



## OptiMat D Molded case circuit breakers for currents from 40 to 1600 A

OptiMat D range of molded case circuit breakers and disconnecter switches is modern generation of three-pole circuit breakers of fixed, plug-in and withdrawable design equipped with thermomagnetic regulated and electronic microprocessor trip units aimed at protecting electric circuits from overload and short circuits, including one-phase short circuits.

Circuit breakers approved by the Russian Maritime Register of Shipping (hereinafter RMRS) and the Russian Classification Society (hereinafter RCS) are designed to protect electrical equipment on ships and port infrastructure. Circuit breakers approved by the NPP are designed to protect nuclear power stations.



### ► Designation

For circuit breakers with microprocessor trip unit

### OptiMat D 1600 N - D - MR2 - U3 - AES

	1	2	3	4	5	6	7	8
1	Series							
2	Configuration							
3	Frame size / Rated current I <sub>n</sub> , A							
4	Limiting breaking capacity, kA							
5	Circuit breaker design version							
6	Type of microprocessor trip unit							
7	Designation of climatic and placement category							
8	Approval designation							

<sup>1)</sup> MR1 — protection of electric circuits from overload and short circuits with regulated time delay in the overload zone and regulated short-term time delay in short circuit zone, with programmable thermal memory.

<sup>2)</sup> MR1.1 — protection of electrical circuits from overload and short circuits with fixed time delay in the overload zone and adjustable short-term time delay in short circuit zone, with preset thermal memory function.

<sup>3)</sup> MR2.1 — protection of electric circuits from overload and short circuits (including one-phase short circuits) with regulated time delay in the overload zone and regulated short-term time delay in short circuit zone, with programmable thermal memory.

<sup>4)</sup> MR2 — protection of electric circuits from overload and short circuits (including one-phase short circuits) with regulated time delay in the overload zone and regulated short-term time delay in short circuit zone, with programmable thermal memory and programmable parameters indication.

<sup>5)</sup> Withdrawable design version OptiMat D800-1600 is supplied complete with a fixed part.

Basic configuration of OptiMat D circuit breaker includes inter-pole partitions (4 pcs).

Codes indicated in the tables can be amended. If you did not find the necessary codes on the website, please call KEAZ customer service.

For circuit breakers with thermomagnetic regulated releases

OptiMat D 250 N - TM 250 - UHL3 - AES

1	Series	OptiMat					
2	Configuration	D — molded case circuit breakers					
3	Circuit breaker size designation	250 — with 16 to 250 A releases			630 — with 320 to 630 A releases		
4	Limiting breaking capacity, kA	L — 25 N — 40 F — 50			N — 40 F — 50 H — 65		
5	Release designation	TM — thermomagnetic adjustable release for protecting electrical circuits from overloads and short circuits					
6	Release rated currents	016, 020, 025, 032, 040, 050, 063, 080, 100, 125 — with operating current $I_n$ , regulated setpoints from overload currents and fixed protection setpoints for short circuit currents 160, 200, 250 — with regulated setpoints from overload currents and SC currents			320, 400, 500, 630 — with regulated setpoints from overload currents and SC currents		
7	Designation of climatic and placement category	UHL3					
8	Approval designation	REC — for circuit breakers with RMRS and RCS		AES — for nuclear power plants		when absent — QCD approval	

Basic configuration of OptiMat D circuit breaker includes inter-pole partitions (4 pcs).

For class X (ABP-X) circuit breaker-disconnector

OptiMat D 250 - NA - UHL3 - AES

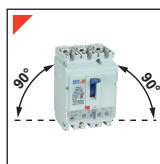
1	Series	OptiMat			
2	Configuration	D — molded case circuit breakers			
3	Frame size / Rated current $I_n$ , A	100	160	250	400 630
4	ABS class designation	NA — Class X: with built in unregulated instantaneous short circuit release for self protection			
5	Designation of climatic and placement category	UHL3			
6	Approval designation	REG — for circuit breakers with RMRS and RCS		AES — for nuclear power plants	when absent — QCD approval

Basic configuration of OptiMat D circuit breaker includes inter-pole partitions (4 pcs).

## ► Series advantages



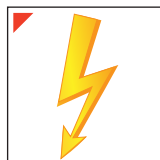
Intellectual microprocessor trip units provide all required types of protection with high measurement accuracy of network parameters.



Mounting vertically or turning right/left by 90° for fixed, plug-in and withdrawable versions.



OptiMat E circuit breakers can be operated at -40...+70 °C (for microprocessor trip unit) and -60...+70 °C (for thermomagnetic releases)



Efficient current limitation significantly reduces the impact of short circuit current both on grid elements and the device itself.



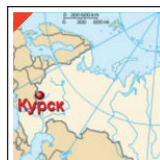
Resistant to switching overvoltages and radiofrequency interference.



5 years warranty. Each unit undergoes multistage quality control from assembling to the finished goods warehouse.



Main contact «double break» system guarantees instantaneous short circuit current breaking and significantly decreases main contact wear, which results in longer service life of the circuit breaker.






The location in the central part of Russia and fully domestic production facilities allow us to fulfill equipment delivery in the shortest possible time.



## ► Technical specification


Type of release			Thermomagnetic adjustable					Microprocessor												
Sizes of circuit breakers			OptiMat D250		OptiMat D630			OptiMat D100		OptiMat D160		OptiMat D250		OptiMat D400		OptiMat D630				
Main characteristics																				
Rated operating voltage Ue, V			690					690												
Rated insulation voltage Ui, V			800					800												
Rated impulse withstand voltage Uimp, kV			8					8												
Application category			A					A					A (MR1), B (MR1.1), (MR2) и (MR2.1)							
Suitability for disconnection			yes					yes												
Number of poles			3					3												
Control																				
Manual	control lever		+					+					+							
	rotary remote handle		+					+					+							
Electrical	motor drive		+					+					+							
Versions and connection types																				
Fixed	front mounting		+					+					+							
	rear mounting		+					+					+							
Plug-in	front, rear mounting, orientable		+					+					+							
Withdrawable	front, rear mounting, orientable		+					+					+							
Rated and limiting parameters of the main circuit of circuit breakers																				
Rated current In, A			16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250				320, 400, 500, 630			100		160		250		400		630		
Rated frequency, Hz			50					50												
Levels of breaking capacity			L	N	F	N	F	H	N	H	N	H	N	H	N	H	N	H		
Rated limiting short-circuit breaking capacity (Icu), kA	Ue 400 V		25	40	50	40	50	65	40	65	40	65	40	65	40	65	40	65		
	Ue 690 V		8	8	10	8	10	10	8	10	8	10	8	10	8	10	8	10		
Rated operating maximum capacity Ics, % from Icu			100					100												
Rated short circuit making capacity Icm, kA	Ue 400 V		53	84	105	84	105	143	84	143	84	143	84	143	84	143	84	143		
	Ue 690 V		13,6	13,6	17	13,6	17	17	13,6	17	13,6	17	13,6	17	13,6	17	13,6	17		
Rated short-time withstand current Icw, kA	0,5 sec		-			-			3			7,5			7,5					
	1 sec		-					-					-							
General wear resistance, cycles			16000			10000			16000		16000			10000						
Switching wear resistance, cycles		Ue 400 V	6300			2500			10000		6300			2500						
Protection releases																				
Thermomagnetic release/microprocessor trip unit			TM					MR1					MR1		MR1.1		MR2		MR2.1	
Overload protection	with regulated current setpoint		+					+					+		+		+		+	
	with fixed time setpoint		-					-					-		+		-		-	
	with regulated time setpoint		-					+					-		-		+		+	
Short-circuit protection	with regulated setpoint		+ (In=160, 200, 250 A)					+					+		+		+		+	
	with time delay		-					+					-		+		+		+	
	fixed, instant action		+ (In=16, 20, 25, 32, 40, 50, 63, 80, 100, 125 A)					+					+		+		+		+	
Single-phase short circuit protection			-					-					-		-		+		+	
Indication of measured current			-					-					+		-		+		-	
Supplementary devices for control, signaling and safety																				
Auxiliary contacts	auxiliary contacts (AC)		+					+												
	signal contacts SK1 and SK2		+					+												
Voltage releases and motor drive	shunt trip		+					+												
	undervoltage release		+					+												
	motor drive		+					+												
Accessories for connection and safety	terminal cover		+					+												
	pole extenders		+					+												
	inter-pole partitions		included					included												
Overall dimensions and weight																				
Overall dimensions W×H×D, mm			105 × 162,5 × 88			140 × 256 × 111			105 × 162,5 × 88					140 × 256 × 111						
Weight, kg			1,7			5,5			2,2					6,2						

Type of release			Microprocessor								Circuit breaker				
Sizes of circuit breakers			OptiMat D800		OptiMat D1000		OptiMat D1250		OptiMat D1600		OptiMat D250-NA		OptiMat D630-NA		
Main characteristics															
Rated operating voltage Ue, V			690								690				
Rated insulation voltage Ui, V			800								800				
Rated impulse withstand voltage Uimp, kV			8								8				
Application category			B								A				
Suitability for disconnection			yes								yes				
Number of poles			3								3				
Control															
Manual	control lever		+								+				
	rotary remote handle		-								+				
Electrical	motor drive		+								+				
Versions and connection types															
Fixed	front mounting		+								+				
	rear mounting		+								+				
Plug-in	front, rear mounting, orientable		-								+				
Withdrawable	front, rear mounting, orientable		+								+				
Rated and limiting parameters of the main circuit of circuit breakers															
Rated current In, A			800		1000		1250		1600		100, 160, 250		400, 630		
Rated frequency, Hz			50								50				
Levels of breaking capacity			N	H	N	H	N	H	N	H	F		H		
Rated limiting breaking capacity Icu, kA	Ue 400 V		50	85	50	85	50	85	50	85	50		65		
	Ue 690 V		20	30	20	30	20	30	20	30	10		10		
Rated operating capacity Ics, % from Icu			100								-				
Rated short circuit making capacity Icm, kA	Ue 400 V		105	187	105	187	105	187	105	187	105		143		
	Ue 690 V		40	63	40	63	40	63	40	63	17		17		
Rated short-time withstand current Icw, kA	0.5 sec.		-								4		11,3		
	1 sec.		19,2								-		-		
General wear resistance, cycles			10000								16000		10000		
Switching wear resistance, cycles	Ue 400 V		2000		2000		1000		1000		6300		2500		
Protection releases															
Thermomagnetic release/microprocessor trip unit			MR2								-				
Overload protection	with regulated current setpoint		+								-				
	with fixed time setpoint		-								-				
	with regulated time setpoint		+								-				
Short-circuit protection	with regulated setpoint		+								-				
	with time delay		+								-				
	fixed, instant action		+								-				
Single-phase short circuit protection			+								-				
Indication of measured current			+								-				
Supplementary devices for control, signaling and safety															
Auxiliary contacts	auxiliary contacts (AC)		+								+				
	signal contacts SK1 and SK2		+								+				
Voltage releases and motor drive	shunt trip		+								+				
	undervoltage release		developed								+				
	motor drive		+								+				
Accessories for connection and safety	terminal cover		+								+				
	pole extenders		+								+				
	inter-pole partitions		included								included				
Overall dimensions and weight															
Overall dimensions W*H*D, mm			210 x 378 x 140								105 x 162,5 x 88		140 x 256 x 111		
Weight, kg			17								1,7		5,5		


## ► Items


Appearance	Rated current, A	Product name	Code	Product name	Code	Product name	Code
Design with thermomagnetic regulated release							
Rated limiting breaking capacity		Icu=25 kA at 400 V AC		Icu = 40 kA at 400 V AC		Icu = 50 kA at 400 V AC	
	16	OptiMat D250L-TM016-UHL3	291409	OptiMat D250N-TM016-UHL3	291422	OptiMat D250F-TM016-UHL3	291435
	20	OptiMat D250L-TM020-UHL3	291410	OptiMat D250N-TM020-UHL3	291423	OptiMat D250F-TM020-UHL3	291436
	25	OptiMat D250L-TM025-UHL3	291411	OptiMat D250N-TM025-UHL3	291424	OptiMat D250F-TM025-UHL3	291437
	32	OptiMat D250L-TM032-UHL3	291412	OptiMat D250N-TM032-UHL3	291425	OptiMat D250F-TM032-UHL3	291438
	40	OptiMat D250L-TM040-UHL3	291413	OptiMat D250N-TM040-UHL3	291426	OptiMat D250F-TM040-UHL3	291439
	50	OptiMat D250L-TM050-UHL3	291414	OptiMat D250N-TM050-UHL3	291427	OptiMat D250F-TM050-UHL3	291440
	63	OptiMat D250L-TM063-UHL3	291415	OptiMat D250N-TM063-UHL3	291428	OptiMat D250F-TM063-UHL3	291441
	80	OptiMat D250L-TM080-UHL3	291416	OptiMat D250N-TM080-UHL3	291429	OptiMat D250F-TM080-UHL3	291442
	100	OptiMat D250L-TM100-UHL3	291417	OptiMat D250N-TM100-UHL3	291430	OptiMat D250F-TM100-UHL3	291443
	125	OptiMat D250L-TM125-UHL3	291418	OptiMat D250N-TM125-UHL3	291431	OptiMat D250F-TM125-UHL3	291444
	160	OptiMat D250L-TM160-UHL3	291419	OptiMat D250N-TM160-UHL3	291432	OptiMat D250F-TM160-UHL3	291445
	200	OptiMat D250L-TM200-UHL3	291420	OptiMat D250N-TM200-UHL3	291433	OptiMat D250F-TM200-UHL3	291446
	250	OptiMat D250L-TM250-UHL3	291421	OptiMat D250N-TM250-UHL3	291434	OptiMat D250F-TM250-UHL3	291447
	320	OptiMat D630N-TM320-UHL3	291465	OptiMat D630F-TM320-UHL3	291469	OptiMat D630H-TM320-UHL3	291473
	400	OptiMat D630N-TM400-UHL3	291466	OptiMat D630F-TM400-UHL3	291470	OptiMat D630H-TM400-UHL3	291474
	500	OptiMat D630N-TM500-UHL3	291467	OptiMat D630F-TM500-UHL3	291471	OptiMat D630H-TM500-UHL3	291475
	630	OptiMat D630N-TM630-UHL3	291468	OptiMat D630F-TM630-UHL3	291472	OptiMat D630H-TM630-UHL3	291476


Appearance	Rated current, A	Product name	Code	Product name	Code
Design with microprocessor trip unit MR1					
Rated limiting breaking capacity		Icu=40 kA at 400 V AC		Icu=65 kA at 400 V AC	
	100	OptiMat D100N-MR1-U3	144412	OptiMat D100H-MR1-U3	144414
	160	OptiMat D160N-MR1-U3	285502	OptiMat D160H-MR1-U3	285503
	250	OptiMat D250N-MR1-U3	137335	OptiMat D250H-MR1-U3	144411
	400	OptiMat D400N-MR1-U3	279892	OptiMat D400H-MR1-U3	279891
	630	OptiMat D630N-MR1-U3	279890	OptiMat D630H-MR1-U3	279889


Appearance	Rated current, A	Product name	Code	Product name	Code
Design with microprocessor trip unit MR1.1					
Rated limiting breaking capacity		Icu = 40 kA at 400 V AC		Icu = 65 kA at 400 V AC	
	400	OptiMat D400N-MR1.1-U3	321646	OptiMat D400H-MR1.1-U3	321648
	630	OptiMat D630N-MR1.1-U3	321650	OptiMat D630H-MR1.1-U3	321654


Appearance	Rated current, A	Product name	Code	Product name	Code
<b>Design with microprocessor trip unit MR2</b>					
Rated limiting breaking capacity		<b>Icu=40 kA at 400 V AC</b>		<b>Icu=65 kA at 400 V AC</b>	
	400	OptiMat D400N-MR2-U3	249225	OptiMat D400H-MR2-U3	249226
	630	OptiMat D630N-MR2-U3	144413	OptiMat D630H-MR2-U3	144415
Rated limiting breaking capacity		<b>Icu=50 kA at 400 V AC</b>		<b>Icu=85 kA at 400 V AC</b>	
	800	OptiMat D800N-MR2-U3	307837	OptiMat D800H-MR2-U3	307836
	1000	OptiMat D1000N-MR2-U3	270314	OptiMat D1000H-MR2-U3	270315
	1250	OptiMat D1250N-MR2-U3	307838	OptiMat D1250H-MR2-U3	307839
	1600	OptiMat D1600N-MR2-U3	233946	OptiMat D1600H-MR2-U3	233947
Rated limiting breaking capacity		<b>Icu=50 kA at 400 V AC</b>		<b>Icu=85 kA at 400 V AC</b>	
	800	OptiMat D800N-D-MR2-U3	321641	OptiMat D800H-D-MR2-U3	321642
	1000	OptiMat D1000N-D-MR2-U3	294415	OptiMat D1000H-D-MR2-U3	294416
	1250	OptiMat D1250N-D-MR2-U3	321643	OptiMat D1250H-D-MR2-U3	321643
	1600	OptiMat D1600N-D-MR2-U3	293576	OptiMat D1600H-D-MR2-U3	294414


Appearance	Rated current, A	Product name	Code	Product name	Code
<b>Design with microprocessor trip unit MR2.1</b>					
Rated limiting breaking capacity		<b>Icu=40 kA at 400 V AC</b>		<b>Icu=65 kA at 400 V AC</b>	
	400	OptiMat D400N-MR2.1-U3	321658	OptiMat D400H-MR2.1-U3	321659
	630	OptiMat D630N-MR2.1-U3	321663	OptiMat D630H-MR2.1-U3	321664


Appearance	Rated current, A	Product name	Code
<b>Design types of circuit breakers-d disconnect, class X (ABP-X)</b>			
Rated limiting breaking capacity		<b>Icu = 50 kA at 400 V AC</b>	
	100	OptiMat D100-NA-UHL3	303832
	160	OptiMat D160-NA-UHL3	303831
	250	OptiMat D250-NA-UHL3	303833


Appearance	Rated current, A	Product name	Code
<b>Design types of circuit breakers-d disconnect, class X (ABP-X)</b>			
Rated limiting breaking capacity		<b>Icu = 65 kA at 400 V AC</b>	
	400	OptiMat D400-NA-UHL3	303834
	630	OptiMat D630-NA-UHL3	303835


Appearance	Rated current, A	Product name	Code	Product name	Code
<b>Design with microprocessor trip unit MR1 REQ</b>					
Rated limiting breaking capacity		<b>Icu=40 kA at 400 V AC</b>		<b>Icu=65 kA at 400 V AC</b>	
	100	OptiMat D100N-MR1-U3-REQ	244073	OptiMat D100H-MR1-U3-REQ	244072
		OptiMat D100N-MR1-OM4-REQ	255731	OptiMat D100H-MR1-OM4-REQ	255734
	160	OptiMat D160N-MR1-U3-REQ	on request	OptiMat D160H-MR1-U3-REQ	on request
		OptiMat D160N-MR1-OM4-REQ	327482	OptiMat D160H-MR1-OM4-REQ	327481
	250	OptiMat D250N-MR1-U3-REQ	244075	OptiMat D250H-MR1-U3-REQ	244074
		OptiMat D250N-MR1-OM4-REQ	255733	OptiMat D250H-MR1-OM4-REQ	255732

Appearance	Rated current, A	Product name	Code	Product name	Code
Design with microprocessor trip unit MR1 REC					
Rated limiting breaking capacity		Icu=40 kA at 400 V AC		Icu=65 kA at 400 V AC	
	400	OptiMat D400N-MR1-U3-REC	on request	OptiMat D400H-MR1-U3-REC	on request
		OptiMat D400N-MR1-OM4-REC	327474	OptiMat D400H-MR1-OM4-REC	327471
	630	OptiMat D630N-MR1-U3-REC	285388	OptiMat D630H-MR1-U3-REC	285389
		OptiMat D630N-MR1-OM4-REC	285390	OptiMat D630H-MR1-OM4-REC	285391

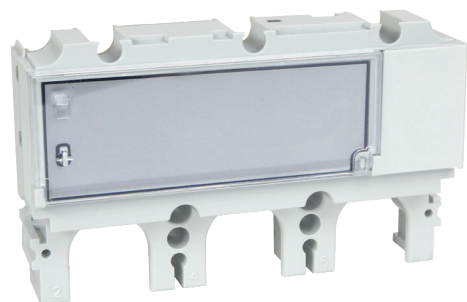
Appearance	Rated current, A	Product name	Code	Product name	Code
Design with microprocessor trip unit MR1.1 REC					
Rated limiting breaking capacity		Icu = 40 kA at 400 V AC		Icu = 65 kA at 400 V AC	
	400	OptiMat D400N-MR1.1-U3-REC	353181	OptiMat D400H-MR1.1-U3-REC	353184
		OptiMat D400N-MR1.1-OM4-REC	327473	OptiMat D400H-MR1.1-OM4-REC	327476
	630	OptiMat D630N-MR1.1-U3-REC	353186	OptiMat D630H-MR1.1-U3-REC	353188
		OptiMat D630N-MR1.1-OM4-REC	327479	OptiMat D630H-MR1.1-OM4-REC	327477

Design with microprocessor trip unit MR2 REC					
Rated limiting breaking capacity		Icu=40 kA at 400 V AC		Icu=65 kA at 400 V AC	
	400	OptiMat D400N-MR2-U3-REC	255723	OptiMat D400H-MR2-U3-REC	255724
		OptiMat D400N-MR2-OM4-REC	255725	OptiMat D400H-MR2-OM4-REC	255726
	630	OptiMat D630N-MR2-U3-REC	244090	OptiMat D630H-MR2-U3-REC	244089
		OptiMat D630N-MR2-OM4-REC	255727	OptiMat D630H-MR2-OM4-REC	255730

Rated limiting breaking capacity		Icu=50 kA at 400 V AC		Icu=85 kA at 400 V AC	
	800	OptiMat D800N-MR2-U3-REC	353195	OptiMat D800H-MR2-U3-REC	353194
		OptiMat D800N-MR2-OM4-REC	on request	OptiMat D800H-MR2-OM4-REC	on request
	1000	OptiMat D1000N-MR2-U3-REC	353191	OptiMat D1000H-MR2-U3-REC	353190
		OptiMat D1000N-MR2-OM4-REC	on request	OptiMat D1000H-MR2-OM4-REC	on request
	1250	OptiMat D1250N-MR2-U3-REC	353193	OptiMat D1250H-MR2-U3-REC	353192
		OptiMat D1250N-MR2-OM4-REC	on request	OptiMat D1250H-MR2-OM4-REC	on request
	1600	OptiMat D1600N-MR2-U3-REC	244093	OptiMat D1600H-MR2-U3-REC	244092
		OptiMat D1600N-MR2-OM4-REC	on request	OptiMat D1600H-MR2-OM4-REC	on request

Design with microprocessor trip unit MR2.1 REC					
Rated limiting breaking capacity		Icu=40 kA at 400 V AC		Icu=65 kA at 400 V AC	
	400	OptiMat D400N-MR2.1-U3-REC	353182	OptiMat D400H-MR2.1-U3-REC	353185
		OptiMat D400N-MR2.1-OM4-REC	327475	OptiMat D400H-MR2.1-OM4-REC	327472
	630	OptiMat D630N-MR2.1-U3-REC	353187	OptiMat D630H-MR2.1-U3-REC	353189
		OptiMat D630N-MR2.1-OM4-REC	327480	OptiMat D630H-MR2.1-OM4-REC	327478

## ► Circuit breaker

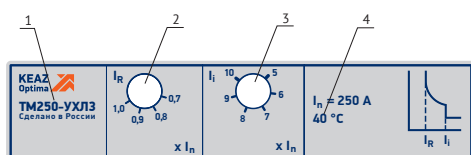


OptiMat D-NA circuit breaker-disconnectors up to 630 A are devices manufactured on the basis of the corresponding circuit breakers, while maintaining the dimensions, designs, fastening and the ability to install accessories.

OptiMat D-NA do not provide protection, but have built-in self-protection.

Circuit breaker	Self-protection current setting (Ii), A
OptiMat D100-NA	3500
OptiMat D160-NA	
OptiMat D250-NA	
OptiMat D400-NA	8800
OptiMat D630-NA	

## ► Thermomagnetic regulated releases



OptiMat D circuit breakers up to 630 A can be equipped with regulated TM releases. Thermomagnetic regulated release can adjust operating current  $I_R$  to protect from overload current. It also has a setpoint from short circuit current protection, including regulated setpoints for rated current from 160 to 630 A.

Setpoints for current and tripping time in the zones of overload and short circuit are presented in the table below:

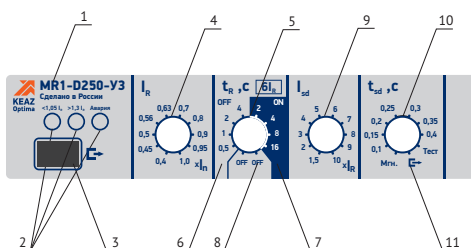
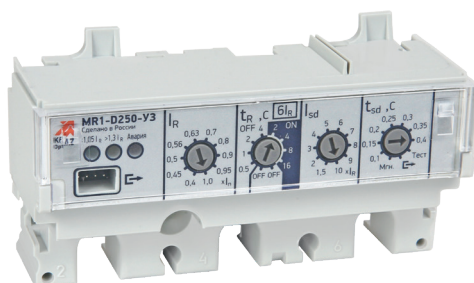
Parameter	Value			Permissible tolerance
	16 to 125 A	160 to 250 A	320 to 630 A	
Setpoint of operating current $I_R$ of the release in multiplicity to the circuit breaker rated current ( $I_R/I_n$ )	Regulated 0.7; 0.8; 0.9; 1.0			-
Time delay (s) $t_r$ $t_r$ at $1.5 \times I_n$ $t_r$ at $2 \times I_n$ $t_r$ at $6 \times I_R$	Non-regulated 120–600 60–250 5–15			-
Operating current setpoints in the short circuit zone $I_{sd}$ as a multiple of the rated current ( $I/I_n$ )	10 $\times I_n$	5; 6; 7; 8; 9; 10 $I_n$	5...10 $I_n$	$\pm 20\%$

1. Release marking.
2. Setpoint switch of release operating current ( $I_R$ ) in multiplicity to the circuit breaker rated current ( $I_n$ ).
3. Setpoint switch of trip current in short circuit zone ( $I_{sd}$ ) in multiplicity to the rated current ( $I_n$ ).
4. Release control temperature.

## ► Microprocessor trip unit

OptiMat D circuit breakers can be equipped with microprocessing releases MR1, MR1.1, MR2 and MR2.1. A microprocessor trip unit is comprised of the following parts: actuating electromagnet, measuring devices and release control block. Shunt trip adjustments allow precise setpoint maps to be built up to provide coordinated protection. The microprocessor trip unit has the following advantages over a conventional thermomagnetic release: a diverse set of protection functions and a wide range of settings, high operating accuracy, protection coordination and selectivity, as well as no temperature influence, performance indicators and reasons for deviation.

### Microprocessor trip unit MR1 (for OptiMat D100, D160 and D250)



Setpoints of current and tripping time in the overload and short circuit zones are presented in the table below:

Parameter	Value	Permissible tolerance
Setpoint of operating current $I_R$ of the release in multiplicity to the circuit breaker rated current ( $I_R/I_n$ )	0.4; 0.45; 0.5; 0.56; 0.63; 0.7; 0.8; 0.9; 0.95; 1.0	$\pm 2\%$
Tripping time setpoints at current of $6I_R$ ( $t_R$ ), s	0.5; 1; 2; 4 — without «thermal memory»; 2; 4; 8; 16 — with «thermal memory» OFF — overload protection is off	$\pm 10\%$
Trip current setpoints in the short circuit zone $I_{sd}$ as a multiple of the operating current ( $I_{sd}/I_R$ )	1.5; 2; 3; 4; 5; 6; 7; 8; 9; 10	$\pm 15\%$
Tripping time setpoints in short circuit zone ( $t_{sd}$ ), s	Inst. (without intentional time delay); 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4	$\pm 0.02$ s
Instantaneous current setpoint $I_1$ to $I_n$ (non-regulated)	12	$\pm 20\%$

1. Trip unit marking.
2. Color load and emergency indicators.
3. A slot for external release testing device at the manufacturer's facility.
4. Switch of setpoint of operating current ( $I_R$ ) in multiplicity to the circuit breaker rated current ( $I_n$ ).
5. Switch of tripping time setpoints ( $t_R$ ) at a current  $6I_R$ .
6. Zone of tripping time setpoints in overload zone without «thermal memory» (off).
7. Zone of tripping time setpoints in overload zone with «thermal memory» (on).
8. Position of circuit breaker disabling overload protection.
9. Switch of trip current setpoint in short circuit zone ( $I_{sd}$ ) in multiplicity to the operating current ( $I_R$ ).
10. Switch of tripping time setpoints in short circuit zone ( $t_{sd}$ ).
11. Position «-» of circuit breaker.
10. Position «-» is selected when the release is tested by an external device. It is designed for approval tests of the release at the manufacturer's facility.

### Testing

Health test of maximal releases is conducted with the circuit breaker in "on" state (pole contacts closed).

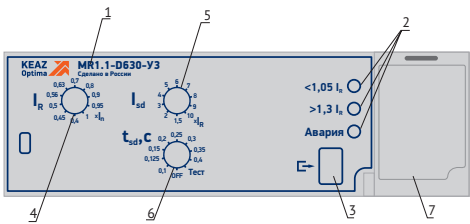
To launch a health test:

- set circuit breaker 10 into «Test» position, at that, circuit breakers 4, 5 and 9 can have any position;
- turn the circuit breaker on;
- energize with operating current  $I_R = (0.4-1.0) I_n$ .

Health test program will send a signal to circuit breaker work indicators (LEDs shall light in a sequence) and the actuating release, which should result in circuit breaker opening.

To exit the health test mode, set circuit breaker 10 in any position except for «Test» and «-».

Microprocessor trip unit MR1.1 (for OptiMat D400 and D630)

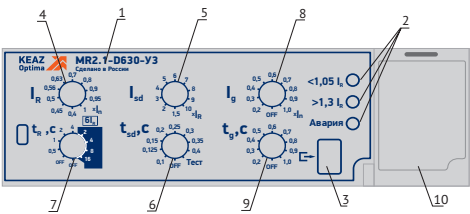


Setpoints of current and tripping time in the overload and short circuit zones are presented in the table below:

Parameter	Value	Permissible tolerance
Setpoint of operating current $I_n$ of the release in multiplicity to the circuit breaker rated current ( $I_n/I_n$ )	0,4; 0,45; 0,5; 0,56; 0,63; 0,7; 0,8; 0,9; 0,95; 1,0	±2 %
Tripping time setpoints at current of $6I_n$ ( $t_{6I_n}$ ), s	12 — with «thermal memory»	±10 %
Trip current setpoints in the short circuit zone $I_{sd}$ as a multiple of the operating current ( $I_{sd}/I_n$ )	1,5; 2; 3; 4; 5; 6; 7; 8; 9; 10	±15 %
Tripping time setpoints in short circuit zone ( $t_{sd}$ ), s	Off (without intentional time delay); 0,1; 0,125; 0,15; 0,2; 0,25; 0,3; 0,35; 0,4	±0,02 s
Instantaneous current setpoint $I_l$ (non-regulated), A	5000 (OptiMat D400); 7000 (OptiMat D630)	±20 %

- 1. Trip unit marking.
- 2. Color load and emergency indicators.
- 3. External power supply connector for testing the release.
- 4. Setpoint switch of release operating current ( $I_n$ ) in multiplicity to the circuit breaker rated current ( $I_n$ ).
- 5. Switch of trip current setpoints in short circuit zone ( $I_{sd}$ ) in multiplicity to the operating current ( $I_n$ ).
- 6. Switch of tripping time setpoints in short circuit zone ( $t_{sd}$ ).
- 7. Compartment for replaceable Li-ion batteries (included with release).

Microprocessor trip unit MR2.1 (for OptiMat D400 and D630)



Setpoints of current and tripping time in the overload and short circuit zones are presented in the table below:

Parameter	Value	Permissible tolerance
Setpoint of operating current $I_n$ of the release in multiplicity to the circuit breaker rated current ( $I_n/I_n$ )	0,4; 0,45; 0,5; 0,56; 0,63; 0,7; 0,8; 0,9; 0,95; 1,0	±2 %
Tripping time setpoints at current of $6I_n$ ( $t_{6I_n}$ ), s	Off (overload protection deactivated), 0,5; 1; 2; 4 — without «thermal memory»; Off (overload protection deactivated), 2; 4; 8; 16 — with «thermal memory»	±10 %
Trip current setpoints in the short circuit zone $I_{sd}$ as a multiple of the operating current ( $I_{sd}/I_n$ )	1,5; 2; 3; 4; 5; 6; 7; 8; 9; 10	±15 %
Tripping time setpoints in short circuit zone ( $t_{sd}$ ), s	Off (without intentional time delay); 0,1; 0,125; 0,15; 0,2; 0,25; 0,3; 0,35; 0,4	±0,02 s
Instantaneous trip current setpoint $I_l$ (non-regulated), A	5000 (OptiMat D400); 7000 (OptiMat D630)	±20 %
Trip current setpoints at a single phase short circuit in multiplicity to the rated current ( $I_g/I_n$ )	Off; 0,2; 0,3; 0,4; 0,5; 0,6; 0,7; 0,8; 0,9; 1,0	±10 %
Tripping time setpoints at single phase short circuit, s ( $t_g$ )	Off (without intentional time delay); 0,2; 0,3; 0,4; 0,5; 0,6; 0,7; 0,8; 0,9; 1,0.	±0,02 s

- 1. Trip unit marking.
- 2. Color load and emergency indicators.
- 3. External power supply connector for testing the release.
- 4. Setpoint switch of release operating current ( $I_n$ ) in multiplicity to the circuit breaker rated current ( $I_n$ ).
- 5. Switch of trip current setpoints in short circuit zone ( $I_{sd}$ ) in multiplicity to the operating current ( $I_n$ ).
- 6. Switch of tripping time setpoints in short circuit zone ( $t_{sd}$ ).
- 7. Setpoint zone:
  - Zone of tripping time setpoints in overload zone without «thermal memory» (off)
  - Zone of tripping time setpoints in overload zone with «thermal memory» (on)
- 8. Trip current setpoint switch ( $I_l$ ) in case of single-phase short circuit in multiplicity to the rated current ( $I_n$ ).
- 9. Tripping time setpoint switch at single phase short circuit ( $t_g$ ).
- 10. Compartment for replaceable Li-ion batteries (included with release).

Testing for MR1.1 and MR2.1

Health test of maximal releases is conducted with the circuit breaker in «on» state (pole contacts closed).

To launch a health test:

- set switch 6 into «Test» position, at that, switches 4; 5; 7; 8; 9 can have any position;
  - connect DC power supply with voltage from 5 to 24 V, with load capacity of at least 1 A, to the miniUSB.
- Testing alternately will turn on the LEDs (item 2) and will give a trip signal to the operating release, after which the circuit breaker should open.

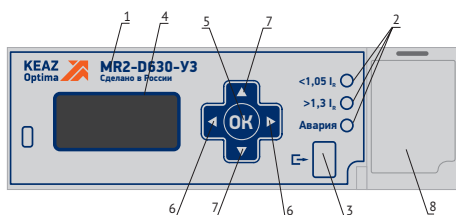
To exit the health check mode, switch 6 must be set to any of the positions except the «Test» position.

## Microprocessor trip unit MR1 (for OptiMat D400 and D630) and MR2 (for OptiMat D400, D630, D800, D1000, D1250 and D1600)



Setpoints for current and tripping time in the zones of overload and short circuit are presented in the table below:

Parameter	MR1	Value MR2	Permissible tolerance
Setpoint of operating current $I_R$ of the release, A	160 to 400 with 20 A increments (for OptiMat D400) 250 to 630 with 20 A increments (for OptiMat D630)	160–400 with 20 A increments (for In 400 A) 250–630 with 20 A increments (for In 630 A) 320–800 with 40 A increments (for In 800 A) 400–1000 with 50 A increments (for In 1000 A) 500–1250 with 50 A increments (for In 1250 A) 640–1600 with 60 A increments (for In 1600 A)	±2 %
Tripping time setpoints at current of $6I_R$ ( $t_R$ ), s	12, with «thermal memory»	0,5; 1; 2; 4 — without «thermal memory»; 2; 4; 8; 16 — with «thermal memory»	±10 %
Trip current setpoints in the short circuit zone $I_{sc}$ as a multiple of the operating current ( $I_{sc}/I_R$ )	1,5; 2; 3; 4; 5; 6; 7; 8; 9; 10	1,5; 2; 3; 4; 5; 6; 7; 8; 9; 10	±15 %
Tripping time setpoints in short circuit zone ( $t_{sc}$ ), s	off (without intentional time delay)	off (without intentional time delay); 0,1; 0,15; 0,2; 0,25; 0,3; 0,35; 0,4	±0,02 s
Instantaneous current setpoint $I_i$ (non-regulated), A	5000 for OptiMat D400 7000 for OptiMat D630	5000 for OptiMat D400 7000 for OptiMat D630 9600 for OptiMat D800 12000 for OptiMat D1000 15000 for OptiMat D1250 19200 for OptiMat D1600	±20 %
Trip current setpoints at a single phase short circuit in multiplicity to the rated current ( $I_g/I_n$ )	-	Off; 0,4; 0,6; 0,8; 1,0	±10 %
Tripping time setpoints at single phase short circuit ( $t_g$ ), s	-	0 (без преднамеренной выдержки); 0,1; 0,2; 0,3; 0,4; 0,5; 0,6; 0,7; 0,8; 0,9; 1,0	±0,02 s



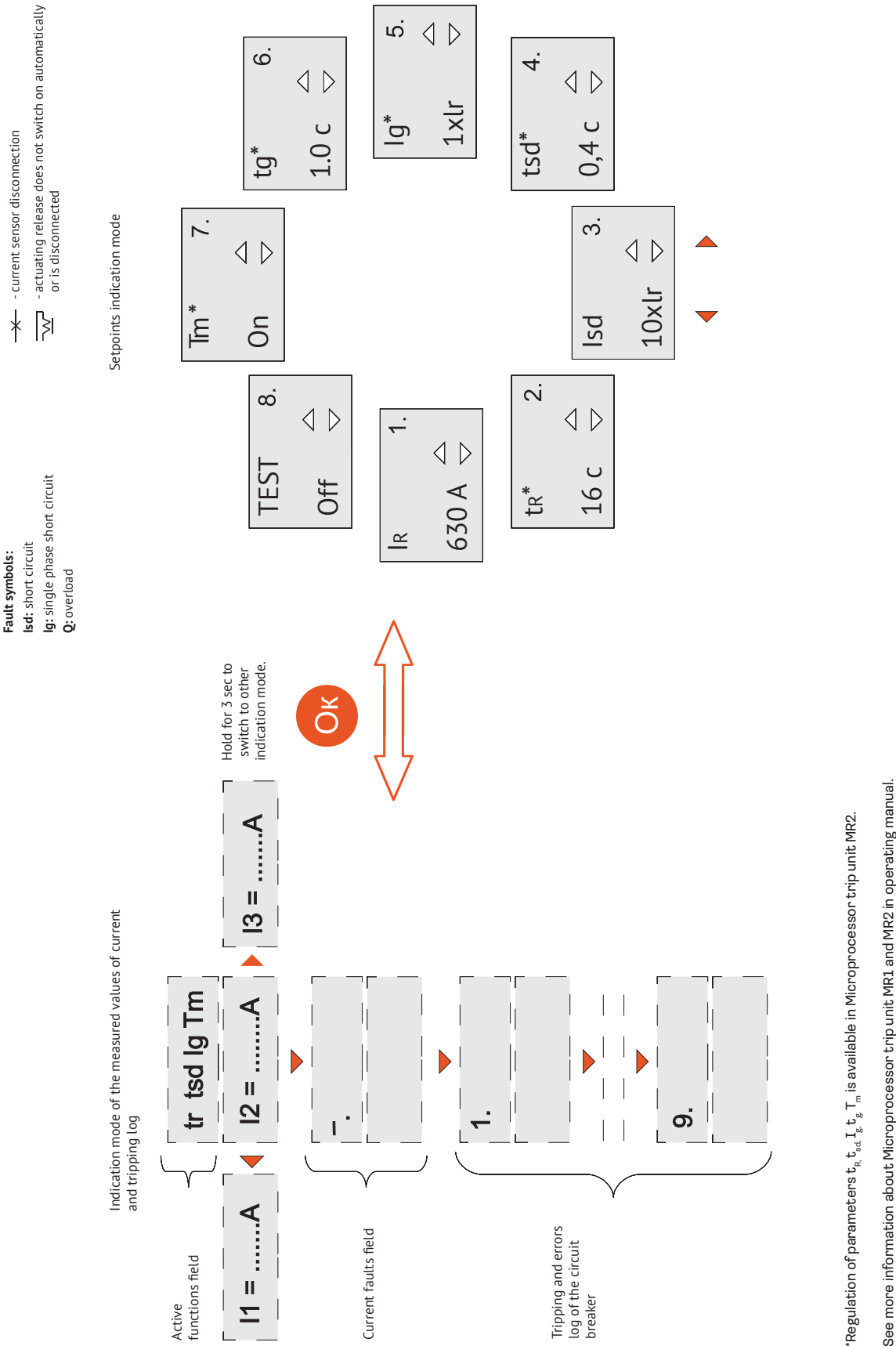
1. Designation of microprocessor trip unit.
2. Color load and emergency LED indicators.
3. MiniUSB slot is designed to connect an external DC source in the TEST mode and connecting an external release testing device at the manufacturer's facility.
4. Screen for programmable parameters.
5. OK button switches between modes, makes processor exit from sleep mode and saves the changes when exiting the menu.
6. Left/right buttons for choosing the previous/next parameter of function ( $I_R$ ,  $t_R$ ,  $I_{sc}$ ,  $t_{sc}$ ,  $I_g$ ,  $t_g$ , Tm, TEST).
7. Up/down buttons for increasing/decreasing the value of the set parameter and viewing the tripping and errors log.
8. Compartment for replaceable Li-ion batteries (included with release).

### Testing

Trip units are health-tested only with the circuit breaker de-energized. Handle shall be up, which is a circuit breaker active position (pole contacts closed). Current must not flow through the poles of the circuit breaker during testing! A DC source with a voltage of 5 to 24 V with a load capacity of 1 A must be connected to the miniUSB connector

To start testing, go to the setpoint menu on the «TEST» tab, use the «▼», «▲», keys, select the «On» value and exit the menu by pressing and holding the «OK» key for 3 s. The test will start. After checking the current transducers, health test program will send a signal to the actuating release. «OK» key needs to be pressed if the circuit breaker is off. If the circuit breaker is off, press «OK». The program will automatically exit the «TEST» mode. If a red LED is on, the circuit breaker is faulty. The type of fault can be viewed in the tripping and errors log.

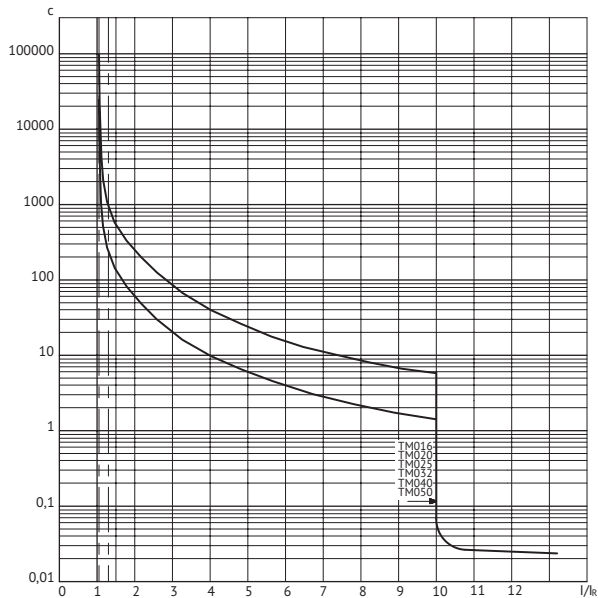
► Menu of microprocessor trip units MR1 (for OptiMat D400 and D630) and MR2 (for OptiMat D400, D630, D800, D1000, D1250 and D1600)



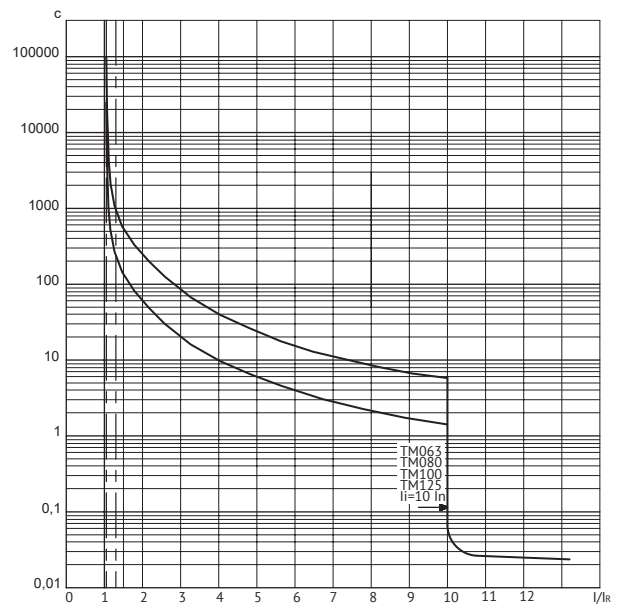
\*Regulation of parameters  $t_R$ ,  $t_{sd}$ ,  $I_g$ ,  $t_g$ ,  $T_m$  is available in Microprocessor trip unit MR2.  
See more information about Microprocessor trip unit MR1 and MR2 in operating manual.

## ► Current and time characteristics

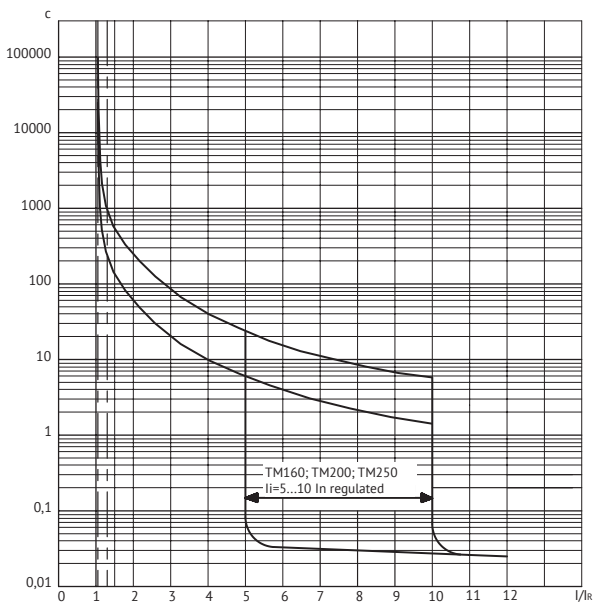
OptiMat D250 D250 with thermomagnetic regulated release TM016, TM020, TM025, TM032, TM040, TM050



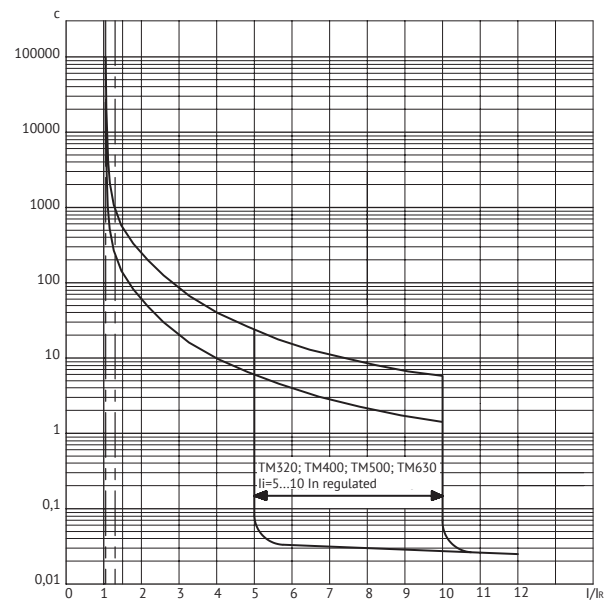
OptiMat D250 D250 with thermomagnetic regulated release TM063, TM080, TM100, TM125



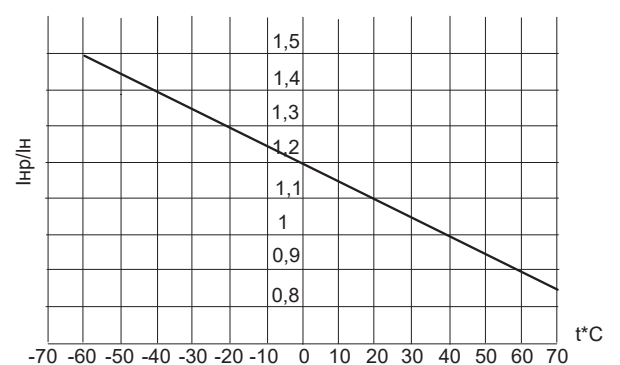
OptiMat D250 D250 with thermomagnetic regulated release TM160, TM200; TM250



OptiMat D630 D250 with thermomagnetic regulated release TM320, TM400, TM500, TM630

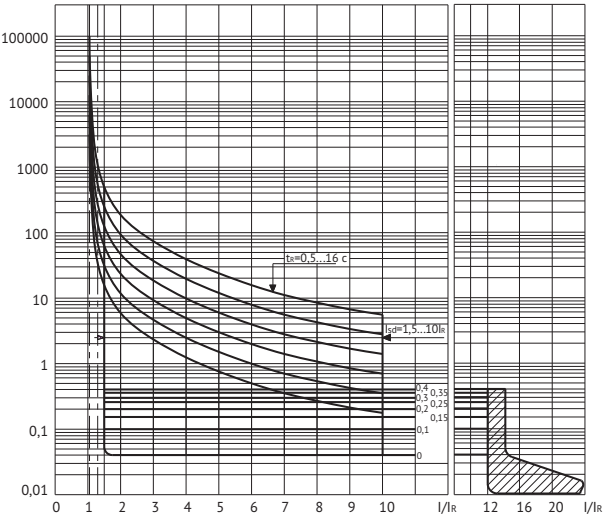


Rated operating currents of OptiMat D250 and D630 circuit breakers with thermomagnetic protection releases vs. ambient temperature

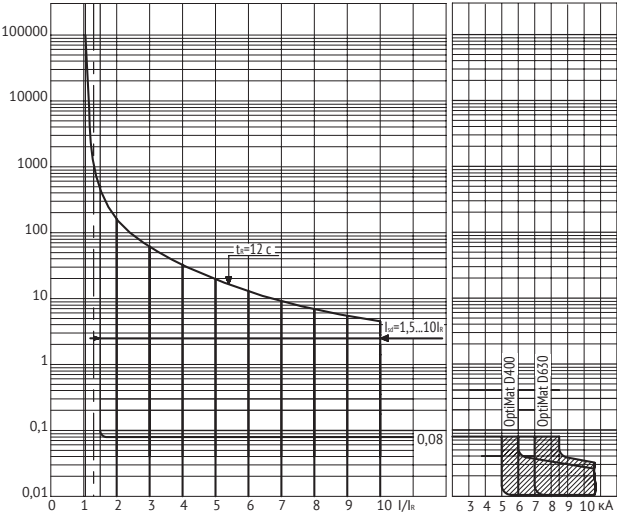


► Time-current characteristics in the overload zone and in short-circuit zone

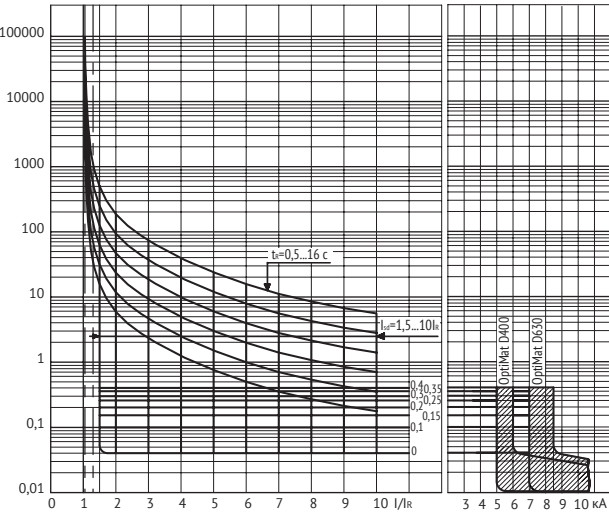
OptiMat D100, D160 and D250 with microprocessor trip unit MR1



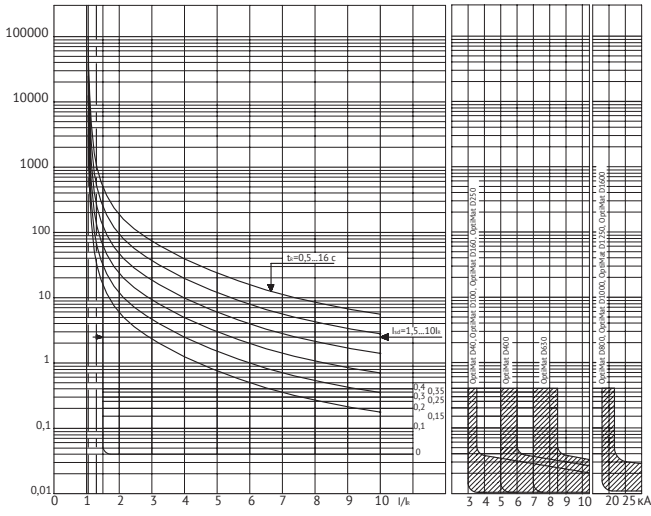
OptiMat D400 and D630 with microprocessor trip unit MR1 and MR1.1



OptiMat D400 and D630 with microprocessor trip unit MR2 and MR2.1



OptiMat D800, D1000, D1250 and D1600 with microprocessor trip unit MR2



Overload protection response time  $t_R$  vs. current:

Time at $6I_R$ , c	0.5	1	2	4	2	4	8	12*	16
Load	without thermal memory, s				with thermal memory, s				
$1.3I_R$	16.7...20.4	33.3...40.7	66.6...81.4	133.1...162.7	70.7...86.4	151...184	354...433	666...814	1375...1680
$1.5I_R$	11.3...13.8	22.5...27.5	45...55	90...110	46.8...57.2	97.7...119.4	215...262	361...441	556...679
$2I_R$	5.4...6.6	10.8...13.2	21.6...26.4	43...52.7	22...26.8	45...55	93...114	146...179	204...249
$3I_R$	2.1...2.5	4.1...5.1	8.3...10.1	16.5...20.2	8.3...10.1	16.6...20.5	34...41.6	51...63	70.1...85.7
$4I_R$	1.1...1.3	2.2...2.6	4.3...5.3	8.6...10.6	4.3...5.3	8.7...10.7	17.6...21.5	26.5...32.5	35.7...43.7
$6I_R$	0.45...0.55	0.9...1.1	1.8...2.2	3.6...4.4	1.8...2.2	3.6...4.4	7.2...8.8	10.8...13.3	14.4...17.6
$8I_R$	0.27...0.33	0.45...0.55	0.9...1.1	2...2.4	1...1.2	2...2.4	4...4.8	5.9...7.2	7.9...9.7
$10I_R$	0.18...0.22	0.27...0.33	0.6...0.8	1.2...1.5	0.6...0.8	1.3...1.5	2.4...3	3.7...4.5	5...6

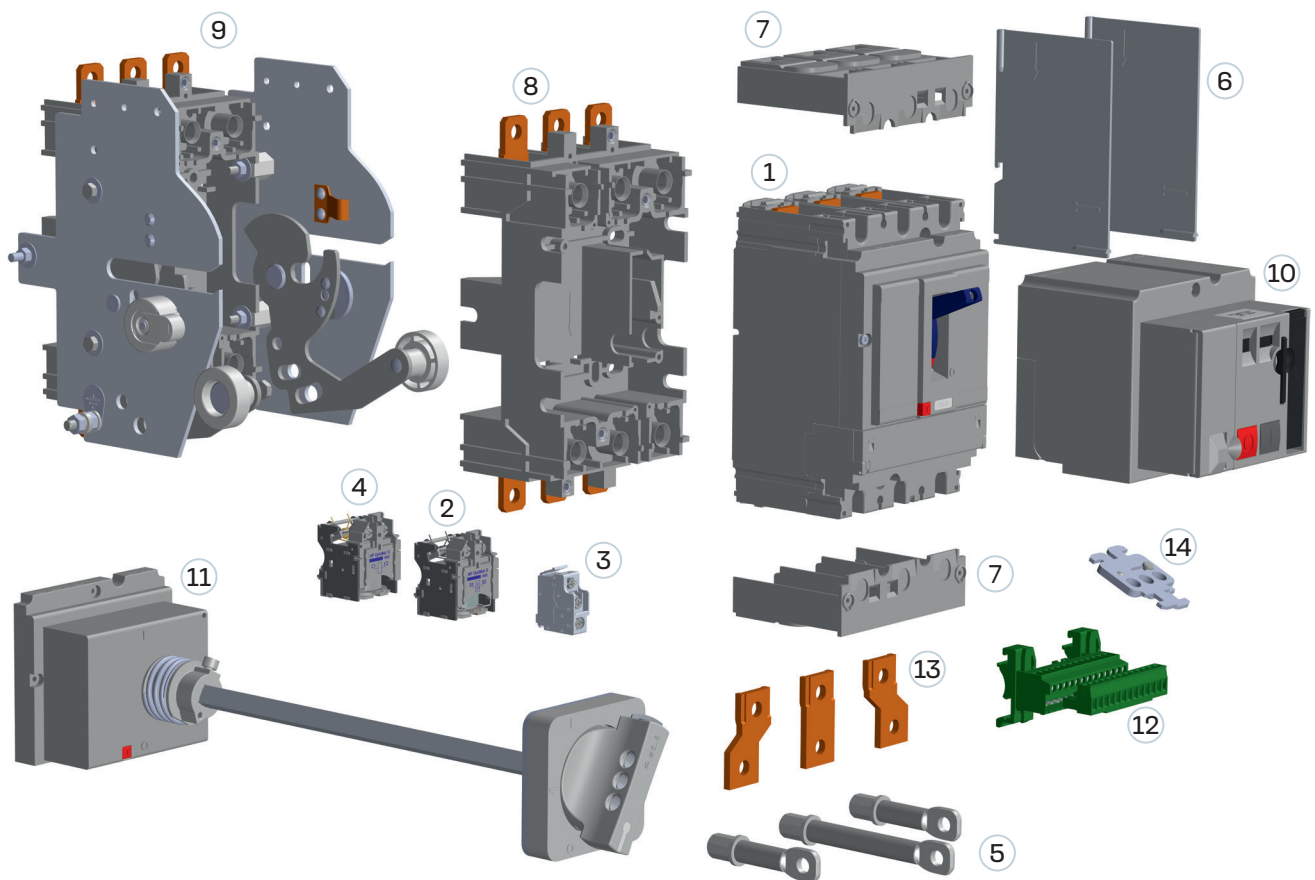
\* Only for MR1/ MR1.1 — D400/630

**Note** — For the  $t_R$  time setpoints in the thermal memory zone, the response time values are shown for the first check of the release. When subsequent release checks are conducted for 20 minutes, there can be allowable deviations from the indicated tripping times due to program adjustment of thermal memory.

## ► Configuration

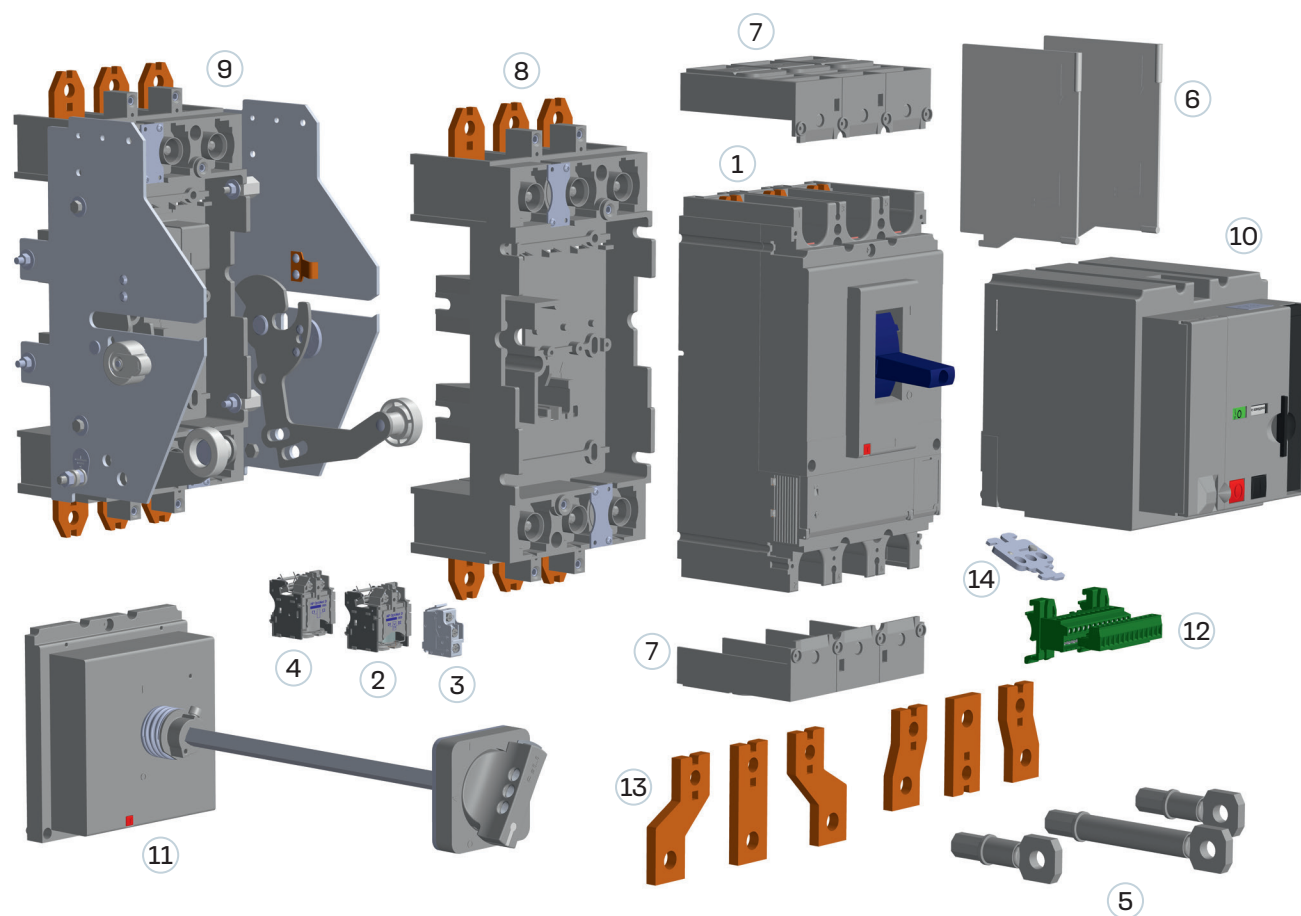
### Configuration of OptiMat D100, D160 and D250

- 1 Circuit breaker
- 2 Shunt trip
- 3 Auxiliary contacts (auxiliary and signal contacts)
- 4 Undervoltage release
- 5 Terminals for rear connection
- 6 Inter-pole partitions
- 7 Terminal cover
- 8 Plug-in connection set
- 9 Withdrawable design set
- 10 Motor drive
- 11 Remote manual drive
- 12 External secondary circuit connectors
- 13 Pole expanders
- 14 Position locking device (off)



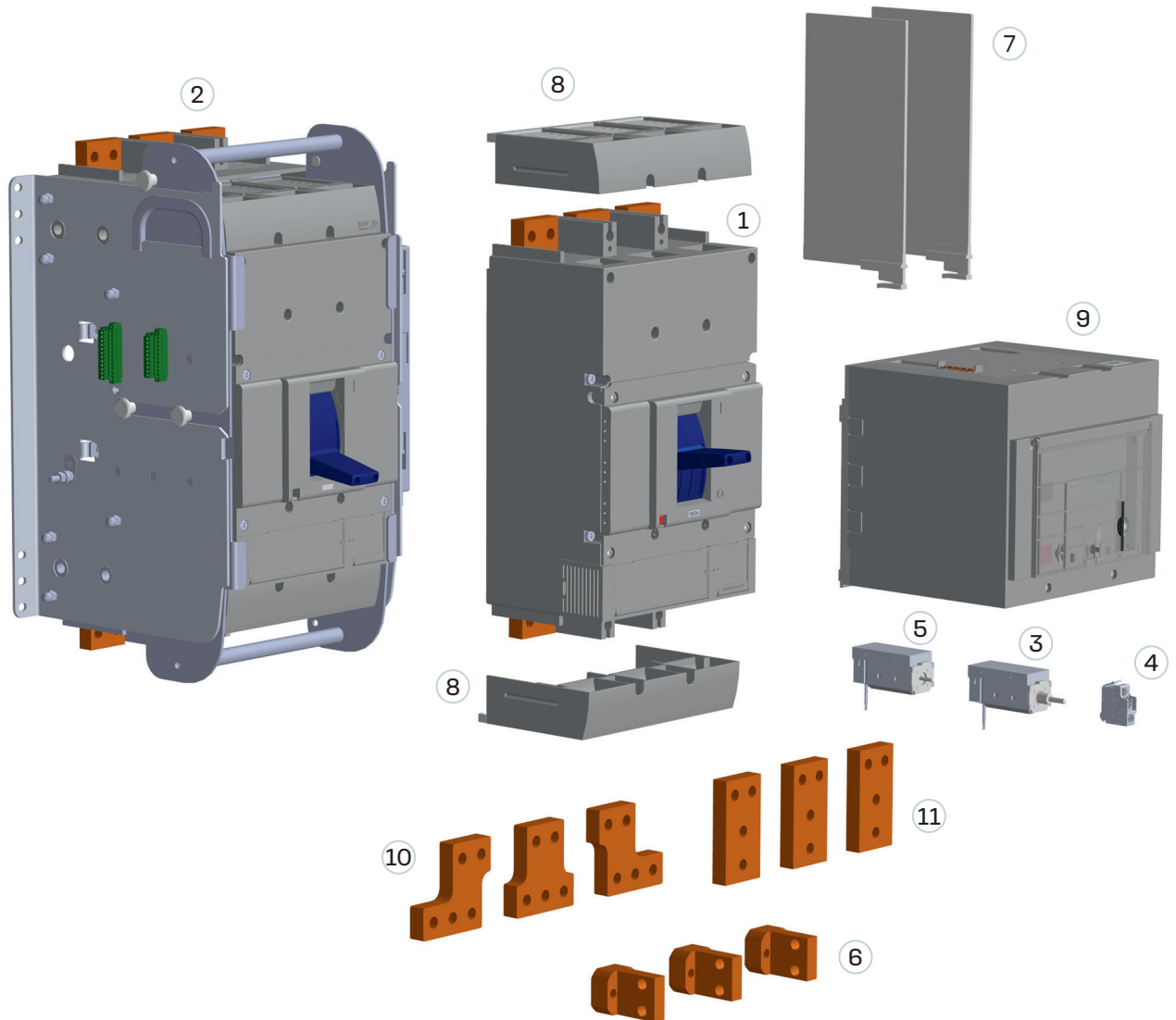
## Configuration of OptiMat D400 и D630

- 1 Circuit breaker
- 2 Shunt trip
- 3 Auxiliary contacts (auxiliary and signal contacts)
- 4 Undervoltage release
- 5 Terminals for rear connection
- 6 Inter-pole partitions
- 7 Terminal cover
- 8 Plug-in connection set
- 9 Withdrawable design set
- 10 Motor drive
- 11 Remote manual drive
- 12 External secondary circuit connectors
- 13 Pole expanders
- 14 Position locking device (off)



## Configuration of OptiMat D800, D1000, D1250 и D1600

- 1 Circuit breaker
- 2 Withdrawable circuit breaker
- 3 Shunt trip
- 4 Auxiliary contacts (auxiliary and signal contacts)
- 5 Undervoltage release
- 6 Terminals for rear connection
- 7 Inter-pole partitions
- 8 Terminal cover
- 9 Motor drive
- 10 Pole expanders
- 11 Pole extenders

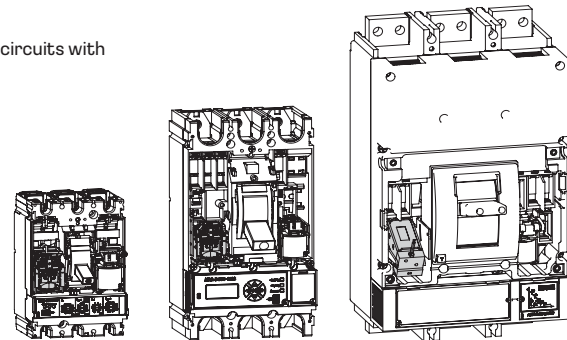


► Accessories

Shunt trip

Shunt trip is designed for circuit breaker remote tripping. It is used in DC and AC control circuits with 50 Hz frequency.

Standard size	Version	Code		
		general purpose industrial version	RCS approval	RMRS approval
OptiMat D100, D160, D250, D400 and D630	HP 24DC/48AC	143498	244086	255777
	HP 48DC/110AC	143495	244087	255779
	HP 110DC/230AC	143496	244084	255778
	HP 220DC/400AC	143497	244085	255780
OptiMat D800, D1000, D1250 and D1600	HP 220DC/230AC	281764	353214	developed



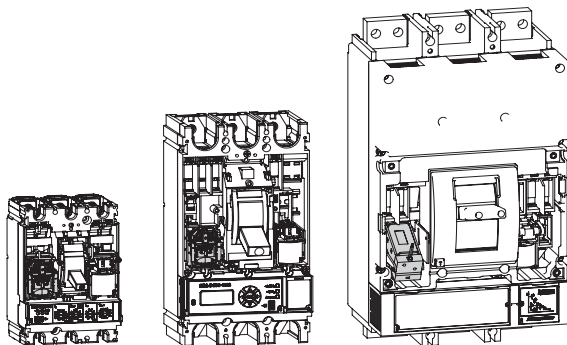
Characteristics	OptiMat D100, D160, D250, D400 and D630				OptiMat D800, D1000, D1250 and D1600
Rated control voltages of the release (Uc), V	24DC/48AC	48DC/110AC	110DC/230AC	220DC/400AC	230AC
Operating voltage range	0,7-1,1 Uc				
Power consumption, VA or W	30				
Control command	Voltage supply for 0.02 to 3 sec				
Maximum consumption current at 110 % Uc (~230 V), A	1				
Maximum tripping time (before the power contacts open), msec	40				

Undervoltage release

The undervoltage release is designed to trip the circuit breaker when the voltage drops below the established standards. The circuit breaker can be re-enabled when the voltage rises above the circuit switching threshold. It is used in DC and AC circuits with 50 Hz frequency.

Standard size	Version	Code		
		general purpose industrial version	приемка PKO	RMRS approval
OptiMat D100, D160, D250, D400 and D630	MP 230AC	254589	255806	255807
	MP 220DC	254586	244081	255805

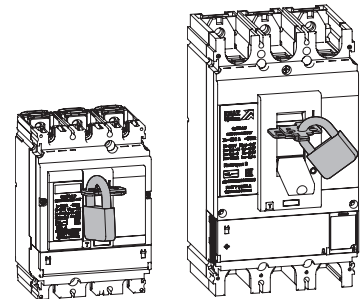
Characteristics	OptiMat D100, D160, D250, D400 and D630	
Rated control voltage (Uc), V	220DC	230AC
Operating range	0,85-1,1 Uc	
Tripping threshold: deactivation activation	0,35-07 Uc 0,85 Uc	
Power consumption, VA or W	6	
Operating mode	continuous	



Position locking device (off)

When the position blocking device is «Off», the equipment and personnel is kept save during maintenance checks or commissioning at the facilities by preventing the manual actuation of the circuit breaker. When the circuit breaker is blocked when in off state, circuit is disconnected according to GOST IEC 60947-2. One can also hang 1 to 3 padlocks with 5 to 8 mm shackles (purchased separately).

Product name	Code
Position locking device (off) OptiMat D100, D160, D250, D400, D630-UHL3	290397



## Auxiliary contacts

Auxiliary contacts are designed to signal the status of the circuit breaker as a single design model and are installed in the circuit breaker sockets, according to the table below. Functions of auxiliary contacts are changed depending on the socket where they are installed (see Circuit diagrams of OptiMat D circuit breakers):

VK1...VK4 — auxiliary contacts of alarm of switching state of the main contacts (closed/open).

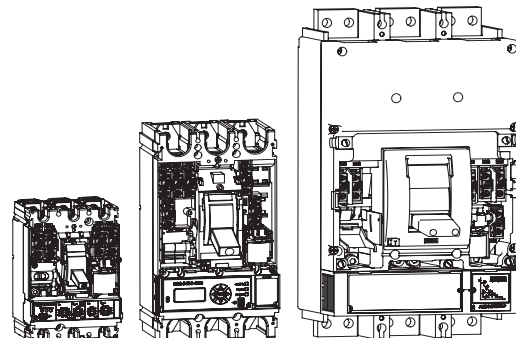
SK1 — alarm contact of deactivation of the circuit breaker with mechanism release due to:

- tripping of protection releases;
- tripping of shunt trip or undervoltage release;
- pressing the test button; or
- pressing the motor drive alarm button.

SK2 — signal contact of emergency shutdown of the circuit breaker due to tripping of the protection release. Maximum number of auxiliary contacts is shown in the table:

	Type	Code				Available contacts		
		general purpose industrial version	RCS approval	RMRS approval		OptiMat D250	OptiMat D630	OptiMat D1600
Set of auxiliary contacts VK/ SK1/SK2	VK					2		4
	SK1	314967 (1 pcs.)	143490 (4 pcs.)	244078 (4 pcs.)	255772 (4 pcs.)		1	
	SK2						1	

Characteristics	Alternating current (AC)					Direct current (DC)			
Rated voltage (Uc), V	24	48	110	230	400	24	48	110	250
Rated operating current (Ic), A	6	6	5	4	2	3	1,5	0,5	0,2

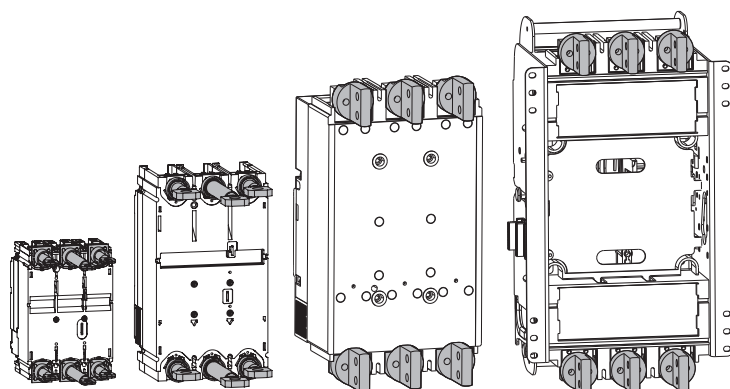


## Rear connection kit

Terminals for rear connection of conductors allow to install OptiMat D circuit breakers in low-voltage complex devices for distribution and double-sided controls - in locations where rear-connected busbars and conductors with cable lugs are required. They are orientable and can be positioned both vertically and horizontally.

Terminals for OptiMat D100-D250 and OptiMat D400-D630 are supplied individually and have two versions: long and short. Rear connection terminals of OptiMat D800-1600 are used for fixed and withdrawable designs of circuit breakers and are supplied in a set of 3 pieces. It is recommended to use terminal covers with the rear connection set.

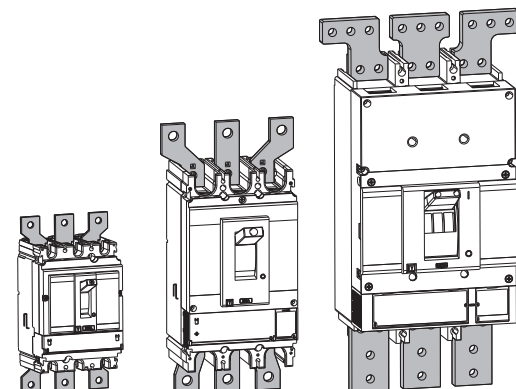
Product name	Code		
	general purpose industrial version	RCS approval	RMRS approval
Rear connection kit OptiMat D100, D160, D250 63-250A-long	238709	353198	327483
Rear connection kit OptiMat D100, D160, D250 63-250A-short	234089	244077	327484
Rear connection kit OptiMat D100, D160, D250 16-50A-long	313954	353196	255811
Rear connection kit OptiMat D100, D160, D250 16-50A-short	313955	353197	255810
Rear connection kit OptiMat D400, D630 320-630A-long	238710	244094	255812
Rear connection kit OptiMat D400, D630 320-630A-short	234090	244095	255813
Rear connection kit OptiMat D800, D1000, D1250, D1600-UHL3-3 pcs.	272308	on request	on request



## Pole expanders and extenders

Pole expanders allow you to increase the pole-to-pole distance of OptiMat D circuit breakers for easy connection of large busbars and cable lugs. Pole extenders for OptiMat D800-1600 allow the connection of several cable lugs or busbars. Pole expanders and extenders for OptiMat D800-1600 can be installed on both fixed and withdrawable circuit breakers. OptiMat D expanders and extenders are supplied as a set of 3 terminals.

Standard size	Product name	Code		
		general purpose industrial version	RCS approval	RMRS approval
OptiMat D100, D160, D250	Pole expanders OptiMat D100, D160, D250-UHL3-3 pcs.	255857	353215	327488
	Pole expanders OptiMat D400, D630-UHL3-long-3 pcs.	258210	353216	327489
OptiMat D400, D630	Pole expanders OptiMat D400, D630-UHL3-short-3 pcs.	252558	353217	327490
	Pole expanders OptiMat D800, D1000, D1250, D1600-UHL3-3 pcs.	294399	on request	on request
OptiMat D800, D1000, D1250, D1600	Pole expanders OptiMat D800, D1000, D1250, D1600-UHL3-3 pcs.	294400	on request	on request



Remote manual drive

Remote manual drive allows controlling the device installed deep into the cabinet from the front cabinet panel. It supports the following functions:  
Mechanic blocking of door when the device is on.

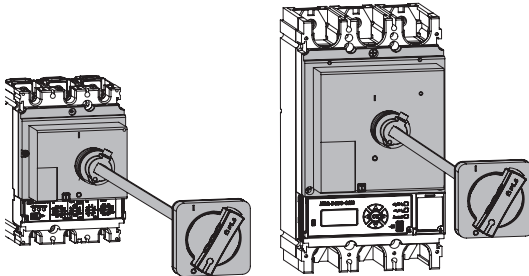
1) Remote manual drive is equipped with a locking device coupled to the extension axis.  
It blocks the door if the circuit breaker is «on» or in «emergency shutdown» position. To open the door when the circuit breaker is on, override the blocking using a tool. It is impossible to do it if the handle is blocked by padlocks.

2) Forced neutralization of mechanic door blocking.  
A handle can be reworked at the site to fully override door blocking, including blocking with padlocks. However, if necessary, door blocking can be restored. If there are several remote manual drives on one door, this functions of forced neutralization allows blocking the door from one device.

3) Blocking the device and door with padlocks.  
Padlocks can be used to block the circuit breaker control handle and prevent the door from opening in the «off» position using one to three padlocks Ø 5–8 mm (not included in delivery). If the door control has been modified to provide forced neutralization of door blocking, padlocks do not block the door yet block the device control handle preventing circuit switching.

Also, up to two early-action contacts (standard universal auxiliary contacts) can be installed in the handle of the manual remote drive, which allows you to connect external circuits (for example, undervoltage relays) before closing the power contacts of the circuit breaker.

Standard size	Code		
	general purpose industrial version	RCS approval	RMRS approval
Remote manual drive OptiMat D100, D160, D250-UHL3	240958	353212	244103
Remote manual drive OptiMat D400, D630-UHL3	240959	353213	244105



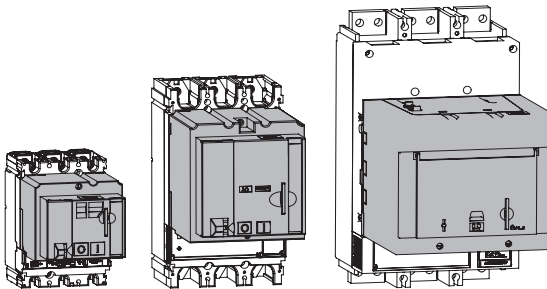
OptiMat D100 and D250      OptiMat D400 and D630

Motor drive

OptiMat D circuit breakers can be equipped with a motor drive with an energy storage device to close and open the circuit breaker. It is designed for remote and manual circuit breaker operation. Control modes: electric (auto) or manual (P).

Standard size	Version	Product name	Code		
			general purpose industrial version	RCS approval	RMRS approval
OptiMat D100, D160, D250	230 V AC	Motor drive OptiMat D100, D160, D250-230AC-U3	247695	353208	255817
	220 V DC	Motor drive OptiMat D100, D160, D250-220DC-U3	260101	developed	developed
	110 V DC	Motor drive OptiMat D100, D160, D250-110DC	340751	developed	developed
OptiMat D400, D630	230 V AC	Motor drive OptiMat D400, D630-230AC-U3	233121	244100	255815
	220 V DC	Motor drive OptiMat D400, D630-220DC-U3	260102	353210	developed
	110 V DC	Motor drive OptiMat D400, D630-110DC-U3	340752	developed	developed
OptiMat D800, D1000, D1250, D1600	230 V AC	Motor drive OptiMat D800, D1000, D1250, D1600-230AC-U3	250716	353211	developed

Characteristics	OptiMat D100-D160-D250	OptiMat D400-D630	OptiMat D800-D1000-D1250-D1600
Operating voltage range (Us), V	0,85-1,1		
Power, VA/W	550	500	200
Starting power, VA/W	550	800	500
Charge time, s	≤3		≤4
Total closing time, s	≤0,08	≤0,08	≤0,1
Total opening time, s	≤1	≤1	≤4
Maximum number of cycles per minute	5	4	4



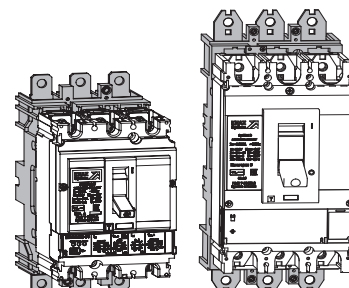
## Plug-in connection kit OptiMat D100-630

The kit includes a fixed part of the plug-in version and parts for converting the circuit breaker into a plug-in version. The fixed part is a base for mounting the moveable part of the plug-in circuit breaker. It can be installed on the mounting plate in different ways, with front or rear connection. Universal terminals of the fixed part provide front and rear orientable connections (horizontal and vertical).

Circuit breaker is connected to the base with the help of plug-in terminals (included in the scope of supply). It is recommended to additionally use terminal covers to insulate the connection. With plug-in connection kit, one can quickly remove the circuit breaker, check or replace it. At that, the power cables and busbars remain connected to the fixed base. One can also install redundant output lines in the cabinet for further installation of circuit breakers. A special interlock (included in the scope of supply) automatically disables the unit when it is inserted or removed while the unit is on, while still allowing commutation of the removed appliance.

Product name	Code		
	general purpose industrial version	RCS approval	RMRS approval
Plug-in connection kit OptiMat D100, D160, D250 63-250A-UHL3	234092	353201	244096
Plug-in connection kit OptiMat D100, D160, D250 16-50A-UHL3	313956	353200	327485
Plug-in connection kit OptiMat D400, D630 320-630A-UHL3	234091*	353202*	244097*

\* When OptiMat D630 circuit breakers are used together with plug-in connection set OptiMat D400...630-UHL3, maximum allowable current with the temperature within the set limits of COST R 50030.2-2010 totals 570 A.



## Withdrawable circuit breakers OptiMat D100-630

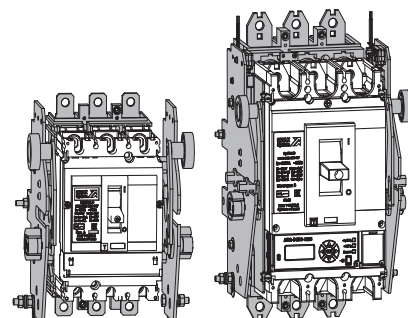
In addition to functions of a plug-in connection, a withdrawable chassis makes device control easier. It offers three positions that can be chosen after the mechanical locking is released by the retainers:

- 1) «Drawn in»: power circuit is on;
- 2) «Drawn out»: power circuit is off, one can switch the device to check the secondary circuits;
- 3) «Removed»: the device is removed from the chassis.

A withdrawable chassis design can imply the installation of immovable chassis parts on the base and moveable chassis parts directly on the device. It is recommended to additionally use terminal covers to insulate the connection. Withdrawable design provides for a visible clearance during commissioning. A special interlock (included in the scope of supply) automatically disables the unit when it is installed or removed while the unit is on, and still allows commutating the removed appliance. The withdrawable version of OptiMat D100-630 is equipped with position contacts as a standard: drawn in/drawn out (2 contacts rolled-in and 2 contacts drawn out).

Designations	Code		
	general purpose industrial version	RCS approval	RMRS approval
Withdrawable connection kit OptiMat D100, D160, D250 63-250A-UHL3	239381	353204	244098
Withdrawable connection kit OptiMat D100, D160, D250 16-50A-UHL3	313957	353203	327486
Withdrawable connection kit OptiMat D400, D630 320-630A-UHL3	234093*	353205*	244099*

\* When OptiMat D630 circuit breakers are used together with extended connection set OptiMat D400...630-UHL3, maximum allowable current with the temperature within the set limits of COST R 50030.2-2010 totals 570 A.

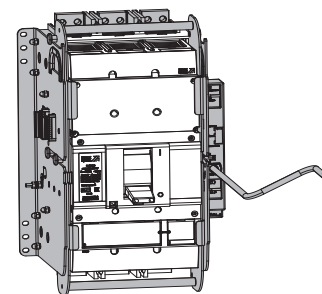


## Withdrawable circuit breakers OptiMat D800-1600

The OptiMat D800-1600 withdrawable circuit breaker (version D) is supplied assembled with a fixed part, which as standard has front terminals for connecting bars and cable lugs.

The withdrawable design ensures convenient and safe operation, and also has three clear positions in the fixed part: Drawn in, Tested and Drawn out. In each position the circuit breaker can be locked with a padlock.

The withdrawable circuit breaker is also equipped with circuit breaker state signaling contacts in the fixed part as standard: Drawn in, Test, Drawn out and connectors for connecting/disconnecting secondary circuits of electrical accessories.

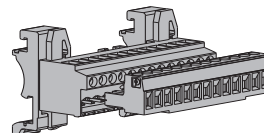


## External connectors for electrical accessory circuits of plug-in and withdrawable circuit breakers

For OptiMat D100-630 circuit breakers of plug-in or withdrawable design, the circuits of additional electrical accessories can be disconnected/connected using an external secondary circuit connector.

The secondary circuit connector consists of two parts — an MSTB plug and a UMSTBVK socket with 13 terminals for connecting circuits. The MSTB plug has high electrical capacity and low resistance, which allows for efficient signal transmission and stable operation of secondary circuits. The socket for secondary circuits UMSTBVK allows you to significantly reduce the time and costs of electrical wiring. It allows you to easily connect and disconnect secondary circuits, which simplifies maintenance and upgrading of the system. The connector can be installed on a din-rail.

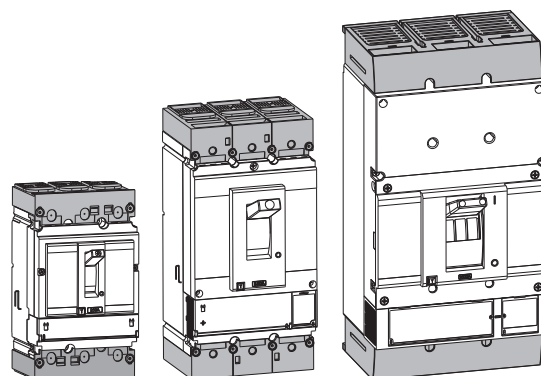
Product name	Code		
	general purpose industrial version	RCS approval	RMRS approval
Socket for secondary circuits UMSTBVK-2.5/13-OptiMat/BA57-UHL3	273633	on request	on request
Plug for secondary circuits MSTB-2.5/13-OptiMat/BA57-UHL3	273632	on request	on request



## Terminal covers

Terminal covers for OptiMat D circuit breakers are used to prevent accidental contact with terminals and provide additional pole-to-pole insulation. Low terminal covers are recommended for the terminals of the moving part of circuit breakers of plug-in and withdrawable designs, as well as for rear connection of fixed circuit breakers OptiMat D100-D630, as well as for fixed and withdrawable circuit breakers OptiMat D800-D1600.

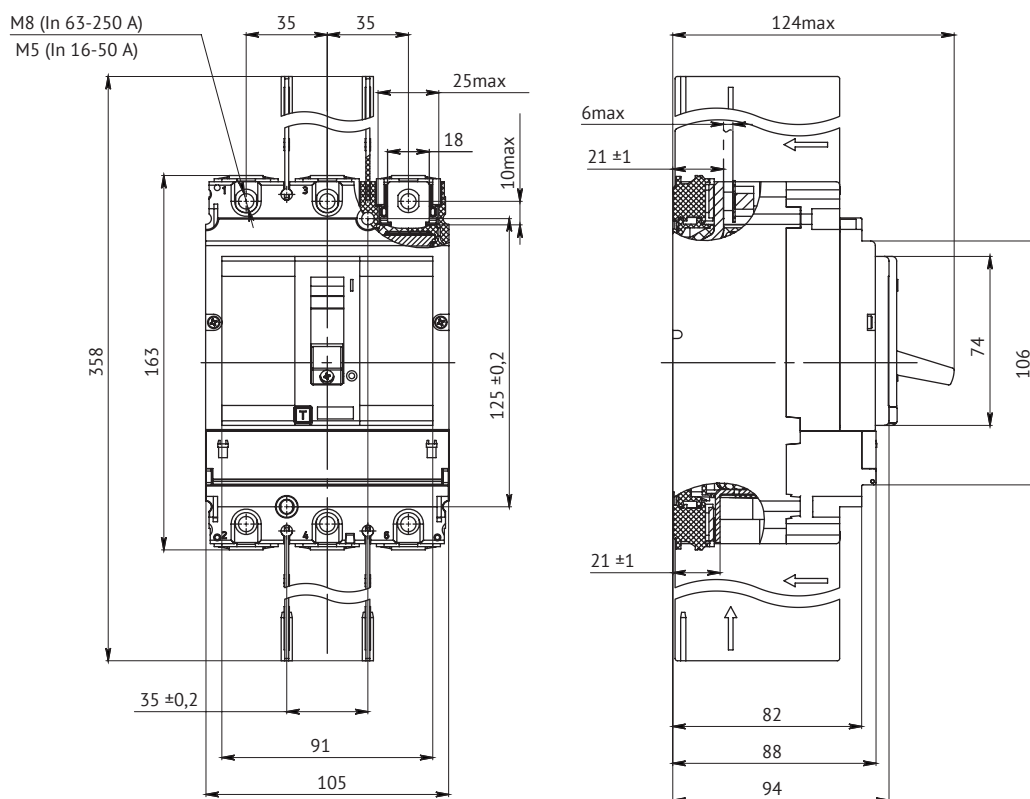
Product name	Code		
	general purpose industrial version	RCS approval	RMRS approval
Terminal cover OptiMat D100, D160, D250-UHL3-2 pcs.	232987	244079	255773
Terminal cover OptiMat D400, D630-UHL3-2 pcs.	251068	256941	on request
Terminal cover OptiMat D800, D1000, D1250, D1600-UHL3-2 pcs.	298993	353207	on request



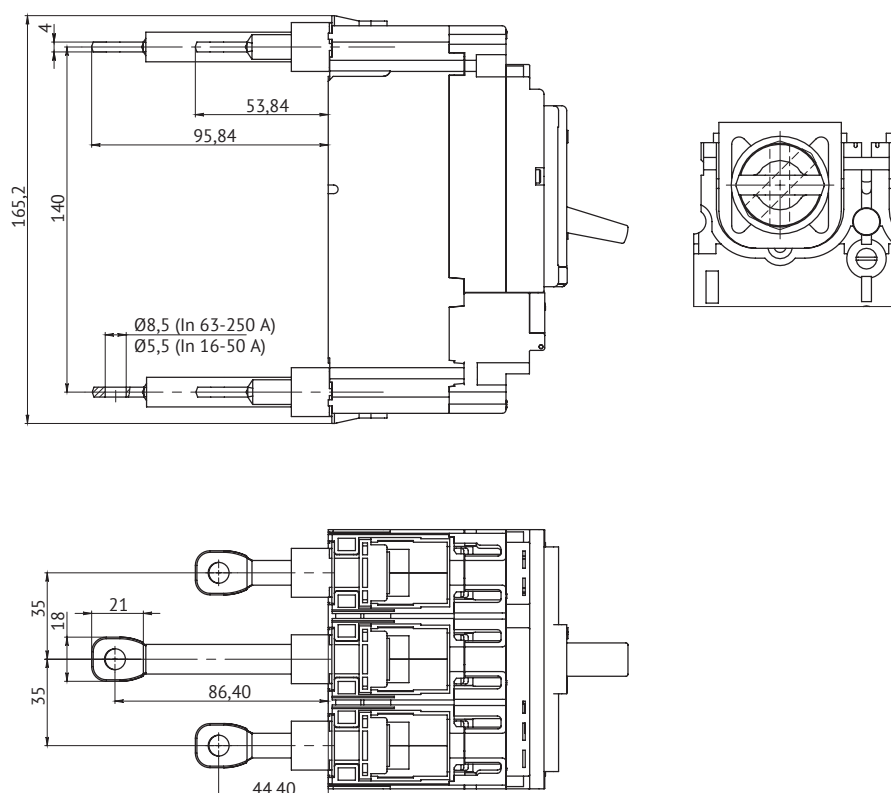
## ► Overall dimensions (mm)

### Stationary OptiMat D100, D160, D250

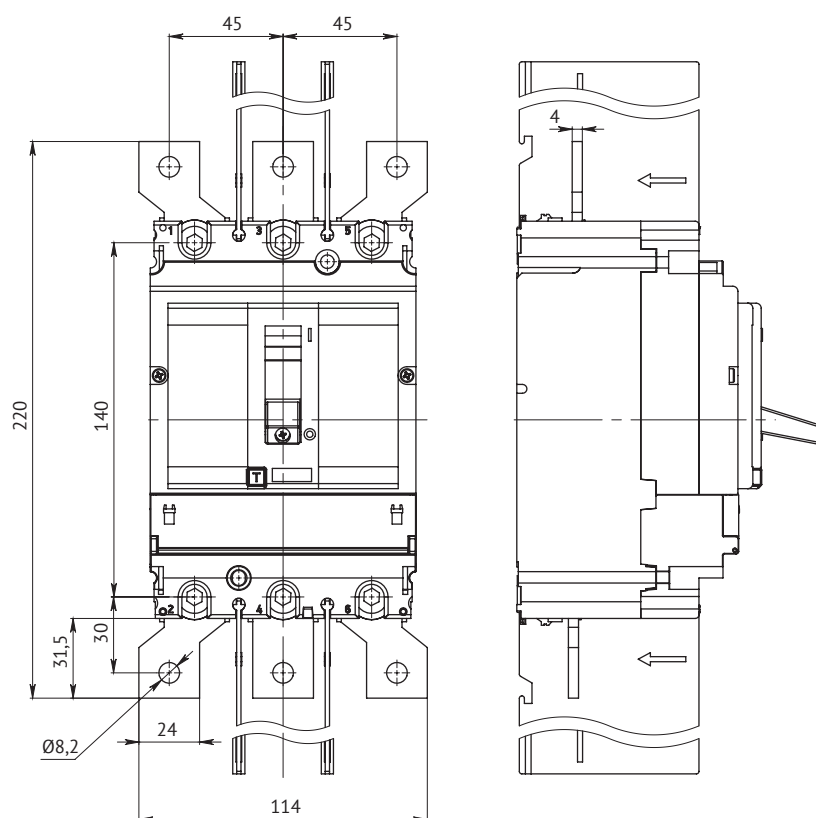
#### Front terminals



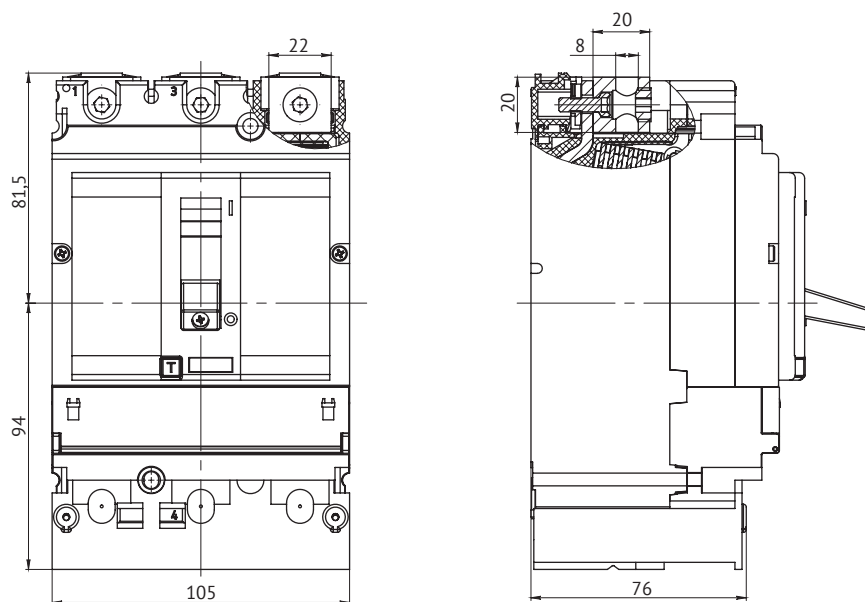
#### Rear terminals



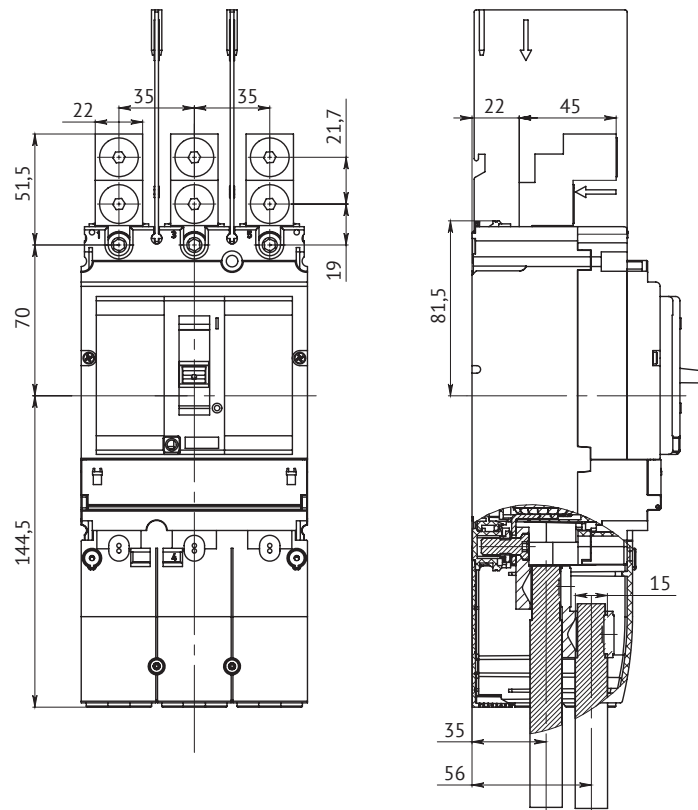
## Pole expanders



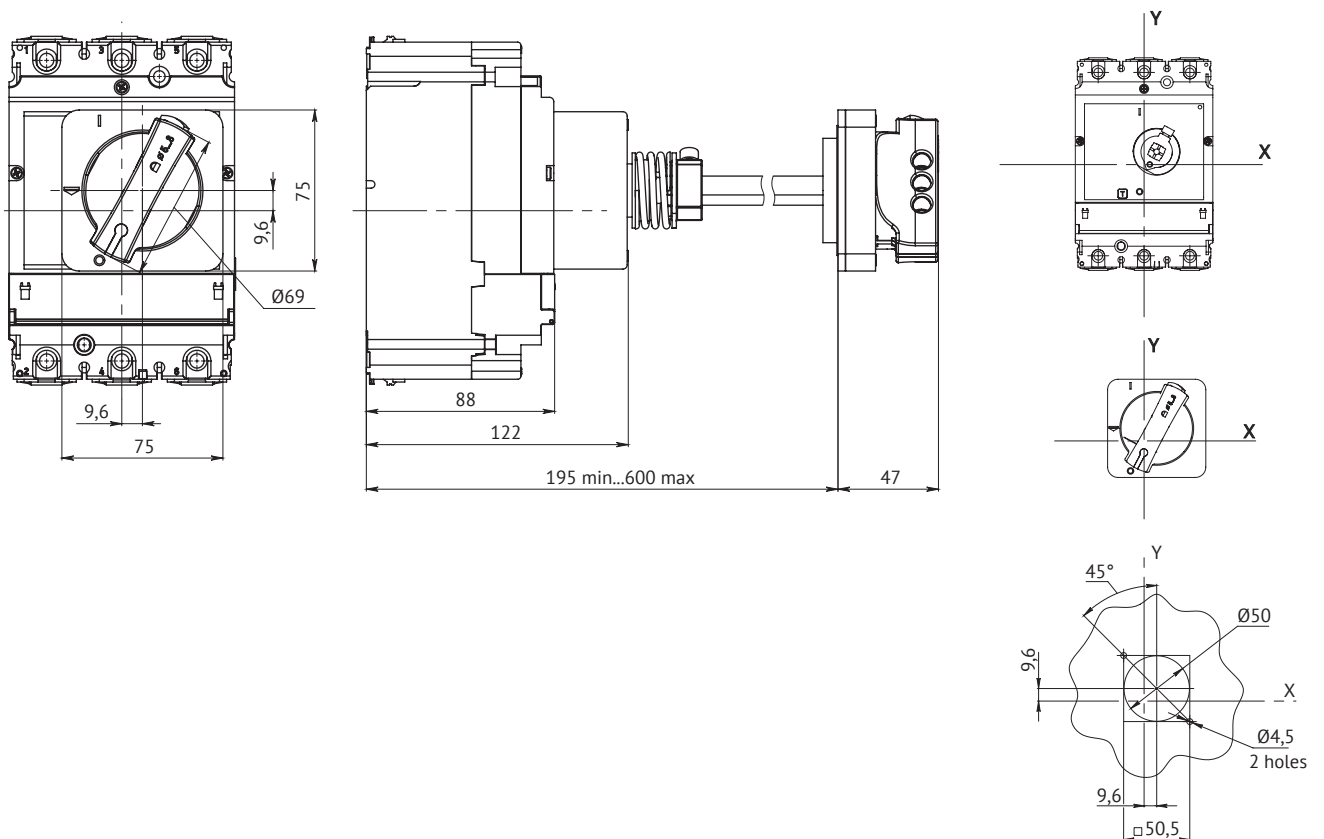
## Cable connection clamps and terminal covers



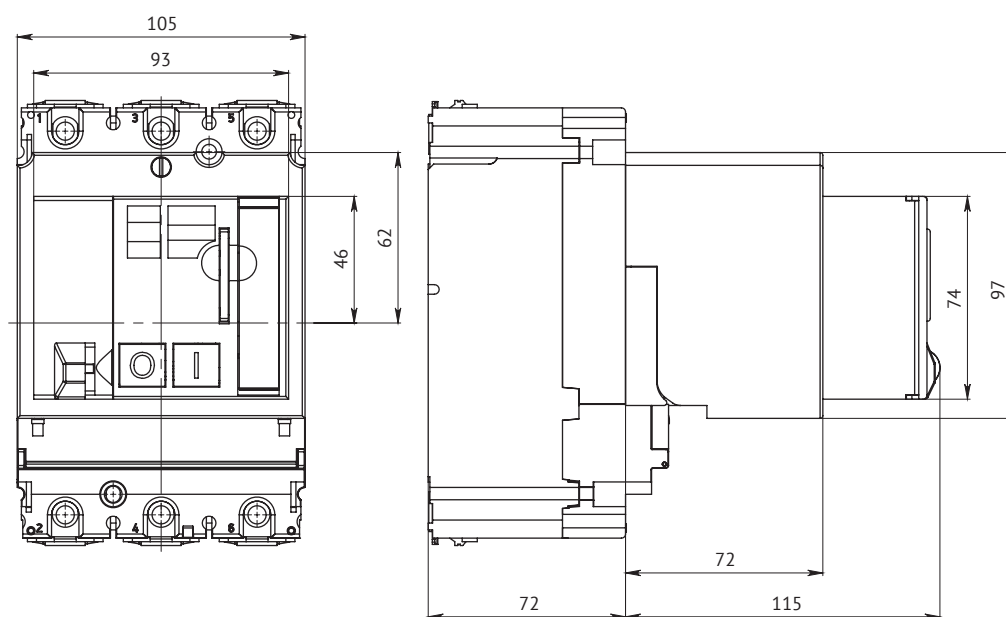
Clamps for connecting two cables and long terminal covers



Remote manual drive

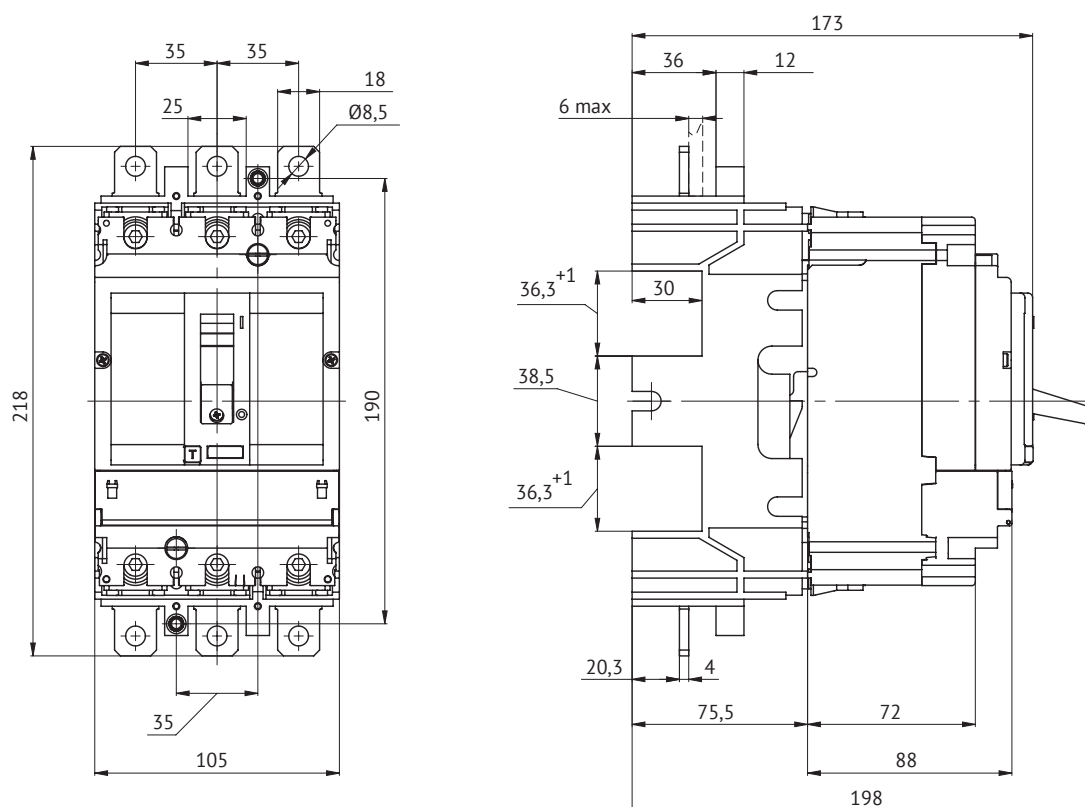


## Motor drive

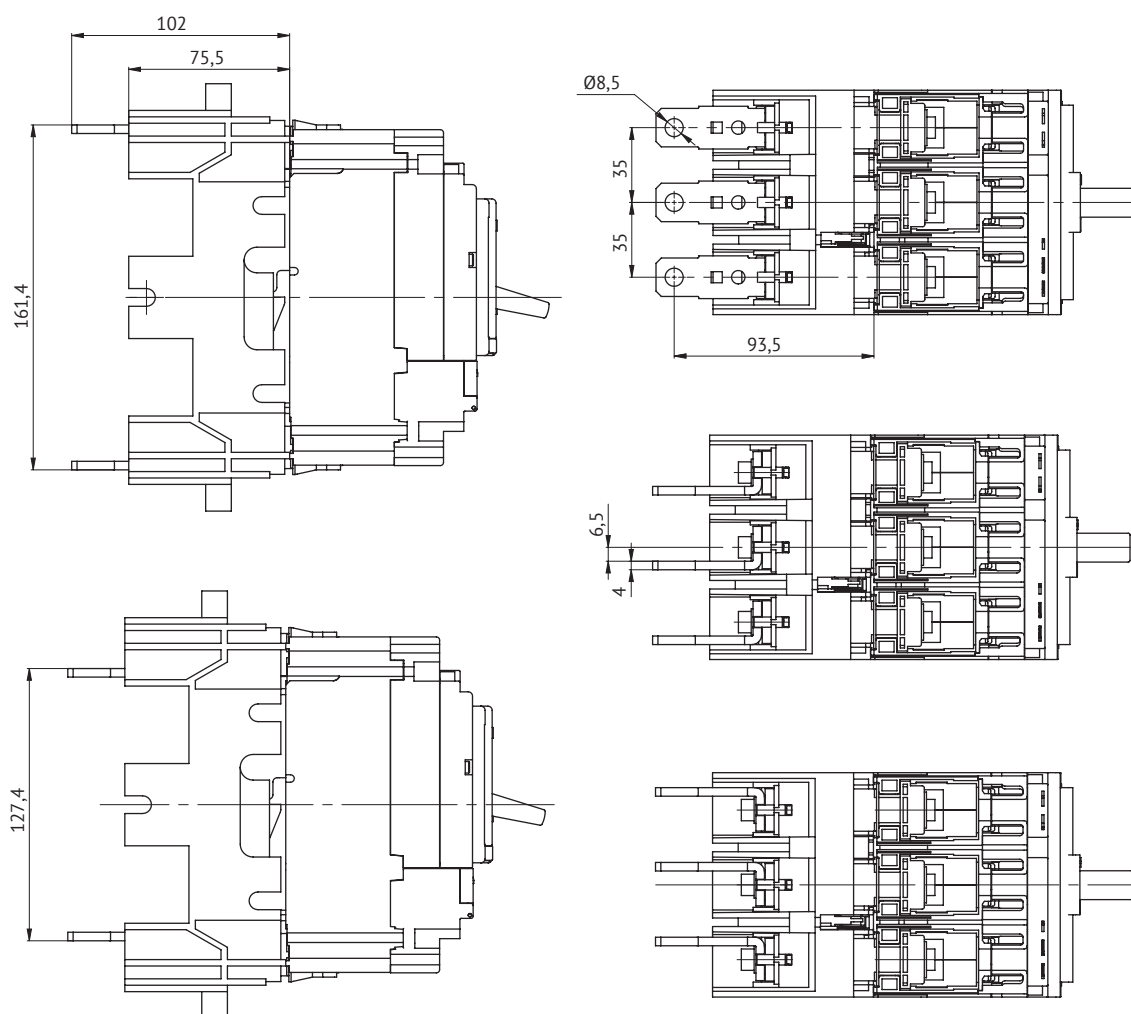


## Plug-in OptiMat D100, D160, D250

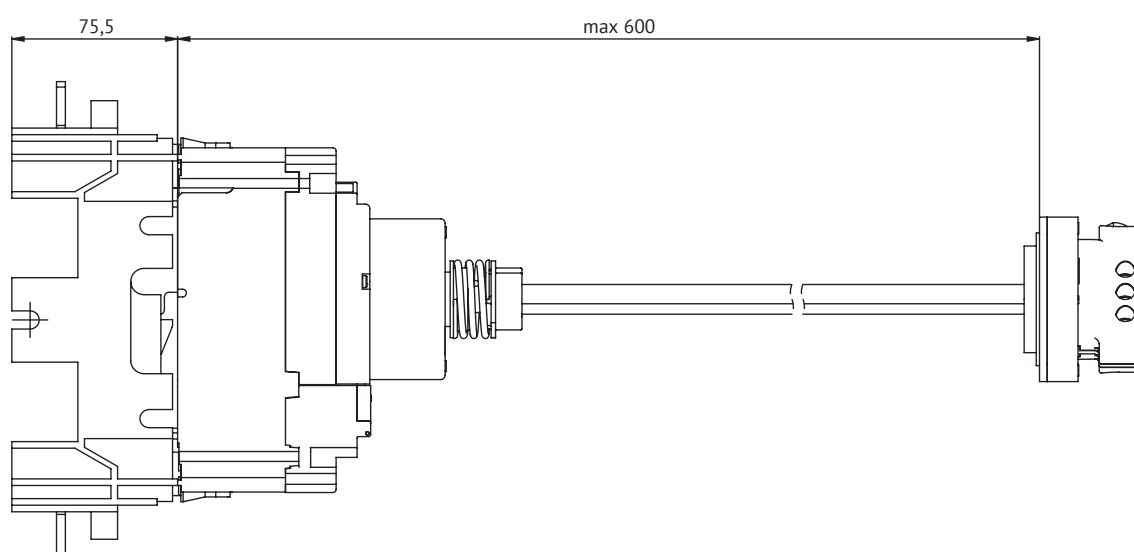
### Front terminals



### Rear orientable terminals

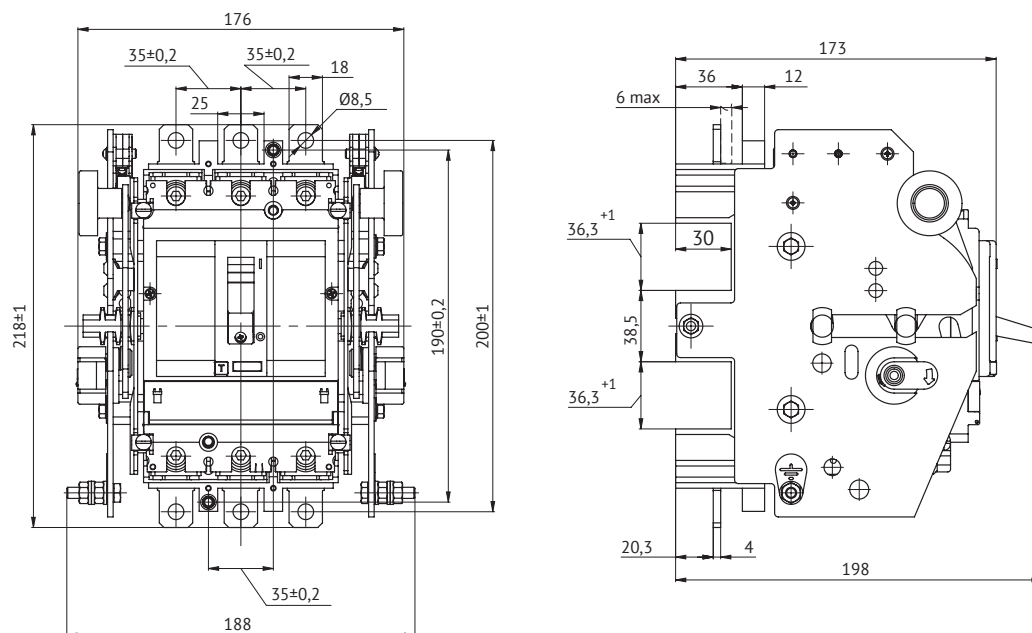


### Motor drive

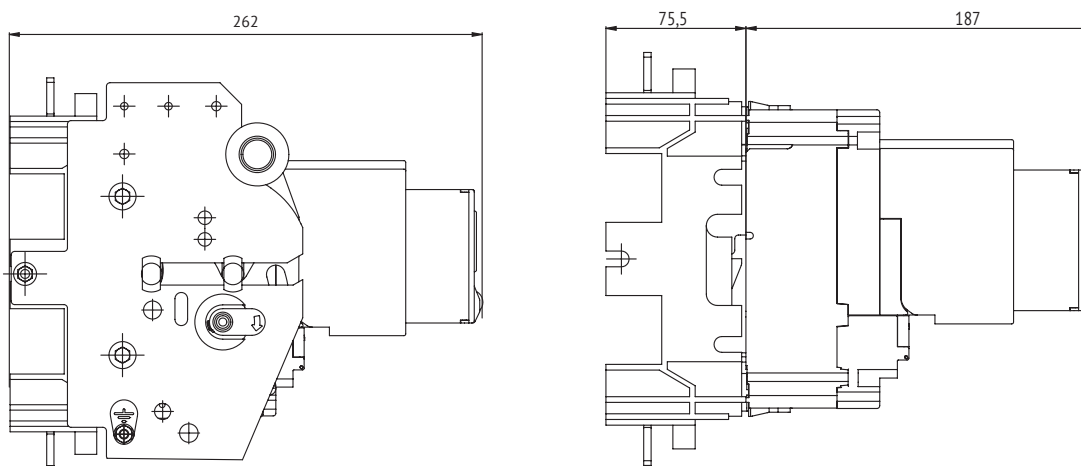


## Withdrawable OptiMat D100, D160, D250

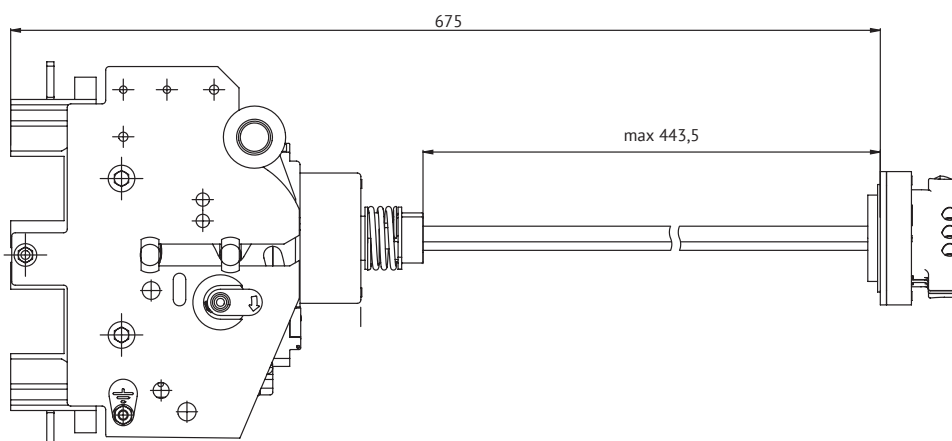
### Front terminals



### Motor drive

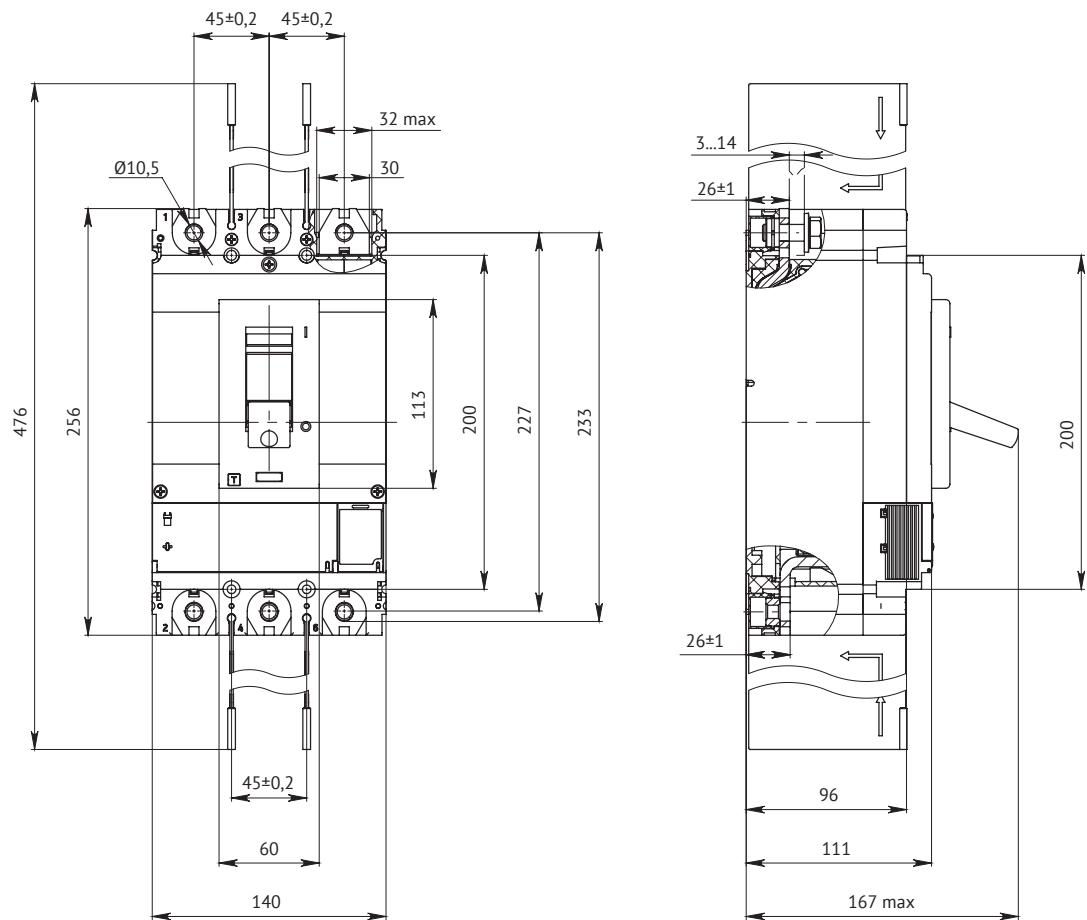


### Remote manual drive

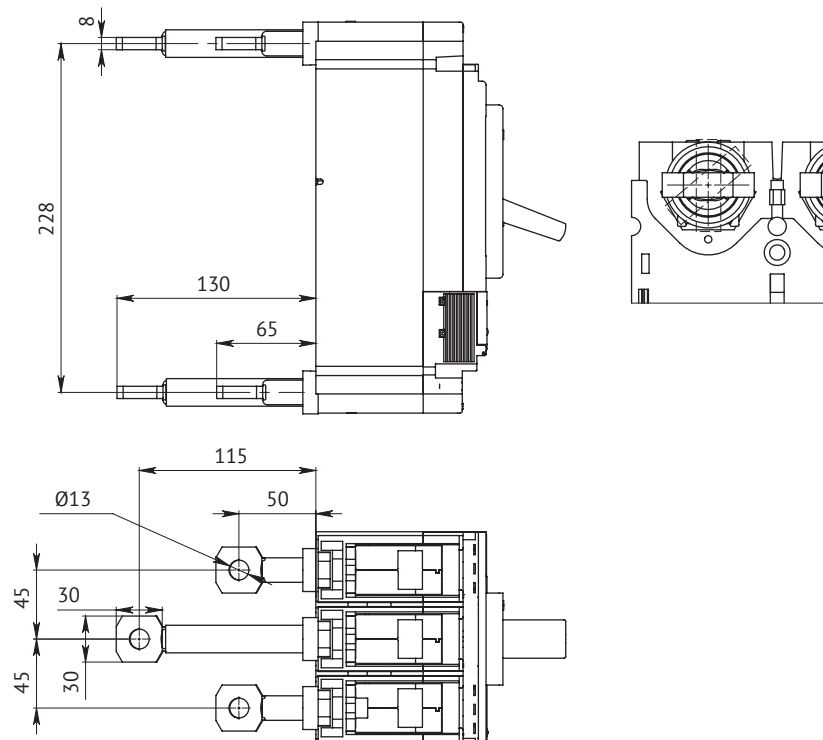


## Stationary OptiMat D400, D630

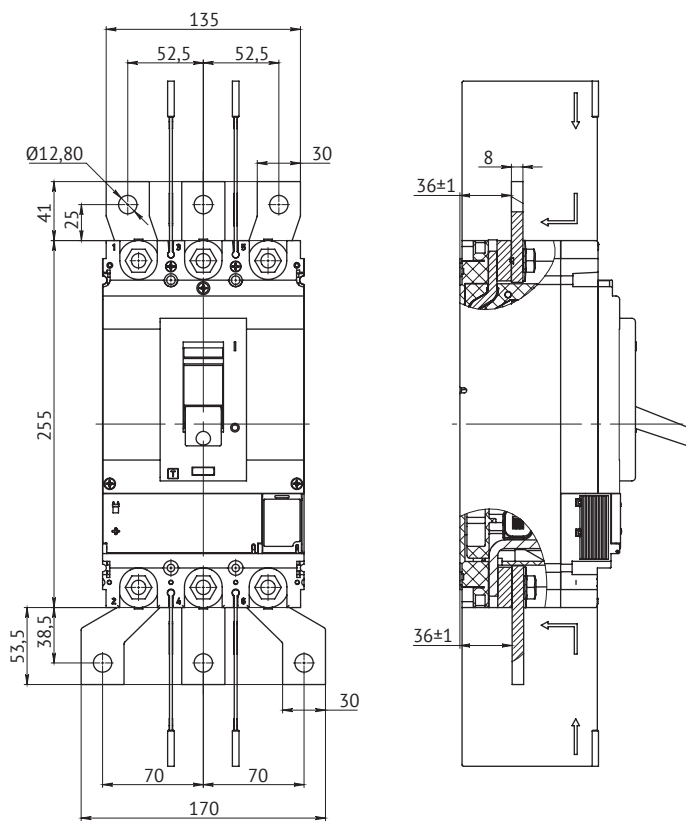
### Front terminals



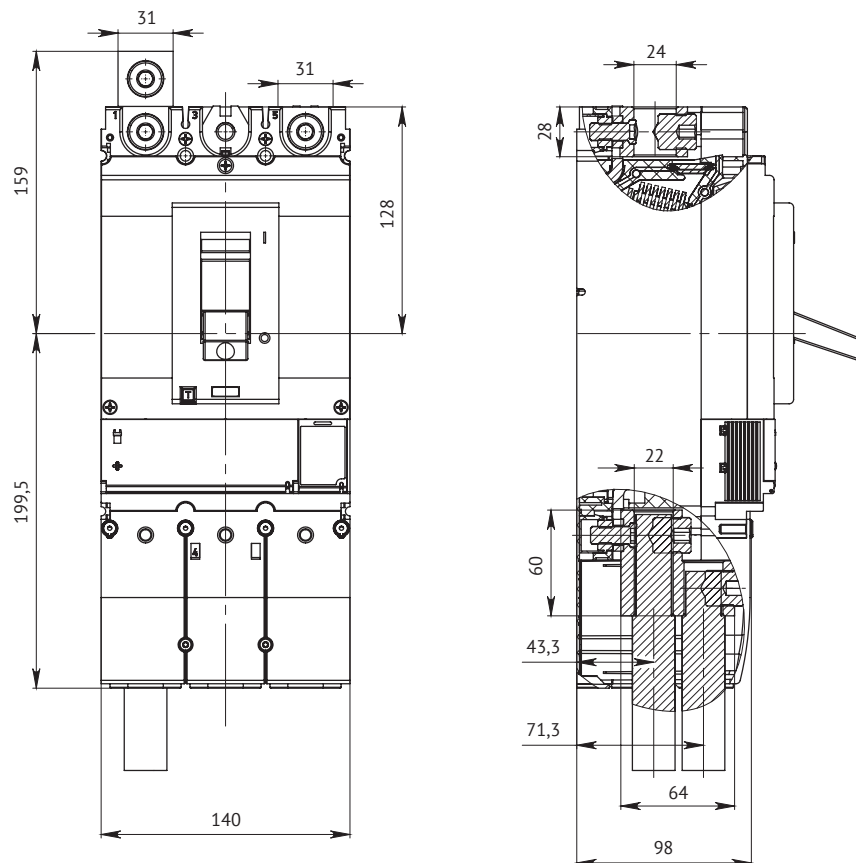
### Rear terminals



### Pole expanders



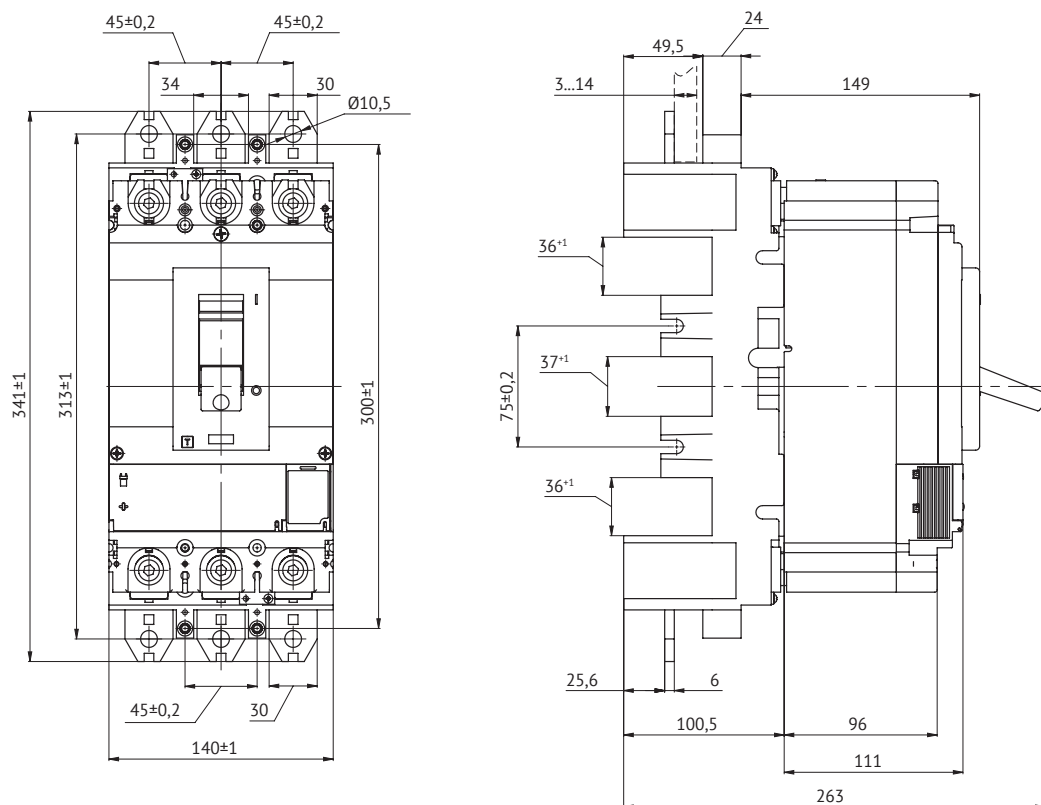
### Clamps for connecting one and two cables, and long power terminal covers



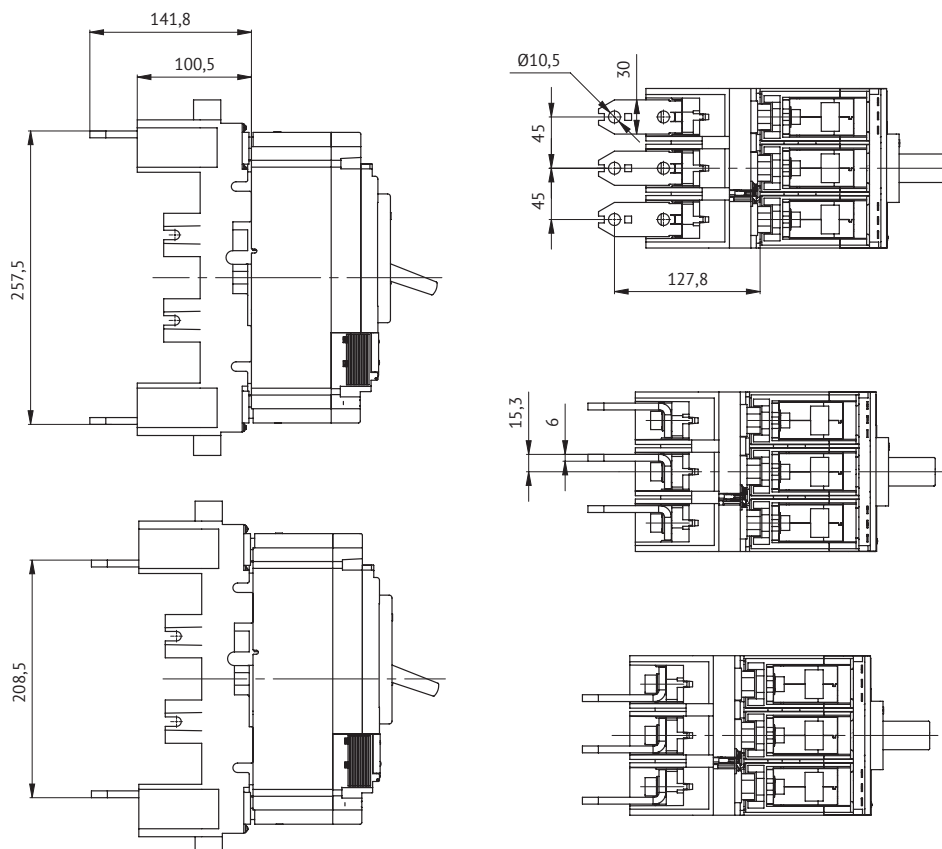


## Plug-in OptiMat D400, D630

### Front terminals

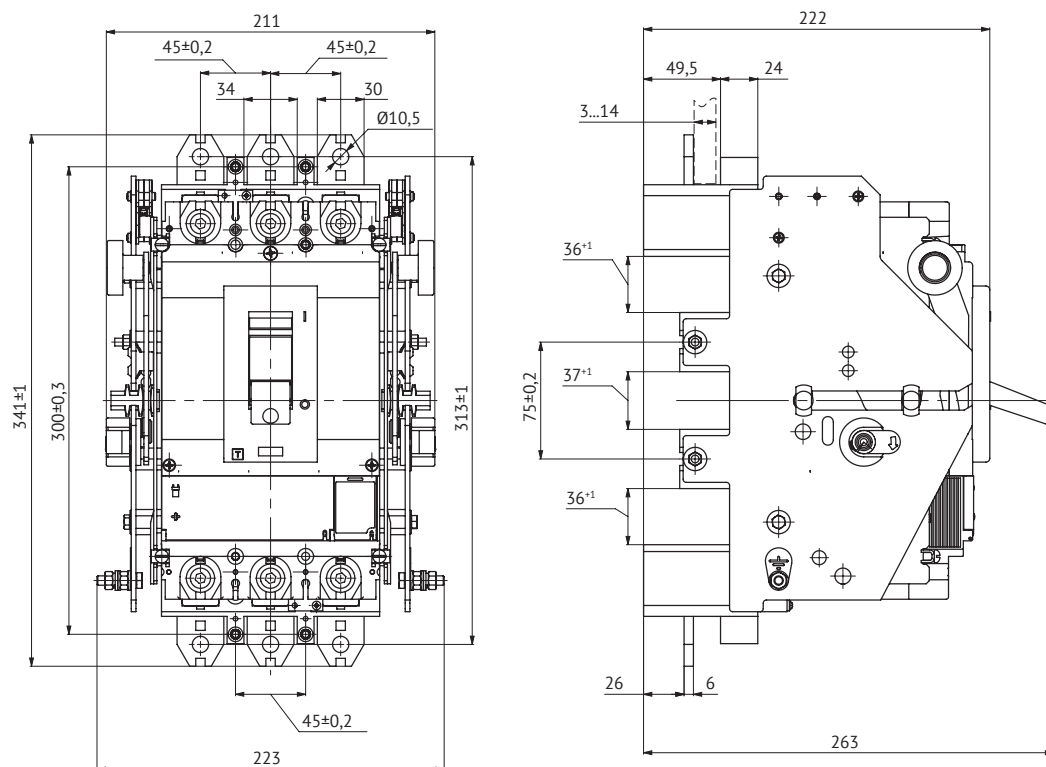


### Rear orientable terminals



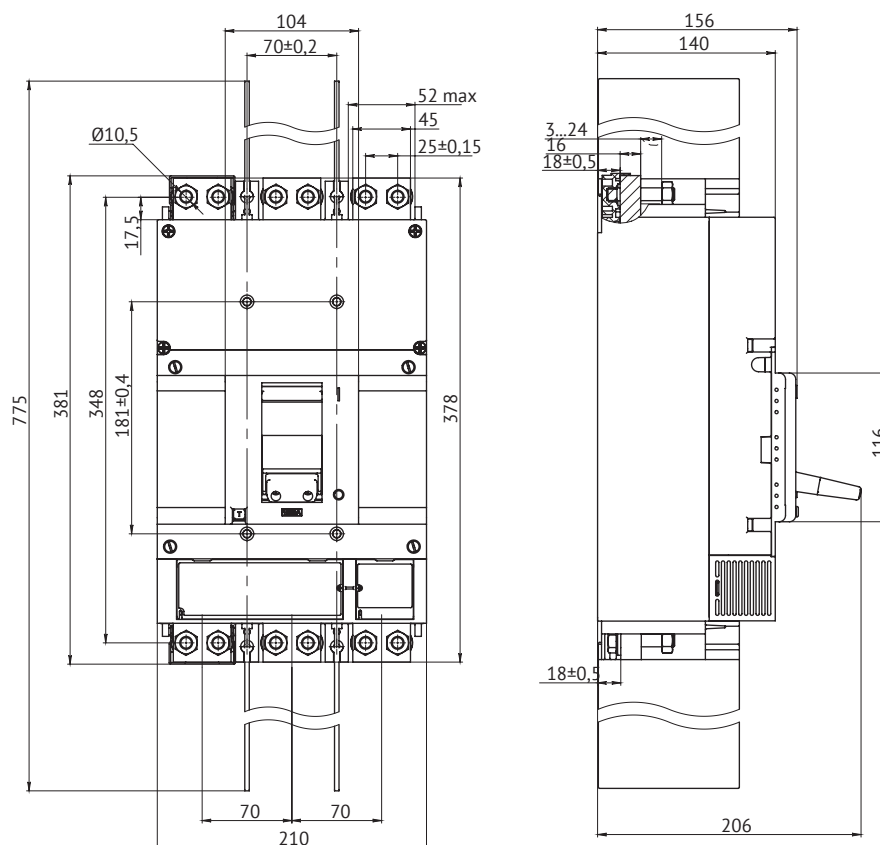
## Withdrawable OptiMat D400, D630

### Front terminals

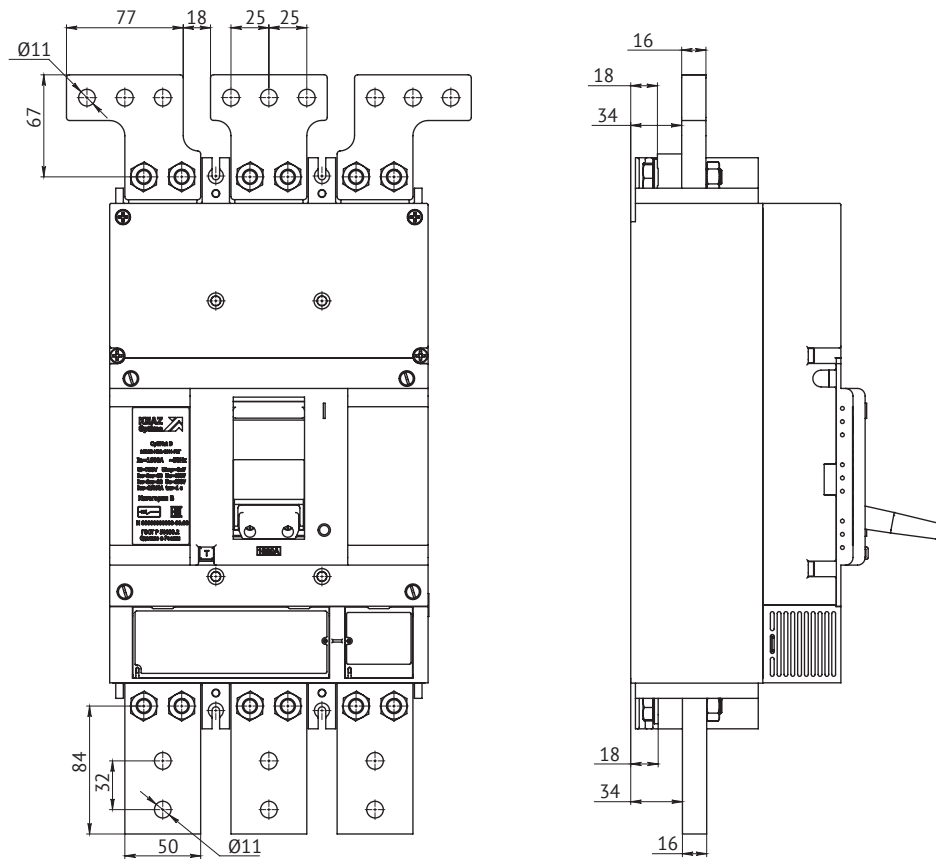


## Stationary OptiMat D800, D1000, D1250 and D1600

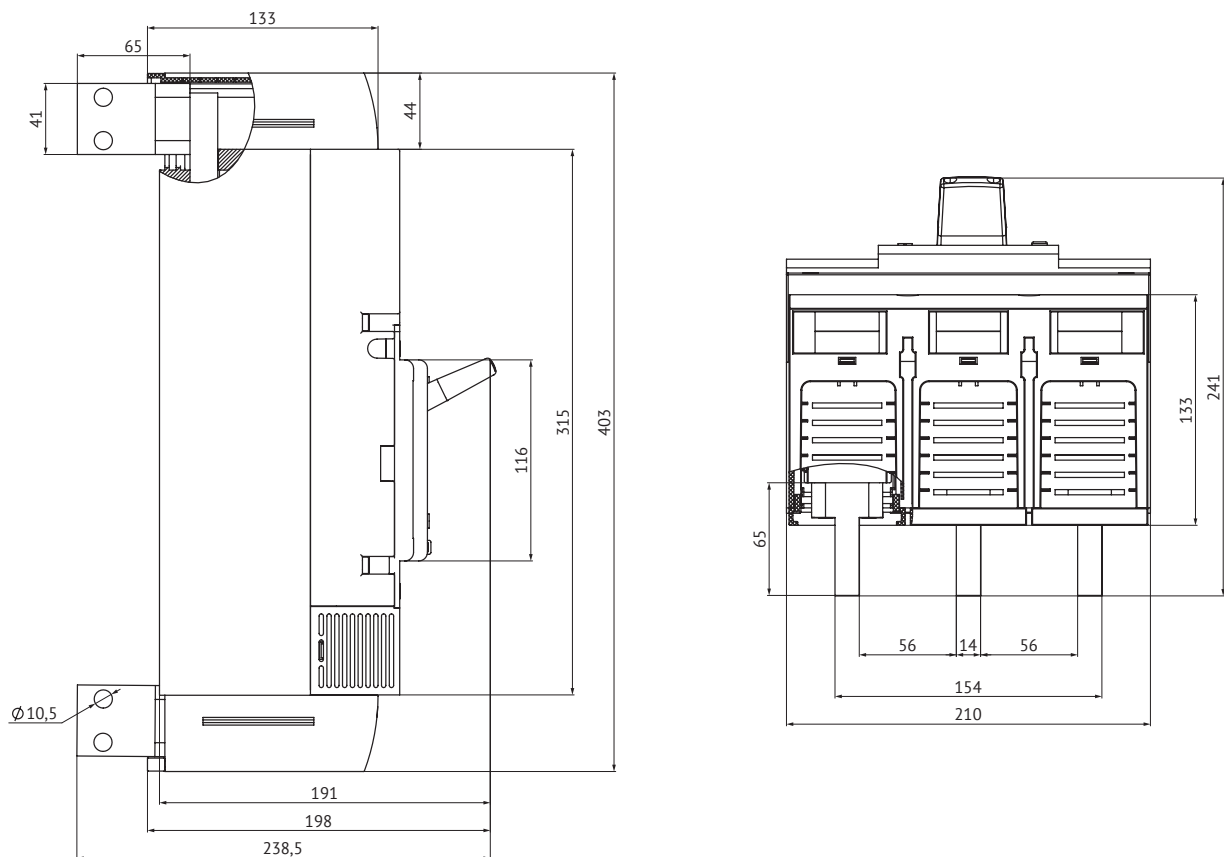
### Front terminals



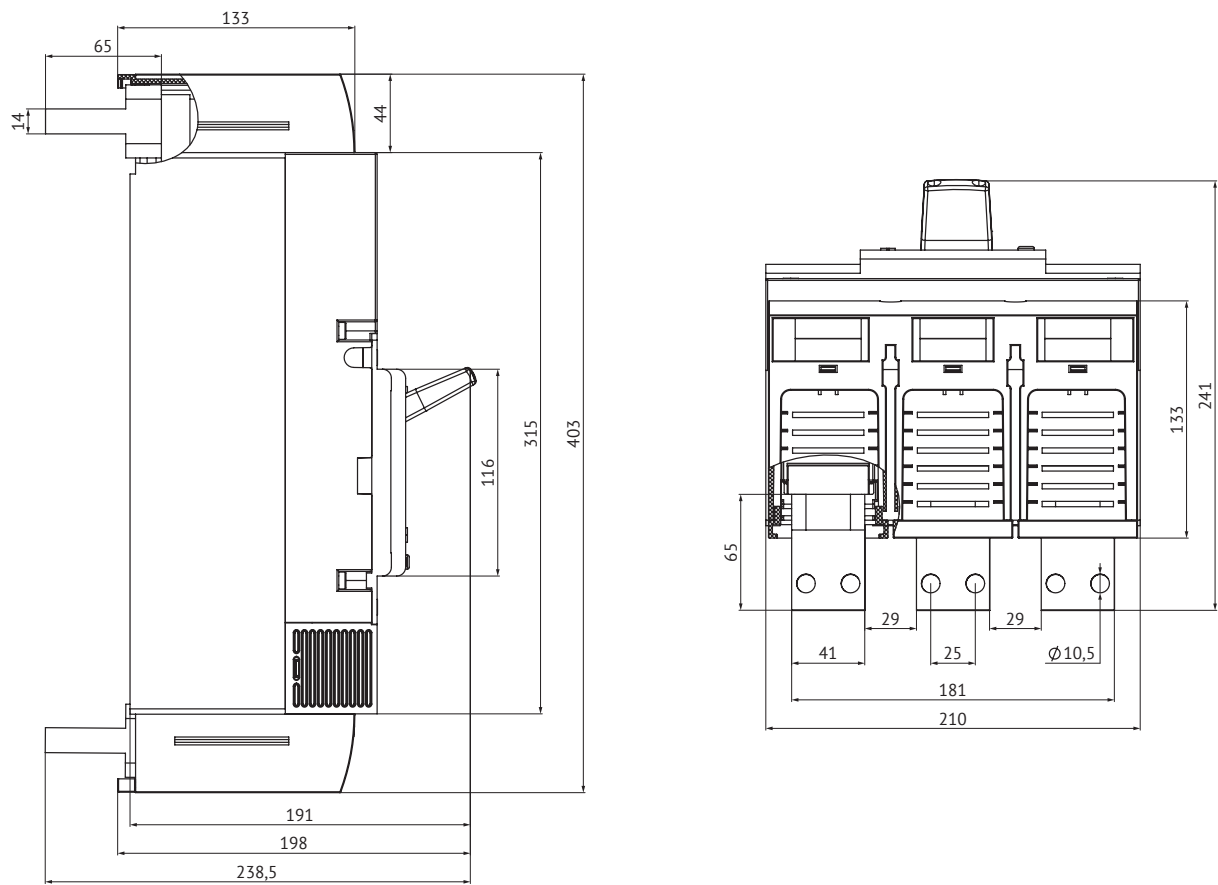
### Pole expanders and extenders



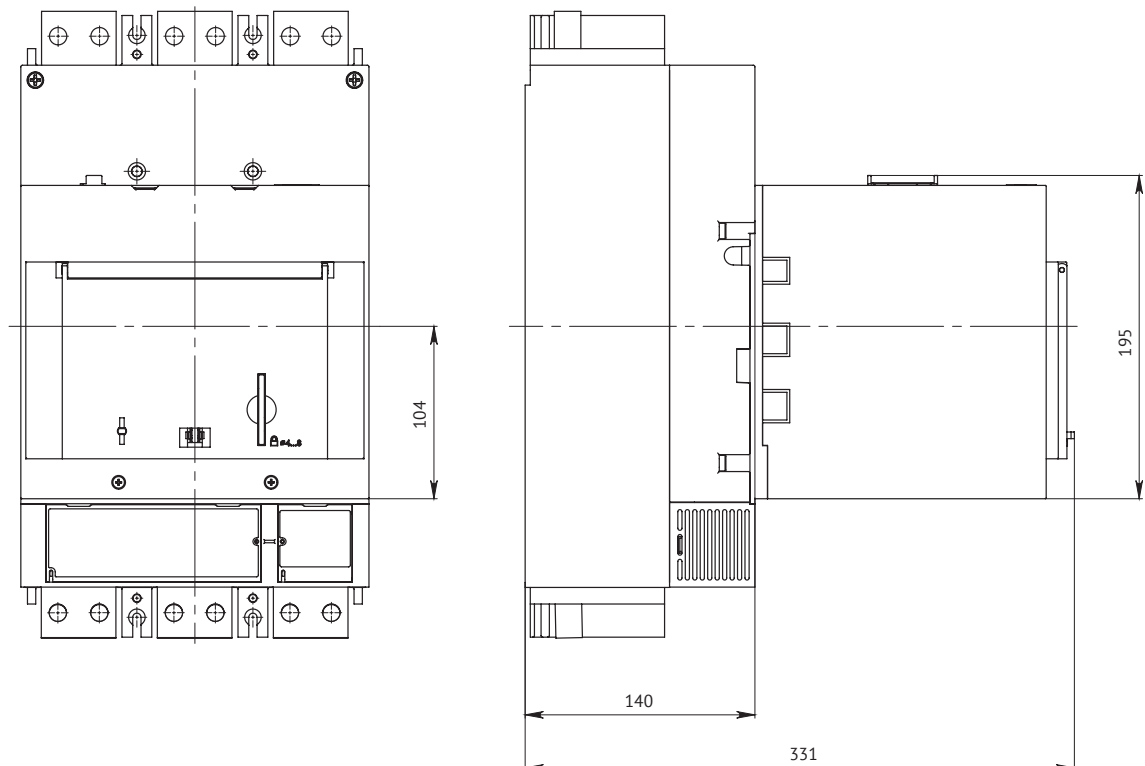
### Rear vertical terminals and terminal covers



### Rear horizontal terminals and terminal covers

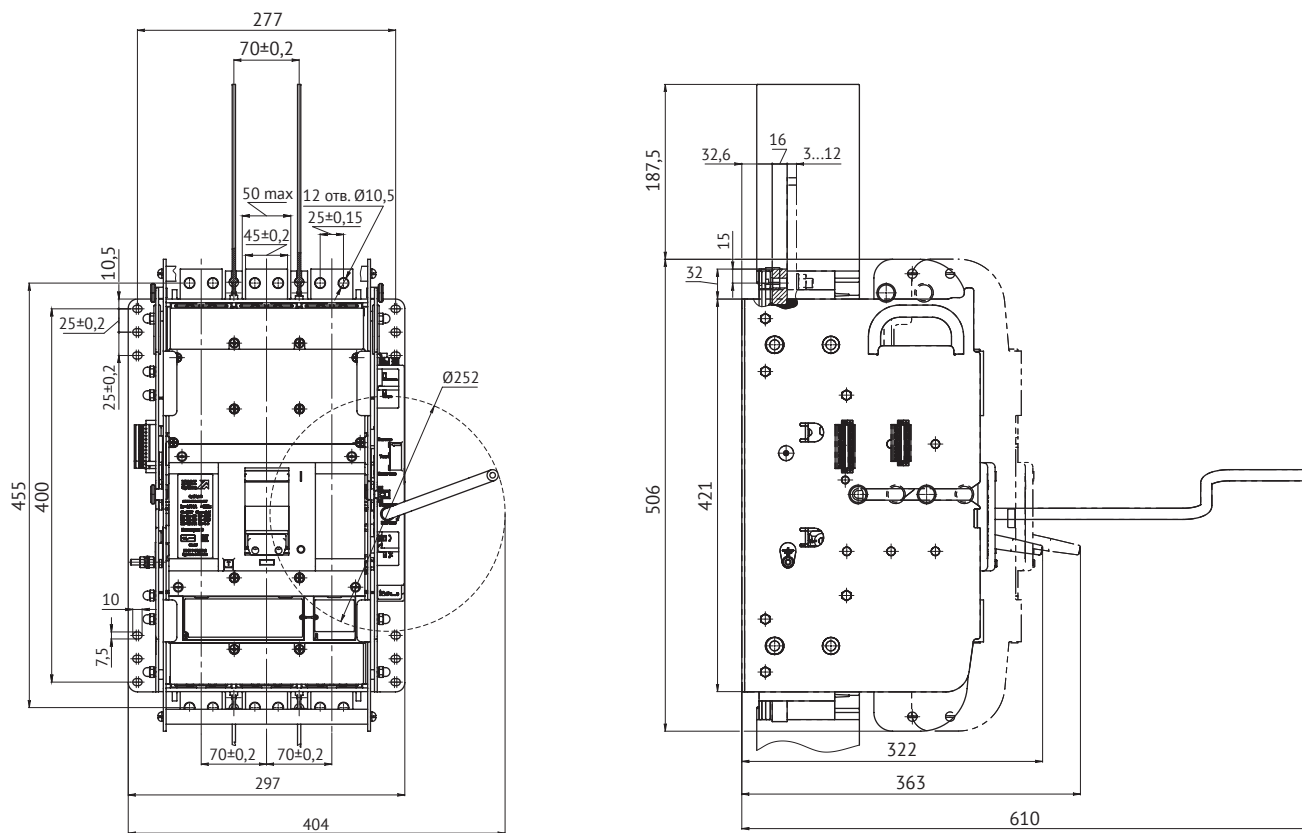


### Motor drive

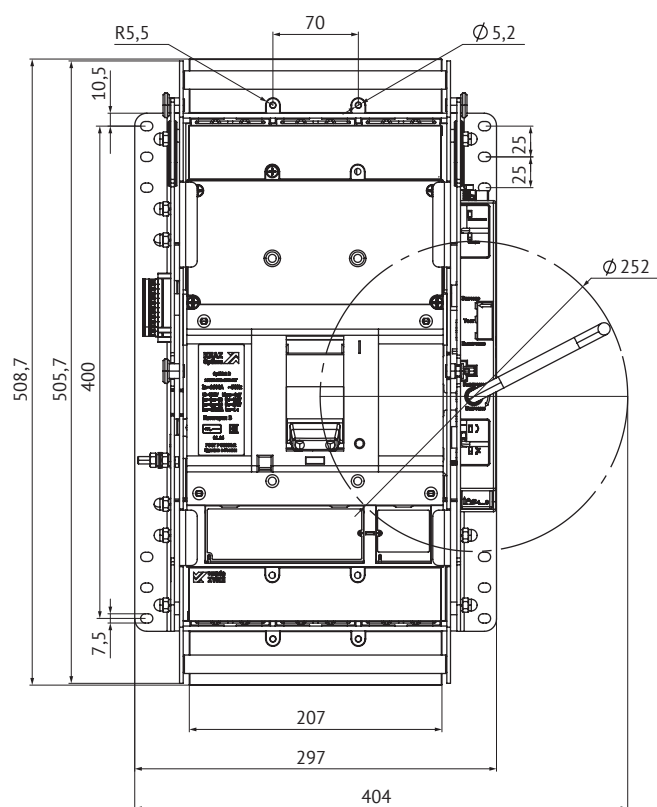


## Withdrawable OptiMat D800, D1000, D1250 and D1600

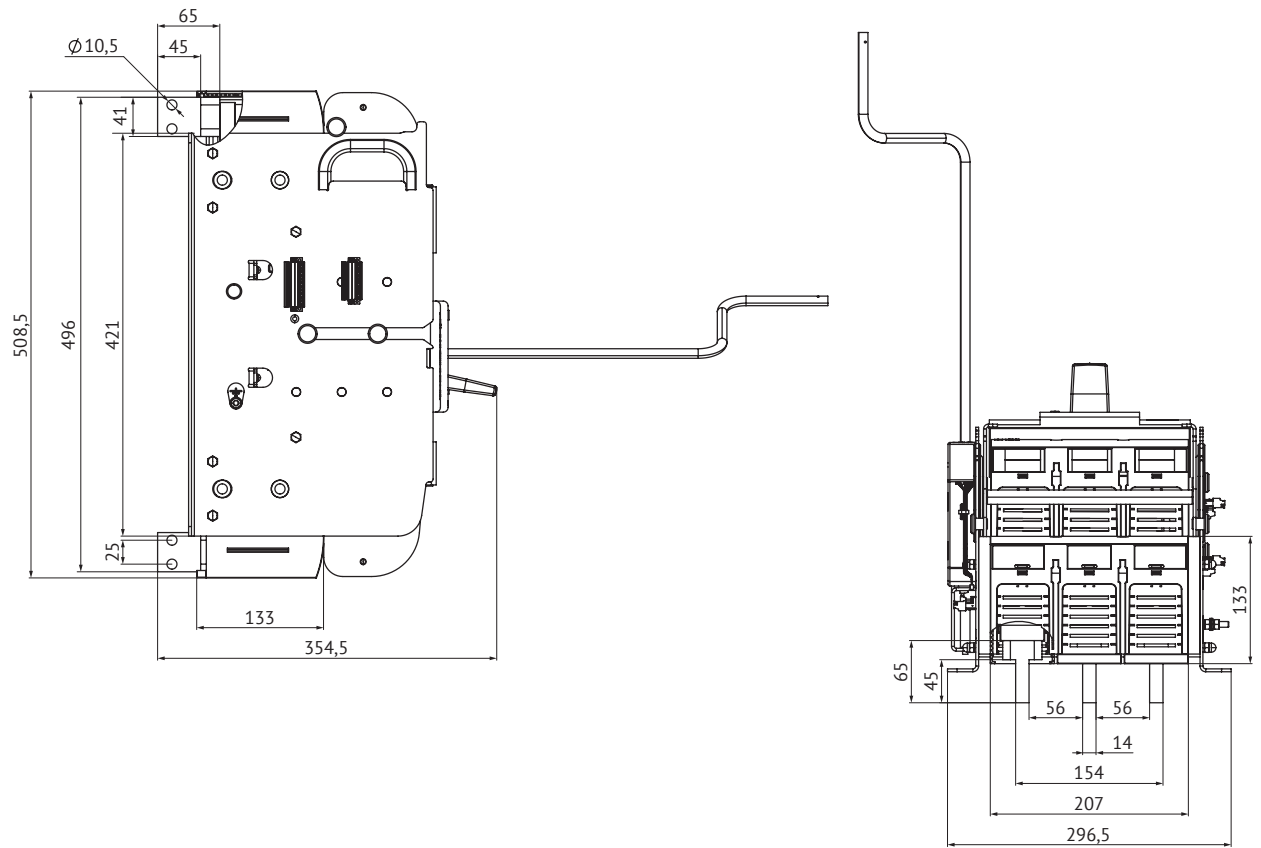
### Front terminals



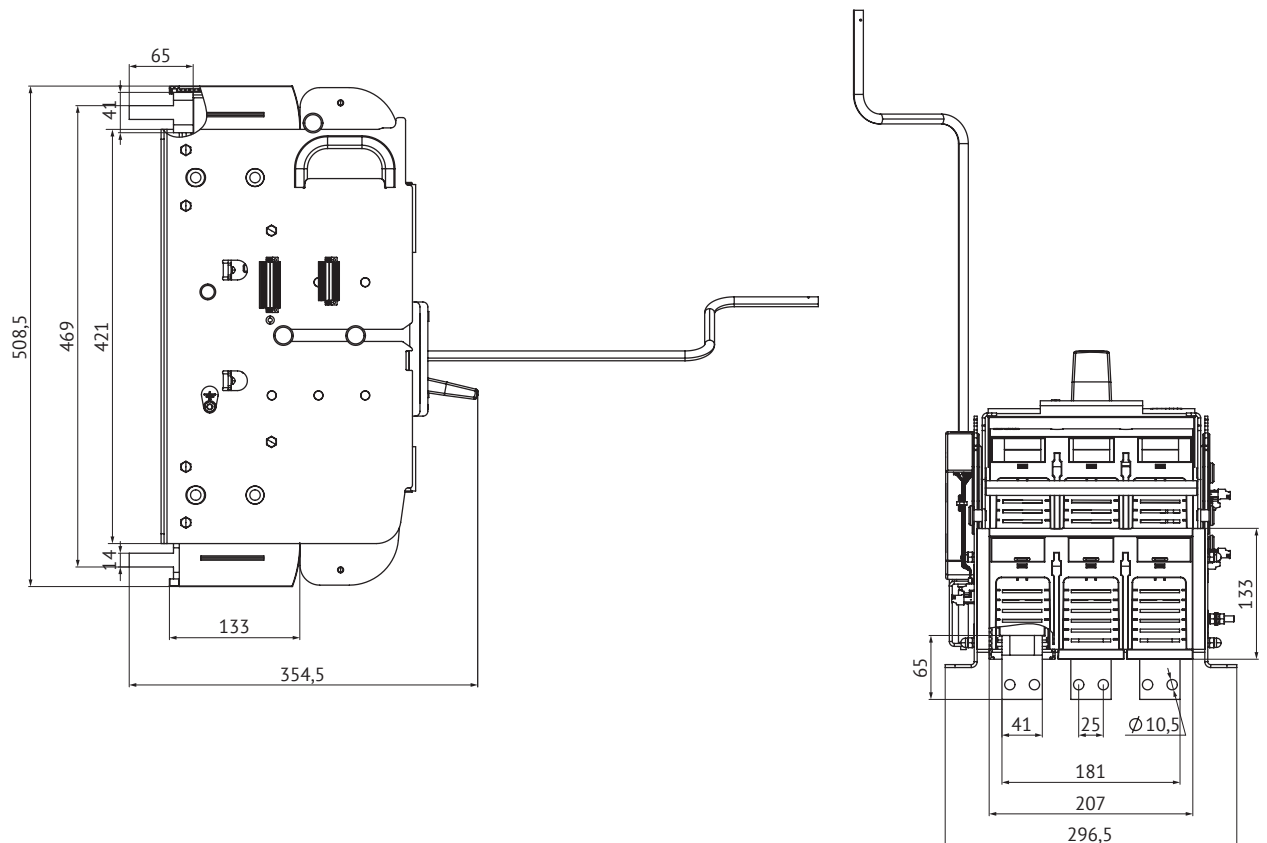
### Terminal cover and terminals



**Rear vertical terminals and terminal covers**



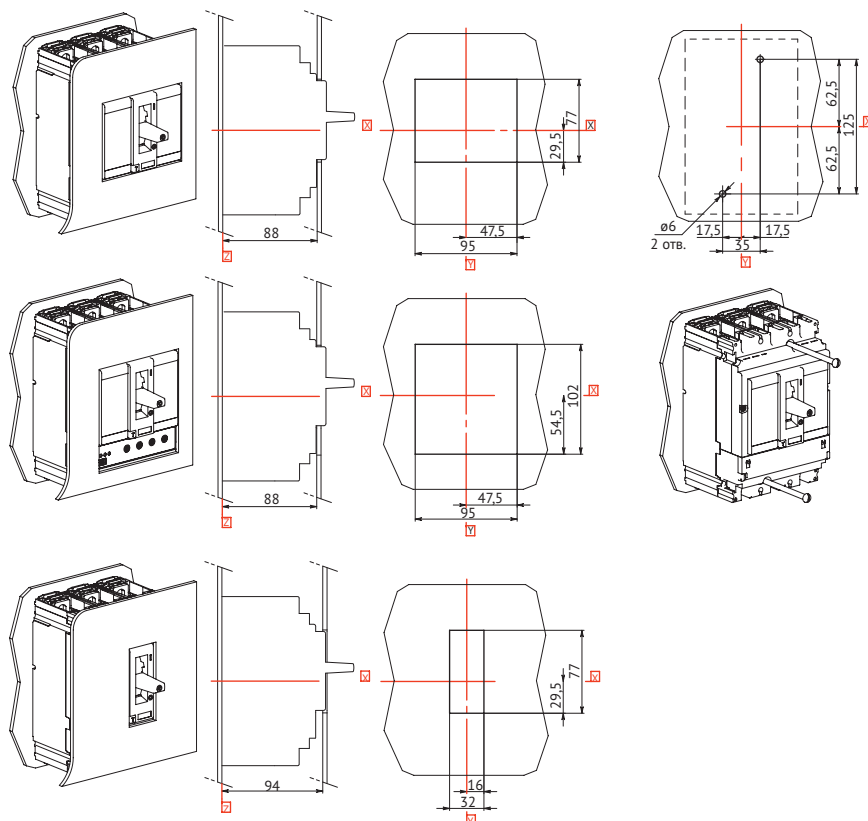
**Rear horizontal terminals and terminal covers**



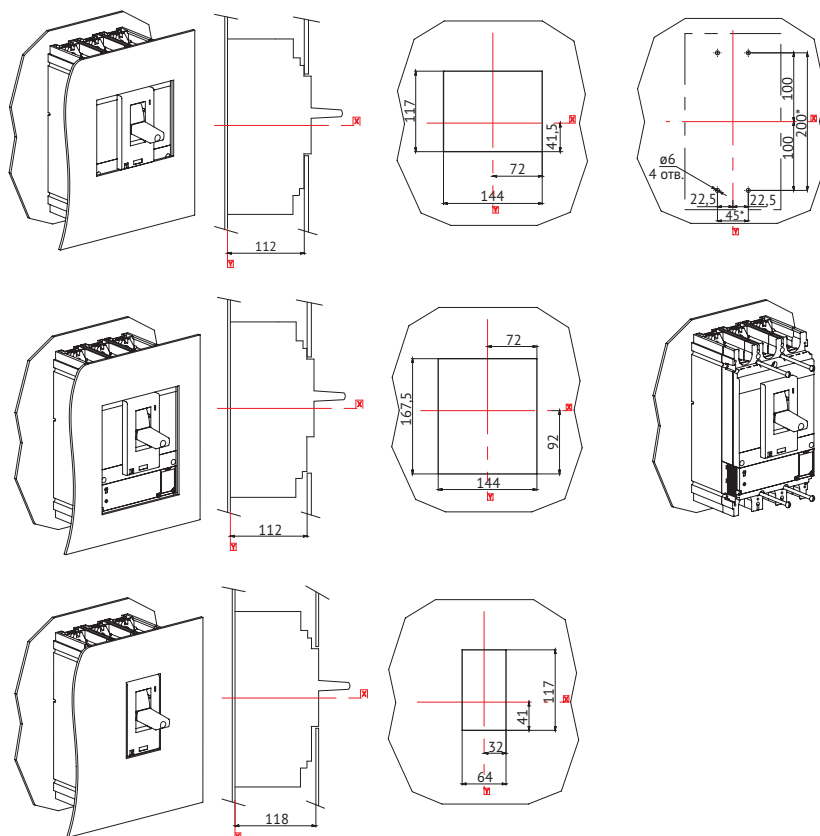


## ► Templates for cabinet marking and drilling

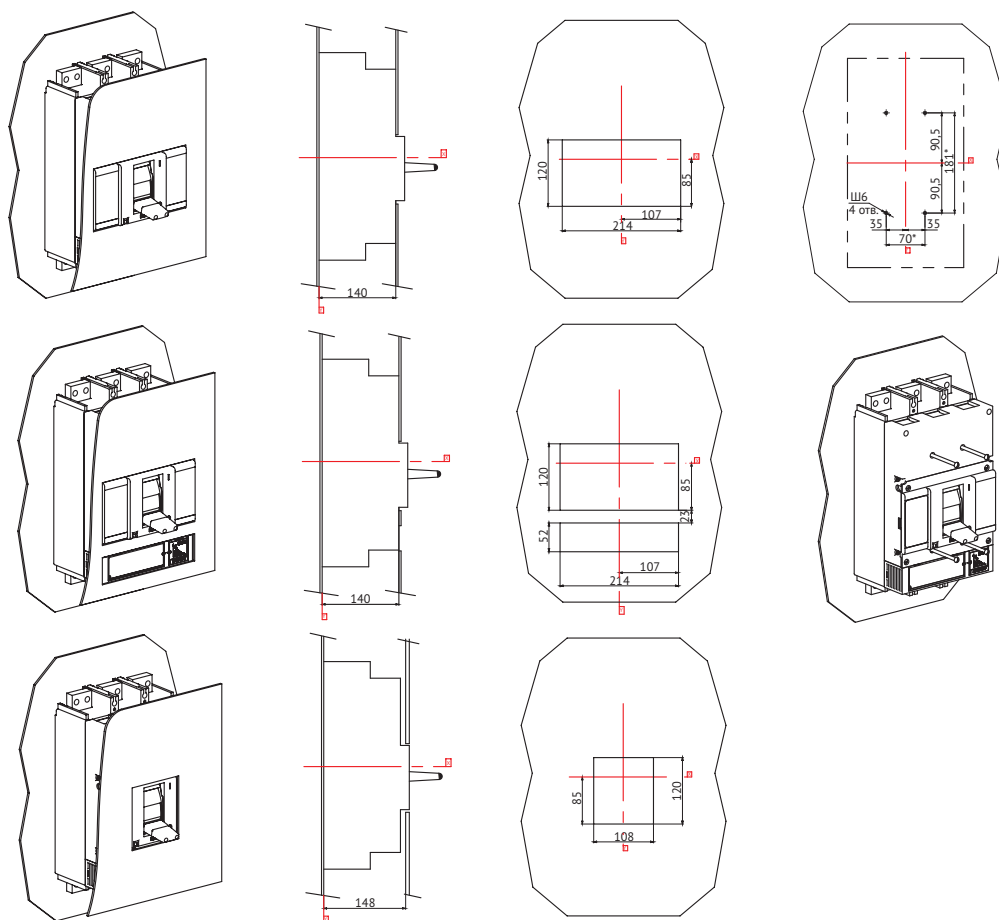
OptiMat D100, D160 and D250



OptiMat D400 and D630

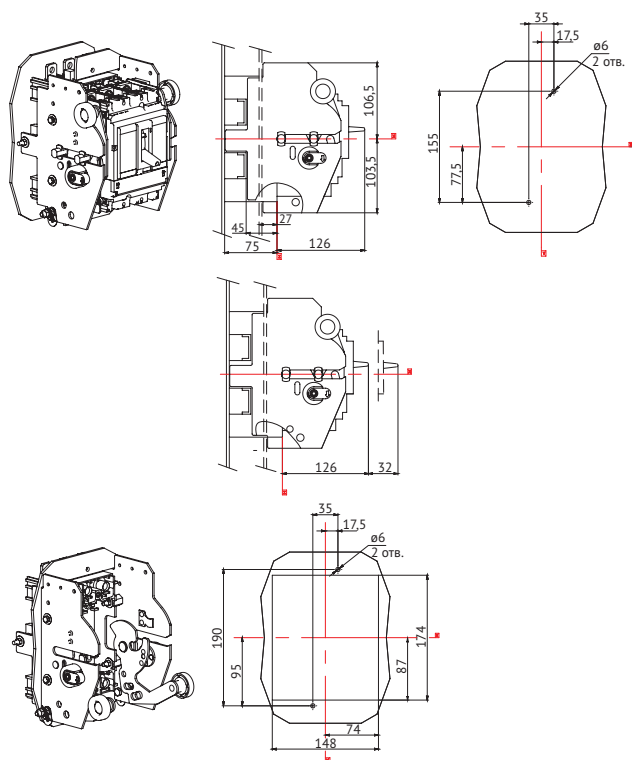


## OptiMat D800, D1000, D1250 and D1600

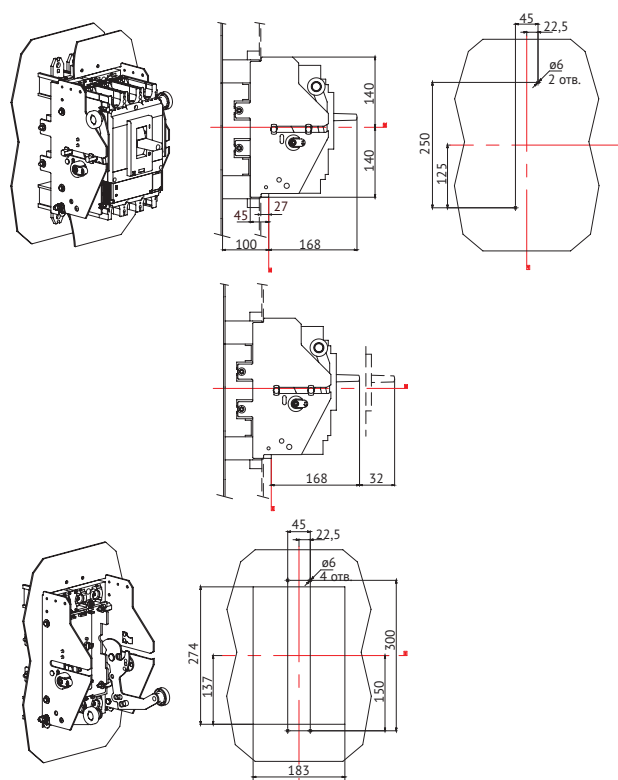


## Plug-in connection and withdrawable design

### OptiMat D100, D160 and D250



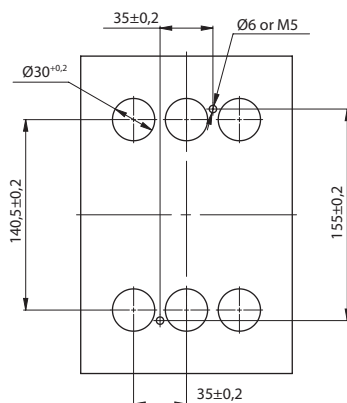
### OptiMat D400 and D630



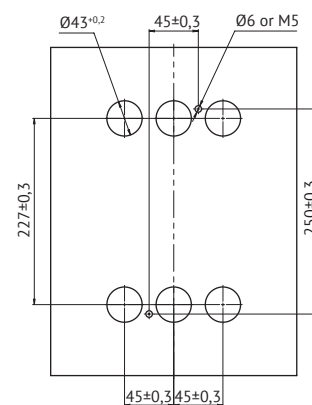
## ► Location of holes in the panel for installing the base

Location of holes on the panel for installing the base

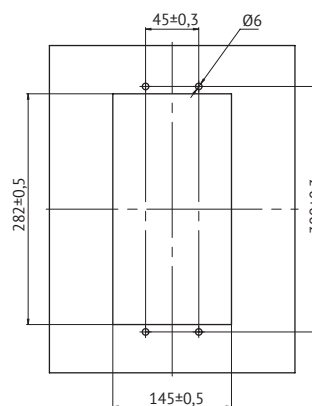
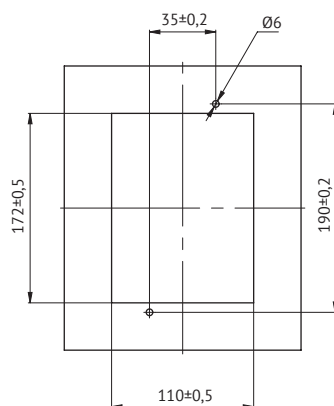
OptiMat D100, D160 и D250



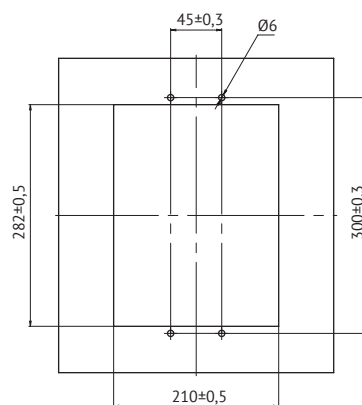
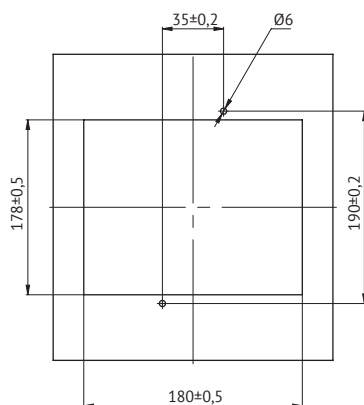
OptiMat D400 и D630



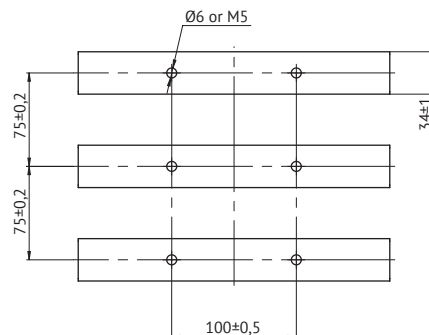
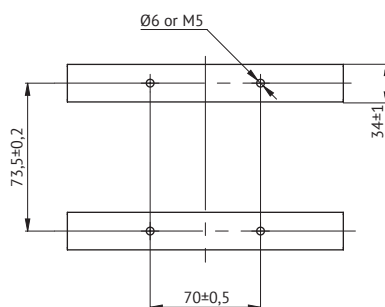
Location of holes for installing plug-in version behind the panel



Location of holes for installing an withdrawable design behind the panel



Location of holes on the rails for installing the base



Circuit diagrams

OptiMat D with thermomagnetic release

The diagram shows the maximum possible number of auxiliary contacts and voltage releasers. The diagram is shown in the «Off» state of the circuit breaker, the device is «charged» and «Drawn in».

Designations adopted in the scheme:

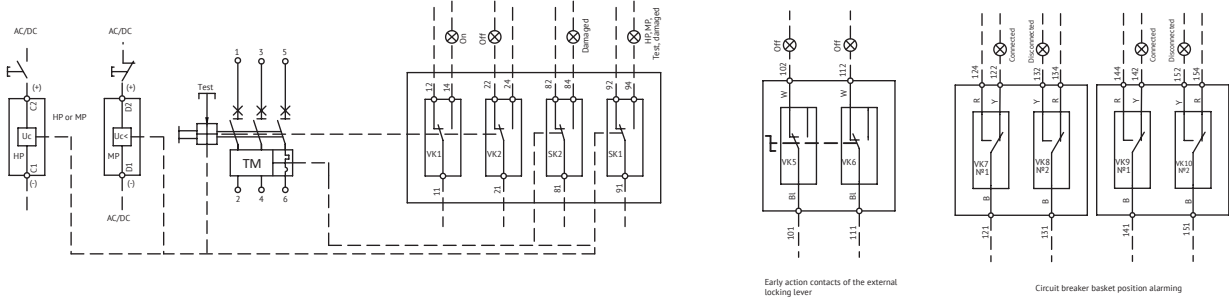
- TM - thermomagnetic current release;
- HP - shunt trip;
- MP - undervoltage release;
- VK1, VK2, VK3, VK4 - signaling about the switching state of the main contacts (closed/open);
- VK5, VK6 - early action contacts when switching on (rotary remote handle only);
- VK7, VK8, VK9, VK10 - circuit breaker basket position alarming;
- SK1 – contacts signaling the disconnection of the breaking mechanism both for operation mode and emergency shutdown;
- SK2 - contact signaling the disconnection of the breaking mechanism (emergency shutdown only).

Color coding of terminals

Numerical designation	Color coding	
	Designation	Wire color
101, 111	Bl	Blue
102, 112	W	White
121, 131, 141, 151	B	Black
122, 132, 142, 152	Y	Yellow
124, 134, 144, 154	R	Red

Dashed line indicates the connections made by the user.

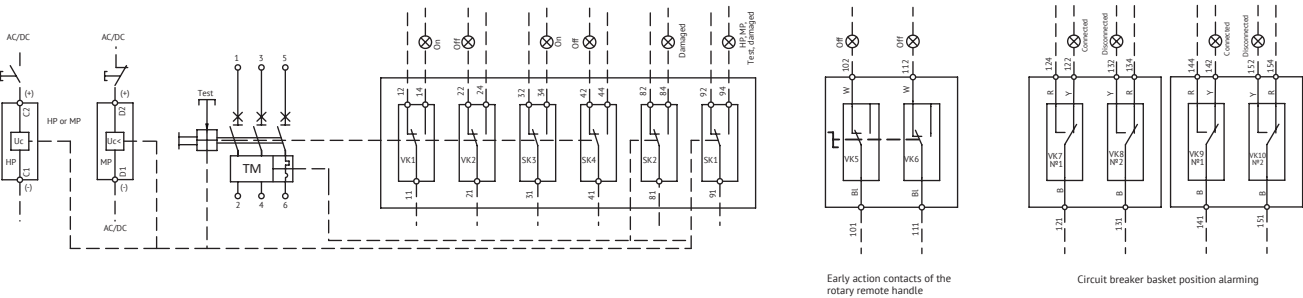
OptiMat D100, OptiMat D160 and OptiMat D250 with thermomagnetic release



Early action contacts of the external locking lever

Circuit breaker basket position alarming

OptiMat D400, OptiMat D630 with thermomagnetic release



Early action contacts of the rotary remote handle

Circuit breaker basket position alarming

## OptiMat D with electronic release

The diagram shows the maximum possible number of auxiliary contacts and voltage releasers. The diagram is shown in the «Off» state of the circuit breaker, the device is «Raised» and «Drawn in».

Обозначения, принятые в схеме:

MR — overcurrent release;

IR - actuating release;

MP — undervoltage release;

HP — shunt trip;

VK1, VK2, VK3, VK4 - signaling about the switching state of the main contacts (closed/open);

VK5, VK6 - early action contacts when switching on (rotary remote handle only);

VK7, VK8, VK9, VK10 - circuit breaker basket position alarming;

SK1 – contacts signaling the disconnection of the breaking mechanism both for operation mode and emergency shutdown;

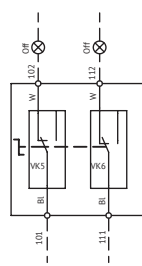
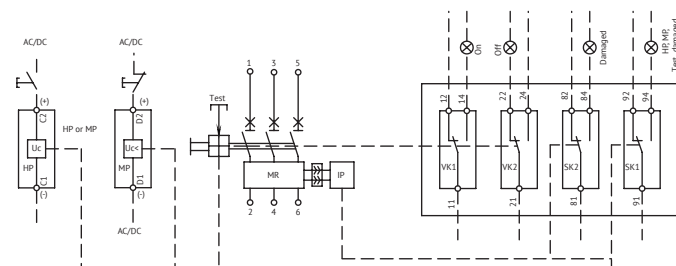
SK2 - contact signaling the disconnection of the breaker (emergency shutdown only).

### Цветовая маркировка выводов

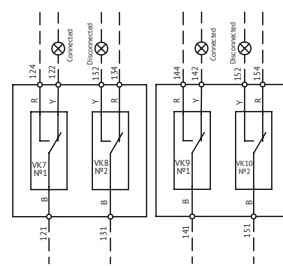
Цифровое обозначение	Color coding	
	Designation	Wire color
101, 111	Bl	Blue
102, 112	W	White
121, 131, 141, 151	B	Black
122, 132, 142, 152	Y	Yellow
124, 134, 144, 154	R	Red

Dashed line indicates the connections made by the user.

## OptiMat D100, OptiMat D160 and OptiMat D250 with electronic release

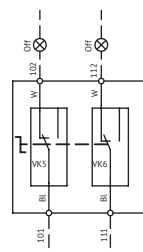
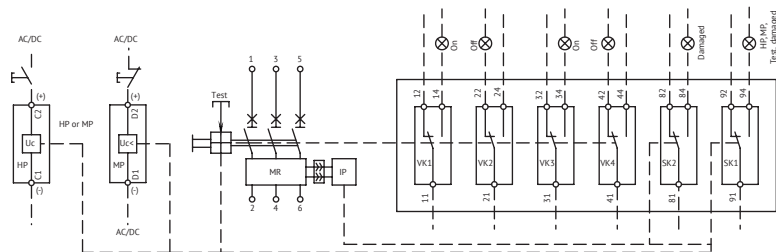


Early action contacts of the rotary remote handle

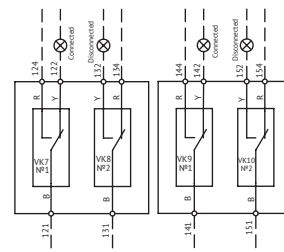


Circuit breaker basket position alarming

## OptiMat D400, OptiMat D630 with electronic release

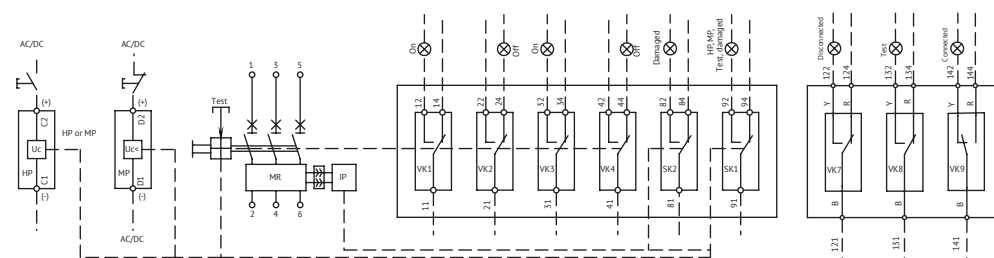


Early action contacts of the rotary remote handle



Circuit breaker basket position alarming

## OptiMat D800, OptiMat D1000, OptiMat D1250 and OptiMat D1600 with electronic release



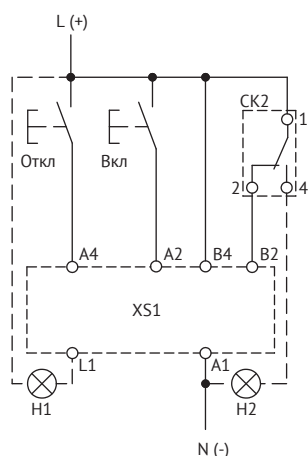
Circuit breaker basket position alarming

## Motor drive connection diagrams

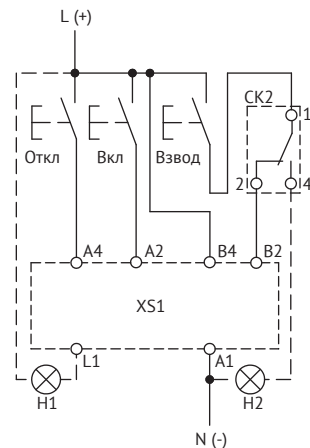
### OptiMat D100, D250, D400 and D630

In the diagrams shown: the circuits are de-energized, the circuit breaker is switching off, drawn in and charged.

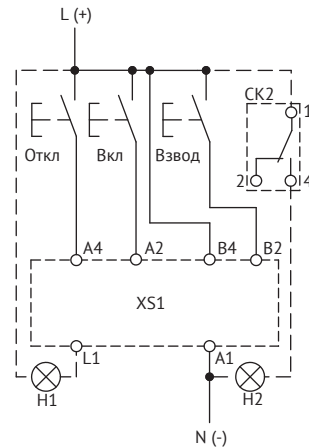
Connection diagram of the drive with automatic charge of activation spring



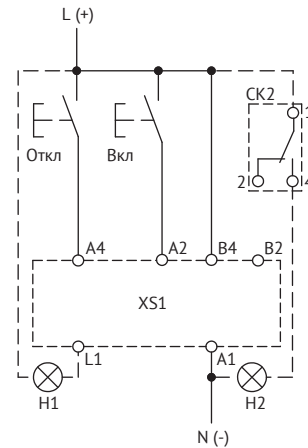
Connection diagram of the drive with remote charge of activation spring



Drive connection diagram with remote charge of the actuating spring, including after emergency shutdown of the circuit breaker



Connection diagram of the drive with remote charge of activation spring



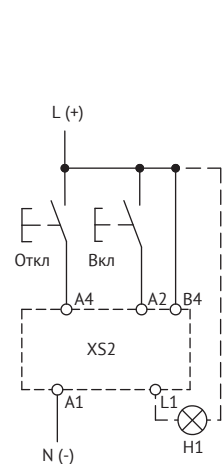
XS1 - connector for connecting conductors; A4 - shutdown command; A2 - activation command; B4, A1 - motor drive power supply; B2 - command to charge the drive activation spring when the circuit breaker mechanism is disengaged (due to pressing the trip button, tripping of the undervoltage release or shunt trip, impact of the locking mechanism); L1 - manual mode;

SK2—signal contact for emergency shutdown due to tripping of the overcurrent release (short circuit, overload); H1 — signaling of manual control mode; N2 - signaling of tripping of the signal contact of the circuit breaker after an emergency shutdown of SK2.

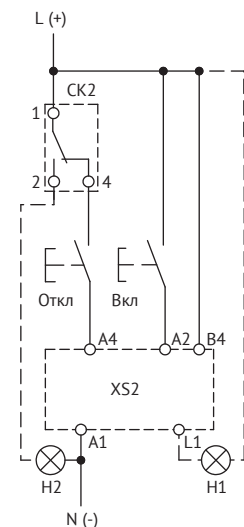
### OptiMat D800, D1000, D1250 and 1600

In the diagrams shown: the circuits are de-energized, the circuit breaker is switching off, drawn in and charged.

Connection diagram of the drive with remote charge of activation spring

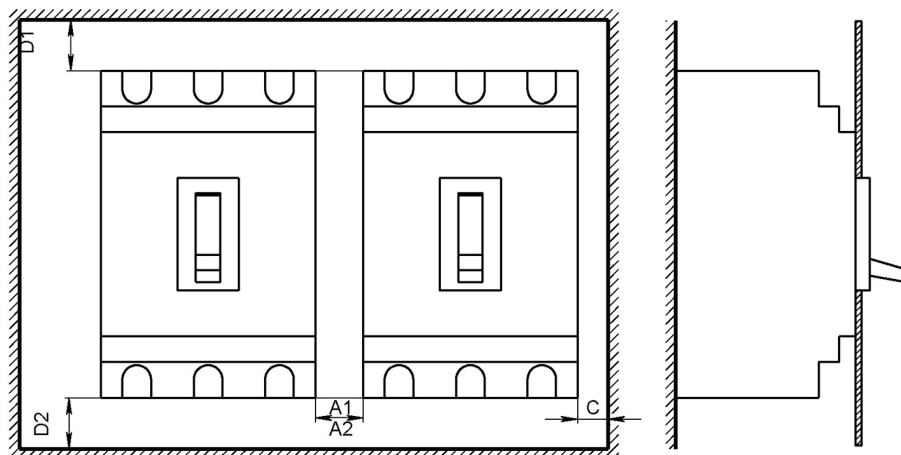


Connection diagram for a drive with manual charge of the actuating spring after an emergency shutdown



XS2 - connector for connecting conductors; A4 - shutdown command; A2 - activation command; B4, A1 - motor drive power supply; L1 - automatic mode; SK2 - alarm contact for emergency deactivation (short circuit, overload); H1 - manual control mode alarm; N2 - signaling of tripping of the signal contact of the circuit breaker after an emergency shutdown of SK2.

► Minimum allowable distance from circuit breakers to metal parts of OptiMat D switchgear



OptiMat D circuit breaker		Dimensions, mm				
		C	D1	D2	A1 <sup>1</sup>	A2 <sup>2</sup>
100, 160 and 250 A	400 V	5	35	35	0	10
	690 V	20	35	35	0	40
400, 630 A	400 V	5	60	60	0	10
	690 V	20	100	100	0	40
800, 1000, 1250, 1600 A	400–690 V	15	100	35	0	15

1 — if there are terminal covers;  
2 — if there are no terminal covers.