



# **S2TCAL-2 & S3T HYDRAPUMP INSTRUCTIONS**

**REIMANN & GEORGER CORPORATION**  
**CONSTRUCTION PRODUCTS**  
P/N 612----

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## 1.1 SAFETY

### 1.1 INTRODUCTION

Your Reimann & Georger Corporation HydraPump has been engineered to provide pumping performance, long term economics and safety advantages that no other type can match. However, even a well-designed and well-built pump can malfunction or become hazardous in the hands of an inexperienced and/or untrained user. Therefore, read this manual and related equipment manuals thoroughly before operating your pump to provide maximum safety for all operating personnel, and to get the maximum benefit from your equipment.

### 1.2 SAFETY DEFINITIONS

A safety message alerts you to potential hazards that could injure you or others or cause property damage. The safety messages or signal words for product safety signs are **DANGER**, **WARNING**, and **CAUTION**. Each safety message is preceded by a safety alert symbol and is defined as follows:

**DANGER:** Indicates an imminently hazardous situation which, if not avoided, **will** cause death or serious injury. This safety message is limited to the most extreme situations.

**WARNING:** Indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury. It may also be used to alert against unsafe practices that may result in property-damage-only accidents.

### 1.3 POWER SOURCE AND PUMP SAFETY LABELS

These labels warn you of potential hazards, which could cause injury. Read them carefully. If a label comes off or becomes illegible, contact Reimann & Georger Corporation for a free replacement.

### 1.4 PUMP SAFETY RULES

1. Only trained personnel shall operate the pump or do repairs. A trained person is one who has read and thoroughly understands this instruction manual and related equipment manuals and, through training and experience, has shown knowledge regarding the safe operational procedures.
2. Always use appropriate safety equipment such as safety shoes, hard hat, eye and ear protection, and work gloves.
3. Safety shoes **must** provide good footing to prevent slipping or falling down.
4. Safety goggles must be worn by operator and all bystanders to prevent injury to eyes.
5. Hearing protection must be worn to prevent permanent hearing damage.
6. Do not lift or lower the pump unit with your back, improper lifting technique can lead to serious back injury.
7. Do not lift, suspend, or lower pump unit by the hydraulic hoses.
8. Do not use a pump, discharge hose, and/or fitting that shows any signs of damage.
9. Only use the pump in accordance with the manufacturer specifications.
10. Do not use near energized conductors without adequately insulating operator and surroundings.
11. Working area is to be kept clear of unauthorized personnel at all times. Place barricades or secure the area in such a manner that no personnel would be injured by flying debris, discharge fluid, or by the discharge hose if it became obstructed.

12. Securely restrain the discharge hose before operating.
13. Do not kink or obstruct a discharge hose while in operation.
14. Keep all body parts away from pump discharge.
15. Keep all body parts away from a high-pressure hydraulic leak.
16. Always connect the return (tank) hose connections before supply (pressure) connections.
17. Allow the system and hydraulic fluid to cool before connecting or disconnecting hydraulic hoses.
18. Always stop the hydraulic power source and depressurize the hydraulic system before connecting or disconnecting hydraulic hoses.
19. Never adjust or service the pump during operation or while connected to a hydraulic power source.
20. Never operate the pump under the influence of drugs, alcohol, or medication.
21. Always shut off the hydraulic power source when not using the equipment.

## 2 SPECIFICATIONS

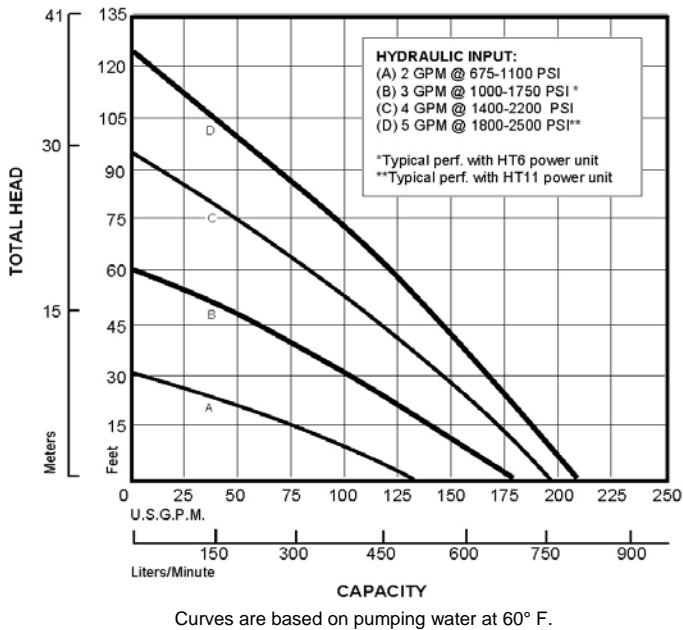
### 2.1 INTRODUCTION

The Reimann & Georger Corporation HydraPumps are hydraulic submersible pumps designed to reliably pump large volumes of liquids and solids (per specifications). These pumps are durable and offer a very high performance-to-weight ratio. They are self-lubricated utilizing the hydraulic fluid in a closed loop to ensure consistent, reliable lubrication. They do not require water for cooling, therefore can be run dry. As with most hydraulic tools, the hydraulic system requirements detailed in the following section must be met but not exceeded to support tool performance and longevity of equipment.

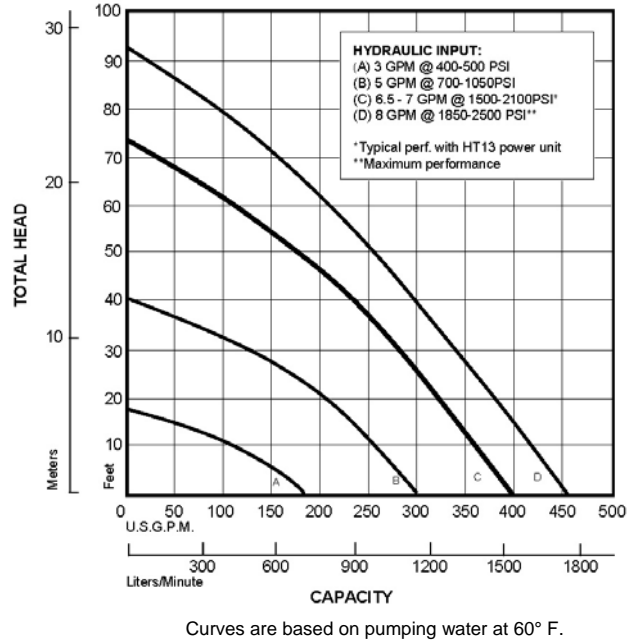
### 2.2 TECHNICAL DATA

	ENGLISH	METRIC
Maximum lift		
S2TCAL-2	125 ft	(37 m)
S3T	75 ft	(23 m)
S4T	110 ft	(34 m)
Maximum discharge flow		
S2TCAL-2	210 gpm	(790 lpm)
S3T	390 gpm	(1470 lpm)
S4T	850 gpm	(3200 lpm)
Discharge diameter		
S2TCAL-2	2 in	(51 mm)
S3T	3 in	(76 mm)
S4T	4 in	(102 mm)
Pump diameter at widest point		
S2TCAL-2	9-3/8 in	(24 cm)
S3T	11-3/4 in	(30 cm)
S4T	19-1/2 in	(50 cm)
Weight		
S2TCAL-2	17 lbs	(8 kg.)
S3T	25 lbs	(11 kg.)
S4T (with hose whips)	140 lbs	(63 kg)
Oil flow range		
S2TCAL-2	2 – 5 gpm	(8 – 19 lpm)
S3T	3 – 8 gpm	(12 – 30 lpm)
S4T	10 – 15 gpm	(38 – 57 lpm)
Working pressure		
S2TCAL-2	675 – 2000 psi	(47 – 138 bar)
S3T	500 – 2500 psi	(34 – 172 bar)
S4T	700 – 2500 psi	(48 – 172 bar)
System pressure relief	2500 psi	(172 bar)
Maximum back pressure in return line	200 psi	(14 bar)
QD Couplings		1/2" HTMA flush face

## S2TC-2 Typical Performance



## S3TC Typical Performance



**Figure 2-1.**  
**Capacity Discharge Curves**

### 2.3 RECOMMENDED HYDRAULIC OIL

Viscosity 160 – 230 SUS at 100°F (32-46 cSt at 40°C)  
 Viscosity index Minimum 100

Many types of compatible hydraulic oil are available through your local dealer/distributor. As an original equipment manufacturer, RGC supplies a Grade ISO VG 32 hydraulic turbine oil.

Hydraulic oil types are too numerous to list in this manual. If you have any question concerning the type of oil suitable for pump operation, please consult your local supplier or Reimann & Georger Corporation for details.

### 2.4 NAMEPLATE AND SERIAL NUMBER TAG

It is important to identify your pump completely and accurately whenever ordering spare parts or requesting assistance in service. The pump has a product nameplate which states the model and serial number. The pump label should appear as the sample nameplate shown in Figure 2-2. Record the model and serial numbers for future reference.



**Figure 2-2.**  
**Typical Pump Product Nameplate**

**MODEL** \_\_\_\_\_

**SERIAL NUMBER** \_\_\_\_\_

### 3 OPERATION

Before making any connection to the pump unit check for live electrical wiring near the work site, or submerged in the fluid to be pumped

#### 3.1 CONNECTION TO HYDRAULIC POWER SOURCE

1. Read and fully understand the operating manual for the hydraulic power source being used.
2. Always check the hydraulic power source flow and pressure output. Never exceed the pump unit's maximum hydraulic flow rate or pressure. Power source must be open center, single direction, and have an unrestricted return flow from the hydraulic motor to the oil reservoir.
3. If the oil flow from the hydraulic power source cannot be adjusted below the maximum flow rate, a flow divider must be installed. This will insure the pump unit receives the correct flow and the excess flow is returned to tank.
4. To protect the pump from excessively high pressure, the pressure relief valve of the power supply must be set at 2500 psi (172 bar) or less. If this is not possible, install a separate pressure relief valve set at 2500 psi (172 bar). If in doubt, contact your dealer.
5. The hydraulic power source must be fitted with a return line oil filter with a filter rating of 10 microns
6. Before making any hydraulic connections, inspect all hydraulic hoses for leaks and risks of rupture as follows:
  - a. Inspect each hose for breaks, cracks, worn spots, bulges, chemical attack, kinks or any other damage. Never stop any detected leak with your hand or fingers. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic oil.
  - b. Replace a damaged hose immediately. Never repair the hose.
7. The back-pressure (return line pressure) at the pump should be as low as possible and must not exceed 200 psi (14 bar) measured at the pump. Back-pressure at the pump is created mainly by the length and diameter of the return line hose.
8. Use a high-pressure hose (inside diameter 1/2") which has a minimum working pressure of 3000 psi. The female hose connection is the oil inlet (pressure) labeled "IN" on the pump, and the male hose connection is the oil outlet (tank) labeled "OUT" on the pump.
9. The pump unit uses flush-face quick-release couplings that are durable and very easy to clean. To prevent contamination, wipe the mating surfaces of the couplings with a clean rag before connecting. They are always fitted such that the male part gives oil and the female part receives oil.

#### 3.2 BEFORE OPERATING THE PUMP

1. Connect the discharge hose to the pump unit using a standard NPT male threaded hose or adapter coupling. Ensure the hose is securely connected before operating. Do not use hoses and/or fittings that are damaged, worn, cut, leaking, kinked, and/or corroded.
2. Connect an appropriate suspension cable to the eyehook or handle of the pump. Do not use the hydraulic hoses for lifting, suspending or lowering pump unit.
3. Place pump into position being careful not to damage hydraulic hoses or discharge hose. Do not lift or lower the pump unit using your back, improper lifting/lowering can cause serious back injury.
4. Securely restrain the discharge hose; the force of the pump discharge can cause rapid and powerful reactionary forces from the discharge hose.

5. Ensure that the discharge hose is not kinked and free of all obstructions.
6. Clear the working area including the discharge hose area of all bystanders. Place barricades or secure the area in such a manner that no personnel would be injured by flying debris or the discharge.
7. Ensure all personnel are using the appropriate safety equipment such as safety shoes, hard hats, ear and eye protection and work gloves.

### 3.3 OPERATING THE PUMP

1. To start the pump, turn on the hydraulic flow making sure not to exceed the pump's rated flow or pressure.
2. Do not kink or obstruct a discharge hose while in operation.
3. Keep all body parts away from the pump discharge



#### **WARNING:**

**FORCE OF THE PUMP DISCHARGE CREATES STRONG REACTIONARY FORCES FROM DISCHARGE HOSE. WORK AREA IS TO BE KEPT CLEAR OF UNAUTHORIZED PERSONNEL AT ALL TIMES. PLACE BARRICADES OR SECURE THE AREA IN SUCH A MANNER THAT NO PERSONNEL WOULD BE INJURED BY FLYING DEBRIS, DISCHARGE FLUID OR BY THE DISCHARGE HOSE IF IT BECAME OBSTRUCTED.**

4. Never adjust or service the pump during operation or while connected to a hydraulic power source.

### 3.4 PREPARING PUMP FOR SHUTDOWN

1. Stop the pump by turning the hydraulic flow off.
2. Stop the hydraulic power source following the procedure in the respective instruction manual.
3. Retrieve the pump unit. Do not use the hydraulic hoses for lifting, suspending or lowering pump unit. Do not lift or lower the pump unit using your back, improper lifting/lowering can cause serious back injury.
4. Allow the system and hydraulic fluid to cool before disconnecting hydraulic hoses.
5. Always stop the hydraulic power source and depressurize the hydraulic system before disconnecting hydraulic hoses.



#### **WARNING:**

**NEVER DISCONNECT OR REMOVE HYDRAULIC COMPONENTS, HOSES, LINES, OR FITTINGS WHILE THE POWER SOURCE IS RUNNING, PRESSURIZED, OR WHENEVER THE HYDRAULIC FLUID IS HOT.**

**LIQUID UNDER HIGH PRESSURE CAN PIERCE THE SKIN, CAUSING SERIOUS INJURY OR DEATH. HOT LIQUID CAN CAUSE SERIOUS PERSONAL BURNS. IF AN INJURY OCCURS, GET IMMEDIATE MEDICAL ATTENTION.**

6. Disconnect discharge hose and store it to prevent damage.

Secure the pump and hydraulic power source to prevent unauthorized use.

## 4 INSPECTION AND MAINTENANCE

### 4.1 GENERAL MAINTENANCE RULES

Hydraulic fluid can become contaminated after extended periods of use which can cause restrictions in the system. Check to see that the fluid is clean, and change at recommended intervals to extend pump's life. Refer to the respective manual for maintenance information on the hydraulic power source.

1. Proper maintenance of the pump and related equipment requires timely adhering to all the guidelines given in this chapter. Proper maintenance is required to maintain the system in good condition and free of defects.
2. Review and follow all the safety rules given in Chapter 1 before attempting any maintenance.
3. Only authorized personnel should be allowed in the maintenance area. Authorized personnel are the trained people as defined below and their supervision.
4. Repairs must be made only by trained personnel. A trained person is one who has read and thoroughly understands this instruction manual and related equipment manuals and, through training and experience, has shown knowledge regarding the safe operational procedures.



#### **WARNING:**

**NEVER SERVICE OR ADJUST THE PUMP DURING OPERATION OR WHILE CONNECTED TO A HYDRAULIC POWER SOURCE.**



#### **WARNING:**

**BEFORE DISCONNECTING HYDRAULIC HOSES, STOP THE HYDRAULIC POWER SOURCE, DEPRESSURIZE THE HYDRAULIC SYSTEM, AND ALLOW THE SYSTEM AND FLUID TO COOL DOWN.**

### 4.2 DAILY MAINTENANCE

1. Keep all surfaces free of grease, dirt, and foreign material.
2. Inspect hydraulic hoses for leaks, breaks, cracks, worn spots, bulges, chemical attack, kinks or any other damage. Replace a damaged hose immediately. Never repair the hose.
3. Disconnect hydraulic hoses and wipe couplings clean, especially before a connection is made. This is the single most common point of entry for foreign particles which can cause premature wear of hydraulic components in the system.
4. Check that all hardware on the pump is tight.
5. Before each use, insure that all broken, worn or defective parts are repaired or replaced.
6. Insure all moving parts, contact area, and pivot points have a coating of lithium based grease.
7. (S4T pump only) Check oil level in bearing housing every 250 hours and when beginning a new job. The level should be at the spill point of the fill plug. Do NOT over-fill!
8. (S4T pump only) Change oil in bearing housing every 1000 hours. Use clean hydraulic oil or non-detergent 10W or 20W motor oil.
9. (S4T pump only) Presence of water or emulsified oil in the housing indicates immediate need for seal replacement and inspection of bearings.

### 4.3 LONG-TERM STORAGE

During long-term storage, all moving parts, contact area, and pivot points have a coating of lithium based grease to protect against corrosion. Connect the quick-release couplings together. Insure that the hydraulic oil is clean, free of all contamination.

## 5 TROUBLESHOOTING

The following chart is intended to assist with troubleshooting. While not all inclusive, the chart outlines the most common causes of a problem and the recommended course of action.

The troubleshooting guide for the associated power supply is in the instruction manual specifically for this unit.

SYMPTOM	CAUSE AND CORRECTIVE ACTION
Motor does not turn.	<p>Jammed impeller- Disconnect from hydraulic power source. Remove top motor plate and clear bowl/impeller of debris.</p> <p>Improper hydraulic flow- Check hydraulic pressure and flow and compare to pump specifications. Refer to hydraulic power source manual for troubleshooting hydraulic power source.</p> <p>Hydraulic hoses improperly connected- Insure couplings are properly connected and locked.</p>
Motor turns but does not pump.	<p>Discharge hose kinked or clogged- Inspect hose per Section 3. Replace if necessary.</p> <p>Hydraulic hoses reversed- Connect hydraulic hoses per Section 3.</p>
Hydraulic fluid in discharge.	<p>Worn shaft seal- Return to authorized RGC repair center.</p> <p>Leaking fitting or coupling- Tighten loose fittings.</p> <p>Worn/damaged fitting or coupling- Replace defective component.</p>

## 6 PARTS LISTS

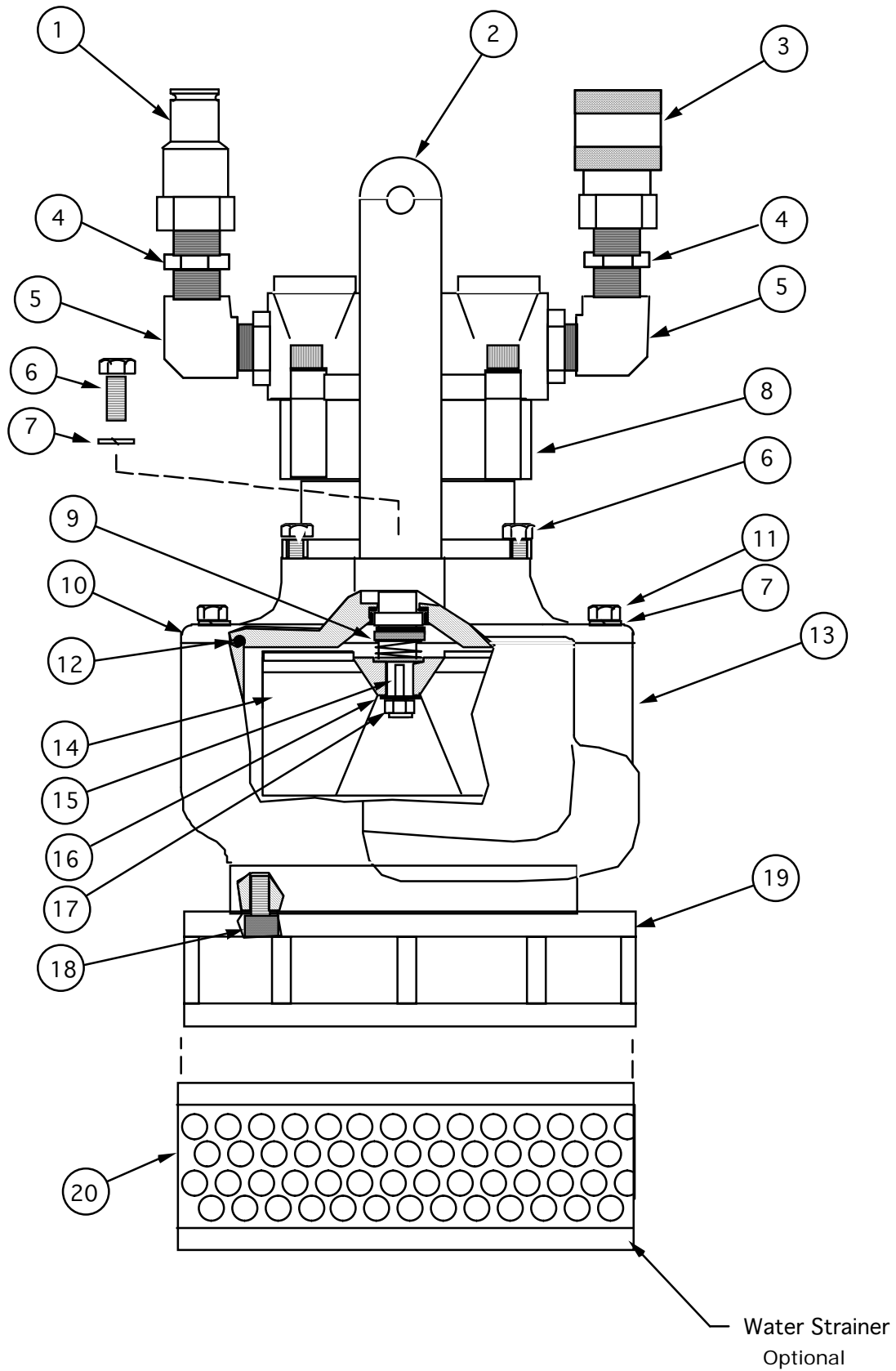
The following parts lists apply to the HydraPumps only. The parts list for the hydraulic power source is in the separate manual supplied for this item. Each item number on the following parts lists can be matched with the item number shown on the corresponding assembly drawing as indicated.

### 6.1 S2TCAL-2 HYDRAPUMP

Refer to Figure 6-1.

Item Number	Part Number	Quantity	Description
1	210801227	1	MALE QUICK DISCONNECT COUPLER
2	213802002	1	HANDLE
3	210809321	1	FEMALE QUICK DISCONNECT COUPLER
4	210200298	2	HEX NIPPLE
5	210209323	2	ELBOW
6	210002009	6	HEX BOLT SS
7	210002011	6	LOCKWASHER SS
8	213802000	1	HYDRAULIC MOTOR
9	213809311	1	MECHANICAL SEAL ASSEMBLY
10	213802004	1	TOP COVER
11	210002010	4	HEX BOLT SS
12	213802001	1	'O' RING, TOP COVER
13	213800133	1	VOLUTE
14	213802012	1	CHANNEL IMPELLER
15	213802008	1	SHAFT KEY
16	213802006	1	RETAINING WASHER SS
17	213802007	1	IMPELLER LOCKING NUT SS
18	210000109	4	SOCKET HEAD BOLT
19	213800129	1	STRAINER
20	213800116	1	STRAINER
*	213802013	1	MOTOR SEAL AND BEARING KIT
*	213802014	1	MOTOR SEAL KIT

\*Accessories (not illustrated)



**Figure 6-1.**  
**S2TCAL-2 HydraPump Assembly**

## 6.2 S3T HYDRAPUMP

Refer to Figure 6-2.

Item Number	Part Number	Quantity	Description
	2130208	1	CHECK VALVE 1/2" NPT
1	2130300	4	HEX HEAD CAP SCREW
	2130301	4	LOCK WASHER
2	2130302	1	TRASH STRAINER
2	2130327	1	WATER STRAINER W/PLUGS (OPTIONAL)
3	2130303	1	VOLUTE – ALUMINUM
4	2130305	1	WEAR RING
5	2130307	1	IMPELLER RETAINING SCREW
6	2130308	1	CONE WASHER
7	2130309	1	IMPELLER
9	7409311	1	SHAFT SEAL ASSEMBLY
10	2130312	1	O-RING – TOP COVER
11	2130313	1	TOP COVER
12	2130314	6	HEX HEAD CAP SCREW
	2130315	6	LOCK WASHER
13	7421316	1	O-RING – MOTOR
14	2130317	1	PIPE PLUG
15	2130318	2	HEX HEAD CAP SCREW
	2130315	2	LOCK WASHER
16	2130319	1	HANDLE
17	2130320	1	MALE QD COUPLING
18	2130321	1	FEMALE QD COUPLING
19	2130322	1	NIPPLE – PRESSURE SIDE
20	2130323	1	ELBOW – PRESSURE SIDE
21	2130318	2	HEX HEAD CAP SCREW
	2130315	2	LOCK WASHER
22	6521324	1	HYDRAULIC MOTOR
23	2130325	1	ELBOW – RETURN SIDE
24	2130326	1	NIPPLE – RETURN SIDE
*	2130402	1	FLOW CONTROL 6GPM 1/2" NPT

\*Accessories (not illustrated)

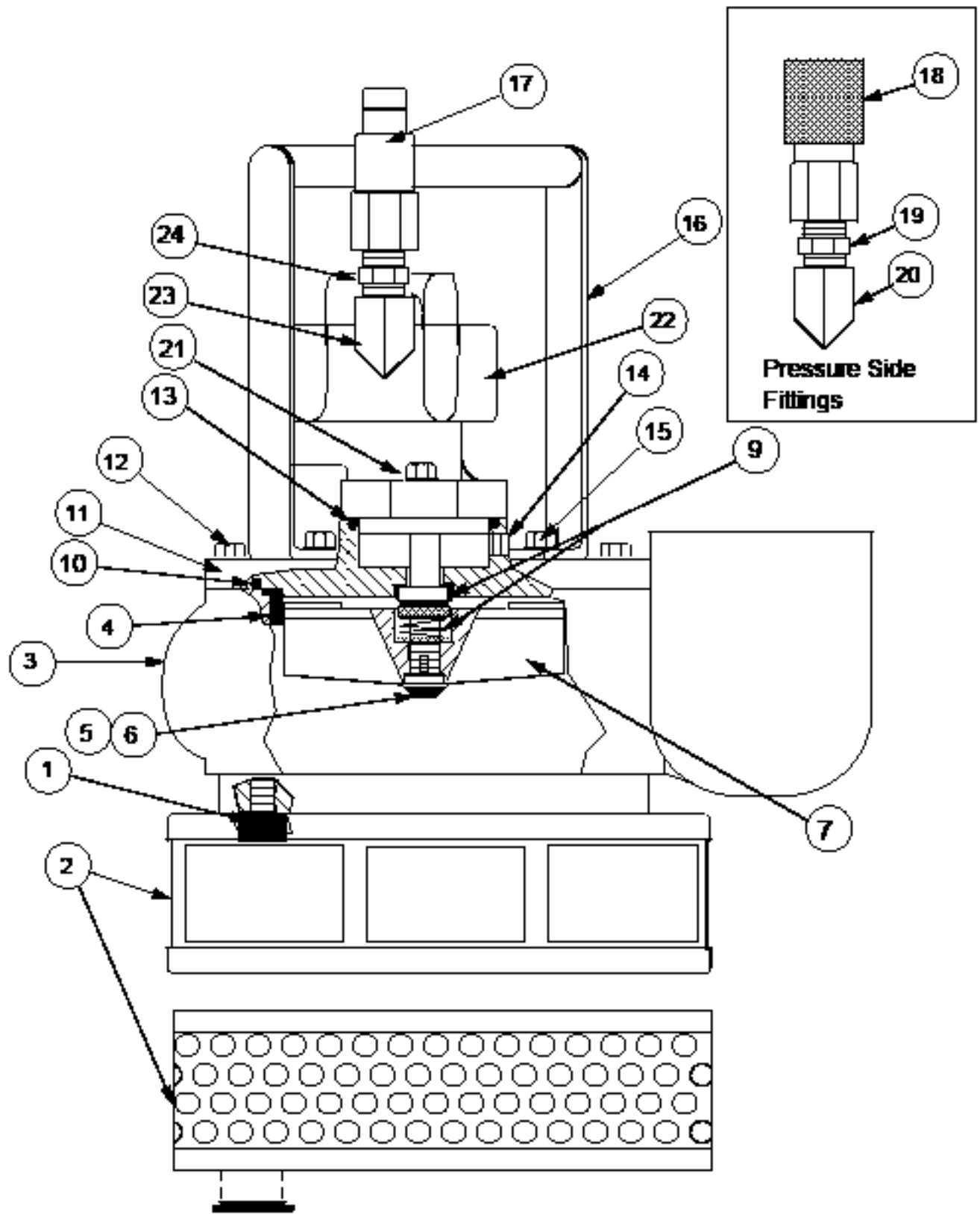


Figure 6-2.  
S3T HydraPump Assembly

### 6.3 S4T HYDRAPUMP

Refer to Figure 6-3.

Item Number	Part Number	Quantity	Description
1	2140174	1	FEMALE QD COUPLING
2	2140175	1	MALE QD COUPLING
3	2140276	2	12" HOSE WHIP
4	2140279	1	LIFTING BRACKET
5	2140152	1	HYDRAULIC MOTOR
6	2140549	4	HEX NUT
6	2140163	4	LOCK WASHER
6	2140550	4	STUD
7	2140254	1	O-RING
8	2140156	1	UPPER BEARING
9	2140190	1	SPLINED SHAFT
10	2140155	1	BEARING HOUSING
11	2140171	1	PIPE PLUG
12	2140191	1	LOWER BEARING
13	2140159	1	INTERNAL SNAP RING
14	2140161	1	O-RING
15	2140192	1	SEAL PLATE
16	2140181	1	O-RING
17	2140194	1	IMPELLER
18	2140168	1	VOLUTE
19	2140178	1	STRAINER
20	2140180	3	HEX HEAD CAP SCREW W/ WASHER
21	2140183	1	IMPELLER RETAINING WASHER
22	2140172	1	IMPELLER LOCKING SCREW
23	2140193	1	SHAFT SEAL ASSEMBLY
24	2140167	1	GASKET
25	2140166	1	DISCHARGE FLANGE
26	2140165	2	HEX HEAD CAP SCREW W/ WASHER
27	2140535	3	HEX HEAD CAP SCREW W/ WASHER
28	2140535	3	HEX HEAD CAP SCREW W/ WASHER
29	2140164	2	HANDLE
30	2140539	4	HEX HEAD CAP SCREW W/ WASHER
*	2140195	1	O-RING KIT

\*Accessories (not illustrated)

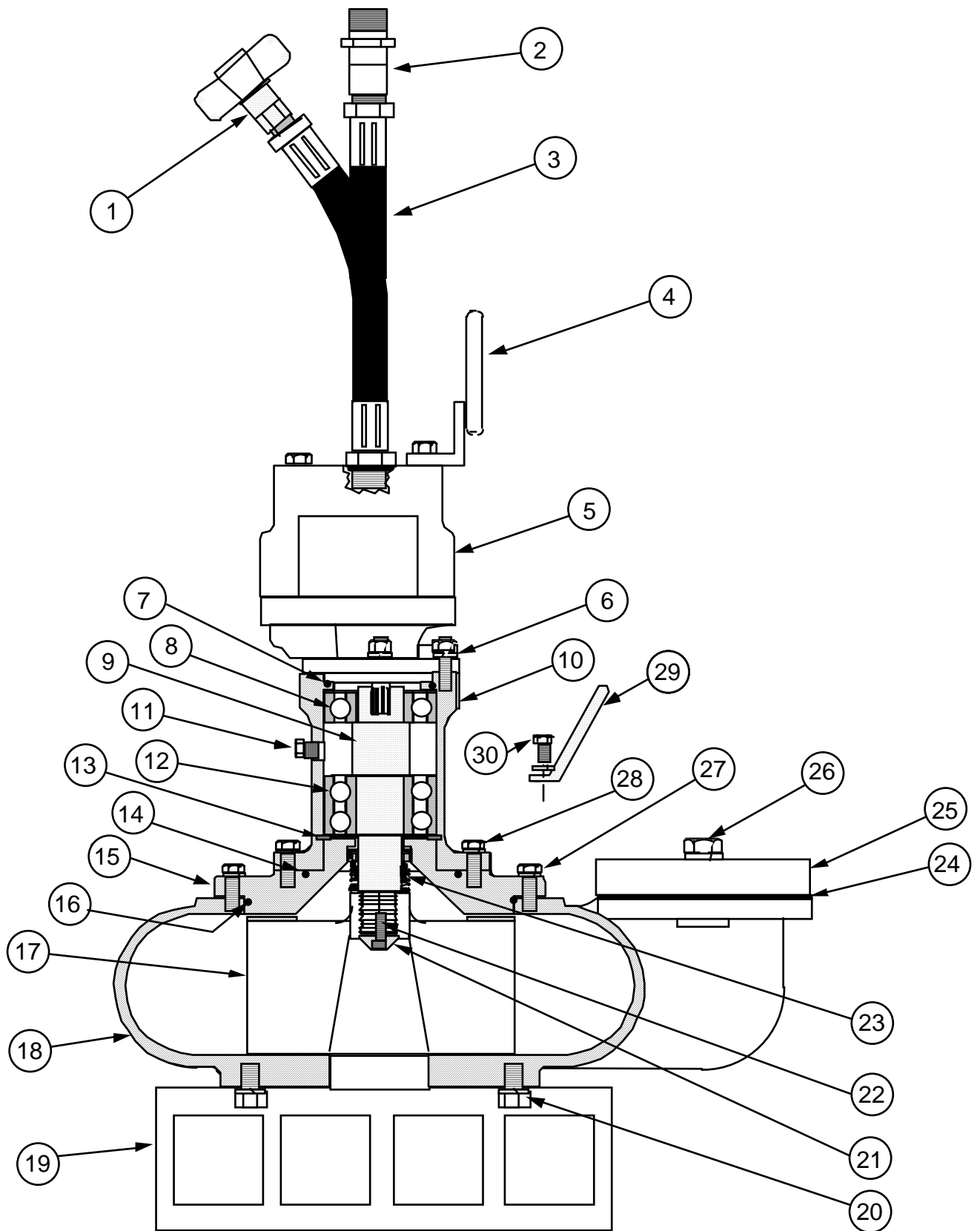


Figure 6-3.  
S4T HydraPump Assembly

## **LIMITED PRODUCT WARRANTY**

**Reimann & Georger Corporation  
Hoisting and Construction Products**

### **A. LIMITED WARRANTY**

Reimann & Georger Corporation (the "Manufacturer") warrants to the original purchaser (the "Buyer") that all Reimann & Georger Hoisting and Construction products shall be free of defects in material and workmanship for a period of one (1) year from date of original purchase.

### **B. MANUFACTURER'S OBLIGATIONS**

The Manufacturer's sole obligation under this Limited Warranty is the repair or, at the Manufacturer's discretion, the replacement of parts found to be defective. Parts and equipment must have authorization from the Manufacturer prior to return to the Manufacturer or repair by an authorized service person. Costs of transportation and other expenses connected with replacing or repairing parts are not covered under this Limited Warranty.

### **C. PARTS MANUFACTURED BY OTHERS**

This Limited Warranty does not cover any parts manufactured by others. Such parts are subject to the warranty, if any, of their respective manufacturers, and are to be repaired only by a respective authorized service person for such parts. The Manufacturer shall have no obligation to undertake repairs of parts manufactured by others.

### **D. NO SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES**

**IN NO EVENT SHALL THE MANUFACTURER BE LIABLE TO THE BUYER OR ANY OTHER PERSON FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL LOSSES OR DAMAGES CONNECTED WITH THE USE OF THE PRODUCT UNDER THIS LIMITED WARRANTY. SUCH DAMAGES FOR WHICH THE MANUFACTURER SHALL NOT BE RESPONSIBLE INCLUDE, BUT ARE NOT LIMITED TO, LOST TIME AND CONVENIENCE, LOSS OF USE OF THE PRODUCT, THE COST OF A PRODUCT RENTAL, COSTS OF GASOLINE, TELEPHONE, TRAVEL, OR LODGING, THE LOSS OF PERSONAL OR COMMERCIAL PROPERTY, AND THE LOSS OF REVENUE.**

### **E. NO LIABILITY IN EXCESS OF PURCHASE PRICE**

**IN NO EVENT SHALL THE MANUFACTURER'S OBLIGATIONS UNDER THIS LIMITED WARRANTY EXCEED THE PURCHASE PRICE OF THE PRODUCT.**

### **F. NO EXTENSION OF STATUTE OF LIMITATIONS**

**ANY REPAIRS PERFORMED UNDER THIS WARRANTY SHALL NOT IN ANY WAY EXTEND THE STATUTES OF LIMITATIONS FOR CLAIMS UNDER THIS LIMITED WARRANTY.**

### **G. WAIVER OF OTHER WARRANTIES**

**THE EXPRESS WARRANTIES SET FORTH IN THIS LIMITED WARRANTY ARE IN LIEU OF AND EXCLUDE ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

### **H. PROCEDURE FOR WARRANTY PERFORMANCE**

If the product fails to perform to the Manufacturer's specifications, the Buyer must provide the Manufacturer with the applicable model and serial numbers, the date of purchase, and the nature of the problem.

**I. ADDITIONAL EXCLUSIONS FROM THIS LIMITED WARRANTY. THIS LIMITED WARRANTY DOES NOT COVER ANY OF THE FOLLOWING:**

1. Equipment which has been abused, damaged, used beyond rated capacity, or repaired by persons other than authorized service personnel.
2. Damage caused by acts of God which include, but are not limited to, hailstorms, windstorms, tornadoes, sandstorms, lightning, floods, and earthquakes.
3. Damage under conditions caused by fire or accident, by abuse or by negligence of the user or any other person other than the Manufacturer, by improper installation, by misuse, by incorrect operation, by "normal wear and tear", by improper adjustment or alteration, by alterations not completed by authorized service personnel, or by failure of product parts from such alterations.
4. Costs of repairing damage caused by poor or improper maintenance, costs of normally scheduled maintenance, or the cost of replacing any parts unless done as the result of an authorized repair covered by the one (1) year Limited Warranty.
5. Costs of modifying the product in any way once delivered to the Buyer, even if such modifications were added as a production change on other products made after the Buyer's product was built.

**J. NO AUTHORITY TO ALTER THIS LIMITED WARRANTY**

No agent, representative, or distributor of the Manufacturer has any authority to alter the terms of this Limited Warranty in any way.