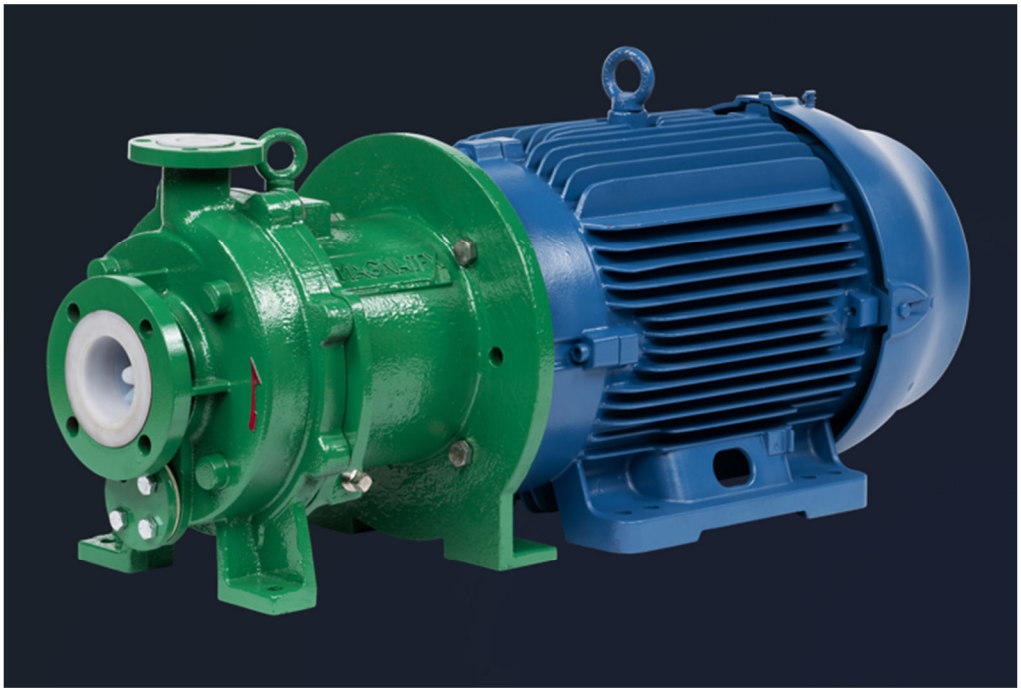
Operation and Maintenance Manual

Magnetic Drive Sealless Centrifugal Pumps

MLZ FLUOROPOLYMER LINED SERIES GROUP 1 and 2 MODELS



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!WARNING! MAG-DRIVE PUMP

DO NOT WORK ON THIS PUMP IF YOU ARE WEARING A MEDICAL DEVICE (DEFIBRILLATOR, PACEMAKER, ETC.) PERSONNEL WHO EXPERIENCE INTERFERENCE WITH THEIR MEDICAL DEVICE SHOULD MOVE AWAY FROM THE PUMP AND REFRAIN FROM HANDLING MAGNETIC PUMP COMPONENTS. SEEK IMMEDIATE MEDICAL ATTENTION IF YOU HAVE EXPERIENCED INTERFERENCE WITH YOUR MEDICAL DEVICE.

The rare earth permanent magnets in this pump have been manufactured such that the magnetic field is directional toward each half of the magnetic coupling. For this reason, the magnetic field that exists outside of the assembled magnetic coupling is minimal. When the two halves are apart, the magnetic field is exposed, which is why we recommend that personnel wearing medical devices DO NOT HANDLE the magnetic coupling components. When the pump is assembled, the magnetic fields from the magnetic coupling components are not exposed and it is safe for wearers of medical devices to be in the general proximity of the assembled pump, whether the pump is in operation or not.

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WARNING:
WHEN WORKING ON MAGNETICALLY DRIVEN PUMPS

- These pumps contain strong industrial rare earth magnets.
- People wearing pacemakers or other metallic medical devices are strongly cautioned that the magnetic field of exposed magnetic components may upset the timing or cause medical device malfunction. Remove the source of or exit the magnetic field if ill effects are experienced.
- Strong magnetic fields of exposed magnetic components may damage watches, credit/bank cards, electronic media storage devices, computers, or other such electronic devices.
- When working on the pumps with exposed magnetic components, be aware that metal objects such as wrenches or other tools brought with proximity of the magnetic field of the magnets may suddenly be attracted to the magnets trapping and damaging fingers in the process.

GENERAL INSTRUCTIONS

This instruction manual is intended to assist those responsible for the installation, operation, and maintenance of MAGNATEX Magnetic Drive Sealless Pumps. Read the complete manual thoroughly, and review the Hydraulic Institute Standards **Rotodynamic Pumps for Pump Piping (ANSI/HI 9.6.6-2016)** before installing and operating the pump.

RECEIPT OF EQUIPMENT

A. Upon receipt and before uncrating, check for physical damage to the pump/motor unit and notify the freight carrier IMMEDIATELY if any damage is found. Note any unit damage on the freight bill receiver and take photos of all packaging and damaged areas.
B. Check the pump nameplate data against receiving and purchase documents to be sure the correct pump size and materials of construction have been supplied. If a motor has been supplied, check the motor nameplate for correct HP rating, speed, enclosure, and electrical ratings.
C. Check to see if flange/nozzle connection protectors are intact. If missing or compromised, check for objects or debris that may have settled into the pump casing through the nozzle openings.
D. Check for free rotation of the pump by hand. With the motor installed on the pump, remove the motor fan cover and rotate the pump by hand using the motor shaft at the fan end of the motor. Only slight resistance and smooth rotation should be felt. There should be no crunching, grinding, or hard spots in the rotation. If the pump is completely dry and equipped with all Silicon Carbide (SiC) bearing components, the SiC components may emit a slight squeal/chatter, which is dependent upon the speed of rotation. Rapid rotation by hand is not recommended. The high-pitched squeal/chatter is normal and

does not indicate damage. Contact your MAGNATEX representative/distributor or MAGNATEX PUMPS INC. (713-972-8666) with any questions.

STORAGE PROCEDURES

As shipped, the pump packaging is suitable for short-term storage only, ~3-6 months, and the unit(s) should be stored indoors in a protected and controlled environment away from weather extremes. If long-term storage is necessary prior to pump installation/operation, contact your local representative or MAGNATEX PUMPS INC. for long-term storage recommendations.
For maximum protection cover the pump with plastic or other protective material. Motors should be rotated by hand every 2-3 months. Maintain pump nozzle covers in place until ready for installation. Before start-up, refer to the section titled Rotation Check and Start-up.

PUMP AND MOTOR ALIGNMENT

MLZ pumps are close-coupled pumps with the motor fitted to the pump frame with a machined register fit, which eliminates the need for external pump and motor alignment. A small gap between the motor mounting flange and the pump frame is normal and should be equal. Some models will require a motor adapter between the pump frame and the motor.

FOUNDATION

The foundation should be firm and heavy to reduce vibration and prevent flexing which can result in misalignment. A concrete foundation with a solid baseplate is recommended. Foundation bolts of the correct size should be located by reference to certified drawings. A baseplate is not necessary, but is available as an option in steel, stainless steel and non-metallic quartz-polymer materials. Anchor bolts for non-metallic baseplates should be torqued to only 15-20 ft-lbs.

LOCATION & PIPING

A. Locate the pump as close as practical to the source of liquid supply.
B. The suction line should be as short and straight as possible and contain a minimum number of elbows. Any elbows should be the large radius type. Elbows and fittings should be no closer than 10 pipe diameters to the pump suction to allow undisturbed flow to the pump impeller. The higher the velocity the greater the distance of straight pipe is needed.
C. Generally, suction piping should be one or two sizes larger than the pump suction to keep friction loss to a minimum. This becomes more important as the distance between the pump and the liquid supply increases, or similarly, if the piping fittings/connections are located closer than 10 pipe diameters to the pump's suction; see B above.
D. The suction piping should have no high spots where air pockets can collect. All joints in the suction line should be tight to prevent air from entering the system and creating the possibility of vapor locking. This is especially important when suction pressure is lower than the atmospheric pressure. A compound pressure gauge should be installed in the suction line at two pipe diameters from the suction flange.
E. An air vent should be installed at the initial high point in the pump discharge line. A check valve and shut-off valve should be as close as possible to the pump discharge nozzle,

allowing for location of a discharge gauge in the same size piping as the nozzle. The check valve protects the pump from excessive back pressure, as well as reverse flow/rotation, and back flow during shut down or driver failure. The discharge valve is located at the pump discharge to regulate flow and isolate the pump for servicing. A pressure gauge should be installed on the suction and discharge side of the pump at two pipe diameters from the pump connection flange.

F. Prior to starting the pump, it is important to flush the piping to ensure the system is free of foreign matter and particles such as pipe scale, welding beads and dirt from system fabrication. Large particles can block the bearing lubrication ports in the pump causing serious damage. In addition, metallic particles can magnetically attach to the inner magnet, resulting in damage. If possible, a temporary startup strainer with a 40x40 US mesh screen should be installed in the pump's suction line. BE VERY CAREFUL not to allow the temporary strainer to become plugged to the point of starving the pump of liquid, resulting in cavitation and the possibility of running the pump dry. Since running the pump dry can destroy the pump's bearings, it is recommended to install a compound pressure gauge between the strainer and pump suction to monitor partial plugging of the strainer. The discharge pressure should also be closely monitored. Any drop in discharge pressure without discharge valve throttling could indicate partial strainer plugging (assuming constant demand to the system).
G. Magnatex pumps, although very rugged, are not designed to handle excessive pipe stress. The resulting forces and moments on the pump can result in misalignment and possible damage to the pump. Piping must be anchored as close to, but independent from, the pump. Pump and pipe flanges must be positioned together with gaskets (supplied by others) before attempting to tighten flange bolts.
H. The pump MUST NOT RUN DRY. To assure that adequate liquid is available to the pump suction, a flow sensor and /or power monitor should be installed to shut the pump down in the event of dry run. MAGNATEX provides an optional electronic power monitor offered at time of pump quotation to prevent dry run operation when properly installed and set according to the normal operating parameters of the pump.

ROTATION CHECK, AND START-UP

Removal of air from the pump system is critical for proper system and component performance. Trapped air/vapor voids in the system piping can cause reduced discharge pressure readings and "choked" system flow. Safely vent all air/vapor from the system following the best operational procedures.

Before the pump is placed in service check the direction of motor shaft rotation as noted below. Rotation should match the cast-in arrow or label and the direction of the casing scroll terminating under the discharge flange.

ROTATION

A. Open the suction and discharge valves and allow the pump to be filled with liquid. Vent piping at system vent points.

!WARNING! NEVER RUN THE PUMP DRY

B. Remove the motor fan guard for visual inspection of motor shaft rotation.
C. Bump the motor by quickly pushing the motor start/stop buttons. Rotation should be clockwise (CW) as seen from motor end. If the direction of rotation is incorrect, reverse two of the three-phase power leads to the motor at the motor conduit box.
D. After confirming proper rotation, open the motor electrical disconnect and install the motor fan guard.
E. DO NOT OPERATE THE PUMP IN REVERSE ROTATION.

PRIMING

A. Open the suction and discharge valves and allow the pump to fill with liquid. If the direction of rotation has not been checked, this must be done as detailed above under Rotation Check and Start-up before proceeding.

!WARNING! NEVER RUN THE PUMP DRY

B. Close the discharge valve to 1/4 open. Do not operate the pump when the discharge valve is closed.
C. Start the motor and immediately check the discharge pressure gauge. The pressure should rise quickly and hold steady. If the pressure rises and then falls back, there is air or vapor in the system. STOP THE PUMP IMMEDIATELY. Wait 15 to 20 seconds before restarting the pump.
D. If after repeating Step C several times, the pressure gauge does not hold steady or does not yield the expected pressure (from performance curve), contact your Magnatex representative, or **MAGNATEX PUMPS INC.** (713-972-8666) for assistance. Do not continue to operate the pump under these conditions.
E. Once the pump is fully primed and the discharge pressure is steady, slowly open the discharge valve until the desired operating point is reached as referenced by discharge pressure reading and /or flow meter indication. The flow and head should match the design performance curve for the pump as ordered.

LUBRICATION OF PUMP PROCESS BEARINGS

MLZ pumps have hydrodynamic bearings on the process side of the pump that are internally lubricated by the pumped liquid. The pump must have liquid in it during operation to avoid damage and breakage of these product lubricated bearings. Contact your Magnatex representative or MAGNATEX PUMPS INC. (713-972-8666) for more information.

GENERAL NOTES

A. Standard connection configuration for the pump connections consists of 150# RF ANSI flanges. Provision for Casing drain is standard, but the Fluoropolymer lining has not been drilled, unless specified on the equipment order.
B. The pump process discharge connection must be positioned in the upward direction for proper venting of the pump casing and rear casing.
C. When accomplishing maintenance tasks and during any reassembly, all threaded fasteners must be torqued in accordance with the torque table below.

RECOMMENDED TORQUE VALUES FOR BOLTS AND SCREWS
MLZ SERIES PUMPS

ALL CASING BOLTS	5/8-11 UNC	90 lb.-ft.	122 Nm
MOUNTING BOLTS	5/8-11 UNC	50 lb.-ft.	67.8 Nm
MOUNTING BOLTS	½-13 UNC	43 lb.-ft.	58.3 Nm
SET SCREWS	5/16-18 UNC	132 lb.-in.	15 Nm
SET SCREWS and SH CAP SCREWS	¼-20 UNC	75 lb.-in.	9 Nm
TAPPED CASING FLG. BOLTS	½-13 UNC	45 lb.-ft.	61 Nm
SMALL MOTOR MOUNTING BOLTS	3/8-16 UNC	236 lb.-in.	27 Nm

Torque values are for new fasteners and have a tolerance of =/- 5%.

MLZ GROUP 2 MOTOR FASTENERS BY PUMP FRAME

FRAME	QTY	SIZE	REMARKS
FA Pump Frame	8	½-13 x 1.25”	(ALT.) ½-13 x 1.50” (Protrudes)
FB Frame w/ MOTOR ADAPTER	8	½-13 x 1.25”	(ALT.) ½-13 x 1.50” (Protrudes)
MOTOR BOLTS ONLY	4	½-13 x 1.00” or 3/8-16 x .75”	(ALT) ½-13 x 1.25”
FC/FC10 Frame w/o MOTOR ADAPTER	4	5/8-11 x 1.50”	Frame to Motor Bolts
FC/FC10 Frame w/ MOTOR ADAPTER	4	5/8-11 X 3.00”	Frame to Motor Bolts
FCC/FCC10 Frame w/o MOTOR ADAPTER	8	5/8-11 x 1.50”	Frame to Motor Bolts
FCC/FCC10 w/ MOTOR ADAPTER	8	5/8-11 X 2.00”	Frame to Motor Bolts

D. The non-metallic threaded components of the pump are designed to be in the process fluid and will tighten in operation. No torque specs are specified. The components should be securely tightened using common spanner tools, large adjustable pliers, or PVC drift rod and mallet after initial firm hand tightening and “bottoming” of the component. These tools may also be used for removing the components. A special socket tool is available from Magnatex for loosening the inner magnet locknut (impeller locknut) at a modest cost.

E. Non-metallic pump components have a thermal coefficient change rate approximately 10X that of metal components and are, as such, more reactive to temperature extremes. This characteristic can be of advantage when assembling or dismantling pumps by applying gentle heating or cooling as needed to ease the operation.

F. Remove any magnetic particles on magnets from maintenance with adhesive tape.

DISMANTLING GROUP 1 PUMPS

SEPARATING THE MAGNET COUPLING – Strong magnetic forces work to keep the inner magnet (Item 8) and outer magnet (Item 13) coupled. Removal of the motor (with the outer magnet

⚠ WARNING ⚠

BE CAREFUL TO AVOID TRAPPING YOUR FINGERS BETWEEN THE PUMP END ASSEMBLY AND THE MOTOR FLANGE.

still installed on the motor shaft) from the pump frame (Item 18) is the easiest way to "break" (disengage) the magnetic couple.

1. Firmly secure the pump and motor unit to the worktable top or other firm surface by bolting or clamping.
2. Support the motor to prevent it from falling from the pump frame when the motor mounting bolts are removed. Use the lifting lugs on the pump frame and motor and a lifting device (crane, chain-fall, etc.) to suspend the motor weight. Remove the hex head bolts (Item 24) connecting the pump frame to the pump casing (Item 1). The machine fit between the frame and casing is tight and may remain in place once the casing bolts have been removed. A rubber (dead blow) mallet and pry bar may be necessary to separate the motor from the pump frame.
3. With the motor still supported, and yet loose from the pump casing, remove the pump casing with the shaft (Item 10) still engaged in the shaft support assembly (Item 2) from the impeller and inner magnet assembly and set it aside. The shaft may remain engaged with the rear casing, so be careful and watch for the shaft position when removing the casing. The impeller and inner magnet assembly should remain in place with the magnet coupling still engaged.

   The rare earth permanent magnets in this pump have been manufactured such that the magnetic field is directional toward each half of the magnetic coupling. For this reason, the magnetic field that exists outside of the assembled magnetic coupling is minimal. When the two halves are apart, the magnetic field is exposed, which is why we recommend that personnel wearing medical devices DO NOT HANDLE the magnetic coupling components. When the pump is assembled, the magnetic fields from the magnetic coupling components are not exposed and it is safe for wearers of medical devices to be in the general proximity of the assembled pump, whether the pump is in operation or not.

4. Prepare to grasp the impeller and magnet assembly firmly to remove it from the frame in one straight axial motion away from the pump frame. The magnet forces will attempt to remain engaged, so it is important to have a firm grasp of the impeller and magnet assembly when pulling it from the frame in one motion.

5. In one motion and with a firm grip on the impeller, pull the impeller and magnet assembly straight out of the pump frame "breaking" (disengaging) the magnet coupling. Keep metal objects away from the inner magnet to prevent sudden attraction to the magnets, possibly trapping fingers between the metal object, such as a wrench, and the magnet segments. Set the impeller and inner magnet assembly aside on a non-magnetic surface.
6. Remove the (6) socket head cap screws (Item 30) from the rear containment shell ring (Item 29) and remove the rear casing (Item 7) from the frame. Check for damage to the interior walls and anti-vortex vanes in the bottom of the shell area. The Silicon Carbide (SiC) rear thrust bushing is molded into the rear casing.
7. If the motor is to be replaced, the outer magnet (Item 13) must be removed before the pump frame (Item 18) and the motor can be separated. There are (3) ¼"-20 tapped holes for use with a gear puller, or insertion of relatively long bolts with washers to facilitate pulling the outer magnet from the pump shaft. Proceed with the next steps to release the outer magnet from the pump shaft.

   NOTE: The inside diameter of the outer magnet has exposed rare earth industrial magnets that will attract metal objects that are brought within close proximity of the magnet surface. Be careful to prevent metal objects from adhering to the magnets, which could go unnoticed and cause problems at re-assembly.

   a. Rotate the magnet to align the motor key at the 12 o'clock position. Remove the hex bolt (Item 31) from the access hole in the small section of the pump frame at the 12 o'clock position (vertical centerline). The set screw (Item 16) in the hub section of the outer magnet should be viewable through the open access hole.
   b. Using a hex key tool, loosen the set screw 3-4 turns to disengage the motor shaft key. Leave the set screw partially installed to prevent losing it.
   c. Rotate the outer magnet CW 90° to align the second set screw with the access port at the vertical centerline.
   d. Using a hex key tool, loosen the set screw 3-4 turns to disengage the motor shaft key. Leave the set screw partially installed to prevent losing it.
   e. Now the outer magnet may be pulled from the motor shaft. If a gear puller is not available, use the (3) ¼"-20 tapped holes to insert long bolts with washers to facilitate applying a pulling action in line with motor shaft. Tapping the outer magnet yoke with a ball peen hammer can help vibrate the yoke and loosen the hub fit on the shaft. Be careful not to tap too hard and drive the magnet hub further back on the motor shaft.
8. With the outer magnet removed, the pump frame can be removed from the motor by removing the (4) bolts (Item 26) that secure the frame to the motor. Support the motor to prevent putting the bolts in a bid as they are loosened. Set the frame aside for re-assembly.
9. Continuing the disassembly of the pump and working with the casing (Item 1), remove the shaft support (Item 2) by inserting the shaft into the support. Grasp the shaft and shaft support with both hands and rotate the support CCW to loosen and remove the threaded component.
10. Working with the impeller and inner magnet assembly, called the **PB Assembly**, the following components are removeable:
    a. Inner Magnet Locknut (Item 9), LH threaded – turn CW to remove from impeller

b. Bearings – 2 each (Item 11) Replace both if either is damaged, or bore is “out of round”, or bore diameter is >1.046” (26.58mm) for Group 1 pumps.
c. Spacer (Item 12) Typically reuseable.
a. Inner Magnet (Item 8) *Careful! Magnetic flux field is exposed though invisible. See magnet caution on page 9.*
d. Impeller (Item 3) Check for damaged vanes or clogged vane passages.
e. Impeller Lock Ring (Item 5), RH threaded – turn CCW to remove from impeller front shroud. Use a drift rod or hardwood dowel and mallet to remove, if necessary.
f. Impeller Ring (Item 4) Replace if damaged with heavy grooves/chips/gouges, or if lubrication groove depth on the front of the ring is < 0.060” (1.524mm). The ring thickness when new is 10mm. Replacement is usually recommended.

The **PB Assembly** is dismantled using the impeller locknut socket tool (Item 28) to remove the LH-threaded locknut without damaging it. Large adjustable pliers can also be used for the removal of the locknut. Perform this work on a non-magnetic surface.

a. Loosen the impeller locknut (LH threads) a few turns, but do not remove the locknut.
b. With the locknut protruding beyond the back of the inner magnet, drive the inner magnet from the tapered sleeve portion of the impeller by grasping the impeller and inverting it to rap the impeller locknut on the worktable surface, jarring the inner magnet from the seated position on the tapered sleeve.
c. Further loosen the impeller locknut to separate the inner magnet from the impeller.
d. Invert the impeller, and working from the eye of the impeller, drive out of the sleeve portion of the impeller the outermost bearing using a hardwood dowel or plastic drift rod and mallet. Do not re-use these bearings.
e. Next, drive out the inner most bearing and the bearing spacer, again working from the suction eye of the impeller with the tools of “step k” above.
f. Remove the impeller lock ring (RH threads) using a large spanner wrench or drift rod or hardwood dowel and mallet.
g. Remove the impeller ring from the impeller ring channel. This completes the dismantling of the **PB Assembly**.

ASSEMBLY OF GROUP 1 PUMPS

The Group 1 pumps are assembled in essentially the reverse order of the steps in the dismantling procedure. All parts should be cleaned and inspected for wear as noted in the tear-down of the pump. Procure all damaged components to be replaced in preparation for the reassembly. Proceed as follows:

1. Place the pump frame (Item 18 onto the motor C-face register and secure with the hex bolts (Item 26).
2. Using a small amount of anti-seize compound, lightly coat either the bore of the outer magnet (Item 13) OR the motor shaft to ease future maintenance. Place the motor key into the shaft keyway.

NOTE: The inside diameter of the outer magnet has exposed rare earth industrial magnets that will attract metal objects that are brought within close proximity of the magnet surface. Be careful to prevent metal objects from adhering to the magnets, which could go unnoticed and cause problems at re-assembly.

3. With the (2) set screws (Item 16) partially installed in the outer magnet, place the outer magnet onto the motor shaft and align the end of the motor shaft flush with the inside of the outer magnet.
    a. Remove the hex head bolt from the access port on the small section of the pump frame.
    b. Rotate the magnet to align the motor key with the access port. The set screw (Item 16) in the outer magnet should be viewable through the access hole.
    c. Using a hex key tool, tighten the set screw to engage the motor shaft key securely.
    d. Rotate the outer magnet CW 90° to align the second set screw with the access port at the vertical centerline.
    e. Using a hex key tool, tighten the set screw to engage the motor shaft securely. Replace the hex head bolt plugging the access hole.
4. Place the rear containment shell ring (Item 29) onto the pump frame and align the (6) through-holes with the tapped holes on the pump frame. Install the socket head cap screws (Item 30) and using a crisscross alternating pattern, torque to 75 lb.-in. (9 Nm).
5. Visually check the inner diameter of the outer magnet to assure no magnetic material has become affixed to the magnet segments. Any such remaining material can damage the rear casing. Small magnetic material can be removed from the magnet segment by using the adhesive side of a strong tape.
6. Put the rear casing (Item 7) in place, locating it on the register of the containment shell ring, flush with no gap at the edges.
7. Install the new casing gasket (Item 6) on to the rear casing.
8. Assemble the **PB Assembly** consisting of the following components:
    a. Inner Magnet Locknut (Item 9), LH threaded – turn CCW to install on impeller.
    b. Bearings – 2 each (Item 11) Replace both if either is damaged, or bore is “out of round”, or bore diameter is >1.046” (26.58mm) for Group 1 pumps.
    c. Spacer (Item 12) Typically reuseable.
    d. Inner Magnet (Item 8) *Careful! Magnetic flux field is exposed though invisible. See magnet caution on page 9.*
    e. Impeller (Item 3) Check for damaged vanes or clogged vane passages.
    f. Impeller Lock Ring (Item 5), RH threaded – turn CW to install on impeller front shroud. Use a drift rod or hardwood dowel and mallet to tighten, if necessary.
    g. Impeller Ring (Item 4) Replace if damaged with heavy grooves/chips/gouges, or if lubrication groove depth on the front of the ring is < 0.060” (1.524mm). The ring thickness when new is 10mm. Replacement is usually recommended.

    Proceed with the assembling of the **PB Assembly** as follows:
    h. Take the impeller (Item 3) and place it vertically onto the table or work surface. The impeller ring should not be in place at this point.
    i. Place the first bearing (Item 11) <u>with fluted face away</u> from the suction side of the impeller into the bore of the sleeve (tapered OD) section of the backside of the impeller. The flat side prevents relative rotation between the impeller and

bearing. Bottom the bearing using a non-metallic cylinder, such as a hardwood dowel 1.375" in diameter, or plastic rod of similar dimensions.

j. Install the spacer (Item 12) into the sleeve bore and bottom in the same manner as the first bearing. Do not over drive the spacer or bearing to prevent damage.

k. Next place the second bearing (Item 11) into the bore of the sleeve (tapered OD) section of the impeller with fluted face away from the suction side of the impeller. Gently bottom this last bearing. When properly installed, the end of the bearing protrudes from the end of the impeller shaft section by 7.5mm for Group 1 pumps.

l. Place the inner magnet (Item 8) onto the impeller sleeve with the 4 D-cut (semi-square) section of the magnet facing the impeller. Engage the corresponding semi-square section of the impeller with that of the inner magnet and bottom the inner magnet onto the back side of the impeller. There should not be a gap between the impeller and the inner magnet when properly installed.

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m. Thread (LH) the impeller locknut (Item 9) onto the impeller sleeve end, turning the nut CCW to tighten the nut. Hand-tighten this nut snuggly. A locknut socket tool (Item 28) is available for removal of the inner magnet locknut. If using the tool to tighten the nut, be careful not to over tighten the nut. Large adjustable pliers can also be used to tighten the locknut. The locknut will tighten slightly during operation.

n. Place the impeller with the installed bearings, spacer, and lock nut on its side with the suction side angled up exposing the impeller ring channel. Place the impeller ring (Item 4) into the channel aligning the flat sides of the backside of the ring with the channel socket. Snap the ring into place, making sure it is installed evenly all around the circumference.

o. Thread (RH) the impeller lock ring (Item 5) onto the front side of the impeller securing the impeller ring in place. Turn the lock ring in the CW direction to snuggly tighten the lock ring. A drift pin may be used to make the lock ring tighter, but do not overtighten. The drift pin or hardwood dowel will be handy for removal of the lock ring when dismantling is required.

p. This completes the assembly of the **PB assembly**, and it may now be placed into the pump casing by gently placing it onto the shaft. If this is a spare assembly, the PB should be bagged to keep it clean and placed in a wooden/ heavy cardboard

box or non-metallic container to protect it from damage and large enough to prevent attraction of metallic objects outside of the container. The assembly has an exposed inner magnet that will attract metallic objects/dust and care must be exercised to prevent damage and personnel injury. Space will provide separation from the magnetic flux field. See medical warnings on page 2 of this IOM.

9. Prepare to place the **PB Assembly** in the rear casing to engage the magnet coupling by firmly gripping the impeller at the edges and suction eye of the impeller back shroud. *Be careful to avoid trapping your fingers between the impeller back shroud and the rear casing as the magnets engage. A firm grip on the impeller is necessary to assure a smooth and slow engagement of the magnet coupling.*
10. Slowly insert the **PB Assembly** into the rear casing as described in the preceding step.
11. Install the shaft into the shaft support, bottoming it in the support well with the anti-rotation flat of the shaft and support engaged.
12. Thread (RH) the shaft support into the casing until it bottoms in the cavity. Rotate the support and additional 1/8 to ¼ turn to assure it is tight. It may be necessary to use a drift rod or hardwood dowel and mallet striking at the outer diameter of the shaft support blades in the direction of tightening to fully seat the support. This completes the casing assembly.
13. Prepare for installing the casing assembly of shaft support and shaft onto the pump frame. The shaft must be carefully piloted into the **PB Assembly** through the bearings and into the shaft bore in the rear casing. Magnetic forces will not be pulling the two assemblies together.
14. Align the casing assembly and the pump frame and motor assembly such that the shaft can be inserted into the bearings installed in the impeller. Carefully move the casing assembly to engage the register fit of the rear casing with that of the lined main casing.
15. Install the casing bolts (Item 24) and evenly tighten them in an alternating crisscross pattern. There will be a small gap of 0.028" (0.7mm) when the bolts are fully tight and torqued. Torque the casing bolts to 50 lb.-ft (67.8 Nm) using an alternating crisscross pattern.
16. Check the assembled pump for smooth rotation. This is easily accomplished by removing the motor fan shroud for access to the fan and shaft. This completes the assembly of the Group 1 pump.

REMOVAL OF MOTOR FROM PUMP UNIT GROUP 2 PUMPS

SEPARATING THE MAGNET COUPLING – Strong magnetic forces work to keep the inner magnet (Item 8) and outer magnet (Item 13) coupled. Removal of the motor (with the outer magnet still installed on the motor shaft) from the pump frame (Item 18) is the easiest way to "break" the magnetic couple. Threaded jacking bolt holes are provided on the pump Frame to allow slowly separating the motor from the Frame with the motor firmly supported for a controlled

"breaking" or disengaging of the magnet coupling.

⚠ WARNING ⚠

BE CAREFUL TO AVOID TRAPPING YOUR FINGERS BETWEEN THE PUMP END ASSEMBLY AND THE MOTOR FLANGE.

1. Firmly secure the pump and motor unit to the worktable top or other firm surface by bolting or clamping.
2. Support the motor to prevent it from falling from the pump frame when the motor mounting bolts are removed. For heavy motors, a lifting device (crane, chain-fall, etc.) is recommended to suspend the motor weight. Remove the hex head bolts connecting the motor to the pump frame. The machine fit between the motor and the frame is tight and the motor may remain in place once the mounting bolts have been removed. A rubber (dead blow) mallet and pry bar may be necessary to separate the motor from the pump frame.
3. Note: Most of the Group 2 motor configurations include a motor adapter between the motor and the pump frame. In those cases, the motor adapter is bolted to the pump Frame and remains attached when the motor is removed. Larger motors (frames 360TC/TSC and above) use 8 mounting bolts. Motors with 4 mounting bolts will have the motor adapter bolted to the motor. If the motor is to be replaced, retain the motor adapter to install on the replacement motor. Group 1 pumps do not have a motor adapter.
4. With the motor still supported, and yet loose from the pump frame, prepare to grasp the motor firmly to remove it from the frame in one straight axial motion away from the pump frame. The magnet forces will attempt to remain engaged, so it is important to have a firm grasp of the motor when pulling it from the frame.

> The rare earth permanent magnets in this pump have been manufactured such that the magnetic field is directional toward each half of the magnetic coupling. For this reason, the magnetic field that exists outside of the assembled magnetic coupling is minimal. When the two halves are apart, the magnetic field is exposed, which is why we recommend that personnel wearing medical devices DO NOT HANDLE the magnetic coupling components. When the pump is assembled, the magnetic fields from the magnetic coupling components are not exposed and it is safe for wearers of medical devices to be in the general proximity of the assembled pump, whether the pump is in operation or not.

5. Pull the motor from the pump frame in one straight axial motion, separating the magnet coupling. Jacking bolts may be utilized for a slower, more controlled separation of the motor from the pump. Keep metal objects away from the interior of the outer magnet to

prevent sudden attraction to the magnets, possibly trapping fingers between the metal object, such as a wrench, and the magnet segments.

6. If the motor is to be replaced, remove the outer magnet (Item 13) from the motor shaft by loosening the (2) set screws (Item 17) that directly contact the shaft, not those (Item 16) that secure the outer magnet yoke to the outer magnet hub (Item 14). The outer magnet hub and outer magnet yoke do not need to be separated.

DISMANTLING OF PUMP WET END GROUP 2 PUMPS

This procedure assumes the pump and motor unit has been removed from the system and generally flushed and drained of all hazardous materials. Always wear personal protective equipment (PPE) when working with hazardous chemicals.

1. Refer to the section above, REMOVAL OF MOTOR FROM PUMP UNIT for the respective pump Group, to separate and remove the motor from the pump frame.
2. Continuing the disassembly with the motor removed, place the bare pump on blocks with the suction flange down between the blocks and clear of the table surface to ease dismantling of the pump. Remove the hex head cap screws (Item 24) securing the casing (Item 1) to the pump frame (Item 18) and pull the pump frame up and off the pump assembly, exposing the rear casing (Item 7). Use lifting equipment to raise the larger components as needed.
3. Lift the rear casing from the main casing, being careful to hold the shaft (Item 10) in place, if it comes out with the rear casing. Some liquids handled by these pumps may cause the shaft to remain in the rear casing during this step of disassembly. Ideally the shaft will remain in place and the rear casing will easily lift off.
4. Remove the rear thrust bushing (Item 20) from the rear casing bushing holder for Group 2 pumps only. The bushing may be held in place by small amounts of adhesive. Group 1 pumps have a Silicon Carbide rear thrust bushing that is integral to the rear casing.
5. Remove and discard the casing gasket (Item 6). Replace at reassembly with new gasket.
6. Slide the impeller (Item 3) and inner magnet (Item 8) assembly up, off the shaft, and out of the casing. This assembly, which is referred to as the **PB Assembly**, includes several components that are replaceable individually, as needed, or as a complete assembly:
    a. Inner Magnet Locknut (Item 9), LH threaded – turn CW to remove from impeller
    b. Bearings – 2 each (Item 11) Replace both if either is damaged, or bore is “out of round”, or bore diameter is >1.205” (30.62mm) for Group 2 pumps, and >1.046” (26.58mm) for Group 1 pumps.
    c. Spacer (Item 12) Typically reuseable.
    d. Inner Magnet (Item 8) *Careful! Magnetic flux field is exposed though invisible. See magnet caution on page 15.*
    e. Impeller (Item 3) Check for damaged vanes or clogged vane passages.
    f. Impeller Lock Ring (Item 5), RH threaded – turn CCW to remove from impeller front shroud. Use a drift rod or hardwood dowel and mallet to remove, if necessary.
    g. Impeller Ring (Item 4) Replace if damaged with heavy grooves/chips/gouges, or if lubrication groove depth on the front of the ring is < 0.060” (1.524mm). The ring thickness when new is 10mm. Replacement is usually recommended.

The **PB Assembly** is dismantled using the impeller locknut socket tool (Item 28) to remove the LH-threaded locknut without damaging it. Large adjustable pliers can also be used for the removal of the locknut. Perform this work on a non-magnetic surface.

a. Loosen the impeller locknut (LH threads) a few turns, but do not remove the locknut.
b. With the locknut protruding beyond the back of the inner magnet, drive the inner magnet from the tapered sleeve portion of the impeller by grasping the impeller and inverting it to rap the impeller locknut on the worktable surface, jarring the inner magnet from the seated position on the tapered sleeve.
c. Further loosen the impeller locknut to separate the inner magnet from the impeller.
d. Invert the impeller, and working from the eye of the impeller, drive out of the sleeve portion of the impeller the outermost bearing using a hardwood dowel or plastic drift rod and mallet. Do not re-use these bearings.
e. Next, drive out the inner most bearing and the bearing spacer, again working from the suction eye of the impeller with the tools of the preceding step.
f. Remove the impeller lock ring (RH threads) using a large spanner wrench or drift rod or hardwood dowel and mallet.
g. Remove the impeller ring from the impeller ring channel. This completes the dismantling of the **PB Assembly**.

7. Working with the casing, remove the shaft support assembly (Item 2) with shaft still in place, turning in a CCW direction (RH threads), grasping the shaft with one hand and the shaft support blades with the other hand and fingers. If necessary, use a drift rod or hardwood dowel and mallet against the outer end of the support blades.
8. Remove the Shaft from the shaft support assembly. Inspect the front thrust ring and shaft support for damage or wear. The front thrust ring is Silicon Carbide (SiC-Z) and is not expected to wear appreciably. If the ring is cracked or chipped, or the support blades or other areas of the shaft support are damaged (worn/torn/cracked), replace the complete shaft support assembly. The front thrust ring is molded in place and removeable.
9. Inspect the pump casing for damaged lining. Replace if torn, heavily abraded, gouged, pitted, or permeated.

ASSEMBLY OF GROUP 2 PUMPS

Clean all parts and inspect for damage, such as chipping of shaft, worn C-PTFE bearings, or gouges from broken Silicon Carbide (SiC) bearing components. Bearings that have been removed should be replaced with new bearings. Inspect the shaft support blades for cracking or deformation from excessive torque transients. Replace all damaged parts. Cuts or gouges in the Fluoropolymer lined components will reduce the service life as permeation can occur at the areas of reduced thickness, depending on service conditions.

There are no clearance adjustments, and optimal pump performance is based upon all parts being within spec./good condition.

Always replace the casing gasket and check the pump process-lubricated bearings for wear

prior to reassembly. It is advisable to replace bearings whenever the pump is dismantled. The following items are readily replaceable and are also available as a **PB Assembly** for easy component renewal:

a. Inner Magnet Locknut (Item 9), LH threaded – turn CCW to install on impeller, CW to remove.
b. Bearings – 2 each (Item 11) Replace both if either is damaged, or bore is "out of round", or bore diameter is >1.205" (30.62mm) for Group 2 pumps, and >1.046" (26.58mm) for Group 1 pumps.
c. Spacer (Item 12) Typically reuseable.
d. Inner Magnet (Item 8) *Careful! Magnetic flux field is exposed though invisible. See magnet caution on page 15.*
e. Impeller (Item 3) Check for damaged vanes or clogged vane passages.
f. Impeller Lock Ring (Item 5), RH threaded – turn CCW to remove from impeller front shroud. Use a drift rod or hardwood dowel and mallet to remove, if necessary.
g. Impeller Ring (Item 4) Replace if damaged with heavy grooves/chips/gouges, or if lubrication groove depth on the front of the ring is < 0.060" (1.524mm). The ring thickness when new is 10mm. Replacement is usually recommended.

1. Place the pump casing (Item 1) on the suction flange (place on cardboard or heavy paper to prevent scratching the PFA raised portion of the flange face). Ensure the casing interior is clean and free of any foreign material.
2. Install the RH-threaded shaft support assembly (Item 2) into the threaded section of the internal suction portion of the casing. Tighten the support by hand only. Place the flat-sided end of the SiC pump shaft (Item 10) into the corresponding socket in the shaft support until the shaft "bottoms" in the socket. Further tighten the shaft support by grasping the pump shaft with one hand and the shaft support blades with the other hand to turn the support no more than an additional 1/8-1/4 turn. Placing the support in a freezer can help ease assembly. It may be necessary to use a drift rod or hardwood dowel and mallet striking at the outer diameter of the shaft support blades in the direction of tightening to fully seat the support. This completes the casing assembly.
3. Next, the pump **PB assembly** will be assembled. If an assembled **PB assembly** is available, it may be placed in the pump casing now by gently placing it onto the shaft. Verify the impeller diameter and magnet size (magnet code is on the back of the inner magnet) is correct before placing it into place.
    a. Take the impeller (Item 3) and place it vertically onto the table or work surface. The impeller ring should not be in place at this point.
    b. Place the first bearing (Item 11) <u>with fluted face away</u> from the suction side of the impeller into the bore of the sleeve (tapered OD) section of the backside of the impeller. The flat side prevents relative rotation between the impeller and bearing. Bottom the bearing using a non-metallic cylinder, such as a hardwood dowel 1.25" to 1.50" in diameter, or plastic rod of similar dimensions.
    c. Install the spacer (Item 12) into the sleeve bore and bottom in the same manner as the first bearing. Do not over drive the spacer or bearing to prevent damage.

d. Next place the second bearing (Item 11) into the bore of the sleeve (tapered OD) section of the impeller with fluted face away from the suction side of the impeller. Gently bottom this last bearing. When properly installed, the end of the bearing protrudes from the end of the impeller shaft section by 1mm for Group 2 pumps.
e. Place the inner magnet (Item 8) onto the impeller sleeve with the 4 D-cut (semi-square) section of the magnet facing the impeller. Engage the corresponding semi-square section of the impeller with that of the inner magnet and bottom the inner magnet onto the back side of the impeller. There should not be a gap between the impeller and the inner magnet when properly installed.

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f. Thread (LH) the impeller locknut (Item 9) onto the impeller sleeve end turning the nut CCW to tighten the nut. Hand-tighten this nut snuggly. A locknut socket tool (Item 28) is available for removal of the inner magnet locknut. If using the tool to tighten the nut, be careful not to over tighten the nut. Large adjustable pliers can also be used to tighten the locknut. The locknut will tighten slightly during operation.
g. Place the impeller with the installed bearings, spacer, and lock nut on its side with the suction side angled up exposing the impeller ring channel. Place the impeller ring (Item 4) into the channel aligning the flat sides of the backside of the ring with the channel socket. Snap the ring into place, making sure it is installed evenly all around the circumference.
h. Thread (RH) the impeller lock ring (Item 5) onto the front side of the impeller securing the impeller ring in place. Turn the lock ring in the CW direction to snuggly tighten the lock ring. A drift pin may be used to make the lock ring tighter, but do not overtighten. The drift pin or hardwood dowel will be handy for removal of the lock ring when dismantling is required.
i. This completes the assembly of the **PB Assembly**, and it may now be placed into the pump casing by gently placing it onto the shaft. If this is a spare assembly, the PB should be bagged to keep it clean and placed in a wooden/ heavy cardboard box or non-metallic container to protect it from damage and large enough to prevent attraction of metallic objects outside of the container. The assembly has an exposed inner magnet that will attract metallic objects/dust and care must be

exercised to prevent damage and personnel injury. Space will provide separation from the magnetic flux field. See medical warnings on page 2 of this IOM.

4. Working with the assembled casing resting on the suction flange, gently place the **PB Assembly** onto the shaft.
5. Install the rear thrust bushing (Item 20, G2 only) into the bushing holder of the rear casing (Item 7), pushing the bushing in completely. G1 pumps have an integral rear thrust bushing molded into the rear casing.
6. Place a new casing gasket (Item 6) into the recess of the casing.
7. Insert the rear casing in place over the inner magnet lining up the rear thrust bushing with the protruding shaft end and press the rear casing onto the shaft, engaging the channel where the casing gasket is in place. Rotate the rear casings as needed to place the manufacturing symbols at 3 o'clock with the main casing (Item 1) discharge flange being 12 o'clock.
8. Lower the pump frame (Item 18) onto the pump casing aligning the casing feet and frame feet in the same plane.
9. Insert the casing bolts (Item 24) AND EVENLY TIGHTEN using a crisscross pattern. Torque the bolts to 50 lb.-ft (67.8 Nm) using an alternating crisscross pattern. This completes the assembly of the bare pump.
10. Refer to the Motor Installation onto Bare Pump section for assembly of the motor to the pump.

INSTALLATION OF MOTOR ONTO GROUP 2 PUMPS – BARE PUMP

1. ENGAGING THE MAGNET COUPLING – Strong magnetic forces work to keep the inner magnet (Item 8) and outer magnet (Item 13) coupled. Installation of the motor (with the outer magnet installed on the motor shaft) onto the pump frame (Item 18) of the assembled pump requires "engaging" the magnetic couple.

    a. Firmly secure the pump to the worktable top by bolting or clamping.
    b. Insert the motor shaft key into the motor shaft keyway.
    c. Using a small amount of anti-seize compound on the motor shaft OR the outer magnet hub bore (Item 14), install the outer magnet (Item 13) with installed OM

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hub onto the motor shaft. The end of the motor shaft must be flush with the inside hub surface of the outer magnet. Keep metal objects away from the interior

of the outer magnet to prevent sudden attraction to the magnets, possibly trapping fingers between the metal object, such as a wrench, and the magnet segments.

d. Securely tighten the outer magnet set screw (Item 17). Inspect the magnet segments of the outer magnet to assure no loose metal objects have adhered to the segments.
e. Support the motor to prevent it from falling from the pump frame while positioning the motor for installation. For heavy motors a lifting device (crane, chain-fall, etc.) is recommended to suspend the motor weight.
f. With the motor still supported, align the motor shaft centerline with the pump frame centerline, yet keeping the motor away from the adapter to prevent inadvertent engagement of the magnet coupling. Prepare to grasp the motor firmly to move it toward the pump frame in one straight axial motion away from the pump frame. The outer magnet is aligned at this point to slip over the rear casing section of the pump. The use of jacking bolts is encouraged to limit the

⚠ WARNING ⚠

BE CAREFUL TO AVOID TRAPPING YOUR FINGERS BETWEEN THE PUMP END ASSEMBLY AND THE MOTOR FLANGE.

travel of the motor when the magnetic fields begin to attract and sync up. DO NOT ALLOW THE MOTOR TO SLAM AGAINST THE PUMP FRAME AS THE MAGNET COUPLING ENGAGES! The magnetic forces will ENGAGE THE INNER AND OUTER MAGNET AS THEY ARE MOVED INTO CLOSE PROXIMITY OF EACH OTHER, so it is important to have a firm grasp of the motor when engaging the magnet coupling.

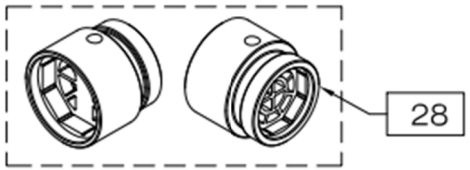
2. Locate the motor C-Face machined register into the corresponding diameter on the pump frame, aligning the motor mounting bolt holes.
3. When a motor adapter (Item 19 on G2 only) is required, it will be bolted to the motor face for smaller motors with 4 mounting bolts (Item 27). For larger motors of frame size 364TSC and higher, the motor adapter is bolted to the pump frame with bolts (Item 26) to secure it for assembly. On these larger motors the motor mounting bolts are through bolts that thread into the motor face from the pump frame side. Install the hex head capscrews (Item 27, motor mounting bolts) and evenly tighten in an alternating pattern.
4. Check the pump for free rotation by hand. This is easily accomplished with the motor fan cover removed for easy access.

LIST OF MODELS

GROUP 1 AA6 1.5x1-6, AA8 1.5x1-8, AB6 3x1.5-6

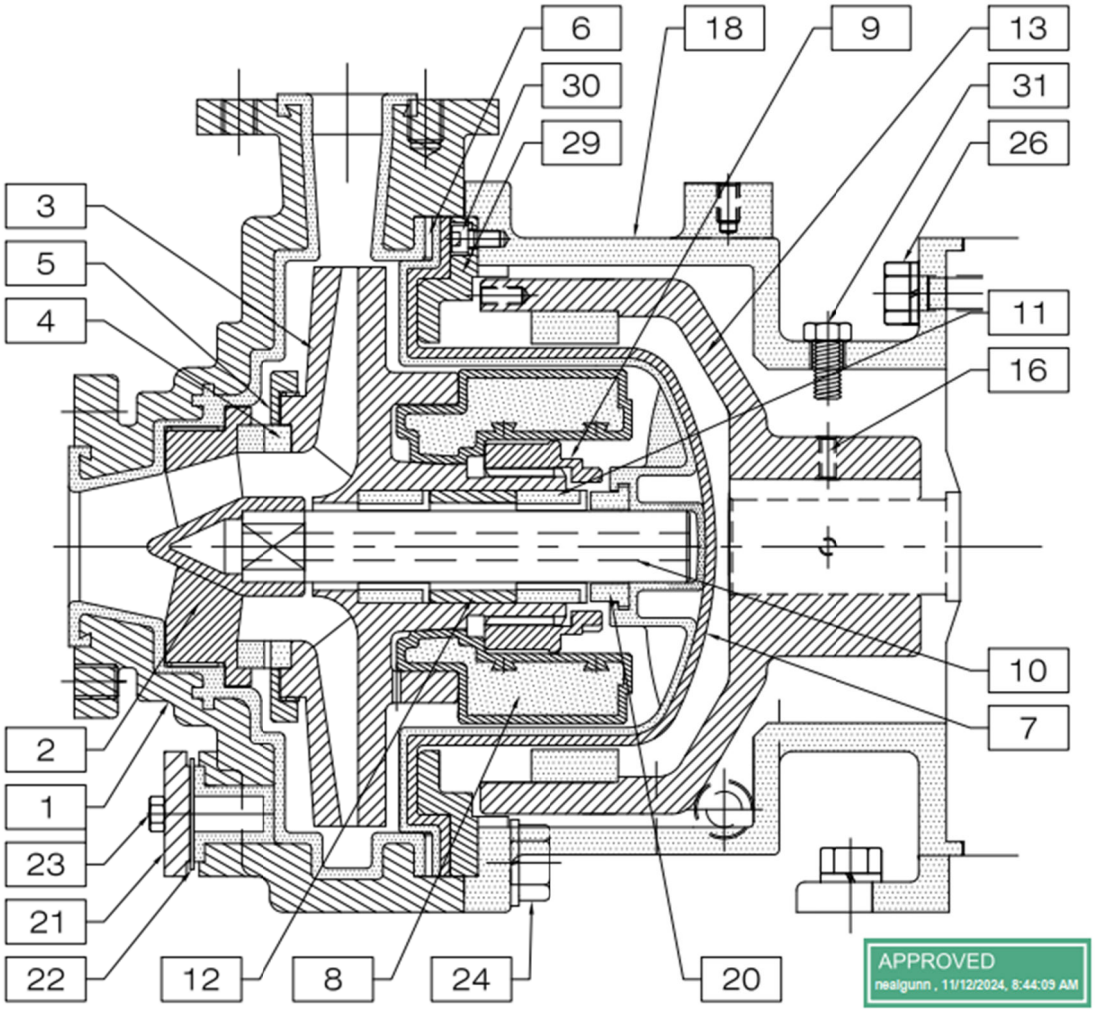
GROUP 2 A05-10 2x1-10, A10 3x2-6, A50-8 3x1.5-8, A60-8 3x2-8, A70-6 4x3-6

A50-10 3x1.5-10, A60-10 3x2-10 A70-8 4x3-8 A70-10 4x3-10 A80-10 6x4-10



MLZ GRP 1 PARTS LIST

ITEM	QT	DESCRIPTION	MAT'L
31	1	HEX HEAD BOLT 1/2-13UNC x 0.75"	304SS
30	6	SKT HD CAP SCREW 1/4-20UNC x 0.38"	304SS
29	1	REAR CONTAINMENT SHELL RING	DI
28	1	IMPELLER LOCK NUT SOCKET TOOL	GFR33%-PA66
26	4	FRAMES FA1-FA4 HEX HEAD BOLT 1/2-13UNC x 1.25"	STEEL
	4	FRAME FA5 HEX HEAD BOLT 3/8-16UNC x 1.25"	
24	6	BOLTING-CAP SCREW 5/8-11UNC x 1.5"	304SS
23	2	DRAIN COVER BOLT 1/2-13UNC x 1"	304SS
22	1	DRAIN COVER GASKET	GF-PTFE
21	1	DRAIN COVER	STEEL
20	1	REAR THRUST BUSHING	SIC-Z
18	1	FRAME	DI
16	1	SET SCREW SKT HD OM (5/16-18 x 1/2")	STEEL
13	1	OUTER MAGNET NdFe	DI/NdFe
12	1	BEARING SPACER	C-PTFE
11	2	BEARING (OPTIONAL SIC-Z)	C-PTFE
10	1	SHAFT	SSiC
9	1	IMPELLER LOCKNUT LH	M-PTFE
8	1	LINED INNER MAGNET NdFe	CFR-ETFE
7	1	REAR CASING	CFR-ETFE
6	1	CASING GASKET	GF-PTFE
5	1	IMPELLER LOCK RING - RH	M-PTFE
4	1	IMPELLER RING (OPTIONAL SIC-Z)	C-PTFE
3	1	IMPELLER	PFA
2	1	SHAFT SUPPORT - FTR ASSEMBLY RH	PFA/SiC-Z
1	1	LINED CASING	DI/PFA



APPROVED
nealgunn , 11/12/2024, 8:44:09 AM

REVISIONS ⚠

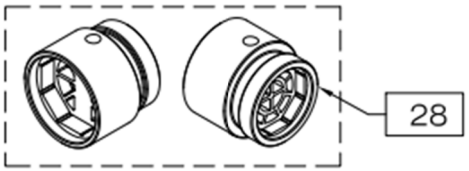
NO.	DATE	COMMENT	INT
1	8/30/24	ADDED ITEM 29 & 30	KJH
2			
3			

MAGNATEX® Pumps, Inc.

SECTION DRAWING
MLZ GROUP 1 CLOSE COUPLED PUMP

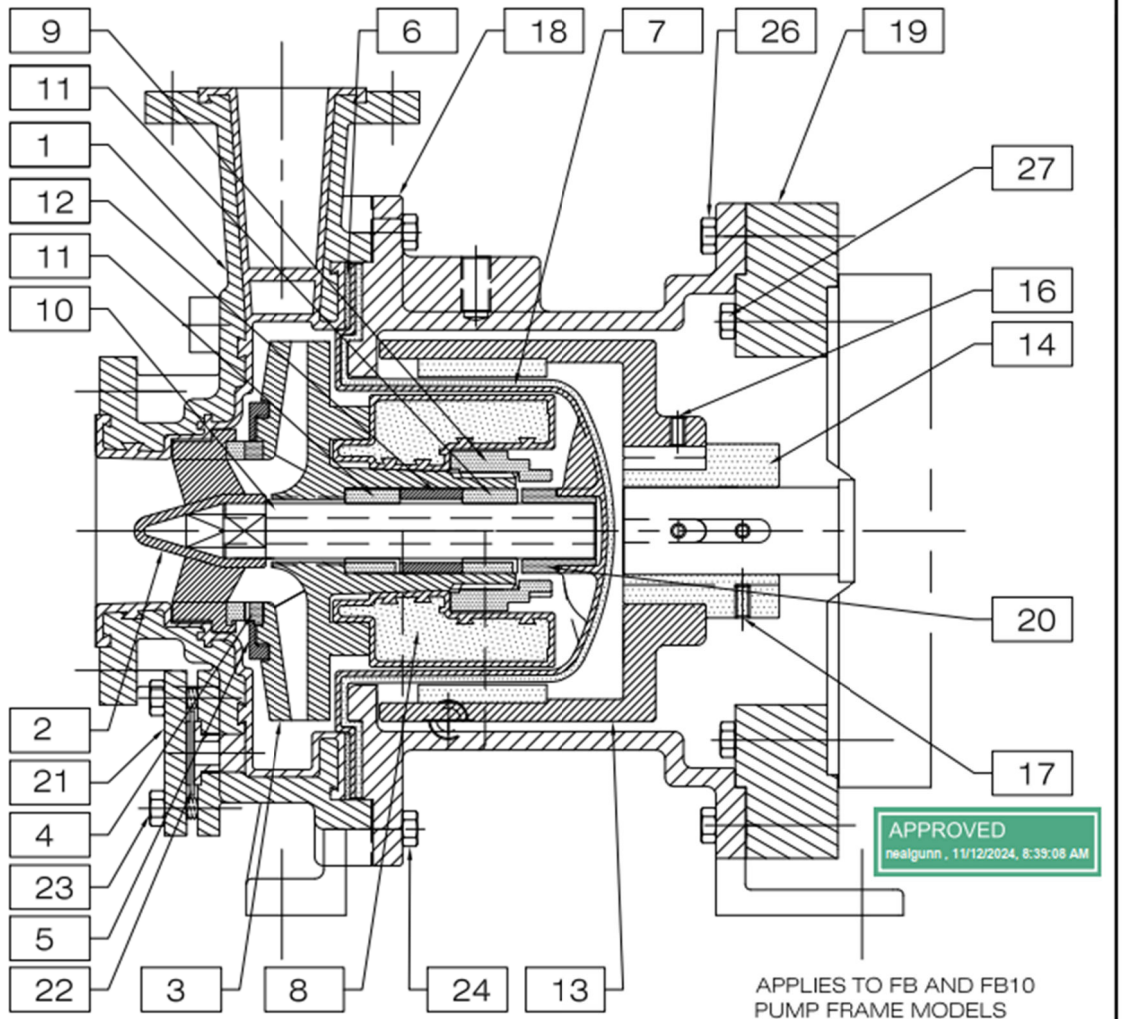
DRAWN BY:	DATE:	SCALE:	PAGE:
K HUFFER	7/8/24	NTS	1 OF 1

SE-MLZ-GRP 1



MLZ GRP 2 PARTS LIST

ITEM	QT	DESCRIPTION	MATL
28	1	IMPELLER LOCK NUT SOCKET TOOL	GFR33%-PA66
27	4	FB FRAME HEX HEAD BOLT 1/2"-13 x 1.00"	STEEL
26	8	FB FRAME HEX HEAD BOLT 1/2"-13 x 1.25"	STEEL
24	8	BOLTING-CAP SCREW 5/8-11UNC x 1.5"	304SS
23	2	DRAIN COVER BOLT 1/2-13UNC x 1"	304SS
22	1	DRAIN COVER GASKET	GF-PTFE
21	1	DRAIN COVER	STEEL
20	1	REAR THRUST BUSHING	C-PTFE
19	1	MOTOR ADAPTER (AS APPLICABLE)	DI
18	1	FRAME	DI
17	2	SET SCREW SKT HD OM 1/4-20 x 3/8"	STEEL
16	2	SET SCREW SKT HD OM 5/16-18 x 1/2"	STEEL
15	1	KEY OUTER MAGNET (1/2")	STEEL
14	1	OUTER MAGNET HUB	STEEL
13	1	OUTER MAGNET NdFe	DI/NdFe
12	1	BEARING SPACER	C-PTFE
11	2	BEARING (OPTIONAL SIC-Z)	C-PTFE
10	1	SHAFT	SSiC
9	1	IMPELLER LOCKNUT LH	M-PTFE
8	1	LINED INNER MAGNET NdFe	CFR-ETFE
7	1	REAR CASING	CFR-ETFE
6	1	CASING GASKET	GF-PTFE
5	1	IMPELLER LOCK RING RH	PFA
4	1	IMPELLER RING (OPTIONAL SIC-Z)	C-PTFE
3	1	IMPELLER	PFA
2	1	SHAFT SUPPORT - FRONT THR RING ASSY RH	PFA/SiC-Z
1	1	LINED CASING	DI/PFA



REVISIONS ⚠

NO.	DATE	COMMENT	INT
1	7/26/24	ADDED REAR CASING CALLOUT	KJH
2	7/25/24	GENERAL REVISION – MATERIALS	KJH
3			

MAGNATEX® Pumps, Inc.

SECTION DRAWING
MLZ GROUP 2 CLOSE COUPLED PUMP

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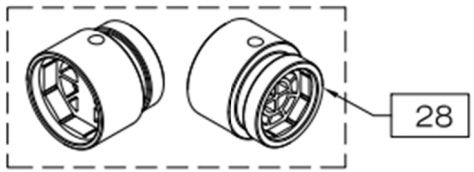
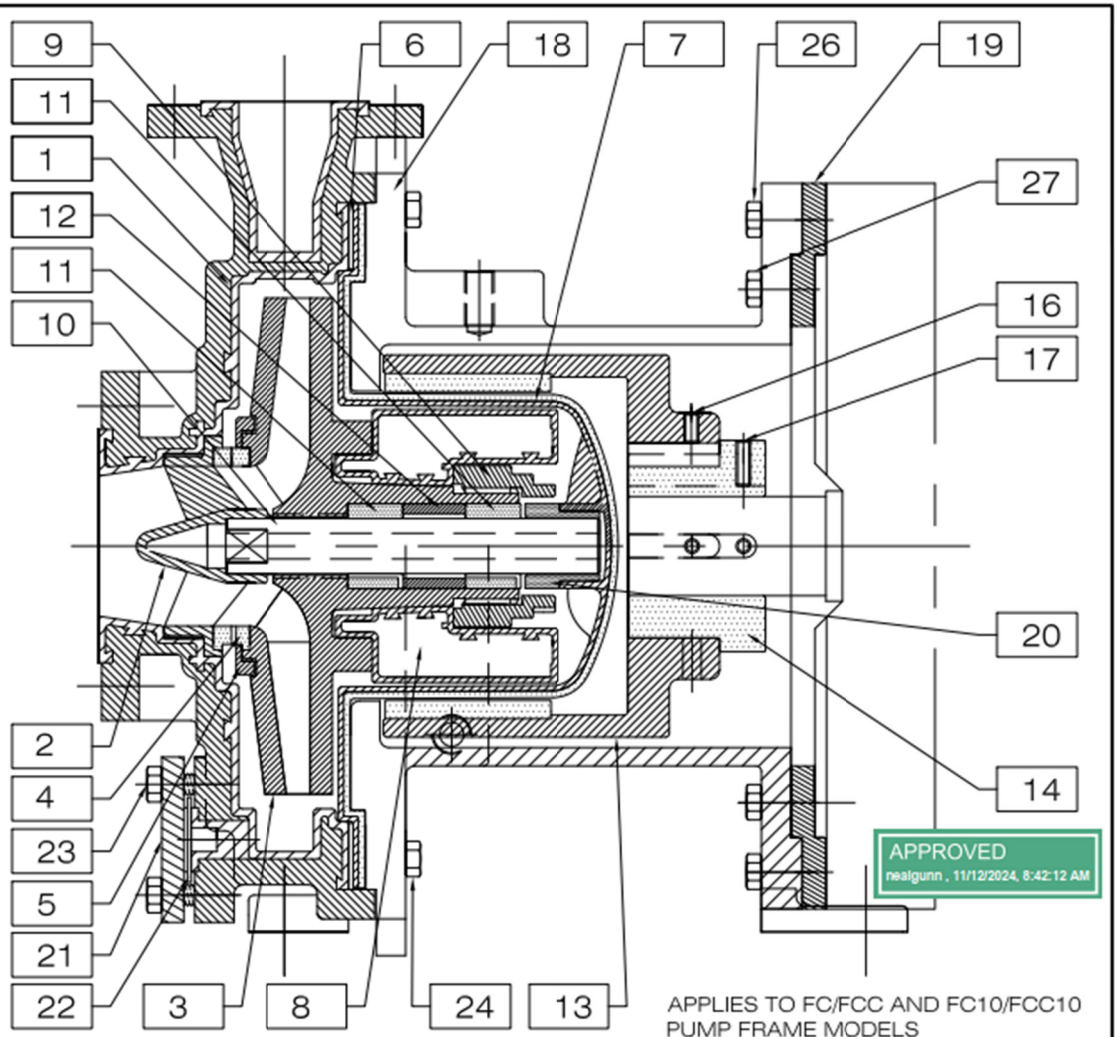
K HUFFER	9/5/2023	NTS	1 OF 1

SE–MLZ–GRP 2–FB FRAME



MLZ GRP 2 PARTS LIST

ITEM	QT	DESCRIPTION	MAT'L
28	1	IMPELLER LOCK NUT SOCKET TOOL	GFR33%-PA66
27	4	FC FRAME HH BOLT 5/8"-11 x 1.50" w/o ADAPTER (19) 320TSC	STEEL
	4	FC FRAME HH BOLT 5/8"-11 x 3.00" w/ ADAPTER (19) 320T	
	8	FCC FRAME HH BOLT 5/8"-11 x 1.50" w/o ADAPTER (19) 360TSC	
	8	FCC FRAME HH BOLT 5/8"-11 x 3.00" w/ ADAPTER (19) 405TSC	
26	2	HH BOLT 5/8"-11 x 1.25" w/ ADAPTER	STEEL
24	8	BOLTING-CAP SCREW 5/8-11UNC x 1.5"	304SS
23	2	DRAIN COVER BOLT 1/2-13UNC x 1"	304SS
22	1	DRAIN COVER GASKET	GF-PTFE
21	1	DRAIN COVER	STEEL
20	1	REAR THRUST BUSHING	C-PTFE
19	1	MOTOR ADAPTER (AS APPLICABLE)	DI
18	1	FRAME	DI
17	2	SET SCREW SKT HD OM 1/4-20 x 3/8"	STEEL
16	2	SET SCREW SKT HD OM 5/16-18 x 1/2"	STEEL
15	1	KEY OUTER MAGNET (1/2")	STEEL
14	1	OUTER MAGNET HUB	STEEL
13	1	OUTER MAGNET NdFe	DI/NdFe
12	1	BEARING SPACER	C-PTFE
11	2	BEARING (OPTIONAL SIC-Z)	C-PTFE
10	1	SHAFT	SSiC
9	1	IMPELLER LOCKNUT LH	M-PTFE
8	1	LINED INNER MAGNET NdFe	CFR-ETFE
7	1	REAR CASING	CFR-ETFE
6	1	CASING GASKET	GF-PTFE
5	1	IMPELLER LOCK RING RH	PFA
4	1	IMPELLER RING (OPTIONAL SIC-Z)	C-PTFE
3	1	IMPELLER	PFA
2	1	SHAFT SUPPORT - FRONT THR RING ASSY RH	PFA/SiC-Z
1	1	LINED CASING	DI/PFA



REVISIONS ⚠

NO.	DATE	COMMENT	INT
1	7/16/24	ADDED REAR CASING CALLOUT	KJH
2	7/25/25	GENERAL REVISION – MATERIALS	KJH
3			

MAGNATEX® Pumps, Inc.

SECTION DRAWING
MLZ GROUP 2 CLOSE COUPLED PUMP

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SE-MLZ-GRP 2-FC/FCC FRAME