# OPERATING INSTRUCTIONS


## TYRE-FLEX COUPLINGS

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R-OI/T-01/00-12/05

## GENERAL

I) Standard features of Tyre-Flex Couplings (Pg. 1)

II) Detail knowledge of this Operating Instructions will ensure trouble free operation of the Tyre-Flex Coupling. Persons responsible for handling, installation & use of the coupling shall required & understand these Operating Instructions.

**ATTENTION** This coupling is suitable for applications in stationery/mobile use in engineering industry.



For all technical queries please contact –

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# INDEX

RATHI

# TYRE-FLEX COUPLING

## *STANDARD FEATURES*

- Torsionally soft coupling
- Protects against heavy shock due to sudden change in load
- Absorbs vibrations & impact loads
- Simple in construction
- No lubrication needed
- Less down time for alignment or replacement of tyre
- Low inventory by utilising same coupling for different shaft sizes with the help of taper bushes
- Permits angular, axial, parallel or combination of misalignments
- All metal parts are coated with anti-corrosive agents
- Can be modified as per customer's specific requirement

# *TYRE-FLEX FAMILY – AT A GLANCE*

- Sizes : 15 (T-4 to TO-25)
- Power Rating : 3.75 kW to 2310 kW 1500 rpm
  (5.02 HP to 3097 HP )@1500 rpm
- Bore Range : 32 mm to 190 mm.
- Misalignment :

  a) Parallel - 1.1 mm. to 6.6 mm.
  b) Angular - upto 4°
  c) Axial - 1.3 mm. to 8.2 mm.

  } Depends on sizes

| | | |
|---|---|---|
| T – B | With inside clamping ring and parallel bore | (T-4 to T-12) |
| TO - B | With outside clamping ring and parallel bore | (TO-14 to TO-25) |
| TOFH | To permit any position like FF, HH, FH in same flange | (TFH7 to TFH12) |

| | | |
|---|---|---|
| T - F/H | With inside clamping ring and taper bore to suit taper bush | (T-4 to T-6) |
| TO - F/H | With outside clamping ring and taper bore to suit taper bush | (TO-7 to TO-22) |
| | | |

Application wise

| | | | |
|---|---|---|---|
| For DBSE, Spacer type | RST | - | 12 to 35 |
| | TS - B | - | 5 to 12 |
| | TS - F/H | - | 5 to 12 |
| For Engine Driven, flange type | TF/TOF | - | 6 to 12 |

## *ELASTOMER INFORMATION*

- Rathi is the only manufacturer, which produces its own rubber elements in a whole range of compounds, by conducting specific research and development into rubber engineering technology.
- By combining the benefits of this technology with mechanical expertise we can optimise power transmission solutions.
- Full laboratory control and a wide range of specialised equipment ensure high quality and consistency in product performance.
- Specialised compounds can be developed in our laboratories to meet specific requirements.

## Recommended Elastomers for Tyre-flex Coupling

| Type | Shore hardness | Max. operating temp. (°C) |
|---|---|---|
| Natural | 75° ±5° | 70 |
| Synthetic | 75° ±5° | 100 |
| Fras | 75° ±5° | 100 |

## *STD. MATERIAL OF CONSTRUCTION*

| Component | Used in | Material |
|---|---|---|
| Flange / Adapter/ Hub | B type | C.I. BS 1452-61 Gr. 12 |
| | F/H type | C.I. BS 1452-61 Gr. 17 |
| | TFH type | C.I. BS 1452-61 Gr. 17 |
| Taper Bush | All type | C.I. BS 1452-61 Gr. 14 |
| Clamping Ring | All type | BS 970 |
| Tyre | All type | Natural ASTM D-2000-720<br>Optional - Synthetic, Fras |
| Spacer | RST | BS 970 |
| Socket head cap screw | TS-5 to TS-12 (For Spacer Side only) | High Tensile BS 4168 Gr. 12.9 |
| Hex. Head screw | All type | High Tensile BS 4168 Gr. 10.9 |
| Spring washer | All type | Steel BS 4464 |

## *TORSIONAL STIFFNESS FOR STANDARD TYRE-FLEX COUPLING*

| COUPLING SIZE | # TORSIONAL STIFFNESS Nm/Deg. (°) |
|---|---|
| 4 | 5 |
| 5 | 13 |
| 6 | 26 |
| 7 | 41 |
| 8 | 63 |
| 9 | 91 |
| 10 | 126 |
| 11 | 178 |
| 12 | 296 |
| 14 | 470 |
| 16 | 778 |
| 18 | 1371 |
| 20 | 1959 |
| 22 | 2760 |
| 25 | 3562 |

# At Rated Torque

## *SPECIAL FEATURES OF VARIOUS TYPES OF TYRE-FLEX COUPLING*

A. T-B TYPE (Fig. 1)

- Simple in construction.
- Less down time for replacement of tyre. Alignment quickly checked by placing straight edge.
- Clamping force on tyre is applied from inside through inside clamping ring by tightening of hex. head screw.
- Finish bore & keyway to be done directly in flanges.

B. T-F/H TYPE (Fig. 2)

- Flanges are taper bored to suit standard taper bush.
- Use of taper bushes of different bore helps to use same coupling for different shaft diameters.
- Easy removal of flanges by loosening of taper bushes.

C. TO (B OR F/H) TYPE (Fig. 3a & 3b)

- Easy for installation and alignment.
- Clamping force on tyre is applied from outside through outside clamping ring tightening of hex. head bolts.
- Straight bores and taper bores can be done in either or flanges.

D. TFH TYPE (Fig. 4)

- Clamping force on tyre is applied through inside clamping ring and external flange by tightening of hex. head bolts.
- Hubs of this type are reversible which permits arranging them in any position like F/H, F/F, H/H. Hence low inventory is the important feature of this type.

G. RST TYPE (Fig. 5a & 5b)

- Use of shaft ended flanges with adapter helps to use std. tyre-flex coupling as spacer type for given DBSE .
- This type special designed for motor pump installation where drive or driven equipment are not to disturb while servicing impeller packing glands, etc.
- Reduces maintenance cost.

H. TS TYPE (Fig. 6)

- Spacer type coupling to accommodate given DBSE.
- Can be provided with straight bore or taper bore to suit standard taper bushes.
- Easy removal of spacer for maintenance purpose.

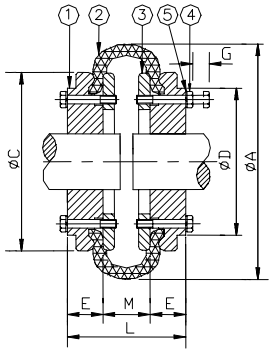
I. TF TYPE (Fig. 7)

- Suitable for engine driven equipment.
- Std. coupling can be bolted to flange mounting.
- Easy for assembly & disassembly.

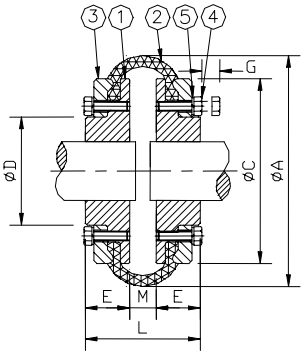
- Available with SAE flanges.

## *CONSTRUCTIONAL DETAILS OF VARIOUS TYPES OF TYRE-FLEX*

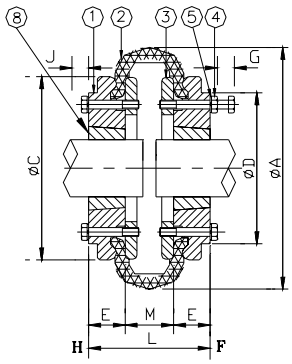
Type TO (B) Assly
TYPE B
T-4 To T-12
Fig. 1



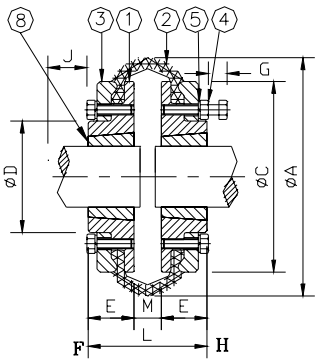

TYPE B
TO-14 To TO-25
Fig. 3a



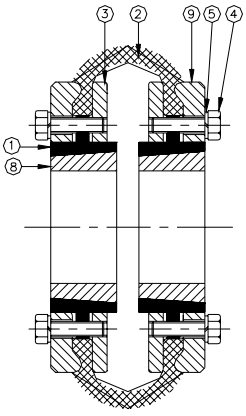

TYPE F/H
T-4 To T-6
Fig. 2




TYPE F/H
TO-7 To TO-22
Fig. 3b



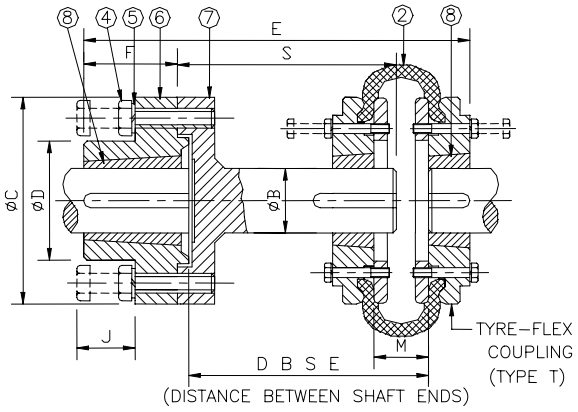

TYPE T-F/H
TFH-7 To TFH-12
Fig. 4



## *CONSTRUCTIONAL DETAILS OF VARIOUS TYPES OF TYRE-FLEX*

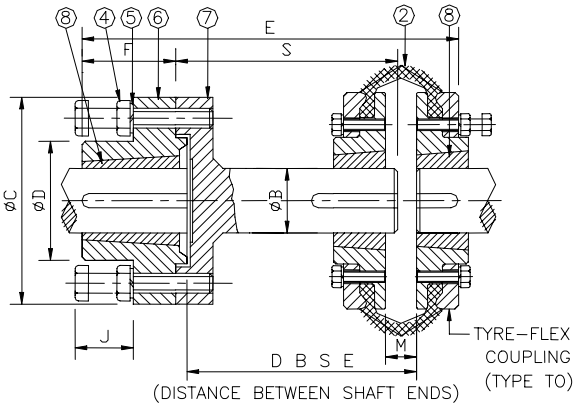
Type RST(T)

Fig. 5a



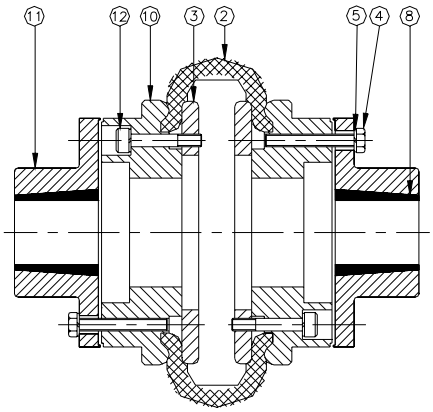

Type RST(TO)

Fig. 5b



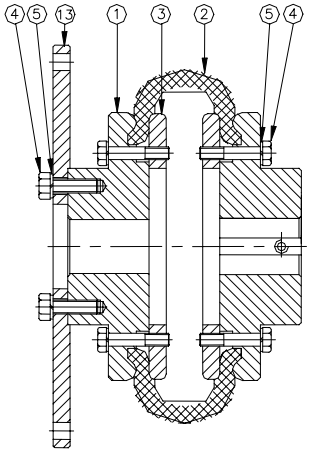

Type TS

Fig. 6



Type TF

Fig. 7



**Nomenclature:-**

| | | |
|---|---|---|
| 1) Hub | 6) RST Adapter | 11) Adapter |
| 2) Tyre | 7) RST Spacer | 12) Socket Head Cap Screw |
| 3) Clamping Ring | 8) Taper Bush | 13) Bolted Flange |
| 4) Hex. Head Bolt | 9) Flange | |
| 5) Spring Washer | 10) Spacer Flange | |

## *RATINGS FOR STANDARD TYRE-FLEX COUPLING*

| Sr. No. | Coupling Size | Rated Torque | | | Rated Power | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Nm | kg-m | lbs-in. | @100 rpm | | @1500 rpm | | @ Speed |
| | | | | | kW | HP | kW | HP | rpm |
| 1 | 4 | 24 | 2.4 | 212 | 0.25 | 0.34 | 3.75 | 5.03 | 1500 |
| 2 | 5 | 66 | 6.7 | 584 | 0.69 | 0.92 | 10.35 | 13.9 | 1500 |
| 3 | 6 | 127 | 12.9 | 1123 | 1.33 | 1.8 | 19.95 | 26.7 | 1500 |
| 4 | 7 | 250 | 25.5 | 2211 | 2.62 | 3.5 | 39.3 | 52.7 | 1500 |
| 5 | 8 | 375 | 38.2 | 3317 | 3.93 | 5.3 | 58.95 | 79.0 | 1500 |
| 6 | 9 | 500 | 51.0 | 4422 | 5.24 | 7.0 | 78.6 | 105 | 1500 |
| 7 | 10 | 675 | 68.8 | 5970 | 7.07 | 9.5 | 106.05 | 142 | 1500 |
| 8 | 11 | 875 | 89.2 | 7739 | 9.16 | 12.3 | 137.4 | 184 | 1500 |
| 9 | 12 | 1330 | 135.6 | 11763 | 13.9 | 18.6 | 208.5 | 279 | 1500 |
| 10 | 14 | 2325 | 237.0 | 20562 | 24.3 | 32.6 | 364.5 | 489 | 1500 |
| 11 | 16 | 3730 | 380.2 | 32988 | 39.5 | 52.9 | 592.5 | 794 | 1500 |
| 12 | 18 | 6270 | 639.1 | 55452 | 65.7 | 88.1 | 986.5 | 1322 | 1500 |
| 13 | 20 | 9319 | 950 | 82400 | 97.6 | 130.8 | 1464 | 1962 | 1200 |
| 14 | 22 | 11553 | 1178 | 102253 | 121 | 162.2 | 1815 | 2433 | 1000 |
| 15 | 25 | 14704 | 1499 | 130141 | 154 | 206.5 | 2310 | 3097.5 | 1000 |

## *WEIGHT & MI OF TYRE-FLEX COUPLING*

| Size | Type | Wt. kg | MI. kg-m$^2$ | GD$^2$ kg-m$^2$ |
|---|---|---|---|---|
| T-4 | B | 1.9 | 0.00161 | 0.00644 |
| | F/H | 1.7 | 0.00148 | 0.00592 |
| T-5 | B | 3.5 | 0.00358 | 0.01432 |
| | F/H | 2.7 | 0.00349 | 0.01396 |
| T-6 | B | 5.0 | 0.0105 | 0.042 |
| | F/H | 3.6 | 0.0103 | 0.0412 |
| T-7 | B | 7.8 | 0.0198 | 0.0792 |
| TO-7 | F | 6.35 | 0.0192 | 0.0708 |
| | H | 6.2 | 0.0157 | 0.0628 |
| T-8 | B | 10.9 | 0.042 | 0.168 |
| TO-8 | F | 8.53 | 0.0303 | 0.1316 |
| | H | 8.5 | 0.0293 | 0.1172 |
| T-9 | B | 15.0 | 0.0681 | 0.2724 |
| TO-9 | F/H | 12.0 | 0.0538 | 0.2152 |
| T-10 | B | 21.5 | 0.1303 | 0.5212 |
| TO-10 | F | 18.2 | 0.1062 | 0.4592 |
| | H | 18.1 | 0.1058 | 0.4232 |
| T-11 | B | 28.8 | 0.1622 | 0.6488 |
| TO-11 | F/H | 21.1 | 0.1461 | 0.5844 |
| T-12 | B | 43.1 | 0.356 | 1.424 |
| TO-12 | F | 30.33 | 0.2627 | 1.0508 |
| | H | 30.3 | 0.2622 | 1.0488 |
| TO-14 | B | 60.6 | 0.6045 | 2.418 |
| | F/H | 42.6 | 0.4922 | 1.9688 |
| TO-16 | B | 86.4 | 1.2755 | 5.102 |
| | F/H | 72.6 | 1.1134 | 4.4536 |
| TO-18 | B | 133.3 | 2.1525 | 8.61 |
| | F/H | 123 | 1.9514 | 7.8056 |
| TO-20 | B | 144.6 | 3.1765 | 12.706 |
| | F/H | 158.3 | 3.0129 | 12.0516 |
| TO-22 | B | 181.63 | 4.7861 | 19.1444 |
| | F/H | 195.1 | 4.8954 | 19.5816 |
| TO-25 | B | 281.1 | 8.129 | 32.516 |

Note: Weight & MI are with min. Bores

## *APPLICATIONS OF TYRE-FLEX COUPLING*

Tyre-flex coupling are generally used where,

- higher shocks & vibration are present
- torque fluctuations occurs
- impact load occurs
- misalignment requirements are more than any other coupling

These couplings are widely used in reciprocating machines like I. C. engines, piston pumps & compressors, bucket elevators, foundry machinery, metal presses, hammer mills, pulverisers, reciprocating conveyors, rubber machinery, vibratory screens, clay working machinery, dynamometers, line shafts, etc.

## *HOW TO SELECT TYRE-FLEX COUPLING*

While selecting the coupling, first choose the type of coupling, which depends on application details like -

a) Type of driver & driven equipment
b) Type of load
c) Misalignment, temperature
d) Space limitations
e) Linear & torsional vibrations
f) Chemical or oil exposure

Then select the size of coupling for which information required is as stated below.

### Requirements

Application : Driver -
Driven -

Application Rating: Power (kW) - Speed(RPM) -

Shaft sizes: Driver - Driven -

Distance between shaft ends (DBSE) if required:

Service Factor (S.F.) to be required/recommended:

### Selection Procedure

(a) Service Factor
Determine appropriate SERVICE FACTOR from table A if not given with above details.

(b) Design Power
Multiply running power of driven machinery by the service factor. This gives DESIGN POWER, which is used as a basis for coupling selection.

(c) Coupling Size
Refer to rating table for your required coupling size and read from the appropriate speed column until a power equal to or greater than the DESIGN POWER is found.

(d) Bore size

Refer respective coupling dimensional table to check that the required bores can be accommodated. If bore size of selected coupling cannot accommodate the shaft size, then select next coupling size where shaft size can be accommodated.

(e) While selecting coupling for high-speed application, check -

$$\text{Peripheral speed} = \frac{\pi DN}{60} \text{ m/s}$$

where D = Max. diameter of coupling in meters
N = RPM

If peripheral speed $\leq 30$ m/s use Cast Iron material
$\geq 30 \leq 60$ m/s use Cast Steel materiel

(f) Collect the following information while selecting flange type tyre-flex coupling

Get SAE flange size. If not then obtain following details -

* Flange outside diameter & thickness
* No.of holes, hole diameter and PCD
* Spacing of holes on flange
* Distance between engine flywheel and shaft end of driven side for deciding total length of coupling

## *TYPICAL SERVICE FACTORS*

Determination of service factors depends on torque fluctuation, usage time, misalignment, type of application, rotating speed, no. of start-stops, no. of reversals, etc .

From experience, service factor to be taken for different applications are:

### SERVICE FACTOR TABLE A

| DRIVEN MACHINE CLASS | TYPE OF DRIVING UNIT | | |
|---|---|---|---|
| | Electric motor, steam turbine | Multi cylinder IC engine or steam engine or water turbine | Single cylinder IC engine or steam engine |
| CLASS-1<br>Agitators, Brewing machinery, Centrifugal Blowers, Conveyors, Centrifugal fans and pumps, Generators, Sewage disposal equipments, Evaporators, Feeders, Textile machines, Wood working machines. | 1.00 | 1.50 | 2.00 |
| CLASS-2<br>Clay working machinery, Crane Hoists, Laundry machinery, Machine Tools, Rotary mills, Paper mill machinery, Non-uniformly loaded centrifugal pumps, Rotary screens, Centrifugal compressors, Shredders, Printing presses, Oil industry, Mixers, Food industry, Beaters, Bucket elevators, Gear pumps, Wood working machinery, Textile machinery. | 1.50 | 2.00 | 2.50 |
| CLASS-3<br>Reciprocating conveyors, Crushers, Shakers, Metal mills, Rubber machinery (Banbury mixers & mills), Reciprocating compressors, Welding sets, Freight & passenger elevators, Cooling tower fans, Hammer mills, Reciprocating pumps, Vibrating screens, Winches, Wire drawing machines. | 2.50 | 2.50 | 3.00 |

## *FIT TOLERANCE GUIDE LINES FOR BORES WITH PARALLEL KEYS*

| Required Fit | Bore | | Shaft Tolerances | Bore Tolerances |
|---|---|---|---|---|
| | Above mm | To mm | | |
| Shaft tolerance as per RATHI | | 25 | k6 | H7 |
| | 25 | 100 | m6 | |
| | 100 | | n6 | |
| Shaft tolerance as per DIN 740/1 | | 50 | k6 | H7 |
| | 50 | | m6 | |
| Shaft with unified system | | 50 | h6 | K7 |
| | 50 | | | M8 |
| | all | | h8 | N7 |

ATTENTION **It is necessary to select required fit in order to -**

1) **Keep low backlash between hub & shaft.**
2) **Keep the hub stress under permissible range.**

⚠ **If these instructions on selection of fit are not followed there is danger of bursting of the coupling.**
**There is a danger to human life due to broken parts flying around.**

## FINISH BORE & KEYWAY PROCEDURE

1. Rathi couplings are supplied with pilot bore unless asked for finish bore. It should be bored to reqd. finish bore size by taking the reference of the outside diameter (OD) of coupling i.e. turn bore concentrically with respect (true) to the coupling OD & not the hub dia. (Refer fig. A)
2. Clamp the hub OD on lathe and true the coupling OD. Ensure finish bore concentricity w.r.t. coupling OD is better than 0.1mm.
3. Unless specified, std. tolerances provided for FB & keyway is H7 and Js9 respectively.
4. Use dial bore gauge or plug gauges for respective size of bore. (If plug gauge is used then ensure that Go end of gauge will pass straight way throughout bore length.)

ATTENTION **The maximum bore capacity as specified in Chart No. xxx and should not be exceeded.**

5. Make chamfer of reqd. size on both sides of bore.
6. Keyway to be done on slotting m/c. or broaching m/c. Mark the keyway centre line such that key should come in between two holes in tyre-flex coupling flange. (Refer fig. B)
7. Keyway shift from marked keyway centre line should be within 0.1 mm.
8. A tapped hole is provided on the hub at keyway location to hold (lock) the key in shaft-hub with a set screw of suitable size. This tapping is generally provided at midpoint of the length through bore distance. If it is not possible to use set screw at midpoint, suitable distance nearer to midpoint of the length through bore is provided. (Refer fig. C)

⚠ **1) Length of the set screw to be used on key for tightening should be of length that will cover the threaded length of hole.**

**2) Diameter of set screw should be equal to or less than keyway width.**

9. Use appropriate set screw to ensure effective locking of the key.

For fitting couplings on splined shaft / taper shaft, please consult RATHI.

⚠ **Non observance of these instructions may lead to failure of the coupling.**

## *FINISH BORE & KEYWAY PROCEDURE*

FIG. A FINISH BORE TO BE DONE W.R.T. COUPLING O.D.

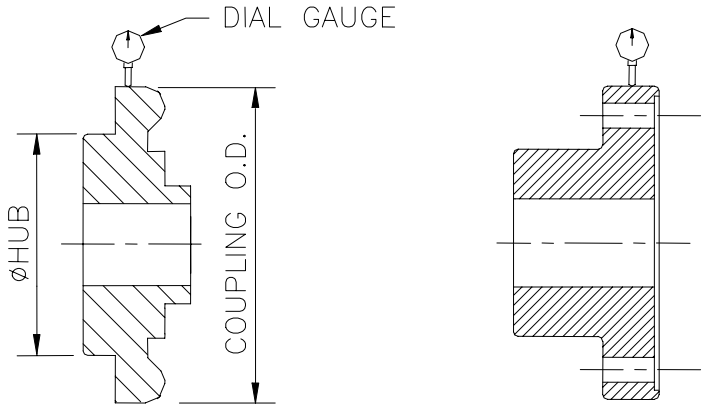



FIG. B LOCATION OF KEYWAY.

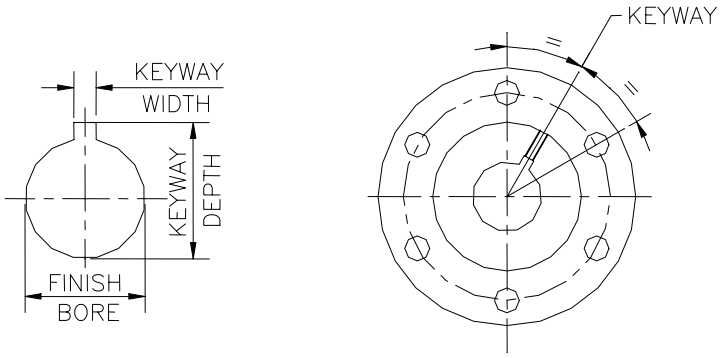
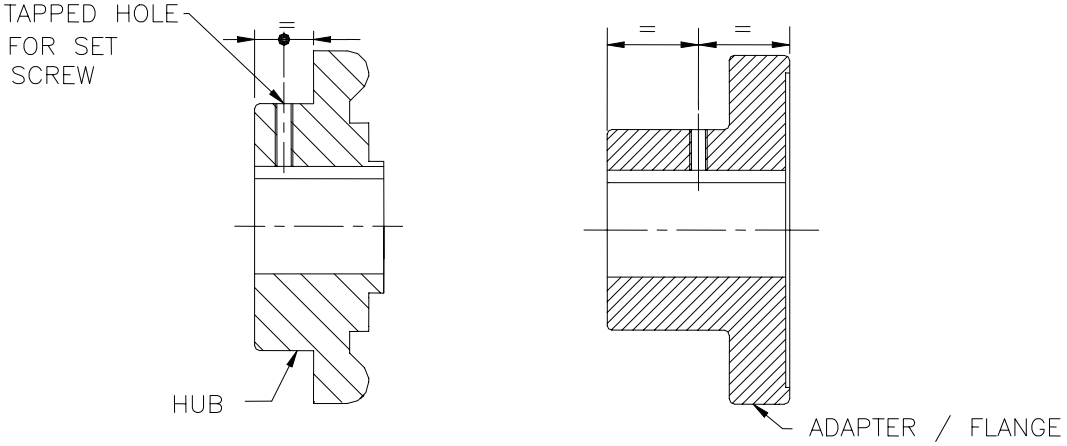
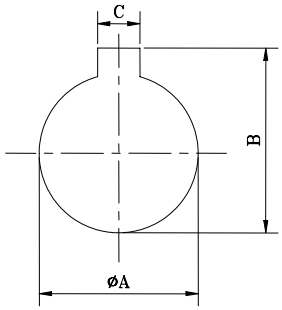



FIG. C LOCATION OF SET SCREW HOLE



## *STANDARD TOLERANCES FOR FINISH BORE & KEYWAY*

Unless otherwise specified, couplings are supplied with finish bores & keyways in H7 & Js9 tolerances respectively & are as per ISO 286-2:1988 standard.




∅A - Bore
B - Keyway Depth
C - Keyway Width

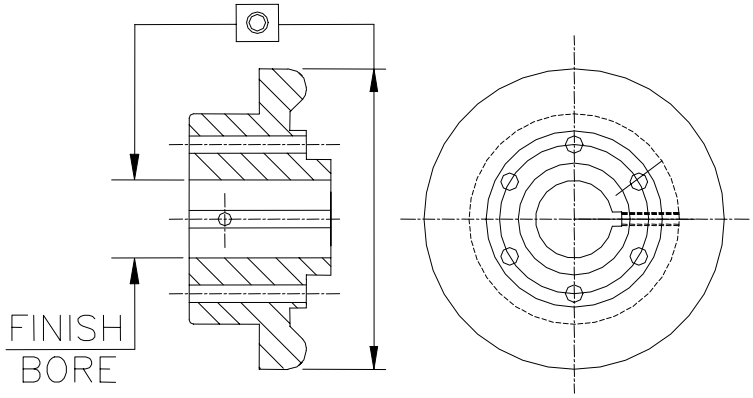
| Basic Size (mm.) | | H7 For Bore (mm.) | Js9 For Keyway Width (mm.) | For Keyway Depth (mm.) |
|---|---|---|---|---|
| Above | Upto & including | | | |
| 3 | 6 | + 0.012<br>0 | ± 0.015 | + 0.1<br>0 |
| 6 | 10 | + 0.015<br>0 | ± 0.018 | |
| 10 | 18 | + 0.018<br>0 | ± 0.021 | |
| 18 | 30 | + 0.021<br>0 | ± 0.026 | + 0.2<br>0 |
| 30 | 50 | + 0.025<br>0 | ± 0.031 | |
| 50 | 80 | + 0.030<br>0 | ± 0.037 | |
| 80 | 120 | + 0.035<br>0 | ± 0.043 | |
| 120 | 180 | + 0.040<br>0 | ± 0.050 | + 0.3<br>0 |
| 180 | 250 | + 0.046<br>0 | ± 0.057 | |
| 250 | 315 | + 0.052<br>0 | ± 0.065 | + 0.4<br>0 |
| 315 | 400 | + 0.057<br>0 | ± 0.070 | |
| 400 | 500 | + 0.063<br>0 | ± 0.077 | + 0.5<br>0 |

*INSTALLATION & ASSEMBLY INSTRUCTIONS*

## (A) BEFORE INSTALLATION

a. After removing the coupling from packing, thoroughly inspect to ensure that they is/are as ordered & there no is transit damage or loss.
b. Remove protective coating/lubricant from bores & keyways. Remove all the bolts & nuts and dismantle the assembly.
c. Follow instruction given on page no. 18, if couplings are pilot bored. (Fig. 1)

(Fig. 1)



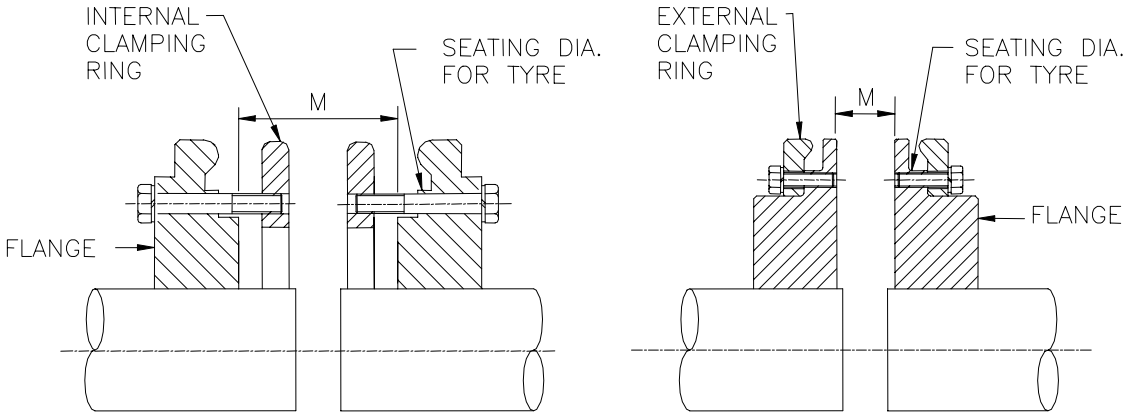

## (B) MOUNTING PROCEDURE

Mount hubs/adapters (*) on their respective shafts with keys such that the shaft ends are flush with inner face of the adapter & tighten the set screw over the keys. Bring both the coupling hubs/adapters (along with equipments) closer so as to maintain gap `M' as shown in fig. 2. In case of spacer type couplings, the gap `M' is equal to the spacer length (spacer length is normally equal to the distance between shaft ends of the equipments). Refer fig. 3 Refer Dimension 'M' given in table A1 & A2 on page nos. (25) & (26) respectively.

* FLANGE - Tyre-flex flange
* ADAPTER - Used in RST or TS coupling

For normal applications the shaft ends should be flush with inner face of flange/adapter. They can protrude beyond the clamping ring of flange/adapter or remain inside if reqd. but sufficient gap should be allowed to take care of end float of both shafts (i.e. axial misalignment). Refer fig. 2

(Fig. 2)

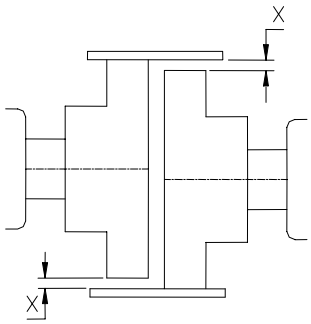



Ensure that the effective length of key is sufficient for transmission of rated torque of coupling.

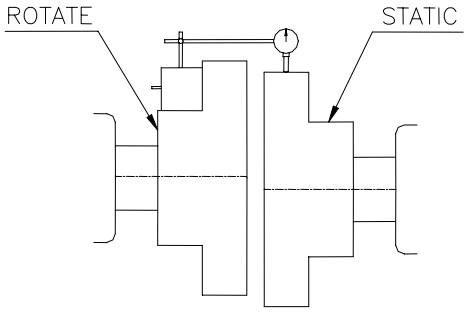
## (C) ALIGNMENT PROCEDURE

Alignment procedure is given separately for each type of alignment for simplicity. However combination of all 3 types of misalignments may be present at the same time.

(I) CHECKING PARALLEL ALIGNMENT




(fig 3a)

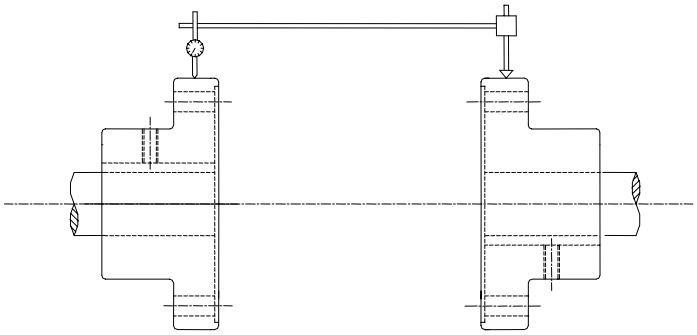



(fig 3b)

- Using straight edge (fig 3a): Align straight edge on OD of one flange, measure gap 'X' at 4 places 90° apart without rotating shafts. Gap 'X' should be less than the allowable initial parallel misalignment (P) mentioned in Table 'A1'.

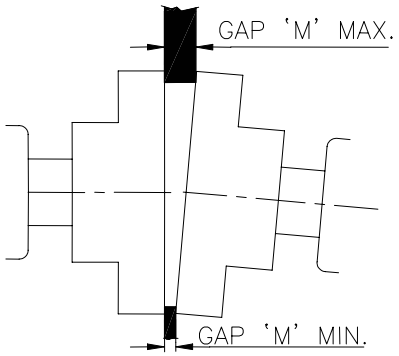
- Using dial gauge (fig 3b): Fix dial gauge on hub OD of one of the halves & set plunger on the flange OD of another half. Rotate the coupling slowly to one complete revolution by taking dial gauge reading at 4 places 90° apart. The parallel misalignment is half of the Total Indicated Reading (TIR) of dial gauge which is equal to valve of 'P' given in Table 'C1'.

- Follow the same procedure in case of spacer coupling as shown in fig. 3c.

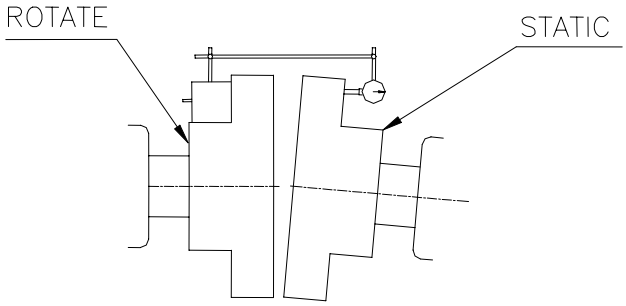


(fig. 3c)

(II) CHECKING ANGULAR ALIGNMENT

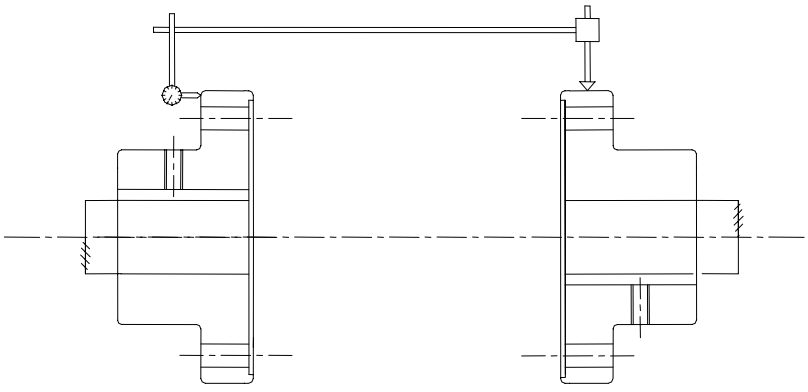



(fig. 4a)




(fig. 4b)

- Measure gap 'M' at 4 places 90° apart without rotating shafts.(Refer fig. 4a) The difference in max. & min. gap will be the Total Indicated Reading (TIR), which will be the angular misalignment present (Refer table 'A1' for allowable TIR values in mm).
- Using dial gauge (fig 4b) : Fix the dial gauge on flange OD of one of the halve & set plunger on the face of another half as shown (Refer fig. 4b). Rotate the coupling slowly to one complete revolution by taking dial readings at 4 intervals 90° apart. The Total Indicated Reading (TIR) will be the angular misalignment (Refer table 'A1').
- Follow the same procedure in case of spacer coupling as shown in fig. 4c.



(fig. 4c)

III) CHECKING AXIAL MISALIGNMENT (End-Float)

- Deviation from standard DBSE due to axial movement of shaft is defined as axial misalignment. (End float). [For normal applications if the shaft ends should be flushed with inner face of flange. In some special cases the shaft ends may protrude beyond the inner face of flange or may remain inside if required.]
- The distance between two faces of coupling halves is to be maintained as specified. The variation in this distance should not exceed the permissible initial axial misalignment given in table 'A1'.
- Repeat the all above steps until the required permissible initial misalignment limits are achieved. Tighten foundation / base frame bolts & ensure the tightening of set screws over keys.

ATTENTION

**The misalignment capabilities shown in drawings & product literature allow for dynamic conditions & variations. For optimum service from the coupling, the installation misalignment (initial misalignment) should not exceed 25% of the maximum allowable misalignment limits. Allowance should be made for any anticipated movements, which will occur during operation (e.g. thermal movements)**

⚠

**IMPORTANT: The necessity for shields & guards varies with individuals installations. The owner or user must provide the required safety guards. Safety guards or shields are not furnished by us with this equipments.**

# TABLE 'A1'

| COUP. SIZE | PERMISSIBLE INITIAL MISALIGNMENT | | | | DIST. BETWEEN FLANGES * (Std. gap 'M') | |
|---|---|---|---|---|---|---|
| | PARALLEL / RADIAL 'P' (mm) | AXIAL (mm) | ANGULAR | | | |
| | | | (degree) | Total Indicated Reading (TIR) | T | TO |
| T-4 | 0.275 | ± 0.32 | 0.5° | 0.7 | 21 | - |
| T-5 | 0.325 | ± 0.42 | 0.5° | 0.87 | 25 | - |
| T-6 | 0.4 | ± 0.5 | 0.5° | 1.09 | 30 | - |
| T-7 / TO-7 | 0.475 | ± 0.58 | 0.5° | 1.25 | 42 | 16 |
| T-8 / TO-8 | 0.525 | ± 0.65 | 0.5° | 1.45 | 44 | 21 |
| T-9 / TO-9 | 0.6 | ± 0.75 | 0.5° | 1.64 | 49 | 24 |
| T-10 / TO-10 | 0.65 | ± 0.82 | 0.75° | 2.82 | 54 | 20 |
| T-11 / TO-11 | 0.725 | ± 0.92 | 0.75° | 3.05 | 51 | 21 |
| T-12 / TO-12 | 0.8 | ± 1.0 | 0.75° | 3.45 | 54 | 25 |
| TO-14 | 0.925 | ± 1.15 | 0.75° | 4.07 | - | 22 |
| TO-16 | 1.05 | ± 1.32 | 1° | 6.02 | - | 8 |
| TO-18 | 1.2 | ± 1.5 | 1° | 6.95 | - | 22 |
| TO-20 | 1.325 | ± 1.65 | 1° | 7.48 | - | 30 |
| TO-22 | 1.45 | ± 1.81 | 1° | 8.27 | - | 27 |
| TO-25 | 1.65 | ± 2.06 | 1° | 9.28 | - | 30 |
| T-4 | 0.275 | ± 0.32 | 0.5° | 0.7 | 21 | - |

* Gap 'M' in the above table is when angular & axial misalignments are zero.

Note : For permissible maximum misalignments, refer table 'A2'.

ATTENTION **The permissible initial misalignments given in the above table must not be exceeded during installation.**

**The permissible initial misalignments given in the above table – parallel, axial and angular must not occur simultaneously.**

## TABLE 'A2'

| COUP. SIZE | PERMISSIBLE MAXIMUM MISALIGNMENT | | | | DIST. BETWEEN FLANGES * (Std. gap 'M') | |
|---|---|---|---|---|---|---|
| | PARALLEL / RADIAL 'P' mm | AXIAL (mm) | ANGULAR | | | |
| | | | (degree) | Total Indicated Reading (TIR) | T | TO |
| T-4 | 1.1 | ± 1.3 | 2° | 2.86 | 21 | - |
| T-5 | 1.3 | ± 1.7 | 2° | 3.49 | 25 | - |
| T-6 | 1.6 | ± 2.0 | 2° | 4.36 | 30 | - |
| T-7 / TO-7 | 1.9 | ± 2.3 | 2° | 5.03 | 42 | 16 |
| T-8 / TO-8 | 2.1 | ± 2.6 | 2° | 5.83 | 44 | 21 |
| T-9 / TO-9 | 2.4 | ± 3.0 | 2° | 6.56 | 49 | 24 |
| T-10 / TO-10 | 2.6 | ± 3.3 | 3° | 11.32 | 54 | 20 |
| T-11 / TO-11 | 2.9 | ± 3.7 | 3° | 12.20 | 51 | 21 |
| T-12 / TO-12 | 3.2 | ± 4.0 | 3° | 13.84 | 54 | 25 |
| TO-14 | 3.7 | ± 4.6 | 3° | 16.30 | - | 22 |
| TO-16 | 4.2 | ± 5.3 | 4° | 24.10 | - | 8 |
| TO-18 | 4.8 | ± 6.0 | 4° | 27.80 | - | 22 |
| TO-20 | 5.3 | ± 6.6 | 4° | 29.92 | - | 30 |
| TO-22 | 5.8 | ± 7.25 | 4° | 33.06 | - | 27 |
| TO-25 | 6.6 | ± 8.25 | 4° | 37.11 | - | 30 |

* Gap 'M' in the above table is when angular & axial misalignments are zero.

Important: At the time of installation, INITIAL misalignments should not exceed 25% of the permissible maximum misalignments.

Note: For permissible initial misalignments, refer table 'A1'.

ATTENTION **The maximum permissible misalignments given in the above table must not be exceeded during operation.**

**The maximum permissible misalignments given in the above table – parallel, axial and angular must not occur simultaneously.**

## (D) ASSEMBLY PROCEDURE

After ensuring that the equipments are aligned properly, follow the instructions as given below for assembly of couplings.

FOR T/TO/TFH

Open Tyre and fit it over the T/TO/TFH flanges ensuring that the Tyre beads are properly inserted between the T/TO/TFH flanges & the internal/external rings. It may be necessary to strike the outside diameter (i.e. circumference) of Tyre with a small mallet. When seated there should be a gap 'E' between the Tyre ends. Tighten clamping ring screws evenly (half turn a time) working round each flanges until the required screw torque is achieved. Refer table B for gap E and clamping screw tightening torque.

FOR RST

Clamp one clamping ring to T/TO flange mounted on shaft. Then insert the flange mounted RST shaft assembly (along with clamping ring) between RST adapter & T/TO flange and bolt it to the RST adapter. Fit the 'T' element as per above instructions. (Refer fig. 5 )

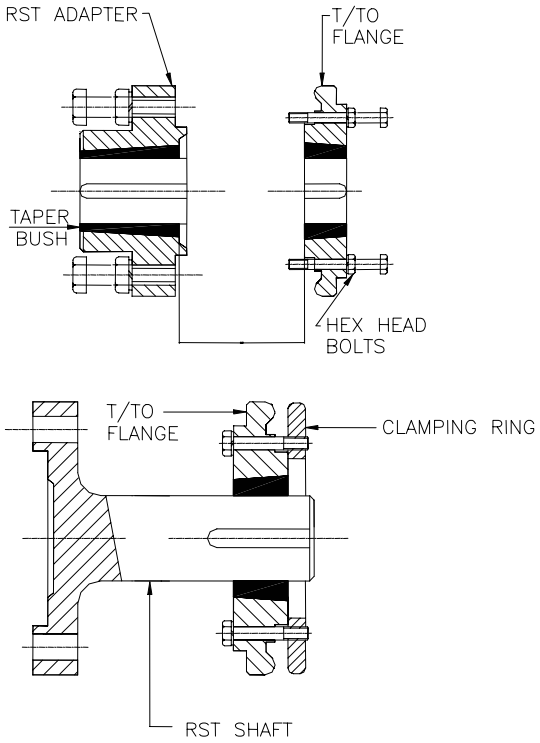
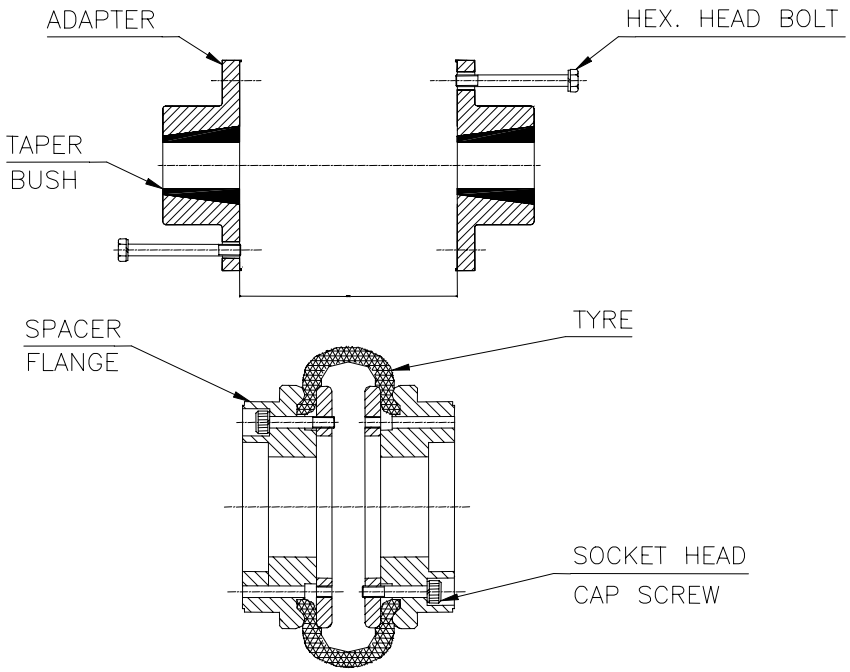



Fig. 5

FOR TS

Clamp one clamping ring to each T/TO to flange. Then insert them in between two adapter and bolt it to TS adapter as shown in fig. 6. Fit the 'T' element as per above instructions.

Fig. 6




IMPORTANT : If the supplied coupling is dynamically balanced, ensure that the match marks (e.g. nos., alphabets) are in straight line & unidirectional before bolting the spacer assy. with both the adapters. It is applicable to non-spacer couplings where match marks on hubs / adapters have to be matched.

ATTENTION **The tyre must not come in contact with cleaning agent.**

⚠ **The necessity of shields and guards varies with individual installations. The owner or user must provide the required safety guards. Safety guards or shields are not in our scope of supply.**

Use Loctite to prevent the loosening of threads, if required.

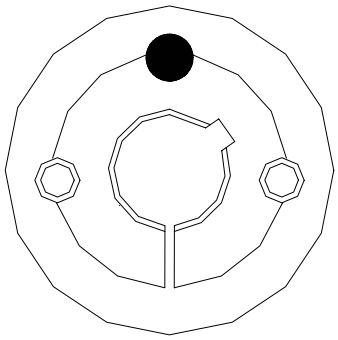
## TABLE 'B'

### *RECOMMENDED TIGHTENING TORQUE*

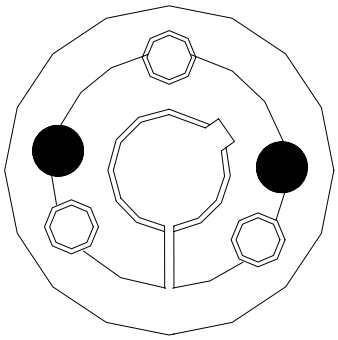
| COUPLING SIZE | BOLT SIZE | TIGHTENING TORQUE (Nm) | END GAP 'E' (mm) |
|---|---|---|---|
| T-4 | M6 X 1P | 15 | 3 |
| T-5 | M6 X 1P | 15 | 3 |
| T-6 | M6 X 1P | 15 | 3 |
| T-7 | M8 X 1.25P | 24 | 3 |
| T-8 | M8 X 1.25P | 24 | 3 |
| T-9 | M10 X 1.5P | 40 | 3 |
| T-10 | M10 X 1.5P | 40 | 3 |
| T-11 | M12 X 1.75P | 40 | 3 |
| T-12 | M12 X 1.75P | 50 | 3 |
| T-14 | M12 X 1.75P | 55 | 3 |
| T-16 | M16 X 2P | 80 | 3 |
| T-18 | M16 X 2P | 105 | 3 |
| T – 20 | M 20 X 2.5P | 120 | 3 |
| T – 22 | M 20 X 2.5P | 165 | 3 |
| T- 25 | M 24 X 3P | 165 | 3 |

ATTENTION **Tightening torque must be observed as given above & tightening of the opposite bolts to be done.**

*INSTALLATION & REMOVAL OF FLANGES/ADAPTERS WITH TAPER BUSHES.*



Sizes - 1008 to 3030



Size - 3525 to 5050

A) TO ASSEMBLE

1. Clean and de-grease the bore and taper surfaces of the bush and the tapered bore of the flanges/adapters. Insert the bush in the coupling flanges/adapters and line up the holes (half thread holes must line up with half straight holes)

2. Lightly oil the grub screws (bush size 1008 to 3030) or the cap screws (bush size 3525 to 5050) and screw them loosely in holes threaded in flanges/adapter shown thus O in diagram, do not tighten yet.

3. Clean and de-grease the shaft. Fit the coupling flanges/adapter with taper bush on shaft and locate in desired position.

4. When using a key it should first be fitted in the shaft keyway. There should be a top clearance between the key and the keyway in the bore.

5. Using a hexagon socket wrench, gradually tighten the grub/cap screws in accordance with the torques as listed in the Table 'C' of screw tightening torques.

6. When the drive has been operating under load for half to one hour check and ensure that the screw are not loosened. If found loose take appropriate steps.

B) FOR REMOVAL

1. Slacken all screws. Remove one or two according to number of jacking off holes shown thus ● in the diagram. Insert these screws in jacking off holes.

2. Tighten screw(s) uniformly and alternately until the bush is loose in the flanges/adapters and coupling is free on the shaft.

3. Remove coupling assembly from the shaft.

TABLE 'C'

| Taper Bush Size | Screw tightening Torque(Nm] | Screw | | |
|---|---|---|---|---|
| | | Size | Qty | Tightening Wrench Size |
| 1008<br>1108 | 5.6 | 1/4" BSW | 2 | 3 |
| 1210<br>1215 | 20 | 3/8" BSW | 2 | 5 |
| 1610<br>1615 | 20 | 3/8" BSW | 2 | 5 |
| 2012<br>2017 | 31 | 7/16" BSW | 2 | 6 |
| 2517<br>2525 | 48 | 1/2" BSW | 2 | 6 |
| 3020<br>3030 | 90 | 5/8" BSW | 2 | 8 |
| 3525<br>3535 | 112 | 1/2" BSW | 3 | 10 |
| 4030<br>4040 | 170 | 5/8" BSW | 3 | 12 |
| 4545 | 192 | 3/4" BSW | 3 | 14 |
| 5050 | 271 | 7/8" BSW | 3 | 14 |