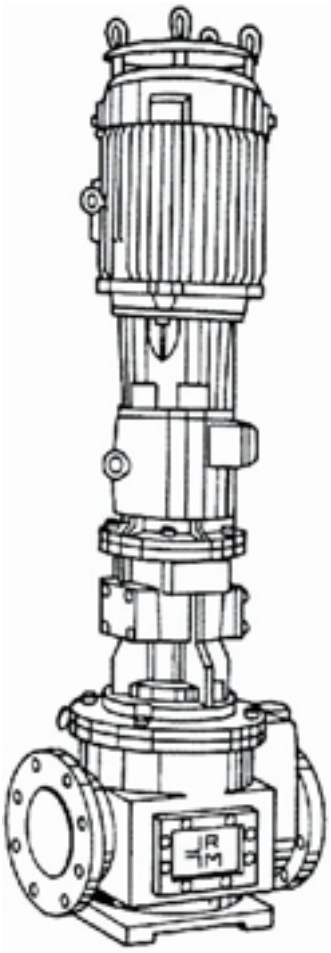
SERVICE MANUAL

MOYNO®

Pipeliner



MOYNO

Always the Right Solution™

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Service Manual
Moyno® Pipeliner
Series 201, 301 and 401

1-1. Introduction

1-2. General

The Moyno® Pipeliner is a rugged, industrial-duty solids reduction unit that disintegrates and grinds solids entrained in waste. The Pipeliner prevents clogging of equipment and permits the use of smaller diameter piping by discharging more homogeneous liquids with an effectively reduced particle size.

The cutting action of the Pipeliner consists of a single shaft rotating a headstock, containing tungsten carbide tipped cutting edges running against a hardened tool steel shearplate. The shearplate has a number of holes in which to allow fluid to pass through. Anything that goes through the Pipeliner must go through these holes. As string and other debris pass through the holes, the rotating cutting edge of the headstock severs them. Solids in the conveying liquid enter the unit's body chamber through a flanged inlet and flow upward into the cutterhead assembly. The macerated solids are then discharged from the Pipeliner through a flanged outlet. Tin cans, large pieces of metal and stones will be screened from passing and can be cleaned from the body casting.

With its simple, rugged design, the Moyno Pipeliner operates efficiently, requires less maintenance than other solids reduction units and can be serviced quickly using ordinary tools. Its solids reduction capabilities offer improved pumping to a variety of sewage, waste and process industry applications.

1-3. Nameplate Data

The Pipeliner nameplate, located on the body casting, contains important operation and service information. This information includes the Pipeliner model and serial numbers (See Figure 1-1).

The Pipeliner model and serial numbers must be used for reference when ordering spare parts. To simplify this procedure, the model number for your Pipeliner should be recorded on the nameplate drawing on the front cover of this manual. Please carefully file this manual for future reference.

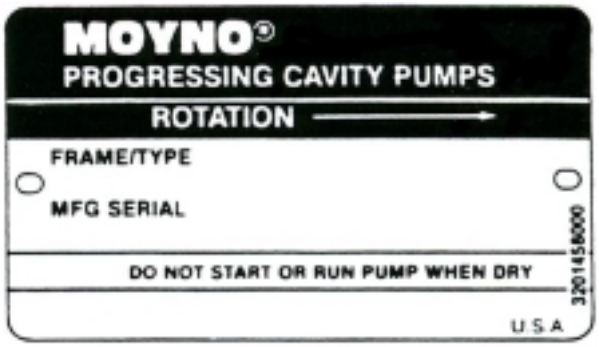

Figure 1-1. Typical nameplate showing model and manufacturing serial numbers.

1-4. Cutter Rotation

As you stand facing the unit, the shaft/headstock should be rotating from right to left. You can check rotation by viewing the shaft through the cover plate opening in the bearing housing. Units supplied prior to May, 1995 do not have cover plates. Instead they have pipe plug holes for viewing.

Note: ***Do not attempt to verify rotation by the fan on the motor.***

The Moyno Pipeliner is not to be run in reverse rotation.

1-5. Model Number

The Pipeliner model number consists of five component parts: body designation, series designation, shearplate hole size, drive designation, horsepower rating and style designation. A typical model number might be P315G50A, as shown on the nameplate in Figure 1-1.

1-6. **Body Designation**

The body designation consists of one letter. The letter "P" designates a Pipeliner body type.

1-7. Series Designation

The series designation consists of one numeral that specifies grinder's series. There are three Pipeliner series designations:

2 - Series 201
3 - Series 301
4 - Series 401

1-8. Shearplate Hole Size

The shearplate hole size consists of a two-digit number that indicates the size of the holes, expressed in millimeters. There are five shearplate hole sizes:

06 - 6mm
08 - 8mm
10 - 10mm
15 - 15mm (nominal)
20 - 20mm (nominal)

The 15mm and 20mm (nominal) shearplates have several diameter holes in them. The multiple holes are necessary to ensure the headstock remains dynamically balanced through a full rotation. See chart below for actual hole sizes.

Model	Actual Hole Sizes
P215	7,11,14mm
P315	11, 15, 18mm
P320	11, 17, 22mm
P415	16, 18, 20, 24mm
P420	12, 15, 16, 24, 28mm

1-9. Drive Designation

The drive designation indicates the type of drive system used to power the conditioning unit. There are two drive designations:

D - Direct Drive
G - Gear Drive

1-10. Horsepower Designation

The horsepower designation consists of a two-or three-digit number that indicates the horsepower rating of the motor used to drive the conditioning unit. There are five horsepower designations:

30 - 3 Horsepower
50 - 5 Horsepower
75 - 7 ½ Horsepower
100 - 10 Horsepower
150 - 15 Horsepower

1-11. Style Designation

If the model number of your Pipeliner is followed by the letter "A", you have received a new style model. The new style consists of a different bearing housing which includes a D112 flange, for drive mounting, and coupling inspection ports.

2-1. Installation

2-2. General

Moyno Pipeliners are lubricated and tested at the factory before shipment and require minimum pre-startup service.

Accessibility to the grinder and adequate clearance should be a prime consideration in any installation. Enough space should surround the unit so the Pipeliner maintenance can be performed easily.

The motor should be installed with flexible conduit long enough to allow the motor to be raised ten inches arid then lowered to the floor. This will enable maintenance to be performed without disconnecting wires.

The Moyno Pipeliner can only be mounted vertically in the upright position. It is not suited for submerged service.

2-3. Lifting Procedure

CAUTION: Do not attempt to lift the Pipeliner using the motor or gearmotor lifting lugs. These lugs are for the motor/gearmotor only. Lift the Pipeliner by one of the following methods:

1. Wrap a nylon lifting sling around the Pipeliner bearing housing just below the motor.
2. If your Pipeliner is equipped with two side blocks on the top of the bearing housing, two special lifting brackets can be attached for lifting see (Figure 2-1). (Lifting brackets are optional; see Pages 12 and 13.)
3. Remove the motor/gearmotor and attach two lifting eye bolts (see Figure 2-2).

Lifting weights for each unit is listed below:

Model	LBS.
201	355
301	550
401	1300

Figure 2-1. Typical lifting method using lifting brackets.

Figure 2-2. Typical lifting method using eye bolts.

2.4 Solids Rejection

CAUTION: Objects that cannot be ground could possibly damage the Pipeliner. Take precautions to ensure that such items are not fed into the unit.

2-5. Piping and Valves

2-6. Piping

Suction piping should be as short as possible. Normally, the suction line should be the same size as the Pipeliner suction. Long sweep 90° or 45° elbows should be used instead of standard elbows.

2-7. Valves

Valves that do not tend to clog should be used to isolate the Pipeliner during service procedures.

3-1. Operation

3-2. Initial Check

Before operating the Pipeliner check the following items to ensure each piece of equipment is installed correctly:

- Electrical connections
- Inlet and outlet valves (both valves should be open)
- Headstock rotation (the coupling should rotate from right to left when viewed through the coupling cover plate opening in the bearing housing)

3-3. Start-Up

CAUTION: Dry operation is harmful to the Pipeliner! Never allow the Pipeliner to operate without liquid for more than one minute, as dry operation will cause premature wear and possible damage to the shearplate and headstock. The shearplate and headstock are lubricated by the liquid flowing through the unit.

1. Open the inlet and outlet valves to the Pipeliner to start the flow of liquid to the unit. Allow sufficient liquid to flow into the unit to fill its body casting.

2. Start the Pipeliner.

3. Start the pump.

3-4. Shutdown

It is necessary to have a sufficient velocity of fluid in the system at all times in order to keep particles in suspension and to ensure a free flow in the discharge lines. If the system is to be shut down for an extended period of time, it is advisable to flush the piping with clean water prior to shutdown.

4-1. Maintenance

Note: In this section, the first reference to each Pipeliner part will be followed by a number in parentheses ( ). These numbers identify the Pipeliner parts and hardware items in the exploded views (Figures 4-1 and 4-2).

4-2. General

WARNING: When servicing the Moyno Pipeliner, be certain the power is off **and locked out. Serious injury can result from accidental startup.**

WARNING: The clean-out ports on either side of the Pipeliner's body casting are for removing debris from the sump and inspecting the shearplate and headstock *ONLY!* They are not access ports for Pipeliner maintenance.

4-3. Shearplate-Headstock Inspection

Inspect the shearplate and headstock every 1,000 operating hours. If these parts are damaged or excessively worn, replace them.

The wear surface of the shearplate is raised above the surface that fits in the conversion ring. You can continue using the shearplate as long as you have a raised surface.

NOTE: The shearplate and headstock can be inspected by removing the cover plates (14) and cover plate gaskets/O-ring (15) from the body casting (1).

4-4. **Mechanical Seal Inspection**

The Pipeliner's mechanical seal operates in an oil bath which cools and lubricates the seal. The level and color of this oil should be checked every time the shearplate and headstock are inspected (see Section 4.3). If the oil is heavily tainted or the level is extremely low, the mechanical seal should be inspected to make sure it is functioning properly.

4-5. Disassembly

4-6. Disconnect Pipeliner

1. Flush the Pipeliner with clean water to eliminate as much debris as possible.

2. Open the circuit breaker and tag it.

3. Close the inlet and outlet valves.

4-7. Motor/Housing Assembly Removal

1. Complete Section 4-6.

2. Remove the bolts and lock washers that attached the motor or gearmotor (36) to the bearing housing (3) or motor adapter (37). Lift the drive vertically, separating it from the bearing housing, and place it on the floor.

3. Remove the bolts, flat washers and lock washers that attach the conversion ring (2) to the body casting (1).

4. Lift the housing assembly vertically to separate it from the body casting.

   NOTE: The conversion ring has jack screw holes which may be used to help separate the assembly from the body.

5. Remove the O-ring (22) from the body casting.

4-8. **Cutterhead Disassembly**

NOTE: To replace the shearplate and headstock only, complete Steps 1, 2, 3 and 6. Reassemble in reverse order (6, 3, 2, 1). Whenever the cutters are replaced, you should complete Step 4 and inspect for contamination. If pumpage has entered the spline area, complete disassembly through Step 10. If not, replace the headstock cap and continue reassembly.

1. Complete Sections 4-6 and 4-7.

2. Tip the housing assembly onto its side.

3. Remove the cap screws and lock washers that hold the headstock (25) to the headstock hub (26) and pull the headstock off the headstock hub.

4. Remove the headstock cap (27) from the headstock hub by unscrewing the cap screws and removing the lock washers that hold the headstock cap to the headstock hub.

5. Remove the O-ring (32) from the headstock hub.

6. **201/301** - Remove the set screws that attach the shearplate to the conversion ring and pull the shearplate from the conversion ring.

   If worn, remove the shearplate key (34) by unscrewing the set screw that attaches it to the conversion ring.

   401 - Remove the four shoulder screws attaching the shearplate to the conversion ring. Pull the shearplate from the conversion ring.

7. Remove the headstock hub by unscrewing the cap screws and lock washers that hold the headstock hub to the spring housing (28).

8. Slide the headstock hub off the spline. Remove the O-ring (31) from the spring housing.

9. **201/301** - Remove the set screws from one of the two holes in the special nut (33) and unthread the special nut from the rotor shaft (4).

   401 - Remove the cap screw that holds the locking tab (34) to the special nut (33). Remove the locking tab, then unthread the special nut from the rotor shaft (4).

   NOTE: It will be necessary to hold the rotor shaft with the headstock hub while unthreading the special nut. Partially thread two cap screws in the headstock hub to function as fulcrum points for a lever.

10. Remove the springs (29) from the spring housing and pull the spring housing from the rotor shaft (4).

4-9. Drain Seal Chamber Oil

1 Complete Sections 4-6 and 4-7.

2. **201/301** - remove the pipe plug (B) from the bearing housing (3).

   401 - remove the oil level stick (42) from the bearing housing (3).

3. Tip the housing assembly on its side and allow the oil to drain through the drain hole.

4-10. Seal Disassembly

1. Complete Sections 4-7 through 4-9.

2. Pull the rotating portion of the mechanical seal, (12) complete with seal sleeve (11), off the rotor shaft. Loosen the set screws that hold the rotary portion of the seal on the sleeve and slide it off the sleeve.

3. Remove the O-rings (30 and 19) from the seal sleeve (11).

4. Remove the cap screws and lock washers that attach the seal housing liner (13) to the conversion ring (2) and pull the seal housing liner away from the conversion ring. Remove the O-ring (20).

5. Remove the stationary portion of the mechanical seal (12) from the seal housing liner.

4-11. Bearing Disassembly (201/301)

1. Remove the bolts, flat washers and lock washers that attach the conversion ring (2) to the bearing housing (3) and remove the conversion ring. Remove the O-ring (21).

2. Remove the spacer (10) from the rotor shaft then remove the O-ring (18) from the spacer.

3. Remove the coupling half (23) from the rotor shaft by first removing the coupling cover plate (40) from the bearing housing. Through the opening, loosen the coupling's set screws (J) and pull the coupling half off the rotor shaft. Remove the shaft key and store it with the coupling half.

4. Remove the bearing and seal cap (8) by first unscrewing the cap screws, flat washers and lock washers that attach the cap to the bearing housing. Rethread two cap screws into jacking holes in the cap and tighten evenly until the cap can be removed. Remove the O-ring (41) from the bearing housing bore.

5. Place the bearing and seal cap in a vise. Using a punch and hammer, gently tap on the inside surface of the rollers until the bearing (5) comes from the cap. Remove the lip seal (17) from the cap.

6. Gently tap the rotor shaft (4) through the bearing housing from the coupling end of the housing and out through the end of the housing that attaches to the conversion ring.

7. Remove the lip seal (16) from the bearing housing.

8. Remove the bearing spacer (7). Remove the snap ring (9) from the rotor shaft. Press the ball bearing (6) from the rotor shaft. Place the rotor shaft in a vise. Using a hammer and punch, tap the inner race of the roller bearing until it comes off the rotor shaft.

4-11. Bearing Disassembly (401)

1. Remove the coupling half (23) from the rotor shaft by first removing the coupling cover plate (46) from the bearing housing. Through the opening, loosen the coupling's set screws (J) and pull the coupling half off the rotor shaft. Remove the shaft key (I) and store it with the coupling half.
2. Remove the bearing cap (8) by first unscrewing the cap screws, flat washers and lock washers that attach the cap to the bearing housing. Rethread two cap screws into jacking holes in the cap and tighten evenly until the cap and gasket (45) can be removed.
3. Place the bearing cap in a vise and remove the lip seal (17).
4. Remove the bearing and seal cap (9) by first removing the cap screws and washers. Place the bearing and seal cap in a vise and remove the lip seal (10).
5. Place the bearing housing assembly into a vise. From the coupling end of the shaft, press the rotor shaft/bearing assembly from the bearing housing.
6. Push the outer race of the roller bearing (6) from the bearing housing.
7. Unthread the bearing lock nut (16) by first bending back the tab on the lock washer (18).
8. Press both bearings (5 and 6) and bearing spacers (7 and 48) from the rotor shaft (4).
9. Press the lip seal (41) from the outer bearing spacer (48).

4-12. Cleaning

Clean all parts in a suitable cleaning solvent, being careful to observe all safety precautions regarding the use of the solvent.

4-13. Inspection

4-14. Bearings

After cleaning, rotate the bearings (5 and 6) slowly, feeling for smoothness and even action. Check for cracks, galling, pitting, burrs, overheating, etc. Replace bearings if there is any doubt concerning complete serviceability.

4-15. Rotor Shaft and Headstock Hub

Inspect the rotor shaft (4) and headstock hub (26) for scoring, burrs, cracks, excessive wear, etc. Pay particular attention to the splines of the rotor shaft. Replace as necessary.

4-16. Mechanical Seal

Inspect the contact faces on the mechanical seal (12) for damage. Replace if there is any doubt concerning serviceability.

4-17. Headstock and Shearplate

Examine the cutting edge on the headstock (25) and the shearplate (24) for damage and excessive wear. Replace as necessary.

4-18. O-Rings and Seals

It is good practice to always replace all O-rings and lip seals whenever the Pipeliner is disassembled.

4-19. Reassembly

The Moyno Pipeliner is reassembled in reverse order of disassembly.

1. During the reassembly process, cleanliness is important. To avoid premature failure, all components must be handled with care and kept clean.

4-20. Lubrication During Reassembly

1. **Bearings and Seal (201/301)**. Pack the roller bearing (5) prior to reassembly into the bearing housing (3). The ball bearing (6) is pre-lubricated and sealed and does not need additional lubrication. Mechanical seal lubricating oil should be poured through the oil level stick hole after the Moyno Pipeliner is completely reassembled.

   Bearings and Seal (401). Pack both the roller and ball bearings with grease prior to reassembling them in the bearing housing. The mechanical seal lubricating oil should be poured through the hole provided for the oil level stick.

   Note: The minimum oil level is indicated on the oil level stick.

2. **Approved Lubricants:**

   CAUTION: Do not mix different brands of lubricants.

Area to Lubricate	Approved Lubricant or Equivalent
Bearings	Dubois ACG2 (Dubois Chemical Co.)
Mechanical Seal	Mobil D.T.E. 24 (Mobil Chemical Co.)

4-21. Bearing Reassembly (201/301)

1. Press new lip seals (16 and 17) in the bearing housing (3) and bearing and seal cap (8). The lips on the seals should be facing outward, away from the bearings.
2. Press the ball bearing (6) against the shoulder on the rotor shaft (4) and attach the snap ring (9) to fix the bearing's location on the rotor shaft.
3. Press the inner ring of the roller bearing (5) against its shoulder on the rotor shaft.
4. Gently tap or press the rotor shaft into the bearing housing through the end of the housing that attaches to the conversion ring (2). Install the bearing spacer (7) on the rotor shaft.
5. Press the outer race of the roller bearing into the bearing and seal cap.
6. Push O-ring (41) into bearing housing bore until it bottoms out against the bearing.
7. Pack the roller bearing and bearing spacer with approximately one cup of grease.
8. Install the bearing and seal cap. Make sure the four holes in the cap line up with the holes in the bearing housing and that the cap slides evenly into place.

CAUTION: It is important that the bearing and seal cap be installed evenly in the bearing housing to prevent scoring on the ball bearing's inner ring surface.

9. Attach the bearing and seal cap to the bearing housing using four cap screws, flat washers and lock washers. Tighten the screws evenly.
10. Verify that the rotor shaft rotates freely in the bearing housing and there is no shaft end movement.
11. Place O-ring (21) in the groove and attach the conversion ring to the bearing housing using eight hex head bolts, flat washers and lock washers.

4-21. Bearing Reassembly (401)

1. Press a new lip seal (41) in the outer bearing spacer.
2. Press new lip seals (10 and 17) in the bearing and seal cap (9) and the bearing cap (8). The lips at both seals should be facing outward, away from the bearings.
3. Press the ball bearing (5) against the shoulder on the rotor shaft. Install the inner bearing spacer.
4. Pack a liberal amount of grease between the ball of the bearing. Install the outer bearing spacer.
5. Press the inner race/roller assembly of the roller bearing (5) against the inner bearing spacer.
6. Place the lock washer (18) on top of the roller bearing then thread the bearing lock nut (16) onto the rotor shaft and tighten it. Bend one of the lock washer tabs up into one of the slots in the lock nut.
7. Pack a liberal amount of grease between the rollers. You should apply approximately one cup of grease between the two bearings.
8. Press the rotor shaft/bearing assembly into the bearing housing until the outer bearing spacer rests against the shoulder in the housing.
9. Push the outer race of the roller bearing down into position around the roller assembly.
10. Install a new gasket (45) then the bearing cap (8) and evenly tighten the cap screws and washers.
11. Install the bearing and seal cap, then evenly tighten the cap screws and washers.
12. Verify that the rotor shaft rotates freely in the bearing housing and there is no shaft end movement.
13. Place the O-ring (21) in its groove and attach the conversion ring to the bearing housing using eight bolts, flat washers and lock washers.

4-22. Seal Reassembly

1. Place a new O-ring (20) in the seal housing liner and attach it to the conversion ring with four cap screws. Tighten all screws evenly.
2. **201, 301** - Install new O-rings (18 and 19) in the spacer (10) and slide it onto the rotor shaft.

   401 - Install a new O-ring (17) into the seal sleeve
3. Install a new O-ring in the stationary portion of the mechanical seal and gently push it into the seal housing liner.
4. Place the rotating portion of the seal on the seal sleeve against the shoulder. Tighten the set screws. Gently slide this assembly onto the rotor shaft until the seal faces contact.
5. Place O-ring (30) in groove in the seal sleeve.

   NOTE: Mechanical seal compression is set when the special nut is tightened on the rotor shaft.

4-23. Spring Housing Reassembly

1. Install the spring housing (28) on the rotor shaft. Grease the springs (29) and install them in the spring housing.
2. Thread the special nut (33) onto the rotor shaft.
3. **201/301** - Install the set screw in the special nut through one of the tapped holes so that the set screw rests in one of the valleys of the spline. Use a small amount of Loctite on the set screw threads.

   401 - Place the locking tab (34) in the valley at the spline and against the special nut, then fasten it in place with a cap screw.

   NOTE: It will be necessary to hold the rotor shaft with the headstock hub while tightening the special nut. Use the lever technique described in Section 4-8.9.
4. Place O-ring (31) in groove in the spring housing.
5. Grease the splines of the rotor shaft (4) and place the headstock hub (26) on the shaft.
6. Attach the headstock hub to the spring housing (28) using cap screws and lock washers.

4-24. Fill Seal Chamber With Oil

1. **201/301** - Install the pipe plug (B) in the bearing housing (3).

   Fill the seal chamber with oil to the level indicated on the oil level stick (35).

   401 - Fill the seal chamber with oil to the level indicated on the oil level stick (42).
2. Check for oil leaks while the rotor shaft is stationary. Hand rotate the shaft, checking for oil leaks and for free shaft movement. There should be no leakage.

4-25. Cutterhead Reassembly

1. **201/301** - Attach the shearplate key (34) to the conversion ring using a set screw.

   Place the shearplate (24) into position on the conversion ring (2) so the slot aligns with the shearplate key.

   Attach the shearplate to the conversion ring by tightening the four set screws.

   401 - Attach the shearplate to the conversion ring by tightening the four shoulder screws and lock washers.
2. Attach the headstock (25) to the headstock hub using cap screws and lock washers. Use a small amount of Loctite on the cap screw threads.
3. Check for free rotation of the headstock.
4. Place a new O-ring (32) into the groove on the headstock hub.
5. Attach the headstock cap (27) to the headstock hub using socket cap screws and lock washers.

4-26. Motor/Body Casting Assembly

1. Clean the inside diameters and top face of the body casting (1).
2. Install a new O-ring (22) in the body casting.
3. Install the bearing housing assembly in the body casting, making sure that the dowel pin hole in the conversion ring (2) aligns with the dowel pin in the body casting.

4. Secure in position using bolts, flat washers and lock washers.

5. Reinstall and connect the Pipeliner motor using bolts and lock washers.

4-27. Reconnect Pipeliner

1. Connect the power source.

2. Open the inlet and outlet valves to the Pipeliner to start the flow of conveying liquid to the unit. Allow sufficient liquid to flow into the unit to fill its body casting.

3. Start the Pipeliner.

4. Start the pump.

4-28. Storage

Storage of one year or less will not damage the Pipeliner. However, to ensure the best possible protection, the following is advised:

1. Store the Pipeliner inside (33°F to 155°F) in a vertical position and cover to protect it from dust. Do not allow moisture to collect around the Pipeliner.

2. If possible, store the Moyno Pipeliner in its original shipping container.

3. Coat the surface of the shearplate and headstock with a rust inhibitor.

4. Extended storage may cause grease to separate. A small amount of oil may leak from the greased areas and from around the mechanical seal. The grease will homogenize to its original consistency when the unit is started, but the lubricant levels should be maintained.

4-29. Shearplate Variations

Shearplates identified on the parts listing have a standard hole size of 15 mm. Other sizes may be ordered by selecting the standard shearplate part number and changing the last two digits as follows:

06 - 6mm
08 - 8mm
10 - 10mm
15 - 15mm (nominal)
20 - 20mm (nominal)

The 15mm and 20mm (nominal) shearplates have several diameter holes in them. The multiple holes are necessary to ensure the headstock remains dynamically balanced through a full rotation. See chart below for actual hole sizes.

Model	Actual Hole Sizes
P215	7,11,14mm
P315	11,15,18mm
P320	11,17, 22mm
P415	16, 18, 20, 24mm
P420	12, 15, 16, 24, 28mm

4-30. Standard Hardware - 201/301

Ref. No.	Description	Part Number	Qty.
A	.50-13 UNC X 2" Hex Head Cap Screw .50 Lock Washer .50-13 UNC Hex Nut	6191550321 6230010431 6140050051	4 4 4
B	.125 BSP Plug	4220219001	1
C	M8 X 30 Long Hex Head Cap Screw M8 Flat Washer M8 Lock Washer	6191724300 6230722070 6230714080	8 8 8
D	M6 X 25 Long Hex Head Cap Screw M6 Flat Washer M6 Lock Washer	6191714250 6230722060 6230704060	4 4 4
E	M5 X l2 Socket Head Screw M5 Lock Washer	6191804120 6230704050	4 4
F	M8 X 40 Long Hex Head Cap Screw M8 Flat Washer MB Lock Washer	6191724400 4220213008 6230714080	8 8 8
G	MB X 30 Long Hex Head Cap Screw M8 Flat Washer M8 Lock Washer	6191724300 6230722070 6230714080	16 16 16
H	M10 X 40 Long Hex Head Cap Screw M10 Flat Washer M10 Lock Washer	6191734400 6230722080 6230714100	4 4 4
I	Shaft Key 10 X 8 X 40 Long	6111030400	1
J	M8 X 16 Long Socket Set Screw - Cup Pt.	4220355000	4
K	M5 X 12 Socket Head Screw M5 Lock Washer	6191804120 6230704050	3 3
L	M8 X 25 Socket Head Screw M8 Lock Washer	6191824250 6230714080	3 3
M	M8 X 35 Socket Head Screw M8 Lock Washer	6191824350 6230714080	3 3
N	M6 X 10 Long Socket Set Screw - Cone Pt.	6061232100	1
O (201 Only)	M6 X 6 Long Socket Set Screw - Cone Pt.	6061232060	4
O (301 Only)	M6 X 10 Long Socket Set Screw - Cone Pt.	6061232100	4
P (201 Only)	M5 X 12 Socket Head Screw	6191804120	1
P (301 Only)	M6 X 12 Socket Head Screw	6191814120	1
Q	M12 X 30 Hex Head Bolt	6191744300	4
R	.50-13 UNC X .75 Socket Head Cap Screws	6191480123	4

Standard Hardware - **401**

Ref. No.	Description	Part Number	Qty.
A	.50-13UNC X 2" Hex Head Cap Screw	6191550321	4
	.50 Lock Washer	6230010431	4
C	M8 X 30 Long Hex Head Cap Screw	6191724300	8
	M8 Flat Washer	6230722070	8
	M8 Lock Washer	6230714080	8
D	M6 X 20 Long Socket Head Screw	6191814200	4
	M6 Lock Washer	6230704060	4
E	M12 X 30 Hex Head Bolt	6191744300	4
F	M12 X 50 Long Hex Head Cap Screw	6191740501	6
	M12 Flat Washer	6230720091	6
	M12 Lock Washer	6230700121	6
G	M8 X 40 Long Hex Head Cap Screw	6191724400	8
	M8 Flat Washer	6230722070	8
	M8 Lock Washer	6230714080	8
H	M8 X 25 Long Socket Head Screw	6191824250	4
	M8 Lock Washer	6230714080	4
I	Shaft Key 10 X 8 X 45 Long	4220292000	1
J	M8 X 16 Long Socket Set Screw - Cup Pt.	4220355000	4
K	M5 X 16 Long Socket Head Screw	6191804160	4
	M5 Lock Washer	6230704050	4
L	M8 X 20 Long Socket Head Screw	6191824200	6
	M8 Lock Washer	6230714080	6
M	M10 X 35 Long Socket Head Screw	6191834350	6
	M10 Lock Washer	6230714100	6
N	M5 X 12 Long Socket Head Screw	6191804120	3
	M5 Lock Washer	6230704050	3
O	.75-10 UNC X 2.25 Hex Hd. Cap Screw	6191580361	16
	.75 Flat Washer	6230030071	16
	.75 Lock Washer	6230010431	16
P	M6 X 12 Lg. CSK. Socket Set Screw	4220303000	1
Q	.75 BSP Hex Head Pipe Plug	4220499075	1
R	M8 X 16 Socket Shoulder Screw	4220254000	4
S	1" BSP Pipe Plug	4220499100	2

4-31. Parts List - 201/301

Ref. No.	Description		201	301
1	Body Casting	(1)	MP2021	MP3021
2	Conversion Ring	(1)	MP2031	MP3031
3	Bearing Housing	(1)	MP2051	MP2051
4	Rotor Shaft	(1)	MP2261	MP2261
5	Roller Bearing	(1)	MP2291	MP2291
6	Ball Bearing	(1)	MP2311	MP2311
	Bearing Kit (See Note A)	(1)	KMP291	KMP291
7	Bearing Spacer	(1)	MP2331	MP2331
8	Bearing and Seal Cap	(1)	MP2341	MP2341
9	Snap Ring	(1)	MP2085	MP2085
10	Spacer	(1)	MP2541	MP2541
11	Seal Sleeve	(1)	MP2531	MP2531
12	Mechanical Seal	(1)	MP248Q	MP248Q
13	Seal Housing Liner	(1)	MP2432	MP2432
14	Cover Plate	(2)	MP2171	MP2171
15	Cover Plate Gasket	(2)	MP279F	MP279F
16	Lip Seal	(1)	MP2621	MP2621
17	Lip Seal	(1)	MP2611	MP2611
18	O-Ring	(1)	MP2111	MP2111
	O-Ring Kit (See Note B)	(1)	KMP21F	KMP31F
19	O-Ring	(1)	MP2112	MP2112
20	O-Ring	(1)	MP2113	MP2113
21	O-Ring	(1)	MP2114	MP2114
22	O-Ring	(1)	MP2115	MP3115
23	Coupling	(1)	See Note C	
24	Shearplate (15mm nominal)	(1)	MP2615	MP3615
25	Headstock	(1)	MP2222	MP3221
26	Headstock Hub	(1)	MP2345	MP2345
27	Headstock Cap	(1)	MP4355	MP4355
28	Spring Housing	(1)	MP2365	MP2365
29	Spring, Stainless Steel	(*)	MP2375	MP2375
30	O-Ring	(1)	MP2116	MP2116
31	O-Ring	(1)	MP2117	MP2117
32	O-Ring	(1)	MP2118	MP2118
33	Special Nut	(1)	MP2435	MP2435
34	Shearplate Key	(1)	MP2445	MP3445
35	Oil Level Stick	(1)	MP2001	MP2001
36	Gearmotor	(1)	**	**
37	Adapter Plate	(1)	See Note D	
38	Lifting Bracket	(2)	MP4441	MP4441
39	Coupling Cover Plate	(2)	MP4437	MP4437
40	Coupling Plate Gasket	(2)	MP4438	MP4438
41	O-Ring	(1)	MP2119	MP2119

Note A: Bearing kit includes items 5, 6, 16 and 17.

Note B: O-ring kit includes items 18, 19, 20, 21, 22, 30, 31, 32 and 41.

*Three springs are required for the 201 model; four are required for the 301.

**Gearmotors are standard vertical mount, D-flange design. See nameplate for details.

Note C:

Eurodrive Model[1]	Coupling P/N
RF60...	MP2060
RF77...	MP3075G
RF70...	MP3065
RF80...	MP4011G
RF67...	MP2065
RF87...	MP4011G

(1)Look on the gearmotor name tag for model number.

Note D:

Catalog #	Description
MP2815	Adapts 213 - 215TC motor to the D112M flange of Pipeliner.
MP3815	Adapts 254 - 256TC motor to the D112M flange of Pipeliner.

Parts List - 401

No.	Description		401
1	BodyCasting	(1)	MP4021
2	Conversion ring	(1)	MP4031
3	Bearing Housing	(1)	MP4051
4	Rotor Shaft	(1)	MP4261
5	Ball Bearing	(1)	MP4291
6	Roller Bearing	(1)	MP4311
	Bearing Kit (See Note A)	(1)	KMP492
7	Inner Bearing Spacer	(1)	MP4331
8	Bearing Cap	(1)	MP4341
9	Bearing & Seal Cap	(1)	MP4129
10	Lip Seal	(1)	MP479Q
11	Seal Sleeve	(1)	MP4541
12	Mechanical Seal	(1)	MP488Q
13	Seal Housing Liner	(1)	MP4432
14	Blanking Flange	(2)	MP4128
15	O-Ring	(2)	MP4531
16	Bearing Lock Nut	(1)	MP4621
17	Lip Seal	(1)	MP4611
18	Bearing Lock Washer	(1)	MP4130
	O-Ring Kit (See Note B)	(1)	KMP491
19	O-Ring	(1)	MP4112
20	O-Ring	(1)	MP4113
21	O-Ring	(1)	MP4114
22	O-Ring	(1)	MP4115
23	Coupling	(1)	See Note C
24	Shearplate (15mm nominal)	(1)	MP4615
25	Headstock	(1)	MP4221
26	Headstock Hub	(1)	MP4345
27	Headstock Cap	(1)	MP4355
28	Spring Housing	(1)	MP4365
29	Spring, Stainless Steel	(8)	MP2375
30	O-Ring	(1)	MP4116
31	O-Ring	(1)	MP4117
32	O-Ring	(1)	MP4118
33	Special Nut	(1)	MP4119
34	Lock Tab	(1)	MP4120
36	Gearmotor	(1)	*
38	Lifting Bracket	(2)	MP4441
40	Spring Pin	(1)	MP4126
41	Lip Seal	(1)	MP4440
42	Oil Level Stick	(1)	MP2001
46	Coupling Cover Plate	(2)	MP4437
47	Coupling Cover Plate Gasket	(2)	MP4438
48	Outer Bearing Spacer	(1)	MP4439

Note A:
Bearing kit includes items *5,* 6, 10, 16, 17 and18.

Note B:
O-ring kit includes items 15 (two O-rings), 19, 20, 21, 22, 30, 31 and 32.

Note: All items designated with a letter are standard hardware items.
Moyno does not supply these items.
The items can be obtained locally.

*****Gearmotors are standard vertical mount, D-flange design. See nameplate for details.

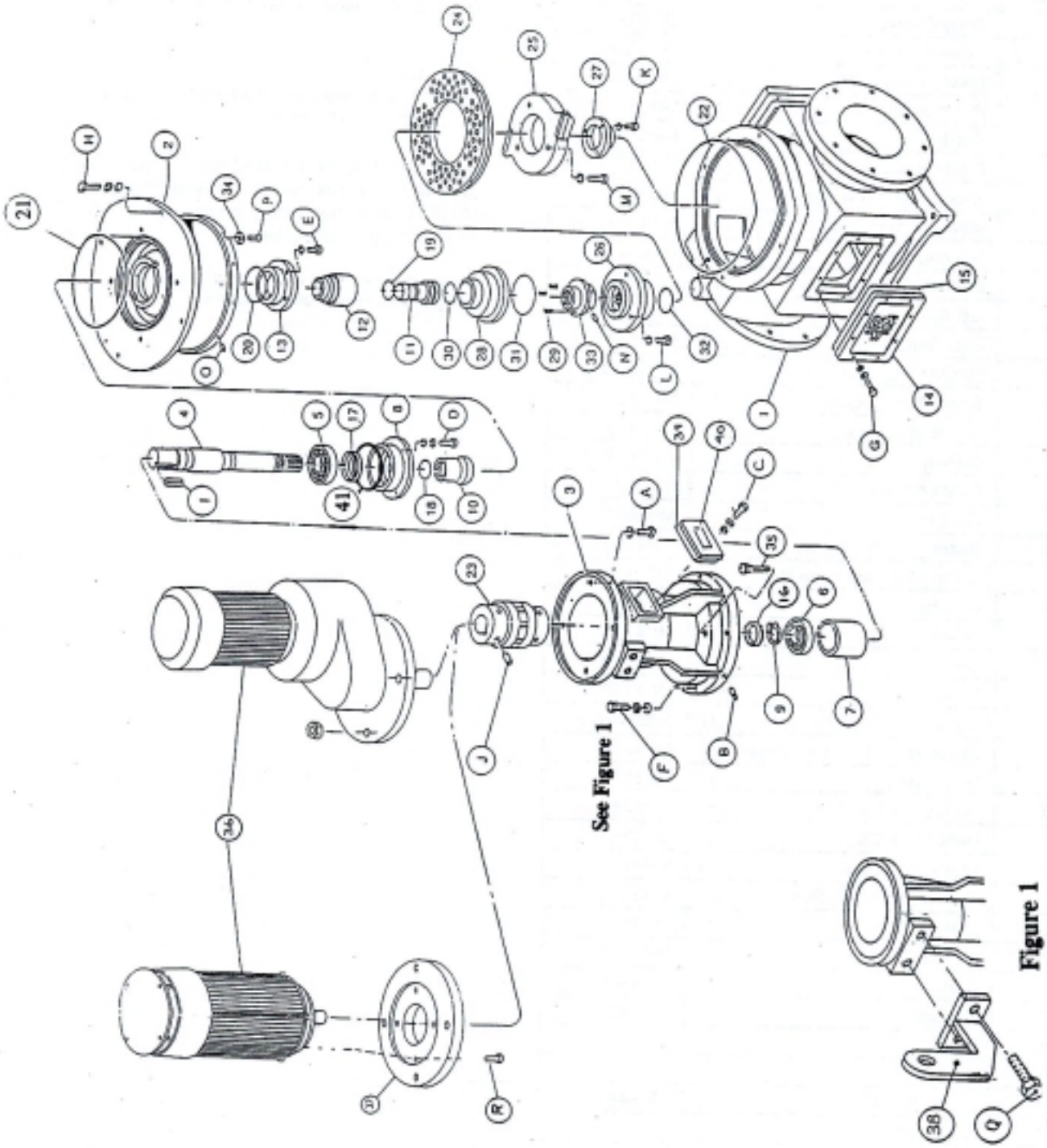

Figure 4-1 Exploded View of 201/301

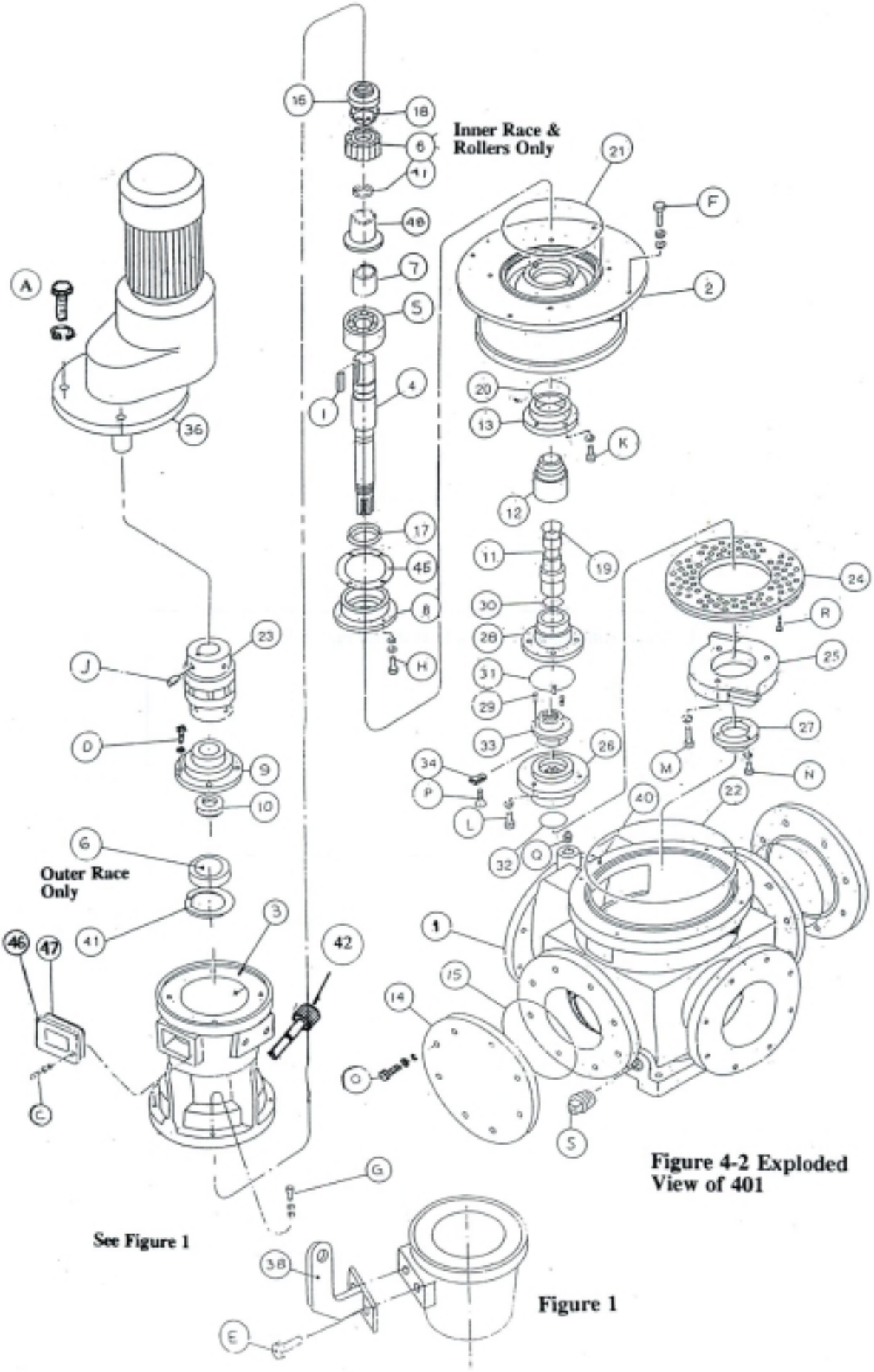

Figure 4-2 Exploded View of 401

Figure 1