OPERATION MANUAL

SIMPLEX®
A Century of Product Integrity

777 Oakmont Lane, Ste. 800
Westmont, IL 60559
1.800.323.9114 • Outside U.S. 1.630.590.6990
www.tksimplex.com

Hand Pumps
Operational Manual
Reference # - TD001
Rev. - B
Date - 0612

IMPORTANT - READ CAREFULLY
This manual contains important information about the correct installation, operation and maintenance of this equipment. All persons involved in the installation, operation and maintenance of this equipment must be thoroughly familiar with the contents of this manual. To safeguard against the possibility of personal injury or property damage, follow the recommendations and instructions of this manual. Keep this manual for reference.

WARRANTY STATEMENT
SIMPLEX products are warranted to be free of defects in materials and workmanship under normal use for as long as the original purchaser owns them, subject to the guidelines and limitations listed. This warranty does not cover: normal wear & tear, cosmetic items, abuse, overloading, alterations, improper lubrication, or use in a manner for which they are not intended. If the customer believes a product is defective, the product must be delivered, or shipped freight prepaid, to the nearest SIMPLEX Authorized Service Center for evaluation and repair.

RECEIVING INSTRUCTIONS
Important! Make sure to inspect all of the components for shipping damage. If damage is found, notify carrier at once. Shipping damage will not be covered by warranty. The carrier is responsible for all loss associated with shipping damage.

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- Note -

This Operational Manual is intended as a technical guideline only. SIMPLEX accepts no liability for any use or reliance made of any information in this Operational Manual. All information, illustrations and specifications in this Operational Manual are based on the latest information available at the time of publication. SIMPLEX reserves the right to make changes at any time without notice. Equipment operators and installers shall be responsible for ensuring that a safe working environment and safe systems of work are in place before operating the equipment.

SIMPLEX®

Hand Pumps

1.0 SAFE OPERATING PROCEDURES & SAFETY PRECAUTIONS

Make sure to read the instructions, warnings and precautions carefully. Follow any recommended safety precautions to avoid personal injury or damage to the unit. Simplex cannot be responsible for any damage or injury from unsafe use, lack of maintenance or incorrect operation. In the event any questions or concerns arise, contact SIMPLEX or a local Distributor for clarification.

If you have never been trained on high-pressure hydraulic safety, consult your distributor or service center for a free Simplex Hydraulic Safety Course.

Failure to comply with the following cautions and warnings could cause equipment damage, property damage or personal injury.

DANGER is only used when your action or lack of action may cause serious injury or even death.

WARNING indicates a potential danger that requires correct procedures or practices to avoid personal injury.

CAUTION is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment, or other property.

WARNING: Wear proper personal protective gear when operating hydraulic equipment.

WARNING: Stay clear of loads supported by hydraulics. A cylinder is only a load lifting device. Cylinders should never be used as a load holding device unless they are equipped with a lock nut, cribbing blocks or U-rings to provide mechanical load holding. It should never be used as a load holding device. After the load has been raised or lowered, it must always be blocked mechanically.

WARNING: USE ONLY RIGID PIECES TO HOLD LOADS. Carefully select steel or wood blocks that are capable of supporting the load. Never use a hydraulic cylinder as a shim or spacer in any lifting or pressing application.

DANGER: To avoid personal injury, keep hands and feet away from cylinder and work-piece during operation.

WARNING: Do not exceed equipment ratings. Never attempt to lift a load weighing more than the capacity of the cylinder. Overloading causes equipment failure and possible personal injury. The Simplex Hand Pumps and cylinders are designed for a maximum pressure of 10,000 PSI (700kg/cm^2). Do not connect a jack or cylinder to a pump with a higher pressure rating. Never set the relief valve to a higher pressure than the maximum rated pressure of the pump. Higher settings may result in equipment damage and/or personal injury.

WARNING: The system operating pressure must not exceed the pressure rating of the lowest rated component in the system. Install pressure gauges in the system to monitor operating pressure. It is your window to what is happening in the system.

CAUTION: Avoid damaging hydraulic hose. Avoid sharp bends and kinks when routing hydraulic hoses. Using a bent or kinked hose will cause severe back-pressure. Sharp bends and kinks will internally damage the hose, leading to premature hose failure. Do not drop heavy objects on hose. A sharp impact may cause internal damage to hose wire strands. Applying pressure to a damaged hose may cause it to rupture.

IMPORTANT: Do not lift hydraulic equipment by the hose or swivel couplers. Use the carrying handle or other means of safe transport.

CAUTION: Keep hydraulic equipment away from flames and heat. Excessive heat will soften seals, resulting in fluid leaks. Heat also weakens hose materials. For optimum performance do not expose equipment to temperatures of 65° C (170° F) or higher. Protect hoses and cylinders from weld spatter.

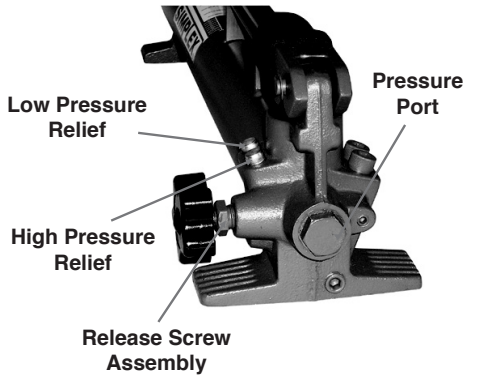
DANGER: Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin, causing serious injury. If oil is injected under the skin, see a doctor immediately.

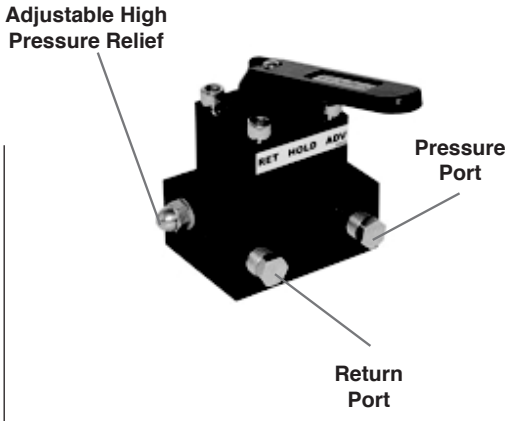
DANGER: Only use hydraulic cylinders in a coupled system. Never use a cylinder with unconnected couplers. If the cylinder becomes severely overloaded, components can fail catastrophically causing severe personal injury or death.

2.0 TECHNICAL SPECIFICATIONS

Model	Speed	Pressure Rating (PSI)		Oil Volume Per Stroke (cu.in.)		Usable Oil Capacity (cu.in.)	Weight (lbs)
		1st Stage	2nd Stage	1st Stage	2nd Stage		
P20	**2**	**200**	**2,850**	.79	.16	20	10
P22	**2**	**200**	**10,000**	.23	.06	20	10
P30	**2**	**200**	**3,000**	.91	.19	30	8
P32	**2**	**200**	**10,000**	.43	.06	30	8
P41	**1**	**10,000**	**----**	.19	----	45	19
P41A	**1**	**10,000**	**----**	.16	----	40	13
P42	**2**	**200**	**10,000**	.79	.16	45	19
P71	**1**	**10,000**	**----**	.14	----	70	10
P71V*	**1**	**10,000**	**----**	.14	----	70	10
P72	**2**	**200**	**10,000**	.91	.19	70	11
P82	**2**	**200**	**10,000**	.79	.17	145	29
P82A	**2**	**350**	**10,000**	.99	.15	134	24
P140	**2**	**400**	**10,000**	2.8	.24	175	26
P140D				2.8	.24	175	30
P230				7.7	.3	230	49
P230D				7.7	.3	230	49
P300				2.8	.24	300	37
P461				7.7	.3	460	61
P461D				7.7	.3	460	61

Hand Pump Components





Models
P20
P22
P30
P32
P42A
P72
P82
P82A
NOTE* - P41 - P41A - P71 - P71V Models are 1 stage, 10,000 psi Hand Pumps.

Models
P230
P461

Models
P230D
P461D

3.0 INSTALLATION

3.1 Connecting the Pump

1. Remove shipping plug(s) from pump outlet port(s) and discard.

2. All hand pumps have 3/8 NPTF threaded port(s). Use 1 1/2 wraps of Teflon tape (or suitable thread sealant) on hose fitting, leaving the first complete thread free of tape to ensure that tape does not enter into hydraulic system, causing damage. Connect hose(s) to pump.

3. Install a pressure gauge in-line from the pump for added safety and better control.

4. Connect the hose(s) to your cylinder or tool; refer to Section 4.5 for correct air removal procedure.

   a. For single-acting tools, connect one 3/8" NPTF hose end, other end is available for direct connect to tool or a hose coupler.
   b. For double acting cylinders, connect two hoses. Connect one 3/8" NPTF hose to the "A" port (**ADVANCE PORT**) and the other 3/8" NPTF hose end to the "B" port (**RETRACT PORT**).

WARNING: The plastic shipping plug is used to trap any residue oil from leaking out of port(s) during shipment. Do not operate pump with the plastic shipping plug installed, oil may expel if pump is operated with this plug installed.

3.2 Pump Venting

Reference the table below to determine the type of reservoir style is installed on your pump.

- Non-vented reservoirs have a predetermined oil level that should not be exceeded, refer to Section 2.0 for oil capacities. The extra air space prevents excessive vacuum that could prevent the pump from working.

- Vented reservoirs can be filled to the top. If the vent is blocked or closed, the pump will be inoperative. Never fill a pump beyond the maximum level recommended by the manufacture. For P82A P230, P230D, P461 and P461D models, turn the vent release screw / valve counterclock wise to open the vent. To close the vent, turn the valve clockwise.

3.3 Pump Positioning

Most Simplex Hand Pumps can be operated in both horizontal and vertical position. When using the hand pump in the vertical position it is imperative to place the hand pump with pump head facing down towards the earth and the pump handle facing upwards towards the sky.

NOTE: The P82A model cannot be vented when operated vertically.

Model	Vented	Non-vented	Horizontal	Vertical
P20		✔	✔	✔
P22		✔	✔	✔
P41		✔	✔	✔
P41A		✔	✔	✔
P42		✔	✔	✔
P82		✔	✔	✔
P82A	✔		✔	✔
P30		✔	✔	✔
P32		✔	✔	✔
P71		✔	✔	✔
P71V		✔	✔	✔
P72		✔	✔	✔
P140		✔	✔	✔
P140D		✔	✔	✔
P300		✔	✔	✔
P230	✔		✔	
P230D	✔		✔	
P461	✔		✔	
P461D	✔		✔	

4.0 OPERATION

Before Using the Pump:

1) Check all system fittings and connections to be sure they are tight and leak free.

2) Check oil level in reservoir before operating pump. See "Adding Oil to the Pump" in S ection 5.0.

CAUTION: Never add extensions to pump handle. Extensions cause unstable pump operation.

WARNING: Always keep your body to the side of the pump, away from the line of force of the handle.

NOTE: To reduce handle effort at high pressure, take short strokes. Maximum leverage is obtained in the last 5° of stroke.

NOTE: When operating the pump in the vertical position, the hose end must be pointed down, or the pump will pick up air and will not build pressure properly.

4.1 USING TWO-SPEED PUMPS
(Models: P20, P22, P42, P82, P82A, P30, P32, P72, P140, P230, P300, P461, P140D, P230D, P461D)

These pumps provide 2-stage flow. Under no-load, the pump operates in the high flow first stage for rapid advance. When the load is contacted, the pump automatically transfers over to the second stage for building pressure.

NOTE: For **P140 / P140D / P230 / P230D / P300 / P461 and P461D models**, when pump reaches approximately 600 PSI, you must momentarily stop pumping and raise the handle to shift to the high pressure stage. After the pump shifts, pumping takes less effort.

4.2 SINGLE-ACTING APPLICATIONS WITH RELEASE VALVE
(Models: P20, P22, P41, P41A, P42, P82, P82A, P30, P32, P71, P71V, P72, P140, P300)

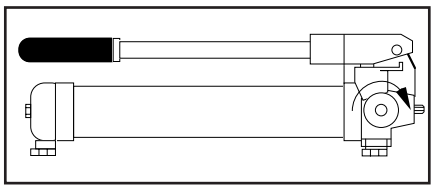


Figure 1

1. Close release valve by turning clockwise, as shown in Figure 1.

CAUTION: Close release valve - **HAND TIGHT ONLY**. Using tools on release valve can damage it and cause the pump to malfunction.

2. Operate pump handle to deliver hydraulic power to system. Pressure will be maintained until release valve is opened.
3. Open release valve (turn counter-clockwise) to release pressure, allowing oil to flow back to the reservoir. Slowly open release valve to release the pressure and control the flow of oil back to the reservoir. The amount the release valve is open controls the speed of the oil return ing to the pump and the speed cylinders moving down under live loads.

4.3 SINGLE-ACTING APPLICATIONS WITH 3-WAY, 2 POSITION MANUAL VALVE
(Models: P230, P461)

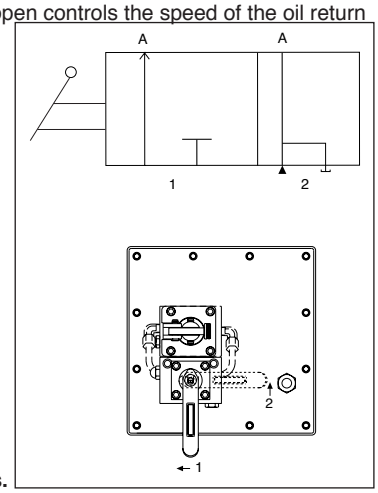


Figure 2

1. Shift valve handle to position 2 as shown in **Figure 2**.

2. Operate pump handle to deliver hydraulic power to the system. Pressure will be maintained until the valve is shifted.

3. To allow oil to return to the reservoir, shift valve handle to position 1 in **Figure 2**. Slowly open release valve to release the pressure and control the flow of oil back to the reservoir. The amount the release valve is open controls the speed of the oil returning to the pump and the speed cylinders moving down under live loads.

Note: P140D, P230, P230D, P461, P461D models are equipped with directional control system valves. Inline system check valve are recommended for controlling cylinder movement under load with thes- models.

4.4 DOUBLE-ACTING APPLICATIONS WITH 4-WAY, 3 POSITION MANUAL VALVE
(Models: P230D, P461D)

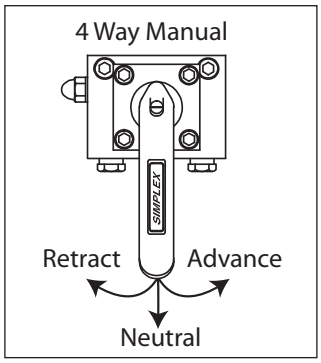


Figure 3

Pumps with 4-way control valves are designed to operate double-acting cylinders. See **Figure 3** for valve positions.

1. Position lever on 4-way valve to select function as follows:
   a. **To Advance**.....push lever to the right.
   b. **For Neutral/Hold**.....place lever in the middle.
   c. **To Retract.**.....push lever to the left.

2. Operate pump to perform work.
3. Change valve positions as needed.

WARNING: Operate double-acting cylinder only when both hoses are connected to the pump and the cylinder. If one hose is disconnected the circuit is blocked and over pressure of the hydraulic circuit can occur resulting in equipment damage or failure causing personal injury or damage to equipment or property.

Relief Valve Adjustment
All pumps contain a factory set relief valve to prevent over-pressurization. Lower pressure can be obtained, contact an Authorized Simplex Service Center.

4.5 AIR REMOVAL

Removing air from the hydraulic system will help the cylinder to advance and retract smoothly.

1. Open the Fill and/or Vent plug on the pump's reservoir, then close release valve.
2. Position hand pump at higher elevation than tool.
3. For single acting hand pump models, position tool with the coupler higher than the moving end. For double acting hand pump models, tool ports are faced upward – refer to diagram with cylinder connected for reference.
4. Fully advance the tool, open release valve to retract tool several times to expel the trapped air in pump circuit.
5. Repeat the above steps as necessary until all of the air is expelled from pump's hydraulic circuit motion is smooth and responsive with each stroke of the pump handle.

5.0 MAINTENANCE

Adding Oil to the Pump

Check oil level regularly. Drain oil and refill with Simplex oil every 12 months. If pump is used in dirty environments, change the oil more often.

WARNING: Always add oil with cylinders fully retracted (extended if pull cylinders) or the system will contain more oil than the reservoir can hold.

1. Remove vent/fill cap from reservoir.
2. Fill reservoir only to level mark shown on pump.
3. Remove air from system if necessary. Recheck oil level after removing air.
4. Return vent/fill cap to proper position.

NOTE: Non-vented hand pumps require air in the reservoir to function properly. If the reservoir is completely filled, a vacuum will form preventing oil from flowing out of the pump.

Keep Oil Lines Clean

When coupler halves are disconnected, always screw on dust caps. Use every precaution to guard unit against the entrance of dirt, because foreign matter may cause pump, cylinder, or valve failure.

6.0 TROUBLESHOOTING GUIDE

Problem	Possible Cause	Solution
Cylinder does not advance.	Oil level in pump reservoir is low.	Add oil according to the Maintenance instructions.
	Release valve is open.	Close the release valve.
	Loose hydraulic coupler.	Check that all couplers are fully tightened.
	Load is too heavy.	Do not attempt to lift more than rated tonnage.
	Air trapped in system.	Remove air according to instructions.
	Cylinder plunger binding.	Check for damage to cylinder. Have cylinder serviced by a qualified hydraulic technician.
Cylinder advances, but does not hold pressure.	Leaking connection.	Check that all connections are tight and leak free.
	Leaking seals.	Locate leak(s) and have equipment serviced by a qualified hydraulic technician.
	Internal leakage in pump.	Have pump serviced by a qualified hydraulic technician.

Visit www.tksimplex.com to Retrieve Repair Part Sheet Documentation

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UNITED STATES HOME OFFICE
777 Oakmont Lane, Ste. 800 - Westmont, IL 60559
Phone: 1(630) 590-6990 - Fax: 1(630) 590-6955 - Toll Free: 1(800) 323-9114
Email: sales@tksimplex.com - www.tksimplex.com