Jaw Couplings
Jaw In-Shear (LS, CS)
Installation Guide

1.0 INTRODUCTION:

The following document is intended for the explicit use of Lovejoy customers to aid in the installation of Lovejoy power transmission products. The information may be considered privileged and should only be disseminated as an active part of conducting business with Lovejoy, Inc.

Although the coupling may have been properly specified during the design and selection process before the coupling was ordered, operational conditions could possibly have changed prior to installation. Lovejoy, Inc. provides the information and technical support necessary to ensure the appropriate coupling selection was made relative to the product specifications and limitations of Lovejoy's power transmission products. The end user is ultimately responsible for verifying the suitability of the final coupling selection based on the actual service conditions at the time of the coupling installation.

Correct installation and alignment practices will ensure longer coupling life, trouble free operation, and a safer operating environment for the coupling. Please thoroughly review all of the following instructions prior to installing this coupling and placing it in operation. Proper safety guidelines and practices should always be followed during every phase of the installation.

This installation document is considered part of the purchased product and should be retained for future reference.

2.0 SAFETY:

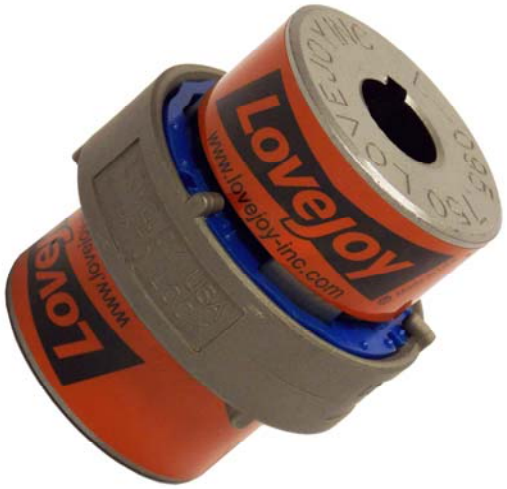
Accidents involving rotating equipment may result in loss of life, serious bodily harm, or property damage. The purchaser of this equipment must assure that the equipment is properly assembled, installed, safeguarded, operated, and maintained. The coupling or equipment should never be operated under or subjected to conditions that exceed manufacturers' specifications.

Consult all applicable Federal, State, and local laws and regulations covering the safe operation and maintenance of equipment, including, without limitation, the USDOL-OSHA "Lockout / Tag-out" procedure set forth in 29 CFR 1910.147.

Because of the possible danger to persons or property from accidents which may result from the improper use or unapproved modifications of the product, this product must be installed, maintained and operated in accordance with the procedures, standards, and engineering specifications specified in the product literature. To assure safe operation, this product should be inspected in accordance with the instructions described in this document. Proper guards and any suitable safety equipment or procedures as may be necessary, or as may be specified in safety codes, should be installed by the user. Safety equipment, coupling guards, and shields are not provided by, nor are they the responsibility of Lovejoy, Inc.

Symbols and text format used in this document may contain safety information and will appear similar to the following:

Warning!	*This symbol indicates safety measures which must be observed to avoid **personal injury**.*
Caution!	This symbol indicates safety measures which must be observed to avoid **damage to coupling.**



3.0 PRODUCT INSPECTION:

Prior to installation, the coupling should be examined for signs of damage resulting from shipping or handling. Refer to the following charts, Table 1a and 1b to ensure all the ordered parts are present.

For maximum protection, the coupling and all components should be stored in the original packaging. All parts should be measured prior to installation to ensure correctness of parts to meet the application requirements; such as the hub bore diameter, shaft diameter, shaft separation, key sizes, etc. The BSE (shaft separation) dimension should be measured from the end of one shaft to the end of the other shaft, not to hub faces or pilots.

Table 1 – Jaw In-Shear Coupling Components List

Size	Hubs	Element (Spider)		Spider
		Type	Qty	Ring
LS 090	2	Spider	1	1
LS 095	2	Spider	1	1
LS 099	2	Spider	1	1
LS 100	2	Spider	1	1
LS 110	2	Spider	1	1
LS 150	2	Spider	1	1
LS 190	2	Spider	1	1
LS 225	2	Spider	1	1
LS 276	2	Spider	1	1
CS 280	2	Spider	1	1
CS 285	2	Spider	1	1
CS 300	2	Cushions	6	1
CS 310	2	Cushions	6	1
CS 350	2	Cushions	6	1
CS 400	2	Cushions	6	1
CS 500	2	Cushions	6	1

3.0 PRODUCT INSPECTION (CONT'D):

Lovejoy manufactures couplings based on the shaft details provided by the purchaser. Lovejoy will not be responsible for inaccurate or incomplete information supplied by the purchaser. Check all shaft dimensions.

It is the responsibility of the purchaser to assure the interface connections (flanges, bolts, keys, hydraulic fits, etc.) between the coupling and connected equipment are capable of handling the anticipated loads.

> ⚠ *Warning!* *Before beginning the coupling installation, make sure the machinery is made safe. Disconnect and lock out all power to the equipment. No part of the installation should be performed on moving, non secure, or unstable equipment.*

4.0 REQUIRED TOOLS:

- Calibrated Torque Wrench and Allen sockets
- Alignment Equipment (dial indicator, laser, straight edge)
- Appropriate tooling for repositioning equipment

5.0 COUPLING AND COMPONENT PREPARATION:

5.1 All exposed surfaces of the coupling and components, including hubs, spiders, cushions, spacers, collars, and any other Lovejoy supplied subassemblies should be thoroughly cleaned prior to installation to remove any protective coatings that may have been applied by Lovejoy as corrosion protection for the coupling surfaces during shipping. All coupling parts, equipment components, shafts, and keyways must be clean and free of any foreign materials prior to attempting assembly or installation. A clean cloth dampened with a nonflammable solvent should be sufficient for this cleaning.

5.2 All sleeves, seals, hub bores, shafts, keys, and keyways must be checked for raised metal, nicks, burrs, dents, gouges, etc., and should be dressed or repaired accordingly prior to installation.

5.3 Prior to removing any existing coupling, establish and record the Distance Between Shaft Ends (BSE), or Gap (G) between the driver and driven shafts and compare this value with the 'G' dimension defined in Table-5 to verify fit of the coupling.

5.4 Once all necessary measurements have been taken and all components are verified as correct, remove any existing coupling and dress the shafts on the driver and driven equipment.

5.5 If the actual shaft BSE is the same as the specified gap for the Lovejoy Jaw coupling (see Table-5), then the hubs can be mounted flush with the ends of the driver and driven shafts.

5.6 If the actual shaft BSE is different than the specified gap for the Lovejoy Jaw coupling, then the hubs must be mounted on the driver and driven shafts so that the dimension between the hub faces matches the 'G' dimension, or gap as specified in Table-5.

5.7 Lovejoy machines the bore in all Lovejoy Jaw style hubs with '**inch**' dimensioned straight bores and keyways to meet the industry accepted **ANSI/AGMA 9002-B04** Standards' tolerance for common keyways and clearance fit bores unless otherwise specified. Tapered and spline bores may require special manufacturing and installation consideration.

5.0 COUPLING AND COMPONENT PREPARATION (CONT'D):

5.8 Lovejoy machines the bore in all Lovejoy Jaw style hubs with '**metric**' dimensioned straight bores and keyways to meet the industry accepted **ANSI/AGMA 9112-A04** Standards' tolerance for common keyways and clearance fit bores unless otherwise specified. Tapered and spline bores may require special manufacturing and installation consideration.

5.9 Lovejoy machines the bore in all Lovejoy Jaw style hubs with splines based on information provided by the customer. Standard spline meet specifications set forth in ANSI B92.1A for Class 5 fits, and DIN 5480 for metric splines. If the spline utilizes the L-LOC shaft locking feature, see section 7.0 for assistance in installing hubs with this feature.

5.10 For all Lovejoy Jaw style hubs with **taper bores** and **taper bores with keyways**, Lovejoy manufactures these hubs with bores using tolerances and specifications as supplied by the customer. Taper bores will be tested with plug gauges usually supplied by the customer or included in the cost of the coupling.

6.0 COUPLING INSTALLATION:

6.1 Prior to installing the hubs on the shaft, slide the retaining collar onto either shaft

6.2 Insert the key into the keyway. The key should fit snuggly in the keyway with minimal side to side movement. Standard keys should be the same length or slightly longer than the keyway in the hub to transmit the maximum allowable torque. Woodruff keys may be shorter and may not transmit the same amount of torque. If one or both of the hubs contains a spline with the Lovejoy L-LOC feature, see section 7.0 regarding Splined Hub Installation for the specified set screw torque

6.3 Slide the appropriate hub on each of the shafts over the keys and align the face of the hub with the end of the shaft. Lovejoy manufactures jaw coupling hubs with a clearance or slip fit and the hub should slide onto the shaft with little or no difficulty. If either shaft needs to extend into the center of the spider, the hub may not align with the end of the shaft. To achieve a shaft separation that is less than the 'G' gap dimension, ensure the opening in the center of the spider is greater than the shaft diameter.

Note: Hubs must be mounted on the driver and driven shafts with the jaws lined up end-to-end.

6.4 Move the equipment into the proper location to achieve the 'G' gap dimension between hub faces as specified in Table-5. Note that the hubs will be mounted with the jaws end-to-end and not intertwined as with standard jaw couplings. The hubs can be moved back on the shafts or overhung slightly to compensate for discrepancies in shaft separation. Ideally, the amount of hub engagement on the shaft should be at least equal to the diameter of the shaft.

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CAUTION:	The hubs should be positioned with the jaws lined up end-to-end as in the picture on the previous page when the equipment is in place.

6.5 Using a calibrated torque wrench, tighten the set screws to the torque specified in Table-2. If one or both of the hubs contain a spline with the Lovejoy L-LOC feature, see section 7.0 regarding Splined Hub Installation for the recommended set screw torque.

6.6 Check alignment using either "straight edge method" or a dial indicator taking measurements at four locations 90º apart to ensure alignment does not exceed the allowable misalignment as specified in Table-5.

6.7 Wrap the blue Jaw-In-Shear spider around the hubs and insert a leg of the spider into each space between the coupling jaws.

6.8 Align the pins on the side of the collar with the grooves in the spider. Slide the pins on the collar through these grooves until the collar completely covers the spider. Rotate the collar until the pins on the side of the collar rotate past the raised dots on the spider. The pins should seat bwtween two of these raised dots.

6.9 Recheck set screws for tightness and recheck the axial and angular alignment for accuracy.

6.10 Remove any tooling and material away from the shafting and coupling. Install the appropriate coupling guard per OSHA requirements and remove the Lockout / Tagout kit from the power supply. The equipment can then be started up and tested. The coupling and equipment should run smoothly. If vibration is detected it could indicate there is an issue with alignment or other problems. These problems could point to problems related to the motor, coupling, or driven equipment and should be resolved prior to placing this coupling into operation.

Table 2 - Set Screw Size and Tightening Torque ***(for Jaw in-Shear Style Hubs)***

CPLG	Inch Set Screws				Metric Set Screws [1]			
	Set Screw - inch		Tightening Torque		Set Screw - mm		Tightening Torque	
Size	Size	Length	in-lbs	Nm	Size	Length	in-lbs	Nm
LS 090	1/4-20	3/16 1/4 & up	45-50 78-87	5.0-5.6 9-10	M6	4-6 8 & up	44 58-62	5 6.6-7
LS 095 LS 099 LS 100 LS 110 LS 150	5/16-18	1/4 5/16 & up	80-90 150-160	9-10 17-19	M8	5-8 10 & up	84-88 142-150	9.5-10 16-17
LS 190 LS 225 LS 276	1/2-13	1/2 & up	540-600	61-68	M12	8-12 14 & up	372-396 504-528	42-45 57-60
CS 280 CS 285 CS 300	1/2-13	1/2 & up	540-600	61-68	M12	8-12 14 & up	372-396 504-528	42-45 57-60
CS 310 CS 350 CS 400 CS 450 CS 500	5/8-11	5/8 & up	1100-1200	124-136	M16	16 18 & up	756-792 1260-1320	86-90 142-150

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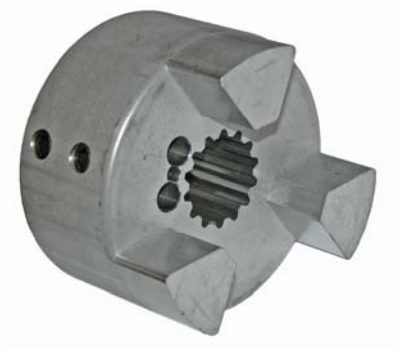
7.0 SPLINE HUB INSTALLATION (LC):

7.1 When installing a hub with a spline and L-LOC (see holes next to the spline in the photo to the right), **ensure the spline shaft is fully engaged and extends completely under BOTH L-LOC set screws**. Some hubs may only have a single set screw and the spline MUST extend completely under that set screw.



7.2 Identify if the hub is a standard powder metal hub, or a hub manufactured from steel (1045, 1018, or equivalent) and tighten the set screws as specified in Table-3 below. If assistance is required to confirm the hub is powder metal, feel free to contact Lovejoy Customer Service.

Warning! *If the spline shaft does not extend fully under one of the L-LOC set screws, **DO NOT** tighten that set screw.*

Table 3 - LLOC Set Screw Tightening Torque ***(JIS / L Style Hubs)***

CPLG Size	Inch L-LOC Set Screws [1]							
	PM Hubs [2]	Tightening Torque			Steel Hubs [2]	Tightening Torque		
	Set Screw Size (inch)	ft-lbs	in-lbs	Nm	Set Screw Size (inch)	ft-lbs	in-lbs	Nm
LS 090	3/8 - 16	23	276	31	5/16 - 18	13	156	18
LS 095	3/8 - 16	23	276	31	5/16 - 18	13	156	18
LS 099	5/16 - 18	13	156	18	3/8 - 16	23	276	31
LS 100	3/8 - 16	23	276	31	3/8 - 16	23	276	31
LS 110	3/8 - 16	23	276	31	1/2 - 13	48	576	65
LS 150	3/8 - 16	23	276	31	1/2 - 13	48	576	65
LS 190	1/2 - 13	48	576	65	1/2 - 13	48	576	65
LS 225	1/2 - 13	48	576	65	1/2 - 13	48	576	65

Notes:
1. Contact Lovejoy Technical Support for Metric LLOC set screws.
2. PM = Powder Metal. Most hubs thru size L225 are PM (Powder Metal) by default

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Table 4 - Dimensional / Performance Details for Jaw In-Shear Couplings

Size	Maximum Bore Standard Hubs		Maximum Speed	Nominal Torque Capacity	
	In	mm	RPM	in-lbs	Nm
LS 090	1.000	25	9,200	335	38
LS 095	1.125	29	9,200	335	38
LS 099	1.188	30	7,700	560	63
LS 100	1.375	35	7,700	560	63
LS 110	1.625	41	5,900	1,090	123
LS 150	1.875	48	5,200	1,810	205
LS 190	2.125	54	4,300	2,920	330
LS 225	2.625	67	3,900	4,200	475
LS 276	2.875	73	3,100	7,460	843
CS 280	3.000	76	2,600	13,300	1,503
CS 285	4.000	102	2,300	18,760	2,120
CS 300	4.875	124	2,300	33,000	3,728
CS 310	5.625	143	2,100	50,000	5,649
CS 350	6.375	162	1,900	83,333	9,415
CS 400	7.375	187	1,800	126,667	14,311
CS 500	9.000	229	1,500	183,333	20,714

Table 5 - Allowable Misalignment for Jaw In-Shear Couplings

Size	G Dimension (Gap)		Allowable Misalignment [1]				
			Parallel		Angular	Axial	
	In	mm	in	mm	degrees	in	mm
LS 090	1.00	25.4	0.030	0.8	2°	0.031	0.8
LS 095	1.00	25.4	0.030	0.8	2°	0.031	0.8
LS 099	1.40	35.6	0.030	0.8	2°	0.031	0.8
LS 100	1.40	35.6	0.030	0.8	2°	0.031	0.8
LS 110	1.64	41.7	0.030	0.8	2°	0.031	0.8
LS 150	1.94	49.3	0.030	0.8	2°	0.047	1.2
LS 190	1.94	49.3	0.047	1.2	2°	0.047	1.2
LS 225	1.94	49.3	0.047	1.2	2°	0.047	1.2
LS 276	3.19	81.0	0.047	1.2	2°	0.063	1.6
CS 280	3.19	81.0	0.047	1.2	2°	0.063	1.6
CS 285	3.19	81.0	0.047	1.2	2°	0.063	1.6
CS 300	4.25	108.0	0.047	1.2	2°	0.063	1.6
CS 310	4.25	108.0	0.047	1.2	2°	0.063	1.6
CS 350	4.88	124.0	0.047	1.2	2°	0.063	1.6
CS 400	5.38	136.7	0.047	1.2	2°	0.063	1.6
CS 500	6.38	162.1	0.047	1.2	2°	0.063	1.6

Notes: 1. The same misalignment values apply for both standard and spacer style couplings

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