



## INSTALLATION OF MULTIDISC CLUTCHES AND BRAKES

1. The Clutches should be thoroughly cleaned before fitting.
2. a) It is very much essential that the clutch is installed by the use of pressure only and not by hammering it into position. Apply pressure at C or D and never at A or B.  
b) The class of fit for the shaft should always be between h7 and j6.  
c) When fitted, the clutch body must run true both axially and radially.
3. a) The discs must be assembled in such a manner that the clutch body and the armature plate are in contact with a disk which revolves with these components.  
b) The expander springs of the outer disc must bear against the surface of the adjacent outer disc.  
c) The outer plates are arranged in such a way that the expander springs are facing the armature plate and are out of phase with one another by 30°.  
d) The last outer plate is assembled in such a way that the expander springs are facing the coil housing and are out of phase with the previous plate by 30°.
4. When the magnet body is pressed on to the shaft, care must be taken to avoid burr. All sharp edges must be rounded off.
5. The gap between the two halves of the clutch should be maintained as per catalogue very strictly.
6. A multiple disc slipping clutch (type with drive transmitted from inner to outer plate) must not be used as a brake with the magnet body stationary since the dirt build up on the slip Ring will cause short circuit.  
In this type of clutch the outer carrier is supplied with a pilot bore and arrangements for centering and attachment should be done by the customer. If necessary, the carrier must be bolted and pinned to its mating part.  
The pilot provided on the carrier can be turned to any diameter required. The bore is ground to facilitate easy mounting of a bearing. While turning care should be taken to fix the carrier true with respect to the bore.
7. In a stationary field type of clutch the maximum speed permitted is determined by the maximum speed permitted for the bearings.
8. The restraining device (holding the coil housing) which prevents the magnet body from rotating must not cause any axial or radial distortion so as to load the bearings in a stationary type of clutch.
9. While mounting two stationary field clutches back to back a small space should be left between the units for the oil to reach the bearings.
10. In a stationary field clutch the air gap between stator and rotor is very critical. Hence, it should never be disassembled.

### Vertical Installation:

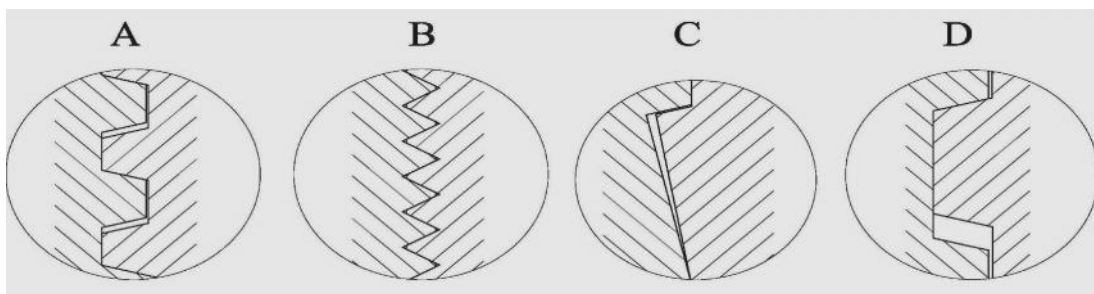
If the clutch or the brake is to be installed vertically, then the armature disc should be at the bottom. The disc clearance should be reduced to 0.2mm to reduce the engagement time.



## **INSTALLATION OF TOOTHED CLUTCHES**

01. The Positive type Toothed Clutches can transmit a higher torque (torque through profiled teeth) than a multi-disc clutch of the same size. High speeds are possible and are maintenance free.
02. The clutches should be thoroughly cleaned before assembly.
03. They should be engaged only while at rest or at a relative speed of  $\pm 5$  r.p.m. of the shafts but may be disengaged at any speed or under load.
04. It is very much essential that the clutch is installed by the use of pressure only and not hammering it into position. Apply pressure at C or D and never at A or B.
05. The class of fit for the shaft should always be h7 to j6.
06. It is very important that the clutch coil housing and Armature disc is properly centered and located axially. The maximum radial and axial run-out permitted is 0.02mm.
07. When the clutch body is pressed onto the shaft, care must be taken to avoid burr. All sharp edges must be rounded off.
08. The Armature Plate must move very freely in the axial direction.
09. Ensure that the screws on the armature plate are fully tightened in position.
10. The gap between the two halves of the clutch should be maintained as per catalogue very strictly.
11. In a stationary field type of clutch the maximum speed permitted is determined by the maximum speed permitted for the bearings.
12. The restraining device (holding the coil housing) which prevents the magnet body from rotating must not cause any axial or radial distortion so as to load the bearings in a stationary type of clutch.
13. While mounting two stationary clutches back to back, a small gap should be left between the units for the oil to reach the bearings.
14. A radial gap of 2mm is maintained between the shaft and the armature plate to prevent magnetic flux leakage into the shaft.
15. The drive motor and the clutch should never be energized at the same instant.
16. Both Wet and Dry operation is possible.
17. In case the clutch is installed vertically then the armature disc clearance should be reduced to 0.2mm to reduce the engagement time. Ensure armature plate is at the bottom.

The toothed Clutches can be supplied with different tooth forms continuous engagement (Fig A & B) Fixed point engagement ( Fig D). Unidirectional engagement ( Fig.C).



18. The tooth clutches are provided with brass drive rings to facilitate easy replacement of the drive rings and for its non-magnetic property.
19. The stationary field type of clutches should never be disassembled since the air gap between the stator and rotor is very critical.



## OPERATING INSTRUCTIONS

### **LUBRICATION :**

1. Clutches with discs in the Magnetic circuit can only be operated wet.
2. Splash or internal lubrication is recommended for the clutches and Brakes. For splash lubrication it is advisable to immerse 1/10<sup>th</sup> of the clutch in oil.
3. The dark colour of the oil due to the high loading of the clutch is Quite harmless.
4. The intervals between oil changes depend on the operating condition of the clutch, the oil quantity, oil temperature etc.
5. The oil used should have the following properties :
  - a) High heat and aging resistance.
  - b) Negative electrolytic properties.
  - c) Low content of solids.
  - d) Good conductivity and cooling.
  - e) Viscosity of 21 mm<sup>2</sup>/s (21cSt)
6. The oil flow rate should be approximately 0.1 to 0.2 it/min/clutch.

The following oils are recommended:

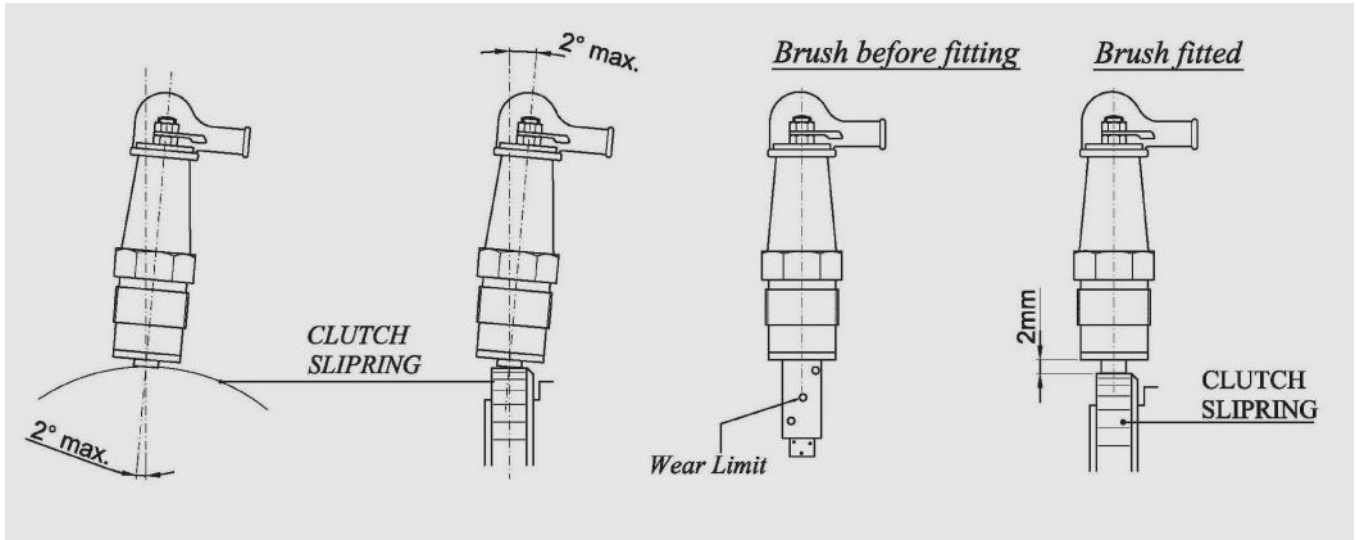
Supplier	Type
B.P.	Cabol 32 Cabol 46
Castrol	Perfecto T 32 Hypsin AWS 4 G
ESSO	Esstic 32 Teresso EP 47 NUTO H 44
MOBIL	VAC HLP 25 D-T-E Oil Light
SHELL INDIAN OIL	Hydrol 32 Servosystem HLP (N)22

### **DRY OPERATION**

1. Adequate ventilation should be provided.
2. Corrosive environment should be avoided.
3. Moist environment should be totally avoided.



## TELESCOPIC BRUSHES



1. Brushes must be connected to the positive pole of supply.
2. For dry running, carbon brushes are adequate.
3. For wet running, bronze gauze wire brush should be used.
4. Colour code is used for matching before replacement of brushes.
5. The maximum permitted operating speeds of slipring type of clutches depend on the rubbing velocity permitted. For the slipring type operating wet, velocities above 20m/s requires an additional dummy brush. A dummy brush is also required at lower rubbing velocities for constantly varying current. Higher slipring velocities are permitted with dry operation.
6. Proper installation with minimum vibration is required for long life. In case the brushes are not screwed directly into the machine housing; They must be supported by strong bolted brackets on each side.
7. Brushes should never be fitted into the oil sump since the danger of short circuits exists through the bridging by metal particles.
8. The brushes should be checked for undue wear once every three Months.
9. Brushes of standard installation lengths can be expected to have a longer service life than the long type owing to their least tendency to oscillate.
10. Sparks between the brush and the slipring should be avoided at all Cost since it will produce a pitted surface.
11. In case the slipring becomes pitted or grooved they can be reground to a depth of 0.5mm (diameter).
12. It is essential to ensure that a good contact between the clutch body and the machine housing or the negative pole is maintained.



## POWER SUPPLY

1. The nominal voltage for clutches should be 24 V.d.c ( $\pm 10\%$ ).
2. To minimize the line losses in voltage the power pack must be operated with maximum load possible in service.
3. The sparks which tend to occur between the relay contacts, due to the inductive load when the coil is de-energized, should be prevented by using a spark quenching capacitor as in fig.a
4. A high self-induced voltage is produced at the time of disengagement of Clutch or brake. This can damage the isolators or relays. Suitable surge-protection devices (varistors) should be used as shown in fig.b.
5. Rapid engagement of the clutch or brake is possible by connecting a resistor in series as shown in fig..c.
6. Rapid disengagement of clutch of brake is possible by connecting a Capacitor in parallel as shown in fig.d.
7. Faster engagement of the clutch or brake can be achieved by applying a pulsed voltage up to three times the rated voltage.

