

ON LOAD GEARS



OPERATIONAL & MAINTENANCE MANUAL

FOR

**ON LOAD TAPCHANGERS
DRY TYPE APPLICATIONS**

TYPE (A) ABS

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FOR

ON LOAD TAPCHANGERS

TYPE [A] ABS

1. INTRODUCTION:

The ON LOAD TAPCHANGER Type [A] ABS is meant for application with dry type transformers, both of the Cast Resin Type, and of the Varnished Air Insulated type. The Tapchanger operates in Air in both cases.

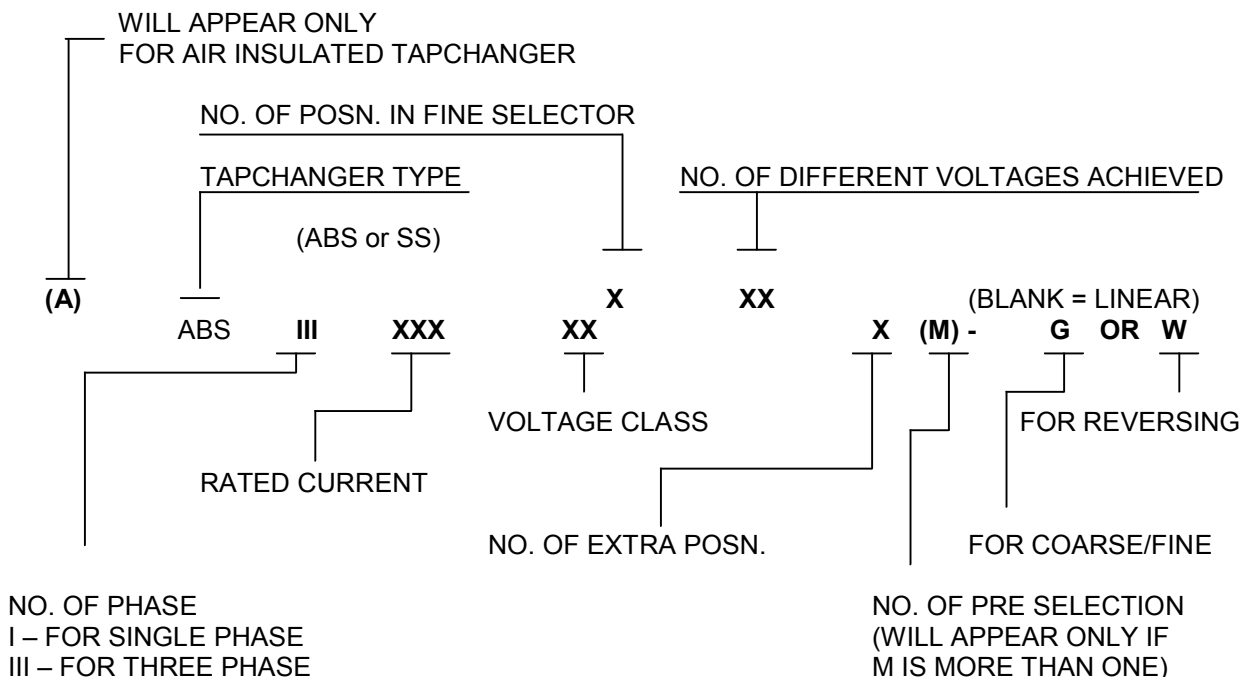
The Tapchanger has two main components, the Power Switch, and the Operating Mechanism. These two are integrally mounted on a common Steel Support Structure. The transformer manufacturer will mount the whole structure on an extension of his core and coil assembly. He will make connections from the winding to the tapchanger through air insulated paper/plastic covered leads. The transformer leads terminate at an insulated PHASE BOARD mounted on the tapchanger support structure. There are three Phase boards, one per phase. Further connections from the phase board to the switching contacts of the Power switch are made by the tap changer manufacturer, as part of the tapchanger construction.

The entire tapchanger is covered with removable steel cover sheets, to prevent ingress of vermin and other extraneous matter. Louvres are provided generously to ensure air circulation and cooling. Since neither the Power switch compartment, nor the Mechanism Compartment are air tight, there is no need for anti condensation heating.

At present tapchanger type [A] ABS is available only upto 11 kV class.

2. TYPE DESIGNATION:

The system of type designation of the ABS range of Tapchanger is as follows:



3. DESPATCH FROM WORKS :

The Tapchanger is despatched by us to the Transformer Manufacturer in a single integral piece, except for the manual operating handle, which is sent clipped on to the mechanism enclosure, at the front of the tapchanger. The Key for Drive Mechanism Door Lock is in position, retained by cellophane tape.

In general, when the Transformer manufacturer despatches the complete Transformer, he will send the Tapchanger mounted on it. He will also provide some form of common barricade, to prevent access to live parts

4. RECOMMENDATIONS FOR PROCESSING OF TAPCHANGER :

Epoxy Resin bonded Glass Filament wound Tubes and Cast Epoxy, which are used as main insulation are almost totally non-hygroscopic. Insulation of this kind is not specifically damaged by exposure to moisture due to whatever reason, for example bad storage. No particular processing is required to regain the full insulation level. When the Tapchanger has been stored for a time, it is enough to wipe all the insulating surfaces with a dry fleece free cloth to remove surface moisture.

5. OPERATIONAL CHECKS PRIOR TO COMMISSIONING:

Before making any Electrical Connections, operate the Tapchanger manually by means of the Crank Handle once over the entire range of positions, observing particularly the following:

1. The load on the Crank Handle is sensibly uniform (about 2 to 4 kg-m).
2. Transit time by audio and visual perceptions should be fast (about 110 milli sec. Max.)
3. Mechanical End Stops are operational.

Now connect the Main Three Phase 415V supply, taking care of Phase Sequence, indicated by appropriate markings on the Terminal Blocks. Switch on and operate electrically. At end positions, try to operate in the direction of Over-Drive. Be ready to Switch Off Power, if Motor starts running due to failure of Electrical Limit Operation. (This may happen if the phase sequence of supply is wrong).

The Tapchanger is now ready for service.

6. ROUTINE MAINTENANCE:

Period: Once a year or 6000 operations, which ever is earlier.

1. Apply grease as per our instructions on all Gear Teeth, Geneva Locking Faces and other Mechanical Contact and Bearing surfaces.
2. Wipe the Tap Position Indicator dial switch fixed studs clear and smear a little "Electrolube" oil.
3. Open the top Vermin Proofing Sheet to access the power switch, and with a dry cotton cloth wipe generally free of all dirt and dust. In particular wipe off any debris of metallic powder found on the floor of the power switch.
4. Observe the general condition of the Main Spring, particularly checking elongation, if any, of holes in the end fittings through which the spring passes.
5. Keep the Drive Mechanism Cabinet reasonably clean and dry at all times.
6. Check the tension of the Drive Motor Belt & if necessary remove one link to reduce slack.

7. MAJOR MAINTENANCE & OVER-HAUL:

IT IS STRONGLY RECOMMENDED THAT THE ASSISTANCE OF OLG IS TAKEN FOR MAJOR MAINTENANCE AND OVER-HAUL.

Schedule for major maintenance and over-haul is as follows:

- a) For Step Capacity (i.e. step voltage x through current) less than 5KVA every 20,000 operations or five years whichever is earlier.
- b) For Step Capacity 5-10 KVA every 15,000 operations or four years whichever is earlier.
- c) For Step Capacity over 10KVA every 12,000 operations or three years whichever is earlier.

Remove the side and top Vermin Proof covers to gain access to the power switch.

1. Clean all deposits with non-fibrous, clean cloth.
2. Visually observe all Contacts for Wear. Contacts must be changed if there are signs of heavy Arcing or Pitting. We recommend changing of complete Hinged Roller Contact Assembly or Fixed Contact as necessary.
3. If the condition of the Main Springs are seen to be unsatisfactory, replace spring.
4. In any case we recommend replacement of Main Spring Assembly after every 40,000 operations.

After completing all work, close the Vermin Proof covers

8. TROUBLE SHOOTING OF ELECTRICAL SCHEME:

PROBLEM NO.1: Lowering & raising operation interchanges while operating relevant Push Button. This problem may occur more particularly the first time when the Tap Change is applied at the Transformer Manufacturer's works, due to mismatch of Winding and Connection Diagram connection.

- i) Verify the Winding and Connection Diagram corresponds.
- ii) Check the Phase Sequence of supply and interchange any two phases.

PROBLEM NO.2: Motor not running (is dead)

- i) Check three Phases & Neutral are available at the terminal blocks.
- ii) Check supply ON/OFF Switch (TCSIS) & Local/Remote Switch (CSS-1) are selected properly.
- iii) Check the fuses provided for three phases (FS1, FS2 & FS3) and for 110V supply (FS4 & FS5) are intact.
- iv) Check whether O/L relay (a1) has been tripped due to over current or short circuit. If it is so, reset it manually or put it in auto-reset mode and wait for sometime. Operate few times in presence. Observe O/L relay (a1) tripping, if found analyse the reason whether taking over current or stuck.
- v) Ensure that the manual operating handle is not inserted into operating position before going for electrical operation.
- vi) If RTCC is not used, ensure that the links have been provided as per "ATTENTION LABLE" stuck inside the door.

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PROBLEM NO.3: On pressing the Push button for Raise/Lower operation, OLTC Operates continuously without stop.

- i). Check DSR & DSL switch function.
- ii). Check SC (Stepping contactor) making function.

PROBLEM NO.4: Motor not running (but humming noise heard) (Applicable to 3 phase Motor).

- i) Check 3 phases are available at Terminal Block.
- ii) Check all the three fuses provided in the coming line (FS1, FS2 & FS3) are intact.
- iii) Check 3 phases at the overload relay output.

PEOBLEM NO.5: Tap position indicator not showing correct number & showing Tap No.73 or more than the Taps available.

- i) Short the terminals No.9, N290. Check the display for “1”, if not showing replace the Tap Position Indicator.
- ii) Check continuity and the values of TPI resistances.
- iii) Check TPI Moving Contact positively making against fixed studs.

PROBLEM NO.6: Tap Changer Stuck.

- i) Check Mechanism freeness.
- ii) Check Moving and Fixed Contact welded.
- iii) Check condition of Transition Resistances.
- iv) Check all the Fixed and Roller Contact in all the tap points are free from major arcing and may need replacement.
- v) Check if Tank is distorted, or if Main Insulating Tie Bars damaged.

Specify the following while communicating with OLG to take action from OLG end.

Sl. No. of OLTC :

Type of OLTC :
(Available in Name Plate)

No. of Operation :

Your observastion based :
on this checklist.

9. DISPOSAL OF PRODUCT

This product is environmentally compatible.

In as supplied condition, the product does not incorporate any hazardous substances. In operation, the product does not emit any hazardous materials or gases.

The following types of materials have been used to make up the product:

1. Re-cyclable material
2. Non Re-cyclable material

During disposal of the product, care must be taken to dismantle as far as possible in more environmentally accepted way as Recyclable & Non-cyclable scraps i.e. steel, copper, aluminium, rubber, PVC, Thermocol, cast –resin, & glass fiber reinforced materials to be segregated properly.

1. Re-cyclable material

Re-cyclable materials like Steel, Copper, and Aluminium can be reused. In disposal, priority must be given to re-use of the materials which can be recycled.

2. Non cyclable material

Non cyclable materials like Cast resin glass fiber reinforced thermoplastics, thermocol, rubber, porcelain & similar materials can be broken in to pieces & can be used as secured land filling materials.

Rubber being biodegradable material must be recycled through authorized contractors.

PVC and Thermocol material should not be burnt as they may release Halogenated hydrocarbons and Carbon monoxide which can affect the ozone layer. Therefore PVC and Thermocol must be recycled through authorized contractors.

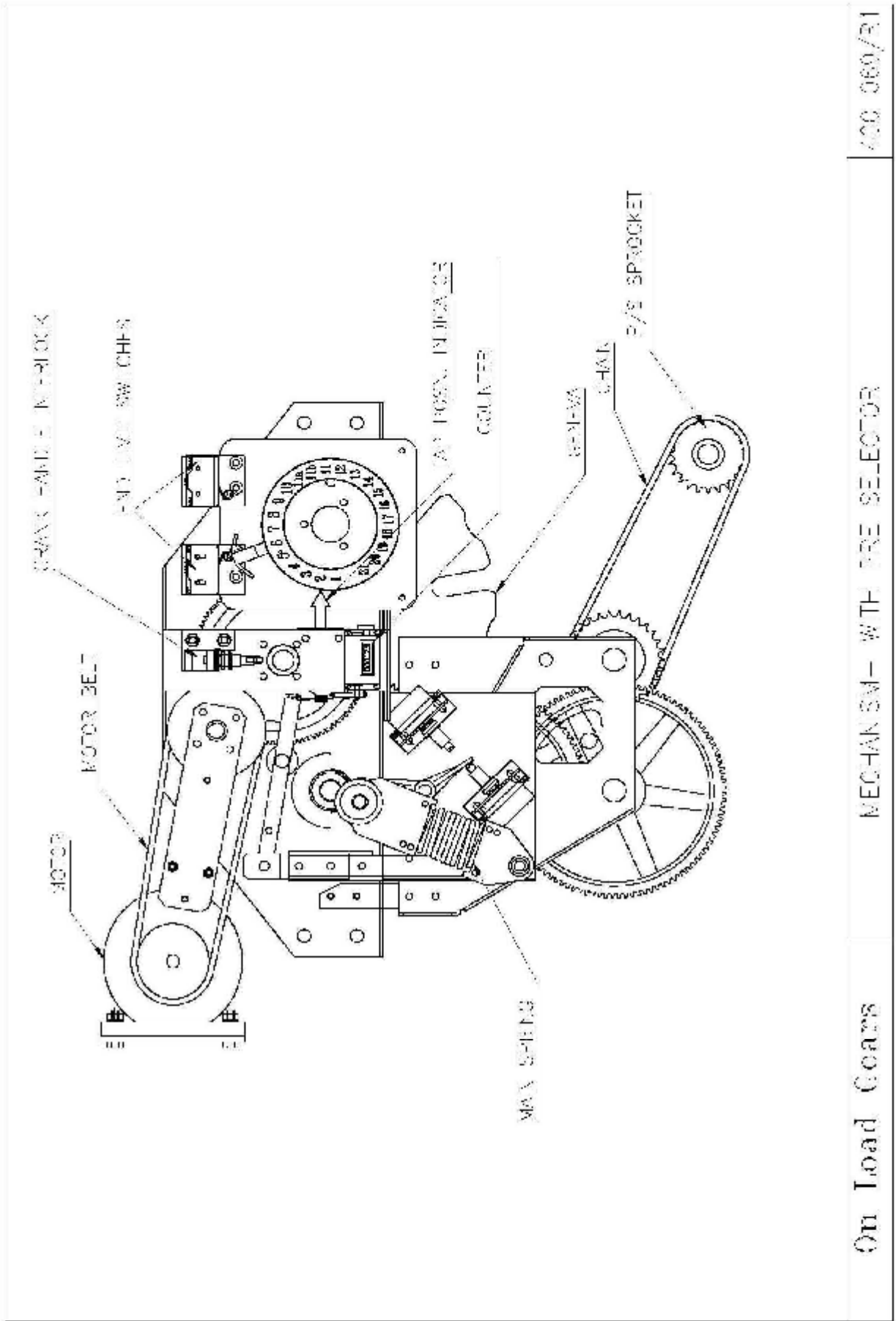
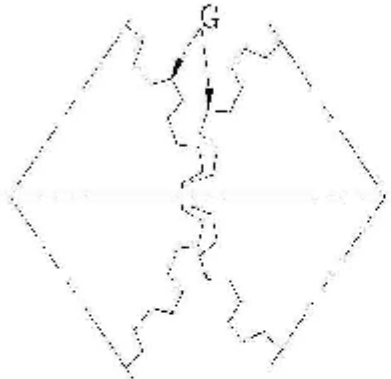
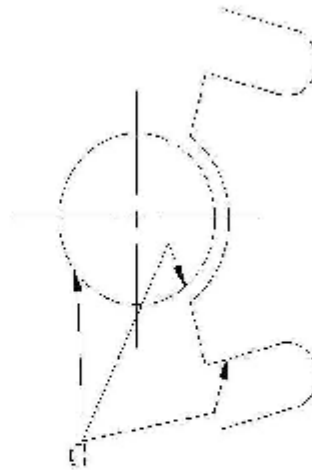


Fig 1

LUBRICATION INSTRUCTIONS



GEAR WHEELS



GENEVA & CAM MECHANISM

ONCE IN A YEAR OR 6000 OPERATIONS WHICHEVER IS EARLIER CARRY OUT THE FOLLOWING:

- 1) LUBRICATE ALL GEAR WHEELS, GENEVA CAM MECHANISM & MECH. LIMIT ASSY. AS INDICATED BY 'G' EITHER WITH LITHIUM GREASE OR MOLYBDENUM-DI-SULPHIDE (COMMERCIAL NAME MOSIL BRB-500)**
- 2) APPLY (LUBRICATION TRANSFORMER OIL) IN ALL MOVING AND HINGED PARTS PERIODICALLY IN POWER SWITCH AND MECHANISM ASSEMBLY.**
- 3) CHECK THE TENSION OF THE DRIVE MOTOR BELT & IF NECESSARY REMOVE ONE LINK.**

 ON LOAD GEARS

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