

## MEDIUM VOLTAGE VACUUM CIRCUIT BREAKERS

### Series VK

FOR INDOOR INSTALLATION



- TRADITION
- OWN DEVELOPMENT
- QUALITY MANAGEMENT
- ENVIRONMENT PROTECTION
- MINIMAL DIMENSIONS
- MINIMAL MAINTENANCE
- RELIABILITY
- MARKET ORIENTATION

## 1. GENERALLY

Vacuum compact circuit breaker series VK is third generation of medium voltage vacuum circuit breakers manufactured in KONČAR - MEDIUM VOLTAGE APPARATUS, Inc.

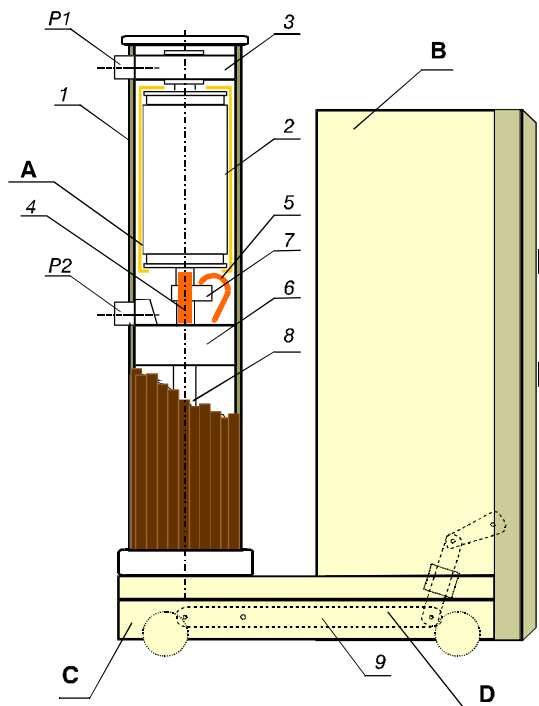
Vacuum compact circuit breakers have been designed to meet requirements of domestic electric distribution networks, and also fit well in industrial switchgear. The design of these series complies with current world trends in medium voltage apparatus design and development.

## 2. DESIGN

Vacuum circuit breakers series VK are based upon latest generation of vacuum interrupters, distinguished by minimal dimensions and masses.

Product range of series VK covers rated voltages up to 38 kV, rated breaking/making capacities up to 40/100 kA and rated currents up to 3150.

Circuit breakers are designed as three-pole units, with vacuum interrupters built into insulating cylinders. The complete line of circuit breakers is designed and type tested in accordance with IEC Norms (Publication 62271-100). According to construction diagrama (Fig. 1.), vacuum circuit breakers consist of the following assemblies:



- A** - Poles
- B** - Operating mechanism
- C** - Base
- D** - Transmission levers
- P1, P2** - Terminals

- 1** - Insulating cylinder of epoxy resin reinforced with glass-fiber
- 2** - vacuum interrupter
- 3** - fixed upper carrier
- 4** - moving contact
- 5** - flexible connection
- 6** - lower connection housing
- 7** - addition of moving contact of vacuum interrupter
- 8** - insulating lever
- 9** - transmission lever

Fig. 1.  
Constructional diagram of VK circuit breaker

Spring charging, energy storing operating mechanism type m5-VK is used at circuit breakers series VK.

Operating mechanism is mechanically trip-free, with possibility of energy surplus restitution. These features make the operating mechanism extremely reliable and durable.

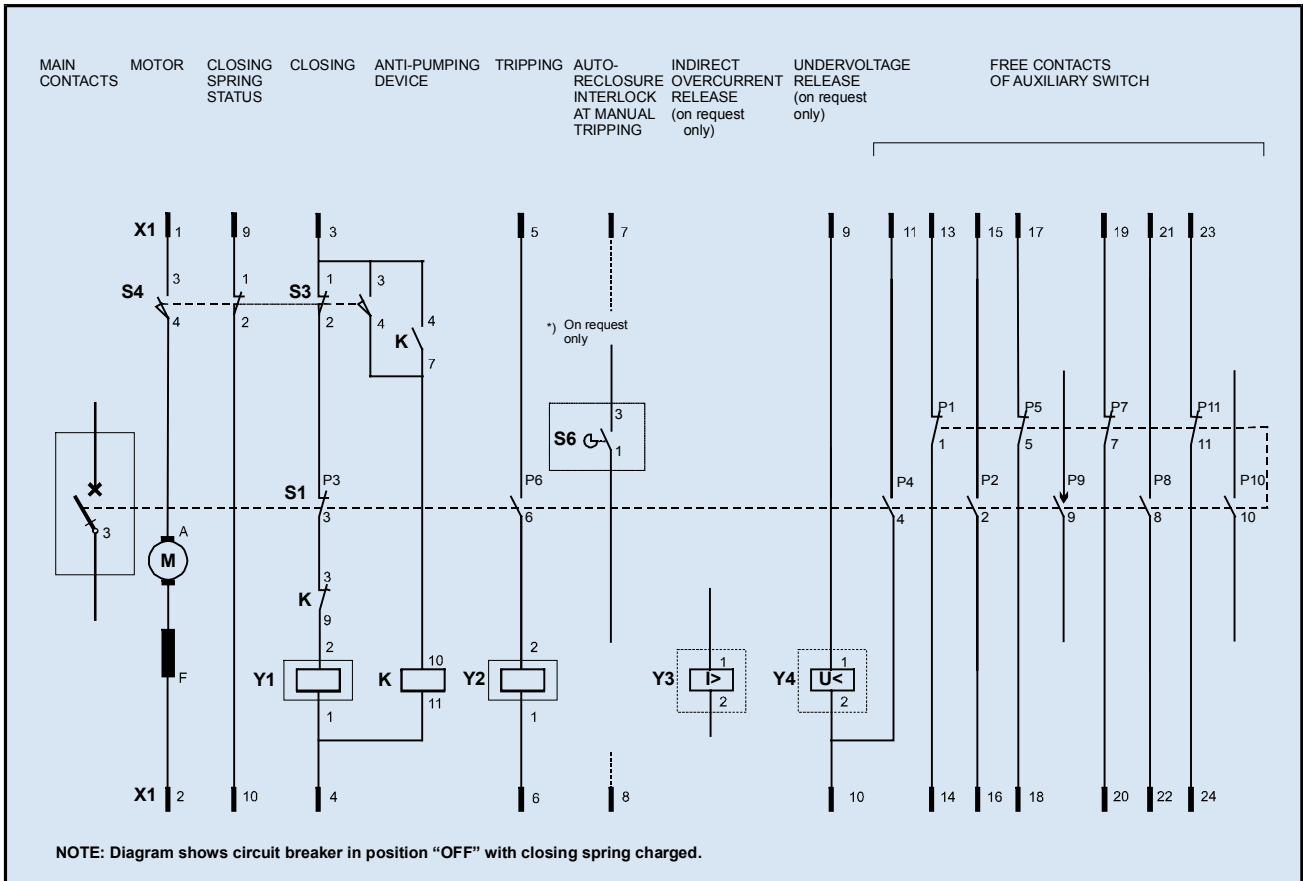
Operating mechanism is equipped with motor drive, opening and closing releases, anti-pumping device, auxiliary switch with 5NC and 5NO contacts, and 24-pin plug-in connector for connection of auxiliary circuits.

Other special fittings can be delivered on customer's request (see Chapters 5, 6 and 7.)

### 3. TECHNICAL CHARACTERISTICS

TYPE DESIGNATION	O -0,3s - CO - 3 min CO																	
	VK 12-25-8	VK 12-25-12	VK 12-25-25	VK 12-40-12	VK 12-40-25	VK 17-25-16 SA	VK 17-25-31 SA	VK 24-16-8	VK 24-16-12	VK 24-25-8	VK 24-25-12	VK 24-25-25	VK 38-16-8	VK 38-16-12	VK 38-25-12	VK 38-25-25	VK 38-31-25	VK 38-20-20 I
Rated voltage	kV										17,5	24	24	24	38	27,5		
Power frequency withstand voltage 50 Hz/1 min.	kV										38	50	50	50	70	95		
Impulse withstand voltage 1,2/50 µs	kV										95	125	125	125	170	200		
Rated frequency	Hz										50 / 60	50	50	50	50	50		
Rated current	A										800	1250	2500	2500	1250	2500	2500	1250/2500
Short time withstand current (3s)	kA										25	40	40	25	16	25	31	20
Rated making capacity (peak value)	kA										63	100	63	63	40	63	100	50
Rated breaking capacity (symmetrical)	kA										25	40	25	25	16	25	31	20
DC component at asymmetrical current	%										32	32	32	32	32	32	32	32
Rated breaking capacity for single capacitor bank	A										400	400 (IEC) 630 (ANSI)	400	400	400	400	400	
Opening time	ms										45	45	45	45	45	45	45	
Closing time	ms										60	70	70	70	60	60	60	
Arcing time at rated breaking capacity	ms										10-15	10-15	10-15	10-15	10-15	10-15	10	
Break time	ms										60	70	70	60	60	60	60	
Rated operating sequence											O -0,3s - CO - 3 min CO							
Mechanical life	cycles										20000	20000	20000	20000	20000	20000	20000	20000
Electrical life at rated normal current	cycles										2500	2500	2500	2500	2500	2500	2500	10000
Electrical life at rated breaking capacity	cycles										50	50	50	50	50	50	140	
Opening / closing release consumption	W/VA										250	250	250	250	250	250	250	
Electric motor consumption	W/VA										do 225	do 225	do 225	do 225	do 225	do 225	do 225	do 225
Weight	kg										~ 80	~ 80	~ 80	~ 80	~ 125	~ 185	~ 95	

## 4. SECONDARY CIRCUIT DIAGRAM



### List of equipment fitted on vacuum circuit breaker series VK:

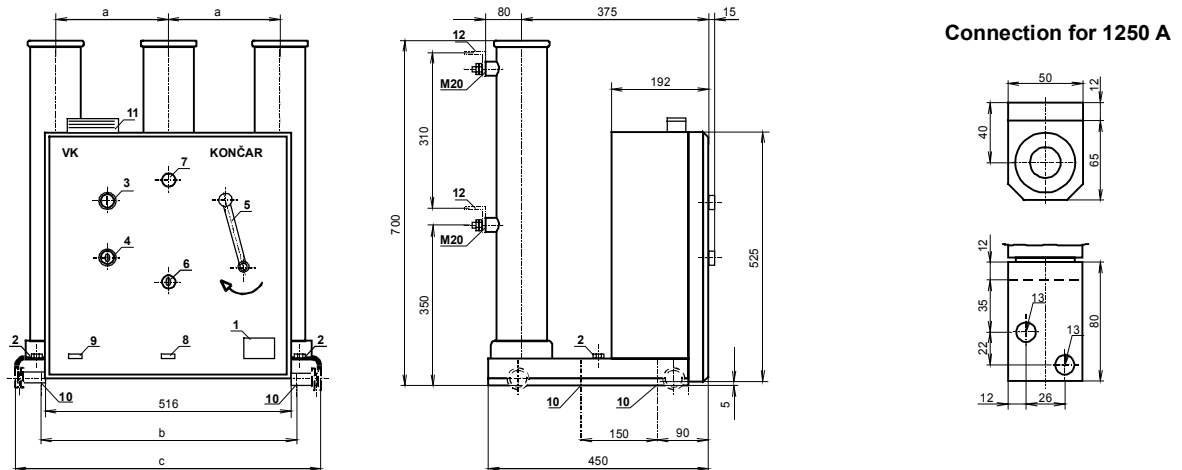
Qty	Description/Application	Identification and technical data	Qty	Description/Application	Identification and technical data																																																		
1	<b>MOTOR (M)</b> / Closing spring charging	<table border="1"> <thead> <tr> <th>Type</th> <th colspan="4">U7030-130/125-L, "Gefeg"</th> <th colspan="2">U7030-103-L, "Gefeg"</th> </tr> </thead> <tbody> <tr> <td>Un (V)</td> <td>220 ≅</td> <td>110 ≅</td> <td>60 =</td> <td>48 =</td> <td colspan="2"></td> </tr> <tr> <td>In (A)</td> <td>2,1</td> <td>4,2</td> <td>7,6</td> <td>9,5</td> <td colspan="2"></td> </tr> <tr> <td>Pn (W; VA)</td> <td>190</td> <td>225</td> <td>190</td> <td>180</td> <td colspan="2"></td> </tr> <tr> <td>n (1/min.)</td> <td colspan="6">13000</td> </tr> </tbody> </table>	Type	U7030-130/125-L, "Gefeg"				U7030-103-L, "Gefeg"		Un (V)	220 ≅	110 ≅	60 =	48 =			In (A)	2,1	4,2	7,6	9,5			Pn (W; VA)	190	225	190	180			n (1/min.)	13000						2	<b>LIMIT SWITCH (S3,S4)</b>	Type: KS; "Končar" Motor stopping Un = 500V In = 10A ≅ Antipumping															
		Type	U7030-130/125-L, "Gefeg"				U7030-103-L, "Gefeg"																																																
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Type	OI; OU "Končar"																																																						
Un (V)	220	110 ≅	60 =	48 =	24 =																																																		
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1	<b>INDIRECT OVERCURRENT RELEASE (Y3)</b>	Protective tripping <table border="1"> <thead> <tr> <th>Type</th> <th colspan="2">Oks; "Končar"</th> </tr> </thead> <tbody> <tr> <td>In (A)</td> <td>1</td> <td>0,5</td> </tr> </tbody> </table> *) To be delivered on special request only	Type	Oks; "Končar"		In (A)	1	0,5	1	<b>MICROSWITCH (S6)</b>	Type: MS-324; "Metalfleks" Closing interlock at manual tripping Un=250V~ In=10A  *) To be delivered on special request only																																												
Type	Oks; "Končar"																																																						
In (A)	1	0,5																																																					
1	<b>UNDERVOLTAGE RELEASE (Y4)</b>	Protective tripping <table border="1"> <thead> <tr> <th>Type</th> <th colspan="5">Okp "Končar"</th> </tr> </thead> <tbody> <tr> <td>Un (V)</td> <td>220 ≅</td> <td>110 ≅</td> <td>60 =</td> <td>48 =</td> <td>24 =</td> </tr> <tr> <td>Pn (W)</td> <td colspan="5">18</td> </tr> <tr> <td>Pn (VA)</td> <td>27</td> <td colspan="4">--</td> </tr> </tbody> </table> *) To be delivered on special request only	Type	Okp "Končar"					Un (V)	220 ≅	110 ≅	60 =	48 =	24 =	Pn (W)	18					Pn (VA)	27	--				1	<b>RELAY (K)</b>	Antipumping device <table border="1"> <thead> <tr> <th>Type</th> <th colspan="4">PR 41C "Iskra"</th> </tr> </thead> <tbody> <tr> <td>Un (V)</td> <td>220 ≅</td> <td>110 ≅</td> <td>60 =</td> <td>48 =</td> <td>24 =</td> </tr> <tr> <td>Pn (W)</td> <td colspan="5">2,5</td> </tr> <tr> <td>Pn (VA)</td> <td>2</td> <td colspan="4">--</td> </tr> </tbody> </table>	Type	PR 41C "Iskra"				Un (V)	220 ≅	110 ≅	60 =	48 =	24 =	Pn (W)	2,5					Pn (VA)	2	--				1	<b>PLUG-IN CONNECTOR (X1)</b>	(24-pole plug and socket) "Harting" Access to control circuits
Type	Okp "Končar"																																																						
Un (V)	220 ≅	110 ≅	60 =	48 =	24 =																																																		
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## 5. DIMENSIONAL DRAWINGS

### LEGEND:

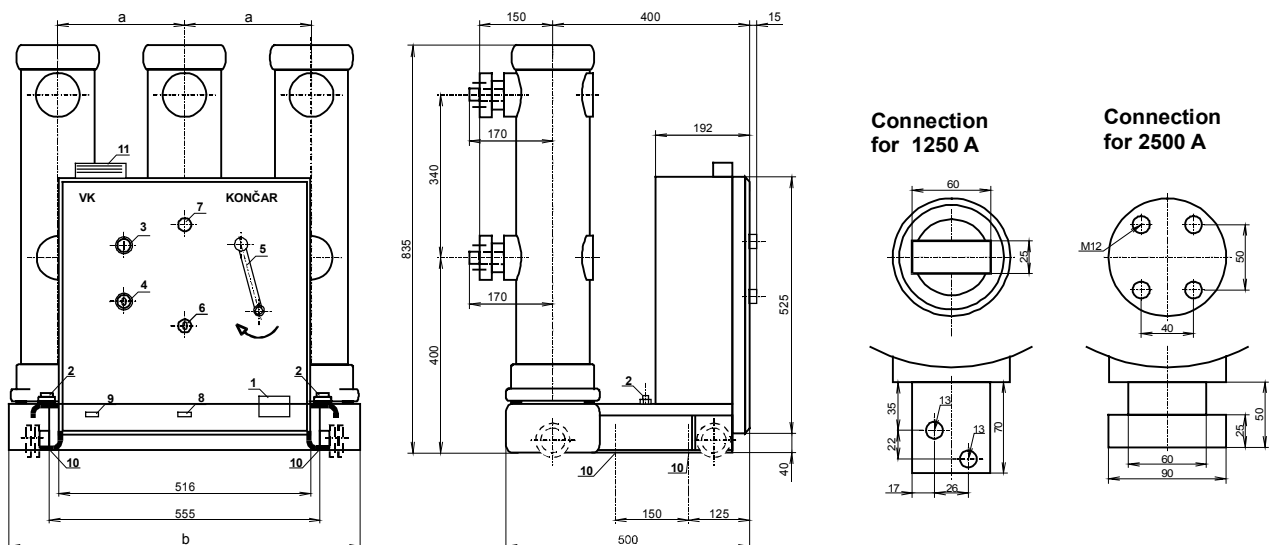
- |                                      |                                       |
|--------------------------------------|---------------------------------------|
| 1. Name plate                        | 7. Closing spring status indicator    |
| 2. Earthing screw, M12               | 8. Contact erosion indicator          |
| 3. Closing push-button               | 9. Counter                            |
| 4. Opening push-button               | 10. Fixing points, openings $\phi$ 13 |
| 5. Handle for manual spring charging | 11. Multipole plug-in connector       |
| 6. Contact status indicator          | 12. Contacts                          |

### 5.1. Dimensional drawing of types VK 12-25-8, VK 12-25-12 , VK24-16-8, VK24-16-12



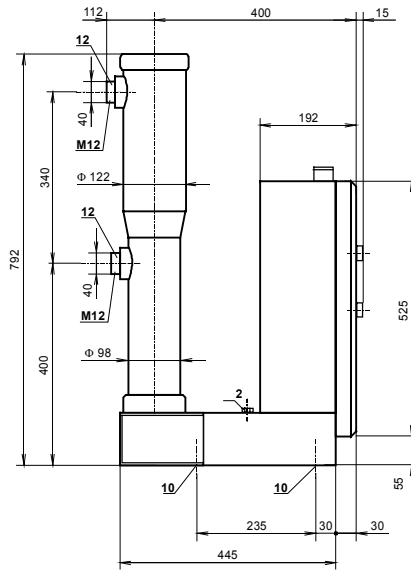
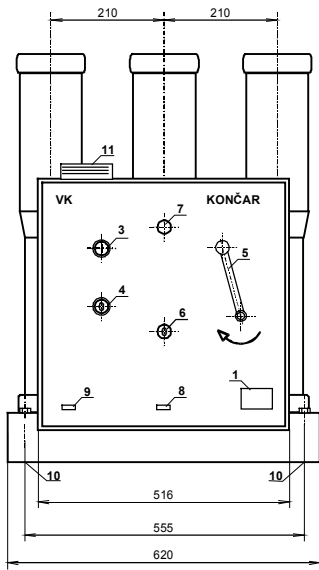
Dim. / Type	VK 12-25-8, VK 12-25-12	VK 24-16-8, VK 24-16-12
a (mm)	180	230
b (mm)	480	540
c (mm)	516	606

### 5.2. Dimensional drawing of types VK12-25-25, VK 12-40-12, VK 12-40-25, VK 17-25-31 SA, VK 24-25-25

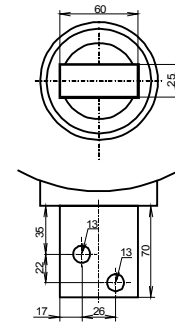


Dim. / Type	VK 12-25-25	VK 12-40-12	VK 12-40-25	VK 17-25-31SA	VK 24-25-25
a (mm)	230	230	275	275	275
b (mm)	660	660	750	750	750

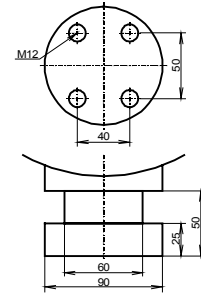
### 5.3. Dimensional drawing of type VK 17-25-31 SA



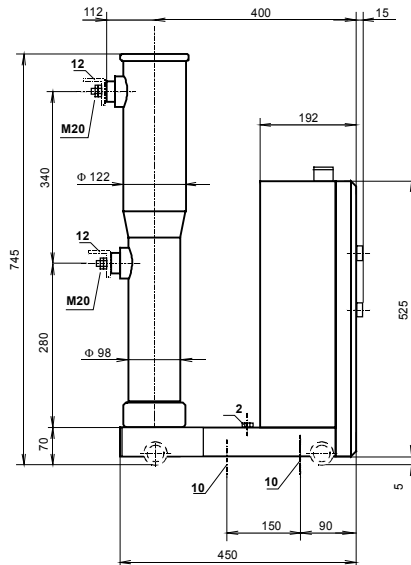
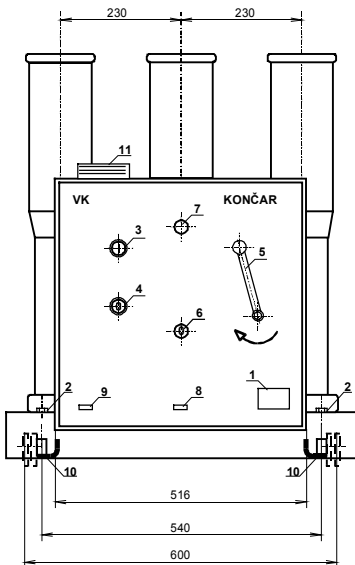
Connection for 1250 A



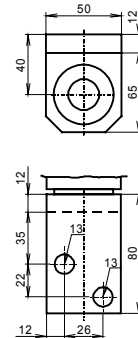
Connection for 2500 A



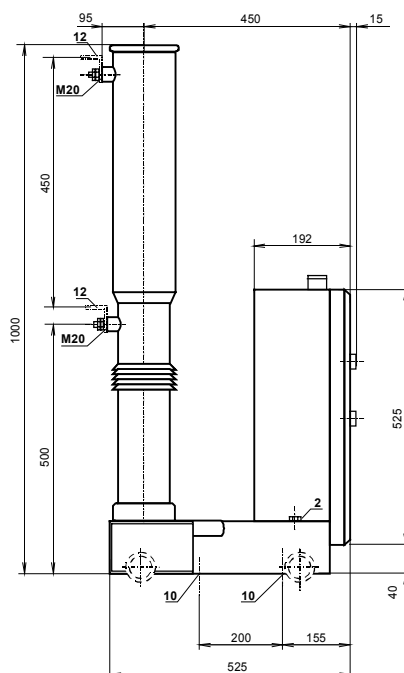
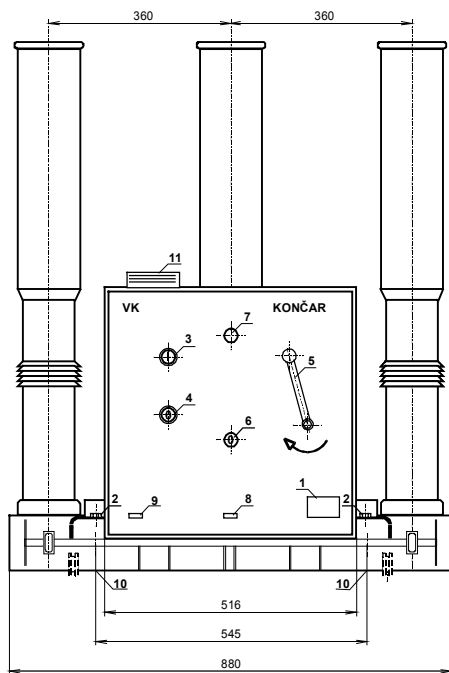
### 5.4. Dimensional drawing of types VK 24-25-8, VK 24-25-12



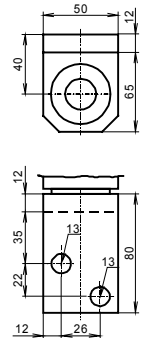
Connection for 1250 A



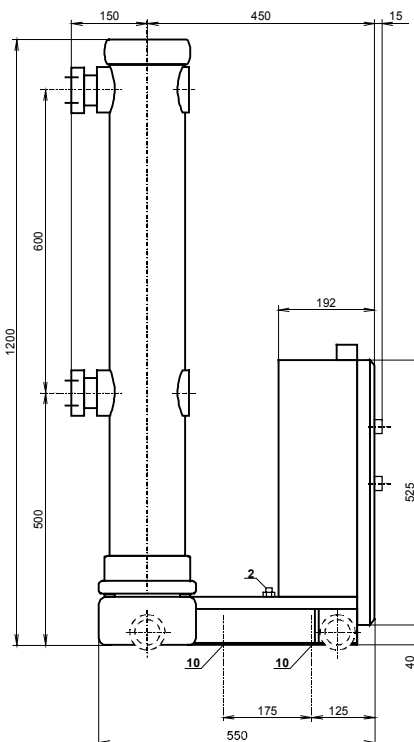
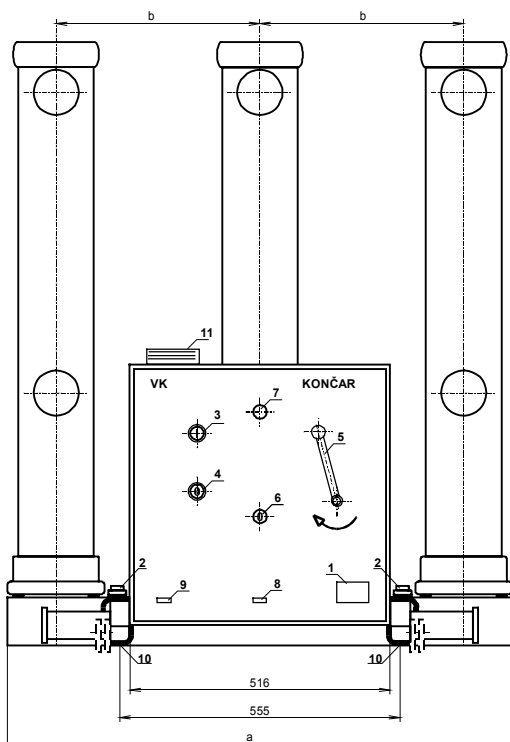
### 5.5. Dimensional drawing of type 38-16-8, VK 38-16-12



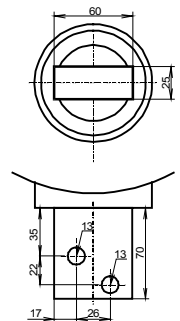
Connection for 1250 A



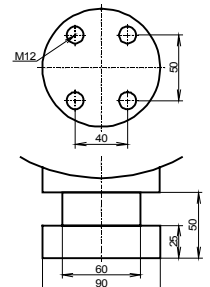
### 5.6. Dimensional drawing of type VK 38-25-12, VK 38-25-25 VK 38-31-25



Connection for 1250 A

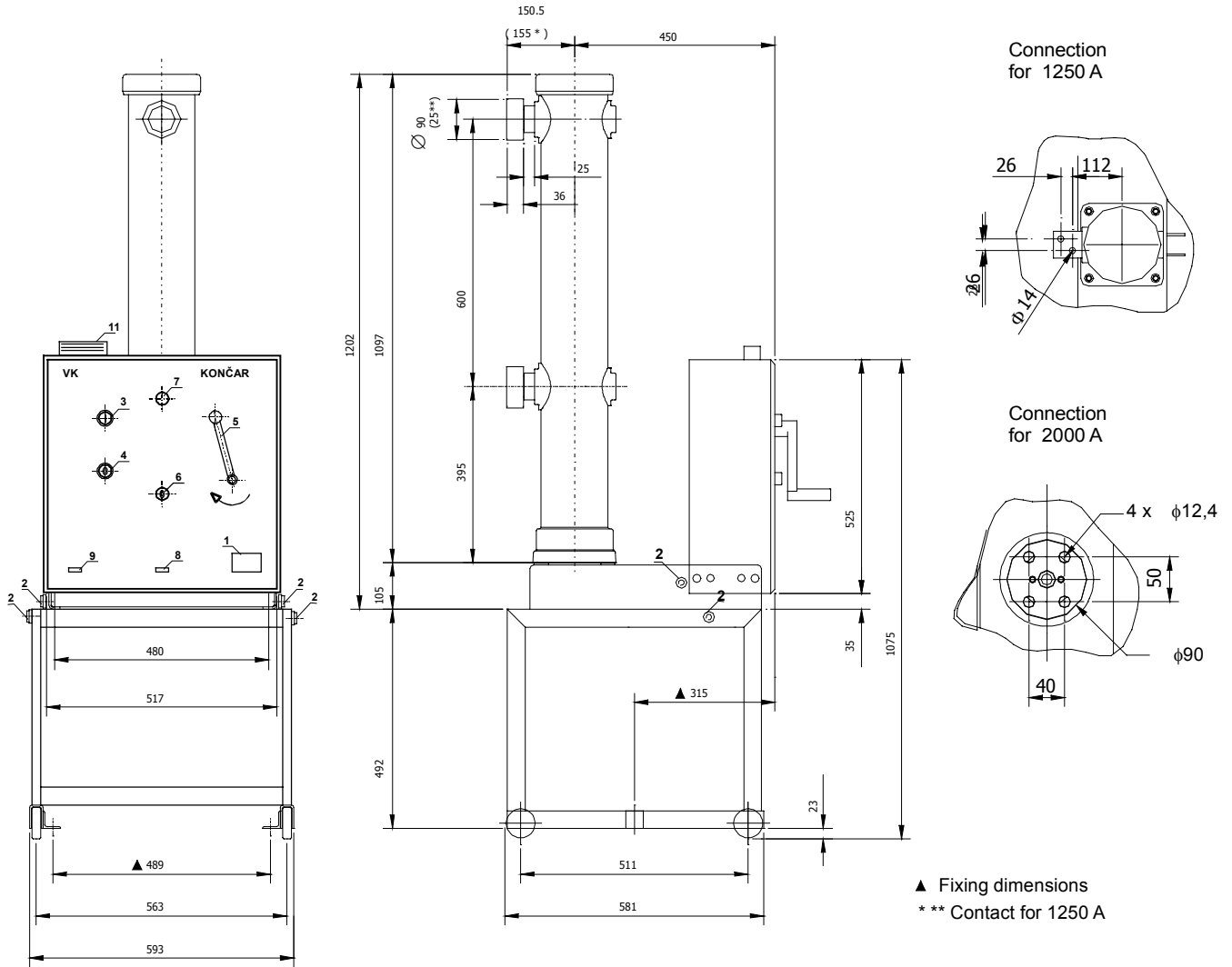


Connection for 2500 A

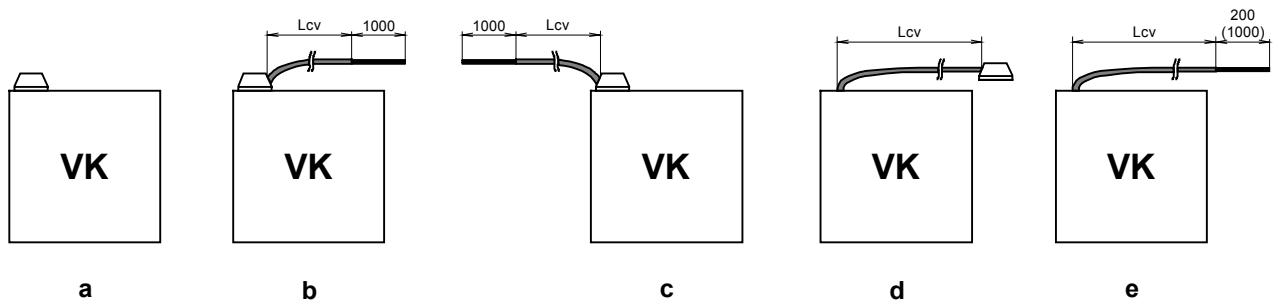


Dim. / Type	VK 38-25-12	VK 38-25-25	VK 38-31-25
a (mm)	360	400	400
b (mm)	920	1000	1000

## 5.7. Dimensional drawing of type VK 38-20-20 I



## 6. PLUG-IN CONNECTOR (Pos. 11 at dimensional drawings)



- a) Plug-in connector without wires  
 b) Plug-in connector with wires in flexible tube (right side of the connector)  
 c) Plug-in connector with wires in flexible tube (left side of the connector)  
 d) Plug-in connector on flexible tube with wires  
 e) Flexible tube with wires without plug-in connector

### NOTE:

a,b,c - Plug-in connector mounted on circuit breaker  
 d,e - Flexible tube with wires mounted on circuit breaker  
 Lengths of flexible tube ( $L_{cv}$ ): 600, 750, 800, 1050, 1250, 2000, 2500



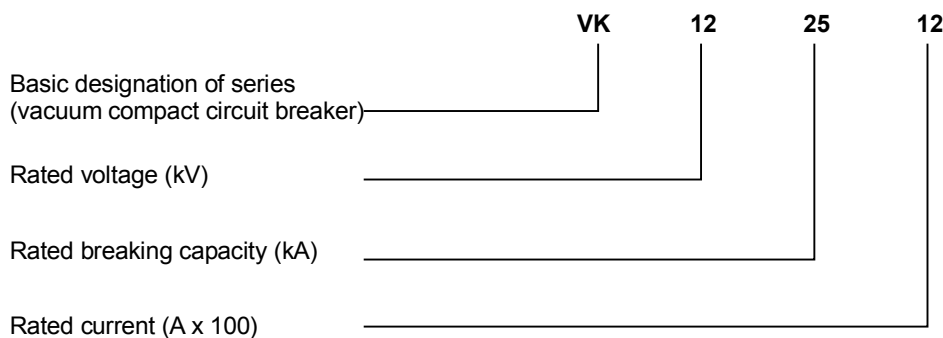
## 7. ORDERING DATA

### INQUIRY FOR - VACUUM CIRCUIT BREAKER Series VK (Fill or mark chosen data and return copy to the Manufacturer)

Customer/User:	_____
Address:	_____
Telephone:	_____
Telefax:	_____ e-mail: _____
Contact person:	_____
Type designation:	_____ Quantity: _____

1. Rated voltage	kV	12; 24; 38
2. Rated breaking capacity	kA	16; 25; ___
3. Rated current	A	800; 1250; 2500
4. Rated voltage of the motor drive	V	220 ≈ ; 110 ≈ ; 220=; 110=; 60=; 48=; 24=
5. Rated voltage of the opening/closing release	V	220 ≈ ; 110 ≈ ; 220=; 110=; 60=; 48=; 24=
6. Microswitch		On special request
7. Undervoltage release	V	On special request (220 ≈ ; 110 ≈ ; 220=; 110=; 60=; 48=; 24=)
8. Additional support (500 mm) for installation in the fixed cells		On special request
9. Plug-in connector (See Chapter 6.)		a; b; c; d; e
10. Length of flexible tube (See Chapter 6.)	mm	600; 750; 800; 1050; 1500; 2000; 2500
11. Counter		On special request
12. Note:		

#### Type designation of vacuum circuit breaker series VK - Example:



*Technical characteristics, dimensional drawings and other relevant data are subject to change.  
Obligatory data only on request.*