RT6 Safety Relay
Would you like a single safety relay for all your safety applications?

Then choose the RT6 universal relay to supervise both your safety devices and the internal safety of your machinery. In addition you can select the safety level required for each installation. All this is possible because the RT6 has the most versatile input option arrangement available on the market. Many other relays can therefore be replaced by the RT6.

The relay also comes with other options such as manual or automatic reset. Manual supervised reset can be used for gates and other safety devices that can be passed through. Automatic reset can be used for small hatches, if deemed acceptable from risk assessment.

The RT6 also has information outputs that follow the inputs and outputs of the relay. These outputs will for example indicate if a gate is open or closed and if the safety relay needs to be reset.

The RT6 is designed with a minimum amount of components thus keeping both production costs and component acquisitions to a minimum.

Choose the RT6 to simplify your safety circuits and reduce your costs.

Connection Examples

For examples of how our safety relays can solve various safety problems, see “Connection Examples” beginning on page 4:46.

Applications

- Emergency Stops
- Light Curtains
- Three Position Devices
- Interlocked Gates/Hatches
- Magnetic Switches
- Light Beams
- Safety Mats
- Contact Strips
- Foot-Operated Switches

Features

- Five input options
- Single or dual channel input
- Manual supervised or automatic reset
- Test input for supervision of external contactors
- Width 45 mm
- LED indication of supply, inputs, outputs, short-circuit and low voltage level
- 3 NO/1 NC relay outputs
- Two voltage free transistor information outputs
- 24 VDC
- 24, 48, 115 or 230 VAC
- Quick release connector blocks

Approvals

CERTIFIED BY inspecta

RT6 Technical Information

Inputs

The RT6 can be configured to operate in either of the following input options:

1. Single channel, 1 NO contact from +24 V DC, safety category 1.
2. Dual channel, 2 NO contacts from +24 V DC, safety category 3.
3. Dual channel 1 NO, 1 NC contact from +24 V DC, safety category 4.
4. Dual channel, 1 NO contact from 0V and 1 NO contact from +24 V DC, safety category 4.
5. Safety mats/contact strips 1 'contact' from 0V and 1 'contact' from +24 V DC, safety category 1.

Note: Safety category only refers to the safety relay configuration, input devices, output devices and wiring must be considered for a safety category of the system.

When the input/inputs are activated and the test/supervised reset is complete, relays 1 and 2 are energized. These are de-energized when the input/inputs are de-activated in accordance with the input option chosen or in case of a power failure. Relays 1 and 2 must both be de-energized before the RT6 can be reset.

Transistor Output Status Information

The RT6 has two voltage free transistor outputs that can be connected to a PLC, computer or other monitoring device. These outputs give the input and output status of the relay.

Reset and Testing

The RT6 has two reset options; manual and automatic. The manual supervised reset is used when the RT6 is monitoring safety devices that can be passed through, i.e. to ensure that the outputs of the safety relay do not close just because a gate is closed. The automatic reset should only be used if deemed an acceptable risk.

In addition, the RT6 can also test (supervise), if for example, contactors and valves etc. are de-energized/de-activated before a restart is allowed.

Indication of Low Voltage

The 'On' LED will flash if the relay supply voltage falls below an acceptable level. This indication will also be given if a monitored safety mat/contact strip is actuated. See connection option 5.

Safety Level

The RT6 has internal dual and supervised safety functions. Power failure, internal faulty component or external interference will not present a risk to options with the highest safety level. A manual reset requires that the reset input is closed and opened before the safety relay outputs are activated. A short-circuit or a faulty reset button is consequently supervised.

When the RT6 is configured for dual channel input, both the inputs are supervised for correct sequence operation before the unit can be reset.

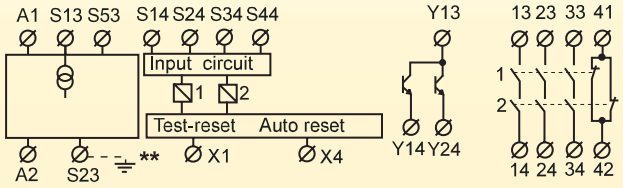
The input options 3 and 4 have the highest safety levels as all short-circuits and power failures are supervised. This in combination with double internal current limitation makes the relay ideal for supervision of safety mats and contact strips.

Regulations and Standards

The RT6 is designed and approved in accordance with appropriate directives and standards. Examples of such are: 98/37/EC, EN ISO 12100-1/-2, EN 60204-1 and EN 954-1/EN ISO 13849-1.

Connection Examples

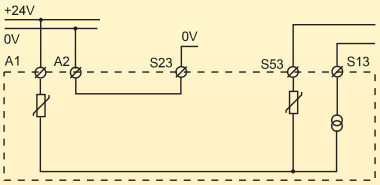
For examples of how our safety relays can solve various safety problems, see "Connection Examples" beginning on page 4:46.



Only for AC supply

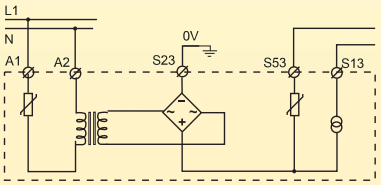
Connection of Supply

DC Supply



The RT6 DC option should be supplied with +24 V on A1 and 0 V on A2.

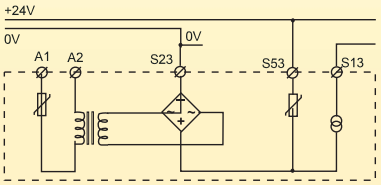
AC Supply



The RT6 AC option should be supplied with the appropriate supply voltage via connections A1 and A2.

The S23/⏚ must be connected to protective earth.

DC Supply of AC Units



All AC-units can also be supplied by +24 VDC to S53 (0VDC to S23).

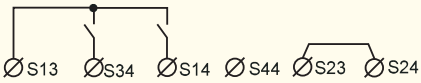
Note: With both DC and AC modules, if cable shielding is used this must be connected to an earth rail or an equivalent earth point.

RT6 Connection of Safety Devices

1. Single Channel, 1 NO from +24V

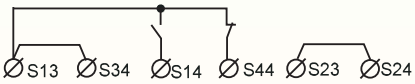
The input (contact to S14) must be closed before the outputs can be activated. When the input contact is opened the relay safety output contacts open.

2. Dual Channel, 2 NO from +24V



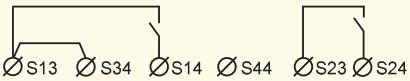
Both input contacts (S14 and S34) must be closed before the relay outputs can be activated. The safety relay contacts will open if one or both of the input contacts are opened. Both the input contacts must be opened and reclosed before the relay can be reset. A short-circuit between inputs S14 and S34 can only be supervised if the device connected to the inputs has short-circuit supervised outputs, e.g. Jokab Focus light curtains.

3. Dual Channel, 1 NO, 1 NC from +24V



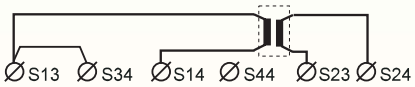
One input contact must be closed (S14) and one opened (S44) before the relay outputs can be activated. The safety relay contacts will open if one or both of the inputs change status or in case of a short-circuit between S14 and S44. Both inputs must return to their initial positions before the relay outputs can be reactivated.

4. Dual Channel, 1 NO from +24V, 1 NO to 0V



Relay functions as option 2, but a short-circuit, in this case between inputs S14 and S24, is supervised (safety outputs are opened).

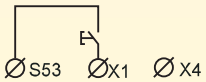
5. Safety Mat or Contact Strip



Both 'contact' inputs from a inactivated safety mat/contact strip must be made in order to allow the RT6 relay outputs to be activated. When the safety mat/contact strip is activated or a short-circuit is detected across S14-S23, the relay will de-energize (safety outputs open) and the 'ON' LED will flash. As output S13 has an internal current limit of 80 mA, the RT6 will not be overloaded when the mat/contact strip is activated or a short circuit is detected.

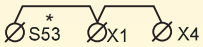
RT6 Reset Connections

Manual Supervised Reset



The manual supervised reset contact connected to input X1 must be closed and opened in order to activate the relay outputs.

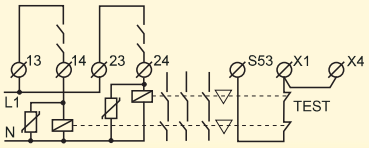
Automatic Reset



Automatic reset is selected when S53, X1 and X4 are linked. The relay outputs are then activated at the same time as the inputs.

connected to S13 for safety mat/contact strip

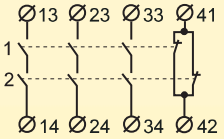
Testing External Contactor Status



Contactors, relays and valves can be supervised by connecting 'test' contacts between S53 and X1. Both manual supervised and automatic reset can be used.

RT6 Output Connections

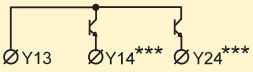
Relay Outputs



The RT6 has three (3 NO) safety outputs and 1 NC information output.

In order to protect the RT6 output contacts it is recommended that loads (inductive) are suppressed by fitting correctly chosen VDRs, diodes, etc. Diodes are the best arc suppressors, but will increase the switch off time of the load.

Transistor Outputs



The RT6 has two (2) voltage free transistor information outputs.

The transistor outputs are supplied with voltage to Y13, either from S53 (+24V) or an external 5-30 VDC. Y14 and Y24 follow the relay inputs and outputs as follows:

- Y14 becomes conductive when the relay input conditions are fulfilled.
- Y24 becomes conductive when both the output relays are activated.

******Note: These outputs are only for information purposes and must not be connected to the safety circuits of the machinery.***

RT6 Technical Data

Manufacturer.....JOKAB SAFETY
Ordering Data/Article Numbers.....see page 4:63
Color.....black and beige
Weight.....335 g (24 VDC), 485 g (24-230 VAC)

Supply
Voltage (A1-A2).....24 VDC +15/-20%, 24/48/115/230 VAC, +15/-10%, 50-60 Hz

Power Consumption
DC supply, nominal voltage.....<2.4 W
AC supply, nominal voltage.....5.3 VA

Connections S13.....Short-circuit protected voltage output, 70 mA +/- 10% current limitation. Is used for the inputs S14, S34 and S44

Connections S53.....Short-circuit protected voltage output, internal automatic fuse, max 270 mA. Is used for the reset and autoreset inputs X1 and X4.

Connections S23.....0V connection for input S24

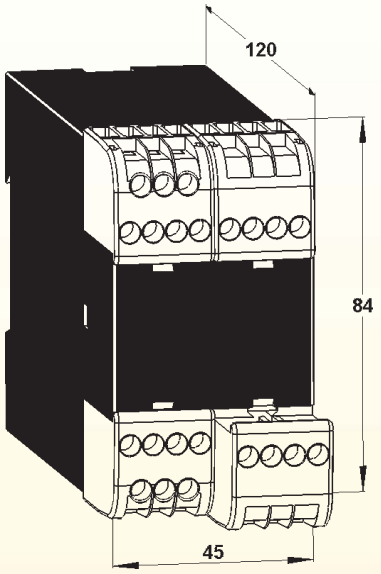
Safety Inputs
S14.....+24 VDC, 20 mA
S24.....0 VDC, 20 mA
S34.....+24 VDC, 20 mA
S44.....+24 VDC, 30 mA

Reset input X1
Supply for reset input.....+24 VDC
Reset current.....300 mA current pulse at contact closure, then 30 mA
Minimum contact closure time for reset.....100 ms

Maximum external connection cable resistance at nominal voltage for
S14, S24, S34.....300 Ohm
S44, X1.....150 Ohm

Response Time
At Power on DC/AC.....<90ms/<220ms
When activating (input-output).....<20 ms
When deactivating (input-output).....<20 ms
At Power Loss.....<150 ms

Relay Outputs
NO.....3
NC.....1
Maximum switching capacity res. load AC.....6A/250 VAC/1500 VA
Maximum switching capacity res. load DC.....6A/24 VDC/150 W
Minimum load.....10mA/10 V
(if load on contact has not exceeded 100 mA)
Contact material.....Ag+Au flash
Mechanical life.....$>10^7$ operations



Note: Connector blocks are detachable without cables having to be disconnected.

Transistor Outputs.....Short-circuit proof
External supply to Y13.....+5 to +30 VDC
Y14.....Indicates that the input conditions have been fulfilled
Y24.....Indicates that the output relays are activated
Maximum load of Y14, Y24.....15 mA /output
Maximum voltage drop at maximum load.....2.4 V

LED Indication

On ●.....Supply voltage OK, the LED is on Flashing light in case of under-voltage, overload or short circuit on inputs
In 1 ● **In 2** ●.....Indicates that the input conditions are fulfilled
⧅ ● **1** ⧅ ● **2**.....Indicates that the output relays are activated

Mounting
Rail.....35 mm DIN rail

Operating Temperature Range.....-10° C to + 55° C

Connection Blocks (detachable)
Maximum screw torque.....1 Nm
Maximum connection area
Solid conductors.....1x4mm²/2x1.5mm²/12AWG
Conductor with socket contact.....1x2.5mm²/2x1mm²
Air and creep distance.....4kV/2 IEC 60664-1

Protection Class
Enclosure.....IP 40 IEC 60529
Connection blocks.....IP 20 IEC 60529