



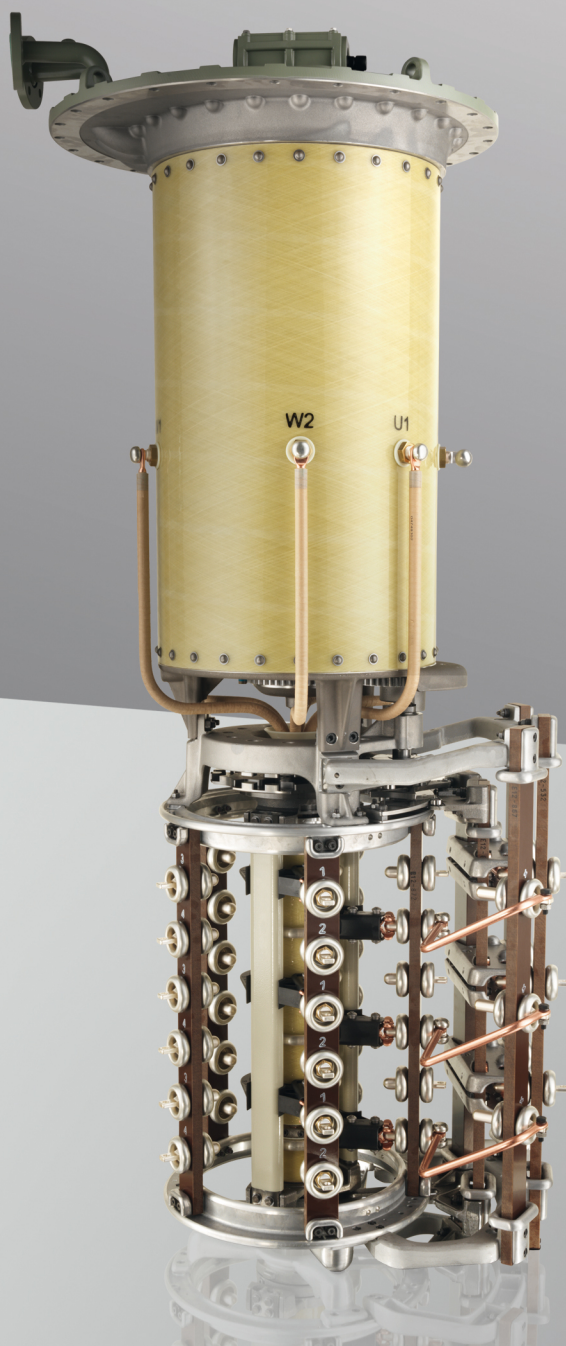
On-Load Tap-Changer VACUTAP® VM®

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Technical Data

2332907/03 EN



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1 General

1.1 On-load tap-changer designations

Example: VM III 650 Y – 72.5 / C – 10 19 1W R

De- scrip- tion		Meaning	Model	Possible parame- ters
VM	=	Type	VACUTAP® VM® VACUTAP® VM 300	VM VM 300
III	=	Number of phases	1 phase 2 phases 3 phases	I II III
650	=	I_{um} [A] = maximum rated through-current	VM I 301, VM II 302, VM III 300Y VM I 351, VM II 352, VM III 350Y VM I 501, VM II 502, VM III 500Y VM I 651, VM II 652, VM III 650Y VM I 802 VM I 1002 VM I 1203 VM I 1503	300 350 500 650 800 1,000 1,200 1,500
650	=	Number of configured sectors	3 (for Y) 1 2 3	0 1 2 3
Y	=	Applications	For use with neutral point only	Y
72.5	=	V_m [kV] = highest voltage for equip- ment	VM® VM® VM® VM® VM®	72.5 123 170 245 300
C	=	Tap selector size	 not with multiple coarse change-over selector	B C D DE
10	=	Number of maximum operating posi- tions without change-over selector	Pitch of tap selector: 10 12 14 16 18	 10 12 14 16 18



De- scrip- tion		Meaning	Model	Possible parame- ters
			22	22
19	=	Number of maximum operating positions with change-over selector (reversing change-over selector or coarse tap connection) Note: Available for 300 amp variant with a maximum of 27 operating positions	Pitch of tap fine selector:	
			10	19
			12	23
			14	27
			16	31
			18	35
or 19	=	Number of maximum operating positions with multiple coarse change-over selector	10	59
			12	71
			14	83
			16	95
			18	107
1W	=	Mid-positions	0 mid-positions (without change-over selector)	0
			1 mid-position	1
			3 mid-positions	3
1W	=	Change-over selector	Reversing change-over selector	W
			Coarse tap connection	G
R	=	Tie-in measures	Fitted tie-in resistors	R
			Potential switches and tie-in resistors on board	S
			Potential switches with fitted tie-in resistors	P

Table 1: Explanation of type designation

1.2 Summary of the technical data

VACUTAP® VM I

On-load tap-changer	VM I 301	VM I 351	VM I 501	VM I 651	VM I 802	VM I 1002	VM I 1203	VM I 1503
Number of phases and application	1	1	1	1	1	1	1	1
Maximum rated through current $I_{um}(A)$	300	350	500	650	800	1,000	1,200	1,500
Rated short-time current (kA)	4	4.2	5	6.5	8	10	12	15
Rated duration of short-circuits (s)	3	3	3	3	3	3	3	3
Rated peak withstand current (kA)	10	10.5	12.5	16.25	20	25	30	37.5
Maximum rated step voltage V_{in} (V) ¹⁾	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300
Step capacity P_{StN} (kVA)	990	1,155	1,625	1,625	2,600	2,600	3,500	3,500
Rated frequency (Hz)	50...60							
Operating positions	without change-over selector: maximum 18 with change-over selector: maximum 35 ²⁾ with multiple coarse change-over selector: maximum 107 ²⁾							
Oil compartment	Pressure-tight up to 0.3 bar permanent differential pressure (test pressure 0.6 bar); head and cover of the diverter switch oil compartment are vacuum sealed.							
Temperature range	The on-load tap-changer VACUTAP® VM® can be operated in the rated load range at surrounding oil temperatures of between -25 ° and +105 °C and with overload up to +115 °C in accordance with IEC 60214-1. For details of operation under arctic conditions, please refer to the General Technical Data for TD 61.							
Dimensions	Weight, displacement volume and oil content of the oil compartment are shown in the relevant dimension drawings.							

Table 2: Technical data for VACUTAP® VM I

¹⁾ The maximum rated step voltage may be exceeded by 10 % due to over-excitation of the transformer if the step capacity is limited to its rated value.

²⁾ 300 amp variants with a maximum of 27 operating positions available



Also see "Special Designs" [► 18] chapter.



VACUTAP® VM II

On-load tap-changer	VM II 302	VM II 352	VM II 502	VM II 652
Number of phases and application	2	2	2	2
Maximum rated through current I_{um} (A)	300	350	500	650
Rated short-time current (kA)	4	4.2	5	6.5
Rated duration of short-circuits (s)	3	3	3	3
Rated peak withstand current (kA)	10	10.5	12.5	16.25
Maximum rated step voltage V_{in} (V) ¹⁾	3,300	3,300	3,300	4,000
Step capacity P_{StN} (kVA)	990	1,155	1,625	1,625
Rated frequency (Hz)	50...60			
Operating positions	without change-over selector: maximum 18 with change-over selector: maximum 35 ²⁾ with multiple coarse change-over selector: maximum 107 ²⁾			
Oil compartment	Pressure-tight up to 0.3 bar permanent differential pressure (test pressure 0.6 bar); head and cover of the diverter switch oil compartment are vacuum sealed.			
Temperature range	The on-load tap-changer VACUTAP® VM® can be operated in the rated load range at surrounding oil temperatures of between -25 ° and +105 °C and with overload up to +115 °C in accordance with IEC 60214-1. For details of operation under arctic conditions, please refer to the General Technical Data for TD 61.			
Dimensions	Weight, displacement volume and oil content of the oil compartment are shown in the relevant dimension drawings.			

Table 3: Technical data for VACUTAP® VM II

¹⁾ The maximum rated step voltage may be exceeded by 10 % due to over-excitation of the transformer if the step capacity is limited to its rated value.

²⁾ 300 amp variants with a maximum of 27 operating positions available



Also see "Special Designs" [► 18] chapter.

VACUTAP® VM III

On-load tap-changer	VM III 300 Y	VM III 350 Y	VM III 500 Y	VM III 650 Y
Number of phases and application	3	3	3	3
Maximum rated through current I_{um} (A)	300	350	500	650
Rated short-time current (kA)	4	4.2	5	6.5
Rated duration of short-circuits (s)	3	3	3	3
Rated peak withstand current (kA)	10	10.5	12.5	16.25
Maximum rated step voltage V_{in} (V) ¹⁾	3,300	3,300	3,300	3,300
Step capacity (P_{StN}) (kVA)	990	1,155	1,625	1,625
Rated frequency (Hz)	50...60			
Operating positions	without change-over selector: maximum 18 with change-over selector: maximum 35 ²⁾ with multiple coarse change-over selector: maximum 107 ²⁾			
Oil compartment	Pressure-tight up to 0.3 bar permanent differential pressure (test pressure 0.6 bar); head and cover of the diverter switch oil compartment are vacuum sealed.			
Temperature range	The on-load tap-changer VACUTAP® VM® can be operated in the rated load range at surrounding oil temperatures of between -25 ° and +105 °C and with overload up to +115 °C in accordance with IEC 60214-1. For details of operation under arctic conditions, please refer to the General Technical Data for TD 61.			
Dimensions	Weight, displacement volume and oil content of the oil compartment are shown in the relevant dimension drawings.			

Table 4: Technical data for VACUTAP® VM III

¹⁾ The maximum rated step voltage may be exceeded by 10 % due to over-excitation of the transformer if the step capacity is limited to its rated value.

²⁾ 300 amp variants with a maximum of 27 operating positions available



Also see "Special Designs" [► 18] chapter.

1.3 Step capacity diagram for VACUTAP® VM®

1.3.1 Step capacity diagram for network application

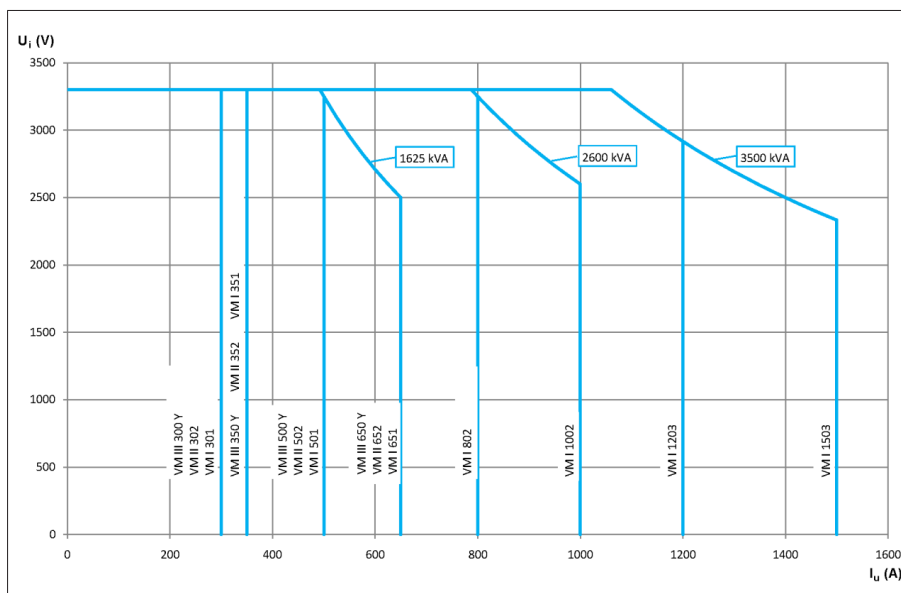


Figure 1: Step capacities (rated step voltage V_i with rated through-current I_u)

1.3.2 Step capacity diagram with electrical arc furnace operation

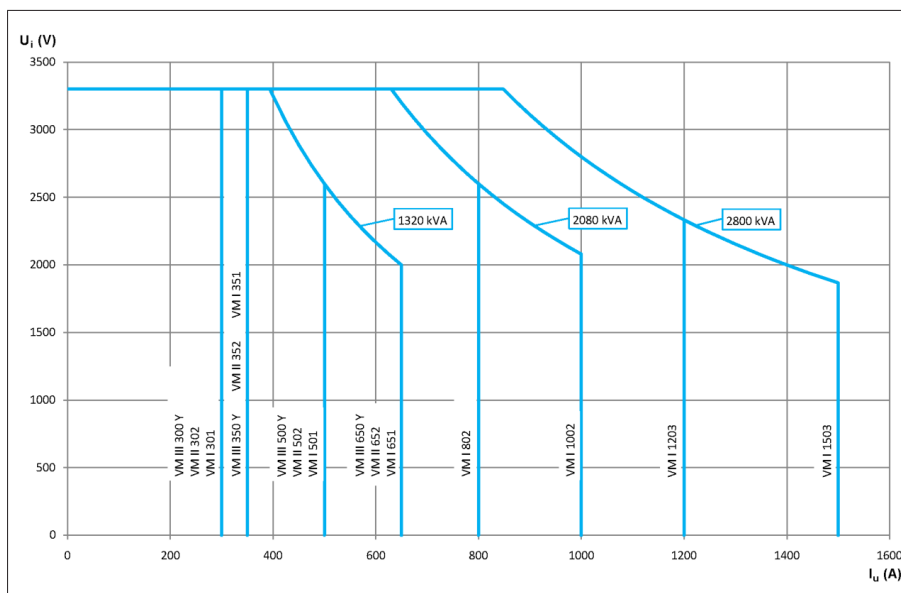


Figure 2: Step capacities (rated step voltage V_i with rated through-current I_u)



1.4 Rated insulation level

Rated insulation level	For all on-load tap-changer variants				
Highest voltage for equipment V_m (kV) ¹⁾	72.5	123	170	245	300 ²⁾
Rated lightning impulse withstand voltage (kV, 1.2/50 μ s)	350	550	750	1,050	1,050
Rated switching impulse voltage (kV)				850	850
Rated short-duration power frequency withstand voltage (kV, 50 Hz, 1 min)	140	230	325	460	460

Table 5: Rated insulation level for all on-load tap-changer variants

¹⁾ In accordance with IEC 60214-1, chapter 3.57: highest effective value for phase-to-phase voltage in a three-phase system for which an on-load tap-changer is designed with respect to its insulation.

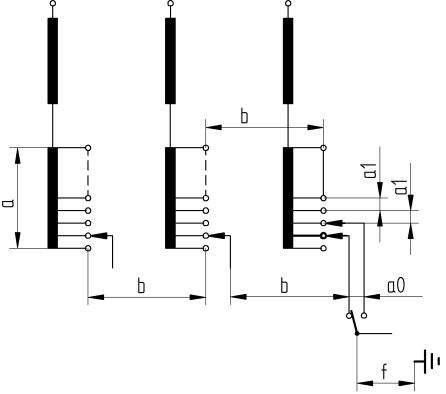
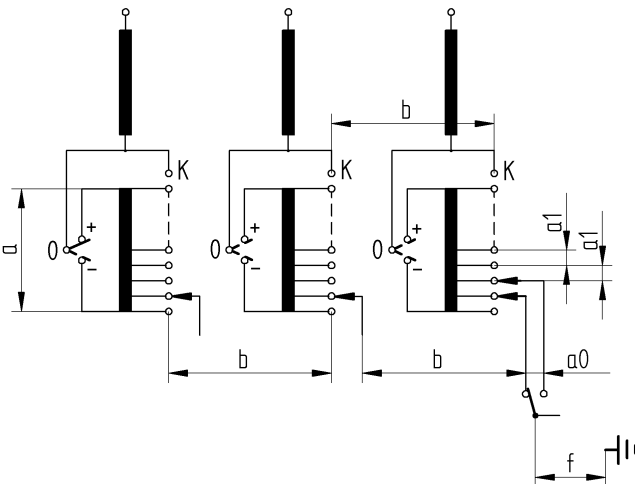
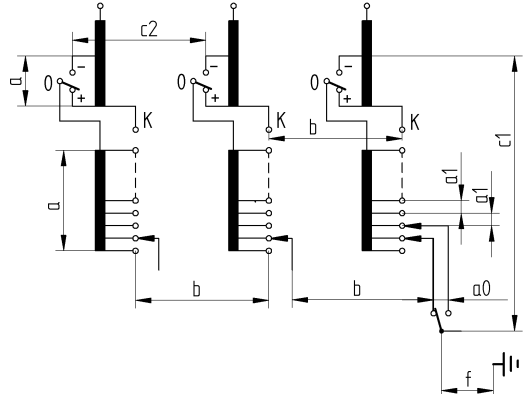
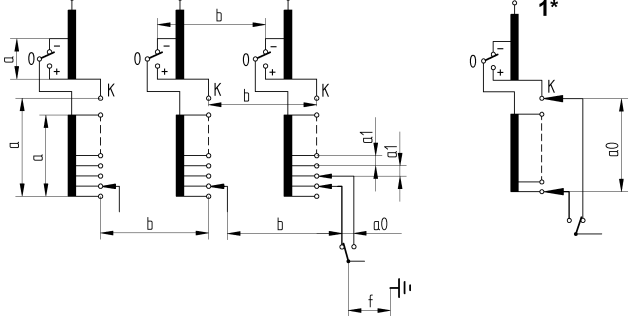
²⁾ Star-point on-load tap-changer and 300-A variants up to maximum 245 kV available.

2 Technical data

2.1 Rated withstand voltages

The following diagrams show the voltage stress present on the tap winding of the three primary basic connections of three-column on-load tap-changers and single-column on-load tap-changers.

When selecting the on-load tap-changer, you must check that the highest stress on the tap selector does not exceed the related rated withstand voltages.

	
without change-over selector	with reversing change-over selector
	
with coarse change-over selector in (+) position	with coarse change-over selector in (-) position

1* Notice: Observe maximum rated lightning impulse withstand voltage stress at a0 in mid-position!

a0 = between selected and preselected tap on the diverter switch

a1 = between fine tap selector contacts of the winding of one tap position (connected or not connected)

a	= between start and end of a tapped winding and, in version with coarse winding, also between start and end of a coarse winding Note for coarse tap selector connection in (-) position of the change-over selector: When loading with impulse voltage, note the permissible withstand voltage "a" between the end of a coarse winding connected with the K fine tap selector contact and the fine tap selector contact at the end of the tapped winding of the same phase.
b	= between the fine tap selector contacts of different phases and between change-over selector contacts of different phases, which are connected with the beginning/end of a tapped winding or with a fine tap selector contact
f	= between diverter switch output terminal and ground
Additionally for coarse tap selector connection in (+) position of the change-over selector:	
c1	= from one (-) change-over selector contact to take-off lead of the same phase
c2	= between (-) change-over selector contacts of different phases

2.1.1 Rated withstand voltages of the internal insulation (with the exception of VACUTAP® VM 300)

The selector size (ID letters B, C, D, DE) characterizes the internal insulation of the selector, whose rated withstand voltages must be matched to the requirements of the transformer winding.

Insulation distances	Selector size B		Selector size C		Selector size D		Selector size DE	
	kV 1.2/50 µs	kV 50 Hz 1 min	kV 1.2/50 µs	kV 50 Hz 1 min	kV 1.2/50 µs	kV 50 Hz 1 min	kV 1.2/50 µs	kV 50 Hz 1 min
a0	max. 150 ²⁾	20	max. 150 ²⁾	20	max. 150 ²⁾	20	max. 150 ²⁾	20
a1	150	30	150	30	150	30	150	30
a	265	50	350	82	490	105	550	120
b ¹⁾	265	50	350	82	490	146	550	160
c1	485	143	545	178	590	208	660	230
c2 ¹⁾	495	150	550	182	590	225	660	250

Table 6: Rated withstand voltages of the internal on-load tap-changer insulation (with the exception of VACUTAP® VM 300)

¹⁾ No insulation distance with single-column on-load tap-changers

²⁾ Varistor response voltage at 1.2/50 µs lightning impulse: as of 45 kV ($U_{100\%}(t)_{\text{standardized}} \neq U_{75\%}(t)_{\text{standardized}}$), residual voltage at 3 kA peak current: 56 kV

The admissible maximum operating voltage on the individual selector distances corresponds to half the value of the above mentioned rated short-duration power frequency withstand voltages.



without change-over selector		with reversing change-over selector		with coarse change-over selector	
Tap-change operation	Selector size	Tap-change operation	Selector size	Tap-change operation	Selector size
10050	B/C/D/DE	10071W	B/C/D/DE	10071G	B/C/D/DE
10060	B/C/D/DE	10081W	B/C/D/DE	10081G	B/C/D/DE
10070	B/C/D/DE	10091W	B/C/D/DE	10091G	B/C/D/DE
10080	B/C/D/DE	12101W	B/C/D/DE	12101G	B/C/D/DE
10090	B/C/D/DE	12111W	B/C	12111G	B/C
10100	B/C/D/DE	14111W	D/DE	14111G	D/DE
12110	B/C/D/DE	14121W	B/C	14121G	B/C
12120	B/C/D/DE	14131W	B/C	14131G	B/C
14130	B/C/D/DE	16121W	D/DE	16121G	D/DE
14140	B/C/D/DE	16131W	D/DE	16131G	D/DE
16150	B/C/D/DE	16141W	B/C/D/DE	16141G	B/C/D/DE
16160	B/C/D/DE	16151W	B/C	16151G	B/C
18170	B/C/D/DE	18151W	D/DE	18151G	D/DE
18180	B/C/D/DE	18161W	B/C	18161G	B/C
22190	B/C/D/DE	18171W	B/C	18171G	B/C
22200	B/C/D/DE	10191W	B/C/D/DE	10191G	B/C/D/DE
22210	B/C	12231W	B/C/D/DE	12231G	B/C/D/DE
22220	B/C	14271W	B/C/D/DE	14271G	B/C/D/DE
		16311W	B/C/D/DE	16311G	B/C/D/DE
		18351W	B/C/D/DE	18351G	B/C/D/DE

Table 7: Available connections (also available as 3 W, 3 G)

2.1.2 Rated withstand voltages of the internal insulation for VACUTAP® VM 300

VACUTAP® VM 300 is only available in selector size B. The selector size characterizes the internal insulation of the selector, whose rated withstand voltages must be matched to the requirements of the transformer winding.

Insulation distances	VM III300 Y		VM I 301		VM II 302	
	kV 1.2/50 µs	kV 50 Hz 1 min	kV 1.2/50 µs	kV 50 Hz 1 min	kV 1.2/50 µs	kV 50 Hz 1 min
a0	max. 150 ¹⁾	20	max. 150 ¹⁾	20	max. 150 ¹⁾	20
a	300	70	300	70	300	70
b	300	70	–	–	300	70
c1	400	120	400	120	100	120
c2	400	120	–	–	400	120

Table 8: Rated withstand voltages of the internal on-load tap-changer insulation for VACUTAP® VM 300

¹⁾ Varistor response voltage at 1.2/50 μ s lightning impulse: as of 45 kV ($U_{100\%}(t)_{\text{standardized}} \neq U_{75\%}(t)_{\text{standardized}}$, residual voltage at 3 kA peak current: 56 kV

The admissible maximum operating voltage on the individual selector distances corresponds to half the value of the above mentioned rated short-duration power frequency withstand voltages.

Connection without change-over selector	Connection with reversing change-over selector	Connection with coarse change-over selector
10100	10091W	10091G
12120	12111W	12111G
14140	14131W	14131G
	10191W ¹⁾	10191G ¹⁾
	12231W ¹⁾	12231G ¹⁾
	14271W ¹⁾	14271G ¹⁾

Table 9: Available connections for VACUTAP® VM 300 (¹⁾ also available as 3 W, 3 G)

2.1.3 Rated withstand voltages for VACUTAP® VM® with multiple coarse change-over selector

Extremely fine voltage setting requires a great number of operating positions which sometimes can only be achieved with a multiple coarse tapping arrangement.

The multiple coarse change-over selector is attached to both sides of the tap selector.

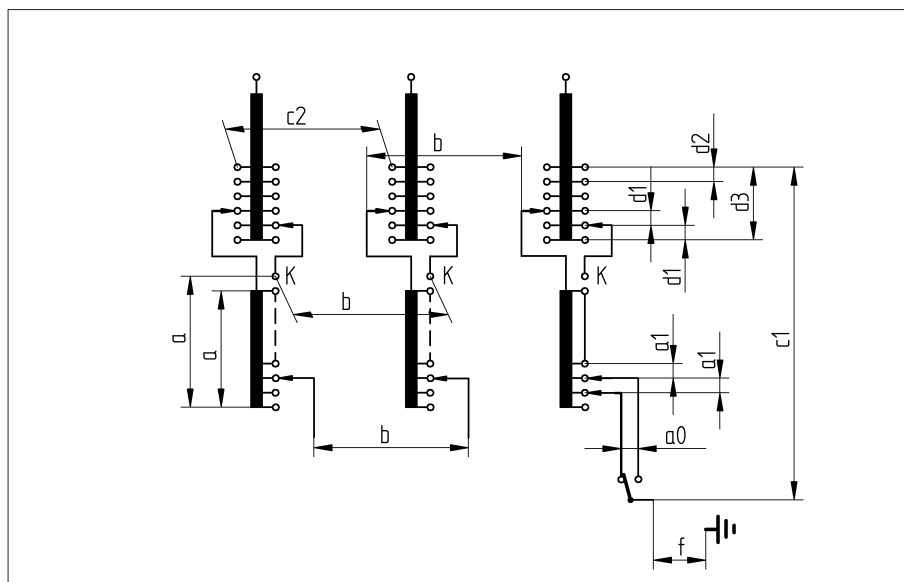


Figure 3: Designation and definition of insulation distances

a0	= between selected and preselected tap on the diverter switch
a1	= between tap selector contacts of the winding of one tap position (connected or not connected)



a	= between beginning and end of a tapped winding and between the connected K contact and any points of the tapped winding of the same phase
b	= between the tap selector contacts of different phases and between the connected K contact of one phase and any points of the tapped winding of another phase
c1	= between any coarse tapplings of one phase to the diverter switch output terminal of the same phase
c2	= between identically-named, unconnected coarse tapplings of different phases
d1	= between connected and adjacent coarse tap contacts in one phase
d2	= between unconnected, adjacent coarse tap contacts in one phase
d3	= between beginning and end of all coarse tap connections of one phase
f	= between diverter switch output terminal and ground

Insulation distances	Selector size B		Selector size C		Selector size D	
	kV 1.2/50 μ s	kV 50 Hz 1 min.	kV 1.2/50 μ s	kV 50 Hz 1 min.	kV 1.2/50 μ s	kV 50 Hz 1 min.
a0	max. 150 ²⁾	20	max. 150 ²⁾	20	max. 150 ²⁾	20
a1	150	30	150	30	150	30
a	265	50	350	82	450	105
b ¹⁾	265	50	350	82	450	146
c1	455	127	525	165	590	210
c2 ¹⁾	455	127	525	165	590	215
d1	265	50	350	82	450	105
d2	350	82	450	105	450	105
d3	350	82	450	105	490	120

Table 10: On-load tap-changer VACUTAP® VM® with multiple coarse change-over selector, rated withstand voltages of the internal on-load tap-changer insulation

¹⁾ No insulation distance with single-column on-load tap-changers

²⁾ Varistor response voltage at 1.2/50 μ s lightning impulse: as of 45 kV ($U_{100\%}(t)_{\text{standardized}} \neq U_{75\%}(t)_{\text{standardized}}$, residual voltage at 3 kA peak current: 56 kV

The admissible maximum operating voltage on the individual selector distances corresponds to half the value of the above mentioned rated short-duration power frequency withstand voltages.

3 Special designs

3.1 Parallel bridges for parallel connections

For current division on the connection contacts of 2 tap selector planes only for on-load tap-changers VACUTAP® VM I 802/1002 and of 3 tap selector planes only for on-load tap-changers VACUTAP® VM I 1203/1503 see [► 57].

Parallel bridges on the tap selector connection contacts are then mandatory if the tap winding has been wound in two or more branches and each of these branch taps is connected to the contacts of the tap selector.

This measure reliably prevents the following:

- Introduction of circulating currents into the current paths of tap selector and diverter switch
- Commutating arc on movable tap selector contact bridges
- Overvoltage between adjacent tap selector connection contacts connected in parallel

3.2 On-load tap-changer combination for delta connection

The on-load tap-changers can also be used with the single-column on-load tap-changer VM I 351 as a two-column on-load tap-changer combination VM I 351/VM II 352 for adjusting the voltage of transformer windings in a delta connection (analogous to VM I 301/VM II 302 and VM I 651/VM II 652). This combination is known as VM III K ("K" for the German for combination).

The tap windings for this should be provided as shown below:

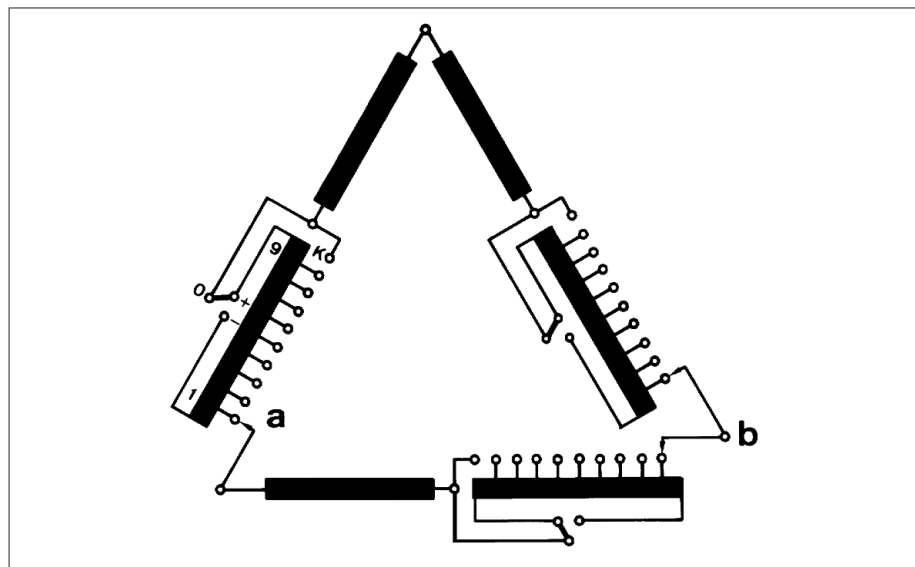


Figure 4: On-load tap-changer combination VM III K for delta connection VM I 351/ VM II 352 (a = VM I 351, b = VM II 352)

3.3 On-load tap-changer VACUTAP® VM III 650 Y ... VM I 1503 with multiple coarse change-over selector (up to maximum 5 coarse tap connections)

Extremely fine voltage setting requires a great number of operating positions which sometimes can only be achieved with a multiple coarse tapping arrangement.

For instance, 107 operating positions can be obtained by using a coarse 5-tap winding and a tapped winding with 18 taps.

The multiple coarse change-over selector is attached to both sides of the tap selector.

The on-load tap-changers are available for $U_m = 72.5$ up to max. 300 kV and for 2...5 coarse tap connections (selector sizes B, C and D).

3.4 Two-column on-load tap-changer VACUTAP® VM II 302/352/502/652

On-load tap-changer VM II 302/352/502/652 [► 24] can be supplied as a two-column on-load tap-changer for single-phase center point tap-change operations with the same technical data as on-load tap-changers VM III 350 Y, VM III 500 Y or VM III 650 Y [► 23].

3.5 On-load tap-changer VACUTAP® VM III 300/350/500/650 Y for Y connection with open neutral point

If on-load tap-changers have an open neutral point, **only current transformers** may be connected to the open neutral point. Otherwise impermissible overvoltages arise at the neutral point.



Reactors must not be connected.

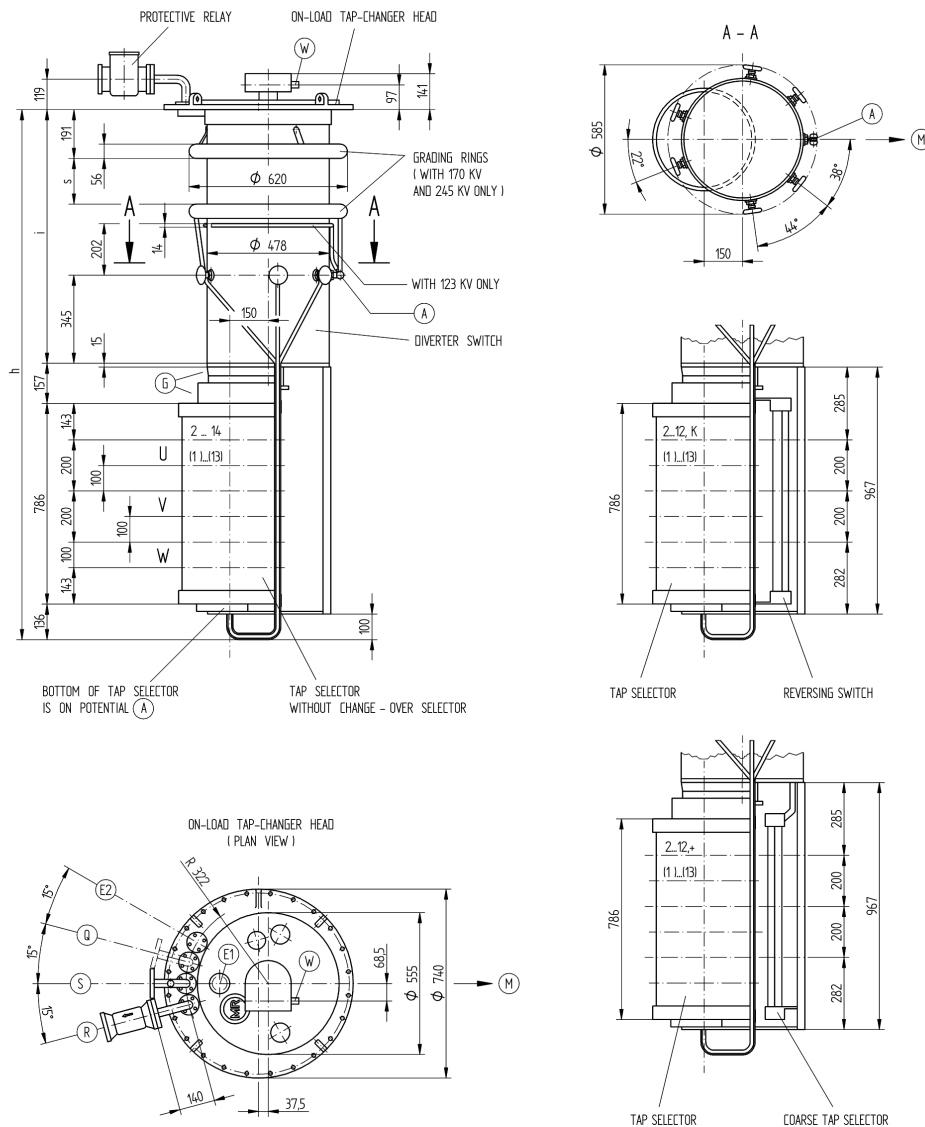
Connection of three oil vessel outputs (= open neutral point)	VACUTAP VM III 300/350/500/650 Y	
Current transformer connection and neutral point formation outside on-load tap-changer	A) Test voltages permitted between the oil vessel output contacts	
	Rated lightning impulse withstand voltage	4 kV (1.2/50 μ S)
	Rated short-duration power frequency withstand voltage	2.5 kV (50 Hz, 1 min.)
	B) Permissible maximum operating voltage between oil vessel output contacts	
		1 kV (50...60 Hz)

Table 11: Permissible test voltages and operating voltages for VACUTAP® VM III 300/350/500/650 Y

4 Appendix

4.1 Dimensional drawings/connection diagrams

4.1.1 VACUTAP® VM III 300 Y-0/W/G (768698)



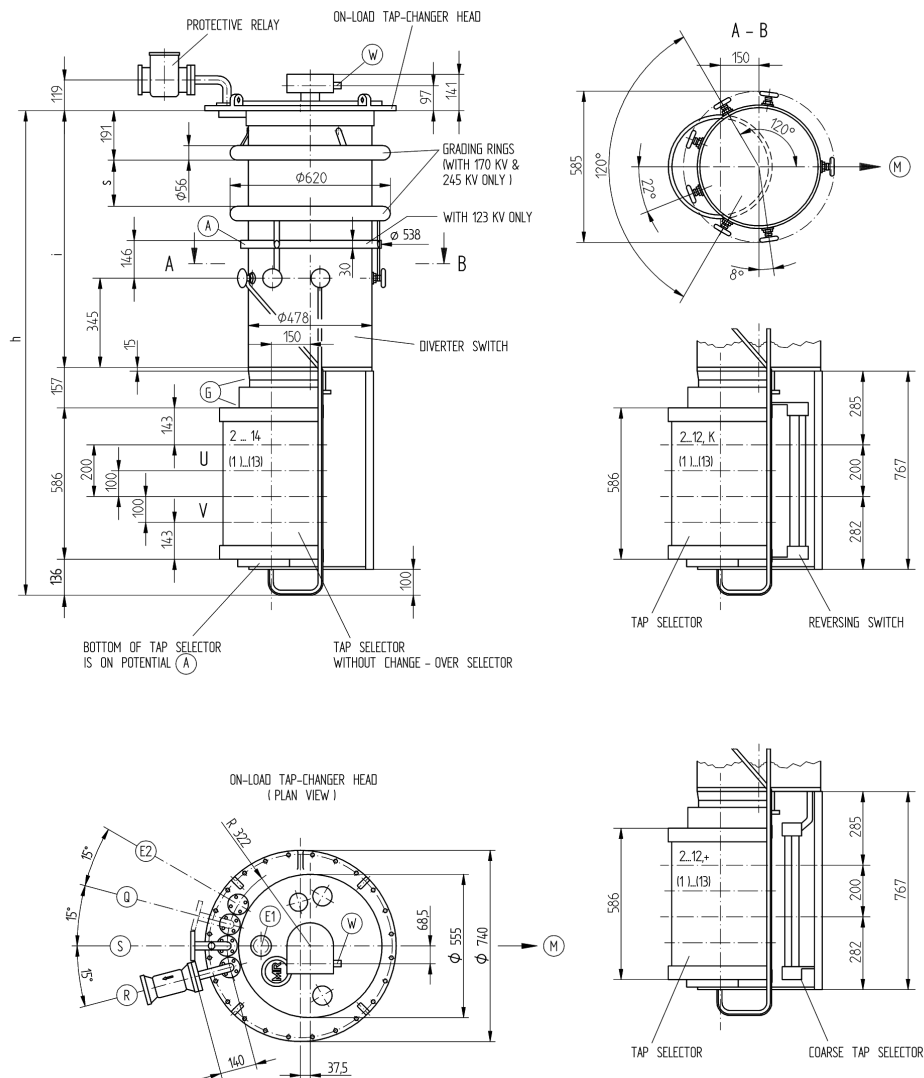
- (A) ON-LOAD TAP-CHANGER CURRENT TAKE-OFF TERMINAL (NEUTRAL)
- (E1) BLEEDING OF ON-LOAD TAP-CHANGER HEAD
- (E2) BLEEDING OF TRANSFORMER TANK
- (G) TAP SELECTOR GEAR (ON POTENTIAL (A))
- (Q) CONNECTING FLANGE FOR OIL RETURN (WITH FILTER UNIT ONLY)
- (R) CONNECTING FLANGE FOR PROTECTIVE RELAY
- (S) CONNECTING FLANGE FOR SUCTION PIPE
- (W) DRIVE SHAFT
- (M) DRIVE SIDE OF TAP SELECTOR

FOR INHERENT DRAWINGS
REFER TO 898026

FOR BINDING DESIGNATIONS OF TERMINALS AND PHASES
REFER TO THE CONNECTION DIAGRAM OF THE TAP CHANGER

TAP SELECTOR SIZE	B			
U _M [KV]	72.5	123	170	245
DIMENSIONS [MM]	h	1942	2072	2202
	i	863	993	1123
	s	—	267	367
OIL VOLUME [DM ³]	130	150	170	190
DISPLACEMENT [DM ³]	190	220	240	260
MAX WEIGHT [KG]	280	285	290	295

4.1.2 VACUTAP® VM II 302-0/W/G (769225)



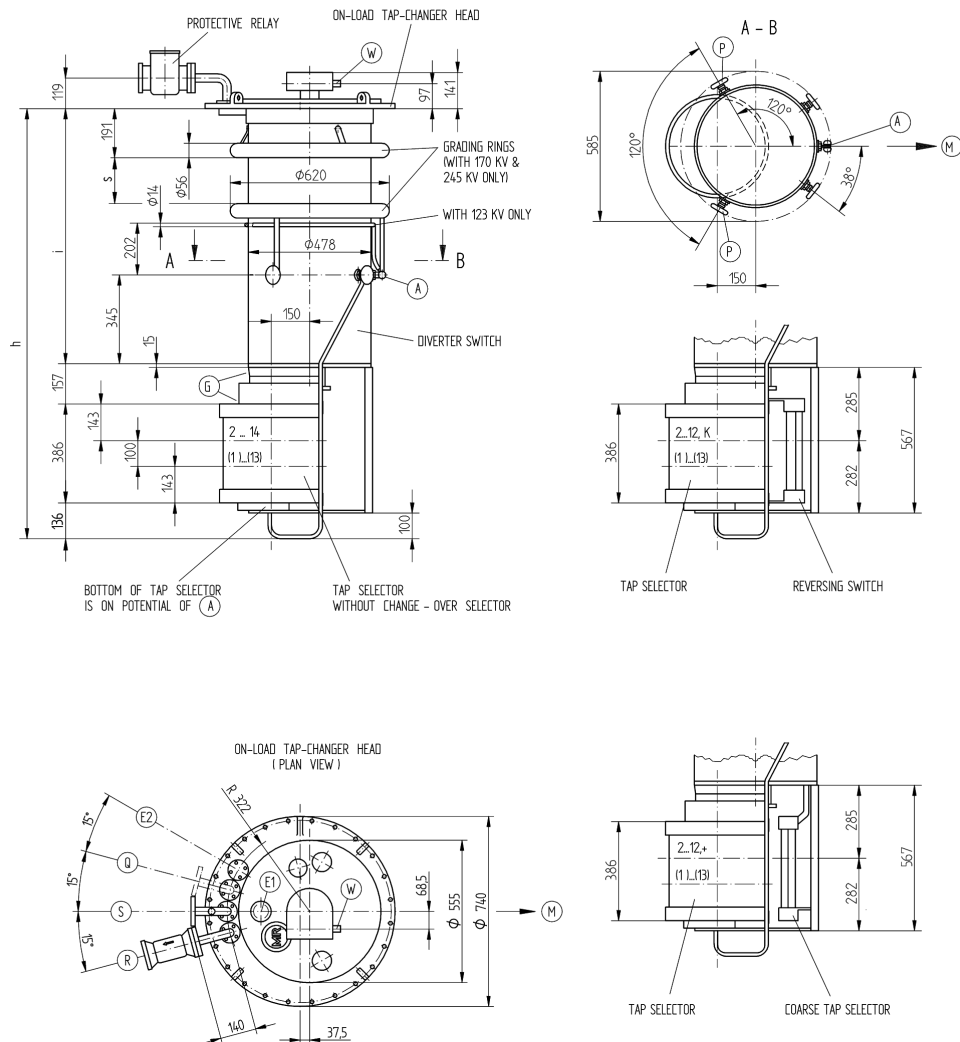
- (A) ON-LOAD TAP-CHANGER CURRENT TAKE-OFF TERMINAL
(E1) BLEEDING OF ON-LOAD TAP-CHANGER HEAD
(E2) BLEEDING OF TRANSFORMER TANK
(G) TAP SELECTOR GEAR (ON POTENTIAL (A))
(D) CONNECTING FLANGE FOR OIL RETURN
(WITH FILTER UNIT ONLY)
(R) CONNECTING FLANGE FOR PROTECTIVE RELAY
(S) CONNECTING FLANGE FOR SUCTION PIPE
(W) DRIVE SHAFT
(M) DRIVE SIDE OF TAP SELECTOR

FOR INHERENT DRAWINGS
REFER TO 898026

FOR BINDING DESIGNATIONS OF TERMINALS AND PHASES
REFER TO THE CONNECTION DIAGRAM OF THE TAP CHANGER

TAP SELECTOR SIZE	B			
	72.5	123	170	245
DIMENSIONS [MM]	h	1742	1872	2002
	i	863	993	1123
	s	—	267	367
OIL VOLUME [DM ³]	130	150	170	190
DISPLACEMENT [DM ³]	180	210	230	250
MAX. WEIGHT [KG]	260	265	270	275

4.1.3 VACUTAP® VM I 301-0/W/G (769226)



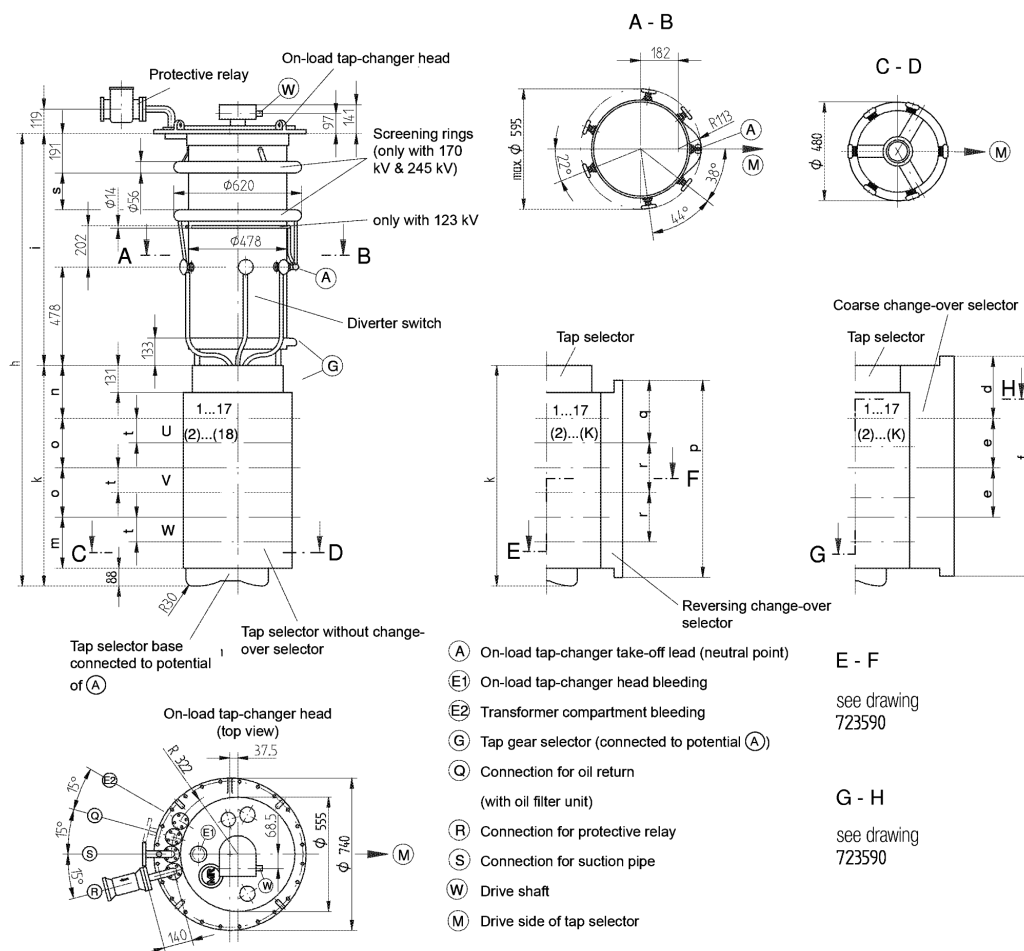
- (A) ON-LOAD TAP-CHANGER CURRENT TAKE - OFF TERMINAL
- (F1) BLEEDING OF ON-LOAD TAP-CHANGER HEAD
- (E2) BLEEDING OF TRANSFORMER TANK
- (G) TAP SELECTOR GEAR (ON POTENTIAL (A))
- (D) CONNECTING FLANGE FOR OIL RETURN
(WITH FILTER UNIT ONLY)
- (R) CONNECTING FLANGE FOR PROTECTIVE RELAY
- (S) CONNECTING FLANGE FOR SUCTION PIPE
- (W) DRIVE SHAFT
- (M) DRIVE SIDE OF TAP SELECTOR
- (P) IS ON POTENTIAL OF (A)

FOR INHERENT DRAWINGS
REFER TO 898026

FOR BINDING DESIGNATIONS OF TERMINALS AND PHASES
REFER TO THE CONNECTION DIAGRAM OF THE TAP CHANGER

TAP SELECTOR SIZE	B			
U _H [KV]	72,5	123	170	245
DIMENSIONS [MM]	h	1542	1672	1802
	i	863	993	1123
	s	—		267
OIL VOLUME [CM ³]	130	150	170	190
DISPLACEMENT [CM ³]	160	190	210	230
MAX WEIGHT [KG]	240	245	250	255

4.1.4 VACUTAP® VM III 350/500/650 Y-0/W/G (746219)

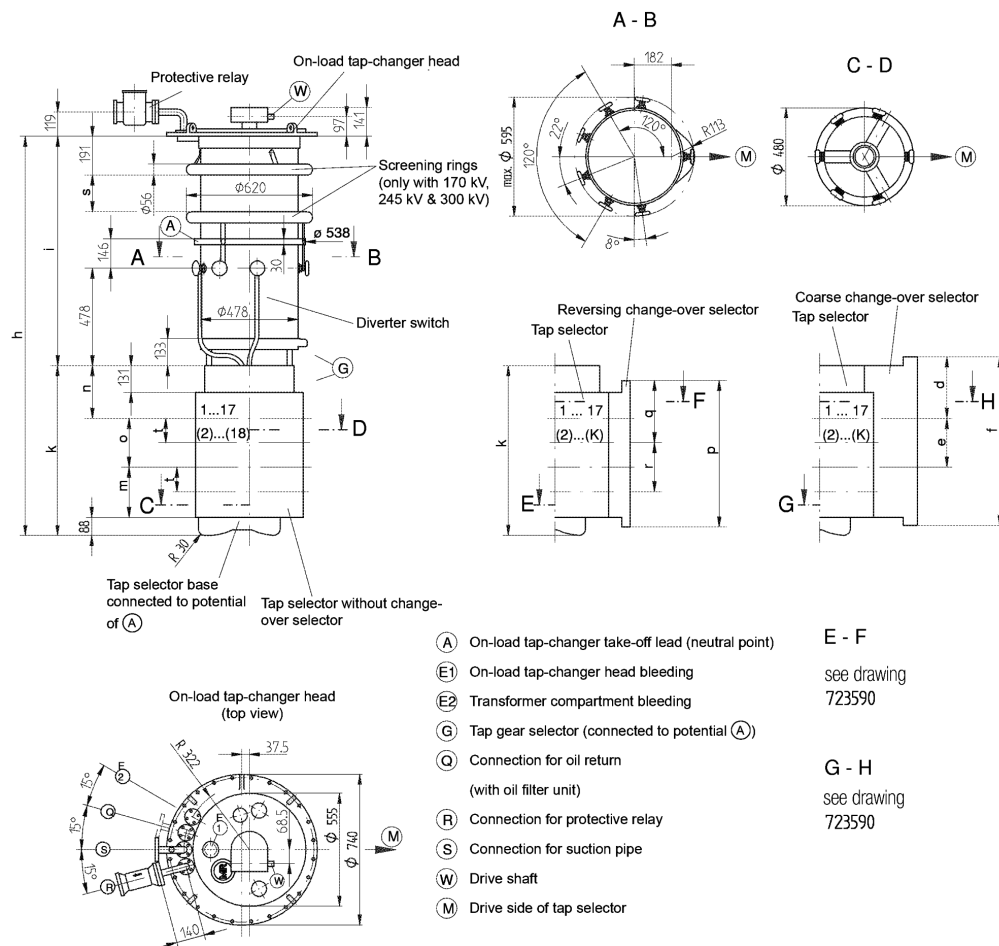


For associated drawings,
see: 898012

The connection diagram is binding for the designation of connection terminals and phases

Tap selector size		B				C				D/DE			
U _m [kV]		72,5	123	170	245	72,5	123	170	245	72,5	123	170	245
Dimensions [mm]	h	1894	2024	2154	2254	2069	2199	2329	2429	2524	2654	2784	2884
	i	996	1126	1256	1356	996	1126	1256	1356	996	1126	1256	1356
	s	-		267	367	-		267	367	-		267	367
	k	898				1073				1528			
	n	233				258				323			
	o	190				240				370			
	m	197				247				377			
	t	95				120				185			
	r	190				240				370			
	q	255				305				435			
	p	783				958				1413			
	d	276.5				301.5				366.5			
	e	190				240				370			
f	892				1067				1522				
Oil content [dm³]		130	150	170	190	130	150	170	190	130	150	170	190
Displacement [dm³]		199	224	244	264	199	224	244	264	207	232	252	272
Max. weight [kg]		350	355	360	365	360	365	370	375	375	380	385	390

4.1.5 VACUTAP® VM II 352/502/652-0/W/G (746220)

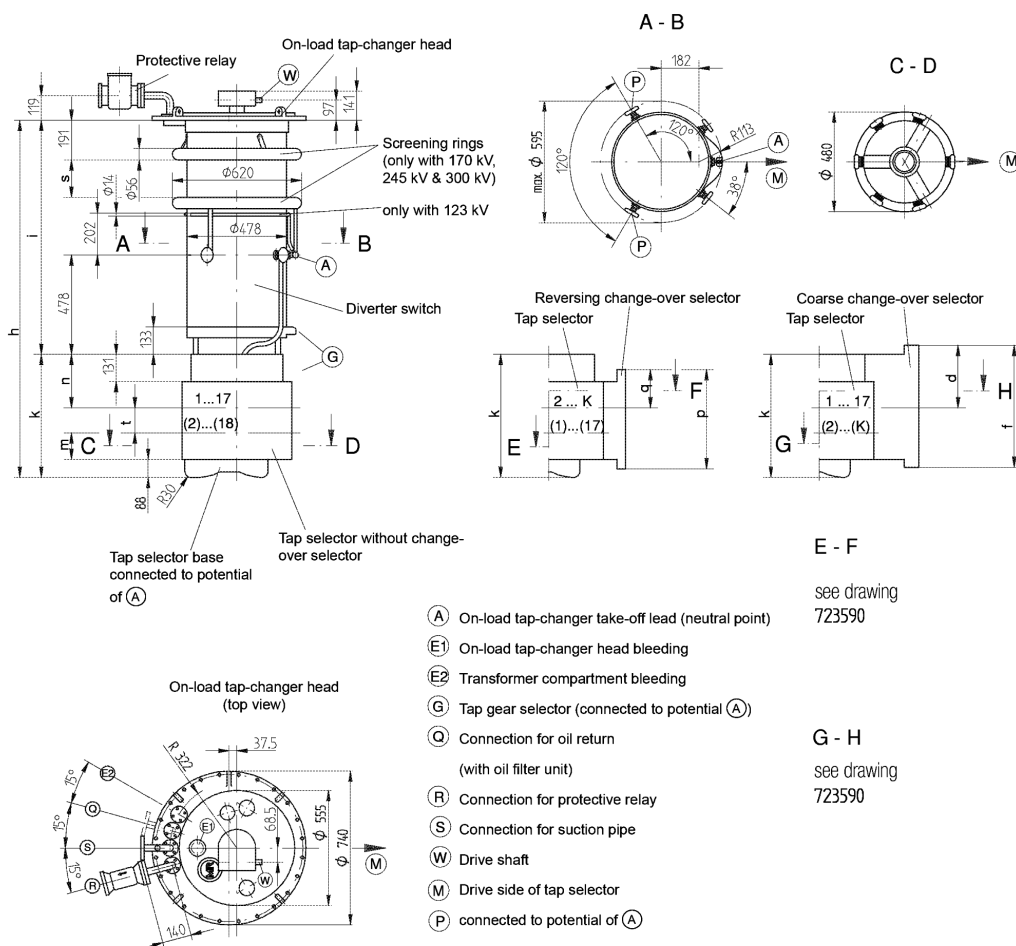


For associated drawings,
see: 898012

The connection diagram is binding for the designation of connection terminals and phases

Tap selector size		B					C					D/DE				
U _m [kV]		72,5	123	170	245	300	72,5	123	170	245	300	72,5	123	170	245	300
Dimensions [mm]	h	1704	1834	1964	2064	2216	1829	1959	2089	2189	2341	2154	2284	2414	2514	2666
	i	996	1126	1256	1356	1508	996	1126	1256	1356	1508	996	1126	1256	1356	1508
	s	-	-	267	367	520	-	-	267	367	520	-	-	267	367	520
	k	-	-	708	-	-	-	-	833	-	-	-	-	1158	-	-
	n	-	-	233	-	-	-	-	258	-	-	-	-	323	-	-
	o	-	-	190	-	-	-	-	240	-	-	-	-	370	-	-
	m	-	-	197	-	-	-	-	247	-	-	-	-	377	-	-
	t	-	-	95	-	-	-	-	120	-	-	-	-	185	-	-
	r	-	-	190	-	-	-	-	240	-	-	-	-	370	-	-
	q	-	-	255	-	-	-	-	305	-	-	-	-	435	-	-
	p	-	-	593	-	-	-	-	718	-	-	-	-	1043	-	-
	e	-	-	190	-	-	-	-	240	-	-	-	-	370	-	-
	d	-	-	276,5	-	-	-	-	301,5	-	-	-	-	366,5	-	-
	f	-	-	702	-	-	-	-	827	-	-	-	-	1152	-	-
Oil content [dm³]		130	150	170	190	210	130	150	170	190	210	130	150	170	190	210
Displacement [dm³]		196	221	241	261	281	196	221	241	261	281	199	224	244	264	284
Max. weight [kg]		310	315	320	325	330	320	325	330	335	340	330	335	340	345	350

4.1.6 VACUTAP® VM I 351/501/651-0/W/G (746221)

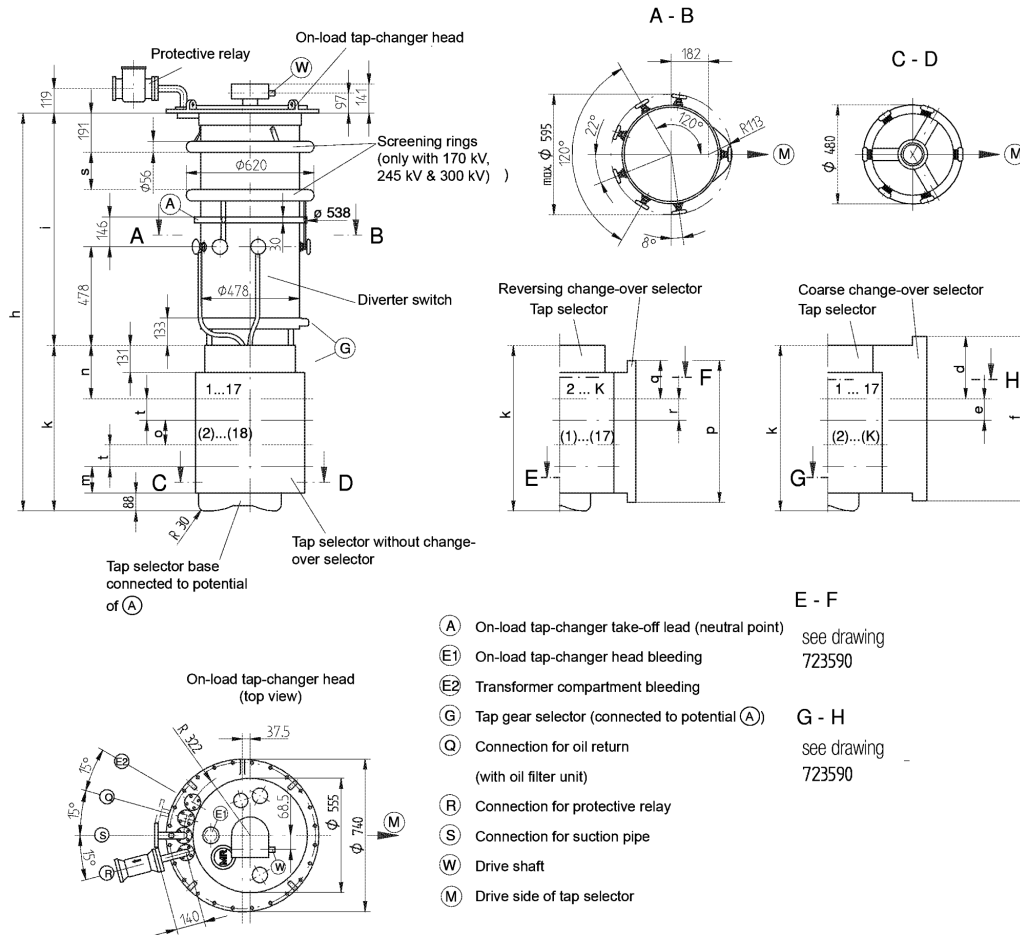


For associated drawings,
see: 898012

The connection diagram is binding for the designation of connection terminals and phases

Tap selector size		B					C					D/DE				
U _m [kV]		72,5	123	170	245	300	72,5	123	170	245	300	72,5	123	170	245	300
Dimensions [mm]	h	1514	1644	1774	1874	2026	1589	1719	1849	1949	2101	1784	1914	2044	2144	2296
	i	996	1126	1256	1356	1508	996	1126	1256	1356	1508	996	1126	1256	1356	1508
	s	-	-	267	367	520	-	-	267	367	520	-	-	267	367	520
	k	-	-	518	-	-	-	-	593	-	-	-	-	788	-	-
	n	-	-	233	-	-	-	-	258	-	-	-	-	323	-	-
	m	-	-	102	-	-	-	-	127	-	-	-	-	192	-	-
	t	-	-	95	-	-	-	-	120	-	-	-	-	185	-	-
	q	-	-	160	-	-	-	-	185	-	-	-	-	250	-	-
	p	-	-	403	-	-	-	-	478	-	-	-	-	673	-	-
	d	-	-	276.5	-	-	-	-	301.5	-	-	-	-	366.5	-	-
	f	-	-	512	-	-	-	-	587	-	-	-	-	782	-	-
Oil content [dm³]		130	150	170	190	210	130	150	170	190	210	130	150	170	190	210
Displacement [dm³]		193	218	238	258	278	193	218	238	258	278	195	220	240	260	280
Max. weight [kg]		280	285	290	295	300	290	295	300	305	310	300	305	310	315	320

4.1.7 VACUTAP® VM I 802/1002-0/W/G (746222)

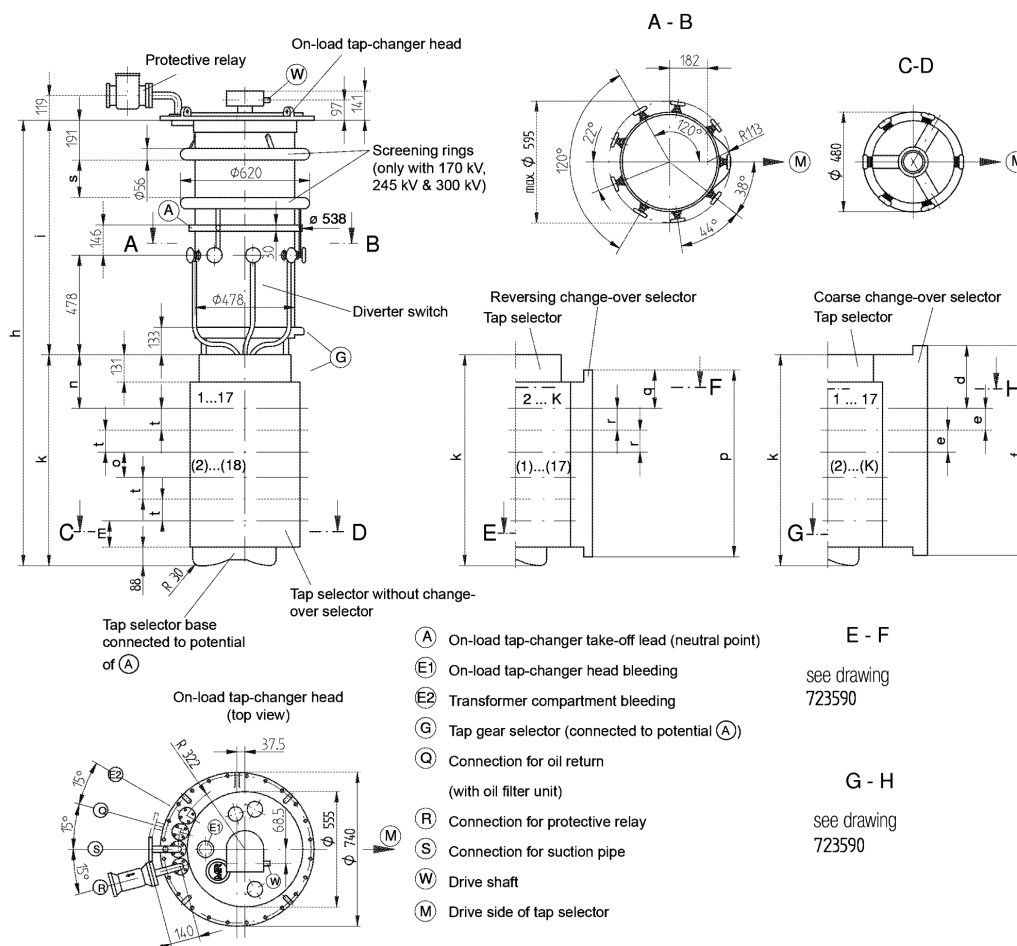


For associated drawings,
see: 898012

The connection diagram is binding for the designation of connection terminals and phases

Tap selector size		B					C					D/DE				
U _m [kV]		72,5	123	170	245	300	72,5	123	170	245	300	72,5	123	170	245	300
Dimensions [mm]	h	1724	1854	1984	2084	2236	1799	1929	2059	2159	2311	1994	2124	2254	2354	2506
	i	996	1126	1256	1356	1508	996	1126	1256	1356	1508	996	1126	1256	1356	1508
	s	-	-	267	367	520	-	-	267	367	520	-	-	267	367	520
	k	-	-	728	-	-	-	-	803	-	-	-	-	998	-	-
	n	-	-	233	-	-	-	-	258	-	-	-	-	323	-	-
	o	-	-	95	-	-	-	-	120	-	-	-	-	185	-	-
	m	-	-	102	-	-	-	-	127	-	-	-	-	192	-	-
	t	-	-	105	-	-	-	-	105	-	-	-	-	105	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	r	-	-	105	-	-	-	-	105	-	-	-	-	105	-	-
	q	-	-	160	-	-	-	-	185	-	-	-	-	250	-	-
	p	-	-	613	-	-	-	-	688	-	-	-	-	883	-	-
	e	-	-	105	-	-	-	-	105	-	-	-	-	105	-	-
	d	-	-	276.5	-	-	-	-	301.5	-	-	-	-	366.5	-	-
f	-	-	722	-	-	-	-	797	-	-	-	-	992	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oil content [dm³]		130	150	170	190	210	130	150	170	190	210	130	150	170	190	210
Displacement [dm³]		196	221	241	261	281	196	221	241	261	281	199	224	244	264	284
Max. weight [kg]		310	315	320	325	330	320	325	330	335	340	330	335	340	345	350

4.1.8 VACUTAP® VM I 1203/1503-0/W/G (746223)



For associated drawings, see:
898012

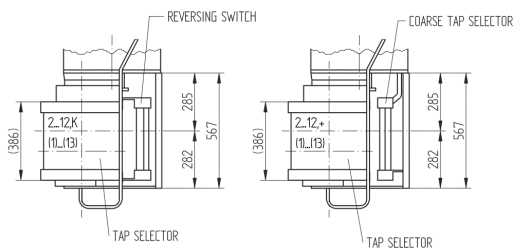
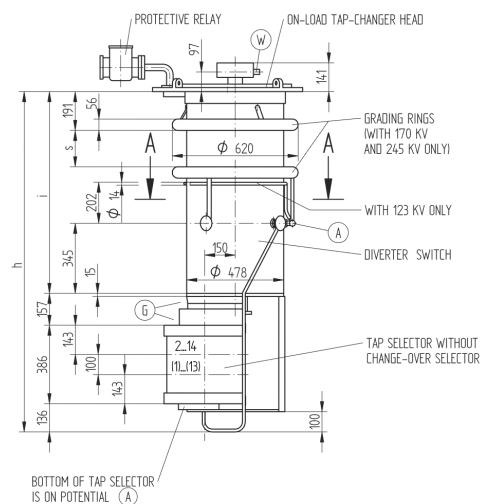
The connection diagram is binding for the designation of
connection terminals and phases

Tap selector size	B					C					D/DE				
U _m [kV]	72,5	123	170	245	300	72,5	123	170	245	300	72,5	123	170	245	300
h	1934	2064	2194	2294	2446	2009	2139	2269	2369	2521	2204	2334	2464	2564	2716
i	996	1126	1256	1356	1508	996	1126	1256	1356	1508	996	1126	1256	1356	1508
s	-	-	267	367	520	-	-	267	367	520	-	-	267	367	520
k	-	-	938	-	-	-	-	1013	-	-	-	-	1208	-	-
n	-	-	233	-	-	-	-	258	-	-	-	-	323	-	-
o	-	-	95	-	-	-	-	120	-	-	-	-	185	-	-
m	-	-	102	-	-	-	-	127	-	-	-	-	192	-	-
t	-	-	105	-	-	-	-	105	-	-	-	-	105	-	-
r	-	-	105	-	-	-	-	105	-	-	-	-	105	-	-
q	-	-	160	-	-	-	-	185	-	-	-	-	250	-	-
p	-	-	823	-	-	-	-	898	-	-	-	-	1093	-	-
e	-	-	105	-	-	-	-	105	-	-	-	-	105	-	-
d	-	-	276.5	-	-	-	-	301.5	-	-	-	-	366.5	-	-
f	-	-	932	-	-	-	-	1007	-	-	-	-	1202	-	-
Oil content [dm ³]	130	150	170	190	210	130	150	170	190	210	130	150	170	190	210
Displacement [dm ³]	200	225	245	265	285	200	225	245	265	285	204	229	249	269	289
Max. weight [kg]	350	355	360	365	370	360	365	370	375	380	375	380	385	390	395

4.1.9 VACUTAP® VM III 300 K-0/W/G (768851)

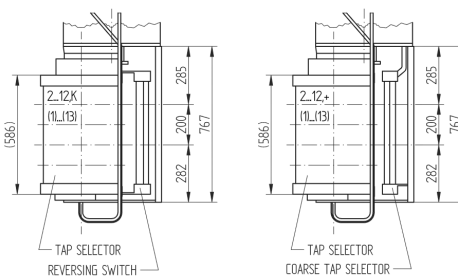
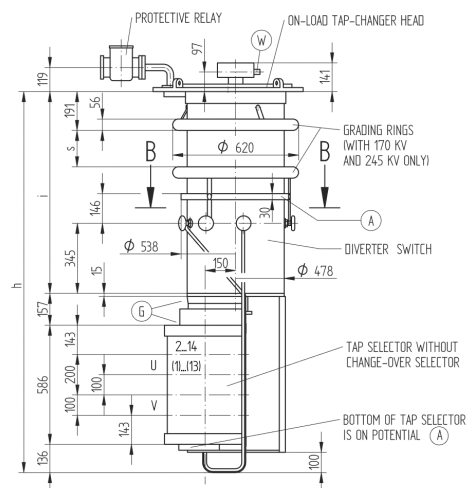
VM I 301 - 0 / W / G

TAP SELECTOR SIDE		B				
Um [kV]		725	123	170	245	
DIMENSIONS [MM]		h	1542	1672	1802	1902
		i	863	993	1123	1223
		s	-		267	367
OIL VOLUME [DM ³]		130	150	170	190	
[DISPLACEMENT [DM ³]]		160	190	210	230	
MAX. WEIGHT [KG]		240	245	250	255	

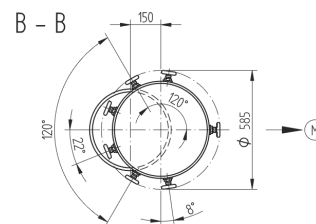
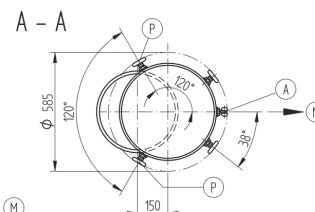
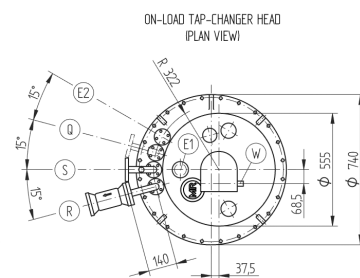


VM II 302 - 0 / W / G

TAP SELECTOR SIDE		B			
Um [kV]		725	123	170	245
DIMENSIONS [MM]	h	1742	1872	2002	2102
	i	863	993	1123	1223
	s	—		267	367
OIL VOLUME [DM ³]		130	150	170	190
DISPLACEMENT [DM ³]		180	210	230	250
MAX. WEIGHT [KG]		260	265	270	275



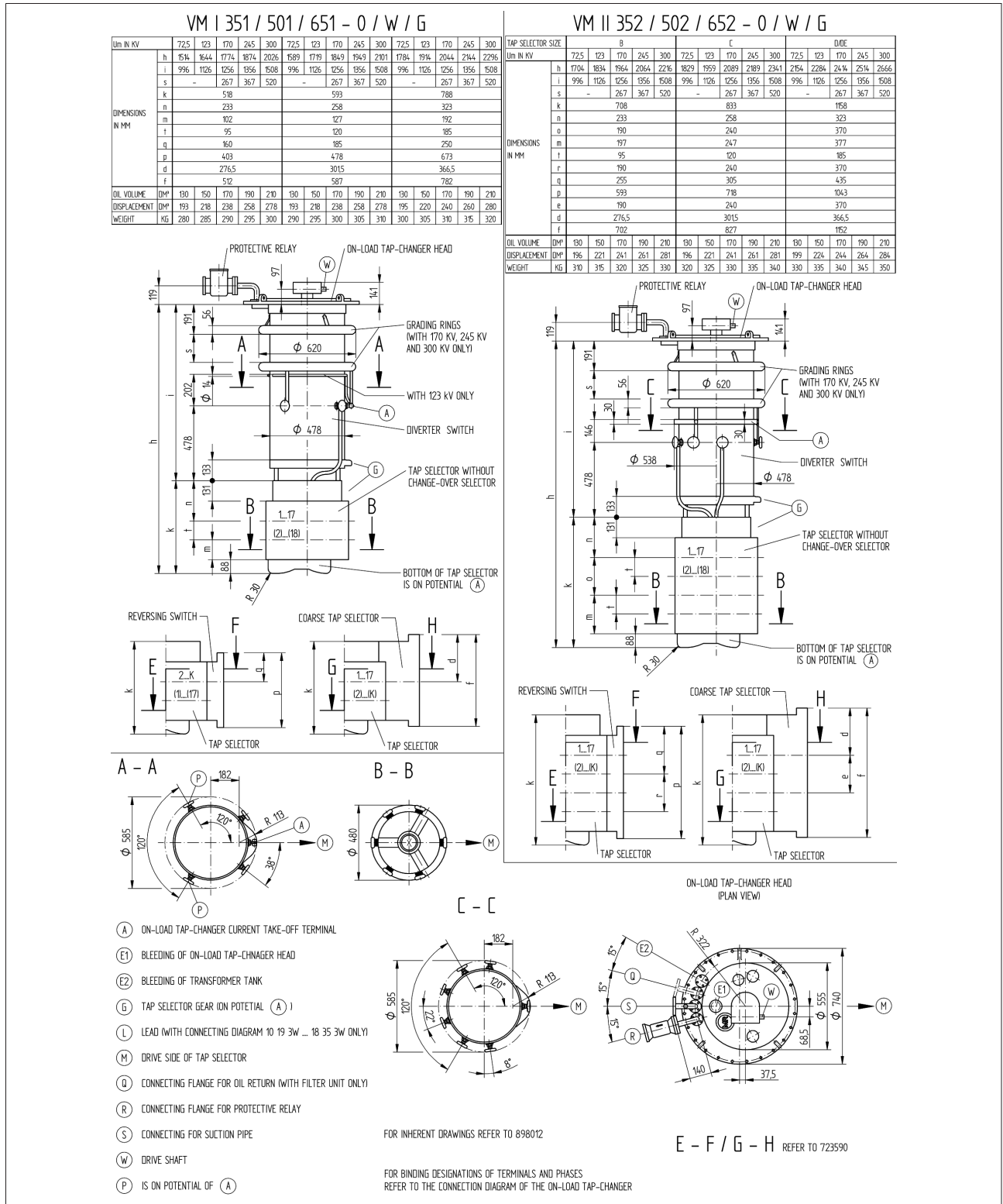
- (A) ON-LOAD TAP-CHANGER CURRENT TAKE-OFF TERMINAL
- (E1) BLEEDING OF ON-LOAD TAP-CHANGER HEAD
- (E2) BLEEDING OF TRANSFORMER TANK
- (G) TAP SELECTOR GEAR (ON POTENTIAL (A))
- (M) DRIVE SIDE OF TAP SELECTOR
- (P) IS ON POTENTIAL OF (A)
- (Q) CONNECTING FLANGE FOR OIL RETURN
(WITH FILTER UNIT ONLY)
- (R) CONNECTING FLANGE FOR PROTECTIVE RELAY
- (S) CONNECTING FOR SUCTION PIPE
- (W) DRIVE SHAFT
- 



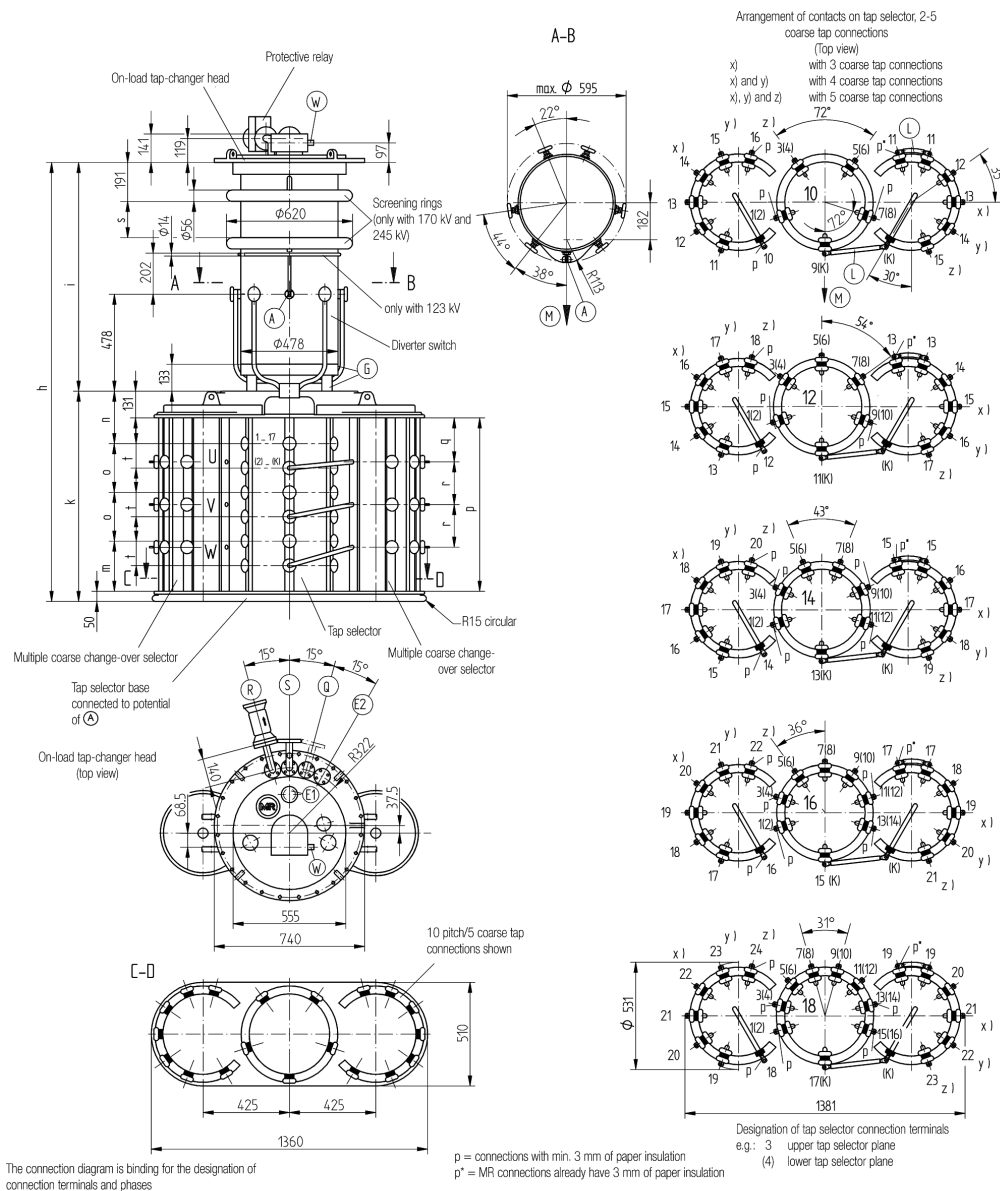
FOR INHERENT DRAWINGS REFER TO 898026

FOR BINDING DESIGNATIONS OF TERMINALS AND PHASES
REFER TO THE CONNECTION DIAGRAM OF THE ON-LOAD TAP-CHANGER

4.1.10 VACUTAP® VM III K-0/W/G (746224)



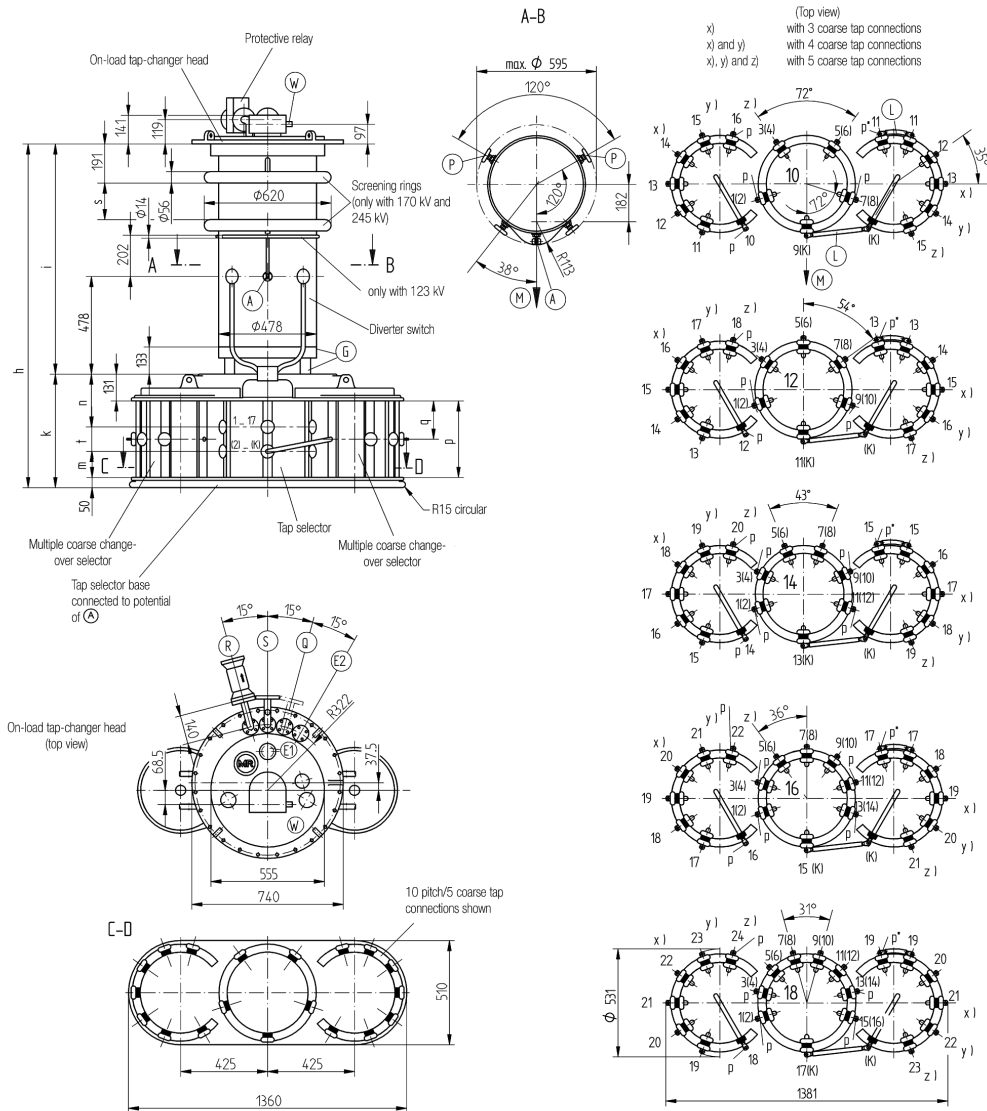
4.1.11 VACUTAP® VM III 650 Y with multiple coarse change-over selector (746226)



- (A) On-load tap-changer take-off lead
- (E1) On-load tap-changer head bleeding
- (E2) Transformer compartment bleeding
- (G) Tap selector gear (connected to potential (A))
- (Q) Connection for oil return (with oil filter unit)
- (R) Connection for protective relay
- (S) Connection for suction pipe
- (W) Drive shaft
- (L) Connecting lead
- (M) Drive side of the tap selector

Tap selector size		B				C				D			
U _m [kV]		72,5	123	170	245	72,5	123	170	245	72,5	123	170	245
Dimensions [mm]	h	1856	1986	2116	2216	2031	2161	2291	2391	2486	2616	2746	2846
	i	996	1126	1256	1356	996	1126	1256	1356	996	1126	1256	1356
	s	—		267	367	—		267	367	—		267	367
	k	860				1035				1490			
	n	233				258				323			
	o	190				240				370			
	m	197				247				377			
	t	95				120				185			
	r	166,5				210				327			
	q	173				217				327,5			
	p	679				854				1309			
Oil content [dm³]		130	150	170	190	130	150	170	190	130	150	170	190
Displacement [dm³]		321	346	366	386	321	346	366	386	333	353	375	395
Max. weight [ka]		460	465	470	475	470	475	480	485	485	490	495	500

4.1.12 VACUTAP® VM I 651 with multiple coarse change-over selector (746227)



The connection diagram is binding for the designation of connection terminals and phases

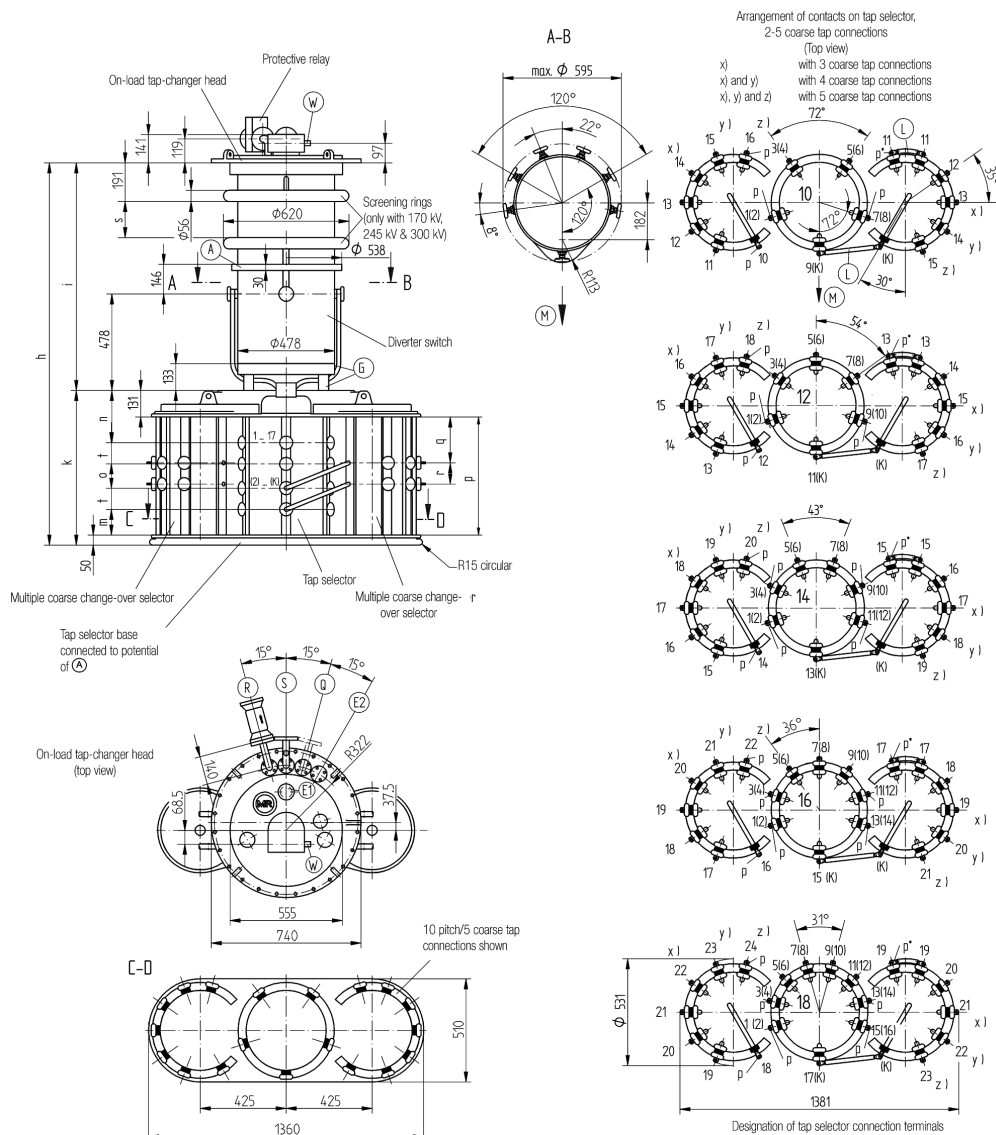
p = connections with min. 3 mm of paper insulation
p* = MR connections already have 3 mm of paper insulation

Designation of tap selector connection terminals
e.g.: 3 upper tap selector plane
(4) lower tap selector plane

- (A) On-load tap-changer take-off lead
- (E1) On-load tap-changer head bleeding
- (E2) Transformer compartment bleeding
- (B) Tap selector gear (connected to potential (A))
- (Q) Connection for oil return (with oil filter unit)
- (R) Connection for protective relay
- (S) Connection for suction pipe
- (W) Drive shaft
- (L) Connecting lead
- (M) Drive side of the tap selector
- (P) connected to potential (A)

Tap selector size		B					C					D				
U_m [kV]		72,5	123	170	245	300	72,5	123	170	245	300	72,5	123	170	245	300
Dimensions [mm]	h	1476	1606	1736	1836	1988	1551	1681	1811	1911	2063	1746	1876	2006	2106	2258
	i	996	1126	1256	1356	1508	996	1126	1256	1356	1508	996	1126	1256	1356	1508
	s	—	267	367	520	—	—	267	367	520	—	—	267	367	520	—
	k	—	480	—	—	—	—	555	—	—	—	—	750	—	—	—
	n	—	233	—	—	—	—	258	—	—	—	—	323	—	—	—
	m	—	102	—	—	—	—	127	—	—	—	—	192	—	—	—
	t	—	95	—	—	—	—	120	—	—	—	—	185	—	—	—
	q	—	149,5	—	—	—	—	187	—	—	—	—	284,5	—	—	—
	p	—	299	—	—	—	—	374	—	—	—	—	569	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Oil content [dm ³]		130	150	170	190	210	130	150	170	190	210	130	150	170	190	210
Displacement [dm ³]		198	223	243	263	283	198	223	243	263	283	203	223	248	268	288
Max. weight [kg]		370	375	380	385	390	380	385	390	395	400	390	395	400	405	410

4.1.13 VACUTAP® VM I 802/1002 with multiple coarse change-over selector (746228)

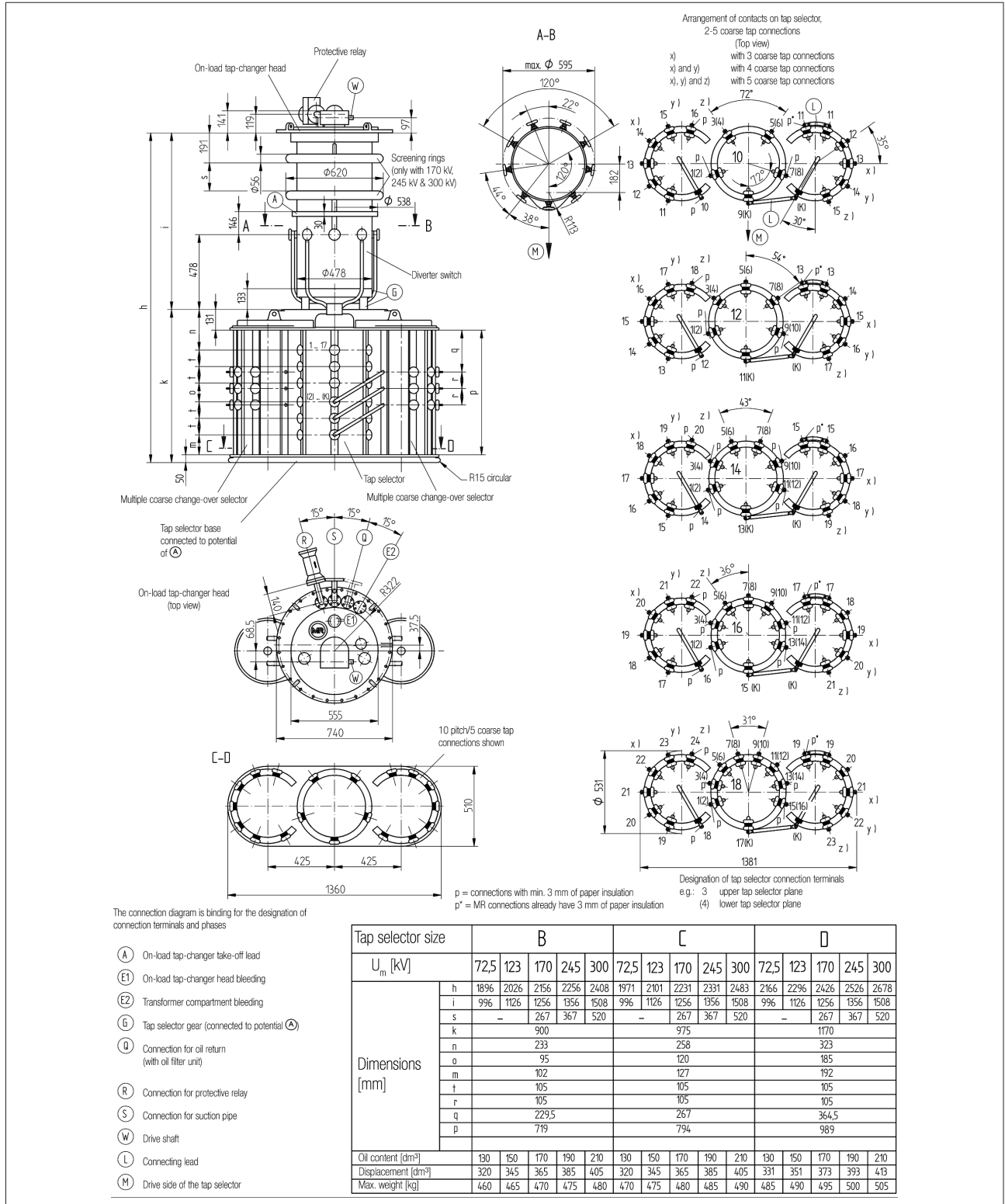


The connection diagram is binding for the designation of connection terminals and phases

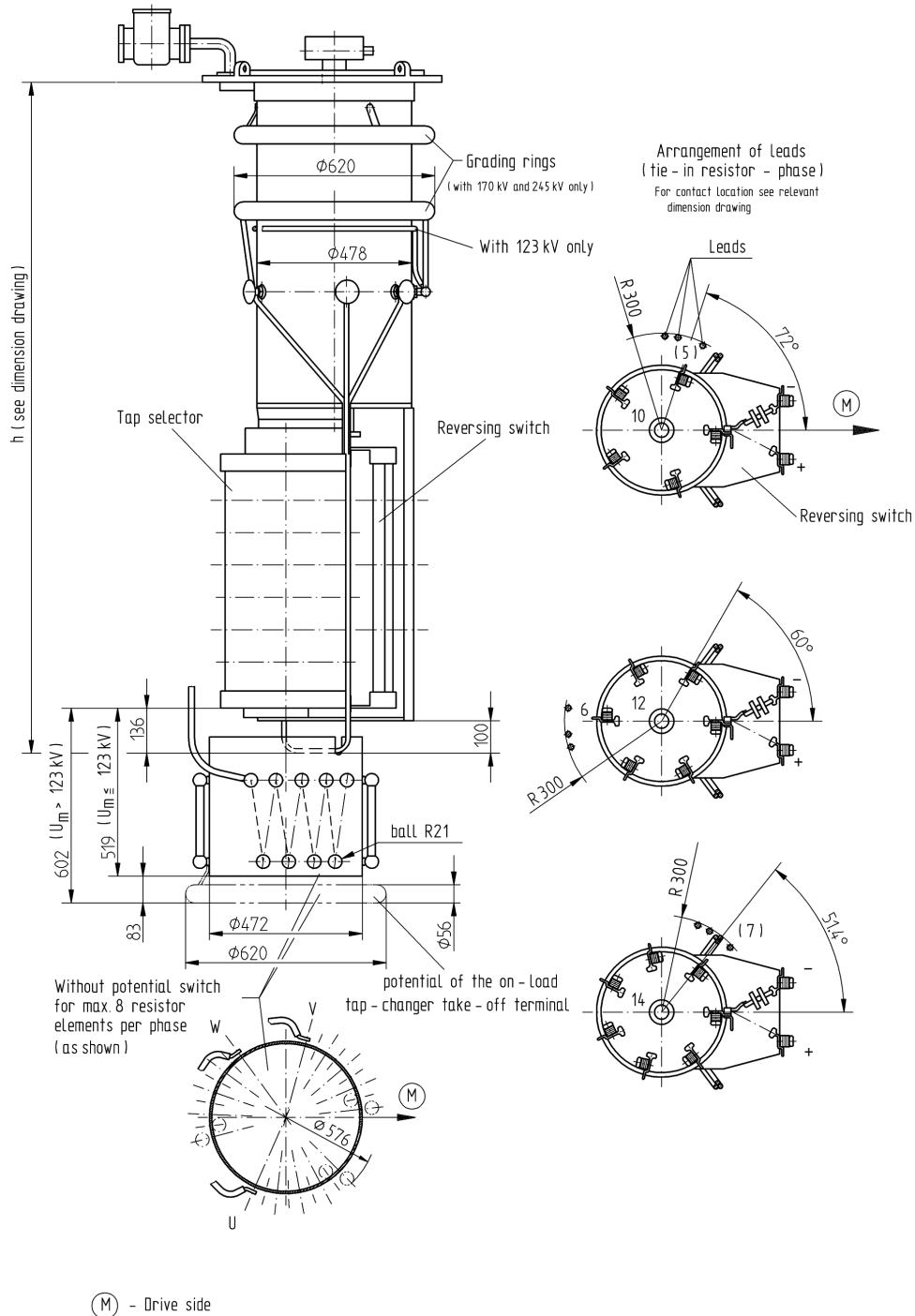
- (A) On-load tap-changer take-off lead
- (E1) On-load tap-changer head bleeding
- (E2) Transformer compartment bleeding
- (G) Tap selector gear (connected to potential (A))
- (Q) Connection for oil return (with oil filter unit)
- (R) Connection for protective relay
- (S) Connection for suction pipe
- (W) Drive shaft
- (L) Connecting lead
- (M) Drive side of the tap selector

Tap selector size		B					C					D				
U _m [kV]		72,5	123	170	245	300	72,5	123	170	245	300	72,5	123	170	245	300
Dimensions [mm]	h	1686	1816	1946	2046	2198	1761	1891	2021	2121	2273	1956	2086	2216	2316	2468
	i	996	1126	1256	1356	1508	996	1126	1256	1356	1508	996	1126	1256	1356	1508
	s	—	—	267	367	520	—	—	267	367	520	—	—	267	367	520
	k	—	—	690	—	—	—	—	765	—	—	—	—	960	—	—
	n	—	—	233	—	—	—	—	258	—	—	—	—	323	—	—
	o	—	—	95	—	—	—	—	120	—	—	—	—	185	—	—
	m	—	—	102	—	—	—	—	127	—	—	—	—	192	—	—
	t	—	—	105	—	—	—	—	105	—	—	—	—	105	—	—
	r	—	—	105	—	—	—	—	105	—	—	—	—	105	—	—
	q	—	—	189,5	—	—	—	—	227	—	—	—	—	324,5	—	—
	p	—	—	509	—	—	—	—	584	—	—	—	—	779	—	—
Oil content [dm ³]		130	150	170	190	210	130	150	170	190	210	130	150	170	190	210
Displacement [dm ³]		200	225	245	265	285	200	225	245	265	285	208	233	253	273	293
Max. weight [kg]		410	415	420	425	430	420	425	430	435	440	430	435	440	445	450

4.1.14 VACUTAP® VM I 1203/1503 with multiple coarse change-over selector (746229)

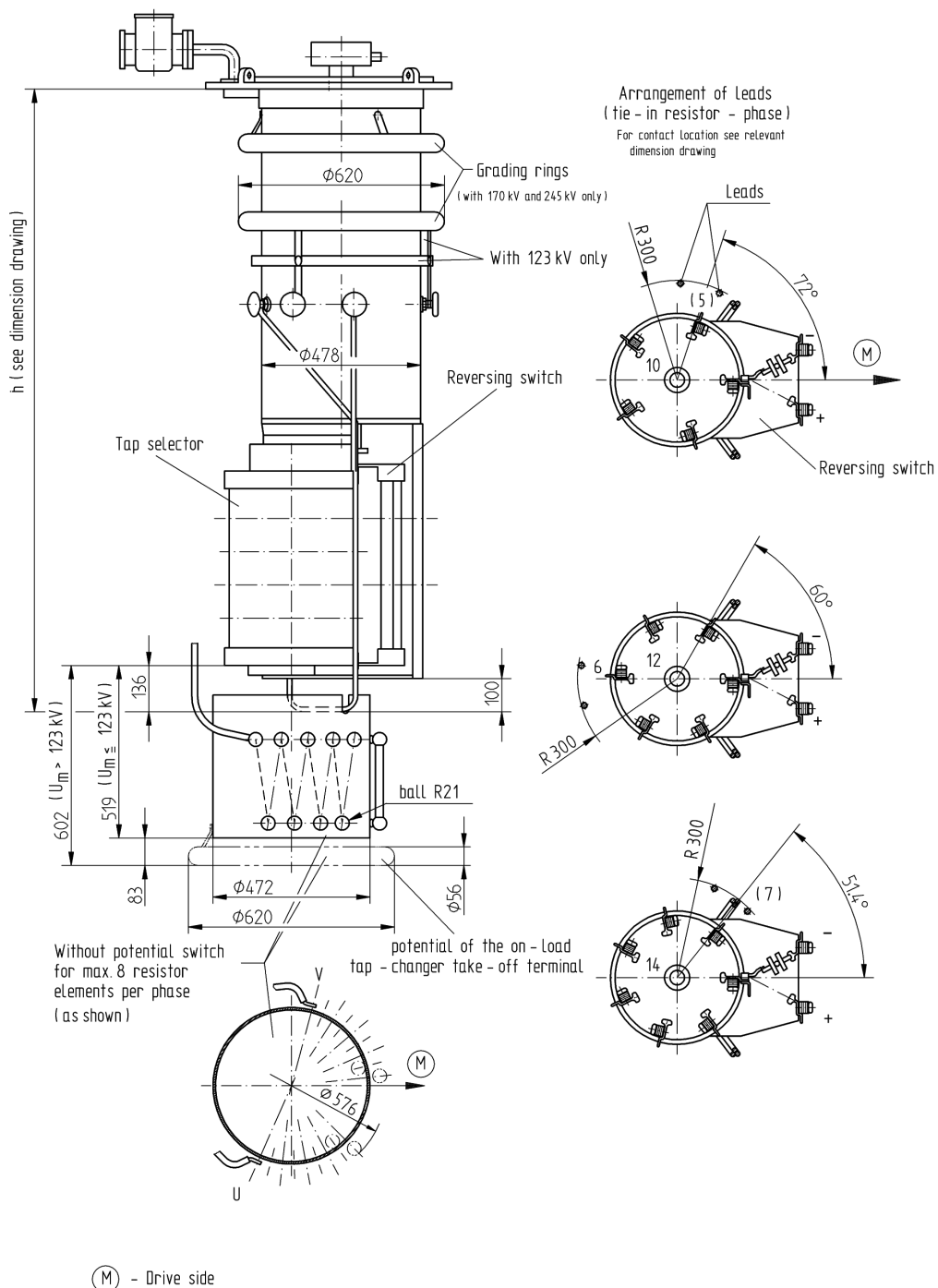


4.1.15 VACUTAP® VM III 300 tie-in resistors without potential switch (898695)

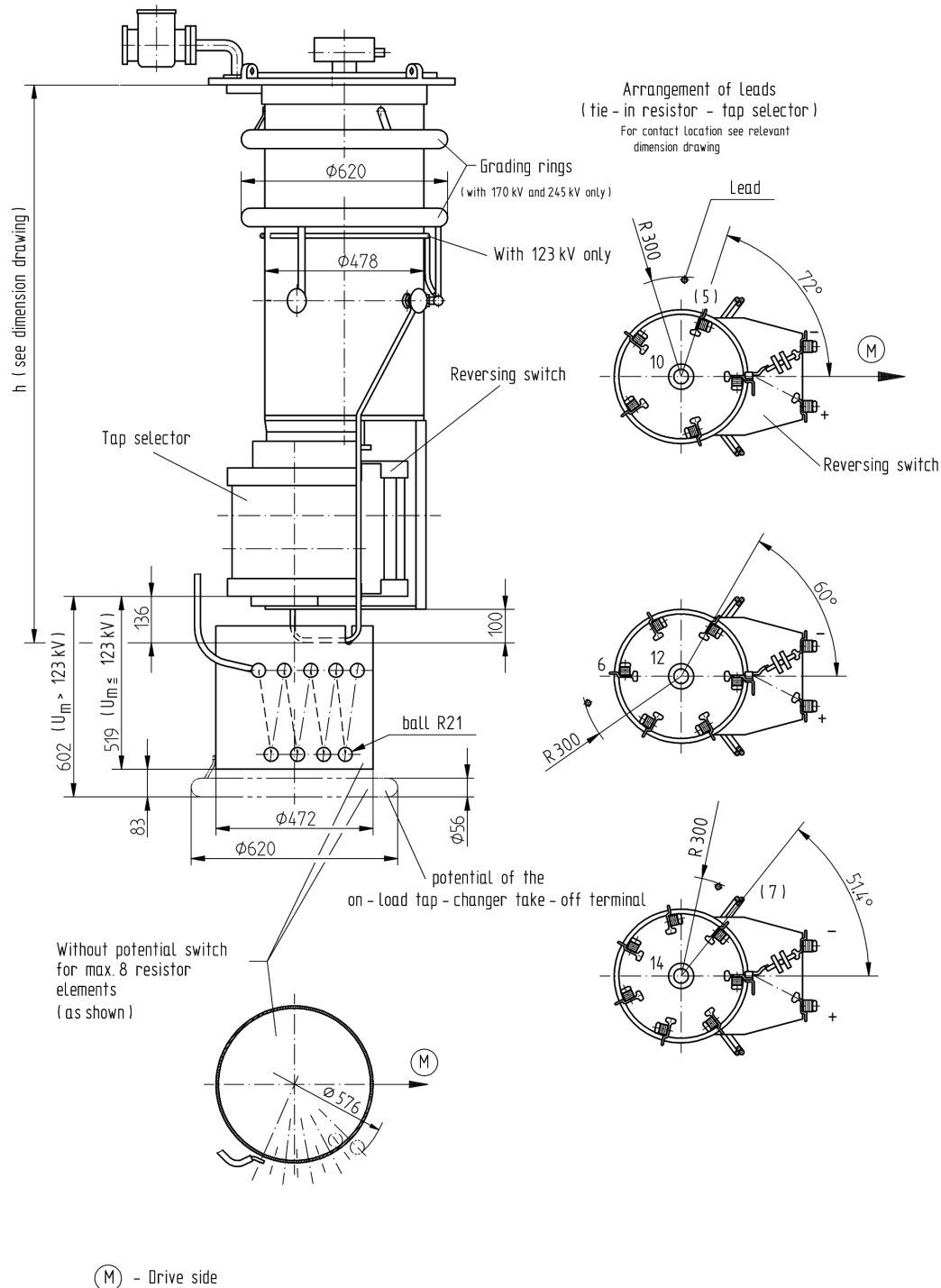


The connection diagram is binding for the designation of the terminals and phases

4.1.16 VACUTAP® VM II 302 tie-in resistors without potential switch (898694)

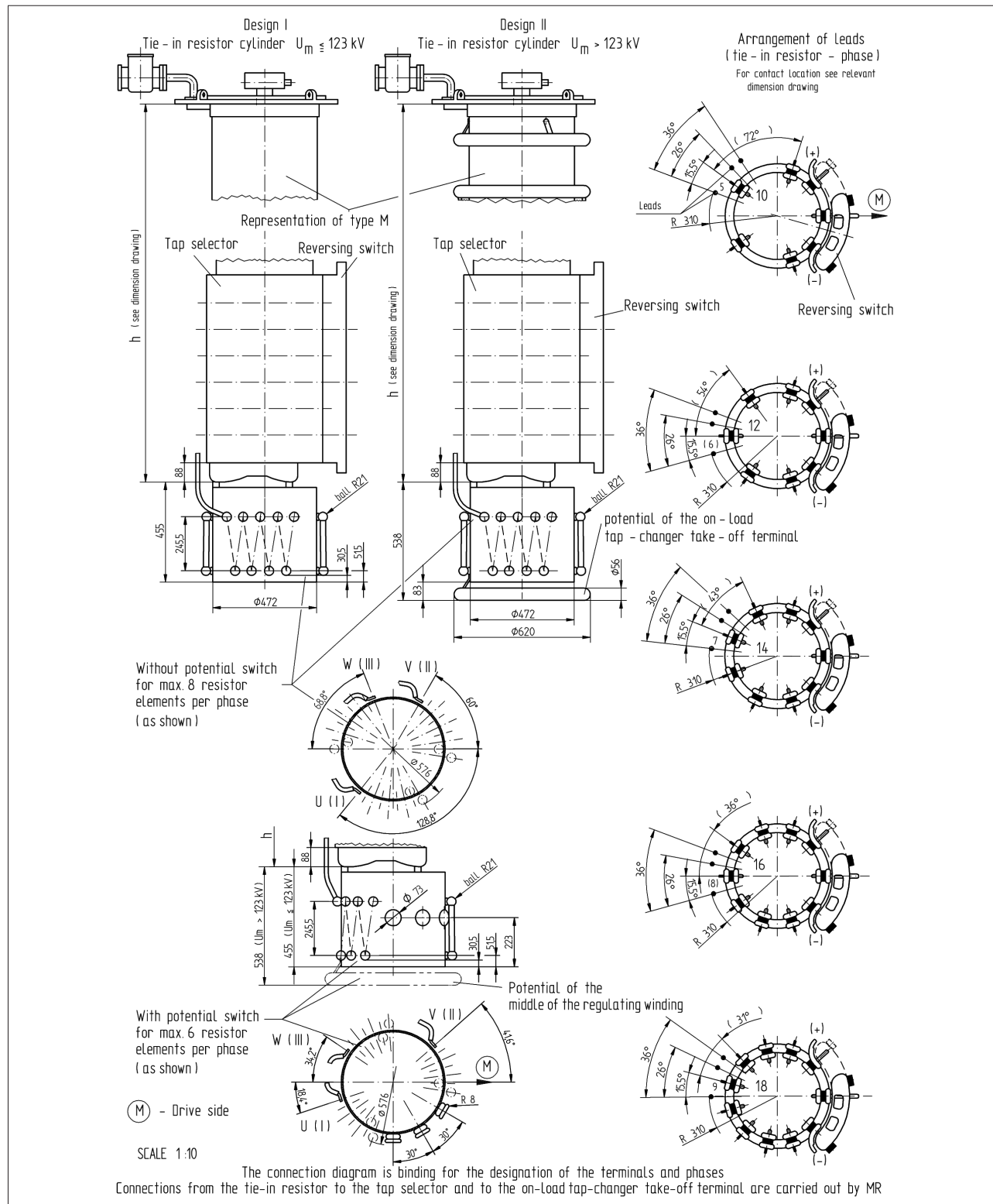


4.1.17 VACUTAP® VM I 301 tie-in resistors without potential switch (898693)

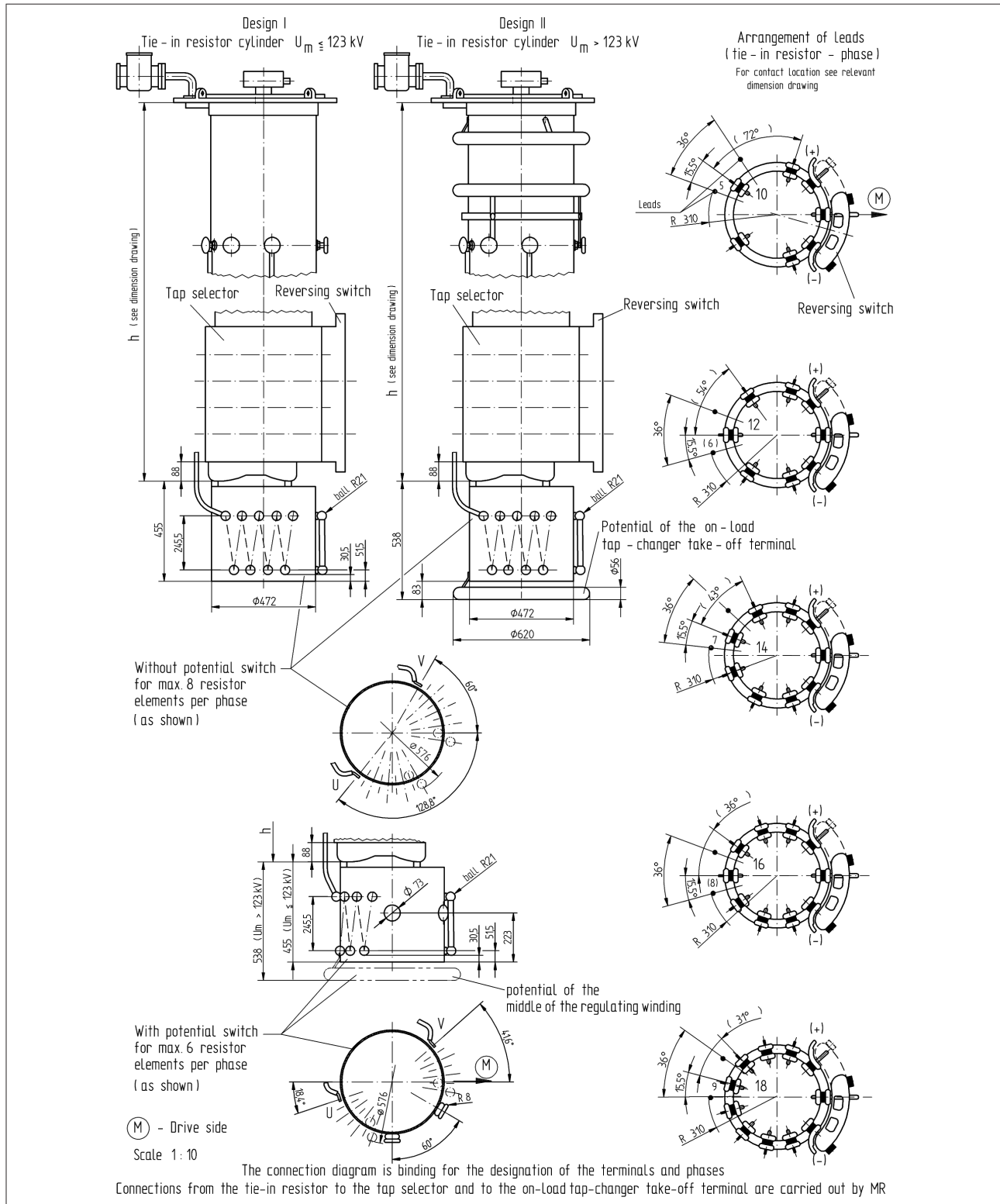


The connection diagram is binding for the designation of the terminals

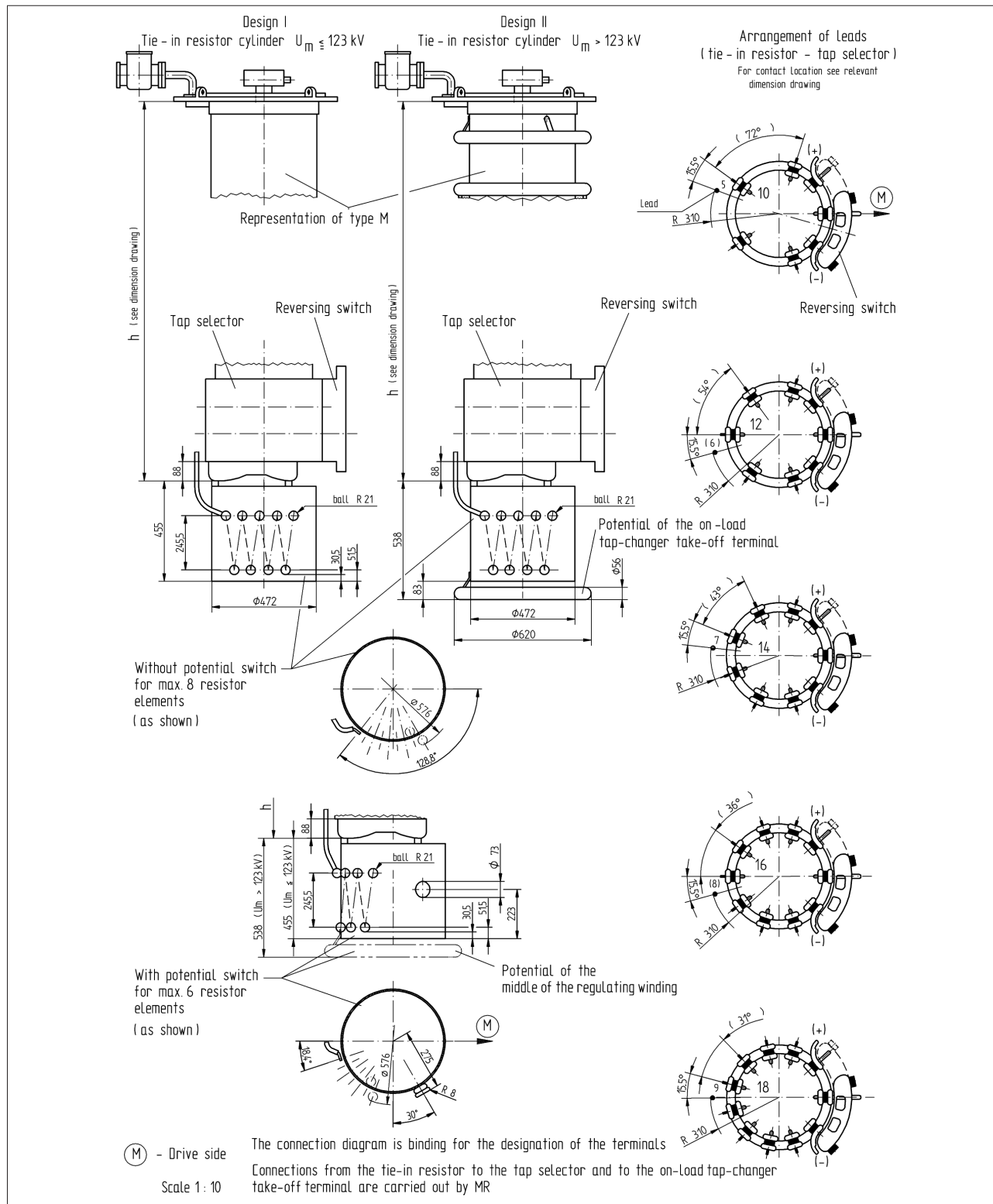
4.1.18 VACUTAP® VM III Y tie-in resistors with/without potential switch (898692)



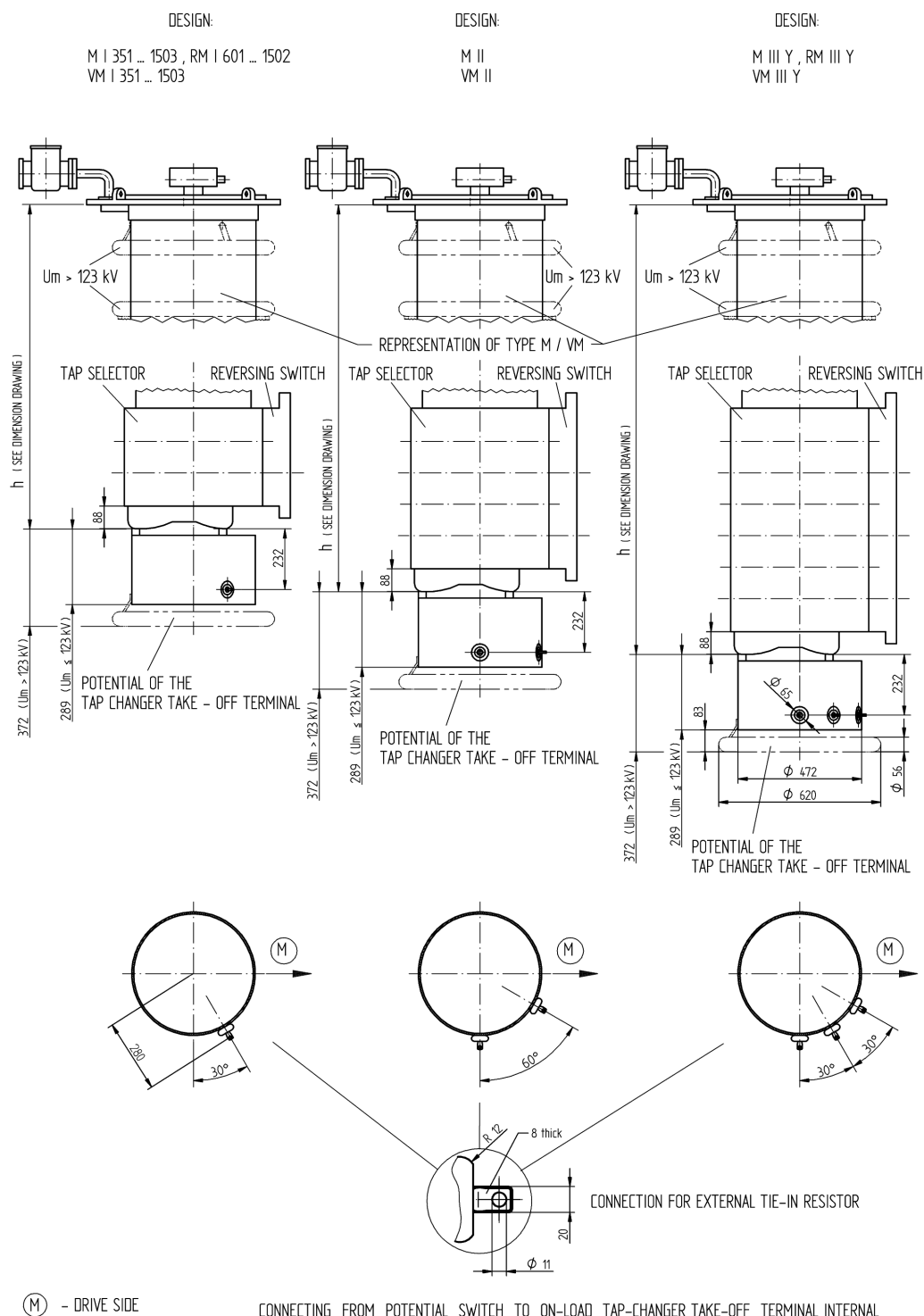
4.1.19 VACUTAP® VM II tie-in resistors with/without potential switch (898691)



4.1.20 VACUTAP® VM I tie-in resistors with/without potential switch (898690)



4.1.21 VACUTAP® VM I 351...1503 tie-in resistor cylinder with potential switch without tie-in resistors (898804)

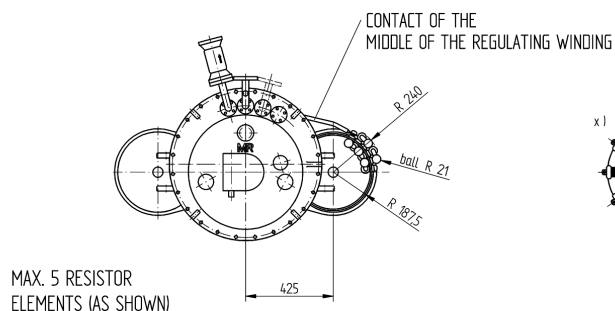
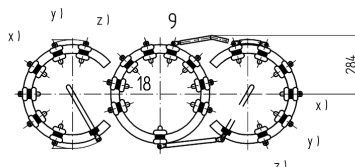
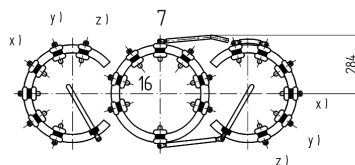
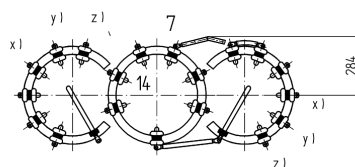
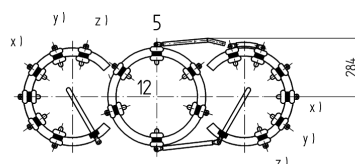
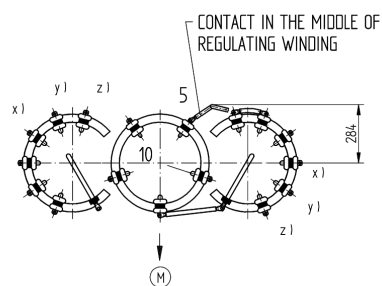
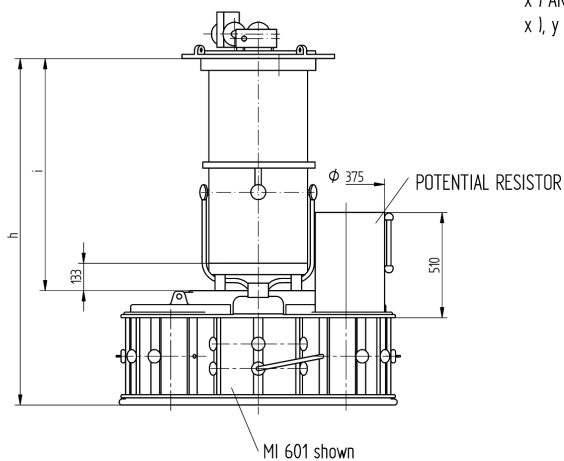


CONNECTING FROM POTENTIAL SWITCH TO ON-LOAD TAP-CHANGER TAKE-OFF TERMINAL INTERNAL
THE CONNECTION DIAGRAM IS BINDING FOR THE DESIGNATION OF TERMINALS AND PHASES

4.1.22 VACUTAP® VM I 651...1503 tie-in resistor cylinder with multiple coarse change-over selector (719733)

ARRANGEMENT OF TAP SELECTOR CONTACTS, 2-5 COARSE TAPS
(PLAN VIEW)

x) FOR 3 COARSE TAPS
x) AND y) FOR 4 COARSE TAPS
x), y) AND z) FOR 5 COARSE TAPS



THE CONNECTION DIAGRAM IS BINDING FOR THE DESIGNATION OF THE TERMINALS AND PHASES

(M) DRIVE SIDE

4.1.23 VACUTAP® VM® associated drawings (898012)

BASIC CONNECTION DIAGRAMS _ _ _ _ _	890 616
INSTALLATION DRAWINGS	
M III 350 Y ... M I 1503 _ _ _ _ _	893 978
VM III 350 Y ... VM I 1503 _ _ _ _ _	746 230
ON-LOAD TAP-CHANGER HEAD M III 350 Y ... M I 1503	
AND VM III 350 Y ... VM I 1503 _ _ _ _ _	893 899
VARIANTS OF THE ON-LOAD TAP-CHANGER HEAD _ _ _ _ _	720 026
SWIVELLING RANGE OF THE GEAR UNIT _ _ _ _ _	720 027
SCREENINGS ON OIL COMPARTMENT TERMINALS _ _ _ _ _	730 336
CONTACT ARRANGEMENT ON TAP SELECTOR _ _ _ _ _	
MOUNTING POSITION OF THE TAP SELECTOR TERMINALS _ _	890 477
CONNECTING LEAD 3W, 1G, 3G _ _ _ _ _	723 590
SCREENINGS AT TAP SELECTOR	
AND CHANGE- OVER SELECTOR _ _ _ _ _	730 335
PARALLEL BRIDGES _ _ _ _ _	899 598
HORIZONTAL DRIVE SHAFT _ _ _ _ _	893 896
ARRANGEMENT OF TAP SELECTOR CONTACTS	
M III 350 / 500 / 600 Y , M II 352 / 502 / 602	
VM III 350 / 500 / 650 Y , VM II 352 / 502 / 652 _ _ _ _	891 107
M I 351 / 501 / 601	
VM I 351 / 501 / 651 _ _ _ _ _	891 108
M I 1203 / 1503	
VM I 1203 / 1503 _ _ _ _ _	891 109
M I 802	
VM I 802 / 1002 _ _ _ _ _	891 110



4.1.24 VACUTAP® VM 300 associated drawings (898026)

CONTACT ARRANGEMENT ON TAP SELECTOR	_____898 041
BASIC CONNECTION DIAGRAMS	_____893 819
ARRANGEMENT OF TAP SELECTOR CONTACTS	_____891 114
ON-LOAD TAP-CHANGER HEAD	_____893 899
VARIANTS OF ON-LOAD TAP-CHANGER HEAD	_____720 026
INSTALLATION DRAWING	
MS	_____893 900
VM 300	_____765 192
HORIZONTAL DRIVE SHAFT	_____893 896

Technical drawings of a vacuum circuit breaker (VM) showing various views and dimensions.

Top View (Z-Z): Shows the internal components, including the protective relay (26), and the main contact assembly (24, 25, 25a, 22, 23, 29a, 29b, 28, 27, 29c, 21, 17, 15, 16, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1).

Front View (B-B): Shows the main contact assembly (24, 25, 25a, 22, 23, 29a, 29b, 28, 27, 29c, 21, 17, 15, 16, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1).

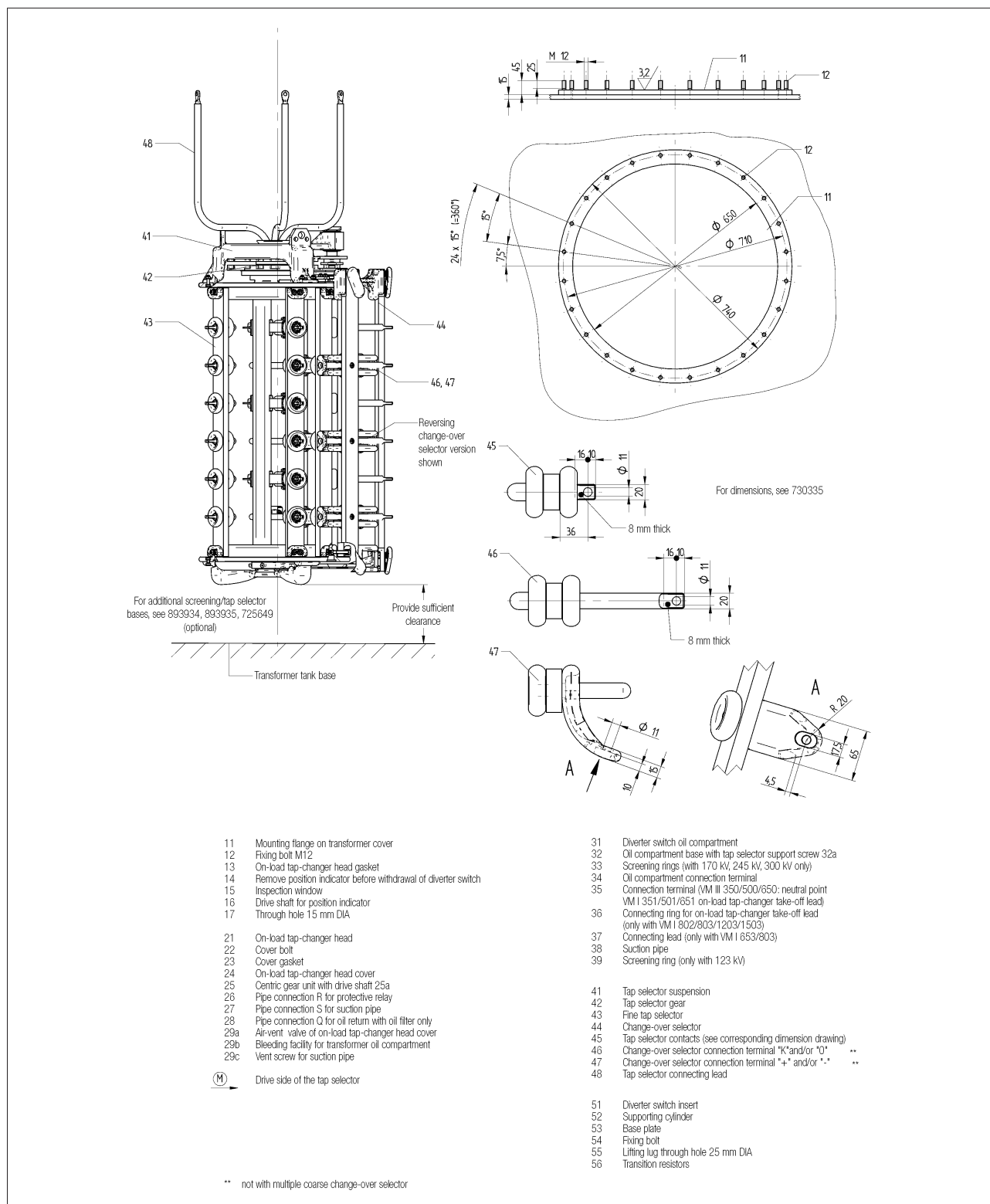
Side View (Y-Y): Shows the main contact assembly (24, 25, 25a, 22, 23, 29a, 29b, 28, 27, 29c, 21, 17, 15, 16, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1).

Bottom View (Z-Z): Shows the main contact assembly (24, 25, 25a, 22, 23, 29a, 29b, 28, 27, 29c, 21, 17, 15, 16, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1).

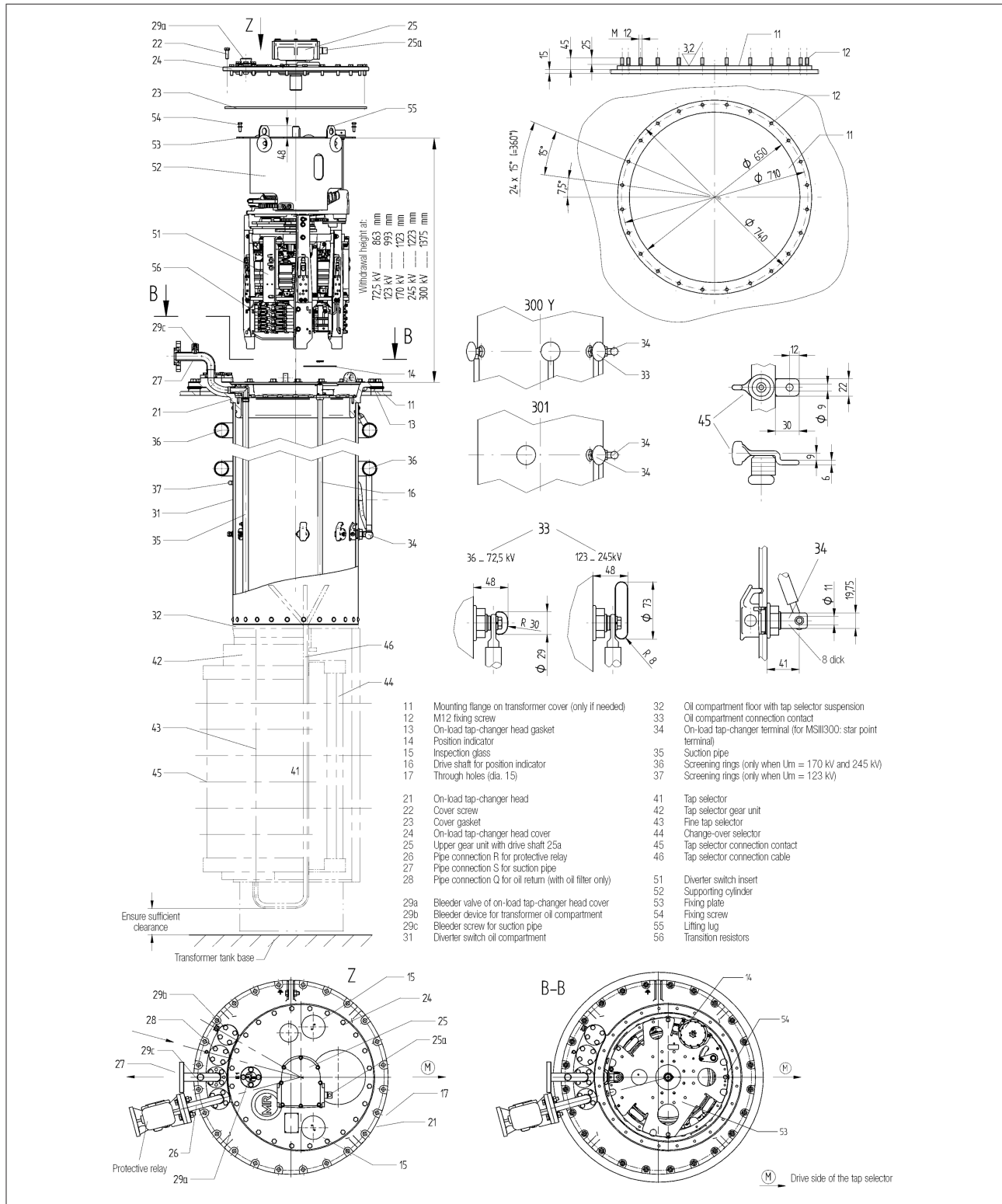
Dimensions:

- Withdrawal height at:
 - 725 kV 863 mm
 - 123 kV 993 mm
 - 170 kV 1123 mm
 - 245 kV 1223 mm
 - 300 kV 1375 mm
- 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 25a, 26, 27, 28, 29a, 29b, 29c, 30, 31, 32, 32a, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 70

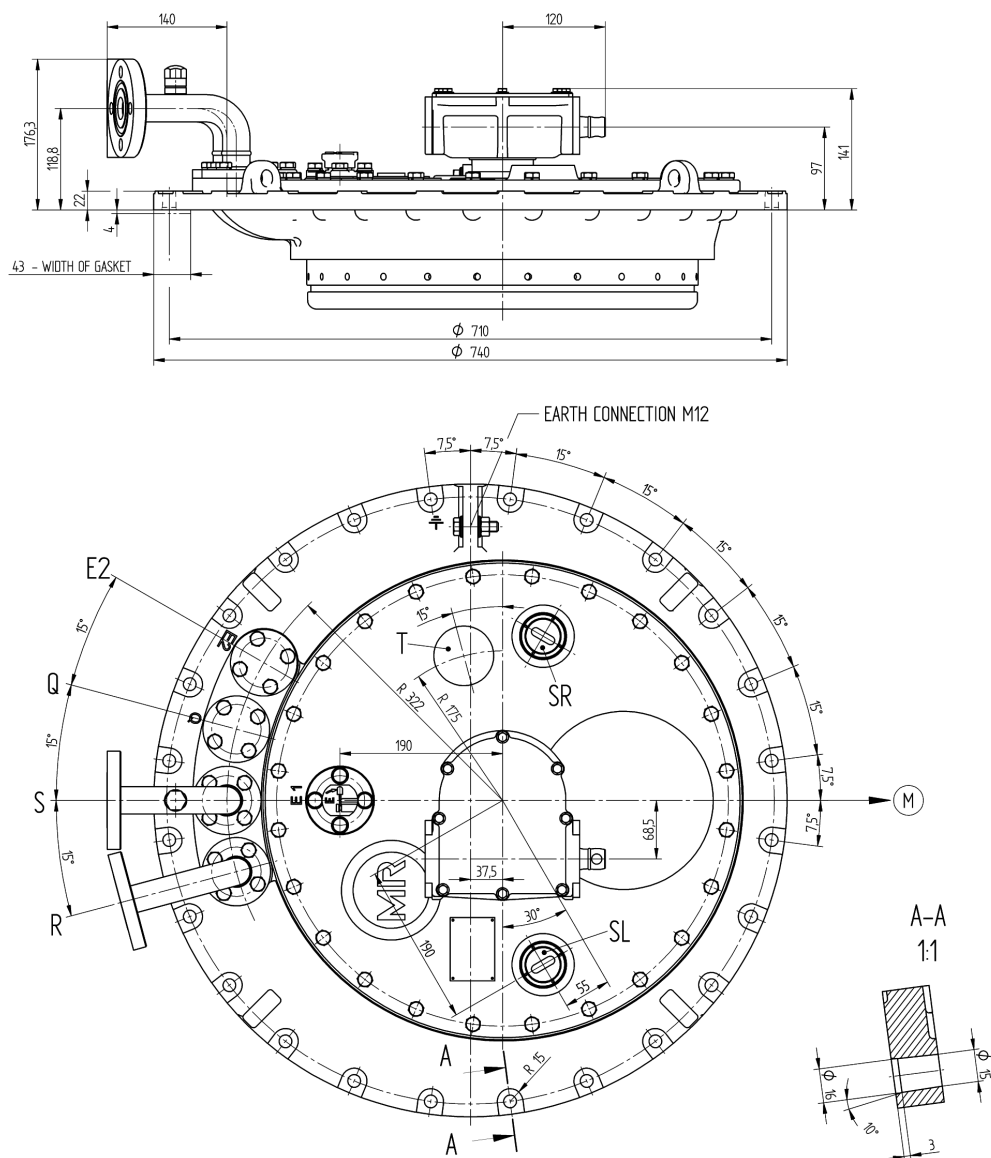
VACUTAP® VM® installation drawing of central drive (746230) –2–



4.1.26 VACUTAP® VM 300 installation drawing of central drive (765192)



4.1.27 VACUTAP® VM® on-load tap-changer head, central drive (893899)



E1 = BLEEDING FACILITY FOR ON-LOAD TAP-CHANGER HEAD

E2 = BLEEDING FACILITY FOR SPACE UNDER THE HEAD OUTSIDE

THE TAP-CHANGER OIL COMPARTMENT (SAME PIPE CONNECTION AS R, S, Q OR BLEEDER SCREW CAN BE USED)

Q = CONNECTION FOR OIL RETURN PIPE (ONLY FOR OIL FILTER) - CONNECTIONS ORIENTABLE THROUGH 360°

S = CONNECTION FOR SUCTION PIPE - CONNECTIONS ORIENTABLE THROUGH 360°

R = CONNECTION FOR PROTECTIVE RELAY (EXCHANGEABLE WITH CONNECTION Q) - CONNECTIONS ORIENTABLE THROUGH 360°

T = THERMOMETER BAG (OPTIONALLY)

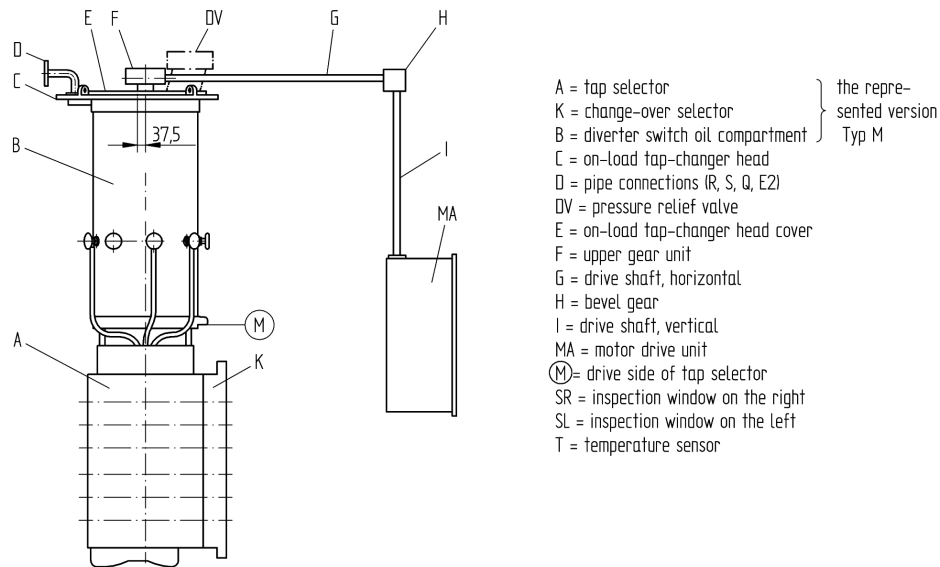
SR = INSPECTION WINDOW, RIGHT

SL = INSPECTION WINDOW, LEFT

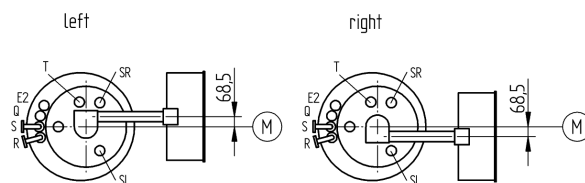
SCALE 1:2,5 (1:1)

(M) DRIVE SIDE OF THE TAP SELECTOR

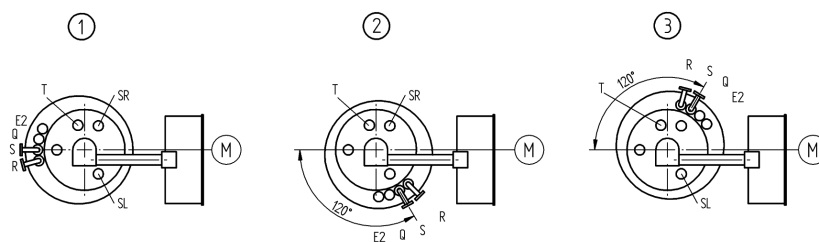
4.1.28 VACUTAP® VM® variants of on-load tap-changer head (720026)



Position of drive shaft of gear unit



Head variants



Swivelling ranges

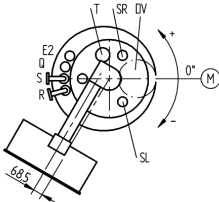
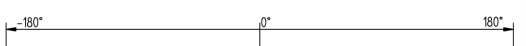
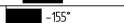
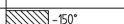
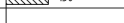
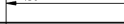
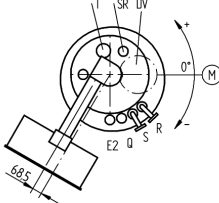
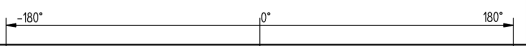
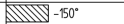
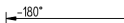
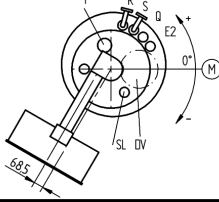
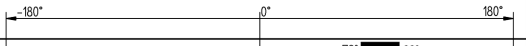
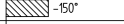
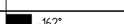
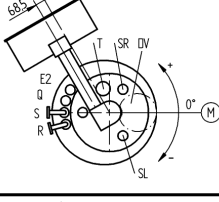
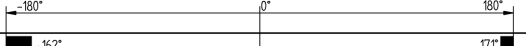
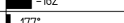
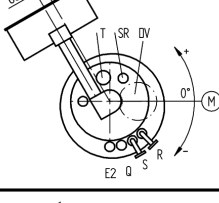
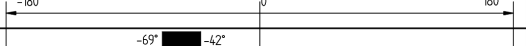
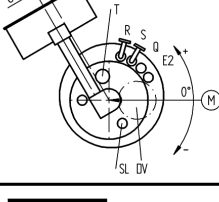
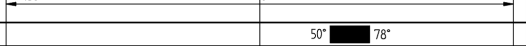
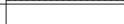
A considerable number of variants of the on-load tap-changer head are available for adapting the horizontal part of the drive shaft to the transformer tank.

The mounting position of the tap selector A and diverter switch oil compartment B is determined by the drive side of tap selector M.

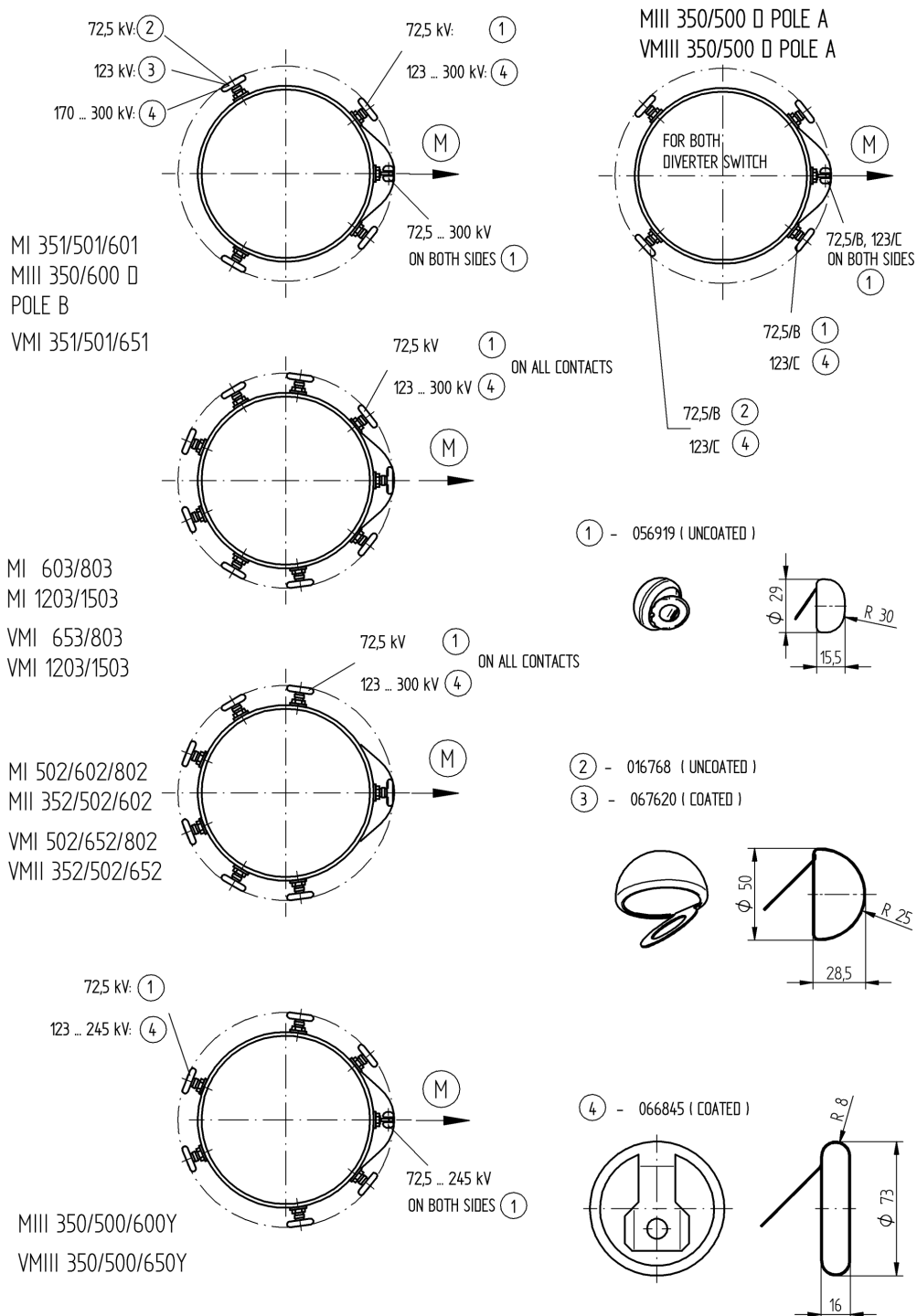
The on-load tap-changer head C together with its pipe connections D may be turned through 120 degrees clockwise or anti-clockwise. This results in the variants 1, 2 and 3.

The upper gear unit F can be turned continuously on its own axis. Table 720027: Lists the limitation of the swivelling range for the particular head variant. The angle specifications refer to the center of rotation of the gear unit. Pay particular attention to the offset of the drive shaft.

4.1.29 VACUTAP® VM® swivel range of gear unit (720027)

SKETCH	HEAD VERSION COMPONENTS USED	LIMITATION OF THE SWIVELLING RANGE
	DRIVE SHAFT RIGHT HEAD VERSION 1	
	PIPE CONNECTION R	-168°  -140°
	PIPE CONNECTION S	 -155°
	PIPE CONNECTION Q	 -171°
	PIPE CONNECTION E2	 147°  174°
	PRESSURE RELIEF VALVE DV	 -150°  -35°  96°  175°
	TEMPERATURE SENSOR T	 56°  112°
	DRIVE SHAFT RIGHT HEAD VERSION 2	
	PIPE CONNECTION R	-48°  -21°
	PIPE CONNECTION S	-63°  -36°
	PIPE CONNECTION Q	-78°  -51°
	PIPE CONNECTION E2	-93°  -66°
	PRESSURE RELIEF VALVE DV	 -150°  -35°  96°  175°
	TEMPERATURE SENSOR T	 56°  112°
	DRIVE SHAFT RIGHT HEAD VERSION 3	
	PIPE CONNECTION R	72°  99°
	PIPE CONNECTION S	57°  84°
	PIPE CONNECTION Q	42°  69°
	PIPE CONNECTION E2	27°  54°
	PRESSURE RELIEF VALVE DV	 -150°  -35°  96°  175°
	TEMPERATURE SENSOR T	 56°  112°
	DRIVE SHAFT LEFT HEAD VERSION 1	
	PIPE CONNECTION R	 -162°
	PIPE CONNECTION S	-177°
	PIPE CONNECTION Q	 141°  168°
	PIPE CONNECTION E2	 126°  153°
	PRESSURE RELIEF VALVE DV	 35°  150°
	TEMPERATURE SENSOR T	 34°  114°
	DRIVE SHAFT LEFT HEAD VERSION 2	
	PIPE CONNECTION R	-69°  -42°
	PIPE CONNECTION S	-84°  -57°
	PIPE CONNECTION Q	-99°  -72°
	PIPE CONNECTION E2	-114°  -87°
	PRESSURE RELIEF VALVE DV	 35°  150°
	TEMPERATURE SENSOR T	 34°  114°
	DRIVE SHAFT LEFT HEAD VERSION 3	
	PIPE CONNECTION R	50°  78°
	PIPE CONNECTION S	35°  62°
	PIPE CONNECTION Q	21°  48°
	PIPE CONNECTION E2	6°  33°
	PRESSURE RELIEF VALVE DV	 35°  150°
	TEMPERATURE SENSOR T	 34°  114°
 LIMITATION OF THE SWIVELLING RANGE TROUGH PIPE CONNECTIONS R AND S  LIMITATION OF THE SWIVELLING RANGE TROUGH OPTIONAL EXISTING PIPE CONNECTIONS Q, E2 AND PRESSURE RELIEF VALVE DV  SWIRELLING RANGE POSSIBLE, BUT THE TEMPERATURE SENSOR T AND THE INSPECTION WINDOW SL / SR ARE NOT VISIBLE		

4.1.30 VACUTAP® VM® screenings on oil compartment contacts (730336)

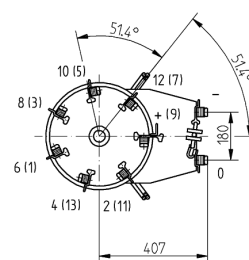
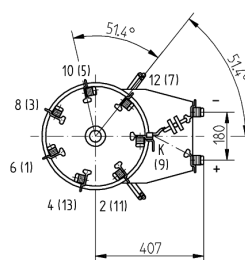
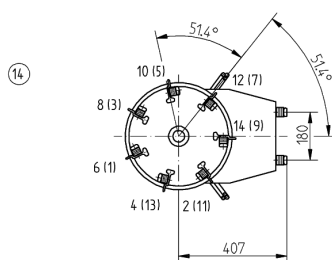
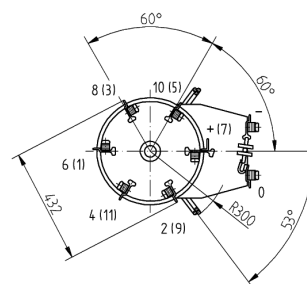
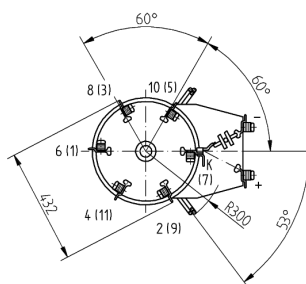
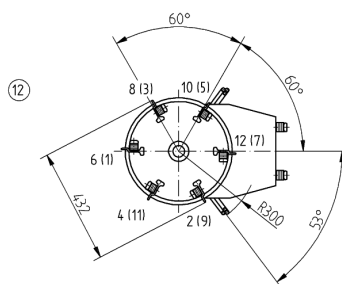
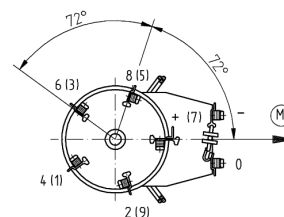
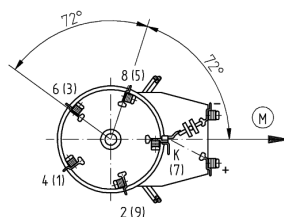
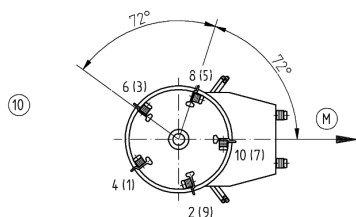


4.1.31 VACUTAP® VM 300 tap selector cross-sections (898041)

TAP SELECTOR WITHOUT
CHANGE - OVER SELECTOR:

TAP SELECTOR WITH
REVERSING SWITCH:

TAP SELECTOR WITH
COARSE TAP SELECTOR:



DESIGNATION OF TAP SELECTOR TERMINALS:

(PLAN VIEW)

E. G.: 4 UPPER CONTACT PLANE

(13) LOWER CONTACT PLANE

(M) DRIVE SIDE OF TAP SELECTOR

(10) (12) (14) TAP SELECTOR PITCH

FOR BINDING DESIGNATIONS OF TERMINALS AND PHASES REFER TO THE RELEVANT CONNECTION DIAGRAM

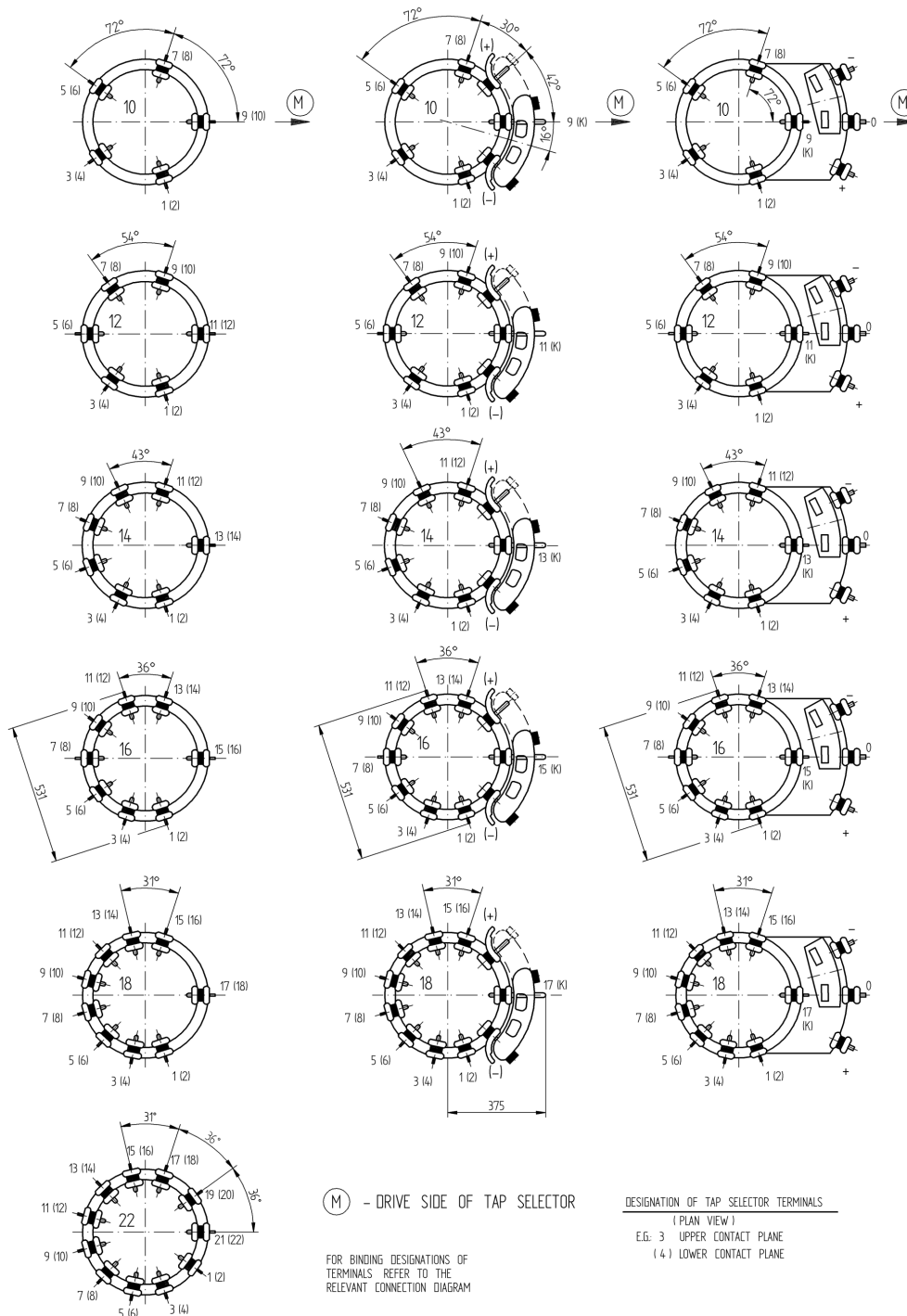
4.1.32 VACUTAP® VM® arrangement of contacts on tap selector, tap selector division 10...22 (898013)

TAP SELECTOR WITHOUT
CHANGE - OVER SELECTOR:

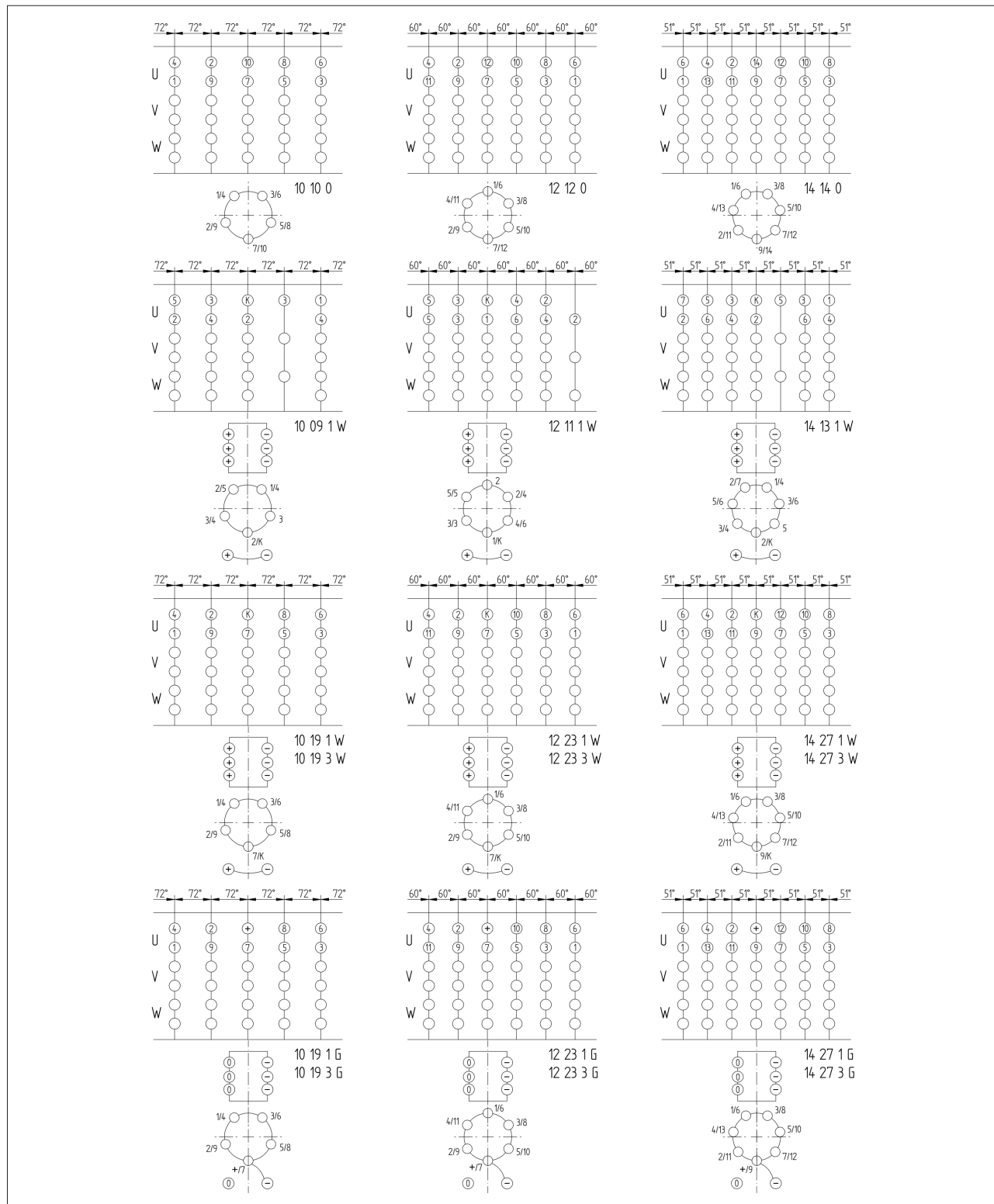
TAP SELECTOR WITH REVERSING SWITCH:

TAP SELECTOR WITH COARSE
TAP SELECTOR:

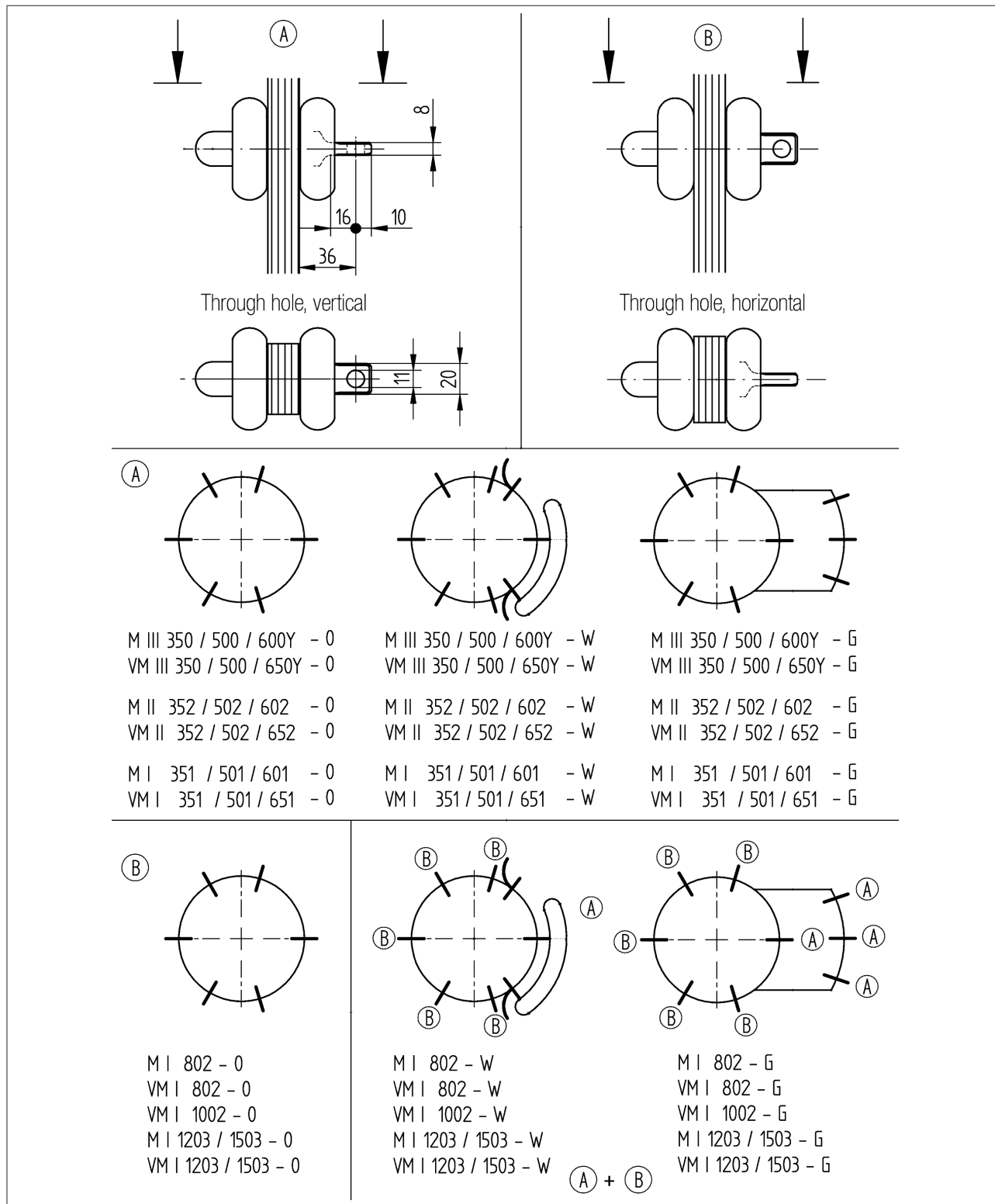
REPRESENTATION APPLIES TO TYPES M III 350/500/600 Y AND M II 352/502/602
THE UPPER AND LOWER TAP SELECTOR PLANE ARE INTERCHANGED IN TYPES M I 351 - M I 1503
AND TO TYPES VM III 350/500/650 Y AND VM II 352/502/652
THE UPPER AND LOWER TAP SELECTOR PLANE ARE INTERCHANGED IN TYPES VM I 351 - VM I 1503



4.1.33 VACUTAP® VM 300 arrangement of contacts on tap selector (blanks, 891114)



4.1.34 VACUTAP® VM® installation position of tap selector connection contacts (890477)

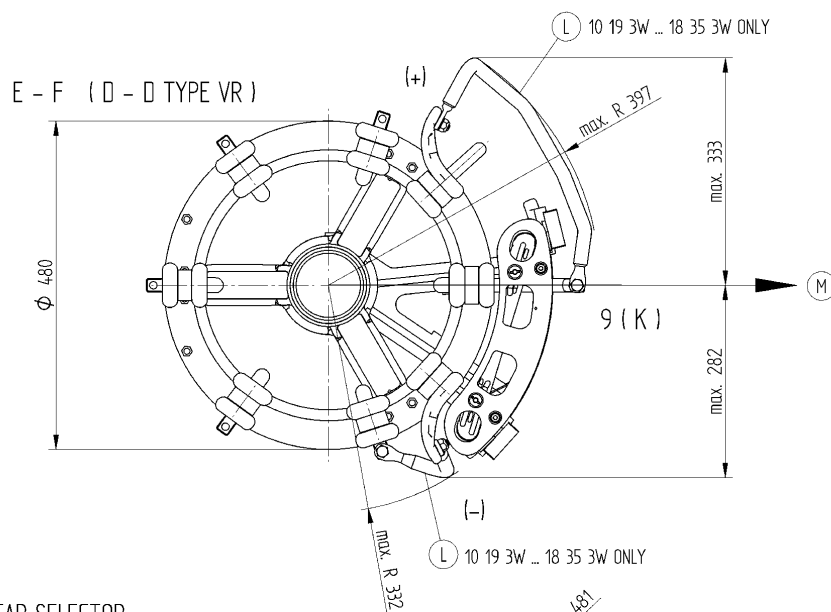


4.1.35 VACUTAP® VM® connecting leads 3W, 1G, 3G (723590)

REVERSING SWITCH:

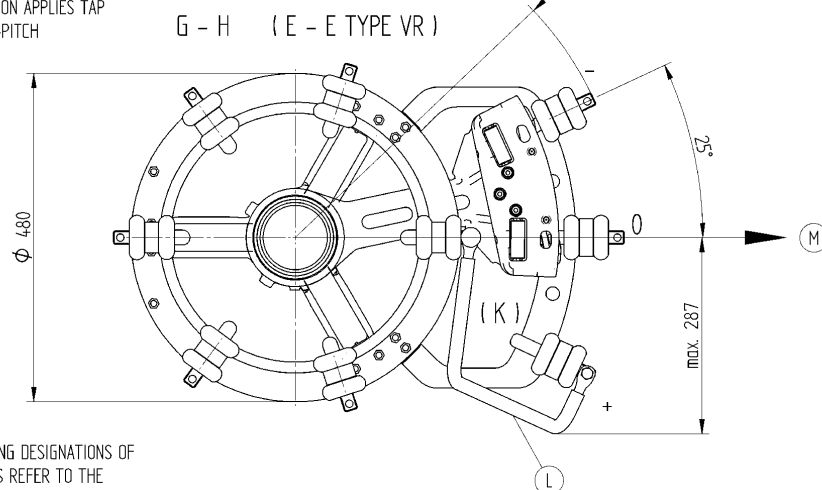
REPRESENTATION APPLIES TO TYPES M III 350/500/600Y AND M II 352/502/602, 12-PITCH
THE UPPER AND LOWER TAP SELECTOR PLANE ARE INTERCHANGED IN TYPES M I 351 ... M I 1503

AND REPRESENTATION APPLIES TO TYPES VM III 350/500/650Y AND VM II 352/502/652, 12-PITCH
THE UPPER AND LOWER TAP SELECTOR PLANE ARE INTERCHANGED IN TYPES VM I 351 ... VM I 1503



COARSE TAP SELECTOR

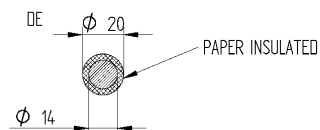
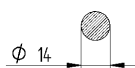
REPRESENTATION APPLIES TAP SELECTOR, 12-PITCH



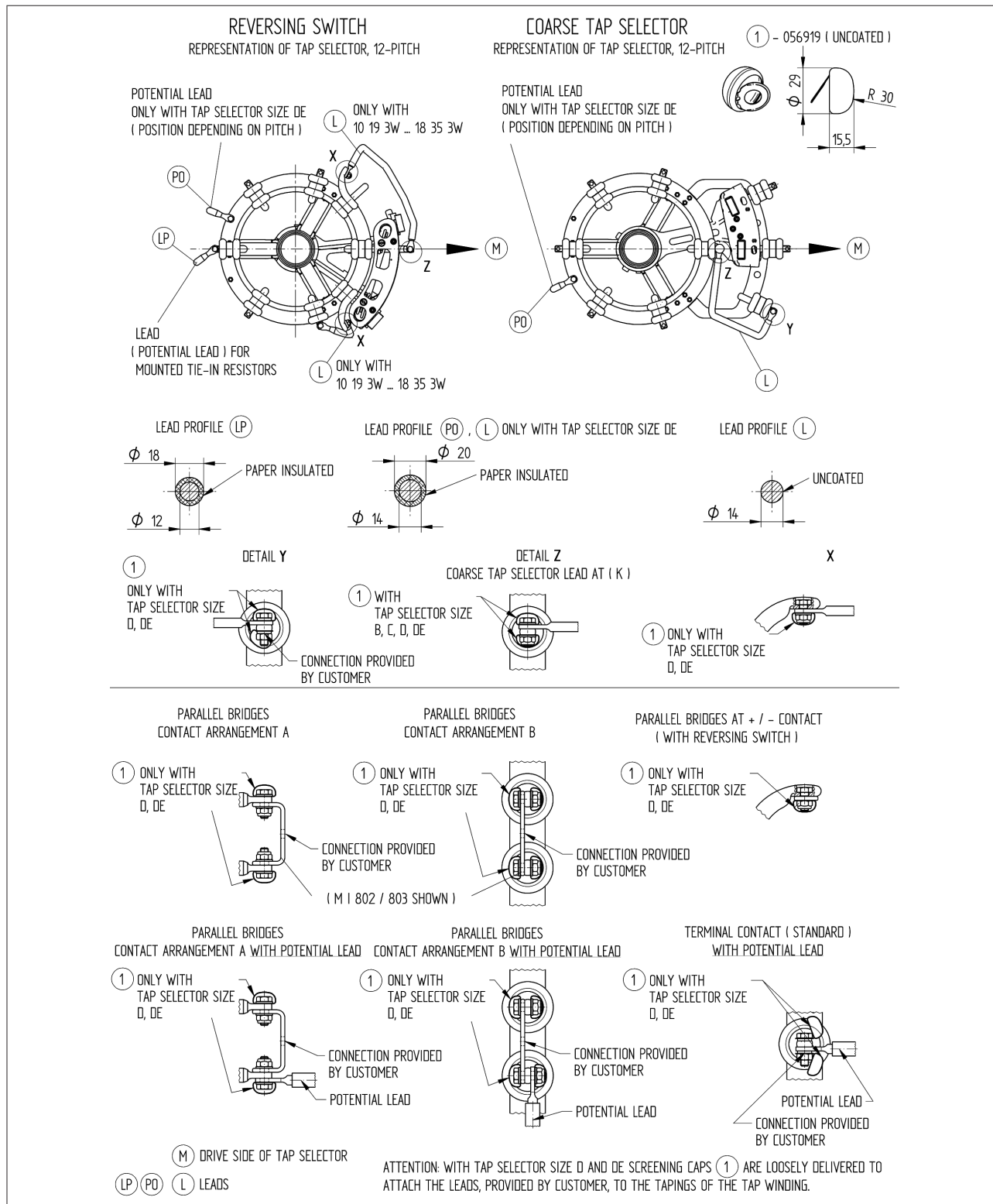
FOR BINDING DESIGNATIONS OF
TERMINALS REFER TO THE
RELEVANT CONNECTION DIAGRAM

- (M) DRIVE SIDE OF TAP SELECTOR
- (L) CONNECTING LEAD

TAP SELECTOR SIZE
B, C, D

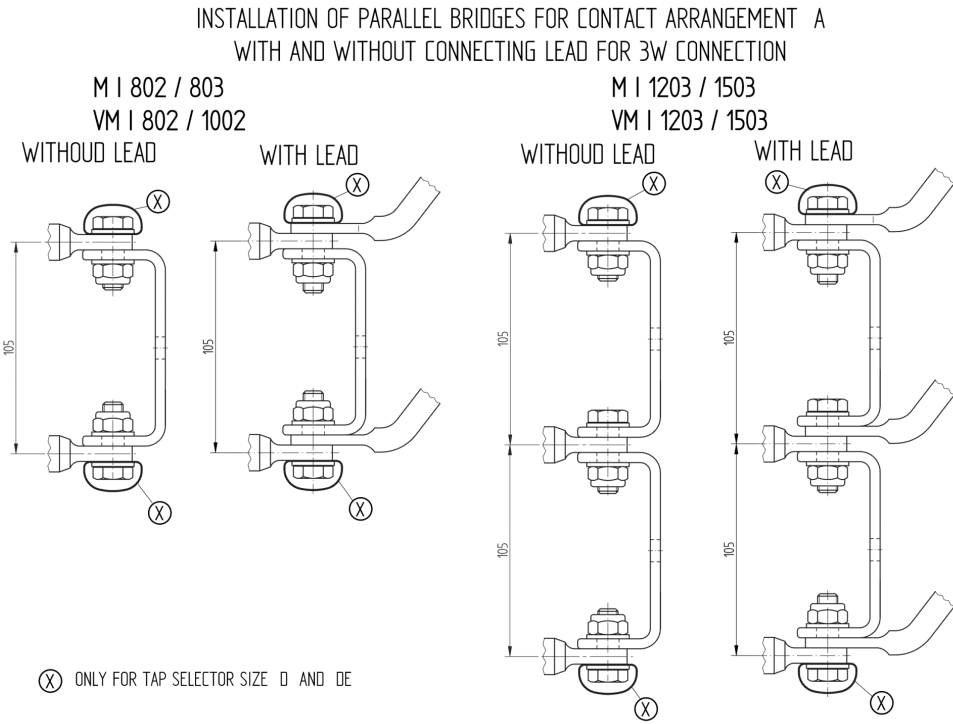
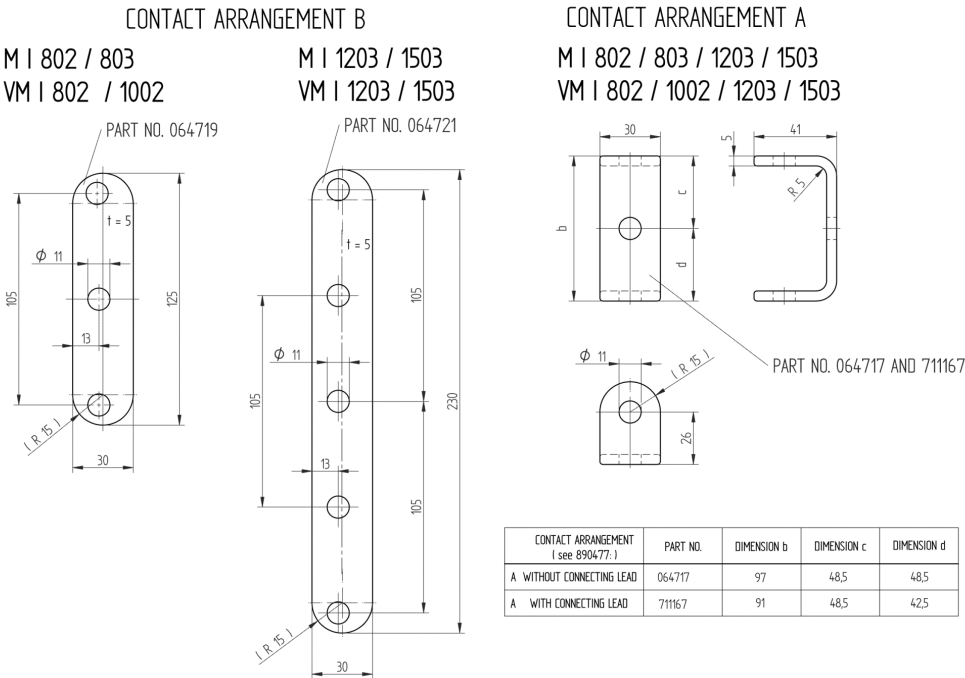


4.1.36 VACUTAP® VM® screenings on fine tap selector and change-over selector (730335)





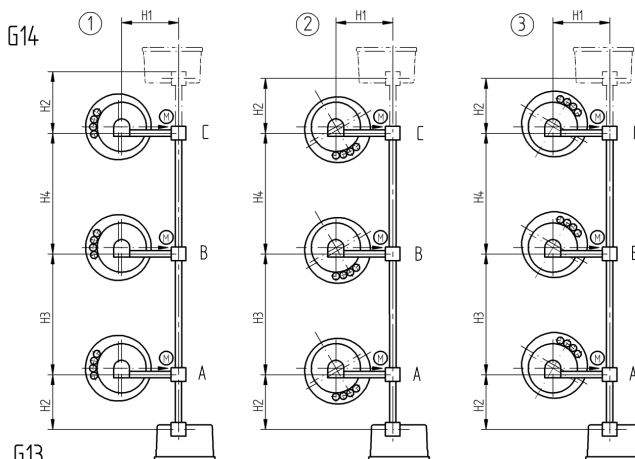
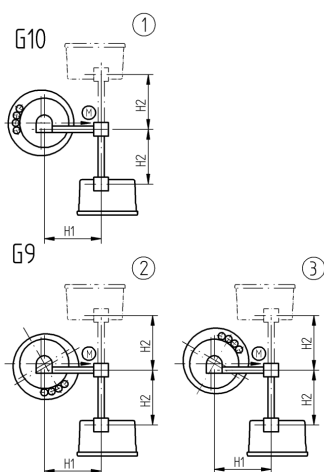
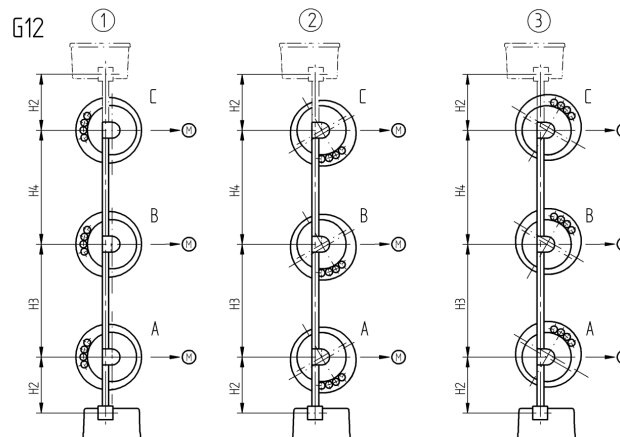
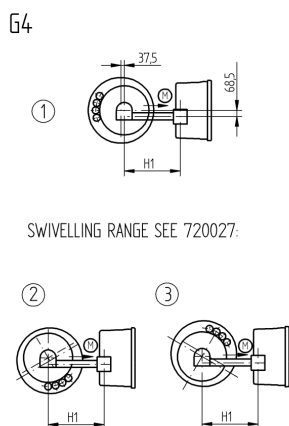
4.1.37 VACUTAP® VM 802/1002/1203/1503 bridges for parallel connection of tap selector connection contacts (899598)



ATTENTION: PARALLEL BRIDGES ARE NOT INCLUDED IN THE STANDARD DELIVERY

SCALE 1:1

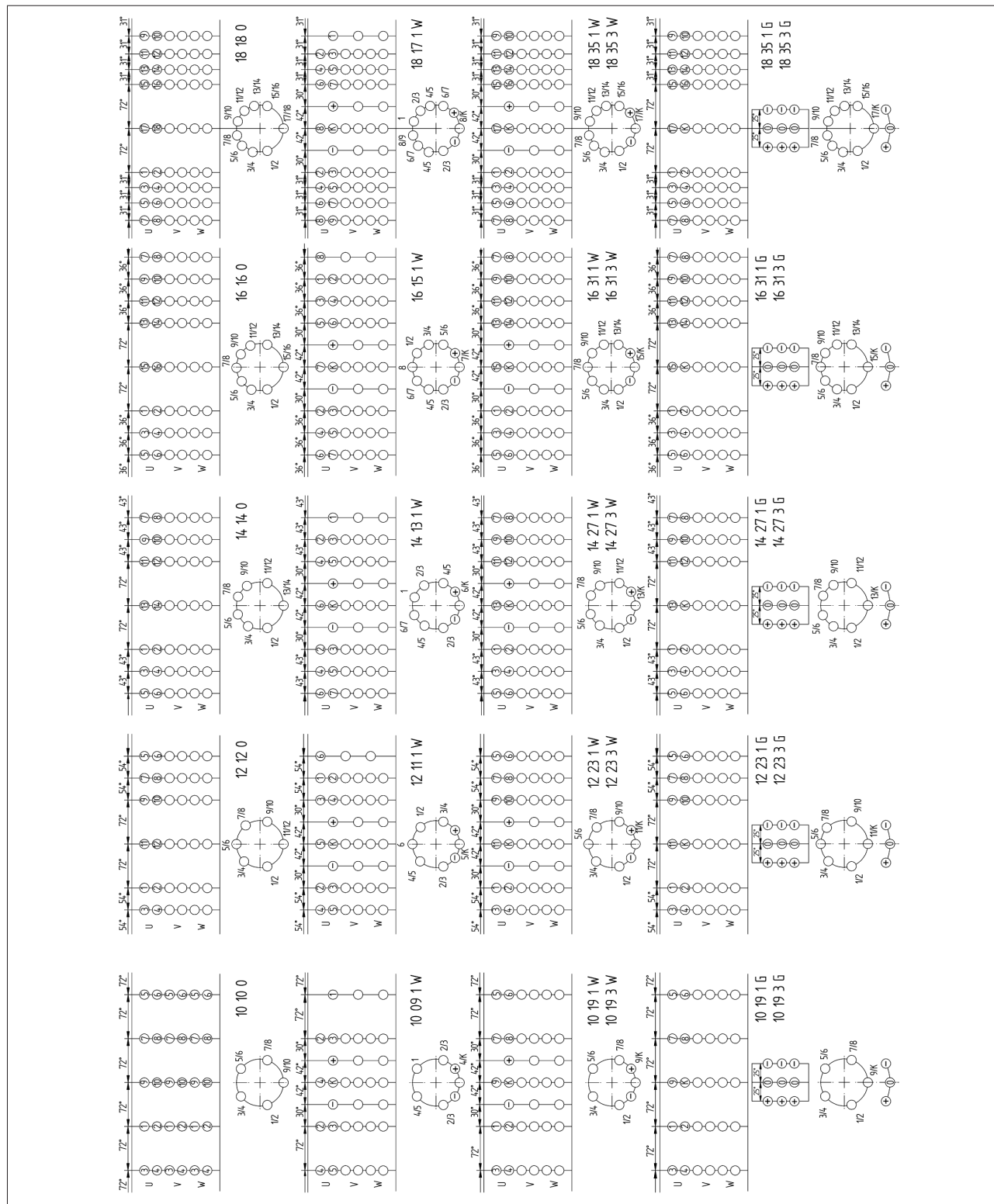
4.1.38 VACUTAP® VM® horizontal drive shaft, central drive (893896)



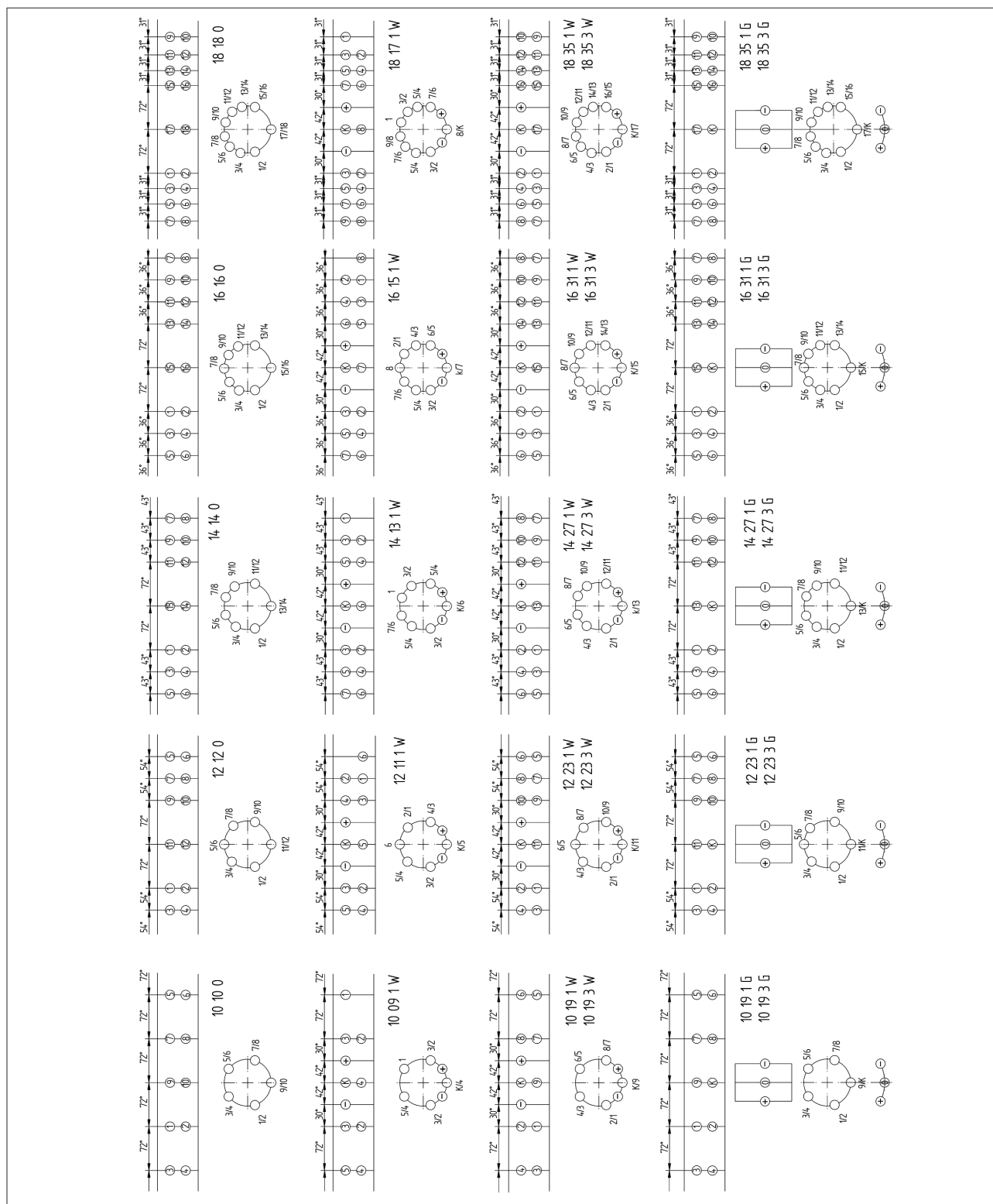
ARRANGEMENT		G4	G9, G10	G11, G12	G13, G14
STANDARD DESIGN		■		■	
SPECIAL DESIGN			■		■
MINIMUM DIMENSIONS ¹⁾ (DETERMINED FOR MECHANICAL REASONS. NECESSARY INSULATING DISTANCES NOT CONSIDERED !)	H1	535	545	-	545
	H2	-	323	515	323
	H3 ²⁾	-	-	840	840
	H4 ²⁾	-	-	840	840
NOTE: 1) FOR OLTCs WITH THE CHANGE-OVER SELECTOR ATTACHED Laterally, THE DIMENSIONS OF THE CHANGE-OVER SELECTOR AFTER INSTALLED IN POSITION HAVE TO BE TAKEN INTO ACCOUNT (SEE THE CORRESPONDING OLTC DIMENSION DRAWING) 2) IN GENERAL DETERMINED BY THE INSULATION DISTANCE BETWEEN POLES A, B, C.					
INTERMEDIATE BEARING FOR	H1 >	2254	2309	-	2309
	H2 >	-	2259	2254	2259
	H3 >	-	-	2249	2259
	H4 >	-	-	2249	2259

① ② ③ - HEAD VERSION
 → M - DRIVE SIDE OF TAP SELECTOR/ SIDE OF CHANGE-OVER SELECTOR

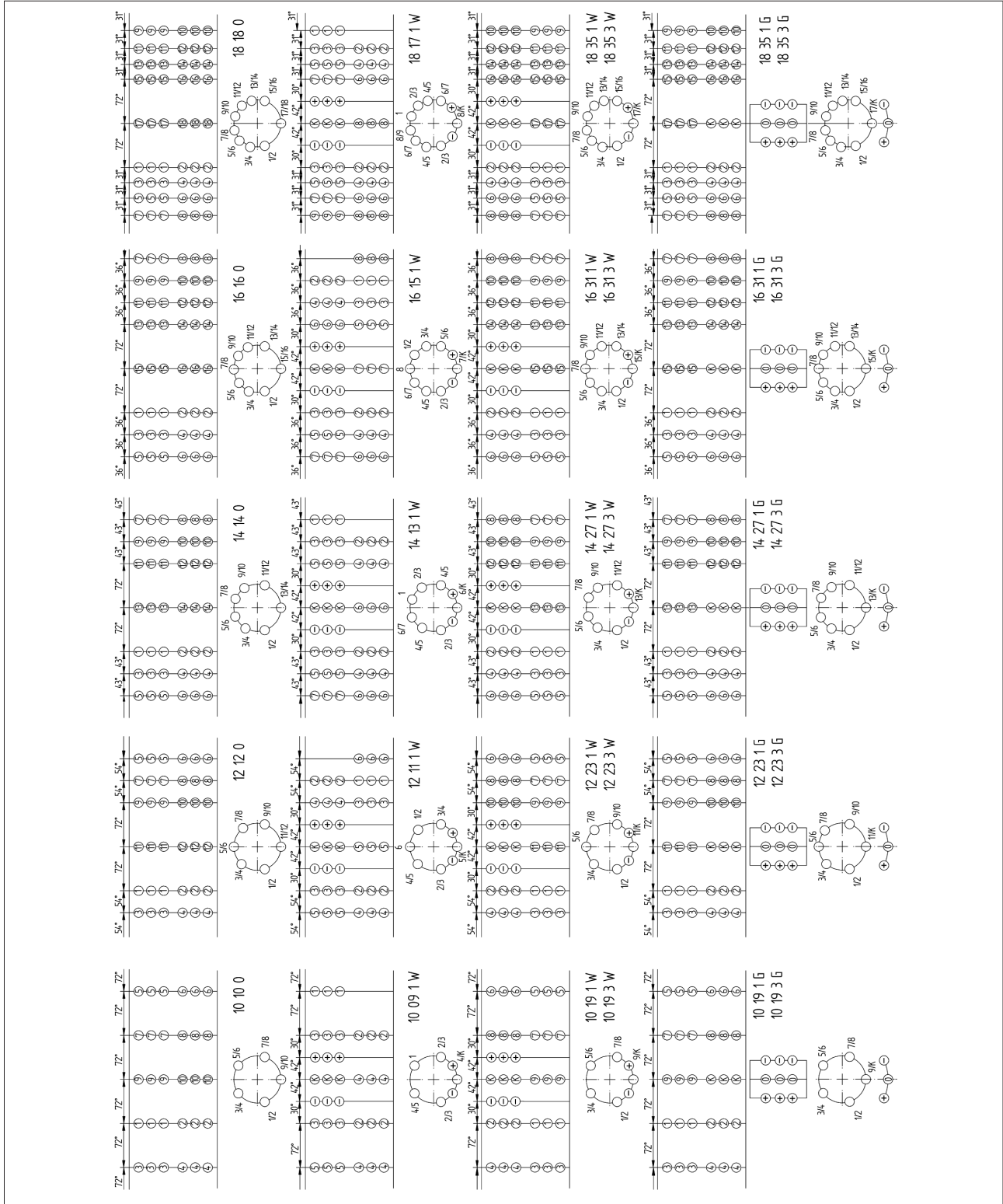
4.1.39 VACUTAP® VM III 350/500/650 Y contact arrangement of tap selector (891107)



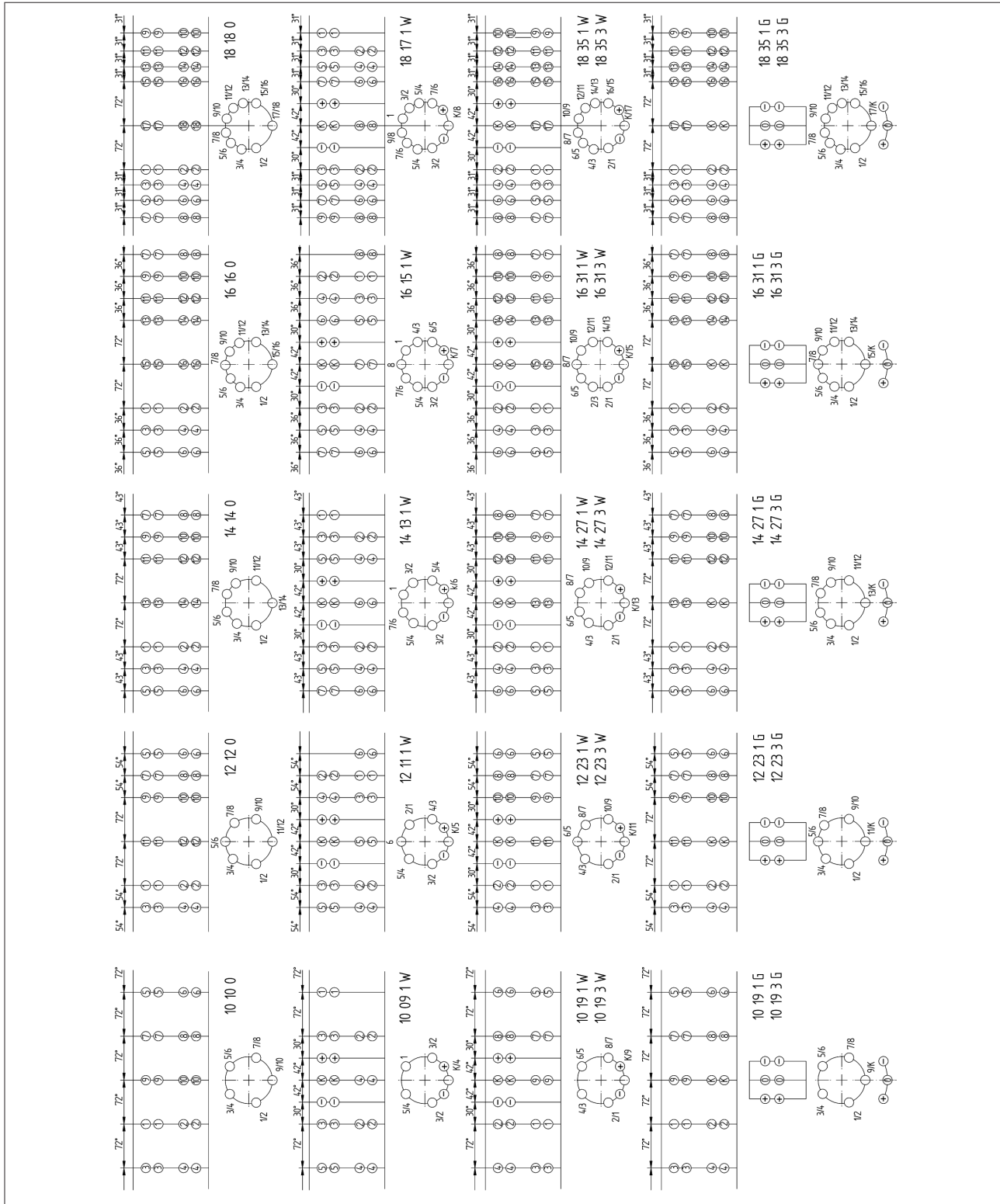
4.1.40 VACUTAP® VM I 351/501/651 contact arrangement of tap selector (891108)



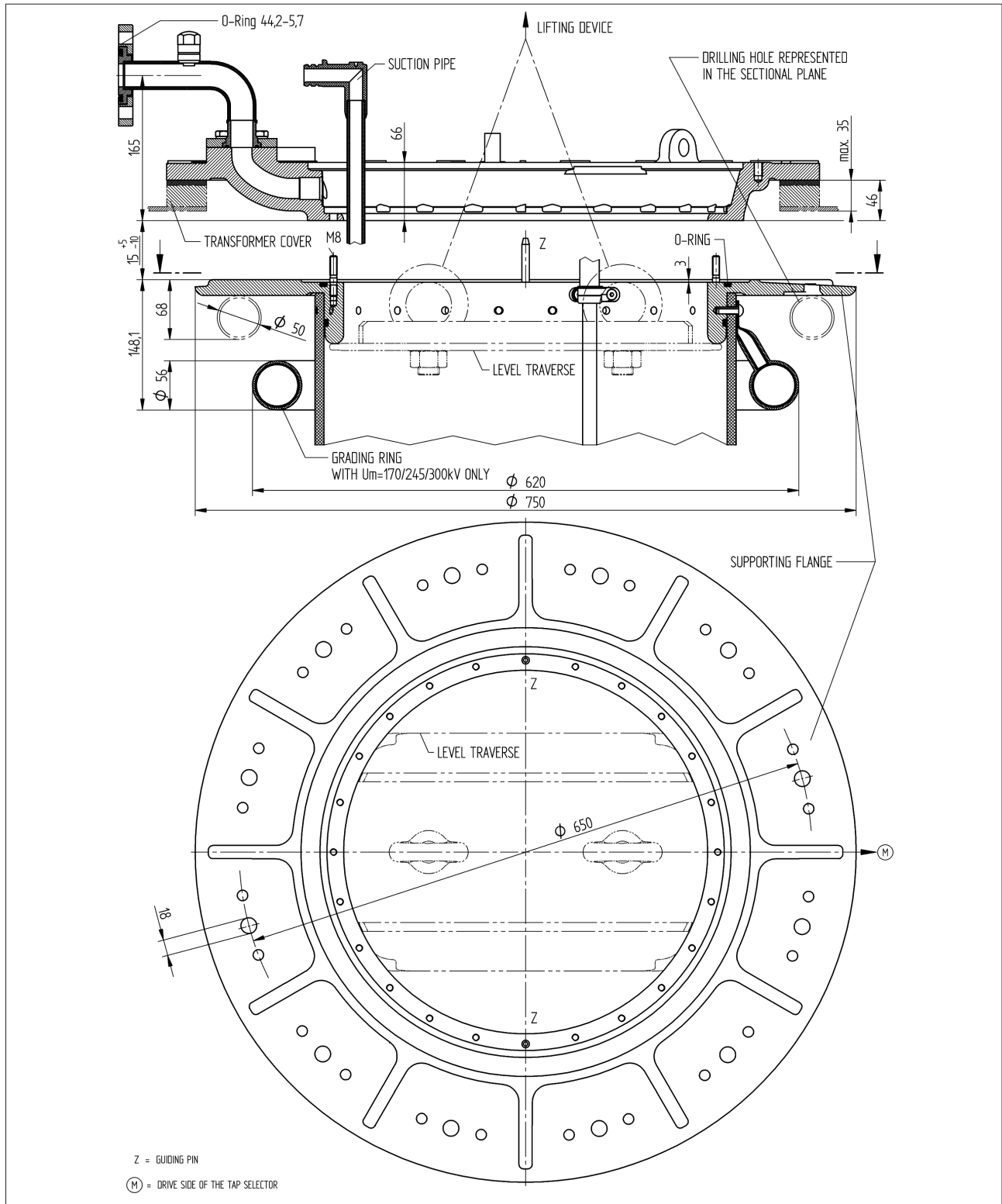
4.1.41 VACUTAP® VM I 1503 connection arrangement of tap selector (891109)



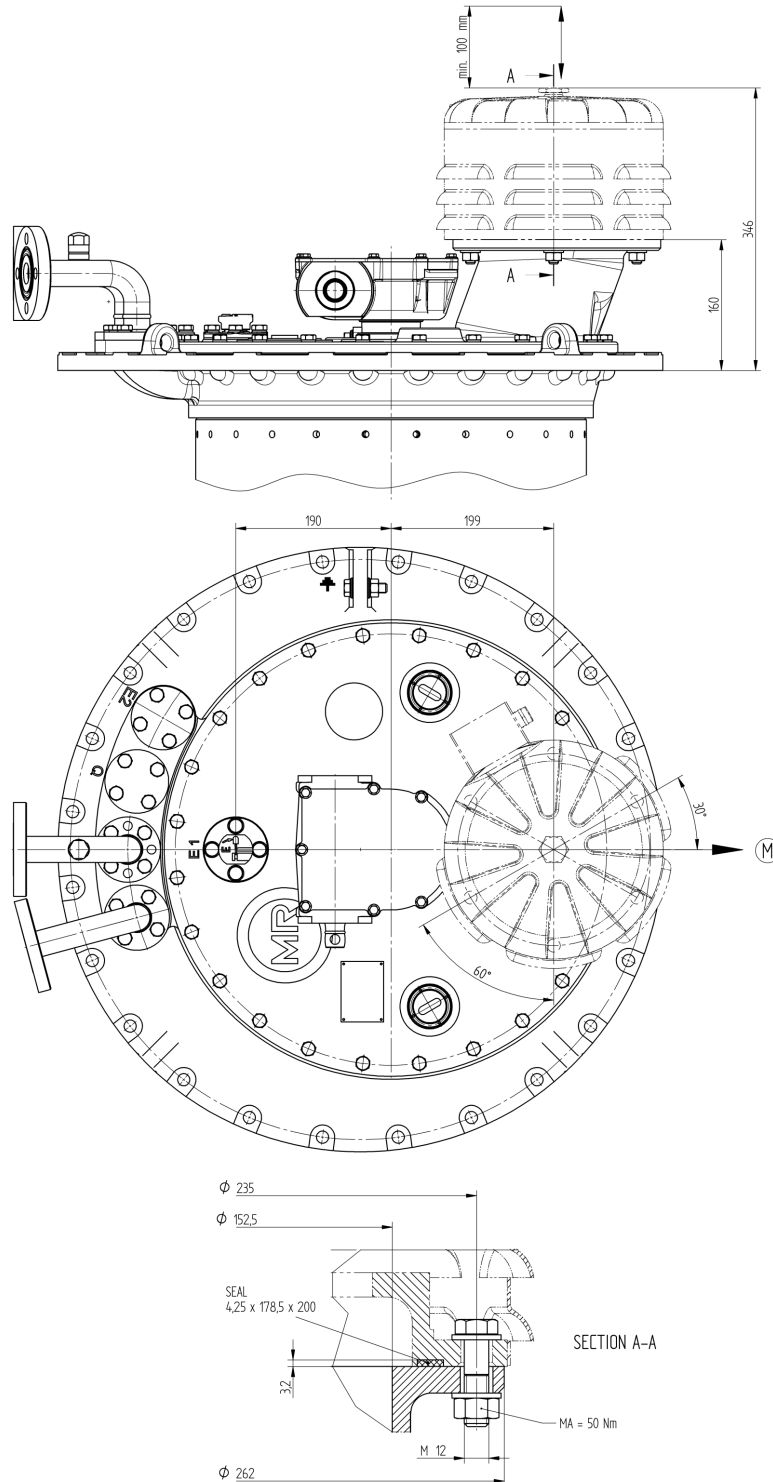
4.1.42 VACUTAP® VM I 802/1002 connection arrangement of tap selector (891110)



4.1.43 VACUTAP® VM® supporting flange, special design for bell-type tank installation for Vm up to 300 kV (896762)



4.1.44 VACUTAP® VM® flange for pressure relief device (895168)

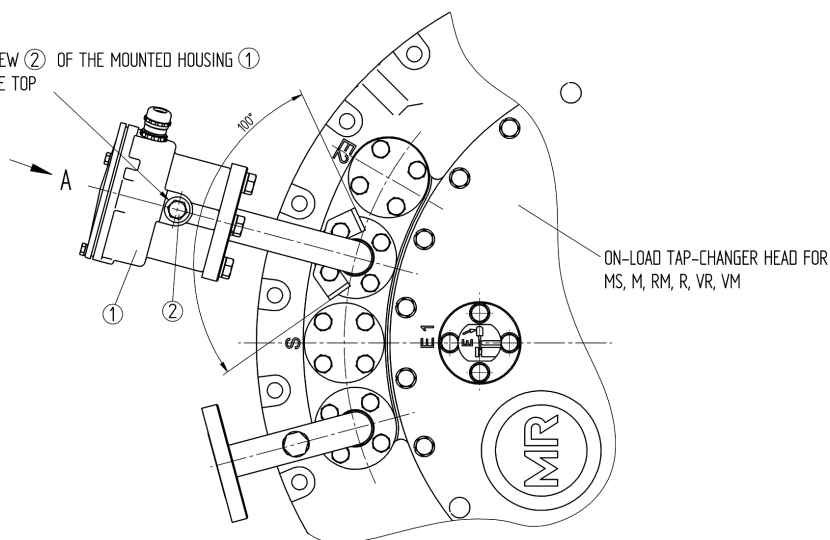


(M) DRIVE SIDE OF THE TAP SELECTOR

4.1.45 VACUTAP® VM® pipe connection Q with tap-change supervisory control (766161)

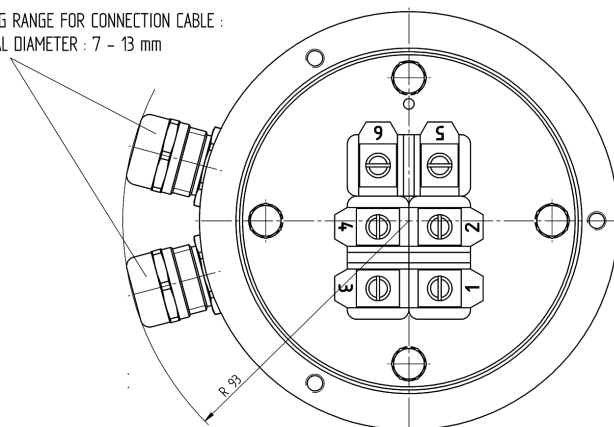
PIPE CONNECTION WITH SUPERVISORY
CONTROL BUSHING WITHOUT OIL FILTER UNIT

CAUTION !
THE BLEEDER SCREW (2) OF THE MOUNTED HOUSING (1)
HAS TO BE ON THE TOP



ANSICHT A (1,5 : 1)
SHOWN WITHOUT COVER

M20x15
CLAMPING RANGE FOR CONNECTION CABLE :
EXTERNAL DIAMETER : 7 - 13 mm



CONNECTING TERMINALS FOR MONITORING DEVICE

WIRING SEE CONNECTION DIAGRAM OF THE
MOTOR DRIVE UNIT

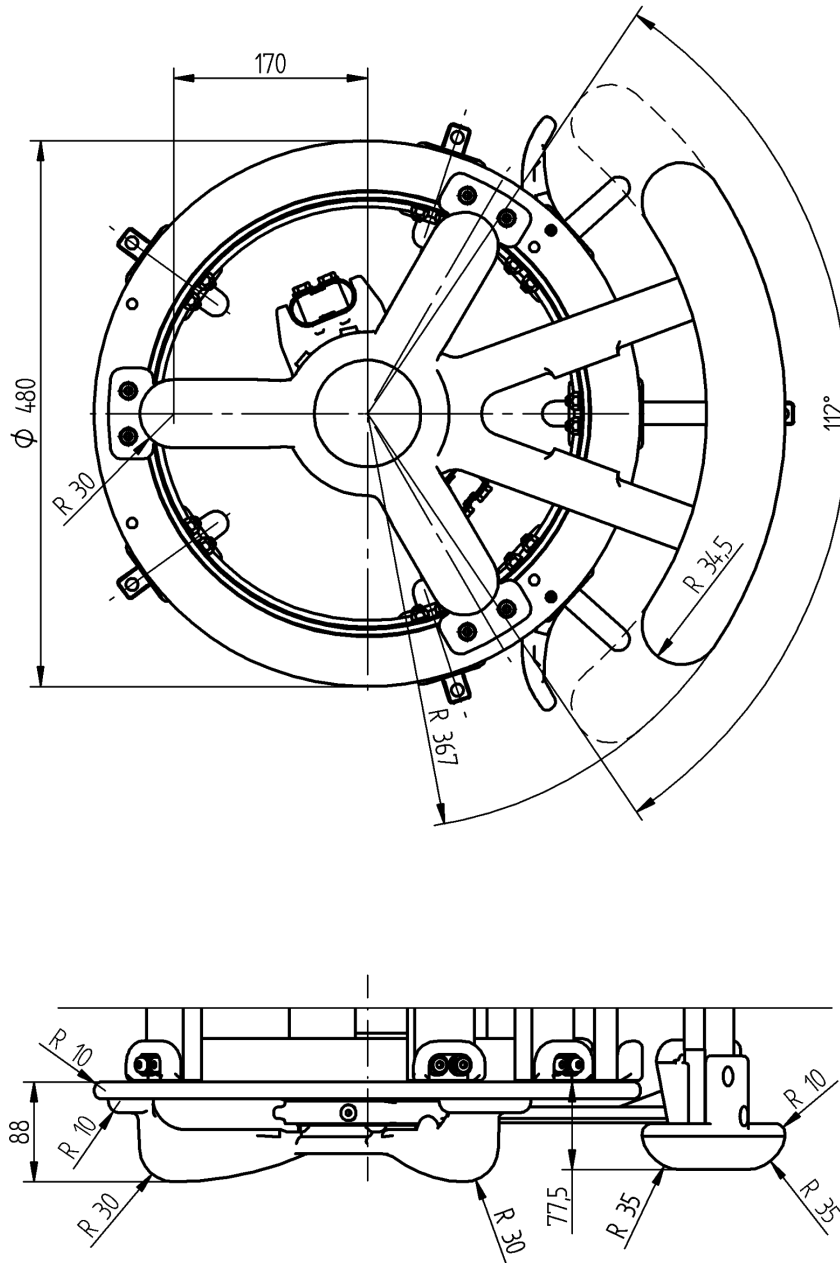
FUNCTION DIAGRAM FOR MONITORING DEVICE
SEE MOTOR DRIVE CIRCUIT DIAGRAM

CONTINUOUS RATED CURRENT: 2A
RATED VOLTAGE DC/AC (50HZ): 24V ... 250V
DIELECTRIC STRENGTH: 1150V / 50HZ / 1 MIN.

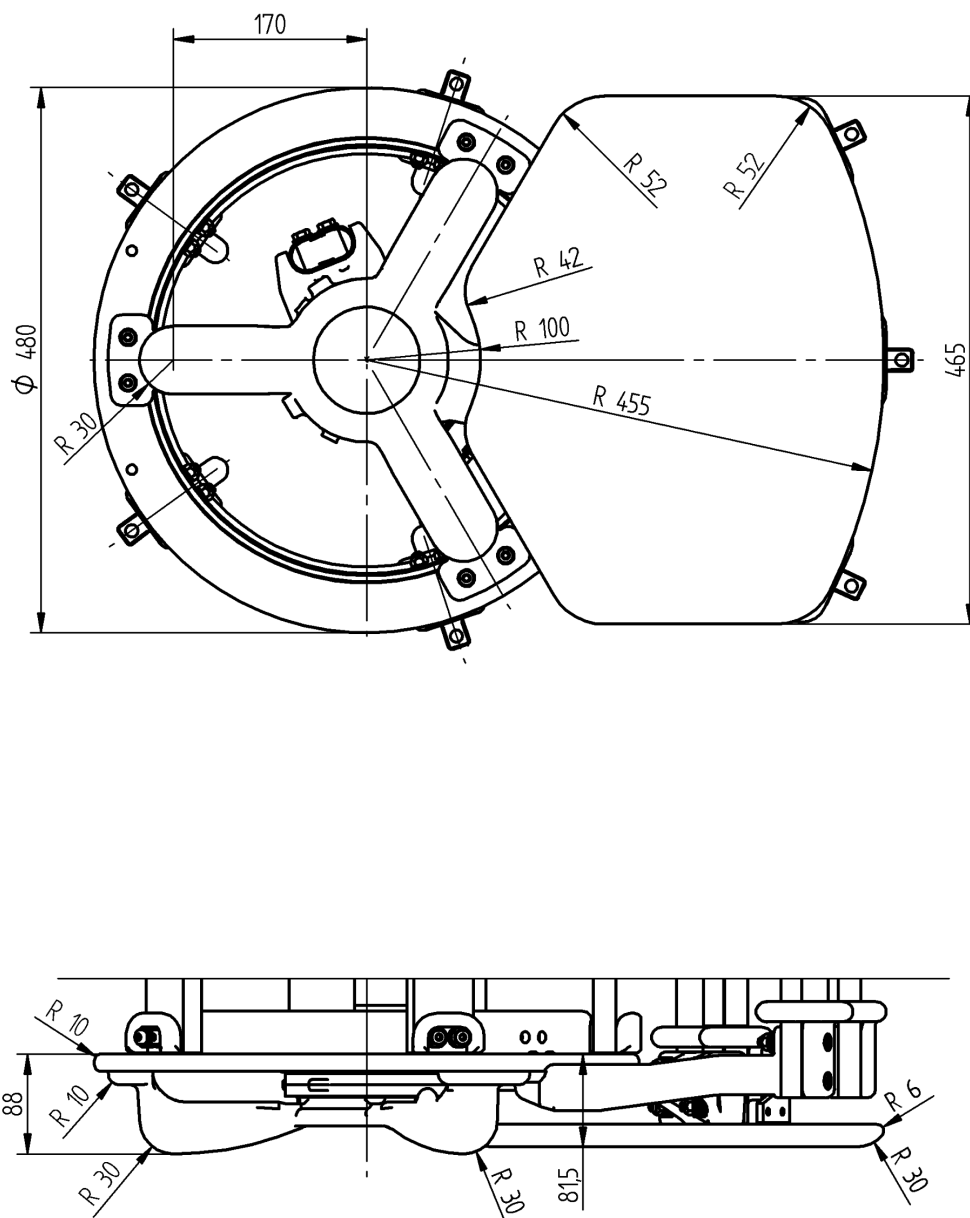
DIELECTRIC TEST OF ALL VOLTAGE-CARRYING
CONNECTIONS AGAINST GROUNDED PARTS:
2000V AC , 50HZ , TEST-DURATION 1 MIN.

SCALE 1 : 2 (1,5 : 1)

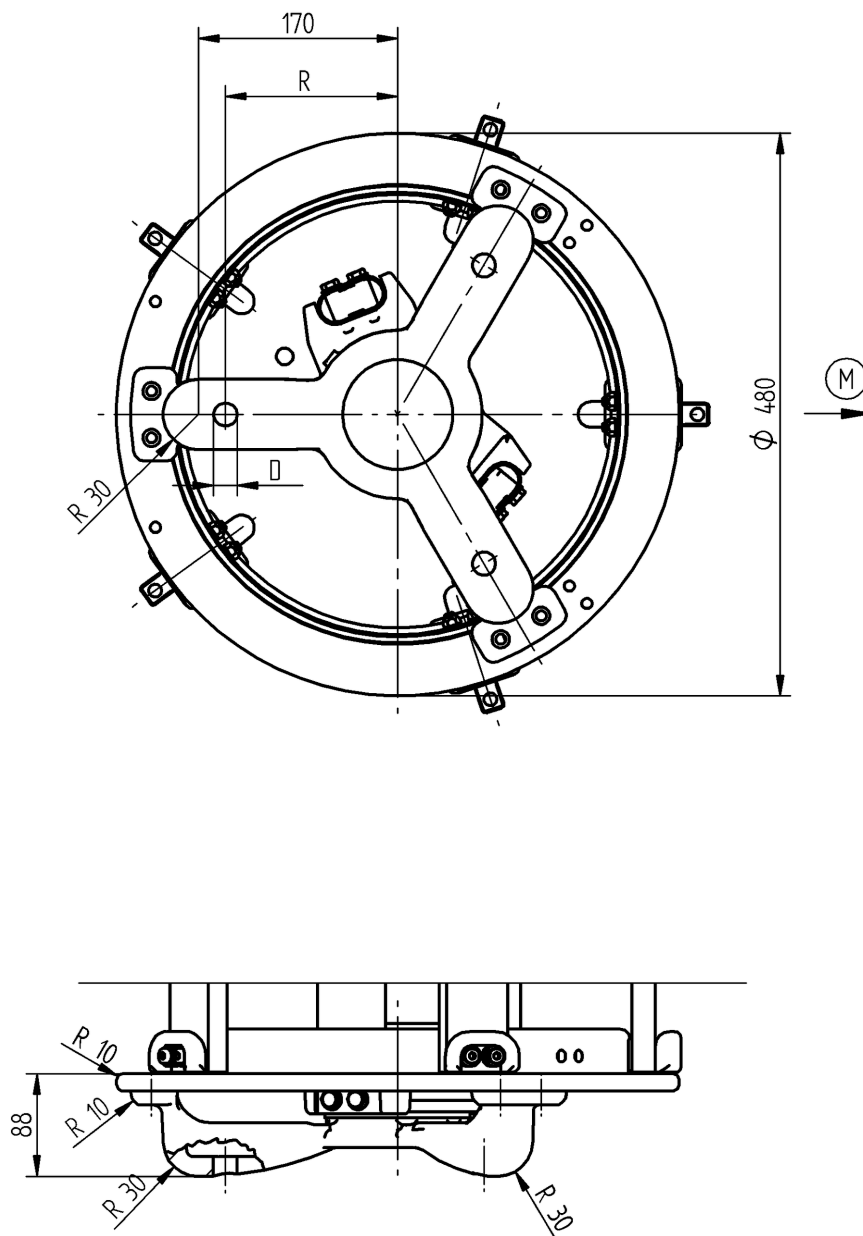
4.1.46 VACUTAP® VM® tap selector base with additional screening, reversing change-over selector design (893934)



4.1.47 VACUTAP® VM® tap selector base with additional screening, coarse tap design (893935)



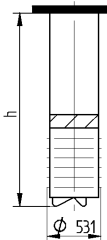
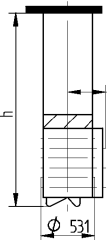
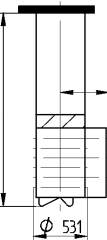
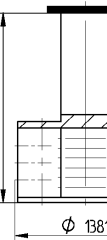
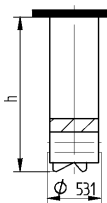
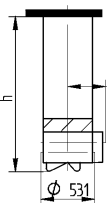
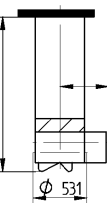
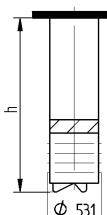
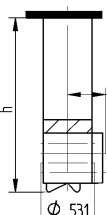
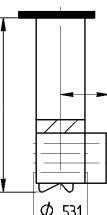
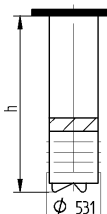
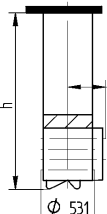
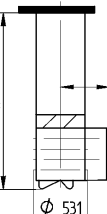
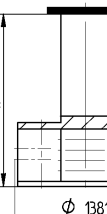
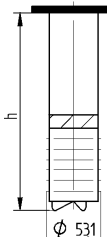
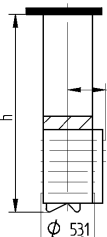
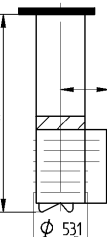
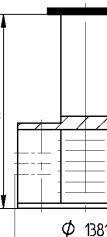
4.1.48 VACUTAP® VM® tap selector base with through hole D20 and D13 (725649)



(M) DRIVE SIDE OF TAP SELECTOR

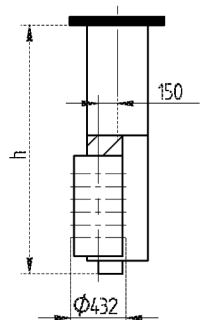
R	D	BOTTOM OF TAP SELECTOR
147	20	097251
160	13	097252

4.2 VACUTAP® VM® overview of on-load tap-changer models (899740)

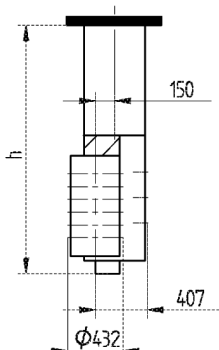
	Without change-over selector	With reversing change-over selector	With coarse change-over selector	with multiple coarse change-over selector (MG) only size B, C and O	Installation length h in mm																																																							
M III 350 Y *) M III 500 Y *) M III 600 Y) not as MG VM III 350 Y *) VM III 500 Y *) VM III 650 Y) not as MG					<table><tr><th colspan="6">Tap selector size</th></tr><tr><th></th><th colspan="2">B</th><th colspan="2">C</th><th>D/DE</th><th>D</th></tr><tr><th>U_m</th><th>O/W/G</th><th>MG</th><th>O/W/G</th><th>MG</th><th>O/W/G</th><th>MG</th></tr><tr><td>72,5</td><td>1894</td><td>1856</td><td>2069</td><td>2031</td><td>2524</td><td>2486</td></tr><tr><td>123</td><td>2024</td><td>1986</td><td>2199</td><td>2161</td><td>2654</td><td>2616</td></tr><tr><td>170</td><td>2154</td><td>2116</td><td>2329</td><td>2291</td><td>2784</td><td>2746</td></tr><tr><td>245</td><td>2254</td><td>2216</td><td>2429</td><td>2391</td><td>2884</td><td>2846</td></tr></table>	Tap selector size							B		C		D/DE	D	U _m	O/W/G	MG	O/W/G	MG	O/W/G	MG	72,5	1894	1856	2069	2031	2524	2486	123	2024	1986	2199	2161	2654	2616	170	2154	2116	2329	2291	2784	2746	245	2254	2216	2429	2391	2884	2846							
Tap selector size																																																												
	B		C		D/DE	D																																																						
U _m	O/W/G	MG	O/W/G	MG	O/W/G	MG																																																						
72,5	1894	1856	2069	2031	2524	2486																																																						
123	2024	1986	2199	2161	2654	2616																																																						
170	2154	2116	2329	2291	2784	2746																																																						
245	2254	2216	2429	2391	2884	2846																																																						
M I 351 *) M I 501 *) M I 601) not as MG VM I 351 *) VM I 501 *) VM I 651) not as MG					<table><tr><th colspan="6">Tap selector size</th></tr><tr><th></th><th colspan="2">B</th><th colspan="2">C</th><th>D/DE</th><th>D</th></tr><tr><th>U_m</th><th>O/W/G</th><th>MG</th><th>O/W/G</th><th>MG</th><th>O/W/G</th><th>MG</th></tr><tr><td>72,5</td><td>1514</td><td>1476</td><td>1589</td><td>1551</td><td>1784</td><td>1746</td></tr><tr><td>123</td><td>1644</td><td>1606</td><td>1719</td><td>1681</td><td>1914</td><td>1876</td></tr><tr><td>170</td><td>1774</td><td>1736</td><td>1849</td><td>1811</td><td>2044</td><td>2006</td></tr><tr><td>245</td><td>1874</td><td>1836</td><td>1949</td><td>1911</td><td>2144</td><td>2106</td></tr><tr><td>300</td><td>2026</td><td>1988</td><td>2101</td><td>2063</td><td>2296</td><td>2258</td></tr></table>	Tap selector size							B		C		D/DE	D	U _m	O/W/G	MG	O/W/G	MG	O/W/G	MG	72,5	1514	1476	1589	1551	1784	1746	123	1644	1606	1719	1681	1914	1876	170	1774	1736	1849	1811	2044	2006	245	1874	1836	1949	1911	2144	2106	300	2026	1988	2101	2063	2296	2258
Tap selector size																																																												
	B		C		D/DE	D																																																						
U _m	O/W/G	MG	O/W/G	MG	O/W/G	MG																																																						
72,5	1514	1476	1589	1551	1784	1746																																																						
123	1644	1606	1719	1681	1914	1876																																																						
170	1774	1736	1849	1811	2044	2006																																																						
245	1874	1836	1949	1911	2144	2106																																																						
300	2026	1988	2101	2063	2296	2258																																																						
M II 352 M II 502 M II 602 VM II 352 VM II 502 VM II 652					<table><tr><th colspan="4">Tap selector size</th></tr><tr><th></th><th>B</th><th>C</th><th>D/DE</th></tr><tr><th>U_m</th><th>O/W/G</th><th>O/W/G</th><th>O/W/G</th></tr><tr><td>72,5</td><td>1704</td><td>1829</td><td>2154</td></tr><tr><td>123</td><td>1834</td><td>1959</td><td>2284</td></tr><tr><td>170</td><td>1964</td><td>2089</td><td>2414</td></tr><tr><td>245</td><td>2064</td><td>2189</td><td>2514</td></tr><tr><td>300</td><td>2216</td><td>2341</td><td>2666</td></tr></table>	Tap selector size					B	C	D/DE	U _m	O/W/G	O/W/G	O/W/G	72,5	1704	1829	2154	123	1834	1959	2284	170	1964	2089	2414	245	2064	2189	2514	300	2216	2341	2666																							
Tap selector size																																																												
	B	C	D/DE																																																									
U _m	O/W/G	O/W/G	O/W/G																																																									
72,5	1704	1829	2154																																																									
123	1834	1959	2284																																																									
170	1964	2089	2414																																																									
245	2064	2189	2514																																																									
300	2216	2341	2666																																																									
M I 802 VM I 802 VM I 1002					<table><tr><th colspan="6">Tap selector size</th></tr><tr><th></th><th colspan="2">B</th><th colspan="2">C</th><th>D/DE</th><th>D</th></tr><tr><th>U_m</th><th>O/W/G</th><th>MG</th><th>O/W/G</th><th>MG</th><th>O/W/G</th><th>MG</th></tr><tr><td>72,5</td><td>1724</td><td>1686</td><td>1799</td><td>1761</td><td>1994</td><td>1956</td></tr><tr><td>123</td><td>1854</td><td>1816</td><td>1929</td><td>1891</td><td>2124</td><td>2086</td></tr><tr><td>170</td><td>1984</td><td>1956</td><td>2059</td><td>2021</td><td>2254</td><td>2216</td></tr><tr><td>245</td><td>2084</td><td>2046</td><td>2159</td><td>2121</td><td>2354</td><td>2316</td></tr><tr><td>300</td><td>2236</td><td>2198</td><td>2311</td><td>2273</td><td>2506</td><td>2468</td></tr></table>	Tap selector size							B		C		D/DE	D	U _m	O/W/G	MG	O/W/G	MG	O/W/G	MG	72,5	1724	1686	1799	1761	1994	1956	123	1854	1816	1929	1891	2124	2086	170	1984	1956	2059	2021	2254	2216	245	2084	2046	2159	2121	2354	2316	300	2236	2198	2311	2273	2506	2468
Tap selector size																																																												
	B		C		D/DE	D																																																						
U _m	O/W/G	MG	O/W/G	MG	O/W/G	MG																																																						
72,5	1724	1686	1799	1761	1994	1956																																																						
123	1854	1816	1929	1891	2124	2086																																																						
170	1984	1956	2059	2021	2254	2216																																																						
245	2084	2046	2159	2121	2354	2316																																																						
300	2236	2198	2311	2273	2506	2468																																																						
M I 1203 M I 1503 VM I 1203 VM I 1503					<table><tr><th colspan="6">Tap selector size</th></tr><tr><th></th><th colspan="2">B</th><th colspan="2">C</th><th>D/DE</th><th>D</th></tr><tr><th>U_m</th><th>O/W/G</th><th>MG</th><th>O/W/G</th><th>MG</th><th>O/W/G</th><th>MG</th></tr><tr><td>72,5</td><td>1934</td><td>1896</td><td>2009</td><td>1971</td><td>2204</td><td>2166</td></tr><tr><td>123</td><td>2064</td><td>2026</td><td>2139</td><td>2101</td><td>2334</td><td>2296</td></tr><tr><td>170</td><td>2194</td><td>2156</td><td>2269</td><td>2231</td><td>2464</td><td>2426</td></tr><tr><td>245</td><td>2294</td><td>2256</td><td>2369</td><td>2331</td><td>2564</td><td>2526</td></tr><tr><td>300</td><td>2446</td><td>2408</td><td>2521</td><td>2483</td><td>2716</td><td>2678</td></tr></table>	Tap selector size							B		C		D/DE	D	U _m	O/W/G	MG	O/W/G	MG	O/W/G	MG	72,5	1934	1896	2009	1971	2204	2166	123	2064	2026	2139	2101	2334	2296	170	2194	2156	2269	2231	2464	2426	245	2294	2256	2369	2331	2564	2526	300	2446	2408	2521	2483	2716	2678
Tap selector size																																																												
	B		C		D/DE	D																																																						
U _m	O/W/G	MG	O/W/G	MG	O/W/G	MG																																																						
72,5	1934	1896	2009	1971	2204	2166																																																						
123	2064	2026	2139	2101	2334	2296																																																						
170	2194	2156	2269	2231	2464	2426																																																						
245	2294	2256	2369	2331	2564	2526																																																						
300	2446	2408	2521	2483	2716	2678																																																						

4.3 VACUTAP® VM 300 overview of on-load tap-changer models (765835)

without
change-over selector



with
change-over selector



Installation length h in mm

VM III 300 Y

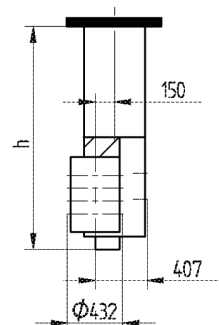
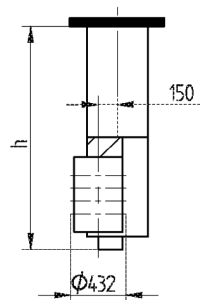
U_m	Tap selector size B
72,5	1942
123	2072
170	2202
245	2302

VM I 301

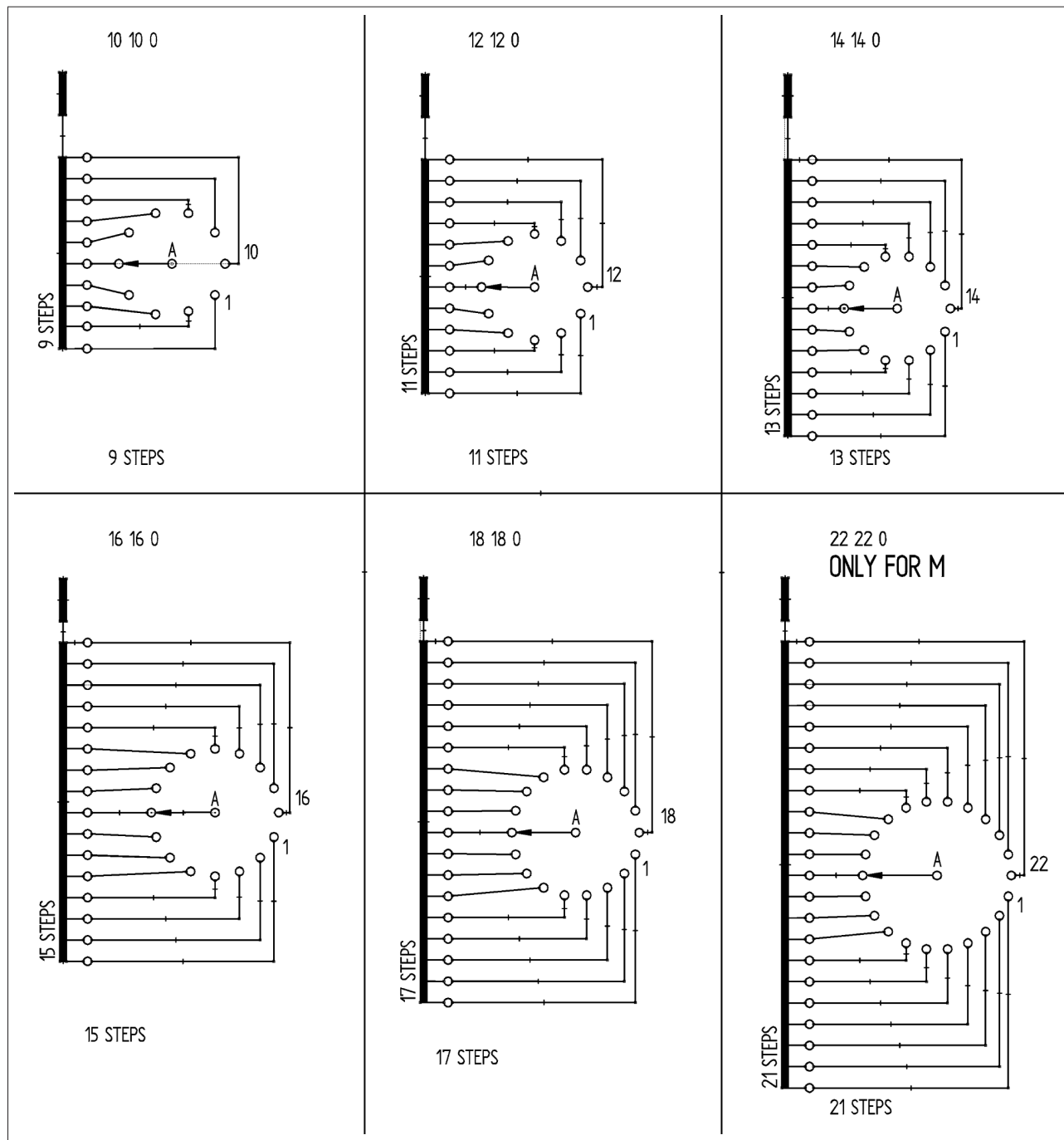
U_m	Tap selector size B
72,5	1542
123	1672
170	1802
245	1902

VM II 302

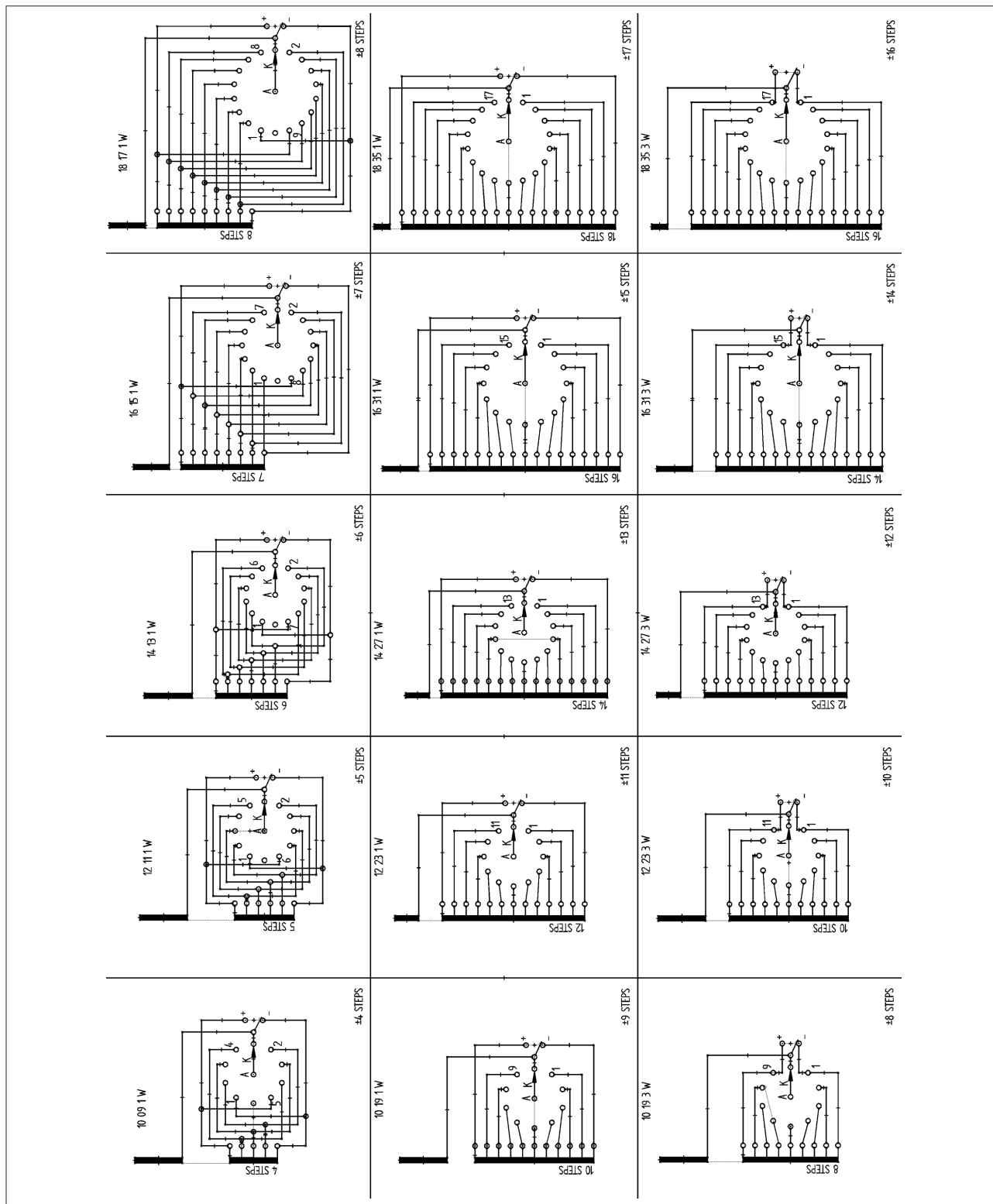
U_m	Tap selector size B
72,5	1742
123	1872
170	2002
245	2102



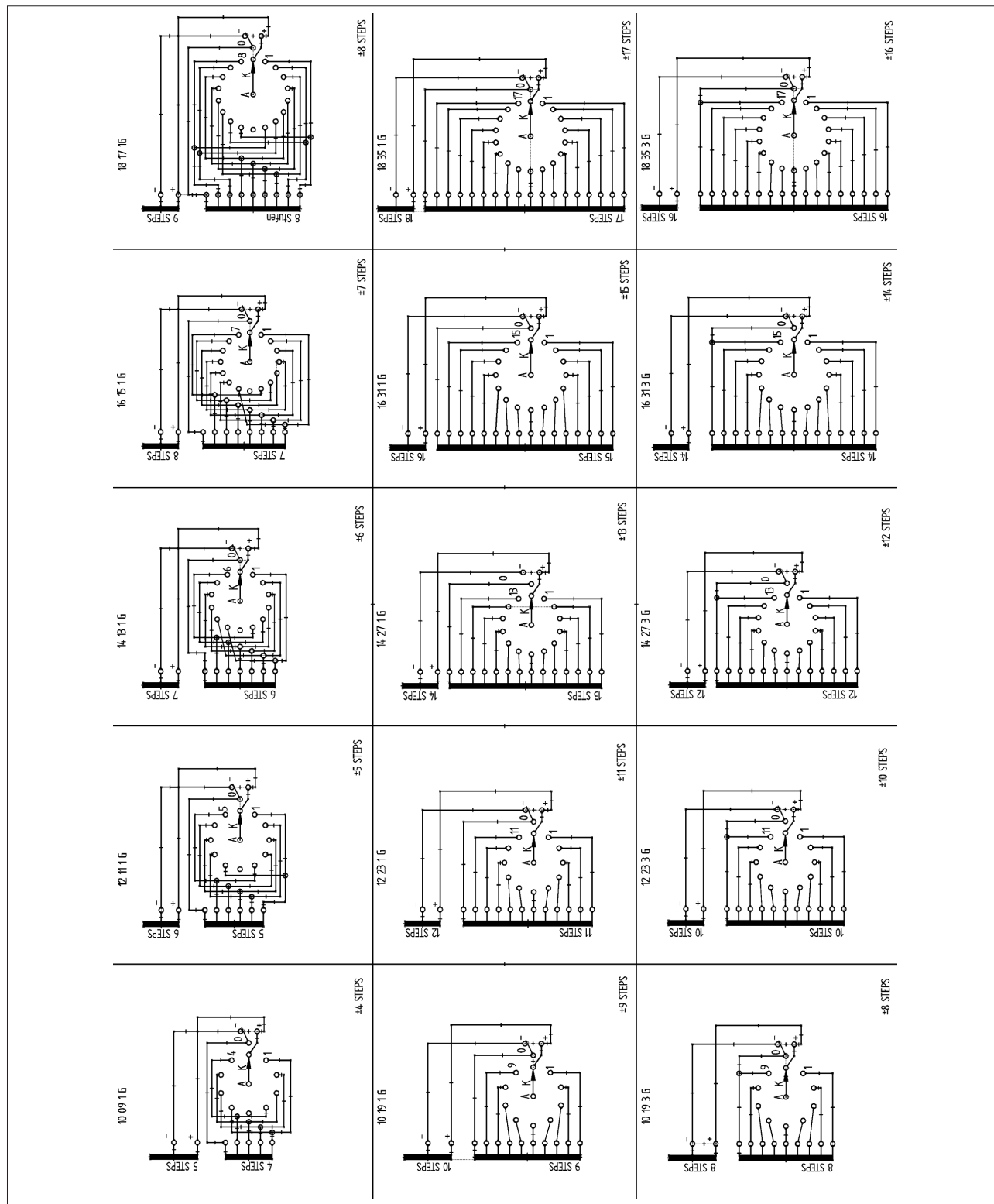
4.4 VACUTAP® VM® overview of basic connection diagrams with designation of tap selector connection contacts in accordance with MR standard (890616)



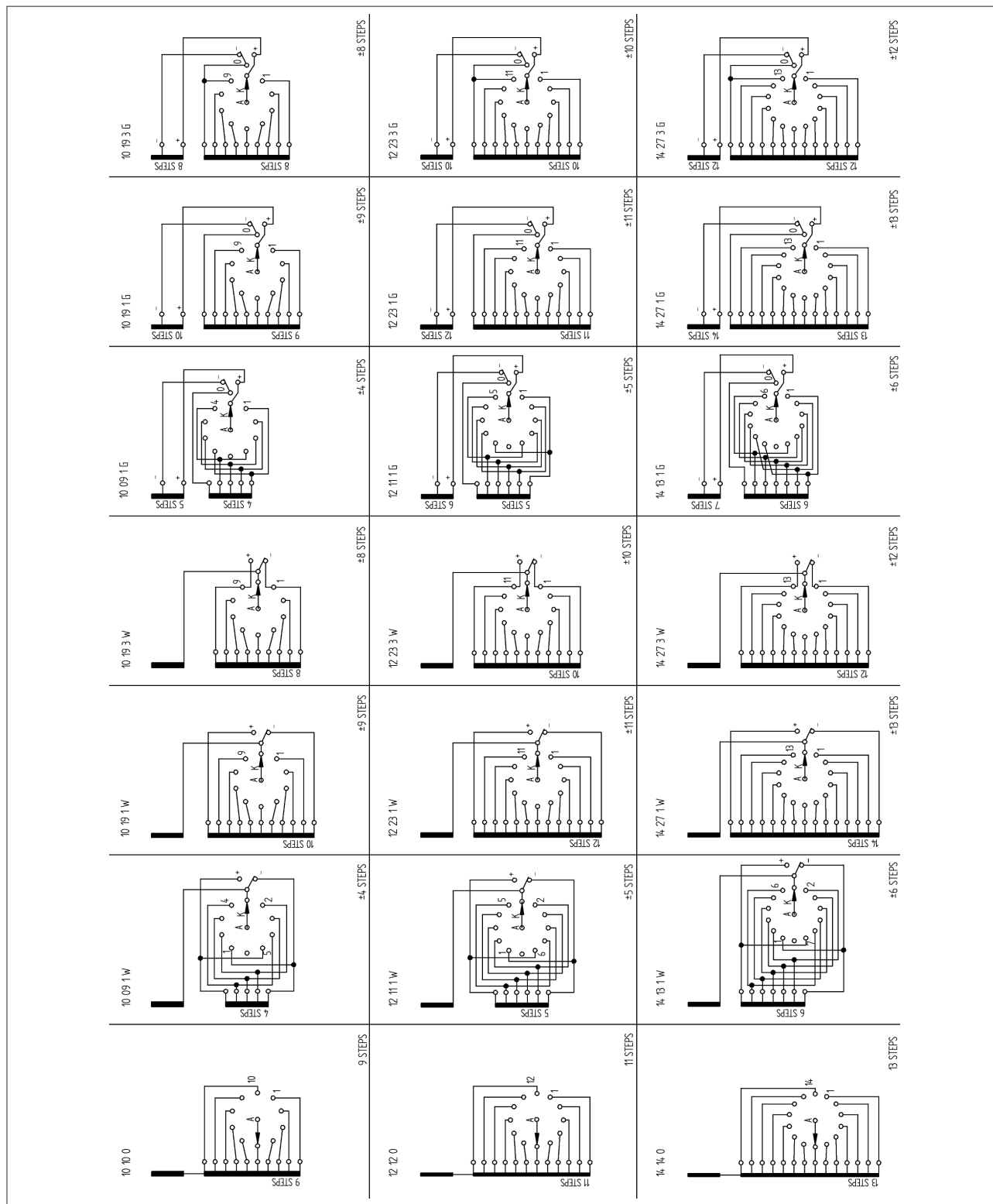
VACUTAP VM® overview of basic connection diagrams with designation of tap selector connection contacts in accordance with MR standard (890616) –2–



VACUTAP VM® overview of basic connection diagrams with designation of tap selector connection contacts in accordance with MR standard (890616) –3–

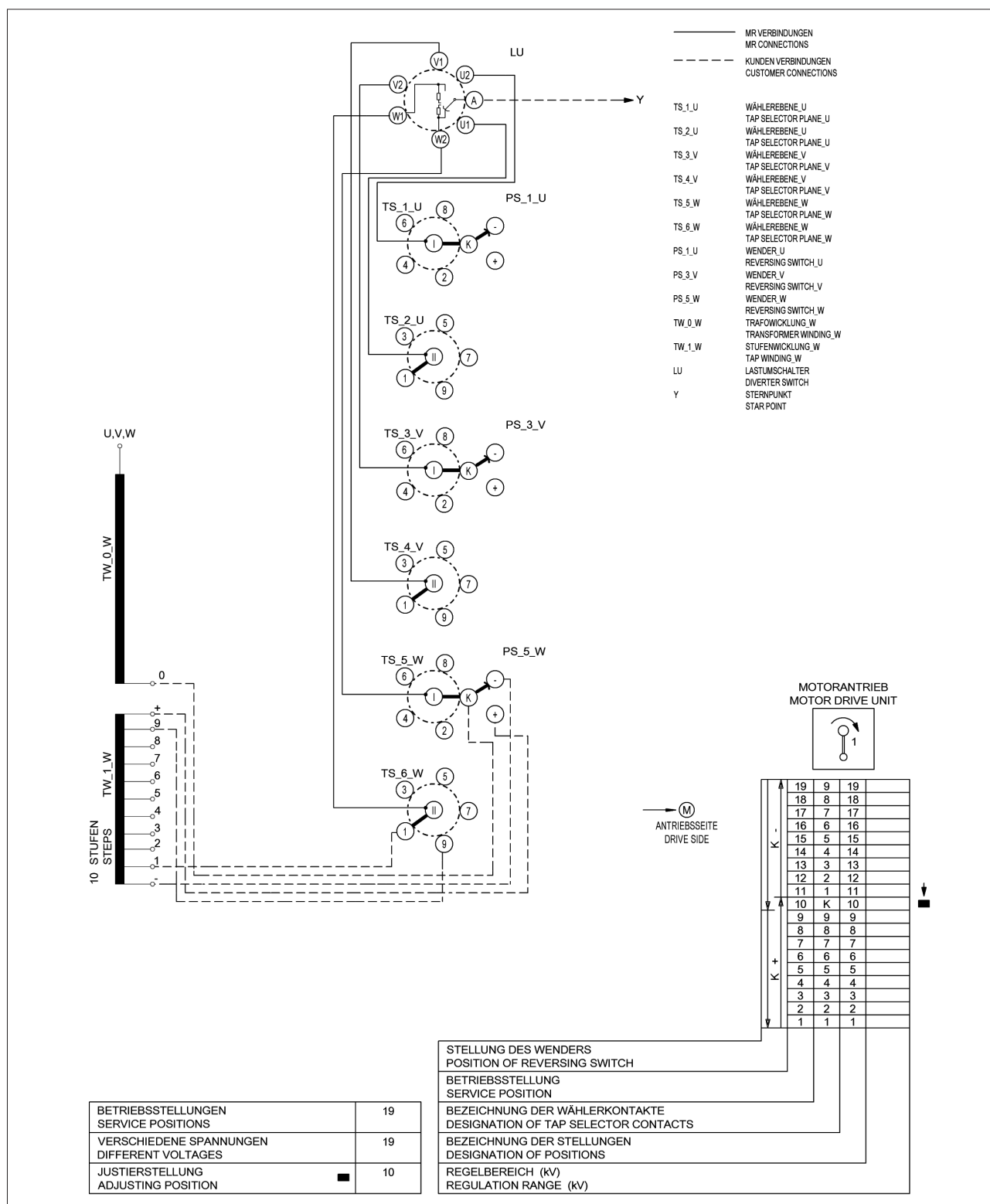


4.5 VACUTAP® VM 300 overview of basic connection diagrams with designation of tap selector connection contacts in accordance with MR standard (893819)

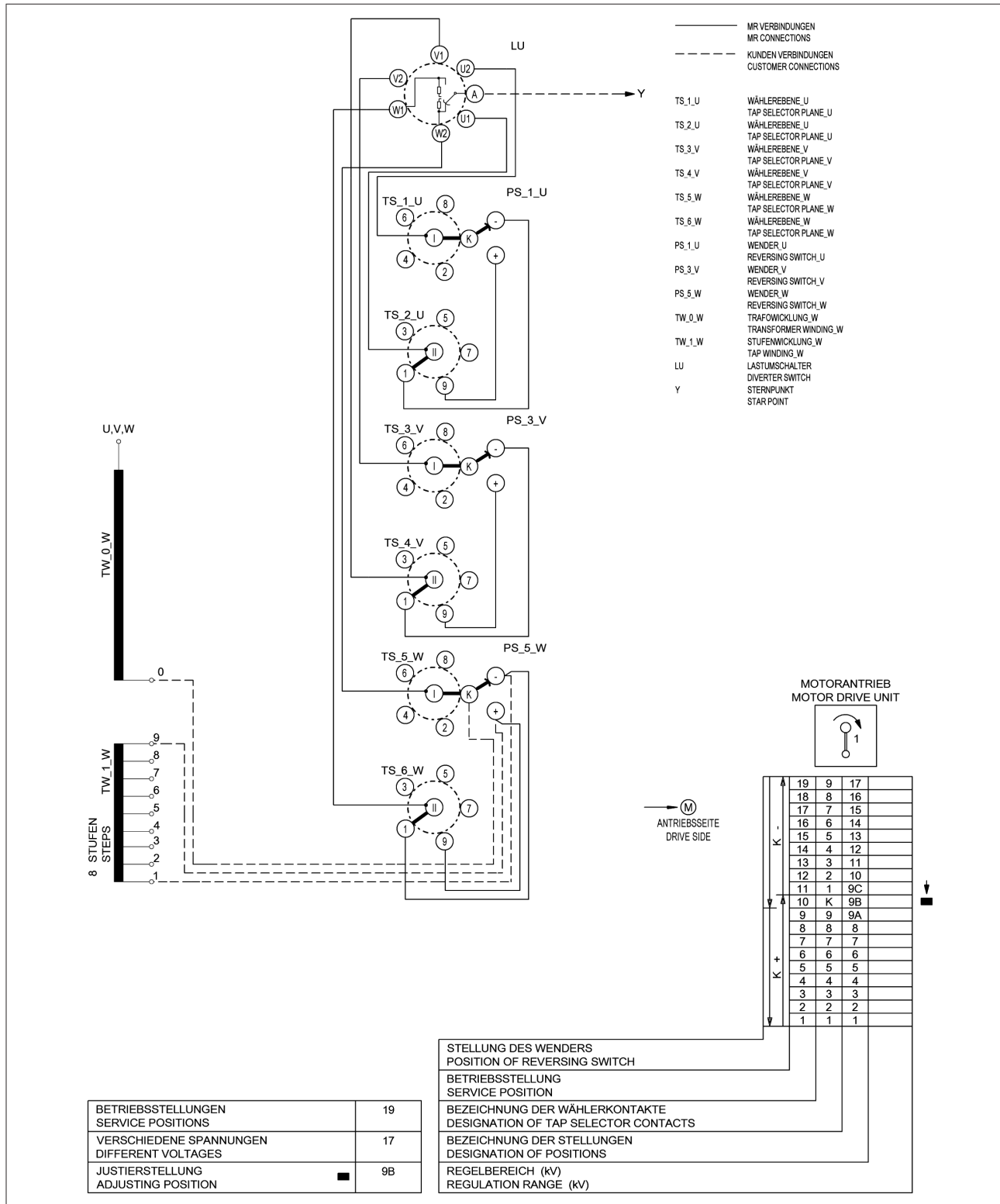


4.6 VACUTAP® VM® detailed connection diagrams (contact designation in accordance with MR standard)

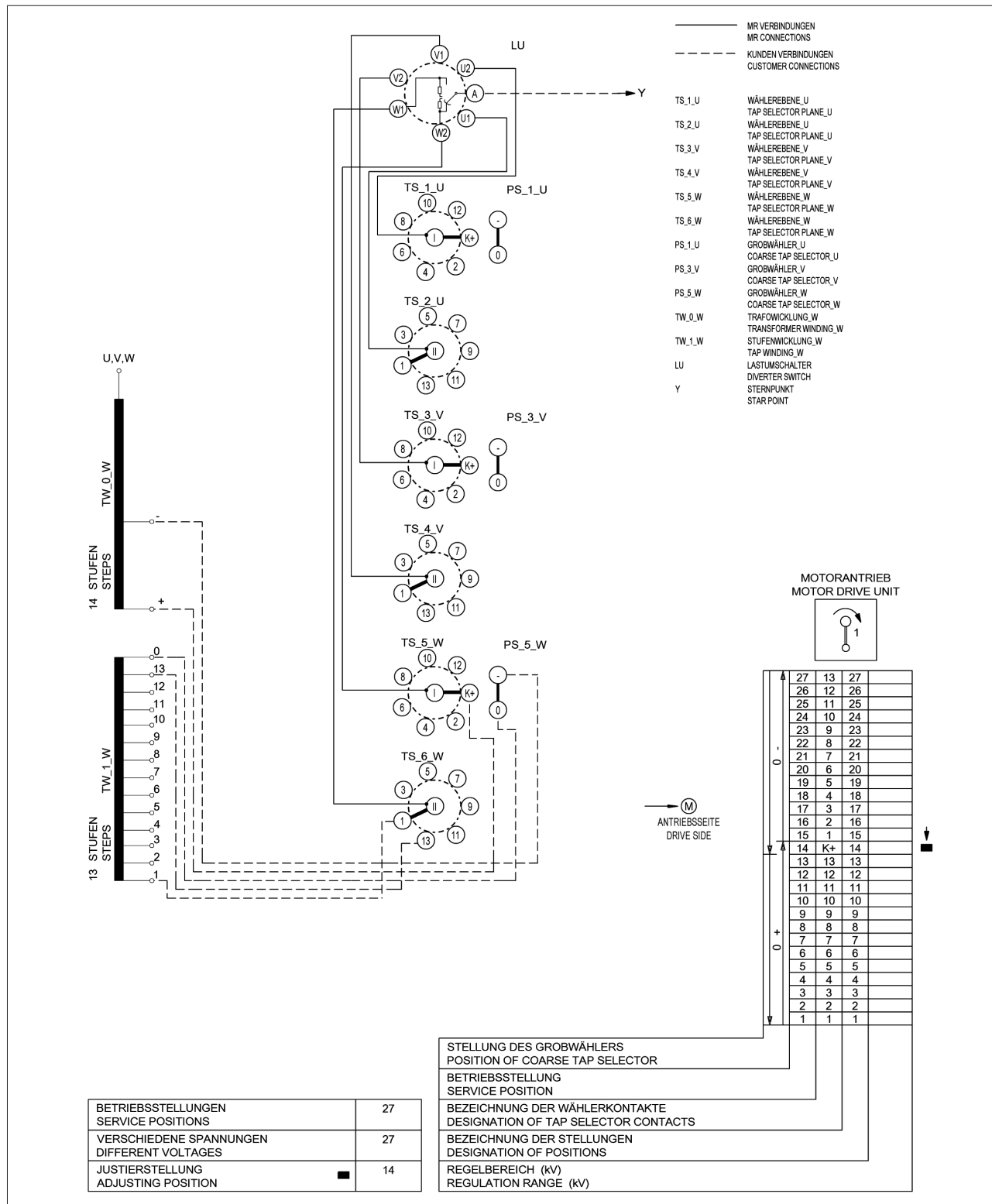
4.6.1 VACUTAP® VM III 300 Y basic connection diagram 10 19 1 W (2414642)



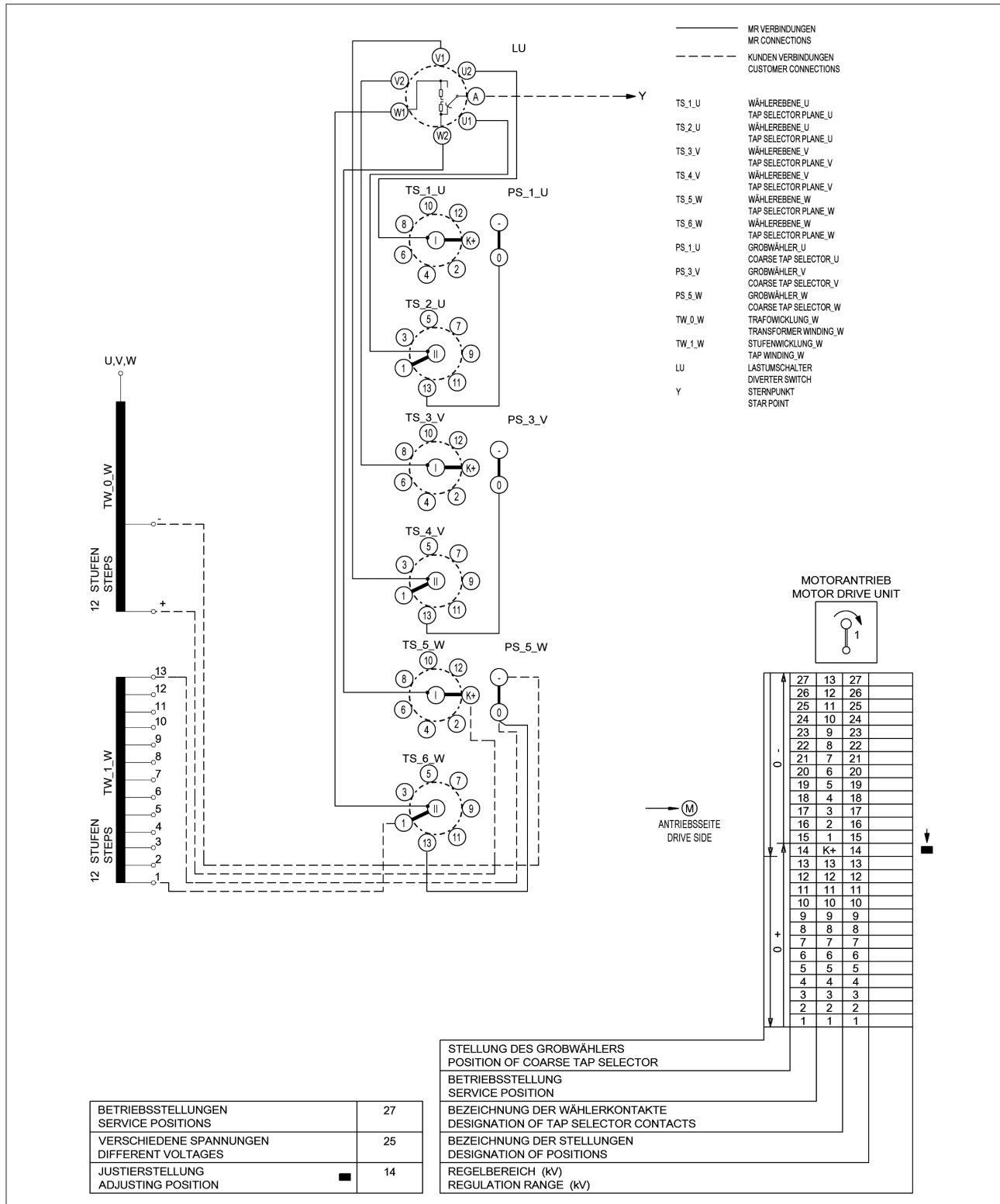
4.6.2 VACUTAP® VM III 300 Y basic connection diagram 10 19 3 W (2414644)



4.6.3 VACUTAP® VM III 300 Y basic connection diagram 14 27 1 G (2414648)

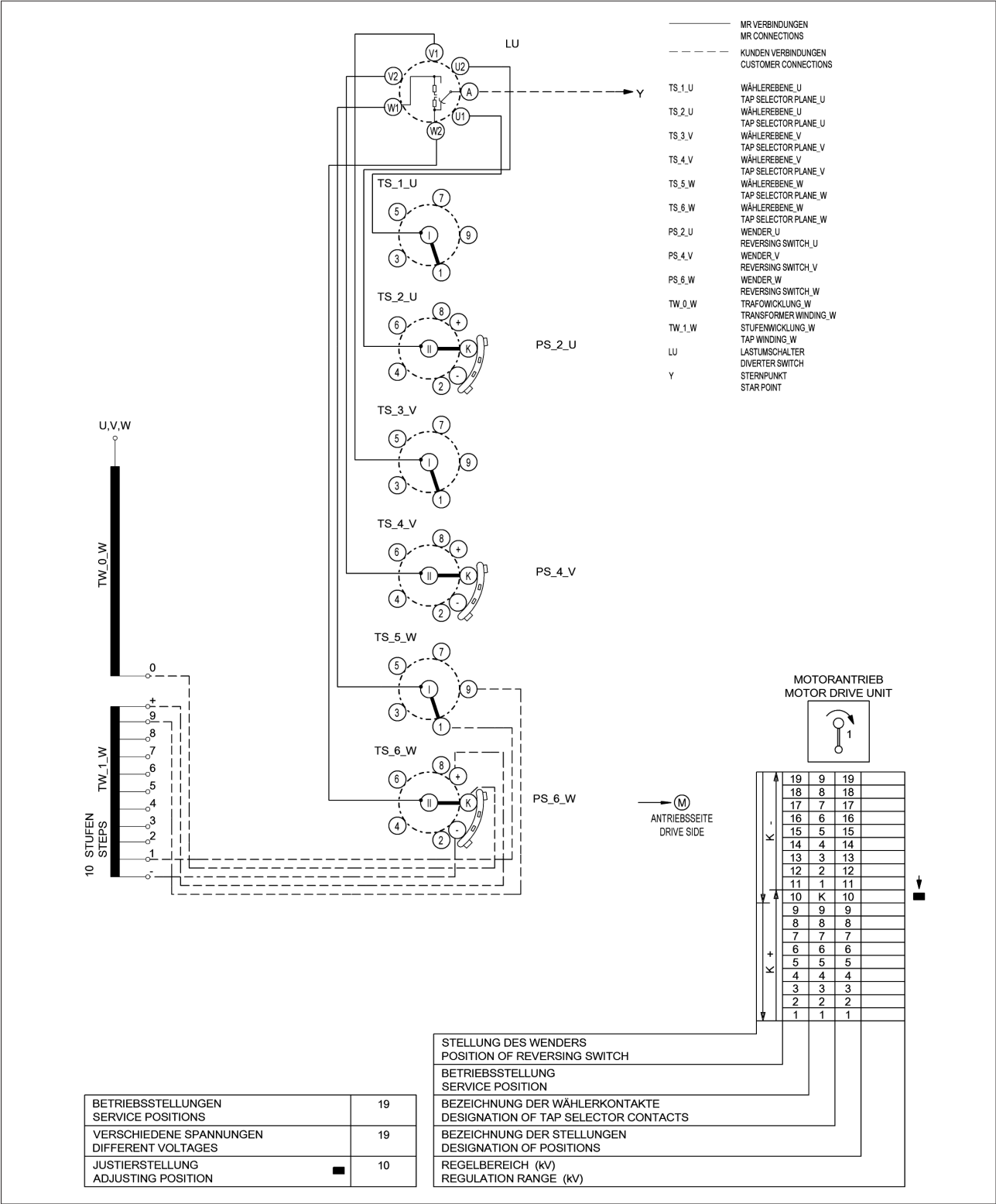


4.6.4 VACUTAP® VM III 300 Y basic connection diagram 14 27 3 G (2414649)

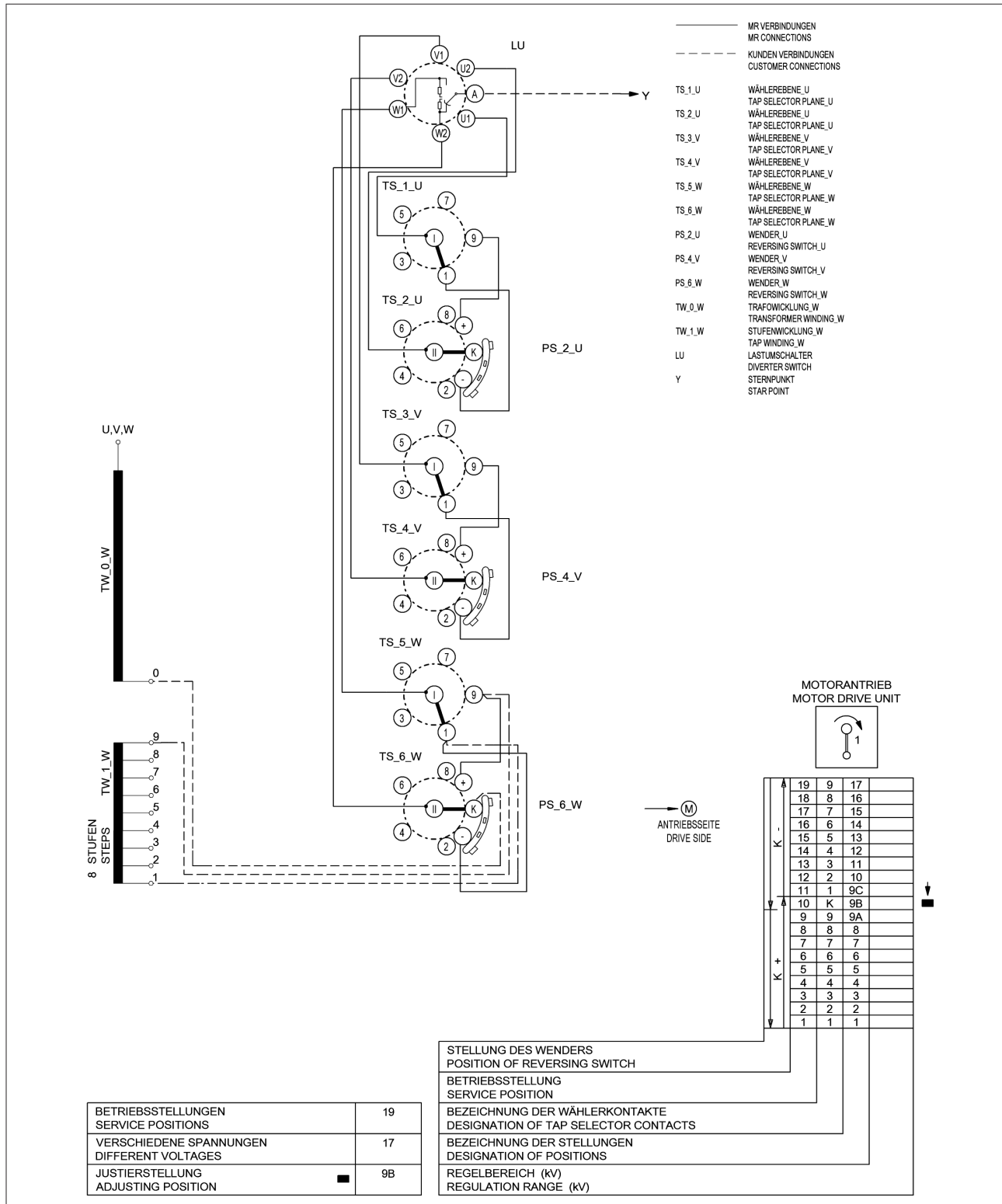




4.6.5 VACUTAP® VM III 350/500/650 Y basic connection diagram 10 19
1 W (2414658)

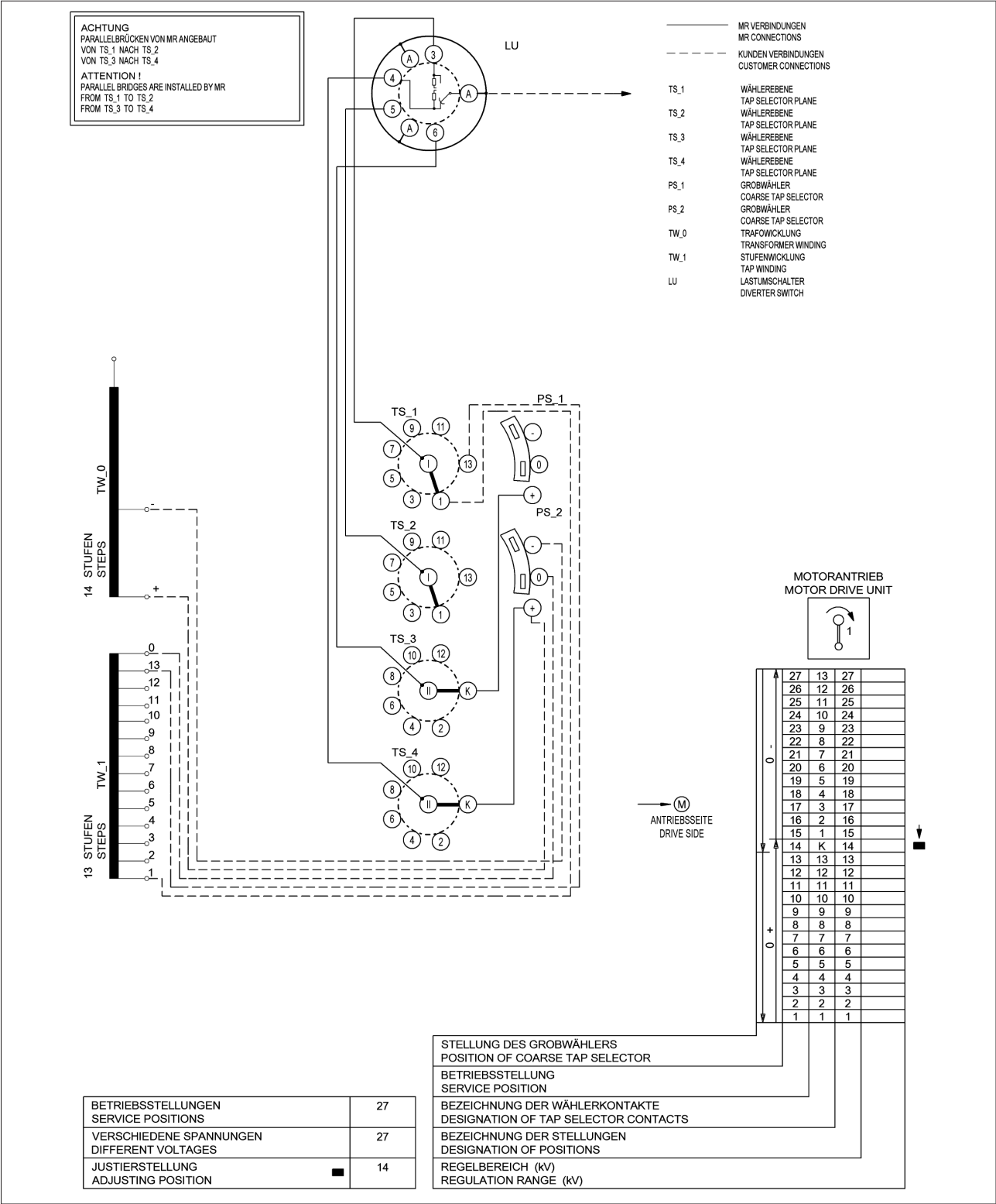


4.6.6 VACUTAP® VM III 350/500/650 Y basic connection diagram 10 19 3 W (2414670)

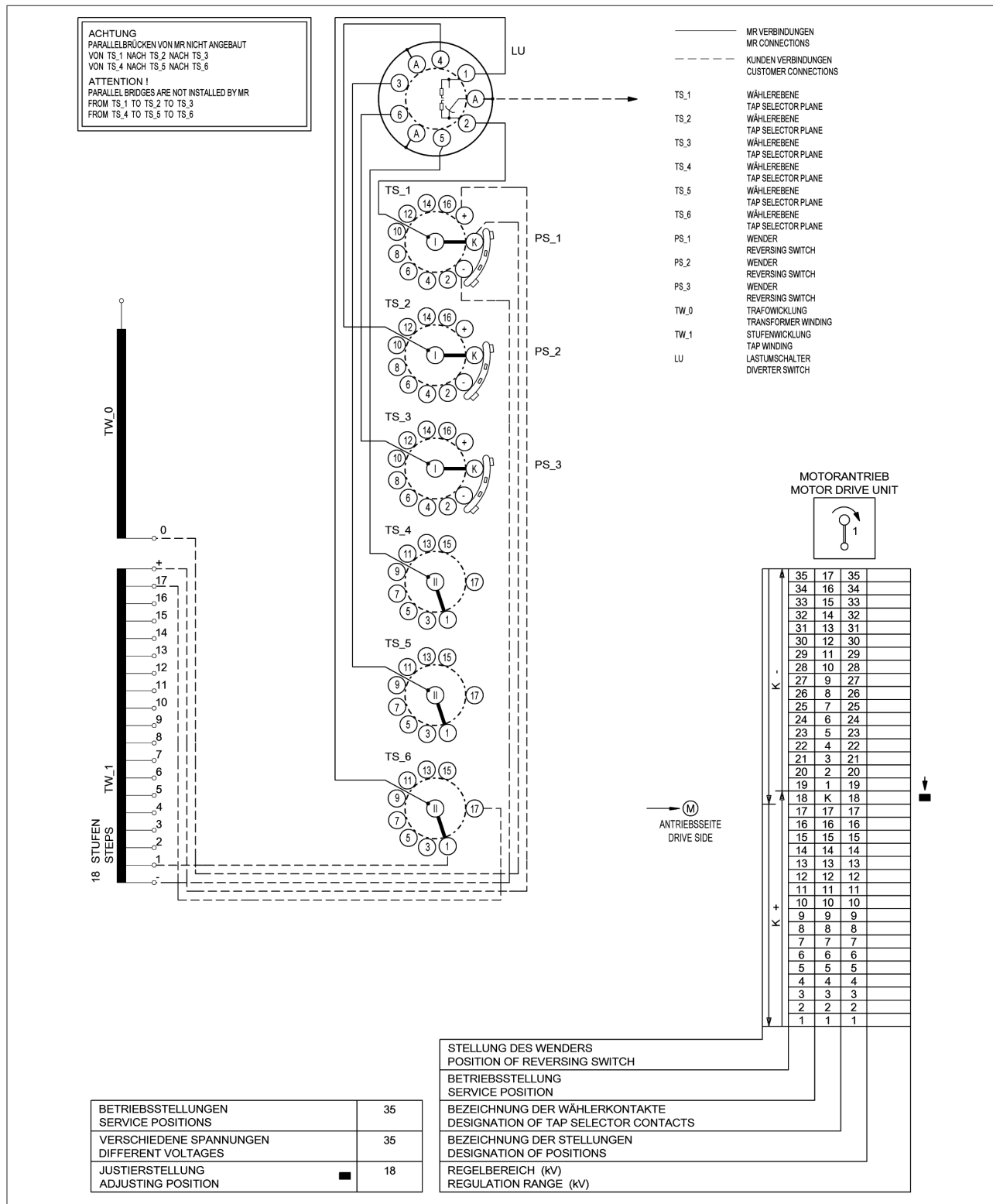




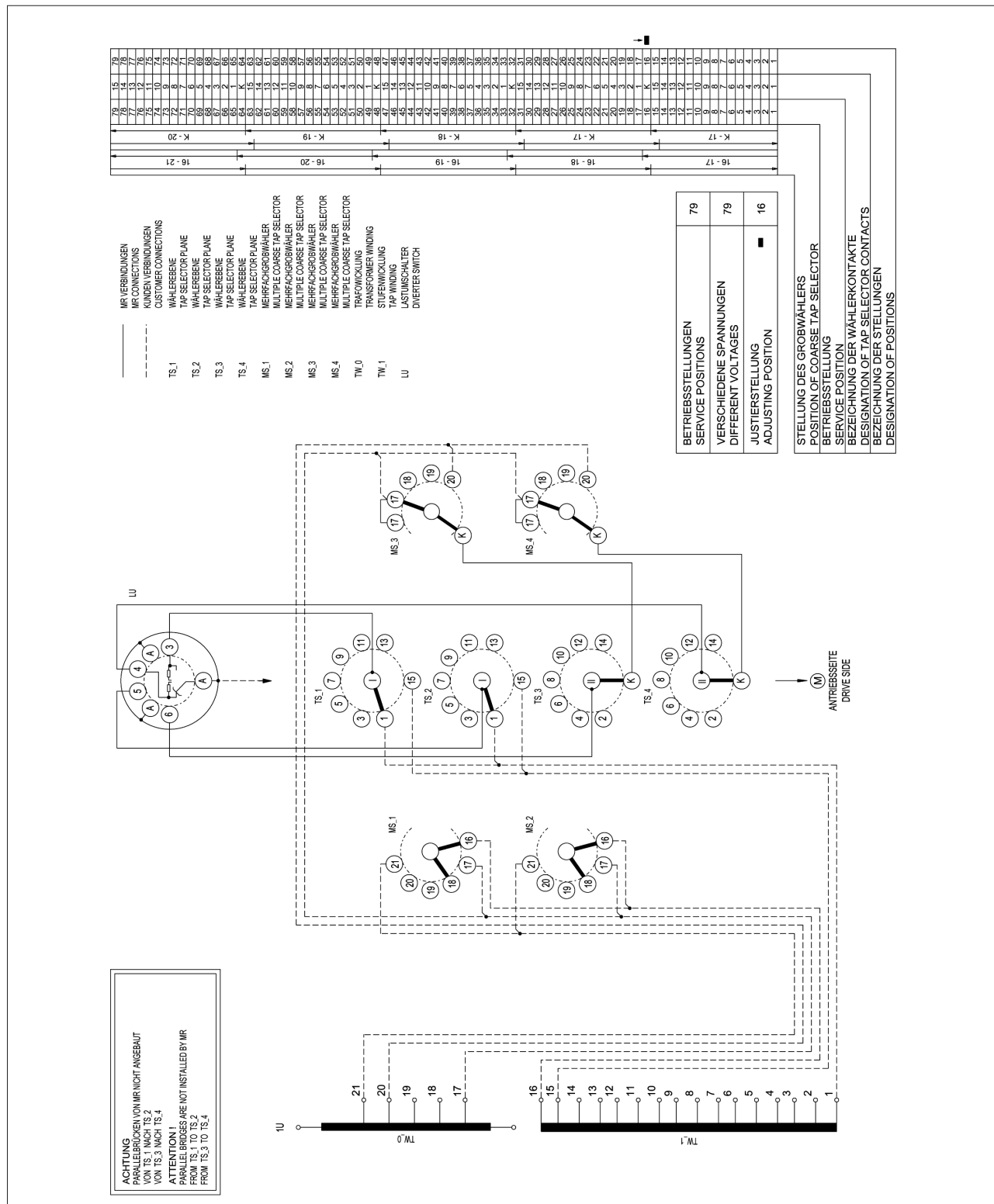
4.6.7 VACUTAP® VM I 802/1002 basic connection diagram 14 27 1 G (2414631)



4.6.8 VACUTAP® VM I 1203/1503 basic connection diagram 18 35 1 W (2414636)



4.6.9 VACUTAP® VM I 802/1002 -basic connection diagram 16 79 1 G, multiple coarse change-over selector design (2407535)



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