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Installation & Operating Manual (IOM)  
GEAR FLEX Coupling  
LFG,LHG/ Series



LFG Series



LHG Series

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## 1. Introduction & General Guidelines


- LFG/LHG type gear coupling are designed as per API standard and complied with ATEX (explosion protection) to transmit power and torque between drive and driven shaft.
- This manual will help you to install and maintain gear 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

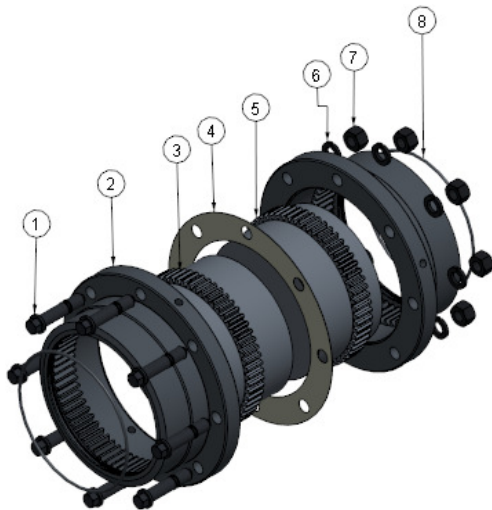
 Damage the product

 Pay attention

 Potentially explosive warning

## 2. Before installation information

- LFG/LHG couplings are delivered by RTPL as assembled condition which consists components from 1 to 8 as shown in fig. 1.



Sr.No	Component	Qty.
1	Coupling Bolt	Refer GA Drawing
2	Sleeve	02
3	Driving Hub	01
4	Gasket	01
5	Driven Hub	01
6	Spring Washer	Refer GA Drawing
7	Hex Nut	Refer GA Drawing
8	O-Ring	02

Fig. 1 PART LIST

- Inspect coupling assembly for visible damage, if you found contact RATHI.
- Disassemble the coupling by removing nuts & bolts. Clean all the parts carefully.

### 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 outside diameter.
- Finish bore strictly done within specified limit (H7, Js9).
- Maintain face run-out and concentricity as per below table.

Outside diameter (mm)	Face run-out/ Concentricity (mm)
10-180	0.04
180-400	0.08
400-630	0.1

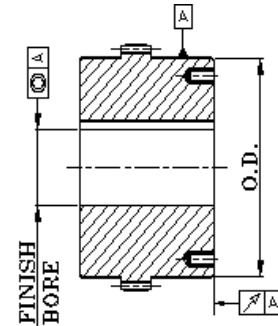


Fig.2 Finish bore

- Provide set screw at distance  $L$  ( $L = LTB / 2$ ). If it is not possible, suitable distance nearer to midpoint of the length through bore (LTB) is provided.

#### 3.2 Hub Mounting.

- Clean protective coatings/lubricants from bores & keyways.
- Remove coupling bolts (1) and separate hubs from transmission unit (fig.3).
- Slide the sleeve having internal teeth with rubber o-ring on shafts.(Fig 3)
- Mount the hubs having external teeth on their respective shafts flushed with the faces of hubs as shown in Fig. 3.
- Hubs and Sleeves must be supported during installation to avoid accidental damage.

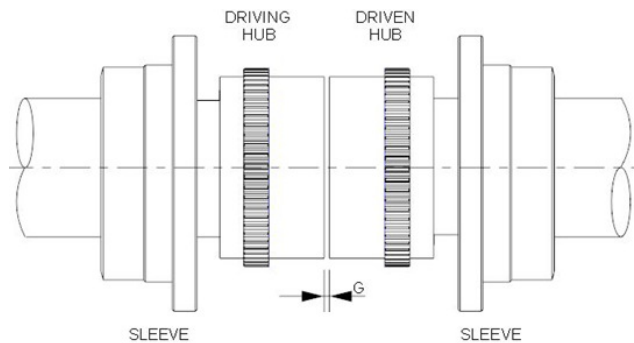


Fig.3 Hub mounting

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

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- Mount hubs over the shaft by maintaining gap 'G' as mentioned in table 2 by using a spacer bar equal in thickness to the required gap.(Fig.4)
- For spacer type, set the equipment at a distance equal to DBSE by using vernier calliper as shown in fig. 5.

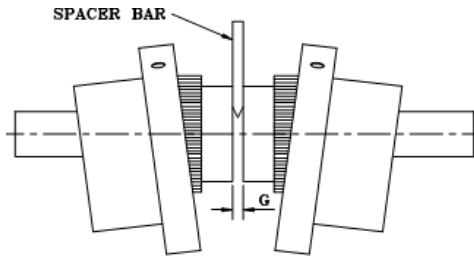


Fig. 4 HUB Mounting

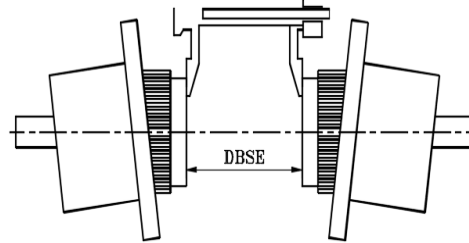


Fig. 5 HUB mounting for spacer coupling

- Tighten the set screw.

### 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 1).

Table 1 : Method of misalignment

Method	Parallel/Radial	Angular (X)
1	<p>Using straight edge</p>	
	<ul style="list-style-type: none"> <li>• Check the parallel/radial alignment with the help of straight edge resting squarely on both the hubs at 4 places 90° apart.</li> <li>• Check the angular misalignment with the help of slip gauges by inserting in the gap at 4 places 90° apart. The difference in max. &amp; min. gap will be the Total Indicated Reading (TIR).</li> <li>• Angular misalignment( X)in mm is half the Total Indicated Reading (TIR).</li> </ul>	

Table 2 : Misalignment & Tightening Torque


COUPLING SIZE	PERMISSIBLE MAXIMUM MISALIGNMENTS					BOLT SIZE	BOLT GRADE	TIGHT. TORQUE (Nm)	GREASE QTY. (Kg)		
	ANGULAR		PARALLEL /RADIAL'P' (mm)	AXIAL (mm)					GAP 'G' STD.	LFG	LHG
	PER GEAR MESH	'X' (mm)		LFG	LHG						
100	± 1.5°	1.6	0.6	±0.5	± 0.25	3	M8	8.8	23	0.04	0.02
101		2.2	0.8			5	M12	8.8	80	0.05	0.02
102		2.4	0.95			5	M12	8.8	80	0.09	0.05
103		2.9	1.1			5	M16	8.8	199	0.22	0.11
104		3.2	1.3			5	M16	8.8	199	0.38	0.19
105		3.7	1.45			10	M20	8.8	390	0.46	0.23
106		4.2	1.55	±1.0	± 0.5	10	M20	8.8	390	0.72	0.36
107		4.6	1.8			10	M20	8.8	390	1	0.5
108		5	1.9			10	M20	8.8	390	1.3	0.65
109		5.6	2.2			10	M24	8.8	673	2.2	1.1
110		6.4	2.6			10	M24	8.8	673	3	1.5
111		7.1	3.3			±2.0	NOT Available	10	M24	8.8	673
112		7.7	3.5	10	M24			8.8	673	6.6	-
113		8.9	6.6	15	M30			8.8	1338	8.8	-
114		9.5	7.3	15	M30			8.8	1338	11.3	-
115		10.2	8.1	15	M30			8.8	1338	14.8	-
116		11.8	8.5	±3.0	20			M36	8.8	2339	22.5
117		13.1	9.1		20	M36	8.8	2339	32	-	
118		14.4	9.6		20	M36	8.8	2339	44.5	-	
119	16.3	10.2	30		M48	8.8	5626	53	-		

- Half Flexible Gear Couplings (LHG) cannot accommodate parallel misalignment.
- Gap 'G' in the above table is given when angular & axial misalignments are zero.
- All misalignments cannot be taken by coupling at a time.

Note:- LHG type couplings are available from size 100 to 110 only

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### 3.4 Final Assembly

- Insert the gasket between the sleeve flanges.  
Position the flanged sleeves with lubrication plugs.
- Insert the bolts thru flange holes. Also place the washer & nuts on bolts and tightening the bolts.
- 
  - Assemble only with the help of the fasteners supplied with the coupling.
  - Fill with recommended grease (RSG with reqd. qty.) for lubrication.
  - For grease quantity for respective coupling size, refer table 2.
  - Use Loctite to prevent the loosening of threads, if required.

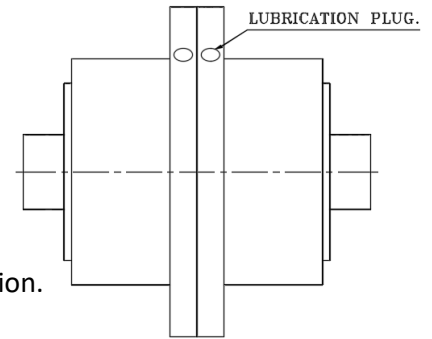


Fig.5 Plug details



- Customer must provide required safety guards, RTPL does not supply safety guards or shields.

### 4. Disassembly/ Replacement

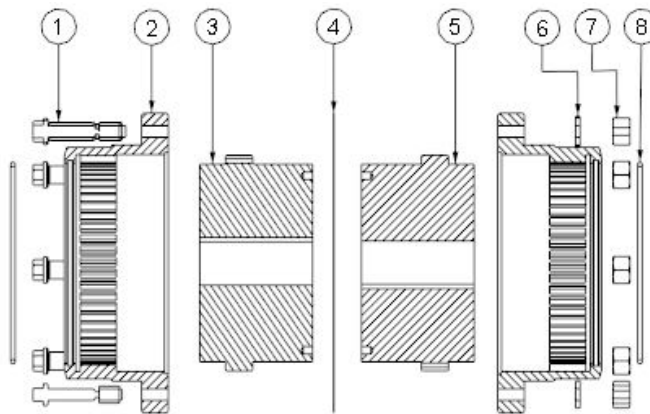


Fig. 6.

- Disengaged sleeve by removing coupling bolts (1) from sleeve.
- Remove the hub from shaft and assemble new hub on shaft.
- Ensure hubs have been mounted as shown in fig.3, to maintain correct Gap 'G'.
- Repeat step of section 3.4.

## 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 complied 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 gear 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.
- After tightening the sleeves (2),fill the specified amount of grease (refer table 2) from lubrication hole (fig.5) with the help of grease gun.
-  • Ensure recommended quantity of grease has been filled, such that sleeve and hub teeth are completely covered.
- It is recommended to check below parameters,
  - Vibration and noise
  - Grease/Oil leakage
  - Damages on gear teeth
  - Damages and deterioration of `O'-ring
  - Deterioration of grease.
- Carry out below steps during first grease change which should take place within 3 months in operation,
  - Dismantle the coupling and clean thoroughly to remove used grease,abrasive powder.
  - Reassemble the coupling.
  - Fill the required quantity of grease again for lubrication.
-  • It is recommended that grease to be renewed at 2 years interval
- In case of high ambient temperature, frequent overloaded condition, frequent reverse operation, large parallel misalignment and angular misalignment, ensure that the checking intervals are shortened.

## 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 (No.)
1	Coupling bolt	01	Refer GA drawing
2	Sleeve	02	02
3	Driving Hub	03	01
4	Driven hub	05	01
5	Hex Nut	07	Refer GA Drawing
6	O-Ring	08	02

### 7.2 Complaint Handling

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



- Product Performance datasheet(PPDS)

		<b>ANNEXURE</b>	Ref.:	
<b>Product Performance Data Sheet (PPDS)</b>		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				

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)	
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## 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	
1	Worn out Gear teeth Shaft bearing failure	Excessive misalignments.	Replace the coupling Realign the coupling	
2	Premature wear of Gear Teeth	Excessive starts and stops High peak load	Use coupling with heat treatment on teeth	
3	Noise during running	No lubrication	Refill the grease up to required limit	-
4	Heat Generation	No lubrication Poor lubrication	Refill the grease up to required limit. Refer maintenance guidelines for lubrication frequency	-
5	Grease leakage	Improper sealing	Ensure proper sealing to avoid grease leakage	-
6	Loose hubs on shaft with sheared keys.	Torsional shock overload	Find & eliminate causes of overload.	-
7	Severe corrosion on outer surface	Chemical attack	Apply anticorrosive coating on coupling (*)	-

### 9. Marking Details

- The ATEX marking for REM coupling will be given on outer surface or front side (Fig. 7).
- **Example :**

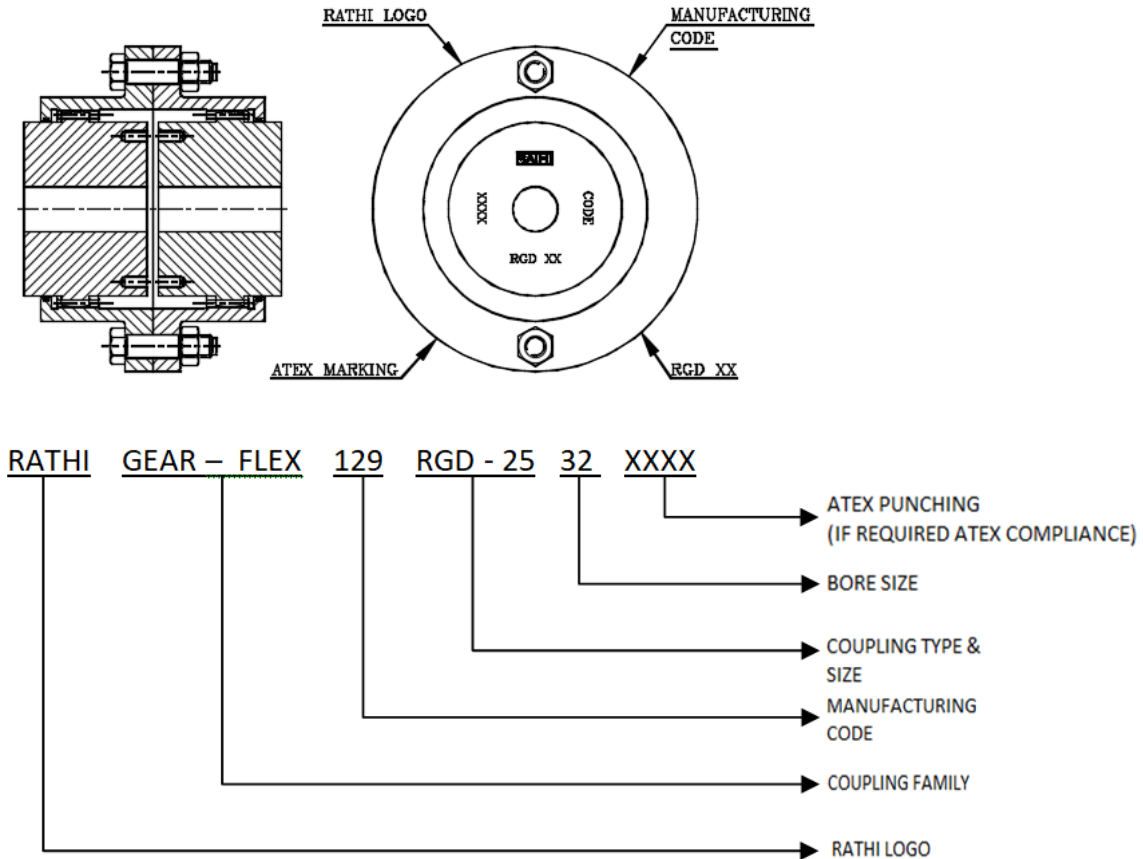



Fig.7. Marking example

- **ATEX Punching sample**

RATHI GEAR-FLEX 120 LFG-100 35  GD -20°C +120°C

- **Where,**

1. Manufacturing code e.g. 120 for December 2020
2. Product code e.g. LFG - 100
3. Finish bore size code e.g. 35



- Please note that, operating temperature in the marking will differ as per type of GREASE or O-RING for respective coupling series.





ATEX

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

Section 1.0 - Machinery Description:  
Flexible Power Transmission Couplings  
Types: Metallic (Non-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