



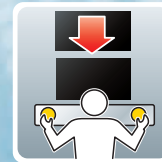
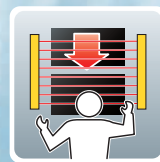
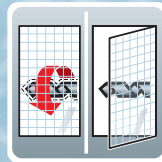
New Products Catalogue 2009

Safety Relays ESR5

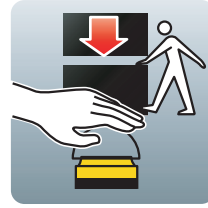
EN ISO 13849

IEC 62061

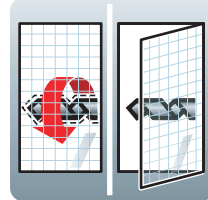
IEC 61508



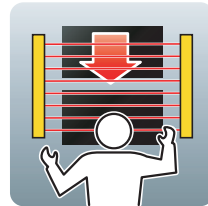
Functional safety on machines – monitoring with safety relays ESR5



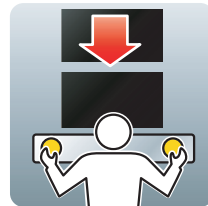
Emergency-stop circuits



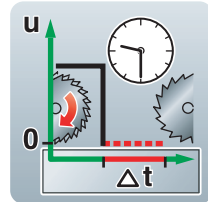
Monitoring of movable guards with guard door monitoring without interlock/guard locking



Monitoring of open hazardous area with light curtain



Safe operation with two-hand control



Off-delayed circuit

Moeller's new ESR5 safety relays provide optimal safety and an extremely high degree of reliability on plant and machinery. Applications that meet the highest safety requirements in accordance with EN ISO 13849-1 up to PL e, in accordance with IEC 62061 up to SILCL 3 and in accordance with IEC 61508 up to SIL 3 can be realized with the ESR5 series of devices.

Functions overview

Safety relays are intended to reliably monitor the signals from safety devices at all times and switch off quickly and reliably in an emergency. Single-channel and dual-channel versions are available for the construction of safety-orientated applications. The internal logic of the safety relay monitors the safety circuits (Emergency Stop, guard door...) and activates the enable paths in fault-free condition. Upon actuation of the safety device or in the event of a fault the enable paths are switched off in compliance with the stop category. Any faults that occur in the control circuit, such as an earth fault, cross connection fault or wire breakage are detected with certainty. Activation of the enable paths is prevented in the event of a fault.

Layout

Universal use is achieved due to the extensive performance range and voltage range of the ESR5 safety relays. The electronic safety relay consists of the internal logic and two redundant relays with positively driven contacts for the enable and signalling paths. The wiring is effected simply on encoded plug-in terminals. If any servicing is performed, these ensure fault-free replacement of the modules without any additional wiring work.

Approvals

Safety relays ESR5 are approved according to:

- TÜV Rheinland



- UL/CUL



Advantages at a glance

- Use for the highest safety requirements in accordance with EN ISO 13849-1, IEC 62061 and IEC 61508.
- Devices suitable for the world market thanks to certification from UL, CUL and TÜV Rheinland.
- Plug-in screw terminals for fast and fault-free replacement.
- Multi-voltage versions 24 - 230 V AC DC for a flexible range of application.

Actuating voltage	Suitable for	Number of enabling paths to IEC/EN 60204 Stop category	Signalling contacts	Part no. Article no.	Price see price list	Std. pack
U_c		0 1				
Electronic safety relays ESR5						
Safety relays for Emergency-Stop and guard door monitoring						
Single-channel ¹⁾	24 V DC, 24 V AC, 50/60 Hz	Cat. 2 according to EN 954-1 PL d according to EN ISO 13849-1 SILCL 3 according to IEC 62061 SIL 3 according to IEC 61508	4	1	ESR5-NO-41-24VAC-DC 118701	1 off
Dual-channel		Cat. 4 according to EN 954-1 PL e according to EN ISO 13849-1 SILCL 3 according to IEC 62061 SIL 3 according to IEC 61508	2	1	ESR5-NO-21-24VAC-DC 118700	
			3	1	ESR5-NO-31-24VAC-DC 118702	
Dual-channel	24 V AC/DC, 230 V AC/DC, 50/60 Hz	Cat. 4 according to EN 954-1 PL e according to EN ISO 13849-1 SILCL 3 according to IEC62061 SIL 3 according to IEC61508	3	1	ESR5-NO-31-24V-230AC-DC 118704	1 off
	230 V AC, 50/60 Hz		3	1	ESR5-NO-31-230VAC 119380	
Off-delayed ²⁾³⁾	24 V DC		2	2	ESR5-NV3-30 118705	
Two-hand relay⁴⁾						
Dual-channel	24 V DC, 24 V AC, 50/60 Hz	Cat. 4 according to EN 954-1 PL e according to EN ISO 13849-1 SILCL 3 according to IEC62061 SIL 3 according to IEC61508	2	1	ESR5-NZ-21-24VAC-DC 118703	1 off
Contact expansion⁵⁾						
Off-delayed	24 V DC, 24 V AC, 50/60 Hz	Cat. 3 according to EN 954-1 PL d according to EN ISO 13849-1 SILCL 2 according to IEC 62061 SIL 2 according to IEC 61508	4	2	ESR5-VE3-42 118706	1 off
Non-delayed		Cat. 4 according to EN 954-1 PL e according to EN ISO 13849-1 SILCL 3 according to IEC62061 SIL 3 according to IEC61508	5	2	ESR5-NE-51-24VAC-DC 118707	

Notes

- 1) Cat. 4/PL e possible only with the aid of fault exclusions.
- 2) SIL 3 only for high demand requirements.
- 3) Suitable for safety position switch with mechanical securing action LS-S-...MT-ZBZ.
- 4) Suitable for applications according to EN 574 type III C
- 5) The base unit determines the maximum stop category according to IEC 61508 and IEC 60204.

ESR5...			Moeller NK2131-1188			http://catalog.moeller.net		
			ESR5-NO-21...	ESR5-NO-41...	ESR5-NO-31-24VAC-DC			
General								
Standards			IEC 61508, ISO 13849-1, IEC 62061, DIN EN 50178, EN 60204-1	EN 954-1, DIN EN 50178, DIN EN 60204-1, UL/CUL Listed	IEC 61508, ISO 13849-1, IEC 62061, DIN EN 50178, EN 60204-1			
Lifespan, mechanical	Operations	× 10 ⁶	10	10	10			
Maximum operating frequency								
Max. operating frequency		Ops/h	3600	3600	3600			
Climatic proofing			Cold according to EN 60068-2-1, dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3	Dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3	Cold according to EN 60068-2-1, dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3			
Ambient temperature		°C	-20 - 55	-20 - 55	-20 - 55			
Ambient temperature, storage		°C	-25...75	-25...75	-25...75			
Mounting position			As required	As required	As required			
Vibrations (IEC/EN 60068-2-6)			2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm	2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm	2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm			
Mechanical shock resistance (IEC 60068-2-27)								
Degree of protection								
Enclosures			IP20	IP20	IP20			
Terminals			IP 20	IP 20	IP 20			
Protection against direct contact when actuated from front (IEC 536)			Fingerproof and back-of-hand proof	Fingerproof and back-of-hand proof	Fingerproof and back-of-hand proof			
Weight		kg	0.17	0.22	0.17			
Terminal capacities								
Solid core or stranded		mm ²	1 × (0.2 – 2.5) 2 × (0.2 – 1)	1 × (0.2 – 2.5) 2 × (0.2 – 1)	1 × (0.2 – 2.5) 2 × (0.2 – 1)			
Flexible with ferrule		mm ²	1 × (0.25 – 2.5) 2 × (0.25 – 1)	1 × (0.25 – 2.5) 2 × (0.25 – 1)	1 × (0.25 – 2.5) 2 × (0.25 – 1)			
Solid or stranded		AWG	24...12	24...12	24...12			
Terminal screw								
Poqidriv screwdriver		Size	2	2	2			
Standard screwdriver		mm	0.6 × 3.5	0.6 × 3.5	0.6 × 3.5			
Max. tightening torque		Nm	0.6	0.6	0.6			
Main conducting paths								
Rated impulse withstand voltage		U_{imp} V AC	6000	4000	4000			
Overvoltage category/pollution degree								
outside			III/2	III/2	III/2			
inside								
Rated insulation voltage		U_i V AC	250	250	250			
Rated operational voltage		U_e V AC	230	230	230			
Rated operational current								
AC-15								
230 V (360 ops./h)		I_e A	5	4	5			
230 V (3600 ops./h)		I_e A	3	3	3			
DC-13								
24 V (360 ops./h)		I_e A	6	4	6			
24 V (3600 ops./h)		I_e A	3	2.5	3			
Max. summation current of all poles								
24 V AC/DC devices		A	72	72	72			
230 V AC devices		A						
Square of the total current (and total current) of all current paths			72 A ² (6 + 6)	72 A ² (4.2 + 4.2 + 4.2 + 4.2)	72 A ² (4.9 + 4.9 + 4.9)			
Short-circuit protection								
max. fuse		A gG/gL	10	6	10			

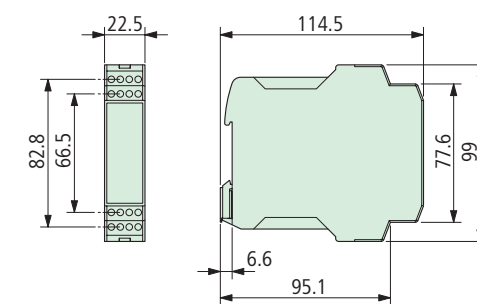
ESR5...			Moeller NK2131-1188			http://catalog.moeller.net		
			ESR5-NZ-21...	ESR5-NO-31-230VAC	ESR5-NO-31-24V-230AC-DC	ESR5-NV3...	ESR5-VE3...	ESR5-NE-51...
General								
Standards			EN 954-1, DIN EN 50178, EN 574 type IIIC, CUL, EN 60204-1, IEC 61508	IEC/EN 61508, EN 945-1; DIN EN ISO 13849-1 applied for, UL, CUL, DIN EN 50178	IEC/EN 61508, EN 945-1; DIN EN ISO 13849-1 applied for, UL, CUL, DIN EN 50178	EN 954-1, DIN EN 50178, DIN EN 60204-1, UL/CUL Listed	IEC/EN 61508, DIN EN ISO 13849-1 (EN 945-1), DIN EN 50178, UL & CSA applied for	EN 954-1, DIN EN 50178, EN 60204-1, UL/CUL
Lifespan, mechanical			10	10	10	10	10	10
Maximum operating frequency								
Max. operating frequency		Ops/h	3600	3600	3600	900	3600	3600
Climatic proofing			Dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3	Dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3	Dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3	Dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3	Cold in accordance with: EN 60068-2-1, dry heat in accordance with EN 60068-2-2, humidity storage test in accordance with 60068-2-78	Dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3
Ambient temperature			-20 - 55	-20 - 55	-20 - 55	-20 - 55	-20 - 45	-20 - 55
Ambient temperature, storage			-25...75	-25...75	-25...75	-25...75	-25...75	-25...75
Mounting position			As required	As required	As required	As required	As required	As required
Vibrations (IEC/EN 60068-2-6)			2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm	2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm	2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm	2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm	2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm	2 g, frequency: 10 – 150 Hz, amplitude: 0.15 mm
Mechanical shock resistance (IEC 60068-2-27)								
Degree of protection								
Enclosures			IP20	IP40	IP40	IP20	IP20	IP20
Terminals			IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Protection against direct contact when actuated from front (IEC 536)			Fingerproof and back-of-hand proof	Fingerproof and back-of-hand proof	Fingerproof and back-of-hand proof	Fingerproof and back-of-hand proof	Fingerproof and back-of-hand proof	Fingerproof and back-of-hand proof
Weight		kg	0.22	0.3	0.3	0,17	0,17	0.22
Terminal capacities								
Solid core or stranded		mm ²	1 × (0.2 – 2.5) 2 × (0.2 – 1)	1 × (0.2 – 2.5) 2 × (0.2 – 1)	1 × (0.2 – 2.5) 2 × (0.2 – 1)	1 × (0.2 – 2.5) 2 × (0.2 – 1)	1 × (0.2 – 2.5) 2 × (0.2 – 1)	1 × (0.2 – 2.5) 2 × (0.2 – 1)
Flexible with ferrule		mm ²	1 × (0.25 – 2.5) 2 × (0.25 – 1)	1 × (0.25 – 2.5) 2 × (0.25 – 1)	1 × (0.25 – 2.5) 2 × (0.25 – 1)	1 × (0.25 – 2.5) 2 × (0.25 – 1)	1 × (0.25 – 2.5) 2 × (0.25 – 1)	1 × (0.25 – 2.5) 2 × (0.25 – 1)
Solid or stranded		AWG	24...12	24...12	24...12	24...12	24...12	24...12
Terminal screw								
Poqidriv screwdriver		Size	2	2	2	2	2	2
Standard screwdriver		mm	0.6 × 3.5	0.6 × 3.5	0.6 × 3.5	0.6 × 3.5	0.6 × 3.5	0.6 × 3.5
Max. tightening torque		Nm	0.6	0.6	0.6	0.6	0.6	0.6
Main conducting paths								
Rated impulse withstand voltage		U_{imp} V AC	6000	6000	6000	4000	4000	4000
Overvoltage category/pollution degree								
outside			III/2	III/2	III/2	III/2	II/2	III/2
inside								
Rated insulation voltage		U_i V AC	250	250	250	250	250	250
Rated operational voltage		U_e V AC	230	230	230	230	230	230
Rated operational current								
AC-15								
230 V (360 ops./h)		I_e A	4	4	4	5		4
230 V (3600 ops./h)		I_e A	3	3	3	3	3	3
DC-13								
24 V (360 ops./h)		I_e A	4	4	4	6		4
24 V (3600 ops./h)		I_e A	3	2.5	2.5	3	3	2.5
Max. summation current of all poles								
24 V AC/DC devices		A	72	72	50	50	49	50
230 V AC devices		A			50			
Square of the total current (and total current) of all current paths			72 A ² (6 + 6)	72 A ² (4 + 4 + 4)	50 A ² (4 + 4 + 4)	49 A ² (3.5+3.5+3.5+3.5)	50 A ² (4 + 4 + 4)	50 A ² (3.7 + 3.7 + 3.7 + 3.7 + 3.7)
Short-circuit protection								
max. fuse		A gG/gL	10	6	6	10	10	6

ESR5...			Moeller NK2131-1188			http://catalog.moeller.net		
			ESR5-NO-21...	ESR5-NO-41...	ESR5-NO-31-24VAC-DC			
Power supply circuit								
Actuating voltage 50/60 Hz		V AC	24	24	24			
Actuating voltage	U_s	V DC	24	24	24			
Voltage tolerance, pick-up		$\times U_e$	0.85...1.1	0.85...1.1	0.85...1.1			
Power consumption								
AC operated 50/60 Hz		VA						
AC operated 50/60 Hz		W	3.4	3.4	3.4			
DC operated		W	1.6	1.6	1.6			
Fuse for control circuit supply								
24 V			Short-circuit protected	Short-circuit protected	Short-circuit protected			
115 V/230 V								
Control circuit								
Rated output voltage		V DC	24	24	24			
Rated current		mA	S12, S22: 30, S34: 45	S12: 65, S34: 40	S12, S22: 30, S34: 45			
Impedance	R	Ω	50	22	50			
Short-circuit current		A	2.3	2.3	2.3			
Response time		ms	100	65	100			
Recovery time		ms						
Response time with reset monitoring	t_{A1}	ms						
Response time without reset monitoring	t_{A2}	ms	100	65	100			
Reset time	t_R/t_{R1}	ms	single-channel 45; dual-channel 10	45	single-channel 45; dual-channel 10			
Minimum contact closing time	t_M	ms						
Recovery time	t_W	ms	ca. 1000	ca. 1000	ca. 1000			
Synchronous monitoring time	t_S	ms						
Electromagnetic compatibility (EMC)								
Emitted interference			EN 61000-6-4	EN 61000-6-4	EN 61000-6-4			
Interference immunity			according to EN 61000-6-2, EN 62061	according to EN 61000-6-2	according to EN 61000-6-2, EN 62061			

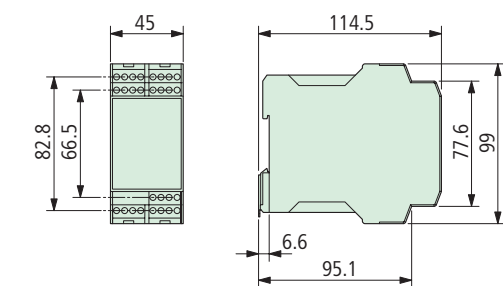
ESR5...			Moeller NK2131-1188			http://catalog.moeller.net		
ESR5-NZ-21...	ESR5-NO-31-230VAC	ESR5-NO-31-24V-230AC-DC	ESR5-NV3...	ESR5-VE3...	ESR5-NE-51...			
24	230	24...230			24			
24		230	24	24	24			
0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.8...1.1			
3	5.8	5.8			2.2			
1.5	2.9	2.9	2	1.8	2.2			
Short-circuit protection								
Short-circuit protected		Short-circuit protected		Short-circuit protected				
		Short-circuit protected		Short-circuit protected				
Rated current								
24	24	24	24	24	24			
S11, S21: 60, Y2: 45	S10, S12, S22: 35, S34, S35: 45	S10, S12, S22: 35, S34, S35: 45	A1, A2: 84, K1/K2: 5	S12, S22: 3.5, S34, S35: 7	A1, A2: 92			
22	11	11			500			
2.3	0.7	0.7			0.1			
50	250	250	20	150	20			
	60	60	20	150	20			
50	250	250	20	150	20			
20	20	20	0.3 ... 3 s (+ 50 %) adjustable	20 (non-delayed enable paths); 100 (min. delayed enable paths)	20			
ca. 1000	ca. 1000	ca. 1000	ca. 1000	ca. 330				
500								
EMC								
EN 61000-6-4	EN 61000-6-4	EN 61000-6-4	EN 61000-6-4	EN 61000-6-4	EN 61000-6-4			
according to EN 61000-6-2	according to EN 61000-6-2	according to EN 61000-6-2	according to EN 61000-6-2	according to EN 61000-6-2, EN 62061	according to EN 61000-6-2			

Safety relays for Emergency-Stop and guard door monitoring

ESR5...24VAC-DC



ESR5...230VAC...



For service issues please contact your Moeller representative or the Moeller Field Service.

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