

Control Relays, Contactor Relays, Electronic Timing Relays, Electronic Safety Relays, Measuring and Monitoring Relays

Relays
Contactor Relays

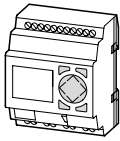


Control Relays, Contactor Relays, Electronic Timing Relays, Electronic Safety Relays, Measuring and Monitoring Relays Overview



Control relays

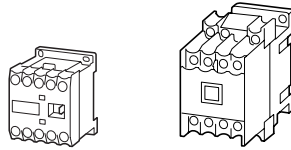
AC and DC operated



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Contactor relays

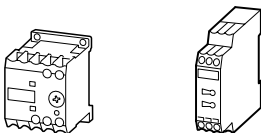
AC and DC operated



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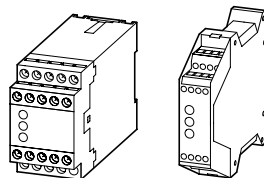
Electronic timing relays

AC and DC operated



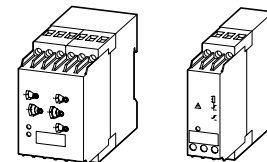
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Electronic safety relays



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Measuring and monitoring relays



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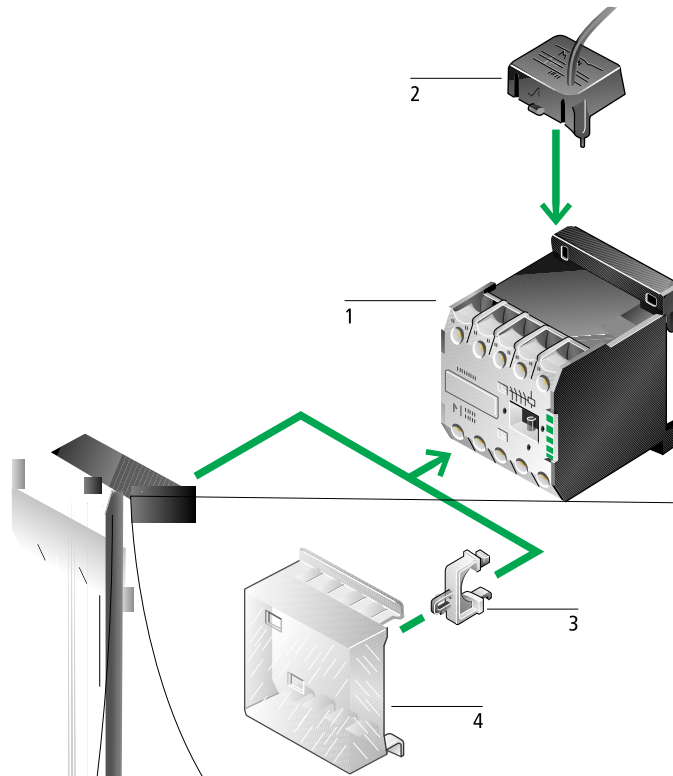
"Easy" Control Relays System Overview

Basic units 1	Basic units, expandable EASY619/621 5	Distinguishing features of the EASY control relay <ul style="list-style-type: none"> • Wide operational temperature range –25 °C to +55 °C • Standard front dimension for fitting into service distribution boards, 18 mm standard slot • Electronic "wiring" by keystroke, LCD (4 lines of 12 characters) and keypad or via software from the PC • Zero-voltage safe internal and external circuit configuration storage in EEPROM memory • 3 contacts (make or break contacts) in series plus one coil in each current path • Series and parallel connection • 41 current paths / lines of logic EASY412 • 121 current paths / lines of logic EASY600 • Integral password protection for circuit configuration and relay value presets • Current flow display for circuit configuration testing (LCD Types) • Selection option from ten different menu languages (EASY600) and five different menu languages (EASY412) D, GB, F, I, E, (P, NL, S, PL, TR)
AC or DC operated	AC or DC operated	
Power supply AC 100 (115) – 240 V, 50/60 Hz DC 24 V DC DA 12 V DC	Power supply AC 100 – 240 V, 50/60 Hz DC 24 V DC	
8 or 12 digital inputs (2 inputs usable as analog inputs [DC/DA variants only])	12 digital inputs (2 inputs usable as analog inputs [DC variants only])	
4 or 6 relay outputs (max. 10 A)	6 relay outputs (max. 10 A)	
4 or 8 transistor outputs	8 transistor outputs	
LCD display, X variants without LCD	LCD display, X variants without LCD	
Screw fixing and snap fitting	Screw fixing and snap fitting	
Screw terminals	Screw terminals	
→ Page 04/006	→ Page 04/008	
Fixing brackets 2	EASY-LINK-DS data plug 6	Functions <ul style="list-style-type: none"> • 8 timing relays 0.01 s to 99 h 59 min <ul style="list-style-type: none"> – On-delay – On-delay with random switching – Off-delay – Off-delay with random switching – Pulse shaping – Flashing • 8 up- and down-counter relays, 0000 to 9999 • 4 weekly timers (4 channels per timer, one On/Off point per channel, optional on Types with clock) • 8 analog value comparators, range 0 – 10 V (EASY...-D...-... Types only) • 8 lines of text, can be freely edited (EASY600 with display) • 16 auxiliary relays (EASY412), up to 32 auxiliary relays (EASY600) • Retentive actual values EASY412-D... <ul style="list-style-type: none"> – 4 markers – 1 timing relay – 1 counter • Retentive actual values EASY600 <ul style="list-style-type: none"> – 12 markers – 2 timing relays – 4 counters, e.g. as hours-run meters
For optional screw fixing, 3 brackets per relay for EASY4... minimum of 3 brackets per relay for EASY6...	For connecting the basic unit with the expansion unit	
→ Page 04/008	→ Page 04/006	
External memory card 3	Expansion unit 7	
For safe storage of the circuit configuration and all parameters	I/O expansion	
→ Page 04/008	AC or DC operated	
Connection cable 4	Power supply: AC 100 – 240 V, 50/60 Hz DC 24 V DC	
Safe isolation between "easy" and PC	12 digital inputs	
→ Page 04/008	6 relay outputs (max. 10 A)	
	8 transistor outputs	
	Screw fixing and snap fitting	
	Screw terminals	
	→ Page 04/006	
	Networking / Bus interfaces	
	EASY204-DP PROFIBUS-DP slave connection	
	EASY205-ASI AS-Interface slave connection	
	→ Page 04/008	
	Coupling unit 8	
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	Connection cable 9	
	e.g. NYM 3 × 1.5 mm ²	
	→ Page 04/008	

Contactor Relays, Electronic Timing Relays System Overview

DILER

Relays
Contactor Relays



DILR

Contactor Relays, Electronic Timing Relays

System Overview

DILER mini contactor relays

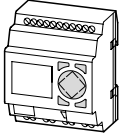
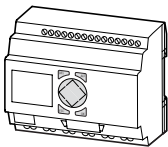
Basic units	1	Suppressors	2
AC or DC operated		All contactor relays with DC operated coils have an integral suppressor circuit	
Magnet systems		Suppressors for contactor relays with AC operated coils	
AC 12 – 480 V, 50, 60, 50/60 Hz		→ Page 04/026	
0.8 – 1.1 × U_c			
25 VA/4.6 VA			
DC 12 – 220 V DC			
0.85 – 1.1 × U_c			
2.6 W/2.6 W			
Maximum of eight contacts			
Interlocked opposing contacts		Sealable shroud with clip	3, 4
Modular system		As cover in IVS enclosures	
Screw fixing and snap fitting		→ Page 04/027	
Finger proof			
Screw terminals			
→ Page 04/010			
		Auxiliary contact modules	5
		2- or 4-pole	
		Overlapping contacts	
		Interlocked opposing contacts	
		→ Page 04/010	

DILR contactor relays

Basic units	1	Suppressors	2	Auxiliary contact modules	5
AC or DC operated		RC suppressor		4-pole	
Magnet systems		Varistor suppressor		Plug-in type	
AC 12 – 600 V, 50, 60, 50/60 Hz		Free-wheel diode suppressor		Interlocked opposing contacts	
0.8 – 1.1 × U_c		→ Page 04/026		→ Page 04/012	
60 VA/8.5 VA					
DC 12 – 250 V DC					
0.85 – 1.1 × U_c					
9.5 W/9.5 W					
Coils for non-standard voltages		Amplifier modules	3	Pneumatic timer modules	6
Maximum of eight contacts		With and without integral suppressor circuits		On- and Off-delayed	
Interlocked opposing contacts		Plug-in type		With or without TÜV* approval to VDE 0116	
Modular system/complete units		Separate mounting		*TÜV = German Technical Supervisory Association	
Screw fixing and snap fitting		→ Page 04/026		→ Page 04/012	
Finger proof					
Screw terminals					
→ Page 04/010					
		Auxiliary contact modules	4	Mechanical latching module	7
		2-pole		Latches the contactor relay in the event of loss of control voltage	
		Plug-in type		→ Page 04/012	
		Interlocked opposing contacts			
		→ Page 04/012			

"Easy" Control Relays

Basic Units

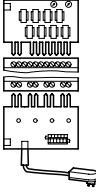
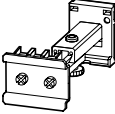
		Description	Type Article no.	Price See Price List	Std. pack
Basic units					
	24 V DC, retentive	<ul style="list-style-type: none"> • 8 digital inputs (2 inputs usable as analog inputs) • 4 relay outputs • LCD display • Operating buttons • Screw terminals 	EASY412-DC-R 202403		1 off
		Features same as EASY 412-DC-R plus built-in timer/time switch	EASY412-DC-RC 202404		
		Features same as EASY412-DC-RC, without keypad and LCD display	EASY412-DC-RCX 221596		
		<ul style="list-style-type: none"> • 8 digital inputs (2 inputs usable as analog inputs) • 4 transistor outputs • LCD display • Operating buttons • Screw terminals • Time switch/Timer 	EASY412-DC-TC 207808		
		Features same as EASY412-DC-TC, without keypad and LCD display	EASY412-DC-TCX 212307		
		<ul style="list-style-type: none"> • 12 digital inputs (2 inputs usable as analog inputs) • 6 relay outputs • LCD display • Operating buttons • Screw terminals • Time switch/Timer 	EASY618-DC-RC 224472		
		<ul style="list-style-type: none"> • 12 digital inputs (2 inputs usable as analog inputs) • 6 relay outputs • LCD display • Operating buttons • Screw terminals • Time switch/Timer • Can be expanded using EASY expansion units 	EASY619-DC-RC 224473		
		Features same as EASY412-DC-RC, without keypad and LCD display	EASY619-DC-RCX 224474		
		<ul style="list-style-type: none"> • 12 digital inputs (2 inputs usable as analog inputs) • 8 transistor outputs • LCD display • Operating buttons • Screw terminals • Time switch/Timer 	EASY620-DC-TC 212309		
		<ul style="list-style-type: none"> • 12 digital inputs (2 inputs usable as analog inputs) • 8 transistor outputs • LCD display • Operating buttons • Screw terminals • Time switch/Timer • Can be expanded using EASY expansion units 	EASY621-DC-TC 218719		
Features same as EASY412-DC-TC, without keypad and LCD display	EASY621-DC-TCX 212311				
	12 V DC, retentive	<ul style="list-style-type: none"> • 8 digital inputs (2 inputs usable as analog inputs) • 4 relay outputs • LCD display • Operating buttons • Screw terminals • Time switch/Timer 	EASY412-DA-RC 224471		

"Easy" Control Relays

Basic Units, Expansion Units, Accessories

Description		Type Article no.	Price See Price List	Std. pack
Basic units				
115/230 V AC	<ul style="list-style-type: none"> • 8 digital inputs, 115/230 V AC • 4 relay outputs • LCD display • Operating buttons • Screw terminals 	EASY412-AC-R 202405		1 off
	Features same as EASY 412-AC-R, plus timer	EASY412-AC-RC 202406		
	Features same as EASY412-AC-RC, without keypad and LCD display	EASY412-AC-RCX 212308		
115/230 V AC, retentive	<ul style="list-style-type: none"> • 12 digital inputs, 115/230 V AC • 6 relay outputs • LCD display • Operating buttons • Screw terminals • Time switch/Timer 	EASY618-AC-RC 212310		
	<ul style="list-style-type: none"> • 12 digital inputs, 115/230 V AC • 6 relay outputs • LCD display • Operating buttons • Screw terminals • Time switch/Timer • Can be expanded using EASY expansion units 	EASY619-AC-RC 218721		
	Features same as EASY619-AC-RC, without keypad and LCD display	EASY619-AC-RCX 212312		
Expansion units				
24 V DC	<ul style="list-style-type: none"> • 12 digital inputs • 8 transistor outputs • With connector 	EASY620-DC-TE 212313		1 off
115/230 V AC	<ul style="list-style-type: none"> • 12 digital inputs, 115/230 V AC • 6 relay outputs • With connector 	EASY618-AC-RE 212314		
Coupling unit	<ul style="list-style-type: none"> • Coupling unit for connecting to an EASY619/621 basic unit • Terminals for remote expansion, up to 30 m to/from the expansion unit • With connector 	EASY200-EASY 212315		
Expansion units for networking				
AS-Interface	<ul style="list-style-type: none"> • Linked directly to EASY619/621 • AS-Interface connection • Slave • 4 inputs, 4 outputs, 4 parameter bits • Addresses available: 0 to 31 • With connector 	EASY205-ASI 221598		1 off
PROFIBUS DP	<ul style="list-style-type: none"> • Linked directly to EASY619/621 • PROFIBUS-DP slave • Addresses available: 0 to 126 • With connector 	EASY204-DP 212316		1 off
Accessories for DP				
PROFIBUS DP bus connector plug	9-pole (pins), comes as a kit without cable, for connection of the data cable	ZB4-209-DS2 206982		1 off
PROFIBUS DP bus connector plug	<ul style="list-style-type: none"> • Metallised insulated housing • Maximum transfer rate 12 MBit/s • Built-in switch (accessible from the outside) for the bus termination resistances • Terminal block for two cables, optionally with straight or 90° angled cable entry • Suitable for EASY204-DP 	ZB4-209-DS3 217820		
PROFIBUS DP data cable	Twisted pair cable, 2 × 0.64 mm ² , length: 100 m	ZB4-900-KB1 206983		

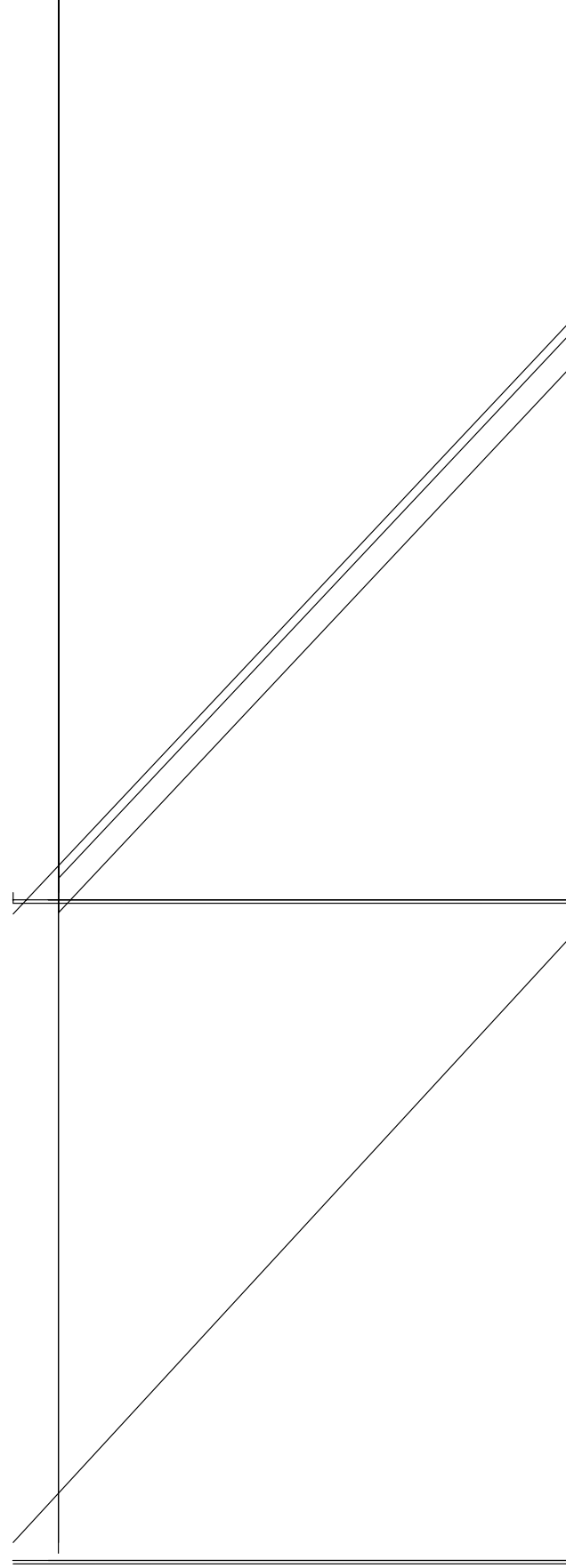
"Easy" Control Relays Networking, Accessories

	Description	Type Article no.	Price See Price List	Std. pack
Accessories				
Software	CD, menu selection from 6 languages Installation under WIN 95, 98, WIN NT 4.0 Service Pack 3 and above	EASY-SOFT 202407		1 off
Memory card	8K memory card for storing the entire circuit configuration for EASY412	EASY-M-8K 202408		
	16K memory card for storing the entire circuit configuration for EASY6..	EASY-M-16K 212317		
Connection cable	Length: 2 m, for connection to 9-pole serial PC interface with interface electronics	EASY-PC-CAB 202409		
Input-output simulator 	Simulator with power supply unit, 115/230 V AC/output 24 V DC, suitable/ designed for EASY412-DC...	EASY412-DC-SIM 212318		
	Same as EASY412-DC-SIM, with 120 V AC plug-in power supply unit/ 24 V DC output, plug suitable for North America	EASY412-DC-SIM-NA 222566		
Fixing bracket	For screw fixing onto mounting plate: 3 brackets per EASY4..., 3 brackets per EASY6..., 2 brackets per EASY2...	ZB4-101-GF1 061360		9 off
Coupling piece	Spare link between basic unit and expansion units	EASY-LINK-DS 221607		1 off
Telescopic adapter 	With 45 mm EN 50 022 top-hat rail, for equalization of the mounting depth of rear mounted devices in CI-K... enclosures and cabinets. Steplessly adjustable via scales, from 75 – 115 mm. For screw and snap fixing (also suitable for PKZM0, FAZ, FIP, ETR, EMR4 etc.)	M22-TA 226161		10 off
	Switched-mode power supply unit	Primary-switched mode, regulated • Rated input voltage 50/60 HZ: 115/230 V AC • Rated output voltage: 24 V DC • Rated output current: 1.25 A	EASY400-POW 212319	

"Easy" Control Relays

Documentation

Description	Type Article no.	Price See Price List	Std. pack
Documentation			
Manual for the "Easy" control relay			
German	AWB2528-1304-D 205375		1 off
English	AWB2528-1304-GB 205481		
French	AWB2528-1304-F 205482		
Italian	AWB2528-1304-I 205483		
Spanish	AWB2528-1304-E 205484		
Brief introduction to the "Easy" control relay			
German	AWB2528-1316-D 205376		1 off
English	AWB2528-1316-GB 205485		
French	AWB2528-1316-F 205486		
Italian	AWB2528-1316-I 205487		
Spanish	AWB2528-1316-E 205488		



DNR Contactor Relays
Basic Units, Modules

DILR Contactor Relays
Basic Units, Modules

Relays
Contactor Relays

Relays
Contactor Relays

Contacts
M = Make
B = Break

Rated operational current I_{th}
AC-15 380 V
220 V 400 V
230 V 415 V
240 V 475 V

Conv. therm. current I_{th}

Distinctive number and version of combination

Circuit symbol

Basic units with interlocked opposing contacts

Auxiliary contact modules with interlocked opposing contacts

Pneumatic timer modules, time ranges of 0.3 - 30 s and 20 - 180 s

Mechanical latching module

Note

DC operation

Type Article no. Price See Price List Std. pack

AC operation

Type Article no. Price See Price List Std. pack

Notes

Other actuating voltages → Page 04/030

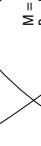
Contact numbers to EN 50 011
Coil terminal markings to EN 50 005

DILR40: supplied without front plate
Front plate → Page 05/047

Version E combinations correspond to EN 50 011 and are to be preferred;
other combinations correspond to EN 50 005

Version E combinations correspond to EN 50 011 and are to be preferred;
other combinations correspond to EN 50 005

DC operation		AC operation		Notes	
Type	Article no.	Type	Article no.	Price	Std. pack
DILR40-G(24VDC)	048537	DILR40(230V50HZ)	043756	1 off	
DILR31-G(24VDC)	048533	DNR31(230V50HZ)	043768		
DILR22-G(24VDC)	048526	DILR22(230V50HZ)	043780		
02DK	098145	02DIL	098145	5 off	
11DIL	010245	11DIL	010245		
20DIL	012718	20DIL	012718		
04DIL	015091	04DIL	015091	5 off	
13DIL	017464	13DIL	017464		
22DIL	019837	22DIL	019837		
31DIL	010752	31DIL	010752		
40DIL	022210	40DIL	022210		
TPE11DIL	002279	TPE11DIL	002279	1 off	
TPD11DIL	002280	TPD11DIL	002280		
TPEH11DIL	046924	TPEH11DIL	046924		
TPDH11DIL	046925	TPDH11DIL	046925		
V-GDIL(Z4VDC)	048562	VBDL(230V50HZ)	043835	1 off	



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04/026

Accessories
1 Amplifier module
0 other accessories

1 TUV = German Technical Supervisory Association

DILR Contactor Relays
Complete Units

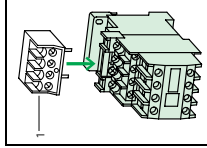
Contacts	Rated operational current I_{th}	Conv. therm. current I_{th}	A	A	Circuit symbol	Distinctive number	AC operation	Price	Std. pack
	AC-15						Type	See Price List	
	220 V	380 V					Article no.		
2 M	230 V	400 V	6	4		22	DILR22D(230V50HZ)		1 off
4 M	240 V	415 V				44	DILR44D(230V50HZ)		
5 M						53	DILR53D(230V50HZ)		

Complete units, with 1 early-make contact, 1 late-break contact



DILR Contactor Relays
Complete Units

DC operation	Price	Notes
Type	See Price List	
Article no.		
DILR22D-G(24VDC)		Coil terminal markings to EN 50 005 Other actuating voltages → Page 04/030 DILR22D: supplied with front plate
DILR44D-G(24VDC)		
DILR53D-G(24VDC)		



Accessories

- T Amplifier module
- Other accessories

Page


04/026
04/026

DILET Electronic Timing Relays


24 – 240 V, 50/60 Hz, AC		346 – 440V, 50/60 Hz, AC	
Type	Price	Type	Price
Article no.	See Price List	Article no.	See Price List
DILET11-30-A 048878		DILET11-30-W 048904	
DILET11-M-A 048886		DILET11-M-W 048891	
DILET70-A 048893		DILET70-W 048899	

Rated operational current _{lc}	Conv. therm. current _{th}	Time range	Price	Std.
220V	380V	1.5 – 30 s	See Price List	1 off
230V	400V	0.05 – 3 s		
240V	440V	0.15 – 10 s		
A	A	3 – 60 s		
A	A	0.15 – 3 min		
A	A	0.5 – 10 min		
A	A	3 – 60 min		
A	A	0.15 – 3 h		
A	A	0.5 – 10 h		
A	A	3 – 60 h		

Timing relays, On-delayed



Multi-function relay with connection for remote potentiometer



Setting example

Time range of timing relay 60 min
 Time required 42 min
 Setting required on time scale 7

Calculated as follows:

$$\frac{\text{Time required} \times 10}{\text{Time range of timing relay}} = \text{Setting on time scale}$$

$$\frac{42 \text{ min} \times 10}{60 \text{ min}} = 7$$

DILET Electronic Timing Relays

Available functions¹⁾ Terminal markings to EN 50 042



Potential-free contact
 Do not apply voltage!



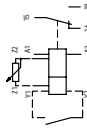
11

11

11, 21, 42, 81



12, 16, 22, 82

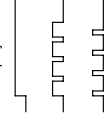


Notes

¹⁾ DILET11 supplied with stated function as standard

Flow diagrams

LED display



11 On-delayed

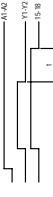


Time t not running
 Contact 15 – 18 closed

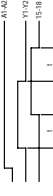
Time t running
 Contact 15 – 18 closed

Time t running
 Contact 15 – 18 open

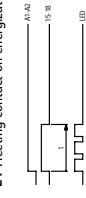
12 Off-delayed



16 On- and Off-delayed



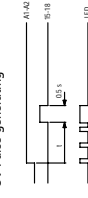
21 Fleeting contact on energization



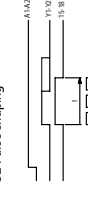
22 Fleeting contact on de-energization



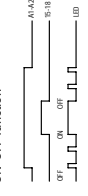
81 Pulse generating






82 Pulse shaping



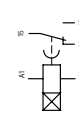
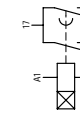
ON-OFF function



ETR4 Electronic Timing Relays

Rated operational current _{AC-15}	Conv. therm. current _{4h}	Time range	24 – 240 V, 50/60 Hz, AC		346 – 440 V, 50/60 Hz	
			Type	Price	Type	Price
220V 230V 240V	A	0.05 – 1 s 0.15 – 3 s 0.5 – 10 s 1.5 – 30 s 5 – 100 s 15 – 300 s 1.5 – 30 min 15 – 300 min 1.5 – 30 h 5 – 100 h	Article no.	See Price List	Article no.	See Price List
A	A		ETR4-11-A 031882		ETR4-11-W 031883	
Timing relays, On-delayed						
						
Star-delta timing relays						
						
Multi-function relay						
						
3	3	3 – 60 s	ETR4-51-A 031884		ETR4-51-W 031885	1 off
3	3	0.05 – 1 s 0.15 – 3 s 0.5 – 10 s 1.5 – 30 s 5 – 100 s 15 – 300 s 1.5 – 30 min 15 – 300 min 1.5 – 30 h 5 – 100 h	ETR4-69-A 031891		ETR4-69-W 031887	1 off

ETR4 Electronic Timing Relays

Available functions ¹⁾	Terminal markings to EN 50 042	Available functions ¹⁾	Terminal markings to EN 50 042
11			
51			

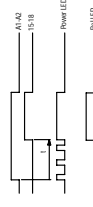
Type suffix	Actuating voltage printed on unit	Connection to B1
-A	24 – 240 V DC 24 – 240, 50/60 Hz	Two-core cable
-W	– 346 – 440, 50/60 Hz	Two-core cable in same cable duct as mains cable
	Voltage tolerance:	
-A	16.8 – 288 V DC	250 m
-W	20.4 – 264 V AC	50 m
	Admissible cable length:	
	Cable, unscreened	Connection to B1
	Cable cross-section	
	0.5 – 1.5 mm ²	
	Accessories:	Page
	Screw adapter	04/028

Notes

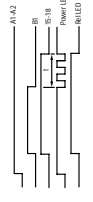
¹⁾ ETR4-11 and ETR4-51 supplied with stated function as standard

Flow diagrams

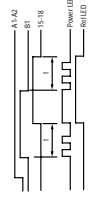
11 On-delayed



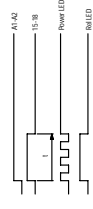
12 Off-delayed



16 On- and Off-delayed



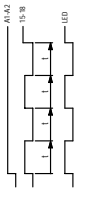
21 Fleeting contact on energization



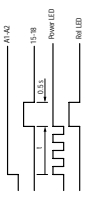
22 Fleeting contact on de-energization



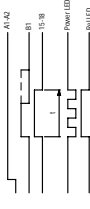
42 Flashing



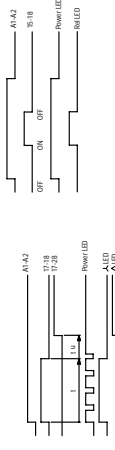
81 Pulse generating



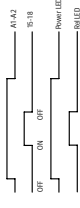
82 Pulse shaping



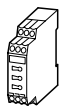
51 Star-delta



ON-OFF function



ETR4 Electronic Timing Relays

Rated operational current I_e			Conv. therm. current I_{th}	Time range	Type Article no.	Price See Price List	Std. pack	Notes																														
AC-11	220 V	380 V																																				
	230 V	400 V																																				
	240 V	440 V																																				
A	A	A																																				
Multi-function relay																																						
With two changeover contacts and connection for remote potentiometer. Can be converted to two timed contacts or one non-delayed contact and one timed contact.																																						
	3	3	6	0.05 – 1 s 0.15 – 3 s 0.5 – 10 s 1.5 – 30 s 5 – 100 s 15 – 300 s 1.5 – 30 min 15 – 300 min 1.5 – 30 h 5 – 100 h	ETR4-70-A 031888		1 off	<table border="1"> <thead> <tr> <th rowspan="2">Type suffix</th> <th colspan="2">Actuating voltage printed on unit</th> </tr> <tr> <th>V DC</th> <th>V AC</th> </tr> </thead> <tbody> <tr> <td>-A</td> <td>24 – 240</td> <td>24 – 240, 50/60 Hz</td> </tr> <tr> <td colspan="3">Voltage tolerance:</td> </tr> <tr> <td></td> <td>V DC</td> <td>V AC</td> </tr> <tr> <td></td> <td>16.8 – 288</td> <td>20.4 – 264</td> </tr> </tbody> </table> <p>Admissible cable length:</p> <table border="1"> <tbody> <tr> <td>Cable, unscreened</td> <td rowspan="2">Connection to B1 Z1/Z2</td> </tr> <tr> <td>Cable cross-section 0.5 – 1.5 mm²</td> </tr> <tr> <td>Two-core cable</td> <td>250 m</td> </tr> <tr> <td>Two-core cable in same cable duct as mains cable 50/60 Hz</td> <td>50 m</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Accessories</th> <th>Page</th> </tr> </thead> <tbody> <tr> <td>Screw adapter</td> <td>04/027</td> </tr> <tr> <td>Remote potentiometer</td> <td>04/028</td> </tr> </tbody> </table>	Type suffix	Actuating voltage printed on unit		V DC	V AC	-A	24 – 240	24 – 240, 50/60 Hz	Voltage tolerance:				V DC	V AC		16.8 – 288	20.4 – 264	Cable, unscreened	Connection to B1 Z1/Z2	Cable cross-section 0.5 – 1.5 mm ²	Two-core cable	250 m	Two-core cable in same cable duct as mains cable 50/60 Hz	50 m	Accessories	Page	Screw adapter	04/027	Remote potentiometer	04/028
Type suffix	Actuating voltage printed on unit																																					
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-A	24 – 240	24 – 240, 50/60 Hz																																				
Voltage tolerance:																																						
	V DC	V AC																																				
	16.8 – 288	20.4 – 264																																				
Cable, unscreened	Connection to B1 Z1/Z2																																					
Cable cross-section 0.5 – 1.5 mm ²																																						
Two-core cable	250 m																																					
Two-core cable in same cable duct as mains cable 50/60 Hz	50 m																																					
Accessories	Page																																					
Screw adapter	04/027																																					
Remote potentiometer	04/028																																					

ETR4 Electronic Timing Relays

ETR4-70 Flow Diagrams

A2/X1 linked

→ Two timed contacts

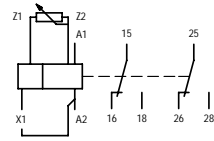
Available functions

Terminal markings
to EN 50 042

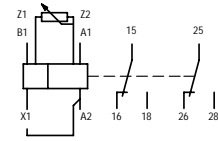
Available functions

Terminal markings
to EN 50 042

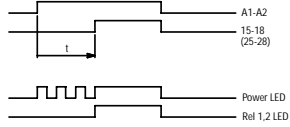
11, 21, 42, 81
ON – OFF



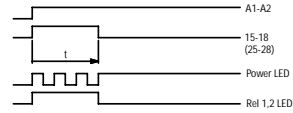
12, 16, 22, 82
ON – OFF



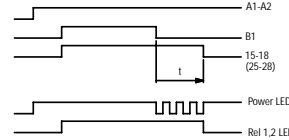
11 On-delayed



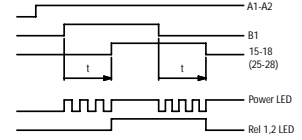
21 Fleeting contact on energization



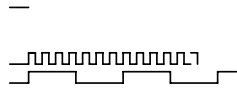
12 Off-delayed



16 On- and Off-delayed



42 Flashing



81 Pulse generating

ON-OFF function

22 Fleeting contact on de-energization

82 Pulse shaping

A2/X1 not linked

→ One non-delayed contact and one timed contact

Available functions

Terminal markings
to EN 50 042

Available functions

Terminal markings
to EN 50 042

11, 21, 42, 81
ON – OFF

12, 16, 22, 82
ON - OFF

11 On-delayed

21 Fleeting contact on energization

12 Off-delayed

16 On- and Off-delayed

42 Flashing

81 Pulse generating

22 Fleeting contact on de-energization

82 Pulse shaping

ON-OFF function

ESR Electronic Safety Relays Engineering

Applications

Electronic safety relays are used for monitoring safety-related control systems. The requirements for the electrical equipment of machines are specified in IEC/EN 60 204. EN 954-1 stipulates that machine users must carry out a risk assessment of machines and implement a control system that meets the requirements of safety categories 1, 2, 3, or 4.

Construction

The electronic safety relays consist of a power section, the electronics and two redundant relays with interlocked opposing contacts for the enabling- and signalling paths.

The ESR electronic safety relays are approved by employers' liability associations and meet the requirements of safety category 3 or 4. The safety category of the control system is determined by the combination with the external circuitry, for which the machine operator is responsible.

The electronic safety relays are single-fault proof, i.e. one fault in the safety circuit does not cause hazardous conditions. EN 954-1 excludes the possibility of two independent faults occurring at the same time.

In fault-free operation, following the starting command, the safety circuits are monitored by the electronics, and the enabling paths are activated via the relay. Following the switch Off command, and also in the event of a fault (earth fault, faulty insulation, wire breakage etc.), the enabling paths are blocked immediately (stop category 0) or with a time delay (stop category 1), and the motor is disconnected from the power supply. Since a short circuit in the redundant safety circuit does not cause a hazardous condition, the fault is not detected until the system is reset, when switching On is prevented.

IEC/EN 60 204-1 stipulates two relevant stop categories for stopping in the event of an emergency:

- Stop category 0: stopping by means of immediate removal of the power supply to the machine actuators.
- Stop category 1: controlled stopping with power available to the machine actuators to achieve the stop. Power is not removed until the stop is achieved.

The safety relays for Emergency-Stop applications and the non-delayed expansion modules are suitable for Stop category 0. Delayed contact expansion modules meet the requirements of Stop category 1.

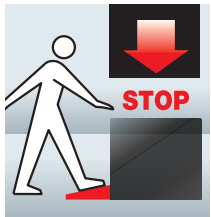
Safety relays for stopping in the event of an emergency and for monitoring of protective guards are available for single-channel and dual-channel applications. The single-channel construction enables earth-fault monitoring to be implemented for the safety circuit. The dual-channel application provides a redundant Emergency-Stop or protective guard monitoring circuit. This allows monitoring for short circuits and cable insulation faults to be implemented additionally. The device can also be used with or without reset monitoring. In this way, the device is not started and enabling paths switched until the falling edge of the On push-button has been detected. An application for the device without reset monitoring is for example, for monitoring protective doors for an automatic restart.

Product range overview

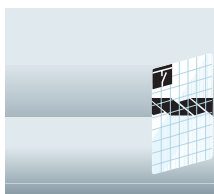
The range includes relays for:



Emergency-Stop circuits



Monitoring of contact mats/safety mats, and safety bumpers



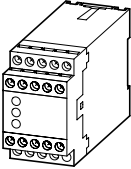

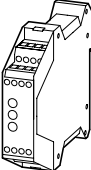





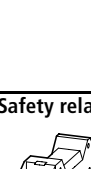

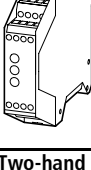

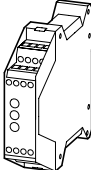

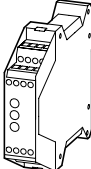

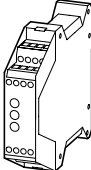

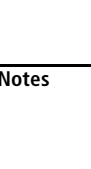

Protective guard monitoring

Monitoring of two-hand controls

Contact expansion modules with and without time delay are also available.

ESR Electronic Safety Relays

Basic Units, Contact Expansion Modules

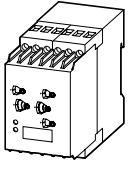
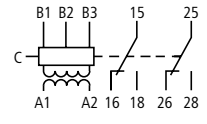
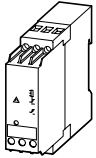
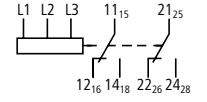
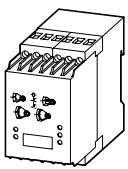
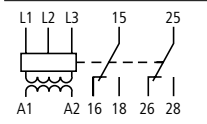
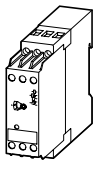
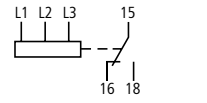
	Actuating voltage U_c		Safety category to EN 954-1	Enabling path to IEC/EN 60 204	Stop category 0 1	Type Article no.	Price See Price List	Std. pack
Safety relays for Emergency-Stop and protective door monitoring¹⁾								
	230 V 50/60 Hz	Dual-channel	4	3	–	ESR3-NO-31(230V) 214615		1 off
								
	24 V DC 50/60 Hz	Single-channel	3	3	–	ESR4-NO-31 214612		
								
	24 V DC 50/60 Hz	Dual-channel	4	2	–	SR4-NO-21 214613		
								
	24 V DC	Dual-channel Off-delayed 0.15 – 3 s	3 ⁴⁾ /4 ⁵⁾	2	1	ESR4-NV3-30 214616		
								
	24 V DC	Dual-channel Off-delayed 1.5 – 30 s	3 ⁴⁾ /4 ⁵⁾	2	1	ESR4-NV30-30 ⁶⁾ 214617		
								
	24 V DC	Dual-channel delayed 1.5 – 30 s ⁸⁾	3 ⁴⁾ /4 ⁵⁾	2	1	ESR4-NT30-30 ⁷⁾ 225011		
								
Safety relay for contact mat monitoring¹⁾								
	24 V DC	Dual-channel	4	2	–	ESR4-NM-21 214619		1 off
								
Two-hand relay^{1) 9)}								
	24 V DC 50/60 Hz	Dual-channel	4	2	–	ESR4-NZ-21 214620		1 off
								
Contact expansion modules¹⁾								
	24 V DC 50/60 Hz	Non-delayed	4 ²⁾	4 ³⁾	–	ESR4-NE-42 214614		1 off
								
	24 V DC	Off-delayed $t_A = 3$ s	4 ²⁾	–	4	ESR4-VE3-42 214618		1 off
								

Notes

- 1) For more information and examples of circuits → Safety Manual: TB0-009
- 2) The basic unit determines the maximum safety category.
- 3) The basic unit determines the maximum stop category.
- 4) Delayed contacts
- 5) Non-delayed contacts
- 6) Suitable for AT0-...MT-ZBZ safety position switches with mechanical securing action
- 7) Suitable for AT0-...FT-ZBZ safety position switches with mechanical securing action
- 8) Contact closes following Emergency-Stop actuation, On-delayed
- 9) Suitable for applications to EN 574 Type III C

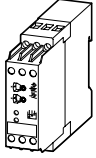
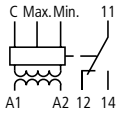
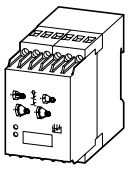
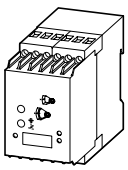
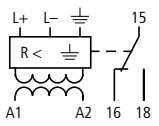
EMR4 Measuring and Monitoring Relays

Current Monitoring Relays, Phase Sequence Relays, Phase Monitoring Relays, Phase Imbalance Monitoring Relays


Description	Adjustable current measuring range $I \sim I_{\text{N}}$	Circuit symbol	Supply voltage	Type Article no.	Price See Price List	Std. pack
EMR4-I... current monitoring relays						
 <ul style="list-style-type: none"> Switching hysteresis adjustable from 5 – 30 % Response delay 0.05 – 30 s Supply voltage LED: green Status indication via LEDs EMR4...-A: monitors one upper or lower limit EMR4...-B: monitors one upper limit 	3 – 30 mA 10 – 100 mA 0.1 – 1 A		24 – 240 V AC/DC	EMR4-I1-2-A 221781		1 off
	0.3 – 1.5 A 1 – 5 A 3 – 15 A		24 – 240 V AC/DC	EMR4-I15-2-A 221782		
			220 – 240 V AC	EMR4-I15-2-B 221783		
EMR4-F... phase sequence relays						
 <ul style="list-style-type: none"> Monitors three-phase systems for phase sequence and phase failure ($< 0.6 \times U_e$) Status indication via LEDs Supply voltage = voltage being monitored 	200 – 500 V AC		200 – 500 V AC	EMR4-F500-2 221784		1 off
EMR4-W... phase monitoring relays						
 <ul style="list-style-type: none"> Monitors three-phase systems for phase sequence, over- and undervoltage and phase failure ($< 0.6 \times U_e$) 3-phase voltage monitoring within a range Status indication via LEDs Selectable On-delay or Off-delay between 0.1 – 10 s 	U_{min} 300 – 380 V AC U_{max} 420 – 500 V AC		160 – 300 V AC	EMR4-W500-2-C 221785		1 off
			300 – 500 V AC	EMR4-W500-2-D 221786		
	U_{min} 350 – 430 V AC U_{max} 500 – 580 V AC		300 – 500 V AC	EMR4-W580-2-D 221787		
EMR4-A... phase imbalance monitoring relays						
 <ul style="list-style-type: none"> Monitors three-phase systems for phase imbalance Detects phase failure even at 95 % regeneration of the failed phase Response delay: 0.5 s Switching threshold adjustable from 5 – 15 % imbalance Status indication via LEDs Phase sequence detection Supply voltage = voltage being monitored 	380 – 415 V 50 Hz		380 – 415 V 50 Hz	EMR4-A400-1 221788		1 off

EMR4 Measuring and Monitoring Relays

Level Monitoring Relays, Insulation Monitoring Relays, Sealable Shrouds


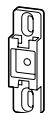


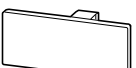
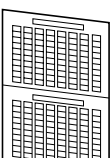
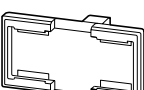
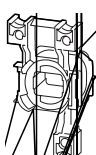
Description	Response sensitivity range	Circuit symbol	Supply voltage	Type Article no.	Price See Price List	Std. pack
EMR4-N... liquid level monitoring relays						
 <ul style="list-style-type: none"> Monitors the level of conductive liquids Monitors the ratio of mixtures of conductive liquids Status indication via LEDs Dual-voltage protection against running dry or overflow 	5 – 100 kΩ		220 – 240 V AC	EMR4-N100-1-B 221789		1 off
 <ul style="list-style-type: none"> Monitors the level of conductive liquids Monitors the ratio of mixtures of conductive liquids Status indication via LEDs Selectable On-delay or Off-delay between 0.5 – 10 s 	250 Ω – 500 kΩ		220 – 240 V AC	EMR4-N500-2-B 221790		
	250 Ω – 500 kΩ		24 – 240 V AC/DC	EMR4-N500-2-A 221791		
EMR4-R... insulation monitoring relays						
 <ul style="list-style-type: none"> Monitors the insulation resistance in non-earthed DC supply systems Selector switch between open-circuit or closed-circuit principle With test and reset facilities Status indication via LEDs 	10 – 110 kΩ		24 – 240 V AC/DC	EMR4-RDC-1-A 221792		1 off
<ul style="list-style-type: none"> Monitors the insulation resistance between non-earthed AC supply systems and protective conductor/earth Tripping function memory Insulation monitoring in 1- and 3-phase AC supply systems Test via local test button or remote test/operation Status indication via LEDs to VDE 0413 Part 2 	10 – 110 kΩ		24 – 240 V AC/DC	EMR4-RAC-1-A 221793		1 off
Mounting width				Type Article no.	Price See Price List	Std. pack
EMR4-PH... sealable shroud						
22.5 mm				EMR4-PH22 221795		1 off
45 mm				EMR4-PH45 221794		1 off

Mini Contactor Relays, Contactor Relays, Electronic Timing Relays Accessories

	For use with contactor relays or timing relays	Type Article no.	Price See Price List	Std. pack	
Spacers					
	For arranging contactor relays and timing relays in combinations	DILE... DILET...	VODILE 026634	50 off	0 mm distance between relays
		DILR... ETR4	VODIL 010772	20 off	0 mm distance between relays
		DILR... ETR4	V5/15DIL 013145	10 off	5 mm distance between relays 15 mm distance between relays for mechanical interlock between both relays
Mechanical interlock					
		DILE...	MVDILE 010113	5 off	For two AC or DC operated contactor relays, mounted vertically or horizontally. Distance between contactor relays 0 mm, mechanical lifespan 2.5×10^6 operations. Additional auxiliary contact modules can be fitted. → Page 04/012
Paralleling link					
	For auxiliary contacts	DILE... ...DILE DILR ...DIL	BT480 052785	100 off	Not proof against accidental contact to IEC 536
Blade terminal DIN 46 244					
	For auxiliary contact and coil connections	DILE... DILET... DILR...	BT483 059904	100 off	Use insulated ferrules
Sealable shrouds					
	Transparent	DILE... DILET...	HDILE 010482	1 off	Snap fitting on contactor relay. For use with open-type contactor relays or in service distribution boards. IP40 degree of protection from front. Can be drilled for the setting dials of the timing relay.
		TPE(H) TPD(H)	PL-DILT 036073	5 off	For screw fixing on timer module, and subsequent sealing

Mini Contactor Relays, Contactor Relays, Electronic Timing Relays

Accessories

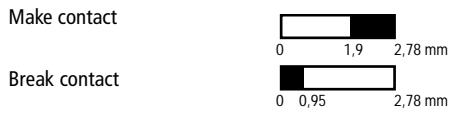
		For use with contactor relays or timing relays	Type Article no.	Price See Price List	Std. pack	
Remote potentiometer, IP54						
	10 kΩ linear 0.25 W max.	DILET... ETR4-70	RR-10 031344		1 off	
Screw adapter						
		ETR4	CS-TE 095853		1 off	For screw fixing of ETR4 timing relays
Component labelling system						
Label	8 × 10 mm	...DIL	KG10 022256		500 off	Clips into 2-pole auxiliary contact modules
						
	8 × 20 mm	...DILE, DILER ...DIL, DILR	KG20 091075		500 off	Clips into 4-pole auxiliary contact modules and basic units
						
Label plate with fixing stud	8 × 17.5 mm Colour: white	DIL...	XGKS-Z 207508		500 off	For use with Moeller equipment with the corresponding mounting hole
						
Sheet of labels	7.5 × 17 mm	XGKS, XGKS-Z KG20	XGKE-GE 207517		25 off	1 off = 1 sheet 240 labels per sheet 1 sheet = DIN A4, can be split into two DIN A5 sheets
	Colour: yellow HKS 3 (≈RAL 1018)	For inscription using laser printer, plotter, transparency- printer, photocopier				
Adapter with fixing stud	Colour: RAL 7035, light grey	DIL...	XGKA-Z 207513		250 off	To secure XGKS on Moeller equipment with the corresponding mounting hole
						
Individual coils						
	AC	DILR	J-DIL00M(230V50HZ) 043833		1 off	Other actuating voltages → Page 04/031
	DC	DILR	G-DIL00M(24VDC) 048557		1 off	

Mini Contactor Relays, Contactor relays

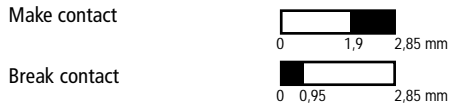
Contact Travel Diagrams

The diagrams show the closing and opening travel of the contacts of the contactor relays and auxiliary contacts at no load. Tolerances are not taken into consideration.

DILER-AC



DILER-DC



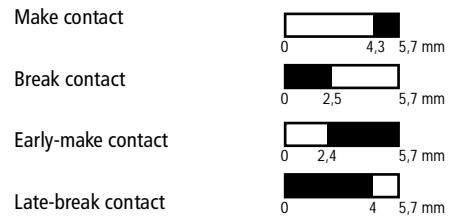
...DILE



...DDILE



DILR



...DIL



TP...11DIL



DILER Mini Contactor Relays, DILR Contactor Relays

Actuating Voltages

AC	DILER-40(...)	DILER-31(...)	DILER-22(...)	DILR40(...)	DILR31(...)	DILR22(...)
	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾
Standard voltages	Price See Price List	Price See Price List	Price See Price List	Price See Price List	Price See Price List	Price See Price List
12V50Hz	066169	066170	066171	–	–	–
24V50Hz	010094	010251	010344	025066	029810	077267
48V50Hz	010190	010044	010201	055915	058286	091505
240V50Hz	010478	010300	010138	017947	022691	017943
24V60Hz	010110	010267	010497	027439	032183	084386
110V60Hz	010254	010172	010265	–	–	–
115V60Hz	010270	010204	010211	096255	010826	093878
42V50Hz, 48V60Hz	051755	051764	051773	043752	043764	043776
110V50Hz, 120V60Hz	051756	051765	051774	043753	043765	043777
190V50Hz, 220V60Hz	051757	051766	051775	043754	043766	043778
220V50Hz, 240V60Hz	051758	051767	051776	043755	043767	043779
230V50Hz, 240V60Hz	051759	051768	051777	043756	043768	043780
380V50Hz, 440V60Hz	051760	051769	051778	043757	043769	043781
400V50Hz, 440V60Hz	051761	051770	051779	043758	043770	043782
415V50Hz, 480V60Hz	051762	051771	051780	043759	043771	043783
24V50/60Hz	021924	021594	021704	022693	027437	058284
42V50/60Hz	033459	029869	029433	039304	044048	060657
110V50/60Hz	021961	021624	021871	091509	096253	065403
230V50/60Hz	052725	052509	052508	052762	052761	052726
Non-standard voltages (i.e. voltages other than the standard voltages listed above) ²⁾	–	–	–	Price See Price List	Price See Price List	Price See Price List
...V50Hz(12–600V)	–	–	–	986763	991507	934554
...V60Hz(12–600V)	–	–	–	989136	993880	936927
DC	DILER-40-G(...)	DILER-31-G(...)	DILER-22-G(...)	DILR40-G(...)	DILR31-G(...)	DILR22-G(...)
	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾
Standard voltages	Price See Price List	Price See Price List	Price See Price List	Price See Price List	Price See Price List	Price See Price List
12V DC	079711	079761	080728	–	–	–
24V DC	010223	010157	010042	048537	048532	048526
48V DC	010255	010205	010346	048538	048533	048527
60V DC	010271	010221	010499	048539	048534	048528
110V DC	010287	010253	010043	048535	048530	048529
220V DC	010303	010269	010091	048536	048531	048525
Non-standard voltages (i.e. voltages other than the standard voltages listed above) ²⁾	–	–	–	Price See Price List	Price See Price List	Price See Price List
...VDC(12–250V)	–	–	–	915590	915591	915592

Notes

¹⁾ To obtain the article number for ordering, read under selected type and actuating voltage from the table above.

²⁾ For non-standard voltages, state the actuating voltage selected from the range (...–...V) shown.

DILR Complete Units, VDIL Mechanical Latching Module, J-DIL Individual Coil Actuating Voltages

AC	DILR22D(...)	DILR44D(...)	DILR53D(...)	VDIL(...)	J-DIL00M(...) Individual coil
	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾
Standard voltages	Price See Price List	Price See Price List	Price See Price List	Price See Price List	Price See Price List
24V50Hz	013207	072533	055923	053536	000079
48V50Hz	041683	010836	084399	055493	023809
240V50Hz	096261	065414	044058	053115	066693
24V60Hz	015580	074906	058296	053659	099744
115V60Hz	084396	053549	032193	052241	043837
42V50Hz, 48V60Hz	043788	043799	043810	043821	043829
110V50Hz, 120V60Hz	043789	043800	043811	043822	043830
190V50Hz, 220V60Hz	043790	043801	043812	043823	043831
220V50Hz, 240V60Hz	043791	043802	043813	043824	043832
230V50Hz, 240V60Hz	043792	043803	043814	043825	043833
380V50Hz, 440V60Hz	043793	043804	043815	–	043834
400V50Hz, 440V60Hz	043794	043805	043816	–	043835
415V50Hz, 480V60Hz	043795	043806	043817	–	043836
24V50/60Hz	010834	070160	048804	053217	002452
42V50/60Hz	027445	086771	070161	055218	011944
110V50/60Hz	079650	048803	027447	051165	085506
230V50/60Hz	052760	052838	052961	054487	051352
Non-standard voltages (i.e. voltages other than the standard voltages listed above) ²⁾	Price See Price List	Price See Price List	Price See Price List	Price See Price List	Price See Price List
...V50Hz(12–415V)	–	–	–	903184	–
...V50Hz(12–600V)	974904	944057	922701	–	910098
...V60Hz(12–415V)	–	–	–	903183	–
...V60Hz(12–600V)	977277	946430	925074	–	910099
DC	DILR22D-G(...)	DILR44D-G(...)	DILR53D-G(...)	V-GDIL(...)	G-DIL00M(...)
	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾	Article no. ¹⁾
Standard voltages	Price See Price List	Price See Price List	Price See Price List	Price See Price List	Price See Price List
24VDC	048542	048547	048552	048562	048557
48VDC	048543	048548	048553	048563	048558
60VDC	048544	048549	048554	048564	048559
110VDC	048540	048545	048550	048560	048555
220VDC	048541	048546	048551	048561	048556
Non-standard voltages (i.e. voltages other than the standard voltages listed above) ²⁾	Price See Price List	Price See Price List	Price See Price List	Price See Price List	Price See Price List
...VDC(12–250V)	915578	915579	915580	915545	910110

Notes

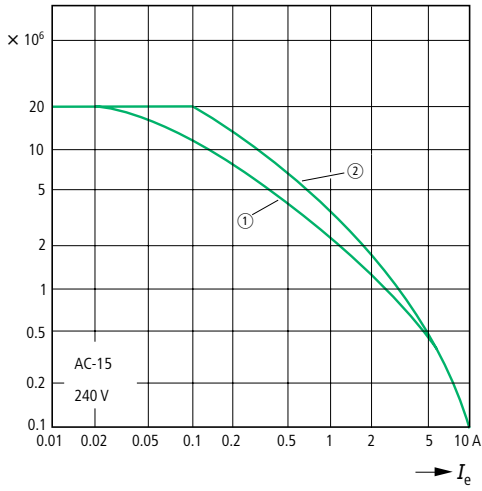
¹⁾ To obtain the article number for ordering, read under selected type and actuating voltage from the table above.

²⁾ For non-standard voltages, state the actuating voltage selected from the range (...–...V) shown.

DIL Contactor Relays, DILET Electronic Timing Relays Tripping Characteristics

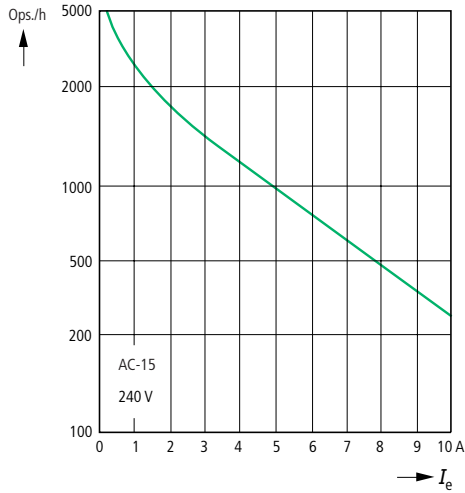
DILR (AC-15)

Component lifespan (operations) I_e = Rated operational current
 ① = Make contact
 ② = Break contact



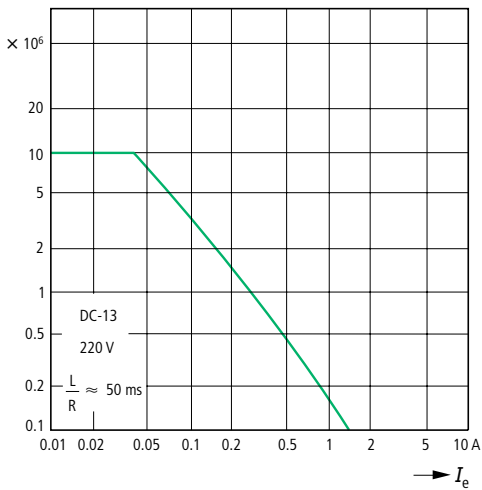
DILR(AC-15)

Max. operating frequency (approx.)
 I_e = Rated operational current



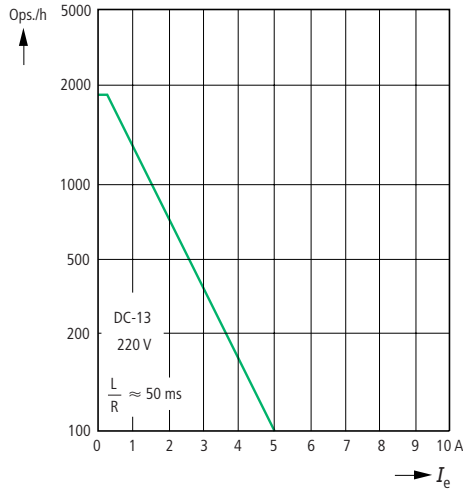
DILR(DC-13¹⁾)

Component lifespan (operations)
 I_e = Rated operational current



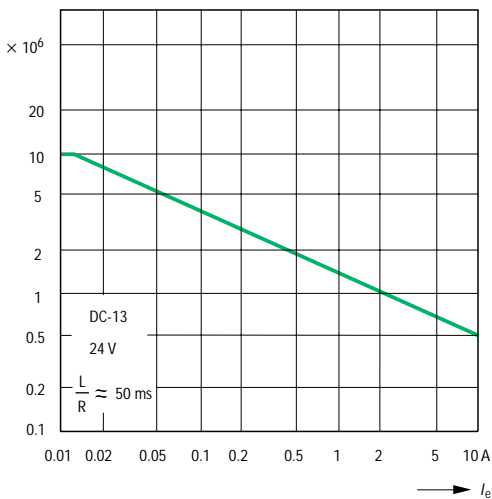
DILR(DC-13¹⁾)

Max. operating frequency (approx.)
 I_e = Rated operational current



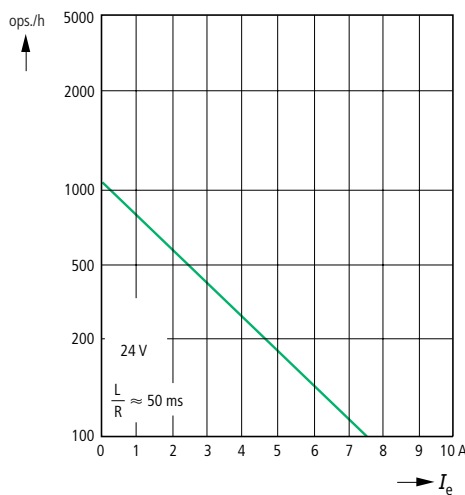
DILR(DC-13¹⁾)

Component lifespan (operations)
 I_e = Rated operational current



DILR(DC-13¹⁾)

Max. operating frequency (approx.)
 I_e = Rated operational current



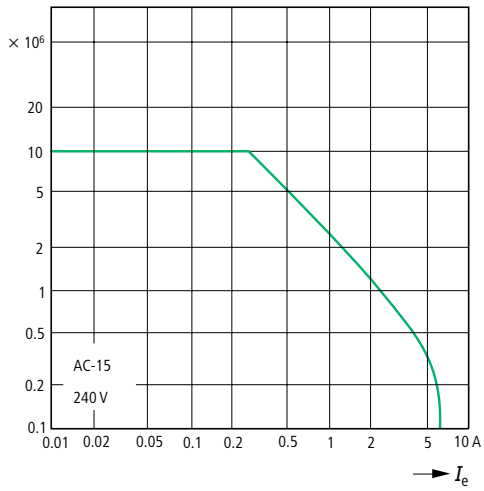
Notes

¹⁾ Making and breaking conditions to DC-13, time constant as stated.

DIL Contactor Relays, DILET Electronic Timing Relays Tripping Characteristics

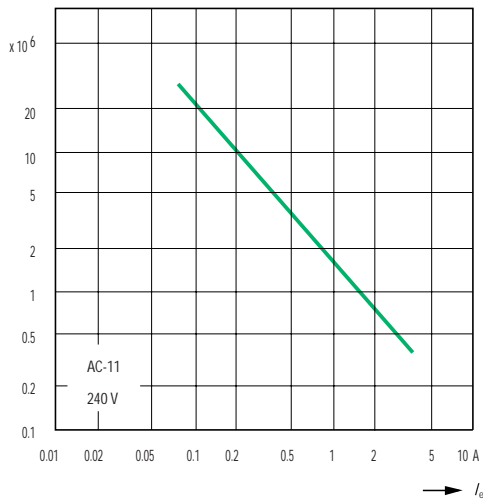
DILER(AC-15)

Component lifespan (operations)
 I_e = Rated operational current



DILET(AC-11)

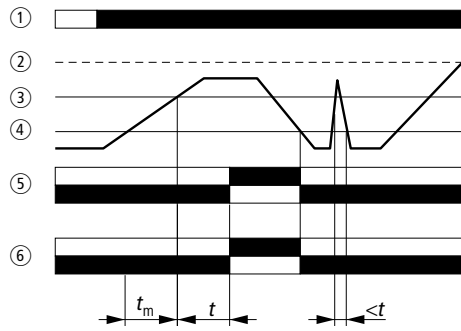
Component lifespan (operations)
 I_e = Rated operational current



EMR4 Measuring and Monitoring Relays

Tripping Characteristics

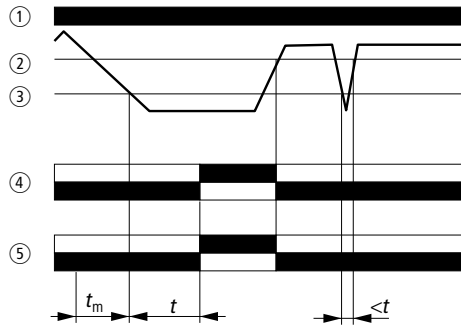
EMR4-I... current monitoring relays



Function at overcurrent, OC

- ① Supply voltage on A1-A2
- ② Hysteresis (reset value) undercurrent, UC
- ③ Response threshold for measuring the current
- ④ Hysteresis (reset value) overcurrent, OC
- ⑤ Timed contact 1: 15-18, 15-16
- ⑥ Timed contact 2: 25-28, 25-26

t_m = 80 ms, measuring cycle
 t = (0.05 – 1 s; 1.5 – 30 s)
 On-delay

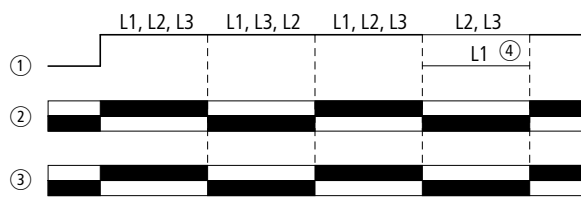


Function at undercurrent, UC

- ① Supply voltage on A1-A2
- ② Hysteresis (reset value) undercurrent, UC
- ③ Response threshold for measuring the current
- ④ Timed contact 1: 15-18, 15-16
- ⑤ Timed contact 2: 25-28, 25-26

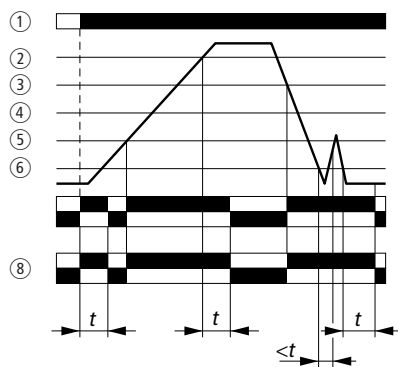
t_m = 80 ms, measuring cycle
 t = (0.05 – 1 s; 1.5 – 30 s)
 On-delay

EMR4-F... phase sequence relay



- ① Voltage being monitored, three-phase system, L1, L2, L3
- ② Timed contact 1: 11-14, 11-12
- ③ Timed contact 2: 21-24, 21-22
- ④ Phase failure 100 %

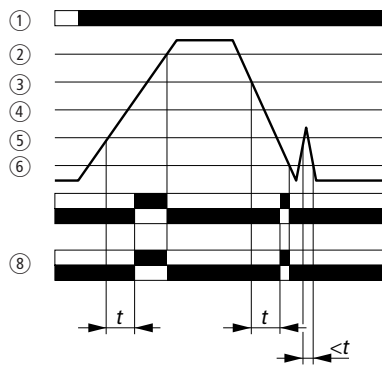
EMR4-W... phase monitoring relay



On-delayed fault indication: function

- ① Supply voltage on A1-A2
- ② $> U$
- ③ Hysteresis + 5 %
- ④ Monitored voltage (rated voltage) L1, L2, L3
- ⑤ Hysteresis – 5 %
- ⑥ $< U$
- ⑦ Timed contact 1: 15-18, 15-16
- ⑧ Timed contact 2: 25-28, 25-26

t = Delay time applies only to overvoltage/undervoltage monitoring



Off-delayed fault indication: function

- ① Supply voltage on A1-A2
- ② $> U$
- ③ Hysteresis + 5 %
- ④ Monitored voltage (rated voltage) L1, L2, L3
- ⑤ Hysteresis – 5 %
- ⑥ $< U$
- ⑦ Timed contact 1: 15-18, 15-16
- ⑧ Timed contact 2: 25-28, 25-26

t = Delay time applies only to overvoltage/undervoltage monitoring

EMR4 Measuring and Monitoring Relays

Tripping Characteristics

EMR4-A... phase imbalance monitoring relay

- ① Adjustable imbalance threshold 5 – 15 %
- ② Monitoring voltage L1, L2, L3 and supply voltage U_{rated}
- ③ Adjustable imbalance threshold 5 – 15 %
- ④ Level L1, L2, L3
- ⑤ Monitoring contact/Timed contact 1: 15-18, 15-16

t = Delay time applies only with phase imbalance, 500 ms fixed setting

EMR4-N100... liquid level monitoring relay

- ① Maximum filling level
- ② Minimum filling level
- ③ Reference sensor C
- ④ Supply voltage on A1-A2
- ⑤ Relay contact function: Drain
"DOWN": 11-14, 11-12
- ⑥ Relay contact function: Fill
"UP": 11-14, 11-12

EMR4-N500... liquid level monitoring relay

- ① Maximum filling level
- ② Minimum filling level
- ③ Reference sensor C
- ④ Supply voltage on A1-A2
- ⑤ On-delay function
15-18, 25-28, 15-16, 25-26
- ⑥ Off-delay function
15-18, 25-28, 15-16, 25-26

EMR4-RDC... insulation monitoring relay

- ① Supply voltage on A1-A2
- ② Front actuator – reset L+ and L-/test L+, reset test L+
- ③ Front actuator – test L-
Remote connection – test L-, test L-, S3-S4
- ④ Remote connection – test L+, S3-S1
- ⑤ Remote connection – save, reset, S3/S2
- ⑥ Insulation resistance R of the supply system,
Set response value R_x , L+(L-)/ \neq
- ⑦ Front switch – function:
: Open circuit arrangement/make circuit,
- : Closed-circuit arrangement/break circuit
- ⑧ Timed contact: 15-18, 15-16

t_f = Test duration approx. 1 s

EMR4-RAC... insulation monitoring relay

- ① Supply voltage on A1-A2
- ② Remote connection – save, reset, S1/S2
- ③ Front actuator, Test/Reset – reset, test
Remote connection S1/ \neq – reset, test
- ④ Insulation resistance of the supply system
Set response value – R_x
- ⑤ Timed contact: 15-18, 15-16

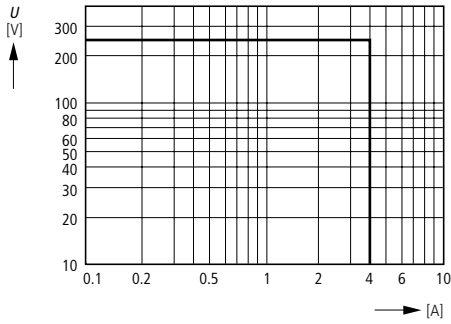
t_f

EMR4 Measuring and Monitoring Relays

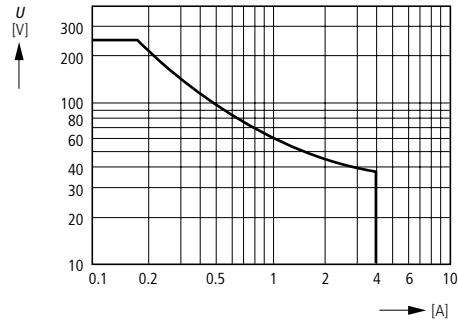
Tripping Characteristics

Load limit curves, range 22.5 mm

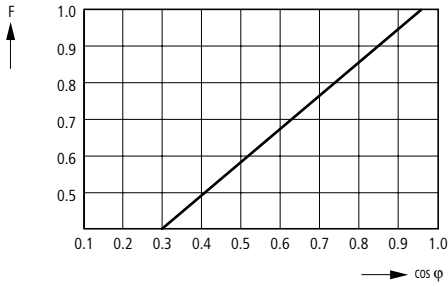
AC load (resistive)



DC load (resistive)

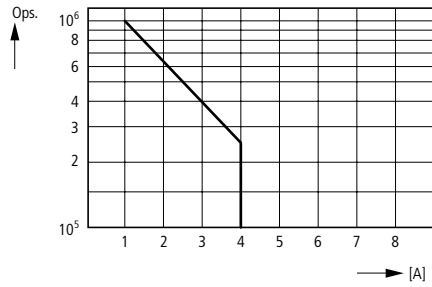


Derating factor at inductive AC load



Derating factor F at inductive load

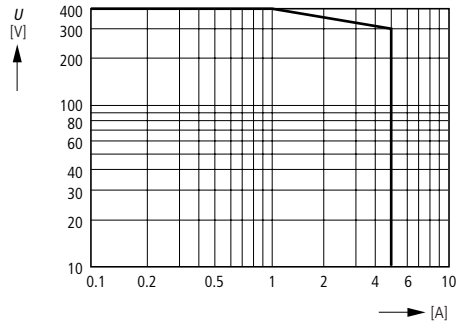
Contact life



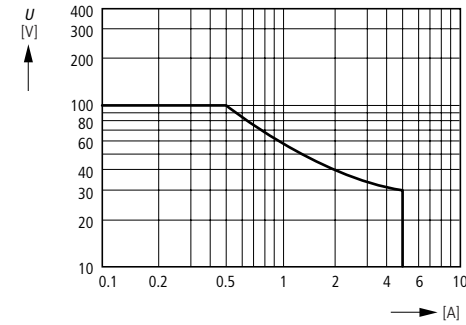
Contact life
Switching operations Ops.
220 V 50 Hz AC-1
360 contact sequences/h

Load limit curves, range 45 mm

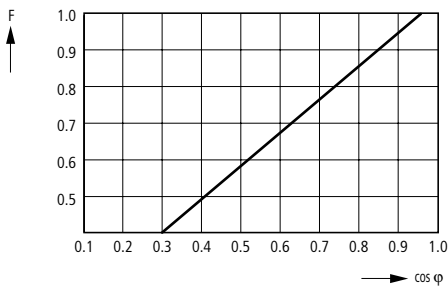
AC load (resistive)



DC load (resistive)

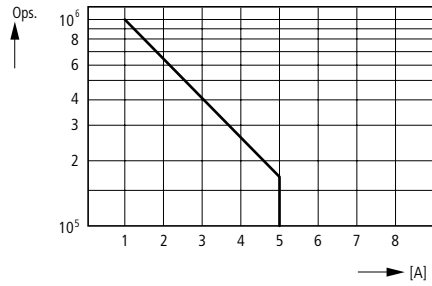


Derating factor at inductive AC load



Derating factor F at inductive load

Contact life



Contact life
Switching operations Ops.
220 V 50 Hz AC-1
360 contact sequences/h

"Easy" Control Relays

Technical Data

			EASY200-EASY	EASY412-...	EASY6...-...
General technical data					
Standards			EN 55 011, EN 55 022, IEC/EN 61 000-4, IEC 60 068-2-6, IEC 60 068-2-27		
Dimensions					
W × H × D	mm		35.5 × 90 × 53 (2 space units)	71.5 × 90 × 53 (4 space units)	107.5 × 90 × 53 (6 space units)
Weight	kg		0.07	0.2	0.3
Mounting			On EN 50 022 top-hat rail, 35 mm, or screw fixing, using ZB4-101-GF1 fixing brackets (accessories)		
Terminal capacity					
Solid	Min./Max.	mm ²	0.2/4 (AWG 22 – 12)		
Flexible with ferrule	Min./Max.	mm ²	0.2/2.5 (AWG 22 – 12)		
Width of standard screwdriver		mm	3.5 × 0.8	3.5 × 0.8	3.5 × 0.8
Tightening torque		Nm	0.6	0.6	0.6
Ambient climatic conditions					
Operational ambient temperature: horizontal / vertical installation		°C	–25/+55, low temperatures to IEC 60 068-2-1, high temperatures to IEC 60 068-2-2		
Condensation			Prevent condensation by suitable measures		
LCD display (clearly legible)		°C	0/+55		
Storage/transport temperature		°C	–40/+70		
Relative humidity, non-condensing (IEC 60 068-2-30)		%	5 – 95		
Air pressure (operation)		hPa	795 – 1080		
Corrosion resistance					
IEC 60 068-2-42	4 days SO ₂	cm ³ /m ³	10	10	10
IEC 60 068-2-43	4 days H ₂ S	cm ³ /m ³	1	1	1
Ambient conditions, mechanical					
Pollution degree			2	2	2
Degree of protection (EN 50 178, IEC 60 529, VBG 4)			IP20	IP20	IP20
Vibration resistance to IEC 60 068-2-6					
Constant amplitude 0.15 mm		Hz	10 – 57	10 – 57	10 – 57
Constant acceleration, 2 g		Hz	57 – 150	57 – 150	57 – 150
Mechanical shock resistance (half-sinusoidal shock 15 g/11 ms) to IEC 60 068-2-32		Impacts	18	18	18
Drop to IEC 60 068-2-31		drop height	50	50	50
Free fall, packaged (IEC 60 068-2-32)		m	1	1	1
Electromagnetic compatibility (EMC)					
Electrostatic discharge (IEC/EN 61 000-4-2, severity level 3, ESD)					
Air discharge		kV	8	8	8
Contact discharge		kV	6	6	6
Electromagnetic fields (IEC/EN 61 000-4-3, RFI)		V/m	10	10	10
Radio interference suppression					
EN 55 011 Class B, EN 55 022 Class B					
Burst pulses (IEC/EN 61 000-4-4, Level 3)					
Supply cables		kV	2	2	2
Signal lines		kV	2	2	2
High-energy pulses (surge) EASY-AC (IEC/EN 61 000-4-5)		kV	2 (supply cable, balanced)		
High-energy pulses (surge) EASY-DC (IEC/EN 61 000-4-5, severity level 2)		kV	0.5 (supply cable, balanced)		
Immunity to line-conducted interference to IEC EN 61 000-4-6		V	10	10	10
Dielectric strength					
Clearance in air and creepage distances dimensioned to			EN 50 178, UL 508, CSA C22.2, No 142		
Dielectric strength			EN 50 178	EN 50 178	EN 50 178
Back-up/accuracy of real-time clock (only on EASY...C)					
Clock battery back-up					
at 25 °C		h	–	Normally 64	Normally 64
at 40 °C		h	–	Normally 24	Normally 24
Accuracy of the real-time clock		s/day	–	Normally ± 5 (~ ± 0.5 h/year)	Normally ± 5 (± 0.5 h/year)
Repetition accuracy of timing relays					
Accuracy of timing relays (of values)		%	–	± 1	± 1
Resolution					
Range "s"		ms	–	10	10
Range "M:S"		s	–	1	1
Range "H:M"		min	–	1	1
Retentive memory					
Write cycles of the retentive memory			–	≥ 100 000	≥ 100 000

"Easy" Control Relays

Technical Data

		EASY412-AC-...	EASY61...-AC-R...
Power supply			
Rated operational voltage	V AC	110/115/120/230/240 (+10/-15 %)	100/110/115/120/230/240 (+10/-15 %)
Admissible range	V AC	90 – 264	85 – 264
Frequency, rated value, tolerance	Hz	50/60 (± 5 %)	50/60 (± 5 %)
Input current			
at 115/120 V AC 60 Hz	mA	Normally 40	Normally 70
at 230/240 V AC 50 Hz	mA	Normally 20	Normally 35
Voltage dips (IEC/EN 61 131-2)	ms	20	20
Heat dissipation			
at 115/120 V AC	VA	Normally 5	Normally 10
at 230/240 V AC	VA	Normally 5	Normally 10

		EASY412-DC-...	EASY412-DA-RC	EASY6...-DC-...
Power supply				
Rated operational voltage	V DC	24 (-15/+20 %)	12 (-15/+30 %)	24 (-15/+20 %)
Admissible range	V DC	20.4 – 28.8	10.2 – 15.6	20.4 – 28.8
Residual ripple	%	≤ 5	±5	≤ 5
Input current at 24 VDC	mA	Normally 80	Normally 140	Normally 140
Voltage dips (IEC/EN 61 131-2)	ms	10	10	10
Heat dissipation at 24 V DC	W	Normally 2	Normally 2	Normally 5

		EASY412-AC-...	EASY618/619-AC-R...
Digital inputs 115/230 V AC			
Number		8	12
Status display		LCD display (if provided)	LCD display (if provided)
Potential isolation			
From power supply		No	No
Between digital inputs		No	No
From the outputs		Yes	Yes
Rated voltage L (sinusoidal)			
at signal "0"	V AC	0 – 40	0 – 40
at signal "1"	V AC	79 – 264	79 – 264
Rated frequency	Hz	50/60	50/60
Input current at signal "1" R1 to R12, I1 to I6 (EASY6... also I9 to I12)	mA	6 × 0.5 (at 230 V AC 50 Hz) 6 × 0.25 (at 115 V AC 60 Hz)	10 (12) × 0.5 (at 230 V AC 50 Hz) 10 (12) × 0.25 (at 115 V AC 60 Hz)
Input current at signal "1" I7, I8	mA	2 × 6 (at 230 V AC 50 Hz) 2 × 4 (at 115 V AC 60 Hz)	2 × 6 (at 230 V AC 50 Hz) 2 × 4 (at 115 V AC 60 Hz)
Delay time I1 to I6/I9 to I12 From 0 to 1 and from 1 to 0			
Debounce ON	50/60 Hz	ms	80/66 ² / ₃
Debounce OFF	50/60 Hz	ms	20/16 ² / ₃
Delay time I7, I8 from 1 to 0			
Debounce ON	50/60 Hz	ms	160/150
Debounce OFF	50/60 Hz	ms	100/100
Delay time I7, I8 from 0 to 1			
Debounce ON	50/60 Hz	ms	80/66 ² / ₃
Debounce OFF	50/60 Hz	ms	20/16 ² / ₃
Max. admissible cable length (per input)			
R1 to R12, I1 to I6 (with EASY 6... also I9 to I12)	m	Normally 40	Normally 40
I7, I8	m	Normally 100	Normally 100

"Easy" Control Relays

Technical Data

		EASY412-DC-...	EASY412-DA-RC	EASY6...-DC...
Digital inputs 24 V DC				
Quantity, of which 2 inputs (I7, I8) can be used as analog inputs		8	8	12 (on basic unit)
Status display		LCD display (if provided)	LCD display (if provided)	LCD display (if provided)
Potential isolation				
From power supply		No	No	No
Between digital inputs		No	No	No
From the outputs		Yes	Yes	Yes
Rated operational voltage	V DC	24	12	24
at signal "0"	V DC	< 5.0 (I1 – I8)	< 4.0 (I1 – I8)	< 5.0 (I1 – I12, R1 – R12)
at signal "1"	V DC	> 15.0 (I1 – I6) > 8.0 (I7 – I8)	> 8.0 (I1 – I8)	> 15.0 (I1 – I6, I9 – I12, R1 – R12) > 8.0 (I7 – I8)
Input current at signal "1" R1 to R12, I1 to I6 (EASY620/621 also I9 to I12)	mA	3.3 (at 24 V DC)	3.3 (at 12 V DC)	3.3 (at 24 V DC)
Input current at signal "1" (I7, I8)	mA	2.2 (at 24 V DC)	1.1 (at 12 V DC)	2.2 (at 24 V DC)
Delay time from 0 to 1				
Debounce On	ms	20	20	20
Debounce Off	ms	Normally 0.25 (I1 – I6)	Normally 0.30 (I1 – I6) Normally 0.35 (I7, I8)	Normally 0.25 (I1 – I6, I9 – I12)
Delay time from 1 to 0				
Debounce On	ms	20	20	20
Debounce Off	ms	Normally 0.4 (I1 – I6) Normally 0.2 (I7, I8)	Normally 0.30 (I1 – I6) Normally 0.15 (I7, I8)	Normally 0.4 (I1 – I6, I9 – I12) Normally 0.2 (I7, I8)
Cable length (unscreened)	m	100	100	100

		EASY412-D...	EASY6...-DC-...
Analog inputs			
Number		2	2
Potential isolation			
From power supply		No	No
From the digital inputs		No	No
From the outputs		Yes	Yes
Input type		DC voltage	DC voltage
Signal range	V DC	0 – 10	0 – 10
Resolution, analog	V	0.1	0.1
Resolution, digital		0.1	0.1
Input impedance	kΩ	11.2	11.2
Accuracy of actual value			
Two EASY devices	%	± 3	± 3
Within a single device	%	± 2 (I7, I8) ± 0.12 V	± 2 (I7, I8) ± 0.12 V
Conversion time, analog/digital	ms	Input delay On: 20 Debounce Off: every cycle	Input delay ON: 20 Debounce OFF: every cycle
Input current	mA	< 1	< 1
Cable length (unscreened)	m	30	30

"Easy" Control Relays

Technical Data

		EASY412-...-R...	EASY618/619-...-R...
Relay outputs			
Number		4	6
in groups of		1	1
Parallel connection of outputs to increase performance		Not admissible	Not admissible
Protection for one output relay		Miniature circuit-breaker B16 or 8 A fuse (slow)	
Potential isolation from mains supply, inputs		Yes	Yes
Safe isolation	V AC	300	300
Basic insulation	V AC	600	600
Lifespan, mechanical operations	$\times 10^6$	10	10
Relay contacts			
Conventional thermal current (10 A UL)	A	8	8
Recommended for load: 12 V AC/DC	mA	> 500	> 500
Protection against short circuit, $\cos \varphi = 1$, characteristic B16 at 600 A	A	16	16
Protection against short circuit, $\cos \varphi = 0.5 - 0.7$, characteristic B16 at 900 A	A	16	16
Rated impulse withstand voltage U_{imp} contact to coil	kV	6	6
Rated insulation voltage U_i	V AC	250	250
Rated operational voltage U_e	V AC	250	250
Safe isolation to EN 50 178 between coil and contact	V AC	300	300
Safe isolation to EN 50 178 between two contacts	V AC	300	300
Making capacity			
AC-15 250 V AC, 3 A (600 Ops/h)	Operations	300 000	300 000
DC-13 L/R ≤ 150 ms 24 V DC, 1 A (500 Ops/h)	Operations	200 000	200 000
Breaking capacity			
AC-15 250 V AC, 3 A (600 Ops/h)	Operations	300 000	300 000
DC-13 L/R ≤ 150 ms 24 V DC, 1 A (500 Ops/h)	Operations	200 000	200 000
Filament lamp load			
1000 W at 230/240 V AC	Operations	25 000	25 000
500 W at 115/120 V AC	Operations	25 000	25 000
Fluorescent tubes			
10 \times 58 W at 230/240 V AC			
With upstream electrical device	Operations	25 000	25 000
Uncompensated	Operations	25 000	25 000
1 \times 58 W at 230/240 V AC			
Conventional, compensated	Operations	25 000	25 000
Operating frequency, relays			
Mechanical operations	$\times 10^6$	10	10
Mechanical switching frequency	Hz	10	10
Resistive load/ lamp load	Hz	2	2
Inductive load	Hz	0.5	0.5
UL/CSA			
Uninterrupted current at 240 V AC/24 V DC	A	10/8	10/8
AC			
Control Circuit Rating Codes (utilization category)		B 300 Light Pilot Duty	B 300 Light Pilot Duty
Max. rated operational voltage	V AC	300	300
Max. thermal uninterrupted current at B 300	A	5	5
Max. Make/Break at B 300	VA	3600/360	3600/360
DC			
Control Circuit Rating Codes (utilization category)		R 300 Light Pilot Duty	R 300 Light Pilot Duty
Max. rated operational voltage	V DC	300	300
Max. thermal uninterrupted current at B 300	A	1	1
Max. Make/Break at R 300	VA	28/28	28/28

"Easy" Control Relays

Technical Data

		EASY412-DC-T...	EASY6...-DC-T...
Transistor outputs			
Number		4	8
Rated operational voltage U_e	V DC	24	24
Admissible range	V DC	20.4 – 28.8	20.4 – 28.8
Residual ripple	%	≤ 5	≤ 5
Supply current			
at "0" signal	Normally/max.	mA	9/16
at "1" signal	Normally/max.	mA	12/22
Protection against polarity reversal		Yes	Yes
Potential isolation from power supply, inputs		Yes	Yes
Rated current I_e at "1" signal, DC	max.	A	0.5
Lamp load without R_v		W	5
Residual current at signal "0", per channel		mA	< 1.0
Max. output voltage			
at signal "0" with external load < 10 M Ω	V DC	2.5	2.5
at signal "1", $I_e = 0.5$ A	V DC	$U = U_e - 1$ V	$U = U_e - 1$ V
Short-circuit protection			
Yes (detected via diagnostics input I16, I15; R15, R16)			
Short-circuit tripping current for $R_a \leq 10$ m Ω	A	$0.7 \leq I_e \leq 2$	$0.7 \leq I_e \leq 2$
Max. total short-circuit current	A	8	16
Peak short-circuit current	A	16	32
Thermal cutout		Yes	Yes
Max. operating frequency at constant resistive load (depending on circuit configuration and load), $R_L < 100$ k Ω	Ops./h	40 000	40 000
Parallel connection of outputs with resistive load; inductive load with external suppression circuit, combination within a group			
		Group 1: Q1 to Q4	Group 1: Q1 to Q4, S1 to S4 Group 2: Q5 to Q8, S5 to S8
Quantity of outputs	max.	4	4
Total maximum current	A	2.0	2.0
Status display of the outputs		LCD display (if provided)	LCD display (if provided)
Approvals			
Currently UL/CSA approved; others in preparation:		EASY200-EASY EASY412-DC-R EASY412-DC-RC EASY412-DC-TC EASY412-DC-TCX EASY412-AC-R EASY412-AC-RC EASY412-AC-RCX EASY618-DC-RC EASY618-AC-RC EASY618-AC-RE EASY619-DC-RC EASY619-DC-RCX EASY619-AC-RC EASY619-AC-RCX EASY620-DC-TC EASY620-DC-TE EASY621-DC-TC EASY621-DC-TCX	
Oscillation test to EN 61 373 for railway applications, passed		EASY412-DC-RC EASY412-DC-TC EASY618-DC-RC EASY620-DC-TC	

Notes

For more detailed Technical Data → AWB2528-1304-GB

"Easy" Control Relays

Technical Data

			EASY205-ASI	EASY204-DP
General technical data				
Standards			EN 55 011, EN 55 022, IEC/EN 61 000-4..., IEC 60 068-2-27, EN 50 295	EN 55 011, EN 55 022, IEC/EN 61 000-4, IEC 60 068-2-27, IEC 61 158
Dimensions	mm		35.5 × 90 × 53	35.5 × 90 × 53
Weight	kg		0.12	0.15
Mounting			On EN 50 022 top-hat rail, 35 mm, or screw fixing, using ZB4-101-GF1 fixing brackets (accessories)	
Ambient climatic conditions				
Operational ambient temperature: horizontal/vertical installation				
Cold to IEC 60 068-2-1	°C		-25/+55	-25/+55
Heat to IEC 60 068-2-2				
Condensation				
			Prevent condensation by suitable measures	Prevent condensation by suitable measures
Storage/transport temperature	°C		-40/+70	-40/+70
Relative humidity				
IEC 60 068-2-30, non-condensing	%		5 – 95	5 – 95
Air pressure (operation)	hPa		795 – 1080	795 – 1080
Corrosion resistance				
IEC 60 068-2-42	4 days SO ₂	cm ³ /m ³	10	10
IEC 60 068-2-43	4 days H ₂ S	cm ³ /m ³	1	1
Ambient conditions, mechanical				
Pollution degree				
			2	2
Degree of protection				
EN 50 178, IEC 60 529 VBG 4			IP20	IP20
Vibration resistance to IEC 60 068-2-6				
Constant amplitude 0.15 mm	Hz		10 – 57	10 – 57
Constant acceleration, 2 g	Hz		57 – 150	57 – 150
Mechanical shock resistance (half-sinusoidal shock 15 g/11 ms)				
to IEC 60 068-2-27	Impacts		18	18
Drop				
to IEC 60 068-2-31	drop height	mm	50	50
Free fall, packaged				
to IEC 60 068-2-32	m		1	1
Electromagnetic compatibility (EMC)				
Electrostatic discharge to IEC/EN 61 000-4-2, severity level 3				
Air discharge	kV		8	8
Contact discharge	kV		6	6
Electromagnetic fields				
to IEC/EN 61 000-4-3	field strength	V/m	10	10
Radio interference suppression				
to EN 55011, EN 55022			Limit value Class B	Limit value Class B
Burst pulses				
to IEC/EN 61 000-4-4, severity level 3	kV		2 (AS-Interface cables)	2 (power supply-, signal cables)
High-energy pulses (surge) EASY...-DC...				
to IEC/EN 61 000-4-5, severity level 2	kV		–	0.5 (supply cable, balanced)
Immunity to line-conducted interference				
to IEC/EN 61 000-4-6	V		10	10
Dielectric strength				
Clearance in air and creepage distances dimensioned to			EN 50 178, UL 508, CSA C22.2 No 142	EN 50 178, UL 508, CSA C22.2 No 142
Dielectric strength			EN 50 178	EN 50 178
Terminal capacity				
Solid	Min./Max.	mm ²	0.2/4 (AWG 22 – 12)	0.2/4 (AWG 22 – 12)
Flexible with ferrule	Min./Max.	mm ²	0.2/2.5 (AWG 22 – 12)	0.2/4 (AWG 22 – 12)
Width of standard screwdriver			3.5 × 0.8	3.5 × 0.8
Tightening torque			0.6	0.6

"Easy" Control Relays
 Technical Data

		EASY205-ASI	EASY204-DP
Power supply			
Rated operational voltage	V DC	26.5 – 31.6	24 (-15/+20 %)
Total power consumption (from yellow AS-Interface cable)	mA	30	–
Admissible range	V DC	–	20.4 – 28.8
Residual ripple	%	–	< 5
Input current at 24 VDC	mA	–	Normally 200
Voltage dips (IEC/EN 61 131-2)	ms	–	10
Heat dissipation at 24 V DC	W	–	Normally 4.8
Protection against polarity reversal			
AS-Interface protected against polarity reversal		Yes	–
AS-Interface profile cable		7F (hex)	–
Slave addresses		0. 1 – 31	–
Addressing unit interface		3.5 mm socket	–
Power supply			Yes
LED displays			
		Power: green	Power LED (POW): green
		Com-Error: red	PROFIBUS-DP LED (BUS): red
Logic links			
EASY600 contact/coil ↔ AS-Interface		S1 → Input 0 S2 → Input 1 S3 → Input 2 S4 → Input 3 R1 ← Output 0 R2 ← Output 1 R3 ← Output 2 R4 ← Output 3 R5 ← PROFIBUS-DP (BUS)	

"Easy" Control Relays

Technical Data

			EASY400-POW
General technical data			
Standards			EN 55 011, EN 55 022, IEC/EN 61 000-4, IEC 60 068-2-27,
Dimensions			71.5 × 90 × 53
Weight	kg		0.25
Mounting position			Horizontal and vertical on top-hat rail or fixing brackets
Mounting			On EN 50 022 top-hat rail, 35 mm, or screw fixing, using ZB4-101-GF1 fixing brackets (accessories)
Ambient climatic conditions			
Operational ambient temperature: horizontal/vertical installation			
Cold to IEC 60 068-2-1	°C		-25/+55
Heat to IEC 60 068-2-2			
Condensation			
Prevent condensation by suitable measures			
Storage/transport temperature	°C		-40/+70
Relative humidity			
IEC 60 068-2-30, non-condensing	%		5 – 95
Air pressure (operation)	hPa		795 – 1080
Corrosion resistance			
IEC 60 068-2-42	4 days SO ₂	cm ³ /m ³	10
IEC 60 068-2-43	4 days H ₂ S	cm ³ /m ³	1
Max. altitude above sea level; above this, note derating	m		2000
Ambient conditions, mechanical			
Pollution degree			
2			
Degree of protection			
EN 50 178, IEC 60 529, VBG 4			
IP20			
Vibration resistance to IEC 60 068-2-6			
Constant amplitude 0.15 mm	Hz		10 – 57
Constant acceleration, 2 g	Hz		57 – 150
Mechanical shock resistance (half-sinusoidal shock 15 g/11 ms)			
to IEC 60 068-2-27	Impacts		18
Drop			
to IEC 60 068-2-31	drop height	mm	50
Free fall, packaged			
to IEC 60 068-2-32	m		1
Electromagnetic compatibility (EMC)			
Radio interference suppression			
EN 55011, EN 55022, EN 50 081-2			
Limit value Class B			
Electrostatic discharge (IEC/EN 61 000-4-2, severity level 3, ESD)			
Air discharge	kV		8
Contact discharge	kV		6
Electromagnetic fields (RFI)			
to IEC/EN 61 000-4-3	field strength	V/m	10
Burst pulses			
to IEC/EN 61 000-4-4, severity level 3	kV		2
High-energy pulses (surge)			
to IEC/EN 61 000-4-5, supply cable balanced	kV		2
High-energy pulses (surge)			
to IEC/EN 61 000-4-5, severity level 2, output cable balanced	kV		0.5
Immunity to line-conducted interference			
to IEC/EN 61 000-4-6	V		10
Surge voltage			
to IEC/EN 60 947	kV		4.9

"Easy" Control Relays

Technical Data

			EASY400-POW
Dielectric strength, potential isolation			
Clearance in air and creepage distances dimensioned to			to EN 50 178
Dielectric strength			to EN 50 178
Protection class U_{out} against U_{in}			Class II to IEC 60 536
Potential isolation primary/secondary			Yes, SELV to VDE 0100 Part 410, IEC 60 364-4-41, HD 384.4.41 S2
Terminal capacity			
Solid	Min./Max.	mm ²	0.2/4 (AWG 22 – 12)
Flexible with ferrule	Min./Max.	mm ²	0.2/2.5 (AWG 22 – 12)
Width of standard screwdriver			mm 3.5 × 0.8
Tightening torque			Nm 0.6
Input voltage			
Rated input voltage			V AC 100/120/230/240 (–15/+10 %)
Voltage range			V AC 85 – 264
Frequency range			Hz 47 – 63
Input current nominal value	115/230 V	Approx. A	0.3/0.15
Inrush current at 25°C	230 V	A	< 5
Power failure bridging	115/230 V	ms	>10/>20
Fuse	115/230 V	A	2/1 slow
Protective switch, min.			FAZ-C1 or FAZ-B6
Rating data			
Efficiency			% \leq 87
Power consumption			W Normally 35
Heat dissipation			W Normally 5
Input current			
Input current	115/230 V AC	A	0.3/0.15
Output voltage			
Rated value			V DC 24
Tolerance range			% \pm 2
Switching peaks (peak to peak)			mV < 240
Influence of input voltage	115 – 230 V	%	\pm 1
Influence at 25 – 100 % load fluctuation			% \pm 2
Output current			
Output current			A 0 – 1.25
Effectiveness of current limitation			A > 1.25
Reduction of output voltage after current limitation			V < 18
Overload proof			Yes, by current limitation
Proof against sustained short circuit			Yes, "hiccup mode", approx. 10 Hz
Special load conditions			
Lamp load, cold	24 V DC	W	10
Base load present			W 5
Behaviour at Emergency-Stop in 24 V DC circuit, disconnection by contactor (contactor load, no damage)			W 30
Displays			
Indication of output voltage (LED, continuous green light = OK)			V DC 24

DILER, DILR Contactor Relays

Technical Data

				DILER ...DILE	DILR ...DIL
General technical data					
Standards				IEC/EN 60 947, VDE 0660, UL, CSA	
Lifespan, mechanical					
AC operated					
Operations		$\times 10^6$	10	20	
DC operated					
Operations		$\times 10^6$	20	20	
Maximum operating frequency, mechanical				9000	7000
Climatic proofing				Damp heat, constant, to IEC 60 068-2-3 Damp heat, cyclical, to IEC 60 068-2-30	
Ambient temperature					
Open					
Min./Max.		°C	-25/+50	-25/+50	
Enclosed					
Min./Max.		°C	-25/+40	-25/+40	
Mounting position				As required, except vertical with A1/A2 at bottom	As required, except suspended
Mechanical shock resistance					
Half-sinusoidal shock, 10 ms					
Basic unit	Make/break contact	g	10/8	–	
Basic unit with auxiliary contact module	Make/break contact	g	10/8	–	
Half-sinusoidal shock, 20 ms					
Basic unit	Make/break contact	g	–	10/6	
Basic unit with auxiliary contact module	Make/break contact	g	–	10/6	
Degree of protection				IP20	IP20 (DILR) IP00 (...DIL)
Protection against direct contact from the front when actuated by a perpendicular test finger (IEC 536)				Finger and back-of-hand proof	
Dimensions				→ Page 04/065	→ Page 04/066
Weight					
AC operated				0.17	→ Page 15/022
DC operated				0.2	→ Page 15/022
Terminal capacity					
Solid					
		mm ²	1 × (0.75 – 2.5)	1 × (0.75 – 4)	
		mm ²	2 × (0.75 – 2.5)	2 × (0.75 – 4)	
Flexible with ferrule to DIN 46 228					
		mm ²	1 × (0.75 – 1.5)	1 × (0.75 – 2.5)	
		mm ²	2 × (0.75 – 1.5)	2 × (0.75 – 2.5)	
Solid or stranded					
Min.		AWG	18	18	
Max.		AWG	14	10	
Terminal screw				M3.5	M3.5
Pozidriv screwdriver					
Size			2	2	
Standard screwdriver					
		mm	0.8 × 5.5	0.8 × 5.5	
		mm	1 × 6	1 × 6	
Tightening torque					
Max.		Nm	1.2	1.2	

DILER, DILR Contactor Relays

Technical Data

			DILER ...DILE	DILR ...DIL
Contacts				
Interlocked opposing contacts to ZH 1/457, including auxiliary contact module			Yes	Yes
Rated impulse withstand voltage U_{imp}			V	6000
Overvoltage category/pollution degree			III/3	III/3
Rated insulation voltage U_i			V AC	690
Rated operational voltage U_e			V AC	600
Safe isolation to IEC 536 between coil and auxiliary contacts, and between the auxiliary contacts			V AC	300
Rated operational current I_e				
AC-15	220/240 V	A	6 (4) ¹⁾	6
	380/415 V	A	3 (2) ¹⁾	4
	500 V	A	1.5	1.5
DC-13 ²⁾				
Above 110 V and at L/R > 15 ms: it is essential that an arc-quenching device (RC suppressor) be used in parallel with the contacts. C: 1 μ F, R: 0.5 Ω in series				
L/R \leq 15 ms: e.g. contactor coils, solenoid valves, DC motors				
Contacts in series:				
1	24 V	A	2.5	10
2 (1)	60 V	A	2.5	10 (6)
3 (1)	110 V	A	1.5	6 (3)
3 (1)	220 V	A	0.5	5 (1)
L/R \leq 50 ms: e.g. magnetic clutches, solenoid brakes				
Contacts in series:				
2	24 V	A	–	6
2	60 V	A	–	6
3 (1)	110 V	A	–	3 (1.5)
3 (1)	220 V	A	–	2 (1)
Control circuit reliability at $U_e = 24$ V				
$U_{min} = 17$ V, $I_{min} = 5.4$ mA	Fault probability		H_f	< 10^{-8} , < 1 failure in 100 million operations
Conventional thermal current I_{th}			A	10
Component lifespan at $U_e = 240$ V				
AC-15			→ Page 04/032	
DC-13			→ Page 04/032	
L/R = 50 ms: 2 contacts in series at $I_e = 0.5$ A	Operations	$\times 10^6$	0.15	→ Page 04/032
Short-circuit rating without welding when supplied directly from mains or transformer > 1000 VA				
Maximum overcurrent protective device	220/240 V	PKZM0	4	4
	380/415 V	PKZM0	4	2.4
	220/230 V	FAZ-C	–	4
Maximum fuse ³⁾	500 V	gG/gL A	6	16
	500 V	A fast	10	–
Current heat loss at I_{th}				
Per contact	AC operated	W	0.2	0.8
	DC operated	W	0.3	0.8

Notes

¹⁾ Auxiliary contact module

²⁾ Making and breaking conditions to DC-13, time constant as stated

³⁾ See transparent overlay 'Fuses' for time/current characteristics (please enquire)

DILER, DILR Contactor Relays

Technical Data

		DILER ...DILE	DILR ...DIL
Magnet systems			
Voltage tolerance			
AC operated			
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz			
Pick-up	$\times U_c$	0.8 – 1.1	0.8 – 1.1
Dual-frequency coil ... V, 50/60 Hz			
Pick-up	$\times U_c$	0.85 – 1.1	0.85 – 1.1
DC operated ¹⁾			
Pick-up	$\times U_c$	0.85 – 1.3	0.85 – 1.1
Without auxiliary contact module			
Pick-up	$\times U_c$	0.7 – 1.3	–
Power consumption			
AC operated			
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz			
Pick-up	VAW	25/22	67/52
Sealing	VAW	4.6/1.3	8.5/2.5
Dual-frequency coil			
... V, 50/60 Hz at 50 Hz			
Pick-up	VAW	30/26	–
Sealing	VAW	5.4/1.6	–
... V, 50/60 Hz at 60 Hz			
Pick-up	VAW	29/24	–
Sealing	VAW	3.9/1.1	–
DC operated			
Pull-in = sealing	W	2.6	9.5
Duty factor	% DF	100	100
Switching times at 100 % U (approximate values)			
AC operated			
Closing delay	ms	14 – 21	22
Make contact			
Opening delay	ms	8 – 18	14
With auxiliary contact module			
Max. closing delay	ms	45	–
DC operated			
Closing delay	ms	26 – 35	38
Make contact			
Opening delay	ms	15 – 25	9
With auxiliary contact module			
Max. closing delay	ms	70	–

Notes

¹⁾ Smoothed DC or three-phase bridge rectifier

TP Timer Modules, V Latching Module, VS Amplifier modules

Technical Data

		TPE(H)11DIL TPD(H)11DIL	VDIL	VS1DIL VS2DIL	ETS4-VS3
General technical data					
Standards		IEC/EN 60 947, VDE 0660, UL, CSA			
Lifespan, mechanical					
AC operated					
Operations	× 10 ⁶	1	5	–	–
DC operated					
Operations	× 10 ⁶	1	1	10	30
Maximum operating frequency, mechanical					
AC operated	Ops./h	3600 (100) ¹⁾	1500	–	–
DC operated	Ops./h	3600 (100) ¹⁾	1500	9000	72000
Climatic proofing		Damp heat, constant, to IEC 60 068-2-3 Damp heat, cyclical, to IEC 60 068-2-30			
Ambient temperature					
Open					
Min./Max.	°C	–25/+50	–25/+50	–25/+50	–25/+60
Min./Max.	°C	(–10/+50) ¹⁾			
Enclosed					
Min./Max.	°C	–25/+40	–25/+40	–25/+40	–25/+45
Min./Max.	°C	(–10/+40) ¹⁾			
Mounting position		As required, except suspended ²⁾	As required	As required	As required
Mechanical shock resistance (half-sinusoidal shock, 20 ms)					
Make/break contact	g	10/6	–	10/–	10/–
Mechanical latching	g	–	20	–	–
Degree of protection		IP00	IP00	IP00	IP20
Protection against direct contact from the front when actuated by a perpendicular test finger (IEC 536)		Finger and back-of-hand proof	Finger and back-of-hand proof	Finger and back-of-hand proof	Finger and back-of-hand proof
Dimensions		→ Page 04/066	→ Page 04/066	→ Page 04/066	→ Page 04/066
Weight	kg	0.08	0.1	0.04 (VS1) 0.05 (VS2)	0.09
Terminal capacity					
Solid					
	mm ²	1 × (0.5 – 2.5)	1 × (0.5 – 2.5)	1 × (0.75 – 4)	1 × (0.75 – 2.5)
	mm ²	2 × (0.5 – 2.5)	2 × (0.5 – 2.5)	2 × (0.75 – 4)	2 × (0.75 – 1.5) ³⁾
Flexible with ferrule to DIN 46 228					
	mm ²	1 × (0.5 – 1.5)	1 × (0.5 – 1.5)	1 × (0.75 – 2.5)	1 × (0.75 – 2.5)
	mm ²	2 × (0.5 – 0.75)	2 × (0.5 – 0.75)	2 × (0.75 – 2.5)	2 × (0.75 – 1.5) ³⁾
Solid or stranded					
Min.	AWG	18	18	18	16
Max.	AWG	14	14	12	14
Terminal screw		M3	M3	M3.5	M3.5
Pozidriv screwdriver	Size	2	2	2	2
Standard screwdriver	mm	0.8 × 5.5	0.8 × 5.5	0.8 × 5.5	0.8 × 5.5
	mm	1 × 6	1 × 6	1 × 6	1 × 6
Tightening torque					
Max.	Nm	1.2	1.2	1.2	1.2

Notes

¹⁾ TPEH11DIL, TPDH11DIL

²⁾ DILR ... -G + TPD(H)11DIL: do not mount vertically

³⁾ Use equal cross-sections only

TP Timer Modules, V Latching Module, VS Amplifier modules

Technical Data

		TPE(H)11DIL TPD(H)11DIL	VDIL	VS1DIL VS2DIL	ETS4-VS3
Contacts					
Interlocked opposing contacts to ZH 1/457, including auxiliary contact module		Yes	–	–	–
Rated impulse withstand voltage U_{imp}	V	6000	8000	4000	6000
Overvoltage category/pollution degree		III/3	III/3	III/2	III/3
Rated insulation voltage U_i	V AC	690	690	440	440
Rated operational voltage U_e	V AC	500	415	415	440
Rated operational current I_e					
AC-15					
220/240 V	A	4	–	1.5	2
380/415 V	A	4	–	1	2
DC-13 ¹⁾					
Above 110 V and at L/R > 15 ms: it is essential that an arc-quenching device (RC suppressor) be used in parallel with the contacts. C: 1 μ F, R: 0.5 Ω in series					
L/R \leq 15 ms: e.g. contactor coils, solenoid valves, DC motors					
Contacts in series:					
1 24 V	A	10	–	1	2.6
1 60 V	A	6	–	1	1.0
1 110 V	A	3	–	1	0.6
1 220 V	A	1	–	1	0.2
L/R \leq 50 ms: e.g. magnetic clutches, solenoid brakes					
Contacts in series:					
1 24 V	A	4	–	0.5	2.0
1 60 V	A	4	–	0.5	0.6
1 110 V	A	1	–	0.5	0.08
1 220 V	A	0.5	–	0.5	0.08
L/R \leq 300 ms					
1 24 V	A	–	–	0.2	0.6
1 60 V	A	–	–	0.2	0.2
1 110 V	A	–	–	0.2	0.08
1 220 V	A	–	–	0.2	0.03
Control circuit reliability at $U_e = 24$ V, $U_{min} = 17$ V, $I_{min} = 5.4$ mA					
Fault probability		H_F	< 10^{-8} , < 1 failure in 100 million operations		
Conventional thermal current I_{th}	A	10	–	8	6
Component lifespan at $I_e = 0.1$ A/1.2 A					
AC-15					
230 V	Operations	$\times 10^6$	–	8/–	7/1
DC-13					
230 V	Operations	$\times 10^6$	–	0.85/–	–
Short-circuit rating without welding when supplied directly from mains or transformer > 1000 VA					
Maximum overcurrent protective device					
220/240 V	PKZM0	2.5	–	–	–
380/415 V	PKZM0	1.6	–	–	–
Maximum fuse ²⁾					
500 V	A gG/gL	6	–	–	–
	A fast	–	–	4	4
Current heat loss at I_{th}					
Per contact, max.	W	0.3	–	–	–

Notes

¹⁾ Making and breaking conditions to DC-13, time constant as stated

²⁾ See transparent overlay 'Fuses' for time/current characteristics (please enquire)

TP Timer Modules, V Latching Module, VS Amplifier modules

Technical Data

				TPE(H)11DIL TPD(H)11DIL	VDIL	VS1DIL VS2DIL	ETS4-VS3
Magnet systems							
Voltage tolerance							
AC operated							
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	Unlatching	$\times U_c$	–	–	0.8 – 1.1	–	
Dual-frequency coil ... V, 50/60 Hz	Unlatching	$\times U_c$	–	–	0.8 – 1.1	–	
DC operated ¹⁾							
	Pick-up	$\times U_c$	–	–	0.75 – 1.25	0.85 – 1.2	
	Unlatching	$\times U_c$	–	0.85 – 1.1	–	–	
Power consumption							
AC operated							
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	Pick-up	VA/W	–	13/12	–	–	
	Sealing	VA/W	–	5/2	–	–	
DC operated							
	Pull-in = sealing	W	–	26	0.27	0.6	
Duty factor		% DF	100	100 at AC 200 ms at DC	100	100	
Switching times at 100 % <i>U</i> (approximate values)							

DILET, ETR4 Electronic Timing Relays

Technical Data

				DILET-A	DILET-W	ETR4-A	ETR4-W	
General technical data								
Standards				IEC/EN 60 255, VDE 0435, IEC/EN 60 947, UL , CSA				
Lifespan, mechanical								
AC operated	Operations	$\times 10^6$		30	30	30	30	
DC operated	Operations	$\times 10^6$		30	30	30	30	
Climatic proofing				Damp heat, constant, to IEC 60 068-2-3 Damp heat, cyclical, to IEC 60 068-2-30				
Ambient temperature								
Open	Min./Max.	$^{\circ}\text{C}$		-20/+60	-20/+60	-25/+60	-25/+60	
Enclosed	Min./Max.	$^{\circ}\text{C}$		-20/+45	-20/+45	-20/+45	-20/+45	
Mounting position				As required				
Mechanical shock resistance (half-sinusoidal shock, 20 ms)			Make contact	g	4	4	4	4
Degree of protection				IP20				
Dimensions				→ Page 04/066				
Weight				kg	0.09	0.09	0.1	0.1
Terminal capacity				→ Page 04/046 (as DILER)		→ Page 04/049 (as ETS4VS3)		
Contacts								
Rated impulse withstand voltage U_{imp}			V AC	6000	6000	6000	6000	
Overvoltage category/pollution degree				III/2	III/2	III/3	III/3	
Rated insulation voltage U_i			V AC	600	600	600	600	
Rated operational voltage U_e			V AC	440	440	440	440	
Safe isolation to IEC 536 between coil and auxiliary contacts, and between the auxiliary contacts				V AC	250	250	250	250
Making capacity								
AC-14	$\cos \varphi = 0.3$	440 V	A	48	48	48	48	
AC-15	$\cos \varphi = 0.3$	220 V	A	50	50	50	50	
DC-11	$L/R \leq 40 \text{ ms}$		$\times I_e$	1.1	1.1	1.1	1.1	
Breaking capacity								
AC-14	$\cos \varphi = 0.3$	440 V	A	3	3	3	3	
AC-15	$\cos \varphi = 0.3$	220 V	A	3	3	3	3	
DC-11	$L/R \leq 40 \text{ ms}$		$\times I_e$	1.1	1.1	1.1	1.1	
Rated operational current I_e								
AC-14	440 V		A	3	3	3	3	
AC-15	220 V		A	3	3	3	3	
DC-11 ¹⁾ Above 110 V and at $L/R > 15 \text{ ms}$: it is essential that an arc-quenching device (RC suppressor) be used in parallel with the contacts. C: 1 μF , R: 0.5 Ω in series								
L/R $\leq 15 \text{ ms}$: e.g. contactor coils, solenoid valves, DC motors								
	24 V		A	1.5	1.5	1.5	1.5	
L/R $\leq 50 \text{ ms}$:				A	1.2	1.2	1.2	
Conventional thermal current I_{th}				A	6	6	6	
Short-circuit rating ²⁾ without welding								
Maximum fuse			A gG/gL	6	6	6	6	

Notes

- ¹⁾ Making and breaking conditions to DC-13, time constant as stated
²⁾ When supplied directly from mains or transformer > 1000 VA

DILET, ETR4 Electronic Timing Relays

Technical Data

		DILET-A	DILET-W	ETR4-A	ETR4-W
Magnet systems					
Voltage tolerance					
AC operated 50/60 Hz					
Pick-up		→ Page 04/017	→ Page 04/017	→ Page 04/019	→ Page 04/019
DC operated ¹⁾ when supplied directly from mains or transformer > 1000 VA					
Pick-up		→ Page 04/017	→ Page 04/017	→ Page 04/019	→ Page 04/019
Power consumption					
AC operated 50/60 Hz					
Pick-up	VA/W	2/-	0.5/-	2/-	0.5/-
Sealing	VA/W	2/-	0.5/-	2/-	0.5/-
DC operated					
Pick-up	W	1.8	-	1.8	-
Sealing	W	1.8	-	1.8	-
Duty factor	% DF	100	100	100	100
Maximum operating frequency	Ops./h	4000	4000	4000	4000
Minimum command time					
AC/DC	ms	50/30	50/-	50/30	50/-
Voltage variation	% ΔU	0.01	0.01	0.01	0.01
Variation due to temperature fluctuation based on +20 °C		0.025	0.025	0.025	0.025
Repetition accuracy (deviation)	%	0.1	0.1	0.1	0.1
Recovery time (after 100% time delay)	ms	70	70	70	70
Contact changeover time t_u	ms	-	-	4 (50) ²⁾	4 (50) ²⁾

Notes¹⁾ Not DILET...-W²⁾ ETR4-51

ESR Electronic Safety Relays

Technical Data

				ESR3-NO-31	ESR4-NO-31	ESR4-NO-21
General technical data						
Standards				IEC/EN 60 947, VDE 0660, IEC/EN 60 255, UL, CSA		
Lifespan, mechanical	Operations	$\times 10^6$		10	10	10
Maximum operating frequency		Ops./h		3600	3600	3600
Climatic proofing				Damp heat to DIN 50 016: 24 hour cycle, 23 °C, 83% relative humidity, 40 °C, 92% relative humidity		
Ambient temperature	Min./Max.	°C		-25/+55	-25/+55	-25/+55
Storage temperature	Min./Max.	°C		-25/+70	-25/+70	-25/+70
Mounting position				As required		
Vibration resistance				5, to IEC/EN 60 068-2-6, frequency: 10 – 55 Hz, amplitude: 0.35 mm		
Degree of protection						
Enclosure				IP40	IP40	IP40
Terminals				IP20	IP20	IP20
Protection against direct contact from the front when actuated by a perpendicular test finger (IEC 536)				Finger and back-of-hand proof		
Dimensions				→ Page 04/067	→ Page 04/067	→ Page 04/067
Weight				kg	0.36	0.2
Terminal capacity						
Flexible with ferrule				mm ²	1 × (0.5 – 1.5) 2 × (0.5 – 1.5)	1 × (0.25 – 2.5) 2 × (0.25 – 0.5)
Solid				mm ²	1 × (0.75 – 2.5) 2 × (0.75 – 2.5)	1 × (0.14 – 2.5) 2 × (0.14 – 0.75)
Terminal screw						
Pozidriv screwdriver				Size	2	–
Standard screwdriver				mm	–	0.6 × 3.5
Tightening torque				Nm	1	0.6
Main contacts						
Rated impulse withstand voltage U_{imp}				V AC	4000	4000
Overvoltage category/pollution degree						
outside					III/3	III/3
inside					III/2	III/2
Rated insulation voltage U_i				V AC	300	300
Rated operational voltage U_e				V AC/DC	230	230
Rated operational current I_e						
AC-15				230 V	A	6
DC-13				24 V (360 Ops./h)	A	6
				24 V (3600 Ops./h)	A	3
Max. summation current of all poles				A	18	12
Short-circuit protection						
Fuse				gG/gL A	6	6

ESR Electronic Safety Relays

Technical Data

ESR4-NV3(30)-30 ESR4-NT30-30	ESR4-NM-21	ESR4-NZ-21	ESR4-NE-42	ESR4-VE3-42
IEC/EN 60 947, VDE 0660, IEC/EN 60 255, UL, CSA				
10	10	10	10	10
3600	3600	3600	3600	3600
Damp heat to DIN 50 016: 24 hour cycle, 23 °C, 83% relative humidity, 40 °C, 92% relative humidity				
-25/+55	-25/+55	-25/+55	-25/+55	-25/+55
-25/+70	-25/+70	-25/+70	-25/+70	-25/+70
As required	As required	As required	As required	As required
5, to IEC/EN 60 068-2-6, frequency: 10 – 55 Hz, amplitude: 0.35 mm				
IP40	IP40	IP40	IP40	IP40
IP20	IP20	IP20	IP20	IP20
Finger and back-of-hand proof				
→ Page 04/067	→ Page 04/067	→ Page 04/067	→ Page 04/067	→ Page 04/067
0.2	0.2	0.2	0.2	0.2
1 × (0.25 – 2.5) 2 × (0.25 – 0.5)	1 × (0.25 – 2.5) 2 × (0.25 – 0.5)	1 × (0.25 – 2.5) 2 × (0.25 – 0.5)	1 × (0.25 – 2.5) 2 × (0.25 – 0.5)	1 × (0.25 – 2.5) 2 × (0.25 – 0.5)
1 × (0.14 – 2.5) 2 × (0.14 – 0.75)	1 × (0.14 – 2.5) 2 × (0.14 – 0.75)	1 × (0.14 – 2.5) 2 × (0.14 – 0.75)	1 × (0.14 – 2.5) 2 × (0.14 – 0.75)	1 × (0.14 – 2.5) 2 × (0.14 – 0.75)
–	–	–	–	–
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
4000	4000	4000	4000	4000
III/3	III/3	III/3	III/3	III/3
III/2	III/2	III/2	III/2	III/2
300	300	300	300	300
230	230	230	230	230
6	6	6	6	6
6	6	6	6	6
3	3	3	3	3
12	12	12	12	12
6	6	6	6	6

ESR Electronic Safety Relays

Technical Data

			ESR3-NO-31	ESR4-NO-31	ESR4-NO-21
Magnet system					
Actuating voltage U_c		V AC	230	24	24
		V DC	–	24	24
Voltage tolerance	Pick-up	$\times U_c$	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1
Power consumption					
	AC operated 50/60 Hz	VA/W	3.2/2.5	2.4/1.4	3.5/2.1
	DC operated	W	–	1.3	1.5
Control circuit					
Rated output voltage		V DC	≤ 24	≤ 24	≤ 24
No-load voltage		V DC	≤ 40	–	–
Rated current		mA	40	40	50
Short-circuit current		A	1	1.4	2.2
Protection			Short-circuit proof transformer	PTC resistor	PTC resistor
Response time		ms	–	2000	2000
Recovery time		ms	–	3000	3000
Inputs					
Rated current		mA	Y13, Y14: 40 Y12, Y31: 15	Y2: 40	S12: 30, S31 S22: 20
Response time t_{A1} (with reset monitoring)		ms	80	–	80
Response time t_{A1} (without reset monitoring)		ms	500	50	60
Reset time t_R/t_{R1}		ms	50/100	40	40/100
Minimum contact closing time t_M		ms	50	50	50
Recovery time t_W		ms	500	< 50	500
Synchronous monitoring time t_S		ms	–	–	–
EMC					
Emitted interference			To EN 50 081-1 and EN 50 081-2		
Noise immunity			To EN 50 082-2		

ESR Electronic Safety Relays

Technical Data

ESR4-NV3(30)-30 ESR4-NT30-30	ESR4-NM-21	ESR4-NZ-21	ESR4-NE-42	ESR4-VE3-42
–	–	24	24	–
24	24	24	24	24
0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1
–	–	2.7/1.6	2.7/1.5	–
2.5	2.7	1.5	1.0	1.0
≤24	≤24	≤24	–	–
–	–	–	–	–
50	50	60	–	–
2.2	0.1	1	–	–
PTC resistor	Electronic protection	PTC resistor	–	–
2000	5	2000	–	–
3000	5	3000	–	–
S12, S22, S31: 25 S34, S35: 40	S12: 30 S31, S22: 20	Y2: 60 Y11, Y21: 60	–	–
30	80	–	–	–
200	60	40	25	25
25/adjustable	40/100	< 50	15	–
200	50	–	–	–
500	500	< 250	–	–
–	–	< 500	–	–
To EN 50 081-1 and EN 50 081-2				
To EN 50 082-2				

EMR4-I Current Monitoring

Technical Data

				EMR4-I1-2-A	EMR4-I15-2-A	EMR4-I15-2-B
General technical data						
Standards				IEC/EN 60 255-6, EN 61 557, UL , CSA, GL		
Lifespan, mechanical	Operations	× 10 ⁶		30	30	30
Climatic proofing				Damp heat cyclical to IEC 60 068-2-30: 24 h cycle, 55 °C, 93 % relative humidity 96 h		
Ambient temperature range	Min./Max.	°C		-25/+65	-25/+65	-25/+65
Storage temperature	Min./Max.	°C		-40/+85	-40/+85	-40/+85
Mounting position				As required	As required	As required
Mechanical shock resistance		g		10	10	10
Degree of protection	Terminals			IP20	IP20	IP20
Dimensions				→ Page 04/067	→ Page 04/067	→ Page 04/067
Weight	Approx.	kg		0.3	0.3	0.3
Terminal capacity						
Flexible with ferrule		mm ²		2 × 2.5	2 × 2.5	2 × 2.5
Solid		mm ²		2 × 2.5	2 × 2.5	2 × 2.5
Standard screwdriver		mm		5.5 × 0.8	5.5 × 0.8	5.5 × 0.8
Tightening torque		Nm		0.5 – 0.8	0.5 – 0.8	0.5 – 0.8
Fixing				Snap fitting on top-hat rail to EN 50 022		

EMR4-F Phase Sequence Relays

Technical Data

				EMR4-F500-2
General technical data				
Standards				IEC/EN 60 255-6, EN 61 557, UL , CSA, GL
Lifespan, mechanical	Operations	$\times 10^6$		30
Climatic proofing				Damp heat cyclical to IEC 60 068-2-30: 24 h cycle, 55 °C, 93 % relative humidity 96 h
Ambient temperature range	Min./Max.	°C		-20/+60
Storage temperature	Min./Max.	°C		-40/+80
Mounting position				As required
Mechanical shock resistance		g		10
Degree of protection	Terminals			IP20
Dimensions				→ Page 04/067
Weight	Approx.	kg		0.15
Terminal capacity				
Flexible with ferrule		mm ²		2 × 2.5
Solid		mm ²		2 × 2.5
Standard screwdriver		mm		5.5 × 0.8
Tightening torque		Nm		0.5 – 0.8
Fixing				Snap fitting on top-hat rail to EN 50 022
Contacts				
Rated impulse withstand voltage U_{imp}		V AC		4000
Overvoltage category/pollution degree				III/3
Rated insulation voltage U_i		V AC		400
Power supply				
Supply voltage	L1, L2, L3	V AC		200 – 500
Voltage tolerance		$\times U_c$		0.85 – 1.1
Power consumption		VA		15
Rated frequency		Hz		50 – 60
Duty factor		%		100
Measuring circuits				
Voltage to be monitored U_N	L1, L2, L3	V AC		200 – 500
Frequency		Hz		50 – 60
Max. measuring cycle		ms		500
Temperature error		%/°C		≤ 0.06
Error within the supply voltage tolerance		%		≤ 0.5
Status indication				
Output relay energized	LED			Yellow
Relay output contacts				
Rated operational voltage U_e		V AC		500
Rated operational current I_e AC-12	At 230 V	A		4
Rated operational current I_e AC-15	At 230 V	A		3
Rated operational current I_e DC-12	At 24 V	A		4
Rated operational current I_e DC-13	At 24 V	A		2
Maximum lifespan, electrical (AC-12/230 V/4 A)	Operations	$\times 10^6$		0.3
Short-circuit rating, max. fuse	Fast/gL	A		10
Load limit curves				→ Page 04/036
EMC				
Electromagnetic compatibility				IEC/EN 61 000-6-2
ESD				IEC/EN 61 000-4-2 Level 3
HF immunity to radiation				IEC/EN 61 000-4-3 Level 3
Burst				IEC/EN 61 000-4-4 Level 3
Surge				IEC/EN 61 000-4-5 Level 4
HF immunity to line-conducted interference				IEC/EN 61 000-4-6 Level 3

EMR4-W Phase Monitoring Relays

Technical Data

				EMR4-W500-2-C	EMR4-W500-2-D	EMR4-W580-2-D
General technical data						
Standards				IEC/EN 60 255-6, EN 61 557, UL , CSA, GL		
Lifespan, mechanical	Operations	$\times 10^6$	30	30	30	
Climatic proofing				Damp heat cyclical to IEC 60 068-2-30: 24 h cycle, 55 °C, 93 % relative humidity 96 h		
Ambient temperature range	Min./Max.	°C	-25/+65	-25/+65	-25/+65	
Storage temperature	Min./Max.	°C	-40/+85	-40/+85	-40/+85	
Mounting position				As required		
Mechanical shock resistance				g		
Degree of protection	Terminals		IP20	IP20	IP20	
Dimensions				→ Page 04/067		
Weight	Approx.	kg	0.3	0.3	0.3	
Terminal capacity						
Flexible with ferrule				mm ²		
Solid				mm ²		
Standard screwdriver				mm		
Tightening torque				Nm		
Fixing				Snap fitting on top-hat rail to EN 50 022		
Contacts						
Rated impulse withstand voltage U_{imp}				V AC		
				4000		
Overvoltage category/pollution degree				III/3		
Rated insulation voltage U_i				V AC		
				400		
Power supply						
Supply voltage				V AC		
				160 – 300		
Voltage tolerance				$\times U_c$		
				0.85 – 1.1		
Power consumption				VA		
				3		
Rated frequency				Hz		
				50 – 60		
Duty factor				%		
				100		
Timing cycle						
Response delay time	Adjustable	s	0.1 – 10	0.1 – 10	0.1 – 10	
Off delay time	Adjustable	s	0.1 – 10	0.1 – 10	0.1 – 10	
Time error within supply voltage		%	≤ 0.5	≤ 0.5	≤ 0.5	
Time error within temperature range		%/°C	≤ 0.06	≤ 0.06	≤ 0.06	
Measuring circuits						
Response range adjustable for over and undervoltage	U_{min}/U_{max}	V AC	300 – 380/420 – 500	300 – 380/420 – 500	350 – 430/500 – 580	
Hysteresis				%		
				5		
Max. measuring cycle				ms		
				80		
Temperature error				%/°C		
				≤ 0.06		
Error within supply voltage				%		
				≤ 0.5		
Status indication						
Supply voltage	LED		Green	Green	Green	
Output relay energized	LED		Yellow	Yellow	Yellow	
Overvoltage	> U	LED	Red	Red	Red	
Undervoltage	< U	LED	Red	Red	Red	
Phase failure, phase sequence error	P	LED	Red	Red	Red	
Relay output contacts						
Rated operational voltage U_e				V AC		
				500		
Rated operational current I_e AC-12	At 230 V	A	5	5	5	
Rated operational current I_e AC-15	At 230 V	A	3	3	3	
Rated operational current I_e DC-12	At 24 V	A	5	5	5	
Rated operational current I_e DC-13	At 24 V	A	2.5	2.5	2.5	
Maximum electrical lifespan (AC-12/230 V/5 A)	Operations	$\times 10^6$	0.1	0.1	0.1	
Short-circuit rating, max. fuse	Fast/gL	A	5	5	5	
Load limit curves				→ Page 04/036		
EMC						
Electromagnetic compatibility				IEC/EN 61 000-6-2		
ESD				IEC/EN 61 000-4-2 Level 3		
HF immunity to radiation				IEC/EN 61 000-4-3 Level 3		
Burst				IEC/EN 61 000-4-4 Level 3		
Surge				IEC/EN 61 000-4-5 Level 4		
HF immunity to line-conducted interference				IEC/EN 61 000-4-6 Level 3		

EMR4-A Phase Imbalance Monitoring Relay

Technical Data

				EMR4-A400-1
General technical data				
Standards				IEC/EN 60 255-6, EN 61 557, UL, CSA, GL
Lifespan, mechanical	Operations	$\times 10^6$		30
Climatic proofing				Damp heat cyclical to IEC 60 068-2-30: 24 h cycle, 55 °C, 93 % relative humidity 96 h
Ambient temperature range	Min./Max.	°C		-20/+60
Storage temperature	Min./Max.	°C		-40/+80
Mounting position				As required
Mechanical shock resistance		g		10
Degree of protection	Terminals			IP20
Dimensions				→ Page 04/067
Weight	Approx.	kg		0.3
Terminal capacity				
Flexible with ferrule		mm ²		2 × 2.5
Solid		mm ²		2 × 2.5
Standard screwdriver		mm		5.5 × 0.8
Tightening torque		Nm		0.5 – 0.8
Fixing				Snap fitting on top-hat rail to EN 50 022
Contacts				
Rated impulse withstand voltage U_{imp}		V AC		4000
Overvoltage category/pollution degree				III/3
Rated insulation voltage U_i		V AC		400
Power supply				
Supply voltage	50 Hz	V AC		380 – 415
Voltage tolerance		$\times U_c$		0.8 – 1.2
Power consumption		VA		15
Rated frequency		Hz		50
Duty factor		%		100
Timing cycle				
Response delay, indication of phase imbalance		ms		500
Time error within supply voltage		%		≤ 0.5
Time error within temperature range		%/°C		≤ 0.06
Measuring circuits				
Monitoring voltage/Voltage to be monitored U_N	L1, L2, L3	V AC		380 – 415
Frequency		Hz		50
Phase imbalance level adjustable		%		5 – 15
Switching hysteresis		%		20
Temperature error		%/°C		≤ 0.06
Error/Deviation within the supply voltage tolerance		%		≤ 0.5
Status indication				
Output relay energized	LED			Yellow
Relay output contacts				
Rated operational voltage U_e		V AC		500
Rated operational current I_e AC-12	At 230 V	A		4
Rated operational current I_e AC-15	At 230 V	A		3
Rated operational current I_e DC-12	At 24 V	A		4
Rated operational current I_e DC-13	At 24 V	A		2
Maximum lifespan, electrical (AC-12/230 V/4 A)	Operations	$\times 10^6$		0.3
Short-circuit rating, max. fuse	Fast/gL	A		10
Load limit curves				→ Page 04/036
EMC				
Electromagnetic compatibility				IEC/EN 61 000-6-2
ESD				IEC/EN 61 000-4-2 Level 3
HF immunity to radiation				IEC/EN 61 000-4-3 Level 3
Burst				IEC/EN 61 000-4-4 Level 3
Surge				IEC/EN 61 000-4-5 Level 4
HF immunity to line-conducted interference				IEC/EN 61 000-4-6 Level 3

EMR4-N Liquid Level Monitoring Relays

Technical Data

				EMR4-N100-1-B	EMR4-N500-2-B	EMR4-N500-2-A		
General technical data								
Standards				IEC/EN 60 255-6, EN 61 557, UL , CSA, GL				
Lifespan, mechanical	Operations	$\times 10^6$		30	30	30		
Climatic proofing				Damp heat cyclical to IEC 60 068-2-30: 24 h cycle, 55 °C, 93 % relative humidity 96 h				
Ambient temperature range	Min./Max.	°C		-20/+60	-25/+65	-25/+65		
Storage temperature	Min./Max.	°C		-40/+80	-40/+85	-40/+85		
Mounting position				As required				
Mechanical shock resistance				g				
Degree of protection				IP20				
Dimensions				→ Page 04/067				
Weight	Approx.	kg		0.15	0.3	0.3		
Terminal capacity								
Flexible with ferrule				mm ²				
Solid				mm ²				
Standard screwdriver				mm				
Tightening torque				Nm				
Fixing				Snap fitting on top-hat rail to EN 50 022				
Contacts								
Rated impulse withstand voltage U_{imp}				V AC	4000	4000	4000	
Overvoltage category/pollution degree					III/3	III/3	III/3	
Rated insulation voltage U_i				V AC	400	400	400	
Power supply								
Supply voltage				V AC	220 – 240	220 – 240	–	
				V AC/DC	–	–	24 – 240	
Voltage tolerance				$\times U_c$	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	
Power consumption				VA/W	2.5	3	2	
Rated frequency				Hz	50 – 60	50 – 60	50 – 60 DC	
Duty factor				%	100	100	100	
Timing cycle								
On or Off delay time	Adjustable	s		–	0.1 – 10	0.1 – 10		
Measuring circuit								
Sensor inputs				B1	Earth reference sensor	Earth reference sensor	Earth reference sensor	
				B2	Maximum level	Maximum level	Maximum level	
				B3	Minimum level	Minimum level	Minimum level	
Response sensitivity range				k Ω	5 – 100	0.25 – 500	0.25 – 500	
Maximum sensor voltage				V AC	30	20	20	
Reset range				k Ω	1.5 – 2.3	–	–	
Maximum sensor current				mA	1	–	–	
Maximum cable capacity				nF	10	–	–	
Maximum cable length				m	100	–	–	
Response delay	approx.	ms		250	–	–		
Status indication								
Supply voltage				LED	Green	Green	Green	
Output relay energized				LED	Yellow	Yellow	Yellow	
Relay output contacts								
Rated operational voltage U_e				V AC	250	400	400	
Rated operational current I_e AC-12				At 230 V	A	4	5	5
Rated operational current I_e AC-15				At 230 V	A	3	3	3
Rated operational current I_e DC-12				At 24 V	A	4	5	5
Rated operational current I_e DC-13				At 24 V	A	2	2.5	2.5
Maximum lifespan, electrical (AC-12/230 V/5 A)				Operations	$\times 10^6$	0.3	0.1	0.1
Short-circuit rating, max. fuse				Fast/gL	A	10	5	5
Load limit curves					→ Page 04/036	→ Page 04/036	→ Page 04/036	
EMC								
Electromagnetic compatibility					IEC/EN 61 000-6-2			
ESD					IEC/EN 61 000-4-2 Level 3			
HF immunity to radiation					IEC/EN 61 000-4-3 Level 3			
Burst					IEC/EN 61 000-4-4 Level 3			
Surge					IEC/EN 61 000-4-5 Level 4			
HF immunity to line-conducted interference					IEC/EN 61 000-4-6 Level 3			

EMR4-R Insulation Monitoring Relays

Technical Data

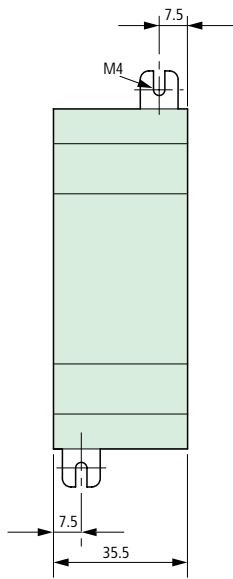
			EMR4-RDC-1-A	EMR4-RAC-1-A
General technical data				
Standards			IEC/EN 60 255-6, EN 61 557, UL , CSA, GL	
Lifespan, mechanical	Operations	$\times 10^6$	30	30
Climatic proofing			Damp heat cyclical to IEC 60 068-2-30: 24 h cycle, 55 °C, 93 % relative humidity 96 h	
Ambient temperature range	Min./Max.	°C	-25/+65	-25/+65
Storage temperature	Min./Max.	°C	-40/+85	-40/+85
Mounting position			As required	
Mechanical shock resistance			10	
Degree of protection	Terminals		IP20	IP20
Dimensions			→ Page 04/067	
Weight	Approx.	kg	0.3	0.3
Terminal capacity				
Flexible with ferrule		mm ²	2 × 2.5	2 × 2.5
Solid		mm ²	2 × 2.5	2 × 2.5
Standard screwdriver			5.5 × 0.8	
Tightening torque			Nm 0.5 – 0.8	
Fixing			Snap fitting on top-hat rail to EN 50 022	
Contacts				
Rated impulse withstand voltage U_{imp}			V AC 4000	4000
Overvoltage category/pollution degree			III/3	III/3
Rated insulation voltage U_i			V AC 400	400
Power supply				
Supply voltage			V AC/DC 24 – 240	24 – 240
Voltage tolerance			$\times U_c$ 0.85 – 1.1	0.85 – 1.1
Power consumption			VA 5.5	4.5
Rated frequency	AC	Hz	50 – 60	50 – 60
Duty factor			% 100	100
Timing cycle				
Delay time	At $R_{insulation}$	s	< 1	< 1
	\times response value	s	< 0.9	< 0.9
Measuring circuits				
Input			L+, L-, PE	L, PE
Response range			k Ω 10 – 110	1 – 11, 10 – 110
Minimum internal resistance of alternating current			k Ω –	100
Minimum internal resistance of direct current			k Ω –	100
Minimum internal resistance			k Ω 57	–
Test resistance			k Ω –	0.82
Maximum insulation voltage			V 300 DC	415 AC
Maximum voltage being monitored/test voltage (EMR4-RAC-1-A = DC voltage being monitored/test voltage)			V DC 24 – 240	\leq 30
Cable length for cancellation- and test button, maximum			m 10	10
Status indication				
Supply voltage	LED		Green	Green
Faults	LED		Yellow	Red
Fault at L+	LED		Red	Red
Fault at L-	LED		Red	Red
Relay output contacts				
Rated operational voltage U_e			V AC 400	320
Rated operational current I_e AC-12	At 230 V	A	5	5
Rated operational current I_e AC-15	At 230 V	A	3	3
Rated operational current I_e DC-12	At 24 V	A	5	3
Rated operational current I_e DC-13	At 24 V	A	2.5	2.5
Maximum lifespan, electrical (AC-12/230 V/5 A)	Operations	$\times 10^6$	0.1	0.1
Short-circuit rating, max. fuse	Fast/gL	A	5	5
Load limit curves			→ Page 04/036	
EMC				
Electromagnetic compatibility			IEC/EN 61 000-6-2	IEC/EN 61 000-6-2
ESD			IEC/EN 61 000-4-2 Level 3	IEC/EN 61 000-4-2 Level 3
HF immunity to radiation			IEC/EN 61 000-4-3 Level 3	IEC/EN 61 000-4-3 Level 3
Burst			IEC/EN 61 000-4-4 Level 3	IEC/EN 61 000-4-4 Level 3
Surge			IEC/EN 61 000-4-5 Level 4	IEC/EN 61 000-4-5 Level 4
HF immunity to line-conducted interference			IEC/EN 61 000-4-6 Level 3	IEC/EN 61 000-4-6 Level 3

"Easy" Control Relays

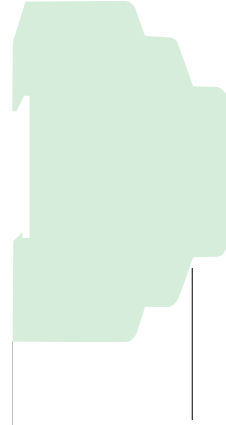
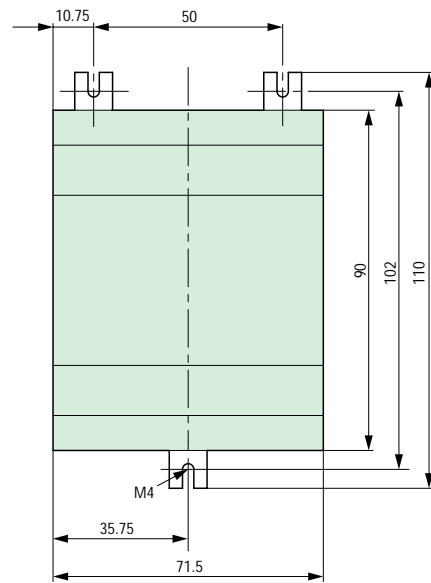
Dimensions

Control relay

EASY2...



EASY4...



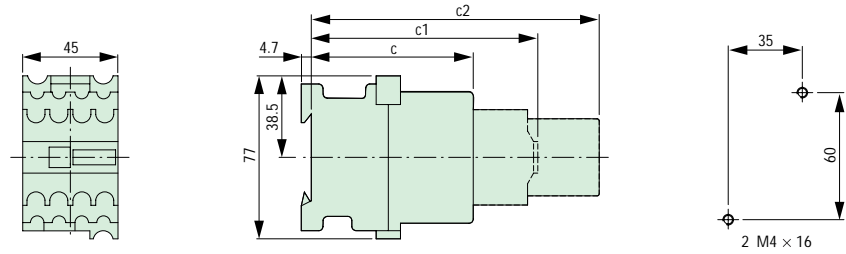
EASY6...

DILR Contactor Relays, DILET, ETR4 Electronic Timing- and Special-Purpose Relays

Dimensions

Contactor relays

DILR22(-G)	DILR22(-G) + ...DIL	DILR22(-G) + TPE(TPD)11DIL	DILR22(-G) + V(-G) DIL
DILR22D(-G)	DILR31(-G) + ...DIL	DILR31(-G) + TPE(TPD)11DIL	DILR31(-G) + V(-G) DIL
DILR31(-G)	DILR40(-G) + ...DIL	DILR40(-G) + TPE(TPD)11DIL	DILR40(-G) + V(-G) DIL
DILR40(-G)	DILR44D(-G)		
	DILR53D(-G)		



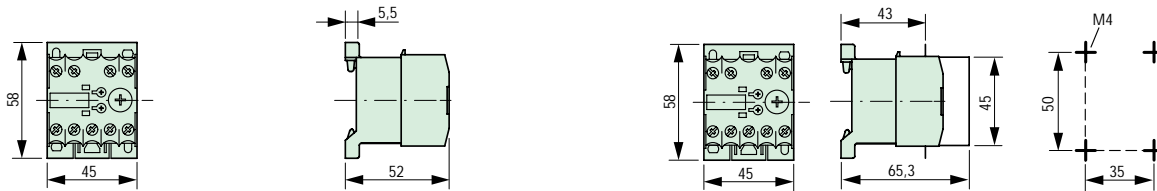
	DILR22 (-G)	DILR22+...DIL (-G)	DILR22+TPE11DIL (-G)	DILR22+VDIL (-G)
	DILR31 (-G)	DILR31+...DIL (-G)	DILR22+TPD11DIL (-G)	DILR31+VDIL (-G)
	DILR40 (-G)	DILR40+...DIL (-G)	DILR31+TPE11DIL (-G)	DILR40+VDIL (-G)
	DILR22D (-G)	DILR44D (-G)	DILR31+TPD11DIL (-G)	
		DILR53D (-G)	DILR40+TPE11DIL (-G)	
			DILR40+TPD11DIL (-G)	
c (with HDIL)	76.5	(101.5)	-	-
c (without HDIL)	74	(99)	-	-
HDIL	-	-	107	(132)
c1	-	-	-	136
				161
				137
				162

c1 = With ...DIL auxiliary contact module or DILR...D(-G) complete unit
 c2 = With V(-G)DIL mechanical latching module or with TP...11DIL pneumatic timer module

Electronic timing relays

DILET...

DILET... + HDILE



Electronic timing relays

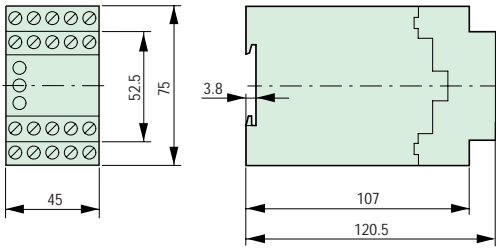
ETR4-11...
 ETR4-51...
 ETR4-69...
 ETR4-70...

Remote potentiometer

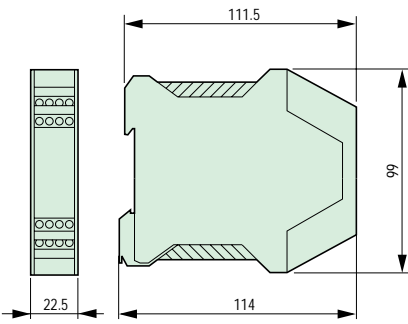
RR-10

ESR Electronic Safety Relays, EMR4 Measuring and Monitoring Relays
Dimensions

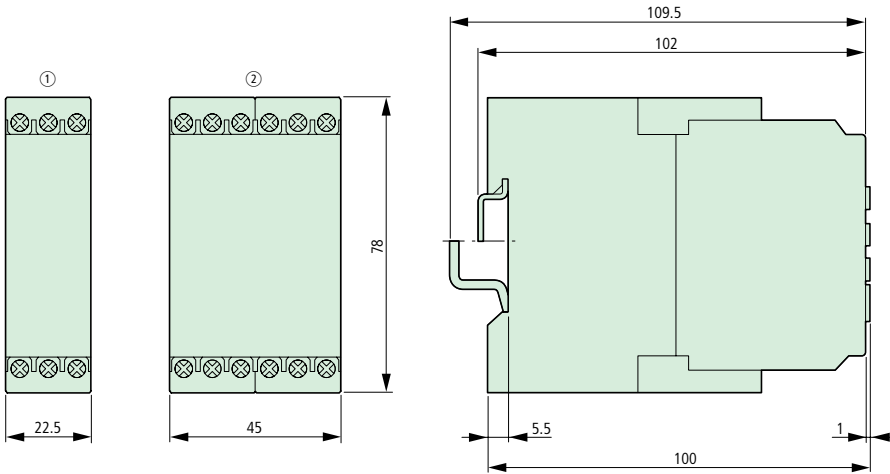
Electronic safety relays
 ESR3-NO-31(230 V)



- ESR4-NO-31
- ESR4-NO-21
- ESR4-NM-21
- ESR4-NZ-21
- ESR4-NV3(30)-30
- ESR4-NT30-30
- ESR4-NE-42
- ESR4-VE3-42



Measuring and monitoring relays
 EMR4...



	①	②
EMR4-I1-2-A		●
EMR4-I15-2-A		●
EMR4-I15-2-B		●
EMR4-F500-2	●	
EMR4-W500-2-C		●
EMR4-W500-2-D		●
EMR4-W580-2-C		●
EMR4-A400-1	●	
EMR4-N100-1-B	●	
EMR4-N500-2-B		●
EMR4-N500-1-A		●
EMR4-RDC-1-A		●
EMR4-RAC-1-A		●

Sealable shroud
 EMR4-PH...

