# BendPak Technical Service Bulletin

# Inspection and Replacement Two-Post Lift Arm Restraint Gears

## BendPak TSB 125 – 072023

The purpose of this TSB is to describe the procedure for Inspection and Replacement of the Arm Restraint Gears and Fasteners on the XPR Series Two-Post Lifts.

The supplied kit includes four Arm Restraint Gear replacements; these replacement Arm Restraint Gears are designed for improved engagement between the Arm Restraint Gear and the Arm Restraint Lock Block on the Lift Arm Assemblies.

⚠ **WARNING** You must always wear appropriate protective equipment during installation: leather gloves, steel-toed work boots, eye protection, back belts, and hearing protection.

**Inspect the Fasteners and Restraint Gears**:

The Restraint Gears play a critical role in securing the load on the Lift by preventing unintended lateral movement. The Gears and their Fasteners should be inspected for damage on a monthly basis.

1. Raise and lock the Lift Head at a comfortable working position, then take the Lift out of service and disconnect it from power.

**Note**: It is much easier to remove the Lift Arm Assemblies when the Lift Head is up off the ground.

2. Remove the Lift Arm Assembly from the Lift Head and place it on a workbench.
3. Visually inspect the Restraint Gears. Inspect for broken, damaged, or worn teeth, and fractures that extend into the body of the gear. If any of these conditions exist, replacement of the gear is required.
4. Visually inspect the Restraint Gear Fasteners. Inspect all Restraint Gear Hex Bolts for the correct class (grade) and their condition. The most common failure modes for Restraint Gear Fasteners is impact damage or damage from excessive torque during assembly.

   Impact damage causes a shear failure which usually results in flat broken bolt faces. Damage from excessive torque results in stretching, twisting, and deforming of the fastener thread. This type of damage may cause galling and broken, or fractured bolts.
5. Check the torque and fastener grade (class) of each hex bolt. For correct torque values and fastener grade (specific bolt strength), refer to the **Table 1 Critical Load-Holding Fasteners** and **Table 2 Fastener Torque Chart** included as a part of this TSB.

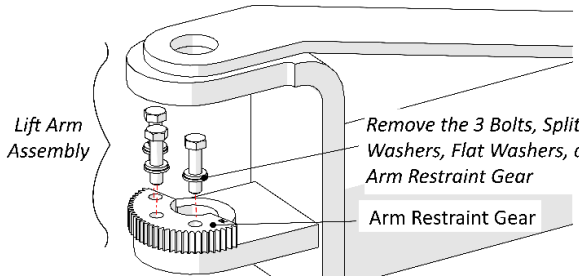
⚠ **WARNING** Torque values are provided as a convenient method of achieving correct pre-loading of highly stressed fasteners. Torque wrenches should be calibrated on an annual basis. Never use an impact driver on a torque multiplier. Failure to inspect and verify a fastener's serviceability may result in subsequent failure of the fastener.

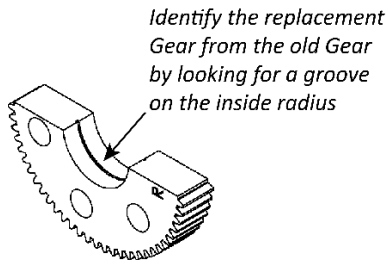
6. If there is no damage to the Restraint Gears and the fasteners pass the initial visual inspection, tighten each bolt to the torque specified in the **Table 1**.
7. If there is wear or damage that requires removal and replacement of the gears or fasteners, proceed with the removal procedure outlined below.

**To replace the Arm Restraint Gears on the XPR Series Lift**:

1. Remove the three M10 x 1.5 x 40 Hex Head Bolts, Split-Lock Washers, Flat Washers, and the Arm Restraint Gear.

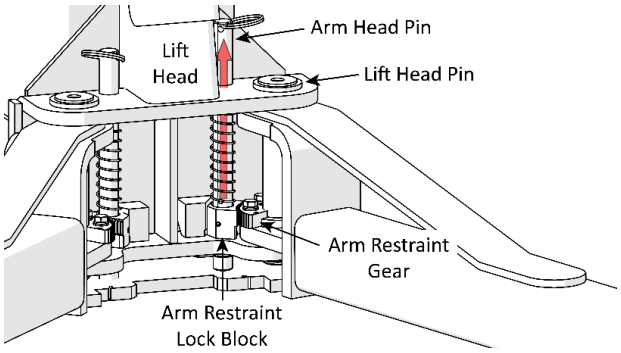
⚠ **CAUTION** Lift Arm assemblies are heavy, and the weight is not evenly distributed. Use appropriate safety equipment and lifting techniques when handling these assemblies.

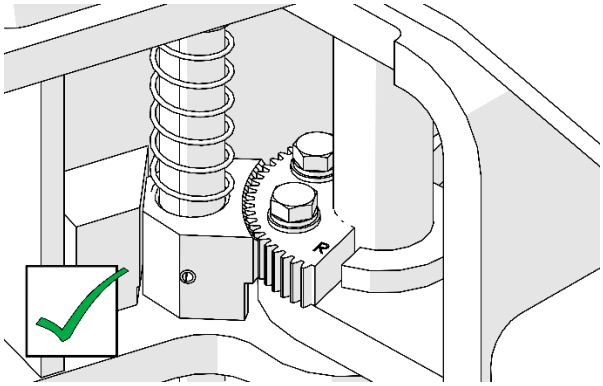



2. Clean the threaded holes in the Lift Arm assembly and inspect for damage.
3. Locate one of the replacement Arm Restraint Gears from the supplied kit and verify you have the correct orientation for the Arm Restraint Gear you are replacing, "**L**" for Left or "**R**" for Right.
4. Position the new Arm Restraint Gear in place, then loosely tighten the three Bolts, Split-Lock Washers, and Flat Washers into the bolt locations.
5. Reinstall the Lift Arm Assembly into the Lift Head and verify that the Arm Restraint Gear is meshing with the Arm Restraint Lock Block.

**Note**: You may need to slightly raise the Arm Head Pin so that the Arm Restraint Gear and Arm Restraint Lock Block mesh properly. Refer to the figures below.



6. Once you have verified that the Arm Restraint Gear and Arm Restraint Lock Block are meshing, then use a calibrated torque wrench to tighten all three Bolts into place.
7. Verify that all three Bolts are secured on the Arm Restraint Gear.
8. Repeat this inspection and replacement procedure for the other three Arm Restraint Gears.
9. Once all four gears have been inspected and replaced as required, verify all four Arm Restraint Gears mesh with the Arm Restraint Lock Block and will move freely when the Lock Blocks are disengaged.
10. Put the Lift back into service and apply power.
    Technical support and service is available from your dealer, on the Web at **bendpak.com/support**, by email at **support@bendpak.com**, or by phone at **(800) 253-2363**, option 7 then 4.

## Critical Load-Holding Fasteners

There two types of fasteners on the XPR Series Lifts:

### 1. Critical load-holding

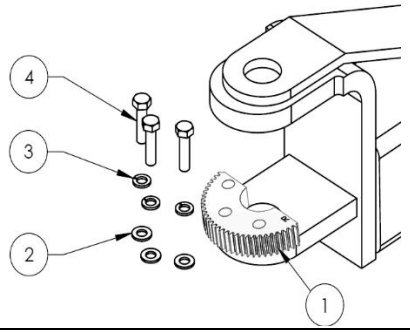
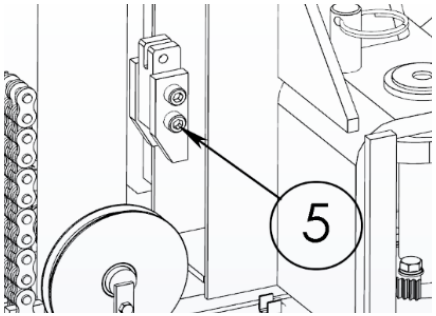
a. The two critical load-holding fasteners as described below require bolt tensile strengths to be equal to, or greater than, class 8.8 or better. Please read all matters relating to these two critical load-holding fasteners.

### 2. Non-critical system assembly

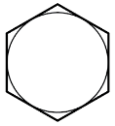
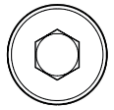
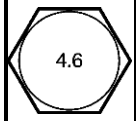
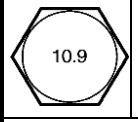
a. All other fasteners/bolts/screws on the lift not mentioned above or listed below are to be considered non-critical assembly fasteners that require class 4.6 or better.

The common class (grades) for metric fasteners/bolts are 4.6, 8.8, 10.9 and 12.9. Each grade has a specific bolt strength. The higher number (greater) means the stronger the bolt.

**Table 1 CRITICAL LOAD-HOLDING FASTENERS / XPR (Series) Two-Post Lifts**

| ID# | ILLUSTRATION | QTY PER LIFT | PART NO. | WHERE USED | PART DESCRIPTION | FASTENER CLASS/GRADE | TIGHTENING TORQUE | NOTES |
|---|---|---|---|---|---|---|---|---|
| 4 |  | 12 | 5530302 | ARM RESTRAINT HALF-MOON GEAR | HEX HEAD BOLT (HHB) M10 x 1.5 x 40 FULLY THREADED. | CLASS 8.8 OR GREATER | 35 (ft-lbs.) | This fastener is found on all XPR-9, XPR-10, XPR-12, XPR-15, and XPR-18 (series) two-post lift models. |
| 5 |  | 4 | 5530761 | CHAIN CONNECTOR BOLT | SOCKET HEAD CAP SCREW (SHCS) M10 x 1.5 x 55 | CLASS 10.9 OR GREATER | 50 (ft-lbs.) | This fastener is found only on XPR-9 (series) two-post lift models. |

## Table 2 FASTENER TORQUE CHART

| | Bolt Grade (SAE) |  | SAE Grade 0-1-2 |  | SAE Grade 5 |  | SAE Grade 8 |  | Socket Head Cap Screw SAE Grade 12.9 |
|---|---|---|---|---|---|---|---|---|---|
| | Bolt Class (Metric) |   | Metric Class 4.6 |   | Metric Class 8.8 |   | Metric Class 10.9 |   | Metric Class 12.9 |

| Bolt Size (SAE) | Bolt Size (Metric) | Tightening Torque | | | Tightening Torque | | | Tightening Torque | | | Tightening Torque | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lubricated (ft-lbs) | Zinc Plated (ft-lbs) | Plain & Dry (ft-lbs) | Lubricated (ft-lbs) | Zinc Plated (ft-lbs) | Plain & Dry (ft-lbs) | Lubricated (ft-lbs) | Zinc Plated (ft-lbs) | Plain & Dry (ft-lbs) | Lubricated (ft-lbs) | Zinc Plated (ft-lbs) | Plain & Dry (ft-lbs) |
| 1/4-20 | M6 x1.0 | 2.3 | 2.6 | 3.0 | 5.8 | 6.6 | 7.7 | 8.3 | 9.4 | 11.1 | 9.7 | 11.0 | 13.0 |
| 5/16-18 | M8 x 1.25 | 3.8 | 4.3 | 5.0 | 9.7 | 11.0 | 13.0 | 13.9 | 15.8 | 18.5 | 16.3 | 18.4 | 21.7 |
| 3/8-16 | M10 x 1.50 | 10.8 | 12.3 | 14.4 | 27.9 | 31.6 | 37.2 | 39.9 | 45.2 | 53.2 | 46.7 | 52.9 | 62.2 |
| 7/16-14 | N/A | 24.0 | 27 | 30.0 | 35.0 | 42 | 50.0 | 55.0 | 59 | 70.0 | 61.0 | 68 | 76.0 |
| 1/2-13 | M12 x 1.75 | 18.9 | 21.4 | 25.2 | 48.7 | 55.1 | 64.9 | 69.6 | 78.9 | 92.8 | 81.4 | 92.2 | 108.5 |
| 9/16-12 | M14 x 2.00 | 30.2 | 34.2 | 40.2 | 77.8 | 88.1 | 103.7 | 111.3 | 126.1 | 148.4 | 130.0 | 147.4 | 173.4 |
| 5/8-11 | M16 x 2.00 | 47 | 53 | 62 | 121 | 137 | 161 | 173 | 196 | 230 | 202 | 229 | 269 |
| 3/4-10 | M18 x 2.50 | 65 | 73 | 86 | 167 | 189 | 222 | 239 | 270 | 318 | 279 | 316 | 372 |
| 7/8-9 | M22 x 2.50 | 136 | 155 | 182 | 320 | 365 | 430 | 460 | 515 | 600 | 510 | 575 | 640 |

**WARNING!** Prior to Installation, inspect all accompanying manuals, parts lists and catalogs to ensure you have all the necessary parts. Identify all fasteners and their proper torque settings as illustrated on this chart. Proper torquing practices cannot be over emphasized. Torque values are provided as a convenient method of achieving correct pre-loading of highly stressed fasteners. If the fasteners are not properly plated, the fastener threads are not clean and free of deformation, or are not properly lubricated, the correct fastener pre-load will not be achieved even though the given torque value is reached. For this reason, it is critical that all fasteners be inspected for proper plating, thread form and correctly lubricated prior to torquing. Failure to verify a fastener's serviceability or to correctly lubricate the fastener prior to assembly and torquing will result in the fastener not being properly pre-loaded and subsequent failure of the fastener may occur. The torque values can only be achieved if the nut (or tapped hole) has a proof load greater than or equal to the bolt's minimum ultimate tensile strength. Clamp loads estimated as 75% of proof load for specified bolts. Torque values are listed in foot-pounds. Torque wrenches should be calibrated on an annual basis. Never use an impact driver on a torque multiplier.