

***General Hydraulic Solutions, Inc.***



**Owners Manual**



***Hydraulic Swimplatform Specialists***

## TABLE OF CONTENTS

Page 2	TABLE OF CONTENTS
Page 3	SAFETY INSTRUCTIONS
Page 4	GUIDELINES FOR INSTALLING PWC
Page 5	WARRANTY
Page 6	GENERAL DESCRIPTION OF SYSTEM
Page 7	OPERATIONAL PROCEDURES
Page 8	EMERGENCY PROCEDURES
Page 9 -10	SERVICE (Hyd oil, Valves, Filter, Grease)
Page 11	RADIO REMOTE PROGRAMMING
Page 12-13	TROUBLE SHOOTING CHART
Page 14	HYDRAULIC PUMP IDENTIFICATION
Page 15	PUMP ASSEMBLY SILVER VALVE BODY First Generation
Page 16-17	PUMP ASSEMBLY BLUE VALVE BODY
Page 18	PUMP ASSEMBLY BLUE VALVE BODY WITH ANTI-FLOAT
Page 19-20	PUMP ASSEMBLY GREEN VALVE BODY
Page 21-22	PUMP ASSEMBLY RED VALVE BODY
Page 23	PUMP ASSEMBLY BLACK VALVE BODY
Page 24-25	PUMP ASSEMBLY ORANGE VALVE BODY
Page 26	PUMP ASSEMBLY PURPLE VALVE BODY
Page 27-28	PUMP ASSEMBLY GREEN VALVE BODY WITH SECOND FUNCTION
Page 29	PUMP ASSEMBLY YELLOW VALVE BODY WITH SECOND FUNCTION
Page 30-31	PUMP ASSEMBLY SILVER VALVE BODY Second Generation
Page 32	CONTROLS, FIRST GENERATION HARD WIRED
Page 33	CONTROLS, NEW SOLID STATE (CURRENT)
Page 34-37	ELECTRICAL SCHEMATICS IN DIFFERENT RUN STATES
Page 38-39	BLEEDING PROCEDURE
Page 40-43	MATERIAL SAFETY DATA SHEETS

### **GENERAL HYDRAULIC SOLUTIONS INC.**

10601 47TH STREET NORTH  
CLEARWATER, FL. USA 33762

TOLL FREE NUMBER, 1-855-791-0128

LOCAL NUMBER, 727-571-1065

FAX NUMBER, 727-561-7415

EMAIL: [customerservice@ghslift.com](mailto:customerservice@ghslift.com)

[www.ghslift.com](http://www.ghslift.com)

#### **HOURS OF BUSINESS**

**MONDAY / THURSDAY 6:30 AM to 5:00 PM EST  
CLOSED, FRIDAY, SATURDAY & SUNDAY**

## **INSTRUCTIONS FOR THE SAFE USE OF THE GHS HYDRAULIC PLATFORM LIFT**

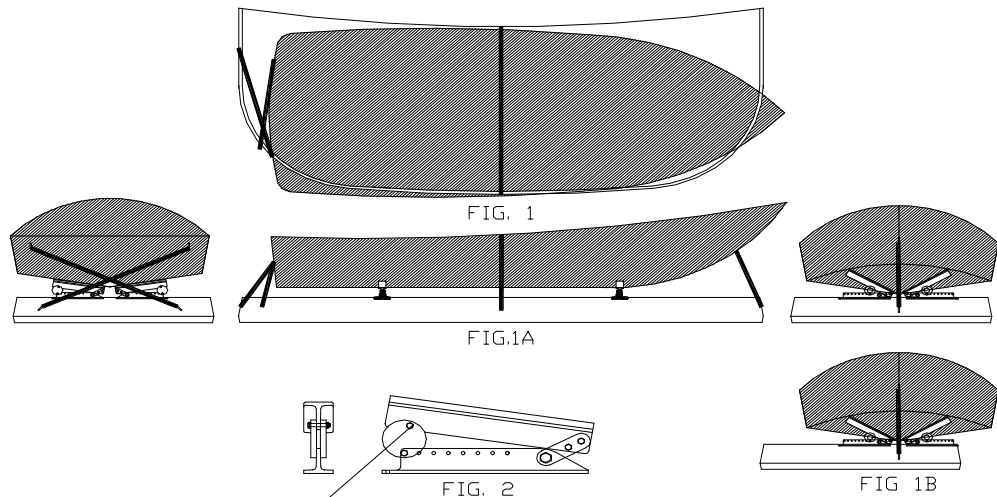
General Hydraulic Solutions (GHS) manufactures a line of hydraulic swim platform lift systems for the marine industry. All lift systems are designed to safely and efficiently lift and support a static load of 700 pounds on the swim platform of a variety of marine vessels. The systems are designed with a safety factor of 5, which means that the system will support a static load of 4500 pounds without failure when the load is placed midway between the transom and the aft end of the swim platform (**30" aft of the transom**). Independent testing has confirmed that the unit will withstand a 4500-pound static load without failure. As the load increased or moves aft, the margin of safety decreases and the ability of the lift to perform is degraded. Also, as the load is increased or moves aft, the ability of the transom to resist the increased moment becomes another safety concern. GHS recommends that the swim platform load be limited to 700 pounds and that the load is centered midway fore and aft on the swim platform. GHS offers an optional set of chocks that is specifically designed to support a PWC within these parameters. Other

The following are some recommendations that should be followed for the safety of the vessel and personnel when the vessel is equipped with the optional swim platform lift system:

- 1 **NEVER** operate the lift with people on the platform or in the water in the vicinity of the platform.
  
- 2 The Power switch (location of this switch will vary according to the boat manufacturer specs) provides electrical power to the Hydraulic Pump Unit (HPU). This switch should be in the "OFF" position at all times except when the lift is in actual operation. When the PWC (Personal Water Craft) is released in the water, the lift should be returned to the water line or all the way up and the Power switch returned to the "OFF" position. All GHS systems are wired for optional radio transmitters and a receiver that have a range of approximately 60-100 ft. under ideal conditions. Returning the rocker switch to the "OFF" position will prevent the accidental and unintentional movement of the platform.
  
- 3 The system includes 2 audible alarms that sound whenever the hydraulic system is activated. This alarm is very annoying and is intended to be so. It alerts everyone in the vicinity that platform is moving and caution is to be observed.
  
- 4 After launching your PWC, **NEVER** leave the platform in the down position. Always return the platform to the waterline or all the way up. As a point of interest, most large swim platforms have an area of approx 70 sq. ft.. When the platform is just 12" below the surface, there is a potential load 4500 pounds on top of it. With the boat at anchor, we can experience acceleration loads that exceed the limits of the system-so ALWAYS MOVE THE LIFT BACK TO AT LEAST THE WATERLINE
  
- 5 Never travel with a PWC or Dingy unless it is covered and the drain plug is pulled, a high volume bilge pump is also recommended. Water weighs approximately 8 lbs per gallon. Your watercraft can weigh 1000's of lbs if full of water.

**SECURING YOUR PERSONAL WATERCRAFT (PWC)  
TO THE SWIM PLATFORM**

- 1 The optional chock system on your yacht is designed to safely support most Personal Watercraft on the centerline of the swim platform. The system is also designed to be easily removed when a PWC is not being used. By loosening only 4 ½” nuts, the chocks will slide aft and free of the tracks, leaving the platform clear of all obstacles to use your platform for other activities. This feature is only for easy removal and not intended to allow the PWC to be stowed anywhere but on the centerline of the swim platform (See fig. 1 & 1A). Figure 1B shows an **incorrect** PWC installation. **CAUTION** Moving the center of gravity of the PWC aft of the centerline of the swim platform can cause damage or failure of either the lift assembly or the transom of the yacht.
  
- 2 Make certain that the chocks fit the bottom of the PWC hull. When the upper chock fits the PWC bottom perfectly you will need to tighten the 4 ½” nuts (with a wrench) to the track. With the PWC in place and all four ratchet straps tight, you will need to move the 3” round disc along the bottom chock until it is tight against the top chock and the hole in the disc & bottom chock line up. Secure these two into position with the ¼” fastener. Now line drill the disc and top chock with a 17/64” drill and secure with the fastener provided. Repeat this with all four chocks (See Fig. 2).
  
- 3 Secure the PWC to the chock system using the Stainless Steel ratchet straps provided with the lift system option package. If you are going to stow anything other than a small two place PWC, you should purchase the optional “HEAVY DUTY” tie down assembly. This assembly consists of 4 each 1” wide straps and Stainless Steel ratchets plus 5 additional “D” tie down rings. The “D” rings are to be installed by the dealer and should be installed as in fig.1 so that the PWC cannot move Port to Starboard, Fore and Aft, or rock in the chocks.
  
- 4 When the yacht is in transit and a PWC is stowed on the platform, it is prudent to occasionally check the condition of the stowed PWC and if sea conditions worsen, the vessel should be slowed to an appropriate speed.



NOTE: TOP FASTNER IN ADJUSTING DISKS (4) MUST BE DRILLED THROUGH UPPER SUPPORTS. AFTER CHOCKS ARE ADJUSTED TO PVC THEN INSTALL THE BOLT (4) PROVIDED TO SECURE THE CHOCKS IN THE PROPER POSITION TO BEST SUPPORT YOUR PVC/TENDER

**GENERAL HYDRAULIC SOLUTIONS**  
**PRODUCT AND WARRANTY REGISTRATION**

**WARNING:**

*It is important that all personal watercraft or tenders that will be stored on the lift have a cover and all drain plugs removed. Water weighs 8 lbs. per gallon and excessive weight can damage the lift and/or the transom of your boat. Your tender can weigh 1000's of pounds if full of water.*

Please read and understand this owner's manual thoroughly before operating your lift system. General Hydraulic Solutions is continually upgrading its product line and would like to inform owner-operators of safety information and upgrades to the lift system. If the owner-operator would complete the enclosed warranty registration card we will keep you informed of any improvements. Also record the information on the space below for your records.

**GENERAL HYDRAULIC SOLUTIONS WARRANTIES YOUR LIFT SYSTEM AGAINST ANY DEFECTS IN WORKMANSHIP OR MATERIALS FOR A PERIOD OF ONE YEAR FROM THE DATE THAT THE SYSTEM IS PUT INTO SERVICE. THIS WARRANTY COVERS ALL PARTS, *EXCEPT ZINC ANODES, AND EXTERNAL STAINLESS STEEL HOSES. THESE SHOULD BE INSPECTED EVERY 6 MONTHS AND REPLACED AS NEEDED.***

---

**Mail to :**  
**GENERAL HYDRAULIC SOLUTIONS INC.**  
**10601 47th, ST. North**  
**CLEARWATER, FL. 33762**

*WARRANTY REGISTRATION CARD*

NAME \_\_\_\_\_  
ADDR1: \_\_\_\_\_  
ADDR2: \_\_\_\_\_  
CITY,ST,ZIP \_\_\_\_\_  
PHONE \_\_\_\_\_  
EMAIL \_\_\_\_\_  
HULL# \_\_\_\_\_  
HIN# \_\_\_\_\_  
BOAT MAKE \_\_\_\_\_  
DATE BUILT \_\_\_\_\_  
LIFT IN SERVICE DATE \_\_\_\_\_  
GHS SERIAL # \_\_\_\_\_

**GENERAL HYDRAULIC SOLUTIONS, INC.**  
**HYDRAULIC PLATFORM LIFT**

**PRODUCT DESCRIPTION**

The GHS Hydraulic Platform Lift is an electric/hydraulic system designed to safely lower your swim platform below the water surface in order to launch various watercrafts. Your yacht builder has designed and strengthened the transom of your yacht to allow the GHS Hydraulic Platform Lift system to be attached to the transom and to operate with very specific maximum loads. Make certain that you consult your yacht "Owners Manual" for this information. Operating the Lift outside of the designed maximum limit may result in **STRUCTURAL** damage to the transom.

The Platform Lift System consists of the following major components:

- A Power Unit Assembly
- B Platform lift assembly
- C Control Unit

The Power Unit Assembly is an integrated unit combining a 12V DC or a 24V DC electric motor, a hydraulic pump, a hydraulic manifold, a manual hydraulic pump and the necessary valves and relays to allow the unit to function. The hydraulic manifold is a complex unit that routes and controls the flow of fluid to the four hydraulic cylinders. All of the valves in the manifold are preset at the factory to function at very precise pressures and are not to be adjusted in the field by anyone other than a factory authorized representative. Any readjusting of these valves by someone other than an authorized representative will void the warranty on the entire Lift Assembly and may cause serious damage to the lift and the vessel.

The Platform Lift Assembly consists of the following major components:

- A Transom Brackets
- B Platform Brackets
- C Lift Cylinders
- D Locking Cylinders
- E Lift Arms

The above components are designed to act as one unit to allow hydraulic pressure to lower and raise the swim platform under controlled conditions. Extreme caution must be exercised when this unit is moving either up or down. The locking and lift cylinders are very powerful, operating pressures as high as 2500 PSI. A warning horn signals when the platform is moving in either the up or down direction to caution all in the vicinity that the platform is moving and all should remain clear. The lift should never be operated when personnel are on the platform.

The remote control unit is a hand-held UP/DOWN switch that is hard-wired to the Power Unit Assembly through a disconnect mounted in the vicinity of the transom. In addition to the standard hard-wired control, there is available an Optional Radio Remote Control that can operate the platform lift from distances of approximately 60-100 feet.

**SYSTEM FEATURES**

- 1 Integrated Power unit-motor, pump, manifold, manual pump, valves and electronics
- 2 Hydraulic fluid filter
- 3 One year warranty
- 4 Manual/automatic selector valves
- 5 Manual emergency hydraulic pump-integral to the power unit
- 6 Heavy duty DC motor and pump
- 7 Compensating and equalizing valves to equalize and control pressure to the lift cylinders
- 8 Lift capacity approximately 700 pounds-depending on model
- 9 Total lift of 28 thru 46 inches depending on model
- 10 100% type 316L stainless steel and naval brass construction
- 11 All stainless steel is electro polished or bottom painted for additional corrosion resistance
- 12 Platform is positively locked in the "UP" position using two locking hydraulic cylinders and mechanical locks
- 13 Adjustable platform supports that level platform fore & aft after installation
- 14 Simple one button operation to unlock and lower platform and one button to raise and lock platform
- 15 Optional radio remote capability
- 16 Audible horn sounds when lift is moving in the up and down direction

## OPERATIONAL PROCEDURES NORMAL PROCEDURES

The GHS Hydraulic Platform Lift is designed for simple one hand operation. To safely LOWER the platform, the following procedure MUST be followed: AFTER MAKING SURE THAT THE PLATFORM AND AREA ARE CLEAR

- 1 Plug the hand held control unit into the receptacle located in the area of the transom. The receptacle is located in this area so that the operator will have a clear view of the platform and the adjacent areas.
- 2 Make sure that the yacht's engines are "OFF".
- 3 Make sure that the platform has ample room to operate. The platform will move approximately 24 inches aft as it rotates to the down position.
- 4 Make sure that there is no debris or foreign matter in the two transom bracket mechanisms that will affect the operation as the arms rotate. Serious damage may result from foreign matter interference.
- 5 Make sure that no one is on the platform or in the water in the vicinity of the platform when it is in operation. Serious injury is possible when the platform is moving.
- 6 After making certain that the platform area is clear, turn the lift Power switch to the "ON" position (location of this switch will vary according to the boat manufacturer specs). This will provide DC power to the hydraulic power unit via the latching solenoid. The light on the Power switch indicates that power is actually supplied to the Hydraulic Power Unit (HPU).
- 7 The current Hydraulic Power Units (boats built after Mar 2004) have a solid state controller. This system must be Powered up prior to operation. To do this depress and hold the up or down button for approximately five seconds, you should hear the audible alarm sound (beep). This is required everytime the unit is Powered up .
- 8 While standing at the transom and observing that the platform area is clear, lower the platform into the water to the desired depth by pushing the "DN" button on the hand held unit. It is good practice not to pulse the unit as that will put unneeded loads on the Electrical /Hydraulic system. Try to keep the button pressed until the platform is fully deployed / stowed.
- 9 When raising the platform, the same safety procedures must be followed as described in #2 thru #6 of the above operational procedures. ABOVE ALL ELSE, BE ABSOLUTELY POSITIVE THAT THE AREA IS CLEAR OF PEOPLE BEFORE RAISING PLATFORM.
- 10 When the lift is not in operation, the lift power rocker switch should be turned to the "off" position. This will prevent any accidental operation of the lift. For instance, if a personal watercraft has been lowered into the water and will be in the water for an extended period, the rocker switch should be turned to "OFF" position.

IT IS THE OPERATOR'S RESPONSIBILITY TO INSURE THAT ALL SAFETY ITEMS ARE CONSIDERED BEFORE OPERATING THE PLATFORM LIFT. THE OPERATOR SHOULD BE INFORMED OF ALL SAFETY PRECAUTIONS AND SHOULD BE AWARE OF THE PHYSICAL DAMAGE THAT CAN OCCUR IF MATERIAL OR PEOPLE ARE IN THE NEAR VICINITY OF THE LIFT WHEN IT IS IN OPERATION.

Warning: Do not operate yacht when platform is not up & locked.

## Emergency Procedures

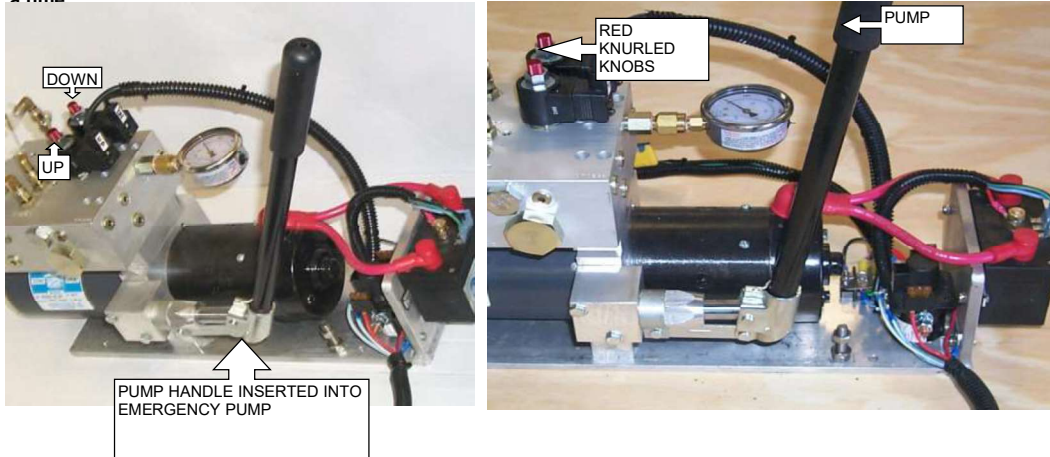
The Hydraulic Platform is designed to give you years of trouble-free service but in the event of a failure, the following procedures should be followed:

### LOSS OF ELECTRICAL POWER OR FAILURE OF PUMP MOTOR

- A Check circuit breaker usually located on the main DC circuit breaker panel in the engine room.
- B If the unit has been run repeatedly in a short period of time, let the unit cool down for 10 minutes and try the lift again. In the event that your DC power supply or the pump motor fails, the lift cannot be operated in the "normal" mode. It may be operated in the manual mode. To operate the unit in the manual mode, locate the Hydraulic Power Unit Assembly (most often it is located in the engine room close to the transom) then do the following:

1 To manually raise the platform:

Insert the Emergency pump handle (black metal handle approx. 18" long) into the Manual Pump located on the Hydraulic Power Unit (HPU). Turn the "knurled" red knob, located on the "UP" Solenoid, counterclockwise until it pops up (about ¼ of a turn). You are now in the manual "UP" mode. Using the handle, pump until the unit is completely up. You should hear the two locking cylinders engage the lock pins and the gage pressure should approach 2500 PSI. When you are sure that the unit is locked in the up Position, push the red knob down & clockwise until it returns to the original position. This procedure may take several minutes because of the low flow rate of the hand pump. NOTE: When using manual mode, only one solenoid is allowed to be in "manual" at a time



2 To manually lower platform:

Insert the handle (black metal handle, approximately 18" Long) into the Manual Pump located on the side of the power unit. Turn the "knurled" red knob, located on the "DN" solenoid, counterclockwise until it pops up (about ¼ of a turn). You are now in the manual "DN" mode. Pump the handle until the unit unlocks and lock plates are clear of locking pins on arms. Adjust sequence valve all the way out (count turns of set screw to redo setting) pump to desired depth. When you are sure that the unit is down to the desired depth, turn the red knob down & clockwise until it returns to the original position, reset sequence valve. You are now back into the normal mode.

**NOTE:** When either of the manual modes are selected, the pump will not operate in the normal (electric) mode even though the motor may run.

3 UNEVEN MOVEMENT

One side of the platform moves faster than the other. There is a possibility that one side of platform will move at a different rate than the other. The Hydraulic Manifold contains combiner-divider valves (see page 17-31) that regulate and equalize fluid flow to both lift cylinders. This valve is only 90% efficient, so you will notice some slight difference in the movement of the individual sides. However this difference will be minimal and should not affect the normal operation of the platform. If there is a significant difference in the rate of movement, try shifting the load toward the faster side. If the problem persists, follow the recommendations in the "TROUBLE SHOOTING GUIDE"

4 LEAKING OR BROKEN HYDRAULIC LINE-DO NOT ATTEMPT TO OPERATE THE LIFT

If the platform is in the up position, and any line is broken or leaking **DO NOT OPERATE THE LIFT**. Contact your dealer or GHS for help in determining if there is a serious problem. If the platform is down, it must be raised before the engines are started. A broken or leaking hose must be replaced prior to operation.

5 PHYSICAL DAMAGE TO EITHER THE PLATFORM OR LIFT ASSEMBLY.

If the swim platform assembly has been damaged due to an accident etc., have the damage assessed by your Dealer before operating the lift. Serious damage to the hull can result from operating the lift when it is misaligned.

If the Lift should ever have any operational problems please reference the Owner's manual /Trouble-Shooting Guide to determine the cause of these problems and their solutions. General Hydraulic Solutions has all necessary parts to help get your lift back in operation.



## SERVICE

### 1 VALVE SETTINGS

All valves have been pre-set at the factory to ensure that the lift functions properly. Any readjustment of these valves by anyone other than a factory-authorized representative will void the warranty and possibly cause damage to the lift or structure of the boat.

### 2 HYDRAULIC FLUID

General Hydraulic Solutions recommends using an ISO 46 (aw) hydraulic fluid. This fluid is compatible with all valves and pumps used in the power unit assembly. The reservoir in the power unit should be checked for proper level every 200 cycles or every 6 months. The level should be approx. 1" from the top when the unit is in the "UP" position. *If the level of the fluid falls below a certain point in the reservoir, the pump has the potential to fail and / or introduce air into the system. This will affect the operation of the unit drastically.* If air is introduced into the system whether from a broken hose or the fluid level being too low, simply refill the reservoir with fluid, make sure there are no leaks on the inside or outside of the boat, then run the unit up and down 1 time only. Recheck the fluid level then let the unit sit for 2 hrs or longer to allow all air bubbles to escape from the fluid in the reservoir. Run the unit again 1 time and repeat the process outlined above. This may take several times to clear all air in the system.

\*\*See page 10 for information to help select the oil that will work best for you in your area

### 3 GREASE FITTINGS

There are 2 grease fittings positioned on the top of the lift cylinders. (see page 38) These fittings should be greased once a year with a good moly based grease.

### 4 OVERALL APPEARANCE AND SYSTEM CLEANLINESS

The General Hydraulic Solutions lift platform is constructed of 316L stainless steel and 464 naval brass. All parts that will be below the waterline have either been electro polished or bottom painted. This should give years of trouble free service. The overall appearance of the system should be inspected once or twice a year during haul out. All cylinders, both lifting and locking, should be inspected for leaking of seals and general appearance. All cylinder rods should be checked in the down position for excessive wear. All bushings should be checked for excessive play. The hydraulic system should be checked once a year also. The hydraulic system should be checked once a year also. The fluid should be checked for cleanliness. Any fluid that looks milky or other than an amber like color should be replaced and the system flushed out. All hoses should be checked for fraying or leakage. All fittings both internally and externally should be checked for leaking or looseness and should be tightened at this time.

The zinc anodes should be checked periodically (quarterly) and replaced when corrosion is evident. Excessive degeneration of this anode could lead to premature corrosion problems in the lift. General Hydraulic Solutions uses a CAMP T-20 anode, Part # HW021 (see Tab Parts List -Page 1). These can be purchased through GHS.

### 5 HYDRAULIC FILTER

There is a 10-micron hydraulic filter (see page 17-31) built into the manifold in the pump assembly unit. This filter should be changed once a year to prevent possible contamination of the system. This filter should be changed during all maintenance or repair of the system. Filters can be purchased through General Hydraulic Solutions.

### 6 SERVICE CONTACTS

Please Contact Us General Hydraulic Solutions can answer any questions

#### General Hydraulic Solutions (GHS)

10601 47TH STREET NORTH  
CLEARWATER, FL. USA 33762  
# 727-571-1065 FX 727-561-7415

EMAIL: [customerservice@ghslift.com](mailto:customerservice@ghslift.com)

[www.ghslift.com](http://www.ghslift.com)

MONDAY / THURSDAY HRS 6:30 AM to 5:00 PM EST

## Recommended Hydraulic Oil For G.H.S. Hydraulic Swim Platform Lifts

- 1 We highly recommend using a NZ (non-zinc), AW (Anti-Wear) hydraulic oil. This material is not expected to be harmful to aquatic organisms. The ECOTOXICITY hazard is based on an evaluation of data for the components or a similar material and provides the lubrication your pump needs.

Use Mineral-Based or Synthetics with Lubricating Properties at Viscosities of 7.4 to 420 cST ( 50 to 2000 sus )  
Viscosities of 7.4 to 420 cST = ISO Grade of 10, 15, 22, 32, 46, 68, 100, 150, 220, and 320. NO higher than 320  
Viscosities of 50 to 2000 sus = ISO Grade of 10, 15, 22, 32, 46, 68, 100, 150, 220, and 320. NO higher than 320

Ask your local oil sales person to help pick the oil that will work best for you in your area and operating conditions.

### 2 Monograde Hydraulic Oils

Monograde Hydraulic Oils are designated by one number (10,15,22,32, etc.) The number indicates a level of the oil viscosity at a particular temperature. The higher the grade number, the higher the oil viscosity.

Use the chart below to determine which viscosity grade will work best for you.

AW ISO 32,42, and 68 are the most commonly used oils.

AW ISO 32 covers between about 28deg.F to about 145deg.F It's a good colder weather oil.

AW ISO 42 covers between about 30deg.F to about 160deg.F It's a good warm weather oil.

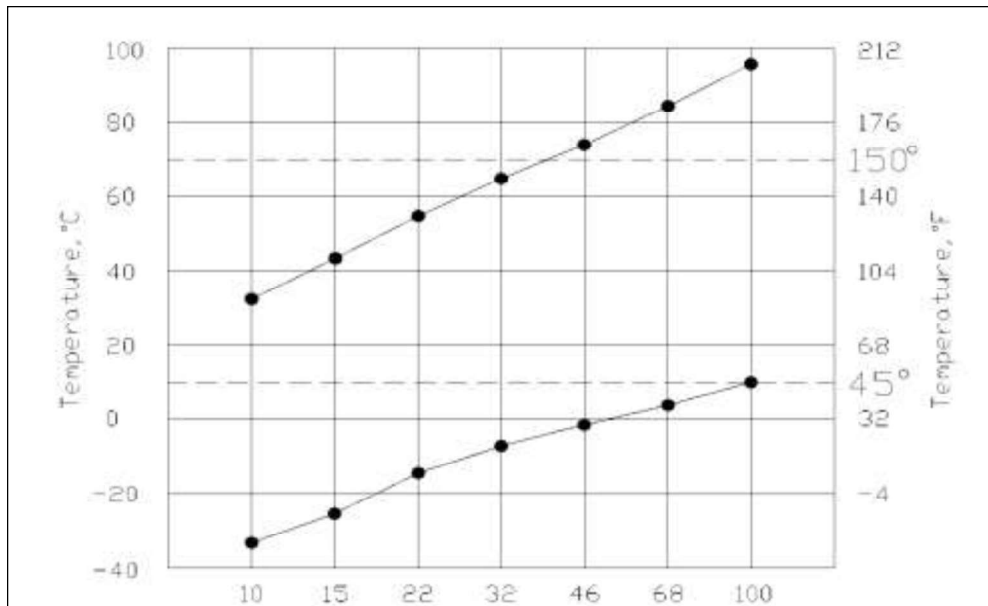
AW ISO 68 covers between about 35deg.F to about 185deg.F It's a good hot weather oil.

( ISO ) Designation of hydraulic oils: International Standardization Organization

### 3 Multigrade Hydraulic Oils

Multigrade Hydraulic Oils may be stabilized by polymeric additives(viscosity index improvers) . Viscosity of such oils is specified at both high and low temperature. These oils are called multigrades and they are designated by two numbers and the letter "W" ( SAE 5W30, SAE 10W20, SAE 10W30 etc.). The first number of the designation specify the oil viscosity at cold temperature, the second number specifies the oil viscosity at high temperature. For example: SAE10W30 oil has a low temperature viscosity similar to that of SAE 10, but it has a high temperature viscosity similar to that of SAE 30 Multigrade Hydraulic Oils are used in a wide temperature range. Remember to take into consideration the location of your hydraulic pump. If it is in the engine room, it will be much warmer inside there. This will affect the viscosity of your oil.

Temperature Operating Window for Hydraulic System Operating at 45deg. F to 150deg. F

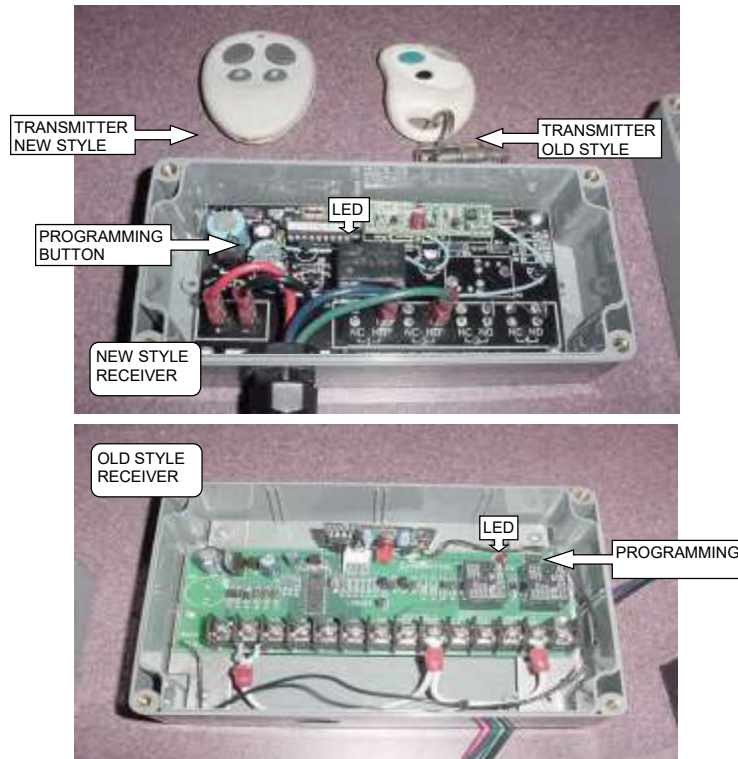


There are many oil manufacturers and types of hydraulic oil you can use. We will always recommend using an ECOLOGICALLY SENSITIVE oil like the NZ (non-zinc) with AW ash less ( Anti-Wear ) additives.

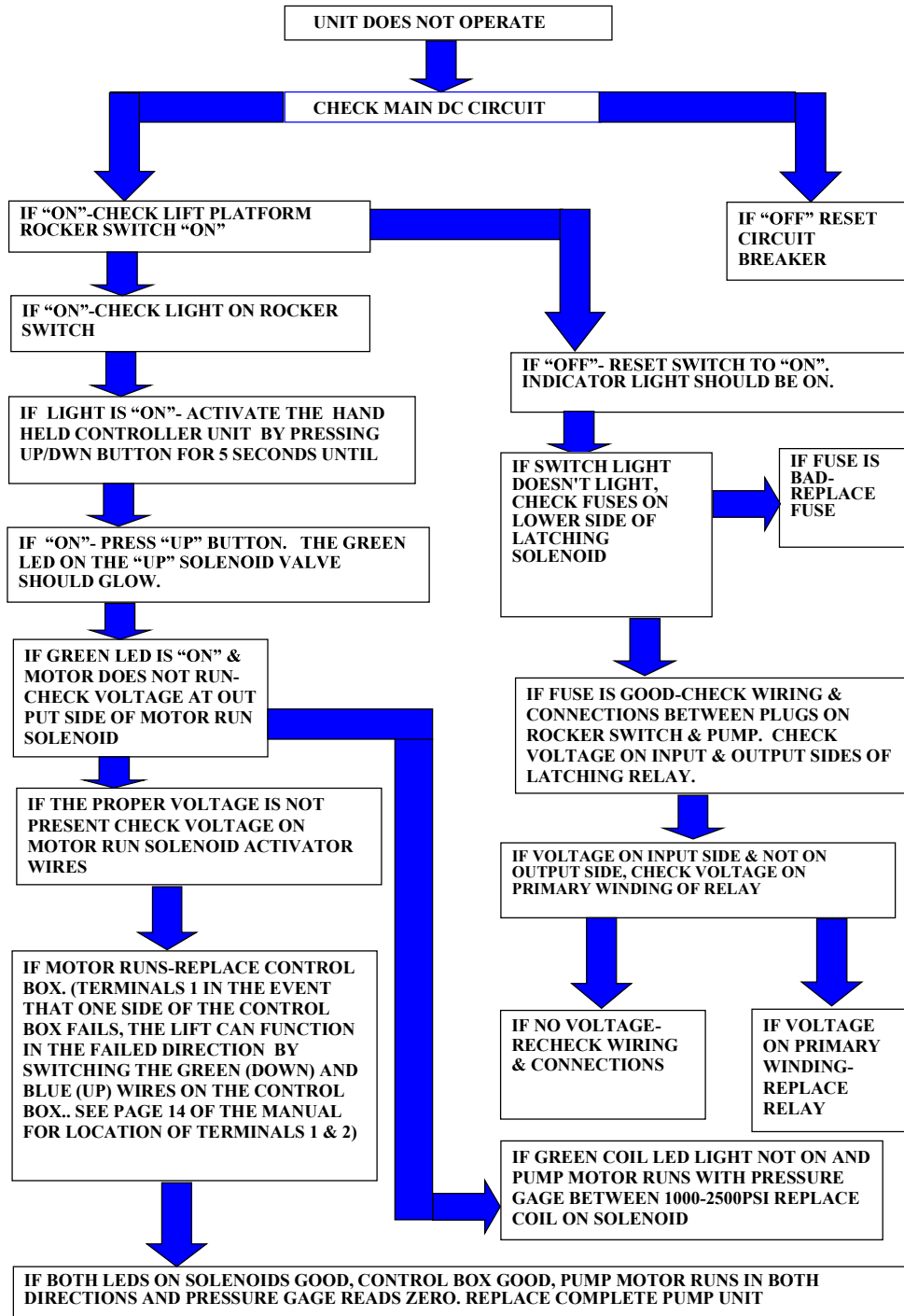
## OPTIONAL RADIO REMOTE CONTROL

- 1 General Hydraulic Solutions uses an optional 2-channel radio remote for wireless operation of the lift platform. The system consists of a receiver unit and two 2-button transmitter units. The remote is FCC approved. These transmitters are water resistant and good for a range of 60-100 feet. These transmitters should provide years of trouble free service, however, if the transmitters are lost or damaged new ones may be purchased through General Hydraulic Solutions.
- 2 **IMPORTANT:** In order to program up to 4 Transmitters to one remote you must first "CLEAR" the memory.
  - \* Locate the program switch as shown below
  - \* Press and hold the program switch for 10 seconds (the LED will go out).
  - \* The unit is now clear
- 3 **REMOTE PROGRAMMING** (programming must be completed within 10 seconds)
  - \* Push the program switch till LED lights solid, then release.
  - \* Push button one on remote transmitter until LED goes out, then release
  - \* Push button one again the LED should flash slowly, then release
  - \* Your remote is now programmed. Repeat for each transmitter.

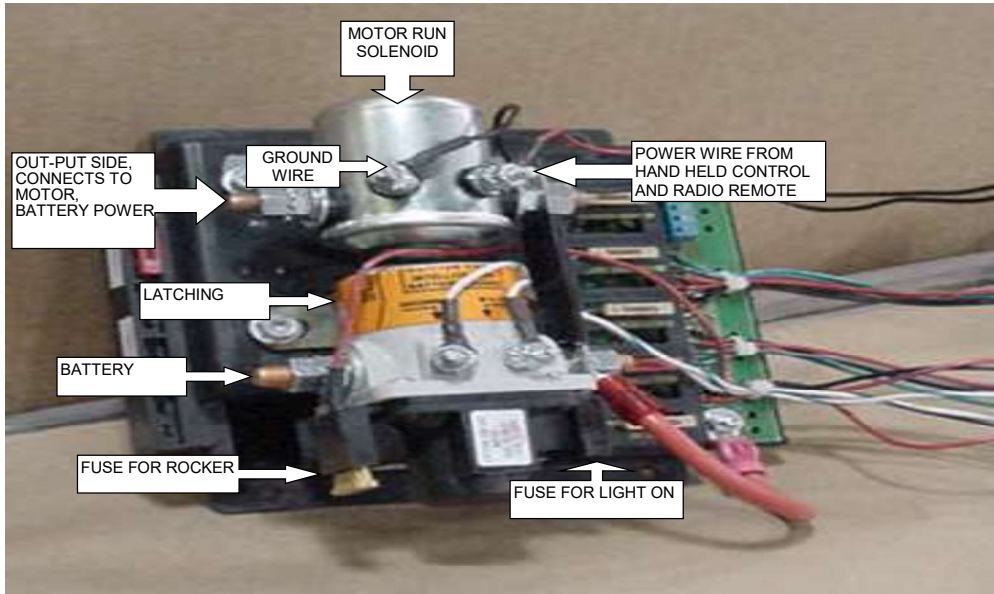
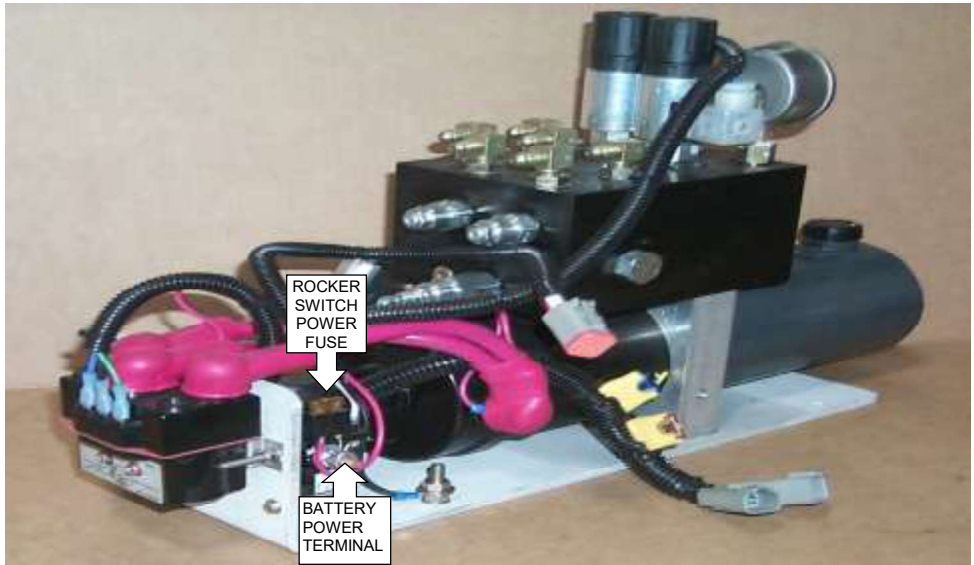
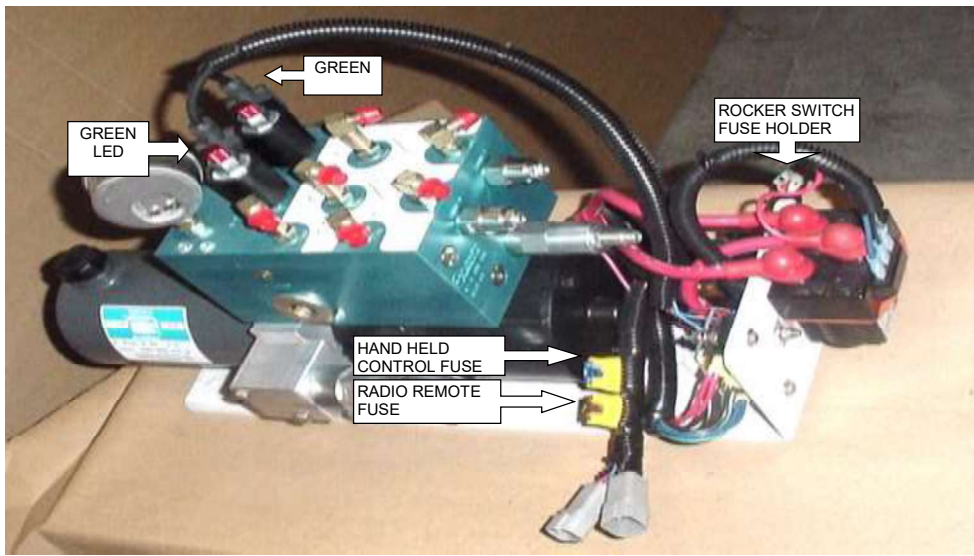
**Note:** If the new remote does not work, make sure that the indicator LED on the remote is flashing and that the batteries are good. Repeat step 3



# GENERAL HYDRAULIC SOLUTIONS TROUBLE SHOOTING GUIDE



**\*\*REFERENCE PAGE 15**



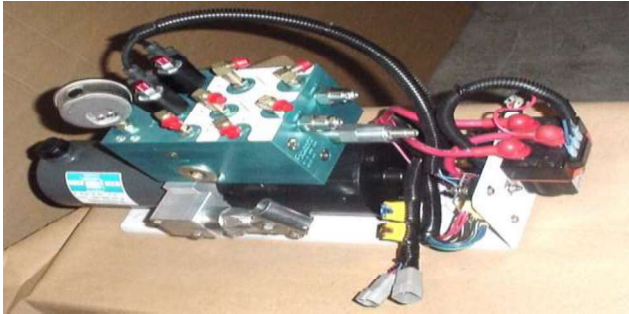
# GHS HYDRAULIC PUMP IDENTIFICATION



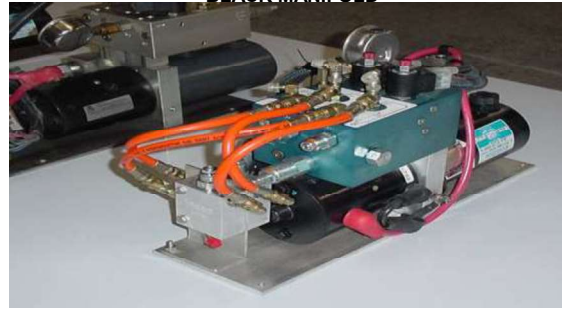
**SILVER MANIFOLD First Generation 2000**



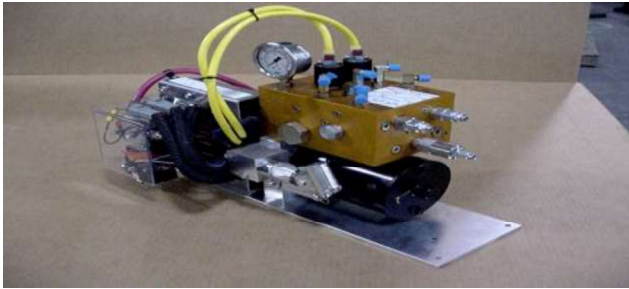
**BLACK MANIFOLD**



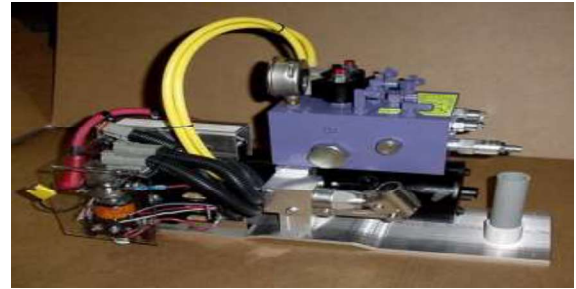
**BLUE MANIFOLD**



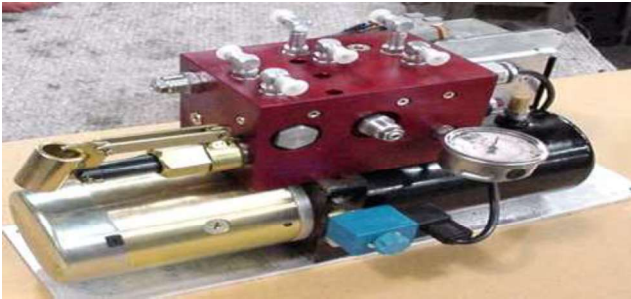
**BLUE WITH ANTI FLOAT MANIFOLD**



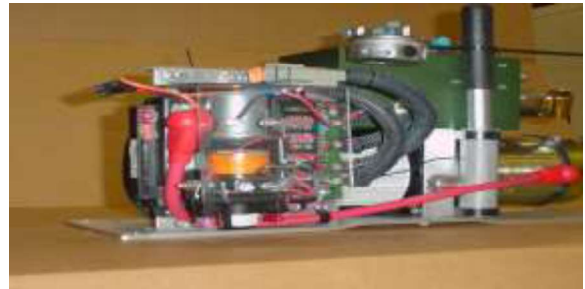
**GOLD WITH ANTI FLOAT MANIFOLD**



**PURPLE WITH ANTI FLOAT MANIFOLD**



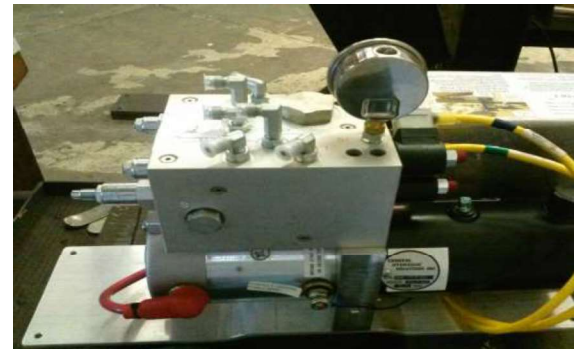
**RED MANIFOLD**



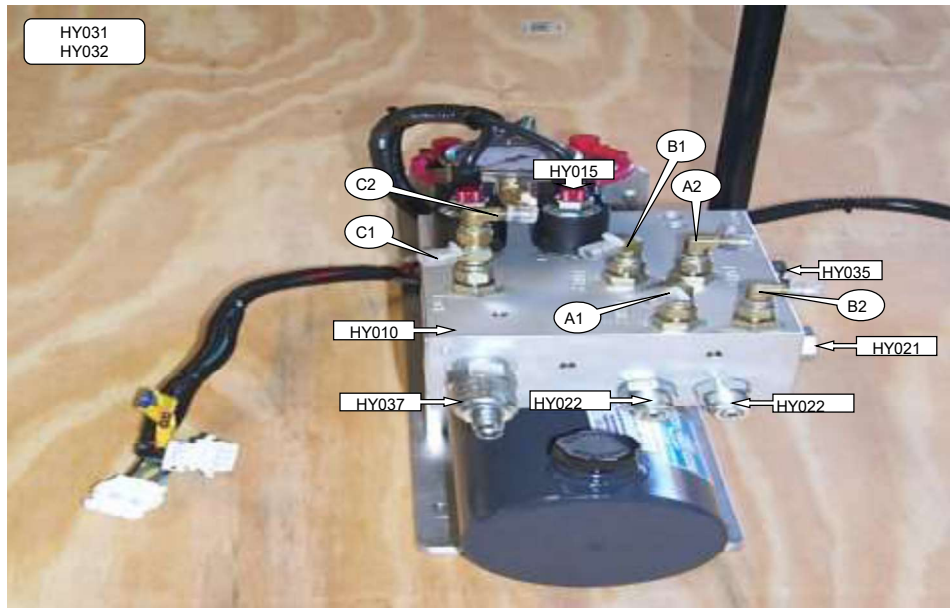
**GREEN WITH ANTI FLOAT MANIFOLD**



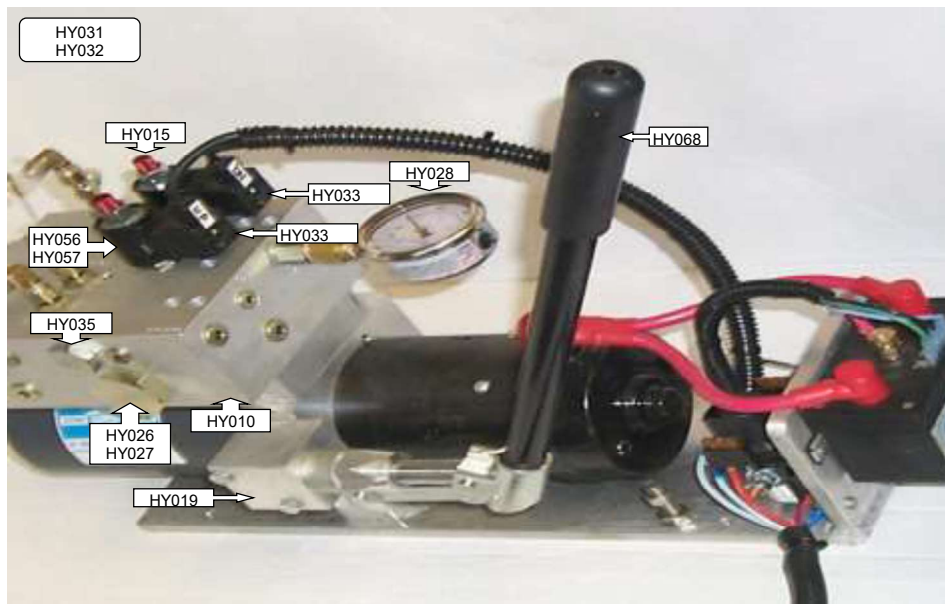
**YELLOW MANIFOLD**



**SILVER MANIFOLD 2012 -CURRENT MODEL**

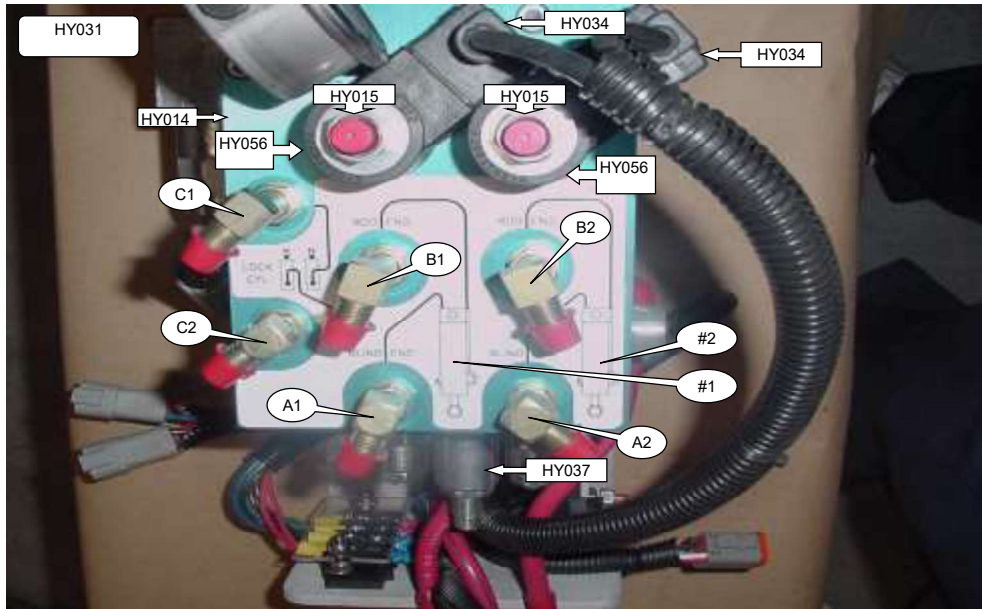


- C1 LOCK CYLINDER HOSE #1
- C2 LOCK CYLINDER HOSE #2
- A1 #1 LIFT CYLINDER HOSE FITTING BLIND END
- B1 #1 LIFT CYLINDER HOSE FITTING ROD END
- A2 #2 LIFT CYLINDER HOSE FITTING BLIND END
- B2 #2 LIFT CYLINDER HOSE FITTING ROD END

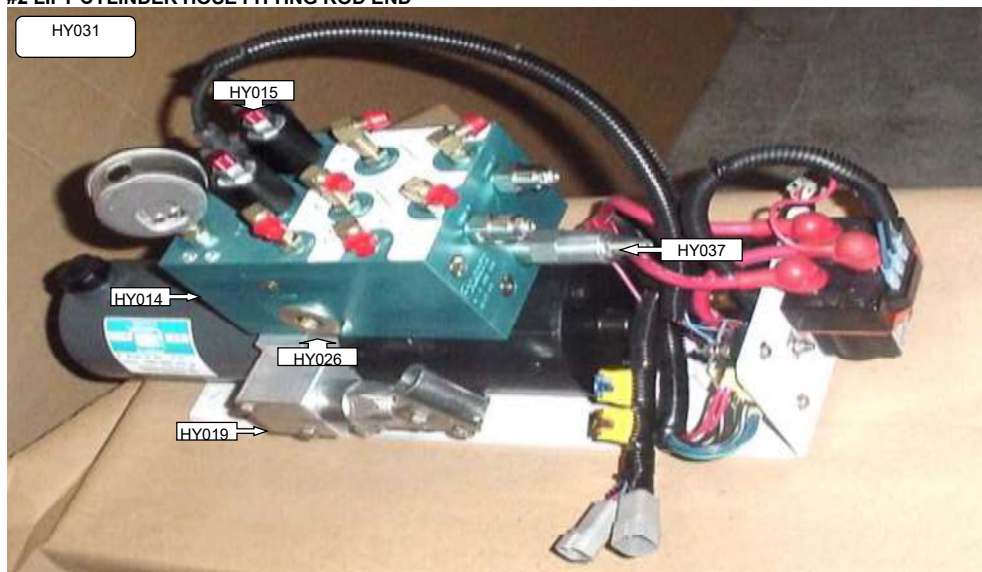


**SILVER HYDRAULIC PUMP**

GHS PART NUMBER	QTY.	
HY010	1	Silver Control Manifold
HY015	2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
HY019	1	Valve hand pump
HY021	1	Flow divider
HY022	2	Counterbalance valve inline valve body
HY026	1	Sintered bronze filter element
HY027	1	Sintered bronze filter element spring
HY028	1	0-3,000 psig glycerin filled pressure gauge #316SS
HY031	1	12 VDC Base Hydraulic unit
HY032	1	24 VDC Base Hydraulic unit
HY033	2	DIN connector cable with LED & surge suppressor
HY035	1	Check Valve
HY037	1	Pressure Sequence valve cartridge
HY056	2	12 VDC solenoid valve coil.
HY057	2	24 VDC solenoid valve coil.
HY068	1	Pump Handle



- C1 LOCK CYLINDER HOSE #1
- C2 LOCK CYLINDER HOSE #2
- A1 #1 LIFT CYLINDER HOSE FITTING BLIND END
- B1 #1 LIFT CYLINDER HOSE FITTING ROD END
- A2 #2 LIFT CYLINDER HOSE FITTING BLIND END
- B2 #2 LIFT CYLINDER HOSE FITTING ROD END



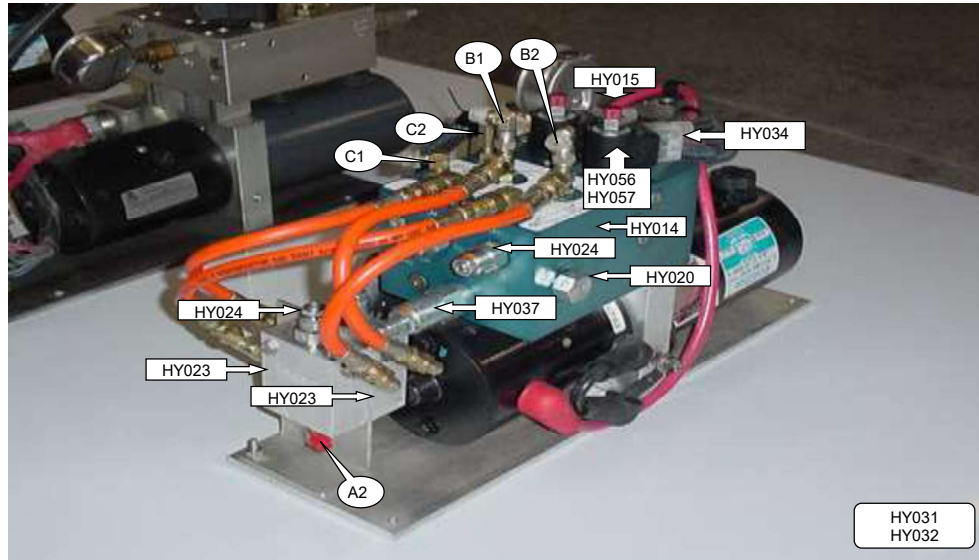
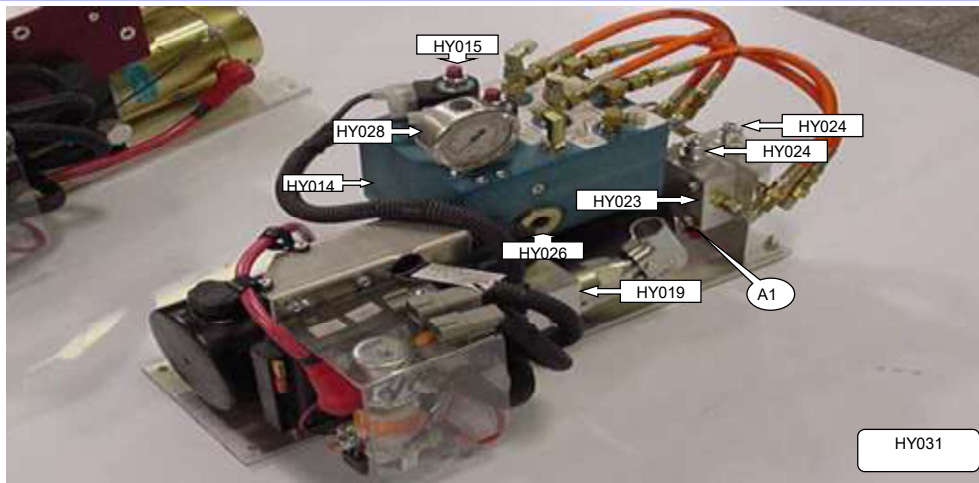
Continued on next page





GHS PART NUMBER	QTY.	BLUE HYDRAULIC PUMP
HY014	1	Blue Control Manifold with Anti-float accessories
HY015	2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
HY019	1	Valve hand pump
HY020	1	Flow divider
HY023	2	Counterbalance valve inline valve body
HY024	4	5 Gpm restricted Sealed Pilot Counterbalance valve cartridge
HY026	1	Sintered bronze filter element
HY027	1	Sintered bronze filter element spring
HY028	1	0-3,000 psig glycerin filled pressure gauge #316SS
HY031	1	12 VDC Base Hydraulic unit
HY032	1	24 VDC Base Hydraulic unit
HY034	2	DIN connector cable with LED & surge suppressor
HY037	1	Pressure Sequence valve cartridge
HY056	2	12 VDC solenoid valve coil.
HY057	2	24 VDC solenoid valve coil.
HY068	1	Pump Handle (NOT SHOWN)

## Blue Anti-Float

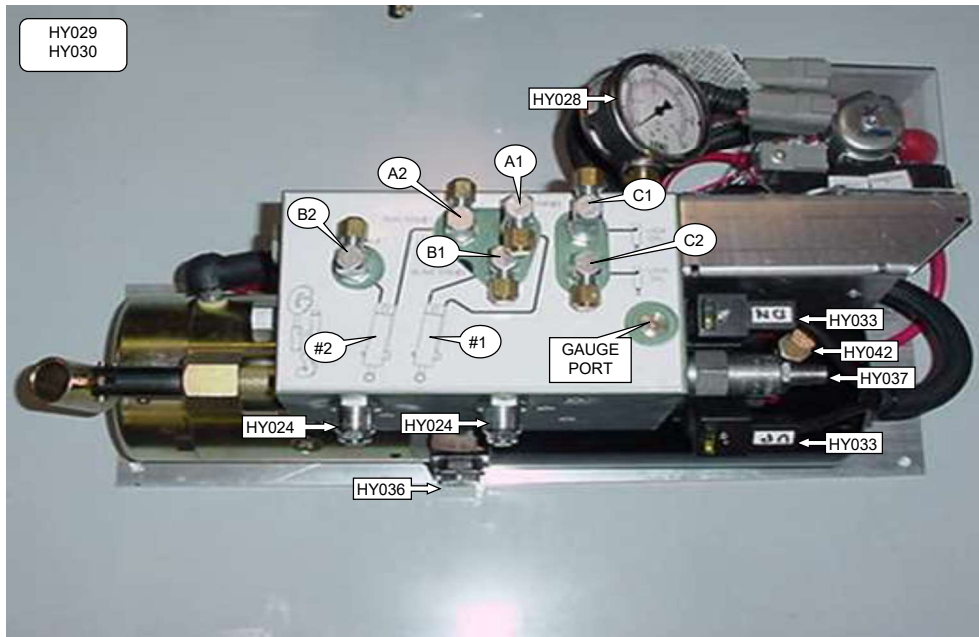


- C1 LOCK CYLINDER HOSE #1
- C2 LOCK CYLINDER HOSE #2
- A1 #1 LIFT CYLINDER HOSE FITTING BLIND END
- B1 #1 LIFT CYLINDER HOSE FITTING ROD END
- A2 #2 LIFT CYLINDER HOSE FITTING BLIND END
- B2 #2 LIFT CYLINDER HOSE FITTING ROD END

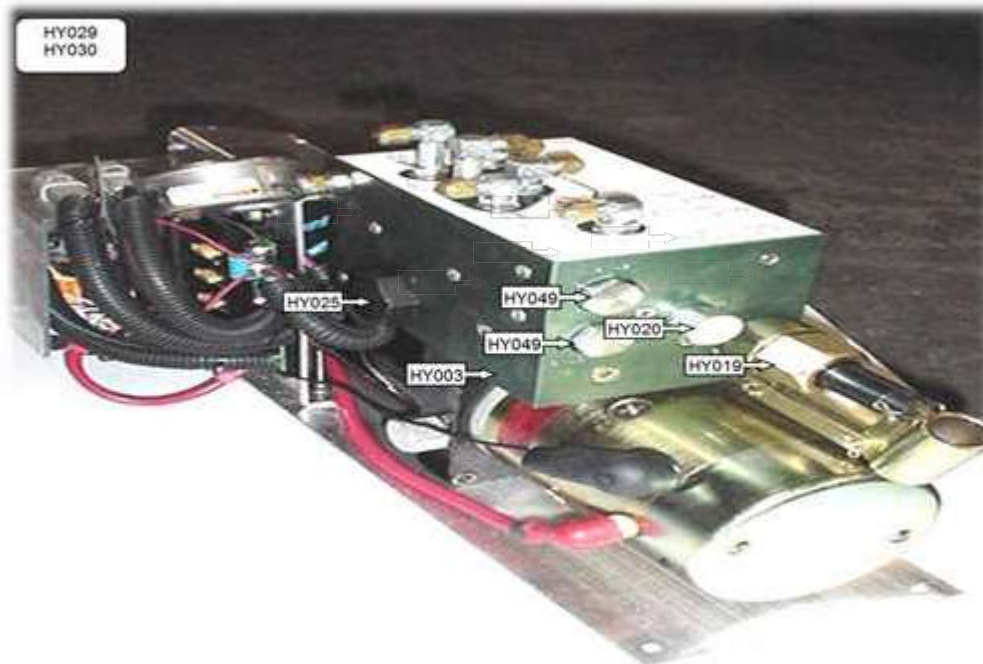
**GHS PART NUMBER**

QTY.	<u>Blue Anti-Float</u>
1	Blue Control Manifold with Anti-float accessories
2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
1	Valve hand pump
1	Flow divider
2	Counterbalance valve inline valve body
4	5 Gpm restricted Sealed Pilot Counterbalance valve cartridge
1	Sintered bronze filter element
1	Sintered bronze filter element spring
1	0-3,000 psig glycerin filled pressure gauge #316SS
1	12 VDC Base Hydraulic unit
1	24 VDC Base Hydraulic unit
2	DIN connector cable with LED & surge suppressor
1	Pressure Sequence valve cartridge
2	12 VDC solenoid valve coil.
2	24 VDC solenoid valve coil.
1	Pump Handle (NOT SHOWN)

## GREEN HYDRAULIC PUMP



- C1 LOCK CYLINDER HOSE #1
- C2 LOCK CYLINDER HOSE #2
- A1 #1 LIFT CYLINDER HOSE FITTING BLIND END
- B1 #1 LIFT CYLINDER HOSE FITTING ROD END
- A2 #2 LIFT CYLINDER HOSE FITTING BLIND END
- B2 #2 LIFT CYLINDER HOSE FITTING ROD END



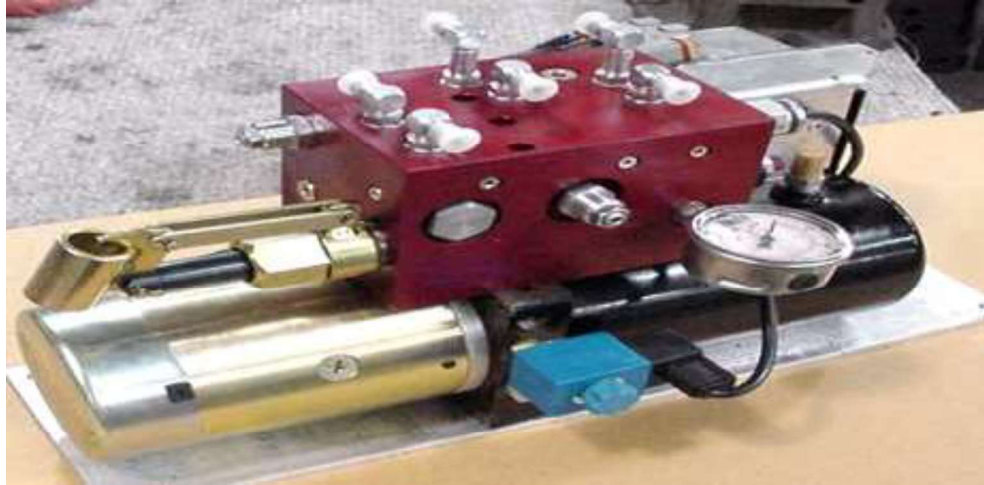
Continued on next page

**GREEN HYDRAULIC PUMP CONTINUED**

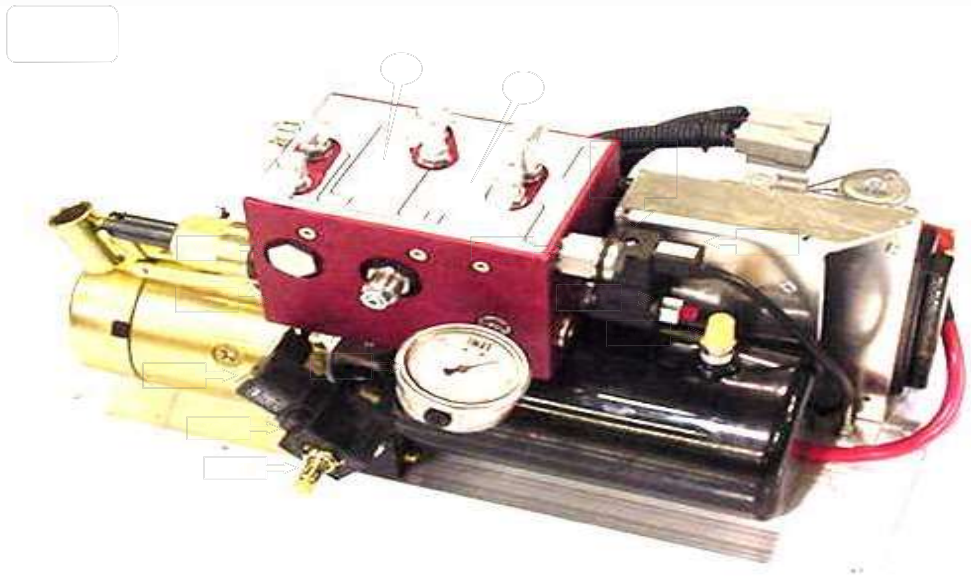


GHS PART NUMBER	QTY.	<b>GREEN HYDRAULIC PUMP</b>
HY003	1	Green Control Manifold
HY015	2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
HY019	1	Hand pump cartridge
HY020	1	Flow divider
HY024	2 or 4	5 Gpm restricted Sealed Pilot Counterbalance valve cartridge
HY025	1	Filter element cartridge 10 MICRON
HY028	1	0-3,000 psig glycerin filled pressure gauge #316SS
HY029	1	12 VDC Base Hydraulic unit
HY030	1	24 VDC Base Hydraulic unit
HY033	2	DIN connector cable with LED & surge suppressor
HY036	1	Check valve
HY037	1	Pressure Sequence valve cartridge
HY042	1	Sintered Bronze 3/8" reservoir breather cap.
HY049	0 or 2	Cavity Plug used only without Anti-float option
HY056	2	12 VDC solenoid valve coil.
HY057	2	24 VDC solenoid valve coil.
HY068	1	Pump Handle (NOT SHOWN)

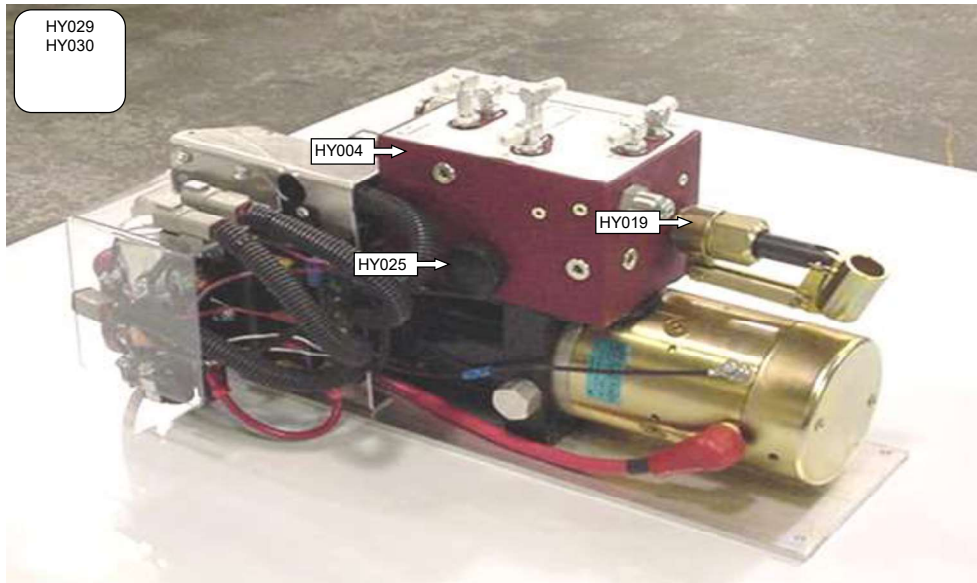
**RED HYDRAULIC PUMP**



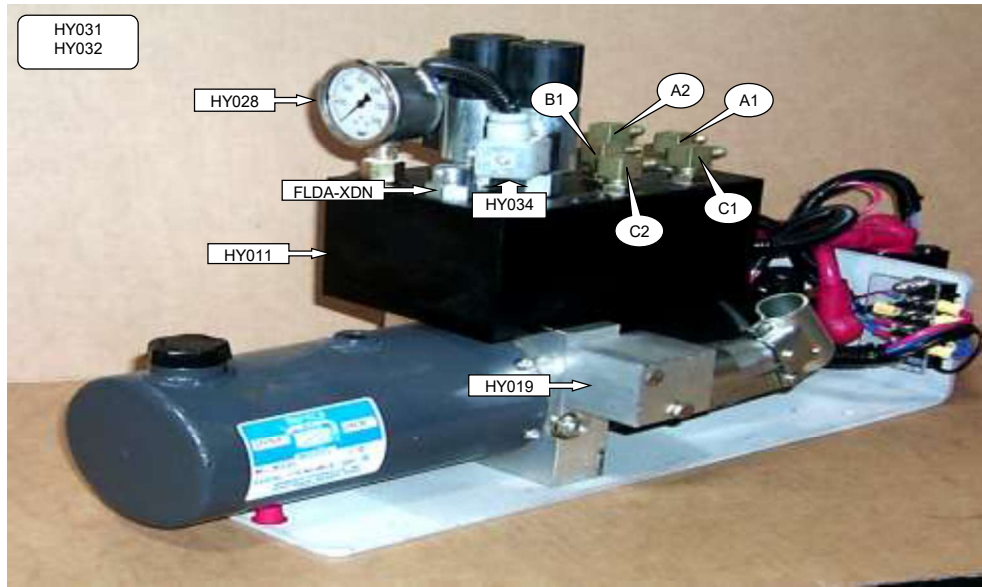
- C1 LOCK CYLINDER HOSE #1
- C2 LOCK CYLINDER HOSE #2
- A1 #1 LIFT CYLINDER HOSE FITTING BLIND END
- B1 #1 LIFT CYLINDER HOSE FITTING ROD END
- A2 #2 LIFT CYLINDER HOSE FITTING BLIND END
- B2 #2 LIFT CYLINDER HOSE FITTING ROD END



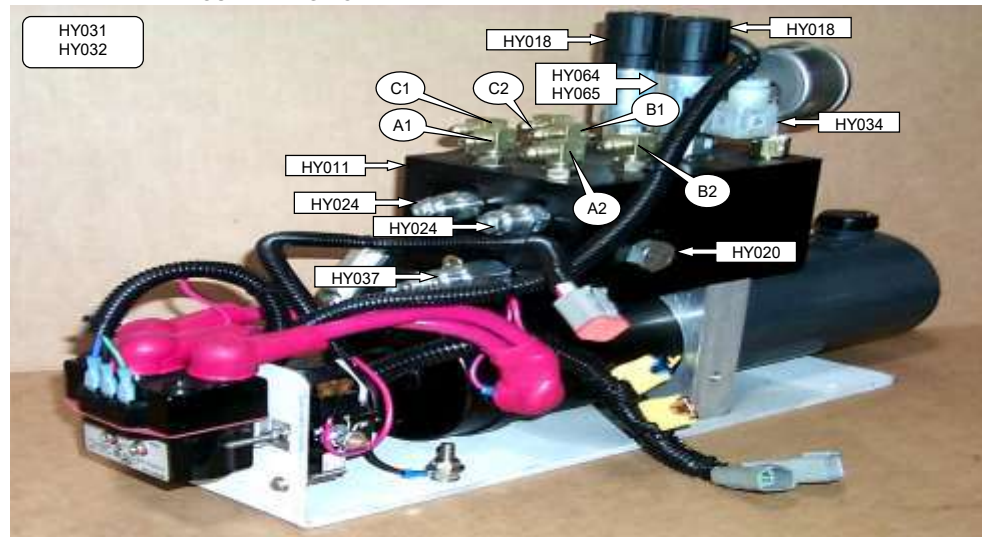
Continued on next page



GHS PART NUMBER	QTY.	<b>Red</b>
HY004	1	Red Control Manifold
HY016	1	2-way N.O. directional valve cartridge.
HY017	1	2-pos, 4-way directional valve cartridge with locking manual ovr'd
HY019	1	Hand pump cartridge
HY021	1	Flow divider
HY022	2	Standard counterbalance valve
HY025	1	Filter element cartridge 10 MICRON
HY028	1	0-3,000 psig glycerin filled pressure gauge #316SS
HY029	1	12 VDC Base Hydraulic unit
HY030	1	24 VDC Base Hydraulic unit
HY033	2	DIN connector cable with LED & surge suppressor
HY036	1	Check valve
HY038	1	3-way pilot operated logic valve
HY042	1	Sintered Bronze 3/8" reservoir breather cap.
HY056	1	12 VDC solenoid valve coil.
HY057	1	24 VDC solenoid valve coil.
HY066	1	2-way valve 12 VDC Coil
HY068	1	Pump Handle (NOT SHOWN)

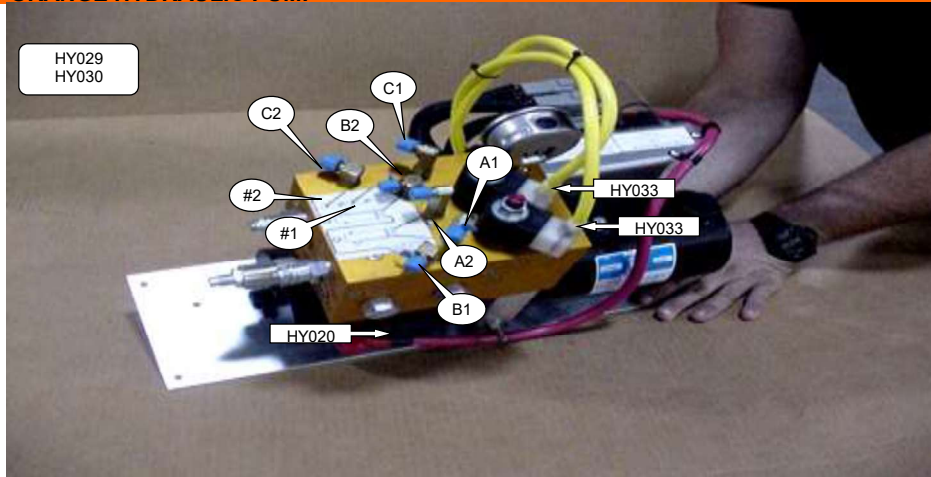


- C1 LOCK CYLINDER HOSE #1
- C2 LOCK CYLINDER HOSE #2
- A1 #1 LIFT CYLINDER HOSE FITTING BLIND END
- B1 #1 LIFT CYLINDER HOSE FITTING ROD END
- A2 #2 LIFT CYLINDER HOSE FITTING BLIND END
- B2 #2 LIFT CYLINDER HOSE FITTING ROD END

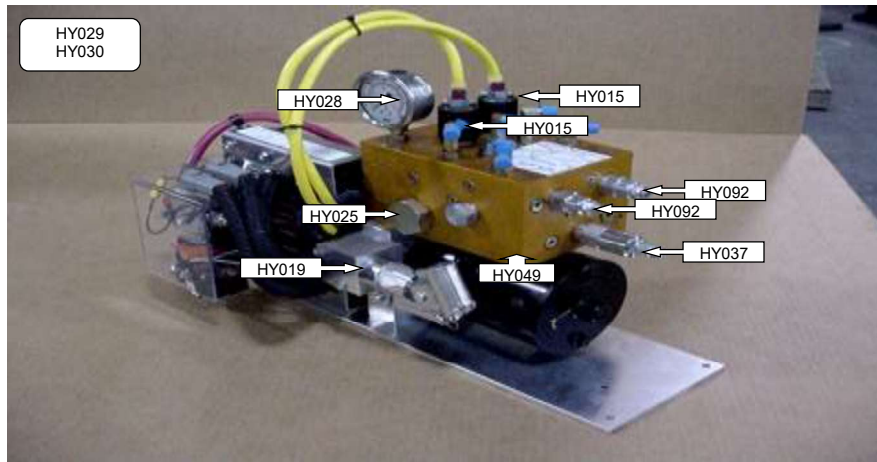


GHS PART NUMBER	QTY.	<b>BLACK HYDRAULIC PUMP</b>
HY011	1	Black Control Manifold
HY018	2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
HY020	1	Flow divider
HY022	2	Standard counterbalance valve
FLDA-XDN	1	Filter element ( SUN HYDRAULICS )
HY028	1	0-3,000 psig glycerin filled pressure gauge #316SS
HY031	1	12 VDC Base Hydraulic unit
HY032	1	24 VDC Base Hydraulic unit
HY034	2	DIN connector cable with LED & surge suppressor
HY037	1	Pressure Sequence valve cartridge
HY064	2	12 VDC solenoid valve coil.
HY065	2	24 VDC solenoid valve coil.
HY024	2	Counterbalance valve cartridge
HY068	1	Pump Handle

**ORANGE HYDRAULIC PUMP**



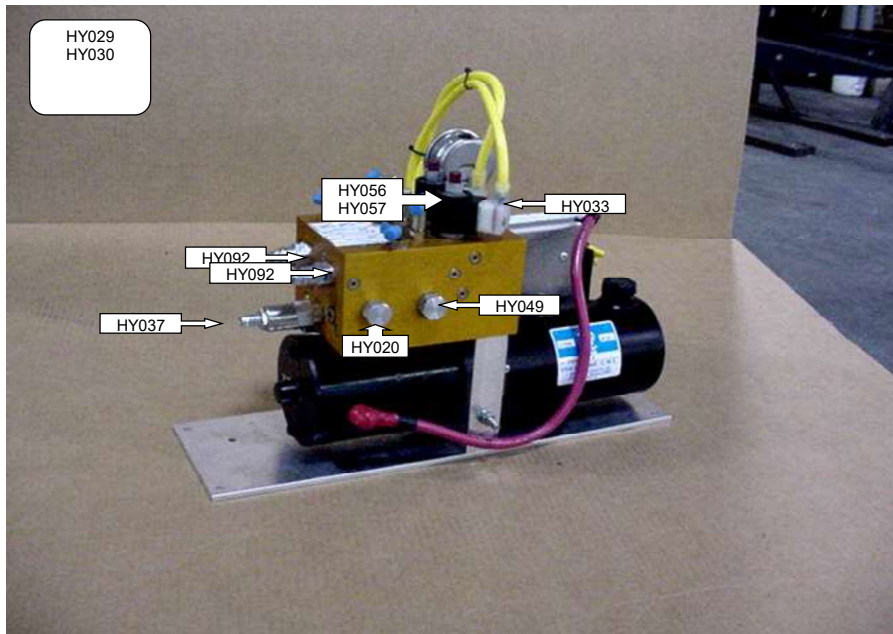
- C1 LOCK CYLINDER HOSE #1
- C2 LOCK CYLINDER HOSE #2
- A1 #1 LIFT CYLINDER HOSE FITTING BLIND END
- B1 #1 LIFT CYLINDER HOSE FITTING ROD END
- A2 #2 LIFT CYLINDER HOSE FITTING BLIND END
- B2 #2 LIFT CYLINDER HOSE FITTING ROD END



continued on next page

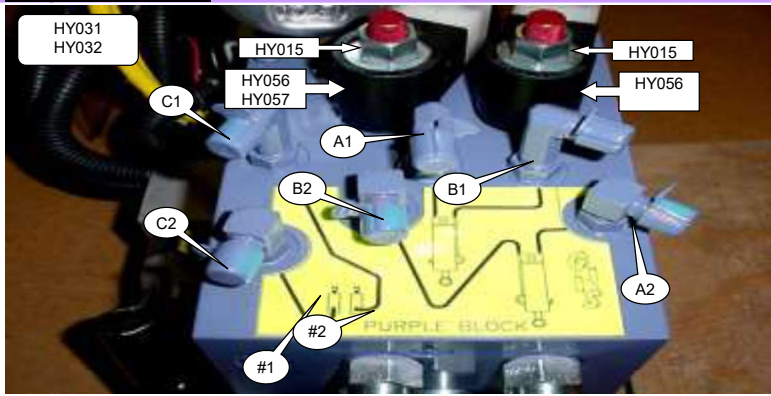


**ORANGE HYDRAULIC PUMP CONTINUED**

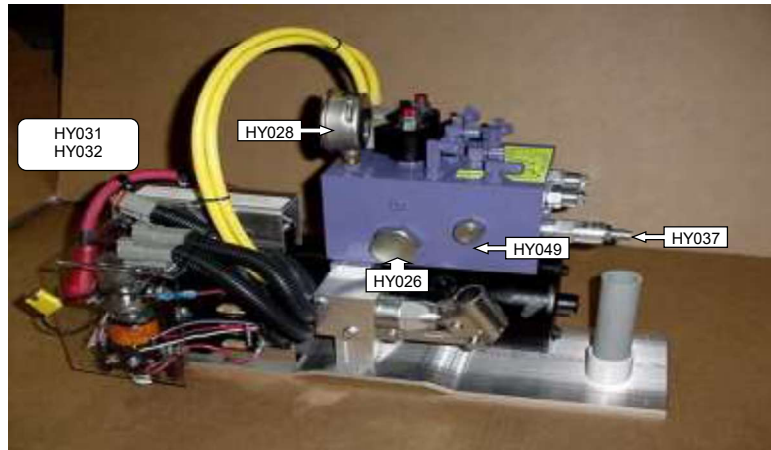
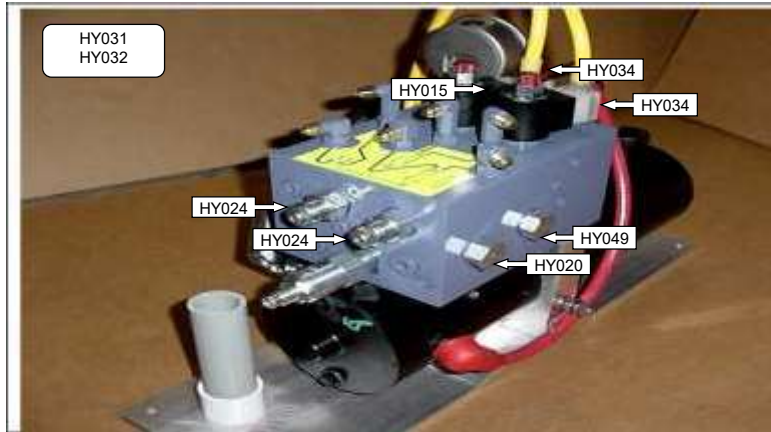


GHS PART NUMBER	QTY.	<b>ORANGE HYDRAULIC PUMP</b>
HY014	1	ORANGE Control Manifold
HY015	2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
HY019	1	Hand pump cartridge
HY020	1	Flow divider
HY092	2 or 4	Counterbalance valve cartridge
HY025	1	Filter element cartridge 10 MICRON
HY028	1	0-3,000 psig glycerin filled pressure gauge #316SS
HY029	1	12 VDC Base Hydraulic unit
HY030	1	24 VDC Base Hydraulic unit
HY033	2	DIN connector cable with LED & surge suppressor
HY037	1	Pressure Sequence valve cartridge
HY049	0 or 2	Cavity Plug used only without Anti-float option (SHOWN)
HY056	2	12 VDC solenoid valve coil.
HY057	2	24 VDC solenoid valve coil.
HY068	1	Pump Handle (NOT SHOWN)

## Purple Anti-Float



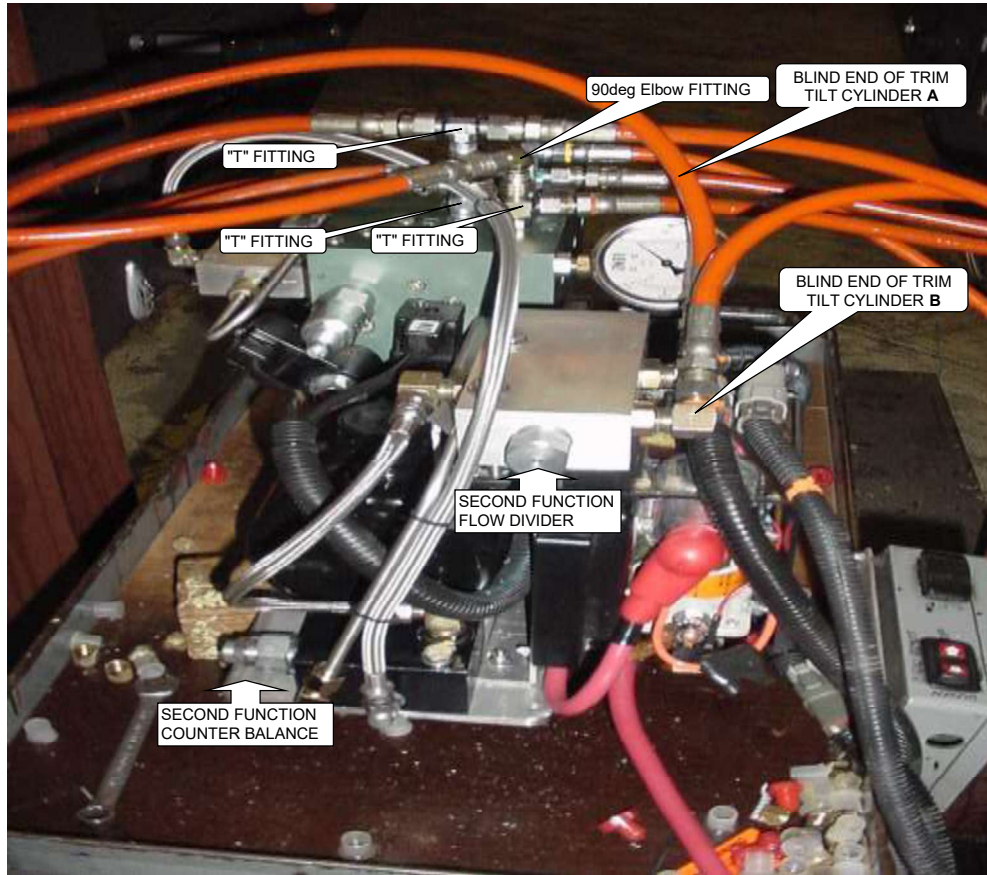
- C1 LOCK CYLINDER HOSE #1
- C2 LOCK CYLINDER HOSE #2
- A1 #1 LIFT CYLINDER HOSE FITTING BLIND END
- B1 #1 LIFT CYLINDER HOSE FITTING ROD END
- A2 #2 LIFT CYLINDER HOSE FITTING BLIND END
- B2 #2 LIFT CYLINDER HOSE FITTING ROD END



GHS PART NUMBER	QTY.	Purple Anti-Float
HY014	1	Purple Control Manifold with Anti-float
HY015	2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
HY020	1	Flow divider
HY049	0 or 2	Cavity Plug
HY024	4-Feb	5 Gpm restricted Sealed Pilot Counterbalance valve cartridge
HY026	1	Sintered bronze filter element
HY027	1	Sintered bronze filter element spring
HY028	1	0-3,000 psig glycerin filled pressure gauge #316SS
HY031	1	12 VDC Base Hydraulic unit
HY032	1	24 VDC Base Hydraulic unit
HY034	2	DIN connector cable with LED & surge suppressor
HY037	1	Pressure Sequence valve cartridge
HY056	2	12 VDC solenoid valve coil.
HY057	2	24 VDC solenoid valve coil.
HY068	1	Pump Handle (NOT SHOWN)

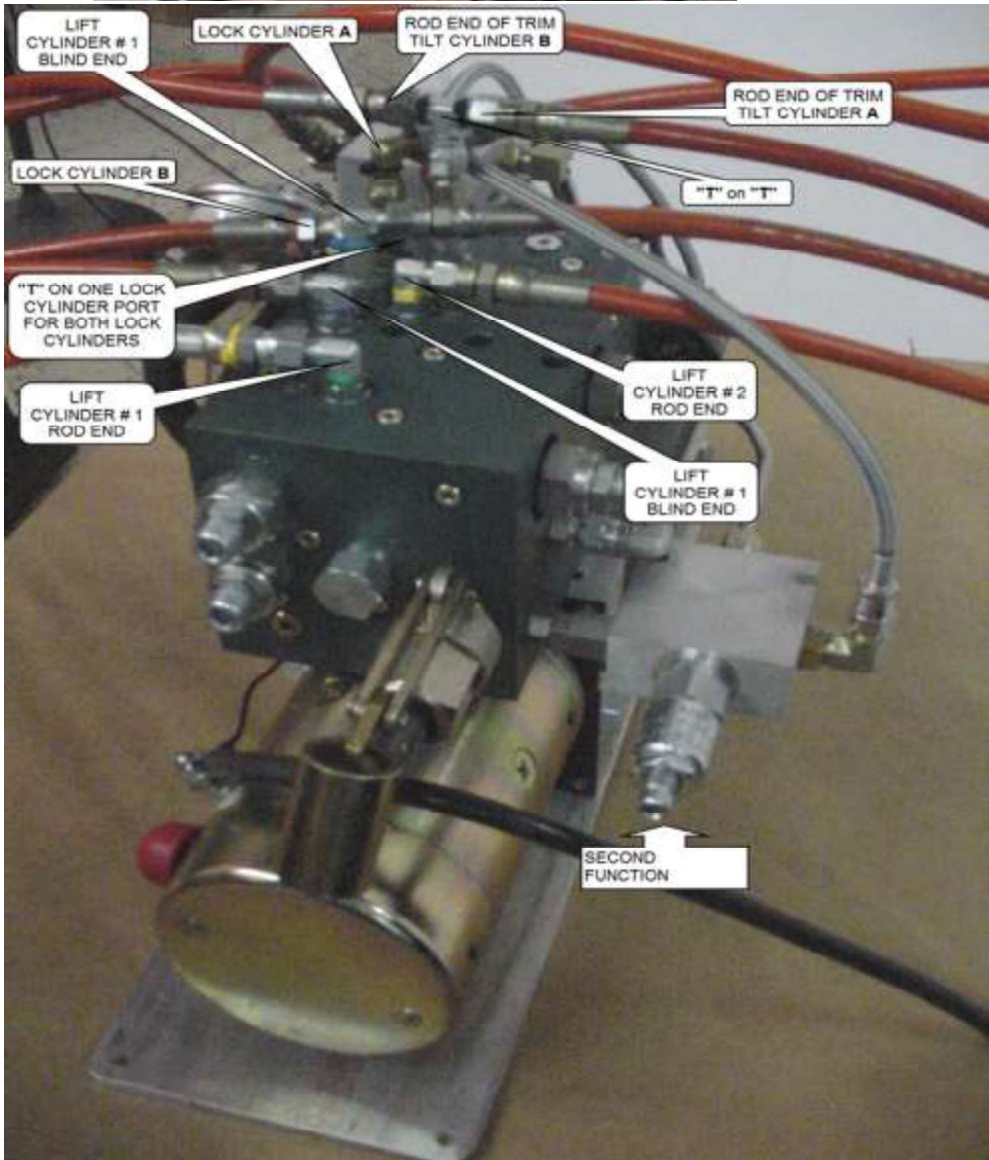
**GREEN HYDRAULIC PUMP WITH SECOND FUNCTION**

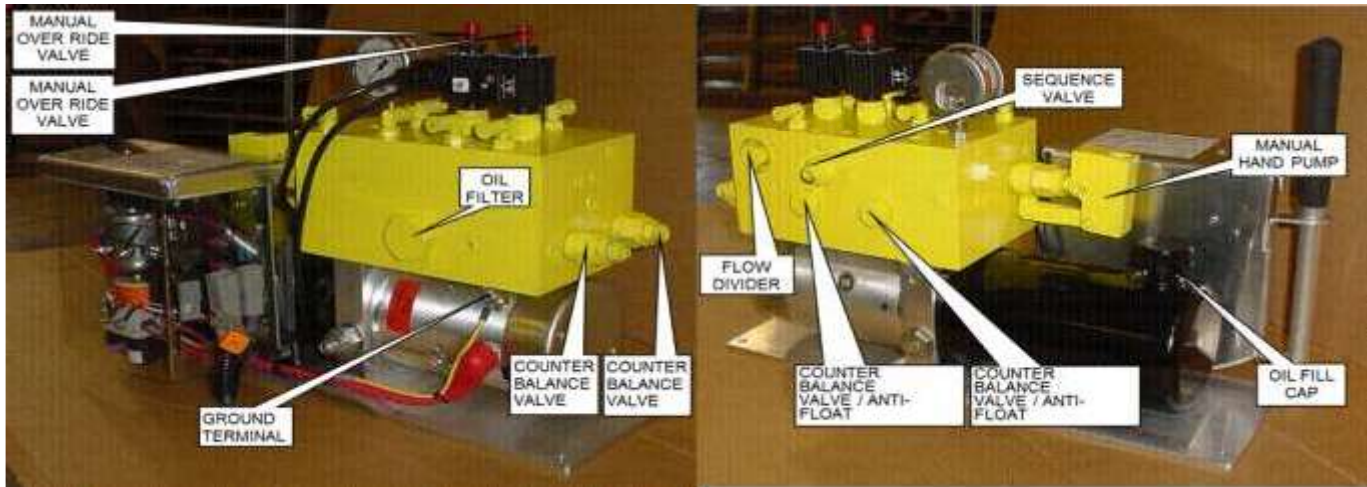
DO NOT ATTEMPT TO MAKE ANY ADJUSTMENTS TO THIS STYLE PUMP!  
ADJUSTMENTS TO THE SWIM PLATFORM SIDE OF THE PUMP AFFECT THE TRIM SIDE AND ADJUSTMENTS TO TRIM SIDE AFFECT SWIM PLATFORM SIDE. This pump is pre set at G.H.S and should only be worked on by otherwise persons only, with direct contact with G.H.S. Transom and or lift failure can occur



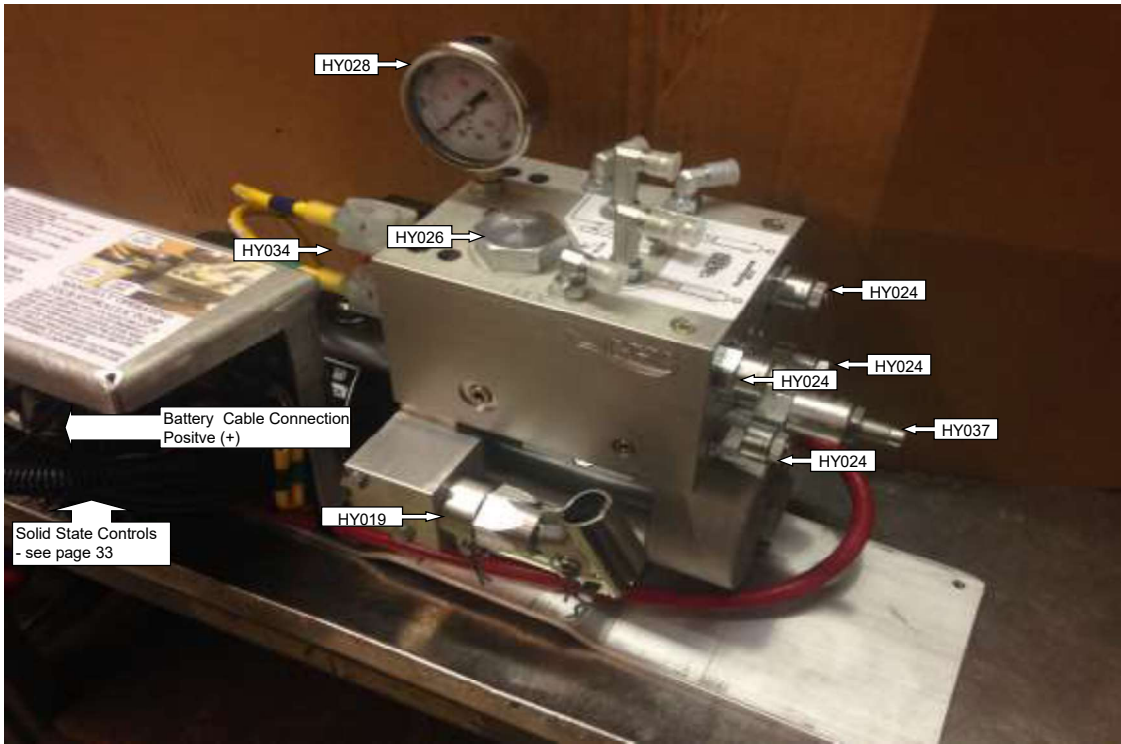
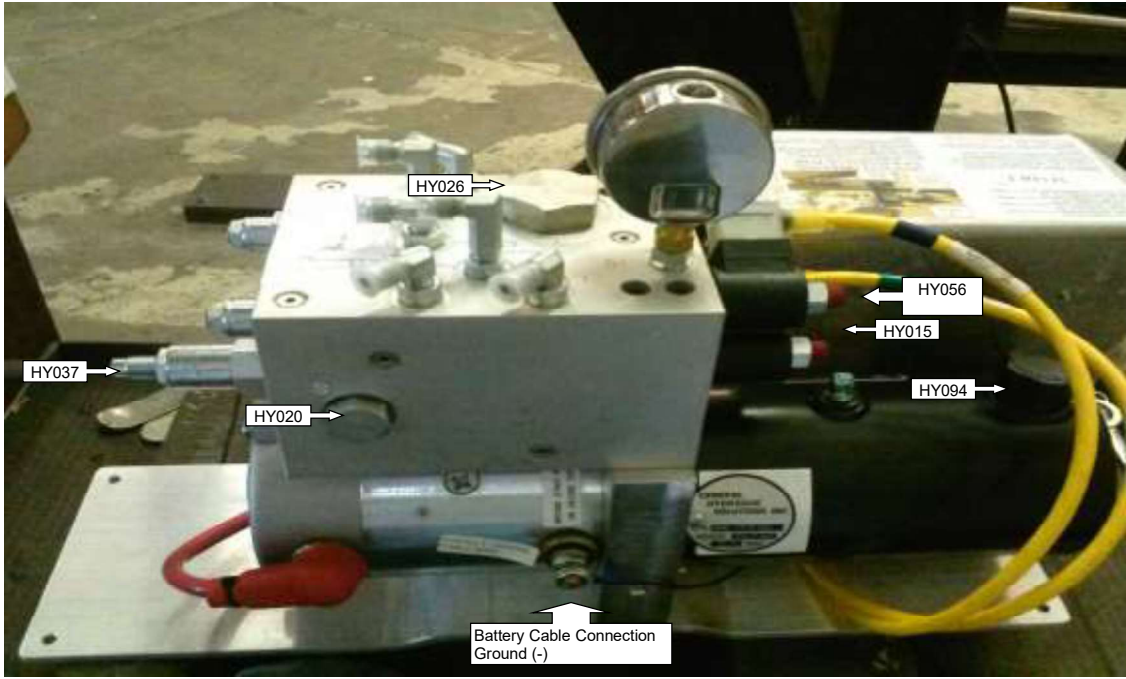
continued on next page

**GREEN HYDRAULIC PUMP WITH SECOND FUNCTION CONTINUED**





GHS PART NUMBER	QTY.	YELLOW HYDRAULIC PUMP
HY056	2	12 VDC solenoid valve coil.
HY057	2	24 VDC solenoid valve coil.
HY015	2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
HY020	1	Flow divider
HY024	2	5 Gpm restricted Sealed Pilot Counterbalance valve cartridge
HY037	1	Pressure Sequence valve cartridge
HY026	1	Sintered bronze filter element
HY027	1	Sintered bronze filter element spring
HY094	1	Filler Cap

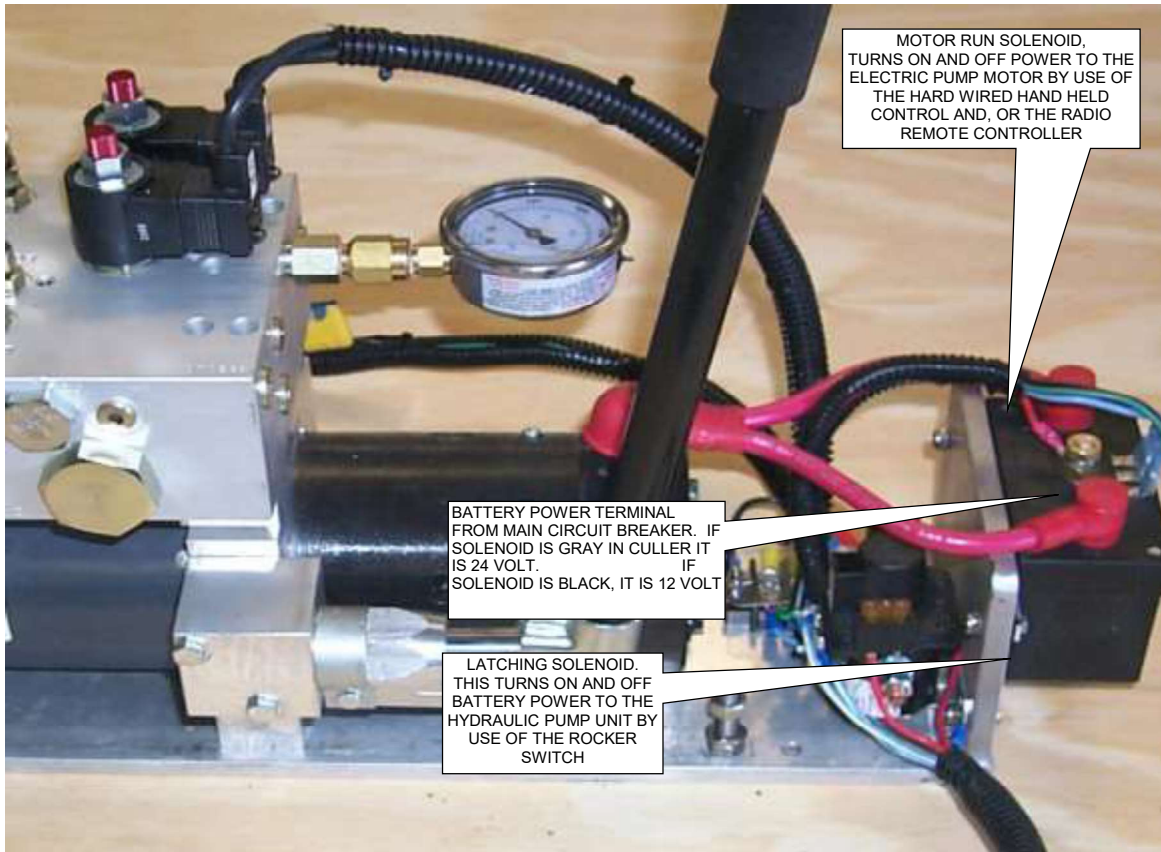
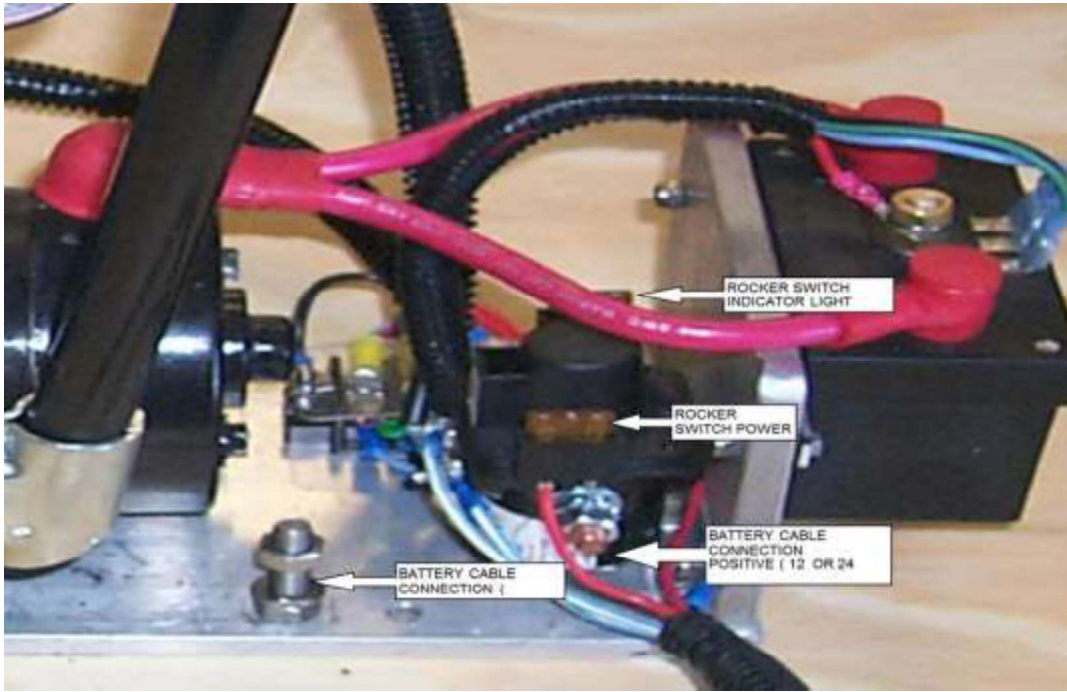


continued on next page

GHS PART NUMBER	QTY.	SILVER HYDRAULIC PUMP Second Generation
-----------------	------	---

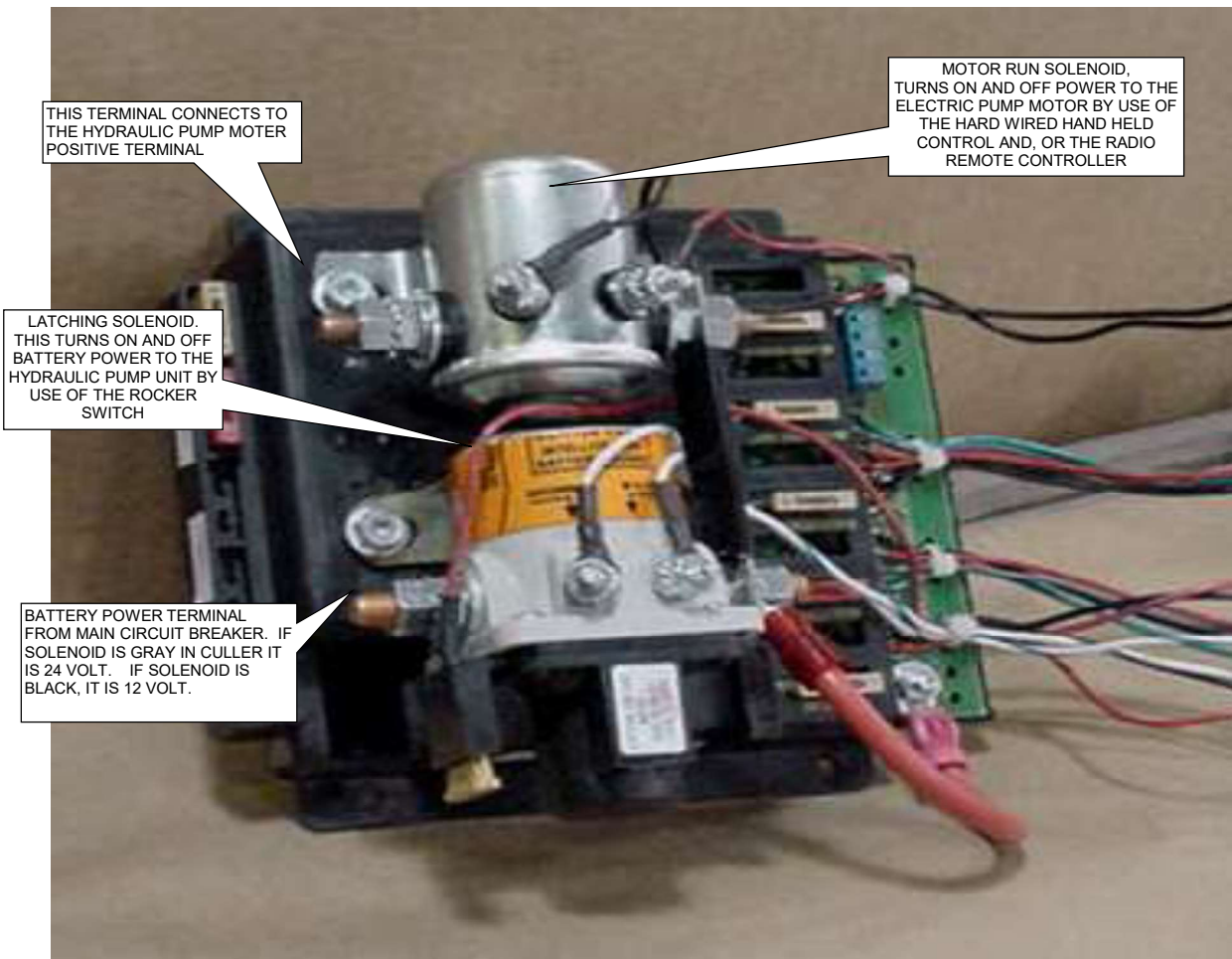
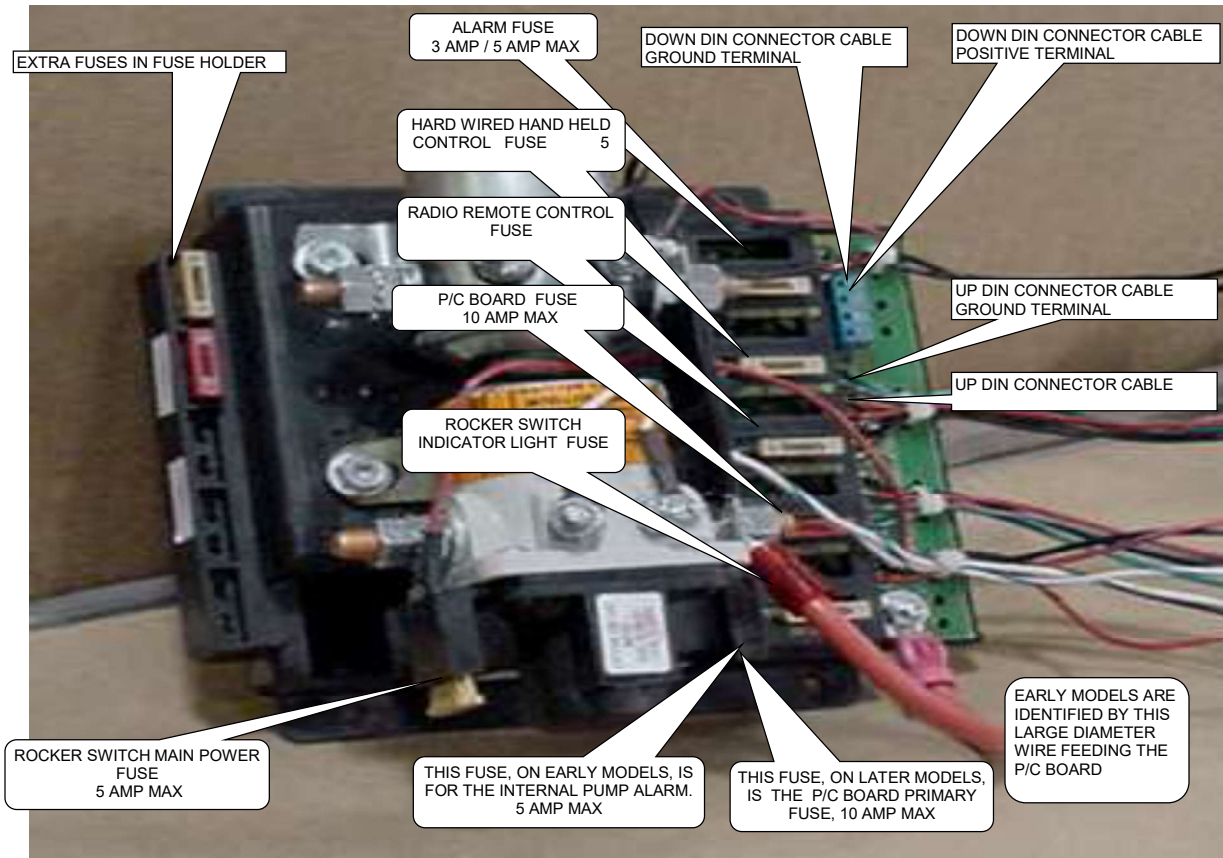
HY015	2	2-pos, 3-way directional valve cartridge with locking Manual ovr'd
HY019	1	Hand pump Cartridge
HY020	1	Flow divider (Sun)
HY024	2 or 4	5 Gpm Counterbalance valve cartridge (Pump shown has AntiFloat Feature)
HY026	1	Filter sintered bronze element
HY028	1	0-3,000 psig glycerin filled pressure gauge #316SS
HY034	2	DIN connector cable with LED & surge suppressor
HY037	1	Pressure Sequence valve cartridge
HY056	2	12 VDC Solenoid valve coil.
HY057	2	24 VDC Solenoid valve coil.
HY068	1	Pump Handle (NOT SHOWN)
HY094	1	Filler Cap
10053-B2	1	12VDC Pump Assembly (Includes Pump, Manifold, Solid State controls)
10052-B3	1	24VDC Pump Assembly (Includes Pump, Manifold, Solid State controls)

**CONTROLS, FIRST GENERATION HARD WIRED**

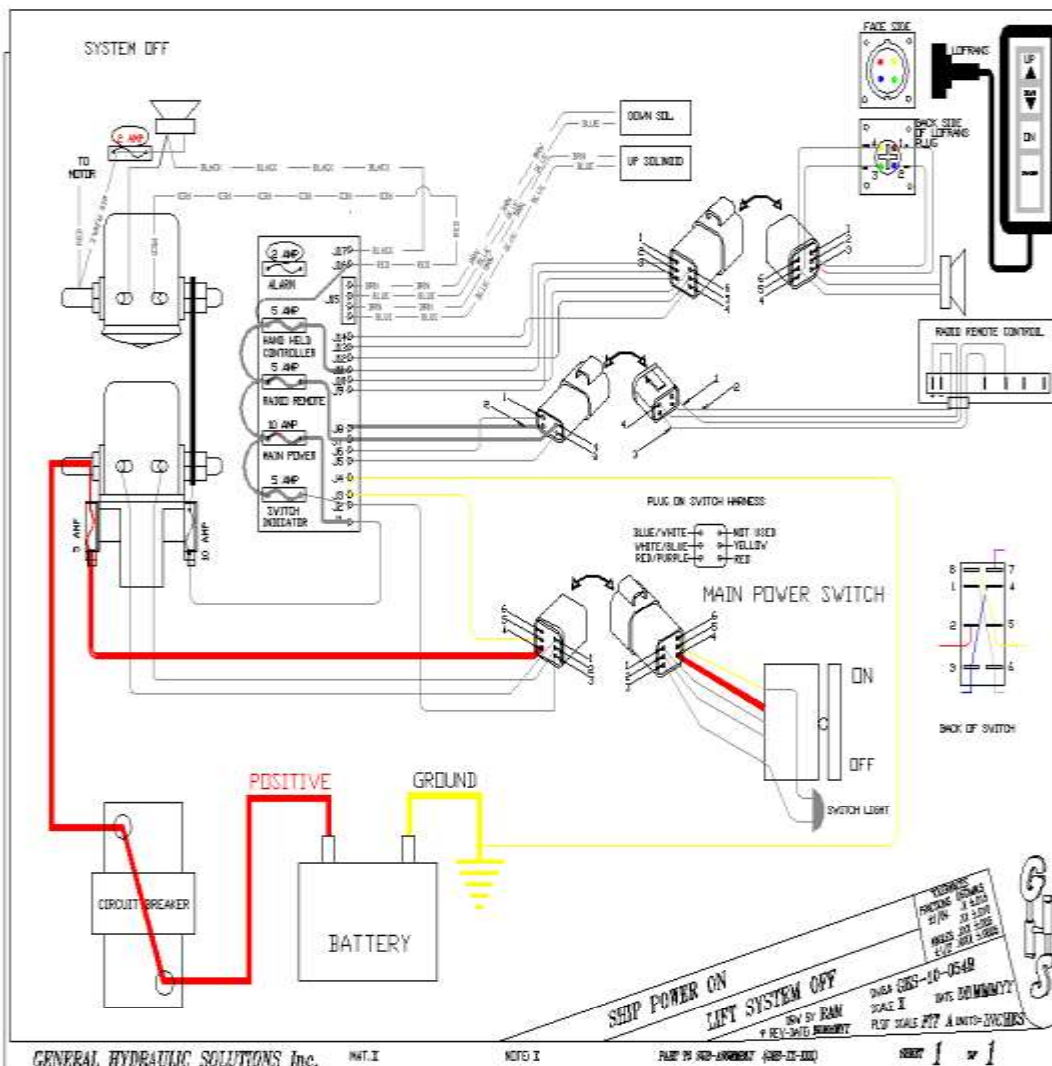
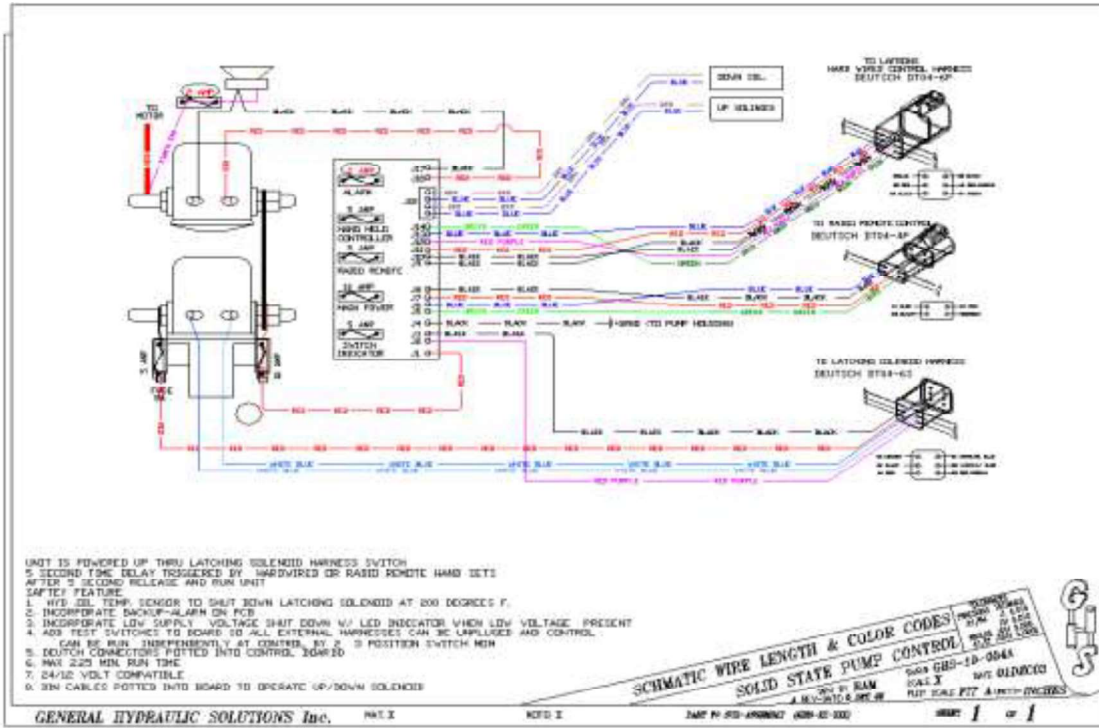


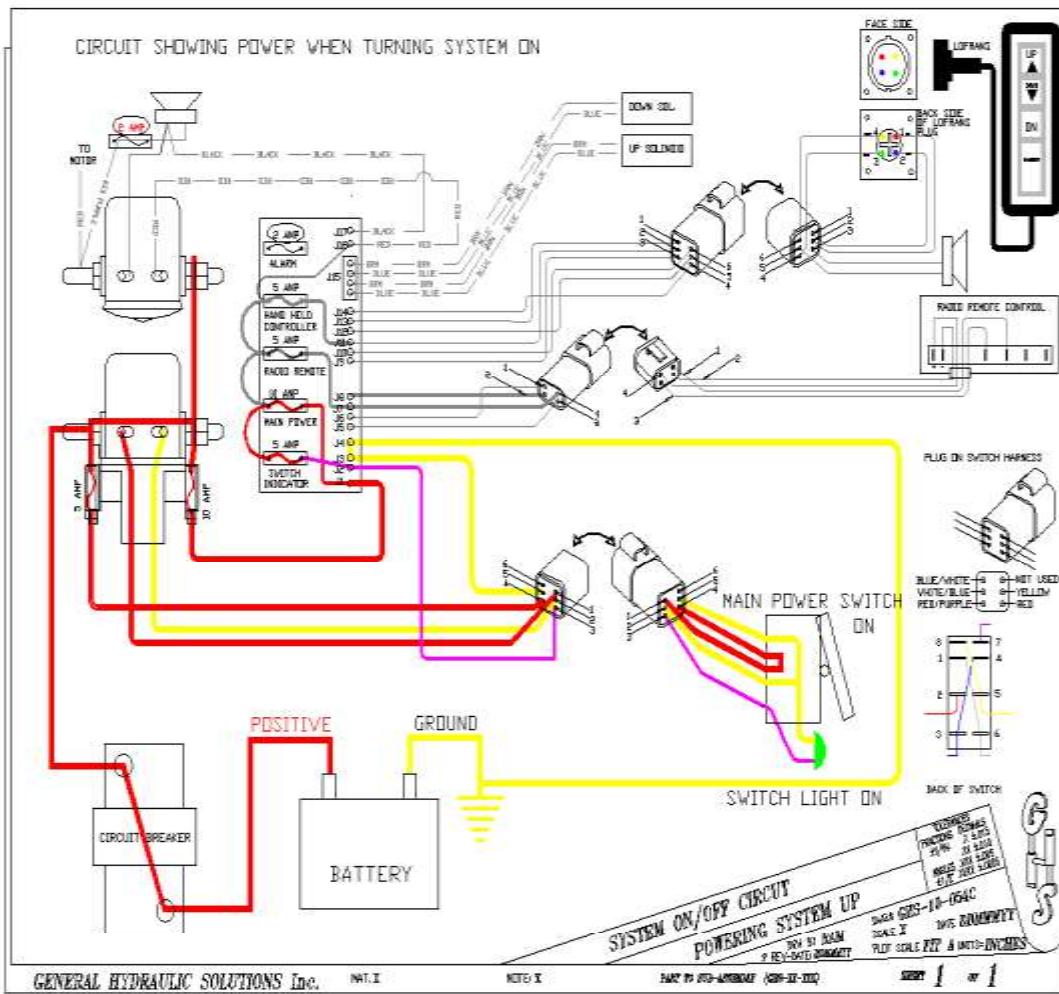
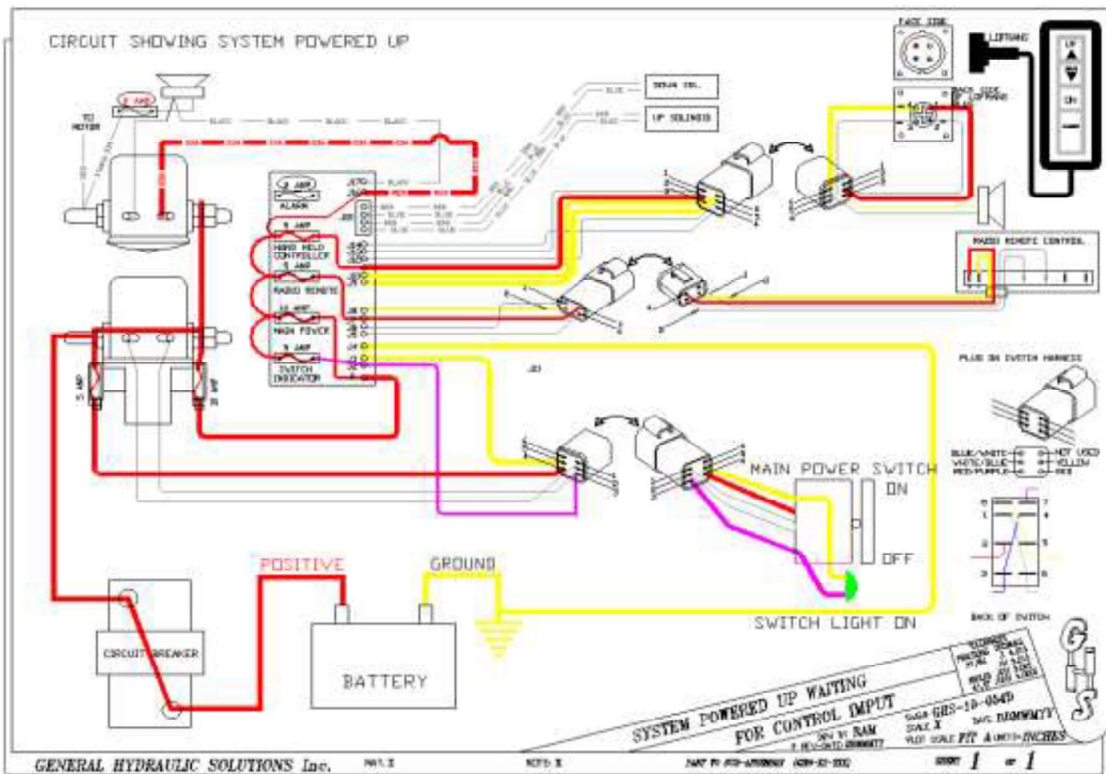


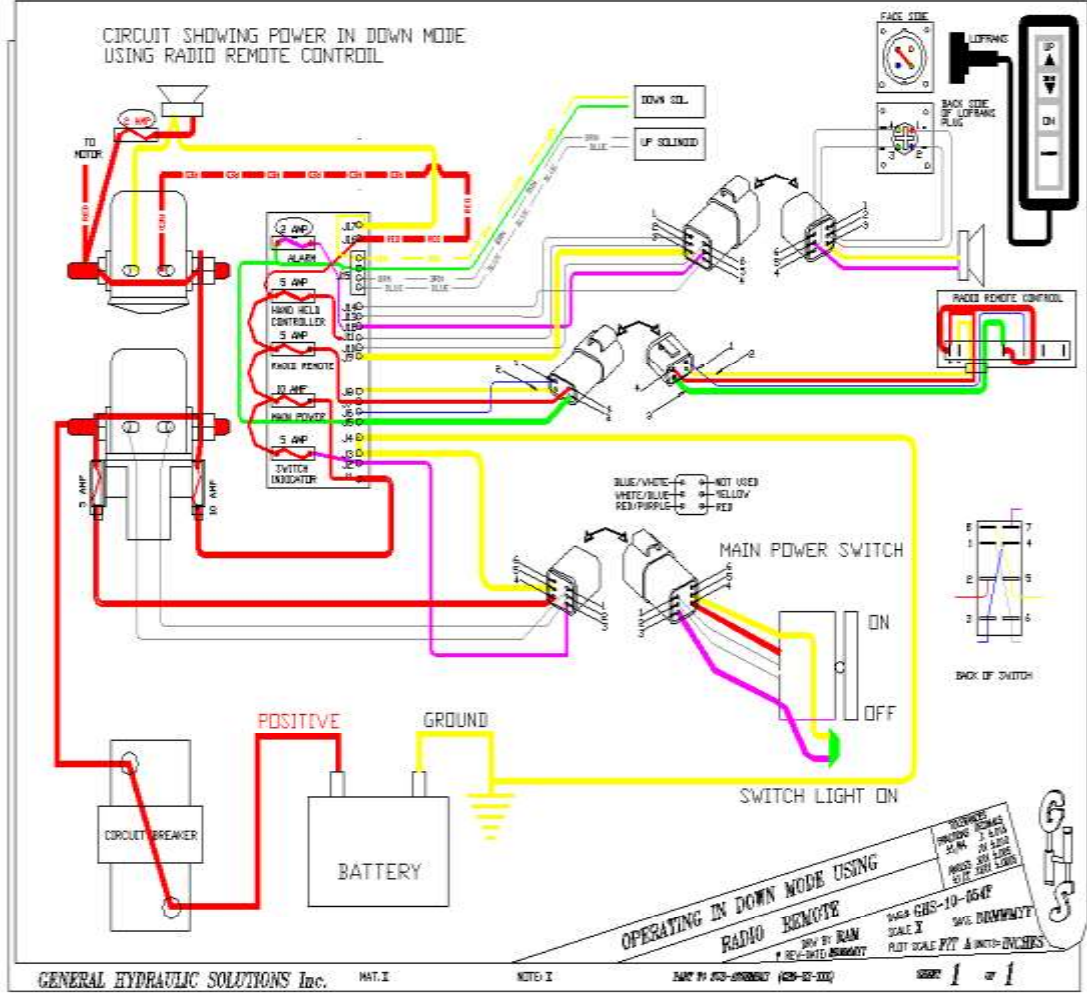
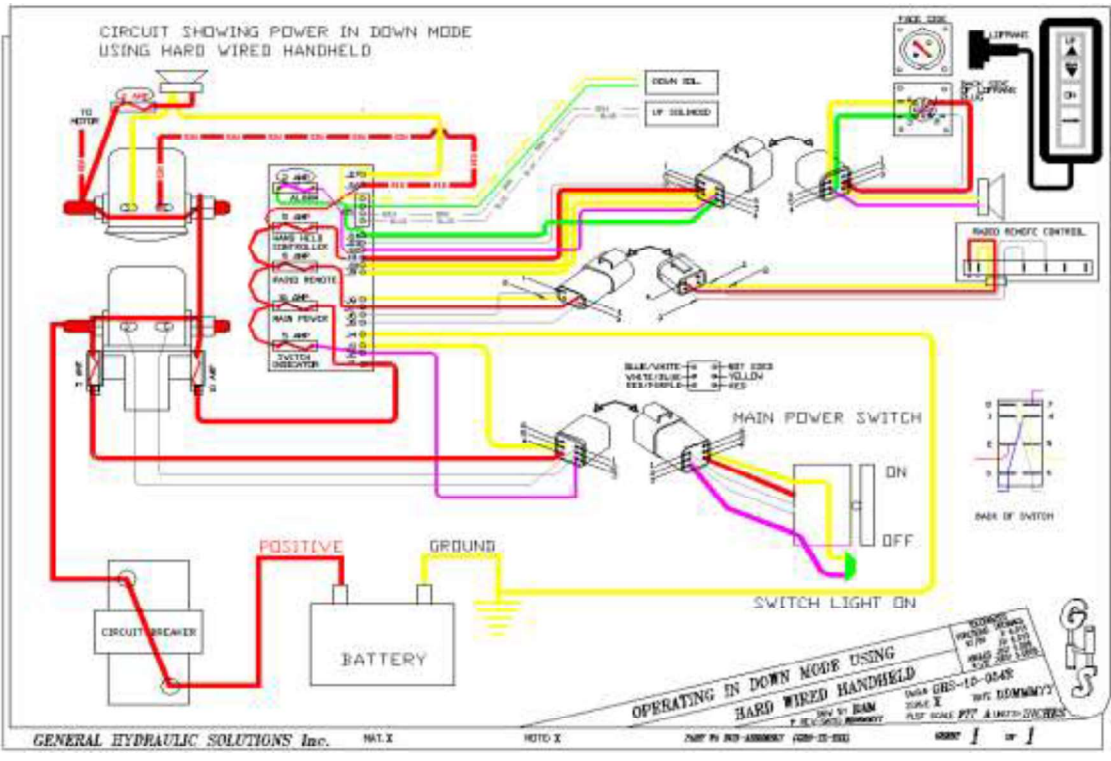
**CONTROLS, NEW SOLID STATE (CURRENT)**

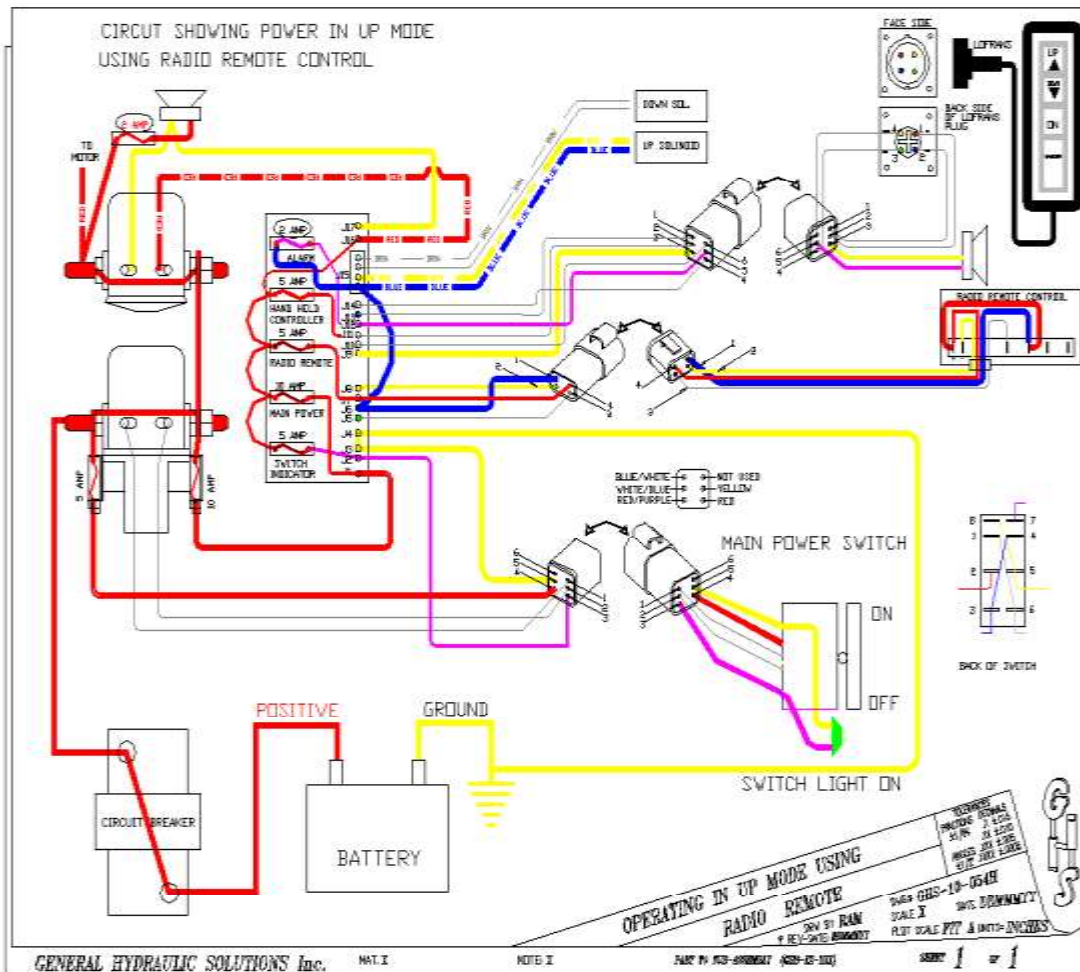
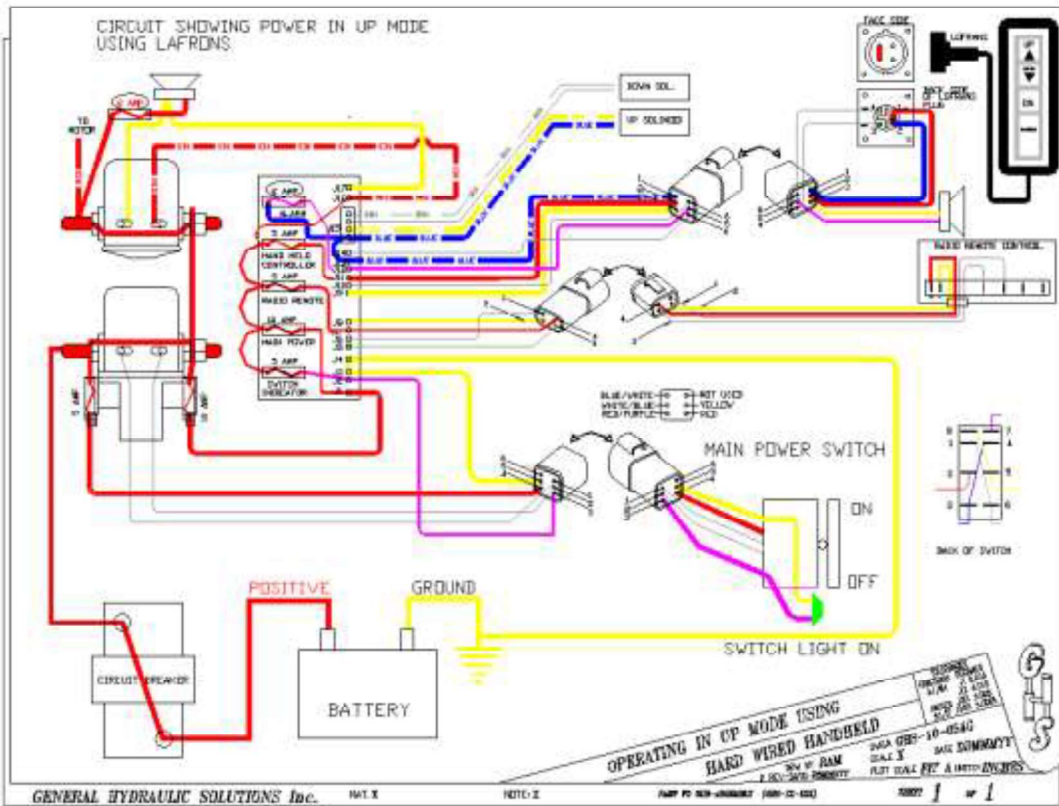


ELECTRICAL SCHEMATICS IN THE DIFFERENT STATES OF OPERATION









**BLEEDING PROCEDURE** **NOTE:** DURING THIS PROCEDURE DO NOT RUN PUMP FOR MORE THAN 4 MINUTES WITHOUT ALLOWING COOL DOWN OF PUMP MOTOR.

**TOOLS NEEDED:** 2 HOSES THAT WILL REACH FROM BLEED FITTING ON LOWER END OF CYLINDER TO BLIND END BULKHEAD FITTING, WRENCHES 9/16 & 5/8

WITH LIFT IN UP POSITION CHECK OIL LEVEL TO INSURE OIL LEVEL IS ONE INCH FROM BOTTOM OF FILLER NECK.

LOWER LIFT TILL ARMS ON BOTH SIDE BOTTOM OUT ON BOTTOM PIN OR ON EARLY MODELS 1999 THRU MID 2000 CYLINDER WILL BOTTOM OUT.

REMOVE SS HOSES FROM BLIND END OF CYLINDER (OIL THAT FLOWS TO LOWER THE LIFT

**NOTE:** BOTH SIDES MUST BE HOOKED UP TO BLEED THE SYSTEM WITH THIS PROCEDURE

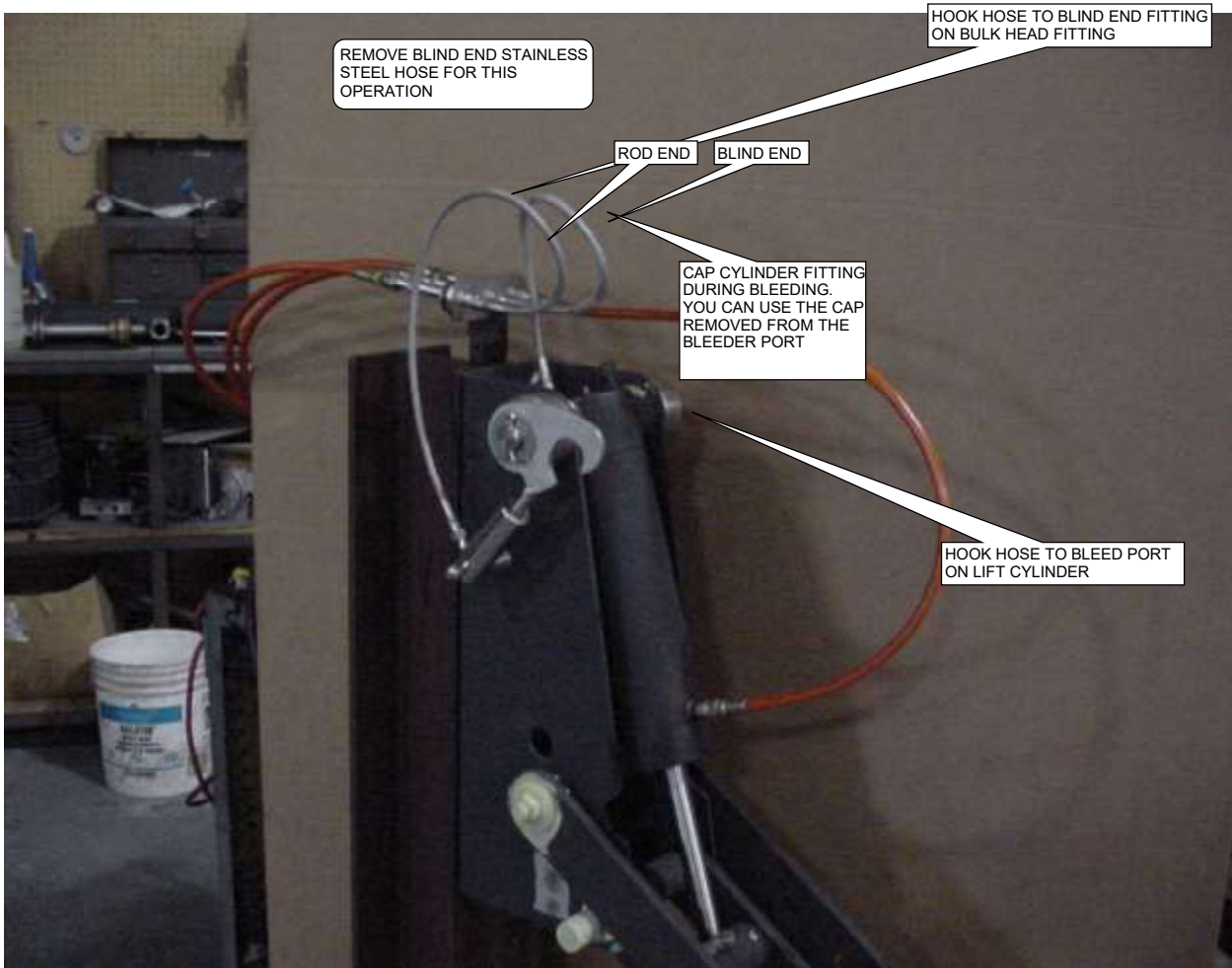
**NOTE:** IF THIS PROCEDURE IS BEING DONE WHILE THE BOAT IS FLOATING PRE-FILL HOSES WITH ISO 32 HYDRAULIC OIL AND PLUG ONE END OF HOSE TO MINIMIZE THE AMOUNT OF SEAWATER THAT COULD GET IN SYSTEM.

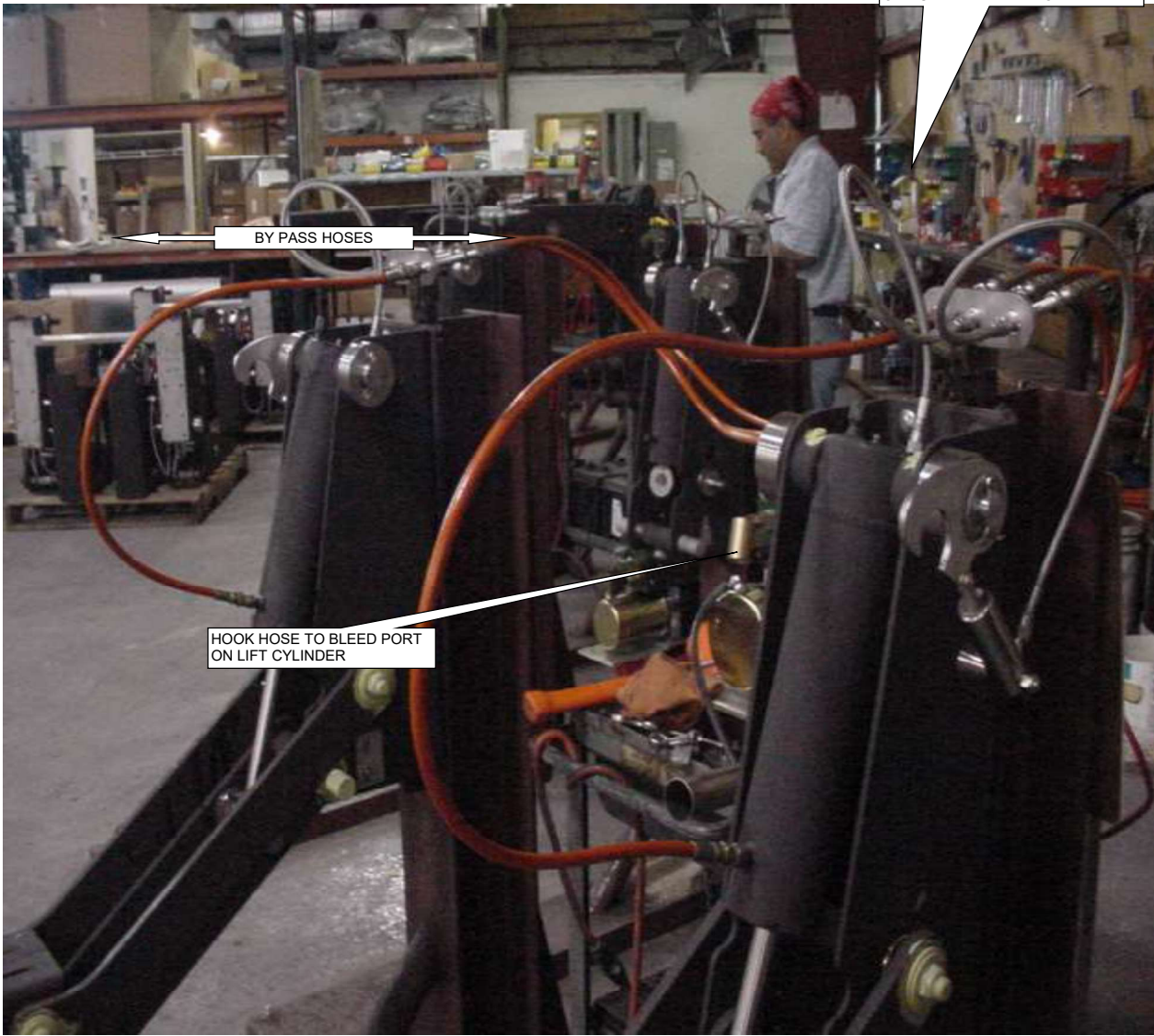
REMOVE CAP FROM BLEED FITTING ATTACH HOSE TO BLEED FITTING AT LOWER END OF CYLINDER, INSTALL CAP THAT WAS REMOVED TO BLIND END OF CYLINDER FITTING, **IF BOAT IS FLOATING** REPEAT THIS OPERATION TO OTHER SIDE DO NOT ATTACH HOSE TO BULKHEAD FITTING TILL BOTH SIDE ARE INSTALLED

POWER SYSTEM UP AND BUMP THE UP BUTTON THIS WILL PURGE ANY CONTAMINATE THAT ENTERED HOSE WHILE INSTALLING UNDERWATER

INSTALL OTHER END OF HOSE TO BULKHEAD FITTING

POWER UP SYSTEM, PUSH UP BUTTON RUN SYSTEM FOR 1-1/2 MINUTES THIS WILL RECIRCULATE THE OIL THRU THE ROD END CAVITY OF THE CYLINDERS.





HOOK HOSE TO BLIND END FITTING  
ON BULK HEAD FITTING

BY PASS HOSES

HOOK HOSE TO BLEED PORT  
ON LIFT CYLINDER

# Material Safety Data Sheets

## SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

### Chevron Clarity® Hydraulic Oil AW

Product Number(s): CPS230340, CPS230341, CPS230342

Synonyms: Chevron Clarity® Hydraulic Oil AW ISO 46

#### Company Identification

Chevron Texaco Global Lubricants

6001 Bollinger Canyon Rd.

San Ramon, CA 94583

United States of America

www.chevron-lubricants.com

Transportation Emergency Response

CHEMTREC: (800) 424-9300 or (703) 527-3887

#### Health Emergency

Chevron Texaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623

#### Product Information

email : lubemsds@chevron.com

Product Information: (800) LUBE TEK

MSDS Requests: (800) 414-6737

#### Chevron Clarity® Hydraulic Oils AW ISO 32, 46, 68

Chevron Clarity Hydraulic Oils AW are ashless (zinc-free) oils that meet or exceed the performance requirements of conventional anti-wear fluids while providing an additional level of environmental safety. All grades are approved Denison HF-O, while ISO 32 and 46 are approved against Cincinnati Milacron P-68 and P-70, respectively. ISO 46 meets both the Vickers anti-wear requirements of M-2950-S for mobile hydraulic systems and I-286-S for industrial hydraulic systems. Chevron Clarity Hydraulic Oils AW are inherently biodegradable and pass the EPA's acute aquatic toxicity (LC-50) test. These oils have substantially better oxidation stability than conventional hydraulic fluids (18,000 hour TOST life) which equates to greatly extended oil life in severe service applications. The hydraulic oils are designed for use in the vane-, piston-, and gear-type pumps of mobile and stationary hydraulic equipment in environmentally sensitive areas. They are especially well suited for applications that exceed 5000 psi as found in axial piston pumps.

## SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	/ CAS NUMBER	/ AMOUNT
Non-hazardous additive blend in refined oil	/ MIXTURE	/ 100%weight

## SECTION 3 HAZARDS IDENTIFICATION

### IMMEDIATE HEALTH EFFECTS

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.

Ingestion: Not expected to be harmful if swallowed.

Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

## SECTION 4 FIRST AID MEASURES

Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

## SECTION 5 FIRE FIGHTING MEASURES

Leaks/ruptures in high pressure system using materials of this type can create a fire hazard when in the vicinity of ignition sources (eg. open flame, pilot lights, sparks, or electric arcs).

### FIRE CLASSIFICATION:

OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

### FLAMMABLE PROPERTIES:

PAGE 40

Flashpoint: (Cleveland Open Cup) 190 °C (374 °F) (Min)

Auto ignition: NDA

Flammability (Explosive) Limits (% by volume in air): Lower: NA Upper: NA

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:



**Fire Fighting Instructions:** This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

**Combustion Products:** Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

**SECTION 6 ACCIDENTAL RELEASE MEASURES**

**Protective Measures:** Eliminate all sources of ignition in vicinity of spilled material.

**Spill Management:** Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

**Reporting:** Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

**SECTION 7 HANDLING AND STORAGE**

**Precautionary Measures:** DO NOT USE IN HIGH PRESSURE SYSTEMS in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

**General Handling Information:** Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

**Static Hazard:** Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static Lightning and Stray Currents'

**Container Warnings:** Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

**SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION**

**GENERAL CONSIDERATIONS:**

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

**ENGINEERING CONTROLS:**

Use in a well-ventilated area.

**PERSONAL PROTECTIVE EQUIPMENT**

**Eye/Face Protection:** No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

**Skin Protection:** No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: 4H (PE/EVAL), Nitrile Rubber, Silver Shield, Viton.

**Respiratory Protection:** No respiratory protection is normally required.

If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

**Occupational Exposure Limits:**

Component

Non-hazardous additive blend in refined oil  
Non-hazardous additive blend in refined oil

Component	/ Agency	/ TWA	/ STEL	/ Ceiling	/ Notation
Non-hazardous additive blend in refined oil	/ ACGIH	/ 5mg/m3	/ 10 mg/m3	/	/
Non-hazardous additive blend in refined oil	/ OSHA Z-1	/ 5 mg/m3	/	/	/

**SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES**

**Attention:** the data below are typical values and do not constitute a specification.

**Color:** Colorless

**Physical State:** Liquid

**Odor:** Petroleum odor

PAGE 41

**pH:** NA

**Vapor Pressure:** <0.01 mmHg @ 37.8°C (100°F)

**Vapor Density (Air = 1):** >1

**Boiling Point:** >315.6°C (600°F)

**Solubility:** Soluble in hydrocarbon solvents; insoluble in water.

**Freezing Point:** NA

**Melting Point:** NA

**Specific Gravity:** 0.86 - 0.87 @ 15.6°C (60.1°F) / 15.6°C (60.1°F)

**Viscosity:** 32 cSt - 61.2 cSt @ 40°C (104°F) (Min)

**SECTION 10 STABILITY AND REACTIVITY**

**Chemical Stability:** This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Incompatibility With Other Materials:** May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**Hazardous Decomposition Products:** None known (None expected)

**Hazardous Polymerization:** Hazardous polymerization will not occur.

#### SECTION 11 TOXICOLOGICAL INFORMATION

##### IMMEDIATE HEALTH EFFECTS

**Eye Irritation:** The eye irritation hazard is based on evaluation of data for similar materials or product components.

**Skin Irritation:** The skin irritation hazard is based on evaluation of data for similar materials or product

**Skin Sensitization:** No product toxicology data available.

**Acute Dermal Toxicity:** The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.

**Acute Oral Toxicity:** The acute oral toxicity hazard is based on evaluation of data for similar materials or product

**Acute Inhalation Toxicity:** The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

##### ADDITIONAL TOXICOLOGY INFORMATION:

This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydro cracking, or severe hydro treating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B). These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

#### SECTION 12 ECOLOGICAL INFORMATION

##### ECOTOXICITY

**This material is not expected to be harmful to aquatic organisms. The ECOTOXICITY hazard is based on an evaluation of data for the components or a similar material.**

##### ENVIRONMENTAL FATE

This material is not expected to be readily biodegradable.

#### SECTION 13 DISPOSAL CONSIDERATIONS

Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

#### SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific

**DOT Shipping Name:** NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR

**DOT Hazard Class:** NOT APPLICABLE

**DOT Identification Number:** NOT APPLICABLE

**DOT Packing Group:** NOT APPLICABLE

**Additional Information:** NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

**IMO/IMDG Shipping Name:** NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE

**IMDG CODE**

**IMO/IMDG Hazard Class:** NOT APPLICABLE

**IMO/IMDG Identification Number:** NOT APPLICABLE

**IMO/IMDG Packing Group:** NOT APPLICABLE

#### SECTION 15 REGULATORY INFORMATION

**EPCRA 311/312 CATEGORIES:** 1. Immediate (Acute) Health Effects: NO

2. Delayed (Chronic) Health Effects: NO

3. Fire Hazard: NO

4. Sudden Release of Pressure Hazard: NO

5. Reactivity Hazard: NO

##### REGULATORY LISTS SEARCHED:

01-1=IARC Group 1

03=EPCRA 313

01-2A=IARC Group 2A

04=CA Proposition 65

01-2B=IARC Group 2B

05=MA RTK

02=NTP Carcinogen

06=NJ RTK

07=DOT Marine Pollutant

08=PA RTK

No components of this material were found on the regulatory lists above.

PAGE 42

##### CHEMICAL INVENTORIES:

**AUSTRALIA:** All the components of this material are listed on the Australian Inventory of Chemical Substances

**CANADA:** All the components of this material are on the Canadian DSL or have been notified under the New

**EUROPEAN UNION:** All the components of this material are in compliance with the EU Seventh Amendment

**JAPAN:** This material contains components that require notification before sale or importation into Japan.

**KOREA:** All the components of this product are on the Existing Chemicals List (ECL) in Korea.

**PHILIPPINES:** All the components of this product are listed on the Philippine Inventory of Chemicals and

**UNITED STATES:** All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical

**NEW JERSEY RTK CLASSIFICATION:**

Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be as follows: PETROLEUM OIL (Hydraulic oil)

**WHMIS CLASSIFICATION:**

This product is not considered a controlled product according to the criteria of the Canadian Controlled Products

**SECTION 16 OTHER INFORMATION**

**NFPA RATINGS:** Health: 0 Flammability: 1 Reactivity: 0

**HMIS RATINGS:** Health: 1 Flammability: 1 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, \*-Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

**REVISION STATEMENT:** This revision updates the following sections of this Material Safety Data Sheet: 1-16

**ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:**

TLV-Threshold Limit Value

TWA - Time Weighted Average

STEL - Short-term Exposure Limit

PEL - Permissible Exposure Limit

CVX - Chevron Texaco

CAS - Chemical Abstract Service Number

NDA - No Data Avabile

NA -Not Applicable

<= - Less Than or Equal To

>= - Greater Than or Equal To

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Chevron Texaco Energy Research & Technology Company, 100 Chevron Way, Richmond,

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.