

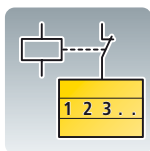
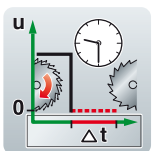
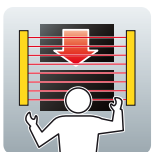
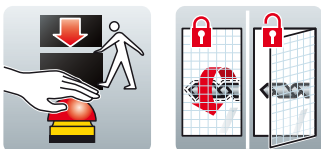


ESR5 safety relay

Control relay suitable for safety applications easySafety



The safety of humans and machinery must be guaranteed throughout the entire life cycle of the machinery or installation. Safety-related components for functional safety, such as position switches, light barriers, two-hand operation, or emergency stop pushbuttons provide personnel protection. Safety-related logic units monitor and evaluate safety-relevant information. Safety relays from the series ESR5 and the safety-related control relay easySafety fulfill the highest requirements of international safety norms.



easySafety control relays – Flexible, safety-related information processing

All-in-One: Safety and control functions combined in one device +++ Simple configuration through prefabricated and tested safety components +++ Direct state display and increased machine availability due to fast error diagnosis through integrated display +++ Multistep password concept prevents unwanted manipulation

ESR5 safety relays – profitable monitoring

The right safety function for each application +++ Fast commissioning and error-free exchange through plug-in screw terminals +++ Multivoltage variants 24 – 230 V AC/DC for universal application

Safety relay, control relay suitable for safety circuits

Safety relays

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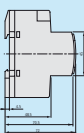
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electronic safety relay

Description

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Ordering

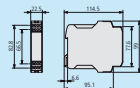
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Technical data

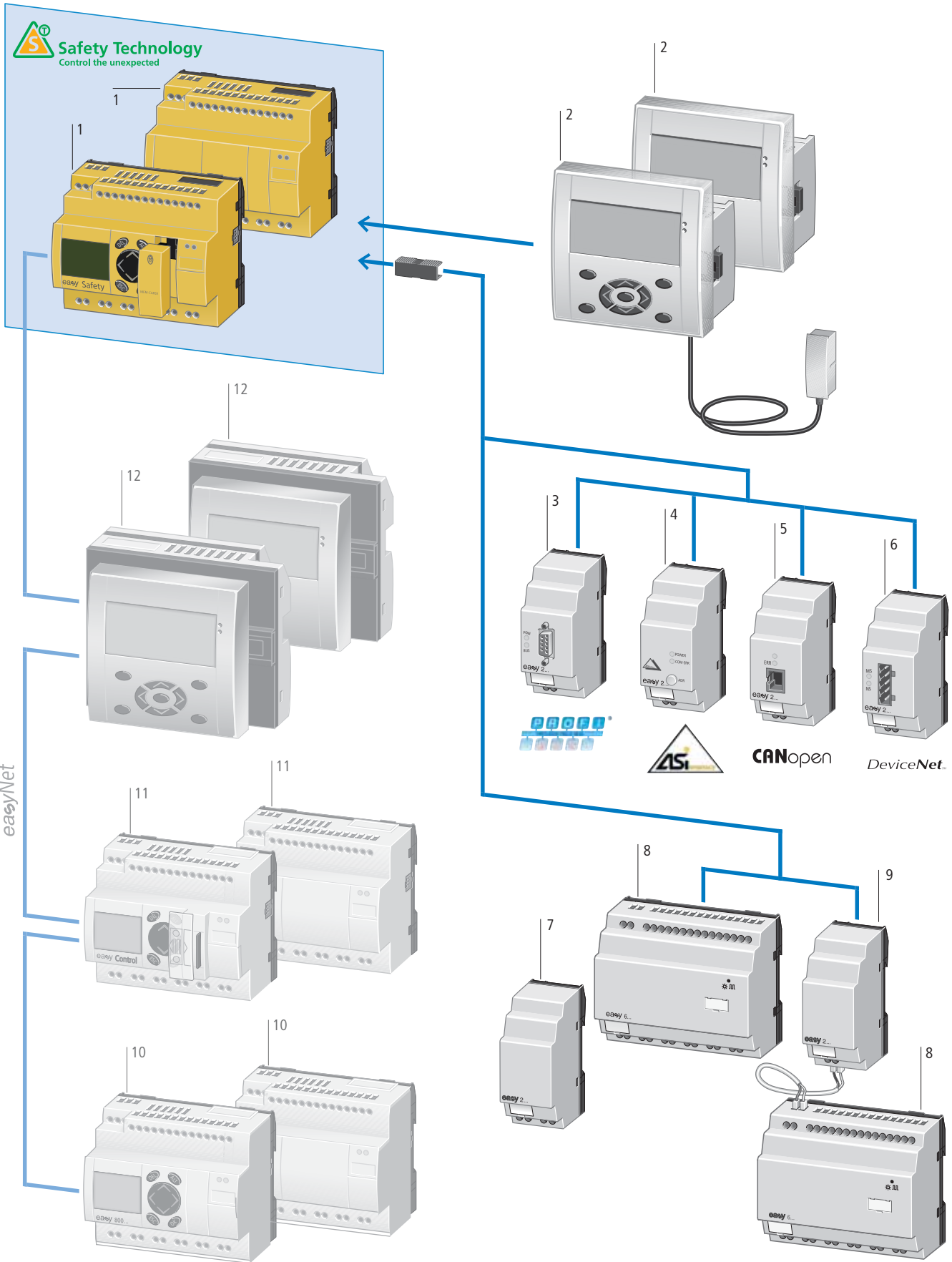
Basic devices, contact expansion modules	13/16
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Dimensions

Basic devices, contact expansion modules	13/19
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System overview



Basic device			
ES4P...	1		
Expandable: standard inputs/outputs and standard bus systems			
Bus system easyNet on board			
24 V DC			
14 safe digital inputs			
4 safe relay outputs or			
1 safe redundant relay output and 4 safe transistor outputs			
Display and keypad optional			
Bolt-on and top-hat rail mounting			
Screw terminals			
→ Page 13/5			
Remote text display	2		
Consists of:			
• display/operating unit MFD-80(-B)			
• power supply/communication module			
Including connecting cable (can be cut to desired length, 5 m)			
24 V DC = MFD-CP4-800			
100 - 240 V AC = MFD-AC-CP4-800			
Spring-loaded terminals			
→ Page 13/7			
Bus modules			
EASY204-DP	3		
PROFIBUS DP slave interface, 24 V DC			
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EASY205-ASI	4		
AS-Interface slave, 24 V DC			
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EASY221-CO	5		
CANopen interface, 24 V DC			
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EASY222-DN	6		
DeviceNet interface, 24 V DC			
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Output expansion			
EASY202-RE	7		
2 relay outputs (max. 10 A, UL)			
Bolt-on and top-hat rail mounting			
Screw terminals			
→ Page 13/6			
I/O expansions			
EASY6...	8		
24 V DC			
12 digital inputs			
6 relay outputs (max. 10 A, UL) or			
8 transistor outputs			
Bolt-on and top-hat rail mounting			
Screw terminals			
→ Page 13/6			
Coupling module	9		
EASY200-EASY			
For remote connection of a digital I/O expansion through two-pole connection cable (max. 30 m); e.g. NYM 3 × 1.5 mm ²			
→ Page 13/6			
easy800	10		
Expandable: digital and analog inputs/outputs and AS-Interface, CANopen, PROFIBUS-DP, DeviceNet			
Bus system easyNet on board			
24 V DC = easy...DC...			
100 - 240 V AC = easy...AC...			
12 digital inputs			
4 usable as analog inputs (DC versions)			
6 relay outputs (max. 10 A, UL) or			
8 transistor outputs			
1 analog output, optional in DC models			
Display and keypad optional			
Bolt-on and top-hat rail mounting			
Screw terminals			
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Compact PLC easyControl	11		
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Description



The easySafety control relay for safety-related applications monitors all commonly used safety devices and also takes over the required control tasks for the machine. Packed with a host of conventional safety relays in the form of safety function blocks, easySafety not only features integrated safety functions but also standard functions in a single device – all in one.

In addition to the safety circuit diagram containing the safety configuration, the safety control relay also contains a standard circuit diagram. This circuit diagram can be used for standard tasks, such as the processing of diagnostics signals or general control tasks of a machine.

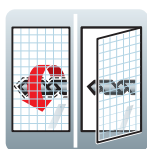
Thanks to the large number of safety function blocks, this provides the user with a number of application options with only one device. The user can now also respond directly to future and changing application requirements. This saves financial resources and offers future investment security. Last but not least, it reduces the stock-keeping required for special safety relays.

easySafety meets the requirements of category 4 to EN 954-1, PL e to EN ISO 13849-1, SILCL 3 to EN IEC 62061 and SIL 3 to EN IEC 61508. With easySafety, it is therefore possible to implement applications meeting the most stringent safety requirements.

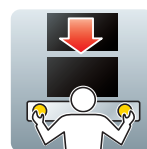
In addition to many standard function blocks from the easy800, easySafety offers the following safety function blocks:



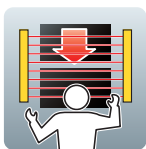
Emergency stop circuits
Allows the safe stopping of a hazardous movement, immediate stop for Stop category 0 and controlled stop for Stop category 1 according to IEC 60204-1; for use in single or dual channel safety monitoring of emergency stop circuits.



Guard door monitoring with and without interlock/guard locking
Used with moving guards such as doors, barriers or flaps. Positions are reliably detected, monitored and enabled to safety-related requirements – optional interlock device with guard locking when increased personal and process protection are required; this securely keeps the guard closed until machine standstill.



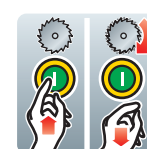
Safe operation with two-hand control
Type III to EN 574. Used for hazardous machine movement such as presses, punching, shearing. It allows the movement of hazardous operation only when both hands of the operator are outside the hazardous area and the two pushbuttons are operated within 0.5 seconds of each other.



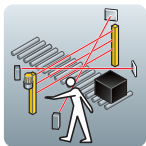
Electro-sensitive protective devices (ESPE)
Protection of the hazardous location or area in the vicinity of machines by means of contactless guards such as light grids/light barriers/light curtains.



Enabling switch
The manual or foot operated enable switch allows the temporary enabling of a guard, such as a safety door, by continuous actuation. This may be necessary for setting or servicing a machine.



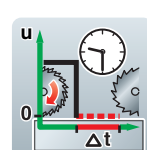
Start device
For the safe starting of an application by means of an external start pushbutton or start condition from the safety circuit diagram.



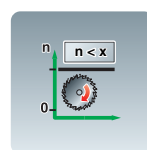
Optionally with muting function, which temporarily bypasses the protective function of a safety device, such as a light curtain. Typical applications include feeding materials into a machine without having to interrupt the machine's operation.



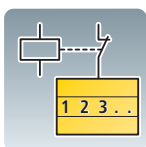
Operating mode selector switches
Used for the safe selection and acceptance of a pre-selected operating mode on an external control circuit device.



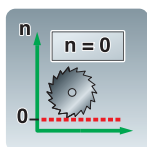
Safety timing relay
Used for changing the switch duration and the on or off switch points of an enable contact in the safety circuit. Safety-related timing relay with on and/or off delayed or single pulse function.



Overspeed monitoring
For the safety-related overspeed monitoring of a motor or a shaft. If the maximum speed is exceeded, the drive is disabled.



Feedback loop monitoring (EDM)
Used for the safety-related monitoring of externally connected actuators, e.g. contactors, relays or valves.



Zero monitoring
Used when the entry or access to the hazardous area is not permitted until the hazardous driving force has come to a standstill.

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Ordering

Inputs (safety)	Outputs (safety)		Display + keypad	easyNet/easyLink	Safety/standard circuit diagram	Part no. Article no.	Price See price list	Std. pack
Digital	6 A relay	Transistor	Test signal					

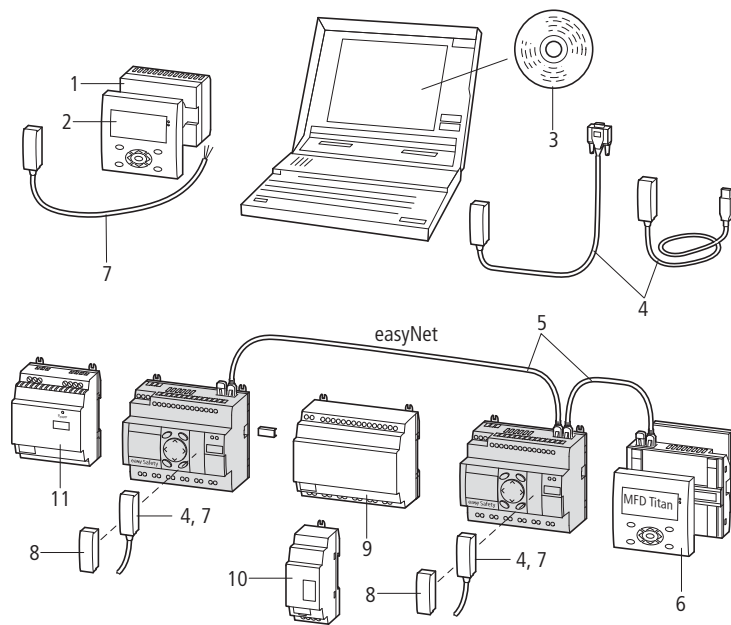
easySafety

EN 954-1: 1996, category 4
EN ISO 13849-1: 2006, PL e (Performance Level)
IEC 61508: 1998, SIL 3 (Safety integrity Level)
IEC 62061: 2005, SILCL 3 (Safety integrity level claim limit)
Expandable: standard inputs/outputs and standard bus systems
24 V DC supply voltage



14	1 (redundant)	4	4	–	✓/✓	✓/✓	ES4P-221-DMXX1 111016	1 off
14	1 (redundant)	4	4	✓	✓/✓	✓/✓	ES4P-221-DMXD1 111017	1 off
14	4	–	4	–	✓/✓	✓/✓	ES4P-221-DRXX1 111018	1 off
14	4	–	4	✓	✓/✓	✓/✓	ES4P-221-DRXD1 111019	1 off

Notes



Accessories	Page
1 Power supply unit/communication mod-	→ 13/7
2 Display/keypad	→ 13/7
3 Safety-related programming software	→ 13/8
4 Programming cables, Serial	→ 13/8
Programming cables, USB	→ 13/8
5 easyNet	→ 13/9
6 MFD silver (Standard)	→ Chapter 12
7 Connection cable	→ 13/8
8 Safety-related memory card	→ 13/8
9 I/O expansion (standard)	→ 13/6
10 Output expansion, bus module, coupling module (standard)	→ 13/6
11 Switched-mode power supply unit	→ 13/9

Information relevant for export to North America




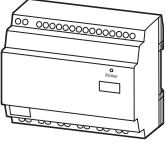

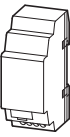
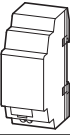

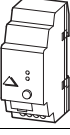

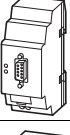
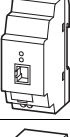
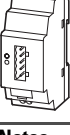
Product Standards IEC/EN see Technical Data; UL 508; CSA-C22.20.4-04; CSA-22.2 No. 142-MI1987; CE marking
UL File No. CSA report applies to both US and Canada
UL CCN NRAQ
CSA File No. 012528
CSA Class No. 2252-81; 2252-01
NA Certification CSA certified, certified by CSA for use in the US
Degree of Protection IEC: IP20, UL/CSA Type: -

	Part no. Article no.	Price See price list	Std. pack
Individual laser inscription			
• Individual labelling of ES4P control relay for safety-related applications with Labeleditor labelling software	ES4-COMBINATION-* 121711		1 off

Information relevant for export to North America



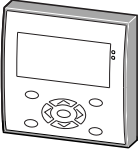

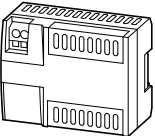

UL/CSA certification not required

	Inputs		Outputs		Supply voltage	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America 
	Digital	Relay 10 A (UL)	Transistor						
I/O expansions									
Can be used through easyLink									
	12	6	–		100 - 240 V AC	EASY618-AC-RE 212314		1 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking E135462 UL File No. E135462 UL CCN NRAQ, NRAQ7 CSA File No. 012528 CSA Class No. 2252-01 + 2258-02 NA Certification UL Listed, CSA certified Degree of Protection IEC: IP20, UL/CSA Type: -
	12	–	8		24 V DC	EASY620-DC-TE 212313			
	12	6	–		24 V DC	EASY618-DC-RE 232112			
	–	2	–		24 V DC	EASY202-RE1) 232186			
Coupling module									
Can be used through easyLink									
	For remote connection of a digital I/O expansion up to 30 m.					EASY200-EASY 212315		1 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking E135462 UL File No. E135462 UL CCN NRAQ, NRAQ7 CSA File No. 012528 CSA Class No. 2252-01 + 2258-02 NA Certification UL Listed, CSA certified Degree of Protection IEC: IP20, UL/CSA Type: -
Bus modules									
Can be used through easyLink									
	AS-Interface	Slave 4 inputs, 4 outputs, 4 parameter bits Addresses available 0 to 31			24 V DC	EASY205-ASI 221598		1 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking E135462 UL File No. E135462 UL CCN NRAQ, NRAQ7 CSA File No. 012528 CSA Class No. 2252-01 + 2258-02 NA Certification UL Listed, CSA certified Degree of Protection IEC: IP20, UL/CSA Type: -
	PROFIBUS-DP	Slave Addresses available 1 to 126			24 V DC	EASY204-DP 212316			
	CANopen	Addresses available 1 to 127			24 V DC	EASY221-CO 233539			
	DeviceNet	Addresses available 0 to 63			24 V DC	EASY222-DN 233540			






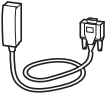



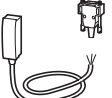






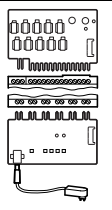



Notes

¹⁾ Not for use in combination with basic devices EASY719-DA-...
Cannot be used on the EASY200-EASY coupling module


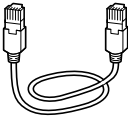







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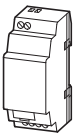



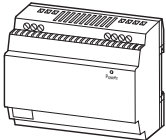
Supply voltage connection	Description	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America
Remote text display					
Display/keypad monochrome display 132 × 64 pixels with switchable backlight IP65, removable silver front frame					
	With keypad, with Moeller company logotype NEMA 4x in connection with MFD-XM-80 protective membrane → Page 12/29	MFD-80-B 265251		1 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking E135462 UL File No. NRAQ UL CCN 012528 CSA File No. 2252-01 + 2258-02 CSA Class No. UL Listed, CSA certified NA Certification IEC: IP65, in combination with MFD-XM-80: UL/CSA part no. 4X Degree of Protection
	With keypad, without Moeller company logotype NEMA 4x in connection with MFD-XM-80 protective membrane → Page 12/29	MFD-80-B-X 284905			
	Without keypad, with Moeller company logotype NEMA 4x	MFD-80 265250			
	Without keypad, without Moeller company logotype NEMA 4x	MFD-80-X 284904			
Power supply unit/communication modules IP20, can be combined with display/operating unit MFD-80... as remote text display					
	100 - 240 V AC	With connection cable (can be cut to desired length, 5 m)	MFD-AC-CP4-800 286824	1 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking E135462 UL File No. NRAQ UL CCN 012528 CSA File No. 2252-01 + 2258-02 CSA Class No. UL Listed, CSA certified NA Certification IEC: IP20, Degree of Protection UL/CSA Type: -
	24 V DC	With connection cable (can be cut to desired length, 5 m)	MFD-CP4-800 274095		
	24 V DC	Without connection cable	MFD-CP4 280888		
	100 - 240 V AC	Without connection cable	MFD-AC-CP4 286822		





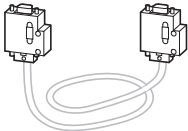




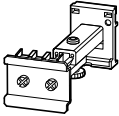

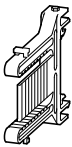

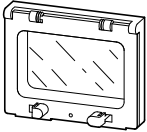

Description	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America  
Programming software				
 easySoft-Safety (including easySoftPro) → Page 12/17 Menu selection in German, English, French, and Italian Operating systems: Windows 2000 SP4, Windows XP SP1, Windows Vista (32 Bit)	ESP-SOFT 111460		1 off  	UL/CSA certification not required
Programming cables				
 SUB-D, 9 pole, serial, 2 m	EASY800-PC-CAB 256277		1 off  	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking UL File No. E135462 UL CCN NRAQ CSA File No. 012528 CSA Class No. 2258-02 NA Certification UL Listed, CSA certified
 USB, 2 m	EASY800-USB-CAB 106408		1 off	
Modem cable				
 Configurable modem, printer and programming cable, possible data transfer rate 56 kBaud, 9 pole SUB-D plug (plug + socket for self connection)	EASY800-MO-CAB 286079		1 off	
Connecting cables				
 For the connection of MFD(-AC)-CP4 to easy800/MFD-...-CP8/ES4P 5 m, can be cut to desired length	MFD-CP4-800-CAB5 280887		1 off  	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking UL File No. E135462 UL CCN NRAQ CSA File No. 012528 CSA Class No. 2252-01 + 2258-02 NA Certification UL Listed, CSA certified Degree of Protection IEC: IP20, UL/CSA Type: -
Memory card				
 256 kB module	ES4A-MEM-CARD1 111461		1 off  	UL/CSA certification not required
Input/output simulator				
 With plug-in power supply unit 100 - 240 V AC/ 24 V DC	ES4A-221-DMX-SIM 116953		1 off  	UL/CSA certification not required
Manual				
	German	AWB2528-1599DE 121076	1 off	
	English	AWB2528-1599EN 121077	1 off	
	French	AWB2528-1599FR 121078	1 off	
	Italian	AWB2528-1599IT 121079	1 off	

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Description	For use with	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America 
Network connection cables					
 Length: 0.3 m	easyNet	EASY-NT-30 256283		1 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking UL File No. E135462 UL CCN NRAQ CSA File No. 012528 CSA Class No. 2258-02 NA Certification UL Listed, CSA certified Degree of Protection IEC: IP20, UL/CSA Type: -
Length: 0.8 m	easyNet	EASY-NT-80 256284			
Length: 1.5 m	easyNet	EASY-NT-150 256285			
Bus termination resistor					
 8 pole, RJ45, 124 Ω Connection to PIN 1 and PIN 2	easyNet	EASY-NT-R 256281		2 off 	
Data cable					
 4 x 0.14 mm ² , twisted pair, AWG 26 Length: 100 m	easyNet	EASY-NT-CAB 256286		1 off 	UL File No. E135462 UL CCN NRAQ NA Certification UL Listed Degree of Protection IEC: IP 20, UL/CSA Type: -
Bus connector plug					
 8 pole, RJ45	easyNet	EASY-NT-RJ45 256280		10 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking UL File No. E135462 UL CCN NRAQ CSA File No. 012528 CSA Class No. 2258-02 NA Certification UL Listed, CSA certified Degree of Protection IEC: IP20, UL/CSA Type: -
Crimping tool					
For RJ45 plug	EASY-NT-CAB EASY-NT-RJ45	EASY-RJ45-T00L 256282		1 off	

Description	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America 
Switched-mode power supply units				
Primary-switched mode, regulated				
 Rated input voltage: 50/60 Hz: 100 - 240 V Rated output voltage: 24 V/12 V DC Rated output current: 0.35 A/20 mA	EASY200-POW 229424		1 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking UL File No. E135462 UL CCN NRAQ CSA File No. 012528 CSA Class No. 2252-01 + 2258-02 NA Certification UL Listed, CSA certified Degree of Protection IEC: IP20, UL/CSA Type: -
 Rated input voltage: 50/60 Hz: 100 - 240 V AC Rated output voltage (residual ripple): 24 V DC (± 3 %) Rated output current: 1.25 A	EASY400-POW 212319			
	EASY430-POW 110940		1 off 	Product Standards IEC/EN see Technical Data; UL 508; CSA C22.2 No. 107.1-01; CE marking UL File No. E300415 UL CCN NMTR, NMTR7 CSA File No. UL report applies to both US and Canada CSA Class No. 3211-87, 3211-07 NA Certification UL Listed, certified by UL for use in Canada Degree of Protection IEC: IP20, UL/CSA Type: -
	EASY500-POW 110941			
 Rated input voltage: 50/60 Hz: 100 - 240 V AC Rated output voltage (residual ripple): 24 V DC (± 3 %) Rated output current: 4.2 A	EASY600-POW 262399			



Supply voltage	Description	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America 
PROFIBUS-DP data cable					
	Twisted pair, without plug, 2-core, 2 x 0.64 mm ² (only suitable for fixed wiring) 100 m	ZB4-900-KB1 206983		100 m	
PROFIBUS-DP bus connector plug					
	Pins, 9 pole Cable entry, angled 90°	ZB4-209-DS2 206982		1 off	
	Metallised insulated housing Maximum transfer rate 12 MBit/s Integrated switch (accessible from the outside) for the bus terminating resistors Terminal block for two cable entries, with straight or 90° angled cable entry, as required	ZB4-209-DS3 217820		1 off	
Connection plug					
	Bus connector plug between base unit and expansion unit/bus module	EASY-LINK-DS 221607		1 off 	UL/CSA certification not required
Fixing bracket For screw fixing to mounting plate					
	2 fixing brackets per easy200 3 fixing brackets per easy400, 500, 600, 800, ES4P, EC4P, MFD(-AC)-CP8...	ZB4-101-GF1 061360		9 off 	UL/CSA certification not required
Telescopic clip					
	With 35mm top-hat rail to IEC/EN 60715 for mounting depth compensation when rear mounting in CI-K... enclosures and cabinets. Stepless adjustment via scale from 75 – 115 mm. Screw and snap mounting	M22-TA 226161		1 off 	Product Standards IEC/EN 60947-5; UL 508; CSA-C22.2 No. 14-05; CSA-C22.2 No. 94-91; CE marking E29184 UL File No. NKCR UL CCN 012528 CSA File No. 3211-03 CSA Class No. UL Listed, CSA certified NA Certification
Top-hat rail adapter for inspection window					
	12 mm x 66 mm x 82 mm Installation on hinged inspection window, for front fitting of devices. Complete set, consisting of 2 brackets and 4 screws	SKF-HA 233782		1 off 	UL/CSA certification not required
Inspection window					
	130 mm x 77 mm x 25 mm (6 space units) For use with EASY700, EASY800, EC4P, ES4P	SKF-FF6 233781		1 off 	UL/CSA certification not required

Technical data

			ES4P...
General			
Standards			EN 55011, EN 55022, IEC/EN 61000-4, IEC 60068-2-6, IEC 60068-2-27, EN 954-1 : Category 4, EN ISO 13849-1: PL e, EN IEC 62061 : SILCL 3, EN IEC 61508 : SIL 3
Dimensions (W x H x D)		mm	107.5 (6 space units) x 90 x 72
Mounting			Top-hat rail IEC/EN 60715, 35 mm or screw fixing using fixing brackets ZB4-101-GF1 (accessories)
Times			
Inputs			
Max. duration of external test pulse		ms	1
Semi-conductor output			
Off test pulse		ms	<1
Switch-off delay		ms	<0.15
Terminal capacity			
Solid		mm ²	0.2 - 4 (AWG 22 - 12)
Flexible with ferrule		mm ²	0.2 - 2.5 (AWG 22 - 12)
Standard screwdriver		mm	3.5 x 0.8
Max. tightening torque		Nm	0.6
Ambient climatic conditions			
Operating ambient temperature		°C	-25...55, low temperatures to IEC 60068-2-1, high temperatures to IEC 60068-2-2
Condensation			Prevent condensation by means of suitable measures
LCD display (clearly legible)		°C	0...55
Storage		°C	-40...70
Relative humidity, non-condensing (IEC/EN 60068-2-30)		%	5...95
Air pressure (in operation)		hPa	795...1080
Ambient mechanical conditions			
Protection type, IEC/EN 60529			IP20
Vibrations (IEC/EN 60068-2-6)			
Constant amplitude 0.15 mm		Hz	10...57
Constant acceleration, 2 g		Hz	57...150
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms	Shocks		18
Drop to IEC/EN 60068-2-31	Drop	mm	50
Mounting position			Horizontal/vertical
Electromagnetic compatibility (EMC) according to IEC/EN 61000-6-2			
Electrostatic discharge (IEC/EN 61000-4-2, Level 3, ESD)			
Air discharge		kV	8
Contact discharge		kV	6
Radio interference suppression (EN 55011)			EN 55011 Class B, EN 55022 Class B
Power pulses (surge) (IEC/EN 61000-4-5, level 2)		kV	1 (supply cables, symmetrical)
Insulation resistance			
Overvoltage category/pollution degree			III/2
Clearance in air and creepage distances			EN 50178, UL 508, CSA C22.2, No. 142, EN 60664-1:2003
Insulation resistance			EN 50178
Back-up/accuracy of the real-time clock			
Accuracy of the real-time clock		s/day	Normally ± 5 (± 0.5 h/year)
Repetition accuracy of timing relays in standard circuit			
Accuracy of timing relay (of value)		%	± 0.02
Resolution			
Range "S"		ms	5
Range "M:S"		s	1
Retentive memory			
Write cycles of the retentive memory (minimum)			10000000000 (10 ¹⁰) (read/write cycles)
Power supply			
Rated operational voltage	U _a	V	24 DC (-15/+20%)
Permissible range		V DC	20.4...28.8
Ripple		%	≤ 5
Interfaces			
easyNet (CAN based)			
Bus termination (first and last station)			Yes
Control operating mode easyNet			
Number of users			Max. 8



			ES4P...
NET network			
Stations	Number		Max. 8
Data transfer rate/distance			1000 Kbit/s, 6 m 500 Kbit/s, 25 m 250 Kbit/s, 60 m 125 Kbit/s, 125 m 50 Kbit/s, 300 m 20 Kbit/s, 700 m 10 Kbit/s, 1000 m Bus lengths greater than 40 m can only be achieved with enhanced cross-section conductors and terminal adapters.
Potential isolation			
From power supply			Yes
From the inputs			Yes
From the outputs			Yes
From the PC interface, memory card, NET network, EASY-Link			Yes
Bus termination (first and last station)			Yes
Terminal type			RJ45
Digital inputs 24 V DC			
Number			14
Inputs can be used as analog inputs			-
Status display			LCD display (if provided)
Potential isolation			
From power supply			No
Between digital inputs			No
From the outputs			Yes
From PC interface, memory card, easyLink			No
From network easyNet			Yes
Rated operational voltage	U_e	V DC	24
At signal "0"	U_e	V DC	< 5
At signal "1"	U_e	V DC	> 15
Clock outputs			
Number			4
Voltage		V DC	24
Electrical isolation			No
Relay outputs			
Number			4 for ES4P-...-DR.. 1 redundant for ES4P-...-DM...
Outputs in groups of			1
Parallel switching of outputs to increase power			Not permissible
Protection of an output relay			Fuse: 6 A gG, Circuit-breaker with characteristic C: 24 V DC 4 A, Short-circuit current < 250 A
Potential isolation			
From power supply			Yes
From the inputs			Yes
From PC interface, memory card, easyNet, easyLink			Yes
Safe isolation according to EN 50178		V AC	300
Basic insulation		V AC	600
Lifespan, mechanical	Operations	$\times 10^6$	10
Contacts			
Conventional thermal current		A	6
Rated impulse withstand voltage Uimp contact coil		kV	6
Rated operational voltage	U_e	V AC	250
Rated insulation voltage	U_i	V AC	250
Safe isolation to EN 50178 between coil and contact		V AC	300
Making capacity			
AC-15, 230 V AC, 3 A	Operations		80000
DC-13, 24 V DC, 5 A, 0,1 Hz	Operations		40000
Switching frequency			
Mechanical operations		$\times 10^6$	10
Switching frequency		Hz	10
UL/CSA			
UL 508			B300/R300

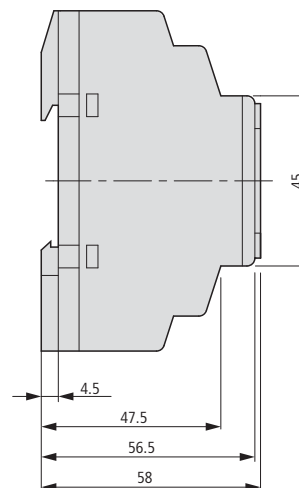
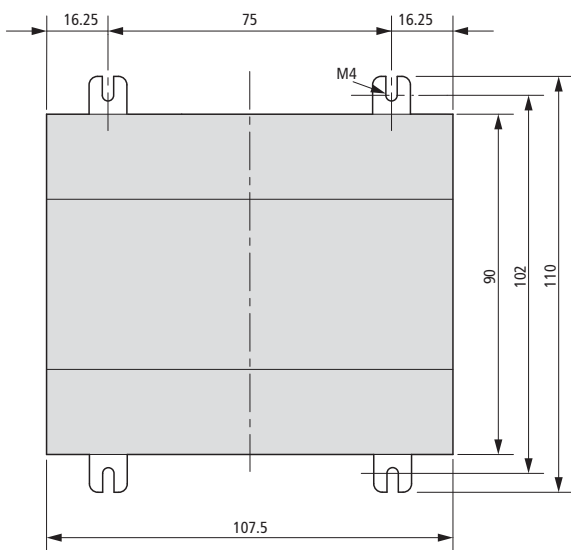


			ES4P...
Transistor outputs			
Number			4
Rated operational voltage	U_e	V DC	24
Permissible range	U_e	V DC	20.4 - 28.8
Ripple		%	≤ 5
Protection against polarity reversal			Yes (Caution: A short circuit will result if 0V or GND is applied to the outputs in the event that the supply voltage is connected to the wrong poles.)
Potential isolation			
From power supply			Yes
From the inputs			Yes
From PC interface, memory card, network, easyNet, easyLink			Yes
Rated operational current at signal "1" DC	I_e	A	Max. 0.5
At signal "1" with $I_e = 0.5$ A		V	$U = U_e - 1$ V
Short-circuit protection			Yes, thermal
Short-circuit tripping current for $R_a \leq 10$ m Ω		A	$0.7 \leq I_e \leq 2$ per output
Total short-circuit current		A	8
Peak short-circuit current		A	16
Thermal cutout			Yes
Max. operating frequency at constant resistive load $R_L < 100$ k Ω (dependant on program and load)		Ops/h	40000
Parallel connection of outputs			No
Status indication of the outputs			LCD display (if provided)
Inductive load			
Without external suppressor circuit			
Duty factor			$T_{0.95} \approx 3 \times T_{0.05} = 3 \times L/R$ $T_{0.95}$ = Time in ms, until 95 % of the steady-state current has been reached
With external suppressor circuit			
Utilization factor		g	1
Duty factor		% DF	100
Max. switching frequency, max. duty factor	Operations		Depending on the suppressor circuit

Safety technical data

www.moeller.net/de/products_solutions/solutions/safety/safety_values

ESP4



Description



Functional safety on machines – monitoring with safety relay ESR5

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.

Functionality

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 a ground fault, cross connection fault or wire breakage are detected with certainty. Activation of the enable paths is prevented in the event of a fault.

Configuration

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

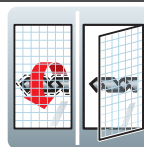


Advantages at a glance

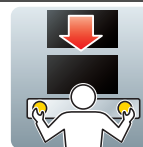
- Use for the highest safety requirements in accordance with EN ISO 13849-1, IEC 62061 and IEC 61508.
- Devices suitable for the world market thanks to certification from UL, CUL and TÜV Rhineland.
- Plug-in screw terminals for fast and fault-free replacement.
- Multi-voltage versions 24 - 230 V AC DC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



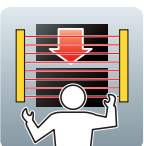
Emergency stop circuits
Allows the safe stopping of a hazardous movement, immediate stop for Stop category 0 and controlled stop Stop category 1 according to IEC 60204-1; for use in single or dual channel safety monitoring of emergency stop circuits.



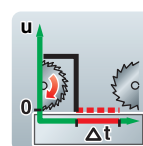
Guard door monitoring
Used with moving guards such as doors, barriers or flaps. Positions are reliably detected, monitored and enabled to safety-related requirements.



Safe operation with two-hand control
Type III to EN 574. Used for hazardous machine movement such as presses, punching, shearing. It allows the movement of dangerous operation only when both hands of the operator are outside the dangerous area and the two pushbuttons are operated within 0.5 seconds of each other.





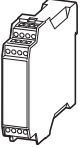
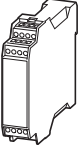
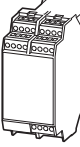





Electro-sensitive protective devices (ESPE)
Protection of the hazardous location or area in the vicinity of machines by means of contactless guards such as light grids/light barriers/light curtains.



Off-delay circuit
Makes it possible to safely stop a hazardous movement with controlled stopping according to IEC 60204-1 stop category 1.

HPL13015EN


Ordering

Actuating voltage	Suitable for	Number of enabling paths to IEC/EN 60204 Stop category	Signal contacts	Part no. Article no.	Price See price list	Std. pack	
U _c		0 1					
ESR5 electronic safety relays							
							
Safety relays for Emergency-Stop and guard door monitoring							
Single-channel	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 Cat. 4/PL e possible only with the aid of fault exclusions .	4	–	1	ESR5-NO-41-24VAC-DC 118701 ESR5-NO-21-24VAC-DC 118700 ESR5-NO-31-24VAC-DC 118702	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		
 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 IEC 62061 SIL 3 according to IEC 61508	3	–	1	ESR5-NO-31-24V-230VAC-DC 118704 ESR5-NO-31-230VAC 119380	1 off 
	230 V AC, 50/60 Hz	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	3	–	1		
Safety relays for emergency stop, guard door and light curtain monitoring							
Off-delayed ¹⁾	24 V DC	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 SIL 3 only for high demand requirements	2	2	0	ESR5-NV3-30 118705	1 off 
Two-hand relay, suitable for applications to EN 574 Typ III C							
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 expansion modules							
The basic device determines the maximum stop category according to IEC 61508 and IEC 60204							
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	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 IEC 62061 SIL 3 according to IEC 61508	5	–	2	ESR5-NE-51-24VAC-DC 118707	1 off 

Notes

¹⁾ Suitable for safety position switch with guard locking LS-S...MT-ZBZ.

Information relevant for export to North America

	Product Standards	IEC/EN see Technical Data; UL 508; CSA-C22.2 No. 14-95; CE marking
	UL File No.	E29184
	UL CCN	NKCR; NKCR7
	CSA File No.	UL report applies to both US and Canada
	CSA Class No.	3211-83; 3211-03
	NA Certification	UL Listed, certified by UL for use in Canada
	Degree of Protection	IEC: IP20, UL/CSA Type: -



Technical data

			ESR5-NO-21...	ESR5-NO-41...	ESR5-NO-31-24VAC-DC
General					
Standards			EN ISO 13849-1, IEC 62061, IEC 61508, DIN EN 50178, UL/CUL listed		
Type-dependent standards			-	-	-
Lifespan, mechanical	c (contacts)	× 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			Any	Any	Any
Vibration resistance (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
Shock resistance (IEC 60068-2-27)			-	-	-
Protection type					
Housing			IP20	IP20	IP20
Terminals			IP20	IP20	IP20
Protection against direct contact when actuated from front (IEC 0106 Part 100)			Finger- and back-of-hand proof	Finger- and back-of-hand proof	Finger- and back-of-hand proof
Weight		kg	0.17	0.22	0.17
Terminal capacity					
Solid or flexible		mm ²	1 x (0.2 - 2.5) 2 x (0.2 - 1)	1 x (0.2 - 2.5) 2 x (0.2 - 1)	1 x (0.2 - 2.5) 2 x (0.2 - 1)
Flexible with ferrule		mm ²	1 x (0.25 - 2.5) 2 x (0.25 - 1)	1 x (0.25 - 2.5) 2 x (0.25 - 1)	1 x (0.25 - 2.5) 2 x (0.25 - 1)
Solid or stranded		AWG	24 - 12	24 - 12	24 - 12
Terminal screw					
Pozidriv screwdriver		Size	2	2	2
Flat-blade screwdriver		mm	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Max. tightening torque		Nm	0.6	0.6	0.6
Main contacts					
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 operating voltage	U _e	V AC	230	230	230
Rated operation 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-NZ-21...	ESR5-NO-31-230VAC	ESR5-NO-31-24V-230VAC-DC	ESR5-NV3...	ESR5-VE3...	ESR5-NE-51...
EN ISO 13849-1, IEC 62061, IEC 61508, DIN EN 50178, UL/CUL listed					
EN 574 Part no. IIIC	EN 60204 (if applicable)	EN 60204 (if applicable)	EN 60204 (if applicable)	-	-
10	10	10	10	10	10
3600	3600	3600	3600	900	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	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	Dry heat according to EN60068-2-2, damp heat according to EN 60068-2-3
-20 - 55	-20 - 55	-20 - 55	-20 - 45	-20 - 55	-20 - 55
-25 - 75	-25 - 75	-25 - 75	-25 - 75	-25 - 75	-25 - 75
Any	Any	Any	Any	Any	Any
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
IP20	IP20	IP20	IP20	IP20	IP20
Finger- and back-of-hand proof	Finger- and back-of-hand proof	Finger- and back-of-hand proof	Finger- and back-of-hand proof	Finger- and back-of-hand proof	Finger- and back-of-hand proof
0.22	0.3	0.3	0.17	0.17	0.22
1 x (0.2 - 2.5) 2 x (0.2 - 1)	1 x (0.2 - 2.5) 2 x (0.2 - 1)	1 x (0.2 - 2.5) 2 x (0.2 - 1)	1 x (0.2 - 2.5) 2 x (0.2 - 1)	1 x (0.2 - 2.5) 2 x (0.2 - 1)	1 x (0.2 - 2.5) 2 x (0.2 - 1)
1 x (0.25 - 2.5) 2 x (0.25 - 1)	1 x (0.25 - 2.5) 2 x (0.25 - 1)	1 x (0.25 - 2.5) 2 x (0.25 - 1)	1 x (0.25 - 2.5) 2 x (0.25 - 1)	1 x (0.25 - 2.5) 2 x (0.25 - 1)	1 x (0.25 - 2.5) 2 x (0.25 - 1)
24 - 12	24 - 12	24 - 12	24 - 12	24 - 12	24 - 12
2	2	2	2	2	2
0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 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	II/2	III/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	49	50	50
-	50	50	-	-	-
72 A ² (6 + 6)	50 A ² (4 + 4 + 4)	50 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 (3.7 + 3.7 + 3.7 + 3.7 + 3.7)
6	6	6	10	10	6

			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_e	V DC	24	24	24
Voltage tolerance pick-up voltage		\times_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 proof	Short-circuit proof	Short-circuit proof
115 V/230 V			-	-	-
Control circuit					
Rated output voltage		V DC	24	24	24
Rated operational current		mA	S12, S22: 30, S34: 45	S12: 65, S34: 40	S12, S22: 30, S34: 45
Resistance	R		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 On Duration	t_M	ms	-	-	-
Recovery time	t_W	ms	Approx.1000	Approx.1000	Approx.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

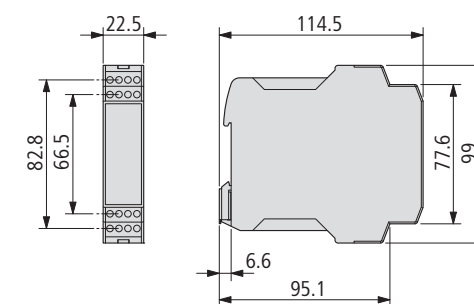
Safety technical data www.moeller.net/de/products_solutions/safety/safety_values

ESR5-NZ-21...	ESR5-NO-31-230VAC	ESR5-NO-31-24V-230VAC-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	1.8	2	2.2
Short-circuit proof					
Short-circuit proof	-	Short-circuit proof	-	-	-
-	Short-circuit proof	Short-circuit proof	-	-	-
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	S12, S22: 3.5, S34, S35: 7	A1, A2: 84, K1/K2: 5	A1, A2: 92
22	11	11	500	-	-
2.3	0.7	0.7	0.1	-	-
50	250	250	150	20	20
-	-	-	-	-	-
-	60	60	150	20	20
50	250	250	150	20	20
20	20	20	20 (non-delayed enable paths); 100 (min. delayed enable paths)	0.3 - 3 s (+ 50 %) adjustable	20
-	-	-	-	-	-
Approx.1000	Approx.1000	Approx.1000	Approx.330	Approx.1000	-
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
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	According to EN 61000-6-2

Dimensions

Safety relays, contact expansion modules

ESR5...24VAC-DC



ESR5...230VAC...

