User Instructions

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EN

HVLP Gearbox & HVLP Pump

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The High Volume Lube Pump (HVLP) delivers accurately measured quantities of lubricating oil to the divider block lubrication system for distribution to rod packing, compressor cylinders, power cylinders and various lubrication points on engines and compressors.

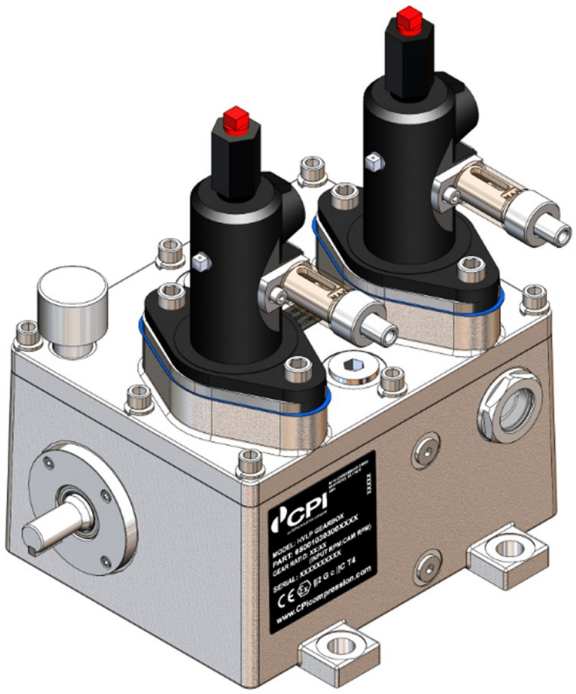
Dual head HVLP pumps can deliver different quantities and types of oil from each pump head or the same oil from both pump heads. HVLP pumps must be supplied with oil under a slight head pressure to assure priming of the plunger cylinder during its suction stroke. This is accomplished by locating an oil storage tank above the pump, or by supplying the pump with oil under pressure from the engine or separate oil system.

Pump Sizes:

- 7mm Plunger
- 10mm Plunger

Gearbox Ratios:

- 1 : 1
- 2 : 1
- 2.8 : 1
- 7.7 : 1
- 21.5 : 1
- 1 : 2.8
- 1 : 7.7



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1. Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedures-specific risks. When these symbols appear in the body of this manual, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

⚠ Warning

SKIN INJECTION HAZARD

High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Do not point dispensing device at anyone or at any part of the body.
- Do not put your hand over the fluid outlet.
- Do not stop or deflect leaks with your hands, body, glove, or rag.
- Relieve the pressure in the lines before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings regularly. Replace worn or damaged parts immediately.

FIRE AND EXPLOSION HAZARD

When flammable fluids are present in the work area, such as gasoline, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources, such as cigarettes and portable electric lamps.
- Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline.
- Do not plug or unplug power cord or turn lights on or off when flammable fumes are present.
- Ground all equipment in the work area.
- Use only grounded hoses.
- **Stop operation immediately** if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

Warning

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Turn off all equipment when equipment is not in use.
- Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call CPI for clarification if needed.
- Route hose and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:

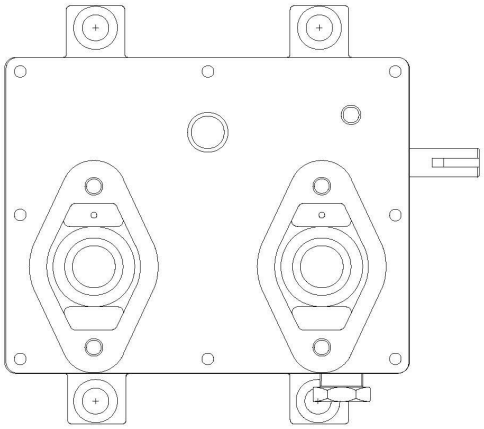
- Protective eye wear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

2. Models

HVLP Pump Models			
CPI Part Number	**Piston Size**	**MAWP**	**Description**
650010000030328	7 mm	8000 psi	7mm Pump head (only)
650010000030321	7mm	8000 psi	7mm Pump head w/anchor cross assembly
650010000030329	10 mm	3500 psi	10mm Pump head (only)
650010000030322	10mm	3500 psi	10mm Pump head w/anchor cross assembly

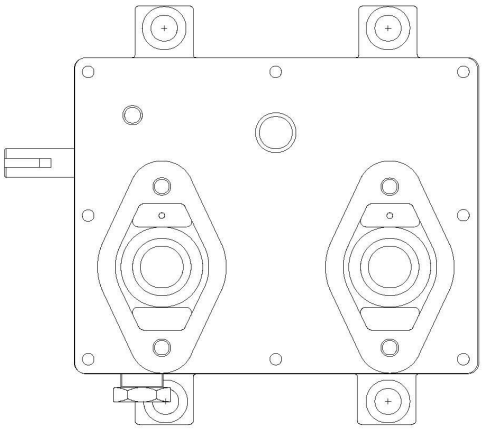
HVLP Gearbox Models		
CPI Part Number	**Drive RPM: Cam RPM Ratio**	**RH or LH**
650010003029911	1:1	LH
650010003030011	1:1	RH
650010003029921	2:1	LH
650010003030021	2:1	RH
650010003029931	2.8:1	LH
650010003030031	2.8:1	RH
650010003029981	7.7:1	LH
650010003030081	7.7:1	RH
650010030299211	21.5:1	LH
650010030300211	21.5:1	RH
650010003029913	1:2.8	LH
650010003030013	1:2.8	RH
650010003029918	1:7.7	LH
650010003030018	1:7.7	RH

RH Gearbox



(front of box)

LH Gearbox



(front of box)

3. Specifications

7mm Pump Max Working Pressure	8000 psi
10 mm Pump Max Working Pressure	3500 psi
Pump Outlet Port	1/4” NPT
Pump Inlet Port	3/8” NPT
Pump Max Strokes per Minute	175
Pump Min Strokes per Minute	5
Max Oil Viscosity	8000 SUS (1700 CPS)
Min Oil Viscosity	80 SUS (15 CPS)

Gearbox Cam Lift	0.45 inch
Recommended Gearbox Oil	90 Weight Gear Oil
Gearbox Oil Volume	Approx. 1.5 qt. (1420 ml)

For pump outputs see Technical Info *Section 6.0*

*Pumps and gearbox are suitable for use with mineral and synthetic base lubricants

*Minimum recommended operating pump strokes per minute is 5. Maximum recommended pump strokes per minute is 175. The pump can be adjusted for zero output if required. Make sure that the input rpm, selection of the gear ratio and choice of camshaft creates the actual number of pump strokes between 5 and 175.

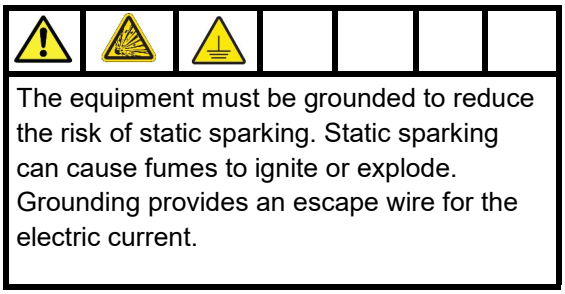
4. Installation

4.1 Mounting

When installing the HVLP gearbox always mount it to a rigid support or frame. The gearbox may be driven by the rotating source of the engine or compressor, or an electric motor. Be careful to accurately align the gearbox to the drive shaft. Misalignment will cause undue stress to the drive shaft and will damage the gearbox seals and bearings.

When an external ratchet drive is used, be sure the drive connection allows the proper degree of throw for the drive arm. All connections should be free of any condition that could cause the drive or drive connections to bind and damage the HVLP gearbox.

4.2 Grounding



The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.

Ensure the gearbox is properly grounded as the pump is grounded through the pump mounting screws.

4.3 Filtration

Proper filtration of the oil before entering the pump will increase the useful life of the entire lubrication system. The lubrication system cannot tolerate foreign materials, air or leaks.

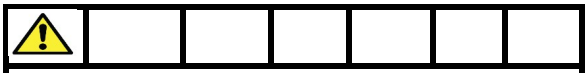
A filter primer at the inlet of the pump is recommended and serves 3 purposes, the filter primer assures only clean oil enters the pump, provides a constant head and allows entrapped air to be collected in the top of the clear bowl. Remember to remove all air from the system, eliminate leaks and prevent trash and debris from entering the system for a dependable, care free lubrication system.

It is recommended that a filter with a minimum rating of 25 micron be used with all HVLP pump heads to eliminate contaminants from entering the pump head.

4.4 Fill With Oil

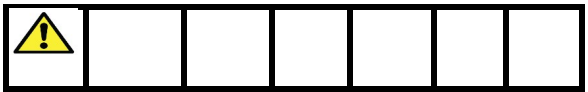
Before running the HVLP pump the gearbox must be filled to the halfway mark of the sight glass with 90 weight gear oil. The gear box should be cleaned and filled with new oil every 12 months.

4.5 Priming the Pump



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop pumping and before cleaning, checking or servicing the equipment.

1. Connect the filter primer to the inlet of the HVLP pump and allow oil to flow to the pump
2. Loosen the priming plug located on the left side of the HVLP pump head and allow oil to flow freely from the plug until air bubbles no longer appear in the oil. The pump does not have to be operating.
3. Set the output adjustment on the front of the pump to maximum output.
4. With the pump operating loosen the tubing connection on the outlet of the pump and allow the pump to run until air no longer appears in the oil. Tighten the tubing connection.
5. The pump should now be free of air and ready for normal operation. Output should be adjusted as needed. Purge air from the lubrication system



Ensure that your system has an adequately designed pressure relief mechanism. Excessive pressure in a hydraulic circuit, not released in a controlled manner, will result in component failure.

5. Operation

There are no special requirements for the gearbox and pump operation.

Once correctly installed, system primed and purged of air, the gearbox and pump are ready for use.

Remember to not exceed the maximum camshaft RPM.

5.1 Adjusting the Pump Output

The pump plunger is operated by an eccentric cam for the discharge stroke and by the plunger return spring for the suction stroke. The plunger is accurately fitted into the plunger cylinder for efficient operation at pressures up to the pump maximum pressure. Helical grooves milled in the plunger and radial bores in the cylinder regulate the quantity of oil delivered. The volume of oil delivered is varied by turning the plunger to different positions by means of the adjustment knob on the front of the pump.

1. Loosen Locknut
2. Turn the adjusting knob clockwise to increase flow
3. Turn adjusting knob counterclockwise to decrease flow.
4. Tighten locknut when desired flow rate is achieved.

5.2 Pressure Relief Procedure

This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure below when you stop pumping and before cleaning, checking or servicing the equipment.

1. Stop gearbox.
2. If installed, close oil supply valve located upstream from pump.
3. If installed, open drain valve located downstream from pump.
4. Slowly crack open fluid line fittings to relieve pressure from system

6. Technical Info

6.1 Calculating Output Capacity

Cam RPM

The Cam RPM is:

- The input drive RPM divided by the gearbox ratio if using a reducer gearbox.
- The input drive RPM multiplied by the gearbox ratio if using a speed multiplier gearbox.

Example 1:

If the input drive is 1000 RPM and the required camshaft speed needs to be much slower, a reducer box must be used. If a 21.5:1 ratio gearbox is installed the camshaft RPM would be:

1000 ÷ 21.5 = 46.5 RPM

Example 2:

If the input drive is 10 RPM and the required camshaft speed needs to be much faster, a speed multiplier box must be used. If a 1:7.7 ratio gearbox is installed the camshaft RPM would be:

10 x 7.7 = 77 RPM

Flow Rate

Flow Rate in Pints Per Day is determined by multiplying the gearbox camshaft RPM by the relevant factor.

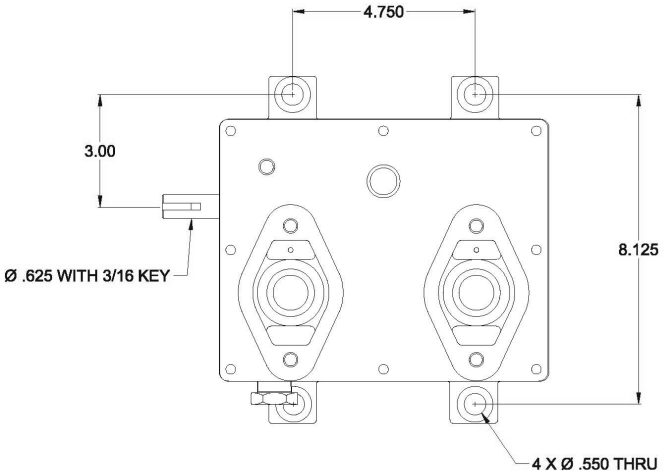
Plunger Size	Maximum
7mm	0.70
10mm	1.35

Example:

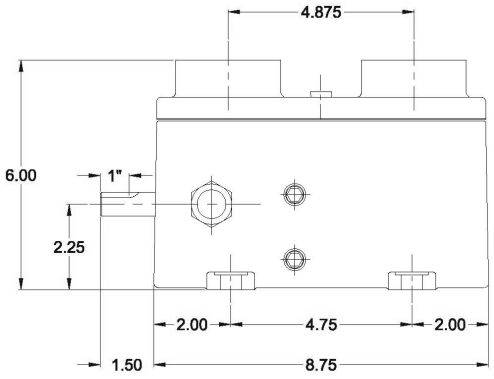
Gearbox camshaft running at 20 RPM

Pump head 7 mm

20 x 0.70= 14 PPD Maximum Flow Rate



Top View of HVLP Gearbox



Front View of HVLP Gearbox

Max Output (Pints Per Day)								
	@ 5 RPM	@ 25 RPM	@ 50 RPM	@ 75 RPM	@ 100 RPM	@ 125 RPM	@ 150 RPM	@ 175 RPM
7mm Pump Output	3.50	17.50	35.00	52.50	70.00	87.50	105.00	122.50
10mm Pump Output	6.75	33.75	67.50	101.25	135.00	168.75	202.50	236.25

Fluid Measurement Conversion Data (NOTE: All measurements are approximate values only)		
Number of Drops	**US Measurement**	**Metric Measurement**
1 drop	0.002 cubic inch	0.033 cubic centimeter (cc)
30 drops	0.061 cubic inch	1 cubic centimeter (cc)
500 drops	1 cubic inch	16.39 cubic centimeter (cc)
14,500 drops	1 pint	0.47 Liter
10 drops/minute	1 pint/24 hours	0.47 Liter /24 hours
		1 (cc) = 1 mL

7. Troubleshooting

Problem	Cause	Solution
If input shaft turns but camshaft does not turn	Poor connection between drive and gearbox	Check motor to box coupling is correctly sized and properly installed
	Keys on input shaft are worn	Replace keys
	Internal coupling or gear is broken / loose	Repair or replace gearbox
Pump cannot reach max required flow rate	Pump incorrectly sized.	Review pump size with CPI, install higher capacity pump if required.
	Input drive rpm too heavily reduced	Review gear configuration with CPI, alter if required.
	Piston and bore are worn	Replace pump.
	Cam or follower is worn	Replace parts or gearbox assembly
Pump has low discharge pressure	Piston and bore are worn.	Replace pump.
	Tubing connections are loose	Check all tubing and attachment points and tighten. Replace leaking components
	Gauge may not be accurate	Replace gauge with known good gauge
Gearbox oil level is rising or falling	Pump is by-passing at cylinder/piston.	Check and replace pump.
	Water is entering the box	Check gasket/oil seal on box, replace if required.
	Box is leaking	Replace gearbox
Flow rates are reducing over time	Piston and bore are worn.	Replace pump.
	Cam or follower is worn	Replace parts or box assembly

8. Maintenance

No additional maintenance is required for the HVLP pump and gearbox to function properly, however if issues do occur refer to the Trouble-shooting section of this manual (Section 7)

HVLP pumps should be removed and replaced every 24 months.

HVLP gearboxes should be drained, cleaned and refilled with clean gearbox oil every 12 months. HVLP gearbox bushings and bearings require re-placement after 3 years.

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