



metsonpower Electrical Supply

TRANSFORMER ACCESSORIES

TAP CHANGERS TYPE MHR



TAP CHANGERS

TYPE MHR

GENERAL SPECIFICATION

These tap changers are available in one, two or three phase applications. Multi layer types are also available. The shaft length is fixed as 50, 70, 100 or 130mm. Driving mechanism can be either on the edge or in the middle of the phases. Connection diagrams in page MHR 2 can be applied in any variation to all types. Easy assembly and compact desing provides labor and cost savings.

ASSEMBLY

A notch is provided to mark each position. For operation, unscrew and release the notch by applying an axial pull on the control knob. Then turn the knob to the desired position. Engage the knob and screw the lock nut. This process is clearly marked on control knob as;

" I LIFT - II TURN - III SWITCH ON "

This description can be engraved in any language.

MATERIALS

Steel Parts: These parts can be stainless or mild steel. Mild steel parts are cadmium or zinc plated. Upon request galvanizing is also available.

Polyamide Parts : These parts are NYLON 66, superior mechanical properties against all acting forces, strong against UV lights.

Aluminum Parts : GAISi12Cu

BrassParts : Cu ZN40Pb2 Ms 60 F34 DIN 17 673

Copper Parts : E - Cu F25 DIN 40500

Insulator Parts : Paper phenol - plastic resin based laminates, HP 2061.5 class of DIN 7735.

ON REQUEST

The aluminum parts can be protected by anodic oxidation. The mild steel parts can be supplied in stainless steel. The brass and copper parts can be tin, silver or cadmium plated.

CURRENT

CURRENT	CONTACT INNER DIA. (For cable connection)
10 A	ø 2.1 mm.
30 A	ø 3.1 mm.
63 A	ø 5.1 mm.

VOLTAGE CLASS

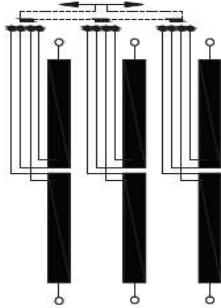
VOLTAGE CLASS	B. I. L.
15 kV	95 kV
20 kV	125 kV
30 kV	170 kV

Other B. I. L. values are also available upon customer request.

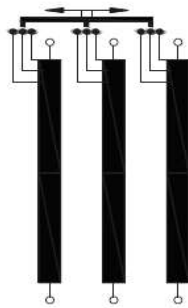


TYPE MHR THREEPHASE TAP CHANGER

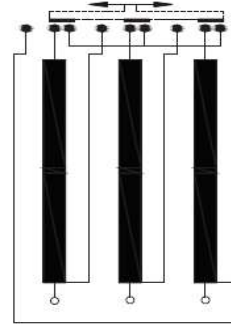
Connection Diagrams



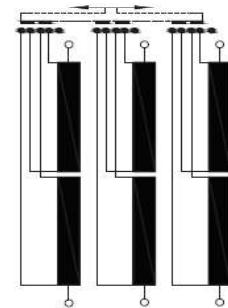
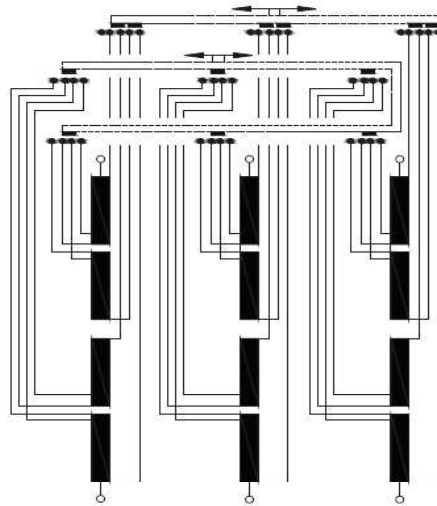
setting for delta transformer



setting for star transformer



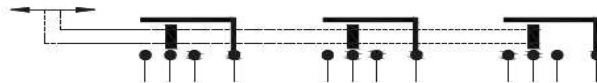
star - delta coupling



series - parallel coupling

Typical combination :

- 1 stage, series - parallel coupling
- 2 stages, delta diagram - setting $\pm 2,5\%$.



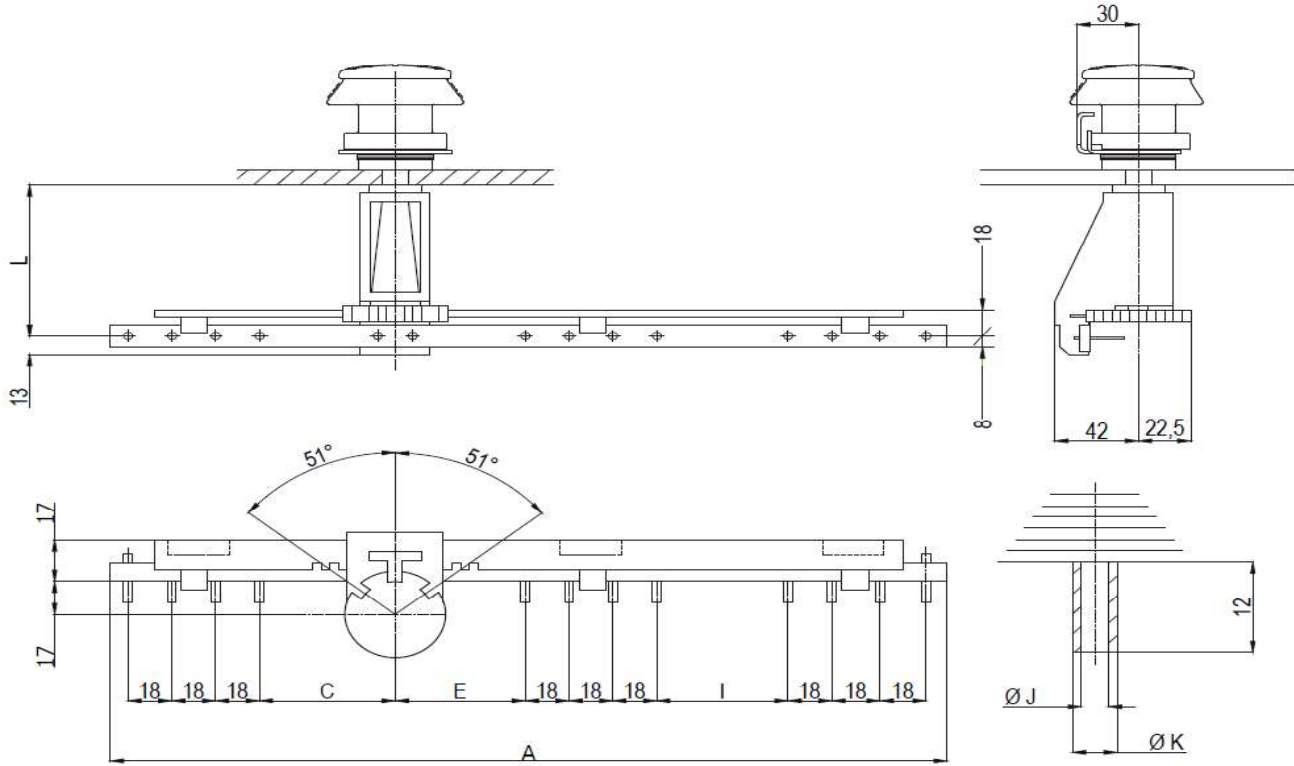
common output per phase



TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil

Delta diagram 20-30kV 30-63A 3-7 positions Setting 2.5 % per position



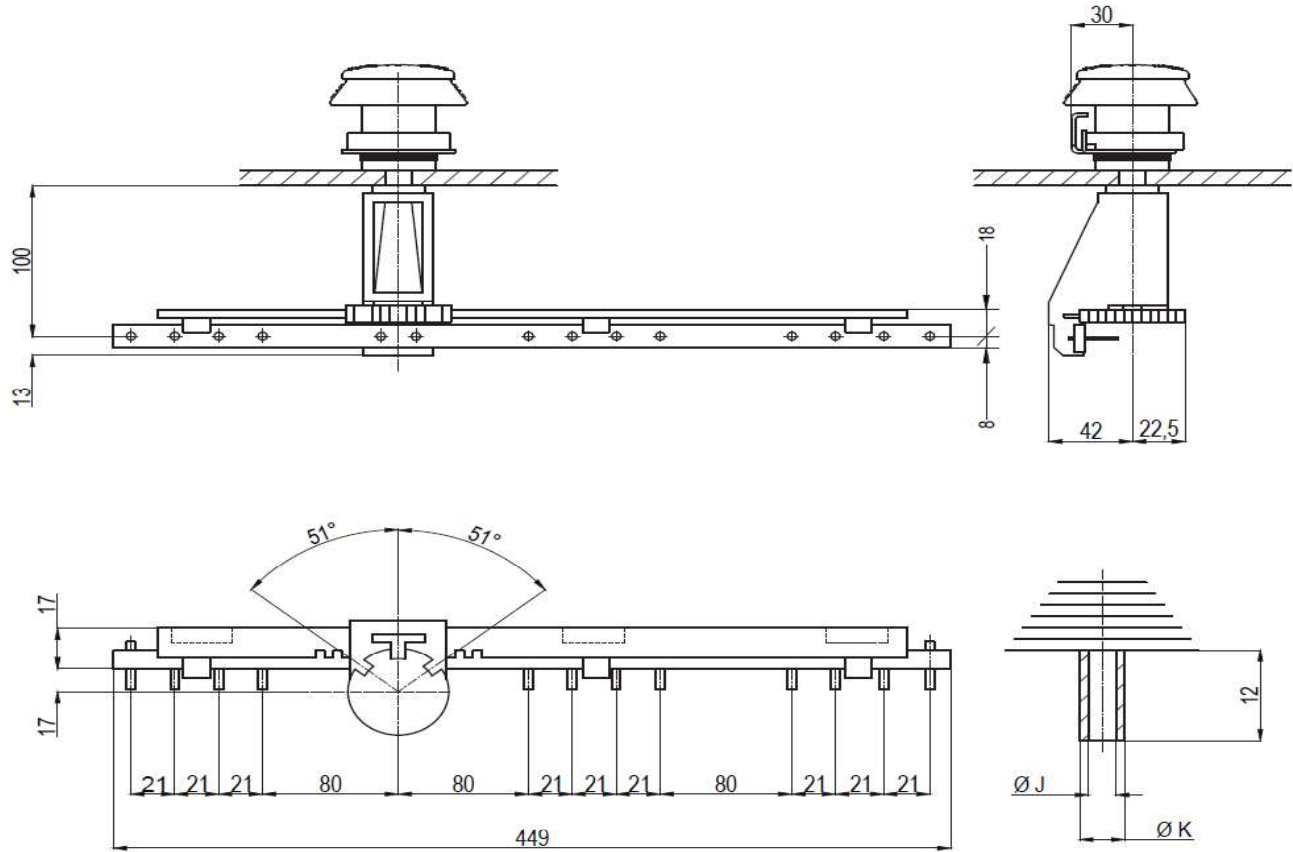
	10 A	30 A	63 A
J	2,1	3,1	5,1
K	4	5	7

	20kV	30kV
C	55	80
E	55	80
I	55	80

L	Number of Positions	20kV				30kV			
		A	10 A Unit No.	30 A Unit No.	63 A Unit No.	A	10 A Unit No.	30 A Unit No.	63 A Unit No.
50	3	347	MC136D341	MC136D342	MC136D343	-	-	-	-
	4	401	MC136D441	MC136D442	MC136D443	-	-	-	-
	5	455	MC136D541	MC136D542	MC136D543	-	-	-	-
	6	509	MC136D641	MC136D642	MC136D643	-	-	-	-
	7	563	MC136D741	MC136D742	MC136D743	-	-	-	-
70	3	347	MD136D341	MD136D342	MD136D343	422	MD136D351	MD136D352	MD136D353
	4	401	MD136D441	MD136D442	MD136D443	476	MD136D451	MD136D452	MD136D453
	5	455	MD136D541	MD136D542	MD136D543	530	MD136D551	MD136D552	MD136D553
	6	509	MD136D641	MD136D642	MD136D643	584	MD136D651	MD136D652	MD136D653
	7	563	MD136D741	MD136D742	MD136D743	638	MD136D751	MD136D752	MD136D753
100	3	347	ME136D341	ME136D342	ME136D343	422	ME136D351	ME136D352	ME136D353
	4	401	ME136D441	ME136D442	ME136D443	476	ME136D451	ME136D452	ME136D453
	5	455	ME136D541	ME136D542	ME136D543	530	ME136D551	ME136D552	ME136D553
	6	509	ME136D641	ME136D642	ME136D643	584	ME136D651	ME136D652	ME136D653
	7	563	ME136D741	ME136D742	ME136D743	638	ME136D751	ME136D752	ME136D753
130	3	347	MF136D341	MF136D342	MF136D343	422	MF136D351	MF136D352	MF136D353
	4	401	MF136D441	MF136D442	MF136D443	476	MF136D451	MF136D452	MF136D453
	5	455	MF136D541	MF136D542	MF136D543	530	MF136D551	MF136D552	MF136D553
	6	509	MF136D641	MF136D642	MF136D643	584	MF136D651	MF136D652	MF136D653
	7	563	MF136D741	MF136D742	MF136D743	638	MF136D751	MF136D752	MF136D753

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil
Delta diagram 30kV 30-63A 3-7 positions (*) Setting 2.5 % per position



	30 A	63 A
J	3,1	5,1
K	5	7

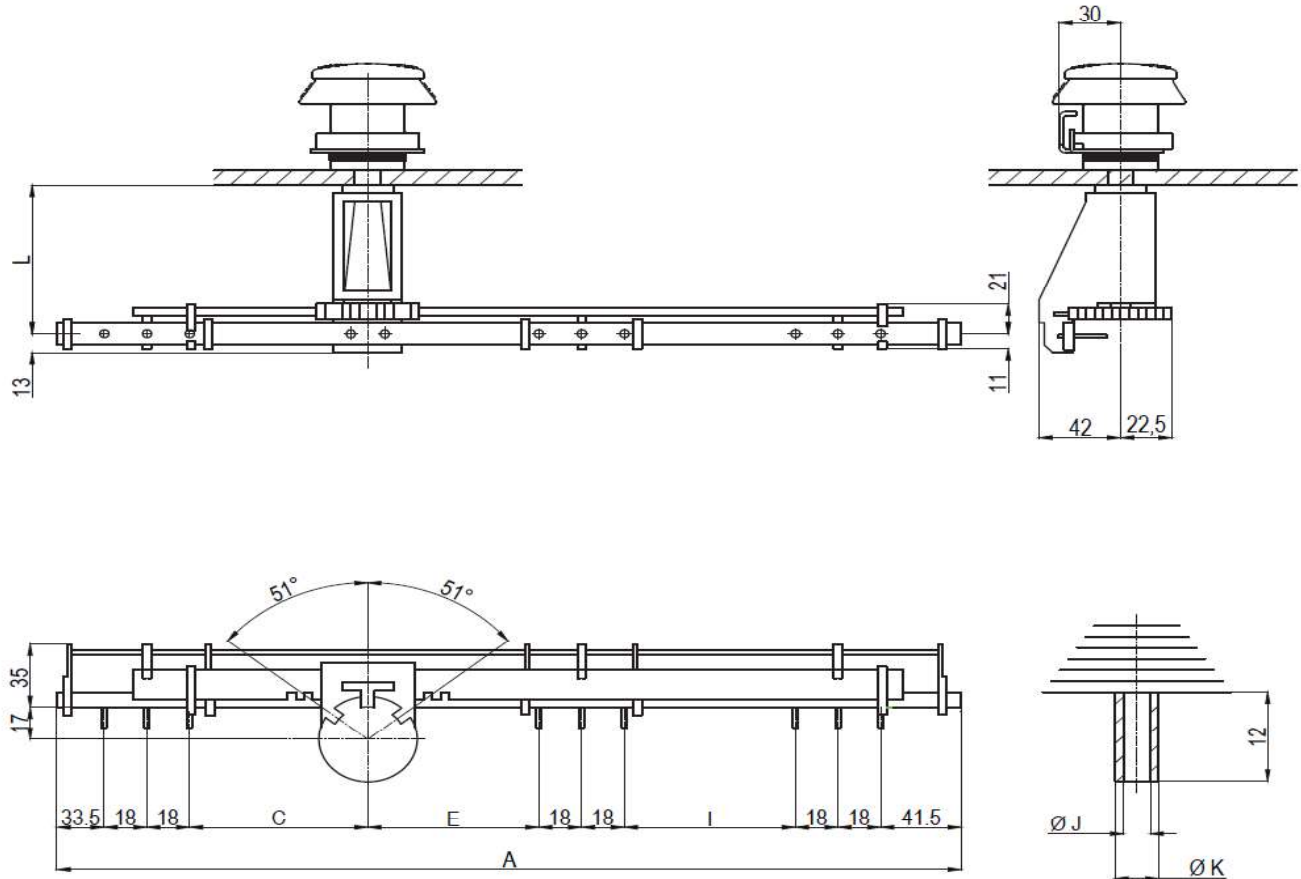
L	Number of Positions	30kV		
		A	30 A Unit No.	63 A Unit No.
100	3	449	ME136D352A	ME136D353A
	4	512	ME136D452A	ME136D453A
	5	575	ME136D552A	ME136D553A
	6	638	ME136D652A	ME136D653A
	7	701	ME136D752A	ME136D753A
130	3	449	MF136D352A	MF136D353A
	4	512	MF136D452A	MF136D453A
	5	575	MF136D552A	MF136D553A
	6	638	MF136D652A	MF136D653A
	7	701	MF136D752A	MF136D753A

(*) Special type with 21 distance between contacts for 30 kV.



TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil
Star diagram 20-30kV 10-63A 3-7 positions Setting 2.5 % per position



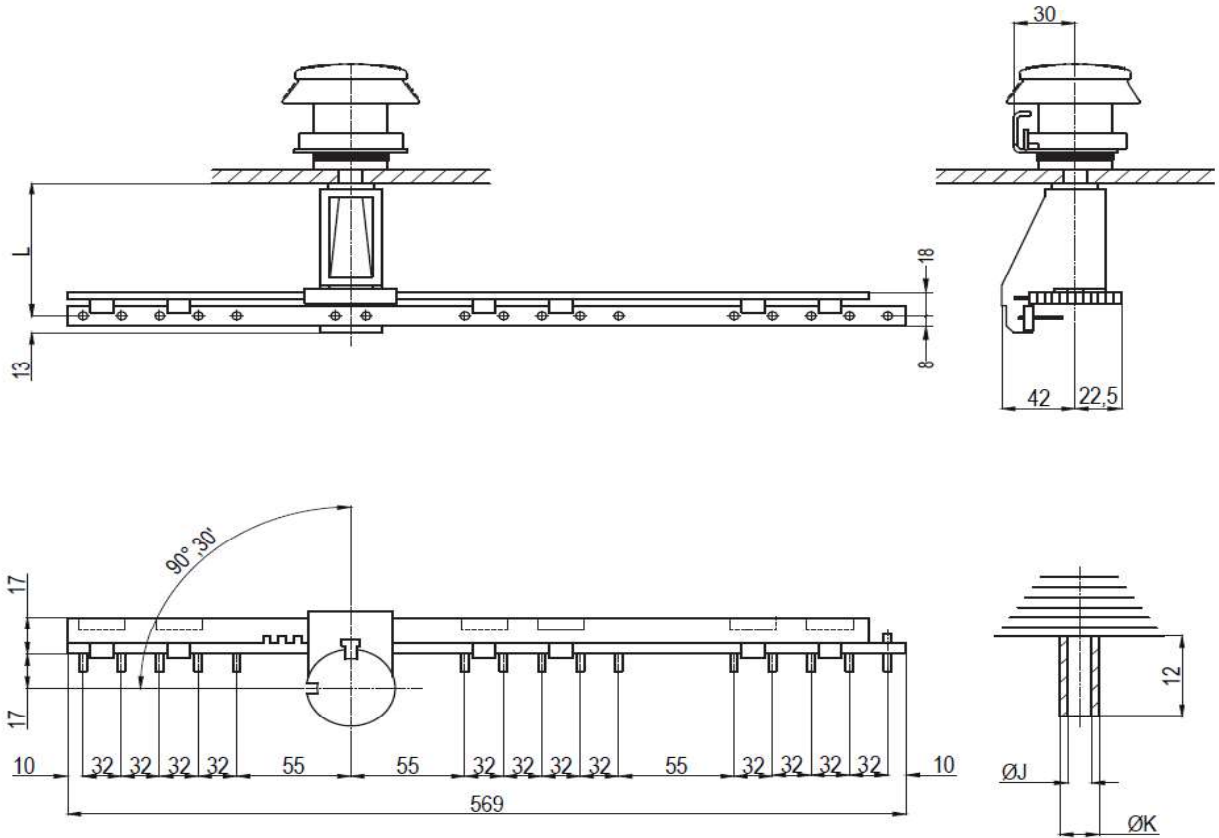
	10 A	30 A	63 A
J	2,1	3,1	5,1
K	4	5	7

	20kV	30kV
C	55	91
E	55	91
I	55	91

L	Number of Positions	20kV				30kV			
		A	10 A Unit No.	30 A Unit No.	63 A Unit No.	A	10 A Unit No.	30 A Unit No.	63 A Unit No.
70	3	347	MD136S341	MD136S342	MD136S343	455	MD136S351	MD136S352	MD136S353
	5	456	MD136S541	MD136S542	MD136S543	564	MD136S551	MD136S552	MD136S553
	7	564	MD136S741	MD136S742	MD136S743	672	MD136S751	MD136S752	MD136S753
100	3	347	ME136S341	ME136S342	ME136S343	455	ME136S351	ME136S352	ME136S353
	5	456	ME136S541	ME136S542	ME136S543	564	ME136S551	ME136S552	ME136S553
	7	564	ME136S741	ME136S742	ME136S743	672	ME136S751	ME136S752	ME136S753
130	3	347	MF136S341	MF136S342	MF136S343	455	MF136S351	MF136S352	MF136S353
	5	456	MF136S541	MF136S542	MF136S543	564	MF136S551	MF136S552	MF136S553
	7	564	MF136S741	MF136S742	MF136S743	672	MF136S751	MF136S752	MF136S753

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil
Series parallel coupling 15-20kV 30-63A

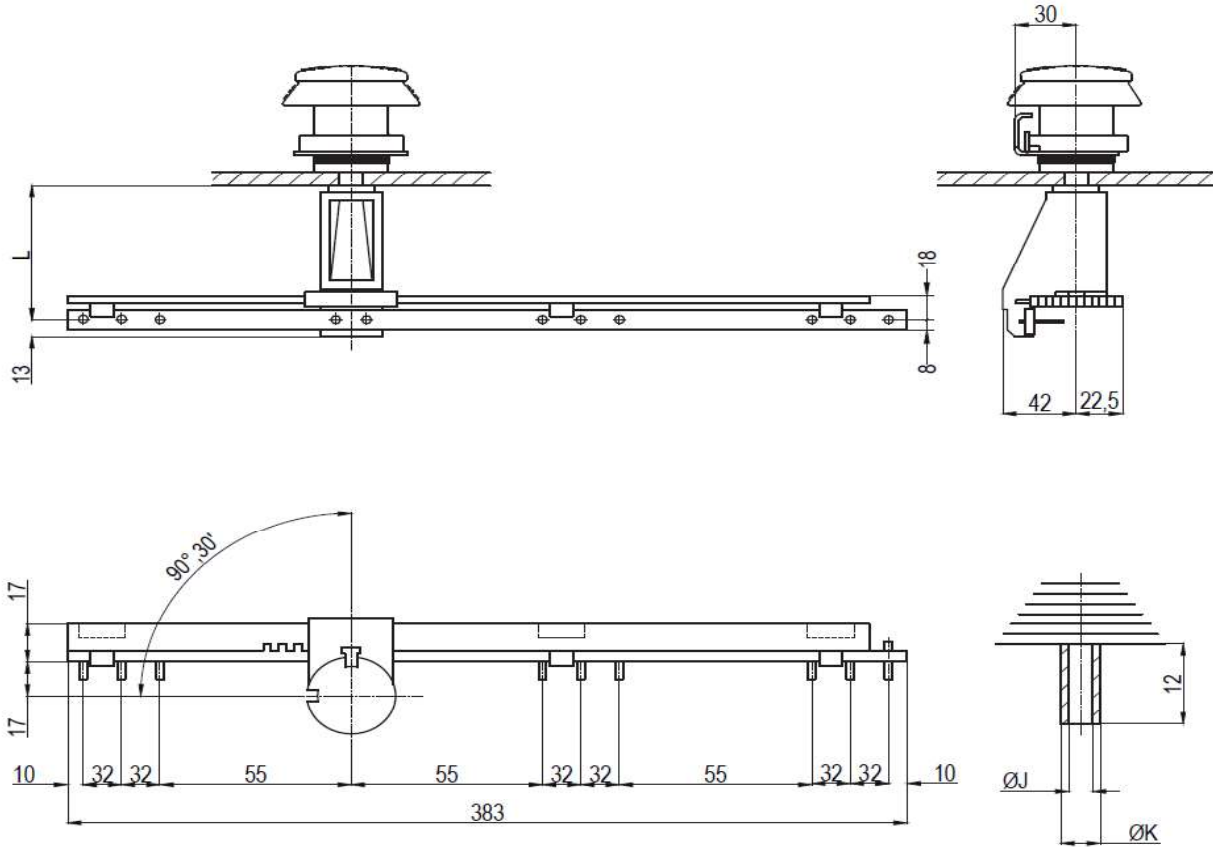


	30 A	63 A
J	3,1	5,1
K	5	7

L	Number of Positions	30 A	63 A
		Unit No.	Unit No.
50	2	MC136P272	MC136P273
70	2	MD136P272	MD136P273
100	2	ME136P272	ME136P273
130	2	MF136P272	MF136P273

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil
Star - Delta coupling 15-20kV 30-63A

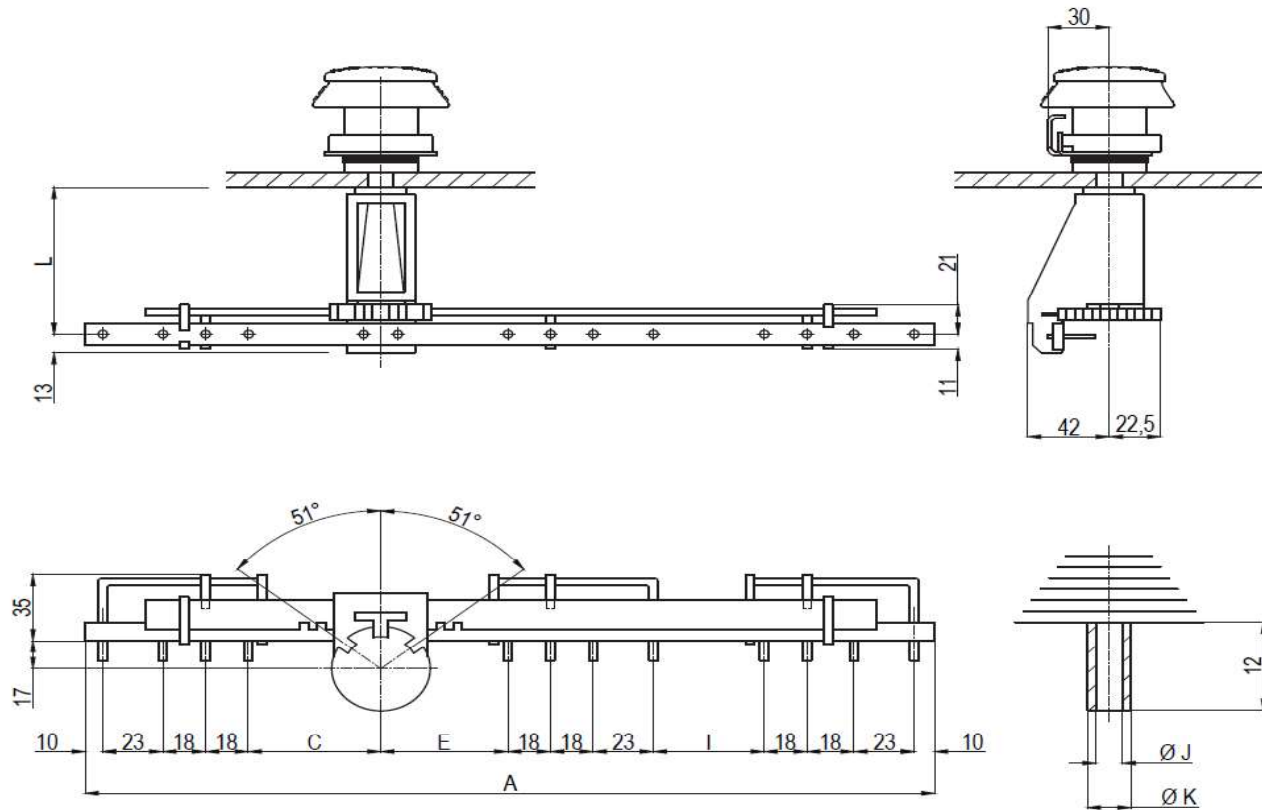


	30 A	63 A
J	3,1	5,1
K	5	7

L	Number of Positions	30 A	63 A
		Unit No.	Unit No.
50	2	MC136R272	MC136R273
70	2	MD136R272	MD136R273
100	2	ME136R272	ME136R273
130	2	MF136R272	MF136R273

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil or askarel Common output per phase
20-30kV 10-63A 3-7 positions. Setting 2.5 % per position



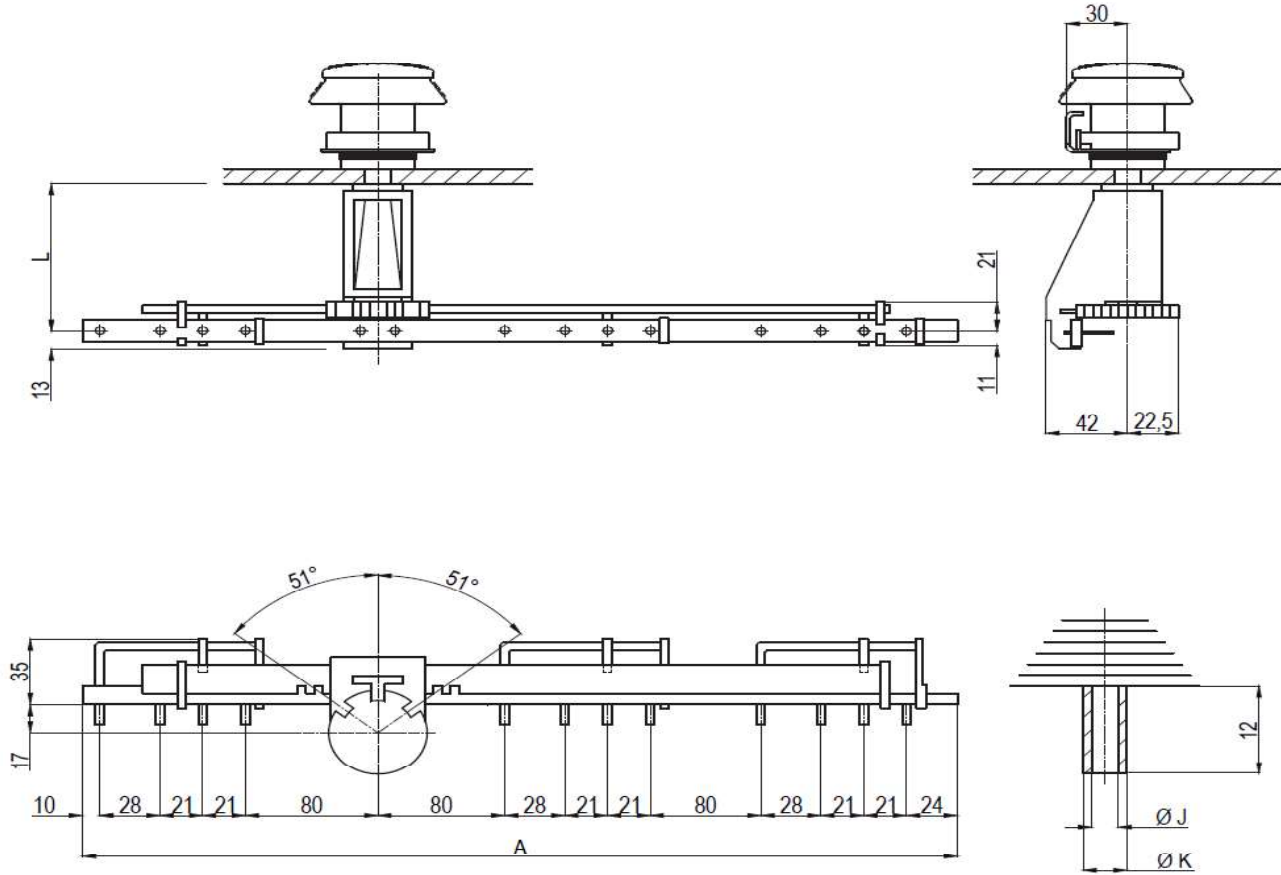
	10 A	30 A	63 A
J	2.1	3.1	5.1
K	4	5	7

	20kV	30kV
C	65	90
E	65	90
I	65	90

L	Number of Positions	20kV				30kV			
		A	10 A Unit No.	30 A Unit No.	63 A Unit No.	A	10 A Unit No.	30 A Unit No.	63 A Unit No.
50	3	392	MC136C341	MC136C342	MC136C343	467	-	-	-
	5	500	MC136C541	MC136C542	MC136C543	575	-	-	-
	7	608	MC136C741	MC136C742	MC136C743	683	-	-	-
70	3	392	MD136C341	MD136C342	MD136C343	467	MD136C351	MD136C352	MD136C353
	5	500	MD136C541	MD136C542	MD136C543	575	MD136C551	MD136C552	MD136C553
	7	608	MD136C741	MD136C742	MD136C743	683	MD136C751	MD136C752	MD136C753
100	3	392	ME136C341	ME136C342	ME136C343	467	ME136C351	ME136C352	ME136C353
	5	500	ME136C541	ME136C542	ME136C543	575	ME136C551	ME136C552	ME136C553
	7	608	ME136C741	ME136C742	ME136C743	683	ME136C751	ME136C752	ME136C753
130	3	392	MF136C341	MF136C342	MF136C343	467	MF136C351	MF136C352	MF136C353
	5	500	MF136C541	MF136C542	MF136C543	575	MF136C551	MF136C552	MF136C553
	7	608	MF136C741	MF136C742	MF136C743	683	MF136C751	MF136C752	MF136C753

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil or askarel Common output per phase
30kV 10-63A 3-7 positions. Setting 2.5 % per position

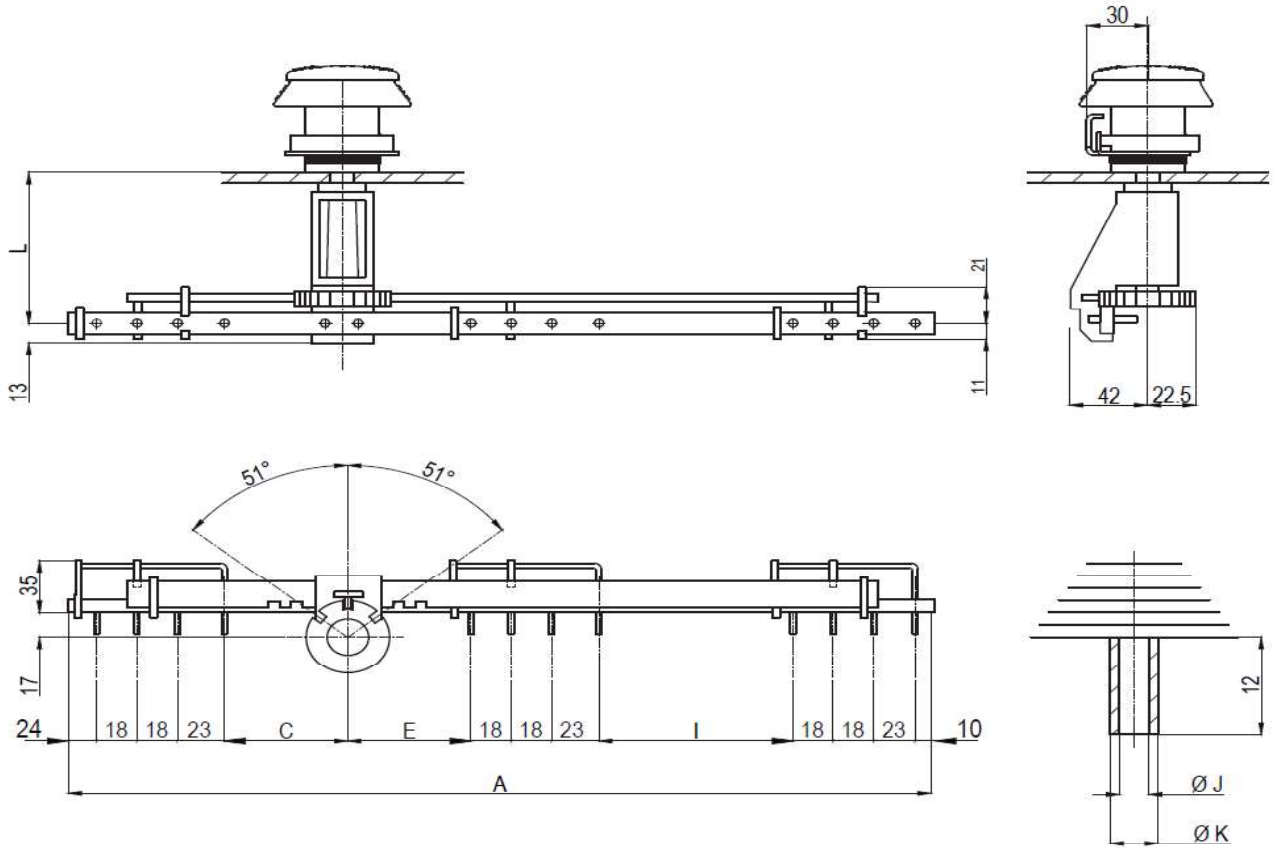


	10 A	30 A	63 A
J	2,1	3,1	5,1
K	4	5	7

L	Number of Positions	30KV			
		A	10 A Unit No.	30 A Unit No.	63 A Unit No.
100	3	484	ME136C351A	ME136C352A	ME136C353A
	5	610	ME136C551A	ME136C552A	ME136C553A
	7	736	ME136C751A	ME136C752A	ME136C753A
130	3	484	MF136C351A	MF136C352A	MF136C353A
	5	610	MF136C551A	MF136C552A	MF136C553A
	7	736	MF136C751A	MF136C752A	MF136C753A

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil or askarel Common output per phase
20-30kV 10-63A 3-7 positions. Setting 2.5 % per position



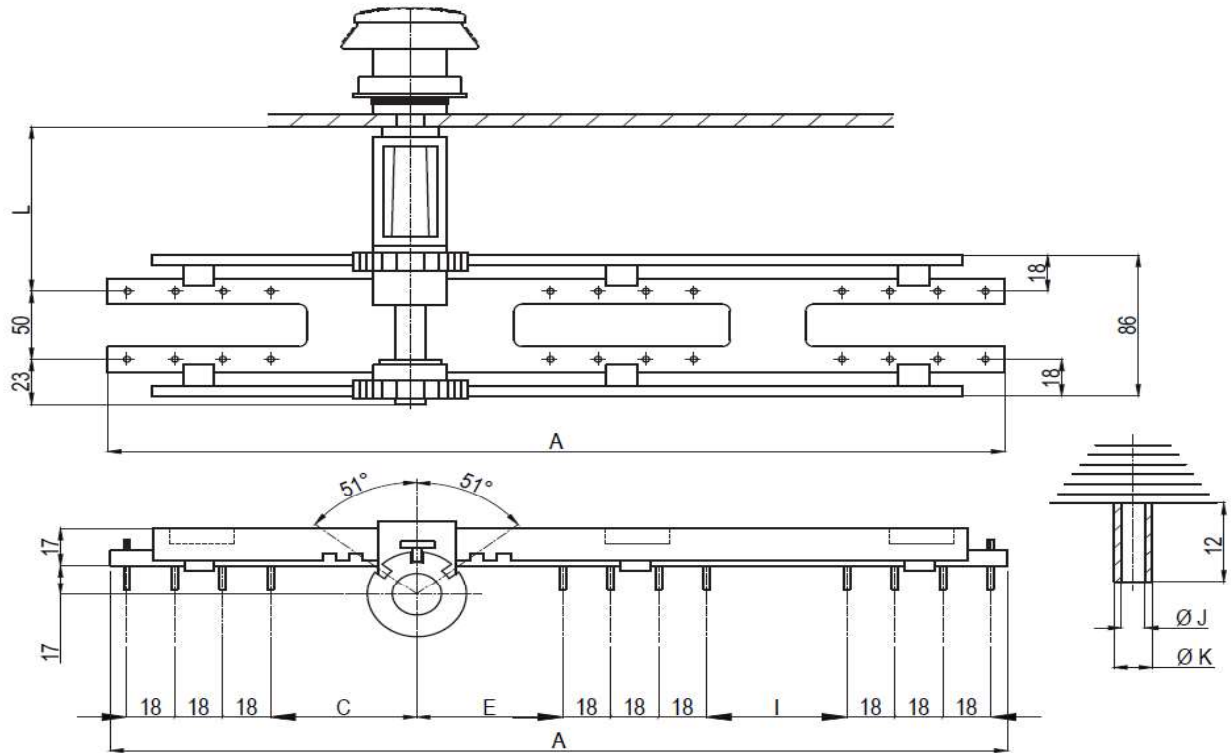
	10 A	30 A	63 A
J	2,1	3,1	5,1
K	4	5	7

	20kV	30kV
C	71	90
E	71	90
I	142	142

L	Number of Positions	20kV				30kV			
		A	10 A Unit No.	30 A Unit No.	63 A Unit No.	A	10 A Unit No.	30 A Unit No.	63 A Unit No.
50	3	495	MC136C341B	MC136C342B	MC136C343B	533	-	-	-
	5	603	MC136C541B	MC136C542B	MC136C543B	641	-	-	-
	7	711	MC136C741B	MC136C742B	MC136C743B	749	-	-	-
70	3	495	MD136C341B	MD136C342B	MD136C343B	533	MD136C351B	MD136C352B	MD136C353B
	5	603	MD136C541B	MD136C542B	MD136C543B	641	MD136C551B	MD136C552B	MD136C553B
	7	711	MD136C741B	MD136C742B	MD136C743B	749	MD136C751B	MD136C752B	MD136C753B
100	3	495	ME136C341B	ME136C342B	ME136C343B	533	ME136C351B	ME136C352B	ME136C353B
	5	603	ME136C541B	ME136C542B	ME136C543B	641	ME136C551B	ME136C552B	ME136C553B
	7	711	ME136C741B	ME136C742B	ME136C743B	749	ME136C751B	ME136C752B	ME136C753B
130	3	495	MF136C341B	MF136C342B	MF136C343B	533	MF136C351B	MF136C352B	MF136C353B
	5	603	MF136C541B	MF136C542B	MF136C543B	641	MF136C551B	MF136C552B	MF136C553B
	7	711	MF136C741B	MF136C742B	MF136C743B	749	MF136C751B	MF136C752B	MF136C753B

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil or askarel Two Stages - Delta diagram
20-30kV 10-63A 3-7 positions. Setting 2.5 % per position



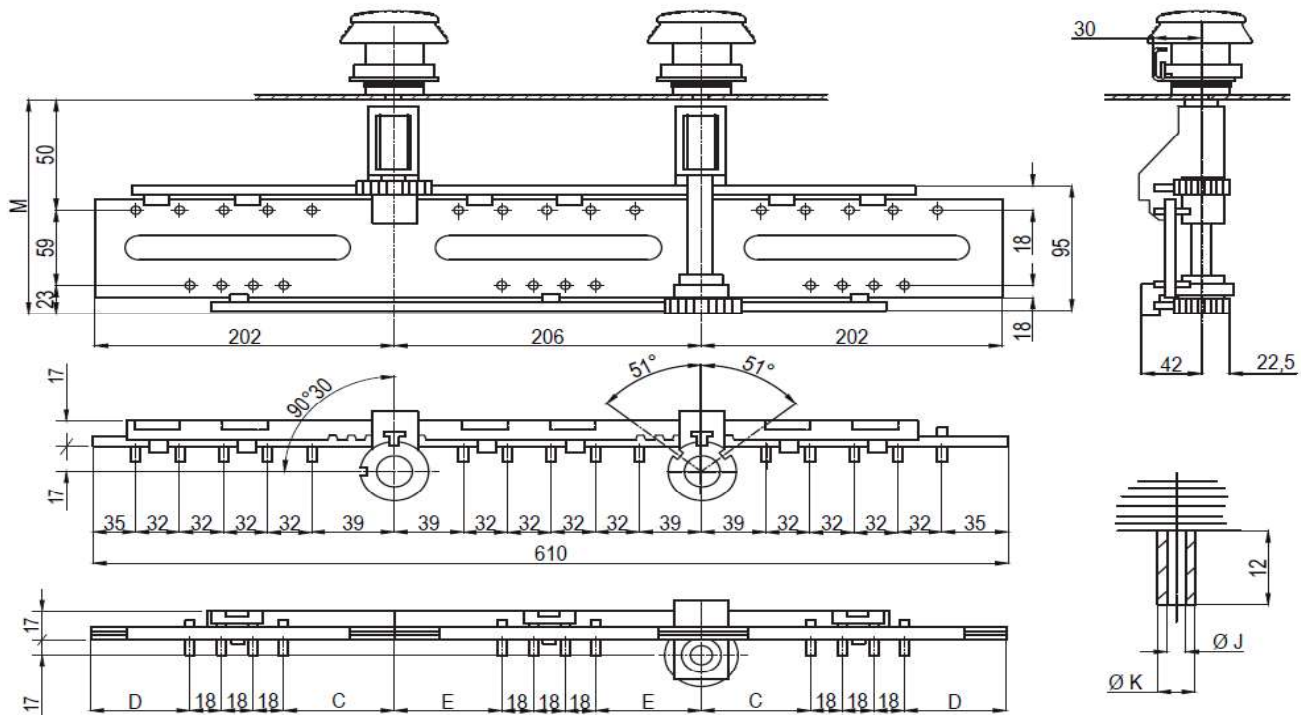
	10 A	30 A	63 A
J	2,1	3,1	5,1
K	4	5	7

	20kV	30kV
C	55	80
E	55	80
I	55	80

L	Number of Positions	20kV				30kV			
		A	10 A Unit No.	30 A Unit No.	63 A Unit No.	A	10 A Unit No.	30 A Unit No.	63 A Unit No.
50	3	358	MC146D341	MC146D342	MC146D343	-	-	-	-
	4	412	MC146D441	MC146D442	MC146D443	-	-	-	-
	5	466	MC146D541	MC146D542	MC146D543	-	-	-	-
	6	520	MC146D641	MC146D642	MC146D643	-	-	-	-
	7	574	MC146D741	MC146D742	MC146D743	-	-	-	-
70	3	358	MD146D341	MD146D342	MD146D343	433	MD146D351	MD146D352	MD14653D3
	4	412	MD146D441	MD146D442	MD146D443	487	MD146D451	MD146D452	MD14653D4
	5	466	MD146D541	MD146D542	MD146D543	541	MD146D551	MD146D552	MD14653D5
	6	520	MD146D641	MD146D642	MD146D643	595	MD146D651	MD146D652	MD14653D6
	7	574	MD146D741	MD146D742	MD146D743	649	MD146D751	MD146D752	MD14653D7
100	3	358	ME146D341	ME146D342	ME146D343	433	ME146D351	ME146D352	ME14653D3
	4	412	ME146D441	ME146D442	ME146D443	487	ME146D451	ME146D452	ME14653D4
	5	466	ME146D541	ME146D542	ME146D543	541	ME146D551	ME146D552	ME14653D5
	6	520	ME146D641	ME146D642	ME146D643	595	ME146D651	ME146D652	ME14653D6
	7	574	ME146D741	ME146D742	ME146D743	649	ME146D751	ME146D752	ME14653D7
130	3	358	MF146D341	MF146D342	MF146D343	433	MF146D351	MF146D352	MF14653D3
	4	412	MF146D441	MF146D442	MF146D443	487	MF146D451	MF146D452	MF14653D4
	5	466	MF146D541	MF146D542	MF146D543	541	MF146D551	MF146D552	MF14653D5
	6	520	MF146D641	MF146D642	MF146D643	595	MF146D651	MF146D652	MF14653D6
	7	574	MF146D741	MF146D742	MF146D743	649	MF146D751	MF146D752	MF14653D7

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil 1. Stage series parallel coupling 15-20kV30-63kV 30-63A
 1. Stage delta diagram 20kV 30-63A 3-7 positions. Setting 2.5 % per position



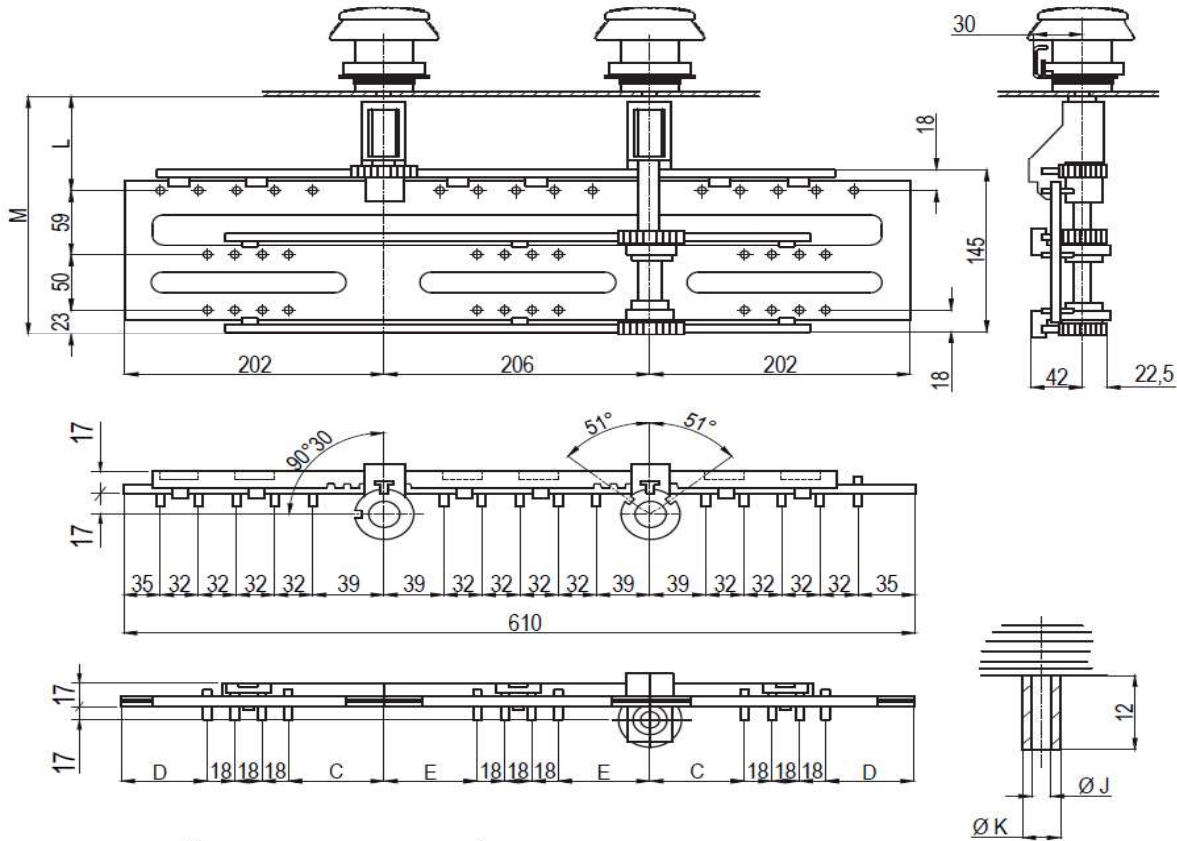
	10 A	30 A	63 A
J	2,1	3,1	5,1
K	4	5	7

L	Number of Positions	20kV			
		M	10 A Unit No.	30 A Unit No.	63 A Unit No.
50	3	132	MC146H371	MC146H372	MC146H373
	4		MC146H471	MC146H472	MC146H473
	5		MC146H571	MC146H572	MC146H573
	6		MC146H671	MC146H672	MC146H673
	7		MC146H771	MC146H772	MC146H773
70	3	152	MD146H371	MD146H372	MD146H373
	4		MD146H471	MD146H472	MD146H473
	5		MD146H571	MD146H572	MD146H573
	6		MD146H671	MD146H672	MD146H673
	7		MD146H771	MD146H772	MD146H773
100	3	182	ME146H371	ME146H372	ME146H373
	4		ME146H471	ME146H472	ME146H473
	5		ME146H571	ME146H572	ME146H573
	6		ME146H671	ME146H672	ME146H673
	7		ME146H771	ME146H772	ME146H773
130	3	212	MF146H371	MF146H372	MF146H373
	4		MF146H471	MF146H472	MF146H473
	5		MF146H571	MF146H572	MF146H573
	6		MF146H671	MF146H672	MF146H673
	7		MF146H771	MF146H772	MF146H773

Number of Positions	C	D	E
3	73	75	76
5	55	57	58
7	37	39	40

TYPE MHR THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil 1. Stage series parallel coupling 15-20kV 30-63A
 2. Stage delta diagram 20-30kV 30-63A 3-7 positions. Setting 2.5 % per position



	10 A	30 A	63 A
J	2,1	3,1	5,1
K	4	5	7

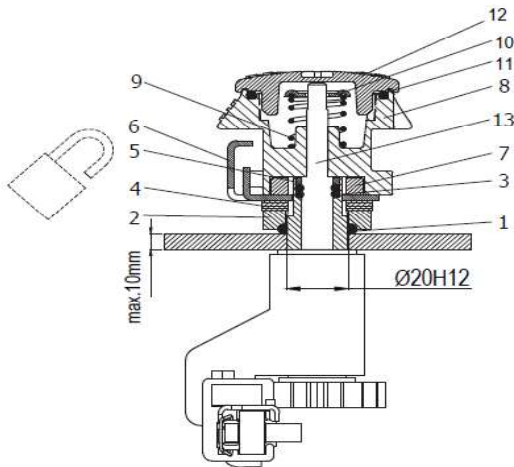
L	Number of Positions	M	20kV		
			10 A Unit No.	30 A Unit No.	63 A Unit No.
50	3	182	MC156K371	MC156K372	MC156K373
	4		MC156K471	MC156K472	MC156K473
	5		MC156K571	MC156K572	MC156K573
	6		MC156K671	MC156K672	MC156K673
	7		MC156K771	MC156K772	MC156K773
70	3	202	MD156K371	MD156K372	MD156K373
	4		MD156K471	MD156K472	MD156K473
	5		MD156K571	MD156K572	MD156K573
	6		MD156K671	MD156K672	MD156K673
	7		MD156K771	MD156K772	MD156K773
100	3	232	ME156K371	ME156K372	ME156K373
	4		ME156K471	ME156K472	ME156K473
	5		ME156K571	ME156K572	ME156K573
	6		ME156K671	ME156K672	ME156K673
	7		ME156K771	ME156K772	ME156K773
130	3	262	MF156K371	MF156K372	MF156K373
	4		MF156K471	MF156K472	MF156K473
	5		MF156K571	MF156K572	MF156K573
	6		MF156K671	MF156K672	MF156K673
	7		MF156K771	MF156K772	MF156K773

Number of Positions	C	D	E
3	73	75	76
5	55	57	58
7	37	39	40

TYPE MHR THREEPHASE TAP CHANGER

Control devices

Assembly according to the order given below as numbers

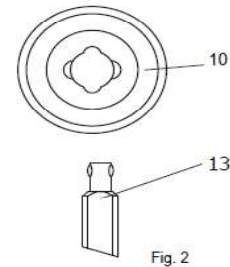


Assembly Order:

- 1- O-ring 18.54x3.53
- 2- O-ring Sleeve
- 3- O-ring 9.13x2.62
- 4- WASHER 13.9x10.2x3.5
- 5- Positions Stopper
- 7- Fixing Nut
- 8- Control Device Body (Nylon-6)
- 9- Spring
- 10- Control Device Lid
- 11- O-ring
- 12- Control Device Cover
- 13- Shaft

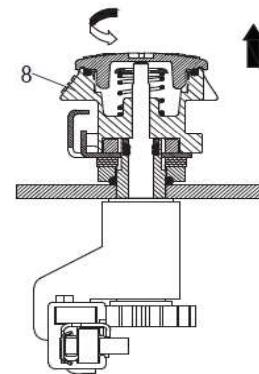
Notes:

For the assembly of the tap changer, the thickness of the transformer cover sheet is assumed to be 10mm. If the sheet thickness is lower than 10mm then use the additional spacer washer (4) so that the resulting thickness is to be 10mm. For example, if the cover sheet thickness is 6mm then 4 washers are to be used, for the 10mm thick cover sheet no washer is needed.



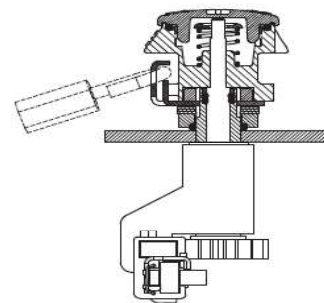
Lid Assembly

The notched end of the shaft (13) is to be fitted into the slot inside the lid. Press the lid onto the shaft, turn it 90° and release. The lid will be locked automatically. To dismantle the lid, apply the assembly operation in reverse order.



Position Changing Mode

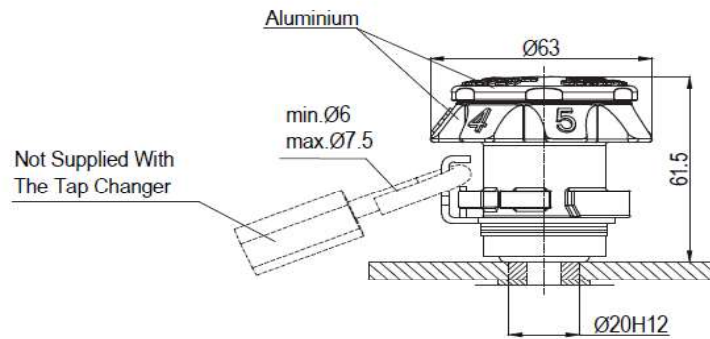
In order to change the position of the tap changer, pull the control device body (8) along the direction of the arrow, turn it to the desired position notch and release. The spring system will automatically lock the position via position stopper and position notch on the body.



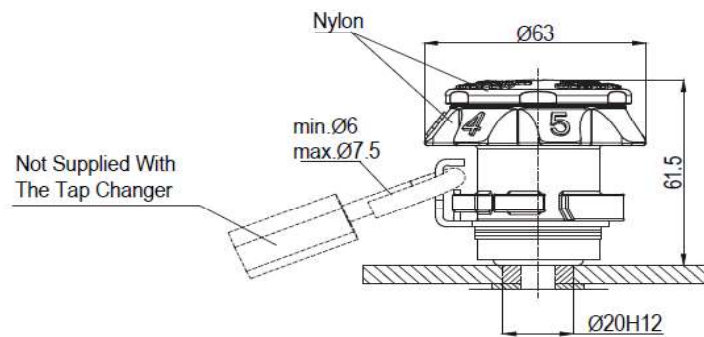
Normal Rest Mode

TYPE MHR THREEPHASE TAP CHANGER

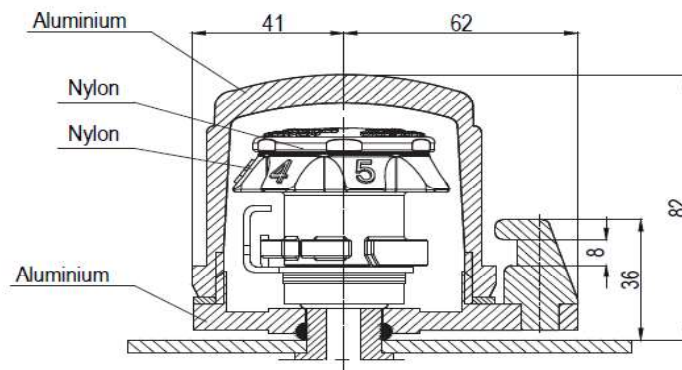
Control devices



Code No: MH338



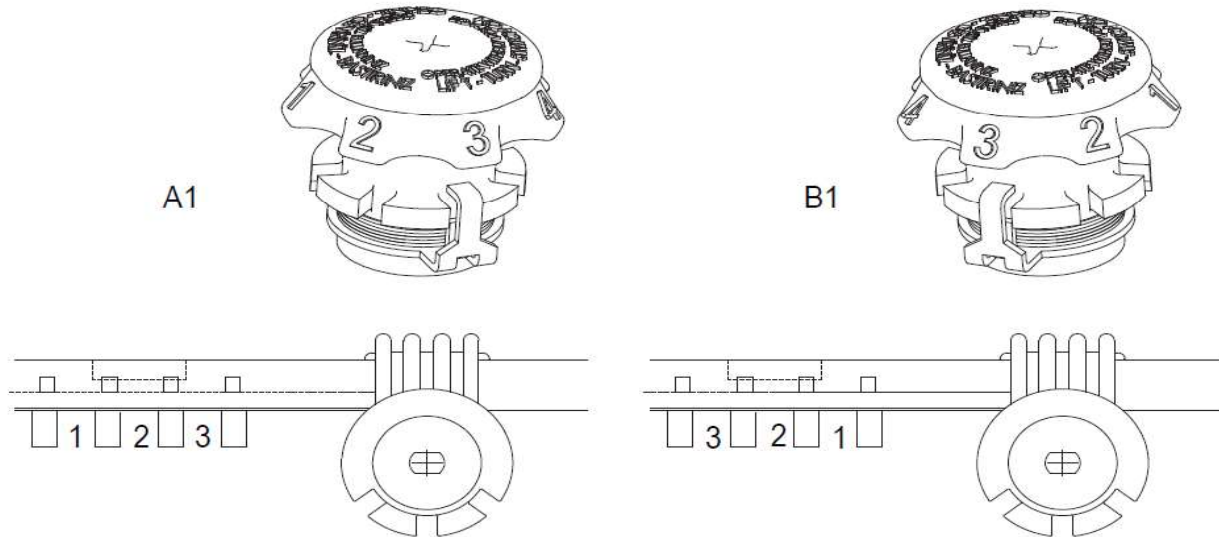
Code No: MH339



Code No: MH336P
With Protective Cover
Standart Type

TYPE MHR THREEPHASE TAP CHANGER

Numbering of the positions



WHEN ORDERING PLEASE QUOTE:

- 1 - Tap changer unit no.
- 2 - The voltage class current and type of setting or coupling.
- 3 - Control device no
- 4 - The language on the control device.
- 5 - Number of positions.
- 6 - The indication of the repeater disc (A1, B1)
- 7 - Dimensions of the fixed contacts (J and K)
- 8 - L, e, X, W dimensions from the tables.

For special setups not shown in the catalogue please consult us.