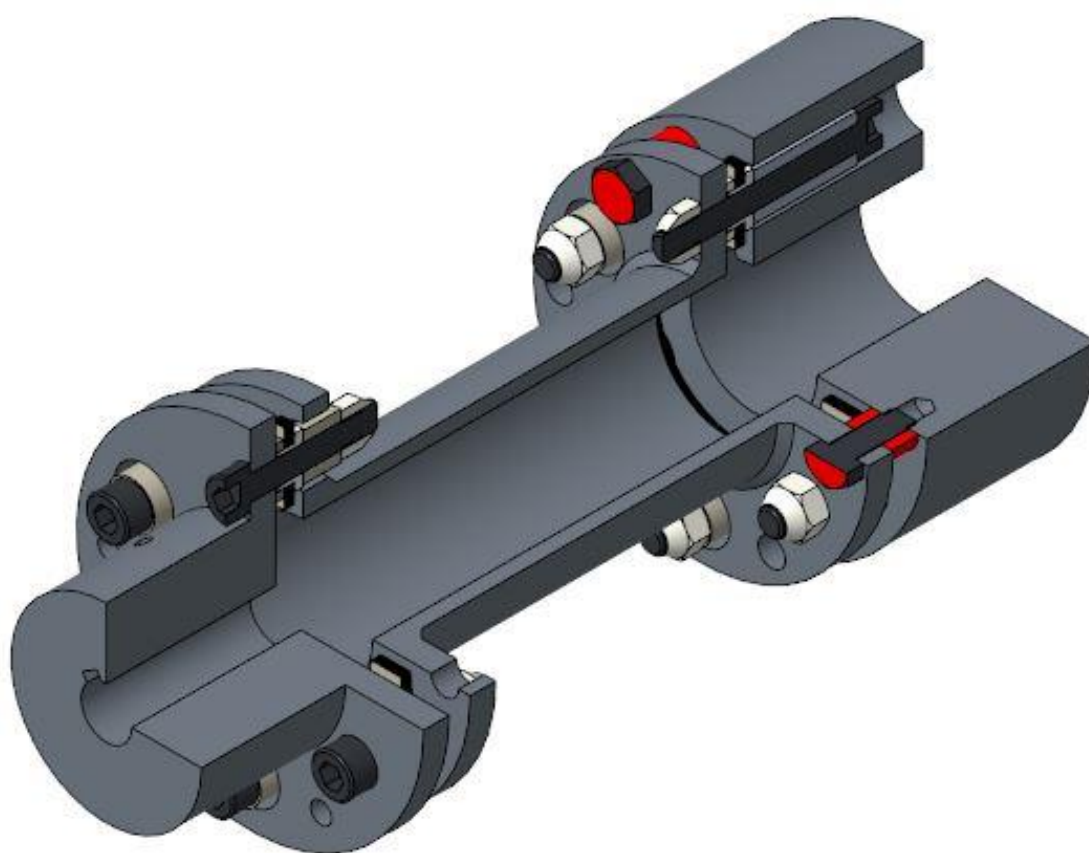

Installation & Operating Manual (IOM)
DISC-O-FLEX Coupling
RLM/RLMK Series





INDEX


	Page No
1. Introduction & General Guidelines	02
2. Before installation information	02
3. Installation Information	03
3.1 Hub Mounting	03
3.2 Shaft Alignment	05
3.3 Final Assembly	06
4. Disassembly/ Replacement	07
5. Safety,General Hazard & Environment	08
6. Inspection & Periodic Maintenance	09
7. Spares Management & Complaint Handling	09
8. Breakdown & Trouble-shooting	12
9. Marking Details	13
10. Declaration of Conformity	15


1. Introduction & General Guidelines

- RLM/RLMK type disc coupling are complied with ATEX (explosion protection) to transmit power and torque between drive and driven shaft using flexible disc element blades to accommodate misalignments between the equipments.
- This manual will help you to install and maintain disc coupling before installing/disassembling of coupling. It is advisable to read the manual carefully before starting the work. These special designs are always provided with general assembly drawing which provides detail information of the design and connected equipments.
- Symbol description :

 Caution person may get injured

 Damage the product

 Pay attention

 Potentially explosive warning

2. Before installation information

- RLM/RLMK couplings are delivered by RTPL with element blade as assembled condition which consists components from 3 to 8 as shown in fig. 2.1, it is recommended not to disassemble it except case of replacement for blade assembly.

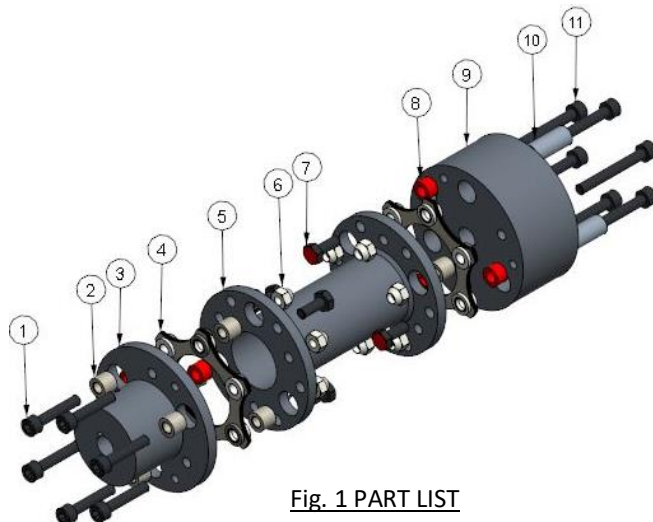


Fig. 1 PART LIST

Sr.No	Component	Qty.
1	Coupling Bolt (DE)	06
2	Small sleeve	06
3	Driving Hub	01
4	Element Blade Assembly	02
5	Center Spacer	01
6	Cleveloc/Nylock Nut	12
7	Gagging Screw	06
8	Balancing bush	06
9	Driven Hub	01
10	Large sleeve	06
11	Coupling Bolt (NDE)	06

- Inspect coupling assembly for visible damage, if you found contact RATHI.
- Remove red marked bolts & bushes, which are provided to avoid damaging of blade during transportation.

3. Installation Information

Ensure the system is disconnected from electrical connection and other possible energy transmission before starting the work.

3.1 Finish Bore Instruction (Fig. 2)

- Hub finish bores machined by customer with reference to flange outside diameter.



Finish bore strictly done within specified limit (H7, Js9).

- Keyway must be done between two adjacent holes.
- Provide set screw at distance L ($L = LTB / 2$)

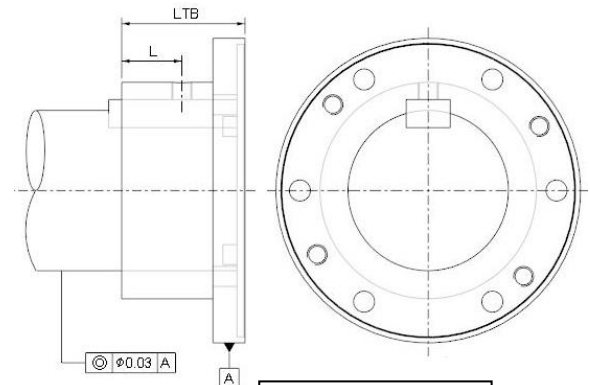


Fig.2 Finish bore

3.2 Hub Mounting.

3.2.1 Clean protective coatings/lubricants from bores & keyways.

3.2.2 Remove attachment bolts (1) and separate hubs from assembly unit (fig.3).

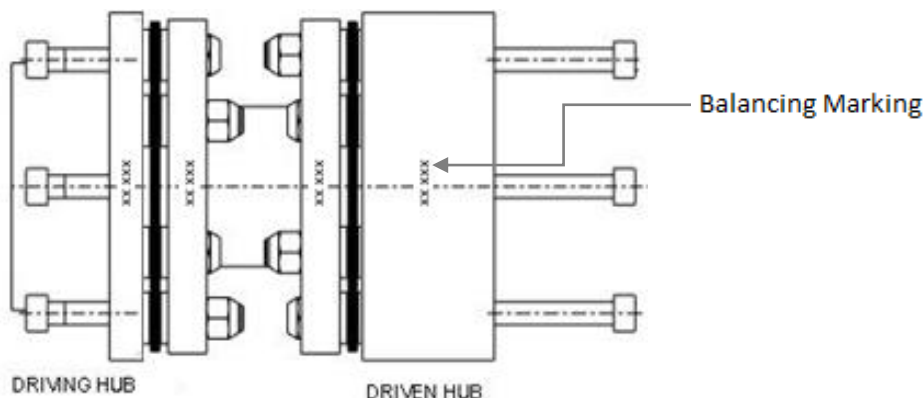


Fig.3 coupling in disengages condition

3.2.3 Straight Bore with clearance fit (Fig.4)

- Assemble key(s) on to the shaft.
- Set screws to be removed from hub, if it comes through the keyway or hub bore.

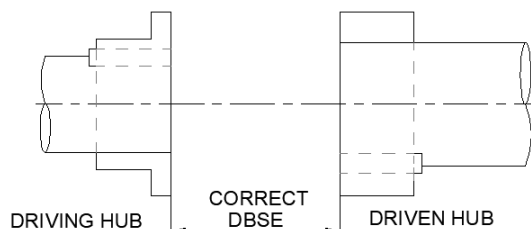


Fig. 4 HUB Mounting

- Mount hubs over the shaft by maintaining DBSE as required.
- Tighten the set screw with torque wrench.

3.2.4 Straight bore with interference fit.

- Check appropriate fit between shaft and hub bore.
- Place the key over the shaft slotted area.
- Heat the hub in oil bath up to temperature 150° C to make bore bigger than shaft.
- Immediately slide expanded hub over the shaft up to desired position.(Fig. 3)
- Tighten the set screw with torque wrench.

3.2.5 Taper Bore (Fig.5)

- Slid the hub over the shaft without inserting key up to DBSE as required.
- Mark the hub position onto the shaft, or mount the dial indicator by keeping in contact with hub flange.
- Remove the hub and insert key(s) in the shaft.
- Heat the hub in oil bath up to temperature 150° C to make bore bigger than shaft.
- Immediately slide expanded hub over the shaft up to marked position.
- Tighten the set screw with torque wrench.

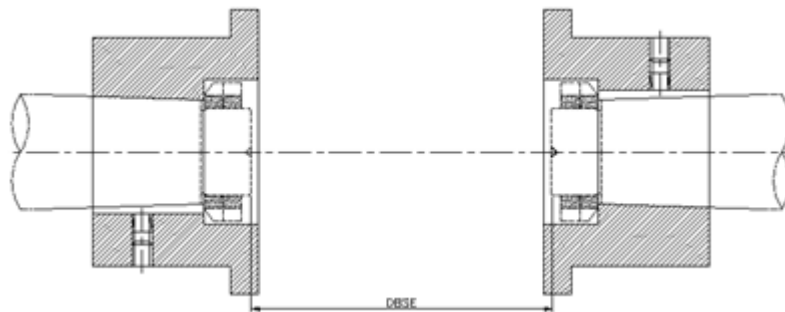


Fig. 5 Taper bore

3.3 Shaft Alignment

- In order to achieve optimum service life of the coupling, shafts must be aligned.



- Initial misalignment should not be more than 25 % of maximum misalignment (Refer Table 3).

Table 2 : Method of misalignment

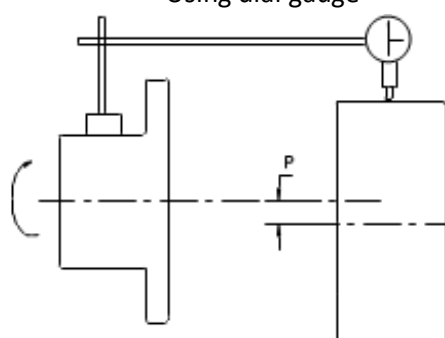
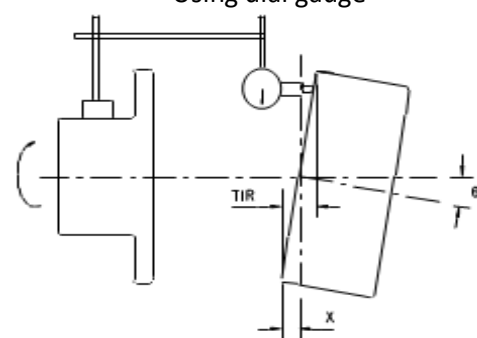
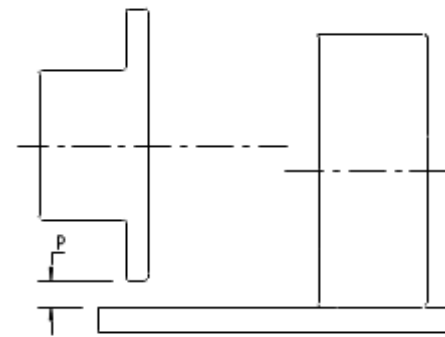
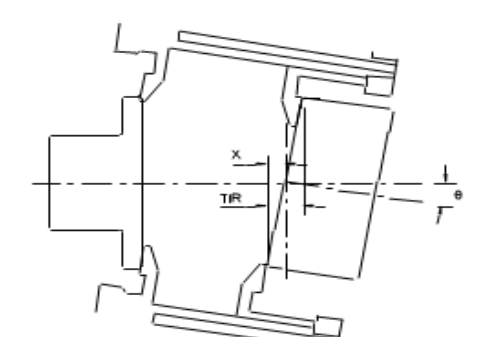
Method	Parallel/Radial	Angular
1	<p>Using dial gauge</p> 	<p>Using dial gauge</p> 
	<ul style="list-style-type: none"> Clamp dial gauge on driven hub Note the reading at each quarter rotation of hub by rotating one end. P or X is half the Total Indicated Reading (TIR) shown on dial gauge 	
2	<p>Using straight edge</p> 	<p>Using vernier calliper</p> 
	<ul style="list-style-type: none"> If the field constraints do not permit to use dial gauge then alternatively use straight edge & vernier calliper to measure parallel and angular alignment respectively. 	

Table 3 : Misalignment & Tightening Torque

Coupling Size	PERMISSIBLE MAXIMUM MISALIGNMENTS					TIGHTENING TORQUE	
	Angular (X)		Axial (± mm)	Parallel (mm/mm) SPAN) # (P)	* GAP 'G' (mm)	Coupling bolt	
	Degree per blade assly.	Total Indicated Reading (TIR) (mm)				Size	Value (Nm)
10	0.75°	0.5	1	0.013	6.5	M6	10
35					6.5	M6	10
95					8	M8	23
170					9.5	M10	46
220					12	M12	80
400		2.8	2		13	M14	129
520					14.4	M16	150
1000					16.2	M18	205
1300					19.5	M20	285
2000					21.5	M22	380
2500				23.5	M24	400	

- Gap 'G' in above table is given when angular and axial misalignments are zero.
- # SPAN = DBSE – G
- For RLMK Couplings, parallel misalignment is zero.

3.4 Final Assembly




- RLM/RLMK couplings are supplied with fully assembled condition with tightened cleveoc nuts(7) at RTPL to specified tightening torque (Table 3).
- Ensure hubs have been mounted as shown in fig.4,to maintain correct DBSE .

3.4.1 RLM

- Support the center spacer between two hubs and ensure small holes of spacer flange will be in line with the large holes of the hub.
- Insert Allen head bolts with sleeves from hub side, first through the large holes and then small holes by holding blade pack assembly between hubs & center spacer.

3.4.2 RLMK

- The large holes of Hub-II should be in line with the small holes of Hub-I
- Insert coupling bolts from driven hub side through small hole and small length sleeves from driving side.
- Insert coupling bolts with long sleeves through the large holes of driven hub
- To avoid loosening of nut, apply thread locker, loctite 270 solution on threads before tightening the bolts
- Tighten the cleveoc nut with to the required tightening torques given in table 3.
- Follow the same procedure from other side also for RLM.
- Measure gap 'G' mentioned in table 2 , which should be equal throughout on both sides.
-  Customer must provide required safety guards, RTPL does not supply safety guards or shields.

4. Disassembly/ Replacement

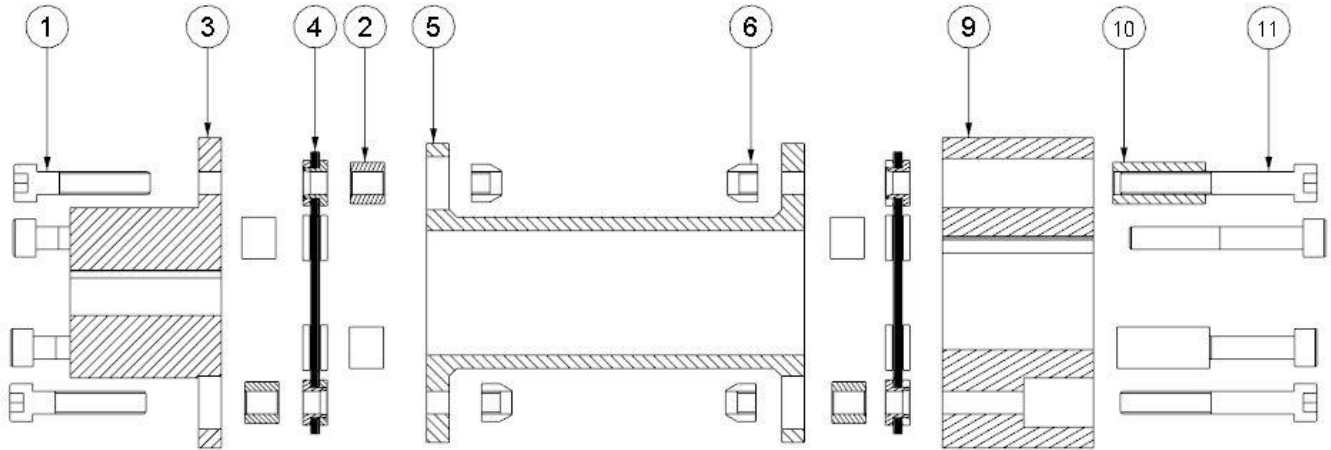


Fig. 7

4.1 Element blade pack

4.1.1 Disassembly




- Support center spacer such that the blades should not be under stresses due to external loads, such as spacer weight
- Dismantle components by loosening coupling bolts (1) from hub.
- Remove cleveloc nuts (2), bushing and blade pack (4).

4.1.2 Replacement

- Replace entire blade assembly of both sides with new factory assembled one, replacement of one blade pack is not advisable (RLM).
- Tighten each cleveloc nut using incremental torque up to specified tightening torque (Table 3) in progressive alternate pattern.

5. Safety General Hazard & Environment

5.1 Safety General Hazard

- Proper care and safety must be taken care before work started.
- The relevant safety and environmental regulations must be complied during installation, commissioning, operation, assembly, disassembly and maintenance.
-  • Coupling must be maintained and/or repaired in the presence of skilled or qualified persons for particular work.
-  • During installation or maintenance ensure the drive unit is cut off from the power supply and caution notice should be display on switch.
-  • Immediate stop the drive unit if anything abnormalities observed on coupling (e.g. cracks, chips, wear, noise or deformation)
- Check all the bolts are tightened as per torque specified in the manual or as specified in the GA drawing.
- The supplied coupling may have to rotate at high speed, it is most important to guard the area in compliance to ATEX and various other local applicable standards.
- This coupling is certified as per ATEX requirement. Please check the suitability of hazardous environment at the time of selection of the coupling or during installation of the coupling.
- All spare parts are to be purchased from manufacturer or authorised dealer only.

If the coupling is to be used below ground in potentially explosive areas, the coupling, must be provided with a robust casing to avoid the risk of ignition from e.g. friction, impact or friction sparks.




The depositing of heavy metal oxides (rust) on the coupling must be avoided by the casing or other suitable precautions.

5.2 Environment

- Our products are complying with EMS standard ISO 14001:2015, any instruction which are impermissible according to standard are not followed.

6. Inspection & Periodic Maintenance


- The disc coupling can be monitored under running condition as well as under idle condition.
- 
 Inspect the coupling once in 6 months in idle condition or whenever it is taken for periodic maintenance.
- During running condition, it is recommended to check the vibration and noise of bearings on either side of the equipments to be under specified limits.
- Special attention to be given to blade assembly (flexible element) whether is there any wavy formation of the blade (“S” or “D” type waviness), this may result in weakening of the flexible element under continuous operation. Also check the blade assembly individual elements of any fracture or tearing of any blades. If found then it is recommended to replace the entire blade assembly at one short. Slight bowing or “S”/”D” like distortion/waviness is not detrimental to the operation of the unit.
- Check the flexible elements, by visual inspection, for any signs of fatigue failure or cracking to the washer anchoring points or general signs of fretting corrosion. Note that any cracking will begin at the outermost edge of the outside blade. This means that, this inspection is still possible without disturbing the element bolting.
- It is recommended to replace cleveloc nut after being re-tightened 4 to 5 times.
- To replace blade assembly, follow procedure as per section 4.1.

7. Spare Management & Complaint Handling

7.1 Spare management

- We recommend to store spare items as given below, in order to have continuous operation and to reduce down time due to failures.
- Spare component list.(Fig.1)

Sr.No.	Part descriptions	Components/ part No.	Quantity
1	Element blade assembly	02	2 Nos
2	Coupling bolt	01 and/or 11	6 Nos
3	Hub (I,II)	03 and/or 09	1 Nos



- 
 • Don't forget to mention hub type while giving spare order for hub and/or coupling bolt

7.2 Complaint Handling

- In case of any failure, for proper root cause, fill up Product Performance Datasheet (PPDS) and provide us along with images/videos.

Product Performance datasheet(PPDS)

[GO TO INDEX](#)

		ANNEXURE Product Performance Data Sheet (PPDS)	Ref.:	
			Date:	
Contact Details	Distributor			
	ZR			
	Customer Details:Name			
	Contact Person			
	Cell No			
	Email ID			
Supply details	Product			
	PO No and Date			
	Invoice No & Date			
	Ref Drawing No			
	Coupling Serial No.			
	Logo: RATHI/Lovejoy/RTFL/OTHER			
	Qty purchased			
	Qty Failed			
Service Details	Application Details: Driver/Driven			
	Equipment Name			
	Installation Date			
	Failure Date			
	Approx service life			
Installation details	Finish bore/Keyway machining by : RTPL / Customer			
	Hub Fitment: Slide fit / Interference / Press fit			
	Method of Hub fitment: Mallet / Jacking / Heating / Hydraulic			
	Fastener Tightening Method: Torque Wrench / Spanners			
	Tightening Torque values			
	Power Rating: KW/RPM/Torque			
	Start/stop frequency			
	Temperature: °C			
	Duty: Hrs / Day			
	Alignment Initial: Axial/Angular/Parallel			
	Alignment after failure: Axial/Angular/Parallel			
	Rathi Installation Instruction: Followed/Not followed			
	Installation skills: Average/Good/Excellent			

PAGE 1 OF 2

[GO TO INDEX](#)

Failure details	Lubrication condition, if applicable	
	Breaking of components: Yes/No	
	Possible Sequence of Component Failure	
	Damage of components: Yes/No	
	Loosening of fasteners: Yes/No	
	Overload/Sudden Peak: Yes/No	
	Loosening of foundation bolts:	
	Loosening of attached piping / ducting: Yes/No	
	Replacement Status : If replaced whether Coupling or Spares	
Customer analysis of the Failure causes (Attach separate sheet, if required)		
Evidence / Requirement	Failed product photos : Attached / Not attached	
	Failed product being returned to RTPL : Yes / No	
	RTPL visit required: Yes/No	
	Replacement required: Yes/No	
	ZR / Distributor Remarks if any	
Other info	Details of any other Coupling previously in use	
	Failure history	
	Bearing condition of Driver & Driven units (Smooth/Noisy/Vibrations)	
R/002		PAGE 2 OF 2

8. Breakdown & Trouble Shooting

- The coupling must run with low vibration and noise during operation. any abnormal behaviour may damage the product or drive unit.
- Following are some possible causes of failure with corrective actions.

SR. NO.	FAILURE MODE	PROBABLE CAUSES	CORRECTIVE ACTIONS	IMAGE
1	Cracking of blade packs Premature shaft bearing failure	Excessive misalignments.	Check for, - loose base plate bolts, - Component thermal expansion - Change in the assembly gap of the coupling. Replace the Blades	
2	Fatigue of Blades	Torsional vibration Excessive starts and stops	conduct a torsional vibration analysis	
3	Elongation of Blade holes	Loose coupling bolts	Change the blade assembly on both the ends Tighten the bolts to required tightening torque	
5	Blade Deformation	Torque Overload	Check sizing and Service Factor of Coupling Review operational history for any abnormalities. If found unsuitable, replace with suitable size	
6	Coupling bolt distortions	Abnormal axial load		
7	HUB bursting	Torsional shock overload		

9. Marking Details

- The ATEX marking for REM coupling will be given on outer surface or front side (Fig. 8).
- Element blade assembly will not be marked.
- **Example :**

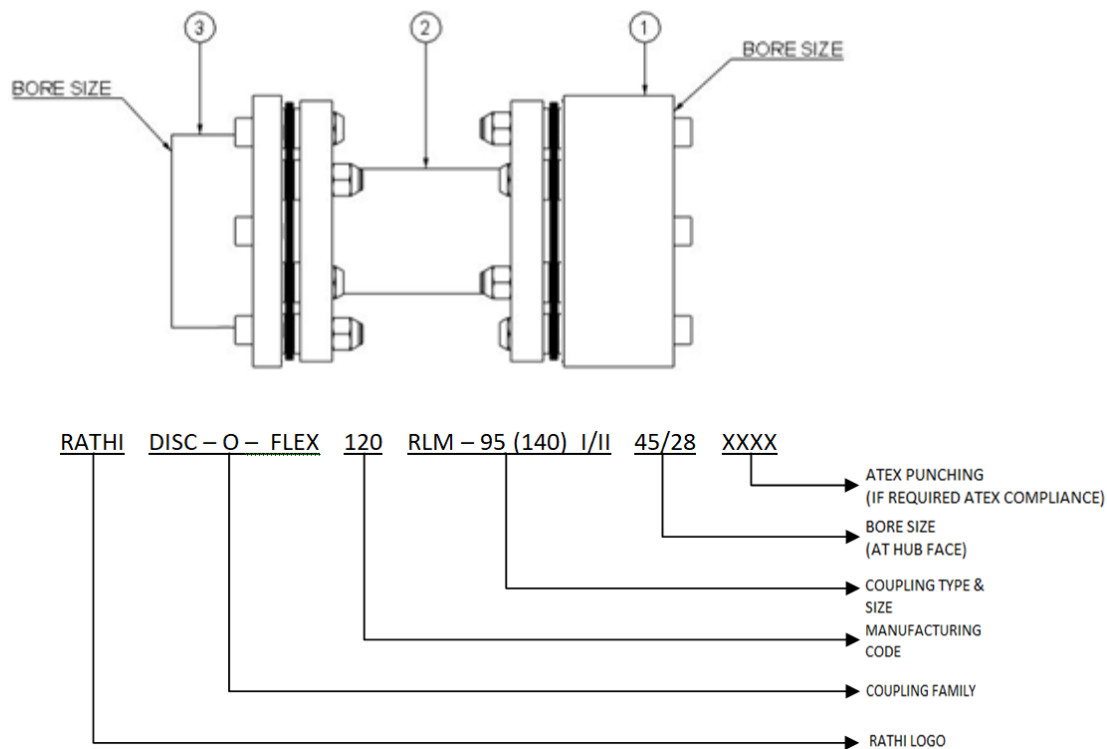


Fig.8. Marking example

- **ATEX Punching sample**

1. RATHI DISC-O-FLEX 120 RLM-95 II 45 $\text{C} \text{C} \text{E} \text{x}$ II 2GD -30°C +135°C
2. RATHI LM-95/140 120
3. RATHI LM-95 I 28 120

Where,

1. Manufacturing code e.g. 120 for December 2020
2. Product code e.g. LM-95/140
3. Finish bore size code e.g. 45

[GO TO INDEX](#)

10.Declaration of Conformity



ATEX

Declaration of Conformity

2014/34/EU

Customer Name

Certificate No.

PO No.

Date

1) Declaration relating to :

Type :

Size :

2) Manufactured and assessed by

Rathi Transpower Pvt.Ltd., Gaia Apex, S. No. 33/2D, Viman Nagar, Pune 411 014 (INDIA).

3) Notified by :

4) This product fulfills all the requirements for Group 2 Category 2 GD equipment in accordance with directive 2014/34/EU (ATEX)

The design complies with ISO 80079-36 AND ISO 80079-37 and is fully documented in Technical File No. RD 003/20

5) The product is incapable of producing arcs, sparks or hot surface which may cause ignition and is designed to be used in accordance with ISO 80079-36 AND ISO 80079-37.

6) The required marking of the product is specified in Technical File No. RD 003/20 and includes the distinctive community marks.

7) **Coupling without the Ex marking must not be used in potential Explosive Atmosphere.**

8) Manufacturing is controlled by an **ISO 9001** registered system.

9) Approved signatories for and on behalf of Rathi Transpower Pvt.Ltd.

Quality Inspector ()

Quality Manager ()

Date :

Date :

Format No : 3QA-F-33 Rev 1



ATEX

Declaration of Incorporation
E.C. Machinery Directive (2006/42/EC)

Section 1.0 - Machinery Description:
Flexible Power Transmission Couplings
Types: Metallic Disc Coupling

Series:

Section 2.0 - Applicable Harmonized Standards
ISO13709(API 610)for centrifugal pumps
ISO14691 couplings for-General-purpose applications
ISO10441(API 671)(opt)couplings for-Special-purpose applications

Section 3.0 - Declaration:
We, Rathi Transpower Pvt. Ltd. declare that under our sole responsibility for the supply of the machinery defined in Section 1.0 above, the said machinery parts are intended to be incorporated into other machinery or assembled with other machinery to constitute machinery as covered by this Directive.

The machinery parts, covered by this declaration must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive.

Signed

Date :

(Quality Manager)

Format No : 3QA-F-33 Rev 1