

The H-J Family of Companies

De-Energized Tap Changer: Type 1



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De-Energized Tap Changers (DETC)

Introduction

The main purpose of a tap changer is to regulate the output voltage of a transformer and therefore adjust it to the grid conditions. The tap changer does this by altering the number of turns in one winding thereby changing the transformer's turns ratio. De-Energized Tap Changers (DETC) are also used on transformers than can be operated at 2 different voltages using the series-parallel coupling application and/or at 2 different connection types using the delta-star coupling application.

At H-J, we produce a large variety of linear tap changers for transformers with currents up to 1250 A, voltages up to 63 kV and up to 11 positions. The tap changers' connections can be configured as delta, star, delta-star coupling, series-parallel coupling, and other special applications. The tap changers' handles are either made of nylon or aluminum and their operation's direction is selectable either clockwise or counterclockwise.

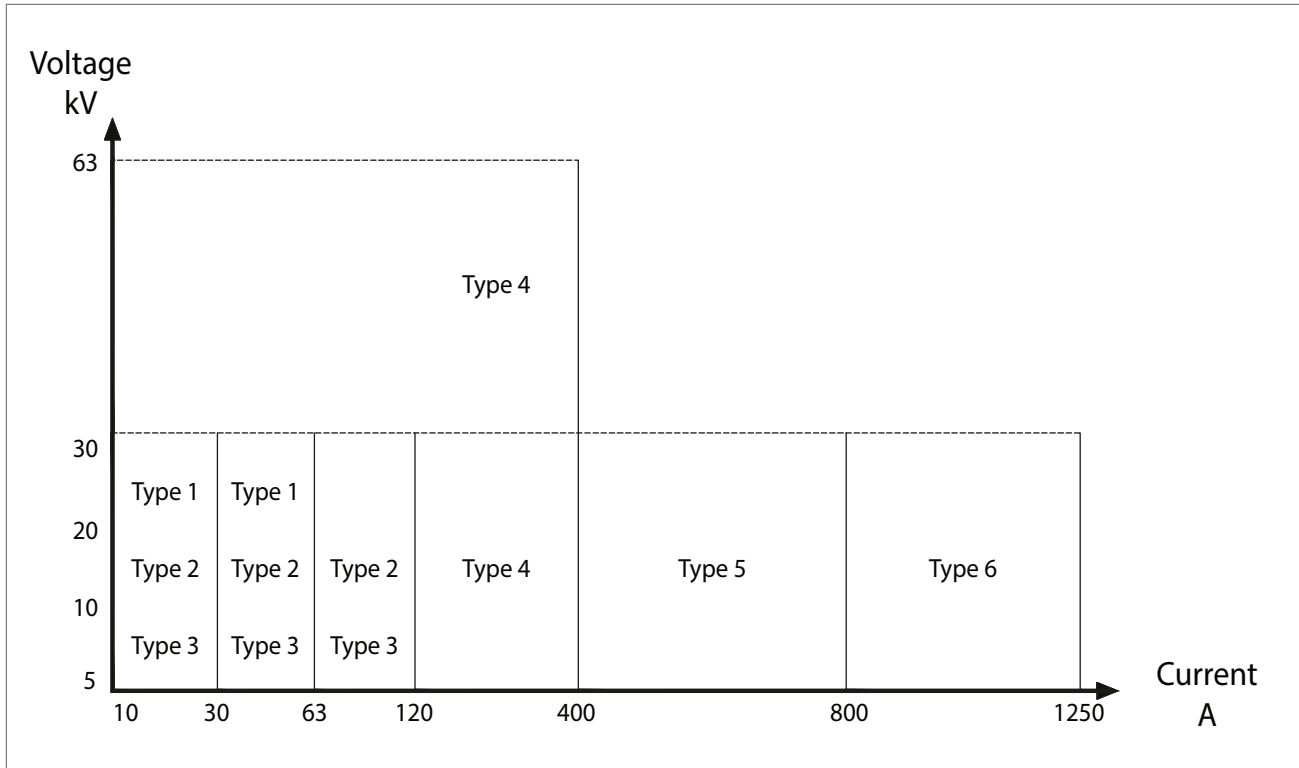
Benefits at a glance

- » Wide range of applications for transformers.
- » Selectable connections including special applications.
- » Customize designs selecting handle type, direction and labeling type.

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De-Energized Tap Changer (DETC) Overview

Selection Chart



Voltage Class kV	Power Frequency Withstand Voltage kV rms	BIL kV
5 - 10	28	75
15	38	95
20	50	125
30	70	170

De-Energized Tap Changer: Type 1

Specification, Assembly and Materials

General Specifications	
Application	Available in three phases application (one and two phases on request)
Multi-layer types	On request
Shaft length	Fixed in sizes 50, 70, 100 or 130mm
Driving mechanism location	Can be either on the edge or in the middle of the phases
Connection diagrams	Can be applied in any variation (see page 9) to all types
Transformer cover/Wall thickness	10mm - 4mm (6 spacer rings with each 1mm)
Current - Contact inner diameter (cable size)	10 A - 2.1 mm 30 A - 3.1 mm 63 A - 5.1 mm
Voltage class - BIL (Other BIL upon request)	15 kV - 95 kV BIL 20 kV - 125 kV BIL 30 kV - 170 kV BIL
Materials	
Steel	Available in stainless or mild steel Mild steel parts are cadmium or zinc plated
Polymide	Nylon 66 / superior mechanical properties against all acting forces
Aluminum	Strong against UV lights GAISi12(Cu)
Brass	CuZn40Bb2 (CW617N)/F34 DIN 17 673
Copper	E - Cu F25 DIN 40 500
Insulator	Paper phenol - plastic resin based laminates/HP 2061.5 class of DIN 7735
On request	Steel parts can be galvanized upon request. Aluminum parts can be protected by anodic oxidation. Mild steel parts can be supplied in stainless steel. Brass and copper parts can be either tin, silver or cadmium-plated

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De-Energized Tap Changer: Type 1

Models Overview

Model #	Connection Type	Voltage Class kV	Rated Current A	Number of Positions	Dimension L mm
1	Delta Diagram	20-30	10-30-63	3-4-5-6-7	50-70-100-130
2	Star Diagram	20-30	10-30-63	3-5-7	70-100-130
3	Series Parallel Coupling	15-20	30-63	2	50-70-100-130
4	Star - Delta Coupling	15-20	30-63	2	50-70-100-130
5	Common Output per Phase	20-30	10-30-63	3-5-7	50-70-100-130
6	Two Stages - Delta Diagram	20-30	10-30-63	3-4-5-6-7	50-70-100-130
7	1. Stage Series Parallel Coupling 2. Stage Delta Diagram	20	10-30-63	3-4-5-6-7	50-70-100-130

Ordering Information

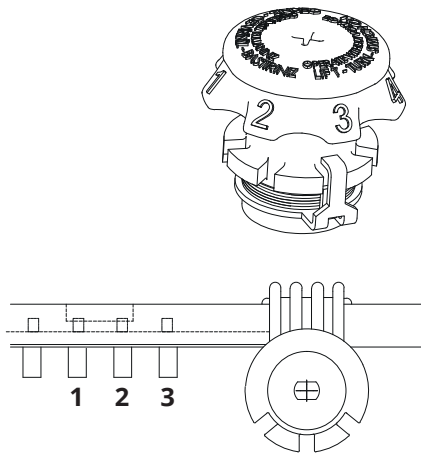
When ordering please indicate:	
1. Tap Changer part number (see pages 10 to 16)	
2. Connection diagrams settings (see page 9)	
3. Voltage class [kV]	
4. Current [A]	
5. Number of positions	
6. Dimensions L [mm] (50 / 70 / 100 /130, see pages 10 to 16)	
7. Handle direction (R / L, see page 7)	
8. Handle type (see page 7)	
9. Cover / Wall thickness [mm] (min. 4, max. 10, see page 8)	

For special setups not shown in the catalog please contact us.

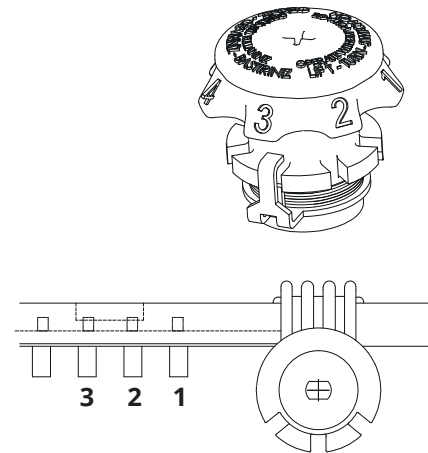
De-Energized Tap Changer: Type 1

Handle Directions and Code Number

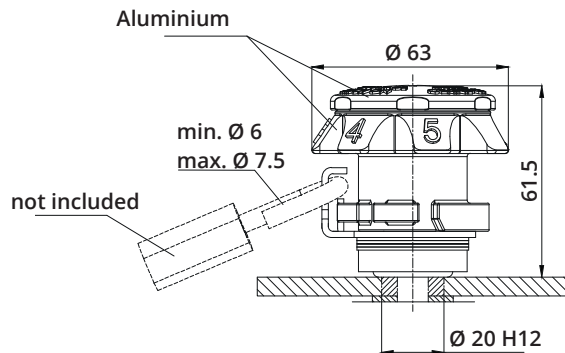
Handle Direction R
Clockwise (Right) direction



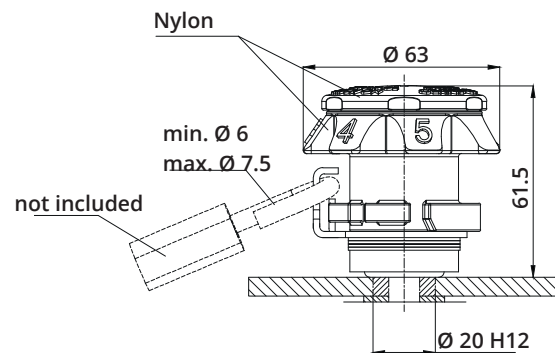
Handle Direction L
Counterclockwise (Left) direction



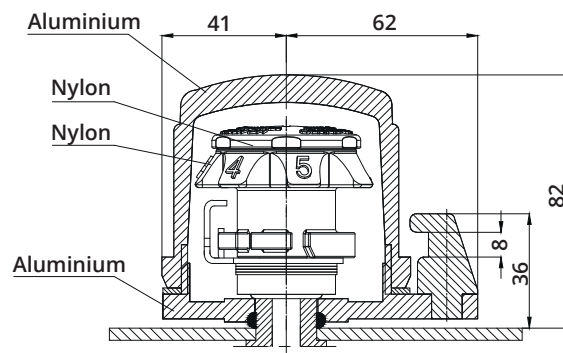
Handle Type: TLH1-A (Aluminum handle)



Handle Type: TLH1-B (Nylon handle)



Handle Type: TLH1-C (Nylon handle with aluminum protection cover)

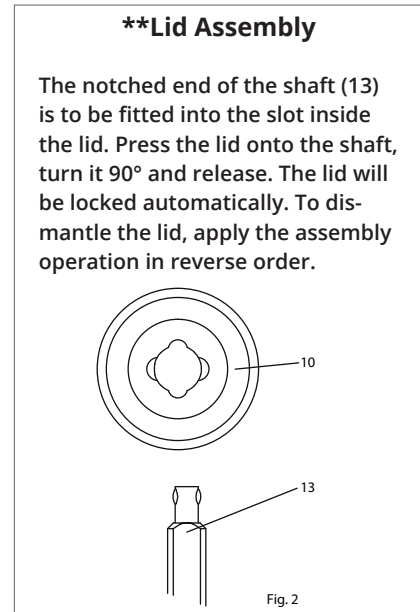
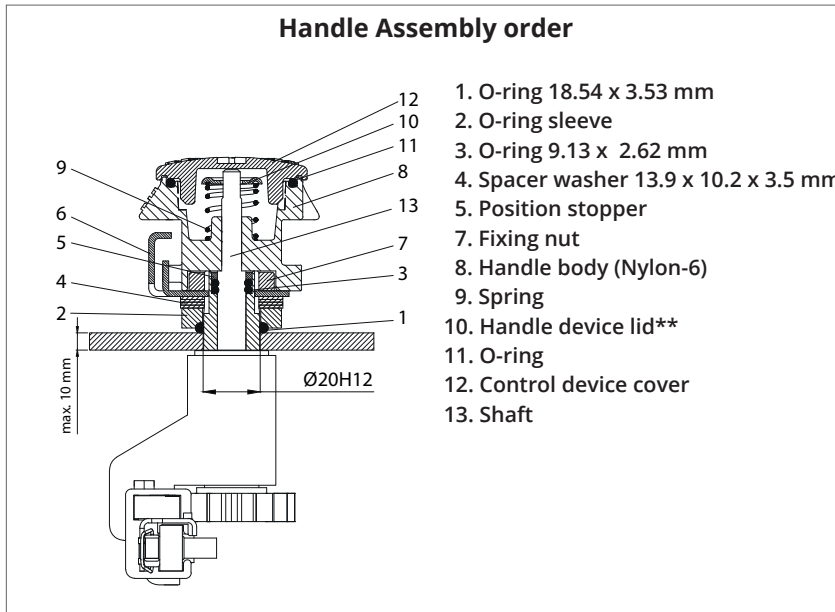


Dimensions in millimeters [mm]

To purchase handle spare parts, please indicate the handle type and handle direction. i.e. TLH1-B-R

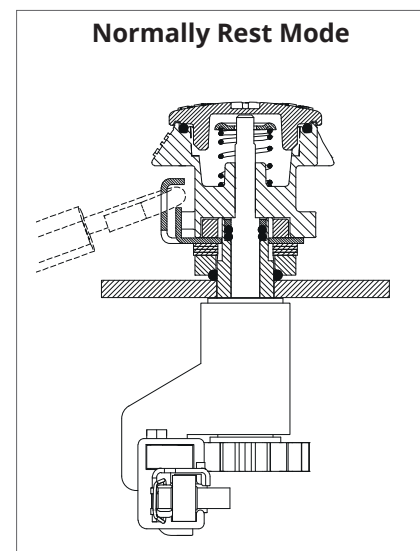
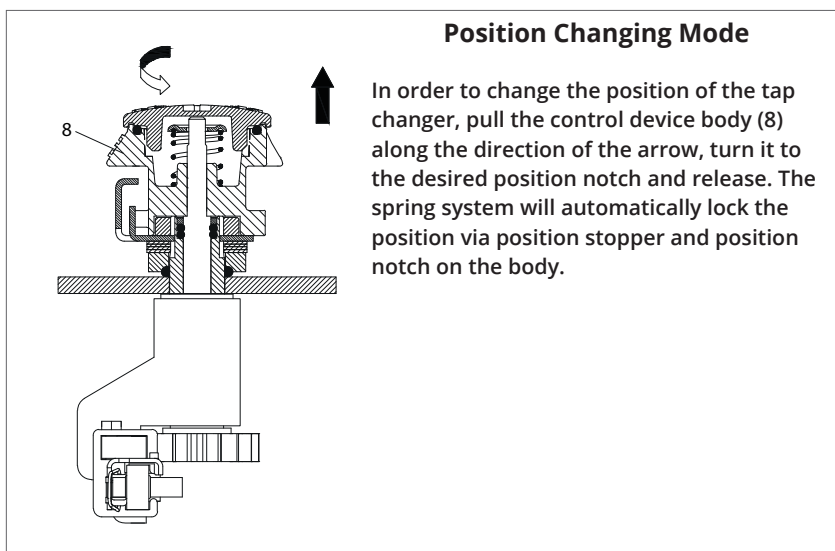
De-Energized Tap Changer: Type 1

Handle Assembly and Operation



Notes

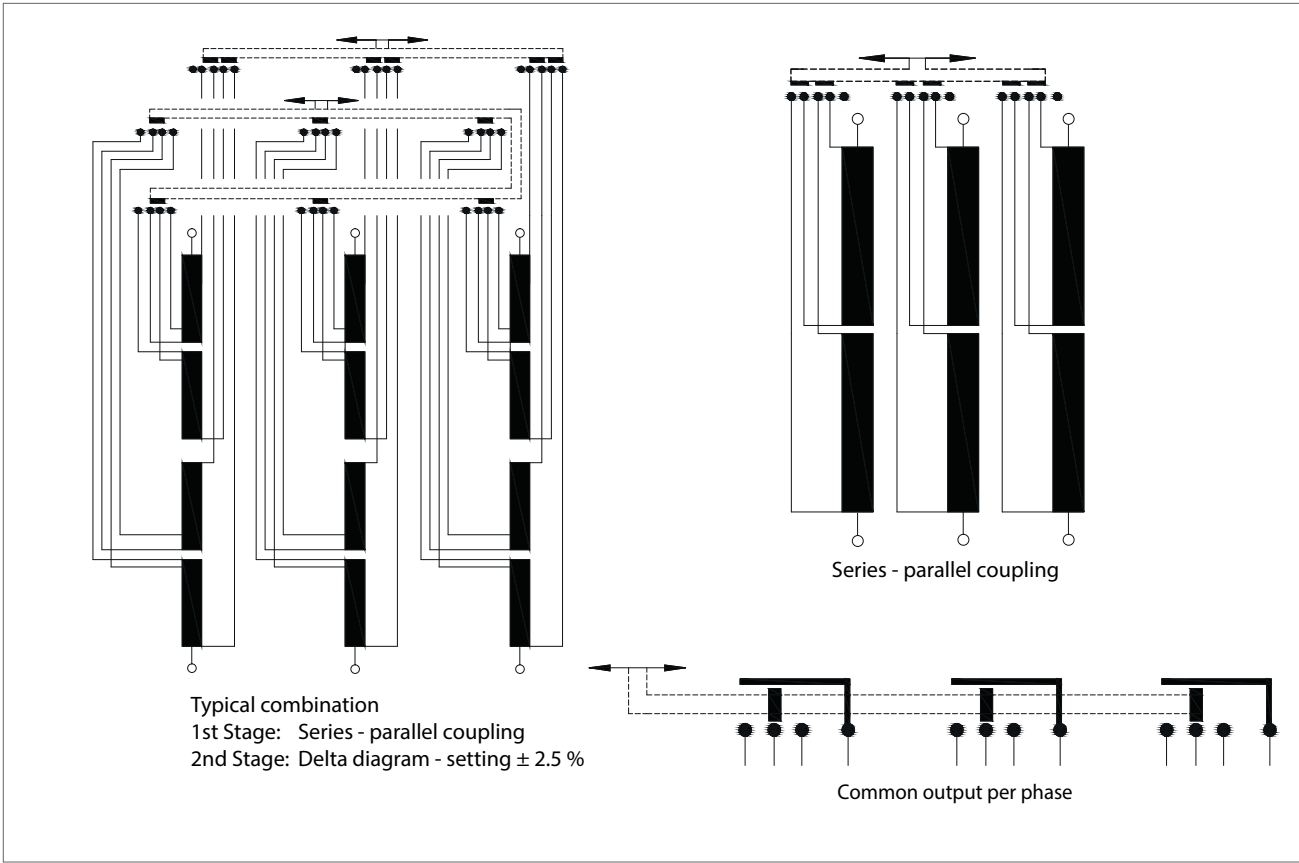
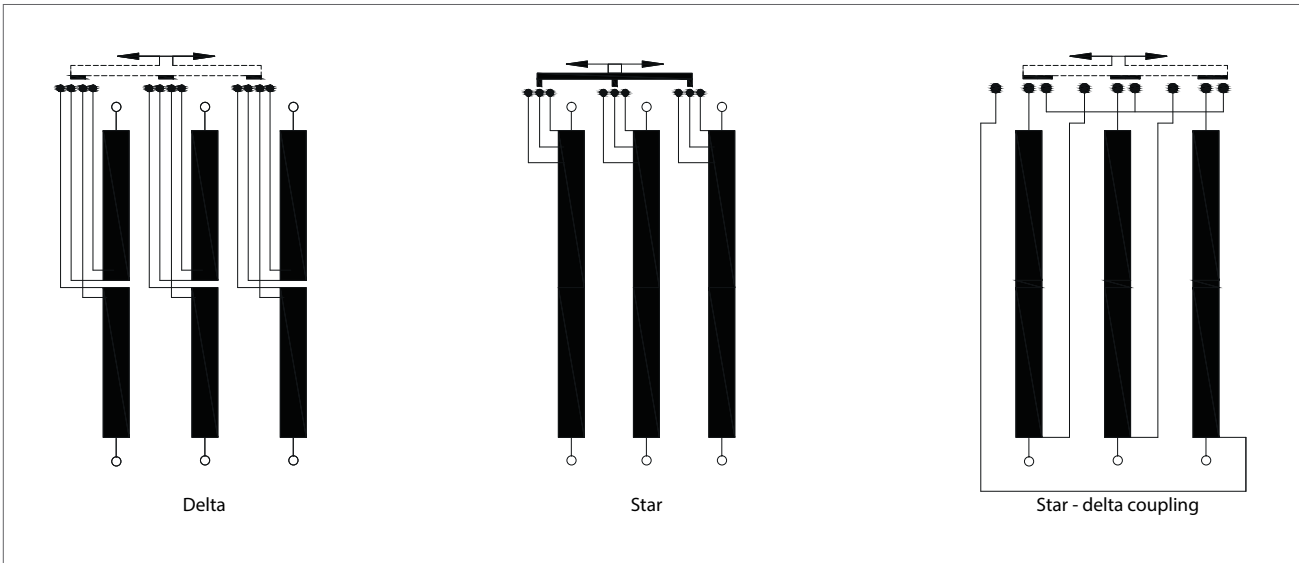
For the assembly of the tap changer, the thickness of the transformer cover/wall is assumed to be 10mm. If the cover wall thickness is lower than 10mm the additional spacer washer (4) can be used to accommodate up to 6mm (1mm per spacer washer) of the transformer cover/wall thickness. The resulting thickness is to be 10mm. For example if the cover/wall thickness is 6mm, 4 washers are to be used to balance the difference of 4mm. If the cover/wall thickness is 10mm there is no washer needed.



Dimensions in millimeters [mm]

De-Energized Tap Changer: Type 1

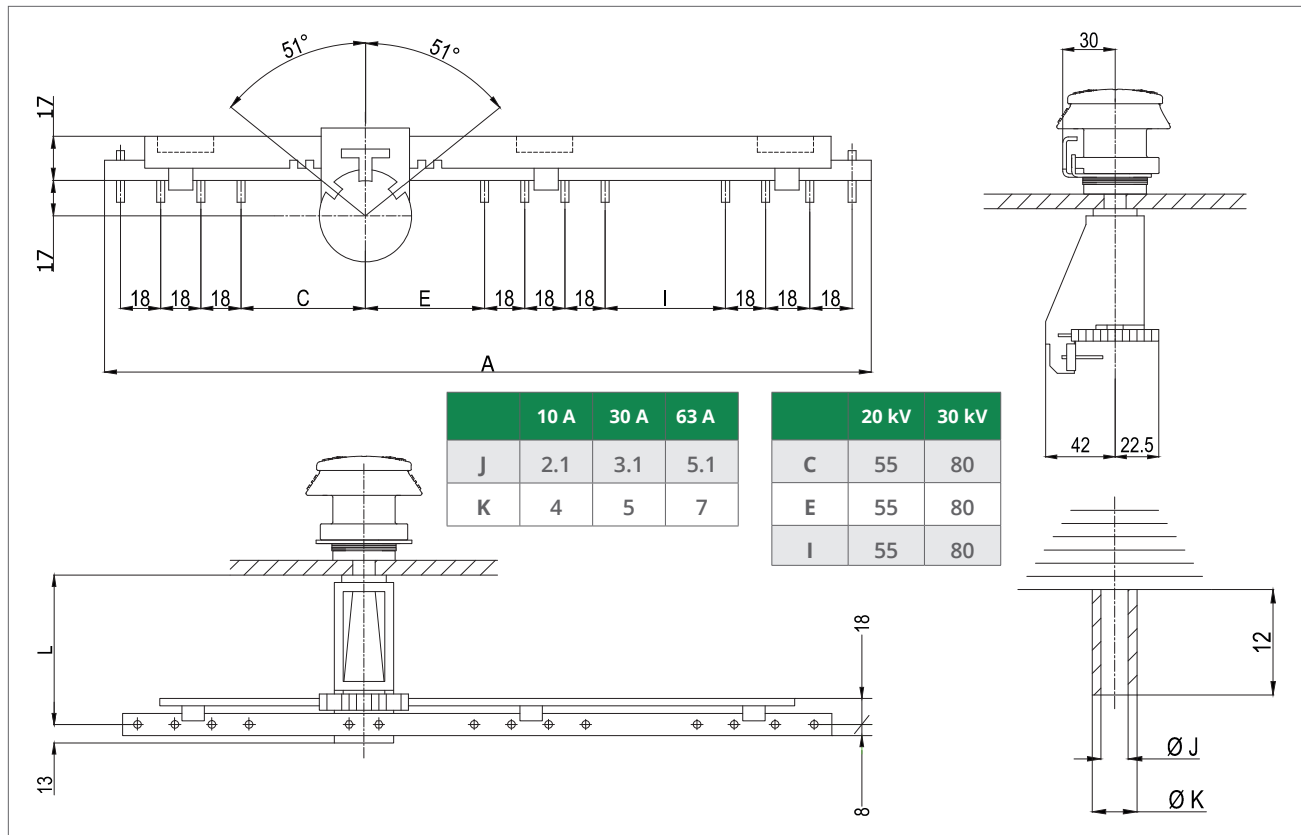
Connection Diagrams Settings



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De-Energized Tap Changer: Type 1 - Model 1

Delta Diagram 20-30 kV/30-63 A/3-7 Positions/Setting 2.5% per Position

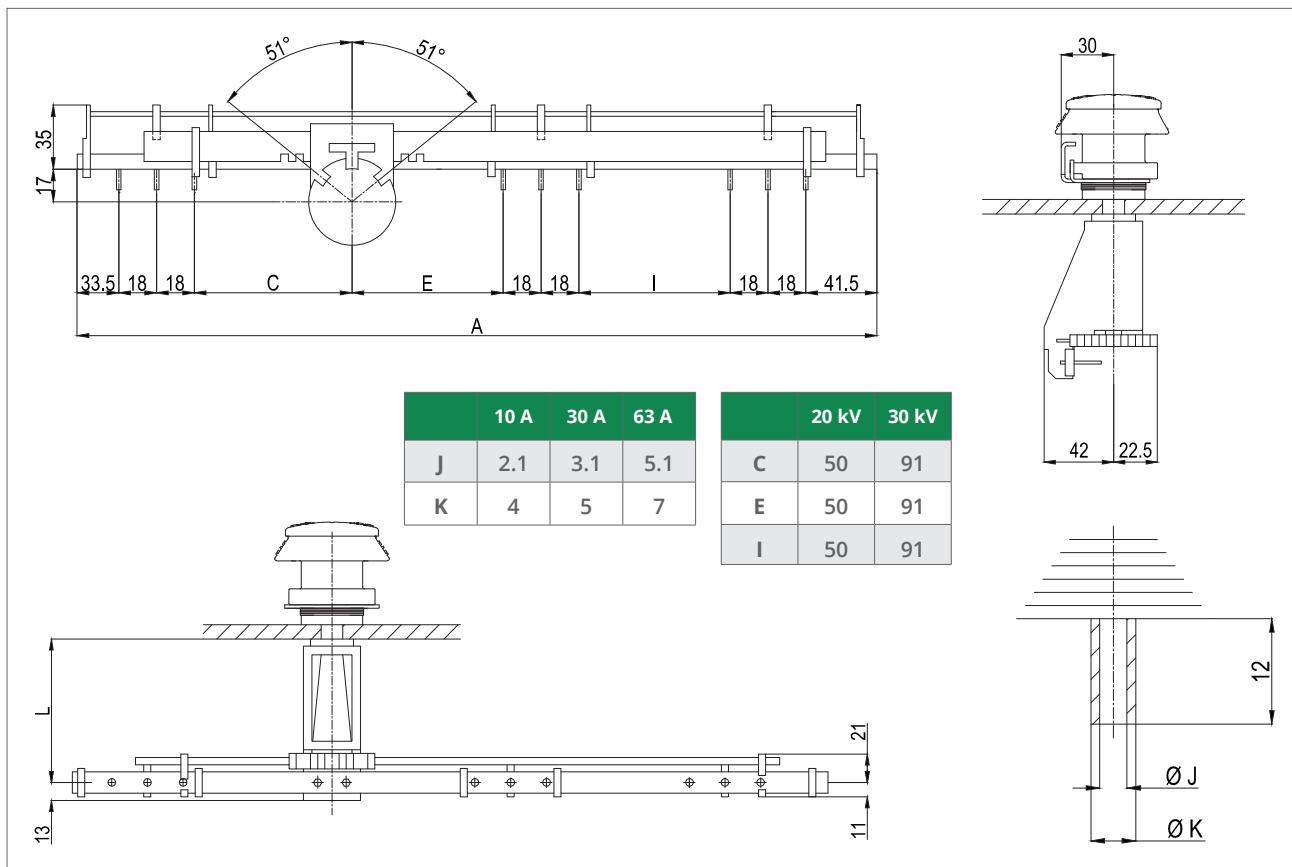


Dimensions in millimeters [mm]

L mm	Number of Positions	Voltage Class 20 kV				Voltage Class 30 kV			
		A mm	10 A	30 A	63 A	A mm	10 A	30 A	63 A
50	3	347	TL11-20-01-3-05	TL11-20-03-3-05	TL11-20-06-3-05	-	-	-	-
	4	401	TL11-20-01-4-05	TL11-20-03-4-05	TL11-20-06-4-05	-	-	-	-
	5	455	TL11-20-01-5-05	TL11-20-03-5-05	TL11-20-06-5-05	-	-	-	-
	6	509	TL11-20-01-6-05	TL11-20-03-6-05	TL11-20-06-6-05	-	-	-	-
	7	563	TL11-20-01-7-05	TL11-20-03-7-05	TL11-20-06-7-05	-	-	-	-
70	3	347	TL11-20-01-3-07	TL11-20-03-3-07	TL11-20-06-3-07	422	TL11-30-01-3-07	TL11-30-03-3-07	TL11-30-06-3-07
	4	401	TL11-20-01-4-07	TL11-20-03-4-07	TL11-20-06-4-07	476	TL11-30-01-4-07	TL11-30-03-4-07	TL11-30-06-4-07
	5	455	TL11-20-01-5-07	TL11-20-03-5-07	TL11-20-06-5-07	530	TL11-30-01-5-07	TL11-30-03-5-07	TL11-30-06-5-07
	6	509	TL11-20-01-6-07	TL11-20-03-6-07	TL11-20-06-6-07	584	TL11-30-01-6-07	TL11-30-03-6-07	TL11-30-06-6-07
100	3	347	TL11-20-01-3-10	TL11-20-03-3-10	TL11-20-06-3-10	422	TL11-30-01-3-10	TL11-30-03-3-10	TL11-30-06-3-10
	4	401	TL11-20-01-4-10	TL11-20-03-4-10	TL11-20-06-4-10	476	TL11-30-01-4-10	TL11-30-03-4-10	TL11-30-06-4-10
	5	455	TL11-20-01-5-10	TL11-20-03-5-10	TL11-20-06-5-10	530	TL11-30-01-5-10	TL11-30-03-5-10	TL11-30-06-5-10
	6	509	TL11-20-01-6-10	TL11-20-03-6-10	TL11-20-06-6-10	584	TL11-30-01-6-10	TL11-30-03-6-10	TL11-30-06-6-10
	7	563	TL11-20-01-7-10	TL11-20-03-7-10	TL11-20-06-7-10	638	TL11-30-01-7-10	TL11-30-03-7-10	TL11-30-06-7-10
130	3	347	TL11-20-01-3-13	TL11-20-03-3-13	TL11-20-06-3-13	422	TL11-30-01-3-13	TL11-30-03-3-13	TL11-30-06-3-13
	4	401	TL11-20-01-4-13	TL11-20-03-4-13	TL11-20-06-4-13	476	TL11-30-01-4-13	TL11-30-03-4-13	TL11-30-06-4-13
	5	455	TL11-20-01-5-13	TL11-20-03-5-13	TL11-20-06-5-13	530	TL11-30-01-5-13	TL11-30-03-5-13	TL11-30-06-5-13
	6	509	TL11-20-01-6-13	TL11-20-03-6-13	TL11-20-06-6-13	584	TL11-30-01-6-13	TL11-30-03-6-13	TL11-30-06-6-13
	7	563	TL11-20-01-7-13	TL11-20-03-7-13	TL11-20-06-7-13	638	TL11-30-01-7-13	TL11-30-03-7-13	TL11-30-06-7-13

De-Energized Tap Changer: Type 1 - Model 2

Star Diagram 20-30 kV/10-63 A/3-7 Positions/Setting 2.5% per Position



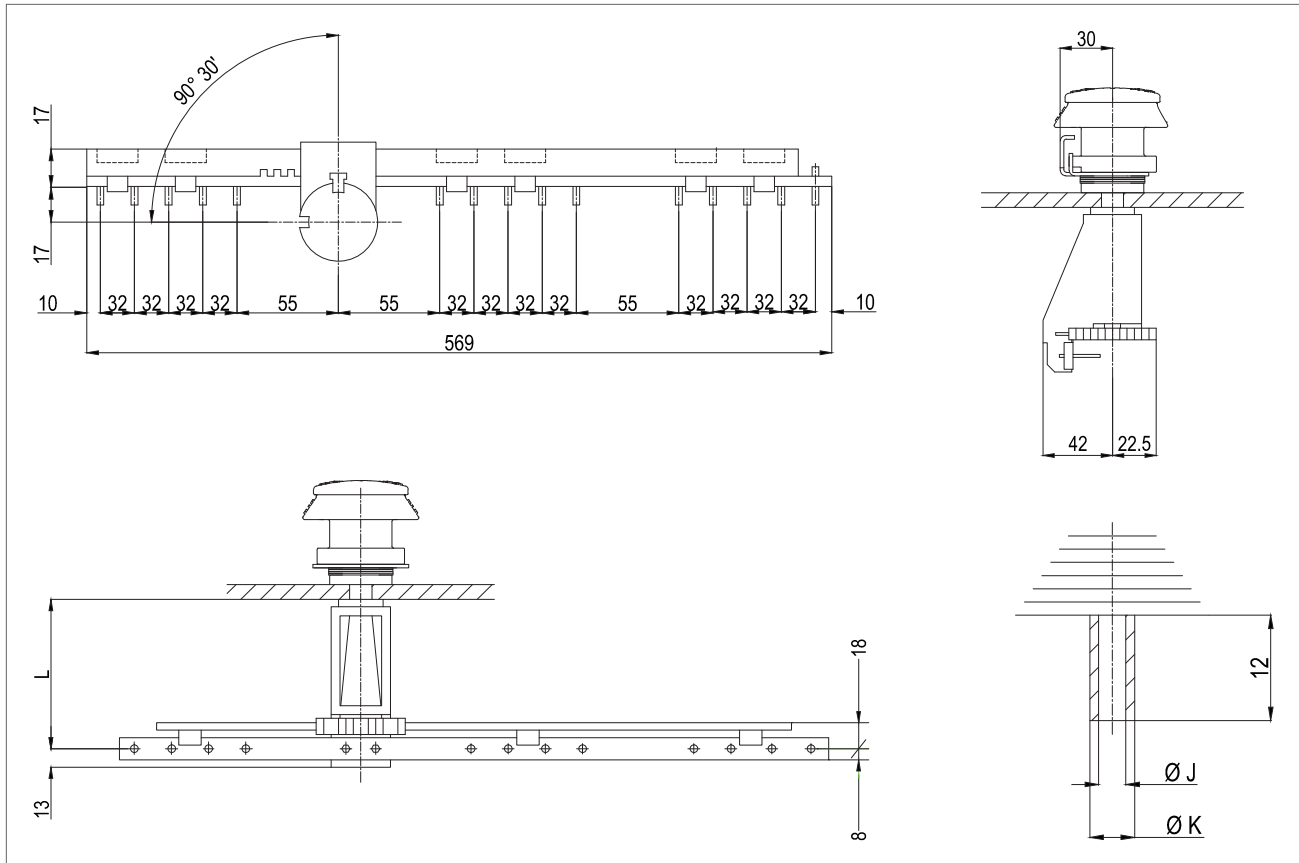
Dimensions in millimeters [mm]

L mm	Number of Positions	Voltage Class 20 kV				Voltage Class 30 kV			
		A mm	10 A	30 A	63 A	A mm	10 A	30 A	63 A
70	3	347	TL12-20-01-3-07	TL12-20-03-3-07	TL12-20-06-3-07	455	TL12-30-01-3-07	TL12-30-03-3-07	TL12-30-06-3-07
	5	456	TL12-20-01-5-07	TL12-20-03-5-07	TL12-20-06-5-07	564	TL12-30-01-5-07	TL12-30-03-5-07	TL12-30-06-5-07
	7	564	TL12-20-01-7-07	TL12-20-03-7-07	TL12-20-06-7-07	672	TL12-30-01-7-07	TL12-30-03-7-07	TL12-30-06-7-07
100	3	347	TL12-20-01-3-10	TL12-20-03-3-10	TL12-20-06-3-10	455	TL12-30-01-3-10	TL12-30-03-3-10	TL12-30-06-3-10
	5	456	TL12-20-01-5-10	TL12-20-03-5-10	TL12-20-06-5-10	564	TL12-30-01-5-10	TL12-30-03-5-10	TL12-30-06-5-10
	7	564	TL12-20-01-7-10	TL12-20-03-7-10	TL12-20-06-7-10	672	TL12-30-01-7-10	TL12-30-03-7-10	TL12-30-06-7-10
130	3	347	TL12-20-01-3-13	TL12-20-03-3-13	TL12-20-06-3-13	455	TL12-30-01-3-13	TL12-30-03-3-13	TL12-30-06-3-13
	5	456	TL12-20-01-5-13	TL12-20-03-5-13	TL12-20-06-5-13	564	TL12-30-01-5-13	TL12-30-03-5-13	TL12-30-06-5-13
	7	564	TL12-20-01-7-13	TL12-20-03-7-13	TL12-20-06-7-13	672	TL12-30-01-7-13	TL12-30-03-7-13	TL12-30-06-7-13

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De-Energized Tap Changer: Type 1 - Model 3

Series Parallel Coupling 15-20 kV/30-63 A



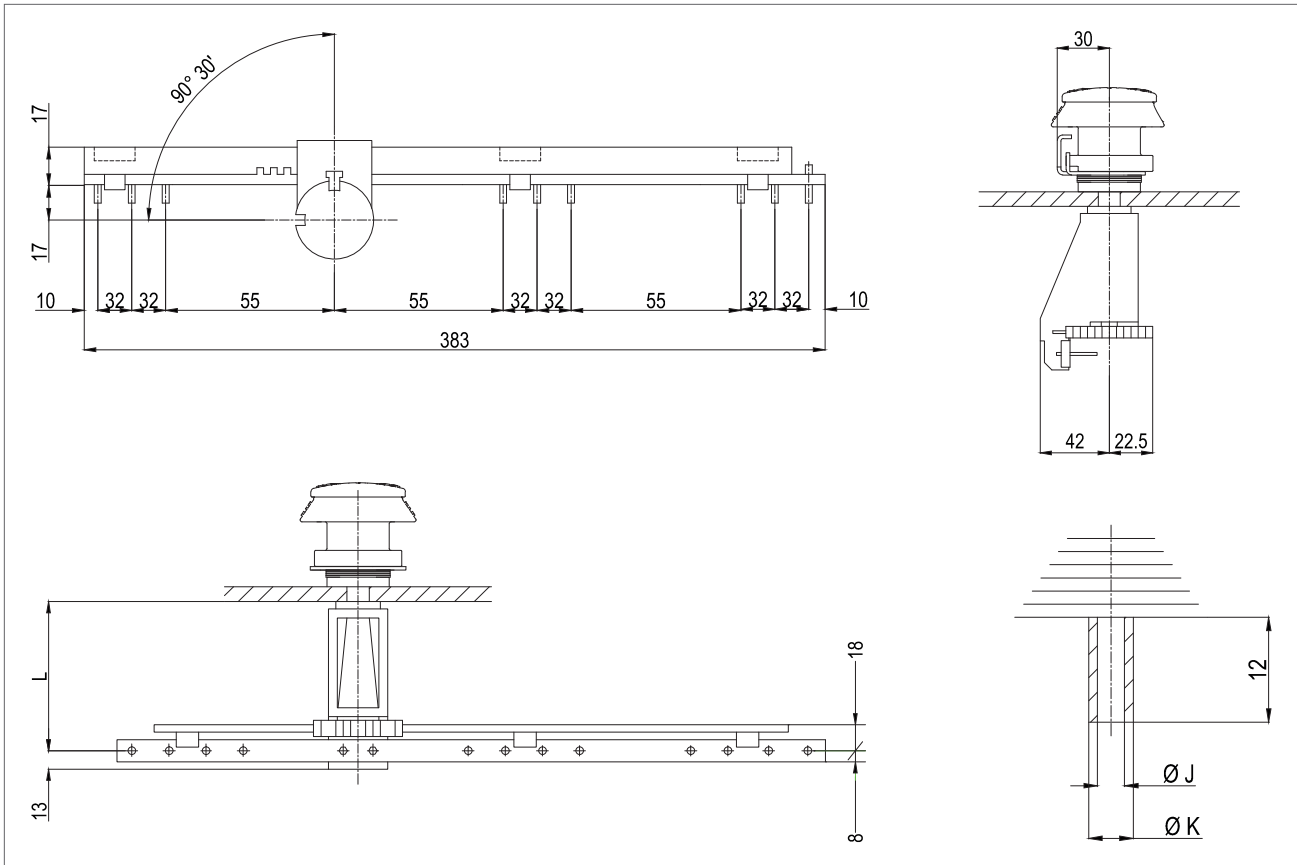
Dimensions in millimeters [mm]

L mm	Number of Positions	Voltage Class 15-20 kV		
		A mm	30 A	63 A
50	2	569	TL13-20-03-2-05	TL13-20-06-2-05
70	2	569	TL13-20-03-2-07	TL13-20-06-2-07
100	2	569	TL13-20-03-2-10	TL13-20-06-2-10
130	2	569	TL13-20-03-2-13	TL13-20-06-2-13

	30 A	63 A
J	3.1	5.1
K	5	7

De-Energized Tap Changer: Type 1 - Model 4

Star - Delta Coupling 15-20 kV/30-63 A



Dimensions in millimeters [mm]

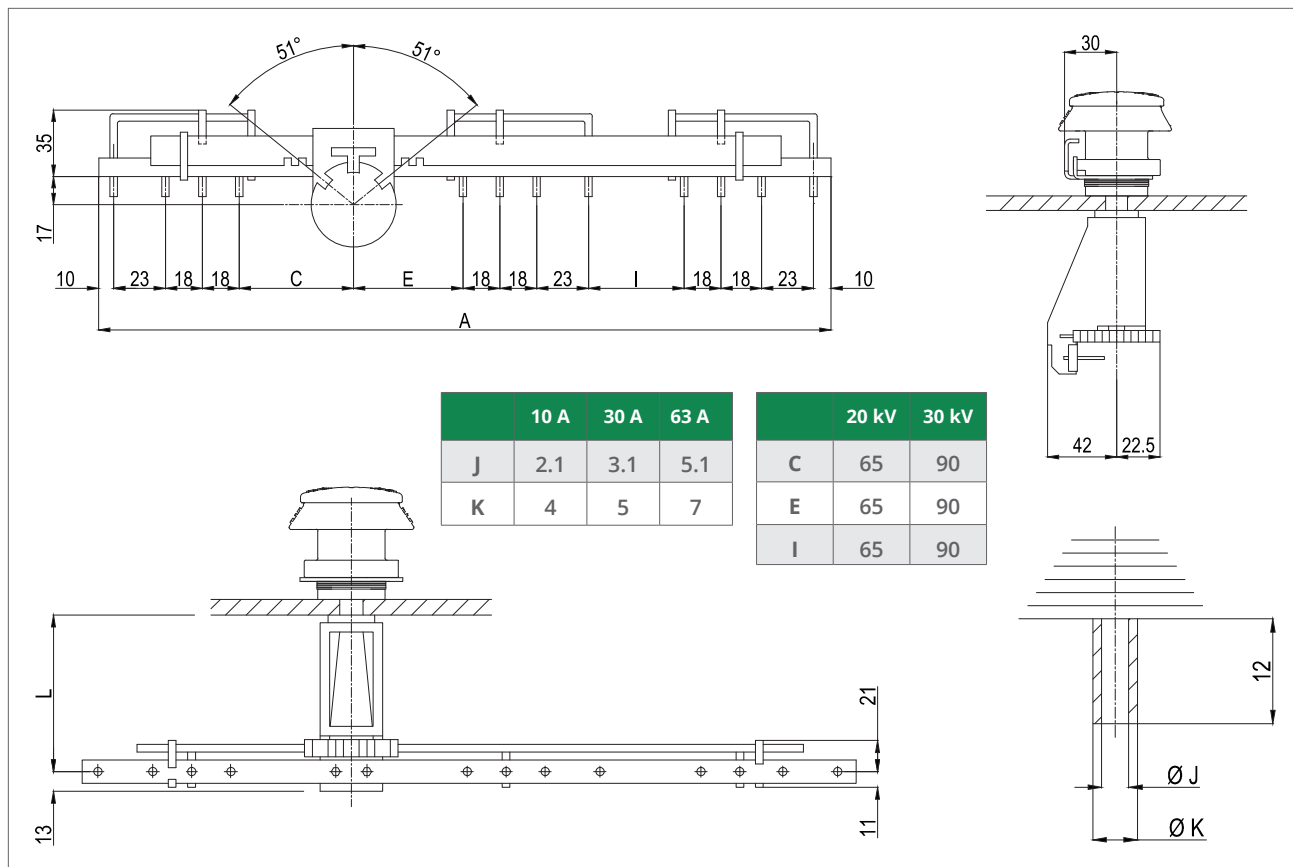
L mm	Number of Positions	Voltage Class 15-20 kV		
		A mm	30 A	63 A
50	2	383	TL14-20-03-2-05	TL14-20-06-2-05
70	2	383	TL14-20-03-2-07	TL14-20-06-2-07
100	2	383	TL14-20-03-2-10	TL14-20-06-2-10
130	2	383	TL14-20-03-2-13	TL14-20-06-2-13

	30 A	63 A
J	3.1	5.1
K	5	7

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De-Energized Tap Changer: Type 1 - Model 5

Common Output per Phase 20-30 kV/10-63 A/3-7 Positions/Setting 2.5% per Position

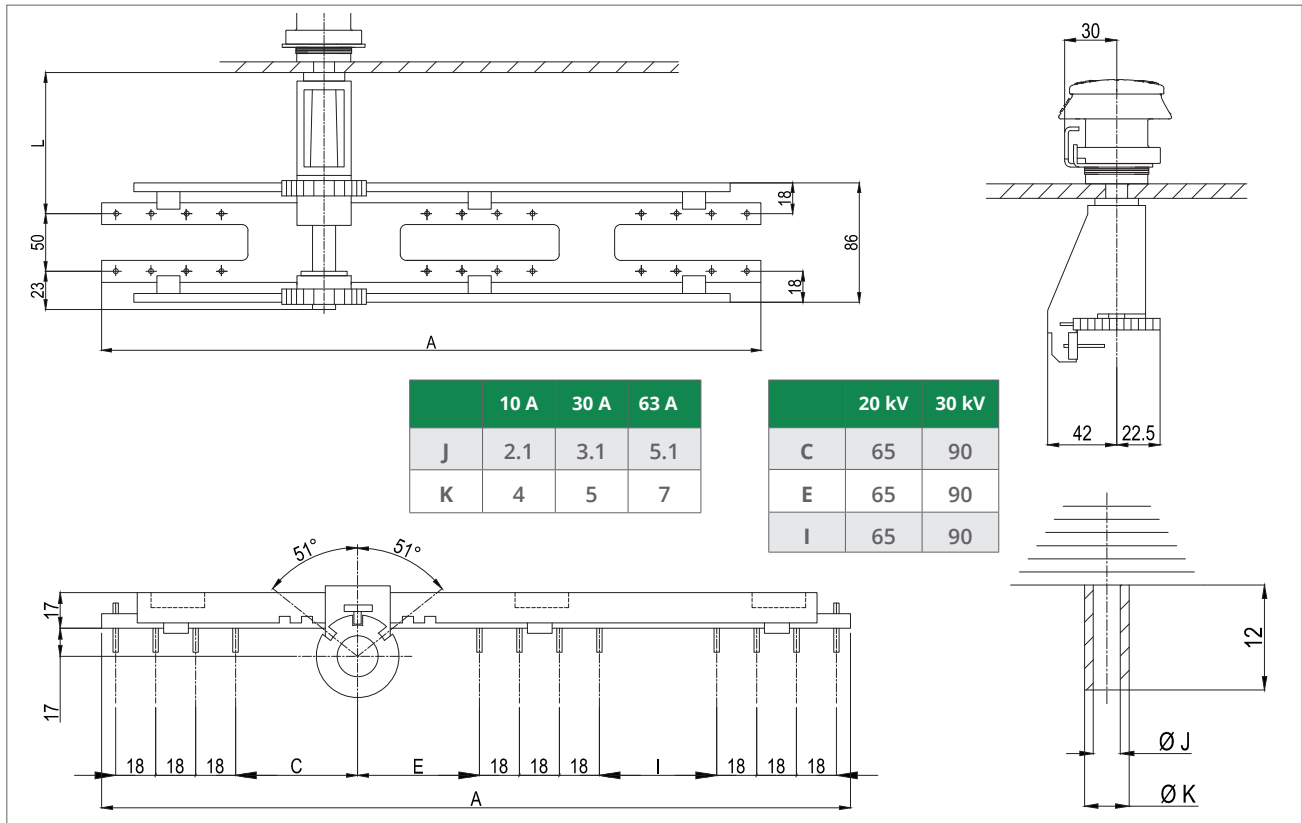


Dimensions in millimeters [mm]

L mm	Number of Positions	Voltage Class 20 kV				Voltage Class 30 kV			
		A mm	10 A	30 A	63 A	A mm	10 A	30 A	63 A
50	3	392	TL15-20-01-3-05	TL15-20-03-3-05	TL15-20-06-3-05	-	-	-	-
	5	500	TL15-20-01-5-05	TL15-20-03-5-05	TL15-20-06-5-05	-	-	-	-
	7	608	TL15-20-01-7-05	TL15-20-03-7-05	TL15-20-06-7-05	-	-	-	-
70	3	392	TL15-20-01-3-07	TL15-20-03-3-07	TL15-20-06-3-07	455	TL15-30-01-3-07	TL15-30-03-3-07	TL15-30-06-3-07
	5	500	TL15-20-01-5-07	TL15-20-03-5-07	TL15-20-06-5-07	564	TL15-30-01-5-07	TL15-30-03-5-07	TL15-30-06-5-07
	7	608	TL15-20-01-7-07	TL15-20-03-7-07	TL15-20-06-7-07	672	TL15-30-01-7-07	TL15-30-03-7-07	TL15-30-06-7-07
100	3	392	TL15-20-01-3-10	TL15-20-03-3-10	TL15-20-06-3-10	455	TL15-30-01-3-10	TL15-30-03-3-10	TL15-30-06-3-10
	5	500	TL15-20-01-5-10	TL15-20-03-5-10	TL15-20-06-5-10	564	TL15-30-01-5-10	TL15-30-03-5-10	TL15-30-06-5-10
	7	608	TL15-20-01-7-10	TL15-20-03-7-10	TL15-20-06-7-10	672	TL15-30-01-7-10	TL15-30-03-7-10	TL15-30-06-7-10
130	3	392	TL15-20-01-3-13	TL15-20-03-3-13	TL15-20-06-3-13	455	TL15-30-01-3-13	TL15-30-03-3-13	TL15-30-06-3-13
	5	500	TL15-20-01-5-13	TL15-20-03-5-13	TL15-20-06-5-13	564	TL15-30-01-5-13	TL15-30-03-5-13	TL15-30-06-5-13
	7	608	TL15-20-01-7-13	TL15-20-03-7-13	TL15-20-06-7-13	672	TL15-30-01-7-13	TL15-30-03-7-13	TL15-30-06-7-13

De-Energized Tap Changer: Type 1 - Model 6

Two Stages - Delta Diagram 20-30 kV/10-63 A/3-7 Positions/Setting 2.5% per Position



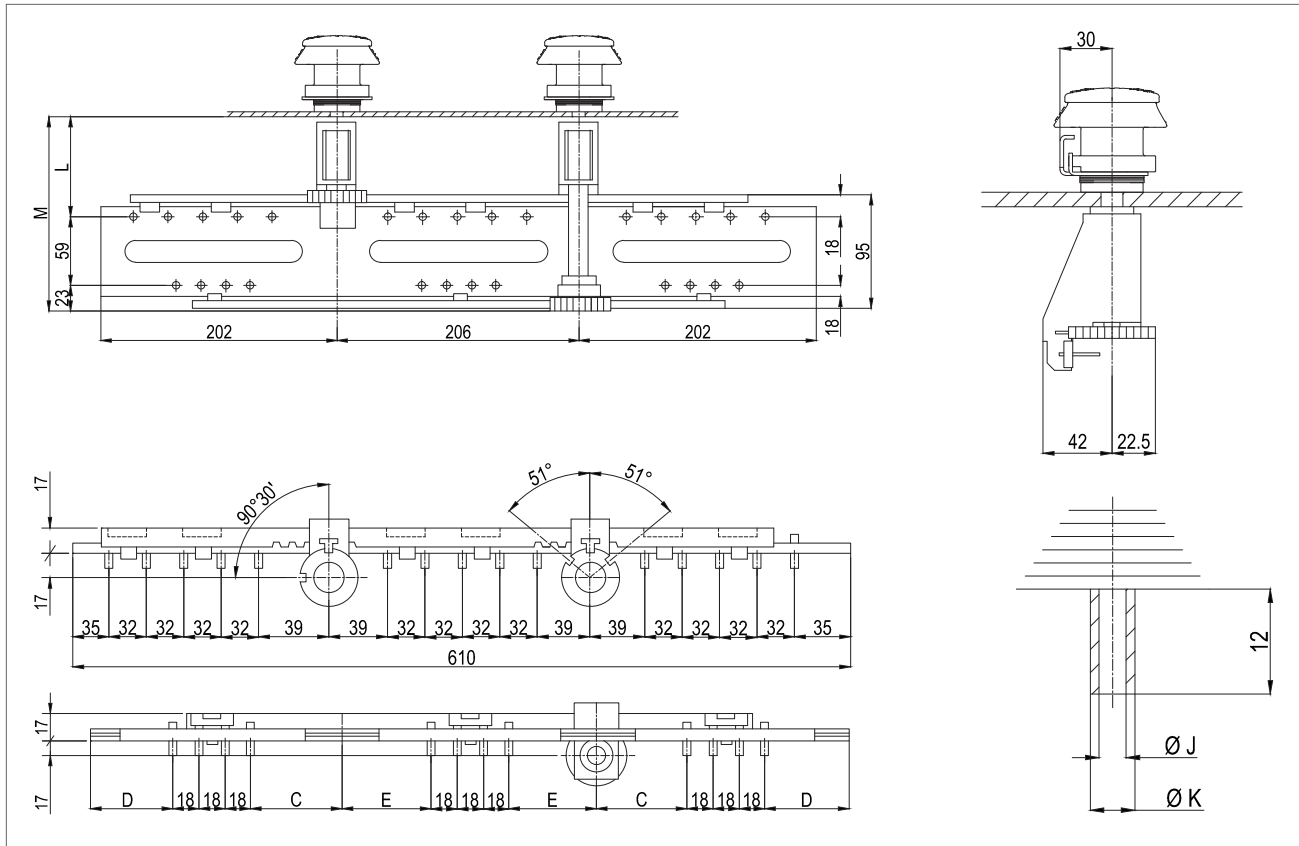
Dimensions in millimeters [mm]

L mm	Number of Positions	Voltage Class 20 kV				Voltage Class 30 kV			
		A mm	10 A	30 A	63 A	A mm	10 A	30 A	63 A
50	3	358	TL16-20-01-3-05	TL16-20-03-3-05	TL16-20-06-3-05	-	-	-	-
	4	412	TL16-20-01-4-05	TL16-20-03-4-05	TL16-20-06-4-05	-	-	-	-
	5	466	TL16-20-01-5-05	TL16-20-03-5-05	TL16-20-06-5-05	-	-	-	-
	6	520	TL16-20-01-6-05	TL16-20-03-6-05	TL16-20-06-6-05	-	-	-	-
	7	574	TL16-20-01-7-05	TL16-20-03-7-05	TL16-20-06-7-05	-	-	-	-
70	3	358	TL16-20-01-3-07	TL16-20-03-3-07	TL16-20-06-3-07	433	TL16-30-01-3-07	TL16-30-03-3-07	TL16-30-06-3-07
	4	412	TL16-20-01-4-07	TL16-20-03-4-07	TL16-20-06-4-07	487	TL16-30-01-4-07	TL16-30-03-4-07	TL16-30-06-4-07
	5	466	TL16-20-01-5-07	TL16-20-03-5-07	TL16-20-06-5-07	541	TL16-30-01-5-07	TL16-30-03-5-07	TL16-30-06-5-07
	6	520	TL16-20-01-6-07	TL16-20-03-6-07	TL16-20-06-6-07	595	TL16-30-01-6-07	TL16-30-03-6-07	TL16-30-06-6-07
	7	574	TL16-20-01-7-07	TL16-20-03-7-07	TL16-20-06-7-07	649	TL16-30-01-7-07	TL16-30-03-7-07	TL16-30-06-7-07
100	3	358	TL16-20-01-3-10	TL16-20-03-3-10	TL16-20-06-3-10	433	TL16-30-01-3-10	TL16-30-03-3-10	TL16-30-06-3-10
	4	412	TL16-20-01-4-10	TL16-20-03-4-10	TL16-20-06-4-10	487	TL16-30-01-4-10	TL16-30-03-4-10	TL16-30-06-4-10
	5	466	TL16-20-01-5-10	TL16-20-03-5-10	TL16-20-06-5-10	541	TL16-30-01-5-10	TL16-30-03-5-10	TL16-30-06-5-10
	6	520	TL16-20-01-6-10	TL16-20-03-6-10	TL16-20-06-6-10	595	TL16-30-01-6-10	TL16-30-03-6-10	TL16-30-06-6-10
	7	574	TL16-20-01-7-10	TL16-20-03-7-10	TL16-20-06-7-10	649	TL16-30-01-7-10	TL16-30-03-7-10	TL16-30-06-7-10
130	3	358	TL16-20-01-3-13	TL16-20-03-3-13	TL16-20-06-3-13	433	TL16-30-01-3-13	TL16-30-03-3-13	TL16-30-06-3-13
	4	412	TL16-20-01-4-13	TL16-20-03-4-13	TL16-20-06-4-13	487	TL16-30-01-4-13	TL16-30-03-4-13	TL16-30-06-4-13
	5	466	TL16-20-01-5-13	TL16-20-03-5-13	TL16-20-06-5-13	541	TL16-30-01-5-13	TL16-30-03-5-13	TL16-30-06-5-13
	6	520	TL16-20-01-6-13	TL16-20-03-6-13	TL16-20-06-6-13	595	TL16-30-01-6-13	TL16-30-03-6-13	TL16-30-06-6-13
	7	574	TL16-20-01-7-13	TL16-20-03-7-13	TL16-20-06-7-13	649	TL16-30-01-7-13	TL16-30-03-7-13	TL16-30-06-7-13

The H-J Family of Companies

De-Energized Tap Changer: Type 1 - Model 7

1. Stage Series Parallel Coupling 15-20 kV/30-63 A
2. Stage Delta Diagram 20 kV/30-63 A/3-7 Positions/Setting 2.5% per Position



Dimensions in millimeters [mm]

L mm	Number of Positions	Voltage Class 20 kV			
		M mm	10 A	30 A	63 A
50	3	132	TL17-20-01-3-05	TL17-20-03-3-05	TL17-20-06-3-05
	4		TL17-20-01-4-05	TL17-20-03-4-05	TL17-20-06-4-05
	5		TL17-20-01-5-05	TL17-20-03-5-05	TL17-20-06-5-05
	6		TL17-20-01-6-05	TL17-20-03-6-05	TL17-20-06-6-05
	7		TL17-20-01-7-05	TL17-20-03-7-05	TL17-20-06-7-05
70	3	152	TL17-20-01-3-07	TL17-20-03-3-07	TL17-20-06-3-07
	4		TL17-20-01-4-07	TL17-20-03-4-07	TL17-20-06-4-07
	5		TL17-20-01-5-07	TL17-20-03-5-07	TL17-20-06-5-07
	6		TL17-20-01-6-07	TL17-20-03-6-07	TL17-20-06-6-07
100	3	182	TL17-20-01-3-10	TL17-20-03-3-10	TL17-20-06-3-10
	4		TL17-20-01-4-10	TL17-20-03-4-10	TL17-20-06-4-10
	5		TL17-20-01-5-10	TL17-20-03-5-10	TL17-20-06-5-10
	6		TL17-20-01-6-10	TL17-20-03-6-10	TL17-20-06-6-10
130	3	212	TL17-20-01-3-13	TL17-20-03-3-13	TL17-20-06-3-13
	4		TL17-20-01-4-13	TL17-20-03-4-13	TL17-20-06-4-13
	5		TL17-20-01-5-13	TL17-20-03-5-13	TL17-20-06-5-13
	6		TL17-20-01-6-13	TL17-20-03-6-13	TL17-20-06-6-13
	7		TL17-20-01-7-13	TL17-20-03-7-13	TL17-20-06-7-13

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

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

The H-J Family of Companies

Transformer Components

- Buchholz Relay
- Pressure Relief Device
- Transformer Protection Relay
- Oil Level Indicator
- Bimetal Thermometer
- Dehydrating Breather
- Linear Tap Changer
- Radiator Valve
- Other Tank Components

