

# RT9 Safety Relay

## Would you like a small safety relay for all your safety applications?

If so, then choose the compact RT9 universal relay to supervise both your safety devices and the internal safety of your machinery. In addition, you can select the safety level that is required for each installation. All this is possible due to the RT9 offering the most versatile input option arrangement available on the market. The RT9 can therefore replace many other relays.

Other RT9 options include selection of either manual supervised or automatic resetting. The manual supervised reset can be used for gates and other safety devices that can be passed through. Automatic reset can be used for small safety hatches, if deemed acceptable from risk assessment.

In addition, the RT9 has a dual function information output that will indicate, e.g. if a gate is open or if the relay needs resetting.

The RT9 uses the latest component technology and modern assembly techniques to ensure a highly cost effective solution.

Choose the RT9 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 5:44.



### 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 22.5 mm
- LED indication of supply, inputs, outputs, short-circuit and low voltage level
- 2 NO relay outputs
- 1 changeover relay with a dual information output
- 24 VDC
- Detachable connection blocks

### Approvals

TÜV Nord  

# RT9 Technical Information

## Inputs

The RT9 can be configured to operate in either of the following input options:

1. Single channel, 1 NO contact from +24 VDC, safety category 1.
2. Dual channel, 2 NO contacts from +24 VDC, safety category 3.
3. Dual channel, 1 NO, 1 NC contact from +24 VDC, safety category 4.
4. Dual channel, 1 NO contact from 0V and 1 NO contact from +24 VDC, safety category 4.
5. Safety mats/contact strips 1 'contact' from 0V and 1 'contact' from +24 VDC, 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 RT9 can be reset.

## Transistor Output Status Information

The RT9 has a changeover contact relay output that can be connected to a PLC, control lamp, computer or similar. The output gives information about the status of the relay.

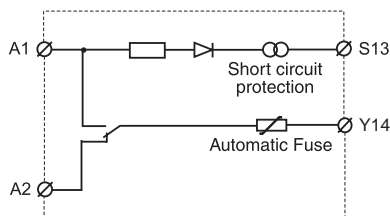
## Reset and Testing

The RT9 has two reset options; manual and automatic. The manual supervised reset is used when the RT9 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.

Due to special internal circuits the RT9 can be automatically reset regardless of the operational voltage rise time, this being an important factor when large loads are started up on the same power supplies at the same time.

In addition, the RT9 can also test (supervise), if for example, contactors and valves, etc. are de-energized/ de-activated before a restart is made.

## Connection of Supply DC Supply



The RT9 should be supplied with +24 V on A1 and 0 V on A2.

*Note: If cable shielding is used this must be connected to an earth rail or an equivalent earth point.*

## 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.

## Safety Level

The RT9 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 RT9 is configured for dual channel input, both the inputs are supervised for correct operation before the unit can be reset.

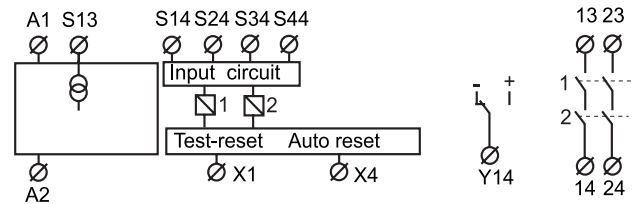
The input options 3 and 4 have the highest safety levels as all short-circuits and power failures are supervised. This in combination with double internal current limitation makes the relay ideal for supervision of safety mats and contact strips.

## Regulations and Standards

The RT9 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.

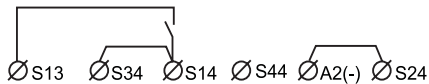
## Connection Examples

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## RT9 Connection of Safety Devices

### 1. Single Channel, 1 NO from +24V



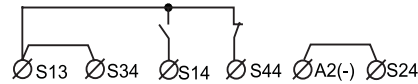
The input (contact to S14) must be closed before the outputs can be activated. When the input contact is opened the relay safety output contacts open.

### 2. Dual Channel, 2 NO from +24V



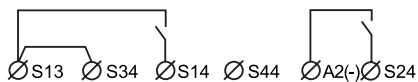
Both input contacts (S14 and S34) must be closed before the relay outputs can be activated. The safety relay contacts will open if one or both of the input contacts are opened. Both the input contacts must be opened and reclosed before the relay can be reset. A short-circuit between inputs S14 and S34 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



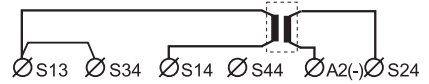
One input contact must be closed (S14) and one opened (S44) before the relay outputs can be activated. The safety relay contacts will open if one or both of the inputs change status or in case of a short-circuit between S14 and S44. Both inputs must return to their initial positions before the relay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

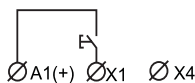


Both 'contact' inputs from an inactivated safety mat/contact strip must be made in order to allow the RT9 relay outputs to be activated. When the safety mat/contact strip is activated or a short-circuit is detected across S14-S23, the relay will de-energize (safety outputs open) and the 'ON' LED will flash. As output S13 has an internal current limit of 85 mA, the RT9 will not be overloaded when the mat/contact strip is activated or a short circuit is detected.

## RT9 Reset Connections

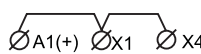
### Manual Supervised Reset

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

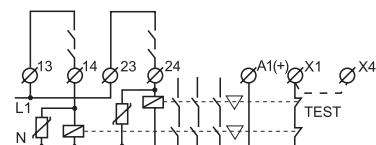


### Automatic Reset

Automatic reset is selected when A1(+), X1 and X4 are linked. The relay outputs are then activated at the same time as the inputs.



### Testing External Contactor Status



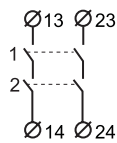
Contactors, relays and valves can be supervised by connecting 'test' contacts between A1(+) and X1. Both manual supervised and automatic reset can be used.

## RT9 Output Connections

### Relay Outputs

The RT9 has two (2 NO) safety outputs.

In order to protect the RT9 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.

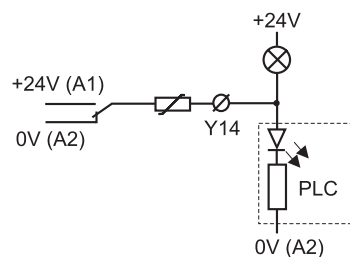


### Transistor Outputs

The RT9 has a changeover contact information output.

The relay output Y14 is connected internally to 0V and 24V in the following way:

- Y14 is internally closed to 0V when the RT9 is not reset.
- Y14 is internally closed to +24V when the RT9 is reset.



## RT9 Technical Data

Manufacturer	ABB AB/Jokab Safety, Sweden
Ordering information	see page 5:63
Color	Grey
Weight	210 g
Supply Voltage (A1-A2)	24 VDC $\pm$ 20%
Power consumption Nominal voltage	2 W
Connection S13	Short-circuit protected voltage output 70 mA $\pm$ 10% current limitation (Is used for the inputs S14, S34 and S44)
Input currents (at nominal supply voltage) S14 (+) input S24 (0V) input S34 (+) input S44 (+) input	30 mA 20 mA 20 mA 25 mA
Reset input X1 Supply for reset input Reset current	+ 24VDC 300 mA current pulse at contact closure, then 30 mA
Minimum contact closure time for reset	80 ms
Minimum contact closure time (at low limit voltage -20%)	100 ms
Maximum external connection cable resistance at a nominal voltage for S14, S24, S34 S44, X1	300 Ohm 150 Ohm
Response time At Power on When activating (input-output) When deactivating (input-output) At Power Loss	<100 ms <20 ms <20 ms <80 ms
Relay outputs NO Maximum switching capacity Resistive load AC Inductive load AC Resistive load DC Inductive load DC Max. total switching capacity Minimum load	2 6A/250 VAC/1500 VA AC15 240VAC 2A 6A/24 VDC/150 W DC13 24VDC 1A 8A distributed on all contacts 10 mA/10V (if load on contact has not exceeded 100 mA)
Contact material	Ag+Au flash
Fuses output (external)	5A gL/gG
Conditional short-circuit current (1 kA) Mechanical life	6A gG 10 <sup>7</sup> operations
Relay information output Y14 (changeover contacts) -(0V) +(24V) Maximum load of Y14 Short-circuit protection for information output	Indicates that RT9 is not reset. Indicates that RT9 is reset. 250 mA Internal automatic fuse

LED indication On ●  In1 ● In2 ●  ☑ ● 1 ☑ ● 2	Supply voltage OK, the LED is on Flashing light in case of under-voltage, overload or current limiting  Indicates that the input conditions are fulfilled  Indicates that the output relays have been activated
Mounting Rail	35 mm DIN rail
Connection blocks (detachable) Maximum screw torque Maximum connection area Solid conductors Conductor with socket contact	1 Nm  1x4mm <sup>2</sup> /2x1.5mm <sup>2</sup> /12AWG 1x2.5mm <sup>2</sup> /2x1mm <sup>2</sup>
Protection class Enclosure Connection blocks	IP 40 IEC 60529 IP 20 IEC 60529
Operating temperature range	-10°C to + 55°C (with no icing or condensation)
Operating humidity range	35% to 85%
Impulse withstand voltage	2.5kV
Pollution degree	2
Performance (max.) The relays must be cycled at least once a year	Category 4/PL e (EN ISO 13849-1:2008) SIL 3 (EN 62061:2005) PFH <sub>d</sub> 9.55E-09
Conformity	2006/42/EC, 2006/95/EC 2004/108/EC EN 954-1:1996, EN 62061:2005 EN ISO 13849-1:2008

