

Simplify safety circuits with one relay...

RT6 Safety Relay

The universal safety relay that can satisfy the majority of your safety applications.

The RT6 universal safety relay can supervise both safety devices and the internal safety functions of machines.

The safety relay has been specifically engineered to give the machine designer the ability to select the required level of safety for each specific application. Hardwire configurable inputs permit either single or dual channel circuits as well as hardwire configurable manual supervised or automatic resetting. These features make the RT6 the most versatile safety relay in the market place today.

The manual supervised reset mode can be used in applications such as gates and other guarding systems that require entry to hazardous areas. Automatic reset can be used for example with small hatches (no entry required) if it is deemed acceptable following necessary risk analysis.

In addition, the RT6 has transistor outputs that can be used for status information purposes. These outputs can easily be connected into the PLC to indicate inputs and safety outputs status.

The RT6 has also been designed to use the minimum number of components, thus providing high reliability and low pricing.

Choose the RT6 to simplify your safety circuit design and cut costs!

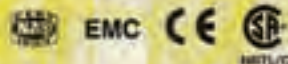


Safety Relay for Monitoring:

- Emergency Stops
- Safety Mats & Strips
- Enabling Devices
- Interlocked Switches
- Magnetic Switches
- Light Beams
- Light Curtains
- Foot Switches
- Machine I/O

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Approvals



Regulations & Standards

The RT6 is designed and approved in accordance to the following relevant safety standards: e.g. EN292-1/2, SS EN 60-204-1, EN 954-1, VDE 0113 and IEC 204.

Connection Handbook

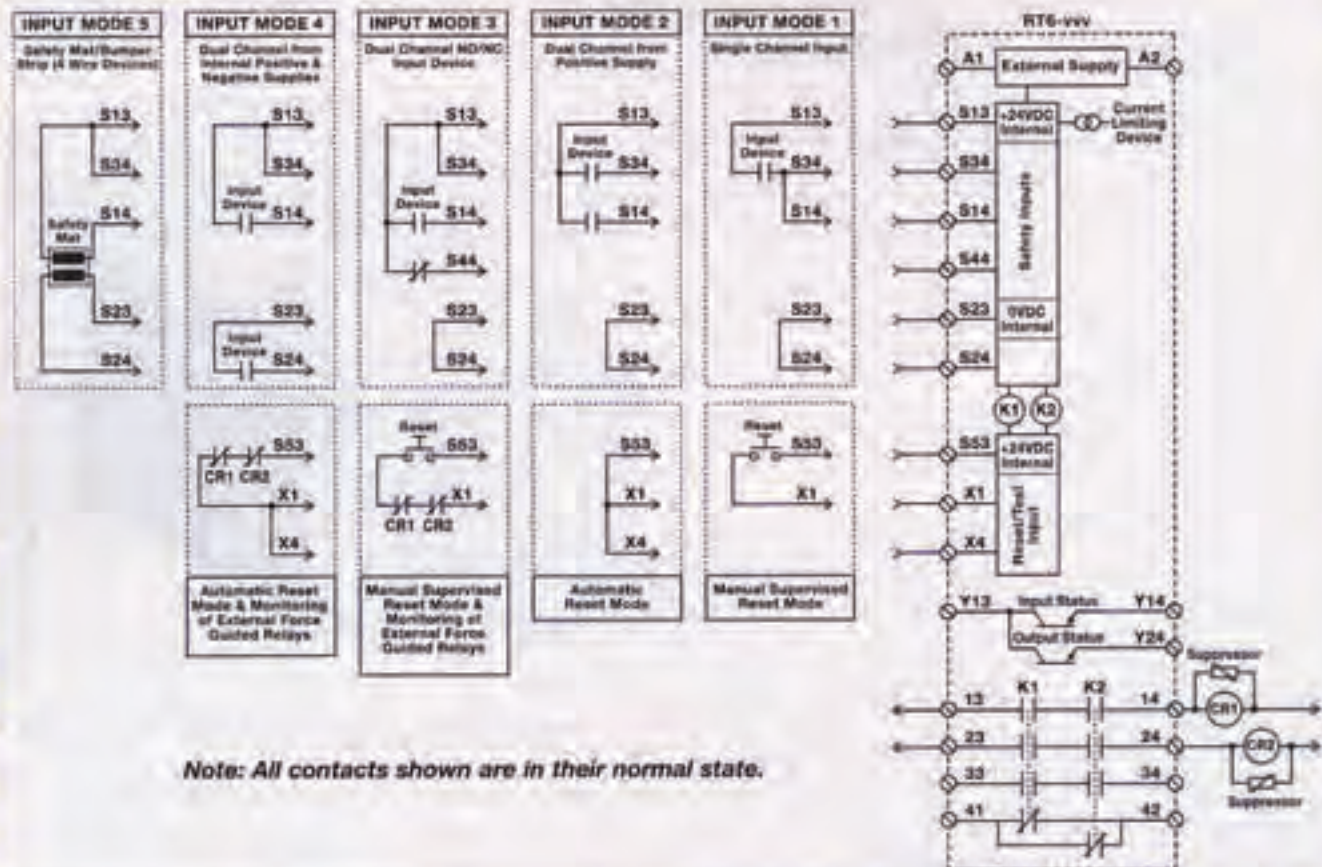
See our Connection Handbook for examples of safety designs using Safety Relays.

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Features

- Detachable Terminal Blocks
- 5 Input Configurations (single and dual channel modes hardwire selectable)
- Manual Supervised or Automatic Reset (hardwire selectable)
- Test Input for monitoring of External Relays/Contactors
- 5 LED Indication: Power On, Input Channels, and Safety Outputs
- 2 Transistor Status Information Outputs
- 24VDC and 24, 48, 115 and 230VAC Supply Versions Available
- AC Supply Versions can be powered by 24VDC
- 3 NO Safety Outputs/1 NC Information Output
- 45mm Width
- Din Rail Mounting
- Approved Category 4 Safety Device

RT6 Wiring Diagrams



Note: All contacts shown are in their normal state.

RT6 Safety Relay Technical Information

Safety Level

The RT6 safety relay is a control reliable device that has redundant and monitored internal safety functions. Power failure, internal component failures or external interference (with the exception of short-circuiting of the input device contact when used in single channel input mode 1) do not result in a dangerous function. Internal Double Current limitation gives the ability of monitoring safety mats or strips.

Safety Inputs

The RT6 safety relay can be hardwire configured in the following input modes:

Mode 1: Single Channel (single contact input device to internal +24VDC)

Input device contact must be closed at input (S14) to reset the safety relay and energize internal relays K1 and K2 which closes the safety outputs. The safety outputs will open if the input device contact opens. The input device should have a positive opening contact and protected input wiring if possible.

Mode 2: Dual Channel (input device with 2 contacts to internal +24VDC)

Input device contacts must be closed at inputs (S14 and S34) to reset the safety relay and energize internal relays K1 and K2 which closes the safety outputs. The safety outputs will open if one or both input device contacts open. Both input device contacts must change state again in order for the safety relay to be reset. A short circuit between the input channels is only supervised if used in conjunction with a safety device that monitors its safety outputs and interface wiring for failure. Otherwise, the input device should have positive opening contacts and protected input wiring if possible.

Mode 3: Dual Channel (input device with 1NO & 1NC contacts to internal +24VDC)

Input device NO contact must close at input (S14) and NC contact open at input (S44) to reset the safety relay and energize internal relays K1 and K2 which closes the safety outputs. The safety outputs will open if one or both input device contacts change state or if a short circuit occurs between the input channels. Both input device contacts must change state again in order for the safety relay to be reset. The highest level of safety (category 4) is possible with this input mode.

Mode 4: Dual Channel (input device with 2 contacts, one contact to +24VDC internal and one contact to internal 0VDC)

Input device contacts must be closed at inputs (S14 and S24) to reset the safety relay and energize internal relays K1 and K2 which closes the safety outputs. The safety outputs will open if one or both input device contacts open or if a short circuit occurs between the input channels. Both input device contacts must change state again in order for the safety relay to be reset. The highest level of safety (category 4) is possible with this input mode.

Mode 5: Safety Mats/Strips (4 wire devices)

Safety mats/strips must be 4 wire devices. When the safety mat/strip is activated, a short circuit occurs between the input channels that de-energizes the safety relay, opens the safety outputs and causes the "Power On" LED to flash. The short circuit does not damage the safety relay, as the current is limited to 60mA at (S13).

Note: A risk analysis should be performed to determine the actual level of safety required.

Reset & Test Functions

Manual Supervised Reset Mode

Once the input condition is fulfilled, the reset input to X1 must be closed and opened for the safety relay to energize and the safety outputs to close. A push button with a NO contact is normally used to perform the reset function. This reset mode is monitored for failure.

Automatic Reset Mode

Once the input condition is fulfilled, the safety relay will energize and the safety outputs close providing the connection between S53, X1 and X4 are made.

Monitoring of External Relays/Contactors

External positive guided relays and/or contactors can be monitored through the test/reset input (S53 and X1) of the safety relays in both manual supervised

or automatic modes of reset. The safety relay can only be reset if the external relays and/or contactors have de-energized and contacts have fallen back to their normal state. Surge suppression is necessary on the relays or contactors coils in order to protect the safety outputs from damage and premature failure.

Outputs

Safety Outputs

The RT6 has 3 NO internally redundant safety outputs (13-14, 23-24 and 33-34) used to stop hazardous motion. It is recommended that all switched loads are adequately suppressed and fused in order to protect the safety outputs from damage and premature failure.

Monitoring Output

The RT6 has 1NC internally paralleled output (41-42) used for information purposes (i.e. indicator light).

Status Information Transistor Outputs

The RT6 has 2 potential free transistor outputs that can be connected to a PLC for status information of the safety relay. The transistor outputs can be supplied either the internal +24VDC supply at (S53) or an external 5 to 30VDC supply.

Y14: goes high when the input condition is fulfilled.

Y24: goes high when safety outputs (13-14, 23-24 and 33-34) close and monitoring output (41-42) opens (i.e. both internal relays K1 and K2 are energized).

Note: These outputs are for information purposes only and must never be connected to machine safety circuit and used to stop hazardous motion.

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N O R T H A M E R I C A

Power Supply Connections & Features

External DC-Supply

On the RT6 24VDC safety relay, (A1) must be connected to an external +24VDC supply and (A2) to 0VDC.

External AC-Supply

On the RT6 AC supplied safety relays, the external AC supply as specified on the safety relay must be connected to (A1 and A2).

Alternate External 24VDC Supply

The AC versions of the RT6 safety relay can be supplied externally with a +24VDC supply at (S53) and 0VDC at (S23) should the AC supply as specified on the safety relay not be available for connection to (A1 and A2).

Internal 24VDC Supply for External Use

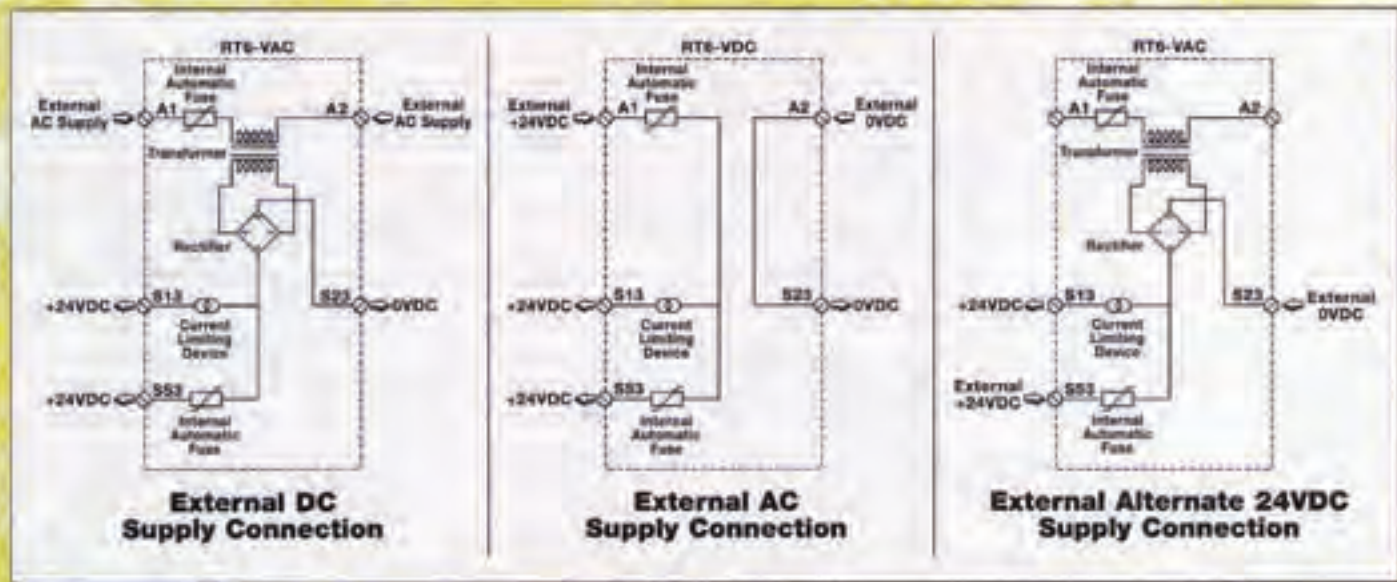
An internal +24VDC supply at (S53) and 0VDC at (S23) on the RT6 safety relay can be used to supply a limited number of external devices. The internal supply is only available when the safety relay is externally supplied at (A1 and A2). Please consult the Technical Specifications section for ratings.

Low Supply Indication

If the external supply voltage decreases below tolerance, the "Power On" LED will flash. Please note that the LED will also flash when safety mats or strips are activated when input mode 5 configuration is used or a short circuit between input channels occurs when input mode 4 configuration is used.

Grounding

Only AC supplied relays must have (S23) wired to protective ground. For both AC and DC supplied safety relays, if shielded cable is used for protection of input device interface wiring, the shield must be wired to ground.



RT6 Technical Specifications

Physical Attributes

Manufacturer:
Jokab Safety
AB, Sweden

Color:
Black
and Beige

Mounting:
35mm
DIN-Rail

Mounting Location:
Enclosure that
fulfills IP54
requirements.

Weight:
335g (24VDC), 485g (24-230VAC)

Dimensions:
45 x 84 x 118mm (w x h x d)

Enclosure Protection Class:
IP 40 IEC 5291, DIN VDE 0470

Operating Temperature
-10°C to +55°C

External Supply (A1-A2)

External Supply:
24VDC +15/-20%
(A1 = +24VDC and A2 = 0VDC)
24VAC/48VAC/115VAC/230VAC
+15/-20%, 50-60Hz

Short Circuit Protection:
24VDC/VAC safety relays:
internal automatic fuse 540mA
48-230VAC safety relays:
internal automatic fuse 110mA

Alternate External Supply (S53-S23)

Alternate Supply:
24VDC +15/-20%
(S53 = +24VDC and S23 = 0VDC)

Short Circuit Protection:
internal automatic fuse 540mA



Detachable
Terminal Block

Internal Supply

S53: Internal +24VDC

S13: Internal +24VDC

S23: Internal 0VDC

Maximum External Loading (S53-S23):
150mA with DC supply (A1-A2)
70mA with AC supply (A1-A2)

Short Circuit Protection (S53-S23):
internal automatic fuse 270mA

Short Circuit Protection (S13-S23):
current limited to 60mA +15/-10%

Power Consumption (A1-A2) @ Nominal Voltage

DC Supply (A1-A2): 2.3W

DC Supply (A1-A2) with (S53-S23)
@ max. load of 150mA: 6.0W

AC Supply (A1-A2): 6.4VA

AC Supply (A1-A2) with (S53-S23)
@ max. load of 70mA: 7.4VA

Safety Inputs

S14: +24VDC, max. current 50mA,
max. wire resistance 300Ω

S24: 0VDC, max. current 25mA,
max. wire resistance 300Ω

S34: +24VDC, max. current 25mA,
max. wire resistance 300Ω

S44: +24VDC, max. current 25mA,
max. wire resistance 150Ω

Reset & Test Inputs

X1: +24VDC on closing, 600mA
max. peak to 40mA min.,
max. wire resistance 150Ω

X1 hardwired to X4:
+24VDC on closing, 600mA
max. peak to 40mA min.,
max. wire resistance 150Ω

Minimum Closing Time: 100ms.

Response Time

Power Up: 70ms.

Energization (input-output): 20ms.

De-energization (input-output): 20ms.

Power Loss: 70ms.

Relay Outputs

NO Safety Outputs: 3

NC Monitoring Output: 1

Max. Switching Capability per Output: 6A/250VAC/1500VA/150W

Min. Switching Capability: 10mA/10V

Contact Material: AgSnO₂+Au Flash

Mechanical Life: 10⁷ operations

Electrical Life: Additional data
sheet available upon request.

Transistor Outputs

Y13: 5 - 30VDC external supply

Y14: PNP output, max. load 15mA,
max. voltage drop @ max. load 2.4V

Y24: PNP output, max. load 15mA,
max. voltage drop @ max. load 2.4V

LED Indication

On ● : External supply voltage
OK (solid light)

On ⊙ : External supply voltage
below tolerance or short
circuit across input channels
(flashing light)

In1 ● : Input channel 1 is fulfilled
(solid light)

In2 ● : Input channel 2 is fulfilled
(solid light)

K1 ● : K1 internal relay is energized
(solid light)

K2 ● : K2 internal relay is energized
(solid light)

Terminals

Type: Detachable terminal blocks
with screw type terminals

Max. Screw Torque: 1Nm

Max. Size Wire per Terminal:

Solid conductor:
1 x 4mm²/2 x 1.5mm²/12AWG
Conductor with socket contact
(DIN 46228): 1 x 2.5mm²/2 x 1mm²

Air Gap & Creepage Space:
4kV/2DIN VDE 0110

Protection Class: IP 20 IEC 5291,
DIN VDE 0470

Ordering Information

The following system is used to order the RT6 Safety Relay: **Part # RT6-XX**
XX = External Supply Voltage (24VDC, 24VAC, 48VAC, 115VAC or 230VAC)

JOKAB SAFETY
NORTH AMERICA

For further information on our complete line
of integrated safety systems, contact us at:

**1-888-282-2123 or fax your
request to 1-800-565-9302.**

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