DATASHEET - ZB12-4



Overload relay, ZB12, Ir= 2.4 - 4 A, 1 N/O, 1 N/C, Direct mounting, IP20



Part no. ZB12-4 Catalog No. 278438 Alternate Catalog XTOB004BC1

No.

EL-Nummer 0004131833

(Norway)

Similar to illustration

Delivery program			
Product range			Overload relay ZB up to 150 A
Product range			Accessories
Accessories			Overload relays
Frame size			ZB12
Phase-failure sensitivity			IEC/EN 60947, VDE 0660 Part 102
Description			Test/off button Reset pushbutton manual/auto Trip-free release
Mounting type			Direct mounting
中	l _r	Α	2.4 - 4
Contact sequence			97 95 2 4 6 98 96 A2 14/ 22
Auxiliary contacts			
N/0 = Normally open			1 N/O
N/C = Normally closed			1 N/C
For use with			DILM7, DILM9, DILM12, DILM15, DIULM7, DIULM9, DIULM12, SDAINLM12, SDAINLM16, SDAINLM22 DS7-34SX004
Short-circuit protection			
Type "1" coordination	gG/gL	Α	25
Type "2" coordination	gG/gL	A	16

Notes

Overload release: tripping class 10 A

short-circuit protective device: Observe the maximum permissible fuse of the contactor with direct device mounting.

Suitable for protection of Ex e-motors.



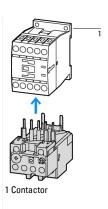
II(2)G [Ex d] [Ex e] [Ex px], II(2)D [Ex p] [Ex t]

PTB 10 ATEX 3010

Observe manual MN03407005Z-DE/EN.

Notes

Fitted directly to the contactor



Technical data

General
Standards

Antiberit temperature Poperature Traines to RECEN 60947 Poperature Traines to RecENT 60947 P	Climatic proofing			Damp heat, constant, to IEC 60068-2-78 Damp heat, cyclic, to IEC 60068-2-30
	Ambient temperature			
Enclosed				
Temperature compensation Waight Machanical shock resistance Degree of Protection Protection against direct contact when actuated from front (6N 50274) Alterude Machanical shock resistance Protection against direct contact when actuated from front (6N 50274) Alterude Machanical shock resistance Protection against direct contact when actuated from front (6N 50274) Alterude Machanical shock resistance Machanical shock resistance Protection against direct contact when actuated from front (6N 50274) Alterude Machanical shock resistance Machanical shock resistan	Open		°C	-25 - +55
Weight kg 0.142 Machanical shock resistance g 1000 Sinusoidal Shock duration 10 ms Degree of Protection P200 Sinusoidal Shock duration 10 ms Protection against direct contact when actuated from front (EN S0274) m Mex. 2000 Alittud m Mex. 2000 Wain conducting paths Wain conducting paths Wain conducting paths Rated simples withstand voltage Up VAC 600 State dissolation voltage Up VAC 800 Rated operational voltage VAC 40 40 Satis issolation rol K6 1140 Wain conductors 40 40 Between main circuits VAC 40 40 Temperatur compensation residual error > 49 °C VAC 40 40 Cerror theat loss Sconductors VAC 40 40 Entire parature compensation residual error > 49 °C Wain conductors 22 40 Salid Maximum setting Wain conductors 40 40 40 Salid Wain conductors 40 4	Enclosed		°C	- 25 - 40
Mechanical shock resistance g Image: Protection Shock duration 10 ms Dagree of Protection against direct contact when actuated from front (EN 50274) IPD Altitude m Max 2000 Market duration of the proof of Michael Shock duration 10 ms Market duration of the proof of Michael Shock duration of the proof of Michael Shock and proof of Shock	Temperature compensation			Continuous
Degree of Protection Protection against direct contact when actuated from front (EN 50274) Altitude Amounts with stand voltage Overvoltage category/pollution degree Rated insulation voltage Rated operational voltage Overvoltage category pollution degree Rated operational voltage Overvoltage category pollution degree Rated insulation voltage Rated operational voltage Valo Rated operational voltage Rated operational voltage Rated operational voltage Valo Rated operational voltage Rated operational voltage Rated operational voltage Rated operational voltage Valo Rated operational voltage Rated operation voltage Ra	Weight		kg	0.142
Protection against direct contact when actuated from front (EN 50274) Image of Max 2000 Main conducting paths Water 2000 Rated impulse withstand voltage Vac 5000 Overvoltage category/pollution degree Ump V AC 5000 Rated impulse virbitated operational voltage U ₁ V S 690 Safe isolation to VB 18140 VAC 4000 Between auxiliary contacts and main contacts VAC 440 Between auxiliary contacts and main contacts VAC 440 Emperatur compensation residual error > 40 °C VAC 440 Current heat loss (3 conductors) VAC 440 Current heat loss (3 conductors) VAC 440 Terminal capacities VAC 440 Solid VAC 440 Plack lies with ferrule VAC 440 Solid or Stranded VAC 440 Plack lies with ferrule VAC 440 Solid or Stranded VAC 440 Plack lies with ferrule VAC 440 Solid or Stranded VAC 440 Terminal screw VAC 440 Terminal screw VAC 440 Pozidriv screwdriver VAC 440 Aux 1-61	Mechanical shock resistance		g	Sinusoidal
Abitutude m Max. 2000 Mainconducting paths VAC 6000 Overvoltage category/pollution degree III/3 Rated insulation voltage U VAC 690 Rated operational voltage U VAC 690 Safe isolation to EN 8140 W 40 400 Between auxilary contacts and main contacts VAC 400 400 Temperatur compensation residual error > 40 °C W 400 400 Current heat loss (3 conductors) W 22 VAC Lower value of the setting range W 2 400 Maximum setting mm² 1x(1 - 6) 2x(1 - 6) Solid mm² 1x(1 - 6) 2x(1 - 6) Elexible with ferrule mm² 1x(1 - 6) 2x(1 - 6) Solid or stranded mm² 1x(1 - 6) 2x(1 - 6) Tipping lorque mm 1x M Total mm 1x M Pozidriv screwdriver mm 1x M	Degree of Protection			IP20
Main conducting paths Bated impulse withstand voltage Ump V AC 6000 Overvoltage category/pollution degree III/3 III/3 Rated insulation voltage Up V AC 690 Safe isolation to EN S1140 Safe isolation to EN S1140 Safe isolation to EN S1140 Between auxiliary contacts and main contacts V AC 440 Between main circuits V AC 440 Temperatur compensation residual error > 40 °C V AC 440 Current heat loss (3 conductors) W 2 2 Lower value of the setting range W 6 Maximum setting M 6 Torminal capacities mm² 1 x(1 - 6) x	Protection against direct contact when actuated from front (EN 50274)			Finger and back-of-hand proof
Rated impulse withstand voltage Unip V AC 6000 Overovitage category/pollution degree U1 V AC 690 Rated insulation voltage U2 V AC 690 Rated operational voltage V BC 690 Safe isolation to RSI140 V AC 440 Between auxiliary contacts and main contacts V AC 440 Temperatur compensation residual error > 40 °C V AC 440 Current heat loss (3 conductors) V AC 25 %/K Lower value of the setting range W 6 Maximum setting W 6 Solid mm² 1 × (1 - 6) Solid or stranded Mm² 1 × (1 - 6) Solid or stranded Mm² 1 × (1 - 6) Teminal capacities Mm² 1 × (1 - 6) Stripping length Mm² 1 × (1 - 6) Tolos Mm² 1 × (1 - 6) Stripping length Mm² 1 × (1 - 6) Tolos Mm² 1 × (1 - 6) Stripping length Mm² 1 × (1			m	Max. 2000
Over-voltage category/pollution degree U _I V 690 Rated insulation voltage U _e VAC 690 Safe isolation to EN 61140 VAC 690 Between auxiliary contacts and main contacts VAC 440 Between main circuits VAC 440 Temperatur compensation residual error > 40 °C VAC 440 Current heat loss (3 conductors) W 2.2 Maximum setting W 6 Termnal capacities mm² 1 x (1 - 6) Solid mm² 1 x (1 - 6) Solid or stranded mm² 1 x (1 - 4) Flexible with ferrule mm² 1 x (1 - 4) Solid or stranded mm² 1 x (1 - 4) Terminal screw M 1 x (1 - 4) Stripping length mm² 1 x (1 - 4) Typing length mm² 1 x (1 - 4) Stripping length mm² 1 x (1 - 4) Typing length mm² 2 x (1 - 4) Typing length mm² 2 x (1 - 4)				
Rated insulation voltage U _i V AC 690 Rated operational voltage U _e V AC 690 Set isolation to EN 61140 V AC 440 Between auxiliary contacts and main contacts V AC 440 Temperatur compensation residual error >40 °C V AC 440 Current heat loss (3 conductors) V AC 225 %/K Lower value of the setting range W 5 Maximum setting W 6 Terminal capacities mm² 1 x(1 - 6) 2 x(1 - 6) Solid or stranded mm² 1 x(1 - 6) 2 x(1 - 6) Solid or stranded MW 8 Terminal screw MW 1 x (1 - 4) 2 x (1 - 4) Tiphening torque NM 1.8 Stripping length mm 10 Tools poxidriv screwdriver mm 1 x (1 - 6) 2 x (1 - 4) Standard screwdriver mm 10 Standard screwdriver mm 1 x (2 - 4) Standard screwdriver mm 1 x (2 - 4) Standard screwdriver	Rated impulse withstand voltage	U _{imp}	V AC	6000
Rated operational voltage U _e V AC 690 Safe isolation to EN 61140 V AC 440 Between auxiliary contacts and main contacts V AC 440 Between main circuits V AC 440 Temperatur compensation residual error > 40 °C V AC 440 Current heat Ioss (3 conductors) V AC 22 %/K Lower value of the setting range W 2.2 Maximum setting W 6 Terminal capacities mm² 1 x(1 - 6) Solid mm² 1 x(1 - 6) Solid or stranded MA 4 x(1 - 6) Solid or stranded AWG 18 - 8 Terminal screw M4 4 Tightening torque MA 18 Stripping length mm 10 Tools Size 2 Pazidriv screwdriver mm 1 x 6 Standard screwdriver mm 1 x 6 Standard screwdriver mm 1 x 6 Size 2 Standar	Overvoltage category/pollution degree			111/3
Safe isolation to EN 61140 Between auxiliary contacts and main contacts Between main circuits V AC 440 Temperatur compensation residual error > 40 °C Current heat loss (3 conductors) Lower value of the setting range Maximum setting Terminal capacities Solid Solid mare an	Rated insulation voltage	Ui	V	690
Between auxiliary contacts and main contacts Between main circuits VAC 440 Temperatur compensation residual error > 40 °C Current heat loss (3 conductors) Lower value of the setting range Maximum setting Terminal capacities Solid Flexible with ferrule Solid or stranded Auxiliary and control circuits Pozidriv screwdriver Standard screwdriver Standard screwdriver Rated impulse withstand voltage Overvoltage category/pollution degree Terminal capacities VAC 440 440 440 440 440 440 440 440	Rated operational voltage	U _e	V AC	690
Between main circuits V AC 440 Temperatur compensation residual error > 40 °C \$ 0.25 %/K Current heat loss (3 conductors) W 2.2 Lower value of the setting range W 6 Maximum setting Mm² 1 x (1 - 6) 2 x (1 - 6) Solid mm² 1 x (1 - 6) 2 x (1 - 6) Flexible with ferrule mm² 1 x (1 - 4) 2 x (1 - 4) Solid or stranded AWG 18 - 8 Terminal screw M4 4 Tightening torque Mn 1.8 Stripping length mm 10 Tools mm 1 x 6 Pozidriv screwdriver size 2 Standard screwdriver mm 1 x 6 Auxiliary and control circuits mm 4000 Rated impulse withstand voltage mm² 4000 Overvoltage category/pollution degree mm² 6000	Safe isolation to EN 61140			
Temperatur compensation residual error > 40 °C Current heat loss (3 conductors) Current heat loss (3 conductors) V	Between auxiliary contacts and main contacts		V AC	440
Current heat loss (3 conductors) W 2.2 Lower value of the setting range W 6 Maximum setting W 6 Terminal capacities mm² 1 x (1 - 6) 2 x (1 - 6) Solid mm² 1 x (1 - 4) 2 x (1 - 4) 2 x (1 - 4) 2 x (1 - 4) 2 x (1 - 4) Solid or stranded AWG 18 - 8 Terminal screw M4 1.8 Stripping length mm 10 Tools mm 10 Pozidriv screwdriver Size 2 Standard screwdriver mm 1 x 6 Auxiliary and control circuits mm 1 x 6 Rated impulse withstand voltage U _{imp} V 4000 Overvoltage category/pollution degree III/3 III/3	Between main circuits		V AC	440
Lower value of the setting range W 22 Maximum setting W 6 Terminal capacities mm² Solid mm² 1 x (1 - 6)	Temperatur compensation residual error > 40 °C			≦ 0.25 %/K
Maximum setting W 6 Terminal capacities mm² 1x (1 - 6) 2x (1 - 6) Solid mm² 1x (1 - 6) 2x (1 - 6) Flexible with ferrule mm² 1x (1 - 4) 2x (1 - 4) Solid or stranded AWG 18 - 8 Terminal screw M4 Tightening torque Nm 1.8 Stripping length mm 10 Tools Tools 2 Pozidriv screwdriver Size 2 Standard screwdriver mm 1x 6 Auxiliary and control circuits Nm 1.8 Rated impulse withstand voltage U _{imp} V 4000 Overvoltage category/pollution degree III/3 III/3	Current heat loss (3 conductors)			
Terminal capacities	Lower value of the setting range		W	2.2
Solid mm² 1x(1-6) 2x(1-6) Flexible with ferrule mm² 1x(1-4) 2x(1-4) Solid or stranded AWG 18-8 Terminal screw M4 Tightening torque Nm 1.8 Stripping length Tools Pozidriv screwdriver Size 2 Standard screwdriver Standard screwdriver mm 1x 6 Auxiliary and control circuits Rated impulse withstand voltage Overvoltage category/pollution degree Terminal capacities mm² 1 Uimp V 4000 Uimp V 4000 Terminal capacities	Maximum setting		W	6
Flexible with ferrule	Terminal capacities		mm^2	
Solid or stranded AWG 18 - 8 Terminal screw M4 Tightening torque Nm 1.8 Stripping length mm 10 Tools Pozidriv screwdriver Standard screwdriver Standard screwdriver Auxiliary and control circuits Rated impulse withstand voltage Uimp V 4000 Overvoltage category/pollution degree Terminal capacities NM 4 AWG 18 - 8 M4 Auxiliary 1.8 Auxiliary 2.8 Auxiliary 2.8 Auxiliary 3.8 Auxiliary 3.8 Auxiliary 4.8 Auxiliary 4.8 Auxiliary 4.8 Auxiliary 5.8 Auxiliary 6. Auxiliary 6. Auxiliary 7. Auxiliary 8. Auxiliary 8. Auxiliary 8. Auxiliary 8. Auxiliary 9. Au	Solid		mm ²	
Terminal screw Tightening torque Nm 1.8 Stripping length Tools Pozidriv screwdriver Size 2 Standard screwdriver mm 1 x 6 Auxiliary and control circuits Rated impulse withstand voltage Uimp V 4000 Overvoltage category/pollution degree Terminal capacities mm² M4 M4 Auxiliary and control circuits III/3 Terminal capacities	Flexible with ferrule		mm ²	
Tightening torque Nm 1.8 Stripping length mm 10 Tools Pozidriv screwdriver Size 2 Standard screwdriver mm 1 x 6 Auxiliary and control circuits Rated impulse withstand voltage U _{imp} V 4000 Overvoltage category/pollution degree III/3 Terminal capacities mm²	Solid or stranded		AWG	18 - 8
Stripping length Tools Pozidriv screwdriver Size Standard screwdriver Mm 1 x 6 Auxiliary and control circuits Rated impulse withstand voltage Uimp V 4000 Overvoltage category/pollution degree Terminal capacities Terminal capacities Terminal capacities	Terminal screw			M4
Tools Pozidriv screwdriver Size 2 Standard screwdriver mm 1 x 6 Auxiliary and control circuits Rated impulse withstand voltage Uimp V 4000 Overvoltage category/pollution degree III/3 Terminal capacities III/3	Tightening torque		Nm	1.8
Pozidriv screwdriver Size 2 Standard screwdriver mm 1 x 6 Auxiliary and control circuits Rated impulse withstand voltage Uimp V 4000 Overvoltage category/pollution degree III/3 Terminal capacities mm²	Stripping length		mm	10
Standard screwdriver mm 1 x 6 Auxiliary and control circuits Rated impulse withstand voltage U _{imp} V 4000 Overvoltage category/pollution degree III/3 Terminal capacities mm ²	Tools			
Auxiliary and control circuits Rated impulse withstand voltage Uimp V 4000 Overvoltage category/pollution degree III/3 Terminal capacities mm²	Pozidriv screwdriver		Size	2
Rated impulse withstand voltage Overvoltage category/pollution degree Terminal capacities Uimp V 4000 III/3 Terminal capacities			mm	1 x 6
Overvoltage category/pollution degree III/3 Terminal capacities mm ²		.,		
Terminal capacities mm ²		U_{imp}	V	
				III/3
Solid mm ² 1 x (0.75 - 4)	Terminal capacities		mm^2	
	Solid		mm^2	1 x (0.75 - 4)

IEC/EN 60947, VDE 0660, UL, CSA

			2 x (0.75 - 4)
Flexible with ferrule		mm ²	1 x (0.75 - 2.5)
		111111	2 x (0.75 - 2.5)
Solid or stranded		AWG	2 x (18 - 14)
Terminal screw			M3.5
Tightening torque		Nm	1.2
Stripping length		mm	8
Tools			
Pozidriv screwdriver		Size	2
Standard screwdriver		mm	1 x 6
Rated insulation voltage	Ui	V AC	500
Rated operational voltage	U _e	V AC	500
Safe isolation to EN 61140			
between the auxiliary contacts		V AC	240
Conventional thermal current	I_{th}	Α	6
Rated operational current	Ie	Α	
AC-15			
Make contact			
120 V	I _e	Α	1.5
220 V 230 V 240 V	l _e	Α	1.5
380 V 400 V 415 V	I _e	Α	0.5
500 V	I _e	Α	0.5
Break contact			
120 V	I _e	Α	1.5
220 V 230 V 240 V	I _e	Α	1.5
380 V 400 V 415 V	I _e	Α	0.9
500 V	I _e	Α	0.8
DC L/R ≦ 15 ms			
			Switch-on and switch-off conditions based on DC-13, time constant as specified.
24 V	I _e	Α	0.9
60 V	I _e	Α	0.75
110 V	I _e	Α	0.4
220 V	I _e	A	0.2
	'e		<u></u>
Short-circuit rating without welding max. fuse		V aG/al	6
IIIaa. Iuse		A gG/gL	U

Notes

Notes Ambient air temperature: Operating range to IEC/EN 60947, PTB: -5°C to +55°C

Main circuits terminal capacity solid and flexible conductors with ferrules: When using 2 conductors use equal cross-sections.

Rating data for approved types

Auxiliary contacts			
Pilot Duty			
AC operated			B300 at opposite polarity B600 at same polarity
DC operated			R300
Short Circuit Current Rating	SC	CCR	
600 V High Fault			
SCCR (fuse)	kΑ	4	100
max. Fuse	А		6 Class J/CC

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	In	Α	4
Heat dissipation per pole, current-dependent	P _{vid}	W	2
Equipment heat dissipation, current-dependent	P _{vid}	W	6
Static heat dissipation, non-current-dependent	P_{vs}	W	0

Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	55
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects $\frac{1}{2} = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) \left(\frac{1}{2} + \frac{1}{2} + \frac{1}{2} \right) \left(\frac{1}{2} + \frac{1}$			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			Meets the product standard's requirements.
10.2.5 Lifting			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			Meets the product standard's requirements.
10.5 Protection against electric shock			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			Is the panel builder's responsibility.
10.8 Connections for external conductors			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			Is the panel builder's responsibility.
10.10 Temperature rise			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

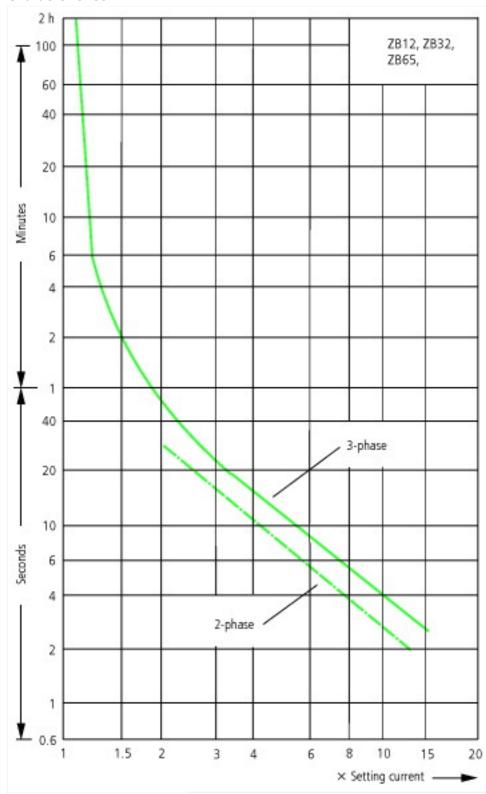
Technical data ETIM 7.0

Low-voltage industrial components (EG000017) / Thermal overload relay (EC000106) Electric engineering, automation, process control engineering / Low-voltage switch technology / Overload protection device / Thermal overload relay (ecl@ss10.0.1-27-37-15-01 [AKF075014]) Α 2.4 - 4 Adjustable current range ٧ 690 Max. rated operation voltage Ue Mounting method Direct attachment Type of electrical connection of main circuit Screw connection Number of auxiliary contacts as normally closed contact Number of auxiliary contacts as normally open contact Number of auxiliary contacts as change-over contact 0 CLASS 10 Release class No Reset function input Yes Reset function automatic Reset function push-button Yes

Approvals

Product Standards	IEC/EN 60947-4-1; UL 60947-4-1; CSA - C22.2 No. 60947-4-1-14; CE marking
UL File No.	E29184
UL Category Control No.	NKCR
CSA File No.	12528
CSA Class No.	3211-03
North America Certification	UL listed, CSA certified
Specially designed for North America	No
Suitable for	Branch circuits

Characteristics

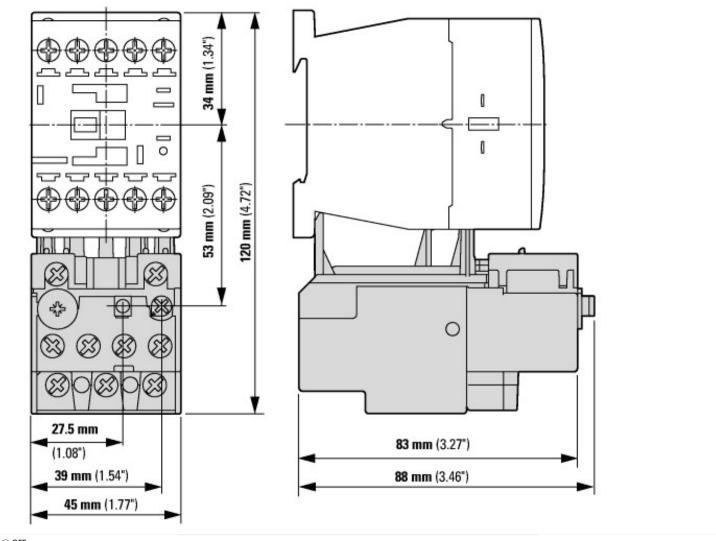


These tripping characteristics are mean values of the spreads at 20 °C ambient air temperature in a cold state. Tripping time depends on response current.

When the devices are at operational temperature the tripping time of the overload relay falls to approx. 25 % of the read off value.

- 1: Minimum level, 3-phase
- 2: Maximum level, 3-phase
- 3: Minimum marker, 2-phase 4: Highest marker, 2-phase

Dimensions



① OFF ② Reset/ON