Single Internal Mechanical Seal

Proper Torque For Bolts on IC+ Series Pumps

Item	Torque ft-lbs	Pumps Included
Motor Bolts	20	- 140 Frame
	55	180 - 250 Frame
	70	280 Frame
	110	320 Frame
Shaft Collar Bolt(s)	6	- 180 Frame
	15	210 - 250 Frame
	40	280 - 320 Frame
Impeller Nut	15	114 pump
	80	216/216/328/4410

Required Tools

1. Rubber Mallet

2. 5/8" socket - for impeller nut 114 pump
7/8" socket - for impeller nut 216/218/328/4410 pumps

3. 3/8" diameter steel rod - to hold stub shaft

4. Appropriate lubricant

5. 3/16" Allen wrench - shaft collar bolt 140 - 180 frames
1/4" Allen wrench - shaft collar bolt 210-280 frames
5/16" Allen wrench - shaft collar bolts 320 frames

6. Impeller puller / pinch bars (may be necessary)

7. 1/16" Gage for checking impeller gap.

Troubleshooting and Applications

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 - 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 - 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 inside seal from distortion due to piping strains, shaft bent, impeller rubbing casing
e. Wrong direction of rotation

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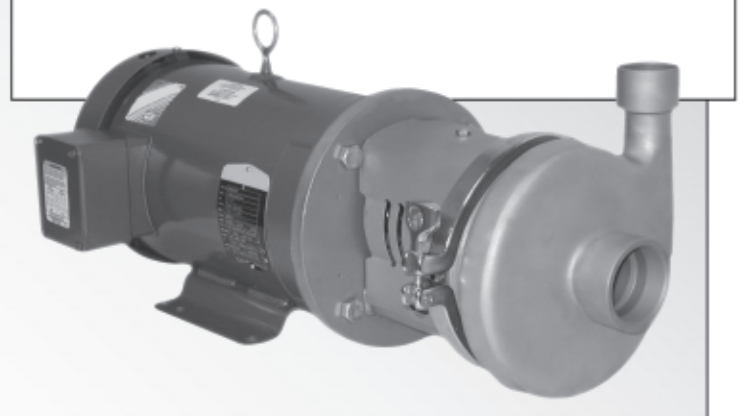
IC+ Series Pumps



INSTRUCTIONS
Your Ampco centrifugal pump is a rugged unit designed to provide years of low cost pumping service. There is a small amount of necessary care required to ensure you of this expected long service. It is recommended that you carefully review the installation and operating sections in this manual.
Every Ampco pump receives a careful running test at the factory to ensure that the head-capacity rating is met in accordance the Hydraulic Institute Standards and to ensure mechanical soundness. Special instructions and advice for unusual conditions, such as corrosive, abrasive, and other problems are too numerous to be included in this general book, but will be the subject of specific discussion on orders or inquires for special applications.

LOCATION
The immediate environment, in which the unit is located, while usually of prime importance to the pump, may determine the enclosure needed for the motor. Ampco can supply several different motor enclosures to meet specific requirements.
The IC+ Series pumps series are supplied with totally enclosed motors as standard. They may be installed where dirt, moisture and mild corrosion are present or in outdoor locations. Washdown duty motors, with epoxy paint or paint free stainless steel, are designed for applications where the motor is frequently subject to washdown to maintain a bacteria-free operating environment. 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.
Submerged suction is the most economical and convenient method of priming a pump when installed in such a position that the top of the casing is below the surface of the liquid to be pumped. The liquid will flow by gravity into the pump and displace the air (through the discharge if possible or a vent when available).

INSTALLATION
Begin with a suction line as direct and as simple as possible. The suction line is usually the most sensitive part of the entire pumping system being totally dependent on outside forces to provide liquid flow into the center of the impeller.

Locate the pump as close to the supply of liquid as possible, with short and direct suction piping. Use wide radius elbows to help reduce friction loss. Air pockets due to high sections, concentric reducers, valve bonnets, etc. should be eliminated by installing a suction having a continual rise or at very least a straight horizontal run with an air eliminator near the pump suction entry. To prevent air pockets use eccentric pipe reducers that are mounted in a horizontal position across the top of the pipeline and valves that can be positioned in a plane rather than the normal upright position as an air pocket may exist in the upright valve bonnet.

Above all, remember that until the liquid reaches the leading edges of the rotating impeller vane the pump cannot impart its energy to move the liquid.
If possible, try not to connect an elbow directly to the inlet of the pump. This may cause excessive turbulence and hinder pump performance.

STARTING
The pump must be primed before starting, as the mechanical seal depends on the liquid being pumped for lubrication and cooling. Even a short run to determine direction of rotation without first priming may seriously damage the seal.
The correct direction of rotation is counter-clockwise when viewed from the suction end of the pump. It is recommended to turn the pump by hand before starting the first time to ensure the unit is not binding.

MAINTENANCE
Since long-term breakdown cannot be tolerated in most services, maintenance procedures and a contingency plan must be established in advance to minimize any production loss caused by down time
During building and start-up it is common to use outside personnel. Operating personnel should acquaint themselves with the pump, particularly its running performance. This will aid in establishing a standard for future reference. This manual and other information provided with the pump should be filed for future reference.
All possible performance data should be recorded once the system is functioning properly and stable. Suction and discharge pressure readings, flow rate, seal leakage rate, bearing temperature, noise and vibration levels all provide input to a pump's performance in the system. It is unlikely that all of this data can be measured, but any information gathered can help alert the user of problems with the pump or system.
Operating personnel should know that any changes in the system or the liquid being pumped might have an effect on the pump's performance. It is advisable to also record the fluid temperature, specific gravity, viscosity, liquid concentration,