

# Woodward XX Herringbone Gear Pump

## Support Services and Spare Parts



## Overview

The XX Herringbone gear pump is a positive displacement gear pump. Also known as the “Double-X” pump, these pumps consist of two matched herringbone gears in a pump assembly that includes unloader, check and relief valves. The drive gear is turned by a drive shaft, which is also the shaft of the electric drive motor. The clearances between the gear teeth as they mesh and between the teeth and the pump housing are very small. The inlet port is connected to the suction line from the sump, and the outlet port is connected to the pressure line which feeds the accumulator and governor distributing valve.

As the teeth pass the inlet port, liquid is trapped between the teeth and the housing. This liquid is carried around the housing to the outlet port. As the teeth mesh again, the liquid between the teeth is pushed into the outlet port. This action produces a positive flow of liquid into the system.

The Herringbone gear pump is better than a standard spur gear pump because each set of teeth begins its fluid discharge phase before the previous set of teeth has completed its discharge phase. This overlap (and the relatively larger space at the center of the gears) tend to minimize pulsations and give a steadier flow than the spur gear pump.

The unloader valve (or bypass valve) acts to route the oil back to the sump with minimal backpressure. This allows the motor to start and stop with minimal load. After the motor has started, the bypass closes and forces the oil into the main pressure header. When the pumping cycle is complete, the bypass opens and allows the motor to be stopped without load.

## Recommended Maintenance

Severe damage can occur if regular maintenance is not performed. Woodward recommends that the bearings be changed every 5 to 7 years.

There are 5 bearings (four gear bearings and a motor bearing) and a number of seals that should be replaced. The bearings must be maximum capacity type. Maximum capacity bearings have more ball bearings to take the high loads and vibrations associated with pumping. If the correct bearings are not used, catastrophic failure can occur within 3 to 4 years. Customers have resisted the 5 to 7-year recommended time frame because the pumps have been running for 15 plus years without problems. These pumps are running on borrowed time.

Minor problems with the gears or case can be repaired with minimal (if any) loss of pumping ability. Major failures will require extensive rework or total replacement. Because of the special nature of these pumps, new, drop-in replacements are not available. Engineered replacements can cost in excess of \$75,000 which makes routine maintenance a bargain.

## Factory Repair Service

Our training and repair facility offers factory repair services for XX Herringbone gear pumps. Factory repairs save you money compared to a service call and allow us to perform additional services that are difficult or impossible to do in the field.

XX Herringbone gear pumps are very robust and will last many more years with routine maintenance. In addition to basic pump overhaul services, we offer advanced repair services and have been able to repair some severely damaged pumps that customers thought were beyond saving.

Basic pump overhaul includes:

- Disassembly, cleaning and inspection of pump and unloader
- Replacement of pump (4) and motor (1) bearings
- Inspection and dressing of herringbone gears
- Installation of new gaskets, seals and O-rings
- Reassembly and adjustment of end clearance to OEM specs

Advanced repair services include:

- Side grinding the drive and idler gears to maintain proper centering of the gears when meshed
- Magnaflux inspection of drive and idler gear journals for cracks
- Resurfacing of inboard and outboard bearing plates to remove any score marks

## XX Pump Parts

Woodward produced various sizes of XX pumps. While the reference numbers are the same, the parts required for XX pump maintenance are specific for each pump size and motor frame.

Please call or email us for assistance in determining which part numbers are appropriate for your unit. You will need the name plate data from the motor and the number of bolts on the top flanges (4,6, or 8).

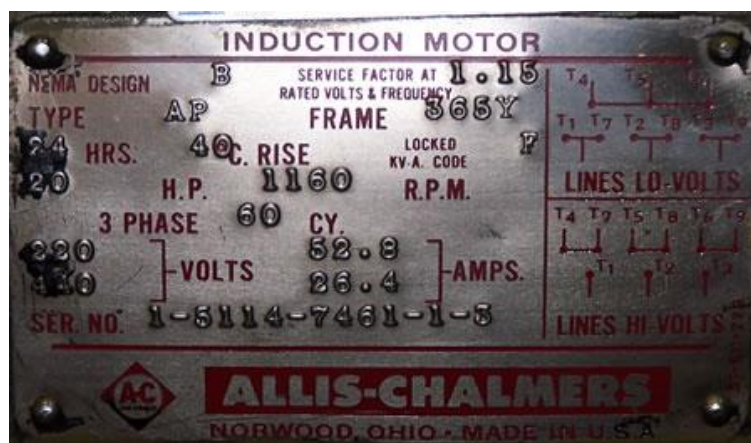


Figure 1. XX Herringbone Motor Data Tag

XX Herringbone Pump Parts		
Reference Number	Part Number	Description
10001-3	188543	Piston Ring – Small Unloader Assembly
	188547	
10001-5	191930	Unloader Piston Spring
10001-17	100209	Safety Valve Disc
10001-18	191086	Large Safety Spring
10001-19	191477	Small Safety Spring
10001-24	191554	XX Pump Relief Valve Spring – 200 PSI
	192022	Safety Spring
	192023	Safety Relief Valve Spring – 300 PSI
10001-25	102029	Safety Disc
10001-29	188498	Piston Ring – Large Unloader Assembly
10001-30	010037	Unloader Piston
10001-31	191107	Unloader Piston Spring
10001-33	100967	Unloader Case/Cartridge
10001-34	100840	Unloader Sleeve
	100880	Unloader Sleeve
	100912	Unloader Sleeve
10001-36	184572	1/8" x 1-1/2" Pin
10001-37	100500	Unloader Disc
	100966	Unloader Disc
	101267	Unloader Disc
	3550-031	Relief Valve Disc
10001-44	206496	Bonnet Gasket (30-100 GPM)
	206497	Bonnet Gasket (150-265 GPM)
10001-54	206499	Valve Case Gasket (100 GPM and below)
	206500	Valve Case Gasket
10001-64	182011	Oil Seal – Echelon Control
10001-95	182026	Pump Case Seal (30 & 40 GM)
	182050	Shaft Seal
	182075	Pump Case Seal (150-200 & 250 GPM)
	182077	Pump Case Seal (300-400 & 500 GPM)
	182080	Pump Shaft Seal (30, 50-75 & 100 GPM)
	206499	Valve Case Gasket (100 GPM and below)
10001-98	206485	Case to Plate Gasket (50-100 GPM)
	206486	Case to Plate Gasket (150-265 GPM)
	206488	Plate to Case Gasket (300-400 GPM)
	206489	Case to Plate Gasket (500-600 GPM)
10001-103	180070	Pump Bearing
	180071	Pump Bearing – Max. Capacity
	180075	Pump Bearing – Max. Capacity
	180076	Pump Bearing
	180159SPL	Motor Bearing
	180161	Bearing
180299	Pump Bearing	

<b>XX Herringbone Pump Parts</b>		
<b>Reference Number</b>	<b>Part Number</b>	<b>Description</b>
<b>10001-104</b>	182250	Case O-Ring
	182251	O-Ring Seal
	182252	O-Ring Seal
	182253	O-Ring Seal
	182670	O-Ring Seal
	206222	O-Ring Seal
	206224	O-Ring Seal
	206226	O-Ring Seal
<b>10001-126</b>	182007	Oil Seal – Unloader Switch
<b>10001-147</b>	140354	Strainer Wire Cloth
<b>10001-156</b>	180012	Motor Bearing
	180154	Motor Bearing (Frame Size: 326)
	180154SPL	Motor Bearing
	180155	Motor Bearing (Frame Size: 284Y)
	180156	Motor Bearing
	180156SPL	Radial Ball Bearing with 2 shields
	180157	Motor Bearing
	180157SPL	Bearing, Ball – Sealed
	180158	Bearing – XX Pump Motor
	180159	Motor Bearing
	180160	Motor Bearing
	180164	Motor Bearing
	180166	Motor Bearing (200-250 GPM, 200-300 PSI)
	180167	Motor Bearing (75-100 GPM, 200-300 PSI)
180167SPL	Motor Bearing	
<b>10001-162</b>	206491	Adapter Plate Gasket
<b>10001-171</b>	206502	Pump Case to Base Gasket (50-100 GPM)
	206503	Pump Case to Base Gasket (150-265 GPM)
	206504	Pump Case to Base Gasket (300-600 GPM)
<b>10001-172</b>	076020	O-Ring – Drive Shaft
<b>10001-174</b>	1327-204	Filter Element – Disposable
<b>10001-177</b>	182597	O-Ring – Strainer Bottom Cap
<b>10001-178</b>	182381	O-Ring – Acorn Nut
<b>10001-180</b>		Screw 3/8-16 X 1 LG
<b>10001-182</b>	206493	Pilot Valve Case-Pump Case Gasket (50-100 GPM)
	206494	Pilot Valve Case-Pump Case Gasket (150-250 GPM)
	206495	Pilot Valve Case-Pump Case Gasket (300-600 GPM)
<b>10001-185</b>	1327-146	Filter Element – Disposable
<b>10001-186</b>	1327-805	O-Ring – Marvel Filter

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