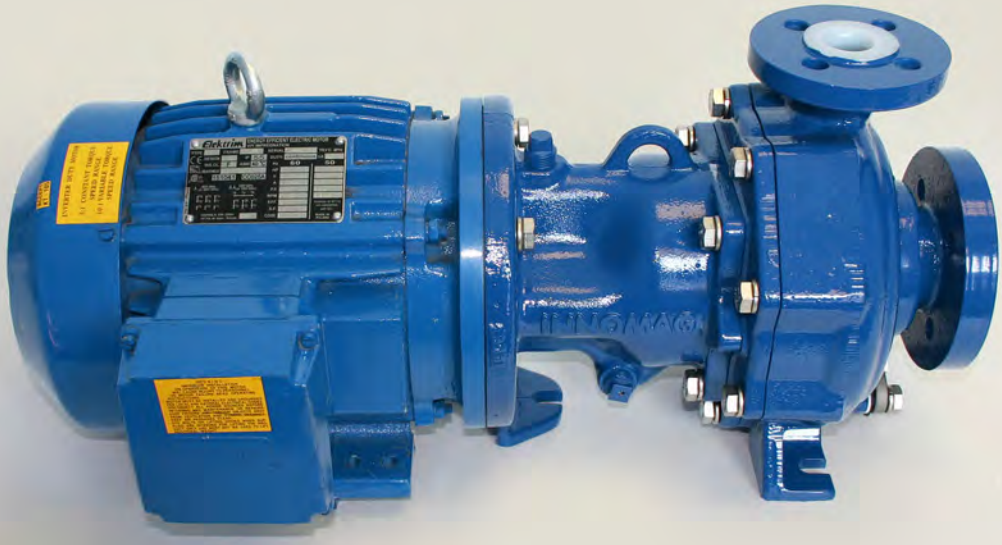
TBMAG
Revolutionary
Thrust-Balanced Design

Installation, Operation & Maintenance Manual



INNOMAG
ADVANCED SEALLESS PUMPS

COVERS MODELS:

A1 - 1.5 x 1 x 6

AL - 1.5 x 1 x 6 LF

A3 - 3 x 1.5 x 6

A4 - 3 x 2 x 6

B1 - 1.5 x 1 x 8

BL - 1.5 x 1 x 8 LF

B3 - 3 x 2 x 6 Short

B4 - 3 x 1.5 x 8

B5 - 3 x 2 x 6 Tall

B6 - 4 x 3 x 6

C1 - 3 x 2 x 8

C2 - 4 x 3 x 8

C3 - 2 x 1 x 10

CL - 2 x 1 x 10 LF

C4 - 3 x 1.5 x 10

C5 - 3 x 2 x 10

C6 - 4 x 3 x 10

C7 - 4 x 3 x 10 H

C8 - 6 x 4 x 10 H

C9 - 6 x 4 x 8

E1 - 50 x 32 x 160 mm

EL - 50 x 32 x 160 mm LF

E3 - 65 x 50 x160 mm

F1 - 50 x 32 x 200 mm

FL - 50 x 32 x 200 mm LF

F4 - 65 x 40 x 200 mm

G2 - 100 x 65 x 200 mm

V1 - 2 x 1.5 x 6 V

W1 - 2 x 1.5 x 8 V

W3 - 3 x 2 x 6 V

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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 rules.

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.

EU marking. Explosion-protected equipment must be identified for work in potentially explosive areas.

Enhance the protection of yourself, as well as your new TB-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.

A pump must only be installed in a system designed for its intended use. Equipment which is operated in potentially explosive atmospheres must adhere to all explosion protection regulations.

Any pump installed or used outside of the service or system it was designed for is strictly prohibited.

Always pay constant attention to safety. Remember all pumps have the potential for danger. Be aware of the following factors which pertain to your new INNOMAG pump:

HIGH TEMPERATURES may be present. Pump surface temperature is directly related to the temperature of the working fluid. Never operate pump above the rated temperature of 250°F (121°C)

HIGH PRESSURES may be present.

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

NEVER run this pump dry. Use diamond-like-coated (DLC) parts for additional protection from dry running. DLC does not guarantee protection from dry running.

NEVER operate this pump with the suction and / or discharge valve closed as this may lead to high surface temperatures.

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

NEVER change conditions of service without approval of authorized INNOMAG distributor or INNOMAG.

NEVER remove "Warnings" that are displayed on the pump.

Equipment which is operated in potentially explosive atmospheres must adhere to all explosion protection regulations.

Pump parts are rotating at **HIGH SPEEDS**.

HIGHLY CORROSIVE and/or toxic chemicals may be present.

NEVER operate pump if there are visible signs of leakage.

NEVER loosen flange connection while system is under pressure.

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

ALWAYS know the EMERGENCY STOP location for this pump.

EXCESSSIVE amounts of dust collected on the pump housing may lead to an increase in surface temperature, possibly exceeding temperature limits. May require regular cleaning.

Cleaning & Maintenance Precautions

When operating with **CHARGABLE LIQUIDS** with conductivities of <10-8 S/m, inert gases (e.g. nitrogen) must be used to flush the pump. Before removal of the pump it is recommended to wait one hour to allow static peak charges to be eliminated.

NEVER attempt cleaning while pump is operating.

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

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

NEVER USE FORCE during installation, operation or maintenance or the pump.

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.

ONLY PROPER TOOLING should be used in strict according with Innomag IOM.

If **ABRASIVE SOLIDS** are present within the fluid, additional wear of the pump should be expected. Intervals between inspections should be shortened compared to usual times.

PACKAGING

- Units are Mounted to skids with full ¾" OSB tops rated for export using SS bolts/washers/nuts
- Wrapped in transparent waterproof plastic wrapping
- Labeled with corresponding shipping and order information
- Skid Dimensions (All dimensions in inches) 36x36 (46lbs), 48x48 (60lbs)
- Appropriate warning labels are attached

FOR INTERNATIONAL EXPORT:

- Skids are covered in heavy-duty cardboard boxing
- Re-wrapped in waterproof plastic wrapping

Export rules and regulations apply.

EXPORT LICENSE may be required!

RECEIVING

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

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.

DANGER

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

Note

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 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.

STORAGE

If storage is required, do not remove packaging. Place unit in a dry and covered area. Pump suction and discharge flanges are all fitted with plywood flange covers designed to keep solids out. See photo on left.

Long term storage of INNOMAG pumps requires no additional procedures. For all non-INNOMAG equipment such as motors and power monitors consult each corresponding manual and follow manufacturer's standard. Use of conservation agents on machined surfaces or desiccants may be necessary.

PUMP IDENTIFICATION TAGS

Every INNOMAG pump unit has a nameplate to provide information on your pump. The nameplates are located on the side of each casing. It is recommended that the purchaser record the serial number and use it for reference when requesting information or service parts from INNOMAG.

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

Pump Model Number: TB-mag A, B or C

Pump Code: Example - A1___11100

Serial Number: Example - 29421

Impeller Diameter / Max Impeller Diameter (in. or mm.)

Duty Point (GPM @ FT. or M3 @ M)

Material Specific Gravity and Temperature (°F or °C)

____Pump RPM / _____Pump power (HP or kW) @ Duty Point

Design Pressure @ 100 °F

Customer Pump # _____

Material Being Pumped _____

CE Marking: Innovative Mag-Drive, LLC (Innomag) pumps are certified to ATEX 95 classification: Group II, Category 2, Gas, T4 121 ° C

LF = Low Flow V = Vertical H = High Flow

Drive Torque - available drives per pump size.

Wet End | A1 | 665 | 1 | 1 | 1 | 0 | 0 | - | A | E | 1 | **Drive End**

TB-Mag Models

Code	Pump Size	STD.	Drive Torque	Max.	Min.
A1	(1.5 x 1 x 6)	AA	0,1	6.65″	4.00″
AL	(1.5 x 1 x 6 LF)	AA	0,1	6.65″	4.00″
A3	(3 x 1.5 x 6)	AB	0,1	6.65″	4.00″
A4	(3 x 2 x 6)	--	0,1	6.65″	4.00″
B1	(1.5 x 1 x 8)	AA	0,1	8.25″	5.50″
BL	(1.5 x 1 x 8 LF)	AA	0,1	8.25″	5.50″
B3	(3 x 2 x 6)	--	0,1	7.00″	5.50″
B4	(3 x 1.5 x 8)	A50	0,1	8.25″	5.50″
B5	(3 x 2 x 6)	A10	0,1	7.00″	5.50″
B6	(4 x 3 x 6)	--	0,1	7.00″	5.50″
C1	(3 x 2 x 8)	A60	0,1	8.25″	5.50″
C2	(4 x 3 x 8)	A70	0,1	8.25″	5.50″
C3	(2 x 1 x 10)	A05	0,1	10.5″	5.50″
CL	(2 x 1 x 10 LF)	A05	0,1	10.5″	5.50″
C4	(3 x 1.5 x 10)	A50	0,1	10.5″	5.50″
C5	(3 x 2 x 10)	A60	0,1	10.5″	5.50″
C6	(4 x 3 x 10)	A70	0,1,2	10.5″	5.50″
C7	(4 x 3 x 10 H)	A70	0,1,2	10.5″	8.00″
C8	(6 x 4 x 10 H)	A80	0,1,2	10.5″	8.00″
C9	(6 x 4 x 8)	A80	0,1,2	8.25″	5.50″
V1	(2 x 1.5 x 6 V)	2015/15	0,1	6.65″	4.00″
W1	(2 x 1.5 x 8 V)	2015/15	0,1	8.25″	5.50″
W3	(3 x 2 x 6 V)	--	0,1	7.00″	5.50″

Impeller Diameter

* 6.65 inches, (example: 665 = 6.65″)

* Impeller trim for ANSI models must be specified in inches.

Bearing System

	Bushing	Shaft, Pump
s 1	SiC	SiC

Wear Rings / Thrust Collar System

	Impeller Wear Rings	Cont. Shell Wear Ring	Casing Wear Ring	Thrust Collar
s 1	SiC	SiC	SiC	CF PTFE
2	SiC	SiC	CF PTFE	SiC
3	SiC	SiC	SiC	SiC
C9 5	CF PTFE	SiC		SiC
C9 6	SiC	SiC		SiC

Gasket (All gaskets are 0.210″ square cross section)

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

Flange Options

s 0	ANSI Dimension Pump Drilled w / ANSI (Class 150) Flanges
1	ANSI Dimension Pump Drilled w / ANSI (Class 300) Flanges
2	ANSI Dimension Pump Drilled w / ISO / DIN (PN16) Flanges
3	ANSI Dimension Pump Drilled w / JIS (10 kg/cm^2) Flanges

Material Options

	Impeller Body	Casing Casting / Lining	Casing Drain	Containment Shell Lining / Composite	Impeller Torque
s 0	CF ETFE	D.I. / ETFE	Yes	CF-ETFE / Aramid Composite	Standard
1	CF ETFE	D.I. / ETFE	No	CF-ETFE / Aramid Composite	Standard
c 4	CF ETFE	D.I. / ETFE	Yes	CF-ETFE / Aramid Composite	Ultra
c 5	CF ETFE	D.I. / ETFE	No	CF-ETFE / Aramid Composite	Ultra

C - Consult Factory for Availability C9 - C9 Pump Only S - Standard Material / Options

Option 1

0	Standard Torque
1	High Torque
2	Ultra High Torque *

* Ultra High Torque is for "K,W" Motor Frame! Refer to Torque Rating Table on the following page for Torque Values

Motor Frame

NEMA C-Face

A	56C	(A-Series Only)
B	143/5TC	
C	182/4TC	
ta D	213/5TC	
ta E	254/6TC	(Max. A-Series)
F	254/6 (4 Pole) 284/6TSC	(Max. B-Series)
G	324/6TSC	
H	364/365TSC	
tc J	284/6TC	
uc K	324/6TC	

IEC B5

M	80	(A-Series Only)
N	90S/L	
P	100L	
Q	112M	
ta R	132S/M	(Max. A-Series)
S	160M	
T	160M/L	(Max. B-Series)
tc U	180M/L	
tc V	200L	
uc W	225S/M	

ta - A- Series High Torque Drives
tc - B/C-Series High Torque Drives
uc - Optional Ultra High Torque Drive

Product Group

	A	TB-Mag A
	B	TB-Mag B
	C	TB-Mag C
	V	TB-Mag A Vertical
	W	TB-Mag B Vertical
LC	L	Long Couple B/C
SS	S	Secondary Seal Unit B/C

LC - Long Coupled Bearing Frame for: TB-Mag Models B1-C9, $$ Adder

SS - Long Coupled Bearing Frame Equipped with Patented Secondary Sealing System for TB-Mag Models B1-C9, $$$ Adder

Material Guide:

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

Wet End E1 | 165 | 1 | 1 | 1 | 0 | 0 - E | B | 0 **Drive End**

TB-Mag Models

Code	Pump Size	Drive Torque	Impeller Dia. (mm) Maximum	Minimum
E1	(50 x 32 x 160 mm)	0,1	169	102
EL	(50 x 32 x 160 mm LF)	0,1	169	102
E3	(65 x 50 x 160 mm)	0,1	169	102
F1	(50 x 32 x 200 mm)	0,1	210	140
FL	(50 x 32 x 200 mm LF)	0,1	210	140
F4	(65 x 40 x 200 mm)	0,1	210	140
G2	(100 x 65 x 200 mm)	0,1	210	140

Impeller Diameter

* 165 mm, (example: 165, 140)

* Impeller trim for ISO models must be specified in mm.

Bearing System

	Bushing	Shaft, Pump
s 1	SiC	SiC

Wear Rings / Thrust Collar System

	Impeller Wear Rings	Containment Shell Wear Ring	Casing Wear Ring	Thrust Collar
s 1	SiC	SiC	SiC	CF PTFE
2	SiC	SiC	CF PTFE	SiC
3	SiC	SiC	SiC	SiC

Gasket (All gaskets are 0.210" square cross section)

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

Flange Options

0	ISO Dimension Pump Drilled w / ANSI (Class 150) Flanges
1	ISO Dimension Pump Drilled w / ANSI (Class 300) Flanges
s 2	ISO Dimension Pump Drilled w / ISO / DIN (PN16) Flanges
3	ISO Dimension Pump Drilled w / JIS (10 kg/cm^2) Flanges

Material Options

	Impeller Body	Casing Casting / Lining	Casing Drain	Containment Shell Lining / Composite	Impeller Torque
s 0	CF PTFE	D.I. / ETFE	Yes	CF-ETFE / Aramid Composite	Standard
1	CF PTFE	D.I. / ETFE	No	CF-ETFE / Aramid Composite	Standard

C - Consult Factory for Availability

S - Standard Material / Options

Option 1

0	Standard Torque
1	High Torque
2	Ultra High Torque *

* Ultra High Torque is for "K,W" Motor Frame!
Refer to Torque Rating Table for Torque Values

Motor Frame

NEMA C-Face

	A	56C	(A-Series Only)
	B	143/5TC	
	C	182/4TC	
ta	D	213/5TC	
ta	E	254/6TC	(Max. A-Series)
	F	254/6 (4 Pole) 284/6TSC	(Max. B-Series)
	G	324/6TSC	
	H	364/365TSC	
tc	J	284/6TC	
uc	K	324/6TC	

IEC B5

	M	80	(A-Series Only)
	N	90S/L	
	P	100L	
	Q	112M	
ta	R	132S/M	(Max. A-Series)
	S	160M	
	T	160M/L	(Max. B-Series)
tc	U	180M/L	
tc	V	200L	
uc	W	225S/M	

ta - A- Series High Torque Drives
tc - B/C-Series High Torque Drives
uc - Optional Ultra High Torque Drive

Product Group

	E	TB-Mag A
	F	TB-Mag B
	G	TB-Mag C
LC	L	Long Couple B/C
SS	S	Secondary Seal Unit B/C

LC - Long Coupled Bearing Frame for:
TB-Mag Models B1-C9, $$ Adder

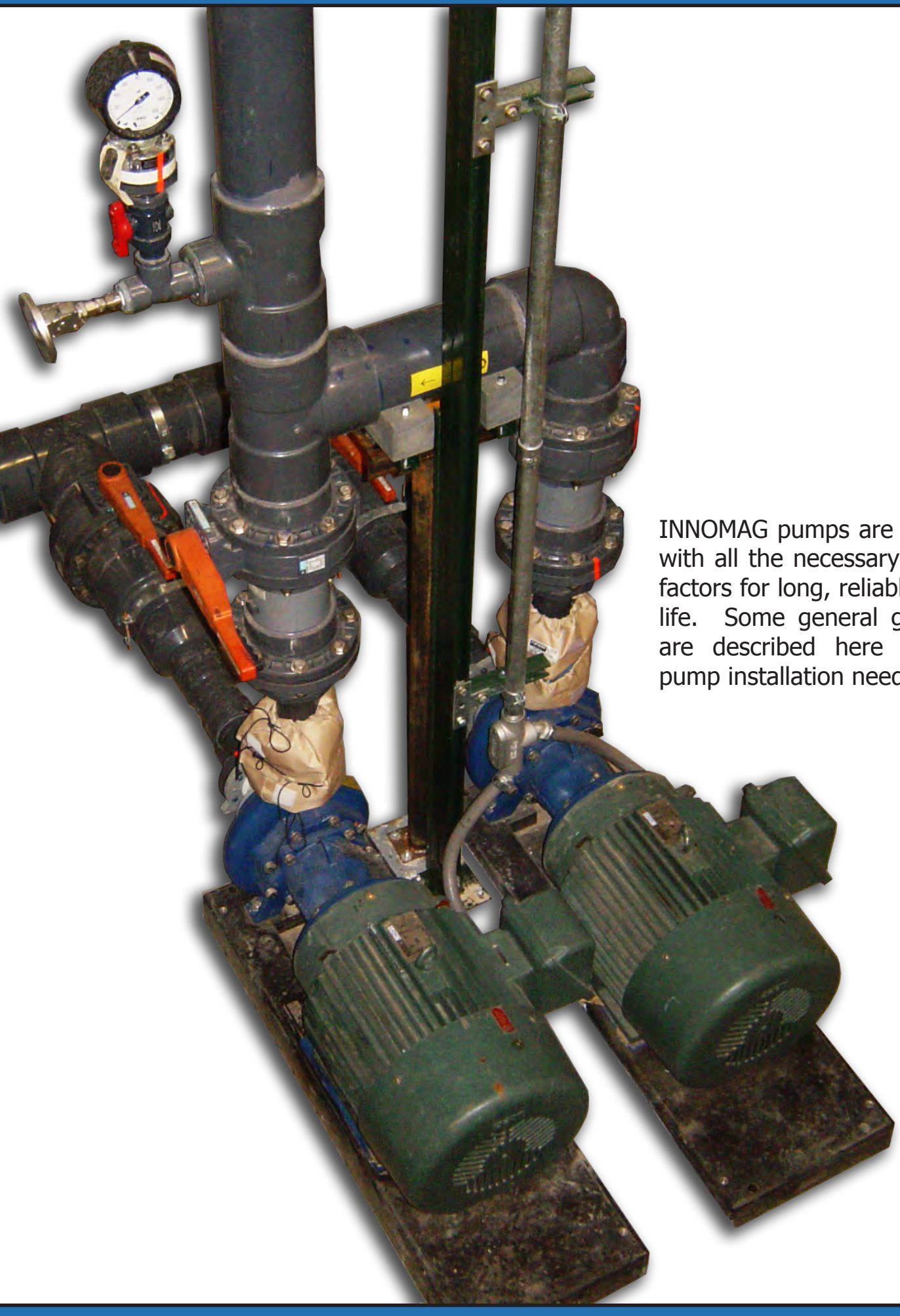
SS-Long Coupled Bearing Frame Equipped with Patented Secondary Sealing System for TB-Mag Models B1-C9, $$$ Adder

(ANSI DIMENSIONAL BEARING FRAME ONLY)

Torque Ratings (ANSI & ISO)

Pump Series	Motor Frame Option 1	3500	2900	1750	1450
TB-Mag A	A,B,C,D,M,N,P,Q,R	10.0 (7.5)	8.3 (6.2)	5.0 (3.8)	4.1 (3.1)
	D1,E1,R1	14.0 (10.4)	11.7 (8.7)	7.0 (5.2)	5.8 (4.4)
TB-Mag B	B,C,D,E,N,P,Q,R,S	20.0 (14.9)	16.6 (12.4)	10.0 (7.5)	8.3 (6.2)
	F,R1,T	30.0 (22.4)	25.0 (18.7)	15.0 (11.2)	12.5 (9.3)
TB-Mag C	B,C,D,E,N,P,Q,R,S	25.0 (18.6)	20.7 (15.5)	12.5 (9.3)	10.4 (7.7)
	F,G,J,R1,T,U,V	50.0 (37.3)	41.4 (31.1)	25.0 (18.7)	20.7 (15.5)
	J1,K1,H1,U1,V1,W	75.0 (56.0)	62.0 (46.6)	37.5 (28.0)	31.3 (23.3)
	K2,W2	100.0 (75.0)	83.0 (63.0)	50.0 (38.0)	41.0 (31.0)

Material Guide:
CF - Carbon Fiber
D.I. - Ductile Iron
ETFE - Ethylene-Tetrafluoroethylene
SiC - Silicon Carbide (Ceramic)



INNOMAG pumps are designed with all the necessary strength factors for long, reliable service life. Some general guidelines are described here for your pump installation needs.

GENERAL GUIDELINES

Piping should be arranged to allow pump flushing prior to removal of the unit on services handling corrosive or hazardous 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: 1-1/2" (9-12 ft-lbs), 2" (18-24 ft-lbs), 3" (23-30 ft-lbs), 4" (27-36 ft-lbs).

Pumps must be installed in strict accordance to the flange load ratings of each pump. No additional loads shall be applied to pump connections due to installation or maintenance. Installation requirements for gaskets and flange loadings must adhere to Innomag IOM and must comply with all local, state and federal codes.

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 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. Suction strainers must be inspected regularly and cleaned when they are found to contain debris

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 discharge line. Isolation valve allows regulation of flow and for inspection of the pump. 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

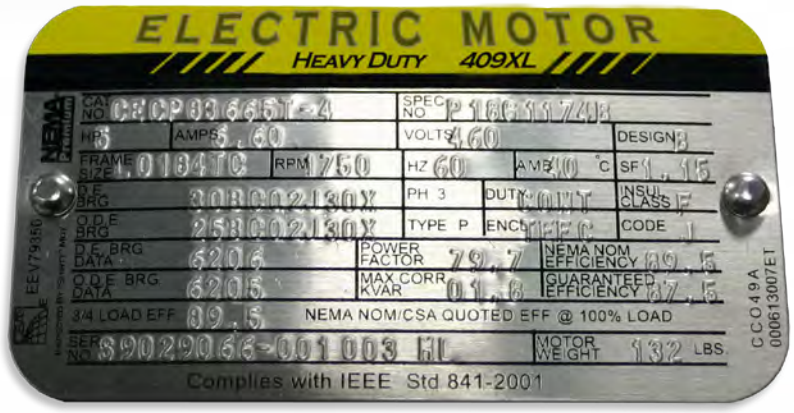
Only a qualified electrician should make the electrical connections to the pump drive motor.

Thoroughly read motor manufacturers instructions before installation.

INNOMAG product is **non-electrical.**

Electric motors used with Innomag pumps must be compatible with all service requirements, meeting or exceeding all local, state and federal codes.

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.

Pumps must be grounded prior to operation using best company standards and practices.

- Toothed-lock washers or contact disks are recommended if the substructure is grounded.
- If the substructure is not grounded, other methods must be used, e.g. cable bridges.

STARTUP

1. Fully open suction valve. Pump requires a flooded suction.

WARNING

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

2. Fully open 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.

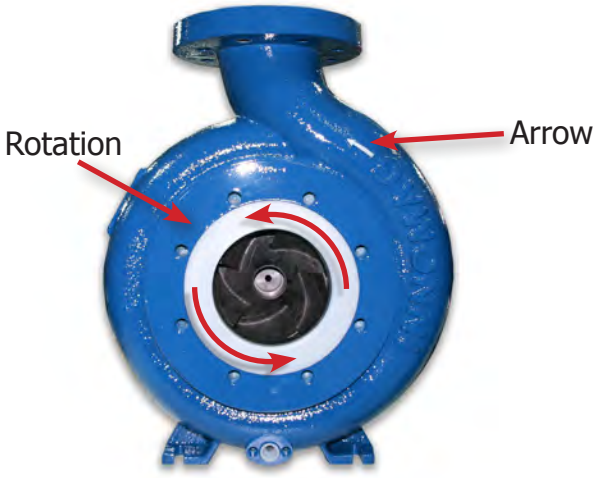
CAUTION

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 driver, re-prime and attempt to restart.



CORRECT ROTATION VIEWED FROM THE PUMP SUCTION IS COUNTER CLOCKWISE.

1. Start the pump.

2. Set 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 pressure gauge readings for future reference.

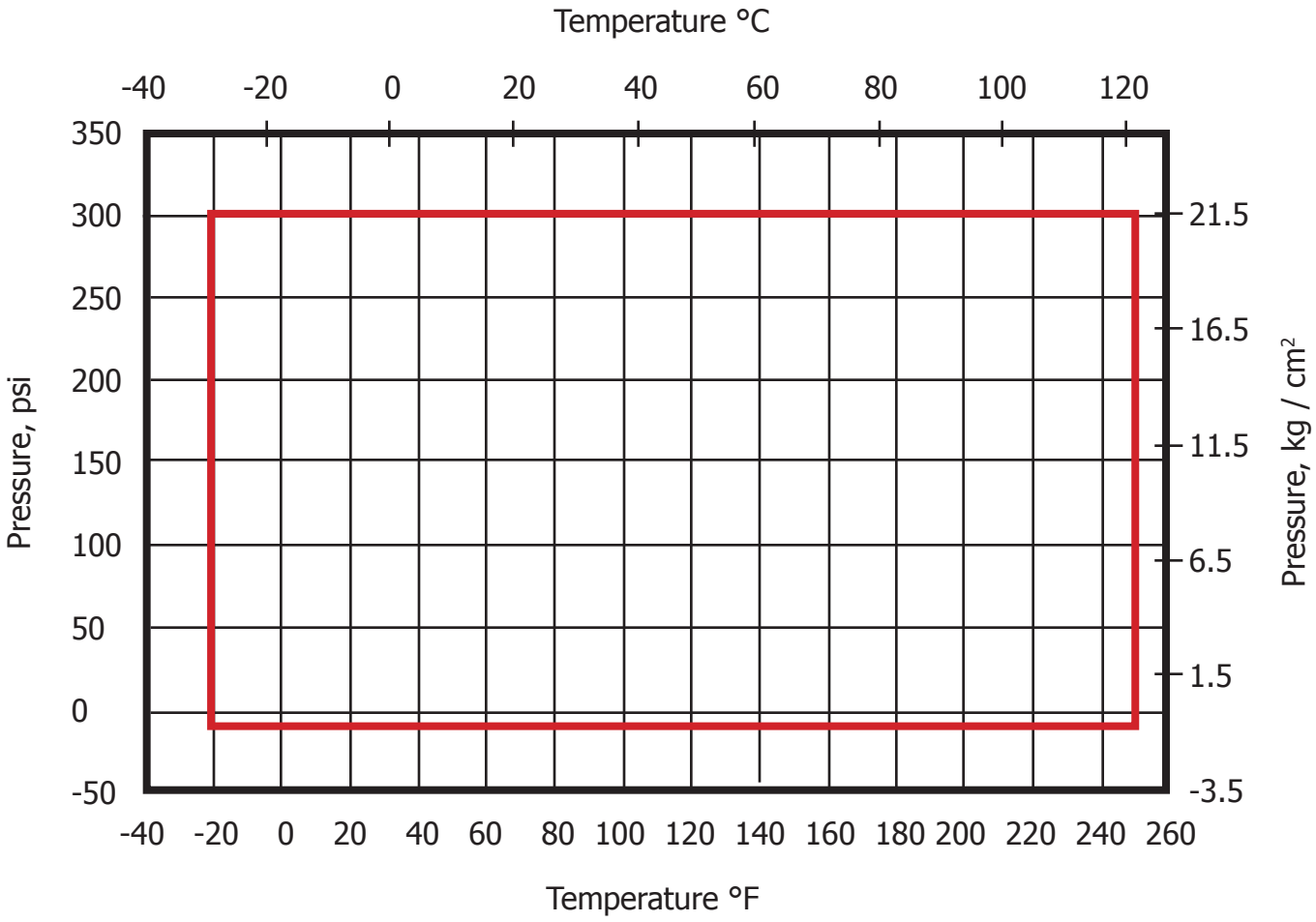
CAUTION

Never throttle pump using the suction valve.

WARNING

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

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



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.

WARNING

Driver may overload and de-couple if pumpage specific gravity is greater than originally assumed. Prolonged running while de-coupled will damage driver magnets.

Decoupling the pump may lead to increased surface temperatures.

WARNING

Never operate below minimum flow rates.

Failure to adhere to operational limits could result in an increase in surface temperature.

Maximum Horsepower

TB Model	Max. hp(kW) 3500 rpm	Max. hp(kW) 2900 rpm	Max. hp(kW) 1750 rpm	Max. hp(kW) 1450 rpm
A Series	14.0 (10.4)	11.7 (8.7)	7.0 (5.2)	5.8 (4.4)
B Series	30.0 (22.4)	25.0 (18.7)	15.0 (11.2)	12.5 (9.3)
C Series	100.0 (74.6)	82.9 (61.8)	50 (37.3)	41.4 (30.9)

Minimum Flow

TB Model	Size	60 Hertz 3500 rpm (US gpm)	60 Hertz 1750 rpm (US gpm)	50 Hertz 2900 rpm (m3/h)	50 Hertz 1450 rpm (m3/h)
A1	1.5 x 1 x 6	1	1	1	1
AL	1.5 x 1 x 6 LF	1	1	1	1
E1	50mm x 32mm	1	1	1	1
EL	50mm x 32mm	1	1	1	1
E3	65mm x 50mm	1	1	1	1
A3	3 x 1.5 x 6	1	1	1	1
A4	3 x 2 x 6	1	1	1	1
B1	1.5 x 1 x 8	5	3	5	3
BL	1.5 x 1 x 8 LF	5	3	5	3
F1	50mm x 32mm	5	3	5	3
FL	50mm x 32mm	5	3	5	3
B3	3 x 2 x 6 S	5	3	5	3
B4	3 x 1.5 x 8	5	3	5	3
F4	65mm x 40mm	5	3	5	3
B5	3 x 2 x 6 T	5	3	5	3
B6	4 x 3 x 6	5	3	5	3
C1	3 x 2 x 8	15	10	15	10
C2	4 x 3 x 8	15	10	15	10
G2	100mm x 65mm	15	10	15	10
C3	2 x 1 x 10	15	10	15	10
CL	2 x 1 x 10 LF	15	10	15	10
C4	3 x 1.5 x 10	15	10	15	10
C5	3 x 2 x 10	15	10	15	10
C6	4 x 3 x 10	15	10	15	10
C7	4 x 3 x 10H	--	75	--	50
C8	6 x 4 x 10H	--	75	--	50
C9	6 x 4 x 8	150	75	100	50
V1	2 x 1.5 x 6 V	1	1	1	1
W1	2 x 1.5 x 8 V	5	3	5	3
W3	3 x 2 x 6 V	5	3	5	3

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.

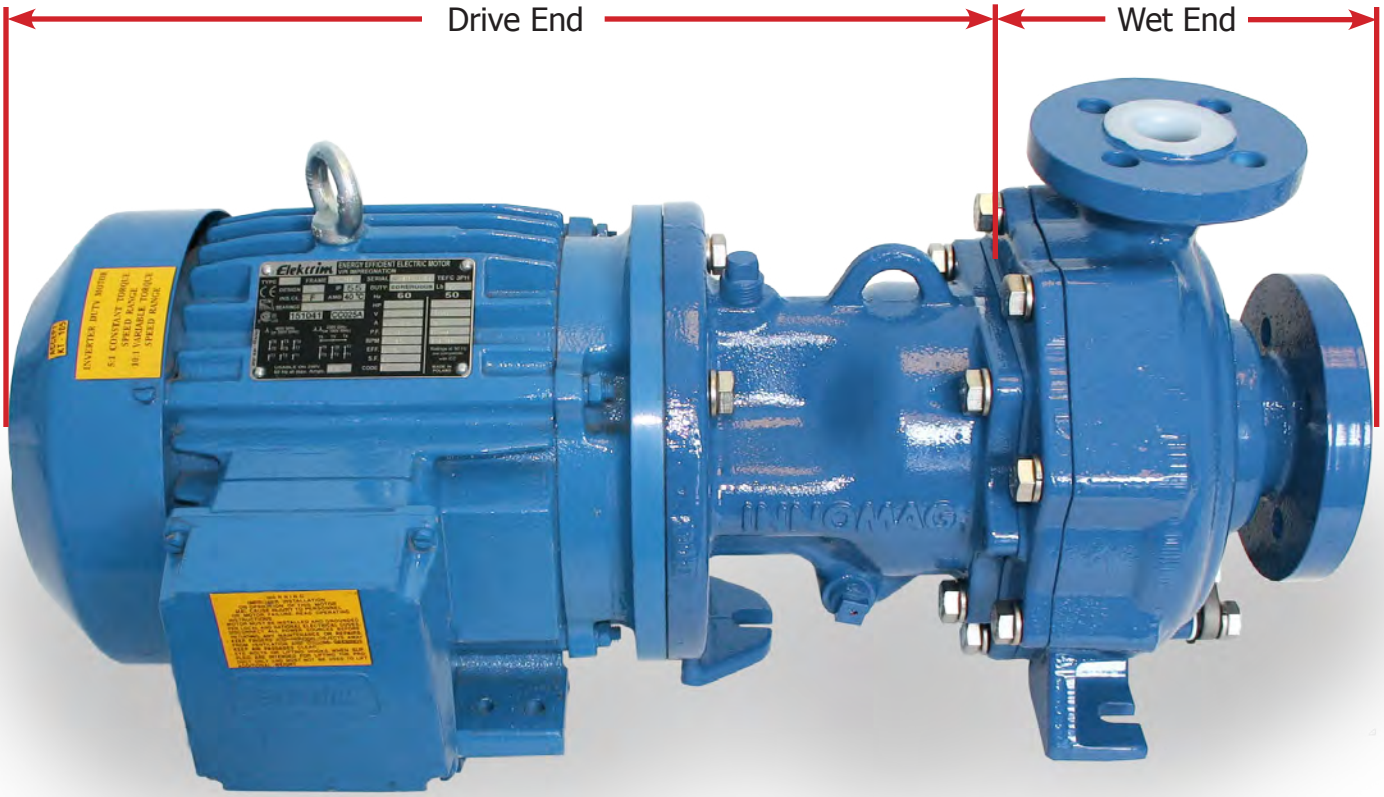
DANGER

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

DANGER

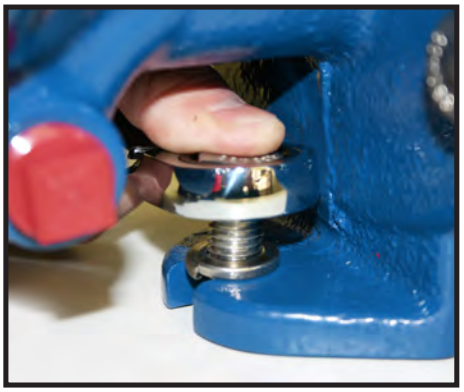
Shut off all valves controlling flow to and from the pump. Isolate the pump from the system and relive any remaining system pressure.

When operating with chargeable liquids with conductivities of <10-8 S/m, inert gases (e.g. nitrogen) must be used to flush the pump. Before removal of the pump it is recommended to wait one hour to allow static peak charges to be eliminated.

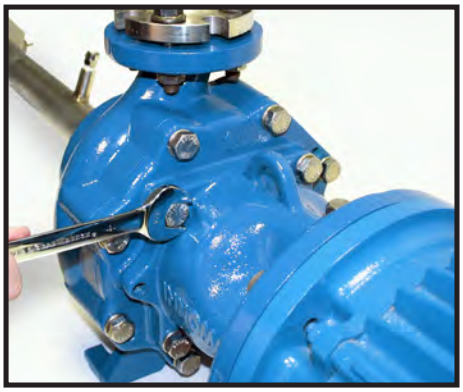


Tools Needed

- ☑ Wrench 3/4" (For A Series) 15/16" (For B - C Series)
- ☑ Jack Bolts (2) 1/2" - 13 x 4 1/2"



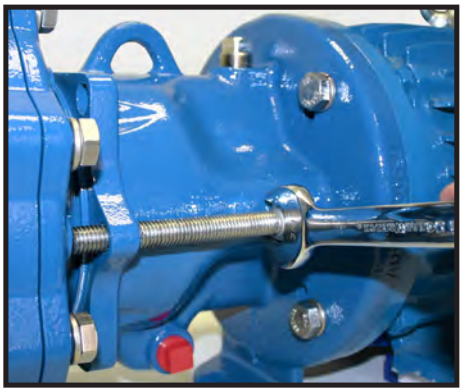
Remove the bolt connecting the adapter foot to the base and any bolts connecting the motor to the base.



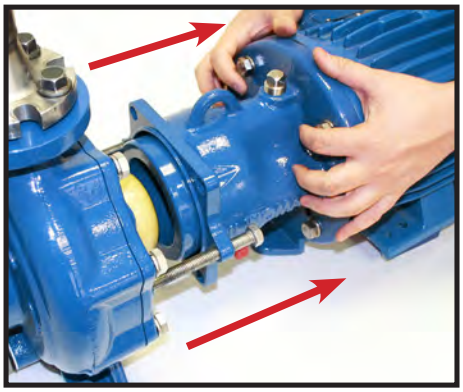
Remove the (4) hex bolts on the adapter.

MAGNETIC

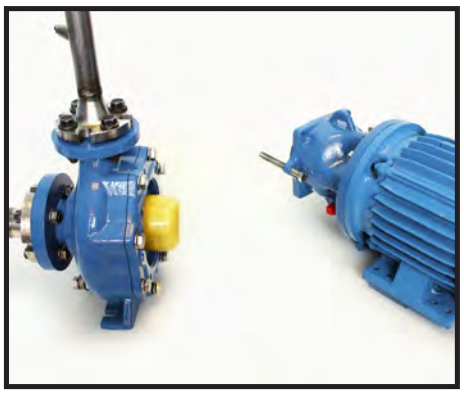
INNOMAG pumps contain extremely strong magnets. The use of non-magnetic tools and work surface is highly recommended. The work area must be clean and free of any ferrous particles.



Separate the drive end from the wet end by evenly tightening the (2) jack bolts.



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 off to the side to allow space for disassembly of the wet end.

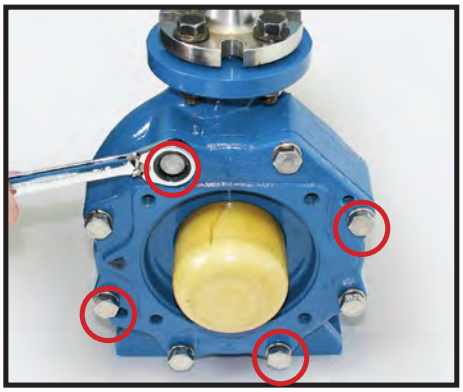
DANGER

When handling hazardous and/or toxic fluids, skin, eye and respiratory protection are required. If pump is being drained, precautions must be taken to prevent injury or environmental contamination.

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

Tools Needed

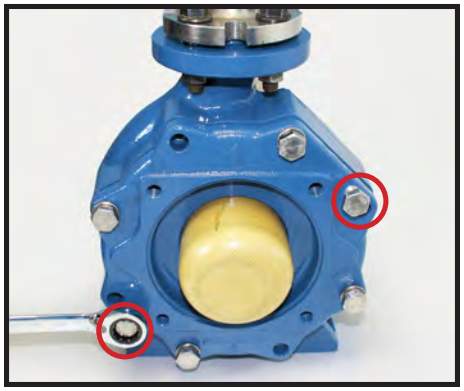
☑ Wrench
3/4" (For A Series pumps)
15/16" (For B - C Series)



Loosen all (8) hex bolts and Remove the (4) highlighted above. Leave the other 4 loose but still attached to the casing.

Note

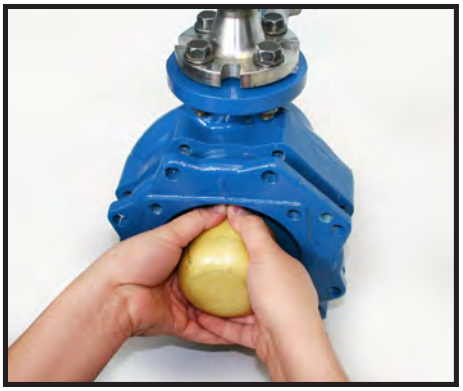
Visually inspect the containment ring. If it appears loose then you can remove all the bolts and skip the following step. However, if the pump has been in service for a long period of time, it is very common for the containment ring to be stuck to the casing. In this case, use the following procedure:



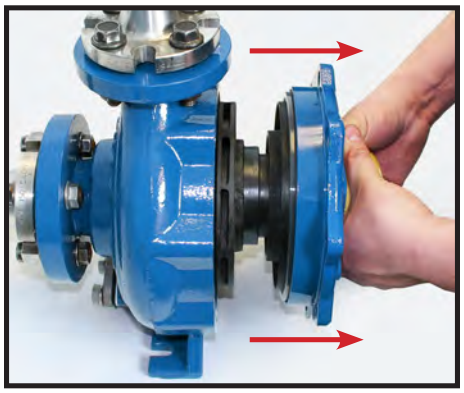
Insert (2) of the bolts you just removed into the jackbolt holes highlighted above and evenly tighten them until the ring breaks free. Remove all the remaining bolts.

CAUTION

For larger pumps we recommend having two people perform the following procedures in order to decrease the chance of breaking the SiC.



Firmly hold the containment shell and use your index fingers and thumbs to support the containment ring.

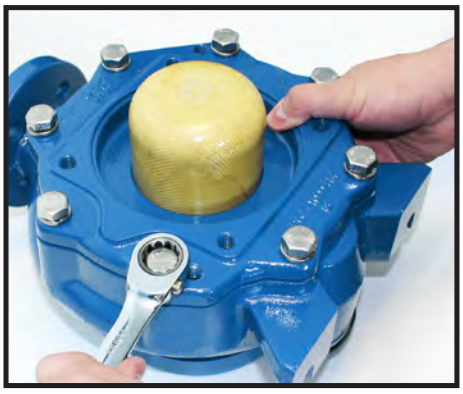


Pull the assembly back in a straight line until it is clear of the casing.

Remove the containment shell and impeller from the containment ring. Note: optional, may be very difficult on pumps in service for long periods of time.

Lift and remove the impeller from the containment shell.

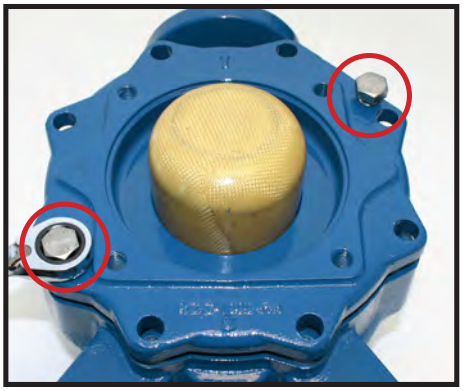
Remove all flange and casing feet bolts. Lay the wet end face down on the suction flange in the work area. Place a piece of cardboard or a shop towel underneath to protect the flange.



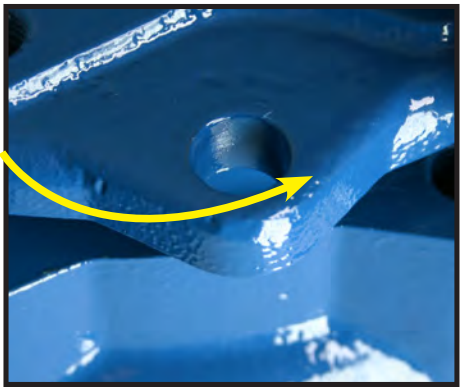
Loosen and remove the (8) hex bolts with a wrench.

Note

Visually inspect the containment ring. If it appears loose then you can remove all the bolts and skip the following step. However, if the pump has been in service for a long period of time, it is very common for the containment ring to be stuck to the casing. In this case, use the following procedure:

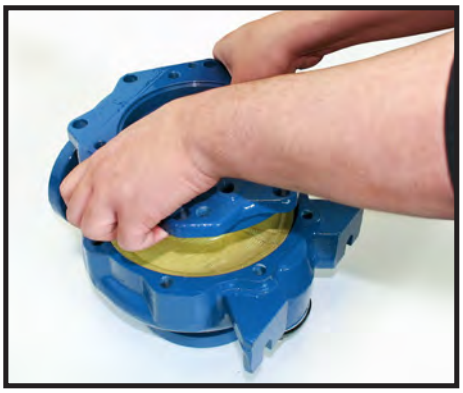


Insert (2) bolts into the jack-bolt holes highlighted above. Tighten the (2) bolts until the containment ring breaks free. Remove all the remaining bolts.



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

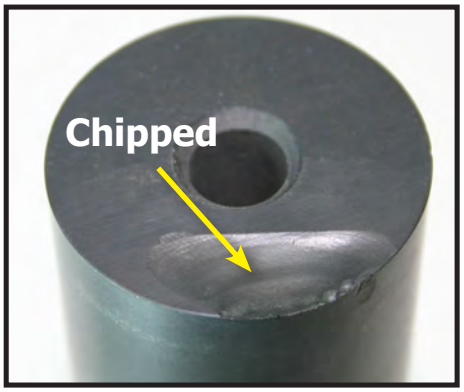
Lift the containment ring with your fingers while holding down the containment shell with your thumbs.

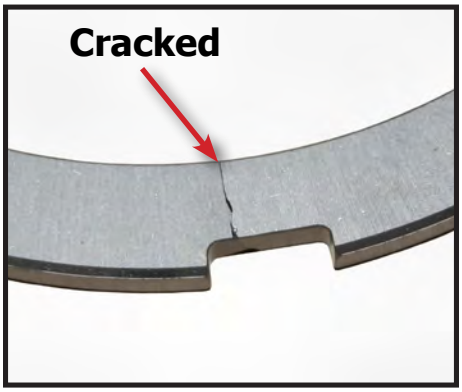


Lift the containment ring straight up off of the containment shell and set aside.

Carefully lift and remove the containment shell straight up from the impeller.

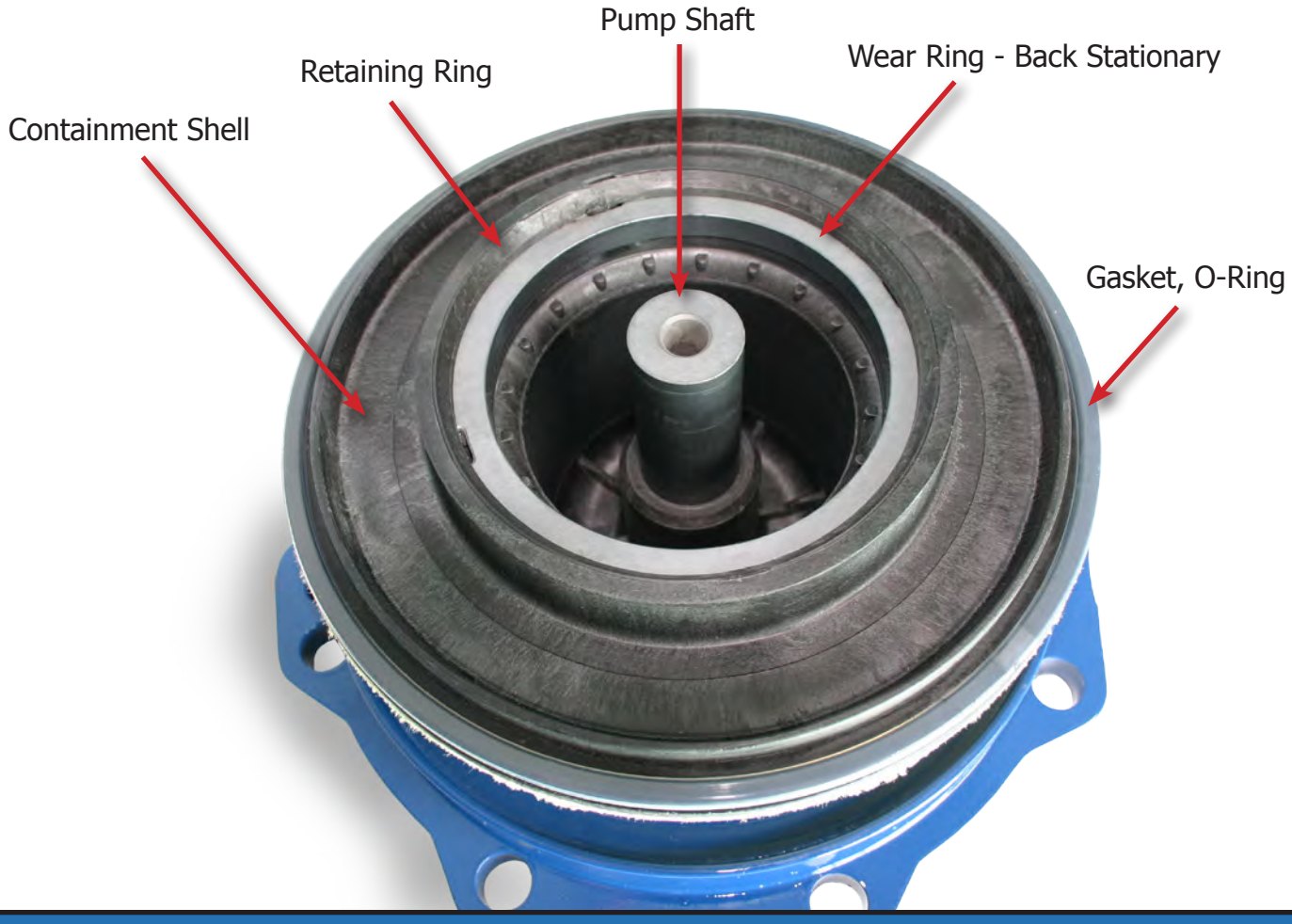
Carefully lift and remove the impeller straight up from the casing.

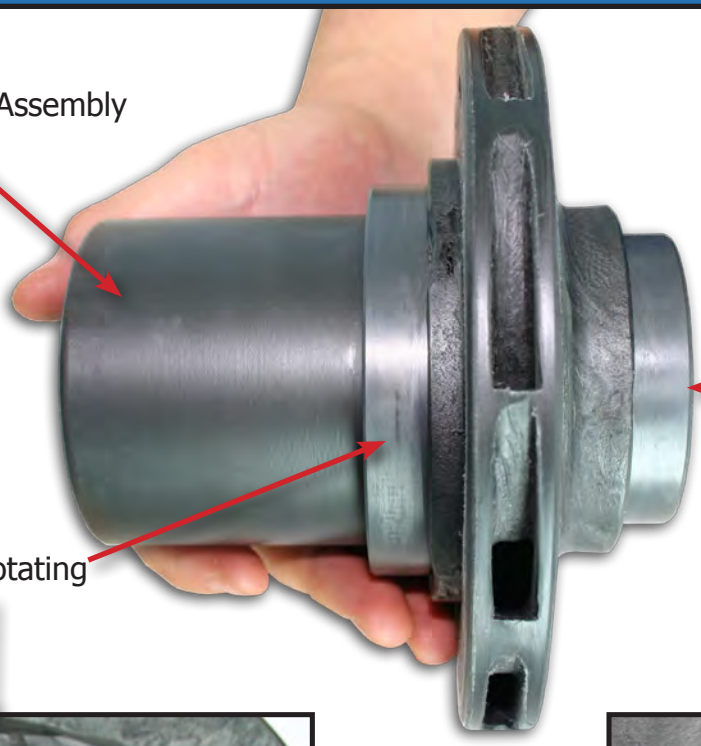


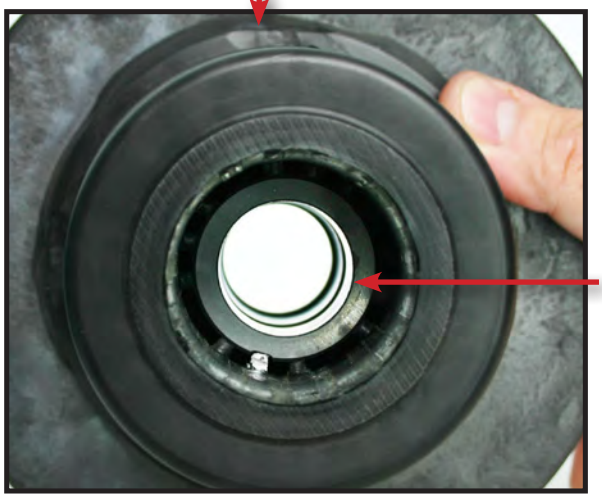


When inspecting the pump internals check all Silicon Carbide (SiC) parts for cracks, chips and scoring marks. Minor chips less than 0.020" are acceptable. Inspect all plastic parts for scoring and cracks. Minor scratches or cuts less than 0.040" are acceptable. Wipe the gasket clean. If replacement of any part is required, follow the procedures in the repair sections of this manual.

Carefully clean and inspect the following parts:

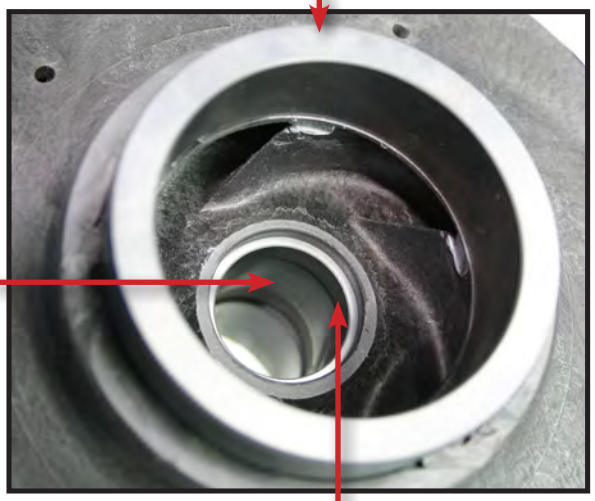




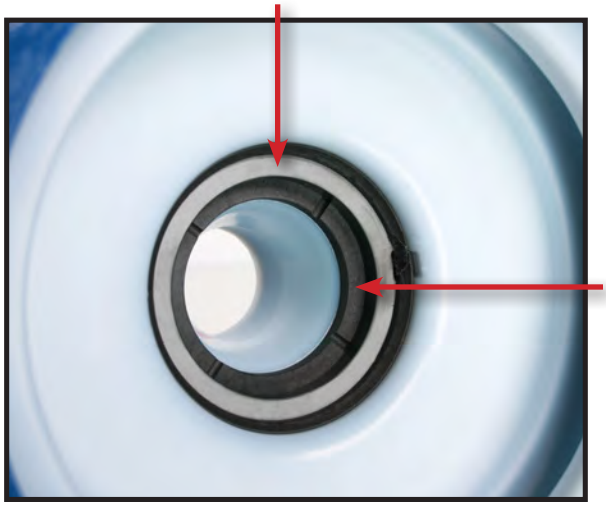


Front Stationary Wear Ring

Bearing Bushings



Thrust Control Valve



Thrust Collar

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

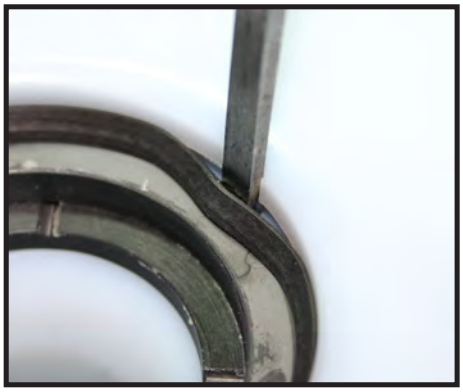
Wipe the inside of the outer magnet assembly clean.

Tools Needed

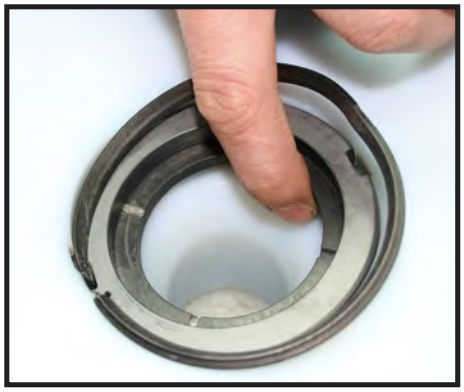
- ☑ T-Handle allen wrench
- ☑ Wire Cutter
- ☑ Lightweight Hammer
- ☑ Soldering Iron

Casing with Wear Rings.

Removal



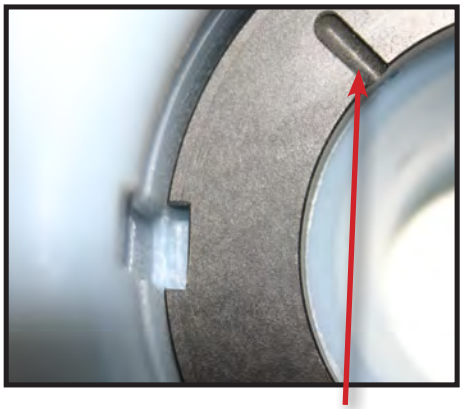
Insert a flathead screwdriver into the casing notch opposite the plastic weld point on the retaining ring and pry out the retaining ring.



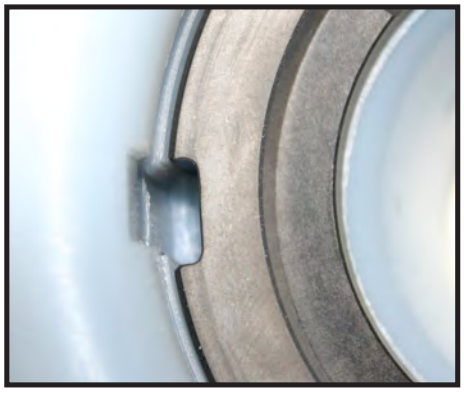
Lift out the thrust collar and front stationary wear ring with your fingers. Pull the retaining ring free.

Remove the locking pin(s).

Installation

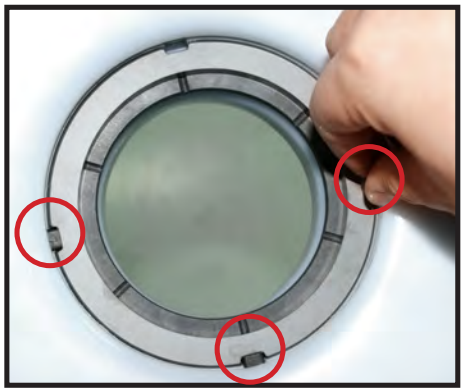


Insert thrust collar (grooved side up) and align the keyway notch with the casing keyway notch.

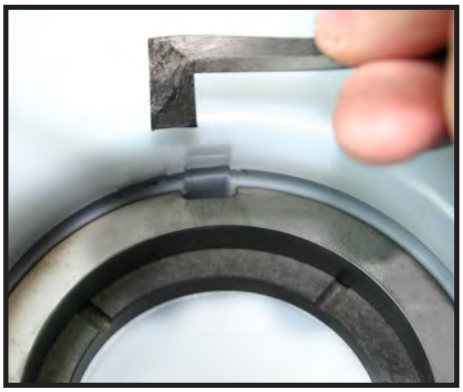


Insert and align the front stationary (SiC) retaining ring with the keyway notch in the casing.

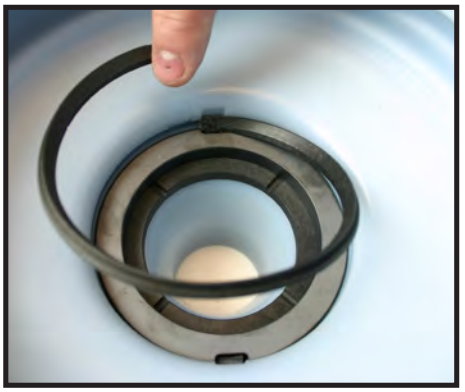
Insert locking pin(s) into all but one of the keyway.



Casings will have from two to six keyways. The example above has four, in this case you must insert (3) locking pins leaving one keyway open.



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



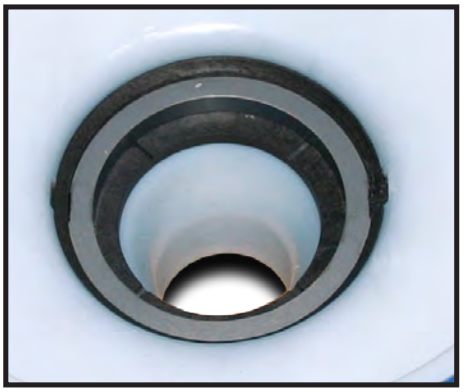
Press the retaining ring into the casing groove.

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

Line up the tip of the T-handle allen wrench at the end of the retaining ring.

Gently tap the retaining ring into position.

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



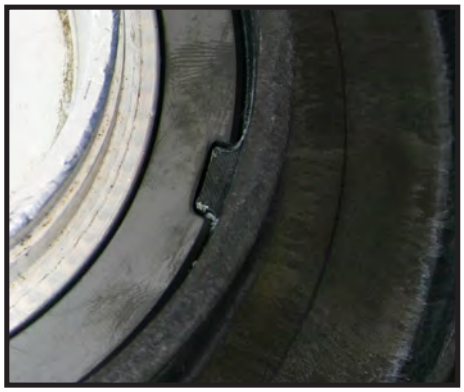
The completed casing.

Tools Needed

- ☑ T-Handle allen wrench
- ☑ Wire Cutter
- ☑ Lightweight Hammer
- ☑ Soldering Iron
- ☑ Shaft Centering Tool

Place the centering tool over the shaft.

Place the wear ring over the centering tool.



Align the wear ring grooves with the containment shell molded keys.

Insert the keyed end of the retaining ring into the open groove.

Apply pressure with your thumbs to inset the retaining ring.

Trim the retaining ring so it slightly overlaps the key (approximately 1/8").

Place your T-handle allen wrench on the end of the retaining ring and gently tap it into place.

Remove the centering tool and melt the retaining ring together with a soldering iron.

Tools Needed

- ☑ 1/4” Allen Wrench
- ☑ 1/2” Ratchet Wrench
- ☑ Shaft Removal Tool

  A Series Part # TLG-2017-AA

  B - C Series Part # TLG-2018-AA

Secure the containment shell upside down - you can use the adapter for this if nothing else is available.

Place the bottom half of the shaft removal tool over the shaft, then gently slide it down the shaft.

Place the rest over the shaft, lining up the bolts with the indentations on the bottom half. Adjust the bolts so that the top of the tool is about 3/4” down the shaft.

Using the allen wrench, tighten the top half to the shaft.

Evenly tighten the two bolts, alternating between them when you feel resistance.

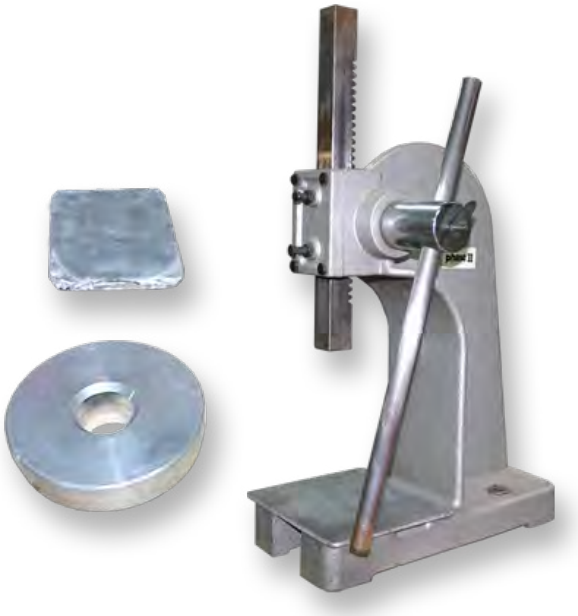
CAUTION

Do not use air or power tools. Do not over tighten the bolts or you may crack the shaft.

Remove the shaft from the containment shell. Loosen and remove the shaft removal tool.

Tools Needed

- ☑ Aluminum Spacer
- ☑ Shaft Centering Tool
- ☑ Arbor Press



Align the **molded key** with the **pump shaft groove.**

Place the shaft centering tool over the shaft.

Place the aluminum spacer over the shaft and push the shaft in using the arbor press until the shaft is flush with the centering tool.

Remove the shaft centering tool.

Place the spacer directly on the shaft and press the shaft down the rest of the way down until it is firmly seated.

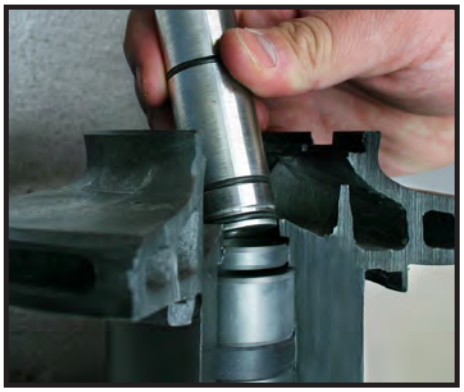
Tools Needed

- ☑ Arbor Press
- ☑ Bushing Installation / Removal Kit
  Part # TLG-2016-AA

Bushing installation / removal kit.

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 SiC when it falls free.



Center the stepped end of part (E) of the bushing removal tool into the thrust control valve.

With the arbor press, carefully push the bushings down until the first bushing and spacer dislodge.

Lift the impeller and remove the first bushing and spacer to allow room for removing the second bushing and thrust control valve.

Continue pressing down on the arbor press until the second bushing and thrust control valve dislodge.

When the second bushing and thrust control valve are free, remove the impeller.

Remove the second bushing and thrust control valve from the bushing removal tool.

Tools Needed

- ☑ Arbor Press
- ☑ Bushing Installation / Removal Kit
  Part # TLG-2016-AA

Bushing Installation / Removal Kit.

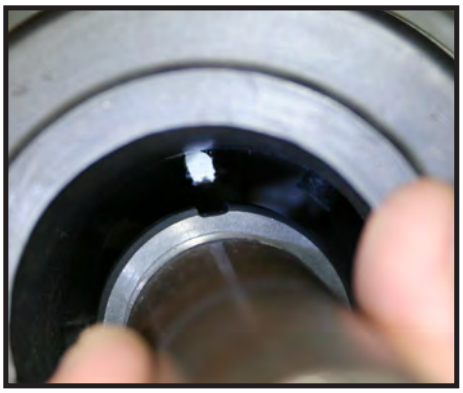
Locate part (C) of the bushing installation tool.

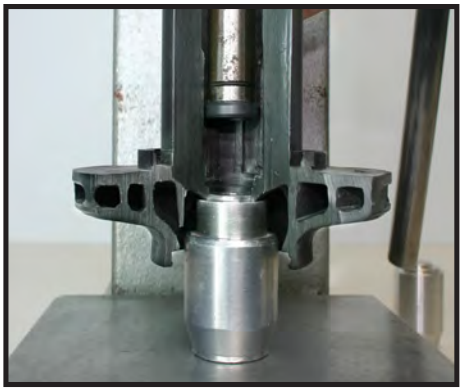
Place the impeller on part (C) of the bushing installation tool.

Locate the molded key in the impeller. It will be marked with white paint.

On the underside, the thrust control valve groove must line up with the molded key.

Place the thrust control valve over the rubber gasket on the stepped end of bushing installation tool part (E).

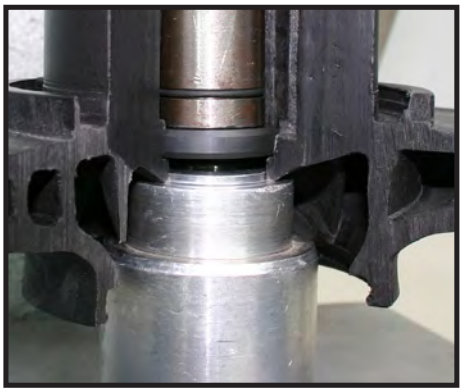

Line up the thrust control valve groove with the marked molded key.



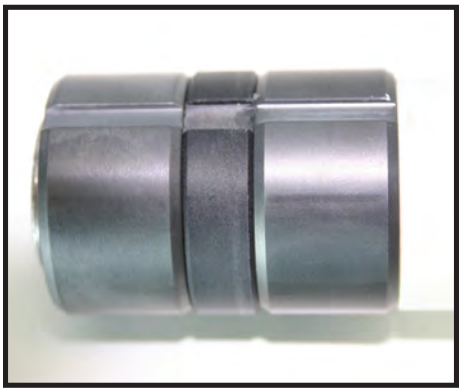
Carefully insert the thrust control valve by hand until it stops, making sure that it is perfectly aligned.

Make sure the bushing installation tool is perfectly centered.

With a slow, even pressure, push the thrust control valve into place.

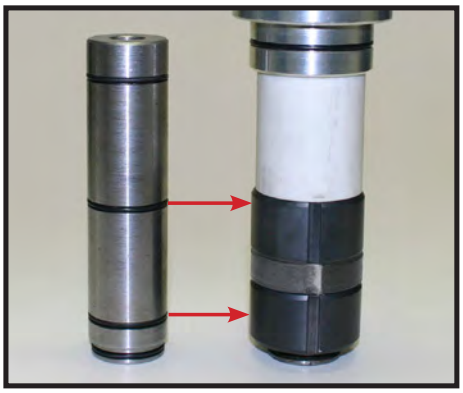


It will stop when it is firmly seated.



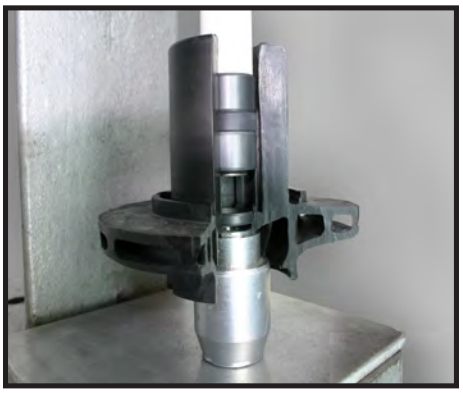
Align the large SiC bushings separated by the plastic spacer on the bushing tool.

Add the white plastic spacer and the large top piece of the bushing tool.



Make sure the bushings are held securely by the rubber o-rings on the bushing tool.

Align the bushings with the molded key.



Press the bushings in until they are firmly seated using the arbor press.

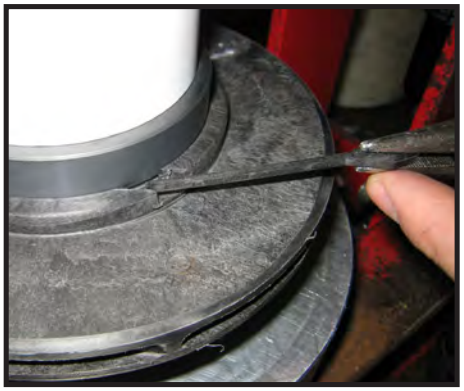
Tools Needed

- ☑ Flathead Screwdriver
- ☑ Bench Press
- ☑ Aluminium Spacer
- ☑ PVC Trimming Sleeve
- ☑ Soldering Iron
- ☑ Needle Nose Pliers

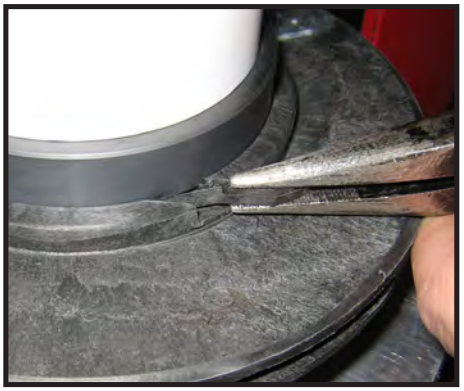
Place the back rotating wear ring on the impeller. Align the notches.

Place the PVC trimming sleeve over the wear ring.

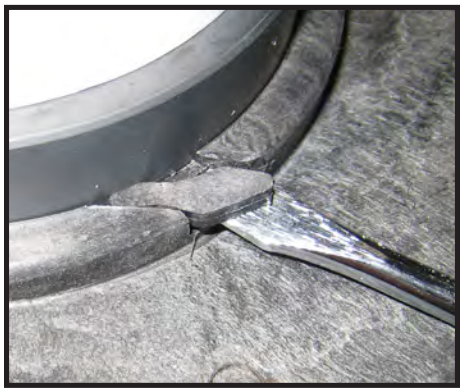
Place the aluminum spacer over the trimming sleeve and press the wear ring into place with the arbor press.



Insert the retaining pin into the slot on the impeller.



Force the pin into place using pliers.



Push the rest of the way with a screwdriver.

Once the pin is completely in, use a soldering iron to melt (plastic weld) it in place.

The finished installation.

Tools Needed

- ☑ Flathead Screwdriver
- ☑ Bench Press
- ☑ Aluminium Spacer
- ☑ Soldering Iron
- ☑ Needle Nose Pliers

Place the front rotating wear ring on the impeller. Align the notches.

Place the aluminum spacer over the wear ring and press into place with the arbor press.

Insert the retaining pin into the slot on the impeller.

Force the pin into place using pliers.

Push the rest of the way with a screwdriver.

The retaining pin properly inserted.

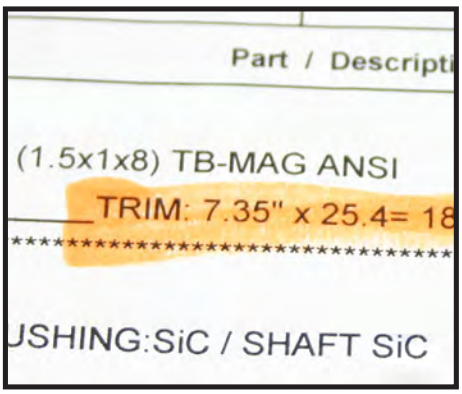
Once the wear ring is completely in, use the soldering iron to solder in place.

The finished installation.

Tools Needed

- ☑ Lathe
- ☑ Caliper
- ☑ X-acto Knife
- ☑ Trimming Sleeve
  A Series Part #
  TLG-2033-AA
  B - C Series Part #
  TLG-2023-AA

Measure the current diameter of the impeller. In this example it is 8.25”

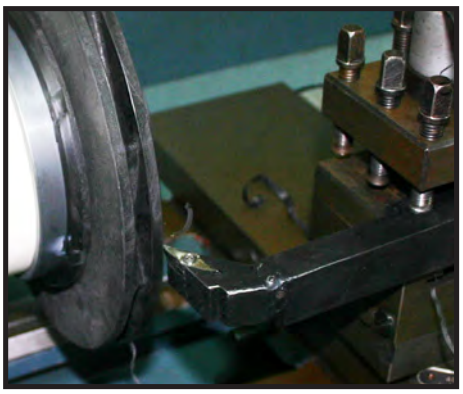


In this example, we need to trim the impeller to 7.35”.

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

Insert the impeller into the lathe and tighten the jaws.

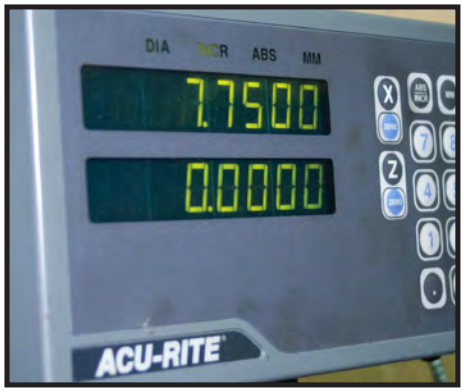
Set the trim 1/4” less then the current diameter. If you have never trimmed an impeller before, then we recommend only cutting 1/8” at a time.



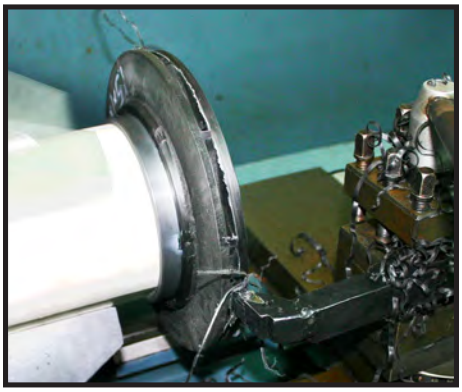
Trim the first layer at a slow speed.

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.



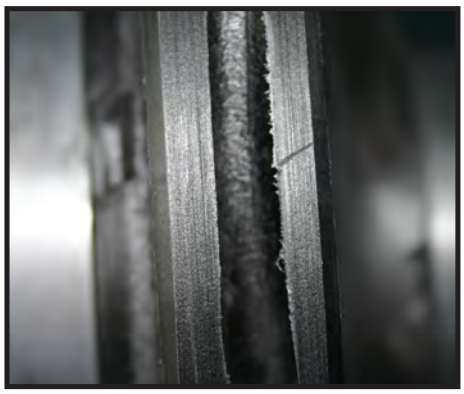
Trim this layer at a slow speed.

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.



Chamfer the same amount off the left edge.

Loosen the jaws and remove the Impeller.

Remove the trimming sleeve and trim any remaining loose plastic.

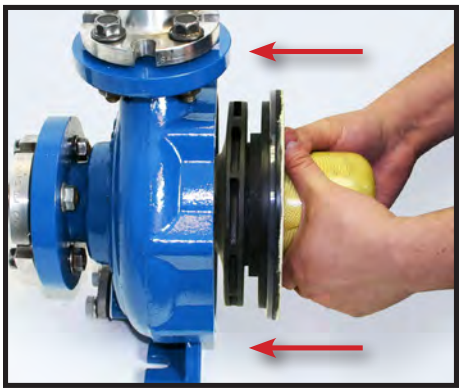
Align and slide the impeller magnet assembly onto the pump shaft located inside the containment shell.

Place the assembly into the containment ring.

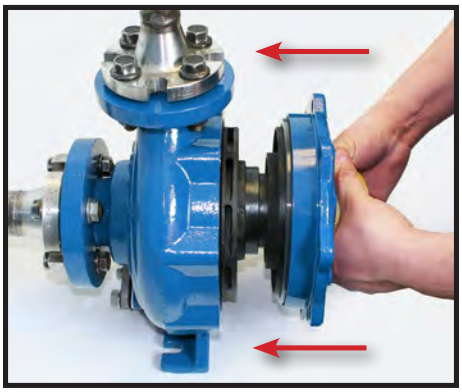
CAUTION

With larger pumps, **we highly recommend following the shop assembly procedure on the following page** to eliminate the chance of damaging the SiC. Due to the brittle nature of SiC, all assemblies must be handled with care to avoid chipping or cracking.

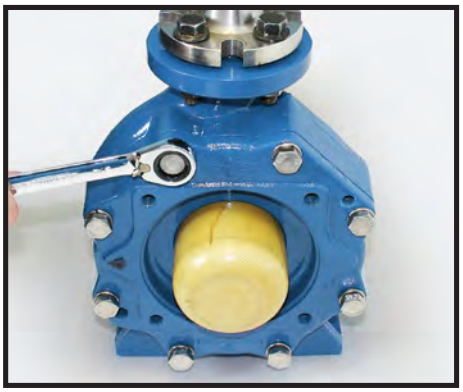
Thoroughly clean all parts before assembly. Make sure all parts are free of dirt, metallic particles, etc.



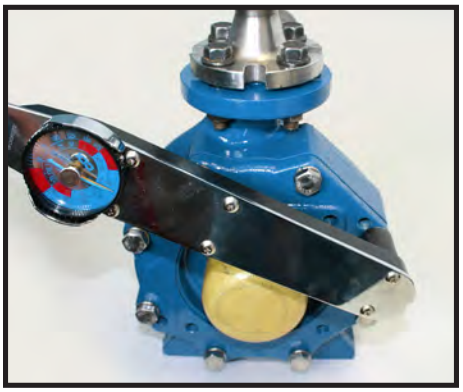
Insert the assembled impeller and containment shell. Carefully align the impeller and casing wear rings. Hold the assembly and install the containment ring



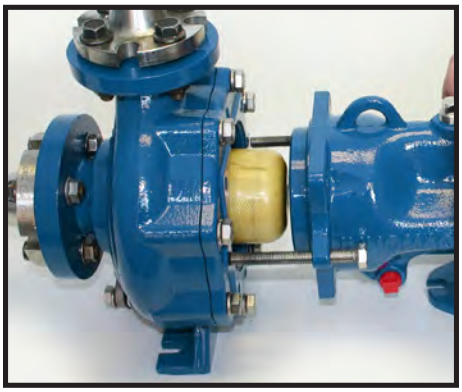
If you cannot separate the containment shell and ring, you can insert the assembly as one piece. Make sure the arrow on the ring points upward.



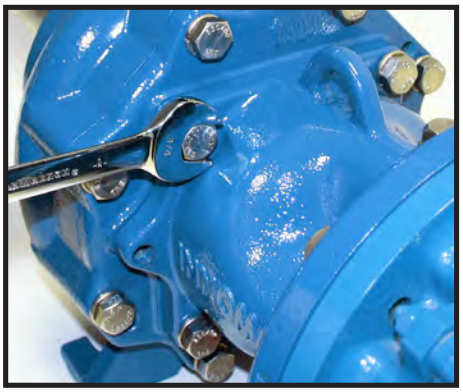
Tighten (8) hex cap screws w/ lock washer.



Torque the bolts to the specification in the Torque Table on the following page.



Extend the jackscrews on the drive end. Align the drive end and push it in until the jackscrews meet the wet end.



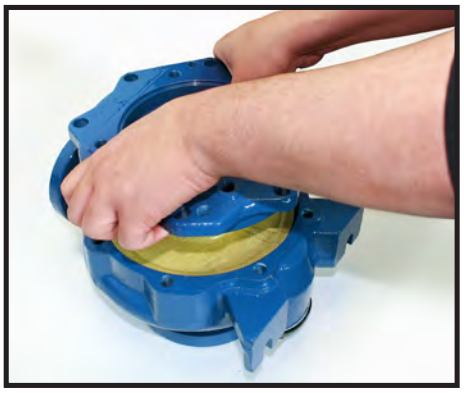
Retract the jackscrews until the two pump halves are mated. Insert and tighten the (4) adapter hex bolts to the torque given in the Torque Table on the following page.

With the casing face down, insert the impeller.

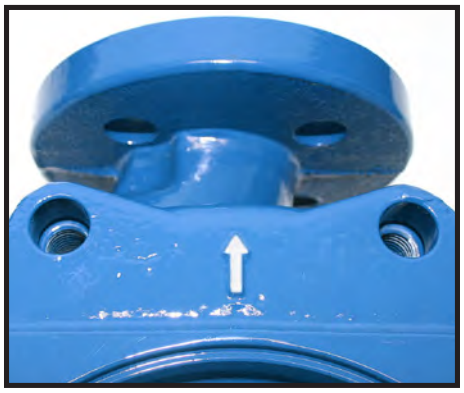
When the impeller is in place, rotate it by hand to make sure it spins freely.

Align the shaft in the containment shell with the bushings.

Lower the containment shell into place.

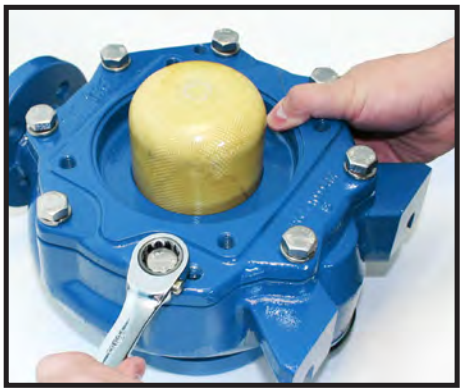


Place the containment ring over the containment shell and align the bolt holes.



Make sure the arrow on the containment ring points toward the discharge flange.

Insert and hand-tighten the (8) casing bolts with lock washers.



Tighten the bolts with a wrench and then torque them to the following rating:

Torque Table

Bolt Size	Torque ft-lbs (n.m)
3/8″-16	20 (27)
1/2″-13	45 (61)
5/8″-11	90 (122)

MAGNETIC

The outer magnet assembly contains very strong magnets. Use caution inserting the jackscrew. Under normal circumstances a visual inspection and wiping clean the inside of the outer magnet is sufficient.

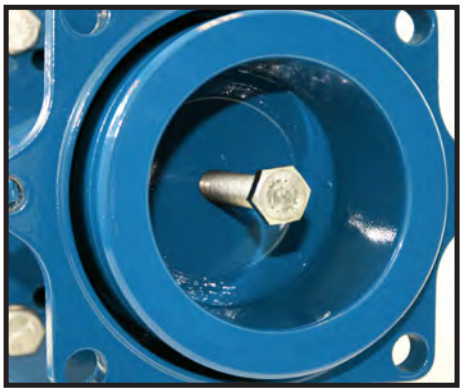
Tools Needed

- ☑ Wrench 3/4" (A), 15/16" (B - C), 9/16" (Plugs)
- ☑ T-Handle allen wrench 3/16" (A), 1/4" (B - C)
- ☑ Jackscrew 1/2" - 13 x 6+" (ANSI) M12 x 1.75 x 100+mm (IEC)
- ☑ Jackscrew Plate with (2) M8 x 1.25 x 30mm screws (IEC)

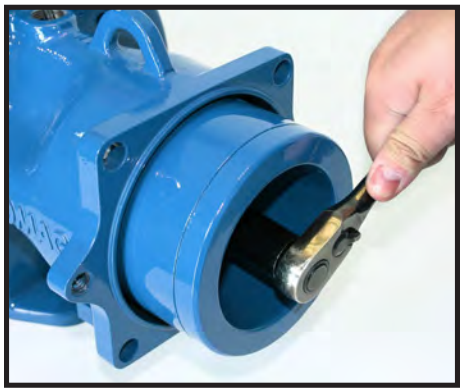
Remove the metal pipe plug from the top of the adapter.

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

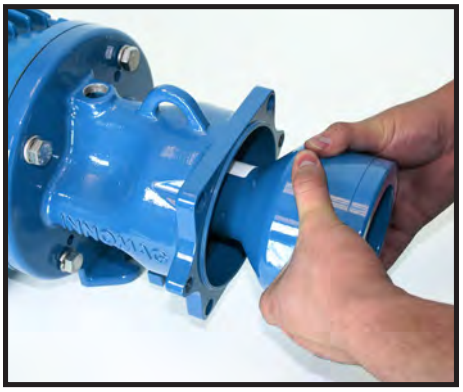
Loosen the (2) set screws.



Insert a jack screw into the center of the outer magnet assembly.

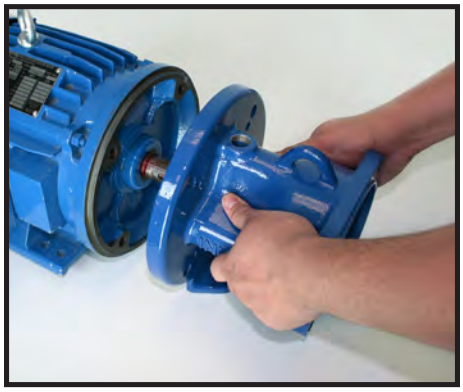


Tighten the jackbolt to free the outer magnet assembly. 3/4" socket wrench recommended due to the magnetic forces.



Carefully remove the outer magnet assembly.

Remove (4) bolts from the adapter.

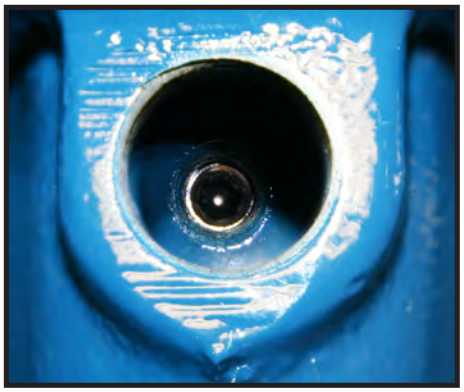


Remove the adapter from the motor.

MAGNETIC

The outer magnet assembly contains very strong magnets. Use caution inserting the jackscrew and plate. Under normal circumstances a visual inspection and wiping clean the inside of the outer magnet is sufficient.

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

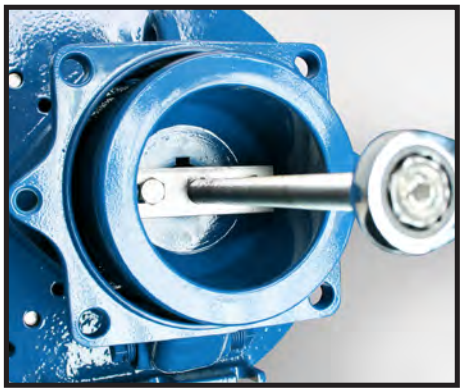


Locate the (2) set screws on the on the outer magnet assembly.

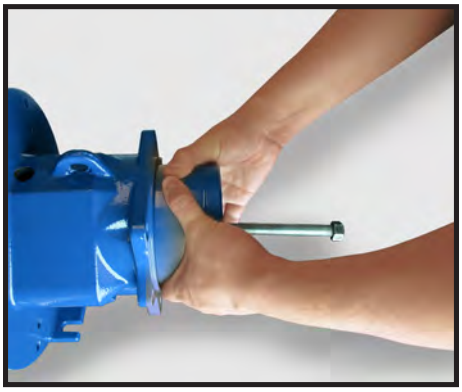
Loosen the (2) set screws.

Locate the (2) screw holes inside the outer magnet assembly.

Attach the jackscrew plate with two screws.



Insert a jackscrew into the jackscrew plate and tighten the jackbolt to free the outer magnet assembly.



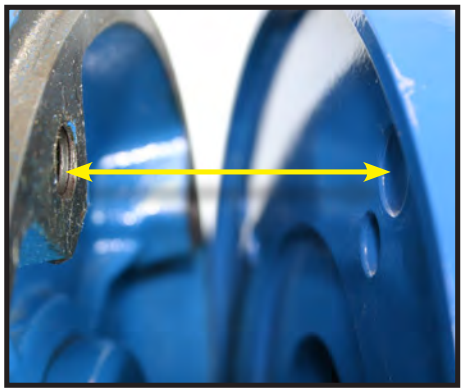
Carefully remove the outer magnet assembly.

Remove (4) bolts from the adapter.

Remove the adapter from the motor.

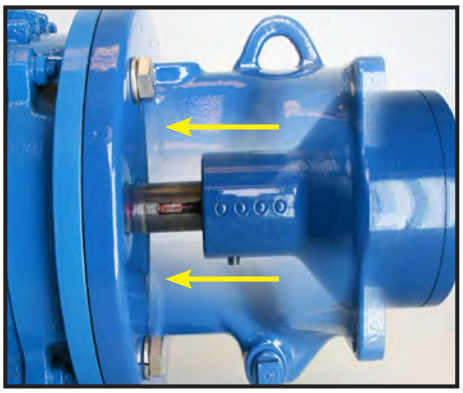
Tools Needed

- ☑ Wrench 3/4" (A), 15/16" (B - C)
- ☑ T-Handle Allen Wrench 3/16" (A) - 1/4" (B - C)
- ☑ Ruler or other Straight Edge



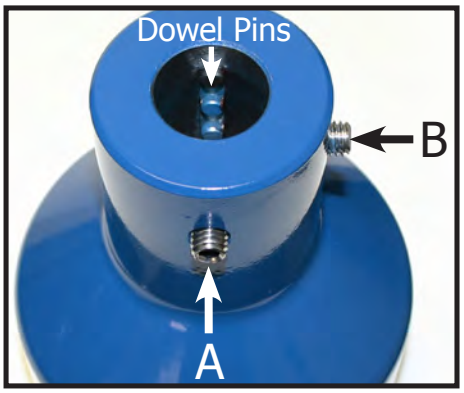
Line up the adapter holes with the threaded holes on the motor. (motors 324 frame and larger require an adapter plate.)

Insert (4) bolts with lock washers and **tighten until no gap is present between the adapter and the motor mounting face.**



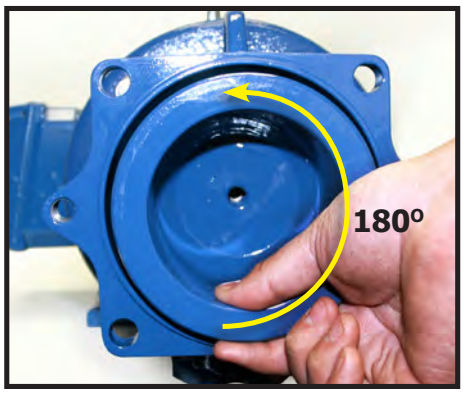
Align outer magnet assembly drive pins with the key groove on the motor shaft. **Do not use blunt force on front face of the outer magnet assembly.** If difficult, verify motor shaft meets manufacture's tolerances and is free of burrs.

Use a ruler, straight edge or visually align the groove on the outer magnet assembly with the outer edge of the adapter.



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

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



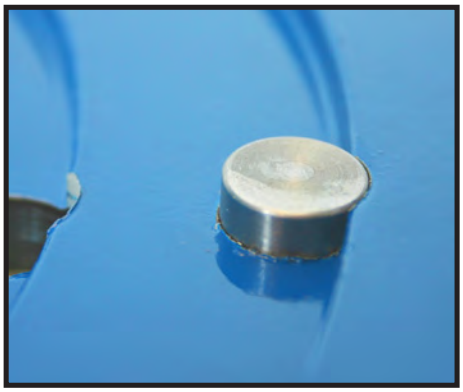
Grab the opposite side of the outer magnet assembly and rotate it 180°. **Visually inspect concentricity of outer magnet assembly with adapter.**

Tighten this set screw (A) first, then rotate the outer magnet assembly 90° counterclockwise to locate and tighten the other set screw (B).

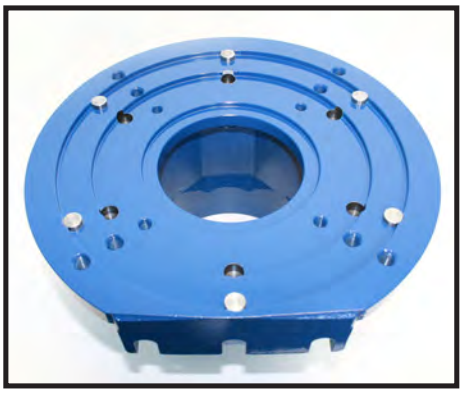
Tools Needed

- ☑ Hammer
- ☑ Wrench
  3/4" (A), 15/16" (B - C)
- ☑ T-Handle Allen Wrench
  5mm (A), 6mm (B - C)
- ☑ Ruler or other Straight Edge

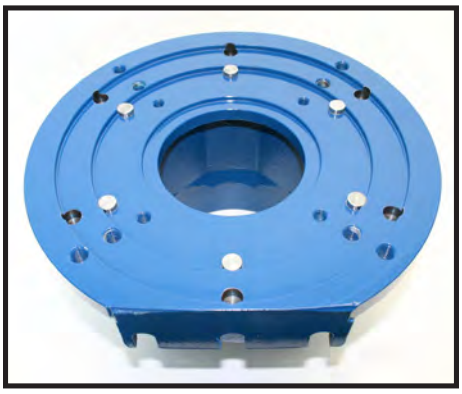
Pound the (6) dowel pins in with a hammer until they are firmly seated. The installation is permanent. Check the configuration for your motor before you begin.



The properly installed dowel pin will be flush with the adapter.

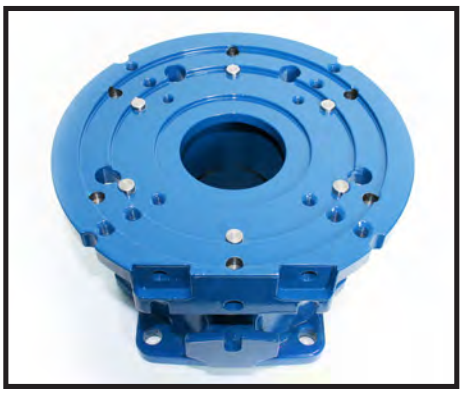


Adapter **ADP-1005-SI** configured for IEC 132.

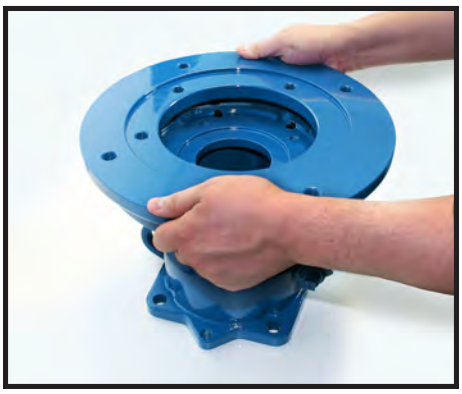


Adapter **ADP-1005-SI** configured for IEC 100 or IEC 112.

Adapter **ADP-1015-SI** configured for IEC 132.

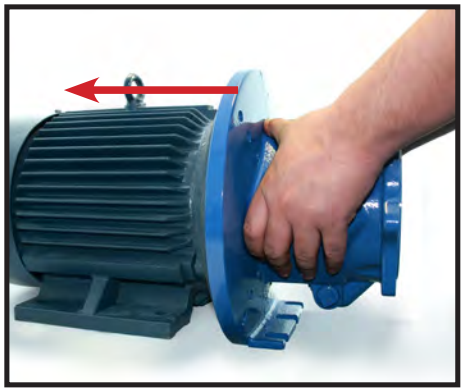


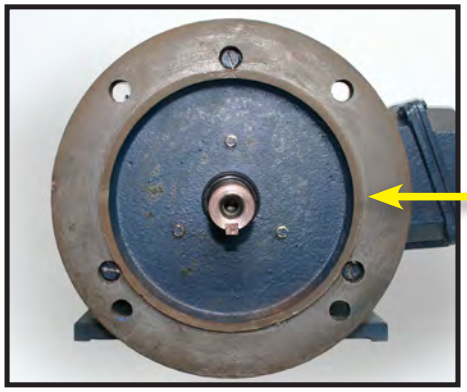
Adapter **ADP-1015-SI** configured for IEC 100 or IEC 112.

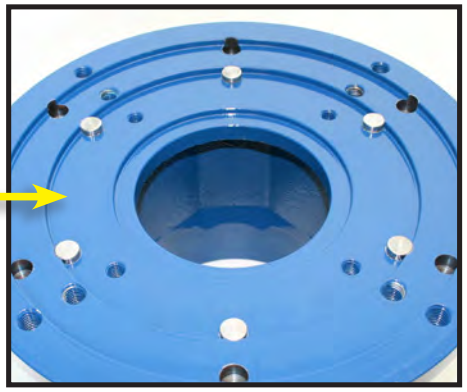


Motors larger than IEC 132 require an adapter plate. To install, align the inner holes on the adapter plate with the holes on the bottom of the adapter.

Insert and tighten the (4) bolts to the adapter plate as shown above.





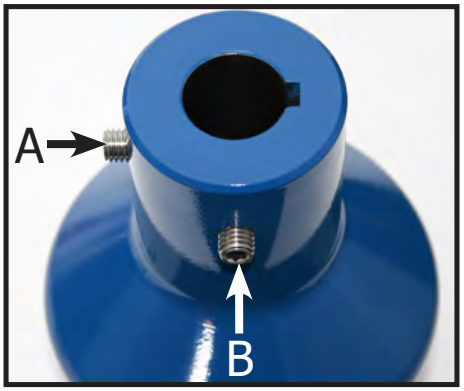


Place the adapter on the motor, the ring on the motor flange will align with the adapter (IEC 112 shown). Dowel pin (or lack thereof) configurations will vary depending on the motor frame.

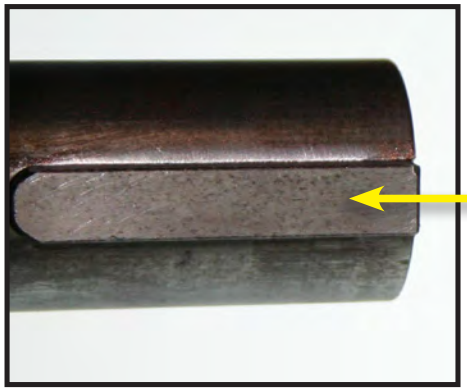
Align the screw holes on the motor with the threaded holes on the adapter.

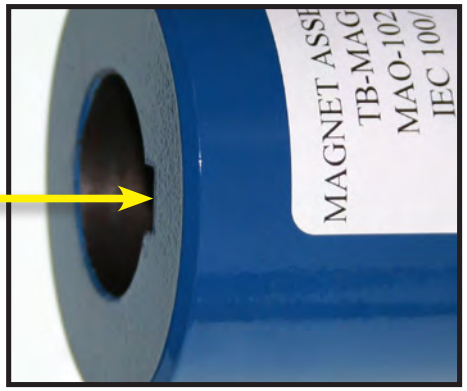
Insert and hand tighten the (4) bolts with lock washers.

Tighten the bolts with a wrench.

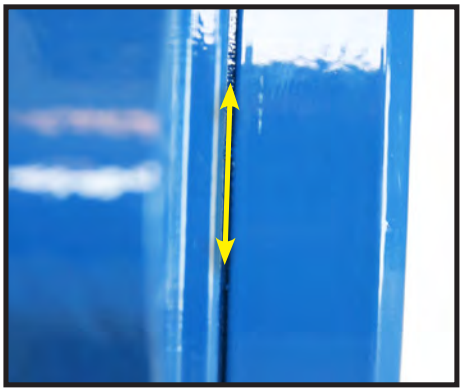


Note the placement of the set screws in relation to the key notch before installation.



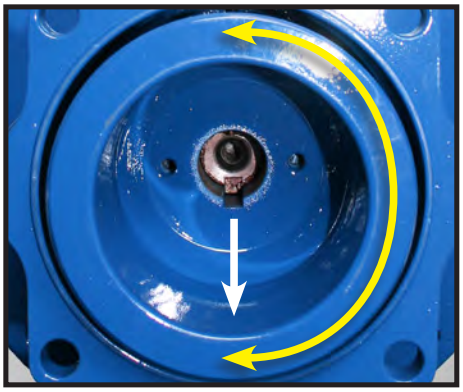


Align the key groove on the outer magnet assembly with the key on the motor shaft and install.



Locate the alignment groove on the outer drive.

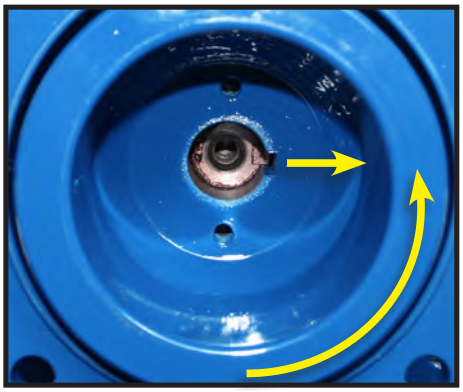
Use a ruler, straight edge or visually align the groove with the adapter.



Rotate the outer drive until the motor key points down.

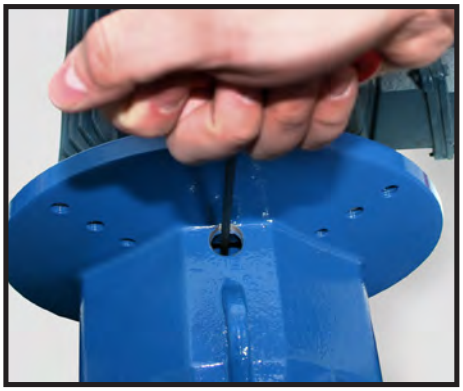
Locate the first set screw (A).

Tighten the first set screw with the T-handle allen wrench.



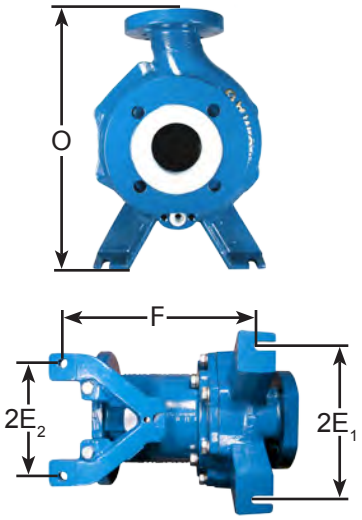
Rotate the outer drive until the motor key points to the right.

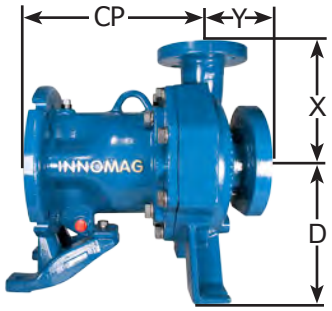
Locate the second set screw (B).



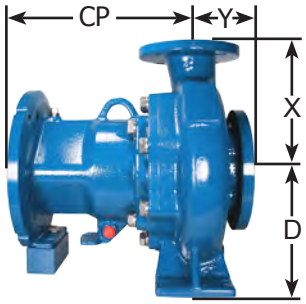
Tighten the second set screw with the T-handle allen wrench.

Replace the metal plug on the adapter and drive end assembly is complete.

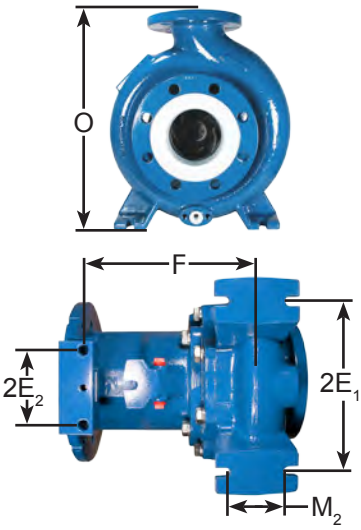




ANSI



ISO

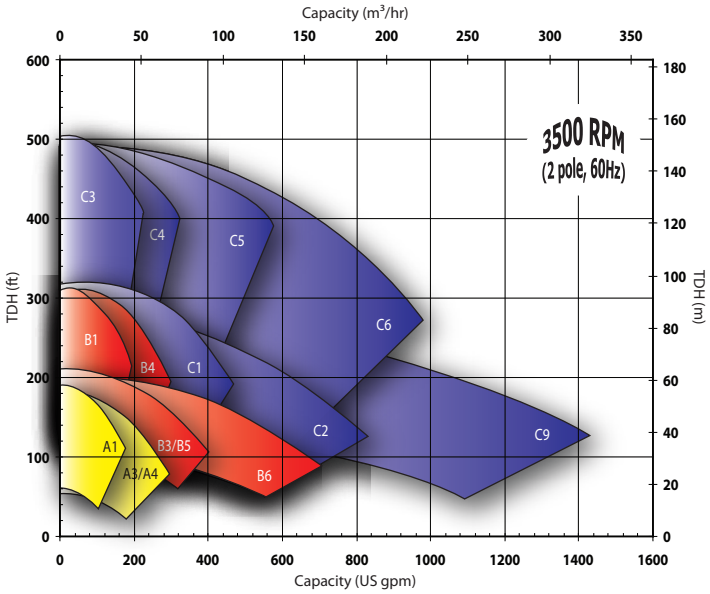


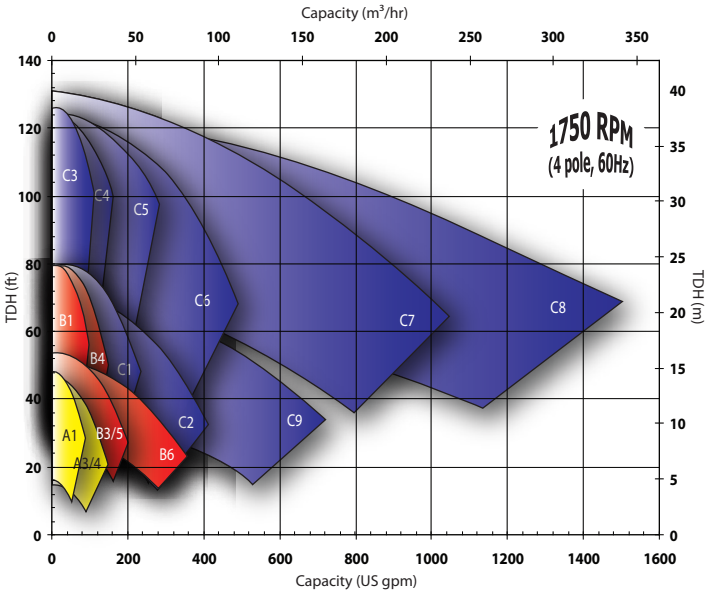
TB-Mag Series	Model (Size)	ANSI No.	D	2E1	2E2	F	O	X	Y	CP	SF	DF	LB (kg)
A	A1 - (1.5 x 1 x 6)	AA	5.25 (133)	6.00 (152)	0.00 (0)	7.25 (184)	11.75 (298)	6.50 (165)	4.00 (102)	8.70 (221)	1.50 (38)	1.00 (25)	80 (36)
	AL - (1.5 x 1 x 6 LF) Low Flow	AA											
	A3 - (3 x 1.5 x 6)	AB									3.00 (76)	1.50 (38)	90 (41)
	A4 - (3 x 2 x 6)	- -										2.00 (51)	
B	B1 - (1.5 x 1 x 8)	AA								11.30 (287)	1.50 (38)	1.00 (25)	125 (57)
	BL - (1.5 x 1 x 8 LF) Low Flow	AA											
	B3 - (3 x 2 x 6) Short 11.75"	- -									3.00 (76)	2.00 (51)	135 (61)
	B4 - (3 x 1.5 x 8)	A50	8.25 (210)	9.75 (248)	7.25 (184)	12.50 (318)	16.75 (425)	8.50 (216)					153 (70)
	B5 - (3 x 2 x 6) Tall 16.75"	A10					16.50 (419)	8.25 (210)					145 (65)
	B6 - (4 x 3 x 6)	- -									4.00 (102)	3.00 (76)	185 (84)
C	C1 - (3 x 2 x 8)	A60					17.75 (451)	9.50 (241)			3.00 (76)	2.00 (51)	159 (72)
	C2 - (4 x 3 x 8)	A70					19.25 (489)	11.00 (279)			4.00 (102)	3.00 (76)	195 (88)
	C3 - (2 x 1 x 10)	A05					16.75 (425)	8.50 (216)			2.00 (51)	1.00 (25)	174 (79)
	CL - (2 x 1 x 10 LF) Low Flow	A05											
	C4 - (3 x 1.5 x 10)	A50									3.00 (76)	1.50 (38)	188 (85)
	C5 - (3 x 2 x 10)	A60					17.75 (451)	9.50 (241)				2.00 (51)	189 (86)
	C6 - (4 x 3 x 10)	A70					19.25 (489)	11.00 (279)			4.00 (102)	3.00 (76)	205 (99)
	C7 - (4 x 3 x 10 H)	A70											219 (99)
	C8 - (6 x 4 x 10 H)	A80	10.00 (254)				23.50 (597)	13.50 (343)			6.00 (152)	4.00 (102)	269 (122)
	C9 - (6 x 4 x 8)	A80											

All ISO products can be Mounted to either IEC or NEMA style Motors

TB- Mag Series	Model (Size)	D	2E1	2E2	M2	F	O	X	Y	CP	SF	DF	LB (KG)
A	E1 - (50 x 32 x 160)	5.20 (132)	7.48 (190)	4.33 (110)	2.76 (70)	7.25 (184)	11.50 (292)	6.29 (160)	3.15 (80)	8.39 (213)	1.97 (50)	1.26 (32)	80 (36)
	EL - (50 x 32 x 160 LF) Low Flow												
	E3 - (65 x 50 x 160)										2.56 (65)	1.97 (50)	86 (39)
B	F1 - (50 x 32 x 200)	6.29 (160)				9.91 (252)	13.39 (340)	7.09 (180)		11.16 (284)	1.97 (50)	1.26 (32)	133 (60)
	FL - (50 x 32 x 200 LF) Low Flow												
	F4 - (65 x 40 x 200)		8.35 (212)						3.97 (100)		2.56 (65)	1.57 (40)	144 (65)
C	G2 - (100 x 65 x 200)	7.09 (180)	9.84 (250)		3.74 (95)		15.94 (405)	8.86 (225)			3.93 (100)	2.56 (65)	168 (76)

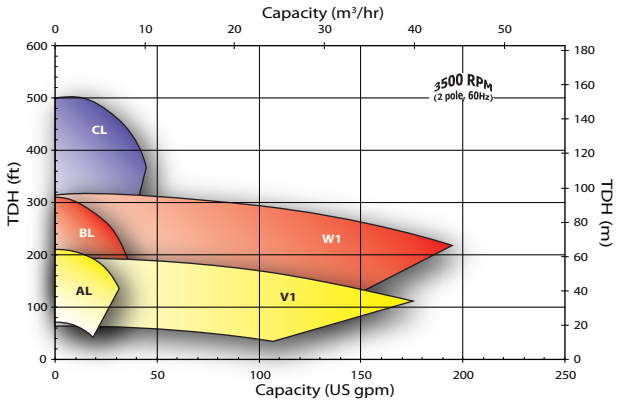
TB-mag Hydraulic Curves

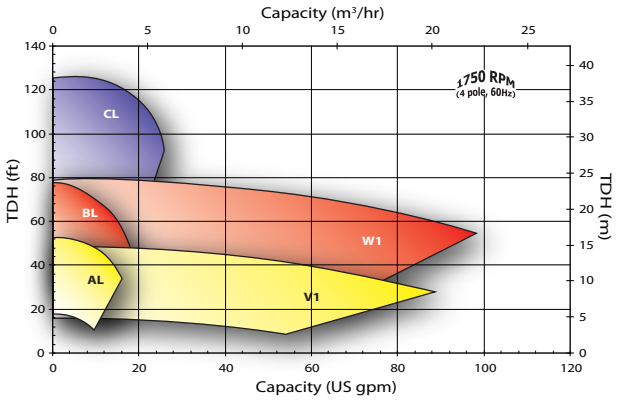




Power Range	ALL Pump Models use ONE Impeller for Stated Power Range				
to 15hp @ 3500 rpm	A1-1.5x1x6	A3-3x1.5x6	A4-3x2x6		
to 30hp @ 3500 rpm	B1-1.5x1x8	B3/B5-3x2x6	B4-3x1.5x8	B6-4x3x6	
to 75hp @ 3500 rpm	C1-3x2x8 C6-4x3x10	C2-4x3x8 C7-4x3x10H	C3-2x1x10 C8-6x4x10H	C4-3x1.5x10 C9-6x4x8	C5-3x2x10

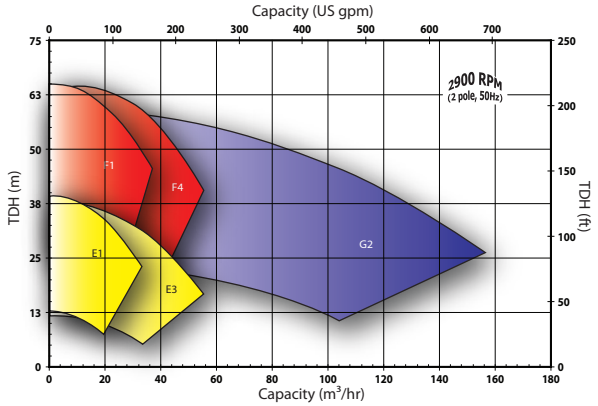
TB-mag Special Pumps

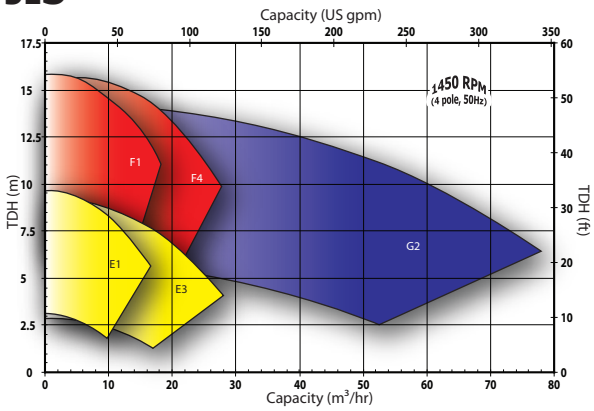




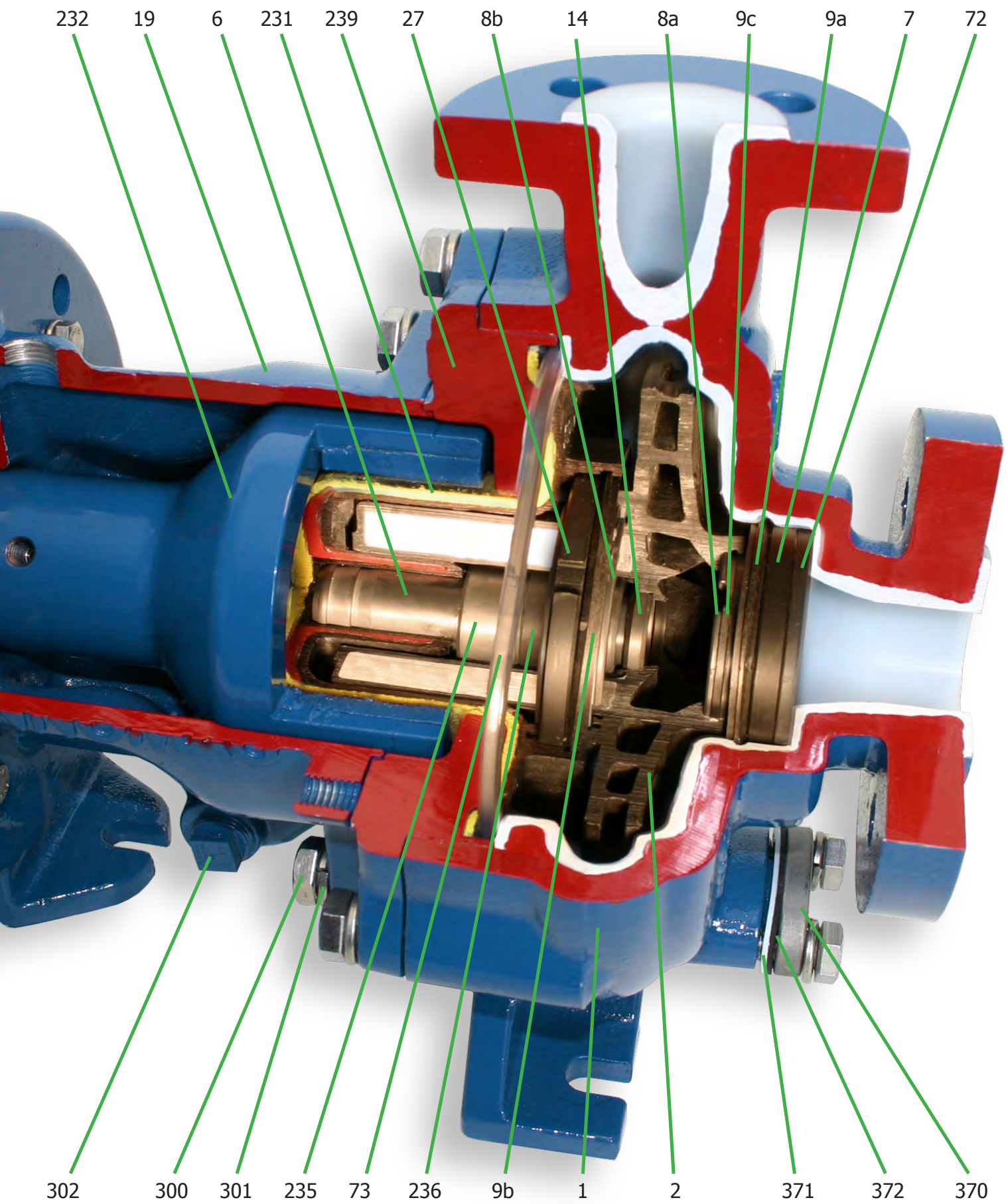
Power Range	ALL Pump Models use ONE Impeller for Stated Power Range	
to 15hp @ 3500 rpm	AL-1.5x1x6LF (low flow)	V1-2x1.5x6 (ANSI vertical)
to 30hp @ 3500 rpm	BL-1.5x1x8LF (low flow)	W1-2x1.5x8 (ANSI vertical)
to 75hp @ 3500 rpm	CL-2x1x10LF (low flow)	

TB-mag ISO/JIS





Power Range	ALL Pump Models use ONE Impeller for Stated Power Range	
to 8.7kW @ 2950 rpm	E1-50x32x160	E3-65x50x160
to 18.5kW @ 2950 rpm	F1-50x32x200	F4-65x40x200
to 46.4kW @ 2950 rpm	G2-100x65x200	


232
19
6
231
239
27
8b
14
8a
9c
9a
7
72
302
300
301
235
73
236
9b
1
2
371
372
370

Item #	Qty.	Part Name	Material
1	1	Casing	Ductile Iron / Pure ETFE Lining
2	1	Impeller Magnet Assembly	CFR-ETFE
6	1	Shaft, Pump	Silicon Carbide
7	1	Wear Ring, Front Stationary	Silicon Carbide
8a	1	Wear Ring, Front Rotating	Silicon Carbide
8b	1	Wear Ring, Back Rotating	Silicon Carbide
9a	1	Retaining Ring, Front Stationary	CFR-ETFE
9b	1	Retaining Ring, Rear Stationary	CFR-ETFE
9c	2	Retaining Ring, Pin (sets)	CFR-ETFE
14	1	Valve, Thrust Control	Silicon Carbide
19	1	Adapter	Ductile Iron
27	1	Wear Ring, Back Stationary	Silicon Carbide
72	1	Collar, Thrust	CFR-PTFE
73	1	Gasket, O-Ring	FEP / FKM (Fluorocarbon) Core
231	1	Shell, Containment	CFR-ETFE / Fiber Reinforced Vinyl Ester
232	1	Magnet Assembly, Outer	Ductile Iron / Neodymium Iron
235	2	Bushing, Bearing	Silicon Carbide
236	1	Bushing, Spacer	Pure PTFE
239	1	Ring, Containment	Ductile Iron
300	14	Hex Cap Screw	304 SS
301	14	Lock Washer	304 SS
302	2	Plug	Plastic
370	1	Drain Flange	304 SS
371	1	Drain Gasket	Pure PTFE
372	1	Drain Gasket	Neoprene

Material Description and Properties

CFR-ETFE

Carbon Fiber Reinforced Ethylene tetrafluoroethylene (CFR-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.

Property	Units	Amount
Specific Gravity	N/A	1.74
Working Temperature Range	°F	-20 to 250
Tensile Strength	PSI	7400
Flexural Modulus	PSI	180000

Ductile Iron

Ductile Iron is Cast Iron with spheroidal graphite. It's 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.

Property	Units	Amount
Tensile Strength	PSI	65000
Yield Strength	PSI	45000
Elongation	%	12
Hardness	BHN	200

Alpha Sintered Silicon Carbide (SiC)

Alpha Sintered Silicon Carbide (SiC) is by far the strongest, hardest, most corrosion resistant ceramic available today. It is 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.

Property	Units	Amount
Density	g/cm^3	3.1
Hardness	Kg/mm^2	2600
Flexural Strength	Mpa	395
Compressive Strength	Mpa	3400

CFR-PTFE

Carbon Fiber Reinforced Polytetrafluoroethylene (PTFE) is a synthetic fluoropolymer which finds numerous applications. Water-containing substances do not wet PTFE, therefore adhesion to PTFE surfaces is inhibited.

Property	Units	Amount
Specific Gravity	N/A	2.09
Tensile Strength	PSI	3500
Compressive Strength	PSI	4300
Tensile Elastic Modulus	PSI	12800

FEP / FKM (Fluorocarbon) Core

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.

Property	Units	Amount
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

Pure ETFE

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.

Property	Units	Amount
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

Item # 1 - Casing

Model	Size / Description	Part #
A1	1.5 x 1 - ANSI class 150	CSG-1010-SI
	1.5 x 1 - ANSI class 300	CSG-1011-SI
	50 x 32mm - ISO PN 16	CSG-1012-SI
	50 x 40mm - JIS 10 kg/cm²	CSG-1013-SI
AL	1.5 x 1 - ANSI class 150	CSG-1010-LF
	1.5 x 1 - ANSI class 300	CSG-1011-LF
	50 x 32mm - ISO PN 16	CSG-1012-LF
	50 x 40mm - JIS 10 kg/cm²	CSG-1013-LF
E1	50 x 32mm - ISO PN 16	CSG-1015-SI
	50 x 40mm - JIS 10 kg/cm²	CSG-1017-SI
	2.0 x 1.5 - ANSI class 150	CSG-1018-SI
EL	50 x 32mm - ISO PN 16	CSG-1015-LF
	50 x 40mm - JIS 10 kg/cm²	CSG-1017-LF
	2.0 x 1.5 - ANSI class 150	CSG-1018-LF
A3	3 x 1.5 - ANSI class 150	CSG-1070-SI
	3 x 1.5 - ANSI class 300	CSG-1071-SI
	65 x 40mm - ISO PN 16	CSG-1072-SI
	65 x 50mm - ISO PN 16	CSG-1073-SI
	65 x 50mm - JIS 10 kg/cm²	CSG-1074-SI
E3	65 x 50mm - ISO PN 16	CSG-107A-SI
	65 x 40mm - ISO PN 16	CSG-107B-SI
	65 x 50mm - JIS 10 kg/cm²	CSG-107C-SI
	3 x 2 - ANSI class 150	CSG-107D-SI
	3 x 1.5 - ANSI class 150	CSG-107E-SI
A4	3 x 2 - ANSI class 150	CSG-1075-SI
	3 x 2 - ANSI class 300	CSG-1076-SI
	80 x 50mm - ISO PN 16	CSG-1077-SI
	80 x 65mm - ISO PN 16	CSG-1078-SI
	80 x 65mm - JIS 10 kg/cm²	CSG-1079-SI
B1	1.5 x 1 - ANSI class 150	CSG-1030-SI
	1.5 x 1 - ANSI class 300	CSG-1031-SI
	50 x 32mm - ISO PN 16	CSG-1032-SI
	50 x 40mm - JIS 10 kg/cm²	CSG-1033-SI

Item # 1 - Casing

Model	Size / Description	Part #
BL	1.5 x 1 - ANSI class 150	CSG-1030-LF
	1.5 x 1 - ANSI class 300	CSG-1031-LF
	50 x 32mm - ISO PN 16	CSG-1032-LF
	50 x 40mm - JIS 10 kg/cm²	CSG-1033-LF
F1	50 x 32mm - ISO PN 16	CSG-1035-SI
	50 x 40mm - JIS 10 kg/cm²	CSG-1037-SI
	2.0 x 1.5 - ANSI class 150	CSG-1038-SI
FL	50 x 32mm - ISO PN 16	CSG-1035-LF
	50 x 40mm - JIS 10 kg/cm²	CSG-1037-LF
	2.0 x 1.5 - ANSI class 150	CSG-1038-LF
B3	3 x 2 - ANSI class 150	CSG-1020-SI
	3 x 2 - ANSI class 300	CSG-1021-SI
	80 x 50mm - ISO PN 16	CSG-1022-SI
	80 x 65mm - JIS 10 kg/cm²	CSG-1023-SI
	80 x 65mm - ISO PN 16	CSG-1024-SI
B4	3 x 1.5 - ANSI class 150	CSG-1080-SI
	3 x 1.5 - ANSI class 300	CSG-1081-SI
	65 x 40mm - ISO PN 16	CSG-1082-SI
	65 x 50mm - ISO PN 16	CSG-1083-SI
	65 x 50mm - JIS 10 kg/cm²	CSG-1084-SI
	80 x 50mm - ISO PN16	CSG-108A-SI
F4	65 x 40mm - ISO PN 16	CSG-1085-SI
	65 x 50mm - JIS 10 kg/cm²	CSG-1087-SI
	3 x 1.5 - ANSI class 150	CSG-1088-SI
B5	3 x 2 (A10) - ANSI class 150	CSG-1090-SI
	3 x 2 (A10) - ANSI class 300	CSG-1091-SI
	80 x 50mm - ISO PN 16	CSG-1092-SI
	80 x 65mm - ISO PN 16	CSG-1093-SI
	80 x 65mm - JIS 10 kg/cm²	CSG-1094-SI
B6	4 x 3 - ANSI class 150	CSG-1160-SI
	4 x 3 - ANSI class 300	CSG-1161-SI
	100 x 65mm - ISO PN 16	CSG-1162-SI
	100 x 80mm - ISO PN 16	CSG-1163-SI
	100 x 80mm - JIS 10 kg/cm²	CSG-1164-SI
C1	3 x 2 - ANSI class 150	CSG-1050-SI
	3 x 2 - ANSI class 300	CSG-1051-SI
	80 x 50mm - ISO PN 16	CSG-1052-SI
	80 x 65mm - JIS 10 kg/cm²	CSG-1053-SI
C2	4 x 3 - ANSI class 150	CSG-1060-SI
	4 x 3 - ANSI class 300	CSG-1061-SI
	100 x 65mm - ISO PN 16	CSG-1062-SI
	100 x 80mm - JIS 10 kg/cm²	CSG-1063-SI
	100 x 80mm - ISO PN 16	CSG-1064-SI
G2	100 x 65mm - ISO PN 16	CSG-1065-SI
	100 x 80mm - JIS 10 kg/cm²	CSG-1067-SI
	4 x 3 - ANSI class 150	CSG-1068-SI
	100 x 80mm - ISO PN 16	CSG-1069-SI

Item # 1 - Casing

Model	Size / Description	Part #
C3	2 x 1 - ANSI class 150	CSG-1100-SI
	2 x 1 - ANSI class 300	CSG-1101-SI
	50 x 32mm - ISO PN 16	CSG-1102-SI
CL	2 x 1 - ANSI class 150	CSG-1100-LF
	2 x 1 - ANSI class 300	CSG-1101-LF
	50 x 32mm - ISO PN 16	CSG-1102-LF
C4	3 x 1.5 - ANSI class 150	CSG-1110-SI
	3 x 1.5 - ANSI class 300	CSG-1111-SI
	65 x 40mm - ISO PN 16	CSG-1112-SI
	65 x 50mm - ISO PN 16	CSG-1113-SI
	65 x 50mm - JIS 10 kg/cm^2	CSG-1114-SI
C5	3 x 2 - ANSI class 150	CSG-1120-SI
	3 x 2 - ANSI class 300	CSG-1121-SI
	80 x 50mm - ISO PN 16	CSG-1122-SI
	80 x 65mm - ISO PN 16	CSG-1123-SI
	80 x 65mm - JIS 10 kg/cm^2	CSG-1124-SI
C6	4 x 3 - ANSI class 150	CSG-1130-SI
	4 x 3 - ANSI class 300	CSG-1131-SI
	100 x 65mm - ISO PN 16	CSG-1132-SI
	100 x 80mm - ISO PN 16	CSG-1133-SI
	100 x 80mm - JIS 10 kg/cm^2	CSG-1134-SI
C7	4 x 3 - ANSI class 150	CSG-1140-SI
	4 x 3 - ANSI class 300	CSG-1141-SI
	100 x 65mm - ISO PN 16	CSG-1142-SI
	100 x 80mm - ISO PN 16	CSG-1143-SI
	100 x 80mm - JIS 10 kg/cm^2	CSG-1144-SI
	125 x 80mm - ISO PN 16	CSG-1145-SI
C8	6 x 4 - ANSI class 150	CSG-1150-SI
	6 x 4 - ANSI class 300	CSG-1151-SI
	150 x 100mm - ISO PN 16	CSG-1152-SI
	150 x 125mm - ISO PN 16	CSG-1153-SI
	150 x 125mm - JIS 10 kg/cm^2	CSG-1154-SI
C9	6 x 4 - ANSI class 150	CSG-1155-SI
	6 x 4 - ANSI class 300	CSG-1156-SI
	150 x 125mm - ISO PN 16	CSG-1157-SI
	150 x 125mm - JIS 10 kg/cm^2	CSG-1158-SI
V1	2 x 1.5 x 6 V - ANSI class 150	CSG-1210-SI
	2 x 1.5 x 6 V - ANSI class 300	CSG-1211-SI
	50 x 32mm V - ISO PN 16	CSG-1212-SI
	50 x 40mm V - JIS 10 kg/cm^2	CSG-1213-SI
W1	2 x 1.5 x 8 V - ANSI class 150	CSG-1230-SI
	2 x 1.5 x 8 V - ANSI class 300	CSG-1231-SI
	50 x 32mm V - ISO PN 16	CSG-1232-SI
	50 x 40mm V - JIS 10 kg/cm^2	CSG-1233-SI
W3	3 x 2 x 6 V - ANSI class 150	CSG-1220-SI
	3 x 2 x 6 V - ANSI class 300	CSG-1221-SI
	80 x 50mm V - ISO PN 16	CSG-1222-SI
	80 x 65mm V - JIS 10 kg/cm^2	CSG-1223-SI

Item # 2 - Impeller

Model	Size	Part #
A1	(1.5 x 1 x 6)	IMA -1010-SI
AL	(1.5 x 1 x 6) LF	IMA -1010-SI
E1	(50mm x 32mm)	IMA -1010-SI
EL	(50mm x 32mm)	IMA -1010-SI
A3	(3 x 1.5 x 6)	IMA -1070-SI
E3	(65mm x 40mm)	IMA -1070-SI
A4	(3 x 2 x 6)	IMA -1070-SI
B1	(1.5 x 1 x 8)	IMA -1030-SI
BL	(1.5 x 1 x 8) LF	IMA -1030-SI
F1	(50mm x 32mm)	IMA -1030-SI
FL	(50mm x 32mm)	IMA -1030-SI
B3	(3 x 2 x 6)	IMA -1020-SI
B4	(3 x 1.5 x 8)	IMA -1040-SI
F4	65mm x 40mm	IMA -1040-SI
B5	(3 x 2 x 6)	IMA -1020-SI
B6	(4 x 3 x 6)	IMA -1065-SI
C1	(3 x 2 x 8)	IMA -1050-SI
C2	(4 x 3 x 8)	IMA -1060-SI
G2	(100mm x 65mm)	IMA -1060-SI
C3	(2 x 1 x 10)	IMA -1100-SI
CL	(2 x 1 x 10) LF	IMA -1100-SI
C4	(3 x 1.5 x 10)	IMA -1100-SI
C5	(3 x 2 x 10)	IMA -1120-SI
C6	(4 x 3 x 10)	IMA -1130-SI
	(4 x 3 x 10) UHT	IMA -1132-SI
C7	(4 x 3 x 10H)	IMA -1140-SI
	(4 x 3 x 10H) UHT	IMA -1142-SI
C8	(6 x 4 x 10H)	IMA -1150-SI
	(6 x 4 x 10H) UHT	IMA -1152-SI
C9	(6 x 4 x 8)	IMA -1155-SI
	(6 x 4 x 8) UHT	IMA -1157-SI
V1	(2 x 1.5 x 6) V	IMA -1010-SI
W1	(2 x 1.5 x 8) V	IMA -1030-SI
W3	(3 x 2 x 6) V	IMA -1020-SI

Item # 9b - Retaining Ring, Back Stationary

Model	Size	Part #
A1	(1.5 x 1 x 6)	RGR-1020-AA
AL	(1.5 x 1 x 6 LF)	RGR-1020-AA
E1	(50mm x 32mm)	RGR-1020-AA
EL	(50mm x 32mm)	RGR-1020-AA
A3	(3 x 1.5 x 6)	RGR-1020-AA
E3	(65mm x 40mm)	RGR-1020-AA
A4	(3 x 2 x 6)	RGR-1020-AA
B1	(1.5 x 1 x 8)	RGR-1040-AA
BL	(1.5 x 1 x 8 LF)	RGR-1040-AA
F1	(50mm x 32mm)	RGR-1040-AA
FL	(50mm x 32mm)	RGR-1040-AA
B3	(3 x 2 x 6)	RGR-1040-AA
B4	(3 x 1.5 x 8)	RGR-1040-AA
F4	(65mm x 40mm)	RGR-1040-AA
B5	(3 x 2 x 6)	RGR-1040-AA
B6	(4 x 3 x 6)	RGR-1040-AA
C1	(3 x 2 x 8)	RGR-1040-AA
C2	(4 x 3 x 8)	RGR-1040-AA
G2	(100mm x 65mm)	RGR-1040-AA
C3	(2 x 1 x 10)	RGR-1040-AA
CL	(2 x 1 x 10 LF)	RGR-1040-AA
C4	(3 x 1.5 x 10)	RGR-1040-AA
C5	(3 x 2 x 10)	RGR-1040-AA
C6	(4 x 3 x 10)	RGR-1040-AA
C7	(4 x 3 x 10H)	RGR-1070-AA
C8	(6 x 4 x 10H)	RGR-1070-AA
C9	(6 x 4 x 8)	RGR-1040-AA
V1	(2 x 1.5 x 6 V)	RGR-1020-AA
W1	(2 x 1.5 x 8 V)	RGR-1040-AA
W3	(3 x 2 x 6 V)	RGR-1040-AA

Item # 7 - Wear Ring, Front Stationary

Model	Size	OD	ID	Part # SIC	CFR/PTFE
A1	(1.5 x 1 x 6)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
AL	(1.5 x 1 x 6 LF)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
E1	(50mm x 32mm)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
EL	(50mm x 32mm)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
A3	(3 x 1.5 x 6)	3.765	3.015	WRS-1050-SI	WRS-1054-SI
E3	(65mm x 40mm)	3.765	3.015	WRS-1050-SI	WRS-1054-SI
A4	(3 x 2 x 6)	3.765	3.015	WRS-1050-SI	WRS-1054-SI
B1	(1.5 x 1 x 8)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
BL	(1.5 x 1 x 8 LF)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
F1	(50mm x 32mm)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
FL	(50mm x 32mm)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
B3	(3 x 2 x 6)	4.296	3.545	WRS-1020-SI	WRS-1024-SI
B4	(3 x 1.5 x 8)	4.296	3.545	WRS-1020-SI	WRS-1024-SI
F4	(65mm x 40mm)	4.296	3.545	WRS-1020-SI	WRS-1024-SI
B5	(3 x 2 x 6)	4.296	3.545	WRS-1020-SI	WRS-1024-SI
B6	(4 x 3 x 6)	5.151	4.201	WRS-1030-SI	WRS-1034-SI
C1	(3 x 2 x 8)	4.296	3.545	WRS-1020-SI	WRS-1024-SI
C2	(4 x 3 x 8)	5.151	4.201	WRS-1030-SI	WRS-1034-SI
G2	(100mm x 65mm)	5.151	4.201	WRS-1030-SI	WRS-1034-SI
C3	(2 x 1 x 10)	3.765	3.015	WRS-1050-SI	WRS-1054-SI
CL	(2 x 1 x 10 LF)	3.765	3.015	WRS-1050-SI	WRS-1054-SI
C4	(3 x 1.5 x 10)	3.765	3.015	WRS-1050-SI	WRS-1054-SI
C5	(3 x 2 x 10)	4.296	3.545	WRS-1020-SI	WRS-1024-SI
C6	(4 x 3 x 10)	5.151	4.201	WRS-1030-SI	WRS-1034-SI
C7	(4 x 3 x 10H)	5.989	5.039	WRS-1040-SI	WRS-1044-SI
C8	(6 x 4 x 10H)	7.422	6.400	WRS-1060-SI	WRS-1064-SI
C9	(6 x 4 x 8)				
V1	(2 x 1.5 x 6 V)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
W1	(2 x 1.5 x 8 V)	3.396	2.645	WRS-1010-SI	WRS-1014-SI
W3	(3 x 2 x 6 V)	4.296	3.545	WRS-1020-SI	WRS-1024-SI

Item # 8a - Wear Ring, Front Rotating

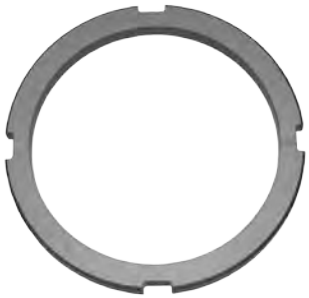
Model	Size	OD	ID	Part # SIC
A1	(1.5 x 1 x 6)	2.640	2.140	WRR-1010-SI
AL	(1.5 x 1 x 6 LF)	2.640	2.140	WRR-1010-SI
E1	(50mm x 32mm)	2.640	2.140	WRR-1010-SI
EL	(50mm x 32mm)	2.640	2.140	WRR-1010-SI
A3	(3 x 1.5 x 6)	3.010	2.510	WRR-1050-SI
E3	(65mm x 40mm)	3.010	2.510	WRR-1050-SI
A4	(3 x 2 x 6)	3.010	2.510	WRR-1050-SI
B1	(1.5 x 1 x 8)	2.640	2.140	WRR-1010-SI
BL	(1.5 x 1 x 8 LF)	2.640	2.140	WRR-1010-SI
F1	(50mm x 32mm)	2.640	2.140	WRR-1010-SI
FL	(50mm x 32mm)	2.640	2.140	WRR-1010-SI
B3	(3 x 2 x 6)	3.540	3.040	WRR-1020-SI
B4	(3 x 1.5 x 8)	3.540	3.040	WRR-1020-SI
F4	65mm x 40mm	3.540	3.040	WRR-1020-SI
B5	(3 x 2 x 6)	3.540	3.040	WRR-1020-SI
B6	(4 x 3 x 6)	4.196	3.696	WRR-1030-SI
C1	(3 x 2 x 8)	4.196	3.696	WRR-1020-SI
C2	(4 x 3 x 8)	4.196	3.696	WRR-1030-SI
G2	(100mm x 65mm)	4.196	3.696	WRR-1030-SI
C3	(2 x 1 x 10)	3.010	2.510	WRR-1050-SI
CL	(2 x 1 x 10 LF)	3.010	2.510	WRR-1050-SI
C4	(3 x 1.5 x 10)	3.010	2.510	WRR-1050-SI
C5	(3 x 2 x 10)	3.540	3.040	WRR-1020-SI
C6	(4 x 3 x 10)	4.196	3.696	WRR-1030-SI
C7	(4 x 3 x 10H)	5.034	4.440	WRR-1040-SI
C8	(6 x 4 x 10H)	6.395	5.790	WRR-1060-SI
C9	(6 x 4 x 8)	5.034	4.440	WRR-1048-SI
V1	(2 x 1.5 x 6 V)	2.640	2.140	WRR-1010-SI
W1	(2 x 1.5 x 8 V)	2.640	2.140	WRR-1010-SI
W3	(3 x 2 x 6 V)	3.540	3.040	WRR-1020-SI

Item # 9a - Retaining Ring, Front Stationary

Model	Size	Part #
A1	(1.5 x 1 x 6)	RGR-1010-AA
AL	(1.5 x 1 x 6 LF)	RGR-1010-AA
E1	(50mm x 32mm)	RGR-1010-AA
EL	(50mm x 32mm)	RGR-1010-AA
A3	(3 x 1.5 x 6)	RGR-1050-AA
E3	(65mm x 40mm)	RGR-1050-AA
A4	(3 x 2 x 6)	RGR-1050-AA
B1	(1.5 x 1 x 8)	RGR-1010-AA
BL	(1.5 x 1 x 8 LF)	RGR-1010-AA
F1	(50mm x 32mm)	RGR-1010-AA
FL	(50mm x 32mm)	RGR-1010-AA
B3	(3 x 2 x 6)	RGR-1020-AA
B4	(3 x 1.5 x 8)	RGR-1020-AA
F4	65mm x 40mm	RGR-1020-AA
B5	(3 x 2 x 6)	RGR-1020-AA
B6	(4 x 3 x 6)	RGR-1030-AA
C1	(3 x 2 x 8)	RGR-1020-AA
C2	(4 x 3 x 8)	RGR-1030-AA
G2	(100mm x 65mm)	RGR-1030-AA
C3	(2 x 1 x 10)	RGR-1050-AA
CL	(2 x 1 x 10 LF)	RGR-1050-AA
C4	(3 x 1.5 x 10)	RGR-1050-AA
C5	(3 x 2 x 10)	RGR-1020-AA
C6	(4 x 3 x 10)	RGR-1030-AA
C7	(4 x 3 x 10H)	RGR-1040-AA
C8	(6 x 4 x 10H)	RGR-1060-AA
C9	(6 x 4 x 8)	RGR-1040-AA
V1	(2 x 1.5 x 6 V)	RGR-1010-AA
W1	(2 x 1.5 x 8 V)	RGR-1010-AA
W3	(3 x 2 x 6 V)	RGR-1020-AA

Item # 8b - Wear Ring, Back Rotating

Model	Size	OD	ID	Part # SIC
A1	(1.5 x 1 x 6)	3.540	3.040	WRR-1020-SI
AL	(1.5 x 1 x 6 LF)	3.540	3.040	WRR-1020-SI
E1	(50mm x 32mm)	3.540	3.040	WRR-1020-SI
EL	(50mm x 32mm)	3.540	3.040	WRR-1020-SI
A3	(3 x 1.5 x 6)	3.540	3.040	WRR-1020-SI
E3	(65mm x 40mm)	3.540	3.040	WRR-1020-SI
A4	(3 x 2 x 6)	3.540	3.040	WRR-1020-SI
B1	(1.5 x 1 x 8)	5.034	4.440	WRR-1040-SI
BL	(1.5 x 1 x 8 LF)	5.034	4.440	WRR-1040-SI
F1	(50mm x 32mm)	5.034	4.440	WRR-1040-SI
FL	(50mm x 32mm)	5.034	4.440	WRR-1040-SI
B3	(3 x 2 x 6)	5.034	4.440	WRR-1040-SI
B4	(3 x 1.5 x 8)	5.034	4.440	WRR-1040-SI
F4	(65mm x 40mm)	5.034	4.440	WRR-1040-SI
B5	(3 x 2 x 6)	5.034	4.440	WRR-1040-SI
B6	(4 x 3 x 6)	5.034	4.440	WRR-1040-SI
C1	(3 x 2 x 8)	5.034	4.440	WRR-1040-SI
C2	(4 x 3 x 8)	5.034	4.440	WRR-1040-SI
G2	(100mm x 65mm)	5.034	4.440	WRR-1040-SI
C3	(2 x 1 x 10)	5.034	4.440	WRR-1040-SI
CL	(2 x 1 x 10 LF)	5.034	4.440	WRR-1040-SI
C4	(3 x 1.5 x 10)	5.034	4.440	WRR-1040-SI
C5	(3 x 2 x 10)	5.034	4.440	WRR-1040-SI
C6	(4 x 3 x 10)	5.034	4.440	WRR-1040-SI
C7	(4 x 3 x 10H)	7.520	6.920	WRR-1070-SI
C8	(6 x 4 x 10H)	7.520	6.920	WRR-1070-SI
C9	(6 x 4 x 8)	5.034	4.440	WRR-1048-SI
V1	(2 x 1.5 x 6 V)	3.540	3.040	WRR-1020-SI
W1	(2 x 1.5 x 8 V)	5.034	4.440	WRR-1040-SI
W3	(3 x 2 x 6 V)	5.034	4.440	WRR-1040-SI



Item # 27 - Wear Ring, Back Stationary

Model	Size	OD	ID	Part # SIC
A1	(1.5 x 1 x 6)	4.296	3.545	WRS-1020-SI
AL	(1.5 x 1 x 6 LF)	4.296	3.545	WRS-1020-SI
E1	(50mm x 32mm)	4.296	3.545	WRS-1020-SI
EL	(50mm x 32mm)	4.296	3.545	WRS-1020-SI
A3	(3 x 1.5 x 6)	4.296	3.545	WRS-1020-SI
E3	(65mm x 40mm)	4.296	3.545	WRS-1020-SI
A4	(3 x 2 x 6)	4.296	3.545	WRS-1020-SI
B1	(1.5 x 1 x 8)	5.989	5.039	WRS-1040-SI
BL	(1.5 x 1 x 8 LF)	5.989	5.039	WRS-1040-SI
F1	(50mm x 32mm)	5.989	5.039	WRS-1040-SI
FL	(50mm x 32mm)	5.989	5.039	WRS-1040-SI
B3	(3 x 2 x 6)	5.989	5.039	WRS-1040-SI
B4	(3 x 1.5 x 8)	5.989	5.039	WRS-1040-SI
F4	(65mm x 40mm)	5.989	5.039	WRS-1040-SI
B5	(3 x 2 x 6)	5.989	5.039	WRS-1040-SI
B6	(4 x 3 x 6)	5.989	5.039	WRS-1040-SI
C1	(3 x 2 x 8)	5.989	5.039	WRS-1040-SI
C2	(4 x 3 x 8)	5.989	5.039	WRS-1040-SI
G2	(100mm x 65mm)	5.989	5.039	WRS-1040-SI
C3	(2 x 1 x 10)	5.989	5.039	WRS-1040-SI
CL	(2 x 1 x 10 LF)	5.989	5.039	WRS-1040-SI
C4	(3 x 1.5 x 10)	5.989	5.039	WRS-1040-SI
C5	(3 x 2 x 10)	5.989	5.039	WRS-1040-SI
C6	(4 x 3 x 10)	5.989	5.039	WRS-1040-SI
C7	(4 x 3 x 10H)	8.574	7.525	WRS-1070-SI
C8	(6 x 4 x 10H)	8.574	7.525	WRS-1070-SI
C9	(6 x 4 x 8)	5.989	5.039	WRS-1040-SI
V1	(2 x 1.5 x 6 V)	4.296	3.545	WRS-1020-SI
W1	(2 x 1.5 x 8 V)	4.296	3.545	WRS-1040-SI
W3	(3 x 2 x 6 V)	5.989	5.039	WRS-1040-SI

Item # 6 - Shaft, Pump

Model	Size / Description	Part #
TB	A-Series - O.D. = 1.00”	STP-1005-SI
	B/C-Series - O.D. = 1.50”	STP-1015-SI

Item # 9d - Key, Locking

Model	Size / Description	Part #
TB	A/B/C (0.313” Wide)	RGR-1205-SI
	C-H (0.438” Wide)	RGR-1206-SI

Item # 9c - Retaining Pin, Impeller

Model	Size	Part #
TB	A/B/C Series	RGR-1200-SI

Item # 235 - (2) Bushing, Bearing

Model	Size	Part #
TB	A – 1.000" I.D.	BGB-1005-SI
	B/C – 1.500" I.D.	BGB-1015-SI

Item # 236 - Bushing, Spacer

Model	Size	Part #
TB	A Series	BGB-1050-SI
	B/C Series	BGB-1060-SI

Item # 20 - Foot, Adapter

Model	Size / Description	Part #
TB	B Series / C Series	FTA-1000-SI

Item # 14 - Valve, Thrust Control

Model	Size	Part #
TB	A Series	VTC-1000-SI
	B/C Series	VTC-1010-SI

Item # 231 - Containment Shell, Complete

Model	Size / Description	Part #
TB	A	SLC-1000-AA
	B/C 8"	SLC-1010-AA
	C 10"	SLC-1020-AA
	C 10" H	SLC-1030-AA

Item # 231 - Shell, Containment

Model	Size / Description	Part #
TB	A	SLC-1000-SI
	B / C 8"	SLC-1010-SI
	C 10"	SLC-1020-SI
	C 10" H	SLC-1030-SI

Old Style Thrust Collar 1998 - 2006

New Style Thrust Collar 2006 +

Item # 72 - Collar, Thrust

Model	Size	1998-2006	2006+ CFR/PTFE	2006+ SiC
A1	(1.5 x 1 x 6)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
AL	(1.5 x 1 x 6 LF)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
E1	(50mm x 32mm)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
EL	(50mm x 32mm)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
A3	(3 x 1.5 x 6)	CRT-1050-SI	CRT-1051-SI	CRT-1052-SI
E3	(65mm x 40mm)	CRT-1050-SI	CRT-1051-SI	CRT-1052-SI
A4	(3 x 2 x 6)	CRT-1050-SI	CRT-1051-SI	CRT-1052-SI
B1	(1.5 x 1 x 8)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
BL	(1.5 x 1 x 8 LF)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
F1	(50mm x 32mm)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
FL	(50mm x 32mm)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
B3	(3 x 2 x 6)	CRT-1020-SI	CRT-1021-SI	CRT-1022-SI
B4	(3 x 1.5 x 8)	CRT-1020-SI	CRT-1021-SI	CRT-1022-SI
F4	(65mm x 40mm)	CRT-1020-SI	CRT-1021-SI	CRT-1022-SI
B5	(3 x 2 x 6)	CRT-1020-SI	CRT-1021-SI	CRT-1022-SI
B6	(4 x 3 x 6)	Style B Only	CRT-1031-SI	CRT-1032-SI
C1	(3 x 2 x 8)	CRT-1020-SI	CRT-1021-SI	CRT-1022-SI
C2	(4 x 3 x 8)	CRT-1030-SI	CRT-1031-SI	CRT-1032-SI
G2	(100mm x 65mm)	CRT-1030-SI	CRT-1031-SI	CRT-1032-SI
C3	(2 x 1 x 10)	Style B Only	CRT-1051-SI	CRT-1052-SI
CL	(2 x 1 x 10 LF)	Style B Only	CRT-1051-SI	CRT-1052-SI
C4	(3 x 1.5 x 10)	Style B Only	CRT-1051-SI	CRT-1052-SI
C5	(3 x 2 x 10)	CRT-1020-SI	CRT-1021-SI	CRT-1022-SI
C6	(4 x 3 x 10)	Style B Only	CRT-1031-SI	CRT-1032-SI
C7	(4 x 3 x 10 H)	Style B Only	CRT-1040-SI	CRT-1042-SI
C8	(6 x 4 x 10 H)	Style B Only	CRT-1060-SI	CRT-1062-SI
C9	(6 x 4 x 8)	Style B Only	N/A	CRT-1048-SI
V1	(2 x 1.5 x 6 V)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
W1	(2 x 1.5 x 8 V)	CRT-1010-SI	CRT-1011-SI	CRT-1012-SI
W3	(3 x 2 x 6 V)	CRT-1020-SI	CRT-1021-SI	CRT-1022-SI

Item # 19 - Adapter

Model	Size / Description	Part #
TB	TB-mag-A, NEMA, 143 – 254/6 Frame	ADP-1000-SI
	TB-mag-A, IEC, 80 - 132 Frame	ADP-1005-SI
	TB-mag-B/C, NEMA, 143 - 286 Frame	ADP-1010-SI
	TB-mag-B/C, IEC, 90 - 132 Frame	ADP-1015-SI
	B/C, Mounting Plate, NEMA, 326 - 405 Frame	ADP-1100-SI
	B/C, Mounting Plate, IEC, 160 - 180 Frame	ADP-1125-SI
	B/C, Mounting Plate, IEC, 200 Frame	ADP-1135-SI
	B/C, Mounting Plate, IEC, 225 Frame	ADP-1145-SI

Item # 73- Gasket, O-Ring

Model	Size	FEP/FKM	FKM	EPDM
	A	GTO-1003-SI	GTO-1004-SI	GTO-1005-SI
TB	B/C 8"	GTO-1013-SI	GTO-1014-SI	GTO-1015-SI
	C 10"	GTO-1023-SI	GTO-1024-SI	GTO-1025-SI

Item # 302 - Adapter Plugs

Model	Size / Description	Part #
TB	A/B/C - 1/2" NPT, Top of Adapter, 18-8 Stainless Steel	HDW-1230-SI
TB	A/B/C - 1/2' NPT, Bottom of Adapter, Red, PP.	HDW-1500-SI

Item # 239 - Ring, Containment

Model	Size / Description	Part #
TB	A - ANSI	RGC-1000-SI
	A - ISO / JIS	RGC-1005-SI
	B/C - ANSI 8"	RGC-1010-SI
	B/C - ISO / JIS 8"	RGC-1015-SI
	Secondary Sealed Unit – 8"	RGC-2110-SI
	B/C - ANSI 10"	RCG-1020-SI
	B/C - ISO / JIS 10"	RGC-1025-SI
	Secondary Sealed Unit – 10"	RGC-2120-SI

Item # 300 - Hex Cap Screw

Model	Size / Description	Part #
TB-A	1/2"-13 x 1.25"	HDW-1021-SI
	M12-1.75x30mm	HDW-1035-SI
TB-B/C	5/8"-11 x 1.50"	HDW-1042-SI
	M16-2.0x40mm	HDW-1049-SI

Item # 301 - Lock Washer

Model	Size / Description	Part #
TB-A	1/2"	HDW-1140-SI
	13 mm	HDW-1145-SI
TB-B/C	5/8"	HDW-1160-SI
	17 mm	HDW-1165-SI

Item # 370 - Drain Flange

Model	Size / Description	Part #
TB	A/B/C – Flange	SUB-1350-SI

Item # 371 - PTFE Drain Gasket

Model	Size / Description	Part #
TB	A/B/C – Drain Gasket	GTO-1040-SI

Item # 372 - Neoprene Drain Gasket

Model	Size / Description	Part #
TB	A/B/C – Drain Gasket Backing	GTO-1050-SI

Item # 2 - Impeller Magnet, Complete

Model	Size / Description	Part #
A1	(1.5 x 1 x 6)	IMA -1010-AA
AL	(1.5 x 1 x 6 LF)	IMA -1010-AA
E1	(50mm x 32mm)	IMA -1010-AA
EL	(50mm x 32mm)	IMA -1010-AA
A3	(3 x 1.5 x 6)	IMA -1070-AA
E3	(65mm x 40mm)	IMA -1070-AA
A4	(3 x 2 x 6)	IMA -1070-AA
B1	(1.5 x 1 x 8)	IMA -1030-AA
BL	(1.5 x 1 x 8 LF)	IMA -1030-AA
F1	(50mm x 32mm)	IMA -1030-AA
FL	(50mm x 32mm)	IMA -1030-AA
B3	(3 x 2 x 6)	IMA -1020-AA
B4	(3 x 1.5 x 8)	IMA -1040-AA
F4	(65mm x 40mm)	IMA -1040-AA
B5	(3 x 2 x 6)	IMA -1020-AA
B6	(4 x 3 x 6)	IMA -1065-AA
C1	(3 x 2 x 8)	IMA -1050-AA
C2	(4 x 3 x 8)	IMA -1060-AA
G2	(100mm x 65mm)	IMA -1060-AA
C3	(2 x 1 x 10)	IMA -1100-AA
CL	(2 x 1 x 10 LF)	IMA -1100-AA
C4	(3 x 1.5 x 10)	IMA -1100-AA
C5	(3 x 2 x 10)	IMA -1120-AA
C6	(4 x 3 x 10)	IMA -1130-AA
	(4 x 3 x 10 UHT)	IMA -1132-AA
C7	(4 x 3 x 10 H)	IMA -1140-AA
	(4 x 3 x 10 UHT)	IMA -1142-AA
C8	(6 x 4 x 10H)	IMA -1150-AA
	(6 x 4 x 10 UHT)	IMA -1152-AA
C9	(6 x 4 x 8)	IMA -1155-AA
	(6 x 4 x 8 UHT)	IMA -1157-AA
V1	(2 x 1.5 x 6 V)	IMA -1010-AA
W1	(2 x 1.5 x 8 V)	IMA -1030-AA
W3	(3 x 2 x 6 V)	IMA -1020-AA

Item # 1 - Casing, Lined Completed Sub Assemblies

Model	Size / Description	Part #
A1	1.5 x 1 - ANSI class 150	CSG-1010-AA
	1.5 x 1 - ANSI class 300	CSG-1011-AA
	50 x 32mm - ISO PN 16	CSG-1012-AA
	50 x 40mm - JIS 10 kg/cm^2	CSG-1013-AA
AL	1.5 x 1 - ANSI class 150	CSG-1010-LB
	1.5 x 1 - ANSI class 300	CSG-1011-LB
	50 x 32mm - ISO PN 16	CSG-1012-LB
	50 x 40mm - JIS 10 kg/cm^2	CSG-1013-LB
E1	50 x 32mm - ISO PN 16	CSG-1015-AA
	50 x 40mm - JIS 10 kg/cm^2	CSG-1017-AA
	2.0 x 1.5 - ANSI class 150	CSG-1018-AA
EL	50 x 32mm - ISO PN 16	CSG-1015-LB
	50 x 40mm - JIS 10 kg/cm^2	CSG-1017-LB
	2.0 x 1.5 - ANSI class 150	CSG-1018-LB
A3	3 x 1.5 - ANSI class 150	CSG-1070-AA
	3 x 1.5 - ANSI class 300	CSG-1071-AA
	65 x 40mm - ISO PN 16	CSG-1072-AA
	65 x 50mm - ISO PN 16	CSG-1073-AA
	65 x 50mm - JIS 10 kg/cm^2	CSG-1074-AA
E3	65 x 50mm - ISO PN 16	CSG-107A-AA
	65 x 40mm - ISO PN 16	CSG-107B-AA
	65 x 50mm - JIS 10 kg/cm^2	CSG-107C-AA
	3 x 2 - ANSI class 150	CSG-107D-AA
	3 x 1.5 - ANSI class 150	CSG-107E-AA
A4	3 x 2 - ANSI class 150	CSG-1075-AA
	3 x 2 - ANSI class 300	CSG-1076-AA
	80 x 50mm - ISO PN 16	CSG-1077-AA
	80 x 65mm - ISO PN 16	CSG-1078-AA
	80 x 65mm - JIS 10 kg/cm^2	CSG-1079-AA
B1	1.5 x 1 - ANSI class 150	CSG-1030-AA
	1.5 x 1 - ANSI class 300	CSG-1031-AA
	50 x 32mm - ISO PN 16	CSG-1032-AA
	50 x 40mm - JIS 10 kg/cm^2	CSG-1033-AA

Item # 1 - Casing, Lined Completed Sub Assemblies

Model	Size / Description	Part #
BL	1.5 x 1 - ANSI class 150	CSG-1030-LB
	1.5 x 1 - ANSI class 300	CSG-1031-LB
	50 x 32mm - ISO PN 16	CSG-1032-LB
	50 x 40mm - JIS 10 kg/cm^2	CSG-1033-LB
F1	50 x 32mm - ISO PN 16	CSG-1035-AA
	50 x 40mm - JIS 10 kg/cm^2	CSG-1037-AA
	2.0 x 1.5 - ANSI class 150	CSG-1038-AA
FL	50 x 32mm - ISO PN 16	CSG-1035-LB
	50 x 40mm - JIS 10 kg/cm^2	CSG-1037-LB
	2.0 x 1.5 - ANSI class 150	CSG-1038-LB
B3	3 x 2 - ANSI class 150	CSG-1020-AA
	3 x 2 - ANSI class 300	CSG-1021-AA
	80 x 50mm - ISO PN 16	CSG-1022-AA
	80 x 65mm - JIS 10 kg/cm^2	CSG-1023-AA
	80 x 65mm - ISO PN 16	CSG-1024-AA
B4	3 x 1.5 - ANSI class 150	CSG-1080-AA
	3 x 1.5 - ANSI class 300	CSG-1081-AA
	65 x 40mm - ISO PN 16	CSG-1082-AA
	65 x 50mm - ISO PN 16	CSG-1083-AA
	65 x 50mm - JIS 10 kg/cm^2	CSG-1084-AA
	80 x 50mm - ISO PN16	CSG-108A-AA
F4	65 x 40mm - ISO PN 16	CSG-1085-AA
	65 x 50mm - JIS 10 kg/cm^2	CSG-1087-AA
	3 x 1.5 - ANSI class 150	CSG-1088-AA
B5	3 x 2 (A10) - ANSI class 150	CSG-1090-AA
	3 x 2 (A10) - ANSI class 300	CSG-1091-AA
	80 x 50mm - ISO PN 16	CSG-1092-AA
	80 x 65mm - ISO PN 16	CSG-1093-AA
	80 x 65mm - JIS 10 kg/cm^2	CSG-1094-AA
B6	4 x 3 - ANSI class 150	CSG-1160-AA
	4 x 3 - ANSI class 300	CSG-1161-AA
	100 x 65mm - ISO PN 16	CSG-1162-AA
	100 x 80mm - ISO PN 16	CSG-1163-AA
	100 x 80mm - JIS 10 kg/cm^2	CSG-1164-AA
C1	3 x 2 - ANSI class 150	CSG-1050-AA
	3 x 2 - ANSI class 300	CSG-1051-AA
	80 x 50mm - ISO PN 16	CSG-1052-AA
	80 x 65mm - JIS 10 kg/cm^2	CSG-1053-AA
C2	4 x 3 - ANSI class 150	CSG-1060-AA
	4 x 3 - ANSI class 300	CSG-1061-AA
	100 x 65mm - ISO PN 16	CSG-1062-AA
	100 x 80mm - JIS 10 kg/cm^2	CSG-1063-AA
	100 x 80mm - ISO PN 16	CSG-1064-AA
G2	100 x 65mm - ISO PN 16	CSG-1065-AA
	100 x 80mm - JIS 10 kg/cm^2	CSG-1067-AA
	4 x 3 - ANSI class 150	CSG-1068-AA
	100 x 80mm - ISO PN 16	CSG-1069-AA

Item # 1 - Casing, Lined Completed Sub Assemblies

Model	Size / Description	Part #
C3	2 x 1 - ANSI class 150	CSG-1100-AA
	2 x 1 - ANSI class 300	CSG-1101-AA
	50 x 32mm - ISO PN 16	CSG-1102-AA
CL	2 x 1 - ANSI class 150	CSG-1100-LB
	2 x 1 - ANSI class 300	CSG-1101-LB
	50 x 32mm - ISO PN 16	CSG-1102-LB
C4	3 x 1.5 - ANSI class 150	CSG-1110-AA
	3 x 1.5 - ANSI class 300	CSG-1111-AA
	65 x 40mm - ISO PN 16	CSG-1112-AA
	65 x 50mm - ISO PN 16	CSG-1113-AA
	65 x 50mm - JIS 10 kg/cm^2	CSG-1114-AA
C5	3 x 2 - ANSI class 150	CSG-1120-AA
	3 x 2 - ANSI class 300	CSG-1121-AA
	80 x 50mm - ISO PN 16	CSG-1122-AA
	80 x 65mm - ISO PN 16	CSG-1123-AA
	80 x 65mm - JIS 10 kg/cm^2	CSG-1124-AA
C6	4 x 3 - ANSI class 150	CSG-1130-AA
	4 x 3 - ANSI class 300	CSG-1131-AA
	100 x 65mm - ISO PN 16	CSG-1132-AA
	100 x 80mm - ISO PN 16	CSG-1133-AA
	100 x 80mm - JIS 10 kg/cm^2	CSG-1134-AA
C7	4 x 3 - ANSI class 150	CSG-1140-AA
	4 x 3 - ANSI class 300	CSG-1141-AA
	100 x 65mm - ISO PN 16	CSG-1142-AA
	100 x 80mm - ISO PN 16	CSG-1143-AA
	100 x 80mm - JIS 10 kg/cm^2	CSG-1144-AA
	125 x 80mm - ISO PN 16	CSG-1145-AA
C8	6 x 4 - ANSI class 150	CSG-1150-AA
	6 x 4 - ANSI class 300	CSG-1151-AA
	150 x 100mm - ISO PN 16	CSG-1152-AA
	150 x 125mm - ISO PN 16	CSG-1153-AA
	150 x 125mm - JIS 10 kg/cm^2	CSG-1154-AA
C9	6 x 4 - ANSI class 150	CSG-1155-AA
	6 x 4 - ANSI class 300	CSG-1156-AA
	150 x 125mm - ISO PN 16	CSG-1157-AA
	150 x 125mm - JIS 10 kg/cm^2	CSG-1158-AA
V1	2 x 1.5 x 6 V - ANSI class 150	CSG-1210-AA
	2 x 1.5 x 6 V - ANSI class 300	CSG-1211-AA
	50 x 32mm V - ISO PN 16	CSG-1212-AA
	50 x 40mm V - JIS 10 kg/cm^2	CSG-1213-AA
W1	2 x 1.5 x 8 V - ANSI class 150	CSG-1230-AA
	2 x 1.5 x 8 V - ANSI class 300	CSG-1231-AA
	50 x 32mm V - ISO PN 16	CSG-1232-AA
	50 x 40mm V - JIS 10 kg/cm^2	CSG-1233-AA
W3	3 x 2 x 6 V - ANSI class 150	CSG-1220-AA
	3 x 2 x 6 V - ANSI class 300	CSG-1221-AA
	80 x 50mm V - ISO PN 16	CSG-1222-AA
	80 x 65mm V - JIS 10 kg/cm^2	CSG-1223-AA

Item # 232 - Magnet Assembly, Outer

Model	Size / Description	Part #
TB-A	NEMA 56C (0.625" dia.)	MAO-1000-SI
	NEMA 143/5TC (0.875" dia.)	MAO-1010-SI
	NEMA 182/4TC (1.125" dia.)	MAO-1020-SI
	NEMA 213/5TC (1.375" dia.)	MAO-1030-SI
	NEMA 213/5TC, High Torque (1.375" dia.)	MAO-1031-SI
	NEMA 254/6TC, High Torque (1.625" dia.)	MAO-1032-SI
	IEC 80 (19mm dia.)	MAO-1005-SI
	IEC 90 (24mm dia.)	MAO-1015-SI
	IEC 100/112 (28mm dia.)	MAO-1025-SI
	IEC 132 (38mm dia.)	MAO-1035-SI
	IEC 132, High Torque (33mm dia.)	MAO-1036-SI
TB-B/C	NEMA 143/5TC (0.875" dia.)	MAO-1040-SI
	NEMA 182/4TC (1.125" dia.)	MAO-1050-SI
	NEMA 213/5TC (1.375" dia.)	MAO-1060-SI
	NEMA 254/6TC (1.625" dia.)	MAO-1070-SI
	NEMA 254/6TC (1750 rpm, 4 Pole) (1.625" dia.)	MAO-1080-SI
	NEMA 284/6TSC(1.625" dia.)	MAO-1080-SI
	NEMA 324/6TSC(1.875" dia.)	MAO-1090-SI
	NEMA 364/5TSC, High Torque (1.875" dia.)	MAO-1100-SI
	NEMA 284/6TC(1.875" dia.)	MAO-1110-SI
	NEMA 284/6TC, High Torque (1.875" dia.)	MAO-1111-SI
	NEMA 324TC, High Torque (2.125" dia.)	MAO-1120-SI
	NEMA 326TC/405 TSC, Ultra High Torque (2.125" dia.)	MAO-1122-SI
	Long Couple Drive – Single	MAO-2100-SI
	Long Couple Drive – Double	MAO-2110-SI
	Long Couple Drive - High Torque	MAO-2120-SI
	Long Couple Drive – Ultra High Torque	MAO-2121-SI
	IEC 90S/L (24mm dia.)	MAO-1055-SI
	IEC 100L/112 (28mm dia.)	MAO-1065-SI
	IEC 132S/M (38mm dia.)	MAO-1075-SI
	IEC 132S/M, 7.5 kW @ 1450 rpm (38mm dia.)	MAO-1076-SI
	IEC 160M, 12.5 kW @ 2900 rpm (42mm dia.)	MAO-1085-SI
	IEC 160M/L (42mm dia.)	MAO-1095-SI
	IEC 180M/L (48mm dia.)	MAO-1105-SI
	IEC 200L (55mm dia.)	MAO-1115-SI
	IEC 180M/L, High Torque (48mm dia.)	MAO-1106-SI
	IEC 200L, High Torque (55mm dia.)	MAO-1116-SI
	IEC 225M, High Torque (55mm dia.)	MAO-1116-SI
	IEC 225M, Ultra High Torque (55mm dia.)	MAO-1117-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 and is properly tightened.
	Decreased flow. High power consumption. High vibration. Noisy operation	Damaged or broken wear rings	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.

1 Year limited Warranty

INNOVATIVE MAG-DRIVE, L.L.C. (Herein INNOMAG) warrants that it will convey good title to all product line sold by it to distributor. INNOMAG further warrants that for 365 days from the date of sale by distributor to the end user, or the date of first use of the product line, whichever is earlier, all product line will be free from defects in material and workmanship which are not commercially acceptable.

This warranty extends to both distributor and the end user. At the time of sale by distributor to end user, distributor must complete and return to INNOMAG the INNOMAG warranty registration card, a copy of which will be included with the product line at time of shipment by INNOMAG to distributor, with the requested information relating to the end user.

This express warranty, as it applies to end user, is expressly conditioned upon distributor completing the warranty registration card and returning it to INNOMAG and upon product line being used in a manner, and under conditions, for which it is designed. INNOMAG shall advise distributor of the product line's intended uses, and conditions of use. For any claim made pursuant to this warranty, product line must be returned to INNOMAG, freight pre-paid, for proper evaluation

If product line is damaged due to distributor and/or end user neglect, this warranty is void.

INNOMAG SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, HOWEVER CAUSED, SUCH AS LOSS OF USE, LOSS OF ANTICIPATED PROFIT OR REVENUES, FACILITY DOWN TIME, COST TO REMOVE PUMP FROM SERVICE, COST TO REINSTALL PUMP INTO SERVICE OR RESPONSIBILITY FOR TRANSPORTATION TO OR FROM OUR PLANT.

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409 S Vista Ave. Addison, IL 60101 Phone: (630) 543-4240 Fax: (630) 543-4245

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