# DATASHEET - ZB12-2,4



Overload relay, ZB12, Ir= 1.6 - 2.4 A, 1 N/O, 1 N/C, Direct mounting, IP20



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11 11	Part no.	ZB12-2,4
	Catalog No.	278437
	Alternate Catalog	XTOB2P4BC1
	No.	
	EL-Nummer	4131832
	(Norway)	

# Delivery program

Similar to illustration

Derivery 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
द	l <sub>r</sub>	A	1.6 - 2.4
Contact sequence			$\begin{array}{c c} & & & & & & \\ \hline \\ \hline \\ \hline \\ 2 & 4 & 6 & 98 & 96 & A2 \\ & & & & & 14/ \\ & & & & & 22 \end{array}$
Auxiliary contacts			
N/O = 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
Short-circuit protection			
Type "1" coordination	gG/gL	A	25
Type "2" coordination	gG/gL	А	10

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.

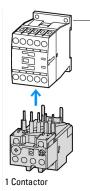


II(2)G [Ex d] [Ex e] [Ex px], II(2)D [Ex p] [Ex t]

PTB 10 ATEX 3010

Observe manual MN03407005Z-DE/EN.

Notes Fitted directly to the contactor



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# Technical data

Rated impulse withstand voltage     Uimp     V     400       Overvoltage category/pollution degree     III/3     III/3       Terminal capacities     mm <sup>2</sup> III/3	General			
Ambient memory and endMember typelie, bic BC0008-2.30Ambient memory and endMember typelie, bic BC0008-2.30Ambient memory and endBernaring memory BC0008-2.30Bornaring memory BC000000000000000000000000000000000000	Standards			IEC/EN 60947, VDE 0660, UL, CSA
Image: Provide para to Exc Protection         Sec -	Climatic proofing			
Open         File. 5 <sup>4</sup> C5 <sup>4</sup> C           Bracked         C         255 <sup>4</sup> C           Tempertature compensation         C         255 <sup>4</sup> C           Weiph         C         255 <sup>4</sup> C           Weiph         C         250 <sup>4</sup> C           Weiph         C         250 <sup>4</sup> C           Weiph         C         C         250 <sup>4</sup> C           Weiph         C         C         260 <sup>4</sup> C           Weiph         C         C         Mathematical Compensation           Degree of Protection         File of Section and solution for the solution of the	Ambient temperature			
Encload         "C         25-40           Temperature compensation         C         26-40           Wight         No         Namous           Wight         No         Namous           Wight         No         Namous           Degree of Protection         Sinusodial         Sinusodial           Protection Jones         Protection Tomes         Sinusodial           Protection Context symmet when actuated from the (NS0274)         Mo         Namous           Antado         Mo         Mo         Mo           Overvlage settergriny/publicind degree         Mo         Mo         Mo           Rated insulation voltage         Up         V         90         Non-           Selevine water instruct compensation residuater instruct compensation residuater instruct compensation residuater instr				
Temperature conjensation         Image: solution         I	Open		°C	-25 - +55
Neight         Is         Is<         Is         Is <t< td=""><td>Enclosed</td><td></td><td>°C</td><td>- 25 - 40</td></t<>	Enclosed		°C	- 25 - 40
Mechanical abock resistance         Normadel Shock Auration 10 ms           Degree of Protection         Protection 10 ms           Protection appint direct contact when actuated from from (EN 90274)         More and back-of-hand prod           Attaide         More and back-of-hand prod           Attaid contains diversed from from (EN 90274)         More and back-of-hand prod           Attaid contains diversed from from (EN 90274)         More and back-of-hand prod           Attaid contains diversed from from (EN 90274)         More and back-of-hand prod           Reade insultion to More and More and Control (EN 90274)         More and Back diversed from from (EN 90274)           Reade insultion to More and More and Control (EN 90274)         More and Control (EN 90274)           Between main contracts         Vac         40           Between main cristing and more contracts         Wore and Control (EN 90274)         50           Maximum attrage discipce from (Contracts)         Wore and Contract (EN 90274)         50           Solid or stranded         More and More and Contract (EN 90274)         10           Solid or stranded         More and Contra	Temperature compensation			Continuous
Image: set of the	Weight		kg	0.142
Production against direct contact when actuated from from t(EN 50274)         Image: Imag	Mechanical shock resistance		g	Sinusoidal
Altide     n     Max 200       Haide     Kaide     Kaide       Attain ballow withstand votage     Va     600       Overvlage category/pollution degree     Va     600       Reted insultion votage     Va     80       Reted insultion votage     Va     80       State day persional votage     Va     80       State shalton to EN 61140     Va     600       Between auxilary contacts and main contacts     Va     40       Between auxilary contacts and main contacts     Va     6205 K/K       Between main circuits     Va     525 K/K       Current heat loss Gaoductors)     Va     525 K/K       Between auxilary contacts     Ma     525 K/K       State for stating range     Ma     525 K/K       Maximum setting     Ya     525 K/K       Stating ange     Ma     525 K/K       Stating ange     Ma     525 K/K       Stating ange     Ma     525 K/K       Maximum setting     Ya     52       Stating ange     Ma     52       Stating ange <td< td=""><td>Degree of Protection</td><td></td><td></td><td>IP20</td></td<>	Degree of Protection			IP20
Main conducting pathsRated impulse withstand voltageJumpVac600Deroviding category/follution degreeIIIIIIIRated impulse withstand voltageVaVac600Rated operational voltageVac600Rated operational voltageVacVac600Between axailiary contacts and main contactsVac400Between axin circuitsVac400Corrent compansation residual error > 40°CVac500Maximum StraigVac500Inderstraing rangeVac500Maximum StraingVac500SolidVac121Inderstraing rangeVac121Solid or strandedVac121Inderstraing rangeVac121Solid or strandedVac121Inderstraing rangeVac121Solid or strandedVac121Solid or strandedVac121Solid or strandedVac121Solid stranded resordiverVac121Provintion screwritiverVac121Solid stranded screwritiverVac121Solid or stranded resordiverVac121Solid or stranded screwritiverVac121Provintion screwritiverVac121So	Protection against direct contact when actuated from front (EN 50274)			Finger and back-of-hand proof
Retad implas withstand voltageVAC000Querollage category/pollution degreeIIIIIIIReted portional voltageVVIVIReted portional voltageVVIVIReted portional voltageVIVIVIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Altitude		m	Max. 2000
Develoage category/pollution degreeImport of the section				
Red insulation voltageUVØ0Red operational voltageUVAC80Setive en auxiliary contacts and main contactsVACVACVACBetween auxiliary contacts and main contactsVACVACVACTermeratur compensation residual error >40°CVACVACVACCurrent hact los (3 conductors)VACVACVACMaximum settingVACVACVACVACMaximum setting angeVACVACVACMaximum settingVACVACVACVACSolidVACVACVACVACSolid or strandedVACVACVACVACSolid or strandedVACVACVACVACTerminal corewVACVACVACVACSolid or strandedVACVACVACVACTerminal corew/fiverVACVACVACVACSolid viscrew/fiverVACVACVACVACSolid viscrew/fiverVACVACVACVACSolid viscrew/fiverVACVACVACVACSolid viscrew/fiverVACVACVACVACSolid viscrew/fiverVACVAC <t< td=""><td>Rated impulse withstand voltage</td><td>U<sub>imp</sub></td><td>V AC</td><td>6000</td></t<>	Rated impulse withstand voltage	U <sub>imp</sub>	V AC	6000
Rete operational voltage         Vace         80           Safet solation to EN 61140         Image: Solation to EN 61140         Image: Solation to EN 61140           Between auxiliary contacts and main contacts         VAC         40           Between auxiliary contacts and main contacts         VAC         40           Between main circuits         VAC         40           Tomperatur compensation residual error > 40 °C         VAC         40           Current heat loss (3 conductors)         VAC         50           Maximum setting         VAC         40           Maximum setting range         VAC         50           Solid         Maximum setting         VAC         50           Solid or stranded         VAC         Maximum setting         VAC           Solid or stranded         VAC         81-8         VAC           Typing length         VAC         81-8         VAC           Totic screwdriver         VAC         81-8         VAC           Storid screwdriver         VAC         91         VAC           Totic screwdriver         VAC         91         VAC           Storid screwdriver         VAC         91         VAC           Storid screwdriver         VAC	Overvoltage category/pollution degree			111/3
Sel isolation to EN 61140     File     VAC     40       Between main circuits     VAC     40       Temperatur compensation residual error > 40 °C     VAC     40       Current heat loss (3 conductors)     VAC     40       Lower value of the setting range     VAC     40       Maximum setting     VAC     50       Terminal capacities     VAC     70       Solid     Marine     VAC       Solid or stranded     VAC     70       Terminal capacities     VAC     80       Fexible with ferrule     VAC     70       Solid or stranded     VAC     70       Tightening torque     VAC     70       Stripping length     VAC     70       Topping length     VAC     70       Pazidriv screwdriver     Yang     72       Standard screwdriver     Yang     72       Retainguistend voltage     Yang     72       Pazidriv screwdriver     Yang     72       Standard screwdriver     Yang     74       Retainguistend voltage     Yang     74       Overvoltage category/pollution digree     Yang     74       Terminal capacities     Yang     74	Rated insulation voltage	Ui	V	690
Between auxiliary contacts and main contactsI YAC40Between main circuitsVAC40Temperatur compensation residual error > 40 °CVAC40Current heat loss (3 conductors)VV5.Lower value of the setting rangeVW5.Maximum settingVW5.Terminal capacitiesVM5.SolidVM5.Solid or strandedVM5.Terminal screwVM5.Solid or strandedVM5.Tightening torqueVM16.Stripping lengthVM16.TotalYM16.Auxiliary and control circuitsYM16.Auxiliary and control circuitsMM16.Auxiliary and control circuitsMM16.Auxiliary and contr	Rated operational voltage	Ue	V AC	690
Between main circuits         VAC         40           Temperatur compensation residual error > 40 °C         52 %/K           Current heat loss (3 conductors)         VM         5.           Current heat loss (3 conductors)         VM         5.           Maximum setting range         VM         5.           Terminal capacities         ma <sup>2</sup> \$.           Solid         ma <sup>2</sup> \$.           Betwine ferrule         MM         \$.           Solid or stranded         MM         \$.           Terminal screw         MM         \$.           Terminal screw         MM         \$.           Totage screwdriver         Size         MM           Pozidriv screwdriver         Size         Ma           Terminal capacities         Mm         \$.           Totage screwdriver         Size         Ma           Totage screwdriver         Size         \$.           Pozidriv screwdriver         Size         \$.           Retaingulse withstand voltage         Mm         \$.           Overvoltage category/pollution degree         Ym         \$.           Terminal capacities         Ym         \$.	Safe isolation to EN 61140			
Imperatur compensation residual error > 40 °C         Imperature = 40 °C	Between auxiliary contacts and main contacts		V AC	440
Current heat los (a conductors)       Image: set interpret interpr	Between main circuits		V AC	440
Lover value of the setting range       K       %       %         Maximum setting       %       %       %         Torminal capacities       max       max       %         Solid       max       1x1 - 6%       %         Solid       max       1x1 - 6%       %         Solid       max       1x1 - 6%       %         Solid or stranded       Max       1x1 - 6%       %         Terminal screw       K       K       K       K         Tothening torque       K       Max       Max       Max       Max         Tothening torque       Max	Temperatur compensation residual error > 40 °C			≦ 0.25 %/K
Maximum setting       V       5         Terminal capacities       Image:	Current heat loss (3 conductors)			
Terminal capacities       man <sup>2</sup> Solid       man <sup>2</sup> Solid       man <sup>2</sup> Flexible with ferrule       man <sup>2</sup> Solid or stranded       man <sup>2</sup> Solid or stranded       man <sup>2</sup> Solid or stranded       Man <sup>2</sup> Terminal screw       Man <sup>2</sup> Tightening torque       Man <sup>2</sup> Stripping length       Man         Tots       Man <sup>2</sup> Poidriv screwdriver       State         Standard screwdriver       State         Retaingulse withstand voltage       Man <sup>2</sup> Overvoltage category/pollution degree       Man <sup>2</sup> Terminal capacities       Man <sup>2</sup>	Lower value of the setting range		W	2.5
Solid         Mm <sup>2</sup> x(1 - 6)           Flexible with ferrule         m <sup>2</sup> x(1 - 4)         x(1 - 4)           Solid or stranded         MW         8-8         MM           Solid or stranded         MW         8-8         MM           Terminal screw         MM         8-8         MM           Tightening torque         MM         8-8         MM           Stripping length         MM         8-8         MM           Tords         MM         8-8         MM           Pozidriv screwdriver         MM         8-8         MM           Standard screwdriver         MM         8-8         MM           Pozidriv screwdriver         MM         8-8         MM           Standard screwdriver         MM         8-8         MM           Autiliary and control circuits         MM         9-2         MM           Autiliary and control circuits         MM         1x 6         MM           Overvoltage category/pollution degree         Mm         MM         MM           Marcel and moltage         Mm         MM         MM	Maximum setting		W	5.7
Image: Provide a stranded     Image: Provide a stranded     Image: Provide a stranded       Solid or stranded     AWG     Is 8       Terminal screw     MM     Is 8       Terminal screw     MM     Is 8       Tightening torque     MM     Is 8       Stripping length     MM     Is 8       Tools     MM     Is 8       Pozidriv screwdriver     MM     Is 8       Standard screwdriver     MM     Is 8       Atkliary and control circuits     MM     Is 8       Atkliary and control circuits     MM     Is 8       Atkliary and control circuits     MM     Is 6       Overvoltage category/pollution degree     Minge: Provide a stranded strands with stand voltage     Minge: Provide a strands strands with stand voltage       Overvoltage category/pollution degree     Mingee: Provide a strands strands with stand voltage     Mingee: Provide a strands strands with stand voltage       Overvoltage category/pollution degree     Mingee: Provide a strands strands strands with stand voltage     Mingee: Provide a strands strands with stand voltage       Overvoltage category/pollution degree     Mingee: Provide a strands strands with stand voltage     Mingee: Provide a strands strands with stand voltage	Terminal capacities		mm <sup>2</sup>	
Solid or stranded     AWG     3-8       Terminal screw     MWG     3-8       Tightening torque     MM     3-8       Stripping length     MM     3-8       Tols     MM     3-8       Pozidriv screwdriver     MM     3-8       Strandard screwdriver     MM     3-8       Auxiliary and control circuits     MM     3-8       Red impulse withstand voltage     Vimp     Vimp       Overvoltage category/pollution degree     Min     1/3       Terminal capacities     Min     Min	Solid		mm <sup>2</sup>	
Terminal screw     Mail       Tightening torque     Nm     1.8       Stripping length     mm     1.0       Tools     Nm     1.0       Pozidriv screwdriver     Size     2       Standard screwdriver     mm     1.6       Rated impulse withstand voltage     Jimp     Ymp       Overvoltage category/pollution degree     Jimp     Mail       Terminal capacities     mm <sup>2</sup> Intra	Flexible with ferrule		mm <sup>2</sup>	
Tightening torque     Nm     18       Stripping length     nm     10       Tools     Nm     10       Pozidriv screwdriver     Size     Nm     10       Standard screwdriver     mm     14       Auxiliary and control circuits     mm     14       Overvoltage category/pollution degree     Vimp     V     4000       Terminal capacities     mm²     11/3	Solid or stranded		AWG	18 - 8
Stripping length     mm     10       Tools     Mm     10       Pozidriv screwdriver     Size     Size       Standard screwdriver     Mm     1x6       Auxiliary and control circuits     Minp     Y       Overvoltage category/pollution degree     Minp     Minp       Terminal capacities     Mm     Mm	Terminal screw			M4
Tools     Image: Marcine stream of the stream	Tightening torque		Nm	1.8
Pozidriv screwdriver     Size     Size       Standard screwdriver     mm     1x6       Auxiliary and control circuits     Vimp     V     400       Overvoltage category/pollution degree     III/3     III/3	Stripping length		mm	10
Standard screwdriver     mm     1 x 6       Auxiliary and control circuits       Rated impulse withstand voltage     Vimp     V     4000       Overvoltage category/pollution degree     III/3     III/3	Tools			
Auxiliary and control circuits       Rated impulse withstand voltage     Vimp     V     4000       Overvoltage category/pollution degree     III/3     III/3       Terminal capacities     mm <sup>2</sup> III/3	Pozidriv screwdriver		Size	2
Rated impulse withstand voltage     Uimp     V     400       Overvoltage category/pollution degree     III/3     III/3       Terminal capacities     mm <sup>2</sup> III/3	Standard screwdriver		mm	1 x 6
Overvoltage category/pollution degree     III/3       Terminal capacities     mm <sup>2</sup>	Auxiliary and control circuits			
Terminal capacities mm <sup>2</sup>	Rated impulse withstand voltage	U <sub>imp</sub>	V	4000
	Overvoltage category/pollution degree			III/3
Solid mm <sup>2</sup> 1 x (0.75 - 4)	Terminal capacities		mm <sup>2</sup>	
	Solid		mm <sup>2</sup>	1 x (0.75 - 4)

			2 x (0.75 - 4)
Flexible with ferrule		mm <sup>2</sup>	1 x (0.75 - 2.5) 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 <sub>e</sub>	V AC	500
Safe isolation to EN 61140			
between the auxiliary contacts		V AC	240
Conventional thermal current	I <sub>th</sub>	А	6
Rated operational current	le	А	
AC-15			
Make contact			
120 V	Ι <sub>e</sub>	А	1.5
220 V 230 V 240 V	Ι <sub>e</sub>	А	1.5
380 V 400 V 415 V	۱ <sub>e</sub>	А	0.5
500 V	Ι <sub>e</sub>	А	0.5
Break contact			
120 V	Ie	A	1.5
220 V 230 V 240 V	Ie	A	1.5
380 V 400 V 415 V	Ι <sub>e</sub>	A	0.9
500 V	le	A	0.8
DC L/R ≦ 15 ms			
			Switch-on and switch-off conditions based on DC-13, time constant as specified.
24 V	۱ <sub>e</sub>	A	0.9
60 V	Ι <sub>e</sub>	A	0.75
110 V	I <sub>e</sub>	A	0.4
220 V	Ι <sub>e</sub>	А	0.2
Short-circuit rating without welding			
max. fuse		A gG/gL	6
Notes			

#### 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	SCCR	
600 V High Fault		
SCCR (fuse)	kA	100
max. Fuse	А	3 Class J/CC

# Design verification as per IEC/EN 61439

•				
Technical data for design verificat	ion			
Rated operational current for s	pecified heat dissipation	In	А	2.4
Heat dissipation per pole, curr	ent-dependent	P <sub>vid</sub>	W	1.9
Equipment heat dissipation, cu	rrent-dependent	P <sub>vid</sub>	W	5.7
Static heat dissipation, non-cu	rrent-dependent	P <sub>vs</sub>	W	0

Heat dissipation capacity	P <sub>diss</sub>	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			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)

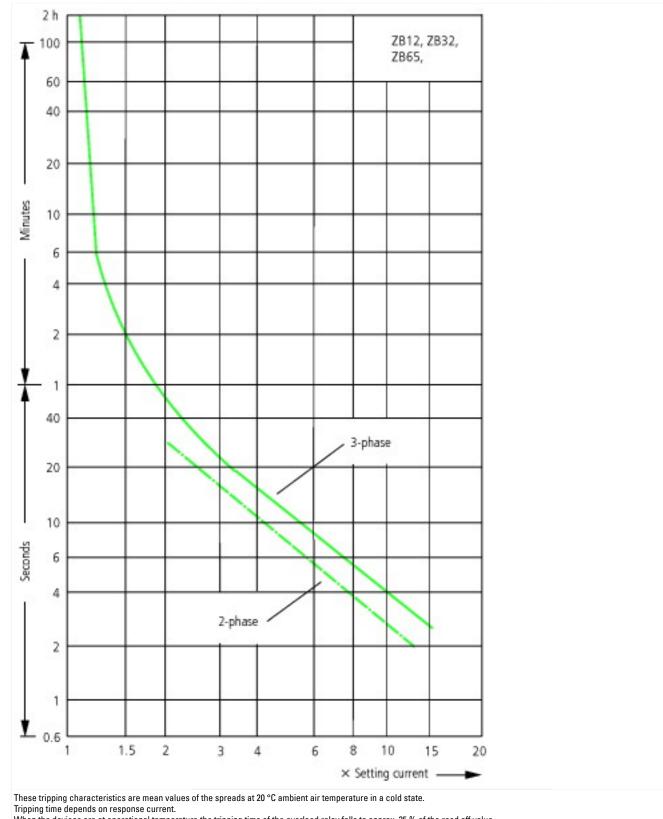
Electric engineering, automation, process control engineering / Low-voltage switch technology / Overload protection device / Thermal overload relay (ecl@ss10.0.1-27-37-15-01 [AKF075014])				
Adjustable current range		А	1.6 - 2.4	
Max. rated operation voltage Ue		V	690	
Mounting method			Direct attachment	
Type of electrical connection of main circuit			Screw connection	
Number of auxiliary contacts as normally closed contact			1	
Number of auxiliary contacts as normally open contact			1	
Number of auxiliary contacts as change-over contact			0	
Release class			CLASS 10	
Reset function input			No	
Reset function automatic			Yes	
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

Max. Voltage Rating	600 V AC
Degree of Protection	IEC: IP20, UL/CSA Type: -

### **Characteristics**



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**

