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# Interface technology and switching devices

2019/2020



## Terminal blocks

- Terminal blocks



## Interface technology and switching devices

- Electronic switching devices and motor control
- Measurement and control technology
- Monitoring
- Relay modules
- System cabling for controllers



## Sensor/actuator cabling and connectors

- Sensor/actuator cabling
- Cables and lines
- Connectors



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# Relay modules

The importance of the reliability of industrial automation equipment is growing with the increase in use of electronic modules.

Modern relays or solid-state relay interfaces perform a wide range of tasks. No matter what the field – production technology, electrical equipment for machines, control engineering for power distribution, building automation, or process engineering – the aim is to ensure signal exchange between process peripherals and the higher-level central control systems. And this exchange must be reliable, floating, and electrically unambiguous. Safe electrical interface modules that meet the requirements of modern system concepts must include the following features:

- Coupling of different signal levels
- Safe electrical isolation between input and output
- High interference insensitivity

In practice, a relay interface comes into use when a flexible interface configuration with a large switching capacity range and the possibility of combining different types of contact is required. Further important features of relay interfaces are:

- Electrical isolation between open contacts
- Switching of independent switching current types
- High short-term overload resistance in the event of a short circuit or voltage peaks
- Practically impervious to electromagnetic fields
- Simple handling

Solid-state relay modules are used when an interface between the process peripherals and electronics is subject to the following requirements:

- Low control power
- High switching frequencies
- Wear-resistant and bounce-free switching
- Insensitive to vibrations and shocks
- Long service life

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# Relay modules

## Product overview

### RIFLINE complete



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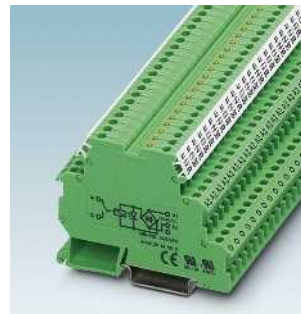
### DEK series



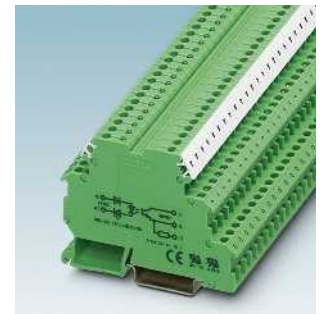
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# Relay modules

## Basics of relay technology

### General information

Electromechanical relays are used as interface modules between the process I/O devices, on the one hand, and the open-loop/closed-loop control and signaling equipment, on the other, for level and power adjustment purposes.

Essentially, electromechanical relays can be divided into two main groups: mono-stable and bi-stable relays.

With monostable DC or AC relays, the contacts automatically return to the release state as soon as they are de-energized.

In the case of bi-stable relays, the contacts remain in their present switch position when the excitation current is switched off.

The documented relay data is based on test conditions and design criteria in accordance with IEC 61810. Data may vary or be limited when mounting relays on DIN rail bases or on PCBs. Numerous parameters, such as:

- Operating time
- Load current
- Input voltage
- Dense mounting arrangement
- Heat dissipation into the environment and the layout for PCB applications ultimately determine the data for the overall arrangement

The Phoenix Contact supply range features numerous ready-mounted relay combinations and base combinations, including some with additional input plug-in modules. These are tested under worst case conditions. The documented data then applies to the combinations.

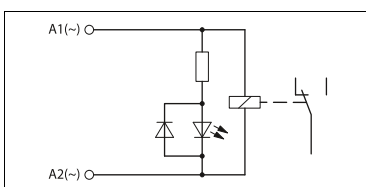
### Coil side

#### Input circuits and voltage types

There are various kinds of input circuits depending on the type of relay used and the nature of the control voltage.

If pure AC relays are used (AC input), the input circuit is generally nothing more than a visual switching status indicator.

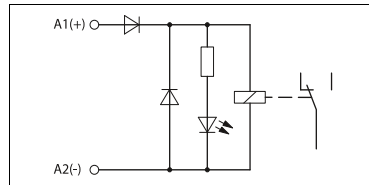
Unless otherwise specified, the frequency of the control voltage is 50/60 Hz.



Basic structure of a relay with AC input

In the case of a pure DC input, the most important addition to the circuit is a freewheeling diode. This limits the voltages induced on the coil on circuit interruption to a value of approximately 0.7 V, which does not pose a danger to any connected control electronics.

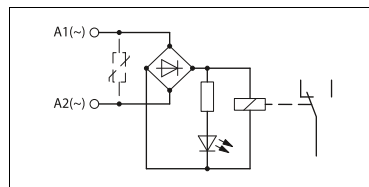
As the freewheeling diode can only perform its required function if the polarity of the voltage connection is correct, a polarity protection diode is also integrated into the input circuit.



Basic structure of a relay with DC input

To allow DC or AC voltage operation, a bridge rectifier is connected in the input circuit. The diodes are simultaneously responsible for performing rectification, freewheeling, and polarity reversal protection functions. The interrupting voltage of the coil is limited to approximately 1.4 V

To protect the input circuit against overvoltages, a varistor is also connected (depending on the type) upstream of the bridge rectifier.

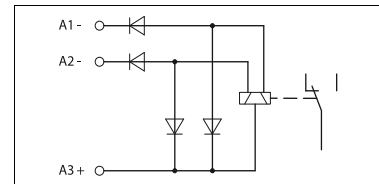


Basic structure of a relay with AC/DC input

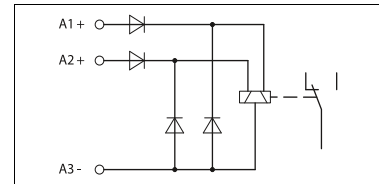
Bi-stable latching relays with a double winding are only ever operated with DC voltage.

With these types of relays, there are three coil connections on the coil side. In addition to the common connection, there are separate connections for “setting” and “resetting”; these are controlled by short pulses only. As a result, the relays hardly heat up at all. Simultaneous control of both control inputs is not permitted.

A distinction is made between negative switching (M) and positive switching (P) types, depending on the polarity of the freewheeling and polarity protection diodes.



Basic structure of a bi-stable relay, negative switching type



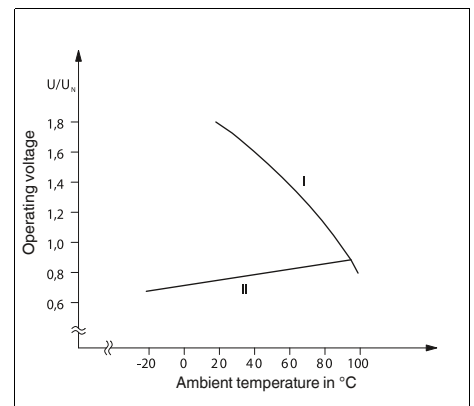
Basic structure of a bi-stable relay, positive switching type

### Operating voltage range

The ambient temperature prevailing at the location of use has a major impact on certain relay operating parameters.

As the ambient temperature increases, the coil winding heats up, causing the operate and release voltages to rise. At the same time, the maximum permissible coil voltage decreases, which means that the usable working range becomes restricted as a result.

The diagram below illustrates how the operating voltage behaves as a function of the ambient temperature.



Basic curve of a relay operating voltage

- I: Maximum permissible voltage with 100% operating time (OT) and compliance with the coil temperature limit
- II: Minimum sparkover voltage

### Interference voltages and interference currents on the coil side

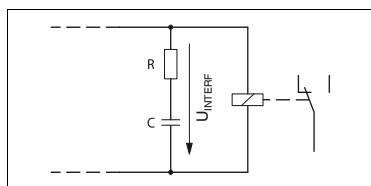
When inductive or capacitive interference voltages are coupled into the long supply lines of a relay, this can prevent the relay from operating safely.

If the coupled-in voltage exceeds the release voltage required by the “relay standard”, IEC 61810-1, the relay may fail to release in extreme cases. In the case of

DC relays, this release voltage is  $\geq 0.05 \times U_N$  and for purely AC relays, it is  $\geq 0.15 \times U_N$ .

The same disturbances can occur when a relay with a low input power is controlled by an electronics module with an AC voltage output featuring an RC circuit. The typical leakage current from RC elements of this kind (generally in the range of a few mA) provides sufficient control power to prevent the downstream relay from releasing or even enough power to excite it.

The disturbance level of any interference voltages that are present can be reduced by connecting an RC element in parallel to the relay coil. This measure also subjects the interference voltage to a capacitive load, causing it to collapse.



External RC interference suppressor to prevent interference voltage coupling

The following values are recommended for the purpose of dimensioning the RC element:

- R = 100 to 220 Ω
- C = 220 to 470 nF

The SO46 series has been developed to provide even higher levels of immunity to interference. These products already contain an integrated RCZ filter. See, for example, PLC...SO46.

### Contact side, contact materials

Given the wide variety of potential applications in the different industrial sectors, the relays used must be matched to the various tasks that need to be performed by selecting the right kind of contact material.

The voltage, current, and power values play an important role when determining the suitability of contact materials. Other criteria include:

- Contact resistance
- Erosion resistance
- Material migration
- Welding tendency
- Chemical influences

In this way, the various contact materials (generally precious-metal alloys) can be matched to the relevant areas of application.

The adjacent table provides details of some of the key materials.

### Contact protection circuit

Every electrical consumer constitutes a mixed load with resistive, capacitive, and inductive components.

Contact material	Typical properties	Typical applications	Guide values for the area of application*
<b>Gold Au</b>	Largely insensitive to industrial atmospheres, low and constant contact resistances in the range of small switching capacities with nickel (AuNi) or silver (AuAg) alloys.	Dry measuring and switching circuits, control inputs	$\mu\text{A} \dots 0.2 \text{ A}$ $\mu\text{V} \dots 30 \text{ V}$
<b>Silver Ag</b>	High electrical conductivity, sensitive to sulfur, therefore often gold-flashed (approximately 0.2 μm) as protection; nickel (AgNi) or copper (AgCu) alloys increase the mechanical resistance and erosion resistance and reduce the welding tendency.	Universal, suitable for medium loads; nickel alloys (AgNi 0.15) for DC circuits with medium to large loads	$\geq 12 \text{ V}$ $\geq 10 \text{ mA}$
<b>Silver, hard gold-plated Ag + Au</b>	Properties similar to gold Au, when switching loads >30 V/0.2 A, the hard gold plating (5 - 10 μm) is destroyed and the values and properties of the Ag contact are applicable. However, a reduction in the service life is then to be expected.	Suitable for control inputs and other small loads.	$\geq 100 \text{ mV}$ $\geq 1 \text{ mA}$
<b>Tungsten W</b>	Highest melting point, very high erosion resistance, greater contact resistances, very low welding tendency, susceptible to corrosion, often used as lead contact.	Loads with very high inrush currents, e.g., incandescent lamps, fluorescent lamps.	$\geq 60 \text{ V}$ $\geq 1 \text{ A}$
<b>Silver nickel AgNi</b>	High erosion resistance, low welding tendency, higher contact resistances than with pure silver.	Universal, suitable for medium to high loads, DC circuits, and inductive loads.	$\geq 12 \text{ V}$ $\geq 10 \text{ mA}$
<b>Silver nickel AgNi + Au</b>	Properties similar to gold Au, when switching loads >30 V/0.2 A, the hard gold plating (5 - 10 μm) is destroyed and the values and properties of the AgNi contact are applicable. However, a reduction in the service life is then to be expected.	Suitable for control inputs and other small loads.	$\geq 100 \text{ mV}$ $\geq 1 \text{ mA}$
<b>Silver tin oxide AgSnO</b>	Low welding tendency, very high erosion resistance for high switching capacities, low material migration.	Application depends heavily on the relay type, switching circuits with high make and break loads, e.g., incandescent lamps and fluorescent lamps, AC and DC circuits. Due to different alloys and production procedures, partly also suitable for smaller loads.	$\geq 12 \text{ V}$ $\geq 100 \text{ mA}$ ( $\geq 10 \text{ mA}$ )
<b>Silver tin oxide, hard gold-plated AgSnO + Au</b>	Properties similar to gold Au, when switching loads >30 V/0.2 A the hard gold plating (5 - 10 μm) is destroyed and the values and properties of the AgSnO contact are applicable. However, a reduction in the service life is then to be expected.	Suitable for control inputs and other small loads.	$\geq 100 \text{ mV}$ $\geq 1 \text{ mA}$

\* Values depend on the relay used and on further operating conditions.

When these loads are switched, the switching contact is in turn subjected to a load, to either a lesser or greater extent. This load can be reduced by including a suitable contact protection circuit.

In view of the fact that consumers with a large inductive component are predominantly used in practice (e.g., contactors, solenoid valves, motors, etc.), these application scenarios are worth considering in more detail.

On interruption, voltage peaks with values of up to several thousand volts occur due to the energy stored in the coil.

These high voltages cause an electric arc on the switching contact which can destroy

the contact due to material vaporization and material migration. The electrical service life is reduced considerably as a result. In extreme cases, the relay may fail in the very first switching cycle with DC voltage and a static electric arc.

A protective circuit must be used to suppress the formation of an electric arc. With optimum dimensioning, almost the same number of switching cycles can be achieved as with a resistive load.

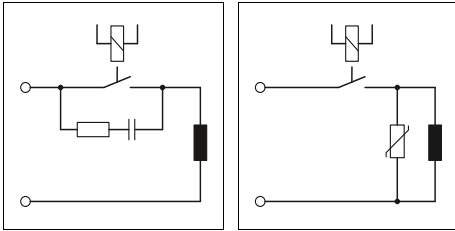


# Relay modules

## Basics of relay technology

In principle, there are a number of possible ways of achieving an effective circuit:

1. Wiring the contact
2. Wiring the consumer
3. Combination of both wiring methods.



Wiring the contact

Wiring the inductive consumer

In principle, protective measures should intervene directly at the source of the interference.

Wiring a consumer should therefore be given priority over wiring the contact.

The following points are advantageous for the consumer circuit (image on right):

1. The circuit is only loaded with the induction voltage during interruption. By contrast, the sum of the operating voltage and the induction voltage is applied to the contact circuit.
2. When the contact is open, the load is electrically isolated from the operating voltage.
3. It is not possible for the load to be activated or to "stick" due to undesired operating currents, e.g., from RC elements.
4. Cut-off peaks of the load cannot be coupled into parallel control lines.

Nowadays, solenoid valves are usually connected using valve connectors that are also supplied with LEDs and components that limit the induction voltage. Valve connectors with an RC element, varistor or Zener diode often do not quench the arc and only serve to comply with legislation governing EMC. Only valve connectors with an integrated 1N4007 freewheeling diode quench the arc quickly and safely, thereby increasing the service life of the relay by a factor of 5 to 10. Valve connectors with LED, integrated 1N4007, and free cable end can be supplied on request as part of the SAC range.

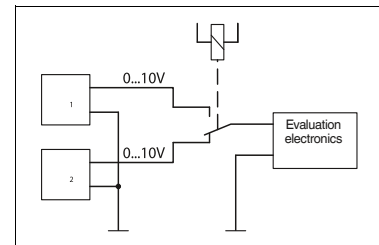
Load wiring	Additional dropout delay	Defined induction voltage limitation	Effective bipolar attenuation	Advantages and disadvantages
<b>Diode</b> 	Large	Yes ( $U_D$ )	No	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• Good effect in terms of extending the service life of the contacts</li> <li>• Easy implementation</li> <li>• Inexpensive</li> <li>• Reliable</li> <li>• Dimensioning not critical</li> <li>• Low induction voltage</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Attenuation only via load resistor</li> <li>• Long dropout delay</li> </ul>
<b>Series connection diode/Zener diode</b> 	Medium to small	Yes ( $U_{ZD}$ )	No	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• Dimensioning not critical</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Attenuation only above <math>U_{ZD}</math></li> <li>• Minimal effect in terms of extending the service life of the contacts</li> </ul>
<b>Suppressor diode</b> 	Medium to small	Yes ( $U_{ZD}$ )	Yes	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• Inexpensive</li> <li>• Dimensioning not critical</li> <li>• Limitation of positive peaks</li> <li>• Suitable for AC voltage</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Attenuation only above <math>U_{ZD}</math></li> <li>• Minimal effect in terms of extending the service life of the contacts</li> </ul>
<b>Varistor</b> 	Medium to small	Yes ( $U_{VDR}$ )	Yes	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• High energy absorption</li> <li>• Dimensioning not critical</li> <li>• Suitable for AC voltage</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Attenuation only above <math>U_{VDR}</math></li> <li>• Minimal effect in terms of extending the service life of the contacts</li> </ul>
<b>R/C combination</b> 	Medium to small	No	Yes	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• HF attenuation due to energy storage</li> <li>• Suitable for AC voltage</li> <li>• Level-independent attenuation</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Precise dimensioning required</li> <li>• High inrush current surge</li> <li>• Minimal effect in terms of extending the service life of the contacts</li> </ul>

### Switching small loads

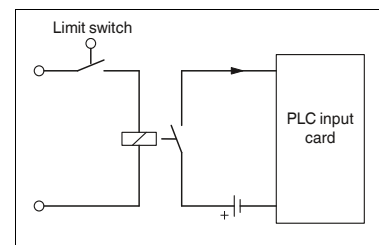
Small loads have to be processed mainly in applications where signals have to be forwarded to control inputs (e.g., of a PLC).

With these loads, no switching sparks (electric arcs) occur on the contacts in the small load range.

In addition to the constant cleaning effect due to contact friction, this switching spark assumes the function of penetrating non-conductive contamination layers that are formed on the contact surfaces of power contacts.



Application example: Measurement point changeover



Application example: PLC input signal

These contamination layers are usually oxidation or sulfidation products of the contact materials silver (Ag) or silver alloys such as silver nickel (AgNi) or silver tin oxide (AgSnO). As a result, the contact resistance may rise so considerably within a short time that reliable switching is no longer possible in the case of small loads.

Due to these properties, the power contact materials mentioned are not suitable for small load applications.

Gold (Au) has become accepted as the contact material of choice for these areas of application mainly on account of its low and constant contact resistances even with small loads and its insensitivity to sulfurous atmospheres.

For the smallest of loads and even greater contact reliability, double contact relays with gold contacts are used.

The slotted contact spring in this design provides two parallel contact points with even lower contact resistances and considerably higher contact reliability.

### Switching large loads

A few important points also need to be considered with regard to switching operations in the large load range that involve power contacts made of either silver (Ag) or silver tin oxide (AgSnO).

A basic distinction must be made between switching DC and AC loads.

### Switching large AC loads

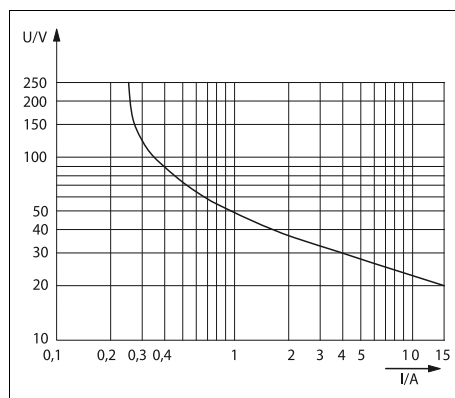
When switching large AC loads, the relay can be operated up to the corresponding maximum values for switching voltage, current, and power. The electric arc that occurs during interruption depends on the current, voltage, and phase relation. This cut-off arc usually disappears automatically the next time the load current passes through zero.

In applications with an inductive load, an effective protective circuit must be provided, otherwise the service life of the system will be reduced considerably.

### Switching large DC loads

Conventional switching relays can only switch off relatively small direct currents (which contrasts with their ability to switch off the maximum permissible AC current), since there is no zero crossing to extinguish the arc automatically. This maximum DC value is also dependent to a large extent on the switching voltage and is determined, among other things, by constructional features such as contact spacing and contact opening speed.

The corresponding current and voltage values are documented by relay manufacturers in electric arc or load limit curves.



Example of a load limit curve (dependent on the type)

A non-attenuated inductive DC load further reduces the values given for switchable currents. The energy stored in the inductance can cause an electric arc to occur, which forwards the current through the open contacts.

With an effective contact protection circuit, preferably freewheeling diodes of the type 1N4007, the service life can be increased by a factor of 5 to 10 in relation to unprotected or unfavorably protected inductive loads (see also chapter Contact Protection Circuits).

If higher DC loads than those documented are to be switched or if the electrical service life is to be increased, several contacts of a relay can be connected in series. See, for example, REL-IR... industrial relays.

Alternatively, solid-state relays with DC voltage output can also be used.

### Switching lamps and capacitive loads

Regardless of the type of voltage, all kinds of lamps and loads with a capacitive component impose extreme requirements on the switching contacts. The moment it is switched on, in other words precisely in the dynamic chattering phase of the relay, extremely powerful current peaks occur.

These are often in the region of several tens of amps, and not infrequently are known to exceed 100 A, which results in welding of the contact. This can be remedied by using specially optimized "lamp load relays" that can cope with these inrush peaks. See, for example, PLC...IC type.

### Switching capacity in accordance with utilization categories AC15 and DC13 (IEC 60947)

In practice, both the maximum interrupting rating for AC loads and the DC interruption values taken from the load limit curves provide only a rough guide for the choice of relay. In reality, this is insufficient, since real loads in the vast majority of industrial applications have inductive or capacitive components and the wiring of the loads can be totally different. As already described, this sometimes leads to considerable variations in terms of service life.

The IEC 60947 contactor standard seeks to avoid these disadvantages by dividing the loads into various utilization categories (DC13, AC15, etc.). This standard is also partly applied to relays. However, users must be aware of the fact that these values are only applicable in practice to a limited extent as well, since all DC13 and AC15 test loads are highly inductive and are also operated without any protective circuit at all (see "Contact protection circuit" section). Moreover, the switching capacity test in accordance with IEC 60947 only requires 6,060 switching cycles to be performed by way of a minimum requirement.

A much more reliable way to determine the switching capacity and the anticipated service life is to refer to the specific application data. Using a comprehensive data bank, the service life can be accurately estimated for most applications and, if necessary, suggestions for improvement can be made. In the case of critical applications, the user is advised to gather service life information based on empirical data.

# Relay modules

## Basics of solid-state relay technology

### Control side

Solid-state relays for various voltage and power levels are available from Phoenix Contact for use as interface modules designed to match process I/O devices to control, signaling, and regulating devices. The solid-state relay element which is actually located in the module is limited to one defined voltage range by virtue of its design. The current consumption on the input side fluctuates depending on the circuit architecture and voltage level.

A suitable input circuit is provided to accommodate all of the voltages required for industrial applications between 5 V and 230 V. The inputs for DC voltage and AC voltage must always be differentiated.

### DC input

Adjustments are made in accordance with the various voltage levels by adding electronics which have been specially adapted to the desired voltage range. In the case of most modules, a polarity protection diode provides reliable protection against destruction in the event of a control voltage being connected incorrectly. Specially coordinated filters reliably suppress possible high-frequency noise emissions.

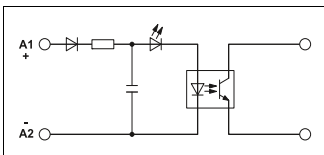


Figure 1: Block diagram for DC input

### AC input

The solid-state relay element requires a stable control voltage to ensure reliable operation. In the case of the AC input, this is achieved by connecting a rectifier and filter capacitor upstream. The rectification is followed, in principle, by the same circuit architecture as the DC input.

The switching frequency always lies below half the mains frequency. Due to the filter capacitor, a higher switching frequency

cannot be achieved. This results in continuous through-switching.

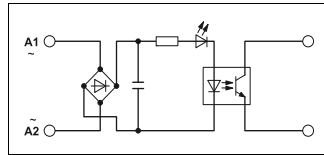


Figure 2: Block diagram for AC input

### Load side

Depending on the application and the type of load, the solid-state relay output must meet various requirements. The following are crucial:

- Power amplification
- Matching the switching voltage and the switching current (AC/DC)
- Short-circuit protection

For these different applications, the solid-state relay element must also be processed using additional electronics on the output side.

### DC output

In order to achieve the necessary output power, the solid-state relay element is supplemented by one or more semiconductor components.

The on-site user should nevertheless simply regard the connection terminal blocks of the output as conventional switch connections. Observing the specified polarity is the only essential requirement.

For practical reasons, the following criteria should be taken into account when selecting a suitable solid-state relay:

1. Operating voltage range (e.g., 12 ... 60 V DC).

This determines the minimum or maximum voltage to be switched.

The lower value must be observed in order to ensure reliable operation. In order to protect the output transistor, the upper value must not be exceeded.

2. Maximum continuous current (e.g., 1 A).

This value indicates the maximum continuous current. If this value is exceeded continuously, the output semiconductor will be destroyed.

The dependence of the output current on the ambient temperature of the solid-state relay should also be taken into consideration. A derating curve

is therefore generally specified for solid-state power relays. This shows the maximum load current as a function of the ambient temperature.

3. Output configuration.

The 2-conductor output is similar to a mechanical contact. Only the polarity of the connections is specified and must be observed.

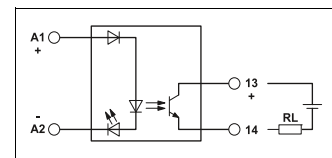


Figure 3: 2-conductor output

The 3-conductor output is non-isolated and requires both potentials from the voltage source on the output side to be connected if it is to operate reliably.

When switched off, a permanent reference to ground (negative potential) is established. In addition, this output circuit offers the advantage of an almost constant internal resistance.

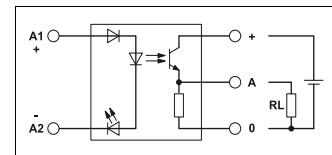


Figure 4: 3-conductor output

### AC output

In order to control the switching and control devices for AC voltage, a semiconductor for AC voltage (TRIAC or thyristor) is connected downstream of the solid-state relay element.

As with the DC output, it is particularly important to consider the maximum operating voltage range and the maximum continuous load current as a function of the ambient temperature.

## Basics of solid-state relay technology

In addition, the maximum peak reverse voltage of the TRIAC (e.g., 600 V) is crucial with AC outputs. This must not be exceeded even in the case of voltage fluctuations or interference voltage peaks in order to prevent destruction. That is why the AC outputs of all solid-state relays from Phoenix Contact have an internal RC protective circuit to protect against interference voltage peaks.

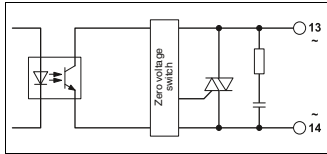


Figure 5: Basic circuit diagram of AC output

### Protective circuits

The moment inductive loads (contactors, solenoid valves, motors) are switched off, surge voltages occur and these can reach very high amplitudes. Electronic components and switching elements are particularly susceptible to these. A protective circuit should therefore always be provided to prevent destruction.

A parallel connection to the load effectively reduces the switching surge voltage to a harmless level. Depending on the solid-state relay output and load type,

- a freewheeling diode/suppressor diode (DC only),
  - a varistor (AC and DC)
  - or an RC element (AC only)
- can provide the necessary protection.

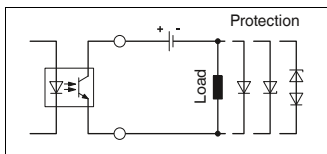


Figure 6: Protective circuit with DC voltage output

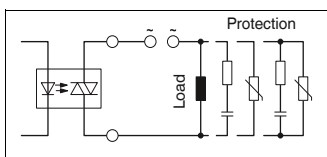


Figure 7: Protective circuit with AC voltage output

### Application notes

Input solid-state relays acting in the direction from the I/O devices to the controller (signaling, controlling, monitoring)

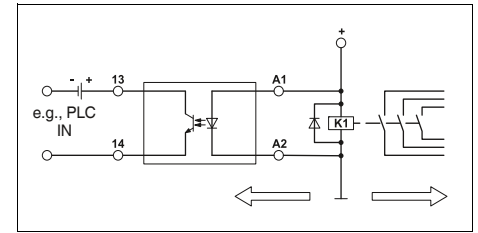
Pluggable versions:

- PLC-O...

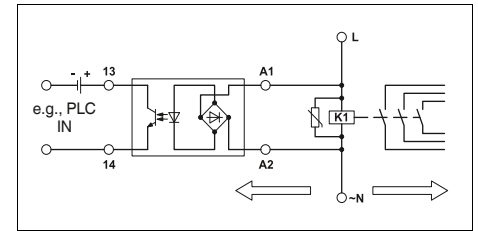
Modular versions:

- DEK-OE...
- EMG 10-OE...
- SIM-EI...
- OPT...

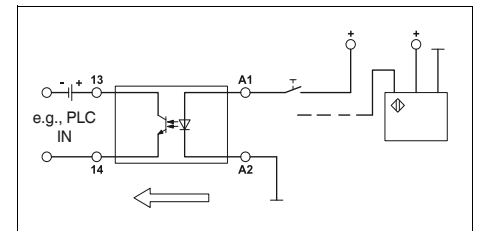
Example: Load protection monitoring (DC contactor)



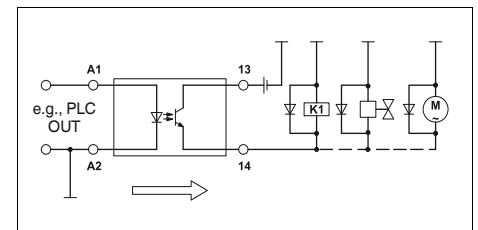
Example: Load protection monitoring (AC contactor)



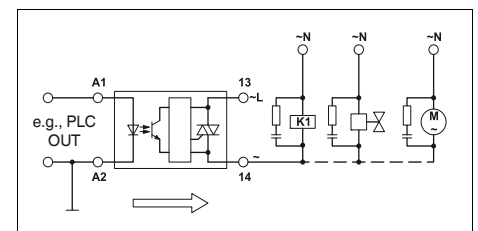
Example: Position indication with limit stop contact or initiator



Example: Contactor, solenoid valve or motor (DC load) switching



Example: Contactor, solenoid valve or motor (AC load) switching



Remarks:

- 1) Ground (negative) potential from the input and output of the solid-state relay must not be connected.
- 2) DC loads must be provided with an effective protective circuit (e.g., diode).
- 3) AC loads must be protected with a varistor or an RC element.

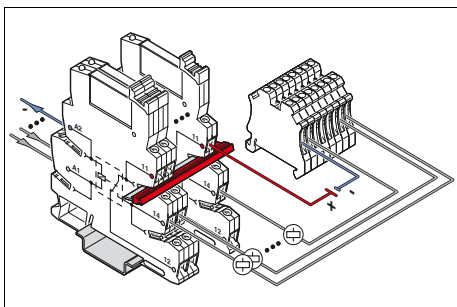
# Relay modules

## Sensor/actuator configuration aids and handling of interference signals

### Configuration aid for connecting sensors and actuators

Electromechanical relays or solid-state relays are used as the coupling element between the controller and the sensors or actuators in the field. This interface ensures appropriate signal conditioning with respect to current and voltage between the controller and field level.

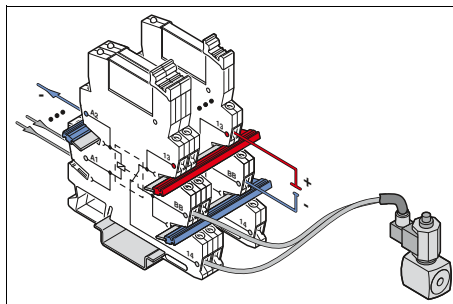
### Conventional connection of actuators



If actuators such as solenoid valves are connected to the controller via a universal relay with changeover contact, an additional terminal block strip must be used for the common load return line. The positive potential of the loads is applied to connection terminal block 11 (changeover contact) at the relay modules. This can be distributed over all relay modules using plug-in bridges. This means that only the direct connection of the potential to one relay is necessary. The loads are connected to connection terminal block 14 (N/O contact). The negative potential required is supplied at a terminal block. This is then distributed to further terminal blocks by means of plug-in bridges. However, load return lines for the individual actuators are applied to every terminal block. This results in a common load return line potential for all actuators via the additional terminal block.

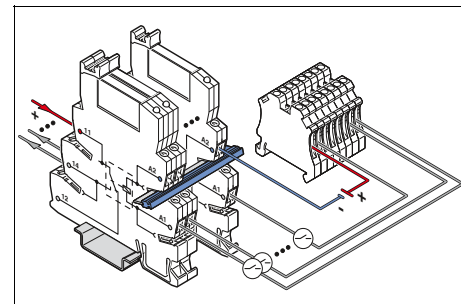
Because of the increased space requirement and additional wiring to the terminal block, the use of additional terminal blocks for distributing potential requires a great deal of effort.

### Easy wiring of actuators



The PLC...ACT relay modules enable fast and easy connection of actuators. The positive potential of the loads is applied to connection terminal block 13. This can be distributed over all relay modules using plug-in bridges. This makes only the direct connection to one module necessary here as well. The actuators are connected to contact 14 (N/O contact). In the case of PLC...ACT relay modules, an N/C contact is not required. Instead, the BB connection serves as an option for connecting the load return line. Here the common negative potential is supplied and distributed by means of plug-in bridges. The terminal block for conventional wiring is not necessary due to the direct connection of the load return line potential to the relay module. This means that no additional space is required in the control cabinet and simpler wiring minimizes the risk of error.

### Conventional connection of sensors



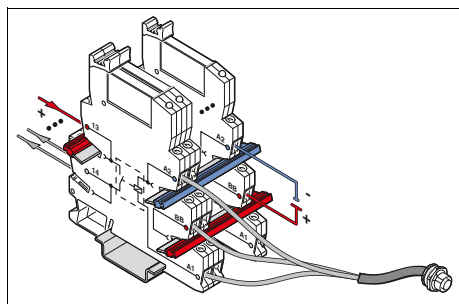
If sensors such as proximity switches are connected via a universal relay to a controller with a changeover contact, an additional terminal block strip must be used for the common sensor supply voltage. It is also important to note that either the wiring in the control cabinet must be implemented the other way round because control of the relay now takes place from the field level and not via the controller, or the relay module must be installed into the control cabinet rotated by 180°. The negative potential of the sensors is applied at connection terminal block A2 on the relay module. This can be distributed over all relay modules using plug-in bridges. This means that direct connection to only one relay is necessary. The sensors are connected to connection terminal block A1. The necessary positive potential is supplied to a terminal block and distributed to further terminal blocks by means of plug-in bridges. However, the supply for the individual sensors is applied to every terminal block. This results in a common supply signal for all sensors via the additional terminal blocks.

Because of the increased space requirement and additional wiring to the terminal block, the use of additional terminal blocks for distributing potential requires a great deal of effort.

**Configuration aid for handling interference signals**

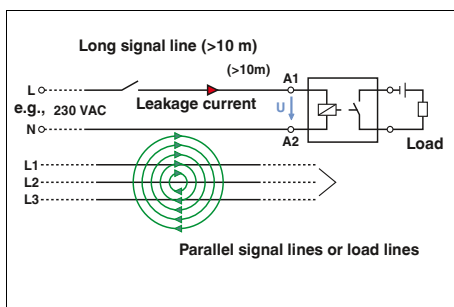
In accordance with IEC 61810-1, the standard release voltage of a relay is 5% of the nominal voltage for DC coils and 15% for AC coils. That means that a relay with a nominal voltage of 230 V AC is only switched off when the control voltage is  $0.15 \times 230 \text{ V AC} = 34.5 \text{ V AC}$ . If interference signals occur on the control side of a relay that are greater than the release voltage, defined switch-off is no longer possible. In the worst case, the interference is large enough to energize the relay. The application is still switched on although no signal is issued by the controller. There can be various reasons for this.

**Easy wiring of sensors**



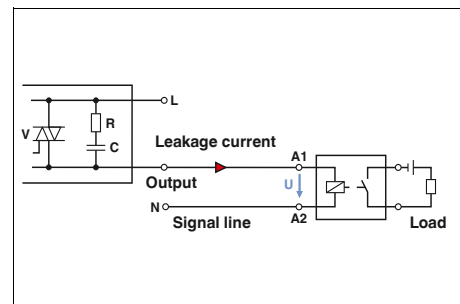
Sensors can be efficiently coupled with the controller with the PLC...SEN relay modules. The input and output side on the module are already interchanged so that the signal direction from the field to the controller can be ideally represented. Therefore, three connection terminal blocks (A1, A2, and BB) are located on the control side of the relay. The common negative potential of the sensors is connected to A2 and distributed to further relay modules by means of plug-in bridges. The sensors are connected directly to the A1 connections. Connection BB is used for the common supply potential of the sensors. The potential is distributed to all connected sensors by means of the plug-in bridges. However, only connections 13 and 14 for the N/O contact are located on the contact side. Signal feedback to the controller takes place over these contacts. The terminal block for conventional wiring can be dispensed with, thanks to the direct connection of the sensor supply voltage to the relay module. This means that no additional space is required in the control cabinet and simpler wiring minimizes the risk of error.

**Coupling of interference signals from parallel lines**



If the control lines to the relay are very long, interference can occur from cables running in parallel. These influence the actual control line and couple the signals to it. This interference voltage can be measured on the control side, even if no signal is issued by the controller.

**Leakage current with AC voltage output card**



Leakage current on the signal line occurs if control of a relay takes place via an output card with AC voltage. This is caused by the RC wiring of the AC voltage output. Typically, the leakage current has a control power that is large enough not to switch off the relay reliably.

**Safe shutdown even with interference signals**

The PLC...SO46 series is equipped with RCZ wiring in the base. The release voltage of the relay is increased by this circuit of resistor, capacitor, and Zener diode so that the relay is resistant to interference voltages. In the case of a relay for 230 V AC, the standard release voltage is 34.5 V AC. The PLC...230UC...SO46 modules have a release voltage of 80 V AC. This enables the relay to switch off reliably at interference voltages of 80 V AC. The PLC...SO46 bases are also available with further voltages. They can be fitted with both electromechanical relays or solid-state relays. Screw connection or Push-in connection is available as the connection technology.

# Relay modules

## RIFLINE complete – Industrial relay system



RIFLINE complete is a cost-effective relay system with various accessories. It consists of DIN rail bases, electromechanical or solid-state relays, plug-in interference suppression modules, marking material, and bridging material. The range of accessories is rounded off with a timer module. This is used to transform a basic relay into a timer relay with three different functions.

The RIFLINE complete relay range consists of seven different base versions from RIF-0 to RIF-4 – these range from one N/O contact up to four PDT contacts. The field of application of this product group ranges from coupling relay applications with switching currents of one milliamp to replacement for miniature contactors with currents up to 16 A.

The relay bases feature Push-in or screw connection technology. Push-in connection technology enables quick and tool-free conductor contacting. The RIF-1 to RIF-4 bases offer double the contact options on both the input and output side.

On the input side of all bases, the negative potential (A2) can be bridged – regardless of the base size. On the output side, the grouped contact (11) can be bridged within the RIF-0 base version. This connection can also be bridged within the RIF-1 base size.

To offer diverse marking options, the engagement lever can be fitted with a zack marker strip. In addition, marker carriers

can be mounted on the bases so that additional marking surfaces are available.

RIFLINE complete can be extended using many elements from the CLIPLINE complete accessories range. This includes marking material, bridges, and test adapters.

To make ordering and management easier, RIFLINE complete modules are provided in the most popular voltages as complete modules with relay and interference suppression module. For individual assembly, tailored to the requirements of the application, additional voltage levels are offered in the modular system.

**RIF-0**

The 6.2 mm narrow RIF-0 base series is suitable for a 1-changeover-contact relay. Switching currents up to 6 A are implemented here. Two base versions are available: 1 N/O contact and 1 changeover contact. RIF-0 is therefore a good choice for all coupling applications.

**RIF-1**

The 16 mm narrow RIF-1 base series is suitable for a 2-changeover-contact relay. Currents up to 13 A can be switched when using the FBS 2-8 plug-in bridge. This relay is ideal for power switching and signal duplication.

**RIF-2**

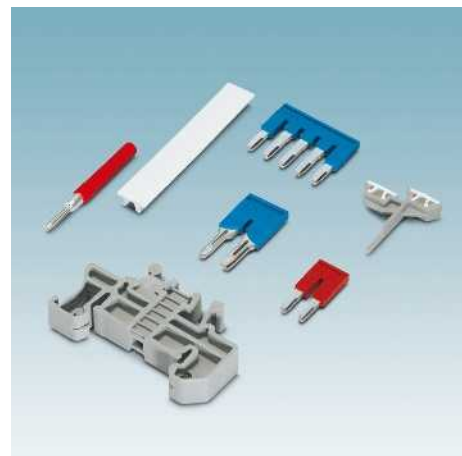
The 31 mm wide RIF-2 base series is designed for industrial relays with up to 4 contacts. Currents up to 12 A are no problem for these bases. This relay is ideal for applications that require power and signal multiplication.

**RIF-3**

The 40 mm wide RIF-3 base series is designed for octal relays with up to 3 contacts. Switching currents up to 10 A are implemented here. Two base versions are available: 2 changeover contacts and 3 changeover contacts. RIF-3 bases are ideal for all applications that require power and signal multiplication.

**RIF-4**

The 43 mm wide RIF-4 base series is designed for power relays with up to 3 contacts. Currents up to 16 A can be switched. RIF-4 bases are a good choice for applications that require power and signal multiplication, e.g., in miniature contactor applications.

**Accessories**

A wide range of accessories are available for the RIFLINE complete relay system that round off the range. These include bridges, professional marking material, special function modules, test plugs, and end brackets.



# Relay modules

## RIFLINE complete – Industrial relay system

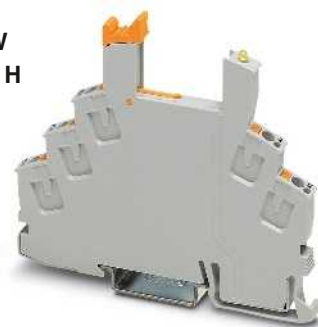
### Modular RIF-0 relay bases

Relay bases that can be fitted with miniature power relays or solid-state relays with a nominal voltage of 12 to 24 V DC.

The advantages:

- Integrated freewheeling diode for input circuit and interference suppression circuit
- LED for status display
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Professional marking material
- Holders for test plugs
- Professional bridging of adjacent modules saves wiring time (A2 and 11/13)
- FBS 2-6 plug-in bridges for the input and output side

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



1-changeover-contact relay base with Push-in connection technology



#### Technical data

250 V AC/DC (contact side)  
Max. 8 A (depends on application/assembly)

Nominal voltage  $U_N$   
Nominal current at  $U_N$

#### General data

Ambient temperature (operation)

-40°C ... 85°C (depends on application/assembly)

Connection data solid/stranded/AWG

0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 24 - 16

Maximum tightening torque

-

Dimensions

Width

6.2 mm

Depth

78 mm

Height

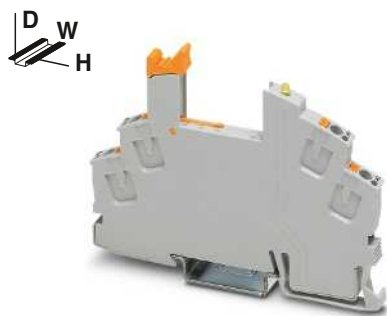
93 mm

#### Ordering data

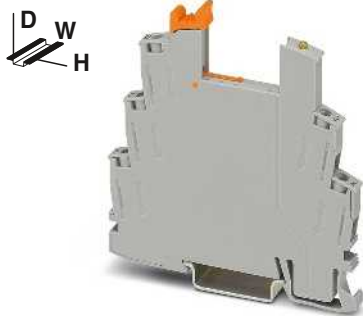
Description	Type	Order No.	Pcs./Pkt.
<b>RIF-0 relay base</b> , PDT version, safe isolation I/O With Push-in connection	RIF-0-BPT/21	2900958	10
<b>RIF-0 relay base</b> , N/O contact version, safe isolation I/O With Push-in connection			
<b>RIF-0 relay base</b> , PDT version, safe isolation I/O With screw connection			
<b>RIF-0 relay base</b> , N/O contact version, safe isolation I/O With screw connection			
<b>RIF-0 relay base</b> , negative switching, PDT version, safe isolation I/O With Push-in connection	RIF-0-BPT-M/ 21	2907468	10

#### Accessories

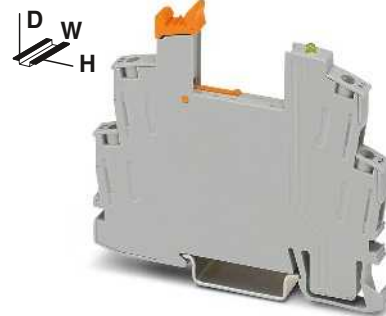
<b>Plug-in bridge</b>			
2-pos. red, 24 A	FBSR 2-6	3033715	50
2-pos. red, 32 A	FBS 2-6	3030336	50
2-pos. blue, 32 A	FBS 2-6 BU	3036932	50
2-pos. gray, 32 A	FBS 2-6 GY	3032237	50
3-pos. red, 24 A	FBSR 3-6	3001594	50
4-pos. red, 24 A	FBSR 4-6	3001595	50
5-pos. red, 24 A	FBSR 5-6	3001596	50
5-pos. red, 32 A	FBS 5-6	3030349	50
10-pos. red, 32 A	FBS 10-6	3030271	10
20-pos. red, 32 A	FBS 20-6	3030365	10
50-pos. red, 32 A	FBS 50-6	3032224	10
<b>End clamp</b> , to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...			
<b>Test plug</b> , consisting of:			
<b>Metal part</b> for 2.3 mm Ø socket hole and	CLIPFIX 35	3022218	50
	MPS-MT	0201744	10
<b>Insulating sleeve</b> , for MPS metal part	MPS-IH RD	0201676	10
	MPS-IH WH	0201663	10
	MPS-IH BU	0201689	10
	MPS-IH YE	0201692	10
	MPS-IH GN	0201702	10
	MPS-IH GY	0201728	10
	MPS-IH BK	0201731	10
<b>Zack marker strip</b> , unprinted, 10-section: each pack contains enough to label 100 terminal blocks			
10-section	ZB 6:UNBEDRUCKT	1051003	10



1 N/O contact relay base for Miniature power relay



1-changeover-contact relay base with screw connection technology



1-N/O-contact relay base with screw connection technology



Technical data	
250 V AC/DC (contact side) Max. 8 A (depends on application/assembly)	
-40°C ... 85°C (depends on application/assembly)	
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 24 - 16	
-	
6.2 mm 66 mm 93 mm	

Technical data	
250 V AC/DC (contact side) Max. 8 A (depends on application/assembly)	
-40°C ... 85°C (depends on application/assembly)	
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 12	
0.6 Nm	
6.2 mm 82 mm 84 mm	

Technical data	
250 V AC/DC (contact side) Max. 8 A (depends on application/assembly)	
-40°C ... 85°C (depends on application/assembly)	
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 12	
0.6 Nm	
6.2 mm 68 mm 84 mm	

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-0-BPT/1	2901873	10

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-0-BSC/21	2900957	10

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-0-BSC/ 1	2901872	10

Accessories		
FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

Accessories		
FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

Accessories		
FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

# Relay modules

## RIFLINE complete – Industrial relay system

### Plug-in miniature power relays

Plug-in relays with one changeover contact, suitable for RIF-0 and PLC-INTERFACE relay bases.

The advantages:

- Power contacts up to 6 A
- Multi-layer gold contact or power contact
- High degree of protection, RT III (wash-proof), or RT II for relay with one changeover contact with manual operation
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Can be soldered in on PCB



Relay with one changeover contact, max. 6 A



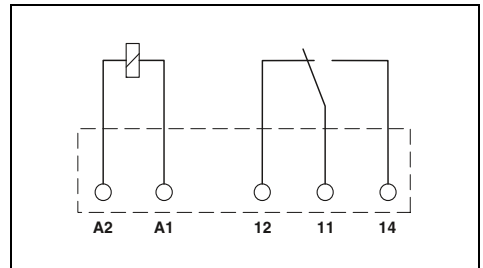
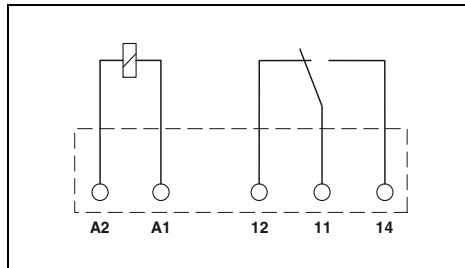
Relay with one changeover contact, with manual operation, max. 6 A

**Notes:**

If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.

For dimensional drawings and perforations for assembly, see page 400

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current	
Minimum switching current	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation)	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Mounting position/mounting	
Dimensions	W / H / D

Technical data	
①	②
See diagram	
14	7
5	5
2.5	2.5
1 PDT	1 PDT
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 A (4 s)	50 mA
10 mA (at 12 V)	1 mA (at 24 V)
4 kV AC (50 Hz, 1 min.)	4 kV AC (50 Hz, 1 min.)
-40°C ... 85°C	-40°C ... 85°C
100% operating factor	100% operating factor
2x 10 <sup>7</sup> cycles	1x 10 <sup>7</sup> cycles
IEC 60664, EN 50178, EN 61810-1	IEC 60664, EN 50178, EN 61810-1
Any / in rows with zero spacing	Any / in rows with zero spacing
5 mm / 28 mm / 15 mm	5 mm / 28 mm / 16 mm

Technical data	
①	②
See diagram	
14	7
5	5
2.5	2.5
1 PDT	1 PDT
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 A (4 s)	50 mA
10 mA (at 12 V)	1 mA (at 24 V)
4 kV AC (50 Hz, 1 min.)	4 kV AC (50 Hz, 1 min.)
-40°C ... 85°C	-40°C ... 85°C
100% operating factor	100% operating factor
1x 10 <sup>7</sup> cycles	1x 10 <sup>7</sup> cycles
IEC 60664, EN 50178, EN 61810-1	IEC 60664, EN 50178, EN 61810-1
Any / in rows with zero spacing	Any / in rows with zero spacing
5 mm / 28 mm / 16 mm	5 mm / 28 mm / 16 mm

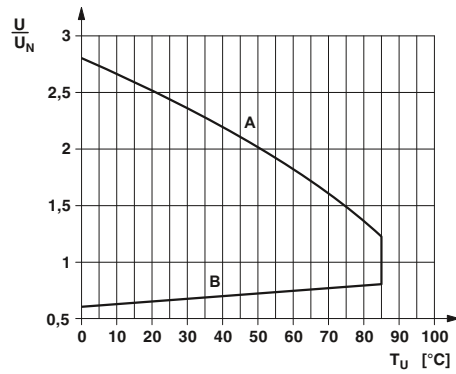
Description	Input voltage $U_N$
Plug-in miniature power relays, with power contacts	① 12 V DC
	② 24 V DC
Plug-in miniature power relays, with multi-layer gold contacts	① 12 V DC
	② 24 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21	2961150	10
REL-MR- 24DC/21	2961105	10
REL-MR- 12DC/21AU	2961163	10
REL-MR- 24DC/21AU	2961121	10

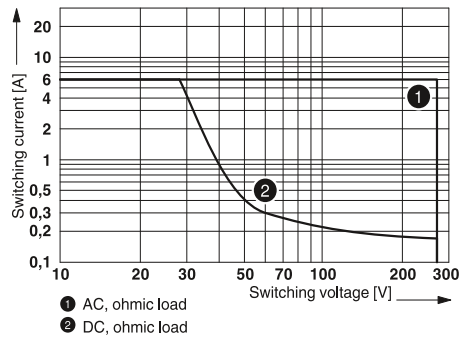
Ordering data		
Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21/MS	2909641	10
REL-MR- 24DC/21/MS	2909642	10
REL-MR- 12DC/21AU/MS	2909644	10
REL-MR- 24DC/21AU/MS	2909645	10

### REL-MR-.../21... (1 changeover contact)

Input voltage range

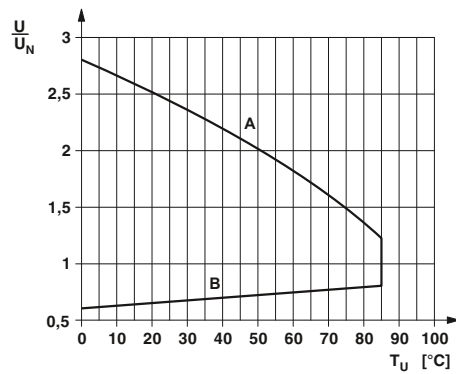


Interrupting rating

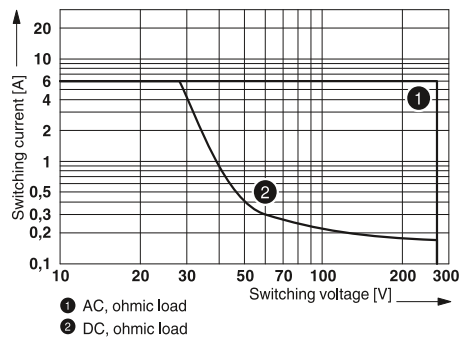


### REL-MR-.../21.../MS (1 changeover contact)

Input voltage range



Interrupting rating





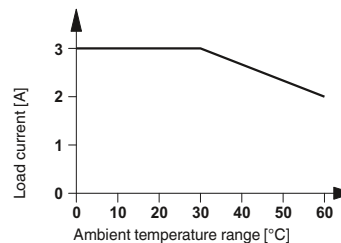


Solid-state relay,  
DC output max. 100 mA

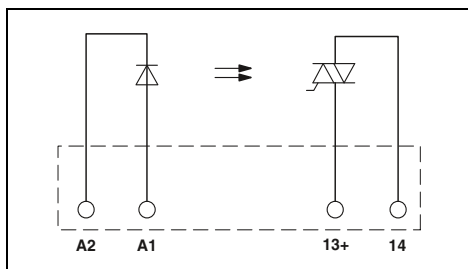
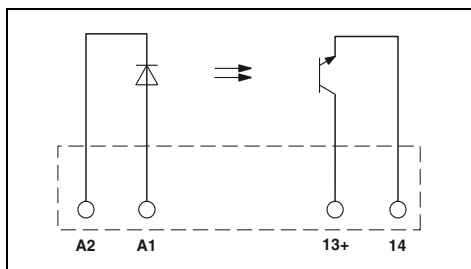
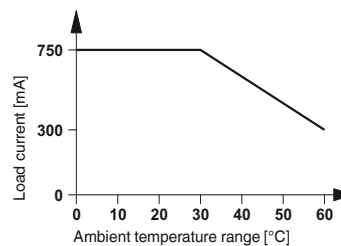


Solid-state relay,  
AC output max. 750 mA

Derating curve for OPT...DC/24DC/2 and PLC-OS.../24DC/2 solid-state relays



Derating curve for OPT...DC/230AC/1 and PLC-OS.../230AC/1 solid-state relays



Technical data

Technical data

①
0.8 -
1.2
16
10
7
20
300
300

①
0.8 -
1.2
10
5
6
6,000
500
10

48 V DC
3 V DC
100 mA
-
-
-
-
2-conductor, floating
-
Reverse polarity protection, surge protection
≤1 V

253 V AC
24 V AC
0.75 A (see derating curve)
10 mA
30 A (10 ms)
<1 mA
0.5
2-conductor floating, zero voltage switch
4.5 A²s
RCV circuit
<1 V

Basic insulation
2.5 kV (50 Hz, 1 min.)
-25°C ... 60°C
100% operating factor
IEC 60664, EN 50178
2 / III
Any / in rows with zero spacing
5 mm / 28 mm / 15 mm

Basic insulation
2.5 kV (50 Hz, 1 min.)
-25°C ... 60°C
100% operating factor
IEC 60664, EN 50178
2 / III
Any / in rows with zero spacing
5 mm / 28 mm / 15 mm

Ordering data

Ordering data

Type	Order No.	Pcs./Pkt.
OPT-24DC/ 48DC/100	2966618	10

Type	Order No.	Pcs./Pkt.
OPT-24DC/230AC/ 1	2967950	10

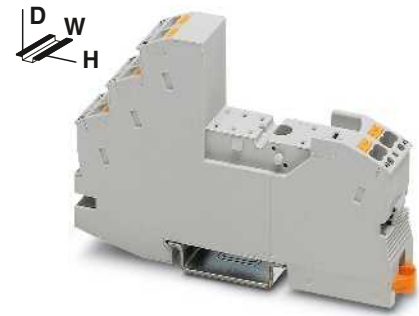
# Relay modules

## RIFLINE complete – Industrial relay system

### Modular RIF-1 relay bases

- Relay bases that can be fitted with 1 or 2 PDT relays or solid-state relays.
- Range of accessories includes:
- Plug-in interference suppression module
  - Plug-in timer module
  - Relay retaining bracket with ejector function and holder for marking material
  - Comprehensive range of marking material
  - Test plug
  - FBS 2-6 plug-in bridges for the input side (A2)
  - FBS 2-8 plug-in bridges for the output side (11/21)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



2-changeover-contact relay base with Push-in connection technology



Nominal voltage  $U_N$   
Nominal current at  $U_N$

General data
Ambient temperature (operation)
Connection data solid/stranded/AWG
Dimensions
Width
Depth with retaining bracket
Height

### Technical data

250 V AC/DC  
Max. 13 A (depends on application/assembly)

-40°C ... 85°C (depends on application/assembly)

0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16

16 mm

75 mm

96 mm

Description
<b>RIF-1 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>RIF-1 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>Relay retaining bracket</b> , with ejector function and holder for marking material, suitable for RIF-1 relay base
- for 16 mm high miniature power and solid-state relays
- for 25 mm high miniature power relays
<b>Relay retaining bracket</b> , wire model, suitable for RIF-1 relay base
- for 16 mm high miniature power and solid-state relays
- for 25 mm high miniature power relays

### Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-BPT/2X21	2900931	10

Plug-in bridge	
2-pos. red, 32 A	
2-pos. red, 24 A	
2-pos. red, 32 A	
2-pos. blue, 32 A	
2-pos. gray, 32 A	
2-pos. red, 41 A	
2-pos. blue, 41 A	
2-pos. gray, 41 A	
<b>End clamp</b> , to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...	
<b>Test plug</b> , consisting of:	
<b>Metal part</b> for 2.3 mm Ø socket hole and	gray
<b>Insulating sleeve</b> , for MPS metal part	red white blue yellow green gray black
<b>Zack marker strip</b> , unprinted	
10-section	
5-section	
<b>Double marker carrier for ZB 5</b>	

### Accessories

FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBSR 2-8	3033808	10
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBS 2-8	3030284	10
FBS 2-8 BU	3032567	10
FBS 2-8 GY	3032541	10
7042		
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100





# Relay modules

## RIFLINE complete – Industrial relay system

### Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 changeover contacts, suitable for the RIF-1 and PLC-INTERFACE relay bases.

The advantages:

- Power contacts up to 16 A
- Multi-layer gold contact or power contact
- High degree of protection up to RT III depending on type (wash-proof)

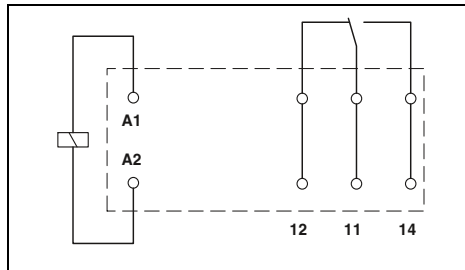


Relay with one changeover contact, 16 A, maximum



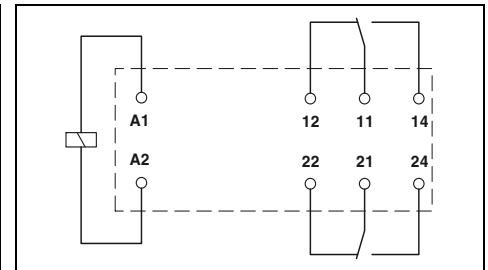
Relay with two changeover contacts, 2 x 8 A, maximum

**Notes:**  
**Notes:**  
 If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.  
 When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



Technical data

	①	②	③	④	⑤	⑥	⑦	⑧
Input data	See diagram							
Permissible range (with reference to $U_N$ )	33	17	8.7	8.2	4.1	32	7	3
Typical input current at $U_N$ [mA]	7	7	7	7	7			
Typical response time at $U_N$ [ms]						3 - 12	3 - 12	3 - 12
Typical response time at $U_N$ (depending on phase relation) [ms]								
Typical release time at $U_N$ [ms]	3	3	3	3	3			
Typical release time at $U_N$ (depending on phase relation) [ms]						2 - 9	2 - 9	2 - 9
Output data								
Contact type	1 PDT				1 PDT			
Contact material	AgNi				AgNi, hard gold-plated			
Max. switching voltage	250 V AC/DC				30 V AC / 36 V DC			
Minimum switching voltage	12 V (at 10 mA)				100 mV (at 10 mA)			
Limiting continuous current	16 A				50 mA			
Maximum switch-on current AC	25 A (20 ms)				50 mA			
Maximum switch-on current DC	50 A (20 ms)				50 mA			
Minimum switching current	10 mA (at 12 V)				1 mA (at 24 V)			
General data								
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)							
Test voltage (contact / contact)	-							
Ambient temperature (operation), AC	-40°C ... 85°C							
Ambient temperature (operation), DC	-40°C ... 85°C							
Mechanical service life, AC	1x 10 <sup>7</sup> cycles							
Mechanical service life, DC	3x 10 <sup>7</sup> cycles							
Standards/regulations	IEC 60664, EN 50178, EN 61810-1							



Technical data

	①	②	③	④	⑤	⑥	⑦	⑧
Input data	See diagram							
Permissible range (with reference to $U_N$ )	33	17	8.7	8.2	4.1	32	7	3
Typical input current at $U_N$ [mA]	7	7	7	7	7			
Typical response time at $U_N$ [ms]						3 - 12	3 - 12	3 - 12
Typical response time at $U_N$ (depending on phase relation) [ms]								
Typical release time at $U_N$ [ms]	3	3	3	3	3			
Typical release time at $U_N$ (depending on phase relation) [ms]						2 - 9	2 - 9	2 - 9
Output data								
Contact type	2 PDT				2 PDT			
Contact material	AgNi				AgNi, hard gold-plated			
Max. switching voltage	250 V AC/DC				30 V AC / 36 V DC			
Minimum switching voltage	5 V (at 10 mA)				100 mV (at 10 mA)			
Limiting continuous current	8 A				50 mA			
Maximum switch-on current AC	12 A (20 ms)				50 mA			
Maximum switch-on current DC	25 A (20 ms)				50 mA			
Minimum switching current	10 mA (at 5 V)				1 mA (at 24 V)			
General data								
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)							
Test voltage (contact / contact)	2.5 kV AC (50 Hz, 1 min.)							
Ambient temperature (operation), AC	-40°C ... 85°C							
Ambient temperature (operation), DC	-40°C ... 85°C							
Mechanical service life, AC	1x 10 <sup>7</sup> cycles							
Mechanical service life, DC	3x 10 <sup>7</sup> cycles							
Standards/regulations	IEC 60664, EN 50178, EN 61810-1							

Ordering data

Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21HC	2961309	10
REL-MR- 24DC/21HC	2961312	10
REL-MR- 48DC/21HC	2834821	10
REL-MR- 60DC/21HC	2961325	10
REL-MR-110DC/21HC	2961338	10
REL-MR- 24AC/21HC	2961406	10
REL-MR-120AC/21HC	2961419	10
REL-MR-230AC/21HC	2961422	10
REL-MR- 12DC/21HC AU	2961532	10
REL-MR- 24DC/21HC AU	2961545	10
REL-MR-110DC/21HC AU	2961561	10
REL-MR- 24AC/21HC AU	2961503	10
REL-MR-120AC/21HC AU	2961516	10
REL-MR-230AC/21HC AU	2961529	10

Ordering data

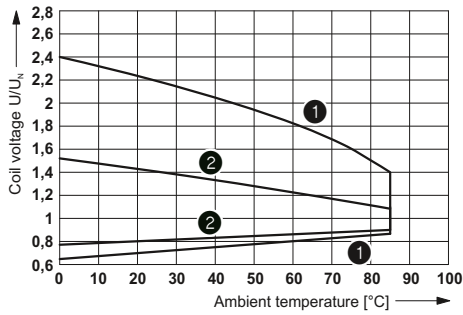
Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21-21	2961257	10
REL-MR- 24DC/21-21	2961192	10
REL-MR- 48DC/21-21	2834834	10
REL-MR- 60DC/21-21	2961273	10
REL-MR-110DC/21-21	2961202	10
REL-MR- 24AC/21-21	2961435	10
REL-MR-120AC/21-21	2961448	10
REL-MR-230AC/21-21	2961451	10
REL-MR- 12DC/21-21AU	2961299	10
REL-MR- 24DC/21-21AU	2961215	10
REL-MR- 48DC/21-21AU	2834847	10
REL-MR- 60DC/21-21AU	2961286	10
REL-MR-110DC/21-21AU	2961228	10
REL-MR- 24AC/21-21AU	2961464	10
REL-MR-120AC/21-21AU	2961477	10
REL-MR-230AC/21-21AU	2961480	10

Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$ [mA]	33
Typical response time at $U_N$ [ms]	7
Typical response time at $U_N$ (depending on phase relation) [ms]	7
Typical release time at $U_N$ [ms]	3
Typical release time at $U_N$ (depending on phase relation) [ms]	3
Output data	
Contact type	1 PDT
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V (at 10 mA)
Limiting continuous current	16 A
Maximum switch-on current AC	25 A (20 ms)
Maximum switch-on current DC	50 A (20 ms)
Minimum switching current	10 mA (at 12 V)
General data	
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact / contact)	-
Ambient temperature (operation), AC	-40°C ... 85°C
Ambient temperature (operation), DC	-40°C ... 85°C
Mechanical service life, AC	1x 10 <sup>7</sup> cycles
Mechanical service life, DC	3x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178, EN 61810-1

Description	Input voltage $U_N$
<b>Plug-in miniature power relays, with power contacts</b>	
①	12 V DC
②	24 V DC
③	48 V DC
④	60 V DC
⑤	110 V DC
⑥	24 V AC
⑦	120 V AC
⑧	230 V AC
<b>Plug-in miniature power relays, with multi-layer gold contacts</b>	
①	12 V DC
②	24 V DC
③	48 V DC
④	60 V DC
⑤	110 V DC
⑥	24 V AC
⑦	120 V AC
⑧	230 V AC

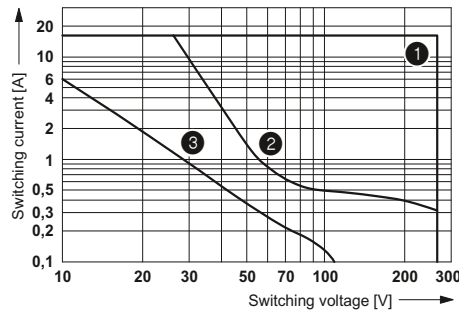
### REL-MR...21HC... (1 changeover contact)

Operating voltage range



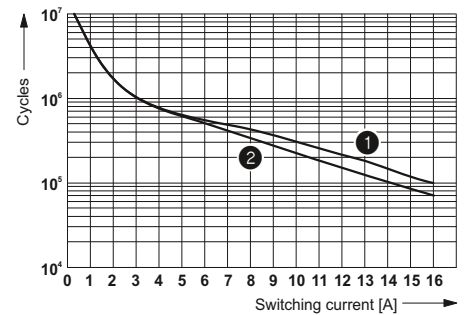
- 1 DC coils
- 2 AC coils

Interrupting rating



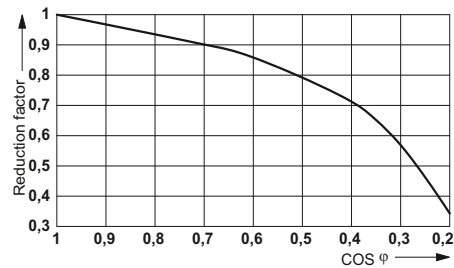
- 1 AC, ohmic load
- 2 DC, ohmic load
- 3 DC, L/R = 40 ms

Electrical service life



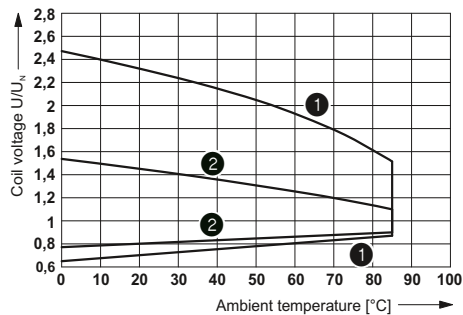
- 1 250 V AC, ohmic load (DC coils)
- 2 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



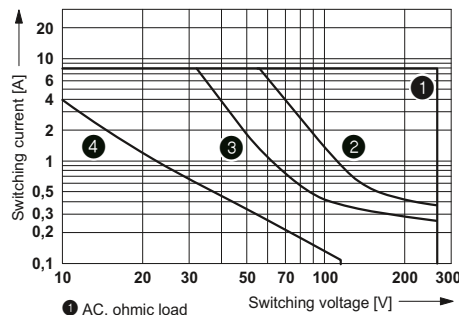
### REL-MR...21-21... (2 changeover contacts)

Operating voltage range



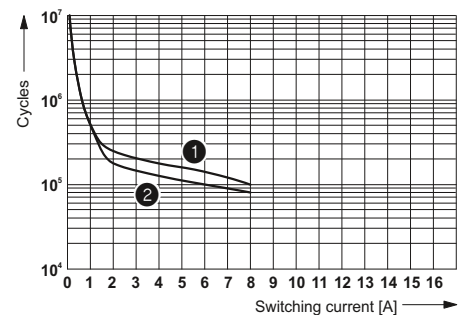
- 1 DC coils
- 2 AC coils

Interrupting rating



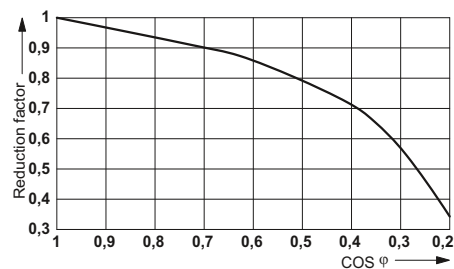
- 1 AC, ohmic load
- 2 DC, ohmic load, contacts in series
- 3 DC, ohmic load
- 4 DC, L/R = 40 ms

Electrical service life



- 1 250 V AC, ohmic load (DC coils)
- 2 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



# Relay modules

## RIFLINE complete – Industrial relay system

### Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 changeover contacts, compatible for the RIF-1 relay base.

The advantages:

- Switching current of up to 16 A
- With lockable manual operation
- Mechanical switch position indicator
- Integrated status LED
- Multi-layer gold contact or power contact
- DC types with integrated free-wheeling diode
- Can be soldered in on PCB

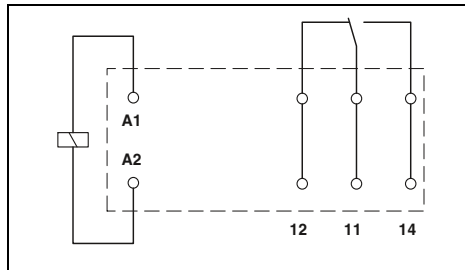


Relay with one changeover contact with manual operation, 16 A, maximum



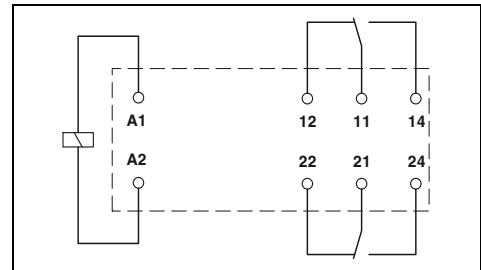
Relay with two changeover contacts with manual operation, 2 x 8 A, maximum

**Notes:**  
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



**Technical data**

①	②	③	④
See diagram			
18	32	7	3.5
9		3 - 12	3 - 12
6		2 - 8	2 - 8



**Technical data**

①	②	③	④
See diagram			
18	32	7	3.5
9		3 - 12	3 - 12
6		2 - 8	2 - 8

Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical response time at $U_N$ (depending on phase relation)	[ms]
Typical release time at $U_N$	[ms]
Typical release time at $U_N$ (depending on phase relation)	[ms]
Output data	
Contact type	1 PDT
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V (at 10 mA)
Limiting continuous current	16 A
Maximum switch-on current AC	32 A (20 ms)
Maximum switch-on current DC	32 A (20 ms)
Minimum switching current	10 mA (at 12 V)
General data	
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact / contact)	-
Ambient temperature (operation), AC	-40°C ... 70°C
Ambient temperature (operation), DC	-40°C ... 70°C
Mechanical service life, AC	5x 10 <sup>6</sup> cycles
Mechanical service life, DC	5x 10 <sup>6</sup> cycles
Standards/regulations	EN 61810-1, VDE 0435-201, EN 50178

Technical data	
Contact type	1 PDT
Contact material	AgNi, hard gold-plated
Max. switching voltage	30 V AC / 36 V DC
Minimum switching voltage	12 V (at 1 mA)
Limiting continuous current	50 mA
Maximum switch-on current AC	50 mA
Maximum switch-on current DC	50 mA
Minimum switching current	1 mA (at 12 V)
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact / contact)	-
Ambient temperature (operation), AC	-40°C ... 70°C
Ambient temperature (operation), DC	-40°C ... 70°C
Mechanical service life, AC	5x 10 <sup>6</sup> cycles
Mechanical service life, DC	5x 10 <sup>6</sup> cycles
Standards/regulations	EN 61810-1, VDE 0435-201, EN 50178

Technical data	
Contact type	2 PDT
Contact material	AgNi, hard gold-plated
Max. switching voltage	30 V AC / 36 V DC
Minimum switching voltage	12 V (at 1 mA)
Limiting continuous current	50 mA
Maximum switch-on current AC	50 mA
Maximum switch-on current DC	50 mA
Minimum switching current	1 mA (at 12 V)
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact / contact)	5 kV AC (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40°C ... 70°C
Ambient temperature (operation), DC	-40°C ... 70°C
Mechanical service life, AC	5x 10 <sup>6</sup> cycles
Mechanical service life, DC	5x 10 <sup>6</sup> cycles
Standards/regulations	EN 61810-1, VDE 0435-201, EN 50178

**Ordering data**

Type	Order No.	Pcs./Pkt.
REL-MR- 24DC/21HC/MS	2987888	10
REL-MR- 24AC/21HC/MS	2987891	10
REL-MR-120AC/21HC/MS	2987901	10
REL-MR-230AC/21HC/MS	2987914	10
REL-MR- 24DC/21HC AU/MS	2987927	10
REL-MR-230AC/21HC AU/MS	2987930	10

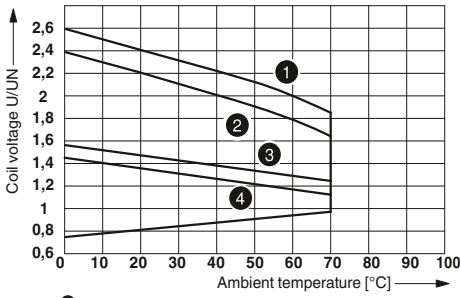
**Ordering data**

Type	Order No.	Pcs./Pkt.
REL-MR- 24DC/21-21/MS	2987943	10
REL-MR- 24AC/21-21/MS	2987956	10
REL-MR-120AC/21-21/MS	2987969	10
REL-MR-230AC/21-21/MS	2987972	10
REL-MR- 24DC/21-21AU/MS	2987985	10
REL-MR-230AC/21-21AU/MS	2987998	10

Description	Input voltage $U_N$
<b>Plug-in miniature power relays, with power contacts</b>	
- Status LED, freewheeling diode A1+, A2-	① 24 V DC
- Status LED	② 24 V AC
- Status LED	③ 120 V AC
- Status LED	④ 230 V AC
<b>Plug-in miniature power relays, with multi-layer gold contacts, with manual operation, mechanical switch position indicator</b>	
- Status LED, freewheeling diode A1+, A2-	① 24 V DC
- Status LED	⑤ 230 V AC

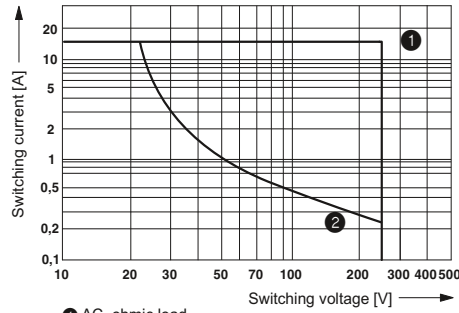
### REL-MR...21HC...MS (1 changeover contact)

Operating voltage range



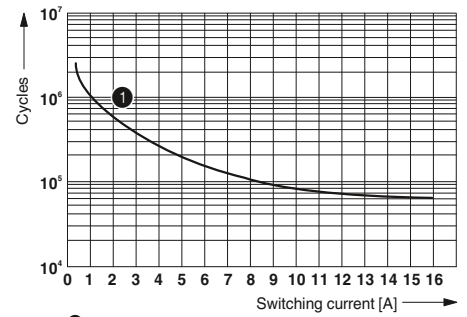
- 1 DC coils, 0 A contact current
- 2 DC coils, 16 A contact current
- 3 AC coils, 0 A contact current
- 4 AC coils, 16 A contact current

Interrupting rating



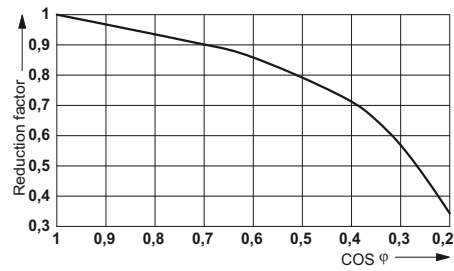
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



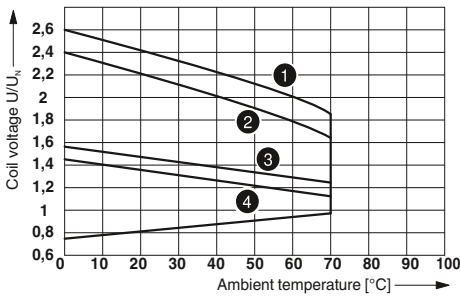
- 1 250 V AC, ohmic load

Service life reduction factor with various cos phi



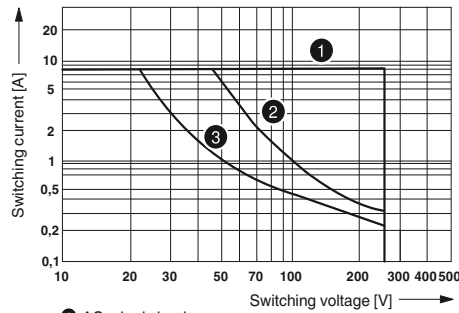
### REL-MR...21-21...MS (2 changeover contacts)

Operating voltage range



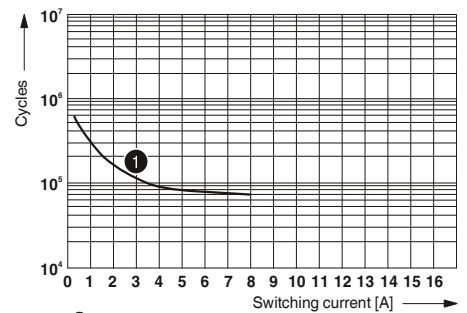
- 1 DC coils, 0 A contact current
- 2 DC coils, 8 A contact current
- 3 AC coils, 0 A contact current
- 4 AC coils, 8 A contact current

Interrupting rating



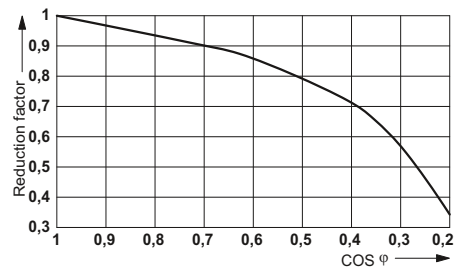
- 1 AC, ohmic load
- 2 DC, ohmic load, contacts in series
- 3 DC, ohmic load

Electrical service life



- 1 250 V AC, ohmic load

Service life reduction factor with various cos phi



# Relay modules

## RIFLINE complete – Industrial relay system

### Non-polarized plug-in miniature power relays

Non-polarized plug-in miniature power relays with 1 or 2 changeover contacts, compatible with the RIF-1 relay base.

The advantages:

- Switching current of up to 16 A
- With lockable manual operation
- Mechanical switch position indicator
- Multi-layer power contact
- Can be soldered in on PCB
- Special voltages (100 and 200 V AC)

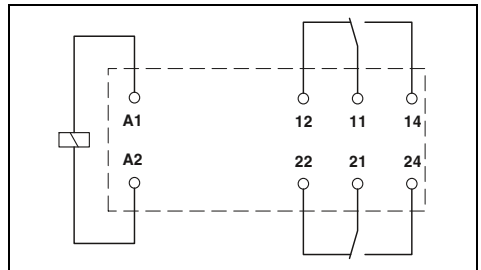
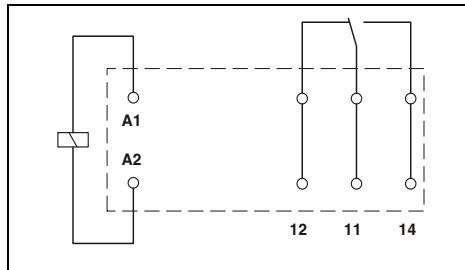
**Notes:**  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



Relay with one changeover contact (non-polarized) with manual operation, 16 A, maximum



Relay with two changeover contacts (non-polarized) with manual operation, 2 x 8 A, maximum



#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	See diagram		
Typical input current at $U_N$	17	8	4
Typical response time at $U_N$	9		
Typical response time at $U_N$ (depending on phase relation)		3 - 12	3 - 12
Typical release time at $U_N$	6		
Typical release time at $U_N$ (depending on phase relation)		2 - 8	2 - 8
Output data			
Contact type	1 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	12 V (at 10 mA)		
Limiting continuous current	16 A		
Maximum switch-on current AC	32 A (20 ms)		
Maximum switch-on current DC	32 A (20 ms)		
Minimum switching current	10 mA (at 12 V)		
General data			
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40°C ... 70°C		
Ambient temperature (operation), DC	-40°C ... 70°C		
Mechanical service life, AC	5x 10 <sup>6</sup> cycles		
Mechanical service life, DC	5x 10 <sup>6</sup> cycles		
Standards/regulations	IEC 61810, IEC 60664		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Non-polarized plug-in miniature power relays, with power contacts	① 24 V DC	REL-MR-BL-24DC/21HC/MS	2908180	10
	② 100 V AC	REL-MR-BL-100AC/21HC/MS	2908179	10
	③ 200 V AC	REL-MR-BL-200AC/21HC/MS	2908178	10

#### Technical data

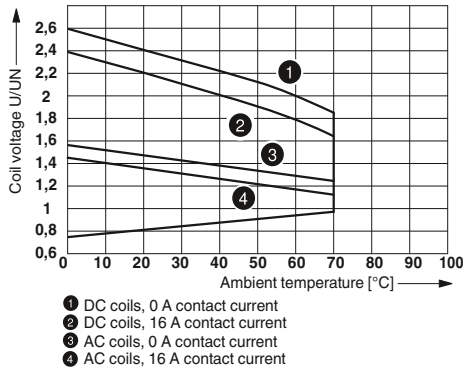
Input data	①	②	③
Permissible range (with reference to $U_N$ )	See diagram		
Typical input current at $U_N$	17	8	4
Typical response time at $U_N$	9		
Typical response time at $U_N$ (depending on phase relation)		3 - 12	3 - 12
Typical release time at $U_N$	6		
Typical release time at $U_N$ (depending on phase relation)		2 - 8	2 - 8
Output data			
Contact type	2 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	12 V (at 10 mA)		
Limiting continuous current	8 A		
Maximum switch-on current AC	16 A (20 ms)		
Maximum switch-on current DC	16 A (20 ms)		
Minimum switching current	10 mA (at 12 V)		
General data			
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40°C ... 70°C		
Ambient temperature (operation), DC	-40°C ... 70°C		
Mechanical service life, AC	5x 10 <sup>6</sup> cycles		
Mechanical service life, DC	5x 10 <sup>6</sup> cycles		
Standards/regulations	IEC 61810, IEC 60664		

#### Ordering data

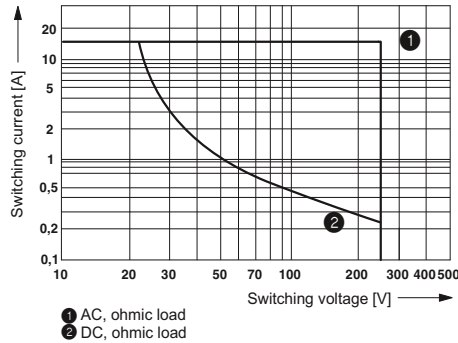
Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Non-polarized plug-in miniature power relays, with power contacts	① 24 V DC	REL-MR-BL-24DC/21-21/MS	2908181	10
	② 100 V AC	REL-MR-BL-100AC/21-21/MS	2908183	10
	③ 200 V AC	REL-MR-BL-200AC/21-21/MS	2908182	10

### REL-MR-BL...21HC/MS (1 changeover contact)

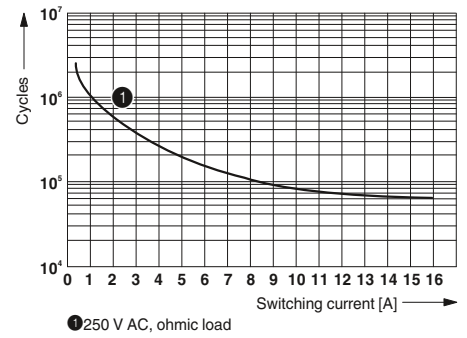
Operating voltage range



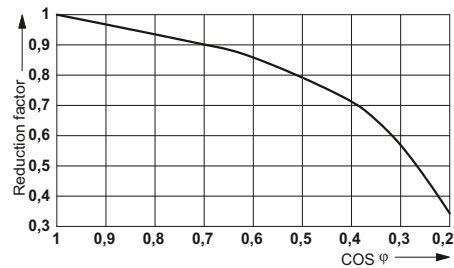
Interrupting rating



Electrical service life

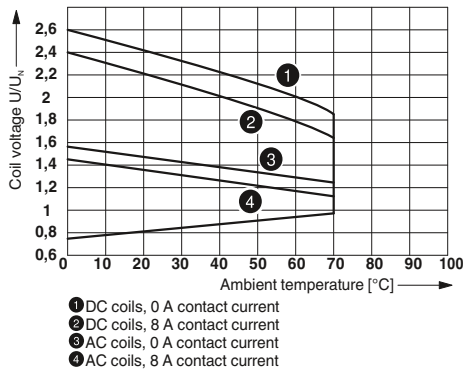


Service life reduction factor with various cos phi

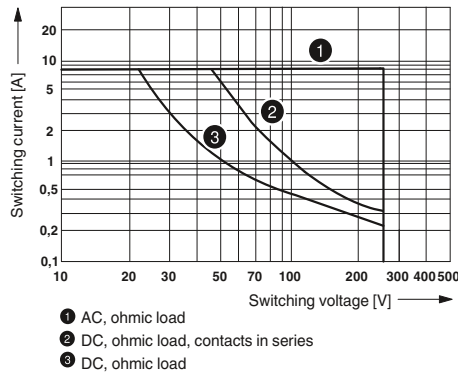


### REL-MR-BL...21-21/MS (2 changeover contacts)

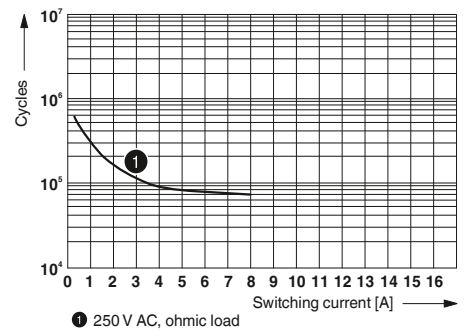
Operating voltage range



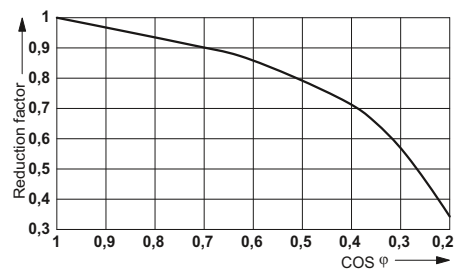
Interrupting rating



Electrical service life



Service life reduction factor with various cos phi



# Relay modules

## RIFLINE complete – Industrial relay system

### Plug-in solid-state relays

Plug-in solid-state relays are compatible for both relay bases RIF-1 and PLC-INTERFACE.

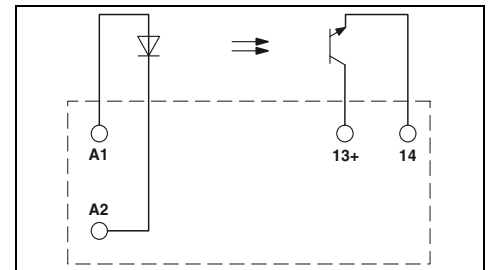
The advantages:

- Switching current of up to 5 A
- RT III seal (wash-proof)
- Vibration- and shock-resistant
- Wear-free and long-lasting
- Zero voltage switch at AC output
- Can be soldered in on PCB

Notes:
For dimensional drawings and perforations for assembly, see page 401
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



Solid-state relay,  
DC output max. 5 A



Input data	
Permissible range (with reference to $U_N$ )	
Switching level	1 signal ("H") [V DC] $\geq$ 0 signal ("L") [V DC] $\leq$
Typical input current at $U_N$	[mA]
Typical switch-on time at $U_N$	[ $\mu$ s]
Typical switch-off time at $U_N$	[ $\mu$ s]
Transmission frequency $f_{limit}$	[Hz]
Output data	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	5 A (see derating curve)
Minimum load current	-
Maximum switch-on current	15 A (10 ms)
Leakage current in off state	-
Output circuit	2-conductor, floating
Max. load value	-
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	$\leq$ 200 mV
General data	
Rated surge voltage	Basic insulation
Test voltage input/output	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25°C ... 60°C
Nominal operating mode	100% operating factor
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	Any / in rows with zero spacing
Dimensions	W / H / D 12.7 mm / 29 mm / 15.7 mm

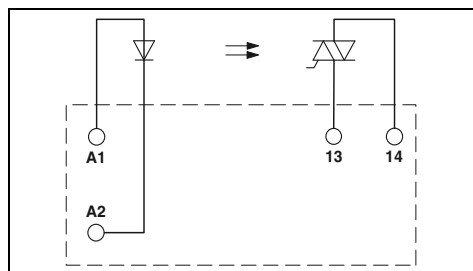
Technical data		
①	②	③
0.8 - 1.2	0.8 - 1.2	0.9 - 1.1
2.5	16	35
0.8	10	20
9	7	3
10	20	25
400	400	400
300	300	300

Ordering data		
Type	Order No.	Pcs./Pkt.
OPT-5DC/24DC/ 5	2982113	10
OPT-24DC/24DC/ 5	2982100	10
OPT-60DC/24DC/ 5	2982126	10

Description	Input voltage $U_N$
<b>Plug-in solid-state relays</b>	
Solid-state power relays	① 5 V DC
Solid-state power relays	② 24 V DC
Solid-state power relays	③ 60 V DC



Solid-state relay,  
AC output max. 2 A



Technical data

①	②
0.8 -	0.8 -
1.2	1.2
3	18
1	8.4
15	7
10,000	10,000
10,000	10,000
10	10

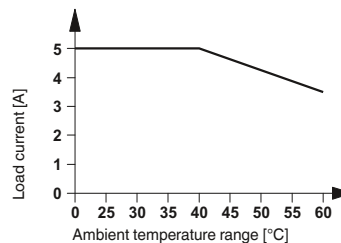
253 V AC  
 24 V AC  
 2 A (see derating curve)  
 25 mA  
 30 A (10 ms)  
 <1 mA  
 2-conductor floating, zero voltage switch  
 4 A<sup>2</sup>s (tp = 10 ms, at 25°C)  
 Surge protection  
 ≤1 V

Basic insulation  
 2.5 kV (50 Hz, 1 min.)  
 -25°C ... 60°C  
 100% operating factor  
 IEC 60664, EN 50178  
 2 / III  
 Any / see derating curve  
 12.7 mm / 29 mm / 15.7 mm

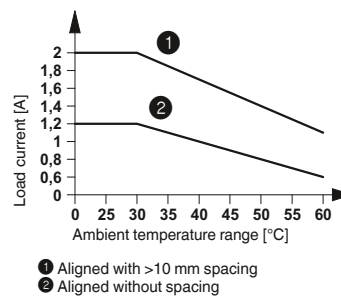
Ordering data

Type	Order No.	Pcs./Pkt.
OPT-5DC/230AC/ 2	2982168	10
OPT-24DC/230AC/ 2	2982171	10

Derating curve for OPT...DC/24DC/5 solid-state relays



Derating curve for OPT...DC/230AC/2 solid-state relays



- ① Aligned with >10 mm spacing
- ② Aligned without spacing



# Relay modules

## RIFLINE complete – Industrial relay system

### Modular RIF-2 relay bases

- Relay bases for assembly with 2 or 4-changeover-contact industrial relay.
- Range of accessories includes:
- Plug-in interference suppression module
  - Plug-in timer module
  - Relay retaining bracket with ejector function and holder for marking material
  - Comprehensive range of marking material
  - Test plug
  - FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



**4-changeover-contact relay base with Push-in connection technology for industrial relays**



Nominal voltage  $U_N$   
Nominal current at  $U_N$

General data
Ambient temperature (operation)
Connection data solid/stranded/AWG
Dimensions
Width
Depth with retaining bracket
Height

Technical data
250 V AC/DC
Max. 12 A (depends on application/assembly)

-40°C ... 85°C (depends on application/assembly)
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
31 mm
75 mm
96 mm

Description
<b>RIF-2 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>RIF-2 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>Plastic relay retaining bracket</b> , with ejector function and holder for marking material, suitable for RIF-2 relay base
<b>Reinforced plastic relay retaining bracket</b> , with ejector function and holder for marking material, compatible for RIF-2 relay base
<b>Relay retaining bracket</b> , wire model, suitable for RIF-2 relay base

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-2-BPT/4X21	2900934	10

<b>Plug-in bridge</b> 2-pos. red, 32 A 2-pos. red, 24 A 2-pos. blue, 32 A 2-pos. gray, 32 A
<b>End clamp</b> , to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...
<b>Test plug</b> , consisting of: <b>Metal part</b> for 2.3 mm Ø socket hole and <b>Insulating sleeve</b> , for MPS metal part
<b>Zack marker strip, unprinted</b> 10-section 5-section
<b>Double marker carrier for ZB 5</b>

Accessories		
FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100



# Relay modules

## RIFLINE complete – Industrial relay system

### Plug-in industrial relays

Plug-in industrial relays with 2 or 4 changeover contacts, compatible for RIF-2 relay base.

The advantages:

- With lockable manual operation
- Mechanical switch position indicator
- Integrated status LED
- Multi-layer gold contact or power contact
- DC types with integrated free-wheeling diode

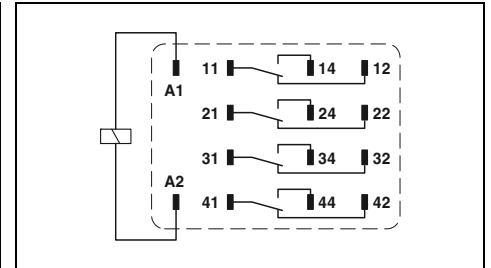
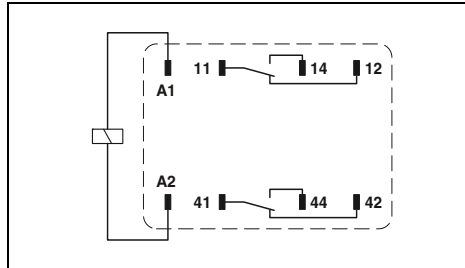


Industrial relay with two changeover contacts with manual operation, 2 x 12 A, maximum



Industrial relay with four changeover contacts with manual operation, 4 x 6 A, maximum

**Notes:**  
For more voltages, see phoenixcontact.com/products  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272  
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to $U_N$ )		See diagram							
Typical input current at $U_N$	[mA]	78	42	8	7.7	4	66	13	6.5
Typical response time at $U_N$	[ms]	13	13	13	13	13			
Typical response time at $U_N$ (depending on phase relation)	[ms]						5 - 15	5 - 15	5 - 15
Typical release time at $U_N$	[ms]	14	14	14	14	14			
Typical release time at $U_N$ (depending on phase relation)	[ms]						5 - 20	5 - 20	5 - 20
Output data									
Contact type		2 PDT							
Contact material		AgNi							
Max. switching voltage		250 V AC/DC							
Minimum switching voltage		5 V (at 24 mA)							
Limiting continuous current		12 A							
Maximum switch-on current AC		30 A (20 ms, N/O contact)							
Maximum switch-on current DC		30 A (20 ms, N/O contact)							
Minimum switching current		5 mA (at 24 V)							
General data									
Test voltage (winding/contact)		2.5 kV <sub>ms</sub> (50 Hz, 1 min.)							
Ambient temperature (operation), AC		-40°C ... 55°C							
Ambient temperature (operation), DC		-40°C ... 70°C							
Mechanical service life, AC		Approx. 2x 10 <sup>7</sup> cycles							
Mechanical service life, DC		Approx. 2x 10 <sup>7</sup> cycles							
Standards/regulations		IEC 60664, IEC 61810							

Technical data		①	②	③	④	⑤	⑥	⑦	⑧
See diagram									
Typical input current at $U_N$	[mA]	78	42	8	7.7	4	66	13	6.5
Typical response time at $U_N$	[ms]	13	13	13	13	13			
Typical response time at $U_N$ (depending on phase relation)	[ms]						5 - 15	5 - 15	5 - 15
Typical release time at $U_N$	[ms]	14	14	14	14	14			
Typical release time at $U_N$ (depending on phase relation)	[ms]						5 - 20	5 - 20	5 - 20
Output data									
Contact type		2 PDT				4 PDTs			
Contact material		AgNi				AgNi, hard gold-plated			
Max. switching voltage		250 V AC/DC				30 V AC / 36 V DC			
Minimum switching voltage		5 V (at 24 mA)				2 V (at 24 mA)			
Limiting continuous current		12 A				50 mA			
Maximum switch-on current AC		30 A (20 ms, N/O contact)				50 mA			
Maximum switch-on current DC		30 A (20 ms, N/O contact)				50 mA			
Minimum switching current		5 mA (at 24 V)				2 mA (24 V DC)			
General data									
Test voltage (winding/contact)		2.5 kV <sub>ms</sub> (50 Hz, 1 min.)							
Ambient temperature (operation), AC		-40°C ... 55°C							
Ambient temperature (operation), DC		-40°C ... 70°C							
Mechanical service life, AC		Approx. 2x 10 <sup>7</sup> cycles							
Mechanical service life, DC		Approx. 2x 10 <sup>7</sup> cycles							
Standards/regulations		IEC 60664, IEC 61810							

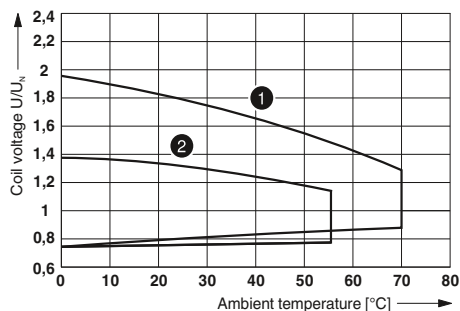
Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Plug-in industrial relays, with power contacts</b>				
With freewheeling diode	① 12 V DC	REL-IR2/LDP- 12DC/2X21	2903659	10
With freewheeling diode	② 24 V DC	REL-IR2/LDP- 24DC/2X21	2903660	10
With freewheeling diode	③ 110 V DC	REL-IR2/LDP-110DC/2X21	2903663	10
With freewheeling diode	④ 125 V DC	REL-IR2/LDP-125DC/2X21	2903664	10
With freewheeling diode	⑤ 220 V DC	REL-IR2/LDP-220DC/2X21	2903665	10
	⑥ 24 V AC	REL-IR2/L- 24AC/2X21	2903666	10
	⑦ 120 V AC	REL-IR2/L-120AC/2X21	2903667	10
	⑧ 230 V AC	REL-IR2/L-230AC/2X21	2903668	10
<b>Plug-in industrial relays, with multi-layer gold contacts</b>				
With freewheeling diode	① 12 V DC			
With freewheeling diode	② 24 V DC			
With freewheeling diode	③ 110 V DC			
With freewheeling diode	④ 125 V DC			
With freewheeling diode	⑤ 220 V DC			
	⑥ 24 V AC			
	⑦ 120 V AC			
	⑧ 230 V AC			

Ordering data		Type	Order No.	Pcs./Pkt.
<b>Ordering data</b>				
Type	Order No.	Pcs./Pkt.		
REL-IR2/LDP- 12DC/2X21	2903659	10		
REL-IR2/LDP- 24DC/2X21	2903660	10		
REL-IR2/LDP-110DC/2X21	2903663	10		
REL-IR2/LDP-125DC/2X21	2903664	10		
REL-IR2/LDP-220DC/2X21	2903665	10		
REL-IR2/L- 24AC/2X21	2903666	10		
REL-IR2/L-120AC/2X21	2903667	10		
REL-IR2/L-230AC/2X21	2903668	10		

Ordering data		Type	Order No.	Pcs./Pkt.
<b>Ordering data</b>				
Type	Order No.	Pcs./Pkt.		
REL-IR4/LDP- 12DC/4X21	2903676	10		
REL-IR4/LDP- 24DC/4X21	2903677	10		
REL-IR4/LDP-110DC/4X21	2903680	10		
REL-IR4/LDP-125DC/4X21	2903681	10		
REL-IR4/LDP-220DC/4X21	2903682	10		
REL-IR4/L- 24AC/4X21	2903686	10		
REL-IR4/L-120AC/4X21	2903687	10		
REL-IR4/L-230AC/4X21	2903688	10		
REL-IR4/LDP- 12DC/4X21AU	2903669	10		
REL-IR4/LDP- 24DC/4X21AU	2903670	10		
REL-IR4/LDP-110DC/4X21AU	2903673	10		
REL-IR4/LDP-125DC/4X21AU	2903674	10		
REL-IR4/LDP-220DC/4X21AU	2903675	10		
REL-IR4/L- 24AC/4X21AU	2903683	10		
REL-IR4/L-120AC/4X21AU	2903684	10		
REL-IR4/L-230AC/4X21AU	2903685	10		

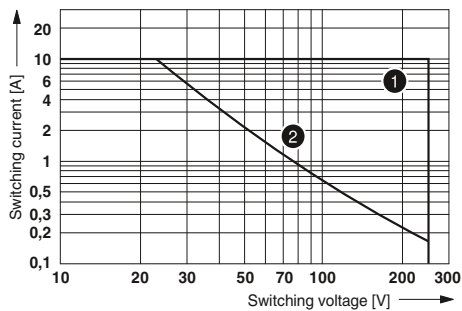
## REL-IR2... (2 changeover contacts)

Operating voltage range



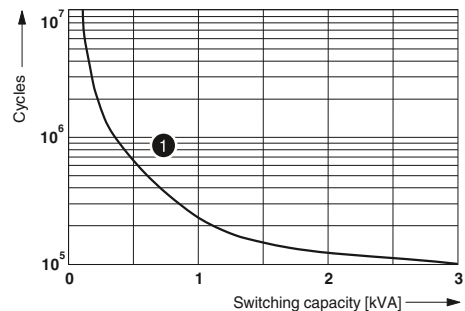
- ① DC coils
- ② AC coils

Interrupting rating



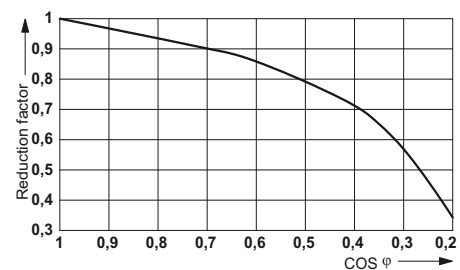
- ① AC, ohmic load
- ② DC, ohmic load

Electrical service life



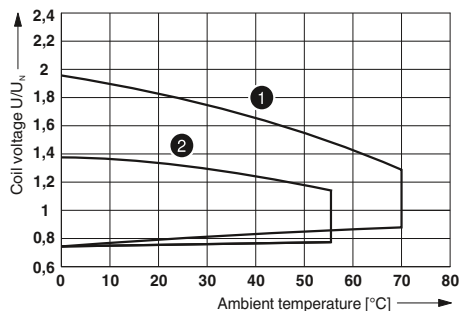
- ① 250 V AC, ohmic load

Service life reduction factor



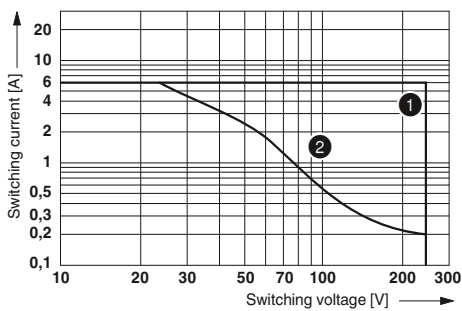
## REL-IR4... (4 changeover contacts)

Operating voltage range



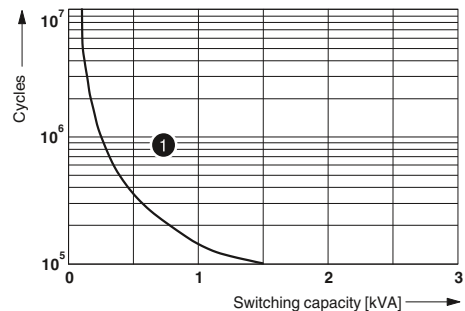
- ① DC coils
- ② AC coils

Interrupting rating



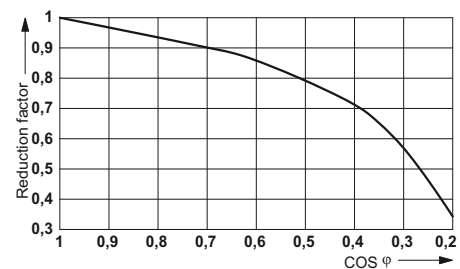
- ① AC, ohmic load
- ② DC, ohmic load

Electrical service life



- ① 250 V AC, ohmic load

Service life reduction factor



# Relay modules

## RIFLINE complete – Industrial relay system

### Non-polarized plug-in industrial relays

Non-polarized plug-in industrial relays with 2 or 4 changeover contacts, compatible with RIF-2 relay base.

The advantages:

- Switching current of up to 12 A
- With lockable manual operation
- Mechanical switch position indicator
- Special voltages (100 and 200 V AC)

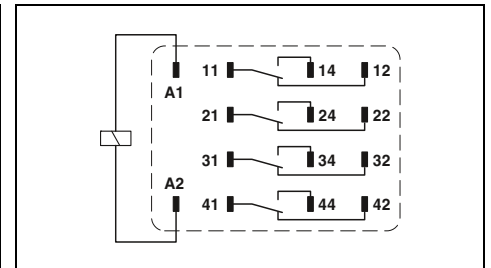
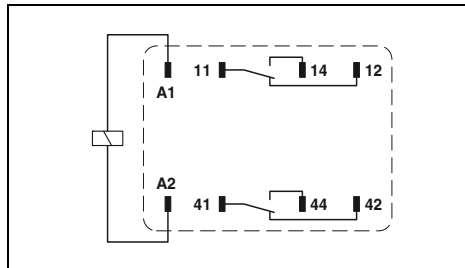
**Notes:**  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



**Industrial relay with two changeover contacts (non-polarized) with manual operation, 2 x 12 A, maximum**



**Industrial relay with four changeover contacts (non-polarized) with manual operation, 4 x 6 A, maximum**



#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	See diagram		
Typical input current at $U_N$	[mA]	38	14.8 7.1
Typical response time at $U_N$	[ms]	13	
Typical response time at $U_N$ (depending on phase relation)	[ms]		5 - 15 5 - 15
Typical release time at $U_N$ (depending on phase relation)	[ms]	3	
Typical release time at $U_N$ (depending on phase relation)	[ms]		5 - 20 5 - 20
Output data			
Contact type	2 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	5 V (at 24 mA)		
Limiting continuous current	12 A		
Maximum switch-on current AC	30 A (20 ms, N/O contact)		
Maximum switch-on current DC	30 A (20 ms, N/O contact)		
Minimum switching current	5 mA (at 24 V)		
General data			
Test voltage (winding/contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40°C ... 55°C		
Ambient temperature (operation), DC	-40°C ... 70°C		
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles		
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles		
Standards/regulations	IEC 60664, IEC 61810		

#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	See diagram		
Typical input current at $U_N$	[mA]	38	14.8 7.1
Typical response time at $U_N$	[ms]	13	
Typical response time at $U_N$ (depending on phase relation)	[ms]		5 - 15 5 - 15
Typical release time at $U_N$ (depending on phase relation)	[ms]	3	
Typical release time at $U_N$ (depending on phase relation)	[ms]		5 - 20 5 - 20
Output data			
Contact type	4 PDTs		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	5 V (at 24 mA)		
Limiting continuous current	6 A		
Maximum switch-on current AC	16 A (20 ms, N/O contact)		
Maximum switch-on current DC	16 A (20 ms, N/O contact)		
Minimum switching current	5 mA (at 24 V)		
General data			
Test voltage (winding/contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40°C ... 55°C		
Ambient temperature (operation), DC	-40°C ... 70°C		
Mechanical service life, AC	1x 10 <sup>7</sup> cycles, approximately		
Mechanical service life, DC	1x 10 <sup>7</sup> cycles, approximately		
Standards/regulations	IEC 60664, IEC 61810		

#### Ordering data

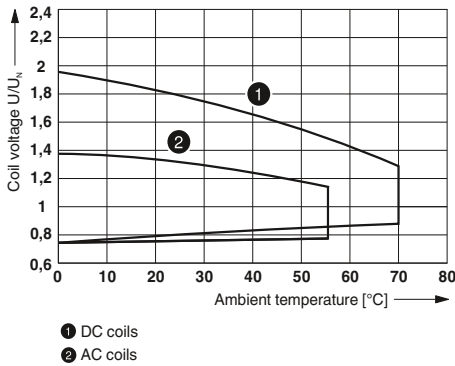
Description	Input voltage $U_N$	Ordering data		
		Type	Order No.	Pcs./Pkt.
<b>Non-polarized plug-in industrial relays, with power contacts</b>	① 24 V DC	REL-IR2/24DC/2X21	2907051	10
	② 100 V AC	REL-IR2/100AC/2X21	2907052	10
	③ 200 V AC	REL-IR2/200AC/2X21	2907053	10

#### Ordering data

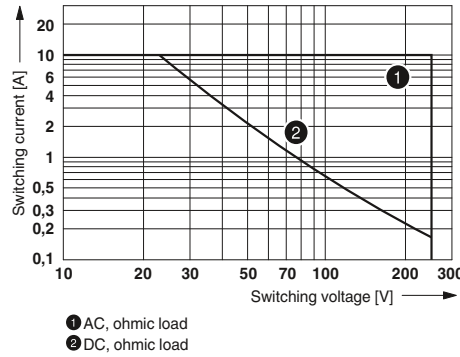
Description	Input voltage $U_N$	Ordering data		
		Type	Order No.	Pcs./Pkt.
<b>Non-polarized plug-in industrial relays, with power contacts</b>	① 24 V DC	REL-IR4/24DC/4X21	2907054	10
	② 100 V AC	REL-IR4/100AC/4X21	2907055	10
	③ 200 V AC	REL-IR4/200AC/4X21	2907056	10

## REL-IR2... (2 changeover contacts)

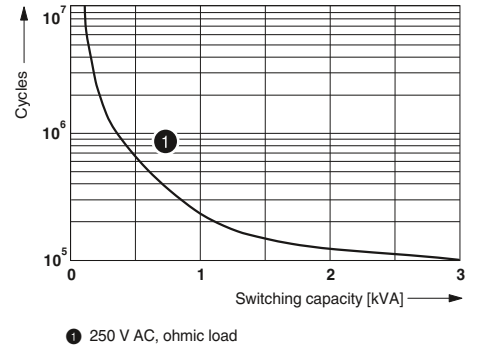
Operating voltage range



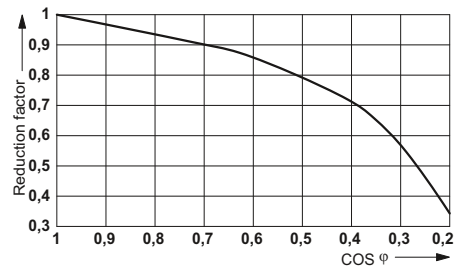
Interrupting rating



Electrical service life

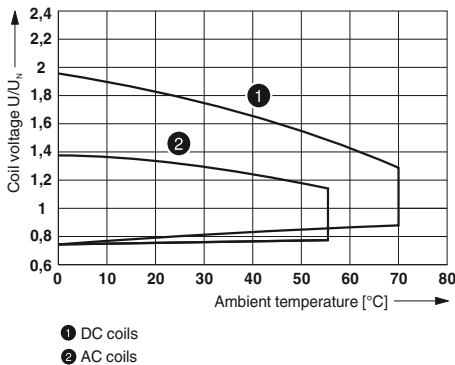


Service life reduction factor

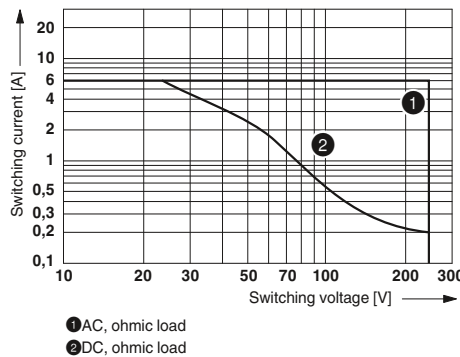


## REL-IR4... (4 changeover contacts)

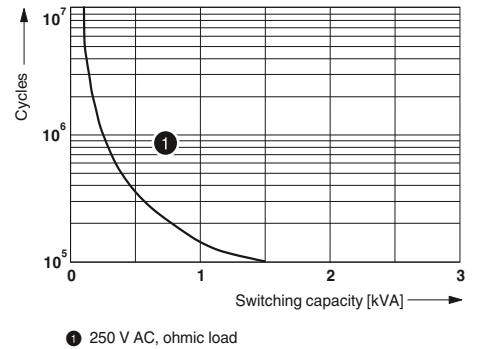
Operating voltage range



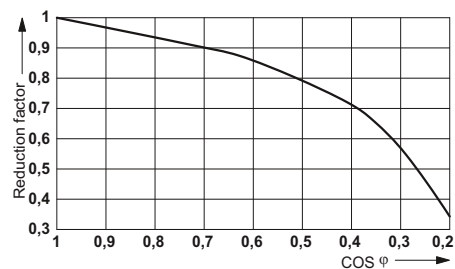
Interrupting rating



Electrical service life



Service life reduction factor



# Relay modules

## RIFLINE complete – Industrial relay system

### Modular RIF-3 relay bases

Relay bases that can be fitted with 2 or 3 PDT relays.

Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



**2-changeover-contact relay base with Push-in connection technology for octal relays**



Nominal voltage  $U_N$   
Nominal current at  $U_N$

Technical data
250 V AC/DC Max. 12 A (depends on application/assembly)

General data
Ambient temperature (operation)
Connection data solid/stranded/AWG
Dimensions
Width
Depth with retaining bracket
Height

-40°C ... 85°C (depends on application/assembly)
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
40 mm
90 mm
103 mm

Description
<b>RIF-3 relay base</b> , 2-PDT version, plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>RIF-3 relay base</b> , 3-PDT version, plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>Plastic relay retaining bracket</b> , with holder for marking material, suitable for RIF-3 relay base
<b>Relay retaining bracket</b> , wire model, suitable for RIF-3 relay base

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-3-BPT/2X21	2900937	10

<b>Plug-in bridge</b> 2-pos. red, 32 A 2-pos. red, 24 A 2-pos. blue, 32 A 2-pos. gray, 32 A	
<b>End clamp</b> , to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...	
<b>Test plug</b> , consisting of: <b>Metal part</b> for 2.3 mm Ø socket hole and	gray
<b>Insulating sleeve</b> , for MPS metal part	red white blue yellow green gray black
<b>Zack marker strip</b> , unprinted 10-section 5-section	
<b>Double marker carrier for ZB 5</b>	

Accessories		
FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100





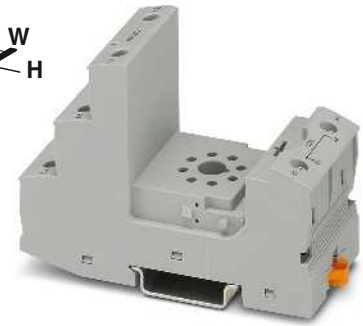
# Relay modules

## RIFLINE complete – Industrial relay system

### Modular RIF-3 relay bases

- Relay bases for assembly with 2 or 3-changeover-contact octal relay.
- Range of accessories includes:
- Plug-in interference suppression module
  - Plug-in timer module
  - Relay retaining bracket with ejector function and holder for marking material
  - Comprehensive range of marking material
  - Test plug
  - FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



**2-changeover-contact relay base with screw connection technology for octal relays**



Nominal voltage  $U_N$   
Nominal current at  $U_N$

Technical data
250 V AC/DC Max. 12.5 A (depends on application/assembly)

General data
Ambient temperature (operation)
Connection data solid/stranded/AWG
Dimensions
Width
Depth with retaining bracket
Height

-40°C ... 85°C (depends on application/assembly)
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10
40 mm
90 mm
96 mm

Description
<b>RIF-3 relay base</b> , 2-PDT version, plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>RIF-3 relay base</b> , 3-PDT version, plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>Plastic relay retaining bracket</b> , with holder for marking material, suitable for RIF-3 relay base
<b>Relay retaining bracket</b> , wire model, suitable for RIF-3 relay base

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-3-BSC/2X21	2900935	10

<b>Plug-in bridge</b> 2-pos. red, 32 A 2-pos. red, 24 A 2-pos. blue, 32 A 2-pos. gray, 32 A <b>End clamp</b> , to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...	
<b>Test plug</b> , consisting of: <b>Metal part</b> for 2.3 mm Ø socket hole and	gray
<b>Insulating sleeve</b> , for MPS metal part	red white blue yellow green gray black
<b>Zack marker strip</b> , unprinted 10-section 5-section	
<b>Double marker carrier for ZB 5</b>	

Accessories		
FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100



# Relay modules

## RIFLINE complete – Industrial relay system

### Plug-in octal relays

Plug-in octal relays with 2 or 3 changeover contacts, compatible for RIF-3 relay base.

The advantages:

- With lockable manual operation
- Mechanical switch position indicator
- Integrated status LED
- DC types with integrated free-wheeling diode

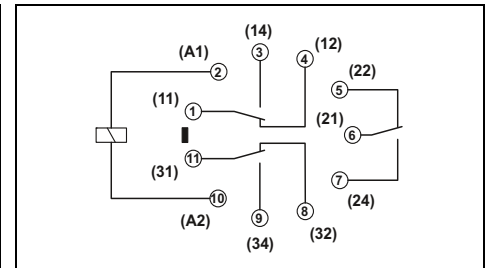
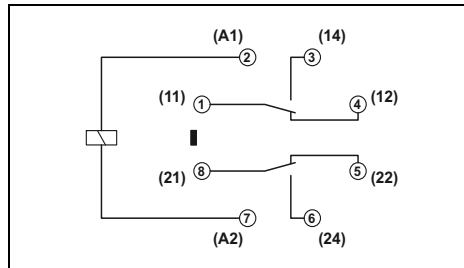


**Octal relay with two changeover contacts with manual operation, 2 x 10 A, maximum**



**Octal relay with three changeover contacts with manual operation, 3 x 10 A, maximum**

**Notes:**  
For more voltages, see [phoenixcontact.com/products](http://phoenixcontact.com/products)  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



Input data		①	⑤	⑥	⑦	⑧
Permissible range (with reference to $U_N$ )		See diagram				
Typical input current at $U_N$	[mA]	60	8	108	23	13
Typical response time at $U_N$	[ms]	18	18			
Typical response time at $U_N$ (depending on phase relation)	[ms]			5 - 15	5 - 15	5 - 15
Typical release time at $U_N$ (depending on phase relation)	[ms]	20	7	5 - 20	5 - 20	5 - 20
Input circuit AC		-				
Input circuit DC		-				
Output data						
Contact type		2 PDT				
Contact material		AgNi				
Max. switching voltage		250 V AC/DC				
Minimum switching voltage		10 V (at 24 mA)				
Limiting continuous current		10 A				
Maximum switch-on current AC		30 A (20 ms, N/O contact)				
Maximum switch-on current DC		30 A (20 ms, N/O contact)				
Minimum switching current		10 mA (at 24 V)				
General data						
Test voltage (winding/contact)		2.5 kV <sub>rms</sub> (50 Hz, 1 min.)				
Ambient temperature (operation), AC		-40°C ... 55°C				
Ambient temperature (operation), DC		-40°C ... 70°C				
Nominal operating mode		100% operating factor				
Mechanical service life, AC		Approx. 2x 10 <sup>7</sup> cycles				
Mechanical service life, DC		Approx. 2x 10 <sup>7</sup> cycles				
Standards/regulations		IEC 60664, IEC 61810				
Mounting position/mounting		Any				
Dimensions	W / H / D	35 mm / 35 mm / 54.4 mm				

Technical data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to $U_N$ )		See diagram							
Typical input current at $U_N$	[mA]	60			14	8	108	23	13
Typical response time at $U_N$	[ms]	18	18	18	18	18			
Typical response time at $U_N$ (depending on phase relation)	[ms]						5 - 15	5 - 15	5 - 15
Typical release time at $U_N$ (depending on phase relation)	[ms]	20	20	20	20	7	5 - 20	5 - 20	5 - 20
Input circuit AC		-							
Input circuit DC		-							
Output data									
Contact type		3 PDTs							
Contact material		AgNi							
Max. switching voltage		250 V DC / 440 V AC							
Minimum switching voltage		10 V (at 24 mA)							
Limiting continuous current		10 A							
Maximum switch-on current AC		30 A (20 ms, N/O contact)							
Maximum switch-on current DC		30 A (20 ms, N/O contact)							
Minimum switching current		10 mA (at 24 V)							
General data									
Test voltage (winding/contact)		2.5 kV <sub>rms</sub> (50 Hz, 1 min.)							
Ambient temperature (operation), AC		-40°C ... 55°C							
Ambient temperature (operation), DC		-40°C ... 70°C							
Nominal operating mode		100% operating factor							
Mechanical service life, AC		Approx. 2x 10 <sup>7</sup> cycles							
Mechanical service life, DC		Approx. 2x 10 <sup>7</sup> cycles							
Standards/regulations		IEC 60664, IEC 61810							
Mounting position/mounting		Any							
Dimensions	W / H / D	35 mm / 35 mm / 54.4 mm							

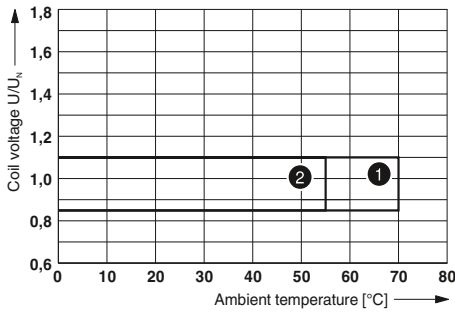
Description	Input voltage $U_N$
<b>Plug-in octal relays, with power contacts</b>	
With freewheeling diode	① 24 V DC
With freewheeling diode	② 48 V DC
With freewheeling diode	③ 110 V DC
With freewheeling diode	④ 125 V DC
With freewheeling diode	⑤ 220 V DC
	⑥ 24 V AC
	⑦ 120 V AC
	⑧ 230 V AC

Ordering data		
Type	Order No.	Pcs./Pkt.
REL-OR2/LDP-24DC/2X21	2903689	10
REL-OR2/LDP-220DC/2X21	2907026	10
REL-OR2/L-24AC/2X21	2903690	10
REL-OR2/L-120AC/2X21	2903691	10
REL-OR2/L-230AC/2X21	2903692	10

Ordering data		
Type	Order No.	Pcs./Pkt.
REL-OR3/LDP-24DC/3X21	2903693	10
REL-OR3/LDP-48DC/3X21	2908897	10
REL-OR3/LDP-110DC/3X21	2908898	10
REL-OR3/LDP-125DC/3X21	2909207	10
REL-OR3/LDP-220DC/3X21	2907027	10
REL-OR3/L-24AC/3X21	2903694	10
REL-OR3/L-120AC/3X21	2903695	10
REL-OR3/L-230AC/3X21	2903696	10

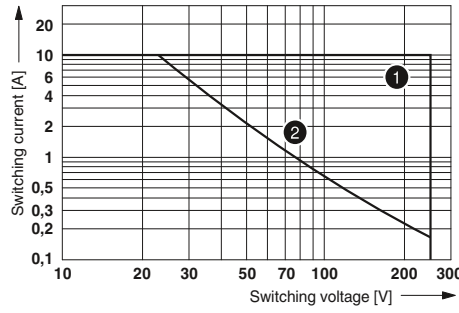
### REL-OR2... (2 changeover contacts)

Operating voltage range



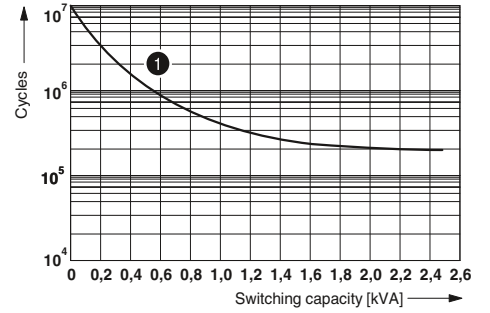
- 1 DC coils
- 2 AC coils

Interrupting rating



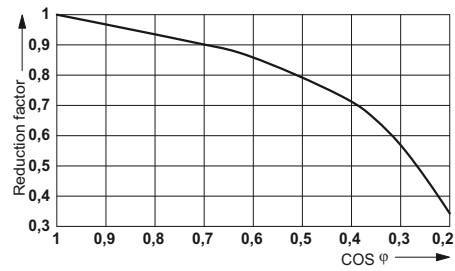
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



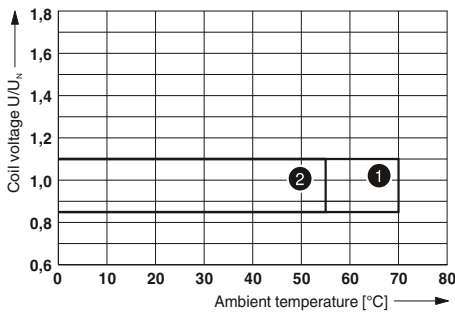
- 1 250 V AC, ohmic load

Service life reduction factor



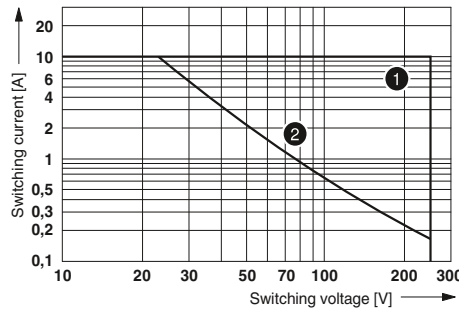
### REL-OR3... (3 changeover contacts)

Operating voltage range



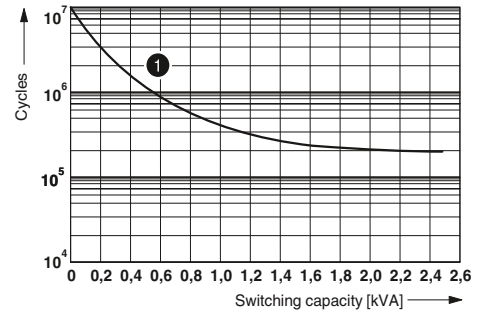
- 1 DC coils
- 2 AC coils

Interrupting rating



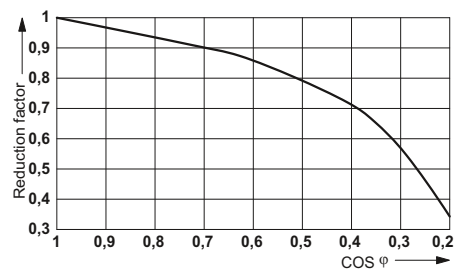
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



- 1 250 V AC, ohmic load

Service life reduction factor



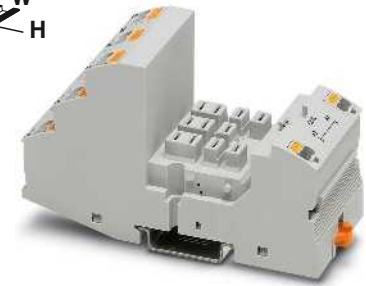
# Relay modules

## RIFLINE complete – Industrial relay system

### Modular RIF-4 relay bases

- Relay bases that can be fitted with 2 or 3 PDT relays or 3 N/O relays.
- Range of accessories includes:
- Plug-in interference suppression module
  - Plug-in timer module
  - Relay retaining bracket with ejector function and holder for marking material
  - Comprehensive range of marking material
  - Test plug
  - FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



**3-changeover-contact relay base with Push-in connection technology for high-power relays**



Nominal voltage  $U_N$   
Nominal current at  $U_N$

#### General data

Ambient temperature (operation)

Connection data solid/stranded/AWG

Input side

Output side

Dimensions

Width

Depth with retaining bracket

Height

#### Technical data

440 V AC / 250 V DC

Max. 16 A (depends on application/assembly)

-40°C ... 85°C (depends on application/assembly)

0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16

0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14

43 mm

90 mm

111 mm

#### Ordering data

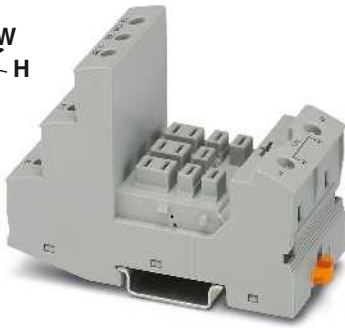
Description
<b>RIF-4 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>RIF-4 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>Relay retaining bracket</b> , with holder for marking material, suitable for RIF-4 relay base
<b>Relay retaining bracket</b> , wire model, suitable for RIF-4 relay base

Type	Order No.	Pcs./Pkt.
RIF-4-BPT/3X21	2900961	10

#### Accessories

<b>Plug-in bridge</b> 2-pos. red, 32 A 2-pos. red, 24 A 2-pos. blue, 32 A 2-pos. gray, 32 A <b>End clamp</b> , to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...	
<b>Test plug</b> , consisting of: <b>Metal part</b> for 2.3 mm Ø socket hole and	gray
<b>Insulating sleeve</b> , for MPS metal part	red white blue yellow green gray black
<b>Zack marker strip</b> , unprinted 10-section 5-section	
<b>Double marker carrier</b> for ZB 5	

FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100



3-changeover-contact relay base with screw connection technology for high-power relays



Plastic relay retaining bracket for RIF-4 base



Metal wire relay retaining bracket for RIF-4 base



Technical data
440 V AC / 250 V DC Max. 13 A (depends on application/assembly)
-40°C ... 85°C (depends on application/assembly)
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10 0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10
44 mm 91 mm 96 mm

Technical data
-
-
-
-
-
-

Technical data
-
-
-
-
-
-

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-4-BSC/3X21	2900960	10

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-RH-4	2900956	10

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-RHM-4	2905983	10

Accessories		

Accessories		

Accessories		

# Relay modules

## RIFLINE complete – Industrial relay system

### Plug-in high-power relays

Plug-in high-power relays with 2 or 3 PDT contacts for the RIF-4 relay base.

The advantages:

- Use in miniature contactor applications
- Switching current of up to 16 A
- Up to 440 V AC switching voltage

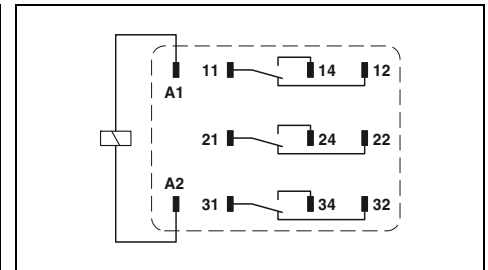
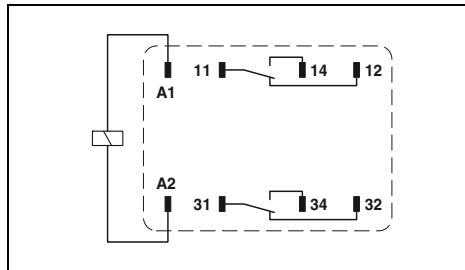
**Notes:**  
For more voltages, see phoenixcontact.com/products  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



**High-power relay with two changeover contacts, 2 x 16 A, maximum**



**High-power relay with three changeover contacts, 3 x 16 A, maximum**



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA] 56
Typical response time at $U_N$	[ms] 20
Typical response time at $U_N$ (depending on phase relation)	[ms] 5 - 25
Typical release time at $U_N$	[ms] 15
Typical release time at $U_N$ (depending on phase relation)	[ms] 5 - 20
Output data	
Contact type	2 PDT
Contact material	AgNi
Max. switching voltage	440 V AC / 250 V DC
Minimum switching voltage	10 V (at 24 mA)
Limiting continuous current	16 A
Maximum switch-on current AC	50 A (20 ms, N/O contact)
Maximum switch-on current DC	50 A (20 ms, N/O contact)
Minimum switching current	10 mA (at 24 V)
Maximum interrupting rating, ohmic load	250 V AC, 4,000 VA 440 V AC, 4,000 VA
Motor load in accordance with UL 508	1/3 HP, 120 V AC (N/O contact) 1/2 HP, 240 V AC (N/O contact)
General data	
Test voltage (winding/contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40°C ... 55°C
Ambient temperature (operation), DC	-40°C ... 70°C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, IEC 61810
Mounting position/mounting	Any
Dimensions	W / H / D 38.6 mm / 36.1 mm / 45.5 mm

Technical data			
①	②	③	④
See diagram			
56	116	23	12
20	5 - 25	5 - 25	5 - 25
15	5 - 20	5 - 20	5 - 20
Ordering data			
Type	Order No.	Pcs./Pkt.	
REL-PR2- 24DC/2X21	2903698	1	
REL-PR2- 24AC/2X21	2903699	1	
REL-PR2-120AC/2X21	2903700	1	
REL-PR2-230AC/2X21	2903701	1	

Technical data					
①	②	③	④	⑤	⑥
See diagram					
56	12	6	116	23	12
20	20	20	5 - 25	5 - 25	5 - 25
15	15	15	5 - 20	5 - 20	5 - 20
Ordering data					
Type	Order No.	Pcs./Pkt.			
REL-PR3- 24DC/3X21	2903702	1			
REL-PR3-110DC/3X21	2908893	1			
REL-PR3-220DC/3X21	2909055	1			
REL-PR3- 24AC/3X21	2903703	1			
REL-PR3-120AC/3X21	2903704	1			

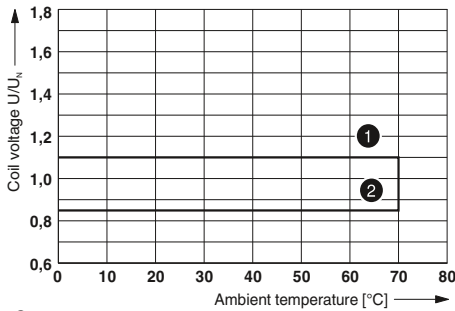
Description	Input voltage $U_N$
<b>Plug-in high-power relays, 2 PDTs with power contacts</b>	
①	24 V DC
②	24 V AC
③	120 V AC
④	230 V AC
<b>Plug-in high-power relays, 3 PDTs with power contacts</b>	
①	24 V DC
②	110 V DC
③	220 V DC
④	24 V AC
⑤	120 V AC

Type	Order No.	Pcs./Pkt.
REL-PR2- 24DC/2X21	2903698	1
REL-PR2- 24AC/2X21	2903699	1
REL-PR2-120AC/2X21	2903700	1
REL-PR2-230AC/2X21	2903701	1

Type	Order No.	Pcs./Pkt.
REL-PR3- 24DC/3X21	2903702	1
REL-PR3-110DC/3X21	2908893	1
REL-PR3-220DC/3X21	2909055	1
REL-PR3- 24AC/3X21	2903703	1
REL-PR3-120AC/3X21	2903704	1

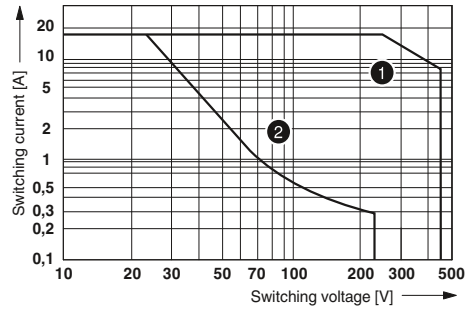
## REL-PR2... (2 changeover contacts)

Operating voltage range



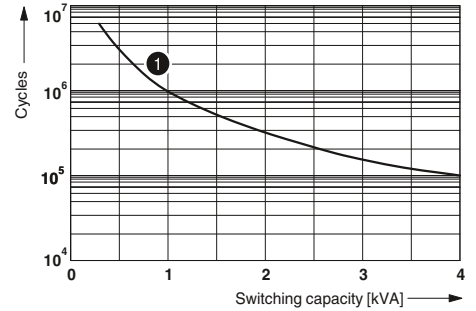
- 1 Maximum continuous voltage at limiting continuous current = 16 A
  - 2 Minimum operate voltage
- For pre-excitation with UN and limiting continuous current = 16 A

Interrupting rating



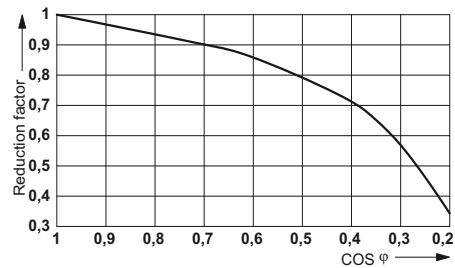
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



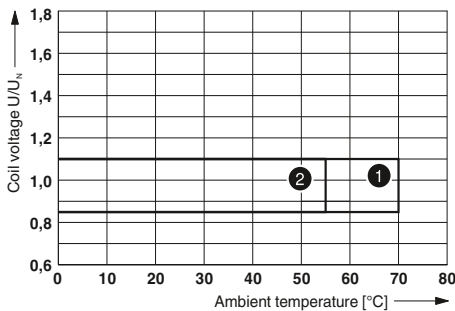
- 1 250 V AC, ohmic load

Service life reduction factor



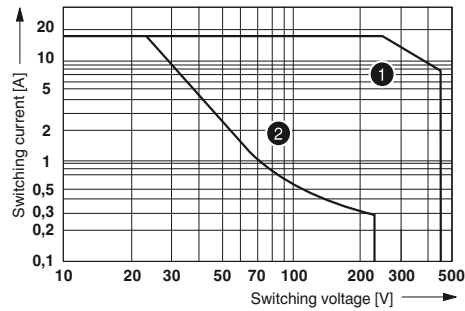
## REL-PR3... (3 changeover contacts)

Operating voltage range



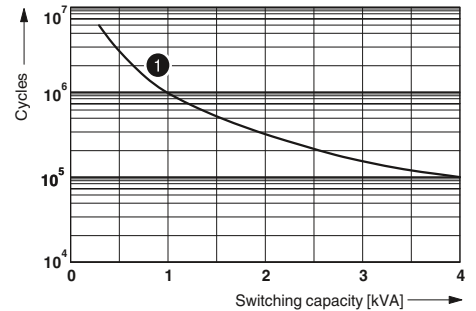
- 1 DC coils
- 2 AC coils

Interrupting rating



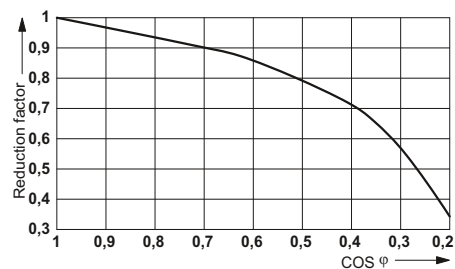
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



- 1 250 V AC, ohmic load

Service life reduction factor





# Relay modules

## RIFLINE complete – Industrial relay system

### Plug-in high-power relays

Plug-in high-power relays with 3 N/O contacts suitable for the RIF-4 relay base.

The advantages:

- Use in miniature contactor applications
- Switching current of up to 16 A
- Up to 440 V AC switching voltage
- Full shutdown by means of  $\geq 3$  mm contact opening

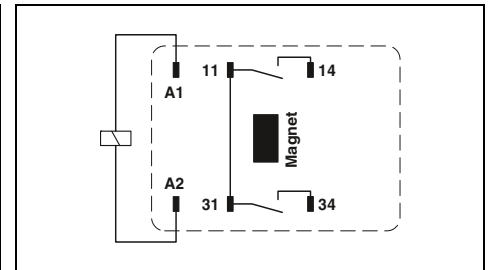
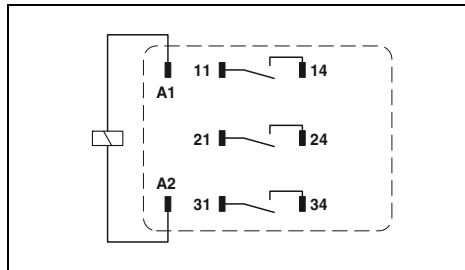
**Notes:**  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



High-power relay with three N/O contacts, 3 x 16 A, maximum



High-power relay with one N/O contact with blowing magnet for switching high DC loads



#### Technical data

	①	②	③	④
Input data	See diagram			
Permissible range (with reference to $U_N$ )	70	116	23	12
Typical input current at $U_N$ [mA]				
Typical response time at $U_N$ [ms]	20			
Typical response time at $U_N$ (depending on phase relation) [ms]		5 - 25	5 - 25	5 - 25
Typical release time at $U_N$ [ms]	15			
Typical release time at $U_N$ (depending on phase relation) [ms]		5 - 20	5 - 20	5 - 20
Output data				
Contact type	3 N/O contacts			
Contact material	AgNi			
Max. switching voltage	440 V AC / 250 V DC			
Minimum switching voltage	10 V (at 24 mA)			
Limiting continuous current	16 A			
Maximum switch-on current AC	50 A (20 ms, N/O contact)			
Maximum switch-on current DC	50 A (20 ms, N/O contact)			
Minimum switching current	10 mA (at 24 V)			
Maximum interrupting rating, ohmic load	250 V AC	4,000 VA		
	440 V AC	4,000 VA		
Motor load in accordance with UL 508		1/3 HP, 120 V AC (N/O contact)		1/2 HP, 240 V AC (N/O contact)

#### Technical data

	①	②	③	④
Input data	See diagram			
Permissible range (with reference to $U_N$ )	70	15	7.3	12
Typical input current at $U_N$ [mA]				
Typical response time at $U_N$ [ms]	20	20	20	
Typical response time at $U_N$ (depending on phase relation) [ms]				5 - 25
Typical release time at $U_N$ [ms]	15	15	15	
Typical release time at $U_N$ (depending on phase relation) [ms]				5 - 18
Output data				
Contact type	1 N/O contact			
Contact material	AgNi			
Max. switching voltage	440 V AC / 250 V DC			
Minimum switching voltage	5 V (at 24 mA)			
Limiting continuous current	16 A			
Maximum switch-on current AC	50 A (20 ms)			
Maximum switch-on current DC	50 A (20 ms)			
Minimum switching current	5 mA (at 24 V)			
Maximum interrupting rating, ohmic load	4,000 VA			
	-			

General data	
Test voltage (winding/contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40°C ... 55°C
Ambient temperature (operation), DC	-40°C ... 70°C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, IEC 61810
Mounting position/mounting	Any
Dimensions	W / H / D 38.6 mm / 36.1 mm / 45.5 mm

General data	
Test voltage (winding/contact)	2.5 kV
Ambient temperature (operation), AC	-40°C ... 70°C
Ambient temperature (operation), DC	-40°C ... 70°C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, IEC 61810
Mounting position/mounting	Any
Dimensions	38.6 mm / 36.1 mm / 45.5 mm

#### Ordering data

Type	Order No.	Pcs./Pkt.
REL-PR3-24DC/3X1	2903706	1
REL-PR3-24AC/3X1	2903707	1
REL-PR3-120AC/3X1	2903708	1
REL-PR3-230AC/3X1	2903709	1

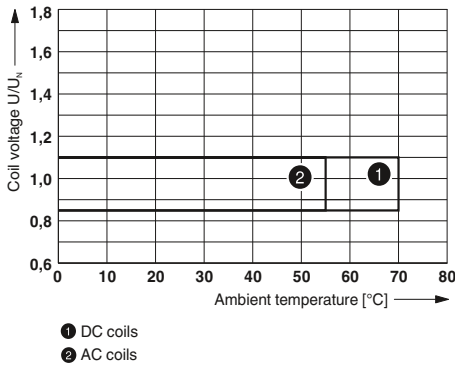
#### Ordering data

Type	Order No.	Pcs./Pkt.
REL-PR1-24DC/1/MB	2908040	1
REL-PR1-110DC/1/MB	2908044	1
REL-PR1-220DC/1/MB	2908046	1
REL-PR1-230AC/1/MB	2908047	1

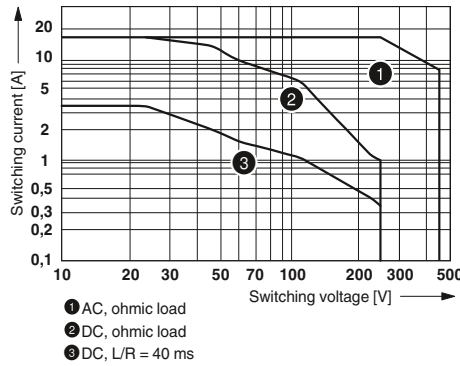
Description	Input voltage $U_N$
<b>Plug-in high-power relays, 3 N/O contacts with power contacts</b>	① 24 V DC
	② 24 V AC
	③ 120 V AC
	④ 230 V AC
<b>Plug-in high-power relays, 1-N/O contact with blow magnet and power contacts</b>	① 24 V DC
	② 110 V DC
	③ 220 V DC
	④ 230 V AC

### REL-PR3... (3 N/O contacts)

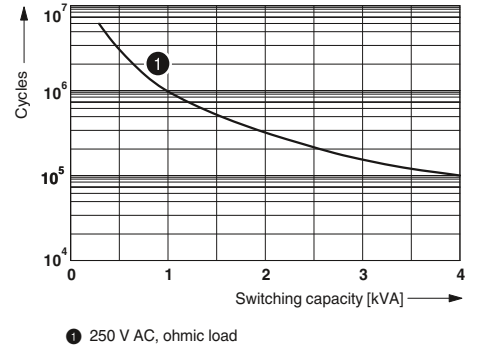
Operating voltage range



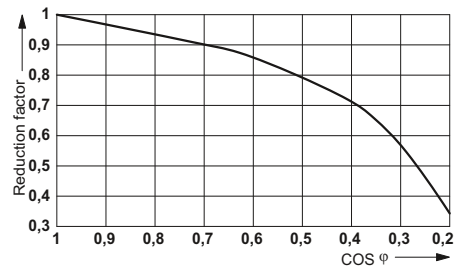
Interrupting rating



Electrical service life

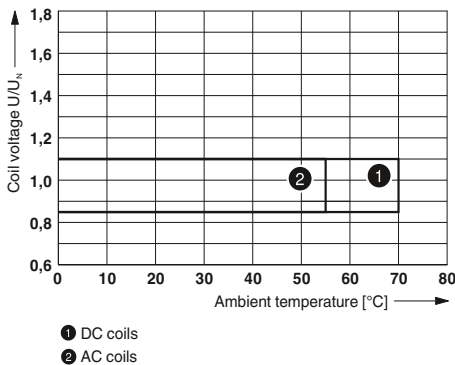


Service life reduction factor

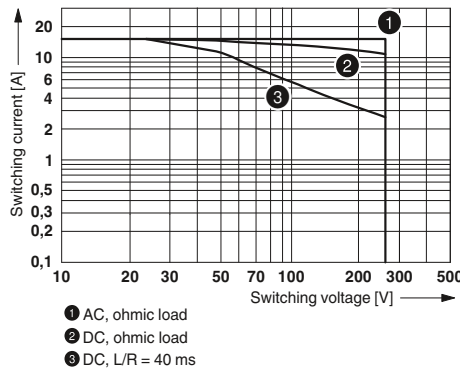


### REL-PR1... (1 N/O contact with blow magnet)

Operating voltage range



Interrupting rating



### Plug-in interference suppression modules for RIF-1, RIF-2, RIF-3, and RIF-4

Plug-in interference suppression modules for optional assembly of RIF-1 to RIF-4 relay bases.

The advantages:

- Attenuation of reverse voltage induced in coil
- Mechanical coding to protect against incorrect connection



Interference suppression modules for RIF-1 to RIF-4



Description
<p><b>Plug-in module, with LED status indicator and freewheeling diode</b> to effectively limit the coil induction voltage, polarity: <b>A1+</b>, <b>A2-</b>, input voltage:</p> <ul style="list-style-type: none"> <li>- 12-24 V DC <math>\pm</math> 20%</li> <li>- 48-60 V DC <math>\pm</math> 20%</li> <li>- 110 V DC <math>\pm</math> 20%</li> </ul>
<p><b>Plug-in module, with LED status indicator and varistor</b> to limit the coil induction voltage and/or external interference peaks, input voltage:</p> <ul style="list-style-type: none"> <li>- 12-24 V AC/DC <math>\pm</math> 20% (30-V-varistor)</li> <li>- 48-60 V AC/DC <math>\pm</math> 20% (75-V-varistor)</li> <li>- 120-230 V AC/110 V DC <math>\pm</math> 20% (275-V-varistor)</li> </ul>
<p><b>Plug-in module, with varistor</b> to limit the coil induction voltage and/or external interference peaks, input voltage:</p> <ul style="list-style-type: none"> <li>- 12-24 V AC/DC <math>\pm</math> 20% (30-V-varistor)</li> <li>- 48-60 V AC/DC <math>\pm</math> 20% (75-V-varistor)</li> <li>- 120-230 V AC/DC <math>\pm</math> 20% (275-V-varistor)</li> </ul>
<p><b>Plug-in module, with RC element</b> to limit the coil induction voltage and/or external interference peaks, input voltage:</p> <ul style="list-style-type: none"> <li>- 12-24 V AC/DC <math>\pm</math> 20% (220 nF/100 <math>\Omega</math>)</li> <li>- 48-60 V AC/DC <math>\pm</math> 20% (220 nF/220 <math>\Omega</math>)</li> <li>- 120 - 230 V AC/DC <math>\pm</math> 20% (100 nF/470 <math>\Omega</math>)</li> </ul>
<p><b>Plug-in module, with bridge rectifier</b> for controlling electromechanical DC voltage relay, input voltage:</p> <ul style="list-style-type: none"> <li>- 12 ... 230 V AC</li> </ul>
<p><b>Plug-in module, with LED status indicator and freewheeling diode</b> to effectively limit the coil induction voltage, polarity: <b>A1-</b>, <b>A2+</b>, input voltage:</p> <ul style="list-style-type: none"> <li>- 12-24 V DC <math>\pm</math> 20%</li> </ul>
<p><b>Plug-in module, with LED status indicator and varistor</b> to limit the coil induction voltage and/or external interference peaks, polarity <b>A1-</b>, <b>A2+</b>, input voltage:</p> <ul style="list-style-type: none"> <li>- 120-230 V AC/110 V DC <math>\pm</math> 20% (275-V-varistor)</li> </ul>

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-LDP-12-24 DC	2900939	10
RIF-LDP-48-60 DC	2900940	10
RIF-LDP-110 DC	2900941	10
RIF-LV-12-24 UC	2900942	10
RIF-LV-48-60 UC	2900943	10
RIF-LV-120-230 AC/110 DC	2900944	10
RIF-V-12-24 UC	2900945	10
RIF-V-48-60 UC	2900947	10
RIF-V-120-230 UC	2900948	10
RIF-RC-12-24 UC	2900949	10
RIF-RC-48-60 UC	2900950	10
RIF-RC-120-230 UC	2900951	10
RIF-BR-12-230 AC	2907060	10
RIF-LDM-12-24 DC	2907057	10
RIF-LVM-100-200 AC/110 DC	2907058	10

**Plug-in timer modules for RIF-1, RIF-2, RIF-3, and RIF-4**

The multifunctional plug-in timer module transforms a relay module into a timer relay. RIF-1 to RIF-4 bases can be equipped with this module. Using DIP switches, three time functions and four time ranges can be selected. Detailed time settings are made using a potentiometer. Relays can be operated with an input voltage of 12, or 24 V AC/DC.

The time functions:

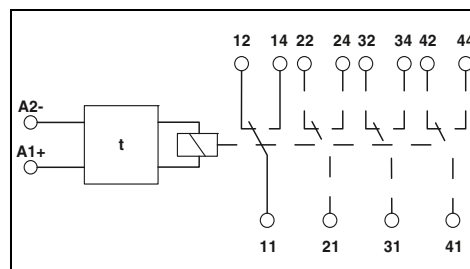
- With switch-on delay
- With passing make contact
- Pulse generator

Time ranges:

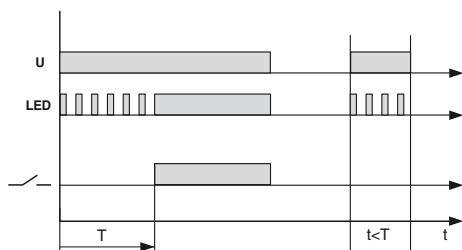
- 0.5 to 10 s
- 5 to 100 s
- 0.5 to 10 min
- 5 to 100 min



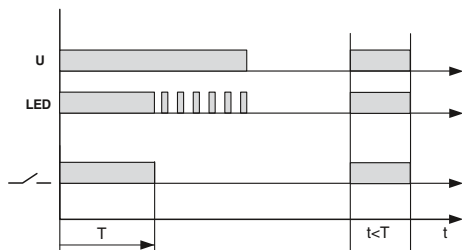
**Timer module for RIF-1 to RIF-4 relay modules for 12 to 24 V AC/DC input voltage**



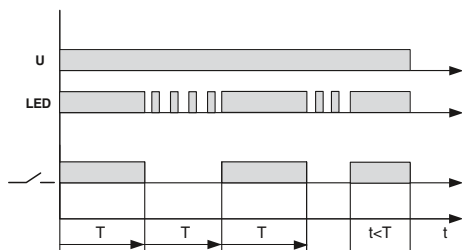
**With switch-on delay**



**Passing make contact**



**Pulse generator**



<b>Input data</b>
Nominal input voltage $U_N$
Nominal input voltage range with reference to $U_N$
Input circuit
<b>Output data</b>
Limiting continuous current
<b>General data</b>
Mounting position
Repeat accuracy
Ambient temperature (operation)
<b>Standards/specifications</b>
Rated insulation voltage
Rated surge voltage

<b>Description</b>
<b>Timer module</b> , for mounting on RIF-1 to RIF-4, with LED status indicator for extending a relay module to create a timer relay with an input voltage of 24 V AC/DC

<b>Technical data</b>		
24 V DC (AC operation only permitted for RIF-1)		
0.4 ... 1.2		
Varistor, yellow LED		
$\leq 250$ mA (relay coil current)		
any		
1%		
-25°C ... 50°C (RIF-1, AC coil, 2 PDTs at 6 A)		
-25°C ... 50°C (RIF-1, DC coil, 2 PDTs at 5 A)		
-25°C ... 40°C (RIF-2, DC coil, 2 PDTs at 8 A)		
-25°C ... 40°C (RIF-2, DC coil, 4 PDTs at 5 A)		
-25°C ... 40°C (RIF-3, DC coil, 3 PDTs at 6.75 A)		
-25°C ... 40°C (RIF-3, DC coil, 2 PDTs at 8 A)		
-25°C ... 35°C (RIF-4, DC coil, 3 PDTs at 8 A)		
-25°C ... 25°C (RIF-4, DC coil, 3 N/O contacts at 8 A)		
DIN EN 50178		
50 V DC		
0.4 kV		

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
RIF-T3-24UC	2902647	1

# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:

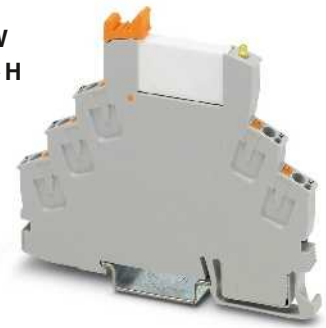
- Relay base with Push-in connection
- 1 N/O contact or 1 PDT relay
- Relay ejector lever on the housing

The advantages:

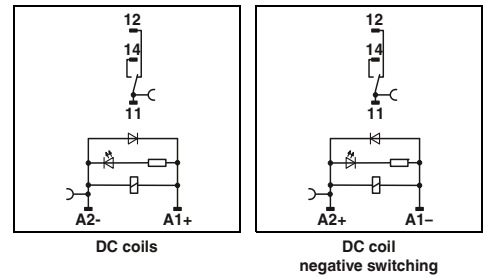
- Status LED integrated in the relay base
- Operational reliability, thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input and output side, see page 358

#### Notes:

If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



1-changeover-contact relay module with Push-in connection



#### Technical data

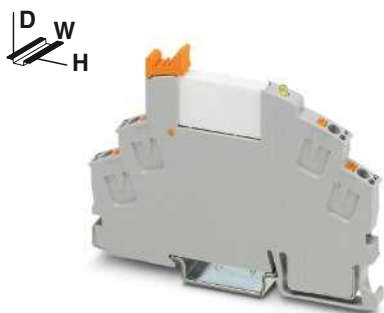
Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input protection:	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Minimum switching current	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation)	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

①	②
See diagram	
16	9
5	5
8	8
Yellow LED, damping diode	
1 PDT	1 PDT
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 mA (at 12 V)	1 mA
4 kV <sub>rms</sub> (50 Hz, 1 min.)	
-40°C ... 60°C	
100% operating factor	
Approx. 2x 10 <sup>7</sup> cycles	
DIN EN 50178	
2 / III	
Any / in rows with zero spacing	
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 24 - 16	
6.2 mm / 93 mm / 78 mm	
Class A product, see page 583	

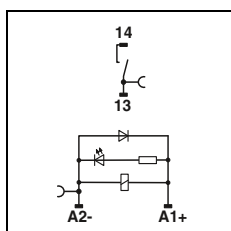
#### Ordering data

Description	Input voltage $U_N$
<b>Coupling relay modules</b> with power contact relay and Push-in connection	
	① 12 V DC
	② 24 V DC
<b>Coupling relay modules</b> with multi-layer gold contact relay, with Push-in connection	
	① 12 V DC
	② 24 V DC
<b>Coupling relay modules</b> with power contact relay and Push-in connection, negative switching	
	② 24 V DC

Type	Order No.	Pcs./Pkt.
<b>RIF-0-RPT-12DC/21</b>	<a href="#">2903371</a>	10
<b>RIF-0-RPT-24DC/21</b>	<a href="#">2903370</a>	10
<b>RIF-0-RPT-12DC/21AU</b>	<a href="#">2903369</a>	10
<b>RIF-0-RPT-24DC/21AU</b>	<a href="#">2903368</a>	10
<b>RIF-0-RPT-M-24DC/21</b>	<a href="#">2908327</a>	10



1-N/O-contact relay module with Push-in connection



DC coils

Technical data

① ②

See diagram

16 9

5 5

8 8

Yellow LED, damping diode

1 N/O contact

1 N/O contact

AgSnO

AgSnO, hard gold-plated

250 V AC/DC

30 V AC / 36 V DC

5 V (at 100 mA)

100 mV (at 10 mA)

6 A

50 mA

10 mA (at 12 V)

1 mA (at 12 V)

4 kV<sub>rms</sub> (50 Hz, 1 min.)

-40°C ... 60°C

100% operating factor

Approx. 2x 10<sup>7</sup> cycles

DIN EN 50178

2 / III

Any / in rows with zero spacing

0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 24 - 16

6.2 mm / 93 mm / 66 mm

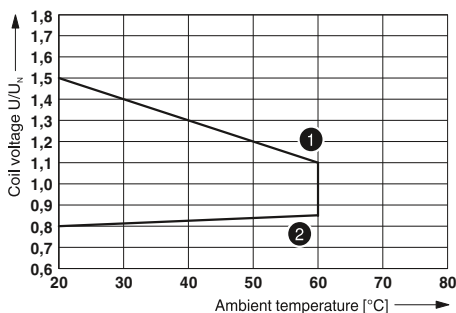
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-RPT-12DC/ 1	2903362	10
RIF-0-RPT-24DC/ 1	2903361	10
RIF-0-RPT-12DC/ 1AU	2903360	10
RIF-0-RPT-24DC/ 1AU	2903359	10

RIF-0-RPT.../21... (1 changeover contact)

Operating voltage range

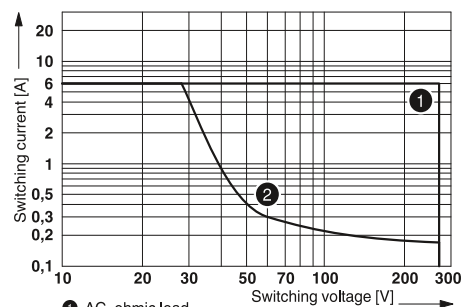


① Maximum continuous voltage at limiting continuous current = 6 A

② Minimum operate voltage

For pre-excitation with U<sub>n</sub> and limiting continuous current = 6 A

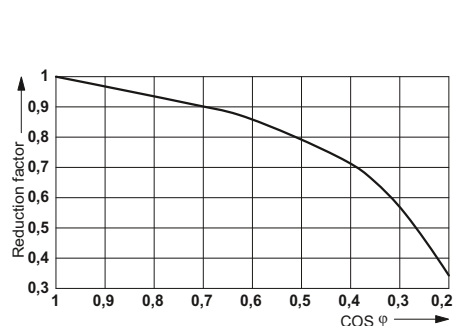
Interrupting rating



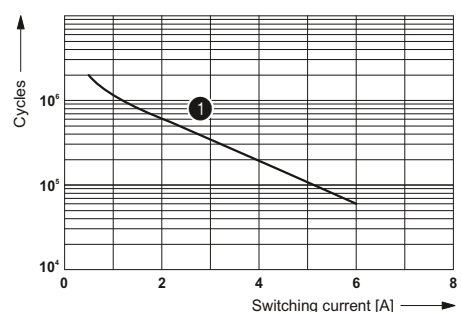
① AC, ohmic load

② DC, ohmic load

Service life reduction factor



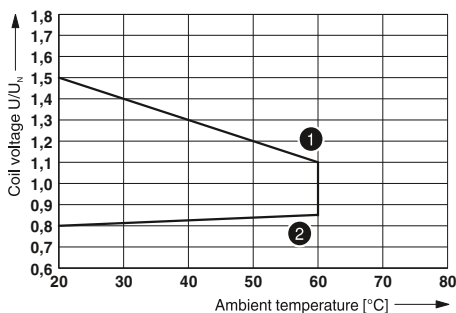
Electrical service life



① 250 V AC, ohmic load

RIF-0-RPT.../1... (1 N/O contact)

Operating voltage range

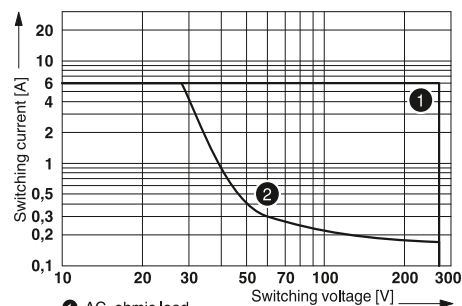


① Maximum continuous voltage at limiting continuous current = 6 A

② Minimum operate voltage

For pre-excitation with U<sub>n</sub> and limiting continuous current = 6 A

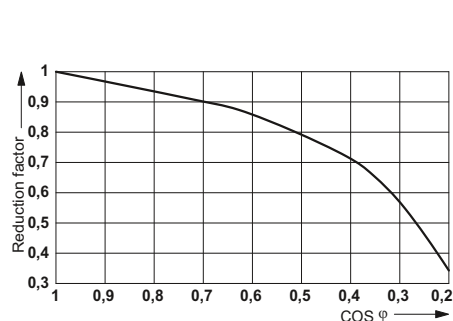
Interrupting rating



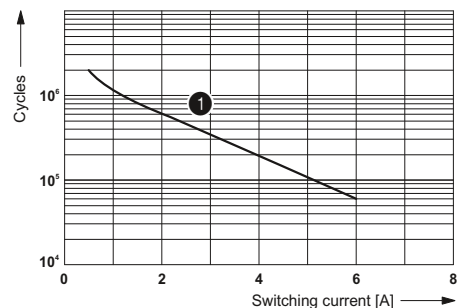
① AC, ohmic load

② DC, ohmic load

Service life reduction factor



Electrical service life



① 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-0 relay modules

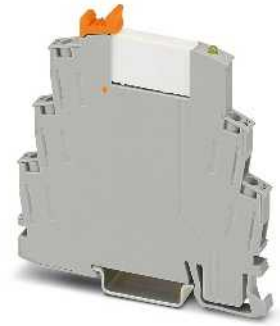
Fully mounted RIF-0 relay modules, consisting of:

- Relay base with screw connection
- 1-PDT or 1-N/O-contact relay
- Relay ejector lever on the housing

The advantages:

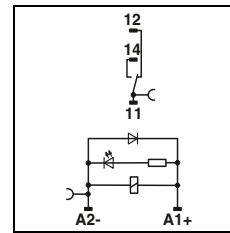
- Status LED integrated in the relay base
- Operational reliability, thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input and output side, see page 358

Notes:
<b>General conditions:</b> Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



1-changeover-contact relay module with screw connection

ERC



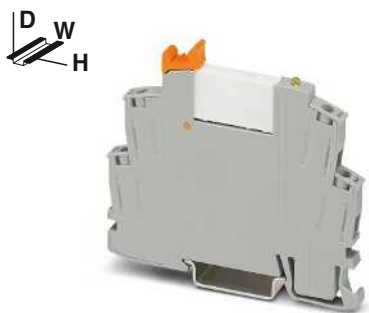
DC coils

Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input protection:	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Minimum switching current	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation)	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Maximum tightening torque	
Dimensions	W / H / D
EMC note	

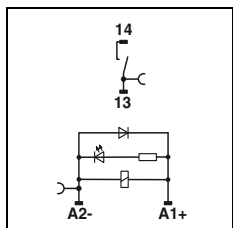
Technical data		
①	②	
See diagram		
16	9	
5	5	
8	8	
Yellow LED, damping diode		
1 PDT	1 PDT	
AgSnO	AgSnO, hard gold-plated	
250 V AC/DC	30 V AC / 36 V DC	
5 V (at 100 mA)	100 mV (at 10 mA)	
6 A	50 mA	
10 mA (at 12 V)	1 mA (at 12 V)	
4 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40°C ... 60°C		
100% operating factor		
Approx. 2x 10 <sup>7</sup> cycles		
DIN EN 50178		
2 / III		
Any / in rows with zero spacing		
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 12		
0.6 Nm		
6.2 mm / 84 mm / 82 mm		
Class A product, see page 583		

Description	Input voltage $U_N$
<b>Coupling relay modules</b> with power contact relay and screw connection	① 12 V DC
	② 24 V DC
<b>Coupling relay modules</b> with multi-layer gold contact relay, with screw connection	① 12 V DC
	② 24 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-0-RSC-12DC/21	2903375	10
RIF-0-RSC-24DC/21	2903374	10
RIF-0-RSC-12DC/21AU	2903373	10
RIF-0-RSC-24DC/21AU	2903372	10



1-N/O-contact relay module with screw connection



DC coils

Technical data

① ②  
See diagram  
16 9  
5 5  
8 8  
Yellow LED, damping diode

1 N/O contact	1 N/O contact
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 mA (at 12 V)	1 mA (at 12 V)

4 kV<sub>rms</sub> (50 Hz, 1 min.)  
-40°C ... 60°C  
100% operating factor  
Approx. 2x 10<sup>7</sup> cycles  
DIN EN 50178  
2 / III

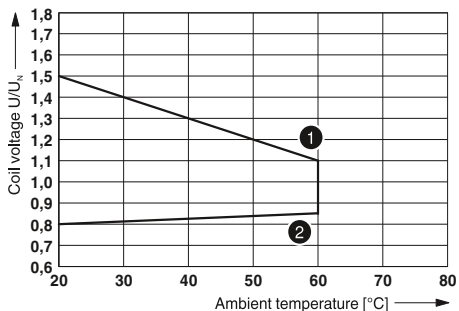
Any / in rows with zero spacing  
0.5 ... 4 mm<sup>2</sup> / 0.5 ... 2.5 mm<sup>2</sup> / 20 - 12  
0.6 Nm  
6.2 mm / 84 mm / 68 mm  
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-RSC-12DC/ 1	2903367	10
RIF-0-RSC-24DC/ 1	2903366	10
RIF-0-RSC-12DC/ 1AU	2903365	10
RIF-0-RSC-24DC/ 1AU	2903364	10

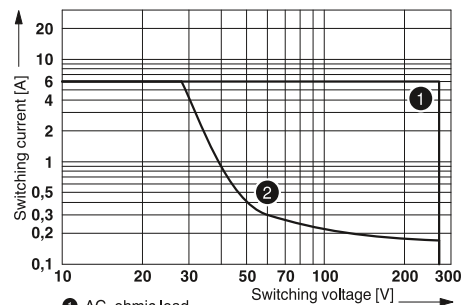
RIF-0-RSC.../21... (1 changeover contact)

Operating voltage range



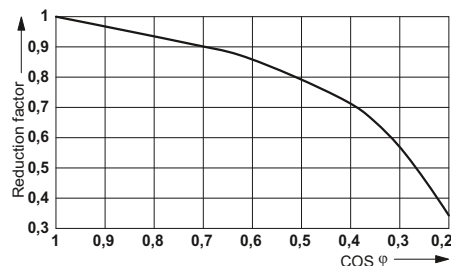
① Maximum continuous voltage at limiting continuous current = 6 A  
② Minimum operate voltage  
For pre-excitation with U<sub>n</sub> and limiting continuous current = 6 A

Interrupting rating

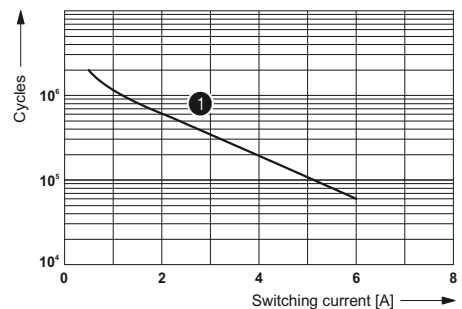


① AC, ohmic load  
② DC, ohmic load

Service life reduction factor with various cos phi



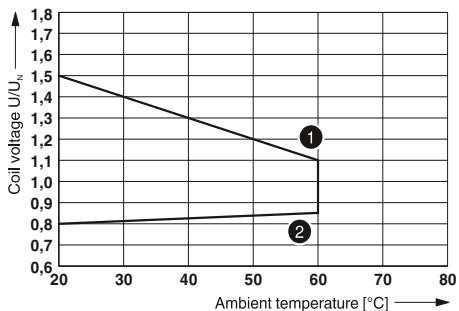
Electrical service life



① 250 V AC, ohmic load

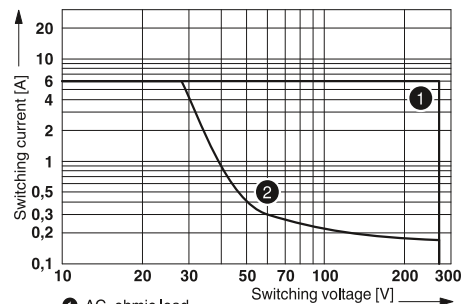
RIF-0-RSC.../1... (1 N/O contact)

Operating voltage range



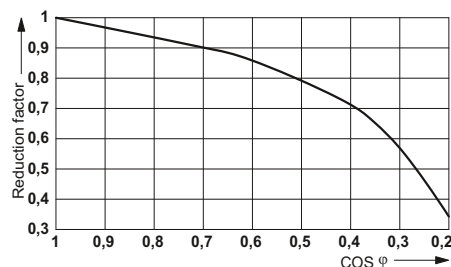
① Maximum continuous voltage at limiting continuous current = 6 A  
② Minimum operate voltage  
For pre-excitation with U<sub>n</sub> and limiting continuous current = 6 A

Interrupting rating

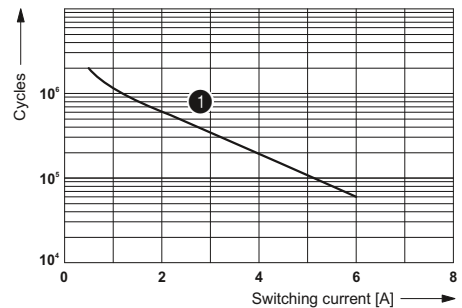


① AC, ohmic load  
② DC, ohmic load

Service life reduction factor



Electrical service life



① 250 V AC, ohmic load



# Relay modules

## RIFLINE complete – Industrial relay system

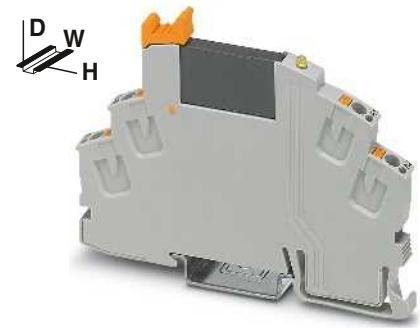
### Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:

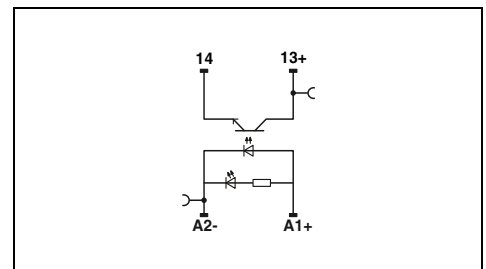
- Relay base with Push-in connection
- Solid-state relays
- Relay ejector lever on the housing

The advantages:

- Status LED integrated into the base
- RTIII sealed solid-state relay
- Zero voltage switch at AC output
- Professional bridging of adjacent modules saves wiring time



**Solid-state relay module with Push-in connection, DC output max. 3 A**



#### Technical data

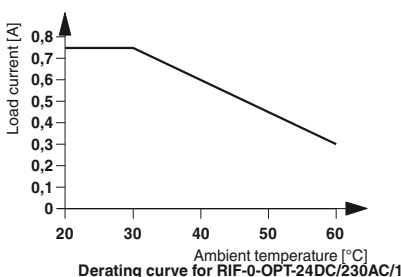
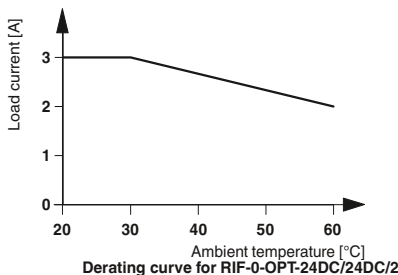
<b>Input data</b>	
Rated actuating voltage range with reference to $U_C$	
Rated actuating current $I_C$	[mA] 8.5
Switching level (with reference to $U_C$ )	1 signal ("H") >0.8 0 signal ("L") <0.4
Typical switch-on time at $U_N$	[ms] 0.02
Typical switch-off time at $U_N$	[ms] 0.3
Transmission frequency $f_{limit}$	[Hz] 300
Input circuit DC	Yellow LED, free-wheeling diode
<b>Output data</b>	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Maximum switch-on current	15 A (10 ms)
Minimum/maximum switching current	- / 3 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	<200 mV
Leakage current in off state	-
Phase angle (cos $\phi$ )	-
Max. load value	-
<b>General data</b>	
Test voltage input/output	2.5 kV <sub>ms</sub> (50 Hz, 1 min.)
Ambient temperature (operation)	-25°C ... 60°C
Standards/regulations	DIN EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	6.2 mm / 93 mm / 66 mm
EMC note	Class A product, see page 583

①	0.8 - 1.2
	8.5
	>0.8
	<0.4
	0.02
	0.3
	300
	Yellow LED, free-wheeling diode
	33 V DC
	3 V DC
	15 A (10 ms)
	- / 3 A (see derating curve)
	Reverse polarity protection, surge protection
	<200 mV
	-
	-
	-
	2.5 kV <sub>ms</sub> (50 Hz, 1 min.)
	-25°C ... 60°C
	DIN EN 50178
	2 / III
	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 24 - 16
	6.2 mm / 93 mm / 66 mm
	Class A product, see page 583

#### Ordering data

Description	Rated actuating voltage $U_C$
<b>Coupling relay modules with solid-state relay and Push-in connection</b>	
①	24 V DC

Type	Order No.	Pcs./Pkt.
RIF-0-OPT-24DC/24DC/2	2905293	10





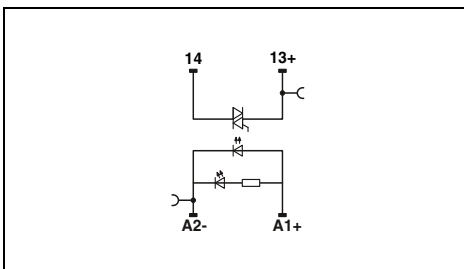
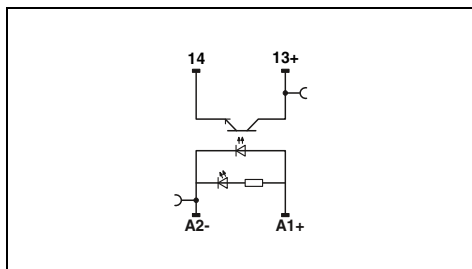
Solid-state relay module with Push-in connection, DC output max. 100 mA



Solid-state relay module with Push-in connection, AC output max. 750 mA

ERC

ERC



Technical data

Technical data

①  
 0.8 -  
 1.2  
 8.5  
 >0.8  
 <0.4  
 0.02  
 0.3  
 300  
 Yellow LED, free-wheeling diode  
 48 V DC  
 3 V DC  
 -  
 - / 100 mA  
 Reverse polarity protection, surge protection  
 <1 V  
 -  
 -  
 -  
 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -25°C ... 60°C  
 DIN EN 50178  
 2 / III  
 0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 24 - 16  
 6.2 mm / 93 mm / 66 mm  
 Class A product, see page 583

①  
 0.8 -  
 1.2  
 8  
 >0.8  
 <0.4  
 10  
 10  
 10  
 10  
 Yellow LED, free-wheeling diode  
 253 V AC  
 24 V AC  
 30 A (10 ms)  
 10 mA / 0.75 A (see derating curve)  
 RCV circuit  
 <1 V  
 1 mA (in off state)  
 0.5  
 4.5 A<sup>2</sup>s (tp = 10 ms, at 25°C)  
 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -25°C ... 60°C  
 DIN EN 50178  
 2 / III  
 0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 24 - 16  
 6.2 mm / 93 mm / 66 mm  
 Class A product, see page 583

Ordering data

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-OPT-24DC/48DC/100	2905294	10

Type	Order No.	Pcs./Pkt.
RIF-0-OPT-24DC/230AC/1	2905295	10

# Relay modules

## RIFLINE complete – Industrial relay system

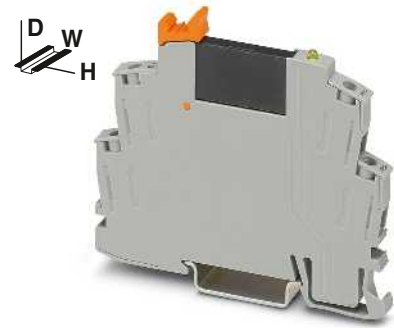
### Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:

- Relay base with screw connection
- Solid-state relays
- Relay ejector lever on the housing

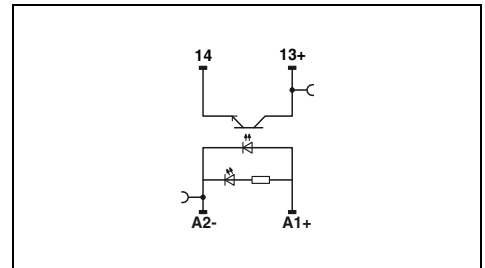
The advantages:

- Status LED integrated into the base
- RTIII sealed solid-state relay
- Zero voltage switch at AC output
- Professional bridging of adjacent modules saves wiring time



**Solid-state relay module with screw connection, DC output max. 3 A**

ERC



#### Technical data

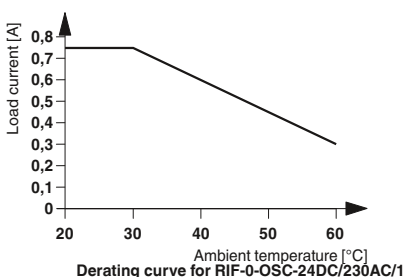
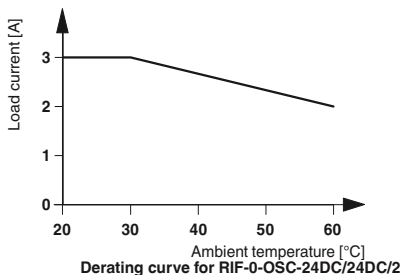
<b>Input data</b>	
Rated actuating voltage range with reference to $U_C$	
Rated actuating current $I_C$	[mA] 8.5
Switching level (with reference to $U_C$ )	1 signal ("H") >0.8 0 signal ("L") <0.4
Typical switch-on time at $U_N$	[ms] 0.02
Typical switch-off time at $U_N$	[ms] 0.3
Transmission frequency $f_{limit}$	[Hz] 300
Input circuit DC	Yellow LED, free-wheeling diode
<b>Output data</b>	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Maximum switch-on current	15 A (10 ms)
Minimum/maximum switching current	- / 3 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	<200 mV
Leakage current in off state	-
Phase angle (cos $\phi$ )	-
Max. load value	-
<b>General data</b>	
Test voltage input/output	2.5 kV <sub>ms</sub> (50 Hz, 1 min.)
Ambient temperature (operation)	-25°C ... 60°C
Standards/regulations	DIN EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0.5 - 4 mm <sup>2</sup> / 0.5 - 2.5 mm <sup>2</sup> / 20 - 12
Maximum tightening torque	0.6 Nm
Dimensions	W / H / D
EMC note	Class A product, see page 583

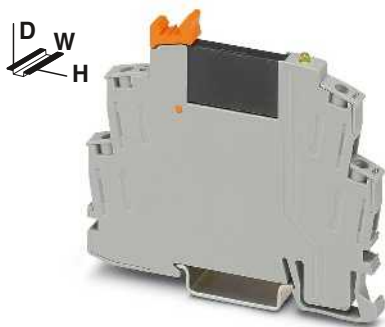
①	0.8 - 1.2
	8.5
	>0.8
	<0.4
	0.02
	0.3
	300
	Yellow LED, free-wheeling diode
	33 V DC
	3 V DC
	15 A (10 ms)
	- / 3 A (see derating curve)
	Reverse polarity protection, surge protection
	<200 mV
	-
	-
	-
	2.5 kV <sub>ms</sub> (50 Hz, 1 min.)
	-25°C ... 60°C
	DIN EN 50178
	2 / III
	0.5 - 4 mm <sup>2</sup> / 0.5 - 2.5 mm <sup>2</sup> / 20 - 12
	0.6 Nm
	W / H / D
	Class A product, see page 583

#### Ordering data

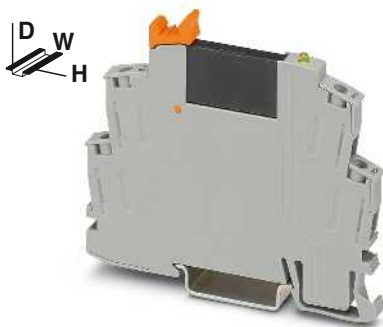
Description	Rated actuating voltage $U_C$
<b>Coupling relay modules</b> with solid-state relay and screw connection	① 24 V DC

Type	Order No.	Pcs./Pkt.
RIF-0-OSC-24DC/24DC/2	2905657	10

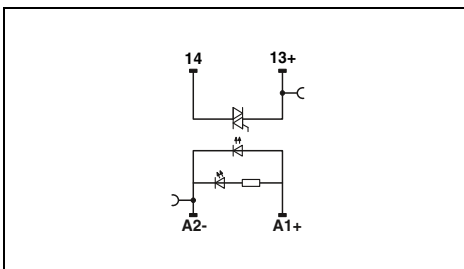
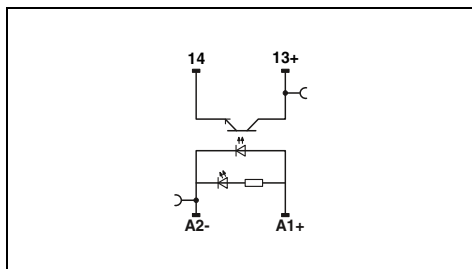




Solid-state relay module with screw connection, DC output max. 100 mA



Solid-state relay module with screw connection, AC output max. 750 mA



Technical data

Technical data

①  
 0.8 -  
 1.2  
 8.5  
 >0.8  
 <0.4  
 0.02  
 0.3  
 300  
 Yellow LED, free-wheeling diode

48 V DC  
 3 V DC  
 -  
 - / 100 mA  
 Reverse polarity protection, surge protection  
 <1 V

-  
 -  
 -

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -25°C ... 60°C  
 DIN EN 50178  
 2 / III

0.5 - 4 mm<sup>2</sup> / 0.5 - 2.5 mm<sup>2</sup> / 20 - 12  
 0.6 Nm  
 6.2 mm / 84 mm / 68 mm  
 Class A product, see page 583

①  
 0.8 -  
 1.2  
 8  
 >0.8  
 <0.4  
 10  
 10  
 10  
 10  
 Yellow LED, free-wheeling diode

253 V AC  
 24 V AC  
 30 A (10 ms)  
 10 mA / 0.75 A (see derating curve)  
 RCV circuit  
 <1 V

1 mA (in off state)  
 0.5  
 4.5 A<sup>2</sup>s (tp = 10 ms, at 25°C)

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -25°C ... 60°C  
 DIN EN 50178  
 2 / III

0.5 - 4 mm<sup>2</sup> / 0.5 - 2.5 mm<sup>2</sup> / 20 - 12  
 0.6 Nm  
 6.2 mm / 84 mm / 68 mm  
 Class A product, see page 583

Ordering data

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-OSC-24DC/48DC/100	2905658	10

Type	Order No.	Pcs./Pkt.
RIF-0-OSC-24DC/230AC/1	2905656	10

# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

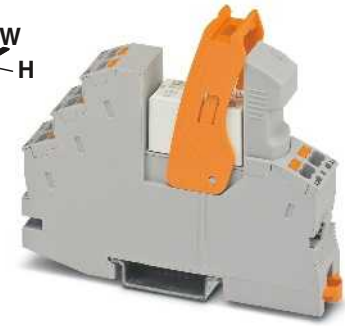
- Relay base with Push-in connection
- 1 or 2 PDT relays
- Relay retaining bracket
- Interference suppression module

The advantages:

- Logical contact arrangement, thanks to 1/3-level relay base
- Operational reliability, thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358
- For FBS 2-8 plug-in bridges for the output side (11/21), see page 358

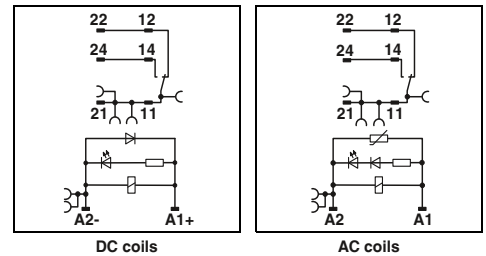
#### Notes:

If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



1-changeover-contact relay module with Push-in connection

ERC



DC coils

AC coils

#### Technical data

Input data	①	②	③	④	⑤	
Permissible range (with reference to $U_N$ )	See diagram					
Typical input current at $U_N$	[mA]	33	18	33	8	6
Typical response time at $U_N$	[ms]	8	8	3 - 12	3 - 12	3 - 12
Typical release time at $U_N$	[ms]	10	10	3 - 20	3 - 20	3 - 20
Input circuit AC	Yellow LED, Varistor					
Input circuit DC	Yellow LED, damping diode					
Output data	1 PDT		1 PDT			
Contact type	AgNi		AgNi, hard gold-plated			
Contact material	250 V AC/DC		30 V AC / 36 V DC			
Max. switching voltage	12 V (at 10 mA)		100 mV (at 10 mA)			
Minimum switching voltage	11 A (see diagram)		50 mA			
Limiting continuous current	25 A (20 ms, N/O contact)		50 mA			
Maximum switch-on current AC	50 A (20 ms, N/O contact)		50 mA			
Maximum switch-on current DC	10 mA (at 12 V)		1 mA (at 24 V)			
Minimum switching current						
General data						
Test voltage (winding/contact)	4 kV <sub>rms</sub> (50 Hz, 1 min.)					
Ambient temperature (operation), AC	-40°C ... 50°C					
Ambient temperature (operation), DC	-40°C ... 70°C					
Nominal operating mode	100% operating factor					
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles					
Mechanical service life, DC	Approx. 3x 10 <sup>7</sup> cycles					
Standards/regulations	DIN EN 50178					
Degree of pollution/surge voltage category	2 / III					
Mounting position/mounting	Any / in rows with zero spacing					
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16					
Dimensions	16 mm / 93 mm / 75 mm					
EMC note	Class A product, see page 583					

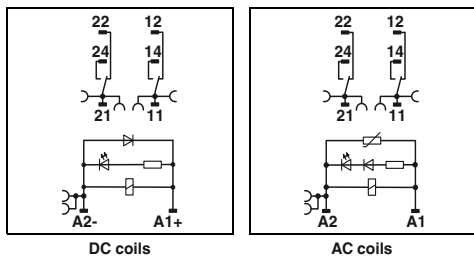
#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Coupling relay modules</b> with power contact relay and Push-in connection	① 12 V DC	RIF-1-RPT-LDP-12DC/1X21	2906224	10
	② 24 V DC	RIF-1-RPT-LDP-24DC/1X21	2903342	10
	③ 24 V AC	RIF-1-RPT-LV-24AC/1X21	2903341	10
	④ 120 V AC	RIF-1-RPT-LV-120AC/1X21	2903340	10
	⑤ 230 V AC	RIF-1-RPT-LV-230AC/1X21	2903339	10
<b>Coupling relay modules</b> with multi-layer gold contact relay, with Push-in connection	① 24 V DC	RIF-1-RPT-LDP-24DC/1X21AU	2903338	10
	② 24 V AC	RIF-1-RPT-LV-24AC/1X21AU	2903337	10
	③ 120 V AC	RIF-1-RPT-LV-120AC/1X21AU	2903336	10
	④ 230 V AC	RIF-1-RPT-LV-230AC/1X21AU	2903335	10



2-changeover-contact relay module with Push-in connection

ERC



Technical data

①	②	③	④	⑤
See diagram				
33	18	33	8	6
8	8	3-12	3-12	3-12
10	10	3-20	3-20	3-20
Yellow LED, Varistor				
Yellow LED, damping diode				

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
8 A (see diagram)	50 mA
12 A (20 ms, N/O contact)	50 mA
25 A (20 ms, N/O contact)	50 mA
10 mA (at 5 V)	1 mA (at 24 V)

4 kV<sub>ms</sub> (50 Hz, 1 min.)  
 -40°C ... 50°C  
 -40°C ... 70°C  
 100% operating factor  
 Approx. 10<sup>7</sup> cycles  
 Approx. 3x 10<sup>7</sup> cycles  
 DIN EN 50178  
 2 / III

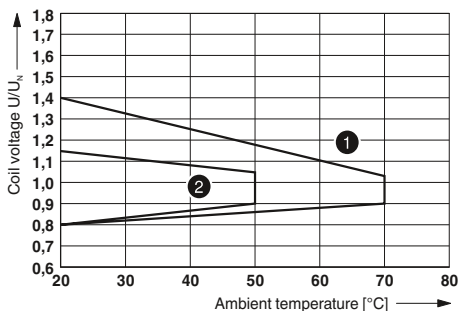
Any / in rows with zero spacing  
 0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16  
 16 mm / 93 mm / 75 mm  
 Class A product, see page 583

Ordering data

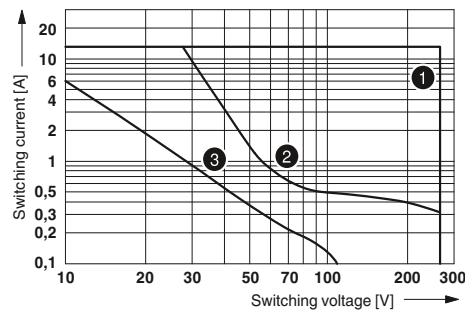
Type	Order No.	Pcs./Pkt.
RIF-1-RPT-LDP-12DC/2X21	2906223	10
RIF-1-RPT-LDP-24DC/2X21	2903334	10
RIF-1-RPT-LV-24AC/2X21	2903333	10
RIF-1-RPT-LV-120AC/2X21	2903332	10
RIF-1-RPT-LV-230AC/2X21	2903331	10
RIF-1-RPT-LDP-24DC/2X21AU	2903330	10
RIF-1-RPT-LV-24AC/2X21AU	2903329	10
RIF-1-RPT-LV-120AC/2X21AU	2903328	10
RIF-1-RPT-LV-230AC/2X21AU	2903327	10

RIF-1-RPT.../1X21... (1 changeover contact)

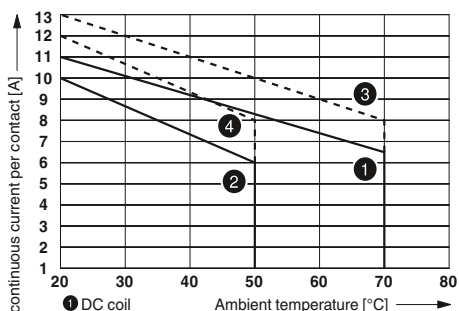
Operating voltage range



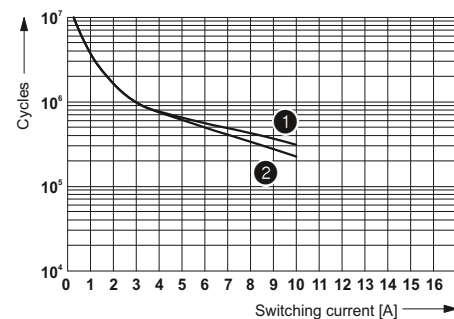
Interrupting rating



Contact derating

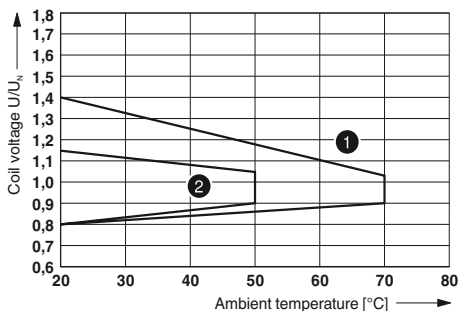


Electrical service life

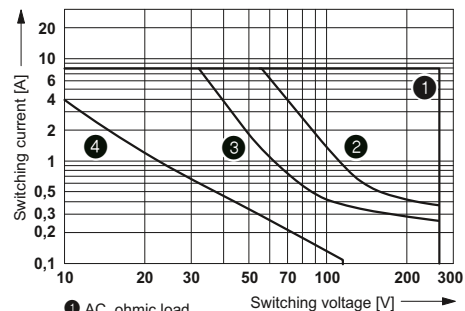


RIF-1-RPT.../2X21... (2 changeover contacts)

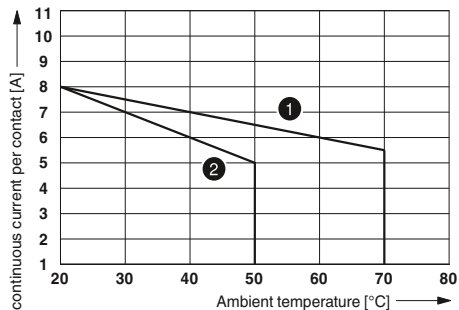
Operating voltage range



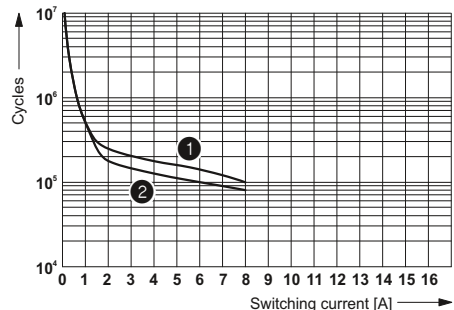
Interrupting rating



Contact derating



Electrical service life



# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

- Relay base with screw connection
- 1 or 2 PDT relays
- Relay retaining bracket
- Interference suppression module

The advantages:

- Logical contact arrangement, thanks to 1/3-level relay base
- Operational reliability, thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358
- For FBS 2-8 plug-in bridges for the output side (11/21), see page 358

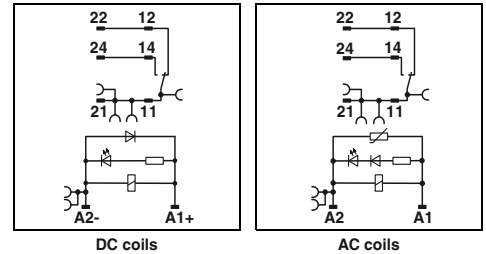
#### Notes:

If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



1-changeover-contact relay module with screw connection

ERC

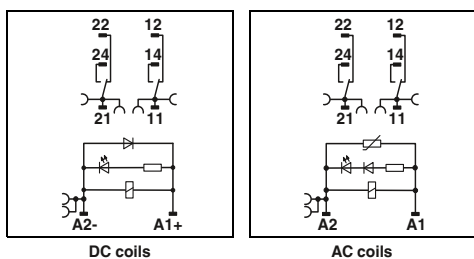


Input data		Technical data				
Permissible range (with reference to $U_N$ )		①	②	③	④	⑤
Typical input current at $U_N$	[mA]	See diagram				
Typical response time at $U_N$	[ms]	33	18	33	8	6
Typical release time at $U_N$	[ms]	8	8	3 - 12	3 - 12	3 - 12
Input circuit AC		10	10	3 - 20	3 - 20	3 - 20
Input circuit DC		Yellow LED, Varistor Yellow LED, damping diode				
Output data						
Contact type		1 PDT		1 PDT		
Contact material		AgNi		AgNi, hard gold-plated		
Max. switching voltage		250 V AC/DC		30 V AC / 36 V DC		
Minimum switching voltage		12 V (at 10 mA)		100 mV (at 10 mA)		
Limiting continuous current		11 A (see diagram)		50 mA		
Maximum switch-on current AC		25 A (20 ms, N/O contact)		25 A (20 ms, N/O contact)		
Maximum switch-on current DC		50 A (20 ms, N/O contact)		50 mA		
Minimum switching current		10 mA (at 12 V)		1 mA (at 24 V)		
General data						
Test voltage (winding/contact)		4 kV <sub>rms</sub> (50 Hz, 1 min.)				
Ambient temperature (operation), AC		-40°C ... 50°C				
Ambient temperature (operation), DC		-40°C ... 70°C				
Nominal operating mode		100% operating factor				
Mechanical service life, AC		Approx. 10 <sup>7</sup> cycles				
Mechanical service life, DC		Approx. 3x 10 <sup>7</sup> cycles				
Standards/regulations		DIN EN 50178				
Degree of pollution/surge voltage category		2 / III				
Mounting position/mounting		Any / in rows with zero spacing				
Connection data solid/stranded/AWG		0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10				
Dimensions	W / H / D	16 mm / 89 mm / 75 mm				
EMC note		Class A product, see page 583				

Description		Input voltage $U_N$	Ordering data		
			Type	Order No.	Pcs./Pkt.
<b>Coupling relay modules with power contact relay and screw connection</b>					
	①	12 V DC	RIF-1-RSC-LDP-12DC/1X21	2908500	10
	②	24 V DC	RIF-1-RSC-LDP-24DC/1X21	2903358	10
	③	24 V AC	RIF-1-RSC-LV-24AC/1X21	2903357	10
	④	120 V AC	RIF-1-RSC-LV-120AC/1X21	2903356	10
	⑤	230 V AC	RIF-1-RSC-LV-230AC/1X21	2903355	10
<b>Coupling relay modules with multi-layer gold contact relay, with screw connection</b>					
	①	24 V DC	RIF-1-RSC-LDP-24DC/1X21AU	2903354	10
	②	24 V AC	RIF-1-RSC-LV-24AC/1X21AU	2903353	10
	③	120 V AC	RIF-1-RSC-LV-120AC/1X21AU	2903352	10
	④	230 V AC	RIF-1-RSC-LV-230AC/1X21AU	2903351	10



2-changeover-contact relay module with screw connection



DC coils

AC coils

Technical data

①	②	③	④	⑤
See diagram				
33	18	33	8	6
8	8	3 - 12	3 - 12	3 - 12
10	10	3 - 20	3 - 20	3 - 20
Yellow LED, Varistor				
Yellow LED, damping diode				

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
8 A (see diagram)	50 mA
12 A (20 ms, N/O contact)	50 mA
25 A (20 ms, N/O contact)	50 mA
10 mA (at 5 V)	1 mA (at 24 V)

4 kV<sub>ms</sub> (50 Hz, 1 min.)  
 -40°C ... 50°C  
 -40°C ... 70°C  
 100% operating factor  
 Approx. 10<sup>7</sup> cycles  
 Approx. 3x 10<sup>7</sup> cycles  
 DIN EN 50178  
 2 / III

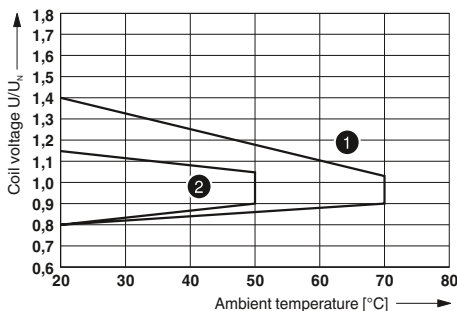
Any / in rows with zero spacing  
 0.5 ... 4 mm<sup>2</sup> / 0.5 ... 4 mm<sup>2</sup> / 20 - 10  
 16 mm / 89 mm / 75 mm  
 Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-RSC-LDP-12DC/2X21	2908501	10
RIF-1-RSC-LDP-24DC/2X21	2903350	10
RIF-1-RSC-LV-24AC/2X21	2903349	10
RIF-1-RSC-LV-120AC/2X21	2903348	10
RIF-1-RSC-LV-230AC/2X21	2903347	10
RIF-1-RSC-LDP-24DC/2X21AU	2903346	10
RIF-1-RSC-LV-24AC/2X21AU	2903345	10
RIF-1-RSC-LV-120AC/2X21AU	2903344	10
RIF-1-RSC-LV-230AC/2X21AU	2903343	10

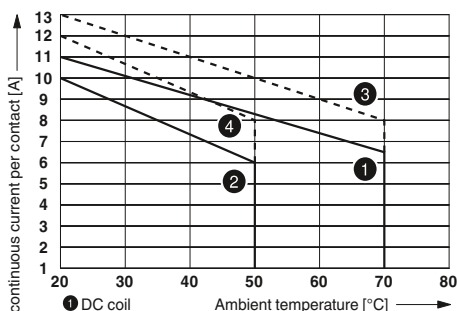
RIF-1-RSC.../1X21... (1 changeover contact)

Operating voltage range



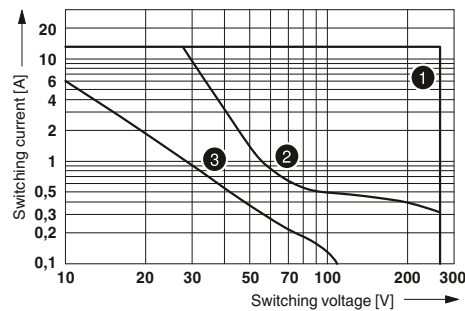
- ① DC coils
- ② AC coils

Contact derating



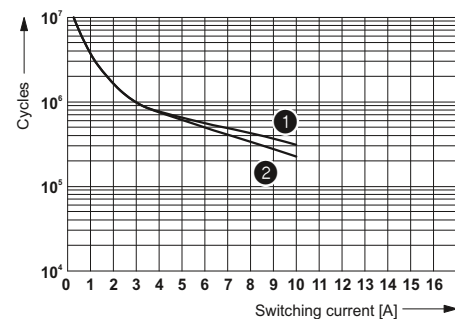
- ① DC coil
- ② AC coil
- ③ DC coil, jumper between 11 and 21
- ④ AC coil, jumper between 11 and 21

Interrupting rating



- ① AC, ohmic load
- ② DC, ohmic load
- ③ DC, L/R = 40 ms

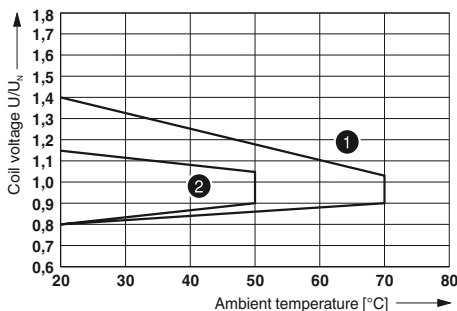
Electrical service life



- ① 250 V AC, ohmic load (DC coils)
- ② 250 V AC, ohmic load (AC coils)

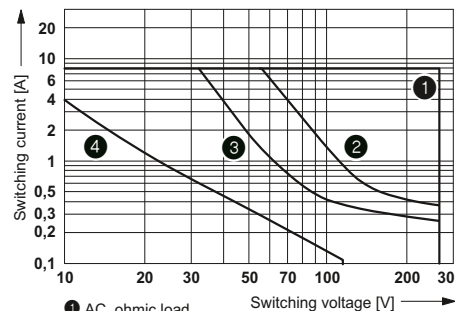
RIF-1-RSC.../2X21... (2 changeover contacts)

Operating voltage range



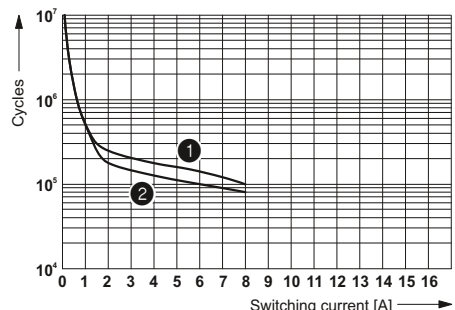
- ① DC coils
- ② AC coils

Interrupting rating



- ① AC, ohmic load
- ② DC, ohmic load, contacts in series
- ③ DC, ohmic load
- ④ DC, L/R = 40 ms

Electrical service life



- ① 250 V AC, ohmic load (DC coils)
- ② 250 V AC, ohmic load (AC coils)



# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

- Relay base with Push-in connection
- 1 or 2 PDT relays with detectable manual operation
- Relay retaining bracket
- Interference suppression module (AC types only)

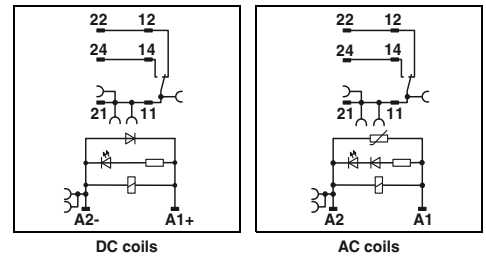
The advantages:

- Relay with lockable manual operation and status LED
- With DC types, free-wheeling diode is integrated into relay
- Mechanical switch position indicator
- Professional bridging of adjacent modules saves wiring time



**1-changeover-contact relay module with Push-in connection and manual operation**

ERC



<b>Input data</b>	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
<b>Output data</b>	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
<b>General data</b>	
Test voltage (winding/contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data		
①	②	③
See diagram		
18	7	3.5
9	4 - 10	4 - 10
10	3 - 20	3 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		
1 PDT		
AgNi		
250 V AC/DC		
12 V (at 10 mA)		
See diagram		
32 A (20 ms, N/O contact)		
24 A (20 ms, N/O contact)		
10 mA (at 12 V)		
4 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40°C ... 50°C		
-40°C ... 60°C		
100% operating factor		
Approx. 5x 10 <sup>6</sup> cycles		
DIN EN 50178		
2 / III		
Any / in rows with zero spacing		
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16		
16 mm / 93 mm / 75 mm		
Class A product, see page 583		

Description	Input voltage $U_N$
<b>Coupling relay modules</b> with power contact relay with manual operation and Push-in connection	① 24 V DC
	② 120 V AC
	③ 230 V AC

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-1-RPT-LDP-24DC/1X21MS	2905289	10
RIF-1-RPT-LV-120AC/1X21MS	2909776	10
RIF-1-RPT-LV-230AC/1X21MS	2905290	10

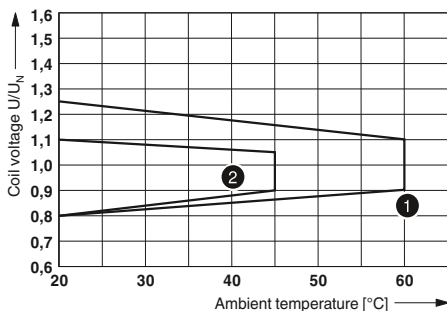


2-changeover-contact relay module with Push-in connection and manual operation



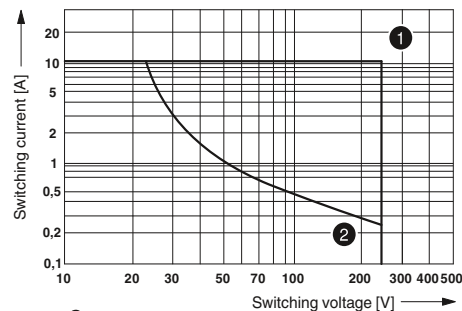
### RIF-1-RPT.../1X21... (1 changeover contact)

Operating voltage range



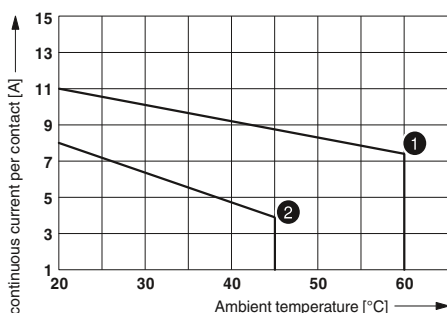
- 1 DC coils
- 2 AC coils

Interrupting rating



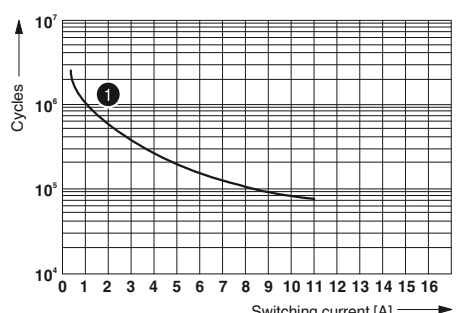
- 1 AC, ohmic load
- 2 DC, ohmic load

Contact derating

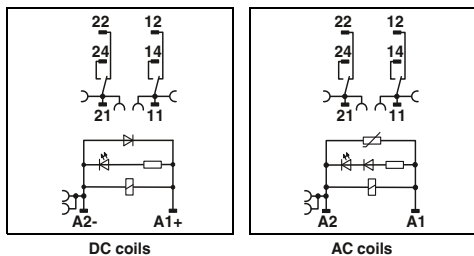


- 1 DC coil
- 2 AC coil

Electrical service life



- 1 = 250 V AC, ohmic load



DC coils

AC coils

#### Technical data

- ① See diagram
- ② 18 7 3.5
- ③ 9 4 - 10 4 - 10
- 10 3 - 20 3 - 20
- Yellow LED, Varistor
- Yellow LED, damping diode

- 2 PDT
- AgNi
- 250 V AC/DC
- 12 V (at 10 mA)
- See diagram
- 16 A (20 ms, N/O contact)
- 12 A (20 ms, N/O contact)
- 10 mA (at 12 V)

- 4 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40°C ... 45°C
- 40°C ... 60°C
- 100% operating factor
- Approx. 5x 10<sup>6</sup> cycles
- DIN EN 50178
- 2 / III

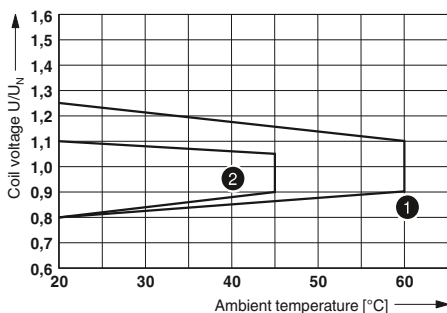
- Any / in rows with zero spacing
- 0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16
- 16 mm / 93 mm / 75 mm
- Class A product, see page 583

#### Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-RPT-LDP-24DC/2X21MS	2905291	10
RIF-1-RPT-LV-120AC/2X21MS	2909775	10
RIF-1-RPT-LV-230AC/2X21MS	2905292	10

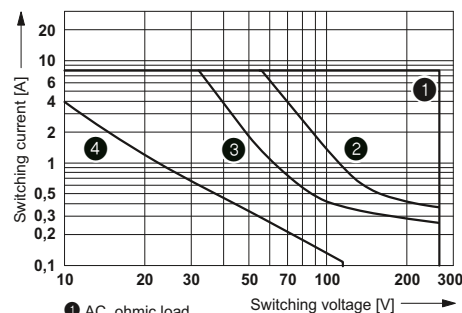
### RIF-1-RPT.../2X21... (2 changeover contacts)

Operating voltage range



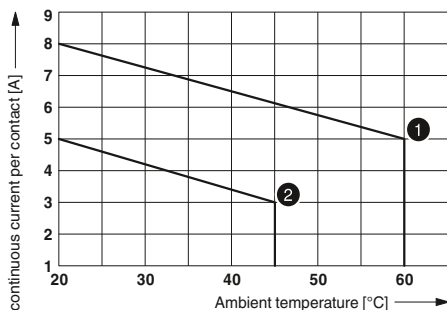
- 1 DC coils
- 2 AC coils

Interrupting rating



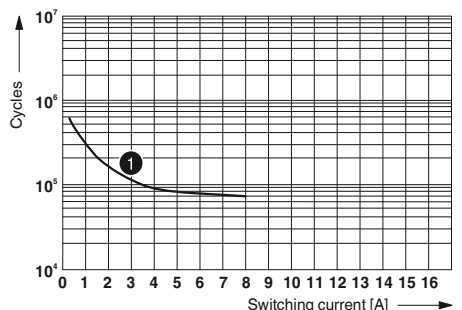
- 1 AC, ohmic load
- 2 DC, ohmic load, contacts in series
- 3 DC, ohmic load
- 4 DC, L/R = 40 ms

Contact derating



- 1 DC coil
- 2 AC coil

Electrical service life



- 1 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

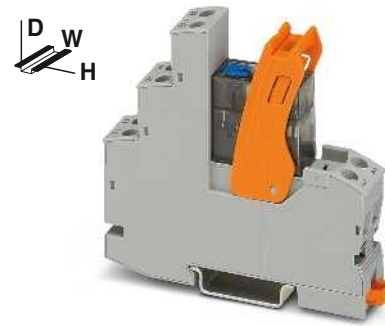
### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

- Relay base with screw connection
- 1 or 2 PDT relays with detectable manual operation
- Relay retaining bracket
- Interference suppression module (AC types only)

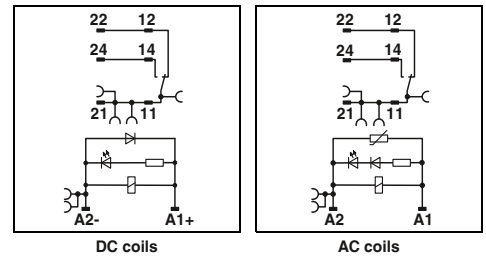
The advantages:

- Relay with lockable manual operation and status LED
- With DC types, free-wheeling diode is integrated into relay
- Mechanical switch position indicator
- Professional bridging of adjacent modules saves wiring time



**1-changeover-contact relay module with screw connection and manual operation**

ERC



DC coils

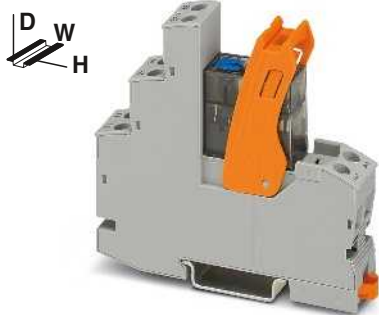
AC coils

#### Technical data

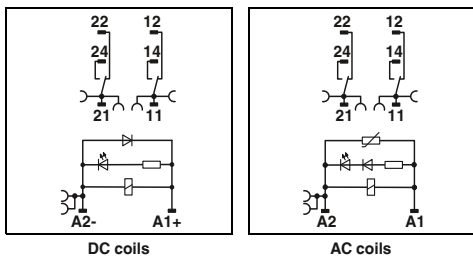
Input data	①	②	③
Permissible range (with reference to $U_N$ )	See diagram		
Typical input current at $U_N$	[mA]	18	7 4.5
Typical response time at $U_N$	[ms]	9	4 - 10 4 - 12
Typical release time at $U_N$	[ms]	10	3 - 20 4 - 20
Input circuit AC	Yellow LED, Varistor		
Input circuit DC	Yellow LED, damping diode		
Output data			
Contact type	1 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	12 V (at 10 mA)		
Limiting continuous current	See diagram		
Maximum switch-on current AC	32 A (20 ms, N/O contact)		
Maximum switch-on current DC	24 A (20 ms, N/O contact)		
Minimum switching current	10 mA (at 12 V)		
General data			
Test voltage (winding/contact)	4 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40°C ... 50°C		
Ambient temperature (operation), DC	-40°C ... 60°C		
Nominal operating mode	100% operating factor		
Mechanical service life	Approx. 5x 10 <sup>6</sup> cycles		
Standards/regulations	DIN EN 50178		
Degree of pollution/surge voltage category	2 / III		
Mounting position/mounting	Any / in rows with zero spacing		
Connection data solid/stranded/AWG	0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10		
Dimensions	W / H / D 16 mm / 89 mm / 75 mm		
EMC note	Class A product, see page 583		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Coupling relay modules</b> with power contact relay with manual operation and screw connection	① 24 V DC	RIF-1-RSC-LDP-24DC/1X21MS	2905659	10
	② 120 V AC	RIF-1-RSC-LV-120AC/1X21MS	2909774	10
	③ 230 V AC	RIF-1-RSC-LV-230AC/1X21MS	2905661	10



2-changeover-contact relay module with screw connection and manual operation



DC coils

AC coils

Technical data

- | ①                         | ②      | ③      |
|---------------------------|--------|--------|
| See diagram               |        |        |
| 18                        | 7      | 4.5    |
| 9                         | 4 - 10 | 4 - 12 |
| 10                        | 3 - 20 | 4 - 20 |
| Yellow LED, Varistor      |        |        |
| Yellow LED, damping diode |        |        |

- 2 PDT
- AgNi
- 250 V AC/DC
- 12 V (at 10 mA)
- See diagram
- 16 A (20 ms, N/O contact)
- 12 A (20 ms, N/O contact)
- 10 mA (at 12 V)

- 4 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40°C ... 45°C
- 40°C ... 60°C
- 100% operating factor
- Approx. 5x 10<sup>6</sup> cycles
- DIN EN 50178
- 2 / III

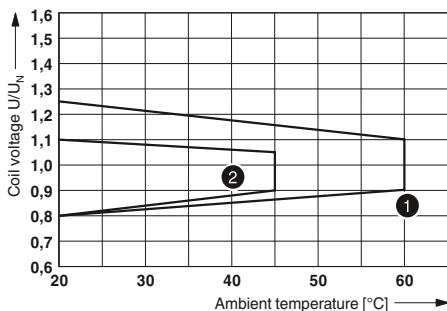
- Any / in rows with zero spacing
- 0.5 ... 4 mm<sup>2</sup> / 0.5 ... 4 mm<sup>2</sup> / 20 - 10
- 16 mm / 89 mm / 75 mm
- Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-RSC-LDP-24DC/2X21MS	2905660	10
RIF-1-RSC-LV-120AC/2X21MS	2909773	10
RIF-1-RSC-LV-230AC/2X21MS	2905662	10

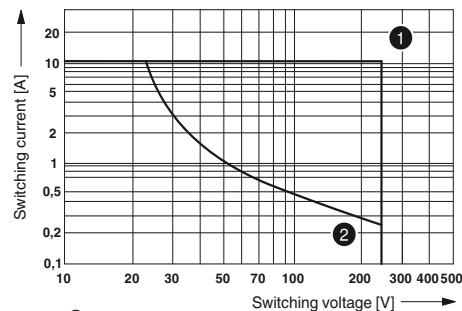
RIF-1-RSC.../1X21... (1 changeover contact)

Operating voltage range



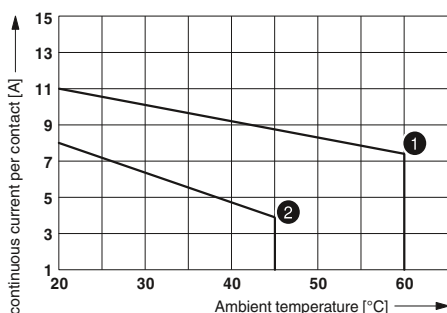
- ① DC coils
- ② AC coils

Interrupting rating



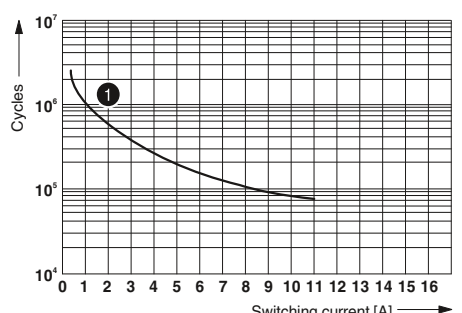
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

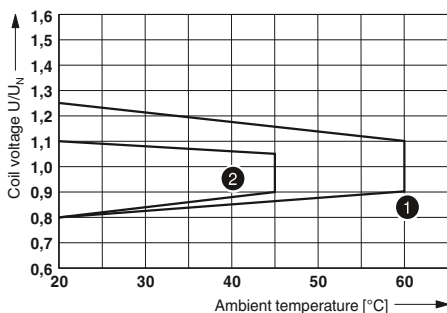
Electrical service life



- ① = 250 V AC, ohmic load

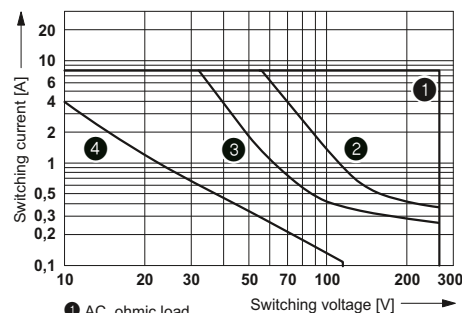
RIF-1-RSC.../2X21... (2 changeover contacts)

Operating voltage range



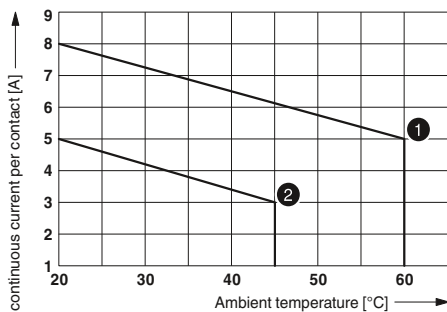
- ① DC coils
- ② AC coils

Interrupting rating



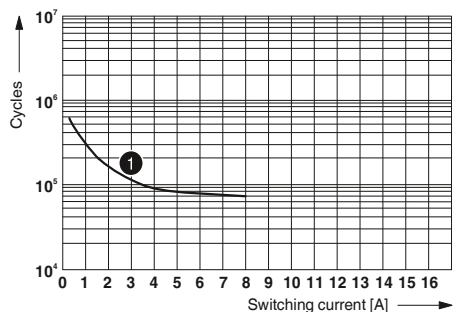
- ① AC, ohmic load
- ② DC, ohmic load, contacts in series
- ③ DC, ohmic load
- ④ DC, L/R = 40 ms

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

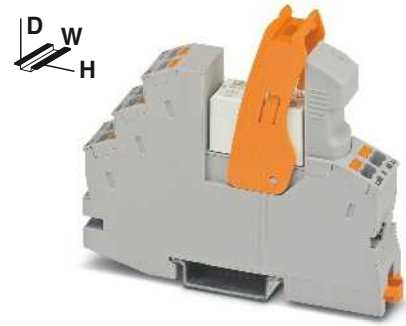
### Fully mounted relays for high inrush currents, e.g., LEDs

Fully mounted RIF-1 relay modules, consisting of:

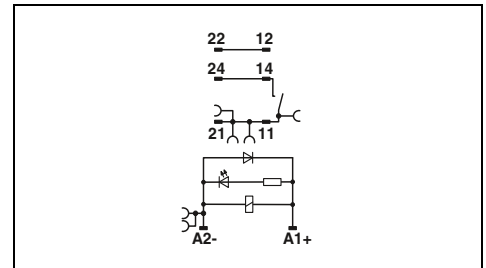
- Relay base with Push-in connection
- 1-N/O-contact relay
- Relay retaining bracket

The advantages:

- Maximum inrush current up to 130 A
- Logical contact arrangement, thanks to 1/3-level relay base
- Operational reliability, thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358
- For FBS 2-8 plug-in bridges for the output side (11/21), see page 358



**1-N/O-contact relay module with Push-in and screw connection**



#### Technical data

<b>Input data</b>	①
Permissible range (with reference to $U_N$ )	See diagram
Typical input current at $U_N$ [mA]	18
Typical response time at $U_N$ [ms]	8
Typical release time at $U_N$ [ms]	10
Input circuit DC	Yellow LED, damping diode
<b>Output data</b>	
Contact type	1 N/O contact
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V AC/DC (at 100 mA)
Limiting continuous current	6 A
Maximum switch-on current DC	80 A (for 20 ms) / 130 A (peak, at capacitive load, 230 V AC, 24 $\mu$ F)
Minimum switching current	100 mA (at 12 V DC)
<b>General data</b>	
Test voltage (winding/contact)	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation), DC	-40°C ... 70°C
Nominal operating mode	100% operating factor
Mechanical service life, DC	3x 10 <sup>7</sup> cycles
Standards/regulations	EN 50178, EN 61810-1
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	Any / in rows with zero spacing
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
Dimensions	16 mm / 93 mm / 75 mm

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Coupling relay modules for high inrush currents</b>				
with Push-in connection	① 12 V DC	RIF-1-RPT-LDP-12DC/1IC	1078802	10
with Push-in connection	② 24 V DC	RIF-1-RPT-LDP-24DC/1IC	2909884	10
with screw connection	③ 12 V DC	RIF-1-RSC-LDP-12DC/1IC	1078803	10
with screw connection	④ 24 V DC	RIF-1-RSC-LDP-24DC/1IC	2909885	10

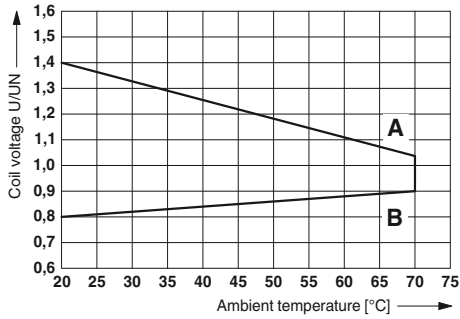
**Operating voltage range**

**Curve A**

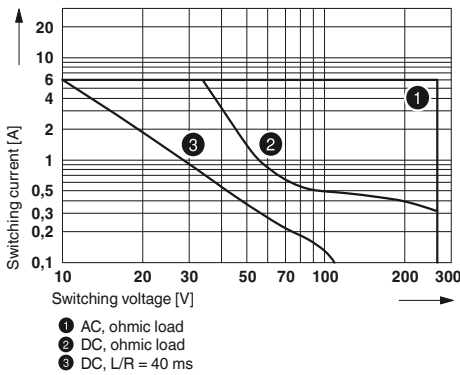
Maximum permissible continuous voltage  $U_{max}$  with limiting continuous current on the contact side (see relevant technical data).

**Curve B**

Minimum permitted pick-up voltage  $U_{op}$  after pre-excitation (see relevant technical data).

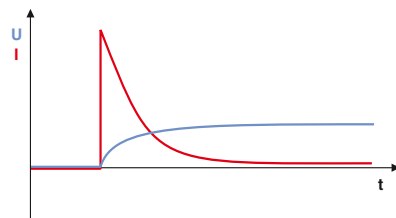


**Interrupting rating**



**Basic behavior of capacitive loads:**

- Very high input current
- Voltage increases with an e-function



# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted relay modules with tungsten lead contact relay

Fully mounted RIF-1 relay modules for very high inrush currents, e.g., from LEDs, consisting of:

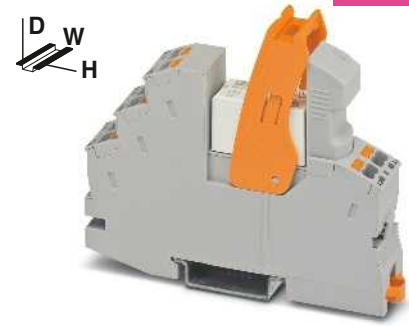
- Relay base with Push-in connection
- 1-N/O-contact relay
- Relay retaining bracket

The advantages:

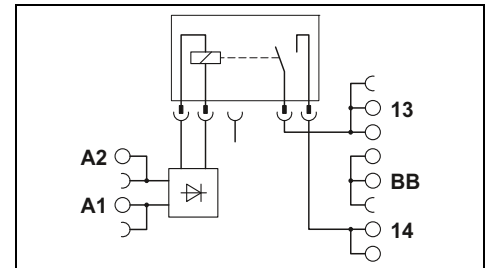
- Maximum inrush current up to 800 A peak
- Logical contact arrangement, thanks to 1/3-level relay base
- Operational reliability, thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358
- For FBS 2-8 plug-in bridges for the output side (11/21), see page 358



new



**1-N/O-contact relay module with Push-in and screw connection**



#### Technical data

<b>Input data</b>	①
Permissible range (with reference to $U_N$ )	See diagram
Typical input current at $U_N$ [mA]	18
Typical response time at $U_N$ [ms]	8
Typical release time at $U_N$ [ms]	10
Input circuit DC	Yellow LED, polarity protection diode, damping diode
<b>Output data</b>	
Contact type	1 N/O contact
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V (at 100 mA)
Limiting continuous current	6 A
Maximum switch-on current DC	165 A (20 ms) / 800 A (peak, at capacitive load, 230 V AC, 24 $\mu$ F)
Minimum switching current	100 mA (at 12 V DC)
<b>General data</b>	
Test voltage (winding/contact)	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation), DC	-40°C ... 70°C
Nominal operating mode	100% operating factor
Mechanical service life, DC	$3 \times 10^7$ cycles
Standards/regulations	EN 50178, EN 61810-1
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	Any / in rows with zero spacing
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
Dimensions	16 mm / 93 mm / 75 mm

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Coupling relay modules with tungsten lead contact relay</b>				
with Push-in connection	① 24 V DC	RIF-1-RPT-LDP-24DC/1ICT	1078686	10
with screw connection	② 24 V DC	RIF-1-RSC-LDP-24DC/1ICT	1078681	10

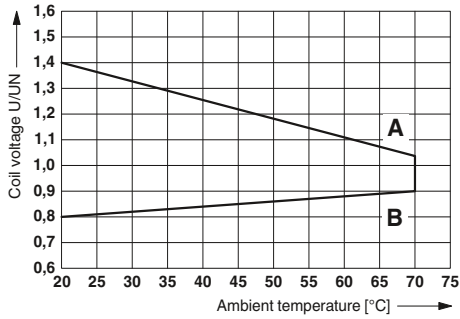
**Operating voltage range**

**Curve A**

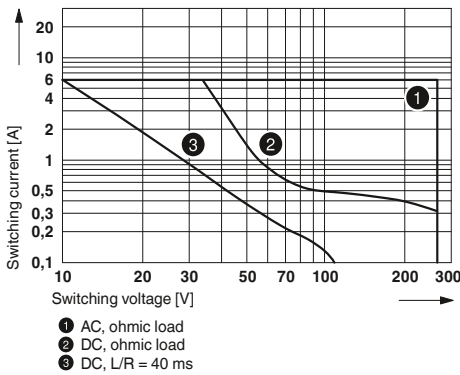
Maximum permissible continuous voltage  $U_{max}$  with limiting continuous current on the contact side (see relevant technical data).

**Curve B**

Minimum permitted pick-up voltage  $U_{op}$  after pre-excitation (see relevant technical data).

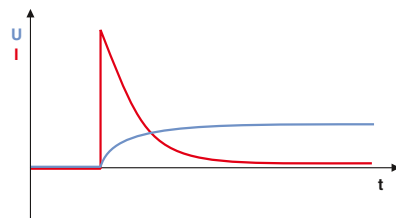


**Interrupting rating**



**Basic behavior of capacitive loads:**

- Very high input current
- Voltage increases with an e-function





# Relay modules

## RIFLINE complete – Industrial relay system

### Fully assembled RIF-1 coupling relay modules with force-guided contacts

Fully assembled RIF-1 coupling relay module with force-guided contacts, consisting of:

- Relay base with Push-in connection
- 2-changeover-contact relay with force-guided contacts in accordance with EN 50205
- Relay retaining bracket
- Interference suppression module

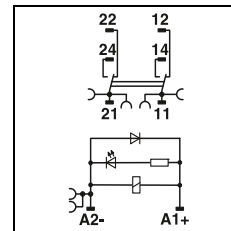
The advantages:

- Switching current of up to 2x 6 A
- Single-channel control
- Forcibly guided contacts in accordance with EN 50205
- Professional bridging of adjacent modules saves wiring time
- Integrated status LED and freewheeling diode
- The requirements for type A in accordance with DIN EN 50205 are satisfied if the circuit is designed as 1 N/O contact / 1 N/C contact

**Notes:**  
Further voltage variants on request



**2-changeover-contact relay module with force-guided contacts, max. 2 x 6 A**



<b>Input data</b>	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit DC	
<b>Output data</b>	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current	
Minimum switching current	
<b>General data</b>	
Ambient temperature (operation)	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
<b>Conformance/approvals</b>	
Conformance	
ATEX	
IECEX	
UL, USA	
UL, USA/Canada	
UL, Canada	
EMC note	

<b>Technical data</b>		
①	See diagram	
	30	[mA]
	10	[ms]
	10	[ms]
	Yellow LED, damping diode	
	2 changeover contacts, forcibly actuated	
	AgNi	
	250 V AC/DC	
	15 V AC/DC	
	6 A	
	6 A	
	10 mA	
	-20°C ... 50°C	
	100% operating factor	
	Approx. 10 <sup>7</sup> cycles	
	DIN EN 50178/VDE 0160, EN 50205	
	2 / III	
	Any / in rows with zero spacing	
	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16	
	16 mm / 93 mm / 70 mm	
	CE-compliant	
	-	
	-	
	-	
	cULus listed UL 508	
	-	
	Class A product, see page 583	

Description	Input voltage $U_N$
<b>Coupling relay module</b> with power contact relay and force-guided contacts	
with Push-in connection	① 24 V DC
with screw connection	① 24 V DC
<b>Force-guided coupling relay</b> with power contacts	
	① 24 V DC

<b>Ordering data</b>		
Type	Order No.	Pcs./Pkt.
RIF-1-RPT-LDP-24DC/2X21/FG	2908215	10
RIF-1-RSC-LDP-24DC/2X21/FG	2909848	10

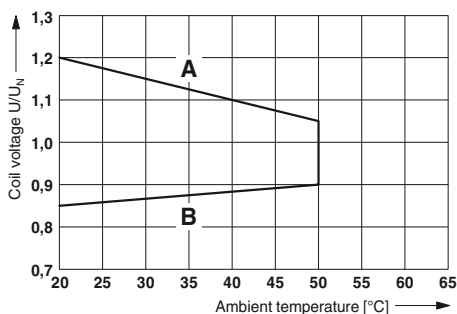
### RIF-1-RPT-LDP-24DC/2X21/FG



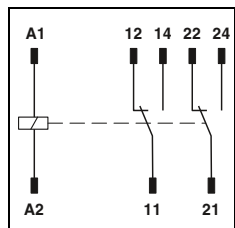
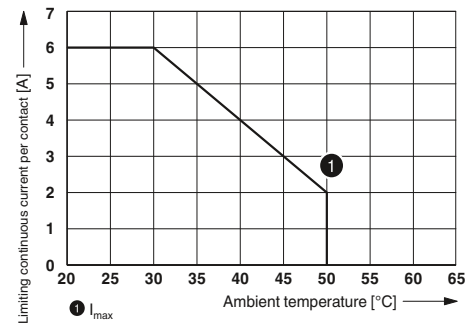
Relay with two changeover contacts with force-guided contacts, max. 2 x 6 A



Operating voltage range



Contact derating



#### Technical data

①  
See diagram  
29  
10  
4

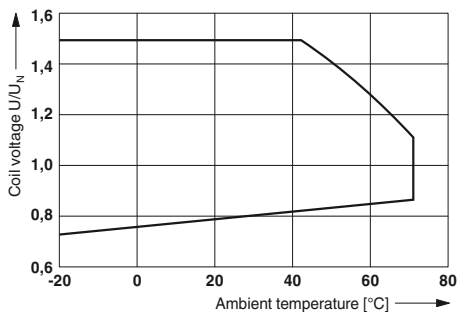
2 PDT  
AgNi  
250 V AC/DC  
15 V  
6 A  
6 A  
10 mA

-25°C ... 70°C  
100% operating factor  
Approx.  $10^7$  cycles  
DIN EN 50178, IEC 60664-1  
2 / III

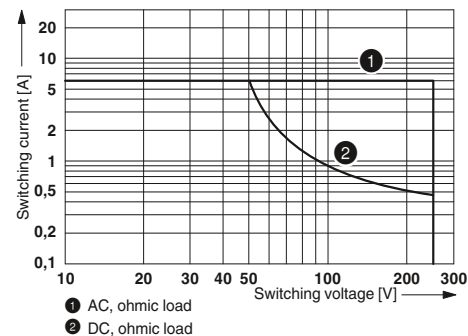
-  
- ... - / - ... - / -  
12.6 mm / 29 mm / 25.5 mm

### REL-SR- 24DC/2X21/FG

Operating voltage range



Interrupting rating



#### Ordering data

Type	Order No.	Pcs./Pkt.
REL-SR- 24DC/2X21/FG	2908777	20

# Relay modules

## RIFLINE complete – Industrial relay system

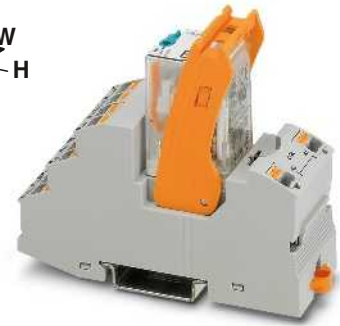
### Fully mounted RIF-2 relay modules

Fully mounted RIF-2 relay modules, consisting of:

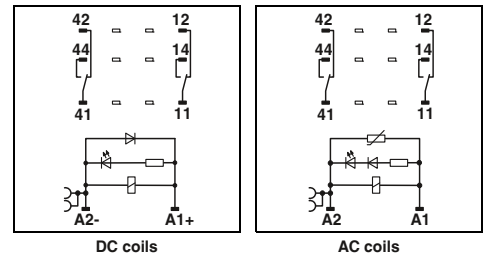
- Relay base with Push-in connection
- 2- or 4-changeover-contact industrial relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Relay with lockable manual operation and status LED
- With DC types, free-wheeling diode is integrated into relay
- Mechanical switch position indicator
- Logical contact arrangement, thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358



**2-changeover-contact industrial relay module with Push-in connection and manual operation**



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life, AC	
Mechanical service life, DC	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data			
①	②	③	④
See diagram			
42	66	13	6.5
13	5 - 15	5 - 15	5 - 15
14	5 - 20	5 - 20	5 - 20
Yellow LED, Varistor			
Yellow LED, damping diode			

2 PDT
AgNi
250 V AC/DC
5 V (at 24 mA)
10 A (see diagram)
30 A (20 ms, N/O contact)
30 A (20 ms, N/O contact)
5 mA (at 24 V)

2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-40°C ... 50°C
-40°C ... 60°C
100% operating factor
Approx. 2x 10 <sup>7</sup> cycles
Approx. 2x 10 <sup>7</sup> cycles
DIN EN 50178
2 / III

Any / in rows with zero spacing
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
31 mm / 96 mm / 75 mm
Class A product, see page 583

### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Pre-assembled coupling relay modules with power contact relay and Push-in connection</b>				
	① 24 V DC	RIF-2-RPT-LDP-24DC/2X21	2903315	10
	② 24 V AC	RIF-2-RPT-LV-24AC/2X21	2903313	10
	③ 120 V AC	RIF-2-RPT-LV-120AC/2X21	2903311	10
	④ 230 V AC	RIF-2-RPT-LV-230AC/2X21	2903310	10

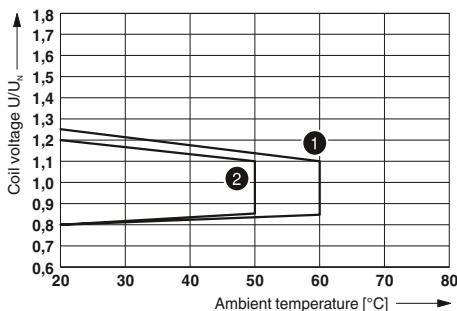


4-changeover-contact industrial relay module with Push-in connection and manual operation



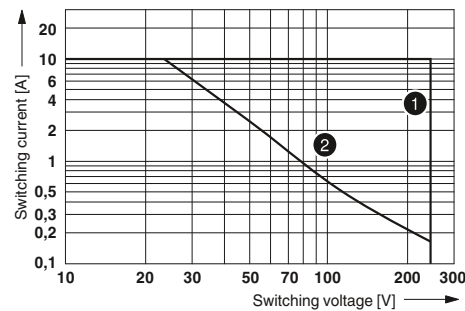
### RIF-2-RPT.../2X21 (2 changeover contacts)

Operating voltage range



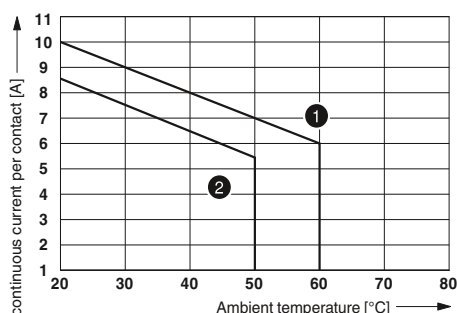
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



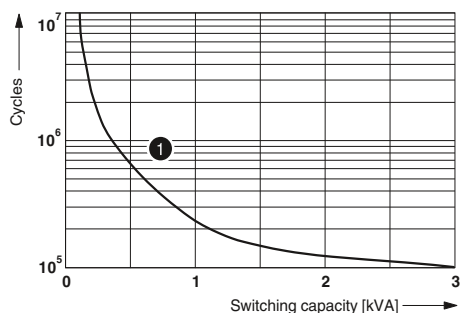
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating

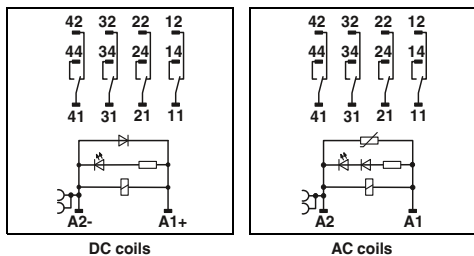


- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load



#### Technical data

①	②	③	④
See diagram			
42	66	13	6.5
13	5 - 15	5 - 15	5 - 15
14	5 - 20	5 - 20	5 - 20
Yellow LED, Varistor			
Yellow LED, damping diode			

- 4 PDTs
- AgNi
- 250 V AC/DC
- 5 V (at 24 mA)
- 6 A (see diagram)
- 16 A (20 ms, N/O contact)
- 16 A (20 ms, N/O contact)
- 5 mA (at 24 V)

- 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40°C ... 50°C
- 40°C ... 60°C
- 100% operating factor
- Approx. 2x 10<sup>7</sup> cycles
- Approx. 2x 10<sup>7</sup> cycles
- DIN EN 50178
- 2 / II

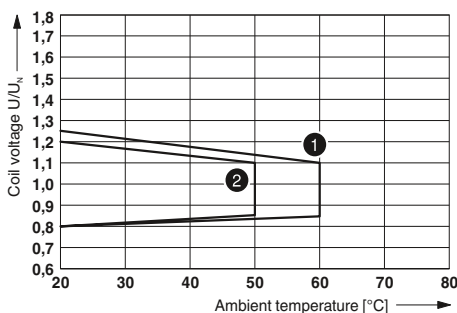
- Any / in rows with zero spacing
- 0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16
- 31 mm / 96 mm / 75 mm
- Class A product, see page 583

#### Ordering data

Type	Order No.	Pcs./Pkt.
RIF-2-RPT-LDP-24DC/4X21	2903308	10
RIF-2-RPT-LV-24AC/4X21	2903306	10
RIF-2-RPT-LV-120AC/4X21	2903305	10
RIF-2-RPT-LV-230AC/4X21	2903304	10

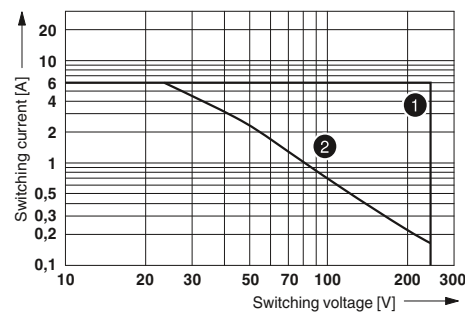
### RIF-2-RPT.../4X21 (4 changeover contacts)

Operating voltage range



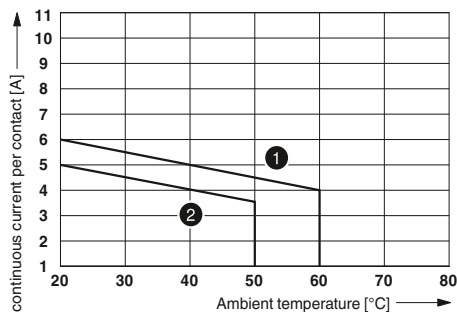
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



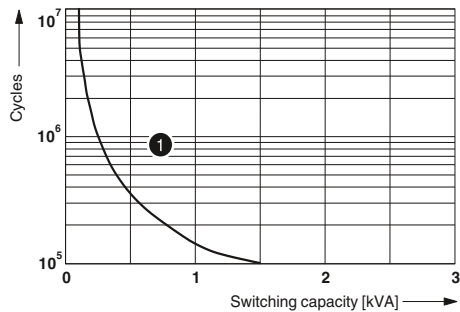
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

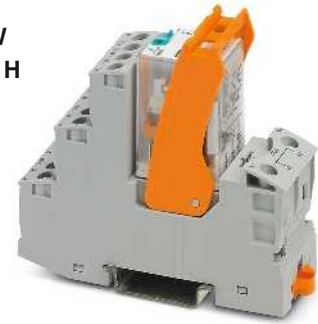
### Fully mounted RIF-2 relay modules

Fully mounted RIF-2 relay modules, consisting of:

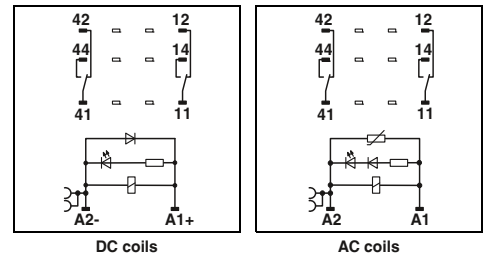
- Relay base with screw connection
- 2 or 4 changeover contacts relay
- Relay retaining bracket
- Interference suppression module (AC types only)

The advantages:

- Relay with lockable manual operation and status LED
- With DC types, free-wheeling diode is integrated into relay
- Mechanical switch position indicator
- Logical contact arrangement, thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358



**2-changeover-contact industrial relay module with screw connection and manual operation**



DC coils

AC coils

#### Technical data

Input data	①	②	③	④	⑤
Permissible range (with reference to $U_N$ )	See diagram				
Typical input current at $U_N$ [mA]	42	7.5	66	13	6.5
Typical response time at $U_N$ [ms]	13	13	5 - 15	5 - 15	5 - 15
Typical release time at $U_N$ [ms]	14	14	5 - 20	5 - 20	5 - 20
Input circuit AC	Yellow LED, Varistor				
Input circuit DC	Yellow LED, damping diode				
Output data					
Contact type	2 PDT				
Contact material	AgNi				
Max. switching voltage	250 V AC/DC				
Minimum switching voltage	5 V (at 24 mA)				
Limiting continuous current	10 A (see diagram)				
Maximum switch-on current AC	30 A (20 ms, N/O contact)				
Maximum switch-on current DC	30 A (20 ms, N/O contact)				
Minimum switching current	5 mA (at 24 V)				
General data					
Test voltage (winding/contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)				
Ambient temperature (operation), AC	-40°C ... 50°C				
Ambient temperature (operation), DC	-40°C ... 60°C				
Nominal operating mode	100% operating factor				
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles				
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles				
Standards/regulations	DIN EN 50178				
Degree of pollution/surge voltage category	2 / III				
Mounting position/mounting	Any / in rows with zero spacing				
Connection data solid/stranded/AWG	0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10				
Dimensions	27 mm / 89 mm / 75 mm				
EMC note	Class A product, see page 583				

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Pre-assembled coupling relay modules with power contact relay and screw connection</b>				
	① 24 V DC	RIF-2-RSC-LDP-24DC/2X21	2903326	10
	② 125 V DC	RIF-2-RSC-LDP-125DC/2X21	2903324	10
	③ 24 V AC	RIF-2-RSC-LV-24AC/2X21	2903323	10
	④ 120 V AC	RIF-2-RSC-LV-120AC/2X21	2903322	10
	⑤ 230 V AC	RIF-2-RSC-LV-230AC/2X21	2903321	10

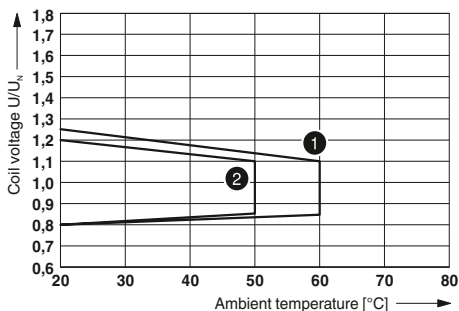


4-changeover-contact industrial relay module with screw connection and manual operation



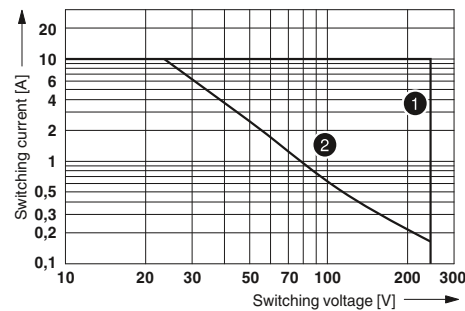
### RIF-2-RSC.../2X21 (2 changeover contacts)

Operating voltage range



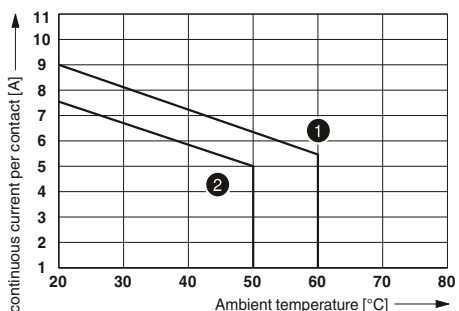
- 1 DC coil (observe contact derating)
- 2 AC coil (observe contact derating)

Interrupting rating



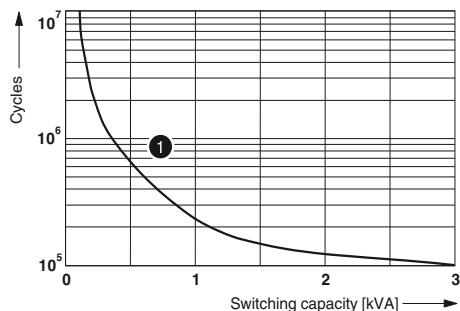
- 1 AC, ohmic load
- 2 DC, ohmic load

Contact derating

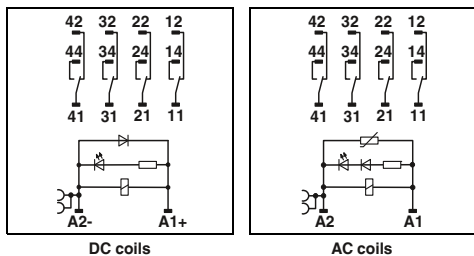


- 1 DC coil
- 2 AC coil

Electrical service life



- 1 250 V AC, ohmic load



DC coils

AC coils

#### Technical data

①	②	③	④	⑤
See diagram				
42	7.5	66	13	6.5
13	13	5 - 15	5 - 15	5 - 15
14	14	5 - 20	5 - 20	5 - 20
Yellow LED, Varistor				
Yellow LED, damping diode				

- 4 PDTs
- AgNi
- 250 V AC/DC
- 5 V (at 24 mA)
- 6 A (see diagram)
- 16 A (20 ms, N/O contact)
- 16 A (20 ms, N/O contact)
- 5 mA (at 24 V)

- 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40°C ... 50°C
- 40°C ... 60°C
- 100% operating factor
- Approx. 2x 10<sup>7</sup> cycles
- Approx. 2x 10<sup>7</sup> cycles
- DIN EN 50178
- 2 / II

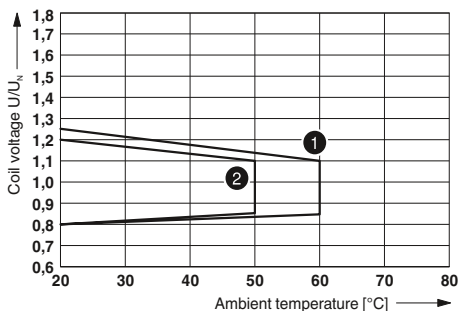
- Any / in rows with zero spacing
- 0.5 ... 4 mm<sup>2</sup> / 0.5 ... 4 mm<sup>2</sup> / 20 - 10
- 27 mm / 89 mm / 75 mm
- Class A product, see page 583

#### Ordering data

Type	Order No.	Pcs./Pkt.
RIF-2-RSC-LDP-24DC/4X21	2903320	10
RIF-2-RSC-LDP-125DC/4X21	2903319	10
RIF-2-RSC-LV-24AC/4X21	2903318	10
RIF-2-RSC-LV-120AC/4X21	2903317	10
RIF-2-RSC-LV-230AC/4X21	2903316	10

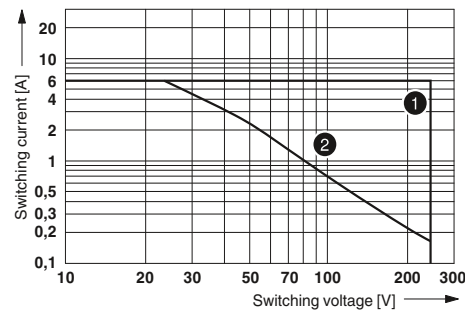
### RIF-2-RSC.../4X21 (4 changeover contacts)

Operating voltage range



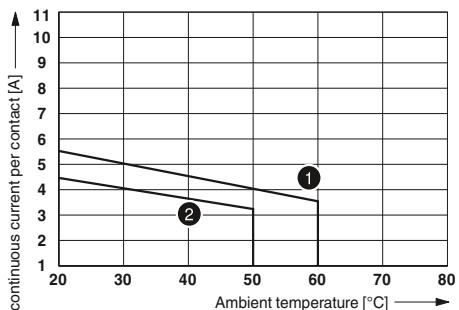
- 1 DC coil (observe contact derating)
- 2 AC coil (observe contact derating)

Interrupting rating



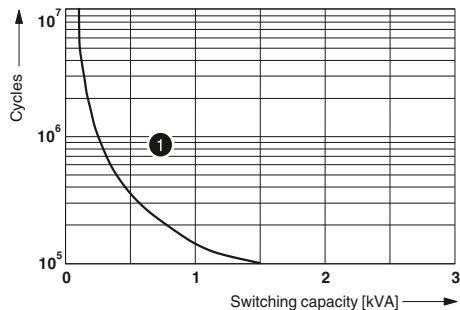
- 1 AC, ohmic load
- 2 DC, ohmic load

Contact derating



- 1 DC coil
- 2 AC coil

Electrical service life



- 1 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-2 relay modules for the Ex area

Relay modules with ATEX, IECEx, and/or Class 1, Division 2 approval for potentially explosive applications

The advantages:

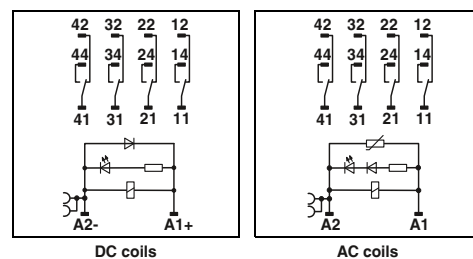
- ATEX, IECEx, and Class1 Division 2 approval in screw and Push-in connection technology
- Safe isolation in accordance with DIN EN 50178 between coil and contact

Fully mounted RIF-2 relay modules, consisting of:

- Relay base with screw or PT connection
- Relay retaining bracket
- Plug-in interference suppression modules
- Sealed 4-changeover-contact industrial relays
- Mechanical switch position indicator
- Logical contact arrangement, thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time



4-changeover-contact industrial relay module with IECEx, ATEX, and Cl. 1 Div. 2 approval



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life, AC	
Mechanical service life, DC	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
Conformance/approvals	
ATEX	
IECEx	
UL, USA/Canada	
EMC note	

Technical data		
①	②	③
See diagram		
42	13	6.5
13	5 - 15	5 - 15
14	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		
4 PDTs		
AgNi		
250 V AC/DC		
5 V (at 24 mA)		
6 A (see diagram)		
16 A (20 ms, N/O contact)		
16 A (20 ms, N/O contact)		
5 mA (at 24 V)		
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40°C ... 50°C		
-40°C ... 60°C		
100% operating factor		
Approx. 2x 10 <sup>7</sup> cycles		
Approx. 2x 10 <sup>7</sup> cycles		
DIN EN 50178, IEC 61508-1		
2 / III		
Any / in rows with zero spacing		
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16		
31 mm / 96 mm / 75 mm		
II 3G Ex ec nC IIC T4 Gc ( IBEExU17ATEXB014X ) Ex ec nC IIC T4 Gc ( IECEx IBE 17.0032X ) Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC Class A product, see page 583		

Description	Input voltage $U_N$
<b>Pre-assembled coupling relay modules for the Ex area</b>	
with Push-in connection	① 24 V DC
with Push-in connection	② 120 V AC
with Push-in connection	③ 230 V AC
with screw connection	④ 24 V DC
with screw connection	⑤ 120 V AC
with screw connection	⑥ 230 V AC
<b>Single relay</b>	
	① 24 V DC
	② 120 V AC
	③ 230 V AC

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-2-RPT-LDP-24DC/4X21/EX	2909741	10
RIF-2-RPT-LV-120AC/4X21/EX	2909740	10
RIF-2-RPT-LV-230AC/4X21/EX	2909739	10
RIF-2-RSC-LDP-24DC/4X21/EX	2909845	10
RIF-2-RSC-LV-120AC/4X21/EX	2909846	10
RIF-2-RSC-LV-230AC/4X21/EX	2909847	10

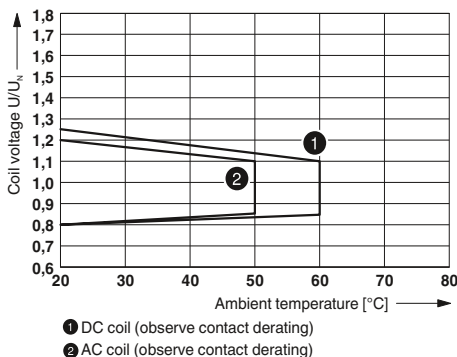
new



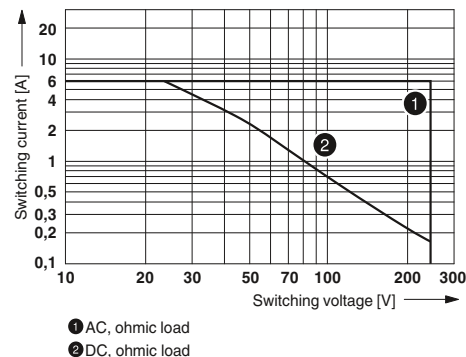
Sealed industrial relay with four changeover contacts, 4 x 6 A, maximum

### RIF-2-R.../4X21/EX

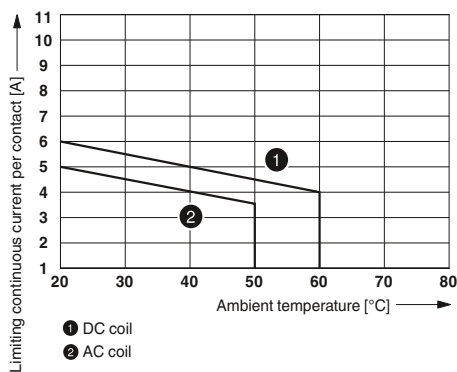
Operating voltage range



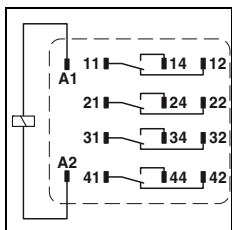
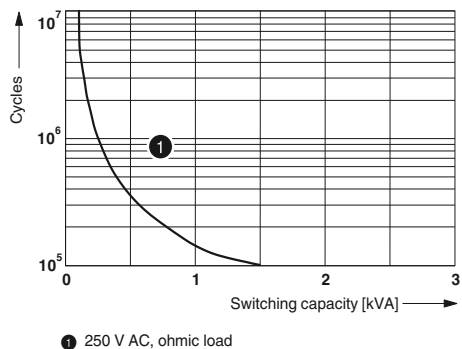
Interrupting rating



Contact derating



Electrical service life



#### Technical data

①	②	③
See diagram		
38	13	6.5
13	5 - 15	5 - 15
3	5 - 20	5 - 20

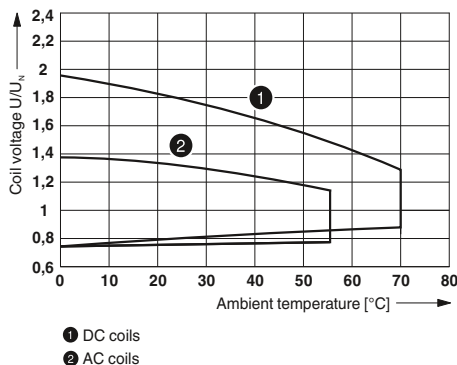
4 PDTs  
 AgNi  
 250 V AC/DC  
 5 V (at 24 mA)  
 6 A  
 16 A (20 ms, N/O contact)  
 16 A (20 ms, N/O contact) / 12 A (4 s, 4 N/O contacts)

5 mA (at 24 V)

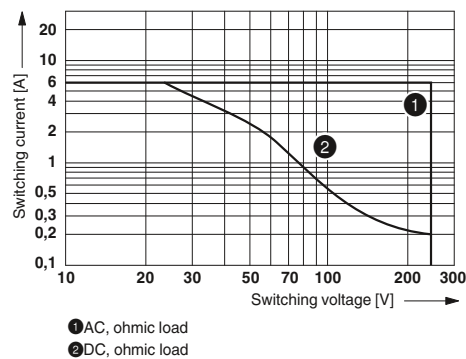
2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -40°C ... 55°C  
 -40°C ... 70°C  
 100% operating factor  
 Approx. 2x 10<sup>7</sup> cycles  
 1x 10<sup>7</sup> cycles, approximately  
 IEC 60664, IEC 61810  
 2 / II  
 any  
 - ... - / - ... - / -  
 21.2 mm / 27.5 mm / 35.6 mm

### REL-IR4.../4X21/EX

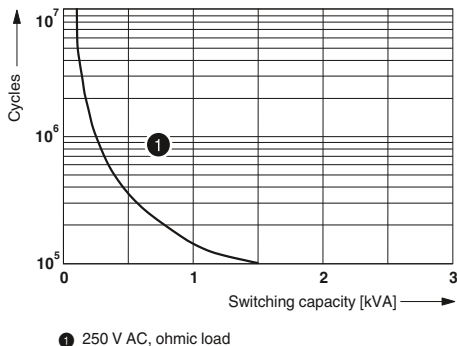
Operating voltage range



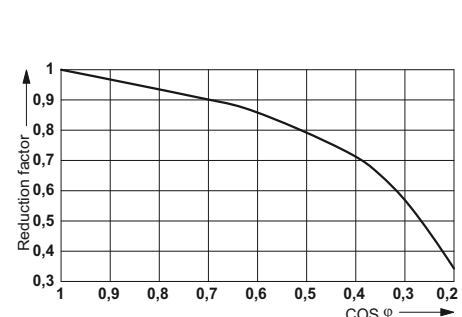
Interrupting rating



Electrical service life



Service life reduction factor



#### Ordering data

Type	Order No.	Pcs./Pkt.
REL-IR4/24DC/4X21/EX	2909738	10
REL-IR4/120AC/4X21/EX	2909744	10
REL-IR4/230AC/4X21/EX	2909742	10



# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-3 relay modules

Fully mounted RIF-3 relay modules, consisting of:

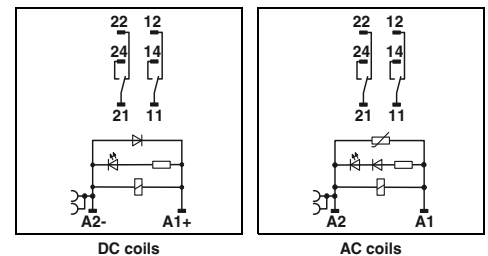
- Relay base with Push-in connection
- 2 or 3-changeover-contact octal relay
- Relay retaining bracket
- Interference suppression module (AC types only)

The advantages:

- Relay with lockable manual operation and status LED
- With DC types, free-wheeling diode is integrated into relay
- Mechanical switch position indicator
- Logical contact arrangement, thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358



**2-changeover-contact octal relay module with Push-in connection and manual operation**



<b>Input data</b>	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
<b>Output data</b>	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
<b>General data</b>	
Test voltage (winding/contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life, AC	
Mechanical service life, DC	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data		
①	②	③
See diagram		
60	23	13
18	5 - 15	5 - 15
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		

2 PDT
AgNi
250 V AC/DC
10 V (at 24 mA)
10 A (see diagram)
30 A (20 ms, N/O contact)
30 A (20 ms, N/O contact)
10 mA (at 24 V)

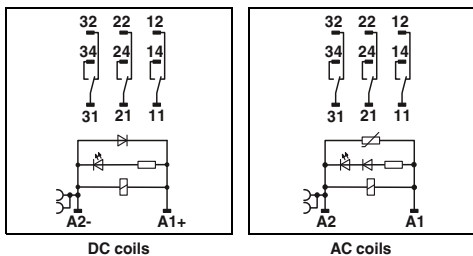
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-40°C ... 50°C
-40°C ... 60°C
100% operating factor
Approx. 2x 10 <sup>7</sup> cycles
Approx. 2x 10 <sup>7</sup> cycles
DIN EN 50178
2 / III
Any / in rows with zero spacing
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
40 mm / 103 mm / 90 mm
Class A product, see page 583

Description	Input voltage $U_N$
<b>Pre-assembled coupling relay modules</b> with power contact relay and Push-in connection	① 24 V DC
	② 120 V AC
	③ 230 V AC

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-3-RPT-LDP-24DC/2X21	2903297	5
RIF-3-RPT-LV-120AC/2X21	2903296	5
RIF-3-RPT-LV-230AC/2X21	2903295	5



**3-changeover-contact octal relay module with Push-in connection and manual operation**



**Technical data**

① ② ③  
See diagram  
60 23 13  
18 5 - 15 5 - 15  
20 5 - 20 5 - 20  
Yellow LED, Varistor  
Yellow LED, damping diode

3 PDTs  
AgNi  
250 V AC/DC  
10 V (at 24 mA)  
8.5 A (see diagram)  
30 A (20 ms, N/O contact)  
30 A (20 ms, N/O contact)  
10 mA (at 24 V)

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-40°C ... 50°C  
-40°C ... 60°C  
100% operating factor  
Approx. 2x 10<sup>7</sup> cycles  
Approx. 2x 10<sup>7</sup> cycles  
DIN EN 50178  
2 / III

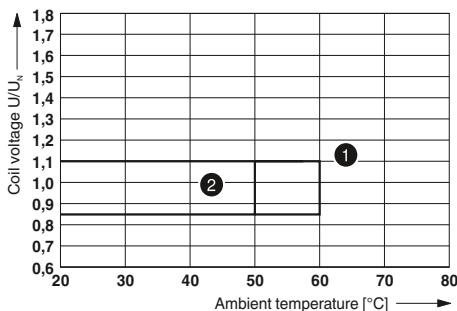
Any / in rows with zero spacing  
0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16  
40 mm / 103 mm / 90 mm  
Class A product, see page 583

**Ordering data**

Type	Order No.	Pcs./Pkt.
RIF-3-RPT-LDP-24DC/3X21	2903294	5
RIF-3-RPT-LV-120AC/3X21	2903293	5
RIF-3-RPT-LV-230AC/3X21	2903292	5

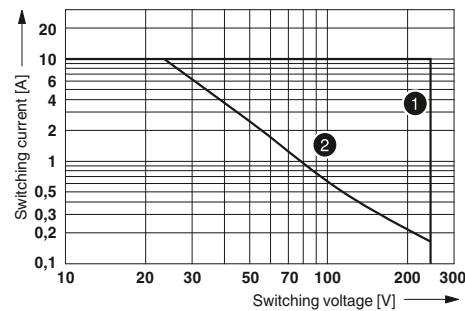
**RIF-3-RPT.../2X21 (2 changeover contacts)**

Operating voltage range



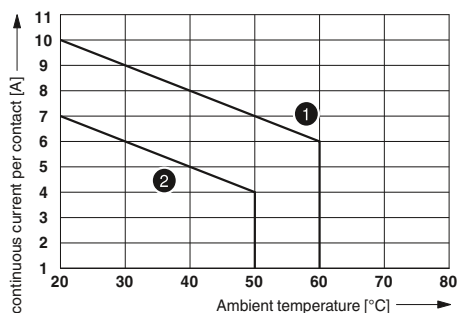
① DC coil (observe contact derating)  
② AC coil (observe contact derating)

Interrupting rating



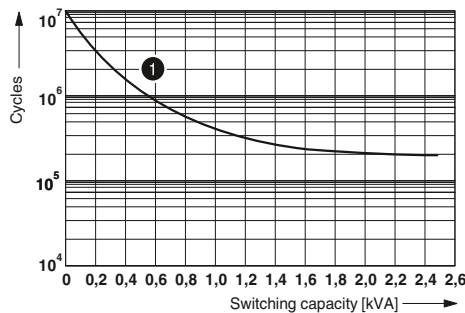
① AC, ohmic load  
② DC, ohmic load

Contact derating



① DC coil  
② AC coil

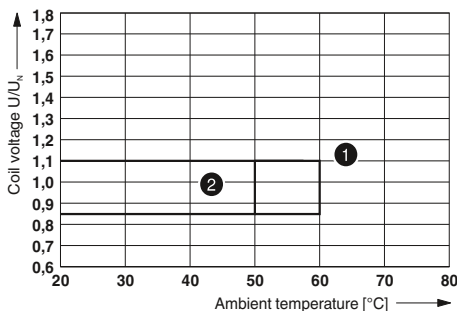
Electrical service life



① 250 V AC, ohmic load

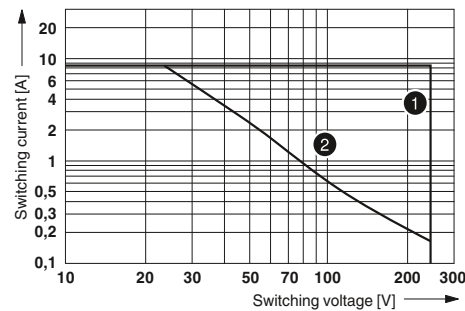
**RIF-3-RPT.../3X21 (3 changeover contacts)**

Operating voltage range



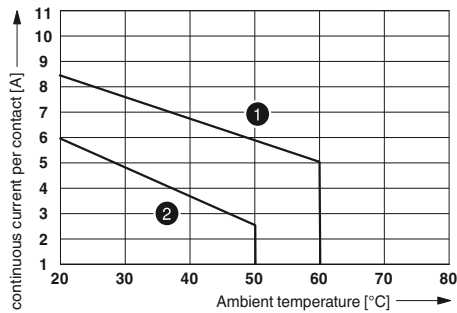
① DC coil (observe contact derating)  
② AC coil (observe contact derating)

Interrupting rating



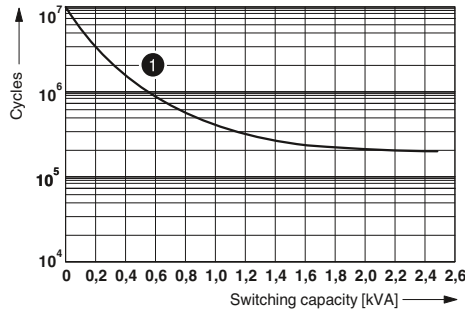
① AC, ohmic load  
② DC, ohmic load

Contact derating



① DC coil  
② AC coil

Electrical service life



① 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

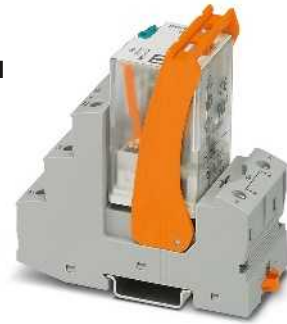
### Fully mounted RIF-3 relay modules

Fully mounted RIF-3 relay modules, consisting of:

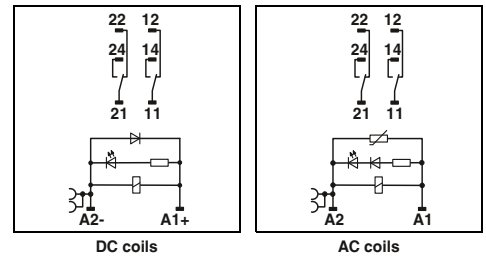
- Relay base with screw connection
- 2 or 3-changeover-contact octal relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Relay with lockable manual operation and status LED
- With DC types, free-wheeling diode is integrated into relay
- Mechanical switch position indicator
- Logical contact arrangement, thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358



**2-changeover-contact octal relay module with screw connection and manual operation**



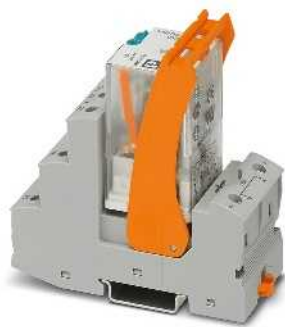
Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life, AC	
Mechanical service life, DC	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data		
①	②	③
See diagram		
60	23	13
18	5 - 15	5 - 15
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		

Contact type	2 PDT
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	10 V (at 24 mA)
Limiting continuous current	10 A (see diagram)
Maximum switch-on current AC	30 A (20 ms, N/O contact)
Maximum switch-on current DC	30 A (20 ms, N/O contact)
Minimum switching current	10 mA (at 24 V)
Test voltage (winding/contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40°C ... 50°C
Ambient temperature (operation), DC	-40°C ... 60°C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles
Standards/regulations	DIN EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	Any / in rows with zero spacing
Connection data solid/stranded/AWG	0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10
Dimensions	40 mm / 96 mm / 90 mm
EMC note	Class A product, see page 583

Description	Input voltage $U_N$
<b>Pre-assembled coupling relay modules</b> with power contact relay and screw connection	① 24 V DC
	② 120 V AC
	③ 230 V AC

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-3-RSC-LDP-24DC/2X21	2903303	5
RIF-3-RSC-LV-120AC/2X21	2903302	5
RIF-3-RSC-LV-230AC/2X21	2903301	5

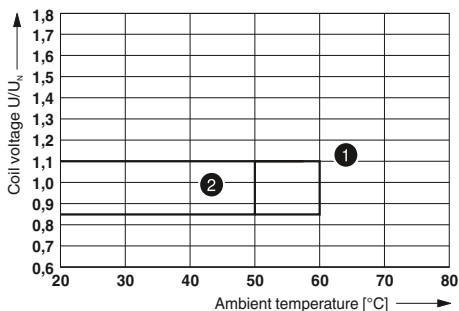


**3-changeover-contact octal relay module with screw connection and manual operation**



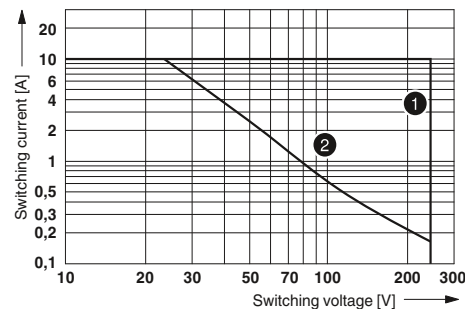
### RIF-3-RSC.../2X21 (2 changeover contacts)

Operating voltage range



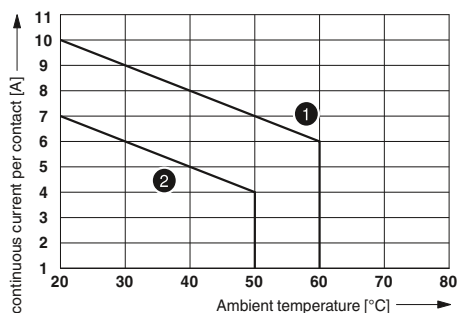
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



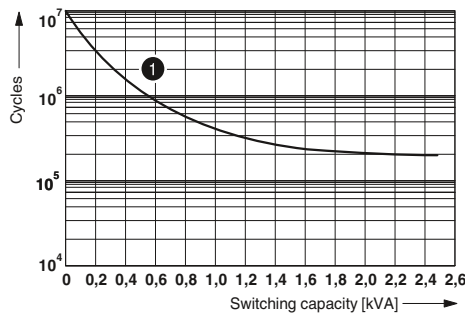
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating

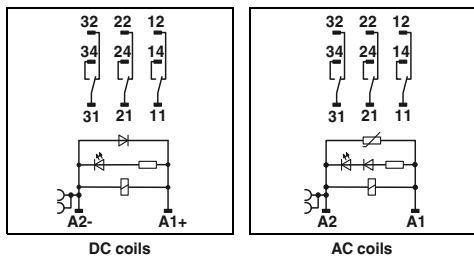


- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load



#### Technical data

① ② ③  
See diagram  
60 23 13  
18 5 - 15 5 - 15  
20 5 - 20 5 - 20  
Yellow LED, Varistor  
Yellow LED, damping diode

3 PDTs  
AgNi  
250 V AC/DC  
10 V (at 24 mA)  
8.5 A (see diagram)  
30 A (20 ms, N/O contact)  
30 A (20 ms, N/O contact)  
10 mA (at 24 V)

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-40°C ... 50°C  
-40°C ... 60°C  
100% operating factor  
Approx. 2x 10<sup>7</sup> cycles  
Approx. 2x 10<sup>7</sup> cycles  
DIN EN 50178  
2 / III

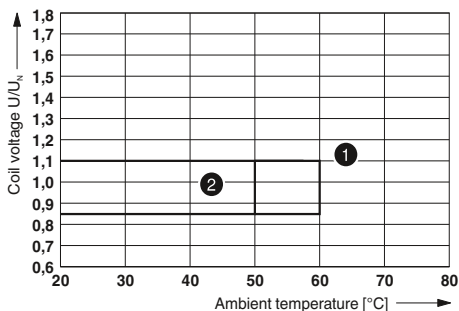
Any / in rows with zero spacing  
0.5 ... 4 mm<sup>2</sup> / 0.5 ... 4 mm<sup>2</sup> / 20 - 10  
40 mm / 96 mm / 90 mm  
Class A product, see page 583

#### Ordering data

Type	Order No.	Pcs./Pkt.
RIF-3-RSC-LDP-24DC/3X21	2903300	5
RIF-3-RSC-LV-120AC/3X21	2903299	5
RIF-3-RSC-LV-230AC/3X21	2903298	5

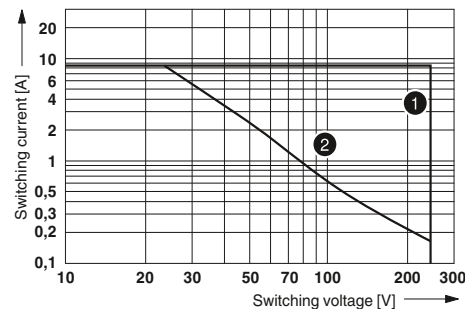
### RIF-3-RSC.../3X21 (3 changeover contacts)

Operating voltage range



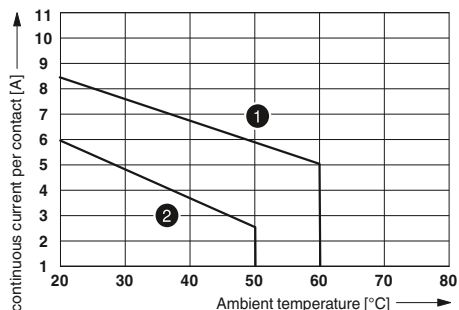
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



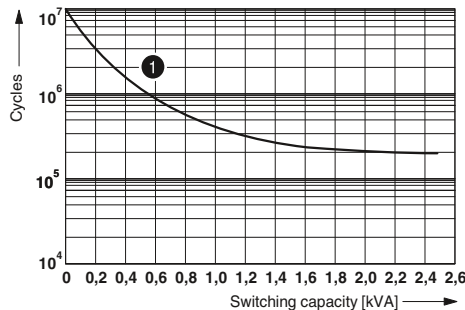
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-4 relay modules

Fully mounted RIF-4 relay modules, consisting of:

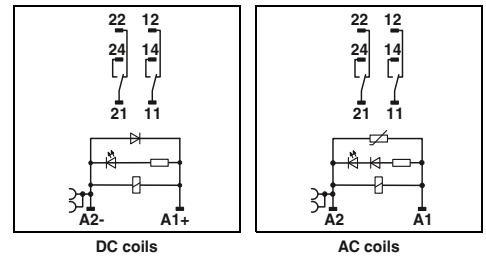
- Relay base with Push-in connection
- 2 or 3-PDT high-power relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Logical contact arrangement, thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358



**2-changeover-contact high-power relay module with Push-in connection**



DC coils

AC coils

#### Technical data

Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
Maximum interrupting rating, ohmic load	
	250 V AC
	440 V AC
Motor load in accordance with UL 508	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life, AC	
Mechanical service life, DC	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Input side	
Output side	
Dimensions	W / H / D
EMC note	

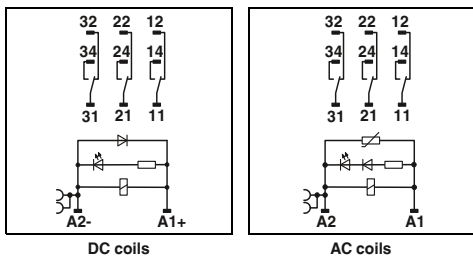
①	②	③
See diagram		
56	24	14
20	5 - 25	5 - 25
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		
2 PDT		
AgNi		
440 V AC / 250 V DC		
10 V (at 24 mA)		
11 A (see diagram)		
50 A (20 ms, N/O contact)		
50 A (20 ms, N/O contact)		
10 mA (at 24 V)		
2500 VA		
4,000 VA		
1/3 HP, 120 V AC (single-phase AC motor)		
1/2 HP, 240 V AC (single-phase AC motor)		
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40°C ... 40°C		
-40°C ... 60°C		
100% operating factor		
Approx. 10 <sup>7</sup> cycles		
Approx. 10 <sup>7</sup> cycles		
DIN EN 50178		
2 / III		
Any / in rows with zero spacing		
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16		
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14		
43 mm / 111 mm / 90 mm		
Class A product, see page 583		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Pre-assembled coupling relay modules</b> with power contact relay and Push-in connection	① 24 V DC	RIF-4-RPT-LDP-24DC/2X21	2903281	5
	② 120 V AC	RIF-4-RPT-LV-120AC/2X21	2903280	5
	③ 230 V AC	RIF-4-RPT-LV-230AC/2X21	2903279	5



3-changeover-contact high-power relay module with Push-in connection



Technical data

①	②	③
See diagram		
56	24	14
20	5 - 25	5 - 25
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		

3 PDTs  
 AgNi  
 440 V AC / 250 V DC  
 10 V (at 24 mA)  
 10 A (see diagram)  
 50 A (20 ms, N/O contact)  
 50 A (20 ms, N/O contact)  
 10 mA (at 24 V)

2500 VA  
 4,000 VA  
 1/3 HP, 120 V AC (single-phase AC motor)  
 1/2 HP, 240 V AC (single-phase AC motor)  
 1/2 HP, 240 V AC (three-phase induction motor)

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -40°C ... 40°C  
 -40°C ... 60°C  
 100% operating factor  
 Approx. 10<sup>7</sup> cycles  
 Approx. 10<sup>7</sup> cycles  
 DIN EN 50178  
 2 / III

Any / in rows with zero spacing

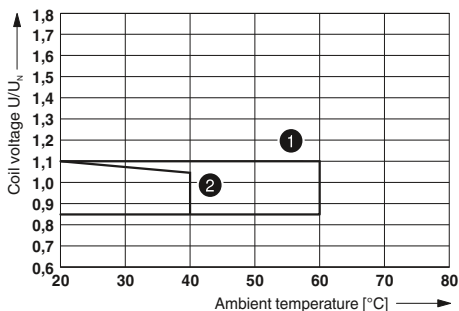
0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16  
 0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14  
 43 mm / 111 mm / 90 mm  
 Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-4-RPT-LDP-24DC/3X21	2903278	5
RIF-4-RPT-LV-120AC/3X21	2903277	5
RIF-4-RPT-LV-230AC/3X21	2903276	5

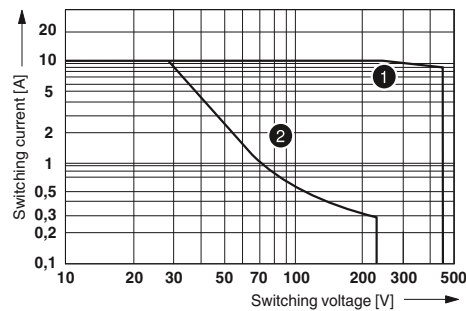
RIF-4-RPT.../2X21 (2 changeover contacts)

Operating voltage range



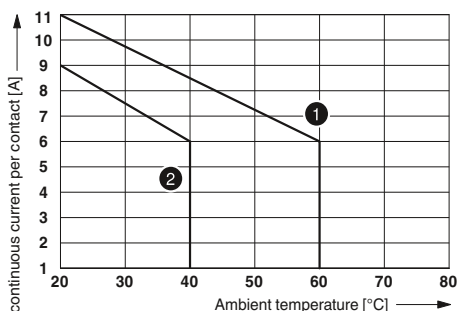
① DC coil (observe contact derating)  
 ② AC coil (observe contact derating)

Interrupting rating



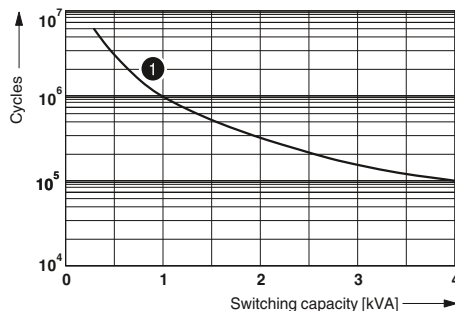
① AC, ohmic load  
 ② DC, ohmic load

Contact derating



① DC coil  
 ② AC coil

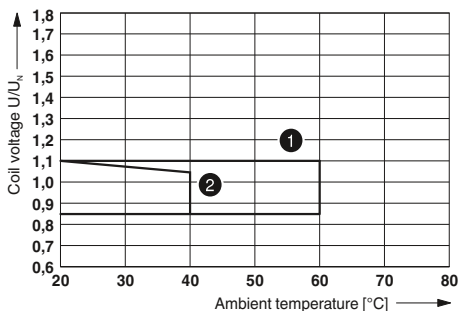
Electrical service life



① 250 V AC, ohmic load

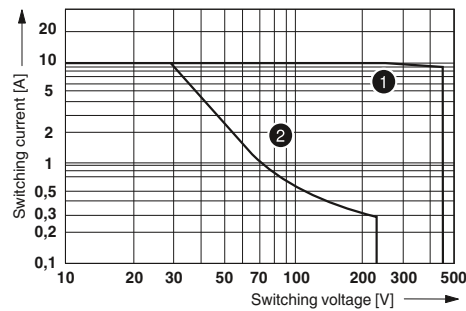
RIF-4-RPT.../3X21 (3 changeover contacts)

Operating voltage range



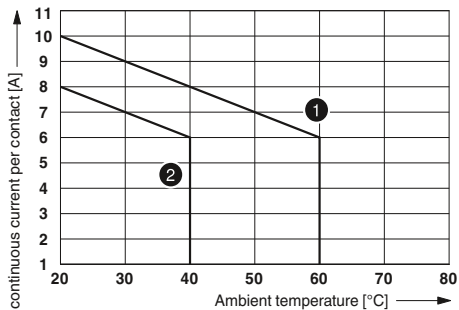
① DC coil (observe contact derating)  
 ② AC coil (observe contact derating)

Interrupting rating



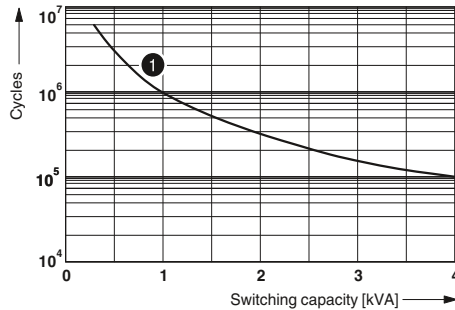
① AC, ohmic load  
 ② DC, ohmic load

Contact derating



① DC coil  
 ② AC coil

Electrical service life



① 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

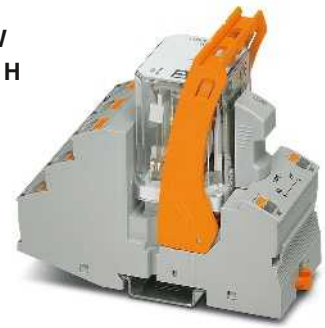
### Fully mounted RIF-4 relay modules

Fully mounted RIF-4 relay modules, consisting of:

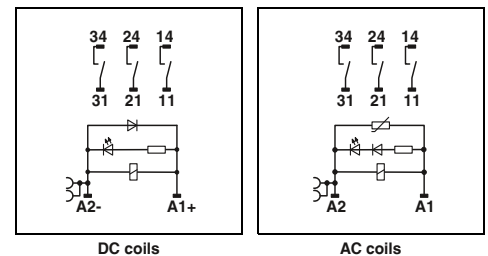
- Relay base with Push-in connection
- 3-N/O high-power relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Logical contact arrangement, thanks to 1/3-level relay base
- Full shutdown by means of  $\geq 3$  mm contact opening
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358



3-N/O-contact high-power relay module with Push-in connection



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA] 70 24 14
Typical response time at $U_N$	[ms] 20 5 - 25 5 - 25
Typical release time at $U_N$	[ms] 20 5 - 20 5 - 20
Input circuit AC	Yellow LED, Varistor
Input circuit DC	Yellow LED, damping diode
Output data	
Contact type	3 N/O contacts
Contact material	AgNi
Max. switching voltage	440 V AC / 250 V DC
Minimum switching voltage	10 V (at 24 mA)
Limiting continuous current	10 A (see diagram)
Maximum switch-on current AC	50 A (20 ms, N/O contact)
Maximum switch-on current DC	50 A (20 ms, N/O contact)
Minimum switching current	10 mA (at 24 V)
Maximum interrupting rating, ohmic load	250 V AC 2500 VA 440 V AC 4,000 VA
Motor load in accordance with UL 508	1/3 HP, 120 V AC (single-phase AC motor) 1/2 HP, 240 V AC (single-phase AC motor) 1/2 HP, 240 V AC (three-phase induction motor)
General data	
Test voltage (winding/contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40°C ... 40°C
Ambient temperature (operation), DC	-40°C ... 60°C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles
Standards/regulations	DIN EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	Any / in rows with zero spacing
Connection data solid/stranded/AWG	
Input side	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
Output side	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	43 mm / 111 mm / 90 mm
EMC note	Class A product, see page 583

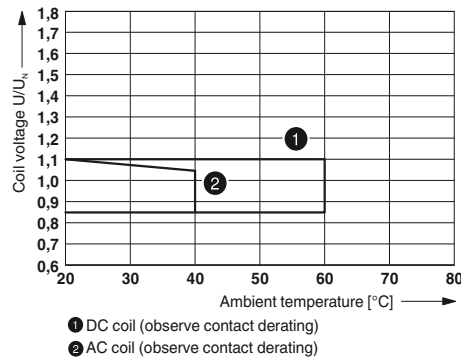
Technical data			
①	②	③	
See diagram			
70	24	14	
20	5 - 25	5 - 25	
20	5 - 20	5 - 20	
Yellow LED, Varistor			
Yellow LED, damping diode			

Description	Input voltage $U_N$
<b>Pre-assembled coupling relay modules</b> with power contact relay and Push-in connection	① 24 V DC
	② 120 V AC
	③ 230 V AC

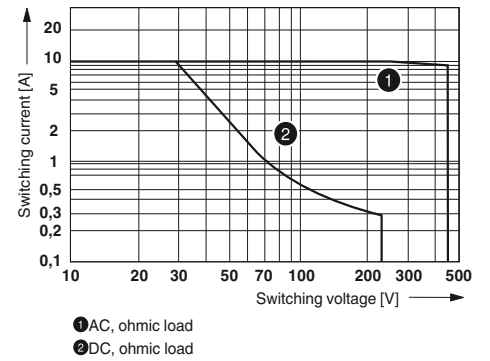
Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-4-RPT-LDP-24DC/3X1	2903275	5
RIF-4-RPT-LV-120AC/3X1	2903274	5
RIF-4-RPT-LV-230AC/3X1	2903273	5

### RIF-4-RPT.../3X1 (3 N/O contacts)

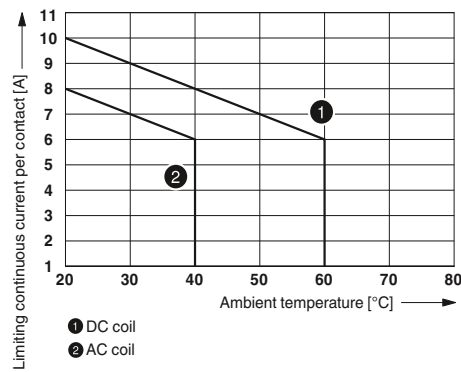
Operating voltage range



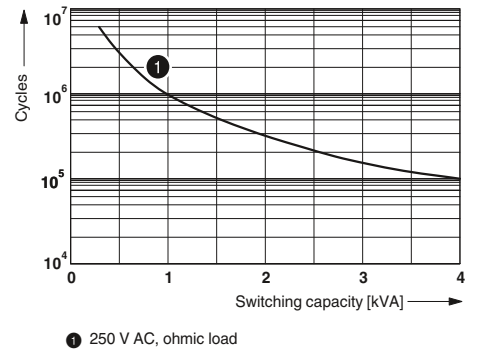
Interrupting rating



Contact derating



Electrical service life





# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-4 relay modules

Fully mounted RIF-4 relay modules, consisting of:

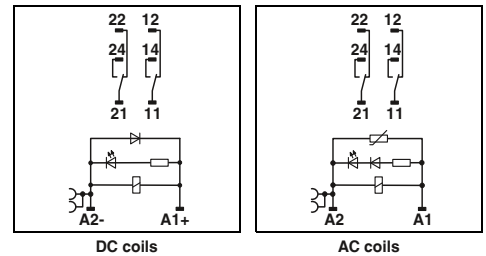
- Relay base with screw connection
- 3-PDT high-power relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Logical contact arrangement, thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358



**2 changeover-contact high-power relay module with screw connection**



DC coils

AC coils

#### Technical data

Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
Maximum interrupting rating, ohmic load	
	250 V AC
	440 V AC
Motor load in accordance with UL 508	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life, AC	
Mechanical service life, DC	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Input side	
Output side	
Dimensions	W / H / D
EMC note	

①	②	③
See diagram		
56	24	14
20	5 - 25	5 - 25
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		
2 PDT		
AgNi		
440 V AC / 250 V DC		
10 V (at 24 mA)		
11 A (see diagram)		
50 A (20 ms, N/O contact)		
50 A (20 ms, N/O contact)		
10 mA (at 24 V)		
2500 VA		
4,000 VA		
1/3 HP, 120 V AC (single-phase AC motor)		
1/2 HP, 240 V AC (single-phase AC motor)		
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40°C ... 40°C		
-40°C ... 60°C		
100% operating factor		
Approx. 10 <sup>7</sup> cycles		
Approx. 10 <sup>7</sup> cycles		
DIN EN 50178		
2 / III		
Any / in rows with zero spacing		
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10		
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10		
44 mm / 96 mm / 91 mm		
Class A product, see page 583		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Pre-assembled coupling relay modules with power contact relay and screw connection</b>				
	① 24 V DC	RIF-4-RSC-LDP-24DC/2X21	2903291	5
	② 120 V AC	RIF-4-RSC-LV-120AC/2X21	2903290	5
	③ 230 V AC	RIF-4-RSC-LV-230AC/2X21	2903289	5

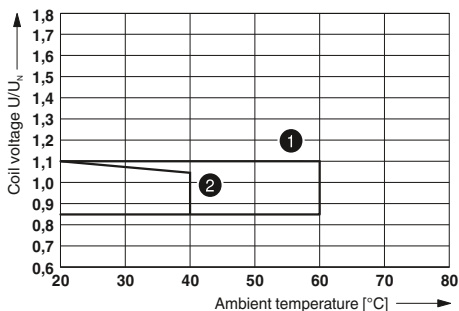


3 changeover-contact high-power relay module with screw connection



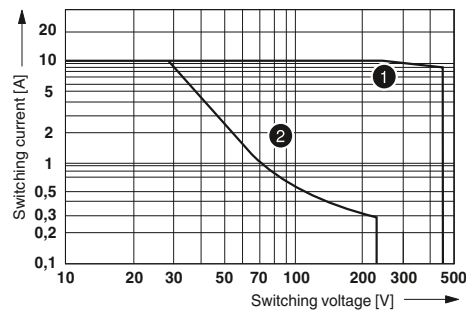
### RIF-4-RSC.../2X21 (2 changeover contacts)

Operating voltage range



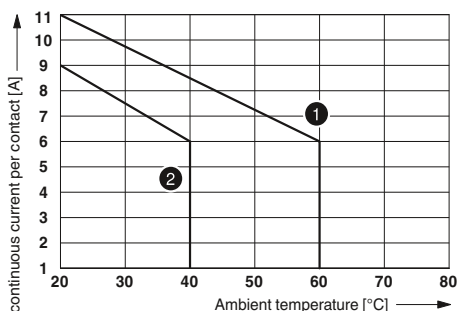
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



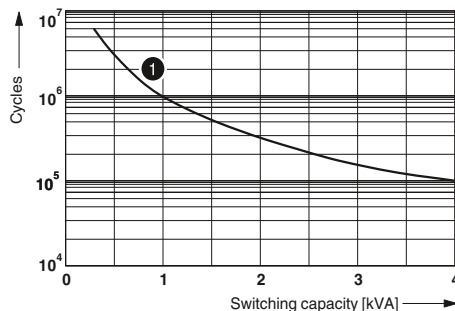
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating

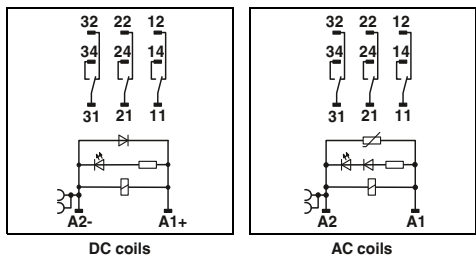


- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load



#### Technical data

- ① See diagram
- ② 56 24 14
- ③ 20 5 - 25 5 - 25
- 20 5 - 20 5 - 20
- Yellow LED, Varistor
- Yellow LED, damping diode

- 3 PDTs
- AgNi
- 440 V AC / 250 V DC
- 10 V (at 24 mA)
- 10 A (see diagram)
- 50 A (20 ms, N/O contact)
- 50 A (20 ms, N/O contact)
- 10 mA (at 24 V)
- 2500 VA
- 4,000 VA
- 1/3 HP, 120 V AC (single-phase AC motor)
- 1/2 HP, 240 V AC (single-phase AC motor)
- 1/2 HP, 240 V AC (three-phase induction motor)

- 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40°C ... 40°C
- 40°C ... 60°C
- 100% operating factor
- Approx. 10<sup>7</sup> cycles
- Approx. 10<sup>7</sup> cycles
- DIN EN 50178
- 2 / III

Any / in rows with zero spacing

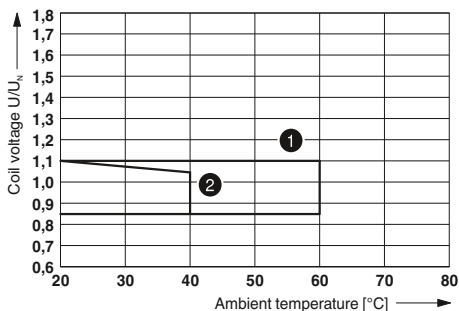
- 0.5 ... 4 mm<sup>2</sup> / 0.5 ... 4 mm<sup>2</sup> / 20 - 10
- 0.5 ... 4 mm<sup>2</sup> / 0.5 ... 4 mm<sup>2</sup> / 20 - 10
- 44 mm / 96 mm / 91 mm
- Class A product, see page 583

#### Ordering data

Type	Order No.	Pcs./Pkt.
RIF-4-RSC-LDP-24DC/3X21	2903288	5
RIF-4-RSC-LV-120AC/3X21	2903287	5
RIF-4-RSC-LV-230AC/3X21	2903285	5

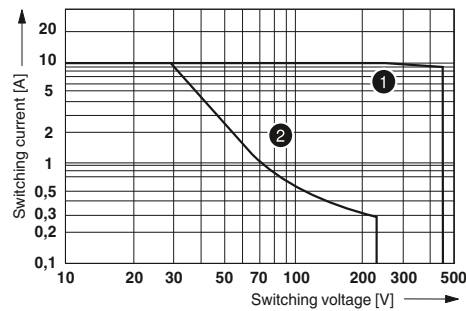
### RIF-4-RSC.../3X21 (3 changeover contacts)

Operating voltage range



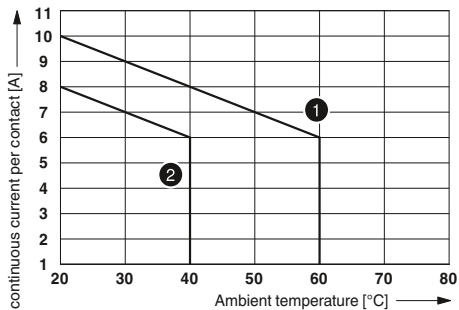
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



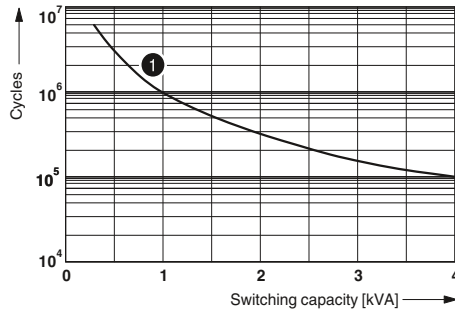
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## RIFLINE complete – Industrial relay system

### Fully mounted RIF-4 relay modules

Fully mounted RIF-4 relay modules, consisting of:

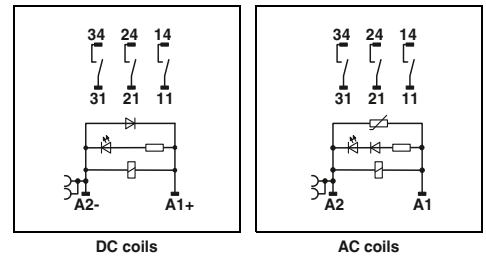
- Relay base with screw connection
- 3-N/O high-power relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Logical contact arrangement, thanks to 1/3-level relay base
- Full shutdown by means of  $\geq 3$  mm contact opening
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 358



3-N/O-contact high-power relay module with screw connection



DC coils

AC coils

#### Technical data

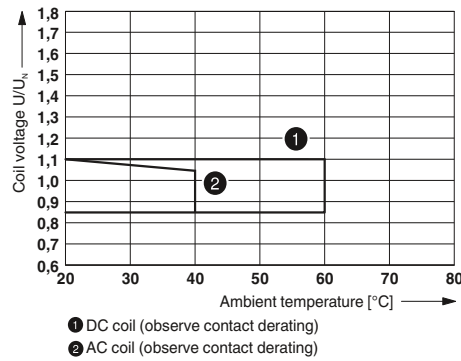
	①	②	③
<b>Input data</b>	See diagram		
Permissible range (with reference to $U_N$ )	70	24	14
Typical input current at $U_N$	[mA]	20	5 - 25
Typical response time at $U_N$	[ms]	20	5 - 20
Typical release time at $U_N$	[ms]	20	5 - 20
Input circuit AC	Yellow LED, Varistor		
Input circuit DC	Yellow LED, damping diode		
<b>Output data</b>	3 N/O contacts		
Contact type	AgNi		
Contact material	440 V AC / 250 V DC		
Max. switching voltage	10 V (at 24 mA)		
Minimum switching voltage	10 A (see diagram)		
Limiting continuous current	50 A (20 ms, N/O contact)		
Maximum switch-on current AC	50 A (20 ms, N/O contact)		
Maximum switch-on current DC	10 mA (at 24 V)		
Minimum switching current	2500 VA		
Maximum interrupting rating, ohmic load	250 V AC	440 V AC	4,000 VA
Motor load in accordance with UL 508	1/3 HP, 120 V AC (single-phase AC motor) 1/2 HP, 240 V AC (single-phase AC motor) 1/2 HP, 240 V AC (three-phase induction motor)		
<b>General data</b>	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Test voltage (winding/contact)	-40°C ... 40°C		
Ambient temperature (operation), AC	-40°C ... 60°C		
Ambient temperature (operation), DC	100% operating factor		
Nominal operating mode	Approx. 10 <sup>7</sup> cycles		
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles		
Mechanical service life, DC	DIN EN 50178		
Standards/regulations	2 / III		
Degree of pollution/surge voltage category	Any / in rows with zero spacing		
Mounting position/mounting	Connection data solid/stranded/AWG		
Input side	0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10		
Output side	0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10		
Dimensions	44 mm / 96 mm / 91 mm		
EMC note	Class A product, see page 583		

#### Ordering data

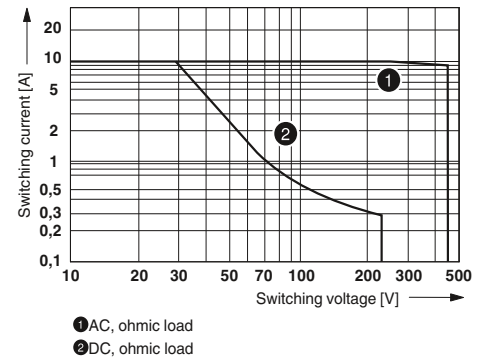
Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Pre-assembled coupling relay modules</b> with power contact relay and screw connection				
	① 24 V DC	RIF-4-RSC-LDP-24DC/3X1	2903284	5
	② 120 V AC	RIF-4-RSC-LV-120AC/3X1	2903283	5
	③ 230 V AC	RIF-4-RSC-LV-230AC/3X1	2903282	5

### RIF-4-RSC.../3X1 (3 N/O contacts)

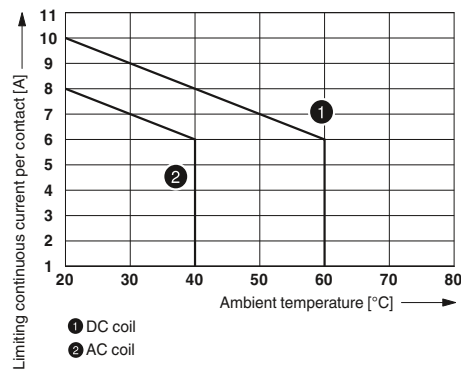
Operating voltage range



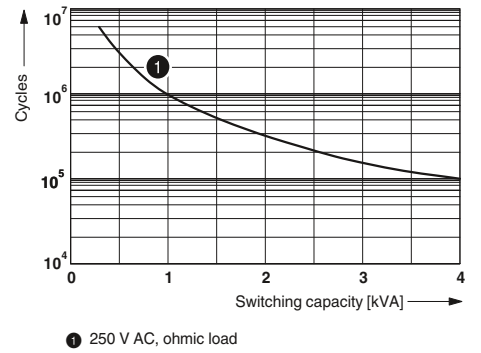
Interrupting rating



Contact derating



Electrical service life



# Relay modules

## RIFLINE complete – Industrial relay system

### RIFLINE complete accessories Plug-in bridges

The plug-in bridges can be used for simple potential distribution via all relay bases.

The end clamp is used for safe isolation between adjacent modules and to visually separate the various function groups.



Plug-in bridge



End clamp

		Ordering data			Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
<b>Plug-in bridge</b>							
2-pos. red, 32 A		FBS 2-6	3030336	50			
2-pos. blue, 32 A		FBS 2-6 BU	3036932	50			
2-pos. gray, 32 A		FBS 2-6 GY	3032237	50			
5-pos. red, 32 A		FBS 5-6	3030349	50			
10-pos. red, 32 A		FBS 10-6	3030271	10			
20-pos. red, 32 A		FBS 20-6	3030365	10			
50-pos. red, 32 A		FBS 50-6	3032224	10			
2-pos. red, 41 A		FBS 2-8	3030284	10			
2-pos. blue, 41 A		FBS 2-8 BU	3032567	10			
2-pos. gray, 41 A		FBS 2-8 GY	3032541	10			
<b>End clamp</b> , to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...		7042			CLIPFIX 35	3022218	50

### RIFLINE complete accessories Marking material

The ZB zack band system offers numerous marking options that can be attached directly to the relay retaining brackets. In addition, further markings can be fixed to the relay base by means of double marker carriers.



5.2 mm, 6.2 mm, and 15.2 mm wide



Double marker carrier

		Ordering data			Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
<b>Zack marker strip, unprinted</b>							
10-section	white	ZB 5 :UNBEDRUCKT	1050004	10			
10-section	white	ZB 6:UNBEDRUCKT	1051003	10			
5-section	white	ZB 15:UNBEDRUCKT	0811972	10			
<b>Double marker carrier for ZB 5</b>	gray				STP 5-2	0800967	100

**RIFLINE complete accessories**

**Test plugs**

The two-piece test plug offers individual plug color combinations. It is inserted directly in the function shaft of the Push-in connection.

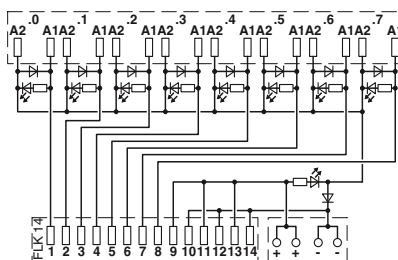


2.3 mm test plug

		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
<b>Test plug, consisting of:</b>				
<b>Metal part</b> for 2.3 mm Ø socket hole and	gray	MPS-MT	0201744	10
<b>Insulating sleeve</b> , for MPS metal part	red	MPS-IH RD	0201676	10
	white	MPS-IH WH	0201663	10
	blue	MPS-IH BU	0201689	10
	yellow	MPS-IH YE	0201692	10
	green	MPS-IH GN	0201702	10
	gray	MPS-IH GY	0201728	10
	black	MPS-IH BK	0201731	10

**Adapter for RIFLINE complete RF-1**

RIF-1-V8... is the VARIOFACE adapter which connects the RIF-1 relay module with the VARIOFACE system cabling. This allows easy connection of eight relay modules to a controller.



VARIOFACE adapter for RIFLINE complete RIF-1

		Technical data		
Maximum permissible operating voltage		30 V DC		
Maximum permissible current (per branch)		1 A (per signal path)		
Maximum total current (voltage supply)		3 A		
Rated surge voltage		0.6 kV (functional insulation)		
Ambient temperature (operation)		-40°C ... 60°C		
Mounting position		Any		
Standards/regulations		IEC 60664, DIN EN 50178		
Connection method	Controller level	IDC/FLK pin strip		
	Supply	Push-in connection		
Connection data solid/stranded/AWG		0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16		
Dimensions	H / D	101 mm / 75 mm		

		Ordering data			
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
<b>V8 adapter</b> , for eight RIF-1 relay modules, with IDC/FLK pin strip for PLC system cabling, <b>positive switching</b>	14	128 mm	RIF-1-V8/PT/FLK14/OUT	2905195	1





**Universal modules**

PLC-R... and PLC-O... relay and solid-state relay modules with PDT or N/O contact, designed for universal use. Available in an overall width of 6.2 mm with one contact or in 14 mm with two contacts.

Available either with screw or Push-in connection.



**Sensors/actuators**

PLC...SEN and PLC...ACT offer space-saving sensor and actuator wiring without additional supply or output terminal blocks. The sensor or actuator connections are incorporated directly at the relay module.

Available either with screw or Push-in connection.



**High currents**

PLC...IC is particularly suitable for applications with high switch-on currents, e.g. from lamp loads. The PLC...HC relay modules are designed for applications with high continuous currents.

Available either with screw or Push-in connection.



**Railway applications**

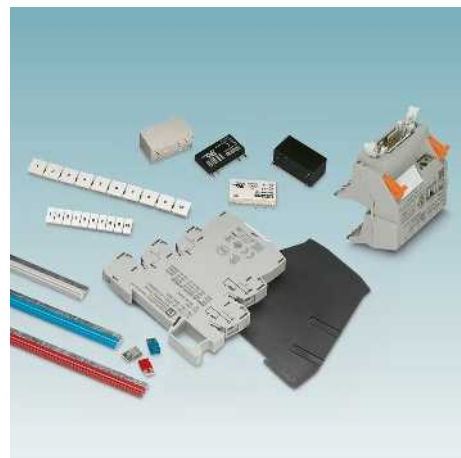
PLC...RW relay or solid-state relay modules are suitable for railway requirements. These cover, for example, the extended temperature and input voltage range of railway applications.



**Interference signals on the input side**

PLC-B...SO46 basic terminal blocks are used for filtering interference currents and interference voltages on the input side.

Available either with screw or Push-in connection.



**Accessories**

The entire PLC-INTERFACE system can be extended by a range of accessories such as power terminals, adapters for system cabling or bridges for distribution of potential.



# Relay modules


## PLC-INTERFACE – Highly-compact relay modules


### Product overview


#### Highly compact relay modules – Special versions and accessories

			Page	Web code
Actuator series		<b>PLC-R.../1/ACT</b> Assembled with a plug-in power contact relay	374	#0618
		<b>PLC-R.../1IC/ACT</b> Assembled with a plug-in miniature relay for high inrush currents	382	
		<b>PLC-O.../24DC/2/ACT</b> Assembled with a plug-in solid-state power relay	376	
		<b>PLC-OSC.../230AC/1/ACT</b> Assembled with a plug-in solid-state power relay	377	
Sensor series		<b>PLC-R.../1AU/SEN</b> Assembled with a plug-in relay for small switching capacities, with gold-plated multi-layer contact	380	#0617
		<b>PLC-O.../48DC/100/SEN</b> Assembled with a plug-in solid-state input relay	381	
Filter series		<b>PLC-B...UC/21/SO46</b> For assembly with electromechanical or solid-state relays	388	#0689
		<b>PLC-B...UC/1/SEN/SO46</b> For assembly with electromechanical or solid-state relays	389	
		<b>PLC-BSC...UC/21-21/SO46</b> For assembly with relays	389	
		<b>PLC-BSC...UC/21/HC/SO46</b> For assembly with relays	389	
Switch modules		<b>PLC-RS...-24UC/1/S...</b> Relay and switch integrated	406	#0898
		<b>PLC-S...-S/...</b> Switch integrated	407	
Solid-state relays		<b>PLC-O.../24DC/...</b> Optocoupler modules for universal use	372	#0899
		<b>PLC-O.../230AC/...</b> Switching capacity up to 230 V AC and 2.4 A in 6.2 mm	410	
		<b>PLC-O.../300DC/...</b> DC voltage output up to 300 V DC	408	
Ex relays		<b>PLC-R.../21/EX</b> 1 changeover contact with power contact	386	#0690
		<b>PLC-R.../21-21/EX</b> 2 changeover contacts with power contact	386	
		<b>PLC-R.../21/HC/EX</b> 1 changeover contact up to 10 A	387	
		<b>PLC-O...C1D2</b> DC voltage output	387	

<b>Hybrid solid-state relays</b>	<b>PLC-INTERFACE for railway applications</b>	<b>PLC-INTERFACE for high inrush currents</b>	<b>Reversing load relays</b>
<b>PLC-H...24DC/230AC/10</b> Hybrid solid-state relays with AC voltage output, max. 10 A  Page: 385 Web code: #0691	<b>PLC.../RW</b> Relay modules with extended input voltage and temperature range, specifically designed for use in railway applications  Page: 418 Web code: #0900	<b>PLC...11C/ACT</b> Maximum inrush current of 130 A, suitable for capacitive loads, available with screw and Push-in connection technology  Page: 382 Web code: #0901	<b>PLC-S...-ELR W 1/2-24DC</b> Electronic reversing load relay for motors up to 24 V DC / 2 A  Page: 423 Web code: #0693

<b>Accessories</b>			Web code: #0692 Page: 426
	<b>Continuous plug-in bridge</b> 500 mm long, insulated, can be cut to length, for potential distribution with PLC-INTERFACE	<b>Plug-in bridge</b> 2-pos., 6 mm long, bridges potentials of adjacent PLC-INTERFACE devices	<b>Plug-in bridge</b> 2-pos., 8 mm long, bridges potentials of adjacent PLC-INTERFACE devices with separating plate
<b>Plug-in bridge</b> 2-pos., for connecting adjacent connections on a 14 mm PLC-INTERFACE device	<b>Separating plate</b> 2 mm thick, required at the start and end of every PLC terminal strip	<b>Passive feed-through bridge</b> Can be inserted instead of a relay or solid-state relay, bridges terminal points A1 and 14	<b>Power terminal</b> For supplying up to four potentials

<b>Logic modules</b>			Web code: #0694 Page: 430
	<b>PLC-V8C.../SAM2 Stand-alone module</b> With 16 I/Os, cannot be extended, connection to PC via micro USB socket. Integrated real-time clock, accommodates external IFS-CONFSTICK memory module.	<b>PLC-V8C.../BM2 Basic module</b> With 16 I/Os, can be extended up to a maximum of 48 I/Os. Connection to PC via micro USB socket. Integrated real-time clock. Accommodates external IFS-CONFSTICK memory module. Optional connection to IFS gateways.	<b>PLC-V8C.../EM Extension module</b> With 16 I/Os, for extending the basic module. A maximum of two extension modules can be connected to each basic module.

<b>System cabling adapters for PLC-INTERFACE</b>			Web code: #0897 Page: 427
	<b>PLC-V8/FLK14...</b> For 6.2 mm relay, with 14-pos. IDC/FLK pin strip, module width: 49.6 mm	<b>PLC-V8/D15S/...</b> For 6.2 mm relay, with 15-pos. D-SUB socket strip, module width: 49.6 mm	<b>PLC-V8L/FLK14/...</b> For 14 mm relay, with 14-pos. IDC/FLK pin strip, module width: 112.3 mm

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### Universal PLC series with changeover contact relay

PLC-R... is the relay series that can be used universally and consists of basic terminal blocks and plug-in relays with changeover contacts.

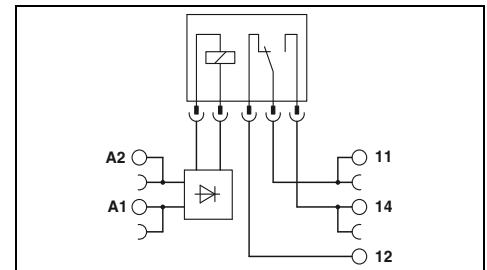
The advantages:

- Slim design
- Screw and Push-in connection technology
- Functional plug-in bridges
- Integrated input and interference suppression circuit
- High degree of protection, RT III (wash-proof), or RT II for relay with one changeover contact with manual operation
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
For diagrams of operating voltage ranges, see page 399
Inflammability class V0 (UL 94)
See the website for more information on connection cross sections with ferrules.
1) 120 and 230 V types up to 55°C



**1-changeover-contact relay module,  
6 A, maximum**



#### Technical data

Input data	
Typical input current at $U_N$	[mA]
Response/release time at $U_N$	[ms]
Input circuit DC	
Input circuit AC/DC	
Output data	
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	5 V (at 100 mA)
Limiting continuous current	6 A
Maximum switch-on current	10 A (4 s)
Minimum switching current	10 mA (at 12 V)
General data	
Test voltage input/output	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-40°C ... 60°C <sup>1)</sup>
Mechanical service life	2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D
EMC note	Class A product, see page 583

①	②	③	④	⑤	⑥	⑦
15.3	9	11	9.2	4.8	3.5	3.2
5/8	5/8	6/15	5/8	5/8	6/15	7/15

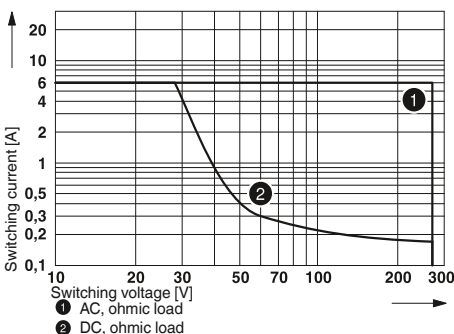
Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

#### Ordering data

Description	Input voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	
①	12 V DC
②	24 V DC
③	24 V AC/DC
④	48 V DC
⑤	60 V DC
⑥	120 V AC / 110 V DC
⑦	230 V AC / 220 V DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	12 V DC
②	24 V DC
③	24 V AC/DC
④	48 V DC
⑤	60 V DC
⑥	120 V AC / 110 V DC
⑦	230 V AC / 220 V DC

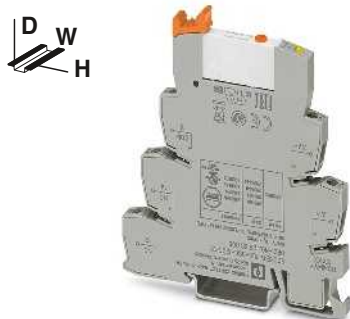
Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21	2966906	10
PLC-RSC- 24DC/21	2966171	10
PLC-RSC- 24UC/21	2966184	10
PLC-RSC- 48DC/21	2966113	10
PLC-RSC- 60DC/21	2966139	10
PLC-RSC-120UC/21	2966197	10
PLC-RSC-230UC/21	2966207	10
PLC-RPT- 12DC/21	2900316	10
PLC-RPT- 24DC/21	2900299	10
PLC-RPT- 24UC/21	2900300	10
PLC-RPT- 48DC/21	2900301	10
PLC-RPT- 60DC/21	2900303	10
PLC-RPT-120UC/21	2900304	10
PLC-RPT-230UC/21	2900305	10

Electrical interrupting rating for PLC...21  
with 1 PDT relay





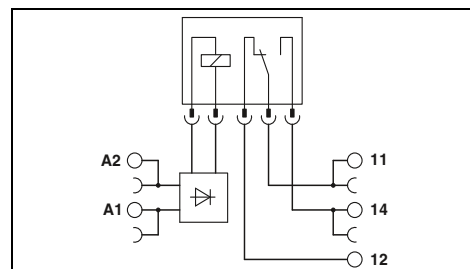
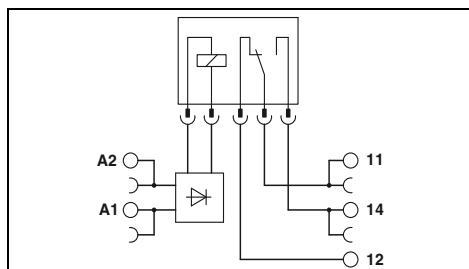
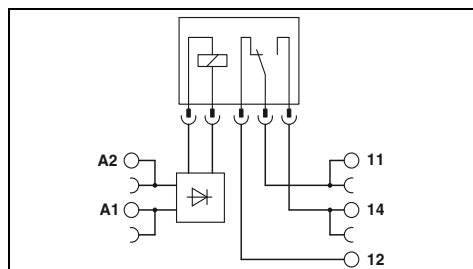
1-changeover-contact relay module, 50 mA, maximum



1-changeover-contact relay module with manual operation, max. 6 A



1-changeover-contact relay module with manual operation, max. 50 mA



**Technical data**

①	②	③	④	⑤	⑥	⑦
15.3	9	11	9.2	4.8	3.5	3.2
5/8	5/8	6/15	5/8	5/8	6/15	7/15

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

AgSnO, hard gold-plated  
30 V AC / 36 V DC  
100 mV (at 10 mA)  
50 mA  
50 mA  
1 mA (at 24 V)

4 kV AC (50 Hz, 1 min.)  
-40°C ... 60°C<sup>1)</sup>  
2x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

**Technical data**

①	②	③	⑥	⑦
15.3	9	11	3.5	3.2
5/8	5/8	6/15	6/15	7/15

Yellow LED  
Yellow LED, bridge rectifier

AgSnO  
250 V AC/DC  
5 V (at 100 mA)  
6 A  
10 A (4 s)  
10 mA (at 12 V)

4 kV AC (50 Hz, 1 min.)  
-40°C ... 60°C  
1x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

**Technical data**

①	②	③	⑥	⑦
15.3	9	11	3.5	3.2
5/8	5/8	6/15	6/15	7/15

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

AgSnO, hard gold-plated  
30 V AC / 36 V DC  
100 mV (at 10 mA)  
50 mA  
50 mA  
1 mA (at 24 V)

4 kV AC (50 Hz, 1 min.)  
-40°C ... 60°C  
2x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21AU	2966919	10
PLC-RSC- 24DC/21AU	2966265	10
PLC-RSC- 24UC/21AU	2966278	10
PLC-RSC- 48DC/21AU	2966126	10
PLC-RSC- 60DC/21AU	2966142	10
PLC-RSC-120UC/21AU	2966281	10
PLC-RSC-230UC/21AU	2966294	10
PLC-RPT- 12DC/21AU	2900317	10
PLC-RPT- 24DC/21AU	2900306	10
PLC-RPT- 24UC/21AU	2900307	10
PLC-RPT- 48DC/21AU	2900308	10
PLC-RPT- 60DC/21AU	2900309	10
PLC-RPT-120UC/21AU	2900310	10
PLC-RPT-230UC/21AU	2900311	10

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21/MS	2909648	10
PLC-RSC- 24DC/21/MS	2909649	10
PLC-RSC- 24UC/21/MS	2909650	10
PLC-RSC-120UC/21/MS	2909651	10
PLC-RSC-230UC/21/MS	2909653	10
PLC-RPT- 12DC/21/MS	2909666	10
PLC-RPT- 24DC/21/MS	2909667	10
PLC-RPT- 24UC/21/MS	2909668	10
PLC-RPT-120UC/21/MS	2909669	10
PLC-RPT-230UC/21/MS	2909670	10

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21AU/MS	2909654	10
PLC-RSC- 24DC/21AU/MS	2909655	10
PLC-RSC- 24UC/21AU/MS	2909656	10
PLC-RSC-120UC/21AU/MS	2909657	10
PLC-RSC-230UC/21AU/MS	2909660	10
PLC-RPT- 12DC/21AU/MS	2909671	10
PLC-RPT- 24DC/21AU/MS	2909672	10
PLC-RPT- 24UC/21AU/MS	2909673	10
PLC-RPT-120UC/21AU/MS	2909674	10
PLC-RPT-230UC/21AU/MS	2909676	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### Universal PLC series with changeover contact relay

PLC-R... is the relay series that can be used universally and consists of basic terminal blocks and plug-in relays with changeover contacts.

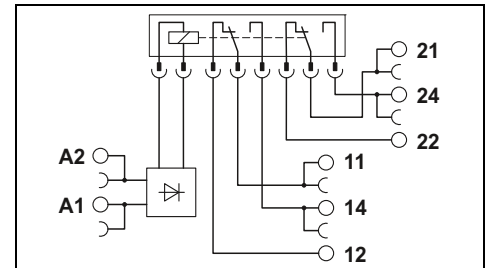
The advantages:

- Slim design
- Screw and Push-in connection technology
- Functional plug-in bridges
- Integrated input and interference suppression circuit
- RT III sealed relay
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 399
Inflammability class V0 (UL 94)
See the website for more information on connection cross sections with ferrules.
1) 230 V types up to 55°C
2) If the specified maximum values are exceeded for multi-layer contact relays, the gold layer will be destroyed. During further use, the maximum values of the power contact relays apply. This may then result in a shorter service life than a dedicated power contact.



**2-changeover-contact relay module, 2 x 6 A, maximum**



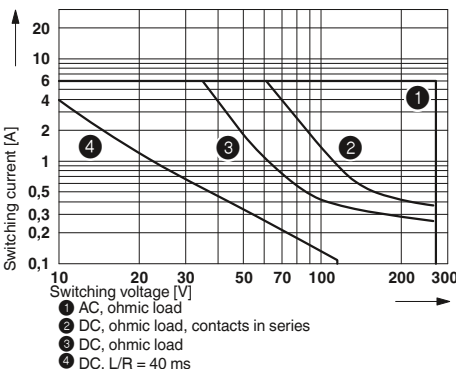
Input data	
Typical input current at $U_N$	[mA]
Response/release time at $U_N$	[ms]
Input circuit DC	
Input circuit AC/DC	
Output data	
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	5 V AC/DC (at 10 mA)
Limiting continuous current	6 A
Maximum switch-on current	15 A (300 ms)
Minimum switching current	10 mA (at 5 V)
General data	
Test voltage input/output	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-40°C ... 60°C <sup>1)</sup>
Mechanical service life	3x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D
EMC note	Class A product, see page 583

Technical data						
①	②	③	④	⑤	⑥	⑦
33	18	17.5	20	10	4.5	4.5
8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10
Yellow LED, reverse polarity protection, free-wheeling diode						
Yellow LED, bridge rectifier						

Description	Input voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	
①	12 V DC
②	24 V DC
③	24 V AC/DC
④	48 V DC
⑤	60 V DC
⑥	120 V AC / 110 V DC
⑦	230 V AC / 220 V DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	12 V DC
②	24 V DC
③	24 V AC/DC
④	48 V DC
⑤	60 V DC
⑥	120 V AC / 110 V DC
⑦	230 V AC / 220 V DC

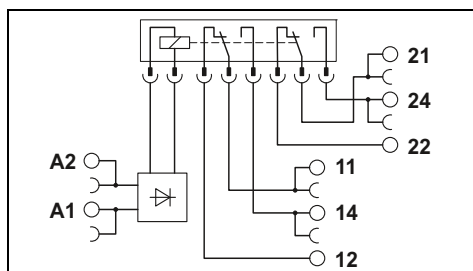
Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21-21	2967235	10
PLC-RSC- 24DC/21-21	2967060	10
PLC-RSC- 24UC/21-21	2967073	10
PLC-RSC- 48DC/21-21	2967248	10
PLC-RSC- 60DC/21-21	2967293	10
PLC-RSC-120UC/21-21	2967086	10
PLC-RSC-230UC/21-21	2967099	10
PLC-RPT- 12DC/21-21	2900329	10
PLC-RPT- 24DC/21-21	2900330	10
PLC-RPT- 24UC/21-21	2900332	10
PLC-RPT- 48DC/21-21	2900333	10
PLC-RPT- 60DC/21-21	2900334	10
PLC-RPT-120UC/21-21	2900335	10
PLC-RPT-230UC/21-21	2900336	10

Electrical interrupting rating for PLC...21-21 with 2 PDT relays





2-changeover-contact relay module,  
2 x 50 mA, maximum



**Technical data**

①	②	③	④	⑤	⑥	⑦
33	18	17.5	20	10	4.5	4.5
8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

AgNi, hard gold-plated  
30 V AC / 36 V DC  
100 mV (at 10 mA)  
50 mA<sup>2</sup>  
50 mA<sup>2</sup>  
1 mA (at 24 V)

4 kV AC (50 Hz, 1 min.)  
-40°C ... 60°C<sup>1</sup>)  
3x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 94 mm  
Class A product, see page 583

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21-21AU	<a href="#">2967277</a>	10
PLC-RSC- 24DC/21-21AU	<a href="#">2967125</a>	10
PLC-RSC- 24UC/21-21AU	<a href="#">2967112</a>	10
PLC-RSC- 48DC/21-21AU	<a href="#">2967280</a>	10
PLC-RSC- 60DC/21-21AU	<a href="#">2967303</a>	10
PLC-RSC-120UC/21-21AU	<a href="#">2967138</a>	10
PLC-RSC-230UC/21-21AU	<a href="#">2967141</a>	10
PLC-RPT- 12DC/21-21AU	<a href="#">2900337</a>	10
PLC-RPT- 24DC/21-21AU	<a href="#">2900338</a>	10
PLC-RPT- 24UC/21-21AU	<a href="#">2900339</a>	10
PLC-RPT- 48DC/21-21AU	<a href="#">2900340</a>	10
PLC-RPT- 60DC/21-21AU	<a href="#">2900341</a>	10
PLC-RPT-120UC/21-21AU	<a href="#">2900342</a>	10
PLC-RPT-230UC/21-21AU	<a href="#">2900343</a>	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### Universal PLC series with changeover contact relays with lockable manual operation

PLC-R... is the relay series that can be used universally and consists of a basic terminal block and plug-in relay with changeover contacts and lockable manual operation.

The advantages:

- Slim design
- Screw and Push-in connection technology
- Functional plug-in bridges
- Integrated input and interference suppression circuit
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Efficient connection to system cabling using V8 adapter

#### Notes:

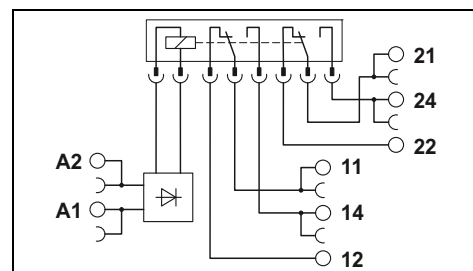
See the website for more information on connection cross sections with ferrules.

If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.

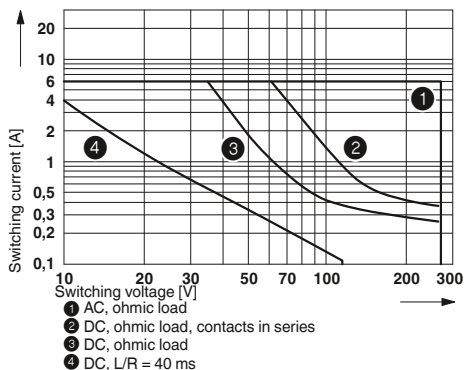


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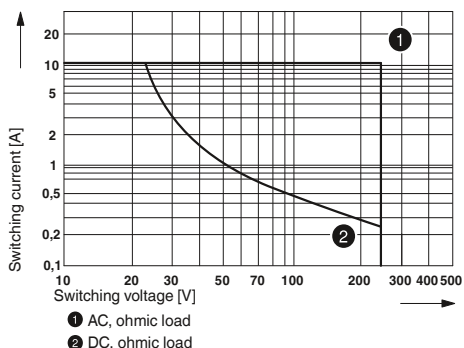
Relay module with 2 changeover contacts with lockable manual operation, max. 2 x 6 A



Electrical interrupting rating for PLC...21-21/MS with 2 PDT relays



Electrical interrupting rating for PLC...21HC/MS with 1 PDT relay



Input data	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit DC	
Input circuit AC/DC	
Output data	
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V (10 mA)
Limiting continuous current	6 A
Maximum switch-on current	12 A (20 ms)
Minimum switching current	10 mA (12 V)
General data	
Test voltage input/output	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 60°C
Mechanical service life	5x 10 <sup>6</sup> cycles
Standards/regulations	EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	14 mm / 80 mm / 104 mm
EMC note	Class A product, see page 583

#### Technical data

①	②	③	④	⑤
18	18	19	5	5
10	3 - 15	6	6	6
10	3 - 15	10	10	10
Yellow LED, free-wheeling diode				
Yellow LED, bridge rectifier				

Description	Input voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	
①	24 V DC
②	24 V AC/DC
③	48 V DC
④	120 V AC / 110 V DC
⑤	230 V AC / 220 V DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	24 V DC
②	24 V AC/DC
③	48 V DC
④	120 V AC / 110 V DC
⑤	230 V AC / 220 V DC

#### Ordering data

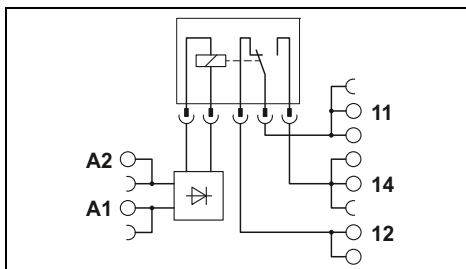
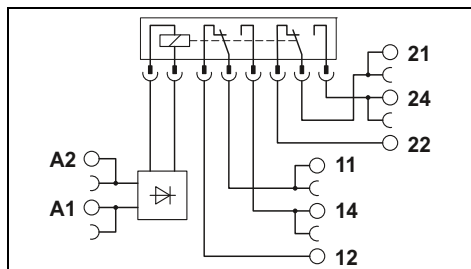
Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/21-21/MS	2910502	10
PLC-RSC- 24UC/21-21/MS	2910503	10
PLC-RSC- 48DC/21-21/MS	2910504	10
PLC-RSC-120UC/21-21/MS	2910505	10
PLC-RSC-230UC/21-21/MS	2910506	10
PLC-RPT- 24DC/21-21/MS	2910519	10
PLC-RPT- 24UC/21-21/MS	2910520	10
PLC-RPT- 48DC/21-21/MS	2910521	10
PLC-RPT-120UC/21-21/MS	2910522	10
PLC-RPT-230UC/21-21/MS	2910523	10



Relay module with 2 changeover contacts with lockable manual operation, max. 2 x 50 mA



Relay module with 1 changeover contact with lockable manual operation, max. 10 A



**Technical data**

**Technical data**

①	②	③	④	⑤
18	18	19	5	5
10	3 - 15	6	6	6
10	3 - 15	10	10	10

①	②	③	④	⑤
18	18	19	5	5
10	3 - 15	6	6	6
10	3 - 15	10	8	8

Yellow LED, free-wheeling diode  
Yellow LED, bridge rectifier

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

AgNi + Au  
30 V AC / 36 V DC  
12 V (1 mA)  
50 mA  
50 mA  
1 mA (12 V)

AgNi  
250 V AC/DC  
12 V (10 mA)  
10 A  
24 A (20 ms)  
10 mA (12 V)

4 kV AC (50 Hz, 1 min.)  
-20°C ... 60°C  
5x 10<sup>6</sup> cycles  
EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 104 mm  
Class A product, see page 583

4 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20°C ... 60°C  
5x 10<sup>6</sup> cycles  
EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 104 mm  
Class A product, see page 583

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/21-21AU/MS	2910507	10
PLC-RSC- 24UC/21-21AU/MS	2910508	10
PLC-RSC- 48DC/21-21AU/MS	2910510	10
PLC-RSC-120UC/21-21AU/MS	2910511	10
PLC-RSC-230UC/21-21AU/MS	2910513	10
PLC-RPT- 24DC/21-21AU/MS	2910524	10
PLC-RPT- 24UC/21-21AU/MS	2910526	10
PLC-RPT- 48DC/21-21AU/MS	2910527	10
PLC-RPT-120UC/21-21AU/MS	2910528	10
PLC-RPT-230UC/21-21AU/MS	2910529	10

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/21HC/MS	2910514	10
PLC-RSC- 24UC/21HC/MS	2910515	10
PLC-RSC- 48DC/21HC/MS	2910516	10
PLC-RSC-120UC/21HC/MS	2910517	10
PLC-RSC-230UC/21HC/MS	2910518	10
PLC-RPT- 24DC/21HC/MS	2910530	10
PLC-RPT- 24UC/21HC/MS	2910531	10
PLC-RPT- 48DC/21HC/MS	2910532	10
PLC-RPT-120UC/21HC/MS	2910533	10
PLC-RPT-230UC/21HC/MS	2910534	10



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE with force-guided contacts

Fully assembled coupling relay module with pluggable relay with force-guided contacts, consisting of:

- Relay base with Push-in or screw connection
- 2-changeover-contact relay with force-guided contacts in accordance with EN 50205

The advantages:

- Switching current of up to 2x 6 A
- Forcibly guided contacts in accordance with EN 50205
- Professional bridging of adjacent modules
- Integrated status LED and freewheeling diode

The requirements for type A in accordance with DIN EN 50205 are satisfied if the circuit is designed as 1 N/O contact / 1 N/C contact.

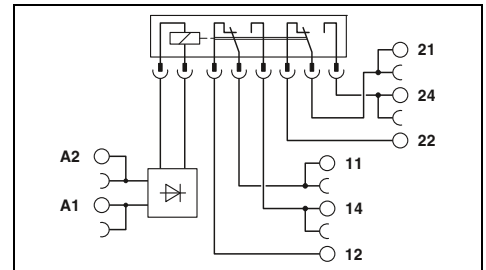
#### Notes:

See the website for more information on connection cross sections with ferrules.



new

2 changeover-contact relay module with force-guided contacts



#### Technical data

Input data		①	②
Typical input current at $U_N$	[mA]	30	30
Typical response time at $U_N$	[ms]	10	3 - 15
Typical release time at $U_N$	[ms]	10	3 - 15
Input circuit DC			Yellow LED
Input circuit AC/DC			Yellow LED
Output data			
Contact material		AgNi	
Max. switching voltage		250 V AC/DC	
Minimum switching voltage		5 V (10 mA)	
Limiting continuous current		6 A	
Maximum switch-on current		6 A	
Minimum switching current		10 mA (5 V)	
General data			
Test voltage input/output		4 kV <sub>rms</sub> (50 Hz, 1 min.)	
Ambient temperature (operation)		-20°C ... 60°C	
Mechanical service life		Approx. 10 <sup>7</sup> cycles	
Standards/regulations		EN 50178	
Connection data solid/stranded/AWG		0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	W / H / D	14 mm / 80 mm / 104 mm	
EMC note		Class A product, see page 583	
Conformance/approvals			
Conformance		-	
UL, USA		UL 508	
UL, USA/Canada		cUL 508	
UL, Canada		-	

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>PLC INTERFACE, with screw connection</b>	① 24 V DC	PLC-RSC- 24DC/2X21/FG	2910535	10
	② 24 V AC/DC	PLC-RSC- 24UC/2X21/FG	2910536	10
<b>PLC-INTERFACE, with Push-in connection</b>	① 24 V DC	PLC-RPT- 24DC/2X21/FG	2910537	10
	② 24 V AC/DC	PLC-RPT- 24UC/2X21/FG	2910539	10



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### Universal PLC series with solid-state relays

PLC-O... is the solid-state relay series that can be used universally comprising basic terminal blocks and plug-in solid-state relays.

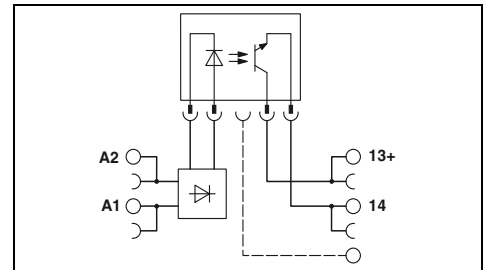
The advantages:

- Slim design
- Screw and Push-in connection technology
- Functional plug-in bridges
- Integrated input circuit
- RT-III sealed solid-state relays
- High switching capacity
- Zero voltage switch at AC output
- Efficient connection to system cabling using V8 adapter

Notes:	
Type of insulating housing:	Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material	See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....	
For derating curves see page 401	
See the website for more information on connection cross sections with ferrules.	



Solid-state relay module, DC output max. 100 mA



Input data	
Permissible range (with reference to $U_N$ )	
Switching level (with reference to $U_N$ )	1 signal ("H") 0 signal ("L")
Typical input current at $U_N$	[mA]
Typical switch-on time at $U_N$	[ms]
Typical switch-off time at $U_N$	[ms]
Transmission frequency $f_{limit}$	[Hz]
Input circuit DC	
Input circuit AC/DC	
Output data	
Max. switching voltage	48 V DC
Minimum switching voltage	3 V DC
Maximum switch-on current	-
Minimum/maximum switching current	- / 100 mA
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	≤ 1 V
Leakage current in off state	-
Max. load value	-
General data	
Test voltage input/output	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25°C ... 60°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D
EMC note	Class A product, see page 583

### Technical data

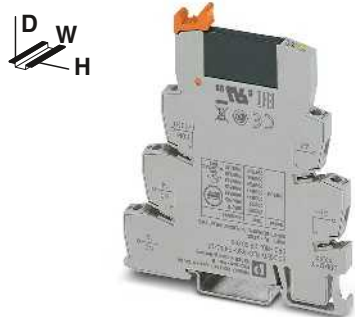
①	②	③	④	⑤	⑥
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.9 - 1.1
≥0.8	≥0.8	≥0.8	≥0.8	≥0.9	≥0.8
≤0.4	≤0.3	≤0.4	≤0.4	≤0.3	≤0.3
8.5	9	5	3	3.5	3.5
0.02	0.03	0.04	1	3	3
0.3	0.3	2	3	4	5
300	300	100	50	10	10

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

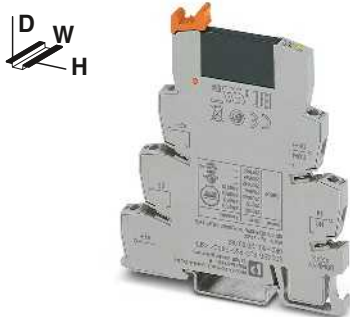
### Ordering data

Description	Input voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	
①	24 V DC
②	48 V DC
③	60 V DC
④	125 V DC
⑤	120 V AC / 110 V DC
⑥	230 V AC / 220 V DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	24 V DC
②	48 V DC
③	60 V DC
⑤	120 V AC / 110 V DC
⑥	230 V AC / 220 V DC

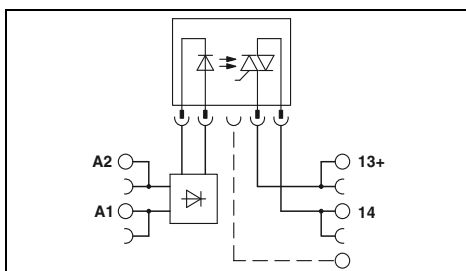
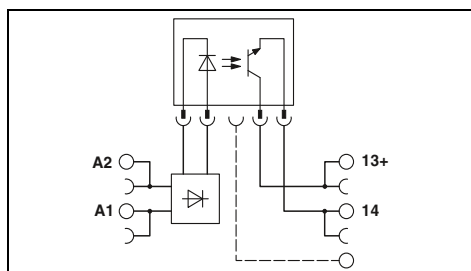
Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 48DC/100	2966728	10
PLC-OSC- 48DC/ 48DC/100	2966993	10
PLC-OSC- 60DC/ 48DC/100	2967455	10
PLC-OSC-125DC/ 48DC/100	2980047	10
PLC-OSC-120UC/ 48DC/100	2966744	10
PLC-OSC-230UC/ 48DC/100	2966757	10
PLC-OPT- 24DC/ 48DC/100	2900352	10
PLC-OPT- 48DC/ 48DC/100	2900353	10
PLC-OPT- 60DC/ 48DC/100	2900354	10
PLC-OPT-120UC/ 48DC/100	2900355	10
PLC-OPT-230UC/ 48DC/100	2900356	10



Solid-state relay module,  
DC output max. 3 A



Solid-state relay module,  
AC output max. 750 mA



Technical data

①	②	③	④	⑤	⑥
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.9 - 1.1
≥0.8	≥0.8	≥0.8	≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.3	≤0.3	≤0.3	≤0.3
8.5	9	5	3	3.5	3.5
0.02	0.03	0.04	0.04	3.5	4
0.3	0.3	0.5	0.6	7	7
300	300	100	100	10	10

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

33 V DC  
3 V DC  
15 A (10 ms)  
- / 3 A (see derating curve)  
Reverse polarity protection, surge protection  
≤200 mV

-  
-

2.5 kV (50 Hz, 1 min.)  
-25°C ... 60°C  
IEC 60664, EN 50178  
2 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

Technical data

①	②	③	④	⑤	⑥
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.8 - 1.1
≥0.8	≥0.8	≥0.8	≥0.8	≥0.8	≥0.8
≤0.25	≤0.25	≤0.3	≤0.3	≤0.25	≤0.25
8	9	6	3.5	4	3.5
10	10	10	10	10	10
10	10	10	10	10	10
10	10	10	10	3	3

253 V AC  
24 V AC  
30 A (10 ms)  
10 mA / 0.75 A (see derating curve)  
RCV circuit  
<1 V

<1 mA (in off state)  
4.5 A<sup>2</sup>s

2.5 kV (50 Hz, 1 min.)  
-25°C ... 60°C  
IEC 60664, EN 50178  
2 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 24DC/ 2	2966634	10
PLC-OSC- 48DC/ 24DC/ 2	2967002	10
PLC-OSC- 60DC/ 24DC/ 2	2967468	10
PLC-OSC-125DC/ 24DC/ 2	2980050	10
PLC-OSC-120UC/ 24DC/ 2	2966650	10
PLC-OSC-230UC/ 24DC/ 2	2966663	10
PLC-OPT- 24DC/ 24DC/2	2900364	10
PLC-OPT- 48DC/ 24DC/2	2900365	10
PLC-OPT- 60DC/ 24DC/2	2900366	10
PLC-OPT-120UC/ 24DC/2	2900367	10
PLC-OPT-230UC/ 24DC/2	2900368	10

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/230AC/ 1	2967840	10
PLC-OSC- 48DC/230AC/ 1	2967853	10
PLC-OSC- 60DC/230AC/ 1	2967866	10
PLC-OSC-125DC/230AC/ 1	2980063	10
PLC-OSC-120UC/230AC/ 1	2967879	10
PLC-OSC-230UC/230AC/ 1	2967882	10
PLC-OPT- 24DC/230AC/1	2900369	10
PLC-OPT- 48DC/230AC/1	2900370	10
PLC-OPT- 60DC/230AC/1	2900371	10
PLC-OPT-120UC/230AC/1	2900372	10
PLC-OPT-230UC/230AC/1	2900374	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC actuator series for output functions

The PLC actuator series couples controllers and actuators such as motors, contactors, and valves.

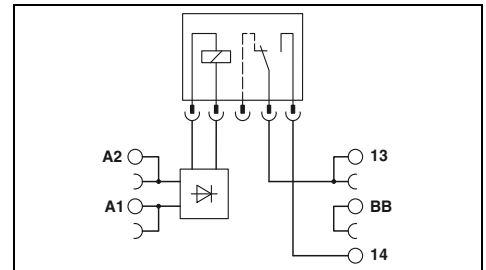
The advantages:

- Direct connection of actuator to relay module including load return line
- No need for additional modular terminal blocks
- Space savings of up to 80%
- Time savings of up to 60%
- Screw and Push-in connection technology
- Relay modules with safe isolation in accordance with DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

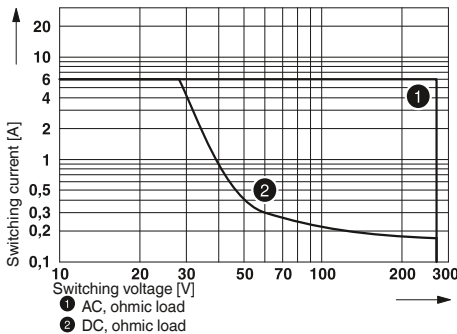
Notes:	
Type of insulating housing:	Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material	See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....	
For diagrams of operating voltage ranges, see page 399	
For derating curves see page 401	
See the website for more information on connection cross sections with ferrules.	



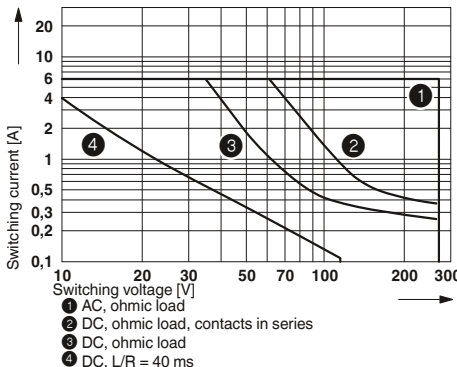
**1-N/O-contact relay module with additional floating terminal point**



**Electrical interrupting rating for PLC...24DC/1/ACT? with 1 N/O relay**



**Electrical interrupting rating for PLC...24DC/1-1/ACT? with 2 N/O relays**



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time/switch-on time at $U_N$	[ms]
Typical release time/switch-off time at $U_N$	[ms]
Input circuit DC	
Output data	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current	
Minimum switching current	
General data	
Test voltage input/output	
Ambient temperature (operation)	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data	
①	See diagram
	9
	5
	8
	Yellow LED, reverse polarity protection, free-wheeling diode
	AgSnO
	250 V AC/DC
	5 V (at 100 mA)
	6 A
	10 A (4 s)
	10 mA (at 12 V)
	4 kV AC (50 Hz, 1 min.)
	-40°C ... 60°C
	2x 10 <sup>7</sup> cycles
	IEC 60664, EN 50178
	3 / III
	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
	6.2 mm / 80 mm / 94 mm
	Class A product, see page 583

Description	Input voltage $U_N$
PLC INTERFACE, with screw connection	
①	24 V DC
PLC-INTERFACE, with Push-in connection	
①	24 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/ 1/ACT	2966210	10
PLC-RPT- 24DC/ 1/ACT	2900312	10

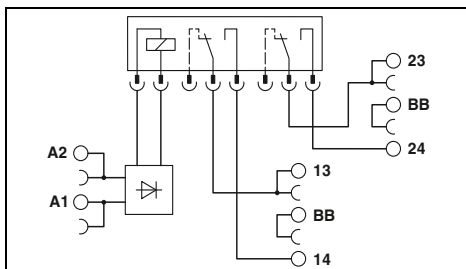
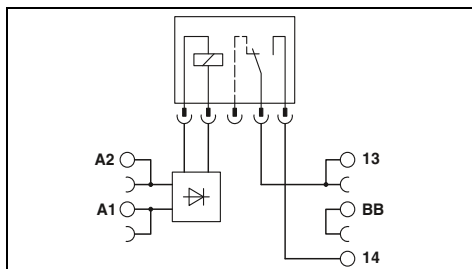


**1-N/O-contact relay module with manual operation and additional floating terminal point**



**2-N/O-contact relay module with additional floating terminal points**

ERC



**Technical data**

①  
See diagram  
9  
5  
8  
Yellow LED, reverse polarity protection, free-wheeling diode

AgSnO  
250 V AC/DC  
5 V (at 100 mA)  
6 A  
10 A (4 s)  
10 mA (at 12 V)

4 kV AC (50 Hz, 1 min.)  
-40°C ... 60°C  
1x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
3 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

**Technical data**

①  
See diagram  
18  
8  
10  
Yellow LED, reverse polarity protection, free-wheeling diode

AgNi  
250 V AC/DC  
5 V AC/DC  
6 A  
8 A  
10 mA

4 kV AC (50 Hz, 1 min.)  
-40°C ... 60°C  
3x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
3 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 94 mm  
Class A product, see page 583

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/ 1/MS/ACT	2909661	10
PLC-RPT- 24DC/ 1/MS/ACT	2909677	10

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/ 1- 1/ACT	2967109	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC actuator series for output functions

The PLC actuator series couples controllers and actuators such as motors, contactors, and valves.

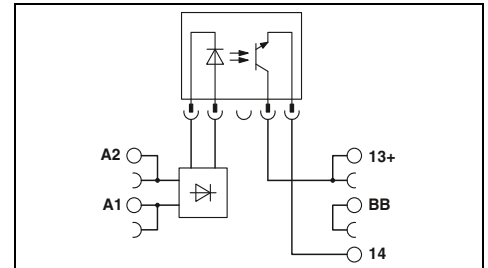
The advantages:

- Direct connection of actuator to relay module including load return line
- No need for additional modular terminal blocks
- Space savings of up to 80%
- Time savings of up to 60%
- Screw and Push-in connection technology
- Relay modules with safe isolation in accordance with DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

**Notes:**  
See the website for more information on connection cross sections with ferrules.



**Solid-state relay module with additional floating terminal point, DC output max. 3 A**

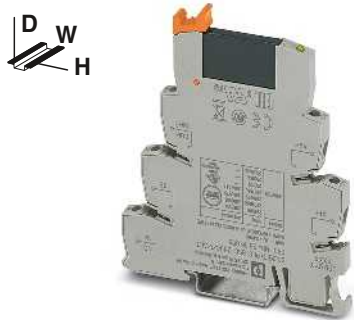


Input data	
Permissible range (with reference to $U_N$ )	
Switching level (with reference to $U_N$ )	1 signal ("H") 0 signal ("L")
Typical input current at $U_N$	[mA]
Typical response time/switch-on time at $U_N$	[ms]
Typical release time/switch-off time at $U_N$	[ms]
Transmission frequency $f_{limit}$	[Hz]
Input circuit DC	
Output data	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current	
Minimum switching current	
Output protection	
Voltage drop at maximum limiting continuous current	
Leakage current in off state	
Phase angle ( $\cos \phi$ )	
Max. load value	
General data	
Test voltage input/output	
Ambient temperature (operation)	
Standards/regulations	
Degree of pollution/surge voltage category	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

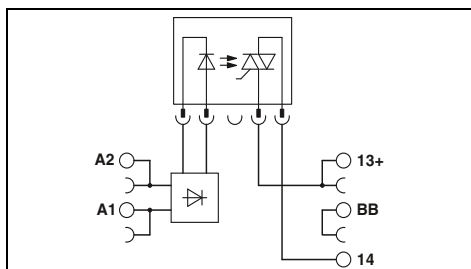
Technical data	
①	②
0.8 - 1.2	0.8 - 1.2
$\geq 0.8$	$\geq 0.8$
$\leq 0.25$	$\leq 0.4$
9.5	8.5
0.02	0.02
0.3	0.3
300	300
Yellow LED, reverse polarity protection, free-wheeling diode	
33 V DC	
3 V DC	
3 A (see derating curve)	
15 A (10 ms)	
-	
Reverse polarity protection, surge protection	
$\leq 200$ mV	
-	
-	
-	
2.5 kV (50 Hz, 1 min.)	
-25°C ... 60°C	
IEC 60664, EN 50178	
2 / III	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
6.2 mm / 80 mm / 94 mm	
Class A product, see page 583	

Description	Input voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	
①	5 V DC
②	24 V DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	5 V DC
②	24 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-OSC- 5DC/ 24DC/ 2/ACT	2980144	10
PLC-OSC- 24DC/ 24DC/ 2/ACT	2966676	10
PLC-OPT- 5DC/ 24DC/2/ACT	2900375	10
PLC-OPT- 24DC/ 24DC/2/ACT	2900376	10



**Solid-state relay module  
with additional floating terminal point,  
AC output max. 750 mA**



**Technical data**

- ②
- 0.8 -
- 1.2
- ≥0.8
- ≤0.25
- 9
- 3
- 9
- 10

Yellow LED, reverse polarity protection, free-wheeling diode

253 V AC  
24 V AC  
0.75 A (see derating curve)  
30 A (10 ms)  
10 mA  
RCV circuit  
<1 V

<1 mA (in off state)  
0.5  
4.5 A²s

2.5 kV (50 Hz, 1 min.)  
-25°C ... 60°C  
IEC 60664, EN 50178  
2 / III

0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/230AC/ 1/ACT	2967947	10



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

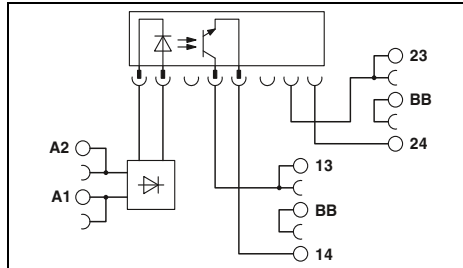
### PLC actuator series for output functions

PLC actuator series with solid-state power relays for coupling the controller and actuators, such as motors, contactors, valves, etc.

<b>Notes:</b>
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For derating curves see page 401
See the website for more information on connection cross sections with ferrules.



**Solid-state relay module with additional floating terminal point, DC output max. 5 A**



#### Technical data

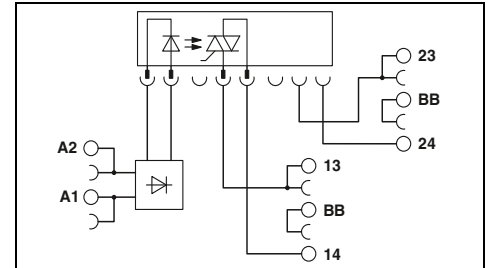
Input data	①
Permissible range (with reference to $U_N$ )	0.8 - 1.2
Switching level (with reference to $U_N$ )	1 signal ("H") $\geq 0.8$ 0 signal ("L") $\leq 0.4$
Typical input current at $U_N$	9 [mA]
Typical switch-on time at $U_N$	0.02 [ms]
Typical switch-off time at $U_N$	0.4 [ms]
Transmission frequency $f_{limit}$	300 [Hz]
Input circuit DC	Yellow LED, reverse polarity protection, free-wheeling diode
Output data	
Maximum/minimum switching voltage	33 V DC / 3 V DC
Maximum switch-on current	15 A (10 ms)
Minimum/maximum switching current	- / 5 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	$\leq 200$ mV
Leakage current in off state	-
Phase angle (cos $\phi$ )	-
Max. load value	-
General data	
Rated insulation voltage	-
Rated surge voltage	Basic insulation
Ambient temperature (operation)	-20°C ... 60°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	See to derating / in rows with zero spacing
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	14 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with screw connection ①	24 V DC	PLC-OSC- 24DC/ 24DC/ 5/ACT	2982786	10



**Solid-state relay module with additional floating terminal point, AC output max. 2 A**



#### Technical data

Input data	①
Permissible range (with reference to $U_N$ )	0.8 - 1.2
Switching level (with reference to $U_N$ )	1 signal ("H") $\geq 0.8$ 0 signal ("L") $\leq 0.4$
Typical input current at $U_N$	9 [mA]
Typical switch-on time at $U_N$	10 [ms]
Typical switch-off time at $U_N$	10 [ms]
Transmission frequency $f_{limit}$	10 [Hz]
Input circuit AC	Yellow LED, reverse polarity protection, free-wheeling diode
Output data	
Maximum/minimum switching voltage	253 V AC / 24 V AC
Maximum switch-on current	30 A (10 ms)
Minimum/maximum switching current	25 mA / 2 A (see derating curve)
Output protection	Surge protection
Voltage drop at maximum limiting continuous current	$\leq 1$ V
Leakage current in off state	Typically 1 mA
Phase angle (cos $\phi$ )	0.5
Max. load value	4 A <sup>2</sup> s (tp = 10 ms, at 25°C)
General data	
Rated insulation voltage	-
Rated surge voltage	Basic insulation
Ambient temperature (operation)	-20°C ... 60°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	See to derating / in rows with zero spacing
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	14 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with screw connection ①	24 V AC	PLC-OSC- 24DC/230AC/ 2/ACT	2982760	10

**PLC actuator series for output functions**

PLC actuator basic terminal blocks that can be fitted with a mechanical or solid-state relay. For coupling the controller and actuators, such as motors, contactors, valves, etc.

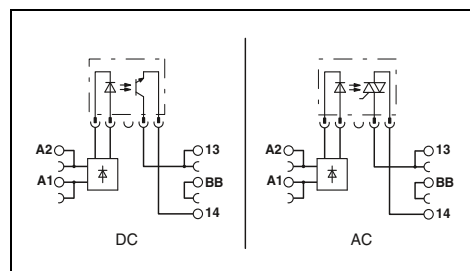
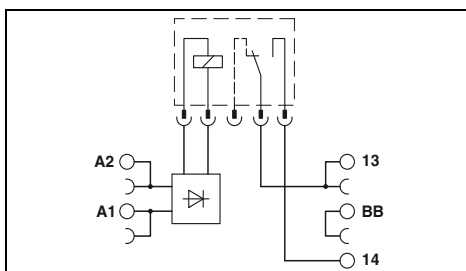
<b>Notes:</b>
Maximum interrupting rating diagrams, see page 402
For derating curves see page 401
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



**Basic terminal block with additional floating terminal point for assembly with relay**



**Basic terminal block with additional floating terminal point for assembly with solid-state relay**



<b>Input data</b>	
Permissible range (with reference to $U_N$ )	0.8 ... 1.2
Typical input current at $U_N$ (50/60 Hz)	15.6 mA / 8.5 mA
Typical response time at $U_N$	5 ms
Typical release time at $U_N$	30 ms
Input circuit	Yellow LED, bridge rectifier
Output data with:	REL-MR-24DC/21AU      REL-MR-24DC/21
Contact type	Single contact, 1 N/O contact
Contact material	AgSnO, hard gold-plated
Max. switching voltage	30 V AC / 36 V DC
Minimum switching voltage	100 mV (at 10 mA)
Limiting continuous current	50 mA
Minimum switching current	1 mA (at 24 V)
Output protection	-
Voltage drop at limiting continuous current	-
Leakage current in off state	-
Max. load value $I^2 \times t$ (t = 10 ms)	-
<b>General data</b>	
Rated insulation voltage	250 V AC
Rated surge voltage/insulation	6 kV / safe isolation, increased insulation
Ambient temperature (operation)	-20°C ... 60°C
Air clearances and creepage distances	EN 50178
Degree of pollution/overvoltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 94 mm

<b>Technical data</b>		
0.8 ... 1.2		
15.6 mA / 8.5 mA		
5 ms		
30 ms		
Yellow LED, bridge rectifier		
REL-MR-24DC/21AU      REL-MR-24DC/21		
Single contact, 1 N/O contact		
AgSnO, hard gold-plated		
30 V AC / 36 V DC		
100 mV (at 10 mA)		
50 mA		
1 mA (at 24 V)		
-		
-		
-		
-		
250 V AC		
6 kV / safe isolation, increased insulation		
-20°C ... 60°C		
EN 50178		
2 / III		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
6.2 mm / 80 mm / 94 mm		

<b>Technical data</b>		
0.8 ... 1.2		
15 mA / 8.3 mA		
10 ms		
20 ms		
Yellow LED, bridge rectifier		
OPT...48DC/...    OPT...24DC/...    OPT...230AC/...		
-		
-		
-		
48 V DC		
33 V DC		
253 V AC		
3 V DC		
3 V DC		
24 V AC		
100 mA		
3 A (see derating curve)		
0.75 A (see derating curve)		
-		
Reverse polarity protection, surge protection		
RCV circuit		
≤1 V		
≤150 mV		
≤1 V		
-		
≤1 mA		
-		
4.5 A <sup>2</sup> s (tp = 10 ms, at 25°C)		
250 V AC		
6 kV / safe isolation, increased insulation		
-20°C ... 60°C		
EN 50178		
2 / III		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
6.2 mm / 80 mm / 94 mm		

Description	Voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	24 V AC/DC
<b>PLC-INTERFACE, with Push-in connection</b>	24 V AC/DC

<b>Ordering data</b>		
Type	Order No.	Pcs./Pkt.
PLC-BSC- 24UC/ 1/ACT	2982799	10
PLC-BPT- 24UC/ 1/ACT	2900450	10

<b>Ordering data</b>		
Type	Order No.	Pcs./Pkt.
PLC-BSC- 24UC/ 1/ACT	2982799	10
PLC-BPT- 24UC/ 1/ACT	2900450	10

<b>Plug-in miniature power relays, with multi-layer gold contacts</b>	
REL-MR- 24DC/21AU	2961121
REL-MR- 24DC/21	2961105
<b>Pluggable solid-state relays</b>	
Solid-state input relays	
Solid-state power relays	
Solid-state power relays	

<b>Accessories</b>		
REL-MR- 24DC/21AU	2961121	10
REL-MR- 24DC/21	2961105	10

<b>Accessories</b>		
OPT-24DC/ 48DC/100	2966618	10
OPT-24DC/ 24DC/ 2	2966595	10
OPT-24DC/230AC/ 1	2967950	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC sensor series for input functions

PLC sensor series for coupling controller and sensors, such as proximity switches, limit switches or auxiliary contacts

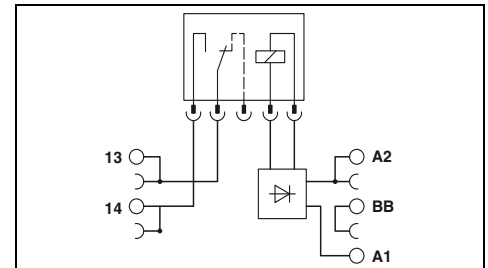
The advantages:

- Direct connection of sensor to relay module including sensor supply
- No need for additional modular terminal blocks
- Space savings of up to 80%
- Time savings of up to 60%
- Screw and Push-in connection technology
- Relay modules with safe isolation in accordance with DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 399
See the website for more information on connection cross sections with ferrules.
1) 120 and 230 V types up to 55°C
2) If the specified maximum values are exceeded for multi-layer contact relays, the gold layer will be destroyed. During further use, the maximum values of the power contact relays apply. This may then result in a shorter service life than a dedicated power contact.



**1-N/O-contact relay module with additional floating terminal point**



### Technical data

Input data	①	②	③	
Permissible range (with reference to $U_N$ )	See diagram			
Switching level (with reference to $U_N$ )	1 signal ("H") 0 signal ("L")			
Typical input current at $U_N$	[mA]	9	3.5	3.2
Typical response time/switch-on time at $U_N$	[ms]	5	6	7
Typical release time/switch-off time at $U_N$	[ms]	8	15	15
Transmission frequency $f_{limit}$	[Hz]			
Input circuit DC	Yellow LED, reverse polarity protection, free-wheeling diode			
Input circuit AC/DC	Yellow LED, bridge rectifier			
Output data				
Contact material	AgSnO, hard gold-plated			
Max. switching voltage	30 V AC / 36 V DC			
Minimum switching voltage	100 mV (at 10 mA)			
Limiting continuous current	50 mA			
Maximum switch-on current	50 mA			
Minimum switching current	1 mA (at 24 V)			
Output protection	-			
Voltage drop at maximum limiting continuous current	-			
General data				
Test voltage input/output	4 kV AC (50 Hz, 1 min.)			
Ambient temperature (operation)	-40°C ... 60°C <sup>1)</sup>			
Mechanical service life	2x 10 <sup>7</sup> cycles			
Standards/regulations	IEC 60664, EN 50178			
Degree of pollution/surge voltage category	3 / III			
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14			
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm		
EMC note	Class A product, see page 583			

①	②	③
See diagram		
Yellow LED, reverse polarity protection, free-wheeling diode		
Yellow LED, bridge rectifier		

Description	Input voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	
①	24 V DC
②	120 V AC / 110 V DC
③	230 V AC / 220 V DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	24 V DC
②	120 V AC / 110 V DC
③	230 V AC / 220 V DC

Ordering data			
Type	Order No.	Pcs./Pkt.	
PLC-RSC- 24DC/ 1AU/SEN	2966317	10	
PLC-RSC-120UC/ 1AU/SEN	2966320	10	
PLC-RSC-230UC/ 1AU/SEN	2966333	10	
PLC-RPT- 24DC/ 1AU/SEN	2900313	10	
PLC-RPT-120UC/ 1AU/SEN	2900314	10	
PLC-RPT-230UC/ 1AU/SEN	2900315	10	

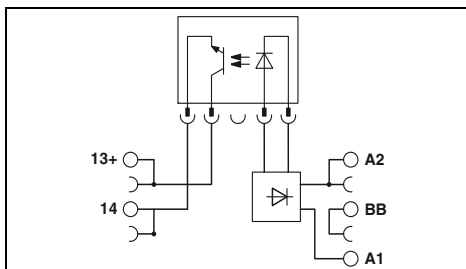
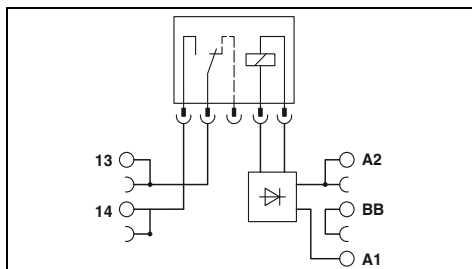


**1-N/O-contact relay module with manual operation and additional floating terminal point**



**Solid-state relay module with additional floating terminal point, DC output max. 100 mA**

ERC



**Technical data**

**Technical data**

① ② ③  
See diagram

① ② ③  
0.8 - 0.8 - 0.8 -  
1.2 1.1 1.1

9 3.5 3.2  
5 6 7  
8 15 15

≥0.8 ≥0.8 ≥0.8  
≤0.4 ≤0.3 ≤0.3  
8.5 3.5 3.5  
0.02 6 3  
0.3 10 5  
300 10 10

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

AgSnO<sub>3</sub>, hard gold-plated  
30 V AC / 36 V DC  
100 mV (at 10 mA)  
50 mA<sup>2</sup>  
50 mA<sup>2</sup>  
1 mA (at 24 V)  
-  
-

-  
48 V DC  
3 V DC  
100 mA  
-  
-  
Reverse polarity protection, surge protection  
≤1 V

4 kV AC (50 Hz, 1 min.)  
-40°C ... 60°C<sup>1</sup>  
1x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
3 / III

2.5 kV (50 Hz, 1 min.)  
-25°C ... 60°C  
-  
IEC 60664, EN 50178  
2 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/ 1AU/MS/SEN	2909663	10
PLC-RSC-120UC/ 1AU/MS/SEN	2909664	10
PLC-RSC-230UC/ 1AU/MS/SEN	2909665	10
PLC-RPT- 24DC/ 1AU/MS/SEN	2909678	10
PLC-RPT-120UC/ 1AU/MS/SEN	2909679	10
PLC-RPT-230UC/ 1AU/MS/SEN	2909680	10

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 48DC/100/SEN	2966773	10
PLC-OSC-120UC/ 48DC/100/SEN	2966799	10
PLC-OSC-230UC/ 48DC/100/SEN	2966809	10
PLC-OPT- 24DC/ 48DC/100/SEN	2900358	10
PLC-OPT-120UC/ 48DC/100/SEN	2900359	10
PLC-OPT-230UC/ 48DC/100/SEN	2900361	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE for high inrush currents, e.g., LEDs

PLC relay modules for high switch-on currents due, for example, to capacitive loads.

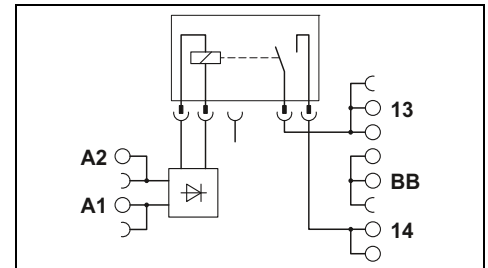
The advantages:

- Maximum inrush current 130 A peak
- Direct connection of load return line thanks to actuator type
- Screw and Push-in connection technology
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

Notes:	
Type of insulating housing:	Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material	See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....	
For diagrams of operating voltage ranges, see page 399	
See the website for more information on connection cross sections with ferrules.	



**1-N/O-contact relay module with additional floating terminal point, max. 130 A peak**

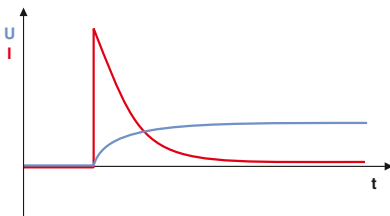


#### Technical data

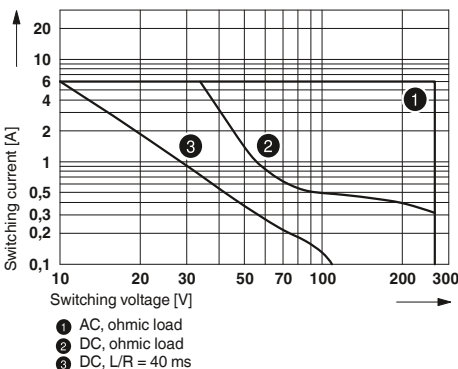
Input data	①	②
Typical input current at $U_N$	33	18
Response/release time at $U_N$	8 / 10	8 / 10
Input circuit DC	Yellow LED, reverse polarity protection, free-wheeling diode	
Output data		
Contact material	AgSnO	
Max. switching voltage	250 V AC/DC	
Minimum switching voltage	12 V (at 100 mA)	
Maximum switch-on current	80 A (for 20 ms) / 130 A (peak, at capacitive load, 230 V AC, 24 $\mu$ F)	
General data		
Test voltage input/output	4 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)	-40°C ... 60°C	
Mechanical service life	3x 10 <sup>7</sup> cycles	
Standards/regulations	EN 50178, EN 61810-1	
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	W / H / D 14 mm / 80 mm / 94 mm	

#### Basic behavior of capacitive loads:

- Very high input current
- Voltage increases with an e-function



#### Maximum interrupting rating



#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with screw connection	① 12 V DC	PLC-RSC- 12DC/ 1IC/ACT	1078800	10
	② 24 V DC	PLC-RSC- 24DC/ 1IC/ACT	2967604	10
PLC-INTERFACE, with Push-in connection	① 12 V DC	PLC-RPT- 12DC/ 1IC/ACT	1078801	10
	② 24 V DC	PLC-RPT- 24DC/ 1IC/ACT	2900298	10

new

**PLC-INTERFACE**  
with tungsten lead contact relay

PLC-INTERFACE with tungsten lead contact relay, e.g., LEDs

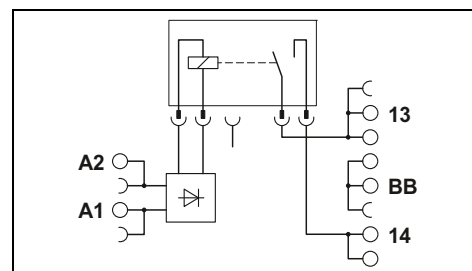
The advantages:

- Maximum inrush current up to 800 A peak through tungsten lead contact
- Direct connection of load return line thanks to actuator type
- Screw and Push-in connection technology
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

Notes:	
Type of insulating housing:	Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material	See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....	
For diagrams of operating voltage ranges, see page 399	
See the website for more information on connection cross sections with ferrules.	



**1-N/O-contact relay module with additional floating terminal point, 800 A peak, maximum**



Input data	
Typical input current at $U_N$	[mA] 18
Response/release time at $U_N$	[ms] 8 / 10
Input circuit DC	Yellow LED, reverse polarity protection, free-wheeling diode
Input circuit AC/DC	
Output data	
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V (at 100 mA)
Limiting continuous current	6 A
Maximum switch-on current	165 A (20 ms) / 800 A (peak, at capacitive load, 230 V AC, 24 $\mu$ F)
Minimum switching current	100 mA (at 12 V DC)
General data	
Test voltage input/output	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-40°C ... 60°C
Mechanical service life	3x 10 <sup>7</sup> cycles
Standards/regulations	EN 50178, EN 61810-1
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 14 mm / 80 mm / 94 mm

**Technical data**

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-INTERFACE, with screw connection		
① 24 V DC	PLC-RSC- 24DC/ 1ICT/ACT	1078680 10
PLC-INTERFACE, with Push-in connection		
① 24 V DC	PLC-RPT- 24DC/ 1ICT/ACT	1078683 10

Description	Input voltage $U_N$
PLC-INTERFACE, with screw connection	
①	24 V DC
PLC-INTERFACE, with Push-in connection	
①	24 V DC

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE for high continuous currents

PLC relay modules for high continuous switching currents

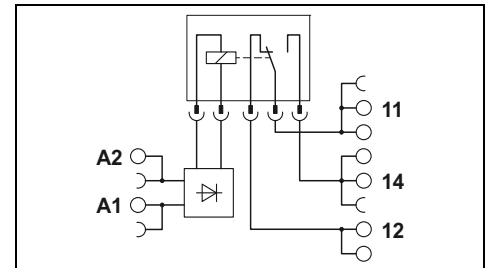
The advantages:

- Maximum continuous current 10 A
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Screw and Push-in connection technology
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter
- Long electrical service life, thanks to 16 A relay
- All common input voltages of 12 V DC to 230 V AC

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 399
See the website for more information on connection cross sections with ferrules.
1) 230 V types up to 55°C



1-changeover-contact relay module, max. 10 A

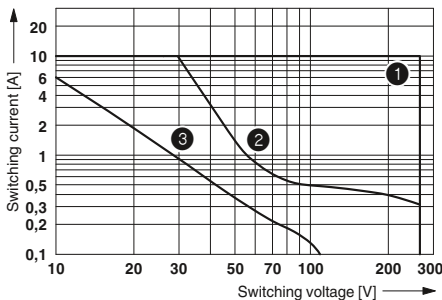


#### Technical data

Input data	①	②	③	④	⑤	⑥	⑦
Typical input current at $U_N$ [mA]	33	18	17.5	20	10	4.2	4.5
Response/release time at $U_N$ [ms]	8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10
Input circuit DC	Yellow LED, reverse polarity protection, free-wheeling diode						
Input circuit AC/DC	Yellow LED, bridge rectifier						
Output data							
Contact material	AgNi						
Max. switching voltage	250 V AC/DC						
Minimum switching voltage	12 V AC/DC						
Limiting continuous current	10 A						
Maximum switch-on current	30 A (300 ms)						
Minimum switching current	10 mA (at 12 V)						
General data							
Test voltage input/output	4 kV AC (50 Hz, 1 min.)						
Ambient temperature (operation)	-40°C ... 60°C <sup>1)</sup>						
Mechanical service life	3x 10 <sup>7</sup> cycles						
Standards/regulations	IEC 60664, EN 50178						
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14						
Dimensions	W / H / D 14 mm / 80 mm / 94 mm						
EMC note	Class A product, see page 583						

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>PLC INTERFACE, with screw connection</b>				
①	12 V DC	PLC-RSC- 12DC/21HC	2967617	10
②	24 V DC	PLC-RSC- 24DC/21HC	2967620	10
③	24 V AC/DC	PLC-RSC- 24UC/21HC	2967633	10
④	48 V DC	PLC-RSC- 48DC/21HC	2967646	10
⑤	60 V DC	PLC-RSC- 60DC/21HC	2967659	10
⑥	120 V AC / 110 V DC	PLC-RSC-120UC/21HC	2967662	10
⑦	230 V AC / 220 V DC	PLC-RSC-230UC/21HC	2967675	10
<b>PLC-INTERFACE, with Push-in connection</b>				
①	12 V DC	PLC-RPT- 12DC/21HC	2900290	10
②	24 V DC	PLC-RPT- 24DC/21HC	2900291	10
③	24 V AC/DC	PLC-RPT- 24UC/21HC	2900293	10
④	48 V DC	PLC-RPT- 48DC/21HC	2900294	10
⑤	60 V DC	PLC-RPT- 60DC/21HC	2900295	10
⑥	120 V AC / 110 V DC	PLC-RPT-120UC/21HC	2900296	10
⑦	230 V AC / 220 V DC	PLC-RPT-230UC/21HC	2900297	10



- ① AC, ohmic load
- ② DC, ohmic load
- ③ DC, L/R = 40 ms

Max. interrupting rating

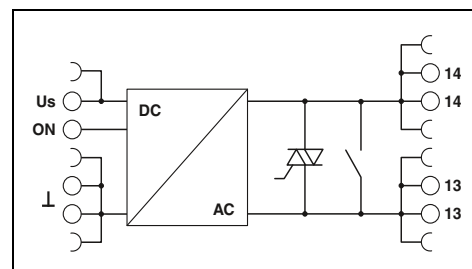
**PLC-INTERFACE**  
with hybrid solid-state relay

- The solid-state relay, combined with a mechanical relay, offers the following advantages:
- Higher electrical service life
  - Lower power dissipation
  - Option of bridging adjacent modules
  - Status display
  - Protection circuits in input and output
  - Switching capacity up to 230 V AC/10 A
  - Screw and Push-in connection technology

**Notes:**  
See the website for more information on connection cross sections with ferrules.



Hybrid solid-state relay,  
AC output max. 10 A and  
bypass relay



**Technical data**

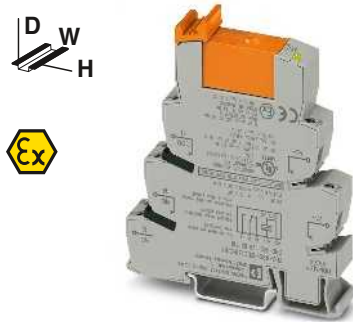
<b>Input data</b>	①
Rated control supply voltage $U_s$	24 [V DC]
Rated control supply voltage range with reference to $U_s$	0.8 - 1.2
Rated control supply current $I_s$	14 mA (input low, output low) 19 mA (input high, output high)
Rated actuation voltage $U_c$ ON	24 [V DC]
Rated actuating voltage range with reference to $U_c$	0.8 - 1.2
Rated actuating current $I_c$	6.8 [mA]
Input circuit DC	Yellow LED, reverse polarity protection, surge protection
<b>Output data</b>	
Max. switching voltage	253 V AC
Minimum switching voltage	24 V AC
Minimum/maximum switching current	100 mA / 10 A (see derating curve)
Output protection	RCV circuit
Leakage current in off state	<1 mA
Max. load value	350 A <sup>2</sup> s (tp = 10 ms, at 25°C)
<b>General data</b>	
Rated insulation voltage	260 V AC
Rated surge voltage	6 kV
Insulation	safe isolation
Ambient temperature (operation)	-25°C ... 60°C
Standards/regulations	DIN EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0,14 - 2,5 mm <sup>2</sup> / 0,14 - 2,5 mm <sup>2</sup> / 26 - 14
Dimensions	14 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

**Ordering data**

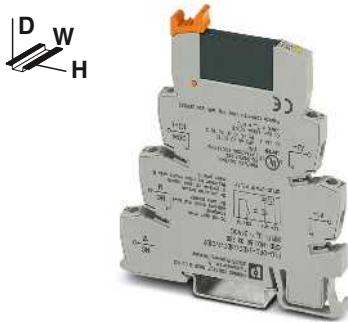
Description	Rated actuating voltage $U_c$	Type	Order No.	Pcs./Pkt.
<b>PLC INTERFACE, with screw connection</b>	① 24 V DC	<b>PLC-HSC-24DC/230AC/10</b>	<b>2905214</b>	1
<b>PLC-INTERFACE, with Push-in connection</b>	① 24 V DC	<b>PLC-HPT-24DC/230AC/10</b>	<b>2905215</b>	1



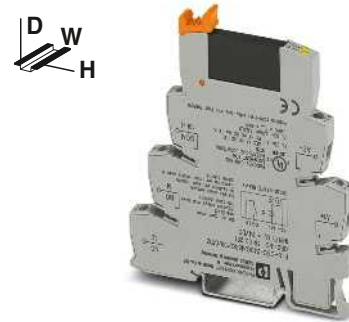




1-changeover-contact relay module, max. 10 A



Solid-state relay module, DC output max. 3 A

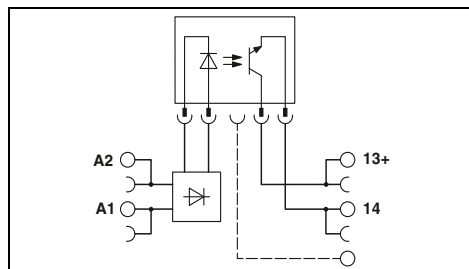
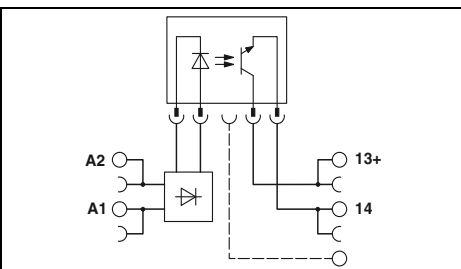
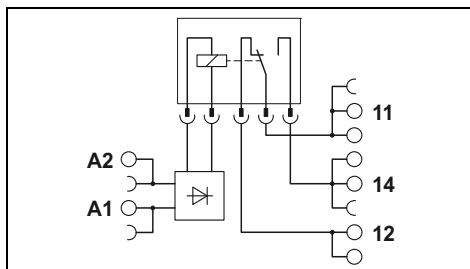


Solid-state relay module, DC output max. 100 mA

ERC  
Ex:

ERC  
Ex:

ERC  
Ex:



**Technical data**

**Technical data**

**Technical data**

① ② ③ ④  
See diagram

②	③
0.8 - 1.2	0.9 - 1.1
≥0.8	≥0.8
≤0.4	≤0.3
8.5	3.5
0.02	3.5
0.3	7
300	10

②	③
0.8 - 1.2	0.9 - 1.1
≥0.8	≥0.9
≤0.4	≤0.3
8.5	3.5
0.02	3
0.3	4
300	10

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

Yellow LED, reverse polarity protection, free-wheeling diode  
Yellow LED, bridge rectifier

AgNi  
250 V AC/DC  
12 V AC/DC  
10 A  
30 A (300 ms)  
10 mA (at 12 V)  
-

-  
33 V DC  
3 V DC  
3 A  
15 A (10 ms)  
-  
Reverse polarity protection, surge protection  
≤200 mV

-  
48 V DC  
3 V DC  
100 mA  
-  
Reverse polarity protection, surge protection  
≤1 V

4 kV AC (50 Hz, 1 min.)  
-20°C ... 60°C (UL), -40°C ... 60°C (ATEX / IECEx)  
3x 10<sup>7</sup> cycles  
IEC 60664, EN 50178, EN 60079-0, -7, -15  
2 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 94 mm  
Class A product, see page 583

2.5 kV (50 Hz, 1 min.)  
-20°C ... 60°C  
-  
IEC 60664, EN 50178  
2 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

2.5 kV (50 Hz, 1 min.)  
-20°C ... 60°C  
-  
IEC 60664, EN 50178  
2 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

CE-compliant  
Ex II 3G Ex ec nC IIC T4 Gc (IBExU16ATEXB015 X)  
Ex ec nC IIC T4 Gc (IECEx IBE 16.0029X)  
Class I, Zone 2, AEx nA nC IIC T6  
Class I, Div. 2, Groups A, B, C, D  
Class I, Zone 2, Ex nA nC IIC Gc T6 X

CE-compliant  
-  
-  
Class I, Zone 2, AEx nA nC IIC T6  
Class I, Div. 2, Groups A, B, C, D  
Class I, Zone 2, Ex nA nC IIC Gc T6 X

CE-compliant  
-  
-  
Class I, Zone 2, AEx nA nC IIC T6  
Class I, Div. 2, Groups A, B, C, D  
Class I, Zone 2, Ex nA nC IIC Gc T6 X

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC-12DC/21HC/EX	2909518	10
PLC-RSC-24DC/21HC/EX	2909519	10
PLC-RSC-120UC/21HC/EX	2909520	10
PLC-RSC-230UC/21HC/EX <sup>1)</sup>	2909521	10
PLC-RPT-12DC/21HC/EX	2909531	10
PLC-RPT-24DC/21HC/EX	2909532	10
PLC-RPT-120UC/21HC/EX	2909533	10
PLC-RPT-230UC/21HC/EX <sup>1)</sup>	2909534	10

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 24DC/ 2/C1D2	5603260	10
PLC-OSC-120UC/ 24DC/ 2/C1D2	5603262	10

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 48DC/100/C1D2	5603261	10
PLC-OSC-120UC/ 48DC/100/C1D2	5603263	10

## PLC-INTERFACE – Highly-compact relay modules

### Basic terminal blocks with interference current filter that can be fitted with relays

PLC basic terminal blocks with integrated filter to protect against interference voltages or currents due, for example, to long control lines.

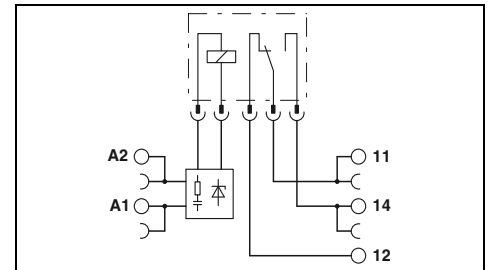
The advantages:

- Resistant to interference currents
- High relay release voltage
- Typical applications:
- Applications with long control lines
- Use of AC output boards, resulting in residual AC currents
- Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 399
Maximum interrupting rating diagrams, see page 402
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



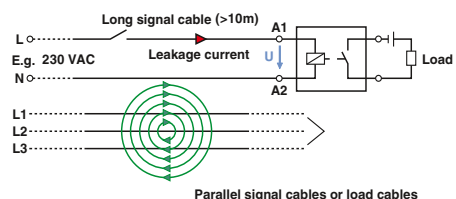
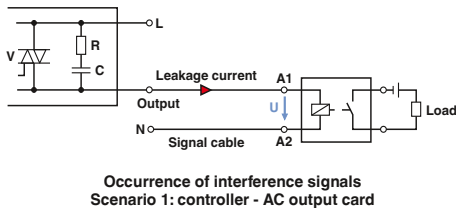
Basic terminal block with Input filter



### Technical data

Input data
Nominal input voltage $U_N$
Permissible range (with reference to $U_N$ )
Typical release voltage (relay assembly)
Typical input current at $U_N$ (50/60 Hz)
Typical response time at $U_N$
Typical release time at $U_N$
Input circuit
Output data with:
Contact type
Contact material
Max. switching voltage
Minimum switching voltage
Limiting continuous current
Maximum switch-on current
Minimum switching current
General data
Test voltage input/output
Ambient temperature (operation)
Mechanical service life
Standards/regulations
Degree of pollution/overvoltage category
Connection data solid/stranded/AWG
Dimensions
EMC note

120 V AC	230 V AC
0.8 ... 1.4	0.78 ... 1.14
50 V AC	80 V AC
7 mA / 8 mA	8.8 mA / 10 mA
7 ms	7 ms
20 ms	20 ms
Yellow LED, bridge rectifier, filter	
REL-MR-60DC/21	REL-MR-60DC/21AU
Single contact, 1-PDT	Single contact, 1-PDT
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
on request	50 mA
10 mA (at 12 V)	1 mA (at 24 V)
4 kV (50 Hz, 1 min.)	
-20°C ... 55°C	
2x 10 <sup>7</sup> cycles	
IEC 60664, EN 50178	
3 / III	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
6.2 mm / 80 mm / 94 mm	
Class A product, see page 583	



Description	Voltage $U_N$
<b>PLC-INTERFACE basic terminal block</b> , for pluggable miniature relays or solid-state relays	
with screw connection	120 V AC
with screw connection	230 V AC
with Push-in connection	120 V AC
with Push-in connection	230 V AC

### Plug-in miniature power relays, with multi-layer gold contacts

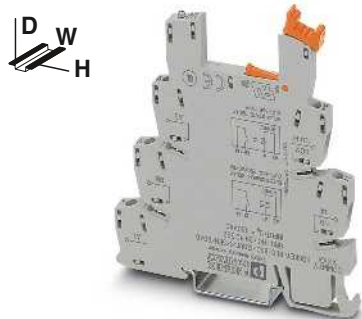
REL-MR- 60DC/21AU	2961134	10
REL-MR- 60DC/21	2961118	10

### Ordering data

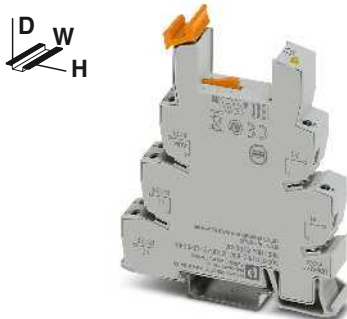
Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/21/SO46	2980319	10
PLC-BSC-230UC/21/SO46	2980335	10
PLC-BPT-120UC/21/SO46	2900453	10
PLC-BPT-230UC/21/SO46	2900455	10

### Accessories

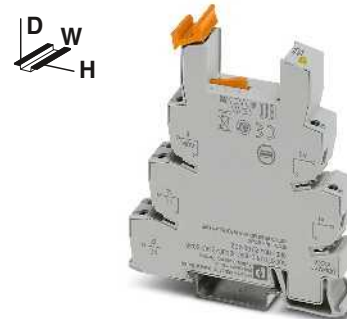
REL-MR- 60DC/21AU	2961134	10
REL-MR- 60DC/21	2961118	10



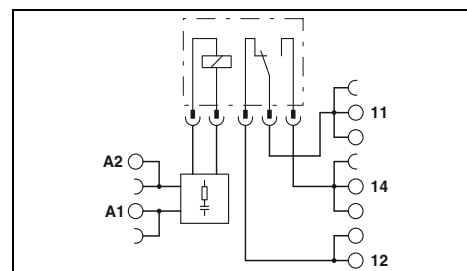
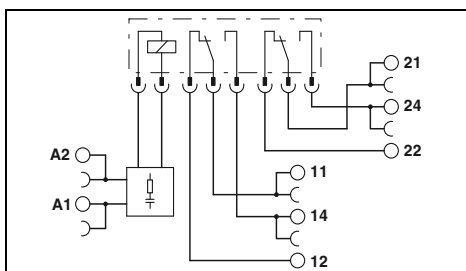
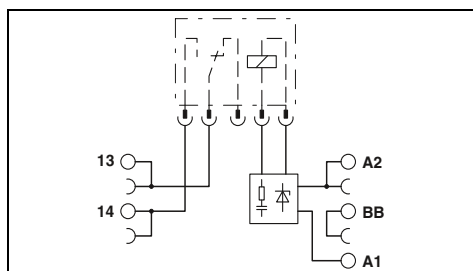
Basic terminal block with additional floating terminal point and input filter



2-changeover-contact basic terminal block with input filter



1-changeover-contact basic terminal block for high continuous currents with input filter



**Technical data**

**Technical data**

**Technical data**

120 V AC	230 V AC
0.8 ... 1.4	0.78 ... 1.14
50 V AC	80 V AC
7 mA / 8 mA	8.8 mA / 10 mA
7 ms	7 ms
20 ms	20 ms
Yellow LED, bridge rectifier, filter	
REL-MR-60DC/21	REL-MR-60DC/21AU
Single contact, 1 N/O contact	Single contact, 1 N/O contact
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
on request	50 mA
10 mA (at 12 V)	1 mA (at 24 V)

120 V AC	230 V AC
0.78 ... 1.4	0.78 ... 1.14
16 V AC	70 V AC
6 mA / 7 mA	8.5 mA / 10 mA
7 ms	7 ms
10 ms	10 ms
Yellow LED, bridge rectifier, filter	
REL-MR-110DC/21-21	REL-MR-110DC/21-21AU
Single contact, 2-PDT	Single contact, 2-PDT
AgNi	AgNi, + 5 µm Au
250 V AC/DC	30 V AC / 36 V DC
5 V AC/DC	100 mV
6 A	50 mA
15 A (300 ms)	50 mA
10 mA	1 mA

120 V AC	230 V AC
0.85 ... 1.4	0.78 ... 1.14
16 V AC	70 V AC
6 mA / 7 mA	8.5 mA / 10 mA
7 ms	7 ms
20 ms	20 ms
Yellow LED, bridge rectifier, filter	
REL-MR-110DC/21HC	
Single contact, 1-PDT	
AgNi	
250 V AC/DC	
12 V AC/DC	
10 A	
30 A (300 ms)	
100 mA	

4 kV (50 Hz, 1 min.)  
 -20°C ... 55°C  
 2x 10<sup>7</sup> cycles  
 IEC 60664, EN 50178  
 3 / III

4 kV (50 Hz, 1 min.)  
 -20°C ... 55°C  
 3x 10<sup>7</sup> cycles  
 IEC 60664, EN 50178  
 3 / III

4 kV (50 Hz, 1 min.)  
 -20°C ... 55°C  
 3x 10<sup>7</sup> cycles  
 IEC 60664, EN 50178  
 3 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 6.2 mm / 80 mm / 94 mm  
 Class A product, see page 583

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 14 mm / 80 mm / 94 mm  
 Class A product, see page 583

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 14 mm / 80 mm / 94 mm  
 Class A product, see page 583

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/ 1/SEN/SO46	2980322	10
PLC-BSC-230UC/ 1/SEN/SO46	2980348	10
PLC-BPT-120UC/ 1/SEN/SO46	2900456	10
PLC-BPT-230UC/ 1/SEN/SO46	2900457	10

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/21-21/SO46	2980416	10
PLC-BSC-230UC/21-21/SO46	2980429	10

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/21HC/SO46	2980432	10
PLC-BSC-230UC/21HC/SO46	2980445	10

**Accessories**

**Accessories**

**Accessories**

REL-MR- 60DC/21AU	2961134	10
REL-MR- 60DC/21	2961118	10

REL-MR-110DC/21-21AU	2961228	10
REL-MR-110DC/21-21	2961202	10

REL-MR-110DC/21HC	2961338	10
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# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### Basic terminal blocks with interference current filter that can be fitted with solid-state relays

PLC basic terminal blocks with integrated filter to protect against interference voltages or currents due, for example, to long control lines.

The advantages:

- Resistant to interference currents
- High relay release voltage

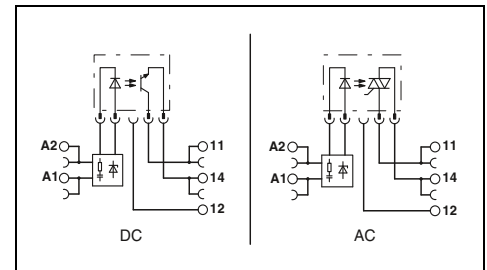
Typical applications:

- Applications with long control lines
- Use of AC output boards, resulting in residual AC currents

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 399
Maximum interrupting rating diagrams, see page 402
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



Basic terminal block with input filter



Input data	
Nominal input voltage $U_N$	120 V AC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Switching level (with optocoupler) 0 signal ("L")	$\leq 0.4$
Typical input current at $U_N$ (50/60 Hz)	7 mA / 8 mA
Typical response time/switch-on time at $U_N$	6 ms
Typical switch-off time at $U_N$	10 ms
Input circuit	Yellow LED, bridge rectifier, filter
Output data with:	
Max. switching voltage	OPT...48DC/... 48 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	100 mA
Maximum switch-on current	15 A (10 ms)
Output protection	Reverse polarity protection, surge protection
Voltage drop at limiting continuous current	<1 V
Leakage current in off state	-
Maximum phase shift (inductive consumer)	0.5
Max. load value $I^2 \times t$ ( $t = 10$ ms)	4.5 A <sup>2</sup> s
General data	
Test voltage input/output	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 55°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/overvoltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

### Technical data

	120 V AC	230 V AC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1	0.8 ... 1.1
Switching level (with optocoupler) 0 signal ("L")	$\leq 0.4$	$\leq 0.4$
Typical input current at $U_N$ (50/60 Hz)	7 mA / 8 mA	8.8 mA / 10 mA
Typical response time/switch-on time at $U_N$	6 ms	6 ms
Typical switch-off time at $U_N$	10 ms	10 ms
Input circuit	Yellow LED, bridge rectifier, filter	Yellow LED, bridge rectifier, filter
Output data with:		
Max. switching voltage	OPT...48DC/... 48 V DC	OPT...24DC/... 30 V DC
Minimum switching voltage	3 V DC	3 V DC
Limiting continuous current	100 mA	3 A
Maximum switch-on current	15 A (10 ms)	30 A (10 ms)
Output protection	Reverse polarity protection, surge protection	RCV circuit
Voltage drop at limiting continuous current	<1 V	<200 mV
Leakage current in off state	-	<1 mA
Maximum phase shift (inductive consumer)	-	0.5
Max. load value $I^2 \times t$ ( $t = 10$ ms)	-	4.5 A <sup>2</sup> s
General data		
Test voltage input/output	2.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 55°C	
Standards/regulations	IEC 60664, EN 50178	
Degree of pollution/overvoltage category	2 / III	
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	6.2 mm / 80 mm / 94 mm	
EMC note	Class A product, see page 583	

Description	Voltage $U_N$
<b>PLC-INTERFACE basic terminal block</b> , for pluggable miniature relays or solid-state relays	
with screw connection	120 V AC
with screw connection	230 V AC
with Push-in connection	120 V AC
with Push-in connection	230 V AC

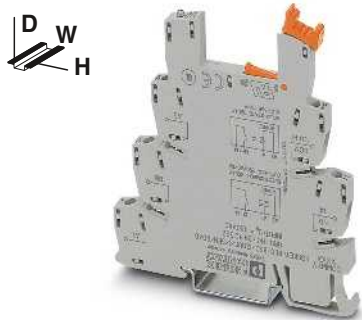
### Ordering data

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/21/SO46	2980319	10
PLC-BSC-230UC/21/SO46	2980335	10
PLC-BPT-120UC/21/SO46	2900453	10
PLC-BPT-230UC/21/SO46	2900455	10

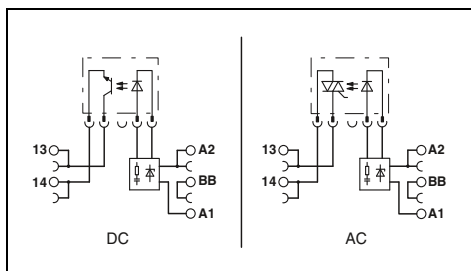
Pluggable solid-state relays	
Solid-state input relays	
Solid-state power relays	
Solid-state power relays	

### Accessories

OPT-60DC/ 48DC/100	2966621	10
OPT-60DC/ 24DC/ 2	2966605	10
OPT-60DC/230AC/ 1	2967963	10



**Basic terminal block  
with additional floating terminal point  
and input filter**



**Technical data**

120 V AC	230 V AC
0.85 ... 1.1	0.8 ... 1.1
≤0.4	≤0.4
7 mA / 8 mA	8.8 mA / 10 mA
6 ms	6 ms
10 ms	10 ms
Yellow LED, bridge rectifier, filter	
OPT...48DC/...	OPT...24DC/...
48 V DC	30 V DC
3 V DC	253 V AC
100 mA	3 A
	0.75 A
	15 A (10 ms)
Reverse polarity protection, surge protection	RCV circuit
<1 V	<200 mV
	<1 V
-	<1 mA
-	0.5
-	4.5 A²s

2.5 kV (50 Hz, 1 min.)  
-20°C ... 55°C  
IEC 60664, EN 50178  
2 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 583

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/ 1/SEN/SO46	<a href="#">2980322</a>	10
PLC-BSC-230UC/ 1/SEN/SO46	<a href="#">2980348</a>	10
PLC-BPT-120UC/ 1/SEN/SO46	<a href="#">2900456</a>	10
PLC-BPT-230UC/ 1/SEN/SO46	<a href="#">2900457</a>	10

**Accessories**

OPT-60DC/ 48DC/100	<a href="#">2966621</a>	10
OPT-60DC/ 24DC/ 2	<a href="#">2966605</a>	10
OPT-60DC/230AC/ 1	<a href="#">2967963</a>	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### Relay modules with filter and predefined switch-on and switch-off thresholds to protect against high interference signals

PLC relay module with integrated wiring to protect against interference voltages or currents due, for example, to long control lines.

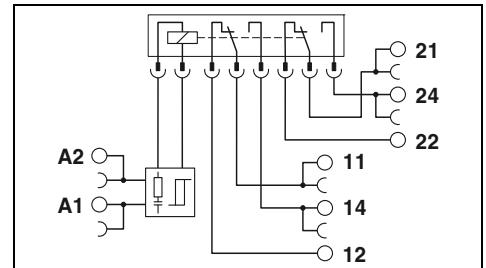
The advantages:

- Resistant to high interference signals, thanks to hysteresis
  - High relay release voltage up to 180 V AC
- Typical applications:
- Applications with long control lines
  - Use of AC output boards, resulting in residual AC currents
  - Screw and Push-in connection technology

new



**2-changeover contact with predefined switch-on and switch-off threshold**



### Technical data

	①	②
<b>Input data</b>		
Typical input current at $U_N$	4,5	4,5
Response/release time at $U_N$	7 / 10	7 / 10
Switch-on threshold	190 V AC	190 V AC
Switch-off threshold	180 V AC	180 V AC
Input circuit AC/DC	Yellow LED, bridge rectifier	
<b>Output data</b>		
Contact material	AgNi	
Max. switching voltage	250 V AC/DC	
Minimum switching voltage	5 V AC/DC (at 10 mA)	
Limiting continuous current	6 A	
Maximum switch-on current	15 A (300 ms)	
Minimum switching current	10 mA (at 5 V)	
<b>General data</b>		
Test voltage input/output	4 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)	-40°C ... 55°C	
Mechanical service life	3x 10 <sup>7</sup> cycles	
Standards/regulations	IEC 60664, EN 50178	
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	W / H / D 14 mm / 80 mm / 94 mm	

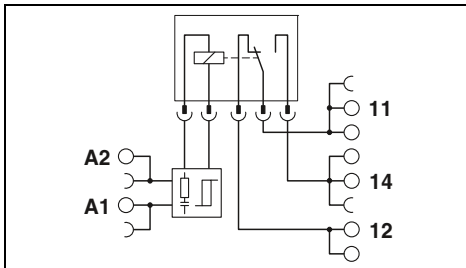
### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>PLC-INTERFACE</b>				
- with screw connection	① 230 V AC	PLC-RSC-230AC/21-21/SO46/HI	1079387	10
- with Push-in connection	② 230 V AC	PLC-RPT-230AC/21-21/SO46/HI	1079389	10

new



**1-changeover contact  
for high continuous currents with  
predefined switch-on and switch-off threshold**



**Technical data**

①	②
4.5	4.5
7 / 10	7 / 10
190 V	190 V
AC	AC
180 V	180 V
AC	AC

Yellow LED, bridge rectifier

AgNi
250 V AC/DC
12 V (at 10 mA)
10 A
30 A (300 ms)
10 mA (at 12 V)

4 kV AC (50 Hz, 1 min.)  
 -40°C ... 55°C  
 3x 10<sup>7</sup> cycles  
 IEC 60664, EN 50178  
 0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 14 mm / 80 mm / 94 mm

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-RSC-230AC/21HC/SO46/HI	1079402	10
PLC-RPT-230AC/21HC/SO46/HI	1079404	10



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### Plug-in miniature power relays

Plug-in miniature power relays are compatible for PLC-INTERFACE and RIF-0 and RIF-1 relay base.

The advantages:

- Power contacts up to 16 A
- Multi-layer gold contact or power contact
- High degree of protection up to RT III depending on type (wash-proof)
- Safe isolation in accordance with DIN EN 50178 between coil and contact

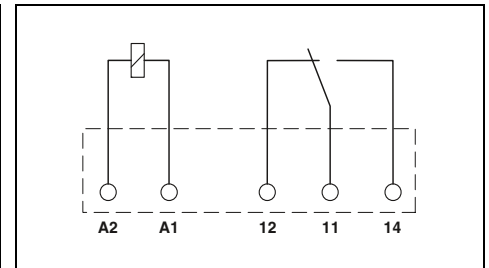
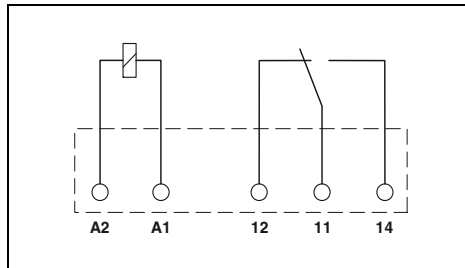


Relay with one changeover contact, max. 6 A



Relay with one changeover contact, with manual operation, max. 6 A

Notes:
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
For dimensional drawings and perforations for assembly, see page 400
For diagrams of operating voltage ranges, see page 399
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



Input data	①	②	③	④	⑤
Permissible range (with reference to $U_N$ )	See diagram				
Typical input current at $U_N$ [mA]	38	14	9	7	3
Typical response time at $U_N$ [ms]	5	5	5	5	5
Typical release time at $U_N$ [ms]	2.5	2.5	2.5	2.5	2.5
Output data					
Contact type	1 PDT		1 PDT		
Contact material	AgSnO		AgSnO, hard gold-plated		
Max. switching voltage	250 V AC/DC		30 V AC / 36 V DC		
Minimum switching voltage	5 V (at 100 mA)		100 mV (at 10 mA)		
Limiting continuous current	6 A		50 mA		
Maximum switch-on current	10 A (4 s)		on request		
Minimum switching current	10 mA (at 12 V)		1 mA (at 24 V)		
Maximum interrupting rating, ohmic load	24 V DC 140 W 48 V DC 20 W 60 V DC 18 W 110 V DC 23 W 220 V DC 40 W 250 V AC 1,500 VA		1.2 W - - - - -		
General data					
Test voltage (winding/contact)	4 kV AC (50 Hz, 1 min.)				
Ambient temperature (operation)	-40°C ... 85°C				
Nominal operating mode	100% operating factor				
Mechanical service life	2x 10 <sup>7</sup> cycles				
Standards/regulations	IEC 60664, EN 50178, EN 61810-1				
Mounting position/mounting	Any / in rows with zero spacing				
Dimensions	W / H / D		5 mm / 28 mm / 15 mm		

Technical data					
①	②	③	④	⑤	
See diagram					
	14	7	3		
	5	5	5		
	2.5	2.5	2.5		
1 PDT					
AgSnO, hard gold-plated					
30 V AC / 36 V DC					
100 mV (at 10 mA)					
50 mA					
on request					
10 mA (at 12 V)					
1 mA (at 24 V)					
140 W					
20 W					
18 W					
23 W					
40 W					
1,500 VA					
4 kV AC (50 Hz, 1 min.)					
-40°C ... 85°C					
100% operating factor					
1x 10 <sup>7</sup> cycles					
IEC 60664, EN 50178, EN 61810-1					
Any / in rows with zero spacing					
5 mm / 28 mm / 16 mm					

Technical data					
②	④	⑤			
See diagram					
	14	7	3		
	5	5	5		
	2.5	2.5	2.5		
1 PDT					
AgSnO, hard gold-plated					
30 V AC / 36 V DC					
100 mV (at 10 mA)					
50 mA					
50 mA					
10 mA (at 12 V)					
1 mA (at 24 V)					
140 W					
20 W					
18 W					
23 W					
40 W					
1,500 VA					
4 kV AC (50 Hz, 1 min.)					
-40°C ... 85°C					
100% operating factor					
1x 10 <sup>7</sup> cycles					
IEC 60664, EN 50178, EN 61810-1					
Any / in rows with zero spacing					
5 mm / 28 mm / 16 mm					

Ordering data	
Description	Input voltage $U_N$
<b>Plug-in miniature power relays, with power contacts</b>	
①	4.5 V DC
②	12 V DC
③	18 V DC
④	24 V DC
⑤	60 V DC
⑥	110 V DC
<b>Plug-in miniature power relays, with multi-layer gold contacts</b>	
①	4.5 V DC
②	12 V DC
③	18 V DC
④	24 V DC
⑤	60 V DC
⑥	110 V DC

Type	Order No.	Pcs./Pkt.
REL-MR- 4,5DC/21	2961367	10
REL-MR- 12DC/21	2961150	10
REL-MR- 18DC/21	2961383	10
REL-MR- 24DC/21	2961105	10
REL-MR- 60DC/21	2961118	10
REL-MR 4,5DC/21AU	2961370	10
REL-MR- 12DC/21AU	2961163	10
REL-MR- 18DC/21AU	2961493	10
REL-MR- 24DC/21AU	2961121	10
REL-MR- 60DC/21AU	2961134	10

Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21/MS	2909641	10
REL-MR- 24DC/21/MS	2909642	10
REL-MR- 60DC/21/MS	2909643	10
REL-MR- 12DC/21AU/MS	2909644	10
REL-MR- 24DC/21AU/MS	2909645	10
REL-MR- 60DC/21AU/MS	2909647	10



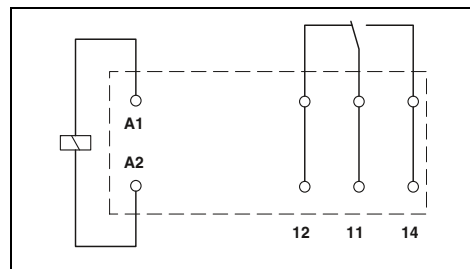
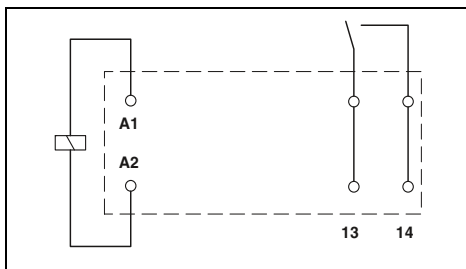
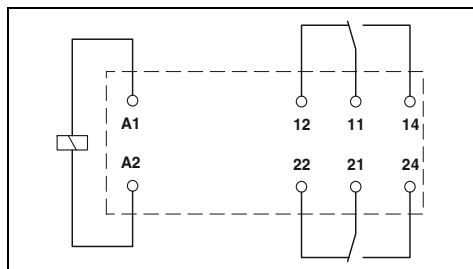
Relay with two changeover contacts,  
2 x 8 A, maximum



Relay with one N/O contact  
for high inrush currents,  
130 A peak, maximum



Relay with one changeover contact,  
16 A, maximum



**Technical data**

②	④	⑤	⑥
See diagram			
33	17	8.2	4.1
7	7	7	7
3	3	3	3

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
8 A	50 mA
25 A (20 ms)	50 mA
10 mA (at 5 V)	1 mA (at 24 V)

190 W	1.2 W
85 W	-
60 W	-
44 W	-
60 W	-
2,000 VA	-

5 kV AC (50 Hz, 1 min.)  
-40°C ... 85°C  
100% operating factor  
3x 10<sup>7</sup> cycles  
IEC 60664, EN 50178, EN 61810-1  
Any / can be aligned without spacing (>70°C ≥2.5 mm)

12.7 mm / 29 mm / 15.7 mm

**Technical data**

④
See diagram
17
8
3

1 N/O contact
AgSnO
250 V AC/DC
12 V (100 mA)
16 A
80 A (20 ms) / 130 A (peak, at capacitive load, 230 V AC, 24 μF)
100 mA (at 12 V DC)

384 W
58 W
48 W
50 W
80 W
4,000 VA

5 kV AC (50 Hz, 1 min.)  
-40°C ... 85°C  
100% operating factor  
3x 10<sup>7</sup> cycles  
EN 50178, EN 61810-1  
Any / can be aligned without spacing (>70°C ≥2.5 mm)

12.7 mm / 29 mm / 15.7 mm

**Technical data**

②	④	⑤	⑥
See diagram			
33	17	8.2	4.1
7	7	7	7
3	3	3	3

1 PDT
AgNi
250 V AC/DC
12 V (at 10 mA)
16 A
50 A (20 ms)
10 mA (at 12 V)

384 W
58 W
48 W
50 W
80 W
4,000 VA

5 kV AC (50 Hz, 1 min.)  
-40°C ... 85°C  
100% operating factor  
3x 10<sup>7</sup> cycles  
IEC 60664, EN 50178, EN 61810-1  
Any / can be aligned without spacing (>70°C ≥2.5 mm)

12.7 mm / 29 mm / 15.7 mm

**Ordering data**

Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21-21	2961257	10
REL-MR- 24DC/21-21	2961192	10
REL-MR- 60DC/21-21	2961273	10
REL-MR-110DC/21-21	2961202	10
REL-MR- 12DC/21-21AU	2961299	10
REL-MR- 24DC/21-21AU	2961215	10
REL-MR- 60DC/21-21AU	2961286	10
REL-MR-110DC/21-21AU	2961228	10

**Ordering data**

Type	Order No.	Pcs./Pkt.
REL-MR- 24DC/11C	2961341	10

**Ordering data**

Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21HC	2961309	10
REL-MR- 24DC/21HC	2961312	10
REL-MR- 60DC/21HC	2961325	10
REL-MR-110DC/21HC	2961338	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### Plug-in solid-state relays

Plug-in solid-state relays are compatible for both PLC-INTERFACE and RIF-0 and RIF-1 relay base.

The advantages:

- Switching current of up to 5 A
- RT III seal (wash-proof)
- Vibration- and shock-resistant
- Wear-free and long-lasting
- Zero voltage switch at AC output
- Can be soldered in on PCB

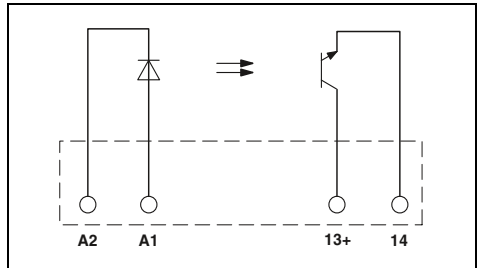
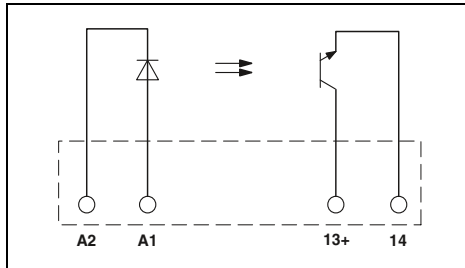


Solid-state relay,  
DC output max. 3 A



Solid-state relay,  
DC output max. 100 mA

**Notes:**  
For dimensional drawings and perforations for assembly, see page 401  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272



#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
Switching level	2.5	16	35
1 signal ("H") [V DC] $\geq$	0.8	10	20
0 signal ("L") [V DC] $\leq$	9	7	3
Typical input current at $U_N$ [mA]	20	20	40
Typical switch-on time at $U_N$ [ $\mu$ s]	300	300	500
Typical switch-off time at $U_N$ [ $\mu$ s]	300	300	300
Transmission frequency $f_{limit}$ [Hz]			

Output data	①	②	③
Max. switching voltage	33 V DC		
Minimum switching voltage	3 V DC		
Limiting continuous current	3 A (see derating curve)		
Minimum load current	-		
Maximum switch-on current	15 A (10 ms)		
Leakage current in off state	-		
Phase angle (cos $\phi$ )	-		
Output circuit	2-conductor, floating		
Max. load value	-		
Output protection	Reverse polarity protection, surge protection		
Voltage drop at maximum limiting continuous current	$\leq 150$ mV		

General data	①	②	③
Rated surge voltage	Basic insulation		
Test voltage input/output	2.5 kV (50 Hz, 1 min.)		
Ambient temperature (operation)	-25°C ... 60°C		
Nominal operating mode	100% operating factor		
Standards/regulations	IEC 60664, EN 50178		
Degree of pollution/surge voltage category	2 / III		

Mounting position/mounting	①	②	③
Dimensions	Any / in rows with zero spacing		
	5 mm / 28 mm / 15 mm		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Plug-in solid-state relays</b>				
Solid-state power relays	① 5 V DC	OPT-5DC/ 24DC/ 2	2967989	10
Solid-state power relays	② 24 V DC	OPT-24DC/ 24DC/ 2	2966595	10
Solid-state power relays	③ 60 V DC	OPT-60DC/ 24DC/ 2	2966605	10
<b>Plug-in solid-state relays</b>				
Solid-state input relays	① 5 V DC			
Solid-state input relays	② 24 V DC			
Solid-state input relays	③ 60 V DC			

#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	0.8 - 1.2	0.8 - 1.2	0.9 - 1.1
Switching level	2.5	16	52
1 signal ("H") [V DC] $\geq$	0.8	10	40
0 signal ("L") [V DC] $\leq$	4	7	3
Typical input current at $U_N$ [mA]	20	20	50
Typical switch-on time at $U_N$ [ $\mu$ s]	300	300	800
Typical switch-off time at $U_N$ [ $\mu$ s]	300	300	100
Transmission frequency $f_{limit}$ [Hz]			

Output data	①	②	③
Max. switching voltage	48 V DC		
Minimum switching voltage	3 V DC		
Limiting continuous current	100 mA		
Minimum load current	-		
Maximum switch-on current	-		
Leakage current in off state	-		
Phase angle (cos $\phi$ )	-		
Output circuit	2-conductor, floating		
Max. load value	-		
Output protection	Reverse polarity protection, surge protection		
Voltage drop at maximum limiting continuous current	$\leq 1$ V		

General data	①	②	③
Rated surge voltage	Basic insulation		
Test voltage input/output	2.5 kV (50 Hz, 1 min.)		
Ambient temperature (operation)	-25°C ... 60°C		
Nominal operating mode	100% operating factor		
Standards/regulations	IEC 60664, EN 50178		
Degree of pollution/surge voltage category	2 / III		

Mounting position/mounting	①	②	③
Dimensions	Any / in rows with zero spacing		
	5 mm / 28 mm / 15 mm		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Plug-in solid-state relays</b>				
Solid-state power relays	① 5 V DC	OPT-5DC/ 48DC/100	2967992	10
Solid-state power relays	② 24 V DC	OPT-24DC/ 48DC/100	2966618	10
Solid-state power relays	③ 60 V DC	OPT-60DC/ 48DC/100	2966621	10



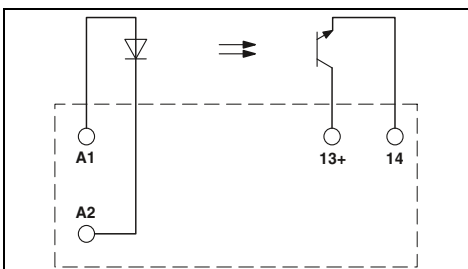
Solid-state relay,  
DC output max. 5 A



Solid-state relay,  
AC output max. 750 mA



Solid-state relay,  
AC output max. 2 A



Technical data

①	②	③
0.8 - 1.2	0.8 - 1.2	0.9 - 1.1
2.5	16	35
0.8	10	20
9	7	3
10	20	25
400	400	400
300	300	300

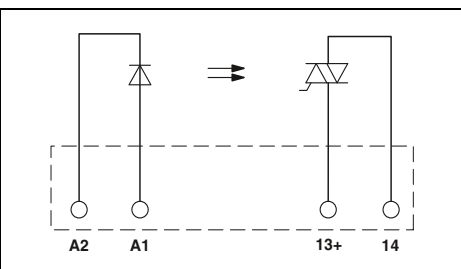
33 V DC  
3 V DC  
5 A (see derating curve)  
-  
15 A (10 ms)  
-  
2-conductor, floating  
-  
Reverse polarity protection, surge protection  
≤200 mV

Basic insulation  
2.5 kV (50 Hz, 1 min.)  
-25°C ... 60°C  
100% operating factor  
IEC 60664, EN 50178  
2 / III

Any / in rows with zero spacing  
12.7 mm / 29 mm / 15.7 mm

Ordering data

Type	Order No.	Pcs./Pkt.
OPT-5DC/ 24DC/ 5	2982113	10
OPT-24DC/ 24DC/ 5	2982100	10
OPT-60DC/ 24DC/ 5	2982126	10



Technical data

②	③
0.8 - 1.2	0.9 - 1.1
10	50
5	15
6	3
6,000	9,000
500	700
10	10

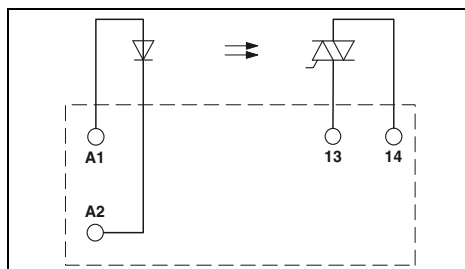
253 V AC  
24 V AC  
0.75 A (see derating curve)  
10 mA  
30 A (10 ms)  
<1 mA  
0.5  
2-conductor floating, zero voltage switch  
4.5 A<sup>2</sup>s  
RCV circuit  
<1 V

Basic insulation  
2.5 kV (50 Hz, 1 min.)  
-25°C ... 60°C  
100% operating factor  
IEC 60664, EN 50178  
2 / III

Any / in rows with zero spacing  
5 mm / 28 mm / 15 mm

Ordering data

Type	Order No.	Pcs./Pkt.
OPT-24DC/230AC/ 1	2967950	10
OPT-60DC/230AC/ 1	2967963	10



Technical data

①	②
0.8 - 1.2	0.8 - 1.2
3	18
1	8.4
15	7
10,000	10,000
10,000	10,000
10	10

253 V AC  
24 V AC  
2 A (see derating curve)  
25 mA  
30 A (10 ms)  
<1 mA  
-  
2-conductor floating, zero voltage switch  
4 A<sup>2</sup>s (tp = 10 ms, at 25°C)  
Surge protection  
≤1 V

Basic insulation  
2.5 kV (50 Hz, 1 min.)  
-25°C ... 60°C  
100% operating factor  
IEC 60664  
2 / III

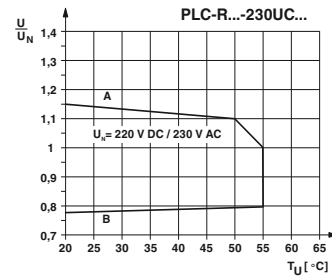
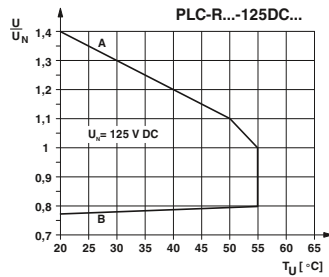
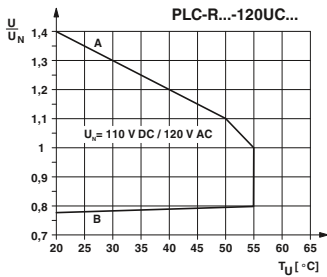
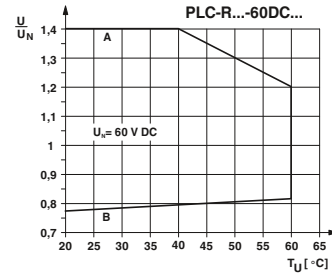
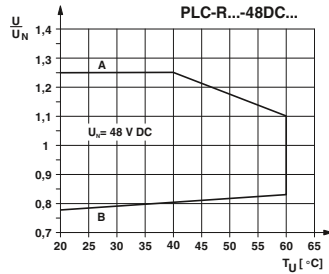
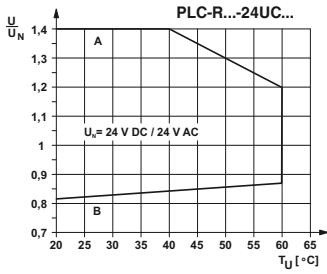
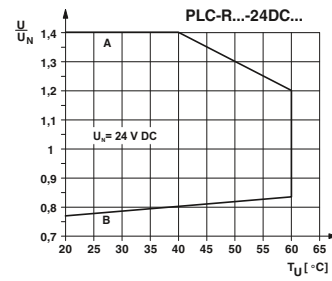
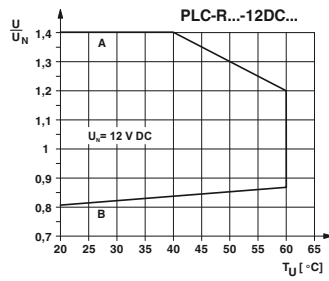
Any / see derating curve  
12.7 mm / 29 mm / 15.7 mm

Ordering data

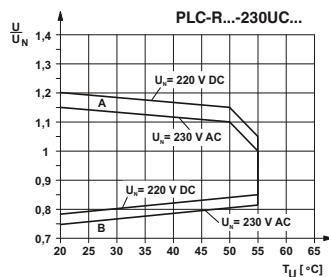
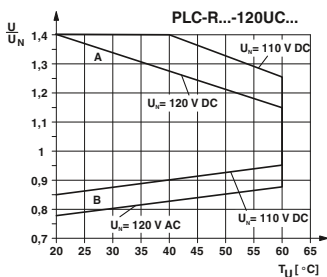
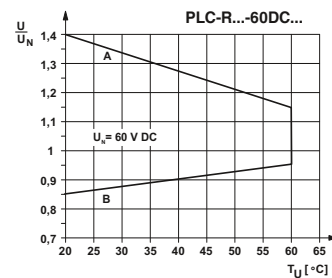
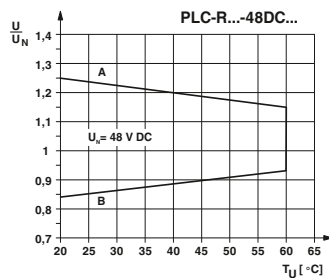
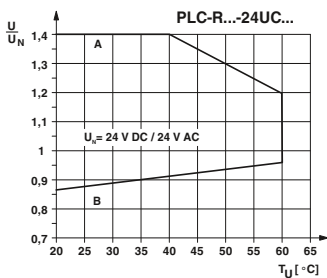
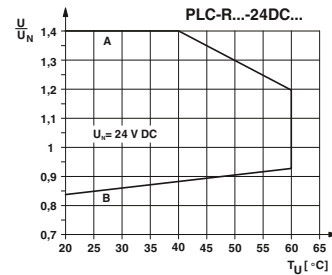
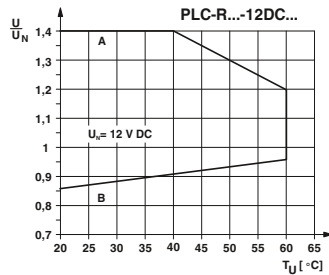
Type	Order No.	Pcs./Pkt.
OPT-5DC/230AC/ 2	2982168	10
OPT-24DC/230AC/ 2	2982171	10



**Operating voltage ranges for PLC-INTERFACE, 6.2 mm versions, equipped with relay**



**Operating voltage ranges for PLC-INTERFACE, 14 mm versions, equipped with relay**



**General conditions:**

Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.

**Curve A**

Maximum permissible continuous voltage  $U_{max}$ , with limiting continuous current on the contact side (see relevant technical data).

**Curve B**

Minimum permitted pick-up voltage  $U_{op}$  after pre-excitation<sup>1)</sup> (see relevant technical data).

<sup>1) Pre-excitation:</sup> relay has been operated in a thermally steady state at the ambient temperature  $T_A$  with nominal voltage  $U_N$  and limiting continuous current on the contact side (see relevant technical data) (warm coil). After being switched off for a short time, the relay must reliably pick up again at  $U_{op}$ . The  $U_{op}$  values for cold coils ( $T_{coil} = T_A = 20^\circ\text{C}$ ) indicated by other manufacturers yield better values, but are not practical.

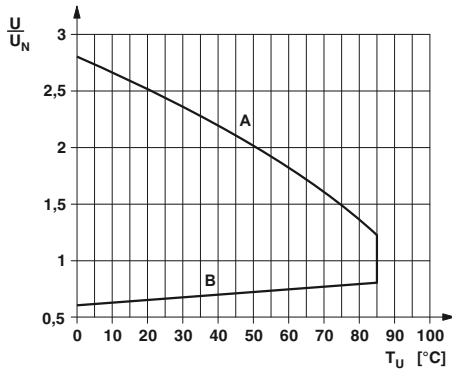
# Relay modules

## Tables, diagrams, dimensional drawings

### Plug-in 1-changeover-contact relays and 2-changeover contact relays

#### REL-MR...21

Permissible input voltage range for REL-MR...21



**General conditions:**

Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.

**Curve A**

Maximum permissible continuous voltage  $U_{max}$  with limiting continuous current on the contact side (see relevant technical data).

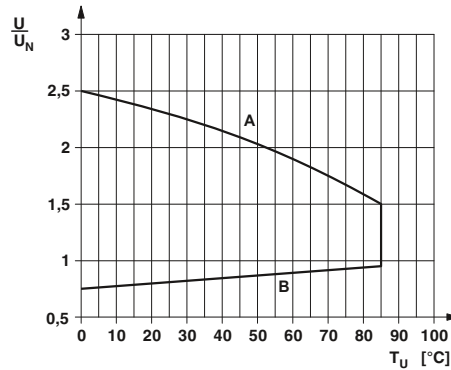
**Curve B**

Minimum permitted pick-up voltage  $U_{op}$  after pre-excitation<sup>1)</sup> (see relevant technical data).

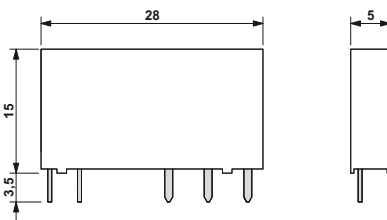
<sup>1) Pre-excitation:</sup> relay has been operated in a thermally steady state at the ambient temperature  $T_A$  with nominal voltage  $U_N$  and limiting continuous current on the contact side (see relevant technical data) (warm coil). After being switched off for a short time, the relay must reliably pick up again at  $U_{op}$ . The  $U_{op}$  values for cold coils ( $T_{coil} = T_A = 20^\circ\text{C}$ ) indicated by other manufacturers yield better values, but are not practical.

#### REL-MR...21-21

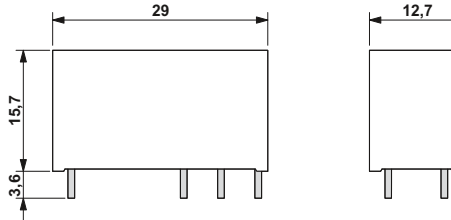
Permissible input voltage range for REL-MR...21-21, REL-MR-24DC/11C, REL-MR...21HC



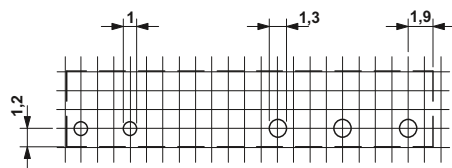
**5 mm overall width**



**12.7 mm overall width**

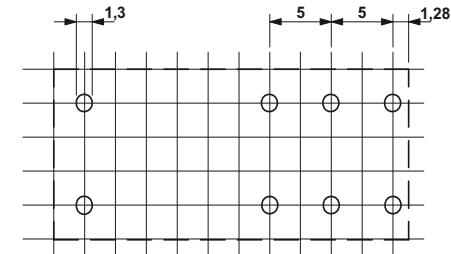


**Perforations for assembly: view of the connections**



Pitch division: 1.25 mm and 1.27 mm

**Perforations for assembly: view of the connections**

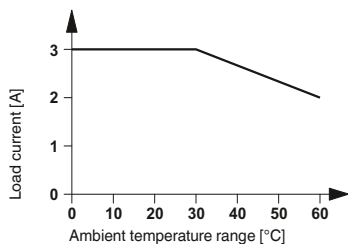


Pitch division: 2.5 mm

Plug-in solid-state relays

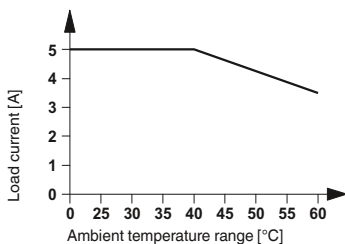
OPT...DC/24DC/2  
OPT...DC/230AC/1

Derating curve for OPT...DC/24DC/2 and PLC-OS.../24DC/2 solid-state relays

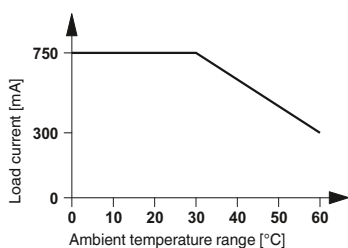


OPT...DC/24DC/5  
OPT...DC/230AC/2

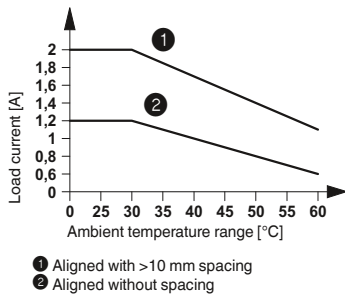
Derating curve for OPT...DC/24DC/5 and PLC-OS.../24DC/5/ACT solid-state relays



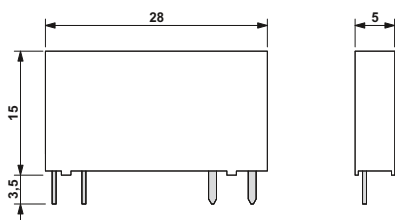
Derating curve for OPT...DC/230AC/1 and PLC-OS.../230AC/1 solid-state relays



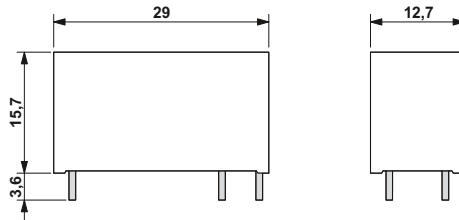
Derating curve for OPT...DC/230AC/2 and PLC-OS.../230AC/2/ACT solid-state relays



5 mm overall width



12.7 mm overall width



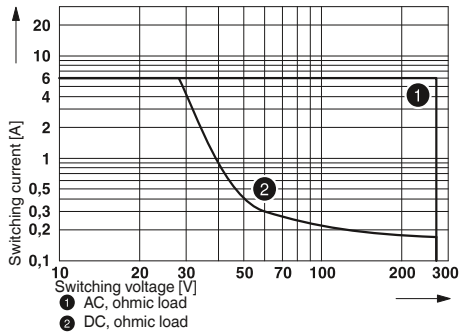


# Relay modules

## Tables, diagrams, dimensional drawings

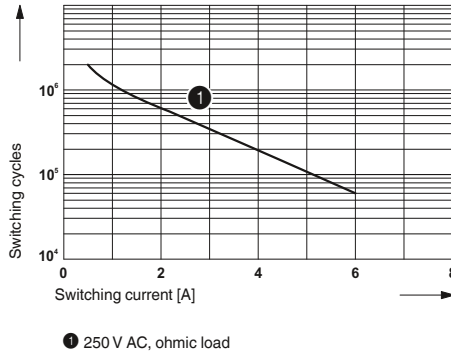
### Electrical interrupting rating for PLC-INTERFACE

Electrical interrupting rating for PLC...21 with 1 PDT relay



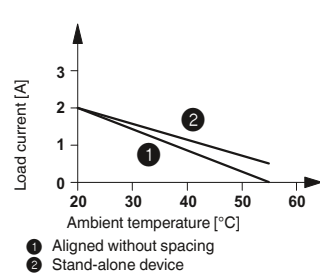
### Electrical service life for PLC-INTERFACE

Electrical service life for PLC-R.../21...

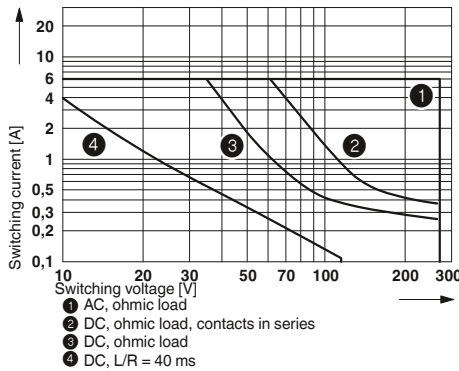


### EMG-OV solid-state power relays

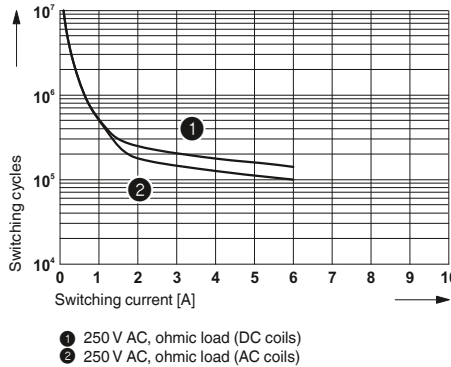
Derating curve for EMG 17-OV...48DC/2



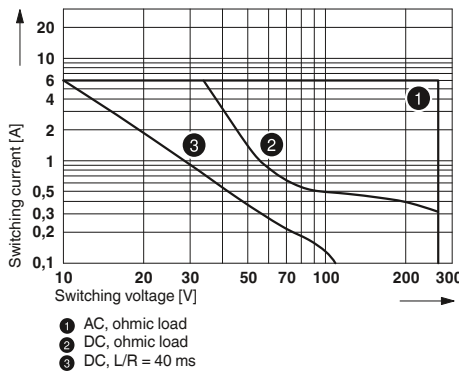
Electrical interrupting rating for PLC...21-21 with 2 PDT relays



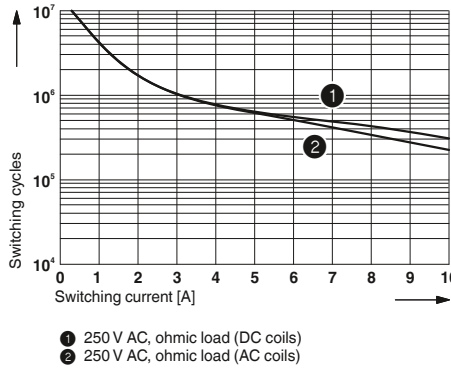
Electrical service life for PLC-R.../21-21...



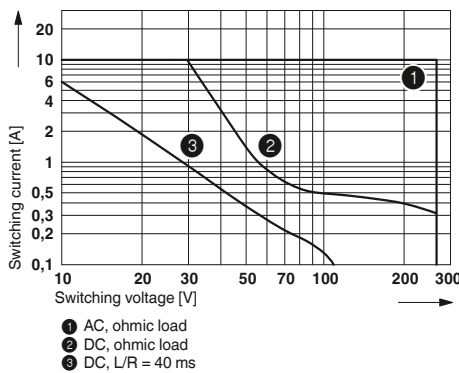
Electrical interrupting rating for PLC...11C/ACT for high inrush currents



Electrical service life for PLC-R.../21HC...



Electrical interrupting rating for PLC...21HC for high continuous currents





# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

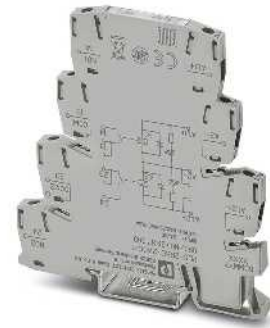
### PLC-INTERFACE with two integrated relays

Relay module with two permanently soldered-in power relays

The advantages:

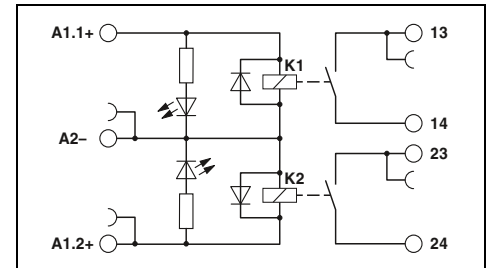
- 100% more channel density than the conventional 6.2 mm relay
- Two switching channels in a 6.2 mm housing
- Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.



Relay module with two integrated, independent relays up to 3.5 A for high channel density

ERC



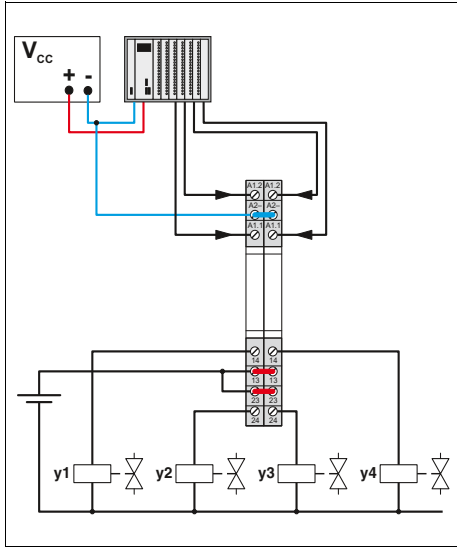
#### Technical data

Input data	①
Typical input current at $U_N$	7 [mA]
Response/release time at $U_N$	4 / 6 [ms]
Input circuit DC	Yellow LED, reverse polarity protection, free-wheeling diode
Output data	
Contact material	AgNi
Max. switching voltage	250 V AC / 30 V DC
Minimum switching voltage	24 V AC/DC
Limiting continuous current	3.5 A
Minimum switching current	5 mA
General data	
Test voltage input/output	3 kV AC (50 Hz, 1 min.)
Test voltage output/output	3 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 60°C
Mechanical service life	2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 583

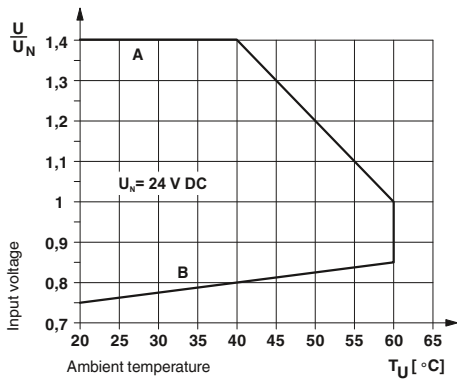
#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>PLC INTERFACE, with screw connection</b>				
①	24 V DC	PLC-2RSC-24DC/ 1	2987309	10
<b>PLC-INTERFACE, with Push-in connection</b>				
①	24 V DC	PLC-2RPT-24DC/1	2901639	10

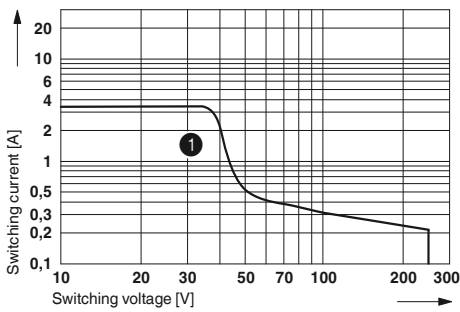
Application example for PLC-2RS...24DC/1



Operating voltage range



Interrupting rating



① DC, ohmic load

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE with manual switch and relay

Relay module with manual switch and integrated power relay for manual, zero, and automatic functions

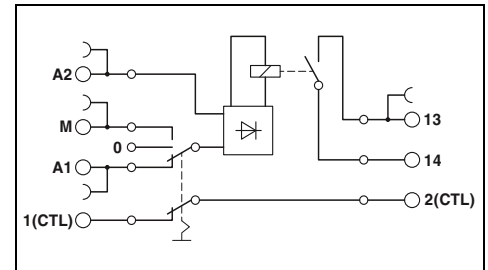
#### The advantages are:

- Maximum switching current 6 A
- Width of only 6.2 mm
- Floating checkback contact
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Screw and Push-in connection technology

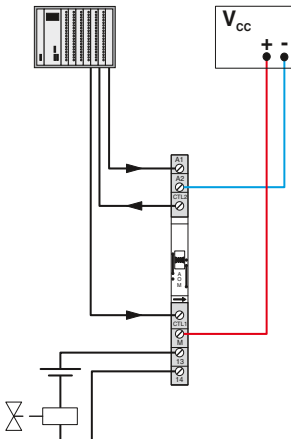
<b>Notes:</b>
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Separating plate PLC-ATP is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.
<b>Module height:</b> PLC-...-S/H = 90 mm; PLC-...-S/L: = 86 mm
PLC...H - manual operation PLC...L - operation using screwdriver
See the website for more information on connection cross sections with ferrules.



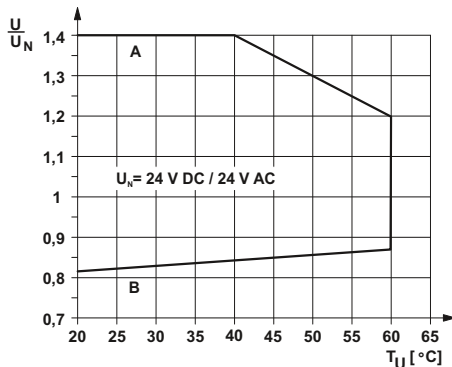
Relay module with manual switch and integrated relay



Application example for PLC-RS...24UC/1/S...



Permissible input voltage range for PLC-RS...24UC/1/S...



**Curve A**  
Maximum continuous voltage when limiting continuous current = 6 A

**Curve B**  
Minimum pick-up voltage for pre-excitation with U<sub>N</sub> and limiting continuous current = 6 A

<b>Input data</b>	
Typical input current at U <sub>N</sub>	[mA]
Response/release time at U <sub>N</sub>	[ms]
Input circuit AC/DC	
<b>Output data</b>	
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	5 V (at 100 mA)
Limiting continuous current	6 A
Maximum switch-on current	On request
Minimum switching current	10 mA (at 12 V)
<b>Feedback</b>	
Operating mode "Automatic" floating	Max. 30 V AC/DC / 50 mA Min. 2 V AC/DC / 1 mA
<b>General data</b>	
Rated insulation voltage	250 V AC
Rated surge voltage	-
Ambient temperature (operation)	-20°C ... 60°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
<b>Connection data solid/stranded/AWG</b>	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D
EMC note	Class A product, see page 583

<b>Technical data</b>			
①	11		
	6 / 15		
	Yellow LED, bridge rectifier		
	AgSnO		
	250 V AC/DC		
	5 V (at 100 mA)		
	6 A		
	On request		
	10 mA (at 12 V)		
	Max. 30 V AC/DC / 50 mA		
	Min. 2 V AC/DC / 1 mA		
	250 V AC		
	-		
	-20°C ... 60°C		
	IEC 60664, EN 50178		
	2 / III		
	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
	6.2 mm / 80 mm / 90 mm		
	Class A product, see page 583		

Description	Input voltage U <sub>N</sub>
<b>PLC INTERFACE, with screw connection</b>	
①	24 V AC/DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	24 V AC/DC

<b>Ordering data</b>			
Type	Order No.	Pcs./Pkt.	
<b>PLC-RSC- 24UC/ 1/S/H</b>	<b>2982236</b>	10	
<b>PLC-RPT- 24UC/ 1/S/H</b>	<b>2900328</b>	10	

**PLC-INTERFACE**  
with manual switch without relay

Switching module without relay for manual, zero, and automatic functions

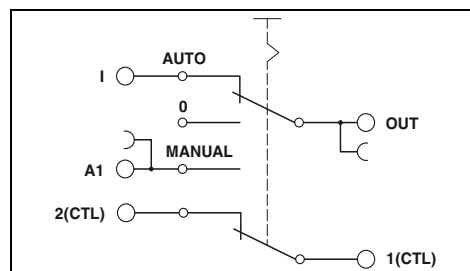
The advantages:

- Width of only 6.2 mm
- Floating checkback contact
- Screw connection technology

<b>Notes:</b>
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Separating plate PLC-ATP is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.
<b>Module height:</b> PLC-...-S/H = 90 mm; PLC-...-S/L: = 86 mm
PLC...H - manual operation PLC...L - operation using screwdriver
See the website for more information on connection cross sections with ferrules.



Module with manual switch without relay



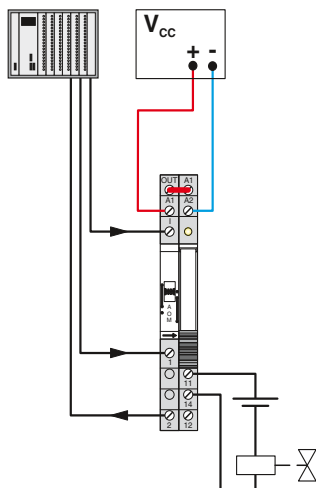
**Technical data**

Max. switching voltage	72 V DC
Minimum switching voltage	2 V DC
Maximum switch-on current	50 mA
Minimum switching current	1 mA
Switching cycles, max.	100 (at 72 V DC / 50 mA) / 10,000 (at 12 V DC / 100 mA)
<b>Feedback</b>	
Operating mode "Automatic" floating	≤72 V DC / 50 mA
<b>General data</b>	
Rated insulation voltage	85 V AC
Rated surge voltage	0.5 kV
Insulation	Basic insulation
Ambient temperature (operation)	-20°C ... 60°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0,14 - 2,5 mm <sup>2</sup> / 0,14 - 2,5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 90 mm

**Ordering data**

Description	Type	Order No.	Pcs./Pkt.
<b>PLC INTERFACE, with screw connection</b>	PLC-SC-S/H	2980733	10

Application example for PLC-S...S...



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE with one integrated solid-state relay

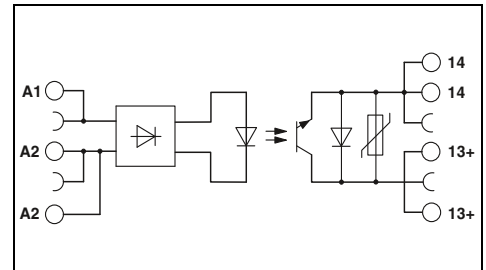
The slim 6.2 mm PLC housing with integrated electronics in various versions offers the following advantages:

- Option of bridging adjacent modules
- Status display
- Protection circuits in input and output
- Wear-resistant and bounce-free switching
- Integrated protection circuit
- DC outputs of up to 300 V DC/1 A or up to 24 V DC/10 A
- Electronic PDT output of up to 48 V DC/500 mA
- Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Separating plate PLC-ATP is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.
The housings of the following modules are open on one side: - PLC-O...-300DC/1 - PLC-O...-24DC/24DC/10/R
See the website for more information on connection cross sections with ferrules.



Solid-state relay module, DC output max. 300 V DC/1 A

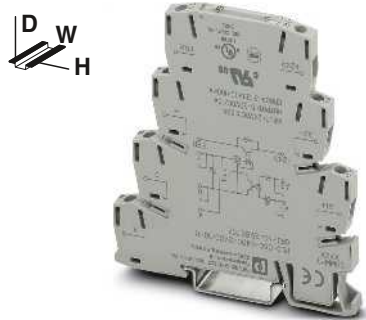


Input data	
Permissible range (with reference to $U_N$ )	
Switching level (with reference to $U_N$ )	1 signal ("H") 0 signal ("L")
Typical input current at $U_N$	[mA]
Transmission frequency $f_{limit}$	[Hz]
Alarm output	
Operating range	- / -
Output data	
Maximum/minimum switching voltage	300 V DC / 12 V DC
Limiting continuous current	1 A (see derating curve)
Voltage drop at maximum limiting continuous current	<500 mV
General data	
Rated insulation voltage	300 V
Rated surge voltage	Basic insulation
Ambient temperature (operation)	-25°C ... 60°C
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 583

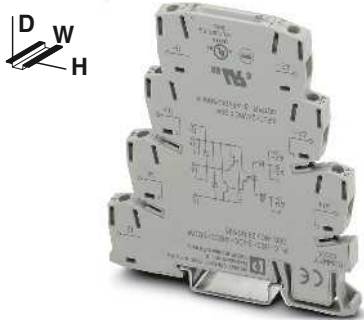
Technical data							
①	②	③	④	⑤	⑥	⑦	⑧
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.8 - 1.1
≥0.8	≥0.8	≥0.8	≥0.8	≥0.8	≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.4	≤0.4	≤0.4	≤0.4	≤0.4	≤0.4
15	6	8	5	5	3	5.6	8.4
50	50	50	50	50	50	10	10

Description	Input voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	
①	5 V DC
②	12 V DC
③	24 V DC
48 V DC ... 60 V DC	④ 60 V DC
	⑤ 110 V DC
	⑥ 220 V DC
	⑦ 120 V AC
	⑧ 230 V AC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	5 V DC
②	12 V DC
③	24 V DC
48 V DC ... 60 V DC	④ 60 V DC
	⑤ 110 V DC
	⑥ 220 V DC
	⑦ 120 V AC
	⑧ 230 V AC

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-OSC- 5DC/300DC/ 1	2980652	10
PLC-OSC- 12DC/300DC/ 1	2980665	10
PLC-OSC- 24DC/300DC/ 1	2980678	10
PLC-OSC- 60DC/300DC/ 1	2980681	10
PLC-OSC-110DC/300DC/ 1	2980694	10
PLC-OSC-220DC/300DC/ 1	2980704	10
PLC-OSC-120AC/300DC/ 1	2980717	10
PLC-OSC-230AC/300DC/ 1	2980720	10
PLC-OPT- 5DC/300DC/1	2900381	10
PLC-OPT- 12DC/300DC/1	2900382	10
PLC-OPT- 24DC/300DC/1	2900383	10
PLC-OPT- 60DC/300DC/1	2900384	10
PLC-OPT-110DC/300DC/1	2900385	10
PLC-OPT-220DC/300DC/1	2900387	10
PLC-OPT-120AC/300DC/1	2900388	10
PLC-OPT-230AC/300DC/1	2900389	10

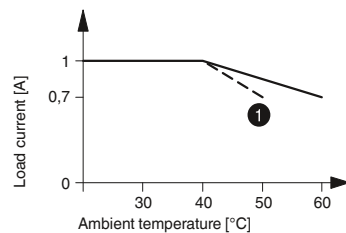


Solid-state relay module, short-circuit-proof DC output max. 10 A, with feedback



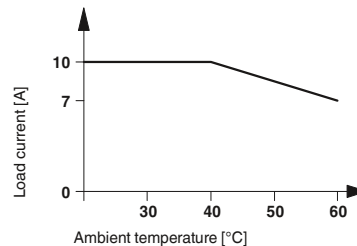
Solid-state relay module, DC output max. 500 mA, with electronic changeover contact

Derating curve for PLC...300DC/1

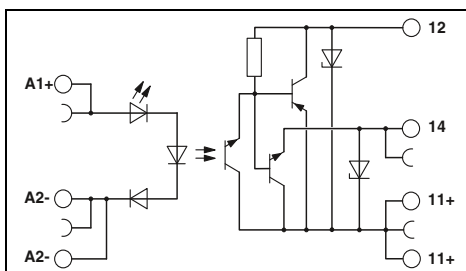
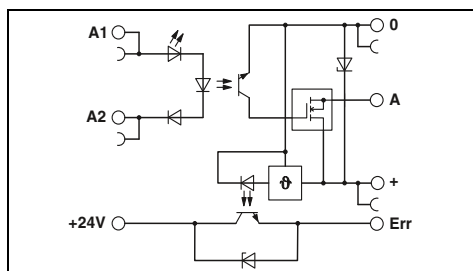
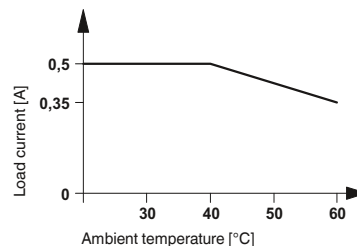


① For input voltages of 220 V DC and 230 V AC

Derating curve for PLC-...24DC/24DC/10/R



Derating curve for PLC...24DC/48DC/500/W



Technical data

- ③
- 0.8 -
- 1.2
- ≥0.8
- ≤0.4
- 3
- 100

3 V DC ... 33 V DC (high active) / 100 mA

33 V DC / 5 V DC  
10 A (see derating curve)  
≤50 mV

-  
Basic insulation  
-25°C ... 60°C  
IEC 60664, EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 583

Technical data

- ③
- 0.8 -
- 1.2
- ≥0.8
- ≤0.4
- 3
- 1,000

- / -

48 V DC / 3 V DC  
500 mA (see derating curve)  
<1.2 V

300 V  
Basic insulation  
-25°C ... 60°C  
IEC 60664, EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 24DC/ 10/R	2982702	10
PLC-OPT- 24DC/ 24DC/10/R	2900398	10

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 48DC/500/W	2980636	10
PLC-OPT- 24DC/ 48DC/500/W	2900378	10



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE with one integrated solid-state relay

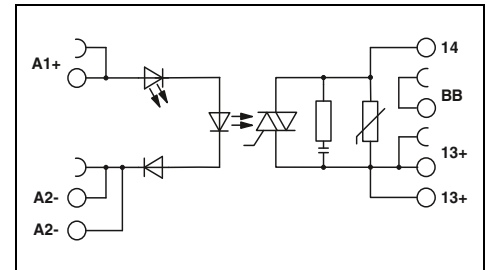
- 6.2 mm narrow solid-state relay for switching AC loads
- Status display
- Protection circuits in input and output
- Wear-free
- Switching capacity up to 230 V AC/2.4 A
- Screw and Push-in connection technology

**Notes:**  
See the website for more information on connection cross sections with ferrules.



**Solid-state relay module with additional floating terminal point, AC output max. 2.4 A**

ERC

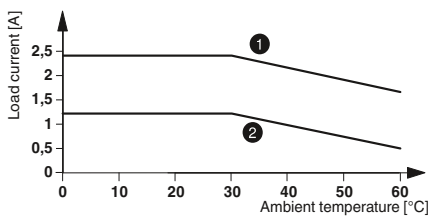


#### Technical data

<b>Input data</b>	Rated actuating voltage range with reference to $U_c$	0.8 - 1.2
	Rated actuating current $I_c$ [mA]	8
	Switching level (with reference to $U_c$ )	1 signal ("H") >0.8 0 signal ("L") <0.4
	Typical switch-on time at $U_N$ [ms]	10
	Typical switch-off time at $U_N$ [ms]	10
	Transmission frequency $f_{limit}$ [Hz]	10
	Input circuit DC	Yellow LED, reverse polarity protection, surge protection
<b>Output data</b>	Max. switching voltage	253 V AC
	Minimum switching voltage	24 V AC
	Maximum switch-on current	250 A (20 ms)
	Minimum/maximum switching current	10 mA / 2.4 A (see derating)
	Output protection	RCV circuit
	Voltage drop at maximum limiting continuous current	<1 V
	Leakage current in off state	<3 mA
	Max. load value	340 A <sup>2</sup> s (tp = 10 ms, at 25°C)
<b>General data</b>	Rated insulation voltage	260 V AC
	Rated surge voltage	4 kV
	Insulation	Basic insulation
	Ambient temperature (operation)	-25°C ... 60°C
	Standards/regulations	DIN EN 50178
	Degree of pollution/surge voltage category	2 / III
	Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
	Dimensions	W / H / D 6.2 mm / 80 mm / 86 mm
	EMC note	Class A product, see page 583

#### Ordering data

Description	Rated actuating voltage $U_c$	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with screw connection	① 24 V DC	PLC-OSC- 24DC/230AC/2.4/ACT	2904631	10
PLC-INTERFACE, with Push-in connection	① 24 V DC	PLC-OPT- 24DC/230AC/2.4/ACT	2904632	10



① = aligned with > 20 mm spacing  
② = aligned without spacing  
**Load current as a function of the ambient temperature**  
Operating time: 100% operating factor



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE

#### Solid-state relays up to 100 kHz

Solid-state relays for the safe acquisition of short pulses.

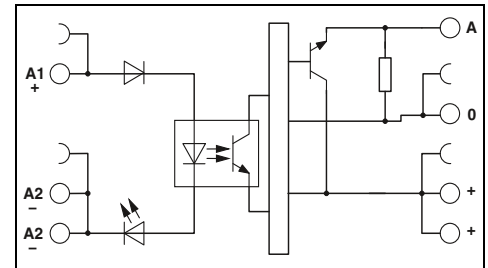
- Status display
- Bridging options
- Limit frequency of up to 100 kHz
- Push-pull stage on output side
- Features a capacitor on the input side for interference suppression

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.



**Solid-state relay module,  
DC output,  
transmission frequency of 100 kHz**

ERC



Input data	
Permissible range (with reference to $U_N$ )	
Switching level with reference to $U_N$	1 signal ("H") 0 signal ("L")
Typical input current at $U_N$	[mA]
Typical switch-on time at $U_N$	[ $\mu$ s]
Typical switch-off time at $U_N$	[ $\mu$ s]
Transmission frequency $f_{limit}$	[kHz]
Input protection:	
Output data	
Operating voltage range	
Limiting continuous current	
Quiescent current	
Residual voltage drop at "H"	
Output circuit	
Output protection	
General data	
Test voltage input/output	
Ambient temperature (operation)	
Standards/regulations	
Degree of pollution/surge voltage category	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

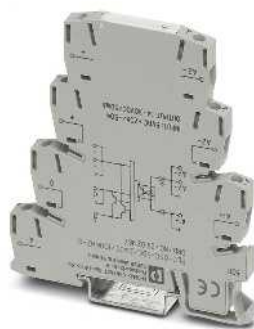
Technical data	
①	②
0.8 - 1.2	0.8 - 1.2
>0.8	>0.8
<0.4	<0.4
7	6
1.5	1.5
2	2
100	100
Yellow LED, reverse polarity protection, surge protection	
4 V DC ... 30 V DC	
50 mA	
4.3 mA	
<0.5 V	
3-conductor, ground-referenced	
Reverse polarity protection, surge protection	
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)	
-20°C ... 60°C	
DIN EN 50178	
2 / II	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
6.2 mm / 80 mm / 86 mm	
Class A product, see page 583	

Description	Input voltage $U_N$
<b>Input solid-state relay</b> with screw connection	① 5 V DC
	② 24 V DC
<b>Input solid-state relay</b> with Push-in connection	① 5 V DC
	② 24 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-OSC- 5DC/ 24DC/100KHZ	2902963	1
PLC-OSC- 24DC/ 24DC/100KHZ	2902964	1
PLC-OPT- 5DC/ 24DC/100KHZ	2902969	1
PLC-OPT- 24DC/24DC/100KHZ	2902970	1



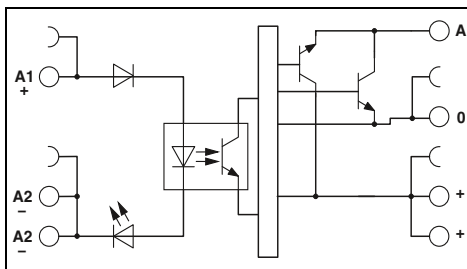
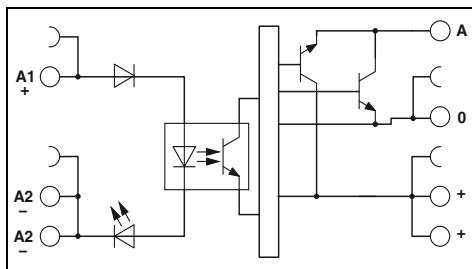
Solid-state relay module,  
DC push-pull output,  
transmission frequency of 100 kHz



Solid-state relay module,  
DC push-pull output,  
transmission frequency of 100 kHz

ERC

ERC



Technical data

Technical data

①	②
0.5 - 1.2	0.8 - 1.2
>0.5	>0.8
<0.3	<0.4
8	8
1	1
2	2
100	100

Yellow LED, reverse polarity protection, surge protection

4 V DC ... 18 V DC  
50 mA  
8.5 mA  
<1.2 V

3-conductor push-pull, ground referenced  
Reverse polarity protection, surge protection

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20°C ... 60°C  
DIN EN 50178  
2 / II

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 583

①	②
0.5 - 1.2	0.8 - 1.2
>0.5	>0.8
<0.3	<0.4
8	8
1	1
2	2
100	100

Yellow LED, reverse polarity protection, surge protection

14 V DC ... 30 V DC  
50 mA  
15 mA  
<2.2 V

3-conductor push-pull, ground referenced  
Reverse polarity protection, surge protection

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20°C ... 60°C  
DIN EN 50178  
2 / II

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 583

Ordering data

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 5DC/ 5DC/100KHZ-G	2902965	1
PLC-OSC- 24DC/ 5DC/100KHZ-G	2902966	1
PLC-OPT- 5DC/ 5DC/100KHZ-G	2902971	1
PLC-OPT- 24DC/ 5DC/100KHZ-G	2902972	1

Type	Order No.	Pcs./Pkt.
PLC-OSC- 5DC/ 24DC/100KHZ-G	2902967	1
PLC-OSC- 24DC/ 24DC/100KHZ-G	2902968	1
PLC-OPT- 5DC/24DC/100KHZ-G	2902973	1
PLC-OPT- 24DC/24DC/100KHZ-G	2902974	1

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE for the TTL signal at input

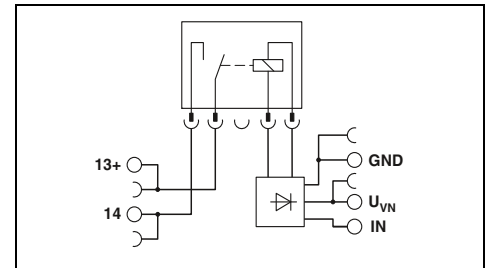
The PLC-BS...TTL/1 basic terminal block is controlled with a TTL (5 V) input signal. It is equipped with either a mechanical relay or a solid-state relay. The basic terminal block equipped with a robust miniature relay offers the following advantages:

- 6.2 mm slim design width
- Bridging options
- Status display
- RTIII degree of protection
- Safe isolation in accordance with EN 50178 (VDE 0160)
- 4 kV<sub>rms</sub> electrical isolation between coil and contact
- Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



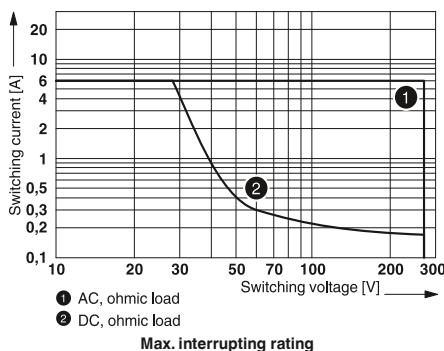
1-N/O basic terminal block for assembly with relay for TTL (5 V)



#### Technical data

<b>Input data</b>	
Rated control supply voltage $U_{VN}$	5 V DC
Rated control supply voltage range with reference to $U_{VN}$	0.9 ... 1.2
Rated control supply current $I_{VN}$	41 mA
Rated actuating voltage $U_c$ (IN)	5 V DC (TTL)
Rated actuating voltage range with reference to $U_c$	0.9 ... 1.2
Rated actuating current $I_c$	2.5 mA
Typical response time at $U_c$	4.5 ms
Typical release time at $U_c$	3.5 ms
Input circuit	Yellow LED, reverse polarity protection, surge protection
<b>Output data with:</b>	
Contact type	REL-MR-4,5DC/21 AU      REL-MR-4,5DC/21
Contact material	Single contact, 1 N/O contact      Single contact, 1 N/O contact
Max. switching voltage	AgSnO, hard gold-plated      AgSnO
Minimum switching voltage	30 V AC / 36 V DC      250 V AC/DC
Limiting continuous current	100 mV (at 10 mA)      5 V (at 100 mA)
Maximum switch-on current	50 mA      6 A
Minimum switching current	50 mA      On request
General data	1 mA (at 24 V)      10 mA (at 12 V)
Rated insulation voltage	250 V
Rated surge voltage/insulation	6 kV
Ambient temperature (operation)	-20°C ... 60°C
Mechanical service life	2x 10 <sup>7</sup> cycles
Air clearances and creepage distances between the power circuits	IEC 60664, EN 50178
Degree of pollution/overvoltage category	2 / III
Mounting position/mounting	Any / in rows with zero spacing
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

5 V DC	41 mA
0.9 ... 1.2	5 V DC (TTL)
41 mA	0.9 ... 1.2
5 V DC (TTL)	2.5 mA
0.9 ... 1.2	4.5 ms
2.5 mA	3.5 ms
4.5 ms	Yellow LED, reverse polarity protection, surge protection
3.5 ms	REL-MR-4,5DC/21 AU      REL-MR-4,5DC/21
Yellow LED, reverse polarity protection, surge protection	Single contact, 1 N/O contact      Single contact, 1 N/O contact
REL-MR-4,5DC/21 AU      REL-MR-4,5DC/21	AgSnO, hard gold-plated      AgSnO
Single contact, 1 N/O contact      Single contact, 1 N/O contact	30 V AC / 36 V DC      250 V AC/DC
AgSnO, hard gold-plated      AgSnO	100 mV (at 10 mA)      5 V (at 100 mA)
30 V AC / 36 V DC      250 V AC/DC	50 mA      6 A
100 mV (at 10 mA)      5 V (at 100 mA)	50 mA      On request
50 mA      6 A	50 mA      10 mA (at 12 V)
50 mA      On request	1 mA (at 24 V)      10 mA (at 12 V)
1 mA (at 24 V)      10 mA (at 12 V)	



Description	PLC-INTERFACE with screw connection with Push-in connection
Plug-in miniature power relays, with multi-layer gold contacts	

#### Ordering data

Type	Order No.	Pcs./Pkt.
PLC-BSC-TTL/1	2982689	10
PLC-BPT-TTL/1	2900458	10

#### Accessories

REL-MR 4,5DC/21AU	2961370	10
REL-MR- 4,5DC/21	2961367	10

**PLC-INTERFACE  
for the TTL signal at input**

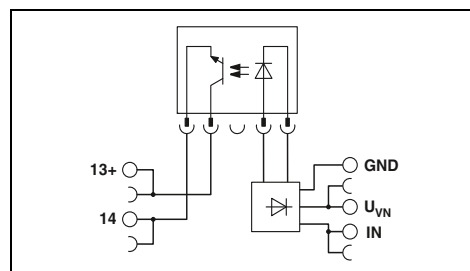
The PLC-BS...TTL/1 basic terminal block is controlled with a TTL (5 V) input signal. It is equipped with either a mechanical relay or a solid-state relay. The basic terminal block equipped with a solid-state relay offers the following advantages:

- 6.2 mm slim design width
- Bridging options
- Status display
- IP67-protected solid-state relay electronic unit
- Switching capacity of up to 24 V DC/3 A
- Alternative input or power solid-state relay
- Wear-free and output-free
- Integrated protection circuit
- Integrated protective circuit
- 2.5 kV<sub>rms</sub> electrical isolation between input and output
- Screw and Push-in connection technology

<b>Notes:</b>
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



**1-N/O basic terminal block  
for assembly with relay for TTL (5 V)**



<b>Input data</b>	
Rated control supply voltage $U_{VN}$	5 V DC
Rated control supply voltage range with reference to $U_{VN}$	0.9 ... 1.2
Rated control supply current $I_{VN}$	11.5 mA
Rated actuating voltage $U_c$ (IN)	5 V DC (TTL)
Switching level 1 signal ("H") (TTL signal)	>2 V DC
Switching level 0 signal ("L") (TTL signal)	<0.8 V DC
Rated actuating current $I_c$	2.5 mA
Typical response time/switch-on time at $U_c$	35 $\mu$ s
Typical switch-off time at $U_c$	320 $\mu$ s
Input circuit	Yellow LED, reverse polarity protection, surge protection
<b>Output data with:</b>	OPT-5DC/48DC/100      OPT-5DC/24DC/2
Max. switching voltage	48 V DC      33 V DC
Minimum switching voltage	3 V DC      3 V DC
Limiting continuous current	100 mA      3 A
Output protection	Reverse polarity protection, surge protection      Reverse polarity protection, surge protection
Voltage drop at limiting continuous current	<1 V      <200 mV
<b>General data</b>	
Rated insulation voltage	250 V
Rated surge voltage/insulation	6 kV/Basic isolation
Ambient temperature (operation)	-20°C ... 60°C
Air clearances and creepage distances between the power circuits	IEC 60664, EN 50178
Degree of pollution/overvoltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

**Technical data**

<b>Technical data</b>	
Rated control supply voltage $U_{VN}$	5 V DC
Rated control supply voltage range with reference to $U_{VN}$	0.9 ... 1.2
Rated control supply current $I_{VN}$	11.5 mA
Rated actuating voltage $U_c$ (IN)	5 V DC (TTL)
Switching level 1 signal ("H") (TTL signal)	>2 V DC
Switching level 0 signal ("L") (TTL signal)	<0.8 V DC
Rated actuating current $I_c$	2.5 mA
Typical response time/switch-on time at $U_c$	35 $\mu$ s
Typical switch-off time at $U_c$	320 $\mu$ s
Input circuit	Yellow LED, reverse polarity protection, surge protection
<b>Output data with:</b>	OPT-5DC/48DC/100      OPT-5DC/24DC/2
Max. switching voltage	48 V DC      33 V DC
Minimum switching voltage	3 V DC      3 V DC
Limiting continuous current	100 mA      3 A
Output protection	Reverse polarity protection, surge protection      Reverse polarity protection, surge protection
Voltage drop at limiting continuous current	<1 V      <200 mV
<b>General data</b>	
Rated insulation voltage	250 V
Rated surge voltage/insulation	6 kV/Basic isolation
Ambient temperature (operation)	-20°C ... 60°C
Air clearances and creepage distances between the power circuits	IEC 60664, EN 50178
Degree of pollution/overvoltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

<b>Description</b>
<b>PLC-INTERFACE</b>
with screw connection
with Push-in connection

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-BSC-TTL/1	2982689	10
PLC-BPT-TTL/1	2900458	10

<b>Pluggable solid-state relays</b>
Solid-state input relays
Solid-state power relays

**Accessories**

OPT-5DC/ 48DC/100	2967992	10
OPT-5DC/ 24DC/ 2	2967989	10

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE for the TTL signal at output

The PLC-OS...24DC/TTL with a built-in solid-state relay can be used for fast and wear-free switching of TTL (5 V) signals.

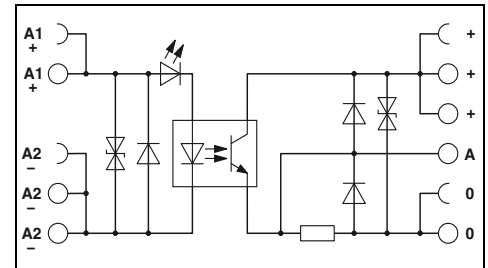
The module offers the following advantages:

- Switching capacity TTL (5 V), fan out = 1
- 6.2 mm slim design width
- Bridging options
- Status display
- Integrated protection circuit
- Integrated protective circuit
- Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.



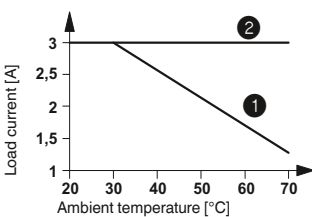
Input solid state relays with TTL (5 V) output



#### Technical data

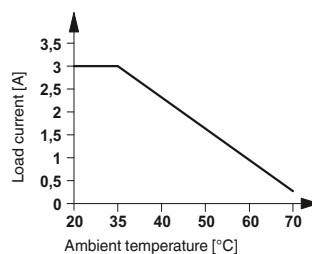
<b>Input data</b>		
Rated actuating voltage $U_C$	24 V DC	
Rated actuating voltage range with reference to $U_C$	0.8 ... 1.2	
Switching level 1 signal ("H")	>0.8	
Switching level 0 signal ("L")	<0.4	
Rated actuating current $I_C$	3.4 mA	
Typical switch-on time at $U_C$	35 $\mu$ s	
Typical switch-off time at $U_C$	35 $\mu$ s	
Transmission frequency $f_{limit}$	1 kHz	
Input circuit DC	Yellow LED, reverse polarity protection, surge protection	
<b>Output data with:</b>		
Rated control supply voltage $U_S$	5 V DC	
Rated control supply voltage range with reference to $U_S$	0.9 ... 1.2	
Limiting continuous current	A TTL load (Fan out = 1)/50 mA for switching mode	
Output protection	Reverse polarity protection, surge protection	
Voltage drop at maximum limiting continuous current	<80 mV	
<b>General data</b>		
Rated insulation voltage	250 V DC	
Rated surge voltage	4 kV	
Insulation	Basic insulation	
Ambient temperature (operation)	-25°C ... 60°C	
Air clearances and creepage distances between the power circuits	IEC 60664, EN 50178	
Degree of pollution/surge voltage category	2 / III	
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	6.2 mm / 80 mm / 86 mm	
EMC note	Class A product, see page 583	
	W / H / D	
<b>Description</b>		
<b>PLC-INTERFACE</b>		
with screw connection	<b>PLC-OSC- 24DC/TTL</b>	
with Push-in connection	<b>PLC-OPT- 24DC/TTL</b>	
	<b>Ordering data</b>	
<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
PLC-OSC- 24DC/TTL	2982728	10
PLC-OPT- 24DC/TTL	2900363	10

Derating curve for PLC-OSP...24DC/3RW



- ① Aligned without spacing
- ② Aligned with ? 20 mm spacing

Derating curve for PLC-OSP...110DC/3RW



**PLC-INTERFACE**  
with solid-state relays  
for railway applications

The PLC-OSP...RW interface modules are suitable for use in accordance with DIN EN 50155 (VDE 0115 Part 200) "Railway applications – Electronic equipment used on rolling stock".

The advantages:

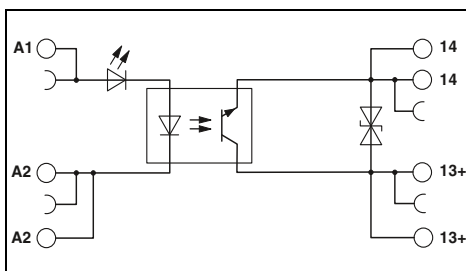
- Temperature range -25°C to +70°C
- Input voltage range 0.7-1.25 x U<sub>N</sub>
- Shock resistance in accordance with DIN 50155 (requirements in accordance with EN 61373)
- Spring cage and Push-in connection method



Solid-state relay module,  
DC output max. 3 A

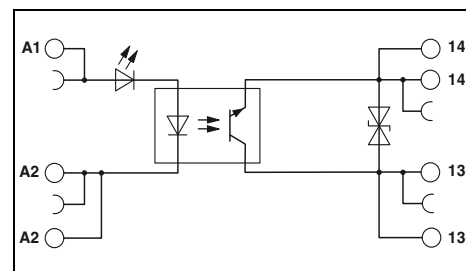


Solid-state relay module,  
DC output max. 110 V DC/3 A



Technical data

①	②	③	④	⑤	⑥
0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
≥0.6	≥0.6	≥0.6	≥0.6	≥0.6	≥0.6
≤0.3	≤0.3	≤0.3	≤0.3	≤0.3	≤0.3
8.5	8.5	3	3	3	3
0.04	0.04	0.08	0.08	0.08	0.08
0.2	0.2	0.6	0.6	0.6	0.6
300	300	100	100	100	100
Yellow LED, reverse polarity protection					



Technical data

①	②	③	④	⑤	⑥
0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
>0.6	>0.6	>0.6	>0.6	>0.6	>0.6
<0.4	<0.4	<0.3	<0.3	<0.3	<0.3
12	12	5.5	5.5	5.5	5.5
0.4	0.4	0.04	0.04	0.04	0.4
0.2	0.1	0.2	0.2	0.2	0.2
50	50	300	300	300	300
Yellow LED, reverse polarity protection, surge protection					

**Notes:**

Type of insulating housing:  
Polyamide PBT non-reinforced, color: gray.

Marking systems and mounting material  
See Catalog 3

For derating curves see page 416

See the website for more information on connection cross sections with ferrules.

Input data	
Permissible range (with reference to U <sub>N</sub> )	
Switching level (with reference to U <sub>N</sub> )	1 signal ("H") 0 signal ("L")
Typical input current at U <sub>N</sub>	[mA]
Typical switch-on time at U <sub>N</sub>	[ms]
Typical switch-off time at U <sub>N</sub>	[ms]
Transmission frequency f <sub>limit</sub>	[Hz]
Input circuit DC	
Output data	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	3 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	<200 mV

General data	
Rated insulation voltage	250 V
Rated surge voltage	Basic insulation
Ambient temperature (operation)	-25°C ... 70°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III

Connection data solid/stranded/AWG	Dimensions	W / H / D
		0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
		6.2 mm / 80 mm / 86 mm
EMC note		Class A product, see page 583

Description	Input voltage U <sub>N</sub>
<b>PLC-INTERFACE, with Push-in connection</b>	
①	24 V DC
②	36 V DC
③	48 V DC
④	72 V DC
⑤	96 V DC
⑥	110 V DC

Ordering data			
Type	Order No.	Pcs./Pkt.	
PLC-OPT- 24DC/ 24DC/3RW	2900379	10	
PLC-OPT-110DC/ 24DC/3RW	2900380	10	

Ordering data			
Type	Order No.	Pcs./Pkt.	
PLC-OPT- 24DC/110DC/3RW	2900391	10	
PLC-OPT- 36DC/110DC/3RW	2900392	10	
PLC-OPT- 48DC/110DC/3RW	2900393	10	
PLC-OPT- 72DC/110DC/3RW	2900394	10	
PLC-OPT- 96DC/110DC/3RW	2900395	10	
PLC-OPT-110DC/110DC/3RW	2900396	10	



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE for railway applications

Relay modules with extended input voltage and temperature range, specifically for use in railway applications

The advantages:

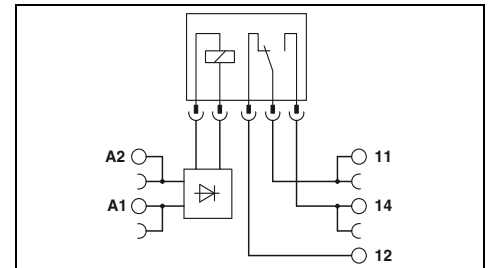
- Temperature range -25°C to +70°C
- Input voltage range 0.7 to 1.25 x U<sub>N</sub>
- Vibration and shock resistance to EN 50155
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



Basic terminal block for assembly with 1-changeover-contact relay up to 6 A

RAE EAC DNV GL

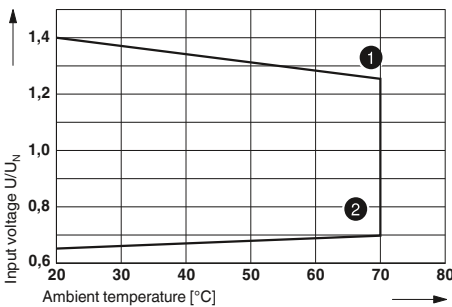


#### Technical data

<b>Input data</b>	
Nominal input voltage U <sub>N</sub>	24 V DC
Permissible range (with reference to U <sub>N</sub> )	See diagram
Typical input current at U <sub>N</sub>	12 mA
Typical response time at U <sub>N</sub>	5 ms
Typical release time at U <sub>N</sub>	8 ms
Input circuit	Yellow LED, reverse polarity protection, free-wheeling diode
<b>Output data with:</b>	
Contact type	REL-MR-18DC/21      REL-MR-18DC/21AU
Contact material	Single contact, 1-PDT      Single contact, 1-PDT
Max. switching voltage	AgSnO      AgSnO, hard gold-plated
Minimum switching voltage	250 V AC/DC      30 V AC / 36 V DC
Limiting continuous current	5 V (at 100 mA)      100 mV (at 10 mA)
Maximum switch-on current	3 A      50 mA
Minimum switching current	On request      50 mA
Minimum switching current	10 mA (at 12 V)      1 mA (at 24 V)
<b>General data</b>	
Test voltage input/output	4 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25°C ... 70°C
Mechanical service life	2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/overvoltage category	3 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

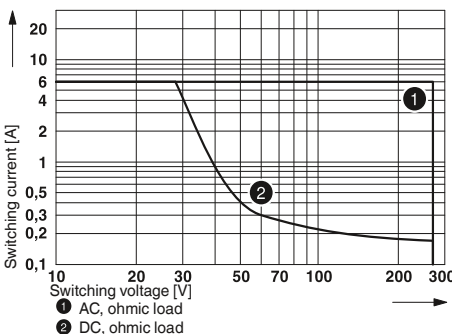
<b>Technical data</b>	
Nominal input voltage U <sub>N</sub>	24 V DC
Permissible range (with reference to U <sub>N</sub> )	See diagram
Typical input current at U <sub>N</sub>	12 mA
Typical response time at U <sub>N</sub>	5 ms
Typical release time at U <sub>N</sub>	8 ms
Input circuit	Yellow LED, reverse polarity protection, free-wheeling diode
Output data with:	
Contact type	REL-MR-18DC/21      REL-MR-18DC/21AU
Contact material	Single contact, 1-PDT      Single contact, 1-PDT
Max. switching voltage	AgSnO      AgSnO, hard gold-plated
Minimum switching voltage	250 V AC/DC      30 V AC / 36 V DC
Limiting continuous current	5 V (at 100 mA)      100 mV (at 10 mA)
Maximum switch-on current	3 A      50 mA
Minimum switching current	On request      50 mA
Minimum switching current	10 mA (at 12 V)      1 mA (at 24 V)

Permissible input voltage range for PLC-BSP-24DC/21RW (with REL-MR-18DC/21... relay)



- ① Maximum continuous voltage when limiting continuous current = 3 A
- ② Minimum pick-up voltage for pre-excitation with U<sub>N</sub> and limiting continuous current = 3 A

Electrical interrupting rating for PLC...21 with 1 PDT relay



- ① AC, ohmic load
- ② DC, ohmic load

Description	Voltage U <sub>N</sub>
PLC-INTERFACE basic terminal block, for pluggable miniature relay with Push-in connection	24 V DC

Pluggable miniature relays	
----------------------------	--

#### Ordering data

Type	Order No.	Pcs./Pkt.
PLC-BPT- 24DC/21RW	2900261	10

#### Accessories

REL-MR- 18DC/21	2961383	10
REL-MR- 18DC/21AU	2961493	10

**PLC-INTERFACE**  
for railway applications

Relay module for input voltages with a nominal frequency of 16.7 Hz

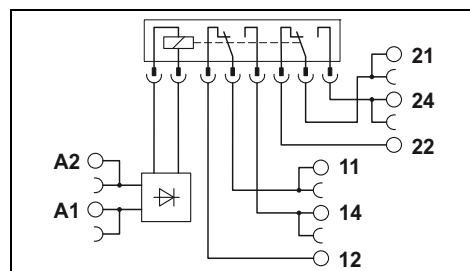
The advantages:

- Input nominal frequency 16.7 Hz
- Vibration and shock resistance to EN 50155
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Push-in connection technology

<b>Notes:</b>
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The values in parentheses then apply for further operation. This can result in a shorter service life than with a pure power contact.
See the website for more information on connection cross sections with ferrules.



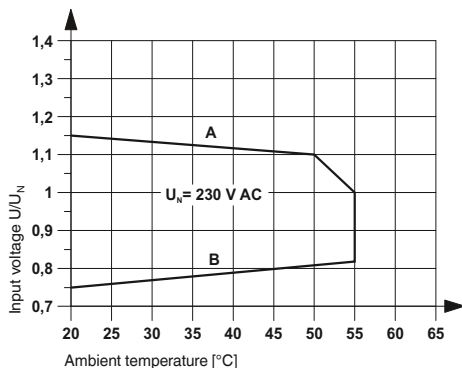
**2-changeover-contact relay module for 16.7 Hz input frequency, max. 2 x 6 A**



**Technical data**

<b>Input data</b>	
Nominal input voltage $U_N$	230 V AC
Input nominal frequency	16.67 Hz
Permissible range (with reference to $U_N$ )	See diagram
Typical response time at $U_N$	20 ms
Typical release time at $U_N$	60 ms
Input circuit	Yellow LED, bridge rectifier
<b>Output data</b>	
Contact type	2 PDT
Contact material	AgNi, hard gold-plated
Max. switching voltage	30 V AC / 36 V DC (250 V AC/DC)
Minimum switching voltage	100 mV (5 V AC/DC)
Limiting continuous current	50 mA (6 A)
Maximum switch-on current	50 mA (8 A)
Minimum switching current	1 mA (10 mA)
<b>General data</b>	
Test voltage input/output	6 kV
Ambient temperature (operation)	-25°C ... 55°C
Mechanical service life	Approx. 3x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/overvoltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	14 mm / 80 mm / 94 mm
EMC note	Class A product, see page 583

**Permissible input voltage range for PLC-RSP-230UC/21-21AU/RWF**



**Curve A**  
Maximum continuous voltage when limiting continuous current = 6 A

**Curve B**  
Minimum pick-up voltage for pre-excitation with  $U_N$  and limiting continuous current = 6 A

Description	Voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>PLC-INTERFACE</b> with Push-in connection	230 V AC	PLC-RPT-230UC/21-21AU/RWF	2900345	10

**Ordering data**

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE for railway applications

Relay modules with extended input voltage and temperature range, specifically designed for railway applications

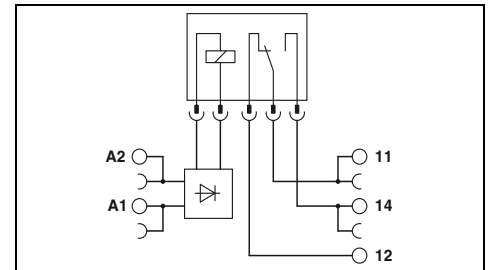
The advantages:

- Certified to EN 50155
- Optimum relay operation, thanks to wide-range electronics
- Temperature range -40 to +70°C (short-term 85°C)
- Input voltage range 0.7 to 1.25 x U<sub>N</sub> (short-term 1.4 x U<sub>N</sub>)
- Vibration and shock resistance to EN 50155
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
Electrical service life diagrams, see page 402
See the website for more information on connection cross sections with ferrules.



1-changeover-contact relay module, 6 A, maximum



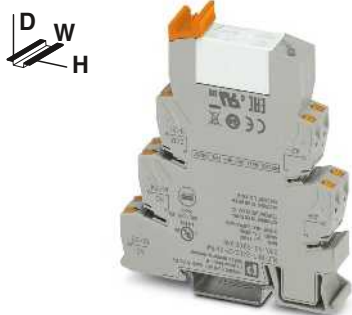
Input data	
Permissible range (with reference to U <sub>N</sub> )	
Typical input current at U <sub>N</sub>	[mA]
Typical response time at U <sub>N</sub>	[ms]
Typical release time at U <sub>N</sub>	[ms]
Input protection:	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current	
Minimum switching current	
General data	
Test voltage (winding/contact)	
Ambient temperature (operation)	
Mechanical service life	
Standards/regulations	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data		
①	②	③
0.7 - 1.25	0.7 - 1.25	
9	3	2
4	4	4
4	4	4
Yellow LED, bridge rectifier, free-wheeling diode		
1 PDT		1 PDT
AgSnO		AgSnO, hard gold-plated
250 V AC/DC		30 V AC / 36 V DC
5 V (at 100 mA)		100 mV (at 10 mA)
6 A		50 mA
10 A (4 s)		50 mA
10 mA (at 12 V)		1 mA (at 24 V)
4 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40°C ... 70°C (temperature class TX)		
Approx. 2x 10 <sup>7</sup> cycles		
EN 50155 (VDE 0115 part 200), EN 50178, EN 61373, EN 50121		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
6.2 mm / 80 mm / 94 mm		
Class A product, see page 583		

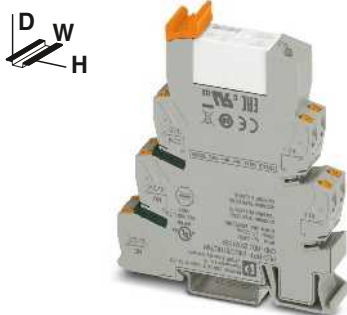
Description	Input voltage U <sub>N</sub>
<b>PLC-INTERFACE, with power contact</b> with Push-in connection	① 24 V DC
	② 72 V DC
	③ 110 V DC
<b>PLC-INTERFACE, with hard gold-plated contact</b> with Push-in connection	① 24 V DC
	② 72 V DC
	③ 110 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-RPT- 24UC/21/RW	2900318	10
PLC-RPT- 72UC/21/RW	2900319	10
PLC-RPT-110UC/21/RW	2900320	10
PLC-RPT- 24UC/21AU/RW	2900321	10
PLC-RPT- 72UC/21AU/RW	2900322	10
PLC-RPT-110UC/21AU/RW	2900323	10

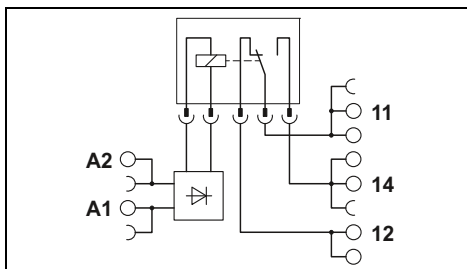
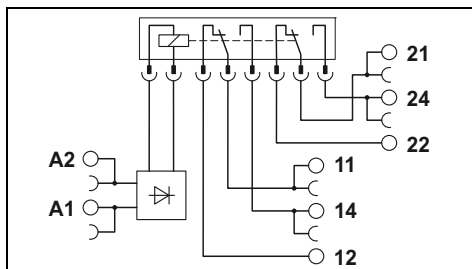
PLC-INTERFACE – Highly-compact relay modules



2-changeover-contact relay module, 2 x 6 A, maximum



1-changeover-contact relay module, max. 10 A



Technical data

①	②	③
0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
20	6	4.5
5	5	5
11	11	11

Yellow LED, bridge rectifier, free-wheeling diode

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
6 A	50 mA
15 A (300 ms)	50 mA
10 mA (at 5 V)	1 mA (at 24 V)

5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -40°C ... 70°C (temperature class TX)  
 Approx. 3x 10<sup>7</sup> cycles  
 EN 50155 (VDE 0115 part 200), EN 50178, EN 61373, EN 50121

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 14 mm / 80 mm / 94 mm  
 Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RPT- 24UC/21-21/RW	2900346	10
PLC-RPT- 72UC/21-21/RW	2900347	10
PLC-RPT-110UC/21-21/RW	2900348	10
PLC-RPT- 24UC/21-21AU/RW	2900349	10
PLC-RPT- 72UC/21-21AU/RW	2900350	10
PLC-RPT-110UC/21-21AU/RW	2900351	10

Technical data

①	②	③
0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
20	6	4.5
5	5	5
11	11	11

Yellow LED, bridge rectifier, free-wheeling diode

1 PDT	
AgNi	
250 V AC/DC	
12 V (at 10 mA)	
10 A (with inserted bridge 2967691)	
30 A (300 ms)	
10 mA (at 12 V)	

5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -40°C ... 70°C (temperature class TX)  
 Approx. 3x 10<sup>7</sup> cycles  
 EN 50155 (VDE 0115 part 200), EN 50178, EN 61373, EN 50121

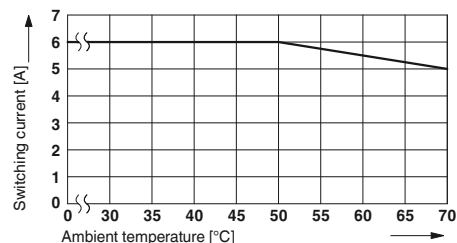
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 14 mm / 80 mm / 94 mm  
 Class A product, see page 583

Ordering data

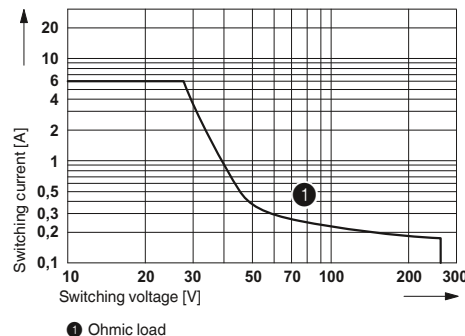
Type	Order No.	Pcs./Pkt.
PLC-RPT- 24UC/21HC/RW	2900324	10
PLC-RPT- 72UC/21HC/RW	2900325	10
PLC-RPT-110UC/21HC/RW	2900326	10

Derating curve for

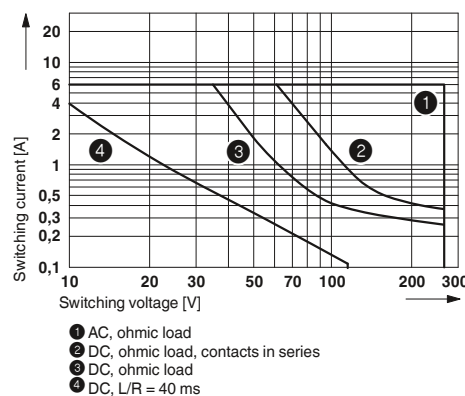
PLC-RSP...21/RW  
 PLC-RSP...21AU/RW  
 PLC-RSP...21-21/RW  
 PLC-RSP...21-21AU/RW



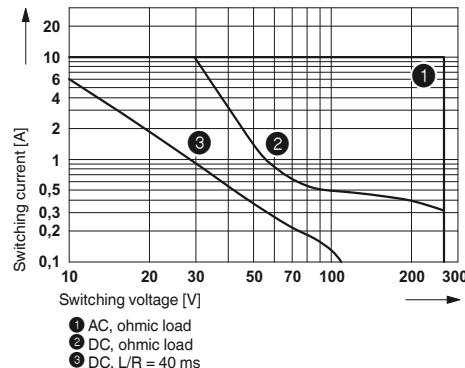
Interrupting rating for PLC-RSP...UC/21RW



Interrupting rating for PLC-RSP...UC/21-21/RW



Interrupting rating for PLC-RSP...UC/21HC/RW





PLC series

Electronic reversing load relays for DC motors

The PLC-S...-ELR W 1/2-24DC electronic reversing load relays are used to switch mechanically commutated DC motors up to 24 V/2 A.

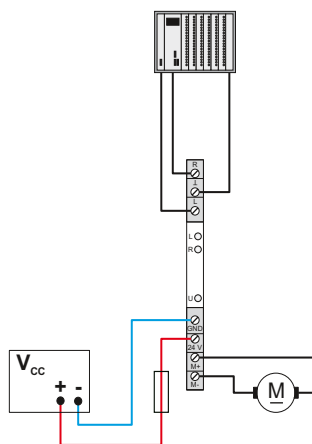
- Wear-free reversing
- Braking by controlling both inputs
- Short-circuit and surge and overload-proof output
- Integrated locking circuit and load wiring
- Screw or Push-in connection technology

<b>Notes:</b>
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
PWM = Pulse Width Modulation
See the website for more information on connection cross sections with ferrules.



DC reversing load relay with overload and short-circuit-proof output

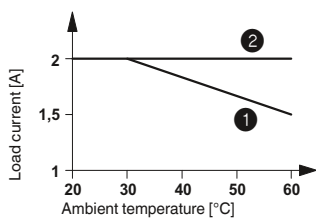
Application example for PLC-S...ELR W 1/2-24DC



Status table

Input		Output	
Right	Left	M +	M -
0	0	High resistance	High resistance
1	0	+24 V	GND
0	1	GND	+24 V
1	1	GND	GND

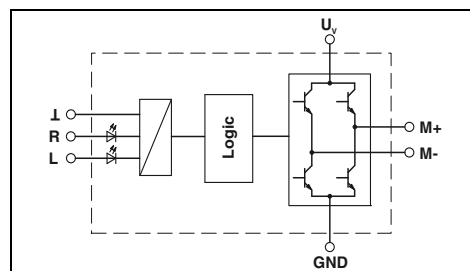
Derating curve for PLC-S...ELR W 1/2-24DC



- 1 Aligned without spacing
- 2 Aligned with >20 mm spacing

<b>Input data</b>	
Control voltage $U_{ST}$ right/left	24 V DC $\pm 20\%$
Control input current $I_{ST}$ right/left	Approx. 3 mA
Input protection:	Yellow LED, reverse polarity protection, surge protection
<b>PWM option</b>	
Maximum clock frequency of the PWM at the control inputs	1,000 Hz
Pulse width repetition rate of the PWM	0% ... 100%
<b>Output data</b>	
Supply voltage range $U_V$	10 V DC ... 30 V DC
Quiescent current	10 mA
Output protection	Green LED, reverse polarity protection, surge protection
<b>Motor switching output</b>	
Continuous current $I_a$ max.	2 A (see derating curve)
Current limitation at short-circuits	15 A (during braking)
<b>General data</b>	
Rated insulation voltage	50 V
Rated surge voltage / insulation	0.5 kV / basic insulation
Ambient temperature (operation)	-25°C ... 60°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/overvoltage category	2 / II
<b>Mounting position</b>	Vertical (horizontal DIN rail)
Mounting	In rows with zero spacing
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 583

<b>Description</b>	
<b>Electronic reversing load relays</b> , for driving DC motors, with light indicator and protection circuit	
with screw connection	
with Push-in connection	



Technical data

<b>Input data</b>	
Control voltage $U_{ST}$ right/left	24 V DC $\pm 20\%$
Control input current $I_{ST}$ right/left	Approx. 3 mA
Input protection:	Yellow LED, reverse polarity protection, surge protection
<b>PWM option</b>	
Maximum clock frequency of the PWM at the control inputs	1,000 Hz
Pulse width repetition rate of the PWM	0% ... 100%
<b>Output data</b>	
Supply voltage range $U_V$	10 V DC ... 30 V DC
Quiescent current	10 mA
Output protection	Green LED, reverse polarity protection, surge protection
<b>Motor switching output</b>	
Continuous current $I_a$ max.	2 A (see derating curve)
Current limitation at short-circuits	15 A (during braking)
<b>General data</b>	
Rated insulation voltage	50 V
Rated surge voltage / insulation	0.5 kV / basic insulation
Ambient temperature (operation)	-25°C ... 60°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/overvoltage category	2 / II
<b>Mounting position</b>	Vertical (horizontal DIN rail)
Mounting	In rows with zero spacing
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-SC-ELR W1/ 2-24DC	2980539	1
PLC-PT-ELR W1/ 2-24DC	1069556	1

# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC-INTERFACE Pulse expansion modules

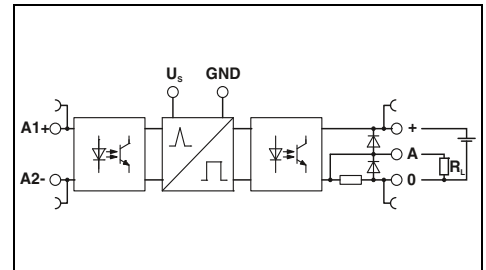
- Solid-state relays for acquiring and extending short pulses.
- Pulse detection can be set from >0.1 ms or >2 ms
  - Status display
  - Delay times of 10 to 2550, can be set via DIP switches
  - Bridging options
  - Can be retriggered
  - Screw and Push-in connection technology

**Notes:**  
See the website for more information on connection cross sections with ferrules.



**Solid-state relay module for the extension of input pulses, DC output max. 100 mA**

ERC

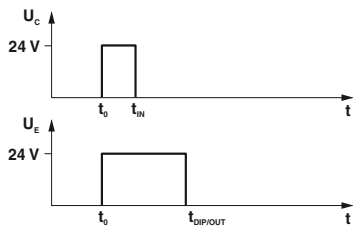


#### Technical data

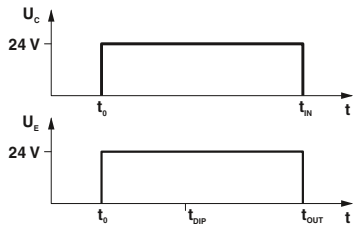
<b>Input data</b>	
Rated control supply voltage $U_s$	24 V DC
Rated control supply voltage range with reference to $U_s$	0.8 ... 1.2
Rated control supply current $I_s$	
- Input low, output low	13 mA
- Input high, output high	19 mA
Rated actuating voltage $U_c$	24 V DC
Rated actuating current $I_c$	3 mA
Switching threshold "0" signal in reference to $U_c$	<0.4
Switching threshold "1" signal in reference to $U_c$	>0.8
Status indication	Yellow LED
Operating voltage display	Green LED
Input circuit	Reverse polarity protection, surge protection
<b>Output data</b>	
Output voltage range $U_E$	3 V DC ... 48 V DC
Limiting continuous current	100 mA
Voltage drop at maximum limiting continuous current	<1 V DC
Output circuit	3-conductor, ground-referenced
Output protection	Reverse polarity protection, surge protection, free running
<b>General data</b>	
Rated insulation voltage	50 V DC
Rated surge voltage	0.5 kV
Ambient temperature (operation)	-25°C ... 60°C
Standards/regulations	DIN EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 583
	W / H / D

#### Ordering data

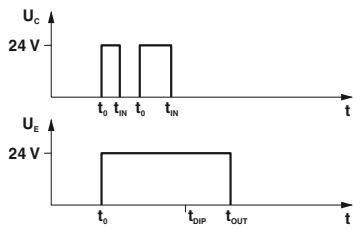
Description	Type	Order No.	Pcs./Pkt.
<b>PLC INTERFACE, with screw connection</b>	PLC-OSC-LPE-24DC/48DC/100	2903171	1
<b>PLC-INTERFACE, with Push-in connection</b>	PLC-OPT-LPE-24DC/48DC/100	2903173	1



Input pulse  $t_1 <$  set output pulse  $t_3$   
(no restart when triggered again)



Input pulse  $t_1 \geq$  set output pulse  $t_3$  then:  
input pulse  $t_1 =$  output pulse  $t_2$   
(no restart when triggered again)



Input pulse  $t_1 <$  set output pulse  $t_3$   
(restart when triggered again)

DIP							
S1	S2	S3	S4	S5	S6	S7	S8
10	-	-	-	-	-	-	-
-	20	-	-	-	-	-	-
-	-	40	-	-	-	-	-
-	-	-	80	-	-	-	-
-	-	-	-	160	-	-	-
-	-	-	-	-	320	-	-
-	-	-	-	-	-	640	-
-	-	-	-	-	-	-	1280



# Relay modules

## PLC-INTERFACE – Highly-compact relay modules

### PLC accessories

The power terminal **PLC-ESK** helps in supplying the bridge potentials, the partition plate **PLC-ATP** helps in optical and safe disconnection of the adjacent PLC modules. The passive feed-through bridge **PLC-BP (A1-14)** is used instead of a relay and connects the A1 and 14 terminal points.



Feed-in terminal and partition plate

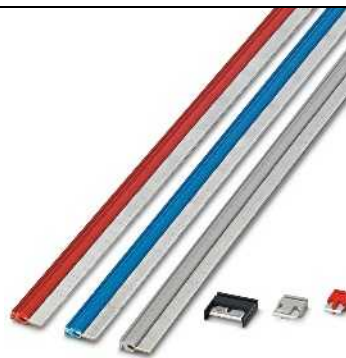


Feed-through bridge

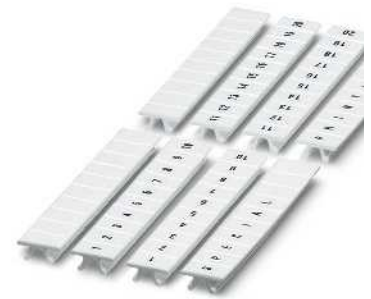
Ordering data			Ordering data				
Description	Color	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
<b>Power terminal</b> , for supply of up to four potentials, with the same shape as PLC standard series, max. 32 A/250 V AC	gray	PLC-ESK GY	2966508	5			
<b>Separating plate</b> , thickness 2 mm, required at the start and end of a PLC terminal strip. It also serves in visual separation of groups, safe isolation of different voltages of neighboring PLC interfaces as per DIN EN 50178/VDE0160, separation of neighboring bridges of different potentials and separation of PLC interfaces at voltages >250 V	black	PLC-ATP BK	2966841	25			
<b>Screwdriver</b> Blade: 0,6 x 3,5 x 100 mm, length: 181 mm		SZF 1-0,6X3,5	1204517	10			
<b>Passive feed-through bridge</b> , can be plugged in instead of relay or solid-state relay, bridges terminal points A1 and 14	black				PLC-BP A1-14	2980283	10

### PLC accessories

The colored isolated FBST plug-in bridges are not required for the PLC interface to up to 70%. The 500 mm long “Endless bridges” **FBST 500-PLC** are especially effective. The 2-pos. single plug-in bridges **FBST 6** are especially suited for bridging a smaller number of PLC modules.



Plug-in bridge systems



Marking material

Ordering data			Ordering data				
Description	Color	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
<b>Continuous plug-in bridge</b> , 500 mm long, isolated, can be cut to length, for potential distribution Nominal current: 32 A	red	FBST 500-PLC RD	2966786	20			
	blue	FBST 500-PLC BU	2966692	20			
	gray	FBST 500-PLC GY	2966838	20			
<b>Plug-in bridge</b> , 2-pos., 6 mm long, for potential distribution Nominal current: 6 A	red	FBST 6-PLC RD	2966236	50			
	blue	FBST 6-PLC BU	2966812	50			
	gray	FBST 6-PLC GY	2966825	50			
<b>Plug-in bridge</b> , 2-pos., 8 mm long, for potential distribution with a partition plate Nominal current: 6 A	gray	FBST 8-PLC GY	2967688	50			
<b>Plug-in bridge</b> , 2-pos., 14 mm long, insulated, for potential distribution Nominal current: 10 A	black	FBST 14-PLC BK	2967691	50			
<b>Zack marker strip, printed horizontally</b> , 10-section, with consecutive numbers, e.g., 1-10, 11-20, etc. up to 91-100					ZB 6,LGS:FORTL.ZAHLEN	1051016	10

Adapters for PLC-INTERFACE

PLC-V8/... are the VARIOFACE adapters which connect the narrow PLC-INTERFACE modules to the VARIOFACE system cabling:

**Notes:**  
Cross list with matching PLC-INTERFACE modules, see page 534



VARIOFACE adapter for 6.2 mm PLC-INTERFACE



VARIOFACE adapter for 14 mm PLC-INTERFACE



Maximum permissible operating voltage  
Maximum permissible current (per branch)  
Maximum total current (voltage supply)

Ambient temperature (operation)  
Standards/regulations  
Connection method

Connection data solid/stranded/AWG  
Dimensions

Supply  
Controller level  
H / D

30 V DC  
1 A (per signal path)  
3 A  
-40°C ... 70°C  
IEC 60664, DIN EN 50178  
Screw connection  
IDC/FLK pin strip  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
39 mm / 56 mm

30 V DC  
1 A (per signal path)  
3 A  
-40°C ... 70°C  
IEC 60664, DIN EN 50178  
Screw connection  
IDC/FLK pin strip  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
39 mm / 56 mm

Ordering data

Ordering data

Description	No. of pos.	Module width W
<b>V8 adapter, for 8 PLC-INTERFACES (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, positive switching</b>		
Output	14	50 mm
Input	14	50 mm
<b>V8 adapter, for 8 PLC-INTERFACES (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, negative switching</b>		
Output	14	50 mm
Input	14	50 mm
<b>V8 output adapter, for 8 PLC-INTERFACES (6.2 mm), with D-SUB connection</b>		
Pin strip	15	50 mm
Socket strip	15	50 mm
<b>V8 input adapter, for 8 PLC-INTERFACES (6.2 mm), with D-SUB connection</b>		
Pin strip	15	50 mm
Socket strip	15	50 mm
<b>V8 adapter, for 8 PLC-INTERFACES (14 mm), with IDC/FLK pin strip, for PLC system cabling, positive switching</b>	14	112.5 mm
<b>V8 adapter, for 8 PLC-INTERFACES (14 mm), with IDC/FLK pin strip, for PLC system cabling, negative switching</b>	14	112.5 mm

Type	Order No.	Pcs./Pkt.
PLC-V8/FLK14/OUT	2295554	1
PLC-V8/FLK14/IN	2296553	1
PLC-V8/FLK14/OUT/M	2304102	1
PLC-V8/FLK14/IN/M	2304115	1
PLC-V8/D15S/OUT	2296058	1
PLC-V8/D15B/OUT	2296061	1
PLC-V8/D15S/IN	2296074	1
PLC-V8/D15B/IN	2296087	1

Type	Order No.	Pcs./Pkt.
PLC-V8L/FLK14/OUT	2299660	1
PLC-V8L/FLK14/OUT/M	2304306	1





**Logic modules with plug-in relays**

PLC logic combines a logic module and plug-in relay and eliminates the wiring effort and additional switching elements. Each relay channel can be flexibly equipped with an electromechanical or a solid-state relay. PLC logic processes 16 I/O signals with just one logic module and boasts an extremely compact design width of just 50 mm.

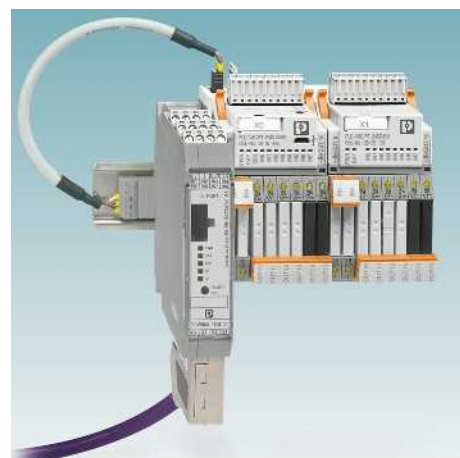
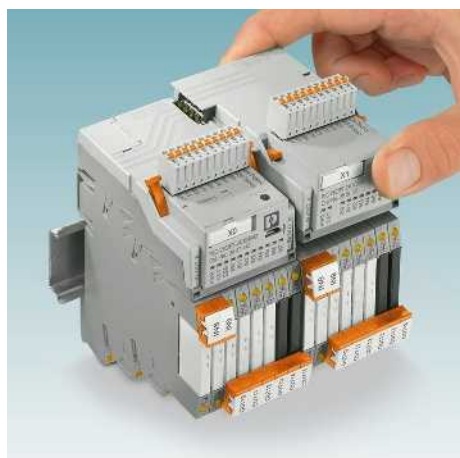
**Intuitive programming with LOGIC+**

- Function block diagram or ladder diagram
- Numerous integrated function blocks
- Specific function blocks are available to download
- Hardware view in the program
- Can be downloaded free of charge

**i** Your web code: #0139

**Visualization using a touch panel**

For jobs requiring control, operation, and monitoring, the BTP 2000 series HMIs go perfectly with PLC logic. Basic touch panels can be used to visualize all the logic module process data. Three different display sizes enable clear representation, from simple alphanumeric images to graphics-intensive images with object animation.



**Easily connect extension modules**

The basic module and the extension module are connected via integrated connectors – no tools required. A maximum of two extension modules can be connected to a basic module. This means that PLC logic can work with up to 48 I/Os.

**Control and monitor via Bluetooth adapter**

Together with the PLC logic app, the Bluetooth adapter is available for wireless access to process data between the logic module and the mobile end device, and can be used for operation and monitoring purposes.

The Bluetooth connection enables efficient monitoring of multiple logic modules, with just one visualization device.

**Integration into common bus systems**

PLC logic is integrated into various networks via optional adaptable fieldbus gateways. This enables bidirectional communication with a higher-level controller for remote control as well as diagnostics and visualization.

Gateways are available for transmitting data via PROFIBUS DP, Modbus/TCP, CANopen®, PROFINET, and EtherNet/IP™.

# Relay modules

## PLC logic – Programmable logic relay system

### Logic modules

PLC-V8C devices are the plug-in logic modules which form the PLC logic relay system in conjunction with the narrow 6.2 mm PLC-INTERFACE terminal blocks. Eight freely-selectable PLC-INTERFACE terminal blocks must be separately ordered for each logic module. You can find an overview of matching PLC-INTERFACE terminal blocks on page 436.

All logic modules feature these properties:

- 8 integrated digital inputs (two of which can be configured as analog inputs)
- A further 8 channels can be configured with matching PLC-INTERFACE terminal blocks as inputs or outputs
- Programming with LOGIC+ software

#### PLC-V8C.../SAM2

- Stand-alone logic module with 16 I/Os, not extendable
- Connection to PC via micro USB socket
- Integrated realtime clock (RTC)
- Accommodates external IFS-CONFSTICK memory block
- Relay and analog modules can be used

#### PLC-V8C.../BM2

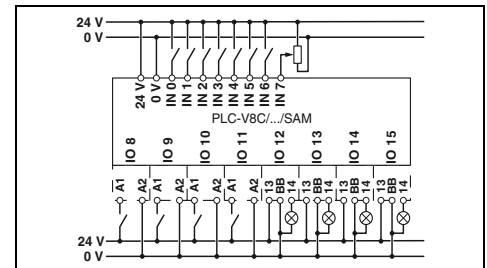
- Basic logic module with 16 I/Os, can be extended with a maximum of two extension modules (PLC-V8C.../EM) to 48 I/Os
- Connection to PC via micro USB socket
- Integrated realtime clock (RTC)
- Accommodates external IFS-CONFSTICK memory block
- Optional connection to IFS gateways
- Relay and analog modules can be used

#### PLC-V8C.../EM

- Extension logic module with 16 I/Os, for extending the basic module
- Relay modules can be used



Stand-alone module



#### Technical data

Supply	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 26.4 V DC
Maximum input current at U <sub>N</sub>	160 mA
Input data (digital)	
Number of inputs	8 (2 configurable as analog)
Input voltage	24 V DC
Description of the input	EN 61131-2, type 3
Input current 0-signal	<1 mA
Input current 1-signal	Typically 2.5 mA
Input data (analog)	
Number of inputs	2 (IN6 and IN7 are configurable as analog)
Input voltage range	0 V ... 10 V
Input resistance	>3.5 kΩ
Input data (PLC-INTERFACE)	
Number of inputs	≤8
Output data (for controlling PLC-INTERFACE)	
Number of outputs	≤8
Nominal voltage	24 V DC
Nominal current	9 mA
Realtime clock (basic module only)	
Buffer time (capacitor)	96 h (capacitor)
Realtime clock accuracy	±2 s/d
General data	
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Permissible humidity (operation)	95%
Air clearances and creepage distances between the power circuits	DIN EN 50178
Rated insulation voltage	50 V
Rated surge voltage	0.8 kV
Insulation	Basic insulation
Mounting type	Can be plugged onto 8 x PLC-INTERFACE terminal blocks
Degree of protection	IP20
Screw connection rigid / flexible / AWG	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 26 - 16
Push-in connection rigid / flexible / AWG	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 26 - 16

#### Ordering data

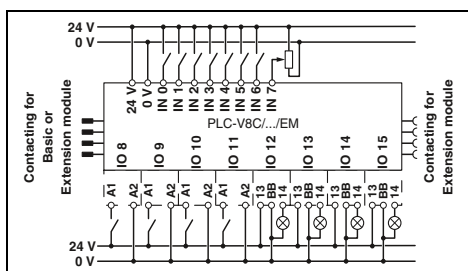
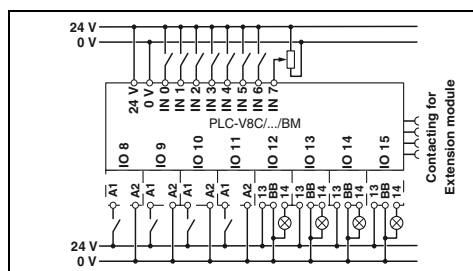
Description	Type	Order No.	Pcs./Pkt.
PLC-V8C plug-in logic modules with Push-in connection	PLC-V8C/PT-24DC/SAM2	2907443	1



**Basic module  
(can be extended)**



**Extension module**



**Technical data**

**Technical data**

24 V DC  
19.2 V DC ... 26.4 V DC  
160 mA

24 V DC  
19.2 V DC ... 26.4 V DC  
65 mA

8 (2 configurable as analog)  
24 V DC  
EN 61131-2, type 3  
<1 mA  
Typically 2.5 mA

8 (2 configurable as analog)  
24 V DC  
EN 61131-2, type 3  
<1 mA  
Typically 2.5 mA

2 (IN6 and IN7 are configurable as analog)

2 (IN6 and IN7 are configurable as analog)

0 V ... 10 V  
>3.5 kΩ

0 V ... 10 V  
>3.5 kΩ

≤8

≤8

≤8  
24 V DC  
9 mA

≤8  
24 V DC  
9 mA

96 h (capacitor)  
±2 s/d

-

-20°C ... 50°C  
-20°C ... 70°C  
95%  
DIN EN 50178

-20°C ... 45°C  
-20°C ... 70°C  
95%  
DIN EN 50178

50 V  
0.8 kV  
Basic insulation  
Can be plugged onto 8 x PLC-INTERFACE terminal blocks

50 V  
0.8 kV  
Basic insulation  
Can be plugged onto 8 x PLC-INTERFACE terminal blocks

IP20  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 26 - 16  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 26 - 16

IP20  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 26 - 16  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 26 - 16

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./Pkt.
PLC-V8C/PT-24DC/BM2	2907446	1

Type	Order No.	Pcs./Pkt.
PLC-V8C/PT-24DC/EM	2905137	1

# Relay modules

## PLC logic – Programmable logic relay system

### Analog modules

Together with the PLC logic modules, the analog modules enable analog standard signals to be processed.

The analog modules are connected to PLC logic stand-alone modules or basic modules.

- Status indicator for supply voltage and diagnostics
- Standard configuration: 4 to 20 mA or Pt 100

#### Analog input

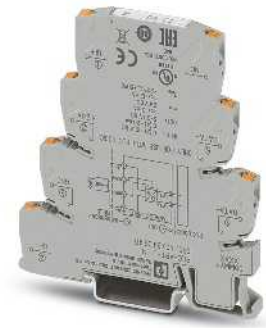
- Available standard signals: 0 to 20 mA, 4 to 20 mA, 0 to 10 V or 2 to 10 V (configurable via DIP switch)

#### Temperature transducer

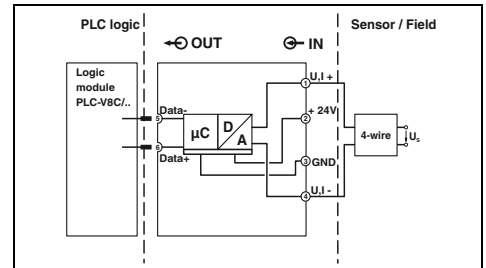
- 2-conductor Pt 100 or Pt 2000 (configurable via DIP switch)
- Temperature measuring range: -50 to 200°C

#### Analog output

- Available standard signals: 0 to 20 mA, 4 to 20 mA, 0 to 10 V or 2 to 10 V (configurable via DIP switch)



Analog input



<b>Supply</b>	
Rated control supply voltage $U_S$	24 V DC
Rated control supply voltage range with reference to $U_S$	0.8 ... 1.1
<b>Rated control supply current <math>I_S</math></b>	
Operating voltage display	13 mA
<b>Input signal</b>	
Input signal	Green LED
Input resistance	Voltage input
Output data	Current input
Output signal	0 V ... 10 V
	2 V ... 10 V
	>120 k $\Omega$
	0 mA ... 20 mA
	4 mA ... 20 mA
	~ 40 $\Omega$
	-
	-
	-
	-
<b>General data</b>	
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Air clearances and creepage distances between the power circuits	DIN EN 50178
Rated insulation voltage	50 V
Rated surge voltage	0.5 kV
Insulation	Basic insulation
Mounting type	In rows with zero spacing
Degree of protection	IP20
Screw connection rigid / flexible / AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Push-in connection rigid / flexible / AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14

#### Technical data

<b>Technical data</b>		
24 V DC		
0.8 ... 1.1		
13 mA		
Green LED		
Voltage input		Current input
0 V ... 10 V		0 mA ... 20 mA
2 V ... 10 V		4 mA ... 20 mA
>120 k $\Omega$		~ 40 $\Omega$
		-
		-
		-
		-
<b>General data</b>		
-20°C ... 50°C		
-20°C ... 70°C		
DIN EN 50178		
50 V		
0.5 kV		
Basic insulation		
In rows with zero spacing		
IP20		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		

#### Ordering data

Description	
with Push-in connection	
with Push-in connection	
with Push-in connection	

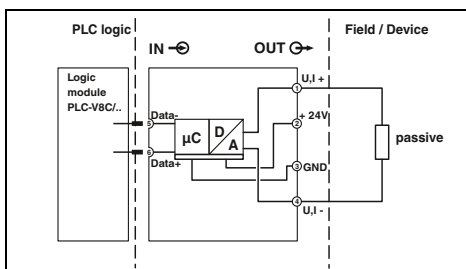
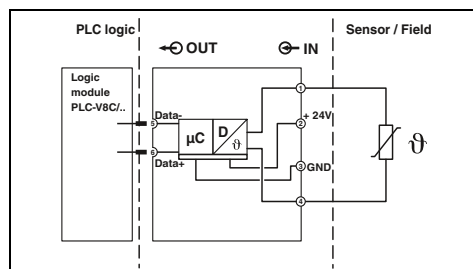
Type	Order No.	Pcs./Pkt.
PLC-APT-UI-IN	2906917	1



Temperature transducer



Analog output



Technical data

24 V DC  
0.8 ... 1.1  
14 mA  
Green LED  
Temperature range  
-50°C ... 200°C

Technical data

24 V DC  
0.8 ... 1.1  
≤28 mA  
Green LED  
-  
Voltage output                      Current output  
0 V ... 10 V                              0 mA ... 20 mA  
2 V ... 10 V                              4 mA ... 20 mA  
12.3 V                                      24.6 mA  
10 kΩ                                      500 Ω (20 mA)  
<20 mV<sub>pp</sub>                              -

-20°C ... 50°C  
-20°C ... 70°C  
DIN EN 50178

-20°C ... 50°C  
-20°C ... 70°C  
DIN EN 50178

50 V  
0.5 kV  
Basic insulation  
In rows with zero spacing  
IP20  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14

50 V  
0.5 kV  
Basic insulation  
In rows with zero spacing  
IP20  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-APT-PT100-IN	2906919	1

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-APT-UI-OUT	2906921	1



# Relay modules

## PLC logic – Programmable logic relay system

### Accessories

#### Programming cable and memory block

- The programming cable (MICRO USB B to USB A) is used to connect PLC logic to a PC, length: 2 m
- PLC logic programs are saved by the memory block or can be easily copied to other devices



Cable for programming



Memory block

		Technical data			Technical data		
General data							
EMC note					Class A product, see page 583		
		Ordering data			Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Programming cable		CAB-USB A/MICRO USB B/2,0M	2701626	1			
Multi-functional memory block for the Interface system					IFS-CONFSTICK	2986122	1
- Flat design							

### Accessories

#### PLC logic starter kit

The PLC logic starter kit with 8 inputs and 8 outputs contains all the components needed to get started quickly and easily with PLC logic with Push-in connection technology.

- PLC-V8C-PT/24DC/SAM2 plug-in logic module
- PLC-RPT-24DC/1/ACT eight relay output terminal blocks
- Micro USB programming cable



Starter kit with stand-alone module

		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
PLC logic starter kit 3, consisting of: plug-in stand-alone logic module, eight relay output terminal blocks with Push-in connection (250 V AC/DC, max. 6 A), and micro USB programming cable		PLC-LOGIC-STARTERKIT3	2909916	1

Accessories

IFS gateways and Bluetooth adapter

- The gateways are connected to the PLC-V8C.../BM PLC logic basic module via the DIN rail connector and the connecting cable
- The Bluetooth adapter is connected to the logic module via the memory connection

Current values are monitored and controlled via the PLC logic app.

INTERFACE system bus master terminal (IB IL IFS-MA-PAC, 2692720) for connecting PLC logic to a Inline controller, see Catalog 6, Automation



IFS gateway



Bluetooth adapter



General data  
EMC note

Technical data
Class A product, see page 583

Technical data

Description	Color
<b>IFS gateway</b> for PROFIBUS DP	gray
Modbus/TCP	gray
CANopen®	gray
PROFINET	gray
EtherNet/IP™	gray
<b>Programming adapter</b> for configuring modules with S-PORT interface Cable length: 3 m	
<b>DIN rail connector</b>	green
<b>Connecting cable</b> for connecting PLC logic with the ME 22,5 TBUS DIN rail connector, cable length: 0.3 m	
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface	

Ordering data		
Type	Order No.	Pcs./Pkt.
EM-PB-GATEWAY-IFS	2297620	1
EM-MODBUS-GATEWAY-IFS	2901528	1
EM-CAN-GATEWAY-IFS	2901504	1
EM-PNET-GATEWAY-IFS	2904472	1
EM-ETH-GATEWAY-IFS	2901988	1
IFS-USB-DATACABLE	2320500	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
PLC-V8C/CAB/TBUS/0,3M	2905263	1

Ordering data		
Type	Order No.	Pcs./Pkt.
IFS-BT-PROG-ADAPTER	2905872	1

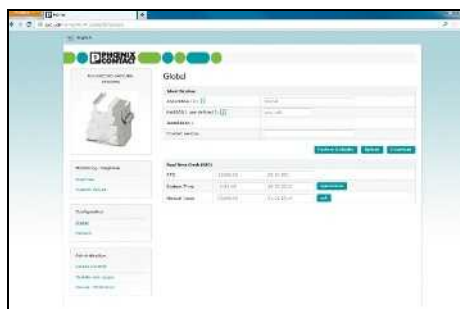
# Relay modules

## PLC logic – Programmable logic relay system

### Selection table for PLC-INTERFACE

Relay output	Push-in connection		Screw connection	
	Type	Order No.:	Type	Order No.:
1 changeover contact, output data: 6 A, 250 V AC/DC	PLC-RPT-24DC/21	2900299	PLC-RSC-24DC/21	2966171
1 changeover contact, output data: 50 mA, 36 V DC, gold contact	PLC-RPT-24DC/21AU	2900306	PLC-RSC-24DC/21AU	2966265
1 N/O contact, output data: 6 A, 250 V AC/DC, actuator type	PLC-RPT-24DC/1/ACT	2900312	PLC-RSC-24DC/1/ACT	2966210
1 N/O contact with switch, output data: 6 A, 250 V AC/DC	PLC-RPT-24UC/1/S/H	2900328	PLC-RSC-24UC/1/S/H	2982236
<b>Solid-state relay output</b>				
Output data: 100 mA, 3 V DC - 48 V DC	PLC-OPT-24DC/48DC/100	2900352	PLC-OSC-24DC/48DC/100	2966728
Output data: 3 A, 3 V DC - 33 V DC	PLC-OPT-24DC/24DC/2	2900364	PLC-OSC-24DC/24DC/2	2966634
Output data: 750 mA, 24 V AC - 253 V AC	PLC-OPT-24DC/230AC/1	2900369	PLC-OSC-24DC/230AC/1	2967840
Output data: 3 A, 3 V DC - 33 V DC, actuator type	PLC-OPT-24DC/24DC/2/ACT	2900376	PLC-OSC-24DC/24DC/2/ACT	2966676
Output data: 750 mA, 24 V AC - 253 V AC, actuator type			PLC-OSC-24DC/230AC/1/ACT	2967947
Output data: 1 A, 12 V DC - 300 V DC	PLC-OPT-24DC/300DC/1	2900383	PLC-OSC-24DC/300DC/1	2980678
Output data: 500 mA, 3 V DC - 48 V DC, electronic changeover contact	PLC-OPT-24DC/48DC/500/W	2900378	PLC-OSC-24DC/48DC/500/W	2980636
Output data, TTL, 50 mA, 5 V DC	PLC-OPT-24DC/TTL	2900363	PLC-OSC-24DC/TTL	2982728
<b>Analog output</b>				
Output signal: 0 V ... 10 V, 2 V ... 10 V, 0 mA ... 20 mA, 2 mA ... 20 mA	PLC-APT-UI-OUT	2906921	PLC-ASC-UI-OUT	2906920
<b>Relay input</b>				
Input voltage: 24 V DC	PLC-RPT-24DC/1AU/SEN	2900313	PLC-RSC-24DC/1AU/SEN	2966317
Input voltage: 120 V AC/DC	PLC-RPT-120UC/1AU/SEN	2900314	PLC-RSC-120UC/1AU/SEN	2966320
Input voltage: 230 V AC/DC	PLC-RPT-230UC/1AU/SEN	2900315	PLC-RSC-230UC/1AU/SEN	2966333
Input voltage: 5 V DC (basic terminal block without relay)			PLC-BSC- 5DC/ 1/SEN	2980267
Relay for 5 V DC basic terminal block			REL-MR-4,5DC/21AU	2961370
<b>Solid-state relay input</b>				
Input voltage: 24 V DC	PLC-OPT-24DC/V8C/SEN	2908172	PLC-OSC-24DC/V8C/SEN	2908173
Input voltage: 120 V AC/DC	PLC-OPT-120UC/V8C/SEN	2908174	PLC-OSC-120UC/V8C/SEN	2908175
Input voltage: 230 V AC/DC	PLC-OPT-230UC/V8C/SEN	2908176	PLC-OSC-230UC/V8C/SEN	2908177
<b>Analog input</b>				
Input signal: 0 V ... 10 V, 2 V ... 10 V, 0 mA ... 20 mA, 2 mA ... 20 mA	PLC-APT-UI-IN	2906917	PLC-ASC-UI-IN	2906916
Input signal: Pt 100 or Pt 1000 sensor	PLC-APT-PT100-IN	2906919	PLC-ASC-PT100-IN	2906918
<b>Dummy or reserve</b>				
Basic terminal blocks: output	PLC-BPT-24DC/21	2900445	PLC-BSC-24DC/21	2966016
Basic terminal blocks: input	PLC-BPT-24DC/1/SEN	2900262	PLC-BSC-24DC/1/SEN	2966061

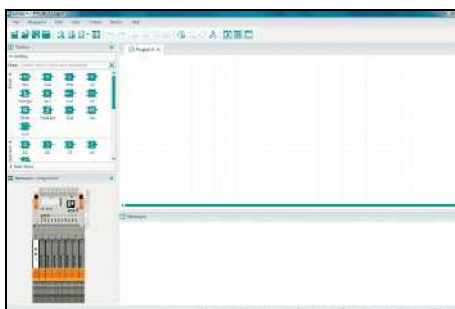
### LOGIC+ programming software



#### Integrated web server

PLC logic basic settings are easily configured via the integrated web server. The LOGIC+ software does not need to be installed in order to do so.

- Time and date
- Password and access control
- Firmware update
- Status indicators for inputs and outputs
- General device information



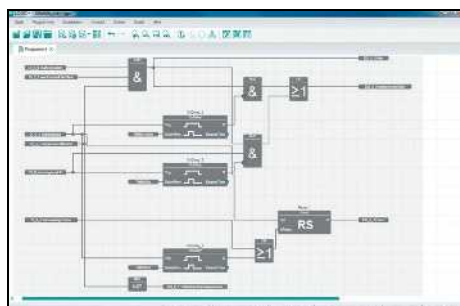
#### Logic+ user interface

- Clear separation in program editor, toolbox, hardware view, and signaling window
- All elements can be easily placed using drag & drop
- Notes and errors are highlighted in color in the program editor



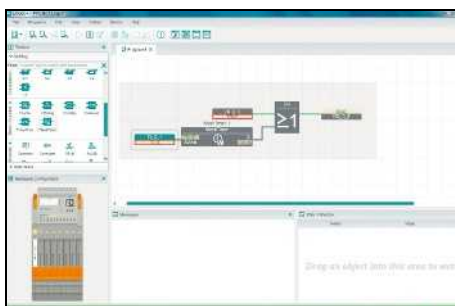
#### Hardware configurator

- Each channel can be configured as an input or output and with relay or analog modules
- Clear assignment of the inputs and outputs, thanks to the graphical representation of the hardware connections



#### Function blocks

- Basic functions: AND, OR, NOT, XOR
- Mathematical functions: add, divide, multiply, subtract, generate absolute value
- Positive and negative edge detection
- RS and SR flip-flops
- Switch-on and switch-off delay, pulse encoder, pulse stretching, weekly clock timer
- Up and down counter
- Analog and digital comparators
- Special functions, for example, roller shutter control or pulse width modulation are available to download



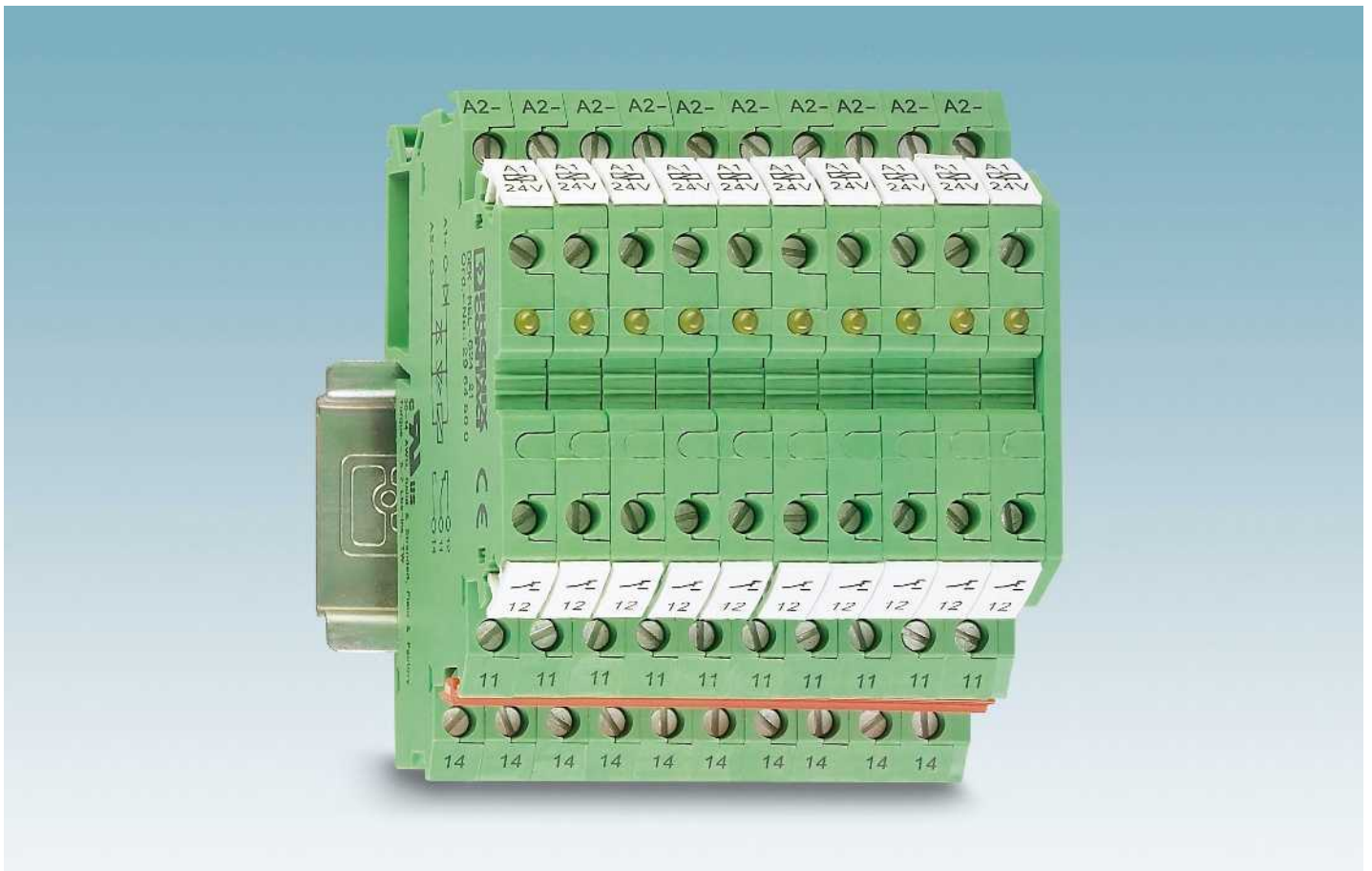
#### Simulation and online values

- Offline simulation:
  - Simulation of the created program directly in LOGIC+
  - Virtualization of the values in the program editor, hardware view, and in the observation window
- Online values:
  - Representation of the program running on the hardware in LOGIC+ with online values
  - Overwriting values from LOGIC+



#### PLC logic app

- Once the app is installed on your smartphone or tablet, it can be used to make parameter adjustments to the logic modules. The visualization view is created via the editor of the web server integrated in the logic modules. The app can be used for operation and monitoring, as it can access all program variables.
- Inputs and outputs (digital, analog)
  - Flags
  - Numerical values
  - Time values



The Phoenix Contact interface terminal blocks DEK provide complete interface functions in modular terminal block housing that is just 6.2 mm wide. In conjunction with standard terminal block accessories, these high capacity interfaces have not only the design but also the high level of user convenience of modular terminal blocks.

The main common feature of all Phoenix Contact interface terminal blocks is their width of just 6.2 mm. This saves 60% space in the control cabinet in comparison to conventional 15 mm wide coupling relays from modular systems.

The DEK range offers the best solution for all industrial voltages both for signal input and output.

High switching capacities are a matter of course for the relay terminal block DEK-REL... and the solid-state relay terminal block DEK-OV...

The wear-free DEK-OV... power-level terminal is used in applications with high switching rates where electromechanical relays quickly exhaust their service life.

Integrated LEDs clearly indicate the switching status of the electronic terminal blocks and provide an excellent overview of the coupling level and the system.

Colored insertion bridges EB-DIK for the supply and ground signals make it possible to design the circuit simply and effectively.

Integrated protective circuits such as free-wheeling diodes, polarity reversal protection diodes and surge protection elements protect the coupling modules and ensure optimum availability of the system.



# Relay modules

## Relay modules in terminal block design – DEK series

### Input interface DEK-REL-24/1/SEN and output interface DEK-REL-24/1/AKT

In addition to the familiar advantages of the electronic terminal blocks DEK-REL... such as

- 2-layer contact with hard gold-plating for universal applications from 1 mA to 5 A continuous current
- 2 kV<sub>rms</sub> electrical isolation of input and output
- Integrated input circuit

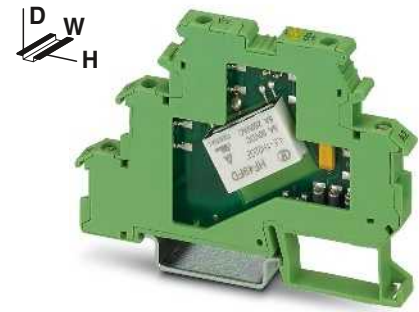
With this terminal block, all connections for a sensor or actuator are provided over a width of just 6.2 mm!

This means that 16 outputs take up a total constructional width of just 105.4 mm (including the power terminal block).

#### Advantages:

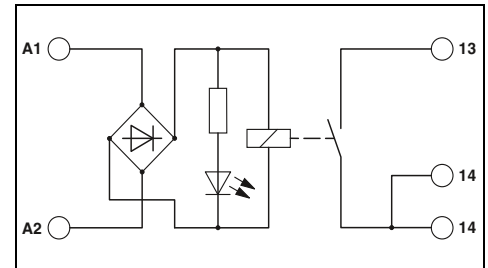
- Lower costs as the N terminal block is no longer required
- Wiring is reduced to a minimum
- Up to 73% more space

Notes:	
Type of housing:	Polyamide PA non-reinforced, color: green.
Marking systems and mounting material	See Catalog 3
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.	
Other insertion bridges EB...DIK... refer to page 445	



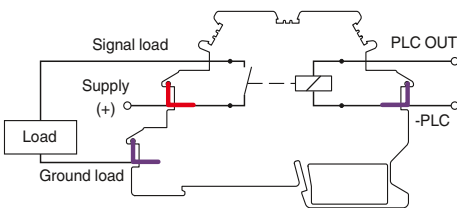
For low to medium powers  
1 N/O contact (1)

ERC

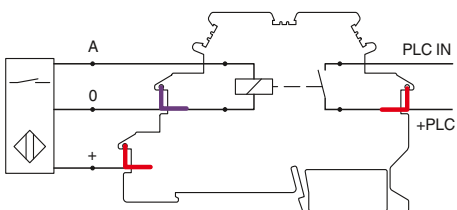


#### Technical data

Input data		①	②
Permissible range (with reference to U <sub>N</sub> )		0.9 - 1.1	0.8 - 1.1
Typical input current at U <sub>N</sub>	[mA]	23	6.5
Response/release time at U <sub>N</sub>	[ms]	8 / 15	5 / 15
Input protection:		Yellow LED, bridge rectifier	
Output data			
Contact type		1 N/O contact (double contact)	
Contact material		AgNi, hard gold-plated	
Max. switching voltage		250 V AC / 125 V DC	
Minimum switching voltage		0.1 V	
Limiting continuous current		3 A (5 A up to 35°C at 24 V DC)	
Maximum switch-on current		5 A	
Minimum switching current		1 mA	
Maximum interrupting rating, ohmic load		24 V DC	72 W
		48 V DC	60 W
		60 V DC	50 W
		110 V DC	50 W
		250 V AC	750 VA
General data			
Test voltage (winding/contact)		2 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)		-20°C ... 50°C	
Mechanical service life		Approx. 2x 10 <sup>7</sup> cycles	
Standards/regulations		IEC 60664, EN 50178	
Connection data solid/stranded/AWG		0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
Dimensions		W / H / D	
EMC note		Class A product, see page 583	



Pin configuration, DEK-REL...AKT

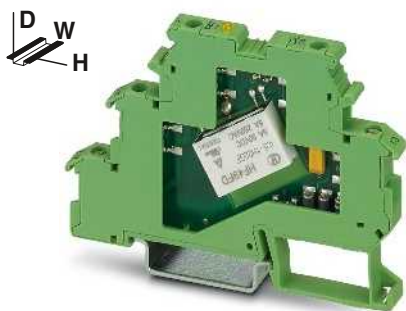


Pin configuration DEK-REL...SEN

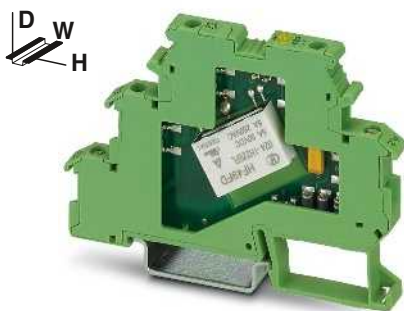
Description		Input voltage U <sub>N</sub>
Relay terminal block with miniature relay		① 5 V AC/DC ② 24 V AC/DC

Ordering data			
Type	Order No.	Pcs./Pkt.	
DEK-REL- 5/I/1	2941183	10	
DEK-REL- 24/I/1	2940171	10	

Accessories			
Terminal block, with three through contacts, for mounting on NS 35... For busbar feeding		Cover	
Insertion bridge, for middle and lower levels	No. of pos.	Color	
	80	blue	
	80	red	
	80	white	
D-DEK 1,5 GN		2716949	10
EB 80- DIK BU	26 A	2715940	1
EB 80- DIK RD	26 A	2715953	1
EB 80- DIK WH	26 A	2715788	1



For low to medium powers  
1 N/O contact (1)



For low to medium powers  
1 N/O contact (1)

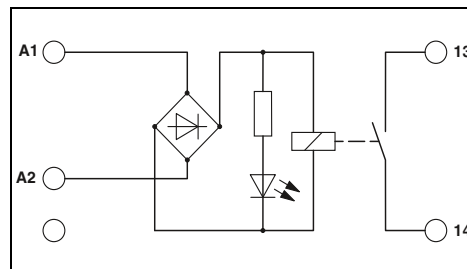
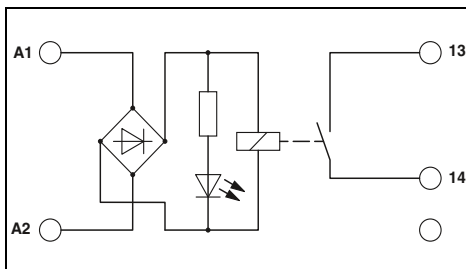
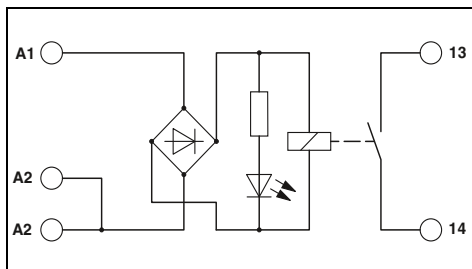


For low to medium powers  
1 N/O contact (1)

ERC

ERC

ERC



Technical data

Technical data

Technical data

① 0.9 - 0.8 -  
1.1 1.1  
23 6.5  
8 / 15 5 / 15  
Yellow LED, bridge rectifier

② 0.8 -  
1.1  
6.5  
5 / 15  
Yellow LED, bridge rectifier

② 0.8 -  
1.1  
6.5  
5 / 15  
Yellow LED, bridge rectifier

1 N/O contact (double contact)  
AgNi, hard gold-plated  
250 V AC / 125 V DC  
0.1 V  
3 A (5 A up to 35°C at 24 V DC)  
5 A  
1 mA

1 N/O contact  
AgNi, hard gold-plated  
250 V AC / 125 V DC  
0.1 V  
3 A (5 A up to 35°C at 24 V DC)  
5 A  
1 mA

1 N/O contact  
AgNi, hard gold-plated  
250 V AC / 125 V DC  
0.1 V  
3 A (5 A up to 35°C at 24 V DC)  
5 A  
1 mA

72 W  
60 W  
50 W  
50 W  
750 VA

72 W  
60 W  
50 W  
50 W  
750 VA

72 W  
60 W  
50 W  
50 W  
750 VA

2 kV AC (50 Hz, 1 min.)  
-20°C ... 50°C  
Approx. 2x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 583

2 kV AC (50 Hz, 1 min.)  
-20°C ... 50°C  
Approx. 2x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 583

2 kV AC (50 Hz, 1 min.)  
-20°C ... 50°C  
Approx. 2x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 583

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs./Pkt.
DEK-REL- 5/O/1	2941170	10
DEK-REL- 24/O/1	2941154	10

Type	Order No.	Pcs./Pkt.
DEK-REL- 24/1/AKT	2964063	10

Type	Order No.	Pcs./Pkt.
DEK-REL- 24/1/SEN	2964050	10

Accessories

Accessories

Accessories

D-DEK 1,5 GN	2716949	10
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

DIKD 1,5	2715979	50
D-DEK 1,5 GN	2716949	10
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

DIKD 1,5	2715979	50
D-DEK 1,5 GN	2716949	10
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1



# Relay modules

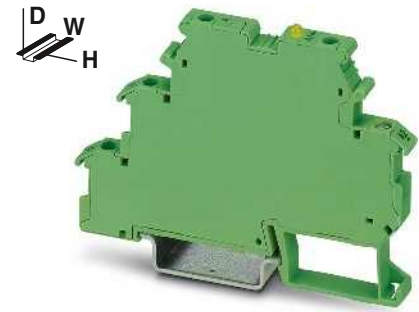
## Relay modules in terminal block design – DEK series

### Solid-state relay terminal blocks DEK-OE... and DEK-OV...

Phoenix Contact DEK-OE and DEK-OV interface terminal blocks are only 6.2 mm wide but still provide a complete input or output interface with:

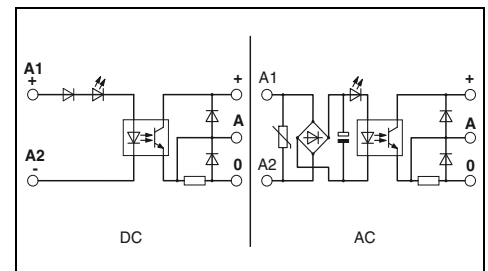
- Electrical isolation between input and output at up to 2.5 kV<sub>rms</sub>
- Integrated input circuit
- Status display
- Insertion bridges EB-DIK
- Labeling and mounting with modular terminal block convenience
- Wear-free switching up to 24 V DC/10 A and 240 V AC/800 mA
- Integrated output protection circuit
- Zero voltage switch at AC output
- Actuator version available.

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Other insertion bridges EB...DIK... refer to page 445

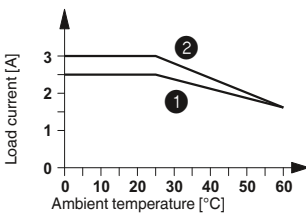


With DC voltage output  
max. = 100 mA

ERC

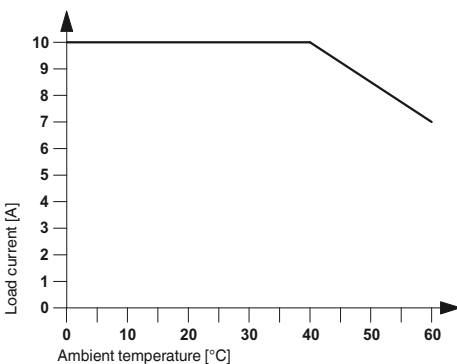


Derating curve for  
DEK-OV...24DC/3 and DEK-OV-24DC/24DC/3/AKT

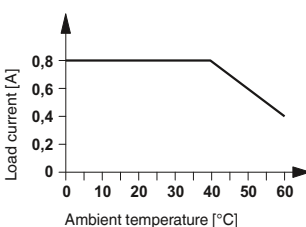


- 1 Horizontal mounting
- 2 Vertical mounting

Derating curve for DEK-OV-24DC/24DC/10



Derating curve for DEK-OV...240AC/800



Input data	
Permissible range (with reference to U <sub>N</sub> )	
Switching level with reference to U <sub>N</sub>	1 signal ("H") 0 signal ("L")
Typical input current at U <sub>N</sub>	[mA]
Transmission frequency f <sub>limit</sub>	[Hz]
Input circuit AC	
Input circuit DC	
Output data	
Operating voltage range	
Periodic peak reverse voltage	
Limiting continuous current	
Minimum load current	
Surge current	
Leakage current in off state	
Max. load value	
Output protection	
Voltage drop at maximum limiting continuous current	
General data	
Test voltage input/output	
Ambient temperature (operation)	
Standards/regulations	
Degree of pollution/surge voltage category	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

### Technical data

①	②	③	④	⑤	⑥
0.9 - 1.1	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.9 - 1.1	0.9 - 1.1
≥0.8	≥0.8	≥0.8	≥0.8	≥0.8	≥0.9
≤0.4	≤0.4	≤0.4	≤0.4	≤0.4	≤0.4
6.5	11	7	4	3.2	2.5
300	300	300	300	3	3

Yellow LED, reverse polarity protection, surge protection  
Yellow LED, reverse polarity protection

3 V DC ... 48 V DC
-
100 mA
-
-
-
-
Reverse polarity protection, free-wheeling diode
≤0.9 V

2.5 kV (50 Hz, 1 min.)
-20°C ... 60°C
IEC 60664, EN 50178
2 / III
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
6.2 mm / 80 mm / 56 mm
Class A product, see page 583

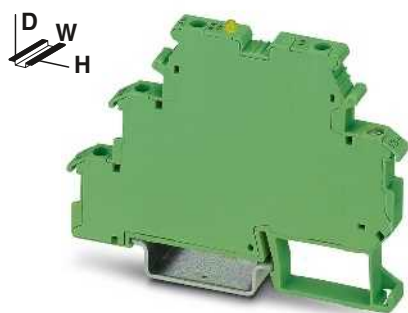
### Ordering data

Type	Order No.	Pcs./Pkt.
DEK-OE- 5DC/ 48DC/100	2940223	10
DEK-OE- 12DC/ 48DC/100	2964487	10
DEK-OE- 24DC/ 48DC/100	2940207	10
DEK-OE- 60DC/ 48DC/100	2941536	10
DEK-OE-120AC/ 48DC/100	2941659	10
DEK-OE-230AC/ 48DC/100	2940210	10

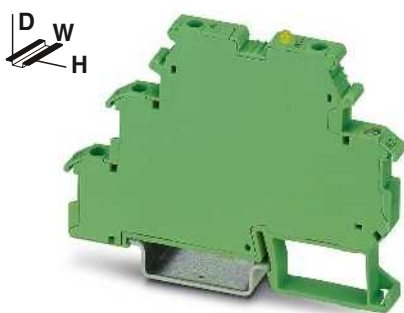
### Accessories

EB 80- DIK BU	26 A	2715940	1
EB 80- DIK RD	26 A	2715953	1
EB 80- DIK WH	26 A	2715788	1

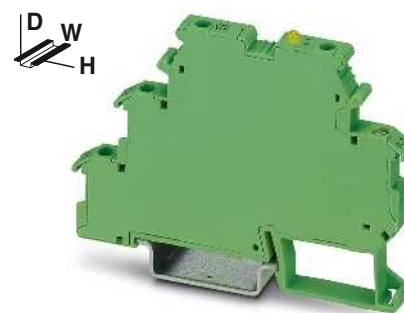
Description	Input voltage U <sub>N</sub>
<b>Solid-state input relays</b>	
①	5 V DC
②	12 V DC
③	24 V DC
④	60 V DC
⑤	120 V AC
⑥	230 V AC
<b>Solid-state power relays</b>	
①	5 V DC
②	12 V DC
③	24 V DC
⑦	24 V DC
<b>Actuator principle</b>	
<b>Insertion bridge, for middle and lower levels</b>	
No. of pos.	Color
80	blue
80	red
80	white



With DC voltage output  
max. = 3 A



With DC voltage output  
max. = 10 A

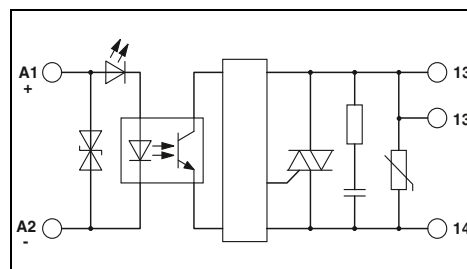
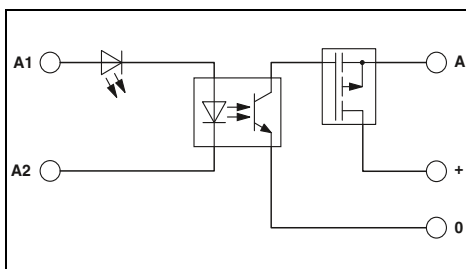
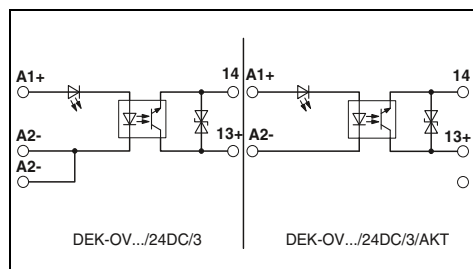


With AC voltage output  
max. = 800 mA

ERC

ERC

ERC



### Technical data

①	②	③	⑦
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥0.8	≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.4	≤0.4
11	8.5	7	7
300	300	300	300

Yellow LED, reverse polarity protection

3 V DC ... 30 V DC

3 A (see derating curve)

Reverse polarity protection, surge protection  
≤0.2 V

2.5 kV (50 Hz, 1 min.)

-20°C ... 60°C

IEC 60664, EN 50178

2 / III

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14

6.2 mm / 80 mm / 56 mm

Class A product, see page 583

### Technical data

①	②	③
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.4
5.1	4.7	3.5
100	100	100

Yellow LED, reverse polarity protection, surge protection

5 V DC ... 30 V DC

10 A (see derating curve)

100 A (t = 20 ms)

Reverse polarity protection, surge protection  
<50 mV

2.5 kV (50 Hz, 1 min.)

-20°C ... 60°C

IEC 60664, EN 50178

2 / III

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14

6.2 mm / 80 mm / 56 mm

Class A product, see page 583

### Technical data

①	②	③
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.4
10.2	10.5	10.7
10	10	10

Yellow LED, reverse polarity protection, surge protection

10 V AC ... 253 V AC (50/60 Hz)

600 V

0.8 A (see derating curve)

10 mA

30 A (t = 10 ms)

1.2 mA

4.5 A<sup>2</sup>s

RCV circuit

≤1 V

2.5 kV (50 Hz, 1 min.)

-20°C ... 60°C

IEC 60664, EN 50178

2 / III

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12

6.2 mm / 80 mm / 56 mm

### Ordering data

Type	Order No.	Pcs./Pkt.
DEK-OV- 5DC/ 24DC/ 3	2941361	10
DEK-OV- 12DC/ 24DC/ 3	2941387	10
DEK-OV- 24DC/ 24DC/ 3	2941374	10
DEK-OV- 24DC/ 24DC/ 3/AKT	2964296	10

### Ordering data

Type	Order No.	Pcs./Pkt.
DEK-OV- 5DC/ 24DC/ 10	2961752	10
DEK-OV- 12DC/ 24DC/ 10	2961749	10
DEK-OV- 24DC/ 24DC/ 10	2964322	10

### Ordering data

Type	Order No.	Pcs./Pkt.
DEK-OV- 5DC/240AC/800	2964623	10
DEK-OV- 12DC/240AC/800	2964636	10
DEK-OV- 24DC/240AC/800	2964649	10

### Accessories

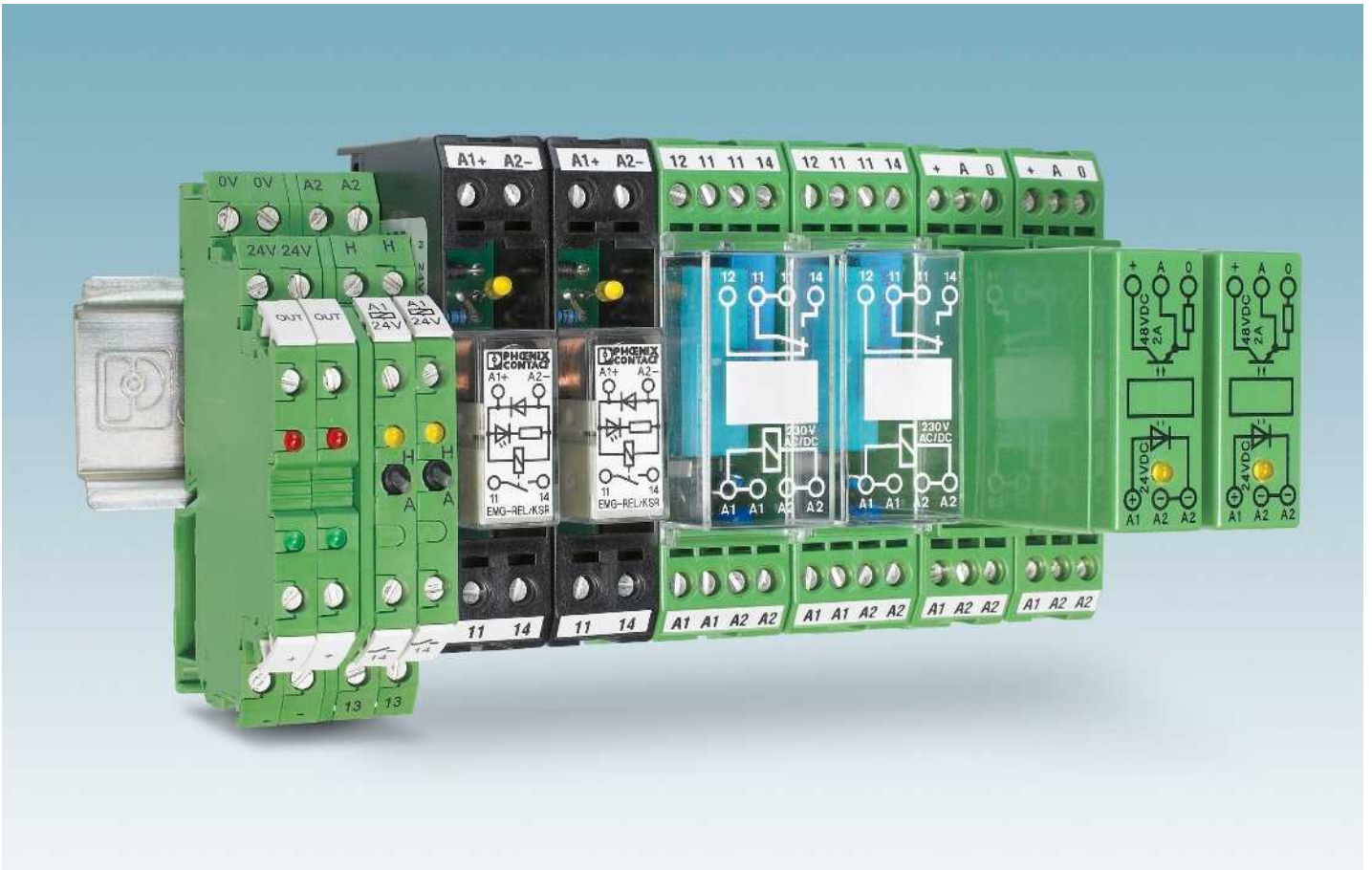
Type	Order No.	Pcs./Pkt.
EB 80- DIK BU	2715940	1
EB 80- DIK RD	2715953	1
EB 80- DIK WH	2715788	1

### Accessories

Type	Order No.	Pcs./Pkt.
EB 80- DIK BU	2715940	1
EB 80- DIK RD	2715953	1
EB 80- DIK WH	2715788	1

### Accessories

Type	Order No.	Pcs./Pkt.
EB 80- DIK BU	2715940	1
EB 80- DIK RD	2715953	1
EB 80- DIK WH	2715788	1



### Switch/relay terminal blocks DEK-REL-24/1/S

The functions “Manual”, “0”, “Automatic” are provided in a 6.2 mm narrow relay terminal block.

### Interference-free relay and solid-state relay interfaces

Coupled interference voltages on the coil lines or leakage currents can cause malfunctions in conventional modules. These special interface modules, equipped with high switching thresholds and/or effective filters, ensure good functioning.

### Relay interfaces for switching lamp loads ST-REL... and EMG 17-REL...

Lamp loads and capacitive consumers produce extremely high inrush currents which weld conventional relay contacts. To prevent this, Phoenix Contact uses an arc-resistant contact optimized for these applications, which keeps these peaks under control.

### Plug-in solid-state power relays ST-OV 3-24DC/400/3

The output of this component, dimensioned with a peak reverse voltage of 800 V, allows, for example, 230 V motors to be driven in simple reversible mode.

### Power circuit breaker solid-state relays, with signal logic

These modules combine the features of a short-circuit proof power solid-state relay and those of a thermomagnetic protection element.

### 100-kHz input solid-state relay DEK-OE-...100KHZ

Input solid-state relay for reliable transmission of high-frequency signals, such as those that occur with incremental encoders, for example.

### Electronic sensor terminal blocks for NAMUR proximity sensors

For converting the changeable resistance of a NAMUR sensor into a digital signal that can be read by a PLC.

### Inverter module DEK-TR/INV

Module for converting NPN outputs to PNP outputs and PNP to NPN.

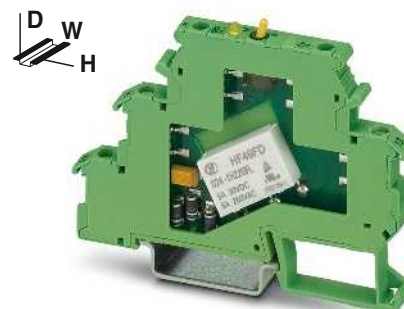
Relay modules with manual switch

Relay modules with manual switch and integrated power relay for manual, zero, and automatic functions

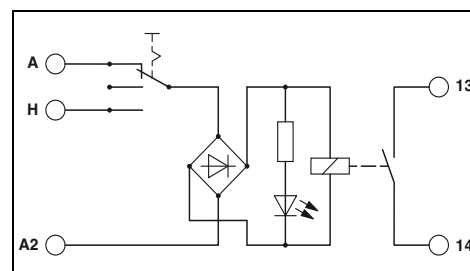
The advantages:

- Maximum switching current 5 A
- Width of only 6.2 mm
- Increased contact stability thanks to double contact
- Safe isolation in accordance with DIN EN 50178 between coil and contact

<b>Notes:</b>	
Type of housing: Polyamide PA non-reinforced, color: green.	
Marking systems and mounting material See Catalog 3	
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.	
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.	



Relay module with manual switch and integrated relay



Technical data

<b>Input data</b>	①
Permissible range (with reference to $U_N$ )	0.8 - 1.1
Typical input current at $U_N$ [mA]	6.5
Response/release time at $U_N$ [ms]	5 / 15
Input protection:	Yellow LED, bridge rectifier
<b>Output data</b>	
Contact type	1 N/O contact
Contact material	AgNi, hard gold-plated
Max. switching voltage	250 V AC / 125 V DC
Minimum switching voltage	0.1 V
Limiting continuous current	3 A (5 A up to 35°C at 24 V DC)
Maximum switch-on current	5 A
Minimum switching current	1 mA
Maximum interrupting rating, ohmic load	24 V DC 72 W 48 V DC 60 W 60 V DC 50 W 110 V DC 50 W 250 V AC 750 VA
<b>General data</b>	
Test voltage (winding/contact)	2 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 50°C
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 61 mm
EMC note	Class A product, see page 583

Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Relay module with power relay	① 24 V AC/DC	DEK-REL- 24/1/S	2964131	10

Accessories

Cover	Poles	Color	Accessories	Order No.	Pcs./Pkt.
<b>Insertion bridge</b>			D-DEK 1,5 GN	2716949	10
	2	red	EB 2- DIK RD	2716693	10
	3	red	EB 3- DIK RD	2716745	10
	4	red	EB 4- DIK RD	2716758	10
	5	red	EB 5- DIK RD	2716761	10
	10	red	EB 10- DIK RD	2716774	10
	5	blue	EB 5- DIK BU	2716677	10
	10	blue	EB 10- DIK BU	2716680	10
	80	blue	EB 80- DIK BU	2715940	1
	80	red	EB 80- DIK RD	2715953	1

# Relay modules

## Special relays and solid-state relays

### Relay modules with interference current filter

Relay and solid-state relay modules with integrated filter to protect against interference voltages or currents due, for example, to long control lines

The advantages:

- Resistant to interference currents
- High relay release voltage

Typical applications:

- Applications with long control lines
- Use of AC output boards, resulting in residual AC currents

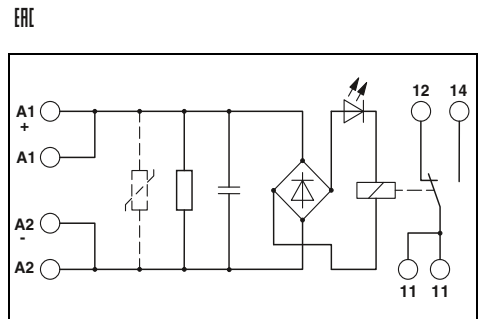
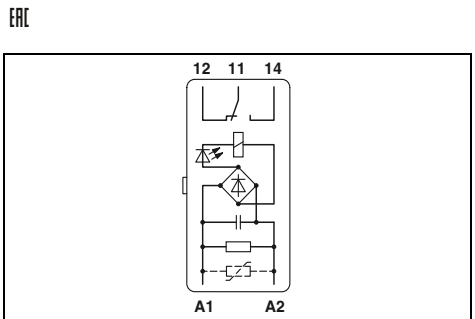
**Notes:**  
Load current diagrams, see page 402



1 changeover contact, plug-in relay



1 changeover contact, soldered-in relay



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$ [mA]	26 19 18
Response/release time at $U_N$ [ms]	8 / 10 8 / 11 10 / 8
Input protection: Yellow LED, bridge rectifier, surge protection	
Output data	
Contact type	
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Limiting continuous current	6 A
Maximum switch-on current	8 A
Maximum interrupting rating, ohmic load	
	24 V DC 140 W
	48 V DC 60 W
	60 V DC 45 W
	110 V DC 35 W
	220 V DC 55 W
	250 V AC 1,500 VA
General data	
Test voltage (winding/contact)	2.5 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 50°C
Mechanical service life	Approx. $2 \times 10^7$ cycles
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	- / - / -
Dimensions	W / H / D 20.8 mm / 42.5 mm / 112 mm
EMC note	

Technical data		
①	②	③
0.9 - 1.1	0.85 - 1.1	0.9 - 1.1
26	19	18
8 / 10	8 / 11	10 / 8
Yellow LED, bridge rectifier, surge protection		
Technical data		
Single contact, 1-PDT		
Double contact, 1 PDT		
AgNi		
250 V AC/DC		
6 A		
8 A		
140 W		
60 W		
45 W		
35 W		
55 W		
1,500 VA		
2.5 kV AC (50 Hz, 1 min.)		
-20°C ... 50°C		
Approx. $2 \times 10^7$ cycles		
IEC 60664, EN 50178		
- / - / -		
20.8 mm / 42.5 mm / 112 mm		

Technical data		
③		
0.9 - 1.1		
18		
10 / 8		
Yellow LED, bridge rectifier, surge protection		
Technical data		
Single contact, 1-PDT		
Double contact, 1 PDT		
AgNi		
250 V AC/DC		
6 A		
8 A		
95 W		
50 W		
45 W		
35 W		
55 W		
1,500 VA		
2.5 kV AC (50 Hz, 1 min.)		
-20°C ... 40°C		
Approx. $2 \times 10^7$ cycles		
IEC 60664, EN 50178		
0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12		
22.5 mm / 75 mm / 62.5 mm		
Class A product, see page 583		

Description	Input voltage $U_N$
Relay module with power contact-relay	① 24 V AC
	② 120 V AC
	③ 230 V AC
Relay module with multi-layer contact relay	① 24 V AC
	② 120 V AC
	③ 230 V AC

Ordering data			
Type	Order No.	Pcs./Pkt.	
ST-REL3-KG 24/21/SO46	2826091	10	
ST-REL3-KG120/21/SO46	2833026	10	
ST-REL3-KG230/21/SO46	2832027	10	
ST-REL3-KG 24/21/AU/SO46	2826981	10	
ST-REL3-KG120/21/AU/SO46	2829797	10	
ST-REL3-KG230/21/AU/SO46	2826266	10	

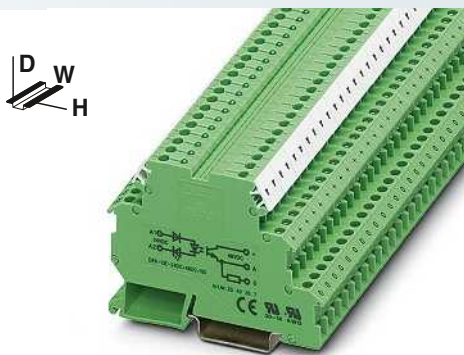
Ordering data			
Type	Order No.	Pcs./Pkt.	
EMG 22-REL/KSR-230/21/ SO46	2940760	10	
EMG 22-REL/KSR-230/21/AU/SO46	2940061	10	

Basic terminal block, complete with end cover		
Equipment marker		

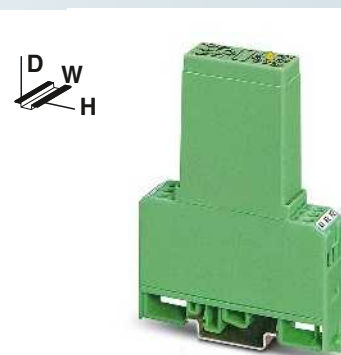
Accessories		
URELG 3	2820136	10

Accessories		
EMG-GKS 12	2947035	50

**Notes:**  
 Type of housing:  
**ST-REL:** Polyamide non-reinforced PA, color: bottom part gray, hood green  
**EMG:** Polyamide fiber reinforced PA-F, color: green.  
**DEK:** Polyamide non-reinforced PA, color: green.  
 Marking systems and mounting material  
 See Catalog 3  
 For derating curve, refer to page 401  
 Use of EB 80-DIK... bridges in the DEK terminal blocks:  
 Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.

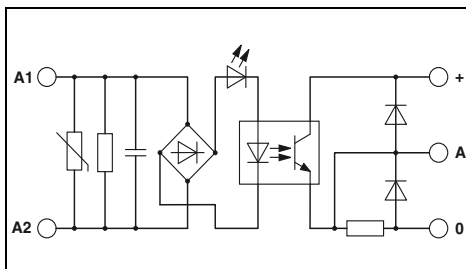


Solid-state input relay  
max. 100 mA



Solid-state power relay  
max. 2 A

ERC



Technical data

Input data	②
Permissible range (with reference to $U_N$ )	0.9 - 1.1
Switching level	1 signal ("H") [V DC] $\geq$ 207 0 signal ("L") [V DC] $\leq$ 92
Typical input current at $U_N$	[mA] 2.5
Typical switch-on time at $U_N$	[ms] 4.4
Typical switch-off time at $U_N$	[ms] 14
Transmission frequency $f_{limit}$	[Hz] 5
Input circuit AC	Yellow LED, surge protection, RC element

Input circuit DC	
Output data	
Max. switching voltage	48 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	100 mA
Maximum switch-on current	-
Output circuit	3-conductor, ground-referenced
Output protection	Reverse polarity protection, free running
Voltage drop at maximum limiting continuous current	$\leq 0.9$ V

General data	
Test voltage input/output	2.5 kV AC
Ambient temperature (operation)	0°C ... 55°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III

Mounting position/mounting	Any / in rows with zero spacing
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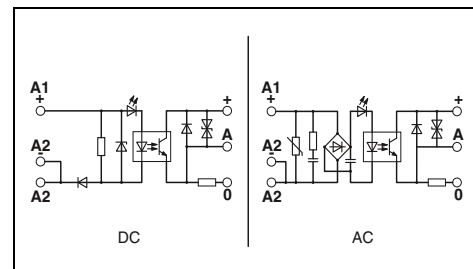
Connection data solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	W / H / D 6.2 mm / 80 mm / 56 mm

EMC note

Description	Input voltage $U_N$
<b>Solid-state power relays</b>	① 24 V DC
	② 230 V AC

Equipment marker

ERC



Technical data

Input data	①
Permissible range (with reference to $U_N$ )	0.8 - 1.2
Switching level	16.8
Typical input current at $U_N$	[mA] 16
Typical switch-on time at $U_N$	[ms] 8
Typical switch-off time at $U_N$	[ms] 0.02
Transmission frequency $f_{limit}$	[Hz] 0.2
Input circuit AC	300

Input circuit DC	
Output data	
Max. switching voltage	48 V DC
Minimum switching voltage	12 V DC
Limiting continuous current	2 A (see derating curve)
Maximum switch-on current	5 A ( $t = 1$ s)
Output circuit	3-conductor, ground-referenced
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	1.1 V

General data	
Test voltage input/output	3.5 kV AC
Ambient temperature (operation)	-10°C ... 55°C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III

Mounting position/mounting	- / mounted in rows with zero spacing; horizontal/not in rows: any
----------------------------	--

Connection data solid/stranded/AWG	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	17.5 mm / 75 mm / 102 mm
EMC note	Class A product, see page 583

EMC note

Description	Input voltage $U_N$
<b>Solid-state power relays</b>	① 24 V DC
	② 230 V AC

Equipment marker

Ordering data

Type	Order No.	Pcs./Pkt.
DEK-OE-230AC/ 48DC/100/SO 46	2964678	10

Accessories

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Ordering data

Type	Order No.	Pcs./Pkt.
EMG 17-OV- 24DC/ 48DC/2	2942810	10

Accessories

EMG-GKS 12	2947035	50
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# Relay modules

## Special relays and solid-state relays

### Relay modules for high inrush currents

The Phoenix Contact relay modules of the type SO 38 have been designed for switching electrical equipment with high inrush currents.

Areas of application are:

- Inductive loads (motors, power contactors etc.)
- Inductive/capacitive loads (fluorescent lamps etc.)
- Ohmic loads (glow lamps, heaters).

The module is based on a relay with a special arc-resistant tungsten lead contact. This takes over the high inrush and interrupting current capacitively. The inductive main contact made of AgCdO takes over the continuous current up to 10 A reliably. With the model EMG 17-REL...2E/SO38, this switching capacity is reached using a power relay with a set of silver tin oxide (AgSnO) contacts.

The module is available in two versions:

- Modular EMG housing that can be mounted on a DIN rail, with an overall width of 17.5 mm
- Convenient plug-in housing ST-REL from the Phoenix ST series for mounting on the basic terminal blocks URELG or UDK-RELG

Further features are:

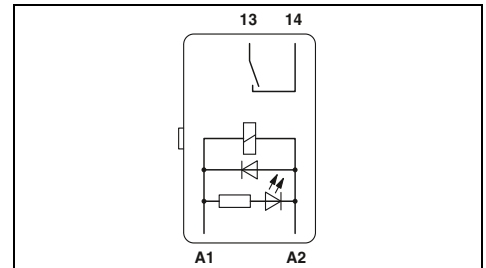
- Snap-on mounting on the common EN rails
- Easy maintenance
- Clear labeling of the terminal blocks using Phoenix Contact marking material

Notes:
Type of housing: Polycarbonate fiber reinforced PC-F, color: green or black.
Marking systems and mounting material See Catalog 3



Medium to high powers  
1 N/O contact (1)

ERC



#### Technical data

<b>Input data</b>	①
Permissible range (with reference to $U_N$ )	0.85 - 1.1
Typical input current at $U_N$	[mA] 28
Response/release time at $U_N$	[ms] 13 / 15
Input protection:	Yellow LED, free-wheeling diode
<b>Output data</b>	
Contact type	1 N/O contact with lead contact
Contact material	AgCdO
Max. switching voltage	250 V AC
Limiting continuous current	10 A
Maximum switch-on current	80 A (20 ms)
Maximum interrupting rating, ohmic load	
	24 V DC -
	48 V DC -
	60 V DC -
	110 V DC -
	220 V DC -
	250 V AC 2500 VA
<b>General data</b>	
Test voltage (winding/contact)	2.5 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 50°C
Mechanical service life	Approx. 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Mounting position/mounting	- / horizontal with zero spacing, vertical with spacing
Connection data solid/stranded/AWG	- / - / -
Dimensions	W / H / D 20.8 mm / 42.5 mm / 112 mm
EMC note	

#### Ordering data

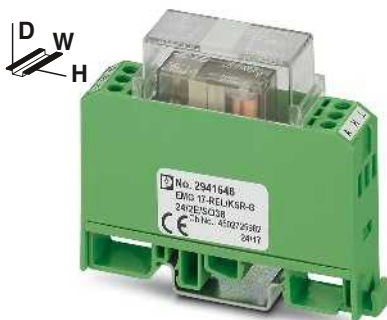
Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Relay module with power contact-relay</b> + wolfram lead contact	① 24 V DC	ST-REL3-KG 24/ 1/SO38	2829564	10
<b>Relay module with power contact relay,</b> with two inputs for manual, automatic	① 24 V DC			

#### Accessories

<b>Basic terminal block,</b> complete with end cover	URELG 3	2820136	10
<b>Equipment marker</b>			

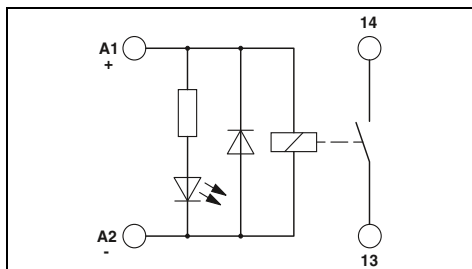


Medium to high powers  
1 N/O contact (1)



Medium to high powers  
1 N/O contact (1)

ERC



Technical data

①  
0.85 -  
1.1  
28  
13 /  
15  
Yellow LED, free-wheeling diode

1 N/O contact with lead contact  
AgSnO<sub>2</sub>  
250 V AC  
10 A  
80 A (20 ms)

-  
-  
-  
-  
-  
2500 VA

4 kV AC (50 Hz, 1 min.)  
-20°C ... 50°C  
Approx. 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
Any

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
17.5 mm / 75 mm / 62.5 mm  
Class A product, see page 583

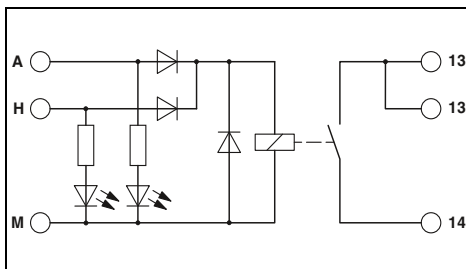
Ordering data

Type	Order No.	Pcs./Pkt.
EMG 17-REL/KSR-G 24/SO38 BK	2949994	10

Accessories

EMG-GKS 12	2947035	50
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ERC



Technical data

①  
0.9 -  
1.1  
23  
9 / 10  
Automatic: yellow LED, manual: red LED, free-wheeling diode, reverse polarity protection

Single contact, 1 N/O contact  
AgSnO  
250 V AC/DC  
10 A  
120 A (20 ms)

240 W  
120 W  
85 W  
70 W  
90 W  
2500 VA

4 kV AC (50 Hz, 1 min.)  
-20°C ... 50°C  
3x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
Any

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
17.5 mm / 75 mm / 62.5 mm  
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
EMG 17-REL/KSR-G 24/2E/SO38	2941646	10

Accessories

EMG-GKS 12	2947035	50
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# Relay modules

## Special relays and solid-state relays

### Pluggable solid-state power relays ST-OV 3

The pluggable version of the module provides all the advantages of the ST series, such as:

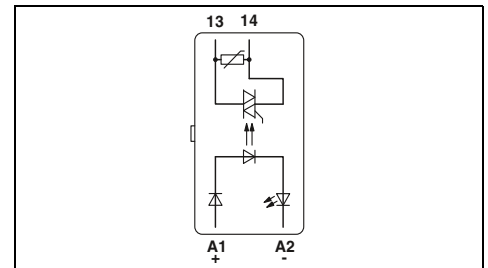
- Switching of up to 400 V AC/3 A
- Control of 230 V motors in straightforward reversing mode (e.g., synchronous motor in single-phase operation, see illustration)
- Pluggable

Notes:	
Type of insulating housing: polyamide PA non-reinforced, color: bottom part gray, hood green	
Ground (minus) potential from the input and output of the optocoupler should not be connected.	
AC loads must be protected with a varistor or an RC element.	



With AC voltage output  
max. = 3 A

ERC



#### Technical data

Input data		①
Switching level with reference to $U_N$	1 signal ("H")	$\geq 0.8$
	0 signal ("L")	$\leq 0.4$
Typical input current at $U_N$		[mA] 7
Transmission frequency $f_{limit}$		[Hz] 10
Input protection:		Yellow LED, reverse polarity protection, RC element
Output data		
Operating voltage		400 V AC
Operating voltage range		24 V AC ... 420 V AC
Periodic peak reverse voltage		800 V
Limiting continuous current		3 A (see derating curve)
Minimum load current		50 mA
Surge current		125 A ( $t = 10$ ms)
Residual voltage drop at "H"		$\leq 1.2$ V
Leakage current in off state		Approx. 12 mA
Output protection		Surge protection, RC element
General data		
Test voltage input/output		2.5 kV AC
Ambient temperature (operation)		0°C ... 60°C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		Horizontal DIN rail / -
Dimensions	W / H / D	20.8 mm / 42.5 mm / 112 mm

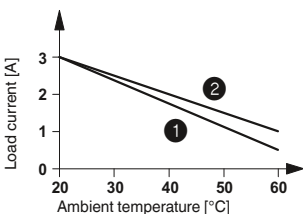
#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Solid-state power relays	① 24 V DC	ST-OV3-24DC/400AC/3	2905417	10

#### Accessories

Basic terminal block, complete with end cover	URELG 3	2820136	10
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Derating curve for ST-OV 3-24DC/400AC/3



- ① Aligned without spacing
- ② Aligned with 20 mm spacing



# Relay modules

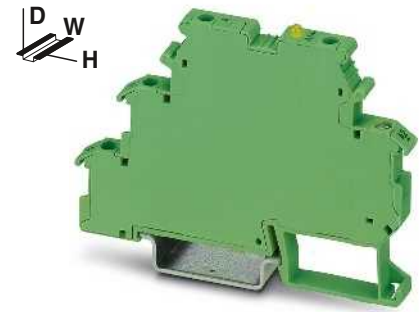
## Special relays and solid-state relays

### 100-kHz input solid-state relays DEK-OE

A solid-state relay for the reliable detection of short pulses

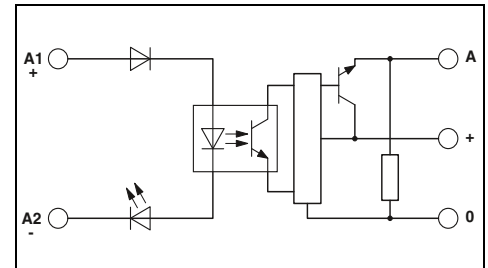
- Limit frequency of up to 100 kHz
- Push-pull stage on output side
- Includes signal inputs on PLC counter boards
- Features a capacitor on the input side for interference suppression

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.



With DC voltage output  
Transmission frequency 100 kHz

ERC

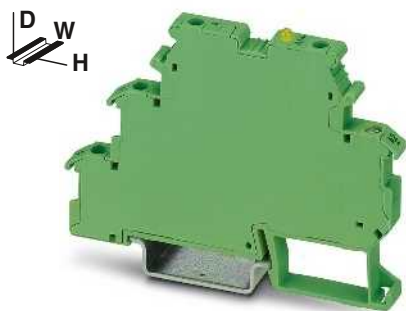


#### Technical data

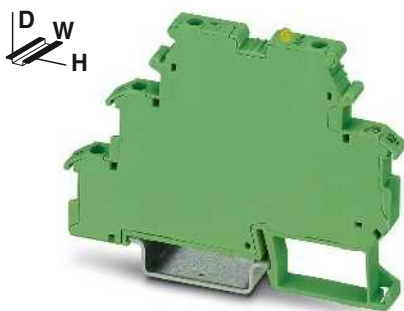
Input data		①	②
Permissible range (with reference to $U_N$ )		0.8 - 1.2	0.8 - 1.2
Switching level with reference to $U_N$	1 signal ("H")	$\geq 0.8$	$\geq 0.8$
	0 signal ("L")	$\leq 0.4$	$\leq 0.4$
Typical input current at $U_N$	[mA]	7	6
Typical switch-on time at $U_N$	[ $\mu$ s]	1.5	1.5
Typical switch-off time at $U_N$	[ $\mu$ s]	2	2
Transmission frequency $f_{\text{limit}}$	[kHz]	100	100
Input protection:		Yellow LED, reverse polarity protection, surge protection	
Output data			
Operating voltage range		4 V DC ... 30 V DC	
Limiting continuous current		50 mA	
Quiescent current		4.3 mA	
Residual voltage drop at "H"		$\leq 0.5$ V DC	
Output circuit		3-conductor, ground-referenced	
Output protection		Surge protection	
General data			
Test voltage input/output		2.5 kV AC	
Ambient temperature (operation)		-20°C ... 60°C	
Standards/regulations		IEC 60664, EN 50178	
Degree of pollution/surge voltage category		2 / II	
Connection data solid/stranded/AWG		0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12	
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm	
EMC note		Class A product, see page 583	

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Solid-state input relays	① 5 V DC	DEK-OE- 5DC/ 24DC/100KHZ	2964270	10
	② 24 V DC	DEK-OE- 24DC/ 24DC/100KHZ	2964283	10



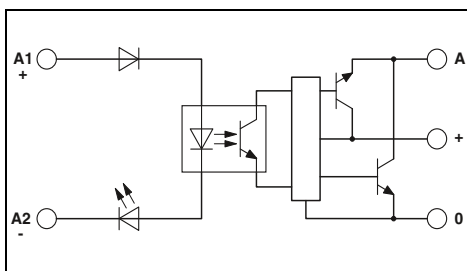
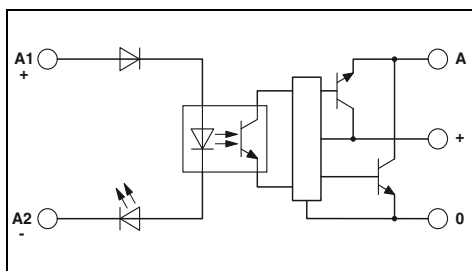
With DC voltage output push-pull  
Transmission frequency 100 kHz



With DC voltage output push-pull  
Transmission frequency 100 kHz

ERC

ERC



Technical data

Technical data

①	②
0.5 - 1.2	0.8 - 1.2
≥0.5	≥0.8
≤0.3	≤0.4
8	8
1	1
2	2
100	100

Yellow LED, reverse polarity protection, surge protection

①	②
0.5 - 1.2	0.8 - 1.2
≥0.5	≥0.8
≤0.3	≤0.4
8	8
1	1
2	2
100	100

Yellow LED, reverse polarity protection, surge protection

4 V DC ... 18 V DC  
50 mA  
8.5 mA  
≤1.2 V DC  
3-conductor push-pull, ground referenced  
Surge protection

14 V DC ... 30 V DC  
50 mA  
15 mA  
≤2.2 V DC  
3-conductor push-pull, ground referenced  
Surge protection

2.5 kV AC  
-20°C ... 60°C  
IEC 60664, EN 50178  
2 / II

2.5 kV AC  
-20°C ... 60°C  
IEC 60664, EN 50178  
2 / II

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 583

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 583

Ordering data

Ordering data

Type	Order No.	Pcs./Pkt.
DEK-OE- 5DC/ 5DC/100KHZ-G	2964542	10
DEK-OE- 24DC/ 5DC/100KHZ-G	2964364	10

Type	Order No.	Pcs./Pkt.
DEK-OE- 5DC/ 24DC/100KHZ-G	2964555	10
DEK-OE- 24DC/ 24DC/100KHZ-G	2964348	10

# Relay modules

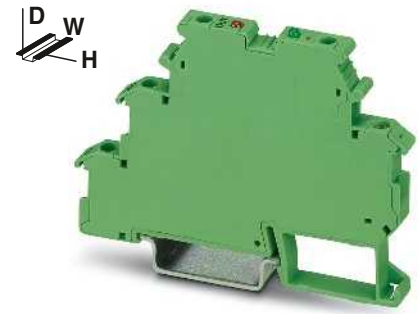
## Special relays and solid-state relays

### Electronic sensor terminal blocks for NAMUR proximity sensors

The electronic sensor terminal block, EIK 1-SVN 24-P from Phoenix converts the changeable resistance of a NAMUR sensor unit into a digital signal that can be read by all PLCs.

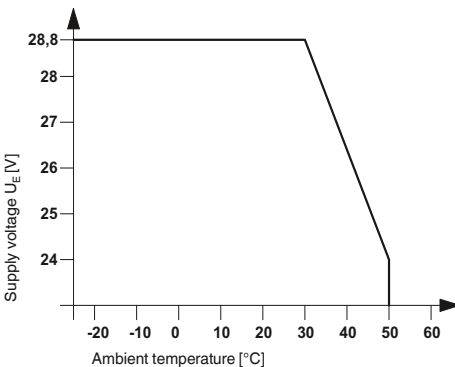
- Monitoring of initiator side for short circuits or strand breaks
- Suitable resistance circuit to enable monitoring of mechanical switches (see application 2)
- LED error display
- Status display (high signal) via green LED
- 24 V/50 mA digital output
- Bridging and marking with standard terminal accessories

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.

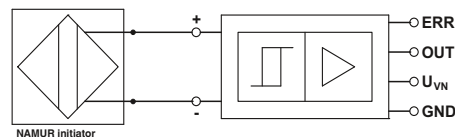


For inductive proximity sensors in accordance with NAMUR

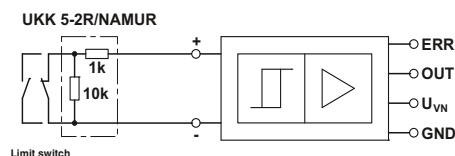
Derating curve for EIK 1-SVN 24 P



Application 1

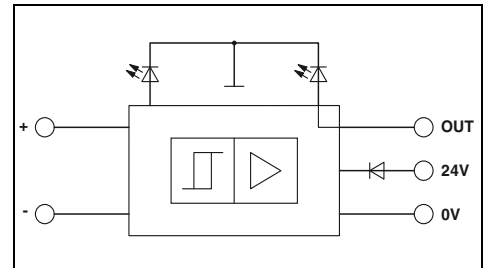


Application 2



<b>Supply</b>	Input supply nominal voltage $U_{VN}$
<b>Ripple</b>	Current consumption $I_{Imax}$ Input circuit
<b>Control circuit</b>	Non-load voltage Switching points in accordance with EN 60947-5-6:
<b>Switching hysteresis</b>	Internal resistance Output protection
<b>Signal output</b>	Maximum output current $I_{Amax}$ Residual voltage $U_R$ with $I_{Omax}$ Output voltage $U_O$
<b>Output protection</b>	36 V Zener diode as free-wheeling diode
<b>General data</b>	Ambient temperature (operation) Transmission frequency (INPUT/OUTPUT) Input pulse length Input pause length Standards/regulations Degree of pollution/overvoltage category
<b>Screw connection rigid / flexible / AWG</b>	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
<b>Dimensions</b>	6.2 mm / 80 mm / 56 mm
<b>EMC note</b>	Class A product, see page 583

ERC



### Technical data

<b>Supply</b>	18.5 V DC ... 28.8 V DC ( $U_{VN}$ , see derating curve)
<b>Ripple</b>	In accordance with DIN 19240 70 mA (at 50 mA output current) Green LED, polarity protection diode
<b>Control circuit</b>	8.2 V DC $\pm$ 10% $\geq$ 2.1 mA (in conductive state) $\leq$ 1.2 mA (in blocking state) 6.3 mA ... 10 mA (in the event of a short-circuit) 0 mA ... 0.35 mA (in the event of a wire break) Approx. 0.2 mA Approx. 1 k $\Omega$ Visual short-circuit and wire break control with LED (red), 12 V Zener diode
<b>Signal output</b>	50 mA $\leq$ 1.5 V ( $U_R$ ) $\leq$ 100 mV (in conductive state) $U_{VN} - U_R$ in blocking state 36 V Zener diode as free-wheeling diode
<b>General data</b>	-25°C ... 50°C 1 kHz $\geq$ 0.5 ms $\geq$ 0.5 ms IEC 60664, EN 61000-6-2, EN 61000-6-4 2 / III
<b>Screw connection rigid / flexible / AWG</b>	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
<b>Dimensions</b>	6.2 mm / 80 mm / 56 mm
<b>EMC note</b>	Class A product, see page 583

### Ordering data

Type	Order No.	Pcs./Pkt.
EIK1-SVN-24P	2940799	10

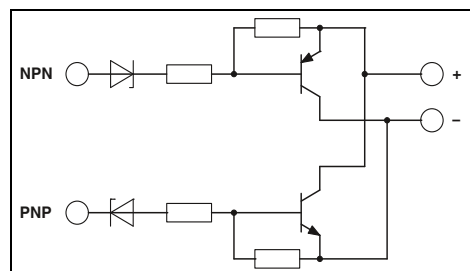
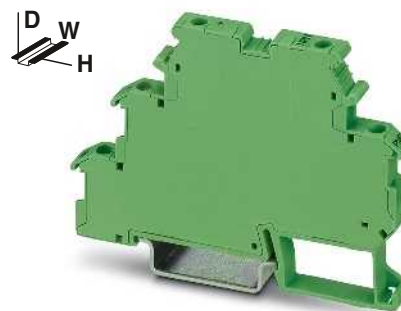
### Accessories

DIKD 1,5	2715979	50
UKK 5-2R/NAMUR	2941662	50
EB...-DIK...		
Ordering data at DEK-REL...		

**Inverter modules DEK-TR/INV**

The DEK-TR/INV inverter module inverts the signals of ground-switching NPN transistor outputs into positive switching PNP outputs, as well as signals from PNP into NPN signals. See application example.

<b>Notes:</b>
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.



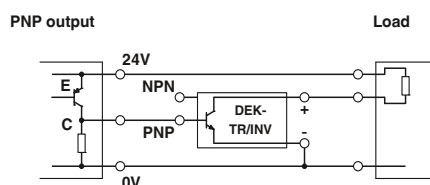
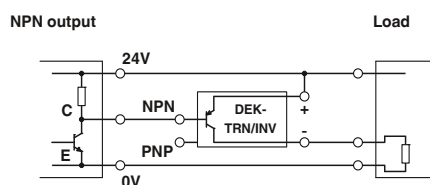
**Technical data**

Supply voltage	20 V DC ... 30 V DC ( $U_V$ )
Continuous current	200 mA
Residual voltage drop	<1 V
Leakage current	<1 mA
Maximum transmission frequency	15 kHz
<b>NPN input/PNP output</b>	
Switch-on threshold	<5 V (at $U_V = 24$ V; <( $U_V - 19$ V))
Switch-off threshold	>15 V (at $U_V = 24$ V; >( $U_V - 9$ V))
Minimum limit values	-2 V
Maximum limit values	26 V (at $U_V = 24$ V; $U_V + 2$ V)
<b>Control circuit</b>	
Switch-on threshold	>19 V
Switch-off threshold	<9 V
Minimum limit values	-2 V
Maximum limit values	26 V (at $U_V = 24$ V; $U_V + 2$ V)
<b>General data</b>	
Ambient temperature (operation)	-20°C ... 50°C
Standards/regulations	IEC 60664
	Basic insulation
	2 / II
Degree of pollution/overvoltage category	
Screw connection rigid / flexible / AWG	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	6.2 mm / 80 mm / 56 mm

**Ordering data**

Description	Type	Order No.	Pcs./Pkt.
<b>Inverter module</b>	DEK-TR/INV	2964319	10

**Connection examples:**



# Relay modules

## Special relays and solid-state relays

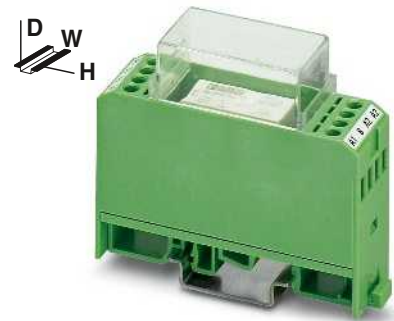
### Hybrid relay modules

With its integrated transistor level, the hybrid relay module is able to amplify weak input signals. This serves as the basis for reliable relay operation.

The advantages:

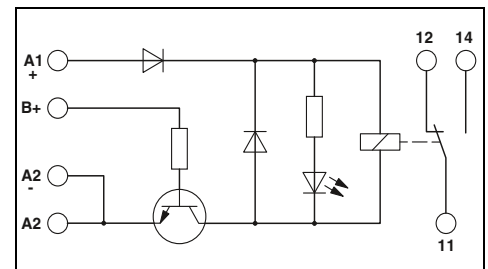
- Low control current (terminal B), type-dependent as of 0.5 mA
- Integrated input and interference suppression circuit
- Safe isolation in accordance with DIN EN 50178 between coil and contact

Notes:
Type of housing: Polycarbonate fiber reinforced PC-F, color: green.
Marking systems and mounting material See Catalog 3
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.



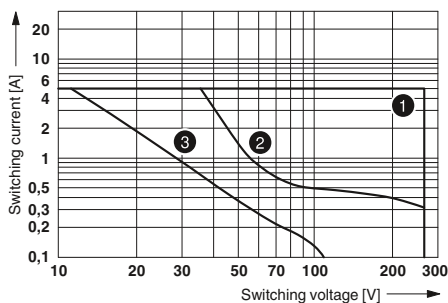
Positive switching hybrid relay

ERC



#### Technical data

Input data	①	②	③
Relay supply voltage $U_N \pm 10\%$	24	24	24
Minimum control voltage	2.7	5	15
Maximum control voltage	5.25	13.2	35
Minimum control current	2.6	0.5	0.5
Maximum control current	7.7	1	1
Typical input current at $U_N$	21	21	21
Response/release time at $U_N$	9 / 10	9 / 10	9 / 10
Input protection:	Yellow LED, reverse polarity protection, free-wheeling diode		
Output data			
Contact type	Single contact, 1-PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Limiting continuous current	5 A		
Maximum switch-on current	8 A		
Maximum interrupting rating, ohmic load	24 V DC	120 W	
	48 V DC	60 W	
	60 V DC	50 W	
	110 V DC	50 W	
	220 V DC	80 W	
	250 V AC	1250 VA	
General data			
Test voltage (winding/contact)	4 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation)	-20°C ... 50°C		
Mechanical service life	Approx. $5 \times 10^7$ cycles		
Standards/regulations	IEC 60664, EN 50178		
Degree of pollution/surge voltage category	2 / III		
Connection data solid/stranded/AWG	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12		
Dimensions	W / H / D 22.5 mm / 75 mm / 62.5 mm		
EMC note	Class A product, see page 583		
Description	Relay module with miniature power contact relay with integrated NPN transistor control, for low control currents		
	①	5 V DC	
	②	12 V DC	
	③	24 V DC	
Equipment marker	EMG-GKS 12		



- ① AC, ohmic load
- ② DC, ohmic load
- ③ DC, L/R = 40 ms

Interrupting rating

#### Ordering data

Type	Order No.	Pcs./Pkt.
EMG 22-REL/KSR-G 24/TRN 5	2949787	10
EMG 22-REL/KSR-G 24/TRN12	2952363	10
EMG 22-REL/KSR-G 24/TRN35	2952350	10

#### Accessories

EMG-GKS 12	2947035	50
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For up-to-date modifications or supplements  
to the catalog contents, please visit:  
**[phoenixcontact.net/webcode/#0132](https://phoenixcontact.net/webcode/#0132)**

