Overload relay

Motor protection is one of the most important tasks when machines are to equiped electrically. You will find the correct solution for every application, from the price efficient bimetal solution up to the more demanding networked, full motor protection.

Bimetal overload relays
Overload relays up to 630 A

- Saves mounting time due to direct mounting onto contactor
- ATEX approval for the protection of EEx e motors up to 250 A
- Single-phasing sensitivity offers wide-ranging motor protection
- Integrated Test button gives higher safety

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EMT6 thermistor machine protection relays

- Overload protection by direct evaluation of the winding temperature
- Fast recognition of operating state by LED display
- Suitable for overload monitoring of EEx e motors
- Reduced variants due to wide-range power supply

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ZEV electronic motor-protective relay
Overload relays up to 820 A

- Flexible mounting using Rogowski current transformers
- Simple parameterisation reduced commissioning time
- ATEX approval for the protection of EEx e motors
- Short downtime due to error messages in display
- Additional thermistor evaluation offers full motor protection

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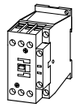
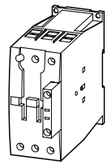
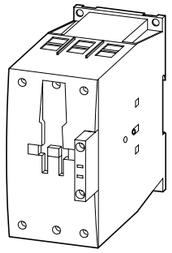
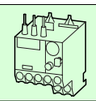
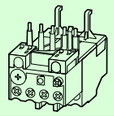
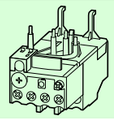
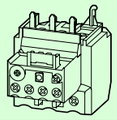
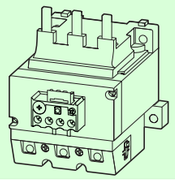
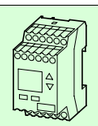
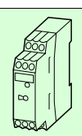
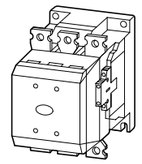
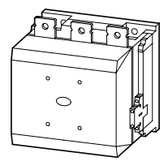
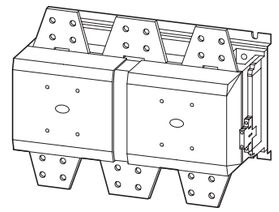
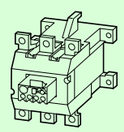
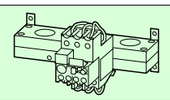
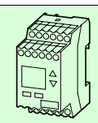
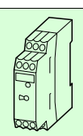
Setting ranges (A) (Note max. current of the contactor)	 DILEM	 DILM7 DILM9 DILM12 DILM15	 DILM17 DILM25 DILM32	 DILM40 DILM50 DILM65	 DILM80 DILM95 DILM115 DILM150 DILM170
Overload relays					
ZE					
ZB12 0.1 – 16					
ZB32 0.1 – 32					
ZB65 6 – 65					
ZB150 25-150					
Z5-.../FF250 50-250					
CT-operated overload relay					
ZW7-...[1] 42 – 630					
Electronic motor-protective relay					
ZEV[2] 1 – 820					
Thermistor machine protection overload relays					
EMT6((DB)K)					

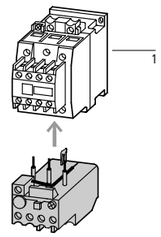
Notes
1) Can only be used up to DILM580
2) Can only be used up to DILM820

 M185 M225 M250 M300 M400 M500	 M580 M650 M750 M820 M1000	 DILM1600
		
		
		
		

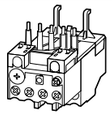
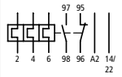
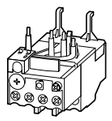
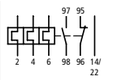
Overload releases	Contact sequence	Auxiliary contacts N/O = Normally	Auxiliary contacts N/C = Normally	For use with	Short-circuit protection Type "1" coordination gG/gL	Short-circuit protection Type "2" coordination gG/gL
I_r						
A					A	A
ZE overload relay for mini contactor						
Phase failure sensitivity to IEC/EN 60947 For direct mounting Ex PTB 01 ATEX 3331						
0.1…0.16	97 95 / 2 4 6 98 96	1 N/O	1 N/C	DILEM DILEM/21/MV SDAINLEM	20	0.5
0.16…0.24						1
0.24…0.4						2
0.4…0.6						2
0.6…1						4
1…1.6						6
1.6…2.4						6
2.4…4						10
4…6						
6…9						

Part no. Article no.	Price see price list	Std. pack	Notes
ZE-0,16 014263		1 off	Overload release: tripping class 10 A Short-circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. Ex Observe manual AWB2300-1425, German or English.
ZE-0,24 014285			
ZE-0,4 014300			
ZE-0,6 014333			
ZE-1,0 014376			
ZE-1,6 014432			
ZE-2,4 014479			
ZE-4 014518			
ZE-6 014565			
ZE-9 014708			

When fitted directly to the contactor a clearance of at least 5 mm is required between the overload relays.

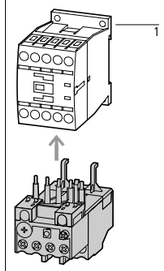


1 Contactor → page 5/3
Accessories → page 2/39
Manual → page 6/18

	Setting range Overload releases	Contact sequence	Auxiliary contacts		For use with	Short-circuit protection	
			N/O = Normally	N/C = Normally		Type "1" coordination	Type "2" coordination
	I_r					gG/gL	gG/gL
	A					A	A
ZB12 overload relays							
Phase failure sensitivity to IEC/EN 60947, VDE 0660 Part 102 For direct mounting							
	0.1…0.16		1 N/O	1 N/C	DILM7, DILM9, DILM12, DILM15, DIULM7, DIULM9, DIULM12, SDAINLM12, SDAINLM16, SDAINLM22	25	0.5
	0.16…0.24						1
	0.24…0.4						2
	0.4…0.6						4
	0.6…1						4
	1…1.6						6
	1.6…2.4						10
	2.4…4						16
	4…6						20
	6…10					50	25
	9…12						
	12…16						
ZB32 overload relays							
Phase failure sensitivity to IEC/EN 60947, VDE 0660 Part 102 For direct mounting							
	0.1…0.16		1 N/O	1 N/C	DILM17, DILM25, DILM32, DIULM17, DIULM25, DIULM32, SDAINLM30, SDAINLM45, SDAINLM55	25	0.5
	0.16…0.24						1
	0.24…0.4						2
	0.4…0.6						4
	0.6…1						4
	1…1.6						6
	1.6…2.4						10
	2.4…4						16
	4…6						20
	6…10					50	25
	10…16					63	35
	16…24					100	35
	24…32					125	63

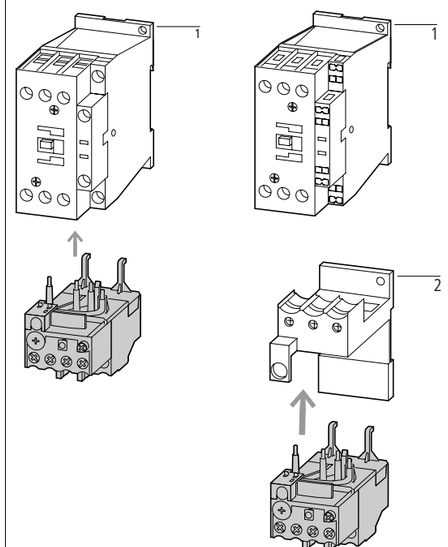
Part no. Article no.	Price see price list	Std. pack	Notes
ZB12-0,16 278431		1 off	Overload release: tripping class 10 A Short-circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. Suitable for protection of EEx e-motors. PTB 04 ATEX 3022 Observe manual AWB2300-1527D/GB.
ZB12-0,24 278432			
ZB12-0,4 278433			
ZB12-0,6 278434			
ZB12-1 278435			
ZB12-1,6 278436			
ZB12-2,4 278437			
ZB12-4 278438			
ZB12-6 278439			
ZB12-10 278440			
ZB12-12 278441			
ZB12-16 290168			
ZB32-0,16 278442		1 off	Overload release: tripping class 10 A Short-circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. Suitable for protection of EEx e-motors. PTB 04 ATEX 3022 Observe manual AWB2300-1527D/GB.
ZB32-0,24 278443			
ZB32-0,4 278444			
ZB32-0,6 278445			
ZB32-1 278446			
ZB32-1,6 278447			
ZB32-2,4 278448			
ZB32-4 278449			
ZB32-6 278450			
ZB32-10 278451			
ZB32-16 278452			
ZB32-24 278453			
ZB32-32 278454			

Fitted directly to the contactor

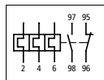
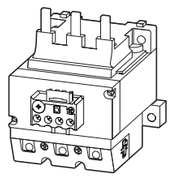
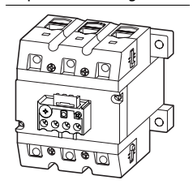
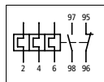


1 Contactor → 5/17

Fitted directly to the contactor Separate mounting

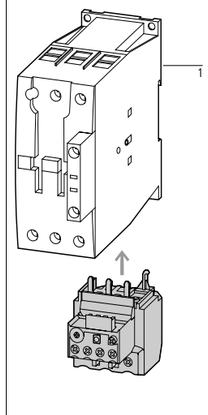


1 Contactor → 5/17
2 Bases → 6/18

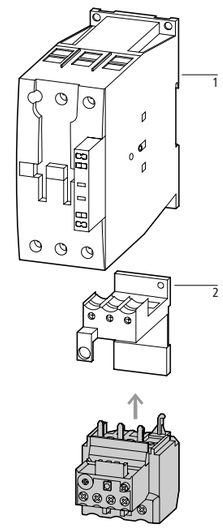
	Overload releases	Contact sequence	Auxiliary contacts		For use with	Short-circuit protection	
			N/O = Normally	N/C = Normally		Type "1" coordination	Type "2" coordination
	I_r					gG/gL	gG/gL
	A					A	A
Overload relays ZB65							
Phase failure sensitivity to IEC/EN 60947, VDE 0660 Part 102 For direct mounting							
	6…10		1 N/O	1 N/C	DILM40, DILM50, DILM65, DIULM40, DIULM50, DIULM65, SDAINLM70, SDAINLM90, SDAINLM115	50	25
	10…16					63	35
	16…24					63	50
	24…40					125	63
	40…57					160	80
	50…65					160	100
	35…50				DILM80, DILM95, DILM115, DILM150, DILM170 DIULM80, DIULM95, DIULM115, DIULM150, SDAINLM140, SDAINLM165, SDAINLM200, SDAINLM260	160	125
	50…70					250	160
	70…100					315	200
	95…125					315	250
	120…150					315	250
	145…175					315	250
Separate mounting							
	35…50		1 N/O	1 N/C		160	125
	50…70					250	160
	70…100					315	200
	95…125					315	250
	120…150					315	250
	145…175					400	315

Part no. Article no.	Price see price list	Std. pack	Notes
ZB65-10 278455		1 off	Overload release: tripping class 10 A Short-circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. Suitable for protection of EEx e-motors. PTB 04 ATEX 3022 Observe manual AWB2300-1545D/GB.
ZB65-16 278456			
ZB65-24 278457			
ZB65-40 278458			
ZB65-57 278459			
ZB65-65 278460			
ZB150-50 278462			
ZB150-70 278463			
ZB150-100 278464			
ZB150-125 278465			
ZB150-150 278466			
ZB150-175 107316			
ZB150-50/KK 278468		1 off	Overload release: tripping class 10 A Short-circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. Suitable for protection of EEx e-motors. PTB 04 ATEX 3022 Observe manual AWB2300-1545D/GB.
ZB150-70/KK 278469			
ZB150-100/KK 278470			
ZB150-125/KK 278471			
ZB150-150/KK 278472			
ZB150-175KK 107317			

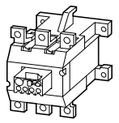
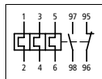
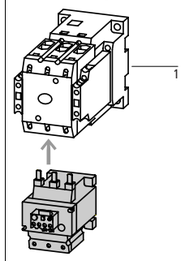
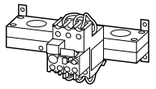
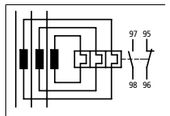
Fitted directly to the contactor



Separate mounting

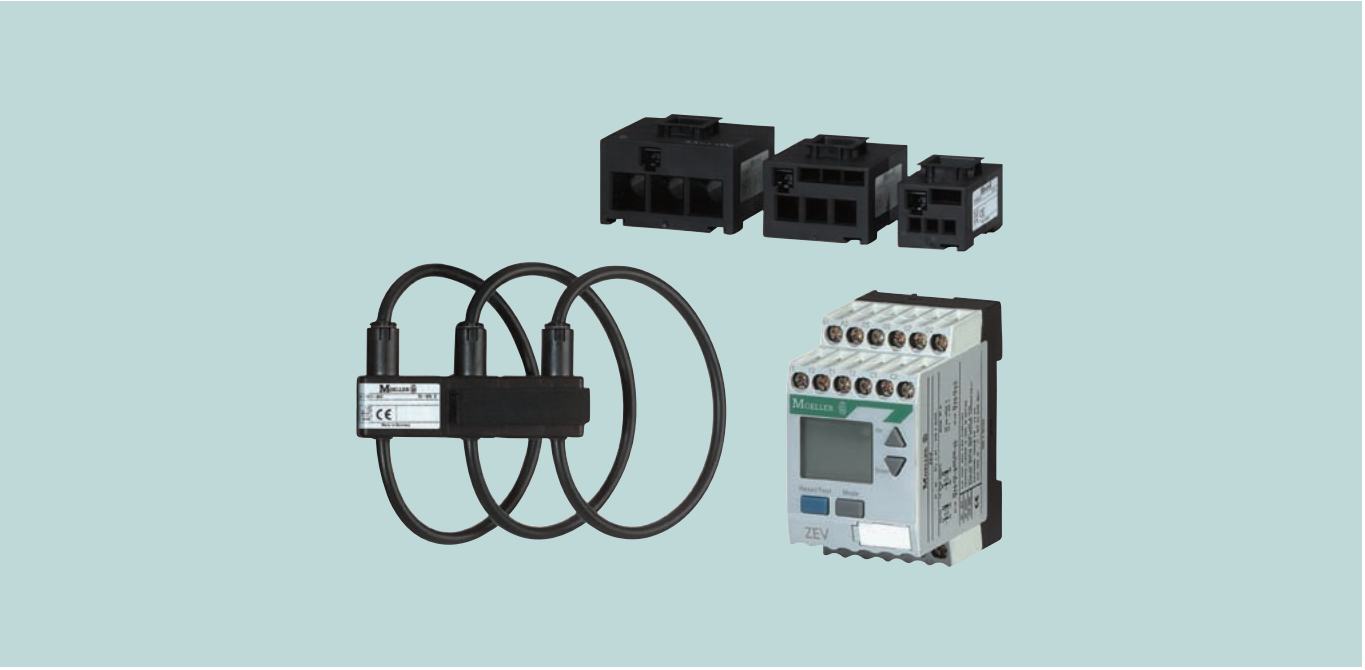


1 Contactor → 5/17
2 Bases → 6/18

Overload releases I_r A	Contact sequence	Auxiliary contacts N/O = Normally	Auxiliary contacts N/C = Normally	For use with		Short-circuit protection Type "1" coordination gG/gL A	Short-circuit protection Type "2" coordination gG/gL A	Part no. Article no.	Price see price list	Std. pack	Notes	Notes
Overload relay Z5 greater than 150A												
Phase failure sensitivity to IEC/EN 60947												
												
50…70		1 N/O	1 N/C	DILM185 DILM225 DILM250		250	160	**Z5-70/FF250** 210070		1 off	Overload release: tripping class 10 A Short-circuit protection: Observe the maximum permissible fuse of the contactor.	**Fitted directly to the contactor** 
70…100						315	200	**Z5-100/FF250** 210071				
95…125						315	250	**Z5-125/FF250** 210072				
120…160						400	250	**Z5-160/FF250** 210073				
160…220					Direct mounting Separate mounting	400 500	315 400	**Z5-220/FF250** 210074				
200…250					Direct mounting Separate mounting	400 500	315 400	**Z5-250/FF250** 210075				
ZW7 current transformer-operated overload relays												
Separate mounting												
												
42…63		1 N/O	1 N/C	–		–	–	**ZW7-63** 000245		1 off		The main current parameters are defined by the main current wiring which is used.
60…90				–		–	–	**ZW7-90** 002618				
85…125				–		–	–	**ZW7-125** 004991				
110…160				–		–	–	**ZW7-160** 007364				
160…240				–		–	–	**ZW7-240** 009737				
190…290				–		–	–	**ZW7-290** 052448				
270…400				–		–	–	**ZW7-400** 045329				
360…540				–		–	–	**ZW7-540** 047702				
420…630				–		–	–	**ZW7-630** 050075				

1 Contactor → page 5/25
Accessories → page 2/39

ZEV – electronic overload relay for motor currents from 1 … 820 A



General

Technological advances require completely new approaches: the application of newly developed sensor systems and tripping units has made motor protection considerably simpler and more economical. All Z overload relays provide the standard functions: protection in the event of phase failure, overload, or current imbalance. The innovative ZEV motor-protective system from Moeller can now do all these things and much more:

Application

Even the most severe starting situations can be dealt with by the ZEV motor-protective system. The enhanced tripping classes (up to CLASS40) provide reliable protection for motors with starting times of up to 40 seconds. Protection for any motor starting situation can be optimally set by preselecting one of the eight tripping classes between 5 and 40 seconds. An earth fault is quickly detected by the external core-balance transformers. The integrated thermistor connection allows the relay to be upgraded to provide a full motor-protective system.

Handling

The LCD display guides the user through the setting menus and ensures straight-forward operation. In the event of a fault, the display shows the cause of the fault and enables rapid fault identification.
Additional signal cables can be implemented via the freely configurable auxiliary contacts 05-06 and 07-08.
They can each be assigned one of the following functions:

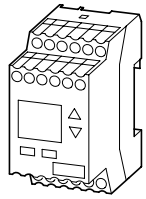
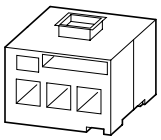
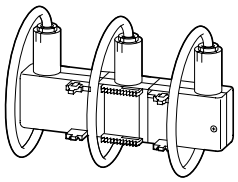
- Early warning of overload
- Earth fault
- Thermistor tripping
- Internal fault

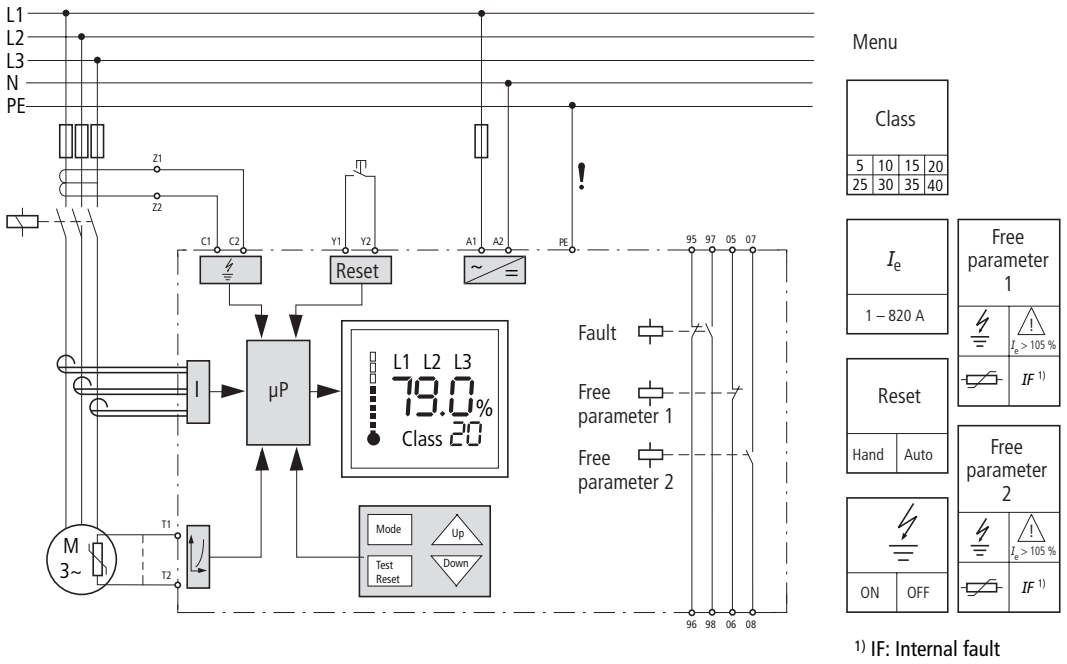
Engineering

The multi-voltage module automatically adapts to different voltages
from 24 … 240 V, 50/60 Hz,
and 24 … 240 V DC, thus enabling flexible application with all conventional control voltages.

Mounting

Ring-type sensors enable the innovative ZEV motor protection system to be used also for small motors. With large motor currents and cable cross-sections, the sensor cables are simply wound round the incoming cable.
A main current wiring system and complex cable matching for an additional device are no longer necessary, neither is the drilling of the mounting plate. Instead, the sensors are simply fastened with a Velcro fastener.
This saves mounting time and expense. The volume of 58 times less than conventional transformers enables the saving of valuable mounting space in the control panel.

	Length	Diameter	Overload releases	For use with	Fault currents	Part no. Article no.	Price see price list	Std. pack
			I_r					
	mm	mm	A		A			
ZEV								
PTB 01 ATEX 3233								
			1…820	DILEM…DILM820		**ZEV** 209634		1 off
Current sensors								
		6	1…25	DILEM DILM7…DILM25		**ZEV-XSW-25** 209635		1 off
		13	3…65	DILM7…DILM65		**ZEV-XSW-65** 209636		
		21	10…145	DILM12…DILM150		**ZEV-XSW-145** 209637		
		110	40…820	DILM40…DILM820		**ZEV-XSW-820** 209641		
Connecting cables								
	200			ZEV-XSW-25 ZEV-XSW-65 ZEV-XSW-145 ZEV-XSW-820		**ZEV-XVK-20** 209643		1 off
	400					**ZEV-XVK-40** 209644		
	800					**ZEV-XVK-80** 209645		
SSW core-balance transformers								
For earth-leakage monitoring 		40			0.3	**SSW40-0,3** 028286		1 off
					0.5	**SSW40-0,5** 028305		
					1	**SSW40-1** 028306		
		65			0.5	**SSW65-0,5** 028307		
		65			1	**SSW65-1** 028316		
		120			0.5	**SSW120-0,5** 028319		
		120			1	**SSW120-1** 028321		
Fixing bracket								
				ZEV ZEV-XSW-25 ZEV-XSW-65 ZEV-XSW-145 easy..., MFD... PS4..., EM4... LE4...		**ZB4-101-GF1** 061360		9 off
Documentation								
ZEV motor protective relay Overload monitoring of EEx e motors								
German						**AWB2300-1433D** 259711		1 off
English						**AWB2300-1433GB** 267430		1 off



1) IF: Internal fault

Inputs			Outputs	
A 1/A 2	Rated control voltage		95/96	N/C contact overload/thermistor
T 1/T 2	Thermistor sensor		97/98	Make contact overload/thermistor
C 1/C 2	SSW core-balance transformer		05/06	N/C contact freely assignable
Y 1/Y 2	Remote reset		07/08	Make contact freely assignable

Switchgear and cable sizing correspond to the respective starting inertia (CLASS)

The switchgear is designed for "CLASS 10" in normal and overload operation. To ensure that the switchgear (circuit-breaker and contactor) as well as the cables are not overloaded with extended tripping times, they must be over-dimensioned accordingly. The rated operational current I_e for switchgear and cables can be calculated with the following current factor while taking the tripping class into account:

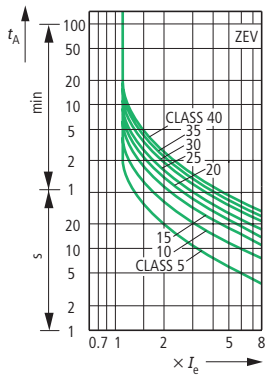
Tripping class	Class 5	Class 10	Class 15	Class 20	Class 25	Class 30	Class 35	Class 40
Current factor for rated operational current I_e	1.00	1.00	1.22	1.41	1.58	1.73	1.89	2.00

Rated motor currents < 1 A
With the ZEV-XSW-25 to ZEV-XSW-145 push-through sensors, the motor incomer cables for each phase are pushed through the push-through openings. With motor currents of less than 1 A, the motor incomer cables are looped into the ZEV-XSW25.

Number of loops n		4	3	2
Rated motor current I_N	A	0.25…0.32	0.33…0.49	0.5…0.99
Set current on the relay I_E between the lowest and highest values	A	1.00…1.28	1.00…1.47	1.00…1.98

The set current I_E of the device is calculated by: $I_E = n \times I_N$

Tripping characteristics



With a phase failure or unbalance
> 50 %, the ZEV will trip within 2.5 seconds.

Tripping times for ZEV electronic motor-protective relay

Tripping class, adjustable	CLASS	5	10	15	20	25	30	35	40
Tripping times in s (±20 %)		at 3-pole symmetric loading from cold state							
Current setting I_E	× 3	11.3	22.6	34	45.3	56.6	67.9	79.2	90.5
	× 4	8	15.9	23.9	31.8	39.8	47.7	55.7	63.6
	× 5	6.1	12.3	18.4	24.6	30.7	36.8	43	49.1
	× 6	5	10	15	20	25	30	35	40
	× 7.2	4.1	8.2	12.3	16.4	20.5	24.5	28.6	32.7
	× 8	3.6	7.3	10.9	14.6	18.2	21.9	25.5	29.2
	× 10	2.9	5.7	8.6	11.5	14.4	17.2	20.1	23

Recovery time after overload trip
(Overview of the recovery time in min)

CLASS	5	10	15	20	25	30	35	40
$t_{recovery}$ [min]	5	6	7	8	9	10	11	12

Thermistor tripping

Rated trip resistance	R = 3200 Ω ±15 %
Recovery resistance	R = 1500 Ω +10 %

Total cold resistance Σ $R_K \leqq$ 1500 Ω
at $R_K \leqq$ 250 Ω per sensor: 6 sensors
at $R_K \leqq$ 100 Ω per sensor: 9 sensors

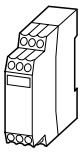
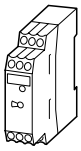
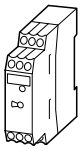
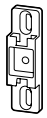
Ready to respond after trip at 5 K under response temperature

Test button tripping time: 5 s

EC prototype test certification number: PTB 01 ATEX 3233

For protection of motors in EEx e area, also order AWB2300-1433G "ZEV motor-protective system, Overload monitoring of motors in EEX e areas".

EMT6 Moeller HPL0211-2007/2008 http://catalog.moeller.net

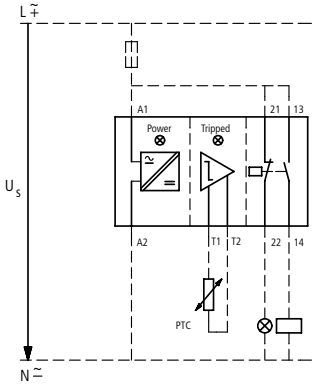
	Description	Rated operational current AC-15 240 V I_e A	Rated operational current AC–14 400 V I_e A	Conventional thermal current I_{th} A	Rated control voltage U_s V	**Part no.** Article no.	**Price** see price list	Std. pack
EMT6 thermistor machine protection relays								
	Without automatic reset Mains and fault LED display	3	3	6	24 – 240 V 50/60 Hz, 24 240 V DC	**EMT6** 066166		1 off
	Without automatic reset Mains and fault LED display Trip with short-circuit in the sensor cable				24 – 240 V 50/60 Hz, 24 – 240 V DC	**EMT6-K** 269470		
	Without automatic reset Mains and fault LED display				230 V 50/60 Hz	**EMT6(230V)** 066400		
	Selector switch with/without automatic reset For manual or remote resetting Test button Mains and fault LED display				24 – 240 V 50/60 Hz, 24 – 240 V DC	**EMT6-DB** 066167		
	Selector switch with/without automatic reset For manual or remote resetting Test button Mains and fault LED display Trip with short-circuit in the sensor cable				24 – 240 V 50/60 Hz, 24 – 240 V DC	**EMT6-KDB** 269471		
	Selector switch with/without automatic reset For manual or remote resetting Test button Mains and fault LED display				230 V 50/60 Hz	**EMT6-DB(230V)** 066401		
	Multifunction device Selector switch with/without automatic reset Trip with short-circuit in the sensor cable Zero-voltage safe For manual or remote resetting Test button Short-circuit recognition and zero-voltage safety can be deactivated Mains and fault LED display				24 – 240 V 50/60 Hz, 24 – 240 V DC	**EMT6-DBK** 066168		
Accessories								
	Screw adapter For screw fixing							
						**CS-TE** 095853		10 off
	Documentation EMT6 thermistor overload relay Overload monitoring of machines in the EEx e area							
	German					**AWB2327-1446D** 264853		1 off
	English					**AWB2327-1446GB** 267010		1 off

Terminal marking according to EN 50005

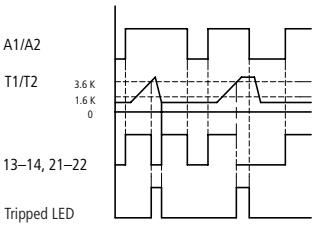
Notes

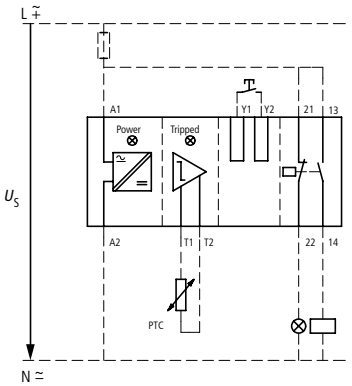
Flow Diagrams
LED display

- Supply voltage is available
- Device has tripped
- Device has tripped/short-circuit in the sensor circuit

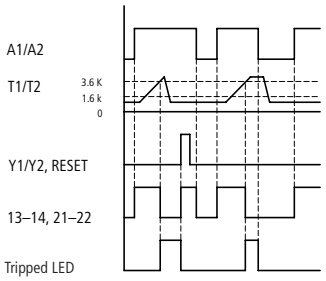


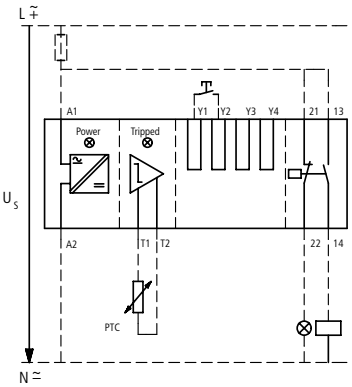
EMT6-K, EMT6-(K)DB, EMT6-DBK
Auto



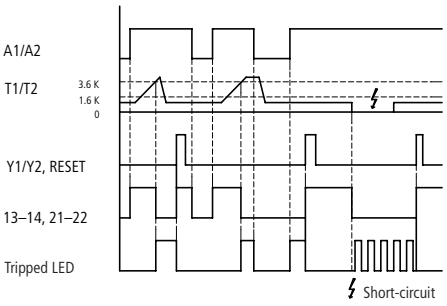


EMT6-(K)DB, EMT6-DBK
Hand





EMT6-DBK
Zero-voltage safe operation



PTB 02 ATEX 3162
With the EMT6, EMT6(230V), EMT6-DB and EMT6-DB(230V) an additional short-circuit protection in the sensor circuit with current monitor is to be provided. Observe the AWB2327-1446 manual (a 6/16).

Can be snap fitted on a top-hat rail to IEC/EN 60715.

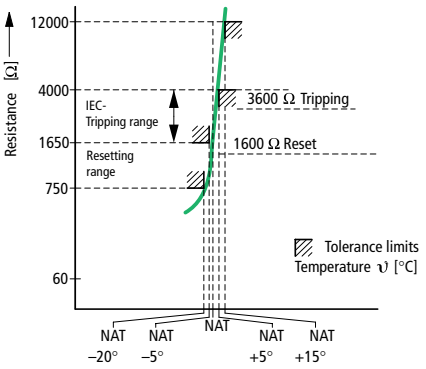
At $R_K \leqq 250\ \Omega$ per sensor: 6 sensors, at $R_K \leqq 100\ \Omega$ per sensor: 9 sensors in the winding (fitted by customer), max. cable length to sensor 250 m (non-screened); Total thermistor resistance (cold) $\Sigma\ R_K \leqq 1500\ \Omega$

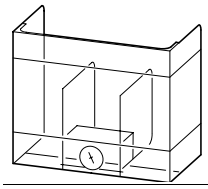
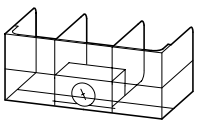
Sensor circuit characteristic values at U_s and +20 °C

$R_{T1\text{-}T2}$	EMT6... $U_{T1\text{-}T2}$ V DC max.	$I_{T1\text{-}T2}$ mA max.
T1, T2 short-circuited	–	1,9
4 kΩ	3	0,8
T1-T2 open	5,1	–

Functions that can be disconnected on the EMT6-DBK:

Function	disconnection via link
Short-circuit detection	$Y_1 - Y_3$
Zero voltage safety	$Y_1 - Y_4$



		For use with	**Part no.** Article no.	**Price** see price list	Std. pack	**Notes**
Documentation						
Overload relays Overload monitoring of EEx e motors						
		ZB12... ZB32...	**AWB2300-1527D/GB** 284910		1 off	German/English
		ZB65... ZB150...	**AWB2300-1545D/GB** 102065			
Bases						
For separate mounting		ZB32	**ZB32-XEZ** 278473		5 off	Can be snap fitted on a top-hat rail to IEC/ EN 60715 or can be screw fitted.
		ZB65	**ZB65-XEZ** 278474		1 off	
Push-buttons						
For enclosed overload relays Mounting diameter: 22.3 mm						
External reset button IP65						
		ZW7... ZB12 ZB32 ZB65 ZB150	**M22-DZ-B** 254833		10 off	Blue button plate
		ZW7... ZB12 ZB32 ZB65 ZB150	**M22-DZ-B-GB14** 254834			Blue button plate: RESET
Off button, IP65						
		ZW7... ZB12 ZB32 ZB65 ZB150	**M22-DZ-X** 254835		10 off	Without button plate, button plate must be added
Button plates						
		M22-DZ-X	**M22-XD-R** 216423		10 off	Red legend plate
			M22-XD-R-X0 218153			Button plate, red with white circle
			M22-XD-R-GB0 218194			Red legend plate STOP
Covers						
		Z5-.../FF250	**Z5/FF250-XHB** 215217		1 off	Separate mounting Z5/FF250 -XHB Z5-.../FF250 Z5/FF250 -XHB Fitted directly to the contactor DIL M400 -XHB DIL M185/ 225/250 Z5/FF250 -XHB-Z Z5-.../FF250 Z5/FF250 -XHB
		Direct fitting Z5-.../FF250 to DILM185, DILM225, DILM250	**Z5/FF250-XHB-Z** 215218			

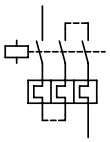
Selection data	ZE ZB12	ZB32, ZB65, ZB150	Z5	ZW7	ZEV
Phase-failure sensitivity	●	●	●	–	●
Temperature compensation	●	●	●	●	●
Auxiliary switch 1 M + 1 B	●	●	●	●	●
Test/off button	●	●	●	●	●
Reset button manual/auto	●	●	●	●	●
Separate mounting	–	●	●	●	●
Protection of EEx e-motors (PTB)	●	●	●	–	●
Protection with heavy starting duty	–	–	–	●	●
Trip-free release	●	●	●	●	●
P standard features					

EU prototype test certificate number

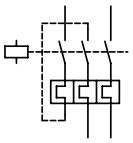
ZEV	PTB 01 ATEX 3233
ZE	PTB 01 ATEX 3331
ZB12	PTB 04 ATEX 3022
ZB32	PTB 04 ATEX 3022
ZB65	PTB 04 ATEX 3022
ZB150	PTB 04 ATEX 3022
EMT6	PTB 02 ATEX 3162

Protection of single-phase and DC current motors:

1 pole

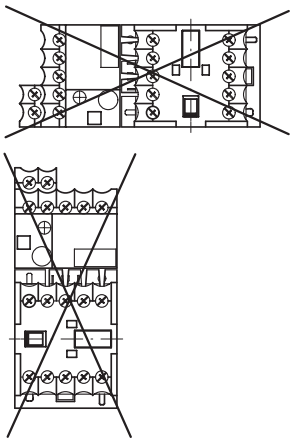


2 pole

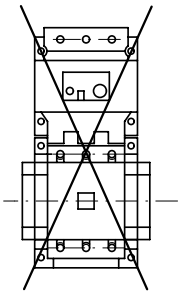


Mounting position:

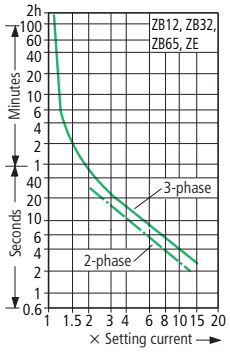
ZE

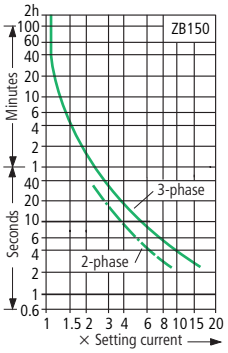


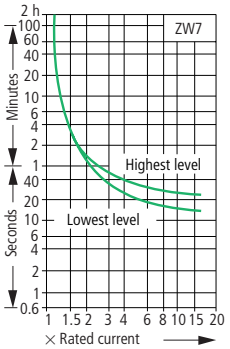
ZB12, ZB32, ZB65, ZB150, Z5

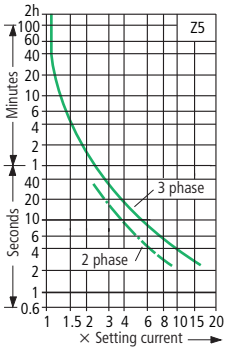


These tripping characteristics are mean values of the spread at 20 °C ambient temperature in a cold state. Tripping time depends on response current. When the devices are at operational temperature the tripping time of the overload relay reduces to approx. 25 % of the read off value. Specific characteristics for each individual setting range can be found in the manual on → Page 6/18









ZE, ZB Moeller HPL0211-2007/2008 http://catalog.moeller.net

			ZE	ZB12, ZB32	ZB65	ZB150(KK)
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[1]		°C	–25…50	–25…55	–25…55	–25…55
Enclosed[1]		°C	–25…40	–25…40	–25…40	–25…40
Temperature compensation			Continuous			
Mounting position			→ Engineering selection data			
Weight			0.07	0.15	0.25	1.64
Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27		g	10	10	10	10
Protection type			IP20	IP 20	IP00	IP00
Protection against direct contact when actuated from front (IEC 536)			Finger- and back-of-hand proof			
Main conducting paths						
Rated impulse withstand voltage	U_{imp}	V AC	6000	6000	6000	8000
Overvoltage category/pollution degree			III/3	III/3	III/3	III/3
Rated insulation voltage						
AC	U_i	V AC	690	690	690	1000
Rated operational voltage	U_e	V AC	690	690	690	1000
Safe isolation to VDE 0106 Part 101 and Part 101/A1						
Between auxiliary contacts and main contacts		V AC	300	440	440	440
Between main circuits		V AC	300	440	440	440
Overload release setting range		A	0.1…9	0.1…32	6…75	25…150
Temperature compensation residual error > 40°C		%/K	≦ 0.25	≦ 0.25	≦ 0.25	≦ 0.25
Short-circuit protection Maximum fuse			→ page 6/5	→ page 6/7	→ page 6/9	→ page 6/9
Current heat loss (3 conductors)						
Lower value of the setting range		W	2.5	2.5	3	16
Maximum setting		W	6	6	7.5	18
Terminal capacities						
Solid		mm²	2 × (0.75 – 2.5)	2 × (1 – 6)	2 × (1 – 16)[4]	2 × (4 – 16)
Flexible with ferrule		mm²	2 × (0.5 – 1.5)	2 × (1 – 4) 2 × (1 – 6)[3]	1 × (1…25) 2 × (1…10)[2]	1 × (4 – 70) 2 × (4 – 50)
Stranded		mm²			1 × (16…25)	1 × (16…50) 2 × (16…50)
Solid or stranded		AWG	18 – 14	14 – 8	14 – 2	2/0
Terminal screw			M3.5	M4	M6	M10
Tightening torque		Nm	1.2	1.8	3.5	10
Tools						
Pozidriv screwdriver		Size	2	2	2	–
Standard screwdriver		mm	0.8 × 5.5	1 × 6	1 × 6	
Hexagon socket-head spanner	SW	mm	–	–	–	5

Notes

[1] Ambient temperature: Operating range to IEC/EN 60947, PTB: -5°C to +55°C
[2] Main contacts terminal capacity solid and stranded conductors with ferrules: When using 2 conductors use identical cross-section
[3] 6 mm² flexible with ferrules to DIN 46228
[4] at ZB65-XEZ max 1 × (1…16)

				Z5-.../FF250	ZW7
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[1)]			°C	–25…50	–25…50
Enclosed[1)]			°C	–25…40	–25…40
Temperature compensation				Continuous	Continuous
Mounting position				→ Engineering selection data	As required
Weight				1.55	0.8
Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27			g	10	10
Protection type				IP00	IP00
Protection against direct contact when actuated from front (IEC 536)				With terminal cover	Finger- and back-of-hand proof
Main conducting paths					
Rated impulse withstand voltage		U_{imp}	V AC	8000	6000
Overvoltage category/pollution degree				III/3	III/3
Rated insulation voltage					
AC		U_i	V AC	1000	690
Rated operational voltage		U_e	V AC	1000	690
Safe isolation to VDE 0106 Part 101 and Part 101/A1					
Between auxiliary contacts and main contacts			V AC	440	440
Between main circuits			V AC	440	440
Overload release setting range			A	50…250	40…630
Temperature compensation residual error > 40°C			%/K	≦ 0.25	–
Short-circuit protection Maximum fuse				→ page 6/11	With overload relay in conjunction with a transformer as required for the contactor
Current heat loss (3 conductors)					
Lower value of the setting range			W	16	3
Maximum setting			W	28	10
Terminal capacities					
Flexible with cable lug			mm^2	95	–
Stranded with cable lug			mm^2	120	–
Solid or stranded			AWG	250 MCM	–
Flat conductor	Number of segments × width × thickness		mm	6 × 16 × 0.8[2)]	–
Busbar		Width	mm	20 × 3	–
Push-through opening			mm	–	27
Terminal screw				M8 × 25	–
Tightening torque			Nm	24	–
Tools					
Hexagon head spanner		SW	mm	13	–

Notes
1) Ambient temperature: operating range to IEC/EN 60947, PTB: -5°C to +50°C
2) Flat conductor terminal capacity: fixing with box terminal

				ZE	ZB12, ZB32	Z5-.../FF250	ZW7
Auxiliary and control circuits							
Rated impulse withstand voltage	U_{imp}	V		6000	6000	6000	6000
Overvoltage category/pollution degree				III/3	III/3	III/3	III/3
Terminal capacities							
Solid		mm²		2 × (0.75 – 2.5)	2 × (0.75…4)	2 × (0,75 – 4)	2 × (0.75 – 4)
Flexible with ferrule		mm²		2 × (0.5 – 1.5)	2 × (0.75 – 2.5)	2 × (0,75 – 2,5)	2 × (0.75 – 2.5)
Solid or stranded		AWG		2 × (18 – 12)	2 × (18 – 12)	2 × (18 – 12)	2 × (18 – 12)
Terminal screw				M3.5	M3.5	M3.5	M3.5
Tightening torque		Nm		0.8 – 1.2	0.8 – 1.2	0.8 – 1.2	0.8 – 1.2
Tools							
Pozidriv screwdriver		Size		2	2	2	2
Standard screwdriver		mm		0.8 × 5.5	1 × 6	1 × 6	1 × 6
Rated insulation voltage	U_i	V AC		690	500	500	500
Rated operational voltage	U_e	V AC		500	500	500	500
Safe isolation to VDE 0106 Part 101 and Part 101/A1							
between the auxiliary contacts		V AC		300	240	240	240
Conventional thermal current	I_{th}	A		6	6	6	6
Rated operational current							
AC–15							
Make contact							
120 V	I_e	A		1.5	1.5	1.5	1.5
240 V	I_e	A		1.5	1.5	1.5	1.5
415 V	I_e	A		0.5	0.5	0.5	0.5
500 V	I_e	A		0.3	0.5	0.5	0.5
Break contact							
120 V	I_e	A		1.5	1.5	1.5	1.5
240 V	I_e	A		1.5	1.5	1.5	1.5
415 V	I_e	A		0.7	0.9	0.9	0.9
500 V	I_e	A		0.5	0.8	0.8	0.8
DC-13 L/R – 15 ms[1)]							
24 V	I_e	A		0.9	0.9	0.9	0.9
60 V	I_e	A		0.75	0.75[3)]	0.75[3)]	0.75[3)]
110 V	I_e	A		0.4	0.4	0.4	0.4
220 V	I_e	A		0.2	0.2	0.2	0.2
Short-circuit rating without welding							
max. fuse[2)]			A gG/gL A gG/gL	4	6	6	6

Notes
[1)] Rated operational current: Making and breaking conditions to DC-13, L/R constant as stated
[2)] See overlay: "Fuses" for short-circuit rating time/current characteristic (please enquire)
[3)] Rated operational current DC-13, 60 V: N/O auxiliary contact 0.6 A

							ZEV
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[1]			°C	25…60[8]
			Enclosed[1]			°C	25…40[8]
			Storage			°C	–40…80
Temperature compensation							Continuous
Mounting position							As required
Weight						kg	0.257
Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27						g	15
Protection type							IP20
Protection against direct contact when actuated from front (IEC 536)							Finger- and back-of-hand proof
Main conducting paths							
Overload release setting range						A	1…820[7]
Temperature compensation residual error > 40°C						%/K	–
Short-circuit protection Maximum fuse[3]							With overload relay in conjunction with a transformer as required for the contactor
Tools		Pozidriv screwdriver				Size	1
		Standard screwdriver				mm	0.8 × 5.5
Auxiliary and control circuits							
Rated impulse withstand voltage					U_{imp}	V	4000
Overvoltage category/pollution degree							III/3
Terminal capacities		Solid				mm^2	1 × (0.5 – 2.5) 2 × (0.5 – 1.5)[4]
		Flexible with ferrule				mm^2	1 × (0.5 – 2.5) 2 × (0.5 – 1.5)[4]
		Solid or stranded				AWG	1 × (18 – 14)
Terminal screw							M3.5
Tightening torque						Nm	0.8
Tools		Pozidriv screwdriver				Size	1
		Standard screwdriver				mm	0.8 × 5.5
Rated insulation voltage					U_i	V AC	250
Rated operational voltage					U_e	V AC	240
Safe isolation to VDE 0106 Part 101 and Part 101/A1		between the auxiliary contacts				V AC	240[5]
Conventional thermal current					I_{th}	A	6
Rated operational current	AC–15	Make contact	120 V		I_e	A	3[6]
			240 V		I_e	A	3[6]
			415 V		I_e	A	–
			500 V		I_e	A	–
		Break contact	120 V		I_e	A	3
			240 V		I_e	A	3
			415 V		I_e	A	–
			500 V		I_e	A	–
	DC-13 L/R – 15 ms[2]		24 V		I_e	A	1
			60 V		I_e	A	–
			110 V		I_e	A	–
			220 V		I_e	A	–
Power consumption					$P_{max.}$	W	2.5
Short-circuit rating without welding		max. fuse[3]				A gG/gL	6
Voltage tolerance			AC operated			× U_c	0.85…1.1
			DC operated			× U_c	0.85…1.1
Thermistor protection							
Total resistance (cold)						Ω	1500
Response value						Ω	2720…3680
Reset range						Ω	1500…1650
Recovery time		Overload					→ page 6/15
		Thermistor tripping					5 K below response temperature
		Earth-fault protection					immediate

Notes

[1] Ambient temperature: open and enclosed operating range to IEC/EN 60947, PTB: -5°C to +50°C
[2] Rated operational current: Making and breaking conditions to DC-13, L/R constant as stated
[3] See overlay: "Fuses" for short-circuit rating time/current characteristic (please enquire)
[4] Terminal capacities auxiliary and control circuits, solid, flexible with ferrules: With connection of 2 conductors only the following combinations are permissible: 0.5 and 0.75 mm², 0.75 and 1 mm², 1 and 1.5 mm²
[5] Safe isolation: Up to 240 V depending on contact assignment between mains and outputs no potential isolation to thermistor and summation current transformer input and current sensor (neighbouring contacts: U_s = 127 V)
[6] Rated operational current AC-15: contacts 95/96 and 97/98 3 A (contactor control), contacts 05/06 and 07/08 1.5 A (auxiliary contacts)
[7] Overload relay main contact setting range: setting range dependant on current sensor
[8] Main contacts terminal capacity solid and stranded conductors with ferrules: When using 2 conductors use identical cross-section
Ambient temperature open and enclosed: limited readability of the LCD display at < -15 °C

			ZEV-XSW-25	ZEV-XSW-65	ZEV-XSW-145	ZEV-XSW-820
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[1]						
Open		°C	25…60	25…60	25…60	25…60
Enclosed		°C	25…40	25…40	25…40	25…40
Storage		°C	–40…80	–40…80	–40…80	–40…80
Temperature compensation			Continuous			
Mounting position			As required			
Weight		kg	0.23	0.4	0.45	0.14
Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27		g	15	15	15	15
Protection type			IP20	IP20	IP20	IP20
Protection against direct contact when actuated from front (IEC 536)			Finger- and back-of-hand proof			
Main conducting paths						
Rated impulse withstand voltage	U_{imp}	V AC	[2]	[2]	[2]	8000
Overvoltage category/pollution degree			[2]	[2]	[2]	III/3
Rated insulation voltage						
AC	U_i	V AC	[2]	[2]	[2]	1000
Rated operational voltage	U_e	V AC	[2]	[2]	[2]	1000
Safe isolation to VDE 0106 Part 101 and Part 101/A1						
Between busbar and sensor		V AC	–	–	–	500
Overload release setting range		A	1…25	3…65	10…145	40…820
Short-circuit protection Maximum fuse			With overload relay in conjunction with a transformer as required for the contactor			
Push-through opening		mm	6	13	21	110

Notes
[1] Operating range to IEC/EN 60947, PTB: -5°C to +50°C
[2] The main current parameters are defined by the main current wiring which is used.

			EMT6
General			
Standards			IEC/EN 60947, VDE 0660, EN 55011
Climatic proofing			Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60068-2-30
Ambient temperature			
Open		°C	–25…60
Enclosed		°C	–25…45
Storage		°C	–45…60
Mounting position			As required
Weight		kg	0.15
Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27		g	10
Protection type			IP20
Protection against direct contact when actuated from front (IEC 536)			Finger- and back-of-hand proof
Safe isolation to VDE 0106 Part 101 and Part 101/A1			
between the contacts		V AC	250
between contacts and power supply		V AC	250
Auxiliary and control circuits			
Rated impulse withstand voltage	U_{imp}	V AC	6000
Overvoltage category/pollution degree			III/3
Terminal capacities Auxiliary and control circuits			
Solid		mm^2	1 × 2.5 2 × (0.5 – 1.5)
Flexible with ferrule		mm^2	1 × 2.5 2 × (0.5 – 1.5)
Solid or stranded		AWG	20 – 14
Terminal screw			M3.5
Tightening torque		Nm	1.2
Tools			
Pozidriv screwdriver		Size	2
Standard screwdriver		mm	1 × 6
Auxiliary power circuit			
Rated insulation voltage	U_i	V	400
Rated operational current			
AC–-14			
Make contact			
415 V	I_e	A	3
Break contact			
415 V	I_e	A	3
AC–15			
Make contact			
240 V	I_e	A	3
415 V	I_e	A	1
Break contact			
240 V	I_e	A	3
415 V	I_e	A	1
Max. short-circuit protective device			
Fuse	gG/gL	A	6
Control circuit			
Rated insulation voltage	U_i	V	240
Rated operational voltage	U_e	V	240[1)]
Pick-up and drop-out values		× U_e	0.85 – 1.1
Power consumption			
AC		VA	3.5
DC		W	2
Trip at approx.		Ω	3600
Recovery at approx.		Ω	1600

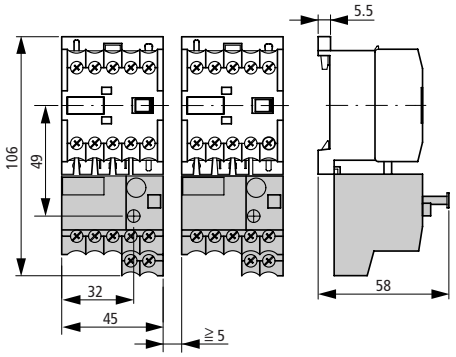
Notes

[1)] EMT6(-DB)230V: U_e = 230 V

ZE, ZB

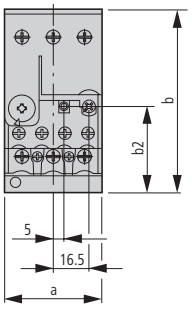
Overload relay

ZE

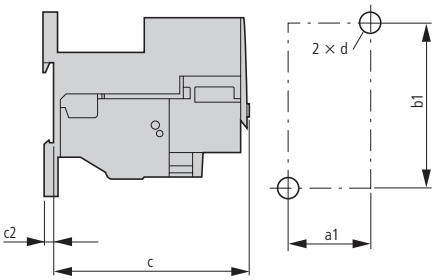


Base

ZB32-XEZ

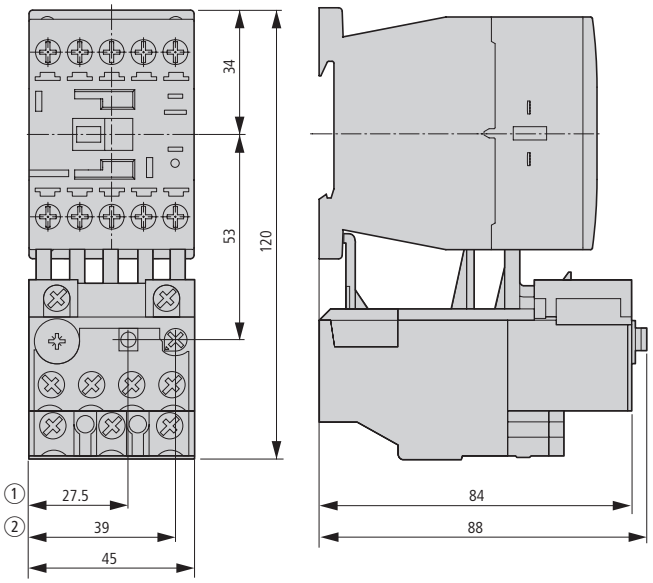


ZB65-XEZ



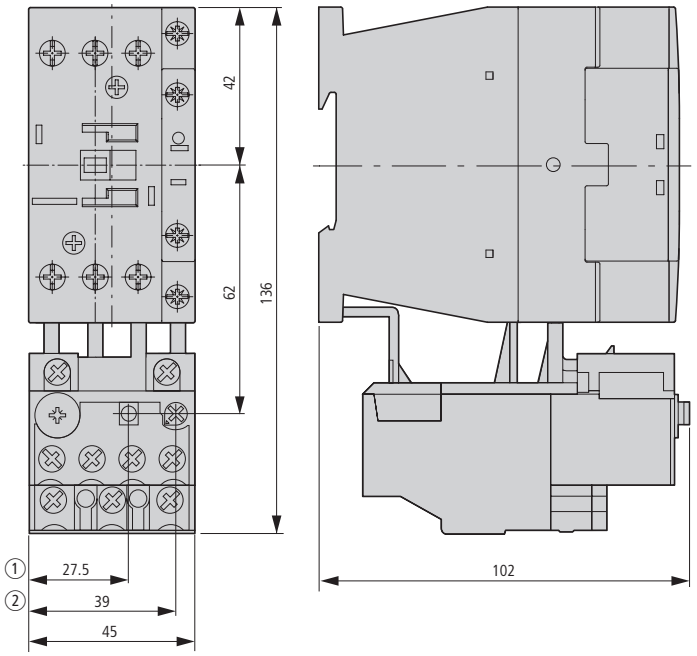
Part no.	ZB32	ZB65
a	45	60
b	85	86
c	90.5	112
c2	3.8	4.7
a1	35	50
b1	75	75
b2	40.5	47
d	M4	M5

ZB12

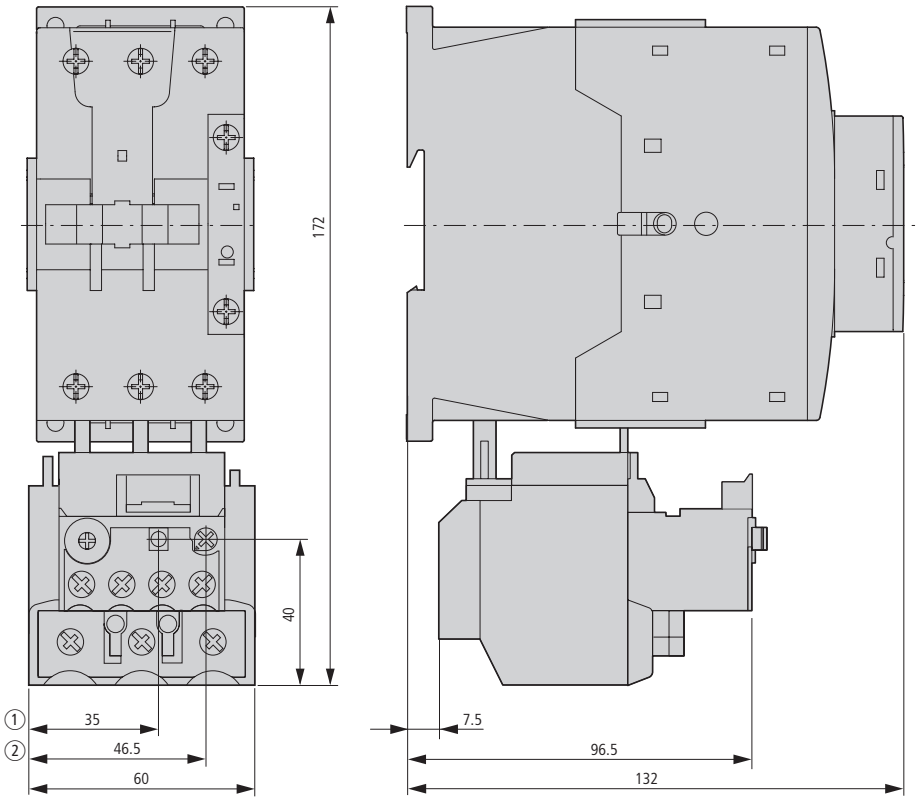


① OFF
② Reset/ON

ZB32



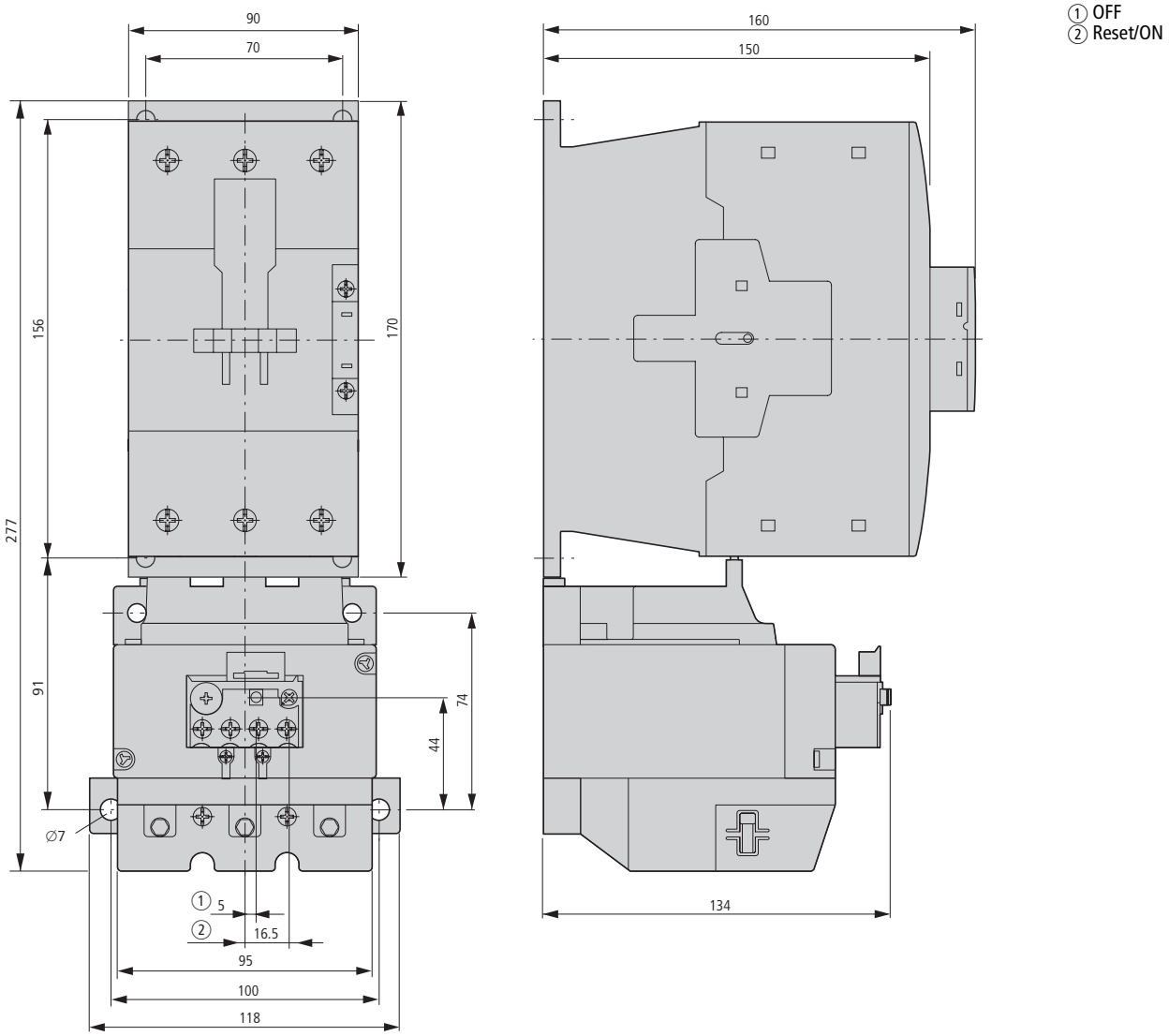
ZB65



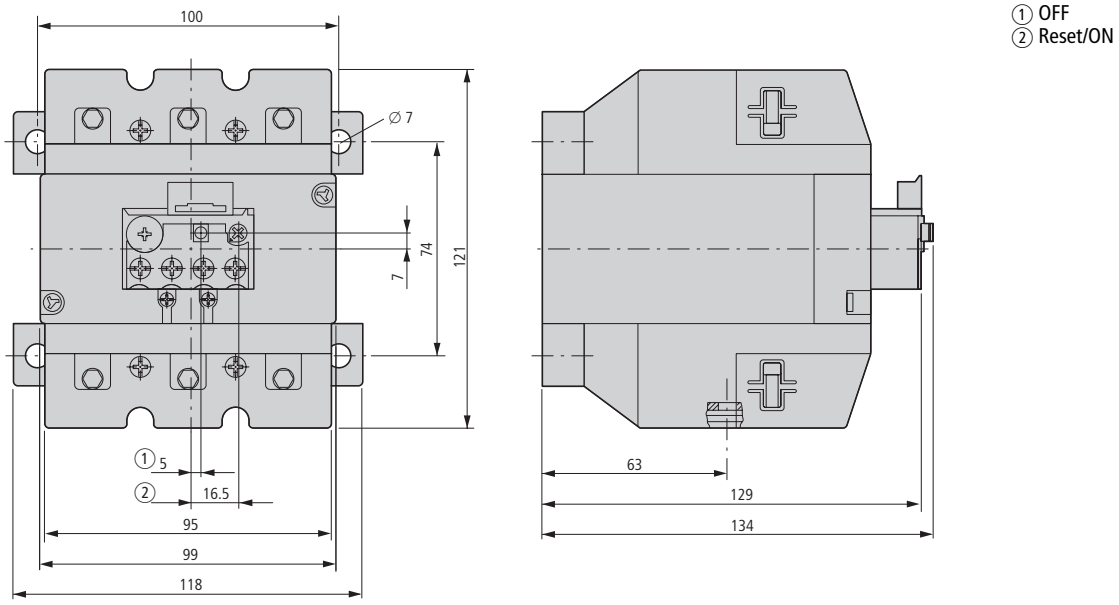
① OFF
② Reset/ON

Overload relay

ZB150

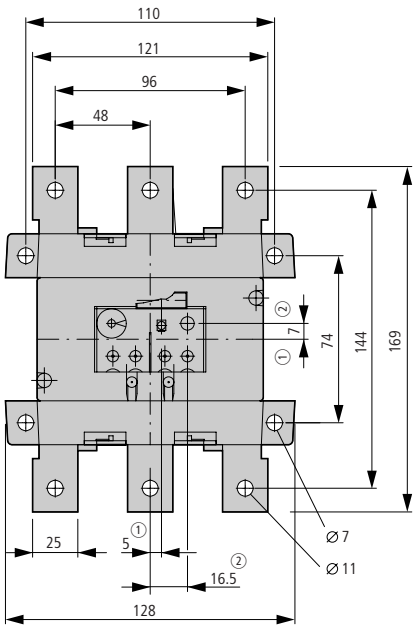


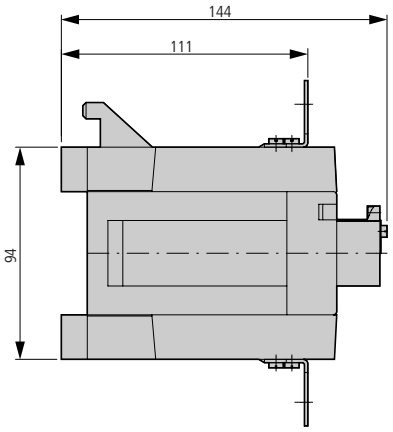
ZB150KK



Overload relay greater than 150 A

Z5-.../FF250

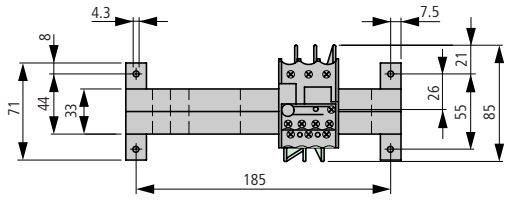


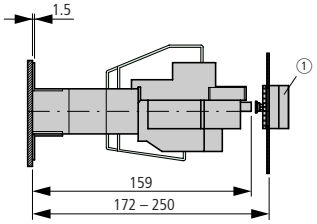


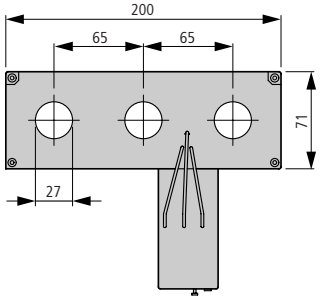
① OFF
② Reset/ON

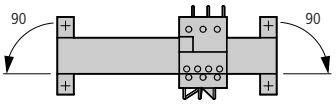
Current transformer-operated overload relay

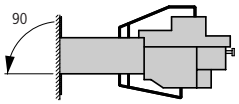
ZW7







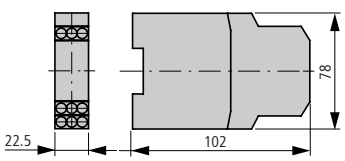




① Reset/on

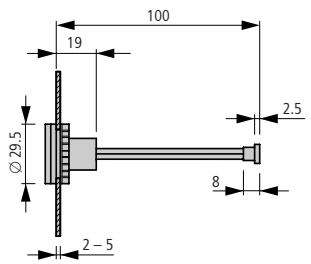
Thermistor overload relays for machine protection

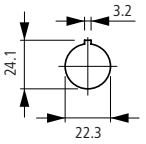
EMT6...



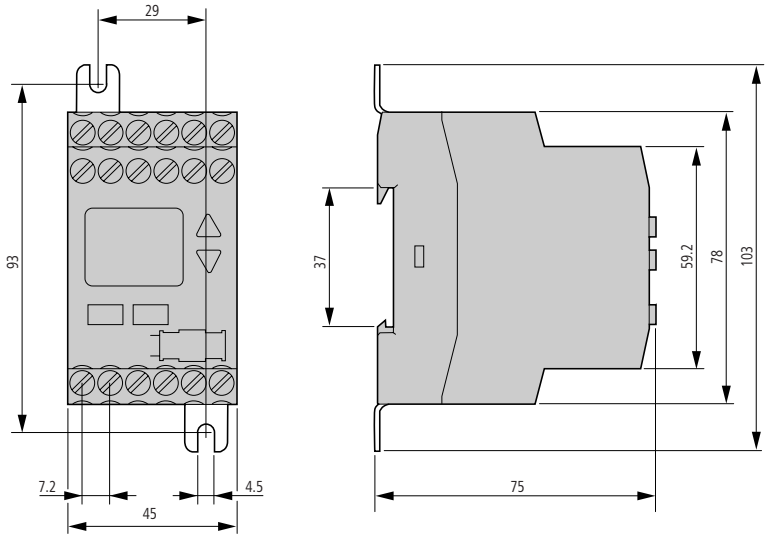
External reset button
Off button

M22-DZ-B
M22-DZ-X

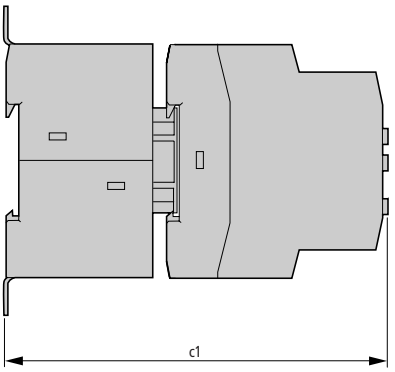




Electronic motor-protective relay
ZEV

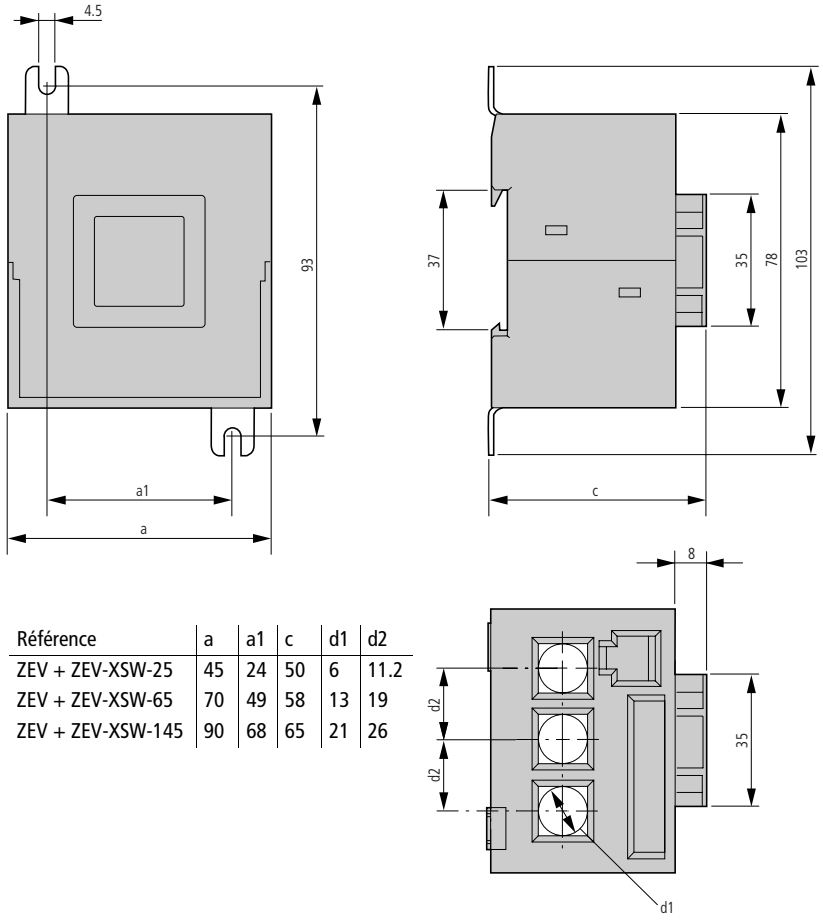


Electronic motor-protective relay
ZEV + ZEV-XSW-...



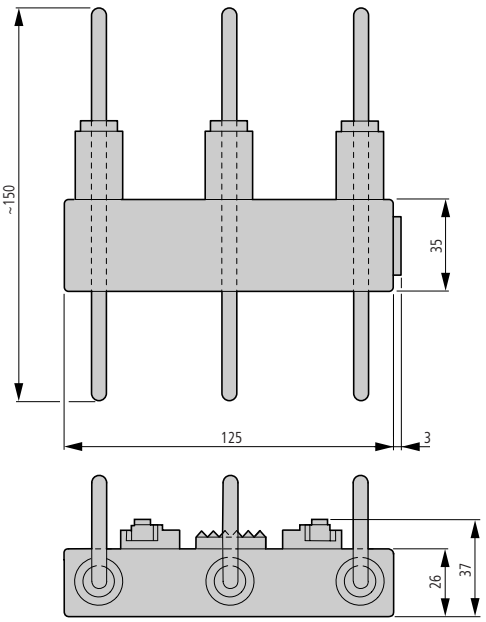
Part no.	c1
ZEV + ZEV-XSW-25	120
ZEV + ZEV-XSW-65	128
ZEV + ZEV-XSW-145	134

Current sensors
ZEV-XSW-...



Référence	a	a1	c	d1	d2
ZEV + ZEV-XSW-25	45	24	50	6	11.2
ZEV + ZEV-XSW-65	70	49	58	13	19
ZEV + ZEV-XSW-145	90	68	65	21	26

Current sensors
ZEV-XSW-820



Core-balance transformer
SSW...

Part no.	a	a1	a2	b	b1	c	d	e
SSW40-...	64	50	38	100	80	86	4.5	40
SSW65-...	75	60	43	124	100	112	4.5	65
SSW120-...	86.5	70	54.5	200	170	205	4.5	120