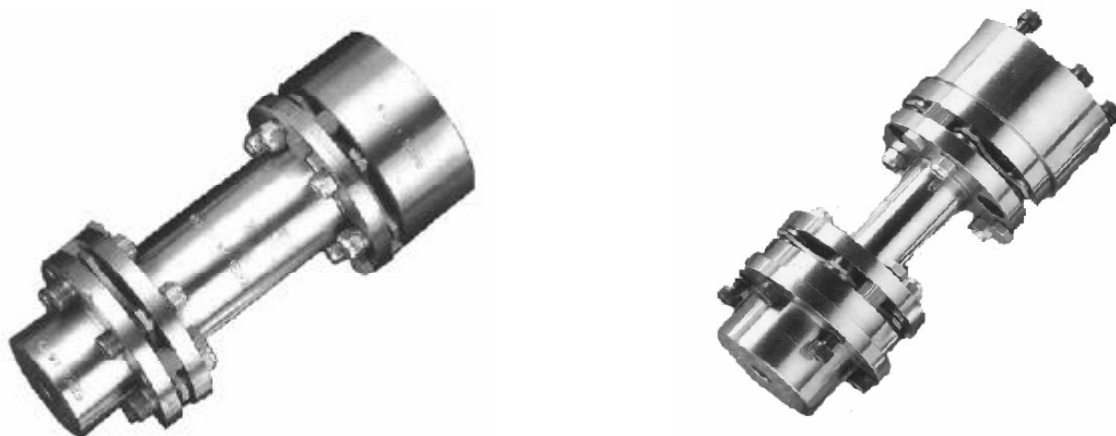


RATHI TRANSPower PVT. LTD. PUNE - INDIA

# **INSTALLATION INSTRUCTIONS**

## **DISC-O-FLEX COUPLING**



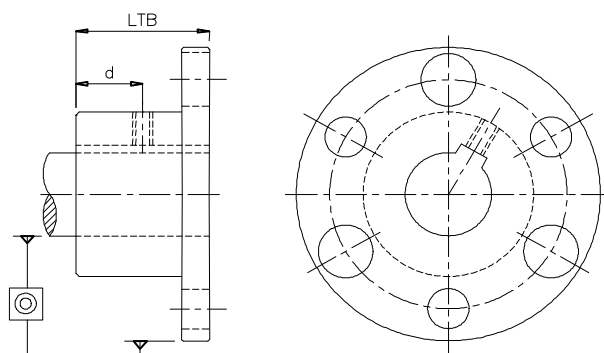
## DISC-O-FLEX COUPLING

### INSTALLATION INSTRUCTIONS

#### (A) BEFORE INSTALLATION

1. Remove the coupling from packing & thoroughly inspect for signs of damage.
  2. Remove red coloured bolts & sleeves which are provided for the protection of blades from bending due to spacer weight & from damage during transportation & handling.
- Remember.** The spacers of DBSEs less than the specified min. Std. DBSEs in catalogue may not be available with red coloured bolts & sleeves.
3. Remove protective coatings/lubricants from bores & keyways.
  4. Disassemble the coupling by removing reqd. bolts & nuts. Find the couplings in disassembled conditions as shown in mounting procedure.
  5. If the coupling is supplied in pilot bore, the finish bore must be done w.r.t. to Outside Diameter, not w.r.t. Hub boss Diameter. Keyway is to be slotted between two adjacent holes of hub as shown in fig. It is recommended that the distance 'd' should be half of the length through bore 'LTB'. (Ref. Fig. 1)

Fig. 1



#### (B)(a) MOUNTING PROCEDURE (For LM/LMC Couplings)

1. Disassemble the coupling by removing all nuts & bolts. Find the couplings in disassembled conditions as shown below:-

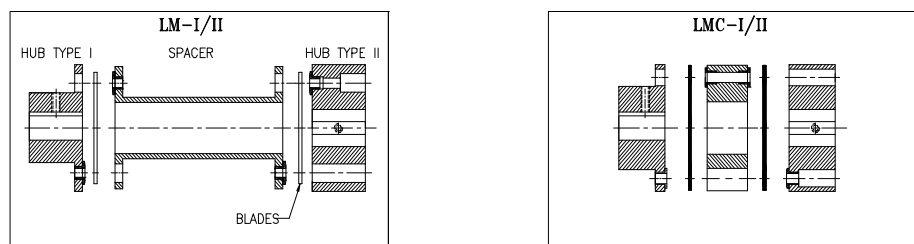
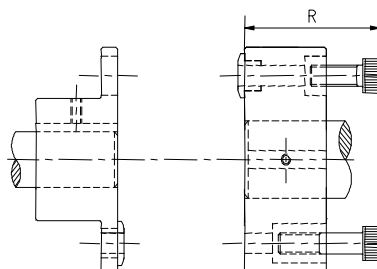


Fig.2

contd.....

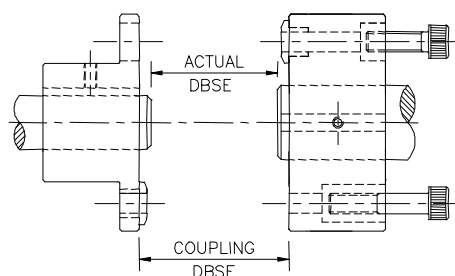
## DISC-O-FLEX COUPLING

2. Mount the hubs on corresponding shafts with the help of the keys & set screws. For hubs type II min. bolt clearance 'R' is required for disengagement of the spacer assembly. So confirm the distance 'R' before mounting the hubs. Value of R is given in respective catalogue. FIG. 3



With one machine firmly bolted down, set the reference length 'A' equal to the distance between shaft ends (DBSE) as shown in fig. No. 3. DBSE of coupling is measured between inside faces of hub as shown in fig. 3.

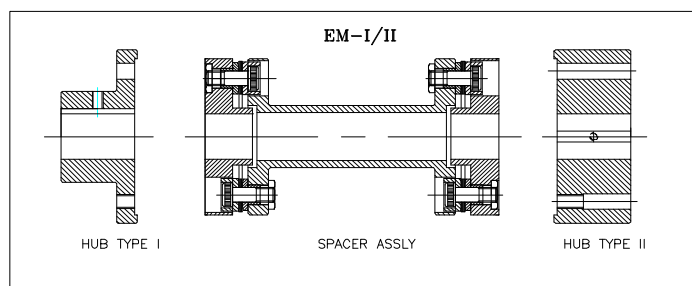
Deviation in standard DBSE is defined as axial misalignment (end float). For normal applications the shaft end should be flushed with inner face of the hub. In some special cases the shaft ends may protrude beyond the inner face of the hub or may remain inside, if required. The distance between two faces of hub flanges is to be maintained as specified. The variation in this distance should not exceed the permissible initial axial misalignment given in table 1. Fig. 4



### **(B)(a) MOUNTING PROCEDURE (For EM/FLM/FM Couplings)**

3. Disassemble the coupling by removing HUBS & bolts. Find the couplings in disassembled conditions as shown below :

Fig. 5



4. Mount the HUBS on corresponding shafts with the help of the keys & set screws. For HUBS type II min. bolt clearance 'R' is required for disengagement of the spacer assembly. So confirm the distance 'R' before mounting the HUBS as shown in fig 6. Value of R is given in respective catalogue.

## DISC-O-FLEX COUPLING

5.

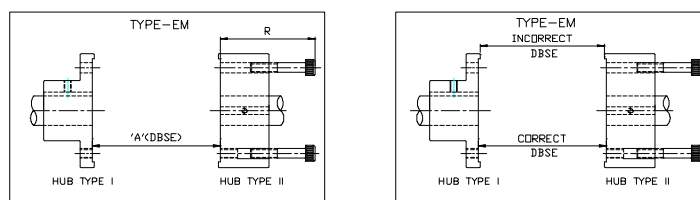


Fig. 6

With one machine firmly bolted down, set the reference length 'A' equal to the distance between shaft ends (DBSE) as shown in fig. DBSE of coupling is measured between inside faces of hub's steps as shown in fig. 3.

Deviation in standard DBSE is defined as axial misalignment (end float). For normal applications the shaft end should be flushed with inner face of the adapter. In some special cases the shaft ends may protrude beyond the inner face of the hub or may remain inside, if required (Ref. Fig. 7). The distance between two faces of hub flanges is to be maintained as specified. The variation in this distance should not exceed the permissible initial axial misalignment given in table 1.

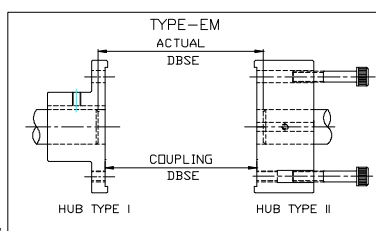


Fig. 5

### (C) ALIGNMENT PROCEDURE

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

**IMPORTANT : The misalignment capabilities shown in drawings or in product literature are for dynamic conditions and variations.**

**For optimum service from the coupling the installation misalignment (Initial misalignment) should not be more than 25% of the maximum allowable misalignments limits. Allowance should be made for any anticipated movements which will occur during operation (e.g. Thermal movements).**

For Permissible *INITIAL* misalignments refer table 1

For Permissible *MAXIMUM* misalignments refer table 2

## DISC-O-FLEX COUPLING

### (I) CHECKING PARALLEL / RADIAL ALIGNMENT

#### (a) Using Dial Gauge :

Clamp the dial indicator at one end and rest the plunger on O.D. Take the reading at each quarter revolution of hub by rotating one end. The parallel misalignment (P) is half the Total Indicated Reading (TIR) shown on dial gauge. (Refer Fig. a)

FIG. a

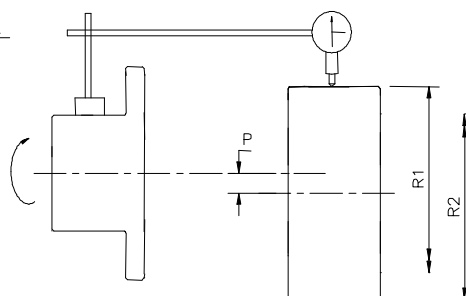
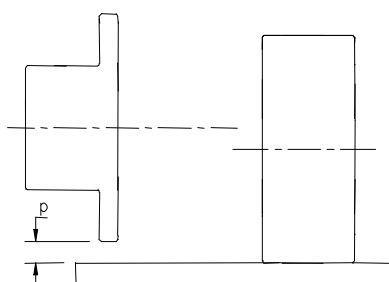


FIG. b



#### (b) Using Straight Edge :

If the field constraints do not permit the use of dial indicator then use straight edge. Measure gap 'P' by using filler gauge (Refer Fig. b)

**Remember :** The parallel misalignment 'P' should not exceed the permissible initial parallel misalignment mentioned in table 1.

### (II) CHECKING ANGULAR ALIGNMENT

#### (a) Using Dial Gauge :

Clamp the dial indicator at one end and rest the plunger on face of the hub. Take the reading at each quarter revolution of hub by rotating one end. The angular misalignment (X) is half the Total Indicated Reading (TIR) shown on dial gauge. (Refer Fig. a)

FIG. a

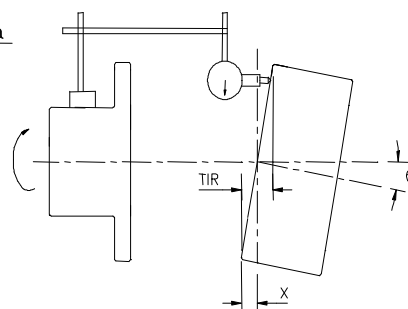
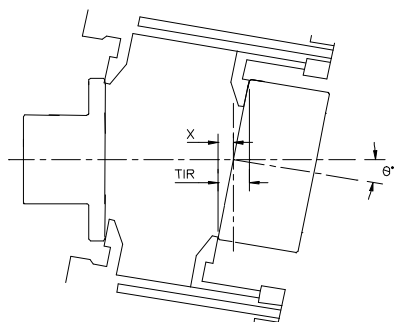


FIG. b



#### (b) Using Vernier Calliper :

If the field constraints do not permit the use of dial indicator then use vernier calliper. Measure DBSE at 4 places 90° apart. The angular misalignment is half the Total Indicated Reading (TIR) shown on vernier scale. (Refer Fig. b)

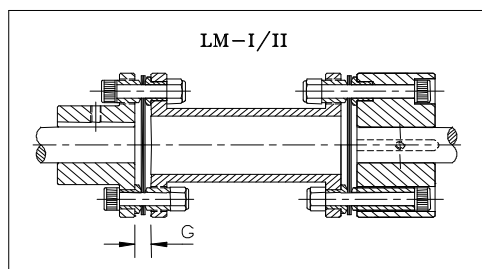
**Remember :** The angular misalignment should not exceed the permissible initial angular misalignment mentioned in table 1.

**DISC-O-FLEX COUPLING****(D).a) ASSEMBLY PROCEDURE FOR LM TYPE COUPLING**

Clean all the parts carefully.

**IMPORTANT :** If the coupling is dynamically balanced, ensure that the matchmarks are in straight line & unidirectional before bolting the assembly.

- 1) Support the spacer between two hubs in such a way that the clear holes of spacer flange will be in line with the press fitted bushes in the hub.
- 2) Hold the flexible blade between the HUBS & spacer flanges.
- 3) Insert socket head cap screws with sleeves from hub side through the clear holes of HUBS, blade holes & press fitted bushes on spacer and tighten the nylock nut.
- 4) Then insert the socket head cap screws from hub side through the press fitted bushes in the HUBS, blade holes and clear hole on spacer flange. Insert the sleeve from spacer side & tighten the Nylock nut.
- 5) Follow the same procedure from other side also. Then tighten all the nylock nuts to the required tightening torques for blade pack bolts given in table 3.



- 6) Ensure the Gap 'G' is equal at both sides of spacer. Value of gap 'G' is given in table 1 & 2. Tighten the foundation bolts of both equipments.

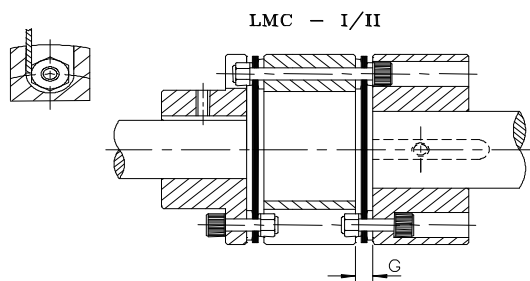
**IMPORTANT:** The necessity for shields & guards varies with individual installations. The owner or user must provide the required safety guards. We do not furnish safety guards or shields with this equipment.

## DISC-O-FLEX COUPLING

### **(D).b) ASSEMBLY PROCEDURE FOR LMC TYPE COUPLING**

Clean all the parts carefully.

**IMPORTANT :** If the coupling is dynamically balanced, ensure that the matchmarks are in straight line & unidirectional before bolting the assembly.



- 1) Support the spacer plate between two hubs in such a way that the slot of the spacer plate will be in line with the press fitted bushes of HUBS.
- 2) Insert one flexible blade set between hub & spacer plate.
- 3) First Insert Allen head bolts (having small length) from hub side, through press fitted bushes on hub flange, blade holes and slot of spacer plate as shown in fig. 1. Then insert plain washer & Nylock nut through slot of spacer. Keep the across flat of nut parallel to slot size by keeping 1.5 mm Thk. strip in between nut A/F and slot size, tighten the allen head bolts by allen key. After tightening remove the strip from slot. (For tightening torque refer table no. 3).
- 4) Insert another bladepack set on other side and tighten the bolts same way as mentioned above.
- 5) Then insert the remaining 3 long allen head bolts with plain washer from clear hole side of hub through blade holes, press fitted bushes of spacer plate and slot of hub flange. Insert plain washer and nylock nut from slot side of hub flange. By keeping 1.5 mm Thk. strip in between nut A/F and slot size, tighten the allen head bolts by allen key. After tightening remove the strip from slot. (For tightening torque refer table 3).
- 6) To avoid loosening of nut, apply thread locker, loctite 270 solution on threads before tightening the bolts. Tighten all foundation bolts.
- 7) Ensure that Gap "G" is maintained equally at four places 90° apart on both sides without rotating either of the shaft. For Gap "G" refer table no. 1 & 2. If the gap G is not maintained with the hubs flush with the shaft ends, adjust the HUBS such that gap G is equal on both side of spacer. This ensures that the blades are not subjected to initial stresses due to excessive misalignments.

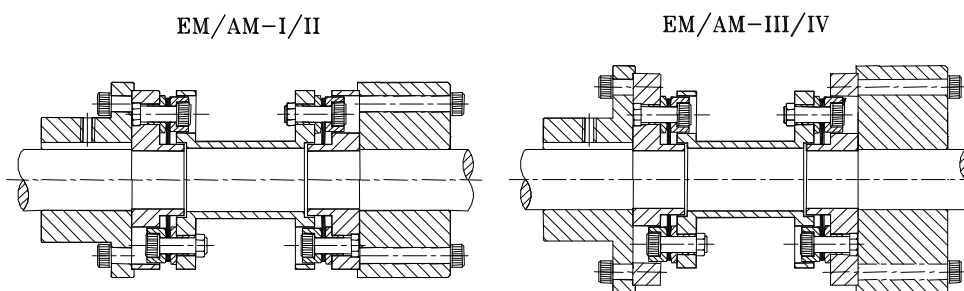
**IMPORTANT:** The necessity for shields & guards varies with individual installations. The owner or user must provide the required safety guards. We do not furnish safety guards or shields with this equipment.

**DISC-O-FLEX COUPLING****(D).c) ASSEMBLY PROCEDURE FOR EM TYPE COUPLING**

Clean all the parts carefully.

**IMPORTANT :** If the coupling is dynamically balanced, ensure that the matchmarks are in straight line & unidirectional before bolting the assembly.

- 1) First ensure tightening all the nuts & bolts for reqd. tightening torque for disc pack bolts of spacer assly.
- 2) Ensure that the blades in spacer assly. Are in straight position and total length of spacer assly which is equal to distance between hub faces.
- 3) Compress lightly the spacer assly and insert it in between hub's faces and ensure that it has rest evenly in steps provided in both hubs.



- 4) Bring the tapped hole of adaptor in line with clear holes of hub. Insert the hub bolts with spring washers & tighten to reqd. tightening torque as given in table 3.
- 5) Ensure that gap 'G' is equal all over on both side of spacer assly. (For gap 'G' refer table no. 1 & 2)
- 6) Tighten all the foundation bolts of both equipments.
- 7) Use thread locker lockite 270 solution to prevents the loosening of bolts, if require.

**IMPORTANT:** The necessity for shields & guards varies with individual installations. The owner or user must provide the required safety guards. We do not furnish safety guards or shields with this equipment.

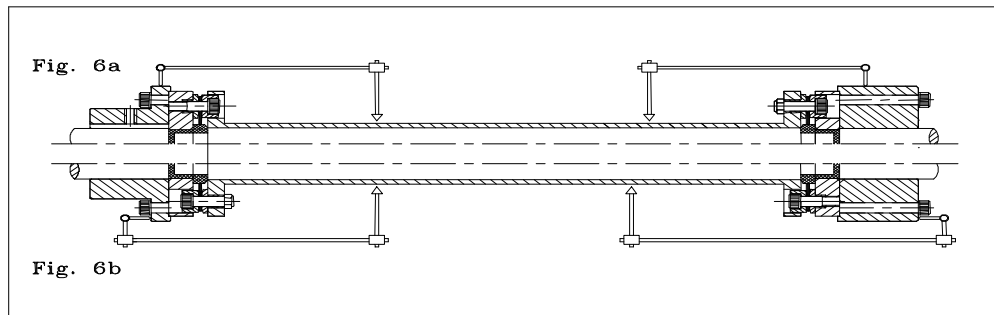


## DISC-O-FLEX COUPLING

### **(D).d) ASSEMBLY PROCEDURE FOR FLM/FM TYPE COUPLING**

Clean all the parts carefully.

**IMPORTANT :** If the coupling is dynamically balanced, ensure that the matchmarks are in straight line & unidirectional before bolting the assembly.



**Note :** If the FLM coupling is without distance piece, then follow the same assly procedure of LM coupling type. For FLM coupling having adaptor both side and for FM coupling, follow the assly. Procedure as given below.

- 1) First ensure tightening all the nuts & bolts of spacer assly. to reqd. tightening torque as given in table no. 3.
- 2) Ensure that the shims in spacer assly. are in straight position and total length of spacer assly which is equal to distance between hub faces.
- 3) Insert the spacer assly. between two hub faces and ensure that it has rest evenly in the steps provided in both HUBS.
- 4) Bring the tapped hole of D. P. in line with clear holes of hub. Insert the hub bolts with spring washers & tighten to reqd. tightening torque as given in table 3.
- 5) Mount dial indicator on both side of assly. as shown in fig. And follow the same alignment procedure for checking angular & parallel alignment as given in page no. 31 & 32.
- 6) The deviation in readings is total Indicated Readings (TIR). The actual misalignments are half of the TIR. These values should not exceeds initial misalignment values given in table no. 1
- 7) Tighten all the foundation bolts of both equipment.

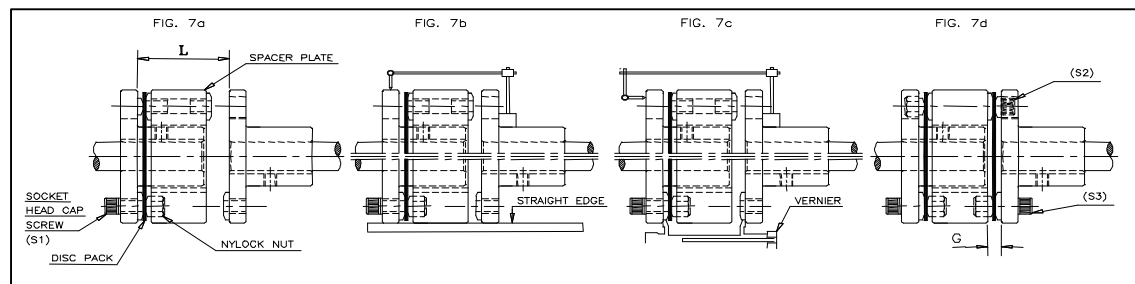
**IMPORTANT:** The necessity for shields & guards varies with individual installations. The owner or user must provide the required safety guards. We do not furnish safety guards or shields with this equipment

## DISC-O-FLEX COUPLING

### **(D).e) ASSEMBLY PROCEDURE FOR INVERTED HUB TYPE LM/LMC TYPE COUPLING**

Clean all the parts carefully.

**IMPORTANT :** If the coupling is dynamically balanced, ensure that the matchmarks are in straight line & unidirectional before bolting the assembly.



After mounting Hubs on respective shaft, Insert one bladepack & spacer on inverted hub as shown in fig.

- 1) **For LM** type spacer assy, bring clear hole of spacer in line with bush of hub flange. **For LMC** type spacer, bring the spacer slot in line with bush of hub flange.
- 2) Insert the socket head cap screw from hub side through bush hole, blade hole and clear hole of spacer flange. Tighten these bolt by using plain washer/sleeve and nylock nut from spacer side to required tightening torque given in table no.3 Then insert socket head cap screw with sleeve from spacer through blade hole hub bush hole and tighten them by nylock nut. In case of **LMC** type spacer having slot, keep 1.5 mm thickness strip in between nut A/F and slot face. Then tighten the allen head bolt (having small length) by allen key to required tightening torque. After tightening, remove the strip from spacer slot.
- 3) Bring another hub along with equipment closer to spacer mounted hub and set the distance L as shown on respective assy drg.
- 4) Check the alignment as per the alignment procedure given on page No. 31 & 32.
- 5) Hold another side disc pack in between spacer and hub. Insert socket head cap screw along with sleeve and follow the same the same procedure as given in Sr. No. 2. For tightening of another side socket head cap screw (of smaller length). Then insert longer socket head cap screw along with plain washer/sleeve from clear hole of hub flange. It passes through blade holes, spacer bush hole and tighten them with plain washer & nylock nut in the slot provided on hub flange as per procedure given in Sr. No.2.
- 6) Ensure that gap G is equal all over on both side of spacer assy.

**IMPORTANT:** The necessity for shields & guards varies with individual installations. The owner or user must provide the required safety guards. We do not furnish safety guards or shields with this equipment.

**DISC-O-FLEX COUPLING****(E) DISMANTALLING PROCEDURE**

Failures are rare & can be attributed to excessive misalignment, severe overload or a combination of the both. In all cases of the coupling failure, it is advisable that the cause of failure is first identified & then corrected. Failure of coupling will generally be a failure of blade assembly. These assemblies should be replaced in pairs. Failure of one will usually result in damage to the other.

Support the spacer such that the blades should not be under stresses due to external loads, such as spacer weight.

Remove the reqd. bolts, nuts such that spacer/spacer assly. will get free from complete assly.

If the spacer assly. is located in hubs step then compress the spacer assly. and disengage it from hub's locating step.

**Remember.** It is recommended that the entire blade pack should be replaced with the new factory assembled blade pack.

## DISC-O-FLEX COUPLING

### TABLE 1

#### PERMISSIBLE INITIAL MISALIGNMENTS FOR DISC-O-FLEX COUPLING

COUPLING SIZE		PERMISSIBLE INITIAL MISALIGNMENTS				* GAP 'G' (Std) mm	
LM	EM	Angular		Axial (± mm)	Parallel (mm/mm SPAN) #	LM	EM
		Degree per disc pack	Diff. in gap (mm)				
5	4	0.18°	±0.125	0.25	0.003	5.2	5.2
10	8					6.5	7.5
35	25					7.5	7.5
55	40					8	8.5
95	65		± 0.375	0.25		8	8.5
170	125					9.5	9.3
220	165					12	12.4
400	370					13	10.4
520	390		± 0.7	0.5		14.4	13.8
1000	790					16.2	14.6
1300	1025					19.5	16
2000	1425					21.5	17.4
2500	1880					23.5	16.9

\* Gap 'G' in above table is given when angular and axial misalignments are zero.

# SPAN = DBSE - G

## DISC-O-FLEX COUPLING

### TABLE 2

#### PERMISSIBLE *MAXIMUM* MISALIGNMENTS FOR DISC-O-FLEX COUPLING

COUPLING SIZE		PERMISSIBLE MAXIMUM MISALIGNMENTS				* GAP 'G' (Std) mm	
LM	EM	Angular		Axial (± mm)	Parallel (mm/mm SPAN) #	LM	EM
		Degree per disc pack	Diff. in gap (mm)				
5	4		± 0.5	1	0.013	5.2	5.2
10	8					6.5	7.5
35	25					7.5	7.5
95	65		± 1.5			8	8.5
170	125					9.5	9.3
220	165					12	12.4
400	370					13	10.4
520	390					14.4	13.8
1000	790		± 2.8	2		16.2	14.6
1300	1025					19.5	16
2000	1425					21.5	17.4
2500	1880					23.5	16.9

\* Gap 'G' in above table is given when angular and axial misalignments are zero.

# SPAN = DBSE - G

**DISC-O-FLEX COUPLING****TABLE 3****TIGHTENING TORQUES**

COUPLING SIZE		For Blade Pack Bolts		For Hub Bolts	
LM	EM	Bolt Size	Nm	Bolt Size	Nm
5	4	M5	7.6	M5	7.6
10	8	M6	12.8	M6	12.8
35	25	M6	12.8	M6	12.8
95	65	M8	31.2	M8	31.2
170	125	M10	61.6	M10	61.6
220	165	M12	108	M10	61.6
400	370	M14	172	M10	61.6
520	390	M16	264	M10	61.6
1000	790	M18	360	M10	61.6
1300	1025	M20	520	M10	61.6
2000	1425	M22	696	M12	108
2500	1880	M24	888	M16	264

Note : All the above values are for socket head cap screws high Tensile Grade 12.9 as per DIN-912.