

Motor Protection Circuit Breaker

Series 8146/5-V27



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02966E00

- > For protection of Ex e and Ex d motors
- > Protects electric lines and plant equipment
- > Thermal overcurrent release, adjustable, phase failure sensitive
- > Electromagnetic quick release
- > Robust enclosure made of glass fibre reinforced polyester resin
- > Optionally available with
 - undervoltage release
 - shunt trip
 - ammeter
 - auxiliary contacts



Motor protection circuit breakers of series 8146/5-V27 are used where high short circuit currents are to be controlled and to protect both Ex e and Ex d motors. These breakers are suitable to protect lines and systems and can basically be used without a back-up fuse at 400 V. Breakers are operated by rotary actuators enabling safe switching and also clearly identifying the switching position.

Zone	ATEX / IECEx					
	0	1	2	20	21	22
For use in		x	x		x	x

WebCode 8146N

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Motor Protection Circuit Breaker

Series 8146/5-V27

Selection Table

Version	Current adjustment range	Additional device	Order number	Weight kg
Motor protection circuit breaker without accessories, Series 8146/5-V27	0.1 ... 0.16 A	without	8146/5-V27-101-015-00-1	2,591
	0.1 ... 0.16 A	1 NC + 1 NO	8146/5-V27-201-015-02-2	2,600
	0.16 ... 0.25 A	without	8146/5-V27-101-025-00-1	2,608
	0.16 ... 0.25 A	1 NC + 1 NO	8146/5-V27-201-025-02-2	2,600
	0.25 ... 0.4 A	without	8146/5-V27-101-035-00-1	2,610
	0.25 ... 0.4 A	1 NC + 1 NO	8146/5-V27-201-035-02-2	2,600
	0.4 ... 0.63 A	without	8146/5-V27-101-045-00-1	2,574
	0.4 ... 0.63 A	1 NC + 1 NO	8146/5-V27-201-045-02-2	2,600
	0.63 ... 1 A	without	8146/5-V27-101-055-00-1	2,600
	0.63 ... 1 A	1 NC + 1 NO	8146/5-V27-201-055-02-2	2,600
	1 ... 1.6 A	without	8146/5-V27-101-065-00-1	2,653
	1 ... 1.6 A	1 NC + 1 NO	8146/5-V27-201-065-02-2	2,630
	1.6 ... 2.5 A	without	8146/5-V27-101-075-00-1	2,633
	1.6 ... 2.5 A	1 NC + 1 NO	8146/5-V27-201-075-02-2	2,630
	2.5 ... 4 A	without	8146/5-V27-101-085-00-1	2,630
	2.5 ... 4 A	1 NC + 1 NO	8146/5-V27-201-085-02-2	2,630
	4 ... 6.3 A	without	8146/5-V27-101-095-00-1	2,600
	4 ... 6.3 A	1 NC + 1 NO	8146/5-V27-201-095-02-2	2,630
	6.3 ... 9 A	without	8146/5-V27-101-105-00-1	2,600
	6.3 ... 9 A	1 NC + 1 NO	8146/5-V27-201-105-02-2	2,850
	9 ... 12.5 A	without	8146/5-V27-101-115-00-1	2,500
	9 ... 12.5 A	1 NC + 1 NO	8146/5-V27-201-115-02-2	3,200
	12.5 ... 16 A	without	8146/5-V27-101-125-00-1	2,400
	12.5 ... 16 A	1 NC + 1 NO	8146/5-V27-201-125-02-2	3,550
	16 ... 20 A	without	8146/5-V27-301-135-00-3	4,200
	16 ... 20 A	1 NC + 1 NO	8146/5-V27-401-135-02-4	4,250
	20 ... 22.5 A	without	8146/5-V27-301-145-00-3	3,500
	20 ... 22.5 A	1 NC + 1 NO	8146/5-V27-401-145-02-4	4,250

- On request:
- Circuit breakers for the current adjustment range 25 ... 63 A (Type 8525)
 - Further accessories e. g. shunt trip, ammeter, additional auxiliary contacts (2 NC + 2 NO)

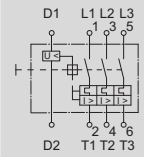
Motor Protection Circuit Breaker

Series 8146/5-V27



Selection Table

Version	Current adjustment range	Rated operational voltage U_e	Auxiliary contacts	Order number	Weight
					kg
Motor protection circuit breaker with undervoltage release, Series 8146/5-V27	0.1 ... 0.16 A	230 V AC 50 / 60 Hz	without	8146 / 5-V27-107-015-10-2	2,610
			1 NC + 1 NO	8146 / 5-V27-207-015-12-2	2,610
		400 V AC 50 / 60 Hz	without	8146 / 5-V27-108-015-10-2	2,610
			1 NC + 1 NO	8146 / 5-V27-208-015-12-2	2,610
	500 V AC 50 / 60 Hz	without	8146 / 5-V27-110-015-10-2	2,610	
		1 NC + 1 NO	8146 / 5-V27-210-015-12-2	2,610	
	0.16 ... 0.25 A	230 V AC 50 / 60 Hz	without	8146 / 5-V27-107-025-10-2	2,630
			1 NC + 1 NO	8146 / 5-V27-207-025-12-2	2,630
		400 V AC 50 / 60 Hz	without	8146 / 5-V27-108-025-10-2	2,630
			1 NC + 1 NO	8146 / 5-V27-208-025-12-2	2,630
	500 V AC 50 / 60 Hz	without	8146 / 5-V27-110-025-10-2	2,630	
		1 NC + 1 NO	8146 / 5-V27-210-025-12-2	2,630	
	0.25 ... 0.4 A	230 V AC 50 / 60 Hz	without	8146 / 5-V27-107-035-10-2	2,630
			1 NC + 1 NO	8146 / 5-V27-207-035-12-2	2,630
		400 V AC 50 / 60 Hz	without	8146 / 5-V27-108-035-10-2	2,630
			1 NC + 1 NO	8146 / 5-V27-208-035-12-2	2,630
	500 V AC 50 / 60 Hz	without	8146 / 5-V27-110-035-10-2	2,630	
		1 NC + 1 NO	8146 / 5-V27-210-035-12-2	2,630	
	0.4 ... 0.63 A	230 V AC 50 / 60 Hz	without	8146 / 5-V27-107-045-10-2	2,630
			1 NC + 1 NO	8146 / 5-V27-207-045-12-2	2,630
		400 V AC 50 / 60 Hz	without	8146 / 5-V27-108-045-10-2	2,630
			1 NC + 1 NO	8146 / 5-V27-208-045-12-2	2,630
	500 V AC 50 / 60 Hz	without	8146 / 5-V27-110-045-10-2	2,630	
		1 NC + 1 NO	8146 / 5-V27-210-045-12-2	2,630	
0.63 ... 1 A	230 V AC 50 / 60 Hz	without	8146 / 5-V27-107-055-10-2	2,630	
		1 NC + 1 NO	8146 / 5-V27-207-055-12-2	2,630	
	400 V AC 50 / 60 Hz	without	8146 / 5-V27-108-055-10-2	2,630	
		1 NC + 1 NO	8146 / 5-V27-208-055-12-2	2,630	
500 V AC 50 / 60 Hz	without	8146 / 5-V27-110-055-10-2	2,630		
	1 NC + 1 NO	8146 / 5-V27-210-055-12-2	2,630		
1 ... 1.6 A	230 V AC 50 / 60 Hz	without	8146 / 5-V27-107-065-10-2	2,700	
		1 NC + 1 NO	8146 / 5-V27-207-065-12-2	2,700	
	400 V AC 50 / 60 Hz	without	8146 / 5-V27-108-065-10-2	2,700	
		1 NC + 1 NO	8146 / 5-V27-208-065-12-2	2,700	
500 V AC 50 / 60 Hz	without	8146 / 5-V27-110-065-10-2	2,700		
	1 NC + 1 NO	8146 / 5-V27-210-065-12-2	2,700		
1.6 ... 2.5 A	230 V AC 50 / 60 Hz	without	8146 / 5-V27-107-075-10-2	2,700	
		1 NC + 1 NO	8146 / 5-V27-207-075-12-2	2,700	
	400 V AC 50 / 60 Hz	without	8146 / 5-V27-108-075-10-2	2,700	
		1 NC + 1 NO	8146 / 5-V27-208-075-12-2	2,700	
500 V AC 50 / 60 Hz	without	8146 / 5-V27-110-075-10-2	2,800		
	1 NC + 1 NO	8146 / 5-V27-210-075-12-2	2,700		



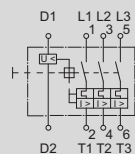
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Selection Table

Version	Current adjustment range	Rated operational voltage U_e	Auxiliary contacts	Order number	Weight kg
	2.5 ... 4 A	230 V AC 50 / 60 Hz	without	8146/5-V27-107-085-10-2	2,900
			1 NC + 1 NO	8146/5-V27-207-085-12-2	2,800
		400 V AC 50 / 60 Hz	without	8146/5-V27-108-085-10-2	2,800
			1 NC + 1 NO	8146/5-V27-208-085-12-2	2,800
		500 V AC 50 / 60 Hz	without	8146/5-V27-110-085-10-2	2,800
			1 NC + 1 NO	8146/5-V27-210-085-12-2	2,800
	4 ... 6.3 A	230 V AC 50 / 60 Hz	without	8146/5-V27-107-095-10-2	2,800
			1 NC + 1 NO	8146/5-V27-207-095-12-2	2,800
		400 V AC 50 / 60 Hz	without	8146/5-V27-108-095-10-2	2,800
			1 NC + 1 NO	8146/5-V27-208-095-12-2	2,800
		500 V AC 50 / 60 Hz	without	8146/5-V27-110-095-10-2	2,800
			1 NC + 1 NO	8146/5-V27-210-095-12-2	2,800
	6.3 ... 9 A	230 V AC 50 / 60 Hz	without	8146/5-V27-107-105-10-2	3,000
			1 NC + 1 NO	8146/5-V27-207-105-12-2	3,000
		400 V AC 50 / 60 Hz	without	8146/5-V27-108-105-10-2	3,000
			1 NC + 1 NO	8146/5-V27-208-105-12-2	3,000
		500 V AC 50 / 60 Hz	without	8146/5-V27-110-105-10-2	3,000
			1 NC + 1 NO	8146/5-V27-210-105-12-2	3,000
	9 ... 12.5 A	230 V AC 50 / 60 Hz	without	8146/5-V27-107-115-10-2	3,350
			1 NC + 1 NO	8146/5-V27-207-115-12-2	3,350
		400 V AC 50 / 60 Hz	without	8146/5-V27-108-115-10-2	3,350
			1 NC + 1 NO	8146/5-V27-208-115-12-2	3,350
		500 V AC 50 / 60 Hz	without	8146/5-V27-110-115-10-2	3,350
			1 NC + 1 NO	8146/5-V27-210-115-12-2	3,350
12.5 ... 16 A	230 V AC 50 / 60 Hz	without	8146/5-V27-107-125-10-2	3,700	
		1 NC + 1 NO	8146/5-V27-207-125-12-2	3,700	
	400 V AC 50 / 60 Hz	without	8146/5-V27-108-125-10-2	3,700	
		1 NC + 1 NO	8146/5-V27-208-125-12-2	3,700	
	500 V AC 50 / 60 Hz	without	8146/5-V27-110-125-10-2	3,700	
		1 NC + 1 NO	8146/5-V27-210-125-12-2	3,700	
16 ... 20 A	230 V AC 50 / 60 Hz	without	8146/5-V27-307-135-10-4	4,400	
		1 NC + 1 NO	8146/5-V27-407-135-12-4	4,400	
	400 V AC 50 / 60 Hz	without	8146/5-V27-308-135-10-4	4,400	
		1 NC + 1 NO	8146/5-V27-408-135-12-4	4,400	
	500 V AC 50 / 60 Hz	without	8146/5-V27-310-135-10-4	4,400	
		1 NC + 1 NO	8146/5-V27-410-135-12-4	4,400	
20 ... 22.5 A	230 V AC 50 / 60 Hz	without	8146/5-V27-307-145-10-4	4,400	
		1 NC + 1 NO	8146/5-V27-407-145-12-4	4,400	
	400 V AC 50 / 60 Hz	without	8146/5-V27-308-145-10-4	4,400	
		1 NC + 1 NO	8146/5-V27-408-145-12-4	4,400	
	500 V AC 50 / 60 Hz	without	8146/5-V27-110-145-10-4	4,400	
		1 NC + 1 NO	8146/5-V27-410-145-12-4	4,400	



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Explosion Protection

Global (IECEx)				
Gas and dust	IECEx PTB 06.0090 Ex d e IIC T6 ... T4 Gb Ex tb IIIC T80°C ... T130°C Db			
Europe (ATEX)				
Gas and dust	PTB 01 ATEX 1024 E II 2 G Ex d e IIC T6 ... T4 Gb E II 2 D Ex tb IIIC T80°C ... T130°C Db			
Note				
	Type	Adjustment range	T _{Gas}	T _{Dust}
	8146/5-V27-1, 8146/5-V27-2	0.1 ... 0.25 A 0.25 ... 12.5 A 12.5 ... 16 A	T6 T5 T4	80 °C 95 °C 130 °C
	8146/5-V27-3, 8146/5-V27-4	0.1 ... 12.5 A 12.5 ... 22.5 A	T6 T5	80 °C 95 °C
	8146/5-V27-5, 8146/5-V27-6	0.1 ... 12.5 A	T6	80 °C
Certifications and certificates				
Certificates	IECEx, ATEX, Canada (CSA), Kazakhstan (TR), Korea (KCs), Russia (TR), Ukraine (TR), Belarus (TR)			

Technical Data

Mechanical data				
Degree of protection	IP66 according to IEC/EN 60529			
Enclosure material	Polyester resin, glass-fibre-reinforced, dark grey, similar to RAL 7024 Surface resistance $\leq 10^9 \Omega$, impact strength ≥ 7 J, flame-resistant, self-extinguishing according to IEC-92-1, UL 94, ASTM D 635-77			
Mounting / Installation				
Mounting orientation	Any			
Connection	8146/5-V27-1 8146/5-V27-2	Directly to the fitted components		
		Main contact	1.5 ... 6 mm ² , finely stranded 1.5 ... 10 mm ² , solid	
		Auxiliary contact	0.75 ... 1.5 mm ² , finely stranded 0.75 ... 2.5 mm ² , solid	
	8146/5-V27-3 8146/5-V27-4 8146/5-V27-5 8146/5-V27-6	On terminal blocks	0.5 ... 6 mm ² , finely stranded 0.5 ... 10 mm ² , solid	
Please note: Compare the cable diameter with the terminal area of the cable entry				
Switch insert				
Electrical data				
Rated operational voltage	max. 690 V AC, 50/60Hz			
Rated operational current	0.1 ... 22.5 A			
Switching capacity	Depending on the selected adjustment range (AC)			
	230 V	400 V	500 V	690 V
	7.0 kW	12.4 kW	16 kW	22 kW
Service life	10 ⁵ operating cycles			
electrical	10 ⁵ operating cycles			
mechanical	10 ⁵ operating cycles			
Main contacts	3-pole			

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Technical Data

Short-circuit protection	Adjustment range from X ... Y	Highest rated current of the short circuit fuse if I_{CC} is $> I_{CS}$									
		at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC	
		I_{CS}	gG, aM	I_{CS}	gG, aM	I_{CS}	gG, aM	I_{CS}	gG, aM	I_{CS}	gG, aM
	0.1 ... 0.16 A up ... 1.0 ... 1.6 A	Short-circuit proof, no back-up fuse needed up to $I_{CC} = 100$ kA									
	1.6 ... 2.5 A								40 kA	25 A	
	2.5 ... 4.0 A						60 kA	35 A / 40 A	10 kA	40 A	
	4.0 ... 6.3 A				70 kA	50 A	40 kA	50 A	7 kA	40 A	
	6.3 ... 9.0 A				50 kA	80 A	30 kA	80 A	5 kA	50 A	
	9.0 ... 12.5 A			75 kA	80 A	45 kA	80 A	27 kA	80 A	4.5 kA	50 A
	12.5 ... 16.0 A			60 kA	100 A	40 kA	100 A	22 kA	100 A	4 kA	50 A
	16.0 ... 20.0 A			55 kA	100 A	35 kA	100 A	22 kA	100 A	3.5 kA	50 A
	20.0 ... 22.5 A			50 kA	125 A	30 kA	125 A	20 kA	125 A	3 kA	50 A
		I_{CS} = rated short-circuit breaking capacity I_{CC} = projected short-circuit current at mounting location									
Thermal overcurrent release		Depending on the adjustment range of the switch, adjustable on the switch									
Electromagnetic quick release		Current ranges					Operate value set at factory				
		0.16	...	0.63 A			7.5	...	12.0	I_n	
		0.63	...	2.5 A			9.0	...	14.0	I_n	
		2.5	...	6.3 A			10.0	...	15.0	I_n	
		6.3	...	22.5 A			12.5	...	17.5	I_n	
Ambient conditions											
Ambient temperature range		-20 to +40 °C									
Switch insert											
Mechanical data											
Switching handle		Designation: 0 - I; can be locked in the 0-position with three padlocks Colour: Standard: black handle, black protective collar Special version: red handle, yellow protective collar (for EM-STOP function)									
Auxiliary contacts											
Device version		Optional: without; 1 NC + 1 NO; 2 NCs + 2 NOs									
Electrical data											
Rated operational voltage U_e		max. 500 V AC									
Rated operational current		AC-15: 24 V / 2.5 A; 230 V / 2 A; 400 V / 1 A DC-13: 24 V / 2.5 A; 60 V / 2.5 A; 110 V / 0.6 A; 220 V / 0.25 A									
undervoltage release											
Electrical data											
Function		In case of voltage interruption, the moulded case circuit breaker triggers, preventing an unwanted restart of a motor, for example									
Pick-up voltage		$\geq 0.85 \times U_e$									
Drop-out		0.7 ... 0.35 $\times U_e$									
Power consumption											
Inrush		0.9 VA									
Holding		0.9 VA									
Shunt release											
Electrical data											
Function		Used for tripping the moulded case circuit breaker remotely by applying an actuating voltage $\geq 0.85 \times U_e$									
Pick-up voltage		$\geq 0.85 \times U_e$									
Relative duty cycle		Switches off automatically via integrated contact switch									
Power consumption											
Inrush		24 ... 60 V: 14.4 ... 90 VA; 110 ... 240 V: 13 ... 61 VA; 220 ... 415 V: 17.6 ... 62.3 VA									
Holding		Switches off automatically via integrated contact switch									
Ammeter											

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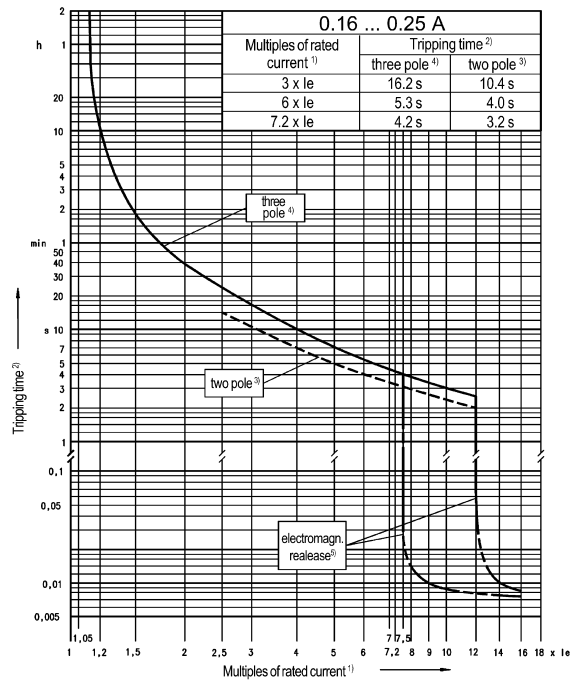
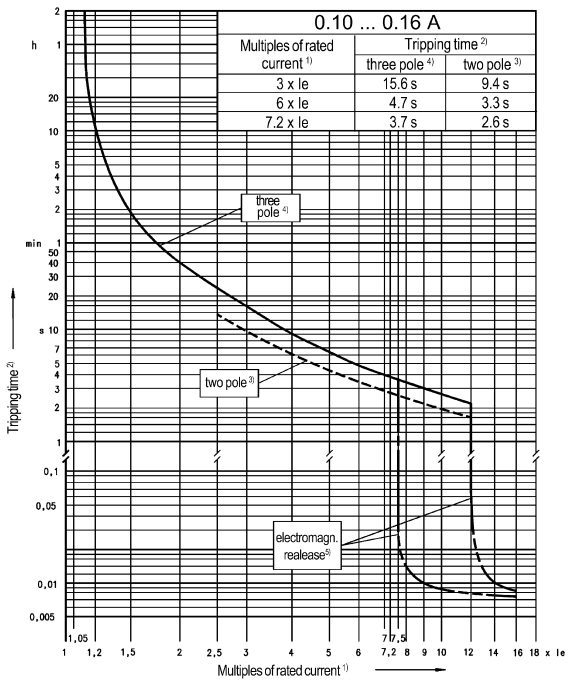


Technical Data

Device version	Type 8405, front dimensions 64 mm x 64 mm
Electrical data	
Movement	Moving iron measuring instrument, class 2.5; direct measuring; overload scale 1:2
Measuring range	Depending on the adjustment range of the switch
Overload capacity	2 x I _e 25s, 50 x I _e 1s

Tripping behaviour

Adjustment range of the motor protection switch	Tripping time of the motor protection switch with					
	3	4	5	6	7.2	8
	times rated current. 3-pole from cold state..					
A ... A	s	s	s	s	s	s
0.1 ... 0.16	15.0	9.0	6.5	4.8	3.7	3.2
0.16 ... 0.25	16.0	10.0	6.8	5.2	4.0	3.6
0.25 ... 0.4	16.0	9.7	6.5	5.0	3.8	3.3
0.4 ... 0.63	17.0	10.2	7.3	5.7	4.4	3.9
0.63 ... 1.0	17.5	10.2	7.2	5.5	4.2	3.8
1.0 ... 1.6	17.0	10.0	7.1	5.6	4.4	4.0
1.6 ... 2.5	18.0	10.3	7.5	5.9	4.7	4.2
2.5 ... 4.0	18.4	11.5	8.1	6.4	5.0	4.6
4.0 ... 6.3	19.0	12.0	8.5	6.7	5.3	4.9
6.3 ... 9.0	18.2	11.5	7.9	6.0	4.5	3.8
9.0 ... 12.5	19.0	11.5	8.0	6.0	4.6	4.0
12.5 ... 16.0	19.5	11.5	7.5	5.4	4.0	3.3
16.0 ... 20.0	20.0	11.5	7.8	5.7	4.2	3.5
20.0 ... 22.5	20.0	10.4	7.0	5.0	3.7	3.2

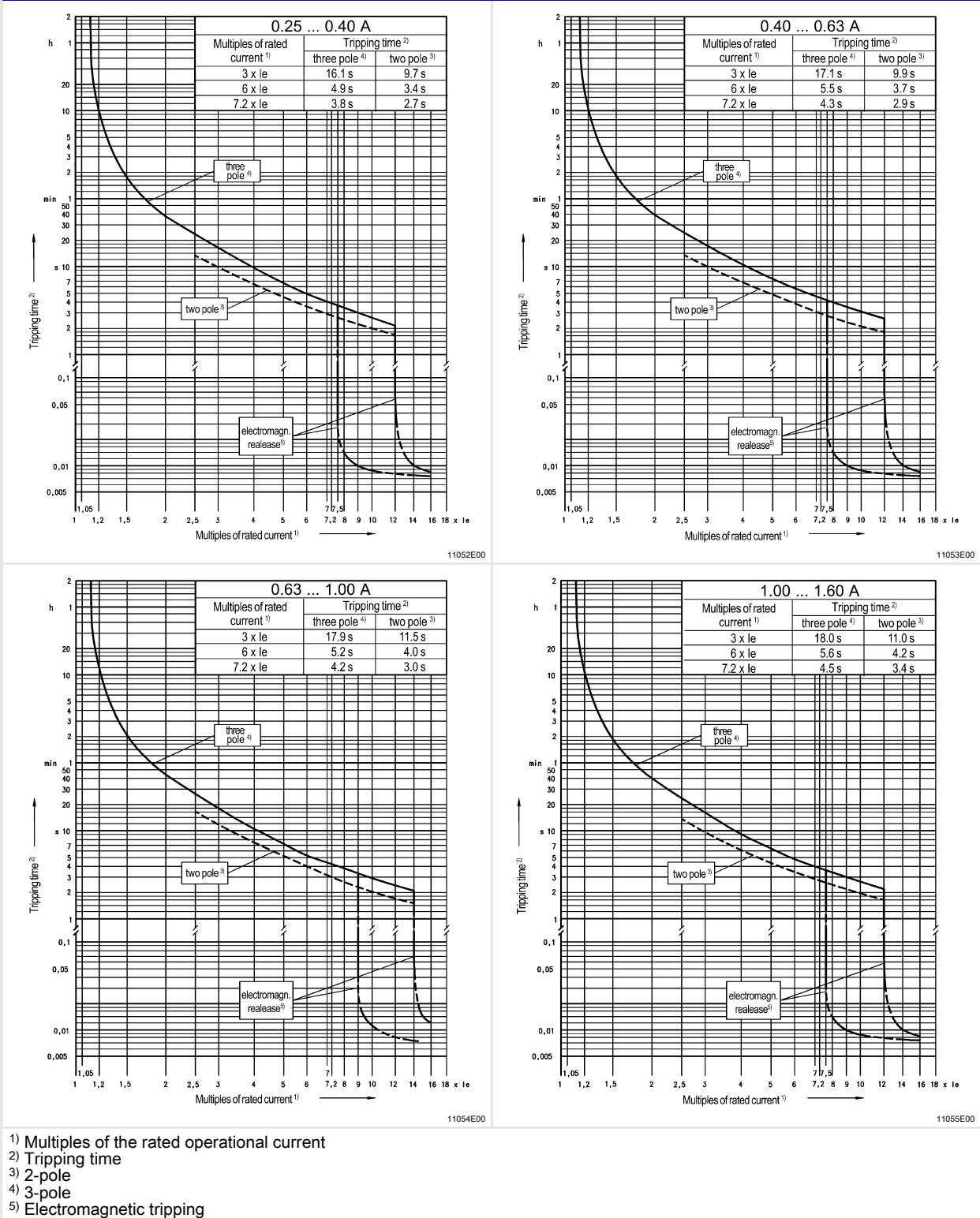


- 1) Multiples of the rated operational current
- 2) Tripping time
- 3) 2-pole
- 4) 3-pole
- 5) Electromagnetic tripping

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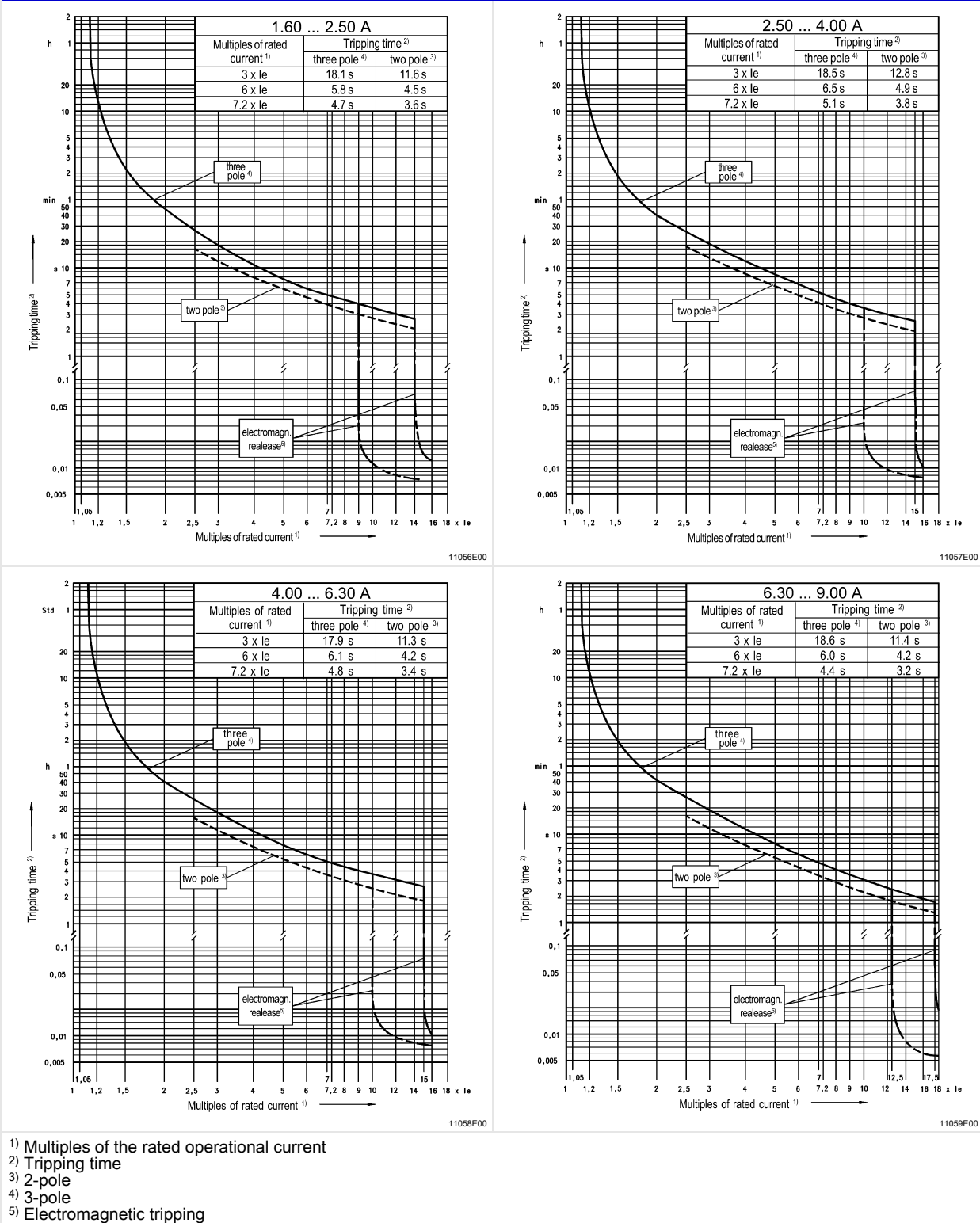
Tripping behaviour



Motor Protection Circuit Breaker Series 8146/5-V27



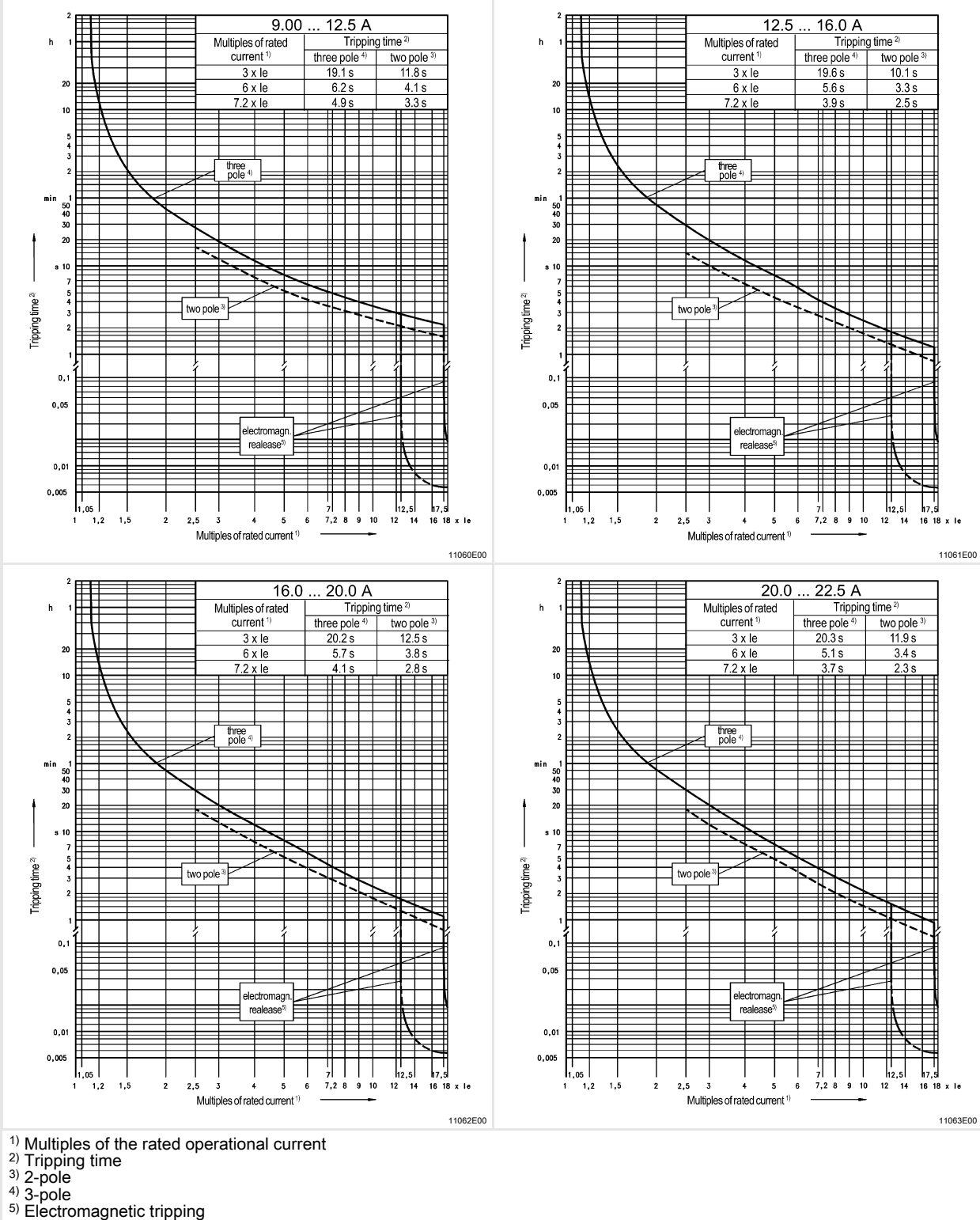
Tripping behaviour



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Tripping behaviour

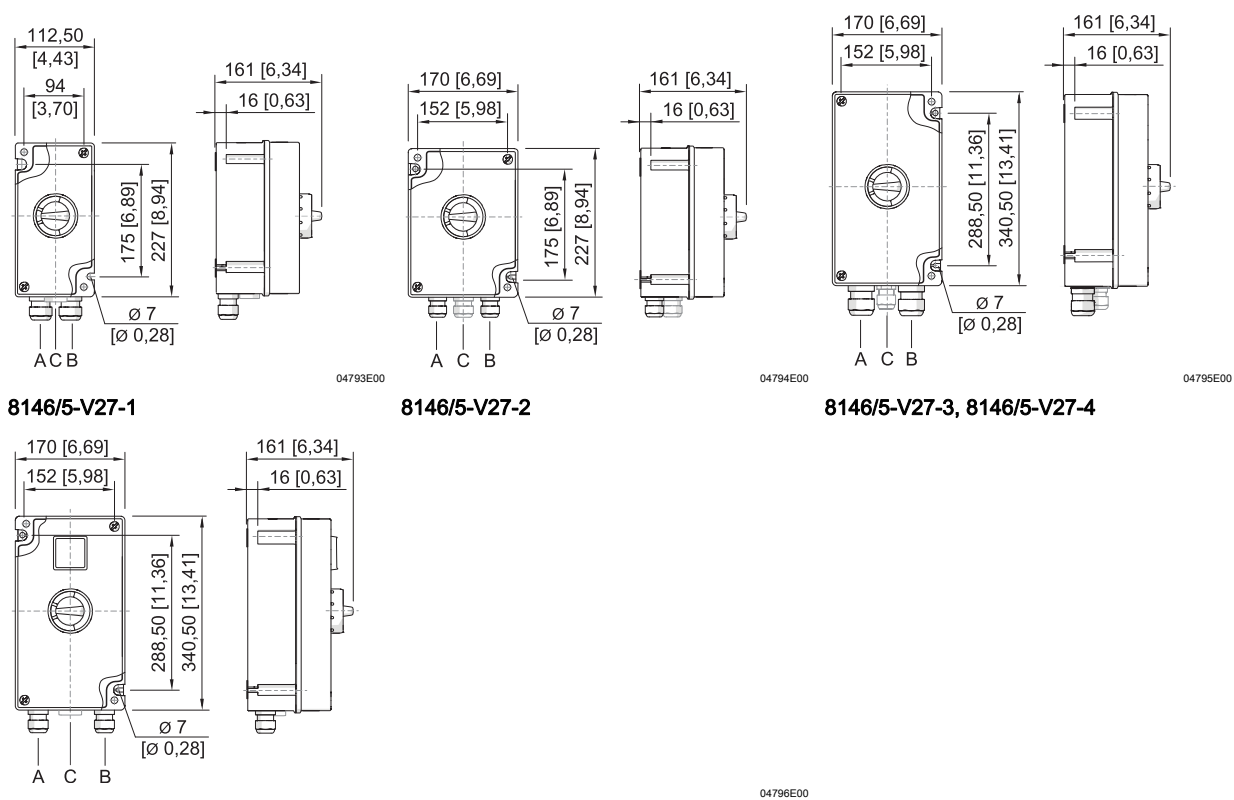


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Series 8146/5-V27



Dimensional Drawings (All dimensions in mm [inches]) \varnothing subject to modifications



8146/5-V27-5, 8146/5-V27-6

Cable entries

Type	Additional equipment ¹⁾	Series 8161 cable entries				Series 8290 stopping plugs	
		M25 x 1.5		M32 x 1.5		M25 x 1.5	
8146/5-V27-1	Without	2	A + B	–	–	1	C
	With	3	A, B, C	–	–	–	–
8146/5-V27-2	Without	2	A + B	–	–	1	C
	With	3	A, B, C	–	–	–	–
8146/5-V27-3, 8146/5-V27-4	Without	–	–	2	A + B	1	C
	With	1	C	2	A + B	–	–
8146/5-V27-5, 8146/5-V27-6							
0.1 ... 12.5 A	Without	2	A + B	–	–	1	C
	With	3	A, B, C	–	–	–	–
12.5 ... 22.5 A	Without	–	–	2	A + B	1	C
	With	1	C	2	A + B	–	–

M25x1.5 for cable \varnothing 7 ... 17 mm
M32 x 1.5 for cable \varnothing 9 ... 21 mm

¹⁾ Auxiliary contact, undervoltage release, shunt trip

We reserve the right to make alterations to the technical data, dimensions, weights, designs and products available without notice. The illustrations cannot be considered binding.

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