 V**	**-10 – +10 V**	**0 – 20 mA**	**4 – 20 mA**
Output signal	adjustable via switch and software FDT/DTM, connection via USB service cable			
Max. load impedance at I-output	-		700 Ω	
Min. load impedance at U-output	>2 kΩ		-	
Load deviation	-			
Limitation for exceeding measurement range	10.25 V		20.5 mA	
max. Output signal	10.5 V		21 mA	

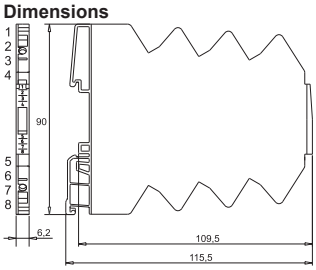
General	**+30/-30V**	**+50/-50mA**	**+5A/-5A**
Nominal voltage	DC 24 V		
Operation voltage range	16.8–30 V		
Rated current	approx. 18 mA		
Status Indication	LED green, red (error)		
Input/output protection	Overvoltage DC 30 V, Output short circuit-proof		
Accuracy	0.1 % FSR		0.5 % FSR
Linearity error	± 0.05 % FSR		± 0.1 % FSR
Termination	Screw-/spring terminal: 0.14–1.5 mm^2		
Resolution	16-bit		
Temperaturcompensation intern	–		
Configuration	Switch and software: FDT / DTM		
Temperature error	<100 ppm FSR		
Data storage	Flash		
Insulation voltage input/output	2.5 kV_{eff}		
Housing material	PA 6.6 (UL 94 V-0)		
Field installation	rail TS 35 (EN 60715)		
Protection class	IP 20		
Installation postition	Optional		
Operation temperature range	-40 °C – 70 °C		
Storage temperature range	-40 °C – 85 °C		
Dimensions (w × h × d)	6.2 × 90.0 × 115.5 mm		
Weight (kg/piece)	0.050		
Approvals	cULus, Class I, Div. 2, Groups A,B,C,D T4		

Accessories	**Color**	**2-pole**	**3-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	red	762802	762805	762812	762822	762832	10
6 A jumper comb	white	762803	762806	762813	762823	762833	10
6 A jumper comb	blue	762804	762807	762814	762824	762834	10

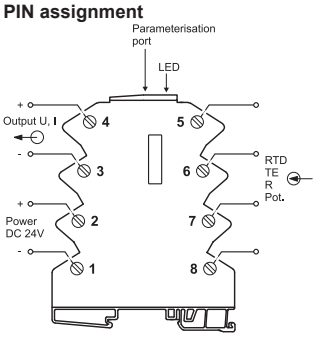
Accessories	**Article number**	**Type**	**PU**
USB service cable	750894	LCON ZB USB	1
Label holder 4×11mm white	681313	BZT-0411	100

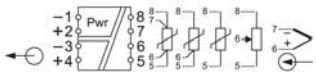
Input: PT, thermocouple, potentiometer – adjustable temperature converter
Output: 0–20 mA / 4–20 mA / 0–10 V / -10–10 V / 2–10 V / 0–5 V / 1–5 V
Insulation: 2.5 kV, 3-way isolation

Dimensions



PIN assignment





Range adjustment

Range*	S1				S2							
Start	7	8	1	2	End	3	4	5	6	7	8
-200°C	●				0°C	●					
-150°C	●	●			50°C		●	●			
-100°C	●		●		100°C	●	●		●		
-50°C		●		●	150°C	●		●	●		
0°C	●	●	●	●	200°C	●	●	●	●		
					250°C	●				●	
Sensor*	S1	1	2	3	300°C	●	●			●	
Pt100		●			350°C	●		●		●	
Pt1000			●		400°C	●	●	●		●	
TE J		●	●		450°C	●			●	●	
TE K				●	500°C	●	●		●	●	
Pot. %		●	●	●	550°C	●		●	●	●	
					600°C	●	●	●	●	●	
Output*	S1	4	5	6	650°C	●					●
0 – 20mA	●				700°C	●	●				●
4 – 20mA		●			750°C	●		●			●
0 – 10V	●	●			800°C	●	●	●			●
±10V				●	850°C	●			●		●
					900°C	●	●		●		●
					950°C	●		●	●		●
					1000°C	●	●	●	●		●
					1050°C	●				●	●
					1100°C	●	●			●	●
					1150°C	●		●		●	●
					1200°C	●	●	●		●	●
					1250°C	●			●	●	●
					1300°C	●	●		●	●	●
					1350°C	●		●	●	●	●
					1400°C	●	●	●	●	●	●

S1-S2 1-8 off: FDT/DTM

*See instruction leaflet

● → Switch On

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	750340	LCON TA DFDT 806210	1
Spring terminal				
Nominal voltage	DC 24 V	751340	LCON TA DFDT 806211	1

Input	**PT, poti, resistance**	**Thermocouples**
Measurement input	PT100, PT1000, Potenziometer 0–100 kΩ customer specific via contact points, polynomial	Type B, C, E, J, K, N, R, S, T customer specific via contact points, polynomial
Galvanic insulation I/O	3-way isolation	
Temperature range	-220... 850 °C depending on type	-210...2310 °C depending on type
Step response (10–90%)	TE: 10 – 750 ms, PT: 5 – 750 ms (adjustable by means of filter stage 1–5, default: 200 ms – filter stage 4)	
Input resistance	-	1 MΩ
Sensor current	0.2/0.6 mA type-dependent	-
Circuit	PT - 2, 3, 4-wire, for 2-conductor with offset adjustment, no external bridges necessary, autom. detection	

Output	**0-10 V**	**-10 – +10 V**	**0 – 20 mA**	**4 – 20 mA**
Output signal	adjustable via switch and software FDT/DTM, connection via USB service cable			
Max. load impedance at I-output	-		700 Ω	
Max. load impedance at U-output	>2 kΩ		-	
Limitation for exceeding measurement range	10.25 V		20.5 V	
max. modulation range/output current	10.5 V		21 mA	
Ripple	-			

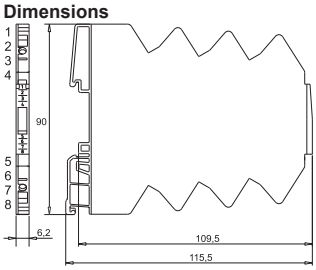
General	**PT, poti, resistance**	**Thermocouples**
Nominal voltage	DC 24 V	
Operation voltage range	16.8–30 V	
Rated current	approx. 18 mA	
Status Indication	LED green, red (error)	
Input/output protection	Overvoltage DC 30 V, Output short circuit-proof	
Accuracy	(10K: set Measurement range(K)) + 0.2% FSR	(10K: set Measurement range(K)) + 0.4% FSR
Resolution	16-bit	
Linearity error	± 0.1 % FSR	
Temperaturcompensation intern	-	±1 K typ., max. ±2 K
Termination	Screw-/spring terminal: 0.14–1.5 mm^2	
Configuration	Switch and software: FDT / DTM	
Temperature error	<100 ppm/K	
Data storage	Flash	
Insulation voltage input/output	AC 2.5 kV_{eff}	
Housing material	PA 6.6 (UL 94 V-0)	
Field installation	rail TS 35 (EN 50022)	
Protection class	IP 20	
Installation postition	Optional	
Operation temperature range	-40 °C – 70 °C	
Storage temperature range	-40 °C – 85 °C	
Dimensions (w × h × d)	6.2 × 90.0 × 115.5 mm	
Weight (kg/piece)	0.050	
Approvals	cULus, Class I, Div. 2, Groups A,B,C,D T4	

Accessories	**Color**	**2-pole**	**3-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	red	762802	762805	762812	762822	762832	10
6 A jumper comb	white	762803	762806	762813	762823	762833	10
6 A jumper comb	blue	762804	762807	762814	762824	762834	10

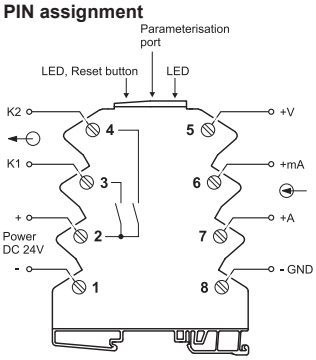
Accessories	**Article number**	**Type**	**PU**
USB service cable	750894	LCON ZB USB	1
Label holder 4×11mm white	681313	BZT-0411	100

Input: ±30 V, ±50 mA, ±5 A adjustable – adjustable limit value switch
Output: Semiconductor NO contact
Insulation: 2.5 kV, 2-way isolation

Dimensions



PIN assignment



Description		Part-No.	Type			PU
Screw terminal						
Nominal voltage	DC 24 V	750360	LCON ALS FDT 806210			1
Spring terminal						
Nominal voltage	DC 24 V	751360	LCON ALS FDT 806211			1

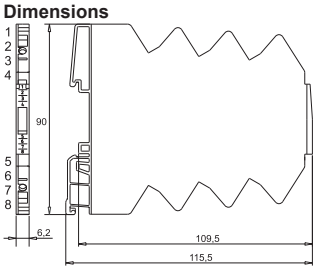
Input	**+30/-30V**	**+50/-50mA**	**+5A/-5A**
Measurement input	+30/-30 V, +50/-50 mA, DC +5 A/-5 A, adjustable via software FDT/DTM, connection via micro USB		
Galvanic insulation I/O	2-way isolation		
Step response (10–90%)	4 ms – 750 ms (adjustable by means of filter stage 1–5, default: filter stage 4 = 200 ms)		
Input characteristic impedance	> 800 kΩ	30 Ω	10 mΩ
Zero /Span	freely adjustable		
Output			
Output signal	adjustable via software: FDT / DTM, connection via USB service cable		
Contact type	K1, K2 semiconductor NO contact		
Max. switching voltage	DC 30 V		
Max. switching current	DC 100 mA		
Status Indication	LED yellow K1 and LED yellow K2, not short-circuit-proof		
Operating mode	Limit value, window, alarm output / additionally adjustable: Hysteresis, input / output delay		
General	**+30/-30V**	**+50/-50mA**	**+5A/-5A**
Nominal voltage	DC 24 V		
Operation voltage range	16.8–30 V		
Rated current	approx. 12 mA		
Status Indication	LED green, yellow (K1, K2), red (error)		
Input/output protection	Overvoltage DC 30 V		
Accuracy	0.1 % FSR		0.5 % FSR
Linearity error	± 0.05 % FSR		± 0.1 % FSR
Termination	Screw-/spring terminal: 0.14–1.5 mm^2		
Resolution	16-bit		
Temperaturcompensation intern	–		
Configuration	Software: FDT / DTM		
Temperature error	<100 ppm FSR		
Data storage	Flash		
Insulation voltage input/output	2.5 kV_{eff}		
Housing material	PA 6.6 (UL 94 V-0)		
Field installation	rail TS 35 (EN 50022)		
Protection class	IP 20		
Installation postition	Optional		
Operation temperature range	-40 °C – 70 °C		
Storage temperature range	-40 °C – 85 °C		
Dimensions (w × h × d)	6.2 × 90.0 × 115.5 mm		
Weight (kg/piece)	0.050		
Approvals	cULus, Class I, Div. 2, Groups A,B,C,D T4		

Accessories	**Color**	**2-pole**	**3-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	red	762802	762805	762812	762822	762832	10
6 A jumper comb	white	762803	762806	762813	762823	762833	10
6 A jumper comb	blue	762804	762807	762814	762824	762834	10

Accessories	**Article number**	**Type**	**PU**
USB service cable	750894	LCON ZB USB	1
Label holder 4×11mm white	681313	BZT-0411	100

Input: PT, thermocouple, potentiometer – adjustable temperature converter
Output: Semiconductor NO contact
Insulation: 2.5 kV, 2-way isolation

Dimensions



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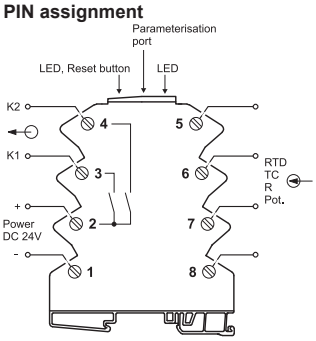
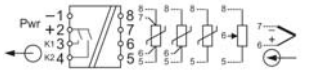




Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	750370	LCON TLS FDT 806210	1
Spring terminal				
Nominal voltage	DC 24 V	751370	LCON TLS FDT 806211	1

Input	**PT, poti, resistance**	**Thermocouples**
Measurement input	PT100, PT1000, Potenziometer 0–100 kΩ customer specific via contact points, polynomial	Type B, C, E, J, K, N, R, S, T customer specific via contact points, polynomial
Galvanic insulation I/O	2-way isolation	
Temperature range	-220... 850 °C depending on type	-210...2310 °C depending on type
Step response (10–90%)	TE: 10 – 750 ms, PT: 5 – 750 ms (adjustable by means of filter stage 1–5, default: 200 ms – filter stage 4)	
Input characteristic impedance	-	1 MΩ
Sensor current	0.2/0.6 mA type-dependent	-
Circuit	PT - 2, 3, 4-wire, for 2-conductor with offset adjustment, no external bridges necessary, autom. detection	-
Output		
Output signal	adjustable via software: FDT / DTM, connection via USB service cable	
Contact type	K1, K2 semiconductor NO contact	
Max. switching voltage	DC 30 V	
Max. switching current	DC 100 mA	
Status Indication	LED yellow K1 and LED yellow K2, not short-circuit-proof	
Operating mode	Limit value, window, alarm output / additionally adjustable: Hysteresis, input / output delay	

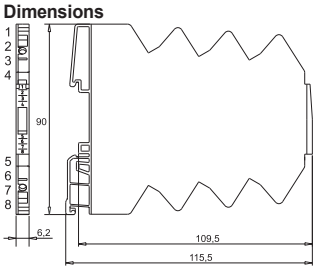
General	**PT, poti, resistance**	**Thermocouples**
Nominal voltage	DC 24 V	
Operation voltage range	16.8–30 V	
Rated current	approx. 12 mA	
Status Indication	LED green, yellow (K1, K2), red (error)	
Input/output protection	Overvoltage DC 30 V	
Accuracy	(10K: set Measurement range(K)) + 0.2% FSR	(10K: set Measurement range(K)) + 0.4% FSR
Resolution	16-bit	
Linearity error	± 0,1 % FSR	
Temperaturcompensation intern	-	±1 K type., max. ±2 K
Termination	Screw-/spring terminal: 0.14–1.5 mm^2	
Configuration	Software: FDT / DTM	
Temperature error	<100 ppm/K	
Data storage	Flash	
Insulation voltage input/output	AC 2.5 kV_{eff}	
Housing material	PA 6.6 (UL 94 V-0)	
Field installation	rail TS 35 (EN 50022)	
Protection class	IP 20	
Installation postition	Optional	
Operation temperature range	-40 °C – 70 °C	
Storage temperature range	-40 °C – 85 °C	
Dimensions (w × h × d)	6.2 × 90.0 × 115.5 mm	
Weight (kg/piece)	0.050	
Approvals	cULus, Class I, Div. 2, Groups A,B,C,D T4	

Accessories	**Color**	**2-pole**	**3-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	red	762802	762805	762812	762822	762832	10
6 A jumper comb	white	762803	762806	762813	762823	762833	10
6 A jumper comb	blue	762804	762807	762814	762824	762834	10

Accessories	**Article number**	**Type**	**PU**
USB service cable	750894	LCON ZB USB	1
Label holder 4×11mm white	681313	BZT-0411	100

Input: 0–10 V, 0–20 mA, 4–20 mA adjustable
Output: 2 × 0–10 V, 0–20 mA, 4–20 mA
Insulation: 2.5 kV, 4-way isolation

Dimensions



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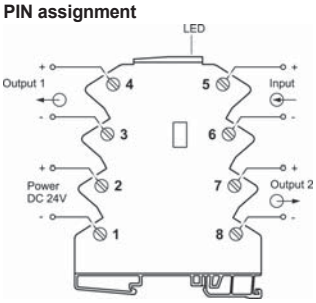
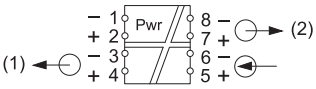
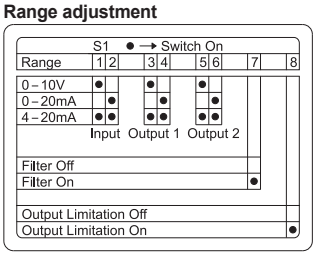




Range adjustment



See instruction leaflet for details

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	750321	LCON AASP D 806210	1
Spring terminal				
Nominal voltage	DC 24 V	751321	LCON AASP D 806211	1

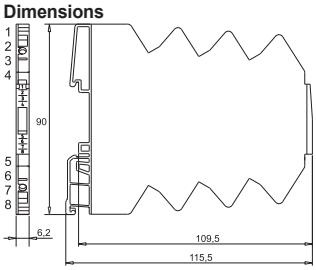
Input	**0/10 V**	**0–20 mA**	**4–20 mA**
Measurement input	0–10 V, 0–20 mA, 4–20 mA, adjustable via switch		
Galvanic insulation I/O	4-way isolation		
Transmission frequency	30 Hz (filter off), 5 Hz (filter on)		
Input characteristic impedance	500 kΩ	100 Ω	100 mΩ
Zero /Span	–		
Output	**0-10 V**	**0–20 mA**	**4–20 mA**
Output signal	–		
Max. load impedance at I-output	-	400 Ω	
Max. load impedance at U-output	>2 kΩ	-	
Limitation for exceeding measurement range	yes, switchable		
max. modulation range/output current	10.5 V	21 mA	
Ripple	< 20 mV_{eff}		
General			
Nominal voltage	DC 24 V		
Operation voltage range	16.8–30 V		
Rated current	13.0 mA		
Status Indication	LED green		
Input/output protection	Overvoltage DC 30 V, Output short circuit-proof		
Accuracy	0.1 % FSR		
Resolution	16-bit		
Linearity error	± 0.1 % FSR		
Configuration	Switch		
Temperature error	<150 ppm FSR		
Data storage	Flash		
Insulation voltage input/output	2.5 kV_{eff}		
Housing material	PA 6.6 (UL 94 V-0)		
Field installation	rail TS 35 (EN 50022)		
Protection class	IP 20		
Installation postition	Optional		
Termination	screw terminal: 0.14–1.5 mm^2		
Operation temperature range	-40 °C – 70 °C		
Storage temperature range	-40 °C – 85 °C		
Dimensions (w × h × d)	6.2 × 90.0 × 115.5 mm		
Weight (kg/piece)	0.600		
Approvals	–		

Accessories	**Color**	**2-pole**	**3-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	red	762802	762805	762812	762822	762832	10
6 A jumper comb	white	762803	762806	762813	762823	762833	10
6 A jumper comb	blue	762804	762807	762814	762824	762834	10

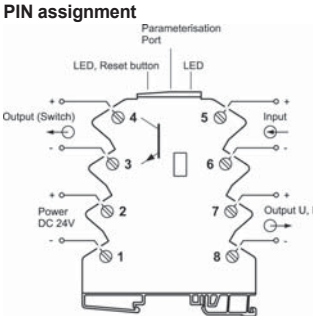
Accessories	**Article number**	**Type**	**PU**
Tag holder 4×11 mm white	681313	BZT-0411	100
Laser printer labels A4 unpunched	681031	LEB-A4	1
USB service cable	750894	LCON ZB USB	1

Input/output: 0–10 V, 0–20 mA, 4–20 mA, 2–10 mA, 0–5 V, 1–5 V, 2–10 V adjustable
Output: switching transistor DC 30 V/100 mA adjustable (LiveZero)
Insulation: 2.5 kV, 4-way isolation

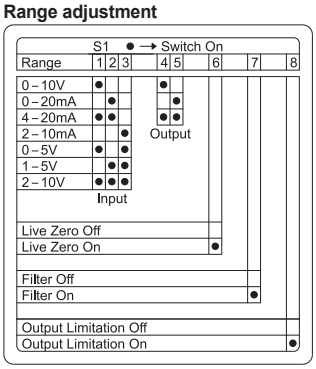
Dimensions



PIN assignment



Range adjustment



S1 1-8 off: FDT/DTM
See instruction leaflet for details

Description		Part-No.	Type	PU
Screw terminal				
Nominal voltage	DC 24 V	750322	LCON AALS DFDT 806210	1
Spring terminal				
Nominal voltage	DC 24 V	751322	LCON AALS DFDT 806211	1

Input	**0–10 V, 0–5 V, 1–5 V, 2–10 V**	**0–20 mA, 4–20 mA, 2–10 mA**
Measurement input	0–10 V, 0–5 V, 1–5 V, 2–10 V, 0–20 mA, 4–20 mA, 2–10 mA, adjustable via software FDT/DTM, connection via micro USB	
Galvanic insulation I/O	2-way isolation	
Delay ON/OFF	5 ms – 200 ms (adjustable by means of filter stage 1–5, default: 50 ms)	
Step response (10–90%)	10 ms – 500 ms (adjustable by means of filter stage 1–5, default: 100 ms)	
Input characteristic impedance	500 kΩ	100 Ω
Zero /Span	freely adjustable	
Ausgangsseite Analog	**0-10 V, 0–5 V, 1–5 V, 2–10 V**	**0–20 mA, 4–20 mA, 2–10 mA**
Output signal	adjustable via software FDT/DTM, connection via micro USB	
Max. load impedance at I-output	-	400 Ω
Max. load impedance at U-output	>2 kΩ	-
Limitation for exceeding measurement range	yes, switchable	
max. modulation range/output current	10.5 V	21 mA
Ripple	< 20 mV_{eff}	
Ausgangsseite Schalttransistor		
Output signal	adjustable via software FDT/DTM, connection via micro USB	
Contact type	Switching transistor, non short-circuit proof	
Max. switching voltage	DC 30 V	
Max. switching current	DC 100 mA	
Status Indication	LED yellow	
Operating mode	Limit value, timeframe, tendency+, tendency-, tendency+/-, inversion, error memory	
LiveZero	can be activated via switch and FDT/DTM	
General		
Nominal voltage	DC 24 V	
Operation voltage range	16.8/30 V	
Rated current	13.0 mA	
Status Indication	LED green/red	
Input/output protection	Overvoltage DC 30 V	
Accuracy	0.1 % FSR	
Resolution	16-bit	
Linearity error	± 0.1 % FSR	
Configuration	Software: FDT / DTM	
Temperature error	<150 ppm FSR	
Data storage	Flash	
Insulation voltage input/output	2.5 kV_{eff}	
Housing material	PA 6.6 (UL 94 V-0)	
Field installation	rail TS 35 (EN 50022)	
Protection class	IP 20	
Installation postition	Optional	
Termination	screw terminal: 0.14–1.5 mm^2	
Operation temperature range	-40 °C – 70 °C	
Storage temperature range	-40 °C – 85 °C	
Dimensions (w × h × d)	6.2 × 90.0 × 115.5 mm	
Weight (kg/piece)	0.600	
Approvals	–	

Accessories	**Color**	**2-pole**	**3-pole**	**4-pole**	**8-pole**	**16-pole**	**PU**
6 A jumper comb	red	762802	762805	762812	762822	762832	10
6 A jumper comb	white	762803	762806	762813	762823	762833	10
6 A jumper comb	blue	762804	762807	762814	762824	762834	10

Accessories		**Article number**	**Type**	**PU**
Tag holder 4×11 mm	white	681313	BZT-0411	100
Insulation plate		760809	TP 7-0809	5
Laser printer labels A4 unpunched		681031	LEB-A4	1

Article number index

SkyBLUE

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