

# OPERATOR'S MANUAL

# 650937-X

SPECIFICATIONS, SERVICE KITS, GENERAL INFORMATION, TROUBLESHOOTING

INCLUDE MANUALS: 6694X-X LOWER PUMP END (PN 97999-012) &  
FORM 3638-2 GENERAL INFORMATION MANUAL (PN 97999-353)

RELEASED: 8-30-96

REVISED: 6-4-10

(REV.02)

**2.062 SQ." HYDRAULIC MOTOR**  
**0.4:1 RATIO**  
**6" STROKE**

## 650937-X TWO-BALL PUMP SERIES 400 SERIES STAINLESS STEEL



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,  
OPERATING OR SERVICING THIS EQUIPMENT.**

### SERVICE KITS

- Use only genuine ARO® replacement parts to assure compatible pressure rating and longest service life.
- **637164 for repair of Hydraulic Motor section.**  
Service Note: The Hydraulic Motor Service/Parts Manual is not shipped with the pump but it is included with each Service Kit. If this Service/Parts Information is needed, request the Hydraulic Motor Operator's Manual from ARO. (Manual 61588-100, PN 97999-063).
- **637211-XX3 for repair of Lower Pump section.**  
Refer to the chart on page 2 for description of -XXX options.

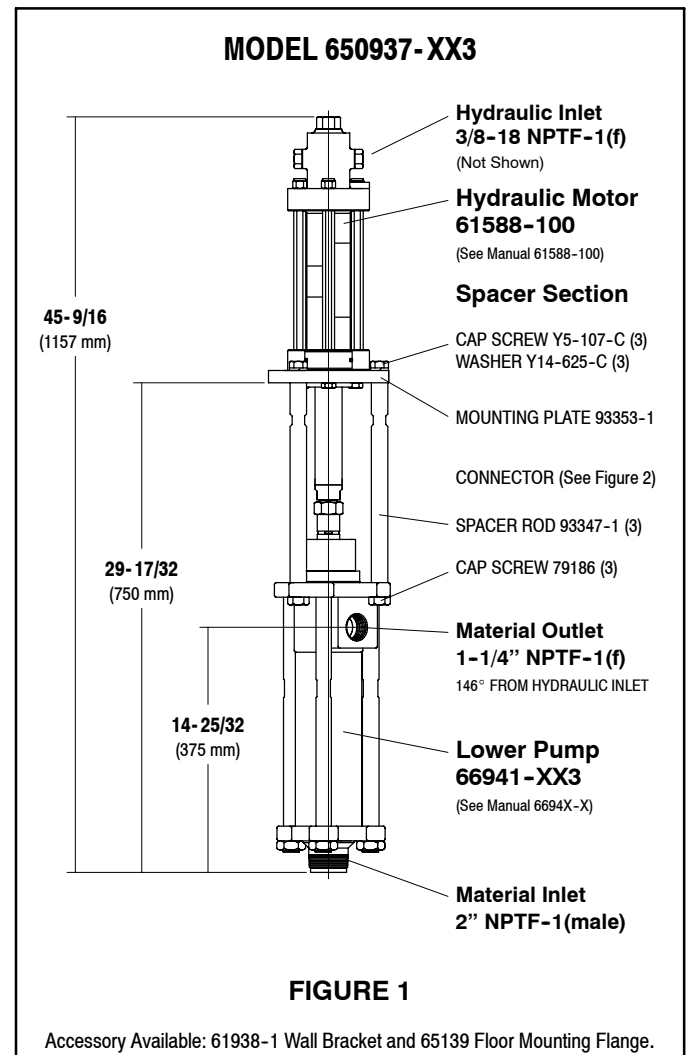
### SPECIFICATIONS

<b>Model Series</b> (Refer to option chart)	650937-XX3
<b>Type</b>	Hydraulically Operated, Two-Ball
<b>Ratio</b>	0.4:1
<b>Hydraulic Motor</b>	61588-100
<b>Motor Repair Kit</b>	637164
<b>Motor Size</b>	2.062 sq." (13.3 sq. cm)
<b>Stroke</b>	6"
<b>Hydraulic Inlet</b>	3/8" - 18 NPTF-1(f)
<b>Hydraulic Return</b>	1/2" - 14 NPTF-1(f)
<b>Lower Pump End Series</b>	66941-XX3
<b>Lower Pump Repair Kit</b>	637211-XX3
<b>Material Inlet</b>	2" NPTF-1 (m)
<b>Material Outlet</b>	1-1/4" NPTF-1(f)

### PERFORMANCE

<b>Hydraulic Inlet Pressure Range</b>	50 - 1200 PSI (3.4 - 83 bar)
<b>Fluid Pressure Range</b>	20 - 515 PSI (1.4 - 35.5 bar)
<b>Max. Rec'd Cycles / Minute</b>	50
<b>Displacement In<sup>3</sup> Per Cycle</b>	59.79
<b>Volume / Cycle</b>	33 oz. (979 ml)
<b>Cycles Per Gallon</b>	3.86
<b>Flow @ 50 Cycles / Minute</b>	12.9 GPM (49.0 lpm)
<b>Noise Level</b>	N/A

### PUMP DATA



### IMPORTANT

**This is one of the four documents which support the pump.  
Replacement copies of these forms are available upon request.**

- 650937-X MODEL OPERATOR'S MANUAL
- GENERAL INFORMATION - INDUSTRIAL PISTON PUMPS
- 6694X-X LOWER PUMP END OPERATOR'S MANUAL
- 61588-100 HYDRAULIC MOTOR OPERATOR'S MANUAL

INGERSOLL RAND COMPANY LTD

209 NORTH MAIN STREET - BRYAN, OHIO 43506

☎ (800) 495-0276 • FAX(800) 892-6276

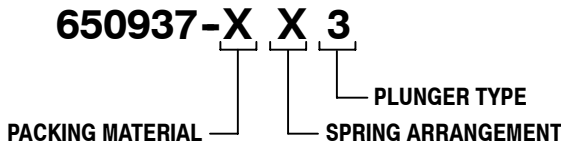
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# ARO

**IR** Ingersoll Rand  
Industrial Technologies

# PUMP OPTION DESCRIPTION CHART



<b>PACKING MATERIAL</b> (PACKINGS ARE UPPER AND LOWER UNLESS NOTED)	
C UHMW-PE	P UHMW-PE/PTFE STAG'D (UPPER)
K CARBON GRAPHITE FILLED PTFE	UHMW-PE (LOWER)
L MINERAL FILLED PTFE	R PTFE/UHMW-PE STAG'D (UPPER)
	PTFE (LOWER)
<b>SPRING ARRANGEMENT</b>	
3 NO SPRING	
6 WAVE SPRING	
<b>PLUNGER TYPE</b>	
3	HD SS W/HD CHROME PLATING

## GENERAL DESCRIPTION

**⚠ WARNING** HAZARDOUS PRESSURE. Do not exceed maximum operating pressure of 515 psi (35.5 bar) at 1200 psi (83 bar) inlet hydraulic pressure.

<b>PUMP RATIO X</b> <b>INLET PRESSURE TO PUMP MOTOR</b>	<b>=</b>	<b>MAXIMUM PUMP</b> <b>FLUID PRESSURE</b>
Pump ratio is an expression of the relationship between the pump motor area and the lower pump end area. EXAMPLE: When 150 p.s.i. (10.3 bar) inlet pressure is supplied to the motor of a 5:1 ratio pump it will develop a maximum of 750 p.s.i. (52 bar) fluid pressure (at no flow) - as the fluid control is opened, the flow rate will increase as the motor cycle rate increases to keep up with the demand.		

**⚠ WARNING** Refer to general information sheet for additional safety precautions and important information.

- The Two-Ball pumps are primarily designed for the pumping of medium viscosity fluids compatible with 400 series stainless steel. The lower pump is designed for easy priming and the double acting feature is standard in all ARO industrial pumps. Material is delivered to the pump discharge outlet on both the up and down stroke.
- The motor is connected to the lower pump end by a spacer section. This allows for lubrication of the upper packing gland and prevents motor contamination because of normal wear and eventual leakage through the material packing gland. Be sure the solvent cup is adequately filled with lubricant to protect the upper packings and insure longest service life.

## TROUBLE SHOOTING

Pump problems can occur in either the Hydraulic Motor Section or the Lower Pump End Section, use these basic guidelines to help determine which section is affected.

**If the pump will not cycle.**

- Be certain to first check for non-pump problems including kinked, restrictive or plugged inlet/outlet hose or dispensing device. Depressurize the pump system and clean out any obstructions in the inlet/outlet material lines.
- Refer to the motor manual for trouble shooting if the pump does not cycle and/or hydraulic fluid leaks from the hydraulic motor.

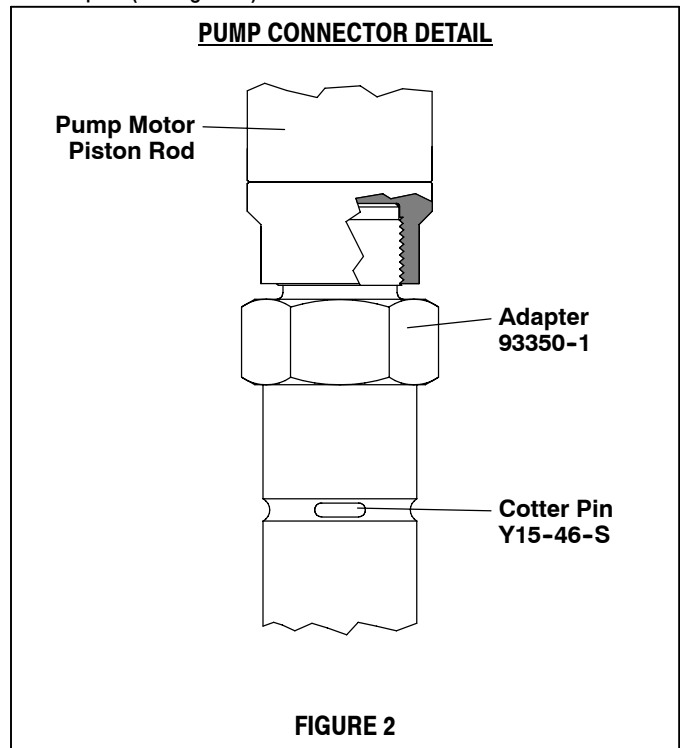
**If the pump cycles but does not deliver material.**

- Refer to the lower pump end manual for further trouble shooting.

## PUMP CONNECTION - UPPER / LOWER

**NOTE: All threads are right hand.**

1. Lay the pump assembly on a workbench.
2. Remove the top three screws and washers from the three spacer rods (see figure 1).
3. Pull the hydraulic motor from the lower pump end until motor piston rod is in the "down" position and lower pump end rod is in "up" position.
4. Remove the three spacer rods by unscrewing the bottom three cap screws.
5. Remove the cotter pin and unscrew the lower pump end rod from the adapter (see figure 2).



### REASSEMBLY

1. Align the pump motor with the lower pump end.
2. Screw the adapter onto the motor piston rod.
3. Screw the lower pump rod into the adapter and secure with the cotter pin. NOTE: Bend the ends of the pin into the groove of adapter.
4. Reinstall the spacer rods to the lower pump end, securing with three cap screws.
5. Bring the motor and lower pump together and retain with the three screws and washers.