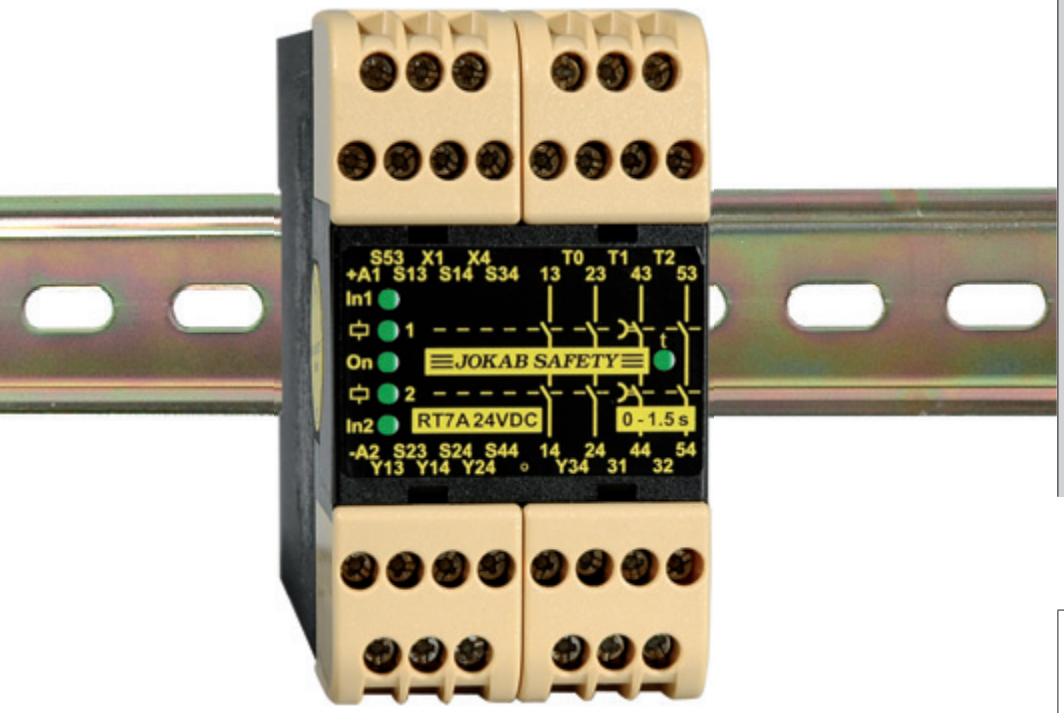
Safety relay RT7



Universal relay with delayed outputs

The RT7 is a universal relay that can be used to supervise both 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 because the RT7 has the most versatile input options arrangement available on the market. The RT7 can therefore replace many other relays.

The RT7 has four (4 NO) dual safety outputs of which two may be delayed for up to three seconds in order to achieve a safe and 'soft' stop. A 'soft' stop allows machinery to brake and stop gently before power is removed. A 'soft' stop has many benefits: the machinery life will be prolonged, processed products will not be damaged, and restarts from the stopped position are made possible and easier.

Another option with the RT7 is manual or automatic resetting. A manual supervised reset is used for gates and other safety devices that can be bypassed, while an automatic reset is used for small safety hatches if deemed appropriate from a risk point of view.

In addition, the RT7 has information outputs that follow the inputs and outputs of the relay. These outputs indicate if for example a gate is opened or closed, if there is a delay or if the relay needs to be reset.

Choose the RT7 to simplify your safety circuits and reduce your costs.

Approvals:

Safety relay for:

- Emergency stops
- Light curtains
- Three position devices
- Interlocked gates/hatches
- Magnetic switches
- Light beams
- Safety mats
- Contact strips
- Foot operated switches

Features:

- 4 NO/1 NC relay outputs, 2 NO outputs can be delayed for soft stops
- Delay times RT7A 0; 0,5; 1,0; 1,5 s RT7B 0; 1,0; 2,0; 3,0 s
- 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
- Three voltage free transistor information outputs
- Supply 24 VDC, 24, 48, 115 or 230 VAC
- Quick release connector blocks

Technical information - RT7 A/B

Inputs
The RT7 can be configured to operate in either of the following input options:

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

When the input/inputs are activated and the test/supervised reset is complete, relays 1,2,3 and 4 are activated. Relays 1 and 2 are immediately de-energized when the inputs are deactivated in accordance with the input option selected. Relays 3 and 4 are either de-energized immediately or after the selected time delay.
All the relays (1,2,3 and 4) must be de-energized before the RT7 can be reset.

Transistor output status information
The RT7 has three(3) 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 RT7 has two reset options; manual and automatic.

The manual supervised reset is utilised when the RT7 is used to monitor safety devices that can be bypassed, i.e. to ensure that the outputs of the safety relay do not close just because the gate is closed.

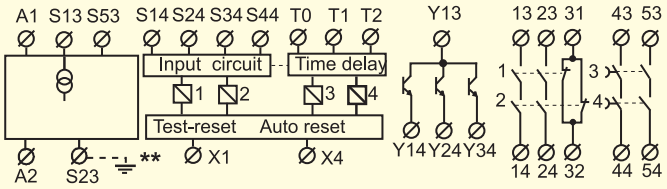
The automatic reset should only be used if acceptable from a risk point of view. The RT7 can also test (supervise), if for example, contactors and valves etc are de-energized/de-activated before a restart is allowed.

Indication of low voltage
The 'On' LED will flash if the relay 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 RT7 has internal dual and supervised safety functions. Power failure, an 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 RT7 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 internal current limitation makes the relay ideal for supervision of safety mats and contact strips.

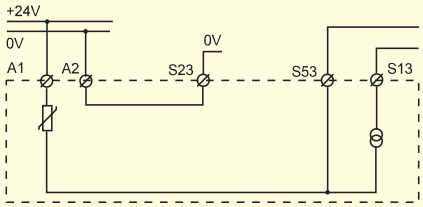
Regulations and standards
The RT7 is designed and approved in accordance with appropriate directives and standards. Examples of such are 98/37/EC, EN ISO 12100-1/-2, EN 60204-1, EN 954-1/EN ISO 13849-1.



**Only for AC supply

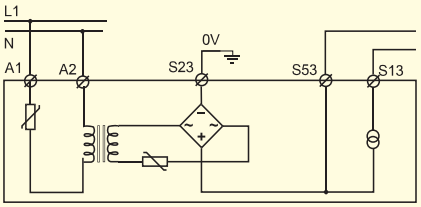
Connection examples

DC supply



The RT7 DC option should be supplied with +24 V on A1 and 0 V on A2.

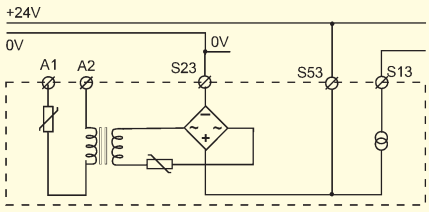
AC supply



The RT7 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

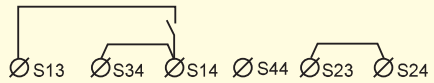


All AC-units can also be supplied by +24 VDC to S53 (0VDC to S23).

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.

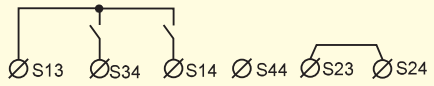
Connection of safety devices - RT7 A/B

1. SINGLE CHANNEL, 1 NO from +24V



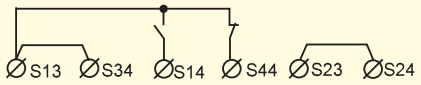
The input (contact to S14) must be closed before the outputs can be activated. When the input contact is opened the relay safety output contacts open.

2. DUAL CHANNEL, 2 NO from +24V



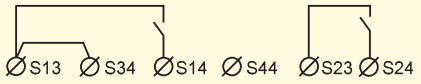
Both input contacts (S14 and S34) must be closed before the relay outputs can be activated. The safety relay contacts will open if one or both of the input contacts are opened. Both the input contacts must be opened before the relay can be reset. A short-circuit between the inputs S14 and S34 can only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



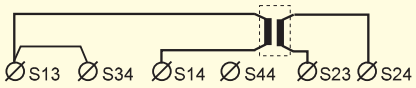
One input contact must be closed (S14) and one opened (S44) before the relay outputs can be activated. The safety relay contacts will open if one or both of the inputs change state or in the case of a short-circuit between S14 and S44. Both inputs must be returned to their initial positions before the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

4. DUAL CHANNEL, 1 NO from +24V, 1 NO from 0V



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

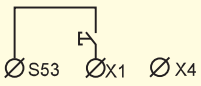
5. Safety mat/Contact strip



Both 'contact' inputs from an inactivated safety mat/contact strip, must be made in order to allow the RT7 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 70 mA, the RT7 will not be overloaded when the mat/contact strip is activated or a short circuit is detected.

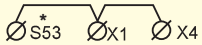
Reset connections - RT7 A/B

Manual supervised reset



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

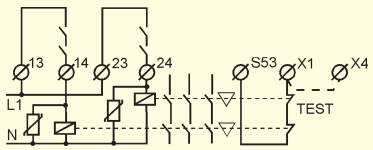
Automatic reset



**connected to S13 for safety mat/contact strip*

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

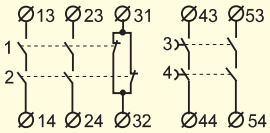
Testing external contactor status



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

Output connections - RT7 A/B

Relay outputs

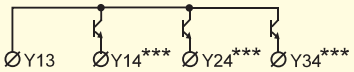


The RT7 has four (4 NO) safety outputs of which two can be delayed, and 1 NC information output.

In order to protect the RT7 output contacts it is recommended that loads (inductive) are suppressed by fitting correctly chosen VDR's, diodes etc. Diodes are the best arc suppressors, but will increase the switch off time of the load.

Transistor outputs

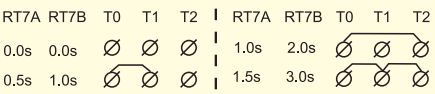
The RT7 has three(3) voltage free transistor information outputs.



The transistor outputs are supplied with voltage to Y13 either from S53 (+24V) or externally from 5 to 30 VDC. Y14, Y24 and Y34 follow the 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.
- Y34 becomes conductive when both the delay output relays are activated.

Time delay outputs



Time delays are selected by linking the appropriate T0, T1 and T2 connections.

When a stop signal is detected a program stop command is first given to the PLC/servo which brakes the dangerous machine operations in a 'soft' and controlled way.

The delayed relay safety outputs will then turn off the power to the motors, i.e. when the machinery has already stopped. It takes usually around 0.5 to 3 seconds for a dangerous action to be stopped softly.

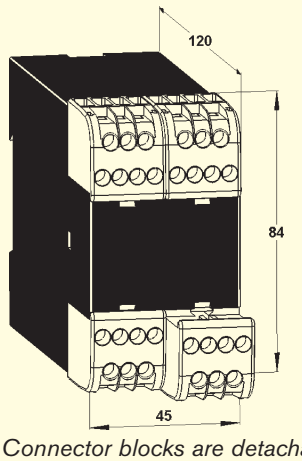
*****NOTE**

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

Technical data – RT7 A/B

Manufacturer	JOKAB SAFETY AB, Sweden
Article number/Ordering data	
RT7B	10-028-10 24DC 3 s
	10-028-12 24AC 3 s
	10-028-13 48AC 3 s
	10-028-14 115AC 3 s
	10-028-15 230AC 3 s
RT7A	10-028-20 24DC 1,5 s
	10-028-22 24AC 1,5 s
	10-028-23 48AC 1,5 s
	10-028-24 115AC 1,5 s
	10-028-25 230AC 1,5 s
Colour	Black and beige
Weight	405 g (24 VDC) 550 g (24-230 VAC)
Supply	
Voltage (A1-A2)	24 VDC +15/-20%, 24/48/115/230 VAC, +/-15%, 50-60 Hz
Power consumption	
DC supply, nominal voltage	4.6 W
AC supply, nominal voltage	8.7 W
Connection S13 Short-circuit protected voltage output, 70 mA +/-10% current limitation. Is used for the inputs S14, S34 and S44.	
Connection S53 Short-circuit protected voltage output, internal automatic fuse, max 270 mA. Is used for the reset and autoreset inputs X1 and X4.	
Connection S23 0V connection for input S24.	
Safety inputs	
S14 (+) input	20mA
S24 (0V) input	20 mA
S34 (+) input	20 mA
S44 (+) input	25 mA
Reset input X1	
Supply for reset input	+24 VDC
Reset current	600 mA current pulse at contact
Minimum contact	closure, then 30 mA.
closure time for reset	100ms
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	<90/<140 ms
When activating (input-output)	<20 ms
When deactivating (input-output)	<20 ms
At Power loss	<80 ms
Delay time options	
RT7A	0; 0.5; 1.0; 1.5 secs
RT7B	0; 1.0; 2.0; 3.0 secs

Relay outputs	
NO direct (relays 1/2)	2
NO direct or delayed (relays 3/4)	2
NC (relays 1/2)	1
Maximum switching capacity res. load	
Relays 1/2 AC	6A/250 VAC/1500 VA
DC	6A/24 VDC/150 W
Relays 1/2 total	9A distributed on all contacts
Relays 3/4 AC	6A/250 VAC/1380 VA
DC	6A/24 VDC/138 W
Relays 3/4 total	6A distributed on all contacts
Minimum load (Relays 1/2/3/4)	10 mA/10V (if load on contact has not exceeded 100 mA)
Contact material	$AgSnO_2$+ Au flash
Mechanical life	$>10^7$ operations
Transistor outputs	
External supply to Y13	+5 to +30 VDC
Y14	Indicates that the input conditions are fulfilled
Y24	Indicates that the output relays 1/2 are activated
Y34	Indicates that the delay output relays 3/4 are activated
Maximum load of Y14,Y24, Y34	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 or overload.
In1 **In2**	Indicates that the input conditions are fulfilled.
1 **2**	Indicates that the output relays 1/2 are activated.
t	Indicates that the delay output relays 3/4 are activated.
Mounting	
Rail	35 mm DIN rail
Operating temperature range	
24VDC	-10° C to + 55° C
24-230VAC	-10° C to + 45° 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 block	IP 20 IEC 60529



Connector blocks are detachable (without cables having to be disconnected)