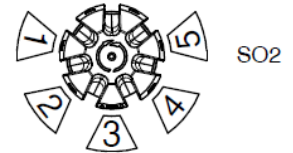
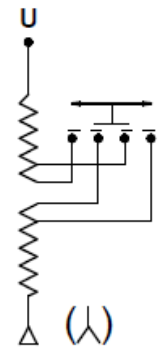
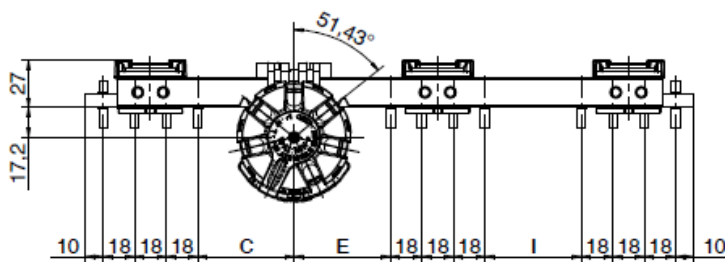
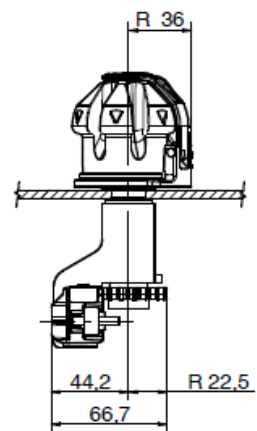
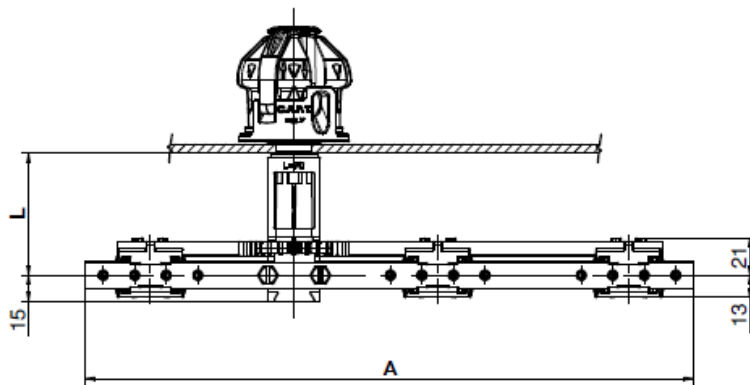


## TECHNICAL FEATURES

- | De-energized operation
- | For oil immersed transformer
- | For bridge connection
- | Rated voltage: 36 kV (BIL= 170 kV)
- | Rated current: 30 A
- | 5 positions
- | Regulation: 2,5% per position



Knob rotation scheme



## OVERALL DIMENSIONS

- | A = 530 mm
- | C = E = I = 80 mm
- | L = 70 mm

## I MAIN CHARACTERISTICS

This is a de-energized tap changer. It means all switching manoeuvre must be performed after disconnecting transformer by the electrical net opening the sectionalising switches, both HV and LV side, so transformer becomes off-circuit. Main characteristics of this tap-changer series are:

- I Dimensional compactness
- I Only 4 components to assemble for customers
- I Only one rotative movement
- I Self-centering moving contacts

## I MODIFICATIONS

In case we need to modify some particulars, in order to improve the quality of our products, C.A.P.T. company reserve an option to change without a previous warning. Substantial modification will be surely communicated.

## I TRANSFORMER OIL

All our tap changers are suitable to work in oil immersed transformers according to standard IEC 60296. In case user need to use specific oil (silicon, synthetic or vegetal) it is necessary consulted C.A.P.T. technical office who verify the functionality of tap in all the mechanicals, electrical and chemical characteristics.

## I INSULATION MATERIAL

The insulating materials used are bakelite (paper laminates and phenoplastic resin) of "E" thermal class.

## I GASKETS

The standard gaskets supplied by C.A.P.T. for all drives are suitable for use in mineral oil according to IEC 60296 at operating temperatures between -25°C and +105°C and in air at temperatures between -25°C and +40°C according to IEC 60214.

## I MECHANICAL CHARACTERISTICS

On the tap-changers type 090 fixed contacts are mounted in the fixed strips perpendicular to the support, while in the moving strips are installed moving contacts. The fixed strip is bolted to the bearing in which the moving strip slides, driven by a pinion.

## I DRIVE-HANDLE AND OPERATING CONTROL

The knob in polyamide must be inserted only when the 2 milled centering parts have been aligned. One is positioned on the shaft and the other is positioned on the metallic section of the support. To change the position, after having released the locking-device up to its stroke-end, you only have to rotate the knob without pulling it up and continue the operation up to reach the wanted new position, then close locking-device. The knob can be padlocked in any position by utilizing the appropriate rectangular hole on the positioning-ring and inserting the shackle of the padlock (8 mm max.) in the corresponding hollow space of the knob.

## I VOLTAGES

**Voltage class allowed** (According to standard IEC 60214):

- I Voltage class: 36 kV
- I AV: 70 kV
- I LI (1,2/50 $\mu$ s): 170 kV

**Voltage test between adjacent contacts:**

- I Pitch: 18 mm
- I AV: 12 kV
- I LI (1,2/50 $\mu$ s): 30 kV
- I LIC: 33 kV

## I METALLIC PARTS

The metallic parts that mainly compose drive control of the tap-changer are normally made of stainless steel and brass.

## I POLYAMIDE PARTS

Lower part of the bearing gear and control knob are normally made of polyamide.

## I FIXED CONTACTS

Made of copper with following internal diameter:  $\varnothing=3,1$ mm for 30 A rating. The connection of the conductors is provided by crimping of flexible cables.

## I MOVING CONTACTS

They are made of brass with wave shape to obtain a higher contact section (lower rise-temperature) and aid the tap changer self-positioning.

## I DRYING PROCESS

Different drying treatment can be process by customer: oven, in a vacuum autoclave, vapour-phase or other. In this process is normally included tap changer too. The maximum temperature suggested by C.A.P.T. for our tap changers is 100°C-120°C for 24-36 hours.

## I DRYING PROCESS IN CASE OF BEVEL GEAR AND DRIVE HANDLE

It is better to leave out from drying treatment the drive handle and bevel gear. In case it is impossible to leave them out, we suggest to strictly respect the temperature recommended. When you need drive handle with micro switch for electrical lock or electrical position transmitter it is recommended to do the treatment without the drive.

## I MAINTENANCE (for the end-user)

The tap changer does not require special maintenance.

If the tap changer remains unused in a single position for a long period of time (months) during the maintenance of the transformer and with the transformer de-energised, we recommend to first perform a series of operations on all the positions in order to clean the surface of the contacts. (see IEC60214-2 5.4.3 and 9.1.3)

## I SWITCHING OPERATION (TO THE END-USER)

Don't pull the knob up (see figure 1.1). To change the position, after having lifted up the clamp (locking-device) (see figure 1.2), you only have to rotate the knob without pulling it up and continue the operation up to the required new position, and then insert and lock the clamp (locking-device) inside the right position (see figure 1.3). Check that the 2 triangular arrows located on the knob and on the "positioning" ring correspond with each other. It is possible to remove the knob only if it is placed in the insert/extract mechanism because an antiextraction device is functioning (see figure 1.4).

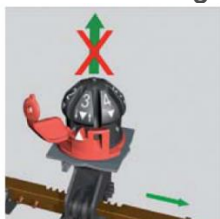


fig. 1.1



fig. 1.2



fig. 1.3



fig. 1.4

## | SAFETY PADLOCK

The knob can be padlocked in any position by utilizing the appropriate rectangular hole on the positioning-ring and inserting the shackle of the padlock (6 mm max.) in the corresponding hollow space of the knob (see figure 1.5).



fig. 1.5

## | ASSEMBLY OPERATIONS (FOR THE MANUFACTURER OF TRANSFORMERS)

The knob must be inserted only when the 2 milled centering parts are in alignment. One is positioned on the shaft and the other is positioned on the metallic section of the support (see figure 2.1).

The lid of the transformer can vary in thickness from 2÷8 mm. The knob is self-adjusting and no thickness washers are necessary (see figure 2.2).

The components must be inserted in the following order:

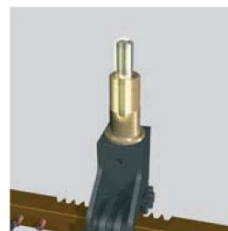


fig. 2.1



fig. 2.2

- | 1. OR gasket ring
- | 2. Positioning ring
- | 3. Fixing nut
- | 4. Knob
- | (see figure 2.3)

Position the knob in the insert/extract position countermarked by 2 small arrows next to the number.



Example: for a knob with 5 positions, the insert/extract position is position 3 (see figure 2.4).

When you reach the “desired” and correct position, you must press the knob down lightly until the attachment takes place (see figure 2.5). A soft “clacking” sound means the attachment has occurred.

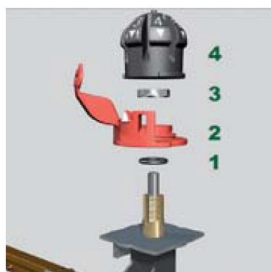


fig. 2.3

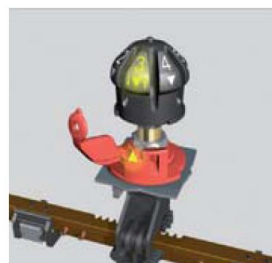


fig. 2.4

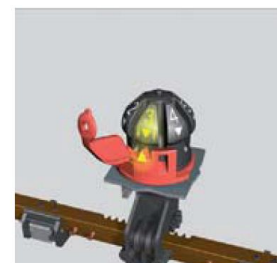


fig. 2.5

## | TREATMENT IN THE OVEN AND / OR UNDER VACUUM

It is recommended that the treatment is carried out at a maximum temperature between 100-120 °C for 24-36 hours (see figure 3.1) Contact our technical CAPT office when carrying out drying procedures at higher temperatures, or when carrying out “special” treatments.

## | LUBRICATION AND OPERATIONS

After the treatment, before using the tap changer, you must lubricate carefully all the fixed and moving contacts of the tap changer, or alternatively, place the tap changer together with its active part in an oil bath in the transformer-tank. Wait until the tap changer has come down to environment temperature before performing the first operation (see figure 3.2).

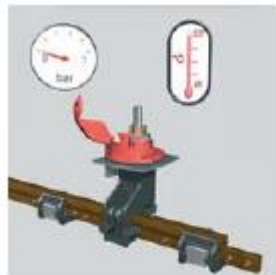


fig. 3.1



fig. 3.2

## | WHEN CONTACT C.A.P.T.

In the following cases please contact C.A.P.T.

- for temperature condition higher/lower then suggest
- for hard environment conditions, with possibility of snow or sand storming, or in potential seismic area.

## | TYPE TEST

Type test reports are furnished on request. Our de-energized tap changers are tested according to IEC 60214 as follows:

- | **7.2 - Type tests.**
- | 7.2.2 - Temperature rise of contacts.
- | 7.2.3 - Short-circuit current test.
- | 7.2.4.1 - Mechanical endurance test.
- | 7.2.5 - Dielectric tests.
- | 7.3.1 - Mechanical routine test.