

FIGURE 1A. TSKL

FIGURE 1B. TLKL

- 1A, B – Pre-assembled half coupling
- 2 – Half spacer
- 3, 4, 5, 6 – Drive bolt set\*
- 7 – Hub
- 8, 9, 10 – Spacer fastener bolt set (stripper bolts)
- 11 – Gagging (locking) screw
- 12 – Gagging (locking) sleeve

**\* IMPORTANT** Do not disturb the drive bolts when fitting or removing the coupling!

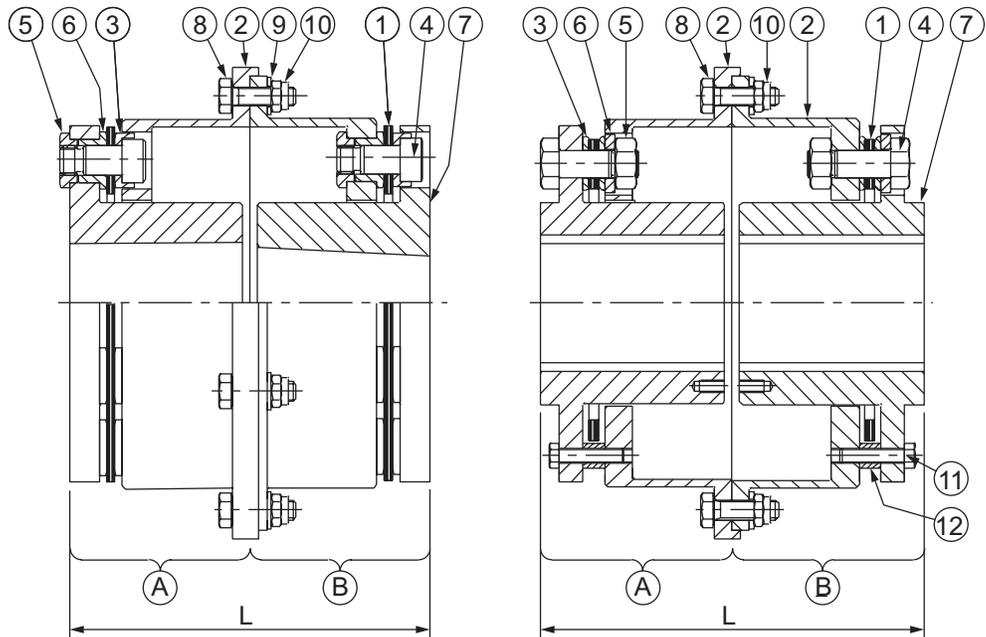
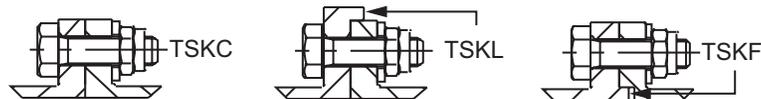


FIGURE 1C. Flange Location Variants Replaced by the TSKL Type



### Foreword

These instructions are provided to familiarize 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.

**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 sales/service engineer 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 (Min gap 'X').

These instructions are written for standard catalog 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** 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 to people or damage to the equipment.**

**IMPORTANT** All reasonable care has been taken in the design and manufacture of this coupling to ensure that it will be safe when properly used. It is assumed that the user is aware of the statutory requirements of his plant.

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



**Maintenance work must only be carried out:**

- when the equipment is stationary and has been made safe
- by suitably trained and qualified personnel



**Prior to installing or removing the coupling, ensure that the machinery is made safe.**



**Hubs must be adequately supported during installation or removal to avoid accidental damage should they slip.**



**The spacer must be adequately supported during installation or removal to avoid accidental damage should it slip.**

**ATTENTION** Before starting the machinery, ensure that all necessary safety procedures are being observed.

**IMPORTANT** These instructions are of a general nature; if a general arrangement (GA) drawing is supplied with the coupling, then all data indicated on that drawing takes precedence over information included in these instructions.

The usual extent of supply comprises:

- Two factory-assembled coupling halves (A and B), with finished bores and keyways in each hub. In this case, they should not be dismantled — **DO NOT** remove nuts (5).
- A set of spacer bolts (stripper bolts) and locknuts (8 and 10) with washers (9) as applicable.

**NOTE:** If the hubs are not finish bored, then refer to the "Customer Bore and Keyway Supplement."

**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:

- Spacer fastener set (ref. 8, 9, 10)
- Hubs, bored to your requirement or unbored (ref. 7)
- Pre-assembled coupling halves for refurbishing balanced or unbalanced couplings (ref. A/B)
- Membrane unit, comprising of membrane pack (ref. 1) and drive bolt set (ref. 3, 4, 5 and 6) – for refurbishing unbalanced couplings only

## 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.

Fit the driver (A) and driven (B) half-couplings to the corresponding machine shafts. Normally, John Crane supply hubs with parallel bore and keyway, individually machined to give a light interference fit with the associated shaft.

### 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, although  $\pm 1-2$  mm overhang is acceptable to correct for errors in setting distance between shaft ends (DBSE).

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 recommend 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  $175^{\circ}\text{C}$ , 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.

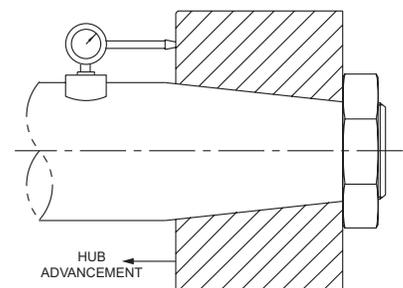
### Taper bore with keyed drive (see Figure 2)

1. Thoroughly clean all contact surfaces and smear the tapered surfaces with oil.
2. 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.
3. Measure the distance from the end of the shaft to the face of the hub using a depth micrometer (record this measurement).
4. Securely mount a dial gauge onto the inboard hub flange and set to zero.
5. 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.
6. Refit the hub and draw up the shaft to the correct axial position indicated by the dial gauge. If an interference fit is required the hub may have to be heated (this is rare, however).
7. When the hub has cooled remeasure the distance from the end of the shaft to the face of the hub to confirm the correct axial position.
8. Fit the shaft-end retaining nut if applicable to ensure the hub is locked in position axially.

**NOTE:** The hub face may not be flush with the shaft end when taper bores are used.

**ATTENTION** Hubs must be positively secured to the shaft during installation to ensure that, in the event of element failure, the hubs cannot move axially on the shafts allowing the coupling anti-fly feature to disengage.

FIGURE 2





**Operation, Inspection and Maintenance****Solo running**

**It is not sufficient just to unbolt the coupling halves if solo running of the driver machinery (e.g., motor) is required.**

The half-coupling on the rotating shaft must be gagged (see Figure 3) to support the spacer and prevent flexure. The flanges of the coupling halves must be held apart to prevent clashing and possible sparking.

1. If this can be achieved within the maximum allowed compression, both half couplings may be gagged using special short gagging sleeves (13) to compress the membrane packs and shorten the half-couplings.

The Minimum gap 'X' when compressed is given in Table 1, unless indicated otherwise on the GA drawing.

2. Otherwise, the two machines must be pulled apart far enough to ensure clearance between the flange faces/spigots.

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 rechecked. Alignment checking is recommended if a deterioration of installation alignment during service is suspected.

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 replacement disc pack assemblies and, if necessary, the spacer.

**To remove the coupling**

- Remove the stripper bolts (8). Separate the two machines to allow the coupling halves to be withdrawn from the shafts.
- Remove each coupling half from its shaft by exerting force on the hub boss or flange. **DO NOT** use pullers on the spacers (2), as this will strain the membranes.
- The half-couplings may now be taken to the workshop for inspection. No further dismantling should be attempted.

**Refurbishing the coupling transmission unit**

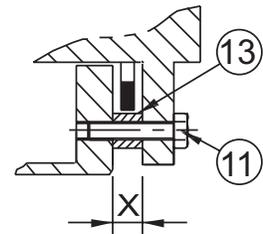
- It is important that the stripper bolts (8), washers (9) and self-locking nuts (10) are replaced after they have been disassembled five times.
- If membrane replacement is necessary, then John Crane recommends that the coupling is returned to an authorised centre for refurbishment. Replacement half-coupling assemblies or membrane pack assemblies (membrane units) can be obtained from John Crane if preferred. Membrane units should always be replaced in pairs.
- Identify the bolts which connect the membrane pack to the hub and spacer piece. Undo the nuts (5) and remove the membrane pack assembly from the hub and half-spacer. Do not attempt to dismantle the pack any further; replacement membrane units are always supplied complete with fasteners and fittings.
- Examine the spacer and hub flanges. If undamaged, then membrane unit replacement is acceptable.

When TSKL or TLKL couplings have been supplied with unfinished bores, they will normally be packed as two half-coupling assemblies, plus one set of stripper bolts (8), washers (9) and locknuts (10)

Each half-coupling consists of an unbored or pilot bored hub with semi spacer and membrane unit assembly, comprising of a membrane pack (ref. 1) and drive bolt sets (ref. 3, 4, 5 and 6).

**IMPORTANT** The drive bolts MUST NOT be disturbed or withdrawn from the membranes (1).

Each half-coupling will be supplied with gagging bolts (11) and sleeves (13) to make the assembly rigid for machining and if required balancing.

**FIGURE 3**

**Machining and assembly**

- Ensure the half-coupling assembly is locked rigid using the gagging sleeves between the flange faces and the gagging bolts are tight.
- Use adhesive tape to mask off the membrane gap to protect the membrane pack from dirt and swarf.
- Machine the hub bores to the required dimensions and remove any swarf or burrs.
- Remove the masking.
- The concentricity of the bore to the outside diameter of the flange must be within the limits stated in Tables 2 and 3.
- Repeat the above procedure for the second half-coupling.
- Balance coupling if required.
- Before fitting the coupling to the rotating equipment, refer to the coupling fitting and maintenance instructions.

**TABLE 2**

TSKL – SIZE (& TSKC; TSKF)	0013 0011	0033 0027	0075 0060	0135 0110	0230 0180	0350 0260	0500 0400	0740 0560	0930 0750	1400 1120
Concentricity (TIR) (mm)	0.025			0.03	0.04		0.05		0.06	

**TABLE 3**

TLKL – SIZE	1850	2400	3000	4200	6000	9009	9012	9015	9022	9033
Concentricity (TIR) (mm)	0.03	0.035								

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

### CE / ATEX Marking

All couplings that comply with CE and ATEX legislation will be marked as shown. This will be etched on the spacer element of the transmission unit if enough room is available.

#### A) Ambient temperature is standard (40°C max)

CE  I M2<sub>C</sub>  II 2GD<sub>C</sub> T6 (T85°C)  SL1 4LU, UK. XX

Where John Crane's Metastream metal membrane couplings are required for use in higher ambient temperatures, John Crane UK Ltd certifies that the equipment complies with the temperature classification range listed below in Table 4, and in all other respects complies with the type certificates.

**TABLE 4**

Ambient Range Marking		Group II, Category 2 GD **	Group I, Category 2 M2	Marking Option
Min.	Max.			
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 < 150°C) OR ambient temperature is unspecified, the equipment is not suitable for mining applications, Group I, Category 2.

CE  II 2GD<sub>C</sub> T3 (T200°C)  SL1 4LU, UK. XX

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

When the ambient temp. is specified, 'T3' is replaced by the following 'T' mark (\*\*) according to Table 4.

CE  I M2<sub>C</sub>  II 2GD<sub>C</sub> \*\*  SL1 4LU, UK. XX

#### 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 John Crane's Metastream couplings

John Crane's Metastream metal membrane couplings, supplied in conformance with Directive 2014/34/EU, have to meet the classifications specified in Table 4 when used in accordance with instructions and information supplied.

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

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

**John Crane UK Ltd**

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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 13. (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: 20<sup>th</sup> July 2016

S. Pennington  
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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)







<b>North America</b>	<b>Europe</b>	<b>Latin America</b>	<b>Middle East &amp; Africa</b>	<b>Asia Pacific</b>
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Fax: 1-847-967-3915	Fax: 44-1753-224224	Fax: 55-11-3371-2599	Fax: 971-488-62830	Fax: 65-6518-1803

If the products featured will be used in a potentially dangerous and/or hazardous process, your John Crane representative should be consulted prior to their selection and use. In the interest of continuous development, John Crane Companies reserve the right to alter designs and specifications without prior notice. It is dangerous to smoke while handling products made from PTFE. Old and new PTFE products must not be incinerated. ISO 9001 and ISO14001 Certified, details available on request.