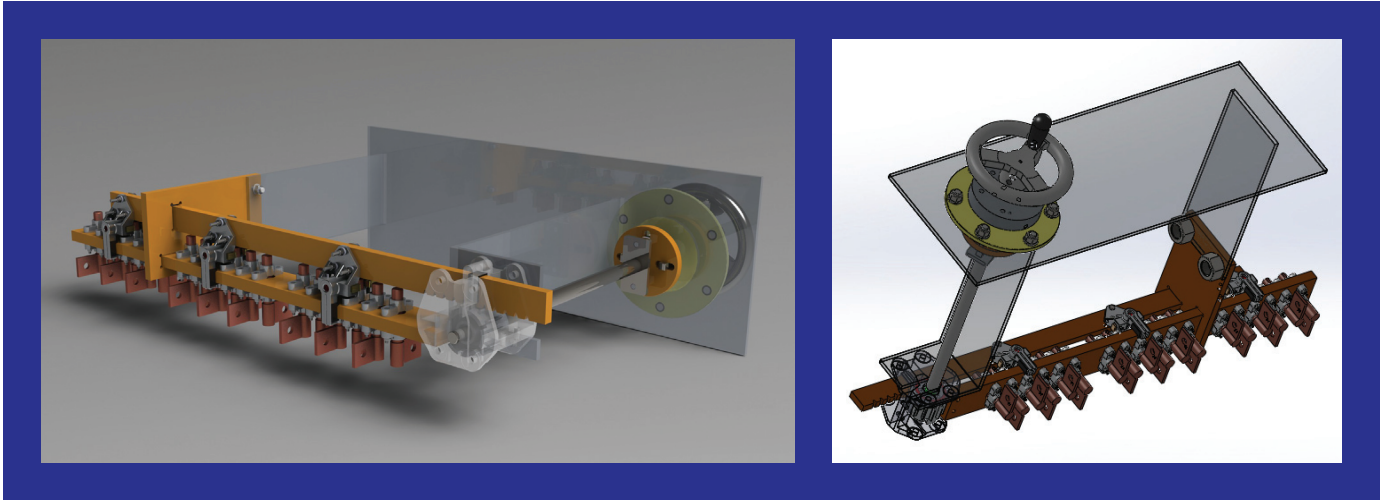


# ER KAR

Transformer  
Accessories and Equipments



***EKF 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 EKFI 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 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 400A.

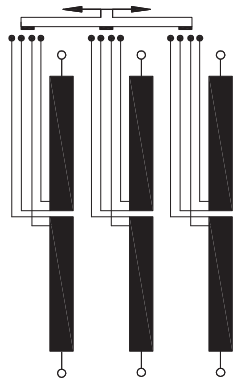
See page EKFI 24 for the types and dimensions of the contacts.

**VOLTAGE CLASS**

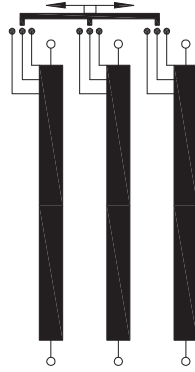
VOLTAGE CLASS	B. I. L.
20 kV	125 kV
30 kV	170 kV
60 kV	325 kV

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

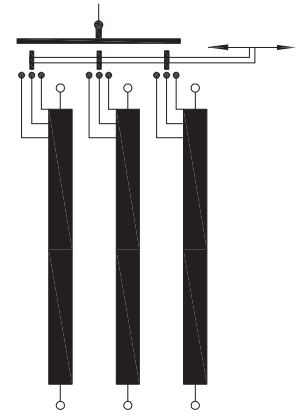
Usual Diagram



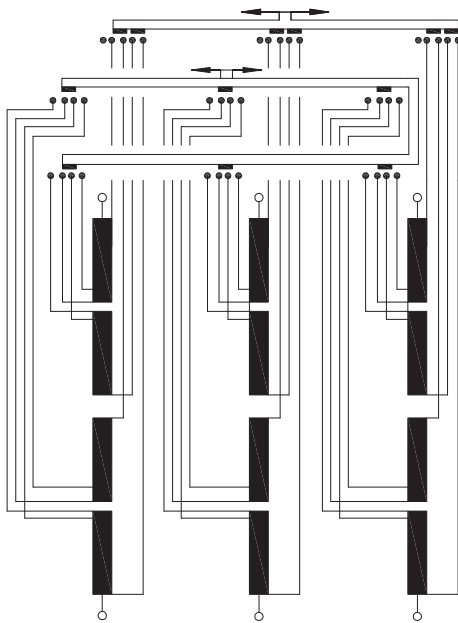
setting for delta transformer



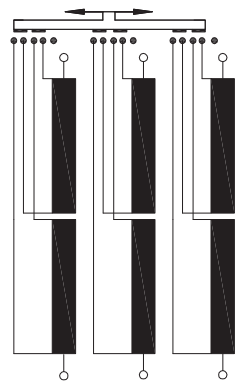
setting for star transformer



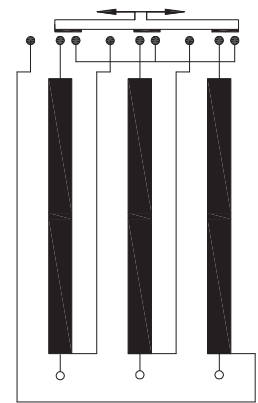
setting for star with outer - earthed conductor transformer



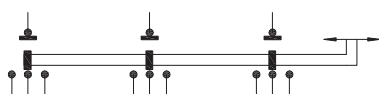
Typical combination :  
 -1 stage, series - parallel coupling  
 - 2 stages, delta diagram - setting  $\pm 2,5\%$  .



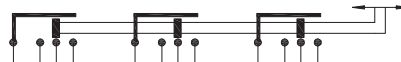
series - parallel coupling



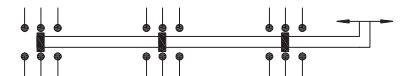
star - delta coupling



common output per phase

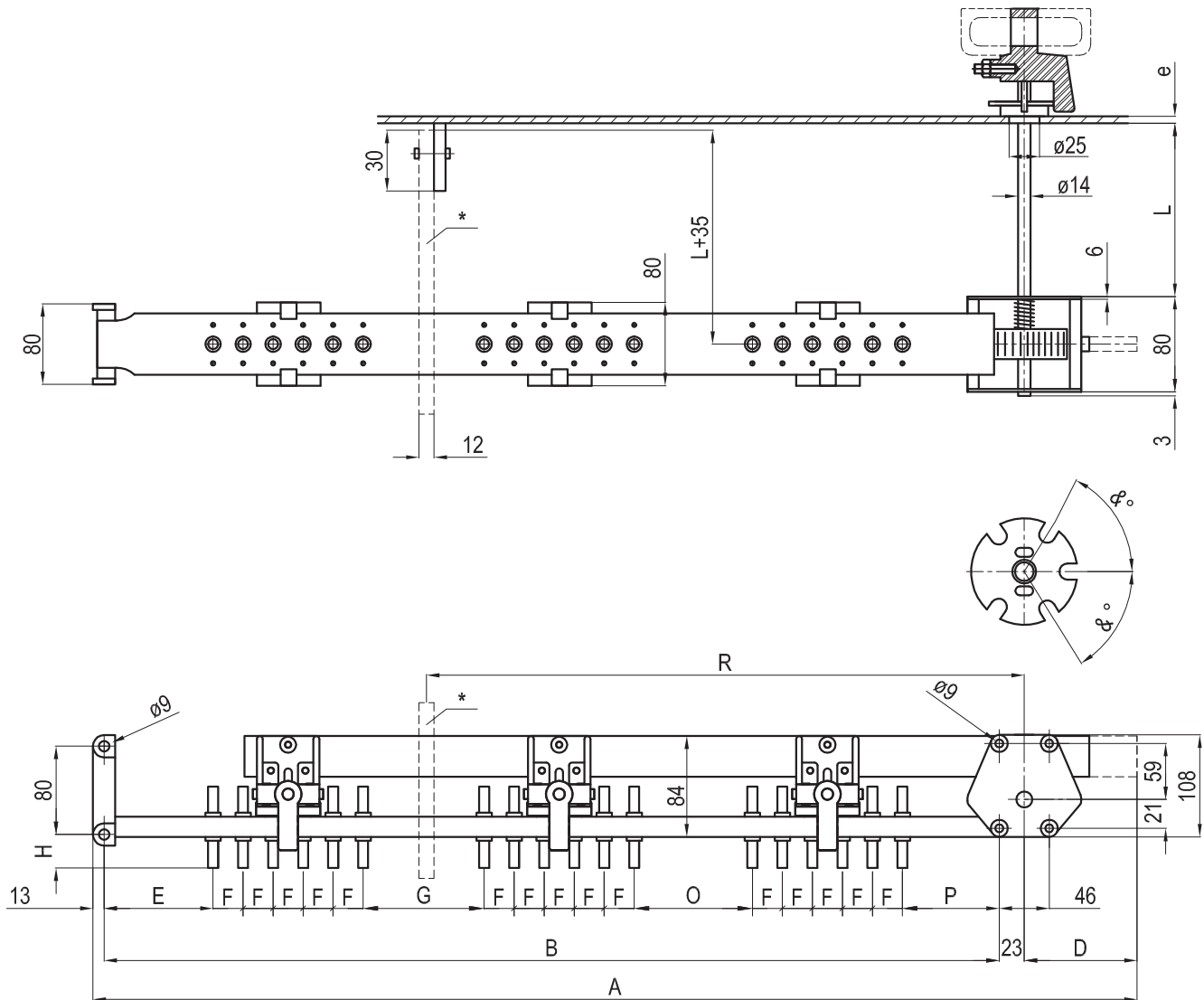


common output per phase



opposite contacts

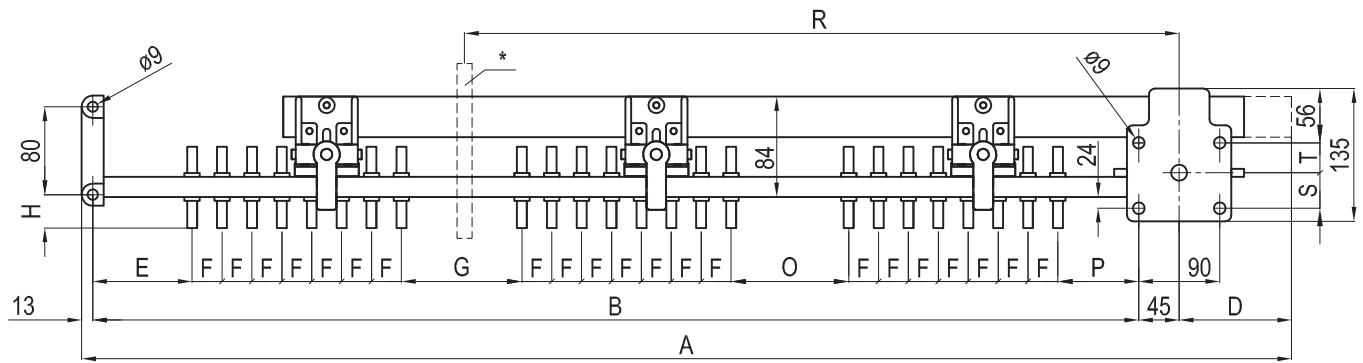
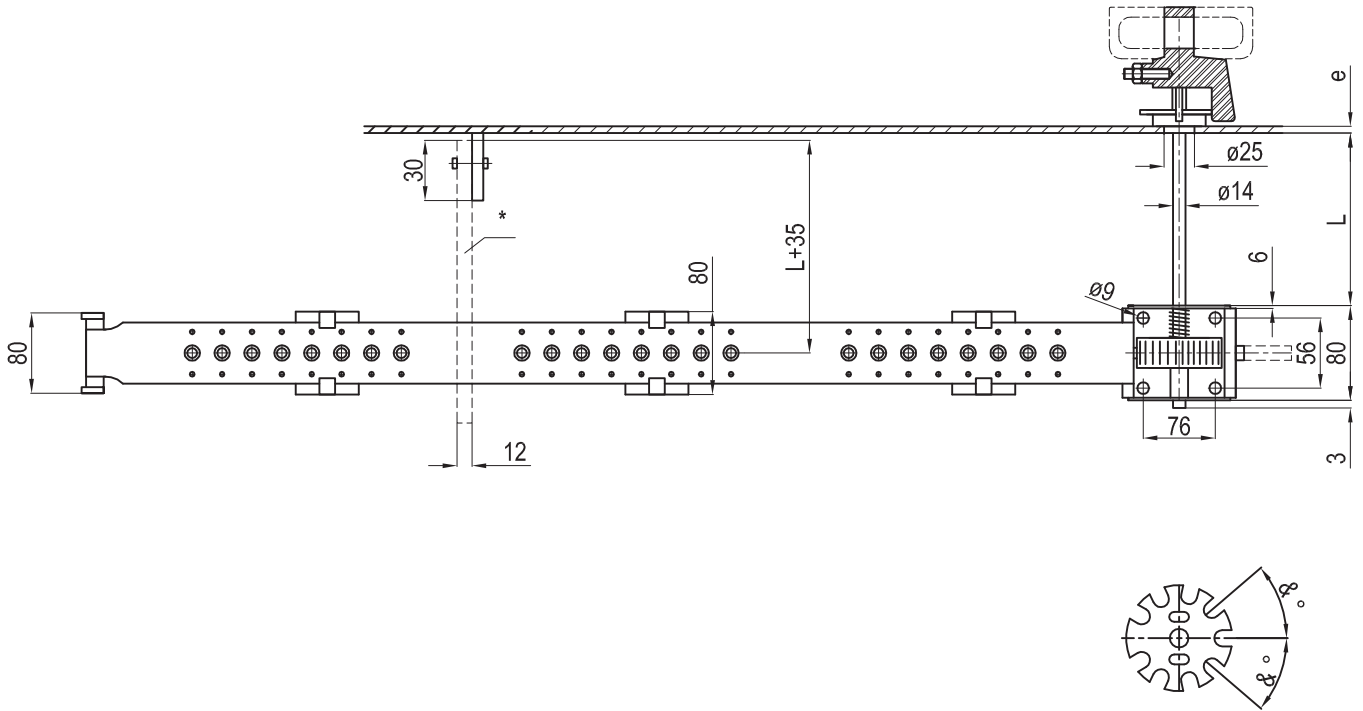
Off-circuit operation can be used in oil Delta diagram 20-60kV  
150-400A 2-6 positions Setting 2.5 % per position (With Aluminium Support)



Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	R	$\phi^\circ$	L	e	Unit No
20	2	601	503	62	76	32	70	Depending on fixed contacts	70	95	351	$63^\circ$	Please quote when ordering		E 43146D2
	3	729	599	94	76	32	70		70	95	415	$63^\circ$		E 43146D3	
	4	857	695	126	76	32	70		70	95	479	$63^\circ$		E 43146D4	
	5	985	791	158	76	32	70		70	95	543	$63^\circ$		E 43146D5	
	6	1113	887	190	76	32	70		70	95	607	$63^\circ$		E 43146D6	
30	2	721	623	62	106	32	100		100	125	426	$63^\circ$		E 43156D2	
	3	849	719	94	106	32	100		100	125	490	$63^\circ$		E 43156D3	
	4	977	815	126	106	32	100		100	125	554	$63^\circ$		E 43156D4	
	5	1105	911	158	106	32	100		100	125	618	$63^\circ$		E 43156D5	
	6	1233	1007	190	106	32	100		100	125	682	$63^\circ$		E 43156D6	
60	2	1440	1331	73	267	43	260	260	286	871	$84^\circ$	E 43166D2			
	3	1612	1460	116	267	43	260	260	286	957	$84^\circ$	E 43166D3			
	4*	1784	1589	159	267	43	260	260	286	1043	$84^\circ$	E 43166D4			
	5*	1956	1718	202	267	43	260	260	286	1129	$81^\circ$	E 43166D5			

\* Additional supporting plate is used

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)

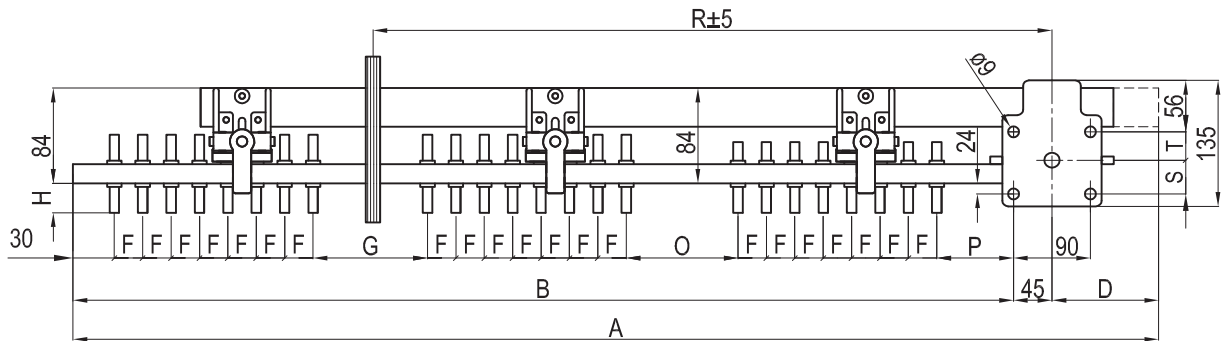
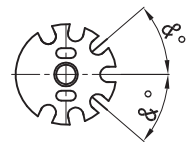
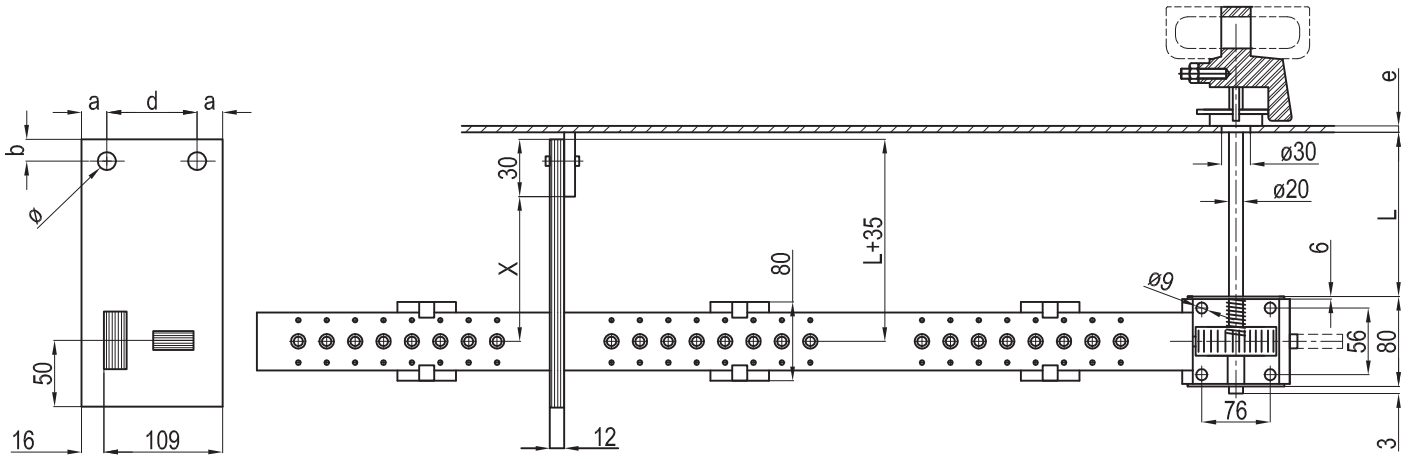


Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	R	S	T	& °	L	e	Unit No
20	7	1263	983	222	76	32	70	Depending on fixed contacts	70	95	693	29	35	38°	Please quote when ordering		E 43146D7
	8	1391	1079	254	76	32	70		70	95	757	29	35	38°			E 43146D8
	9	1519	1175	286	76	32	70		70	95	821	29	35	38°			E 43146D9
30	7	1383	1103	222	106	32	100		100	125	768	29	35	38°			E 43156D7
	8	1511	1199	254	106	32	100		100	125	832	29	35	38°			E 43156D8
	9	1639	1295	286	106	32	100		100	125	896	29	35	38°			E 43156D9
60	6*	2150	1847	245	267	43	260		260	286	1237	29	35	51°			E 43166D6
	7*	2322	1976	288	267	43	260		260	286	1323	29	35	51°			E 43166D7

\* Additional supporting plate is used

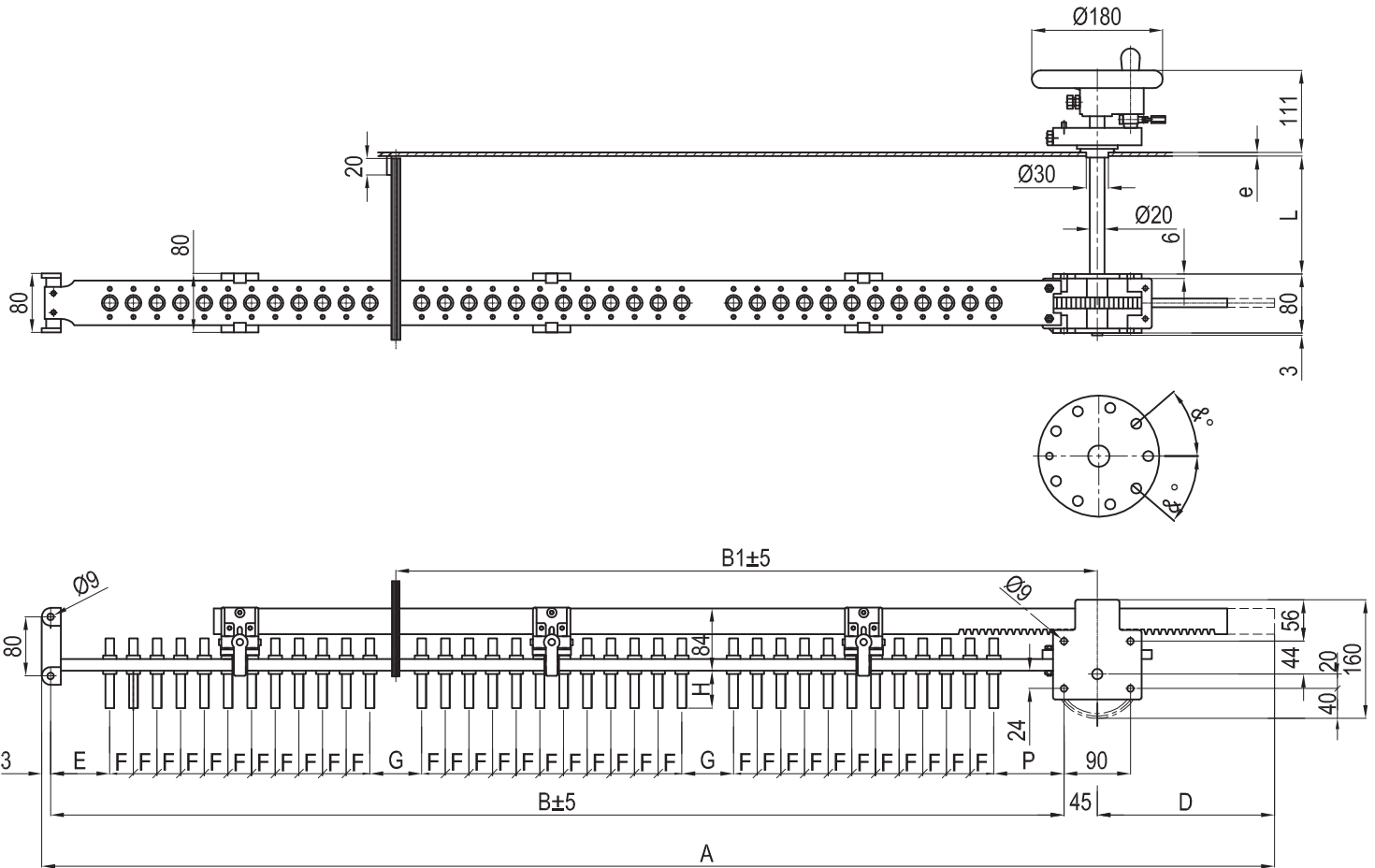


Off-circuit operation can be used in oil Delta diagram 20-30kV  
150-400A 7-9 positions Setting 2.5 % per position (With HP Support)



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	1204	937	222	32	70	Depending on fixed contacts	70	95	693	29	35	70	38°	Please quote when ordering		E 43346D7
	8	1332	1033	254	32	70		70	95	757	29	35	70	38°			E 43346D8
	9	1460	1129	286	32	70		70	95	821	29	35	70	38°			E 43346D9
30	7	1294	1027	222	32	100		100	125	768	29	35	130	38°			E 43356D7
	8	1422	1123	254	32	100		100	125	832	29	35	130	38°			E 43356D8
	9	1550	1219	286	32	100		100	125	896	29	35	130	38°			E 43356D9
60	6*	1900	1610	245	43	260		260	286	1237	29	35	250	51°			E 43366D6
	7*	2072	1739	288	43	260		260	286	1323	29	35	250	51°			E 43366D7

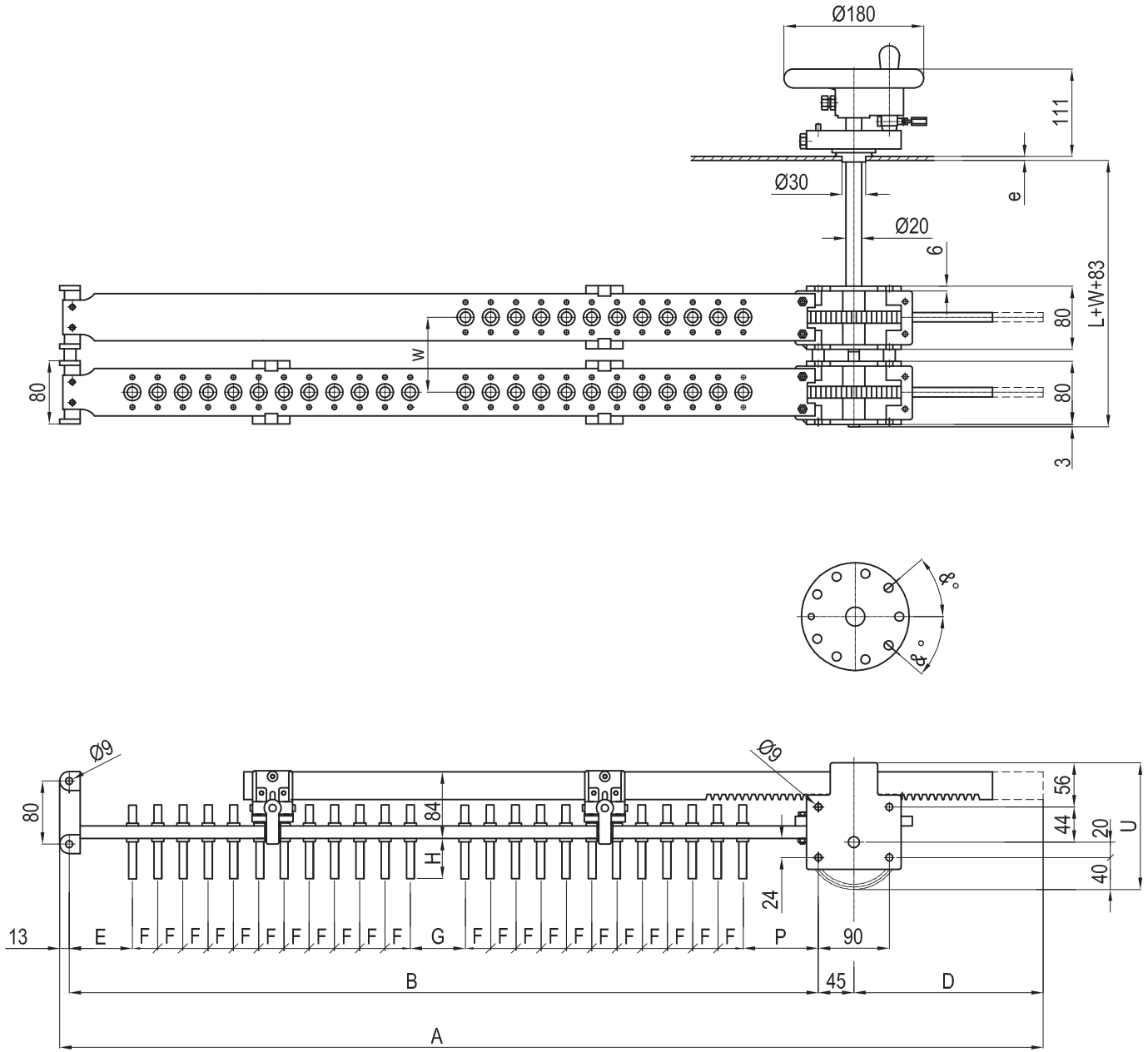
Off-circuit operation can be used in oil Delta diagram 20-60kV  
150-400A 10-11 positions Setting 2.5 % per position (With Aluminium HP Support)



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		E 43146D10
	11	1789	1367	949	364	32	76		70	95	20	44	32°		E 43146D11	
30	10	1781	1391	960	332	32	106		100	125	20	44	32°		E 43156D10	
	11	1909	1487	1024	364	32	106		100	125	20	44	32°		E 43156D11	

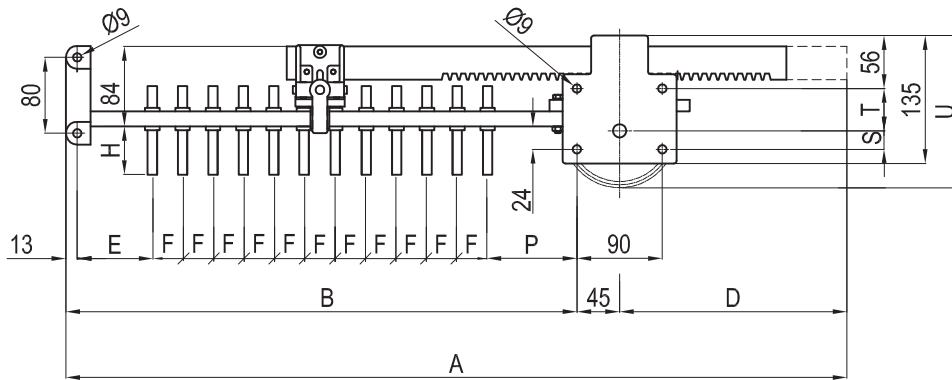
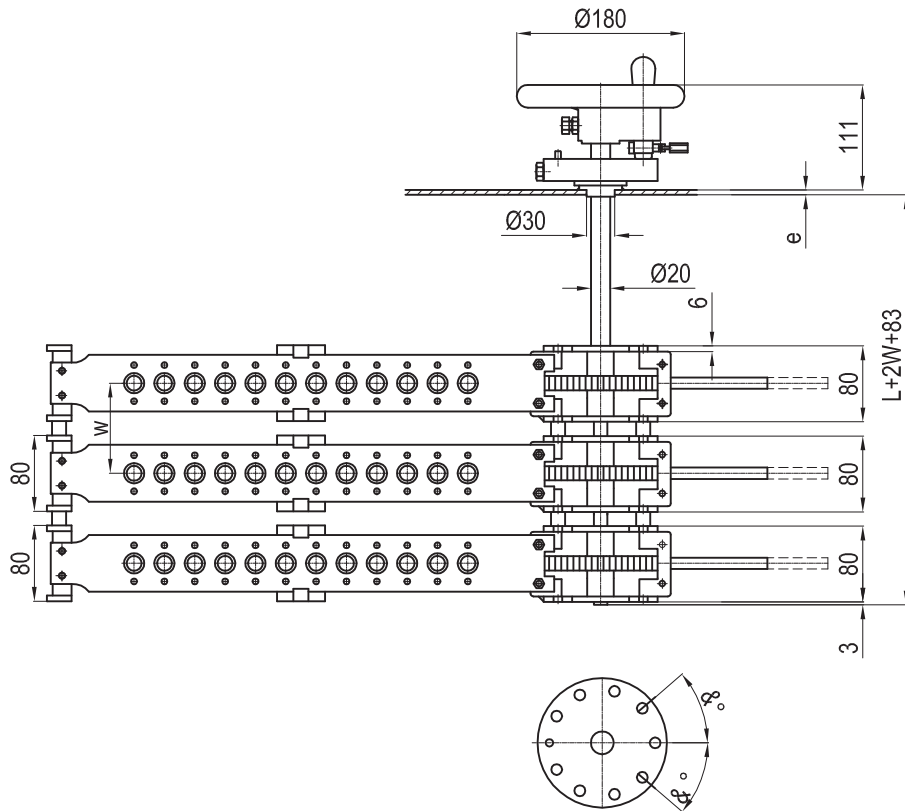


Off-circuit operation can be used in oil Delta diagram 20-30kV  
150-400A 7-11 positions Setting 2.5 % per position (With Aluminium Support)



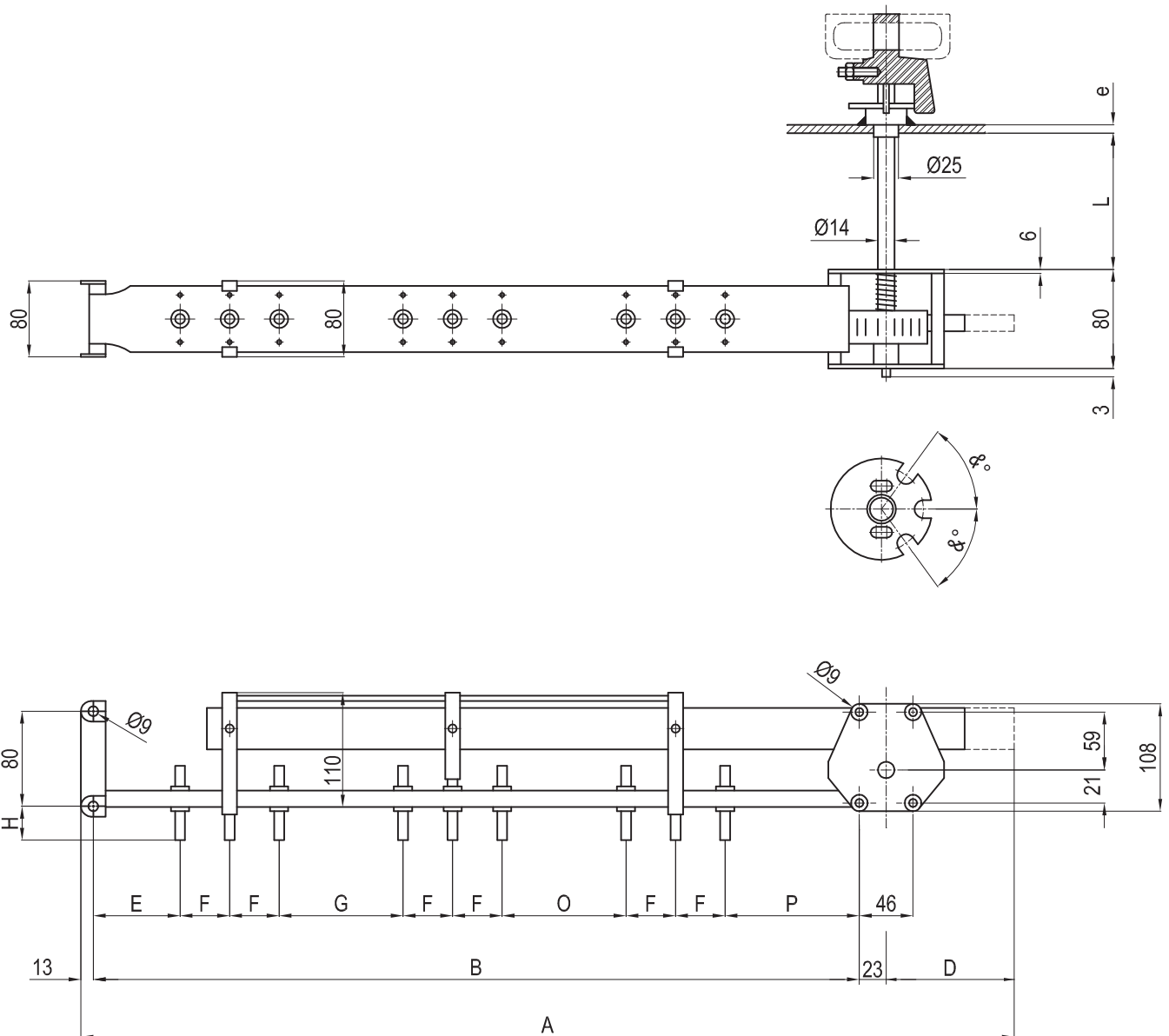
Voltage class kV	Number of Positions	A	B	D	F	E	H	G	P	S	T	U	& °	L	e	W	Unit No
20	7	969	689	222	32	76	Depending on fixed contacts	70	95	29	35	151	38°	Please quote when ordering			E 47146D7
	8	1065	753	254	32	76		70	95	29	35	151	38°				E 47146D8
	9	1161	817	286	32	76		70	95	29	35	151	38°				E 47146D9
	10	1271	881	332	32	76		70	95	20	44	160	32°				E 47146D10
	11	1367	945	364	32	76		70	95	20	44	160	32°				E 47146D11
30	7	1059	779	222	32	106	Depending on fixed contacts	100	125	29	35	151	38°	Please quote when ordering			E 47156D7
	8	1155	843	254	32	106		100	125	29	35	151	38°				E 47156D8
	9	1251	907	286	32	106		100	125	29	35	151	38°				E 47156D9
	10	1361	971	332	32	106		100	125	20	44	160	32°				E 47156D10
	11	1457	1035	364	32	106		100	125	20	44	160	32°				E 47156D11

Off-circuit operation can be used in oil Delta diagram 20-30kV  
150-400A 7-11 positions Setting 2.5 % per position (With Aluminium Support)



		A	B	D	F	E	H	P	S	T	U	& °	L	e	W	Unit No
20	7	675	395	222	32	76	Depending on fixed contacts	95	29	35	151	38°	Please quote when ordering			E 48146D7
	8	739	427	254	32	76		95	29	35	151	38°				E 48146D8
	9	803	459	286	32	76		95	29	35	151	38°				E 48146D9
	10	881	491	332	32	76		95	20	44	160	32°				E 48146D10
	11	945	523	364	32	76		95	20	44	160	32°				E 48146D11
30	7	735	455	222	32	106	Depending on fixed contacts	125	29	35	151	38°	Please quote when ordering			E 48156D7
	8	799	487	254	32	106		125	29	35	151	38°				E 48156D8
	9	863	519	286	32	106		125	29	35	151	38°				E 48156D9
	10	941	551	332	32	106		125	20	44	160	32°				E 48156D10
	11	1005	583	364	32	106		125	20	44	160	32°				E 48156D11

Off-circuit operation can be used in oil Star diagram 20-60kV  
150-400A 2-6 positions Setting 2.5 % per position (With Aluminium Support)

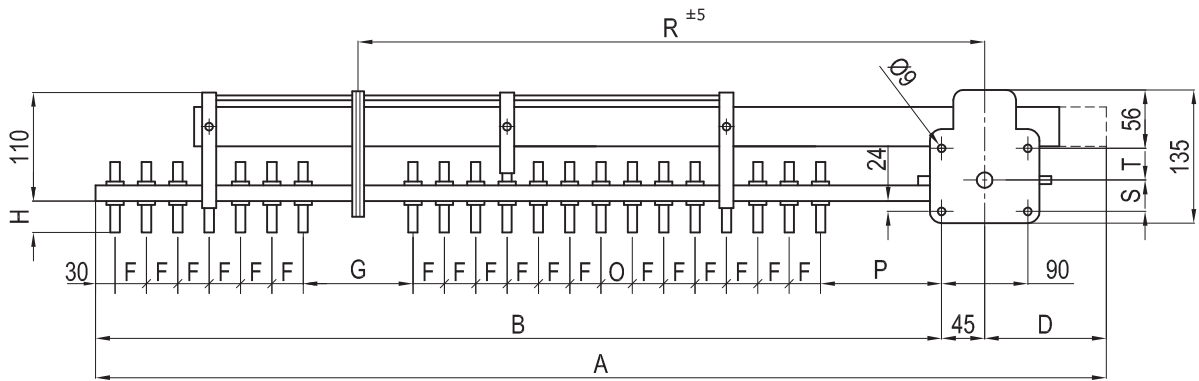
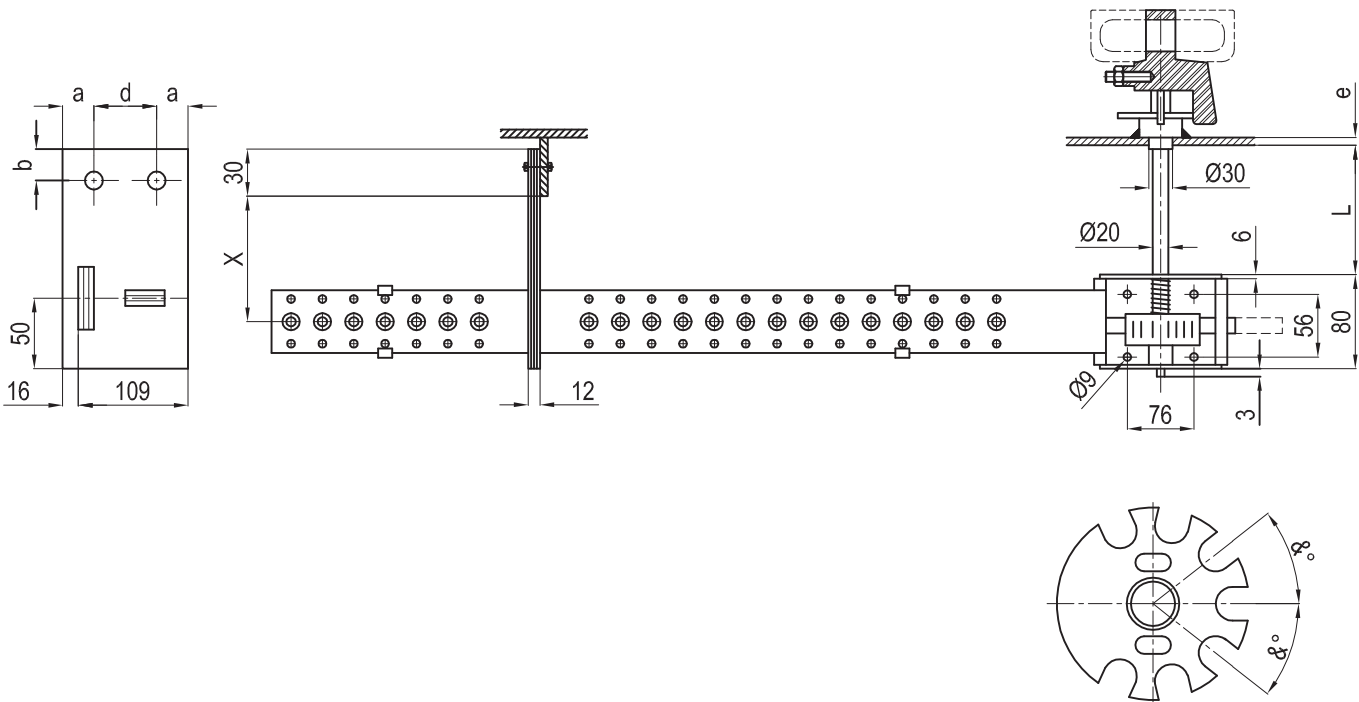


Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	& °	L	e	Unit No
20	2	429	331	62	76	32	32	Depending on fixed contacts	32	95	63°	Please quote when ordering		E 43146S2
	3	557	427	94	76	32	32		32	95	63°			E 43146S3
	4	685	523	126	76	32	32		32	95	63°			E 43146S4
	5	813	619	158	76	32	32		32	95	63°			E 43146S5
	6	941	715	190	76	32	32		32	95	63°			E 43146S6
	30	2	489	391	62	106	32		32	Depending on fixed contacts	32			125
3		617	487	94	106	32	32	32	125		63°	E 43156S3		
4		745	583	126	106	32	32	32	125		63°	E 43156S4		
5		873	679	158	106	32	32	32	125		63°	E 43156S5		
6		1001	775	190	106	32	32	32	125		63°	E 43156S6		
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°	E 43166S3		
	4	1275	1080	159	267	43	70	70		286	84°	E 43166S4		
	5	1447	1209	202	267	43	70	70		286	81°	E 43166S5		



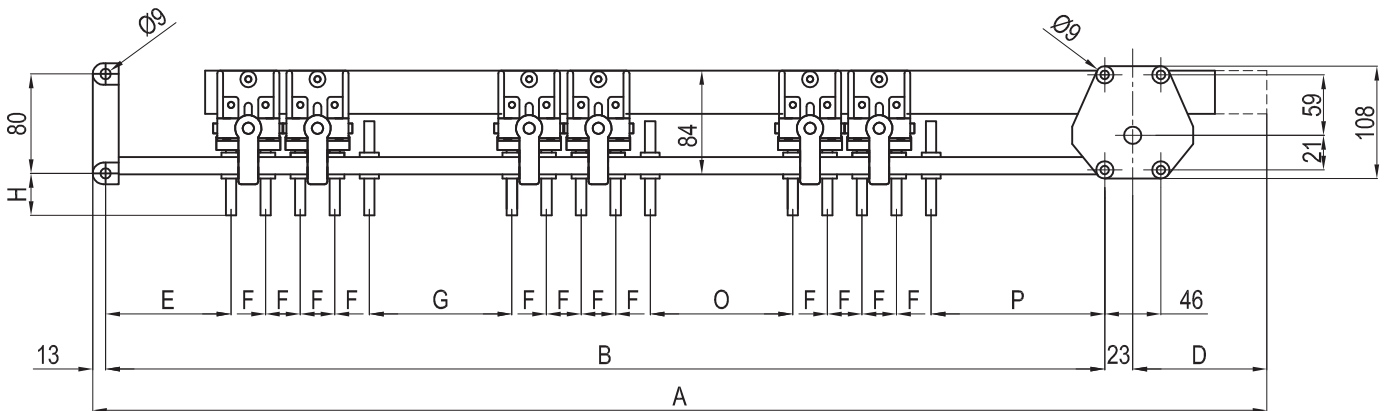
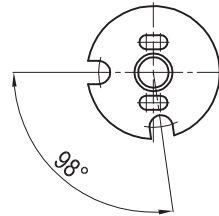
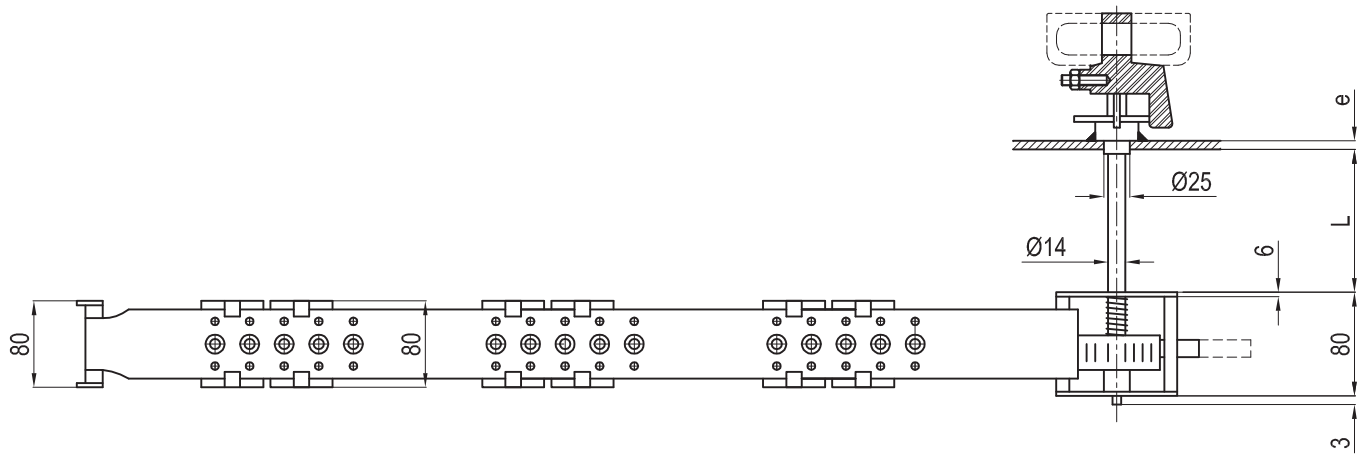


Off-circuit operation can be used in oil Star diagram 20-60kV  
150-400A 7-9 positions Setting 2.5 % per position (With HP Support)



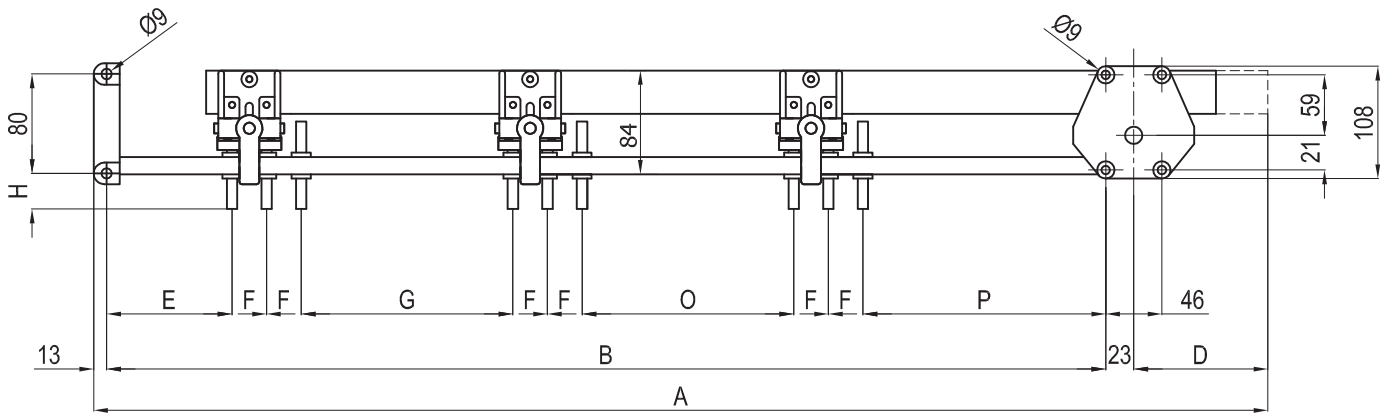
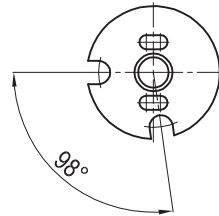
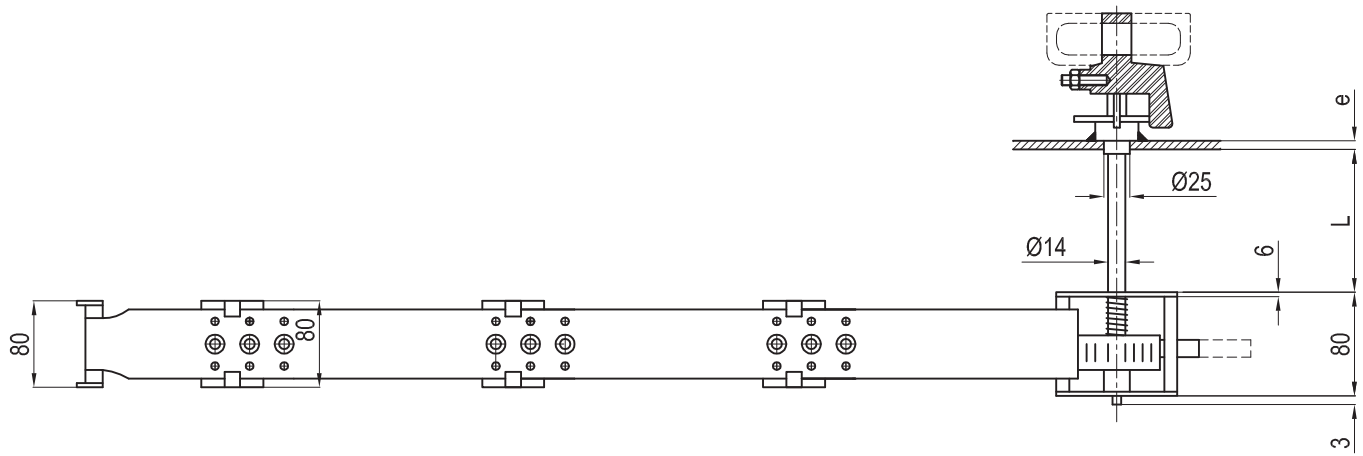
Voltage class kV	Number of Positions	A	B	D	F	G	H	O	P	R	S	T	X min.	& °	L	e	Unit No
20	7	1060	793	222	32	60	Depending on fixed contacts	32	95	586	29	35	70	38°	Please quote when ordering		E 43346S7
	8	1188	889	254	32	60		32	95	650	29	35	70	38°			E 43346S8
	9	1316	985	286	32	60		32	95	714	29	35	70	38°			E 43346S9
30	7	1090	823	222	32	60		32	125	616	29	35	130	38°			E 43356S7
	8	1218	919	254	32	60		32	125	680	29	35	130	38°			E 43356S8
	9	1346	1015	286	32	60		32	125	744	29	35	130	38°			E 43356S9
60	6*	1391	1101	245	43	70		70	286	866	29	35	250	51°			E 43366S6
	7*	1563	1230	288	43	70		70	286	952	29	35	250	51°			E 43366S7

Off-circuit operation can be used in oil askarel  
 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		E 43176P2
15 - 30	1227	1111	80	126	50	120		120	145	98°			E 43186P2

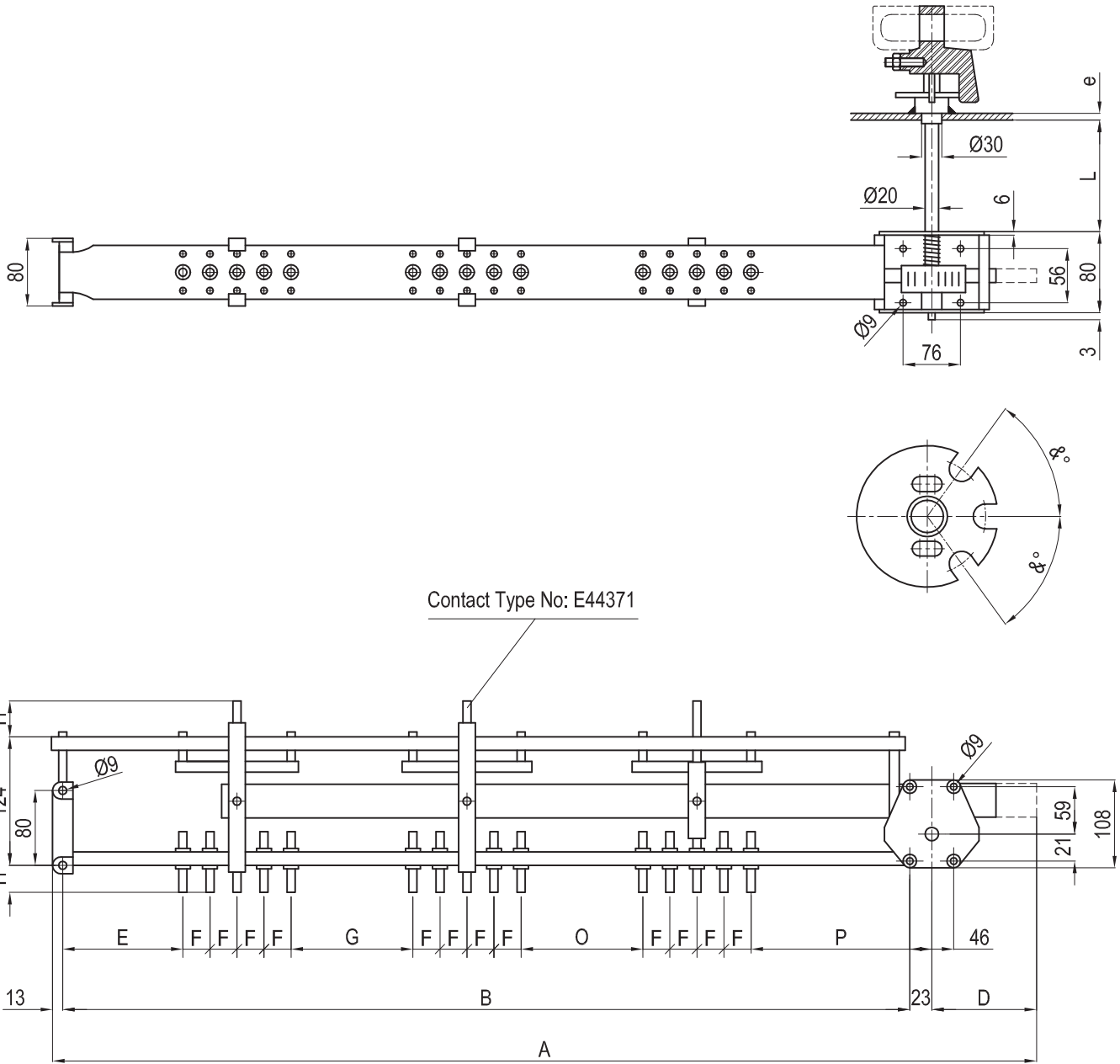
Off-circuit operation can be used in oil askarel  
 Star delta coupling 20-30kV 150-400A (With Aluminium Support)



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		E 43146R2
30	1029	887	106	106	76	100		100	125	149°			E 43156R2

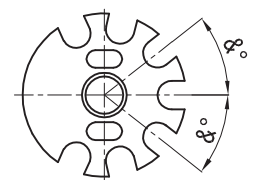
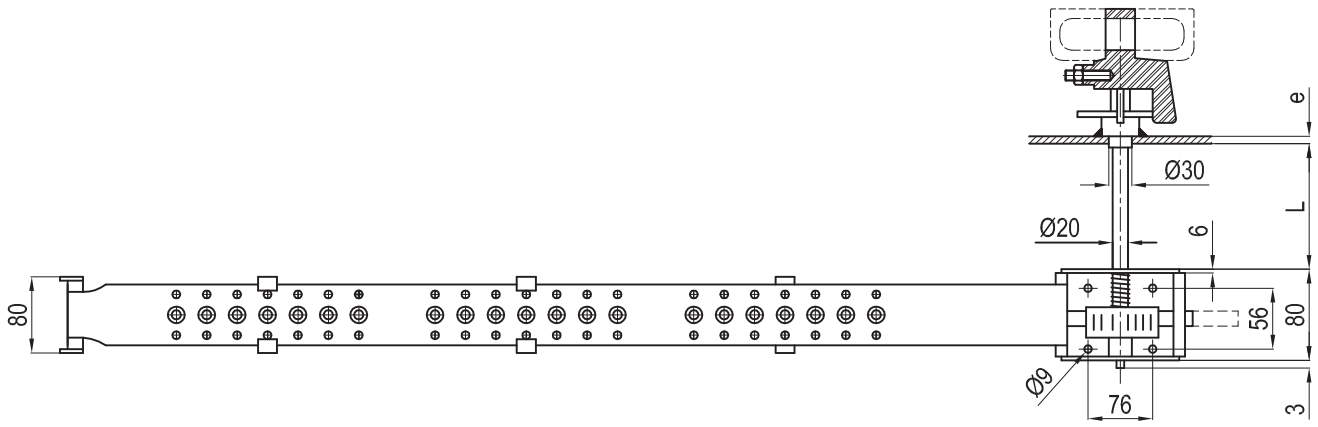


Off-circuit operation can be used in oil askarel Common output per phase  
20-60kV 150-400A 3-6 P. Setting 2.5 % per position (With Aluminium Support)

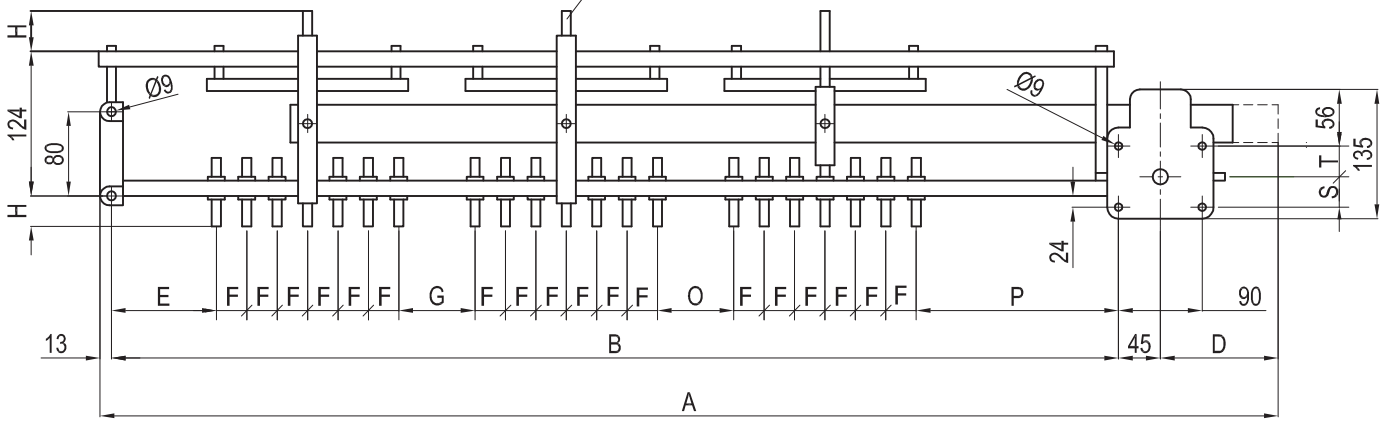


Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	& °	L	e	Unit No
20	3	633	503	94	76	32	70	Depending on fixed contacts	70	95	63°	Please quote when ordering		E 43146C3
	4	761	599	126	76	32	70		70	95	63°			E 43146C4
	5	889	695	158	76	32	70		70	95	63°			E 43146C5
	6	1017	791	190	76	32	70		70	95	63°			E 43146C6
30	3	753	623	94	106	32	100	Depending on fixed contacts	100	125	63°	Please quote when ordering		E 43156C3
	4	881	719	126	106	32	100		100	125	63°			E 43156C4
	5	1009	815	158	106	32	100		100	125	63°			E 43156C5
	6	1137	911	190	106	32	100		100	125	63°			E 43156C6
60	3	1483	1331	116	267	43	260	Depending on fixed contacts	260	286	84°	Please quote when ordering		E 43166C4
	4	1655	1460	159	267	43	260		260	286	84°			E 43166C5
	5	1827	1589	202	267	43	260		260	286	81°			E 43166C6

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

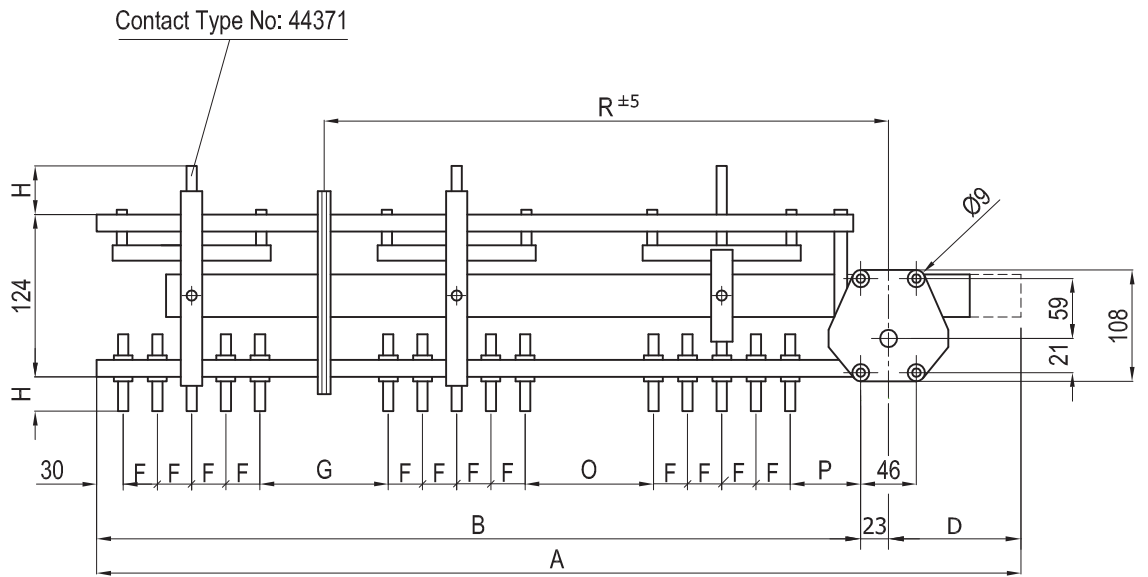
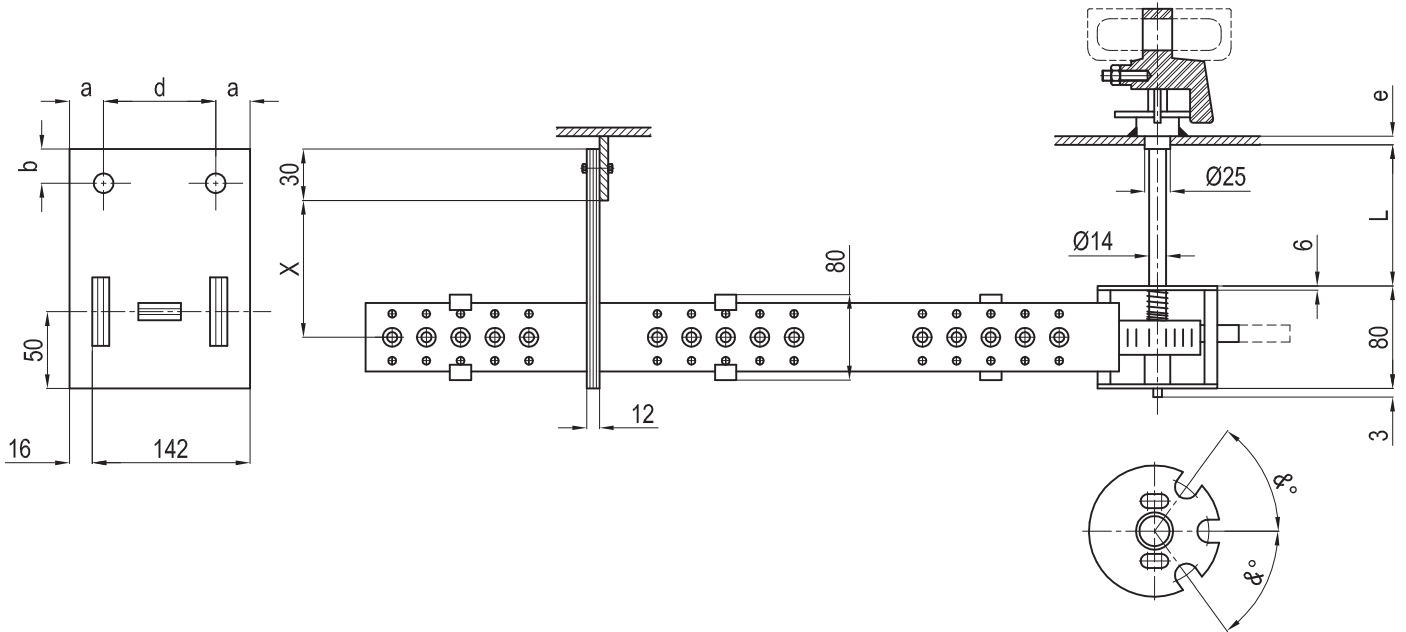


Contact Type No: E44371



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		E 43146C7
	8	1295	983	254	76	32	70		70	95	29	35	38°			E 43146C8
	9	1423	1079	286	76	32	70		70	95	29	35	38°			E 43146C9
30	7	1287	1007	222	106	32	100		100	125	29	35	38°			E 43156C7
	8	1415	1103	254	106	32	100		100	125	29	35	38°			E 43156C8
	9	1543	1199	286	106	32	100		100	125	29	35	38°			E 43156C9
60	6	2021	1718	245	267	43	260		260	286	29	35	51°			E 43166C6
	7	2193	1847	288	267	43	260		260	286	29	35	51°			E 43166C7

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

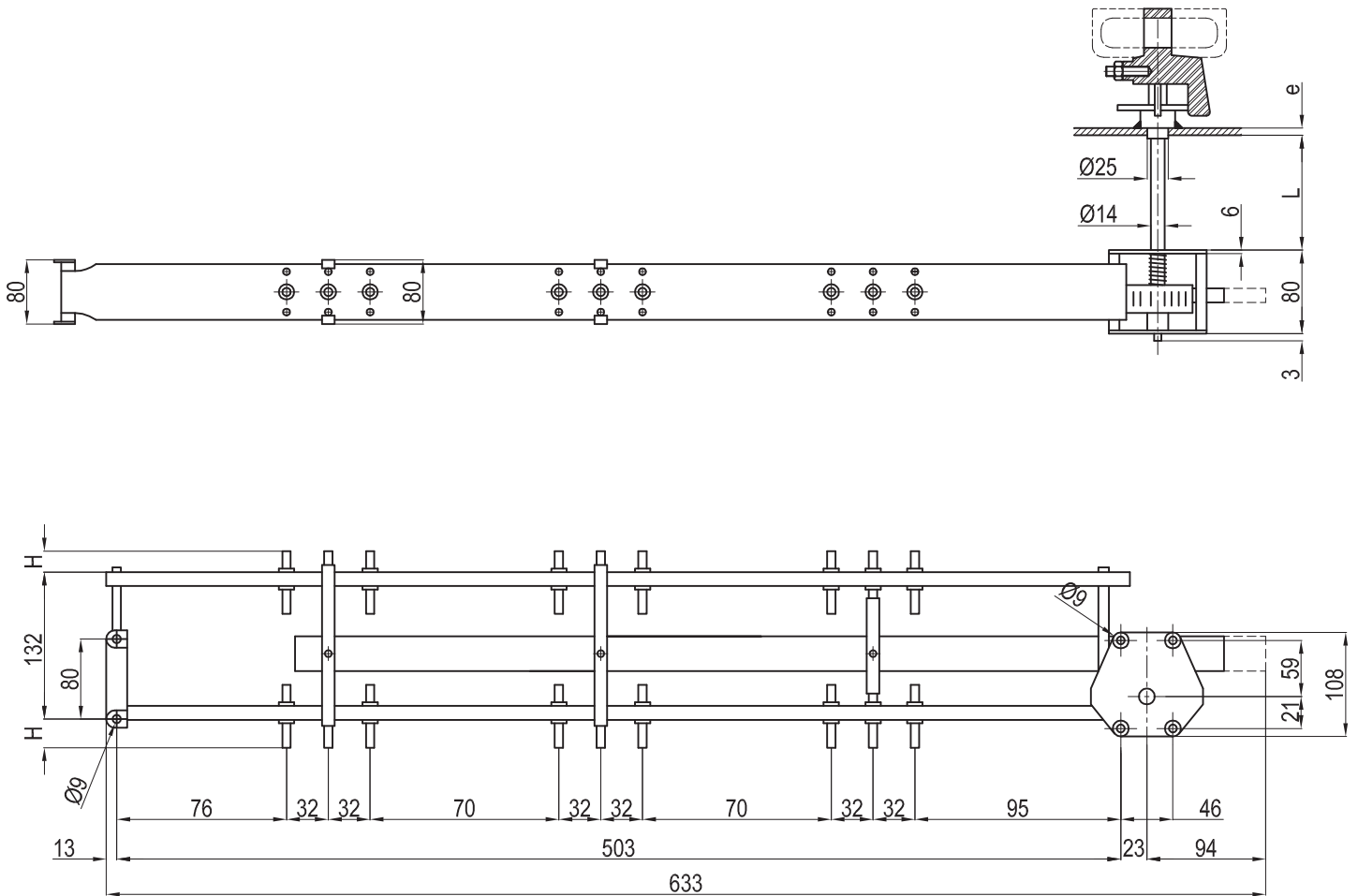


Voltage class kV	Number of Positions	A	B	D	F	G	H	O	P	R	X min.	& °	L	e	Unit No
20	3	574	457	94	32	70	Depending on fixed contacts	70	95	351	70	63°	Please quote when ordering		E 43346C3
	4	702	553	126	32	70		70	95	415	70	63°			E 43346C4
	5	830	649	158	32	70		70	95	479	70	63°			E 43346C5
	6	958	745	190	32	70		70	95	543	70	63°			E 43346C6
30	3	664	547	94	32	100		100	125	426	130	63°			E 43356C3
	4	792	643	126	32	100		100	125	490	130	63°			E 43356C4
	5	920	739	158	32	100		100	125	554	130	63°			E 43356C5
	6	1048	835	190	32	100		100	125	618	130	63°			E 43356C6
60	3	1233	1094	116	43	260		260	286	871	250	84°			E 43366C3
	4	1405	1223	159	43	260		260	286	957	250	84°			E 43366C4
	5	1577	1352	202	43	260		260	286	1043	250	81°			E 43366C5



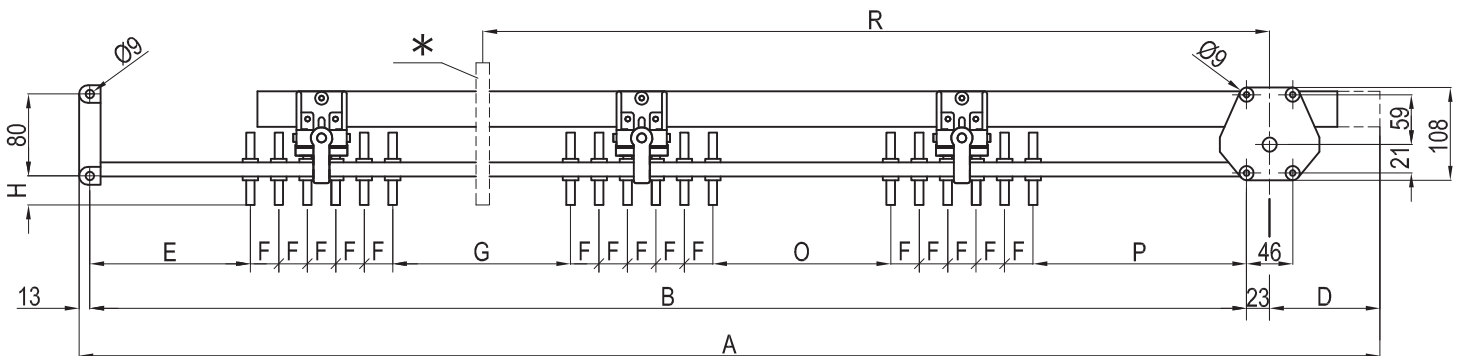
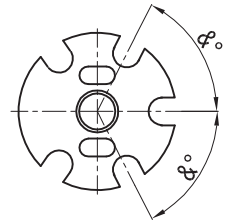
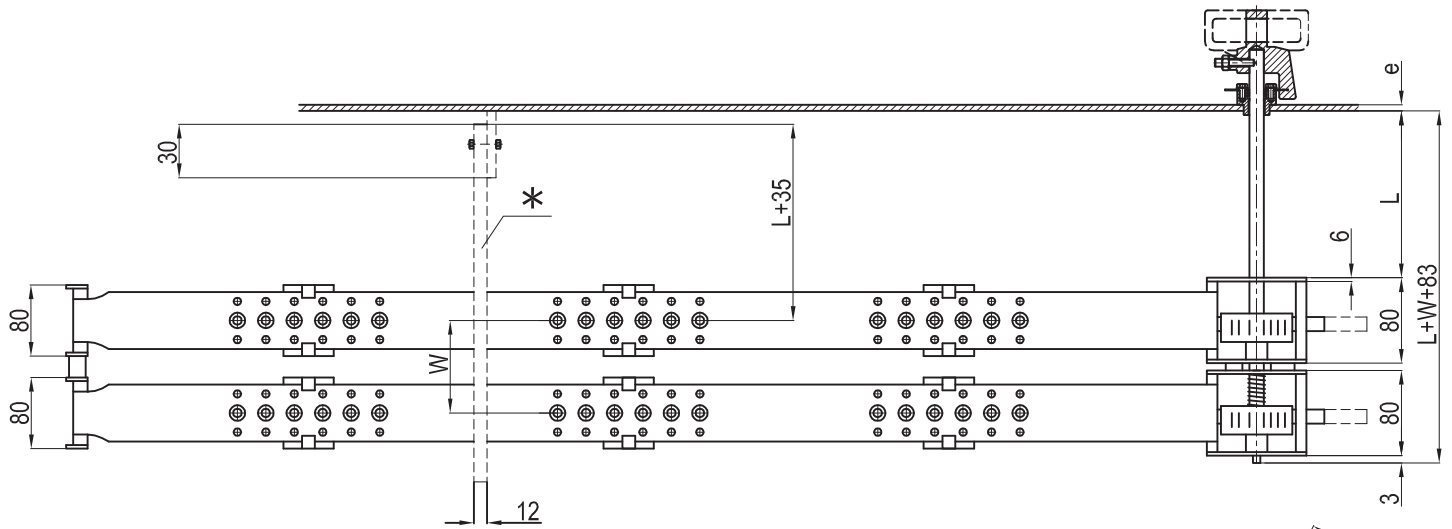


Off-circuit operation can be used in oil askarel  
 Opposite contacts. Setting 2.5 % per position (With Aluminium Support)



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

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



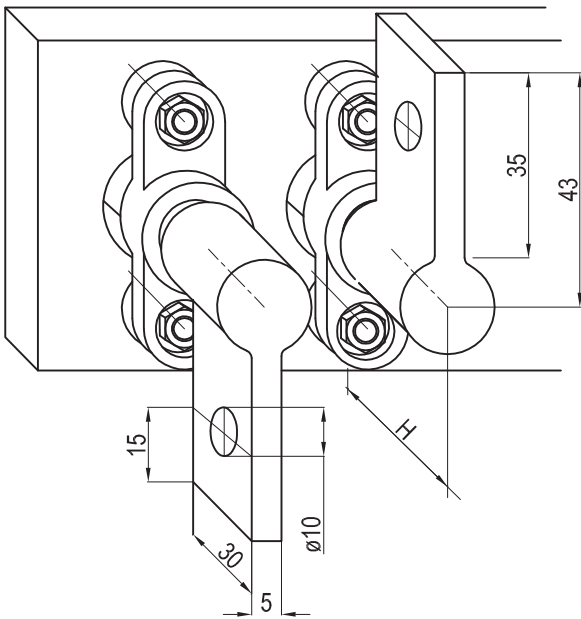
Voltage class kV	Number of Positions	A	B	D	E	F	G	H	O	P	R	& °	L	e	Unit No		
20	2	601	503	62	76	32	70	Depending on fixed contacts	70	95	351	63°	Please quote when ordering		E 44146D2		
	3	729	599	94	76	32	70		70	95	415	63°			E 44146D3		
	4	857	695	126	76	32	70		70	95	479	63°			E 44146D4		
	5	985	791	158	76	32	70		70	95	543	63°			E 44146D5		
	6	1113	887	190	76	32	70		70	95	607	63°			E 44146D6		
30	2	721	623	62	106	32	100			100	125	426		63°			E 44156D2
	3	849	719	94	106	32	100			100	125	490		63°			E 44156D3
	4	977	815	126	106	32	100			100	125	554		63°			E 44156D4
	5	1105	911	158	106	32	100			100	125	618		63°			E 44156D5
	6	1233	1007	190	106	32	100			100	125	682		63°			E 44156D6
60	2	1140	1331	73	267	43	260		260	286	871	84°			E 44166D2		
	3	1612	1460	116	267	43	260		260	286	957	84°			E 44166D3		
	4*	1784	1589	159	267	43	260		260	286	1043	84°			E 44166D4		
	5*	1956	1718	202	267	43	260		260	286	1129	81°			E 44166D5		

\* Additional supporting plate is used

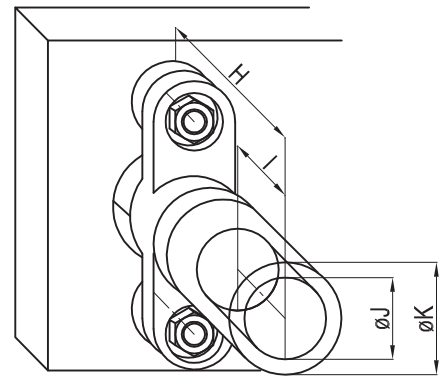




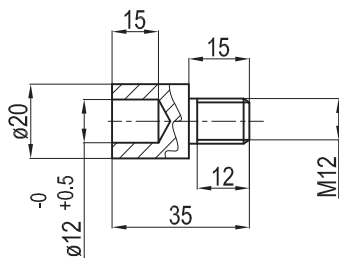
## Fixed Contacts



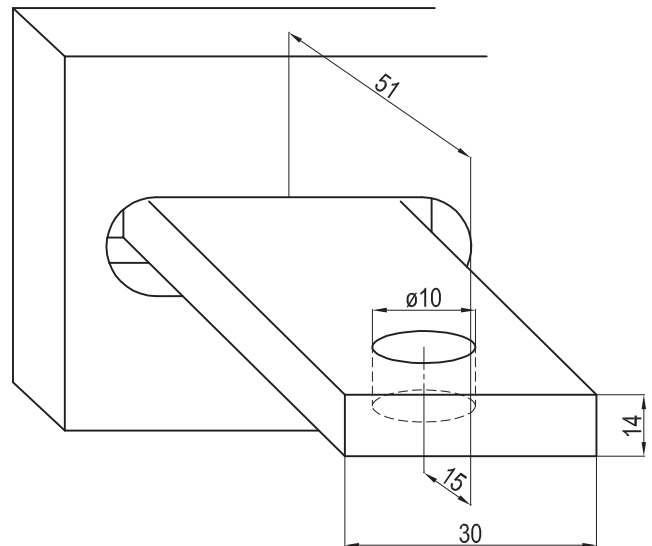
Flag type contacts



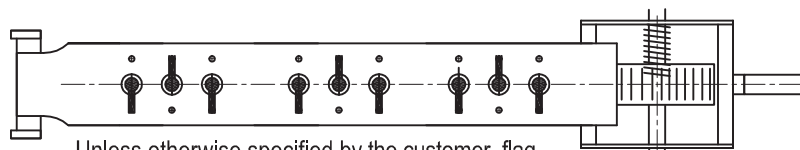
Tubular contact



Fixed contact adapter for cable connection  
(Optional for Contact No : E44374 )



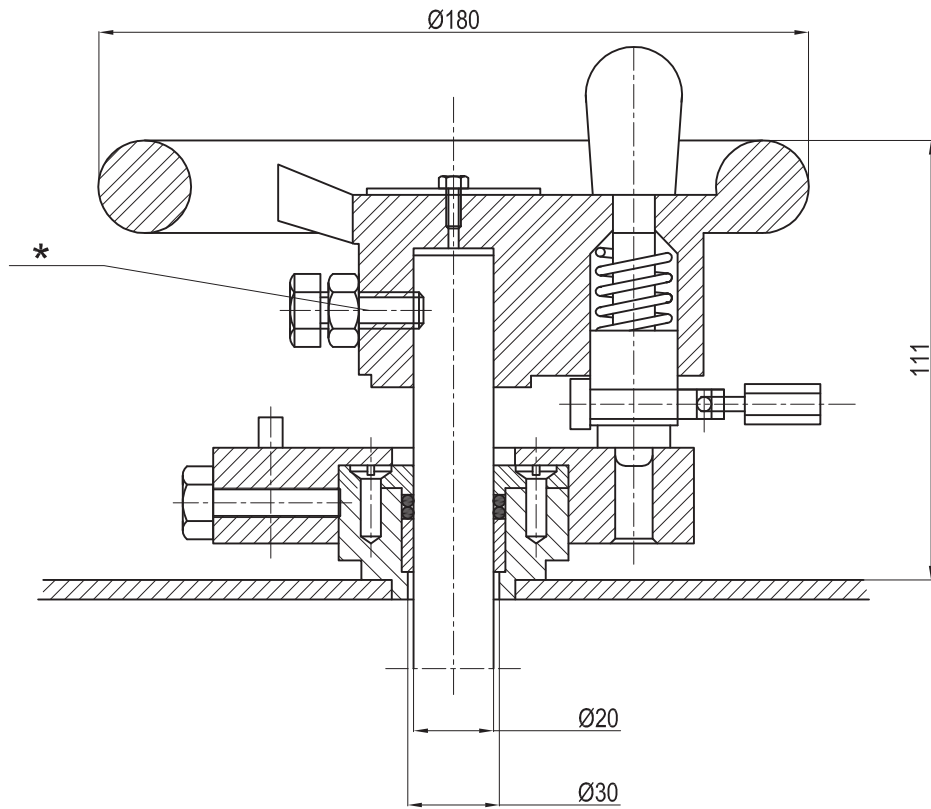
Common contact with straight flat shape  
No : E44371



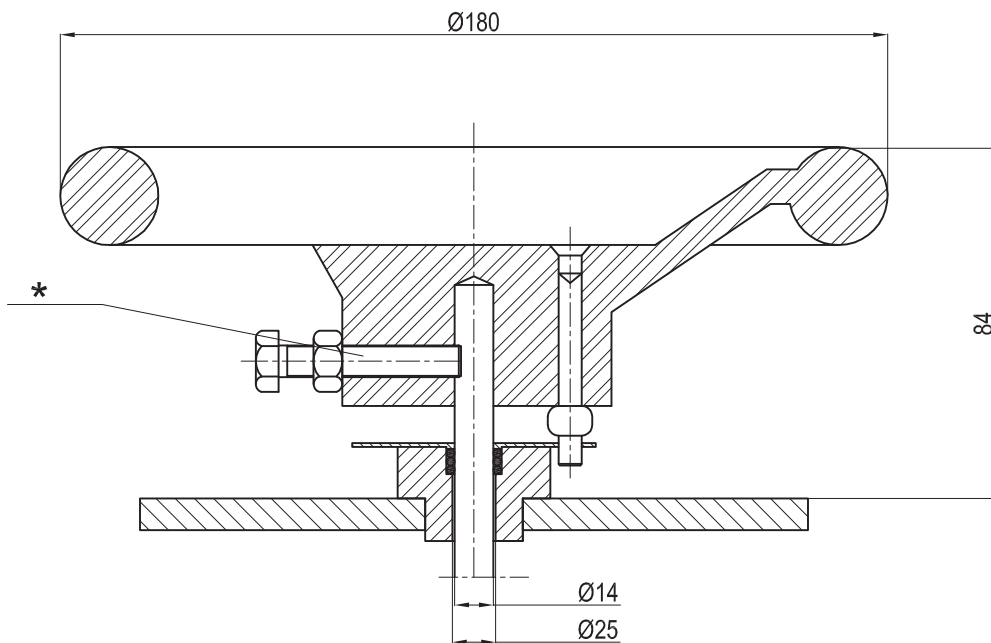
Unless otherwise specified by the customer, flag type contacts are positioned as in the diagram above. The contact situated near the operating device is facing downwards.

	Contact Numbers	ø J	ø K	I	H
150 A. Tubular Contact	E44365	7	14	20	37
220 A. Tubular Contact	E44366	8.5	14	20	37
150 A. Tubular Contact	E44367	9.5	13.5	30	56
220 A. Tubular Contact	E44368	13.5	17.4	30	56
315 A. Tubular Contact	E44369	15.2	20	30	56
315 A. Tubular Contact ( Optional )	E44372	M12	20	30	56
400 A. Flag Type	E44370	---	30 x 30 x 5		51

Handhell-opereted control devices

**E44349**

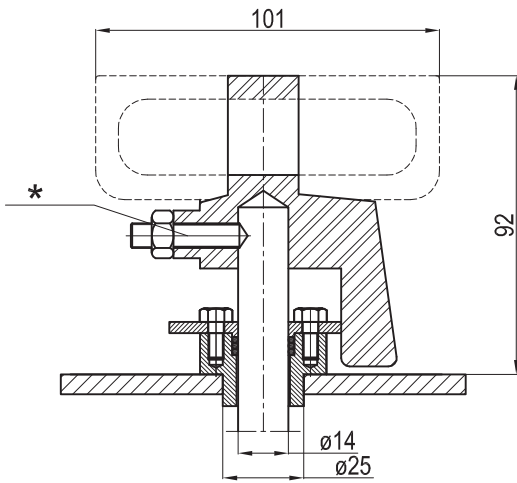
unlocking by padlockable pull  
knob for axis dia. 20mm.

**E44350**

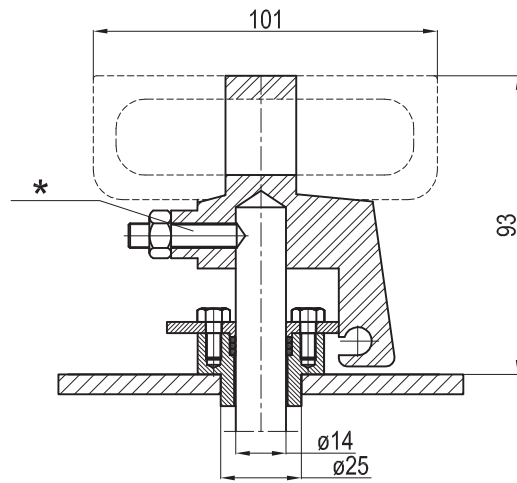
unlocking by axial displacement of  
the control shaft for axis dia. 14mm.

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

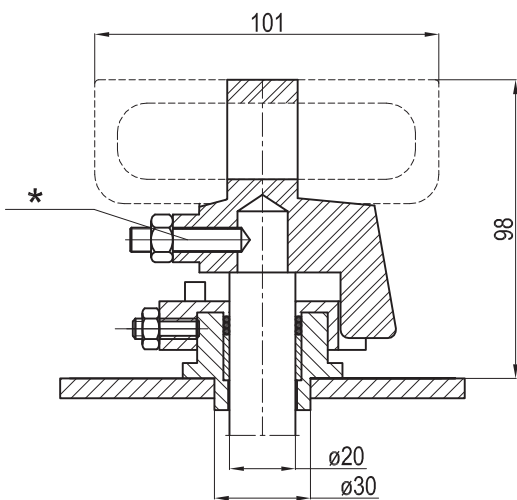
Control devices incorporating a handle  
Unlocking by axial displacement of the control shaft



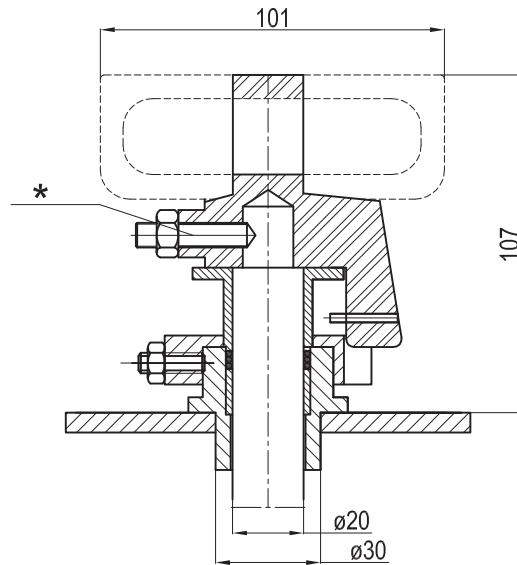
standard for axis dia. 14mm.  
**E44345A**



padlockable model for axis dia. 14mm.  
**E44345B**



standard for axis dia. 20mm.  
**E44346A**

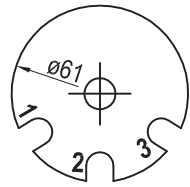


padlockable model for axis dia. 20mm.  
**E44346B**

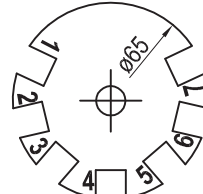
\* The hole on the shaft is drilled at parallel position with respect to the middle position of the tap changer

## Numbering of the repeater disc

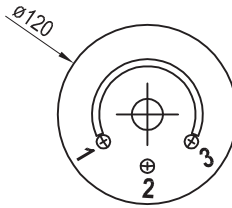
Repeaters for rack and pinion operated controls.



No. E50352



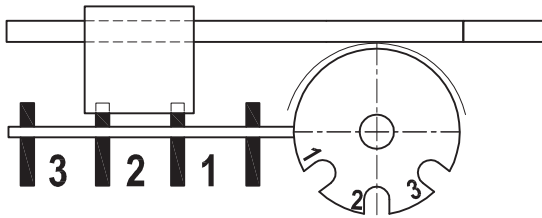
No. E50353



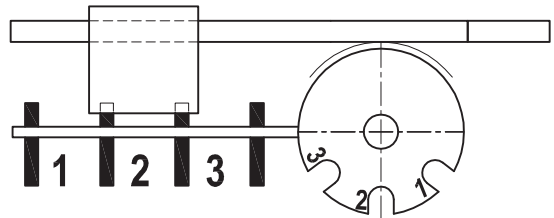
No. E50354

Numbering of the repeaters for rack and pinion operated control.

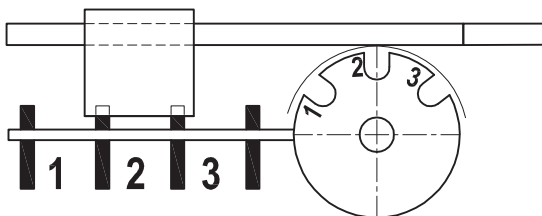
**A1**



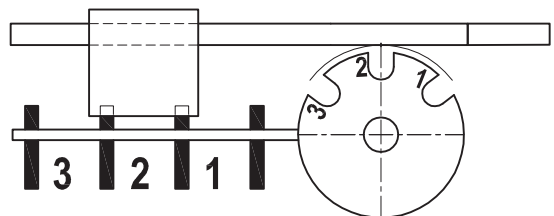
**B1**

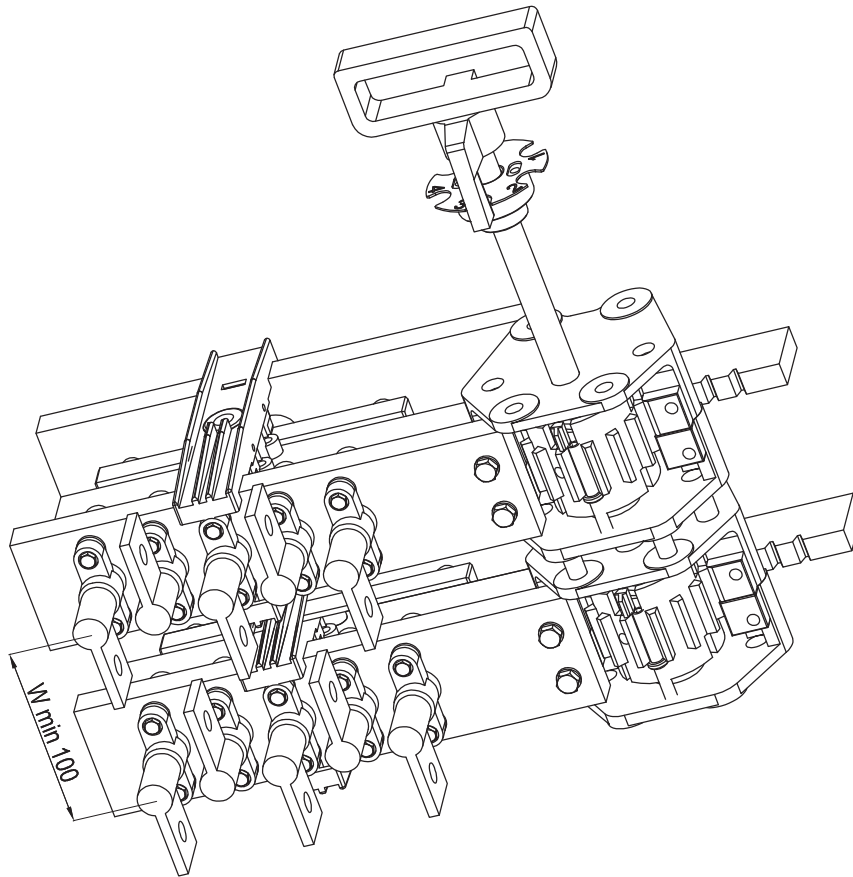


**C1**



**D1**





All the horizontal tap changers in the EKFI 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.