

FIGURE 1A. LSEC

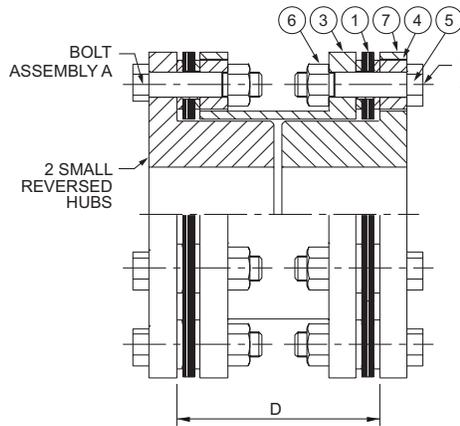
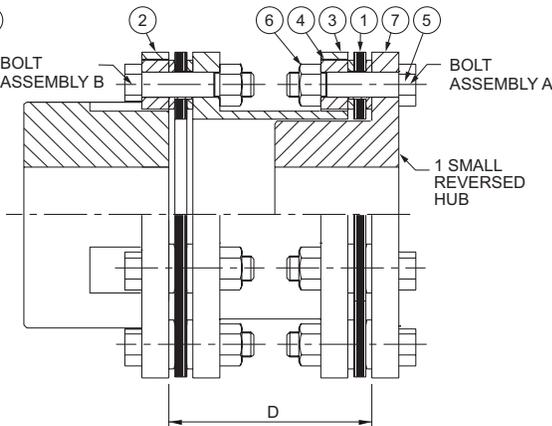


FIGURE 1B. LSEH



- 1 – Membrane pack
- 2 – Hub
- 3 – Spacer
- 4 – Overload collar
- 5 – Bolt
- 6 – Locknut
- 7 – Small reversed hub

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 the company 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. (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 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 to people or damage to the equipment.

Safety Instructions (continued)

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 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:

- Hub for the driving machine (e.g., motor) shaft
- Hub for the driven machine shaft
- Two membrane pack assemblies
- Spacer (distance piece)
- Set of fasteners to assemble the unit between the two hub flanges

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:

- Bolt-Set (ref. 4, 5, 6)
- Hubs, bored to your requirement or unbored (ref. 2, 7)
- Spacer (ref. 3)
- Membrane packs (ref. 1)

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



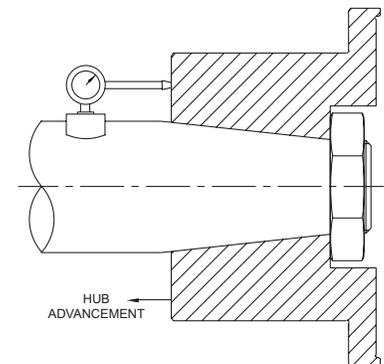
Prior to installing the coupling, ensure that the machinery is made safe. Hubs must be adequately supported during installation to avoid accidental damage should they slip.

Parallel bore with keyed drive

1. Ensure the hub bore and mating shaft are clean.
2. 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).
3. Measure the shaft diameter and hub bore to confirm the correct fit.
4. 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.
5. 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 spot heat or exceed 175°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 re-measure 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.

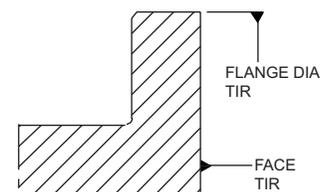
FIGURE 2

Hubs mounted by FB taper bushes

To mount hubs supplied with taper bushes refer to the FB Taper Bushes Fitting & Maintenance Instructions, I-FB BUSH.

Unbored hubs

John Crane recommends a light interference fit for keyed hubs and shafts (e.g., a P7/h6 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 runout does not exceed 0.025 mm TIR. The hub location recess should be set so the maximum runout does not exceed 0.03 mm TIR. Please note that for API 671 applications the required tolerances will be tighter.

FIGURE 3

Adapters

For machines where the coupling bolts to a flywheel, the coupling will be supplied with a SAE flange adapter. Refer to the supplement for location and mounting details.

Shaft alignment

Because the fitting of coupling components requires one machine to be moved, shaft alignment must be done during assembly of the coupling when indicated.

IMPORTANT Do not support alignment equipment or take measurements on the spacer.

Align the center 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.

IMPORTANT The DBSE cannot be measured directly. Axial distance 'D' must be measured between the inner faces of the hub flanges (see Table 1).

3. Align the shaft center 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 a laser shaft-alignment kit. Further details are available from John Crane on request.
4. Recheck the 'D' after the shafts have been aligned.

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 recommends that installed misalignment is no more than 10% of the maximum allowable misalignment, allowance being made for any anticipated movements that will occur during operation (e.g., thermal movements on hot pumps).

Assemble Coupling Transmission Unit

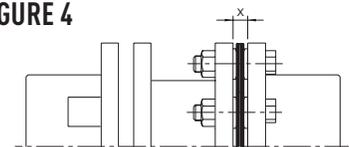
LSEC option – with 2 small reversed hubs

1. Slide a membrane unit (1) over the boss of the hub mounted on the shaft of the fixed machine.
2. Supporting the spacer (3), slide one end over the boss of the hub mounted on the shaft of the fixed machine. Align the larger sets of holes in the spacer flange with the smaller sets of holes in the hub flange, and vice versa. Align the holes in the membrane unit with the holes in the hub flanges.
3. Assemble drive bolts as instructed below.
4. Slide a membrane unit (1) over the boss of the hub mounted on the shaft of the movable machine.
5. Move the machine into position carefully inserting the hub boss into the spacer bore. Adjust the axial position of the machine until the distance between the hub flanges equals 'D' given in Table 1
6. Perform shaft alignment.
NOTE: Do not support alignment equipment or take measurements on the spacer.
7. Align the larger sets of holes in the spacer flange with the smaller sets of holes in the hub flange, and vice versa. Align the holes in the membrane unit with the holes in the hub flanges.
8. Assemble drive bolts as instructed below.

LSEH option – with 1 standard and 1 small reversed hub

1. Slide a membrane unit (1) over the boss of the small reversed hub.
2. Supporting the spacer (3), slide one end over the boss of the hub and align the larger sets of holes in the spacer flange with the smaller sets of holes in the hub flange, and vice versa. Align the holes in the membrane unit with the holes in the hub flanges.
3. Assemble drive bolts as instructed below.
4. Bring the movable machine into position. Adjust the axial position of the machine until the distance between the hub flanges equals 'D' given in Table 1.
5. Perform shaft alignment.
NOTE: Do not support alignment equipment or take measurements on the spacer.
6. Align the larger sets of holes in the spacer flange with the smaller sets of holes in the hub flange, and vice versa.
7. Slide a membrane unit (1) between one end of the spacer and its corresponding hub, such that the holes in the membrane unit align with the holes in the spacer and hub flanges.
8. Insert drive bolts from the hub towards the spacer and assemble as instructed on next page.
NOTE: To assist in this operation, a lever may be inserted between the spacer and hub flanges, to move the spacer slightly against the flexibility of the membrane unit that was first fitted (Figure 4). Minimum gap 'X' when compressed is given in Table 1.
9. Finally, rotate the machinery two or three times slowly to ensure it moves freely. The coupling is now ready for continuous and trouble-free service.

FIGURE 4



Bolt Assembly

Bolt assembly A

1. Ensure the large flat machined on the head of the bolt (5) is next to the hub boss when fitting to a standard hub (2) .
2. Insert bolt from hub side into one of the smaller bolt holes in the hub flange and through the sleeve in the membrane unit (see Bolt Assembly A on the drawing).
3. Place collar (4) onto bolt shank (5) and secure using lock nut (6).
4. Repeat steps 1 to 3 for alternate holes around the hub flange

Bolt assembly B

1. Place collar (4) over bolt (5), ensuring that the chamfer accommodates the bolt head radius.
2. From the hub side, pass bolt through one of the larger holes in the hub flange and insert through the sleeve in the membrane unit into the small hole of the spacer flange (see Bolt Assembly B on the drawing).
3. Secure using lock nuts (6).
4. Repeat steps 1–3 for the remaining holes around the hub flange.

NOTE:

- Drive bolts must not be turned; hold the bolt and tighten the locknuts evenly one flange at a time in a "diametrically opposite" sequence.
- If a general arrangement drawing is supplied with the coupling, then tighten the nuts to the torque values quoted on that drawing, otherwise use the values quoted in Table 1.

TABLE 1. Standard Coupling Bolt Tightness Torques

Coupling	LSEH Max. Overhang Hub (2) Only mm	Distance Between Flanges 'D' mm	Compressed 'X' Min. mm	Bolt	Spanner A/F mm	Bolt Tightening Torque	
						N-m	lb-ft
LSEC(H)-0012	13	65	5.0	M6	10	6	4
LSEC(H)-0035	17	75	5.4	M8	13	15	11
LSEC(H)-0060	15	100	6.1	M10	17	30	22
LSEC(H)-0100	29	100	4.6	M12	19	54	40
LSEC(H)-0225	21	140	8.1	M14	22	86	63
LSEC(H)-0300	31	140	9.9	M16	24	165	122
LSEC(H)-0400	43	140	10.1	M18	27	225	166
LSEC(H)-0625	36	180	13.1	M20	30	322	237

Operation, Inspection and Maintenance

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.

Removing the coupling spacer

LSEC Option – with 2 small reversed hubs

1. Having ensured that the equipment is safely isolated, loosen all the nuts (6) at both ends of the coupling, but do not remove them.
2. Support the spacer (3) and remove all the fasteners (4, 5 and 6) from the end of the coupling attached to the movable machine.
3. Unbolt the movable machine from the bedplate and carefully pull it back until the hub boss is clear of the spacer.
4. Remove the loose membrane unit from the hub. Then move the machine to give access for removing the spacer.
5. Remove all the nuts, bolts and washers from the second membrane unit and pull out the spacer and membrane unit.

LSEH Option – with 1 standard and 1 small reversed hub

1. Having ensured that the equipment is safely isolated, loosen all the nuts (6) at both ends of the coupling, but do not remove them.
2. Support the spacer (3) and remove all the fasteners (4, 5 and 6) from the standard hub (2) end of the coupling.
3. Gently withdraw the membrane unit (1) from between the hub and spacer flanges using a combined pulling and rotational action. If necessary, a lever may be used to move the spacer slightly against the flexibility of the other membrane unit.
4. Unbolt the movable machine from the bedplate and carefully move the machine to give access for removing the spacer.
5. Remove all the nuts, bolts and washers from the second membrane unit and pull out the spacer and membrane unit.
 - Do not attempt to dismantle the membrane units (disc pack assemblies) any further; replacements are always supplied as assembled units.
 - It is recommended that BOTH membrane units be replaced, as failure of one inevitably results in some damage to the other.

IMPORTANT Fastener sets (4, 5 and 6) should be replaced after the coupling has been disassembled five times.

LSEC & LSEH

L SERIES CLOSE COUPLED COUPLINGS

Fitting & Maintenance Instructions



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