



metsonpower Electrical Supply

TRANSFORMER ACCESSORIES

TAP CHANGERS TYPE MHF II



GENERAL SPECIFICATION

These tap changers are available in one two or three phase applications. Multi layer types are also available.

The shaft length is variable.

Connection diagrams in page MHFII 2 can be applied in any variation to all types.

These tap changers are bolted on to the supports, welded under transformer cover and allow strong construction.

ASSEMBLY

A notch is provided to mark each position. For operation, the notch must be released by applying an axial pull on the control knob. Once the knob is in the desired position it will drop into the respective space by the help of a high tension spring. This process is clearly marked on control knob as;

" LIFT - TURN - 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.

Aluminum Parts : GAISI12Cu

BrassParts : Cu 7N40Pb2 Ms 60 F34 DIN 17 673

Copper Parts : E - Cu F25 DIN 40 500

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

Up to 400A.

See page MHFII 24 for the types and dimensions of the contacts.

VOLTAGE CLASS

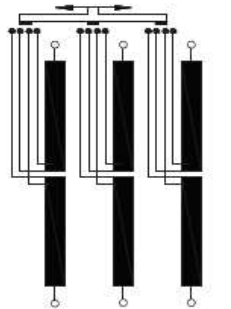
VOLTAGE CLASS	B. I. L.
20 kV	125 kV
30 kV	170 kV
60 kV	325 kV

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

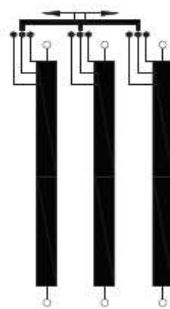


TYPE MHFII THREEPHASE TAP CHANGER

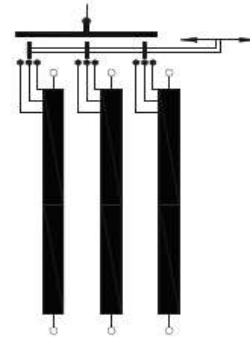
Usual Diagram



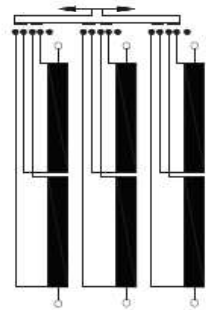
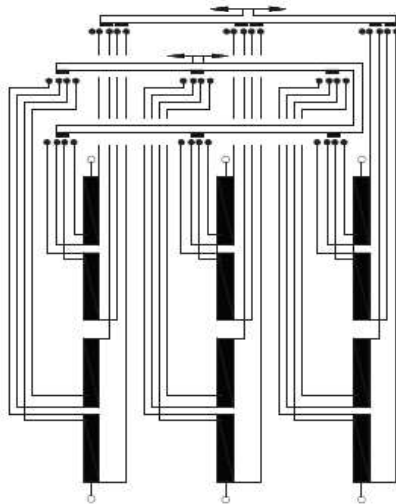
setting for delta transformer



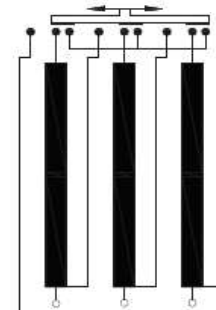
setting for star transformer



setting for star with outer - earthed conductor transformer

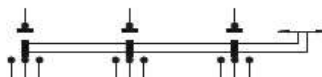


series - parallel coupling

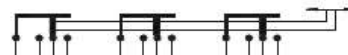


star - delta coupling

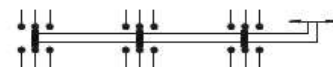
Typical combination :
-1 stage, series - parallel coupling
- 2 stages, delta diagram - setting $\pm 2,5\%$.



common output per phase



common output per phase



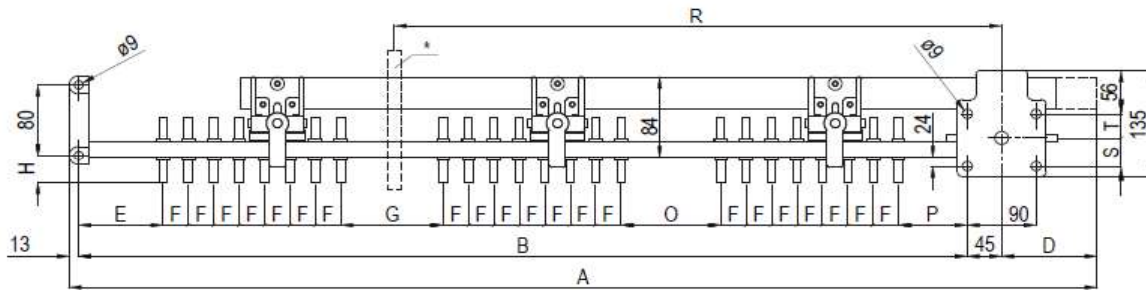
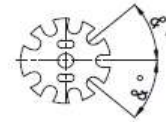
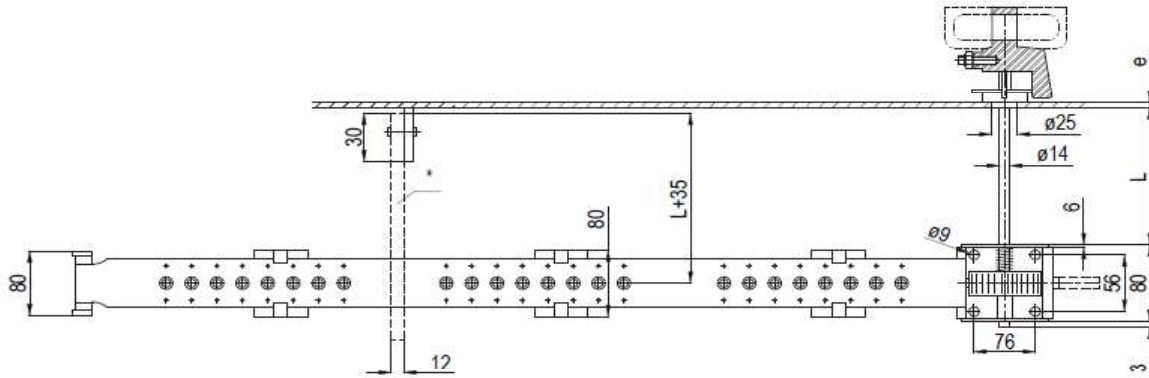
opposite contacts



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Delta diagram 20-60kV

150-400A 7-9 positions Setting 2.5 % per position (With Aluminium Support)



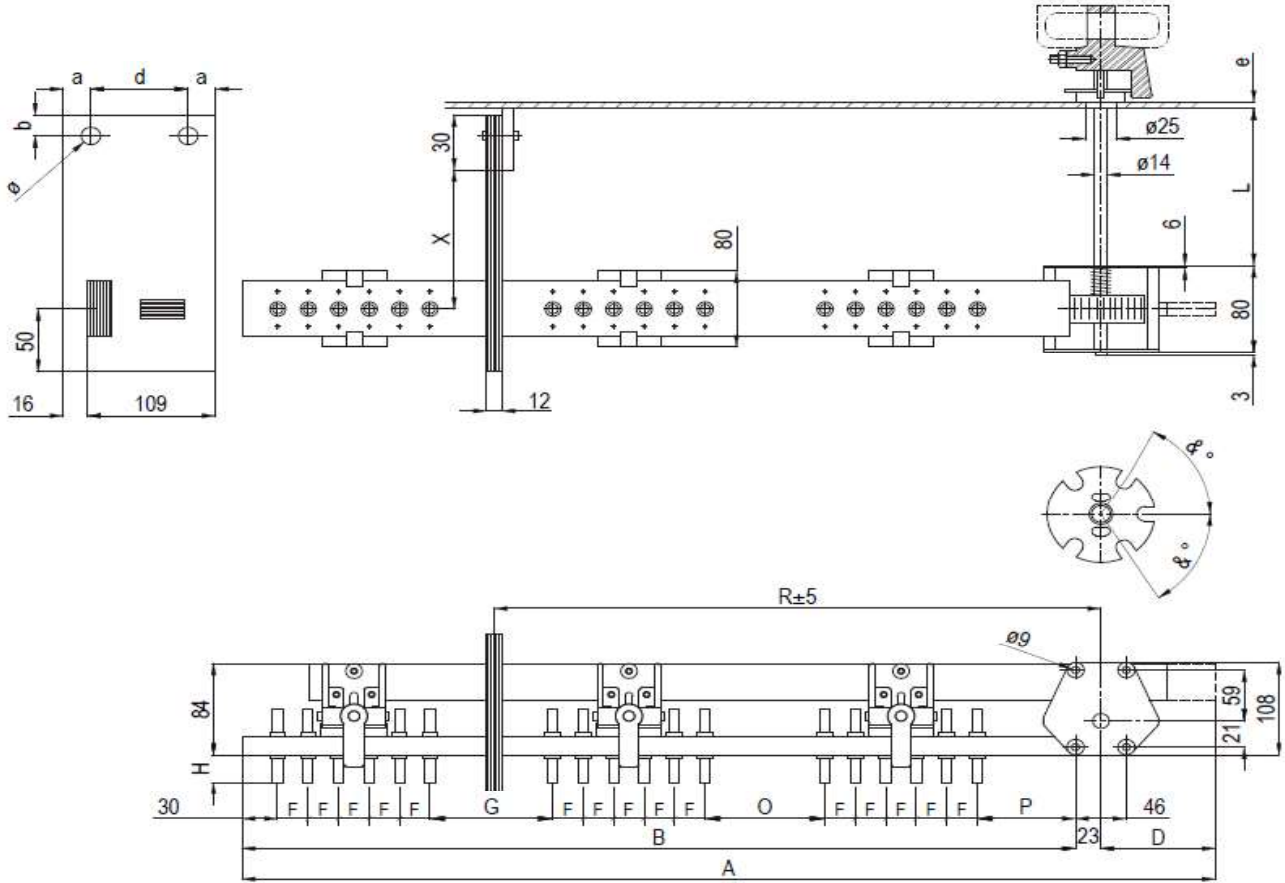
Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	R	S	T	& °	L	e	Unit No
20	7	1263	983	222	76	32	70	Depending on fixed contacts	70	95	693	29	35	38°	Please quote when ordering		M431D746
	8	1391	1079	254	76	32	70		70	95	757	29	35	38°			M431D846
	9	1519	1175	286	76	32	70		70	95	821	29	35	38°			M431D946
30	7	1383	1103	222	106	32	100		100	125	768	29	35	38°			M431D756
	8	1511	1199	254	106	32	100		100	125	832	29	35	38°			M431D856
	9	1639	1295	286	106	32	100		100	125	896	29	35	38°			M431D956
60	6*	2150	1847	245	267	43	260		260	286	1237	29	35	51°			M431D666
	7*	2322	1976	288	267	43	260		260	286	1323	29	35	51°			M431D766

* Additional supporting plate is used



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Delta diagram 20-60kV
150-400A 2-7 positions Setting 2.5 % per position (With HP Support)

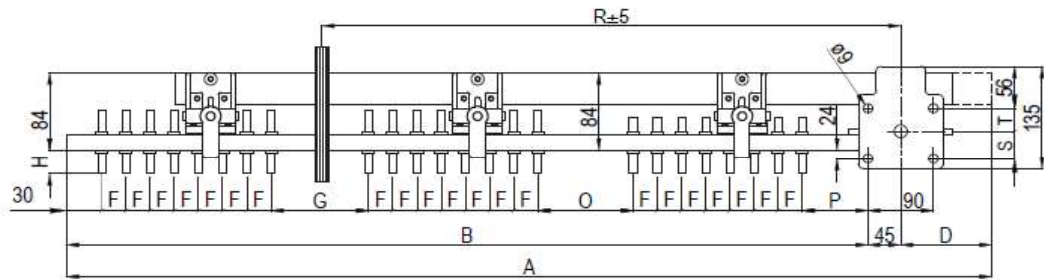
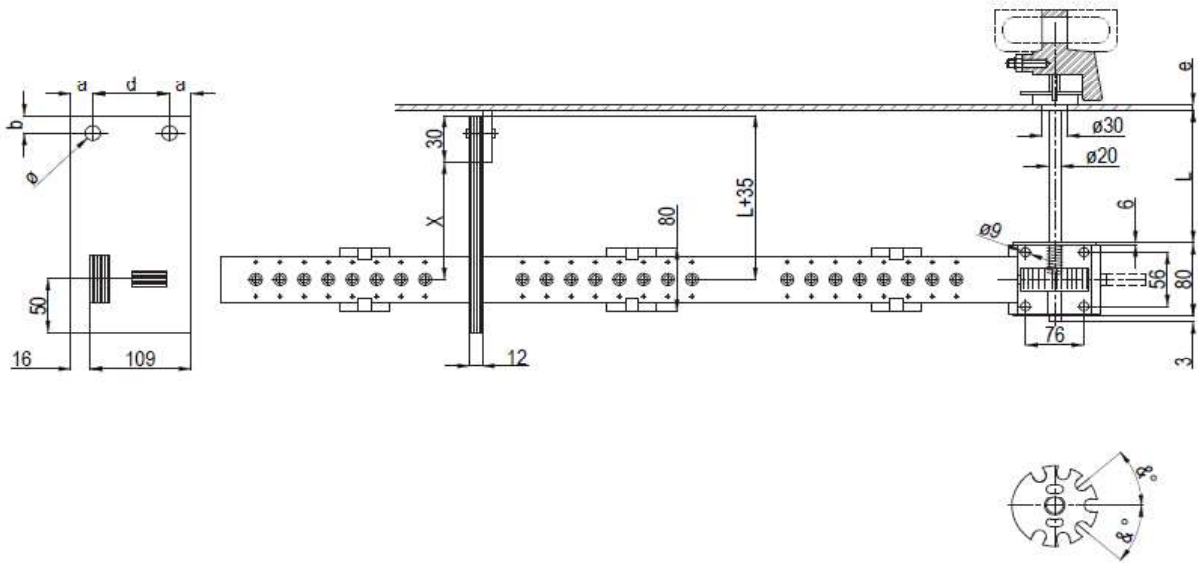


Voltage class kV	Number of Positions	A	B	D	F	G	H	O	P	R	X min.	8°	L	e	Unit No
20	2	542	457	62	32	70	Depending on fixed contacts	70	95	351	70	63°	Please quote when ordering		M433D246
	3	670	553	94	32	70		70	95	415	70	63°			M433D346
	4	798	649	126	32	70		70	95	479	70	63°			M433D446
	5	926	745	158	32	70		70	95	543	70	63°			M433D546
	6	1054	841	190	32	70		70	95	607	70	63°			M433D646
	30	2	632	547	62	32		100	100	125	426	130			63°
3		760	643	94	32	100	100	125	490	130	63°	M433D356			
4		888	739	126	32	100	100	125	554	130	63°	M433D456			
5		1016	835	158	32	100	100	125	618	130	63°	M433D556			
6		1144	931	190	32	100	100	125	682	130	63°	M433D656			
60		2	1190	1094	73	43	260	260	286	871	250	84°	M433D266		
	3	1362	1223	116	43	260	260	286	957	250	84°	M433D366			
	4	1534	1352	159	43	260	260	286	1043	250	84°	M433D466			
	5	1706	1481	202	43	260	260	286	1129	250	81°	M433D566			



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Delta diagram 20-30kV
 150-400A7-9 positions Setting 2.5 % per position (With HP Support)



Voltage class kV	Number of Positions	A	B	D	F	G	H	O	P	R	S	T	X min.	& °	L	e	Unit No
20	7	1204	937	222	32	70	Depending on fixed contacts	70	95	693	29	35	70	38°	Please quote when ordering		M433D746
	8	1332	1033	254	32	70		70	95	757	29	35	70	38°			M433D846
	9	1460	1129	286	32	70		70	95	821	29	35	70	38°			M433D946
30	7	1294	1027	222	32	100		100	125	768	29	35	130	38°			M433D756
	8	1422	1123	254	32	100		100	125	832	29	35	130	38°			M433D856
	9	1550	1219	286	32	100		100	125	896	29	35	130	38°			M433D956
60	6	1900	1610	245	43	260		260	286	1237	29	35	250	51°			M433D666
	7	2072	1739	288	43	260		260	286	1323	29	35	250	51°			M433D766

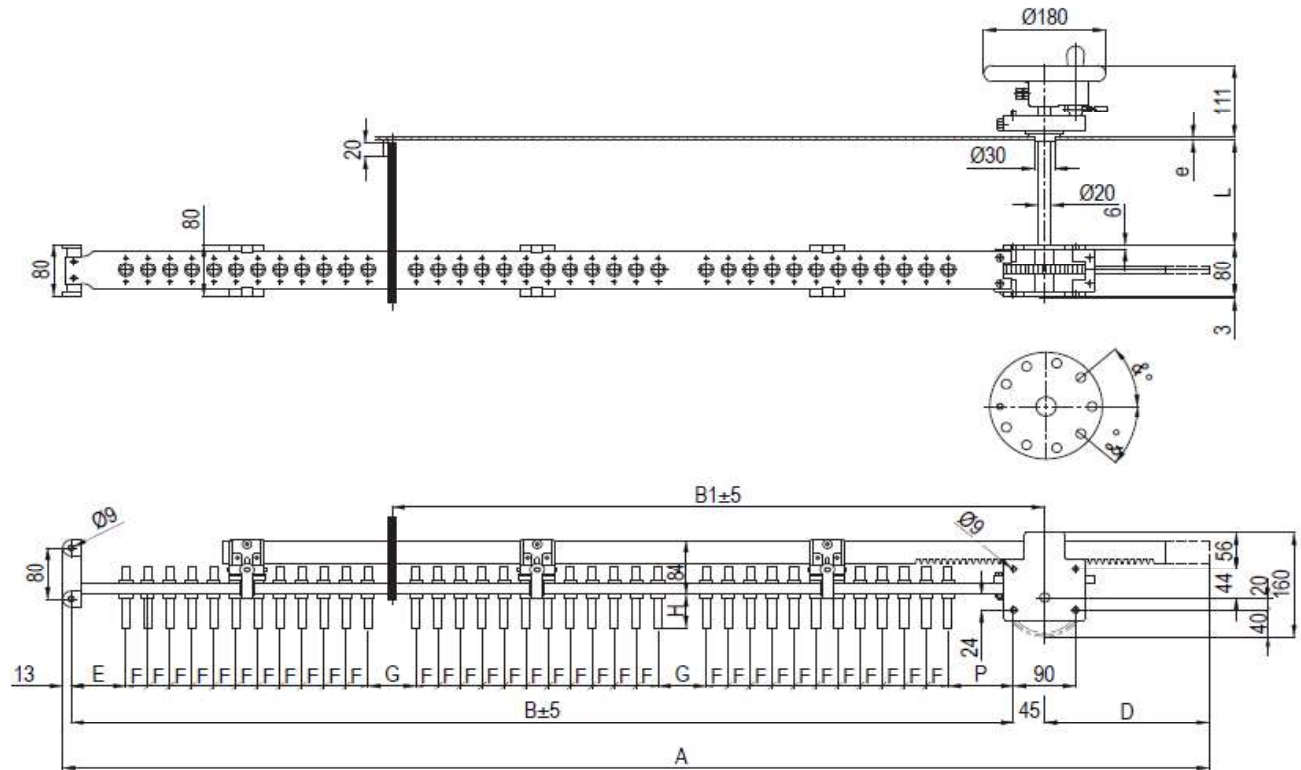
METSON POWER ELECTRICAL SUPPLY, **A:** Ser Tower Busidance, Yesilova Mahallesi, Ayas, ANKARA Yolu Blv. No: 115, 06796 Etimesgut/ ANKARA, Turkey. **M:** metsonpower_turkey@gmail.com



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Delta diagram 20-60kV

150-400A 10-11 positions Setting 2.5 % per position (With Aluminium HP Support)



Voltage class kV	Number of Positions	A	B	B1	D	F	E	H	G	P	S	T	&°	L	e	Unit No
20	10	1661	1271	885	332	32	76	Depending on fixed contacts	70	95	20	44	32°	Please quote when ordering		M431D1046
	11	1789	1367	949	364	32	76		70	95	20	44	32°			M431D1146
30	10	1781	1391	960	332	32	106		100	125	20	44	32°			M431D1056
	11	1909	1487	1024	364	32	106		100	125	20	44	32°			M431D1156



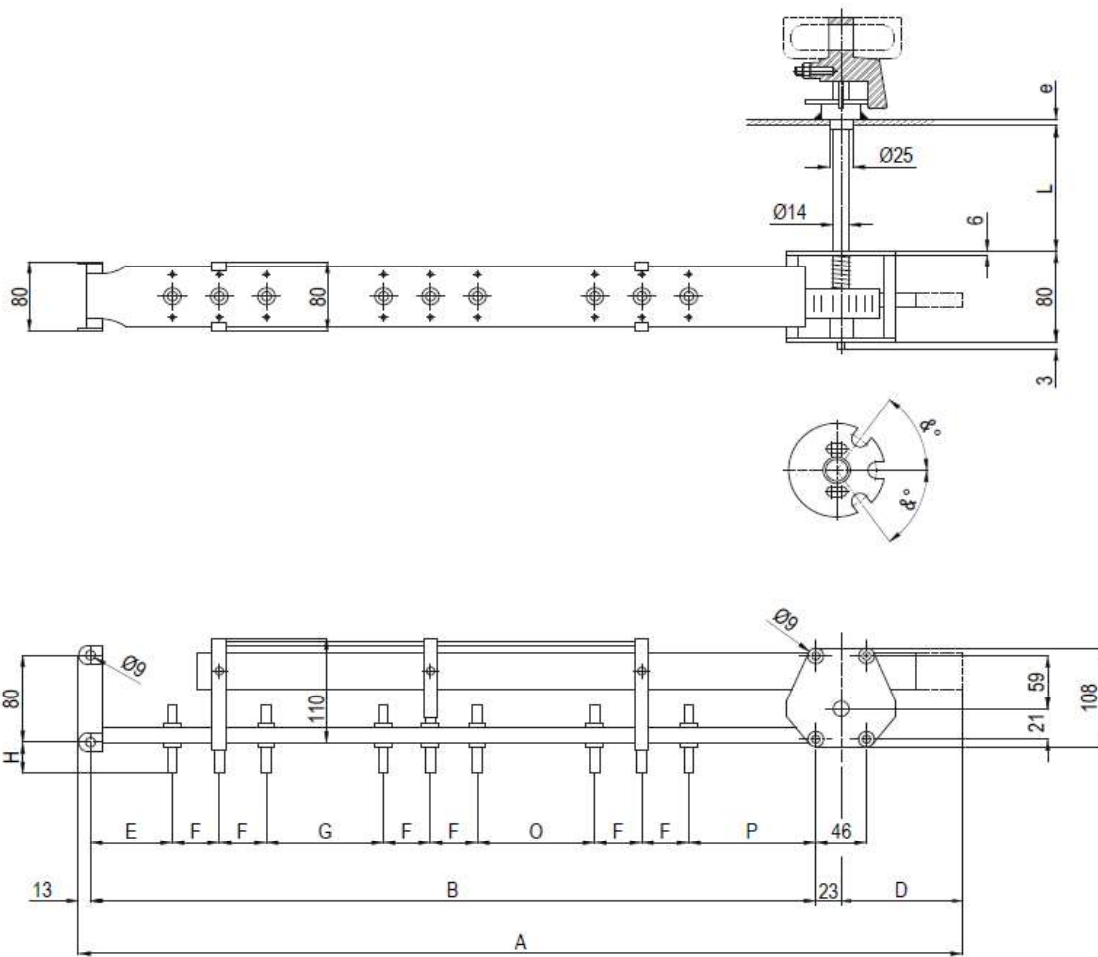
TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in o il Star diagram 20-60kv

150-400A 2-6 positions Setting 2.5 % per position (With Aluminium Support)



TRANSFORMER ACCESSORIES



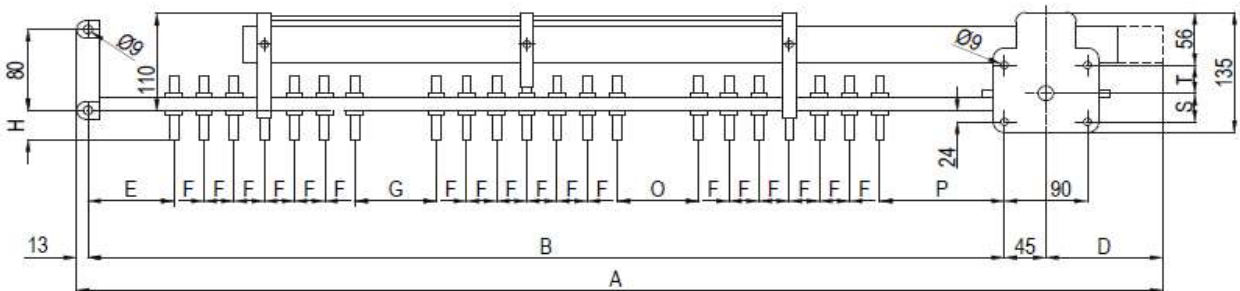
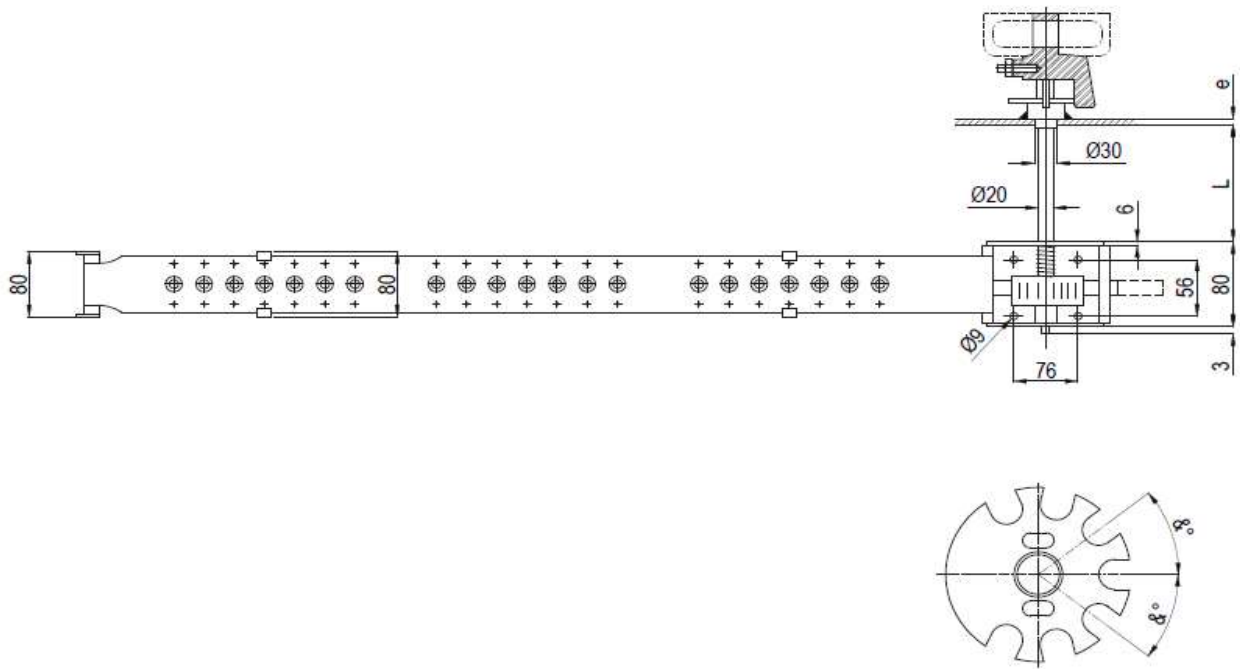
Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	& °	L	e	Unit No
20	2	429	331	62	76	32	32	Depending on fixed contacts	32	95	63°	Please quote when ordering		M431S246
	3	557	427	94	76	32	32		32	95	63°			M431S346
	4	685	523	126	76	32	32		32	95	63°			M431S446
	5	813	619	158	76	32	32		32	95	63°			M431S546
	6	941	715	190	76	32	32		32	95	63°			M431S646
	30	2	489	391	62	106	32		32	Depending on fixed contacts	32			125
3		617	487	94	106	32	32	32	125		63°	M431S356		
4		745	583	126	106	32	32	32	125		63°	M431S456		
5		873	679	158	106	32	32	32	125		63°	M431S556		
6		1001	775	190	106	32	32	32	125		63°	M431S656		
60		2	931	822	73	267	43	70	Depending on fixed contacts		70	286	84°	Please quote when ordering
	3	1103	951	116	267	43	70	70		286	84°	M431S366		
	4	1275	1080	159	267	43	70	70		286	84°	M431S466		
	5	1447	1209	202	267	43	70	70		286	81°	M431S566		



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Star diagram 20-60kV

150-400A 2-6 position SETting 2.5 % per position (With Aluminium Support)

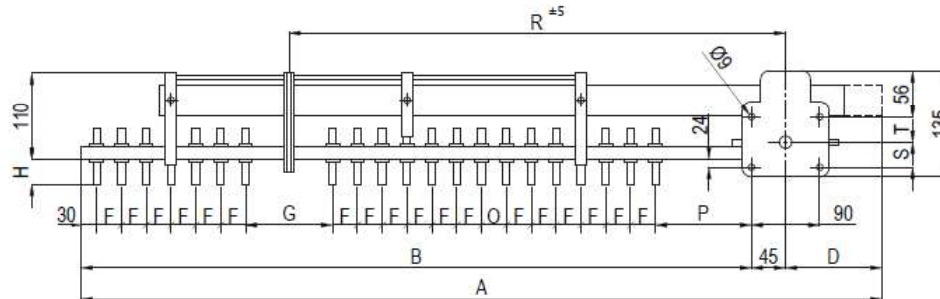
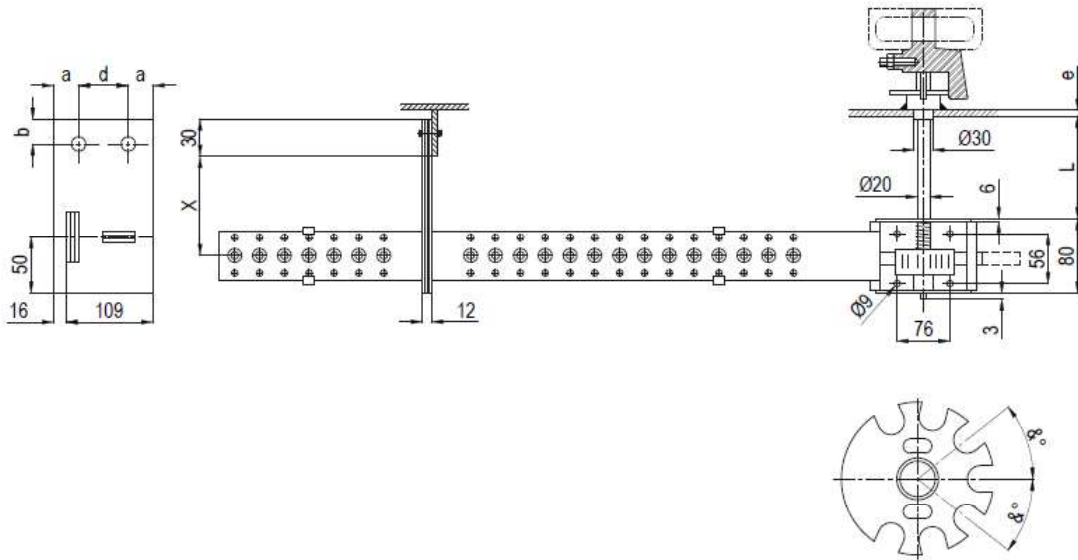


Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	S	T	& °	L	e	Unit No
20	7	1091	811	222	76	32	32	Depending on fixed contacts	32	95	29	35	38°	Please quote when ordering		431S746
	8	1219	907	254	76	32	32		32	95	29	35	38°			431S846
	9	1347	1003	286	76	32	32		32	95	29	35	38°			431S946
30	7	1151	871	222	106	32	32		32	125	29	35	38°			431S756
	8	1279	967	254	106	32	32		32	125	29	35	38°			431S856
	9	1407	1063	286	106	32	32		32	125	29	35	38°			431S956
60	6	1641	1338	245	267	43	70		70	286	29	35	51°			431S666
	7	1813	1467	288	267	43	70		70	286	29	35	51°			431S766



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Star diagram 20-60kV
150-400A 7-9 positions Setting 2.5 % per position (With HP Support)



Voltage class kV	Number of Positions	A	B	D	F	G	H	O	P	R	S	T	X min.	& °	L	e	Unit No
20	7	1060	793	222	32	60	Depending on fired contacts	32	95	586	29	35	70	38°	Please quote when ordering		M433S746
	8	1188	889	254	32	60		32	95	650	29	35	70	38°			M433S846
	9	1316	985	286	32	60		32	95	714	29	35	70	38°			M433S946
30	7	1090	823	222	32	60		32	125	616	29	35	130	38°			M433S756
	8	1218	919	254	32	60		32	125	680	29	35	130	38°			M433S856
	9	1346	1015	286	32	60		32	125	744	29	35	130	38°			M433S956
60	6*	1391	1101	245	43	70		70	286	866	29	35	250	51°			M433S666
	7*	1563	1230	288	43	70		70	286	952	29	35	250	51°			M433S766

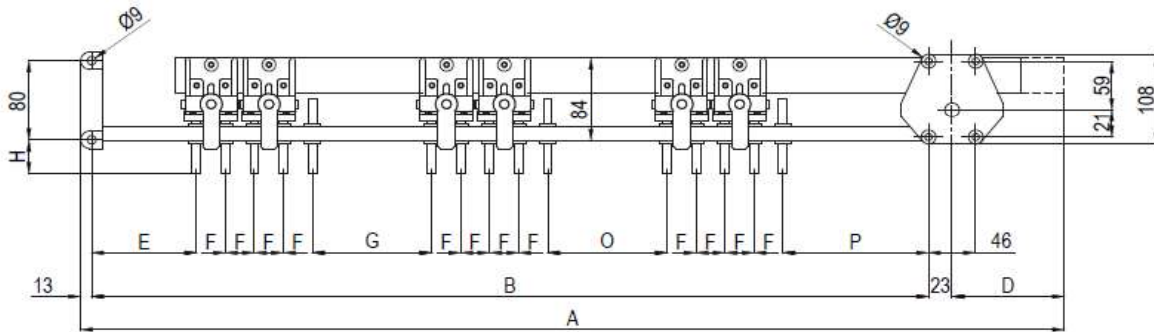
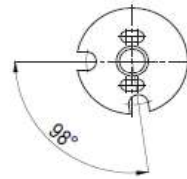
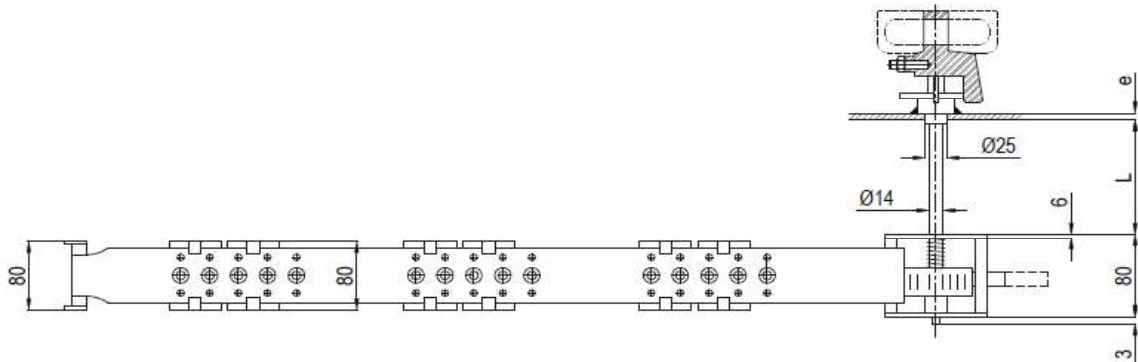
METSON POWER ELECTRICAL SUPPLY, **A:** Ser Tower Busidance, Yesilova Mahallesi, Ayas, ANKARA Yolu Blv. No: 115, 06796 Etimesgut/ ANKARA, Turkey. **M:** metsonpower_turkey@gmail.com



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil

Series parallel coupling 10-30kV 150-400A (With Aluminium Support)



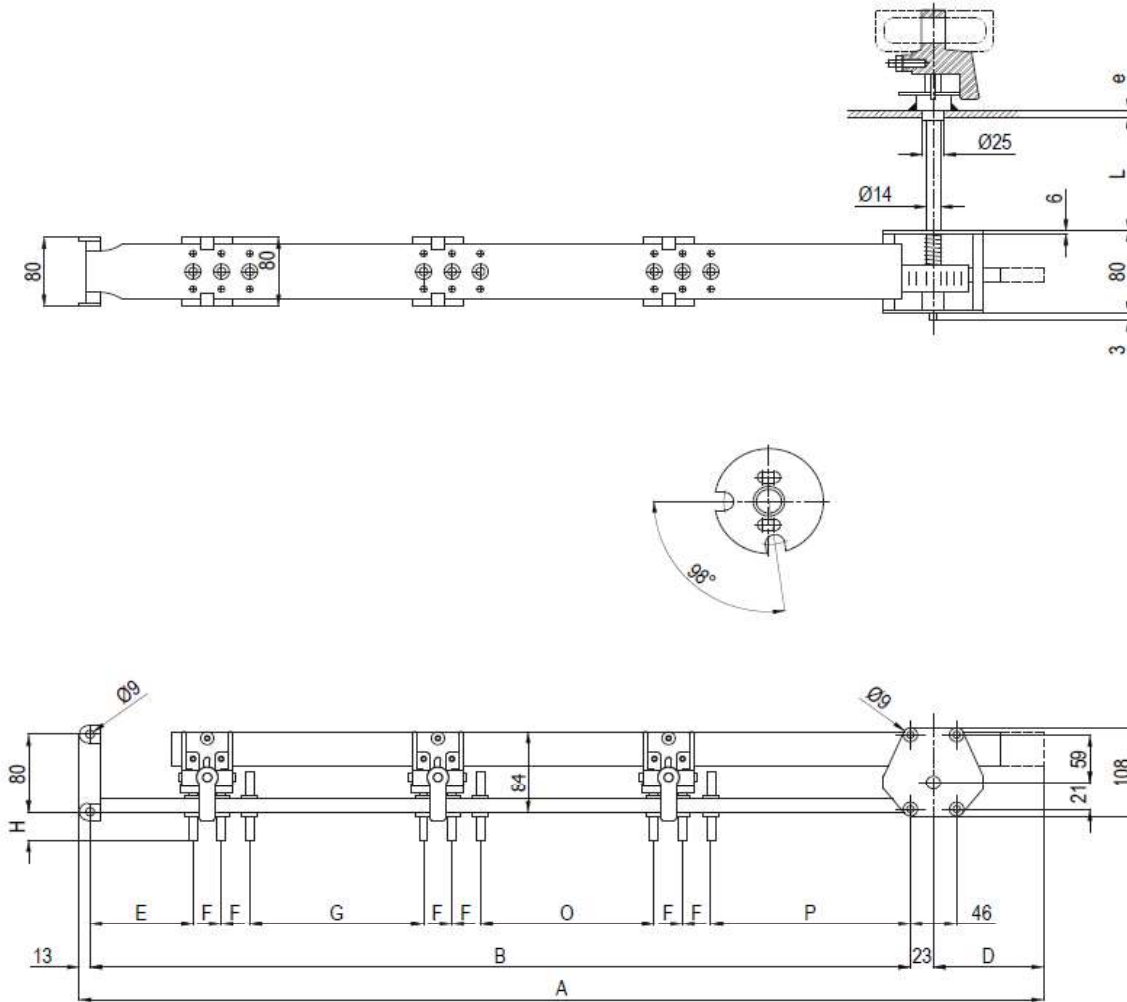
Voltage class kV	A	B	D	E	F	G	H	O	P	&*	L	e	Unit No
10 - 20	1027	911	80	76	50	70	Depending on fixed contacts	70	95	98°	Please quote when ordering		M431P276
15 - 30	1227	1111	80	126	50	120		120	145	98°			M431P286



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil

Star delta coupling 20-30kV 150-400A (With Aluminium Support)

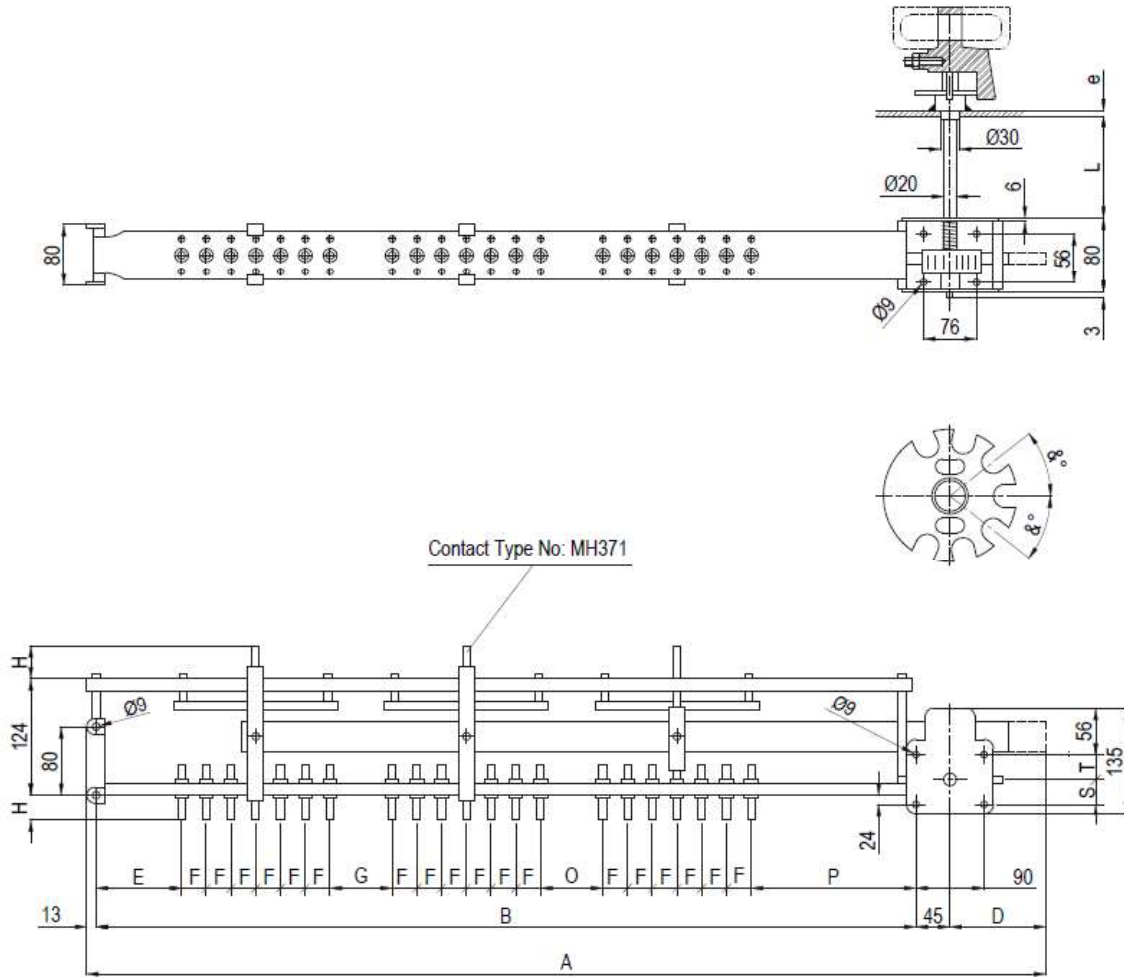


Voltage class kV	A	B	D	E	F	G	H	O	P	&°	L	e	Unit No
20	727	611	80	76	50	70	Depending on fixed contacts	70	95	98°	Please quote when ordering		M431R246
30	1029	887	106	106	76	100		100	125	149°			M431R256



TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Common output per phase
20-60kV 150-400A 7-9 P. Setting 2.5 % per position (With Aluminium Support)



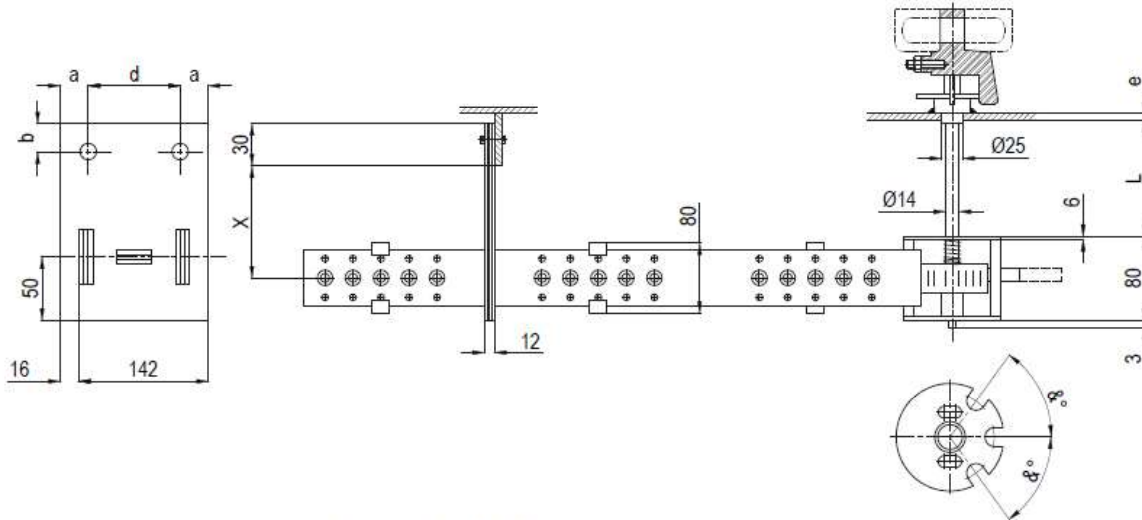
Contact Type No: MH371

Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	S	T	& °	L	e	Unit No
20	7	1167	887	222	76	32	70	Depending on fixed contacts	70	95	29	35	38°	Please quote when ordering		M431C746
	8	1295	983	254	76	32	70		70	95	29	35	38°			M431C846
	9	1423	1079	286	76	32	70		70	95	29	35	38°			M431C946
30	7	1287	1007	222	106	32	100		100	125	29	35	38°			M431C756
	8	1415	1103	254	106	32	100		100	125	29	35	38°			M431C856
	9	1543	1199	286	106	32	100		100	125	29	35	38°			M431C956
60	6	2021	1718	245	267	43	260		260	286	29	35	51°			M431C666
	7	2193	1847	288	267	43	260		260	286	29	35	51°			M431C766

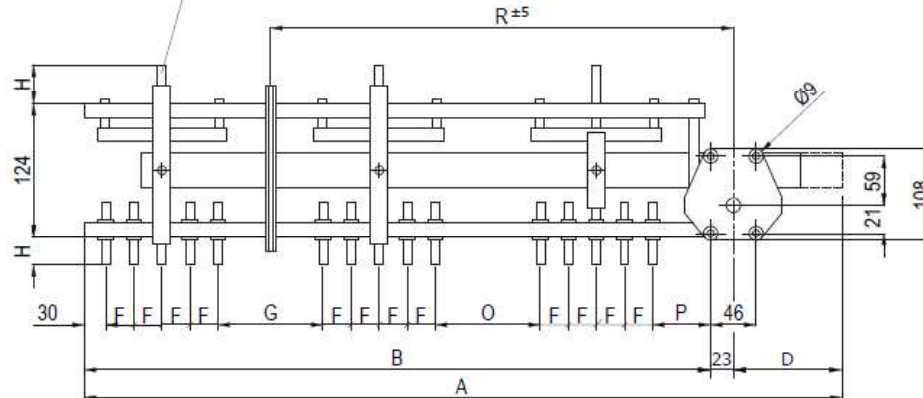


TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Common output per phase
20-60kV 150-400A 3-6 P. Setting 2.5 % per position (With HP Support)



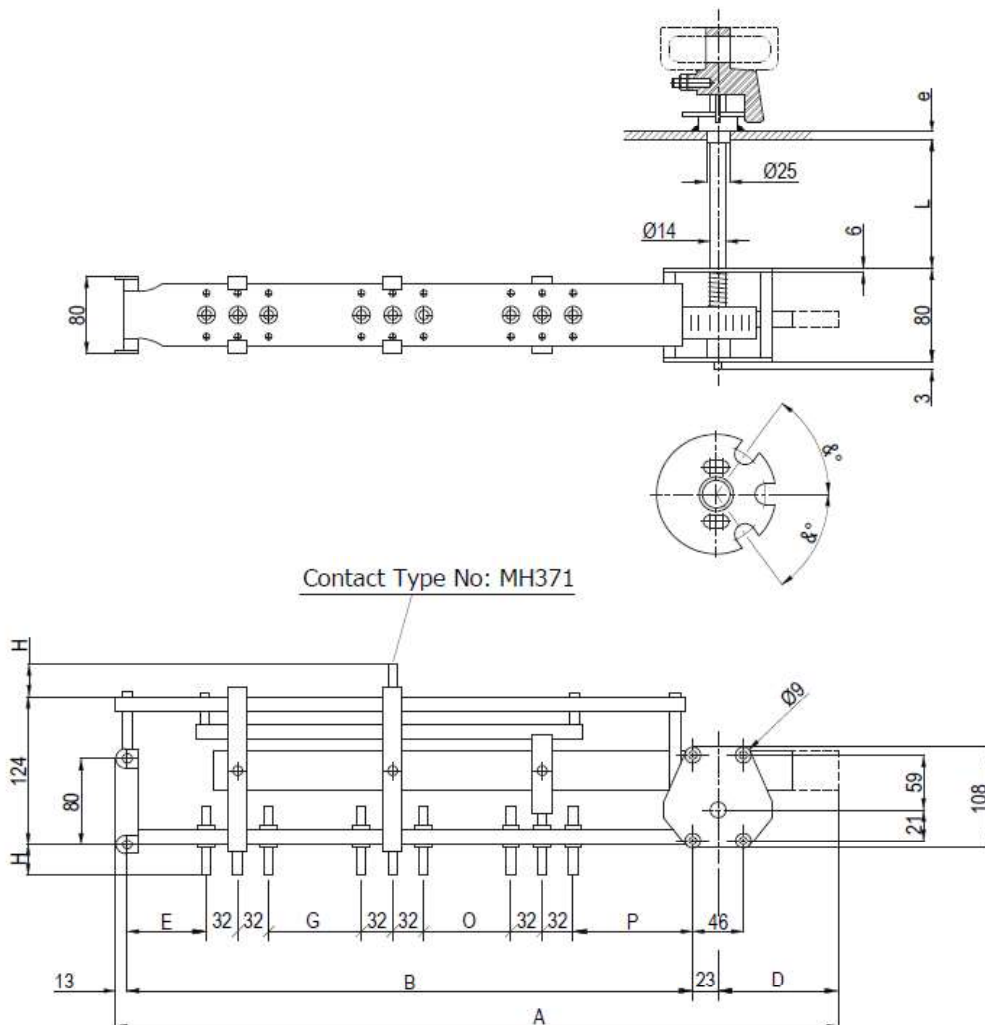
Contact Type No: MH371



Voltage class kV	Number of Positions	A	B	D	F	G	H	O	P	R	X min.	& °	L	e	Unit No
20	3	574	457	94	32	70	Depending on fixed contacts	70	95	351	70	63°	Please quote when ordering		M433C346
	4	702	553	126	32	70		70	95	415	70	63°			M433C446
	5	830	649	158	32	70		70	95	479	70	63°			M433C546
	6	958	745	190	32	70		70	95	543	70	63°			M433C646
30	3	664	547	94	32	100		100	125	426	130	63°		M433C356	
	4	792	643	126	32	100		100	125	490	130	63°		M433C456	
	5	920	739	158	32	100		100	125	554	130	63°		M433C556	
	6	1048	835	190	32	100		100	125	618	130	63°		M433C656	
60	3	1233	1094	116	43	260		260	286	871	250	84°		M433C366	
	4	1405	1223	159	43	260		260	286	957	250	84°		M433C466	
	5	1577	1352	202	43	260		260	286	1043	250	81°		M433C566	

TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Star diagram wht outer-earthed conductor 20-60kV
150-400A 3-6 P. Setting 2.5 % per position (With Aluminium Support)

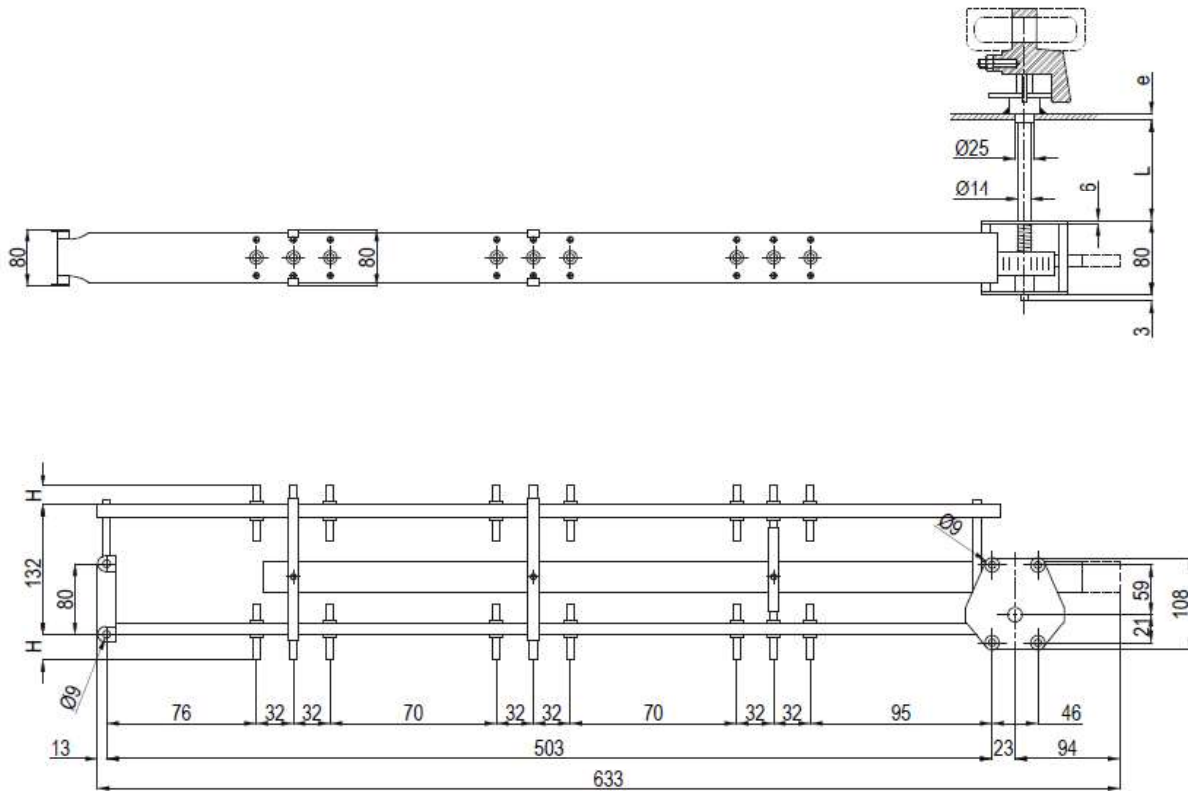


Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	& °	L	e	Unit No
20	3	557	427	94	76	32	32	Depending on fixed contacts	32	95	63°	Please quote when ordering		M431F346
	4	685	523	126	76	32	32		32	95	63°			M431F446
	5	813	619	158	76	32	32		32	95	63°			M431F546
	6	941	715	190	76	32	32		32	95	63°			M431F646
30	3	617	487	94	106	32	32		32	125	63°		M431F356	
	4	745	583	126	106	32	32		32	125	63°		M431F456	
	5	873	679	158	106	32	32		32	125	63°		M431F556	
	6	1001	775	190	106	32	32		32	125	63°		M431F656	
60	3	1103	951	116	267	43	70		70	286	84°		M431F366	
	4	1275	1080	159	267	43	70		70	286	84°		M431F466	
	5	1447	1209	202	267	43	70		70	286	81°		M431F566	

TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil

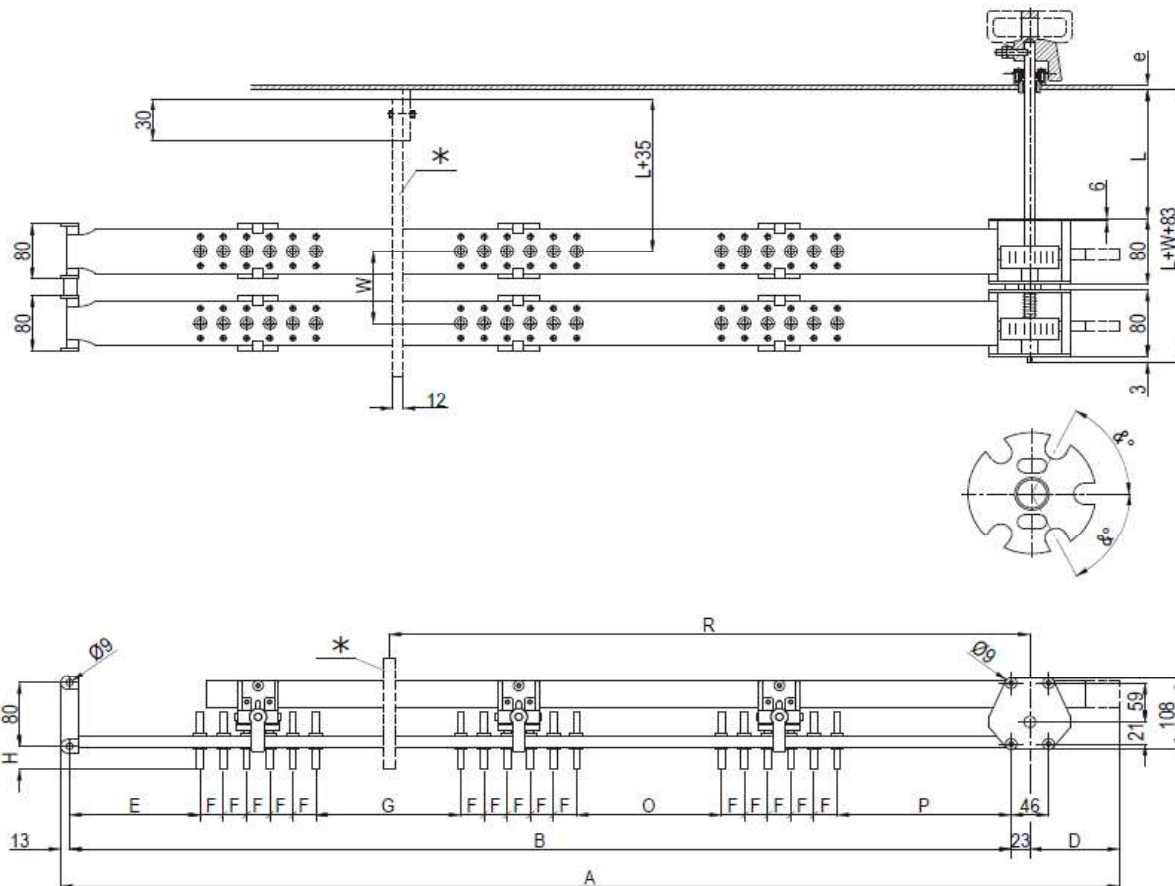
Opposite contacts . Setting 2.5 % per position (With Aluminium support)



Opposite Contacts
20kV-150 to 400 A
3 positions
Unit No: 43146G3

TYPE MHFII THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Two-stage tap changer Delta diagram
20-60kV 150-400A 2-6P Setting 2.5 % per position (With Aluminium Support)



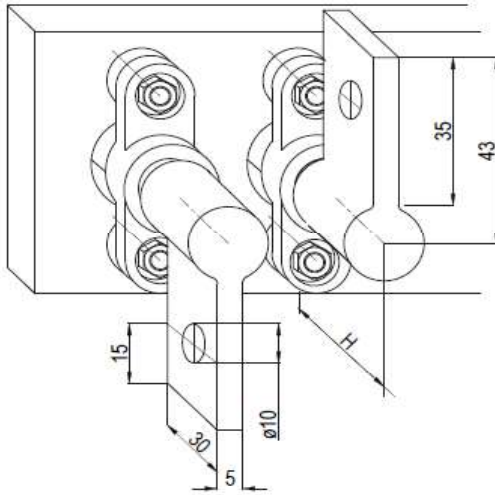
Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	R	&°	L	e	Unit No
20	2	601	503	62	76	32	70	Depending on fixed contacts	70	95	351	63°	Please quote when ordering	M441D246 M441D346 M441D446 M441D546 M441D646	
	3	729	599	94	76	32	70		70	95	415	63°			
	4	857	695	126	76	32	70		70	95	479	63°			
	5	985	791	158	76	32	70		70	95	543	63°			
	6	1113	887	190	76	32	70		70	95	607	63°			
30	2	721	623	62	106	32	100		100	125	426	63°		M441D256 M441D356 M441D456 M441D556 M441D656	
	3	849	719	94	106	32	100		100	125	490	63°			
	4	977	815	126	106	32	100		100	125	554	63°			
	5	1105	911	158	106	32	100		100	125	618	63°			
	6	1233	1007	190	106	32	100		100	125	682	63°			
60	2	1140	1331	73	267	43	260		260	286	871	84°		M441D266 M441D366 M441D466 M441D566	
	3	1612	1460	116	267	43	260		260	286	957	84°			
	4*	1784	1589	159	267	43	260		260	286	1043	84°			
	5*	1956	1718	202	267	43	260		260	286	1129	81°			

* Additional supporting plate is used

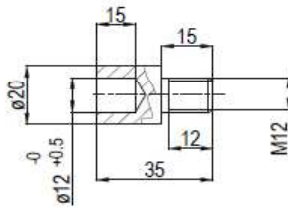


TYPE MHFII THREEPHASE TAP CHANGER

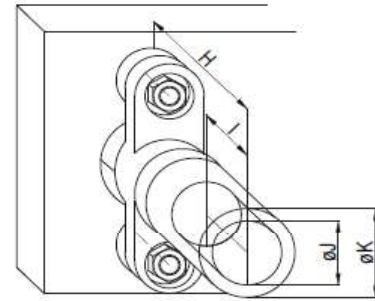
Fixed Contacts



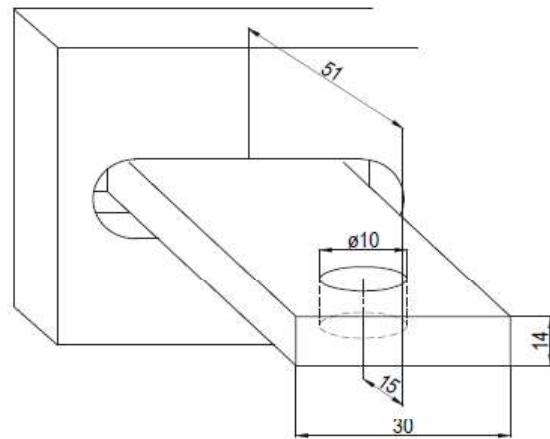
Flag type contacts



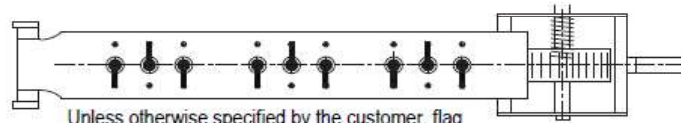
Fixed contact adapter for cable connection
(Optional for Contact No : MH374)



Tubular contact



Common contact with straight flat shape
No : MH371

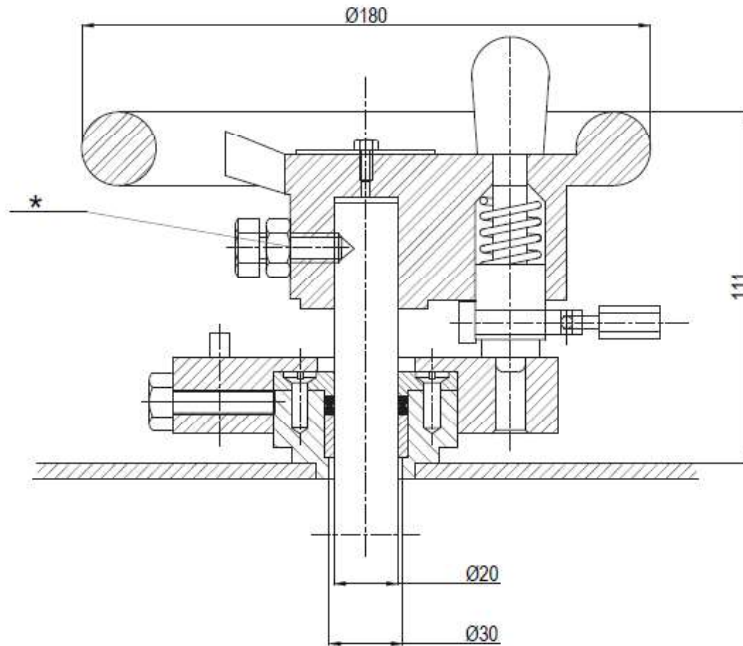


Unless otherwise specified by the customer, flag type contacts are positioned as in the diagram above. The contact situated near the operating device is facing downwards.

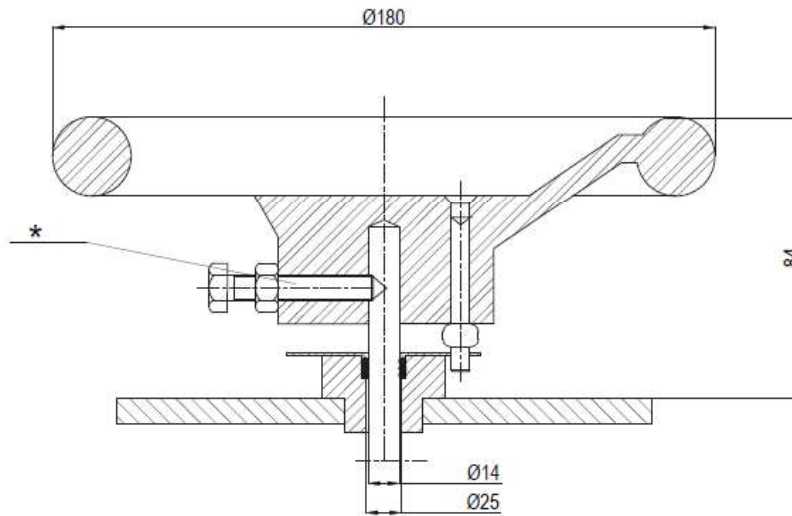
	Contact Numbers	$\varnothing J$	$\varnothing K$	I	H
150 A. Tubular Contact	MH365	7	14	20	37
220 A. Tubular Contact	MH366	8.5	14	20	37
150 A. Tubular Contact	MH367	9.5	13.5	30	56
220 A. Tubular Contact	MH368	13.5	17.4	30	56
315 A. Tubular Contact	MH369	15.2	20	30	56
315 A. Tubular Contact (Optional)	MH372	M12	20	30	56
400 A. Flag Type	MH370	---	30 x 30 x 5		51



TYPE MHFII THREEPHASE TAP CHANGER andwhell-opereted control devices



MH349
unlocking by padlockable pull
knob for axis dia. 20mm.

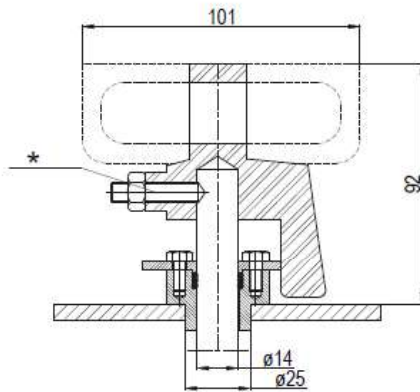


MH350
unlocking by axial displacement of
the control shaft for axis dia. 14mm.

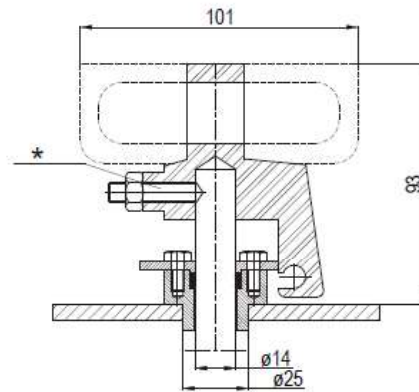
* The hole on the shaft is drilled at parallel position with respect to the middle position of the tap changer

TYPE MHFII THREEPHASE TAP CHANGER

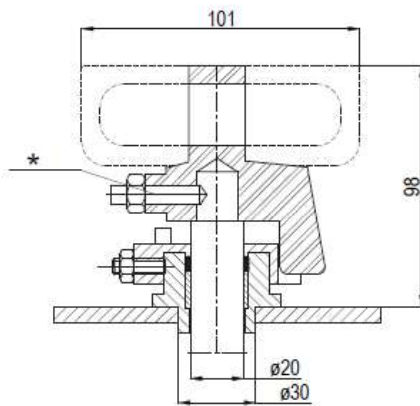
Control devices incorporating a handle Unlocking by axial displacement of the control shaft



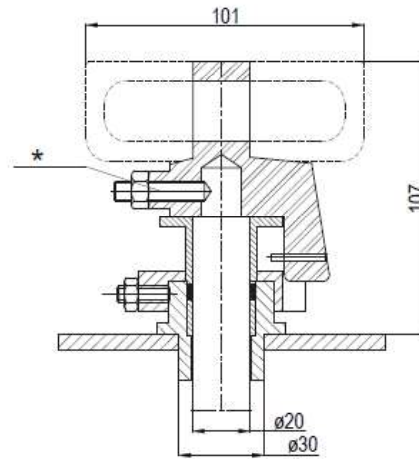
standard for axis dia. 14mm.
MH345A



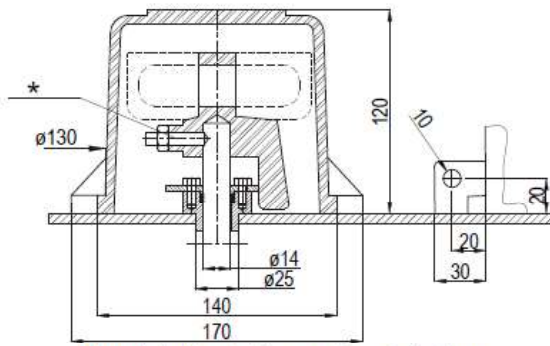
padlockable model for axis dia. 14mm.
MH345B



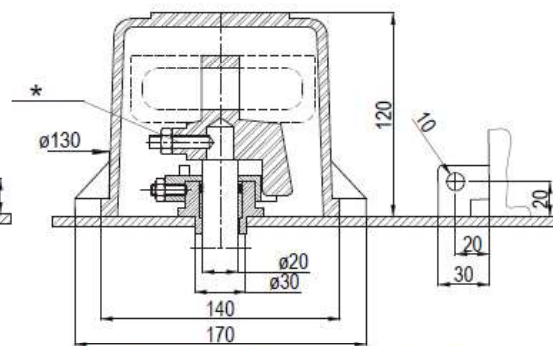
standard for axis dia. 20mm.
MH346A



padlockable model for axis dia. 20mm.
MH346B



with padlockable protective cover for axis dia. 14mm.
MH347



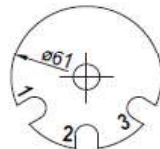
with padlockable protective cover for axis dia. 20mm.
MH348

* The hole on the shaft is drilled at parallel position with respect to the middle position of the tap changer

TYPE MHFII THREEPHASE TAP CHANGER

Numbering of the repeater disc

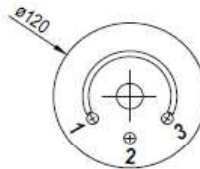
Repeaters for rack and pinion operated controls.



No. MD352



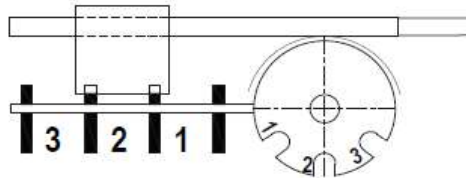
No. MD353



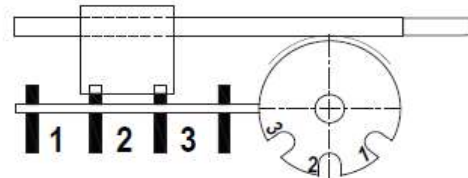
No. MD354

Numbering of the repeaters for rack and pinion operated control.

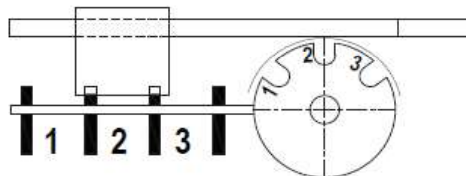
A1



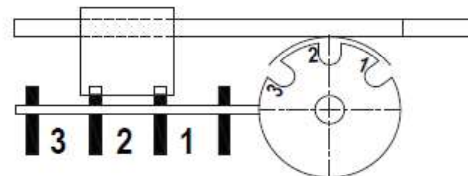
B1



C1

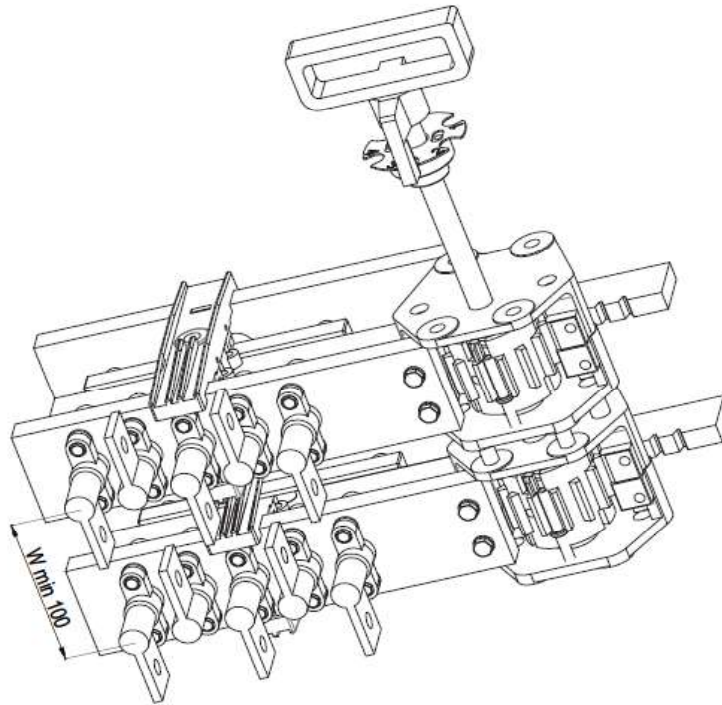


D1



TYPE MHFII THREEPHASE TAP CHANGER

Combinations



All the horizontal tap changers in the MHFII reinforced serie can be paired by superimposing several tap changers whose purpose - built steel brackets are assembled by nuts and bolts.

Depending on the diagram adopted, the user can:

- either operate the tap changers with one shaft
- or operate part of the tap changers with one shaft and the other part with a second shaft.

In this case, please quote the position of the coupling shaft and that of the setting shaft.

Note : It is essential to quote dimension "W" in the order. The minimum value of this dimension to be set in each case depends on the isolating conditions and on the layout of the various tap changers.

WHEN ORDERING PLEASE QUOTE:

- 1 - The 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, C1, D1)
- 7 - Dimensions of the fixed contacts ($\varnothing J$ and $\varnothing K$)
- 8 - L, e, X, W dimensions from the tables. (\varnothing , b, a, d) for hanger
- 9 - The numbers of the fixed contacts

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

TAP CHANGERS TYPE MHF III



TAP CHANGERS

TYPE MHF III

GENERAL SPECIFICATION

These tap changers are available in one two or three phase applications.
The shaft length is variable.
Connection diagrams in page MHFIII 2 can be applied in any variation to all types.
These tap changers are bolted on to the supports, welded under transformer cover and allow strong construction.

ASSEMBLY

A fraction of turn on the control head in necessary to switch from one position to another. A notch is provided to mark each position precisely. For each operation, the notch must first be released by pulling the padlockable pul rod. After being turned to the desired position, the device locks into the respective notch under the action of a spring. Refer to page MHFIII 11 for the choice of an operating device matching the tap changer fitting.
The numbering of the positions is engraved on the repeater disc of the control head.
See page MHFIII 12 for the various directions of numbering.

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.

Aluminum Parts : GAISi12Cu

BrassParts : Cu ZN40Pb2 Ms 60 F34 DIN 17 673

Copper Parts : E - Cu F25 DIN 40 500

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

Up to 800A.
See page MHFIII 10 for the types and dimensions of the contacts.

VOLTAGE CLASS

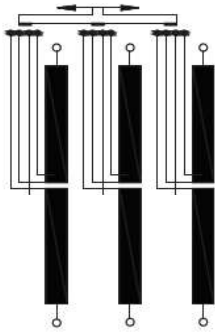
VOLTAGE CLASS	B. I. L.
20 kV	125 kV
30 kV	170 kV

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

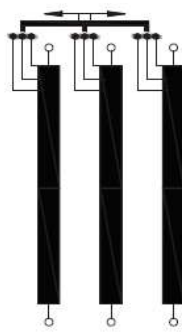


TYPE MHF III THREEPHASE TAP CHANGER

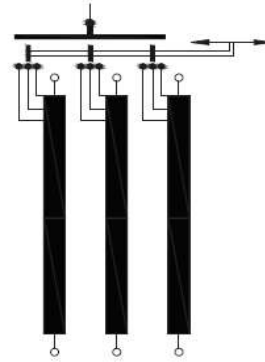
Usual Diagram



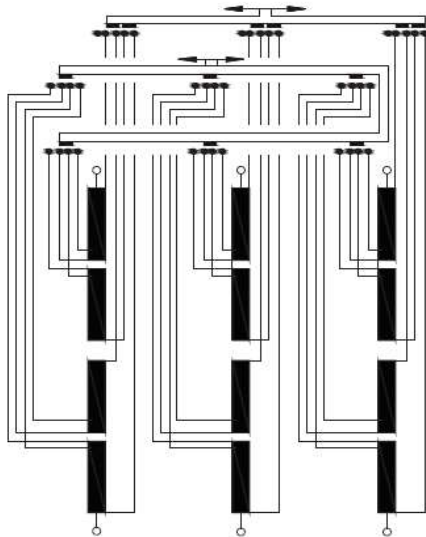
setting for delta transformer



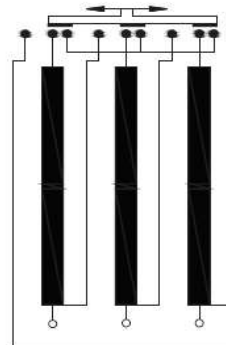
setting for star transformer



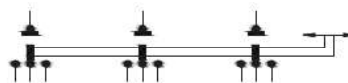
setting for star with outer - earthed
conductor transformer



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



star - delta coupling



common output per phase



TYPE MHF III THREEPHASE TAP CHANGER

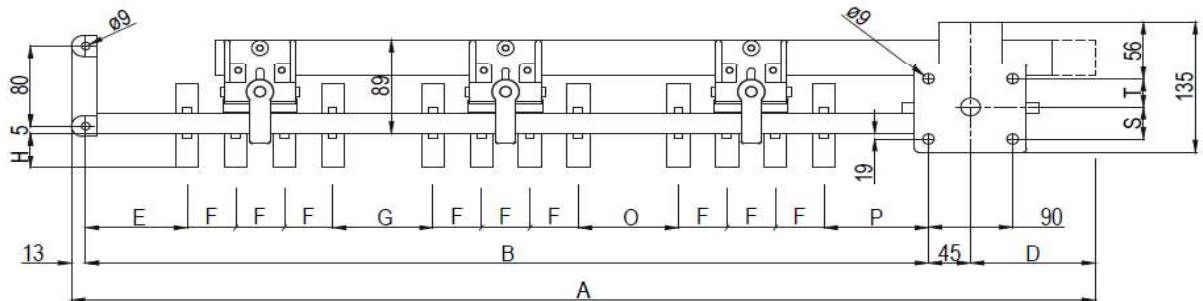
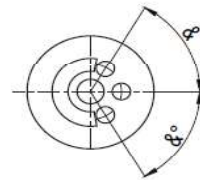
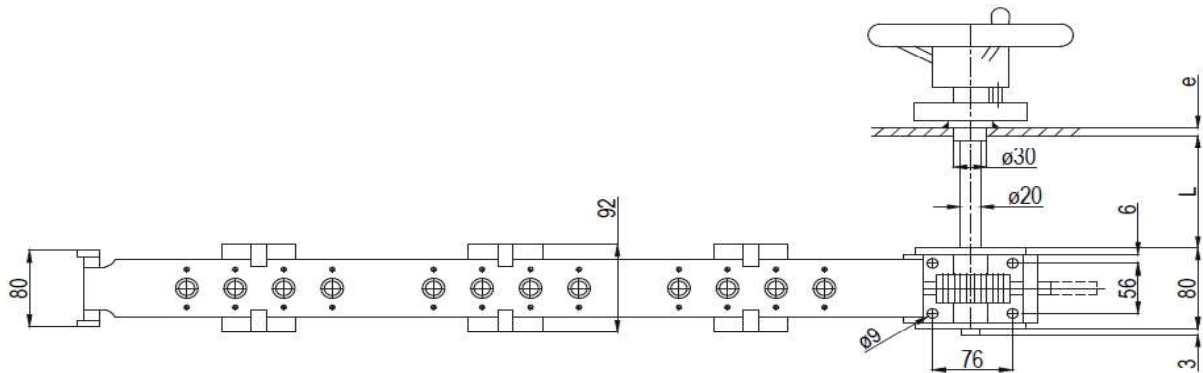
Off-circuit operation can be used in oil Delta diagram 20-30kV

400-800A 3-6 positions Setting 2.5 % per position (With Aluminium Support)



metsonpower

TRANSFORMER ACCESSORIES



Voltage class kV	Number of Positions	A	B	D	E	F	G	F	O	P	S	T	& °	L	e	Unit No
20	3	1018	830	130	90	50	90	Depending on fixed contacts	90	110	32	32	67°	Please quote when ordering		431D347
	4	1218	980	180	90	50	90		90	110	32	32	67°			431D447
	5	1418	1130	230	90	50	90		90	110	32	32	67°			431D547
	6	1618	1280	280	90	50	90		90	110	30	34	64°			431D647
30	3	1138	950	130	120	50	120	Depending on fixed contacts	120	140	32	32	67°	Please quote when ordering		431D357
	4	1338	1100	180	120	50	120		120	140	32	32	67°			431D457
	5	1538	1250	230	120	50	120		120	140	32	32	67°			431D557
	6	1738	1400	280	120	50	120		120	140	30	34	64°			431D657

* L min 95 for MH320 control device

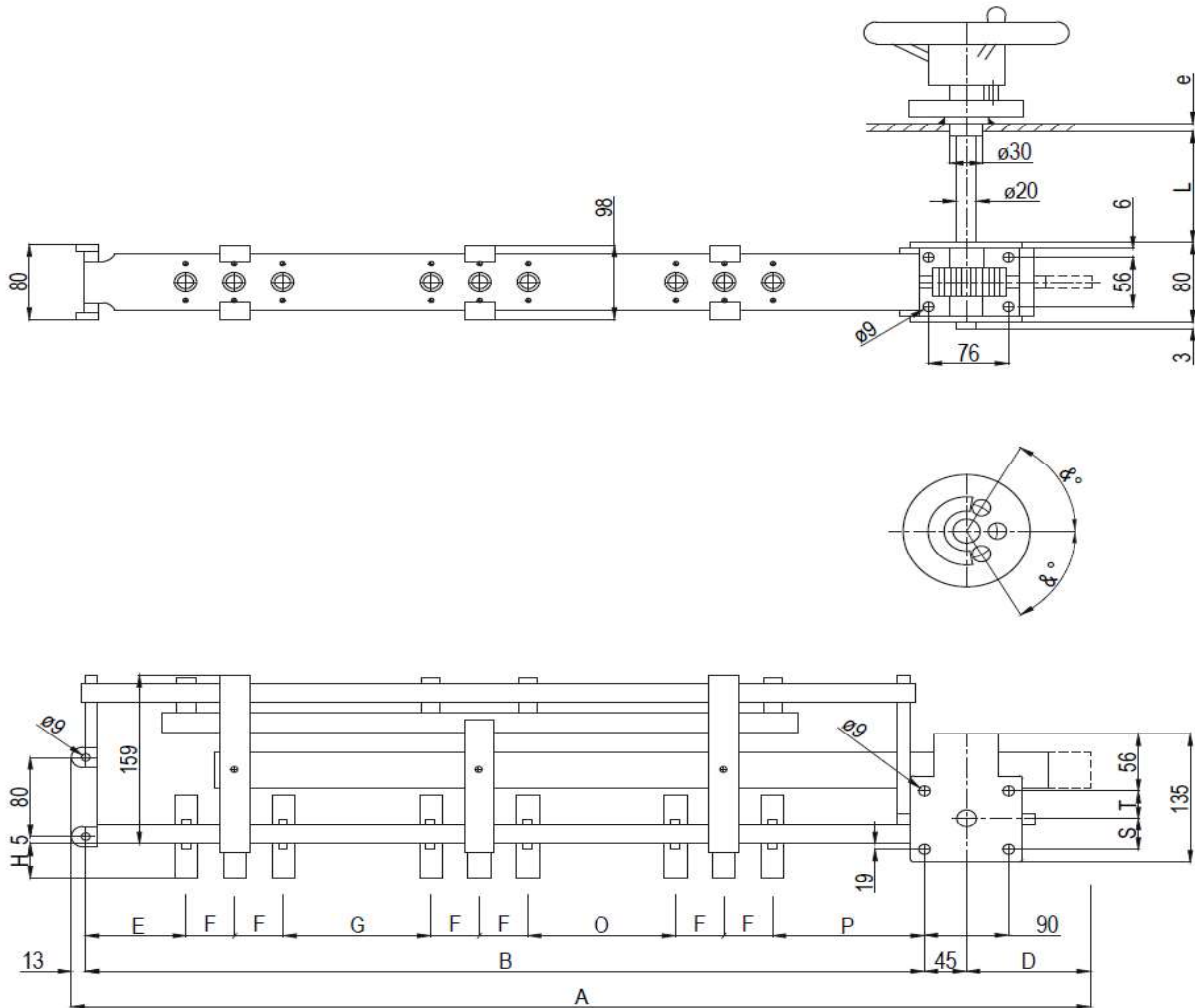
* L min 170 for MH330 control device

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TYPE MHF III THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Star diagram 20-30kV
400-800A 3-6P Setting 2.5 % per position. (With Aluminium Support)



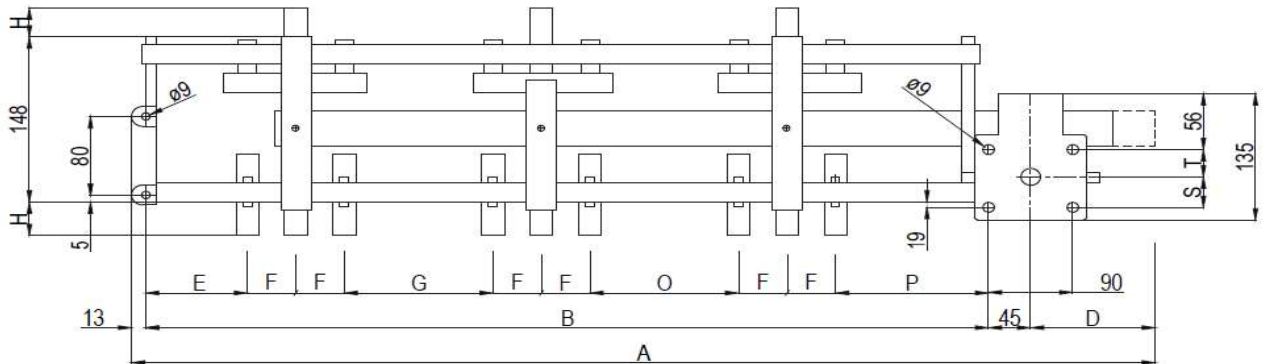
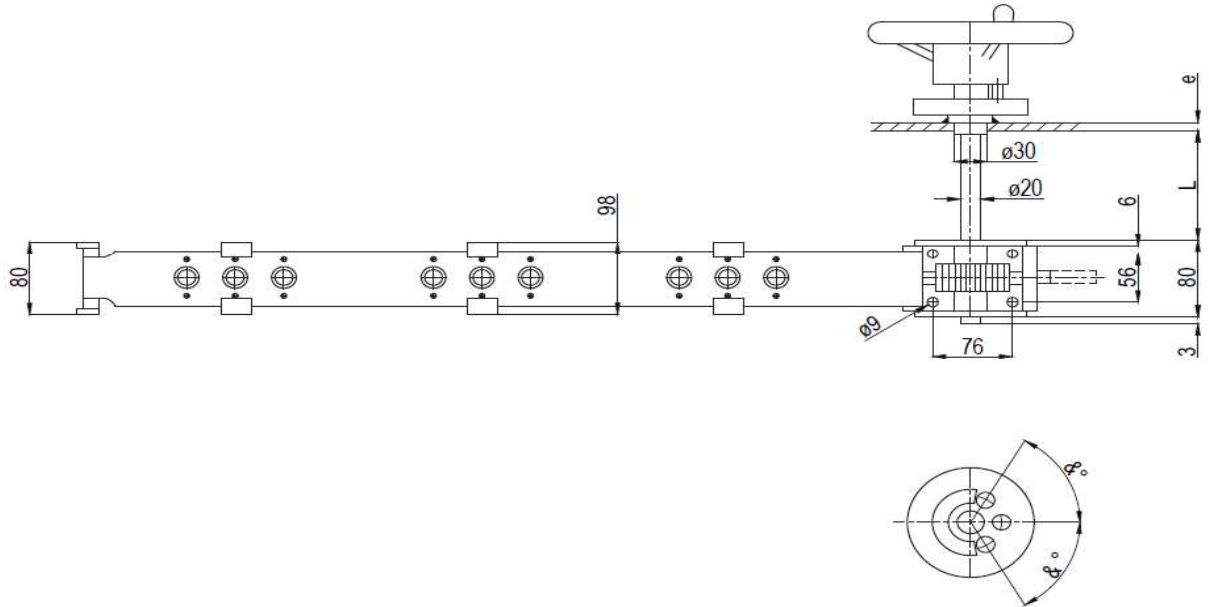
Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	S	T	&°	L	e	Unit No
20	3	788	600	130	90	50	50	Depending on fixed contacts	50	110	32	32	68°	Please quote when ordering		M431S347
	4	988	750	180	90	50	50		50	110	32	32	68°			M431S447
	5	1188	900	230	90	50	50		50	110	32	32	68°			M431S547
	6	1388	1050	280	90	50	50		50	110	30	34	64°			M431S647
30	3	848	660	130	120	50	50		50	140	32	32	68°			M431S357
	4	1048	810	180	120	50	50		50	140	32	32	68°			M431S457
	5	1248	960	230	120	50	50		50	140	32	32	68°			M431S557
	6	1448	1110	280	120	50	50		50	140	30	34	64°			M431S657

* L min 95 for MH320 control device

* L min 170 for MH330 control device

TYPE MHF III THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Common output per phase
20-30kV 400-800A 3-6 P. Setting 2.5 % per position (With Aluminium Support)



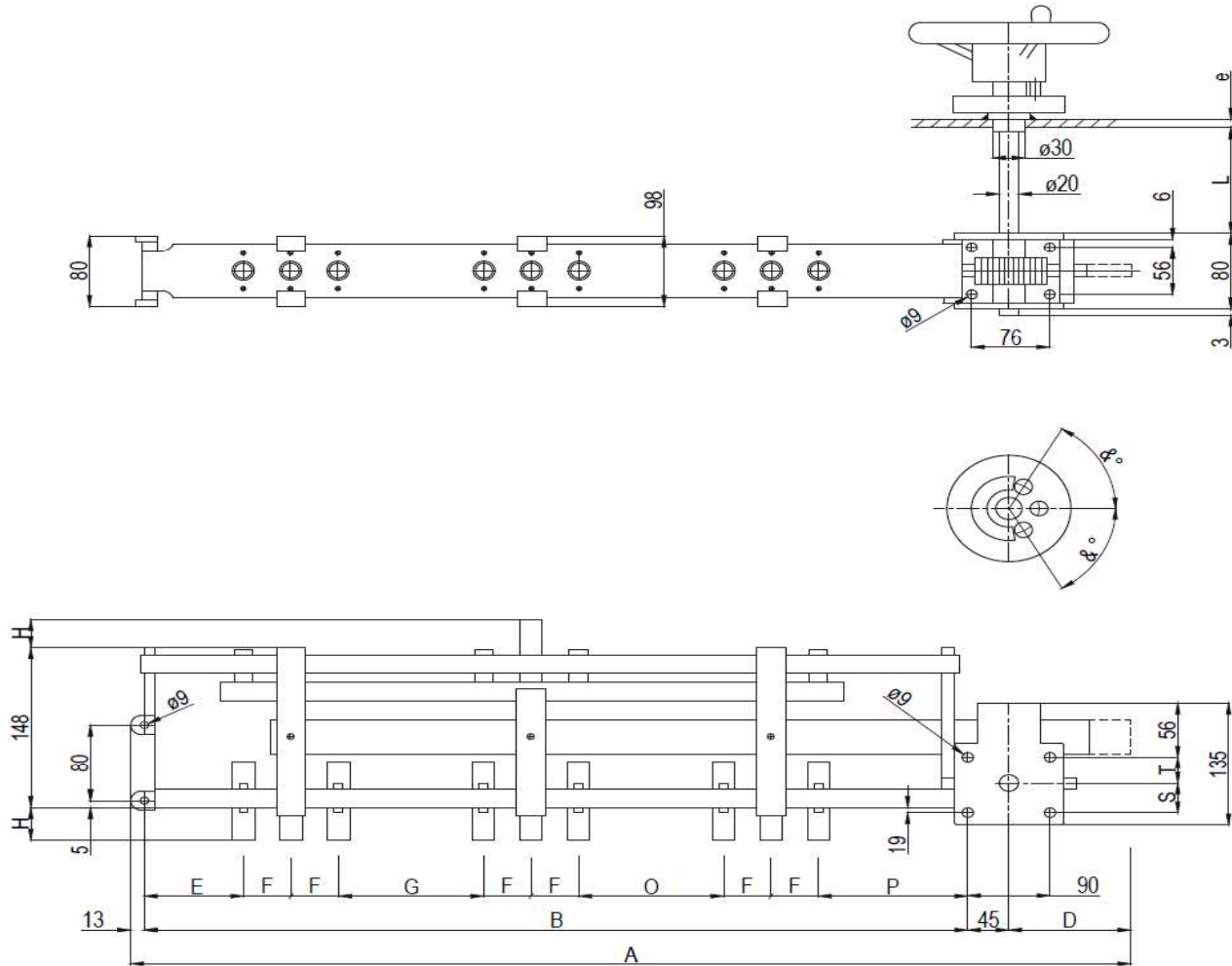
Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	S	T	&°	L	e	Unit No
20	3	868	680	130	90	50	90	Depending on fixed contacts	90	110	32	32	68°	Please quote when ordering		M431C347
	4	1068	830	180	90	50	90		90	110	32	32	68°			M431C447
	5	1268	980	230	90	50	90		90	110	32	32	68°			M431C547
	6	1468	1130	280	90	50	90		90	110	30	34	64°			M431C647
30	3	988	800	130	120	50	120		120	140	32	32	68°			M431C357
	4	1188	950	180	120	50	120		120	140	32	32	68°			M431C457
	5	1388	1100	230	120	50	120		120	140	32	32	68°			M431C557
	6	1588	1250	280	120	50	120		120	140	30	34	64°			M431C657

* L min 95 for MH320 control device
* L min 170 for MH330 control device



TYPE MHF III THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Star diagram Whit outer-earthed conductor
20-30kV 400-800A 3-6 P. Setting 2.5 % per position (With Aluminium Support)



Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	S	T	& °	L	e	Unit No
20	3	788	600	130	90	50	50	Depending on fixed contacts	50	110	32	32	68°	Please quote when ordering		M431F347
	4	988	750	180	90	50	50		50	110	32	32	68°			M431F447
	5	1188	900	230	90	50	50		50	110	32	32	68°			M431F547
	6	1388	1050	280	90	50	50		50	110	30	34	64°			M431F647
30	3	848	660	130	120	50	50	Depending on fixed contacts	50	140	32	32	68°	Please quote when ordering		M431F357
	4	1048	810	180	120	50	50		50	140	32	32	68°			M431F457
	5	1248	960	230	120	50	50		50	140	32	32	68°			M431F557
	6	1448	1110	280	120	50	50		50	140	30	34	64°			M431F657

* L min 95 for MH320 control device

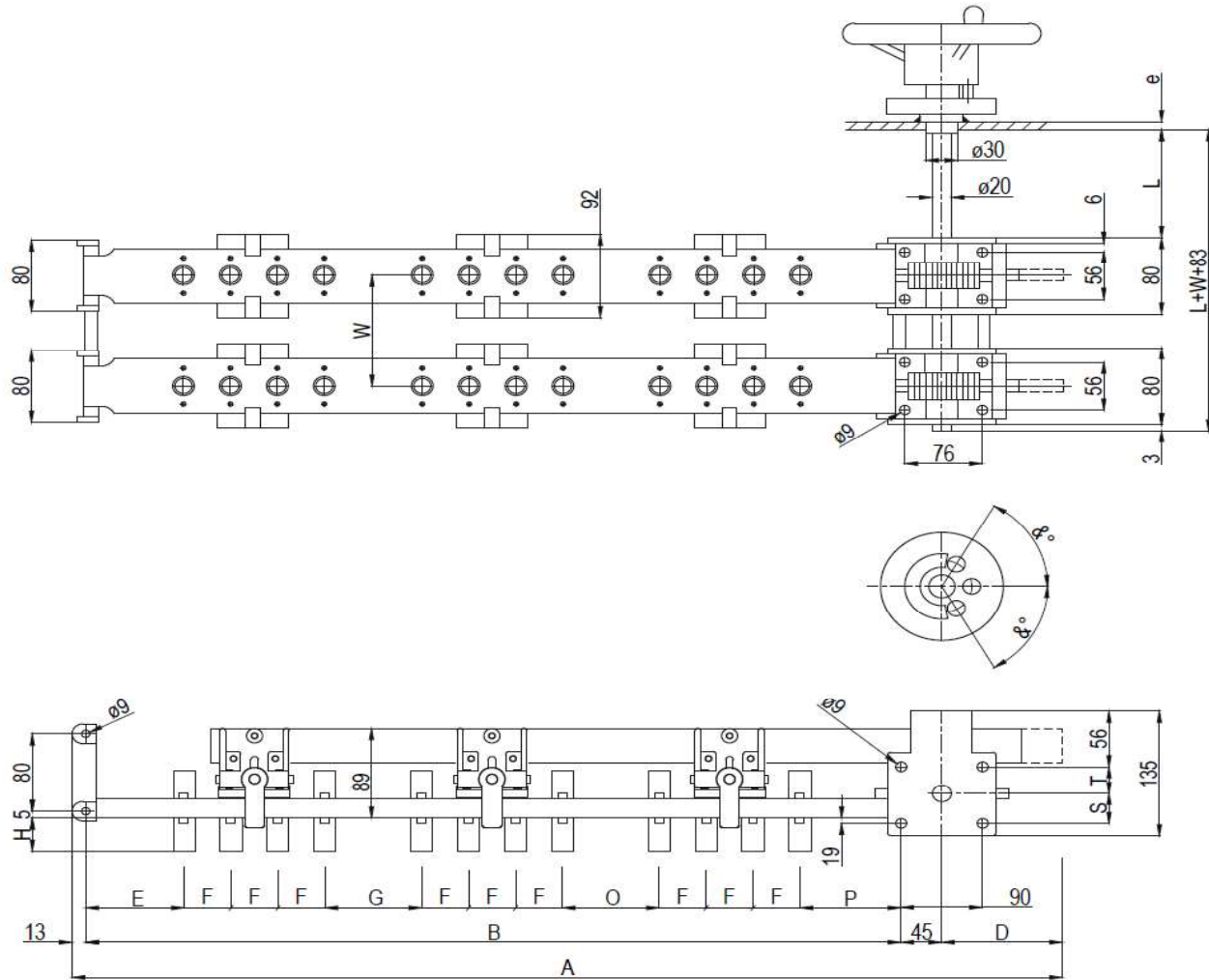
* L min 170 for MH330 control device

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TYPE MHF III THREEPHASE TAP CHANGER

ff-circuit operation can be used in oil Two-stage tap changer Delta diagram
20-30kV 400-800A 3-6P Setting 2.5 % per position (With Aluminium Support)



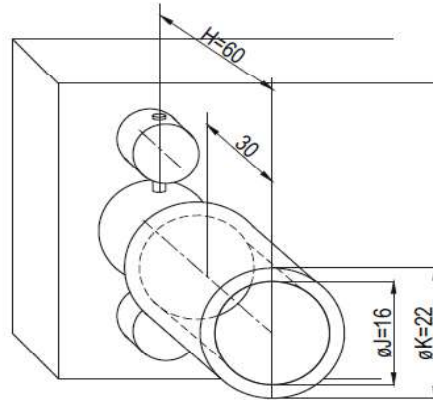
Voltage class kV	Number of Positions	A	B	D	E	F	C	H	O	P	S	T	& °	L	e	Unit No
20	3	1018	830	130	90	50	90	Depending on fixed contacts	90	110	32	32	68°	Please quote when ordering		M441D347
	4	1218	980	180	90	50	90		90	110	32	32	68°			M441D447
	5	1418	1130	230	90	50	90		90	110	32	32	68°			M441D547
	6	1618	1280	280	90	50	90		90	110	30	34	64°			M441D647
30	3	1138	950	130	120	50	120		120	140	32	32	68°			M441D357
	4	1338	1100	180	120	50	120		120	140	32	32	68°			M441D457
	5	1538	1250	230	120	50	120		120	140	32	32	68°	M441D557		
	6	1738	1400	280	120	50	120		120	140	30	34	64°	M441D657		

* L min 95 for MH320 control device
* L min 170 for MH330 control device

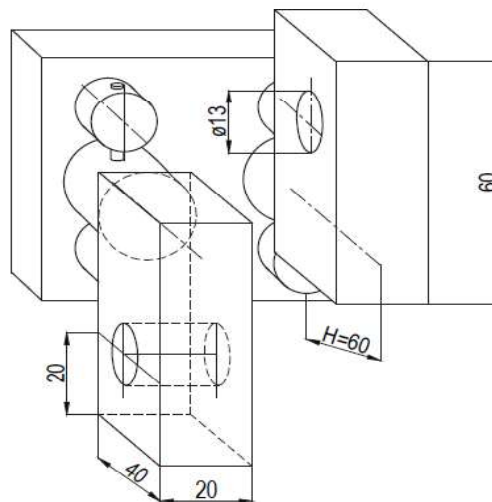


TYPE MHF III THREEPHASE TAP CHANGER

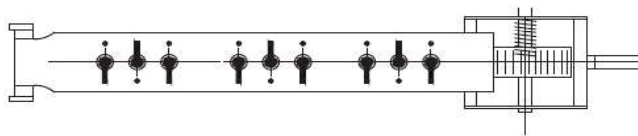
Fixed Contact



Tubular contact
MH375



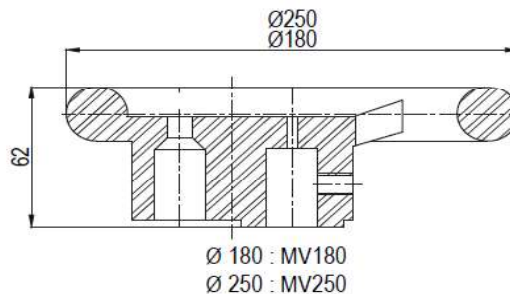
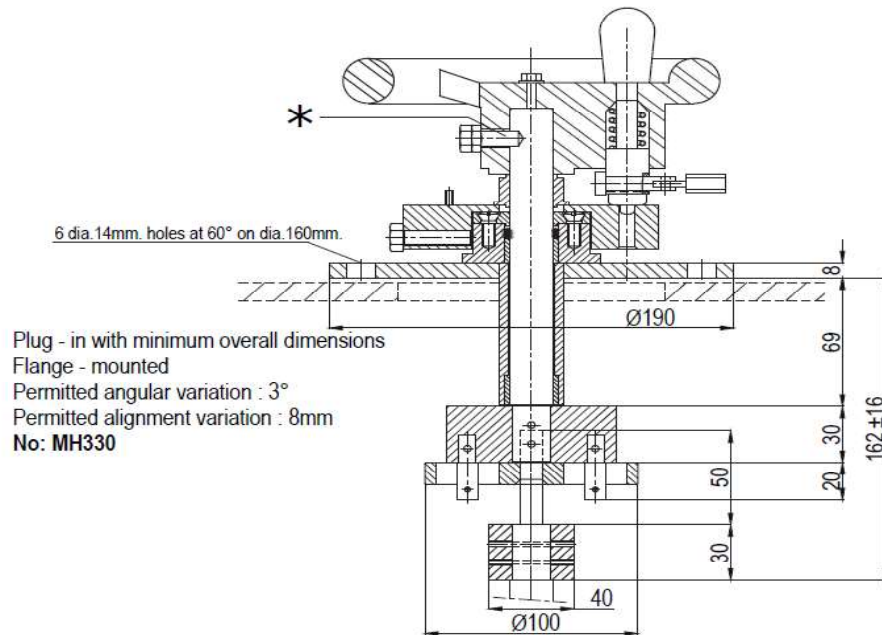
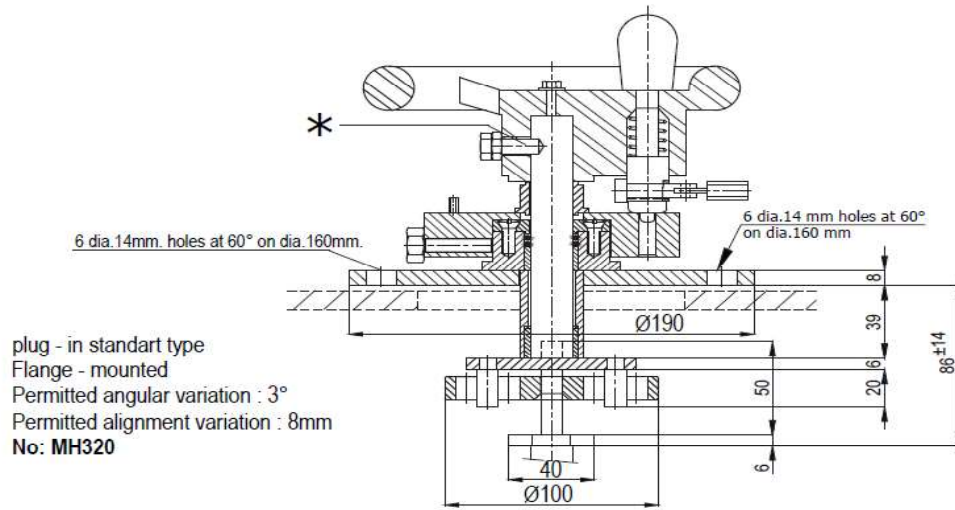
Flag type contact
MH374



Unless otherwise specified by the customer, flag type contacts
faced as shown in the above diagram.
The contact situated near the operating device is face downwards.

TYPE MHF III THREEPHASE TAP CHANGER

Control devices



* The hole on the shaft is drilled at parallel position with respect to the middle position of the tap changer

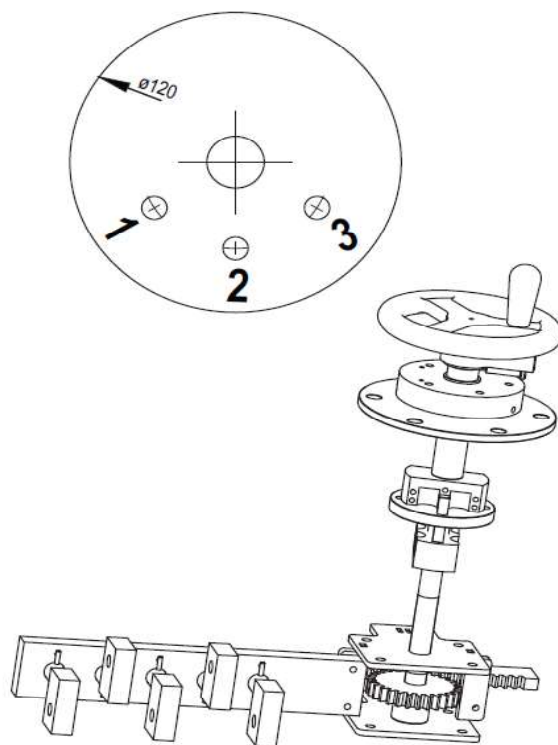
* L min.95 for MH320 control device

* L min 170 for MH330 control device

TYPE MHF III THREEPHASE TAP CHANGER

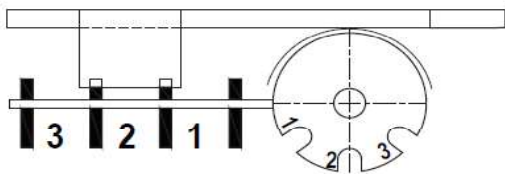
Numbering of the repeater disc

Repeaters for rack and pinion drive

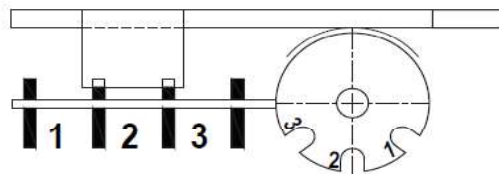


Numbering of the repeaters for rack and pinion drive

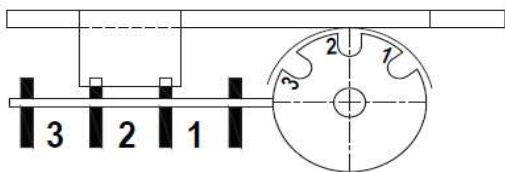
A1



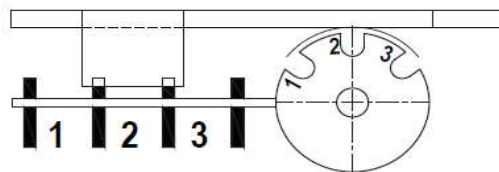
B1



D1

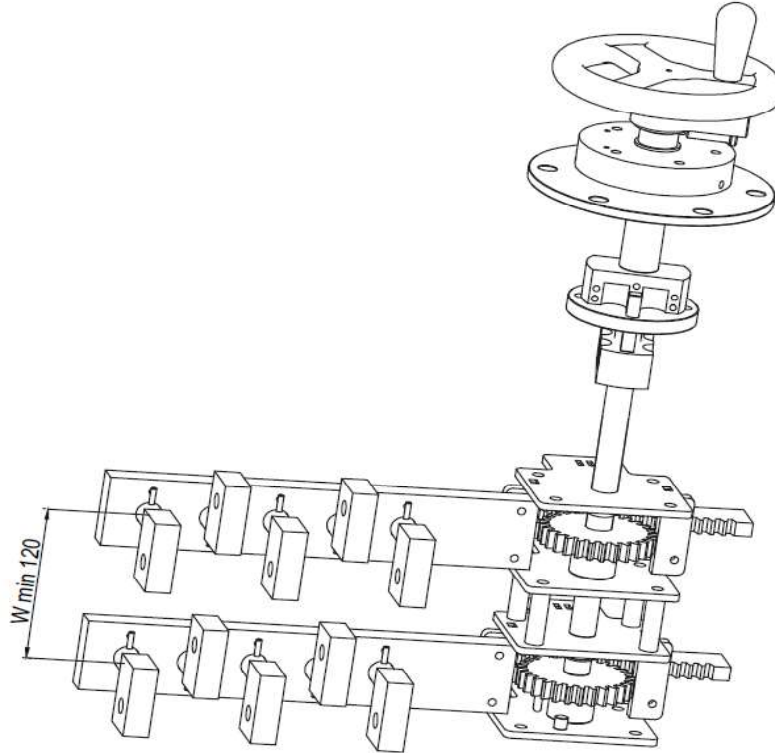


C1



TYPE MHF III THREEPHASE TAP CHANGER

Combinations



All type MHFIII tap changers may be paired by superimposing several tap changers whose purpose - built steel brackets are assembled by nuts and bolts.

According to the diagram adopted, the user can:

- either operate the tap changers with one shaft
- or operate part of the tap changers with one shaft and the other part with another shaft.

In this case, please quote the position of the coupling shaft and the setting shaft.

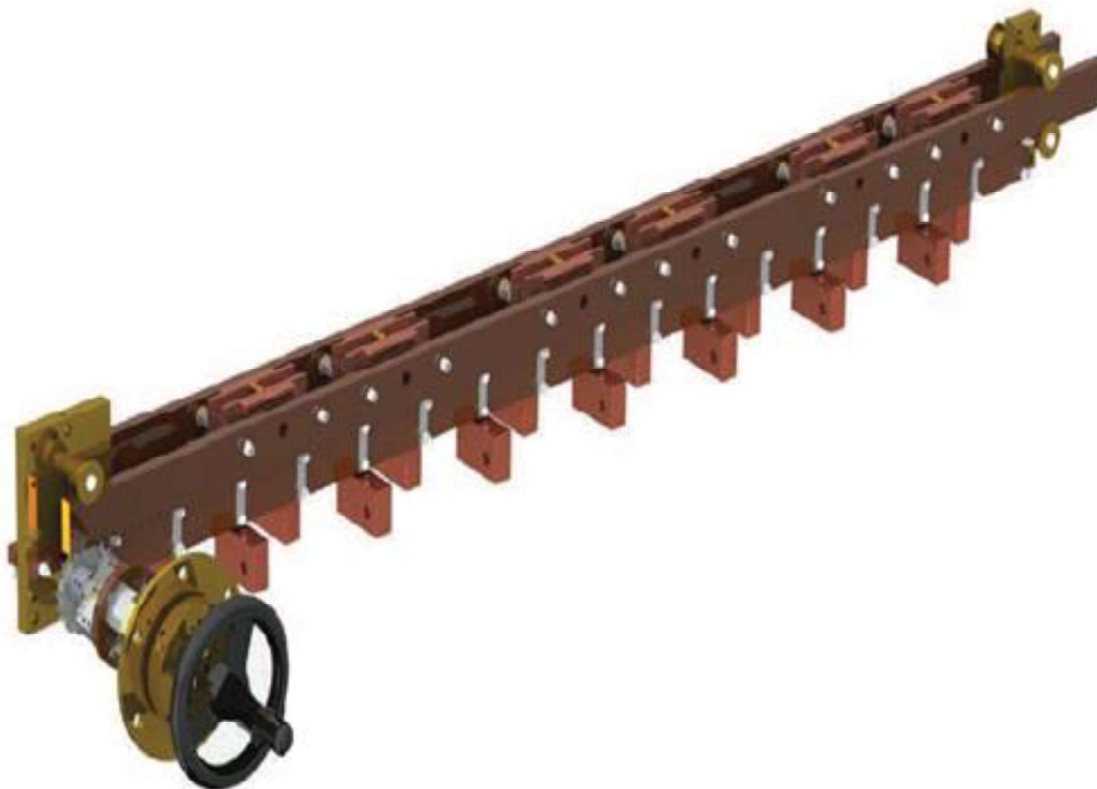
Note : It is essential to quote dimension "W" in the order. The minimum value of this dimension to be set in each case depends on the insulation conditions and on the position of the different tap changers.

WHEN ORDERING PLEASE QUOTE:

- 1 - The 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, C1, D1)
- 7 - Dimensions of the fixed contacts ($\emptyset J$ and $\emptyset K$)
- 8 - L, e, W dimensions from the tables.

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

TAP CHANGERS TYPE MHF IV



TAP CHANGERS

TYPE MHF IV

GENERAL SPECIFICATION

These tap changers are available in one two or three phase applications.

The shaft length is variable.

Connection diagrams in page MHFIV 2 can be applied in any variation to all types.

These tap changers are bolted on to the supports, welded under transformer cover and allow strong construction.

ASSEMBLY

A fraction of turn on the control head is necessary to switch from one position to another. A notch is provided to mark each position precisely. For each operation, the notch must first be released by pulling the padlockable pul rod. After being turned to the desired position, the device locks into the respective notch under the action of a spring. Refer to page MHFIV 7 for the choice of an operating device matching the tap changer fitting.

The numbering of the positions is engraved on the repeater disc of the control head.

See page MHFIV 8 for the various directions of numbering.

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.

Aluminum Parts : GAlSi12Cu

BrassParts : Cu ZN40Pb2 Ms 60 F34 DIN 17 673

Copper Parts : E - Cu F25 DIN 40 500

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

Up to 1250A.

See page MHFIV 6 for the types and dimensions of the contacts.

VOLTAGE CLASS

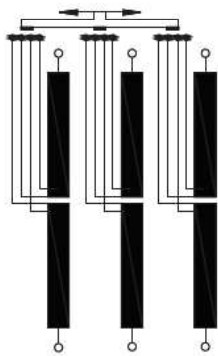
VOLTAGE CLASS	B. I. L.
20 kV	125 kV
30 kV	170 kV

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

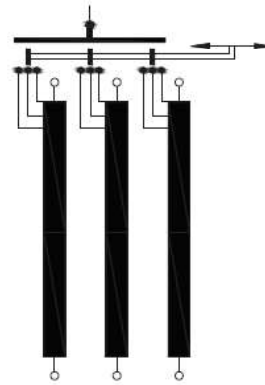


TYPE MHF IV THREEPHASE TAP CHANGER

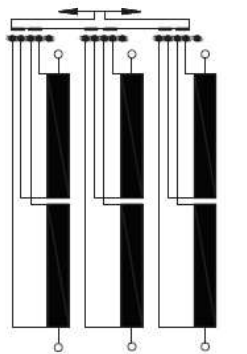
Usual Diagram



setting for delta transformer



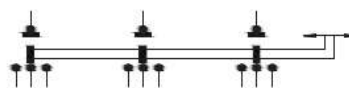
setting for star with outer - earthed
conductor transformer



series - parallel coupling



star - delta coupling

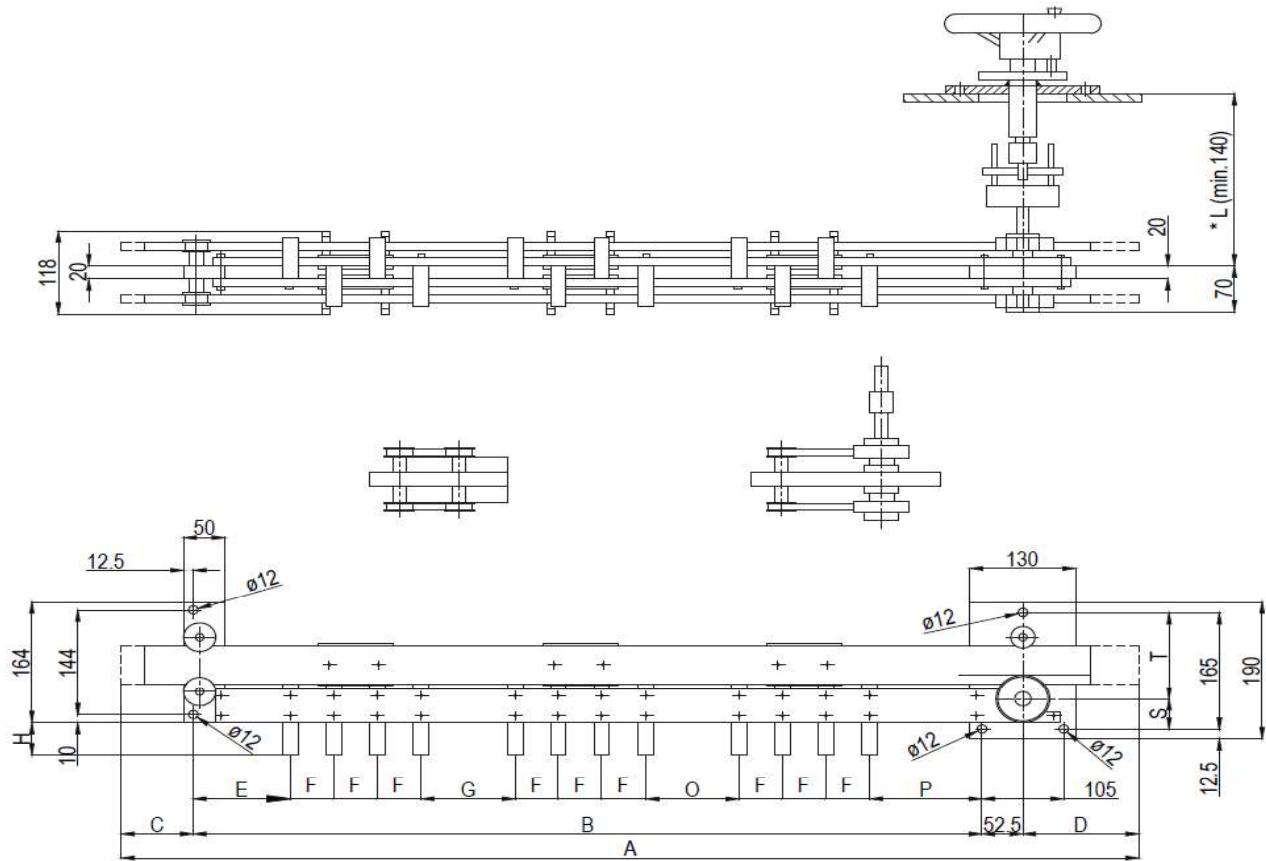


common output per phase



TYPE MHF IV THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Delta diagram 20-30kV
800-1250A 2-5 positions Setting 2.5 % per position



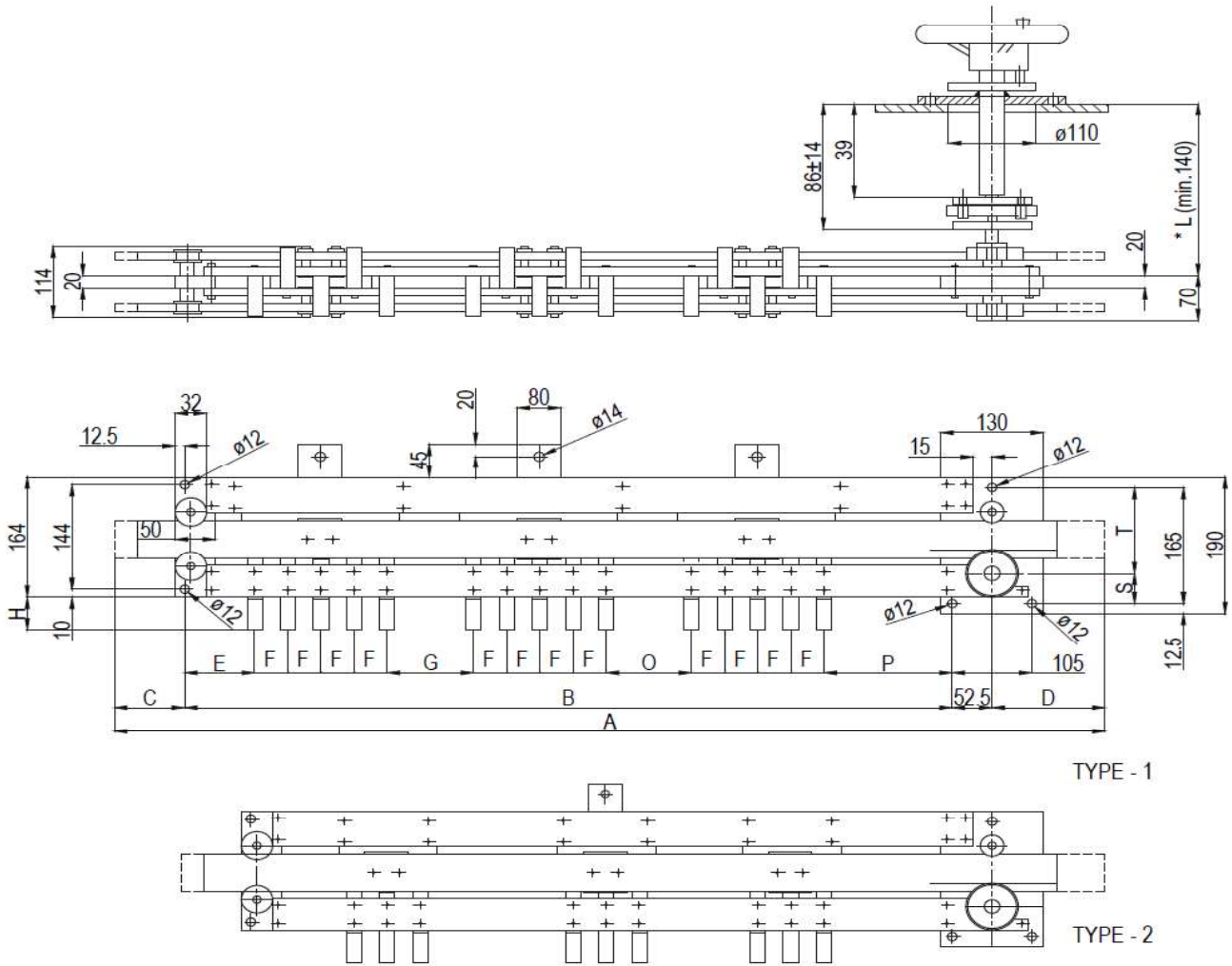
Voltage class kV	Number of Positions	A	B	C	D	E	F	G	H	O	P	S	T	L	Unit No
20	2	876	681	58	85	108	55	80	Depending on fixed contacts	80	83	43	122	Please quote when ordering	M431D248
	3	1151	846	113	140	108	55	80		80	83	43	122		M431D348
	4	1426	1011	168	195	108	55	80		80	83	43	122		M431D448
	5	1701	1176	223	250	108	55	80		80	83	29	136		M431D548
30	2	1010	815	58	85	140	55	115	Depending on fixed contacts	115	115	43	122	Please quote when ordering	M431D258
	3	1285	980	113	140	140	55	115		115	115	43	122		M431D358
	4	1560	1145	168	195	140	55	115		115	115	43	122		M431D458
	5	1835	1310	223	250	140	55	115		115	115	29	136		M431D558

* L min 95 for MH320 control device

* L min 170 for MH330 control device

TYPE MHF IV THREEPHASE TAP CHANGER

Off-circuit operation can be used in oil Star diagram 20-30kV
800-1250A 2-5 positions Setting 2.5 % per position

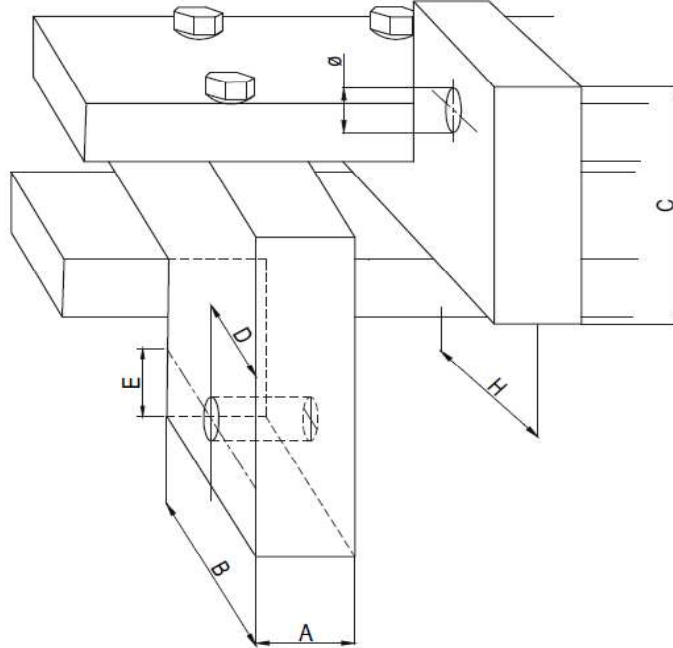


Voltage class kV	Number of Positions	A	B	C	D	E	F	G	H	O	P	S	T	L	Unit No TYPE - 1	Unit No TYPE - 2
20	2	815	620	58	85	125	55	115	Depending on fixed contacts	115	100	43	122	Please quote when ordering	M43148C2	M431F348
	3	1090	785	113	140	125	55	115		115	100	43	122		M43148C3	M431F348
	4	1365	950	168	195	125	55	115		115	100	43	122		M43148C4	M431F448
	5	223	250	125	55	115	115	100		29	136	M43148C5	M431F548			
		1640	1115	223	250	125	55	115		115	100	29	136		M43148C5	M431F548
30	2	935	740	58	85	155	55	145	Depending on fixed contacts	145	130	43	122	Please quote when ordering	M43158C2	M431F258
	3	1210	905	113	140	155	55	145		145	130	43	122		M43158C3	M431F358
	4	1485	1070	168	195	155	55	145		145	130	43	122		M43158C4	M431F458
	5	1760	1235	223	250	155	55	145		145	130	29	136		M43158C5	M431F558
		1760	1235	223	250	155	55	145		145	130	29	136		M43158C5	M431F558

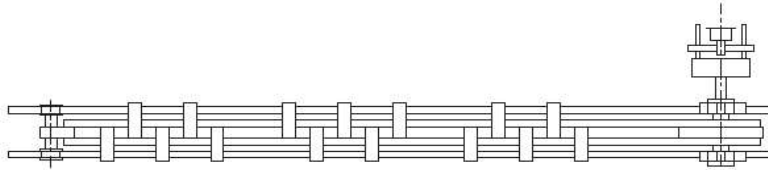
* L min 95 for MH320 control device
* L min 170 for MH330 control device

TYPE MHF IV THREEPHASE TAP CHANGER

Fixed contact



FLAG TYPE CONTACTS

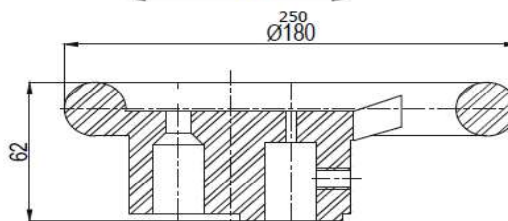
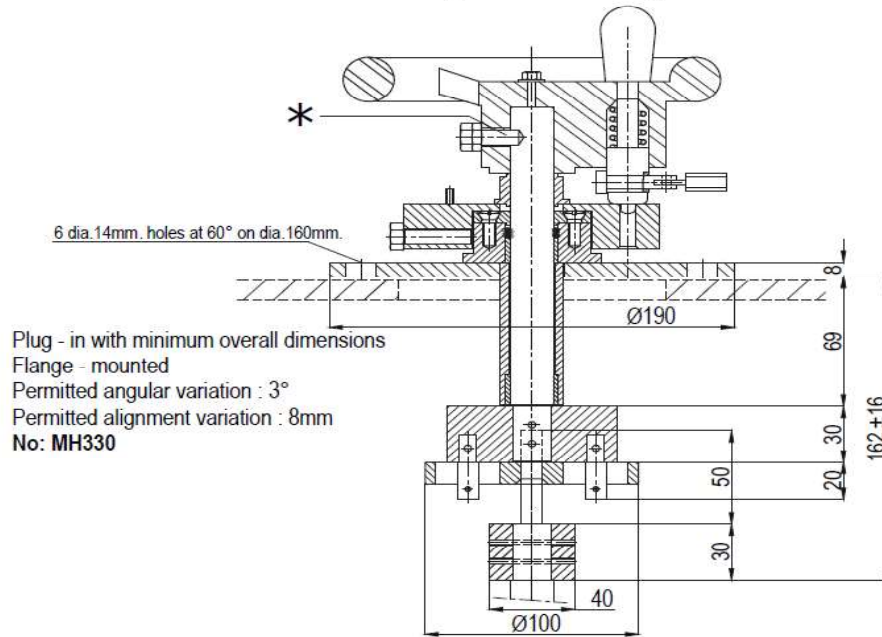
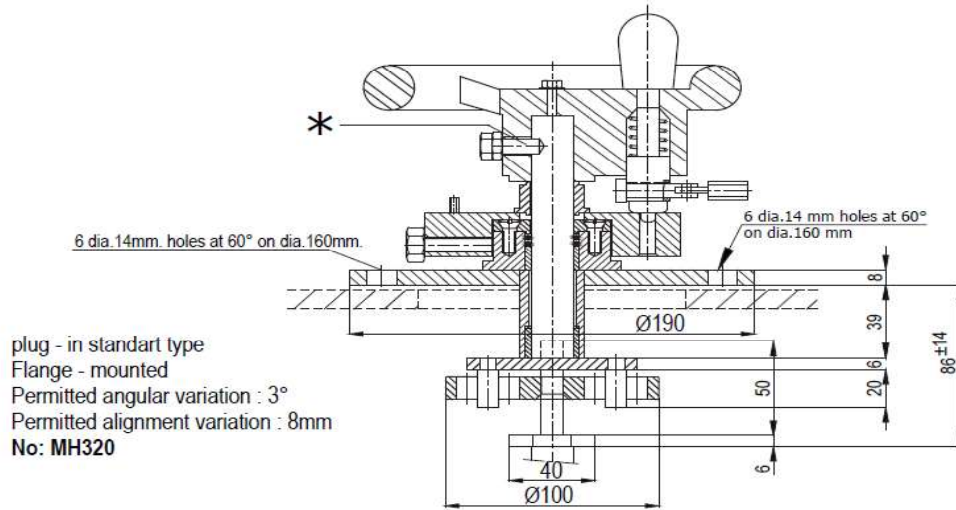


Unless Otherwise Specified By the Customer, Flag type Contacts are Positioned as in the Diagram Above

DESCRIPTION	CONTACT NUMBERS	CURRENT A	A	B	C	D	E	H
FLAG TYPE CONTACT	MK364	800	20	37.5	60	15	15	37.5
	MK365	1000	20	42.5	60	17.5	17.5	42.5
	MK366	1200	25	47.5	80	20	20	47.5

TYPE MHF IV THREEPHASE TAP CHANGER

Control devices



Ø 180 : MV180
Ø 250 : MV250

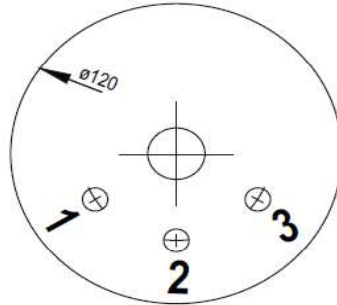
* The hole on the shaft is drilled at parallel position with respect to the middle position of the tap changer

- * L min.95 for MH320 control device
- * L min 170 for MH330 control device

TYPE MHF IV THREEPHASE TAP CHANGER

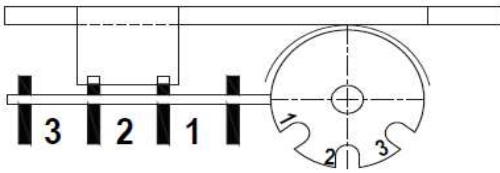
Numbering of the repeater disc - Combinations

Repeaters for rack and pinion drive

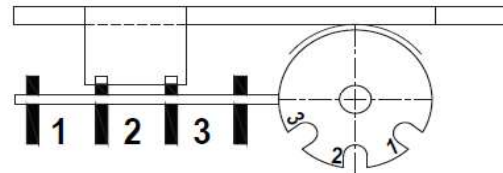


Numbering of the repeater disc for rack and pinion drive

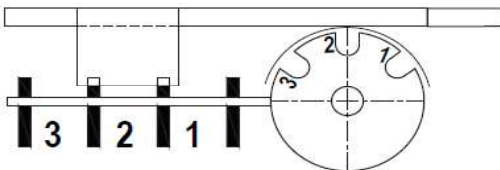
A1



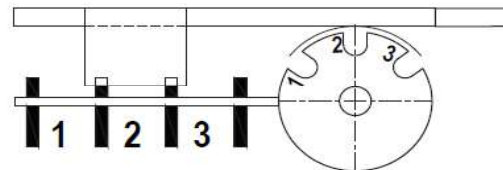
B1



D1



C1



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- 4 - The language on the control device.
- 5 - Number of positions.
- 6 - The indication of the repeater disc (A1, B1, C1, D1)
- 7 - Dimensions of the fixed contacts

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