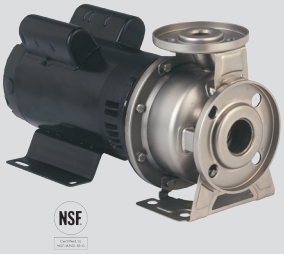
wilo®



Wilo BLZ
Block Line Stainless Steel Closed Coupling Pump

Installation and operating instructions

50-21-001-0314

1 General

1.1 Description

The BLZ (Close-Coupled End-Suction) Series centrifugal pumps are base-mounted pumps which feature: high efficiency, rugged construction, compact design, foot -mounted volute, and “sealed for life” non-regreasable ball bearings. These features make installation, operation, and service easy to perform.

1.2 Pump Application

The standard BLZ (Close-Coupled End-Suction) Series centrifugal pumps 304L stainless steel construction makes it ideal for service pumping of clean water and other fluids compatible with 304L stainless steel. These pumps are not recommended for handling dirty water or water with suspended solids, water containing acids, or corrosive liquids, seawater, and flammable or dangerous liquids. Please see pump Operational Limits for fluid temperature ranges. These pumps are not designed to run without water.

For other applications contact your local Wilo representative.

1.3 Operational Limits

Unless special provisions have been made for your pump by Wilo, the operational limits for BLZ (Close-Coupled End-Suction) Series Pumps are as follows:

Maximum Working Pressure,
Listed on pump nameplate:
125 psi standard on BLZT (threaded units)
230 psi standard on BLZF (flanged units)

1.4 Seal Operating Limits

Standard Mechanical Seals
pH Limitations: 7-11
Temperature Range: -4 to 212°F [-20 to 100°C] for use on closed or open systems which are relatively free of dirt and/ or other abrasive particles.

1.5 Pump Identification

Wilo pumps are designated by a series of numbers such as BLZ 1x1.25x4.50 THD, .75HP, 1~, 115-230v, ODP. The pump nameplate gives identification and rating information as identified in Figure 1. Permanent records for this pump are kept by the serial number and therefore must be used with all correspondence and spare parts orders.

Figure 1 - Nameplate

2 Safety Instructions

Safety Instructions

This safety alert symbol will be used in this manual and on the pump safety instruction decals to draw attention to safety related instructions. When used, the safety alert symbol means ATTENTION, BECOME ALERT, YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.

2.1 Electrical Safety

WARNING: Electrical Shock Hazard

Imminently Hazardous Situation!

Electrical connections are to be made by a qualified electrician in accordance with all applicable codes, ordinances, and good practices. Failure to follow these instructions could result in serious personal injury or death, or property damage.

WARNING: Electrical Overload Hazard

Potentially Hazardous Situation!

Three-phase and single-phase motors must have properly sized heaters to provide overload and undervoltage protection. Single phase motors have built-in overload protectors. Failure to follow these instructions could result in serious personal injury or death, or property damage.

2.2 Thermal Safety

WARNING: Extreme Temperature Hazard

Potentially Hazardous Situation!

If pump, motor, or piping are operating at extremely high or low temperatures, guarding or insulation is required. Failure to follow these instructions could result in serious personal injury or death, or property damage.

2.3 Mechanical Safety

WARNING: Unexpected Startup Hazard

Potentially Hazardous Situation!

If pump, motor, or piping are operating at extremely high or low temperatures, guarding or insulation is required. Failure to follow these instructions could result in serious personal injury or death, or property damage.

WARNING: Excessive System Pressure Hazard

Potentially Hazardous Situation!

The maximum working pressure of the pump is listed on the nameplate. Do not exceed this pressure! Do not use air to hydrotest pump. Failure to follow these instructions could result in serious personal injury or death, or property damage.

WARNING: Excessive Pressure Hazard – Volumetric Expansion
Potentially Hazardous Situation!

The heating of water and other fluids causes volumetric expansion. The associated forces may cause failure of system components and release of high temperature fluids. This will be prevented by installing properly sized and located compression tanks and pressure relief valves. Failure to follow these instructions could result in serious personal injury or death, or property damage.

3 Purpose of Manual

This manual is furnished to acquaint you with some of the practical ways to install, operate, and maintain this pump. Read it completely before doing any work on your unit and keep it handy for future reference. Equipment cannot operate well without proper care. To keep this unit at top efficiency, follow the recommended installation and servicing procedures outlined in this manual.

4 Warranty

Should your pump ever need servicing, please contact Wilo USA at 1-888-945-6872.

5 Pump Identification

All pumps are designated by Serial Number, Pump Series, and Size. This information is stamped on an identification plate which is mounted on the pump. Refer to the pump identification in the specific instruction section of this manual for detailed information.

6 Receiving Pump

It is imperative to check the pump for shortages and damage immediately upon receipt. Prompt reporting to the carrier's agent with notations made on the freight bill will expedite satisfactory adjustment by the carrier.

Pumps and drivers are normally shipped from the factory assembled and driver is painted with a finish coat.

7 Temporary Storage

If the pump is not to be installed and operated soon after arrival, store it in a clean, dry place having controlled, moderate changes in ambient temperature. Rotate the shaft periodically to coat the bearings with lubricant and to retard oxidation, corrosion, and to reduce the possibility of false brinelling of the bearings.

8 Location

The pump should be installed as near the suction supply as possible, but with no less than five suction diameters of straight pipe to assure laminar flow at the suction inlet. The total dynamic suction lift (static lift plus friction losses in suction line) should not exceed the limits for which the pump was sold.

The pump must be primed before starting. Whenever possible, the pump should be located below the fluid level to facilitate priming and assure a steady flow of liquid. This condition provides a positive suction head on the pump. It is also possible to prime the pump by pressurizing the suction vessel.

When installing the pump, consider its relative location to the system to assure that sufficient Net Positive Suction Head (NPSH) at pump suction is provided. Available NPSH (NPSHA) must always equal or exceed the required NPSH (NPSHR) of the pump.

The pump should be installed with sufficient accessibility for inspection and maintenance. A clear space with ample head room should be allowed for the use of an overhead crane or hoist sufficiently strong to lift the unit.

NOTE: Allow sufficient space to be able to dismantle pump without disturbing the pump inlet and discharge piping.

Select a dry place above the floor level wherever possible. Take care to prevent pump from freezing during cold weather when not in operation. Should the possibility of freezing exist during a shut-down period, the pump should be completely drained, and all passages and pockets where liquid might collect should be blown out with compressed air. Make sure there is a suitable power source available for the pump driver. If motor driven, electrical characteristics should be identical to those shown on motor data plate.

9 Foundation

The foundation for your pump must be sufficiently rigid to absorb any vibration and stress encountered during pump operation. A raised foundation of concrete is preferable for most floor-mounted pumps. The raised foundation assures a satisfactory base, protects against flooding, simplifies moisture drainage, and facilitates cleanliness.

The foundation should be poured without interruption to within ½ to 1½ inches [13-38mm] of the finished height. The top surface of the foundation should be well scored and grooved before the concrete sets; this provides a bonding surface for the grout.

Foundation bolts should be set in concrete as shown in Figure 4. An optional 4 inch [102mm] long tube around the bolts at the top of the concrete will allow some flexibility in bolt alignment to match the holes in the base plate. Allow enough bolt length for grout, shims, lower base plate flange, nuts and washers. The foundation should be allowed to cure for several days before the base plate is shimmed and grouted.

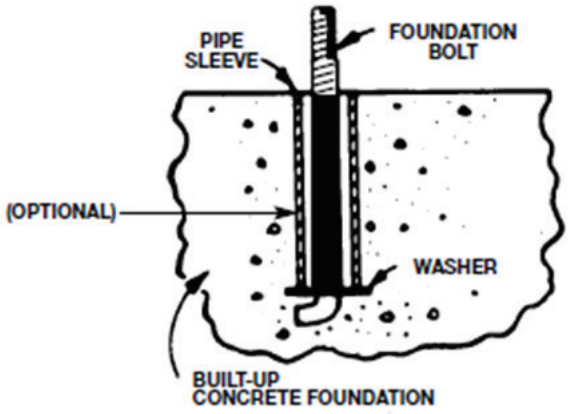


Figure 4 – Foundation

10 Base Plate Setting (Before Piping)

NOTE: This procedure assumes that a concrete foundation has been prepared with anchor or hold-down bolts extending upward, ready to receive unit.

- Use blocks and shims under base for support at anchor bolts and midway between bolts, to position base approximately 1" [25mm] above the concrete foundation, with studs extending through holes in the base plate.
- By adding or removing shims under the base, level and plumb the pump shaft and flanges. The base plate does not have to be level.
- Draw anchor nuts tight against base, and observe pump and motor shafts or coupling hubs for alignment. (Temporarily remove coupling guard for checking alignment.)
- Check to make sure the piping can be aligned to the pump flanges without placing pipe strain on either flange.
- Grout in base plate completely (See "Grouting Procedure") and allow grout to dry thoroughly before attaching piping to pump. (24 hours is sufficient time with approved grouting procedure.)

11 Grouting Procedure

Grout compensates for uneven foundation, distributes weight of unit, and prevents shifting and vibration. Use an approved, non-shrinking grout, after setting and leveling unit (See figure 5).

- Build strong form around the foundation to contain grout.
- Soak top of concrete foundation thoroughly, then remove surface water.
- Base plate (if employed by end-user) should be completely filled with grout.
- After the grout has thoroughly hardened, check the foundation bolts and tighten if necessary.
- Check the alignment after the foundation bolts are tightened.
- Approximately 14 days after the grout has been poured or when the grout has thoroughly dried, apply an oil base paint to the exposed edges of the grout to prevent air and moisture from coming in contact with the grout.

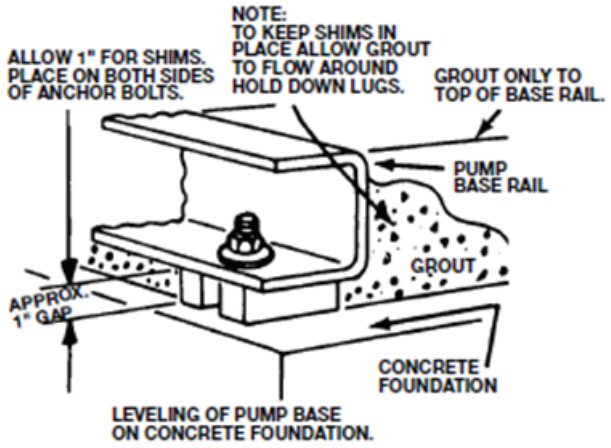


Figure 5 – Setting Base Plate and Grouting

12 Suction and Discharge Piping – General Precautions

When installing the pump piping, be sure to observe the following precautions:

- Piping should always be run to the pump. Do not move pump to pipe, as this will could make final alignment impossible.
- Both the suction and discharge piping should be supported independently near the pump and properly aligned, so that no strain is transmitted to the pump when the flange bolts are tightened. Use pipe hangers or other supports at necessary intervals to provide support. When expansion joints are used in the piping system, they must be installed beyond the piping supports closest to the pump. Tie bolts should be used with expansion joints to prevent pipe strain. Do not install expansion joints next to the pump or in any way that would cause a strain on the pump resulting from system pressure changes. It is usually advisable to increase the size of both suction and discharge pipes at the pump connections to decrease the loss of head from friction.
- Install piping as straight as possible, avoiding unnecessary bends. Where necessary, use 45° or long sweep 90° fittings to decrease friction losses. To decrease friction losses, install piping as straight as possible, keeping in mind – desired 5 straight pipe diameters and laminar flow to the suction inlet.
- Make sure that all piping joints are airtight.
- Where flanged joints are used, assure that inside diameters match properly.
- Remove burrs and sharp edges when making up joints.
- Do not "spring" piping when making any connections.
- Provide for pipe expansion when hot fluids are to be pumped.

12.1 Reducers

Eccentric reducers should be installed directly at the suction nozzle, with the taper at the bottom to prevent air pockets from forming. Straight taper reducers should never be used in a horizontal suction line because of the air pocket that is formed at the leg of the reducer and the pipe. (See Figure 6).

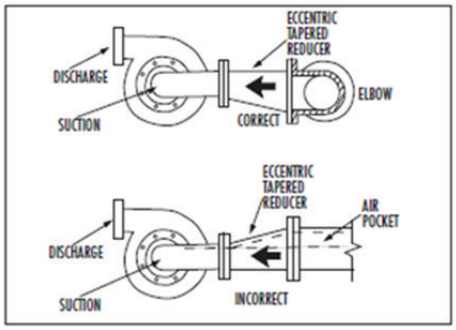


Figure 6 – Installation of Eccentric Tapered Reducers

12.2 Discharge Piping – Precautions and Recommendations

Discharge piping should also be short and direct as possible, with few elbows and fittings, to reduce head loss from friction.

The discharge pipe diameter should be the same as, or larger than, the discharge nozzle diameter.

12.3 Valves in Discharge – Piping Precautions and Recommendations

The discharge piping should include a check valve and a gate valve. The check valve should be located between the gate valve and the pump. If an increaser is used in the discharge piping, the increaser should be installed between the pump nozzle and the check valve. The check valve protects against a reverse flow of the liquid if the driver fails. (See Figure 7).

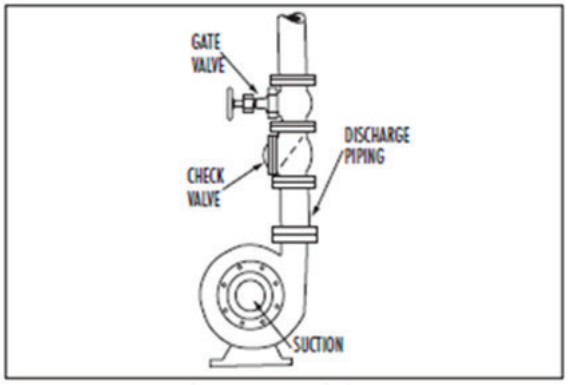


Figure 7 – Gate Valve and Check Valve

The gate valve is used in the priming operation as a throttling valve to control pump volume, and to shut down the pump for inspection and maintenance.

13 Pressure Gauges – Precautions and Recommendations

Properly sized pressure gauges should be installed in both the suction and discharge nozzles in the gauge taps. The gauges will enable the operator to easily observe the operation of the pump to determine if it is conforming to its performance curve. If cavitation, vapor binding, or other unstable operation should occur, excessively fluctuating discharge pressure will be noted.

14 Pump Insulation – Precautions and Recommendations

On chilled water applications most pumps are insulated. As part of this practice, the motor should be accessible. Otherwise, this would "trap" heat inside the housing which could lead to increased bearing temperatures and premature bearing failures.

15 Mechanical Seals – Precautions and Recommendations

Mechanical seals are preferred over packing on most applications because of better sealing qualities and longer serviceability. Leakage is eliminated when a seal is properly installed, and normal life is much greater than that of packing on similar applications.

Pumps containing single mechanical seals normally utilize the pumped liquid to lubricate the seal faces. This method is preferred when the pumped liquid is neither abrasive nor corrosive.

16 Operation

16.1 Pre-Start Checks

Before Initial start of the pump, make the following inspections:

- Check all connections to motor and starting device. Check voltage, phase, and frequency on motor nameplate with line circuit.
- Check suction and discharge piping and pressure gauges for proper operation.
- Assure that pump is full of liquid ('PRIMING') and all valves are properly set and operational, with the discharge valve closed, and the suction valve open.
- Check rotation. Be sure that the drive operates in the direction indicated by the arrow on the pump casing as serious damage can result if the pump is operated with incorrect rotation.
- Check rotation each time the motor leads have been disconnected.

WARNING: Rotating Components Hazard
Potentially Hazardous Situation!

Do not operate pump without all guards in place. Failure to follow these instructions could result in property damage, serious personal injury or death.

CAUTION: Seal Damage Hazard

Do not run pump dry, seal damage may occur. Failure to follow these instructions could result in property damage, serious personal injury or death.

16.2 Priming

If the pump is installed with a positive head on the suction, it can be primed by opening the suction and vent valve and allowing the liquid to enter the casing.

If the pump is installed with a suction lift, priming must be done by other methods such as foot valves, ejectors, or by manually filling the casing and suction line through the gauge ports.

WARNING: Rotating Components Hazard
Potentially Hazardous Situation!

Do not operate pump without all guards in place. Failure to follow these instructions could result in property damage, serious personal injury or death.

16.3 Starting

- Close drain valves and valve in discharge line.
- Open fully all valves in the suction line.
- Prime the pump.
- NOTE: If the pump does not prime properly, or loses prime during start-up, it should be shut down and the condition corrected before the procedure is repeated.
- When the pump is operating at full speed, open the discharge valve slowly. This should be done promptly after start-up to prevent damage to pump by operating at zero flow.

16.4 Operating Check

- Check the pump and piping to assure that there are no leaks.
- Check and record pressure gauge readings for future reference.
- Check and record voltage, amperage per phase, and power (kW) if a wattmeter is available.
- Check bearings for lubrication and temperature. Normal temperature is 180°F [82°C] maximum.
- Make all pump output adjustments with the discharge line.

CAUTION: Cavitation Damage Hazard

Do not throttle the suction line to adjust the pump output. Failure to follow these instructions could result in property damage.

16.5 Freezing Protection

Pumps that are shut down during freezing conditions should be protected by one of the following methods.

- Drain the pump; remove all liquids from the casing.
- Keep fluid moving in the pump and insulate or heat the pump to prevent freezing.

WARNING: Rotating Components Hazard

Potentially Hazardous Situation!

Do not operate pump without all guards in place. Failure to follow these instructions could result in property damage, serious personal injury or death.

16.6 Troubleshooting

Between regular maintenance inspections, be alert for signs of motor or pump trouble. Common symptoms are listed in **Table 1 – Troubleshooting Chart.** Correct any trouble immediately and AVOID COSTLY REPAIR AND SHUTDOWN.

17 Maintenance

17.1 General Maintenance

Operating conditions vary so widely that to recommend one schedule of preventive maintenance for all centrifugal pumps is not possible. Yet some sort of regular inspection must be planned and followed. Keep a permanent record of the periodic inspections and maintenance performed on the pump. Following a routine maintenance program will keep the pump in good working condition and prevent costly breakdown. **INSTALL GAUGES in the threaded ports on the inlet and discharge and record the baseline suction/discharge pressures, and write that, and the date, on the pumps performance curve.**

One of the best rules to follow in the proper maintenance of the centrifugal pump is to keep a record of actual operating hours. Then, after a predetermined period of operation has elapsed, the pump should be given a thorough inspection. The length of this operating period will vary with different applications, and can only be determined from experience. New equipment, however, should be examined after a relatively short period of operation. The next inspection period can be lengthened somewhat. This system can be followed until a maximum period of operation is reached which should be considered the operating schedule between inspections.

18 Lubrication

18.1 Bearing Temperature

Normally the maximum desirable operating temperature for ball bearings is 180°F [82°C]. Special designs may have higher limits. Should the temperature of the bearing within the motor frame rise above the limit, the pump should be shut down to determine the cause. Check with an accurate temperature measuring device to be sure. Bearing temperature sensors could be added to motors in extreme duty conditions.

19 Mechanical Seal Information

General instructions for operation of the various mechanical sealing arrangements are included below. It is not feasible to include detailed instructions for all mechanical seals in this booklet because of the almost unlimited number of possible combinations and arrangements. Instead, seal manufacturer's instructions will be included as a separate supplement to this book, where required.

- Mechanical seals are precision products and should be treated with care. Use special care when handling seals. Clean oil and clean parts are essential to prevent scratching the finely lapped sealing faces. Even light scratches on these faces could result in leaky seals.
- Normally, mechanical seals require no adjustment or maintenance except routine replacement of worn or broken parts.
- A mechanical seal which has been used should not be put back into service until the sealing faces have been replaced or relapped. (Relapping is generally economical only in seals two inches [50mm] in size and above.)

Four important rules which should always be followed for optimum seal life are:

1. Keep the seal faces as clean as possible. Use 150 propyl alcohol if there is any questions of contamination on the surface.
2. DO NOT TOUCH SEAL FACES. OIL ON FINGER TIPS WILL CONTAMINATE THE SEAL FACE.
3. Keep the seal as cool as possible.
4. Assure that the seal always has proper lubrication.
5. If seal is lubricated with filtered fluid, clean filter frequently.

20 Cleaning without Dismantling Pump

A short section of pipe so designed that it can be readily dropped out of the line can be installed adjacent to the suction flange. With this arrangement, any matter clogging the impeller is accessible by removing the pipe section. If the pump cannot be freed of clogging after the above methods have been tried, dismantle the unit as in the following sections described to locate the trouble.

21 Disassembly and Assembly Instructions

The procedure outlined in this section covers the dismantling and reassembly of the BLZ (Close-Coupled End-Suction) Series pump with mechanical seals on the shaft.

When working on the pump, use accepted mechanical practices to avoid unnecessary damage to parts. Check clearances and conditions of parts when pump is dismantled and replace if necessary.

21.1 Disassembly Instructions for BLZ THD Pumps, see figure 8

All pumping parts can be removed from case without disturbing the piping.

WARNING: Electrical Shock Hazard

Potentially Hazardous Situation!

Disconnect and lock out power before servicing. Failure to follow these instructions could result in property damage, serious injury or death.

CAUTION: Extreme Temperature Hazard

Allow pump temperatures to reach acceptable levels before proceeding. Open drain valve, do not proceed until liquid stops coming out of drain valve. If liquid does not stop flowing from drain valve, isolation valves are not sealing and should be repaired before proceeding. After liquid stops flowing from drain valve, leave drain valve open and continue. Remove the drain plug located on the bottom of the pump housing. Do not reinstall plug or close drain valve until reassembly is completed. Failure to follow these instructions could result in property damage and/or moderate personal injury.

CAUTION: Excessive Pressure Hazard

Make certain the internal pressure is relieved before continuing. Failure to follow these instructions could result in property damage, serious injury or death.

21.2 Volute Casing

1. Drain pump casing by removing drain plugs.
2. Remove the bolts securing volute casing to cover plate.
3. Pry volute case from cover plate with a screwdriver.

21.3 Impeller

1. Hold the motor shaft with a screwdriver in the shaft end slot. Remove the impeller nut. Grasp and turn the impeller counterclockwise (as viewed from pump end).

21.4 Seal

1. Remove the rotating part of the seal by pulling it off the shaft.
2. The stationary seat can be pressed from the casing cover.

21.5 Check List For Examination of Pump Parts

Impeller – Replace the impeller if any vane is broken, excessive erosion shows, or if labyrinth surfaces are worn. Impeller nut should be replaced if damaged.

Mechanical Seal – Seal face, O-ring and sealing members should be free of debris and dirt. Complete seal assembly should be replaced if not in perfect condition.

Shaft– Shaft surface under seal must be clean, smooth and without any grooves. It should be replaced if necessary.

Note:
If replacement parts are ordered, please furnish the following information to your Wilo Representative:
1. Item Numbers
2. Description of Pump Part
3. Wilo Model Number and Serial Number on the Nameplate.

21.6 Assembly Instructions for BLZ THD Pumps, see figure 8

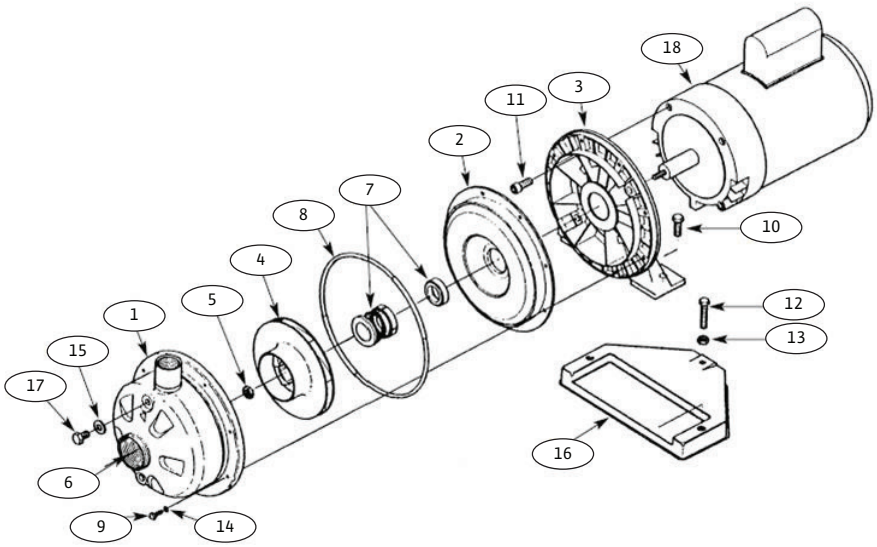
Position the pump on its end with the shaft up. The work surface should be level, capable of supporting the motor. A crane or hoist is recommended to allow more control of the heavy and awkward assembly.

WARNING: Power Supply
Potentially Hazardous Situation!

Make certain the motor is not connected to a power source. Do not install or assemble the pump on a motor connected to a power source. Serious injury could occur if the motor activates during pump assembly.

1. Position the motor bracket on the motor with the mounting feet toward the motor. Cross-tighten bolts to recommended torque of 6 ft.-lbs. [8.1 N-m].

2. Using finger pressure only, firmly press the stationary seal seat into the cover plate. Press the seat until it evenly bottoms out in the seat cavity.



Item No.	Part Name
1	Casing
2	Cover Plate
3	Motor Bracket
4	Impeller
5	Impeller Nut
*6	Casing Ring - only used on:
	BLZ 1x1.25x4.50 THD
	BLZ 1x1.25x5.19 THD
	BLZ 1x1.25x6.19 THD
7	Mechanical Seal
8	O-ring
9	Casing Bolt
10	Base Bolt 1
11	Motor Bolt
12	Base Bolt 2
13	Base Nut
14	Casing Washer
15	Casing Vent Plug Washer
16	Base
17	Vent Plug
18	Motor

Figure 8 – BLZ THD Exploded View

3. Be careful not to damage the stationary seal.
    - Position the cover plate over the motor shaft.
    - Align the cover plate holes with the motor bracket holes.
    - Firmly press the cover plate into position. (Cover plate may need to be tapped into place by using a rubber mallet.)

4. Ensure all seals have good contact.
    - Carefully press the rotating seal assembly onto the motor shaft. Ensure the face of the seal assembly has solid, flush contact with the stationary seal seat.
    - The seal retainer must seal against the motor shaft.
    - Position the seal spring and seal washer.

5. Failure to properly install the impeller and the impeller nut could result in the impeller spinning off the shaft in three phase applications (when the motor may start in reverse rotation).
    - While holding the seal spring in place, thread the impeller clockwise onto the motor shaft.
    - Use a screwdriver to hold the motor shaft stationary. Turn the impeller on the shaft until it spins down and bottoms out. Make certain that the impeller is firmly bottomed and sealed.
    - Install the impeller nut onto the shaft in the same manner as the impeller was installed. Make certain the impeller nut is firmly seated against the impeller. Apply loctite® 242 or 243 to the impeller nut before installing.

6. Position the O-ring over the cover plate. Do not cut, nick, or damage the O-ring during installation.

7. The discharge can be positioned in the direction desired.
    - Position the pump volute casing over the cover plate.
    - Rotate the discharge to the desired direction.
    - Align the bolt holes and secure the casing to the cover plate with lock washers and cap screws.
    - Cross tighten the bolts to 3.4 ft-lbs [4.6 N-m]. Over tightening may result in stripping of the motor bracket threads.

8. Position the motor bracket on the pump and secure with cap screw

9. Place the bolt and lock nut on the back of the motor bracket. Adjust the bolt height to support the motor and tighten the lock nut to secure the bolt height.

10. Rotate the impeller to ensure proper alignment. Impeller should not 'wobble' or exhibit an eccentric orbit.

21.7 Disassembly Instructions for BLZ F Pumps,
see table 2 and figure 9 for pumps 3HP up to 15HP
see table 3 and figure 10 for pumps 2HP to 30HP

Table 2 – Wilo BLZ F Pump Size, 3HP to 15HP

BLZ 1.25X2X5.19 F	BLZ 1.5X2.5X5.50 F	BLZ 2X2.5X5.50 F
BLZ 1.25X2X5.94 F	BLZ 1.5X2.5X5.94 F	BLZ 2X2.5X6.19 F
BLZ 1.25X2X6.56 F	BLZ 1.5X2.5X6.56 F	BLZ 2X2.5X6.56 F
BLZ 1.25X2X7.31 F	BLZ 1.5X2.5X7.19 F	BLZ 2.5x3x4.88 FI
BLZ 1.25X2X7.88 F	BLZ 1.5X2.5X7.88 F	BLZ 2.5X3X5.31 F
BLZ 1.5X2.5X4.94 F	BLZ 2X2.5X5.19 F	BLZ 2.5X3X5.38 F
		BLZ 2.5X3X5.88 FI

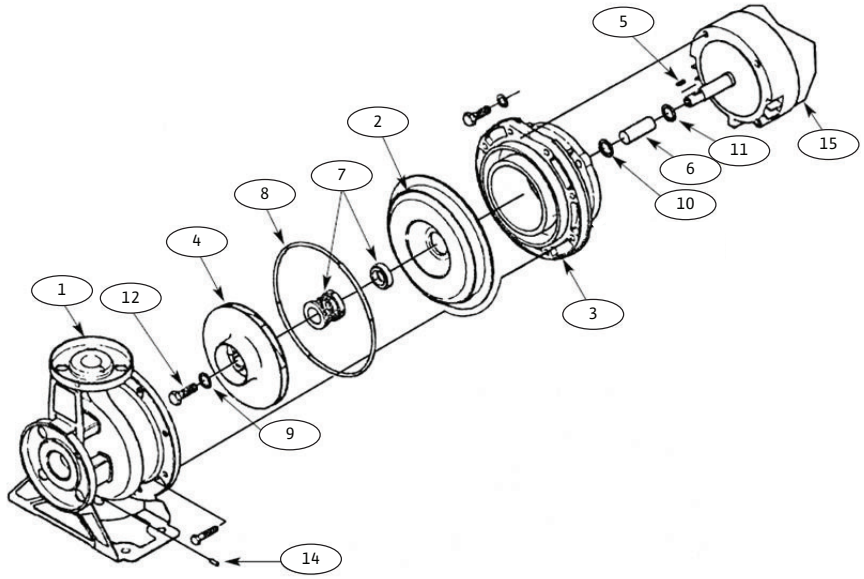
Table 3 – Wilo BLZ F Pump Size, 20HP to 30HP

BLZ 2.5X3X6.31 FI
BLZ 2.5X3X6.88 FI
BLZ 2.5X3X6.75 FI
BLZ 2.5X3X7.06 FI
BLZ 2.5X3X7.50 FI

All pumping parts can be removed from case without disturbing the piping.

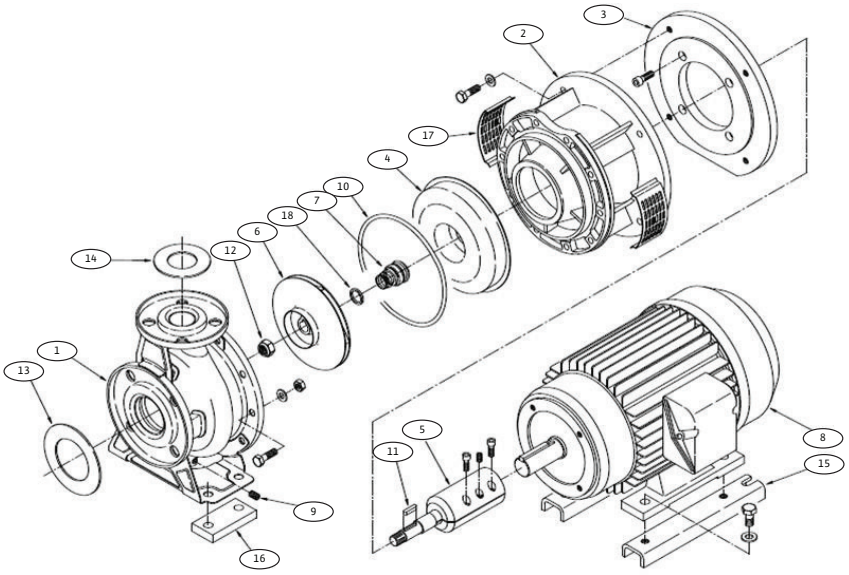
WARNING: Electrical Shock Hazard
Potentially Hazardous Situation!

Disconnect and lock out power before servicing. Failure to follow these instructions could result in property damage, serious injury or death.



Item No.	Part Name
1	Casing
2	Cover Plate
3	Motor Bracket
4	Impeller
5	Key
6	Shaft Sleeve
7	Mechanical Seal
8	O-Ring
9	Impeller Bolt Gasket
10	Sleeve Gasket
11	Motor Shaft Gasket
12	Impeller Bolt
13	Motor Support (not shown)
14	Vent Plug
15	Motor

Figure 9 – BLZ F Exploded View, 3HP to 15HP



Item No.	Part Name
1	Casing
2	Motor Bracket
3	Adapter Ring
4	Cover Plate
5	Coupling/Stub Shaft
6	Impeller
7	Mechanical Seal
8	Motor
9	Drain Plug
10	O-Ring
11	Key
12	Impeller Nut
13	Suction Flange Gasket
14	Discharge Flange Gasket
15	Motor Support
16	Casing Support (BLZ 2.5X3X6.88 FI)
17	Coupling Guard
18	Lip Seal

Figure 10 – BLZ F Exploded View, 20HP to 3 HP

CAUTION: Extreme Temperature Hazard

Allow pump temperatures to reach acceptable levels before proceeding. Open drain valve, do not proceed until liquid stops coming out of drain valve. If liquid does not stop flowing from drain valve, isolation valves are not sealing and should be repaired before proceeding. After liquid stops flowing from drain valve, leave drain valve open and continue. Remove the drain plug located on the bottom of the pump housing. Do not reinstall plug or close drain valve until reassembly is completed. Failure to follow these instructions could result in property damage and/or moderate personal injury.

CAUTION: Excessive Pressure Hazard

Make certain the internal pressure is relieved before continuing. Failure to follow these instructions could result in property damage, serious injury or death.

21.8 Volute Casing

1. Drain pump casing by removing drain plugs.
2. Remove the bolts securing volute casing to cover plate.
3. Pry volute case from cover plate with a screwdriver.

21.9 Impeller

1. Hold the motor shaft with a screwdriver in the shaft end slot. Remove the impeller nut. Grasp and turn the impeller counterclockwise (as viewed from pump end).

21.10 Seal

1. Remove the rotating part of the seal by pulling it off the shaft.
2. The stationary seat can be pressed from the casing cover.

21.11 Check List For Examination of Pump Parts

Impeller – Replace the impeller if any vane is broken, excessive erosion shows, or if labyrinth surfaces are worn. Impeller nut should be replaced if damaged.

Mechanical Seal – Seal face, O-ring and sealing members should be free of burrs and dirt. Complete seal assembly should be replaced if not in perfect condition.

Shaft– Shaft surface under seal must be clean, smooth and without any grooves. It should be replaced if necessary.

Note:
If replacement parts are ordered, please furnish the following information to your Wilo Representative:
1. Item Numbers
2. Description of Pump Part
3. Wilo Model Number and Serial Number on the Nameplate.

21.12 Assembly Instructions for BLZ F Pumps,
see table 2 and figure 9 for pumps 3HP up to 15HP

Position the pump on its end with the shaft up. The work surface should be level, capable of supporting the motor.

WARNING: Power Supply
Potentially Hazardous Situation!

Make certain the motor is not connected to a power source. Do not install or assemble the pump on a motor connected to a power source. Serious injury could occur if the motor activates during pump assembly.

1. Position a Nylon gasket over the motor shaft. (See item #11 in figure)

2. Carefully press the rotating seal assembly onto the shaft sleeve. The smooth face of the rotating ring must make good contact with the seal seat and the seal retainer must seal against the shaft sleeve.

Note: Seal faces should be wiped clean with non-oil based solvent or alcohol.

3. Using finger pressure only, insert the seal seat into the casing cover. Press the seal until it evenly bottoms out in the seal cavity. DO NOT TOUCH SEAL FACES.

4. Position the cast iron motor bracket over the shaft. Fasten the bracket to the motor, tightening bolts using a cross-tightening pattern. Tighten the bolts to 8 ft.-lbs. [10.9 N-m]. Overtightening may cause stripping of threads.

5. Carefully position the cover plate and seal over the shaft. Be careful not to damage the stationary seal seat.

6. Slide the stainless steel shaft sleeve, with rotating assembly, over the motor shaft.

7. Position the O-ring around the cover plate. Do not cut, nick, or damage the O-ring during the installation.

8. Install the impeller shaft key (3/16"x3/16"x1-3/16").

9. Place the seal spring assembly over the rotating piece of the seal in position to receive the impeller.

10. Place a Nylon gasket on top of spring retainer. (See item #10 in Figure 9)

11. Firmly press the impeller into position by aligning the slot over the shaft key. Press the impeller down the shaft until it bottoms and seats squarely against the gasket and shaft sleeve.

12. Place a Nylon gasket (See item #9 in Figure 9) over the impeller hub and into the impeller eye. Install the impeller bolt to secure the impeller to the shaft. Do not overtighten the shaft bolt. (Use a loctite®242 or 243 thread compound to secure the shaft bolt and prevent it from working loose.)

13. Tighten the impeller bolt. (Tighten the bolts to the factory recommended torque specifications of 11 ft.-lbs. [14.9 N-m])

14. Install the pump volute over the cover plate. Rotate the volute to align with the bolt holes and secure it with the bolts, washers, and nuts. Cross-tighten the bolts to the factory recommended torque specifications (8 ft.-lbs. [10.9 N-m]).

15. With a socket wrench, rotate impeller to check for alignment. If rubbing against casing, loosen bolts on casing and retighten.

21.13 Assembly Instructions for BLZ F Pumps,
see table 3 and figure 10 for pumps 20HP up to 30HP

Position the pump on its end with the shaft up. The work surface should be level, capable of supporting the motor.

WARNING: Power Supply
Potentially Hazardous Situation!

Make certain the motor is not connected to a power source. Do not install or assemble the pump on a motor connected to a power source. Serious injury could occur if the motor activates during pump assembly.

1. 1. Insure that key is installed in motor shaft keyway, slide coupling onto shaft.

Tip: To ease the installation of the coupling tighten the set screw on the side of the coupling. Tightening this screw will cause the coupling to open slightly allowing for easier installation. After the coupling is in place be sure to loosen the set screw to release the pressure and allow the coupling to close down on the motor shaft.

2. Secure the coupling to the motor shaft by tightening the socket head bolts in the side of the coupling. Torque to 11ft.-lbs [14.9 N-m].

3. Fasten the adapter ring to the motor using a cross tightening pattern.

4. Fasten the motor bracket to the adapter ring.

5. Apply a thin coat of non-petroleum based lubricant (i.e. "soapy water") to the stationary seal seat in the casing cover, using finger pressure only press the stationary seal into the seal seat. Wipe the seal face clean with alcohol and a soft cloth.

6. Position the o-ring around the cover plate.

7. Using hand pressure or a rubber mallet, press fit the casing cover onto the motor bracket.

8. Apply a thin coat of non-petroleum based lubricant (i.e. dish soap) to the inside of the rubber boot on the rotating seal. Slide the seal onto the coupling pushing it gently until it contacts the stationary seal that was installed in step 6. Place the spring and spring retainer over the coupling and onto the rotating seal.

9. Place the stainless steel lip seal onto the spring retainer insuring that the raised surface of the lip seal seats into the spring retainer.

10. Install the impeller shaft key into the coupling shaft.

11. Slide impeller over the key and shaft.

12. Tighten the impeller nut to secure the impeller in place. Tighten to 11 ft.-lbs. [14.9N-m].

13. Install Casing . Take care to align the bolt holes. Cross tighten the bolts to 8 ft.-lbs. [10.9 N-m].

14. With a socket wrench, rotate impeller to check for proper casing alignment. If rubbing against casing occurs loosen casing bolts and retighten taking care to cross-tighten and use equal torque.

15. Install motor support or casing support as required.

22 Maintenance

The pump does not require special maintenance.

The following rules must be observed for safe operation (more than 2 months):

1. If the pump is not going to be used for a long period, the pump should be drained of water and flushed with clean water.

2. Where the pump is exposed to freezing temperatures, it should always be left drained when not in use.

23 Necessary Replacement of Hydraulic Components

The following components must always be replaced when the pump is disassembled:

- Gaskets
- O-rings
- Mechanical seals
- Lip seals
- Impeller nuts

NOTE: Examine the following components for wear or damage and remove, measure clearance/tolerance. If found excessive, then immediately replace the following components.

- Impeller
- Mechanical seal faces

24 Ordering Parts

The pumps covered by this manual have been designed and built with certain replaceable wearing parts. The recommended inventory of spare parts depends upon the installation and the importance of continued operation.

For normal service, with repairs to be made in the field, the following parts are recommended for stock.

- 1 set of gaskets
- 1 sets of mechanical seals (complete)
- 1 set of lip seals

Parts should be ordered as far in advance of their use as possible since circumstances beyond the control of the company may reduce existing stock. Not all parts are stocked and must be manufactured for each order.

To facilitate rapid handling of your order for spare parts, be sure to include the following information:

- Serial number of the pump.
- Article / part number of the part.
- Quantity of each part.
- Name / description of the part.
- Material desired. (Parts will be furnished in original materials unless specified as a material change. All material substitutions should be discussed with the factory.)

25 Fastener Torque Requirements , see Table 4

26 Dealer Servicing

If trouble occurs that cannot be rectified, contact your local Wilo Representative. He/she will need the following information in order to give you assistance.

- Complete nameplate data of pump and motor.
- Suction and discharge pipe pressure gauge readings.
- Ampere draw of the motor.
- A sketch of the pumping connections and piping.

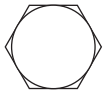
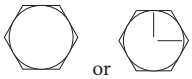
27 Motor

For motor issues, consult the Motor Instruction, Operation and Maintenance Manual.

Problems	Causes	Remedies
Output too low	Back pressure too high	Check the plant for contamination. Regulate a new operating point.
	Pump or pipe work not completely filled	Vent and fill the pump as well as the suction of in flow line.
	Suction lift too high or positive suction head too low	Check the liquid level; open the shut off valves on the suction side. Clean the filters.
	Wrong direction of rotation	Change the motor connection
Pump does not prime or only intermittently	Pump casing, shaft seal, foot valve or suction line leads	Replace the casing seal. Check the shaft seal, Check the flange connections
	Suction lift too high or positive suction head too low.	Check the liquid level; open the shutoff valves on the suction side. Clean the filters on the suction side.
	Loose or jammed parts in the pump	Open and clean the pump
Pump leaks	Casing bolts not correctly tightened	Check the tightening torque of the casing bolts
	Mechanical seal leaks	Check the seal surfaces and rubber material of the mechanical seal. In case of damages exchange mechanical seal.
Temperature of the pump increases	Pump or pipe work not completely filled	Vent and fill the pump as well as the suction line or in flow line.
	Suction lift too high or positive suction head too low	Check the liquid level; open the shut off valves on the suction side. Clean the filters on the suction side.
	Pump is run against closed valve	Open the shut off valve on discharge side.
Noisy pump	Pump or pipe work not completely filled	Purge of air the pump and the pipe work.
	Suction lift too high or positive suction head too low	Check the liquid level; open the shut off valves on the suction side. Clean the filters on the suction side.
	Pump is not properly leveled	Check the pump leveling and alignment.
	Foreign material in the pump	Dismantle and clean the pump
The motor contractor trips	Pump is not properly leveled or is distorted	Check the pump leveling and alignment.
	Ground	Check the earth connection. Check the potential causes such as damaged wirings or cables, leakages on the electrical parts.
	Operating conditions outside of performance range of pump	Refer to pump operating conditions stated in technical data
	Loose or jammed parts in the pump	Open and clean the pump.

Table 1 – Troubleshooting Chart

Capscrew Torque (Foot-Pound)

		Capscrew Diameter									
	Capscrew Type	¼	5/16	3/8	7/16	½	5/8	¾	7/8	1	1¼
	SAE Grade 2	6	13	25	38	60	120	730	210	300	375
 or	Brass Stainless Steel	4	10	17	27	42	83	130	200	300	375
	SAE Grade 5	10	20	35	60	90	180	325	525	800	1000
	SAE Grade 8	13	28	46	75	115	225	370	590	395	1300

Capscrew Torque (Newton-Meter)

		Capscrew Diameter										
	Capscrew Type	M6	M8	M10	M12	M14	M16	M18	M20	M24	M27	M30
 4.6	ISO 4.6	8	14	33	60	100	150	165	245	320	410	550
 8.8	ISO 8.8	9	22	44	75	120	185	240	300	500	600	725
 10.9	ISO 10.9	12	28	51	98	145	225	295	390	600	800	930
 12.9	ISO 12.9	14	32	60	105	165	250	375	475	800	1000	1200

Table 4 – Fastener Torque Requirement

WILO USA LLC
Tel: 888-945-6872
Web: www.wilo-usa.com
Email: info@wilo-usa.com

Wilo Canada Inc.
Tel: 866-945-6236
Web: www.wilo-canada.com
Email: info@wilo-canada.com

Wilo Mexico
Tel: + 52 55 5586 3209
Web: www.wilo-mexico.com
Email: info@wilo.com.mx