

OWNER'S MANUAL

for

MART

VERTICAL POWER WASHER PUMP



TABLE OF CONTENTS

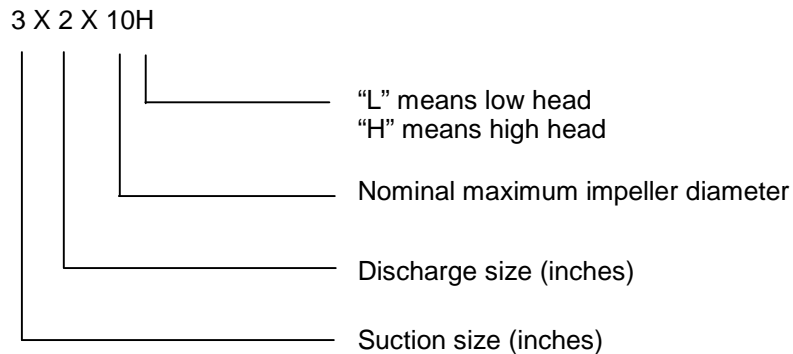
I.	GENERAL DESCRIPTION AND SAFETY PRECAUTIONS	1
A.	General Description	1
B.	Pump Identification	1
C.	Nameplate	1
D.	Safety Precautions	1
II.	INSPECTION AND STORAGE	2
A.	Inspection	2
B.	Storage of Pump.....	2
III.	INSTALLATION	2
IV.	ALIGNMENT	3
V.	OPERATION	3
A.	Pre-start Cautions	3
B.	Starting the Pump	3
C.	Stopping the Pump	4
VI.	MAINTENANCE	4
A.	Backhead.....	4
B.	Bearing Temperature.....	4
C.	Bearing Lubrication.....	4
VII.	TROUBLESHOOTING	4
VIII.	DISASSEMBLY AND REASSEMBLY.....	6
A.	Disassembly	6
B.	Parts Inspection.....	8
C.	Reassembly	8
IX.	PARTS LIST	10
A.	Parts Ordering	10
TABLES		
1.	Troubleshooting.....	5
2.	Enclosed Impeller Clearance	8
3.	Pump Parts List	10
4.	Kit Parts List	11
5.	Recommended Torque Values	12
DIAGRAMS		
Vertical Pump Sectional Assembly Drawings (Figure 2)		12 - 20
Impeller Capscrew Tightening Illustration (Figure 1)		22

I. GENERAL DESCRIPTION AND SAFETY PRECAUTIONS.

A. GENERAL DESCRIPTION. The Vertical Pump is designed for the industrial washer application.

The pump is flexible coupled to a constant speed motor. The pump and motor are mounted on a structural steel baseplate. The pump end consists of a casing, shaft, impeller, backhead, suction head, column, baseplate, discharge piping, bearing frame, and bearings. The bearing frame supports the bearings above the solution tank, thereby preventing contamination of the bearings. Bearings are also protected from fluid and vapors by bearing cap and lip seals.

B. PUMP IDENTIFICATION. Use the following example for identifying information about your pump model number.



C. NAMEPLATE. A nameplate is attached to each pump. The data on the nameplate should be recorded and filed for easy reference. Nameplate data should be furnished to MART Corporation or Carver Pump Company when ordering spare parts or requesting information. Record pump serial number and model number on the lines below.

Pump Serial Number _____

Model Number _____

D. SAFETY PRECAUTIONS. This manual contains descriptions and instructions, which are the results of carefully conducted engineering and research efforts. The manual is designed to provide adequate instructions for the safe and efficient installation, operation, or maintenance of the pump. Failure or neglect to properly install, operate, or maintain the pump may result in personal injury, property damage, or unnecessary damage to the pump.

Observe all caution or danger tags attached to the equipment or included in this manual.

CAUTION
IMPORTANT SAFETY NOTICE

Various federal, state, and local laws and the regulations concerning OSHA affect installation, use, and operation of pumping equipment. Compliance with such laws relating to the proper installation and safe operation of pumping equipment is the responsibility of the equipment owner. All necessary steps should be taken by the owner to assure compliance with such laws before operating the equipment.

II. INSPECTION AND STORAGE.

A. INSPECTION. Upon receipt of the shipment, unpack and inspect the pump, motor assemblies, and individual parts to insure none are missing or damaged. Carefully inspect all boxes and packing material for loose parts before discarding them. Immediately report to the factory and to the transportation company if there are any missing or damaged parts incurred during shipment, and file a "damage and/or lost in shipment" claim with the carrier.

B. STORAGE OF PUMP. If the pumping unit and/or parts are not immediately installed and operated, store the equipment in a clean, dry, well-ventilated place, free from vibrations, moisture, and rapid or wide variations in temperature.

Grease Lubricated Pump. Rotate the shaft for several revolutions at least once per month to coat the bearings with lubricant, retard oxidation and corrosion, and prevent possible false brinelling.

Consider a unit to be in storage when:

1. The pump has been delivered to the job site and is waiting to be installed.
2. The pump has been installed but operation is delayed pending completion of construction.
3. There are long (30 days or more) periods between operating cycles.
4. The plant (or department) is shut down for periods of longer than 30 days.

NOTE

Storage requirements vary depending on climatic environment, length of storage, and equipment. For storage periods of three months or longer, contact a representative from Carver Pump Company for specific instructions. Improper storage will damage equipment and will require non-warranty restoration and/or non-warranty product failures.

III. INSTALLATION.

Personnel who possess general training in the operation and maintenance of centrifugal pumps should install the pump. The pumps should be installed in accordance with good safety and machinery practices. Faulty installation will result in operating troubles and premature wear of parts.

After ascertaining the unit has suffered no damage in transit, the pumping unit can be installed. Proceed as follows:

CAUTION

To lift pumping unit, use a hoist or device with suitable lifting capacity. Do not pick up the complete unit by the motor or pump shaft. The motor alone may be lifted using the motor lifting eyes.

1. Make sure the mounting frame is level and clean and free of debris. Install pump into reservoir and bolt to mounting frame. Rotate the shaft by hand to verify that the pump rotates freely.
2. Connect piping. Extreme care should be taken when connecting new piping to ensure that no foreign matter such as dirt, chips, tools, etc., is in the piping, tank, or return piping as this will cause debris to draw into the pump and cause excessive damage. Any debris caught in the pump passageways will throw the pumping unit out of balance.

CAUTION

Ensure piping does not strain pump. Strain may cause misalignment. To ensure proper alignment, check pump shaft for freedom of rotation after installing and tightening piping..

3. Connect any necessary auxiliary piping and gauge lines.
4. Since the pumping unit is shipped with bearings greased, initial greasing is not necessary unless pumping unit has been in storage for an extended period of time.
5. Install motor on pump intermediate and install shaft coupling to connect pump shaft and motor shaft. Turn pump and motor shafts by hand to ensure free rotation. Attached coupling guard. Do NOT operate pump without guard in place.
6. Connect wiring to motor. Due to high voltage required to operate the pumping unit, personnel working with the equipment should be familiar with electrical safety practices and modern methods of resuscitation. Methods of modern resuscitation may be obtained from the Bureau of Medicine and Surgery.
7. Connect electrical power supply to motor.
8. Open system valves, if supplied.

IV. ALIGNMENT.

A flexible coupling connects the pump and motor. The pump intermediate (#61) motor bracket aligns the pump shaft and motor shaft.

V. OPERATION.

A. PRE-START CAUTIONS:

1. Before starting or operating the pump, read this entire manual, especially the following instructions.
2. Before starting the pump, rotate shaft by hand to assure all moving parts are free.
3. Before starting the pump, install closed guards around all exposed rotating parts.
4. Observe all caution or danger tags attached to the equipment.
5. Never run pump dry because the close running fits within the pump are liquid lubricated. Dry running may result in pump seizure.

B. STARTING THE PUMP. Once system valves have been adjusted to the specified pumping conditions, the pumping unit will operate without operator intervention. If problems occur while starting the pump, refer to Table 1, Troubleshooting.

1. Make sure no one is working on the pumping unit.
2. If the pumping unit has been idle for a period of time, make sure the unit is firmly attached to its mounting frame.

CAUTION

Check level of liquid in reservoir to ensure pump casing is under liquid level.

4. Jog starter switch on motor to check that direction of rotation is clockwise when viewed from the top looking downward. Direction of rotation must agree with the arrow stamped on the pump frame or base.
5. Start the pumping unit in accordance with the machine operating directions.
6. If excessive vibration or noise occurs during operation, shut the pump down and consult a representative from the MART Corporation.
6. Pumping unit is now in full operation.
7. Check amperage draw of motor and compare to the motor nameplate in order to verify proper operation.

C. STOPPING THE PUMP.

1. Stop the pumping unit in accordance with the machine operating directions..
2. The pumping unit is now in the "off" position.

VI. MAINTENANCE.

A. BACKHEAD. The backhead is equipped with a throttle bushing. The inside diameter of the throttle bushing will increase with wear. If the pump is not equipped with a shaft sleeve, the throttle bushing requires replacement if the inside diameter is 1.644 inches or greater. If the pump is equipped with a shaft sleeve, the throttle bushing requires replacement if the inside diameter is 1.905 inches or greater.

B. BEARING TEMPERATURE. Bearing temperature should be monitored periodically. Normal operating temperatures are 120 degrees F to 160 degrees F, depending on the ambient temperature. Bearings may appear to run hot when pump is first started. The lip seal, not the bearing, causes this to happen. When the seal is seated, temperature should drop to normal.

Check bearing temperature by placing a pyrometer against the bearing frame while pump is running. A temperature above 180 degrees F indicates possible damage or wear. The most common cause of high bearing temperature is over greased bearings.

C. BEARING LUBRICATION. Lubrication frequency depends on operating conditions. Normal duty calls for relubrication every 1000 hours of operation. Bearings are lubricated at Carver Pump Company with Mobilith Grease AW2, which is a lithium complex soap type grease. Only Mobilith Grease AW2 should be used. On the pump bearing frame, both bearings require grease.

To relubricate bearings, use the following procedure:

CAUTION

Over greasing creates heat and can damage the bearings. Do NOT over grease.

1. Never relubricate pump bearings while unit is running. If necessary, shut down pump in accordance with section V, Operation.

CAUTION

Care must be taken to avoid excess pressure which may damage the lip seal.

2. Using a hand-operated grease gun on grease fittings, add approximately one ounce of fresh grease for each bearing. Do NOT over grease. For new bearings see Paragraph VIII.C.2 on page 9.

Bearing temperature may rise above normal immediately after lubrication, but should stabilize within 4 to 8 hours of operation.

VII. TROUBLESHOOTING.

If you have followed the installation and starting procedures outlined in this manual, the pump should provide reliable service and long life. However, if operating problems occur, significant time and expense will be saved if Table 1, Troubleshooting, is used to eliminate the most common causes of those problems.

Table 1. Troubleshooting

Symptom	Probable Cause	Remedy
Failure to deliver liquid.	<ol style="list-style-type: none"> 1. Discharge valve closed. 2. Discharge head above shutoff. 3. Impeller or suction partially clogged. 4. No power. 5. Liquid level in tank too low. 	<ol style="list-style-type: none"> 1. Check discharge valve. 2. Call MART Technical Service at 1-800-543-6278 3. Inspect impeller and suction pipe and clean. 4. Check power connection to motor. Check overloads 5. Add liquid to system.
Reduced capacity and/or pressure.	<ol style="list-style-type: none"> 1. Discharge valve closed. 2. Damaged impeller. 3. Impeller or suction pipe partially clogged. 4. Liquid level in tank too low. 5. Total head too high. 6. Wrong rotation. 7. Speed too low. 8. Discharge piping loose. 9. Worn throttle bushing. 10. Worn swivel joint. 	<ol style="list-style-type: none"> 1. Check discharge valve. 2. Replace impeller. 3. Inspect impeller and suction pipe and clean. 4. Add liquid to system. 5. Call MART Technical Service at 1-800-543-6278. 6. Switch power connections to motor. 7. Wrong RPM Motor. 8. Check, inspect, tighten. 9. Check, inspect, replace 10. Check, inspect, replace.
Pump surges.	<ol style="list-style-type: none"> 1. Liquid level in tank too low. 2. Solution is too hot. 3. Solution is too viscous. 	<ol style="list-style-type: none"> 1. Add liquid to system. 2. Lower solution temperature. 3. Drain and clean machine.
Pump loses prime after starting.	<ol style="list-style-type: none"> 1. Liquid level in tank too low. 2. Solution is too hot. 	<ol style="list-style-type: none"> 1. Add liquid to system 2. Lower solution temperature.
Overload on motor.	<ol style="list-style-type: none"> 1. Head lower than that for which pump is designed. 2. Mechanical defects of pump or motor such as bent shaft, binding or rubbing rotating element. 3. Liquid handled of higher specific gravity or lower viscosity than intended application. 4. Excess liquid being pumped. 5. Worn nozzles. 6. Worn throttle bushing. 7. Worn swivel joint. 	<ol style="list-style-type: none"> 1. Call MART Technical Service at 1-800-543-6278. 2. Replace defective parts or replace pump or motor. 3. Clean out and Change solution. 4. Call MART Technical Service at 1-800-543-6278. 5. Check, inspect, replace. 6. Check, inspect, replace. 7. Check, inspect, replace.
Insulation failure.	<ol style="list-style-type: none"> 1. Oil or water soaked windings. 2. Excessive vibration. 	<ol style="list-style-type: none"> 1. Disassemble motor, clean and dry windings. 2. Refer to “vibrates or is noisy.”

Table 1. Troubleshooting (cont.)

Symptom	Probable Cause	Remedy
Insulation failure. (cont.)	3. Wrong voltage.	3. Check voltage at motor terminals.
Vibrates or is noisy.	<ol style="list-style-type: none"> 1. Insufficient or insecure pump mounting. 2. Mechanical defects of pump or motor such as bent shaft, binding rotating element, or warped impeller. 3. Foreign matter in pump impeller. 4. Strain due to piping or improper piping supports. 5. Misalignment. 6. Damaged bearings. 7. Throttle bushing is worn. 8. Impeller loose. 9. Cavitation. 	<ol style="list-style-type: none"> 1. Check reservoir pump mounting frame and bolt tightness. 2. Replace defective parts or replace pump or motor. 3. Disassemble pump. Clean and replace damaged parts. 4. Check piping alignment and remove piping weight from pump with proper supports. 5. Align pump and motor as outlined in section IV of this manual. 6. Replace bearings. 7. Replace throttle bushing. 8. Disassemble pump in accordance with section VIII. Inspect parts and replace damaged parts. 9. Clean suction screen or reduce operating temperature, if problem persists disassemble pump and inspect.
Rapid wear of coupling spider.	<ol style="list-style-type: none"> 1. Misalignment. 2. Bent shaft. 	<ol style="list-style-type: none"> 1. Align pump and motor as outlined in section IV, Alignment. 2. Replace shaft.

VIII. DISASSEMBLY AND REASSEMBLY.

After extended operation, it may be difficult to separate some components. Rust solvent may be used and suitable extricating tools where possible. Use hammers with plastic or rubber heads; hammers with metal heads can damage the pump. Hoisting equipment should be used for lifting heavy parts. It is recommended that safety shoes and safety glasses be worn while working on this equipment.

A. DISASSEMBLY. During disassembly, match mark parts so they can be replaced in their original position and orientation

1. Disconnect, lock out, and tag electrical power supply to motor. Disconnect motor wiring at motor.
2. Drain reservoir. As necessary, flush pump to remove corrosive or toxic liquids.
3. Disconnect discharge piping.
4. Remove hex bolts, nuts, and washers securing guard plates to intermediate (61). Remove guard plates.
5. Disconnect shaft coupling (70).
6. Remove bolts (65) attaching motor. Remove motor.

CAUTION

Use a hoist or suitable lifting device with adequate lifting capacity to lift motor. Do not pick up the complete pump and motor unit by the motor or pump shaft. The motor alone may be lifted using the motor lifting eyes.

7. Remove nuts, washer, and mounting bolts from the pump mounting plate. Lift the pump and mounting plate out of the tank and place in a suitable work area.

CAUTION

To lift pumping unit, use a hoist or device with suitable lifting capacity. . Do not pick up the complete pump by the pump shaft.

8. Remove nuts (64) and capscrews (63) securing intermediate (61) to bearing frame (30). Remove intermediate (61).
9. Remove capscrews (10) and washers (38) securing suction head (3) to casing (2). Remove suction head (3). Remove suction head gasket (5).
10. Remove impeller capscrew (A4) and impeller washer (A1).
11. Remove impeller (1) from end of shaft (33) by hand. If impeller does not come off easily try using two pry bars and **gently** prying on inside of suction eye. Warning: If you pry too hard you can break the impeller. If the impeller does not come off easily then remove capscrews (35) and washers (37) from backhead (6) and tap backhead (6) gently to drive impeller (1) off shaft (33). Remove impeller key (A2). **DO NOT HIT IMPELLER WITH A HAMMER - IT WILL BREAK.**

NOTE

If necessary, a hoist may be attached to casing (2) by removing pipe plugs (11) from casing (2) and inserting lifting eyes into pipe plug holes.

12. Remove capscrews (10) and washers (38) securing backhead (6) to casing (2). Remove casing (2) from pumping unit.
13. Remove capscrews (35) and washers (37) securing column (31) to backhead (6). Remove backhead (6). Remove backhead o-ring (G16).
14. Remove shaft sleeve (34), if equipped.

NOTE

If throttle bushing (B3) is METAL, locking ring (B1) and capscrews (B4) are required. Setscrews (B5) are not required. (Note: Drawing shows (B5) pointing to cap screws – Drawing needs updating)

15. If METAL throttle bushing (B3) needs to be replaced, remove capscrews (B4) securing locking ring (B1) to backhead (6). If equipped with NON-METAL remove capscrews (B4) securing locking ring (B1) to backhead (6) Remove locking ring (B1) remove setscrews (B5) and separate throttle bushing (B3) from locking ring (B1).
16. Loosen, but do not remove, setscrews (B6) in slinger (B2). Remove slinger (B2).
17. Remove capscrews (G9) securing bearing cap (G1) to bearing frame (30).
18. Pull shaft (33) and bearings from inboard side (motor coupling side/top side) of pumping unit.
19. Loosen set screws in coupling hub (70) and Using a puller, remove hub from shaft (33). Remove coupling key (G11).
20. Remove bearing cap (G1) from shaft (33).
21. Un-crimp bearing lockwasher (G13). Un-screw bearing locknut (G4) and remove bearing lockwasher (G13).
22. Using a bearing press or bearing puller, remove radial bearing (G3) and thrust bearing (G2) from shaft (33).
23. Remove lip seals (G5) from ring (71) and bearing frame (30). Remove lip seal (G6) from bearing cap (G1).

B. PARTS INSPECTION.

1. After disassembly, all parts should be thoroughly cleaned and inspected. Damaged or worn parts should be replaced with new ones. All sealing faces should be perfectly clean. It is recommended that lip seals, bearings, gaskets, and o-rings be replaced with new components.
2. Inspect inside diameter of the throttle bushing (B3). The inside diameter of the throttle bushing (B3) will increase with wear. If the pump is not equipped with a shaft sleeve, the throttle bushing requires replacement if the inside diameter is 1.644 inches or greater. If the pump is equipped with a shaft sleeve, the throttle bushing requires replacement if the inside diameter is 1.905 inches or greater.
3. If pump is not equipped with shaft sleeve, inspect the shaft diameter in the throttle bushing area. If the shaft diameter is 1.605 inches or less, replace the shaft. If the pump is equipped with shaft sleeve, inspect outside diameter of sleeve. If shaft sleeve outside diameter is 1.855 inches or less, replace shaft sleeve. On new components both the shaft sleeve and the shaft have a constant diameter everywhere in the throttle bushing area.
4. On the impeller, check the clearance as follows:
 - a. Measure outside diameter of impeller (1) eye wear surface in three locations 120 degrees apart. The impeller eye is the ring on the suction end of the impeller opposite of the shaft hub. It is sometimes referred to as the "nose".
 - b. Measure inside diameter of suction head (3) wear surface in three locations 120 degree apart.
 - c. If difference between high reading of inside diameter of the suction head (3) and low reading of outside diameter of impeller (1) wear surface exceeds double the maximum clearances given in Table 2, replace suction head (3) and impeller (1).
5. On bearing column (30) measure the inside diameter at the lower bearing (G3) location. Replace column if diameter exceeds .003" greater than outside diameter of new bearing
6. Measure inside diameter of upper bearing G12 cartridge replace if greater than 3.5438".
7. Measure inside diameter of bearing frame at upper bearing cartridge – replace if frame diameter exceeds 4.312.
8. Inspect shaft at bearing locations. Replace shaft if inner race of bearings have "spun" on shaft. New bearings will not have sufficient press fit if bearings have spun on shaft.

Table 2. Enclosed Impeller Clearance

Model(Suction x Discharge x Maximum Impeller Diameter)	FACTORY STANDARD DIAMETRIC CLEARANCE	
	Minimum	Maximum
3 x 2 x 10H	0.012	0.017
5 x 4 x 11	0.016	0.021

C. REASSEMBLY OF PUMP. During reassembly, return parts to their original position. Tighten nuts and bolts to the values listed in Table 5, Recommended Torque Values.

1. Install new lip seals (G5) in column (31) and bearing frame (30). Install new lip seals (G6) in bearing cap (G1).
2. Pack new bearings half full with Mobilith Grease AW2. Press new radial bearing (G3) on shaft (33). Press thrust bearing (G2) in bearing cartridge (G12). Note: the amount of lubricant required is about 3 ounces for the upper bearing and 1-1/2 ounces for the lower bearing by weight.
3. Install bearing lockwasher (G13). Install and tighten bearing locknut (G4). Re-crimp bearing lockwasher (G13).
4. Install bearing cap (G1) and secure with capscrews (G9).
5. Install coupling key (G11). Install coupling hub.
6. Install shaft (33) through bearing frame (30).

CAUTION

Take special care to avoid damaging seals. Lubricate seal lips and shaft before sliding shaft through seals. If seals are damaged, replace with new seals.

7. Install slinger (B2) on shaft (33) and secure with setscrews (B6).
8. If throttle bushing (B3) was removed, press new throttle bushing (B3) into backhead with a hydraulic press until the throttle bushing (B3) is flush with backhead (6).
9. Install locking ring (B1). If equipped with non-metal throttle bushing, use a ¼-20 NC-2 tap to tap drill through setscrew (B5) holes and tap throttle bushing (B3).
10. If equipped with non-metal bushing, insert setscrews (B5) through locking ring (B1) into throttle bushing (B3).
11. Install shaft sleeve (34), if equipped.
12. Install new backhead o-ring (G16) on backhead (6). Install backhead (6) on column (31) and secure with capscrews (35) and washers (37).

NOTE

If necessary, a hoist may be attached to lifting eyes on casing, which were used during disassembly.

13. Lubricate the edge of the casing and Install casing (2) past o-ring and secure to backhead (6) with washers (38) and capscrews (10).
14. Install impeller key (A2). Install impeller (1) and secure with impeller washer (A1) and impeller capscrew (A4). Tighten capscrew to torque value shown in Figure 1. Proper torque is critical – if the capscrew is not properly torqued, the impeller may come loose and do severe damage to the pump. Use a strap wrench or a crescent wrench over the keyway to hold the shaft while tightening. Do not use a pipe wrench or try to jam the impeller with a screw driver while tightening. Holding the impeller by the vanes may break it.

NOTE

Use Loctite 262 Red when installing capscrew.

15. Install new suction head gasket (5) on suction head (3). Install suction head (3) and secure to casing (2) with lock washers (38) and capscrews (10).
16. Remove lifting eyes from casing (2). Install pipe plugs (11).

CAUTION

Use a hoist or suitable lifting device with adequate lifting capacity to lift motor and intermediate.

17. Install pumping unit into reservoir. Secure base to reservoir frame with lockwashers, nuts and capscrews.
18. Install intermediate (61) and motor on pumping unit. Secure intermediate (61) to bearing frame (30) with nuts (64) on capscrews (63).
19. Reconnect coupling.
20. Install guard plates and secure to intermediate (61) with capscrews and washers.

CAUTION

To lift pumping unit, use a hoist or device with suitable lifting capacity. Do not pick up the complete unit by the motor or pump shaft. The motor alone may be lifted using the motor lifting eyes.

21. Reconnect discharge piping.

CAUTION

Ensure discharge piping does not strain pump. Strain may cause misalignment. To ensure proper alignment, check pump shaft for freedom of rotation after installation of discharge piping.

23. Reconnect wiring to motor. Reconnect electrical power supply to motor. Fill machine with water and pump start pump.
24. Check from proper rotation direction of pump.
25. Rotate pump and motor by hand to ensure there is no binding or rubbing.

MART PUMP 20-70HP PARTS LIST

A. PARTS ORDERING. When ordering parts please provide the following information.

1. Serial number of pump (located on nameplate). Size of pump (2 X 3 X 10 or 4 x 5 x 11)
2. Part description (located on parts list in the following pages).
3. Part number (located on parts list).
4. Quantity of parts needed.

For replacement parts contact:

MART Tech Services
2450 Adie Road Suite 100
Maryland Heights, MO, 63043
www.marttechservices.com

Toll-free: 800-543-6278
Switchboard: 314-567-3705
Fax: 314-567-6318
Email: themart@martwash.com (ATTN: SERVICE)

If motor or motor parts are required, please specify name of manufacturer, HP and frame size from motor nameplate.

B. PARTS DESCRIPTION & DRAWINGS. To determine the proper drawing to reference, first determine if you have a simplex pump (single wash pump) or a duplex pump (suction pump feeding main wash pump). Next determine which pump frame type is on your pump. There are two frames for MART pumping systems, 12V or 1530.

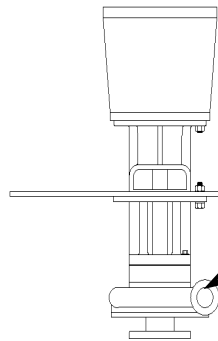
Use one of the ways below to determine which pump frame type you have:

1. Count the bolt holes on the upper pump frame bearing cap- item G1: 12V has 4 holes, 1530 has 8 Holes
2. Read the serial number from the steel tag on the pump. All pumps with serial numbers above 100,000 are 1530 frame. These are the newer model and were produced starting in 1994. All pumps with serial numbers less than 50,000 are 12 V frame. If your pump serial number is below 100,000 and above 50,000 you can determine which frame you have by (a) Calling MART Tech Services (b) Counting the bolt holes in item #1 above
3. Measure the center to center distance between the upper and lower bearings on the pump shaft. The 1530 frame-bearing center to center distance is 6". The 12V frame-bearing center to center distance is 5".
4. Measure the opening on the bearing frame below the lower bearing.
5. Look at the bearing frame photographs below choose the proper pump type.

Please verify frame type with us when ordering.

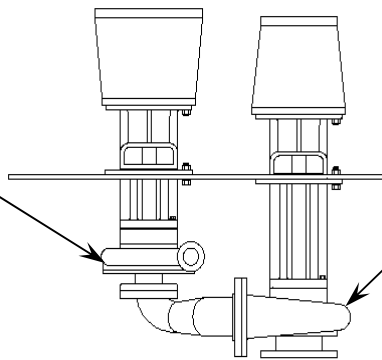


PUMP BEARING FRAME TYPES



Main Pump
See Page 12 for 1530 with
Hardened Steel Bushing
See Page 14 for 1530 with
Composite Bushing
See Page 16 for 12V

Simplex (Single) Pump System



Main Pump
See Page 12 for 1530 with
Hardened Steel Bushing
See Page 14 for 1530 with
Composite Bushing
See Page 16 for 12V

Booster or Suction Pump
See Page 18 For 1530
See Page 20 for 12V

Duplex (Dual) Pump System

Main Pump 1530 Frame Hardened Steel Throttle Bushing				
Sym	Part #	PART DESCRIPTION	Part #	Kit
1	"A" Kit	Impeller	30220	"A" Kit
2		Volute	30281	"B" Kit
3	"A" Kit	Suction head	51173	"C" Kit
4	"A" Kit	Gasket (suction head)		
6	53037	Backhead		
10		Capscrew (suction head-casing and backhead-casing)		
11		Plug (casing)		
30	30300	Bearing frame		
31	52306	Column		
33	53203	Shaft		
34	"B" Kit	Shaft sleeve		
35		Capscrew (column-backhead)		
36		Capscrew (frame-column)		
37		Lockwasher (column-backhead, column-base)		
38		Lockwasher (suction head-casing,backhead-casing)		
39		Capscrew (column-base)		
40		Hex nut (column-base)		
41		Washer (column-base)		
42		Lockwasher (column-base)		
60		Baseplate		
61	52395	Intermediate 15HP-20HP		
	52390	Intermediate 30HP		
	52392	Intermediate 40HP-50HP		
63		Hex head bolt (frame-intermediate)		
64		Hex nut (frame-intermediate)		
65		Hex head bolt (motor-intermediate)		
	72556/			
70	71919	Coupling 40-50HP/ 30HP		
71		Ring		
A1	"A" Kit	Impeller washer		
A2	"A" Kit	Impeller key		
A3	"A" Kit	Impeller stud		
A5	"A" Kit	Impeller jam nut		
B1	"B" Kit	Locking ring		
B2	"B" Kit	Slinger		
B3	"B" Kit	Throttle bushing		
B4	"B" Kit	Capscrew (locking ring-backhead)		
B6	"B" Kit	Setscrew (slinger)		
G1	53044	Bearing cap		
G2	"C" Kit	Thrust bearing		
G3	"C" Kit	Radial bearing		
G4	"C" Kit	Bearing locknut		
G5	"C" Kit	Lip seal (bearing frame, column)		
G6	"C" Kit	Lip seal (bearing cap)		
G7		Grease zerk		
G9		Hex head bolt (bearing cap-frame)		
G10		Plug		
G11		Coupling key		
G12	53045	Bearing cartridge		
G13		Bearing lockwasher		
G16	46790	O-ring		

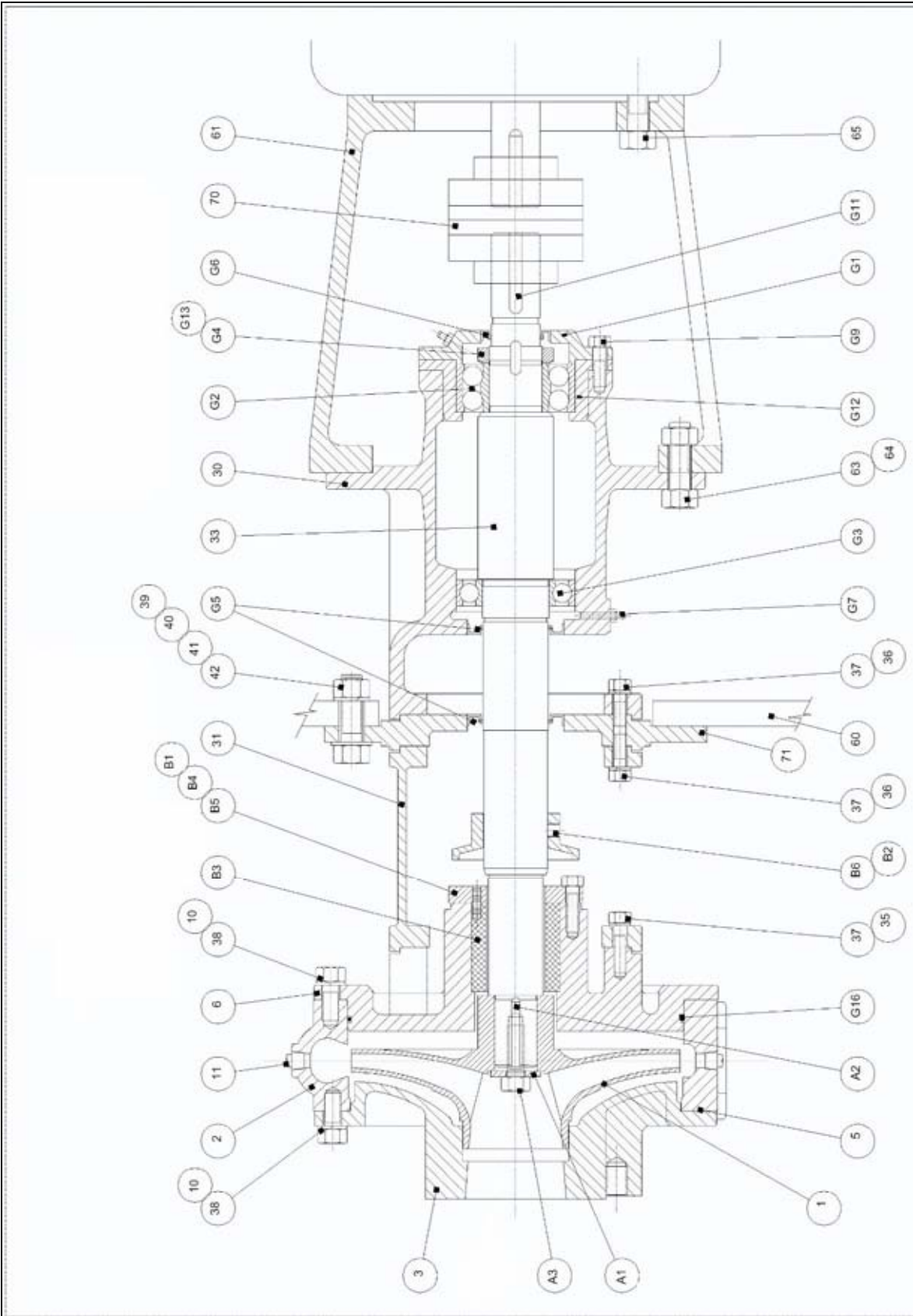


Fig. 2 Main Pump Cut Away 1530 Frame Composite Throttle Bushing

Main Pump 1530 Frame Composite Throttle Bushing				
Sym	Part #	PART DESCRIPTION	Part #	Kit
1	"A" Kit	Impeller	30220	"A" Kit
2		Volute	30280	"B" Kit
3	"A" Kit	Suction head	51173	"C" Kit
4	"A" Kit	Gasket (suction head)		
6	53037	Backhead		
10		Capscrew (suction head-casing and backhead-casing)		
11		Plug (casing)		
30	30300	Bearing frame		
31	52306	Column		
33	50489	Shaft		
35		Capscrew (column-backhead)		
36		Capscrew (frame-column)		
37		Lockwasher (column-backhead, column-base)		
38		Lockwasher (suction head-casing,backhead-casing)		
39		Capscrew (column-base)		
40		Hex nut (column-base)		
41		Washer (column-base)		
42		Lockwasher (column-base)		
60		Baseplate		
61	52395	Intermediate 15HP-20HP		
	52390	Intermediate 30HP		
	52392	Intermediate 40HP-50HP		
63		Hex head bolt (frame-intermediate)		
64		Hex nut (frame-intermediate)		
65		Hex head bolt (motor-intermediate)		
	72556/			
70	71919	Coupling 40-50HP/ 30HP		
71		Ring		
A1	"A" Kit	Impeller washer		
A2	"A" Kit	Impeller key		
A3	"A" Kit	Impeller stud		
A5	"A" Kit	Impeller jam nut		
B1	"B" Kit	Locking ring		
B2	"B" Kit	Slinger		
B3	"B" Kit	Throttle bushing		
B4	"B" Kit	Capscrew (locking ring-backhead)		
B5	"B" Kit	Setscrew (locking ring-bushing,)		
B6	"B" Kit	Setscrew (slinger)		
G1	53044	Bearing cap		
G2	"C" Kit	Thrust bearing		
G3	"C" Kit	Radial bearing		
G4	"C" Kit	Bearing locknut		
G5	"C" Kit	Lip seal (bearing frame, column)		
G6	"C" Kit	Lip seal (bearing cap)		
G7		Grease zerk		
G9		Hex head bolt (bearing cap-frame)		
G10		Plug		
G11		Coupling key		
G12	53045	Bearing cartridge		
G13		Bearing lockwasher		
G16	"A" Kit	O-ring		

Main Pump 12V Frame Composite Throttle Bushing					
Sym	Part #	PART DESCRIPTION		Part #	Kit
1	"A" Kit	Impeller		30220	"A" Kit
2		Volute		30280	"B" Kit
3	"A" Kit	Suction head		30310	"C" Kit
4	"A" Kit	Gasket (suction head)			
6	53037	Backhead			
10		Capscrew (suction head-casing and backhead-casing)		30281	"B" Kit
11		Plug (casing)		50741	Shaft
30	49440	Bearing frame			
31	52306	Column			
33	30330	Shaft			
35		Capscrew (column-backhead)			
36		Capscrew (frame-column)			
37		Lockwasher (column-backhead, column-base)			
38		Lockwasher (suction head-casing,backhead-casing)			
39		Capscrew (column-base)			
40		Hex nut (column-base)			
41		Washer (column-base)			
42		Lockwasher (column-base)			
60		Baseplate			
61	52395	Intermediate 15HP-20HP			
	52390	Intermediate 30HP			
	52392	Intermediate 40HP-50HP			
63		Hex head bolt (frame-intermediate)			
64		Hex nut (frame-intermediate)			
65		Hex head bolt (motor-intermediate)			
70		Coupling			
71		Ring			
A1	"A" Kit	Impeller washer			
A2	"A" Kit	Impeller key			
A3	"A" Kit	Impeller stud			
A5	"A" Kit	Impeller jam nut			
B1	"B" Kit	Locking ring			
B2	"B" Kit	Slinger			
B3	"B" Kit	Throttle bushing			
B4	"B" Kit	Capscrew (locking ring-backhead)			
B5	"B" Kit	Setscrew (locking ring-bushing.)			
B6	"B" Kit	Setscrew (slinger)			
G1	52434	Bearing cap			
G2	"C" Kit	Thrust bearing			
G3	"C" Kit	Radial bearing			
G4	"C" Kit	Bearing locknut			
G5	"C" Kit	Lip seal (bearing frame, column)			
G6	"C" Kit	Lip seal (bearing cap)			
G7		Grease zerk			
G9		Hex head bolt (bearing cap-frame)			
G10		Plug			
G11		Coupling key			
G13		Bearing lockwasher			
G16	"A" Kit	O-ring			

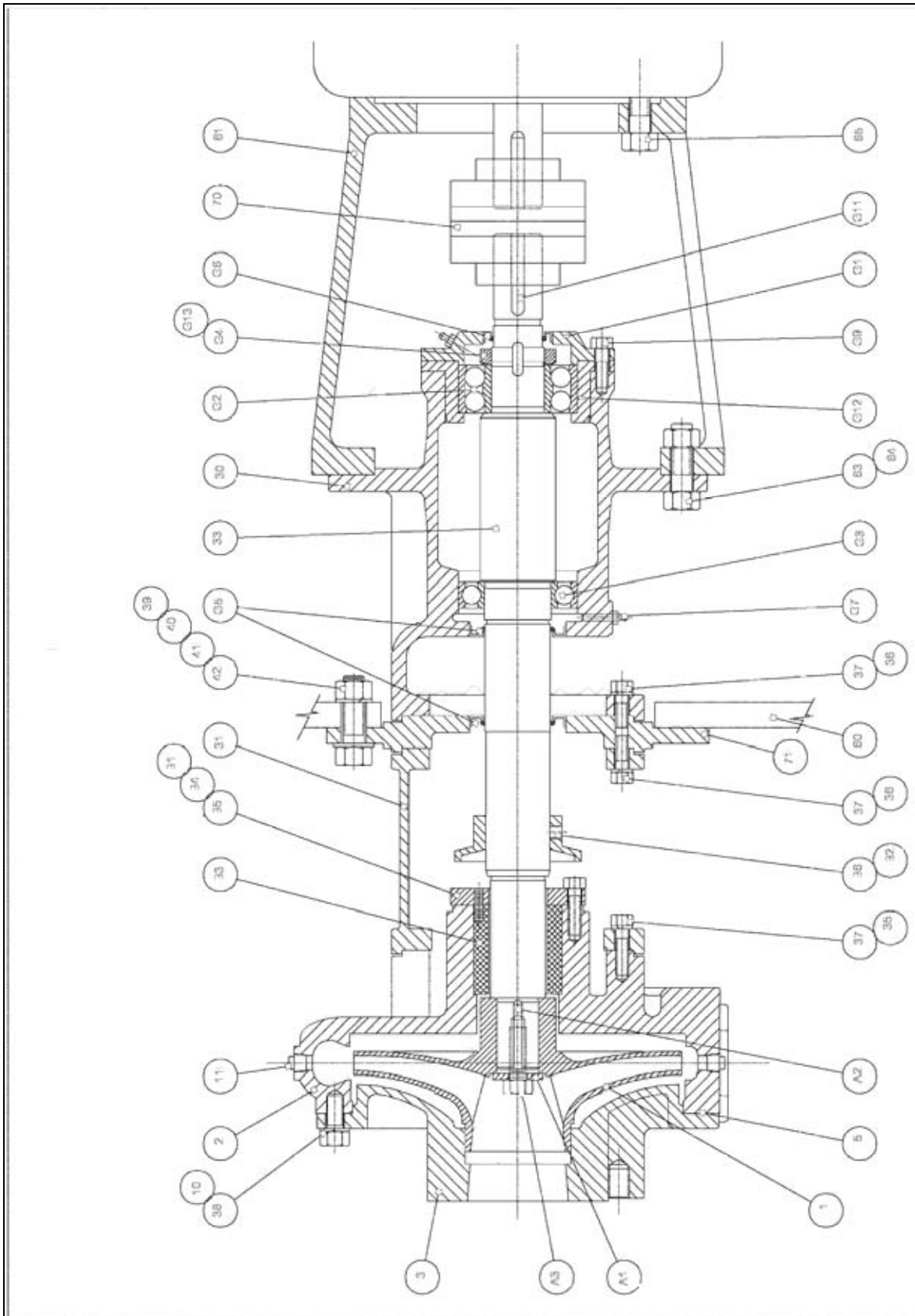


Fig. 4 Boost Pump Cut Away 1530 Frame Composite Throttle Bushing

Boost Pump 1530 Frame Composite Throttle Bushing					
Sym	Part #	PART DESCRIPTION		Part #	Kit
1	"A" Kit	Impeller		30230	"A" Kit
2		Volute/ Backhead		30280	"B" Kit
3	"A" Kit	Suction head		51173	"C" Kit
4	"A" Kit	Gasket (suction head)		52238	Gasket Kit
11		Plug (casing)			
30	30300	Bearing frame			
31	52306	Column			
33	51174	Shaft			
35		Capscrew (column-backhead)			
36		Capscrew (frame-column)			
37		Lockwasher (column-backhead, column-base)			
39		Capscrew (column-base)			
40		Hex nut (column-base)			
41		Washer (column-base)			
42		Lockwasher (column-base)			
60		Baseplate			
61	52395	Intermediate 15HP-20HP			
	52390	Intermediate 30HP			
	52392	Intermediate 40HP-50HP			
63		Hex head bolt (frame-intermediate)			
64		Hex nut (frame-intermediate)			
65		Hex head bolt (motor-intermediate)			
70	72555	Coupling			
71		Ring			
A1	"A" Kit	Impeller washer			
A2	"A" Kit	Impeller key			
A3	"A" Kit	Impeller stud			
A5	"A" Kit	Impeller jam nut			
B1	"B" Kit	Locking ring			
B2	"B" Kit	Slinger			
B3	"B" Kit	Throttle bushing			
B4	"B" Kit	Capscrew (locking ring-backhead)			
B5	"B" Kit	Setscrew (locking ring-bushing,)			
B6	"B" Kit	Setscrew (slinger)			
G1	53044	Bearing cap			
G2	"C" Kit	Thrust bearing			
G3	"C" Kit	Radial bearing			
G4	"C" Kit	Bearing locknut			
G5	"C" Kit	Lip seal (bearing frame, column)			
G6	"C" Kit	Lip seal (bearing cap)			
G7		Grease zerk			
G9		Hex head bolt (bearing cap-frame)			
G10		Plug			
G11		Coupling key			
G12	53045	Bearing cartridge			
G13		Bearing lockwasher			

Hardened Steel Throttle Bushing Upgrade Parts	
30281	"B" Kit
51804	Shaft

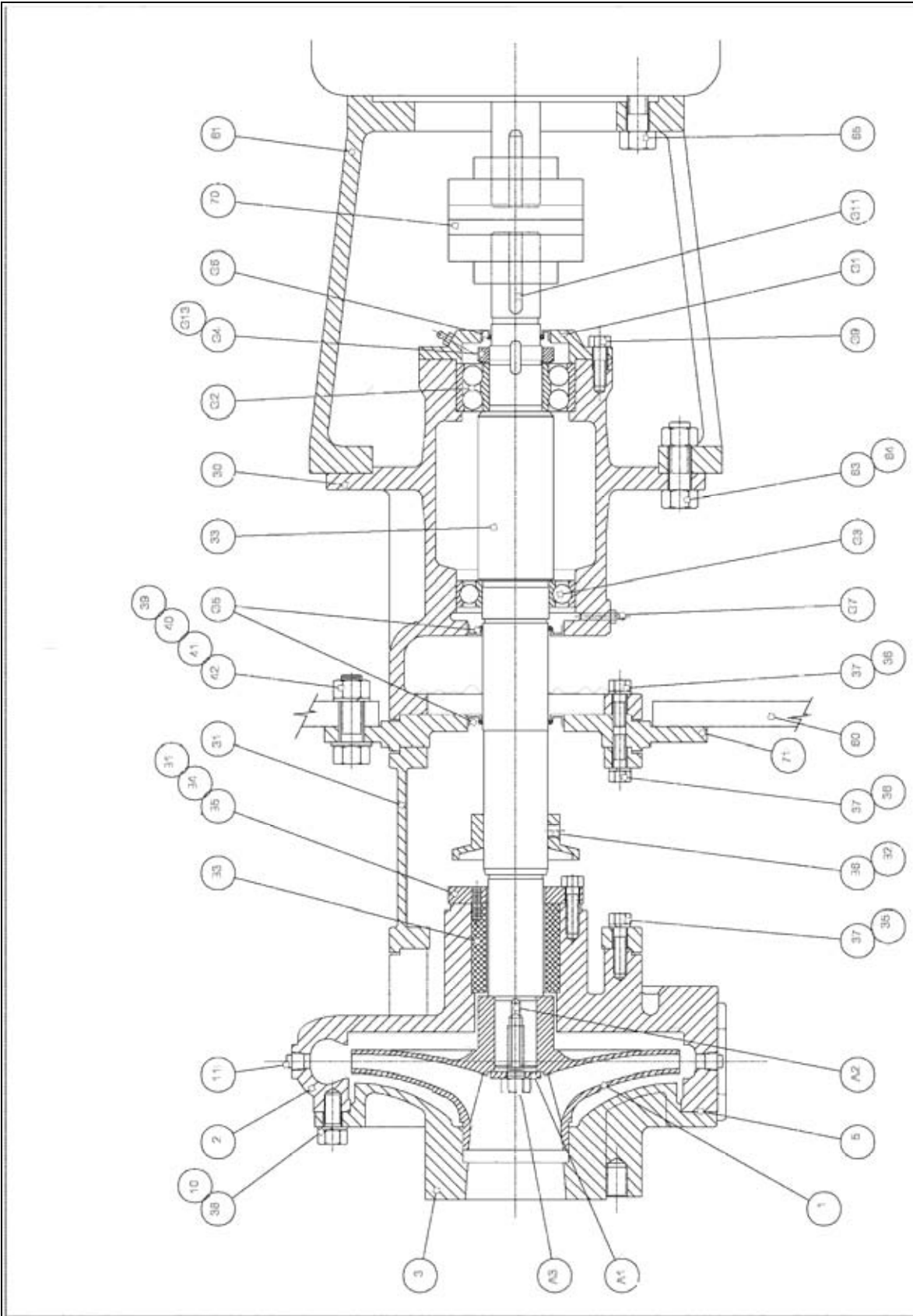


Fig. 4 Boost Pump Cut Away 12V Frame Composite Throttle Bushing

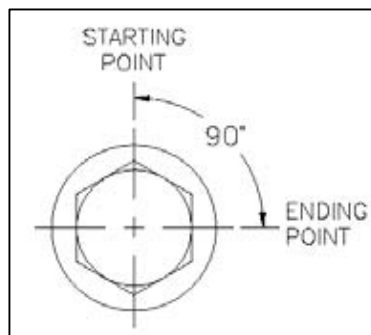
Boost Pump 12V Frame Composite Throttle Bushing					
Sym	Part #	PART DESCRIPTION		Part #	Kit
1	"A" Kit	Impeller		30230	"A" Kit
2		Volute		30280	"B" Kit
3	"A" Kit	Suction head		30310	"C" Kit
4	"A" Kit	Gasket (suction head)		52238	Gasket Kit
6	53037	Backhead			
11		Plug (casing)			
30	49440	Bearing frame			
31	52306	Column			
33	48432	Shaft			
35		Capscrew (column-backhead)			
36		Capscrew (frame-column)			
37		Lockwasher (column-backhead, column-base)			
39		Capscrew (column-base)			
40		Hex nut (column-base)			
41		Washer (column-base)			
42		Lockwasher (column-base)			
60		Baseplate			
61	52395	Intermediate 15HP-20HP			
	52390	Intermediate 30HP			
	52392	Intermediate 40HP-50HP			
63		Hex head bolt (frame-intermediate)			
64		Hex nut (frame-intermediate)			
65		Hex head bolt (motor-intermediate)			
70		Coupling			
71		Ring			
A1	"A" Kit	Impeller washer			
A2	"A" Kit	Impeller key			
A3	"A" Kit	Impeller stud			
A5	"A" Kit	Impeller jam nut			
B1	"B" Kit	Locking ring			
B2	"B" Kit	Slinger			
B3	"B" Kit	Throttle bushing			
B4	"B" Kit	Capscrew (locking ring-backhead)			
B5	"B" Kit	Setscrew (locking ring-bushing,)			
B6	"B" Kit	Setscrew (slinger)			
G1	52434	Bearing cap			
G2	"C" Kit	Thrust bearing			
G3	"C" Kit	Radial bearing			
G4	"C" Kit	Bearing locknut			
G5	"C" Kit	Lip seal (bearing frame, column)			
G6	"C" Kit	Lip seal (bearing cap)			
G7		Grease zerk			
G9		Hex head bolt (bearing cap-frame)			
G10		Plug			
G11		Coupling key			
G13		Bearing lockwasher			

Hardened Steel Throttle Bushing Upgrade Parts	
30281	30281
53328	53328

Table 5. Recommended Torque Values (except for impeller capscrew)

Bolt Size	Material	
	Steel (or otherwise noted)	316 Stainless Steel
1/4"-20	5	7
5/16"-18	11	12
3/8"-16	18	21
1/2"-13	39	45
5/8"-11	83	97
3/4"-10	105	132
7/8"-9	160	203
1"-8	236	300

Torque the impeller cap-screw as shown below.



Impeller Cap Screw & Washer

Torque Capscrew – 1/4 turn

FIGURE 1: IMPELLER CAP-SCREW TORQUE METHOD

Follow these instructions for installation of the impeller cap-screw

1. Install the flange head capscrew with washer into the shaft. Hand-tighten the screw until it is snug in the shaft and clamps the impeller washer tightly. Then, tighten the capscrew 1/4 turn (90°), approximately 80-90 ft-lbs.
2. To ensure proper seating, loosen the capscrew, re-snug and retighten the capscrew 1/4 turn (90°).

Use Loctite 262 Red when installing capscrew

MART Pump Repair Kits For 1530-12V



A Kit Main Pump 20-50 hp
 Impeller (1) trimmed to size
 Suction Head (1)
 Volute Gasket (1)
 Bolts (8)
 Impeller Bolt (1)
 Impeller Washer (1)
 Impeller Key (1)
 O-Ring (1)

1530-12V
 30220



B Kit Main Pump 15-50 hp
 Throttle Bushing Harden Steel (1)
 Shaft Sleeve SS (1)
 Step Key SS (1)
 Locking Ring (1)
 Slinger (1)
 Hex Bolts (2)
 Set Screws (2)

1530-12V
 30281



C Kit Main Pump 15-50 hp
 Oil Seal (1)
 Oil Seal (2)
 Radial Bearing (1)
 Thrust Bearing (1)
 Bearing Locking Nut (1)

1530-51173
 12V-30310



Main Pump 20-50 hp Stainless Steel
 Sleeve Shaft

1530-53203
 1530-50490
 12V-30330



A Kit Booster Pump 15-20 hp
 Impeller (1) trimmed to size
 Suction Head (1)
 Volute Gasket (1)
 Bolts (12)
 Impeller Bolt (1)
 Impeller Washer (1)
 Impeller Key (1)
 O-Ring (1)

1530-12V
 30230



B Kit Booster Pump 15-50 hp
 Plastic Throttle Bushing (1)
 Step Key (1)
 Locking Ring (1)
 Slinger (1)
 Locking Ring Set Screw (2)
 Hex Bolts (2)
 Set Screws (2)

1530-12V
 30280



Booster Pump 15-20 hp Shaft

1530-51174
12V-48432



Duplex Gasket Kit

1530-12V
52238

MART Pump Motor Couplings for 1530 Frame with Leeson Motor



Assy,Pump Coupling,15&20hp
1 Coupling 1-3/8
1 Coupling 1-5/8
1 Insert

72555



Assy,Pump Coupling,30hp,Simplex
1 Coupling 1-3/8
1 Coupling 1-5/8
1 Insert
1 Collar

71919



Assy,Pump Coupling,40&50hp
1 Coupling,1-3/8
1 Coupling,1-7/8
1 Coupling,Body

72556

MART Pump Motor Couplings for 12V Frame with US Motor



Assy,Pump Coupling,15&20hp

1 Coupling 1-7/16

1 Coupling 1-5/8

1 Insert

71934



Assy,Pump Coupling,30-40-50 hp

1 Coupling 1-7/16

1 Coupling 1-7/8

1 Insert

1 Collar

71935



2450 Adie Road Suite 100
Maryland Heights, MO 63043
Tele: 1-800-543-6278 Fax: 314-567-6318
Website: www.marttechservices.com

Copyright © 2005 Arcus Corporation. All Rights Reserved. Made in the USA.