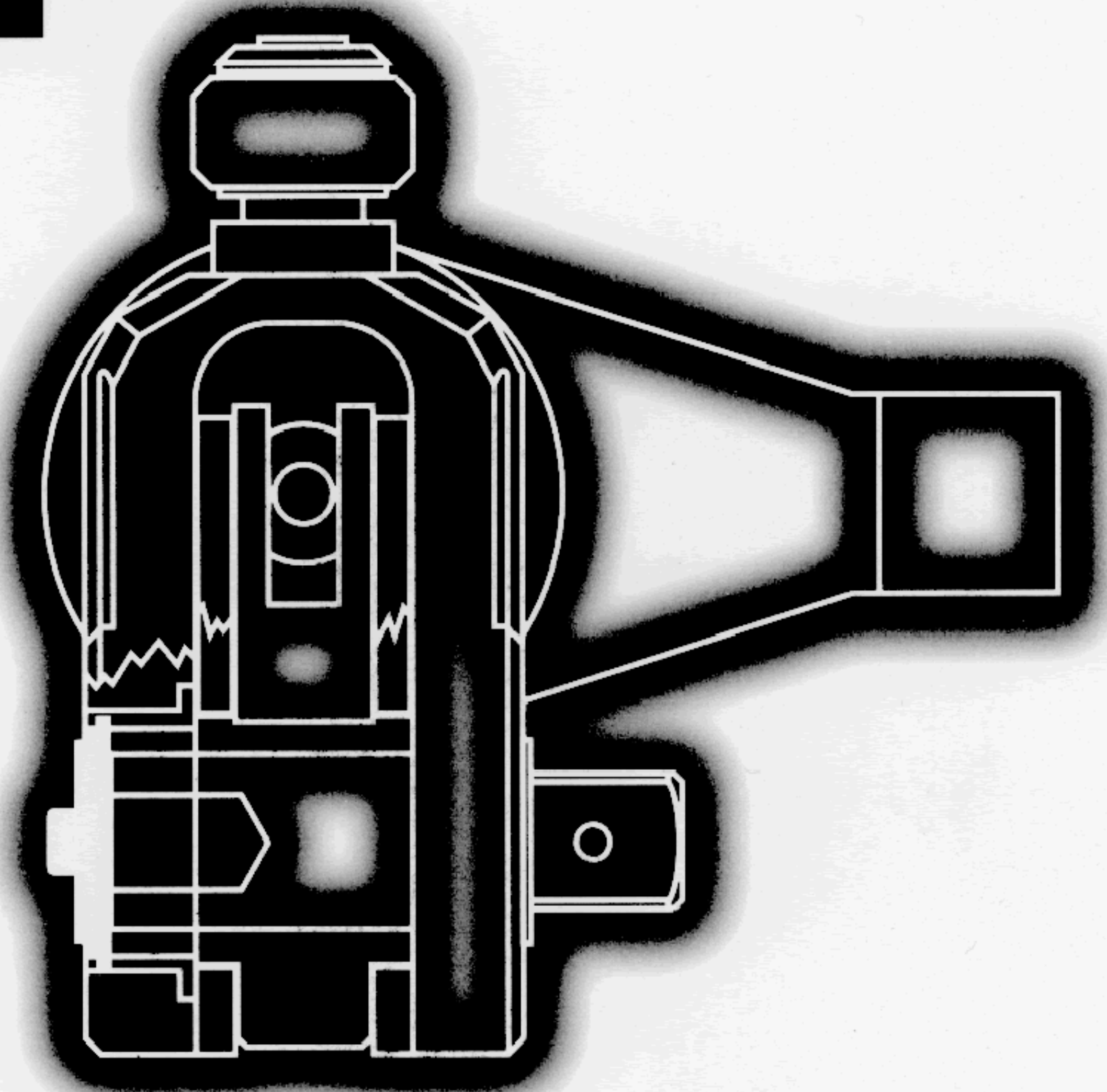


HYTORC



MXT/XLT/SERIES

OPERATIONAL AND SPARE PARTS MANUAL

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INTRODUCING HYTORC

THANK YOU FOR BUYING HYTORC!

YOU ARE NOW HOLDING ONE OF THE WORLD'S LARGEST SELLING AND MOST ADVANCED HYDRAULIC TORQUE TOOLS.

HYTORC is used more often, by more industries on more applications than all others combined. If you maintain your new tool properly, it will last for years to come.

This manual is designed to provide you with the basic knowledge required to operate and maintain your HYTORC tool. Please read this manual carefully and follow the instructions provided. If you have any questions regarding your HYTORC tool, please call us directly at 201 512-9500 or fax 201 512-0530.

Finally, your purchase of this HYTORC tool entitles you to the following FREE services:

- **Free on-site training in the application and operation of your HYTORC equipment**
- **Free semi-annual training**
- **Free annual tool inspection**
- **Free loaner tools in case of failure**
- **Free engineering assistance by calling 1 800 FOR-HYTORC, or our continental office**

Your local HYTORC office was informed of the delivery of this equipment. Should you require immediate training, please feel free to call us directly to arrange an appointment with you at your convenience.

Instructional VHS video tape cassettes are also available for basic training and occasional brush up on operating procedures.

Again, thank you and welcome to HYTORC!

World-wide Warranty

HYTORC equipment is engineered to the latest technological standards and are accompanied by our exclusive 12-word, 12-month warranty:

"YOU BREAK IT UNDER NORMAL USE, WE FIX IT FREE OF CHARGE!"

If a HYTORC XLT cannot be repaired on site, FREE loaner HYTORC equipment will be made available to you upon request.

UNEX CORPORATION OR ITS DEALERS SHALL NOT BE LIABLE FOR LOSS OF PRODUCT OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS INCURRED BY THE BUYER OR THE USER.

Offices Worldwide

Europe	HYTORC Europe	Tel. 33-1-4288-6745
Asia:	HYTORC Asia	Tel. 81-3-3314-3315
Australia	HYTORC Australia	Tel. 61-8-293-8411
All Others	HYTORC USA	Tel. 201-512-9500

SECTION I

IMPORTANT SAFETY INSTRUCTIONS

WARNING: Your HYTORC TORQUE MACHINE is a power tool, and as with any power tool, certain safety precautions should be observed to avoid accidents or personal injury. The following tips will assist you.

- **READ ALL INSTRUCTIONS**
- **KEEP WORK AREA CLEAN AND WELL LIT**
- **CONSIDER WORK AREA ENVIRONMENT**
Electrical Pumps should never be used in any atmosphere which can be considered potentially volatile. If there is any doubt, use an air pump. Also Note: metal to metal contact can cause sparks, precautions should be taken.
- **AVOID PREMATURE TOOL STARTING**
The Pump Remote Control is for the TOOL OPERATOR only. Avoid separate pump and tool operator.
- **STAY CLEAR DURING OPERATION**
In most cases, the tool will allow "hands free" operation. If the tool must be held or steadied during operation, use alternative means of securing the tool to the application.
- **GUARD AGAINST ELECTRIC SHOCK**
Ensure the pump is properly grounded and the proper voltage is being used.
- **STORE IDLE TOOLS**
When not in use, tools and accessories should be properly stored to avoid deterioration.
- **USE THE RIGHT TOOL**
Don't force small tools or attachments to do the job of a larger tool. Don't use a tool for purposes not intended.
- **PROPER SAFETY ATTIRE**
When handling/operating hydraulic equipment, use work gloves, hard hats, safety shoes, hearing protection and other applicable clothing.
- **USE SAFETY GLASSES**
- **MOVING EQUIPMENT**
Do not use hydraulic hoses, uniswivels, pump power or remote cords as means of moving the equipment.

- **HOSES**

Do not kink hoses. Inspect and replace if damaged.

- **SHROUDS AND COVER PLATES**

All tools are equipped with shrouds and/or cover plates to cover up moving internal parts. Do not use tools without shrouds but contact your local HYTORC office to fix.

- **MAINTAIN TOOLS WITH CARE**

For top performance, inspect tool, powerpack, hoses, connectors, electric lines and accessories for visual damage frequently. Always follow instructions for proper tool and pump maintenance. Refer to the Operations Maintenance Section for further clarification.

- **STAY ALERT**

Watch what you are doing. **Use common sense.** Do not use power equipment under the influence of any mood altering substances.

- **PRIOR TO OPERATION**

Ensure that all hydraulic connections are securely connected. Verify that the hydraulic hoses are not kinked. Insure the square drive and its retainer are fully and securely engaged.

- **PRIOR TO USE**

Cycle tool to ensure proper function. Locate a solid, secure reaction point. Be sure the reaction arm retaining clamp is fully engaged. Be sure the hydraulic hoses are free of the reaction point. Pressurize the system momentarily; if the tool tends to "ride up" or to "creep", stop and re-adjust the reaction arm to a more solid and secure position.

NOTE: Remain clear of the reaction arm during operation and never put body parts between reaction arm and reaction surface.

- **ALWAYS USE QUALITY ACCESSORIES**

Always use top quality impact sockets in good condition which are the correct size and fully engage the nut. Hidden flaws, however, remain a possibility which could cause breakage, so **stay clear of sockets during operation.**

- **DO NOT USE FORCE**

Do not hammer on socket or tool to enhance performance. If the nut will not turn with the wrench you are using, use a larger size HYTORC tool.

- **REACTION ARM**

Proper reaction is required. Adjust reaction arm or plate accordingly. Avoid excessive play. In case of questions, consult with your local HYTORC office.

SECTION II

INSTRUCTIONS BEFORE USE

READ CAREFULLY: Most malfunctions in new equipment are the result of improper operation and/or set-up assembly.

PREPARATION: Remove HYTORC Torque Machine from shipping container.

INSPECTION: Visually inspect all components for shipping damage. If any damage is found, notify carrier immediately.

2-1 Working Pressure

The tool's maximum working pressure is 10,000 PSI (700kg/cm²).

Make sure that all hydraulic equipment used with this tool is rated for 10,000 PSI Operating Pressure.

2-2 Hydraulic Connections

With older style pumps (SST-10, SST-20), the retract side of the system may remain pressurized after the pump has been switched "off". This trapped pressure makes it impossible to loosen the retract-side fittings by hand.

To release the pressure, find the 5/16" manual override holes in the end of the black solenoids on the pump. With a welding rod, allen key or similar device, push in on the ends of both solenoids, each in turn, and the residual pressure will be released. All fittings will then be hand tight again.

Newer style pumps (HYTORC 115, HYTORC 230, HYTORC AIR) are equipped with an auto-pressure relief.

Never disconnect or connect any hydraulic hoses or fittings without first unloading the wrench and the pump. If the system includes a gauge, double check the gauge to assure pressure has been released.

When making connections with quick disconnect couplings, make sure the couplings are fully engaged. Threaded connections such as fittings, gauges etc. must be clean and securely tightened and leak free.

CAUTION: Loose or improper threaded fittings can be potentially dangerous if pressurized, yet, severe over tightening can cause premature thread failure. Fittings need to be only tightened secure & leak free. Never grab, touch or in any way come in contact with a hydraulic pressure leak. Escaping oil can penetrate the skin and cause injury.

2-3 Electrical Connections

Ensure proper power availability to prevent motor failure or dangerous electrical overloading. Compare the motor nameplate for required amperage.

Do not use electric pump if the 3-prong electrical plug is not whole.

Minimize the length of extension cords and be sure they are of adequate wire size, with ground connections.

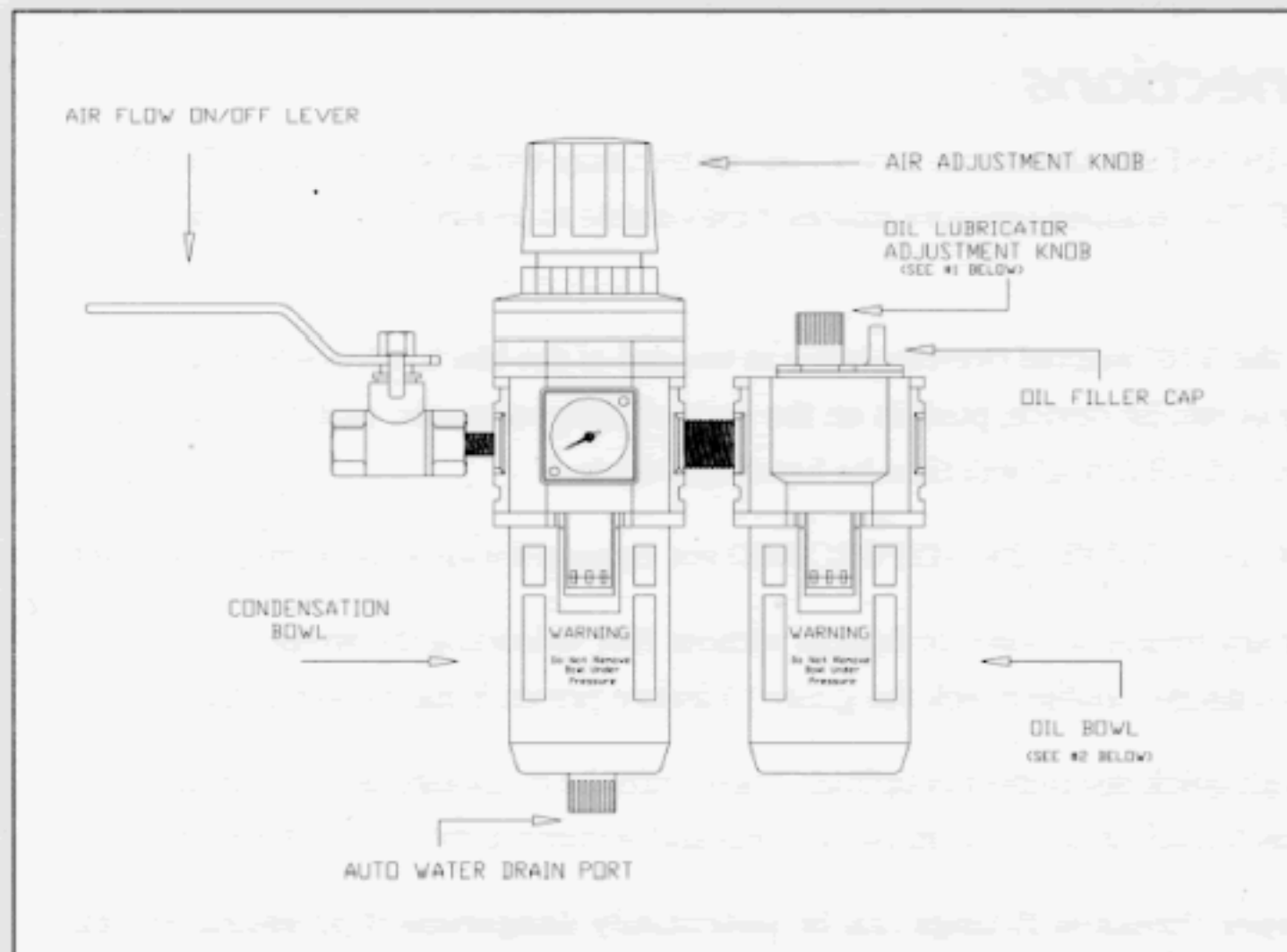
Extension cord should be #10 AWG gauge.

WARNING: Electric motors may spark. Do not operate in an explosive atmosphere or in the presence of conductive liquids. Use an air motor pump instead.

2-4 Air Connections

Ensure that you have sufficient air flow (in cfm) to operate your pneumatic pump. If in doubt, compare the pump manufacturer's recommended air flow rating prior to pressurizing pump. Improper air flow may damage the pump motor. For best results use airhoses larger than 3/4" diameter.

Use of a *filter regulator lubricator* (FRL) is highly recommended. (Pictured below.)



1. **ADJUST FLOW TO 1 - 2 DROPS PER MINUTE**
2. **FILL HALF WAY WITH GRADE 46 HYDRAULIC OIL SUPPLIED**

SECTION III

OPERATION

3-1 General

All HYTORC Torque Machines are supplied completely assembled, ready for use. A HYTORC Hydraulic Power Pack, for use with your HYTORC machine, is recommended to provide the speed, pressure and portability that makes your HYTORC System efficient and accurate.

The System accuracy of your MXT Series tool is +/- 3% based upon manufacturer's specifications. This accuracy may be certified through calibration by HYTORC or any other qualified calibration facility whose program is traceable to the National Institute of Standards and Technology (N.I.S.T.).

Using a calibrated gauge enhances the accuracy of your HYTORC System.

3-2 Connecting the System

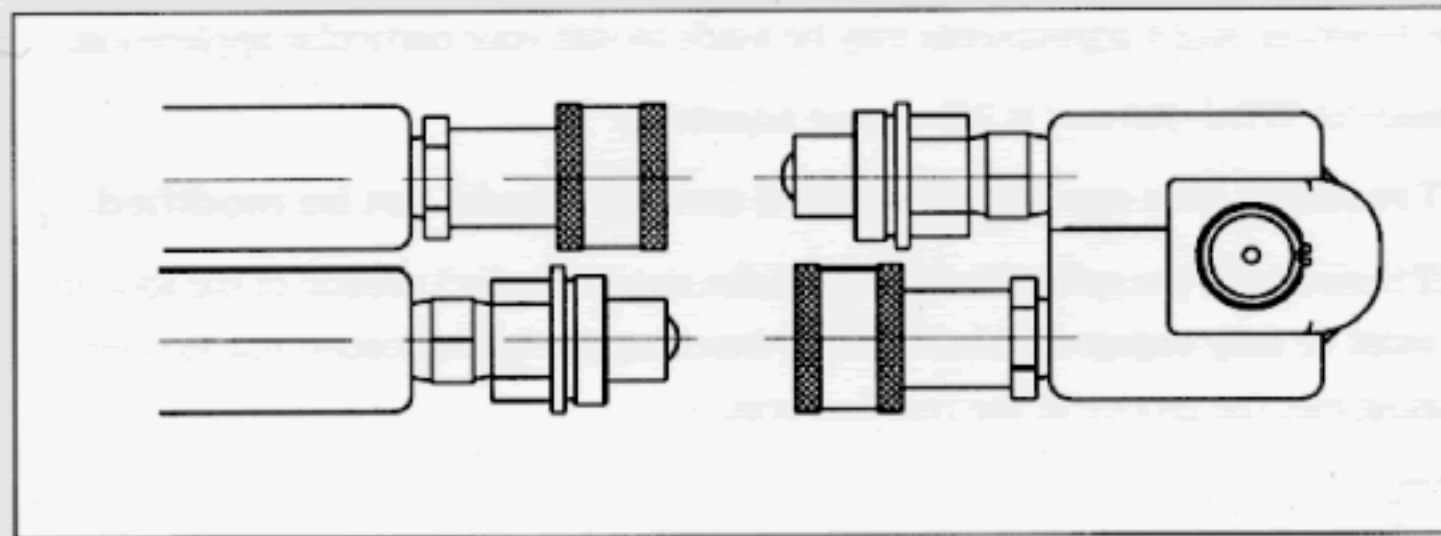
The wrench head and power pack are connected by a 10,000 PSI operating pressure, (40,000 PSI burst) twinline hose assembly. Each end of the hose will have one male and one female connector to assure proper interconnection between pump and wrenchheads.

IMPORTANT

To avoid tool malfunction, do not reverse connectors.

DO NOT tamper with the set screw on the uniswivel assembly. It is factory set for safety purposes, and adjustments should only be made by trained personnel.

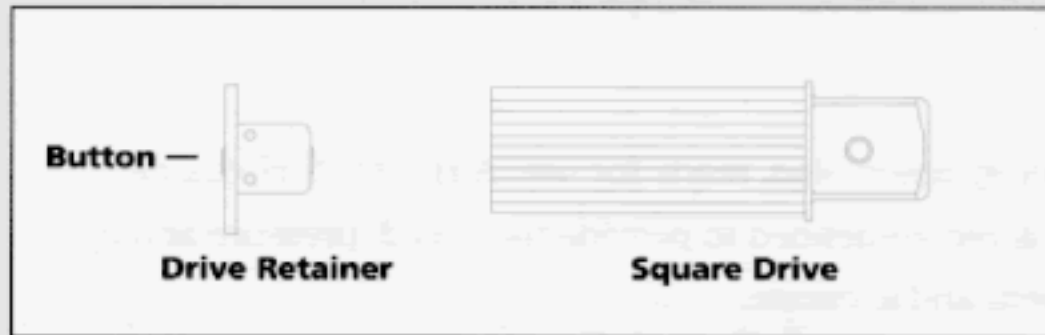
Connect the twinline hose to the uniswivel as shown below:



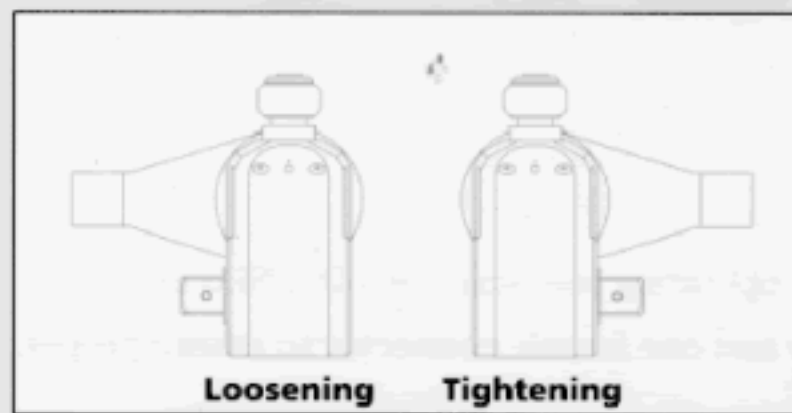
Insure the connectors are fully engaged and screwed snugly and completely together.

3-3 **Drive Direction Change**

To remove the square drive, disengage the drive retainer assembly by depressing the center round button and gently pulling on the square end of the square drive. The square drive will slide easily out.



To insert the drive in the tool, place the drive in the desired direction, engage drive and bushing splines, then twist drive and bushing until ratchet spline can be engaged. Push drive through ratchet. Depress drive retainer button, engage retainer with drive and release button to lock.



**RIGHT IS TIGHT.
LEFT IS LOOSE.**

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

3-4 **Reaction Arm**

All HYTORC Torque machines are equipped with a universal reaction arm. These reaction arms are employed to absorb and counteract forces created as the unit operates. The reaction arm should extend in the same direction of the square drive; however, slight adjustments may be made to suit your particular application.

The MXT Reaction Arm is made of TITAN 399 and is 360 degree adjustable.

NOTE: The standard MXT reaction arm cannot be welded on and should not be modified.

The reaction arm for all MXT Series tools are splined to slide over the rear (cylinder) portion of the tool. In operation, the reaction arm must be fully engaged and secured by inserting the spring loaded reaction arm clamp at the base of the housing into the groove of the reaction arm.



3-5 Setting Torque

Once the system is fully connected and the proper power supply available, it is time to adjust the pump pressure to the level needed on your job.

When tightening, use the manufacturer's specifications to determine the torque value which you will ultimately require.

Appendix I - which is presented as a guideline for comparison only - gives typical torque values specified for the most commonly encountered fasteners.

Torque sequence may vary from plant to plant and even within individual plants, depending upon the gasket material, etc. Always abide by local procedures.

Next, find the pressure-torque conversion table applicable to the tool which you intend to use. A complete copy of that chart appears in Appendix II.

An example of finding the desired torque required is as follows:

Assume you are going to use a HY-3MXT to torque a 1-1/4" bolt to 1,265 ft lbs.

Start by going to the chart above and read left-to-right across the top line (Starts out PSI HY-MXT HY-MXT etc) To the column HY-MXT.

Read straight down to the number closest to 1,265 ft lbs, which in this case is 1,280 - about 1.5% over the targeted torque value.

Now, using 1,280, read back to the left on that same line and read the pump pressure, under the PSI column, 4,000 PSI.

To be technically correct, you should diminish that 4,000 PSI by 1.5% (to 3940), but 1,280 is well within the tool's +/- 3% accuracy range, so proceed to set 4,000 PSI on your pump's regulator valve.

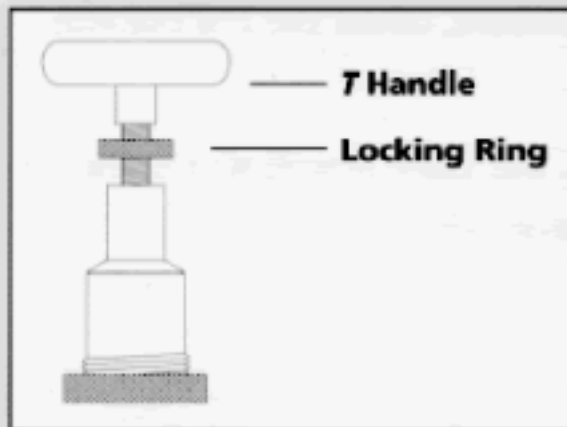
3-6 **Setting the Pressure on the Pump**

To set the pressure on the pump, follow this procedure:

1. Loosen the knurled locking ring below the "T" handle on the pump's external pressure regulator. Then turn the "T" handle (shown in figure 6) counterclockwise (CCW) until it turns freely and easily.
2. Turn the pump "on". Using the pump's remote control pendant, push down the advance switch (or button on air pumps) and hold it.
3. While holding the pump in the advance mode, slowly turn the "T" handle clockwise and observe the pump pressure gauge rise.

NOTE: Always adjust the regulator pressure up – never down.

4. When your gauge reaches 4,000 PSI, stop turning the "T" handle and let the gauge settle out.
5. If the pressure continues to rise (above 4,000), release the advance button and back off your pressure slightly - by turning CCW on the "T" handle. Then re-depress the advance switch on your remote and slowly bring pressure up to 4,000 again.
6. When the pressure is correct, turn the pump "off" and tighten the knurled lock nut provided under the "T" handle. This sets pump pressure, which determines torque tool output.
7. Once your target pressure is set and locked, cycle the pump once more to ensure that your pressure setting did not change as you turned down the knurled knob.



Example of a Pressure Regulator Valve

3-7 **Applying the Torque Machine – the Tightening Process**

1. Having set your target pressure, cycle the tool three or four times to full pressure. Cycling the tool ensures that the system is operating properly and removes trapped air, if any.
2. Place the proper size impact socket on the square drive and secure properly with a locking ring and pin.
3. Place the tool and the socket on the nut, making sure that the socket has fully engaged the nut. Further ensure that the drive retainer is engaged.
4. Make sure the reaction arm is firmly abutted against a stationary object (i.e. an adjacent nut, flange, equipment housing etc.)
5. When positioning the wrench, make sure that the hose connections are well clear of any obstructions, and that all body parts are safely out of harm's way.
6. THEN, AND ONLY THEN, apply momentary pressure to the system to ensure proper tool placement. If it doesn't look or act right, stop and re-adjust the reaction arm.

3-8

Operating the Torque Machine

1. By pushing down on the remote control button in the advance position, the rear of the tool will be pushed back until its reaction arm will contact its reaction point.
2. Continue to hold down the button as the socket turns until you hear an audible "click" which will signify the hydraulic cylinder inside the tool is fully extended and will not turn the socket further.
3. Continuing to hold down the remote control button will result in a rapid buildup of pressure to the point of where the gauge reads what was preset prior to applying the wrench.

IMPORTANT: The reading of full preset pressure after the cylinder is extended DOES NOT INDICATE that this pressure (torque) is applied to the bolt. It only indicates that the cylinder is fully extended and cannot turn the socket further until the tool automatically resets itself.

Releasing the remote control button will retract the cylinder. The tool will automatically reset itself and the operator will hear an audible "click" indicating he can again push the remote control button and the socket will turn. Each time the cylinder is extended and retracted, it is called a cycle. Successive cycles are made until the tool "stalls" at the pre-set Torque/PSI with an accuracy of +/- 3%. Repeatability is +/- 1%.

IMPORTANT: ALWAYS ATTEMPT ONE FINAL CYCLE TO INSURE THE "STALL" POINT HAS BEEN REACHED.

Should the tool "lock-on" after the final cycle, push down on the remote control button once more (to build pressure) and, while maintaining this pressure, pull back on the accuracy assurance pawl lever. Releasing the remote control while continuing to hold back the on the accuracy assurance pawl lever will allow the tool to be removed easily.

3-9

Loosening Procedures

First, set the pump to 10,000 PSI. Change the drive and the reaction arm to the loosening mode, assuring the reaction arm abuts squarely off a solid reaction point. Press and hold the remote control button down. Pressure will decrease as the socket begins to turn. As the cylinder extends fully, you will hear an audible "click". Release the remote control button, and the cylinder automatically retracts, at which time you again hear the audible "click". Repeat this process until the fastener can be removed by hand.

NOTE: IF THE BOLT DOES NOT LOOSEN WITH THE ABOVE PROCEDURE, IT IS AN INDICATION THAT YOU REQUIRE THE NEXT LARGER SIZE TOOL TO LOOSEN THE BOLT.

SECTION IV

HYTORC POWER PACKS

4-1

General Information

All HYTORC Power Packs operate at a pressure range from 500 to 10,000 PSI and are fully adjustable. They have been engineered and designed for portability and high flow for increased speed. Before using your HYTORC power pack, check the following points:

- **Is the reservoir filled with oil?**
- **Where is the closest electrical outlet at the job site?**
- **Is there enough air pressure (100 PSI) and flow at the job site? (Air units only)**
- **Is the gauge mounted and rated for 10,000 PSI?**
- **Is the oil filler plug securely in place?**

4-2

Working Pressure

The Pump's maximum working pressure is 10,000 PSI (700 kg/cm²). Make sure all hydraulic equipment and accessories are rated for 10,000 PSI operating pressure.

4-3

Hydraulic Connections

Never disconnect or connect hydraulic hoses or fittings without first unloading the wrench. Unplug the electrical cord of the pump, and open all hydraulic controls several times to assure that the system has been depressurized. If the system includes a gauge, double check the gauge to assure pressure has been released.

When making a connection with quick disconnect couplings, make sure the couplings are fully engaged. Threaded connections such as fittings, gauges etc. must be clean and securely tightened and leak free.

CAUTION: Loose or improperly threaded couplers can be potentially dangerous if pressurized, however, severe over tightening can cause premature thread failure. Fittings need to be only tightened secure and leak free. Never grab, touch or in any way come in contact with a hydraulic pressure leak. Escaping oil can penetrate the skin and cause injury. Do not subject the hose to potential hazard such as sharp surfaces, extreme heat or heavy impact. Do not allow the hose to kink and twist. Inspect the hose for wear before it is used.

4-4 Electrical Power

1. CHECK FOR PROPER ELECTRICAL SUPPLY BEFORE CONNECTING.
2. THIS MOTOR MAY SPARK. DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE OR IN PRESENCE OF CONDUCTIVE LIQUIDS.
 - a. Do not use a power or extension cord that is damaged or has exposed wiring.
 - b. All single phase motors come equipped with a three prong grounding type plug to fit the proper grounded type electrical outlet. Do not use a two prong ungrounded extension cord as the pump's motor must be grounded.
3. Compare motor nameplate against power availability to prevent motor burnout or dangerous electrical overloading.

4-5 Prior to Use

Check hydraulic oil level to prevent possible pump burnout. Open the filler plug located on the reservoir plate. Look at oil fill level on the oil sight gauge. The oil level should be approximately 2" from the top of the reservoir plate— with motor off. Add HYTORC oil as necessary. Do not mix different grades of oil.

Make sure all desired gauge, valve, hose and quick coupler connections are tight and secure before operating.

The use of a pressure gauge is required for normal pump operation. Mounted on the manifold, the gauge permits the operator to monitor the load on the wrench. 1/4" calibrated gauges are available for most applications.

4-6 Operation

Before starting your Electric Pump (HYTORC 115/230), connect your hydraulic hoses to both the pump and torque wrench.

Place the toggle switch in the ON position and the rocker switch on the hand control pendant in the OFF position. To start the pump, depress and release the yellow safety button.

NOTE: The safety button is an added feature designed to prevent premature starting and should only be depressed by the tool operator.

Push the rocker switch to advance and release. This will start your pump and place it in the retract position.

NOTE: Read the section labeled HYTORC OPERATIONS and SETTING TORQUE prior to installing the torque wrench onto the application.

Your HYTORC 115/230 hydraulic pump has been designed with an auto shut off system. The pump will shut off after approximately 30 seconds of non-cycling. This will prevent overheating and unnecessary wear which will prolong the life of your pump. To restart the pump, the yellow safety button must again be depressed prior to use.

SECTION V

PREVENTIVE MAINTENANCE

5-1

Preventive Maintenance – Torque Machines

Tool failure, although rare, does occur. Such failure is most often in the hydraulic couplers or hoses. These items are repairable or replaceable immediately, since they are available universally. Failure of structural members of the tool are quite rare, but replacement parts are available from stock. All repairs to HYTORC tools may be made by reasonably experienced individuals according to the aforementioned instructions.

- **Lubrication**

All moving parts should periodically be coated with a good quality NLGI #2 molybdenum disulfide grease. Under harsh environmental conditions, cleaning and lubricating should be performed more frequently.

- **Hydraulic Hoses**

Hoses should be checked for cracks and leaks after each job. Hydraulic fittings can become plugged with dirt and should be flushed periodically.

- **Quick-Connects**

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.

- **Springs**

Springs are used for the drive pawl assembly and for the accuracy assurance pawl. These springs can be replaced if necessary.

- **Cylinder Seals**

If the cylinder requires disassembly, it is recommended that the cylinder seals be replaced at the same time. Seal kits are readily available.

- **Structural Members**

All structural parts on the tool should be inspected once a year to determine if there are any cracks, chips or deformities. If so, immediate replacement is required.

5-2 Preventive Maintenance – Hydraulic Power Packs

HYTORC Hydraulic Power Packs are precision-built units and, as such, do require a certain amount of care and maintenance.

- **Hydraulic Oil**
Oil should be completely changed after every 40 hours of operation, or at least twice a year. Always make sure the reservoir is filled with fluid. If additional oil is required, use only high-grade hydraulic oil.
- **Quick-Disconnects**
Fittings should be checked periodically for leaks. Dirt or foreign materials should be kept away from fittings. Clean before use.
- **Hydraulic Gauge**
Some gauges are liquid filled. Should this liquid level drop, it indicates external leakage, and replacement is necessary. Should the gauge fill with hydraulic oil, it indicates internal failure and it should be discarded.
- **Filter on Pump**
The filter should be replaced twice a year in normal use and more often if the pump is used daily or in a dirty, harsh environment.
- **Remote Control**
(Air Unit) The air line to the remote control unit should be checked for obstructions or kinks in the line periodically. If there is a bend or break in the line, it must be replaced. The spring-loaded buttons on the remote handle should be checked in the event of operating difficulties. (Electric Unit) The rocker switch should be checked periodically if any indication of problems exist.
- **Air Valve**
This valve should be checked twice a year.
- **Brushes and Brush Holders**
(Electric Unit) Check and replace, if worn.
- **Armature**
(Electric Unit) Check yearly.

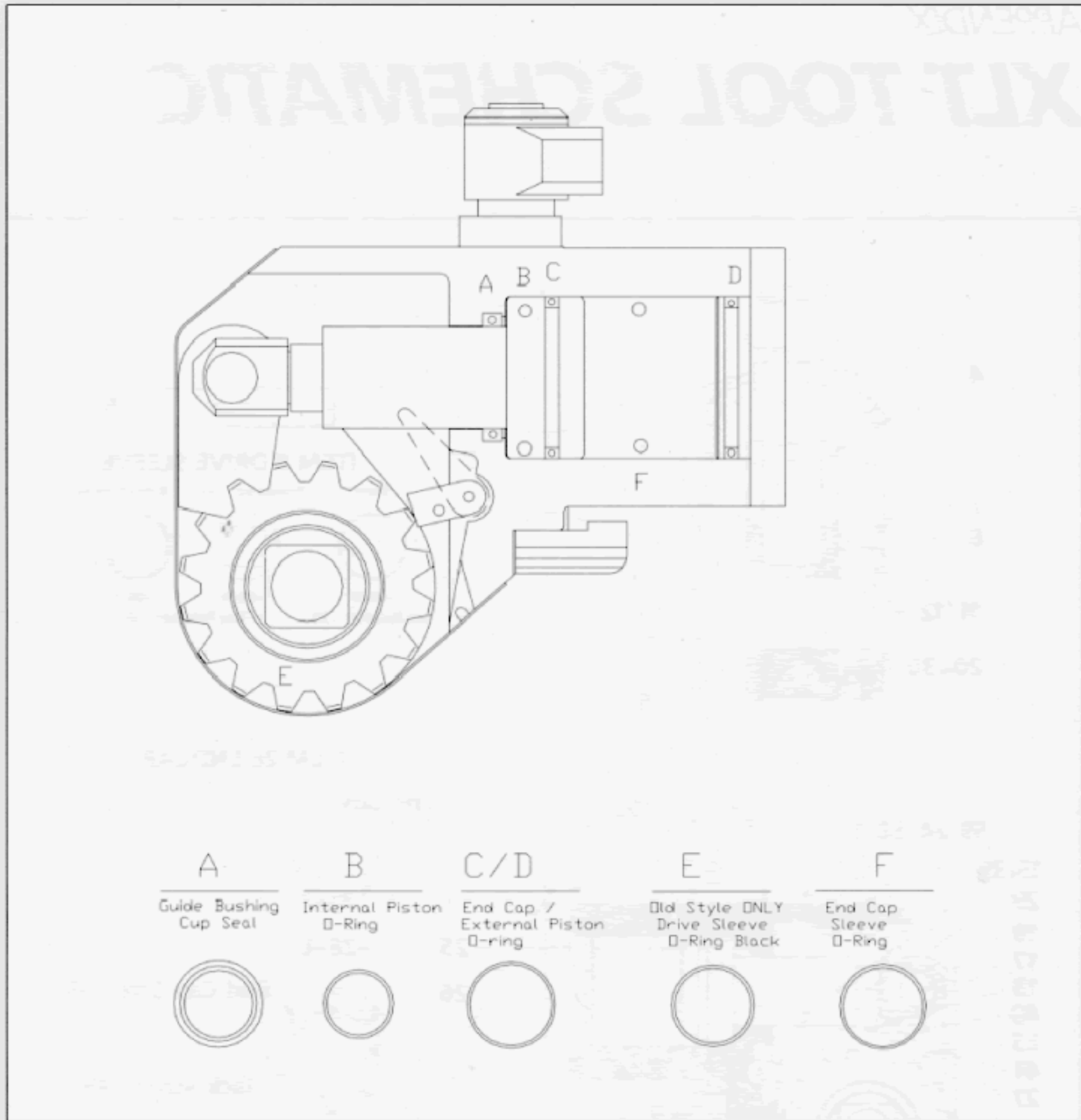
SECTION VI

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	REQUIRED ACTION
Gauge shows pressure build-up but the tool will not cycle.	<ol style="list-style-type: none"> 1. Couplings loose or inoperative 2. Solenoid inoperative 	<ol style="list-style-type: none"> 1. Tighten and/or replace couplings. Use Test #1 listed below to isolate problem. 1. Check using test #2 below. If solenoid is bad, replace.
Cylinder will not retract.	<ol style="list-style-type: none"> 1. See above 2. Voltage to electric pump is too low to line drop or inadequate amperage is available 3. Linkage between piston rod and drive arms are broken. 	<ol style="list-style-type: none"> 1. See Above 2. Get shorter extension cord or upgrade to 12AWG, 25 amp rating or better. If shop power is adequate, draw power from welding machine or cal rod transformer. 3. Replace parts as necessary.
Cylinder pressure will not build.	<ol style="list-style-type: none"> 1. Oil blow by in tool (Piston seal leak, blown O-ring, cracked piston) 2. Pump Problem 	<ol style="list-style-type: none"> 1. Replace defective parts. SHOP JOB 2. Check to see if sub-plate is worn by, <ol style="list-style-type: none"> a) Remove screws from pump motor to reservoir, slide pump motor to the side, turn pump on and while holding down on the button, put your finger on the dump tube (round tube under the directional control valve) - if you feel pressure, then replace the subplate and shear seals. 2A. Check to see if you have leaks from the external relief valve and the 2 oil line connections (bottom of relief valve and connection into pump body - other end of oil line. If leaking, retighten with 9/16" open end wrench. SHOP JOB 2B. If pump sounds like a lot of pebbles in a tin can, the problem may be a worn motor coupling - remove motor from base plate - using a pair of needle nose pliers remove the motor coupling - if worn replace. SHOP JOB 2C. AIR PUMPS - Faulty Air Valve due to excessive moisture and/or dirt in air supply. Disassemble air valve and wipe any residue from air valve piston - spray brake cleaner into air valve body, dry thoroughly. Disassemble all small air lines and blow out with compressed air. Lubricate both air valve piston and body with hydraulic oil (sparingly) and reassemble. SHOP JOB 2D. Air pumps - Faulty remote control valve cartridge. Replace.

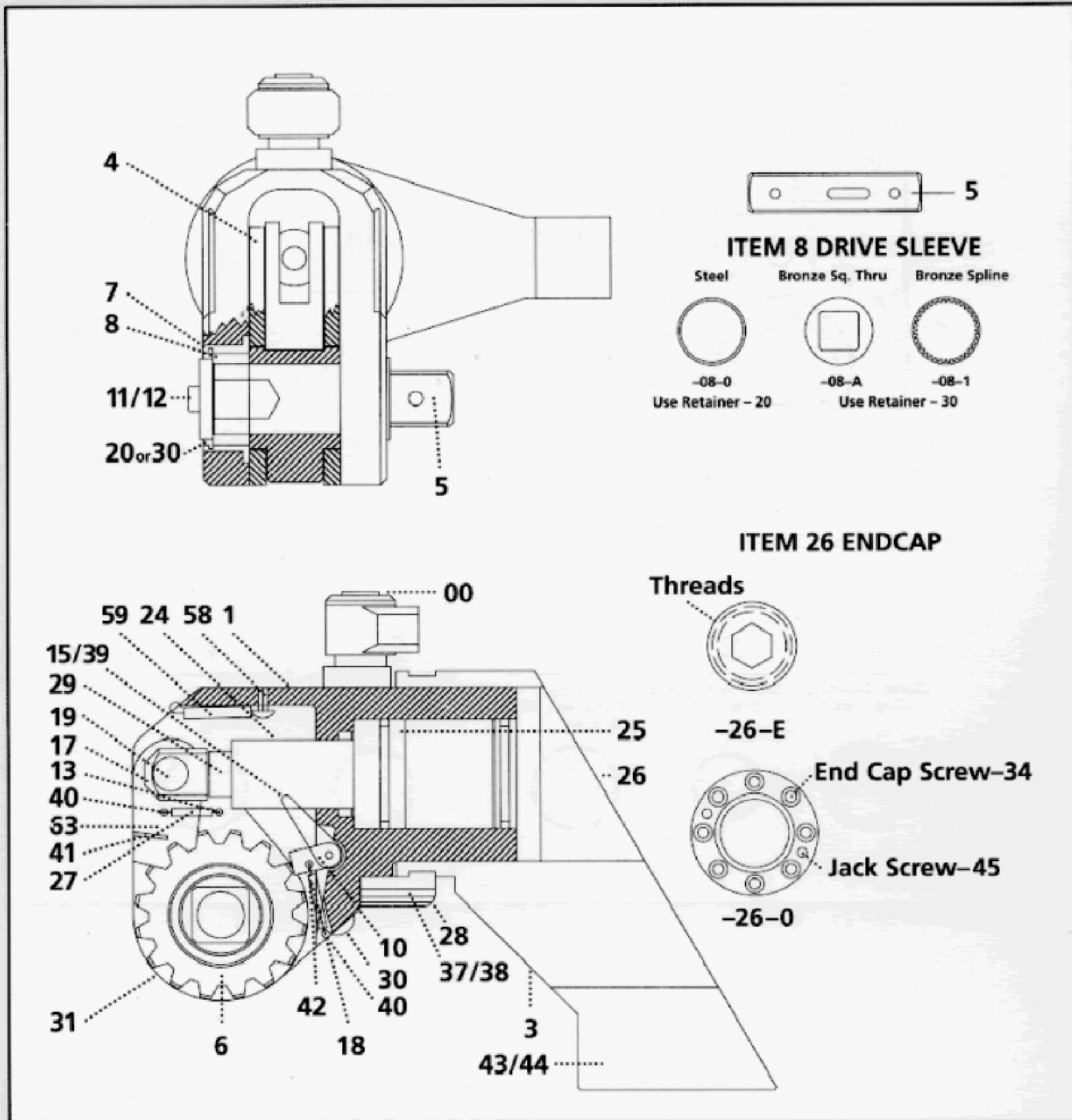
SYMPTOM	PROBABLE CAUSE	REQUIRED ACTION
Cylinder/Tool leaks	<ol style="list-style-type: none"> 1. Safety relief valve on swivel has lifted. 2. Blown O-ring in cylinder 3. Defective gland seal. 	<ol style="list-style-type: none"> 1A Tighten all hose and couplers. If leak continues, adjust safety setting - Test #4 1B Check to see if the system is properly plumbed by running test #5 (high pressure on retract side will lift the safety relief valve) 2. Replace O-Ring with proper high pressure O-Ring. SHOP JOB 3. Replace gland seal. SHOP JOB
Tool operates backwards	<ol style="list-style-type: none"> 1. Couplings reversed 2. Multiple hoses in even numbers 	<ol style="list-style-type: none"> 1. Run test #5. Replumb system as necessary. 2. As plumbed, HYTORC hoses may only be joined together in odd numbers ONLY. If it is necessary to use 2,4,6 hoses - make an adapter from spare high pressure couplings and nipples.
Ratchet returns with retract stroke	<ol style="list-style-type: none"> 1. Broken or otherwise inoperable reaction pawl. 	<ol style="list-style-type: none"> 1. Replace reaction pawl and/or spring. SHOP JOB.
Ratchet will not take successive strokes	<ol style="list-style-type: none"> 1. Broken or otherwise inoperative drive pawl or spring 2) Cylinder not retracting completely 3) Linkage between piston rod and drive plates is broken 	<ol style="list-style-type: none"> 1. Replace drive pawl and/or spring. SHOP JOB 2. Remove tool from nut and cycle freely for several strokes. If problem persists, check pawls. 2A. Operator not allowing adequate time for cylinder to retract fully. 3. Replace parts as necessary - SHOP JOB.
Tool locks onto nut	<ol style="list-style-type: none"> 1) Reaction pawl is loaded when the tool is max'd out in torque 2) Tool is operating backwards 3) Tool is wedged under a fixed object 	<ol style="list-style-type: none"> 1) Press advance button on remote and build pressure - continue to press down on remote while pulling back on one of the accuracy assurance levers - release remote while continuing to hold back on levers 2) Push advance button down - tool should immediately fall free- Run test #5. 3) Remove shroud from around ratchet. Using any tool available, pry the drive pawl out of the ratchet and at the same time pull back on the accuracy assurance levers. Tool should swing free or burn away the socket or obstruction.

SYMPTOM	PROBABLE CAUSE	REQUIRED ACTION
Gauge records no pressure	<ol style="list-style-type: none"> 1) Gauge connection is loose 2) Bad gauge 3) Pump will not build pressure 4) Tool seals are blown 	<ol style="list-style-type: none"> 1) Tighten coupling. 2) Replace gauge 3) See cylinder will not build pressure - above 4) Replace defective seals. SHOP JOB
Pump will not build pressure	<ol style="list-style-type: none"> 1) Air or electric supply is low 2) Defective relief or regulator valve 3) Low oil or clogged filter 4) Internal leak in oil line from external relief valve to pump body. 5) Worn sub-plate 	<ol style="list-style-type: none"> 1) Check air pressure or voltage. 2) Replace valve. SHOP JOB 3) Fill reservoir and clean filter. 4) Open reservoir, inspect oil line while trying to build pressure - if leaking tighten fittings or replace. 5) See "Cylinder will not build pressure - #2 above"
Motor sluggish and inefficient "sounds sick" slow to build pressure	<ol style="list-style-type: none"> 1) Air or electric supply is low 2) Clogged filter 	<ol style="list-style-type: none"> 1) See #1 in preceding block 2) Clean or replace filter
Pump heats up	<ol style="list-style-type: none"> 1) Improper use 2) Remote control is left in "on" position when pump is not actively in use. 	<ol style="list-style-type: none"> 1) Operator is continuing to hold down on the advance stroke after the cylinder has reached end of stroke - this causes a lot of oil to go through a very small hole in relief-valve - causing heat build-up. Have operator release advance stroke after accuracy assurance levers spring forward. 2) Turn pump off whenever not actually being used. DO NOT leave pump running when tool is not in use.
Hose or tool fitting is damaged or leaks	<ol style="list-style-type: none"> 1) Broken or melted plastic outer covering 2) Frayed Kevlar or steel strands 3) Oil leaks through fibers 4) Broken fittings 	<ol style="list-style-type: none"> 1) If underlying Kevlar or steel is still intact continue operation. Inspect frequently. 2) Cut hose in half and discard. Replace Hose. 3) Cut hose in half and discard. Replace hose. 4) Remove old fitting and replace with STEEL high pressure fittings only. After changing fittings, always run test #5 to insure proper plumbing.
Electric pump will not run	<ol style="list-style-type: none"> 1) Loose electric connections in control box. 2) Bad brushes 3) Motor burned up 	<ol style="list-style-type: none"> 1) Open control box and visually inspect for loose threaded or push-on connectors. Reconnect loose wires. If in doubt check wiring diagram. DANGER - BOX CONTAINS HIGH VOLTAGE - ALWAYS UNPLUG PRIOR TO TOUCHING ANYTHING IN CONTROL BOX. 2) Change brushes. SHOP JOB 3) Replace motor or components whichever is necessary. SHOP JOB.



APPENDIX

XLT TOOL SCHEMATIC



APPENDIX

XLT TOOL PARTS LIST

#	DESCRIPTION	HY-5XLT	HY-1XLT	HY-3XLT	HY-5XLT
1*	Housing Complete	XLT-5-01-E	XLT-01-01-E	XLT-03-01-E	XLT-05-01-
3	Reaction Arm	XLT-5-03	XLT-01-03	XLT-03-03	XLT-05-03
4	Drive Plate Universal	XLT-5-04	XLT-01-04	XLT-03-04	XLT-05-04
5	Square Drive Square Through	XLT-5-05-A	XLT-01-05-A	XLT-03-05-A	XLT-05-05-A
5	Square Drive Spline	XLT-5-05-1	XLT-01-05-1	XLT-03-05-1	XLT-05-05-1
6	Ratchet Square	XLT-5-06-A	XLT-01-06-A	XLT-03-06-A	XLT-05-06-A
6	Ratchet Spline	XLT-5-06-1	XLT-01-06-1	XLT-03-06-1	XLT-05-06-1
7	Drive Bushing for Steel Sleeve	XLT-5-07-0	XLT-01-07-0	XLT-03-07-0	XLT-05-07-0
7	Drive Bushing for B/A Sleeve	XLT-5-07-1	XLT-01-07-1	XLT-03-07-1	XLT-05-07-1
8	Drive Sleeve Round Steel	XLT-5-08-0	XLT-01-08-0	XLT-03-08-0	XLT-05-08-0
8	Drive Sleeve Square BR/ALU	XLT-5-08-A	XLT-01-08-A	XLT-03-08-A	N/A
8	Drive Steel Spline BR/ALU	XLT-5-08-1	XLT-01-08-1	XLT-03-08-1	XLT-05-08-1
10	Reaction Pawl	XLT-5-10	XLT-01-10	XLT-03-10	XLT-05-10
11	Drive Retainer	XLT-5-11	XLT-01-11	XLT-03-11	XLT-05-11
13	Drive Plate Roll Pin	XLT-5-13	XLT-01-13	XLT-03-13	XLT-05-13
15	Lever	XLT-5-15	XLT-01-15	XLT-03-15	XLT-05-15
17	Piston Connector Rod	XLT-5-17	XLT-01-17	XLT-03-17	XLT-05-17
18	Reaction Pawl Spring	XLT-5-18	XLT-01-18	XLT-03-18	XLT-05-18
19	Rod Pin	XLT-5-19	XLT-01-19	XLT-03-19	XLT-05-19
20	Drive Sleeve O-Ring	XLT-5-20	XLT-01-20	XLT-03-20	XLT-05-20
24	Piston Sleeve	XLT-5-24	XLT-01-24	XLT-03-24	XLT-05-24
25	Piston with Seals	XLT-5-25	XLT-01-25	XLT-03-25	XLT-05-25
26	End Cap with Screws	XLT-5-26-1	XLT-01-26-1	XLT-03-26-1	XLT-05-26-1
26	End Cap used with E Style Housing Only	XLT-5-26-E	XLT-01-26-E	XLT-03-26-E	XLT-05-26-E
27	Spring, Drive Pawl (2)	XLT-5-27	XLT-01-27	XLT-03-27	XLT-05-27
28	Reaction Arm Clamp	XLT-5-28	XLT-01-28	XLT-03-28	XLT-05-28
29	Piston Rod	XLT-5-29	XLT-01-29	XLT-03-29	XLT-05-29
30	Retaining Ring	XLT-5-30	XLT-01-30	XLT-03-30	XLT-05-30
31-0	Shroud, 4-Screw Type	XLT-5-31-0	XLT-01-31-0	XLT-03-31-0	XLT-05-31-0
31-1	Shroud, Spring Type	XLT-5-31-1	XLT-01-31-1	XLT-03-31-1	XLT-05-31-1
32	Screw, Shroud	XLT-5-32	XLT-01-32	XLT-03-32	XLT-05-32
33	Spring, Secondary Drive Pawl	XLT-5-33	XLT-01-33	XLT-03-33	XLT-05-33
34	Screws, End Cap	XLT-5-34	XLT-01-34	XLT-03-34	XLT-05-34
37	Screw, RA Clamp	XLT-5-37	XLT-01-37	XLT-03-37	XLT-05-37
38	Spring, RA Clamp	XLT-5-38	XLT-01-38	XLT-03-38	XLT-05-38
39	Lever Screw	XLT-5-39	XLT-01-39	XLT-03-39	XLT-05-39
40	Roll Pin, Primary DP/Reaction Pawl	XLT-5-40	XLT-01-40	XLT-03-40	XLT-05-40
41	Roll Pin, Secondary DP	XLT-5-41	XLT-01-41	XLT-03-41	XLT-05-41
42	Roll Pin, Reaction Pawl	XLT-5-42	XLT-01-42	XLT-03-42	XLT-05-42
43	Reaction Arm Boost with Screws	XLT-5-43	XLT-01-43	XLT-03-43	XLT-05-43
44	Boot Screws	XLT-5-44	XLT-01-44	XLT-03-44	XLT-05-44
45	Screw, End Cap Jacking	XLT-5-45	XLT-01-45	XLT-03-45	XLT-05-45
58	Screws, Shroud Spring	XLT-5-58	XLT-01-58	XLT-03-58	XLT-05-58
59	Shroud Spring	XLT-5-59	XLT-01-59	XLT-03-59	XLT-05-59
**	Piston Rod Assembly	XLT-5-61	XLT-01-61	XLT-03-61	XLT-05-61
**	Seal Kit Universal	XLT-5-62	XLT-01-62	XLT-03-62	XLT-05-62
#+63	Drive Pawl Assembly Kit	XLT-5-63	XLT-01-63	XLT-03-63	XLT-05-63
#64	Roll Pin Kit (all roll pins)	XLT-5-64	XLT-01-64	XLT-03-64	XLT-05-64
#00	Uniswivel Assembly	XLT-001	XLT-001	XLT-003	XLT-003
#00	Uniswivel Seal Kit	XLT-01-00	XLT-01-00	XLT-001-00	XLT-001-00

* E Series Housing includes 01-E, 07-1, 26-E and 31-1.

** Piston Rod Assembly includes 24, 25 and 29.

++ Drive Pawl Assembly Kit includes 17, and 19.

Available only as an assembly.

Revised July 21, 1994

APPENDIX

XLT TOOL PARTS LIST

#	DESCRIPTION	HY-8XLT	HY-10XLT	HY-20XLT	HY-25XLT
1*	Housing Complete	XLT-08-01-E	XLT-10-01	XLT-20-01	XLT-25-01
3	Reaction Arm	XLT-08-03	XLT-10-03	XLT-20-03	XLT-25-03
4	Drive Plate Universal	XLT-08-04	XLT-10-04	XLT-20-04	XLT-25-04
5	Square Drive Square Through	N/A	XLT-10-05-A	N/A	N/A
5	Square Drive Spline	XLT-08-05-1	XLT-10-05-1	XLT-20-05-1	XLT-25-05
6	Ratchet Square	N/A	XLT-10-06-A	N/A	N/A
6	Ratchet Spline	XLT-08-06	XLT-10-06-1	XLT-20-06-01	XLT-25-06
7	Drive Bushing for Steel Sleeve	N/A	XLT-10-07-0	N/A	XLT-25-07-0
7	Drive Bushing for B/A Sleeve	XLT-08-07-1	XLT-10-07-1	XLT-20-07-1	XLT-25-07-1
8	Drive Sleeve Round Steel	N/A	XLT-10-08-0	N/A	XLT-25-08-0
8	Drive Sleeve Square BR/ALU	N/A	XLT-10-08A	N/A	N/A
8	Drive Steel Spline BR/ALU	XLT-08-08	XLT-10-08-1	XLT-20-08-1	XLT-25-08-1
10	Reaction Pawl	XLT-08-10	XLT-10-10	XLT-20-10	XLT-25-10
11	Drive Retainer	XLT-08-11	XLT-10-11	XLT-20-11	XLT-25-11
13	Drive Plate Roll Pin	XLT-08-13	XLT-10-13	XLT-20-13	XLT-25-13
15	Lever	XLT-08-15	XLT-10-15	XLT-20-15	XLT-25-15
17	Piston Connector Rod	XLT-08-17	XLT-10-17	XLT-20-17	XLT-25-17
18	Reaction Pawl Spring	XLT-08-18	XLT-10-18	XLT-20-18	XLT-25-18
19	Rod Pin	XLT-08-19	XLT-10-19	XLT-20-19	XLT-25-19
20	Drive Sleeve O-Ring	XLT-08-20	XLT-10-20	XLT-20-20	XLT-25-20
24	Piston Sleeve	XLT-08-24	XLT-10-24	XLT-20-24	XLT-25-24
25	Piston with Seals	XLT-08-25	XLT-10-25	XLT-20-25	XLT-25-25
26	End Cap with Screws	XLT-08-26-1	XLT-10-26-1	XLT-20-26-1	XLT-25-26
26	End Cap used with E Style Housing Only	XLT-08-26-E	N/A	N/A	N/A
27	Spring, Drive Pawl (2)	XLT-08-27	XLT-10-27	XLT-20-27	XLT-25-27
28	Reaction Arm Clamp	XLT-08-28	XLT-10-28	XLT-20-28	XLT-25-28
29	Piston Rod	XLT-08-29	XLT-10-29	XLT-20-29	XLT-25-29
30	Retaining Ring	XLT-08-30	XLT-10-30	XLT-20-30	XLT-25-30
31-0	Shroud, 4-Screw Type	N/A	XLT-10-31-0	N/A	XLT-25-31-0
31-1	Shroud, Spring Type	XLT-08-31-1	XLT-10-31-1	XLT-20-31-1	XLT-25-31-1
32	Screw, Shroud	XLT-08-32	XLT-10-32	XLT-20-32	XLT-25-32
33	Spring, Secondary Drive Pawl	N/A	XLT-10-33	XLT-20-33	XLT-25-33
34	Screws, End Cap	XLT-08-34	XLT-10-34	XLT-20-34	XLT-25-34
37	Screw, RA Clamp	XLT-08-37	XLT-10-37	XLT-20-37	XLT-25-37
38	Spring, RA Clamp	XLT-08-38	XLT-10-38	XLT-20-38	XLT-25-38
36	Lever Screw	XLT-08-39	XLT-10-39	XLT-20-39	XLT-25-39
40	Roll Pin, Primary DP/Reaction Pawl	XLT-08-40	XLT-10-40	XLT-20-40	XLT-25-40
41	Roll Pin, Secondary DP	N/A	XLT-10-41	XLT-20-41	XLT-25-41
42	Roll Pin, Reaction Pawl	XLT-08-42	XLT-10-42	XLT-20-42	XLT-25-42
43	Reaction Arm Boost with Screws	XLT-08-43	XLT-10-43	XLT-20-43	XLT-25-43
44	Boot Screws	XLT-08-44	XLT-10-44	XLT-20-44	XLT-25-44
45	Screw, End Cap Jacking	XLT-08-45	XLT-10-45	XLT-20-45	XLT-25-45
58	Screws, Shroud Spring	XLT-08-58	XLT-10-58	XLT-20-58	XLT-25-58
59	Shroud Spring	XLT-08-59	XLT-10-59	XLT-20-59	XLT-25-59
**	Piston Rod Assembly	XLT-08-61	XLT-10-61	XLT-20-61	XLT-25-61
**	Seal Kit Universal	XLT-08-62	XLT-10-62	XLT-20-62	XLT-25-62
#,++63	Drive Pawl Assembly Kit	XLT-08-63	XLT-10-63	XLT-20-63	XLT-25-63
#,64	Roll Pin Kit (all roll pins)	XLT-08-64	XLT-10-64	XLT-20-64	XLT-25-64
65	Reaction Arm Crane	XLT-08-CA	N/A	N/A	N/A
#00	Uniswivel Assembly	XLT-003	XLT-003	XLT-003	XLT-003
#00	Uniswivel Seal Kit	XLT-001-00	XLT-001-00	XLT-001-00	XLT-001-00

* E Series Housing includes 01-E, 07-1, 26-E and 31-1.

** Piston Rod Assembly includes 24, 25 and 29.

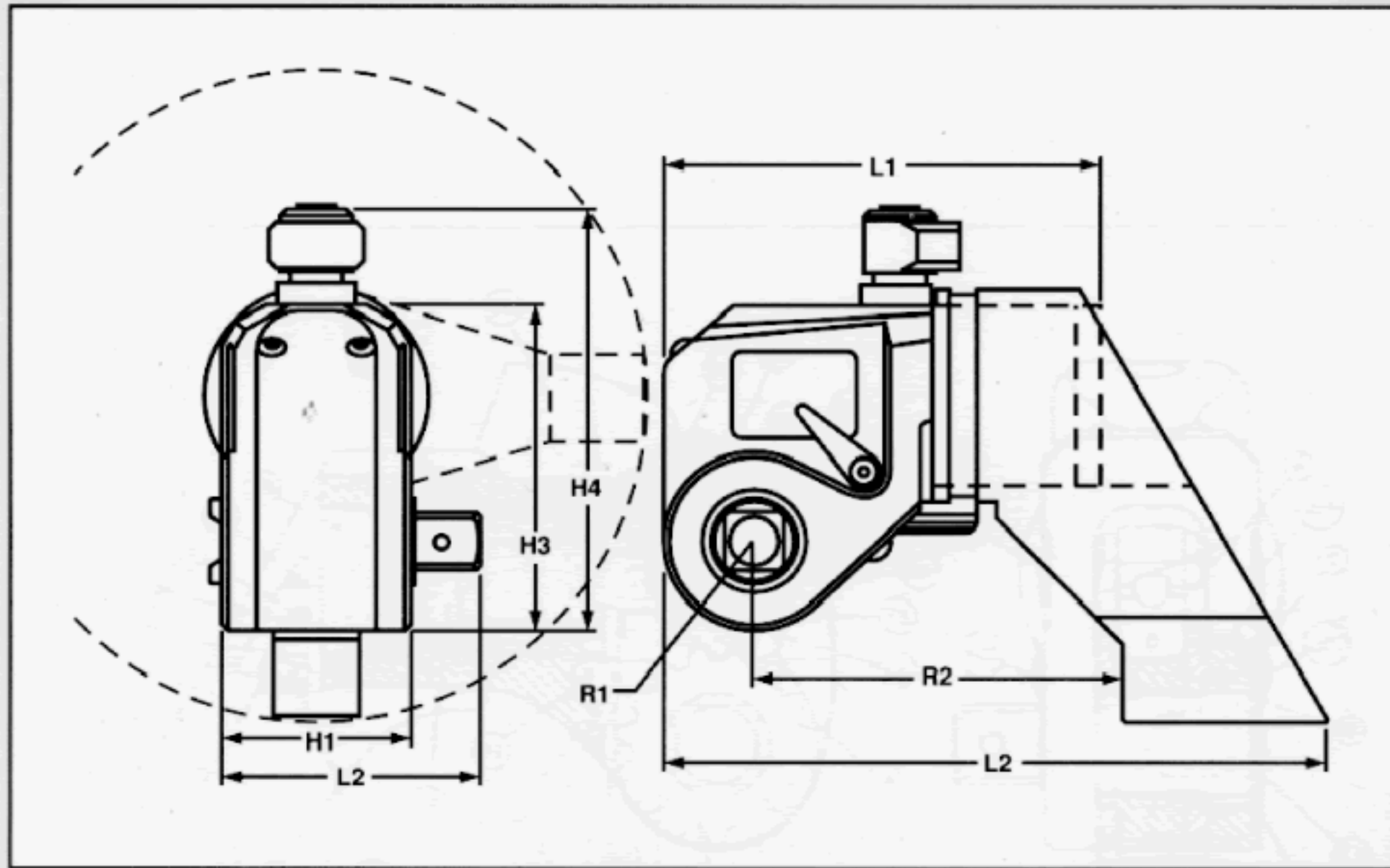
++ Drive Pawl Assembly Kit includes 17, and 19.

Available only as an assembly.

Revised February 21, 1997

APPENDIX

DIMENSIONAL DATA



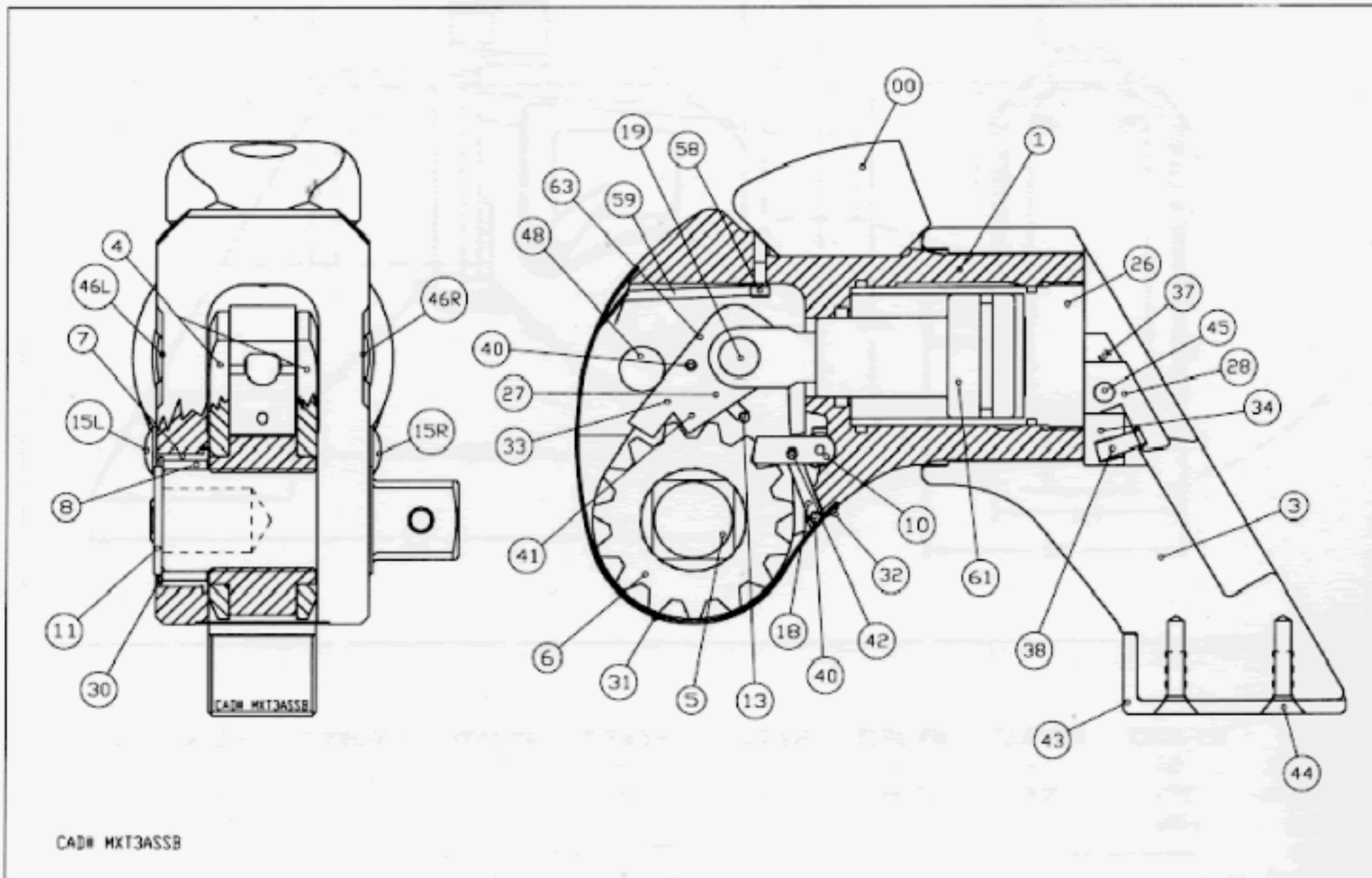
HYTORC	HY-5XLT	HY-1XLT	HY-3XLT	HY-5XLT	HY-8XLT	HY-10XLT	HY-20XLT	HY-25XLT	HY-50XLT
Min. ft./lbs.	50	200	480	835	1200	1755	2960	3960	7875
Max. ft./lbs.	370	1390	3230	5590	8000	11520	19760	25890	52500
Accuracy	±3%	±3%	±3%	±3%	±3%	±3%	±3%	±3%	±3%
Housing	TITAL 399								
Uni-Swivel	Standard								
Reaction Arm	TITAL 399, Vertical, 360 Degree, torsion-absorbing								
Weight (Lbs)*	1.85	4.45	9.95	16.75	24.95	29.5	51.5	68.5	124

*The weight listed is for the complete ready-to-use HYTORC tool with reaction member.

HYTORC	L1	L2	H1	H2	H3	H4	R1	R2	SQ
HY-5XLT	3.00	4.91	1.32	1.88	3.00	4.25	0.65	2.57	1/2"
HY-1XLT	4.50	6.95	1.97	2.81	3.60	4.95	0.98	3.85	3/4"
HY-3XLT	5.90	9.26	2.63	3.75	4.80	6.75	1.30	5.13	1"
HY-5XLT	7.10	11.11	3.15	4.49	5.80	7.70	1.56	6.15	1-1/2"
HY-8XLT	7.70	12.57	3.57	5.09	6.50	8.50	1.76	6.96	1-1/2"
HY-10XLT	8.80	13.89	3.94	5.61	7.20	9.00	1.95	7.69	1-1/2"
HY-20XLT	10.10	16.67	4.73	6.74	8.90	10.20	2.34	9.23	2-1/2"
HY-25XLT	11.80	18.52	5.25	7.48	9.60	11.50	2.60	10.25	2-1/2"
HY-50XLT	15.50	22.99	6.57	9.36	11.00	12.80	3.25	12.82	2-1/2"

APPENDIX

MXT TOOL SCHEMATIC



APPENDIX

MXT TOOL PARTS LIST

DWG #	DESCRIPTION	HY-1MXT	HY-3MXT	HY-5MXT
1	Housing Assembly	MXT-01-01	MXT-03-01	MXT-05-01
3	Reaction Arm Assembly	MXT-01-03	MXT-03-03	MXT-05-03
4	Drive Plate Universal	XLT-01-04	XLT-03-04	XLT-05-04
5	Square Drive Spline	XLT-01-05-1	XLT-03-05-1	XLT-05-05-1
6	Ratchet Spline	XLT-01-06-1	XLT-03-06-1	XLT-05-06-1
7	Drive Bushing	XLT-01-07-1	XLT-03-07-1	XLT-05-07-1
8	Drive Sleeve Spline	XLT-01-08-1	XLT-03-08-1	XLT-05-08-1
10	Reaction Pawl	XLT-01-10	XLT-03-10	XLT-05-10
11	Drive Retainer Assembly	XLT-01-11	XLT-03-11	XLT-05-11
13	Drive Plate Roll Pin	XLT-01-13	XLT-03-13	XLT-05-13
15	Left & Right Button Assembly	MXT-01-15	MXT-03-15	MXT-05-15
15L	Button Lever Assembly	MXT-01-15L	MXT-03-15L	MXT-05-15L
15R	Button Lever Assembly	MXT-01-15R	MXT-03-15R	MXT-05-15R
18	Reaction Pawl Spring	MXT-01-18	MXT-03-18	MXT-05-18
19	Rod End Pin	XLT-01-19	XLT-03-19	XLT-05-19
26	End Cap	MXT-01-26	MXT-03-26	MXT-05-26
27	Drive Pawl Spring	XLT-01-27	XLT-03-27	XLT-05-27
28	Reaction Arm Lever	MXT-01-28	MXT-03-28	MXT-05-28
30	Drive Sleeve Retainer Ring	XLT-01-30	XLT-03-30	XLT-05-30
31	Shroud	MXT-01-31	MXT-03-31	MXT-05-31
32	Shroud Screw	XLT-01-32	XLT-03-32	XLT-05-32
33	Drive Pawl Spring Secondary	XLT-01-33	XLT-03-33	XLT-05-33
34	Reaction Arm Thrust Plate	MXT-01-367	MXT-03-367	MXT-05-367
37	Thrust Plate Screws	MXT-01-503	MXT-03-503	MXT-05-503
38	Reaction Arm Lever Spring	MXT-01-508	MXT-03-508	MXT-05-508
40	Roll Pin Drive Pawl Primary	XLT-01-40	XLT-03-40	XLT-05-40
41	Roll Pin Drive Pawl Secondary	XLT-01-41	XLT-03-41	XLT-05-41
42	Roll Pin Reaction Pawl	XLT-01-42	XLT-03-42	XLT-05-42
43	Reaction Arm Boot	XLT-01-43	XLT-03-43	XLT-05-43
44	Boot Screws	XLT-01-44	XLT-03-44	XLT-05-44
45	Pin Reaction Arm Lever	MXT-01-509	MXT-03-509	MXT-05-509
46L	MXT Serial Plate Left	MXT-01-46L	MXT-03-46L	MXT-05-46L
46R	MXT Serial Plate Right	MXT-01-46R	MXT-03-46R	MXT-05-46R
48	Access Plug	MXT-01-02	MXT-03-02	MXT-05-02
58	Screw, Shroud Spring	XLT-01-58	XLT-03-58	XLT-05-58
59	Shroud Spring	XLT-01-59	XLT-03-59	XLT-05-59
61	Piston Rod Assembly	XLT-01-61	XLT-03-61	XLT-05-61
62	Seal Kit	MXT-01-62	MXT-03-62	MXT-05-62
63	Drive Pawl Assembly Kit	XLT-01-63	XLT-03-63	XLT-05-63
00	Uniswivel Assembly	MXT-001	MXT-003	MXT-005
00	Uniswivel Seal Kit	MXT-001-00	MXT-003-00	MXT-005-00

APPENDIX

MXT TOOL PARTS LIST

DWG #	DESCRIPTION	HY-10MXT	HY-20MXT	HY-35MXT
1	Housing Assembly	MXT-10-01	MXT-20-01	MXT-35-01
3	Reaction Arm Assembly	MXT-10-03	MXT-20-03	MXT-35-03
4	Drive Plate Universal	XLT-10-04	XLT-20-04	MXT-35-04
5	Square Drive Spline	XLT-10-05-1	XLT-20-05	MXT-35-05
6	Ratchet Spline	XLT-10-06-1	XLT-20-06	MXT-35-06
7	Drive Bushing	XLT-10-07-1	XLT-20-07	MXT-35-07
8	Drive Sleeve Spline	XLT-10-08-1	XLT-20-08	MXT-35-08
10	Reaction Pawl	XLT-10-10	XLT-20-10	MXT-35-10
11	Drive Retainer Assembly	XLT-10-11	XLT-20-11	MXT-35-11
13	Drive Plate Roll Pin	XLT-10-13	XLT-20-13	MXT-35-13
15	Left & Right Button Assembly	MXT-10-15	MXT-20-15	MXT-35-15
15L	Button Lever Assembly	MXT-10-15L	MXT-20-15L	MXT-35-15L
15R	Button Lever Assembly	MXT-10-15R	MXT-20-15R	MXT-35-15R
18	Reaction Pawl Spring	MXT-10-18	MXT-20-18	MXT-35-18
19	Rod End Pin	XLT-10-19	XLT-20-19	MXT-35-19
26	End Cap	MXT-10-26	MXT-20-26	MXT-35-26
27	Drive Pawl Spring	XLT-10-27	XLT-20-27	MXT-35-27
28	Reaction Arm Lever	MXT-10-28	MXT-20-28	MXT-35-28
30	Drive Sleeve Retainer Ring	XLT-10-30	XLT-20-30	MXT-35-30
31	Shroud	MXT-10-31	MXT-20-31	MXT-35-31
32	Shroud Screw	XLT-10-32	XLT-20-32	MXT-35-32
33	Drive Pawl Spring Secondary	XLT-10-33	XLT-20-33	MXT-35-33
34	Reaction Arm Thrust Plate	MXT-10-367	MXT-20-367	MXT-35-367
37	Thrust Plate Screws	MXT-10-503	MXT-20-503	MXT-35-503
38	Reaction Arm Lever Spring	MXT-10-508	MXT-20-508	MXT-35-508
40	Roll Pin Drive Pawl Primary	XLT-10-40	XLT-20-40	MXT-35-40
41	Roll Pin Drive Pawl Secondary	XLT-10-41	XLT-20-41	MXT-35-41
42	Roll Pin Reaction Pawl	XLT-10-42	XLT-20-42	MXT-35-42
43	Reaction Arm Boot	XLT-10-43	XLT-20-43	MXT-35-43
44	Boot Screws	XLT-10-44	XLT-20-44	MXT-35-44
45	Pin Reaction Arm Lever	MXT-10-509	MXT-20-509	MXT-35-509
46L	MXT Serial Plate Left	MXT-10-46L	MXT-20-46L	MXT-35-46L
46R	MXT Serial Plate Right	MXT-10-46R	MXT-20-46R	MXT-35-46R
48	Access Plug	MXT-10-02	MXT-20-02	MXT-35-02
58	Screw, Shroud Spring	XLT-10-58	XLT-20-58	MXT-35-58
59	Shroud Spring	XLT-10-59	XLT-20-59	MXT-35-59
61	Piston Rod Assembly	XLT-10-61	XLT-20-61	MXT-35-61
63	Drive Pawl Assembly Kit	XLT-10-63	XLT-20-63	MXT-35-63
00	Uniswivel Assembly	MXT-0010	MXT-0020	MXT-0035
00	Uniswivel Seal Kit	MXT-0010-00	MXT-0020-00	MXT-0035-00

APPENDIX

SQUARE/ALLEN DRIVE WORKING TORQUE

DRIVE SIZE: The square or hex drive of each HYTORC is limited in its maximum output by its material and its engagement area. Since your HYTORC uses a specially suited alloy-steel for its drive members, the following maximum torque output can be achieved without drive failure, provided the reaction member abuts close to the same plane as the nut to be turned.

DRIVE SIZE	MAXIMUM WORKING TORQUE	PROBABLE FAILURE
1/2" Allen	350 ft./lbs.	380 ft./lbs.
1/2" Square	385 ft./lbs.	425 ft./lbs.
5/8" Allen	685 ft./lbs.	750 ft./lbs.
3/4" Allen	1.185 ft./lbs.	1.300 ft./lbs.
3/4" Square	1.390 ft./lbs.	1.485 ft./lbs.
7/8" Allen	1.880 ft./lbs.	2.065 ft./lbs.
1" Allen	2.810 ft./lbs.	3.100 ft./lbs.
1" Square	3.230 ft./lbs.	3.400 ft./lbs.
1-1/8" Allen	4.000 ft./lbs.	4.400 ft./lbs.
1-1/4" Allen	5.500 ft./lbs.	6.100 ft./lbs.
1-3/8" Allen	7.300 ft./lbs.	8.000 ft./lbs.
1-1/2" Allen	9.500 ft./lbs.	10.400 ft./lbs.
1-1/2" Square	11.520 ft./lbs.	12.475 ft./lbs.
1-5/8" Allen	12.000 ft./lbs.	13.200 ft./lbs.
1-3/4" Allen	15.000 ft./lbs.	16.500 ft./lbs.
1-7/8" Allen	18.500 ft./lbs.	20.300 ft./lbs.
2" Allen	22.500 ft./lbs.	24.700 ft./lbs.
2-1/4" Allen	32.000 ft./lbs.	35.100 ft./lbs.
2-1/2" Allen	44.000 ft./lbs.	48.200 ft./lbs.
2-1/2" Square	52.500 ft./lbs.	63.625 ft./lbs.

If the reaction arm cannot abut on the same plane as the nut to be turned, less torque should be applied, as the additional side load has to be taken into consideration.

When torque requirements are close or in excess of the values listed above, use HYTORC's Socket Hex - Drive with replaceable Hex Insert Bits.

APPENDIX

BOLT/TORQUE/HYTORC

The data below is based on bolts lubricated to manufacturer's specifications. Due to a variation in friction, we recommend in extreme cases to check with the bolt manufacturer, as this chart represents a **guideline only.**

SAE 1 SAE2 30,000 PSI	ASTM B7 BOLT	B-7 A/F HEAVY HEX NUT	ASTM 354 B-8 60,000 PSI	FT./LBS.	RECOMMENDED MXT MODELS MXT SERIES MAKE-UP ONLY	MXT SERIES MAKE-UP/BREAK-OUT
1"	7/8"	1-7/16"	7/8"	300	HY-5XLT	HY-5XLT
1-1/8"	1"	1-5/8"		425	HY-1XLT	HY-1XLT
			1"	500	HY-1XLT	HY-1XLT
1-1/4"				600	HY-1XLT	HY-1XLT
1-3/8"	1-1/8"	1-13/16"	1-1/8"	700	HY-1XLT	HY-1XLT
	1-1/4"	2"		800	HY-1XLT	HY-1XLT
1-1/2"			1-1/4"	900	HY-1XLT	HY-1XLT
				1,000	HY-1XLT	HY-3XLT
1-5/8"	1-3/8"	2-13/16"		1,250	HY-1XLT	HY-3XLT
			1-3/8"	1,350	HY-3XLT	HY-3XLT
	1-1/2"	2-3/8"		1,500	HY-3XLT	HY-3XLT
1-3/4"				1,600	HY-3XLT	HY-3XLT
1-7/8"				1,800	HY-3XLT	HY-5XLT
	1-5/8"	2-9/16"		2,000	HY-3XLT	HY-5XLT
2"			1-5/8"	2,200	HY-3XLT	HY-5XLT
	1-3/4"	2-3/4"		2,600	HY-5XLT	HY-5XLT
2-1/4"			1-3/4"	3,000	HY-5XLT	HY-5XLT
	1-7/8"	2-15/16"		3,700	HY-5XLT	HY-8XLT
2-1/2"	2"	3-1/8"	1-7/8"	4,000	HY-5XLT	HY-8XLT
			2"	4,400	HY-8XLT	HY-10XLT
2-3/4"				5,100	HY-8XLT	HY-10XLT
	2-1/4"	3-1/2"	2-1/4"	6,000	HY-10XLT	HY-10XLT
3"				7,000	HY-10XLT	HY-20XLT
	2-1/2"	3-7/8"		8,000	HY-10XLT	HY-20XLT
3-1/4"			2-1/2"	9,000	HY-10XLT	HY-20XLT
3-1/2"	2-3/4"	4-1/4"		10,000	HY-20XLT	HY-25XLT
			2-3/4"	11,500	HY-20XLT	HY-25XLT
3-3/4"	3"	4-5/8"		13,000	HY-20XLT	HY-25XLT
4"				14,500	HY-25XLT	HY-25XLT
			3"	15,500	HY-25XLT	HY-25XLT
	3-1/4"	5"		16,500	HY-25XLT	HY-25XLT
4-1/4"			3-1/4"	19,500	HY-25XLT	HY-50XLT
	3-1/2"	5-3/8"		20,500	HY-25XLT	HY-50XLT
4-1/2"				21,500	HY-25XLT	HY-50XLT
			3-1/2"	24,500	HY-50XLT	HY-50XLT
4-3/4"	3-3/4"	5-3/4"		25,500	HY-50XLT	HY-50XLT
6-1/2"	4-1/4"			29,500	HY-50XLT	HY-50XLT
5"	4"	6-1/8"	3-3/4"	30,500	HY-50XLT	HY-50XLT
	4-1/2"	6-7/8"		35,500	HY-50XLT	HY-80SL
			4"	37,000	HY-50XLT	HY-80SL
	4-3/4"	7-1/4"		41,000	HY-50XLT	HY-80SL
			4-1/4"	44,000	HY-50XLT	HY-80SL
	5"	7-5/8"		47,500	HY-80SL	HY-80SL
			4-1/2"	52,000	HY-80SL	HY-80SL
			4-3/4"	61,000	HY-80SL	HY-80SL
			5"	71,500	HY-80SL	HY-80SL

APPENDIX

PRESSURE/TORQUE CONVERSION CHART

XLT Series – Ft./Lbs.

PSIG	HY-5XLT	HY-1XLT	HY-3XLT	HY-5XLT	HY-8XLT	HY-10XLT	HY-20XLT	HY-25XLT	HY-50XLT
1500	56	200	480	835	1200	1755	2960	3960	7875
1600	59	214	512	890	1280	1864	3160	4216	8400
1800	67	242	576	1000	1440	2082	3555	4728	9450
2000	74	270	640	1110	1600	2300	3950	5240	10500
2200	81	298	704	1222	1760	2526	4345	5752	11550
2400	89	326	768	1334	1920	2752	4740	6264	12600
2600	96	354	832	1446	2080	2978	5135	6776	13650
2800	104	382	896	1558	2240	3204	5530	7288	14700
3000	111	410	960	1670	2400	3430	5930	7800	15750
3200	118	438	1024	1782	2560	3656	6325	8318	16800
3400	126	466	1088	1894	2720	3882	6720	8836	17850
3600	133	494	1152	2006	2880	4108	7115	9354	18900
3800	141	522	1216	2118	3040	4334	7510	9872	19950
4000	148	550	1280	2230	3200	4560	7905	10390	21000
4200	155	578	1344	2342	3360	4792	8300	10898	22050
4400	163	606	1412	2454	3520	5024	8695	11406	23100
4600	170	634	1478	2565	3680	5256	9090	11914	24150
4800	178	662	1544	2678	3840	5488	9485	12422	25200
5000	185	690	1610	2790	4000	5720	9880	12930	26250
5200	192	718	1674	2902	4160	5948	10275	13450	27300
5400	200	746	1738	3014	4320	6176	10670	13970	28350
5600	207	774	1802	3126	4480	6404	11065	14490	29400
5800	215	802	1866	3238	4640	6632	11460	15010	30450
6000	222	830	1930	3350	4800	6860	11860	15530	31500
6200	229	858	1994	3462	4960	7094	12250	16040	32550
6400	237	886	2058	3574	5120	7328	12645	16550	33600
6600	244	914	2122	3686	5280	7562	13040	17060	34650
6800	252	942	2186	3798	5440	7796	13435	17570	35700
7000	259	970	2250	3910	5600	8030	13830	18080	36750
7200	266	998	2316	4022	5760	8264	14225	18602	37800
7400	274	1026	2382	4134	5920	8498	14620	19124	38850
7600	281	1054	2448	4246	6080	8732	15020	19646	39900
7800	289	1082	2514	4358	6240	8966	15415	20168	40950
8000	296	1110	2580	4470	6400	9200	15810	20680	42000
8200	303	1138	2646	4582	6560	9432	16200	21214	43050
8400	211	1166	2712	4694	6720	9664	16600	21738	44100
8600	318	1194	2778	4806	6880	9896	16995	22262	45150
8800	326	1222	2844	4918	7040	10128	17390	22786	46200
9000	333	1250	2910	5030	7200	10360	17785	23310	47250
9200	340	1278	2974	5142	7360	10592	18180	23826	48300
9400	348	1306	3038	5254	7520	10824	18575	24342	49350
9600	355	1334	3102	5366	7680	11056	18970	24858	50400
9800	363	1362	3166	5478	7840	11288	19365	25374	51450
10000	370	1390	3230	5590	8000	11520	19760	25890	52500

NOTE: If the nut does not loosen using the maximum torque output of the tool, it is an indication that you require the next larger size tool to loosen the bolt.

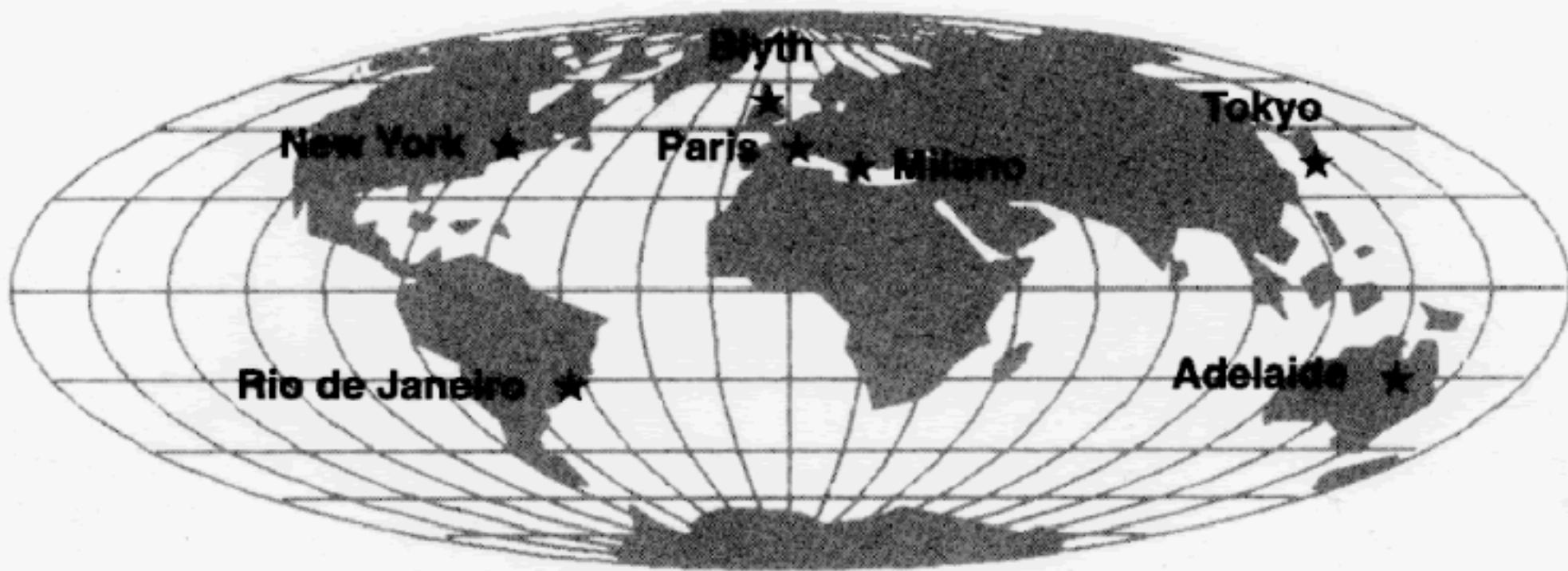
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