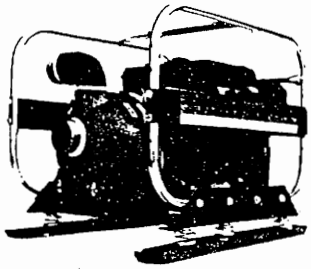
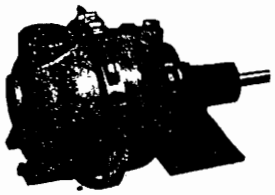
OPERATION AND
SERVICE GUIDE
O-1750E
DEC. 1995

SERIES 'T'
SELF-PRIMING CENTRIFUGAL PUMPS

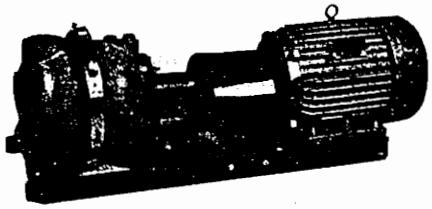
Refer to Bulletin P-612 and
Parts List P-9920.



• Gasoline engine driven



• Pedestal mounted



• Pumps flexible-coupled
to power source

Self-Priming • Corrosion Resistant • Lightweight • High Volume • High Lift

SAFETY WARNING

'T' Pumps are designed for pumping fresh or saltwater, clear or dirty. Do not use 'T' Pumps for pumping chemicals. If the water to be pumped is known to be contaminated with chemicals, contact your dealer or the factory for applications assistance. Do not use a pump that is not chemically compatible with the liquid you intend to pump or serious bodily injury, death, fire, explosion, or environmental damage could result. Pumping liquids with high solids or abrasives content will accelerate wear of certain components such as the shaft seal, impeller, volute, and wearplate. Therefore, wear should not be misconstrued as to the existence of a defect and as such would not be included in a warranty claim. Nor is it implied that such components will last through the 1 year warranty period without occasional, or even frequent replacement depending upon the severity of the application. Replace badly worn or damaged components to assure safe operation of this pump. Consult dealer or factory for recommendations on pumping abrasive and other difficult liquids.

I. GENERAL INSTRUCTIONS • TABLE OF CONTENTS

A. Inspect unit for shipping damage immediately upon receipt and before signing for merchandise. If any damage exists, note damage on shipping bill of lading or receiving documents(s) before signing. Also notify your dealer or distributor immediately of any damage to the shipment. Note that you, the receiver, are the only one who can make a claim. The carrier will not accept claims from anyone else.

B. Read these instructions and the power unit instructions until you are sure you can operate this equipment safely and correctly.

C. This 'T' pump has been designed to give maximum service over a long operating life. Proper care in operating and maintaining your pump will ensure its high efficiency and minimize unscheduled repairs.

PLEASE READ SECTIONS I, II, III, & IV BEFORE STARTING THE PUMP

II. SAFETY PRECAUTIONS

WARNING:

A. Never use these pumps for pumping flammable liquids such as gasoline. AN EXPLOSION AND SERIOUS INJURY MAY RESULT IF THIS WARNING IS IGNORED.

B. Your 'T' pump is designed for use with water, clear or dirty, *do not use it for pumping chemicals.* Provide all needed safety precautions to protect people and property before pumping *any* fluids.

C. Before starting the pump, follow all of the instructions in this manual and any supplemental instructions supplied with the pump, engine or motor.

D. Any person operating this pump and its power unit should be fully aware of its safe operational procedures before they start using it.

E. Never operate this unit in an explosive atmosphere, near combustible materials, or where insufficient ventilation exists to prevent any personal injury or damage. Be certain any other power unit is safe for the area in which it is to be operated. Never operate gas powered engines indoors.

F. Always be sure that the unit is on a secure footing and keep the immediate pump and power unit area free of all unauthorized personnel. If the pump is sitting beside a pit, be sure it is well anchored so that it does not fall in.

G. Never operate the unit with any guards removed.

H. With engine driven pumps:
   1. Observe all safety precautions for the handling of fuel.
   2. Never refuel the engine while it is running, and care should be exercised so that no fuel is spilled on a hot engine. Always allow engine to cool at least five minutes before refueling.

I. Before working on this pump, make sure that the power unit cannot inadvertently be started.

J. Be sure that the power unit, pump, and wiring and piping installations are suitable for the liquid being pumped and comply with all applicable codes and regulations.

K. Do not use torches or apply fire or flames to this pump for any reason.

L. This pump must not be subjected to more than 65 pounds per square inch internal pressure. The pump itself, normally cannot develop more than 55 pounds per square inch pressure. The pump must not be used under any of the following unusual conditions which can result in excessive pressures being developed:
   1. Pump shaft speed over 3600 RPM.
   2. Quick closing valves in discharge line or any other device which may introduce hydraulic shock into the system.
   3. Possible sudden obstruction of discharge line such as vehicle driving over the hose.
   4. High positive suction pressures (such as with a flooded suction) which would increase the total system pressure to 65 PSI or above.
   5. Do not pump a liquid having a specific gravity greater than 1.3

M. Do not overtighten the drain or filler plugs. Hand tighten only. Excessive force may damage the threads or the pump body. Do not use metal plugs.

N. Use at least one foot of flexible hose to make plumbing connections to the pump body. Rigid piping may put stresses on the pump, causing damage. If rigid piping must be used, properly support it so as to eliminate stresses on the pump.

O. Do not tighten inlet and discharge fittings more than one turn beyond hand tight. Excessive force will damage the pump or fittings.

P. Long suction and discharge hoses must be supported so that the weight of the hose filled with liquid does not damage the pump.

Q. Use replacement parts supplied by the manufacturer only.

R. Always fill the pump body with the liquid to be pumped before starting the pump. It is not necessary to drain the pump body after use, unless there is danger of freezing, settling of solids, or crystallization.

S. Do not run pump dry. Do not restrict flow through pump with closed discharge valve or "starved" suction line. If it is necessary to restrict flow through the pump for longer than a minute or two, it must either be stopped or a discharge bypass line installed to keep liquid temperatures below the maximum recommended operating temperature of 130° F.

III. PREPARING THE PUMP AND POWER UNIT FOR OPERATION

A. General
   1. Inspect your unit for signs of shipping damage. Notify your dealer immediately of any damage or missing components.
   2. Read and re-read these instructions and the power unit instructions until you are sure of safe and correct operating methods.

B. **Power unit preparation, gasoline engine driven pumps**
   1. For complete operating and maintenance information read completely the engine manufacturer's instructions included with the pump.
   2. Before starting, fill crankcase with oil specified by the engine manufacturer. Use a high quality detergent oil classified for service SC, SD, SE or MS. Do not add anything to the recommended oil.
   3. Before starting, fill fuel tank with clean, fresh unleaded "regular" grade automotive gasoline. Do not mix oil with gasoline.

CAUTION: Always remove spark plug or spark plug wire before working on a unit to prevent accidental starting. The engine governor is set at the factory. Do not tamper with any part which may increase the governed engine speed.

C. **Power unit preparation, electric motors**
   1. Make certain that the input power to your electric motor is proper, single phase or three phase, and is of the proper voltage according to the motor specification plate.
   2. Be sure of the proper motor rotation. Pump impeller should rotate counterclockwise, looking from the suction inlet side. For single phase motors consult the motor manufacturer's instructions for wiring for counterclockwise rotation. Three phase motor rotation may be reversed by interchanging any two of the three power leads. Make certain that wiring for your electric motor complies with all existing codes.

D. **Pump Preparation**
   1. Fill the shaft seal lubrication system with the same oil used in the engine. If motor driven, use SAE 10W40. (Oil fill cap is located behind the pump filler plug on top of the pump. See item #1A on the exploded view drawing at end of manual). The initial fill will be completely used within the first few hours of operation. Re-fill the tube after 3 operating hours, check every 24 operating hours.

IV. PUMP OPERATING INSTRUCTIONS

Insure that the shaft seal lubrication system is filled with oil as described above.

A. Fill the pump body with clean water before starting. Avoid running your pump dry, for prolonged periods: excessive seal wear may result even with the lubrication system because pressure exerted by the liquid in the body of the full, operating pump is required to drive lubrication to the seal.

B. Make certain that all hose and pipe connections are airtight. Important: an air leak in the suction line may prevent priming, and will reduce the capacity of the pump.

C. Always place the pump as close as possible to the source of the liquid to be pumped. Keep all lines as short and straight as possible, to minimize restrictions.
   Engine driven 'T' pumps are equipped with a "wide stance" chassis which will stabilize the pump in difficult jobsite situations. However, always attempt to place the pump in a level, secure position for safe, efficient operation. See figure #1.

D. If flexible hose must be laid across a roadway, protect it with planking. Instantaneous shut-off pressures applied when a vehicle runs across an unprotected hose will cause "hydraulic shock". This shock can damage the pump and/or damage the hose. See figure #2.

E. Solids as large as 1/2 the size of the 2" & 3" suction ports may be passed. (e.g. 1" & 1½" solids respectively). To ensure that no larger solids enter the pump, always install a suction line strainer supplied by the manufacturer. If the strainer is likely to clog, use one of the methods shown below to prevent clogging (see figure #3).

F. Drain the pump body whenever there is danger of freezing.

G. After each use—always flush residue and solids from the pump body by the following method:
   1. Remove suction hose from body.
   2. Remove the drain plug (item #20 on parts drawing) and allow all fluid to drain from the pump body.
   3. Loosen the pump front support by rotating eye bolts (item #45) 3 full turns clockwise.
   4. Remove the V-band clamp (item #23) and pull the pump body and support forward until clear of the opposing half. Remove and wash the body O-ring (item #22) with clean water. If the impeller eye appears obstructed, remove the wear plate (item #28). Remove all obstructions. Re-install wear plate.
   5. Rinse the pump interior and wipe the body O-ring seat areas.
   6. Re-assemble the pump.

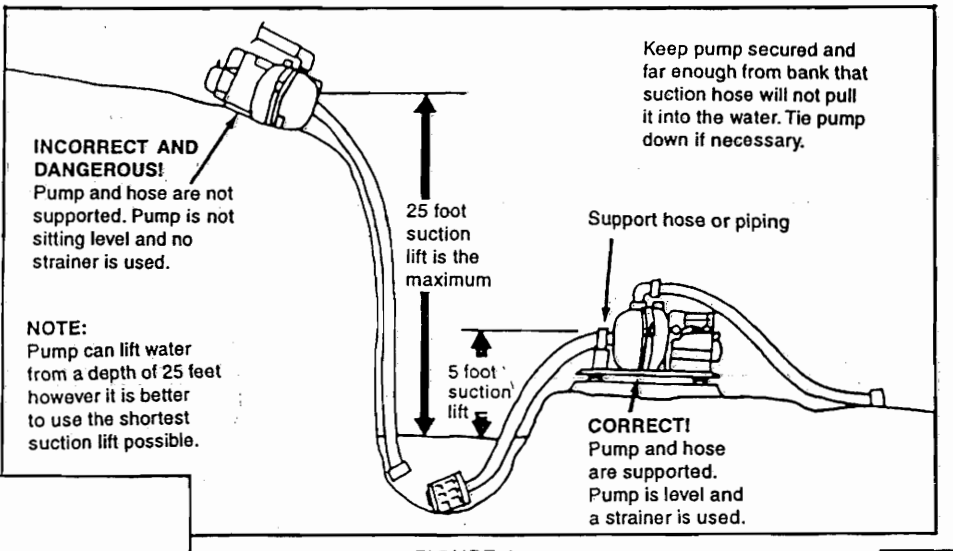


FIGURE 1

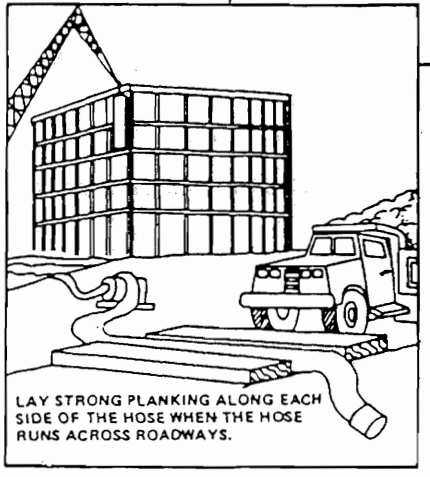
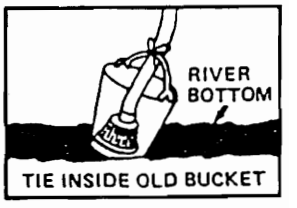


FIGURE 2

SUGGESTED WAYS TO KEEP STRAINER OUT OF RIVER SILT.

1. Prepare a bed of stones on which to rest the strainer (see Figure #3)
2. Tie the strainer so that it stays off the bottom of the pit excavation, etc.
3. Tie the strainer inside a bucket or pail (see Figure #3)



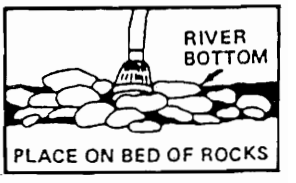


FIGURE 3

V. TROUBLE SHOOTING AND REPAIR

Good preparation and maintenance should always result in proper pump function. Despite these practices, some problems may occur. The following suggestions should be sufficient to solve most pump problems.

Note: "(item#....)" refers to the exploded view drawing on page 7.

Problem	Treatment
Pump will not prime after one minute of operation	1. Fill pump body to overflowing. Re-start. 2. Check suction line for obstructions or loose fittings. 3. Pump speed (is engine choke still on?). Vacuum performance drops rapidly when RPM is decreased. 4. Check valve (item #24) not sealing (pump will not hold prime water). Remove obstruction 5. Leakage at suction gasket (item #27).
Pump will prime but flow is less than usual	1. See 2 and 3 above 2. Discharge hose obstructed 3. Check for excessive wear and clearance between wear plate and impeller. Greater than 1/16" clearance when body is removed requires replacement of either or both.
Water leaking through oil seal (item #7)	1. Worn shaft seal

VI. PUMP DISASSEMBLY AND REPAIR

Tools required:

Screw driver (broad blade, straight slot) Allen wrench 5/32" hex. Impellers with metal hubs may require a "Jackscrew" for removal. 3" pumps would require a 5/8-11 bolt. 2" pumps need a 1/2-13 bolt. Impellers with no metal hub do not require a "Jackscrew" for removal.

A. Loosen eye or hex head bolts (item #45) on pump support (item #48) 3 turns.

B. Remove clamping band (item #23) and pull body assembly (items #21 & 48) away from bracket half

C. Body assembly contains a rubber gasket seal (item #27) which is removable by hand, and a check valve (item #24) which is held in place by two self-tapping screws (item #26) through a retainer plate (item #25).

D. **BRACKET DISASSEMBLY**
Remove the volute wear plate (item #28). (Note the slots in the wear plate which locate it on the volute.) Observe the inside surface for signs of excessive wear.

E. To remove the impeller (item #16), simply remove the retainer screw (item #18) and O-ring (item #17). The impeller should now be manually removable. Impellers with metal hubs may require a Jackscrew. Once the impeller is removed, the attached seal should be protected unless replacement is intended. Note the shims (item #13) within the impeller bore. Retain these shims and the shaft key (item #14) for later use in reassembly—even with a new impeller.

F. To remove the seal (item #15) from the impeller, place a screwdriver through the front and press the seal out of its seat. When replacing the seal, insure that it is fully seated within its socket and that the face is perpendicular to the shaft. Whenever the impeller seal half is replaced, the bracket seal half must be replaced at the same time (and vice versa), as the seal halves wear a path into each other. A new seal half running against a worn seal half is likely to leak.

G. To disassemble the volute (item #11) from the bracket (item #6) on 2" series pumps, remove 2 Allen-head screws The 3" unit requires the removal of 4 Allen-head screws (item #12). Clean and safely store the volute O-ring (item #10) until reassembly.

VII. PEDESTAL MOUNTED, FLEXIBLE COUPLED PUMPS

A. FLEXIBLE COUPLED PUMPS: COUPLING ALIGNMENT

Measure the diameter of the power unit shaft. Choose the appropriate coupling for your pump and power unit. (See flexible couplings chart number VI-A). Proper shaft and coupling alignment reduces vibration and prevents premature coupling failure. The following 8 steps help in obtaining proper shaft alignment:

1. Make sure you use a rigid base plate large enough for the assembly of the pump and the drive-unit. We offer kits 58-0116 and 58-0117 for this purpose. (See base-plate kits listed after couplings chart VI-A)**
2. Place the pump and drive-unit on the base plate.
3. Measure the distance between the centerline of the pump shaft and the base plate surface.
4. Measure the distance between the centerline of the drive-unit shaft and base plate.
5. Compare measurements obtained from steps 3 and 4 and use spacers and shims for height adjustment to insure alignment of both shafts.
6. Place the coupling halves over each shaft, put the "spider" between the two halves and couple the two halves together.
7. To assure parallel alignment (Figure 5) place a straight edge along the side of both coupling halves in two different locations, 90° apart. The coupling is aligned when the straight edge rests squarely on the sides of both coupling halves.
8. To avoid angular misalignment, insert a measuring device (taper gauge or feeler gauge) between the coupling faces at four locations 90° apart (See arrows in Figure 6) and measure the gap at each of the four locations. For proper alignment all four measurements should be equal. Reshimming may be required to achieve this alignment.

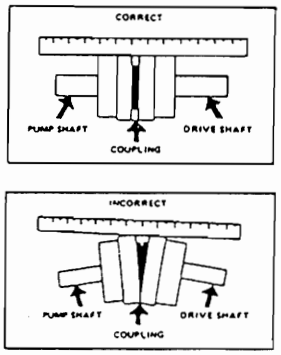


FIGURE 5

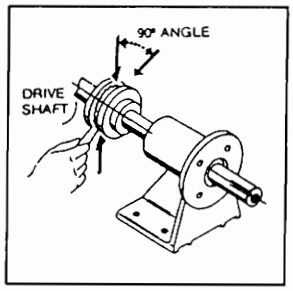


FIGURE 6

FLEXIBLE COUPLINGS CHART VI-A

COUPLING PART NUMBER	POWER UNIT SHAFT DIAMETER	PUMP SHAFT DIAMETER	ELECTRIC MOTOR FRAME SIZES
787-01	1.125"	.75"	182T-184T
2051-01	1.125"	1.125"	182T-184T
2052-01	1.375"	1.125"	213T-215T

**BASEPLATE KITS

These kits contain a baseplate, coupling guard, shims and hardware for mounting a pedestal pump to the power units listed. All necessary mounting holes are provided.

KIT 58-0116—This kit is suitable for use with motors having the following frame sizes: 182T, 184T and 213T, for 2" pump

KIT 58-0117—This kit is suitable for use with motors having the following frame sizes: 184T, 213T and 215T, for 3" pump

B. Pedestal Pump Dimensions

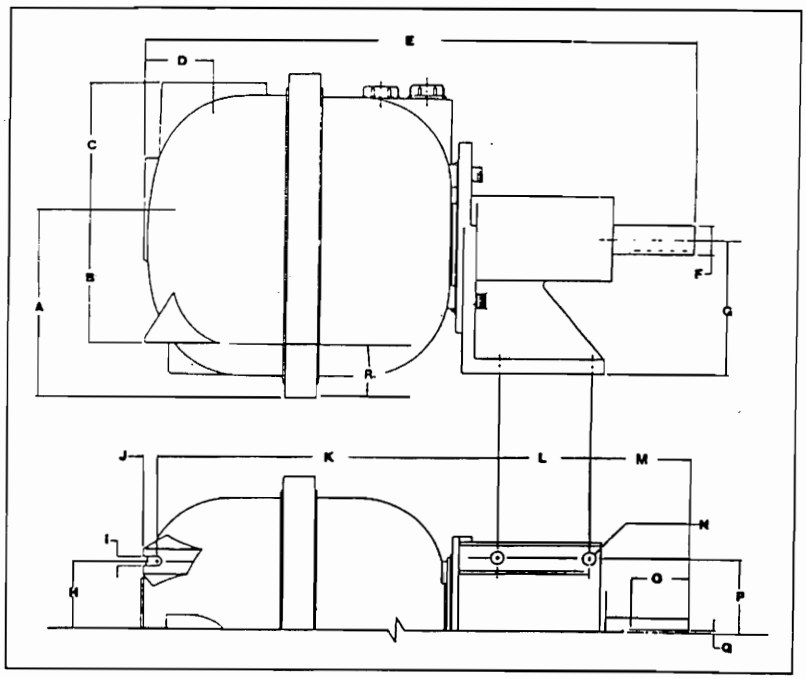


FIGURE 4

Pump Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
2"	7.12	5.17	4.85	2.63	16.40	.75	4.17	2.625	.375	.492	10.95	2.25	2.58	.34	1.12	1.61	.094	1.0
3"	7.12	5.17	4.90	2.63	22.19	1.122	5.36	2.625	.375	.492	13.13	3.56	4.94	.44	2.50	2.875	.125	1.0

All dimensions are in inches.

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