

**Hydraulic Vertical Lifting Wedges
Models LW-16 and LWC-16**

L4363 Rev. B 03/19 EN

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1.0 SAFETY

1.1 Introduction

Read all instructions carefully. Follow all recommended safety precautions to avoid personal injury as well as damage to the pump and/or damage to other property. Enerpac cannot be responsible for any damage or injury from unsafe use, lack of maintenance or incorrect operation. Do not remove warning labels, tags, or decals. In the event that any questions or concerns arise, contact Enerpac or a local Enerpac distributor for clarification.

Appropriate training in the safe use of high pressure, high force hydraulic tools is required prior to the operation of this tool. If training is needed, contact your local Enerpac distributor or authorized service center for information about an Enerpac hydraulic safety training course.

This manual follows a system of safety alert symbols, signal words and safety messages to warn the user of specific hazards. Failure to comply with these warnings could result in death or serious personal injury, as well as damage to the equipment or other property.



The Safety Alert Symbol appears throughout this manual. It is used to alert you to potential physical injury hazards. Pay close attention to Safety Alert Symbols and obey all safety messages that follow this symbol to avoid the possibility of death or serious personal injury.

Safety Alert Symbols are used in conjunction with certain Signal Words that call attention to safety messages or property damage messages and designate a degree or level of hazard seriousness. The Signal Words used in this manual are WARNING, CAUTION and NOTICE.



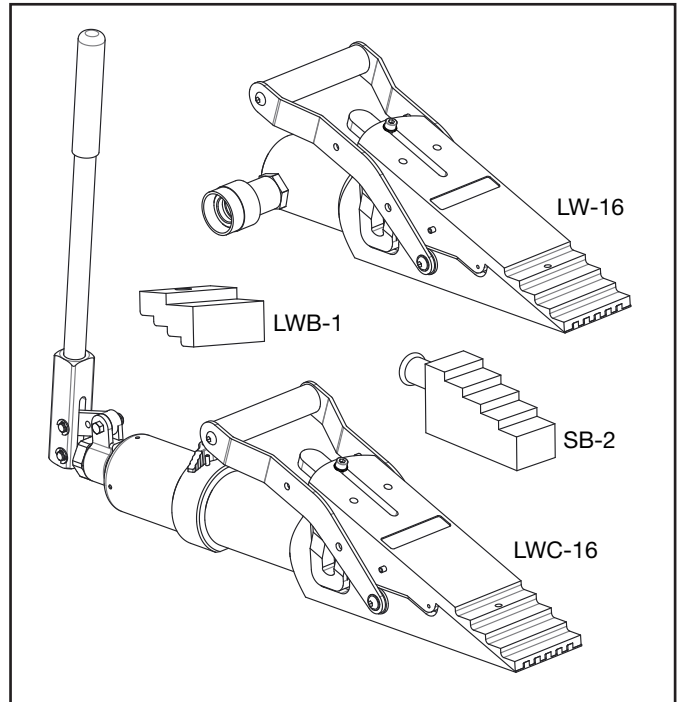
WARNING Indicates a hazardous situation that, if not avoided, could result in death or serious personal injury.



CAUTION Indicates a hazardous situation that, if not avoided, could result in minor or moderate personal injury.



NOTICE Indicates information considered important, but not hazard related (e.g. messages relating to property damage). Please note that the Safety Alert Symbol will not be used with this signal word.



1.2 Safety Precautions - Hydraulic Vertical Lifting Wedges



Failure to observe and comply with the following precautions and instructions may result in death or serious personal injury. Property damage could also occur.

- Read and completely understand the safety precautions and instructions in this manual. Always follow all safety precautions and instructions, including those that are contained within the procedures of this manual.
- Follow all instructions and heed all precautions stated in this manual.
- Keep this manual for future reference in a place that is accessible to all persons operating or servicing the lifting wedge.
- Always perform a visual inspection of the lifting wedge before placing it into operation. If any damage, cracks or problems are found, do not use the tool. Make repairs before using the lifting wedge.
- Do not use the lifting wedge if it is leaking oil. Do not use the lifting wedge if damaged, altered or in need of repair.
- Do not alter the calibration of the safety devices, such as maximum pressure valves (if equipped).
- Allow only authorized, trained, and experienced personnel to operate the lifting wedge and supervise its use.
- Ensure that all users are trained and qualified to operate the lifting wedge. Operators must be aware of all applicable occupational safety laws and must operate the lifting wedge in accordance with all such laws.
- Keep the work area clean and well illuminated.
- When operating the lifting wedge, do not wear loose clothing or jewelry. These items could get caught up in the lifting wedge during operation. Tie up long hair.

- Always wear and use appropriate personal protective equipment (PPE) such as non-skid safety shoes, hard-hat, hearing protection, and face and eye protection. Use of these and other PPE items (used as appropriate for the conditions) will reduce the chance of personal injuries. The use of these items may also be required by local regulations or laws.
- Consult your employer concerning specific safety requirements and the safety equipment required for use in your country or region.
- Do not exceed equipment ratings. Never attempt to lift a load weighing more than the capacity of the lifting wedge. Overloading causes equipment failure and possible personal injury.
- Never set a relief valve to a higher pressure than the maximum rated pressure of the pump and lifting wedge. If ratings are different, relief valve setting should not exceed the setting of the lowest rated component (pump or lifting wedge).
- Keep others clear of the work area while the tool is in use. Be sure that all personnel not operating the lifting wedge remain at a safe distance when the lifting wedge is in operation.
- Stop the lifting wedge if people and/or animals enter the work area.
- Ensure that the operator is alert, observant of the task being performed and that the work is being done with care.
- Do not allow use of the lifting wedge by persons that are tired, or under the influence of drugs, alcohol or medication.
- Do not allow children to operate the lifting wedge or to assist.
- Do not use the lifting wedge to lift people. Do not allow people to be on top of the load during lifting or lowering.
- Be sure setup is stable before lifting load. Lifting wedges should be located on a firm and level surface capable of supporting the full load. Do not weld or otherwise modify the lifting wedge to attach a base or other support.
- Use only Enerpac SB-2 safety block or blocking pieces to hold loads. Never use a hydraulic lifting wedge as a shim or spacer in any lifting application.
- Do not use lifting wedge in situations where loads are not directly centered or placed fully on the lifting wedge. Off-center loads produce considerable strain on lifting wedges. In addition, the load may slip or fall, causing potential danger.
- Do not use lifting wedge with stepped block in situations where the stepped block is not positioned fully under the load.
- Lift only dead weight loads. Avoid lifting live weight loads.
- Be especially careful when lifting loads such as partially filled storage tanks, in which the center of gravity could move or shift during lifting. Be aware that the distribution of some loads can change quickly and without warning.
- Keep all personnel clear of the work area while lifting or lowering is in progress. To avoid personal injury, keep hands and feet away from lifting wedge and load during operation.
- Maintain communication with the operator at all times during lifting or lowering. Use hand signals, two-way radios or other appropriate forms of communication (as required by applicable laws and regulations) if the load is not visible to the operator.
- Operate pump and valve as required to ensure that the load is lifted and lowered evenly and at a controlled rate.
- Closely watch the load at all times during lifting and lowering. Stop lifting or lowering immediately if the load becomes unstable or appears to be lifting or lowering unevenly.
- Stay clear of loads supported only by hydraulics. Follow the lifted load with the Enerpac SB-2 safety block or use suitable cribbing.
- Conduct a risk assessment prior to performing any lift.
- Always be certain that hydraulic pressure is fully relieved and that the load is fully removed from the lifting wedge(s) before disconnecting hydraulic hoses, loosening hydraulic fittings, or performing any lifting wedge disassembly or repair procedures.
- Never allow persons to work under or near the load while the load is being supported with the Enerpac SB-2 safety block or hydraulically. After the load has been raised or lowered, it always must be blocked mechanically with the Enerpac SB-2 safety block with suitable cribbing.
- When using a hand pump (or a tool with a built-in hand pump), always keep your body to the side of the pump, away from the line of force of the pump lever. Keep hands and fingers away from pinch point areas, such as the pump lever linkage. Never add extensions to the pump lever.

1.3 Safety Symbols



Failure to observe and comply with the safety symbols affixed to the lifting wedge could result in death or serious personal injury.

Make sure the safety symbols (decals, labels, etc.) are securely affixed to the tool and that they are legible. If not, obtain replacements from Enerpac. Refer to the tool repair parts sheet for locations and part numbers. Failure to maintain safety symbols on tool could result in death or serious personal injury.

The following safety symbols are affixed to the lifting wedge:



Crush hazard: Keep hands, fingers and other body parts away from the lifting wedge during operation.



Read Instruction Sheet: Read the instruction sheet before using or servicing equipment.

1.4 Additional Safety Precautions, Model LW-16



Failure to observe and comply with the following precautions and instructions may result in death or serious personal injury. Property damage could also occur.

- Always read, follow and completely understand all manufacturer's instructions when operating pumps, valves and all other devices used with the lifting wedge. Follow all safety precautions contained in the manufacturer's manuals.
- Use the lifting wedge only with a compatible Enerpac pump. Use of a non-compatible pump may result in erratic and/or unsafe operation.
- The lifting wedge is designed for a maximum working pressure of 10,000 psi [700 bar]. Do not connect the tool to a pump with a higher pressure rating. Be certain that all hydraulic hoses and fittings are properly connected and that they are rated at 10,000 psi [700 bar] or higher.
- Never set a relief valve to a higher pressure than the maximum rated pressure of the pump and tool. If ratings are different, relief valve setting should not exceed the setting of the lowest rated component (pump or tool).
- Perform cleaning, maintenance and repair operations only after disconnecting the tool from the hydraulic pump.
- Wear suitable personal protective equipment (PPE) such as goggles, gloves and protective clothing when checking hoses and fittings.
- Do not leave the lifting wedge unattended in the workplace when it is connected to the hydraulic pump.

- Do not expose the lifting wedge to temperatures in excess of 158°F [70°C]. Allow tool to cool or remove heat source.
- Be aware of hot metal components. Avoid contact with these components to prevent burns.
- Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin. If oil is injected under the skin, see a doctor immediately.
- Do not pressurize disconnected couplers.
- Never use a hydraulic lifting wedge with uncoupled couplers.
- Do not remove or disable the pump relief valve.
- Install pressure gauge(s) in the system to monitor operating pressure. It is your window to see what is happening in the system (LW-16 only).
- Keep hydraulic equipment away from flames and heat. Excessive heat will soften packings and seals, resulting in fluid leaks. Heat also weakens hose materials.
- To avoid personal injury keep hands and feet away from lifting wedge, pressurized hose and load during operation.

NOTICE Ensure that any repairs are performed only by trained, qualified and authorized personnel using original equipment replacement parts. For repair service, contact the Enerpac Authorized Service Center in your area.

1.5 Additional Safety References

Consult the applicable industry and/or government standards in your country or region for additional safety precautions and work rules applicable to hydraulic cylinders, jacks and other similar lifting equipment.

In the United States, refer to the following documents:

- Code of Federal Regulations - Title 29 Occupational Safety and Health Standards (U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001. www.gpo.gov).
- ASME B30.1 Standards - Jacks (American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990. www.asme.org).

In the European Union, refer to the standards and directives listed in the product's EU Declaration of Incorporation.



Failure to observe and comply with the following precautions could result in minor or moderate personal injury. Property damage could also occur.

- To help ensure proper operation and best performance, use only the Enerpac specified hydraulic oil for your Enerpac product. Use of any other oil may result in unsafe operation and /or damage to tool. The Enerpac product warranty may also be invalidated.
- Be careful to avoid damaging hydraulic hoses. Avoid sharp bends and kinks when routing hydraulic hoses. Do not exceed the minimum bend radius specified by the hose manufacturer. 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 hoses. A sharp impact may cause internal damage to hose wire strands. Applying pressure to a damaged hose may cause it to rupture.
- Do not lift hydraulic equipment by the hoses or couplers. Use lifting eye (if equipped) or handle and appropriately rated lifting equipment.

2.0 CONFORMANCE TO NATIONAL AND INTERNATIONAL STANDARDS



Enerpac declares that this product has been tested and conforms to applicable standards and is compatible with all CE requirements. A copy of the product EU Declaration is enclosed with each shipment.

3.0 PRODUCT DATA

3.1 Specifications

Model No.	Maximum Lifting Height				Oil Capacity		Weight	
	(lifting wedge only)		(with LWB-1 stepped block†)		in ³	cm ³	lbs	kg
	in	cm	in	cm				
LW-16	2.02	5.13	2.72	6.91	4.75	78	15.4	7.0
LWC-16	2.02	5.13	2.72	6.91	*	*	22.0	10.0

* Reservoir pre-filled with oil at factory. Oil does not need to be added or changed under normal operating conditions. Refer to Section 6.3 for additional information.

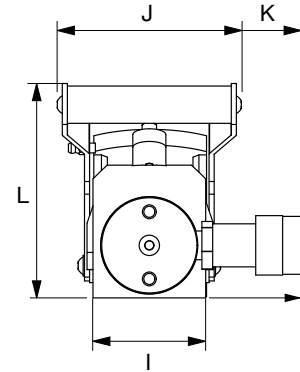
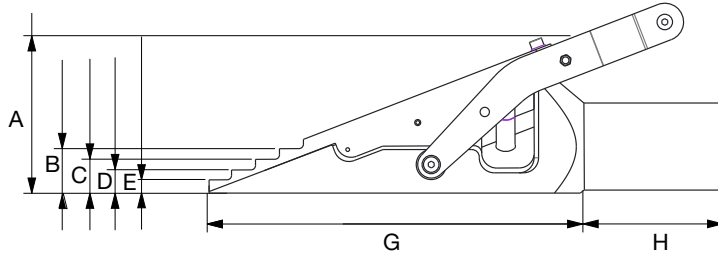
† LWB-1 stepped block is included with the LWC-16. It is an optional accessory for the LW-16.

Model No.	Maximum Hydraulic Working Pressure		Maximum Lifting Capacity		Minimum Access Gap (tip clearance)		Vertical Lift (each wedge step)	
	psi	bar	ton	kN	in	mm	in	mm
LW-16	10,000	700	16	142	0.39	10	0.83	21
LWC-16	**	**	16	142	0.39	10	0.83	21

** Maximum pressure internally limited to approximately 10,000 psi [700 bar]. This setting is not user-adjustable.

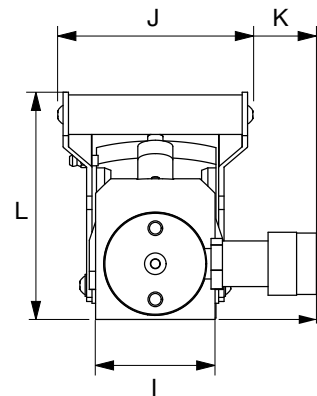
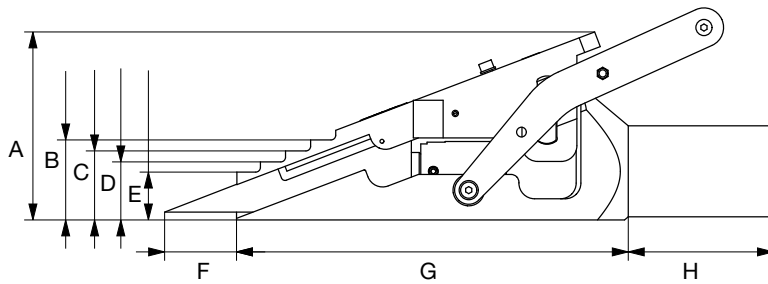
3.2 Dimensions, Model LW-16 Lifting Wedge (collapsed position)

Item	Imperial (in)	Metric (mm)	Item	Imperial (in)	Metric (mm)
A	3.94	100.0	G	9.72	247.0
B	1.20	30.5	H	3.17	80.7
C	0.93	23.5	I	2.68	68.0
D	0.65	16.5	J	4.33	110.0
E	0.39	10.0	K	5.50	140.0
F	--	--	L	8.27	210.0



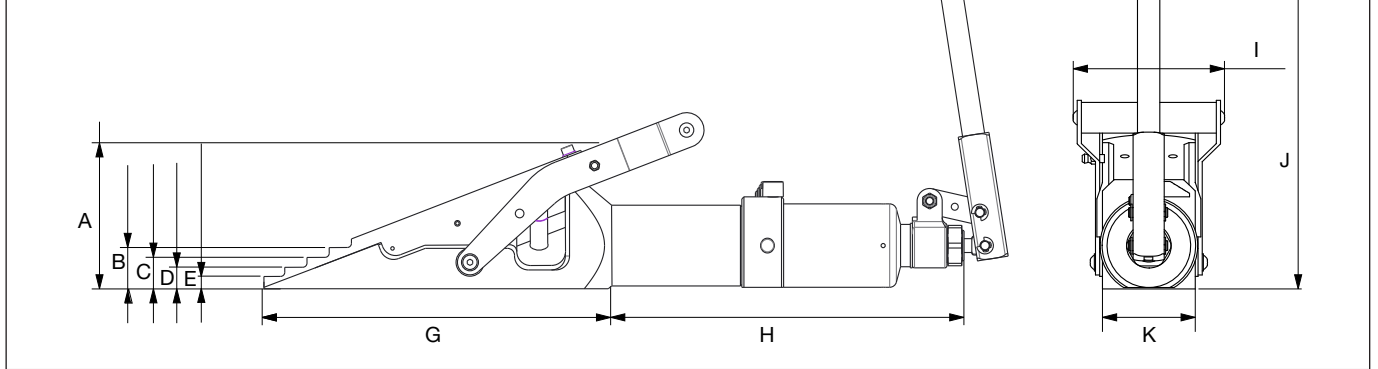
3.3 Dimensions, Model LW-16 Lifting Wedge (extended position)

Item	Imperial (in)	Metric (mm)	Item	Imperial (in)	Metric (mm)
A	4.76	121.0	G	9.72	247.0
B	2.03	51.5	H	3.17	80.7
C	1.75	44.5	I	2.68	68.0
D	1.48	37.5	J	4.33	110.0
E	1.20	30.5	K	5.50	140.0
F	1.77	45.0	L	8.27	210.0



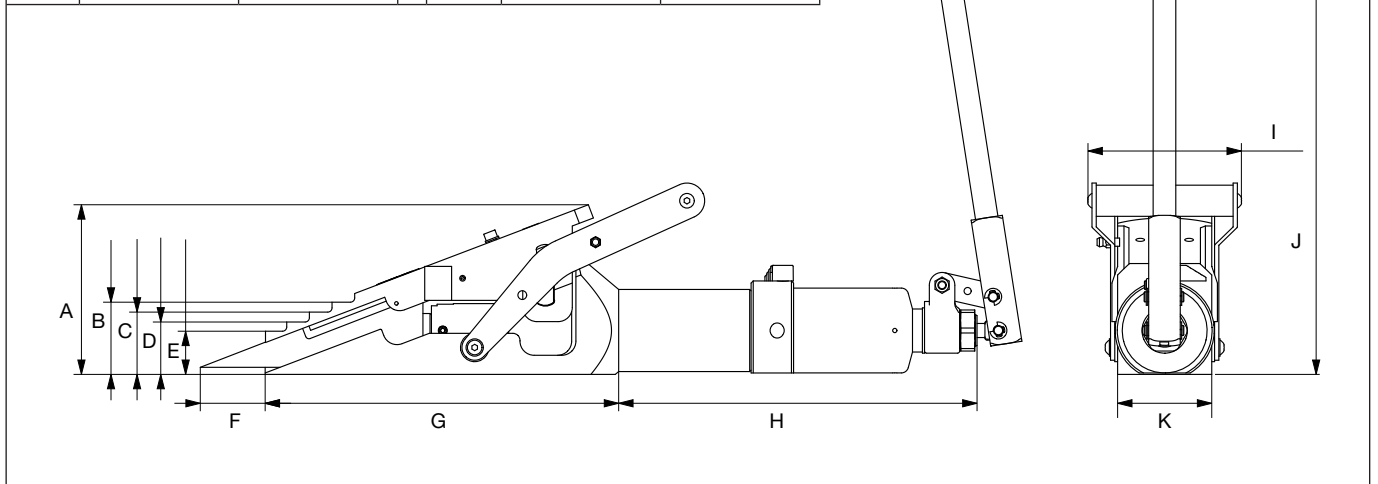
3.4 Dimensions, Model LWC-16 Lifting Wedge (collapsed position)

Item	Imperial (in)	Metric (mm)	Item	Imperial (in)	Metric (mm)
A	3.94	100.0	G	9.72	247.0
B	1.20	30.5	H	9.97	253.2
C	0.93	23.5	I	4.33	110.0
D	0.65	16.5	J	14.92	378.9
E	0.39	10.0	K	2.68	68.0
F	--	--			

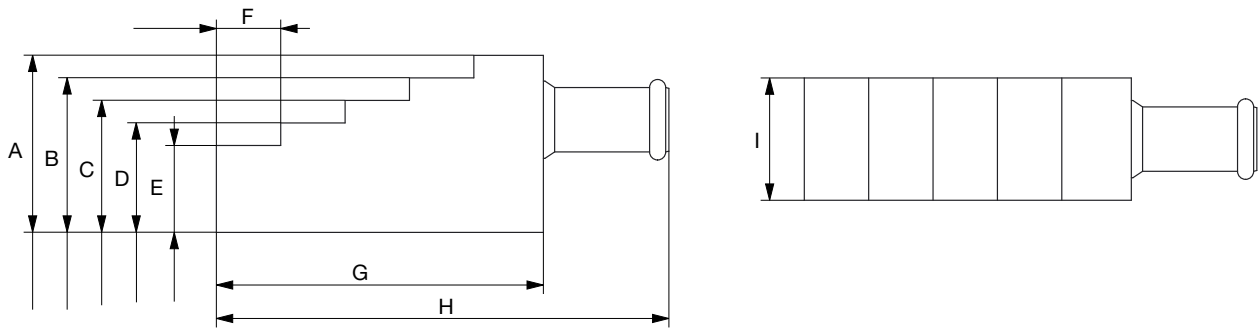


3.5 Dimensions, Model LWC-16 Lifting Wedge (extended position)

Item	Imperial (in)	Metric (mm)	Item	Imperial (in)	Metric (mm)
A	4.76	121.0	G	9.72	247.0
B	2.03	51.5	H	9.97	253.2
C	1.75	44.5	I	4.33	110.0
D	1.48	37.5	J	14.92	378.9
E	1.20	30.5	K	2.68	68.0
F	1.77	45.0			

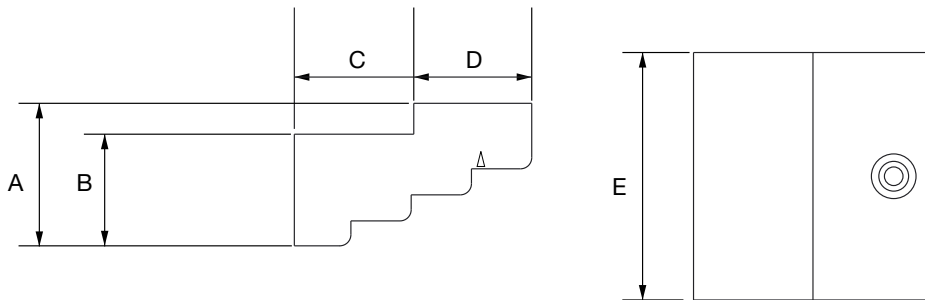


3.6 Dimensions, Model SB-2 Safety Block



Item	Imperial (in)	Metric (mm)	Item	Imperial (in)	Metric (mm)
A	2.17	55.0	F	0.79	20.0
B	1.89	48.0	G	4.00	101.6
C	1.61	41.0	H	5.54	140.7
D	1.34	34.0	I	1.50	38.0
E	1.06	27.0			

3.7 Dimensions, Model LWB-1 Stepped Block



Item	Imperial (in)	Metric (mm)
A	1.51	38.3
B	1.18	30.0
C	1.26	32.1
D	1.25	31.7
E	2.62	66.5

4.0 DESCRIPTION

Enerpac LW Series hydraulic vertical lifting wedges provide a convenient way to lift large, heavy objects for which floor clearance is limited.

Two models are available. Model LW-16 features a built-in single-acting hydraulic cylinder and is powered by an external hydraulic pump (user supplied).

Model LWC-16 is similar to the LW-16, but contains an integral hydraulic hand pump for added convenience and portability.

The minimum access gap (clearance between floor and bottom edge of object) is only 0.39 inch [10 mm] for each LW Series model.

Maximum lifting capacity of both models is 16 tons [157 kN]. For the LW-16, optional Enerpac AM Series split flow manifolds allow either 2 or 4 wedges to be used simultaneously to lift 32 or 64 tons [314 or 628 kN] respectively.

The lifting jaw surface of the wedge contains a series of steps. Any of the steps can be used to support the tool's full rated load.

The unique interlocking wedge design of the LW Series helps reduce the possibility of the wedge slipping out from under the load and also helps prevent bending of the wedge's first step.

A built-in return spring automatically retracts the wedge when hydraulic pressure is relieved.

5.0 RECEIVING INSTRUCTIONS

Visually inspect all components for shipping damage. Shipping damage is not covered by warranty. If shipping damage is found, notify carrier at once. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

6.0 PREPARATION FOR USE

6.1 Hydraulic Pump Requirements (Model LW-16 only)

The hydraulic pump is sold separately and is not included with the LW-16 lifting wedge.

To allow precise control of lifting wedge speed and movement, it is recommended that a hand-operated hydraulic pump be used with the LW-16.

A powered pump can be used if desired. However, the hydraulic flow must be carefully regulated so that the load is not raised too quickly and there are no abrupt movements.

Whichever type of pump is used, be certain that it is rated at 10,000 psi [700 bar] and is capable of holding a sufficient amount of hydraulic oil to operate the lifting wedge (or set of lifting wedges) to full extension.

The pump must be designed for use with single acting devices and must be equipped with a pressure release valve (or suitable directional control valve). Installation of additional devices in the circuit may be required to regulate retract and advance speed.

The pump must also be equipped with a separate safety pressure relief valve that opens if the system working pressure exceeds 10,000 psi [700 bar]. Verify that the pump safety relief valve is adjusted to this setting before using the pump with the lifting wedges(s).

Always monitor the system hydraulic pressure during operation. A pressure gauge (user supplied) should be installed in the line between the pump and the LW-16 lifting wedge. The installation of multiple pressure gauges is recommended for systems using more than one lifting wedge.

6.2 Hydraulic Oil Requirements (Model LW-16 only)

Use of Enerpac HF Series ISO 32 hydraulic oil is recommended. Enerpac hydraulic oil is available at your local Enerpac Distributor or Authorized Service Center.

NOTICE

- Failure to use the correct oil type may result in damage to hydraulic components and will void the product warranty.
- Be sure that the oil is clean. The oil cleanliness should be maintained to a maximum level of 18/16/13 per the ISO 4406 standard. If the oil develops a milky, cloudy or dark appearance, it should be changed immediately.
- To avoid overfilling and possible equipment damage, add oil to the pump reservoir only after all lifting wedges are completely retracted and system pressure is relieved.
- When using a hand-operated pump, it is permissible to use a high-quality brand of ISO 15 hydraulic oil. The lower oil viscosity will result in reduced pumping effort, especially in cold weather conditions.

6.3 Hydraulic Oil Requirements (Model LWC-16 only)

The hydraulic reservoir of the LWC-16 lifting wedge is pre-filled at the factory with ISO 15 hydraulic oil. The reservoir should not require additional oil under normal operating conditions. It is NOT necessary to periodically check the oil level.

NOTICE Do not loosen or remove the oil drain/fill plug. Special procedures are required to properly check the oil level and to add oil to the bladder style reservoir. If it is suspected that the oil level is low, take the unit to your Enerpac Authorized Service Center for inspection.

6.4 Hydraulic Connections (Model LW-16 only)

Model LW-16 is equipped with one Enerpac CR-400 High Flow female coupler. This 3/8" NPTF coupler provides hydraulic flow for both advance and retract functions and is compatible with all Enerpac HC Series hydraulic hoses.

After making connections, be certain that all couplers used in the system are fully connected, so that hydraulic flow is not blocked or restricted.

All hoses, fittings and other hydraulic components in the circuit must be rated for at least 10,000 psi [700 bar] operation.

6.5 Air Removal (Model LW-16)

Trapped air must be purged from the lifting wedge and hose before placing the system into operation. If multiple lifting wedges are to be used, it is recommended that air be removed from each lifting wedge individually. Refer to the following procedure:

1. Position the tool vertically with the lifting wedge pointed downward. To ensure complete air removal, be sure that the hydraulic cylinder is positioned *lower* than the pump reservoir.
2. Close the pump release valve.
3. Operate the hand pump lever until the wedge is fully extended. Then, open the release valve to retract the wedge. Repeat this process several times, until all air is removed and operation is smooth. Check that oil reservoir is full after air purging is completed.

NOTICE The pump reservoir vent (if equipped) must be opened before the lifting wedge is advanced. Failure to vent the system will result in a vacuum and the lifting wedge will not advance.

6.6 Air Removal (Model LWC-16)

Trapped air must be purged from the internal hydraulic system before placing the tool into operation. Refer to the following procedure:

1. Position the tool vertically with the lifting wedge end pointed downward. Close the release valve (turn release valve knob in the clockwise direction until hand tight - DO NOT use tools).
2. Operate the hand pump lever until the wedge is fully extended. Then, open the release valve to retract the wedge. Repeat this process several times, until all air is removed and operation is smooth.

7.0 OPERATION

7.1 Hydraulic Pump (Model LW-16 only)

Hydraulic pump operation procedures will vary depending on pump type, valve configuration and other factors. For detailed operating instructions and related information, refer to the instruction sheet included with your pump.

7.2 Setup and Use - Model LW-16

Refer to Figure 1 and other figures as indicated.

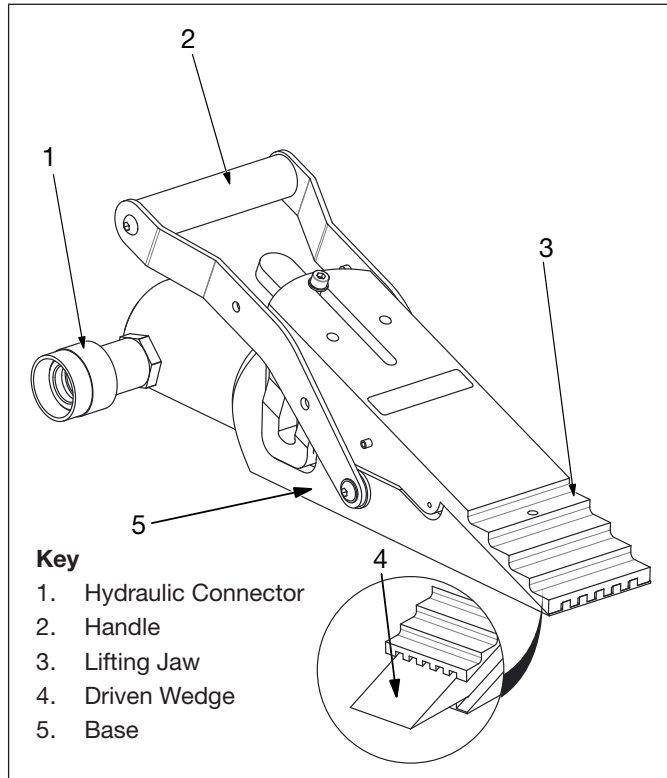


Figure 1, LW-16 Major Components

1. Make hydraulic connections. Fully hand-tighten all couplers. Refer to Section 6.4 for additional information.
2. Ensure the minimum access gap under the item to be lifted measures 0.39" [10 mm] or greater. Refer to Figure 2.

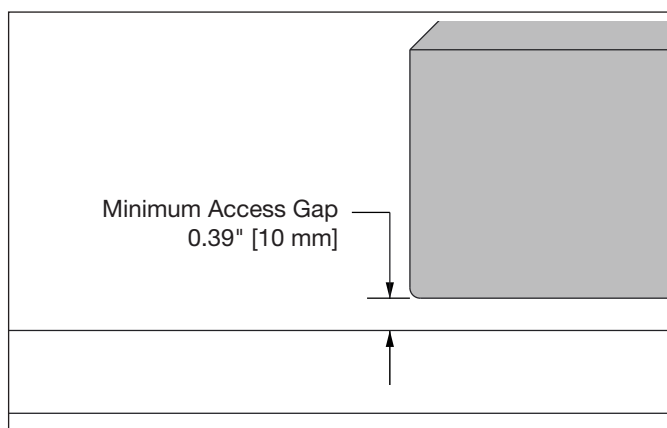


Figure 2, Minimum Access Gap

3. Lubricate lifting wedge with grease. Refer to instructions in Section 9.0.
4. Place the lifting wedge under the center of the item to be lifted. The lifting jaw contains a series of steps. The step to be used must be fully inserted into the access gap so that the heel of the step is in contact with the outer surface of the item to be lifted. Refer to Figure 3.

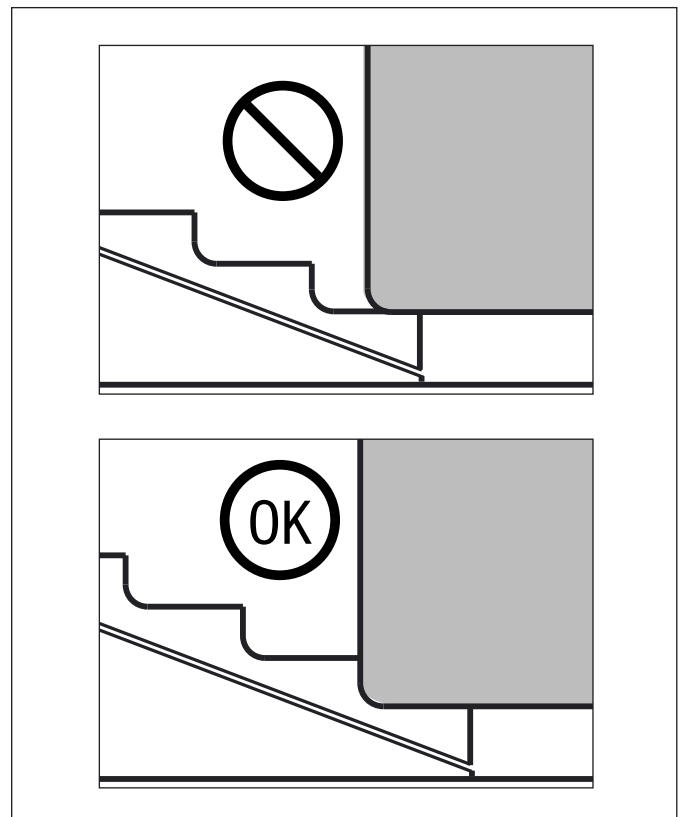


Figure 3, Inserting Wedge Under Load

5. Close the release valve on the hand pump and advance the wedge by operating the hand pump lever.
6. When the item has been lifted to the desired height, or to the maximum height on the step used, insert the Enerpac SB-2 safety block (included separately with lifting wedge). Refer to Figure 4.

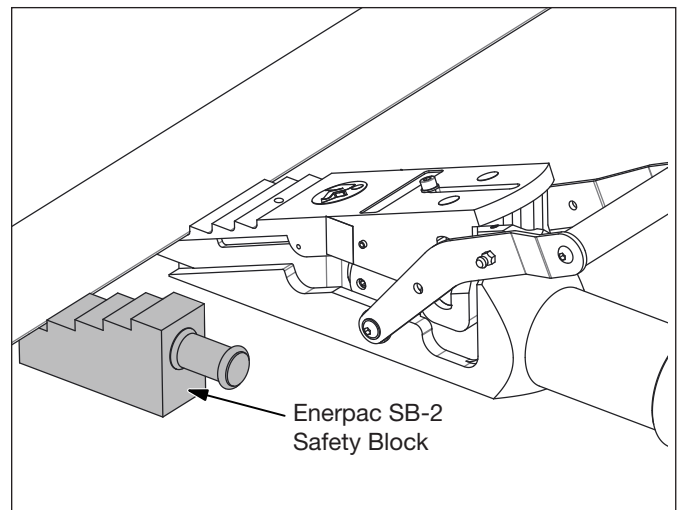


Figure 4, Enerpac SB-2 Safety Block



Load will be lowered in the next step. Before lowering, be sure hands, feet and other body parts are not inside the access gap area. Failure to observe this precaution could result in serious personal injury.

7. Slowly open the release valve to lower the load until it is fully supported by the safety block.
8. If the item to be lifted must be raised an additional amount, insert the wedge under the load using the next highest wedge step. Then, repeat steps 3 through 7 of this procedure to raise the load an additional amount.

7.3 Setup and Use - Model LWC-16

Refer to Figure 5 and other figures as indicated.

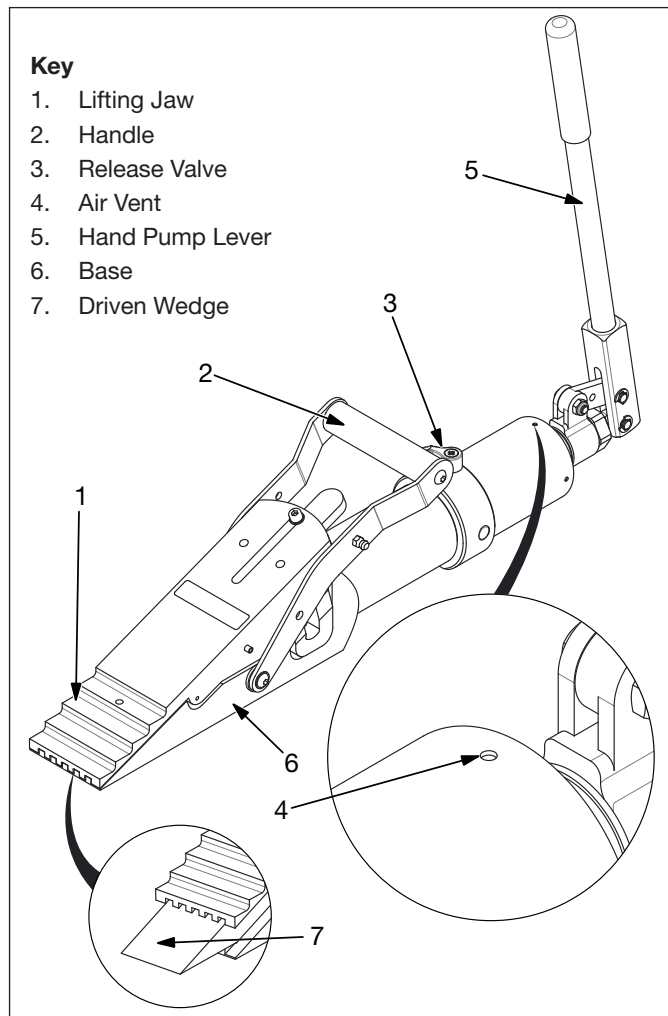


Figure 5, LWC-16 Major Components

1. Be sure that the lifting wedge is fully retracted. Close the release valve (turn release valve knob in the clockwise direction until hand tight - DO NOT use tools).
2. Be sure the air vent is not obstructed in any way as this will result in a vacuum within the system and the wedge will not advance.
3. Ensure the minimum access gap under the item to be lifted measures 0.39" [10 mm] or greater. Refer to Figure 2.
4. Lubricate the lifting wedge with grease. Refer to instructions in Section 9.0.
5. Place the lifting wedge under the center of the item to be lifted. The lifting jaw contains a series of steps. The step to be used must be fully inserted into the access gap so that the heel of the step is in contact with the outer surface of the item to be lifted. Refer to Figure 3.
6. Operate the hand pump lever to advance the lifting wedge.
7. When the item has been lifted to the desired height, or to the maximum height on the step used, insert the Enerpac SB-2 safety block (included separately with lifting wedge). Refer to Figure 4.



Load will be lowered in the next step. Before lowering, be sure hands, feet and other body parts are not inside the access gap area. Failure to observe this precaution could result in serious personal injury.

8. Slowly open the release valve to lower the load until it is fully supported by the safety block.

9. If the item to be lifted must be raised an additional amount, insert the wedge under the load using the next highest wedge step. Then, repeat steps 4 through 8 of this procedure to raise the load an additional amount.

7.4 Enerpac LWB-1 Stepped Block Accessory

The LWB-1 stepped block is useful when lifting items containing a larger access gap. It allows the item to be lifted higher and with less penetration.

The stepped block is included with the LWC-16 lifting wedge and available as an optional accessory for the LW-16 lifting wedge.



Failure to observe and comply with the following instructions could allow the load to become unstable and shift position. Death and/or serious personal injury could result if load falls on persons working in the area.

To ensure safe operation:

- The stepped block must protrude under the load at least 0.59" [15 mm].
- The *full width* of the stepped block must be used.

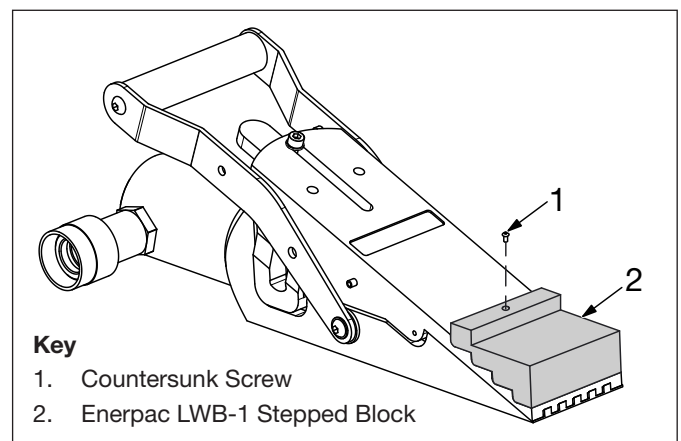


Figure 6, Enerpac LWB-1 Stepped Block

To install the stepped block:

1. Be sure that mating surfaces are clean before beginning installation.
2. Mount the stepped block on the lifting jaw and secure it with the countersunk screw, as shown in Figure 6.

8.0 INSPECTION, MAINTENANCE & STORAGE

- Keep the lifting wedge clean. Remove any loose dirt or dust from exterior surfaces.
- Periodically check the lifting wedge for cracks, wear and damage. Replace any cracked, worn or damaged parts immediately.
- Periodically check hydraulic components for loose connections, oil leaks and other obvious problems. Replace any leaking, worn or damaged components immediately.
- Store the lifting wedge in a clean, dry and secure location. Keep the stored lifting wedge and hoses (if present) away from heat and direct sunlight.
- Model LW-16 only:
 - To prevent dirt entry, install dust caps on hydraulic couplers after disconnecting the hydraulic hose from the lifting wedge.
 - Change the pump hydraulic oil at the recommended interval shown in the pump instruction sheet. Change the oil immediately if contamination is suspected.
- For repair service, contact an Enerpac Authorized Service Center. Inspection and repairs should be performed only by an Enerpac Authorized Service Center or other qualified hydraulic tool service facility.

9.0 LUBRICATION

NOTICE Use NLGI 2 grease for all grease lubrication procedures in Sections 9.1 through 9.4.

9.1 Lifting Wedge Lubrication (all models)

Machined surfaces and moving parts should be liberally coated with grease BEFORE each use. Without lubrication, binding and galling of lifting wedge components may occur during the retract stroke, resulting in possible erratic operation and/or excessive wear.

Use the following procedure to lubricate the lifting wedge. Refer to Figure 7, items 1, 3, 4, 5 and 6.

1. Remove the grease nipple from its storage location on the lifting wedge handle.
2. Screw the grease nipple into the upper grease port. Attach the grease gun and apply grease until grease seeps out. This will lubricate the mating surfaces of the lifting jaw and the driven wedge.
3. Remove grease nipple from the upper grease port.
4. Screw the grease nipple into the lower grease port. Attach the grease gun and apply grease until grease seeps out. This will lubricate the mating surfaces of the driven wedge and the base.
5. Remove grease nipple from the lower grease port.

9.2 Alternate Lubrication Method (all models - if grease gun is not available)

1. Connect hydraulic hose and hand pump to the lifting wedge (Model LW-16 only).
2. Close the pump release valve.
3. Operate the pump lever to advance the wedge.
4. Smear grease onto the exposed surfaces of the driven wedge.
5. Open the pump release valve to retract the wedge.

9.3 Guide Pin Lubrication

To lubricate the guide pins:

1. Remove any grit or dirt from the guide pin slots. Refer to Figure 7, item 2.
2. Smear grease into the guide pin slots.

9.4 Pump Linkage Lubrication (Model LWC-16 only)

Periodically apply grease to the linkage pins so that they remain lubricated. Refer to Figure 7, item 7.

10.0 TROUBLESHOOTING

Refer to the troubleshooting guide (Table 1 or 2, as applicable) for a list of possible lifting wedge operational problems, causes and solutions.

For repair service, contact an Enerpac Authorized Service Center. Inspection and repairs should be performed only by an Enerpac Authorized Service Center or other qualified hydraulic tool service facility.

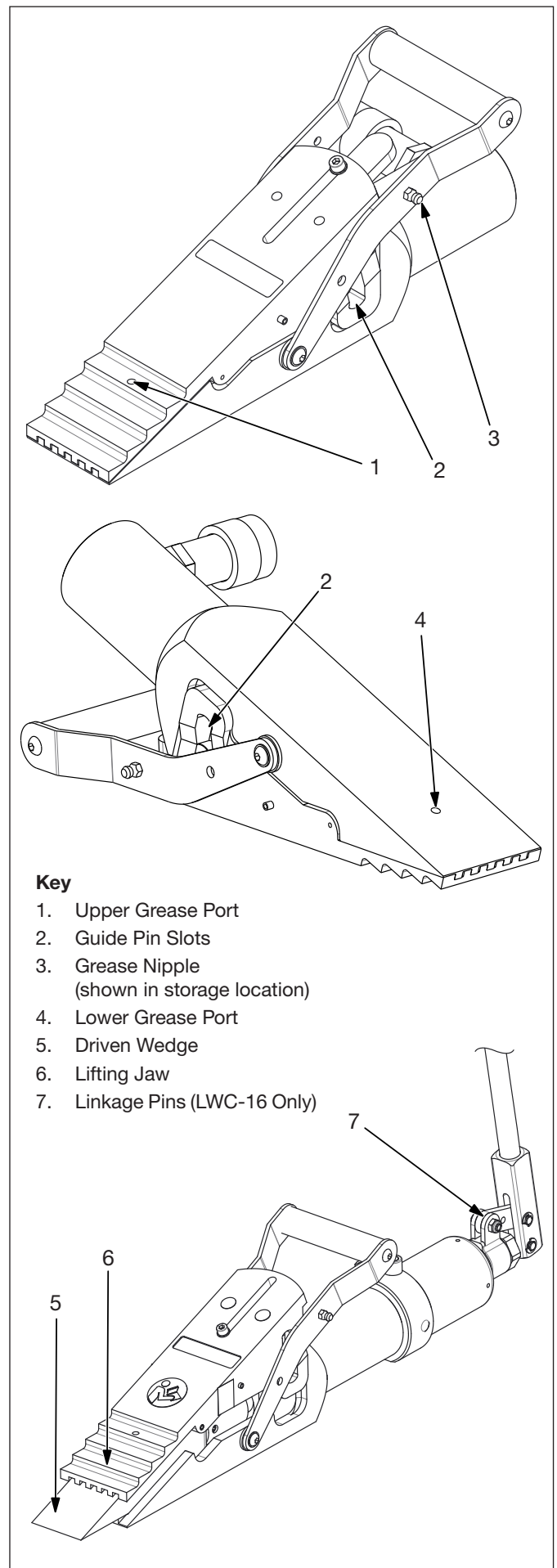


Figure 7, Lubrication, Models LW-16 and LWC-16

Table 1 - Troubleshooting Guide, Model LW-16

Problem	Possible Cause	Solution
1. Lifting wedge will not advance.	a. Load too heavy for lifting wedge.	Reduce load or use a larger capacity lifting device.
	b. Pump release valve open.	Close pump release valve.
	c. Coupler not fully tightened.	Tighten coupler.
	d. Pump malfunctioning.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
2. Lifting wedge advances only part way.	a. Low oil level.	Add oil to reservoir.
	b. Coupler not fully tightened.	Tighten coupler.
	c. Cylinder plunger binding or damaged.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
3. Lifting wedge advances in spurts.	a. Air in hydraulic system.	Purge air from system. Refer to Section 6.5.
	b. Cylinder plunger binding or damaged.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
4. Lifting wedge advances slower than normal.	a. Coupler not fully tightened.	Tighten coupler.
	b. Leaking connection.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	c. Pump malfunctioning.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
5. Lifting wedge advances but will not hold.	a. Leaking connection.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	b. Cylinder seals leaking.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	c. Pump malfunctioning.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
6. Lifting wedge cylinder leaks oil.	a. Loose connection.	Tighten coupler. Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	b. Cylinder seals worn or damaged.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	c. Cylinder has internal damage.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
7. Lifting wedge will not retract or retracts slower than normal.	a. Pump release valve is closed.	Open pump release valve.
	b. Coupler not fully tightened.	Tighten coupler.
	c. Pump reservoir overfilled.	Drain excess oil from reservoir.
	d. Narrow hose restricting flow.	Replace hydraulic hose with hose of larger diameter.
	e. Broken or weak cylinder retraction spring.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	f. Cylinder and/or wedge mechanical components worn or damaged.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
8. Oil leaking from external relief valve.	a. Coupler not fully tightened.	Tighten coupler.
	b. Restriction in hydraulic hose.	Remove restriction.
	c. Cylinder has internal damage.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
9. Lifting wedge advances normally but does not retract under load.	Driven wedge needs lubrication.	Remove lifting wedge from load and lubricate driven wedge.
10. Lifting jaw is bent.	a. Load shift.	Reposition load to prevent load shift. Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	b. Load too heavy for lifting wedge.	Reduce load or use a larger capacity lifting device. Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
11. Lifting wedge advances halfway and then stops.	Pump reservoir not vented.	Open reservoir air vent.

Table 2 - Troubleshooting Guide, Model LWC-16		
Problem	Possible Cause	Solution
1. Lifting wedge will not advance.	a. Load too heavy for lifting wedge.	Reduce load or use a larger capacity lifting device.
	b. Pump release valve open.	Close pump release valve.
	c. Pump malfunctioning.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
2. Lifting wedge advances only part way.	a. Low oil level.	Add oil to reservoir.
	b. Coupler not fully tightened.	Tighten coupler.
	c. Cylinder plunger binding or damaged.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
3. Lifting wedge advances in spurts.	a. Air in hydraulic system.	Purge air from system. Refer to Section 6.6.
	b. Cylinder plunger binding or damaged.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
4. Lifting wedge advances slower than normal.	Pump malfunctioning.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
5. Lifting wedge advances but will not hold.	a. Cylinder seals leaking.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	b. Pump malfunctioning.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
6. Lifting wedge cylinder leaks oil.	a. Worn or damaged seals.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	b. Cylinder has internal damage.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
7. Lifting wedge will not retract or retracts slower than normal.	a. Pump release valve is closed.	Open pump release valve. Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	b. Broken or weak retraction spring.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	c. Lifting wedge internally damaged.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
8. Lifting wedge advances but does not retract under load.	Driven wedge needs lubrication.	Remove lifting wedge from load and lubricate driven wedge.
9. Lifting jaw is bent.	a. Load shift.	Reposition load to prevent load shift. Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
	b. Load too heavy for lifting wedge.	Reduce load or use a larger capacity lifting device. Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.
10. Lifting wedge advances halfway and then stops.	Air vent obstructed.	Check air vent for obstructions. Remove obstructions if present.
11. Pressure leaks and pump lever rises without assistance.	Internal wear or damage.	Repair or replace component(s) as required. Contact Enerpac Authorized Service Center.

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