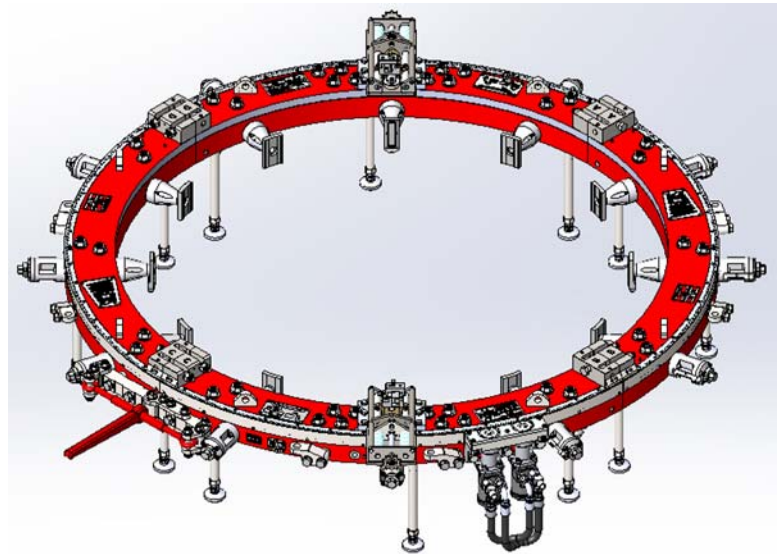




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Large Diameter Split Frame (LDSF) User's Manual



E.H. Wachs Part No. 12-042-MAN
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Chapter 3

Operating Instructions

SAFE OPERATION OF THE LDSF

The LDSF has dangerous pinch points between rotating and stationary components. **DO NOT STAND CLOSE TO THE MACHINE WHILE IT IS OPERATING. SERIOUS INJURY COULD RESULT.**

Use of the counterbore slide requires the operator to feed the slide manually while the LDSF rotates. **THIS SHOULD BE DONE ONLY WITH THE LDSF MOUNTED ON A HORIZONTAL PIPE (WITH THE MACHINE IN VERTICAL ORIENTATION).**

RIGGING AND LIFTING THE LDSF

The LDSF frame can be lifted in any of the following configurations:

- individual sections (each section 1/4 of the frame)
- half-ring assemblies (each assembly consisting of 2 individual sections)
- fully assembled frame, with hinge.

Disassemble the frame into individual sections only for storage, or for moving it if necessary.

In This Chapter

SAFE OPERATION OF THE LDSF

RIGGING AND LIFTING THE LDSF

ASSEMBLING THE LDSF

SETTING UP THE LDSF ON THE PIPE

PARTING AND PARTING-BEVELING OPERATION

COUNTERBORING OPERATION

REMOVING THE LDSF FROM THE PIPE

When mounting the frame on the workpiece, you must have the LDSF fully assembled. Use the hinge and jack to spread the ring open to install it on in-line pipe.

Lift Attachments

Two types of lift attachments are provided with the LDSF.

- Use the lift eyes screwed into the top of the machine **ONLY** for lifting individual (1/4 ring) sections.



Figure 3-1. To lift an individual section, attach the rig to the lift eyes on top of the machine.

- Use the lift brackets mounted on the outside of the frame to lift half-ring assemblies, or the fully assembled frame.

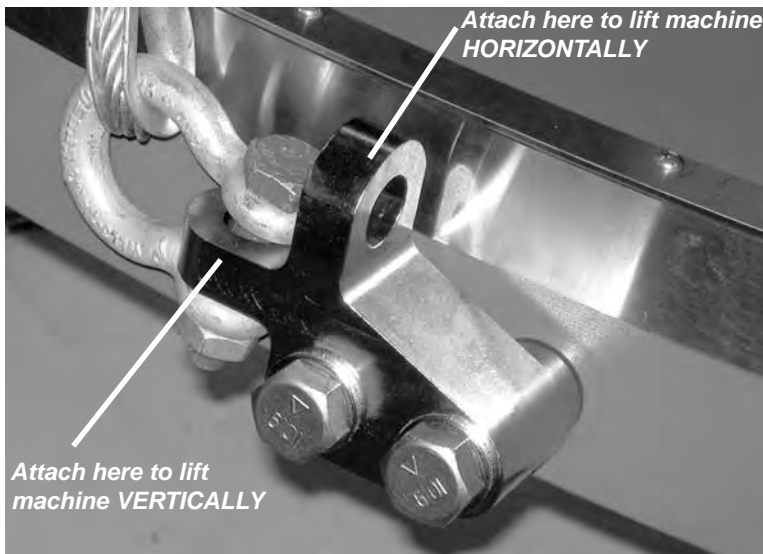


Figure 3-2. Use the lift brackets on the side of the frame to lift the assembly machine.

- the top eye of the bracket is for lifting the machine in a horizontal orientation



Figure 3-3. Lift the machine horizontally as shown.

- the side eye of the bracket is for lifting the machine in a vertical orientation.



Figure 3-4. Lift the machine vertically as shown.

ASSEMBLING THE LDSF

Stand legs are supplied for assembling the LDSF frame on the floor to prepare it for mounting on the pipe. Three legs are provided for each individual section of the frame. Insert the legs into the holes in the bottom of the stationary ring when moving the sections to the assembly location.



Figure 3-5. Insert the stand legs into the bottom of the stationary ring.

The latches at the end of each section are stamped with a letter identifying the joints—A, B, C, and D. Assemble the sections so that the letters are matched up.

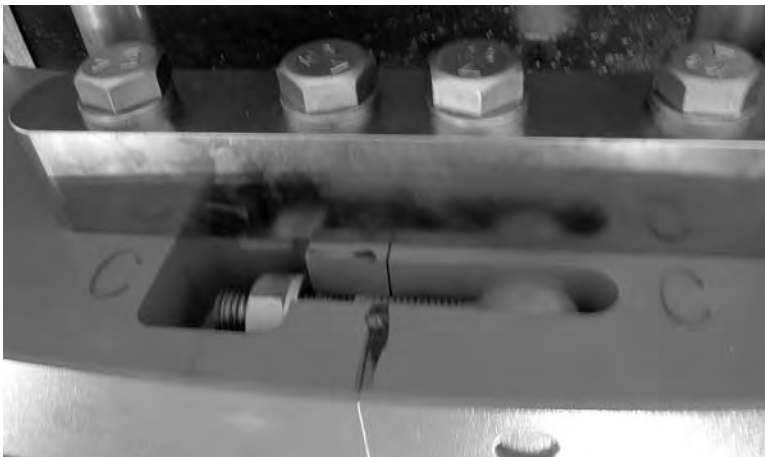


Figure 3-6. The photos show the joint letters stamped on the rotating ring (top) and stationary ring (bottom). Always line up the matching letters when assembling sections of the machine.

1. Lift each individual section of the frame out of the storage crate. Insert the stand legs and set the sections down on the floor. Arrange the sections so that the joint letters are matched up.

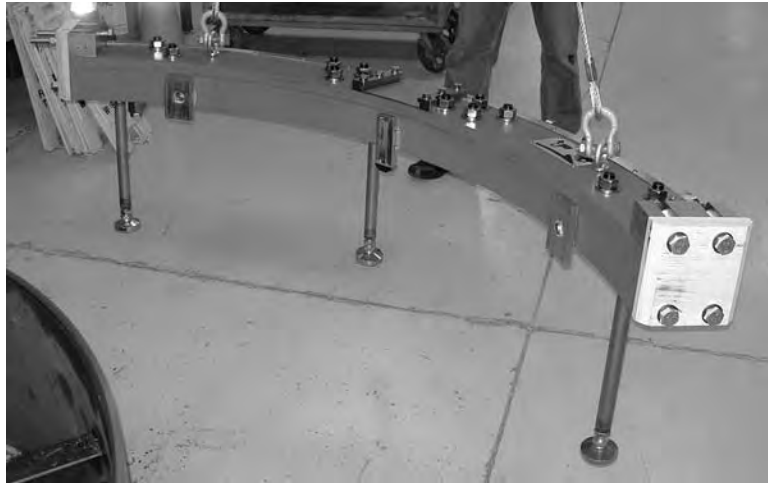


Figure 3-7. Attach the rigging as shown to lift individual sections of the LDSF frame.

2. Remove the wood end caps from the ends of the sections.



Figure 3-8. Remove the screws to take the end caps off the ends of the sections.

3. At each joint, press the sections together to engage the dowel pins.

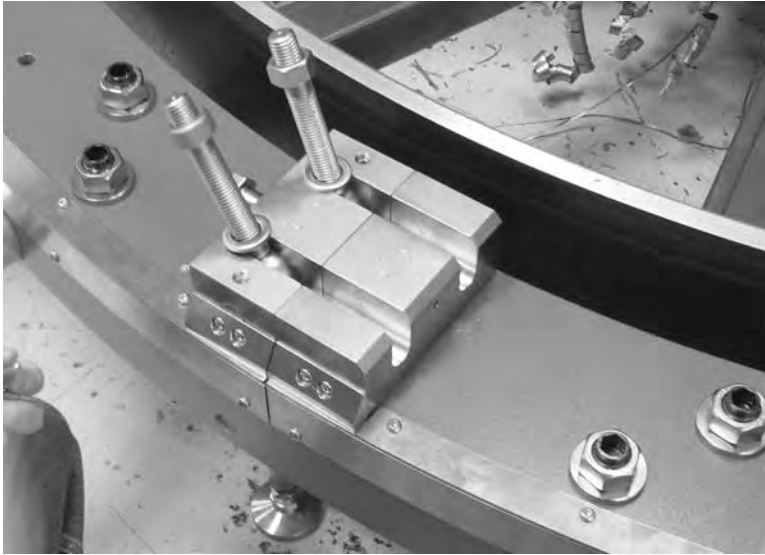


Figure 3-9. Push the sections together to close the split line. (There will be about a 1/2" gap between the sections until you tighten the latch bolts.)

4. On the stationary ring (underside of the machine), swing the latch bolts into place. Snug the nuts to hold the bolts in place.

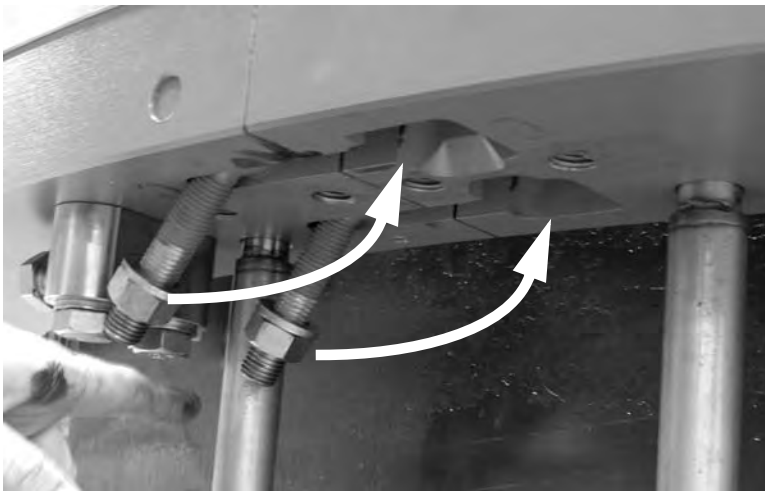


Figure 3-10. Swing the latch bolts in the stationary ring into the slots, and snug the nuts to hold them in place.

5. On the rotating ring, swing the latch bolts into place. Snug the nuts to hold the bolts in place.

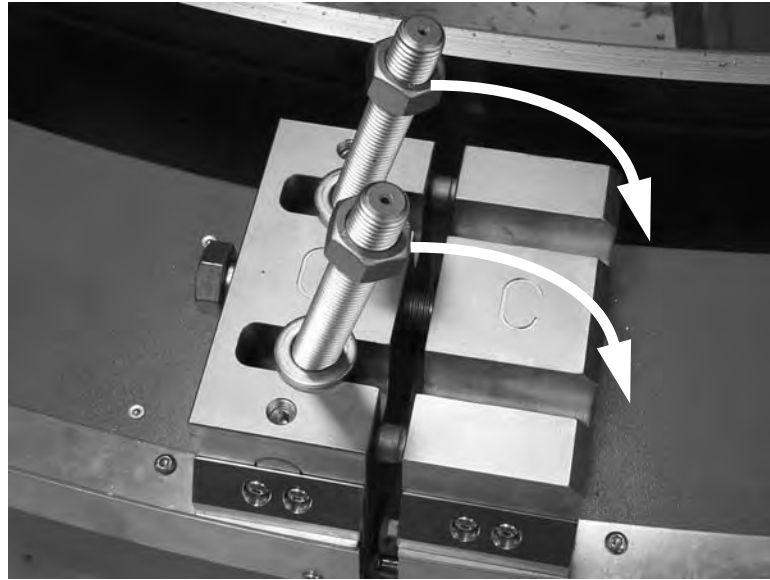


Figure 3-11. Swing the latch bolts in the rotating ring into the slots, and snug the nuts to hold them in place.

6. Tighten the nuts on the stationary ring latch bolts. The split line between the sections should close completely, with no gap between the sections.



Figure 3-12. Tighten the nuts on the stationary ring latch bolts to secure the sections together.

7. Tighten the nuts on the rotating ring latch bolts.

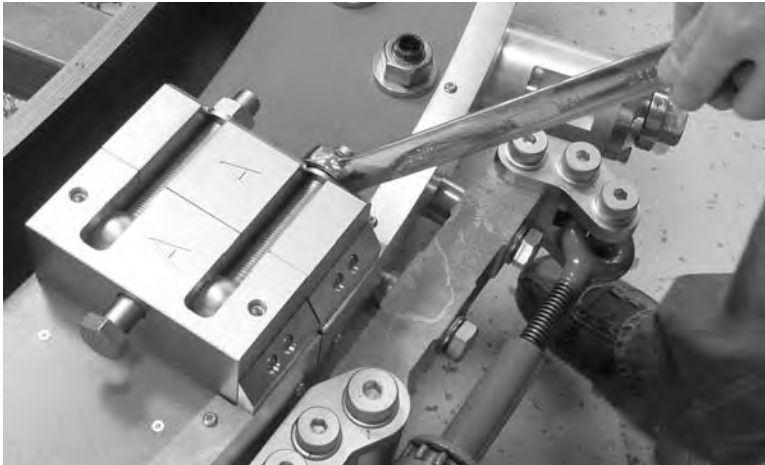


Figure 3-13. Tighten the nuts on the rotating ring latch bolts.

8. Attach the support block at each joint, and insert and tighten the 4 screws.



Figure 3-14. Install the support block at each split line and tighten the 4 screws.

SETTING UP THE LDSF ON THE PIPE

Attaching the Hinge and Jack

1. Attach the hinge to the LDSF stationary ring at the location with the holes provided.



Figure 3-15. Attach the hinge to the stationary ring.

2. Insert and tighten the two screws in each half of the hinge.



Figure 3-16. Insert and tighten the screws holding the hinge.

3. Remove the pins on the ends of the hinge and insert them through the eyes of the jack screws. (You may need to turn the jack screws to set the jack to the appropriate length.)



Figure 3-17. Mount the jack using the pins at the ends of the hinge.

Setting the Clamp Leg Positions

The LDSF clamps legs can be mounted in two positions:

- outer (standard) position for 82.5”-90” pipe diameter range
- inner position for 75”-82.5” pipe diameter range.

Use the following procedure to change the legs from the outer to the inner position.

1. Turn the adjustment screw on the clamp leg counter-clockwise until you can remove the leg.

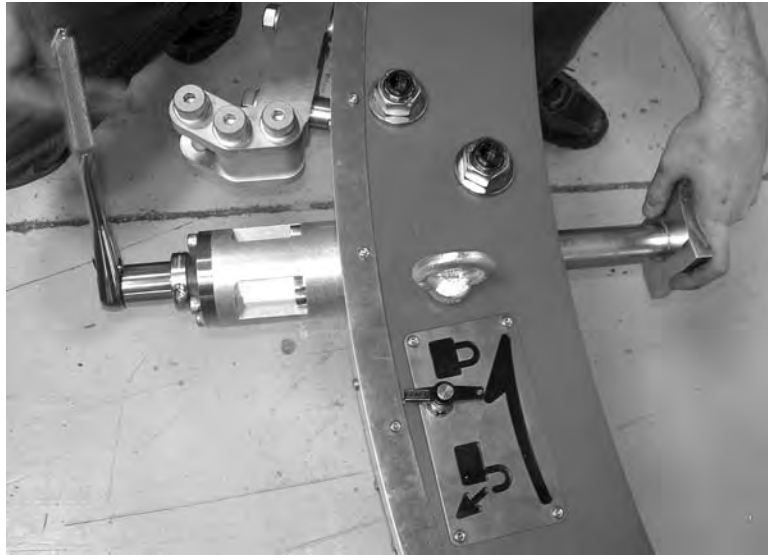


Figure 3-18. Turn the adjustment screw to advance the clamp leg all the way out.

2. Attach the cone spacer to the inner side of the stationary ring and tighten the screws.

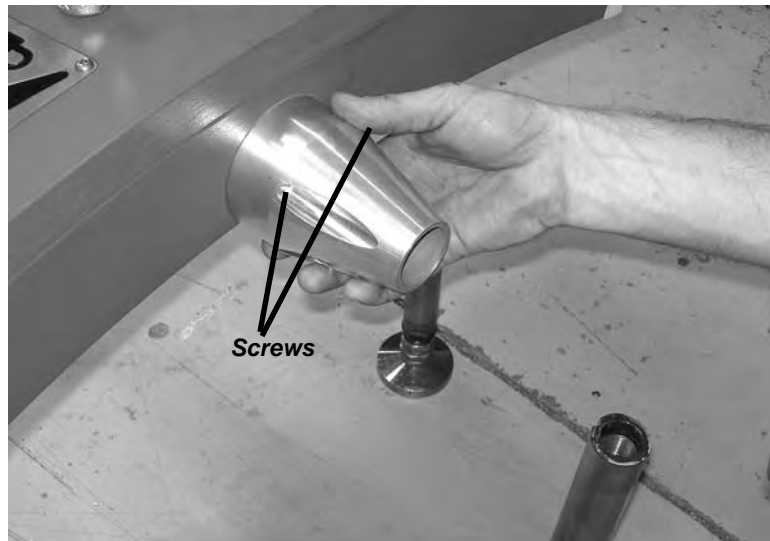


Figure 3-19. Attach the cone spacer to the inside of the stationary ring.

3. Insert the leg through the cone spacer and press it all the way in. Turn the adjustment screw clockwise to engage the threads on the leg, and retract the leg for mounting the LDSF.



Figure 3-20. Insert the clamp leg through the cone spacer and turn the adjustment screw to thread it in.

Make sure you set all 12 clamp legs to the same position. You will not be able to mount the LDSF on the pipe correctly if the legs are not all the same.

Mounting the Machine

1. Make sure the frame locking pins are inserted through the rotating ring.
2. Loosen the nuts on the latch bolts at the joint opposite the hinge (both rotating and stationary rings). Swing the latches out of the slots.



NOTE

You must remove the support block between the sections to access both latch bolts in the stationary ring.



Figure 3-21. Loosen the nuts on the latch bolts (stationary ring, top photo, and rotating ring, bottom photo) and swing them out of the slots.

3. Loosen the nuts on the latch bolts at the hinge location (both rotating and stationary rings). Swing the latches out of the slots.
4. Loosen, but do not remove, the two screws on the right side of the hinge assembly.

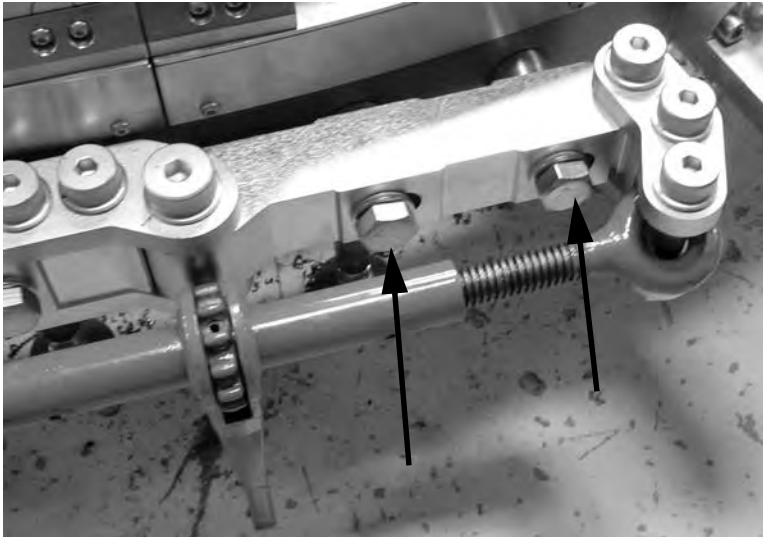
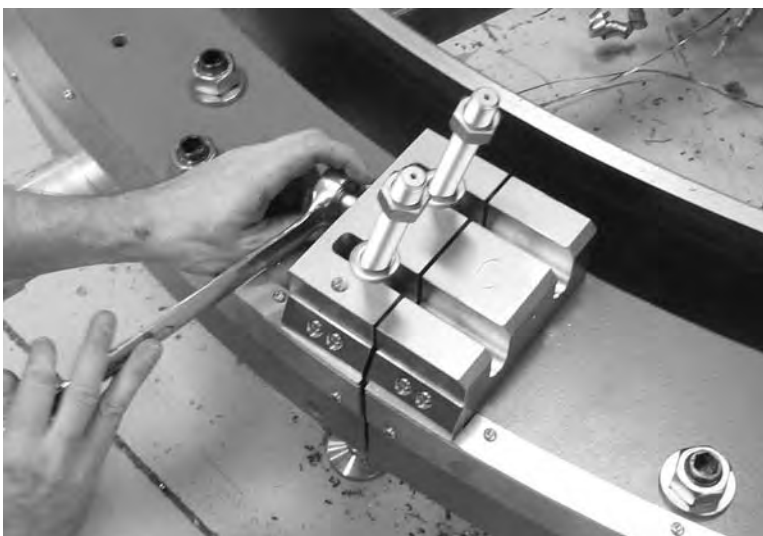


Figure 3-22. Loosen the two screws on the right side of the hinge to allow the screws to move in the slotted holes.

5. At the joint opposite the hinge, turn the jacking screw to separate the ring sections. Turn the screw until the dowel pins are out of the holes. Retract the jacking screw completely.
6. At the hinge location, turn the jacking screw to separate the ring sections. Turn the screw until the dowel pins are out of the holes. Retract the jacking screw completely.



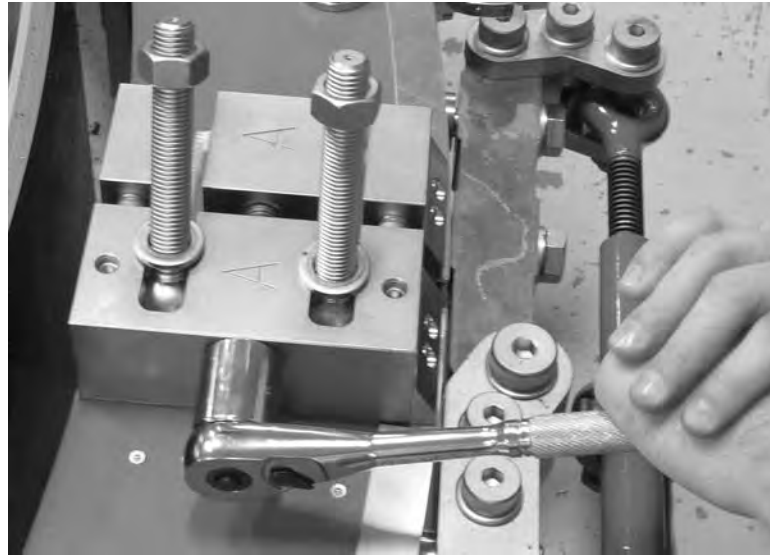


Figure 3-23. Turn the jacking screws to separate the sections at both split points.

7. Tighten the two screws on the right side of the hinge assembly.



Figure 3-24. Tighten the two screws to secure the hinge to the stationary ring.

8. Set the ratchet on the jack to retract the threaded rods (pulling the ends of the hinge together). Operate the jack to open the LDSF. Make sure the dowel pins separate from the holes at both split points.

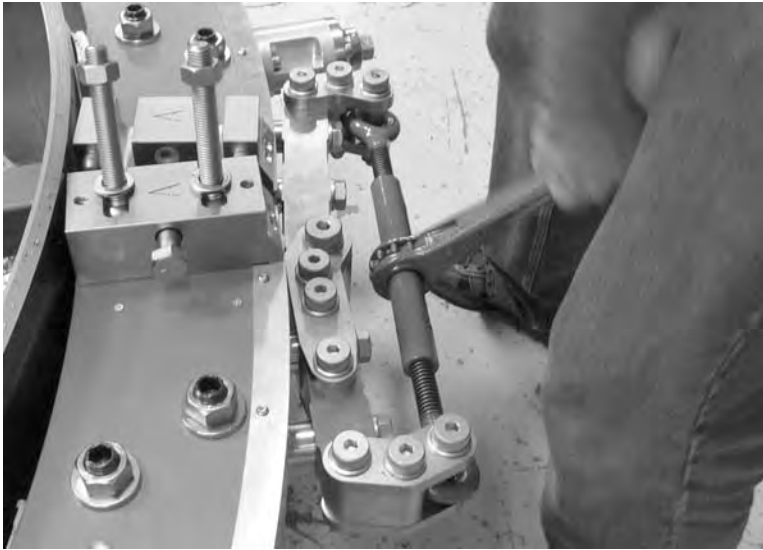


Figure 3-25. Operate the jack to open the machine.

9. Open the LDSF far enough to mount it over the pipe.
10. Rig the machine according to the instructions in “Rigging and Lifting the LDSF” earlier in this chapter.
11. Lift the machine and remove the stand legs.
12. Mount the machine over the pipe at the cutting location. Make sure the stationary ring and clamp legs are on the fixed (supported) side of the cut line.
13. Reverse the ratchet on the jack. Operate the jack to close the machine on the pipe.
14. On the split line opposite the jack, swing the latch bolts on the stationary ring into the slots. (Loosen the nuts if necessary.) Snug down the nuts to hold the latch bolts in place.



NOTE

There will be about a 1/2” gap between the sections when you close the machine. The latch bolts will pull the sections together to close the gap.

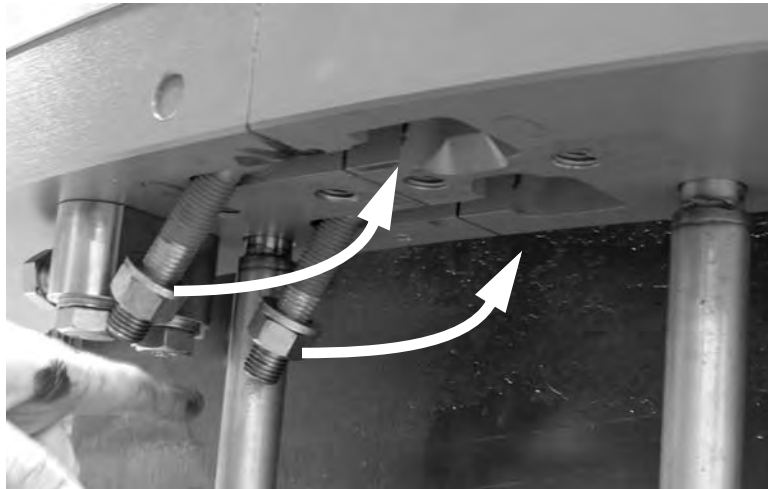


Figure 3-26. Swing the latch bolts into place in the slots.

15. On the split line at the jack location, swing the latch bolts on the stationary ring into the slots. (Loosen the nuts if necessary.) Snug down the nuts to hold the latch bolts in place.
16. Loosen, but do not remove, the two screws on the right side of the hinge assembly.

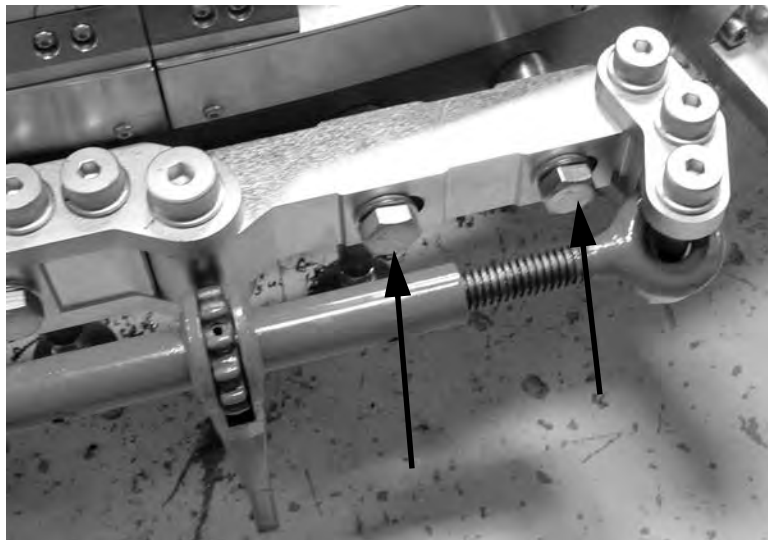


Figure 3-27. Loosen the two screws on the right side of the hinge to allow the screws to move in the slotted holes.

17. On the split line opposite the jack, tighten the nuts on the stationary ring latch bolts. The split line between

the sections should close completely, with no gap between the sections.



Figure 3-28. Tighten the nuts on the latch bolts.

18. On the split line at the hinge, tighten the nuts on the stationary ring latch bolts. The split line between the sections should close completely, with no gap between the sections.
19. Tighten the two screws on the right side of the hinge assembly.



Figure 3-29. Tighten the two screws to secure the hinge to the stationary ring.

20. Attach the support block to the stationary ring at each joint. Insert and tighten the 4 screws holding the block.



Figure 3-30. Attach the support block at the joint and tighten the 4 screws.

21. Swing the latch bolts in the rotating ring into the slots at both split lines. Tighten the nuts to secure the latch bolts.



Figure 3-31. Swing the latch bolts into the slots and tighten the nuts.

22. Tighten all latch bolt nuts securely.
23. Turn the adjustment screws on the clamp legs in the center of each section (4 legs at 90° angles) until the clamp feet contact the pipe.

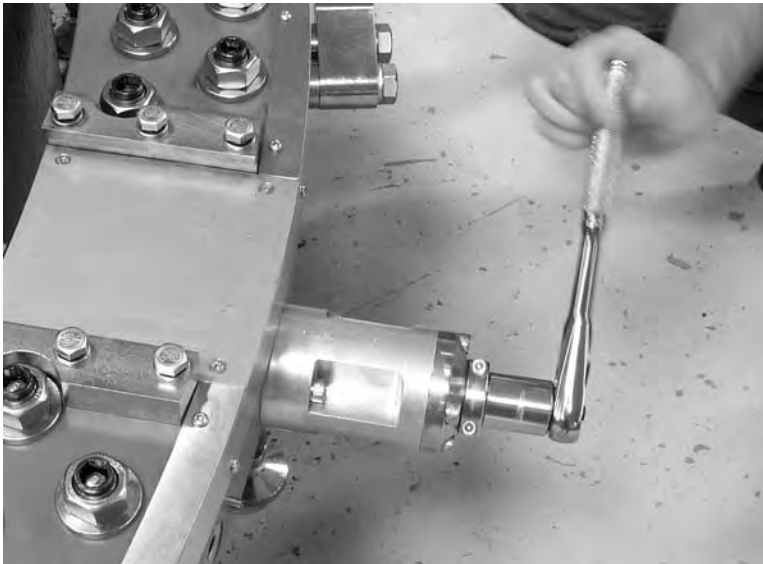


Figure 3-32. Turn the clamp leg adjustment screws to set the clamp feet against the pipe.

24. Measure the clearance between the stationary ring and the pipe at each clamp leg position, and adjust the legs as necessary so that the machine is centered on the pipe.
25. Tighten the 4 center clamp legs to 30 lb-ft. Check the clearance at each location again, and adjust if necessary.
26. Tighten the other 8 clamp legs to **30 lb-ft**.
27. Tighten the 4 center clamp legs to **60 lb-ft**, then tighten the other 8 legs to **60 lb-ft**.
28. Tighten the 4 center clamp legs to **90 lb-ft**, then tighten the other 8 legs to **90 lb-ft**.
29. Remove the rigging from the machine.

Mounting the Drive Motor Assembly

The motor assembly is mounted to the stationary frame as a complete unit.



NOTE

Recommended tightness on the clamp legs is 90 lb-ft. Tighten all legs in steps, 30 lb-ft at a time, until they are at 90 lb-ft.



Figure 3-33. The photo shows the drive mounting location on the LDSF frame. The three screws in the drive assembly go into the three holes on the frame.



Figure 3-34. The photo shows the hydraulic drive assembly.

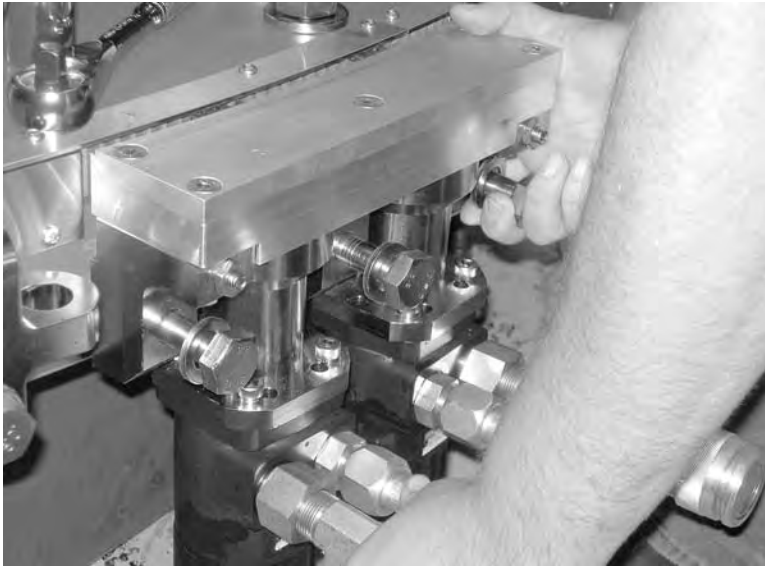


Figure 3-35. Attach the drive assembly to the stationary ring.



Figure 3-36. Tighten the screws holding the drive assembly.

PARTING AND PARTING-BEVELING OPERATION

Setting up the Slides

Offset Parting Setup

For parting (straight cutoff) operation, use a parting tool in each slide. Use the large spacer blocks to mount the tools in the slide, as described below.

1. In the first slide, set the large spacer block into the tool holder in the **low** orientation (with no gap at the side of the block). Tighten the mounting screw into the spacer block.

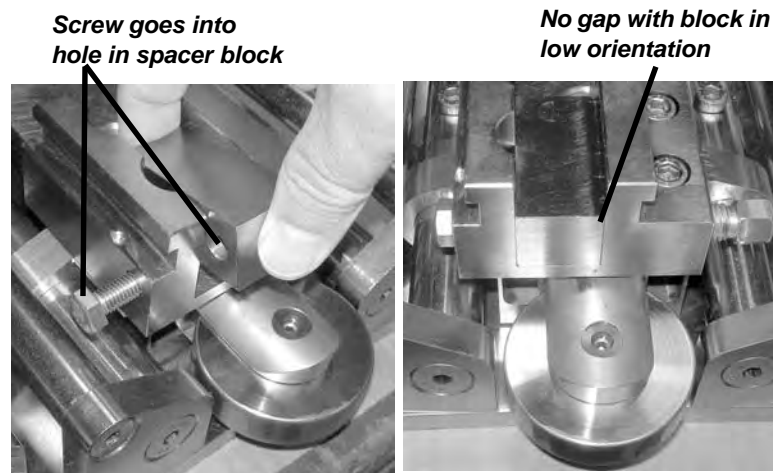


Figure 3-37. Put the spacer block in the tool holder in the low orientation (no gap between block and holder).

2. In the second slide, set the large spacer block into the tool holder in the **high** orientation (with a gap at the side of the block). Tighten the mounting screw into the spacer block.

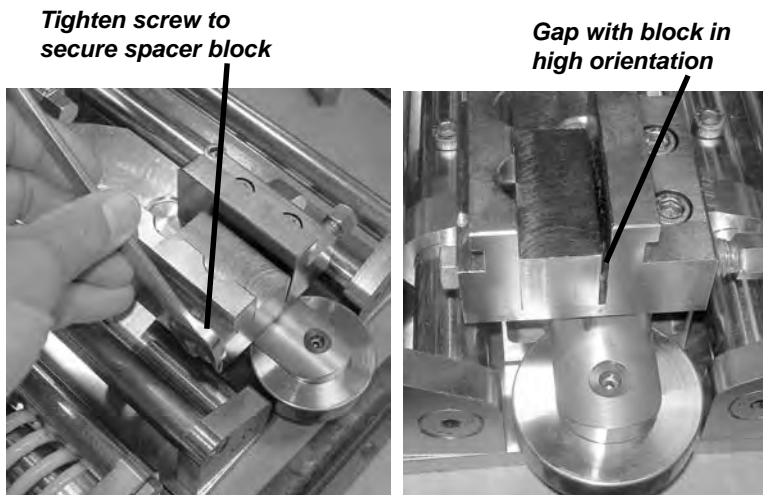


Figure 3-38. Put the spacer block in the tool holder in the high orientation (with a gap between the block and holder).

3. In each slide, install a parting tool on top of the spacer block.
4. Install the tool cover by sliding it over the tool holder.



Figure 3-39. Slide the tool cover onto the tool holder and position it flush at the front.

5. Set the tool back in the holder and tighten the screw in the tool cover. You will adjust the tool position after mounting the slide to the machine.

6. Turn the starwheel on both slides clockwise to fully retract the slide.

Parting-Beveling Setup

For parting and beveling, use a parting tool in one slide and a beveling tool in the other slide. Either slide can be used for parting or beveling.

1. In the first slide, set the large spacer block into the tool holder in the **low** orientation (with no gap at the side of the block). Tighten the mounting screw into the spacer block.

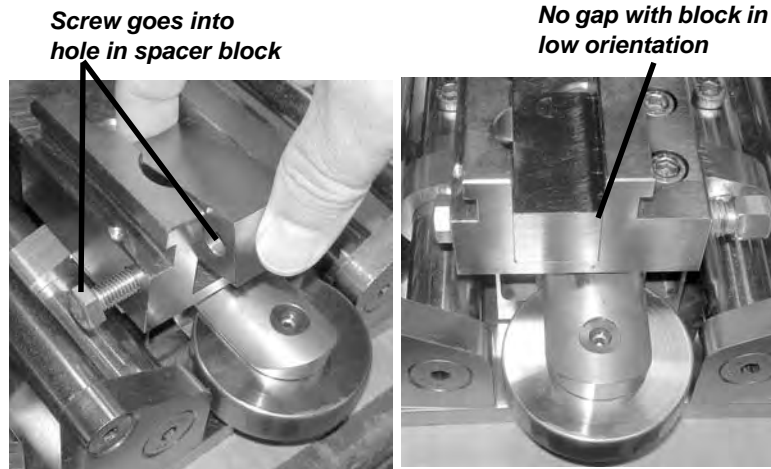


Figure 3-40. Put the spacer block in the tool holder in the low orientation (no gap between block and holder).

2. Install a parting tool on top of the spacer block. Install the tool cover by sliding it over the tool holder.
3. Set the tool back in the holder and tighten the screw in the tool cover. You will adjust the tool position after mounting the slide to the machine.
4. In the second slide, set the small spacer block into the tool holder, and tighten the mounting screw into the spacer block.

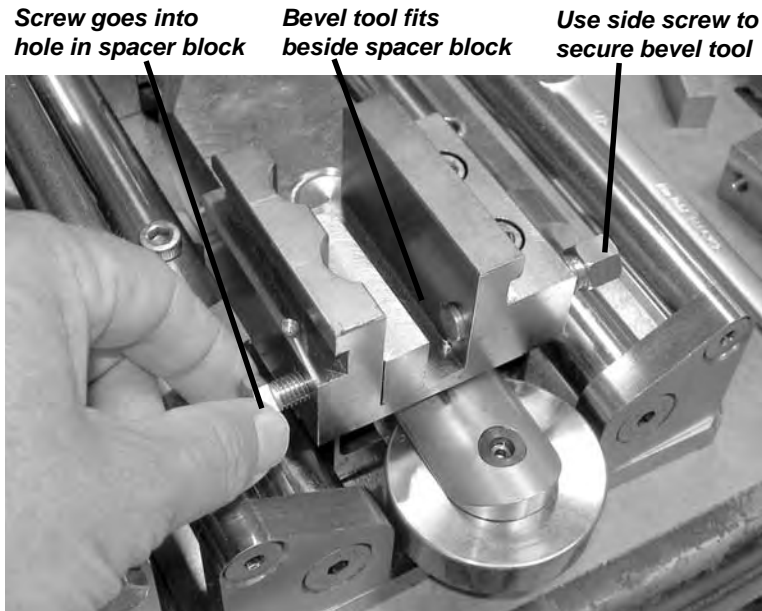


Figure 3-41. Use the small spacer block for installing a beveling tool.

5. Install a beveling tool in the gap next to the spacer block.
6. Set the tool back in the holder and tighten the set screw in the side of the tool holder. You will adjust the tool position after mounting the slide to the machine.
7. Turn the starwheel on both slides clockwise to fully retract the slide.

Mounting the Slides on the LDSF

1. On both slides, turn the jacking screw so that the end plate is all the way forward. Snug the screw, but do not over-tighten it.



NOTE

Make sure the slides are fully retracted before mounting them. See "Setting up the Slides" on page 44.

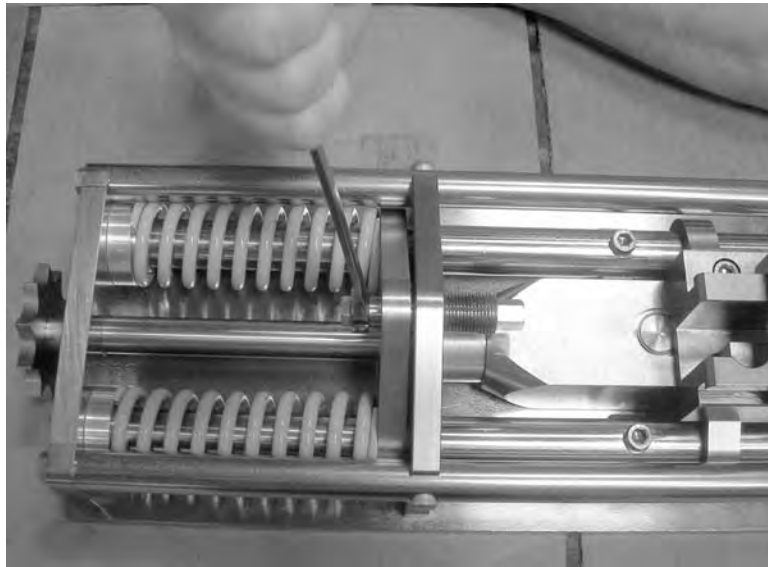


Figure 3-42.

2. Install the mounting blocks for both slides on the rotating ring. Leave the screws loose so you can mount the slide.
3. Slide the base plate of the slide beneath the mounting blocks.

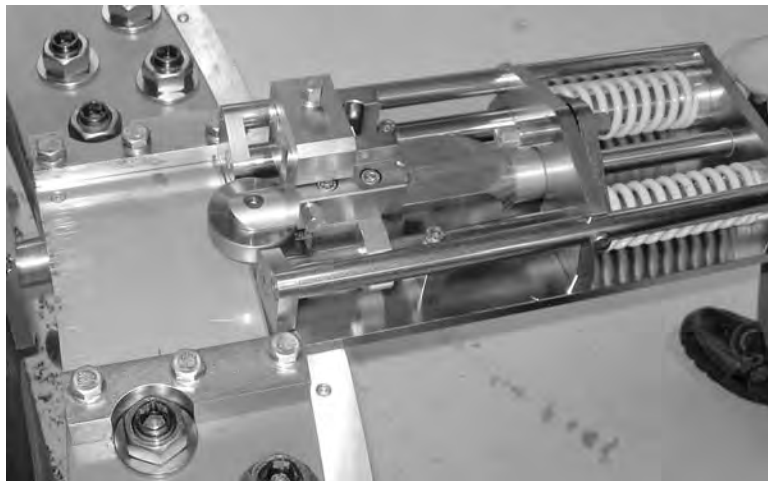


Figure 3-43. Attach the mounting blocks loosely to the rotating ring, and mount the slide between the blocks.

4. Push the slide forward until the tracking wheel is against the pipe. Snug down the screws in the mounting block just tight enough to hold the slide. It will

need to move when you run the machine to set the slide positions.

5. Remove the frame locking pins from the rotating ring and put them in their storage locations on the side of the machine.
6. When you have both slides mounted, connect the hydraulic lines to the machine and turn on the HPU.
7. Operate the LDSF slowly through one complete rotation. As the tracking wheel on each slide travels over the surface of the pipe, it will push the slide back so that it is in position to contact the pipe at the high point (the location where the clearance is least).
8. Securely tighten the screws in the slide mounting blocks to hold the slides in position.

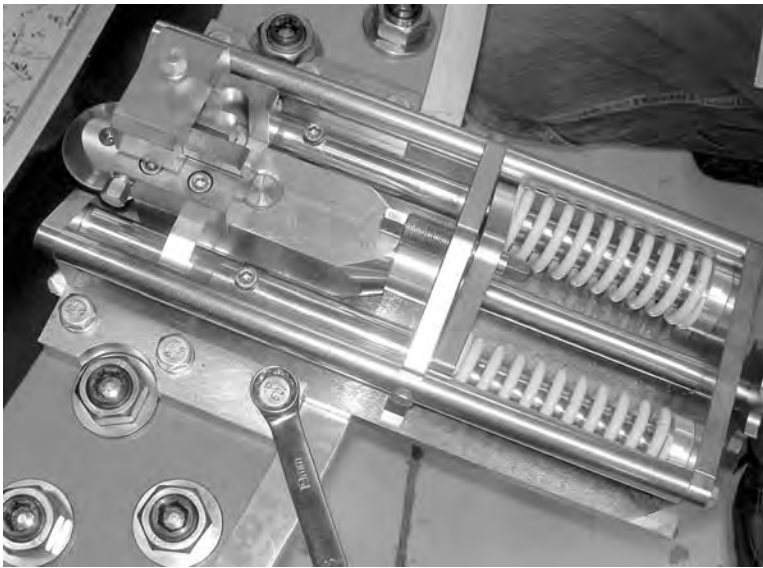


Figure 3-44. Tighten the screws in the slide mounting blocks.

9. Turn the jacking nuts on both slides back all the way to release the springs for operation.
10. Loosen the tool set screws in both slides, and move the tools forward until they are about 1/16" from the pipe. Tighten the set screws.

Mounting and Configuring the Trip

1. Mount the trip assembly to the mounting location on the stationary ring.

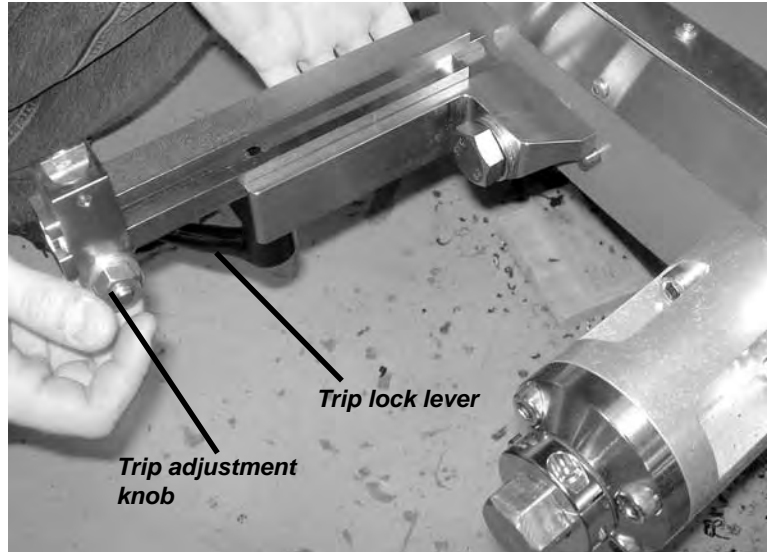


Figure 3-45. Mount the trip to the stationary ring.

2. Loosen the trip lock lever, and push the trip all the way in against the machine. Tighten the trip lock lever.
3. Using the drive motor, rotate the frame to position one of the starwheels over the trip assembly.
4. Loosen the trip adjustment knob, and slide the trip toward or away from the frame to position it beneath the starwheel. Tighten the trip adjustment knob.
5. Loosen the trip lock lever to release the slide to the disengaged position. (The slide is spring-loaded and will disengage when the lever is loosened.)
6. Tighten the trip lock lever. Leave the trip disengaged until you are performing the cut.

Double-Trip Setup

You can use two trips to double the feed rate. Install a second trip at the opposite location on the stationary ring, and configure it as described above.

Performing the Cut

1. Turn on power at the HPU. Set the operating pressure to 2000 psi.
2. Remove both frame locking pins from the rotating ring, and put them in their “parking” holes in the stationary ring.



Figure 3-46. Remove the frame locking pins and put them in the parking holes in the stationary frame.

3. Make sure that the trip is disengaged.
4. Turn on the hydraulic power and slowly operate the machine through one rotation to check clearances and make sure the slide tracking wheels are following the pipe surface. Stop the machine.
5. Loosen the trip lock lever and push the trip in to engage it.
6. Start the machine and set the flow to 14 gpm at the HPU. Make sure the starwheels are striking the trip.
7. Operate the machine until the tools begin cutting the pipe. Use of coolant is recommended for better cutting performance and to increase tool life.
8. Adjust the speed as necessary for optimum cutting performance. Make sure both slides are advancing and both tools are cutting.
9. Operate the machine until the cutting operation is complete. Turn off power at the HPU.
10. Turn the starwheels on both slides to retract them.



NOTE

Recommended hydraulic settings are 14 gpm flow at 2000 psi pressure.



WARNING

Stand clear of the LDSF while it is operating. There are pinch points between moving components that can cause serious injury.



WARNING

Counterbore slide operation with the LDSF is intended only for use on a horizontal pipe (with the machine in vertical configuration). Operating the counterbore slide with the machine mounted horizontally is not safe for the operator.

COUNTERBORING OPERATION

The counterbore slide mounts to the tool holder on the standard LDSF slide. Use only one slide when counterboring. Disengage or remove the trip when counterboring.

If you have performed a parting or parting/beveling operation, the LDSF is correctly positioned on the pipe for counterboring. Do not move the LDSF before performing the counterbore.

NOTE: Counterbore slide operation with the LDSF is intended only for use on a horizontal pipe (with the machine in vertical configuration). Operating the counterbore slide with the machine mounted horizontally is not safe for the operator.

Mounting the Slide and Tooling

1. Insert the tool bit into the holder of the counterbore slide. Several tool configurations are available; see examples in the figures below.

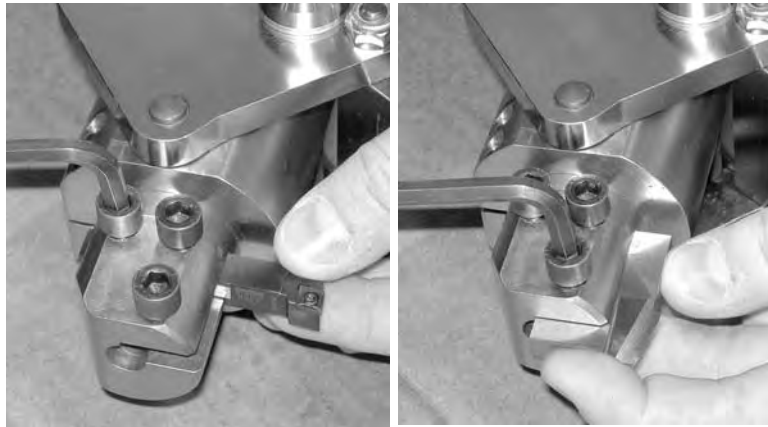


Figure 3-47. Mount the appropriate tool in the counterbore slide.

2. If you are going to counterbore at an angle, loosen the nut on the counterbore slide pivot and set the slide at the desired angle. Tighten the pivot nut.



Figure 3-48. Loosen the pivot screw to set the counterbore slide angle.

3. Install and configure **one** LDSF slide as described in “Mounting the Slides on the LDSF” above.
4. Set the base of the counterbore slide in the tool holder on the LDSF slide. Do not tighten it in place yet; you will need to move it when setting the position.



Figure 3-49. Mount the counterbore slide in the tool holder on the LDSF slide.

5. Turn the starwheel on the LDSF slide to position the counterbore slide at the required position over the pipe end. Turn the counterbore slide knob as necessary to align the tool bit with the pipe.
6. Tighten the set screw in the tool holder to secure the counterbore slide in place.

Performing the Counterbore

1. Turn the knob on the counterbore slide to advance the tool close to the pipe surface.
2. Make sure that the trip is disengaged. It is recommended to remove the trip when counterboring.
3. Turn on power at the HPU.
4. Start the machine. Turn the counterbore knob each rotation of the LDSF to feed the slide.
5. Continue feeding the counterbore slide as the machine operates. Use of coolant is recommended for better cutting performance and longer tool life.
6. Stop the machine periodically to check and measure the counterbore.
7. When the counterbore is complete, turn off hydraulic power.
8. Retract the counterbore slide, and remove it from the tool holder of the LDSF slide.

REMOVING THE LDSF FROM THE PIPE

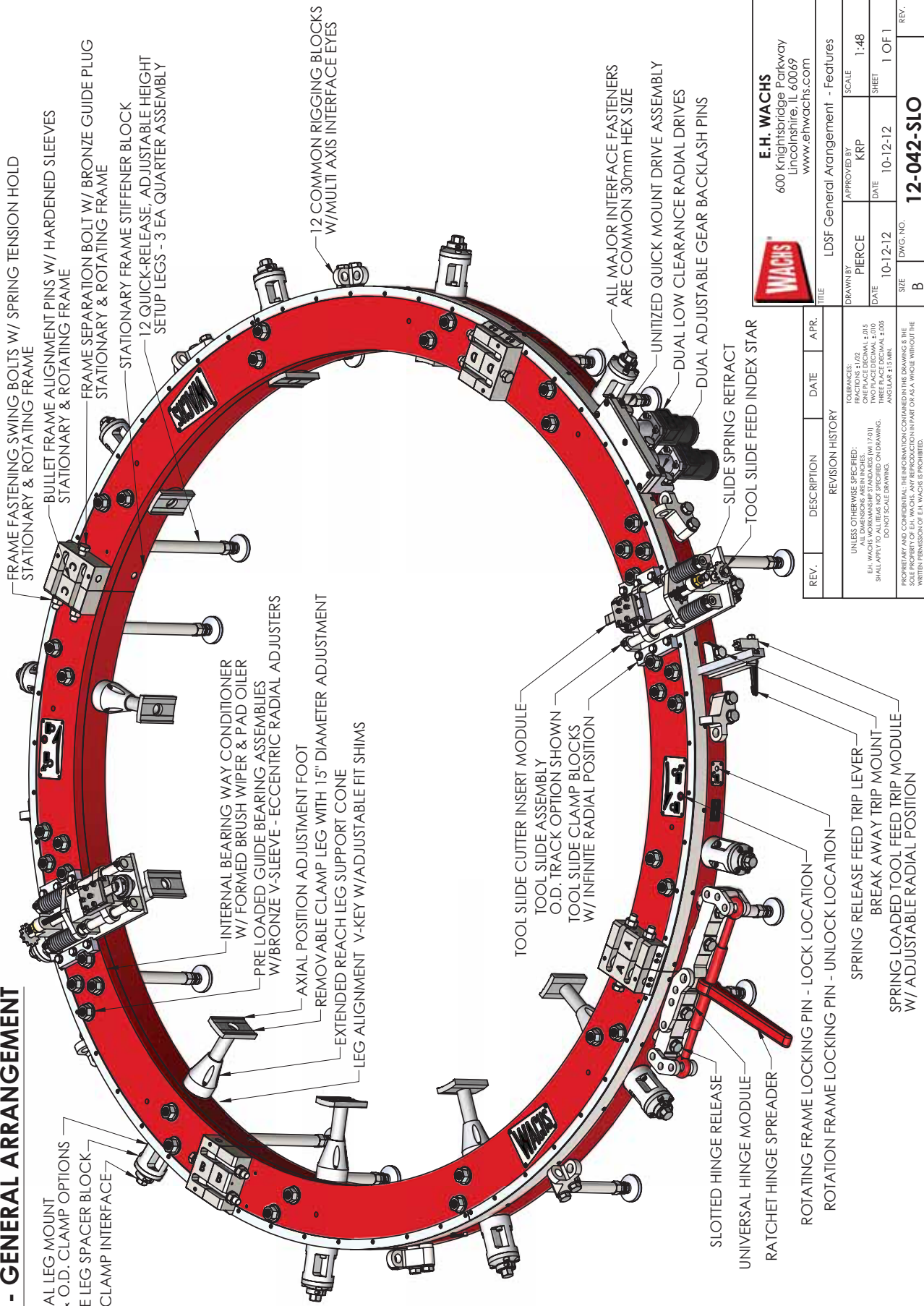
1. Operate the machine to align the split lines of the rotating ring with the matching split lines of the stationary ring (A to A, B to B, etc.). Stop the machine with the split lines on both rings lined up.
2. Insert the 2 frame locking pins through the rotating ring.
3. Turn the starwheels on both slides to retract them.
4. Loosen the screws in the slide mounting brackets and remove the slides from the LDSF.

5. Remove the drive assembly from the LDSF.
6. Rig the LDSF and make sure the lifting device is holding it securely before you loosen the clamp legs.
7. Turn the adjustment screws on the clamp legs to loosen the legs. Retract the legs all the way.
8. Remove the support blocks from the stationary ring at the hinge location and the opposite location where the machine will be split.
9. Loosen the nuts on the latch bolts at the joint opposite the hinge (both rotating and stationary rings). Swing the latches out of the slots.
10. Loosen the nuts on the latch bolts at the hinge location (both rotating and stationary rings). Swing the latches out of the slots.
11. Loosen, but do not remove, the two screws on the right side of the hinge assembly.
12. At the joint opposite the hinge, turn the jacking screw to separate the ring sections. Turn the screw until the dowel pins are out of the holes. Retract the jacking screw completely.
13. At the hinge location, turn the jacking screw to separate the ring sections. Turn the screw until the dowel pins are out of the holes. Retract the jacking screw completely.
14. Tighten the two screws on the right side of the hinge assembly.
15. Set the ratchet on the jack to retract the threaded rods (pulling the ends of the hinge together). Operate the jack to open the LDSF. Make sure the dowel pins separate from the holes at both split points.
16. Replace the wood end caps on each of the sections.
17. Open the LDSF far enough to remove it from the pipe.
18. Lift the LDSF from the pipe and move it to a location where you can set it down. Install the stand legs and set the LDSF on the floor.
19. If you are finished with the machine, disassemble it for storage.



LDSF - GENERAL ARRANGEMENT

UNIVERSAL LEG MOUNT
W/ I.D. & O.D. CLAMP OPTIONS
REMOVABLE LEG SPACER BLOCK
MANUAL ADJUST CLAMP INTERFACE



E.H. WACHS
600 Knightsbridge Parkway
Lincolnshire, IL 60069
www.ehwachs.com

REV.	DESCRIPTION	DATE	APR.	TITLE
B				LDSF General Arrangement - Features

DRAWN BY	APPROVED BY	SCALE
PIERCE	KRP	1:48

DATE	DATE	SHEET
10-12-12	10-12-12	1 OF 1

SIZE	DWG. NO.	REV.
B	12-042-S10	

UNLESS OTHERWISE SPECIFIED:
TOLERANCES:
FRACTIONS 1/32
ONE PLACE DECIMAL ±.015
E.H. WACHS WORKSHOP STANDARDS (M17.01)
SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING.
DO NOT SCALE DRAWING.
ANGULAR ±15 MIN.

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	60-1252-00	SPRING, .360 OD	16
2	80-0080-00	NAME PLATE	1
3	90-049-06	RIVET	4
4	WH 100	RETAINING RING, INTERNAL	2
5	SPIROLOX #RSN-75	RETAINING RING, .704 DIA. x .046 GROOVE	12
6	24DU1 6	BUSHING, 3/4" ID x 7/8" OD x 1" LING.	12
7	91292A129	SHCS, M5 x 8mm x 25mm LING.	12
8	91595A643	PIN, DOWEL 10mm x 24mm LING.	4
9	92095A208	BHCS, M5 x 8mm x 10mm LING.	32
10	92095A226	BHCS, M6 x 1mm x 12mm LING.	148
11	92125A208	FHCS, M5 x 8mm x 10mm LING.	16
12	93750A720	T-HANDLE, 1/2" DIAMETER x 3-1/2" LING.	3
13	12-042-4401-00	SLIDE, OUT OF ROUND	2
14	91610A412	PIN ROLL M3 x 30mm LING.	24
15	12-042-4404	ASSEMBLY SPRING LOADED TRIP	2
16	12-042-4012	ASSEMBLY, HINGE	1
17	12-042-4006	ASSEMBLY LOADED BEARING	16
18	12-042-4007	ASSEMBLY, IDLER BEARING	24
19	12-042-1981	HHCS, M20 x 2.5mm x 100mm LING.	16
20	12-042-1995	WASHER, M20 THICK	16
21	12-042-0105	SPACER	16
22	12-042-0068	BRACKET LIFTING	8
23	12-042-0068	LEG, FIXED CLAMP	8
24	12-042-4005	ASSEMBLY, AVALANCH LEG	4
25	12-042-4001	HOUSING, LEG EXTENSION	12
26	12-042-0011	SHCS, M10 x 50mm LING.	96
27	12-042-1978	SHCS, M10 x 1.5mm x 30mm LING.	48
28	12-042-0008	KIT, CLAMP LEG KET WASHER	12
29	12-042-0209	SPACER, LEG HOUSING	12
30	12-042-0000	ASSEMBLY, LEG SCREW	12
31	12-042-4004	KEY, CLAMP LEG	8
32	12-042-0054	BLOCK, GUARD END	8
33	12-042-0070	PLATE, UNLOCK INDICATOR	2
34	12-042-0073	RETAINER PIN	2
35	12-042-0063	WIPER, FELT	8
36	12-042-0061	HOLDER, BRUSH	4
37	12-042-0064	BRUSH	8
38	12-042-0065	BLOCK, WIPER MOUNTING	4
39	12-042-0066	BRACKET, FELT WIPER	4
40	12-042-0062	BLOCK, LOCATING PIN	8
41	12-042-0072	SHCS, M10 x 5mm x 35mm LING.	6
42	12-042-1974	FHCS, M12 x 1.75mm x 45mm LING.	2
43	12-042-1976	WASHER, M12	12
44	12-042-1977	CLAMP, LEFT SLIDE	2
45	12-042-0603	CLAMP, RIGHT SLIDE	2
46	12-042-0604	ASSEMBLY, HYDRAULIC PLUMBING	1
47	12-042-4201	FRAME, 105' STATIONARY	1
48	12-042-0002-105	FRAME, ROTATING	1
49	12-042-0020-105	GUARD, RADIAL GEAR	3
50	12-042-0057-105	GUARD, RADIAL GEAR	1
51	12-042-0058-105	GUARD, RADIAL GEAR	1
52	12-042-0059-105	BASE PLATE	2
53	12-042-0055-105	GUARD, GEAR	2
54	12-042-0052-105	GUARD, GEAR	2
55	12-042-0053-105	GUARD, GEAR	2
56	12-042-0050-105	GUARD, GEAR	2
57	12-042-0051-105	GUARD, GEAR	2
58	12-042-0069	BLOCK, LIFTING	8
59	91290A823	SHCS, M14 x 2.0mm x 55mm LING.	16
60	11107A32	7/8" FERRULE	8
61	12-042-4008	ASSEMBLY, SETUP LEG	12
62	12-042-4015	ASSEMBLY, LOCATING PIN PLATE	2

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600 Knightsbridge Parkway
Lincolnshire, IL 60069
www.ehwachs.com

APPROVED BY: KRP
SCALE: 1:16

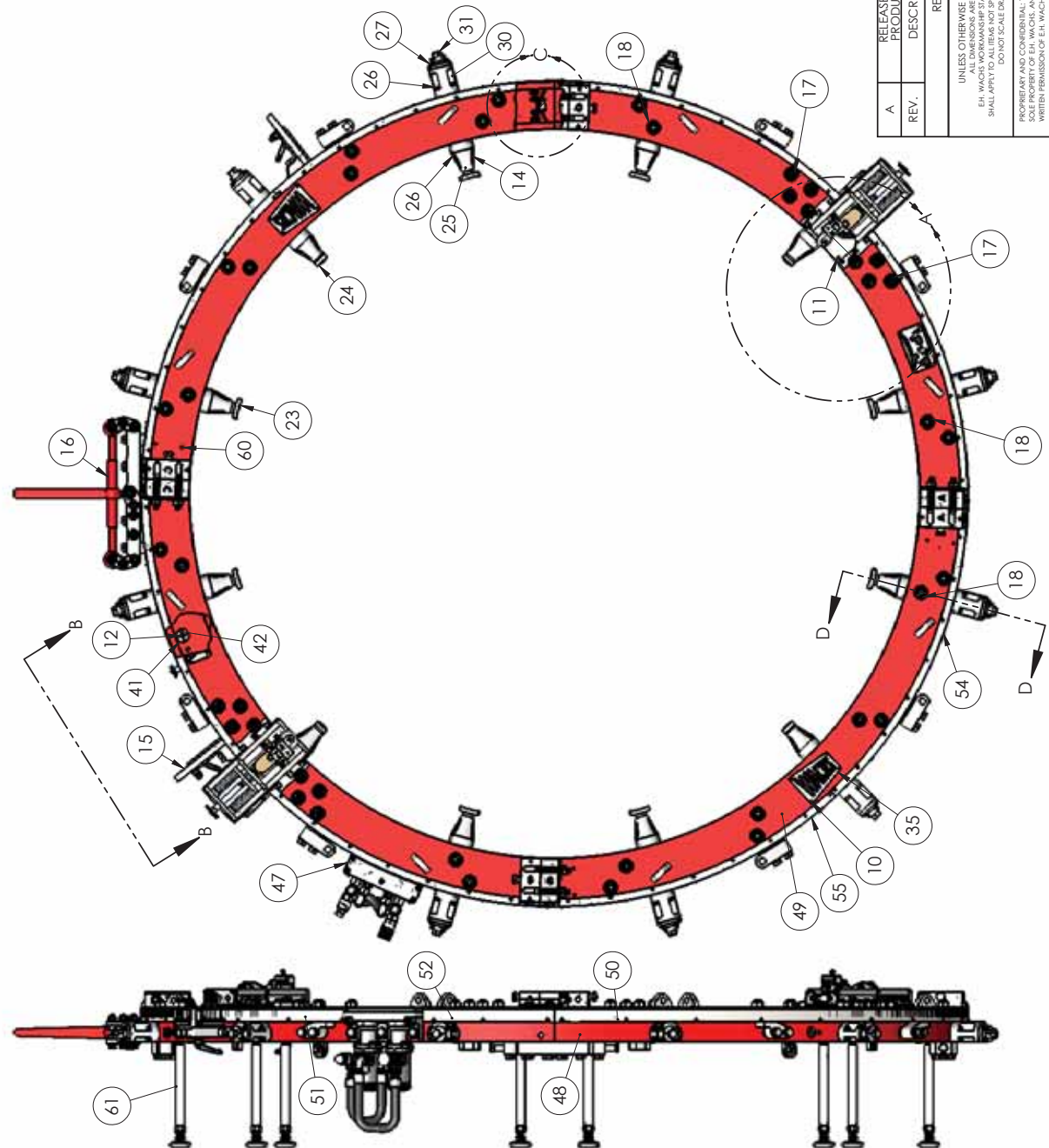
DATE: 12-6-12
SHEET: 1 OF 3

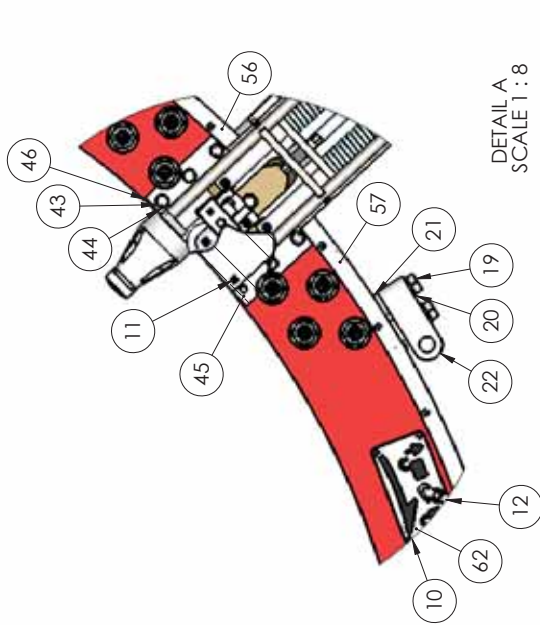
SIZE: DWG. NO. **12-042-5100-105**
REV. A

REV.	DESCRIPTION	DATE	APR.
A	RELEASED FOR PRODUCTION	12/6/2012	MWG

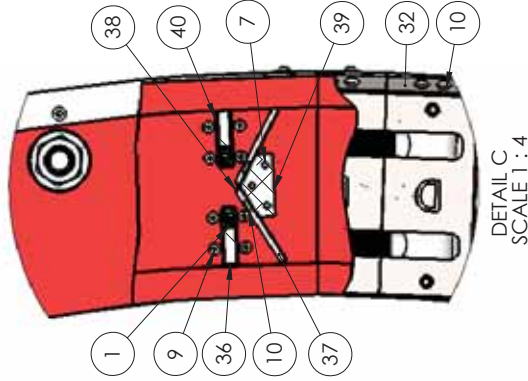
REVISION HISTORY	
UNLESS OTHERWISE SPECIFIED:	TOLERANCES:
FRACTIONS 1/32	ONE PLACE DECIMAL ± 0.15
DECIMALS 1/16	TWO PLACE DECIMAL ± 0.10
THREE PLACE DECIMAL ± 0.05	THREE PLACE DECIMAL ± 0.05
ANGULAR ± 0.5 MIN.	DO NOT SCALE DRAWING.

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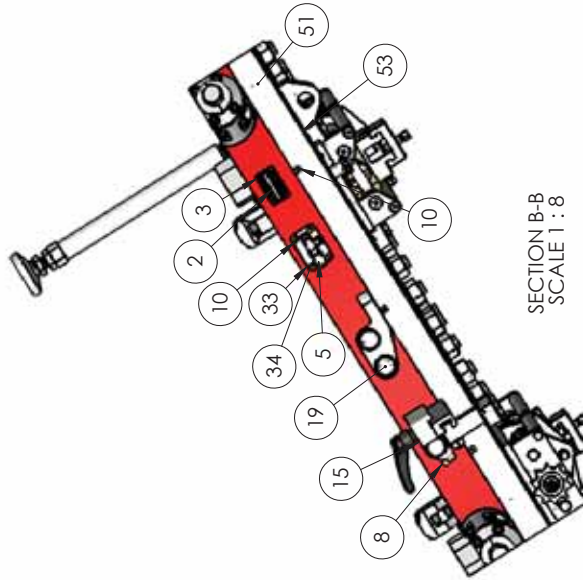




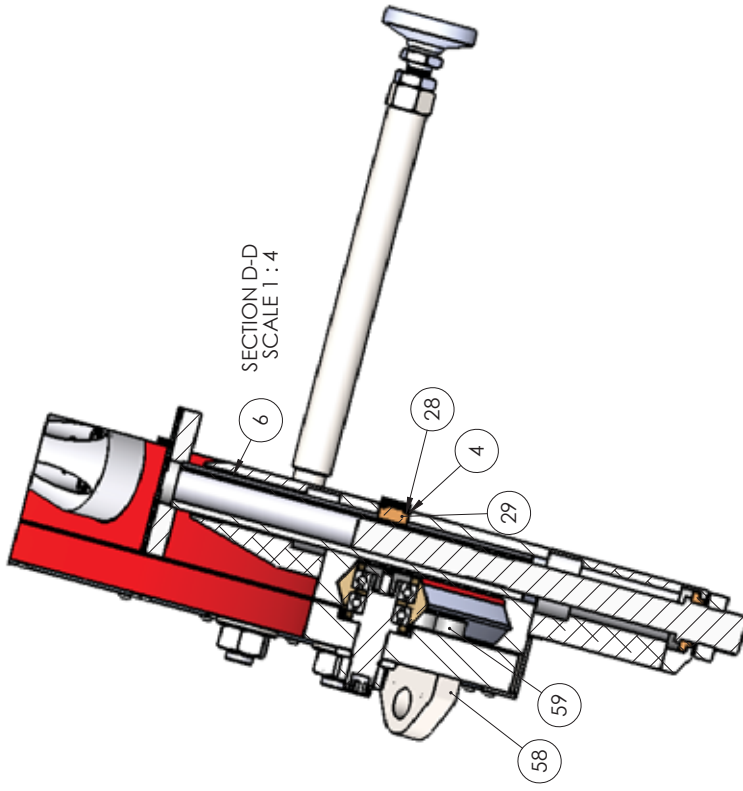
DETAIL A
SCALE 1 : 8



DETAIL C
SCALE 1 : 4



SECTION B-B
SCALE 1 : 8



SECTION D-D
SCALE 1 : 4

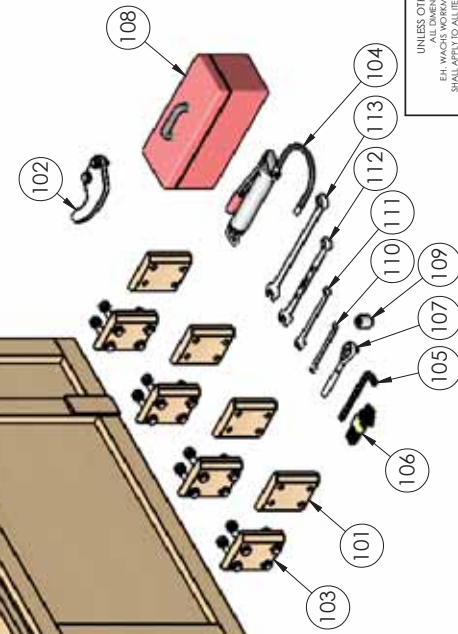
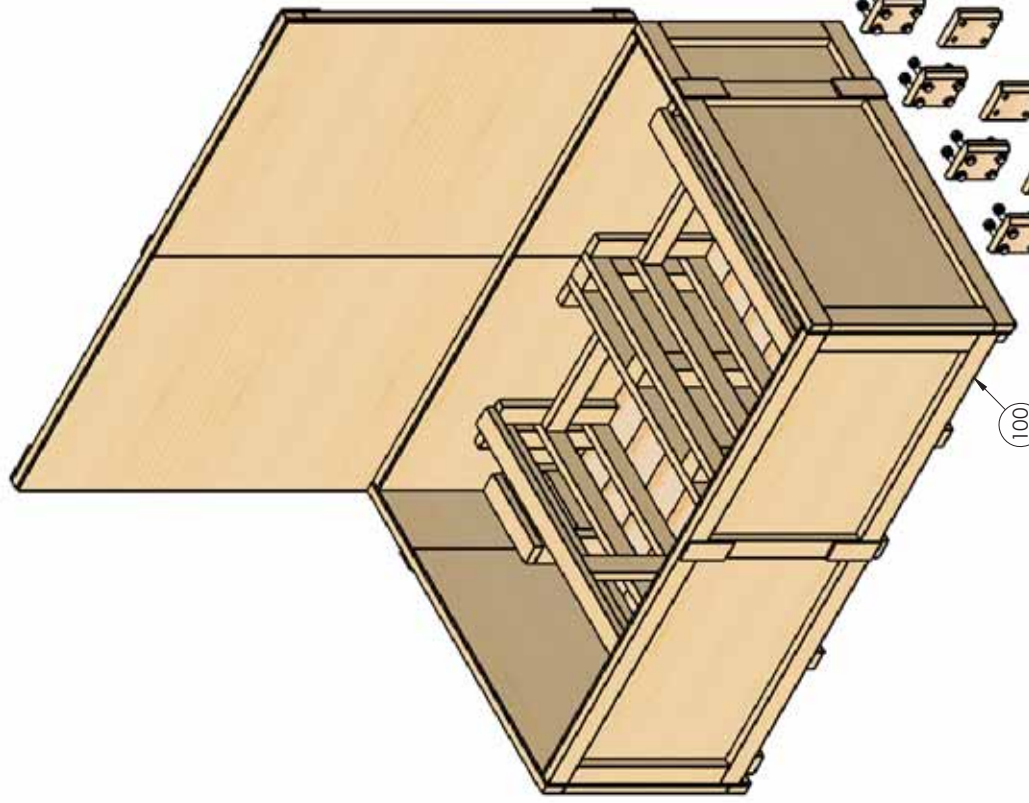


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TITLE		ASSEMBLY, 105" DIAMETER LDSF	
DRAWN BY	MWG	APPROVED BY	KRP
DATE	12-6-12	DATE	12-6-12
SCALE	1:16	SHEET	2 OF 3
SIZE	B	DWG. NO.	12-042-5100-105
REV.	A		

UNLESS OTHERWISE SPECIFIED:
FRACTIONS 1/32
ONE PLACE DECIMAL ± 0.15
E.H. WACHS WORKMANSHIP STANDARDS (M17.011)
SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING.
DO NOT SCALE DRAWING.
ANGULAR ± 15 MIN.
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
100	12-042-8000-105	GRATE, 105" LDSF SHIPPING	1
101	12-042-0217	SECTION, SCREW END CAP	4
102	12-042-4013	ASSEMBLY, HINGE END GUARD	1
103	12-042-4014	ASSEMBLY, END PROTECTOR	4
104	1811K2	OIL GUN	1
105	5503A31	L-KEY, 5/8" BALL POINT	1
106	5709A45	HEX SET, 15 PCS BAL POINT - METRIC	1
107	5823A2	WRENCH, 1/2" SQ DRIVE RATCHET	1
108	6572A13	BOX, STORAGE	1
109	7149A83	SOCKET, 30mm	1
110	7191A16	WRENCH, 13mm COMBINATION	1
111	7191A23	WRENCH, 19mm COMBINATION	1
112	7191A36	WRENCH, 30mm COMBINATION	1
113	7191A37	WRENCH, 36mm COMBINATION	1

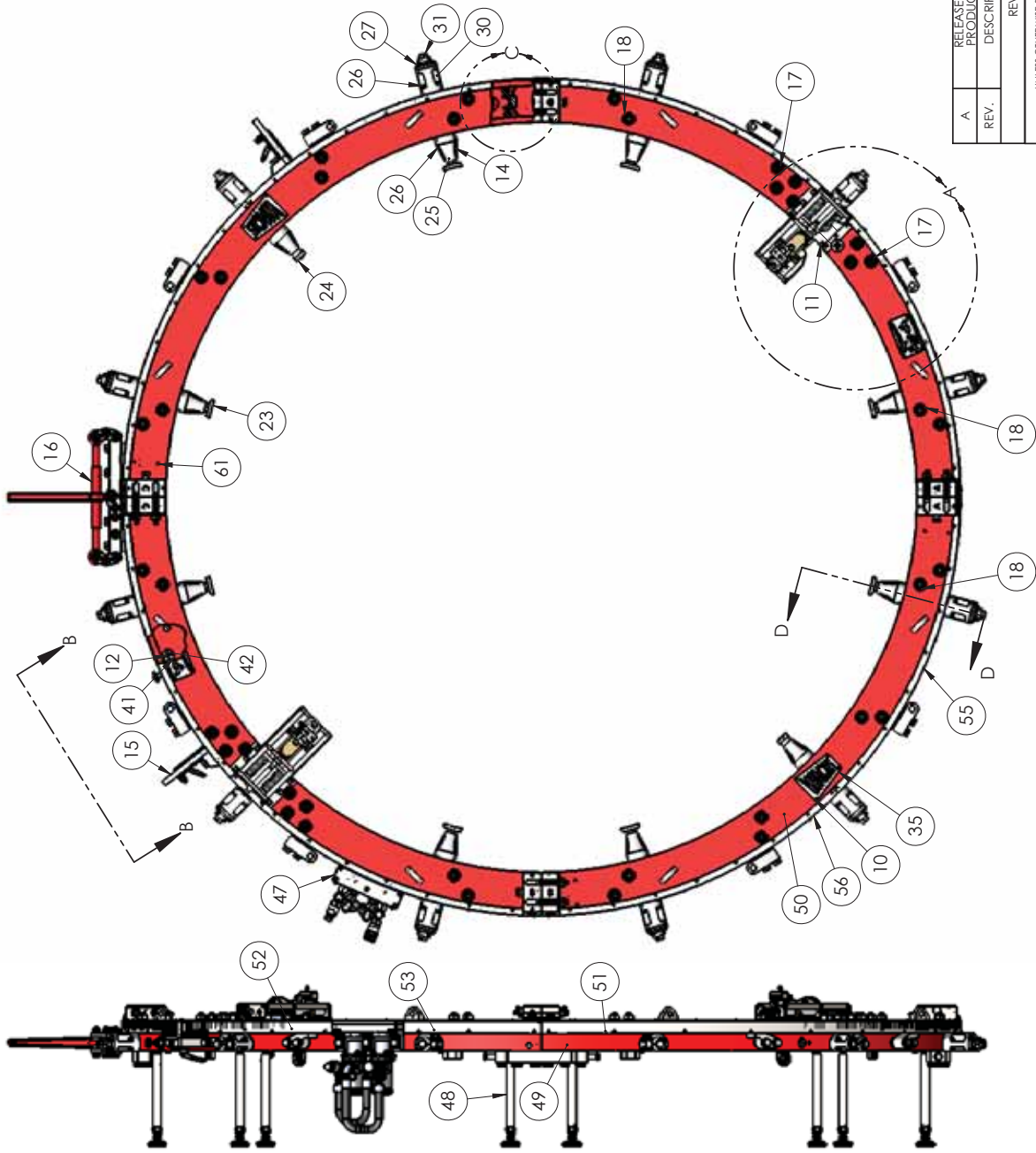


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 Lincolnshire, IL 60069
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TITLE		ASSEMBLY, 105" DIAMETER LDSF	
DRAWN BY	MWG	APPROVED BY	KRP
DATE	12-6-12	DATE	12-6-12
SCALE	1:18	SHEET	3 OF 3
SIZE	B	DWG. NO.	12-042-5100-105
REV.	A		

UNLESS OTHERWISE SPECIFIED:
 FRACTIONS 1/32
 ONE PLACE DECIMAL ±.015
 E.H. WACHS WORKMANSHIP STANDARDS (M17.01)
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 ANGULAR ±.5 MIN.

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	60-1252-00	SPRING, .360 OD	16
2	80-0080-00	NAME PLATE	1
3	90-049-06	RIVET	4
4	WH 100	RETAINING RING, INTERNAL	12
5	SPIROLOX #BRN-75	RETAINING RING, INTERNAL	2
6	24D114	BUSHING, 3/4" ID X 7/8" OD X 1" LING.	12
7	91292A129	SHCS, M5 X .8mm X 25mm LING.	12
8	91595A443	PIN, DOWEL 10mm X 24mm LING.	12
9	92095A208	BHCS, M5 X .8mm X 10mm LING.	32
10	92095A206	BHCS, M6 X 1mm X 12mm LING.	148
11	92125A206	HHCS, M6 X 1mm X 10mm LING.	6
12	92125A208	HHCS, M6 X 1mm X 12mm LING.	6
13	92750A720	I-HANDLE, 1/2" DIAMETER X 3-1/2" LING.	2
14	12-042-4401-00	SLIDE, OUT OF ROUND	2
15	91610A412	PIN, ROLLMS X 30mm LING.	24
16	12-042-4404	ASSEMBLY, SPRING LOADED TRIP	2
17	12-042-4012	ASSEMBLY, HINGE	1
18	12-042-4006	ASSEMBLY, LOADED BEARING	16
19	12-042-4007	ASSEMBLY, IDLER BEARING	24
20	12-042-1981	HHCS, M20 X 2.5mm X 100mm LING.	16
21	12-042-1995	WASHER, M20 THICK	16
22	12-042-0105	SPACER	8
23	12-042-0068	BRACKET, LIFTING	8
24	12-042-4005	LEG, FIXED CLAMP	8
25	12-042-4011	ASSEMBLY, AXIAL ADJ. LEG	4
26	12-042-0201	HOUSING, LEG EXTENSION	12
27	12-042-1979	SHCS, M10 X 50mm LING.	96
28	12-042-1978	SHCS, M10 X 1.5mm X 30mm LING.	48
29	12-042-0208	KIT, CLAMP LEG KEY WASHER	12
30	12-042-0209	KEY, CLAMP LEG	12
31	12-042-0200	SPACER, LEG HOUSING	12
32	12-042-4004	ASSEMBLY, LEG SCREW	12
33	12-042-0054	BLOCK, GUARD END	8
34	12-042-0070	PLATE, UNLOCK INDICATOR	2
35	12-042-0073	RETAINER, PIN	2
36	12-042-0063	PLATE, WAGHS LOGO	2
37	12-042-0061	WIPER, FELT	8
38	12-042-0064	HOLDER, BRUSH	4
39	12-042-0065	BRUSH	8
40	12-042-0066	BLOCK, WIPER MOUNTING	4
41	12-042-0062	BRACKET, FELT WIPER	8
42	12-042-0072	BLOCK, LOCATING PIN	2
43	12-042-1974	SHCS, M10 X 5mm X 35mm LING.	6
44	12-042-1976	HHCS, M12 X 1.75mm X 45mm LING.	12
45	12-042-1977	WASHER, M12	12
46	12-042-0603	CLAMP, LEFT SLIDE	2
47	12-042-0604	CLAMP, RIGHT SLIDE	2
48	12-042-4201	ASSEMBLY, HYDRAULIC PLUMBING	1
49	12-042-4008	ASSEMBLY, SET UP LEG	12
50	12-042-0002-120	FRAME, 105" STATIONARY	1
51	12-042-0020-120	FRAME, ROTATING	1
52	12-042-0057-120	GUARD, RADIAL GEAR	3
53	12-042-0058-120	GUARD, RADIAL GEAR	1
54	12-042-0059-120	GUARD, RADIAL GEAR	1
55	12-042-0055-120	BASE PLATE	2
56	12-042-0052-120	GUARD, GEAR	2
57	12-042-0053-120	GUARD, GEAR	2
58	12-042-0058-120	GUARD, GEAR	2
59	12-042-0051-120	GUARD, GEAR	2
60	91290A625	BLOCK, LIFTING	6
61	1102K32	SHCS, M16 X 2.0mm X 58mm LING., ZERK, GREASE	16
62	12-042-4015	ASSEMBLY, LOCATING PIN PLATE	8



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 Lincolnshire, IL 60069
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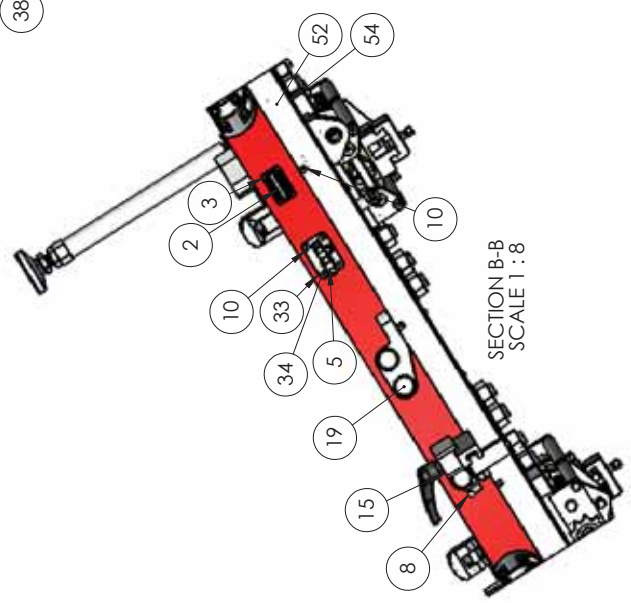
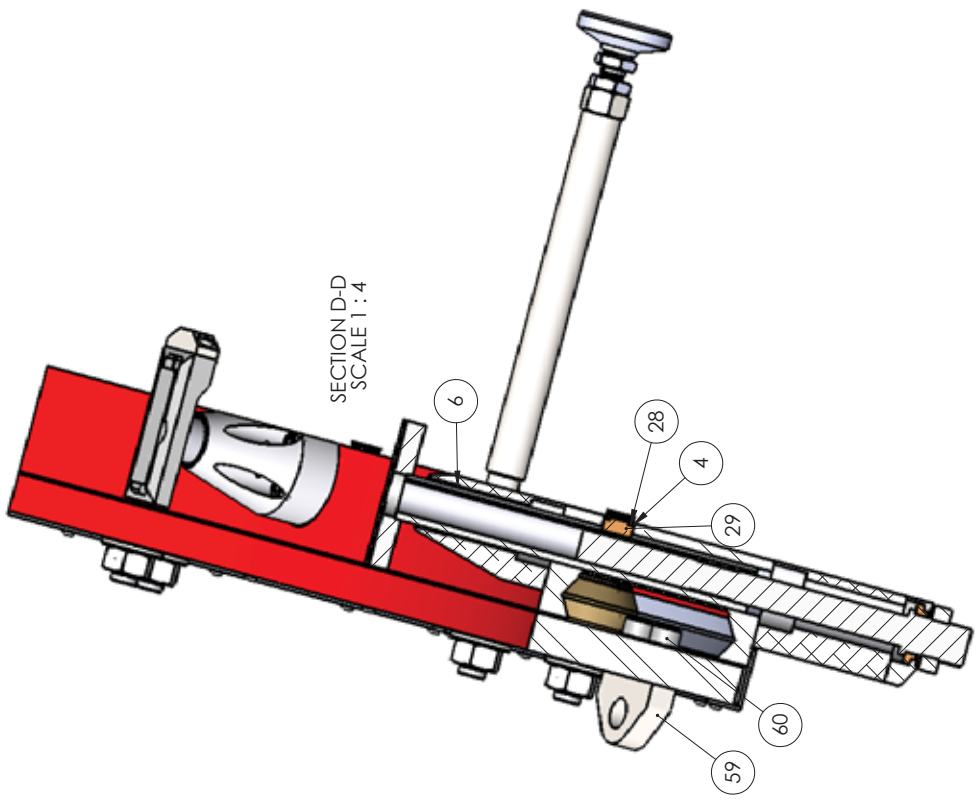
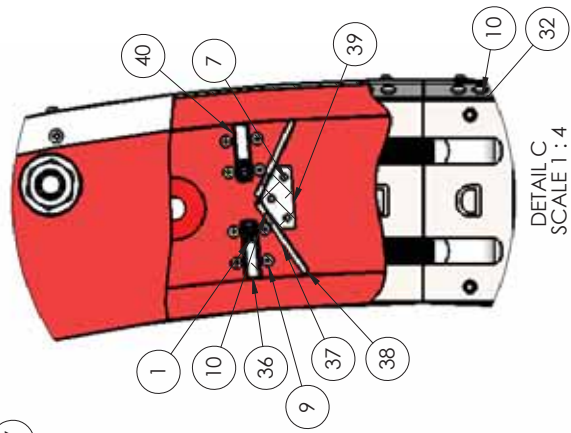
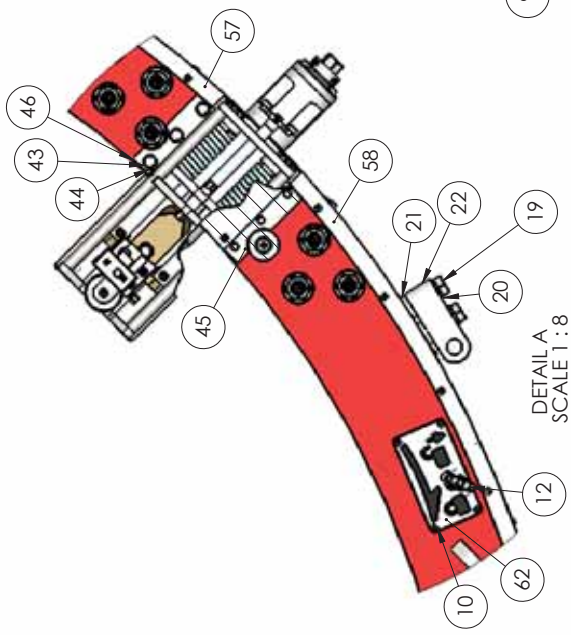
REV.	DESCRIPTION	DATE	APR.
A	RELEASED FOR PRODUCTION	11/20/2013	MWG

TITLE	ASSEMBLY, 120" DIAMETER LDSF
DRAWN BY	MWG
APPROVED BY	KRP
SCALE	1:18
DATE	11-20-13
DATE	11-20-13
SHEET	1 OF 3

UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 E.H. WACHS WORKMANSHIP STANDARDS (M17.01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. THREE PLACE DECIMAL ±.005 ANGULAR ±15 MIN. DO NOT SCALE DRAWING.

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SIZE	DWG. NO.	REV.
B	12-042-5100-120	A

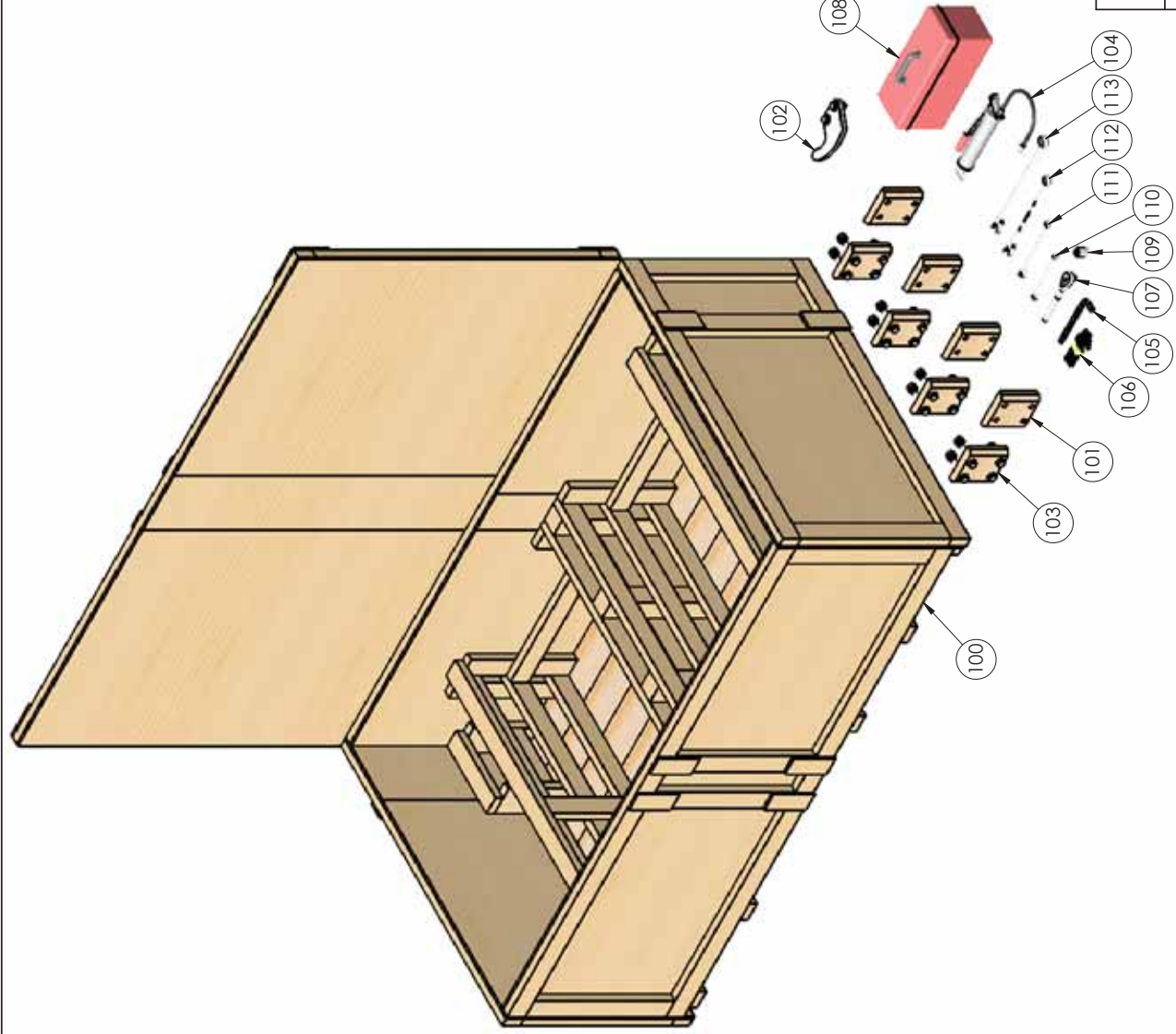


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Lincolnshire, IL 60069
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TITLE		ASSEMBLY, 120" DIAMETER LDSF	
DRAWN BY	MWG	APPROVED BY	KRP
DATE	11-20-13	DATE	11-20-13
SCALE	1:16	SHEET	2 OF 3
SIZE	B	DWG. NO.	12-042-5100-120
REV.	A		

UNLESS OTHERWISE SPECIFIED:
 FRACTIONS 1/32
 ONE PLACE DECIMAL ±.015
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 DO NOT SCALE DRAWING.
 ANGULAR ±.15 MIN.
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
100	12-042-8000-120	CRATE, LDSF SHIPPING	1
101	12-042-0217	SECTION, SCREW END CAP	4
102	12-042-4013	ASSEMBLY, HINGE END GUARD	1
103	12-042-4014	ASSEMBLY, END PROTECTOR	4
104	1811K2	OIL GUN	1
105	5503A31	L-KEY, 5/8" BALL POINT	1
106	5709A45	HEX SET, 15 PCS BAL POINT - METRIC	1
107	5823A2	WRENCH, 1/2" SQ DRIVE RATCHET	1
108	6572A13	BOX, STORAGE	1
109	7149A83	SOCKET, 30mm	1
110	7191A16	WRENCH, 13mm COMBINATION	1
111	7191A23	WRENCH, 19mm COMBINATION	1
112	7191A36	WRENCH, 30mm COMBINATION	1
113	7191A37	WRENCH, 36mm COMBINATION	1



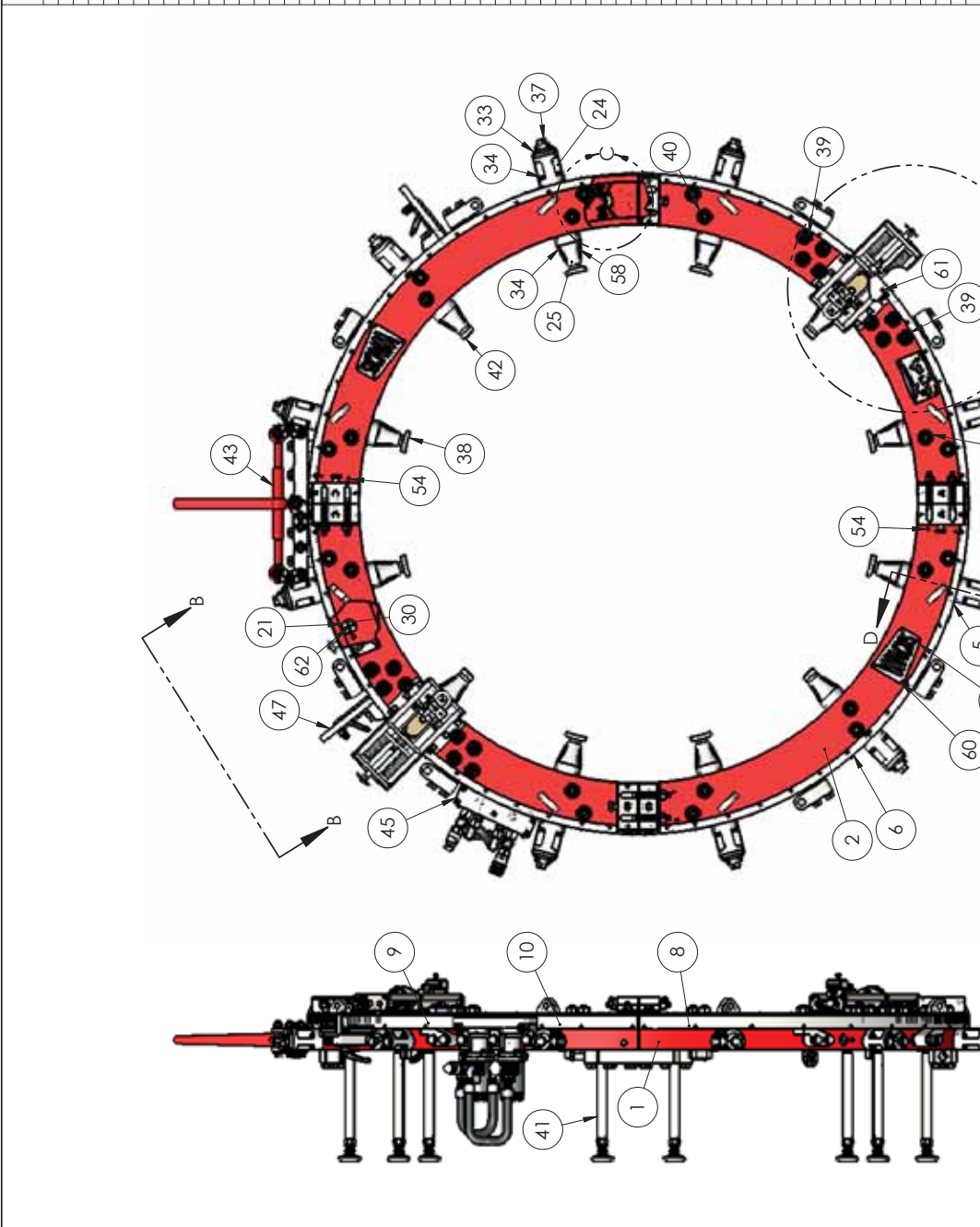
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 600 Knightsbridge Parkway
 Lincolnshire, IL 60069
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TITLE		ASSEMBLY, 120" DIAMETER LDSF	
DRAWN BY	MWG	APPROVED BY	KRP
DATE	11-20-13	DATE	11-20-13
SCALE	1:18	SHEET	3 OF 3
SIZE	B	DWG. NO.	12-042-5100-120
REV.	A		

UNLESS OTHERWISE SPECIFIED:
 FRACTIONS 1/32
 ONE PLACE DECIMAL ±.015
 E.H. WACHS WORKMANSHIP STANDARDS (M17.01)
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 ANGULAR ±.5 MIN.

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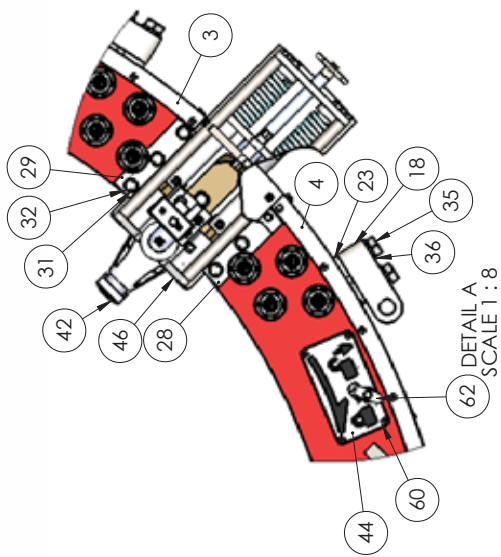
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0002-75	FRAME, 90° STATIONARY	1
2	12-042-0020-75	FRAME, ROTATING	1
3	12-042-0050-75	GUARD, GEAR	2
4	12-042-0051-75	GUARD, GEAR	2
5	12-042-0052-75	GUARD, GEAR	2
6	12-042-0053-75	GUARD, GEAR	2
7	12-042-0055-75	BASE PLATE	2
8	12-042-0057-75	GUARD, RADIAL GEAR	3
9	12-042-0058-75	GUARD, RADIAL GEAR	1
10	12-042-0059-75	GUARD, RADIAL GEAR	1
11	12-042-0054	BLOCK, GUARD END	8
12	12-042-0061	WIPER, FELT	8
13	12-042-0062	BRACKET, FELT WIPER	8
14	12-042-0063	PLATE, WACHS LOGO	2
15	12-042-0064	HOLDER, BRUSH	4
16	12-042-0065	BRUSH	8
17	12-042-0066	BLOCK, WIPER MOUNTING	4
18	12-042-0068	BRACKET, LIFTING	4
19	12-042-0069	BLOCK, LIFTING	8
20	12-042-0070	PLATE, UNLOCK INDICATOR	2
21	12-042-0072	BLOCK, LOCKING PIN	2
22	12-042-0073	REINFORCING PIN	2
23	12-042-0105	SPACER	16
24	12-042-0200	HOUSING, LEG EXTENSION	12
25	12-042-0201	KIT, CLAMP LEG, KEY WASHER	12
26	12-042-0208	KEY, CLAMP LEG	12
27	12-042-0209	CLAMP, LEFT SLIDE	2
28	12-042-0603	CLAMP, RIGHT SLIDE	2
29	12-042-0604	SHCS, M10 x 5mm x 35mm LING.	2
30	12-042-1974	HHCS, M12 x 1.75mm x 45mm LING.	12
31	12-042-1976	WASHER, M12	12
32	12-042-1977	SHCS, M10 x 1.5mm x 30mm LING.	48
33	12-042-1978	SHCS, M10 x 50mm LING.	96
34	12-042-1981	SHCS, M20 x 2.5mm x 100mm LING.	16
35	12-042-1981	WASHER, M20 THICK	16
36	12-042-1995	ASSEMBLY, LEG SCREW	12
37	12-042-4004	LEG, FIXED CLAMP	8
38	12-042-4005	ASSEMBLY, LOADED BEARING	16
39	12-042-4006	ASSEMBLY, IDLER BEARING	20
40	12-042-4007	ASSEMBLY, SET UP LEG	12
41	12-042-4008	ASSEMBLY, AXIAL ADJ. LEG	4
42	12-042-4011	ASSEMBLY, HINGE	1
43	12-042-4012	ASSEMBLY, LOCATING PIN PLATE	2
44	12-042-4015	ASSEMBLY, HYDRAULIC PLUMBING	1
45	12-042-4201	SLIDE, OUT OF ROUND	2
46	12-042-4401-00	ASSEMBLY, SPRING LOADED TRIP	2
47	12-042-4404	SPRING, 3.60 OD	16
48	60-1252-00	NAME PLATE	1
49	80-0080-00	RIVET	4
50	90-049-06	RETAINING RING, INTERNAL	12
51	WH 100	RETAINING RING, INTERNAL	2
52	SPIROLOX #8SN-75	BUSHING, 3/4" ID X 7/8" OD X 1" LING.	12
53	240D111	FERK GREASE	8
54	1102K30	SHCS, M16 x 2.0mm x 95mm LING.	16
55	91290A825	SHCS, M8 x 8mm x 25mm LING.	12
56	91292A129	PIN, COWEL 10mm x 24mm LING.	12
57	91595A643	PIN, ROLL M5 x 30mm LING.	24
58	91617A412	BHCS, M5 x 8mm x 10mm LING.	32
59	92095A206	BHCS, M5 x 11mm x 12mm LING.	148
60	92095A226	BHCS, M5 x 8mm x 10mm LING.	16
61	92125A208	T-HANDLE, 1/2" DIAMETER X 3-1/2" LING.	3
62	93750A720		



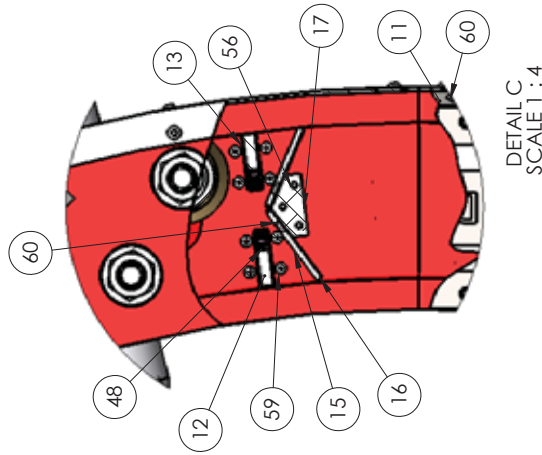


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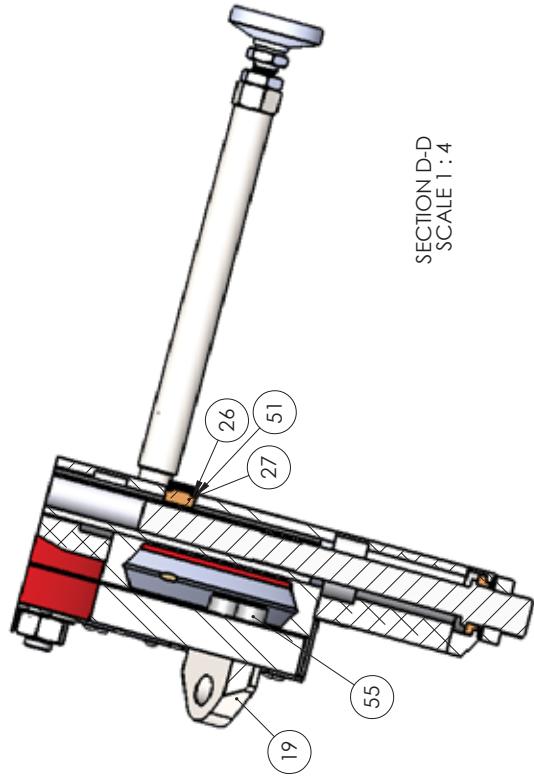
REV. A	RELEASED FOR PRODUCTION	DATE	12/6/2012	DESCRIPTION	DATE	12/6/2012	APPROVED BY	MWG	SCALE	1:16
REV. B	DESCRIPTION	DATE	12-6-12	DATE	12-6-12	APPROVED BY	KRP	SCALE	1 OF 3	REV. A
ASSEMBLY, 90° DIAMETER LDSF										
UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 THREE PLACE DECIMAL ±.005 ANGULAR ±.5 MIN. DO NOT SCALE DRAWING.										
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SECTION B-B
SCALE 1 : 8



DETAIL C
SCALE 1 : 4



SECTION D-D
SCALE 1 : 4

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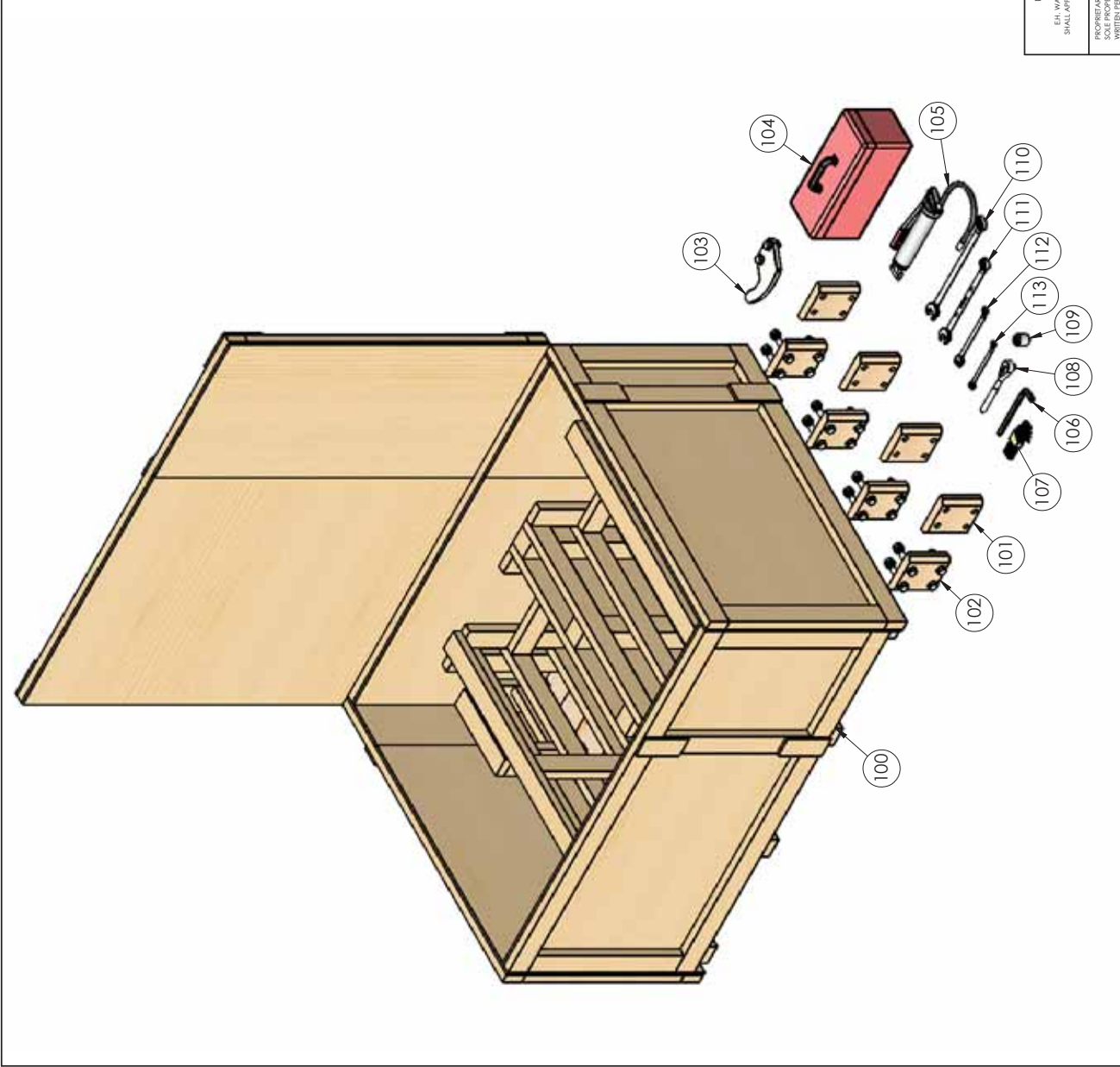
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TITLE		ASSEMBLY, 90" DIAMETER LDSF	
DRAWN BY	MWG	APPROVED BY	KRP
DATE	12-6-12	DATE	12-6-12
SCALE	1:16	SHEET	2 OF 3
SIZE	B	DWG. NO.	12-042-5100-75
REV.	A		

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
100	12-042-8000-75	CRATE, LDSF SHIPPING	1
101	12-042-0217	SECTION, SCREW END CAP	4
102	12-042-4014	ASSEMBLY, END PROTECTOR	4
103	12-042-4013	ASSEMBLY, HINGE END GUARD	1
104	6572A13	BOX, STORAGE	1
105	1811K2	OIL GUN	1
106	5503A31	L-KEY, 5/8" BALL POINT	1
107	5709A45	HEX SET, 15 PCS BAL POINT - METRIC	1
108	5823A2	WRENCH, 1/2" SQ DRIVE RATCHET	1
109	7149A83	SOCKET, 30mm	1
110	7191A37	WRENCH, 36mm COMBINATION	1
111	7191A36	WRENCH, 30mm COMBINATION	1
112	7191A23	WRENCH, 19mm COMBINATION	1
113	7191A16	WRENCH, 13mm COMBINATION	1

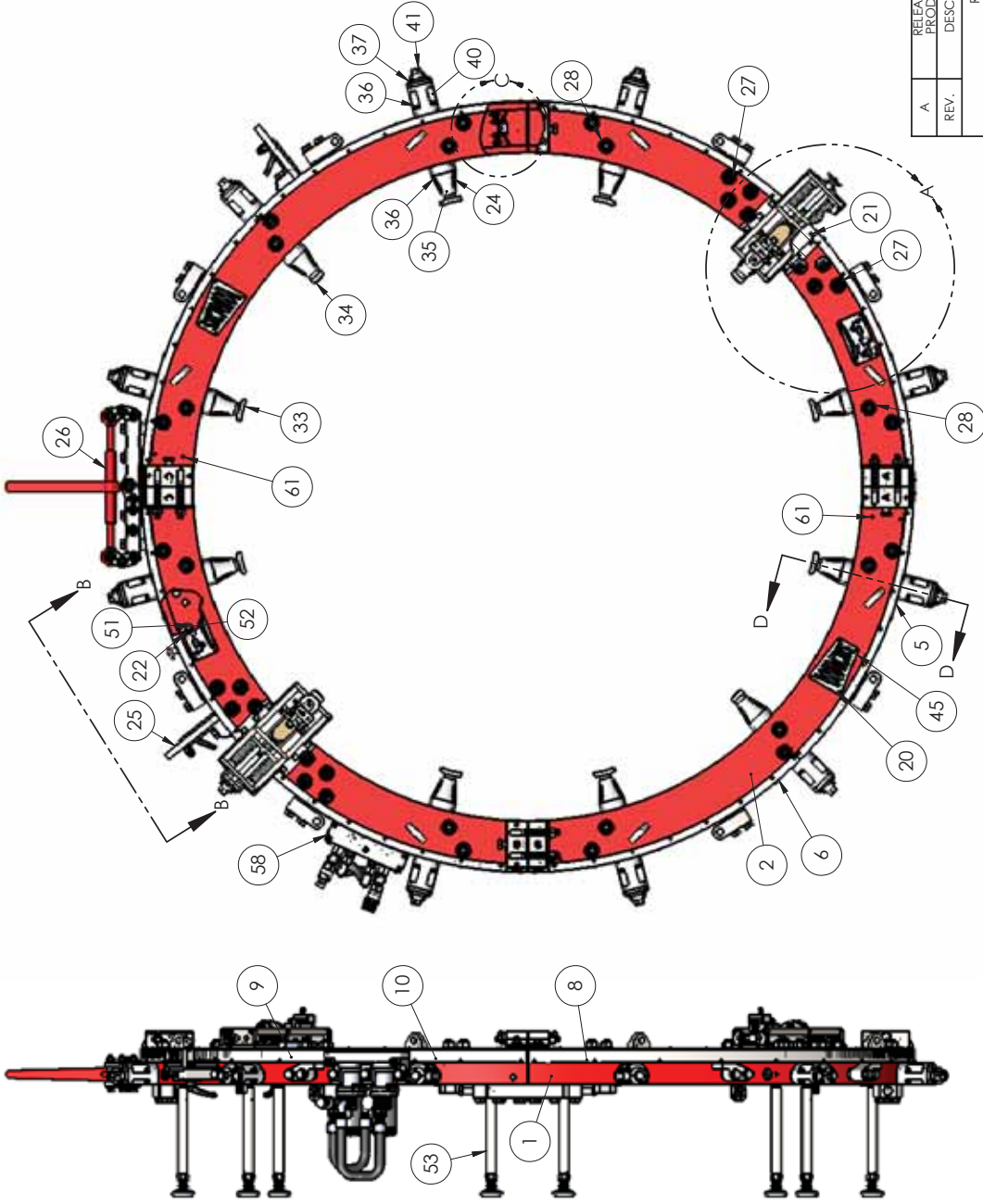


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TITLE		ASSEMBLY, 90" DIAMETER LDSF	
DRAWN BY	MWG	APPROVED BY	KRP
DATE	12-6-12	SCALE	1:16
SIZE	B	SHEET	3 OF 3
DWG. NO.	REV.		A
12-042-5100-75			

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0002-90	FRAME, 90" STATIONARY	1
2	12-042-0020-90	FRAME, ROTATING	1
3	12-042-0050-90	GUARD, GEAR	2
4	12-042-0051-90	GUARD, GEAR	2
5	12-042-0052-90	GUARD, GEAR	2
6	12-042-0053-90	GUARD, GEAR	2
7	12-042-0055-90	BASE PLATE	3
8	12-042-0057-90	GUARD RADIAL GEAR	1
9	12-042-0058-90	GUARD RADIAL GEAR	1
10	12-042-0059-90	GUARD RADIAL GEAR	1
11	60-1252-00	SPRING, 3/60 OD	16
12	80-0080-00	NAME PLATE	1
13	90-049-06	RIVET	4
14	WH, 100	RETAINING RING, INTERNAL	12
15	SPIROLOX #RSN-75	RETAINING RING, .704 DIA. x .046 GROOVE	2
16	24DU16	BUSHING, 3/4 ID x 7/8 OD x 1 LING.	12
17	91292A129	SHCS, M5 x .8mm x 2.5mm LING.	12
18	91595A643	PIN, DOWEL 10mm x 24mm LING.	4
19	92095A208	BHCS, M5 x .8mm x 10mm LING.	32
20	92095A226	BHCS, M6 x 1mm x 12mm LING.	148
21	92125A208	FHCS, M5 x .8mm x 10mm LING.	16
22	93750A720	I-HANDLE, 172" DIAMETER x 3-1/2" LING.	3
23	12-042-4401-00	SLIDE, OUT OF ROUND	2
24	91610A412	PIN, ROLL M3 x 30mm LING.	24
25	12-042-4404	ASSEMBLY, SPRING LOADED TRIP	2
26	12-042-4012	ASSEMBLY, HINGE	1
27	12-042-4007	ASSEMBLY, LOADED BEARING	16
28	12-042-4006	ASSEMBLY, IDLER BEARING	20
29	12-042-1981	FHCS, M20 x 2.5mm x 100mm LING.	16
30	12-042-1995	WASHER, M20 THICK	16
31	12-042-0105	SPACER	16
32	12-042-0068	BRACKET, LIFTING	8
33	12-042-4005	LEG, FIXED CLAMP	8
34	12-042-4011	ASSEMBLY, AXIAL ADJ. LEG	4
35	12-042-0201	HOUSING, LEG EXTENSION	12
36	12-042-1979	SHCS, M10 x 50mm LING.	96
37	12-042-1978	SHCS, M10 x 1.5mm x 30mm LING.	48
38	12-042-0208	KIT, CLAMP LEG KEY WASHER	12
39	12-042-0209	KEY, CLAMP LEG	12
40	12-042-0200	SPACER, LEG HOUSING	12
41	12-042-4004	ASSEMBLY, LEG SCREW	12
42	12-042-0054	BLOCK, GUARD END	8
43	12-042-0070	PLATE, UNLOCK INDICATOR	2
44	12-042-0073	RETAINER, PIN	2
45	12-042-0063	PLATE, WACHS LOGO	2
46	12-042-0061	WIPER, FELT	8
47	12-042-0064	HOLDER, BRUSH	4
48	12-042-0065	BRUSH	8
49	12-042-0066	BLOCK, WIPER MOUNTING	4
50	12-042-0062	BRACKET, FELT WIPER	8
51	12-042-0072	BLOCK, LOCATING, PIN	8
52	12-042-1974	SHCS, M10 x 50mm x 35mm LING.	6
53	12-042-4008	ASSEMBLY, SET UP LEG	2
54	12-042-1976	WASHER, M12	12
55	12-042-1977	WASHER, M12	12
56	12-042-0403	CLAMP, LEFT SLIDE	2
57	12-042-0603	CLAMP, RIGHT SLIDE	2
58	12-042-0604	ASSEMBLY, HYDRAULIC PLUMBING	7
59	12-042-4009	BLOCK, LIFTING	8
60	91290A625	SHCS, M16 x 2.0mm x 58mm LING.	16
61	1102K32	ZERK, GREASE	8
62	12-042-4015	ASSEMBLY, LOCATING PIN PLATE	2



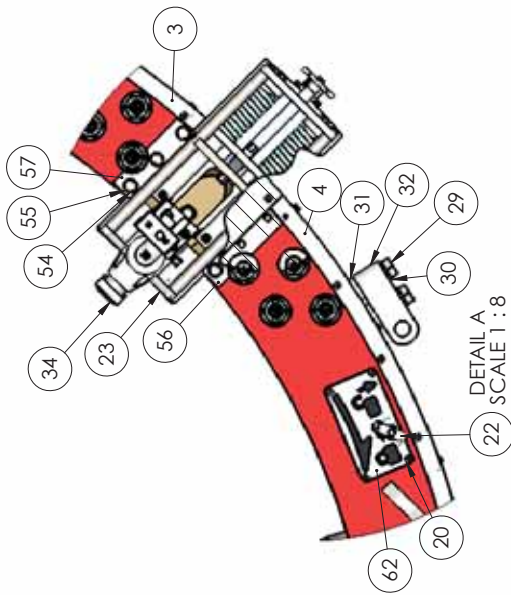
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REV.	DESCRIPTION	DATE	APR.
A	RELEASED FOR PRODUCTION	12/16/2012	MWG

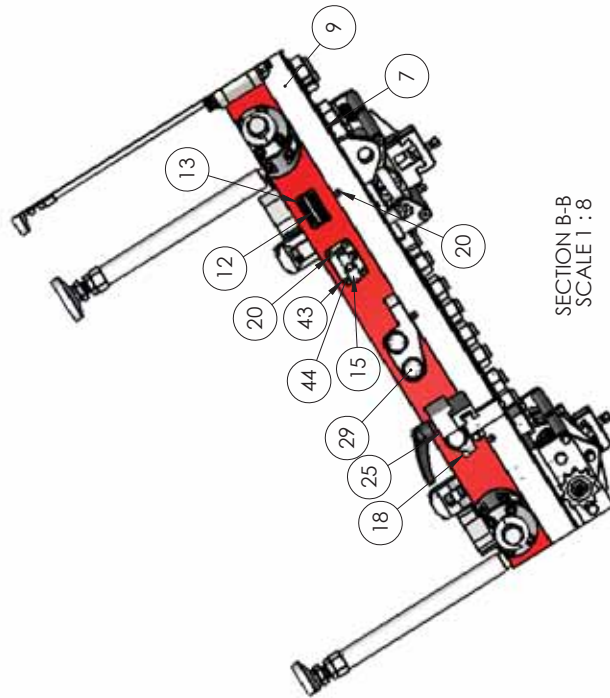
TITLE	ASSEMBLY, 90" DIAMETER LDSF
DRAWN BY	MWG
APPROVED BY	KRP
SCALE	1:16
DATE	12-6-12
DATE	12-6-12
SHEET	1 OF 3
SIZE	DWG. NO. 12-042-5100-90
REV.	A

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ONE PLACE DECIMAL ±.015
THREE PLACE DECIMAL ±.005
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DO NOT SCALE DRAWING.
ANGULAR ±.5 MIN.

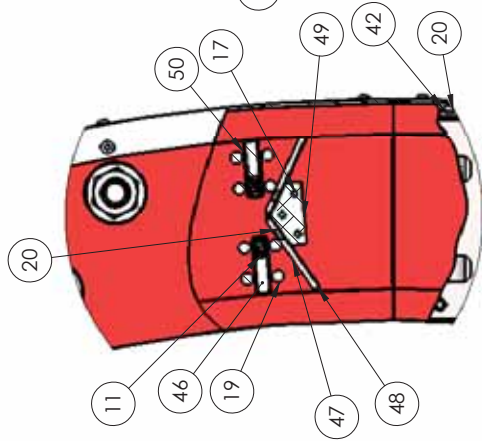
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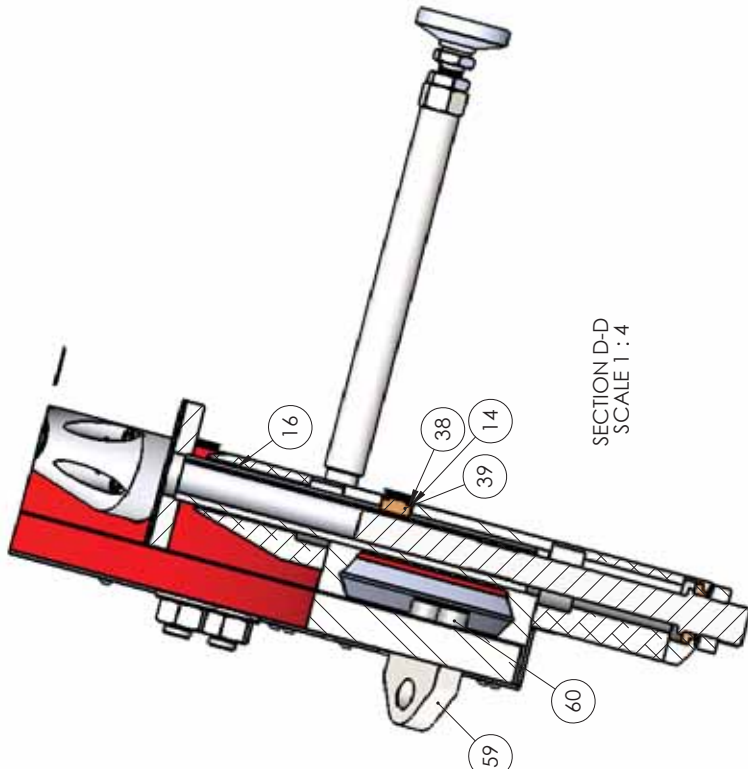
DETAIL A
SCALE 1 : 8



SECTION B-B
SCALE 1 : 8



DETAIL C
SCALE 1 : 4



SECTION D-D
SCALE 1 : 4

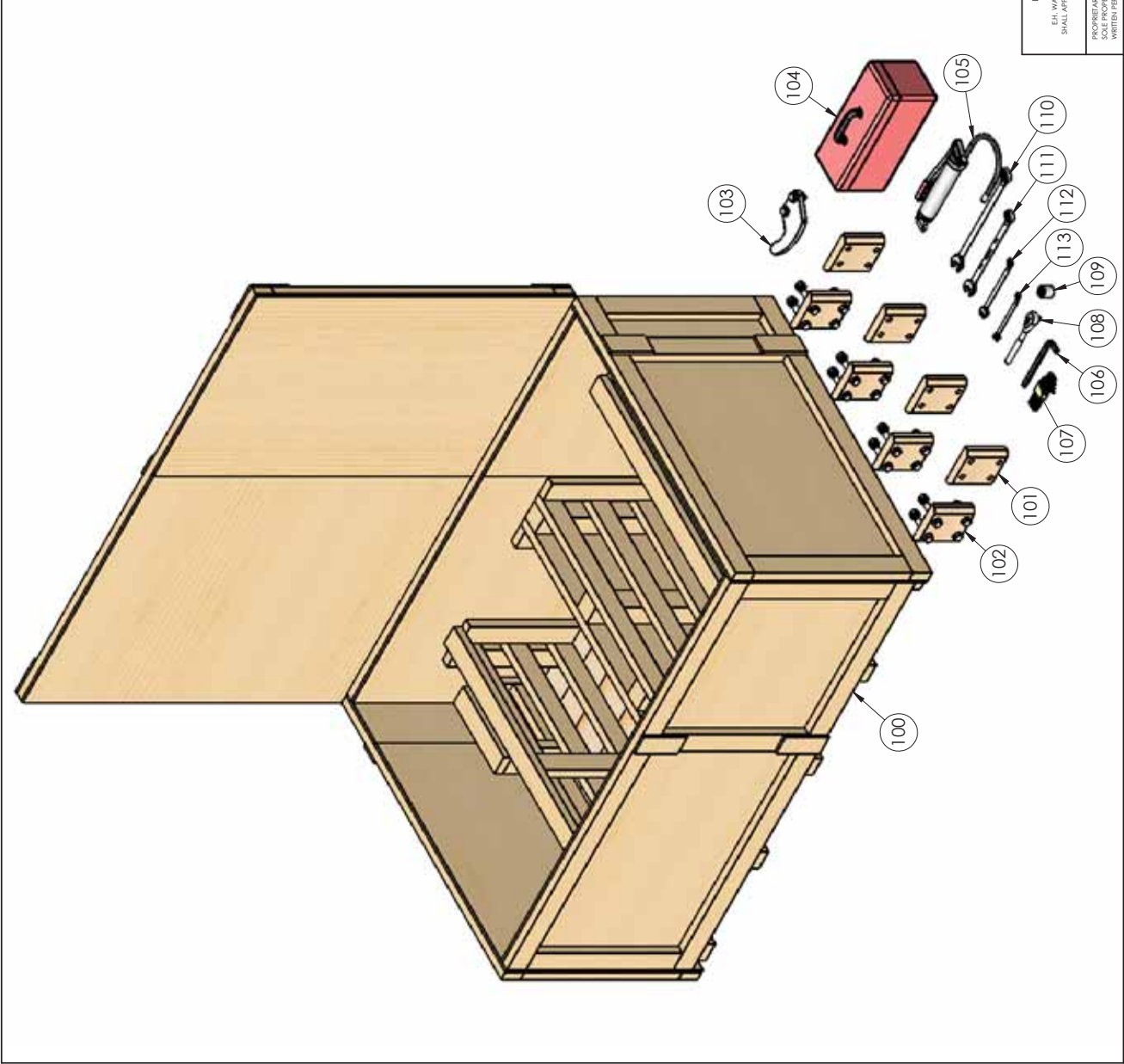


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TITLE		ASSEMBLY, 90" DIAMETER LDSF	
DRAWN BY	MWG	APPROVED BY	KRP
DATE	12-6-12	DATE	12-6-12
SCALE	1:16	SHEET	2 OF 3
SIZE	B	DWG. NO.	12-042-5100-90
REV.	A		

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
100	12-042-8000-90	CRATE, LDSF SHIPPING	1
101	12-042-0217	SECTION, SCREW END CAP	4
102	12-042-4014	ASSEMBLY, END PROTECTOR	4
103	12-042-4013	ASSEMBLY, HINGE END GUARD	1
104	6572A13	BOX, STORAGE	1
105	1811K2	OIL GUN	1
106	5503A31	L-KEY, 5/8" BALL POINT	1
107	5709A45	HEX SET, 15 PCS BAL POINT - METRIC	1
108	5823A2	WRENCH, 1/2" SQ DRIVE RATCHET	1
109	7149A83	SOCKET, 30mm	1
110	7191A37	WRENCH, 36mm COMBINATION	1
111	7191A36	WRENCH, 30mm COMBINATION	1
112	7191A23	WRENCH, 19mm COMBINATION	1
113	7191A16	WRENCH, 13mm COMBINATION	1



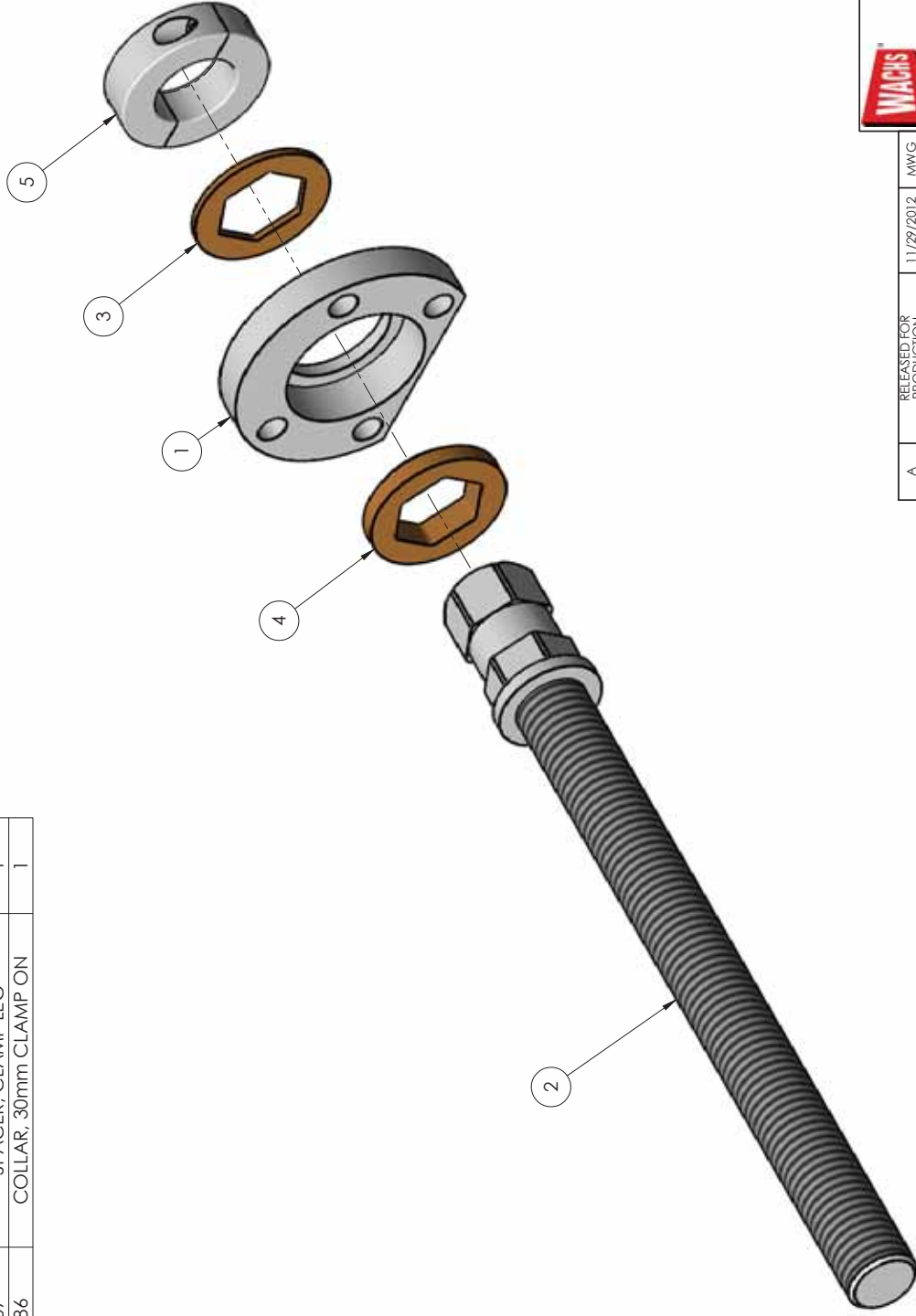
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TITLE		ASSEMBLY, 90" DIAMETER LDSF	
DRAWN BY	MWG	APPROVED BY	KRP
DATE	12-6-12	DATE	12-6-12
SCALE	1:16	SHEET	3 OF 3
SIZE	B	DWG. NO.	12-042-5100-90
REV.	A		

UNLESS OTHERWISE SPECIFIED:
FRACTIONS 1/32
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ANGULAR ± 15 MIN.

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0202	CAP, CLAMP LEG END	1
2	12-042-0205	SCREW, CLAMP LEG	1
3	12-042-0206	WASHER, THRUST	1
4	12-042-0207	SPACER, CLAMP LEG	1
5	12-042-1986	COLLAR, 30mm CLAMP ON	1



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A	RELEASED FOR PRODUCTION	11/29/2012	MWG	APR.
REV.	DESCRIPTION	DATE		

REVISION HISTORY

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ONE PLACE DECIMAL ± 0.15
TWO PLACE DECIMAL ± 0.05
THREE PLACE DECIMAL ± 0.025
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TOLERANCES:
FRACTIONS 1/32
ONE PLACE DECIMAL ± 0.15
TWO PLACE DECIMAL ± 0.05
THREE PLACE DECIMAL ± 0.025
ANGULAR ± 0.5 MIN.

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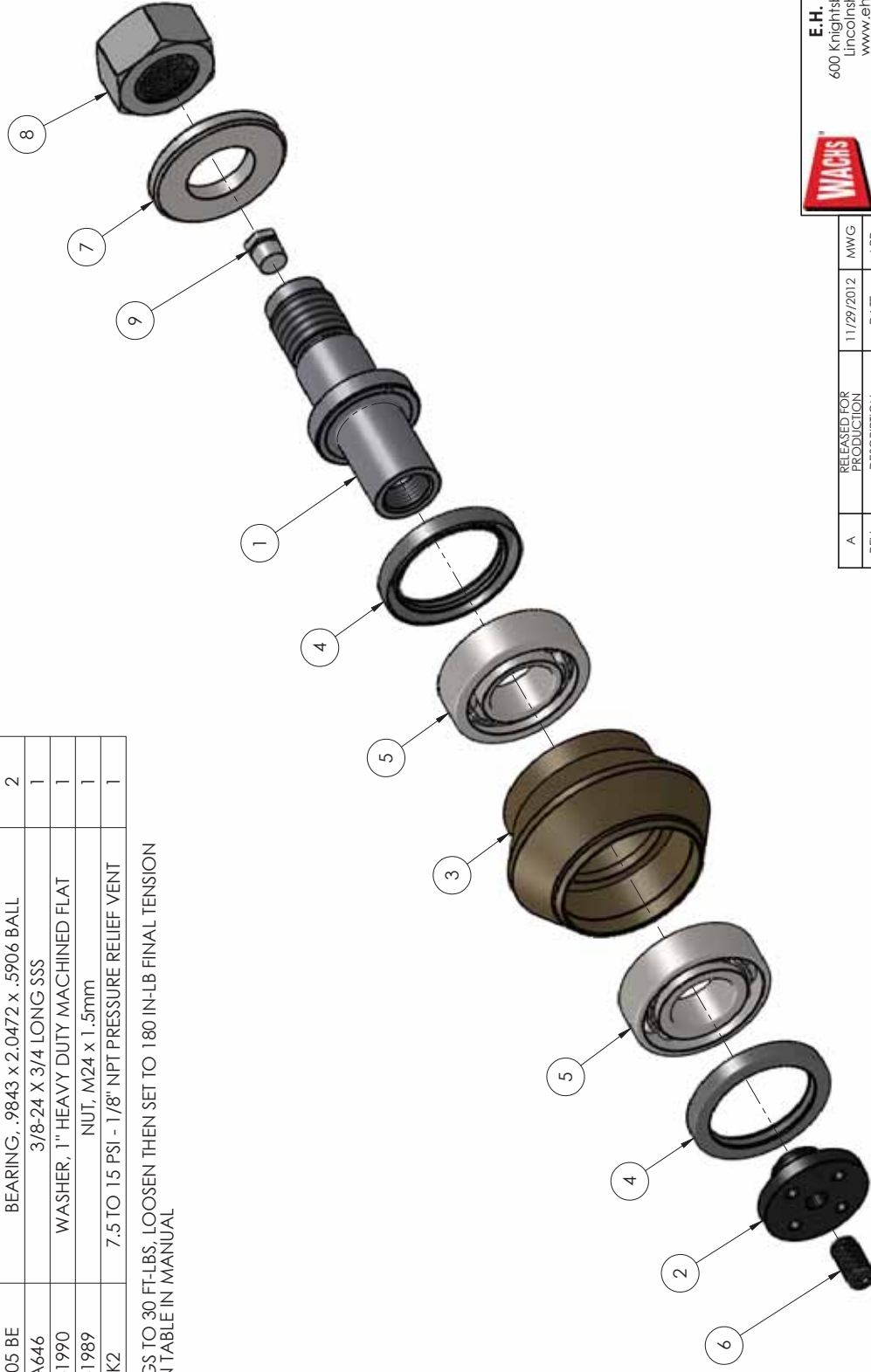
TITLE

ASSEMBLY, LEG SCREW

DRAWN BY	MWG	APPROVED BY	KRP	SCALE	2:3
DATE	11-29-12	DATE	11-29-12	SHEET	1 OF 1
SIZE	B	DWG. NO.	12-042-4004	REV.	A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0040	SHAFT, ECCENTRIC V-ROLLER	1
2	12-042-0041	SCREW, ECCENTRIC LOCKING	1
3	12-042-0042	ROLLER, V-GROOVE	1
4	12-042-0044	SEAL, 1.563 x 2.066	2
5	SKF - 7205 BE	BEARING, .9843 x 2.0472 x .5906 BALL	2
6	91375A646	3/8-24 X 3/4 LONG SSS	1
7	12-042-1990	WASHER, 1" HEAVY DUTY MACHINED FLAT	1
8	12-042-1989	NUT, M24 x 1.5mm	1
9	1093K2	7.5 TO 15 PSI - 1/8" NPT PRESSURE RELIEF VENT	1

NOTE: TIGHTEN BEARINGS TO 30 FT.-LBS. LOOSEN THEN SET TO 180 IN.-LB FINAL TENSION
SEE LUBRICATION TABLE IN MANUAL



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TWO PLACE DECIMAL ±.005
THREE PLACE DECIMAL ±.005
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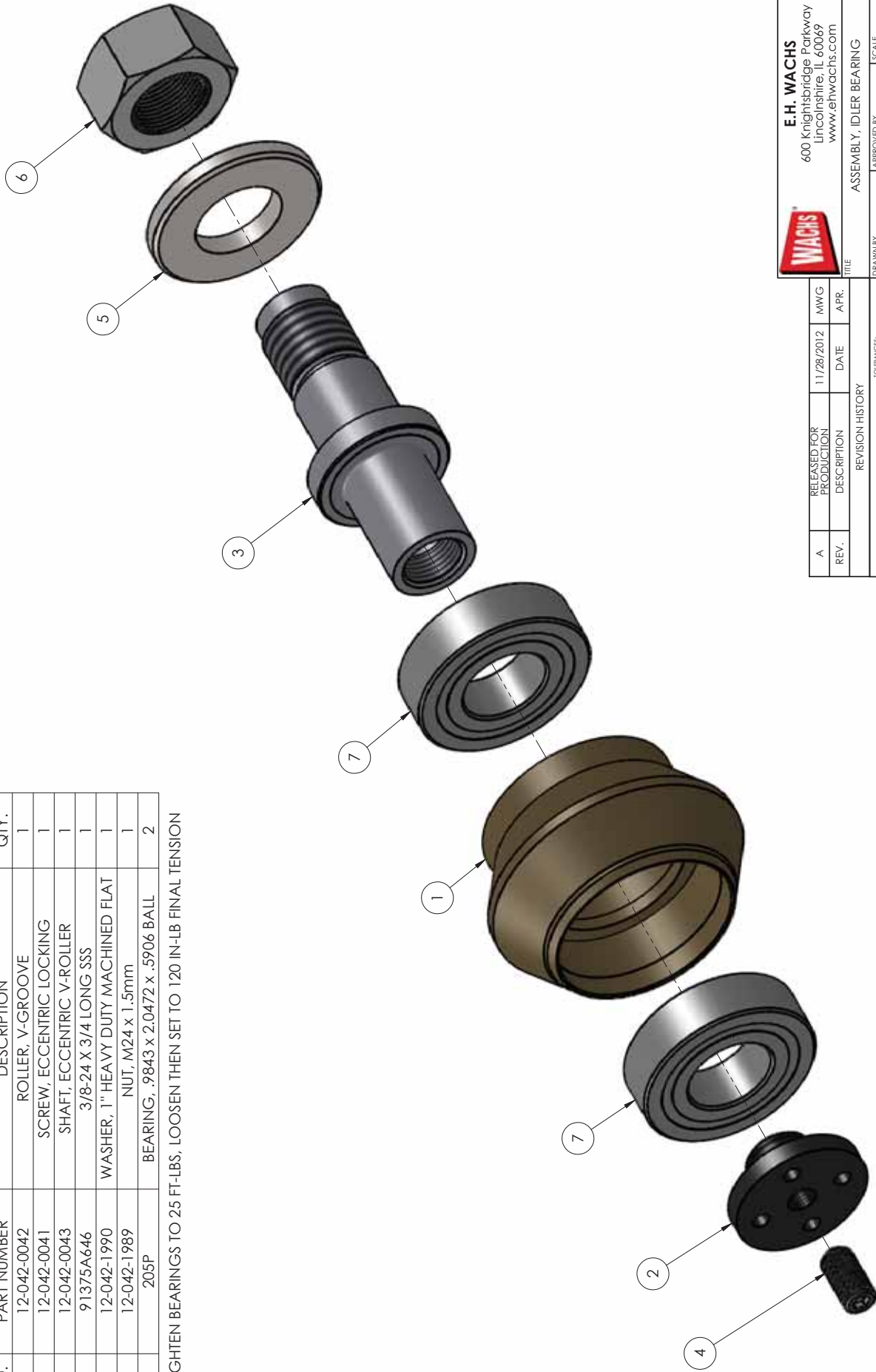
TITLE
ASSEMBLY, LOADED BEARING

DRAWN BY	MWG	APPROVED BY	KRP	SCALE	2:3
DATE	11-29-12	DATE	11-29-12	SHEET	1 OF 1

SIZE	B	DWG. NO.	12-042-4006	REV.	A
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0042	ROLLER, V-GROOVE	1
2	12-042-0041	SCREW, ECCENTRIC LOCKING	1
3	12-042-0043	SHAFT, ECCENTRIC V-ROLLER	1
4	91375A646	3/8-24 X 3/4 LONG SSS	1
5	12-042-1990	WASHER, 1" HEAVY DUTY MACHINED FLAT	1
6	12-042-1989	NUT, M24 x 1.5mm	1
7	205P	BEARING, .9843 x 2.0472 x .5906 BALL	2

NOTE: TIGHTEN BEARINGS TO 25 FT-LBS, LOOSEN THEN SET TO 120 IN-LB FINAL TENSION



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A	RELEASED FOR PRODUCTION	11/28/2012	MWG	APR.
REV.	DESCRIPTION	DATE		

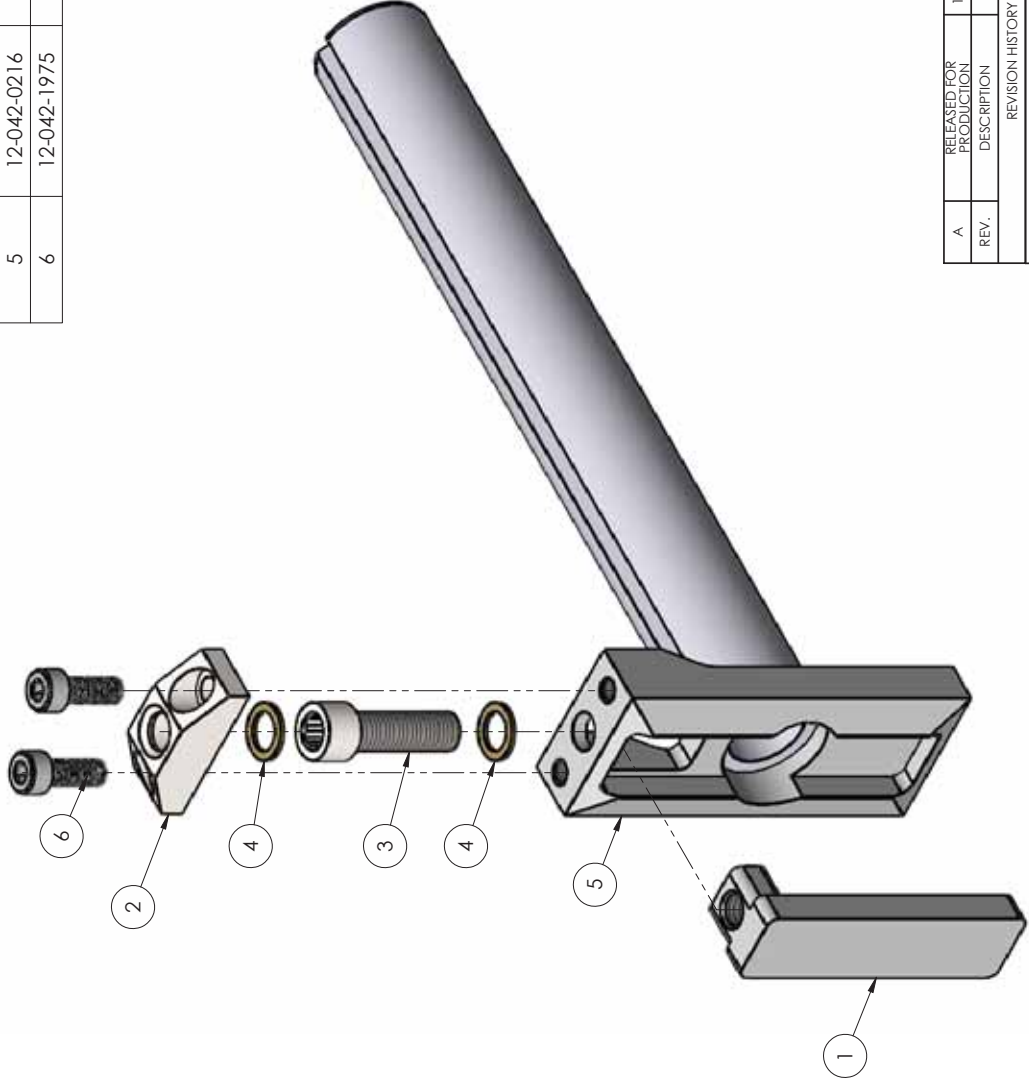
REVISION HISTORY			
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TITLE			
DRAWN BY	APPROVED BY	SCALE	
MWG	KRP	1:1	
DATE	DATE	SHEET	
11-28-12	11-28-12	1 OF 1	

SIZE	DWG. NO.	REV.
B	12-042-4007	A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0212	FOOT, EXTENDED CONTACT	1
2	12-042-0213	CAP, AXIAL LEG END	1
3	12-042-0214	SCREW, LEG AXIAL ADJUSTMENT	1
4	12-042-0215	WASHER, MODIFIED BRONZE	2
5	12-042-0216	WELDMENT, AXIAL ADJUSTABLE CLAMP LEG	1
6	12-042-1975	SHCS, M8 x 1.25mm x 22mm LNG.	2



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A	RELEASED FOR PRODUCTION	12/10/2012	MWG	APR.
REV.	DESCRIPTION	DATE		

REVISION HISTORY				
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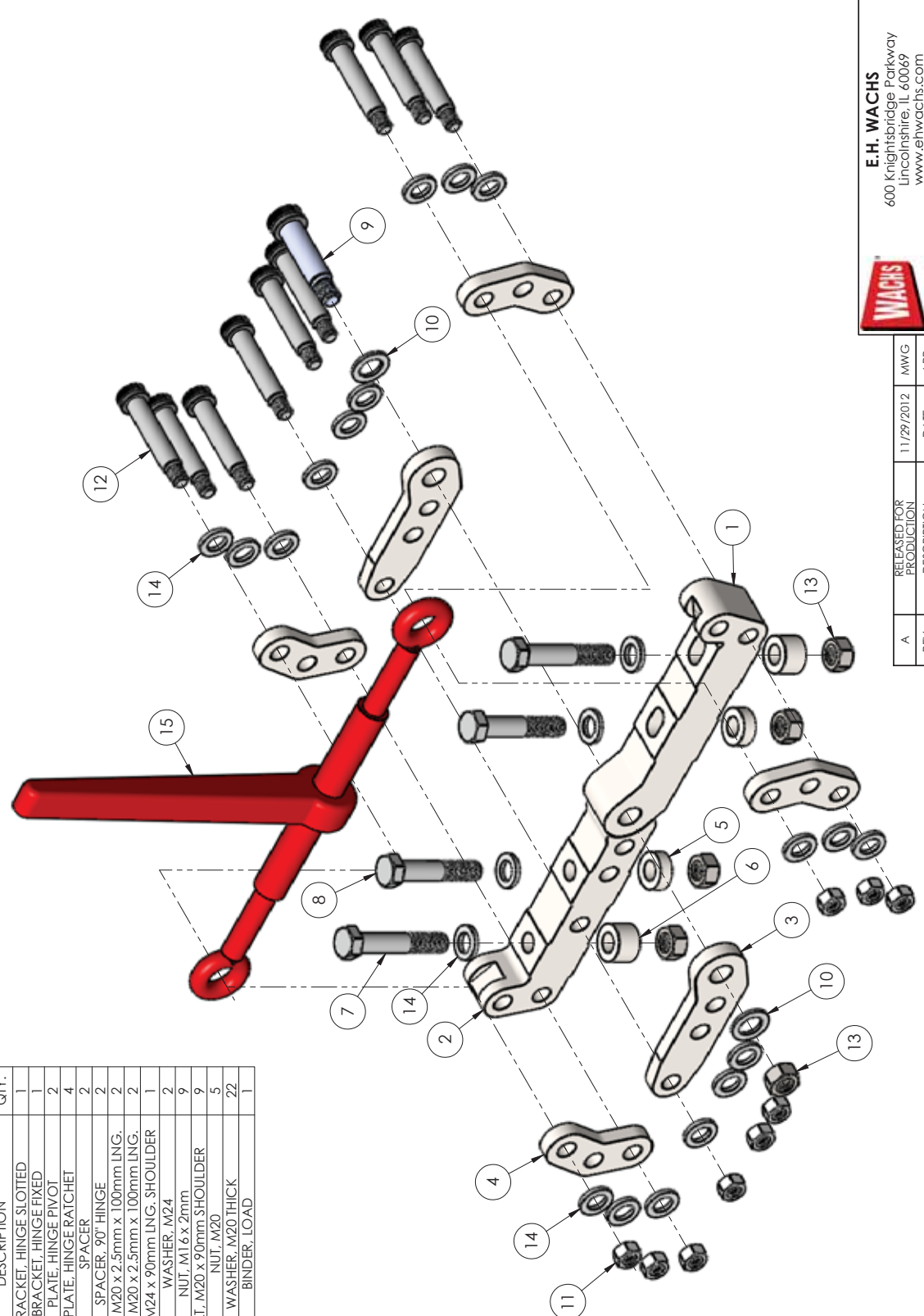
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FRACTIONS 1/32
ONE PLACE DECIMAL ± 0.15
TWO PLACE DECIMAL ± 0.05
THREE PLACE DECIMAL ± 0.025
SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING.
DO NOT SCALE DRAWING.
ANGULAR ± 15 MIN.

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DRAWN BY	MWG	APPROVED BY	KRP	SCALE	2:3
DATE	12-10-12	DATE	12-10-12	SHEET	1 OF 1

TITLE	ASSEMBLY, AXIAL ADJ. LEG				
SIZE	B	DWG. NO.	12-042-4011		
REV.	A				

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0101	BRACKET, HINGE SLOTTED	1
2	12-042-0102	BRACKET, HINGE FIXED	1
3	12-042-0103	PLATE, HINGE PIVOT	2
4	12-042-0104	PLATE, HINGE RATCHET	4
5	12-042-0105	SPACER	2
6	12-042-0106	SPACER, 90° HINGE	2
7	12-042-1980	HHCS, M20 x 2.5mm x 100mm LING.	2
8	12-042-1981	HHCS, M20 x 2.5mm x 100mm LING.	2
9	12-042-1982	BOLT, M24 x 90mm LING. SHOULDER	1
10	12-042-1983	WASHER, M24	2
11	12-042-1984	NUT, M16 x 2mm	9
12	12-042-1985	BOLT, M20 x 90mm SHOULDER	9
13	12-042-1994	NUT, M20	5
14	12-042-1995	WASHER, M20 THICK	22
15	MCMASTER CARR #296713	BINDER, LOAD	1



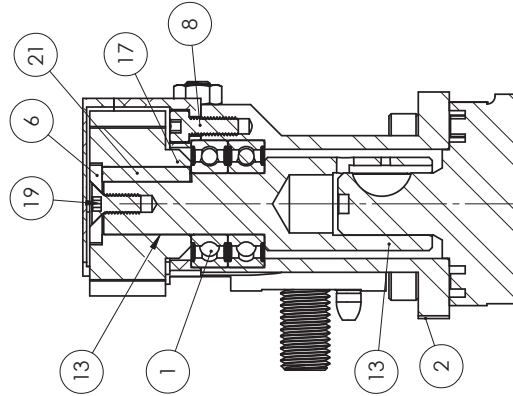
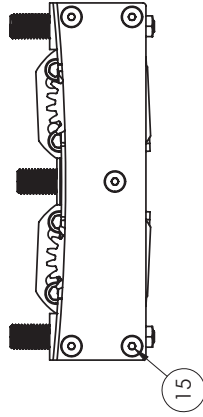
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REV.	DESCRIPTION	DATE	APR.
A	RELEASED FOR PRODUCTION	11/29/2012	MWG

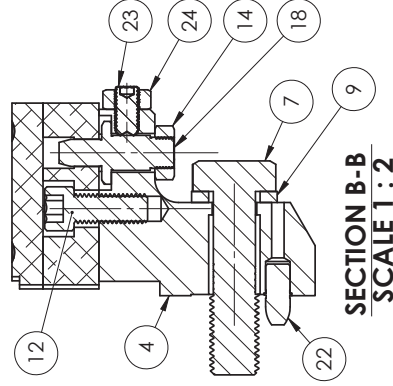
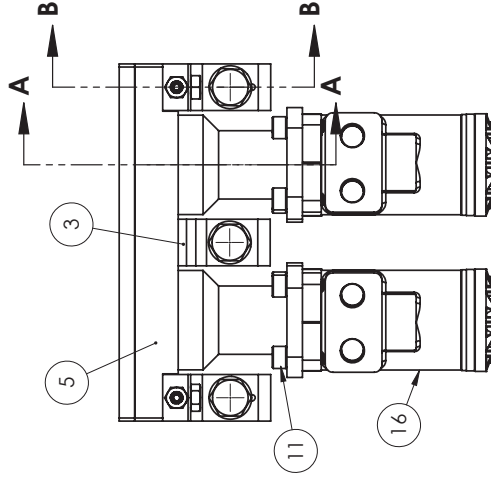
REVISION HISTORY			
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TITLE			
DRAWN BY	MWG	APPROVED BY	KRP
DATE	11-29-12	DATE	11-29-12
SCALE	1:4	SHEET	1 OF 1
SIZE	B	DWG. NO.	12-042-4012
REV.	A		

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	6205-2RSL	BEARING	4
2	12-042-0401	BEARING HOUSING	2
3	12-042-0403	MOUNTING BRACKET, DRIVE	1
4	12-042-0404	MOUNTING BRACKET, DRIVE	2
5	12-042-0405	PLATE, PINION HOUSING	1
6	12-042-0410	RETAINER, GEAR	2
7	12-042-0396	SCREW, CAPTIVATED	3
8	12-042-1971	SHCS, M8 x 1.25mm x 20mm LNG.	10
9	12-042-1995	WASHER, M20 THICK	3
10	12-042-1972	SSS, M10 x 1.5mm x 20mm LNG.	2
11	12-042-1968	SHCS, 3/8-16 x 1" LNG.	8
12	12-042-1970	SHCS, M12 x 1.75mm x 30mm LNG.	3
13	12-042-0409	SHAFT	2
14	91847A525	JAM NUT, 1/2-20	2
15	12-042-1969	FHCS, M8 x 1.25mm x 25mm LNG.	5
16	EATON 101-1014	HYDRAULIC MOTOR	2
17	12-042-0400	GEAR, PINION	2
18	TLP-5083	LOCATING PIN	2
19	12-042-1973	FHCS, M8 x 1.25mm x 22mm LNG.	2
20	12-042-0406	COVER, DRIVE GEAR	1
21	96717A230	KEY, 6mm SQ. x 36mm LNG.	2
22	CLM-100-BND	DOWEL, M10 BULLET NOSE	2
23	99642A163	SSS, M10 x 1mm x 20mm LNG.	2
24	91415A215	NUT, M10 x 1mm	2



SECTION A-A
SCALE 1 : 2



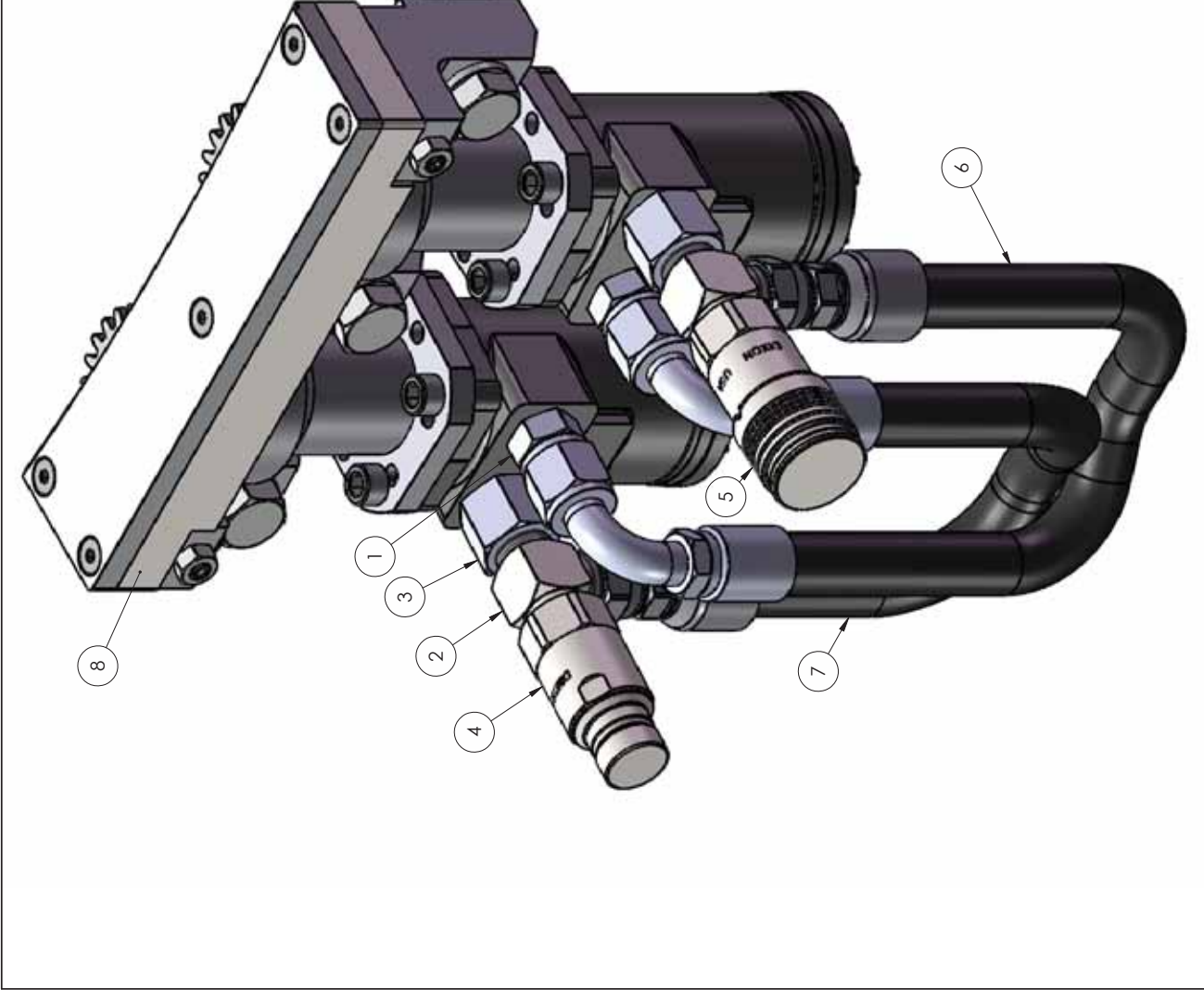
SECTION B-B
SCALE 1 : 2

0	RELEASED	9/12/2012	AG	
REV.	DESCRIPTION	DATE	APR.	
REVISION HISTORY				
UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 THREE PLACE DECIMAL ±.005 E.H. WACHS WORKMANSHIP STANDARDS (M17.01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. DO NOT SCALE DRAWING. ANGULAR ±.5 ANI.				
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DRAWN BY		APPROVED BY		SCALE
AG				1:4
DATE		DATE		SHEET
9/12/12				1 OF 1
SIZE	DWG. NO.	REV.		
B	12-042-4200	0		

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TITLE
HYDRAULIC DRIVE, 90" LDSF

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-10_f50x-s	ADAPTER, -10 ORB (M) x -12 JIC (M)	2
2	2610-12-12-12	FITTING, TEE 3/4" NPT (M) x 3/4" NPT (M) x 3/4" JIC (M)	2
3	10-3-4_f50g-s	ADAPTER, FITTING, -10 ORB (M) x -12 NPT (F)	2
4	FF6HP	PLUG, QUICK DISCONNECT	1
5	FF6HS	SOCKET, QUICK DISCONNECT	1
6	12-042-4402	ASSEMBLY, HOSE	1
7	12-042-4402	ASSEMBLY, HOSE	1
8	12-042-4200	HYDRAULIC DRIVE, 90 "LDSF	1



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TITLE: ASSEMBLY, HYDRAULIC PLUMBING

DRAWN BY: MWG
 APPROVED BY: KRP
 SCALE: 1:2
 DATE: 6-27-13
 SHEET: 1 OF 1

SIZE: B
 DWG. NO.: 12-042-4201
 REV.: A

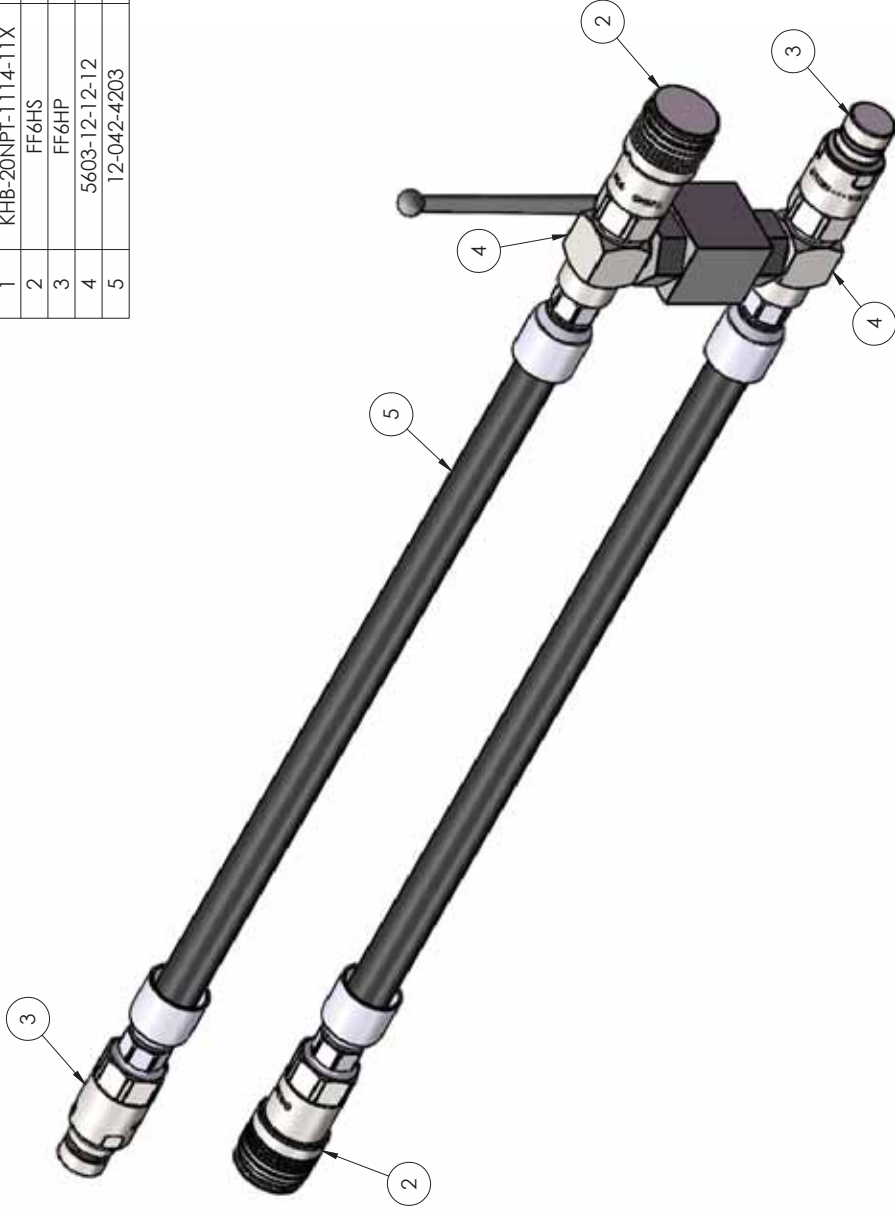
REV.	RELEASED FOR PRODUCTION	DATE	MWG	APR.
A		6/27/2013		

REVISION HISTORY

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 FRACTIONS 1/32
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 TWO PLACE DECIMAL ±.005
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 SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING.
 THREE PLACE DECIMAL ±.005
 DO NOT SCALE DRAWING.
 ANGULAR ±.5 MIN.

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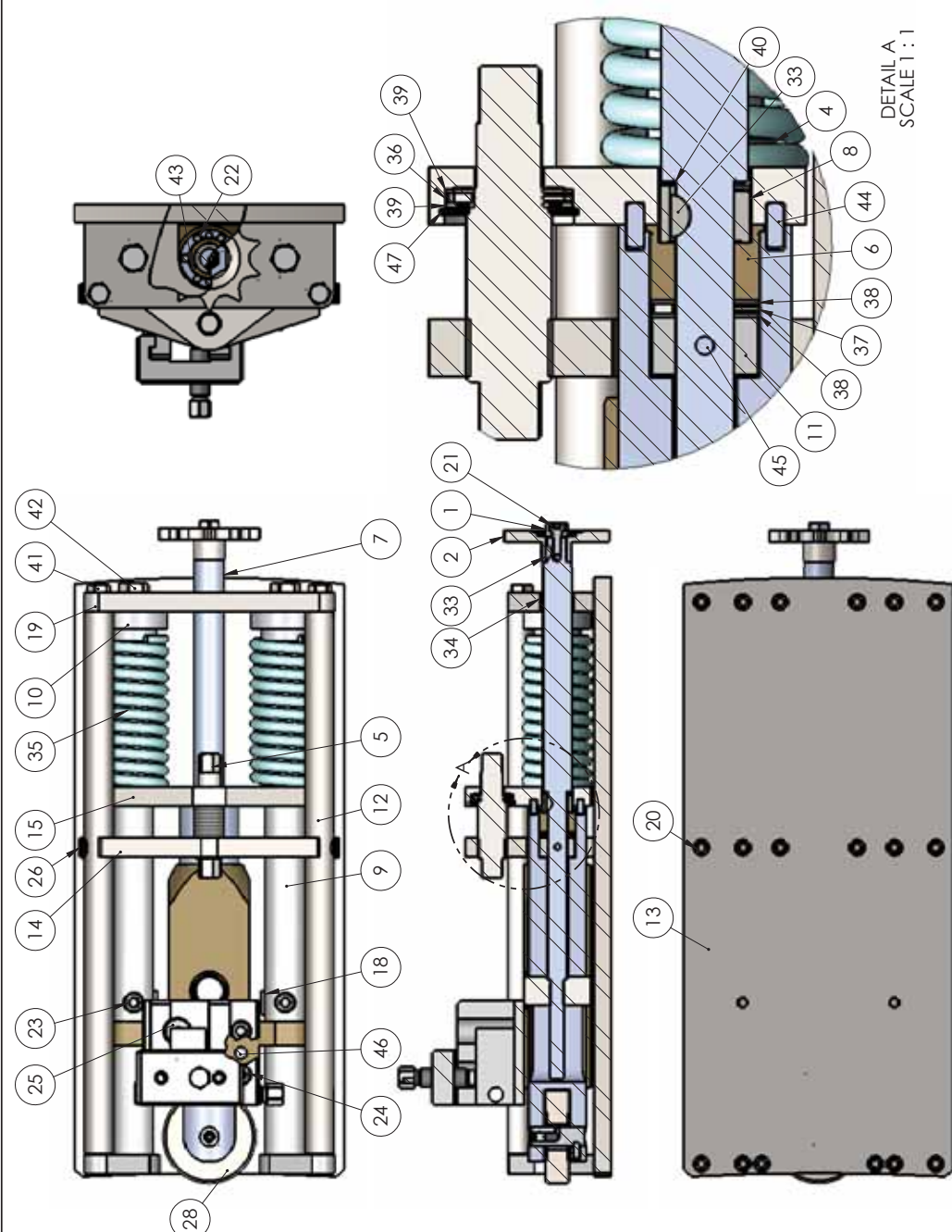
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	KHB-20NPT-1114-11X	VALVE, BALL 3/4" NPT (F) x 3/4" NPT (F)	1
2	FF6HS	SOCKET, QUICK DISCONNECT	2
3	FF6HP	PLUG, QUICK DISCONNECT	2
4	5603-12-12-12	DESCRIPTION	2
5	12-042-4203	HOSE, 3/4" x 24" LNG.	2



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TITLE		DRAWN BY		APPROVED BY		SCALE	
ASSEMBLY, HYDRAULIC SHUTOFF		MWG		KRP		1:3	
REV.		DATE		DATE		SHEET	
A		6/27/2013		6-27-13		1 OF 1	
DESCRIPTION		MWG		KRP		1:3	
REVISION HISTORY		DATE		DATE		SHEET	
UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 ONE PLACE DECIMAL ± 0.05 TWO PLACE DECIMAL ± 0.005 THREE PLACE DECIMAL ± 0.005 ANGULAR ± 0.5 MIN. DO NOT SCALE DRAWING.		6/27/2013		6-27-13		1 OF 1	
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		A		B		A	

12-042-4202



DETAIL A
SCALE 1:1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-1201-00	RETAINER, STARWHEEL	1
2	12-042-1204-00	STARWHEEL	1
3	12-042-1210-00	HOLDER, TOOL	1
4	12-042-1265-00	BEARING, 1.002 X 1.282 X 1.0 I.G. SLEEVE	2
5	12-042-1281-00	SCREW, SPRING TENSIONING	1
6	12-042-1285-00	BUSHING, FEED SCREW	1
7	12-042-1310-00	SCREW, FEED	1
8	12-042-1311-00	SPACER, FEED SCREW	1
9	12-042-1312-00	SHAFT, GUIDE	2
10	12-042-1313-00	SPACER, SPRING	2
11	12-042-1314-00	BLOCK, SHAFT BEARING	1
12	12-042-1315-00	ROD, STIFFENER	2
13	12-042-1320-00	PLATE, BASE	1
14	12-042-1321-00	PLATE, GUIDE BAR SUPPORT	1
15	12-042-1322-00	PLATE, TRACKING BAR END	1
16	12-042-1323-00	MOUNT, RIGHT GUIDE BAR	1
17	12-042-1324-00	MOUNT, LEFT GUIDE BAR	1
18	12-042-1325-00	MOUNT, GUIDE BAR	2
19	12-042-1326-00	PLATE, GUIDE BAR SUPPORT	1
20	12-042-1329-00	SHCS, M6 x 1.0mm x 1.6mm LING.	18
21	12-042-1340-00	SHCS, M6 x 1.0 x 1.5mm LING.	1
22	12-042-1341-90	SHCS, A5 x 8mm x 1.8mm LING.	6
23	12-042-1342-90	SHCS, M8 x 1.25mm x 45mm LING.	2
24	12-042-1343-90	SHCS, M8 x 1.25mm x 30mm LING.	2
25	12-042-1344-90	PHCS, M8 x 1.25mm x 18mm LING.	2
26	12-042-1345-90	BOLT, SHOULDER M8 x 25mm LING.	2
27	12-042-1346-90	PHCS, M10 x 1.5mm x 30mm LING.	2
28	12-042-1347-00	PARTING SLIDE SUB-ASSEMBLY, 10-20 LGSF	1
29	69-400-44	SCREW, TOP LOCK	2
30	69-400-68	BLOCK, .67 TOOL SUPPORT	1
31	69-400-69	BLOCK, .75 TOOL SUPPORT	1
32	69-400-70	BLOCK, 1.00 X .92 TOOL SUPPORT	1
33	90-019-43	KEY, 3/32 X 3/8 WOODRUFF	2
34	AA-838-14	BUSHING, 3/4" X 7/8" X 1/2" LING.	1
35	LHL-2000A-08	SPRING, 1.795 X 1.271 X 6.0 LING.	2
36	5909K13	BEARING, 1.5mm x 28mm x 2mm THRUST	1
37	5909K31	BEARING, THRUST 1/2" x 5/64" THICK	2
38	5909K44	WASHER, THRUST 1/2" x 5/64" THICK	2
39	91344A033	WASHER, 1/2" TRIPL E WAVE	1
40	91287A153	HHCS, M8 x 1.25mm x 25mm LING.	2
41	91287A172	HHCS, M10 x 1.5mm x 30mm LING.	2
42	91595A104	PIN, DOWEL 3mm DIA. x 8mm LING.	1
43	91595A120	PIN, DOWEL 4mm DIA. x 10mm LING.	3
44	91595A130	PIN, DOWEL 4mm DIA. x 22mm LING.	1
45	91595A155	PIN, DOWEL 8mm DIA. x 18mm LING.	2
46	92370A171	RING, 1.197 x .056 INTERNAL RETAINING	1
47	91287A154	HHCS, M8 x 1.25mm x 30mm LING.	1
48	12-042-1347-00	WASHER, 1" HEAVY DUTY MACHINED FLAT	2
49	69-400-27	COVER, TOOL CLAMP	1
50			



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REV.	DESCRIPTION	DATE	APR.
B	ADDED TOOL SUPPORT BLOCKS RELEASED FOR PRODUCTION	5/20/2013	MWG
A		5/15/2013	MWG

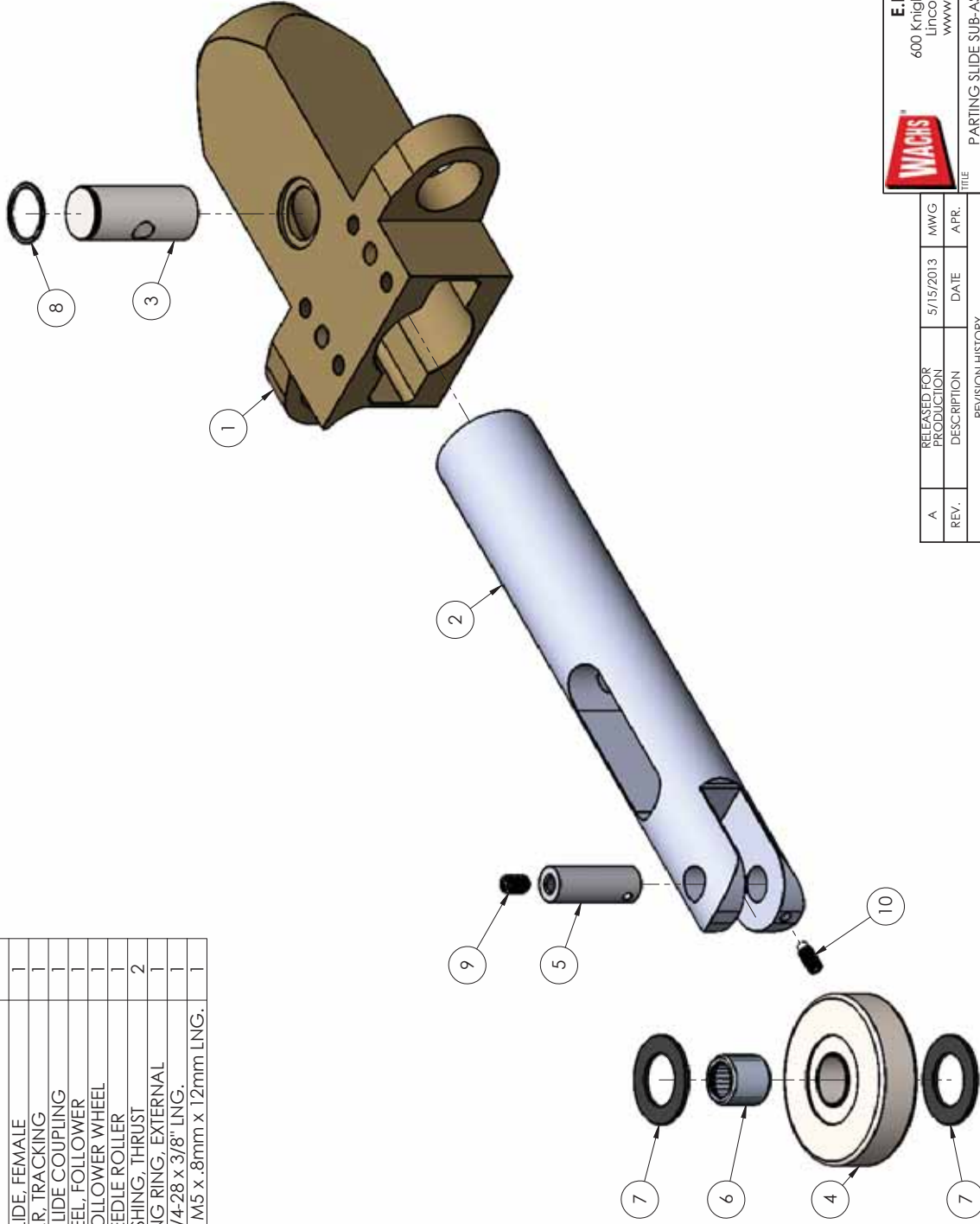
REVISION HISTORY			
UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 ONE PLACE DECIMAL ± 0.15 E.H. WACHS WORKMANSHIP STANDARDS (M17-01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. DO NOT SCALE DRAWING.			

TITLE			
DRAWN BY	MWG	APPROVED BY	KRP
DATE	5-15-13	DATE	5-15-13
SCALE	1:3	SHEET	1 OF 1

SIZE	DWG. NO.	REV.
B	12-042-4401-00	B

SLIDE, OUT OF ROUND

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-1200-00	SLIDE, FEMALE	1
2	12-042-1202-00	BAR, TRACKING	1
3	12-042-1205-00	PIN, SLIDE COUPLING	1
4	12-042-1207-00	WHEEL, FOLLOWER	1
5	12-042-1286-00	PIN, FOLLOWER WHEEL	1
6	60-1214-00	NEEDLE ROLLER	1
7	60-1215-00	BUSHING, THRUST	2
8	60-1256-00	RETAINING RING, EXTERNAL	1
9	92311A558	SSS, 1/4-28 x 3/8" LNG.	1
10	92905A118	SSS-EXTENDED, M5 x .8mm x 12mm LNG.	1



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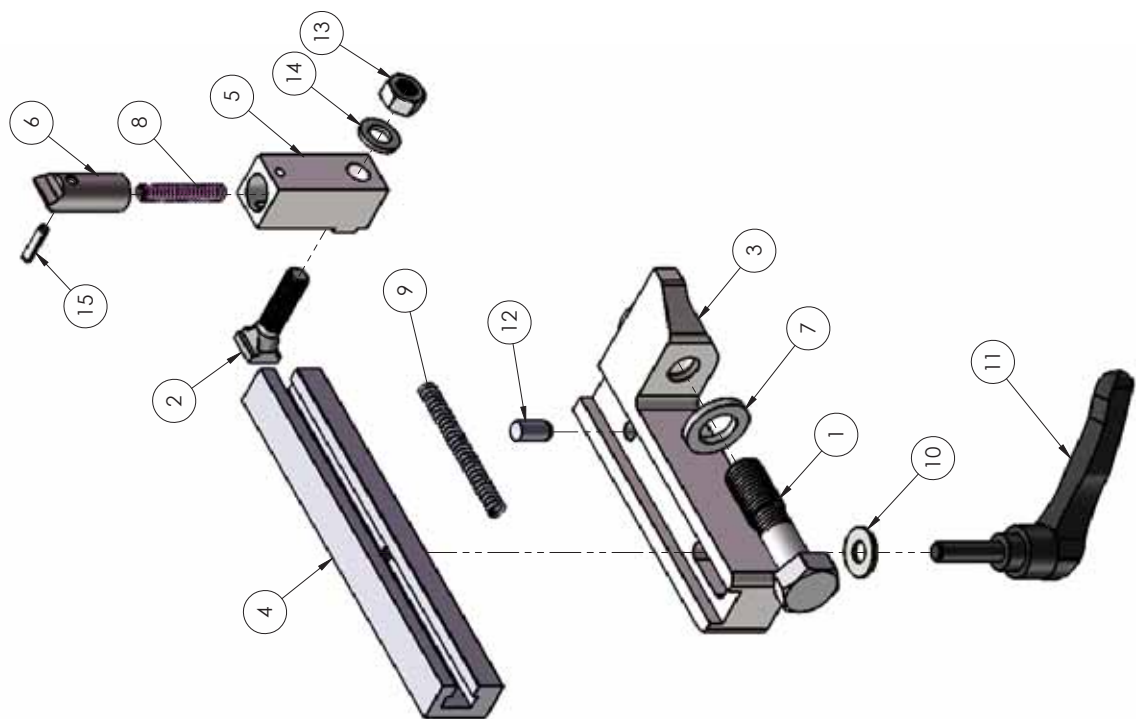
A	RELEASED FOR PRODUCTION	5/15/2013	MWG	APR.
REV.	DESCRIPTION	DATE		

TOLERANCES:
FRACTIONS 1/32
ONE PLACE DECIMAL ±.015
TWO PLACE DECIMAL ±.005
THREE PLACE DECIMAL ±.002
ANGULAR ±.5 MIN.
DO NOT SCALE DRAWING.

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TITLE PARTING SLIDE SUB-ASSEMBLY, 10-20 LCSF

DRAWN BY	MWG	APPROVED BY	KRP	SCALE	2:3
DATE	5-15-13	DATE	5-15-13	SHEET	1 OF 1
SIZE	B	DWG. NO.	12-042-4403-00	REV.	A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0396	SCREW, CAPTIVATED	1
2	12-042-0399	BOLT, T-SLOT M12 x 50mm LNG.	1
3	12-042-0650	BLOCK, TRIP MOUNTING	1
4	12-042-0651	SLIDE, TRIP	1
5	12-042-0652	HOUSING, FEED PIN	1
6	12-042-0653	TRIP, FEED	1
7	12-042-1995	WASHER, M20 THICK	1
8	60-1044	SPRING, .329 X .211 X 2.0 LG.	1
9	60-1225-00	SPRING, SLIDE	1
10	90-175-51	WASHER, 3/8 FLAT SS18-8	1
11	KHD_76	HANDLE, ADJUSTABLE	1
12	91595A642	PIN, DOWEL M10 x 22mm LNG.	1
13	91828A420	NUT, M12 x 1.75 SS	1
14	93849A107	WASHER, EXTRA THICK M12 SS	1
15	98296A909	PIN, ROLL 3/16 DIA. x 7/8" LNG.	1



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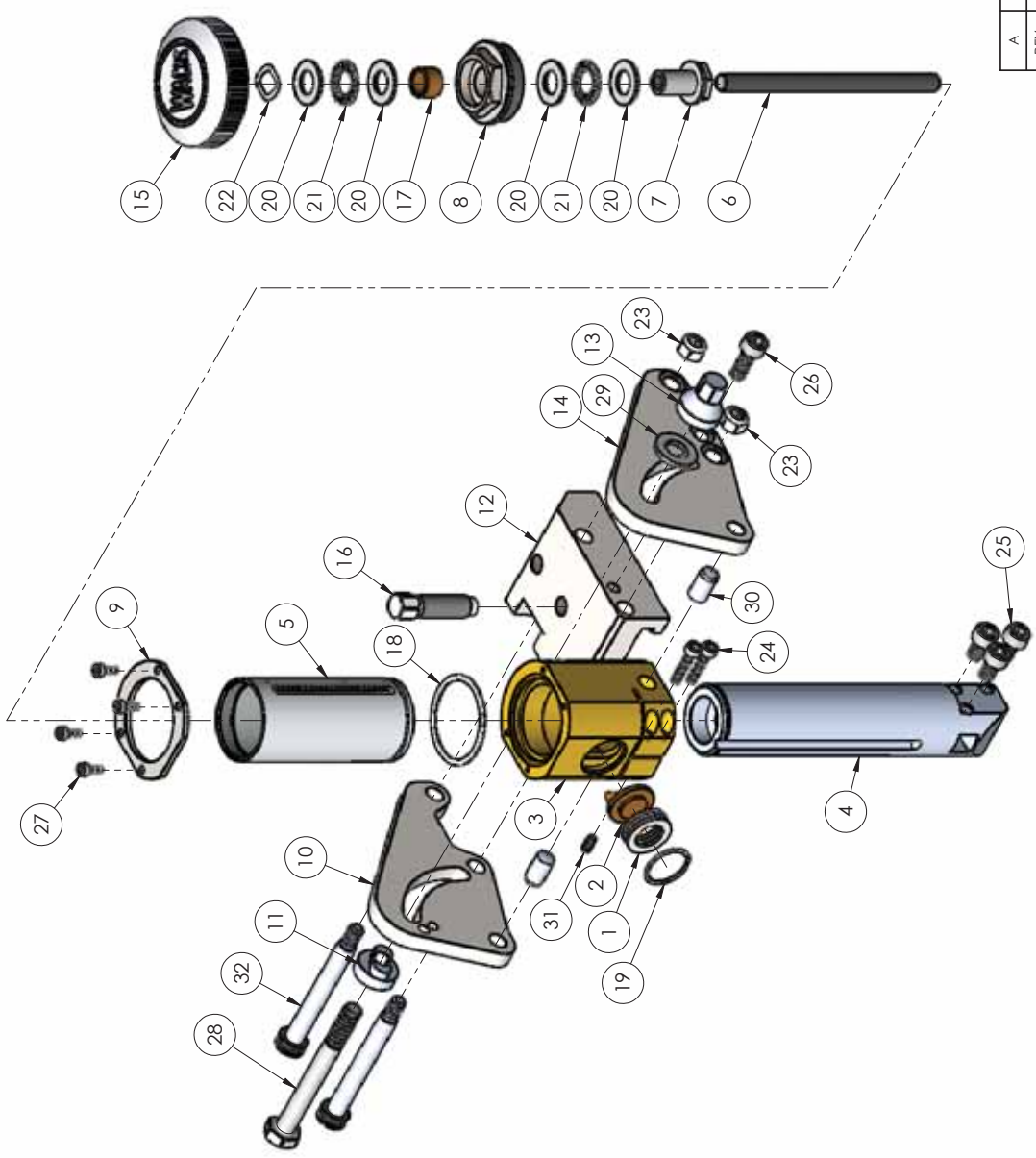
REV.	RELEASED FOR PRODUCTION	5/13/2013	MWG	APR.
	DESCRIPTION	DATE		

REVISION HISTORY	
UNLESS OTHERWISE SPECIFIED:	TOLERANCES:
FRACTIONS 1/32	ONE PLACE DECIMAL ±.015
THREE PLACE DECIMAL ±.005	E.H. WACHS WORKMANSHIP STANDARDS (M17.01)
SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING.	DO NOT SCALE DRAWING.
ANGULAR ±.5 ANGLE	

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DRAWN BY	MWG	APPROVED BY	KRP	SCALE	2:5
DATE	5-13-13	DATE	5-13-13	SHEET	1 OF 1
SIZE	B	DWG. NO.	12-042-4404	REV.	A

TITLE: ASSEMBLY, SPRING LOADED TRIP



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12-042-0208	KIT, CLAMP LEG KEY WASHER	1
2	12-042-0209	KEY, CLAMP LEG	1
3	12-042-1401-00	HOUSING, PIVOT	1
4	12-042-1402-00	BAR, C'BORE	1
5	12-042-1403-00	TUBE, HOUSING	1
6	12-042-1404-00	SCREW, FEED	1
7	12-042-1406-00	NUT	1
8	12-042-1407-00	HUB	1
9	12-042-1410-00	PLATE, TUBE RETAINING	1
10	12-042-1411-00	PLATE, PIVOT SLIDE LEFT	1
11	12-042-1413-00	BLOCK, PIVOT SLIDE LOCKING	1
12	12-042-1414-00	BLOCK, PIVOT SLIDE MOUNTING	1
13	12-042-1415-00	NUT, PIVOT LOCK	1
14	12-042-1416-00	PLATE, PIVOT SLIDE RIGHT	1
15	12-042-1418-00	KNOB, PIVOT FEED	1
16	69-400-44	SCREW, TOP LOCK	1
17	AA-628-7	BUSHING, 5/8" x 1/2" x 3/8" LNG.	1
18	RST-175	RING, 1.750 x .068 EXTERNAL RETAINING	1
19	Smalley WH-98	RETAINING RING, INTERNAL	1
20	TRB-815	THRUST WASHER	4
21	5909K31	THRUST NEEDLE ROLLER BEARING	2
22	90134A033	WASHER, 1/2" WAVE	1
23	90576A117	NUT, M8 x 1.25 NYLOCK	2
24	91290A248	SHCS M5 x 22 MM LG	2
25	91290A416	SHCS, M8 x 1.25mm x 12mm LNG.	3
26	91290A426	SHCS, M8 x 1.25mm x 20mm LNG.	1
27	91292A116	SHCS, M4 x .7mm x 10mm LNG.-SS	4
28	91310A655	HHCS, M10 x 1.5mm x 90mm LNG.	1
29	91455A150	WASHER, M12	1
30	91595A640	PIN, DOWEL M10 x 20mm LNG.	2
31	92605A233	SSS-SS, M5 x .8mm x 10mm LNG.	1
32	92981A309	BOLT, SHOULDER M10 x 70mm LNG.	2



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A	RELEASED FOR PRODUCTION	5/14/2013	MWG
REV.	DESCRIPTION	DATE	APR.

TITLE		DRAWN BY		APPROVED BY		SCALE	
SLIDE, PIVOT		MWG		KRP		2:5	
REVISION HISTORY		DATE		DATE		SHEET	
		5-14-13		5-14-13		1 OF 1	
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