TLKS
COUPLING

Installation, Operation & Maintenance Instructions

Foreword

These instructions are provided to familiarise the user with the coupling and its designated use. These instructions must be read and applied whenever work is carried out on the coupling and must be kept available for future reference.

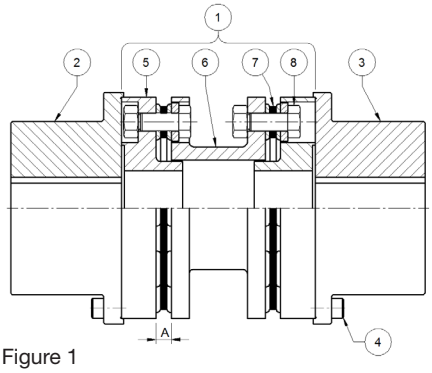


Figure 1

Reference	Description
1	Transmission Unit
2	Driver Hub
3	Driven Hub
4	Hub Bolts
5	Guard Ring
6	Spacer
7	Membrane Pack
8	Drive Bolt Assembly

ATTENTION These instructions are for the fitting, operation and maintenance of the coupling as used in rotating equipment and will help to avoid danger and increase reliability. The information required may change with other types of equipment or installation arrangements. These instructions must be read in conjunction with the instruction manuals for both the driver and driven machinery..

If the coupling is to be used for an application other than that originally intended or outside the recommended performance limits, John Crane must be contacted before its installation and use.

Any warranty may be affected by improper handling, installation, or use of this coupling. Contact John Crane for information as to exclusive product warranty and limitations of liability

If questions or problems arise, contact your local John Crane representative or the original equipment manufacturer as appropriate.

ATTENTION John Crane couplings are precision products and must be handled appropriately. Take particular care to avoid damage to spigots, mating faces, hub bores, keyways and membranes. Do not excessively compress the coupling membranes during assembly. Refer to Table 1 for compression limits. (X)

These instructions are written for standard catalogue products, generally designed in accordance with the drawing shown.

Safety Instructions

The following designations are used in the installation instructions to highlight instructions of particular importance.

IMPORTANT is used for items of particular concern when using the coupling.

ATTENTION where there is an obligation or prohibition concerning the avoidance of risk.

⚠ where there is an obligation or prohibition concerning harm.

The usual extent of supply comprises

1. A factory assembled transmission unit, comprising 2 off guard rings (5), 1 – off spacer (6), 2 off membrane packs (7) plus fasteners and fixings(8)
2. Driver hub
3. Driven hub
4. 2 sets of bolts (4) to assemble the transmission unit to the two hub flanges

IMPORTANT If a general arrangement drawing is supplied with the coupling then all data indicated on that drawing takes precedence over information included in these instructions.

Storage

If the coupling is not to be used immediately, it should be stored away from direct heat in its original packing.

All documentation supplied with the coupling should be retained for future reference.

Spares

When requesting spares always quote the full designation of the coupling

The following spares can be purchased from John Crane.

1. Set of hub bolts (4) (please specify standard or/and large hubs)
2. Hubs, bored to your requirement or unbored (2, 3)
3. Complete transmission unit, balanced or unbalanced (1)
4. Membrane pack including drive bolts and guard ring assemblies (5, 7, 8)

Installation

Remove coupling from packaging and carefully inspect for signs of damage. Pay particular attention to the hub bores and the spigot/recess location features, which should be free from burrs and other damage.

INSTALLATION OF HUBS

⚠ Prior to installing the coupling, ensure that the machinery is made safe. Half-couplings must be adequately supported during installation to avoid accidental damage should they slip.

Ensure the hub bore and mating shaft are clean.

Parallel Bore with Keyed Drive

The hub is usually installed with the hub face and shaft end flush.

1. Measure the shaft diameter and hub bore to confirm the correct fit.
2. For clearance fits, install the key(s) into the shaft keyway and with a little lubrication on the shaft, slide the hub onto the shaft. The key should be a tight sliding fit in the keyway with a small clearance at the top of the key. Secure the hub to the shaft in the correct axial position with one or more grub screws.
3. John Crane recommends a light interference fit for most applications and it may be necessary to apply heat to assist fitting of such hubs. A warm oil bath will usually be adequate. DO NOT use spot heat or exceed 175 degrees centigrade as this may cause distortion. A thermal heat stick can be used to estimate the temperature before quickly sliding the hub onto the shaft. A suitable stop will ensure the correct axial position is located.

Taper Bore with Keyed Drive

1. Fit the hub onto the shaft without the key(s). Lightly hammer the hub with a soft faced mallet to ensure metal to metal contact takes place.
2. Measure the distance from the end of the shaft to the face of the hub using a depth micrometer.
3. Securely mount a dial gauge onto the inboard hub flange and set to zero.
4. If necessary remove the hub and fit the key(s) which should be a tight sliding fit in the keyway with a small clearance at the top of the key.
5. Refit the hub and draw up the shaft to the correct axial position indicated by the dial gauge. The hub may have to be heated to achieve the required interference. See Figure 2. Note that the hub face may not be flush with the shaft end when taper bores are used.

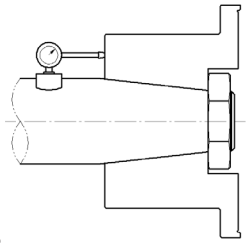


Figure 2

Installation (continued)

Taper Hubs Mounted by Oil Injection

1. Ensure that fillets and corner radii of mating surfaces, oil distribution and drainage grooves are well rounded and free from burrs.
2. Thoroughly clean all contact surfaces and smear the tapered surfaces with oil.
3. Fit the hub onto the shaft.
4. Fit the oil injection equipment, axial stop and mounting tools. Consult the arrangement drawing and the oil injection system suppliers' instructions.

⚠ Fit and secure the axial ram or hydraulic nut BEFORE injecting oil between the components.

5. Inject oil between the components until the required mounting pressure is reached, or it leaks out at the ends of the mating surfaces.
6. By means of the mounting tools, position the hub in the correct axial position, injecting oil during this operation.
7. Release the oil pressure.
8. Remove the mounting tool and oil injection equipment.
9. Assemble the locking washer and lock nut to shaft end if applicable.

Unbored Hubs

John Crane recommends a light interference fit for keyed hubs and shafts [e.g. a K7/m6 fit]. The finished bore size can be calculated from the measured shaft diameter.

When setting up the hub to machine the bore use the hub location recess and face as datum surfaces, as shown in Figure 3.

The hub face should be set such that the maximum run out does not exceed 0.00008mr per mm of hub flange diameter or 0.025 mm TIR, whichever is greater.

The hub location recess should be set so the maximum run out does not exceed 0.00008mr per mm of recess diameter or 0.012 mm TIR, whichever is greater.

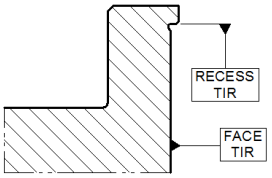


Figure 3

Adapters

For machines having an integral flanged shaft, the flange may be machined to suit the bolting configuration of the coupling transmission unit. Alternatively, the coupling may be supplied with a customised flange adapter. Refer to the specific general arrangement drawing for location and mounting details.

Shaft Alignment

Align the centre lines of the DRIVING and DRIVEN machine shafts as follows:

1. Move the equipment into position
2. Check for any soft foot and correct before commencing alignment.
3. With one machine firmly bolted down, set the distance between shaft ends (DBSE) according to the drawing or catalogue dimension.

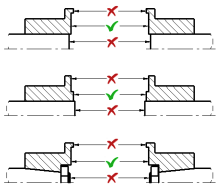


Figure 4

IMPORTANT DBSE should be measured between the inner face of the hubs and should not be taken as the length of the transmission unit at its outer periphery. DBSE may not be equal to the precise distance between shaft ends. In particularly, the faces of taper bored hubs may not be flush with the shaft end. Refer to Figure 4.

4. Align the shaft centre lines both horizontally and vertically by aligning the hub flanges. JOHN CRANE recommends the reverse periphery method for accurate alignment. This can be done using dial gauges or with the John Crane LASE-A-LIGN™ shaft alignment system kit kit. Further details are available from John Crane on request.
5. Recheck the DBSE after the shafts have been aligned.
6. Axial shims (together with a shim carrier in some cases) may be supplied on applications where it is difficult to accurately set a predetermined shaft end separation [DBSE]. This is often the case where one or both of the hubs are taper bored. Where this feature is supplied, the thickness of shims [plus carrier if applicable] are added to the free length of the transmission unit so that the combined length is equal to the measured distance between the hub flange faces, making any allowance for known shaft movements. Note it is best to measure the transmission unit when it is in a gagged condition.

IMPORTANT The misalignment tolerances quoted in literature and on drawings, allow for dynamic conditions and variations. For the best service from the coupling, John Crane recommend that installed misalignment is no more than 10% of the maximum allowable misalignment, allowance being made for any anticipated movements which will occur during operation (eg. Thermal movements on hot pumps).

Installation Of The Transmission Unit

1. Check spigot and recess locations on the hubs and transmission unit for damage

   ⚠ The transmission unit must be adequately supported during installation to avoid accidental damage should it slip.

2. It may be necessary to compress the transmission unit whilst sliding it between the hubs. Facilities are provided to make this easier. The spacer flanges are drilled (4 holes in each flange) to allow compression bolts (ref. 9) to be threaded into the guard ring. Tightening evenly will compress the transmission unit until clearance between the hub spigots and length of the transmission unit is achieved, allowing installation. (see Figure 5). Minimum gap of X should not be less than the values shown in Table 1, unless indicated otherwise on the general arrangement drawing.

   IMPORTANT Always remove the compression bolts as soon as the transmission unit is in position, before fully tightening the hub bolts.

3. Align the hub/transmission unit flanges if they have been match marked.

4. Fit the hub bolts and tighten these evenly to locate the transmission unit, ensuring the spigots enter their recesses squarely. Bolt-threads should be lubricated with oil and tightened in a "diametrically opposite" sequence to the torque values shown in Table 1.

5. Measure dimension 'A (see Figure 1) on the transmission unit. Check against the minimum and maximum value in Table 1.

6. Rotate the machinery two or three times slowly to ensure it moves freely.

Hub tightening torque values apply to oil lubricated threads.

Maximum angular misalignment = 0.33 de
to 3600rpm. 0.25 degrees above 3600rpm

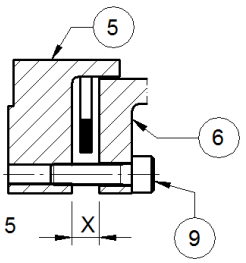


Fig. 5

TABLE A1

Coupling Size	Standard Hub Bolt Size	Standard Hub Tightening Torque Nm	Large Hub Bolt Size	Large Hub Tightening Torque Nm	Min gap X mm	Coupling Max Axial Deflection +/- mm	Dim'n 'A' (Min) mm	Dim'n 'A' (Max) mm	Dim'n 'B' mm	Hub Jacking Bolt Size
300	M8	35	M12	120	9.1	1.4	10.1	10.3	82	M6
500	M10	65	M12	120	9.4	1.7	10.9	11.2	102	M6
750	M12	120	M14	180	10.1	1.9	11.6	11.9	120	M6
1050	M12	120	M14	180	10.7	2.2	12.3	12.7	136	M6
1500	M14	180	M16	280	11.9	2.4	13.8	14.2	153	M8
2000	M16	280	M16	280	13.4	2.7	15.4	15.8	171	M8
2600	M16	280	-	-	14.6	3.0	16.7	17.2	183	M8
3350	M14	180	-	-	15.3	3.2	17.7	18.2	205	M8
4250	M14	180	-	-	16.1	3.5	18.6	19.2	220	M8
6010	M16	280	-	-	17.3	3.9	20.1	20.7	250	M8
8500	M16	280	-	-	19.8	4.4	23.0	23.7	276	M8
9013	M16	280	-	-	23.1	5.0	26.7	27.5	320	M8
9017	M16	280	-	-	25.2	5.5	29.2	30.0	348	M16
9021	M16	280	-	-	28.1	6.0	32.4	33.4	378	M16
9036	M16	280	-	-	34.3	7.1	39.4	40.5	460	M16
9049	M16	280	-	-	37.7	7.9	43.4	44.7	507	M16

Operation, Inspection And Maintenance

⚠ **Before starting the machinery, ensure that all necessary safety procedures are being observed and coupling guards are fitted.**

Routine examination should include a periodic check on the tightness of fasteners and visual inspection of transmission components for signs of fatigue or wear.

If the coupled machinery is disturbed at any time, shaft alignment should be re checked. Alignment checking is recommended if a deterioration of installation alignment during service is suspected.

⚠ **Maintenance work must only be carried out by suitably qualified personnel when the equipment is stationary and has been made safe.**

Failures are rare and can generally be attributed to excessive misalignment or / and severe torsional overload. In all cases of coupling failure, the cause should be identified and corrected before replacing the coupling.

It is possible to repair the coupling by fitting a replacement disc pack assembly or replacing the entire transmission unit.

To replace the transmission unit, remove the hub bolts and then withdraw the transmission unit using the compression bolts feature in the spacer as appropriate. It may be necessary to use the jacking holes provided in each hub to push the spigot off the guard ring. (See Table 1).

⚠ **Transmission unit must be adequately supported during removal to avoid accidental damage should it slip.**

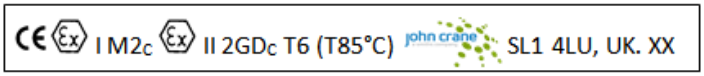
ATTENTION When repairing John Crane's flexible membrane couplings, only John Crane approved parts should be used.

This section refers to couplings which bear the CE and ATEX* required markings:

CE / ATEX marking

All couplings which comply with CE and ATEX legislation will be marked as shown. This will be etched on the spacer element of the transmission unit.

A) Ambient temperature is standard (40ºC max)



Where Metastream metal membrane couplings from John Crane are required for use in higher ambient temperatures, John Crane UK Ltd certifies that the equipment complies with the temperature classification range listed below table 1; and in all other respects complies with the type certificates. Operation in aggressive atmospheres

TABLE 1

Ambient Range Marking Min.	Ambient Range Marking Max. #	Group II, Category 2 GD **	Group I, Category 2 M2	MARKING OPTION
Unknown		T3 (T200°C)	Not Applicable	B
-55°C <	Ta < 150°C	T3 (T200°C)	Not Applicable	B
-55°C <	Ta < 90°C	T4 (T135°C)	150°C	C
-55°C <	Ta < 55°C	T5 (T100°C)	150°C	C
-55°C <	Ta < 40°C	T6 (T85°C)	150°C	A

B) Ambient temperature is (-55°C < Ta < 150ºC) OR Ambient temperature is unspecified, the equipment is not suitable for mining applications, Group I, Category 2.

C) Ambient temperature is (-55°C < Ta < 90ºC)

When the ambient temp. is specified, 'T3' is replaced by the following 'T' mark (**) according to table1.

Note:

'XX' is the year of manufacture and will change. For example for year 2016; XX = 16. CE and EX marks must meet requirements of Annex II in Reg. (EC) No. 765/2008 and Annex II in Dir. 84/47/EEC respectively.

Operation in Aggressive Atmospheres

The following components contain non-metallic materials. Confirm compatibility or provide suitable protection if the coupling is to operate in an aggressive atmosphere.

- The hub electrical insulation (if supplied option) – reinforced thermosetting plastic.
- Limited end float bearings (if supplied option) – PTFE based plastic.

Temperature Classification of Metastream Couplings

Metastream metal membrane couplings from John Crane, supplied in conformance with Directive 2014/34/EU, have to meet the classifications specified in table 1 when used in accordance with instructions and information supplied.

Metastream T, L and H series couplings, using the disk type flexible elements, are covered by type examination certificate **Sira 02ATEX9403.**

Metastream M series couplings, using the diaphragm type flexible elements, are covered by type examination certificate **Sira 02ATEX9404.**

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Declaration of Conformity

EEC Directive 2014/34/EU of 26.02.2014
and resultant legislation and standards

We, the manufacturers – John Crane UK Ltd, – confirm that the explosion prevention requirements have been implemented for

Metastream® metal-membrane couplings

Equipment complies with the requirements of directive 2014/34/EU. It is in accordance with article 1 3. (a) of the directive and the fundamental Health and Safety requirements of Annex II, are fulfilled.

The current Type Examination Certificates for the couplings are:-

'T', 'L' & 'H' Series -	Sira 02ATEX9403
'M' Series -	Sira 02ATEX9404

The technical documentation is deposited with the designated notified body in accordance with article 13 (b) (ii) of the Directive 2014/34/EU.

SIRA Certification Services
Unit 6, Hawarden Industrial Park
Hawarden, Chester, CH5 3US
United Kingdom

Signed:

Date: 20th July 2016

S. Pennington
(Engineering Manager - Couplings)

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Declaration of Incorporation

E.C. Machinery Directive (2006/42/EC)

Section 1.0 - Machinery Description:
Flexible Power Transmission Ring and Diaphragm Form Membrane Couplings
Types:

'H', 'T', 'L' & 'M' Series

Section 2.0 - Applicable Harmonised 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, John Crane 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: 20th July 2016

S. Pennington
(Engineering Manager - Couplings)

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