

# Overload relay, electronic, 20-100A, +earth-fault protection

Powering Business Worldwide<sup>™</sup>

ZEB65-100-GF Part no. Article no. 136505 Catalog No. XTOE100DGS

# **Delivery program**

Don'tory program			
Product range			Electronic overload relays ZEB
Phase-failure sensitivity			IEC/EN 60947, VDE 0660 Part 102
Description			Test/off button Reset pushbutton Manual/auto reset selectable Protection with heavy starting duty (Class 10A-30)
Mounting type			Direct mounting
Earth-fault protection			
Earth-fault protection			with
Trip at approx.			$> 0.5 \times I_r \text{ in 2 s}$ > 1.5 x $I_r \text{ in 1 s}$
Setting range			
Overload releases	l <sub>r</sub>	A	20 - 100
Contact sequence			97 95
Auxiliary contacts			
N/0 = Normally open			1 N/0
N/C = Normally closed			1 N/C
For use with			DILM40 DILM50 DILM65 DILM72 DIULM40 DIULM50 DIULM50 DIULM50 SDAINLM70 SDAINLM70 SDAINLM90 SDAINLM115

### **Technical data**

#### General

Standards		IEC/EN 60947, VDE 0660, UL, CSA
Climatic proofing		Damp heat, constant, to IEC 60068-2-78 Damp heat, cyclic, to IEC 60068-2-30
Ambient temperature		
Open	°C	-25 - +65
Ambient temperature open max.	°C	65
Mechanical shock resistance	g	15 Shock duration 10 ms according to IEC 60068-2-27
Degree of Protection		IP20
Protection against direct contact when actuated from front (EN 50274)		Finger and back-of-hand proof
Main conducting paths		

Rated impulse withstand voltage	$U_{\text{imp}}$	V AC	6000
Overvoltage category/pollution degree			III/3
Rated insulation voltage	Ui	V AC	690
Rated operational voltage	U <sub>e</sub>	V AC	690
Rated frequency	f	Hz	50/60
Safe isolation to EN 61140			

Between auxiliary contacts and main contacts	V AC	600
Between main circuits	V AC	600
Terminal capacities	$mm^2$	
Solid	$\text{mm}^2$	1 x 16 - 50
Solid or stranded	AWG	1 x 6 - 1
Auxiliary and control circuits		

Read injudices withstand voltage         Um. W         V         6000           Overvoltage category (pollution degree         mm²         103           Floatides         mm²         2 x (0.75 - 4)           Floatides with ferrule         mm²         2 x (0.75 - 2.5)           Solid or stranded         mm²         2 x (18 - 12)           Tighteening torque         mm²         0 x (18 - 12)           Tighteening torque         mm²         0 x - 12           Pooleful's screwdriver         mm²         1 x 0           Standard screwdriver         mm²         1 x 0           Standard screwdriver         Up.         X 0         50	Auxiliary and control circuits				
Terminal capacities         mm²         4 (275 - 4)           Solid         mm²         2 (2075 - 4)           Flooble with furule         mm²         2 (2075 - 25)           Solid or stranded         3 (2075 - 25)         3 (2075 - 25)           Tightening torque         Mm²         2 (2075 - 25)           Tightening torque         Mm²         38 - 12           Tools         Mm²         2 (2000 - 200	Rated impulse withstand voltage	$U_{imp}$	V	6000	
Solid         mm²         2 x 10.75 - 4)           Floxible with ferrule         mm²         2 x 10.75 - 2.5)           Solid or stranded         AWG         2 x 10.75 - 2.5)           Terminal screw         M35         M35           Tightening torque         Ib-in         7           Tightening torque         Ib-in         7           Tools         Size         2           Pozidriv scrowdriver         Ima         1 x 8           Standard scrowdriver         Ima         1 x 8           Rated insulation voltage         U, VAC         500           Rated operational voltage         U, VAC         500           Safe isolation to EN 61140         WAC         240           between the southery contacts         Ima         A         5           Conventional thermal current         Ima         A         5           AC13         120 Y         A         5           Make contact         Ima         A         1.5           120 Y         Ima         A         1.5           Break contact         Ima         A         1.5           120 Y         Ima         A         1.5           Break contact         Ima	Overvoltage category/pollution degree			III/3	
Flexible with ferrule	Terminal capacities		$\mathrm{mm}^2$		
Salid or stranded  Salid or stranded  Ferminal screw  Fightening torque  Floring torque  Pozidriv screwdriver  Pozidriv screwdriver  Standerd screwdriver  Standerd screwdriver  Neted insulation voltage  Note in Salid or Note in Salid  Note in Salid or No	Solid		$\text{mm}^2$	2 x (0.75 - 4)	
Terminal screw         Mass (Name)	Flexible with ferrule		mm <sup>2</sup>	2 x (0.75 - 2.5)	
Tightening torque         Mm         08-12           Tools         bin         7           Pozidriv screwdriver         wm         1x6           Standard screwdriver         mm         1x6           Rated insulation voltage         U <sub>1</sub> VAC         500           Rated porational voltage         U <sub>2</sub> VAC         500           Safe isolation to N6140         W         VAC         50           between the auxiliary contacts         W         VA         5           Conventional turrent         In         A         5           Rated operational current         In         A         5           Make contact         I <sub>2</sub> A         1           120 V         I <sub>2</sub> A         15           380 V 400 V 415 V         I <sub>2</sub> A         15           500 V         I <sub>2</sub> A         15           120 V         I <sub>2</sub> A         15           220 V 230 V 240 V         I <sub>2</sub> A         15           120 V         I <sub>2</sub> A         15           380 V 400 V 415 V         I <sub>2</sub> A         15           200 V 230 V 240 V         I <sub>2</sub>	Solid or stranded		AWG	2 x (18 - 12)	
Tightening torque         In the control of the	Terminal screw			M3.5	
Tools         Image: Part of the screwdriver         Size of the screwdriver         Size of the screwdriver         Image: Part of the screwdriver <t< td=""><td>Tightening torque</td><td></td><td>Nm</td><td>0.8 - 1.2</td></t<>	Tightening torque		Nm	0.8 - 1.2	
Pozidirv screwdriver         Size         2           Standard screwdriver         mm         1 x 6           Rated insulation voltage         U <sub>u</sub> VAC         500           Rated operational voltage         U <sub>u</sub> VAC         500           Sefe isolation to RN I140         VAC         240           between the auxiliary contacts         VAC         240           Conventional current         I <sub>B</sub> A         5           Rated operational current         I <sub>B</sub> A         5           Make contact         I <sub>B</sub> A         1.5           220 V 220 V 240 V         I <sub>B</sub> A         1.5           380 V 400 V 415 V         I <sub>B</sub> A         0.5           Break contact         I <sub>B</sub> A         1.5           220 V 220 V 240 V         I <sub>B</sub> A         1.5           380 V 400 V 415 V         I <sub>B</sub> A         1.5           380 V 400 V 415 V         I <sub>B</sub> A         0.5           220 V 220 V 220 V 240 V         I <sub>B</sub> A         0.9           500 V         I <sub>B</sub> A         0.9           60 V         I <sub>B</sub> A         0.5	Tightening torque		lb-in	7	
Standard screwfriver         mm         1 x 6           Rated insulation voltage         U <sub>i</sub> V AC         500           Safe isolation to EN 61140         V AC         240           between the auxiliary contacts         V AC         240           Conventional thermal current         I <sub>th</sub> A         5           Rated operational current         I <sub>th</sub> A         5           AC-15         Make contact           120 V         I <sub>th</sub> A         1.5           220 V 230 V 240 V         I <sub>th</sub> A         1.5           380 V 400 V 415 V         I <sub>th</sub> A         1.5           Break contact         I <sub>th</sub> A         1.5           220 V 230 V 240 V         I <sub>th</sub> A         1.5           380 V 400 V 415 V         I <sub>th</sub> A         1.5           230 V 230 V 240 V         I <sub>th</sub> A         1.5           230 V 230 V 240 V         I <sub>th</sub> A         1.5           250 V 250 V 240 V         I <sub>th</sub> A         1.5           250 V 250 V 240 V         I <sub>th</sub> A         0.9           260 V         I <sub>th</sub> A         0.9 </td <td>Tools</td> <td></td> <td></td> <td></td>	Tools				
Rated insulation voltage         Ui         VAC         500           Rated operational voltage         Ue         VAC         500           Safe isolation to EN 61140         VAC         240           between the auxiliary contacts         VAC         240           Conventional thermal current         Inc.         AC         5           AC-15         VAC         AC         AC           Make contact         Inc.         AC         1.5           220 V 230 V 240 V         Inc.         AC         1.5           380 V 400 V 415 V         Inc.         AC         1.5           Break contact         Inc.         AC         1.5           220 V 230 V 240 V         Inc.         AC         1.5           380 V 400 V 415 V         Inc.         AC         1.5           380 V 400 V 415 V         Inc.         AC         1.5           380 V 400 V 415 V         Inc.         AC         1.5           380 V 400 V 415 V         Inc.         AC         1.5           380 V 400 V 415 V         Inc.         AC         1.5           380 V 400 V 415 V         Inc.         AC         1.5           380 V 400 V 415 V         Inc. <t< td=""><td>Pozidriv screwdriver</td><td></td><td>Size</td><td>2</td></t<>	Pozidriv screwdriver		Size	2	
Rated operational voltage         Ue         VAC         500           Safe isolation to EN 61140         VAC         240           between the auxiliary contacts         In         A         5           Conventional thermal current         Ie         A         5           Rated operational current         Ie         A         5           Make contact         Image: Contact of the contact o	Standard screwdriver		mm	1 x 6	
Safe isolation to EN 61140           between the auxiliary contacts         VAC         240           Conventional thermal current         In         A         5           Rated operational current         In         A         E           AC-15         Nake contact         In         A         1.5           120 V         In         A         1.5           220 V 230 V 240 V         In         A         1.5           380 V 400 V 415 V         In         A         0.5           Break contact         In         A         1.5           220 V 230 V 240 V         In         A         1.5           220 V 230 V 240 V         In         A         1.5           380 V 400 V 415 V         In         A         1.5           380 V 400 V 415 V         In         A         0.9           DC-13 L/R - 15 ms         In         A         0.9           24 V         In         A         0.9           60 V         In         A         0.9           110 V         In         A         0.9           110 V         In         A         0.9           110 V         In         A <td>Rated insulation voltage</td> <td>Ui</td> <td>V AC</td> <td>500</td>	Rated insulation voltage	Ui	V AC	500	
between the auxiliary contacts         V AC         240           Conventional thermal current         I <sub>II</sub> A         A         5           Rated operational current         I <sub>II</sub> AC-15         A         A           Make contact         III AC-15         III AC	Rated operational voltage	U <sub>e</sub>	V AC	500	
Conventional thermal current       In       A       5         Rated operational current       In       A       A         AC-15         Make contact         120 V       In       A       1.5         220 V 230 V 240 V       In       A       0.5         500 V       In       A       0.5         Break contact       In       A       1.5         220 V 230 V 240 V       In       A       1.5         380 V 400 V 415 V       In       A       0.9         500 V       In       A       0.8         DC-13 L/R - 15 ms       In       A       0.9         60 V       In       A       0.75         110 V       In       A       0.4         220 V       In       A       0.4         220 V       In       A       0.4         220 V       In       A       0.2         Short-circuit rating without welding       In       A       0.2	Safe isolation to EN 61140				
Rated operational current  AC-15  Make contact  120 V  120	between the auxiliary contacts		V AC	240	
AC-15  Make contact  120 V  1e A 1.5  220 V 230 V 240 V  1e A 0.5  500 V  1e A 0.5  Break contact  120 V  1e A 1.5  220 V 230 V 240 V  1e A 0.5  Break contact  120 V  1e A 1.5  220 V 230 V 240 V  1e A 0.5  Break contact  120 V  1e A 0.5  DC-13 L/R - 15 ms  24 V  1e A 0.9  500 V  1e A 0.75  110 V  220 V  1e A 0.75  110 V  220 V  1e A 0.4  220 V  Short-circuit rating without welding	Conventional thermal current	I <sub>th</sub>	Α	5	
Make contact       I <t< td=""><td>Rated operational current</td><td>I<sub>e</sub></td><td>Α</td><td></td></t<>	Rated operational current	I <sub>e</sub>	Α		
120 \   120	AC-15				
220 V 230 V 240 V   1e	Make contact				
380 V 400 V 415 V	120 V	l <sub>e</sub>	Α	1.5	
Soo V   Ie	220 V 230 V 240 V	I <sub>e</sub>	Α	1.5	
Break contact         Incompanies	380 V 400 V 415 V	I <sub>e</sub>	Α	0.5	
120 V       Ie       A       1.5         220 V 230 V 240 V       Ie       A       1.5         380 V 400 V 415 V       Ie       A       0.9         500 V       Ie       A       0.8         DC-13 L/R - 15 ms       Ie       A       0.9         60 V       Ie       A       0.75         110 V       Ie       A       0.4         220 V       Ie       A       0.2         Short-circuit rating without welding       Image: Control of the control of th	500 V	I <sub>e</sub>	Α	0.5	
220 V 230 V 240 V	Break contact				
380 V 400 V 415 V       Ie       A       0.9         500 V       Ie       A       0.8         DC-13 L/R - 15 ms       -       -       -         24 V       Ie       A       0.9         60 V       Ie       A       0.75         110 V       Ie       A       0.4         220 V       Ie       A       0.2         Short-circuit rating without welding       -       -       -	120 V	I <sub>e</sub>	Α	1.5	
500 V	220 V 230 V 240 V	l <sub>e</sub>	Α	1.5	
DC-13 L/R - 15 ms  24 V  I <sub>e</sub> A  0.9  60 V  I <sub>e</sub> A  0.75  110 V  I <sub>e</sub> A  0.4  220 V  Short-circuit rating without welding	380 V 400 V 415 V	l <sub>e</sub>	Α	0.9	
24 V       I <sub>e</sub> A       0.9         60 V       I <sub>e</sub> A       0.75         110 V       I <sub>e</sub> A       0.4         220 V       I <sub>e</sub> A       0.2         Short-circuit rating without welding       B       A       0.2	500 V	I <sub>e</sub>	Α	0.8	
60 V	DC-13 L/R - 15 ms				
110 V I <sub>e</sub> A 0.4  220 V I <sub>e</sub> A 0.2  Short-circuit rating without welding	24 V	I <sub>e</sub>	Α	0.9	
220 V I <sub>e</sub> A 0.2 Short-circuit rating without welding	60 V	l <sub>e</sub>	Α	0.75	
Short-circuit rating without welding	110 V	I <sub>e</sub>	Α	0.4	
	220 V	l <sub>e</sub>	Α	0.2	
max. fuse A gG/gL 6	Short-circuit rating without welding				
	max. fuse		A gG/gL	6	

# **Design verification as per IEC/EN 61439**

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Technical data for design verification			
Rated operational current for specified heat dissipation	In	Α	100
Heat dissipation per pole, current-dependent	$P_{\text{vid}}$	W	8.47
Equipment heat dissipation, current-dependent	$P_{\text{vid}}$	W	25.4
Static heat dissipation, non-current-dependent	$P_{vs}$	W	0
Heat dissipation capacity	P <sub>diss</sub>	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	65
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 6.0**

Low-voltage industrial components (EG000017) / Electronic overload relay (EC001080) Electric engineering, automation, process control engineering / Low-voltage switch technology / Overload protection device / Electronic overload relay (ecl@ss8.1-27-37-15-02 [AKF076011]) Adjustable current range Α 20 - 100 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 0 Number of auxiliary contacts as change-over contact 0 - 0 Rated control supply voltage Us at AC 50HZ Rated control supply voltage Us at AC 60HZ ٧ 0 - 0 ٧ Rated control supply voltage Us at DC 0 - 0 Release class Adjustable Voltage type for actuating Selfsupplied

#### **Approvals**

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Product Standards	UL 508; CSA-C22.2 No. 14; IEC/EN 60947-4-1; CE marking
UL File No.	E1230
UL Category Control No.	NKCR
CSA File No.	2290956
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: -

# **Dimensions** 117 76 **@@@@** 143 103

108

## **Additional product information (links)**

IL04210002E Solid-state motor protection relay

 $IL04210002E\ Solid-state\ motor\ protection\ relay \\ \ ftp://ftp.moeller.net/DOCUMENTATION/AWA\_INSTRUCTIONS/IL04210002E2012\_06.pdf$