

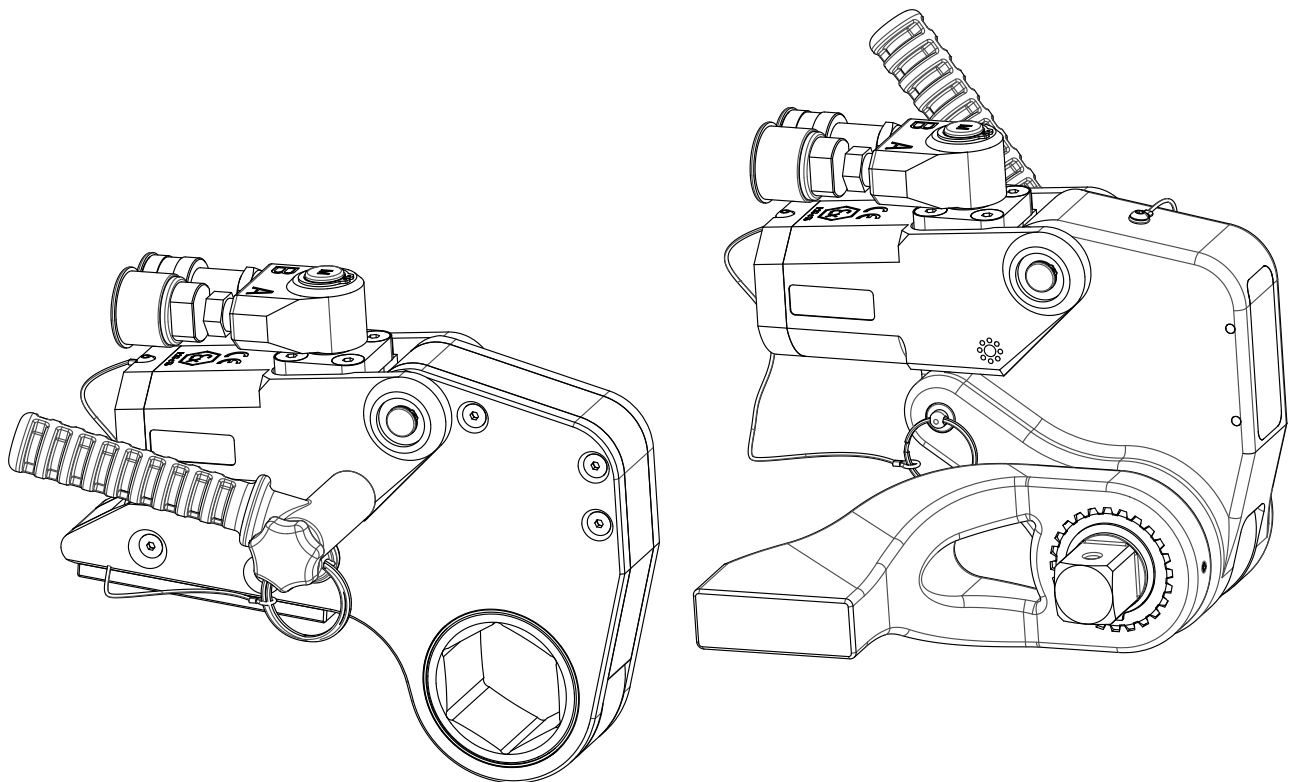
Enerpac HMT HMT Modular Tool

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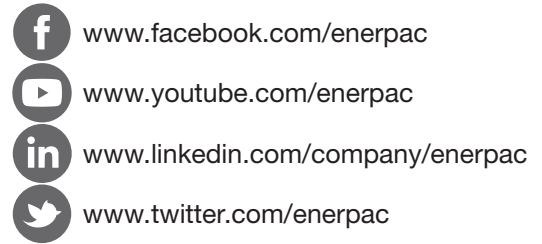
Document Language: ENGLISH EN



To reduce the risk of injury, users must read and understand this document before use.

ABOUT US

Enerpac is a global market leader in high pressure hydraulic tools, controlled force products, portable machining, on-site services and solutions for precise positioning of heavy loads. As a leading innovator with a 110-year legacy, Enerpac has helped move and maintain some of the largest structures on earth. When safety and precision matters, elite professionals in industries such as aerospace, infrastructure, manufacturing, mining, oil & gas and power generation rely on Enerpac for quality tools, services and solutions. For additional information, visit www.enerpac.com.



WARRANTY

Refer to the Enerpac Global Warranty document for terms and conditions of the product warranty. Such warranty information can be found at www.enerpac.com.

NAMEPLATE



AVAILABLE LANGUAGES

L4478 is available in the following languages, visit www.enerpac.com for a copy.

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1. Safety

Read all instructions carefully. Follow all recommended safety precautions to avoid personal injury as well as damage to the product and / or damage to other property. Enerpac cannot be responsible for any damage or injury from unsafe use, lack of maintenance, or incorrect operation. Do not remove warning labels, tags, or decals. In the event that any questions or concerns arise, contact Enerpac or a local Enerpac distributor for clarification.

Save these instructions for future use.

If you have never been trained on high-pressure hydraulic safety, consult your distributor or service center for information about Enerpac Hydraulic Safety Courses.

This manual follows a system of safety alert symbols, signals, words, and safety messages to warn the user of specific hazards. Failure to comply with these warnings could result in death or serious personal injury, as well as damage to the equipment or other property.



The Safety Alert Symbol appears throughout this manual. It is used to alert you to potential physical injury hazards. Pay close attention to Safety Alert Symbols and obey all safety messages that follow this symbol to avoid the possibility of death or serious injury.

Safety Alert Symbols are used in conjunction with certain Signal Words that call attention to safety messages or property damage messages and designate a degree or level of hazard seriousness. The Signal Words used in this manual are DANGER, WARNING, CAUTION, and NOTICE.

▲ DANGER Indicates a hazardous situation that, if not avoided, will result in death or serious personal injury.

▲ WARNING Indicates a hazardous situation that, if not avoided, could result in death or serious personal injury.

▲ CAUTION Indicates a hazardous situation that, if not avoided, could result in minor or moderate personal injury.

NOTICE Indicates information considered important, but not hazard related (e.g. messages related to property damage). Please note that the Safety Alert Symbol will not be used with the signal word.

1.1 Safety Precautions

▲ WARNING

Failure to observe and comply with the following precautions could result in death or serious personal injury. Property damage could also occur.

- Always wear protective head-wear, ear protectors, footwear and gloves (at a minimum rigger type gloves) suitable for safe operation of the tool. The protective clothing must not interfere with safe operation of the tool or restrict the ability to communicate with co-workers.
- Be sure your workplace is safe. Follow the instructions in your workplace's standard operating procedures and be sure to observe all communicated safety precautions.
- Do not place any part of the body between the wrench reaction foot and the reaction point.
- Do not place any objects between the wrench reaction foot and the reaction point. Keep the hoses away from the reaction points.
- Do not stand in the line of movement of the tool when it is in operation. If the tool separates from the nut or bolt during operation it will detach in that direction.
- Be aware that a nut or bolt that breaks off during operation of the tool may become a high velocity projectile.
- Be sure appropriate guards are securely in position and free from damage.
- Keep your hands away from the fastener being loosened or tightened. Tightening and loosening nuts and bolts involves little visible movement. However, the pressures and loads are extreme.
- Maximum allowable operating pressure for the HMT-Series torque wrench is 10,000 psi [690 bar]. Do not exceed this pressure setting.
- Always be sure that pump is stopped and all pressure is fully relieved (0 psi/bar) before disconnecting or connecting hydraulic hoses. The sudden and uncontrolled release of pressurized oil could occur if hoses are disconnected while under pressure.
- Never attempt to connect or disconnect hoses while the pump is on and/or the system is pressurized.
- Be certain that all hose couplings are fully connected at both the pump and wrench ends before applying any hydraulic pressure. If the couplings are not fully connected, oil flow will be blocked, and the wrench could be subjected to excessive hydraulic pressures. Catastrophic failure of wrench could result.

- Never apply more hydraulic pressure to any tool, hose, fitting or accessory than the maximum allowable pressure as stated in the manufacturer's specifications. The system operating pressure must not exceed the pressure rating of the lowest rated component in the system.
- Be sure the operator has completed safety induction training, specific to the work surroundings. The operator should be thoroughly familiar with the controls and the proper use of the tool.
- The operator must be of at least the minimum age required by applicable local regulations, laws and the facility standard operating procedures.
- Do not abuse or overstress the hoses in any way. Do not bend the hoses excessively.
- Take every precaution to prevent oil leaks from occurring. High pressure oil leaks can penetrate the skin, resulting in serious injury.
- Never strike the tool while it is pressurized or under load. Components under tension may become dislodged, allowing them to become dangerous projectiles. Uncontrolled release of pressurized hydraulic oil could also occur.
- Avoid striking the tool at any time, even when it is not pressurized or under load. Striking the tool could cause permanent damage to wrench components and may affect the wrench calibration.
- Use only a high quality non-flammable solvent for cleaning and degreasing parts during wrench repair procedures. To reduce the risk of fire or explosion, do not use flammable solvents.
- Be sure to wear proper eye and hand protection when using solvent. Always follow the solvent manufacturer's safety and use instructions and any additional instructions included in the standard operating procedures for your work-site. Be certain there is adequate ventilation when using solvent.
- Always position the wrench for maximum stability. Use the positioning handle to properly position tool during operation.
- Be sure reaction points are adequate for the forces at work during operation of the tool.
- Be sure the reaction point is of a suitable shape. If possible, use an adjacent nut or bolt as a reaction point.
- When the hex socket is placed on the nut or bolt a gap may exist between the reaction foot and the reaction point. When the tool is operated the reaction foot and point will make forceful contact. Be sure the wrench is stable before applying hydraulic pressure.
- Provide adequate support in vertical and inverted applications.
- The torque required to loosen a nut is variable and may exceed the torque capacity of the wrench. Never operate the wrench at above 75 percent of its rated maximum torque when loosening a nut or bolt.
- Be sure to minimize torsional and bending stresses in the wrench, the hex socket and any accessories.
- Bolt lubricants and anti-seize compounds will have a rated coefficient of friction. Be sure to know the coefficient of friction for the lubricant or anti-seize compound that is being used. To ensure proper tightening of nuts and bolts, always use this coefficient of friction when calculating required torque values.

NOTICE

Failure to observe and comply with the following precautions could result in property damage and/or void the product warranty.

- Never carry the wrench by its hoses.
- Always use Enerpac pumps and hoses.
- Always use Enerpac replacement parts.
- The maximum torque output of the wrench must always exceed the torque required to loosen or tighten the nut or bolt.
- Never operate the wrench with a hydraulic supply connection to the advance side only as this may damage the internal parts.
- In severe service conditions, be aware that the wrench must be inspected, cleaned and lubricated more frequently than normal.
- Check that the swivel post screws are tight prior to use.
- If oil leakage is present from wrench, replace seals as required before placing the wrench back into service.
- If the wrench is dropped from a significant height, have the tool inspected and checked for proper operation before placing it back into service.
- Always follow the inspection and maintenance instructions contained in this manual. Perform maintenance and inspection activities at the specified time intervals.

CAUTION

Failure to observe and comply with the following precautions could result in minor or moderate personal injury. Property damage could also occur.

- Always carry the wrench by its housing. Never carry the wrench using the positioning handle. The handle could break and the wrench could drop suddenly. The positioning handle is designed only as an aid to help position the wrench on the bolt or nut.
- Be sure that backup wrench (on the opposite end of nut or bolt being tightened or loosened) is secured so it cannot drop or become disengaged during bolting procedures.
- Be sure that the hex socket size corresponds to the size of the fastener being loosened or tightened. Failure to observe this precaution can result in the wrench becoming unstable and can lead to catastrophic failure of the tool.

1.2 ATEX Safety Precautions

Reducing the Risk of Explosion



Failure to observe and comply with the following precautions and instructions could result in explosion and/or fire. Death and/or serious personal injury could occur.

- To help reduce the risk of explosion, be certain to use the HMT-Series torque wrench only in the specific explosive atmospheres for which it has been tested and certified. Refer to the beginning of this section for ATEX classification information.
- The HMT-Series torque wrench is generally not considered as a potential source of ignition. However, proper operation and maintenance of the tool is essential in order to help ensure that no sparks are generated that could cause an ignition of an explosive gas or dust mixture (which might be present in the environment). Complete operation and maintenance instructions must be provided to all personnel in advance of operating or servicing the wrench.
- Hot surfaces can be a major source of ignition. To help prevent the possibility of ignition resulting from excessive surface temperatures, do not use the wrench in an environment with an ambient temperature of above 104°F [40°C].
- Enerpac has designed and constructed the HMT-Series torque wrench to minimize the possibility of an incendiary spark that may be caused by the impact of aluminium components with corroded steel. However, to reduce the chance of an incendiary spark, use of the wrench with corroded steel structures or components should be avoided whenever possible. Be especially careful to avoid accidental impacts with the wrench and corroded steel.

NOTICE To help prevent a mechanical spark hazard, no components containing a magnesium content greater than 7.5 percent have been used in the HMT-Series torque wrench (in accordance with standard EN 13463-1).

- Take extreme care to prevent the HMT-Series torque wrench from being dropped on the floor or onto any other metallic surface that might cause mechanical sparks at impact. Also, take every precaution to prevent other tools (or other metallic objects) from dropping onto the HMT-Series torque wrench.

Electrostatic Discharge

- Electrostatic discharge is a potential source of ignition and can result in electrostatic build-up on isolated conductive parts. Isolated conductive parts create capacitive poles which can become charged. Electrostatic discharge risk is minimized by the hydraulic hoses, which have multiple layers of steel braiding, resulting in electrical continuity between the torque wrench and the grounded hydraulic pump.
- Non-conductive polyester labels could be a site for electrostatic build-up. However, electrostatic build-up is prevented by the close proximity of the grounded torque wrench body.

2. Compliance Statement(s)

2.1 Conformance to National and International Standards

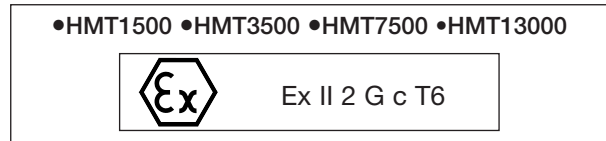


Enerpac declares that the product(s) have been tested and conforms to applicable standards and the product(s) are compatible to all EU and UK Requirements.

Copies of the EU Declaration as well as the UK Self-Declaration are enclosed with each shipment.

2.2 ATEX Compliance Statement

In addition to the CE mark, the Enerpac HMT-Series torque wrenches carry the ATEX mark and classification:



This classification indicates that the tool is appropriate for use in a potentially explosive atmosphere.

The testing standards applicable to the HMT-Series torque wrenches are the standard EN 13463-1:2009, Non-electrical equipment for use in potentially explosive atmospheres. Part 1: Basic method and requirements, and also the draft standard of ISO/IEC 80079-36.

Contact Enerpac if there are any questions regarding the ATEX classification or questions regarding application of the HMT-Series torque wrenches in hazardous environments.

3. Features & Components

3.1 Feature Diagram

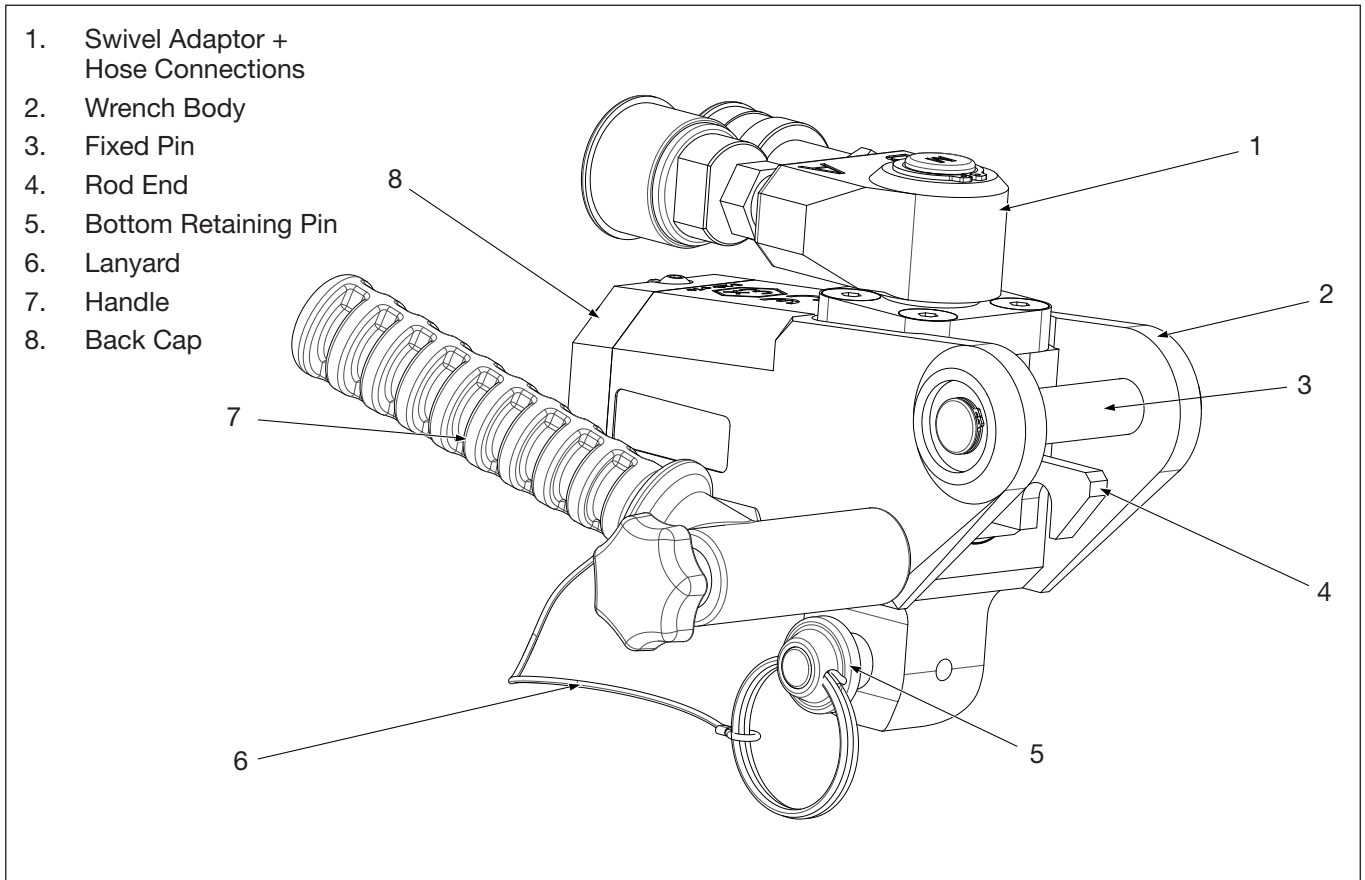


Figure 1: Major features and components of HMT Drive Unit

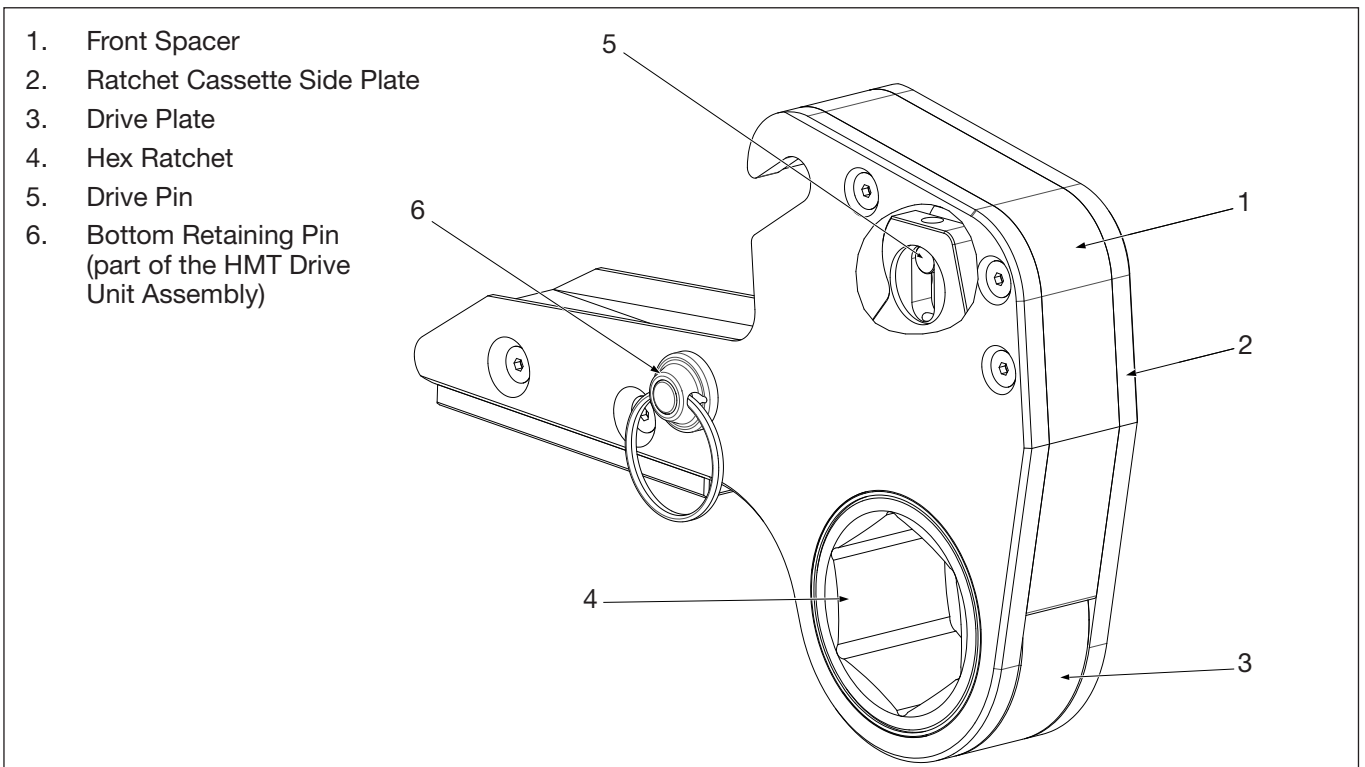


Figure 2: Major features and components of HMT HLP Low Profile Cassette

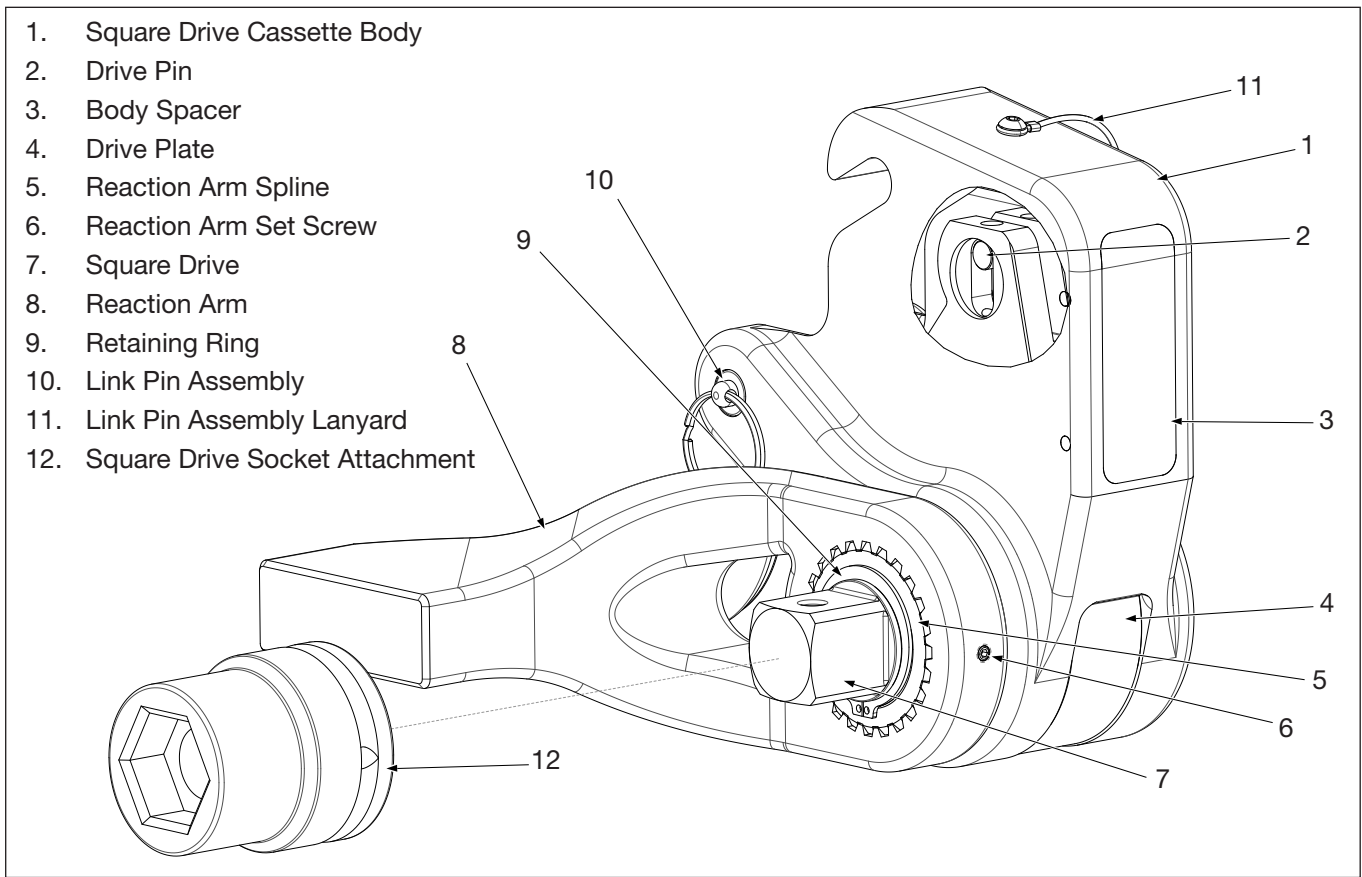


Figure 3: Major features and components of HMT HSQ Square Drive Cassette (HMT1500, HMT3500, HMT7500)

3.2 Feature Description

3.2.1 Assembling HLP/ HSQ Cassette Assemblies onto HMT Drive Unit

The HLP and HSQ cassette assemblies each include a hook feature as part of the body assembly, this is inserted around the top retaining pin of the drive. The cassette assembly rest along the base of drive unit body. At this point, the bottom retaining pin holes in the drive unit body and cassette assembly will align, allowing the bottom retaining pin to be inserted fully to secure the two together.

3.2.2 Engaging HMT Drive Unit Rod End with HLP/ HSQ Cassette Drive Plate Assembly

When assembling the HLP or HSQ Cassette onto the HMT drive unit body ensure that the rod end of the drive unit is fully engaged with the drive pin in the drive plate of the cassette assembly by rotating the ratchet or square drive $\frac{1}{4}$ turn back and forth a number of times by hand until engagement is confirmed.

CAUTION Failure to ensure correct engagement of the wrench body and drive plate assembly drive pin prior to operation will damage the rod end. Resulting damage will not be covered under warranty.

3.2.3 Using Extended Reaction Arm/ Reaction Paddle with the HMT with HLP Cassette (Fig. 6/ 7)

To use the HMT with the HLP Cassette, a suitable reaction surface must be available.

If bolt spacing is such that the reaction surface of the wrench does not reach a suitable reaction surface such as an adjacent bolt, use the extended reaction arm or reaction paddle as depicted. This will allow reaction to be taken against the side of the flange.

To attach the reaction paddle or extended reaction arm, remove the standard bottom retaining pin, align the holes of the reaction paddle or extended reaction arm with that of the reaction surface of the wrench, insert the long retaining pin to secure.

Ensure the reaction paddle or extended reaction arm extends in the appropriate direction: right for tightening; left for loosening.

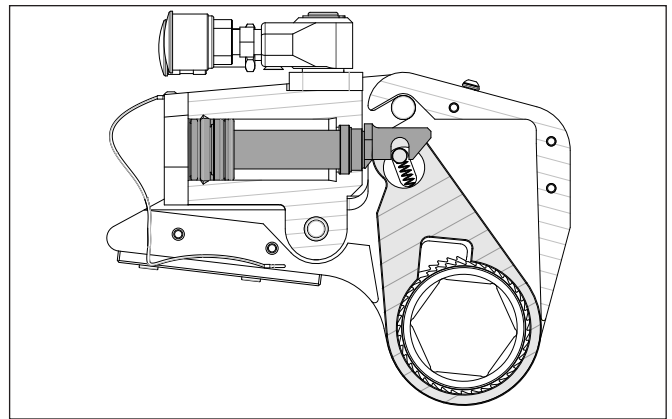


Figure 4: Connecting HLP Cassette and HMT Drive Unit

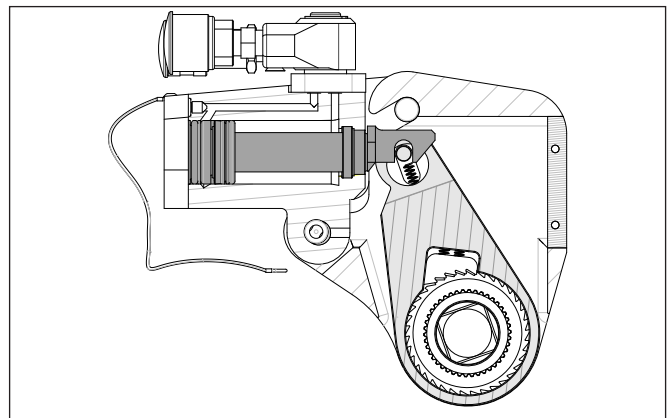


Figure 5: Connecting HSQ Cassette and HMT Drive Unit

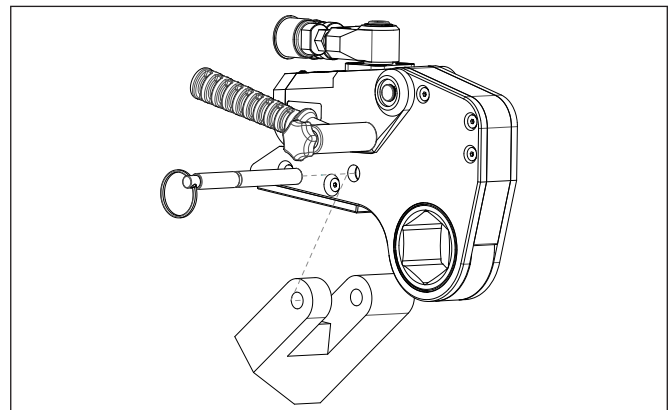


Figure 6: Installing Reaction Paddle

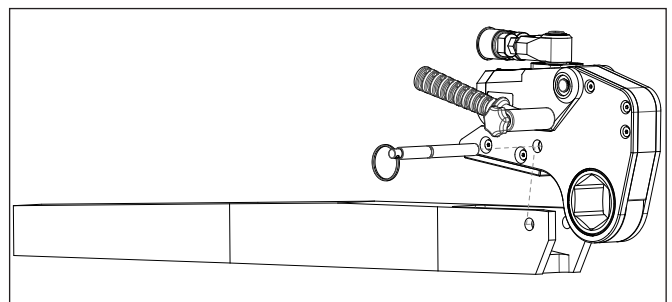


Figure 7: Installing Extended Reaction Arm

3.2.4 Using HSQ Reaction Arm

The HMT with the HSQ Cassette assembly comes with a reaction arm that is assembled directly onto the square drive.

Slide the square drive reaction arm over the reaction arm spline and secured using a socket screw. This is designed to allow the square drive to move as required while the reaction stay in place, as shown in Figure 8.

Ensure the reaction arm extends in the appropriate direction: right for tightening; left for loosening.

CAUTION Failure to ensure correct engagement of the wrench body and drive plate assembly drive pin prior to operation will damage the rod end. Resulting damage will not be covered under warranty.

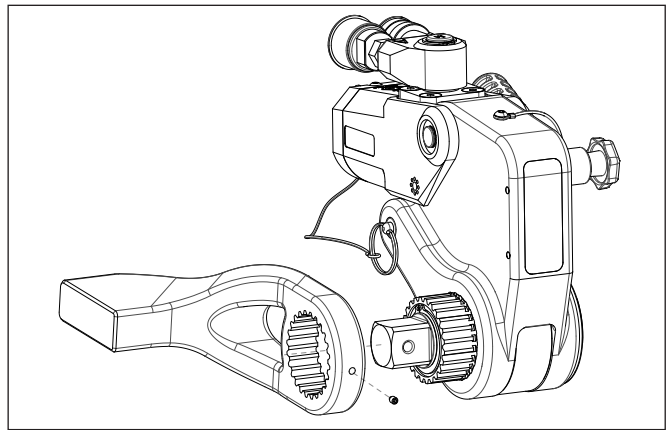


Figure 8: Installing Square Drive Reaction Arm

3.2.5 Selecting HSQ Cassette Direction

The following diagram illustrates the direction the square drive should face for loosening and tightening of a standard right hand fastener:

- For tightening bolts, install the square drive in the location shown in Figure 9.
- For loosening bolts, install the square drive on the opposite side of the wrench.

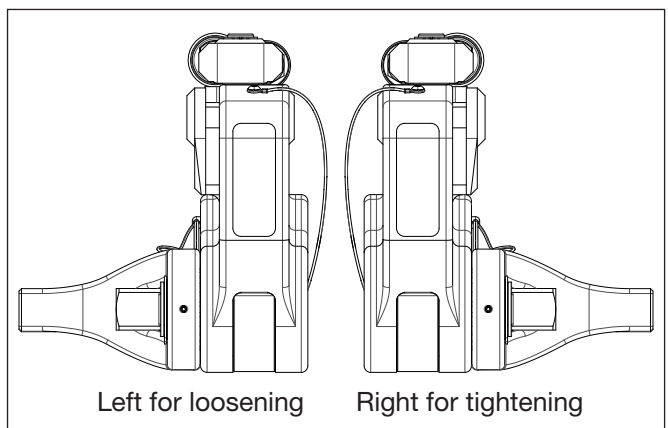


Figure 9: Drive Directions for Loosening/ Tightening

3.2.6 Attaching Handle

Secure the positioning handle with thumb screw or eyebolt. Handle can be installed on either side of wrench body (as needed).

Ensure that handle or eyebolt is correctly secured in place before lifting the wrench.

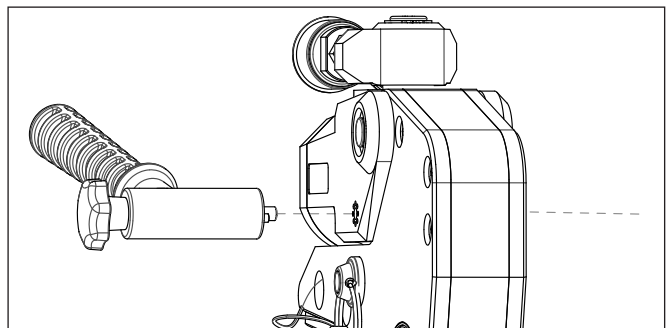


Figure 10: Attaching Handle

3.3 Hose Connection

⚠ WARNING Be sure all hoses and fittings are rated for at least 10,000 psi [690 bar] operation. Check that all hydraulic couplings are securely connected before operating the tool. Failure to observe these precautions may result in the hoses bursting or disconnecting under pressure. High pressure oil leakage may also occur. Serious personal injury could result.

The torque wrench and hydraulic pump are connected by a 10,000 psi [690 bar] twin-line hose assembly. On each twin hydraulic hose, one line must be MALE-MALE and the other line must be FEMALE-FEMALE in order to ensure a correct interconnection between the pump and wrench. Ensure the connectors are fully engaged and screwed snugly together.

⚠ CAUTION NEVER use an even number of hydraulic twin hoses between the pump and wrench. If so, you have the high pressure on the retract side and your wrench is not able to work properly. To avoid tool malfunction, do not reverse connectors. Do not try to loosen the swivel assembly at any moment.

Connect hoses to wrench as described in the following steps:

- Be sure that all pressure in system is relieved and that pressure gauge indicates zero psi/bar.
- Remove the hose dust caps.
- Connect the hose with the female coupling to the wrench advance coupling.
- Connect the hose with the male coupling to the wrench retract coupling.
- At each connection, pull the collar on the female coupling over the male coupling. Engage threads and hand tighten the collar.
- Connect the hoses to the pump. Refer to the pump instruction manual.

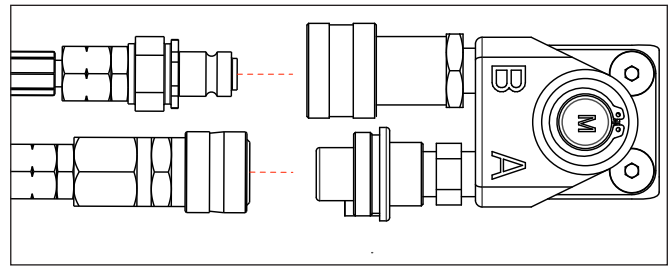
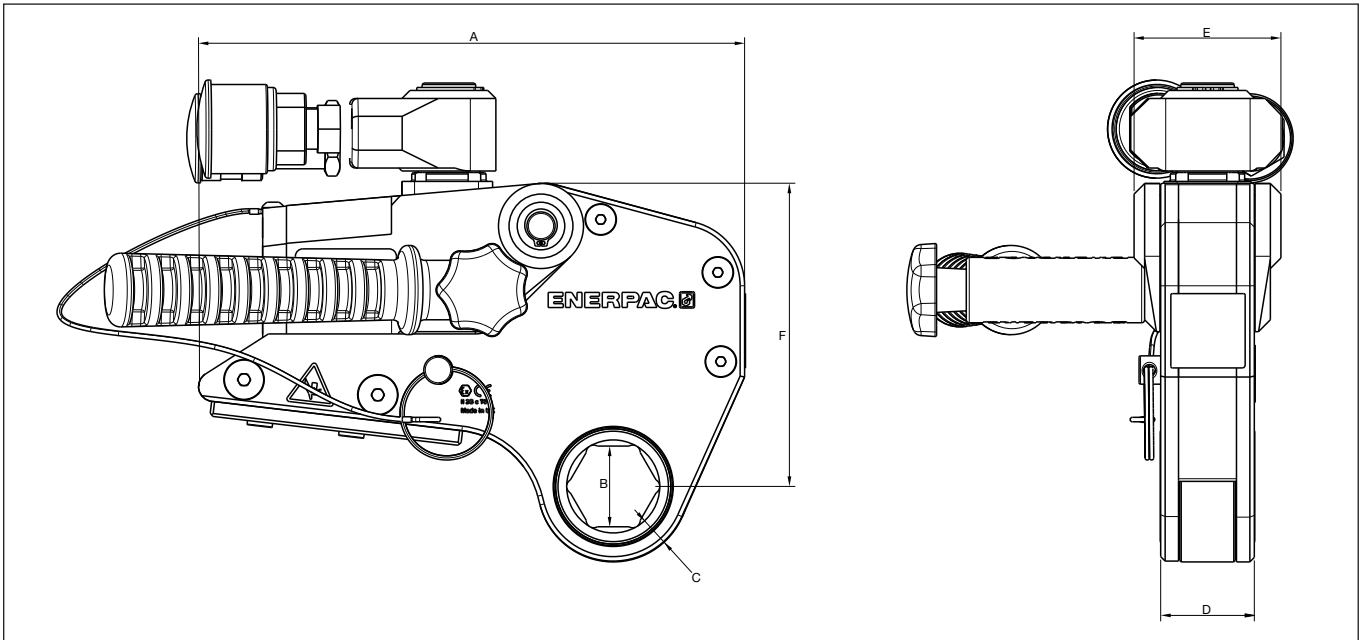


Figure 11: Hose Connection

4. Technical Product Data

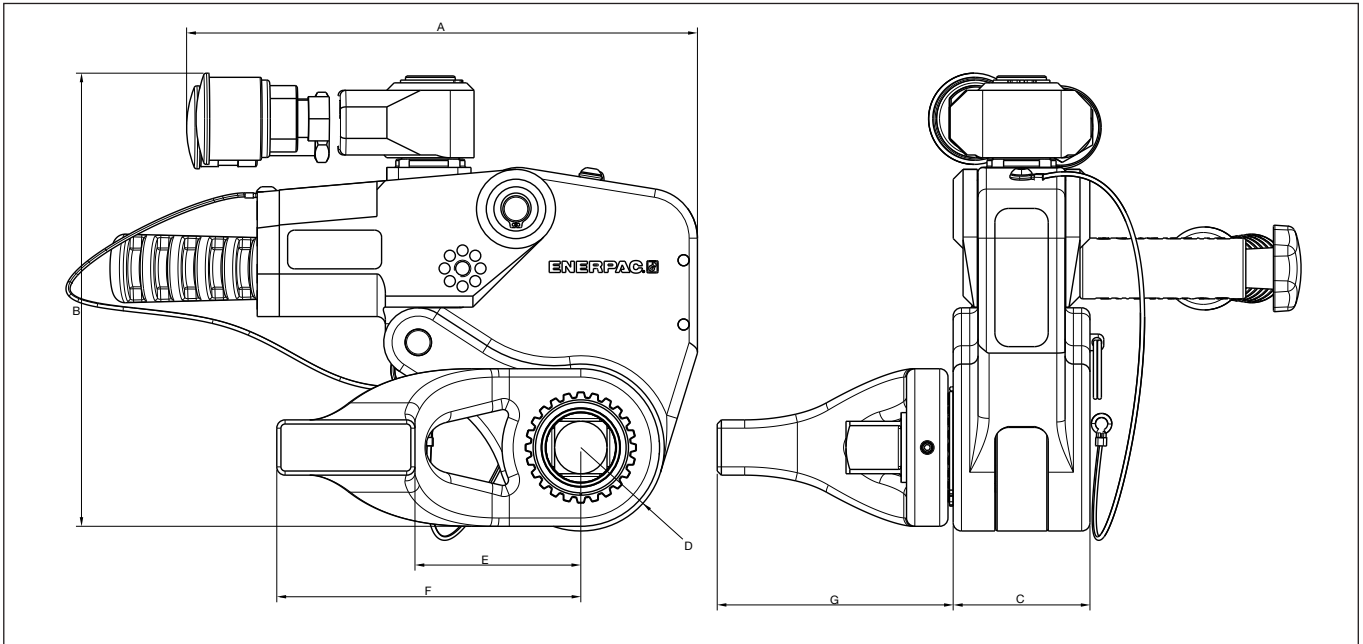
4.1 HMT with HLP Cassette Dimensional Callout Art



4.2 HMT with HLP Cassette Dimensional Table

			Model Number			
			HMT1500	HMT3500	HMT7500	HMT13000
Maximum Operating Pressure	psi		10,000	10,000	10,000	10,000
	bar		690	690	690	690
Minimum Torque	lbf.ft		154	354	756	1,349
	Nm		209	480	1,025	1,829
Maximum Torque	lbf.ft		1,541	3,543	7,562	13,489
	Nm		2,089	4,804	10,252	18,289
Weight	Cassette	lbs	4.41	8.82 - 11.02	17.63 - 19.84	24.25 - 28.66
		kg	2.0	4.0 - 5.0	8.0 - 9.0	11.0 - 13.0
	HMT	lbs	2.2	3.97	7.05	11.2
		kg	1.0	1.8	3.2	5.1
Dimensions	A	inch [mm]	7.23 [183.72]	5.79 [147.12]	12.16 [308.80]	14.71 [373.70]
	B	inch [mm]	1 1/16" - 2 1/4" [26 - 57]	1 3/8" - 3 1/8" [35 - 80]	2 3/16" - 3 15/16" [55 - 100]	2 7/16" - 4 5/8" [62 - 113]
	C	inch [mm]	0.38 [9.75]	0.50 [12.75]	0.64 [16.30]	0.72 [18.2]
	D	inch [mm]	1.2 [31.5]	1.7 [42.0]	2.1 [52.6]	2.50 [63.40]
	E	inch [mm]	1.94 [49.40]	2.58 [65.50]	3.23[82]	3.86 [98]
	F	inch [mm]	4.01 [102]	5.35 [136]	6.70 [170.11]	8.42 [213.76]

4.3 HMT with HSQ Cassette Dimensional Callout Art



4.4 HMT with HSQ Cassette Dimensional Table

			Model Number		
			HSQ1500	HSQ3500	HSQ7500
Square Drive			¾"	1"	1 ½"
Maximum Operating Pressure	psi		10,000	10,000	10,000
	bar		690	690	690
Minimum Torque	lbf.ft		154	354	756
	Nm		209	480	1,025
Maximum Torque	lbf.ft		1,541	3,543	7,562
	Nm		2,089	4,804	10,252
Weight	HSQ	lbs	5.95	9.04	18.08
		kg	2.7	4.1	8.2
	HMT	lbs	2.2	3.97	7.05
		kg	1.0	1.8	3.2
Dimensions	A	inch [mm]	7.28 [184.83]	8.36 [212.25]	9.64 [245]
	B	inch [mm]	6.45 [163.94]	8.13 [206.60]	10.08 [256.06]
	C	inch [mm]	2.34 [49.50]	2.58 [65.50]	3.15 [80]
	D	inch [mm]	1.19 [30.20]	1.52 [38.50]	1.99 [50.50]
	E	inch [mm]	2.36 [60]	3.07 [78]	4.33 [110]
	F	inch [mm]	4.33 [110]	5.83 [148]	8.27 [210]
	G	inch [mm]	3.36 [85.37]	4.36 [110.80]	6.40 [162.65]

4.5 Torque Settings

4.5.1 Imperial System Torque Factor Calculation

To set the torque, adjust the pump pressure according to the following calculation:

$$\text{Pump pressure (psi)} = \text{Torque (lbs.ft)} / \text{Torque factor}$$

	HMT1500	HMT3500	HMT7500	HMT13000
Torque factor Imperial system:	0.1541	0.3543	0.7562	1.3489

4.5.2 Imperial System Pressure/Torque Table

Pump Pressure (psi)	HMT1500 Torque (lbs.ft)	HMT3500 Torque (lbs.ft)	HMT7500 Torque (lbs.ft)	HMT13000 Torque (lbs.ft)
1000	154	354	756	1349
1500	231	531	1134	2023
2000	308	709	1512	2698
2500	385	886	1891	3372
3000	462	1063	2269	4047
3500	539	1240	2647	4721
4000	616	1417	3025	5396
4500	693	1594	3403	6070
5000	771	1772	3781	6745
5500	848	1949	4159	7419
6000	925	2126	4537	8093
6500	1002	2303	4915	8768
7000	1079	2480	5293	9442
7500	1156	2657	5672	10117
8000	1233	2834	6050	10791
8500	1310	3012	6428	11466
9000	1387	3189	6806	12140
9500	1464	3366	7184	12815
10000	1541	3543	7562	13489

NOTICE Torque values are rounded to the nearest whole unit.

4.5.3 Metric System Torque Factor Calculation

To set the torque, adjust the pump pressure according to the following calculation:

$$\text{Pump pressure (bar)} = \text{Torque (Nm)} / \text{Torque factor}$$

	HMT1500	HMT3500	HMT7500	HMT13000
Torque factor Metric system:	3.0275	6.9623	14.8579	26.5057

4.5.4 Metric System Pressure/Torque Table

Pump Pressure (bar)	HMT1500 Torque (Nm)	HMT3500 Torque (Nm)	HMT7500 Torque (Nm)	HMT13000 Torque (Nm)
60	182	418	891	1590
90	272	627	1337	2386
120	363	835	1783	3181
150	454	1044	2229	3976
180	545	1253	2674	4771
210	636	1462	3120	5566
240	727	1671	3566	6361
270	817	1880	4012	7157
300	908	2089	4457	7952
330	999	2298	4903	8747
360	1090	2506	5349	9542
390	1181	2715	5795	10337
420	1272	2924	6240	11132
450	1362	3133	6686	11928
480	1453	3342	7132	12723
510	1544	3551	7578	13518
540	1635	3760	8023	14313
570	1726	3969	8469	15108
600	1817	4177	8915	15903
630	1907	4386	9360	16699
660	1998	4595	9806	17494
690	2089	4804	10252	18289

NOTICE Torque values are rounded to the nearest whole unit.

5. Operation

5.1 Initial Setup

5.1.1 Setting the torque

1. Connect the tool to the power supply and turn the pump on.
2. Adjust the pressure on the pump as necessary to set the torque. Refer to pump manufacturer's instruction manual.
3. When the desired pressure is reached, cycle the tool again to confirm that the desired pressure setting has been obtained.



Figure 12: Using the Pump

5.1.2 Inspection Before Operation

- Be sure the nut or bolt to be fastened is clean and free of loose dust or dirt.
- Be sure the nut threads properly engage with the threads of the bolt, and that cross-threading has not occurred.
- Be sure that the threads and the bearing surface are liberally coated with the correct bolt lubricant or anti-seize compound.
- Make all torque calculations based on the bolt lubricant's (or anti-seize compound's) stated coefficient of friction. Failure to do so may result in the required bolt load not being achieved.
- Be sure that the backup wrench (used to keep the nut or bolt on the opposite end in place) is correctly positioned and secured.

⚠ WARNING Be certain that backup wrench is of the correct size and that there is an adequate abutment surface. Personal injury could occur if backup wrench loosens or dislodges during bolting procedures.

5.2 Operating HMT with HLP Cassette Assembly

The position of the tool relative to the nut determines whether the action will tighten or loosen the nut. The power stroke of the piston assembly will always turn the ratchet hex toward the front spacer.

1. Place the ratchet hex on the nut. Make certain it is the correct size for the nut and that it fully engages the nut.
2. Position the reaction surface of the wrench against a suitable reaction surface such as an adjacent nut, flange or solid system component. Make certain that there is clearance for the hoses, and swivel coupling assembly. DO NOT allow the tool to react against the hoses, or swivel coupling assembly.

If required attach the extended reaction arm or reaction paddle, as depicted in Figure 13/ 14, to allow reaction against the side of the flange.

3. Turn the pump on and set up the pre-set pressure for the correct torque. Use the remote control advance button to advance the piston assembly.

CAUTION Ensure that the rod end has engaged with the drive pin in the HLP cassette assembly prior to use.

4. When the HLP cassette assembly is connected to the nut and the wrench started, the reaction surface of the wrench will move against the contact point and the nut will begin to turn. Once the piston reaches the end of its stroke, the pressure will rise rapidly. On the pump use the controls to retract the tool. There is usually a series of audible clicks as the tool retracts.
5. Continue this cycling operation of advance and retract until the nut is no longer turning and the pump gauge reaches the pre-set pressure.
6. Once the nut stops rotating, cycle the tool one last time to ensure final torque has been achieved.

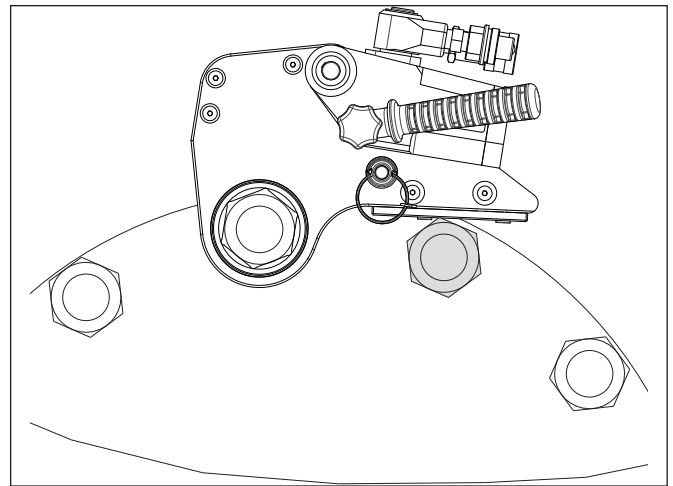


Figure 13: Position HMT with HLP Cassette with a suitable reaction point

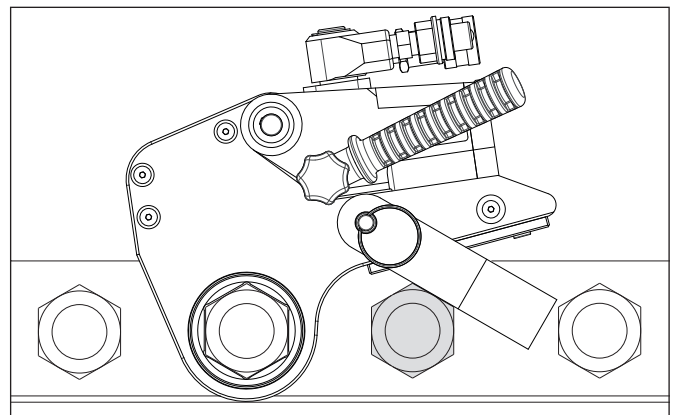


Figure 14: Using reaction paddle

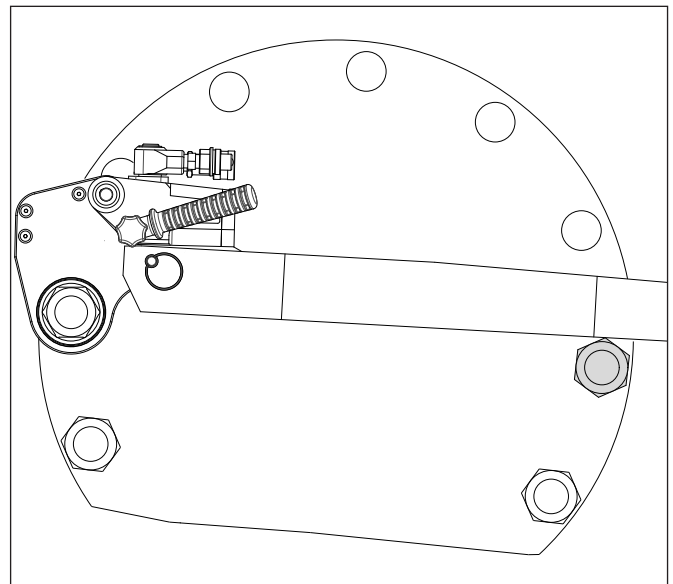


Figure 15: Using extended reaction arm

5.3 Operating HMT with HSQ Cassette Assembly

The position of the tool relative to the nut determines whether the action will tighten or loosen the nut. The power stroke of the piston assembly will always turn the square drive toward the body spacer.

1. Before using the HMT drive unit and HSQ cassette assembly, cycle the wrench two or three times to ensure that the link is inserted correctly.
2. Select correct socket for bolt to be loosened / tightened.
3. Ensure the reaction arm contacts a suitable reaction point at a 90° angle from the square drive, as per the following image;
4. After having turned the pump on, input the pre-set pressure for the correct torque, and using the remote control advance the piston assembly.

CAUTION Ensure that the rod end has engaged with the drive pin in the square drive cassette assembly prior to use.

5. When the socket is connected to the nut and the wrench started, the reaction surface of the wrench will move against the contact point and the nut will begin to turn. Once the piston reaches the end of its stroke, the pressure will rise rapidly. On the pump use the controls to retract the tool. There is usually a series of audible clicks as the tool retracts.
6. Continue this cycling operation of advance and retract until the socket is no longer turning and the pump gauge reaches the pre-set pressure.

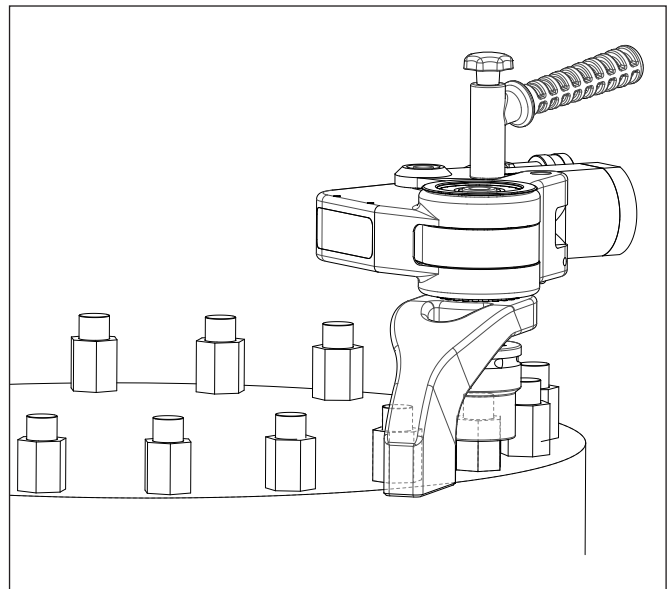


Figure 16: Position HMT with HSQ Cassette with a suitable reaction point

7. Once the nut stops rotating, cycle the tool one last time to ensure final torque has been achieved.
8. To reverse the torque wrench direction, release the drive retainer and pull out the square drive. Move the square drive to the opposite side and reinsert retainer.

6. Storage

6.1 Recommended Storage

Enerpac tools should be stored in a cool, dry place. Tools should always be cleaned, serviced and lubricated prior to storage. Ensure that tools are stored in their designated packing cases.

7. Maintenance

7.1 General Maintenance

Preventative maintenance can be performed by the user.

Recommended service intervals are:

- 3 months – Heavy Duty use
- 6 months – Normal use
- 12 months – Infrequent use

Lubrication frequency depends on factors known only to the user. The amount of contaminants in the working area is one factor. Wrenches used in a clean room environment will require less maintenance than wrenches used outdoors and dropped in loose dirt or sand.

1. When lubrication is required, lubricate all moving parts.
2. Springs are used for the drive pawl assembly and for the accuracy assurance pawl. These springs can be replaced if necessary.
3. If the piston rod requires disassembly, it is recommended that the piston rod seals be replaced at the same time. Seal kits are readily available.
4. Hoses should be checked for cracks and leaks before, and after each job. Hydraulic fittings can become plugged with dirt and should be flushed periodically.
5. Fittings should be kept clean and not allowed to be dragged along the ground or floor as even small particles of dirt can cause the internal valves to malfunction.
6. All structural parts on the tools should be inspected at least once a year to determine if there are any cracks, chips, or deformities.
7. Non destructive testing must be carried out if the tool has been used under severe conditions.

Full maintenance must be performed only by an Enerpac authorized service center or a qualified and experienced technician.

7.2 Preventative Maintenance

1. Check tightness of swivel assembly retaining screws (12) and drive unit body back cap screws (10) (see Section 7.2).
2. Pressurize the wrench to 10,000 psi [690 bar] pressure (in both advance and retract), and check for any signs of leakage.
3. Relieve pressure and disconnect hydraulic hoses.
4. Clean all exposed components with a mild solvent.

7.3 Full Maintenance

7.3.1 Hydraulic Swivel Assembly

Disassembly of Swivel Post and Swivel Assembly Attachment (Fig 17 + Fig.18)

- Remove the circlip (A) from the top of the swivel post (E).
- Using a pair of flat blade screwdrivers, gently pry the swivel assembly (B) from the swivel post (E).
- Remove O-ring (D) from the swivel post (E).
- Remove the socket head capscrews (C) and the swivel post (E).
- Remove O-rings (F) from the swivel post hydraulic ports.
- Place the swivel assembly in a vise with soft jaws. Remove the hydraulic couplings (B1, B2 and B3) from the swivel assembly (B).

Hydraulic Swivel and Swivel Post Reassembly and Reinstallation

Hydraulic Fittings:

NOTICE If removed, reinstall the couplings (B1 and B3) and adapter (B2) before installing the swivel (B) on the swivel post (F). Use a vise with soft jaws to hold the swivel as couplings and adapter are installed.

- Apply Loctite 577 sealant to threads on female coupling (B3) and adapter (B2). See Fig. 25 for locations.
- Tighten the couplings (B1 and B3) and adapter (B2) by hand, until they are each finger tight. Then, wrench tighten these parts an additional 2 to 3 turns beyond finger tight.

NOTICE To allow the sealant sufficient time to cure, wait a minimum period of 3 hours at 68 to 104°F [20 to 40°C], or 6 hours at 40 to 68°F [5 to 20°C] before pressurizing the wrench.

Swivel Post:

- Apply a small amount of Loctite 243 thread sealant to the threaded mounting holes in the wrench housing. See Fig. 11 for locations.
- Install two new O-rings (F) into the ports on the base of the swivel post (E).
- Place the swivel post (E) onto the wrench (G), making sure that hydraulic ports are aligned. Be careful that O-rings (F) do not drop out or become pinched or cut.
- Install the degreased socket head capscrews (D) and tighten to 3.7 Ft.lbs [5.1 Nm].

Swivel Assembly:

- Install a new O-rings (D) into the grooves on the swivel post (E).
- Coat O-rings (D) with a small amount of silicone grease. Then, carefully slide the swivel assembly (B) onto the swivel post (E).
- Reinstall the circlip retainer ring (A).
- Perform hydraulic pressure testing before placing the wrench into service. Refer to the procedure in Section 7.2.6

7.3.2 HMT Drive Unit (Fig. 19)

Disassembly

- Firmly hold the drive unit body (1). Remove bottom retaining pin (11) and ball end screw (9) from the drive unit, separate cassette assembly from the drive unit.
- Unscrew the socket button head cap (18) from the back cap (2) and remove the bottom retaining pin lanyard (17).
- Remove the retaining rings (11) and top retaining pin (6).
- Unscrew the eight socket head cap screws (10) and remove the back cap (2) and back cap o-ring (15).
- Unscrew and remove the rod end (4) from the front of the drive unit body, holding the Piston Rod (3) with a spanner to prevent rotation.
- Remove piston rod (3) and seals, O-rings and bush (13, 16, 14, 5) from the drive unit body.
- Check and remove any remaining seals, O-rings or bush from the drive unit body.
- Remove grub screw (8) and O-ring (20).
- Clean all exposed components with a mild solvent.
- Inspect all parts for damage.

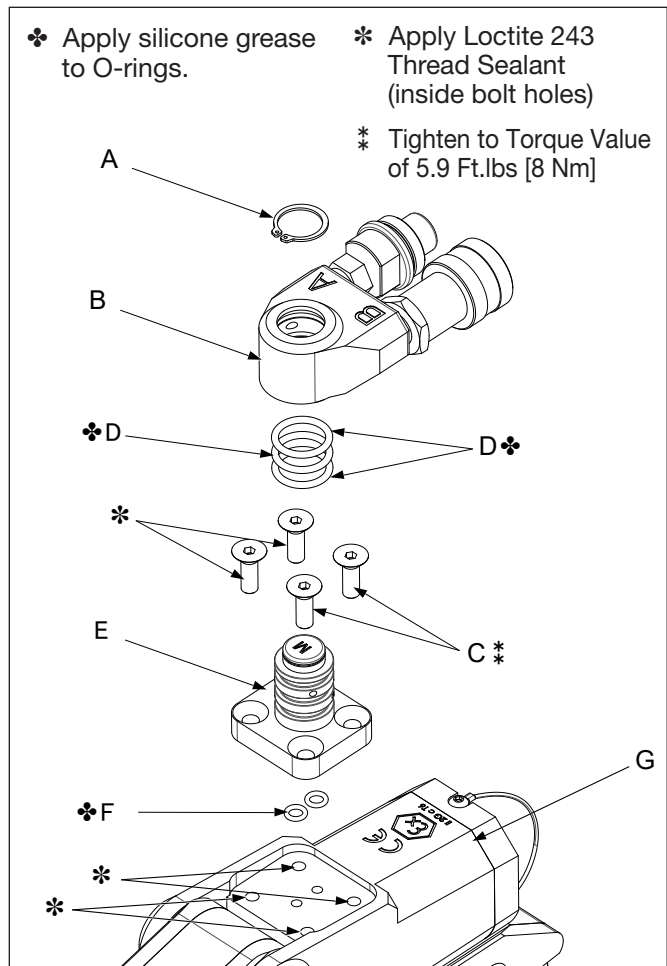


Figure 17: Swivel Post and Swivel Assembly

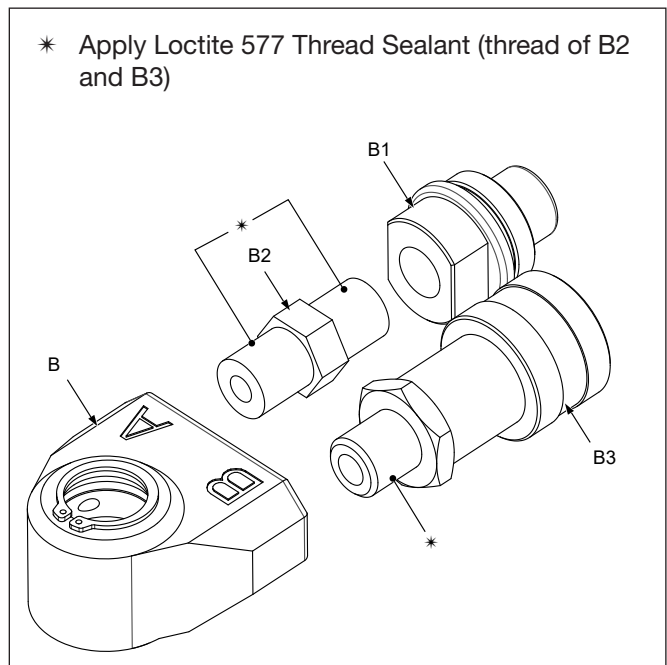


Figure 18: Exploded Swivel Assembly

• **Reassembly and Installation**

NOTICE In the following steps, coat all O-rings and seals with silicone grease before installation.

NOTICE Do not use excessive force when installing the piston rod (3) in the following steps. Excessive force may cause damage to these component and also may damage the sealing faces within the wrench.

- Insert the O-ring (20) and grub screw (8) into the relief shaft.

NOTE: Ensure the grub screw (8) and O-ring (20) have been installed after Loctite 577 has been applied. Loctite must be fully cured before testing.

- Fit bush (5) and rod end seal (14) into the drive unit body piston shaft (1)
- Insert the piston O-ring (16) into the lower groove on the piston rod (3) followed by the piston cup seal (13) into the upper groove. Insert the piston rod (3) into the drive unit body (1).
- Apply threadlock to the Rod End (4) threads and install into the Piston Rod (3), holding the Piston Rod with a spanner to prevent rotation.

- Install the back cap thread O-ring (15) into the groove in the back cap body (2).
- Attach the back cap (2), and secure with the eight socket head cap screws after applying Loctite 243 Thread Sealant (10). Tighten the socket head cap screws to the following Torque values:
 - o HMT1500 : 6 Ft/lbs [8 Nm]
 - o HMT3500 : 14 Ft/lbs [19 Nm]
 - o HMT7500 : 30 Ft/lbs [41 Nm]
 - o HMT13000 : 40 Ft/lbs [56 Nm]
- Place the bottom retaining pin lanyard (17) onto the back cap and secure with the socket button head cap (18).
- Fit the top retaining pin (6) and retaining ring (11).
- If removed, reinstall the hydraulic swivel and swivel post. Refer to Section 7.2.1.
- Assembly with the appropriate cassette assembly, secured with bottom retaining pin (11) and ball end screw (9); and perform hydraulic pressure testing before placing the wrench into service. Refer to the procedure in Section 7.2.6.

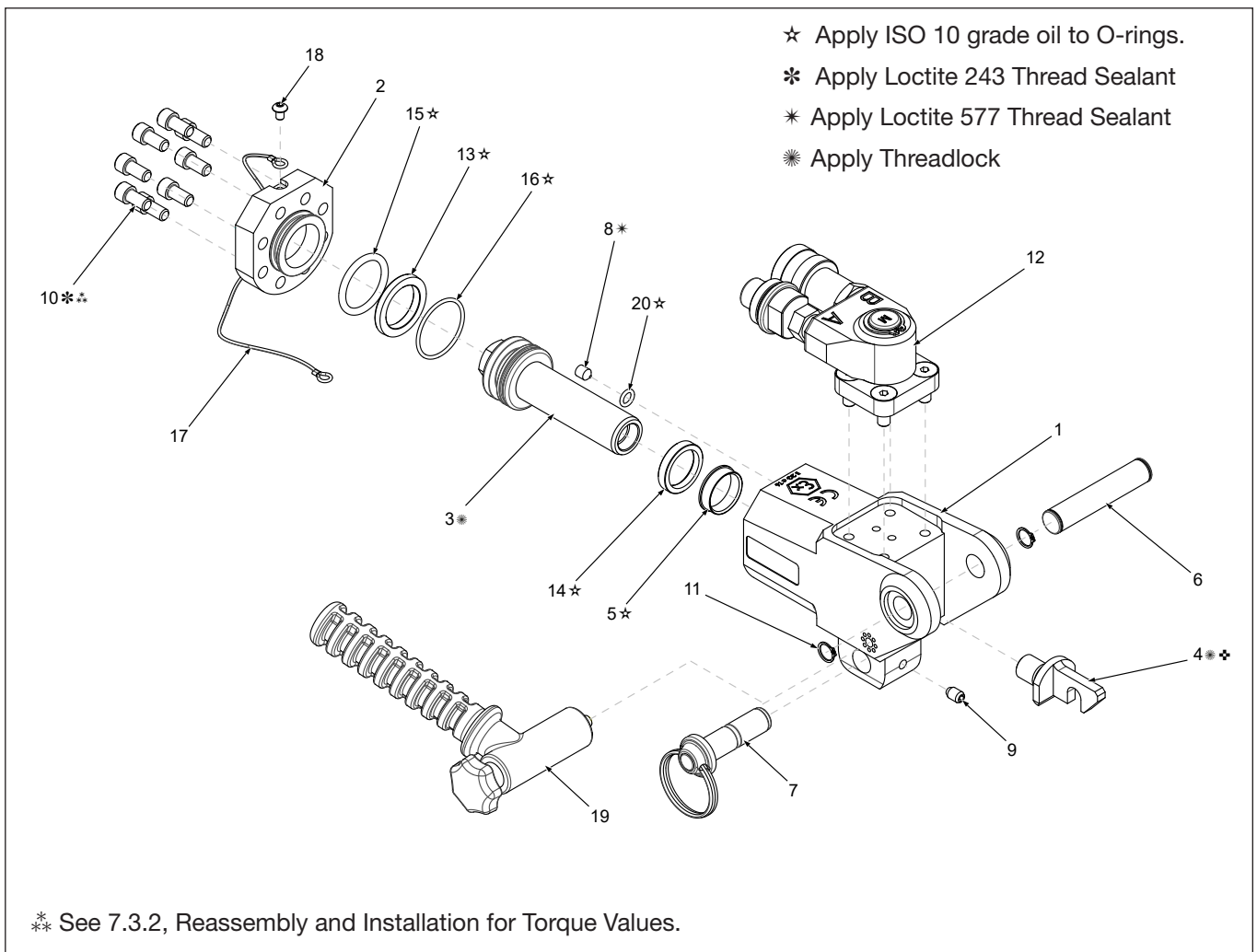


Figure 19: Exploded HMT

7.3.3 HMT HLP Cassette Assembly - Disassembly and Reassembly (Fig. 20/ 21)

- With the HLP cassette laid down on its side, remove the three front spacer screws (12) and two reaction block screws (13) followed by the one of HLP cassette side plate (1 or 2).
- Separate the ratchet bush (14). The drive plate assembly is free to be removed from the cassette. Carefully remove the two compression springs (8) from the drive plate and set to one side.
- Remove the ratchet (4), pawl (5) and pawl springs (6).
- Disengage the two drive pin retainers (9), and slide out the drive pin (7) from the drive plate (3).
- On the remaining plate remove the three front spacer screws (12) and two reaction block screws (13) separate front spacer (11) and reaction block (10) from the remaining HLP cassette side plate (1 or 2).
- Disassemble the reaction block by removing the two socket head cap screws (17), and remove the wear plate (16) from reaction block spacer (10).
- Clean all components with a mild solvent.
- Inspect all parts for damage. Any damaged components must be replaced.
- Dry all components. Apply a thin coat of molybdenum disulphide grease in the areas shown in Figure 20.

NOTICE Be sure that the ratchet, drive plate, pawl, pawl spring, square drive, access plugs, and compression springs are correctly installed, in the reverse order of disassembly. Failure to install these parts correctly will result in component damage. Refer to figures 19 and 20.

- Assemble the HLP cassette assembly to the appropriate drive unit body.
- Connect the wrench to the pump and perform hydraulic pressure testing before placing the wrench into service. Refer to the procedure in Section 7.2.6.
- Without the wrench on a nut or bolt, check operation at a nominal pressure to make sure the piston advances and retracts freely.
- Release the pressure and make sure that the piston fully retracts.

7.3.4 HMT HSQ Cassette Assembly - Disassembly and Reassembly (Fig. 22/ 23)

- To separate the square drive reaction arm (4), unscrew the securing reaction arm grub screw (20) and disengage.
- Remove the square drive circlip (8) and slide the reaction arm spline (3) off the square drive (2). Separate the drive bush (6) and remove the remaining reaction arm circlip (9).
- Remove the square drive (2), drive retainer ring (21), retainer block (5), and push button retainer (16).
- Remove the front spacer pins (22) followed by the front spacer (15).
- The drive plate assembly is free to be removed from the body. Carefully remove the two rod end pin spring (18) from the drive plate and set to one side.
- Disengage the two drive pin retainers (19), and slide out the rod end pin (10) from the drive plate (11).
- Remove the splined ratchet (7), pawl (14) and pawl springs (13).
- If the linkpin (12) requires replacement, unscrew the M4 button head screw (24) and separate link pin and lanyard (23) from the body.
- Clean all components with a mild solvent.
- Inspect all parts for damage. Any damaged components must be replaced.

NOTICE Do not apply molybdenum disulphide grease to the ratchet lever bore, or to the drive shoe teeth. Application of grease to these areas will cause erratic operation, slippage of drive mechanism and excessive component wear.

- Dry all components. Apply a thin coat of molybdenum disulphide grease in the areas shown in Figure 22.

NOTICE Be sure that the ratchet, drive plate, pawl, pawl spring, square drive, access plugs, and compression springs are correctly installed, in the reverse order of disassembly. Ensure that the square drive is inserted through the drive plate. Failure to install these parts correctly will result in component damage. Refer to figures 21 and 22.

- Assemble the Square Drive Cassette assembly to the appropriate wrench body.
- Connect the wrench to the pump and perform hydraulic pressure testing before placing the wrench into service. Refer to the procedure in Section 7.2.6.
- Without the wrench on a nut or bolt, check operation at a nominal pressure to make sure the piston advances and retracts freely.
- Release the pressure and make sure that the piston fully retracts.

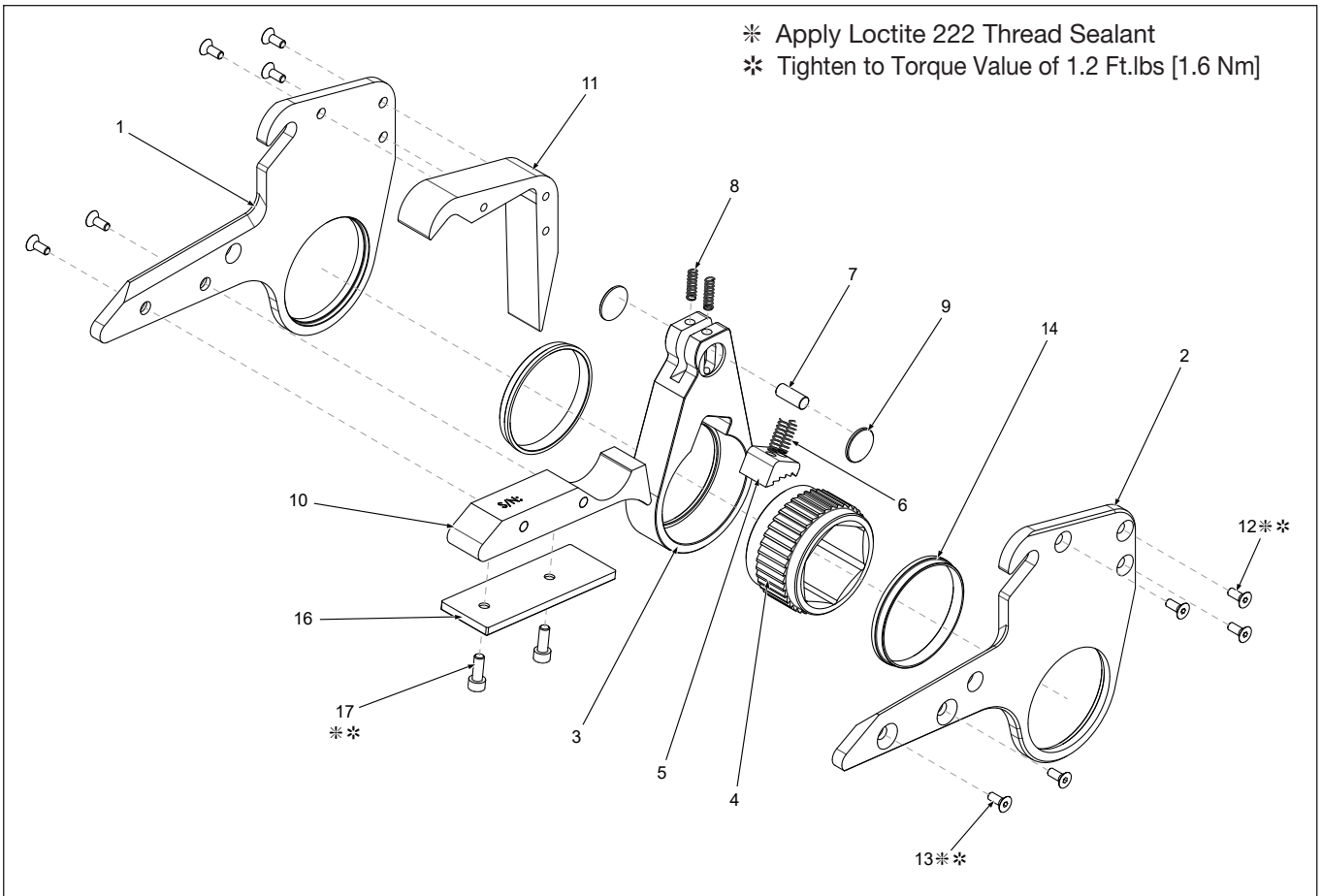


Figure 20: Exploded HMT HLP Cassette

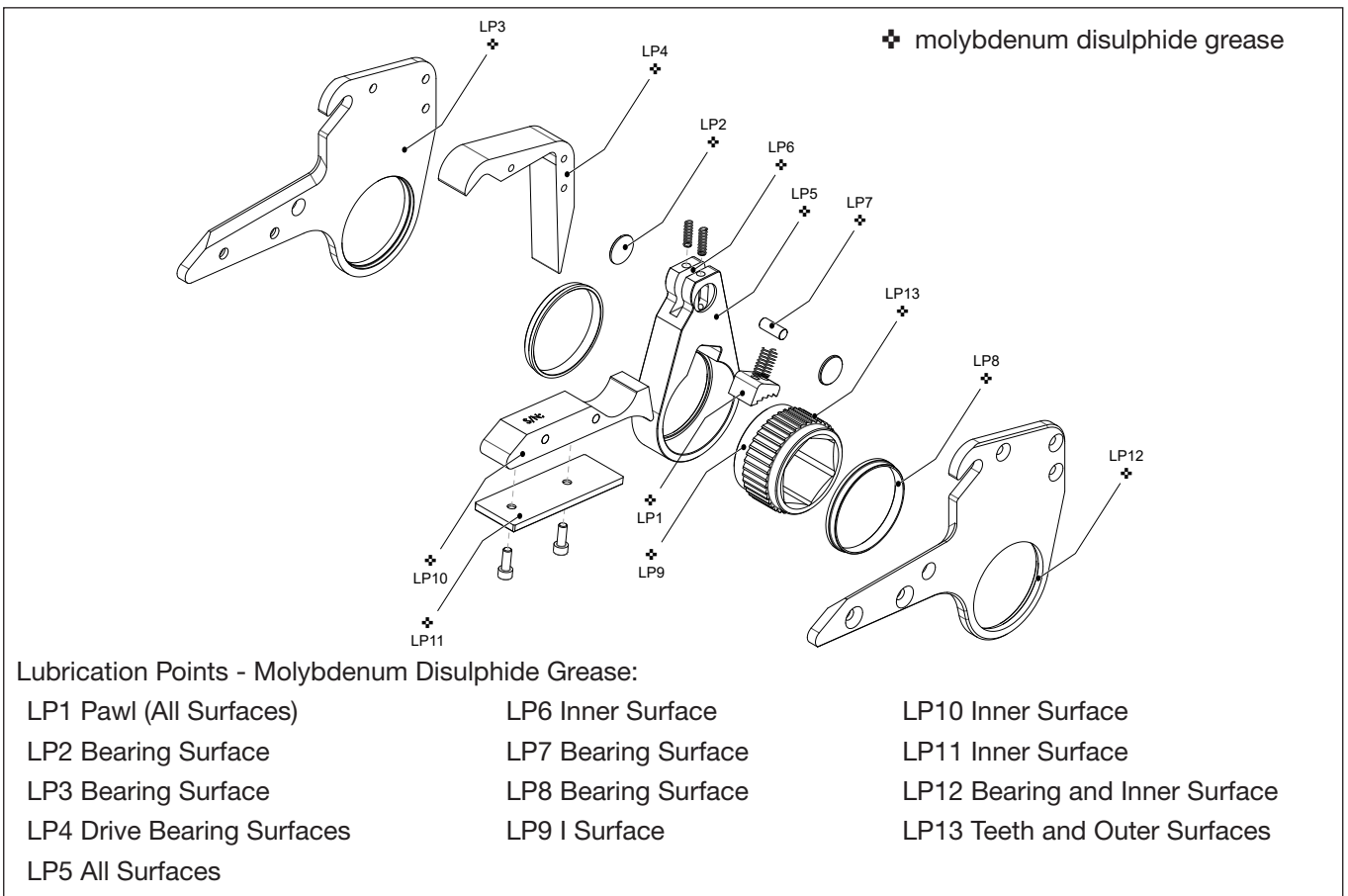


Figure 21: HMT HLP Cassette Lubrication Points

※ Apply Loctite 222 Thread Sealant

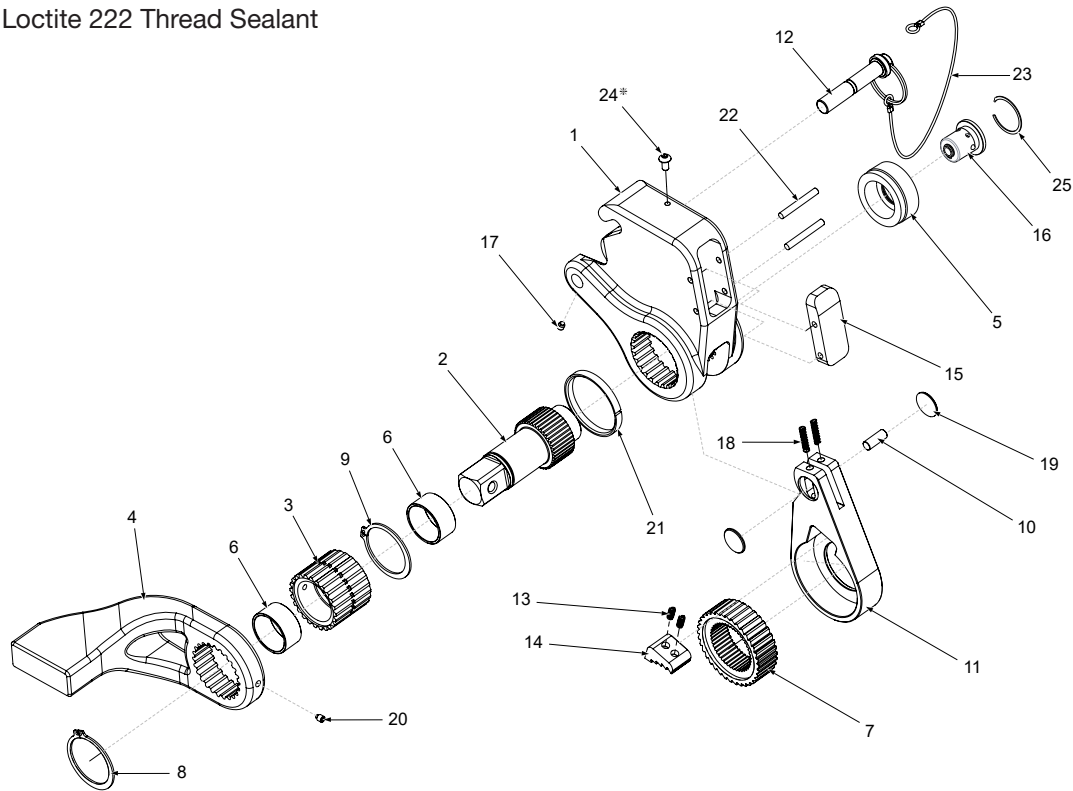
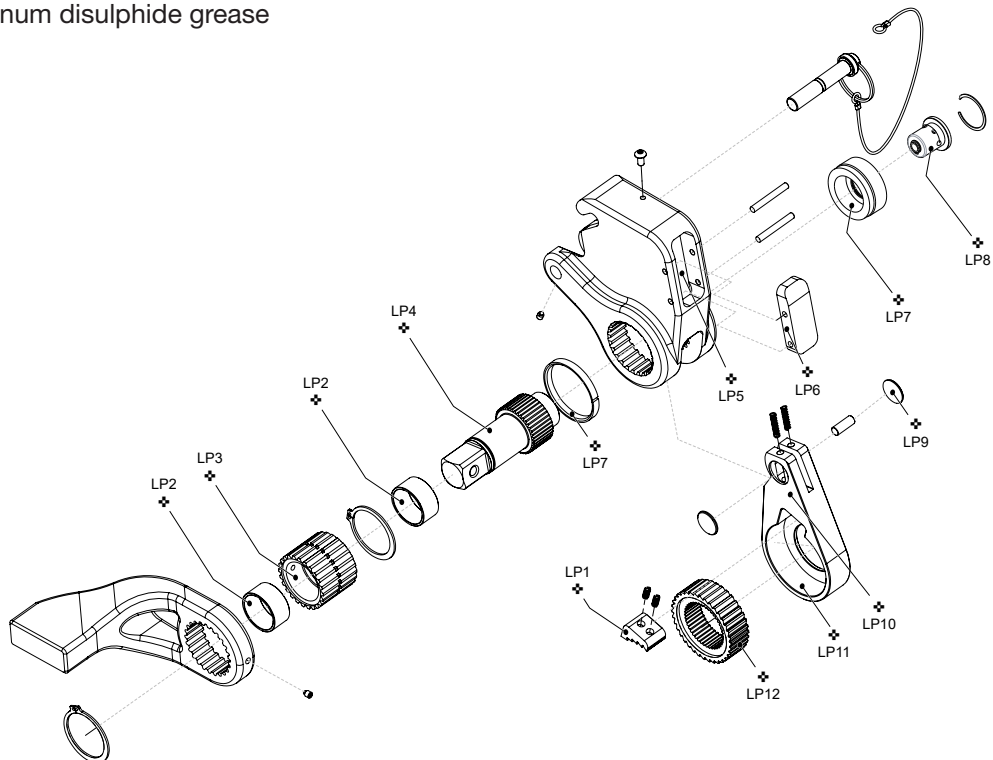


Figure 22: Exploded Torque HMT HSQ Cassette

✦ molybdenum disulphide grease



Lubrication Points - Molybdenum Disulphide Grease:

- | | | |
|--------------------------------|----------------------|-------------------------------|
| LP1 Pawl (All Surfaces) | LP5 Internal Bearing | LP9 Bearing Surface |
| LP2 Bearing Surface | LP6 Mating Surface | LP10 All Surfaces |
| LP3 Wrench Body Inner Surfaces | LP7 Bearing Surface | LP11 Internal Surface |
| LP4 Square Drive Bearing | LP8 Bearing Surface | LP12 Teeth and Outer Surfaces |

Figure 23: HSQ Lubrication Points HMT HSQ Cassette

7.3.5 Square Drive Shaft Push Button Retainer Assembly Disassembly and Reassembly (Fig. 24)

NOTICE Disassemble the drive shaft push button retainer assembly only if it is not operating properly or if it is worn or damaged.

1. Remove circlip (25).
2. Separate the button mechanism (16) from the retaining block (5).
3. Clean all parts with a mild solvent. Dry all parts after cleaning.
4. Inspect all parts for damage.
5. Reassemble retaining button assembly (16) and bushing (5) and secure with circlip (25).
6. Apply a thin coat of molybdenum disulphide grease in the areas shown in Figure 23.

NOTICE If a fault develops with the retaining button assembly (16), the whole assembly will need to be replaced. It is not recommended that this item be disassembled.

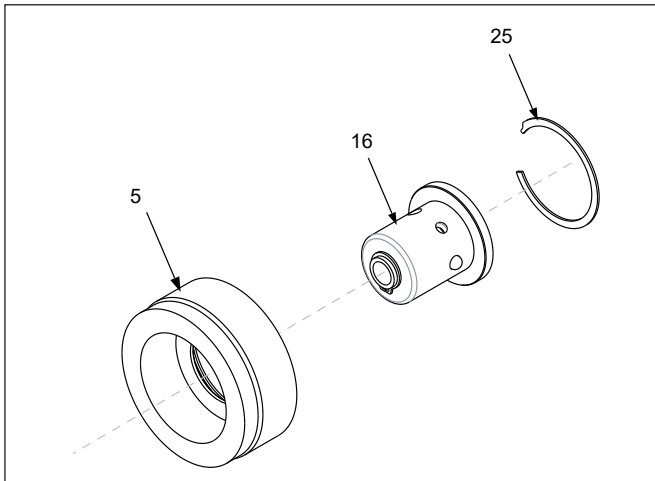


Figure 24: Exploded Push Button Retainer Assembly

7.3.6 Hydraulic Pressure Testing

- Connect hydraulic hoses and cycle the wrench at 1,000 psi [69 bar] to check for oil leaks.
- If there are no leaks, cycle the wrench at 10,000 psi [690 bar] and check again for leaks.
- If leaks are present, determine the cause and make repairs as required before placing the wrench into service.

WARNING Pressurized hydraulic oil can penetrate the skin and could cause serious personal injury. Always repair any oil leaks before using the wrench.

8. Parts List

8.1 Exploded Views - HMT Drive Unit Exploded View

Note:

Refer to the wrench instruction sheet for detailed maintenance instruction,

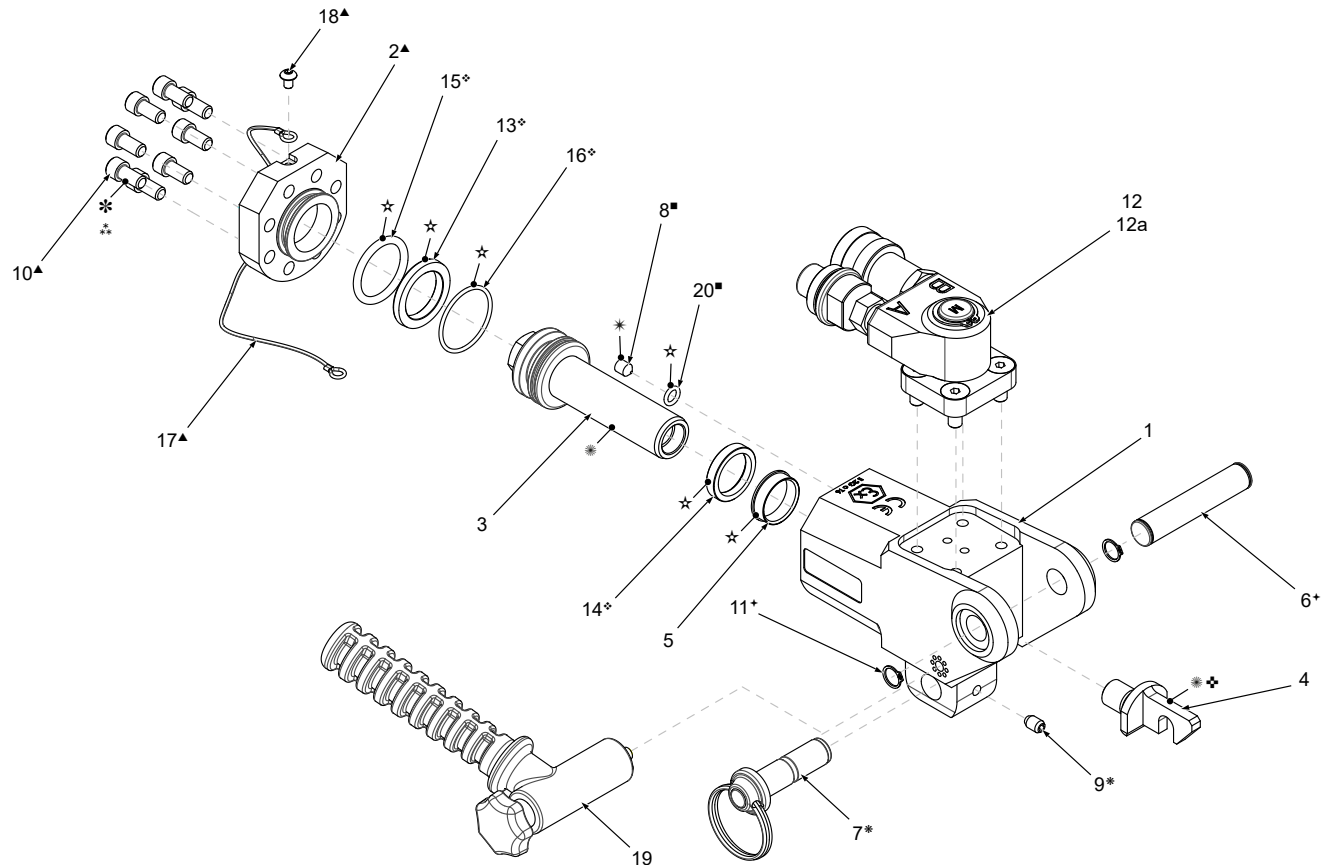
⊕ Apply molybdenum disulphide grease.

☆ Apply ISO 10 grade oil to O-rings.

* Apply Loctite 243 Thread Sealant.

** Tighten to Torque Values:

- HMT1500 : 6 Ft/lbs [8 Nm]
- HMT3500 : 14 Ft/lbs [19 Nm]
- HMT7500 : 30 Ft/lbs [41 Nm]
- HMT13000 : 40 Ft/lbs [56 Nm]



Service Kits:

Items marked ▲ supplied in Back Cap Kit: HMT1500BCK, HMT3500BCK, HMT7500BCK, HMT13000BCK.

Items marked + supplied in Top Retaining Pin Kit: HMT1500TRK, HMT3500TRK, HMT7500TRK, HMT13000TRK.

Items marked * supplied in Bottom Retaining Pin Kit: HMT1500BRK, HMT3500BRK, HMT7500BRK, HMT13000BRK.

Items marked ▣ supplied in Grub Screw Kit: HMT1500GSK, HMT3500GSK, HMT7500GSK, HMT13000GSK.

Items marked * supplied in Seal Kit: HMT1500SK, HMT3500SK, HMT7500SK, HMT13000SK.

8.2 Table of Parts - HMT Drive Unit Exploded View

Item	Description	Qty	Part Numbers			
			HMT1500	HMT3500	HMT7500	HMT13000
1	Drive Unit Body	1	not available	not available	not available	not available
2	Back Cap	1	▲	▲	▲	▲
3	Piston Rod	1	HMT1500-03	HMT3500-03	HMT7500-03	HMT13000-03
4	Rod End	1	HMT1500-04	HMT3500-04	HMT7500-04	HMT13000-04
5	Bush	1	HMT1500-05	HMT3500-05	HMT7500-05	HMT13000-05
6	Top Retaining Pin	1	✦	✦	✦	✦
7	Bottom Retaining Pin	1	*	*	*	*
8	Grub Screw	1	■	■	■	■
9	Ball End Screw	1	*	*	*	*
10	Back Cap Screw	8	▲	▲	▲	▲
11	Retaining Ring	2	✦	✦	✦	✦
12	Swivel Assembly	1	SP300MKA	SP300MKA	SP300MKA	SP300MKA
12a	Swivel Seal Kit (not shown)		TSP300MSK	TSP300MSK	TSP300MSK	TSP300MSK
13	Piston Cup Seal	1	❖	❖	❖	❖
14	Rod End Seal	1	❖	❖	❖	❖
15	Back Cap O-Ring	1	❖	❖	❖	❖
16	Piston O-Ring	1	❖	❖	❖	❖
17	Lanyard	1	▲	▲	▲	▲
18	Screw	1	▲	▲	▲	▲
19	Handle	1	SWH6A	SWH6A	SWH6A	SWH10A
20	O-Ring	1	■	■	■	■

▲ Indicates items included and available only as part of Back Cap Kit: HMT1500BCK, HMT3500BCK, HMT7500BCK, HMT13000BCK.

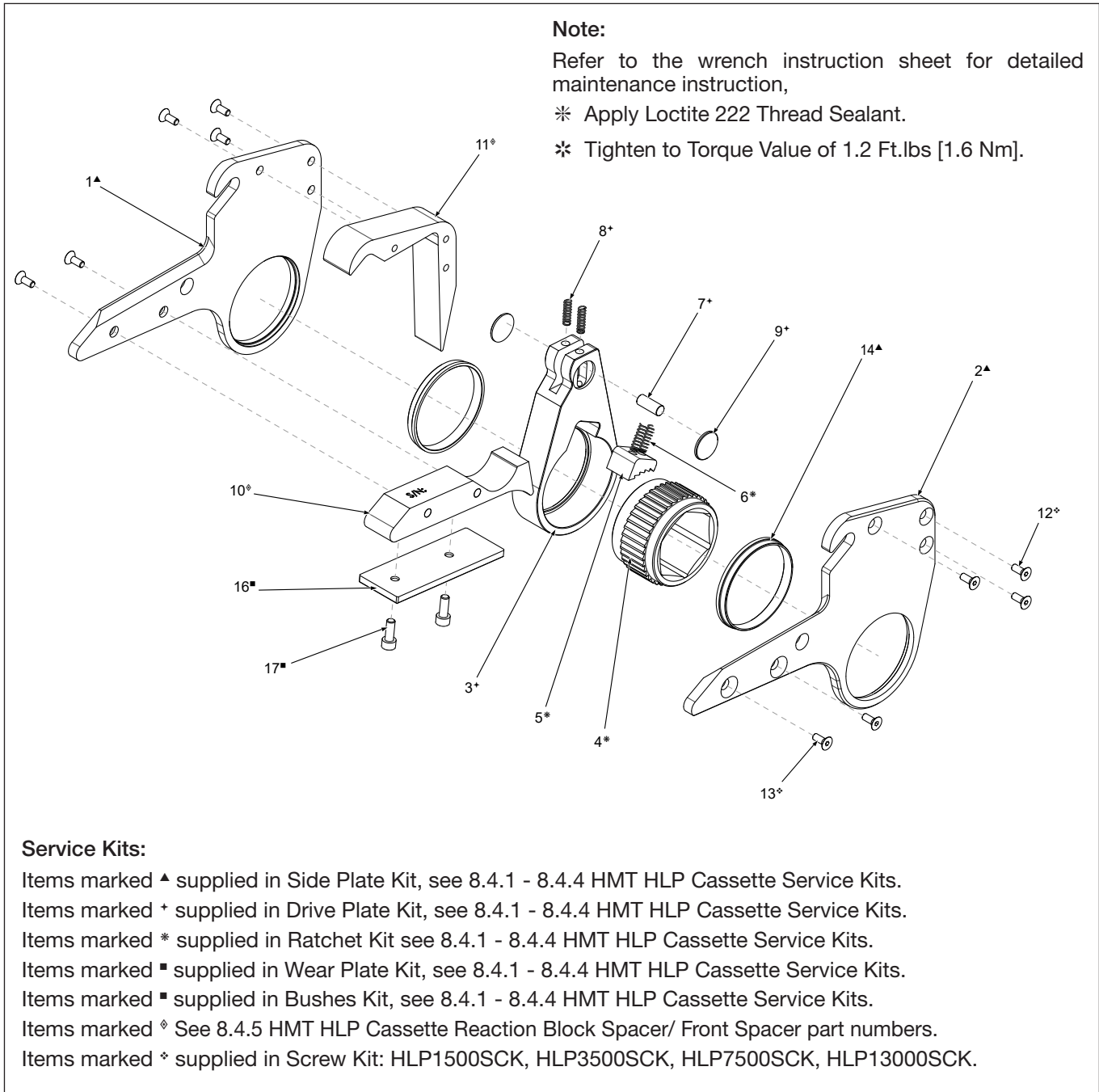
✦ Indicates items included and available only as part of Top Retaining Pin Kit: HMT1500TRK, HMT3500TRK, HMT7500TRK, HMT13000TRK.

* Indicates items included and available only as part of Bottom Retaining Pin Kit: HMT1500BRK, HMT3500BRK, HMT7500BRK, HMT13000BRK.

■ Indicates items included and available only as part of Grub Screw Kit: HMT1500GSK, HMT3500GSK, HMT7500GSK, HMT13000GSK.

❖ Indicates items included and available only as part of Seal Kit: HMT1500SK, HMT3500SK, HMT7500SK, HMT13000SK.

8.3 Exploded Views - HMT HLP Cassette Assembly



8.4 Table of Parts - HMT HLP Cassette Assembly

Item	Description	Qty	Part Numbers			
			HMT1500 Cassettes	HMT3500 Cassettes	HMT7500 Cassettes	HMT13000 Cassettes
1	Left Side Plate	1	▲	▲	▲	▲
2	Right Side Plate	1	▲	▲	▲	▲
3	Drive Plate	1	✦	✦	✦	✦
4	Hex Ratchet	1	*	*	*	*
5	Drive Pawl	1	*	*	*	*
6	Drive Pawl Spring	2	*	*	*	*
7	Drive Pin	1	✦	✦	✦	✦
8	Drive Pin Spring	2	✦	✦	✦	✦
9	Drive Pin Retainer	2	✦	✦	✦	✦
10	Reaction Block Space	1	◇	◇	◇	◇
11	Front Space	1	◇	◇	◇	◇
12	Front Space Screw	6	❖	❖	❖	❖
13	Reaction Block Screw	4	❖	❖	❖	❖
14	Ratchet Bush	2	▲ ★	▲ ★	▲ ★	▲ ★
15	Crush Hazard Sticker (not shown)	2	▲	▲	▲	▲
16	Wear Plate	1	■	■	■	■
17	Screw	2	■	■	■	■

- ▲ Indicates items included and available only as part of Side Plate Kit, see 8.4.1/ 8.4.2/ 8.4.3/ 8.4.4 HMT HLP Cassette Service Kits.
- ✦ Indicates items included and available only as part of Drive Plate Kit, see 8.4.1/ 8.4.2/ 8.4.3/ 8.4.4 HMT HLP Cassette Service Kits.
- * Indicates items included and available only as part of Ratchet Kit see 8.4.1/ 8.4.2/ 8.4.3/ 8.4.4 HMT HLP Cassette Service Kits.
- Indicates items included and available only as part of Wear Plate Kit, see 8.4.1/ 8.4.2/ 8.4.3/ 8.4.4 HMT HLP Cassette Service Kits.
- ★ Indicates items included and available as part of Bushes Kit, see 8.4.1/ 8.4.2/ 8.4.3/ 8.4.4 HMT HLP Cassette Service Kits.
- ◇ See 8.4.5 HMT HLP Cassette Reaction Block Spacer/ Front Spacer part numbers.
- ❖ Indicates items included and available only as part of Screw Kit: HLP1500SCK, HLP3500SCK, HLP7500SCK, HLP13000SCK.

8.4.1 HMT1500 HLP Cassette Service Kits

Cassette Model	Part Numbers				
	Side Plate Kit (Section 8.3/8.4, item 1,2,14,15)	Drive Plate Kit (Section 8.3/8.4, item 3,7,8,9)	Ratchet Kit (Section 8.3/8.4, item 4,5,6)	Wear Plate Kit (Section 8.3/8.4, item 16, 17)	Bushes Kit (Section 8.3/8.4, item 14)
HLP1101	HLP1500175103	HLP1103DPK	HLP1101RK	HLP1105WPK	HLP1500-14-01
HLP1102	HLP1500175103	HLP1103DPK	HLP1102RK	HLP1105WPK	HLP1500-14-01
HLP1103	HLP1500175103	HLP1103DPK	HLP1103RK	HLP1105WPK	HLP1500-14-01
HLP1104	HLP1500175105	HLP1105DPK	HLP1104RK	HLP1105WPK	HLP1500-14-02
HLP1105	HLP1500175105	HLP1105DPK	HLP1105RK	HLP1105WPK	HLP1500-14-02
HLP1106	HLP1500175107	HLP1107DPK	HLP1106RK	HLP1107WPK	HLP1500-14-03
HLP1107	HLP1500175107	HLP1107DPK	HLP1107RK	HLP1107WPK	HLP1500-14-03
HLP1108	HLP1500175111	HLP1111DPK	HLP1108RK	HLP1105WPK	HLP1500-14-04
HLP1109	HLP1500175111	HLP1111DPK	HLP1109RK	HLP1105WPK	HLP1500-14-04
HLP1110	HLP1500175111	HLP1111DPK	HLP1110RK	HLP1105WPK	HLP1500-14-04
HLP1111	HLP1500175111	HLP1111DPK	HLP1111RK	HLP1105WPK	HLP1500-14-04
HLP1112	HLP1500175113	HLP1113DPK	HLP1112RK	HLP1105WPK	HLP1500-14-05
HLP1113	HLP1500175113	HLP1113DPK	HLP1113RK	HLP1105WPK	HLP1500-14-05
HLP1114	HLP1500175201	HLP1201DPK	HLP1114RK	HLP1207WPK	HLP1500-14-06
HLP1115	HLP1500175201	HLP1201DPK	HLP1115RK	HLP1207WPK	HLP1500-14-06
HLP1200	HLP1500175201	HLP1201DPK	HLP1200RK	HLP1207WPK	HLP1500-14-06
HLP1201	HLP1500175201	HLP1201DPK	HLP1201RK	HLP1207WPK	HLP1500-14-06
HLP1202	HLP1500175205	HLP1205DPK	HLP1202RK	HLP1207WPK	HLP1500-14-07
HLP1203	HLP1500175205	HLP1205DPK	HLP1203RK	HLP1207WPK	HLP1500-14-07
HLP1204	HLP1500175205	HLP1205DPK	HLP1204RK	HLP1207WPK	HLP1500-14-07
HLP1205	HLP1500175205	HLP1205DPK	HLP1205RK	HLP1207WPK	HLP1500-14-07
HLP1206	HLP1500175207	HLP1207DPK	HLP1206RK	HLP1207WPK	HLP1500-14-08
HLP1207	HLP1500175207	HLP1207DPK	HLP1207RK	HLP1207WPK	HLP1500-14-08

8.4.2 HMT3500 HLP Cassette Service Kits

Cassette Model	Part Numbers				
	Side Plate Kit (Section 8.3/8.4, item 1,2,14,15)	Drive Plate Kit (Section 8.3/8.4, item 3,7,8,9)	Ratchet Kit (Section 8.3/8.4, item 4,5,6)	Wear Plate Kit (Section 8.3/8.4, item 16, 17)	Bushes Kit (Section 8.3/8.4, item 14)
HLP3106	HLP3500175107	HLP3107DPK	HLP3106RK	HLP3204WPK	HLP3500-14-01
HLP3107	HLP3500175107	HLP3107DPK	HLP3107RK	HLP3204WPK	HLP3500-14-01
HLP3108	HLP3500175111	HLP3111DPK	HLP3108RK	HLP3204WPK	HLP3500-14-02
HLP3109	HLP3500175111	HLP3111DPK	HLP3109RK	HLP3204WPK	HLP3500-14-02
HLP3110	HLP3500175111	HLP3111DPK	HLP3110RK	HLP3204WPK	HLP3500-14-02
HLP3111	HLP3500175111	HLP3111DPK	HLP3111RK	HLP3204WPK	HLP3500-14-02
HLP3112	HLP3500175113	HLP3113DPK	HLP3112RK	HLP3204WPK	HLP3500-14-03
HLP3113	HLP3500175113	HLP3113DPK	HLP3113RK	HLP3204WPK	HLP3500-14-03
HLP3114	HLP3500175201	HLP3201DPK	HLP3114RK	HLP3204WPK	HLP3500-14-04
HLP3115	HLP3500175201	HLP3201DPK	HLP3115RK	HLP3204WPK	HLP3500-14-04
HLP3200	HLP3500175201	HLP3201DPK	HLP3200RK	HLP3204WPK	HLP3500-14-04
HLP3201	HLP3500175201	HLP3201DPK	HLP3201RK	HLP3204WPK	HLP3500-14-04
HLP3202	HLP3500175204	HLP3204DPK	HLP3202RK	HLP3204WPK	HLP3500-14-05
HLP3203	HLP3500175204	HLP3204DPK	HLP3203RK	HLP3204WPK	HLP3500-14-05
HLP3204	HLP3500175204	HLP3204DPK	HLP3204RK	HLP3204WPK	HLP3500-14-05
HLP3205	HLP3500175207	HLP3207DPK	HLP3205RK	HLP3214WPK	HLP3500-14-06
HLP3206	HLP3500175207	HLP3207DPK	HLP3206RK	HLP3214WPK	HLP3500-14-06
HLP3207	HLP3500175207	HLP3207DPK	HLP3207RK	HLP3214WPK	HLP3500-14-06
HLP3208	HLP3500175209	HLP3209DPK	HLP3208RK	HLP3214WPK	HLP3500-14-07
HLP3209	HLP3500175209	HLP3209DPK	HLP3209RK	HLP3214WPK	HLP3500-14-07
HLP3210	HLP3500175214	HLP3214DPK	HLP3210RK	HLP3214WPK	HLP3500-14-08
HLP3211	HLP3500175214	HLP3214DPK	HLP3211RK	HLP3214WPK	HLP3500-14-08
HLP3212	HLP3500175214	HLP3214DPK	HLP3212RK	HLP3214WPK	HLP3500-14-08
HLP3213	HLP3500175214	HLP3214DPK	HLP3213RK	HLP3214WPK	HLP3500-14-08
HLP3214	HLP3500175214	HLP3214DPK	HLP3214RK	HLP3214WPK	HLP3500-14-08
HLP3215	HLP3500175215	HLP3215DPK	HLP3215RK	HLP3204WPK	HLP3500-14-09
HLP3300	HLP3500175302	HLP3302DPK	HLP3300RK	HLP3204WPK	HLP3500-14-10
HLP3301	HLP3500175302	HLP3302DPK	HLP3301RK	HLP3204WPK	HLP3500-14-10
HLP3302	HLP3500175302	HLP3302DPK	HLP3302RK	HLP3204WPK	HLP3500-14-10

8.4.3 HMT7500 HLP Cassette Service Kits

Cassette Model	Part Numbers				
	Side Plate Kit (Section 8.3/8.4, item 1,2,14,15)	Drive Plate Kit (Section 8.3/8.4, item 3,7,8,9)	Ratchet Kit (Section 8.3/8.4, item 4,5,6)	Wear Plate Kit (Section 8.3/8.4, item 16, 17)	Bushes Kit (Section 8.3/8.4, item 14)
HLP7203	HLP7500175205	HLP7205DPK	HLP7203RK	HLP7205WPK	HLP7500-14-02
HLP7204	HLP7500175205	HLP7205DPK	HLP7204RK	HLP7205WPK	HLP7500-14-02
HLP7205	HLP7500175205	HLP7205DPK	HLP7205RK	HLP7205WPK	HLP7500-14-02
HLP7206	HLP7500175208	HLP7208DPK	HLP7206RK	HLP7215WPK	HLP7500-14-03
HLP7207	HLP7500175208	HLP7208DPK	HLP7207RK	HLP7215WPK	HLP7500-14-03
HLP7208	HLP7500175208	HLP7208DPK	HLP7208RK	HLP7215WPK	HLP7500-14-03
HLP7209	HLP7500175209	HLP7209DPK	HLP7209RK	HLP7215WPK	HLP7500-14-04
HLP7210	HLP7500175214	HLP7214DPK	HLP7210RK	HLP7215WPK	HLP7500-14-05
HLP7211	HLP7500175214	HLP7214DPK	HLP7211RK	HLP7215WPK	HLP7500-14-05
HLP7212	HLP7500175214	HLP7214DPK	HLP7212RK	HLP7215WPK	HLP7500-14-05
HLP7213	HLP7500175214	HLP7214DPK	HLP7213RK	HLP7215WPK	HLP7500-14-05
HLP7214	HLP7500175214	HLP7214DPK	HLP7214RK	HLP7215WPK	HLP7500-14-05
HLP7215	HLP7500175215	HLP7215DPK	HLP7215RK	HLP7215WPK	HLP7500-14-06
HLP7300	HLP7500175302	HLP7302DPK	HLP7300RK	HLP7205WPK	HLP7500-14-07
HLP7301	HLP7500175302	HLP7302DPK	HLP7301RK	HLP7205WPK	HLP7500-14-07
HLP7302	HLP7500175302	HLP7302DPK	HLP7302RK	HLP7205WPK	HLP7500-14-07
HLP7304	HLP7500175306	HLP7306DPK	HLP7304RK	HLP7205WPK	HLP7500-14-08
HLP7085M	HLP7500175306	HLP7306DPK	HLP7085MRK	HLP7205WPK	HLP7500-14-08
HLP7090M	HLP7500175090	HLP7090MPK	HLP7090MRK	HLP7308WPK	HLP7500-14-09
HLP7306	HLP7500175306	HLP7306DPK	HLP7306RK	HLP7205WPK	HLP7500-14-08
HLP7308	HLP7500175090	HLP7090MPK	HLP7308RK	HLP7308WPK	HLP7500-14-09
HLP7309	HLP7500175312	HLP7312DPK	HLP7309RK	HLP7314WPK	HLP7500-14-10
HLP7312	HLP7500175312	HLP7312DPK	HLP7312RK	HLP7314WPK	HLP7500-14-10
HLP7314	HLP7500175314	HLP7314DPK	HLP7314RK	HLP7314WPK	HLP7500-14-11
HLP3715	HLP7500175314	HLP7314DPK	HLP7315RK	HLP7314WPK	HLP7500-14-11

8.4.4 HMT13000 HLP Cassette Service Kits

Cassette Model	Part Numbers				
	Side Plate Kit (Section 8.3/8.4, item 1,2,14,15)	Drive Plate Kit (Section 8.3/8.4, item 3,7,8,9)	Ratchet Kit (Section 8.3/8.4, item 4,5,6)	Wear Plate Kit (Section 8.3/8.4, item 16, 17)	Bushes Kit (Section 8.3/8.4, item 14)
HLP13207	HLP13000175214	HLP13214DPK	HLP13207RK	HLP13215WPK	HLP13000-14-01
HLP13208	HLP13000175214	HLP13214DPK	HLP13208RK	HLP13215WPK	HLP13000-14-01
HLP13209	HLP13000175214	HLP13214DPK	HLP13209RK	HLP13215WPK	HLP13000-14-01
HLP13210	HLP13000175214	HLP13214DPK	HLP13210RK	HLP13215WPK	HLP13000-14-01
HLP13211	HLP13000175214	HLP13214DPK	HLP13211RK	HLP13215WPK	HLP13000-14-01
HLP13212	HLP13000175214	HLP13214DPK	HLP13212RK	HLP13215WPK	HLP13000-14-01
HLP13213	HLP13000175214	HLP13214DPK	HLP13213RK	HLP13215WPK	HLP13000-14-01
HLP13214	HLP13000175214	HLP13214DPK	HLP13214RK	HLP13215WPK	HLP13000-14-01
HLP13215	HLP13000175215	HLP13215DPK	HLP13215RK	HLP13215WPK	HLP13000-14-02
HLP13300	HLP13000175303	HLP13303DPK	HLP13300RK	HLP13403WPK	HLP13000-14-03
HLP13301	HLP13000175303	HLP13303DPK	HLP13301RK	HLP13403WPK	HLP13000-14-03
HLP13302	HLP13000175303	HLP13303DPK	HLP13302RK	HLP13403WPK	HLP13000-14-03
HLP13303	HLP13000175303	HLP13303DPK	HLP13303RK	HLP13403WPK	HLP13000-14-04
HLP13304	HLP13000175307	HLP13307DPK	HLP13304RK	HLP13403WPK	HLP13000-14-04
HLP13305	HLP13000175307	HLP13307DPK	HLP13305RK	HLP13403WPK	HLP13000-14-04
HLP13085M	HLP13000175307	HLP13307DPK	HLP13085MRK	HLP13403WPK	HLP13000-14-04
HLP13306	HLP13000175307	HLP13307DPK	HLP13306RK	HLP13403WPK	HLP13000-14-04
HLP13307	HLP13000175307	HLP13307DPK	HLP13307RK	HLP13403WPK	HLP13000-14-05
HLP13308	HLP13000175090	HLP13090DPK	HLP13308RK	HLP13403WPK	HLP13000-14-05
HLP13090M	HLP13000175090	HLP13090DPK	HLP13090MRK	HLP13403WPK	HLP13000-14-05
HLP13309	HLP13000175313	HLP13313DPK	HLP13309RK	HLP13313WPK	HLP13000-14-06
HLP13310	HLP13000175313	HLP13313DPK	HLP13310RK	HLP13313WPK	HLP13000-14-06
HLP13311	HLP13000175313	HLP13313DPK	HLP13311RK	HLP13313WPK	HLP13000-14-06
HLP13312	HLP13000175313	HLP13313DPK	HLP13312RK	HLP13313WPK	HLP13000-14-06
HLP13313	HLP13000175313	HLP13313DPK	HLP13313RK	HLP13313WPK	HLP13000-14-07
HLP13314	HLP13000175401	HLP13401DPK	HLP13314RK	HLP13215WPK	HLP13000-14-07
HLP13315	HLP13000175401	HLP13401DPK	HLP13315RK	HLP13215WPK	HLP13000-14-07
HLP13400	HLP13000175401	HLP13401DPK	HLP13400RK	HLP13402WPK	HLP13000-14-08
HLP13401	HLP13000175401	HLP13401DPK	HLP13401RK	HLP13402WPK	HLP13000-14-08
HLP13402	HLP13000175403	HLP13403DPK	HLP13402RK	HLP13403WPK	HLP13000-14-08
HLP13403	HLP13000175403	HLP13403DPK	HLP13403RK	HLP13403WPK	HLP13000-14-09
HLP13404	HLP13000175407	HLP13407DPK	HLP13404RK	HLP13313WPK	HLP13000-14-09
HLP13405	HLP13000175407	HLP13407DPK	HLP13405RK	HLP13313WPK	HLP13000-14-09
HLP13406	HLP13000175407	HLP13407DPK	HLP13406RK	HLP13313WPK	HLP13000-14-10
HLP13407	HLP13000175407	HLP13407DPK	HLP13407RK	HLP13313WPK	HLP13000-14-10
HLP13408	HLP13000175410	HLP13410DPK	HLP13408RK	HLP13215WPK	HLP13000-14-10
HLP13409	HLP13000175410	HLP13410DPK	HLP13409RK	HLP13215WPK	HLP13000-14-10
HLP13115M	HLP13000175410	HLP13410DPK	HLP13115MRK	HLP13215WPK	HLP13000-14-10
HLP13410	HLP13000175410	HLP13410DPK	HLP13410RK	HLP13215WPK	HLP13000-14-10

8.4.5 HMT HLP Cassette Reaction Block Spacer/ Front Spacer Part Numbers

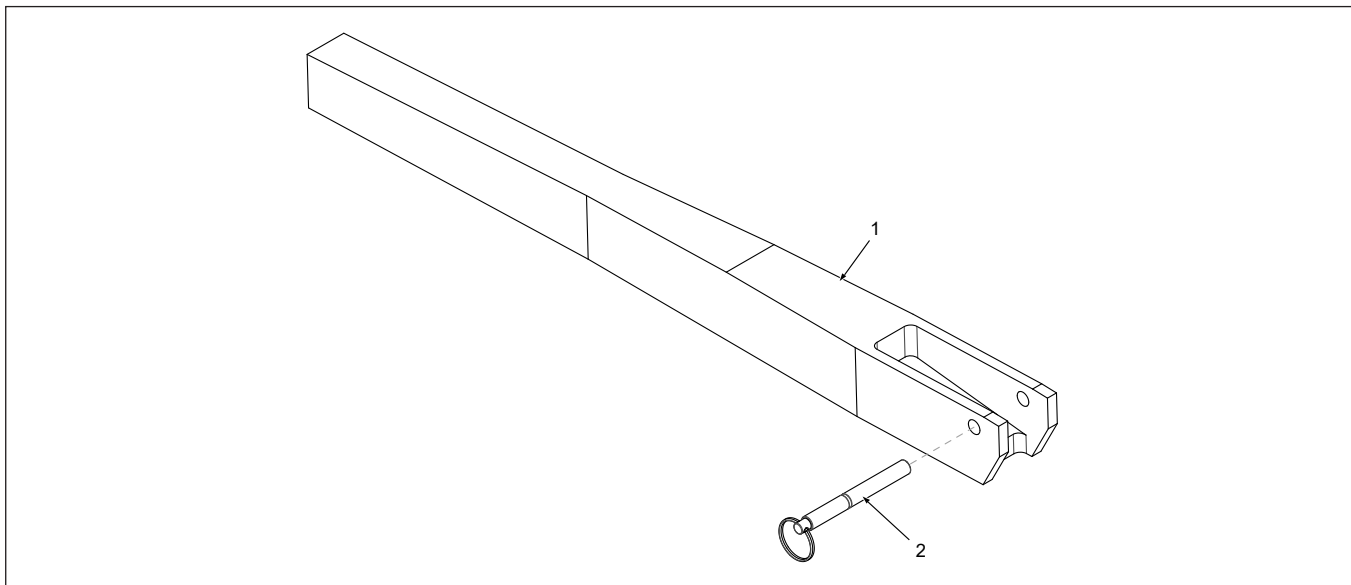
Cassette Model	Part Numbers	
	Reaction Block Space (Section 8.3/8.4, item 10)	Front Spacer (Section 8.3/8.4, item 11)
HLP1101	HLP1500-09-01	HLP1500-10-01
HLP1102	HLP1500-09-01	HLP1500-10-01
HLP1103	HLP1500-09-01	HLP1500-10-01
HLP1104	HLP1500-09-02	HLP1500-10-02
HLP1105	HLP1500-09-02	HLP1500-10-02
HLP1106	HLP1500-09-03	HLP1500-10-03
HLP1107	HLP1500-09-03	HLP1500-10-03
HLP1108	HLP1500-09-04	HLP1500-10-04
HLP1109	HLP1500-09-04	HLP1500-10-04
HLP1110	HLP1500-09-04	HLP1500-10-04
HLP1111	HLP1500-09-04	HLP1500-10-04
HLP1112	HLP1500-09-05	HLP1500-10-05
HLP1113	HLP1500-09-05	HLP1500-10-05
HLP1114	HLP1500-09-06	HLP1500-10-06
HLP1115	HLP1500-09-06	HLP1500-10-06
HLP1200	HLP1500-09-06	HLP1500-10-06
HLP1201	HLP1500-09-06	HLP1500-10-06
HLP1202	HLP1500-09-07	HLP1500-10-07
HLP1203	HLP1500-09-07	HLP1500-10-07
HLP1204	HLP1500-09-07	HLP1500-10-07
HLP1205	HLP1500-09-07	HLP1500-10-07
HLP1206	HLP1500-09-08	HLP1500-10-08
HLP1207	HLP1500-09-08	HLP1500-10-08

Cassette Model	Part Numbers	
	Reaction Block Space (Section 8.3/8.4, item 10)	Front Spacer (Section 8.3/8.4, item 11)
HLP3106	HLP3500-09-01	HLP3500-10-01
HLP3107	HLP3500-09-01	HLP3500-10-01
HLP3108	HLP3500-09-02	HLP3500-10-02
HLP3109	HLP3500-09-02	HLP3500-10-02
HLP3110	HLP3500-09-02	HLP3500-10-02
HLP3111	HLP3500-09-02	HLP3500-10-02
HLP3112	HLP3500-09-03	HLP3500-10-03
HLP3113	HLP3500-09-03	HLP3500-10-03
HLP3114	HLP3500-09-04	HLP3500-10-04
HLP3115	HLP3500-09-04	HLP3500-10-04
HLP3200	HLP3500-09-04	HLP3500-10-04
HLP3201	HLP3500-09-04	HLP3500-10-04
HLP3202	HLP3500-09-05	HLP3500-10-05
HLP3203	HLP3500-09-05	HLP3500-10-05
HLP3204	HLP3500-09-05	HLP3500-10-05
HLP3205	HLP3500-09-06	HLP3500-10-06
HLP3206	HLP3500-09-06	HLP3500-10-06
HLP3207	HLP3500-09-06	HLP3500-10-06
HLP3208	HLP3500-09-07	HLP3500-10-07
HLP3209	HLP3500-09-07	HLP3500-10-07
HLP3210	HLP3500-09-08	HLP3500-10-08
HLP3211	HLP3500-09-08	HLP3500-10-08
HLP3212	HLP3500-09-08	HLP3500-10-08
HLP3213	HLP3500-09-08	HLP3500-10-08
HLP3214	HLP3500-09-08	HLP3500-10-08
HLP3215	HLP3500-09-09	HLP3500-10-09
HLP3300	HLP3500-09-10	HLP3500-10-10
HLP3301	HLP3500-09-10	HLP3500-10-10
HLP3302	HLP3500-09-10	HLP3500-10-10

Cassette Model	Part Numbers	
	Reaction Block Space (Section 8.3/8.4, item 10)	Front Spacer (Section 8.3/8.4, item 11)
HLP7203	HLP7500-09-02	HLP7500-10-02
HLP7204	HLP7500-09-02	HLP7500-10-02
HLP7205	HLP7500-09-02	HLP7500-10-02
HLP7206	HLP7500-09-03	HLP7500-10-03
HLP7207	HLP7500-09-03	HLP7500-10-03
HLP7208	HLP7500-09-03	HLP7500-10-03
HLP7209	HLP7500-09-04	HLP7500-10-04
HLP7210	HLP7500-09-05	HLP7500-10-05
HLP7211	HLP7500-09-05	HLP7500-10-05
HLP7212	HLP7500-09-05	HLP7500-10-05
HLP7213	HLP7500-09-05	HLP7500-10-05
HLP7214	HLP7500-09-05	HLP7500-10-05
HLP7215	HLP7500-09-06	HLP7500-10-06
HLP7300	HLP7500-09-07	HLP7500-10-07
HLP7301	HLP7500-09-07	HLP7500-10-07
HLP7302	HLP7500-09-07	HLP7500-10-07
HLP7304	HLP7500-09-08	HLP7500-10-08
HLP7085M	HLP7500-09-08	HLP7500-10-08
HLP7090M	HLP7500-09-09	HLP7500-10-09
HLP7306	HLP7500-09-08	HLP7500-10-08
HLP7308	HLP7500-09-09	HLP7500-10-09
HLP7309	HLP7500-09-10	HLP7500-10-10
HLP7312	HLP7500-09-10	HLP7500-10-10
HLP7314	HLP7500-09-11	HLP7500-10-11
HLP7315	HLP7500-09-11	HLP7500-10-11

Cassette Model	Part Numbers	
	Reaction Block Space (Section 8.3/8.4, item 10)	Front Spacer (Section 8.3/8.4, item 11)
HLP13207	HLP13000-09-01	HLP13000-10-01
HLP13208	HLP13000-09-01	HLP13000-10-01
HLP13209	HLP13000-09-01	HLP13000-10-01
HLP13210	HLP13000-09-01	HLP13000-10-01
HLP13211	HLP13000-09-01	HLP13000-10-01
HLP13212	HLP13000-09-01	HLP13000-10-01
HLP13213	HLP13000-09-01	HLP13000-10-01
HLP13214	HLP13000-09-01	HLP13000-10-01
HLP13215	HLP13000-09-02	HLP13000-10-02
HLP13300	HLP13000-09-03	HLP13000-10-03
HLP13301	HLP13000-09-03	HLP13000-10-03
HLP13302	HLP13000-09-03	HLP13000-10-03
HLP13303	HLP13000-09-04	HLP13000-10-04
HLP13304	HLP13000-09-04	HLP13000-10-04
HLP13305	HLP13000-09-04	HLP13000-10-04
HLP13085M	HLP13000-09-04	HLP13000-10-04
HLP13306	HLP13000-09-04	HLP13000-10-04
HLP13307	HLP13000-09-05	HLP13000-10-05
HLP13308	HLP13000-09-05	HLP13000-10-05
HLP13090M	HLP13000-09-05	HLP13000-10-05
HLP13309	HLP13000-09-06	HLP13000-10-06
HLP13310	HLP13000-09-06	HLP13000-10-06
HLP13311	HLP13000-09-06	HLP13000-10-06
HLP13312	HLP13000-09-06	HLP13000-10-06
HLP13313	HLP13000-09-07	HLP13000-10-07
HLP13314	HLP13000-09-07	HLP13000-10-07
HLP13315	HLP13000-09-07	HLP13000-10-07
HLP13400	HLP13000-09-08	HLP13000-10-08
HLP13401	HLP13000-09-08	HLP13000-10-08
HLP13402	HLP13000-09-08	HLP13000-10-08
HLP13403	HLP13000-09-09	HLP13000-10-09
HLP13404	HLP13000-09-09	HLP13000-10-09
HLP13405	HLP13000-09-09	HLP13000-10-09
HLP13406	HLP13000-09-10	HLP13000-10-10
HLP13407	HLP13000-09-10	HLP13000-10-10
HLP13408	HLP13000-09-10	HLP13000-10-10
HLP13409	HLP13000-09-10	HLP13000-10-10
HLP13115M	HLP13000-09-10	HLP13000-10-10
HLP13410	HLP13000-09-10	HLP13000-10-10

8.5 Exploded Views - HMT Extended Reaction Arm

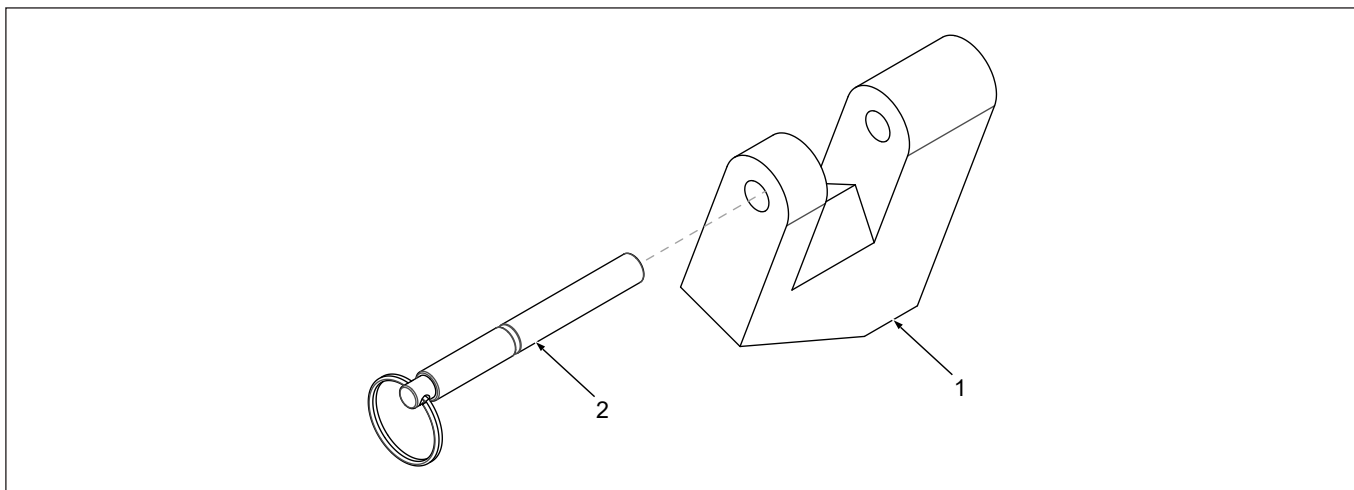


8.6 Table of Parts - HMT Extended Reaction Arm Assembly

Item	Description	Qty	Part Numbers			
			HLP1-Series	HLP3-Series	HLP7-Series	HLP13-Series
1	Extended Reaction Arm ★	1	HTE15	HTE35	HTE75	HTE130
2	Reaction Arm Pin	1	RAP15	RAP35	RAP75	RAP130

★ Dispatched as assembly including appropriate Reaction Arm Pin to suit.

8.7 Exploded Views - HMT Reaction Paddle



8.8 Table of Parts - HMT Reaction Paddle Assembly

Item	Description	Qty	Part Numbers			
			HLP1-Series	HLP3-Series	HLP7-Series	HLP13-Series
1	Reaction Paddle ★	1	HRP15	HRP35	HRP75	HRP130
2	Reaction Paddle Pin	1	RPP15	RPP35	RPP75	RPP130

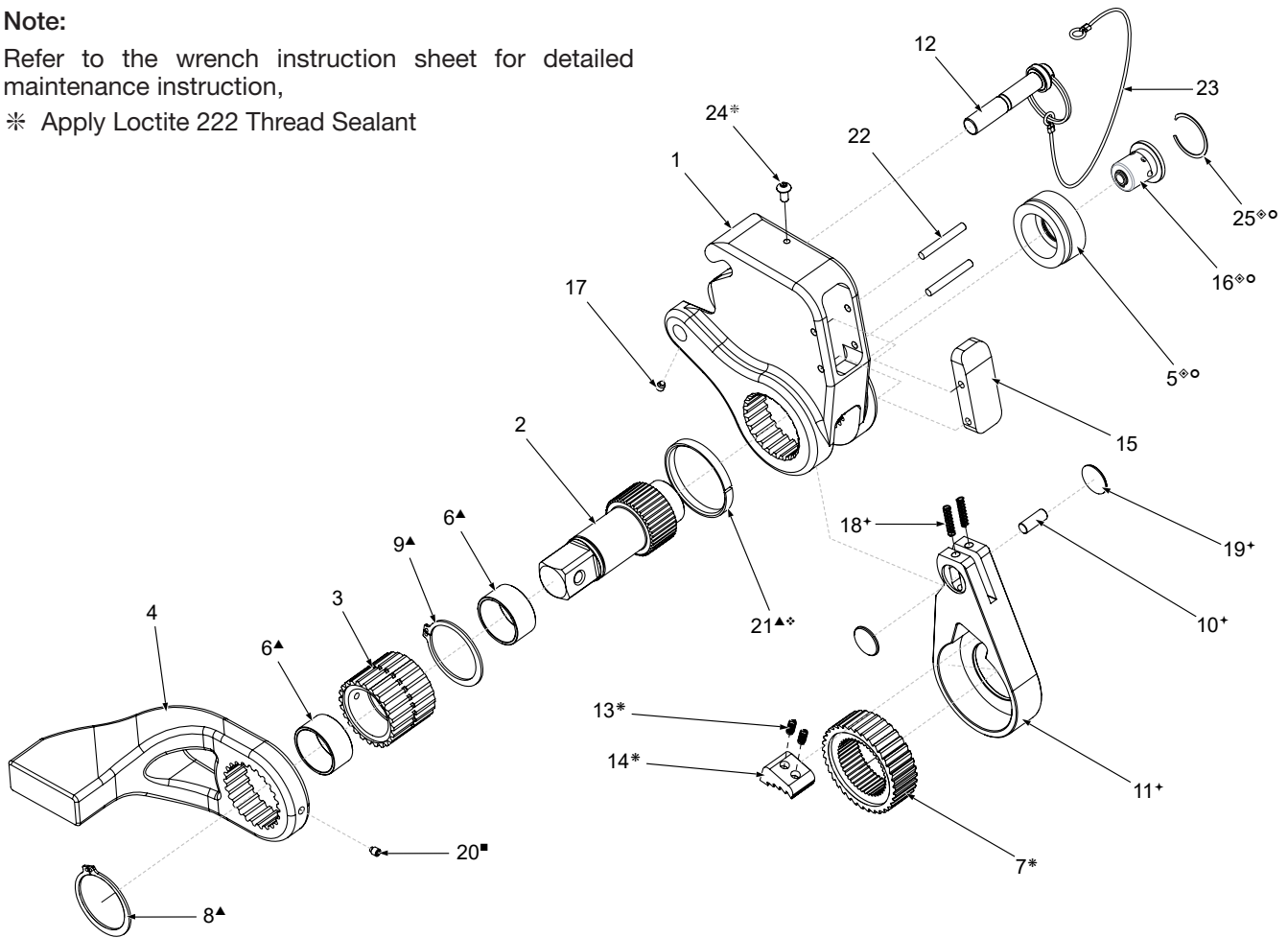
★ Dispatched as assembly including appropriate Reaction Paddle Pin to suit.

8.9 Exploded Views - HMT HSQ Square Drive Cassette Assembly

Note:

Refer to the wrench instruction sheet for detailed maintenance instruction,

* Apply Loctite 222 Thread Sealant



Service Kits:

Items marked ▲ supplied in Reaction Spline Kit: HSQ1500RSPK, HSQ3500RSPK, HSQ7500RSPK.

Items marked + supplied in Drive Plate Kit: HSQ1500DPK, HSQ3500DPK, HSQ7500DPK.

Items marked * supplied in Ratchet Kit: HSQ1500RK, HSQ3500RK, HSQ7500RK.

Items marked ▪ dispatched alongside Reaction Arm: HSQ1500-04, HSQ3500-04, HSQ7500-04.

Items marked ◊ dispatched alongside Square Drive: HSQ1500-02, HSQ3500-02, HSQ7500-02.

Items marked ◊ supplied in Push Button Retainer Assembly: PBR02A.

Items marked ◊ supplied in Push Button Retainer Assembly: PBR03A.

8.10 Table of Parts - HMT HSQ Square Drive Cassette Assembly

Item	Description	Qty	Part Numbers		
			HSQ1500	HSQ3500	HSQ7500
1	HSQ Square Drive Cassette Body	1	Not available	Not available	Not available
2	Square Drive	1	HSQ1500-02	HSQ3500-02	HSQ7500-02
3	Reaction Arm Spline	1	HSQ1500-03	HSQ3500-03	HSQ7500-03
4	Reaction Arm	1	HSQ1500-04	HSQ3500-04	HSQ7500-04
5	Retainer Block	1	◇	○	○
6	Drive Bush	2	▲	▲	▲
7	Splined Ratchet	1	*	*	*
8	Square Drive Circlip	1	▲	▲	▲
9	Reaction Arm Circlip	1	▲	▲	▲
10	Rod End Pin	1	✦	✦	✦
11	Drive Plate	1	✦	✦	✦
12	Link Pin Assembly	1	HSQ1500-12	HSQ3500-12	HSQ7500-12
13	Pawl Spring	2	*	*	*
14	Pawl	1	*	*	*
15	Front Spacer	1	Not available	Not available	Not available
16	Push Button Retainer Assembly	1	◇	○	○
17	Pin Retainer Grub Screw	1	Not available	Not available	Not available
18	Rod End Pin Spring	2	✦	✦	✦
19	Drive Pin Retainer	2	✦	✦	✦
20	Reaction Arm Grub Screw	1	■	■	■
21	Drive Retainer Ring	1	▲ ✦	▲ ✦	▲ ✦
22	Front Spacer Pin	2	Not available	Not available	Not available
23	Link Pin Assembly Lanyard	1	HSQ1500-12	HSQ3500-12	HSQ7500-12
24	M4 Button Head	1	HSQ1500-12	HSQ3500-12	HSQ7500-12
25	Drive Retainer Clip	1	◇	○	○

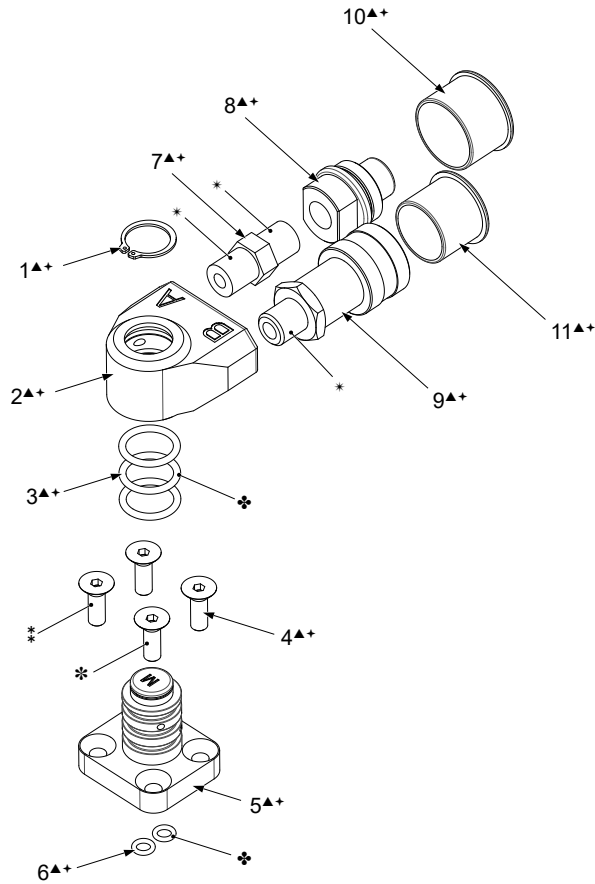
- ▲ Indicates items included and available only as part of Reaction Spline Kit: HSQ1500RSPK, HSQ3500RSPK, HSQ7500RSPK.
- ✦ Indicates items included and available only as part of Drive Plate Kit: HSQ1500DPK, HSQ3500DPK, HSQ7500DPK.
- * Indicates items included and available only as part of Ratchet Kit: HSQ1500RK, HSQ3500RK, HSQ7500RK.
- Dispatched alongside Reaction Arm: HSQ1500-04, HSQ3500-04, HSQ7500-04.
- ✦ Dispatched alongside Square Drive: HSQ1500-02, HSQ3500-02, HSQ7500-02.
- ◇ Indicates items included and available only as part of Push Button Retainer Assembly: PBR02A.
- Indicates items included and available only as part of Push Button Retainer Assembly: PBR03A.

8.11 Exploded Views - Swivel Assembly

Note:

Refer to the wrench instruction sheet for detailed maintenance instruction,

- ❖ Apply silicone grease to O-rings.
- * Tighten to Torque Value of 5.9 Ft.lbs [8 Nm].
- * Apply Loctite 243 Thread Sealant (inside bolt holes).
- * Apply Loctite 577 Thread Sealant (thread of B1 and B2).



Service Kits:

Items marked ▲ supplied in Swivel Assembly.

Items marked + supplied in Swivel Seal Kits.

8.12 Table of Parts - Swivel Assembly

Item	Description	Qty	Part Numbers
1	Circlip	1	▲
2	Swivel Manifold Block	2	▲
3	O-Ring	3	▲ ✦
4	Socket Head Capscrews	4	▲
5	Swivel Manifold Post	1	SP300101 ▲
6	O-Ring	2	▲ ✦
7	Adaptor [10,000 psi]		▲
8	Male Coupling [10,000 psi]		▲
9	Female Coupling [10,000 psi]		▲
10	Dust Cap for male coupler	1	▲
11	Dust Cap for female coupler	1	▲
<p>▲ Indicates items included and available only as part of Swivel Assembly: SP300MKA. ✦ Indicates items included and available only as part of Swivel Seal Kit: TSP300MSK.</p>			

9. Troubleshooting

Fault	Possible Cause	Corrective Action
Ratchet will not turn (HLP Cassette Assembly only)	Grease or dirt build up in the teeth of the ratchet and segment pawl	Disassemble the ratchet and clean the grease or dirt out of the teeth.
	Worn or broken teeth on ratchet and/or segment pawl	Replace any worn or damaged parts.
Wrench pressure will not build	Piston seal and/or end plug seal leaking	Replace any defective o-rings.
	Retaining screws sheared	Replace any broken screws.
	Coupler is defective	Replace any defective couplers.
Piston will not advance	Couplers are not securely attached to the tool and /or pump	Check the coupler connections and make certain that they are connected.
	Coupler is defective	Replace any defective couplers.
	Defective remote control unit	Replace the button and/or control pendant.
	Dirt in the direction-control valve of the pump unit	Disassemble the pump and clean the direction-control valve.
Piston will not retract	Hose connections reversed	Check the advance on the pump is connected to the advance on the wrench and the retract on the pump is connected to the retract on the wrench.
	Retract hose not connected	Connect the retract hose securely.
	Retract pin and/or spring broken	Replace the broken pin and/or spring.
Pressure reading erratic	Defective gauge	Replace the gauge.
Pump will not build up pressure	Defective relief valve	Inspect, adjust or replace the relief valve.
	Air supply too low or air hose too small	Make certain the air supply and hose size comply with the pump manual recommendations.
	Electric power source is too low	Make certain the amperage, voltage and any extension cord size comply with the pump manual requirements.
	Defective gauge	Replace the gauge.
	Low oil level	Check and fill the pump reservoir.
	Clogged filter	Inspect, clean and/or replace the pump filter.

Refer to the Pump Instruction Sheet for troubleshooting required for the pump unit.

