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CONTRINEX

# **SAFETY RELAY**

# YRB-0131-241







# **TYPE 4 SAFETY PROTECTION DEVICE**

#### FOR SAFETY LIGHT CURTAINS/BARRIERS

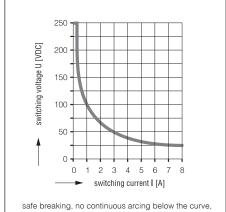
# MAIN FEATURES

- For safety light curtains and access control barriers with symmetric (such as Safetinex YBB and YCA models) or asymmetric outputs
- Safety Integrity Level (SIL) 3 according to IEC/EN 61508
- Claimed Level (SIL CL) 3 according to IEC/EN 62061
- Performance Level (PL) e and category 4 according to EN/ISO 13849-1
- Safety category 4 according to EN 954-1
- Certified TÜV, CE and UL
- Output: 3 N.O. safety contacts / 1 N.C. monitoring contact
- Manual or automatic restart
- LED indicator for channel 1, 2 and power supply
- 22.5 mm wide, DIN-rail-mountable housing

## **APPLICATION AREA**

This safety relay is a SIL 3, PL e, category 4 device, designed for the protection of people and machines. It can be used in applications together with:

Electro-sensitive protective equipment type 4 (light curtains and access control barriers)



max. 1 switching cycle / s

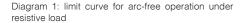
## **TECHNICAL DATA**

#### **INPUT**

Nominal voltage U <sub>N</sub>	24 VDC
Voltage range	0.9 1.1 U <sub>N</sub>
Nominal consumption	DC approx. 1.7 W
Min. off-time	250 ms
Control voltage on S11 at U <sub>N</sub>	22.5 VDC
Control current typ. over S12, S22	35 mA at U <sub>N</sub>
Min. voltage on S12, S22 when relay is activated	21 VDC
Short-circuit protection	Internal PTC
Overvoltage protection	Internal VDR

## **OUTPUT**

Contacts		3 N.O. safety contacts	
		1 N.C. contact ATTENTION	N.C. contact can only be
		used for monitoring	
Operating delay (typ.) at U <sub>N</sub> : manual restart		20 ms	
	automatic restart	350 ms	
Release delay (typ.) at U <sub>N</sub> :	disconnecting supply	20 ms	
	disconnecting S12, S22	15 ms	
Contact type		positively driven	
Nominal output voltage		250 VAC (DC: see Diagrar	m 1)
Switching of low loads		$\geq$ 100 mV	
(contact 5 μ Au)		≥ 1 mA	
Thermal current I <sub>th</sub>		max. 8 A per contact (see Diagram 2)	
Switching capacity (according to IEC/EN 60947-5-1)			
to AC 15:	N.O. contacts	3 A / 230 VAC	
	N.C. contacts	2 A / 230 VAC	
to DC 13:	N.O. contacts	4 A / 24 VDC	0.5 A 110 V
	N.C. contacts	4 A / 24 VDC	
to DC 13:	N.O. contacts	$8 \text{ A} / 24 \text{ VDC} > 25 \times 10^3$	
		ON: 0.4 s	OFF: 9.6 s



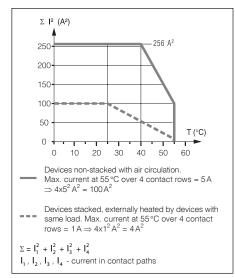


Diagram 2: total current limit curve



### **TECHNICAL DATA**

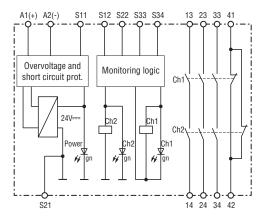
#### **GENERAL DATA**

Electrical contact life to 5 A, AC 230 V cos $\phi$ = 1		> 1.5 x 10 <sup>5</sup> switching cycles	
Permissible operating frequency		max. 1200 operating cycles/h	
Short-circuit strength:	max. fuse rating	10 A gL	IEC/EN 60947-5-1
	line circuit breaker	B 6 A	
Mechanical life		> 20 x 10 <sup>6</sup> switching cycles	
Ambient temperature range		-15 +55 °C	
EMC		according to IEC/EN 61000-4-2 to 5	
Degree of protection:	Housing	IP 40	IEC/EN 60529
	Terminals	IP 20	IEC/EN 60529
Wire connection		according to DIN 46 228-1/-2/-3/-4	
Screw terminals (integrated)		1 x 4 mm <sup>2</sup> solid or	
		1 x 2.5 mm <sup>2</sup> stranded ferruled, or	
		2 x 1.5 mm <sup>2</sup> stranded ferruled, or	
		2 x 2.5 mm <sup>2</sup> solid	
Housing material		thermoplastic, meets UL 94V-0	
Housing dimensions (W x H x D)		22.5 x 90 x 118 mm	
Mounting		on DIN rail	IEC/EN 60715
Weight		220 g	

#### SAFETY RELATED DATA

Category	4
PL	е
$MTTF_d$	> 100 years
$DC_{avg}$	99.0 %
d <sub>op</sub>	220 days/year
h <sub>op</sub>	12 hours/day
t <sub>cycle</sub>	3.60E+03 s/cycle
SIL CL	3
SIL	3
HFT*	1
$DC_{avg}$	99.0 %
SFF	99.7 %
$PFH_d$	2.66E-10 h <sup>-1</sup>

## STRUCTURE AND OPERATION (BLOCK DIAGRAM)



A1(+), A2(-): connection operating voltage

13-14, 23-24, 33-34 : safety contacts (normally open)

S12, S22 : inputs for light curtain outputs

S33, S34: bridge S33 and S34 for automatic restart

#### NOTES

When applying supply voltage to terminals A1(+) and A2(-), 'Power' LED illuminates. Terminals S12 and S22 must be connected to the safety light curtain outputs. When contacts 13-14, 23-24 and 33-34 are closed, the 'Channel 1' and 'Channel 2' LEDs illuminate.

The safety relay YRB-0131-241 can be operated in manual or automatic restart mode.

**Warning:** The same power supply must be used for the safety relay and both light curtain units. If this is not possible and these devices are connected to galvanically separated power supplies, then the 0V contact of the light curtain units and the A2(-) contact of the safety relay must be bridged.

The gold-plated contacts of the YRB-0131-241 relay result in this device being also suitable for switching small loads of 1 mVA - 7 VA, 1 mW - 7 W in the range of 0.1 - 60 V, 1 - 300 mA. The contacts also support the maximum switching current.

To operate light curtains with symmetric outputs (both channels + switching), the selector switch S1 has to be in position "without". To operate light curtains with asymmetric outputs (one channel switching +, one channel -), the selector switch S1 has to be in position "with". The channel switching - must be connected to S22, the channel switching + to S12.

## **PART REFERENCE**

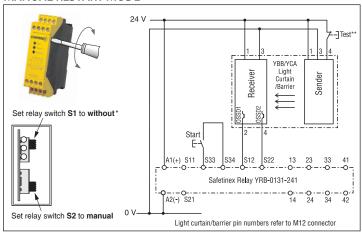
Safety relay YRB-0131-241



### **CONNECTION EXAMPLES FOR APPLICATIONS**

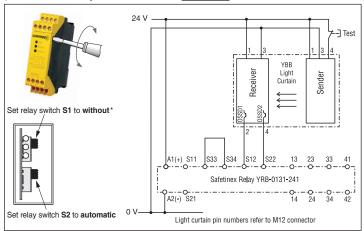
In these examples, the Safetinex YBB/YCA light curtain/barrier is operating in channel 1 mode.

#### MANUAL RESTART MODE



#### **AUTOMATIC RESTART MODE**

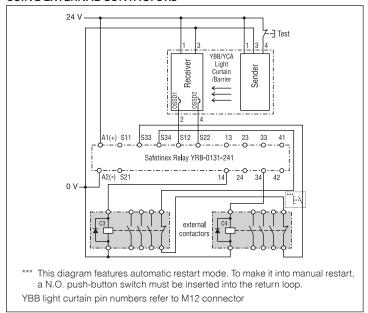
(For YBB models only. Automatic restart is <u>not allowed</u> for YCA access control devices)



- \* Position of switch S1: With symmetric outputs on light curtain (such as Safetinex YBB and YCA models), set switch S1 to "without".
  - With asymmetric outputs on light curtain, set switch S1 to "with".
- \*\* The Test function is only applicable for YBB models.

  Disconnect unit before setting S1

## **USING EXTERNAL CONTACTORS**



YRB-0131-241\_E.indd / rev. 1 / 10.11.10 / HB