



# CJ Series Pumps



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# CJ SERIES PUMPS



CJ Series pumps are some of the most versatile pumps available. They have been proven in thousands of applications over the years. These pumps are backed by the experience gained over these years both in application and manufacturing expertise.

The CJ Series pump is constructed with two separate pumping elements—the open hopper with auger and the rotor with stator. The hopper permits gentle, full flow into the pump's suction housing. An auger then carries the materials to the rotor-stator pumping elements. The instant the pump is started, the pumping action begins. The pumping action is created by the single helical rotor rolling unevenly in the double-threaded helix of the stator. As the rotor turns within the stator, cavities are formed with progress toward the discharge end of the pump, carrying the material being handled. While one cavity diminishes, the opposing cavity increases at exactly the same rate. Pressure is independent of speed; capacity is approximately proportional to speed. This keeps the sum of the two discharges at a constant volume. The result is a pulsation free, positive displacement flow with no valves.

The open throat, hopper design, combined with the effective progressing cavity pumping principle, enables the handling of many materials such as putties and pastes, calcium carbonate sludge, ground meat emulsions, packing house offal, magmas, paper pulp, spent grain, black paste, heavy grease, grout, lightweight, gypsum roof decking, as well as many other substances. Mixtures containing high percentages of solids or abrasives are also handled with ease.

There is a series of three letters which provide information about the size of the pump or the TYPE designation. These letters indicate the kinds of materials from which the pump is constructed.

1. The first letter identifies the material of the body casting.
2. The second letter indicates the material used in the drive shaft, connecting rod, rotor and other wettable parts.
3. The third letter indicates the material of the stator. It identifies only the stator material and not that of the tube in which the stator is placed.

The standard J pump type designation, CDQ, would result in the following:

**C** = Cast Iron Suction Housing

**D** = Tool Steel Internals including drive shaft, pins, connecting rod, rotor, and other minor metallic parts in contact with the material being pumped

**Q** = Buna N Nitrite Rubber Stator (70 durometer)

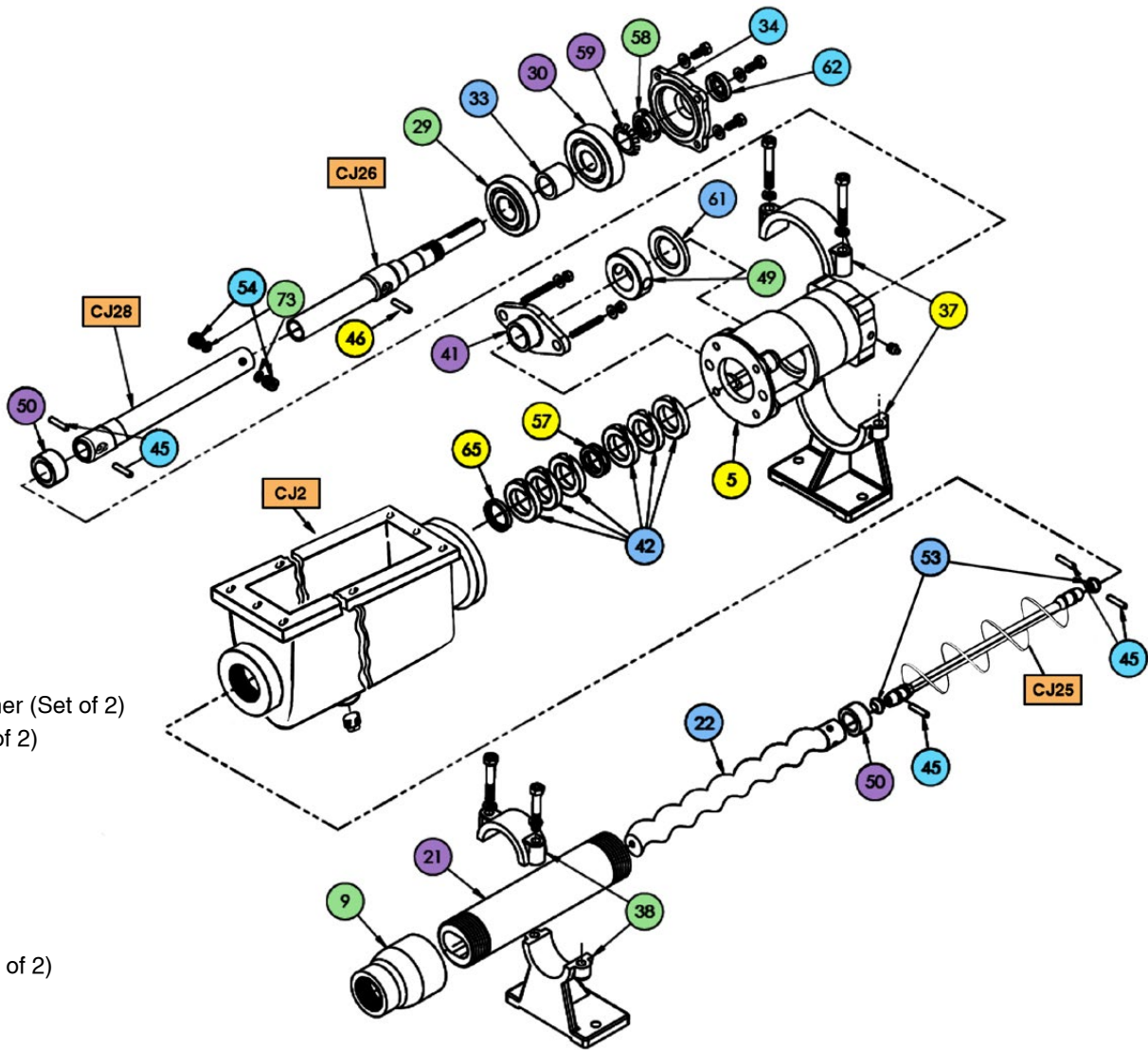
**\*OTHER OPTIONS AVAILABLE\***

## SHORT TERM STORAGE

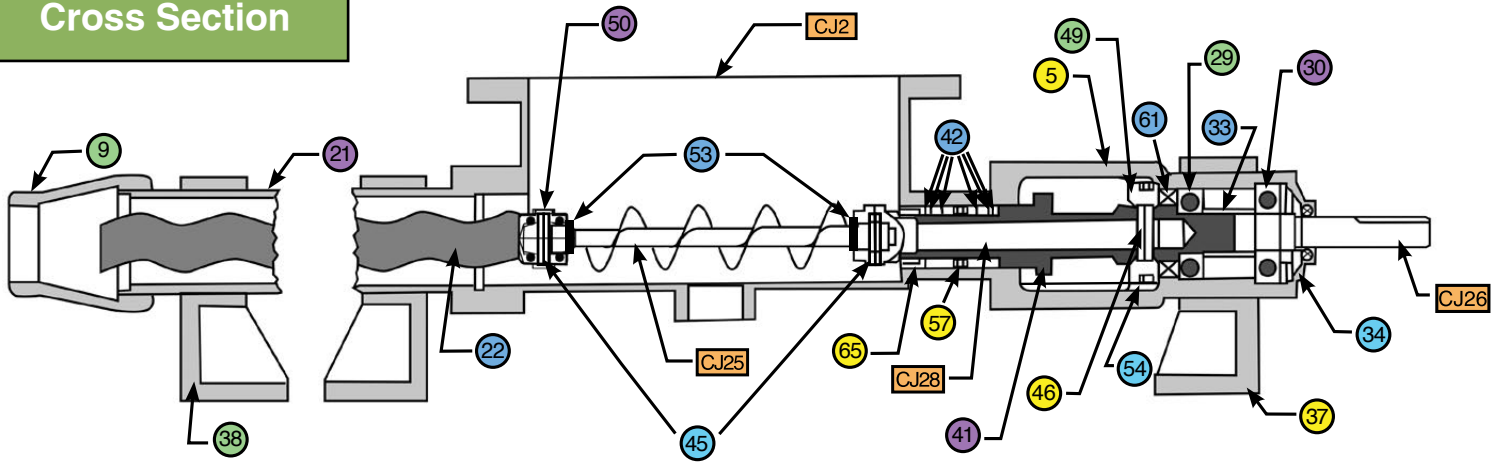
Storage of six months or less will not damage the hopper pump. However, to ensure the best possible protection, the following is advised:

- Store unit inside whenever possible or cover with some type of protective covering. Do not allow moisture to collect around pump.
- Remove drain plug and both inspection plates allowing the suction housing to drain and dry completely. Replace inspection plates.
- Loosen the packing gland and inject a liberal amount of grease into the stuffing box. Tighten the gland nut only hand tight. When water flush systems are to be used, do not use grease. A small amount of light oil is recommended.

- CJ2 Hopper
- CJ25 Auger
- CJ26 Drive Shaft
- CJ28 Connecting Rod
- 5 Bearing Housing
- 9 Reducer
- 21 Stator
- 22 Rotor
- 29 Radial Bearing
- 30 Thrust Bearing
- 33 Bearing Spacer
- 34 Bearing Cover Plate
- 37 Pump Support
- 38 Stator Support
- 41 Packing Gland
- 42 Packing Set
- 45 Rotor Pin (Set of 2)
- 46 Shaft Pin
- 49 Shaft Collar
- 50 Rotor Band (Set of 2)
- 53 Connecting Rod Washer (Set of 2)
- 54 Drive Pin Screw (Set of 2)
- 57 Lantern Ring
- 58 Bearing Lock Nut
- 59 Bearing Lock Washer
- 61 Radial Seal
- 62 Thrust Seal
- 65 Packing Gland Insert
- 73 Drive Pin Washer (Set of 2)



### Cross Section



## GENERAL INSTALLATION

CJ Series pumps are lubricated and tested at the factory prior to shipment and require minimum pre-start up maintenance.

Accessibility to the pump and adequate clearance should be a prime consideration in any installation. Enough space should surround the unit so that maintenance can be carried out with ease.

### Piping

The inlet of an Open Throat Pump is designed to be used with a Hopper or Chute Feed.

The weight supported by the Pump Hopper should not exceed 1000 pounds. The Hopper or Chute should be easily removable for pump maintenance.

Discharge piping diameter should generally be as large as the pump ports unless fluids conditions indicate otherwise.

An easily removable section of piping between 1-2 times longer than the stator should be mated to the discharge port. This will allow the rotor and stator to be removed without having to remove the complete pump from the base.

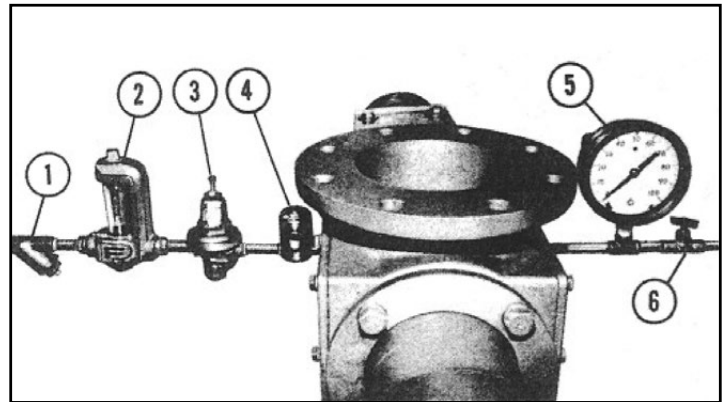
| PUMP | SUGGESTED DISCHARGE PIPING LENGTHS AND/OR CLEARANCE | MINIMUM DISCHARGE PIPING LENGTHS AND/OR CLEARANCE |
|------|---|---|
| 2J3  | 21"   | 8 3/8"  |
| 2J4  | 28"   | 11 3/8"   |
| 2J6  | 42"   | 14 1/4"   |

### Foundation

For maximum pump-driver unit life, each unit should be mounted on a strong, fabricated-steel base plate which can be ordered from Continental. The base plates should be mounted on a concrete foundation built on a solid base. The foundation should be approximately 4" longer and wider than the base on which it is built and should be an overall size of 4" - 8" larger than the base plate once it is mounted. Anchor bolts for the base plate should be located in the foundation.

Check the base plate surface with a carpenter's level and place shims under the base plate at the places necessary to make it level. Then check the pump and driver shafts and the pump ports. Care should be taken to ensure that all components are level and mounted in a direct line.

For maximum rigidity and lower noise levels the base plate should be grouted to the foundation after the anchor bolts have been evenly tightened. A good grade of nonshrinking grout is recommended. The spaces between the base plate and the foundation around the shims and inside the bushings for the anchor bolts should also be filled with grout. Allow the grout to dry according to manufacturer's instructions, then fully tighten the anchor bolts.



A typical water flush arrangement includes a strainer valve (1), sight flow meter (2), pressure regulating valve (3), solenoid valve (4), pressure gauge (5) and needle valve (6).

### Seal Flushing or Lubrication

The standard and most common sealing used on a hopper pump is 6 or 7 ring graphite or Teflon packing with a lantern ring. Tapped holes on the side ribs of the suction housing provide access to the lantern ring for grease lubrication or water flushing. Lubrication or water flush of the packing is essential.

Water flushing is recommended when the substance to be pumped is abrasive. Clean water should be supplied to the stuffing box at a rate of approximately 1/2 gallon/hr.

The pressure should be approximately 10-15 PSI higher than the fluid in the suction housing.

When the packing is to be lubricated with grease, it can be done so through the grease fitting with a good grade of bearing grease. This should be done not less than once weekly.

If mechanical seals are to be used on the unit, consult the manufacturer's instructions for seal flush requirements.

When new packing is placed on the drive shaft, often all but one ring will fit, until pump operation compacts them. In such cases, a single packing ring is included in a small bag attached to the packing gland nut.

After the pump has run and the packing has compressed, the final packing ring can be added.

## OPERATION

Before putting the pump into operation, the following items should be checked to ensure that each piece of equipment is installed correctly:

- Pump, driver, coupling or sheave alignment
- Electrical connections
- Gauges and other instruments
- Water flush connection to the stuffing box
- Pump rotation. Normal rotation is indicated on the pump drive end
- Belt tension on belt driven units (There should be no appreciable deflection when first starting up.)

## Start-Up

1. In suction lift applications, the suction housing should be filled with liquid prior to starting to lubricate the rotor and stator until flow is established.
2. If applicable, turn on the seal water to packing.
3. Start Pump.
4. If excessive leakage is present after 15 minutes of operation, tighten the gland nuts 1/6 of a turn. Tighten the gland nuts 1/6 of a turn after an additional 15 minutes if necessary, and repeat until desired leakage of 1-2 drops per minute is obtained. Do not tighten until zero leakage is obtained.

**CAUTION: DRY OPERATION IS HARMFUL TO THE PUMP.**

## DISASSEMBLY PROCEDURES

### A. Before you begin:

1. Operate pump (preferably with clean water) to ensure rotor and stator are lubricated.
2. Shut off pump.
3. Close suction and discharge valves.
4. Turn off flush water to packing or rotary seal, if used.
5. Disconnect power source.
6. Drain any fluid in pump.

### B. When removing stator:

1. Remove section of discharge pipe attached to discharge reducer.
2. Remove discharge reducer by threading from stator.
3. Remove top half of stator support.
4. Unthread stator from suction housing.
5. If space allows, pull stator off rotor. If space does not allow, slide drive shaft pin retainer toward the stuffing box and drive out pin with a suitable punch. Loosen the packing gland nuts. As a unit, slide the stator and all rotating parts except for the drive shaft forward, exposing the rotor pin connection. Slide the pin retainer toward the auger assembly, and drive out rotor pin with a punch. The stator and the rotor can then be removed from the pump within the minimum allowable disassembly distance.
6. Check rotor and stator for wear.

### C. When disassembling rotor, auger assembly and/or intermediate drive shaft:

1. Slide pin retainers toward the auger assembly to expose rotor pins. Using a punch, drive out pins, and separate rotor, intermediate drive shaft and auger assembly.
2. Remove retaining ring from intermediate drive shaft.
3. Slide pin retainer from other end of auger assembly. Using a punch, drive out connecting rod pins and remove auger.

**D. When removing drive shaft and bearing housing assembly:**

1. Remove bearing cover with thrust grease seal from drive end of bearing housing.
2. Pull bearings and drive shaft from bearing housing.
3. Remove bearing locknut and bearing lock washer. Using an arbor press, remove thrust bearing and radial bearing. Inspect grease seals and, replace if needed.

**E. When removing packing:**

1. Stop pump.
2. Remove gland adjustment nuts and packing gland from stuffing box.
3. Remove packing rings. This is best done by using flexible packing extractors. Use two extractors simultaneously on opposite sides of each ring. Pull evenly.
4. Remove lantern rings in similar fashion. Twist split rings to remove from shaft.

**ASSEMBLY PROCEDURES**

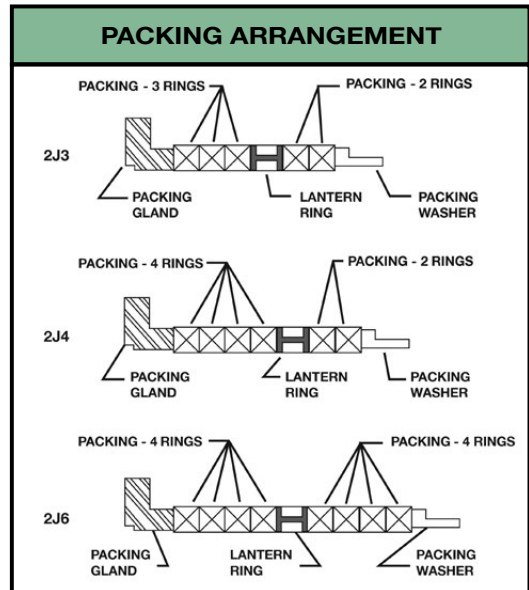
CJ Series pumps are reassembled in reverse order of dismantling. The following suggestions are offered:

**Note: While pump is dismantled, check all gaskets, “O” rings and packing. Replace all worn items. Connecting rod washers should be replaced each time conveyor assembly is disconnected from the rotor or intermediate drive shaft.**

**A. Bearing/Drive Shaft Assembly.**

1. Lubricate all bearing parts and pack bearings. The following is a list of approved lubricants:  
 Keystone Lubricating . . . . .Keystone #89  
 Texaco . . . . . Regal AFB2  
 Shell Oil Co. . . . .Cyprina #3  
 Humble Oil & Refining Co. . Beacon #325  
 American Oil Co. . . . .Supermil  
 American Oil Co. . . . . Grease #A72832  
 Mobile. . . . .EP1  
 Shell Oil Co. . . . .Alvania #2

2. Bearings with spacer, should be pressed onto drive shaft with an arbor press applying pressure to inner races only. Make sure bearings are seated fully on shaft. Install a new bearing lock washer on shaft and the bearing locknut. Tighten the locknut securely and bend tab of lock washer down into wrenching slot to prevent loosening of nut.
3. Install new radial grease seal in bearing housing and new thrust grease seal in bearing cover.
4. Carefully insert bearing shaft assembly into housing, so as not to damage the grease seal. Slide pin retainer and packing gland onto leading end of drive shaft, as it is extended through the grease seal.
5. Install the bearing cover plate with grease seal. Tighten all cap screws evenly to prevent damage to bearing cover plate and grease seal.



**B. Packing assembly.**

1. Insert packing rings and lantern ring halves into stuffing box and around the intermediate drive shaft, using quantities and positioning as shown in packing diagram for your specific size pump.
2. Insure that the packing rings are installed with splits staggered at 90 degree intervals and that the flat side of the lantern ring halves face the packing.
3. All but the last packing ring may fit into the stuffing box. As the pump operates, the packing will compress and the last ring can be added.

**C. Install rotor, auger and drive shaft in reverse of disassembly.**

**D. Installation of stator.**

4. Lightly lubricate rotor and interior of stator with a generous amount of waterless hand cleaner, baby oil or other lubricant compatible with rubber.
5. Thread stator onto rotor until stator is tightly threaded into suction housing.
6. Install top stator support.
7. Reinstall reducer on end of stator. Install all discharge piping removed at disassembly.

**ROTOR WEAR**

| ROTOR WEAR          |  |
|---------------------|--|
| STANDARD ROTOR SIZE | STANDARD ROTOR CREST TO CREST DIAMETER |
| 3                   | 1.415 +000/-004                        |
| 4                   | 1.888 +000/-004                        |
| 6                   | 2.281 +000/-004                        |

If the measured crest to crest diameter is within .010" of the standard value, the rotor is reusable. Rotors with crest to crest diameters .011 to .050 inch under the standard value should be replaced. These rotors can be renewed by chrome plating to standard dimensions provided that:

- a. the key slots are not excessively worn.
- b. the rotor surface is not cracked, pitted or deeply grooved (1/32" or more).
- c. the base metal surface is not pitted or corroded. Rotors may be sent to Robbins & Myers or any other competent plating shop. Surface should be buffed, replated to standard dimensions, then polished.

**STATOR WEAR**

If stator is worn and in need of replacement, its surface may be pitted and gouged. However, even a smooth surface may be worn. Test wear by noting how easily the rotor can be removed. If the rotor slips out too easily the stator should be replaced.

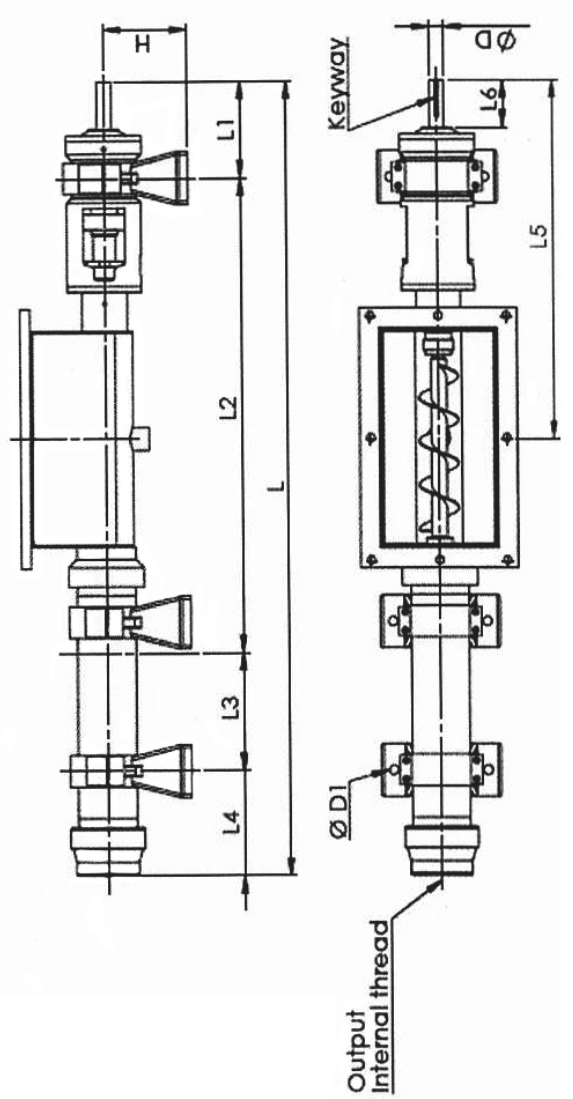
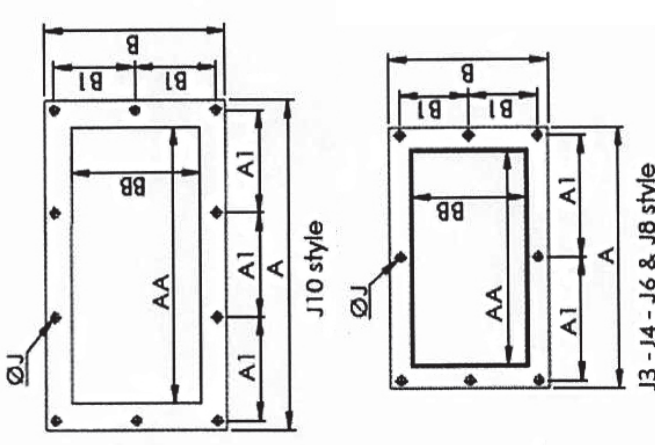
**RECOMMENDED SPARE PARTS**

The CJ Series pump has been designed and built with all wearable parts replaceable. A recommended inventory of spare parts is dependent upon the application and importance of continued operation. For the shortest possible downtime, we recommend the following parts be stocked:

- 1 - Rotor
- 1 - Stator
- 1 - Con-rod kit
- 1 - Packing set

The above is only a suggested list. For further assistance in determining what you'll need for your application, contact your Continental Pump representative.





| PUMP SIZE   | STAGES | L    | L1    | L2   | L3   | L4   | L5    | L6   | H    | H1   | W    | W1  | ØD     | ØD1   | KEYWAY                | AA    | A     | A1     | BB    | B    | B1    | ØJ    | OUTPUT               | WEIGHT (LBS.) |
|-------------|--------|------|-------|------|------|------|-------|------|------|------|------|-----|--------|-------|-----------------------|-------|-------|--------|-------|------|-------|-------|----------------------|---------------|
| <b>J3</b>   | 1      | 33.5 |       | 22.2 | ---  | 5.6  |       | 2    | 4.1  | 8.2  | 5.4  | 4.3 | 0.75   | 0.4   | 3/16" x 1/8"          | 9.75  | 14.1  | 6.25   | 5.0   | 9.4  | 3.88  | 9/16" | NPT 1 1/4" x 11 1/2" | 61            |
|             | 2      | 38.5 | 5.70  | 23.4 | ---  | 9.4  | 19.3  | 2    | 4.1  | 8.2  | 5.4  | 4.3 | 0.75   | 0.4   | 3/16" x 1/8"          | 9.75  | 14.1  | 6.25   | 5.0   | 9.4  | 3.88  | 9/16" | NPT 1 1/4" x 11 1/2" | 68            |
|             | 3      | 43.5 |       | 21.6 | 9    | 7.2  |       |      | 4.1  | 8.2  | 5.4  | 4.3 | 0.75   | 0.4   | 3/16" x 1/8"          | 9.75  | 14.1  | 6.25   | 5.0   | 9.4  | 3.88  | 9/16" | NPT 1 1/4" x 11 1/2" | 74            |
| <b>J4</b>   | 1      | 38.1 |       | 23.9 | ---  | 7.2  |       | 2.75 | 5.46 | 11   | 7.16 | 5.5 | 0.9374 | 9/16  | 1/4" x 3/16" x 2 1/4" | 11.75 | 16.25 | 7.374  | 7.0   | 11.5 | 5.0   | 3/4"  | NPT 2" x 11"         | 130           |
|             | 2      | 45.2 | 7.00  | 30.1 | ---  | 8.1  | 21.75 | 2.75 | 5.46 | 11   | 7.16 | 5.5 | 0.9374 | 9/16  | 1/4" x 3/16" x 2 1/4" | 11.75 | 16.25 | 7.374  | 7.0   | 11.5 | 5.0   | 3/4"  | NPT 2" x 11"         | 136           |
|             | 3      | 52.3 |       | 23.8 | 11   | 10.5 |       | 2.75 | 5.46 | 11   | 7.16 | 5.5 | 0.9374 | 9/16  | 1/4" x 3/16" x 2 1/4" | 11.75 | 16.25 | 7.374  | 7.0   | 11.5 | 5.0   | 3/4"  | NPT 2" x 11"         | 143           |
| <b>J6</b>   | 1      | 51.2 |       | 32.1 | ---  | 10.6 |       | 4.33 | 6.24 | 12.5 | 8.74 | 7   | 1.1248 | 11/16 | 1/4" x 3/16" x 2 1/4" | 14.5  | 19    | 8.748  | 8.11  | 12.5 | 5.5   | 3/4"  | NPT 2 1/2" x 8"      | 161           |
|             | 2      | 62.2 | 8.50  | 31.5 | 12   | 9.2  | 27.4  | 4.33 | 6.24 | 12.5 | 8.74 | 7   | 1.1248 | 11/16 | 1/4" x 3/16" x 2 1/4" | 14.5  | 19    | 8.748  | 8.11  | 12.5 | 5.5   | 3/4"  | NPT 2 1/2" x 8"      | 192           |
|             | 3      | 73.0 |       | 31.5 | 18   | 13.8 |       | 4.33 | 6.24 | 12.5 | 8.74 | 7   | 1.1248 | 11/16 | 1/4" x 3/16" x 2 1/4" | 14.5  | 19    | 8.748  | 8.11  | 12.5 | 5.5   | 3/4"  | NPT 2 1/2" x 8"      | 209           |
| <b>J8</b>   | 1      | 63.0 |       | 44.0 | ---  | 9.8  |       | 4.33 | 8    | 16   | 11.5 | 9   | 1.3748 | 7/8   | 3/8" x 3/16" x 3"     | 20    | 24.5  | 11.496 | 10.63 | 14.5 | 6.5   | 3/4"  | NPT 4" x 8"          | 341           |
|             | 2      | 75.4 | 9.25  | 42.2 | 14   | 10.0 | 33.11 | 4.33 | 8    | 16   | 11.5 | 9   | 1.3748 | 7/8   | 3/8" x 3/16" x 3"     | 20    | 24.5  | 11.496 | 10.63 | 14.5 | 6.5   | 3/4"  | NPT 4" x 8"          | 370           |
|             | 3      | 87.9 |       | 42.0 | 24   | 12.6 |       | 4.33 | 8    | 16   | 11.5 | 9   | 1.3748 | 7/8   | 3/8" x 3/16" x 3"     | 20    | 24.5  | 11.496 | 10.63 | 14.5 | 6.5   | 3/4"  | NPT 4" x 8"          | 410           |
| <b>J10</b>  | 1      | 73.8 |       | 50.7 | ---  | 9.6  |       | 5.27 | 9.74 | 19.5 | 11.5 | 9   | 1.8748 | 7/8   | 1/2" x 1/4" x 3 1/2"  | 26    | 31    | 9.751  | 12    | 17   | 7.625 | 3/4"  | NPT 5" x 8"          | 510           |
|             | 2      | 84.2 | 13.50 | 50.7 | 10.5 | 9.5  | 42.12 | 5.27 | 9.74 | 19.5 | 11.5 | 9   | 1.8748 | 7/8   | 1/2" x 1/4" x 3 1/2"  | 26    | 31    | 9.751  | 12    | 17   | 7.625 | 3/4"  | NPT 5" x 8"          | 627           |
|             | 3      | 94.6 |       | 50.8 | 18   | 12.4 |       | 5.27 | 9.74 | 19.5 | 11.5 | 9   | 1.8748 | 7/8   | 1/2" x 1/4" x 3 1/2"  | 26    | 31    | 9.751  | 12    | 17   | 7.625 | 3/4"  | NPT 5" x 8"          | 630           |
| <b>J10H</b> | 1      | 79.3 |       | 50.8 | ---  | 15.0 |       | 5.27 | 9.74 | 19.5 | 11.5 | 9   | 1.8748 | 7/8   | 1/2" x 1/4" x 3 1/2"  | 26    | 31    | 9.751  | 12    | 17   | 7.625 | 3/4"  | NPT 5" x 8"          | 562           |
|             | 2      | 94.6 |       | 50.8 | 18   | 12.4 |       | 5.27 | 9.74 | 19.5 | 11.5 | 9   | 1.8748 | 7/8   | 1/2" x 1/4" x 3 1/2"  | 26    | 31    | 9.751  | 12    | 17   | 7.625 | 3/4"  | NPT 5" x 8"          | 650           |

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