



Maintenance Instructions
Parts List

S3TCAL and S3TCDI Pump



167 Stock Street, Nesquehoning, PA 18240 Phone: 570-645-3779 Fax: 570-645-4061

Website: www.hydra-tech.com

E-Mail: htpump@hydra-tech.com

IMPORTANT SAFETY INFORMATION



SAFETY ALERT SYMBOL

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

⚠ DANGER

Immediate hazards which, if not avoided, **WILL** result in severe injury or death.

⚠ WARNING

Hazards which, if not avoided, **COULD** result in severe injury or death.

⚠ CAUTION

Hazards or unsafe practices which, if not avoided, **MAY** result in injury or property damage.

⚠ WARNING

Before operating this tool, see the safety information and operating instructions in the Operation Manual.

⚠ WARNING

Do not operate the pump if the impeller blades are exposed. After assembly, install the inlet screen before operating the pump.

Failure to observe this warning could result in severe injury or death.

⚠ WARNING

Do not inspect, adjust, or clean tool when it is connected to a power source. Accidental startup could result in serious injury.

⚠ WARNING



Skin injection hazard:

Oil under pressure easily punctures skin causing serious injury, gangrene or death. If you are injured by escaping oil, seek medical attention immediately.

- Do not use fingers or hands to check for leaks.
- Do not hold hose or couplers while operating the power source.
- Depressurize the hydraulic system before servicing.




**HYDRA-TECH
PUMPS**

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IMPORTANT SAFETY INFORMATION

	⚠ WARNING
	<p>Wear eye protection when operating or servicing this tool.</p> <p>Failure to wear eye protection could result in serious eye injury from flying debris or hydraulic oil.</p>

⚠ WARNING
<p>Do not exceed the maximum hydraulic flow, pressure relief or back pressure listed in the Specifications and Parts manual.</p> <p>Failure to observe this warning could result in severe injury or death.</p>

⚠ WARNING
<p>Do not disconnect tool, hoses, or fittings while the power source is running or if the hydraulic fluid is hot. Hot hydraulic fluid could cause serious burns.</p>

⚠ CAUTION
<p>Hydraulic oil can cause skin irritation.</p> <ul style="list-style-type: none">• Handle the tool and hoses with care to prevent skin contact with hydraulic oil.• In case of accidental skin contact with hydraulic oil, wash the affected area immediately to remove the oil. <p>Failure to observe these precautions may result in injury.</p>

IMPORTANT
<p>Do not reverse hydraulic flow. Operation with hydraulic flow reversed can cause tool malfunction. Connect the supply (pressure) hose and return (tank) hose to the proper tool ports.</p>

IMPORTANT
<p>Procedure for disconnecting hydraulic hoses, fittings or components:</p> <ol style="list-style-type: none">1. Move the flow lever on the hydraulic power source to the OFF position.2. Stop the power source.3. Follow the sequence under Disconnecting Hoses to prevent pressure buildup. In case some pressure has built up, loosen hoses, fittings or components slowly.



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PUMP SAFETY PRECAUTIONS

Pump operators and maintenance personnel must always comply with the safety precautions given in this manual and on the stickers and tags attached to the pump and hose. These safety precautions are given for your safety. Review them carefully before operating the pump and before performing general maintenance or repairs. Supervising personnel should develop additional precautions relating to the specific work area and local safety regulations. If so, place the added precautions in the space provided in this manual.

All Hydra-Tech submersible pumps will provide safe and dependable service if operated in accordance with the instructions given in this manual. Read and understand this manual and any stickers and tags attached to the pump and hoses before operation. Failure to do so could result in personal injury or equipment damage.

- Operator must start in a work area without bystanders. The operator must be familiar with all prohibited work areas such as excessive slopes, dangerous terrain conditions, and confined spaces.
- Establish a training program for all operators to ensure safe operations.
- Do not operate the pump unless thoroughly trained or under the supervision of an instructor.
- Always wear safety equipment such as goggles, head protection, hearing protection, and safety shoes at all times when operating the pump.
- Do not inspect or clean the pump while the hydraulic power source is engaged. Disconnect both hydraulic hoses before attempting to clean or inspect the pump. Accidental engagement of the pump can cause serious injury.
- Do not operate this pump without first reading the Operating Instructions.
- Do not install or remove this pump while the hydraulic power source is connected. Accidental engagement of the pump can cause serious injury.
- Never operate the pump near energized transmission lines. Know the location of buried or covered services before starting work.
- Do not wear loose fitting clothing when operating the pump. Loose fitting clothing may get entangled with the pump and cause serious injury.
- Supply hoses must have a minimum working pressure rating of 3000 psi/ 206 bar or higher depending on model.
- The hydraulic circuit control valve must be in the "OFF" position when coupling or uncoupling the pump. Wipe all couplers clean before connecting. Failure to do so may result in damage to the quick couplers and cause overheating. Use only lint-free cloths.
- Be sure all hose connections are tight.
- Do not operate the pump at oil temperatures above 140° F/60° C. Operation at higher oil temperatures can cause operator discomfort and may cause damage to the pump.
- Do not operate a damaged, improperly adjusted, or incompletely assembled pump.
- To avoid personal injury or equipment damage, all pump repair, maintenance and service must only be performed by authorized and properly trained personnel.
- Do not exceed the rated limits of the pump or use the pump for applications beyond its design capacity.
- Always keep critical pump markings, such as labels and warning stickers legible.
- Always replace parts with replacement parts recommended by Hydra-Tech Pumps.
- Check fastener tightness often and before each daily use.
- NEVER put your hands or any other body part into the volute or discharge outlet while the pump is running. Do not operate pump without the strainer and discharge lines in place.
- Do not lift the pump by pulling on the hydraulic hoses. Use a suitable line or chain fastened to the pump handle or lifting point. Always use appropriate lifting equipment to locate or move the pump.
- Do not point water discharge toward bystanders or property.
- DO NOT PUMP FLAMABLE LIQUIDS.

OPERATION

PREOPERATION PROCEDURES

CHECK HYDRAULIC POWER SOURCE

1. Using a calibrated flow meter and pressure gauge, make sure the hydraulic power source develops flow and pressure that is appropriate for the pump.
2. Make certain that the hydraulic power source is equipped with a relief valve set to open at 10% above rated operating pressure.
3. Make certain that the power source return pressure does not exceed 100 psi/ 7 bar.
4. Make sure the pump inlet is clear of debris. Remove any obstruction before connecting the hydraulic hoses.

CONNECTING HYDRAULIC HOSES

1. Wipe all hose couplers with a clean lint free cloth before making connections. Do not connect pressure to the return port. Motor shaft seal limit is 100 psi/7 bar.
2. Connect the hoses from the hydraulic power source to the couplers on the pump or pump hoses. It is a good practice to connect return hose first and disconnect it last to minimize or avoid trapped pressure within the pump motor.

Note: If uncoupled hoses are left in the sun, pressure increase inside the hoses might make them difficult to connect. Whenever possible, connect the free ends of the hoses together.

3. Make sure the hydraulic hoses are connected to ensure that the flow is in the proper direction. The female coupler on the submersible pump is the inlet (pressure) coupler.

PUMP OPERATION

1. Observe all safety precautions.
2. Attach discharge hose to the pump outlet. For best performance, keep the discharge hose as short as possible and lay it out to avoid sharp bends or kinks.
3. Attach a chain or cable to the pump's handle or lifting point. Use suitable lifting equipment to lower the pump into the liquid to be pumped. Do not raise or lower the pump by its hoses or couplers to avoid damage to the hoses or couplers. Never point the discharge hose at bystanders or property.
4. Turn on the hydraulic power source. Watch for solids in the liquid being pumped. If solids or semi-solids are excessive, the discharge flow might decrease. If this happens, stop the pump and check for the cause of the problem. Under some conditions, the liquid being pumped might be slowed enough so that it can no longer push particles in the liquid. If this happens, particles can accumulate in the pumping chamber, causing further restriction and damage. The impeller then acts as a "grinding wheel" which causes accelerated pump wear.

Reduced liquid flow can be caused by the following:

- The pump sinks into solids at the bottom of the hole blocking the inlet.
- The end of the discharge hose is too high, causing an excessive lift height for the column of liquid being pushed by the pump. This slows the flow of liquid to a level where it can no longer carry solids. Kinks in the discharge line will reduce flow and increase demand on the power unit.
- The flow and pressure of hydraulic fluid to the pump is too low, which reduces impeller speed. A 20 percent decrease in hydraulic fluid flow can reduce pump performance by 50 percent. When operating at reduced hydraulic flow and pressure, keep the end of the discharge line as low as possible.

Note: It will not damage the pump to operate it "dry."

5. The pump must maintain a minimum impeller speed in order to move semi-solid particles through the pump. While pumping liquids containing large semi-solids, monitor the flow from the outlet of the discharge hose. If it begins to slow, turn off the hydraulic power source and lift the pump from the work area. Disconnect the hydraulic hoses and clean at the water hose and the pumping chamber. Pumping liquids with a solids to liquid ratio greater than 30 per cent solids to 70 percent liquid will cause accelerated impeller wear.
6. When pumping is complete, set the hydraulic control valve to the "OFF" position. Lift the pump from the work area using the chain or cable to avoid damage to the hoses or couplers.
7. To maintain optimum performance, it is good practice to periodically inspect the impeller and wear components for wear or damage. This is especially important following the pumping of liquids containing sharp, abrasive solids. **ALWAYS DISCONNECT THE HYDRAULIC HOSES BEFORE ATTEMPTING INSPECTION OF THE IMPELLER.**

COLD WEATHER OPERATION

If the pump is to be used during cold weather, preheat the hydraulic fluid at low power source speed. When using the normally recommended fluids, fluid should be at or above 50°F/10° C (400 ssu/82 centistokes) before use. Damage to the hydraulic system or pump motor seals can result from use with fluid that is too viscous or thick.

EQUIPMENT PROTECTION & CARE

- Make sure all couplers are wiped clean before connection.
- The hydraulic circuit control valve must be in the "OFF" position when coupling or uncoupling the pump. Failure to do so may result in damage to the quick couplers and cause overheating of the hydraulic system.
- Make sure the circuit PRESSURE hose (with male quick disconnect) is connected to the "IN" (female quick disconnect) port on the submersible pump. The circuit RETURN hose (with female quick disconnect) is connected to the opposite port. Do not reverse circuit flow. This can cause damage to internal seals.
- Always replace hoses, couplings and other parts with replacement parts recommended by Hydra-Tech Pumps. Supply hoses must have a minimum working pressure rating of 3000 psi/206 bar.
- Do not exceed the maximum rated flow or pressure for the submersible pump (refer to Specifications in this manual for correct flow rate and pressure). If specifications are exceeded, rapid failure of the internal seals will result.
- Always keep critical labels and markings, such as warning stickers and tags legible.
- Pump repair should be performed by experienced personnel only.
- Make certain that the recommended relief valves are installed in the pressure side of the system.

Operating Instructions

S3TC Pump

1. Connect this pump to an open center hydraulic power source rated at a maximum flow of 8 G.P.M. (30 LPM) at 2500 P.S.I. (170 Bar). If you are connecting to a larger power source or are using a bi-directional control valve, a flow control and/or check valve may be required. **Over-speeding or reversing flow to this pump will cause damage to the unit and will void warranty.**
2. Always be sure to use only clean, filtered hydraulic oil to drive the hydraulic motor. Your hydraulic system should have a filter and it should be rated at 10 micron.
3. When connecting hydraulic hoses to the pump, be sure to keep hose connections clean.
4. Use hydraulic oils with anti-wear additives such as these recommended oils or their equivalent:

Pennzoil	AW46 Hydraulic Oil
Texaco	Rando HDAZ
Shell	Tellus Hydraulic Oils
Mobil	D.T.E. 20 Series
Chevron	EP Hydraulic Oils
Exxon	Univis N Hydraulic Oils

Note: When using this equipment in environmentally sensitive areas we recommend using biodegradable oil such as Chevron Clarity, Terresolve EnviroLogic 146, or Exxon Univis Bio 40.

Note: When using this equipment in high temperature environments we recommend using Dexron Automatic Transmission fluid.

MAINTENANCE INSTRUCTIONS

S3TC Pump

GENERAL:

The only routine maintenance required under normal use is to check oil in seal cavity in top cover (#10). On this pump the motor capsule must be removed to allow access to the seal oil plug (#11). This oil is to be 20W hydraulic oil (approx. 1 oz. of Pennzoil AW46 or equivalent or **Dexron Automatic Transmission fluid**). Change oil every 200 hours of operation. If no oil is present or oil is emulsified, shaft seal may need replacement.

Further maintenance may be required if:

- (a) Pump discharge volume is inadequate.
- (b) Oil leakage from pump is present.

If maintenance is necessary, follow this procedure:

1. Remove six 3/8" bolts (#11) from and top cover.
2. Remove top cover and motor assembly from volute (#3).
3. Check condition of "O" ring (#9) and replace if necessary.
4. Check for debris in the volute.
5. Check wear ring (#4) and wear plate (#22). Replace if wear is excessive.
6. Hold impeller (#7) securely and remove socket head retaining screw (#5) and cone washer (#6) from impeller end.
7. Using a 5/16" hex key wrench, or hex key socket with impact wrench, unscrew impeller (#7) CCW (right hand threads).
8. Check impeller for wear and replace if necessary.
9. Remove 2 bolts (#21) from handle (#20) and remove.
10. Remove mechanical seal assy. (#8)
11. Remove 2 motor mounting bolts (#15) from top cover and carefully remove the hydraulic motor (#14).
12. Inspect "O" ring (#13) and replace if necessary.

13. Check top cover (#10) for wear and replace if wear is extreme.
14. Do not disassemble the hydraulic motor (#14). If the hydraulic motor needs service, it should be performed by a qualified Hydra-Tech service representative or replaced.
15. To re-assemble pump, reverse order of disassembly.
16. Fasten motor to top cover making sure the "O" ring (#13) is in place.
17. Install new shaft seal (#8) keeping the parts extremely clean and using clean rubber lubricant to aid in installation.
18. Screw impeller onto shaft and lightly tap on vane to tighten.
19. Install cone washer and socket head screw and tighten while holding impeller firmly.
20. Install drive assembly into volute making sure "O" ring (#9) is in place. Install six 3/8" bolts (#11) for top cover to volute.
21. Fill oil chamber in top cover (approx. 1 oz./30mL) and install oil plug (#12).
22. Connect hydraulic hoses to power unit and test spin pump before using to check for leaks.

Hydraulic Motor Shaft

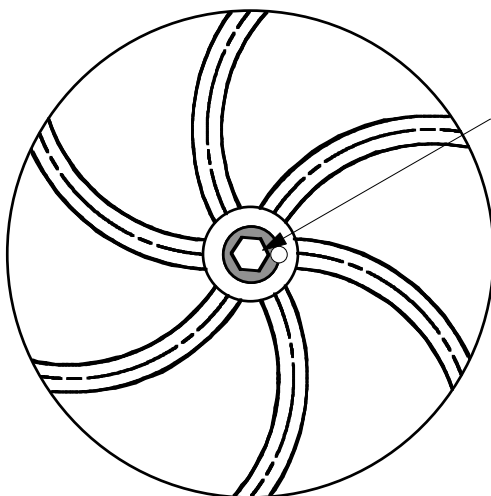
Retaining Washer

Motor Shaft threads into
impeller and stops at insert

Locking Screw

5/16" Hex Tool

Air Impact Wrench



Insert is locked and pinned to impeller and becomes part of impeller.

Use 5/16" Hex tool and impact wrench to remove impeller from motor shaft (unscrew counter-clockwise).

Impeller Removal- S3T,S3TR,S3TC Pumps

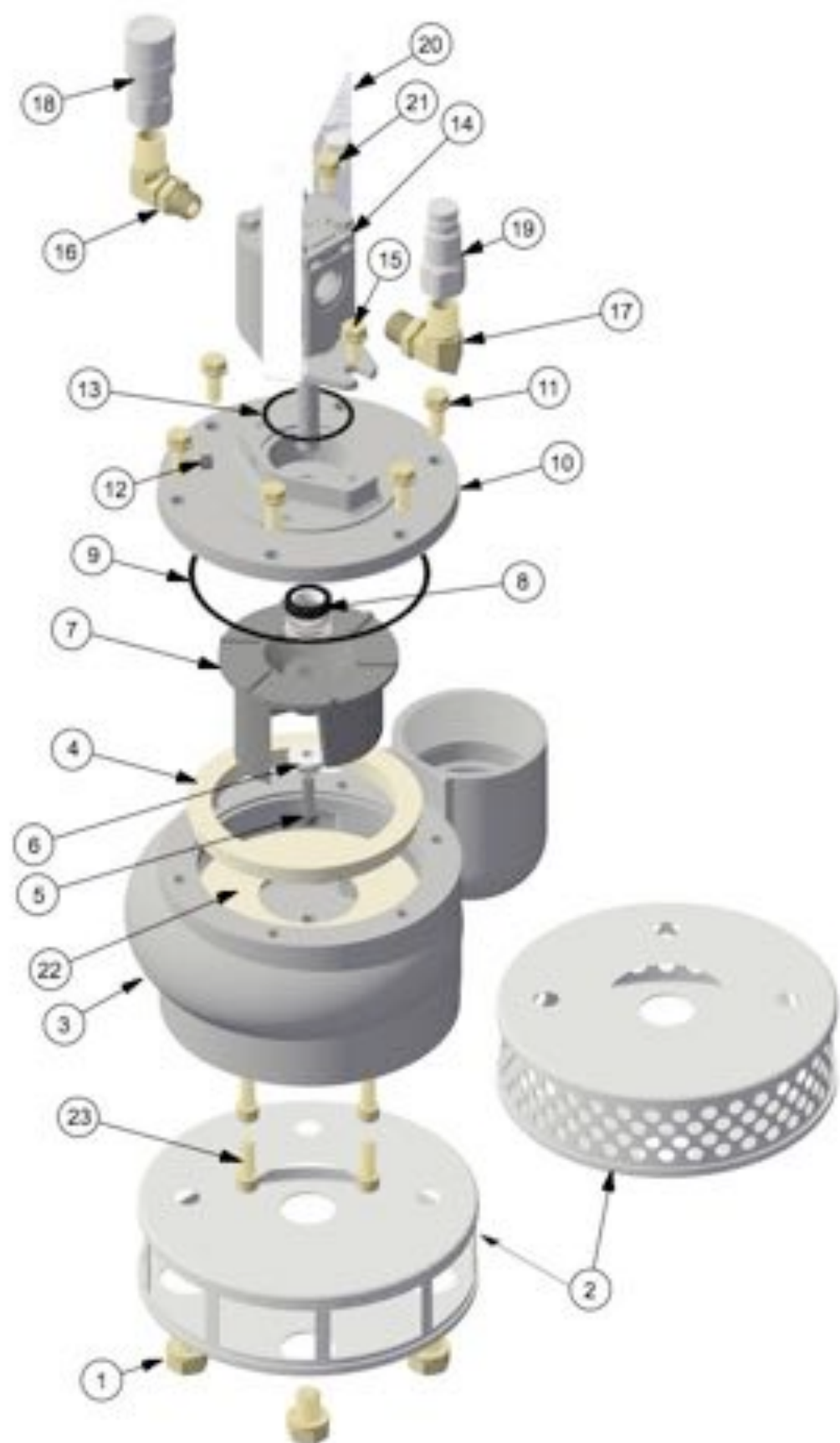


7/30/05

K.R. 

Scale: 1" = NTS

Drawing#507301



PARTS LIST

S3TC Pump

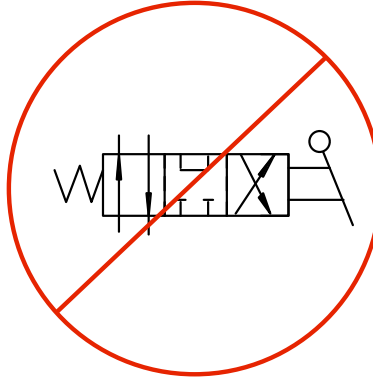
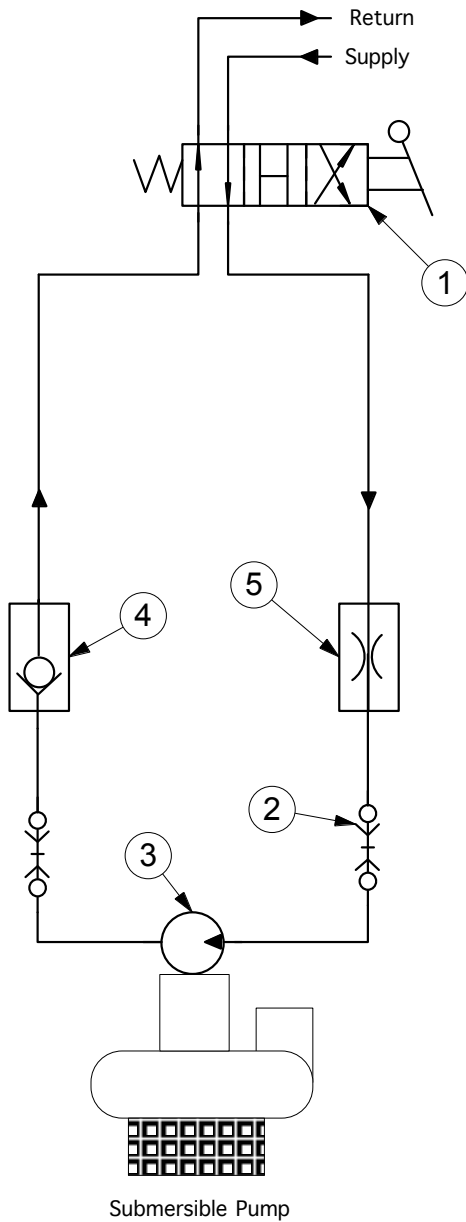
Always mention serial # of unit when ordering parts

Item	Part #	Description
1.	9300 9301	Hex Head Bolt (4 req.) Lock-washer (4 req.)
2.	9302 9295	Strainer/Trash Strainer/Water with Plugs
3.	9205 9206	Volute (Aluminum) Volute (Ductile Iron)
4.	9305	Wear Ring
5.	9307	Impeller Retaining Screw, Socket Head
6.	9308	Cone Washer
7.	9285	Impeller
8.	9311 9527	Shaft Seal Assembly (Mechanical Seal) Viton (Optional)
9.	9312 9312V	"O" Ring, Top Cover Viton (Optional)
10.	9313 9490	Top Cover (Aluminum) Top Cover (Ductile Iron)
11.	9314 9315	Hex Head Bolt (6 req.) Lock-washer (6 req.)
12.	9317	Oil Plug
13.	9316 9316V	"O" Ring, Motor Viton (Optional)
14.	9324 9324A 9324P	Hydraulic Motor (Dan) Hydraulic Motor (Cas) Hydraulic Motor (Par)
15.	9318 9315	Hex Head Bolt (2 req.) Lock-washer (2 req.)
16.	9323M	Male Elbow (Pressure Side)
17.	9325M	Male Elbow (Return Side)
18.	9321	Hydraulic Coupling, Female H.T.M.A.
19.	9320	Hydraulic Coupling, Male H.T.M.A.
20.	9319	Handle
21.	9318 9315	Hex Head Bolt (2 req.) Lock-washer
22.	9201	Wear Plate
23.	9202	Socket Head Cap Screw (4 req.)

Accessories (Not Illustrated)

Part #	Description
9204	Flow Control (6 GPM) 1/2" NPT
9226	Flow Control (8 GPM) 1/2" NPT
9208	Check Valve, 1/2" NPT (prevents reverse flow)

TYPICAL HYDRAULIC SCHEMATIC FOR CUSTOMER SUPPLIED HYDRAULIC POWER SOURCE



Do Not Use Closed Center Valves!

Return flow from the hydraulic motor must be allowed to return to the oil reservoir to enable the pump impeller to gradually slow to a stop. Blocking this flow will cause damage to the hydraulic motor and pump seal!!

- 1) 4 Way Open Center Directional Valve
(Must be operated in forward direction only or use check valve (4) to prevent reversing)
- 2) Valved Quick Disconnect Coupling
- 3) Hydraulic Motor Driving Submersible Pump
- 4) Check Valve (Recommended)
- 5) Flow Control (Recommended if Hydraulic Flow is Greater than Flow Required By Sub. Pump)





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Hydra-Tech Pumps Limited Warranty Submersible Pumps Only

Hydra-Tech Pumps warrants to the original purchaser only that this product is free from defects in material and workmanship, and agrees to repair or replace, at Hydra-Tech's option, any submersible pump part found to be defective within **24 months from the date of purchase**.
This warranty is not transferable.

THIS WARRANTY DOES NOT COVER DAMAGES RESULTING FROM CARELESS HANDLING, IMPROPER INSTALLATION, LACK OF SERVICE, INCORRECT POWER OR FAULTY APPLICATION SUCH AS PUMPING ABRASIVES, CORROSIVES, OR FLUIDS IN EXCESS OF 160 DEGREES F. WARRANTY COVERAGE IS NORMALLY NOT AVAILABLE FOR WEAR ITEMS SUCH AS: Wear Rings; Wear Plates; Impellers, and Mechanical Seals.

Any modification or alteration of this equipment will void the warranty. Any claim for warranty damage must be accompanied by digital photos of the defective part or parts, the serial number from the equipment, and a detailed description of the defect and possible causes. All warranty claims should be emailed to htpump@hydra-tech.com or mailed to Hydra-Tech Pumps, 167 Stock Street, Nesquehoning, Pennsylvania 18240 USA.

Submersible Pumps judged by Hydra-Tech Pumps to have been defective in workmanship or materials when shipped from the factory and within the warranty period will be either repaired or replaced at Hydra-Tech's option free of charge including motor freight both ways, within the continental United States.

HYDRA-TECH MAKES NO WARRANTY EXPRESSED OR IMPLIED INCLUDING WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE EXCEPT AS STATED ABOVE. HYDRA-TECH SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING CONSEQUENTIAL DAMAGES ARISING OUT OF ANY BREACH OF WARRANTY AND WHETHER OR NOT ARISING OUT OF OR BASED ON HYDRA-TECH'S NEGLIGENCE, WHETHER ACTUAL OR IMPLIED, AND FOR DAMAGES TO ANY PROPERTY OR PERSON ARISING OUT OF THE PURCHASE OR THE USE, OPERATION OR MAINTENANCE OF THE EQUIPMENT. HYDRA-TECH SHALL NOT BE RESPONSIBLE FOR REPAIRS OR ALTERATIONS MADE BY OTHERS.

No person is authorized to make any representations or warranties on behalf of Hydra-Tech and no other person is authorized to alter or extend any of the conditions contained in this warranty.

December 2016

