

NF- and MF-Contactors

for off-load switching

List 280E

Edition 01 / 2008

General:

Mains frequency and medium frequency air contactors for switching off load are electro-magnetically actuated no load switches. They are used for example, as capacitor contactors or as rotor short-circuit contactors.

Rated voltage:

Creepage paths and air gaps of the three rated insulation voltages 1000 V, 1500 V and 3000 V are in accordance with VDE 0110. Each contactor is subject to the voltage test (insulation test) in accordance with VDE 0660. For the rated insulation voltage $U_i = 3000$ V two contacts must be connected in series. An exception to this is the application of a 3-pole contactor as rotor short-circuit contactor with star connection. In accordance with VDE 0660, the reference voltage level of the starting contactors in the rotor circuits of three phase motor (just for starting and for starting adjustment, where the rotation speed is reduced by as much as 50%) needs to be only 0,6 of the standstill voltage in order to measure insulation to earth and only 0,6 of the highest resistance value of the compensation voltage of the parts to each other. Medium frequency air contactors are mainly used as capacitor contactors for switching without current. Before they switch on, the generator must be de-energized and short-circuited by means of a generator short-circuiting contactor (with negative poles).

Contacts:

The contacts are solid silver coated for continuous switching.

Drive:

The actuating of the contactors is effected electromagnetically. The magnetic system has the form of a hinged armature. The armature is mounted on the rotary shaft and the magnet with the coil on the bar. When energizing the magnetic coil, the shaft rotates and closes or opens the contacts. The magnetic coils are designed for connection either to alternating or direct current. The a.c. energized contactors can be manufactured for d.c. energized, upon request. In the case of supply from the a.c. mains system 230 V 50 Hz, a HOMA-Si-rectifier is fitted to the contactor and interconnected, on the d.c. side, with the magnet coil, the economy contact, and the economy resistance.

Control:

Controls should be arranged as depicted on page 4 fig. 1 or 2 (dependent the type of switch). When actuating press button "I" (on), the control AC-voltage is transmitted via the two economy contacts connected in series to the Si-rectifier which feeds its outgoing DC-voltage into the magnetic coil. The armature draws and closes the main switching elements. Shortly before the final position of the armature is reached, both economy contacts open thus switching the two parallel economy resistors into the feed-line of the rectifier. The magnetic coils are holding in by means of a holding contact of the switch and by the auxiliary contact of the release coil. For switching off, press button "O" (off) must be actuated. A NO-contact of the switch energizes the release coil which released the mechanical latch-in. At the same time, the release coil opens its auxiliary NC-contact which, in turn, interrupts the holding line and switches off the magnetic coil. Due to the switching off the magnetic coil, the NO-contact in the feed line of the release coil is open and thus deenergizes the release coil. Instead of the press buttons being fitted externally, a selector switch with fixed switching position maybe supplied.

Mechanical latch-in

A mechanical latch-in device is provided as a safety measure against accidental cut-off due to a failure of control voltage, which is released electromagnetically during the cut-off procedure by means of the release magnet.

Auxiliary contacts

The auxiliary contacts for the control- and latch-in condition are mounted below magnetic system. The standard design are 4NC and 4NO auxiliary contacts.

Current carrying capacity:

Taking into account the positive tolerances, harmonics and overvoltages, the maximum load current should not exceed the admissible continuous current. The rated current relates to an ambient temperature of 35°C. For ambient temperatures other than 35°C, the admissible permanent current can be found by using the following formula:

$$I_{\vartheta} = I_{35^{\circ}} \sqrt{\frac{105 - \vartheta}{70}}$$

$I_{35^{\circ}\text{C}}$ = Admissible continuous current [A] as per list

I_{ϑ} = Admissible continuous current [A] at ϑ

ϑ = Ambient temperature [°C]

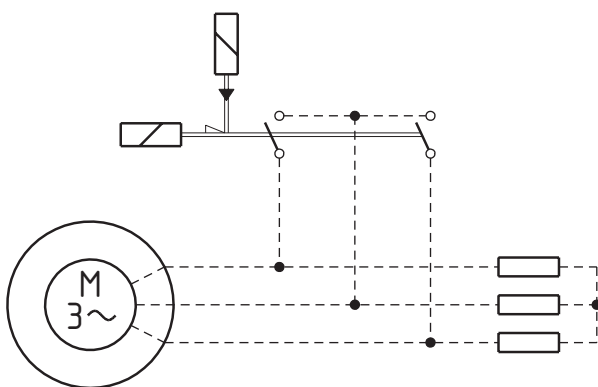
contactor type NFG... up to 300 Hz

contactor type MFG... up to 10000 Hz

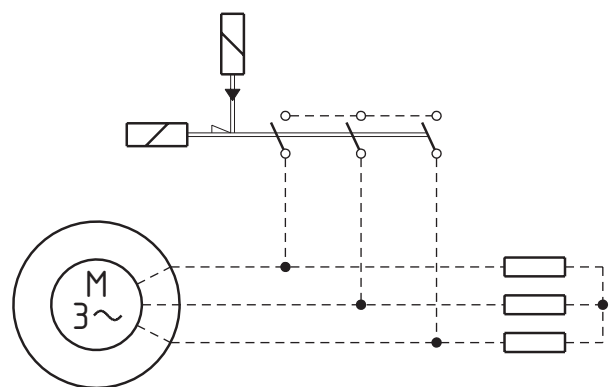
Switch latch device

Together with the additionally required short-circuiting devices and earth connections of the disconnected electrical installation, the switch latch device serves the purpose of protecting maintenance personnel against electric accidents. To this end, the switch latch device in the area of the magnetic system is equipped with a lever by means of which a mechanical locking device is placed between the open magnet. In the course of this, the auxiliary contacts depicted in the circuit diagram on sheet 6 are activated. These auxiliary contacts must be integrated into the installation's control circuit by the customer to prevent the control unit from being switched on. The mechanical locking device's lever is equipped with an additional facility to lock this mechanically locked position by means of three padlocks fitted by maintenance personnel. The switch latch device is not part of the normal switch design and has to be ordered additionally at an extra charge.

Examples:



up to 2500V rotor standstill voltage
rated insulations voltage
 $U_i = 1500\text{V}$ of the contactor



up to 5000V rotor standstill voltage
rated insulations voltage
 $U_i = 3000\text{V}$ of the contactor

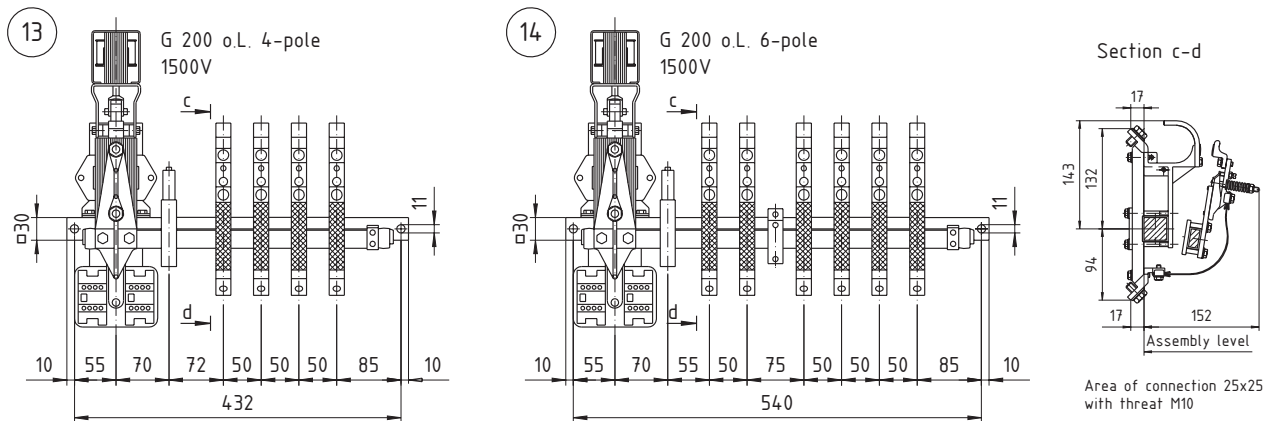
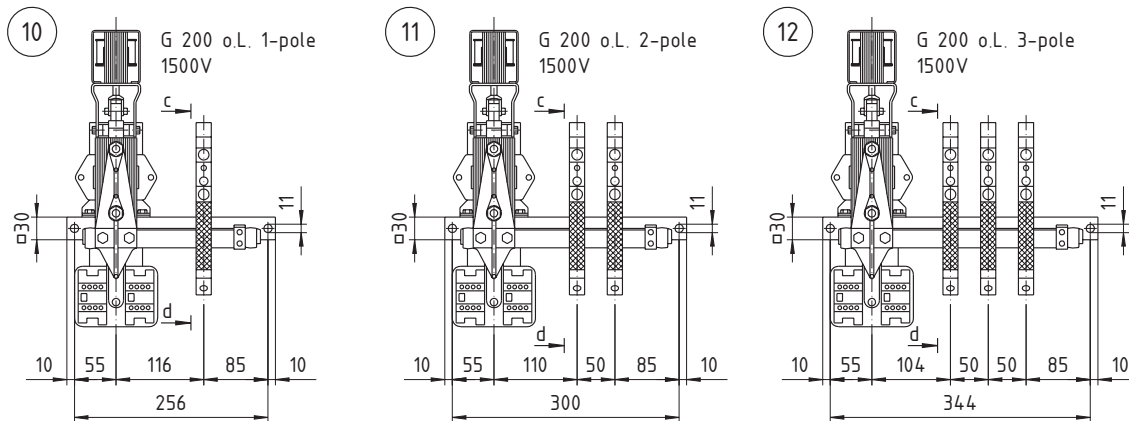
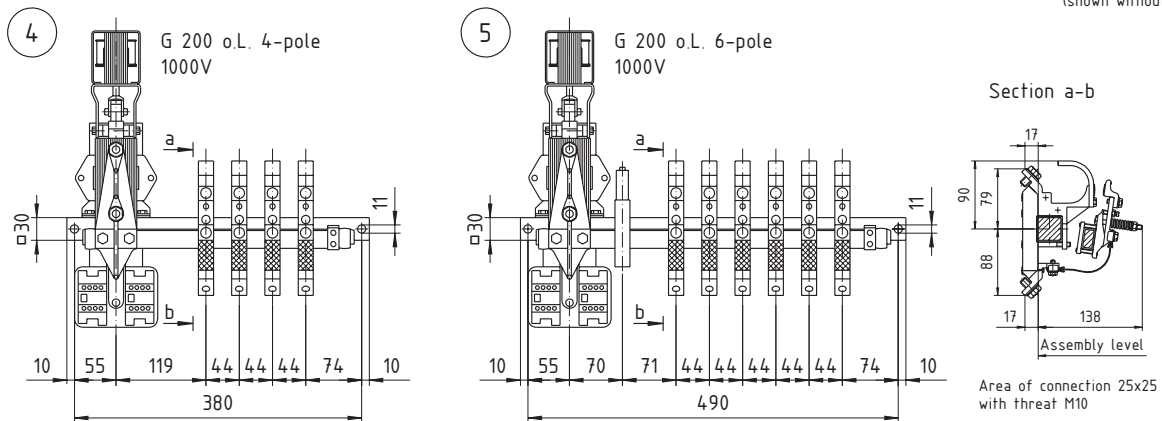
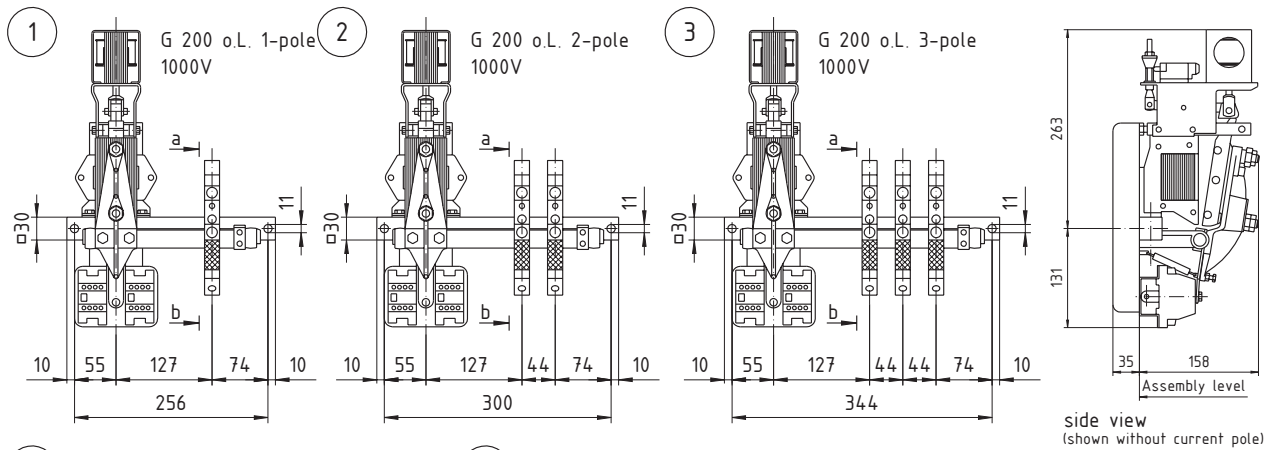
Selection table

contactor type	Rated current at 50 Hz [A]	Number of poles	net-weight [kg]	Rated insulation voltage 1000V			Rated insulation voltage 1500V			Rated insulation voltage 3000V		
				Fig.	Page	A = [mm]	Fig.	Page	A = [mm]	Fig.	Page	A = [mm]
G 200 o.L.	200	I	11,7	1	5	256	10	5	256	---	---	---
		II	13,2	2		300	11		300	15	6	380
		III	15,0	3		344	12		344	---	---	---
		IV	17,5	4		380	13		432	16	6	540
		VI	20,5	5		490	14		540	---	---	---
G 200 o.L.	200	I	14,0	---	---	---	---	---	---	17	6	344
		II	18,0	---	---	---	---	---	---	18		490
G 320v o.L.	475	I	13,0	19	7	256	24	7	256	---	---	---
		II	15,6	20		300	25		344	28	8	380
		III	17,7	21		344	26		380	77		490
		IV	19,0	22		432	27		490	29		570
		VI	24,7	23		540	---		---	---	---	---
G 3202v o.L.	865	I	15,3	35	9	300	38	9	300	---	---	---
		II	18,4	36		380	39		432	41	9	490
		III	24,7	37		540	40		540	---	---	---
G 500v o.L.	900	I	23,0	42	10	345	48	11	345	---	---	---
		II	27,5	43		385	49		385	54	12	445
		III	32,5	44		445	50		445	78		541
		IV	37,5	45		541	51		541	55		680
		VI	42,7	46		680	52		760	---	---	---
		VIII	51,5	47		885	53		885	---	---	---
G 5002v o.L.	1600	I	27,5	61	13	385	66	14	385	---	---	---
		II	38,0	62		541	67		541	70	15	635
		III	43,0	63		635	68		635	79		760
		IV	51,0	64		760	69		885	71		950
		VI	60,0	65		1065	---		---	---	---	---
G 5003v o.L.	2000	I	32,5	80	16	445	83	16	445	86	17	541
		II	43,0	81		635	84		635	87		680
		III	56,0	82		760	85		885	88		885

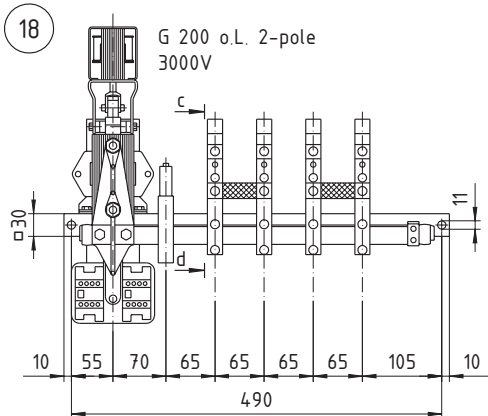
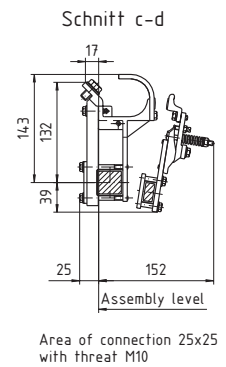
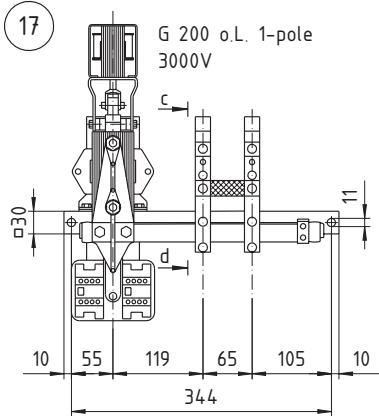
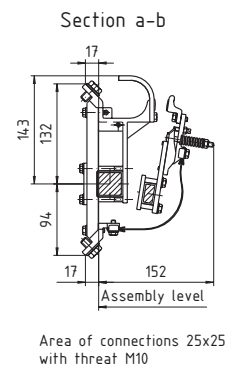
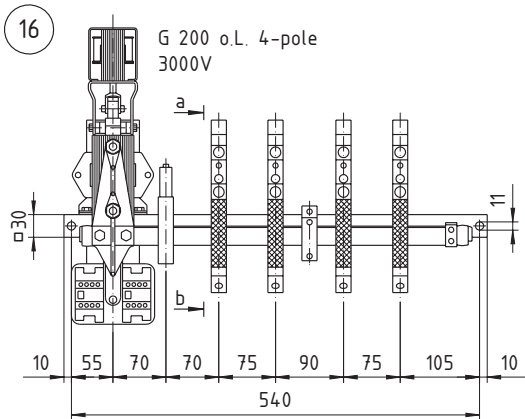
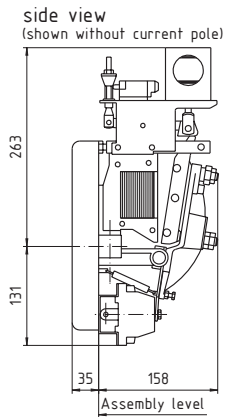
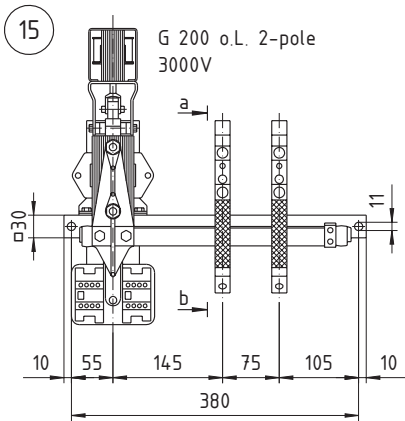
Table for loading capacity

contactor type NFG.. or MFG..	Admissible continuous current per pole at the frequency ...Hz													
	contactor type NFG..						contactor type MFG..							
	0	50	150	180	250	300	500	1000	2000	2500	3000	4000	8000	10000
G 200 o.L.	240	230	220	210	210	205	200	180	160	155	150	140	125	120
G 320v o.L.	500	475	440	430	425	400	400	375	325	300	290	260	210	200
G 3202v o.L.	900	865	820	800	760	750	700	660	600	560	550	500	400	360
G 500v o.L.	900	900	850	850	800	780	720	680	600	575	560	480	380	340
G 5002v o.L.	1600	1600	1300	1250	1200	1150	1150	1050	900	900	850	800	625	560
G 5003v o.L.	2150	2000	1600	1500	---	---	---	---	---	---	---	---	---	---

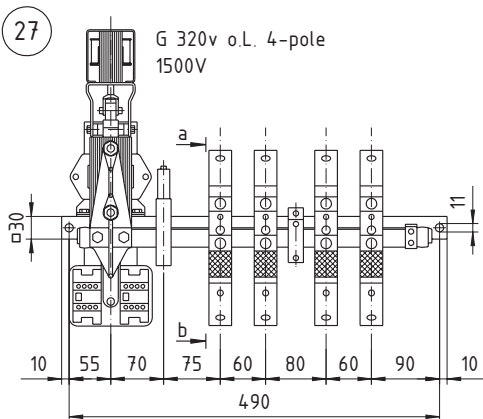
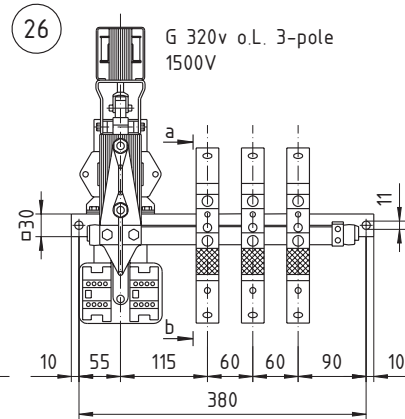
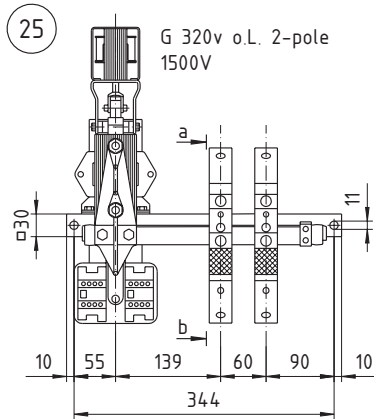
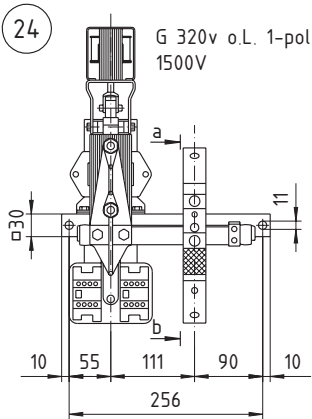
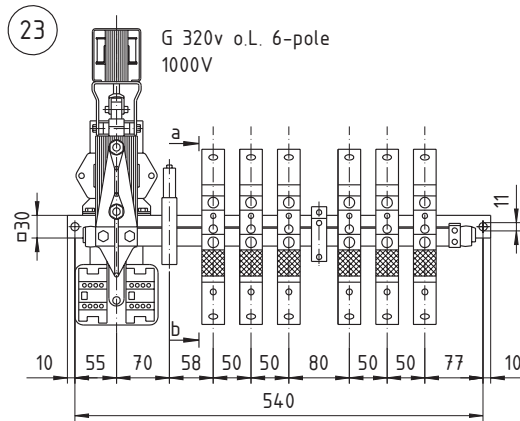
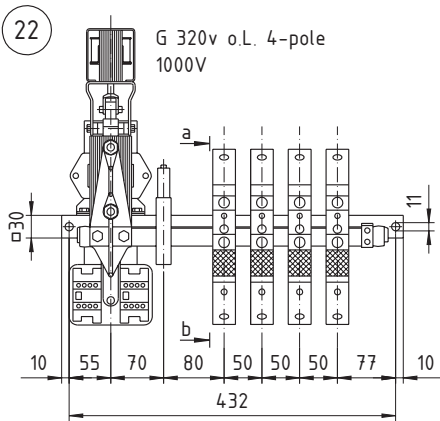
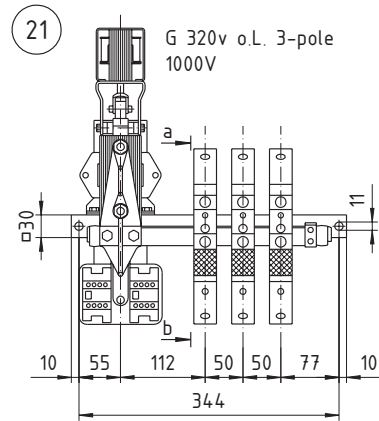
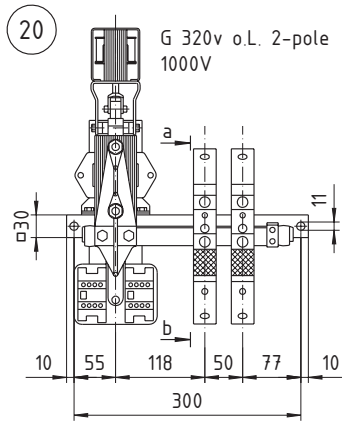
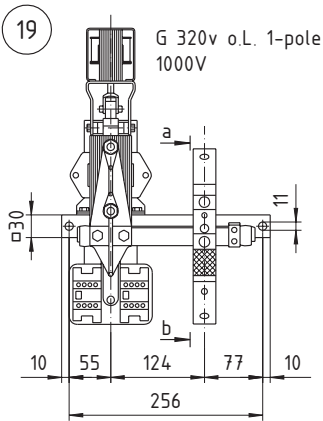
Dimension for G 200 o.L. Ui 1000V and Ui 1500V



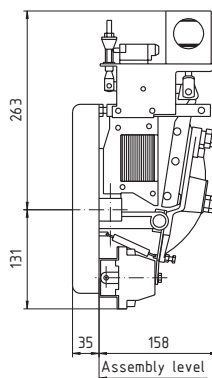
Dimension for G 200 o.L. Ui 3000V



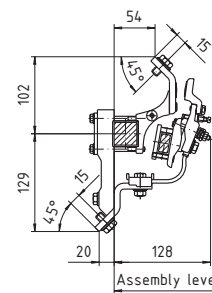
Dimension for G 320v o.L. Ui 1000V and Ui 1500V



side view
(shown without current pole)

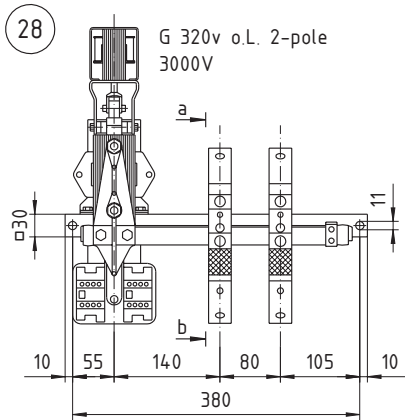


Section a-b

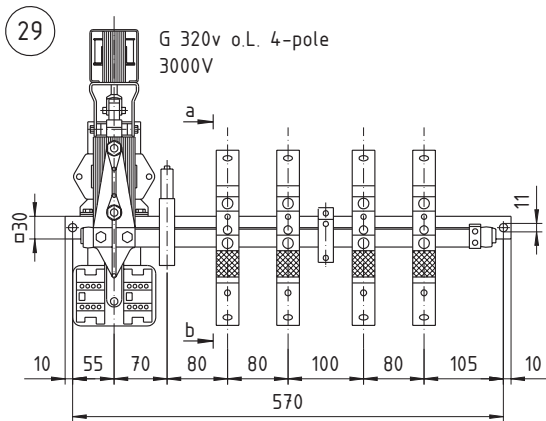
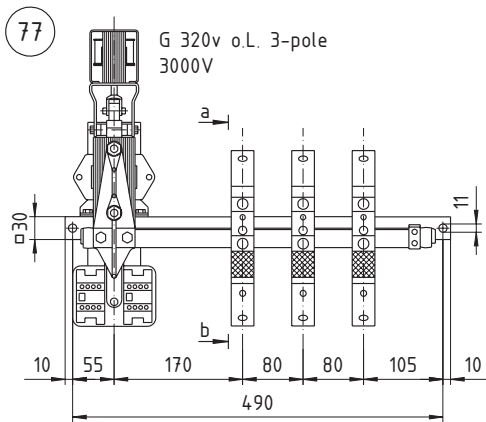
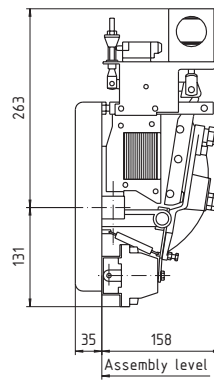


Area of connection 30x30 with thread M10

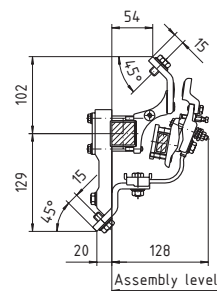
Dimension for G 320v o.L. Ui 3000V



side view
(shown without current pole)

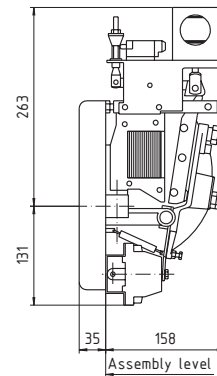
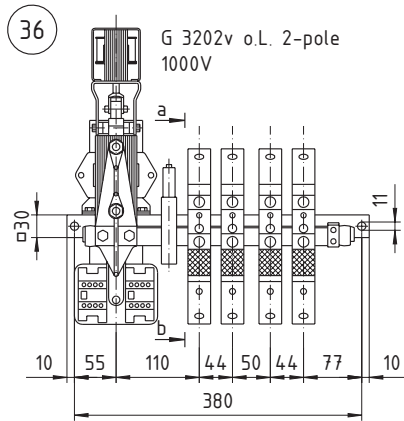
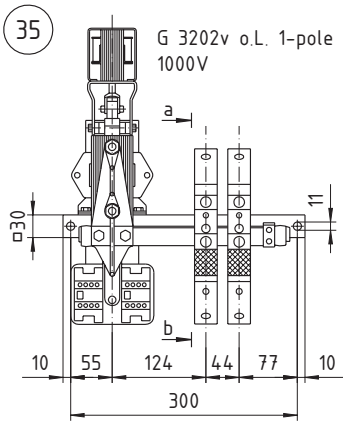


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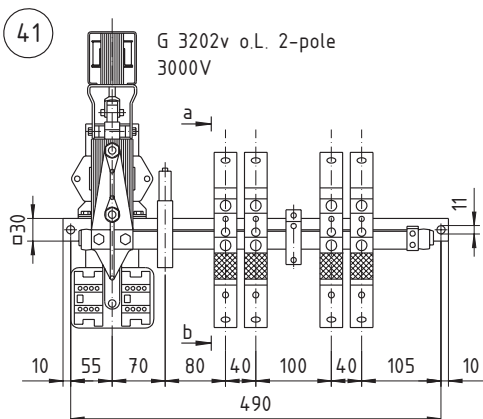
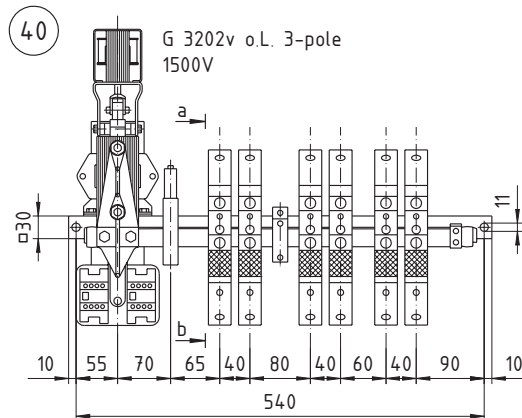
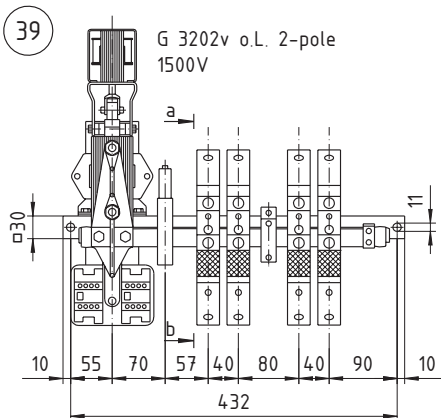
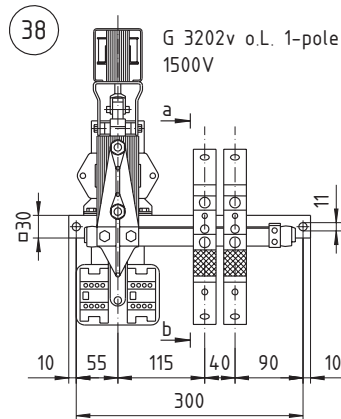
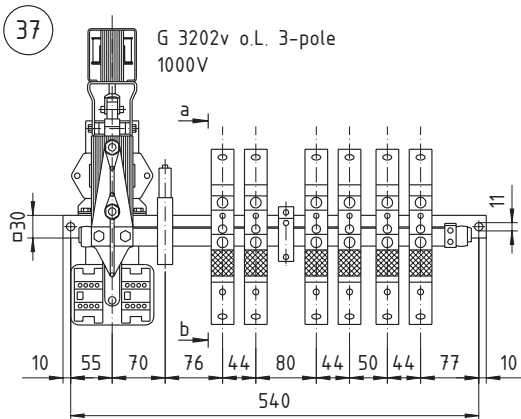


Area of connection 30x30
with thread M10

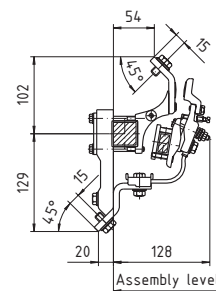
Dimension for G 3202v o.L. Ui 1000V, Ui 1500V and Ui 3000V



side view
(shown without current pole)

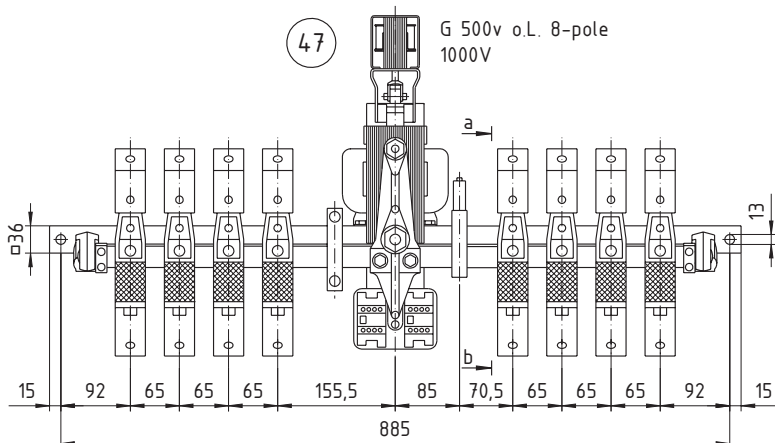
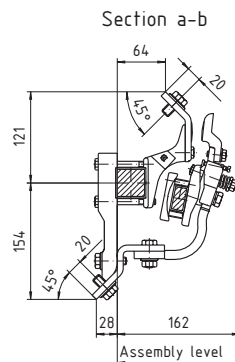
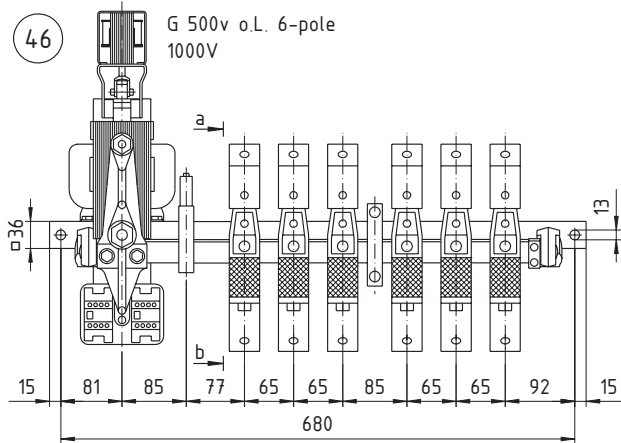
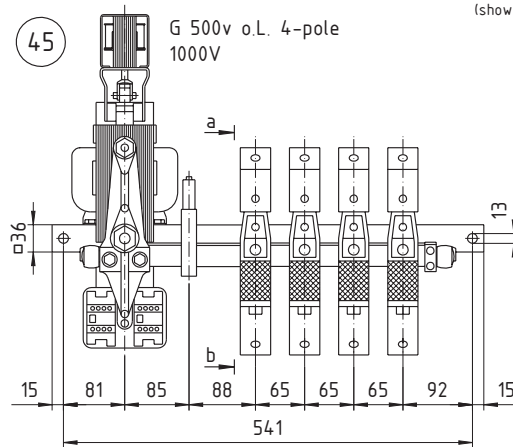
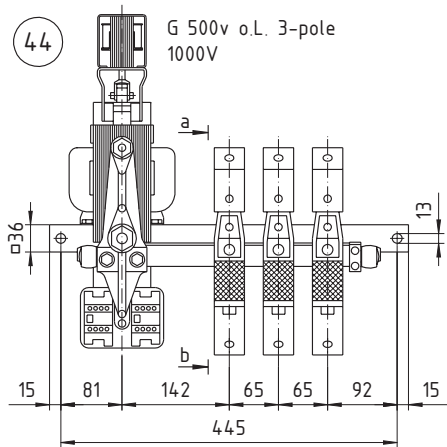
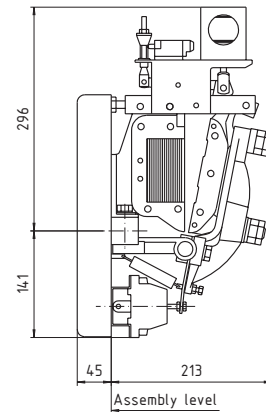
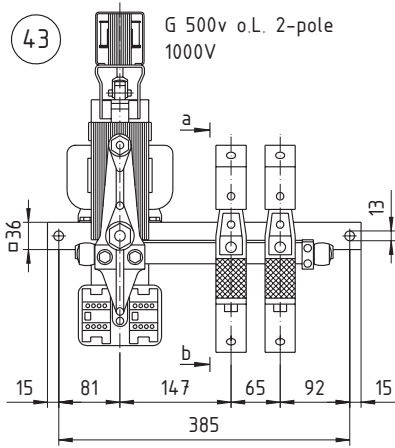
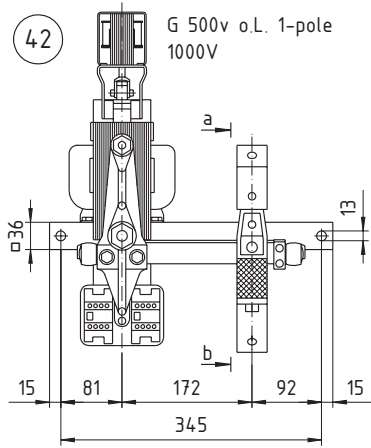


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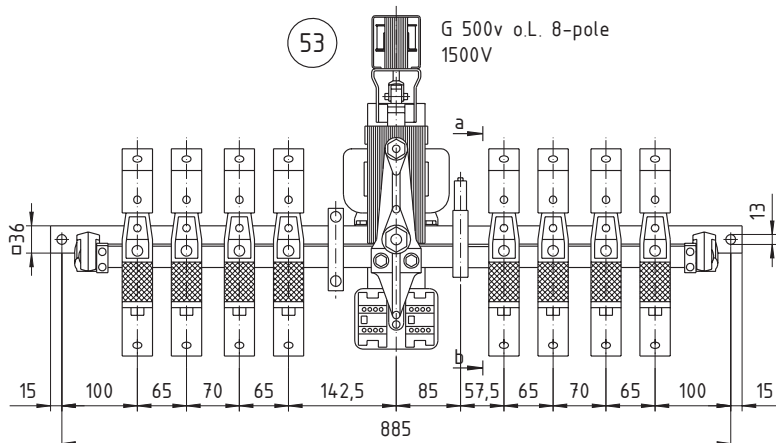
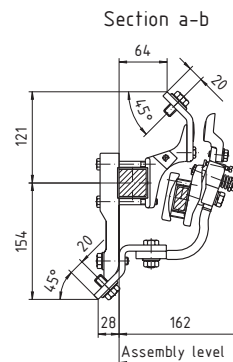
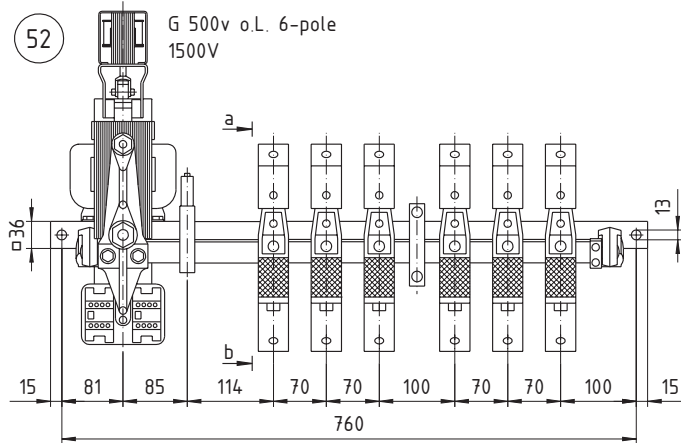
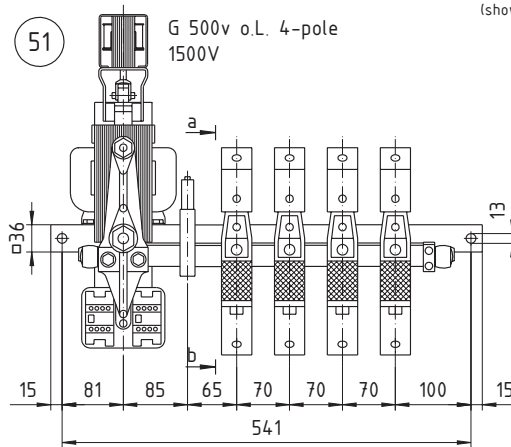
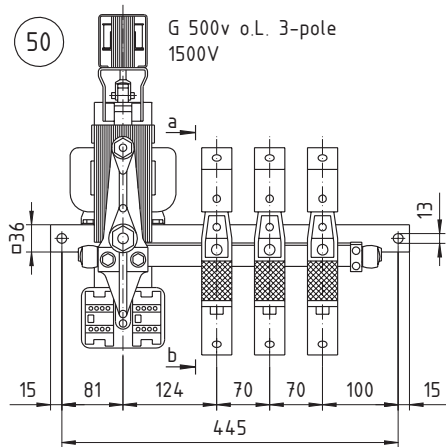
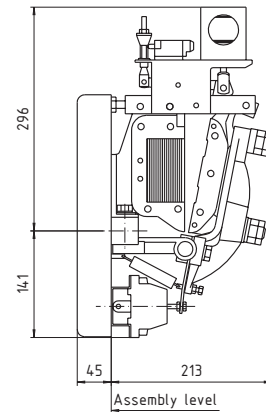
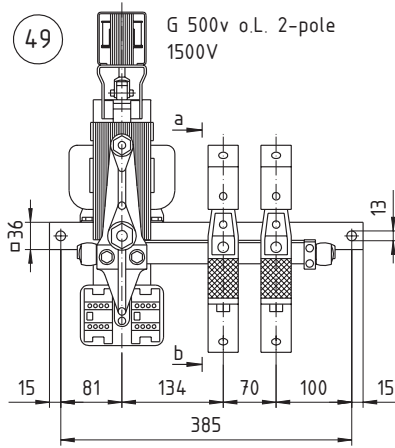
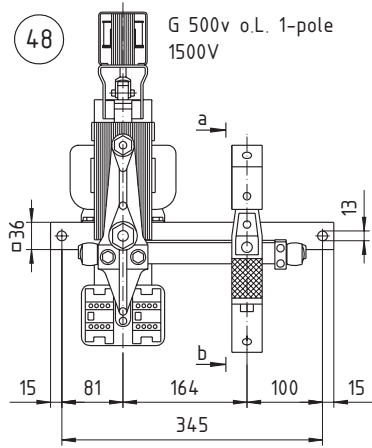


Area of connection 30x30 with thread M10

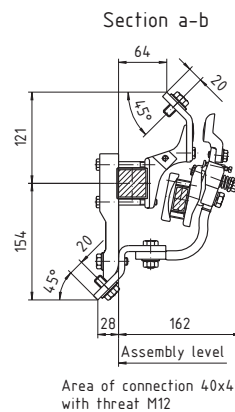
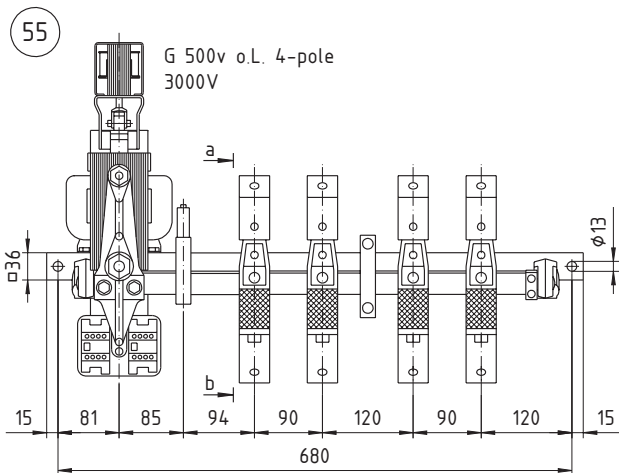
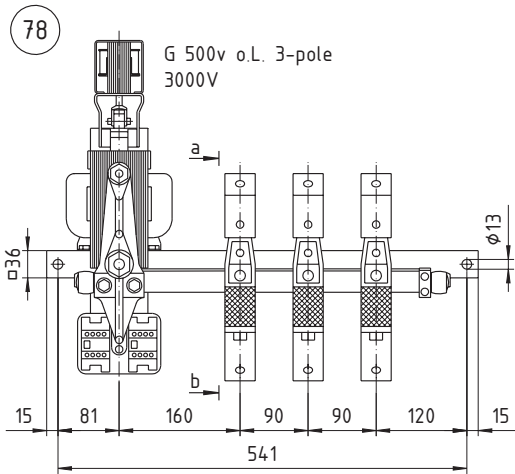
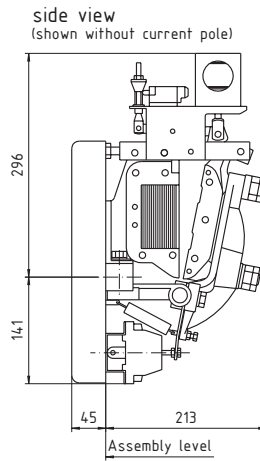
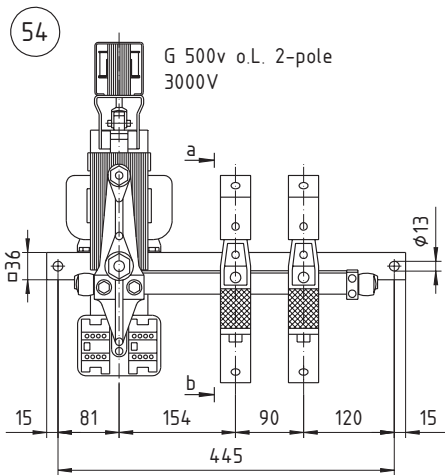
Dimension for G 500v o.L. Ui 1000V



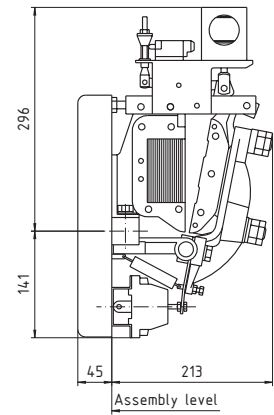
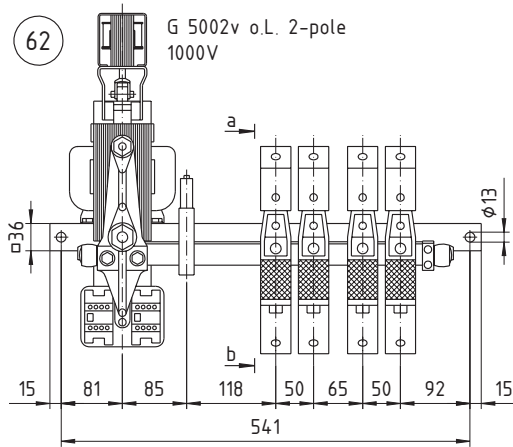
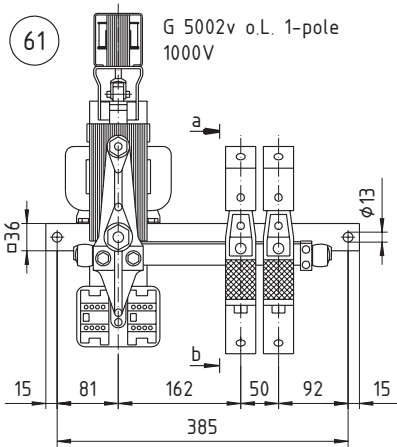
Dimension for G 500v o.L. Ui 1500V



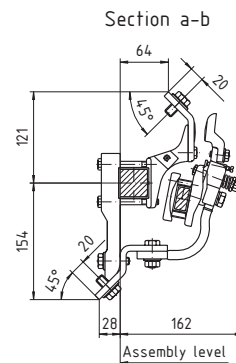
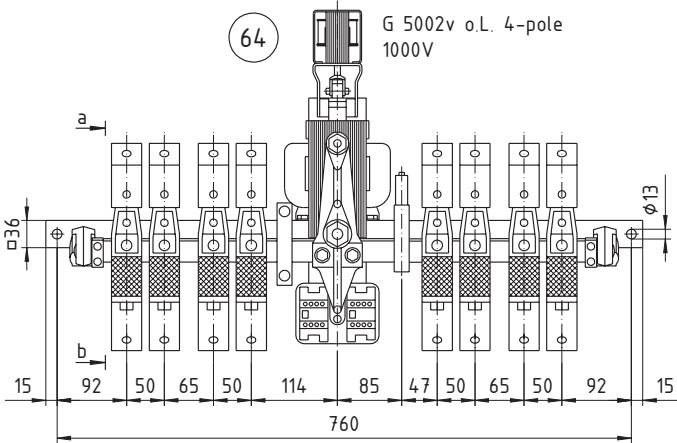
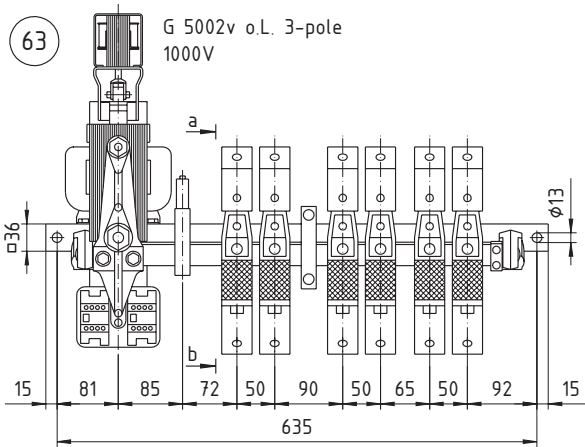
Dimension for G 500v o.L. Ui 3000V



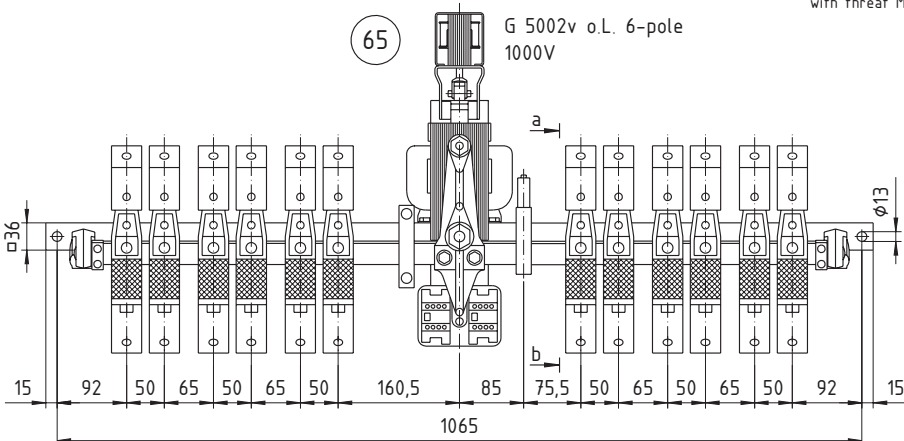
Dimension for G 5002v o.L. Ui 1000V



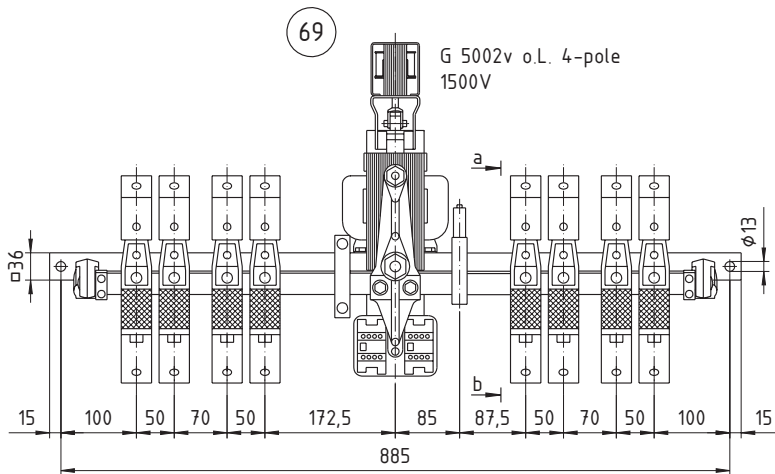
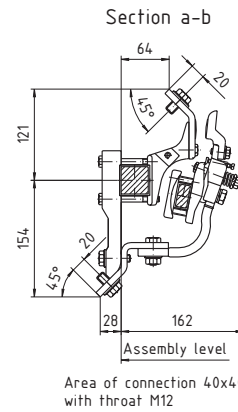
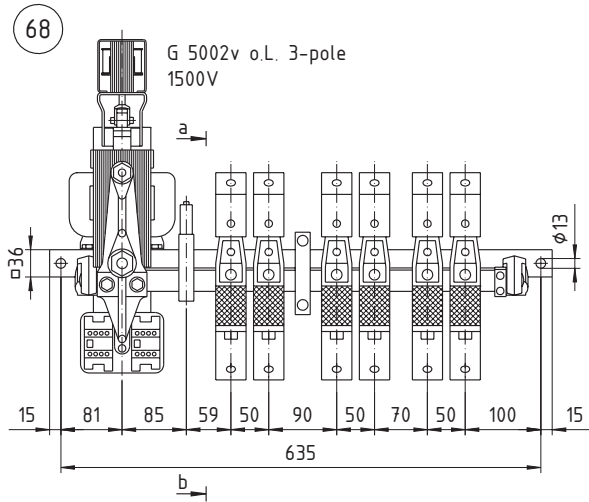
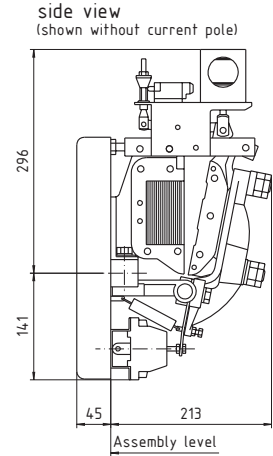
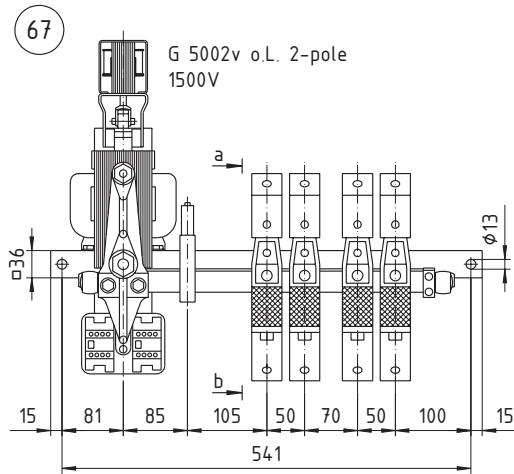
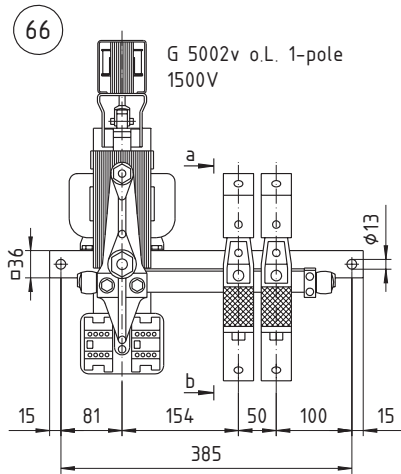
side view
(shown without current pole)



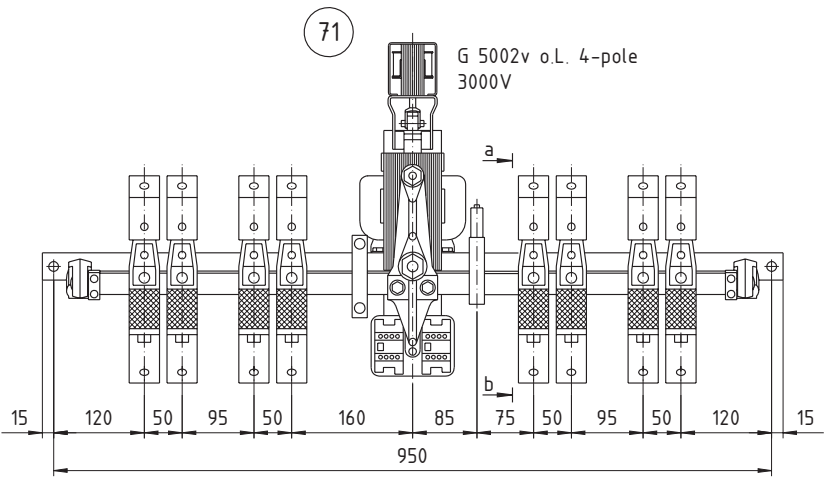
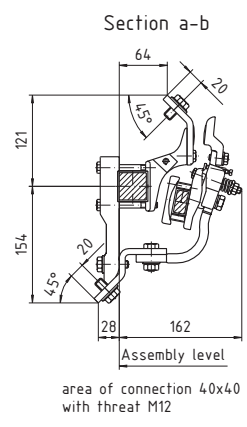
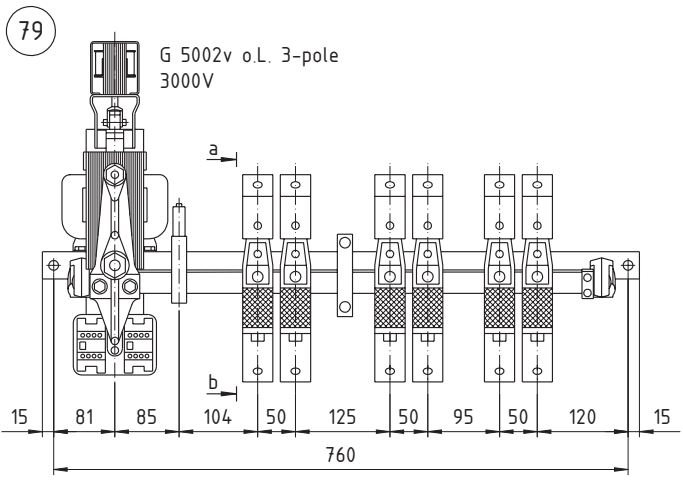
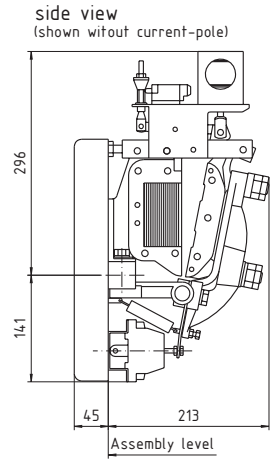
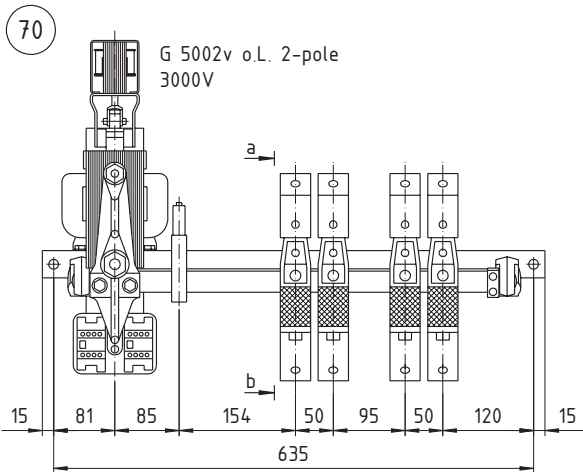
Area of connection 40x40
with thread M12



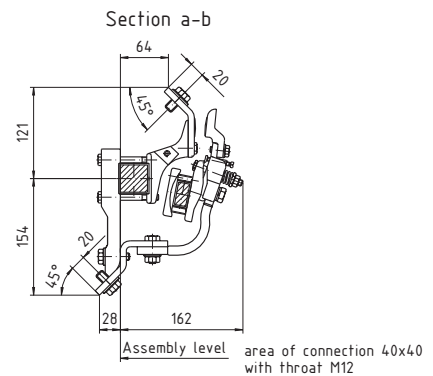
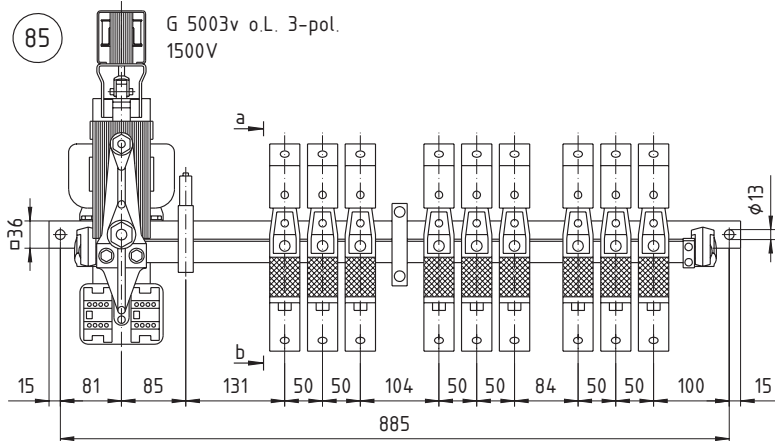
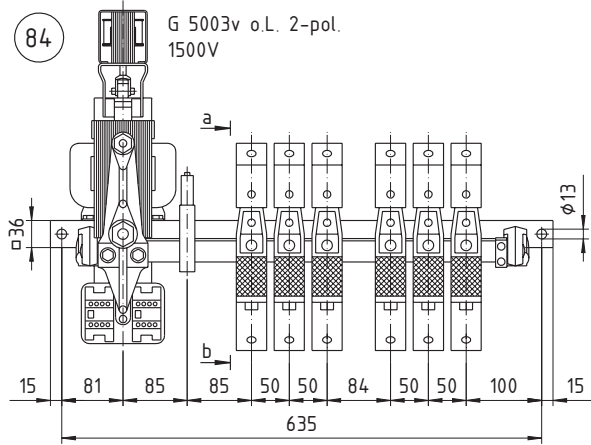
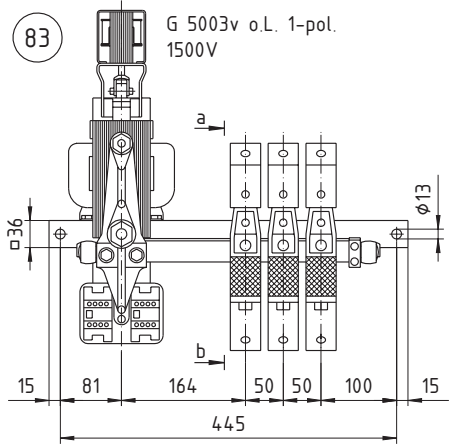
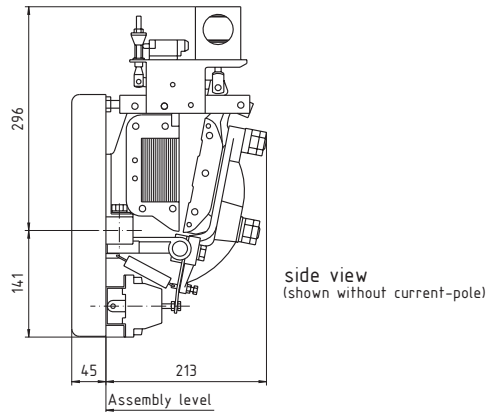
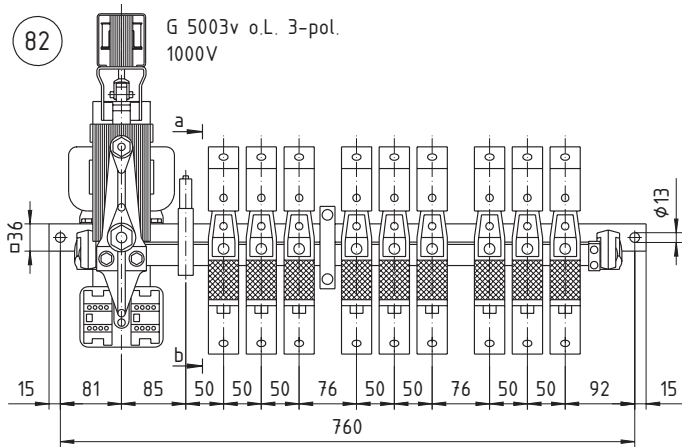
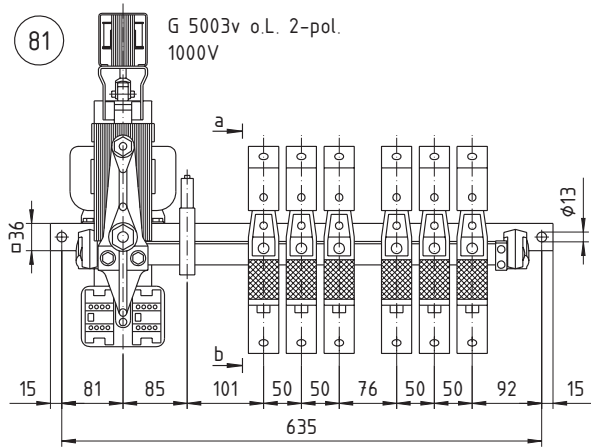
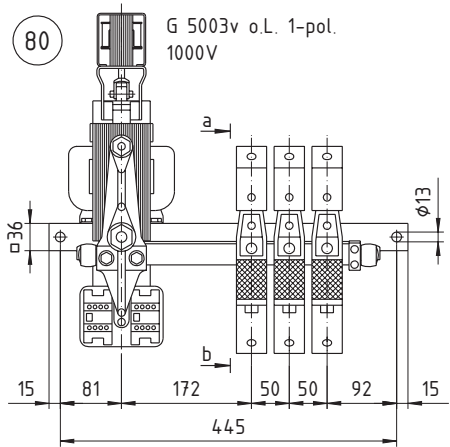
Dimension for G 5002v o.L. Ui 1500V



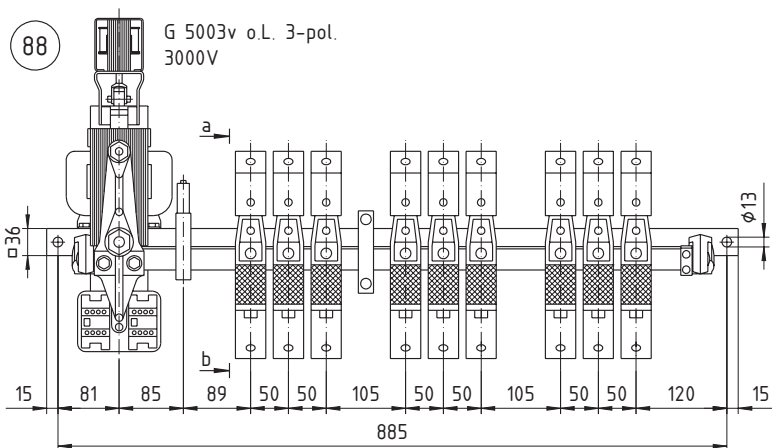
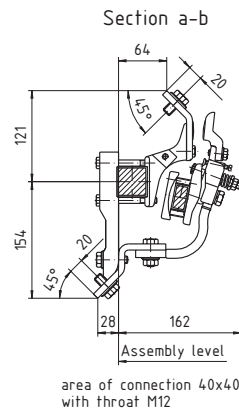
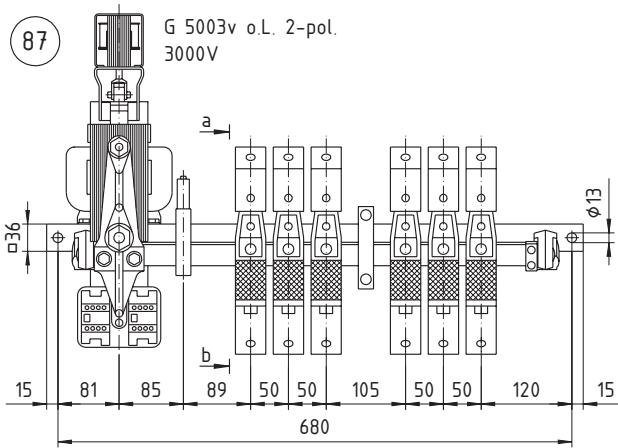
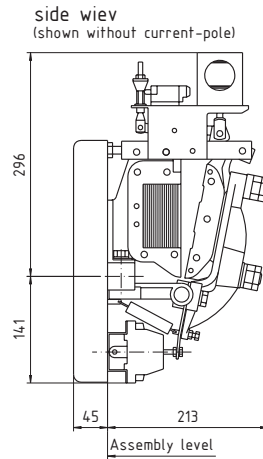
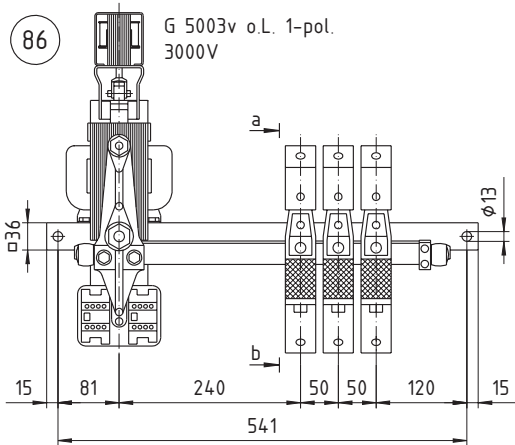
Dimension for G 5002v o.L. Ui 3000V



Dimension for G 5003v Ui 1000V and Ui 1500V



Dimension for G 5003v o.L. Ui 3000V



Manufacturing-program

026/1	pole-changing switches, change over switches, circuit breakers
145	NF and MF high-current switches (air-cooled)
280	<i>NF and MF contactors for off-load switching</i>
282	Damping resistors
350/1	DC- and NF-contactors for on-load switching
421	Prism-contacts (air- and water-cooled)
427	NF and MF high-current switches (watercooled)
460	insulator-supports and bus-bar-supports
467	MF-contactors for on-load switching
475/1	Prism-contacts (air-cooled)
502	cable (air- and water-cooled)
506	discharge- and dropping-resistors
507	capacitor-contactor for on-load switching
549	contactors with NC-contacts for on-load switching
559	Prism-contacts for the electrode-position
560	spare parts
600	pole-changing switches, with motor-drive (water-cooled)
615	NF and MF high-current circuit breaker for off-load switching (water-cooled)
617	NF and MF high-current circuit breaker for off-load switching (air-cooled)
624	contactors with NC-contacts off-load switching
625	DC-contactors with brake-contacts
641	Air-cooled-current-carrying leads