PARTS AND OPERATION MANUAL

MULTIQUIP MAYCO

MODEL ST-70

Structural Concrete Pump

(Hatz Diesel Engine)

Revision #4 (05/29/07)

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THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

⚠ WARNING ⚠

CALIFORNIA — Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

NOTE PAGE

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NOTE: Specification and part number are subject to change without notice.

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✓ DHL
✓ Truck

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MULTIQUIP

ST-70 SPECIFICATIONS

PERFORMANCE	U.S.	METRIC
Pumping Rate — Volume Output	70 yd/hr.*	(54m/hr)*
Maximum Aggregate Size	1 1/2" minus	(38 mm)
Verticle Pumping Height	300 ft.*	(91m)*
Horizontal Pumping Distance	1200 ft.*	(366m)*
Engine — Diesel	HATZ 4M40L: 80HP (59.68KW)	
Hopper Capacity	10 cu. ft. capacity with optional forward/reverse re-mixer	
Line Size	3", 4" or 5" dia.	
Electrical System	12 v D.C.	
Hydraulic Oil System	58 gal.	
Fuel Tank Capacity	20 gal.	
Weight (with fluids)	4700 lb.	(2132kg)
Tire Size	7.35 - 14, 8 ply	
Brakes	12" dia. Hydraulic Surge	
All Steel Trailer Frame		

DIMENSIONS

L x W x H	149" X 67" X 55"	(356 X 170 X 140cm)
Weight (Shipping)	4,700 lbs.	(2132kg)

*These figures will vary with Pump Model, concrete mix design, line size, job site conditions and engine option.

Mayco reserves the right to change and modify the above specifications or design without notice or obligation.

Mechanical Drive Models

MAYCO PUMP, hereinafter referred to as “Manufacturer’, warrants each new Mayco Pump sold by the manufacturer to be free from defects in material and workmanship, under normal use and service, for a period of one year after the date of delivery to the original retail purchaser. Manufacturer will, at its option, replace or repair at a point designated by the Manufacturer any part or parts which shall appear to the satisfaction of the Manufacturer upon inspection at such point to have been defective in material or workmanship. This warranty does not obligate the Manufacturer to bear any transportation charges or labor charges in connection with the replacement or repair the of the defective parts.

This warranty does not apply to any pump if attempts have been made to pump concrete materials which have separated, to any pump which has been repaired with other than Genuine Mayco Parts, nor to any pump which has been altered, repaired or used in such manner as to adversely affect its performance, nor to normal service or maintenance or where blockages have developed within the pump manifold or placing line or which has been operated in any other manner not recommended by the Manufacturer. Due to the abrasive nature of concrete, Mayco does not cover natural component wear.

THIS WARRANTY AND MANUFACTURER’S OBLIGATION HEREUNDER, IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY AND ALL OTHER OBLIGATIONS OR LIABILITIES INCLUDING SPECIAL OR CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES ARISING OUT OF THE FAILURE OF ANY PUMP OR PART TO OPERATE PROPERLY, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Hydraulic Drive Models

MAYCO PUMP, hereinafter referred to as “Manufacturer”, warrants each new Mayco Pump sold by the manufacturer to be free from defects in material and workmanship, under normal use and service, for a period of one year or 2000 hours after the date of delivery to the original retail purchaser. The Manufacturer will, at its option, replace or repair at a point designated by Manufacturer any part or parts which shall appear to the satisfaction of Manufacturer upon inspection at such point to have been defective in material or workmanship. This warranty does not obligate Manufacturer to bear any transportation charges or labor charges in connection with the replacement or repair of the defective parts.

This warranty does not apply to any pump if attempts have been made to pump concrete materials which have separated, to any pump which has been repaired with other than Genuine Mayco Parts, nor to any pump which has been altered, repaired or used in such manner as to adversely affect it’s performance, nor to normal service or maintenance or where blockages have developed within the pump manifold or placing line or which has been operated in any other manner not recommended by the Manufacturer. Due to the abrasive nature of concrete, Mayco does not cover natural component wear.

THIS WARRANTY AND MANUFACTURER’S OBLIGATION HEREUNDER, IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY AND ALL OTHER OBLIGATIONS OR LIABILITIES INCLUDING SPECIAL OR CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES ARISING OUT OF THE FAILURE OF ANY PUMP OR PART TO OPERATE PROPERLY, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

READ THIS PARTS AND OPERATION MANUAL THOROUGHLY BEFORE USING THIS MACHINE. It describes the safe, proper and most efficient way to operate it. KNOW YOUR MACHINE!

- When operating concrete pumps the safety regulations of the responsible employers' liability insurance company must be observed. The observation of these regulations shall be the responsibility of the contractor and operator.
- The following are some supplementary recommendations:
- All safety devices and provisions against accidents such as warning labels and information signs, coverings, etc. must be in place. Do not remove or tamper with them. If they are missing, replace them.
- Check the operational reliability of the machine each time before it is put into operation. Any defects found must be repaired immediately.
- Allow the machine to be operated and maintained by qualified personnel only.
- Before leaving the machine, protect it from unauthorized use and unintentional movements.
- Unauthorized presence in the immediate area of the concrete pump is not allowed. Warn persons who are in the immediate area. Stop work if persons do not leave the area after having been warned.
- Wear personal protective equipment when operating the machine.

■ WARNING! DANGER OF AMPUTATION!

Never place your hands or any part of your body in the hopper or allow anyone else to do so while the engine is running or when there is accumulator hydraulic pressure or series injury could result.

TRAVEL AND TRANSPORTATION

The machine must not be moved with extended outriggers.

Before traveling, check the transportation safety devices of the outriggers, the tire pressure and the functioning of the brakes.

Use hoisting units with transport devices complying with safety requirements.

Hoisting cables or equipment are to be applied only at the lifting points provided.

TOWING:

1. Read the Atwood Hydraulic Surge Brake Installation Instructions.
2. The pump should not be towed in excess of 55 MPH (less depending on road conditions). It can be towed with any truck rated to pull a 5000 lb. load.
3. Before towing, check with local and state laws for proper compliance. (Refer to page 31)
   a. Secure the hitch on the ball and attach the breakaway cable and safety chain to the towing vehicle.
   b. Raise all stand pipes and secure.
4. Use only a 2" one-piece, all-steel, machined or forged ball rated at 5000 lbs. minimum capacity.
5. Do not tow the pump with concrete in the hopper.
6. Do not tow the pump with the concrete reducers attached.
7. Check all wheel lug bolts for proper tightness prior to towing.

STABILIZER JACK

Prior to jacking check the soil conditions. If necessary, enlarge the support foot area by placing square timbers underneath.

Keep a sufficient distance from excavations; slopes could break away because of support pressures.

On inclines and slopes place chocks behind the wheels.

Jack the pump in such a manner that it is in a horizontal (level) position. Check the position of the pump frequently.

CONCRETE PUMP

To avoid splashes due to suction of air, the agitator hopper must always be filled with concrete up to the mixing shaft.

DO NOT OPERATE ANY CONCRETE PUMP WITHOUT THE HOPPER GRILL FIRMLY IN PLACE.

NEVER ALLOW ANY HANDS NEAR THE SHUTTLE CRANK VALVE OR IN THE AGITATOR HOPPER WHILE THE MACHINE IS RUNNING.

WARNING! DANGER OF AMPUTATION!

Never place your hands or any part of your body in the hopper or allow anyone else to do so while the engine is running or when there is accumulator hydraulic pressure or series injury could result.

Refer to Operation section of this manual for more details.

PIPELINES

PIPELINES AND CLAMPS MUST BE OF SUFFICIENT SIZE FOR THE PUMP'S CAPACITY.

The pipeline connections must not be opened under working pressure. Before the pipeline is opened, pressure must be relieved by sucking back the concrete. Secure the couplings after the assembly of the pipeline.

When laying pipeline use as few bends as possible. Horizontal pipelines must be adequately supported. When installing a vertical pipeline, the best method is to use upright struts that can be anchored to the building.

It is preferable to install pipelines within the building whenever possible. See Operator's Manual and "Pumping Concrete" booklets for more information on pipeline installations.

CAUTION:

If the hoses or lines are blocked for any reason, or if the lines are kinked when starting up or during the pumping cycle, the pump pressure could straighten out the kink or force out the blockage. This rapid surge of material could cause the lines to whip or move in such a manner that it could cause injury to anyone working near the hosses or lines.

When moving hoses from one site application to another, it is important to walk the entire system and visually inspect for any kinks or sharp bends in the hose. You must and straighten them before starting or resuming the pumping operation.

Inspect the lines at all times to prevent the above conditions.

MAINTENANCE AND REPAIR

TURN OFF THE ENGINE AND DISCONNECT THE BATTERY CABLES BEFORE PERFORMING ANY MAINTENANCE OR REPAIRS.

MAKE SURE THAT THE ACCUMULATOR PRESSURE GAUGE READS ZERO BEFORE ALLOWING ANYBODY TO PUT THEIR HANDS INTO HOPPER OR SHUTTLE AREA.

Refer to maintenance section of this manual for more details.

MODEL ST-70

THE OPERATOR IS IN COMPLETE CHARGE OF THE PUMP AND DELIVERY SYSTEM AND IS RESPONSIBLE FOR HIS/HER OWN SAFETY AND TO WARN AND KEEP ALL OTHERS OUT OF DANGER.

Do not attempt to operate this equipment without a thorough understanding of this Parts and Operation Manual:

1. To prevent damage to equipment or injury to personnel, the following instruction must be followed carefully:

A. A copy of this manual and all others shall accompany the pump at all times.

B. This equipment shall be operated only by experienced operators or students under the direct supervision of an experienced operator.

C. No unauthorized persons shall be permitted to assist or remain in the vicinity of the unit while it is in operation, or during the, inspection, cleaning or repair for the make-ready operation.

D. This equipment shall not be towed or operated by individuals who cannot read and understand the signs, decals or operating instructions.

E. This equipment shall not be operated by individuals under the influence of alcohol or drugs.

F. Before towing, check the hitch and secure the breakaway cable and safety chain to the towing vehicle.

G. Tow only with a vehicle and hitch rated to pull a 5000 lb. load.

H. Use only a 2" one-piece, all-steel machined or forged ball rated for a minimum of 5000 lbs.

I. Before start-up, check the hopper and remove all obstructions.

J. Keep hands, feet and human body parts out of the hopper when the engine is running.

K. The engine must be turned off before performing any service operations. The engine is remote controlled and may start pumping any time the engine is running.

L. Do not use worn hoses or hose couplings – inspect daily.

M. Replace any worn or damaged hoses, or couplings, immediately.

N. Do not disconnect the hose couplings or nozzles while under pressure.

O. Never fill the fuel tank while the engine is running or hot. Avoid the possibility of spilled fuel which may cause a fire.

P. Always carry a fire extinguisher of adequate size and a first aid kit.

Q. Always wear a safety helmet and safety glasses when on a job site pumping.

R. Always have the hopper grate securely in place when pumping.

S. Pump in reverse when the shuttle valve or delivery system is plugged.

T. Guards, grates, covers, etc. **MUST NOT** be removed or altered.

U. If a failure or malfunction occurs, stop the pump and make all necessary repairs immediately.

V. Electrical and manual controls must always be in working order.

W. NEVER stand on the hopper grate.

X. Always position the pump on safe, solid, level ground, using the jack stands.

Chute Up

Chute Down

Stop

Start Pump Speed Up

Slow Pump Down

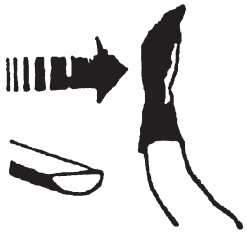
Stop Pump

Little Bit

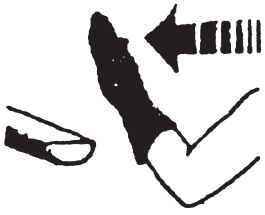
Add Water — 4 Gallons

All Done Clean Up

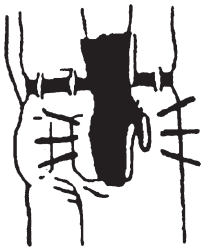
Drive In



Back Up



Pull Forward



Back In

CONCRETE MIX DESIGN

Mix design is most important to achieve maximum pumpability. Pumpability is affected by, among other factors, the type and gradation of aggregate used. Natural aggregates make a more workable mix and pump more readily than crushed aggregates. A blend of natural and crushed aggregates will produce a workable mix. The type and gradation of aggregates is equally important for workability as the size and percentage of coarse aggregates in the mix.

The term "aggregates" describes all of the solid materials, from the largest rock to the smallest grain of sand, contained in the concrete mix.

Concrete mixes with a consistency as dry as one-inch slump and as wet as ten-inch slump have been pumped; but for maximum efficiency from the pump, a slump ranging from two to six inches will produce a more workable mix than one that contains more or less water.

A slump rating should be used with discretion; it is not always a real indication of the pumpability of the mix. The concrete may be workable in the sense that it will readily flow into place, but the same mix may not respond to pressure. Overly wet mixes tend to separate. In addition to affecting the strength and quality of the concrete, the delivery system will not tolerate separation. Overly dry mixes are similarly unsatisfactory if they lack plasticity and tend to be crumbly. To be properly pumped, the mix must be able to continuously coat the inside of the line with a lubricating seal of mortar.

The principle of concrete pumping is based on self-lubrication. As it moves through the transfer line, the concrete takes the shape of a plastic cylinder. It is forced through the transfer line on a film of mortar that is self-troweled to the service of the transfer line around its full periphery by the slug of concrete itself.

There are four ways in which this seal can be lost:

1. By pumping excessively wet mixes which do not have enough cohesion to hold together.
2. By pumping harsh undersanded concrete with poorly graded aggregates which can jam together when the pressure becomes too great for the insufficient amount of sand to hold the aggregates apart.
3. By getting a rock pocket, such as mixer tailings, into the pump valve. This rock pocket will have an insufficient coating of mortar and the mix will not be plastic enough to allow the valve to operate or the mix to move in the line.
4. Through excessive bleeding. If the mix is short or fines, but the sand is otherwise fairly well graded, bleeding will not normally create any problems as long as the pump continues operation. But, if the pump is shut down, bleeding can result in a loss of lubrication and blocked erratic flow.

The above are bad concrete practices, regardless of how the mix is to be placed. But, these points do show that special mixes are not always needed, within limits, for pumping concrete. Good aggregate gradation is most important to pump concrete the maximum distance.

The use of admixtures can have a beneficial effect on pumpability. Most of the dispersing agents will fatten, retard bleeding, and increase workability. Thus, the average concrete can be pumped for appreciably longer distances. Air entraining agents will also improve workability, although they cannot be used as a substitute for good gradation of the aggregate. Pumping will not appreciably affect the final air content of the mix. High-early cement tends to give a more readily pumpable mix with superior water retaining qualities. However, if delays are likely to occur, extra care must be exercised due to the faster setting time over regular cement.

The Mayco Model ST-70 will pump a wide variety of concrete pump mixes. But, there are guidelines that must be followed. Use this information in conjunction with "The Delivery System" on page 32, Sections 18 thru 18.10.

REGIONAL DIFFERENCES

Concrete is made by mixing locally available rock and sand with cement and water. For this reason there are great differences in the pumpability of concrete from one region of the country to another.

It is impossible to define a specific mix for each region that the Model ST-70 be will working in. Therefore, the mixes on pages 14 through 17 will provide a basic guideline for establishing the proper mix design for your area.

Use this information to specify your requirements to your local ready-mix batch plant, contractor and civil engineer. It may take minor adjustments to make a mix pumpable, so you should explain your needs.

The elements that have to be controlled and consistently maintained by the batch plant are:

1. The sizing and mix percentage of rocks, gap graded from the largest down through the smallest sizes.
2. Sand with a sieve analysis that has the proper percentage of fines, ASTM C33 spec.
3. Sufficient cement to produce the required design strength of the concrete and provide the lubricating binder to pump the concrete through the delivery system.

   Use a minimum of:

   500 lbs. of cement/cu yd for 2500 p.s.i. concrete after 28 days.

   530 lbs. of cement/cu yd for 3000 p.s.i. concrete after 28 days.

   600 lbs. of cement/cu yd for 4000 p.s.i. concrete after 28 days.
4. Admixture pump-aid if necessary.
5. The proper amount of water to make a workable slump and plasticize the mix.

In addition, the Mayco Structural Concrete ST-70 Pump can be used to pump a large aggregate hard rock as follows:

1. Pea rock (1/2" minus) pump with mixes being as low as 30% rock and 70% sand. (See page 30, for comments on cleaning the pump.)
2. Shortening pea rock when used with an air compressor and nozzle. (See back pages for recommended set-up.)
3. “Mud Jacking”, high pressure grouting.

ST-70 — CONCRETE MIX INFORMATION

Job Identification* _____ Date* _____

Architect* _____ General Contractor* _____

Structural Engineer* _____ Concrete by* _____

THE PROPORTIONS SHOWN HERE ARE A RECOMMENDATION BASED ON TESTS OF SAMPLES RECEIVED BY THE LABORATORY. TESTS PERFORMED BY SUPPLIERS OR MANUFACTURERS OR ON PRIOR KNOWLEDGE OF THE MATERIALS INVOLVED AND IS LIMITED TO INFORMATION DERIVED FROM THESE SAMPLES TESTS BY OTHERS OR TO THAT PRIOR KNOWLEDGE.

IT IS UNDERSTOOD THAT THE CHEMICAL AND/OR PHYSICAL CHARACTERISTICS OF THESE MATERIALS ARE SUBJECT TO VARIATIONS THAT MAY ADVERSELY AFFECT THE FINISHED PRODUCT AND THAT THIS MIX DESIGN IS NOT TO BE USED EXCEPT AT THE USERS OWN RISK UNLESS THESE VARIATIONS ARE DETERMINED AND COMPENSATED FOR IN A MANNER APPROVED BY THE LABORATORY IN WRITING.

Specifications requirements: 2500 P.S.I. in 28 DAYS 3" SLUMP PUMP MIX 4" DIA LINE

SIEVE ANALYSIS	PER CENT PASSING U.S. STANDARD SIEVE									
MATERIAL	1 1/2	1	3/4							
FAI WCS	100	97	84	70	45	25	10	97.5		
FA2										
CA1 #4-3/8"	100	95	13	3						90.5
CA2 #3-1	100	96	61	6	1					91.0
CA3										
	100	98	85	50	40	33	21	12	4	

Source of Coarse & Fine Aggregates -* Cement – Type* Mix No*

Cement Sks/Cu. Yd.	5.3
Cement – Lbs.	500
Sand, Lbs. W.C.S.	1550
No. 4 Gravel (3/8"), Lbs.	500
No. 3 Gravel (1"), Lbs.	1220
No. 2 Gravel (1-1/2"), Lbs.	
Water, Lbs.	290
Total Weight	4060
Water, gal. per yd.	34.8
Water, gal./Sk. per yd.	6.5
Slump, calculated	3"
Admixture	3 fl. oz. POZZOLITH 300N/100 * OF CEMENT
Max. Water Allowable	*

***THIS INFORMATION PROVIDED BY ENGINEER OR BATCH PLANT**

THE ABOVE MIX DESIGN IS TYPICAL OF A PUMPABLE MIX. TO BE USED AS A GUIDELINE ONLY. REFER TO LOCAL AGENCY FOR JOB SPECIFICATION.

ST-70 — CONCRETE MIX INFORMATION

Job Identification* _____ Date* _____

Architect* _____ General Contractor* _____

Structural Engineer* _____ Concrete by* _____

THE PROPORTIONS SHOWN HERE ARE A RECOMMENDATION BASED ON TESTS OF SAMPLES RECEIVED BY THE LABORATORY. TESTS PERFORMED BY SUPPLIERS OR MANUFACTURERS OR ON PRIOR KNOWLEDGE OF THE MATERIALS INVOLVED AND IS LIMITED TO INFORMATION DERIVED FROM THESE SAMPLES TESTS BY OTHERS OR TO THAT PRIOR KNOWLEDGE.

IT IS UNDERSTOOD THAT THE CHEMICAL AND/OR PHYSICAL CHARACTERISTICS OF THESE MATERIALS ARE SUBJECT TO VARIATIONS THAT MAY ADVERSELY AFFECT THE FINISHED PRODUCT AND THAT THIS MIX DESIGN IS NOT TO BE USED EXCEPT AT THE USERS OWN RISK UNLESS THESE VARIATIONS ARE DETERMINED AND COMPENSATED FOR IN A MANNER APPROVED BY THE LABORATORY IN WRITING.

Specifications requirements: 3000 P.S.I. in 28 DAYS 4" SLUMP PUMP MIX 4" DIA LINE

SIEVE ANALYSIS PER CENT PASSING U.S. STANDARD SIEVE

MATERIAL	1 1/2	1	3/4							
FAI WCS			100	98	86	70	48	24	8	97.5
FA2										
CA1 #4-3/8"			100	94	16	4				90.5
CA2 #3-1	100		93	57	6	1				91.0
CA3										
	100		97	83	51	41	33	23	11	4

Source of Coarse & Fine Aggregates -* Cement – Type* Mix No*

Cement Sks/Cu.Yd.	5.
Cement – Lbs.	525
Sand, Lbs. W.C.S.	1520
No. 4 Gravel (3/8"), Lbs.	480
No. 3 Gravel (1"), Lbs.	1230
No. 2 Gravel (1-1/2"), Lbs.	
Water, Lbs.	295
Total Weight	4050
Water, gal. per yd.	35.4
Water, gal./Sk. per yd.	6.3
Slump, calculated	4"
Admixture	3 fl. oz. POZZOLITH 300N/100 * OF CEMENT
Max. Water Allowable	*

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ST-70 — CONCRETE MIX INFORMATION

Job Identification* _____ Date* _____

Architect* _____ General Contractor* _____

Structural Engineer* _____ Concrete by* _____

THE PROPORTIONS SHOWN HERE ARE A RECOMMENDATION BASED ON TESTS OF SAMPLES RECEIVED BY THE LABORATORY. TESTS PERFORMED BY SUPPLIERS OR MANUFACTURERS OR ON PRIOR KNOWLEDGE OF THE MATERIALS INVOLVED AND IS LIMITED TO INFORMATION DERIVED FROM THESE SAMPLES TESTS BY OTHERS OR TO THAT PRIOR KNOWLEDGE.

IT IS UNDERSTOOD THAT THE CHEMICAL AND/OR PHYSICAL CHARACTERISTICS OF THESE MATERIALS ARE SUBJECT TO VARIATIONS THAT MAY ADVERSELY AFFECT THE FINISHED PRODUCT AND THAT THIS MIX DESIGN IS NOT TO BE USED EXCEPT AT THE USERS OWN RISK UNLESS THESE VARIATIONS ARE DETERMINED AND COMPENSATED FOR IN A MANNER APPROVED BY THE LABORATORY IN WRITING.

Specifications requirements: 4000 P.S.I. in 28 DAYS 4" SLUMP PUMP MIX 5" DIA LINE

SIEVE ANALYSIS	PER CENT PASSING U.S. STANDARD SIEVE									
MATERIAL	1 1/2	1	3/4							
FAI WCS	100	97	84	56	36	22	8	97.5		
FA2										
CA1 #4-3/8"	100	95	13	3						90.5
CA2 #3-1	100	95	64	8	1					91.0
CA3	100	93	64	18	2					90.0
	100	98	90	73	49	40	26	17	10	4

Source of Coarse & Fine Aggregates -* Cement – Type* Mix No*

Cement Sks/Cu. Yd.	6.4
Cement – Lbs.	600
Sand, Lbs. W.C.S.	1480
No. 4 Gravel (3/8"), Lbs.	400
No. 3 Gravel (1"), Lbs.	470
No. 2 Gravel (1-1/2"), Lbs.	800
Water, Lbs.	300
Total Weight	4050
Water, gal. per yd.	36
Water, gal./Sk. per yd.	5.6
Slump, calculated	4"
Admixture	3 fl. oz. POZZOLITH 300N/100 * OF CEMENT
Max. Water Allowable	*

***THIS INFORMATION PROVIDED BY ENGINEER OR BATCH PLANT**

THE ABOVE MIX DESIGN IS TYPICAL OF A PUMPABLE MIX. TO BE USED AS A GUIDELINE ONLY. REFER TO LOCAL AGENCY FOR JOB SPECIFICATION.

SIEVE ANALYSIS — CONCRETE SAND				
SIEVE SIZE	ASTM C33 SPECS	% PASS ACCUM	SAMPLE #1	INDIV % RET
#4	95-100	98	2	2
8	80-100	89	11	9
16	50-85	71	29	18
30	25-60	47	53	24
50	10-30	23	77	24
100	2-10	7	93	16
200				
Fineness Modulus F.M. = 2.65				2.65

The sand content of pumpable concrete is very important. It is one of the two major ingredients that change due to regional location (the other is the rock or gravel).

Above is a typical sieve analysis of washed concrete sand (W.C.S.) to A.S.T.M. C33 specifications.

The total of the “Accumulated % Retained” is the Fineness Modulus (F.M.). The ideal F.M. is between 2.50 and 2.75, but the correct F.M. does not guarantee pumpability. Besides having a correct F.M. the percentage of sand by weight that passes through the No. 50 sieve must be between 15 and 30 and through the No. 100 sieve 5 and 10. The total of #50 and 100 mesh particles must be between 25 and 35 percent.

This fine material plus the cement will provide the necessary film of lubrication to move the concrete inside the delivery system.

SLUMP TEST PROCEDURE

1. To obtain a representative sample, take samples at three or more regular intervals throughout the discharge of the mixer or truck. DO NOT take samples at the beginning or end of the discharge.

2. Dampen the inside of the cone and place it on a smooth, moist, nonabsorbent, level surface large enough to accommodate both the slumped concrete and the slump cone. Stand on the "foot pieces" throughout the test procedure to hold the cone firmly in place.

3. Fill the cone !/3 full by volume and rod 25 times with a 1/2" dia x 24" lg. bullet-pointed steel rod. (This is a specific requirement which will produce non-standard results unless followed exactly.) Distribute rodding evenly over the entire cross section of the sample. (See figure A.)

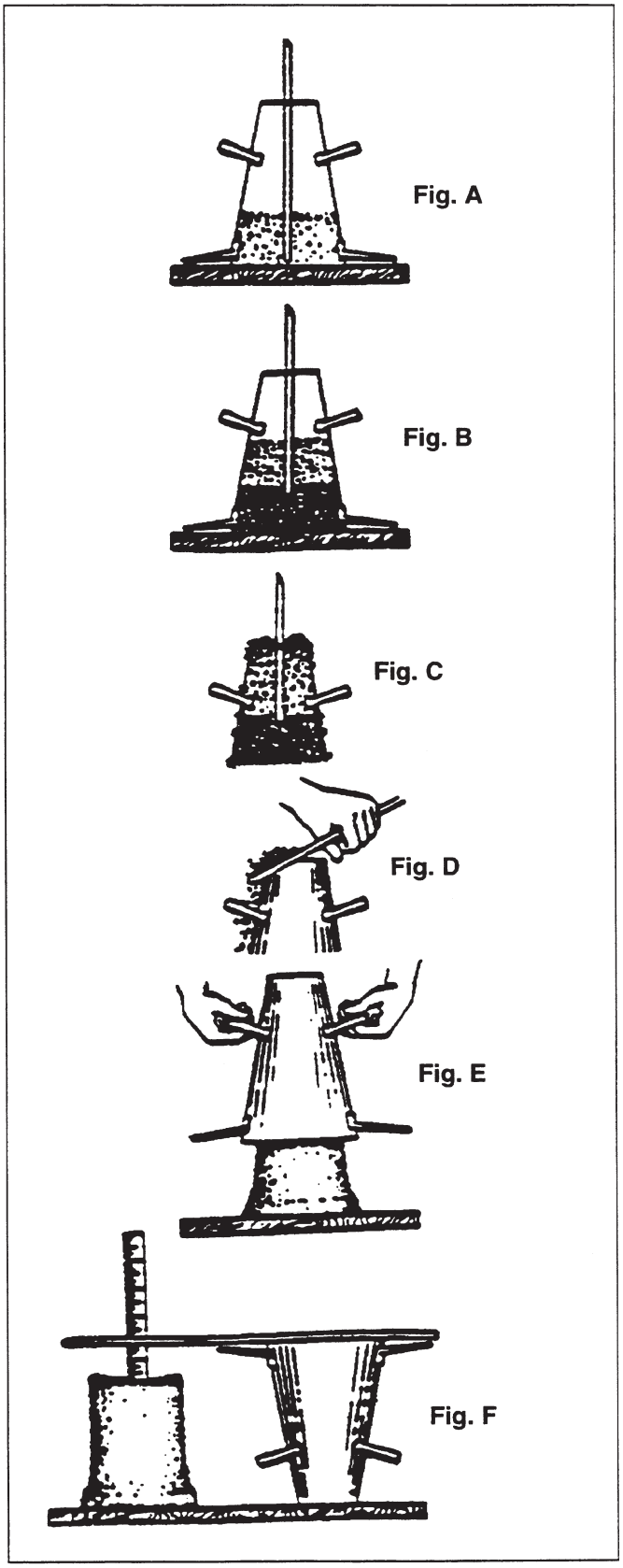
4. Fill cone another !/3 which will make the cone @/3 full by volume. Rod this second layer 25 times with the rod penetrating into, but not through, the first layer. Distribute rodding evenly over the entire cross section of the layer. (See figure B.)

5. Fill cone to overflowing. Rod this layer 25 times with rod penetrating into but not through, the second layer. Distribute rodding evenly over the entire cross section of this layer. (See figure C.)

6. Remove the excess concrete from the top of the cone, using the tamping rod as a screed. (See figure D.)

7. Lift the cone vertically with a slow even motion. Do not jar the concrete or tilt the cone during this process. (See figure E.) Invert the withdrawn cone, and place it next to, but not touching the slumped concrete.

8. Lay a straight edge across the top of the slumped cone. Measure the amount of slump in inches from the bottom of the straight edge to the top of the slumped concrete at a point over the original center of the base (See Figure F). The slump operation must be complete in a maximum elapsed time of 1-½ minutes. Discard the concrete. DO NOT use it in any other tests.

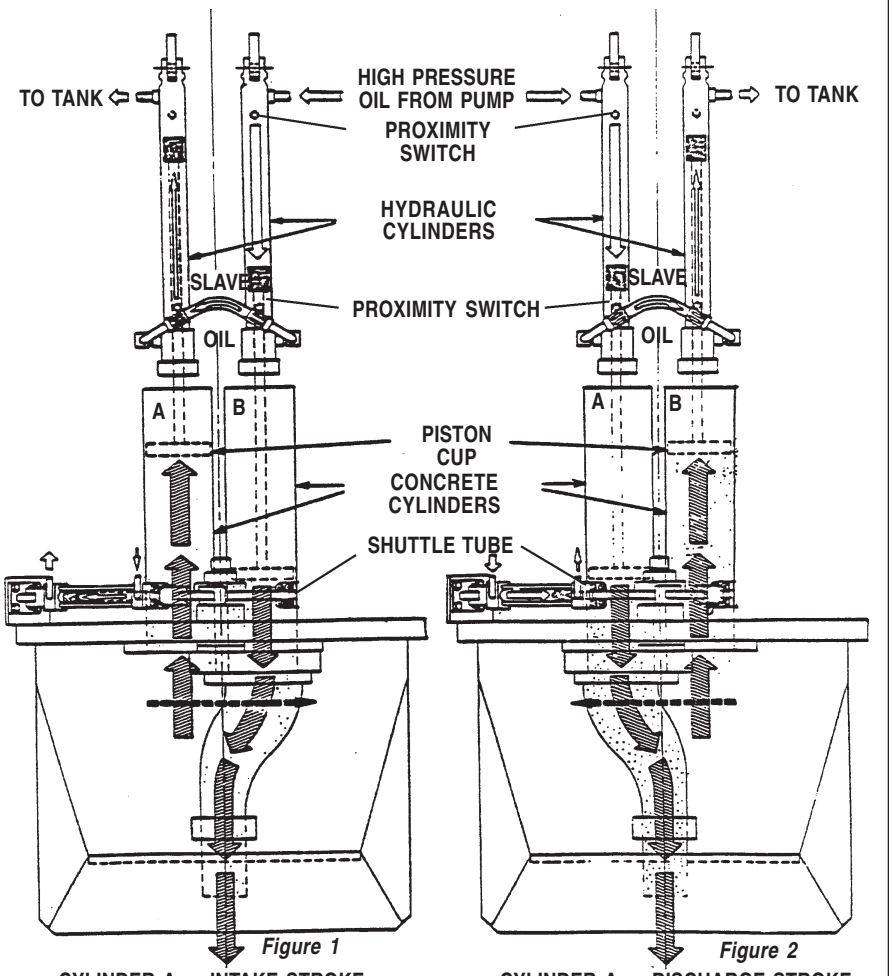


The following is a brief explanation of how the concrete cylinders, hydraulic cylinders, shuttle tube, valves and hopper work in sequence to pump concrete.

The hydraulic pressure is generated by a variable volume, pressure compensated, axial piston pump that is driven by a diesel engine. The hydraulic pressure is applied to one of the two hydraulic cylinders causing the hydraulic piston, which is connected to the concrete piston, to discharge concrete into the delivery line. The rod sides of the drive cylinders are hydraulically connected together creating a "slave circuit." As one cylinder is discharging concrete, the hydraulic oil from the rod side of the drive cylinders is being transferred through the slave circuit causing the opposite cylinder to move back on the suction stroke filling the cylinder with concrete. This operation is made possible by the shuttle tube located in the hopper and is sequenced to operate in conjunction with the cycling of the drive cylinders.

The ST-70 cycling sequence is initiated by an electrical signal generated by two proximity switches located in the drive cylinder. The proximity switches are normally open, magnetically sensing the movement of the main drive cylinder. As the drive cylinder piston head passes the proximity switch, an electrical signal is sent to the solenoid operated pilot valve which in turn directs pilot oil to the four valves controlling the drive cylinder and the shuttle cylinder.

A one-gallon accumulator assists the movement of the shuttle tube. This circuit assures that the shuttle tube will throw with the same intensity of each stroke regardless of how fast the main drive cylinders are cycling.



INITIAL START-UP PROCEDURE

This section is intended to assist the operator with the initial start-up of the MAYCO ST-70 Concrete Pump. It is extremely important that this section be read carefully before attempting to use the pump in the field.

DO NOT proceed to the Operating Procedures (field use) of this manual until this section is thoroughly understood.

NOTE:

Failure to understand the operation of the MAYCO ST-70 Concrete pump could result in severe damage to the pump or personal injury.

Figure 1 illustrates the basic operating controls and indicators on the MAYCO ST-70 Concrete pump. Each of the items referenced will be discussed. The sequence will be as follows:

1. Engine Oil
2. Hydraulic Oil
3. Fuel
4. Rear Stabilizer Stands
5. Emergency Stop Switch
6. Ignition Switch
7. Status Indicators
8. Control Switch, Engine Throttle Control
9. Volume Control
10. Engine Speed, Cooling Fan
11. Pressure Test
12. Hopper Remixer Control Lever
13. Manual and Radio Control
14. Cylinder Lubrication

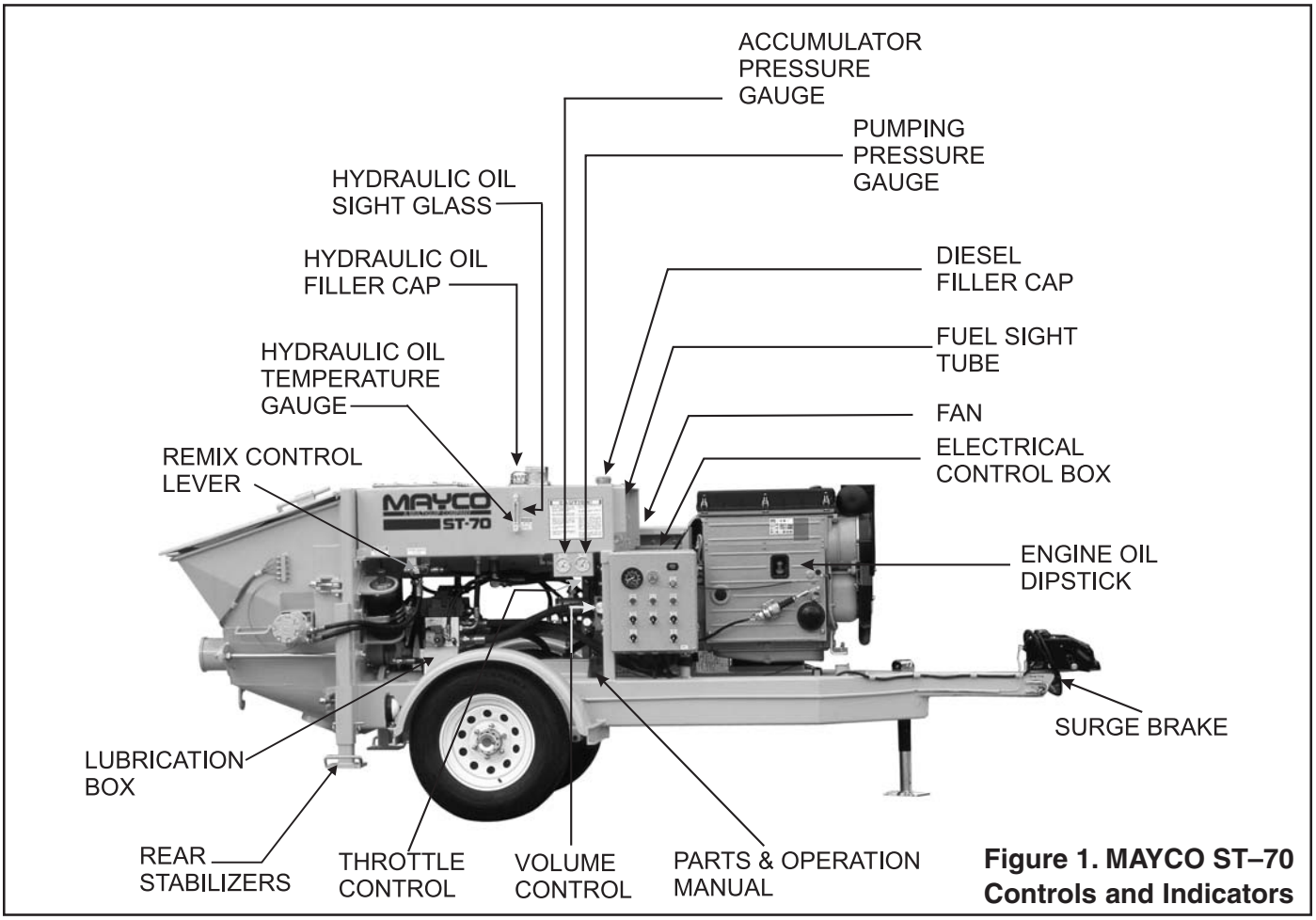


Figure 1. MAYCO ST–70 Controls and Indicators

Engine Oil

1. Pull the engine oil dipstick from the engine side panel as shown in Figure 2.

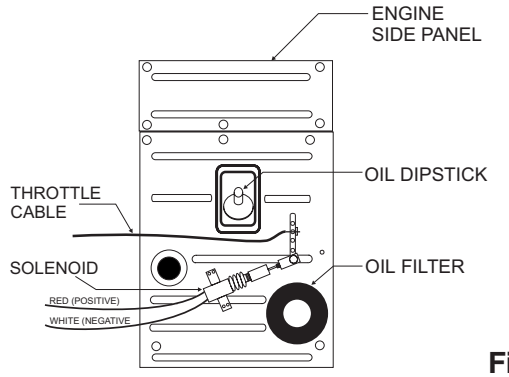


Figure 2.
Engine Oil

Determine if engine oil is low. If oil level is low, add correct amount of engine oil to bring oil level to a normal safe operating level. See Figure 3.

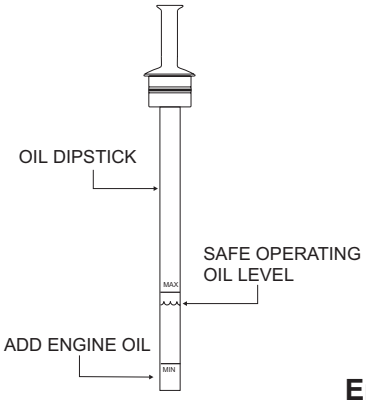


Figure 3.
Engine Oil Dipstick

Hydraulic Oil

2. Determine if the hydraulic oil level is low by observing the level of the oil in the Hydraulic Oil Sight Glass (Figure 4).

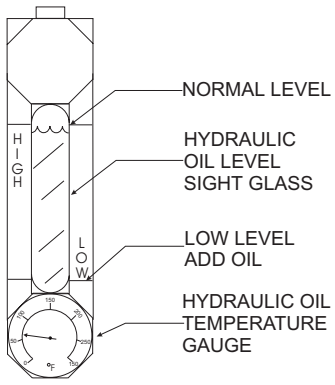


Figure 4.
Hydraulic Oil Sight Glass

If the hydraulic oil level is low, remove the cap just above the oil level sight glass and add the correct amount of hydraulic oil to bring the hydraulic oil level to a normal safe operating level. (Use Shell oil Tellus 68 or Mobil oil DFE26)

FUEL

3. Determine if engine fuel is low (Figure 5). If fuel level is low, remove the fuel filler cap and fill with diesel fuel.

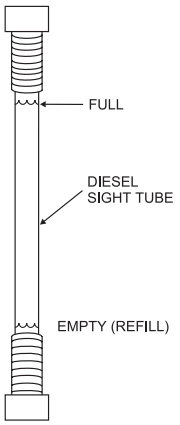


Figure 5.
Fuel Sight Tube

REAR STABILIZER STAND

To reduce excessive vibration and rocking of the ST-70 Concrete Pump set the rear stabilizer as follows:

4. Locate both left and right rear stabilizer stands (Figure 6).

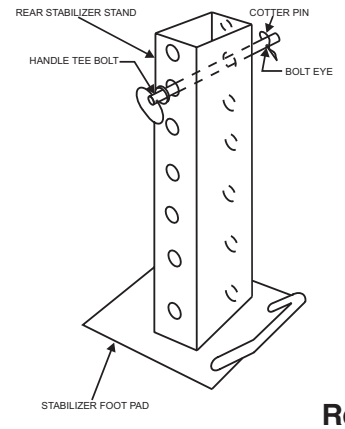


Figure 6.
Rear Stabilizer Stand

A. Remove the ***cotter pin*** from the handle tee bolt eye, and then ***pull*** the handle tee to release the stabilizer stand.

B. Position both rear stabilizers stands on firm (not loose) ***level*** ground.

C. Align the hole on the stabilizer stand with the hole on the frame body and ***insert*** handle tee bolt.

D. Insert the cotter pin into handle tee bolt eye to lock the stabilizer stand.

Emergency Stop Switch

5. Locate the Emergency Stop Switch (Figure 7) on the Hydraulic Pump Control Box. Use this switch in the event of a emergency.

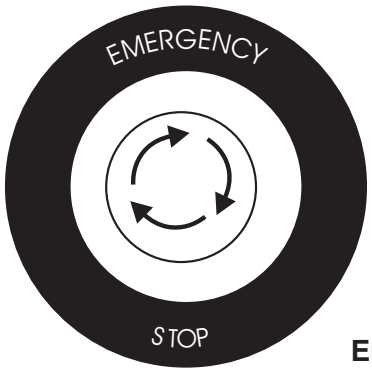


Figure 7. Emergency Stop Switch

Turn the Emergency Stop switch counter-clockwise (open). This will allow the engine to start.

NOTE:

If the Emergency Stop switch is in the closed position (stop), engine will not start. To start the engine, make sure the Emergency Stop switch is in the open position (fully extended).

Ignition Switch

NOTE:

Place all switches on the Hydraulic Control Box in the vertical position (**up**).

6. To start the engine, insert the key (Figure 8) into the ignition switch and turn the key to the ON position.

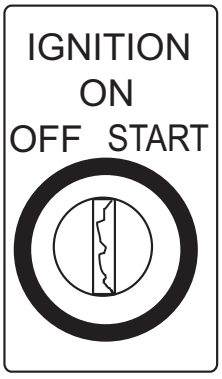


Figure 8. Ignition Switch

7. Observe that the Air Filter and Oil Pressure status indicator lights are ON (Figure 9). The Battery status indicator light should be OFF

A. Turn the key to the ***START*** position and listen for the engine to start.

B. In warm weather let engine warm-up for 5 minutes. In cold weather let engine warm-up for 10 minutes.

C. The Air Filter, Oil Pressure and Battery indicator lights (Figure 9) should all be off.

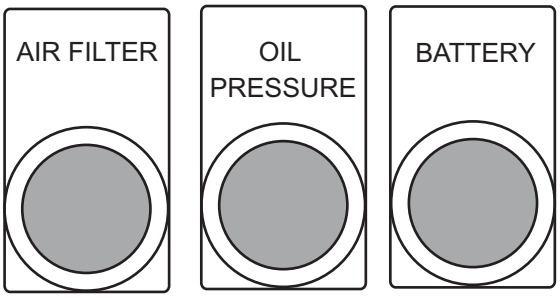


Figure 9. Status indicator Lights

NOTE:

If any of the status indicator lights referenced in the ignition section (step 4) are ON, turn off the engine. **DO NOT** continue to run the engine.

Control Switch

8. Turn the Control Off switch (Figure 10) to the ON position, a ***thumping*** sound (cylinder stroke) should be heard. The thumping sound represents the number of strokes per minute (volume) of the pump.

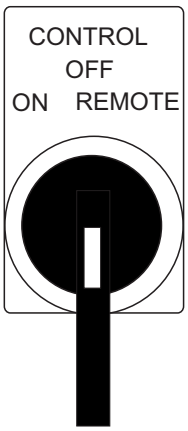


Figure 10. Control Off Switch

9. Turn the Volume Control (Figure 11), ***lock nut*** counterclockwise (CCW) to release the volume control knob.

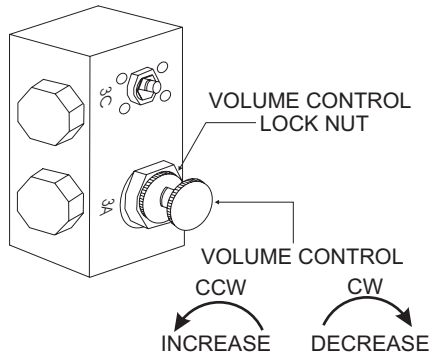


Figure 11. Volume Control

A. Use the volume control, to set the pump volume to approximately **10 strokes per minute**. Turning the volume control clockwise (CW) will ***decrease*** pump volume, and counterclockwise (CCW) will ***increase pump*** volume.

NOTE:

Use a wristwatch or stop watch to determine the number of pump strokes within 1 minute.

B. Let the pump cycle until the hydraulic oil temperature (Figure 12) is approximately 50 to 60 degrees fahrenheit.

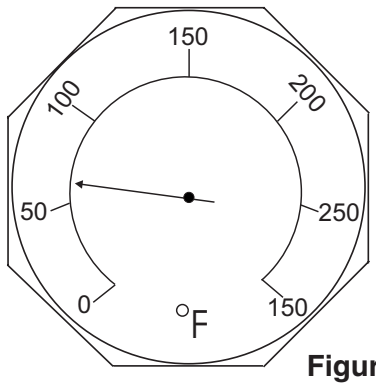


Figure 12. Hydraulic Oil Temperature Gauge

C. While monitoring the tachometer, (Figure 13) turn the engine Throttle Control (Figure 14) until the engine speed reaches 1500 RPM.

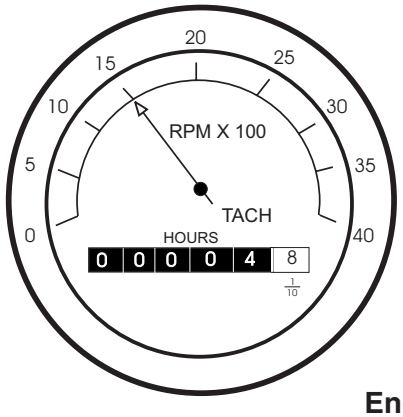


Figure 13. Engine Tachometer

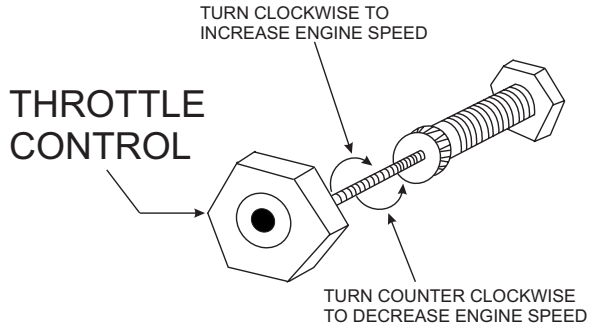


Figure 14. Engine Throttle Control

D. Turn the Control Off switch (Figure 10) to the OFF position.

Engine Speed

10. Turn the Operation Pump/Engine switch to the ***engine*** position (Figure 15).

NOTE:

The pump should not be cycling at this time. Only the **ENGINE** should be running.

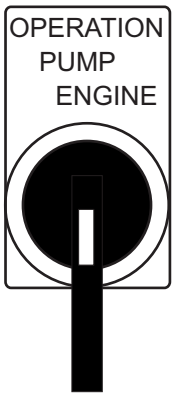


Figure 15. Operation Pump/Engine Switch

A. While monitoring the tachometer, (Figure 13) turn the engine Throttle Control (Figure 14) clockwise until the engine speed reaches 2550 RPM (maximum speed).

B. The Accumulator Pressure Gauge (Figure 16) should read approximately 1750 pounds per square inch (psi).

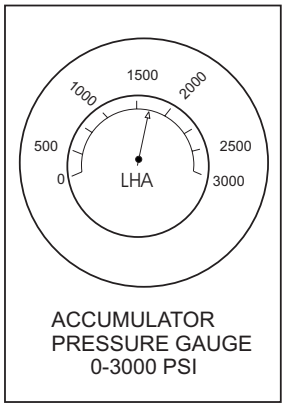


Figure 16. Accumulator Pressure Gauge

11. COOLING FAN

CAUTION

If the hydraulic oil temperature exceeds 170 degrees fahrenheit, **shut down the pump**. **DO NOT** continue to operate the pump. Failure to shut down the pump will result in severe damage to the pump.

This section is intended to make sure the Fan is working properly. Under normal conditions the Fan should be turned on when the hydraulic oil temperature begins to approach between 75 degrees fahrenheit.

Make sure the Operation Pump/Engine switch is in the ***engine*** position (Figure 15), and that only the engine is running.

Turn the Fan switch (Figure 17) to the ON position and listen for fan to start.

Figure 17. Fan On/Off Switch

Turn the Fan switch to the OFF position and listen for fan to stop. If machine exceeds 170°F, and to cool the machine down, turn operation switch to (Fig. 15) engine position. Run engine at high RPM with cooling fan on for 10 to 15 minutes.

NOTE: Do not stroke cylinders. The operator may also spray the hydraulic tank and components with water.

PRESSURE TEST

12. The Pressure Test switch (Figure 18) is a self-diagnostic test switch, that when activated will test the pressure of the system. This switch will be discussed in the maintenance and troubleshooting section of this manual.

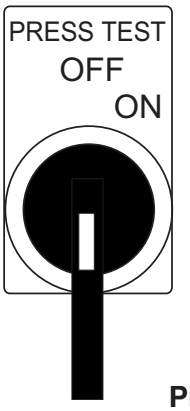


Figure 18. Pressure Test On/Off Switch

13. HOPPER REMIXER CONTROL

A. Located to the left of the Hydraulic Temperature gauge is the Hopper Remixer Control lever (Figure 19).

B. Turn the Operation Pump/Engine switch to the engine position (only the engine should be running).

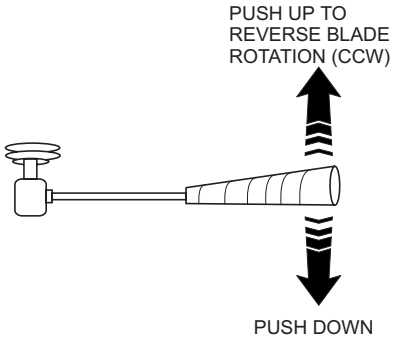


Figure 19. Hopper Remixer Control Lever

C. Push the Hopper Remixer Control lever ***downward*** (Figure 19) and observe that the blades (Figure 20) inside the hopper are turning in a clockwise direction (forward).

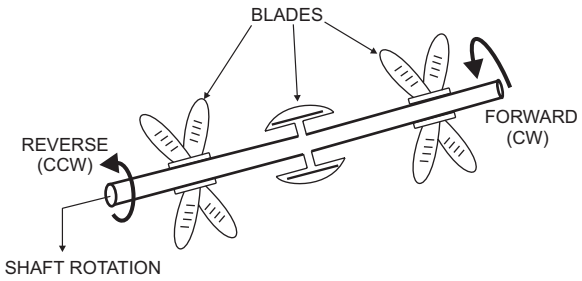


Figure 20.
Hopper Remixer Blades (Rotation)

D. Push the Hopper Remixer Control lever ***upward*** (Figure 18) and observe that the blades (Figure 20) inside the hopper are turning in a counter-clockwise direction (reverse).

14. OPTIONAL RADIO REMOTE CONTROL

The MAYCO ST-70 Concrete Pump has a remote control feature that allows the pump to be remotely controlled. If desired, the pump can be operated via a receiver/transmitter method (Figure 21) or a hardwire method, which utilizes a 25-ft. extension cable. The manual remote cord (Figure 22) should be installed under the main control box. Contact your MAYCO representative for further information.

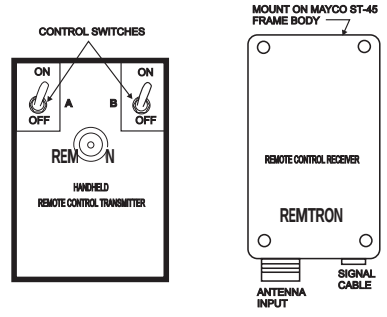


Figure 21.
Handheld Receiver/ Transmitter

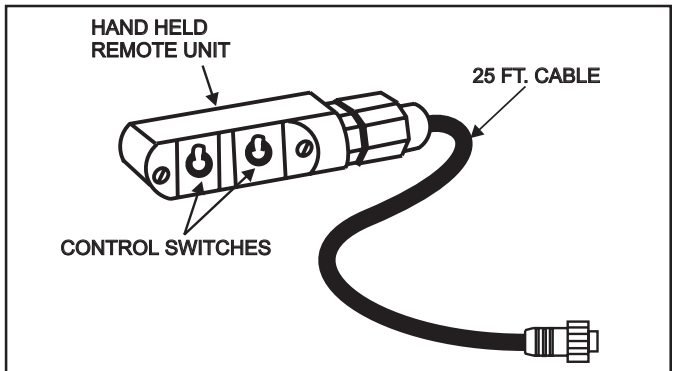


Figure 22.
Handheld Remote Cable Unit

15. CYLINDER LUBRICATION BOX

WARNING

Before checking lubricaton level, stop the engine and remove the engine starter key. We recommend using soluble type oil (water & oil mixture). The oil level should be checked everyday prior to pumping. The oil level should be maintained at a height of 5 inches or about ´½ the concrete cylinder height.

Important Notice! During freezing temperature after pumping, completely drain the water box and cover the hopper. Frozen liquid will restrict the piston travel and cause severe damage to the pump.

As the rubber piston cups naturally wear, fine cement particles will accumulate in the box. Once the concrete paste reaches a height of about ½ inch from the bottom. The box should be drained and cleaned. To clean, remove the drain plug located at the bottom of the box. Once the Box is drained, start the engine and stroke the cylinder (keep hands out of box) ten to fifteen times. While stroking, spray water inside of the box to thoroughly clean out all contamination. When the box is clean, replace drain plug, add new lubrication and install the top cover.

Any questions regarding the above mentioned procedure, please call the Mayco Service Department: 1-800-30-MAYCO.

Important Rules for the Setup and Operation of Mayco Model ST-70 Hydraulic Concrete Pump

1. The Mayco pump must be operated by experienced operators, who are qualified with the particular model being used, or students under the direct supervision of an experienced operator. The operator is in complete charge of the pump and delivery system. Know and warn all others of the DANGERS that are present when using, maintaining or being around this pump and delivery system. KNOW YOUR MACHINE!
2. The operator must become familiar with the controls and gauges by a careful study of the owners manual.
3. The operator must become aware and understand the danger involved in the operation and maintenance of the pump.
4. The operator must know the limitation of the pump described in this manual.
5. The concrete pump is capable of developing high pressures on the concrete. Proper care must be used in the maintenance of pipes and hoses and hose couplings for safe operation.
6. Only experienced operators, or students under the direct supervision of an experienced operator shall perform any maintenance, cleaning, repair or setup operations.
7. Unauthorized persons must not be permitted to assist or remain in the immediate vicinity of the unit while it is in operation.
8. The Mayco pump must not be operated by individuals who cannot read and understand the owners manual in the language in which it is printed.
9. The Mayco pump must not be operated by anyone under the age of 18 years.
10. The Mayco pump must not be operated by anyone under the influence of alcohol or drugs.
11. Locate the pump in an area as level as possible, where two or more ready-mix trucks will have access to the hopper.
12. Begin pumping by placing the hoses or pipe at the farthest point of discharge.
13. Concrete will flow with less back pressure through pipe than through hose. Bends in hose or pipe will also require more pressure. The operator should take these facts into consideration when laying out the system.
14. Vertical and down-hill pumping are more difficult than horizontal pumping. Vertical pumping requires higher pumping pressure. Down-hill pumping can cause separation of the concrete, which can cause a blockage. Back pressure must be kept in the line at all times during down-hill pumping.
15. When the pump is parked in the street, position it so that the control panel (right side) is closest to the curb. – ALWAYS THINK SAFETY!
16. Lower and lock the rear jackstands in place before any concrete is discharged into the hopper.
17. THE DELIVERY SYSTEM

    To successfully pump concrete it is critical to use the correct size and type of delivery system.

    The rules that govern the size of the delivery system apply to all concrete pumps, not just Mayco pumps.

The inside diameter of the hose and pipe must be three to four (3 to 4) times the size of the largest aggregate in the mix that is to be pumped.

Example:

1-1/2" rock (8 to 10% max. content by weight) requires a 5" dia. concrete delivery system.

1" rock (10 to 15% max. content by weight) requires a 4" dia. concrete delivery system.

¾" and under rock (10 to 15% max. content by weight) requires a 3" dia. concrete delivery system.

The rock size and percentage shown is of the total rock content in the mix. The balance of the rock must be properly blended down through all of the smaller sizes.

The same applies to the sand portion of the mix.

Consult the ready-mix company and ensure that they are willing and able to deliver properly blended aggregates in their concrete. 3" inside diameter is the smallest system of hose, pipe and elbows that is recommended for pumping “Hard Rock”, large aggregate concrete.

Remember – The larger the size of the delivery system, the less pressure required to move the concrete.

Use this information in conjunction with “Concrete Mix Design” on pages 12 thru 17.

18 Priming the Pump and Delivery System with Slurry.

It is CRITICAL to the successful operation of a concrete pump that the manifold and all delivery hose, pipe and elbows are coated with a film of lubrication BEFORE you attempt to pump concrete. Failure to properly prepare the pump and system will result in a "dry pack" of concrete, blocking the shuttle valve tube or delivery line.

18.1 With the entire delivery system connected to the pump. Except for the first hose. Pour 5 gallons of water into the second hose and push in your clean out ball and reconnect. This will help hold back the prime.

18.2 What you can use to mix the prime:

There are several things you can use for the prime. Here are a few. Cement and lime at a 50/50 mixture, slick pac, bentonite clay.

NOTE: The bentonite is not compatible with concrete. Do not pump it into the forms discharge it out of the formed area.

Mix the prime to the consistency of a smooth batter.

18.4 Position the first ready-mix truck at the hopper. Check the concrete. Do not discharge concrete into hopper at this time.

18.5 Pour the prime into the first hose and connect it to the pump.

NOTE: You should use two 5 gallon buckets of prime.

18.6 With the pump in FORWARD at 25-30 strokes per minute, slowly discharge the concrete from the ready-mix truck into the hopper and completely fill it. Keep the pump running continuously until concrete is discharging at the end of the delivery system. If the pump is stopped during this procedure, a blockage may occur (see page 22, Section 4).

18.7 If it is necessary to replace or add a section of delivery system, after the initial lubrication procedure, wet the inside area of the hose, pipe or elbow with 5 gallons of water per 25 foot length, before adding it to the system.

19. Waiting for concrete trucks to arrive: If there are delays:

19.1 Stop the pump with a full hopper.

19.2 Run the remixer, alternating forward and reverse, whenever the engine is running.

19.3 Add water to stiff mixes, if necessary.

19.4 If shutdown period exceeds 3 to 4 minutes, turn off engine to prevent vibration from separating the mix in the hopper. Separation will cause a blockage in the manifold when pumping is resumed.

19.5 Start the engine, cycle the pump slowly 1 or 2 strokes and run remixer every 10 minutes.

19.6 If shutdown period reaches 1 hour (or less, depending on the age and temperature of the concrete), pump out and clean the delivery system and pump. (See page 24 for clean up procedures.)

WARNING: Common sense tells us that if you drive a truck into a "brick wall," something is going to be damaged. The same holds true with your concrete pump. If you repeatedly pull the throttle all the way out and force your pump to push through blockages due to separation of material in the hose or manifold, you will soon have breakdowns and costly repairs which are not covered under the warranty. If a blockage exists, find where it is and clear it before further pumping. Do not use extra horse power, it will only make it worse.

1. When pumping long distances or pumping stiff mixes, you can expect a drop in volume, compared to shorter lines and wetter mixes due to higher pumping pressures and cavitation.
2. Leaking hose coupling gaskets (which leak water) cause separation and subsequent jamming at that point.

3. Damaged hoses with internal restrictions can cause blockages.
4. If a blockage occurs in the hose, STOP the pump, "walk the hose" until you find the point of trouble. (The hose will be soft immediately past the blockage.) Elevate the hose at that point with the blockage hanging down. Using a hammer, you can pound the down stream edge of the packed area until it free flows or shakes out of the hose. Pumping can now be resumed. If this method does not clear the pack FOLLOW THE INSTRUCTIONS IN Section 7, paragraph 7.1 thru 7.5 of this page.
5. "Down-hill pumping" can be difficult. When the pump is stopped, the material can flow slowly and cause the hose to collapse. When pumping is resumed, you can expect a blockage at the point of hose collapse. To prevent this, the hose can be "kinked off" at the discharge end when the pump is stopped, to stop gravity flow. The use of stiffer mixes when pumping down-hill will stop gravity flow.
6. When pumping vertically:

   6.1 When pumping vertically up the side of a building, above 40 feet, we recommend the installation of steel pipe securely fastened at intervals as necessary to support the pipe. Ninety-degree, long-radius pipe sweeps should be installed at the top and bottom of the steel line. Use a 25 ft. hose, or short section, off the pump. For the balance of the horizontal distance to the vertical line, use pipe. This type of installation has been satisfactory on many jobs being pumped in excess of 100 feet high. Line pressures are always less using steel pipe as compared to hose.

   6.2 When pumping vertically using all hose, it is recommended not to go higher than 50 feet with hose. The hose should be tied off at intervals of 10 feet, if possible. Special attention should be given when tying the hose off at the top as the hose will have a tendency to stretch when filled with concrete. This will increase the possibility of a blockage at the point where the hose is tied off. To avoid this, a long radius 90 degree elbow is recommended. The suggested place to tie off is under the clamp coupling that connects the hose to the 90 degree elbow.

   Note: It is strongly recommended that pipe be used on all vertical pumping for safety and convenience. If it is absolutely necessary to use hose, then use section 6.2 as a guide.

7. The shuttle tube is plugged if volume at the discharge end of the hose stops, the hose is soft and the hydraulic oil pressure gauge reads 3000 psi or more.

   To clear a plug in the shuttle tube, great care must be taken as a dangerous condition will exist from pressure build-up inside the shuttle tube. (With the shuttle valve, the concrete can be pumped in reverse.)

WARNING: NEVER PLACE YOUR HANDS OR ANY PART OF YOUR BODY IN THE HOPPER OR ALLOW ANYONE ELSE TO DO SO.

Follow these instructions carefully:

7.1 DO NOT open any of the delivery system joint clamps.

7.2 Switch the pump into "Reverse":

With pump speed at medium-slow (approx. 12 strokes per min.) try to pull the "pack" back into the hopper with 5 or 6 reverse strokes, remix the concrete in the hopper.

Switch the pump into "Forward".

If it is still plugged, repeat "Reversing" procedure three times.

If concrete still does not move, see 7.3 and 7.4 below. The **last action** MUST be "pumping in reverse" to relieve the pressure in the shuttle tube.

7.3 Stop the pump. Switch off the engine.

7.4 The senior or most experienced operator must warn all others to stand at least 20 feet away from the machine and turn their heads to face away from the pump.

The operator will position himself/herself beside the reducing elbow at the pump outlet, then, wearing safety glasses slip the end of a pry bar (24" length of reinforcing steel rod) under the latch of the hose clamp and flip it up.

Carefully knock the end of the hose away from the reducer.

Chip the concrete out of the reducer with the pry bar.

Remove the reducer.

From the discharge end chip the concrete out of the shuttle tube with the pry-bar. If concrete cannot be loosened from the outlet of the shuttle tube, then remove the clean-out plug on the bottom of the hopper, discharging the concrete.

Only the senior operator may then remove the inspection cover plate from the shuttle tube, by using a long extension wrench and the 24" pry bar. **Make sure the accumulator pressure gauge reads zero prior to removing cover**.

Chip the blockage out with the pry-bar.

Flush the shuttle tube with water.

Replace and seal the inspection cover plate on the shuttle tube.

7.5 Resume pumping.

8. **The effects of heat and excessive time on concrete:** Hot concrete, commonly referred to as a "hot load", is concrete that has been in a redi-mix truck in excess of 2 to 3 hours. On a hot day, the amount of time is even less. A brief explanation of why heat and time affect concrete: Concrete starts setting or drying up through a chemical reaction. The catalyst to this reaction is heat. When pumping a hot load, it is important to remember that when you have to stop pumping for any reason, add water to the concrete in the hopper and remix (see Page 27, Section 19). Move concrete in the hose every 5 minutes. If shutdown time becomes too long, wash out immediately (see Page 24).

9. ADMIXTURES: Admixtures are designed into the concrete mix by the redi-mix company or an architectural engineering company. This section lists common admixtures and a brief explanation of their function.

9.1 POZZOLITH 300 R or the equivalent. – Acts as a water retarder and a lubricant. On a lean mix, long pushes stiff mixes and vertical pushes, Pozzolith 300 R helps pumpability.

9.2 MBVR – Air entraining, acts as a lubricant.

9.3 CALCIUM CHLORIDE – Commonly referred to as C.C. , is used as an accelerator. When pumping a load with calcium chloride, it is recommended that you wash out if the waiting time between delivery trucks becomes too long.

9.4 SUPER PLASTICIZERS – Acts as an accelerator. The concrete will look very wet after the super plasticizer is added, but will begin to set up very fast. Wash out immediately if you do not have a truck waiting. Super plasticizers are used mainly on commercial jobs.

9.5 RED LABEL – Acts as water retarder and an accelerator. Red label also will mainly be used on commercial jobs.

9.6 FLY ASH – Is used to help increase the strength of the concrete and decrease the cement content per yard. This is one of the most common admixtures used.

NOTE: All admixtures will be shown on the redi-mix concrete ticket. It is suggested before starting the pumping job you ask the driver of the redi-mix truck to see the concrete ticket and note the admixtures that exist and take the proper action.

10. If the volume at end of hose starts to decrease gradually and eventually almost stops, it is quite likely that the wear ring and/or wear plate have to be replaced due to excessive wear allowing the concrete to be discharged back into the hopper under pressure. This is a major reason for plugging in the shuttle tube.

11. Slight pulsation of the hose will always be noticeable near the pump. Excessive pulsation of the hose near the pump is normally due to higher than average line pressures caused by stiff, harsh mixes or extremely long pumping distances. The use of larger I.D. hose than specified on page 3-8, para. 17 in these extreme cases reduces line pressures or the addition of slight amounts of water to the mix, if permissible, will permit easier pumping. The use of certain pumping admixtures may help. If excessive pulsation exists, it is advisable to use burlap or some means of protection under the hose at points where the hose may wear through the outer cover; e.g., over forms or steel or sharp curbs.

12. It is the responsibility of the pump operator to ensure that the delivery system hose and line system, with all clamps and accessories have a higher pressure rating than the concrete pump can generate. The model ST-70 generates 875 p.s.i.

13. Before starting the pumping operation, the following check list procedure should be followed:

    13.1 Check engine oil.

    13.2 Check oil reservoir to make sure that it is full.

    13.3 Start and run the engine a minimum of five minutes before starting the pumping operation.

    13.4 Cycle the pump at 6 strokes/minute maximum and warm oil to 50 degrees Fahrenheit.

NOTE: When the redi-mix truck arrives, it is always a good idea to check the concrete ticket and make sure you have the proper mix design. When adding water to the mix, be sure not to get the concrete too wet. In other words, if you think the load of concrete needs 40 gallons, put in 20 gallons. You can always add more water to the load but you cannot extract the water from the load.

14. All new pumps are 'water pressure tested" at the factory This procedure permits a thorough inspection of entire drive system and valving under simulated full load conditions. The pump owner can do the same by making an adapter to couple to the end of the discharge cone: e.g., the use of a standard 2" pipe cap with a #/8" drilled hole in the center, screwed on to the end of hinged cone or reducer at the pump. Fill hopper with water after making sure that all sand and rock have been removed from manifold. Operate pump at full throttle and the #/8" diameter hole restriction will create sufficient back pressure to make thorough inspection of all moving parts.

CLEANING THE PUMP AND DELIVERY SYSTEM

Cleaning the pump is a very important operation as it determines how the machine will

pump the next time it is used.

At the end of every pour, or because of long delays during a pour, the pump and delivery system must be thoroughly cleaned by removing all concrete material.

1. Ensure that there is no blockage in the hose and line (See page 29, Section 4) or in the shuttle tube (See Page 29, Section 7). If a blockage exists, clear it.
2. Pump concrete until the opening of the concrete cylinder intake in the hopper is visible.
3. Stop the pump.
4. Carefully disconnect the first hose joint at the shuttle tube discharge elbow.
5. Add water to the hopper. Pump and flush clean the entire hopper, shuttle tube and discharge elbow with water.
6. Scoop out 12 inches of concrete from the inboard end of the delivery hose. "Cork screw" a 6" x 6" x 8" sponge into the end of the first hose section. Reconnect the hose to the discharge elbow.
7. Fill hopper with water. Pump until sponge and clean water come out the discharge end of the hose and line system.
8. When the Model ST-70 has been used to pump small aggregate concrete (pea rock, ½" minus) or mixes with high fines content (60% or more sand) there will be a tendency for hardened concrete to build up on the inside surface of the shuttle tube. Therefore, at the end of every such pour, after the pump and system have been cleaned and the engine shut off, remove the shuttle tube inspection plate (See Page 28, Section 7.4) and remove all remaining concrete.
9. When the Model ST-70 has been used to pump large aggregate concrete (¾" to 1 ½") follow the instructions in the above Section 8 once per week.

WARNING

NEVER put your hands or any other parts of your body in the hopper while the engine is running or prior to any maintenance, check the accumulator pressure gauge and make sure the reading is zero pressure.

NEVER use muriatic acid to clean the pump. Acid will dissolve the chrome finish on material cylinder bore and main hydraulic cylinder rods.

Use only a 2½" diameter clean-out hook when back-pumping into redi-mix truck. Use a safety chain to secure the clean-out hook to some solid part of the mixer truck to prevent hook from jumping off of the drum.

Run the pump at 6 strokes per minute maximum speed.

1. Position actuator ball socket above 2" ball.

   WARNING: Use jack stand to lift tongue. Do **NOT** lift by hand as back injury could result.

CAUTION:

The ball capacity must be greater than or equal to the trailer GVWR. Do not use a worn hitch ball, it is unsafe and must be replaced. USE 2" BALL ONLY

NOTE:

Take care not to damage the actuator when backing up the towing vehicle for hook-up.

2. Hold the release handle in the open position (Figure 1).

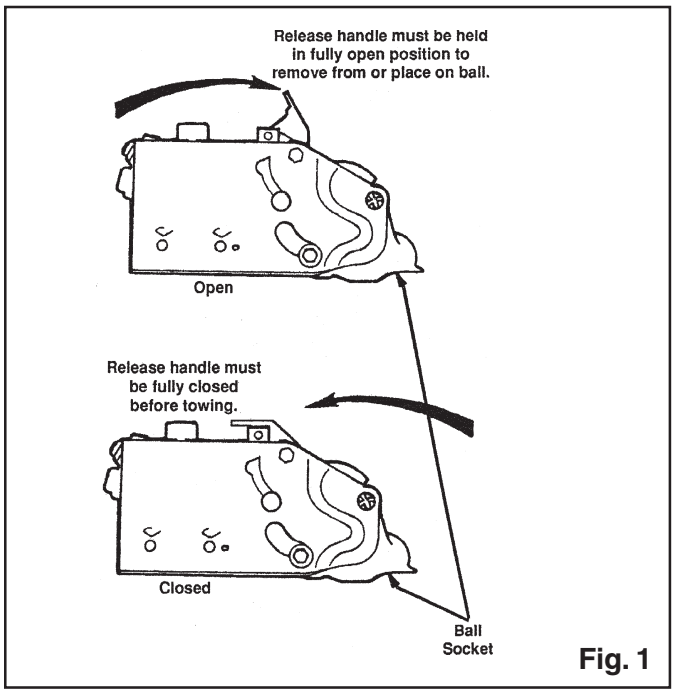


Fig. 1

3. Lower the trailer tongue until the ball rests in the ball socket.
4. Close the release handle.

CAUTION:

The release handle will close freely with finger pressure when the ball is properly inserted into ball socket. If the release handle does not close freely, do not tow the trailer. Do not force the release handle into the closed position.

5. To make sure that the actuator is securely latched onto the ball, extend the trailer tongue jack to the ground and lift the truck and trailer combination 2" to 4". If the ball does not disengage, the actuator is securely attached.
6. Insert a padlock or bolt through the lock hole for added protection.
7. Connect the breakaway cable solidly to the bumper or frame of the tow vehicle as near to the center as possible. The cable must hang clear of the trailer tongue and be long enough to permit short radius turns without pulling the breakaway cable forward.
8. Make sure the breakaway cable is in a released position with the indicator bead touching or resting against the cable spring stop. (Figure 2).

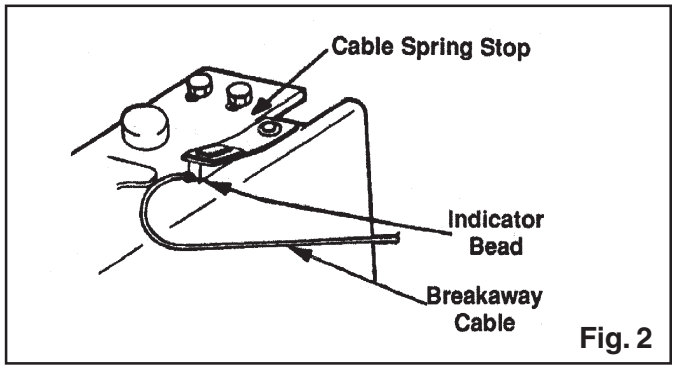


Fig. 2

CAUTION:

Do not use the breakaway cable as a parking brake.

NOTE:

Check the location of the breakaway cable periodically during each trip. The indicator should rest against the spring stop. Accidental application will cause the brakes to drag and heat up, causing a failure.

9. Cross the safety chains under the tongue and securely attach them to the bumper or frame of the tow vehicle. Check with local and state laws for proper compliance.

CAUTION:

Safety chains must always be used.

10. Retract the jack fully. Remove and store the caster, if applicable.
11. Check for proper truck-trailer hook-up; the tow vehicle and trailer should be level with a positive tongue load. For further information, consult a dealer or Atwood Service Center.
12. The back-up lever knob must be positioned in the “Towing Position” (Figure 3).

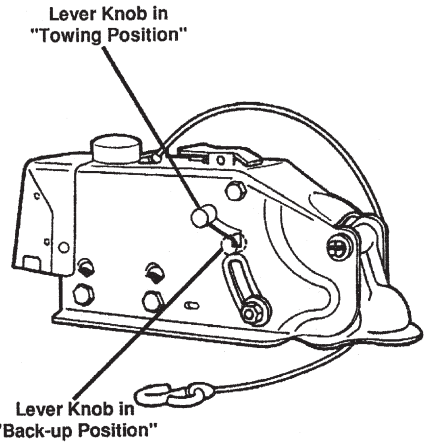


Fig. 3

13. Do not use the Atwood brake actuator with a sway controller, unless prior Atwood Engineering approval of the sway control system has been received.
14. You are now ready to tow your pump.

CAUTION:

Avoid sharp turns. This could bend, create extreme stress or fracture either the actuator or trailer tongue.

BACKING UP

1. Refer to the previous steps 1 through 14 for Towing.
2. Before backing up a slope or through soft ground, pull the trailer forward slightly to assure that the actuator socket is in the fully forward position.
3. Move the lever knob on the side of the actuator downward from the “Towing Position” along the curved slot in the actuator frame to the “Back-up Position” (Figure 3). The slot has a notch at the bottom of its travel. Push the lever knob down to engage the locking notch.
4. Back the trailer up.

CAUTION:

Avoid sharp turns. This could bend, create extreme stress or fracture either the actuator or trailer tongue.

5. If the pump is to be uncoupled from the tow vehicle after backing with the lever knob engaged, block all pump wheels and pull forward slightly to take strain off of the actuator. Uncouple the actuator by lifting the release handle and raising the trailer tongue. Make sure the lever knob is in the "Towing Position" when uncoupling from the trailer.

CAUTION:

Before towing the pump, always ensure that the lever knob has disengaged and is in the "Towing Position."

MAINTENANCE

1. Keep all links and pivots lubricated to prevent rusting and ensure ease of operation. Using SAE 30 oil, lubricate inside the release handle and inside the actuator body. This can be reached from the underside of the actuator.

NOTE:

Lubricate the hitch ball with conventional automotive grease or a lubricant made for hitch balls.

2. Check for any leaks in the brake system. Periodic checks should be made on all hoses to guard against cuts and worn hoses which may cause failure (leaks, rupturing under pressure, and collapsing). Replace defective hoses.
3. Check the brake fluid level in the master cylinder reservoir. Keep it filled to within ½" from the top of the reservoir.

CAUTION:

Do not fill the master cylinder reservoir with used brake fluid. Do not fill the reservoir beyond ½" from top. Do not overfill, brake fluid will damage paint.

4. At the beginning of each year, inspect the brakes for excessive wear, replace the linings if necessary.

NOTE:

Wheel bearings and seals should be inspected and packed at this time.

Extended Storage Instructions

The following preventative maintenance is recommended for extended periods of storage.

1. Check brake system for proper fluid level in master cylinder and bleed all lines.
2. Lubricate all links and pivots to prevent any rusting.
3. Remove wheel and drum assemblies and spray a good anti-corrosion compound (CRC formula 5-56) under rubber boot on forward end of brake wheel cylinder. Avoid spraying drum and brake lining.
4. Grease all bearings and reinstall wheel and drum assemblies.
5. Make sure breakaway cable is fully released.
6. After extended storage, refer to the Maintenance Steps listed above to insure that the trailer is ready for towing.

EXPLANATION OF CODE IN REMARKS COLUMN

The following section explains the different symbols and remarks used in the Parts section of this manual. Use the help numbers found on the back page of the manual if there are any questions.

The contents and part numbers listed in the parts section are subject to change ***without notice***. Multiquip does not guarantee the availibility of the parts listed.

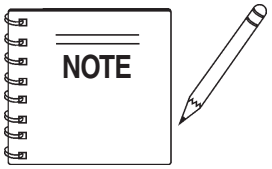
Sample Parts List:

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	12345	BOLT	1	INCLUDES ITEMS W/*
2*		WASHER, 1/4 IN.		NOT SOLD SEPARATELY
2*	12347	WASHER, 3/8 IN.	1	MQ-45T ONLY
3	12348	HOSE	A/R	MAKE LOCALLY
4	12349	BEARING	1	S/N 2345B AND BOVE

NO. Column

Unique Symbols - All items with same unique symbol (*, #, +, %, or >) in the number column belong to the same assembly or kit, which is indicated by a note in the "Remarks" column.

Duplicate Item Numbers - Duplicate numbers indicate multiple part numbers are in effect for the same general item, such as different size saw blade guards in use or a part that has been updated on newer versions of the same machine.



When ordering a part that has more than one item number listed, check the remarks column for help in determining the proper part to order.

PART NO. Column

Numbers Used - Part numbers can be indicated by a number, a blank entry, or TBD.

TBD (To Be Determined) is generally used to show a part that has not been assigned a formal part number at time of publication.

A blank entry generally indicates that the item is not sold separately or is not sold by Multiquip. Other entries will be clarified in the "Remarks" Column.

QTY. Column

Numbers Used - Item quantity can be indicated by a number, a blank entry, or A/R.

A/R (As Required) is generally used for hoses or other parts that are sold in bulk and cut to length.

A blank entry generally indicates that the item is not sold separately. Other entries will be clarified in the "Remarks" Column.

REMARKS Column

Some of the most common notes found in the "Remarks" Column are listed below. Other additional notes needed to describe the item can also be shown.

Assembly/Kit - All items on the parts list with the same unique symbol will be included when this item is purchased.

Indicated by:
"INCLUDES ITEMS W/(unique symbol)"

Serial Number Break - Used to list an effective serial number range where a particular part is used.

Indicated by:
"S/N XXXXX AND BELOW"
"S/N XXXX AND ABOVE"
"S/N XXXX TO S/N XXX"

Specific Model Number Use - Indicates that the part is used only with the specific model number or model number variant listed. It can also be used to show a part is NOT used on a specific model or model number variant.

Indicated by:
"XXXXX ONLY"
"NOT USED ON XXXX"

"Make/Obtain Locally" - Indicates that the part can be purchased at any hardware shop or made out of available items. Examples include battery cables, shims, and certain washers and nuts.

"Not Sold Separately" - Indicates that an item cannot be purchased as a separate item and is either part of an assembly/kit that can be purchased, or is not available for sale through Multiquip.

ST-70 Structural Concrete Pump

1 Units

Qty.	P/N	Description
1	EM16462	FELT HOLDER
4	EM16463	PISTON CUP
4	EM16493	FELT RING
1	EM16461	OIL PARTS
2	EM14408	BRONZE RING
2	EM16145	BUSHING, SWING AXLE (BRONZE)
1	EM16171	WEAR RING
2	EM16816-1	ENERGIZER RING
1	EM16816-2	INSERT RING
2	EM16819	SLEEVE SEAL
1	EM25841	WEAR PLATE
2	EM97024	SWITCH, PROXIMITY
1	EM50417	CUP
1	EM20709-1	SOLENOID
2	EM97050	RELAY (IDEC)
1	EM97048	RELAY
1	EM97021	SOLENOID
1	EM97036	SWITCH, PUMP CONTROL
1	EM97045	SWITCH, OPERATION PUMP/ENG

ST-70 Structural Concrete Pump

3 Units

Qty.	P/N	Description
1	EM16459	PIN
2	EM25801	CONCRETE CYLINDER
2	EM16462	FELT HOLDER
6	EM16463	PISTON CUP
8	EM16493	FELT RING
2	EM16461	OIL PARTS
2	EM14408	BRONZE RING
4	EM16145	BUSHING, SWING AXLE (BRONZE)
3	EM16171	WEAR RING
4	EM16816-1	ENERGIZER RING
2	EM16816-2	INSERT RING
4	EM16819	SLEEVE SEAL
2	EM25841	WEAR PLATE
4	EM97024	SWITCH, PROXIMITY
3	EM50417	CUP
2	EM20709-1	SOLENOID
4	EM97050	RELAY (IDEC)
2	EM97048	RELAY
2	EM97021	SOLENOID
2	EM97036	SWITCH, PUMP CONTROL
2	EM97045	SWITCH, OPERATION PUMP/ENG

NOTE

Part numbers on this Suggested Spare Parts List may supercede/ replace the P/N shown in the text pages of this book.

The safety instruction decals shown must be on all Mayco ST70 — Concrete Pump

ATTENTION

A MANUAL MUST BE STORED IN THIS TUBE AT ALL TIMES.

BEFORE SET-UP AND OPERATION OF THIS EQUIPMENT THE DESIGNATED OPERATOR MUST READ AND COMPLETELY UNDERSTAND THE OPERATING AND INSTRUCTION MANUAL INSIDE THIS TUBE.

1

CAUTION TOWING

1. USE ONLY 2" STEEL BALL
2. TOWING VEHICLE AND HITCH MUST BE RATED TO TOW 4300 LB. LOAD
3. ALWAYS USE SAFETY CHAIN AND BREAKAWAY CHAIN WHEN TOWING UNIT.
4. INSPECT ACTUATOR AND BRAKES BEFORE TOWING UNIT (REFER TO ATWOOD MANUAL DECALS ON HITCH).

2

CAUTION !

1. Before setup and operation of this equipment, the designated operator MUST read and completely understand the operating instruction manual.
2. keep unauthorized and untrained people away from the machine during operation.
3. Rotating or moving parts will cause serious injury. Before servicing or cleaning, turn off the engine and check accumulator pressure gauge for ZERO pressure reading.
4. Do not place hands in lubrication box at any time.
5. Keep hands out of hopper when engine is running. Do not remove or stand on hopper grates.
6. Check hopper for obstructions before operating machine.
7. This machine is remotely controlled and may start at any time.
8. Stop engine before adding fuel or oil.
9. When the pump, manifold or delivery system plugs, do NOT disconnect the delivery system clamps or open the manifold. A plug has occurred when the pump is running but no concrete is discharging from the end of the delivery system; immediately switch the engine OFF. Consult your operating and instruction manual before proceeding.

   Great care must be taken to clear a plug as a dangerous condition, due to high pressure build-up, inside the pump and delivery system.

3

MAINTENANCE

Grease daily:
- Main hydraulic cylinders (2 places)
- Remix bearing (2 places)
- Axle crank bushing (1 place)
- Axle crank (1 place)

Grease type: lithium based EP, Texaco Multitak 20 or Lubriplate EP-2

Main hydraulic reservoir — check daily. *Use Shell Oil Tellus 68 or Mobil DFE26*

Lubrication box — check daily.

Diesel engine — check daily.

Refer to operator manual for complete maintenance schedule.

4

CAUTION

REFER TO MANUAL FOR SERVICE INSTRUCTIONS
CHARGE ONLY WITH DRY NITROGEN

5

WARNING

Explosion caused by improper accumulator charging can result in serious injury or death!
- Follow charging instructions exactly! *(Refer to Service Manual)*
- Never use Oxygen or compressed air to charge the accumulator!
- Use only Dry Nitrogen to charge the accumulator!

6

CAUTION

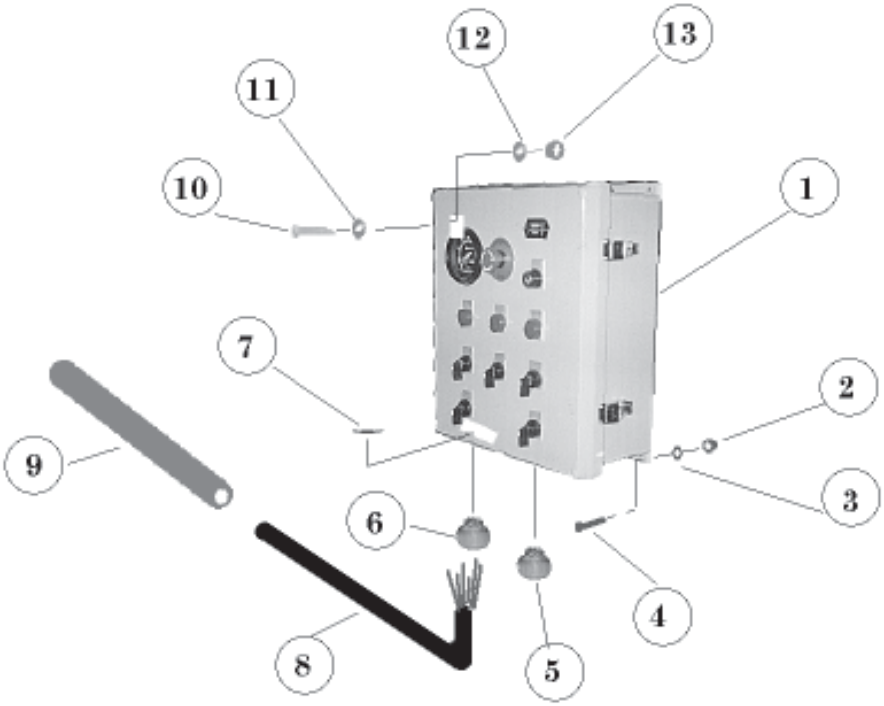
MINIMUM
← OIL LEVEL

Oil level below minimum can cause hydraulic pump and system damage.
Oil temperature should not exceed 170 °F (77 °C).

7

ST- 70
DECALS

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM935	DECAL, ATTENTION, MANUAL STORAGE	1	
2	EM969	DECAL, CAUTION TOWING	1	
3	EM7072	DECAL, CAUTION OPERATING INSTRUCTIONS	3	
4	EM97084	DECAL, MAINTENANCE	1	
5	EM955	DECAL, CAUTION DRY NITROGEN	1	
6	EM97083	DECAL, WARNING	1	
7	EM97071	DECAL, CAUTION MINIMUM OIL LEVEL	1	
	EM1028	DECAL, MAYCO LOGO	2	
	EM97082	DECAL, ST-70	2	
	EM97080	DECAL, EMERGENCY CYCLING	1	
	EM965	DECAL, VOLUME CONTROL	1	
	EM995	DECAL, DIESEL FUEL	1	
	EM985	DECAL, HYDRAULIC OIL	1	
	EM97070	DECAL, PRESSURE GAUGES	1	
	EM1032	DECAL, 800 MAYCO PHONE	2	
	EM98000	DECAL, CAUTION GREASE	4	
	EMDCLST70	DECAL KIT, ST70	1	INCLS. ALL ITEM ABOVE


12
13
11
10
1
7
2
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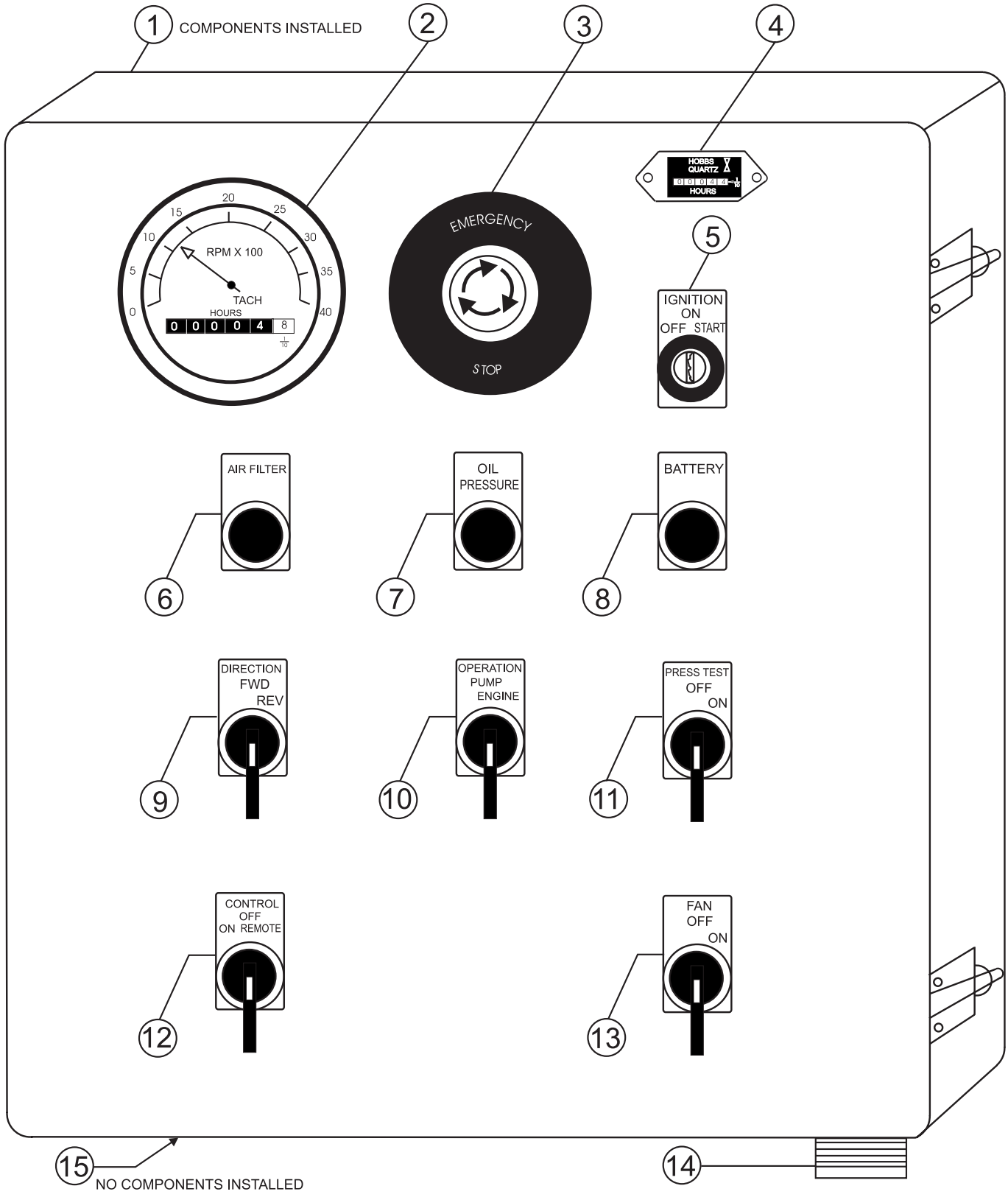
6
4
8
5

ST- 70
CONTROL PANEL INTALLATION

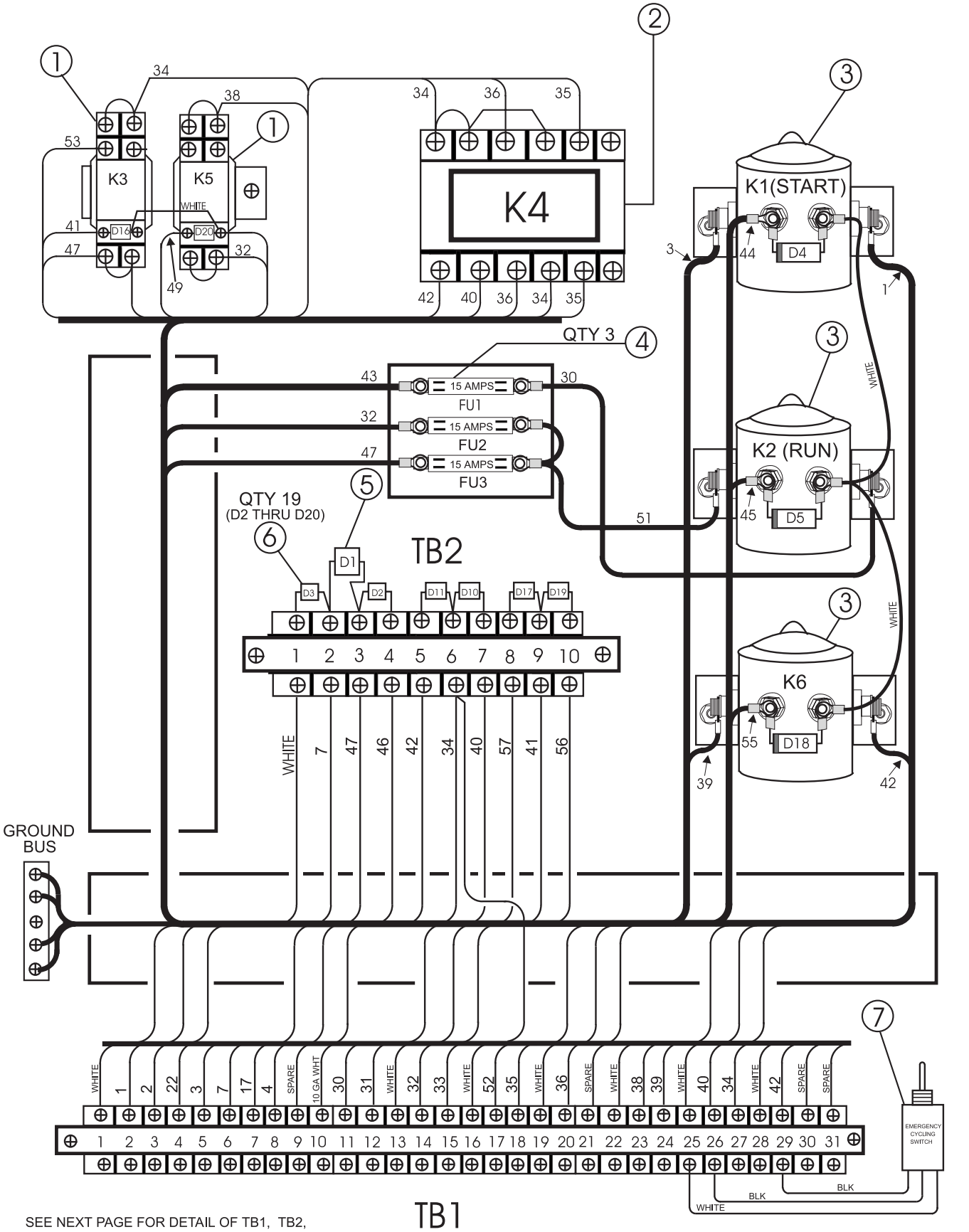
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM97073	PANEL, CONTROL ASSY	1	
2	EM492661	NUT, 1/4"-NC HEX.	2	
3	EM492622	WASHER, 1/4" LOCK	2	
4	EM492357	BOLT, 1/4"-NC x 1" HEX.	2	
5	EM491873	CONNECTOR	1	
6	EM5015901	CONNECTOR	3	
7	EM491876	WASHER, CONNECTOR	4	
8	EM509738	CABLE 18 GA.	1	
9	EM509588	POLIFLEX	1	
10	EM503112	BOLT, 3/8"-NC x 2 3/4" HEX.	2	
11	EM923027	WASHER, 3/8"	2	
12	EM923350	WASHER, LOCK 3/8"	2	
13	EM492554	NUT 3/8"-NC HEX.	2	


1
COMPONENTS INSTALLED
2
3
4
RPM X 100
TACH
HOURS
EMERGENCY
STOP
HOBBS QUARTZ
HOURS
5
IGNITION
ON
OFF START
AIR FILTER
6
OIL PRESSURE
7
BATTERY
8
DIRECTION
FWD
REV
9
OPERATION
PUMP
ENGINE
10
PRESS TEST
OFF
ON
11
CONTROL
OFF
ON REMOTE
12
FAN
OFF
ON
13
14
15
NO COMPONENTS INSTALLED

ST- 70
CONTROL PANEL FRONT

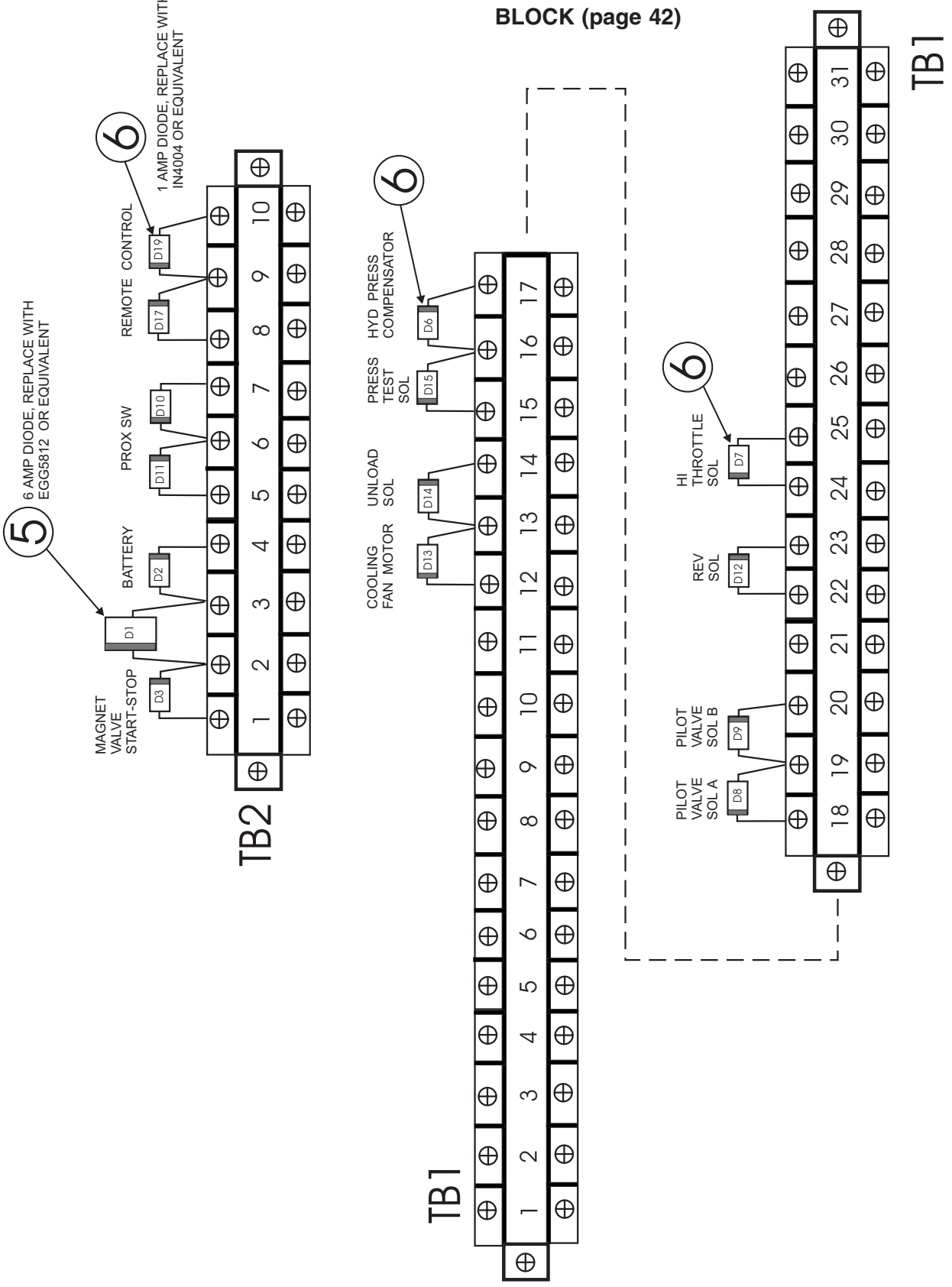
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM97073	CONTROL PANEL ASSY	1	(INCLS. SWITCHES AND INTERIOR ITEMS AS SHOWN ON PAGES 32 & 33).
2	EM25704	TACHOMETER	1	
3	EM97063	SWITCH, EMERGENCY STOP	1	
	EM97064	NAME PLATE, EMERGENCY STOP	1	
4	EM97062	HOUR METER	1	
5	EM97028	SWITCH, IGNITION	1	
	EM97028K	KEY, IGNITION SWITCH	1	
	EM97029	NAME PLATE, IGNITION	1	
6	EM97039	PILOT LIGHT, AIR FILTER	1	
	EM90741	CONTACT BLOCK	1	
	EM97043	NAME PLATE, AIR FILTER	1	
7	EM97039	PILOT LIGHT, OIL PRESSURE	1	
	EM97041	CONTACT BLOCK	1	
	EM97044	NAME PLATE, OIL PRESSURE	1	
8	EM97039	PILOT LIGHT, BATTERY	1	
	EM97041	CONTACT BLOCK	1	
	EM97042	NAME PLATE, BATTERY	1	
9	EM97030	SWITCH, DIRECTIONAL CONTROL	1	
	EM97031	NAME PLATE, DIRECTIONAL FWD/REV.	1	
10	EM97045	SWITCH, OPERATION PUMP/ENGINE	1	
	EM97035	NAME PLATE, OPER. PUMP/ENGINE	1	
11	EM97032	SWITCH, TEST FUNCTION	1	
	EM97034	NAME PLATE, TEST ON/OFF	1	
12	EM97036	SWITCH, PUMP CONTROL	1	
	EM97038	NAME PLATE, CONTROL/REMOTE	1	
13	EM97032	SWITCH, FAN CONTROL	1	
	EM97033	NAME PLATE, FAN ON/OFF	1	
14	EM97068	RECEPTACLE, REMOTE CONTROL	1	
15	EM97046	CASE, CONTROL PANEL (NO COMPONENTS)	1	
X	EM97099	REMOTE CONTROL CABLE	1	
X	EM26793	CORD CABEL ADAPTOR	1	
X	EM23713R	OPTIONAL — RADIO REMOTE CONTROL ASSY	1	

X NOT ILLUSTRATED



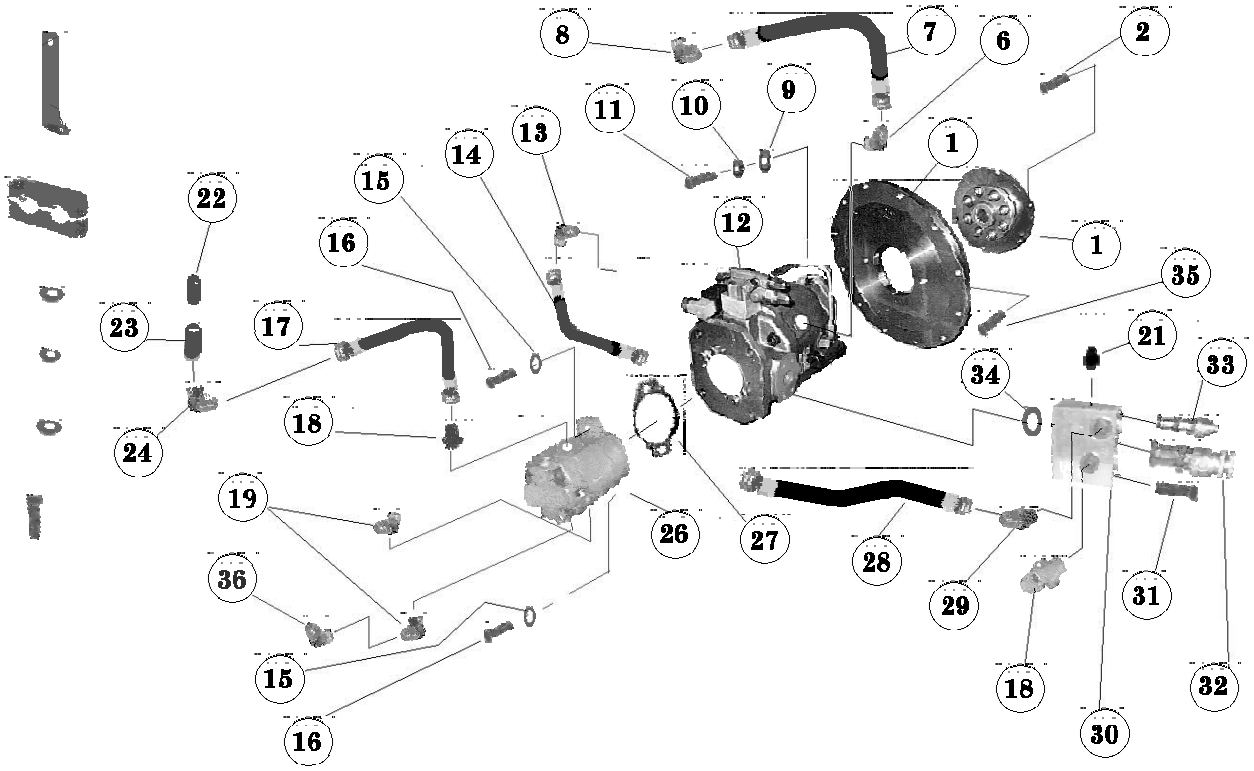
SEE NEXT PAGE FOR DETAIL OF TB1, TB2,
RELAYS K3 AND K5

EXPLODED VIEW OF TERMINAL BLOCK (page 42)



ST- 70
CONTROL PANEL INTERIOR

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM97050	RELAY (IDEC)	2	
2	EM97048	RELAY	1	
3	EM97027	SOLENOID	3	
4	EM97078	FUSE, 15 AMP	3	
5	EM98001	DIODE, 6 AMP	1	
6	EM98002	DIODE, 1 AMP	19	
7	EM40711	SWITCH, ITL1-1	1	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ST-45
MAIN DRIVE PUMPS

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM 97088	COUPLING ASSY, ENGINE	1	
2	EM 506611	SOCKET HD. M12 x 20	6	
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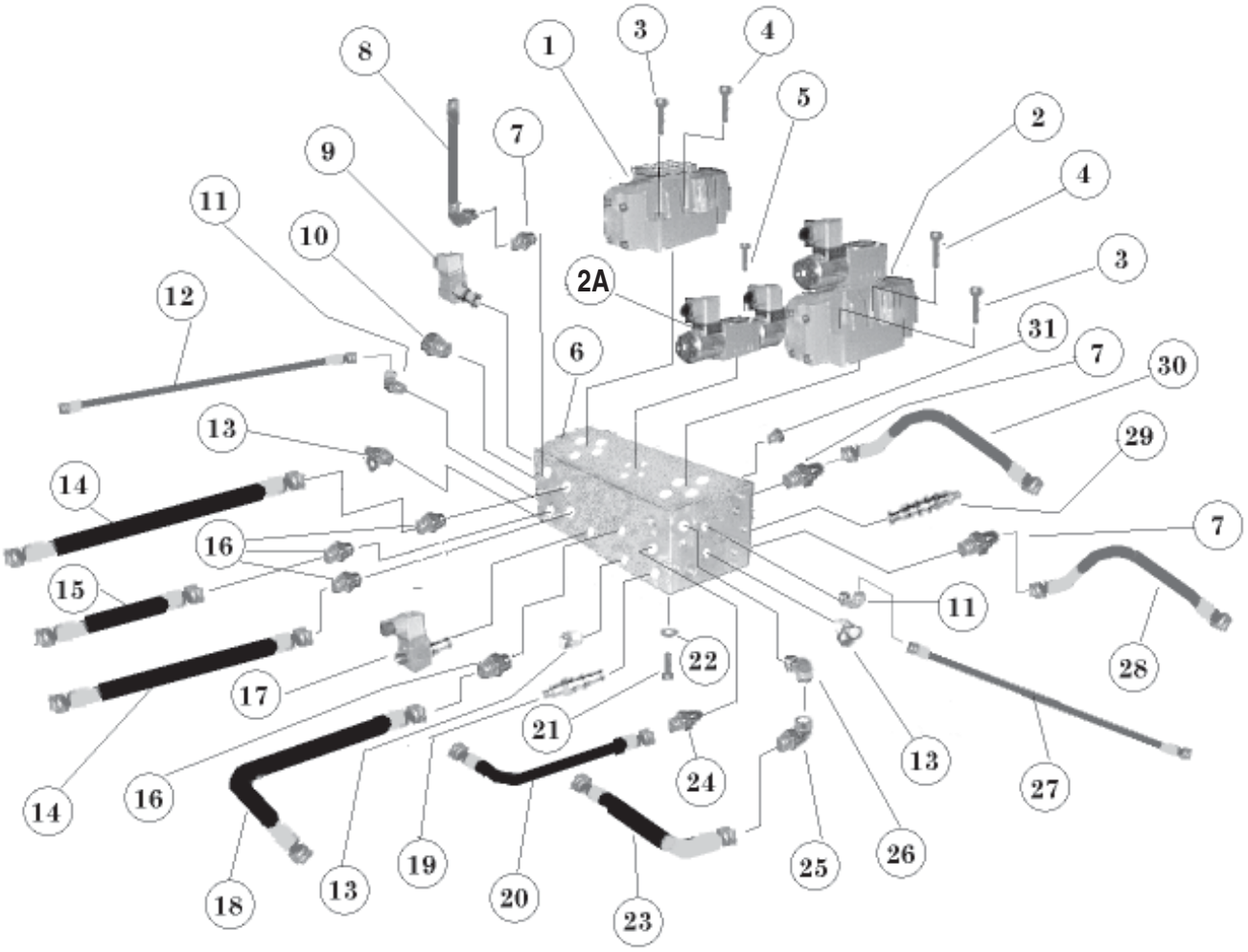
6	EM 25459	ELBOW 90 DEG.		
7	EM 509777	HOSE, CASE DRAIN LINE		
8	EM 509784	ELBOW 90 DEG.		
9	EM 505882	WILLIAM WASHER 518"	2	
10	EM 492627	WASHER, LOCK 5/8"	2	
11	EM 503982	BOLT, HEX. HD 518"-NC x 2"	2	
12	EM 97086	PUMP, PISTON	1	
13	EM 25429	ELBOW 90 DEG.	1	
14	EM 509937	HOSE, COMPENSATOR	1	
15	EM 492624	WASHER, LOCK 318"	2	
16	EM 492375	BOLT, HEX. HD 3/8"-NC x 1"	2	
17	EM 609783	HOSE, SUCTION GEAR PUMP	1	
18	EM 609796	ADAPTER	1	
19	EM 16524	ELBOW, 90 DEG.	2	
20	EM 492375	BOLT, HEX. HD 318"-NC x 1"	1	
21	EM 25511	ADAPTER	1	
22	EM 509793	NIPPLE	1	
23	EM 509794	COUPLE	1	
24	EM 509795	ELBOW 90 DEG,	1	
26	EM 509774	PUMP, DUAL GEAR	1	
27	EM 16190	GASKET	1	
28	EM 509787	HOSE, RETURN LINE (HEAT EXHAUST)	1	
29	EM 25497	ELBOW 90 DEG.	1	
30		BLOCK, MANIFOLD	1	
31	EM 499799	SOCKET HD. 1/2"-NC x 5 1/2"	4	
32	EM98005	VALVE, NEEDLE	1	
33	EM98004	VALVE, RELIEF	1	
34	*	O-RING	1	
35	EM 162	SOCKET HD. MI 0 x 25	10	
36	EM 506195	ELBOW, 90 DEG,	1	

*CONTACT FACTORY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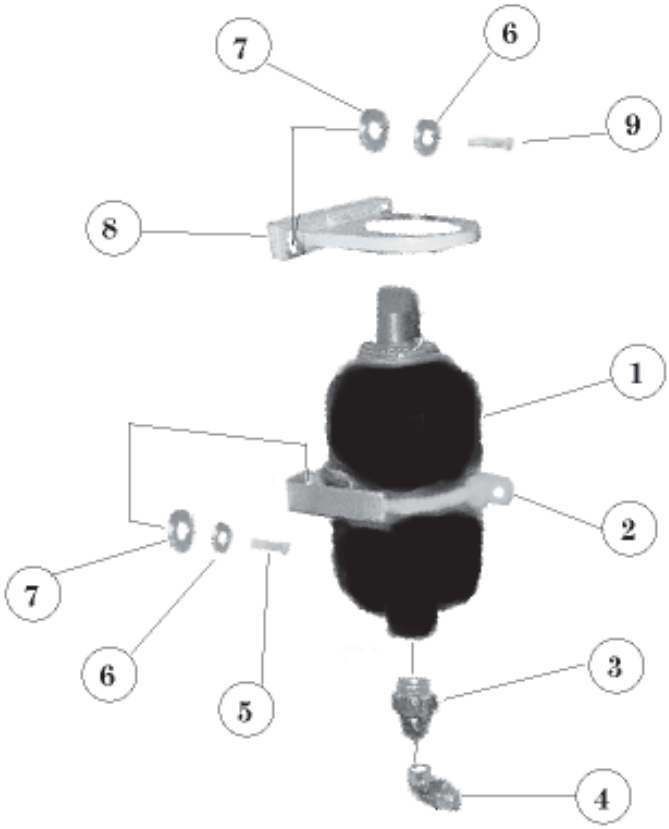
ST-70
MANIFOLD CONTROL

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM97011	DIRECTIONAL CONTROL VALVE, HYDRAULIC CYLINDER	1	
2	EM97013	DIRECTIONAL CONTROL VALVE, SHUTTLE CYLINDER	1	
2A	EM97002	PILOT VALVE		
3	EM509342	SOCKET HEAD, 3/8"-NC x 2-1/2"	8	
4	EM196	SOCKET HEAD, 1/4"-NC x 2-1/4"	4	
5	EM508804	SOCKET HEAD, 10-NC x 2"	4	
6	EM52500176	MANIFOLD BLOCK	1	
7	EM25462	ADAPTER	3	
8	EM509375	HOSE, CHECK VALVE TO TANK	1	
9	EM97003	CARTRIDGE, MAXIMUM PRESSURE TEST	1	
10	EM98006	PLUG	1	
11	EM25429	ELBOW 90 DEG.	2	
12	EM509517	HOSE, PUMP PRESSURE GAUGE	1	
13	EM98007	FITTING	3	
14	EM509511	HOSE, MAIN PRESSURE LINE	2	
15	EM509374	HOSE, PRESSURE LINE TO CYLINDER	1	
16	EM25498	ADAPTER	4	
17	EM97005	CARTRIDGE, BLEED OFF	1	
18	EM509400	HOSE, TANK	1	
19	EM97010	CARTRIDGE, PILOT RELIEF	1	
20	EM509367	HOSE, ACCUMULATOR CIRCUIT	1	
21	EM492376	BOLT, HEX. 3/8"-NC x 1 1/4"	4	
22	EM492624	WASHER, LOCK 3/8"	4	
23	EM509581	HOSE, ACCUMULATOR TO MANIFOLD	1	
24	EM509398	ADAPTER	1	
25	EM509353	ELBOW 90 DEG.	1	
26	EM509352	ELBOW 90 DEG.	1	
27	EM509516	HOSE, PRESSURE GAUGE, ACCUMULATOR	1	
28	EM509372	HOSE, ACCUMULATOR CYLINDER	1	
29	EM97008	CARTRIDGE, UN-LOADING VALVE	1	
30	EM509373	HOSE, ACCUMULATOR CYLINDER	1	
31	EM25539	PLUG	2	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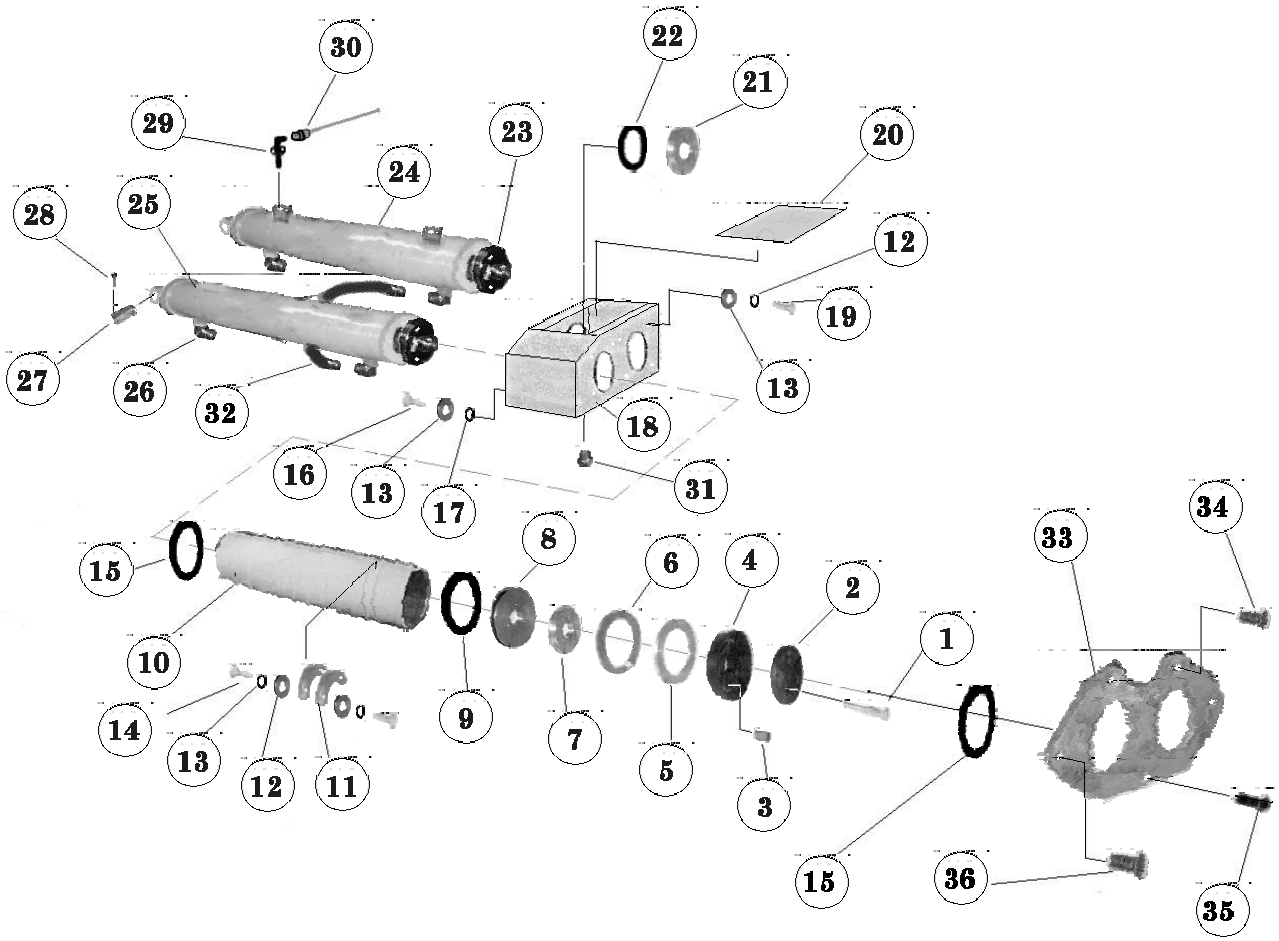
ST-70
ACCUMULATOR

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM97015	ACCUMULATOR	1	
2	EM97016	CLAMP	1	
3	EM509425	ADAPTER	1	
4	EM509353	ELBOW 90 DEG.	1	
5	EM509562	BOLT, HEX. HD 3/8"-NC x 5/8"	2	
6	EM492624	WASHER, LOCK 3/8"-NC	2	
7	EM492598	WASHER, 3/8"	2	
8	EM509444	BRACKET	1	
9	EM492373	BOLT, HEX. HD 3/8"-NC x 3/4"	2	
*	EM98099	ACCUMULATOR REPAIR KIT	1	

***NOT ILLUSTRATED**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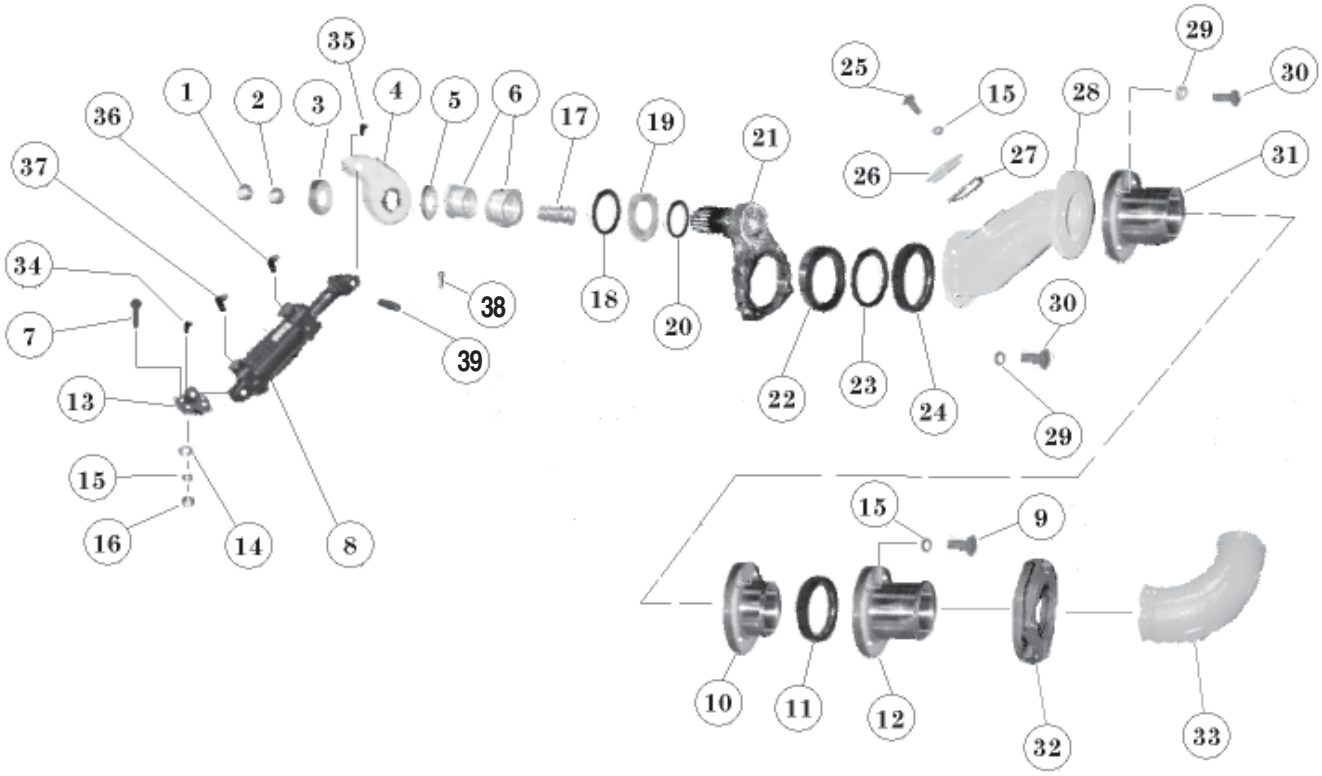
ST-70
HYDRAULIC / CONCRETE CYLINDERS

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM510265	BOLT, HEX. HD. 3/8"-NC x 3 1/4"	6	
2	EM16464	PLATE, FACE	2	
3	EM16465	SPACER	6	
4	EM16463	PISTON CUP	2	
5	EM14408	RING, BRONCE	2	
6	EM16493	RING, FELT	2	
7	EM16462	FELT HOLDER	4	
8	EM16461	PLATE, OILER	2	
9	EM14407	O-RING	2	
10	EM25801	CYLINDER, CONCRETE	2	
11	EM25110	RETAINER, CYLINDER	4	
12	EM492624	WASHER, LOCK 3/8"	14	
13	EM492598	WASHER, 3/8"	22	
14	EM492375	BOLT, HEX. HD. 3/8"-NC x 1"	8	
15	EM16174	O-RING	2	
16	EM492451	BOLT, HEX. HD. 3/8"-NF x 1"	8	
17	EM50443	SEAL, OIL	8	
18	EM509417	TANK, LUBE	1	
19	EM492378	BOLT, HEX. HD. 3/8"-NC x 1 3/4"	1	
20	EM508517	COVER, TANK	1	
21	EM50425	FLANGE	2	
22	EM27435-1	SEAL	2	
23	EM16460	ADAPTER	2	
24	EM97076	CYLINDER HYDRAULIC	1	
25	EM97077	CYLINDER HYDRAULIC	1	
26	EM25497	ELBOW	4	
27	EM16454	CLEVIS PIN	2	
28	EM505723	COTTER PIN 5/32" x 1-½"	4	
29	EM97024	SWITCH, PROXIMITY	2	
30	EM97025	CONDUCTOR, CYLINDER SWITCH	2	
31	EM18447	PLUG PIPE 3/4"	1	
32	EM25474	HOSE	1	
33	EM25843	PLATE, WEAR	1	
34	EM265	BOLT, FLAT SOCKET HD. 5/8"-NC	2	
35	EM264	BOLT, FLAT SOCKET HD. 1/2"-NC	1	
36	EM295	BOLT, FLAT SOCKET HD. 3/4"-NC	2	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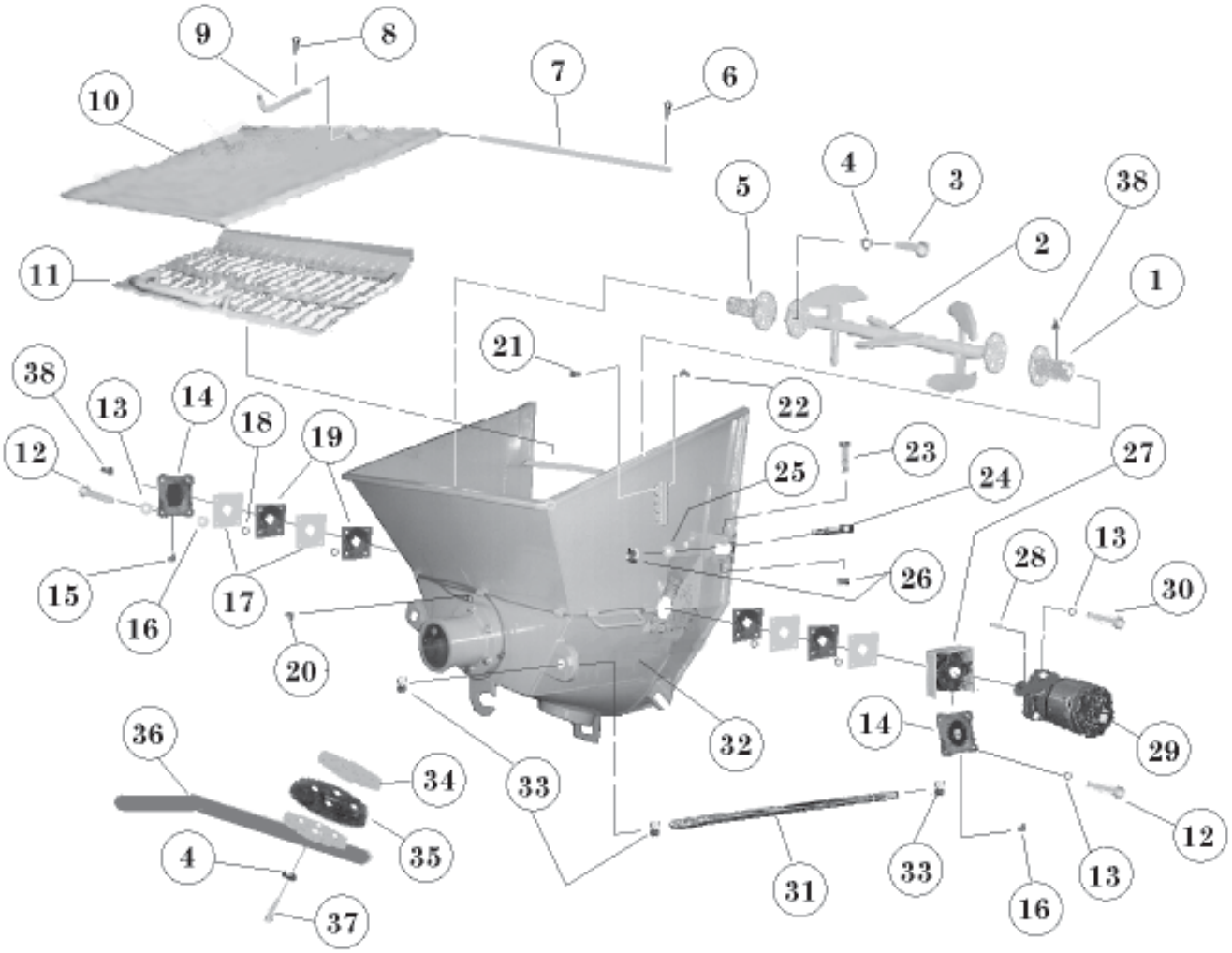
ST-70
SHUTTLE TUBE ASSY

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM417	NUT, LOCK 1"-14 NS	1	
2	EM509221	NUT, HEX1"-14 NS	1	
3	EM16814	TENSIONER	1	
4	EM25236	AXLE, CRANK	1	
5	EM16169	WASHER, THRUST	1	
6	EM16145	BUSHING, BRONZE	2	
7	EM492397	BOLT, HEX 1/2"-NC x 2-1/2"	4	
8	EM25454	CYLINDER, SHUTTLE	1	
9	EM210	BOLT, HEX. HD 1/2"-NC x 3-1/4"	6	
10	EM25803	BEARING, DISCHARGE NIPPLE	1	
11	EM16819	SEAL	1	
12	EM25836	NIPPLE, DISCHARGE	1	
13	EM25454-9	BASE, CYLINDER	1	
14	EM621	WILLIAM WASHER, 1/2"	4	
15	EM492626	WASHER, LOCK 1/2"	4	
16	EM492584	NUT, LOCK 1/2"	1	
17	EM284	STUD, 1"-14 NS	1	
18	EM16175	O-RING	1	
19	EM16170	RING, SEAL	1	
20	EM16176	O-RING	1	
21	EM25843	NUN PLATE	1	
22	EM16171	RING, WEAR	1	
23	EM16816-2	RING, INSERT	1	
24	EM16816-1	RING, ENERGIZER	1	
25	EM492393	BOLT, HEX. HD 1/2"-NC x 1-1/4"	4	
26	EM16802	PLATE, INSPECTION	1	
27	EM20816	O-RING	1	
28	EM16811	SHUTTLE TUBE	1	
29	EM492627	WASHER, LOCK 5/8"	8	
30	EM503982	BOLT, HEX. HD 5/8"-NC x 2"	8	
31	EM25836	NIPPLE, DISCHARGE	1	
32	EM28906	COUPLING 5", OPTIONAL	1	
33	EM25837	ELBOW, REDUCING, 5" x 4", OPTIONAL	1	
34	EM25568	GREASE FITTING	1	
35	EM16426	GREASE FITTING	1	
36	EM25500	ELBOW 45 DEG.	1	
37	EM25459	ELBOW 90 DEG.	1	
38	EM717	PIN, COTTER	1	
39	EM26126	PIN, CLEVIS	1	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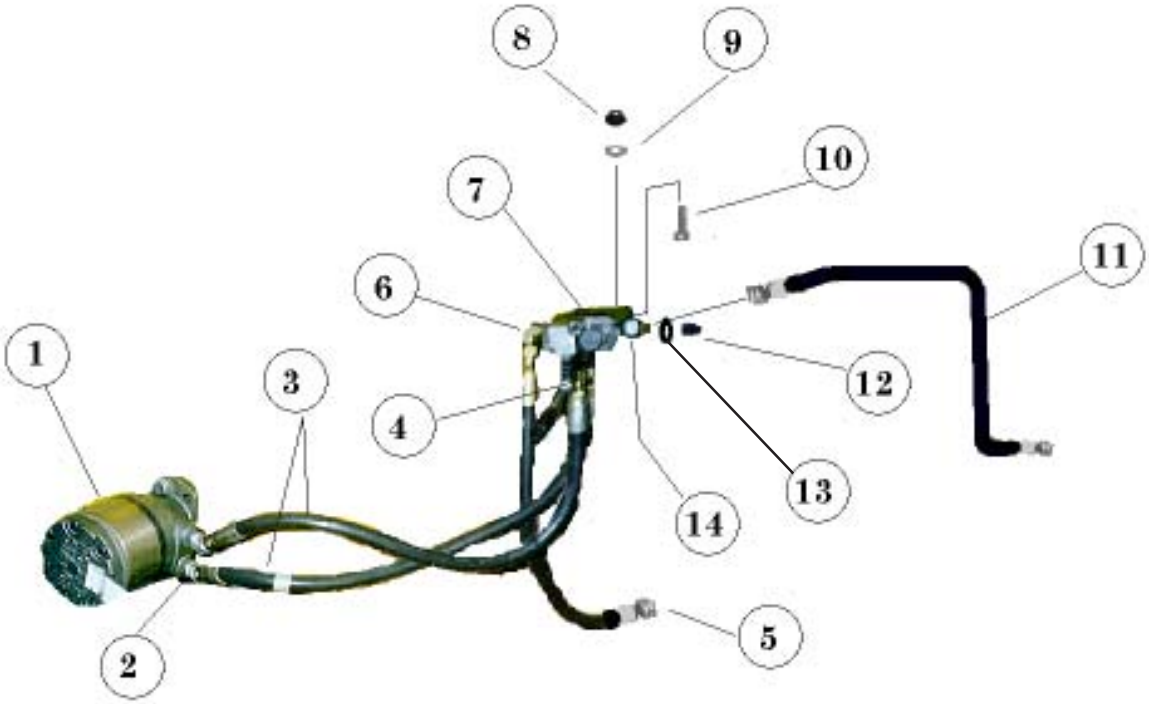
ST-70
HOPPER ASSY

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM25301	SHAFT DRIVE END	1	
2	EM25863	REMIXER	1	
3	EM492375	BOLT, HEX HD 3/8"-NC x 1"	8	
4*	EM492624	WASHER, LOCK 3/8"	12	
5	EM23305	SHAFT, DRIVE END	1	
6	EM491686	COTTER PIN 1/8" x 1-3/4"	2	
7	EM16159	PIN, HINGE	1	
8	EM505723	COTTER PIN 5/32" x 1-1/2"	1	
9	EM70134-2	PIN, SPLASH	1	
10	EM70134	PLATE, SPLASH	1	
11	EM16188	SCREEN, HOPPER	1	
12	EM492397	BOLT, HEX HD 1/2"-NC x 2-1/2"	8	
13	EM492626	WASHER, LOCK 1/2"	10	
14	EM18135	BEARING, FLANGE	2	
15	EM25568	FITTING LUBE, 45 DEG.	2	
16	EM22250	SPACER	4	
17	EM18136	PLATE, SPACER	8	
18	EM18138	SPACER, SEAL	16	
19	EM18137	SEAL, SHAFT	4	
20	EM16426	FITTING, LUBE, 90 DEG.	3	
21	EM508812	FITTING, LUBE	5	
22	EM491701	FITTING, GREASE	5	
23	EM505121	BOLT, HEX HD 3/4"-NC x3"	4	
24	EM14165	EYE BOLT	4	
25	EM619	WILLIAM WASHER 3/4"	4	
26	EM492558	NUT 3/4"-NC	8	
27	EM50141	BRACKET, MOTOR MTG.	1	
28	EM505719	KEY	1	
29	EM25425	MOTOR, REMIXER	1	
30	EM492394	BOLT, HEX HD 1/2"-NC x 1-1/2"	2	
31	EM16166	TIE ROD	2	
32	EM25174	HOPPER	1	
33	EM505728	NUT, HEX. 1"-NC	6	
	EM70860	HOPPER CLEAN OUT PLUG, ASSY	1	..... INCLS. ITEMS W/*
34*	EM70860-1	PLATE, TOP	1	
35*	EM50417	CUP	1	
36*	EM508830	HANDLE	1	
37*	EM492378	BOLT, HEX HD 3/8"-NC x 1-3/4"	4	
38	EM491698	FITTING, GREASE	2	
*	16184	HOPPER SEAL	1	

*NOT ILLUSTRATED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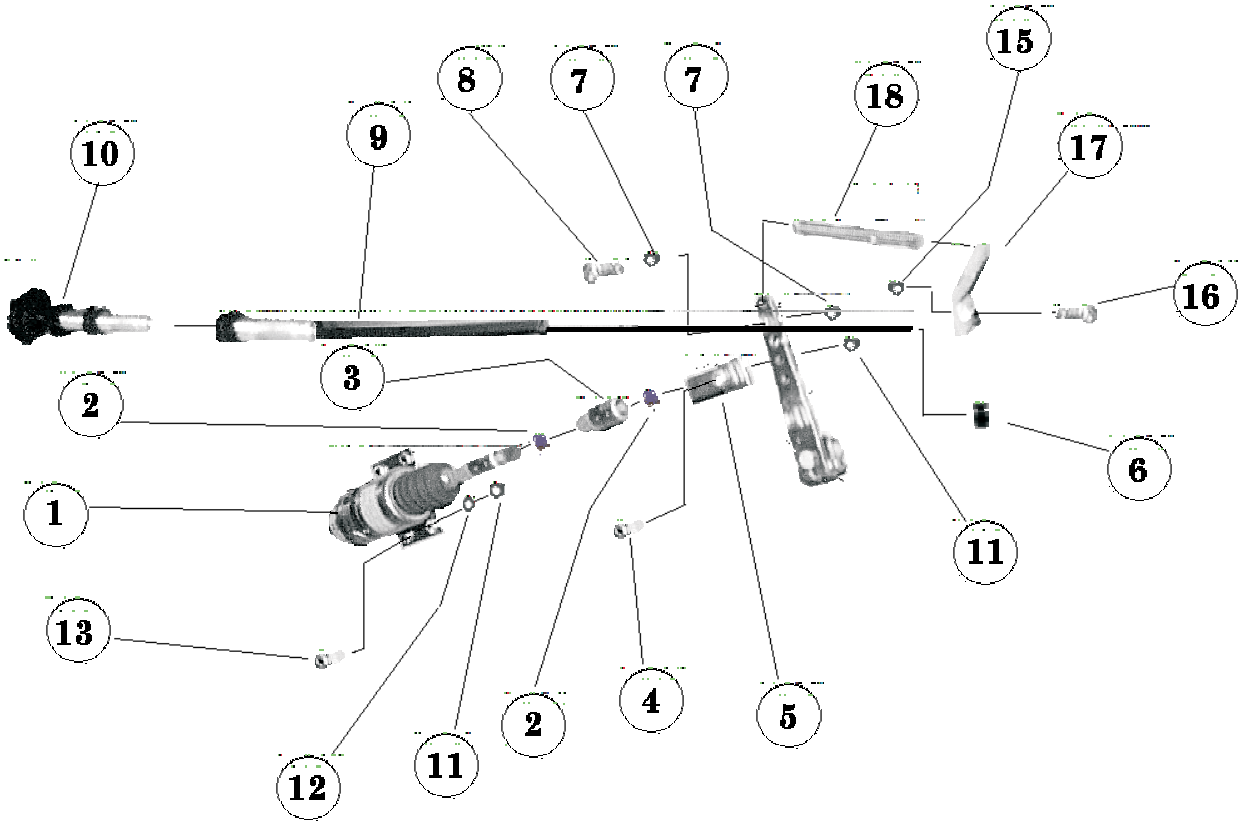
ST-70
REMIXER CONTROL ASSY

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM25425	MOTOR, REMIXER	1	
2	EM25508	ELBOW, 45 DEG.	2	
3	EM25483	HOSE, MOTOR TO VALVE	2	
4	EM25509	ADAPTER	2	
5	EM509378	HOSE, RETURN TO HEAT EXCHANGER	1	
6	EM25507	ELBOW, 90 DEG.	1	
7	EM25495	VALVE, REMIXER	1	
8	EM492553	NUT, HEX. 5/16"-NC	2	
9	EM492623	WASHER, LOCK 5/16"	2	
10	EM218	BOLT, HEX. HD 5/16"-NC x 2 1/2"	2	
11	EM509370	HOSE, TO BEAR PUMP	1	
12	EM98014	TEST PORT	1	
13	EM98015	ADAPTOR	1	
14	EM25563	TEE	1	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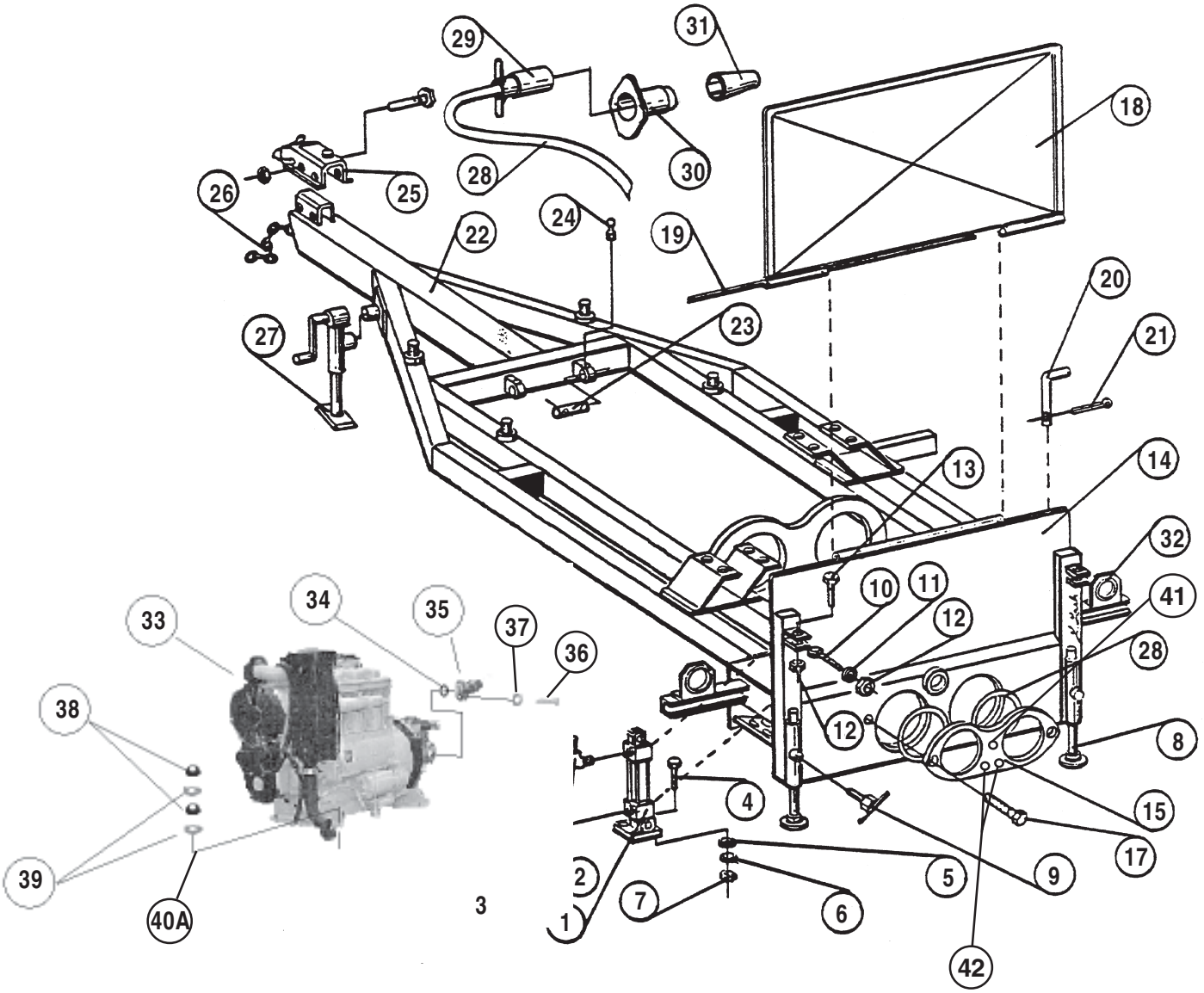
ST-70
THROTTLE ASSY

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM20709-1	SOLENOID	1	
2	EM400	NUT, HEX. 1/4"-NF	2	
3	EM26315	ADAPTER	1	
4	EM492357	BOLT, HEX. HD. 1/4"-NC x 1"	1	
5	EM959119	CLEVIS	1	
6	EM722	STOP NUT	1	
7	EM492598	NUT, LOCK 5/16"-NC	2	
8	EM492364	BOLT, HEX. HD. 5/16"-NC x 1"	1	
9	EM16740-2	CABLE, THROTTLE	1	
10	EM16740-1	HANDLE, THROTTLE	1	
11	EM492581	NUT, LOCK 1/4"-NC	5	
12	EM492622	WASHER, LOCK 1/4"	4	
13	EM508821	BOLT, HEX. HD. 1/4"-NC x 3/4"	4	
14				
15	EM492558	NUT, LOCK 3/8"-NC	1	
16	EM503623	BOLT, HEX. HD. 3/8"-NC	1	
17	EM509414	BRACKET	1	
18	EM509510	SPRING	1	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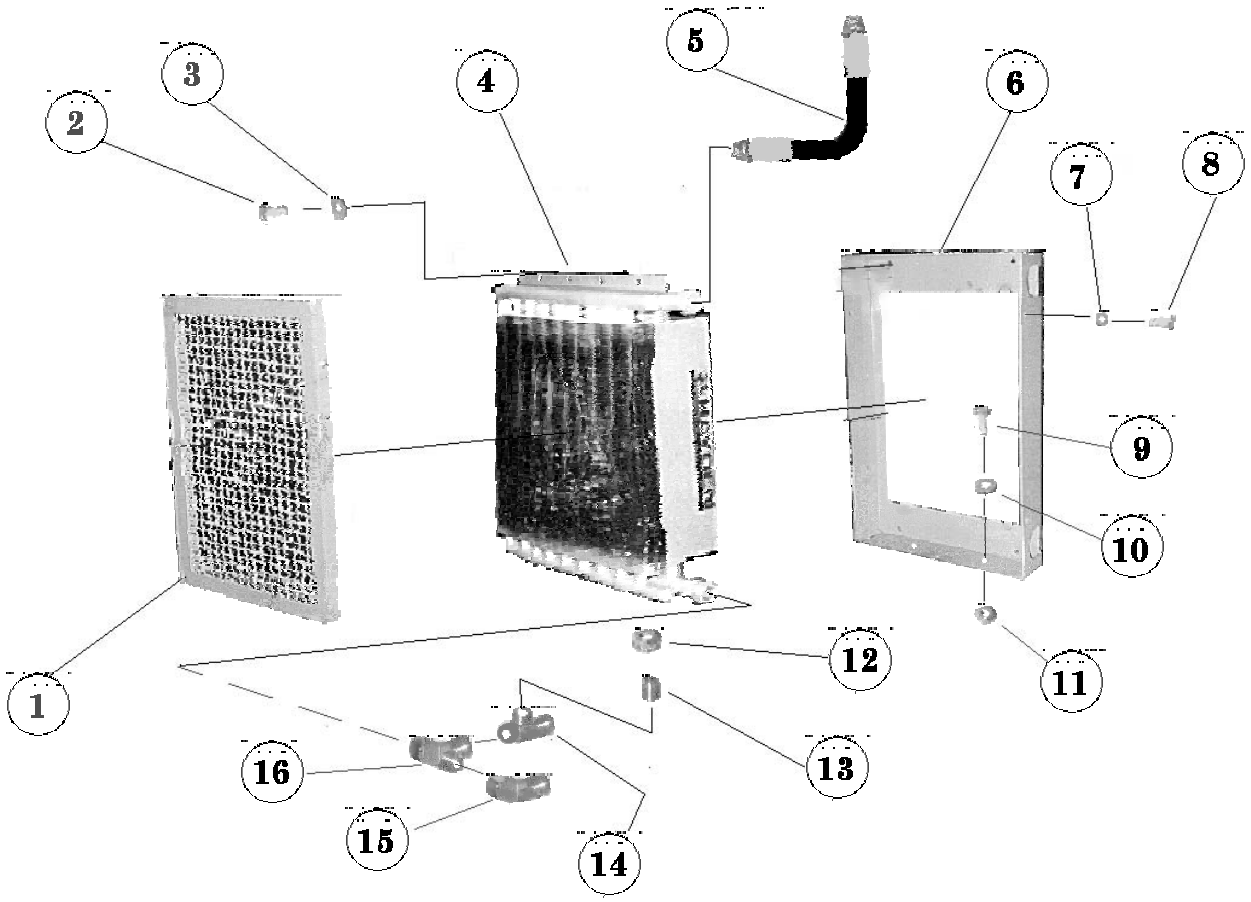
ST-70
ENGINE AND FRAME

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM25454	CYLINDER, SHUTTLE	1	
2	EM25459	ELBOW, 3/4" x 90°	1	
3	EM25500	ELBOW, 3/4" x 45°	1	
4	EM132	BOLT, HEX HD, 1/2-13 x 2"	4	
5	EM621	WILLIAM WASHER, 1/2"	4	
6	EM606	WASHER, LOCK, 1/2"	4	
7	EM404	NUT, HEX, 1/2"-13	4	
8	EM25160	STAND, REAR STABLIZER	2	
9	EM14138	HANDLE, TEE	2	
10	EM14165	BOLT, EYE	4	
11	EM619	WILLIAM WASHER, 3/4"	4	
12	EM407	NUT, HEX, 3/4-10	8	
13	EM119	BOLT, HEX, 3/4-10 x 3"	4	
14	EM26112	PLATE ASSY, REAR	1	
15	EM25841	PLATE, WEAR	1	
16	EM16174	O-RING, WAER PLATE	2	
17	EM295	BOLT, HEX HD	2	
18	EM70134	PLATE, SPLASH	1	
19	EM16159	PIN, HINGE, SPLASH PLATE	1	
20	EM70134-2	PIN, SPLASH PLATE	1	
21	EM717	PIN, COTTER	1	
22	EM80101	FRAME ASSY	1	
23	EM16459	PIN, CLEVIS	2	
24	EM14169	GREASE FITTING	2	
25	EM16602	2" HYDRAULIC SURGE BRAKE ASSY	1	
26	EM25610	JACK STAND, SWIVEL	1	
27	EM20135	CHAIN, SAFETY	1	
28	EM25608	WIRE, #16/5 x 18'	1	
29	EM25607-1	PLUG, MALE #16/5	1	
30	EM25607-2	SOCKET, FEMALE #16/5	1	
31	EM25607-3	BOOT	1	
32	EM26536	LIGHT, TAIL	2	
33	EM25711	ENGINE, DIESEL HATZ 4M40L	1	
34	EM509436	O-RING	1	
35	EM527442	ELBOW 45°	1	
36	EM492394	BOLT, HEX HD, 1/2"-NC x 1-1/2"	4	
37	EM635	WASHER, LOCK 1/2"	4	
38	020310080	NUT	2	
39	030210250	WASHER	2	
40	EM01060100	SHOCK ABSORBER	4	
40A	EM03642900	STUD, SHOCK ABSORBER	8	
41	EM264	BOLT 1/2" x 13 x 3"	1	
42	EM265	BOLT 5/8" x 11 x 3"	2	
*	510269	ENGINE HOOD	1	

***NOT ILLUSTRATED**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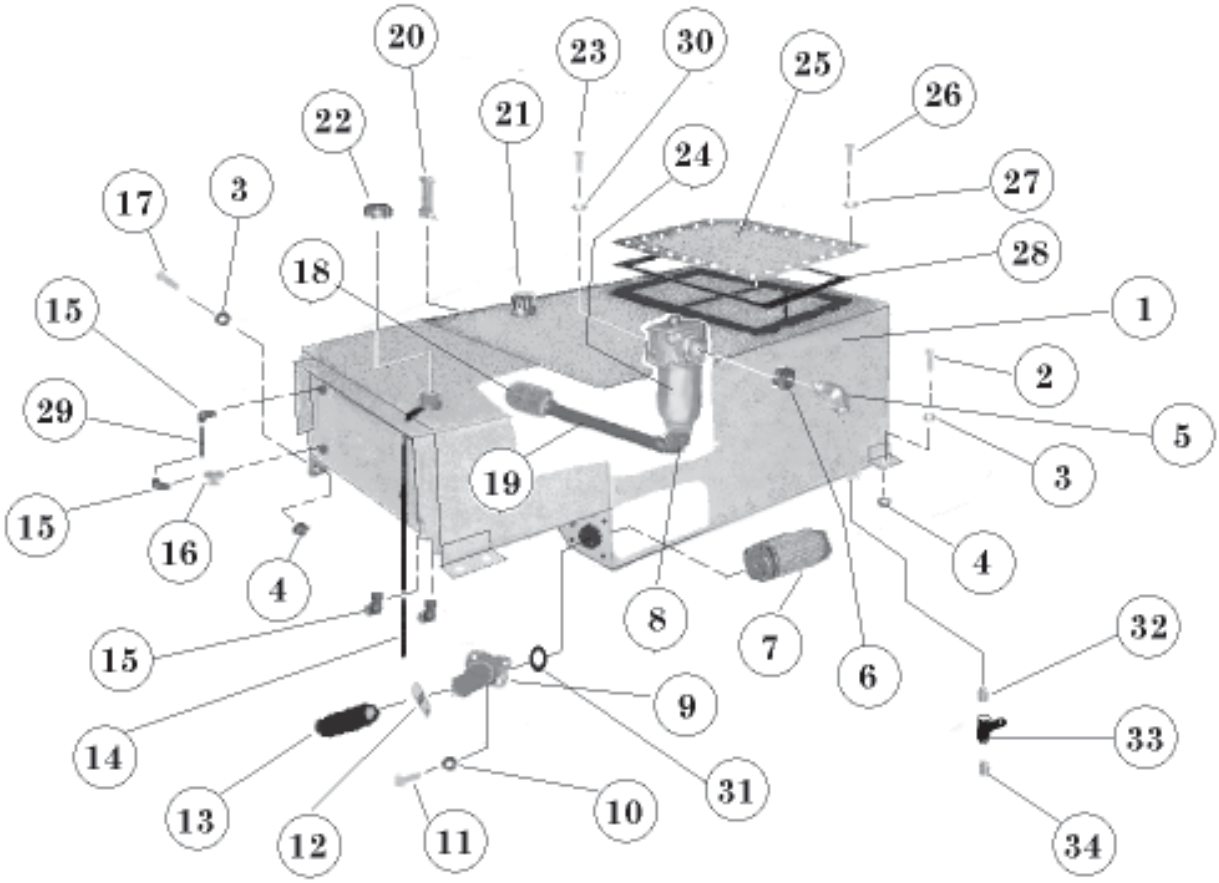
ST-70
OIL COOLER ASSY

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM509805	GUARD, COOLER	1	
2	EM492364	BOLT, HEX. HD. 5/16"-NC x 1"	4	
3	EM923023	WASHER, 5/16"	4	
4	EM509791	COOLER	1	
5	EM509779	HOSE	1	
6	EM509802	SHROUD, COOLER	1	
7	EM492622	WASHER, LOCK 1/4"	4	
8	EM492356	BOLT, HEX. HD. 1/4"-NC x 3/4"	4	
9	EM492376	BOLT, HEX. HD. 3/8"-NC x 1"	2	
10	EM492598	WASHER, 3/8"	2	
11	EM492583	NUT, LOCK 3/8"-NC	2	
12	EM509402	NUT	1	
13	EM509345	FITTING	1	
14	EM509344	TEE	1	
15	EM509401	ELBOW, 90 DEG.	1	
16	EM509343	TEE	1	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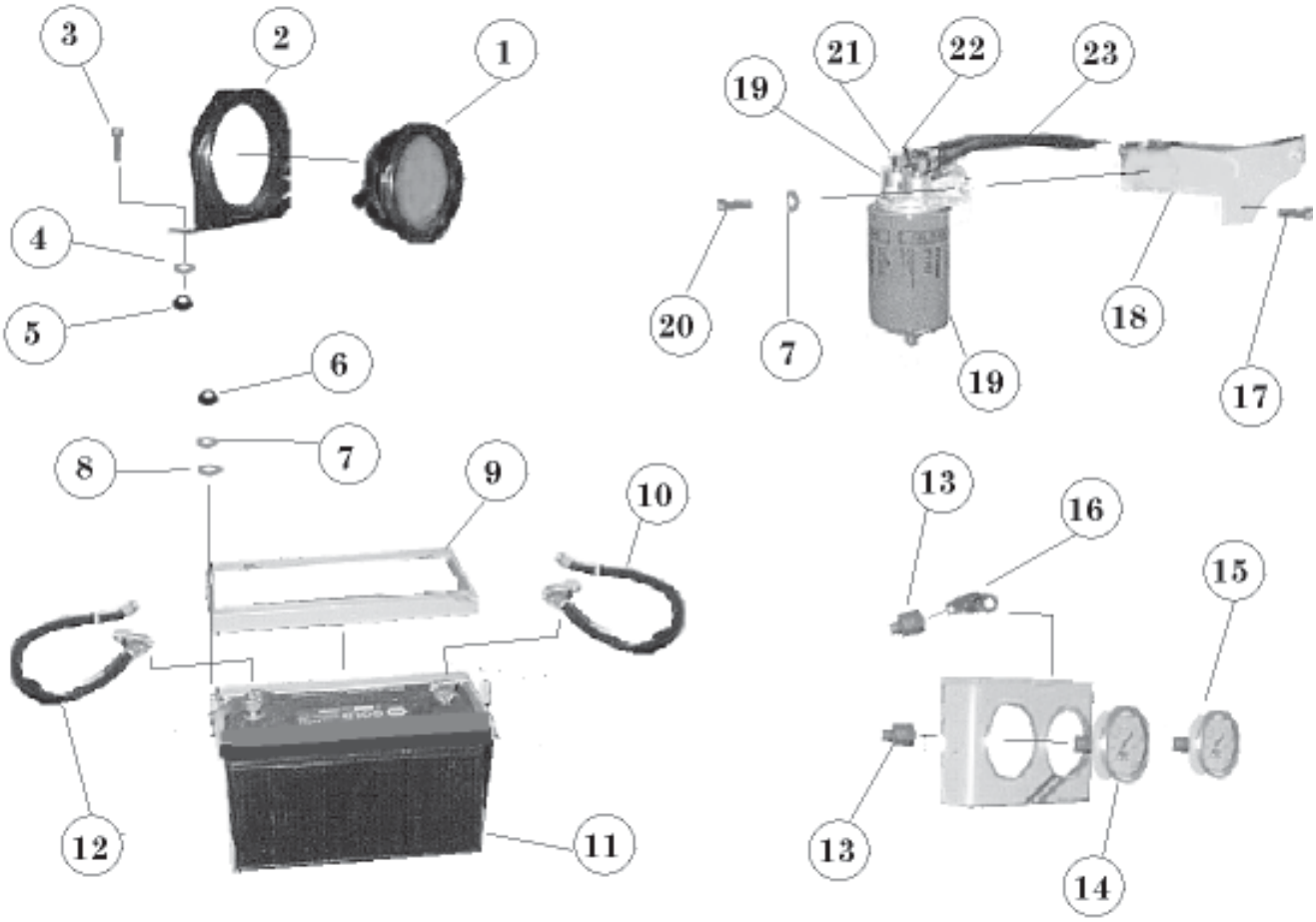
ST-70
FUEL AND HYDRAULIC TANK

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM509406	TANK, FUEL & HYDRAULIC	1	
2	EM175	BOLT, HEX 3/8"-NC x 1 1/4"	4	
3	EM492598	WASHER 3/8"	5	
4	EM492583	NUT, LOCK 3/8"	5	
5	EM18436	ELBOW	1	
6	EM16517	REDUCER	1	
7	EM50424	STRAINER	1	
8	EM16433	ELBOW	1	
9	EM27441	ELBOW	1	
10	EM635	WASHER, HI-COLLAR 1/2"	4	
11	EM492455	BOLT, HEX 1/2"-NF x 1-1/2"	4	
12	EM26471	CLAMP	1	
13	EM509437	HOSE	1	
14	EM508826	TUBE, PLASTIC	1	
15	EM20426	ELBOW	4	
16	EM20421	VALVE	1	
17	EM503117	BOLT, HEX 3/8"-NC x 3"	1	
18	EM16513	DEFUSER	1	
19	EM16516	PIPE	1	
20	EM16478	GAUGE, LEVEL-TEMP.	1	
21	EM16477	FILL CAP ASSY.	1	
22	EM25217	CAP, GAS	1	
23	EM492375	BOLT, HEX 3/8"-NC x 1"	4	
24	EM16512	FILTER	1	
25	EM25119-1	COVER	1	
26	EM492374	BOLT, HEX 5/16"-NC x 1"	20	
27	EM492623	WASHER, LOCK 5/16"	20	
28	EM25184	GASKET	1	
29	EM508827	TUBE, PLASTIC	1	
30	EM492624	WASHER 3/8"	1	
31	EM50466	O-RING	1	
32	EM509369	ADAPTER	1	
33	EM491237	VALVE	1	
34	EM506094	PLUG	1	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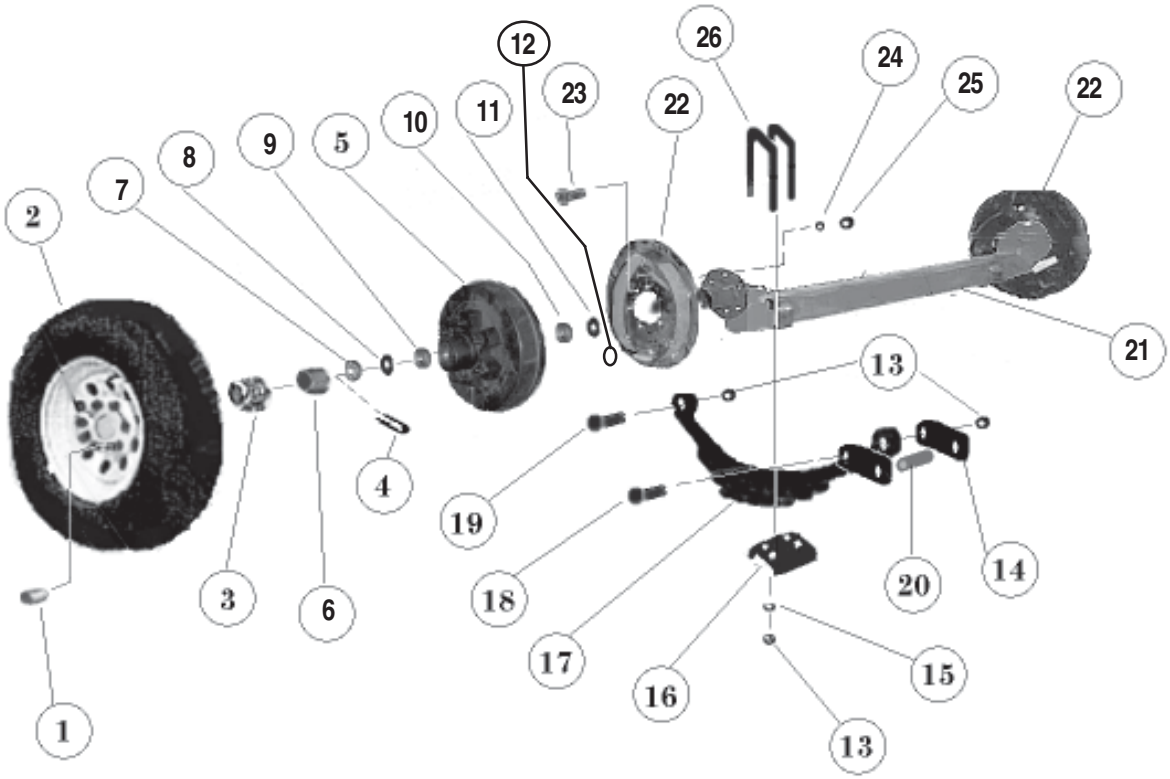
ST-70
BATTERY, TAIL LIGHTS, WATER SEPARATOR, GAUGES

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM26536	LIGHT, TAIL	2	
2	EM26536-1	BRACKET, TAIL LIGHT	2	
3	EM492364	BOLT, HEX. 5/16"-NC x 1"	4	
4	EM492623	WASHER, LOCK 5/16"	4	
5	EM492553	NUT, HEX. 5/16"-NC	4	
6	EM492561	NUT, HEX.1/4"-NC	2	
7	EM492622	WASHER, LOCK 1/4"	5	
8	EM492596	WASHER 1/4"	2	
9	EM25708	FRAME	1	
10	EM509105	CABLE, BATTERY GROUND	1	
11	EM16738	BATTERY, 12 VOLT	1	
12	EM16707	CABLE, BATTERY POSITIVE	1	
13	EM25523	ADAPTER	2	
14	EM97066	GAUGE, ACCUMULATOR PRESSURE	1	
15	EM97067	GAUGE, MAIN	1	
16	EM491396	ELBOW	1	
17	EM269	SOCKET HEAD, M10 x 30	2	
18	EM509449	BRACKET, WATER SEPERATOR FILTER	1	
19	EM16747	FILTER ASSY., WATER SEPERATOR	1	
19A	EM26465	ELEMENT, FILTER	1	
20	EM492356	BOLT, HEX. HD 1/4"-NC x 3/4"	3	
21	EM20426	ELBOW, 90 DEG.	2	
22	EM716	CLAMP, HOSE	2	
23	EM20427	HOSE	1	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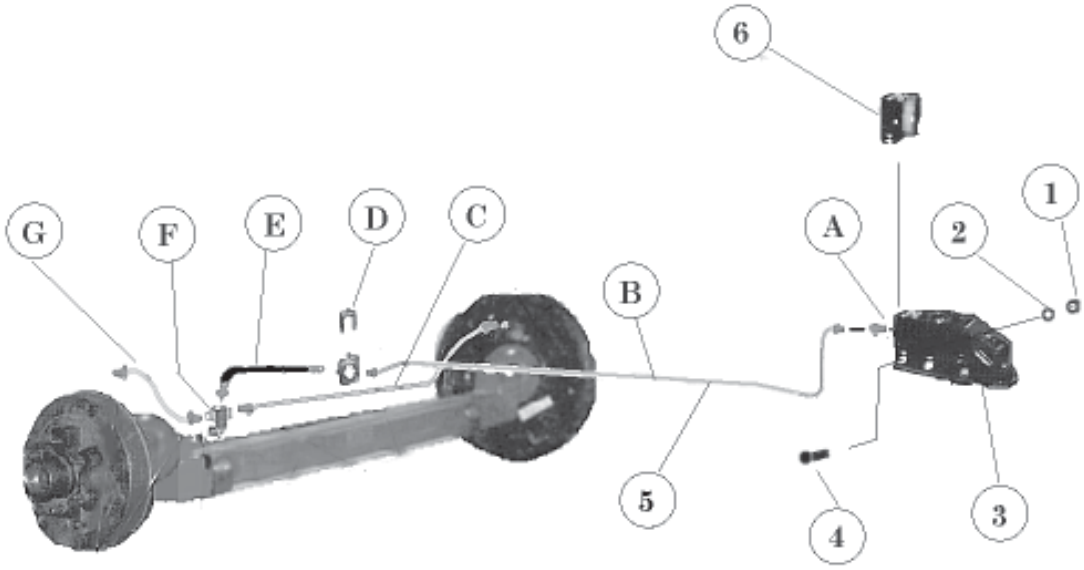
ST-70
AXLE AND BRAKES

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM26519	NUT, CHROME	12	
2	EM26615	TIRE AND WHEEL	2	
3	EM26520	CAP, HUB	2	
4	EM491690	PIN, COTTER 5/32" x 2"	2	
5	EM16610	DRUM, BRAKE	2	
6	EM26601	CAP, GREASE	2	
7	EM26113	NUT, CASTLE	2	
8	EM26111	RACE, OUTER BEARING	2	
9	EM26112	BEARING, OUTER	2	
10	EM26110	RACE, INNER BEARING	2	
11	EM26108	BEARING, INNER	2	
12	EM26109	SEAL, GREASE	2	
13	EM16612	LOCK NUT, HEX9/16"-NF	14	
14	EM16609	LINK, REAR SHACKLE	4	
15	EM508846	WASHER, LOCK 9/16"	8	
16	EM16607	SADDLE, SPRING	2	
17	EM16608	SPRING, LEAF	2	
18	EM966259	SHACKLE BOLT 9/16"-NF	4	
19	EM16611	SHACKLE BOLT 9/16"-NF	2	
20	EM16608-1	BUSHING, PLASTIC	2	
21	EM25611	AXLE	1	
22	EM16614	BRAKE ASSY	2	
23	EM492451	BOLT, HEX 3/8"-NF	10	
24	EM492624	WASHER, 3/8"	10	
25	EM492574	NUT, HEX 3/8"/NF	10	
26	EM16605	U-BOLT	4	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G
F
E
D
C
A
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B
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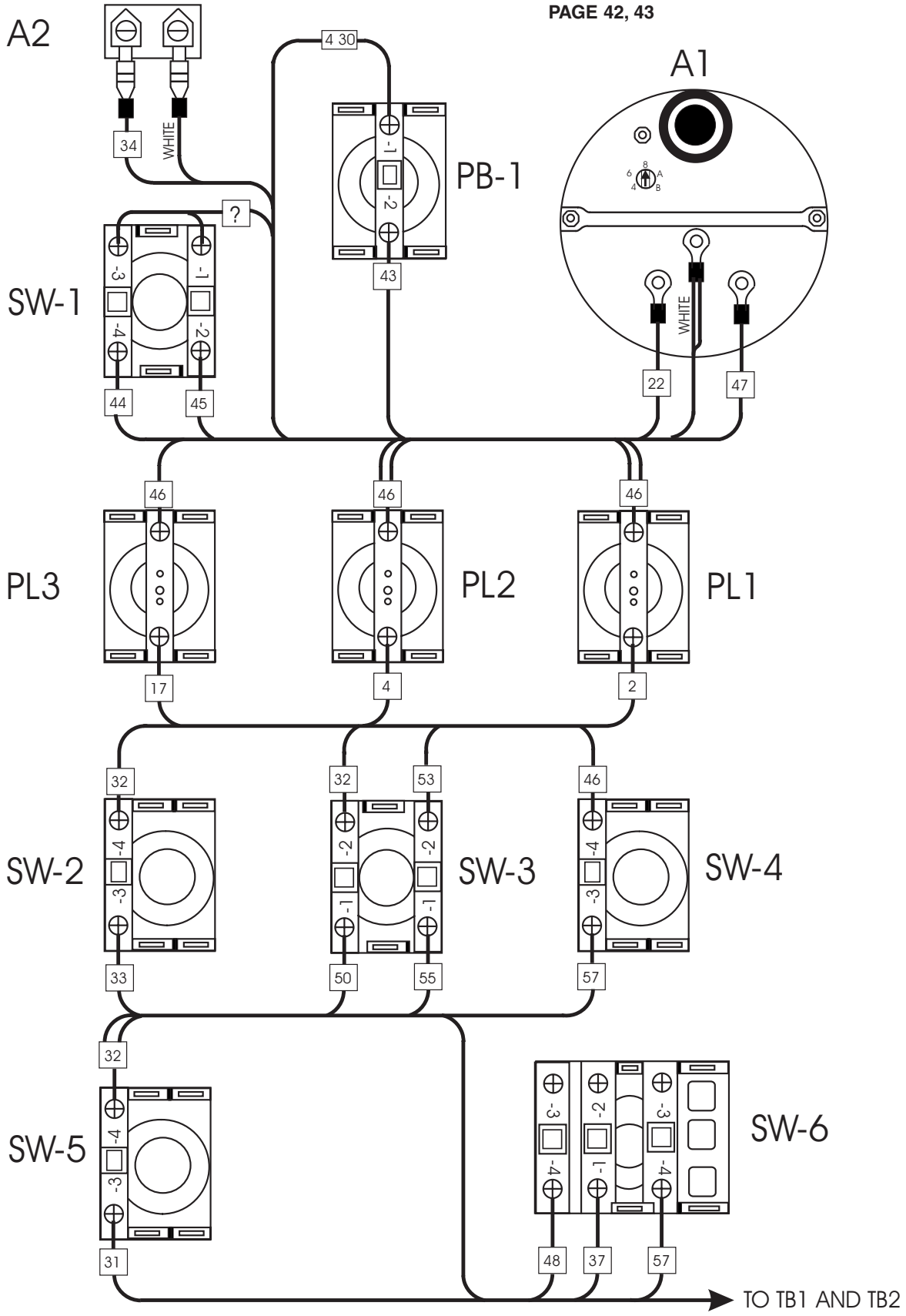
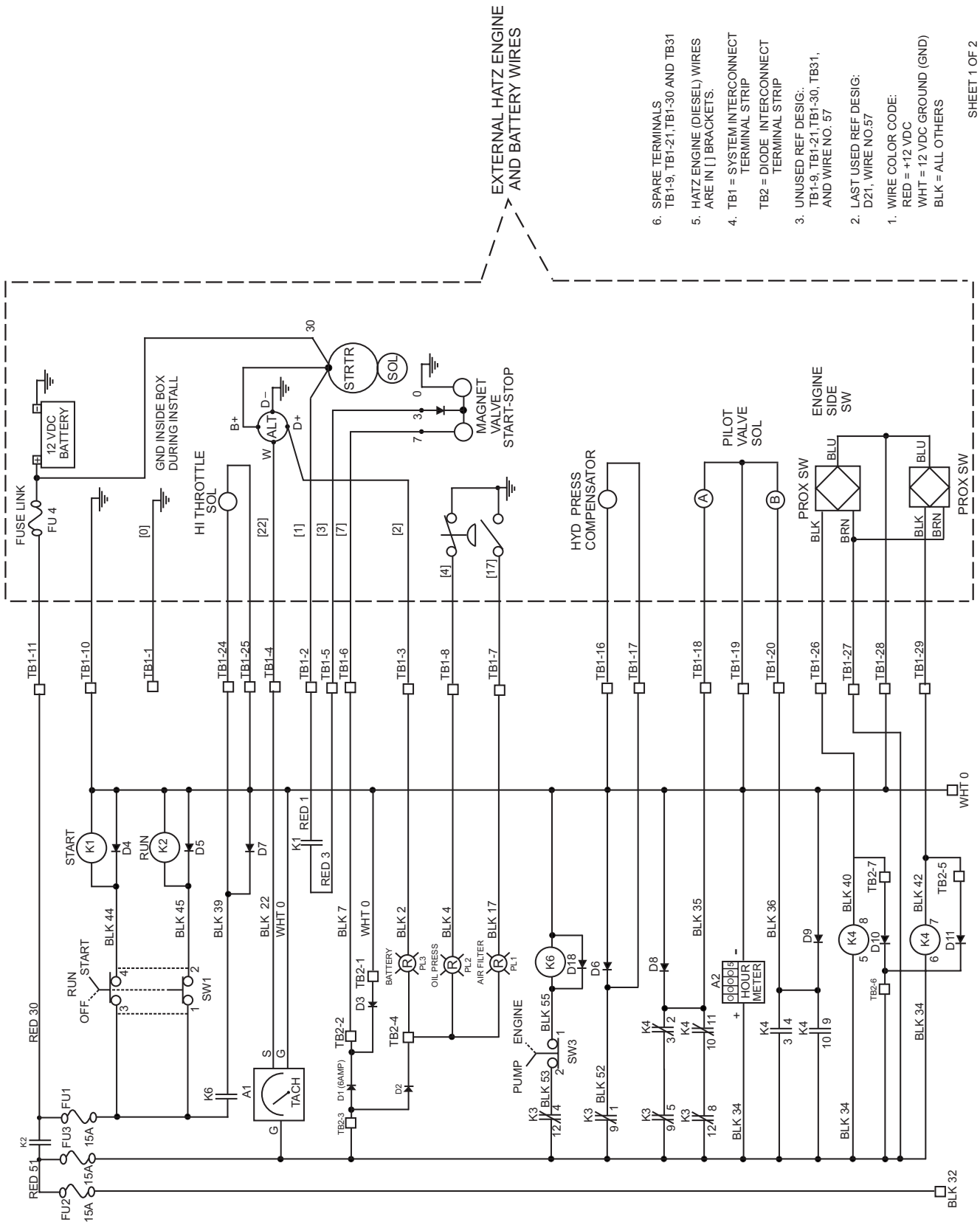
ST-70
HYDRAULIC SURGE BRAKE AND HITCH

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM492584	NUT 1/2"-NC HEX.	2	
2	EM492626	WASHER, LOCK 1/2"	2	
3	EM16602	2" HYDRAULIC SURGE BRAKE ASSY	1	FOR COMPONENTS: CONTACT YOUR LOCAL ATWOOD DEALER.
4	EM492401	BOLT, HEX. 1/2"-NC x 4"	2	
5	EM16116	KIT, BRAKE	1	INCLS. (A, B, C, D, E, F, G) FOR THESE COMPONENTS. CONTACT YOUR MAYCO PARTS DEPT.
6	EM16602-1	COVER	1	

SERVICE INFORMATION

NOTE: ADDITIONAL ILLUSTRATIONS PAGE 42, 43




EXTERNAL HATZ ENGINE AND BATTERY WIRES
6. SPARE TERMINALS TB1-9, TB1-21,TB1-30 AND TB31
5. HATZ ENGINE (DIESEL) WIRES ARE IN [ ] BRACKETS.
4. TB1 = SYSTEM INTERCONNECT TERMINAL STRIP
TB2 = DIODE INTERCONNECT TERMINAL STRIP
3. UNUSED REF DESIG:. TB1-9, TB1-21,TB1-30, TB31, AND WIRE NO. 57
2. LAST USED REF DESIG: D21, WIRE NO.57
1. WIRE COLOR CODE: RED = +12 VDC WHT = 12 VDC GROUND (GND) BLK = ALL OTHERS
SHEET 1 OF 2
12 VDC BATTERY
FUSE LINK
FU 4
GND INSIDE BOX DURING INSTALL
HI THROTTLE SOL
STRTR
SOL
MAGNET VALVE START-STOP
HYD PRESS COMPENSATOR
PILOT VALVE SOL
ENGINE SIDE SW
PROX SW
PROX SW
START
RUN
OFF
SW1
K1
K2
K6
D4
D5
D7
D18
D6
D8
D9
D10
D11
FU1
FU2
FU3
15A
TACH
A1
A2
HOUR METER
ENGINE PUMP
SW3
BATTERY
OIL PRESS
AIR FILTER
PL3
PL2
PL1
D1 (6AMP)
D2
D3
RED 30
RED 51
RED 1
RED 3
WHT 0
BLK 32
BLK 34
BLK 35
BLK 36
BLK 39
BLK 40
BLK 42
BLK 44
BLK 45
BLK 52
BLK 53
BLK 55
BLU
BRN
BLK
TB1-1
TB1-2
TB1-3
TB1-4
TB1-5
TB1-6
TB1-7
TB1-8
TB1-9
TB1-10
TB1-11
TB1-16
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TB1-27
TB1-28
TB1-29
TB1-30
TB2-1
TB2-2
TB2-3
TB2-4
TB2-5
TB2-6
TB2-7
[0]
[1]
[2]
[3]
[4]
[7]
[17]
[22]
B+
B–
D+
ALT
W
S
G
A
B
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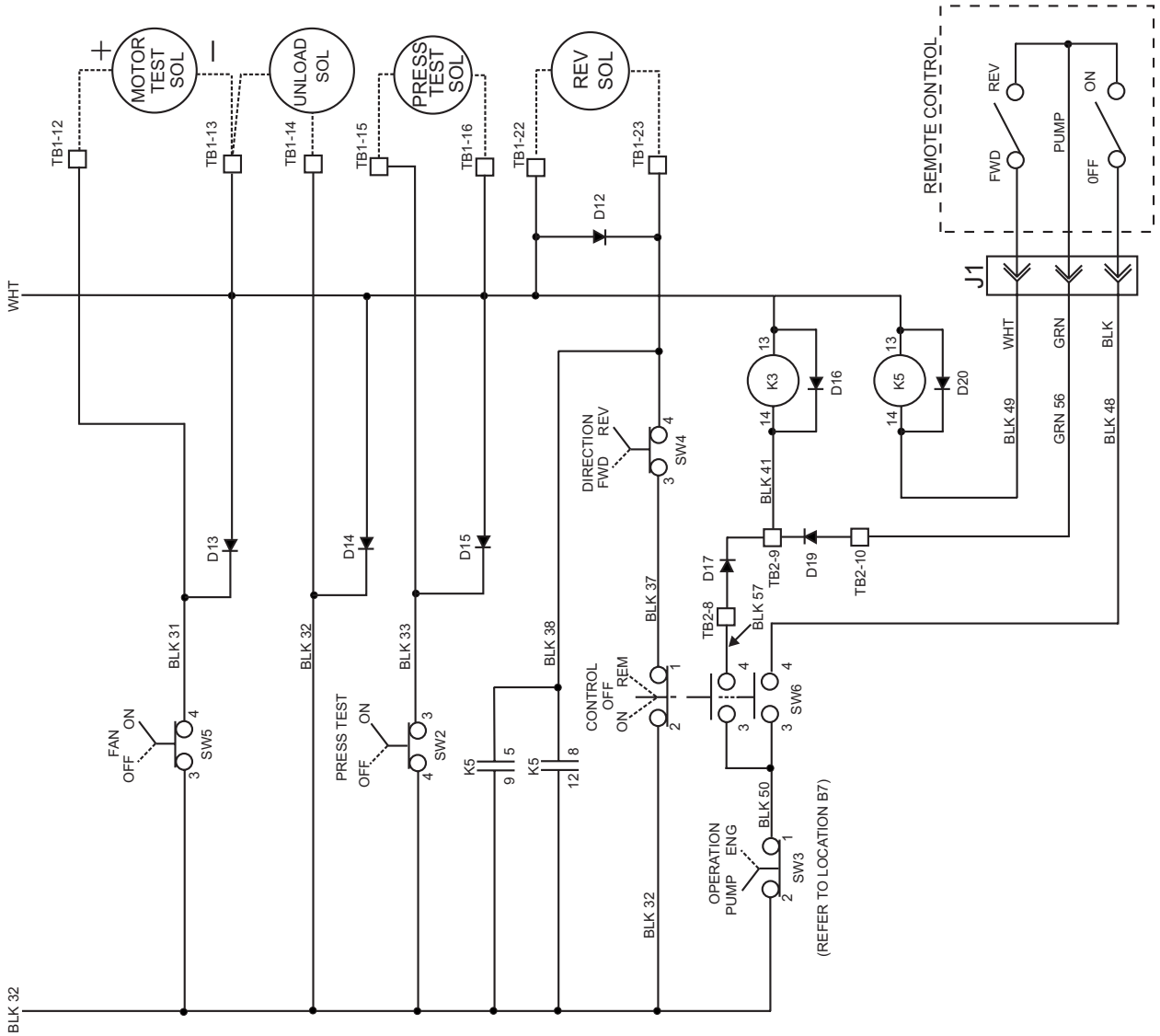
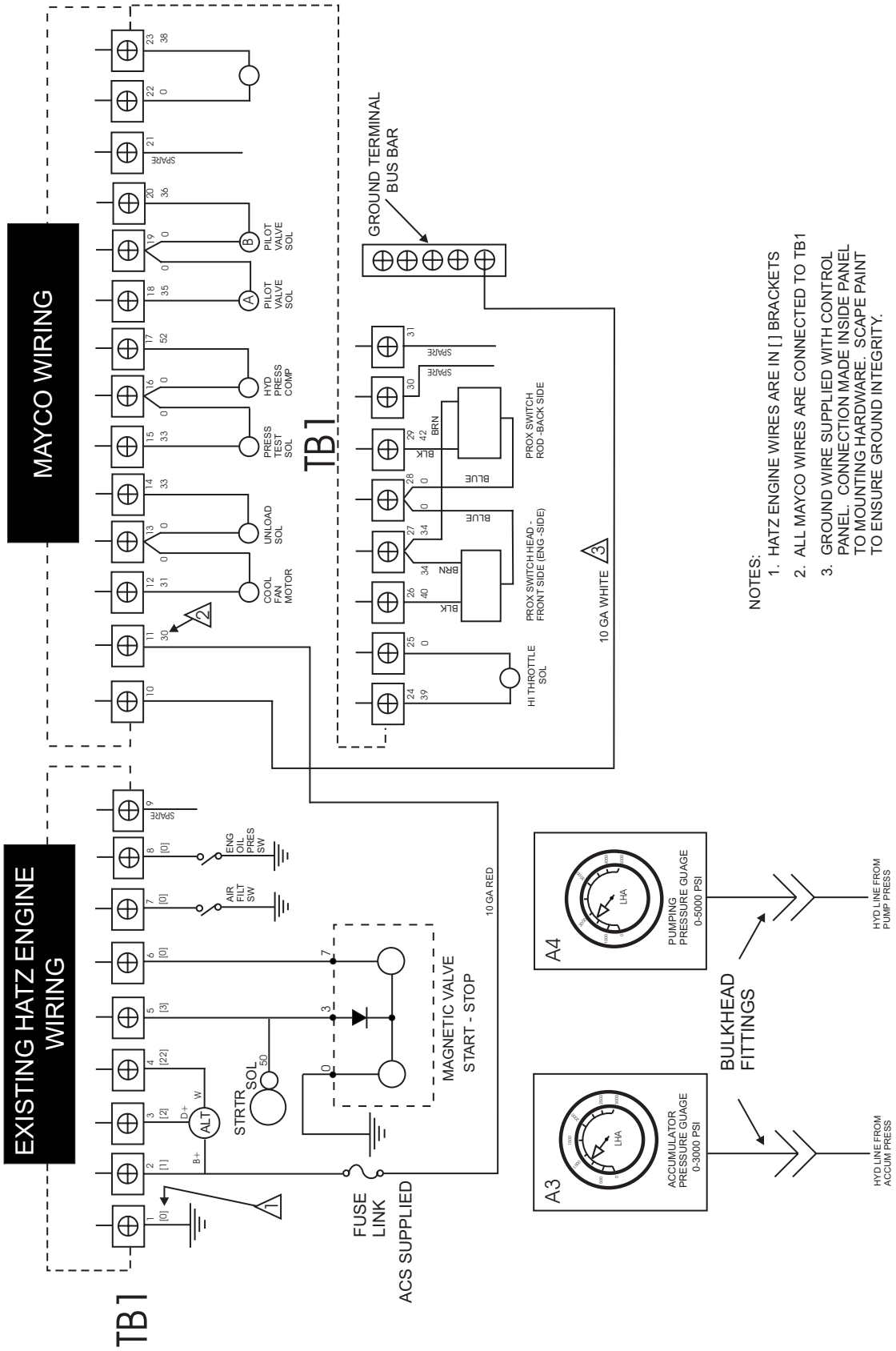
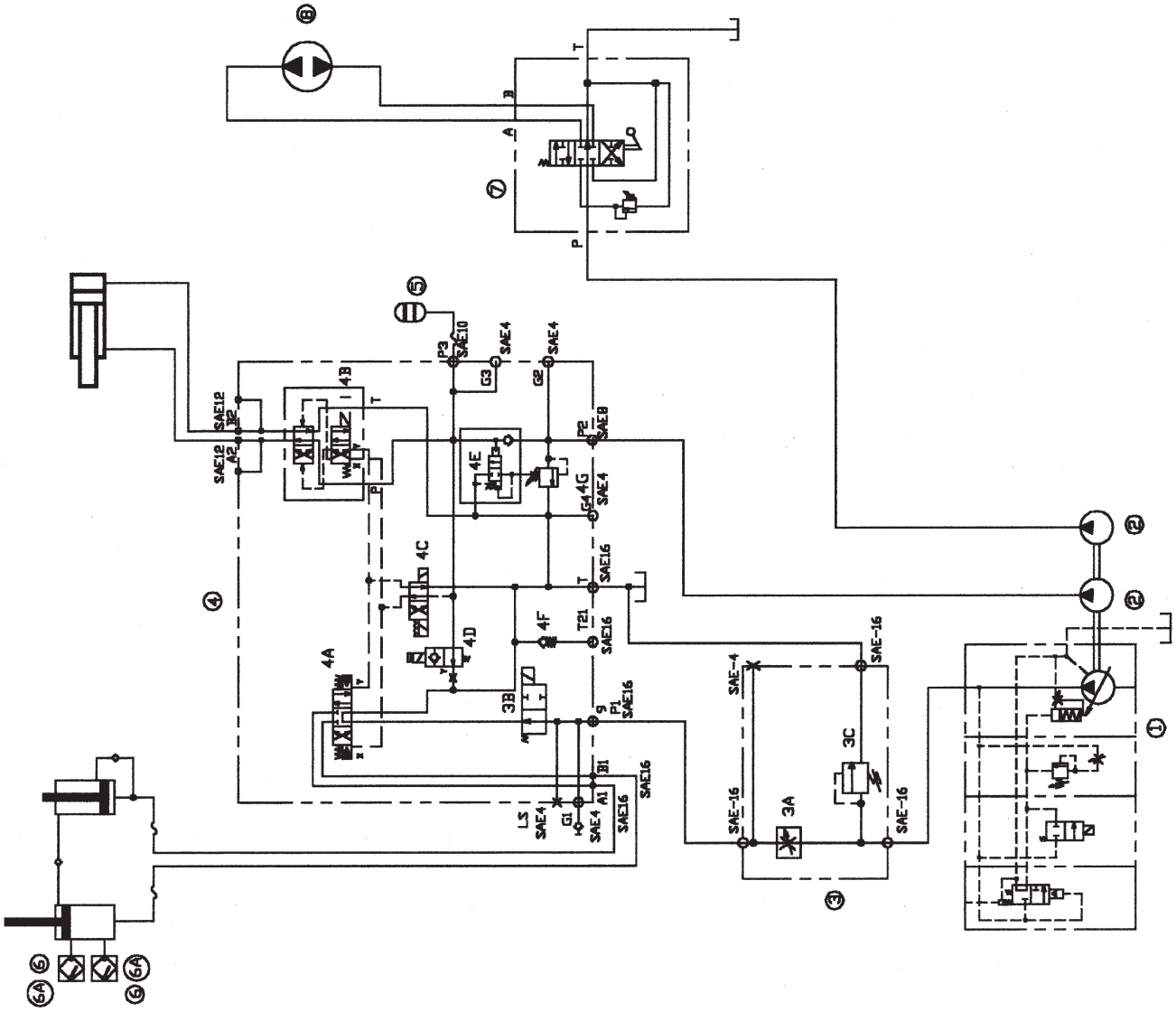
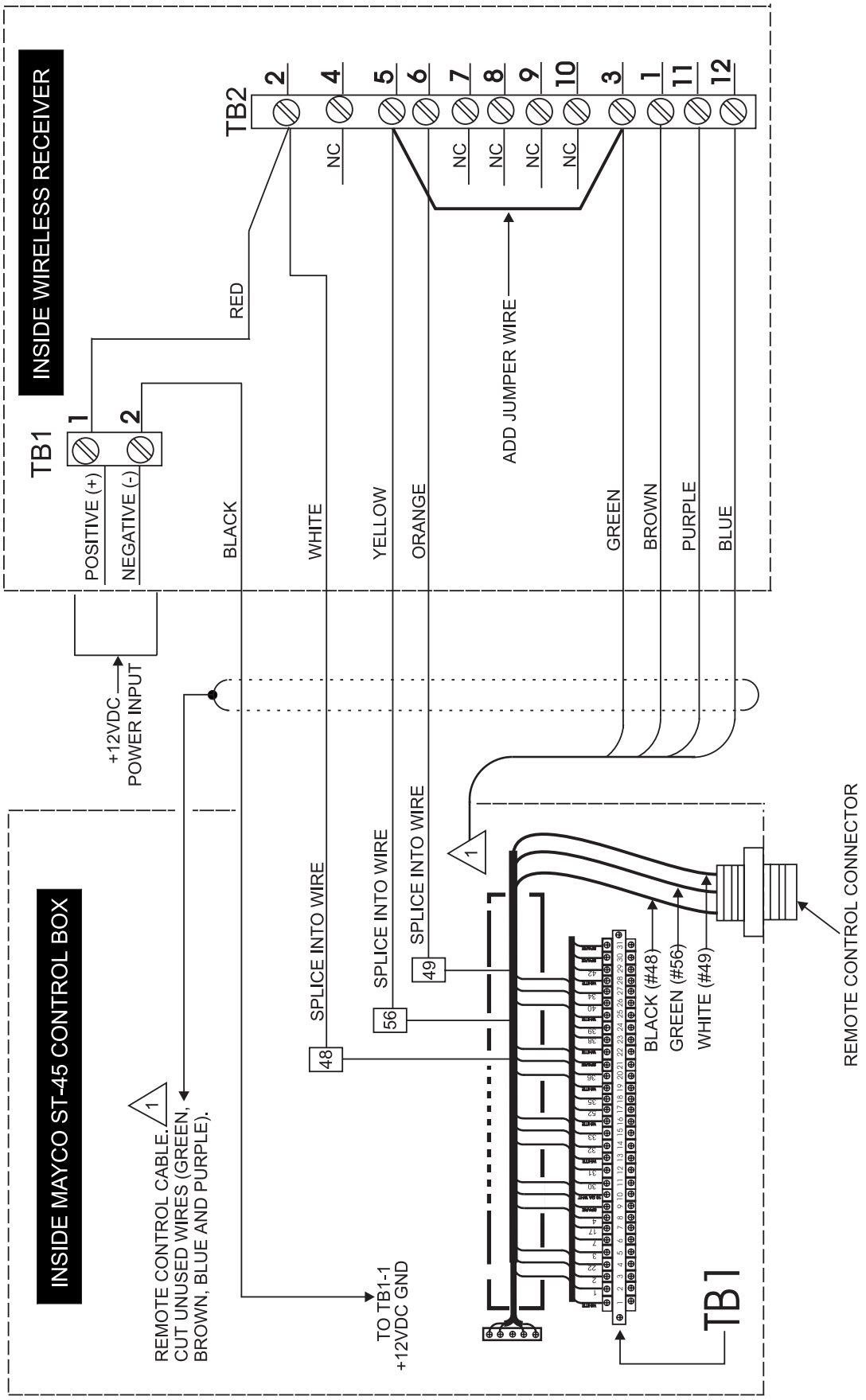
SHEET 2 OF 2


MOTOR TEST SOL
UNLOAD SOL
PRESS TEST SOL
REV SOL
TB1-12
TB1-13
TB1-14
TB1-15
TB1-16
TB1-22
TB1-23
D12
WHT
REMOTE CONTROL
REV
FWD
PUMP
ON
OFF
J1
WHT
GRN
BLK
BLK 49
GRN 56
BLK 48
K3
K5
D16
D20
BLK 41
TB2-9
TB2-10
D19
D17
TB2-8
BLK 57
D13
D14
D15
BLK 31
BLK 32
BLK 33
BLK 38
BLK 37
DIRECTION FWD REV
SW4
CONTROL OFF REM ON
SW6
FAN OFF ON
SW5
PRESS TEST OFF ON
SW2
K5
BLK 50
OPERATION PUMP ENG
SW3
BLK 32
BLK 32
(REFER TO LOCATION B7)


MAYCO WIRING
EXISTING HATZ ENGINE WIRING
TB1
TB1
GROUND TERMINAL BUS BAR
SPARE
PILOT VALVE SOL
HYD PRESS COMP
PRESS TEST SOL
UNLOAD SOL
COOL FAN MOTOR
HI THROTTLE SOL
PROX SWITCH HEAD - FRONT SIDE (ENG -SIDE)
PROX SWITCH ROD -BACK SIDE
10 GA WHITE
10 GA RED
ENG OIL PRES SW
AIR FILT SW
ALT
STRTR SOL
MAGNETIC VALVE START - STOP
FUSE LINK
ACS SUPPLIED
A3
ACCUMULATOR PRESSURE GUAGE 0-3000 PSI
A4
PUMPING PRESSURE GUAGE 0-5000 PSI
BULKHEAD FITTINGS
HYD LINE FROM ACCUM PRESS
HYD LINE FROM PUMP PRESS
NOTES:
1. HATZ ENGINE WIRES ARE IN [ ] BRACKETS
2. ALL MAYCO WIRES ARE CONNECTED TO TB1
3. GROUND WIRE SUPPLIED WITH CONTROL PANEL. CONNECTION MADE INSIDE PANEL TO MOUNTING HARDWARE. SCAPE PAINT TO ENSURE GROUND INTEGRITY.

Port I.D.	Description	Part Number	
1	Main Pump (3000psi) 50hp2550	EM97026	1
2	Remix Pump	EM97002	1
2A	Accumulator Pump	—	1
3	Main Pump Manifold	—	1
3A	Volume Control w/Alum Knob	EM98005	1
3B	Tool Valve	—	1
3C	Relief Adjustable	EM98004	1
4	Main Manifold	—	1
4A	Main Valve	EM97011	1
4B	Shuttle Valve	EM97013	1
4C	Pilot Valve	EM97012	1
4D	Acc. Circuit dump Valve	EM97006	1
4E	Unloading Valve	EM97008	1
4F	Check Valve	EM97009	1
4G	Acc Circuit Relief	—	1
5	Accumulator Charged (1300 psi)	EM97015	1
5a	Accumulator Reducer Fittings	—	1
6	Sensor	EM97024	2
6A	Conductor Wire	EM97025	2
7	Remix Control Valve	EM97017	1
8	White Motor	EM25425	1
	Shuttle Cylinder	EM25454	1
A1	1" Front Port w SAE O ring JIC	—	1
B1	1" Front Port w SAE O ring JIC	—	1
P1	1" Front Port w SAE O ring JIC	—	1
T	1" Front Port w SAE O ring JIC	—	1
P2	1/2" Front Port w SAE O ring JIC	—	1
T21	1" Front Port w SAE O ring JIC	—	1
B1	3/4" Front Port w SAE O ring JIC	—	1




INSIDE WIRELESS RECEIVER
TB1
1
2
POSITIVE (+)
NEGATIVE (-)
TB2
2
4
5
6
7
8
9
10
3
1
11
12
NC
NC
NC
NC
NC
RED
BLACK
WHITE
YELLOW
ORANGE
GREEN
BROWN
PURPLE
BLUE
ADD JUMPER WIRE
+12VDC
POWER INPUT
INSIDE MAYCO ST-45 CONTROL BOX
REMOTE CONTROL CABLE.
CUT UNUSED WIRES (GREEN,
BROWN, BLUE AND PURPLE).
TO TB1-1
+12VDC GND
SPLICE INTO WIRE
SPLICE INTO WIRE
SPLICE INTO WIRE
48
56
49
BLACK (#48)
GREEN (#56)
WHITE (#49)
REMOTE CONTROL CONNECTOR
TB1

The service procedures contained in this manual are intended for use by an individual equipped with the proper tools and equipment and familiar with safe shop practices.

Should questions arise during the service or repair . . . **stop** . . . and contact Mayco service department. 1-800-30-MAYCO.

Do not open hydraulic lines or loosen hydraulic fittings while engine is running! Hydraulic fluid under pressure can penetrate the skin, blind, cause burns or create other potentially dangerous hazards follow all safety instructions as described throughout this manual.

Warning! Danger of Amputation!

The Mayco pump is equipped with a nitrogen accumulator, which stores hydraulic energy. You will be required to put your hand in the concrete cylinders or near the suttle. You are at extreme risk if the engine is running or if pressure is in the hydraulic system. Prior to working on the pump, stop the engine by turning off the ignition switch, remove starter key, place a "Do not operate" tag over the switch and disconnect the battery. The pressure reading on the accumulator pressure gauge must read zero. **Always** relieve the accumulator circuit to zero pressure prior to working on the pump.

Use only original Mayco components. The quality of the components is critical to the operator's safety and performance of the machine.

Maintenance check schedule

	Day	Hour	Week	Month	6-month	Time/Hour
Engine oil	x			x		
Engine air filter				x		
Fuel filter				x		500
Hydraulic oil level	x					
Lubrication box		x				
Replace Hydraulic oil						2100
Clean hydraulic filters				x		
Axle crank	x					
Grease zerks "S" tube		x				2
Grease remix bearing	x					
Check system pressure			x			40
Hardware for tightness			x			40
Cutting ware ring			x			
Trailer brake function	x					
Brake light	x					
Tire condition	x					
Safety devices, decals	x					
Wheel bearings					x	
Battery				x		
Brake lining					x	
Oil leaks, visually inspect	x					

1. When changing the hydraulic oil or topping off the reservoir, use only the following type. (Reservoir capacity 58 gal.)

Hydraulic oil: Shell Oil Tellius 68 or
Mobil DFE 26
Texaco Rand HDC

The Mayco pump is equipped with an in-tank return hydraulic filter with a 10 micron cleanable filter. The element has been designed to remove all particles large enough to cause wear and job break down. Under normal conditions, we recommend replacement every 6 month.

Do not mix oil brands! This may impair quality.

The most important factor to keep in mind is the effect of cold weather on the hydraulic oil. The viscosity (thickness) of the hydraulic oil will be much heavier.

Always run machine until oil temperature reaches a minimum of 50 degrees F. before pumping. Damage to the main piston pump will occur if the machine is cycled too fast before the oil temperature reaches the minimum of 50 degrees. Cycle the machine at 6-8 strokes per minute at approximately 1/3 throttle. In – areas where the weather normally remains under 50 degrees F., use Shell Oil Tellus – 46, or the equivalent. The above steps must be followed or severe damage to the main axial piston pump will be the end result.

2. Lubrication: Grease daily/Hour

- Main hydraulic cylinders - 2 Place
- Remix bearings - 2 Place
- Axle crank - 1 Place
- Suttle cylinders - 2 Place
- "S" tube outlet flange - 3 Place

Grease Type: Lithium Based EP
Texaco Multitak 20
Lubriplate ED-2

3. Accumulator: Use dry nitrogen only, never substitute for any other gas!
   Contact factory for proper charging procedure.

4. Diesel engine: Refer to engine manufactures instructions.

5. Cylinder lubrication box: **Warning**

Before checking lubrication level, stop the engine and remove the engine starter key. We recommend using soluble type oil (water & oil mixture). The oil level should be checked everyday prior to pumping. The oil level should be maintained at a height of 5 inches or about ½ the concrete cylinder height.

Important notice! During freezing temperature after pumping, completely drain the water box and cover the hopper. Frozen liquid will restrict the piston travel and cause damage to the pump.

As the rubber piston cups naturally wear, fine cement particles will accumulate in the box. Once the concrete paste reaches a height of about ½ inch from the bottom. The box should be drained and cleaned. To clean, remove the drain plug located at the bottom of the box. Once the box is drained, start the engine and stroke the cylinder (keep hands out of box) ten to fifteen times. While stroking, spray water inside of the box to thoroughly clean out all contamination. When the box is clean replace drain plug, add new lubrication and install the top cover.

Any questions regarding the above mentioned procedure, please call the Mayco Service Department: **1-800-30-MAYCO.**

ST70 Pressure Setting Sequence

(Setting maximum pump pressure)

Step 1: Remove acorn nut from pressure compensator (located on the top front of the Rexroth pump. The compensator is the lower of the two valves) loosen the jam nut and turn the allen screw clockwise until it seats.

Step 2: Loosen the jam nut located on the end of the compensator valve.

Step 3: Turn the compensator adjustment nut (large) clockwise until tight.

Step 4: Start the engine, loosen the jam nut located on the maximum relief valve cartridge, small manifold port 3C. Run engine at maximum Rpm (2350), turn volume control knob counter clockwise to maximum volume position. Locate the electrical control panel, turn the pump switch to the on position, next turn the test switch on. Using an allen wrench adjust the main relief (port 3C) valve to 3500 PSI. The reading can be taken from pump pressure gauge. Hold the allen adjusting bolt with wrench and tighten jam nut. Using the test switch double check the pressure reading to make sure the setting has not changed.

Step 5: Cycle the pump at maximum Rpm's (2350) at full volume. Turn maximum pressure test switch on. With an allen wrench adjust compensator allen bolt counter clockwise until (3300) PSI is reached. Lock jam nut and turn maximum pressure test switch off. Let pump cycle 10 or 20 times and turn pressure test switch on to make sure the pump is at maximum pressure. Lock the jam nut.

ST-70 Accumulator Circuit

The accumulator circuit has two functions in the hydraulic system.

1. The accumulator circuit furnishes the hydraulic pressure to cycle the shuttle tube.
2. The accumulator circuit also furnishes the pilot pressure necessary to activate the hydraulic system.

The accumulator circuit is equipped with a bladder type accumulator charged with 1100 PSI of dry nitrogen. The accumulator stores one gallon of hydraulic oil, which is, under 1750 PSI of pressure. When the pump cycles, a part of the stored oil is released to the shuttle cylinder, this pressure release assures the shuttle tube has enough force to shear the cylinder of concrete passing from the concrete cylinder to the concrete delivery line during the cycle phase.

Setting pressures in the accumulator circuit

Attach 3000 PSI test gage to port 2-G of the main control block.

(Pressure test gauge Mayco P/N 98016)

The unloading valve cartridge, located in port 4-E, loosen lock nut and with an allen wrench turn adjusting screw clockwise until it is completely closed.

Turn the pump switch and run engine at 2350 Rpm's and adjust the accumulator circuit pilot relief valve cartridge, located at port 4-G. Loosen lock nut, turn allen adjusting screw until pressure gauge reads 1950 PSI, and tighten lock nut. Turn engine off and on several times to make the pressure continues to read 1950 PSI. With relief valve set at 1950 PSI it is time to adjust the unloading cartridge. Turn on pump and run at 2350 Rpm's and maximum volume. Using the accumulator pressure gauge located by control panel, adjust unloading valve cartridge counter clockwise until the pressure reaches 1750 PSI. Start and stop pump several times to make sure accumulator circuit pressure is holding at 1750 PSI. At this time tighten lock nut on unloading valve cartridge. Your accumulator circuit pressure should now be properly adjusted.

Checking accumulator bladder pressure

The accumulator charge pressure should read 1100 PSI. To check pressure, start engine and stroke the pump. The accumulator pressure gauge should read 1750 PSI. To determine the actual accumulator PSI, stop engine and observe the pressure gauge. As the PSI reading slowly decreases it will reach a point where there will be a sudden drop in the PSI. The PSI reading should be taken prior to this sudden drop. If you do not read 1100 PSI the accumulator may require charging or bladder replacement.

Warning – Explosion caused by improper accumulator charging can result in serious injury or death! Never use oxygen or compressed air to charge the accumulator! Only qualified personal should perform this procedure. Use only dry nitrogen to charge the accumulator. Contact your Mayco service department or your local Hydac representative for proper charging procedure.

Hydraulic system trouble shooting

Problem

No hydraulic oil flow from axial piston pump.

Probable cause	Solution
Delta "Q" compensator not de-energizing when the pump is energized.	Check TB1 terminal #17. If this terminal is energized when the pump is turned on, the pump will not cycle because the compensator is dumping control pressure to tank. Check K-3 relay replace if necessary.
Volume control not turned open.	Turn volume control valve counter clockwise.
Hydraulic oil level low.	Fill reservoir to proper level.
Restricted suction screen.	Clean suction screen.
Main pressure relief valve open.	Remove cartridge and clean and reset or replace cartridge.

Problem

Drive cylinders will not cycle.

Probable cause	Solution
Proximity switch not sending signal.	The emergency cycle switch located in control box can be used to determine which switch is faulty – replace defective proximity switch.
Check pilot cycle valve.	1. With pump switch turned on check TB1 terminal #35 and #36 for electrical current flow to valve. 2. Check detents in valve for proper operation.
Check K-4 relay in control box.	Check proximity switch enclosure.
Check main cycle valve on manifold.	Check spool or centering springs.

Problem

Accumulator pressure drops to zero on every cycle

Probable cause	Solution
Low nitrogen charge in accumulator bladder.	Recharge bladder with nitrogen to 1100 PSI.

Problem

Accumulator pressure is below 1750 PSI.

Probable cause	Solution
Unloading valve setting is to low.	Adjust unloading valve until 1750 PSI is reached.

Problem

Accumulator pressure not discharging when switch is turned off.

Probable cause	Solution
Cartridge at port 4-D on manifold block is not working.	Check solenoid and cartridge and replace if necessary.

Electrical System

Proximity switches

The proximity is a normally open switch. The proximity develops a radio frequency, which is emitted from the face of the proximity switch. As the hydraulic drive cylinder piston passes through the radio frequency, the circuit closes and a signal is sent to the pilot cycle valve. This valve cycles the pump and causes the concrete to flow.

This proximity switch is designed to work at hydraulic pressures of 5000 PSI and oil temperatures of 250° Fahrenheit.

Problem

At the completion of a pumping stroke the pumping pressure gauge indicates high pressure and the pump doesn't cycle.

Probable cause	Solution
Proximity switch is not emitting a radio frequency.	If the hydraulic system is in a maximum pressure condition, pull the toggle on the emergency cycle switch toward (located inside control box) you if the pump cycles replace the proximity switch at the lubrication box. If the pump cycles when you push the toggle toward the interior of the control box replace the proximity switch on the towing end of the pump.

If the emergency cycle switch doesn't cycle the pump it may well be a problem with the K-4 relay. A quick check for a problem with the K-4 relay is to use a hot jumper wire. Connect (jumper wire) to terminals #35 and #36 on terminal block #1. When contact is made between these two terminals and the pump cycles. This would indicate that you have a faulty K-4 relay.

Electrical

Problem

When starter switch is activated and nothing occurs.

Probable cause	Solution
Faulty fuses.	Check fuse block in control panel, replace blown fuses. Check fuse link located below engine solenoid, next to battery.

Problem

Hatz engine will not continue to run after key is released.

Probable cause	Solution
DI diode has failed.	Check D1 diode, if failed replace with 6 AMP diode P/N EGG5815 or equivalent.

Problem

Hatz engine will not start.

Probable cause	Solution
No power to TB-5, conductor #3- no power to magnet valve start – stop.	Replace K1 relay.

Problem

Engine runs, no power to circuits #32-47.

Probable cause	Solution
Faulty K-2 relay.	Replace K-2 relay.

Problem

Hatz engine will not increase Rpm's when the pump is turned on.

Probable cause	Solution
K-6 relay not completing the circuit or open circuit at TB1-24	Replace K-6 relay – trouble shoot.

Problem

The pump will not reverse in Remote Control.

Probable cause	Solution
K-5 relay failure – check.	Replace K-5 relay if it has failed.

Problem

Engine oil pressure light will not go out.

Probable cause	Solution
Oil pressure sending unit failure.	Replace sending unit.

Problem

Battery charge light won't turn off.

Probable cause	Solution
Check diode D2, alternator not charging.	Replace if failed. Replace with diode 1U4004-C.

Changing the concrete cylinder piston cups

The Rubber piston cups will occasionally require replacement depending on the following factors.

- The fluid level and cleanliness of the lubrication box.
- The size and type of aggregate.
- The type of concrete being pumped.

It is time to replace the cups when increasingly large particles of sand and cement pass into the lubrication box. Do not allow the cups to become so worn that they begin to pass lubrication into the material cylinders. If the liquid level of the lubrication box becomes to low, the rubber cups will severely deform due to excessive heat. Whenever replacement is due, both cylinder cups should be replaced.

The following procedure should be used to replace the rubber cups and felt rings.

Warning! Danger of Amputation!

The Mayco pump is equipped with a nitrogen accumulator, which stores hydraulic energy. You will be required to put your hand in the concrete cylinders or near the suttle. You are at extreme risk if the engine is running or if pressure is in the hydraulic system. Prior to working on the pump, stop the engine by turning off the ignition switch, remove starter key, place a "Do not operate" tag over the switch and disconnect the battery. The pressure reading on the accumulator pressure gauge must read zero. **Always** relieve the accumulator circuit to zero pressure prior to working on the pump.

Replacement procedure

Step 1: Remove and plug the two hydraulic hoses connected to the remix motor. P/N 25425.

Step 2: Remove the hopper discharge nipple P/N 25836 and loosen sleeve seal P/N 16819 inspect and replace if wear is excessive.

Step 3: Remove the two tie rod nuts P/N 16166 and the four eyebolt nuts P/N 452558.

Step 4: With lifting device; remove hopper P/N 25174 use extreme care not to damage the hopper seal P/N 16184.

Step 5: Start engine and turn on pressure test switch, cycle pump in reverse until hydraulic system obtains maximum pressure, at this point turn pump and engine off. Remove ignition key and disconnect battery. Think safety! Check the hydraulic gauges on panel and make sure accumulator pressure reads zero. The one piston should be in the fully discharge position at the end of the concrete cylinder.

Step 6: At this time remove the three 3/8 – 16 x 3" bolts P/N 492388 from the piston. Remove the front faceplate P/N 16464.

Step 7: Next, install two the 3/8' 16x3" bolts P/N 492388 back into the piston – do not tighten. Use the two bolts as leverage to remove the rubber piston cup and rear components.

Step 8: Reassemble – obtain two 3/8 16x7" full thread studs (these studs will be used to assist in assembly alignment) insert the two studs into the piston adapter P/N 16460. Coat the concrete cylinder with grease.

Step 9: The new "O" ring P/N 14407 must now be modified. Using a sharp knife cut four oil passage grooves into the ring. the grooves should be placed at a distance of 90º apart. The cut should be a v-shaped design, 0.059" deep and 0.157" wide at the top.

Step 10: Install "O" Ring P/N 14407 around oiler plate P/N 16461. Install plate into concrete cylinder utilizing the studs for alignment.

Step 11: Install the felt holder P/N 16462 over the oiler plate. Install felt ring P/N 16462 into felt holder. Note: felt ring must be saturated with 30 wt. oil prior to installation. Install bronze ring P/N 14408.

Step 12: Using silicon sealant place a small bead of sealant material on the front of the rubber piston P/N 16463 and the rear of the face plate P/N 16464. Install over alignment studs and into concrete cylinders.

Step 13: Insert one 3/8" 16x3" bolt P/N 492388 into the open bolt hole, remove alignment studs one at a time and install the remaining 3/8" 16x3" bolts.

Note: Before installing 3/8" bolt, coat the back of bolt heads with silicon sealant. Torque all three bolts equal at 55 ft. lbs. each.

Changing the wear plate and ring

Due to the swinging motion of the Nun-plate and the abrasive nature of concrete it is normal for the cutting ring to wear on the side that shears through the concrete inside the hopper. If the wear ring and wear plate do not fully seat against each other. The concrete slurry will pump into the hopper. This condition can be easily observed by the sudden change of the level of concrete inside the hopper during each stroke.

Warning! Danger of Amputation!

The Mayco pump is equipped with a nitrogen accumulator, which stores hydraulic energy. You will be required to put your hand in the concrete cylinders or near the suttle. You are at extreme risk if the engine is running or if pressure is in the hydraulic system. Prior to working on the pump, stop the engine by turning off the ignition switch, remove starter key, place a "Do not operate" tag over the switch and disconnect the battery. The pressure reading on the accumulator pressure gauge must read zero. **Always** relieve the accumulator circuit to zero pressure prior to working on the pump.

Replacement procedure

Step 1: Remove and plug the two hydraulic hoses connected to the remix motor P/N 25425.

Step 2: Remove the hopper discharge nipple P/N 25836 and loosen sleeve seal P/N 16819 inspect and replace if wear is excessive.

Step 3: Remove the two tie rod nuts P/N 16166 and the four eyebolts nuts P/N 452558.

Step 4: With a lifting devise, remove hopper P/N 25174 use extreme care nut to damage the hopper seal P/N 16184.

Step 5: Remove the four 5/8"-11 1 ½ " bolts that hold the suttle tube to the nun-plate and remove suttle tube. The energizer ring and wear ring will normally have concrete contamination holding them in position. It will be required to chip some of the concrete loose to better expose the energizer ring. Using two small pry bars remove the energizer ring P/N 16816-1, insert ring P/N 16816-2 and wear ring P/N 16171.

Step 6: Clean out all concrete build up in and around the nun-plate area with a wire brush.

Step 7: Inspect the wear components for indications of wear. Note: it is typical that the wear plate P/N 25841 will have two times the service life compared to the cutting ring. The wear plate has two wear surfaces. If it becomes necessary to replace, the plate can be reversed to the opposite side to expose a new flat surface. To replace or reverse the plate, remove the five allen head counter suck bolts. Next remove the two cylinder "O" rings and clean the entire back surface.

Step 8: Wear plate installation: install the two cylinder "O" rings P/N 16174. Using silicon sealant, coat the circumference of the concrete cylinders, wear plate back and around the five bolt holes. Next, install the wear plate and the five bolts. Note: the bolts must all be equally snugged and tightened to 100 foot pounds each.

Step 9: Wear ring installation: Install the wear ring P/N 16171 into the nun plate. Install the insert ring P/N 16812-2 inside of the rubber energizer ring P/N 16816-1. Install the energizer ring assembly into the nun-plate.

After installing the above mentioned components the machine can be re-assembled by reversing steps 1 through 5.

Wheel Bearings

After every 6 months of operation inspect the wheel bearings. Once a year, or when required, disassemble the wheel hubs remove the old grease and repack the bearings forcing grease between rollers, cone and cage with a good grade of high speed wheel bearing greases (never use grease heavier than 265 A.S.T.M. penetration "No. 2."). Fill the wheel hub with grease to the inside diameter of the outer races and also fill the hub grease cap. Reassemble the hub and mount the wheel. Then tighten the adjusting nut, at the same time turn the wheel in both directions, until there is a slight bind to be sure all the bearing surfaces are in contact. Then back off the adjusting nut $^{1}/_{6}$ to ¼ turn or to the nearest locking hole or sufficiently to allow the wheel to rotate freely within limits of .001" to .010" end play. Lock the nut at this position. Install the cotter pin and dust cap, and tighten all hardware.

Brake system

The brake system should be periodically checked. Look for fluid leaks worn or cracked hoses. Check the reservoir for proper fluid levels. The Atwood surge brake should be checked for damage. Make sure that all links and pivots are kept lubricated.

Problem

Squeaking, chatter or chucking.

Probable cause	Solution
Overheated wheel bearing.	Replace wheel bearing, pack with grease.
Low brake fluid.	Fill and bleed brake system.
Seized actuator master cylinder.	Replace/rebuild master cylinder.
Brake shoe noise.	Inspect drums, adjust shoes or replace.

Problem

Brake overheating, side pull, brakes do not operate, poor brake performance.

Probable cause	Solution
Leaking wheel cylinder.	Check and replace wheel cylinder and bleed brake system.
Low fluid level.	Fill with dot approved brake fluid and bleed brake system.
Brake actuator frame damage.	Replace complete unit.
Brake line being pinched.	Replace brake line
Seized actuator.	Replace or rebuild actuator.
Broken return spring.	Replace spring.
Brakes improperly adjusted.	Check adjustment.
Partial application of breakaway cable.	The breakaway cable may be accidentally pulled. (determine cause and correct) pry up on cable until indicator bead touches or rests against cable spring stop. This will fully release trailer brakes and prevent trailer drag.

PAYMENT TERMS

Terms of payment for parts are net 30 days.

FREIGHT POLICY

All parts orders will be shipped collect or prepaid with the charges added to the invoice. All shipments are F.O.B. point of origin. Multiquip's responsibility ceases when a signed manifest has been obtained from the carrier, and any claim for shortage or damage must be settled between the consignee and the carrier.

MINIMUM ORDER

The minimum charge for orders from Multiquip is $15.00 net. Customers will be asked for instructions regarding handling of orders not meeting this requirement.

RETURNED GOODS POLICY

Return shipments will be accepted and credit will be allowed, subject to the following provisions:

1. A Returned Material Authorization must be approved by Multiquip prior to shipment.
2. To obtain a Return Material Authorization, a list must be provided to Multiquip Parts Sales that defines item numbers, quantities, and descriptions of the items to be returned.
    a. The parts numbers and descriptions must match the current parts price list.
    b. The list must be typed or computer generated.
    c. The list must state the reason(s) for the return.
    d. The list must reference the sales order(s) or invoice(s) under which the items were originally purchased.
    e. The list must include the name and phone number of the person requesting the RMA.
3. A copy of the Return Material Authorization must accompany the return shipment.
4. Freight is at the sender's expense. All parts must be returned freight prepaid to Multiquip's designated receiving point.
5. Parts must be in new and resalable condition, in the original Multiquip package (if any), and with Multiquip part numbers clearly marked.
6. The following items are not returnable:
    a. Obsolete parts. (If an item is in the price book and shows as being replaced by another item, it is obsolete.)
    b. Any parts with a limited shelf life (such as gaskets, seals, "O" rings, and other rubber parts) that were purchased more than six months prior to the return date.
    c. Any line item with an extended dealer net price of less than $5.00.
    d. Special order items.
    e. Electrical components.
    f. Paint, chemicals, and lubricants.
    g. Decals and paper products.
    h. Items purchased in kits.
7. The sender will be notified of any material received that is not acceptable.
8. Such material will be held for five working days from notification, pending instructions. If a reply is not received within five days, the material will be returned to the sender at his expense.
9. Credit on returned parts will be issued at dealer net price at time of the original purchase, less a 15% restocking charge.
10. In cases where an item is accepted, for which the original purchase document can not be determined, the price will be based on the list price that was effective twelve months prior to the RMA date.
11. Credit issued will be applied to future purchases only.

PRICING AND REBATES

Prices are subject to change without prior notice. Price changes are effective on a specific date and all orders received on or after that date will be billed at the revised price. Rebates for price declines and added charges for price increases will not be made for stock on hand at the time of any price change.

Multiquip reserves the right to quote and sell direct to Government agencies, and to Original Equipment Manufacturer accounts who use our products as integral parts of their own products.

SPECIAL EXPEDITING SERVICE

A $35.00 surcharge will be added to the invoice for special handling including bus shipments, insured parcel post or in cases where Multiquip must personally deliver the parts to the carrier.

LIMITATIONS OF SELLER'S LIABILITY

Multiquip shall not be liable hereunder for damages in excess of the purchase price of the item with respect to which damages are claimed, and in no event shall Multiquip be liable for loss of profit or good will or for any other special, consequential or incidental damages.

LIMITATION OF WARRANTIES

No warranties, express or implied, are made in connection with the sale of parts or trade accessories nor as to any engine not manufactured by Multiquip. Such warranties made in connection with the sale of new, complete units are made exclusively by a statement of warranty packaged with such units, and Multiquip neither assumes nor authorizes any person to assume for it any other obligation or liability whatever in connection with the sale of its products. Apart from such written statement of warranty, there are no warranties, express, implied or statutory, which extend beyond the description of the products on the face hereof.

PARTS AND OPERATION MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER *ON-HAND* WHEN CALLING

UNITED STATES

Multiquip Corporate Office
18910 Wilmington Ave. Tel. (800) 421-1244
Carson, CA 90746 Fax (800) 537-3927
Contact: mq@multiquip.com

Mayco Parts
800-306-2926 Fax: 800-672-7877
310-537-3700 Fax: 310-637-3284

Service Department
800-421-1244 Fax: 310-537-4259
310-537-3700

MQ Parts Department
800-427-1244 Fax: 800-672-7877
310-537-3700 Fax: 310-637-3284

Warranty Department
800-421-1244, Ext. 279 Fax: 310-537-1173
310-537-3700, Ext. 279

Technial Assistance
800-478-1244 Fax: 310-631-5032

MEXICO

MQ Cipsa
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Contact: cnavarro@multiquip.com.br, srentes@multiquip.com.br

This manual MUST accompany the equipment at all times. This manual is considered a permanent part of the equipment and should remain with the unit if resold.

The information and specifications included in this publication were in effect at the time of approval for printing. Illustrations are based on the *MQ-Mayco ST-70 Structural Concrete Pump*. Illustrations, descriptions, references and technical data contained in this manual are for guidance only and may not be considered as binding. Multiquip Inc. reserves the right to discontinue or change specifications, design or the information published in this publication at any time without notice and without incurring any obligations.

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