Universal Umag

COVERS MODELS:

U0 - 1.5 x 1 x 5″

UL - 1.5 x 1 x 5″ LF

U1 - 2 x 1.5 x 6″

U3 - 3 x 2.5 x 6″

U4 - 2.5 x 2 x 6″

U-Mag Installation, Operation & Maintenance Manual

INNOMAG

ADVANCED SEALLESS PUMPS

The U-mag Series

Table of Contents

Safety First

For your protection, and the protection of others, learn and always follow the safety rules outlined in this booklet. Observe warning signs on machines and act accordingly. Form safe working habits by reading the rules and abiding by them. INSTALLATION, OPERATION AND MAINTENANCE MUST BE DONE BY THOROUGHLY QUALIFIED PERSONNEL IN STRICT ACCORDANCE WITH THIS MANUAL AND MUST COMPLY WITH ALL LOCAL, STATE AND FEDERAL CODES. Keep this booklet handy and review it from time to time to refresh your understanding of the procedures.

Innovative Mag-Drive has designed this pump for safe and reliable operation. However, like any mechanical device, the proper and safe performance of this equipment depends upon using sound and prudent operating, maintenance and servicing procedures performed by properly trained personnel. Instructions and safety procedures contained herein must always be followed. As such, Innovative Mag-Drive shall not be liable for any damages or delays caused by failure to observe any instructions or warnings in this manual.

DANGER

The use of the word "DANGER" always signifies an immediate hazard with a high likelihood of severe personal injury or death if instructions, including recommended precautions, are not followed.

MAGNETIC

The use of the word "MAGNETIC" indicates the persistent presence of a magnetic field. Such fields present immediate danger to individuals having electronic medical devices, metallic heart valves, metallic prosthetics or metallic surgical clips.

WARNING

The use of the word "WARNING" signifies the presence of hazards or unsafe practices which could result in severe personal injury or death if instructions, including recommended precautions, are not followed.

CAUTION

The use of the word "CAUTION" signifies possible hazards or unsafe practices which could result in minor injury, product or property damage if instructions, and recommended precautions are not followed.

Enhance the protection of yourself, as well as your new U-mag pump, by following and using accepted engineering practices in the installation, operation and maintenance of this equipment. Listed below are some basics you should keep in mind in addition to your own company rules regarding installation, operation and maintenance.

Always pay constant attention to safety. Remember all pumps have the potential for danger. Be aware of the following facts regarding your pump:

HIGH TEMPERATURES may be present.

HIGH PRESSURES may be present.

NEVER start the pump without proper prime (casing must be full of liquid).

NEVER run the pump dry.

NEVER operate the pump with the suction and/or discharge valve closed.

NEVER use heat (risk of explosion) to disassemble any portion of the pump.

NEVER change conditions of service without approval of Distributor or INNOMAG.

NEVER remove "Warning" labels.

Parts are rotating at **HIGH SPEEDS**.

HIGHLY CORROSIVE and/or toxic chemicals may be present.

NEVER operate if there are visible signs of leakage.

NEVER loosen flange connection while system is under pressure.

ALWAYS make certain pressure gauges, indicating lights and safety devices are working.

ALWAYS know where the EMERGENCY STOP is.

Cleaning Precautions

NEVER attempt cleaning while the pump is operating.

ALWAYS remove casing drain and purge casing of liquid before service.

ALWAYS perform "Tag & Lockout" to the power source before service.

ALWAYS have this service manual available during any installation or maintenance.

ALWAYS make certain that no toxic or flammable fumes/vapors remain in the pump casing or surrounding area.

ALWAYS clean up any spills immediately according to any local, state or federal codes.

RECEIVING

All INNOMAG pumps are inspected prior to shipping and are well crated for safe transportation. INNOMAG cannot, however, guarantee the safe arrival at the user's plant. Therefore, upon receipt of this equipment:

PACKING LIST ENCLOSED

Check the received items against the packing list for missing parts or damage. Check the packing material thoroughly for small parts.

If there are any parts missing or if the pump is damaged, a claim must be filed against the carrier immediately.

If the pump will be stored in sub-freezing temperatures, the pump must be completely dried first.

NOTE: Pump ends without motors require assembly of the outer magnet drive and motor. Refer to drive end assembly procedures (Section N) in this manual.

WARNING

These pumps use ceramic silicon carbide components. Do not drop pump or subject to shock loads, this may damage internal ceramic components.

DANGER

Failure to properly lift and support equipment could result in serious injury or damage to pumps.

READING YOUR NAMEPLATE

Every INNOMAG pump has nameplates to provide information about the pump. The nameplates are located on the casing and the adapter. It is recommended that the purchaser record the serial number and use it for reference when requesting information or service parts from INNOMAG or Distributor.

Permanent records for this pump are kept by the serial number and it, therefore, should be used with all correspondence and spare parts orders.

Serial number: example - 11145

Pump model number: example - U4

Pump code:

example - U413811201-URO

Serial number: example - 11579

Impeller diameter / Max impeller diameter (mm)

example - 138/156mm

Duty point (GPM @ FT. or M^3/hr @ M)

Material specific gravity and temperature (°F or °C)

Pump RPM / Pump power (HP or kW @ duty point)

Design pressure @ 100 °F: example - 300psi

Customer pump #: example - A3-18

Material being pumped: example - .05% KOH

Section D - Pump Identification Code (ANSI)

Wet End | U0 | 137 | 1 | 1 | 1 | 0 | 0 | - | U | C | 0 | **Drive End**

U-Mag Models (Suction x Discharge x Nominal Impeller Diameter)

Code	Pump Size	Minimum	Maximum
U0	(1.5 x 1 x 5″) (40 x 25 x 127 mm)	3.25″ 83 mm	6.13″ 156 mm
UL	(1.5 x 1 x 5″ LF) (40 x 25 x 127 mm)	3.25″ 83 mm	6.13″ 156 mm
U1	(2 x 1.5 x 6″) (50 x 40 x 152 mm)	3.25″ 83 mm	6.13″ 156 mm
U3	(3 x 2.5) 80 x 65 x 152 mm)	4.50″ 114 mm	6.13″ 156 mm
U4	(2.5 x 2 x 6″) (65 x 50 x 152 mm)	3.50″ 89 mm	6.13″ 156 mm

Impeller Diameter

* 137	mm, divide by 25.4 for inches	ex. 137 / 25.4 = 5.39″

Bearing System

	Bushing	Shaft, Pump
s 0	Carbon Graphite	SiC
1	SiC	SiC

Wear Ring / Thrust Collar System

	Impeller	Casing	Containment Shell
s 0	CF-PTFE	SiC	CF-PTFE
1	SiC	SiC	SiC
2	SiC	SiC	CF-PTFE
3	CF-PTFE	SiC	SiC

Gasket (All gaskets are 0.210″ square cross section, equivalent to standard -363 O-Rings)

s 1	FEP / FKM (Fluorocarbon)
2	FKM (Fluorocarbon)
3	EPDM (Ethylene Propylene)

Flanges

s 0	ANSI / ISO / JIS (Universally Slotted, not available on U3)
1	ANSI (Class 150)
2	ISO (PN16)
3	JIS (10 kg / cm^2) - JIS B2210 - 1989

Construction

	Impeller Body	Casing Casting / Lining	Casing Drain	Containment Shell Lining / Composite
s 0	CF-ETFE	D.I. / ETFE	No	CF-ETFE / Aramid
1	CF-ETFE	D.I. / ETFE	Yes	CF-ETFE / Aramid
c 2	PFA	D.I. / PFA	No	PFA / Aramid

Option 1

0	N / A
1	High Torque

Motor Frame

NEMA C-Face

	A	56C
	B	143/5 TC
	C	182/4 TC
$T	D	213/5 TC
$T	E	254/6 TC
$G	X	For 1″ Shaft

IEC B5

	M	80
	N	90S/L
	P	100L/112M
$T	R	132

Drive Ratings

A, B, M, N are rated at:

HP	(kW)	@	RPM
5.0	(3.7)	@	3500
4.1	(3.1)	@	2900
2.5	(1.9)	@	1750
2.1	(1.6)	@	1450

C0, D0, P0, R0 are rated at:

HP	(kW)	@	RPM
10.0	(7.5)	@	3500
8.3	(6.2)	@	2900
5.0	(3.7)	@	1750
4.1	(3.1)	@	1450

Optional High Torque Drive:
D1, E1, R1 are rated at:

HP	(kW)	@	RPM
14.0	(10.4)	@	3500
11.7	(8.7)	@	2900
7.0	(5.2)	@	1750
5.8	(4.4)	@	1450

Product Group

U	U-Mag

Notes:

C - Consult Factory for Availability
S - Standard Material
T - High Torque Option
$ - Price Adder
G - Gas Engine Motor

Material Guide:

CF - Carbon Fiber
D.I. - Ductile Iron
ETFE - Ethylene-Tetrafluoroethylene
PFA - Perfluoroalkoxy
SiC - Silicon Carbide (Ceramic)

GENERAL GUIDELINES

Piping should be arranged to allow pump flushing prior to removal of the unit on services handling corrosive liquids.

When PTFE or similar lined pipe is used, flange alignment should be carefully checked. Spacer ring gaskets are recommended to assure parallel alignment of pipe and pump flanges. The following flange bolt torque values should be used: 1" (6-8 ft-lbs), 1-1/2" (9-12 ft-lbs), 2" (18-24 ft-lbs), 2 1/2" (20-27 ft-lbs), 3" (23-30 ft-lbs).

Piping should be supported independently from the pump and line up naturally to the pump flanges.

Properly sized pressure gauges should be installed in both the suction and discharge piping. The gauges will enable the operator to easily observe the operation of the pump, and determine if the pump is operating in conformance with the performance curve. If cavitation or other unstable operation should occur, widely fluctuating discharge pressure will be noted.

SUCTION PIPING

Reducers, if used, should be eccentric and installed at the pump suction flange with eccentric side on the bottom.

The length of the suction pipe should be kept to a minimum.

Suction piping should be installed with a gradual rise to the pump to eliminate any air pockets.

The diameter of the suction pipe should always be as large or larger then the pump suction.

Elbows or fittings should be avoided at the suction flange. Allow at least 10 pipe diameters in length for straight run into the pump.

If a valve is used in the suction, use only full flow valves. These valves should be for shut-off only when the pump is not running, not for throttling or controlling flow. A valve designed for flow control should be installed in the discharge. This valve line can be used for throttling.

Suction strainers, when used, must have a net free area of at least three times the suction pipe area. Inspect suction strainers regularly and clean/replace as needed.

An isolation valve should be installed in the suction line at least two pipe diameters from the suction to permit closing of the line for pump inspection and maintenance.

DISCHARGE PIPING

Isolation and check valves should be installed in the discharge line. Isolation valve allows regulation of flow and for inspection of the pump. A check valve prevents pump damage due to water hammer.

CAUTION

It is good practice to install a throttling type shut off valve in the discharge piping. Throttling the discharge during initial start-up is recommended to protect against "water hammer," which is most likely when using long pipe runs at high flow velocity.

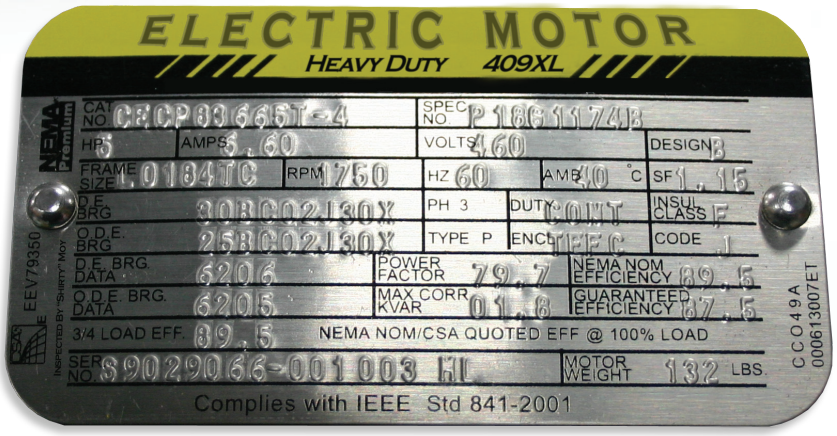
ELECTRICAL

DANGER

Only a qualified electrician should make the electrical connections to the pump drive motor.

Thoroughly read the motor manufacturer's instructions before installation.

Install motor according to NEC requirements and local electrical codes. Check all connections to motor and starting device with wiring diagram. Check voltage, phase, and frequency on motor nameplate with line circuit.



Check motor nameplate data to be certain that all wiring, switches, starter, and overload protection are correctly sized.

Special electrical requirements:

Install a flexible electrical coupling on the motor. Allow movement of at least 12 inches. This requirement is important to service and inspect the pump.

STARTUP

1. Fully open the suction valve. The pump requires a flooded suction.

WARNING

Do not operate with the suction valve closed. Operating the pump more than a few minutes with the suction valve closed may cause bearing failure.

2. Fully open the discharge valve to complete priming. Turn back the discharge valve 1/4 to 1/2 open. INNOMAG pumps operate safely with discharge valve partially open.

CAUTION

Continuous operation against a closed discharge valve may cause pump to overheat.

3. Briefly jog the motor long enough to determine the direction of rotation as indicated by arrow on the front of the casing. Improper rotation will not damage the pump, however, performance is greatly reduced.

CAUTION

Immediately observe pressure gauges. If discharge pressure is not quickly attained—stop the driver, re-prime the pump and attempt to restart.

CORRECT ROTATION VIEWED FROM THE PUMP SUCTION IS COUNTER CLOCKWISE.

1. Start the pump.

2. Set the flow rate and pressure by regulating the discharge valve.

3. Check the pump and piping to assure that there are no leaks.

4. Check and record the pressure gauge readings for future reference.

CAUTION

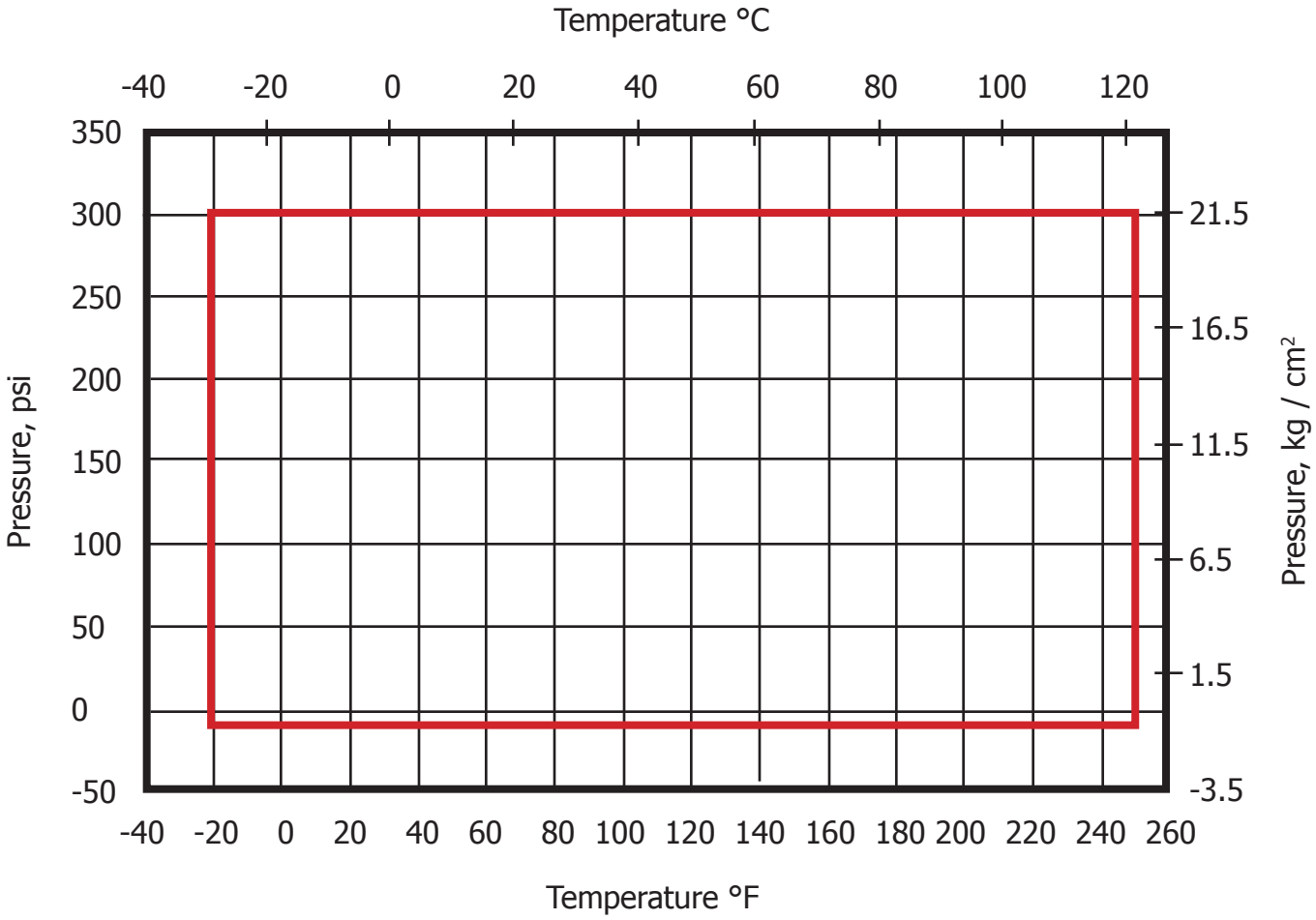
Never throttle pump using the suction valve.

WARNING

Never operate the pump above rated temperature of 250°F (121°C).

WARNING

Never operate the pump above rated pressure 300 psi (20 bar).



WARNING

Driver may overload and de-couple the magnets if the fluid's specific gravity is greater than originally assumed. Prolonged running while de-coupled will damage the magnets.

Maximum Horsepower				
Motor Frame NEMA (IEC)	Max. hp(kW) 3500 rpm	Max. hp(kW) 1750 rpm	Max. hp(kW) 2900 rpm	Max. hp(kW) 1450 rpm
56C - 143/5TC (80, 90 S/L)	5 (3.7)	2.5 (1.9)	4.2 (3.1)	2.1 (1.6)
182/4TC 213/5TC (100L / 112M) (132S/M)	10 (7.5)	5 (3.7)	8.3 (6.2)	4.2 (3.1)
213/5TC High Torque 254/6TC 132 High Torque	14 (10.4)	7 (5.2)	11.7 (8.7)	5.8 (4.4)

WARNING

Never operate below minimum flow rates.

Minimum Flow					
U-Mag Model	Size	60 Hertz 3500 rpm (US gpm)	60 Hertz 1750 rpm (US gpm)	50 Hertz 2900 rpm (lpm)	50 Hertz 1450 rpm (lpm)
U0	1.5 x 1 x 5 (40 x 25 x 127mm)	1	1	3.8	3.8
UL	1.5 x 1 x 5 LF (40 x 25 x 127mm LF)	1	1	3.8	3.8
U1	2 x 1.5 x 6 (50 x 40 x 152mm)	1	1	3.8	3.8
U3	3 x 2.5 x 6 (80 x 65 x 152mm)	1	1	3.8	3.8
U4	2.5 x 2 x 6 (65 x 50 x 152mm)	1	1	3.8	3.8

Power Monitors

CAUTION

INNOMAG recommends the use of a power monitor to prevent pump damage and inefficiency if, for example, a pipe is blocked, a valve is not fully open or the pump is running dry.

Power Monitors use a unique technique of calculating motor shaft power. Any over or under-load situation is detected immediately, across the entire speed range.

Easy installation and zero maintenance

Using the motor as a sensor eliminates the need for external sensors and extra cabling, and no holes need to be made in pipes. The result is increased reliability and reduced investment, installation and maintenance costs.

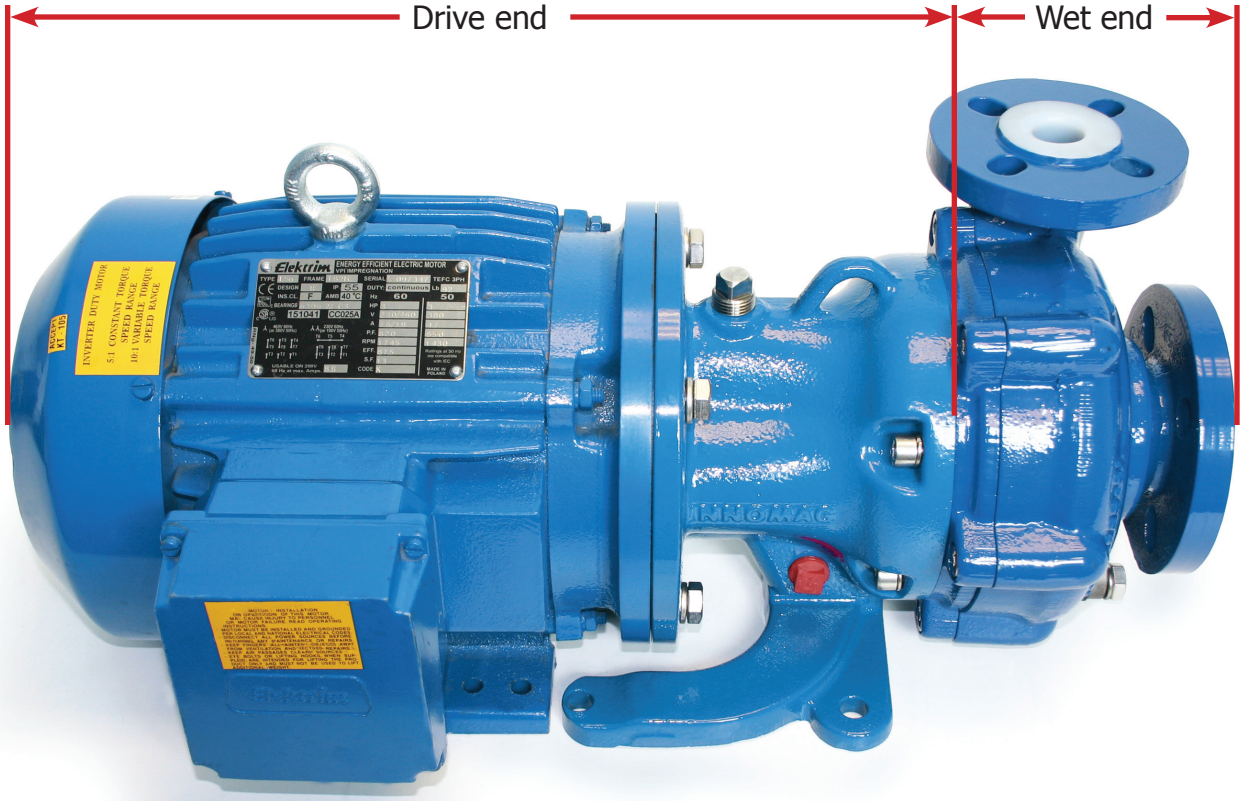
The preventative maintenance and disassembly procedures are intended for use during standard field inspection or service. The disassembly can take place while the pump is piped up or in a maintenance shop. If at all possible, we recommend performing all repairs using the shop procedures to reduce the risk of damage to the SiC parts.

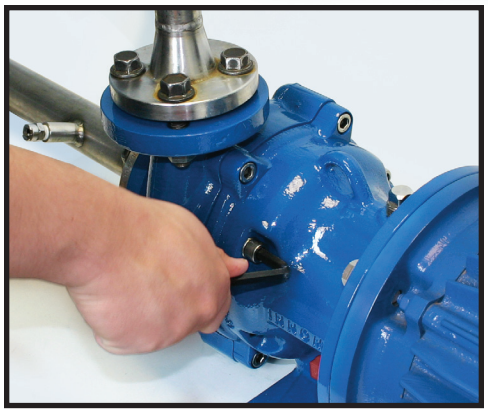
DANGER

Lock out or disconnect driver power to prevent accidental start-up that could result in serious personal injury.

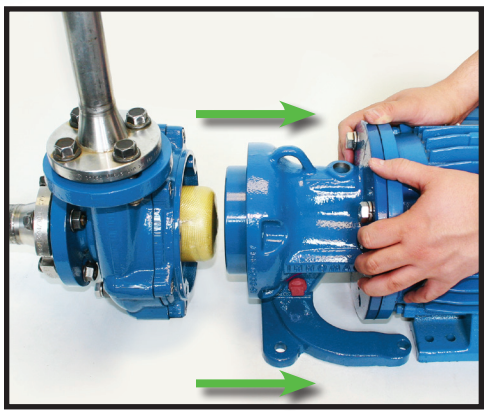
DANGER

Shut off all valves controlling flow to and from the pump. Isolate the pump from the system and relive any remaining system pressure.

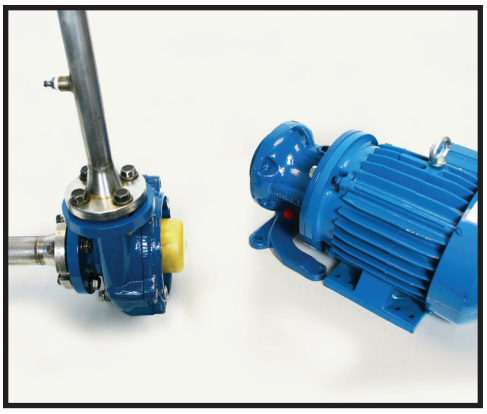




Remove the (4) adapter socket head cap screws with an 8mm or 5/16” hex key.



Firmly hold the drive end and quickly pull it away from the wet end. Pull the drive end back at least 6 inches.



Turn the drive end to the side to allow space for disassembly of the wet end.

Tools Needed

- ☑ 8mm or 5/16” hex key
- ☑ 3/4” (19mm) wrench (for drain flange)

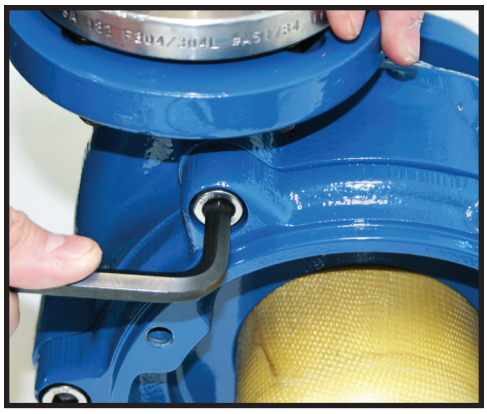
DANGER

Skin, eye and respiratory protection are required when handling hazardous and/or toxic fluids. When draining, precautions must be taken to prevent injury or environmental contamination.

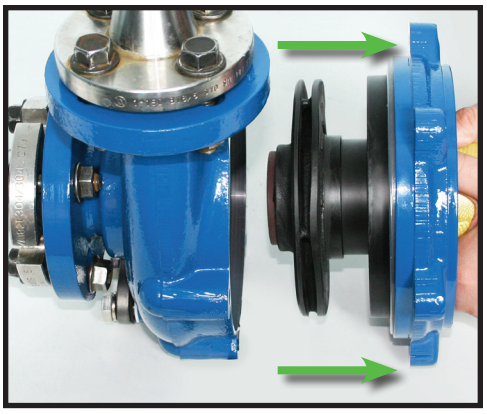
Remove the drain bolts. Drain the pump and individually decontaminate each component in accordance to all federal, state, local and company environmental regulations.

MAGNETIC

INNOMAG pumps contain extremely strong magnets. The use of non-magnetic tools and work surface is highly recommended. The work area must be clean and free of any ferrous particles.



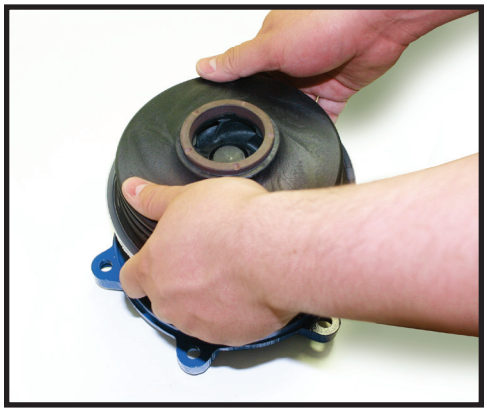
Loosen and remove the (6) socket head cap screws with the hex key.



Grasp the containment shell and pull the assembly back in a straight line until it is clear of the casing.

Note

The following step is optional, removal of the containment ring may be very difficult on pumps in service for long periods of time.



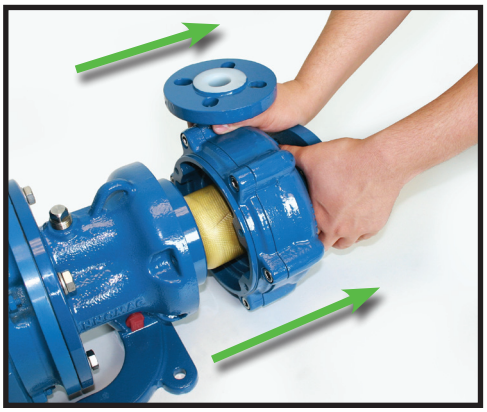
Remove the containment shell and impeller from the containment ring.

Lift and remove the impeller from the containment shell.

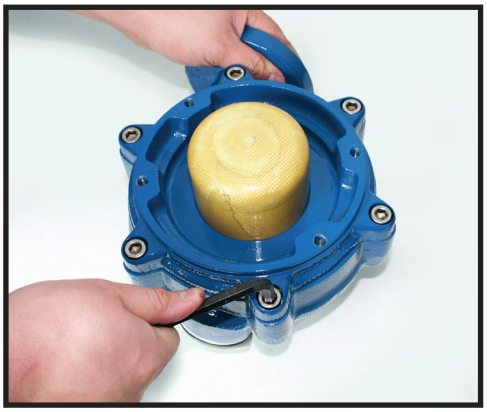
Tools Needed

- ☑ 8mm or 5/16" hex key
- ☑ Flashlight

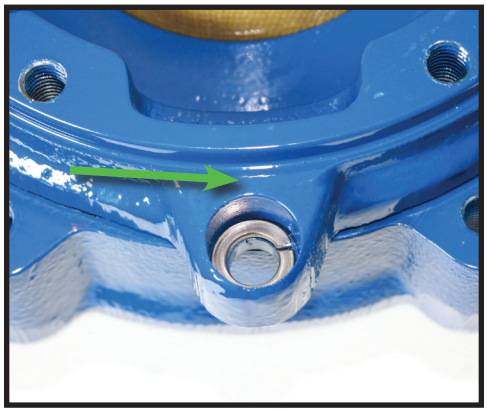
Remove all flanges and the (4) adapter socket head cap screws.



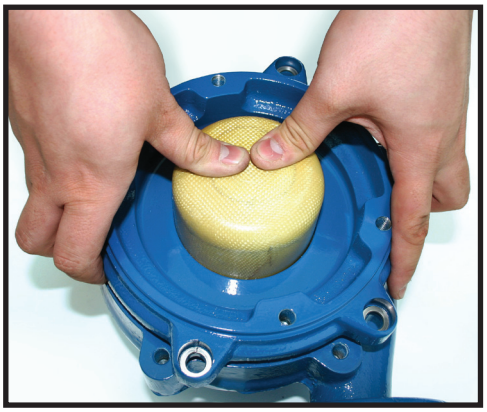
Pull the wet end away from the drive end.



Lay the wet end face down on the suction flange in the work area. Place a shop towel under the flange to protect it. Loosen and remove the (6) socket head cap screws.



Slightly rotate the containment ring to make it easier to grab.

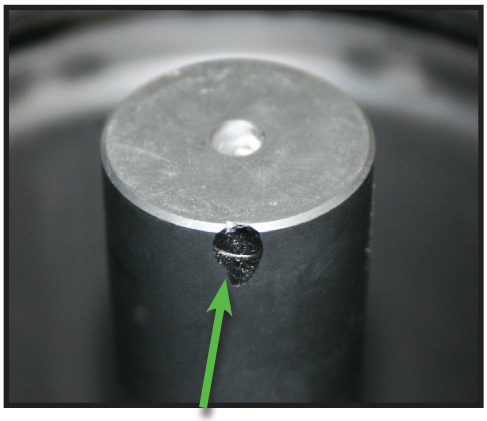


Lift the containment ring with your fingers while holding down the containment shell with your thumbs.

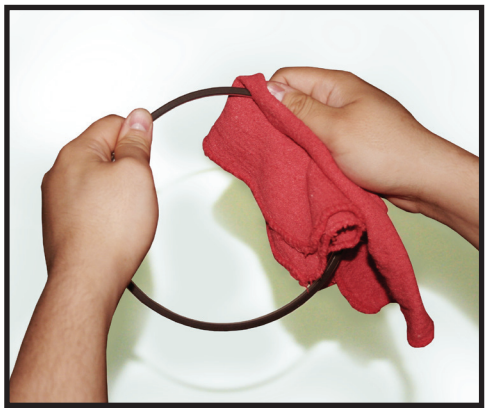
Lift the containment shell straight up from the impeller.

Carefully lift and remove the impeller from the casing.

Use a flashlight to inspect inside the containment shell.



Above is an example of a chipped shaft.

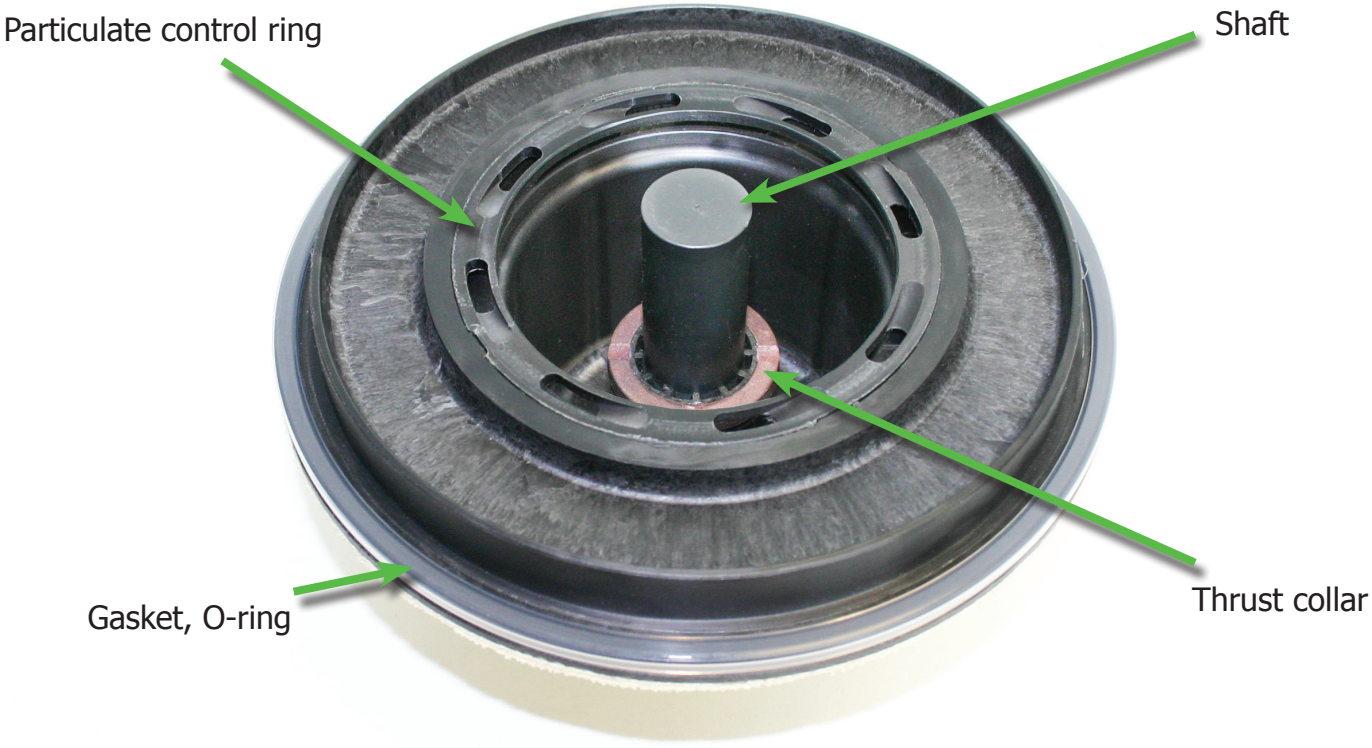


Clean and check the O-ring gasket.

When inspecting inside the pump, check all silicon carbide (SiC) parts for cracks, chips and scoring marks. Minor chips less than 0.020" are acceptable. Inspect all plastic parts for scoring and cracks. Minor scratches or cuts less than 0.040" are acceptable.

Carefully clean and inspect the following parts:

Containment Shell



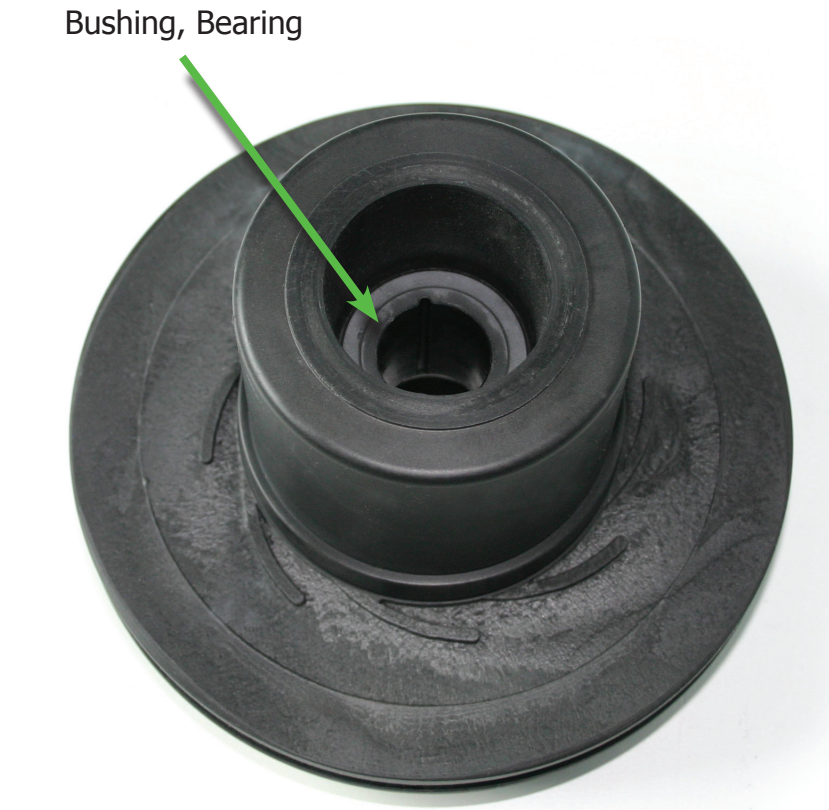
Note

U-Mag impeller wear ring is molded in place and is not user replaceable.

Impeller

Note

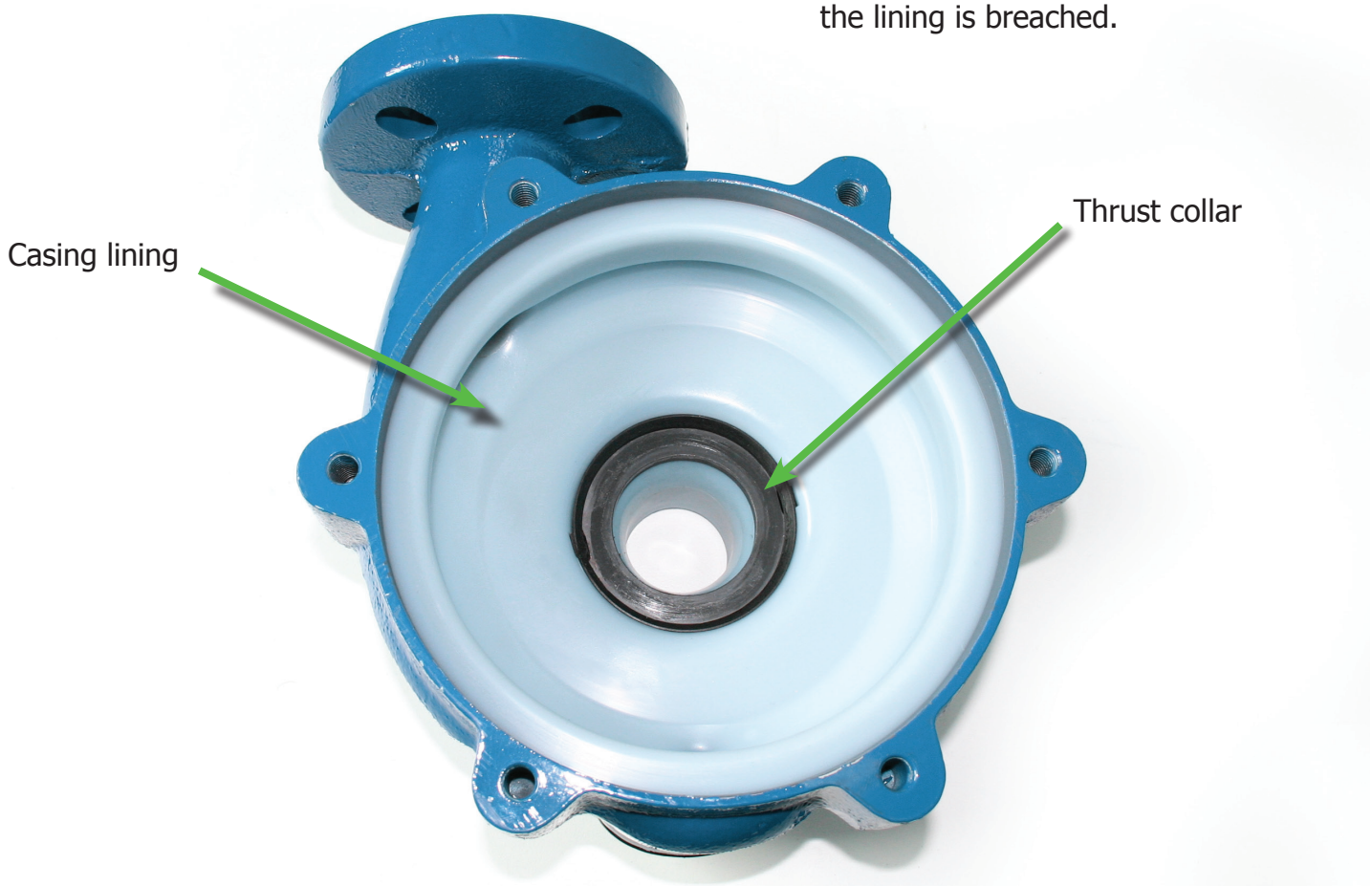
The bearing can be easily replaced. See section L for detailed instructions.



Tools Needed

☑ Flathead screwdriver or small chisel

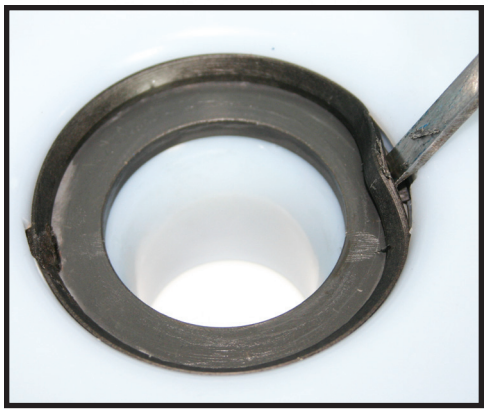
Inspect the casing lining for any abrasion, cracks or delamination. Casing replacement is necessary if the lining is breached.



Removal

Note

Unless there is visual damage to the thrust collar, removal is not necessary and is not part of the normal inspection procedure.

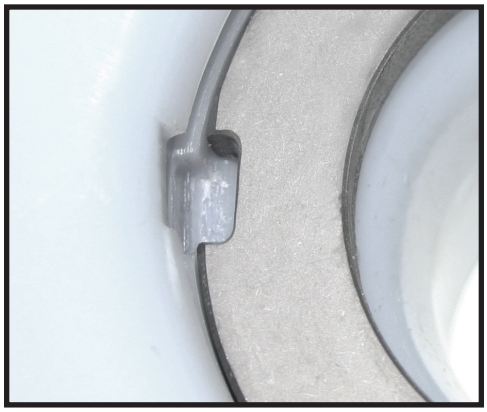


Insert a flathead screwdriver into the casing notch opposite the weld and force out the retaining ring

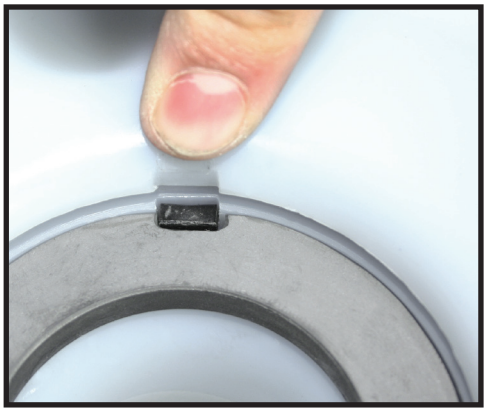
Lift out the thrust collar and front stationary wear ring with your fingers. Pull the retaining ring free and remove the locking pin.

Tools Needed

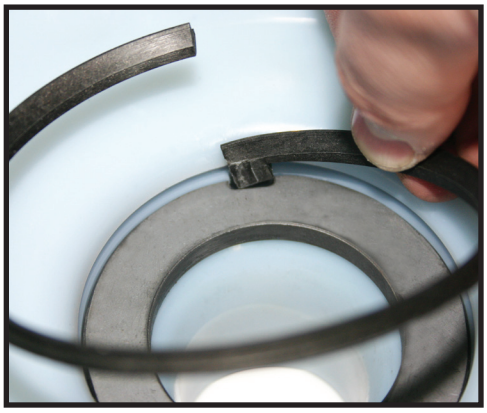
- ☑ T-Handle hex key
- ☑ Wire cutter
- ☑ Lightweight hammer
- ☑ Soldering iron



Insert and align the front stationary (SiC) retaining ring with the keyway notch in the casing.

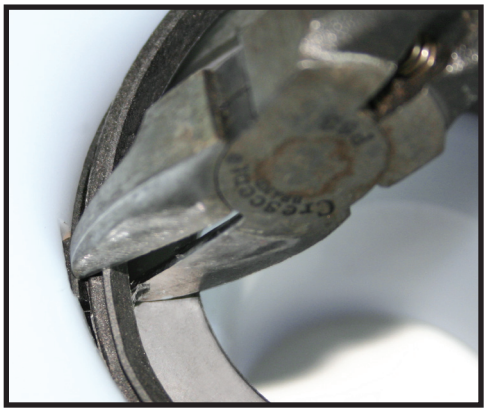


Insert the locking pin into one keyway notch.

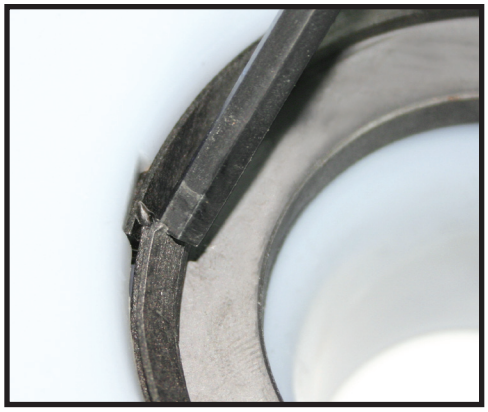


Insert the keyed end of the retaining ring into the remaining keyway.

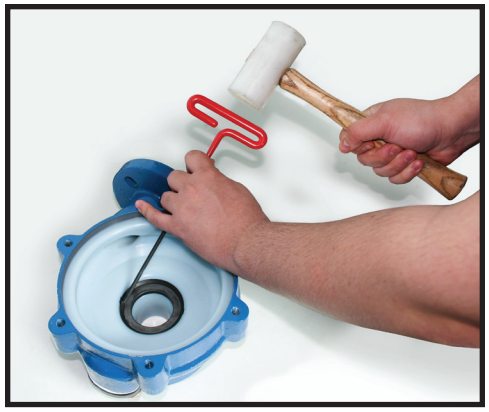
Press the retaining ring into the casing groove.



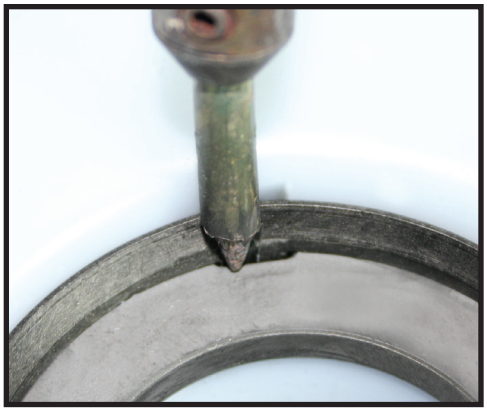
Trim the retaining ring end so it slightly overlaps the drive pin.



Line up the tip of the T-handle hex key at the end of the retaining ring.



Gently tap the retaining ring into position.



With a soldering iron, melt the two plastic ends together.

Tools Needed

☑ Small channel lock pliers

Note

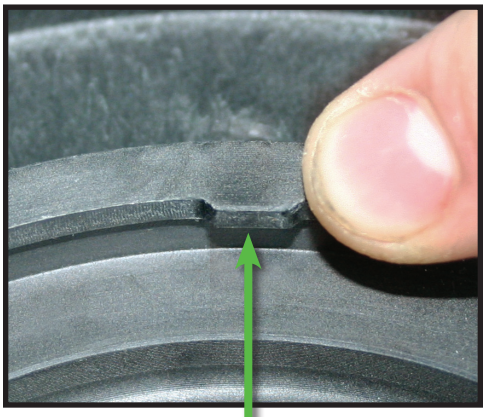
Unless there is visual damage to the particulate control ring, removal is not necessary and is not part of the normal inspection procedure.

Removal

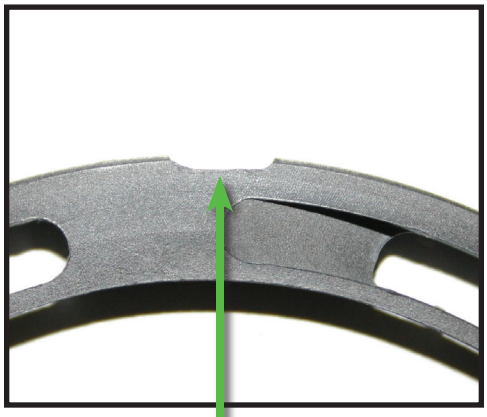
With the small chanel lock pliers, grip the old particulate control ring near one of the notches.

Pull the old particulate control ring out.

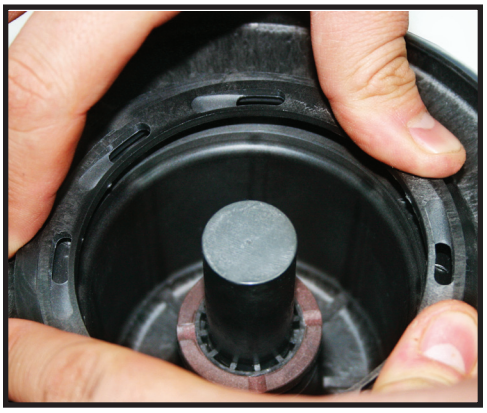
Installation



Locate the **molded keys** on the containment shell.



Locate the **notches** on the particulate control ring.



Align the new particulate control ring notches with the containment shell's molded keys and press in place.

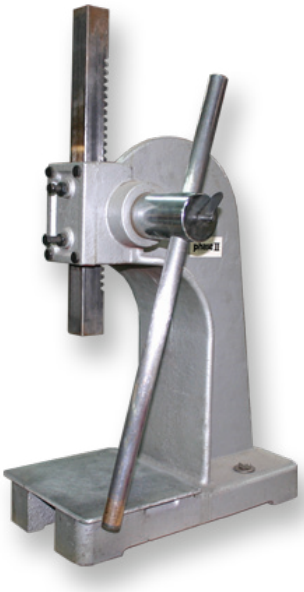
Check the gasket O-ring for dirt or deformation before placing on the impeller. Replace if the O-ring necessary.

Attach one end of the gasket on the containment shell.

Slide your index fingers around the gasket, forcing it down while holding it in place with your thumbs.

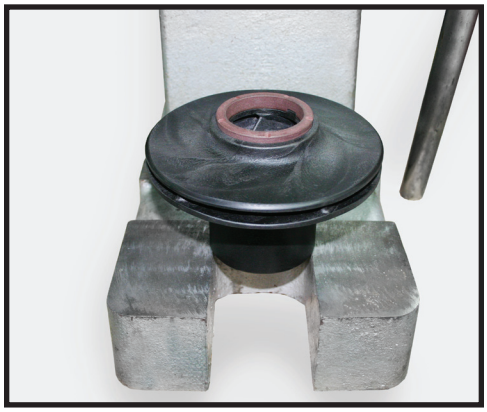
Tools Needed

- ☑ Arbor press
- ☑ PVC bushing tool
  (See section S)



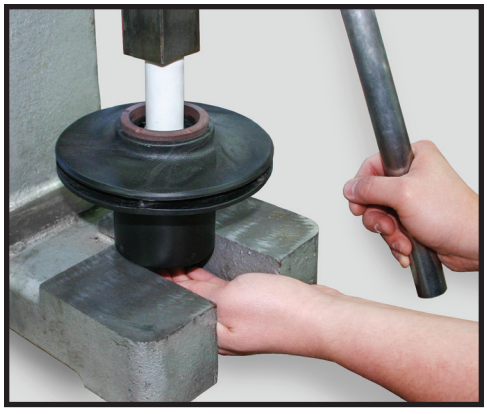
CAUTION

Make sure the bushing removal tool is perfectly centered to prevent damaging the inside of the impeller.

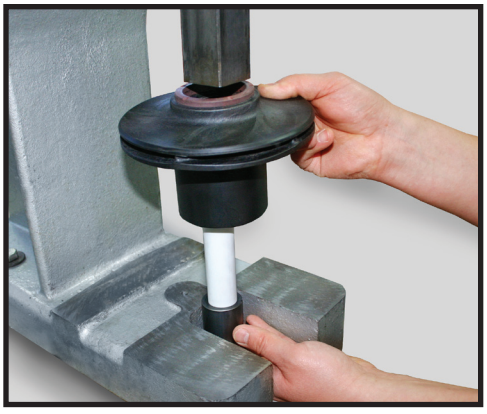


Remove the plate on the arbor press and center the impeller wear ring side up.

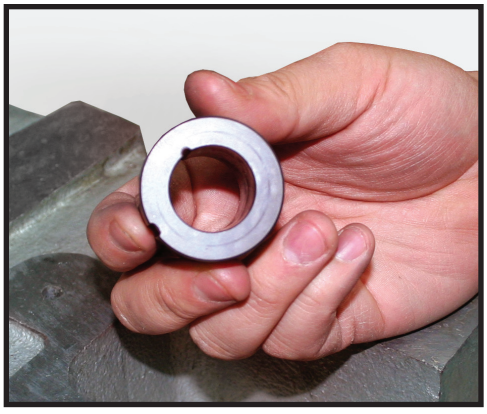
Center the bushing tool on the bushing.



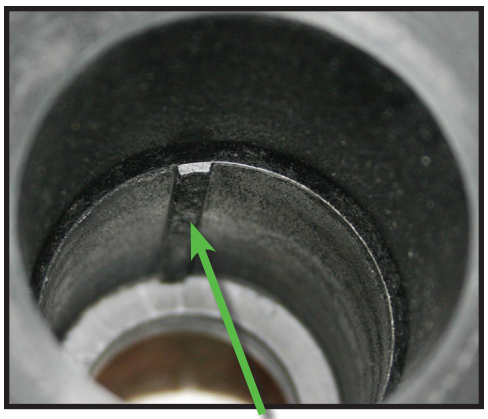
Carefully press the bushing down until it dislodges with your hand underneath to catch the bushing as it falls.



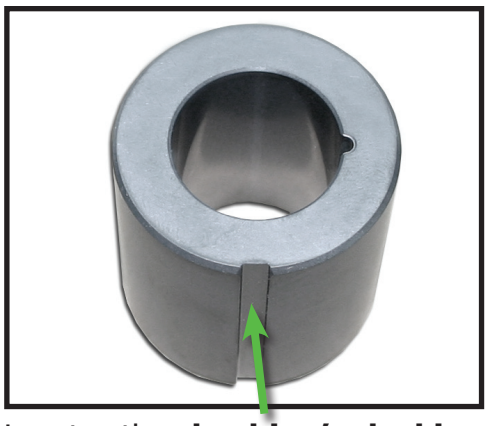
Lift the impeller off the bushing and bushing tool.



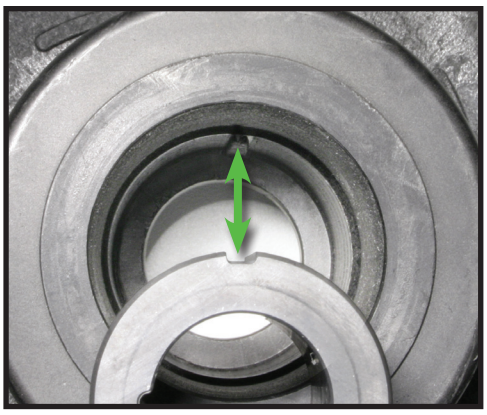
The removed bushing.



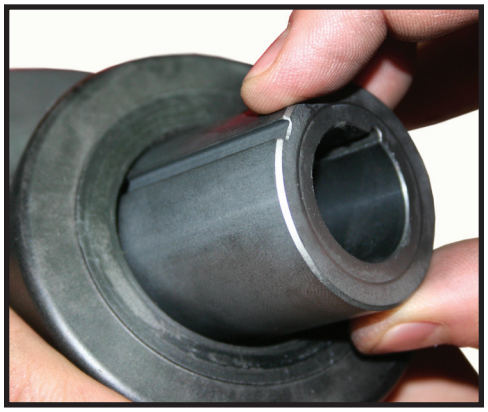
Locate the **molded key** in the impeller.



Locate the **bushing's locking groove.**



Line up the bushing's locking groove with the molded key.



Insert the bushing. Make sure it remains aligned while inserting into the press.

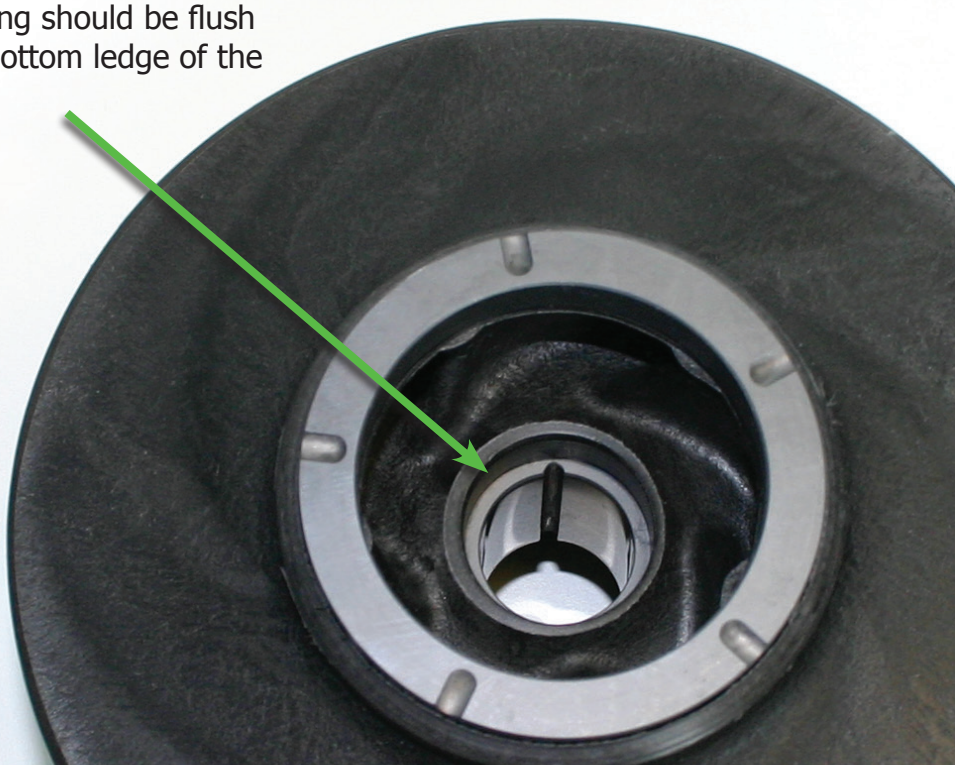
CAUTION

Make sure the bushing removal tool is perfectly centered to prevent damaging the inside of the impeller. We recommend placing a shop towel under the impeller to prevent damage to the wear ring.

Center the PVC pipe on the bushing.

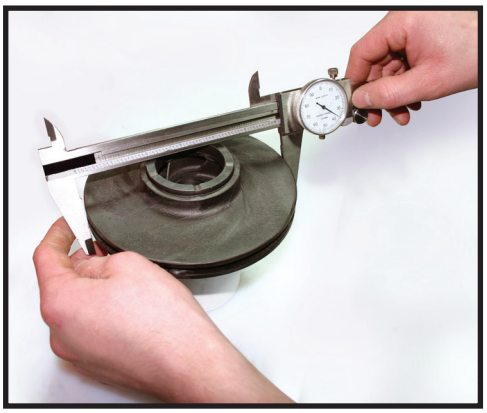
Press the bushing into place.

The bushing should be flush with the bottom ledge of the impeller

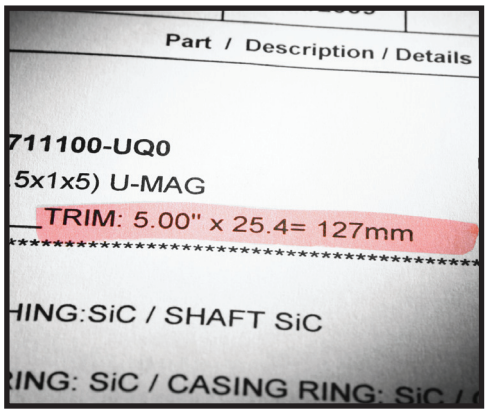


Tools Needed

- ☑ Lathe
- ☑ Caliper
- ☑ X-acto knife
- ☑ Trimming sleeve (See section S)



Measure the current diameter of the impeller. In this example it is 6.15".

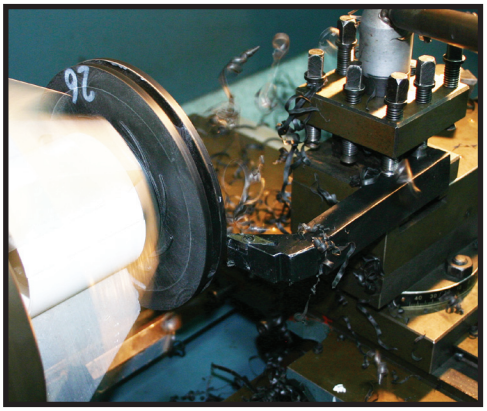


In this example, we need to trim the impeller to 5.00".

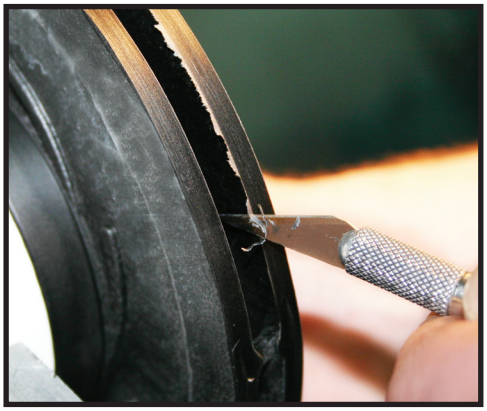
Place the trimming sleeve over the impeller to protect it from damage.

Insert the impeller with trimming sleeve into the lathe and tighten the jaws.

Set the trim 1/4" less then the current diameter. If you are not experienced with the material, then we recommend only cutting 1/8" at a time.

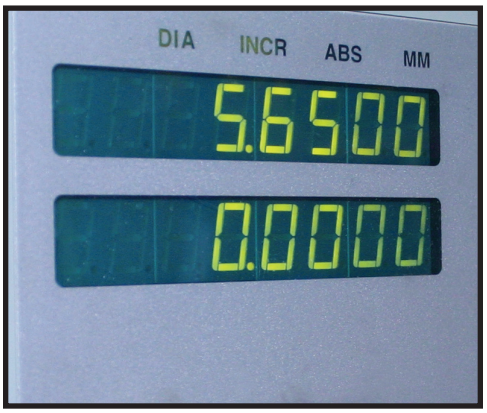


Trim the first layer at a slow speed.

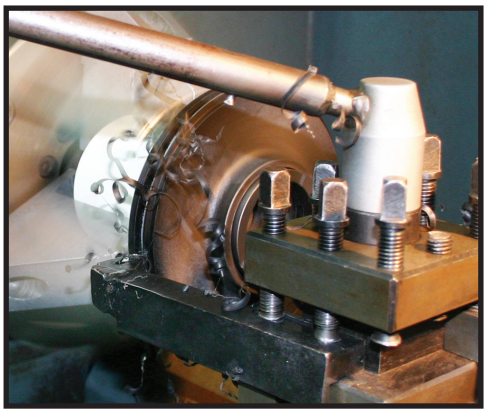


Use the X-acto knife to clean off the loose plastic on the impeller in order to get an accurate measurement

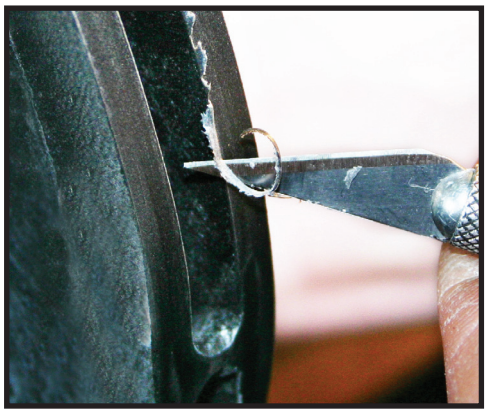
Check the diameter again with the caliper.



Set the lathe for 1/4" less then the current diameter measurement.

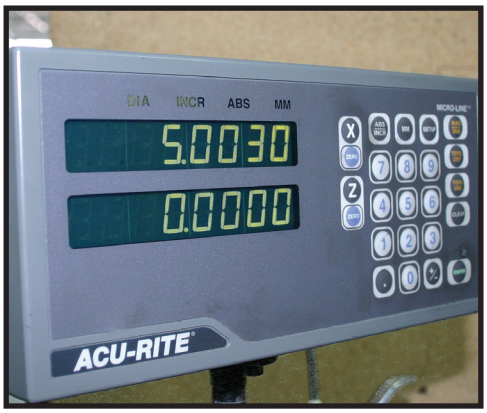


Trim this layer at a slow speed.

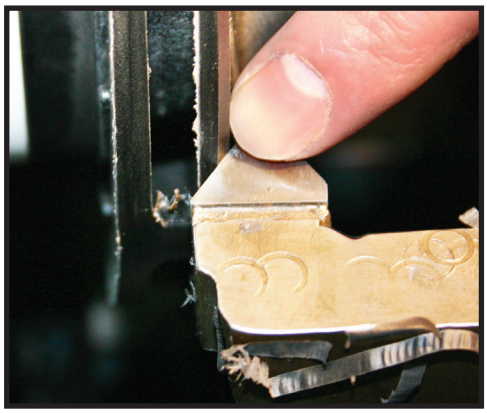


Clean off any loose plastic that would interfere with your diameter measurements.

Use the caliper to measure the current diameter.



Repeat the proceeding four steps until you reach the desired diameter.



Chamfer the right edge of the impeller a small amount.

Chamfer a small amount off the left edge.

Loosen the jaws and remove the impeller.

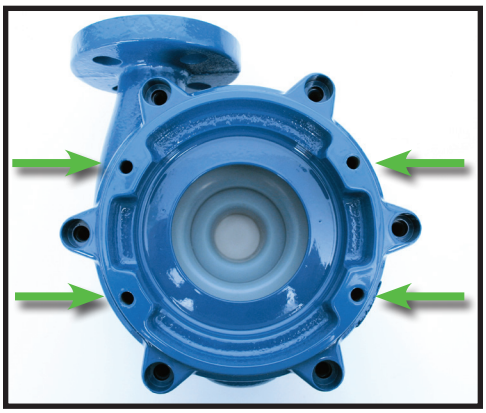
Remove the trimming sleeve and trim any remaining loose plastic with the X-acto knife.

Tool Needed

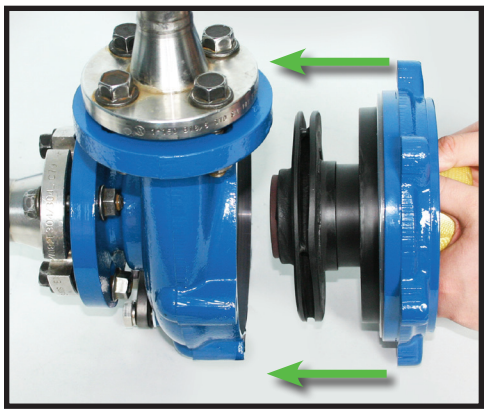
- ☑ 8mm or 5/16" Hex key
- ☑ Torque wrench

Align and slide the impeller magnet assembly onto the pump shaft located inside the containment shell.

Place the assembly into the containment ring.

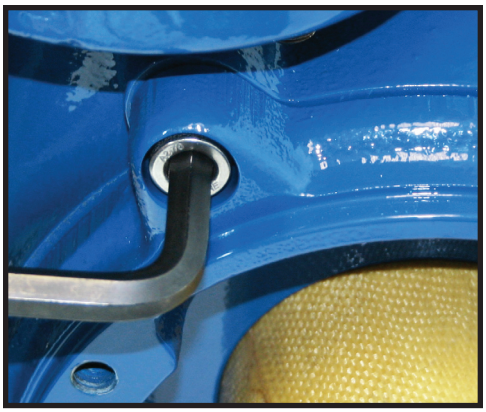


On the next step, you must align the containment ring so that the (4) inner bolt holes are on the right and left side of the pump.

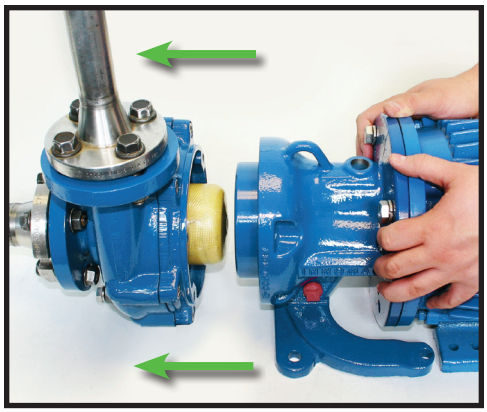


Insert the assembly as one piece straight into the casing.

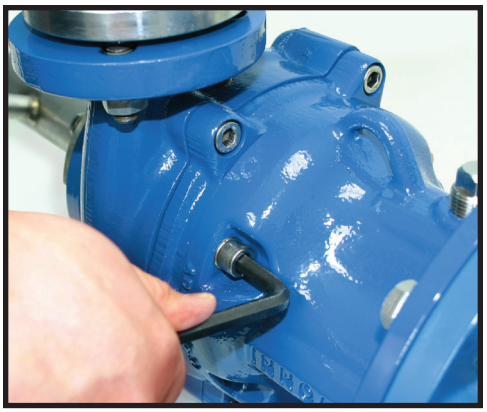
Insert the socket head cap screws with lock washers.



Tighten the (6) socket head cap screws and torque to the torque values on the following page.



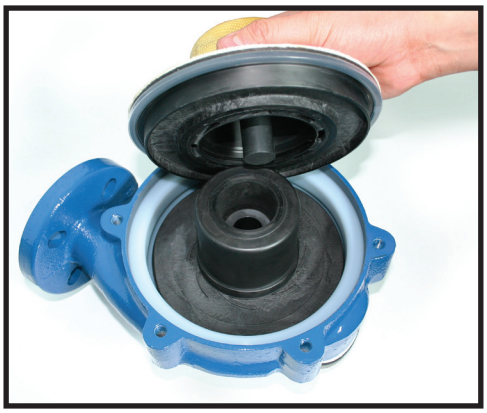
Align the drive end and push it straight in until it meets the wet end.



Tighten the (4) adapter socket head cap screws and torque to 20 ft-lbs (27 N.m).

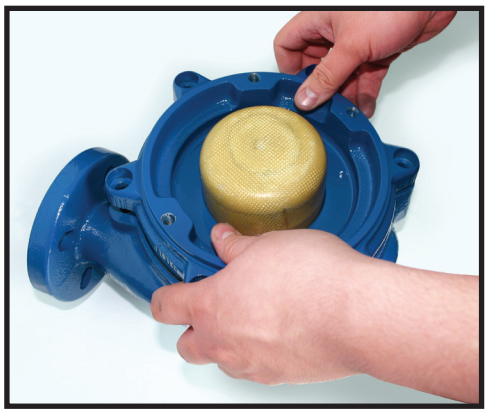
With the casing face down, insert the impeller.

When the impeller is in place, rotate it by hand to make sure it spins freely.

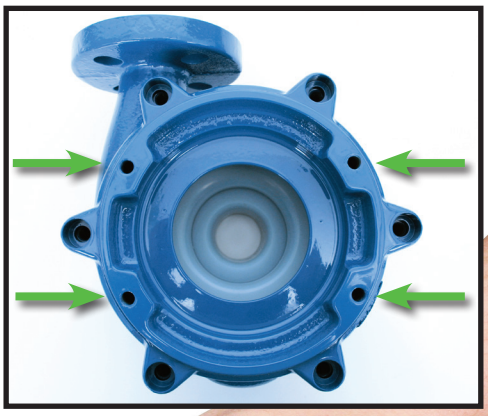


Align the shaft in the containment shell with the bushing.

Lower the containment shell straight into place.



Place the containment ring over the containment shell and align the holes as shown on the previous page.



Align the containment ring so that the (4) inner bolt holes are on the right and left side of the pump.

Insert the socket head cap screws with lock washers.

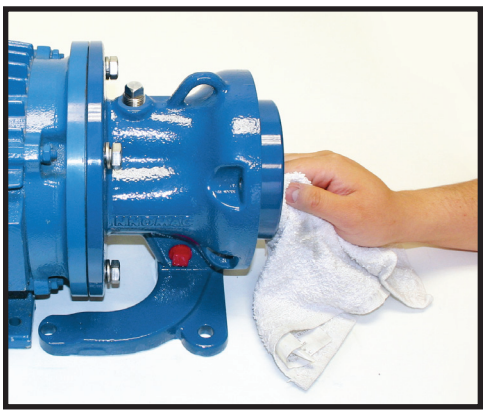
Tighten the bolts with the hex key. Torque to 20 ft-lbs (27 N.m).

Tools Needed

- ☑ Adjustable wrench
- ☑ 3/16” (NEMA) or 5mm (IEC) T-handle hex key
- ☑ 8mm or 5/16” hex key
- ☑ 1/2”-13 Jackscrew
- ☑ Jackscrew plate with (2) screws (IEC only)

Note

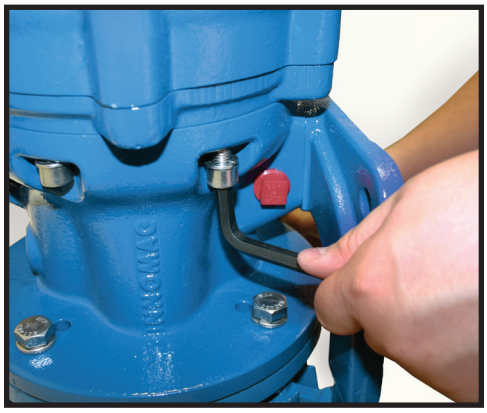
Drive end disassembly is not normally required. Under normal circumstances a visual inspection and wiping clean the inside of the outer magnet is sufficient.



Wipe the inside of the outer magnet assembly clean with a shop towel.

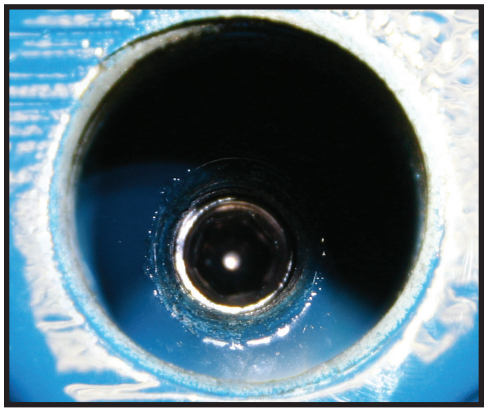
Complete Disassembly

Remove the metal pipe plug from the top of the adapter.



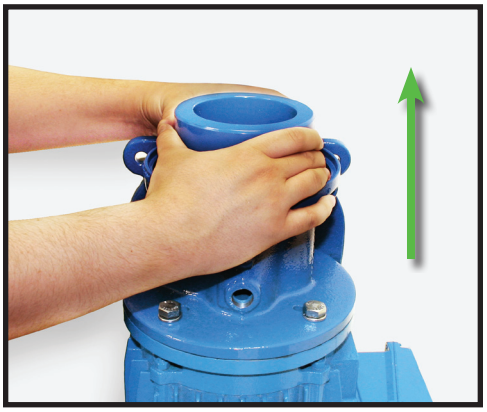
Remove the top (4) adapter socket head cap screws.

Lift the wet end straight up and remove.



Locate the (2) set screws on the on the outer magnet assembly.

Loosen the first set screw then rotate the outer magnet assembly 90° and loosen the second set screw.



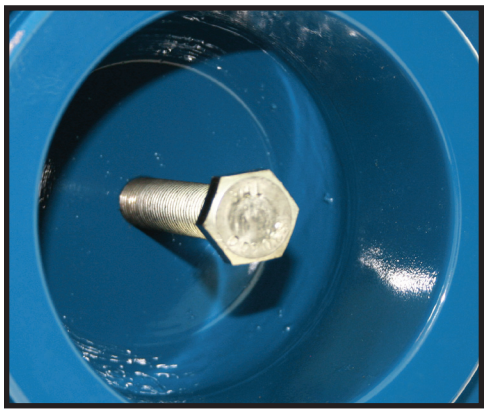
Pull the outer magnet assembly straight up and remove.

Note

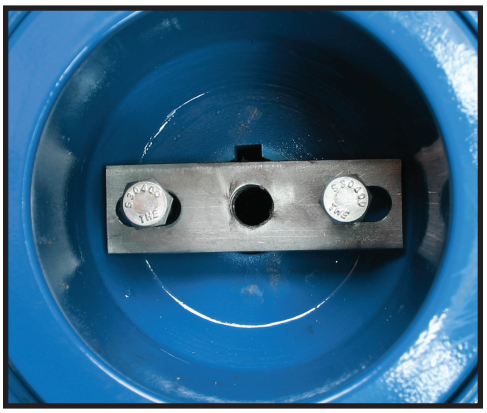
The following two steps are only necessary if the outer magnet assembly is stuck.

MAGNETIC

The outer magnet assembly contains very strong magnets. Use caution inserting the jackscrew and other metal tools.



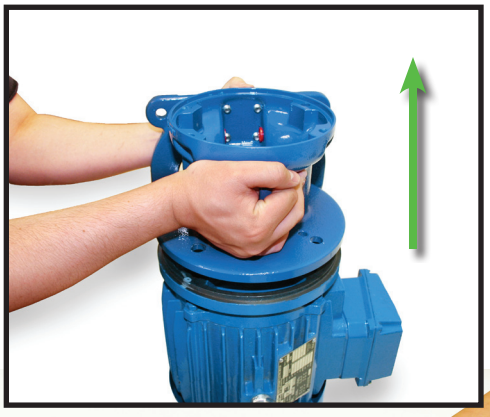
To remove an outer magnet assembly that is stuck, insert a jackscrew into the center hole and tighten until the it breaks loose.



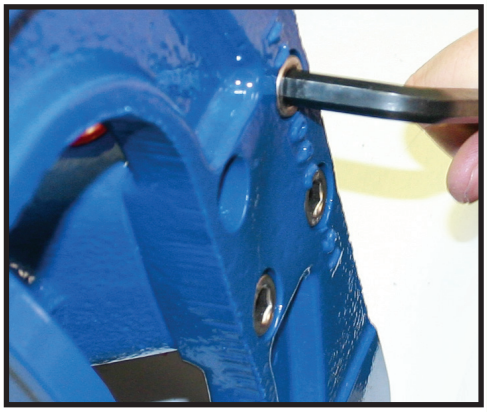
For IEC pumps, attach the jackscrew plate and insert a jackscrew into the plate. Tighten until it breaks loose.

You should now be able to easily lift and remove the outer magnet assembly.

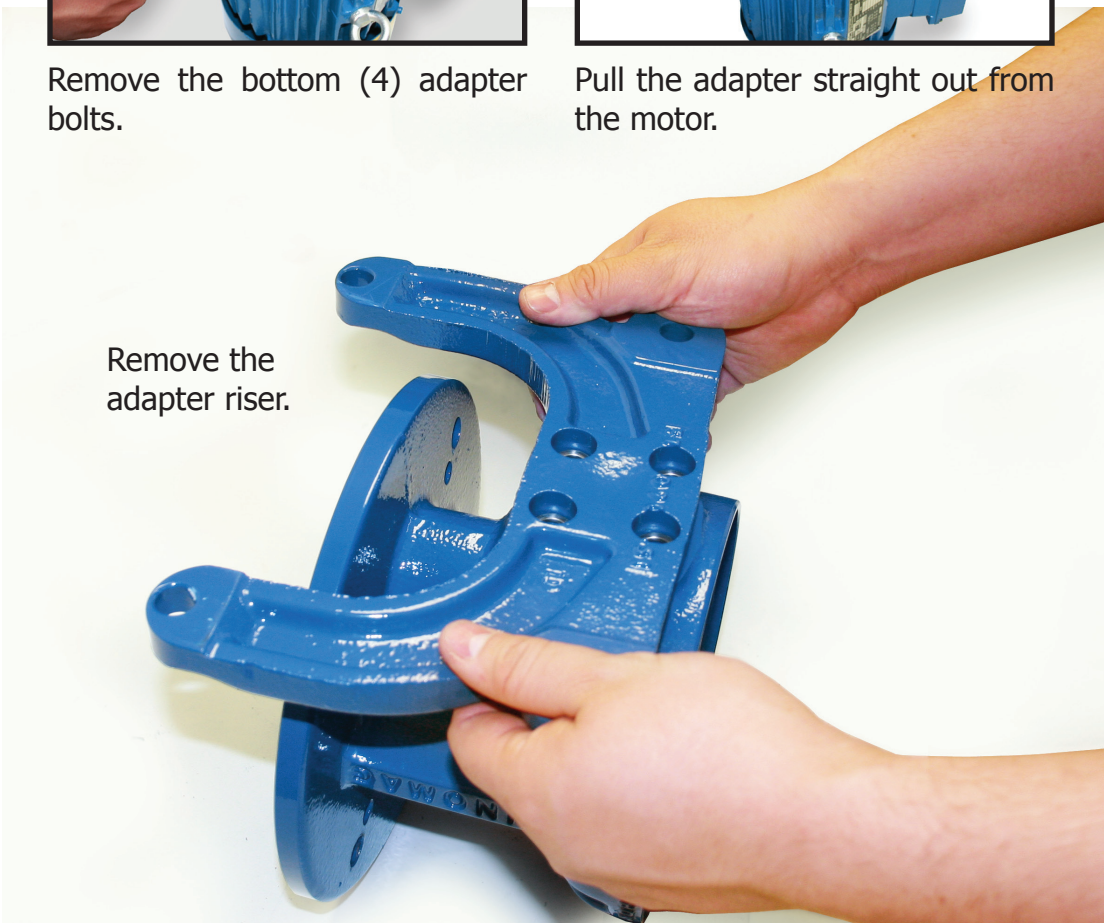
Remove the bottom (4) adapter bolts.



Pull the adapter straight out from the motor.



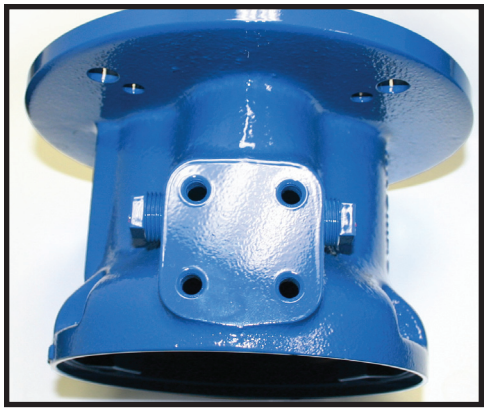
Remove the (4) socket head cap screws on the adapter riser.



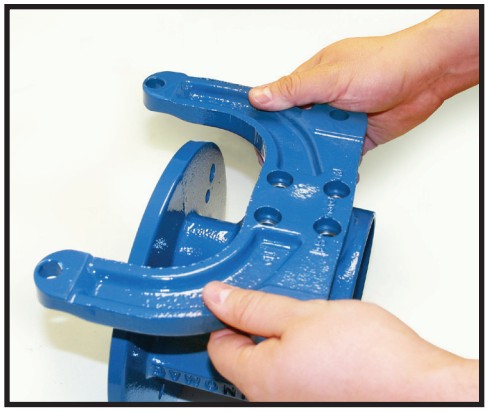
Remove the adapter riser.

Tools Needed

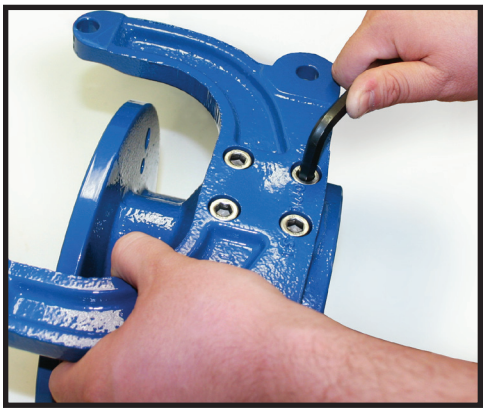
- ☑ 8mm or 5/16” Hex key
- ☑ 3/16” (NEMA) or 5mm (IEC) T-Handle hex key
- ☑ Wrench



Turn the adapter so the (4) riser holes are facing upwards.



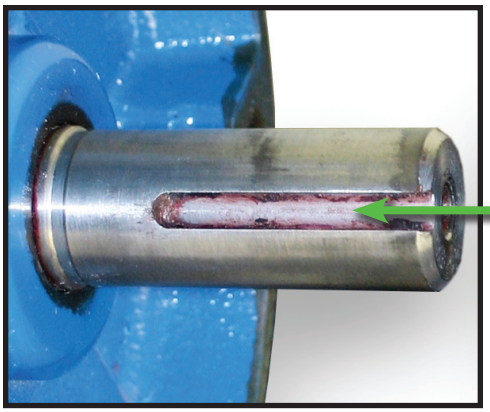
Align the (4) holes on the riser with the (4) holes on the adapter.

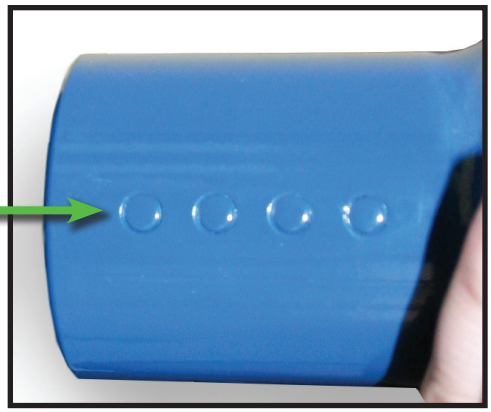


Insert and tighten the (4) riser socket head cap screws.

Lower the adapter over the motor shaft and align the bolt holes. Align adapter feet with the motor feet.

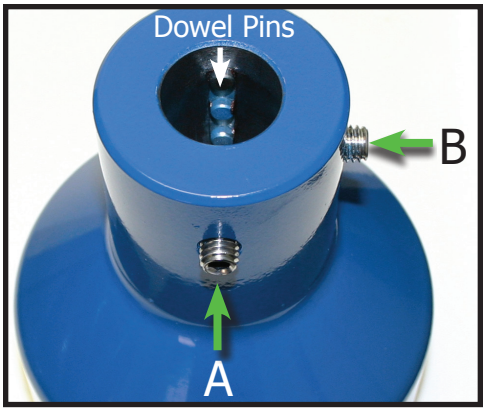
Insert and tighten the (4) lower adapter bolts.





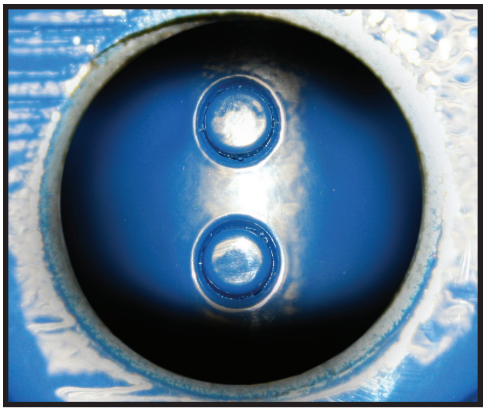
Align the key groove on the motor shaft with the dowel pins on the outer magnet assembly.

Lower the outer magnet assembly onto the motor shaft.

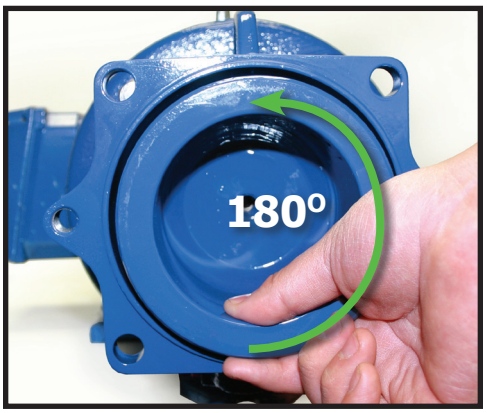


Note the placement of the set screws in relation to the dowel pins before installation.

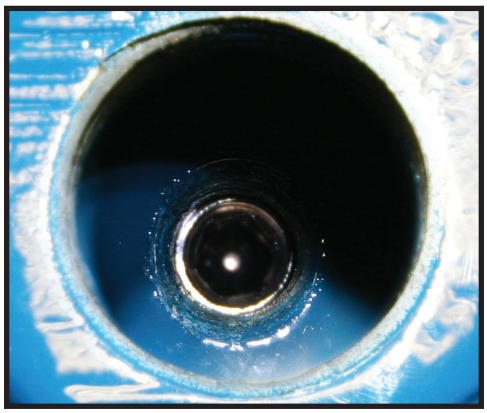
Using a ruler or other straight-edge, align the outer magnet assembly alignment groove with the top edge of the adapter.



Looking through the top hole on the adapter, align the row of dowel pins on the outer magnet assembly with the hole.



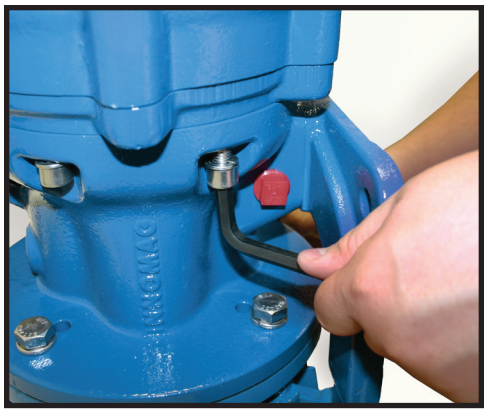
Grab the opposite side of the outer magnet assembly and rotate it 180°.



Locate the first set screw (A) on the on the outer magnet assembly.

Tighten the set screw. Rotate 90 degrees counterclockwise and tighten set screw B.

Lower the wet end straight into the outer magnet assembly.

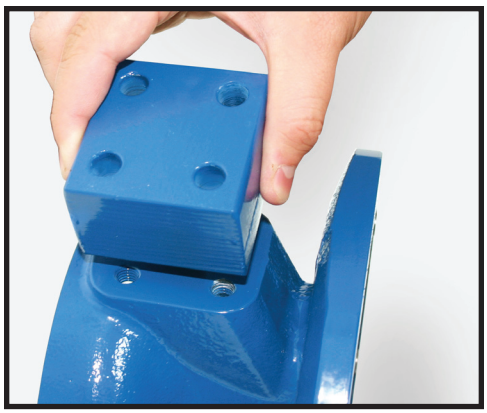


Insert and tighten the top (4) adapter socket head cap screws.

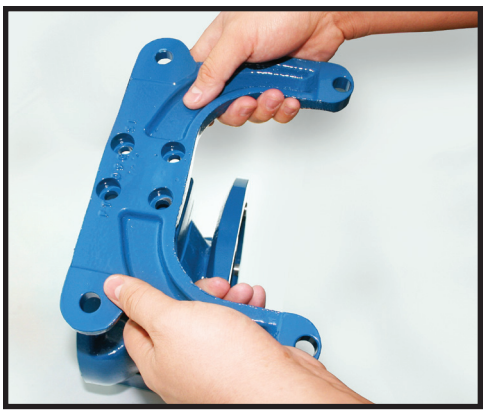
Insert the metal pipe plug on the top of the adapter.

Tools Needed

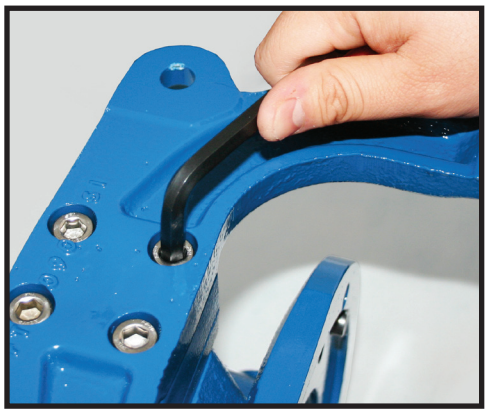
- ☑ 8mm or 5/16” Hex key
- ☑ 3/16” (NEMA) or 5mm (IEC) T-handle hex key
- ☑ Wrench



Align the 4 holes on the block with the 4 holes on the adapter.

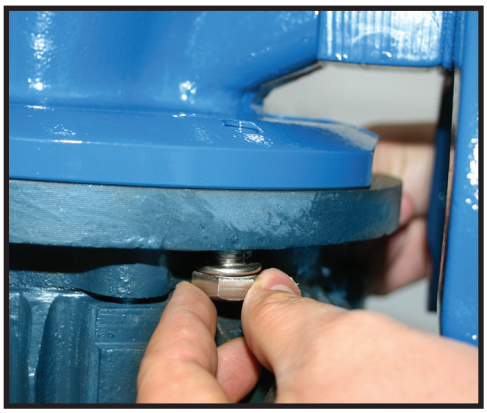


Align the 4 holes on the riser with the 4 holes on the block.

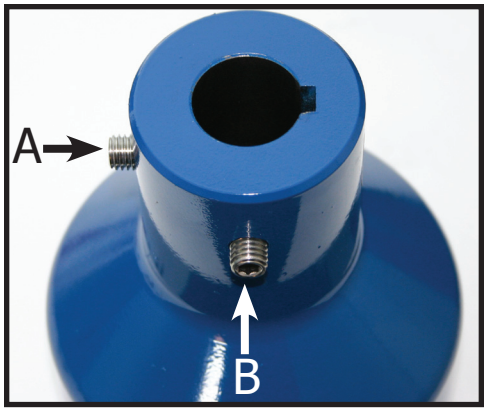


Insert and tighten 4 socket head cap screws.

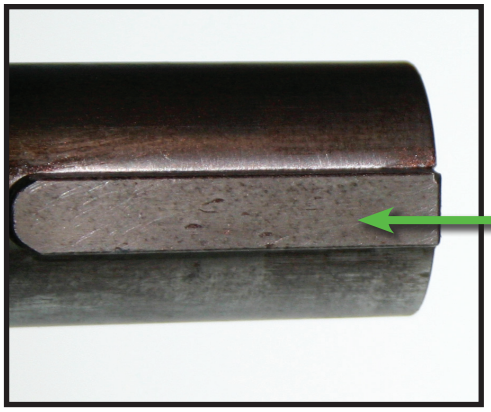
Lower the assembly onto the motor, aligning the 4 adapter holes with the 4 motor mounting holes.

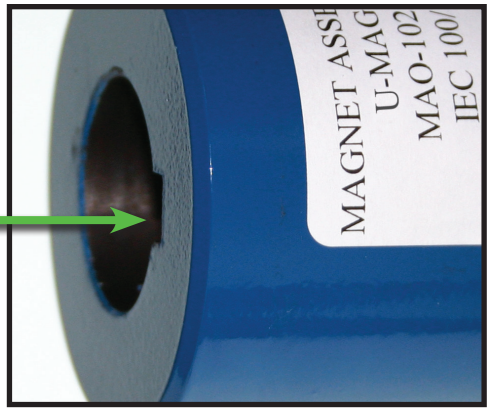


Insert and tighten the 4 bolts through the motor into the adapter.



Note the placement of the set screws in relation to the key notch before installation.

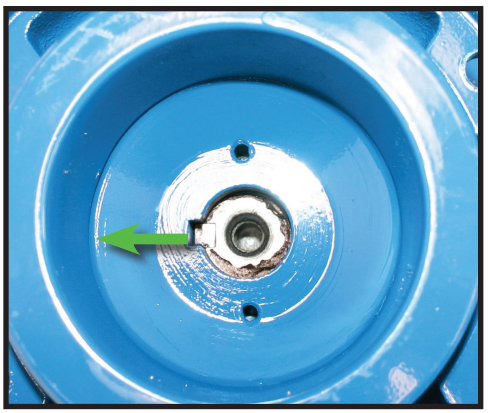




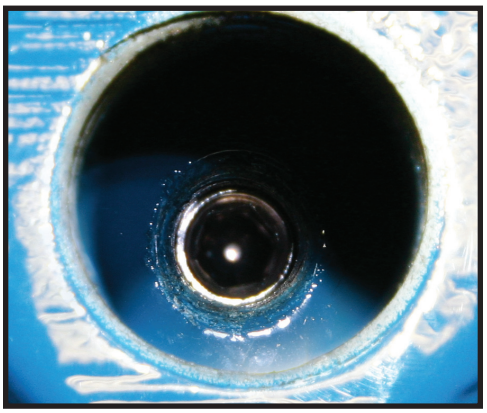
Align the key groove on the outer magnet assembly with the key on the motor shaft.

Lower the outer magnet assembly onto the motor shaft.

Using a ruler or other straight-edge, align the outer magnet assembly alignment groove with the top edge of the adapter.



Turn the outer magnet assembly until the groove points to the left.

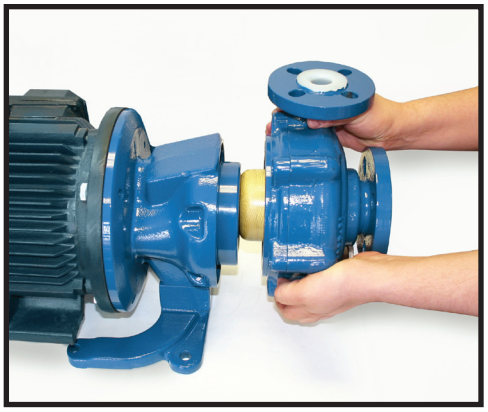


Locate the set screw (A) on the outer magnet assembly.

Tighten the set screw (A) with the T-handle hex key.

Turn the outer magnet assembly until the groove points down.

Tighten the second set screw (B). Replace the metal plug.

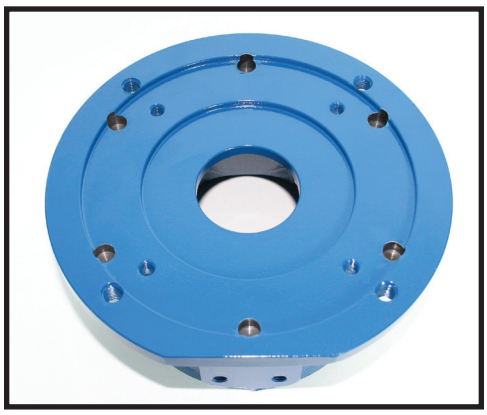


Lower the drive end and insert the wet end in a straight line.

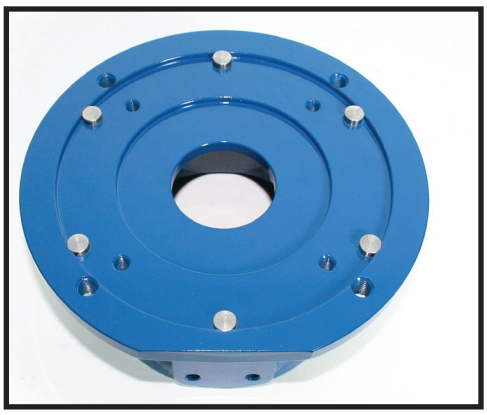
Insert and tighten the (4) upper adapter socket head cap screws.

Tools Needed

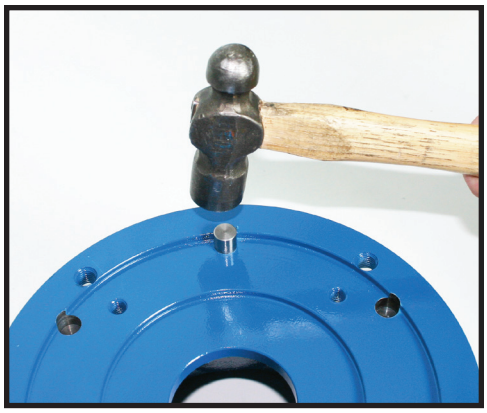
- ☑ 8mm or 5/16” Hex key
- ☑ Hammer



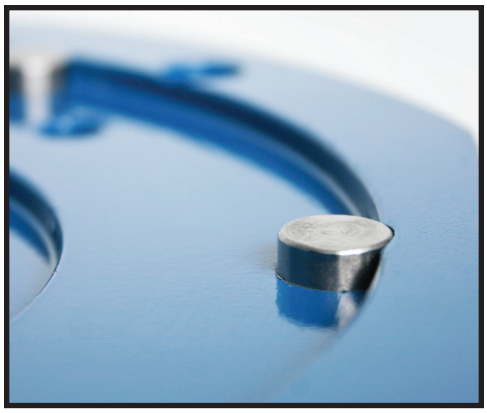
For mounting 80 & 90 motor frames, The IEC adapter does not need any modification.



Mounting 100L & 112M motor frames requires installing (6) dowel pins.



To install the dowel pins, insert them in the (6) unpainted adapter holes and firmly pound them in with a hammer.

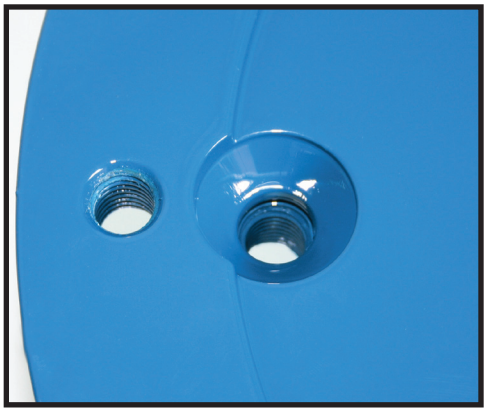


When properly inserted the dowel pins should be flush with the adapter.

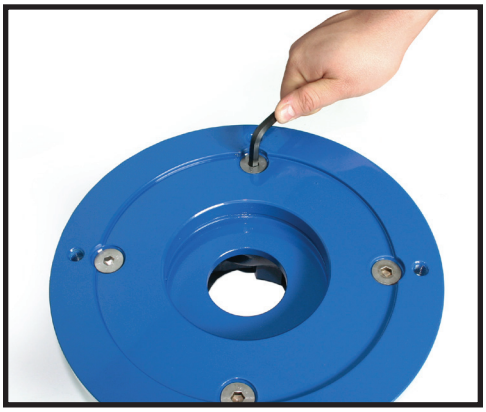
Note

Mounting the 132 motor frame requires an additional mounting plate due to the large diameter C-face on the IEC 132 frame motor.

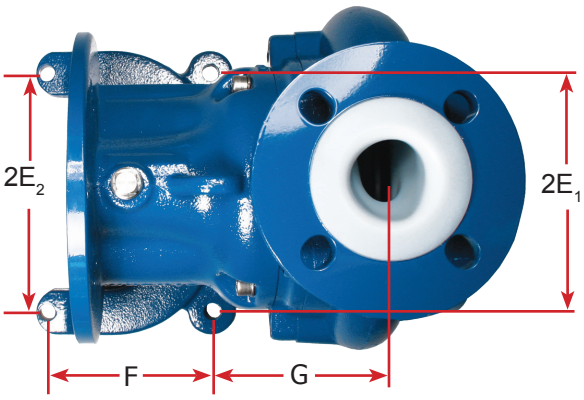
To install the mounting plate, align the (4) large holes on the plate with the (4) outer holes on the adapter.

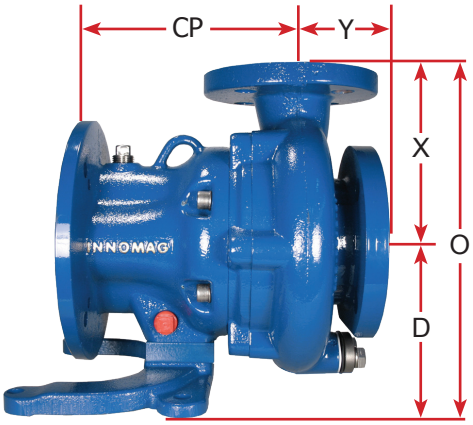


Insert the screws into the aligned mounting holes.



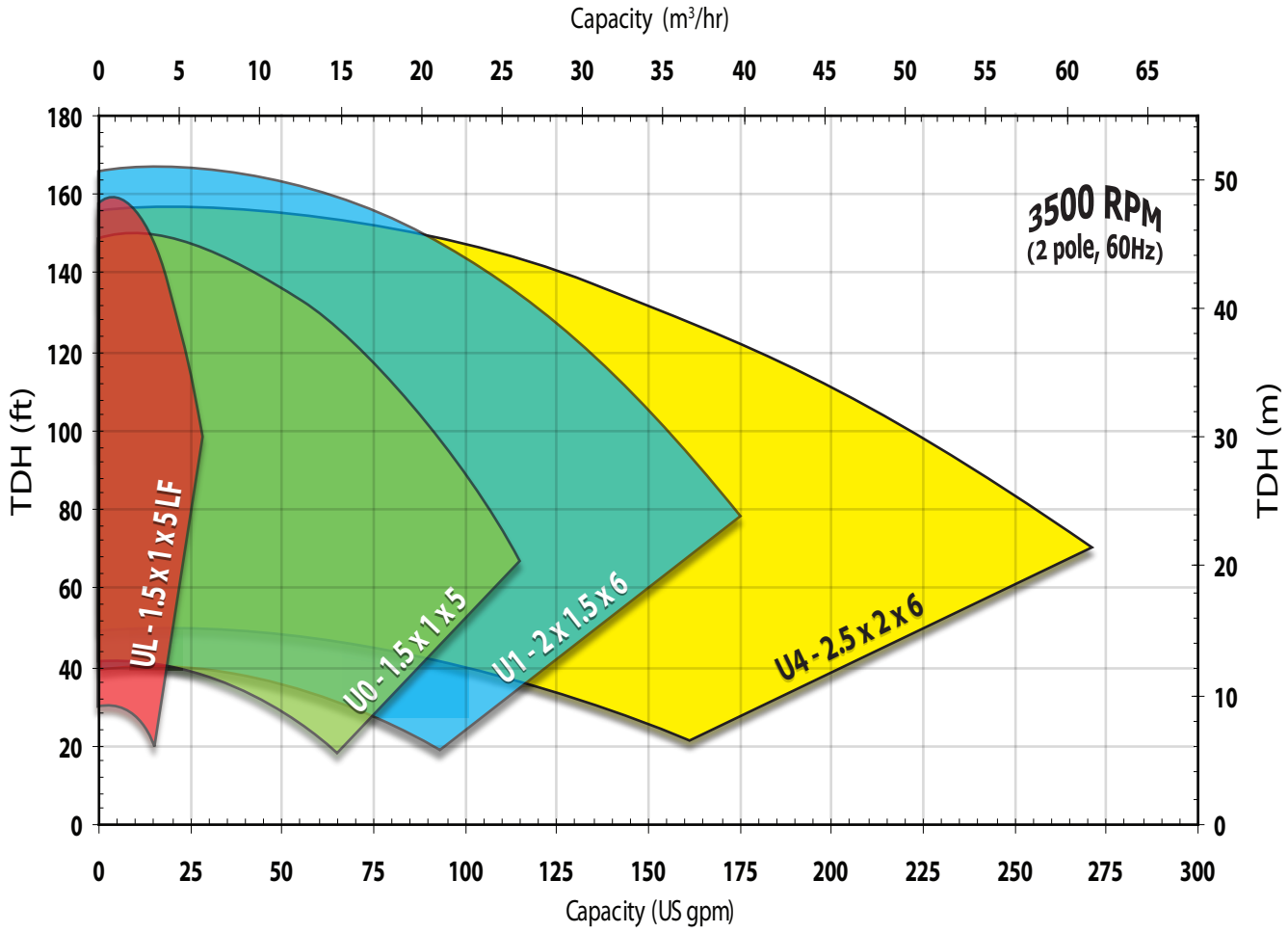
Tighten the (4) socket head cap screws through the mounting plate into the adapter.

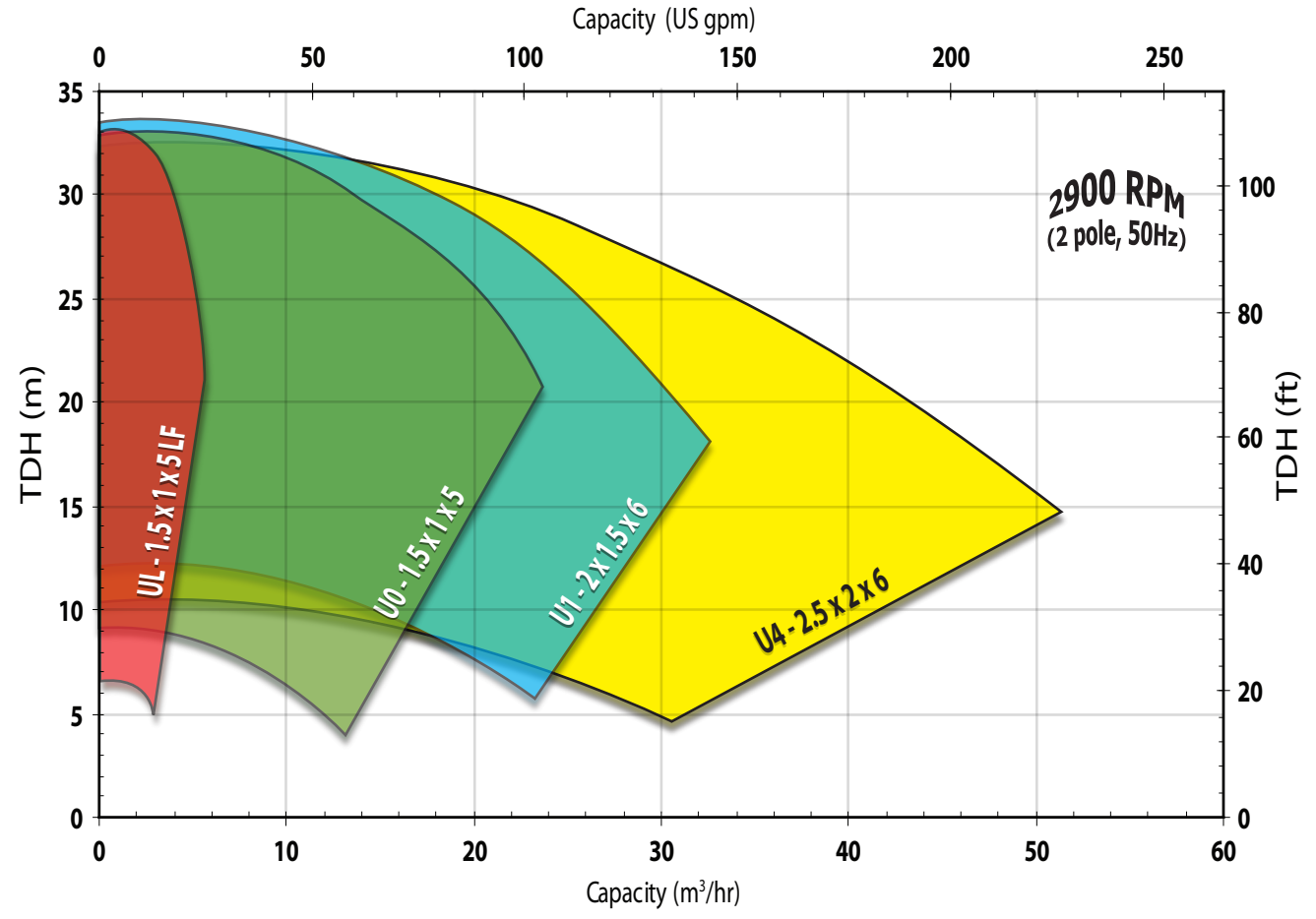


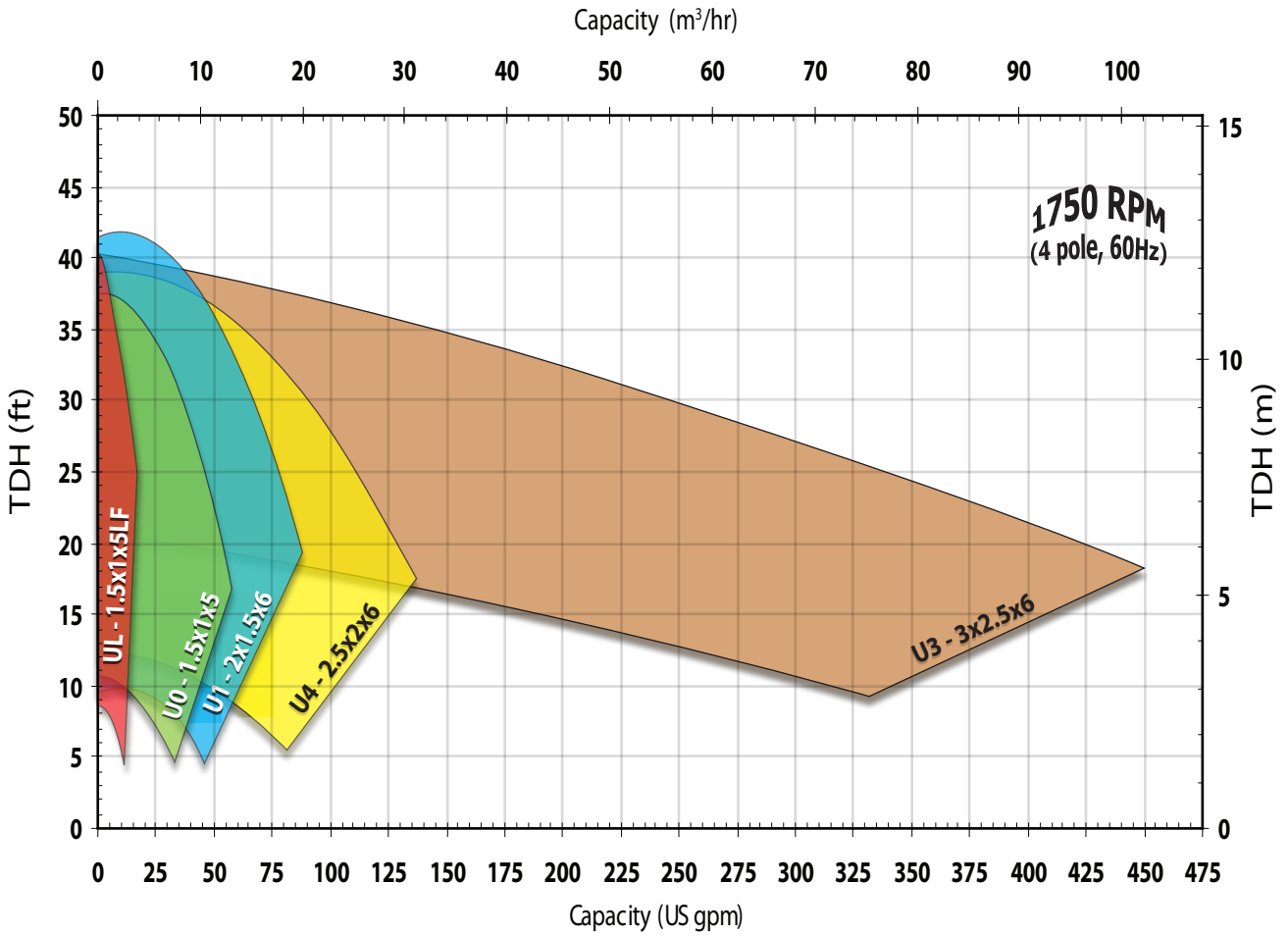


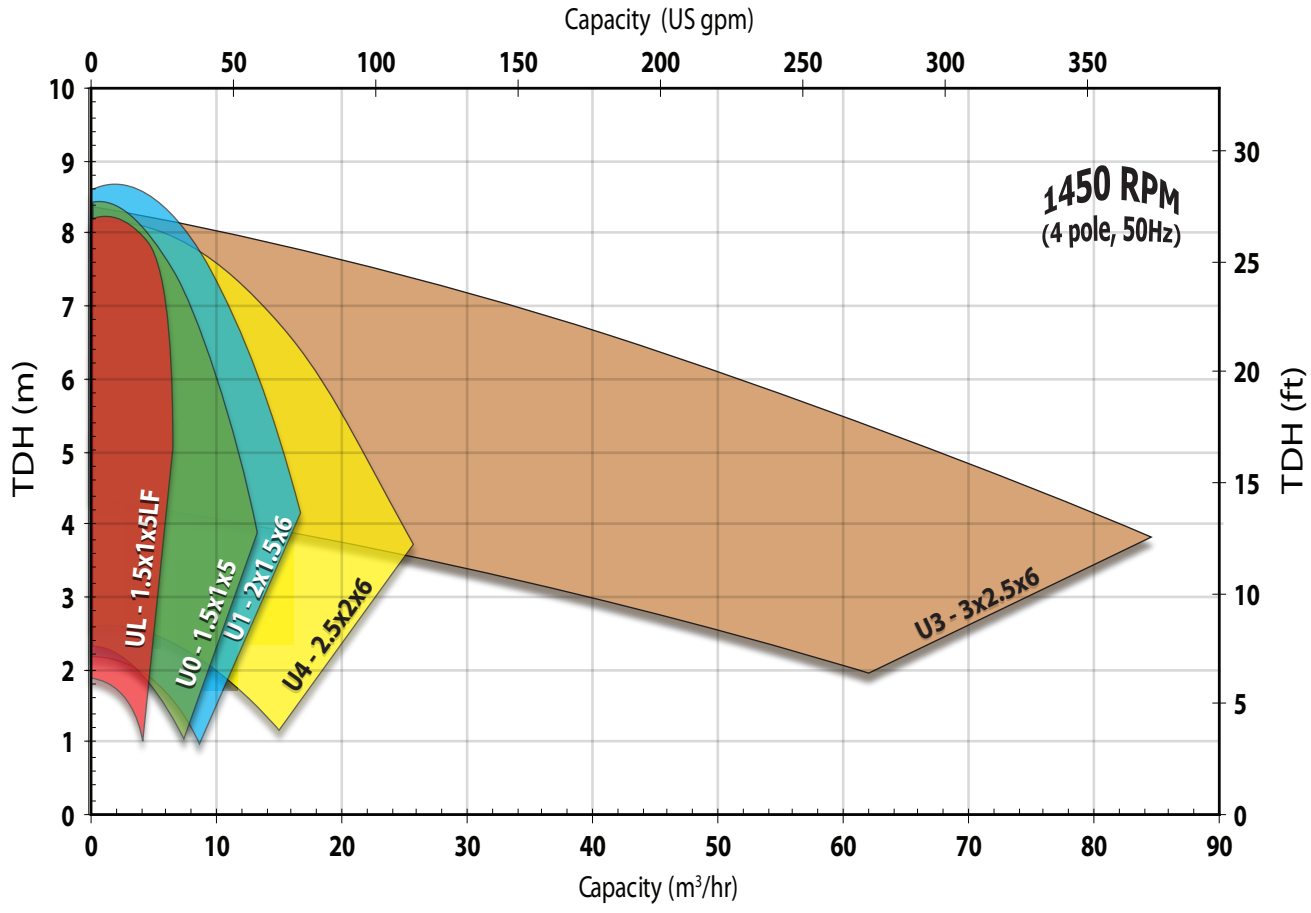
Model (Size)	$2E_1$	$2E_2$	F	G	O	W	X	Y	Z	Suction Flange ANSI (Class 150)	Suction Flange ISO (PN16)	Suction Flange JIS (10kg/cm²)	Discharge Flange ANSI (Class 150)	Discharge Flange ISO (PN16)	Discharge Flange JIS (10kg/cm²)	lb (kg)
U0 - 1.5x1x5 (40x25x156mm)	8.00 (203)	8.00 (203)	5.50 (140)	3.69 (94)	10.00 (254)	9.64 (245)	5.50 (140)	3.15 (80)	2.34 (59)	1.50″	40mm	40mm	1.00″	25mm	25mm	54 (25)
UL-1.5x1x5LF (40x25x156mm)					10.00 (254)			3.15 (80)	2.34 (59)	1.50″	40mm	40mm	1.00″	25mm	25mm	54 (25)
U1 - 2x1.5x6 (50x40x156mm)					11.60 (295)			3.42 (87)	2.56 (65)	2.00″	50mm	50mm	1.50″	40mm	40mm	54 (25)
U3 - 3x2.5x6 (80x65x156mm)					13.20 (323)		7.10 (180)	3.94 (100)	0.00 (0)	3.00″	80mm	80mm	2.50″	65mm	65mm	54 (25)
U4 - 2.5x2x6 (65x50x156mm)					12.40 (315)		6.30 (160)	3.15 (80)	0.00 (0)	2.50″	65mm	65mm	2.00″	50mm	50mm	54 (25)

Model (Size)	NEMA 56C D	NEMA 56C CP	NEMA 143/5TC D	NEMA 143/5TC CP	NEMA 182/4TC D	NEMA 182/4TC CP	NEMA 213/5TC D	NEMA 213/5TC CP	IEC 80/90SL D	IEC 80/90SL CP	IEC 100L/112M D	IEC 100L/112M CP	IEC 132 D	IEC 132 CP
U0 - 1.5x1x5 (40x25x156mm)	4.50 (114)	7.52 (191)	4.50 (114)	7.52 (191)	4.50 (114)	7.52 (191)	5.25 (133)	7.52 (191)	4.50 (114)	6.67 (169)	6.10 (156)	6.85 (174)	6.10 (156)	7.52 (191)
UL-1.5x1x5LF (40x25x156mm)	4.50 (114)		4.50 (114)		4.50 (114)		5.25 (133)		4.50 (114)					
U1 - 2x1.5x6 (50x40x156mm)	6.10 (156)		6.10 (156)		6.10 (156)		6.10 (156)		6.10 (156)					
U3 - 3x2.5x6 (80x65x156mm)	6.10 (156)		6.10 (156)		6.10 (156)		6.10 (156)		6.10 (156)					
U4 - 2.5x2x6 (65x50x156mm)														


Capacity (m³/hr)
0 5 10 15 20 25 30 35 40 45 50 55 60 65
TDH (ft)
180 160 140 120 100 80 60 40 20 0
TDH (m)
50 40 30 20 10 0
3500 RPM
(2 pole, 60Hz)
UL - 1.5x1x5LF
U0 - 1.5x1x5
U1 - 2x1.5x6
U4 - 2.5x2x6
0 25 50 75 100 125 150 175 200 225 250 275 300
Capacity (US gpm)


Capacity (US gpm)
0 50 100 150 200 250
TDH (m)
35 30 25 20 15 10 5 0
TDH (ft)
100 80 60 40 20 0
2900 RPM
(2 pole, 50Hz)
UL - 1.5x1x5LF
U0 - 1.5x1x5
U1 - 2x1.5x6
U4 - 2.5x2x6
0 10 20 30 40 50 60
Capacity (m³/hr)


Capacity (m³/hr)
0 10 20 30 40 50 60 70 80 90 100
TDH (ft)
50 45 40 35 30 25 20 15 10 5 0
TDH (m)
15 10 5 0
1750 RPM
(4 pole, 60Hz)
UL - 1.5x1x5LF
U0 - 1.5x1x5
U1 - 2x1.5x6
U4 - 2.5x2x6
U3 - 3x2.5x6
0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475
Capacity (US gpm)

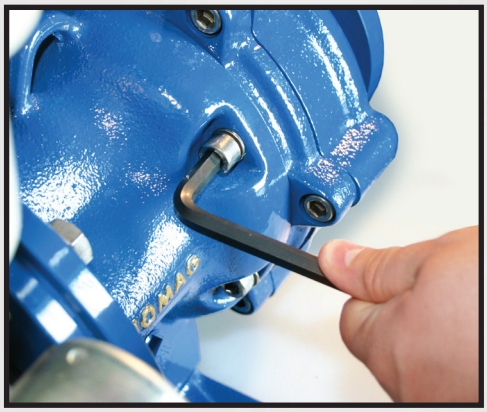

Capacity (US gpm)
0 50 100 150 200 250 300 350
TDH (m)
10 9 8 7 6 5 4 3 2 1 0
TDH (ft)
30 25 20 15 10 5 0
1450 RPM
(4 pole, 50Hz)
UL - 1.5x1x5LF
U0 - 1.5x1x5
U1 - 2x1.5x6
U4 - 2.5x2x6
U3 - 3x2.5x6
0 10 20 30 40 50 60 70 80 90
Capacity (m³/hr)

Tools Needed

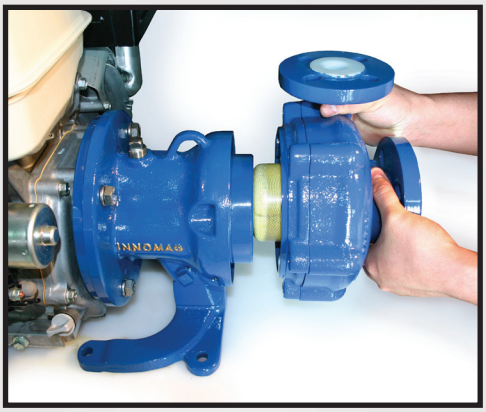
- ☑ 8mm or 5/16” Hex key
- ☑ Adjustable wrench
- ☑ 3/16” (NEMA) or 5mm (IEC) T-handle hex key

CAUTION

Although it may appear that you can simply unbolt the pump from the motor, this is not the case. **You must first remove the wet end and the outer magnet assembly**. Follow these directions carefully to avoid damaging the motor shaft or outer magnet assembly.

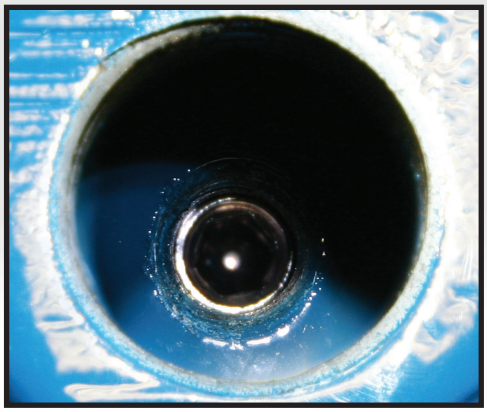


Loosen and remove the (4) socket head cap screws connecting the adapter to the wet end.

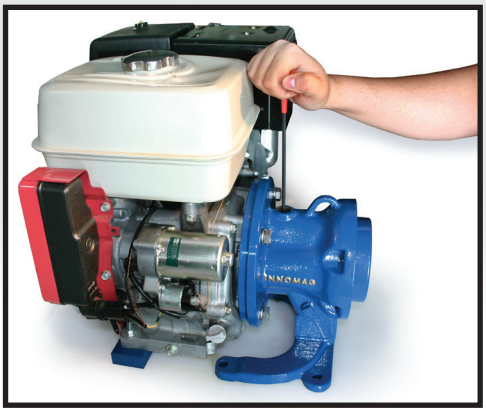


Pull the wet end out from the drive end in a straight line.

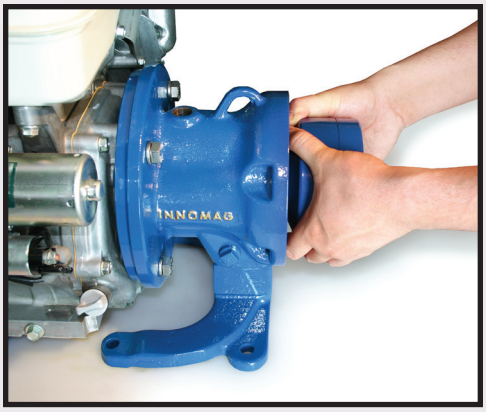
Remove the metal plug on top of the adapter.



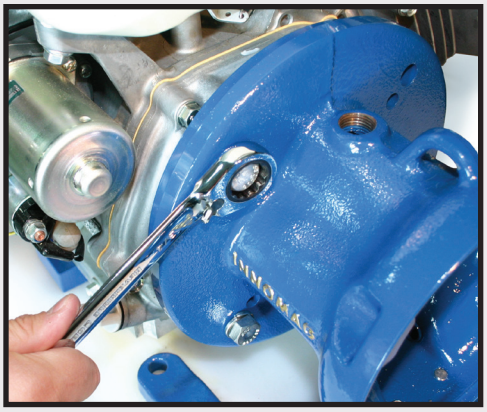
Locate the first set screw on the on the outer magnet assembly.



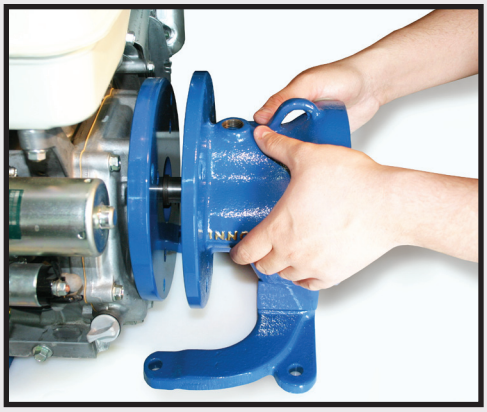
Loosen this set screw, then turn the outer magnet assembly to locate the 2nd set screw and loosen it too.



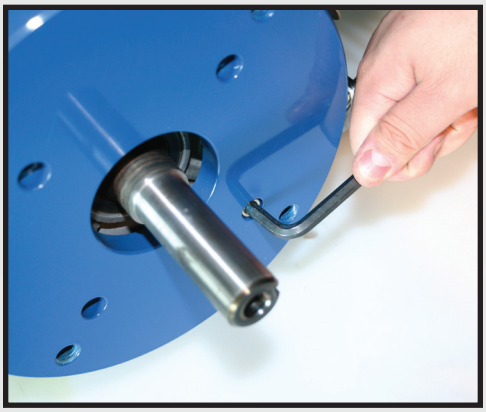
Pull out the outer magnet assembly.



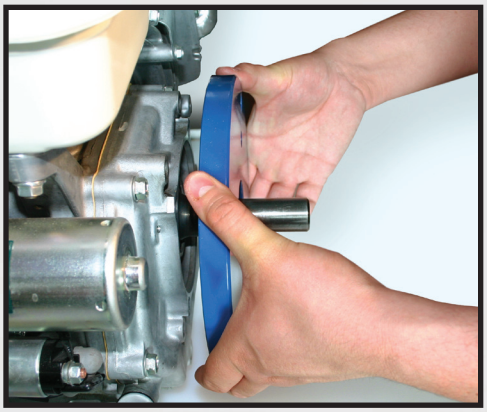
Remove the (4) bolts holding the adapter to the the mounting plate.



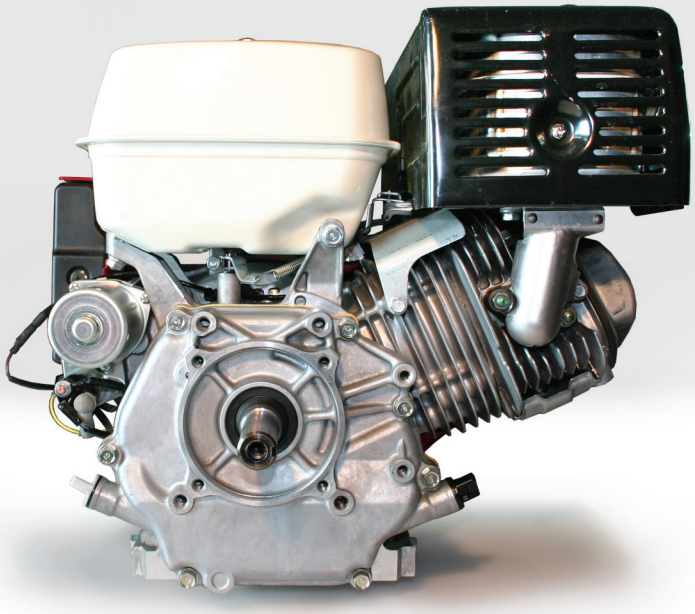
Pull the adapter straight out off the mounting plate.



Loosen and remove the (4) small socket head cap screws on the mounting plate.

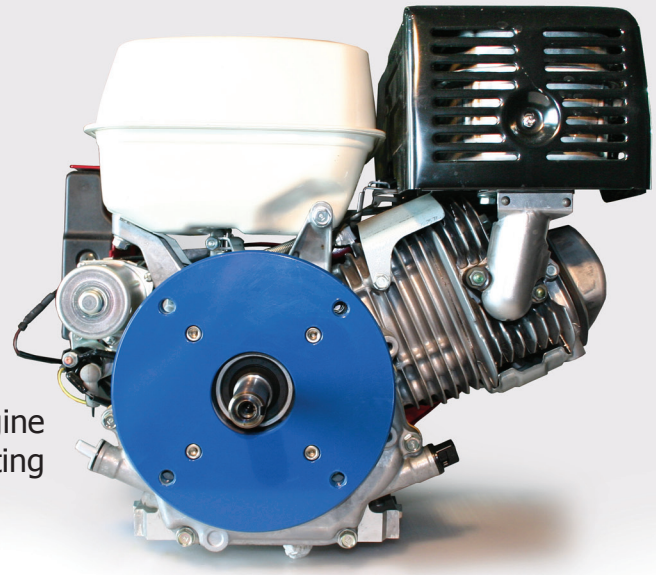


Remove the mounting plate.

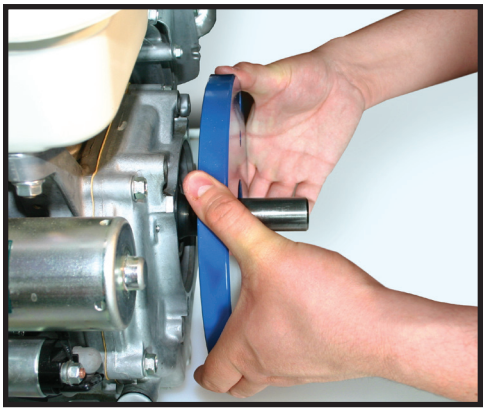


Tools Needed

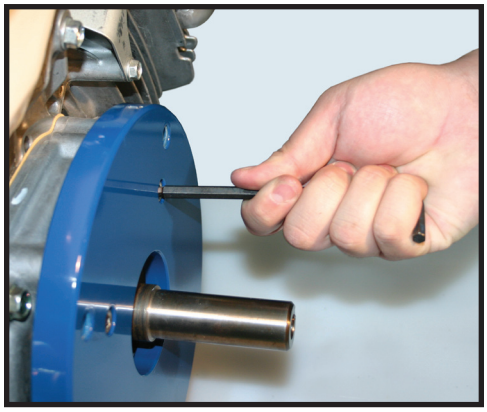
- ☑ 8mm or 5/16” hex key
- ☑ Adjustable wrench
- ☑ 3/16” (NEMA) or 5mm (IEC) T-handle hex key



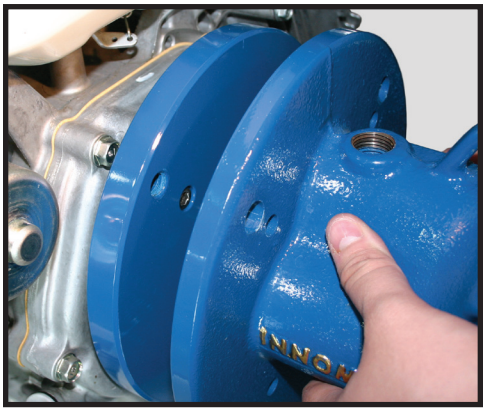
Attaching the Honda engine requires a special mounting plate.



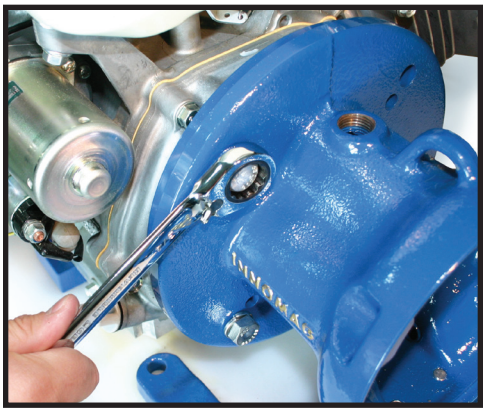
Center the mounting plate on the motor and align the holes.



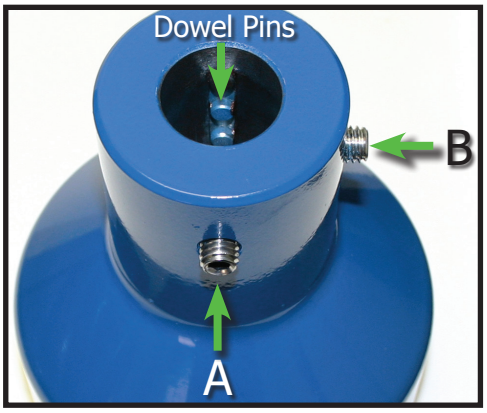
Insert and tighten the (4) socket head cap screws connecting the mounting plate to the motor.



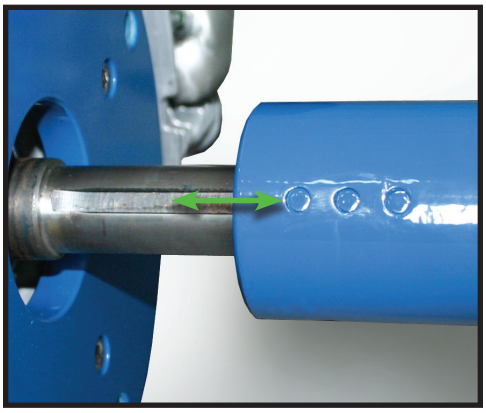
Remove the metal plug from the top of the adapter and align the bolt holes with the holes on the mounting plate.



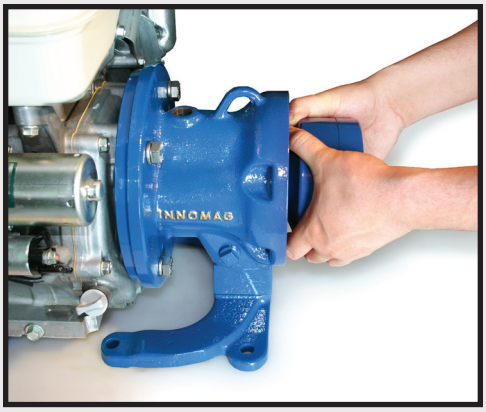
Insert and tighten the (4) bolts attaching the adapter to the the mounting plate.



Note the placement of the set screws in relation to the dowel pins before installation.

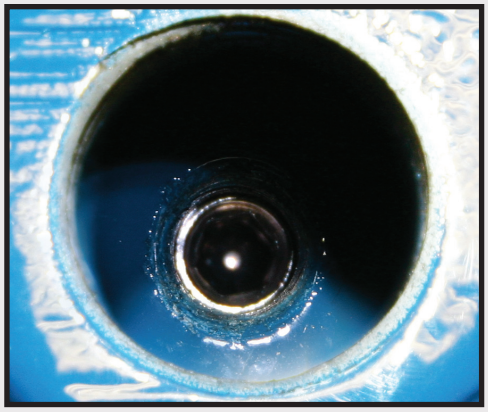


Align the key groove on the motor shaft with the row of dowel pins on the outer magnet assembly. (Adapter not shown above for demonstration purposes)

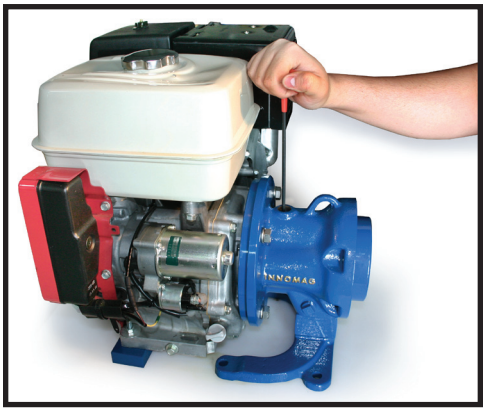


Rotate the outer magnet and motor shaft until the row of dowel pins and shaft groove point down. Slide the outer magnet assembly onto the motor shaft.

Using a ruler or other straightedge, align the outer magnet assembly alignment groove with the top edge of the adapter.

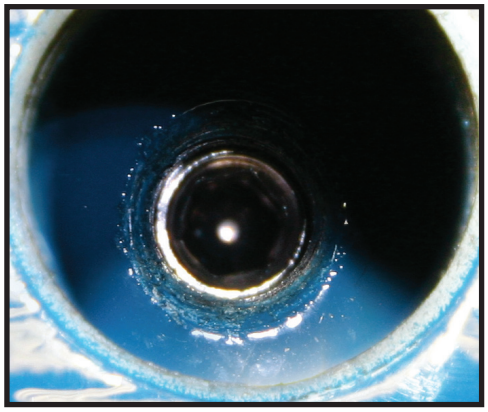


The first set screw (A) directly opposite the row of dowel pins should be visible through the top adapter hole.

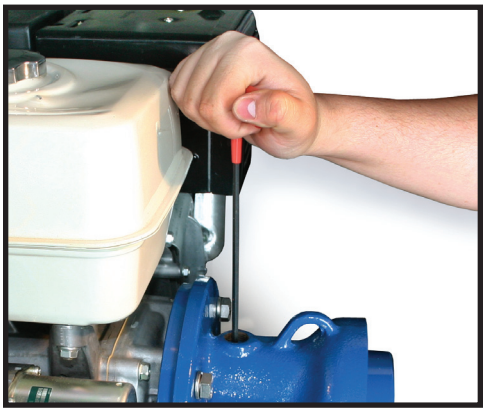


Tighten this set screw (A) with the T-handle hex key.

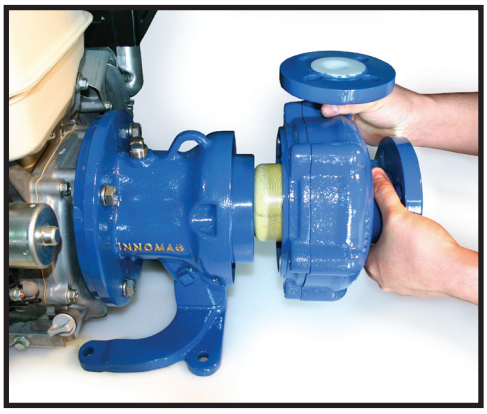
Grab the opposite side of the outer magnet assembly and rotate it 90 degrees counter-clockwise.



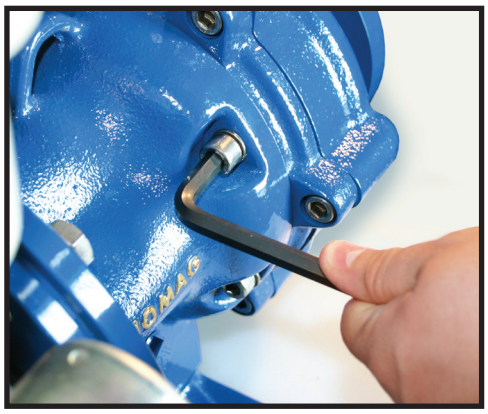
Locate the second set screw on the on the outer magnet assembly.



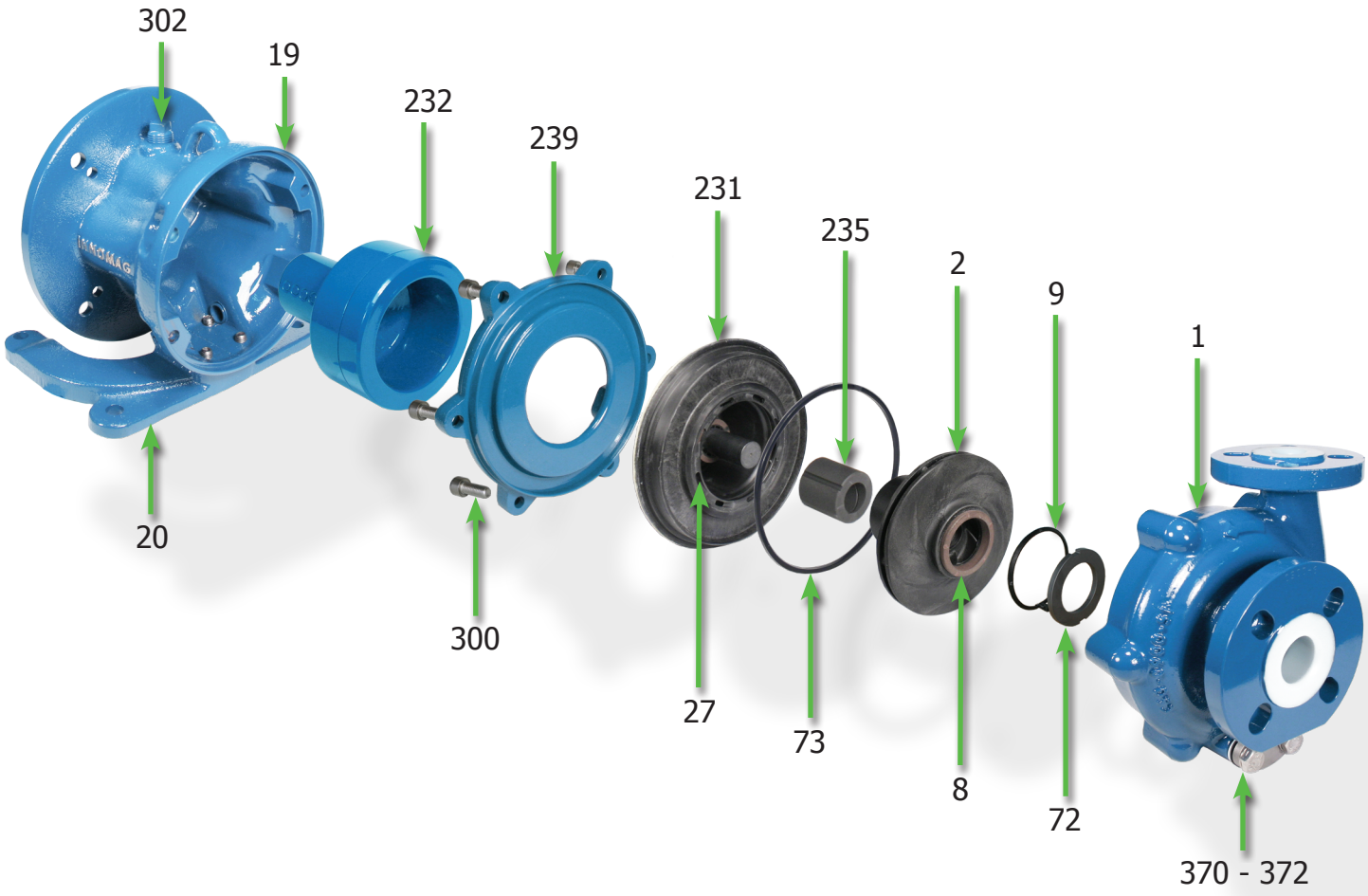
Tighten this set screw (B).



Insert the wet end into the drive end in a straight line.



Insert the (4) socket head cap screws connecting the adapter to the wet end. Torque to 20 ft-lbs (27 N.m).



Item #	Qty	Part Name	Standard Material	Optional Material
1	1	Casing	Ductile Iron / ETFE Lining	Ductile Iron / PFA Lining
2	1	Impeller magnet Assembly	CFR / ETFE	PFA
8	1	Wear Ring (Included w/ #2)	CFR / PTFE	Silicon Carbide
9	1	Retaining Ring	CFR / ETFE	PFA
19	1	Adapter	Ductile Iron	None
20	1	Riser, Pump	Ductile Iron	None
27	1	Particulate Control Ring	CFR / ETFE	None
72	1	Collar, Front Thrust	Silicon Carbide	None
73	1	Gasket, O-Ring	FEP / FKM Core	FKM (Fluorocarbon)
231	1	Shell, Containment	CFR / ETFE / Aramid Reinforced	PFA / Aramid Reinforced
	1	Shaft (Included w/ #231)	Silicon Carbide	None
	1	Collar, Back Thrust (Included w/ #231)	CF-PTFE	Silicon Carbide
232	1	Magnet Assembly, Outer	Ductile Iron / Neodymium Iron	None
235	1	Bushing, Bearing	Carbon Graphite	Silicon Carbide
239	1	Ring, Containment	Ductile Iron	None
300	10	M10 Socket Cap Screw	304 SS	None
302	1	Plug	304 SS	None
370	1	Drain Flange	304 SS	None
371	1	Drain Gasket	PTFE	None
372	1	Drain Gasket Backing	Neoprene	None

Material Description and Properties

CF-ETFE	Property	Units	Amount
Carbon Fiber Reinforced Ethylene Tetrafluoroethylene (CF-ETFE) is the standard fluoropolymer plastic used to make our impeller and containment shell. In addition to high chemical resistance, this thermoplastic offers greater mechanical strength over other fluoropolymers.	Specific Gravity	N/A	1.74
	Working Temperature Range	°F	-20 to 250
	Tensile Strength	PSI	11700
	Tensile Elongation	%	3.0 to 5.0
	Flexural Strength	PSI	19000
	Flexural Modulus	PSI	1500000
	Izod Impact Cut Notch (1/8")	FT-LB / IN	6.00
	Izod Impact (Unnotched)	FT-LB / IN	20.0 to 23.0

Alpha Sintered Silicon Carbide (SiC)	Property	Units	Amount
Alpha Sintered Silicon Carbide (SiC) is by far the strongest, hardest, most corrosion resistant ceramic available today. It's produced by pressure-less sintering of ultra-pure micron powder at temperatures above 3600 °F. The finished part is a fine grain, lightweight, extremely hard material that can out perform any super alloy.	Density	g/cm^3	3.1
	Hardness	Kg/mm^2	2600
	Flexural Strength	Mpa	395
	Compressive Strength	Mpa	3400

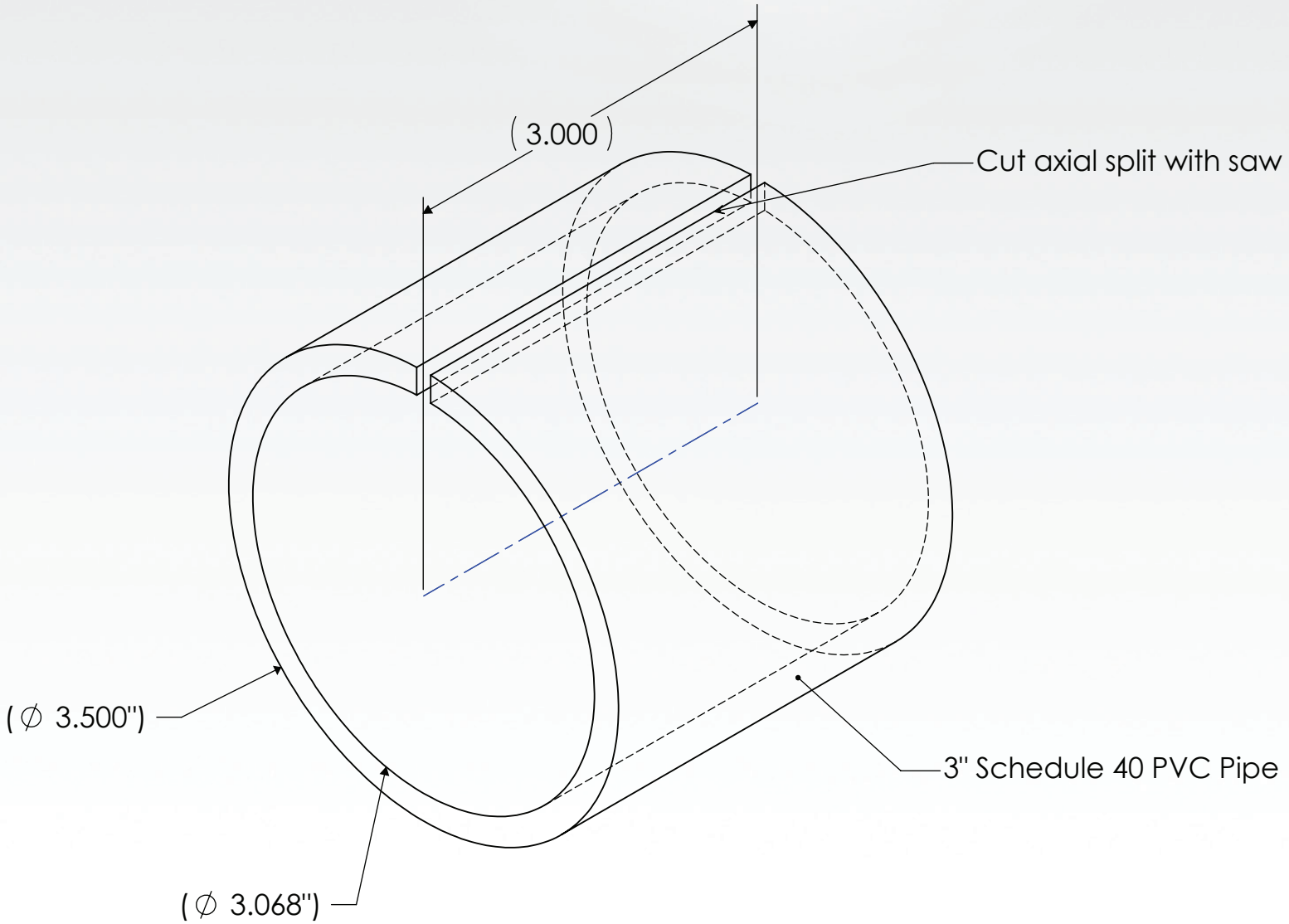
FEP / FKM (Fluorocarbon) Core	Property	Units	Amount
FKM is the designation for about 80% of fluorinated elastomers. All FKMs contain vinylidene fluoride as a monomer. Fluoroelastomers are used for their superior heat and chemical resistance.	Specific Gravity	N/A	2.15
	Working Temperature Range	°F	-20 to 300
	Tensile Strength	PSI	4050
	Compressive Strength	PSI	2200
	Flexural Modulus	PSI	92000

Ductile Iron	Property	Units	Amount
Ductile Iron is Cast Iron with spheroidal graphite. Its chemical composition and percent of carbon is about the same as grey iron. The transformation to ductile iron occurs when molten grey iron is treated with magnesium. The insertion of magnesium into the pouring ladle transforms the Fe3C flakes into spheroids. These spheroids strengthen the metal by acting as crack arresters.	Tensile Strength	PSI	65000
	Yield Strength	PSI	45000
	Elongation	%	12
	Hardness	BHN	200

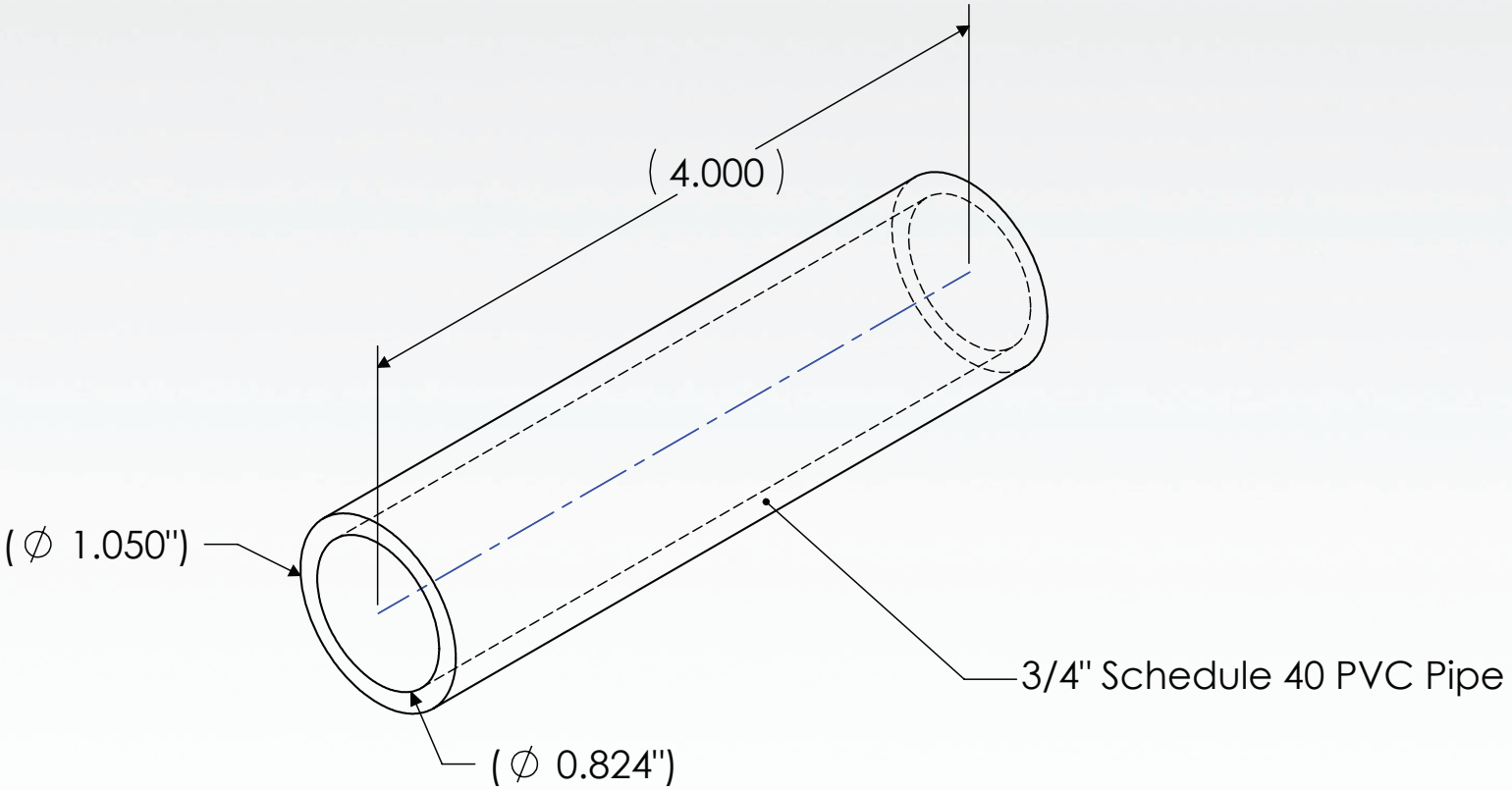
CFR / PTFE	Property	Units	Amount
Polytetrafluoroethylene (PTFE) is a synthetic fluoropolymer which finds numerous applications. Water-containing substances do not wet PTFE, therefore adhesion to PTFE surfaces is inhibited.	Specific Gravity	N/A	2.09
	Tensile Strength	PSI	3500
	Compressive Strength	PSI	4300
	Tensile Elastic Modulus	PSI	12800

Pure ETFE	Property	Units	Amount
Ethylene tetrafluoroethylene (ETFE) is the standard fluoropolymer plastic used to line our casings. When rotomolded, ETFE is mechanically bonded to the ductile iron casing, giving the absolute best connection and durability far superior to conventional blown and compression molding.	Specific Gravity	N/A	1.78
	Working Temperature Range	°F	-20 to 250
	Tensile Strength	PSI	6700
	Tensile Elongation	%	150 - 300
	Flexural Modulus	PSI	145000

U-Mag Trimming Sleeve



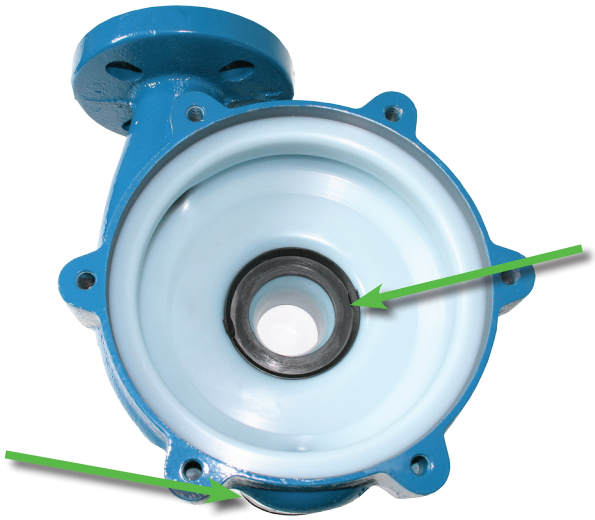
U-Mag Bushing Installation / Removal Tool



Item # 1 - Casing

Standard Casing Lining: ETFE Drain: No
Option 1 Casing Lining: ETFE Drain: Yes
Option 2 Casing Lining: PFA Drain: No

Model	Size / Description	Part #	Part #	Part #
U0	1.5 x 1" (40 x 25mm) ANSI, ISO, JIS	CSG-0900-SI	CSG-0901-SI	CSG-0900-PI
UL	1.5 x 1" LF (40 x 25mm) ANSI, ISO, JIS	CSG-0900-LF	CSG-0901-LN	CSG-0900-PF
U1	2 x 1.5" (50 x 40mm) ANSI, ISO, JIS	CSG-0910-SI	CSG-0911-SI	CSG-0910-PI
U3	3 x 2.5 - ANSI class 150	CSG-0930-SI	CSG-0931-SI	CSG-0930-PI
U3	80 x 65mm - ISO PN 16	CSG-0932-SI	CSG-0933-SI	CSG-0932-PI
U3	80 x 65mm - JIS 10 kg/cm^2	CSG-0934-SI	CSG-0935-SI	CSG-0934-PI
U4	2.5 x 2" (65 x 50mm) ANSI, ISO, JIS	CSG-0940-SI	CSG-0941-SI	CSG-0940-PI



Item # 1 - Casing, Complete

Standard Casing Lining: ETFE Thrust Collar: SiC Drain: No
Option 1 Casing Lining: ETFE Thrust Collar: SiC Drain: Yes
Option 2 Casing Lining: PFA Thrust Collar: SiC Drain: No

Model	Size / Description	Part #	Part #	Part #
U0	1.5 x 1" (40 x 25mm) ANSI, ISO, JIS	CSG-0900-AA	CSG-0901-AA	CSG-0900-PA
UL	1.5 x 1" LF (40 x 25mm) ANSI, ISO, JIS	CSG-0900-LA	CSG-0901-LB	CSG-0900-PB
U1	2 x 1.5" (50 x 40mm) ANSI, ISO, JIS	CSG-0910-AA	CSG-0911-AA	CSG-0910-PA
U3	3 x 2.5 - ANSI class 150	CSG-0930-AA	CSG-0931-AA	CSG-0930-PA
U3	80 x 65mm - ISO PN 16	CSG-0932-AA	CSG-0933-AA	CSG-0932-PA
U3	80 x 65mm - JIS 10 kg/cm^2	CSG-0934-AA	CSG-0935-AA	CSG-0934-PA
U4	2.5 x 2" (65 x 50mm) ANSI, ISO, JIS	CSG-0940-AA	CSG-0941-AA	CSG-0940-PA

Includes wear ring
(not replaceable)

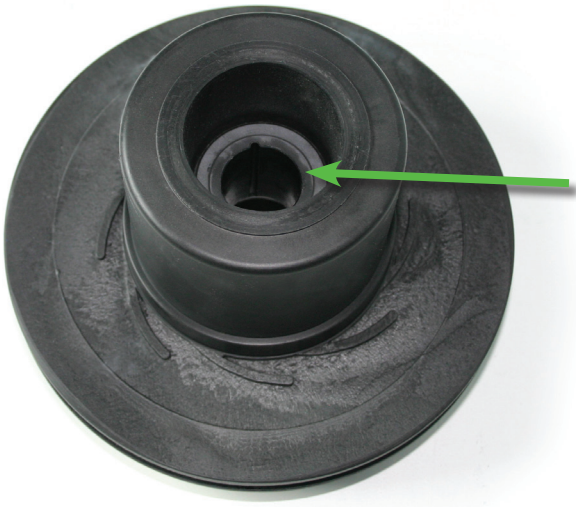
Item # 2 - Impeller

Standard
Impeller Body: CF-ETFE
Wear Ring: CF-PTFE

Option 1
Impeller Body: CF-ETFE
Wear Ring: SiC

Option 2
Impeller Body: Pure PFA
Wear Ring: SiC

Model	Size	Part #	Part #	Part #
U0	1.5 x 1 x 5" (40 x 25 x 127mm)	IMA-0900-SI	IMA-0901-SI	IMA-0903-SI
UL	1.5 x 1 x 5" LF (40 x 25 x 127mm)	IMA-0900-SI	IMA-0901-SI	IMA-0903-SI
U1	2 x 1.5 x 6" (50 x 40 152mm)	IMA-0910-SI	IMA-0911-SI	IMA-0913-SI
U3	3 x 2.5 x 6" (80 x 65 x 152mm)	IMA-0930-SI	IMA-0931-SI	IMA-0933-SI
U4	2.5 x 2 x 6" (65 x 50 x 152mm)	IMA-0940-SI	IMA-0941-SI	IMA-0934-SI



Includes wear ring
(not replaceable)

Also includes item # 235
bushing, bearing installed

Item # 2 - Impeller Magnet, Complete

Standard
Impeller Body: CF-ETFE
Wear Ring: CF-PTFE
Bushing: Carbon

Option 1
Impeller Body: CF-ETFE
Wear Ring: SiC
Bushing: SiC

Option 2
Impeller Body: CF-ETFE
Wear Ring: CF-PTFE
Bushing: SiC

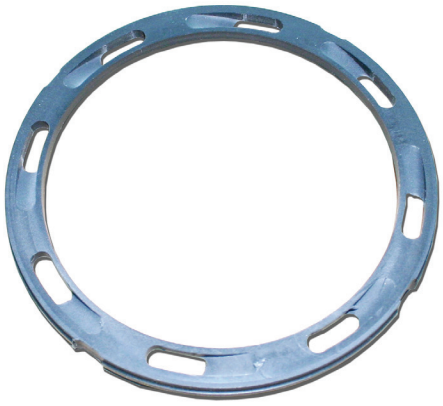
Option 3
Impeller Body: Pure PFA
Wear Ring: SiC
Bushing: SiC

Model	Size / Description	Part #	Part #	Part #	Part #
U0	1.5 x 1 x 5" (40 x 25 x 127mm)	IMA-0900-AA	IMA-0901-AA	IMA-0902-AA	IMA-0903-AA
UL	1.5 x 1 x 5" LF (40 x 25 x 127mm)	IMA-0900-AA	IMA-0901-AA	IMA-0902-AA	IMA-0903-AA
U1	2 x 1.5 x 6" (50 x 40 152mm)	IMA-0910-AA	IMA-0911-AA	IMA-0912-AA	IMA-0913-AA
U3	3 x 2.5 x 6" (80 x 65 x 152mm)	IMA-0930-AA	IMA-0931-AA	IMA-0932-AA	IMA-0933-AA
U4	2.5 x 2 x 6" (65 x 50 x 152mm)	IMA-0940-AA	IMA-0941-AA	IMA-0942-AA	IMA-0943-AA

Item # 9 - Retaining Ring, Front Stationary

Standard Material: CF-ETFE **Option 1** Material: PFA

Model	Size	Part #	Part #
U0	1.5 x 1 x 5" (40 x 25 x 127mm)	RGR-0900-SI	RGR-0901-SI
UL	1.5 x 1 x 5" (40 x 25 x 127mm)	RGR-0900-SI	RGR-0901-SI
U1	2 x 1.5 x 6" (50 x 40 152mm)	RGR-0910-SI	RGR-0911-SI
U3	3 x 2.5 x 6" (80 x 65 x 152mm)	RGR-0930-SI	RGR-0931-SI
U4	2.5 x 2 x 6" (65 x 50 x 152mm)	RGR-1040-SI	RGR-0941-SI



Item # 27 - Particulate Control Ring

Standard Material: CF-ETFE

Model	Size / Description	Part #
U	U0, U1, U2, U3 & U4	SUB-1603-M0

Item # 235 - Bushing, Bearing

Standard Material: Carbon Graphite **Option 1** Material: SiC

Model	Size / Description	Part #	Part #
U	U0, U1, U2, U3 & U4	BGB-0901-SI	BGB-0900-SI

Item # 301 - Lock Washer

Standard
Material: Stainless Steel

Model	Size / Description	Part #
U	M10 Lock Washer	HDW-0901-SI

Item # 370 - Drain Flange

Standard
Material: 304 SS

Model	Size / Description	Part #
U	Flange	SUB-1280-SI

Item # 300 - Socket Head Cap Screw

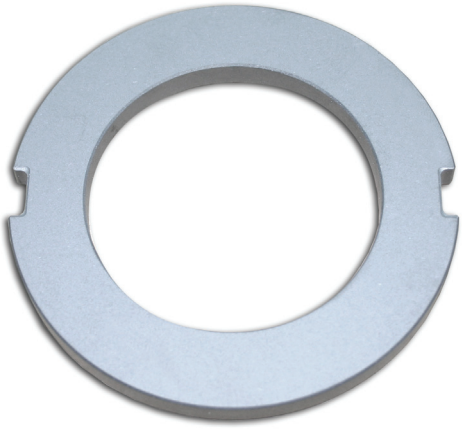
Standard
Material: SS

Model	Size / Description	Part #
U	M10-1.5X25	HDW-1055-SI
	M10-1.5X40	HDW-1056-SI
	M10-1.5X60	HDW-1057-SI

Item # 371 - Drain Gasket

Standard
Material: PTFE

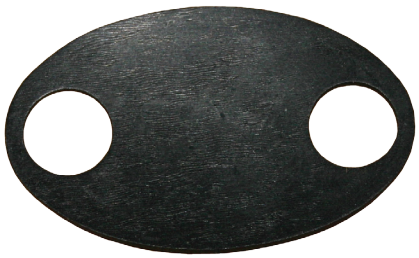
Model	Size / Description	Part #
U	Drain Gasket	GTO-1040-SI



Item # 72 - Collar, Front Thrust

Standard
Material: SiC

Model	Size / Description	Part #
U0	1.5 x 1 x 5" (40 x 25 x 127mm)	CRT-0905-SI
UL	1.5 x 1 x 5" (40 x 25 x 127mm)	CRT-0905-SI
U1	2 x 1.5 x 6" (50 x 40 152mm)	CRT-0910-SI
U3	3 x 2.5 x 6" (80 x 65 x 152mm)	CRT-0935-SI
U4	2.5 x 2 x 6" (65 x 50 x 152mm)	CRT-0940-SI



Item # 372 - Drain Gasket

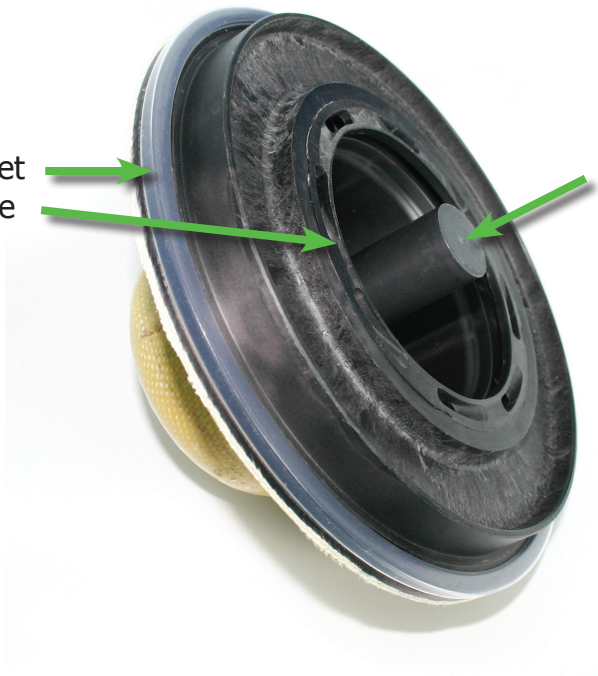
Standard
Material: Neoprene

Model	Size / Description	Part #
U	Drain Gasket Backing	GTO-1050-SI

Includes shaft and thrust collar (not replaceable)

Item # 231 - Containment Shell, Complete

		Standard		**Option 1**		**Option 2**	
		Cont. Shell:	CF-ETFE	Cont. Shell:	CF-ETFE	Cont. Shell:	PFA
		Thrust Collar:	CF-PTFE	Thrust Collar:	SiC	Thrust Collar:	SiC
		Pump Shaft:	SiC	Pump Shaft:	SiC	Pump Shaft:	SiC
Model	Size / Description	Part #		Part #		Part #	
U	U0, UL, U1, U3 & U4	SLC-0900-SI		SLC-0901-SI		SLC-0903-SI	



Includes item # 73 gasket and item # 27 particulate control ring installed.

Includes shaft and thrust collar (not replaceable)

Item # 231 - Containment Shell, Complete

		Standard		**Option 1**		**Option 2**	
		Cont. Shell:	CF-ETFE	Cont. Shell:	CF-ETFE	Cont. Shell:	PFA
		Thrust Collar:	CF-PTFE	Thrust Collar:	SiC	Thrust Collar:	SiC
		Pump Shaft:	SiC	Pump Shaft:	SiC	Pump Shaft:	SiC
Model	Size / Description	Part #		Part #		Part #	
U	U0, UL, U1, U3 & U4 With FKM Gasket	SLC-0900-AA		SLC-0901-AA		SLC-0903-AA	
	With FEP/FKM encapsulated Gasket	SLC-0910-AA		SLC-0911-AA		SLC-0913-AA	
	With EPDM Gasket	SLC-0920-AA		SLC-0921-AA		SLC-0923-AA	

Item # 19 - Adapter

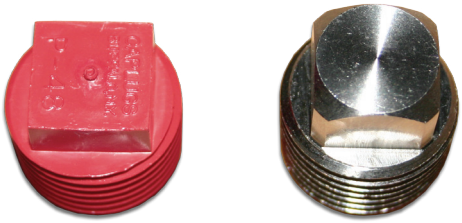
Standard
Material: Ductile Iron

Model	Size / Description	Part #
U	NEMA - 56C thru 213/15TC	ADP-0900-SI
	IEC - 80 thru 112 Frame	ADP-0905-SI
	Mounting Plate, IEC 132 Frame	ADP-0910-SI

Item # 20 - Foot, Adapter

Standard
Material: Ductile Iron

Model	Size / Description	Part #
U	NEMA - 56C thru 213/15TC	FTA-0900-SI
	5.25" Centerline Riser Block	FTA-0905-SI
	6.10" Centerline Riser Block	FTA-0910-SI
	7.10" Centerline Riser Block	FTA-0911-SI



Item # 302 - Plug

Standard
Material: P. E. - SS

Model	Size / Description	Part #
U	Top of Adapter	HDW-1230-SI
	Bottom of Adapter	HDW-1500-SI

Item # 73 - Gasket, O-Ring

Standard
Material: FEP/FKM

Option 1
Material: FKM

Option 2
Material: EPDM

Model	Size / Description	Part #	Part #	Part #
U	U0, UL, U1, U3 & U4	GTO-0903-SI	GTO-0904-SI	GTO-0905-PI

Item # 232 - Magnet Assembly, Outer

Standard
Ductile Iron / NdFeB Magnets

Model	Size	Part #	3500 rpm	2900 rpm	1750 rpm	1450 rpm
U	A - NEMA 56C (0.625" dia.)	MA0-0901-SI	5 hp (3.7kW)	4.1 hp (3.1kW)	2.5 hp (1.9kW)	2.1 hp (1.6kW)
	B - NEMA 143/5TC(0.875" dia.)	MA0-0902-SI	5 hp (3.7kW)	4.1 hp (3.1kW)	2.5 hp (1.9kW)	2.1 hp (1.6kW)
	C - NEMA 182/4TC(1.125" dia.)	MA0-0904-SI	10 hp (7.5kW)	8.3 hp (6.2kW)	5.0 hp (3.7kW)	4.1 hp (3.1kW)
	D - NEMA 213/5TC(1.375" dia.)	MA0-0905-SI	10 hp (7.5kW)	8.3 hp (6.2kW)	5.0 hp (3.7kW)	4.1 hp (3.1kW)
	D1 - NEMA 213/5TC High Torque	MA0-0908-SI	14 hp (10.4kW)	11.7 hp (8.7kW)	7.0 hp (5.2kW)	5.8 hp (4.4kW)
	E1 - NEMA 254/6 TC (1.625" dia.)	MA0-0907-SI	14 hp (10.4kW)	11.7 hp (8.7kW)	7.0 hp (5.2kW)	5.8 hp (4.4kW)
	M - IEC 80 (19mm dia.)	MA0-0911-SI	5 hp (3.7kW)	4.1 hp (3.1kW)	2.5 hp (1.9kW)	2.1 hp (1.6kW)
	N - IEC 90S/L (24mm dia.)	MA0-0912-SI	5 hp (3.7kW)	4.1 hp (3.1kW)	2.5 hp (1.9kW)	2.1 hp (1.6kW)
	P - IEC 100L/112M (28mm dia.)	MAO-0914-SI	10 hp (7.5kW)	8.3 hp (6.2kW)	5.0 hp (3.7kW)	4.1 hp (3.1kW)
	R - IEC 132 (38mm dia.)	MA0-0915-SI	10 hp (7.5kW)	8.3 hp (6.2kW)	5.0 hp (3.7kW)	4.1 hp (3.1kW)
	R1 - IEC 132 High Torque	MA0-0916-SI	14 hp (10.4kW)	11.7 hp (8.7kW)	7.0 hp (5.2kW)	5.8 hp (4.4kW)
	X – 1" Diameter Bore	MA0-0906-SI	10 hp (7.5kW)	8.3 hp (6.2kW)	5.0 hp (3.7kW)	4.1 hp (3.1kW)

Item # 239 - Ring, Containment

Standard
Material: Ductile Iron

Model	Size / Description	Part #
U	U0, UL, U1, U3 & U4	RGC-0900-SI

Problem	Symptoms	Cause	Remedy
Liquid is not being pumped	No suction or discharge pressure. Pump power usage is very low.	Pump not primed	Re-prime pump and verify that suction pipe is full of liquid. Check the suction pipe for high points that can trap air.
	Suction gauge reads much lower than normal.	Suction pipe clogged	Confirm that any suction valves or control valves are not stuck shut. Inspect suction pipe for blockage.
	Suction gauge reads normal. Pump generates full discharge pressure but no flow.	Discharge pipe clogged	Confirm that any discharge valves or control valves are not stuck shut. Inspect discharge pipe for blockage.
	Discharge pressure is only slightly higher than suction pressure.	Clogged impeller	Open pump and clear blockage from impeller.
	No discharge pressure. Pump makes a loud buzzing noise. Increased vibration	De-coupled impeller	Shut off pump. Verify that the motor spins smoothly by hand. If motor will not spin by hand, open pump for inspection. If motor spins by hand, confirm that the impeller is sized for operating conditions and liquid specific gravity. Verify the viscosity of the liquid is not too high. Impeller or outer magnet may be weakened if overheated.
	Pump generates full discharge pressure but no flow. Pump casing and pipes immediately before and after pump heat up.	Head requirement higher than anticipated / Undersized impeller	Confirm than discharge line is not blocked or valve is not stuck shut. Pump may require a larger impeller to overcome system head.
Pump not delivering desired head or flow	Suction pressure is negative. (Gauge pressure) Discharge pressure is lower than normal.	Air leak in suction line	Locate and seal the air leak.
	Discharge pressure is lower than normal. Flow rate is decreased. Pump is noisy. Increased vibration.	Insufficient NPSH	Check liquid level in suction tank. Check suction piping for restrictions, or obstructions. Verify vapor pressure and temperature of process liquid. Pump should be located as close to the source as possible.
	Discharge pressure is lower than normal. Flow is reduced.	Backwards rotation	Verify motor rotation and correct if necessary.
	Pump does not reach desired flow rate.	Head requirement higher than anticipated / Undersized impeller	Increase impeller size or motor speed
	Suction gauge is very low.	Strainer device is full / clogged (if equipped).	Clean / empty strainer basket.
Pump starts, then stops pumping	Discharge pressure rises then falls. Pump power usage is very low after pressure drops.	Pump not properly primed	Re-prime pump and verify that suction pipe is full of liquid. Verify there are no high points in suction pipe that can trap air.
	Discharge pressure rises then falls. Pump makes a loud buzzing noise. Increased vibration	De-coupled impeller	Confirm that the impeller is sized for operating conditions and liquid specific gravity. Verify the viscosity of the liquid is not too high. Impeller assembly or outer magnet may be weakened if overheated.
	Pump operated normally but stops pumping & loses prime. Pump will not run until priming chamber is re-filled.	Suction pipe volume too large for priming chamber	Calculate volume of the suction pipe. It is recommended that the priming chamber volume should be 3 times the suction pipe volume. Decrease suction pipe volume. Move pump closer to source

Problem	Symptoms	Cause	Remedy
Pump uses excessive power	Burning smell coming from back of pump	Outer magnet installed improperly	Confirm that the groove on the outer drive lines up with the edge of the adapter.
	Decreased flow. High power consumption. High vibration. Noisy operation	Damaged or broken wear ring	Inspect the pump and replace damaged components.
	Pump delivers the required flow and head but power consumption is high. High discharge pressure.	Specific Gravity or viscosity higher than expected.	Determine liquid viscosity and specific gravity. Verify the actual power consumption is correct.
	Pump delivers the required head, operates normally. Discharge pressure will be lower if head requirement is lower than anticipated.	Flow is higher than expected. Required head is lower than rated head.	Verify flow with instrumentation or batch cycle time and adjust as needed.
	Pump will produce the rated flow. Discharge head may be decreased. Power will be higher.	Clogged thrust balancing passages in impeller	Open pump and clean blockage from groves in between the impeller and bushings.
Pump is noisy or vibrates	No discharge pressure. Pump makes a loud buzzing noise. Increased vibration	De-coupled impeller	Shut off pump. Verify that the motor spins smoothly by hand. If motor will not spin by hand, open pump for inspection. If motor spins by hand, confirm that the impeller is sized for operating conditions and liquid specific gravity. Verify the viscosity of the liquid is not too high. Impeller or outer magnet may be weakened if overheated.
	Flow and head are normal, Pump or pipes vibrate	Piping or pump not properly anchored	Tighten mounting bolts on pump feet and base plate. Confirm that the suction and discharge pipes are properly supported per Hydraulic Institute recommendations.
	Discharge pressure is lower than normal. Flow rate is decreased. Pump is noisy. Increased vibration.	Insufficient NPSH / pump is cavitating	Check liquid level in suction tank. Check suction piping for restrictions, or obstructions. Verify vapor pressure and temperature of process liquid. Pump should be located as close to the source as possible.
	Discharge pressure may be lower than normal. Flow rate may be decreased. Increased vibration.	Partially clogged impeller is unbalanced	Open pump and clear blockage from impeller.

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