



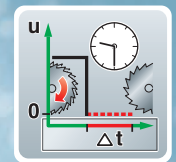
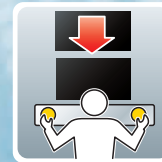
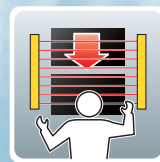
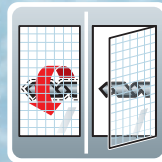
# New Products Catalogue 2009

## Safety Relays ESR5

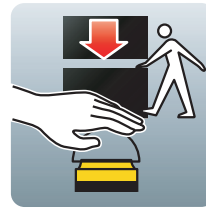
### EN ISO 13849

### IEC 62061

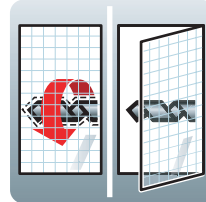
### IEC 61508



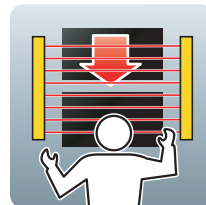
## Functional safety on machines – monitoring with safety relays ESR5



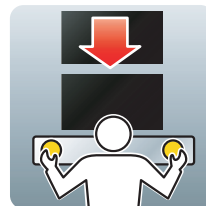
Emergency-stop circuits



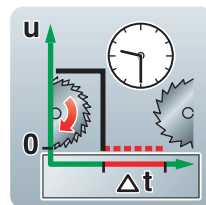
Monitoring of movable guards with guard door monitoring without interlock/guard locking



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				
<b>Electronic safety relays ESR5</b>						
<b>Safety relays for Emergency-Stop and guard door monitoring</b>						
Single-channel <sup>1)</sup>	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	<b>ESR5-NO-41-24VAC-DC</b> 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	<b>ESR5-NO-21-24VAC-DC</b> 118700	
			3	1	<b>ESR5-NO-31-24VAC-DC</b> 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	<b>ESR5-NO-31-24V-230AC-DC</b> 118704	1 off
	230 V AC, 50/60 Hz		3	1	<b>ESR5-NO-31-230VAC</b> 119380	
Off-delayed <sup>2)3)</sup>	24 V DC		2	2	<b>ESR5-NV3-30</b> 118705	
<b>Two-hand relay<sup>4)</sup></b>						
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	<b>ESR5-NZ-21-24VAC-DC</b> 118703	1 off
<b>Contact expansion<sup>5)</sup></b>						
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	<b>ESR5-VE3-42</b> 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	<b>ESR5-NE-51-24VAC-DC</b> 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-NO-21...	ESR5-NO-41...	ESR5-NO-31-24VAC-DC
<b>General</b>					
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 <sup>6</sup>	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 <sup>2</sup>	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 <sup>2</sup>	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					
Pozidriv 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
<b>Main conducting paths</b>					
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 <sup>2</sup> (6 + 6)	72 A <sup>2</sup> (4.2 + 4.2 + 4.2 + 4.2)	72 A <sup>2</sup> (4.9 + 4.9 + 4.9)
Short-circuit protection					
max. fuse		A gG/gL	10	6	10

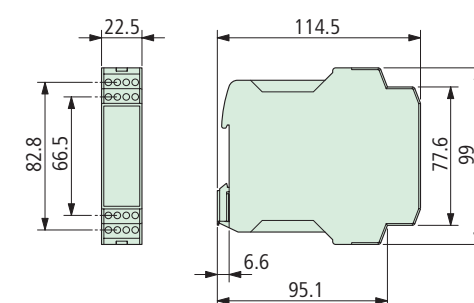
ESR5-NZ-21...	ESR5-NO-31-230VAC	ESR5-NO-31-24V-230AC-DC	ESR5-NV3...	ESR5-VE3...	ESR5-NE-51...
EN 954-1, DIN EN 50178, EN 574 type IIIC, CUL, EN 60204-1, IEC 61508	IEC/EN 61508, EN 945-1; DIN EN ISO 13849-1 applied for, UL, CUL, DIN EN 50178	IEC/EN 61508, EN 945-1; DIN EN ISO 13849-1 applied for, UL, 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
10	10	10	10	10	10
3600	3600	3600	900	3600	3600
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
-20 - 55	-20 - 55	-20 - 55	-20 - 55	-20 - 45	-20 - 55
-25...75	-25...75	-25...75	-25...75	-25...75	-25...75
As required	As required	As required	As required	As required	As required
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
IP20	IP40	IP40	IP20	IP20	IP20
IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
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
0.22	0.3	0.3	0,17	0,17	0.22
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)
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)
24...12	24...12	24...12	24...12	24...12	24...12
2	2	2	2	2	2
0.6 × 3.5	0.6 × 3.5	0.6 × 3.5	0.6 × 3.5	0.6 × 3.5	0.6 × 3.5
0.6	0.6	0.6	0.6	0.6	0.6
6000	6000	6000	4000	4000	4000
III/2	III/2	III/2	III/2	II/2	III/2
250	250	250	250	250	250
230	230	230	230	230	230
4	4	4	5		4
3	3	3	3	3	3
4	4	4	6		4
2.5	2.5	2.5	3	3	2.5
72	50	50	50	49	50
72 A <sup>2</sup> (6 + 6)	50 A <sup>2</sup> (4 + 4 + 4)	50 A <sup>2</sup> (4 + 4 + 4)	49 A <sup>2</sup> (3.5+3.5+3.5+3.5)	50 A <sup>2</sup> (4 + 4 + 4)	50 A <sup>2</sup> (3.7 + 3.7 + 3.7 + 3.7 + 3.7)
6	6	6	10	10	6

ESR5...			Moeller NK2131-1188			http://catalog.moeller.net		
			ESR5-NO-21...	ESR5-NO-41...	ESR5-NO-31-24VAC-DC			
<b>Power supply circuit</b>								
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			
<b>Power consumption</b>								
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			
<b>Fuse for control circuit supply</b>								
24 V			Short-circuit protected	Short-circuit protected	Short-circuit protected			
115 V/230 V								
<b>Control circuit</b>								
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	$R$	$\Omega$	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						
<b>Electromagnetic compatibility (EMC)</b>								
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			

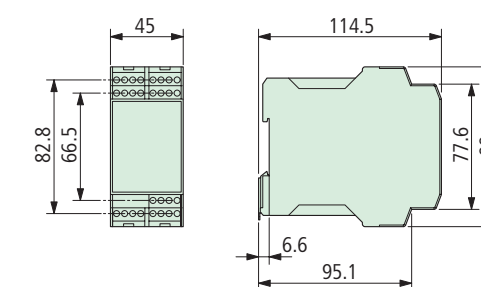
ESR5...			Moeller NK2131-1188			http://catalog.moeller.net		
			ESR5-NZ-21...	ESR5-NO-31-230VAC	ESR5-NO-31-24V-230AC-DC	ESR5-NV3...	ESR5-VE3...	ESR5-NE-51...
24			24	230	24...230			24
24			24		230	24	24	24
0.85...1.1			0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.8...1.1
3			3	5.8	5.8			2.2
1.5			1.5	2.9	2.9	2	1.8	2.2
<b>Short-circuit protected</b>								
			Short-circuit protected		Short-circuit protected			
			Short-circuit protected		Short-circuit protected			
24			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	S10, S12, S22: 35, S34, S35: 45	A1, A2: 84, K1/K2: 5	S12, S22: 3.5, S34, S35: 7	A1, A2: 92
22			22	11	11		500	
2.3			2.3	0.7	0.7		0.1	
50			50	250	250	20	150	20
				60	60	20	150	20
50			50	250	250	20	150	20
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. 1000	ca. 330	
500			500					
EN 61000-6-4			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	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...





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