

INSTRUCTIONS

The care required of this pump, while nominal, is very important. We recommend a careful review of the installation and maintenance covered in this instructional pamphlet to ensure extended trouble-free service.

LOCATION

The motors used on Ampco pump units have been selected as the best for the anticipated environment. For greatest service life, mount the pump and motor where the environment is relatively clean, dry, and non-corrosive. Standard totally-enclosed motors may be installed where dirt, moisture and mild corrosion are present or in outdoor locations. Specialty motors may be required for moist, corrosive, or explosive environments. Motor drain plugs (if not equipped with automatic drains) must be removed periodically to drain accumulated condensation. Pump units should be located where daily visual inspection is possible and no surrounding structure interferes with ventilating air over or through the motor.

INSTALLATION

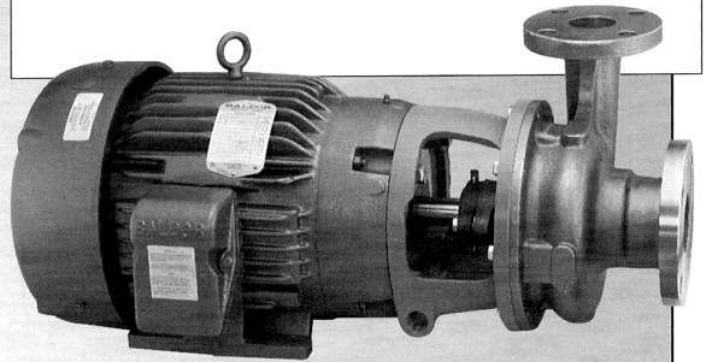
Installation of Ampco pumps should be made as close to the supply of liquid as possible, with short and direct suction piping. Avoid high points in the piping where air pockets can form. The suction and discharge piping should be simple with the connections properly aligned to prevent any strain from being placed on the pump casing. Provisions should be made for pipe expansion and contraction in services handling hot or cold liquids. **Base-mounted pedestal pumps must be realigned AFTER installation and piping is completed.**

Double seal pumps require a pressurized barrier fluid in the seal chamber. **Do not run double seal pumps without the barrier fluid, seal damage may occur and product will leak out of the pump.** The inlet for the stuffing box is the lower hole and outlet is the upper hole. The pressure of the barrier fluid should be at least 10 to 15 psi higher than half of TDH plus the suction head, but not greater than 10 psi above the TDH plus suction head. Flow rates of the barrier fluid are dependent on temperature but should not be less than 15 gph.

MAINTENANCE

Daily observation of Ampco pumps while in operation is the ounce of prevention needed to extend the service life. Mechanical seals are selected for maximum life with due consideration to the economy of the installation. The seal and shaft sleeve are expendable items. Other pump parts are designed for indefinite life expectancy, except as they may be corroded and/or eroded by aggressive products or by misapplication such as undersizing, oversizing, cavitation, etc. Bearings on some pedestal pumps and some motors are prelubricated and require no additional lubrication. Schedule for regreasing other types of bearings will vary, depending on size, speed, duty, and environment. For guidance, a steady running, indoor installation in a relatively clean atmosphere at 40°C (104°F) ambient should not require grease for two years. Care should also be taken not to over grease motors. Pumps handling corrosive or otherwise aggressive solutions should be flushed with clean water after each use because stagnant conditions are usually most corrosive. In sea water, Ampco Alloy pumps provide cathode protection for stainless steel parts. To prevent crevice corrosion and pitting, drain and then flush out the pump with fresh water when inactive for periods greater than one week.

EC/ECH PUMPS



Ampco "E" Series pumps fitted with standard mechanical seals have all-metal seal parts of 316 stainless steel, carbon rotating face, ceramic stationary seat, and Buna-N elastomers. Other seal types are supplied when specified. Optional materials such as Viton, EPDM, or Teflon elastomers, Tungsten Carbide, Silicon Carbide, or Ni-Resist faces can be supplied when requested. The mechanical seal should be replaced at the first sign of leakage where the shaft enters the pump. Leakage may cause motor bearing damage. Also, since the primary seal surfaces are lapped to precise flatness, the seal should be replaced whenever the pump is dismantled to the point of separating the seal faces. Always keep a replacement seal kit on hand. It includes a complete seal along with all the gaskets and o-rings required to rebuild the pump.

There may be other pump assemblies, parts and seal arrangements not shown or otherwise described in this pamphlet, that require the same philosophy of seal positioning. It is suggested that highlights of these instructions be applied while paying close attention to parts arrangement during dismantling.

MECHANICAL SEALS (Self-Locating)

The instructions on the following pages are specifically for bellows type mechanical seals. Being self-locating, the rotating parts need only to be approximately positioned on the shaft sleeve so that contact occurs between the rotating and stationary seal parts before the sleeve butts against the locating shaft shoulder. This sequence of contacts will cause the oil-lubricated rotating seal to slide along the sleeve to the correct location. The oil-softened film will then set up, bonding the bellows to the shaft sleeve to maintain position and transmit torque.

MECHANICAL SEALS (not Self-Locating) Type-9

Mechanical seals which are not self-locating require seal manufacturer's instructions as to the initial spring compression, drive collar location, etc. Following those instructions, the assembler may best determine and mark such locations on the shaft or sleeve by first assembling the pump without the seal. The gland location or end stuffing box may then be scribed onto the shaft or sleeve as a reference point for locating seal's rotating parts in relation to stationary parts.

Single Mechanical Seal T-1 and T-21

DISMANTLE AND REPLACE PARTS AS FOLLOWS:

Before attempting any service on the pump or motor, disconnect or lock out electrical power to the pump motor. If the pump and motor are to be removed as a unit, note the wiring configuration. Use colored or numbered tape to mark the wire connections of the motor and power source, for reconnection.

1. Remove casing by unbolting eight casing bolts. There is a choice of (a) first removing the inlet and discharge piping, or (b) sliding the motor and remaining pump parts back and free of the casing without disturbing the piping.
2. Remove the impeller screw. Ease the impeller off the shaft. Pinch bars between the impeller and cover may be required. Remove the impeller key.
3. Remove the two capscrews holding the gland to the cover. Slide the gland out of the cover onto the motor shaft. The cover may now be removed from the adapter or pedestal. This is a piloting fit, pry if tight.
4. The shaft sleeve and rotating parts of the mechanical seal are removed by drawing the sleeve off the shaft (Initial use of anti-seize lubricant should permit hand removal). A puller, if necessary, should be the type that grips the O.D. Remove the gland from the motor shaft.

The fluid end is now completely dismantled: additional procedures are dictated by purpose for which unit was disassembled.

These instructions are limited to fluid ends only. See other drawings and literature applicable to motors, pedestals, frames, shafts, bearings, etc., if additional repairs are required.

The Mechanical seal is the only expendable pump part. It is suggested that the complete mechanical seal, both stationary and rotating members, be replaced whenever dripping or leakage occurs at the shaft, or whenever parts are removed to the point of separating the primary sealing surfaces. Replace shaft sleeve if worn or damaged.

5. The seal's flexible bellows may stick tightly to the sleeve. Bathe in oil to soften the adhesive, or cut away with knife. Remove the o-ring from the shaft I.D. where applicable.
6. Press the seal's stationary seat with cup or o-ring out of the gland.
7. Thoroughly clean sleeve, seat cavity and shaft with solvent and dry with a clean cloth.

Loss of capacity and/or head due to excessive running clearance (1/16" or more per side) between impeller and casing ring may be restored by replacing wear ring.

8. The wear ring is a press fit in the casing. To remove the ring, cut through two sides, releasing the pressure of the press fit. This may be accomplished by drilling a hole through longitudinal dimension of the ring, then cracking the remaining ring wall. Drill size "a" is the approximate size.

9. When inserting a new ring, be sure the matching surfaces are clean and free of burrs. Press the new ring in, keeping it perfectly straight. If no press is available, ring may be driven in with hammer and wood or suitable fiber block.

Replacement of other parts is accomplished by substituting during normal assembly as follows:

Mechanical Seal Replacement and Reassembly

The rotating portion of the mechanical seal is positioned by sliding the sleeve into position as the impeller screw draws the impeller into place. Oiling the O.D. of the sleeve and the I.D. of the seal facilitates this by softening an adhesive film on the seal (Use soap, glycerin, etc. if oil is not permitted i.e. EPDM). Do not use grease, as this would prevent the adhesive film from resetting. Final adherence to the sleeve is essential for shaft, sleeve, and seal to rotate as a unit.

Proceed as follows:

1. Lightly oil the seat bore and finger press stationary seat with gasket or o-ring into this cavity. Seat (usually ceramic) is fragile. Do not abuse.
 2. Oil and hand fit (no tools) rotating portion of mechanical seal onto sleeve. Check direction, carbon should face small end of the sleeve and spring retainer should locate on the step of the sleeve. Complete assembly without delay after seal is placed on the sleeve.
 3. Slip the gland and seat over the shaft onto the motor shaft. Avoid bumping the seat into the shaft.
 4. Insert sleeve I.D. o-ring where applicable. Lubricate I.D. of sleeve and shaft O.D. with an anti-seize lubricant. Slide sleeve with seal parts onto the shaft.
 5. Slide the cover into its locating bore, positioning the internal bypass hole between 1 and 2 o'clock for top discharge.
 6. Insert gland into cover and secure with two capscrews.
 7. Place the o-ring in the end of the sleeve. Align the keyways and insert the key. Place the gasket or o-ring in the impeller depending on style and slide the impeller onto the shaft over the key. Use blue Loctite #242 on the impeller screw threads and hand tighten the impeller screw.
 8. Tighten the impeller screw with a 6 pt socket until the sleeve is against the shaft shoulder and all rotating parts are secure. A screw driver or equivalent placed into the impeller O.D. will steady the rotating assembly for tightening. Check the freedom of parts by hand rotating the impeller.
 9. Install a new casing gasket on the shoulder of the cover. Place the casing in position and secure with the eight cap screws. Tighten the cap screws uniformly. Rotate the impeller by hand again to check for rubbing.
- One way to damage a new seal is to run it dry. Be sure pump is in place and primed before operating.**
10. Place the pump back into service and inspect for proper rotation and leaks.

Single Mechanical Seal T-1 and T-21

EC/ECH PUMPS
ZC/ZCH PUMPS

1 1/2x1 1/4, 2x1 1/2, 2 1/2x2, 3x2 1/2, 4x3

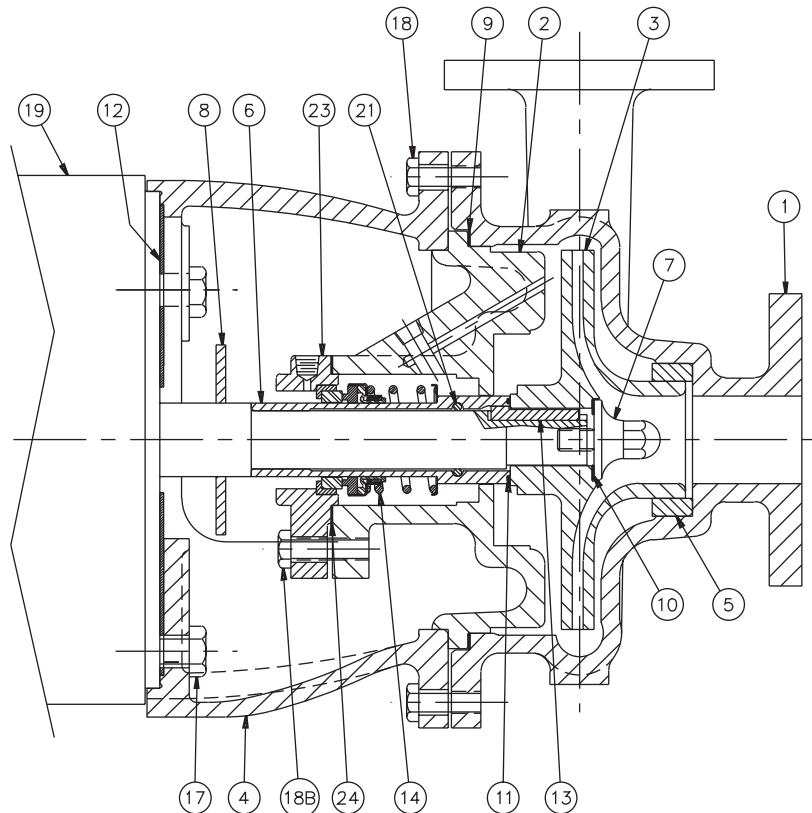
AMPCO PUMPS COMPANY
PARTS BREAKDOWN

DETAIL NO.	REQ. NO.	PART NAME
24	1	GLAND GASKET
23	1	GLAND
22 ^{1,2}	1	WEAR RING (COVER)
21	1	O-RING (SHAFT/SLEEVE)
20 ¹	2	PIPE PLUG (OPTIONAL)
19	1	MOTOR
18B	2	CAP SCREW (COVER/GLAND)
18	8	CAP SCREW (CASING/ADAPTER)
17	4	CAP SCREW (MOTOR/ADAPTER)
16 ¹	2	DRIVE SCREW
15 ¹	1	NAME PLATE
14	1	MECHANICAL SEAL
13	1	IMPELLER KEY
12	1	SPLASH PLATE
11	1	GASKET or O-RING (SLEEVE/IMPELLER)
10	1	GASKET or O-RING (IMPELLER SCREW)
9	1	GASKET (CASING/COVER)
8	1	SLINGER
7	1	IMPELLER SCREW
6	1	SHAFT SLEEVE
5	1	WEAR RING (SUCTION)
4	1	ADAPTER
3	1	IMPELLER
2	1	COVER
1	1	CASING

¹NOT SHOWN

²ONLY ON 4x3

NOTE: Please be sure to always include pump type, size, and serial number with any reference to above numbers and names.



Double Mechanical Seal T-21

DISMANTLE AND REPLACE PARTS AS FOLLOWS:

Before attempting any service on the pump or motor, disconnect or lock out electrical power to the pump motor. If the pump and motor are to be removed as a unit, note the wiring configuration. Use colored or numbered tape to mark the wire connections of the motor and power source, for reconnection.

1. Remove casing by unbolting eight casing bolts. There is a choice of (a) first removing the inlet and discharge piping, or (b) sliding the motor and remaining pump parts back and free of the casing without disturbing the piping.
2. Remove the impeller screw. Ease the impeller off the shaft. Pinch bars between the impeller and cover may be required. Remove the impeller key.
3. Remove the cover, shaft sleeve, gland and seals from the pump as an assembly. The cover is a piloting fit, pry if tight.
4. Remove the two capscrews holding the gland to the cover. Slide the gland out of the cover.
5. The seal's flexible bellows may stick tightly to the sleeve. Bathe in oil to soften the adhesive, or cut away with knife. Remove the shaft sleeve from the cover. Remove the o-ring from the shaft I.D.

The fluid end is now completely dismantled: additional procedures are dictated by purpose for which unit was disassembled.

These instructions are limited to fluid ends only. See other drawings and literature applicable to motors, pedestals, frames, shafts, bearings, etc., if additional repairs are required.

The Mechanical seal is the only expendable pump part. It is suggested that the complete mechanical seal, both stationary and rotating members, be replaced whenever dripping or leakage occurs at the shaft, product is found in the barrier fluid, or whenever parts are removed to the point of separating the primary sealing surfaces. Replace shaft sleeve if worn or damaged.

6. Press stationary seats out of the gland and the cover.
7. Thoroughly clean sleeve, seat cavities and shaft with solvent and dry with a clean cloth.

Loss of capacity and/or head due to excessive running clearance (1/16" or more per side) between impeller and casing ring may be restored by replacing wear ring.

8. The wear ring is a press fit in the casing. To remove the ring, cut through two sides, releasing the pressure of the press fit. This may be accomplished by drilling a hole through longitudinal dimension of the ring, then cracking the remaining ring wall. Drill size "a" is the approximate size.
9. When inserting a new ring, be sure the matching surfaces are clean and free of burrs. Press the new ring in, keeping it perfectly straight. If no press is available, ring may be driven in with hammer and wood or suitable fiber block.

Replacement of other parts is accomplished by substituting during normal assembly as follows:

Mechanical Seal Replacement and Reassembly

The inboard rotating portion of the mechanical seal is positioned by sliding the sleeve into position as the impeller screw draws the impeller into place and cover when the casing draws the cover into place. The outboard rotating portion of the mechanical is positioned by sliding the gland into position. Oiling the O.D. of the sleeve and the I.D. of the seal facilitates this by softening an adhesive film on the seal (Use soap, glycerin, etc. if oil is not permitted i.e. EPDM). Do not use grease, as this would prevent the adhesive film from resetting. Final adherence to the sleeve is essential for shaft, sleeve, and seal to rotate as a unit.

Proceed as follows:

1. Lightly oil the seat bores and finger press stationary seat with gasket or o-ring into this cavity. Seat (usually ceramic) is fragile. Do not abuse. If different seat materials are used for inboard and outboard seals make sure to correctly locate each.
2. Insert sleeve I.D. o-ring. Lubricate I.D. of sleeve and shaft O.D. with an anti-seize lubricant. Slide the sleeve through the cover. Oil and hand fit (no tools) rotating portion of mechanical seals onto sleeve. The inboard rotating seal element should hold the shaft step sleeve tight against the cover. The spring is then placed over the sleeve and inboard seal. The outboard rotating seal element is slid over the sleeve to just engage the spring. Make sure the carbon washers are aligned in their retainers. Complete assembly without delay after the seals are placed on the sleeve.
3. Slip the gland and seat over the shaft onto the motor shaft. Avoid bumping the seat into the shaft.
4. Slide cover and sleeve with seal parts onto the shaft. Slide the cover into its locating bore.
5. Place the o-ring or gasket in the end of the sleeve. Align the keyways and insert the key. Place the gasket or o-ring in the impeller depending on style and slide the impeller onto the shaft over the key. Use blue Loctite #242 on the impeller screw threads and hand tighten the impeller screw.
6. Tighten the impeller screw with a 6 pt socket until the sleeve is against the shaft shoulder and all rotating parts are secure. A screw driver or equivalent placed into the impeller O.D. will steady the rotating assembly for tightening. Check the freedom of parts by hand rotating the impeller.
7. Install a new casing gasket on the shoulder of the cover. Place the casing in position and secure with the eight cap screws. Tighten the cap screws uniformly.
8. Slide the gland and seat into the cover and secure with two capscrews. Rotate the impeller by hand again to check for rubbing.

One way to damage a new seal is to run it dry. Be sure pump is in place and primed before operating and barrier fluid is set up properly.

9. Place the pump back into service and inspect for proper rotation and leaks.

Double Mechanical Seal T-21

EC/ECH PUMPS w/ DOUBLE SEAL ZC/ZCH PUMPS

1 1/2x1 1/4, 2x1 1/2, 2 1/2x2, 3x2 1/2, 4x3

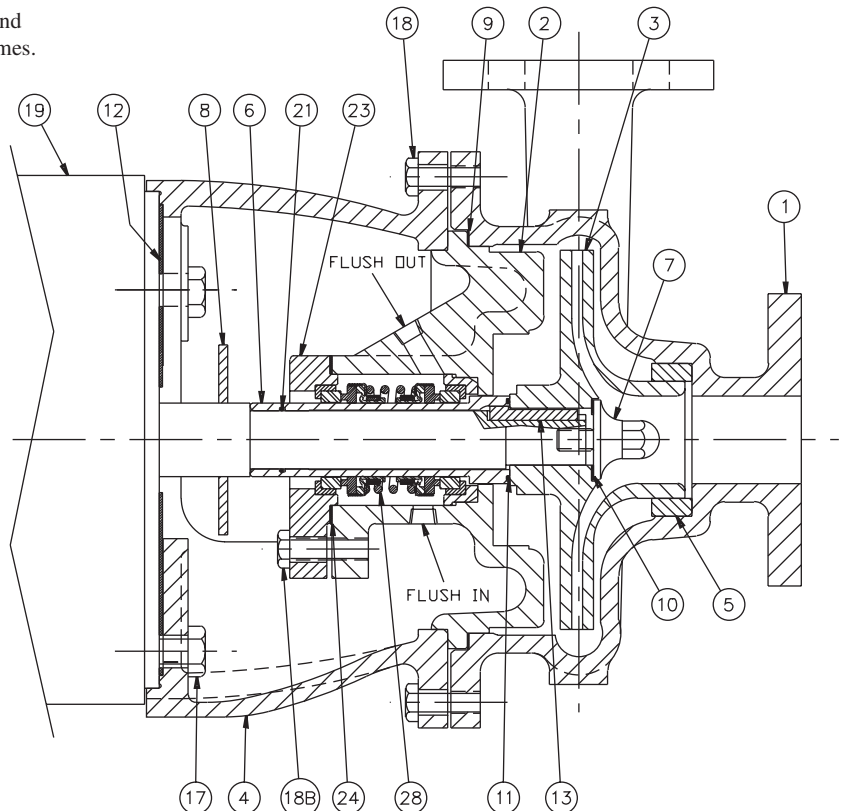
AMPCO PUMPS COMPANY PARTS BREAKDOWN

DETAIL NO.	REQ. NO.	PART NAME
28	1	DOUBLE MECHANICAL SEAL
24	1	GLAND GASKET
23	1	GLAND
22 ^{1,2}	1	WEAR RING (COVER)
21	1	O-RING (SHAFT/SLEEVE)
20 ¹	2	PIPE PLUG (OPTIONAL)
19	1	MOTOR
18B	2	CAP SCREW (COVER/GLAND)
18	8	CAP SCREW (CASING/ADAPTER)
17	4	CAP SCREW (MOTOR/ADAPTER)
16 ¹	2	DRIVE SCREW
15 ¹	1	NAME PLATE
13	1	IMPELLER KEY
12	1	SPLASH PLATE
11	1	GASKET or O-RING (SLEEVE/IMPELLER)
10	1	GASKET or O-RING (IMPELLER SCREW)
9	1	GASKET (CASING/COVER)
8	1	SLINGER
7	1	IMPELLER SCREW
6	1	SHAFT SLEEVE
5	1	WEAR RING (SUCTION)
4	1	ADAPTER
3	1	IMPELLER
2	1	COVER
1	1	CASING

¹NOT SHOWN

²ONLY ON 4x3

NOTE: Please be sure to always include pump type, size, and serial number with any reference to above numbers and names.



Packing

DISMANTLE AND REPLACE PARTS AS FOLLOWS:

Before attempting any service on the pump or motor, disconnect or lock out electrical power to the pump motor. If the pump and motor are to be removed as a unit, note the wiring configuration. Use colored or numbered tape to mark the wire connections of the motor and power source, for reconnection.

1. Remove casing by unbolting eight casing bolts. There is a choice of (a) first removing the inlet and discharge piping, or (b) sliding the motor and remaining pump parts back and free of the casing without disturbing the piping.
2. Remove the impeller screw. Ease the impeller off the shaft. Pinch bars between the impeller and cover may be required. Remove the impeller key.
3. Remove the two capscrews holding the split gland to the cover. Slide the gland out of the cover and remove. The cover may now be removed from the adapter or pedestal. This is a piloting fit, pry if tight.
4. The shaft is removed by drawing the sleeve off the shaft (Initial use of anti-seize lubricant should permit hand removal). A puller, if necessary, should be the type that grips the O.D.

The fluid end is now completely dismantled: additional procedures are dictated by purpose for which unit was disassembled.

These instructions are limited to fluid ends only. See other drawings and literature applicable to motors, pedestals, frames, shafts, bearings, etc., if additional repairs are required.

The packing is the only expendable pump part. It is suggested to replace all rings of packing when rebuilding the pump. Replace shaft sleeve if worn or damaged.

5. Remove the packing rings and seal ring (if furnished) from the cover.
6. Thoroughly clean sleeve, stuffing box and shaft with solvent and dry with a clean cloth. Check flush connections and piping to be sure they are not plugged.

Loss of capacity and/or head due to excessive running clearance (1/16" or more per side) between impeller and casing ring may be restored by replacing wear ring.

7. The wear ring is a press fit in the casing. To remove the ring, cut through two sides, releasing the pressure of the press fit. This may be accomplished by drilling a hole through longitudinal dimension of the ring, then cracking the remaining ring wall. Drill size "a" is the approximate size.
8. When inserting a new ring, be sure the matching surfaces are clean and free of burrs. Press the new ring in, keeping it perfectly straight. If no press is available, ring may be driven in with hammer and wood or suitable fiber block.

Replacement of other parts is accomplished by substituting during normal assembly as follows:

Proceed as follows:

1. Lightly oil the inside of the stuffing box to aid in seating the packing rings.
2. Insert sleeve I.D. o-ring. Lubricate I.D. of sleeve and shaft O.D. with an anti-seize lubricant.
3. Place the cover, impeller side down on a flat surface, and insert the sleeve through the cover.
4. Install the new packing rings and seal ring (if used) one at a time. Gently form the ring around the sleeve then push the packing ring into the stuffing box. Seat each ring individually in the stuffing box. Stagger the packing ring joint 120° or 180° apart, depending on the number of rings used. The seal ring should be located under the inlet (flush) port. Install the split gland in the stuffing box and finger tighten the two capscrews. Never fill the stuffing box with packing rings and try to seat them with the gland. The top rings will be damaged and the bottom rings will not be seated.
5. Slide the cover, with the sleeve, packing, and gland, into its locating bore, positioning the internal bypass hole (if provided) between 1 and 2 o'clock for top discharge.
6. Place the o-ring or gasket in the end of the sleeve. Align the keyways and insert the key. Place the gasket or o-ring in the impeller depending on style and slide the impeller onto the shaft over the key. Use blue Loctite #242 on the impeller screw threads and hand tighten the impeller screw.
7. Tighten the impeller screw with a 6 pt socket until the sleeve is against the shaft shoulder and all rotating parts are secure. A screw driver or equivalent placed into the impeller O.D. will steady the rotating assembly for tightening. Check the freedom of parts by hand rotating the impeller.
8. Install a new casing gasket on the shoulder of the cover. Place the casing in position and secure with the eight cap screws. Tighten the cap screws uniformly.

One way to damage a new seal is to run it dry. Be sure pump is in place and primed before operating.

9. Place the pump back into service and inspect for proper rotation. Allow excessive leakage during the first few hours of running in. If heating occurs or if leakage stops, back of the gland to encourage leakage and allow for expansion. After initial break-in period, the packing may be taken up slowly. Adjustment should be made at about 15 minute intervals until the packing is operating satisfactorily. During operating life, frequent small adjustments are preferable to correct leakage than to permit excessive leakage over an extended period of time and then taking out the packing all at once.

Adding Packing—Only when absolutely necessary should new packing rings be added to old packing in the stuffing box instead of replacing all the packing.

Allowable Leakage—To hold stuffing box temperature and friction to a minimum, some leakage of fluid must be permitted. Stopping all leakage results in seizure, overheating, increased power consumption, and destruction of the packing and shaft sleeve.

Packing

EC/ECH PUMPS w/ PACKING ZC/ZCH PUMPS

1 1/2x1 1/4, 2x1 1/2, 2 1/2x2, 3x2 1/2, 4x3

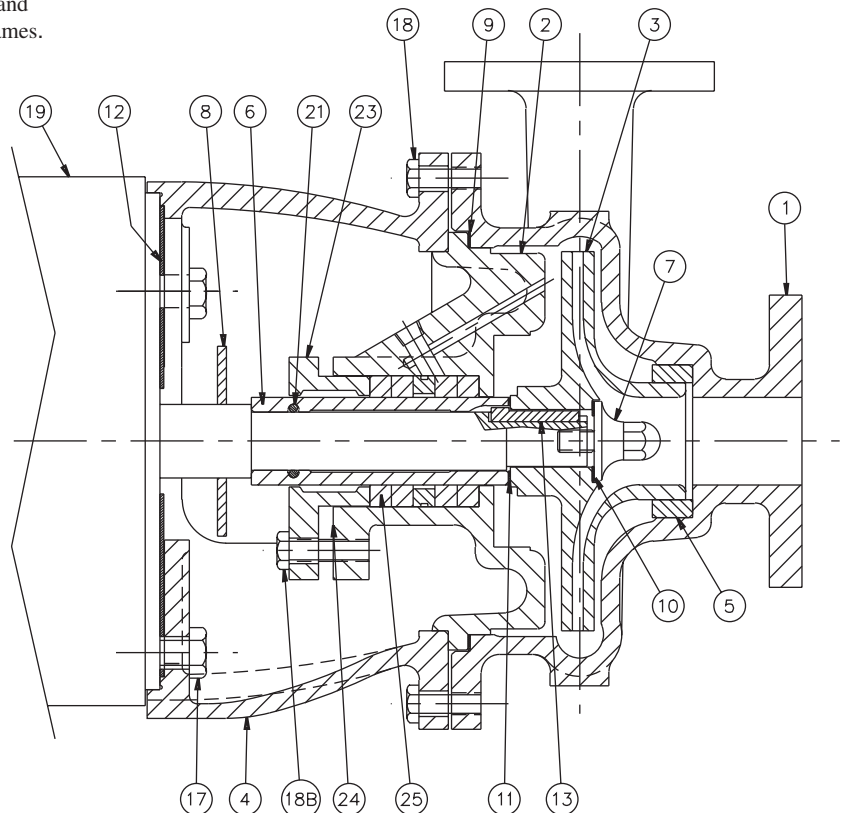
AMPCO PUMPS COMPANY PARTS BREAKDOWN

DETAIL NO.	REQ. NO.	PART NAME
25	1	PACKING RINGS
24	1	GLAND GASKET
23	1	GLAND
22 ^{1,2}	1	WEAR RING (COVER)
21	1	O-RING (SHAFT/SLEEVE)
20 ¹	2	PIPE PLUG (OPTIONAL)
19	1	MOTOR
18B	2	CAP SCREW (COVER/GLAND)
18	8	CAP SCREW (CASING/ADAPTER)
17	4	CAP SCREW (MOTOR/ADAPTER)
16 ¹	2	DRIVE SCREW
15 ¹	1	NAME PLATE
13	1	IMPELLER KEY
12	1	SPLASH PLATE
11	1	GASKET or O-RING (SLEEVE/IMPELLER)
10	1	GASKET or O-RING (IMPELLER SCREW)
9	1	GASKET (CASING/COVER)
8	1	SLINGER
7	1	IMPELLER SCREW
6	1	SHAFT SLEEVE
5	1	WEAR RING (SUCTION)
4	1	ADAPTER
3	1	IMPELLER
2	1	COVER
1	1	CASING

¹NOT SHOWN

²ONLY ON 4x3

NOTE: Please be sure to always include pump type, size, and serial number with any reference to above numbers and names.



COMMON TROUBLES AND THEIR CAUSES

It is to the user's advantage to be familiar with a systematic procedure to determine reasons and causes for unsatisfactory pump operation. The following list of troubles and causes is intended to assist users in determining the cause of any pumping trouble. Faulty installations can then be corrected and a clear description given the manufacturer if assistance is required. Human judgment should not be relied on to measure operating conditions. Use proper instruments to measure values of pressure, suction lift, speeds, temperature rise of motors, etc. When motor speeds are incorrect, check connections and measure voltage at motor terminals.

1. No liquid delivered

- a. Pump and suction line not completely primed
- b. Speed too low
- c. Required discharge too high
- d. Suction lift too high
- e. Impeller, piping, or fittings completely plugged up
- f. Wrong direction of rotation

2. Not sufficient capacity

- a. Air leaks in suction pipe or shaft seal
- b. Speed too low
- c. Required discharge head too high
- d. Suction lift too high or insufficient NPSH available
- e. Impeller, piping, or fittings partially plugged
- f. Insufficient positive suction head for hot water or other volatile liquids
- g. Liquid viscosity too high
- h. Mechanical problems - wear rings worn, impeller damaged, shaft seal defective
- i. Wrong direction of rotation
- j. Suction pipe entrance too close to surface of liquid
- k. Air pockets in pipe high points

3. Not sufficient pressure

- a. Speed too low
- b. Mechanical problems - wear rings worn, impeller damaged, shaft seal defective
- c. Small impeller diameter
- d. Air or gas in liquid
- e. Wrong direction of rotation
- f. Air pockets in pipe high points

4. Pump operates for a while, then quits

- a. Leaky suction line
- b. Air leaking in through shaft seal
- c. Suction lift too high or insufficient NPSH available
- d. Air or gas in liquid
- e. Suction piping and fittings not completely freed of air during priming
- f. Air pockets in pipe high points

5. Pump takes too much power

- a. Speed too high
- b. Pumping too much water because required head is lower than anticipated
- c. Viscosity and/or specific gravity is higher than specified
- d. Mechanical problems - binding at wear rings from distortion due to piping strains, shaft bent, impeller rubbing casing, stuffing box too tight
- e. Wrong direction of rotation

SOME TYPICAL APPLICATIONS

Your Ampco Pump was selected for a specific service. Other Ampco pump styles are available to successfully handle many additional applications including the following partial list. Ask you Ampco representative for complete information.

abrasive slurries
activated carbon filter slurries
acetone
alum solution
amide solution
anodizing solutions
beer
beer filter slurry (diatomaceous earth)
brine solutions
cane juice
carbon suspension
carbon tetrachloride
caustic
chromic acid
cleaning solutions
dye
deionized water
ethylene glycol
fatty acid
fermentation gas
formaldehyde
glycerin
hydrofluosilicic acid
hydrofluoric acid
lard oil and fatty acid
luminiscent solutions
marine sanitary service
marine water desalting equipment
mineral water
molasses
nitric acid
oleic acid
phosphoric acid
plating solutions
potassium acetate
polyethyl benzene
salt water (oil field)
sludge fuel
sodium chloride
sodium fluoride
sodium hydroxide
solvent
spin bath solution (rayon)
starch
sugar liquor
stillage with solids
sulfuric acid
tall oil
tea
vinegar
vegetable oil
vinyl liquor
water solutions (corrosive and/or abrasive)
whey
wort (beer and molasses)
yeast cream

Consult Ampco for applications not listed.