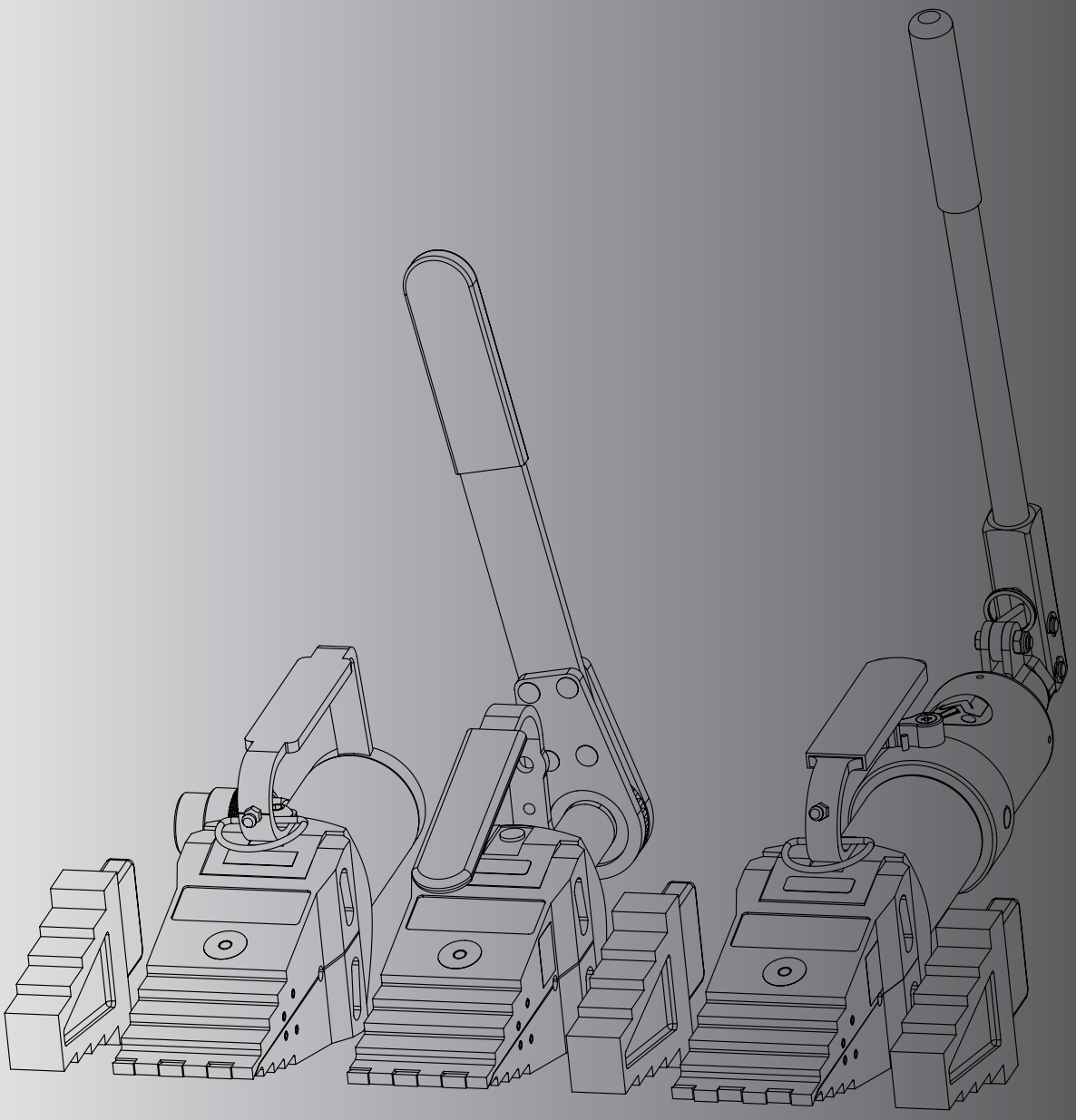
ENERPAC

L4388
Rev. C 10/21

Hydraulic/ Mechanical Wedge Spreader

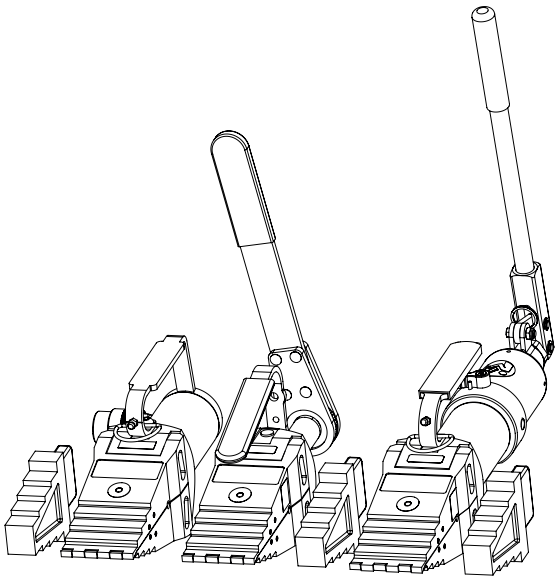
FSM8
FSH14
FSC14



ENGLISH [EN]

Instruction Sheet

Hydraulic/ Mechanical Wedge Spreader



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1.0 INTRODUCTION

Overview

Enerpac Wedge Spreaders use the integrated wedge concept. They are used to spread flanges in order to create space for cleaning and repairing flange surfaces and gasket replacement.

The Enerpac wedge spreader FSM8 is a manual operated tool, and is actuated by a 22mm (0.87in) ratchet spanner

The Enerpac FSH14 is a hydraulic operated tool, that is actuated by an Enerpac RC102 single acting cylinder. The FSH14 must be powered by an Enerpac hand pump.

The FSC14 is actuated by an integral pump.

Application

Wedge spreaders can be used for: pipe and flange repair, removing of elbows, couplers, gasket and metal seals replacement, maintenance/ replacement of valve and control equipment.

Delivery Instructions

Upon delivery all components must be inspected for damage incurred during shipping. If damage is found the carrier should be notified at once. Shipping damage is not covered by the Enerpac warranty.

Warranty

- Enerpac guarantees the product only for the purpose for which is intended.
- Refer to the Enerpac Global Warranty document for terms and conditions of the product warranty.

Any misuse or alteration invalidates the warranty.

- Observe all instructions as communicated in this manual.
- When replacement parts are needed, use only genuine Enerpac replacement parts.

Modification to any part of the equipment outlined in this manual should not be attempted, nor any component part be replaced without first consulting Enerpac. Modifications may render the equipment dangerous. Component parts are each rated to suit the demands of the overall equipment design and replacement with similar items without provenance may lead to unexpected and dangerous accidental features.

If any equipment abuse is evident, the warranty will be invalidated and Enerpac will not be made responsible for an injury due to misuse or failure to comply with the above safety notes.

Part Replacement

Check the Repair Parts Sheets (RPS), available at www.enerpac.com, to order replacement parts when required.

Conformance to National and International Standards

•FSM8 •FSH14 •FSC14

CE UKCA These tools conform with the requirements for CE and UKCA.

Enerpac declares that the product(s) have been tested and conforms to applicable standards and the product(s) are compatible to all EU and UK Requirements.

Copies of the EU Declaration as well as the UK Self-Declaration are enclosed with each shipment.

2.0 SAFETY

Read all instructions carefully. Follow all recommended safety precautions to avoid personal injury as well as damage to the product 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 of any questions or concerns arising, contact Enerpac or a local Enerpac distributor for clarification.

If you have never been trained on high-pressure hydraulic safety, consult your distributor or service center for information about Enerpac Hydraulic Safety Courses.

This manual follows a system of safety alert symbols, signals, 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 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 DANGER, WARNING, CAUTION, and NOTICE.

DANGER Indicates a hazardous situation that, if not avoided, **will** result in death or serious personal injury.

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 related to property damage). Please note that the Safety Alert Symbol will **not** be used with the signal word.

2.1 Safety Precautions

⚠ WARNING

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

- Read and completely understand the safety precautions and instructions in this manual before operating the Flange Spreading Wedges or preparing them for use. Always follow all safety precautions and instructions, including those that are contained within the procedures of this manual.
- Ensure all hydraulic components are rated to a safe working pressure of 700 bar (10 000 psi).
- Do not overload equipment. The risk of hydraulic overloading can be minimized by using the Enerpac Hand Pump, which has a factory-set safety valve preventing the safe working pressure being exceeded.

  If alternative hydraulic pumps are used, ensure that there are adequate systems to limit the working pressure to 700 bar (10 000 psi).
- Wear personal protective gear when operating hydraulic equipment. Always wear eye protection. Safety equipment such as dust mask, non-skid safety shoes, hard hats, gloves or hearing protection (used as appropriate) will reduce personal injuries.
- Applying pressure to a damaged hose may cause it to rupture.
- Immediately replace worn or damaged parts. Use only genuine Enerpac parts from approved distributors or service centers. Enerpac parts have been engineered and manufactured to be fit-for-purpose.
- To minimize risk of personal injury keep hands and feet away from the tool and workpiece during operation.
- Do not handle pressurized hoses; escaping oil under pressure can penetrate the skin, causing serious injury. Seek medical attention immediately if oil penetration is suspected.
- Only pressurize complete and fully connected hydraulic systems. Do not pressurize systems that contain unconnected couplers.

⚠ CAUTION

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

- Ensure components are protected from external sources of damage, such as excessive heat, flame, moving machine parts, sharp edges and corrosive chemicals.
- Take care to avoid sharp bends and kinks in hydraulic hoses. Bends and kinks can cause severe back-up pressure and cause hose failure. Protect hoses from dropped objects; a sharp impact may cause internal damage to hose wire strands. Protect hoses from crush risks, such as heavy objects or vehicles; crush damage can cause hose failure.
- Do not lift hydraulic equipment by the hoses or couplers. Use only the designated carrying handles.
- Lubricate tools as directed in this manual prior to operation. Use only approved lubricants of high quality, following the lubricant manufacturers instructions.

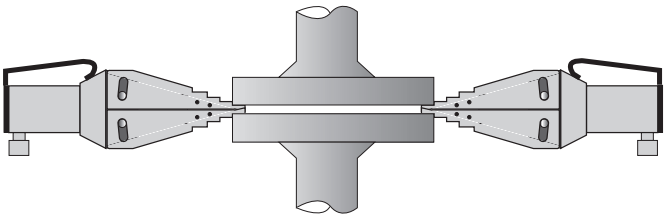
NOTICE

- Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Enerpac Authorized Service Centre in your area.
- Rope off working area and place warning signs.
- To help ensure proper operation and best performance, use of Enerpac oil is strongly recommended.
- The vibration total value to which this tool is subjected does not exceed 2.5m/s^2.

3.0 OPERATING INSTRUCTIONS

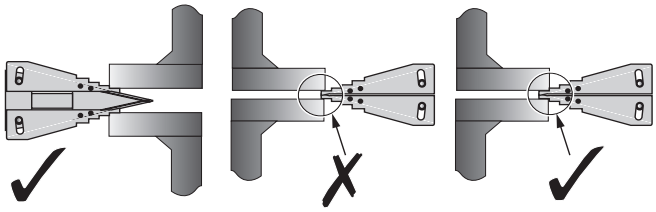
It is recommended that two wedges be used in tandem. This will give an even spread to the joint. The wedges should be set at 180˚ apart **(see fig. 1)**.

Fig. 1



The wedge should be used only if the full step area is located into the gap, and the object requiring spreading is in contact with the heel of the next step **(see fig. 2)**.

Fig. 2 Fig. 3

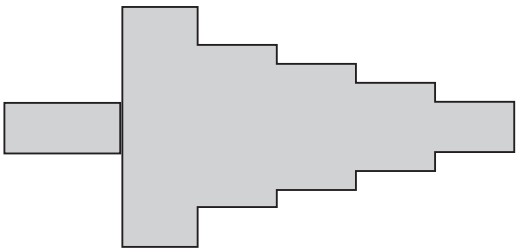


When operating the FSC14, ensure the air vent is not obstructed in any way as this will result in a vacuum within the system and the wedge will not advance.

⚠ WARNING Ensure wedge is fully located on the step selected to spread **(see fig. 2 and 3)**.
Minimum hold should be 15mm (0.59in).

NOTICE The safety block **(see fig. 4)** should be inserted into the joint and the pressure released onto the block.

Fig. 4 SB1,Safety block



NOTICE A fresh hold on a new step can then be chosen to open the joint further if required.

NOTICE The operator must ensure that the wedge and the 4 slide pins are lubricated each and every time the equipment is used. This will give maximum efficiency and prolong the working life of the wedge.

⚠ WARNING To minimise risk of personal injury keep hands and feet away from the tool and workpiece during operation.

⚠ CAUTION The handle of the wedge is there to stop operators holding spread plates as the wedge is retracted. This will stop fingers becoming jammed between plates.

⚠ CAUTION Never hammer or force wedge into the access gap.

⚠ CAUTION When using FSC14, only use the designated handle anchor holes for the lanyard (FSC1).

⚠ WARNING Care should be taken when using the lanyard (FSC1) to avoid entanglement with body parts.

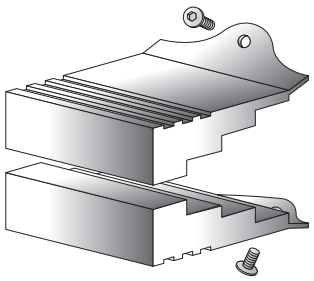
⚠ WARNING Do not over pressurize the pump as this may cause injury to personnel.

⚠ WARNING Do not use a handle extension on any pumps.

4.0 USE OF STEPPED BLOCKS

The maximum opening of the wedge spreaders can be increased from 61 to 81mm (2.40 to 3.19in) when used in combination with the optional FSB1 stepped blocks **(see fig. 5 and 6)**

· Fig. 5



The FSB1 give more access to replace ring joints, metal seals and cleaning of flange surfaces. The use of stepped blocks reduce the amount of penetration of the wedge point into the joint.

Fig. 6A Wedge head dimensions while using the FSB-1 stepped block(s).

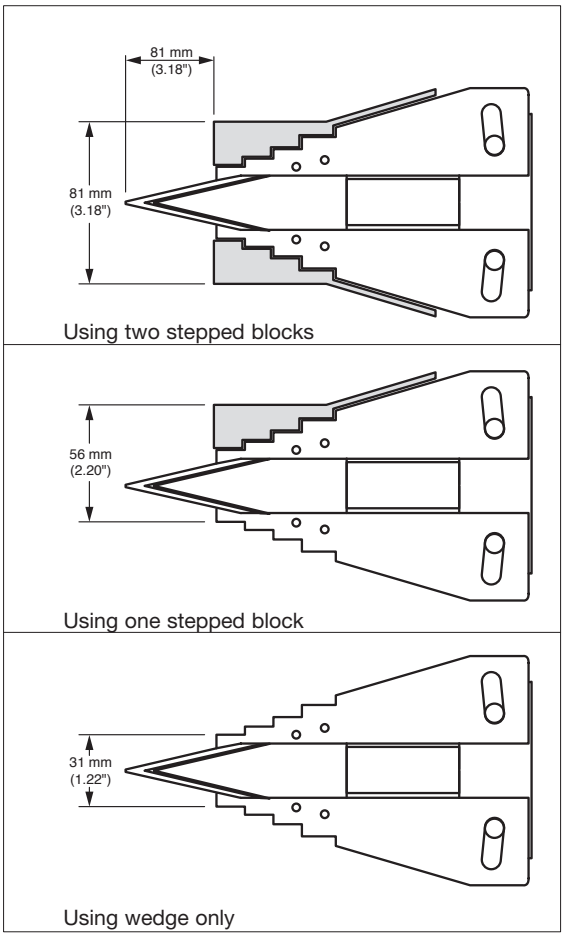
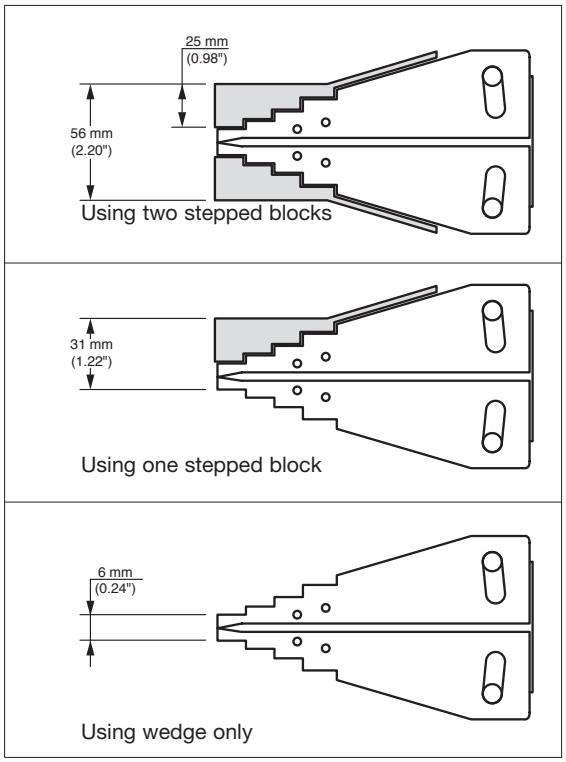


Fig. 6B Wedge head dimensions while using the FSB-1 stepped block(s).(cont)



When using stepped blocks ensure a hold of 15mm (0.59in) minimum is obtained prior to spreading.

5.0 WEDGE USE IN TANDEM

It is recommended that two wedge be used in tandem

This will give an even spread to the joint. The wedge should be set at 180˚ apart **(see fig. 1)**.

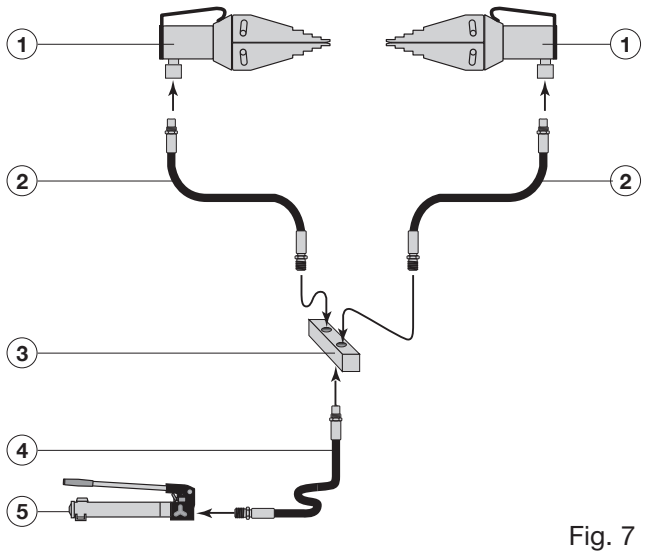


Fig. 7

Two hydraulic wedge spreaders can easily be used simultaneously when used in combination with an Enerpac hand pump, a split-flow manifold and hydraulic hoses **(see fig. 7)**.

1. FSH14
2. HC-700 series hydraulic hose
3. AM-21 Split-flow manifold or A-64, A-66, or FZ-1612
4. HC-700 series hydraulic hose
5. P-series hand pump (P-392)

5.1 Unique interlock Design

The unique shape and design of the teeth of the wedge accommodates high separating force, even at low-height of 6 mm (0.24in) for easy access.

NOTICE Always engage fully to the heel of the step on the wedges. This ensures full grip when separating flanges.

⚠ CAUTION Maximum force on screw bolt of FSM8 is 150 ft. lbs. (203 Nm).

⚠ CAUTION Use only ratchet spanner supplied with FSM8.

⚠ WARNING Do not exceed maximum force rating.

⚠ CAUTION Do not use impact tool on screw bolt.

6.0 USE OF LANYARDS (FSC1)

The lanyard should be used to minimise the risks associated with the tool dropping.

Attach one end of the lanyard to the tool using the supplied shackle with the FSH14 or FSC14 **(see fig. 8)**, for the FSM8 use the top hole located on the handle **(see fig. 9)**. The other end of the lanyard should be fixed to a secure point close to the work-site using an appropriate shackle.

Avoid using the lanyard as a means for picking up or carrying the tool.

The anchor point and lanyard have been engineered to safely sustain a drop over the full lanyard length. It is recommended that all parts are inspected following a drop incident, as damage may compromise the safety of the tool.

⚠ CAUTION Only use the designated D-Ring to secure the safety lanyard.

Fig. 8

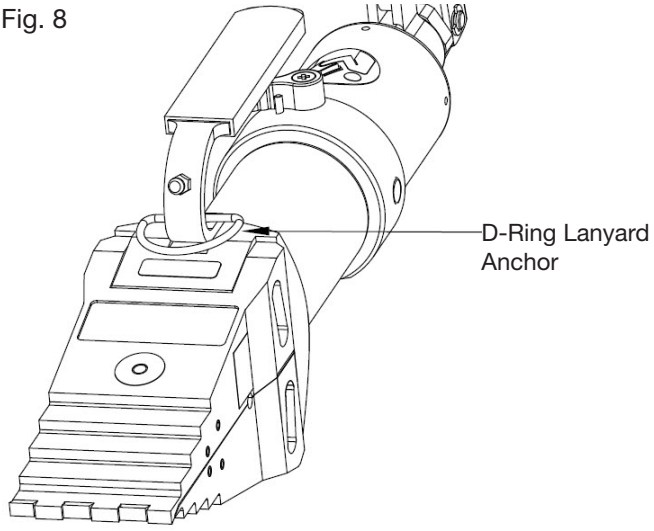
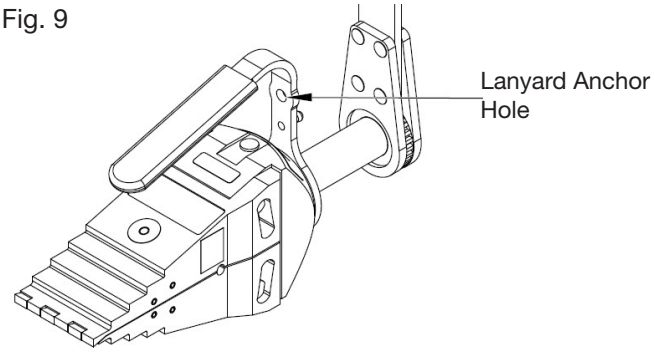


Fig. 9



⚠ DANGER Care should be taken when using the lanyard to avoid entanglement with body parts.

NOTICE Safety lanyards are not supplied as standard, to order separately use part number: FSC1.

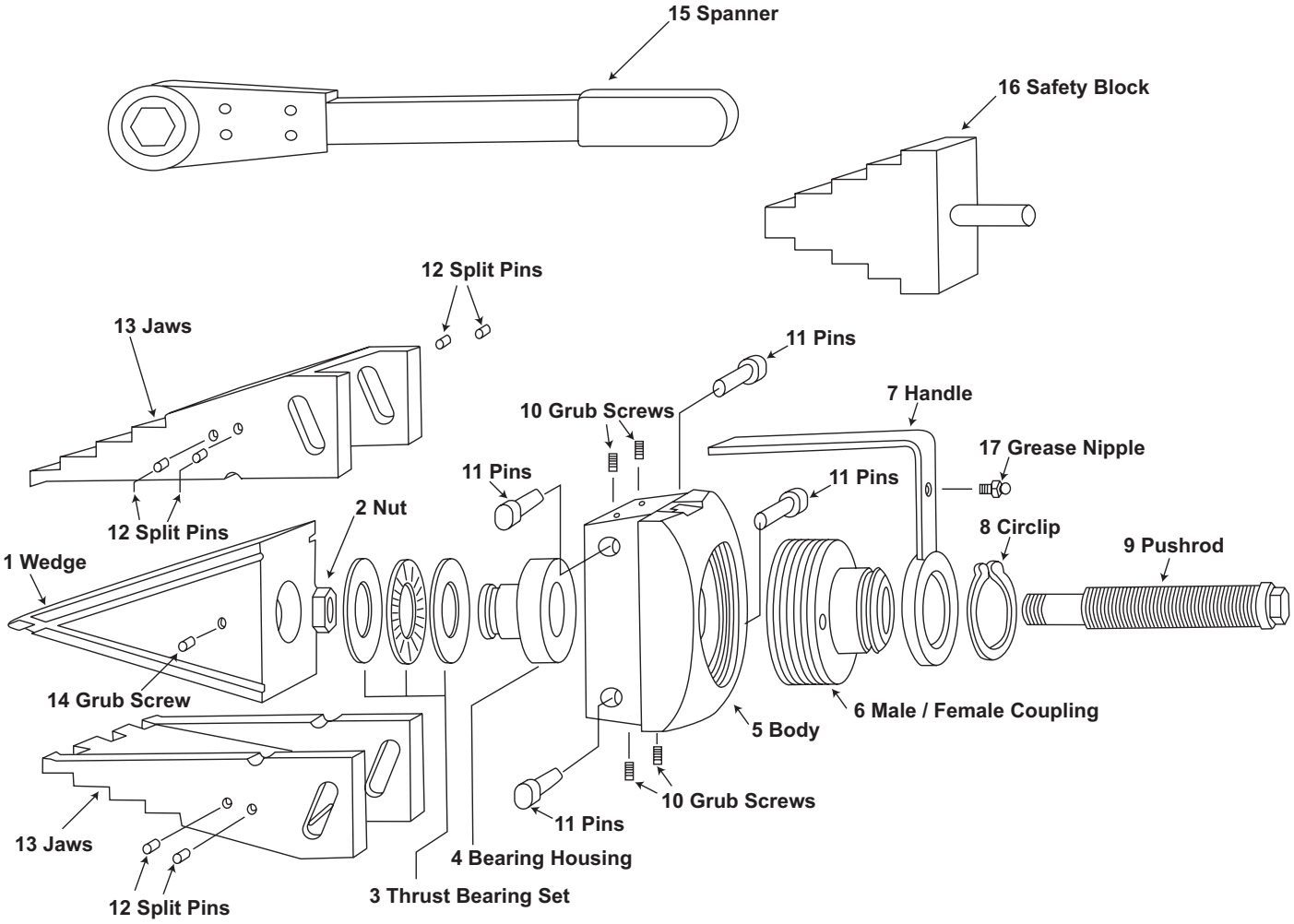
7.0 INSPECTION, MAINTENANCE & STORAGE

- Keep the spreading wedge clean. Remove any loose dirt or dust from exterior surfaces.
- Periodically check the spreading 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 spreading wedge in a clean, dry and secure location. Keep the stored spreading wedge and hoses (if present) away from heat and direct sunlight.
- FSH14 only:

  - To prevent dirt entry, install dust caps on hydraulic couplers after disconnecting the hydraulic hose from the spreading 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.

Fig. 10 FSM8 Exploded View



7.1 FSM8

Lubrication

To properly maintain the tool it is important to grease all moving parts regularly **(see fig. 10)**.

These are:

- Pushrod (No. 9)
- Jaws (No. 13)
- Thrust Bearing Set (No. 3)

Numbers 9 and 13 respectively must be greased each time the tool is used and No. 3 should be greased at least once per month.

Lubricating the Pushrod

Smear grease on the Pushrod (No. 9) while the Wedge (No. 1) is in the retracted position. This will enable the screw to turn freely and give maximum spreading at the tips.

Lubricating the Jaws and Slots

A Grease Nipple (No. 17) is supplied with the tool located on the Handle (No. 7) for easy storage. The Grease Nipple should be removed from the Handle and inserted, in turn, into each of the Jaws, and a grease gun used to pump grease into the Wedge. The Grease Nipple insertion point is shown on **fig. 11**. Grease should also be smeared into the Slots positioned at the side of each Jaw to allow the Pins (No. 11) to slide freely as a load is applied to the Wedge.

NOTICE Prior to the attachment of the safety lanyard, the grease nipple has to be removed from the tool.

Lubricating the Thrust Bearing Set

To gain access to the Thrust Bearing Set follow steps 1 through 6 which follow below. Once accessed, smear grease on the Thrust Bearing Set.

Disassembly Wedge Assembly (See fig. 10)

1. Screw the Pushrod (No. 9) forward using the Spanner (No. 15) provided with the tool until the Wedge (No. 1) is half opened.
2. Remove the Grub Screws (No. 10). Pull out the Pins (No. 11) using small mole grips / vice grips.
3. Screw the Pushrod (No. 9) forward until the Wedge (No. 1) is fully extended **(see fig. 12)**.
4. Slide one of the Jaws (No. 13) forward until it is removed from the Wedge:
5. Repeat steps 1 through 4 with the second Jaw.
6. Loosen the Grub Screw (No. 14) and the Wedge (No. 1) can now be removed from the Bearing Housing (No. 4). NOTE: that this grub screw will be tight as it is secured with Loctite 638 Retaining Adhesive.

Reassembly

Follow Steps 6 through 1 above. Please note when reassembling that Loctite 638 Retaining Adhesive (or equivalent) should be used when reassembling Nut (No. 2) or when screwing the Male / Female Coupling (No. 6) back into the Body (No. 5). Apply Loctite 638 Retaining Adhesive and tighten the Grub Screw (No. 14) and screw back 1/2 turn to allow the Bearing Housing (No. 4) to rotate freely in the Wedge (No. 1).

Fig. 11

NOTE: A grease nipple is located on the handle of the tool for easy storage.

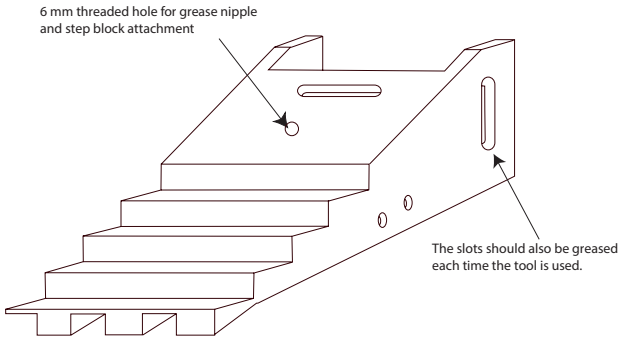
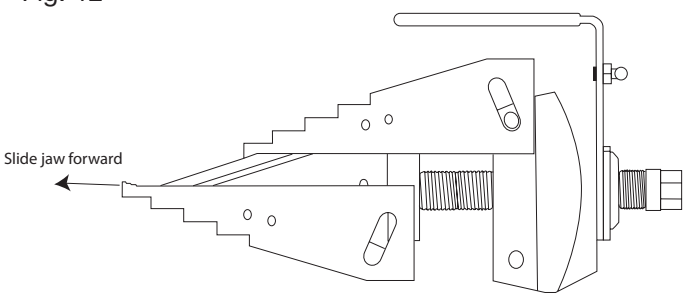


Fig. 12



7.2 FSH14 / FSC14

Lubrication (FSH14 / FSC14)

A Grease Nipple (No. 17) is supplied with the tool located on the Handle (No. 7) for easy storage. The Grease Nipple should be removed from the Handle and inserted in turn into each of the Jaws, and a grease gun used to pump grease into the Wedge

NOTICE The Wedge must be in the closed position.

The Grease Nipple insertion point is shown on **fig. 13**. Grease should also be smeared into the Slots positioned at the side of each Jaw to allow the Pins (No. 5) to slide freely as a load is applied to the Wedge.

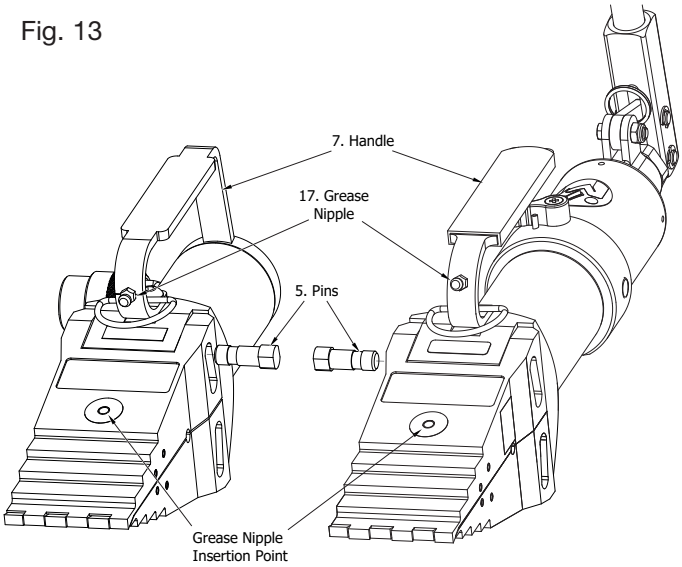
NOTICE Prior to the attachment of the safety lanyard, the grease nipple has to be removed from the tool.

Hydraulic Oil Reservoir (FSC14)

The hydraulic reservoir of the FSC14 spreading 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.

Fig. 13



NOTICE If an issue with the RC102 cylinder is discovered, please check the Repair Parts Sheet at www.enerpac.com.

8.0 Troubleshooting

8.1 FSH14 Troubleshooting

Fault	Possible Cause:	Recommended Action:
The wedge is advancing but does not reach full pressure.	There is air in the hydraulic system.	Follow the Airlock Relief instructions.

8.2 FSC14 Troubleshooting

Fault	Possible Cause:	Recommended Action:
The wedge advances some of the way and then stops progressing.	The air-vent is obstructed by dirt or debris.	Carefully unblock the air-vent using a small blunt object.
The wedge doesn't move.	There is an air-lock within the hydraulic system.	Select Retract (-) and prime pump to circulate oil around the system.
	Insufficient oil in the hydraulic system.	Refill with clean oil and bleed the hydraulic system.
	Retract is selected.	Select Advance and pump the handle.
	Air has accumulated around pump inlet when used upside down.	Bleed any air from the hydraulic reservoir. Inspect the tool for oil leaks on the reservoir, possibly indicative of a perished bladder. Contact an approved Enerpac Contact Center for repair.
	The inlet check-valve or intermediate valve ball has become stuck.	Dismantle the check valve, free and clean the valve balls. Contact an approved Enerpac Contact Center for repair.
The wedge moves as intended, but doesn't seem to be achieving full pressure when under load.	Intermediate valve not seating / relief valve leaking.	Check cleanliness of the valve ball. Re-seat using a hammer and punch. Contact an approved Enerpac Contact Center for further instructions.
Hydraulic pressure slowly diminishes and the pump handle does not rise	The release valve is leaking.	Contact an Enerpac Authorized Service Center for further instructions.
	The piston seal is leaking.	Inspect for oil leaks, possibly indicative of a perished seal or loose blanking plug. Contact an approved Enerpac Contact Center for further instructions.
Tool actuation feels soft and unresponsive.	There is air in the hydraulic system.	1. Position the tool vertically with the spreading 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. Contact an approved Enerpac Contact Center for further instructions.

9.0 DIMENSIONS/ SPECIFICATIONS

Table A

Model Number	Max. Spreading Force	Min. Required Access Gap	Type	Weight	Optional Stepped Blocks / Weight
FSM8	8 ton (72kN)	0.24 inch (6mm)	Mechanical	14.3 lbs (6.5 kg)	FSB1 - 2.4 lbs 1.1 kg
FSH14	14 ton (118 kN)	0.24 inch (6mm)	Hydraulic (Max. 10,000 psi) Max. 700 bar	15 lbs (7.1 kg)	FSB1 - 2.4 lbs 1.1 kg
FSC14	14 ton (118 kN)	0.24 inch (6mm)	Hydraulic (Max. 10,000 psi) Max. 700 bar	21 lbs (9.5 kg)	FSB1 - 2.4 lbs 1.1 kg

Fig. 14 FSH14

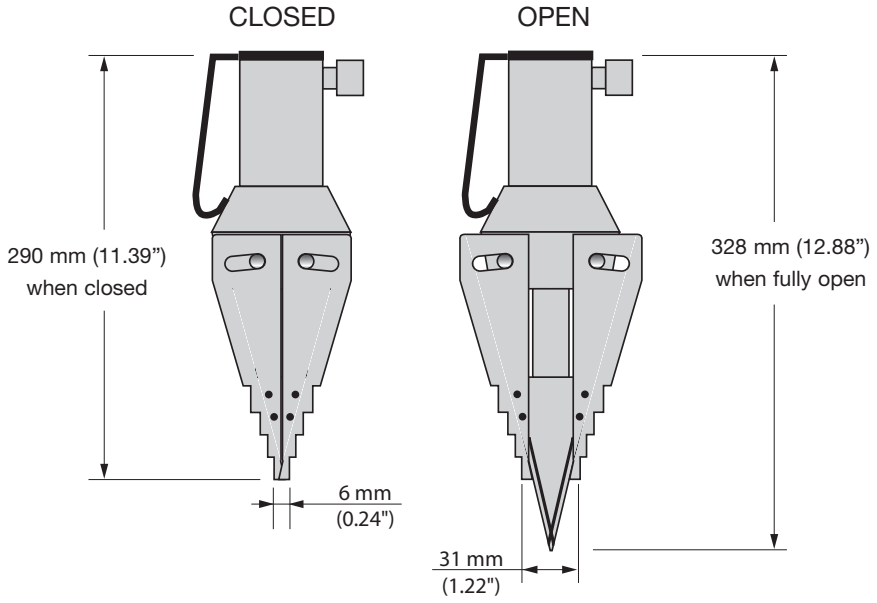


Fig. 15a FSM8

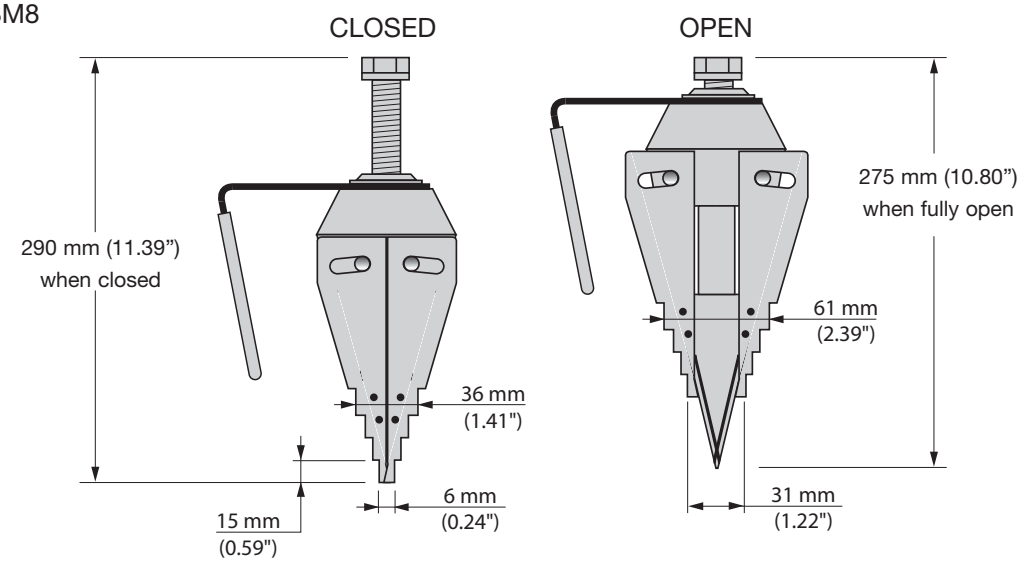


Fig. 15b SW22, Spanner 22 mm

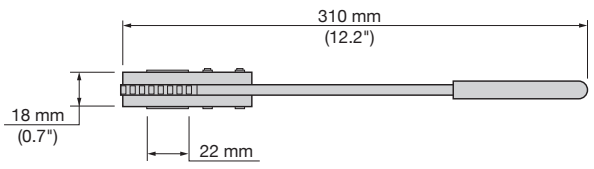


Fig. 16 SB1, Safety block

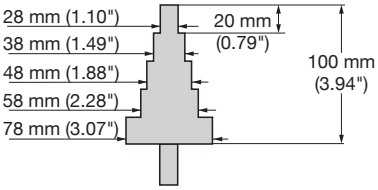


Fig. 17a FSC14

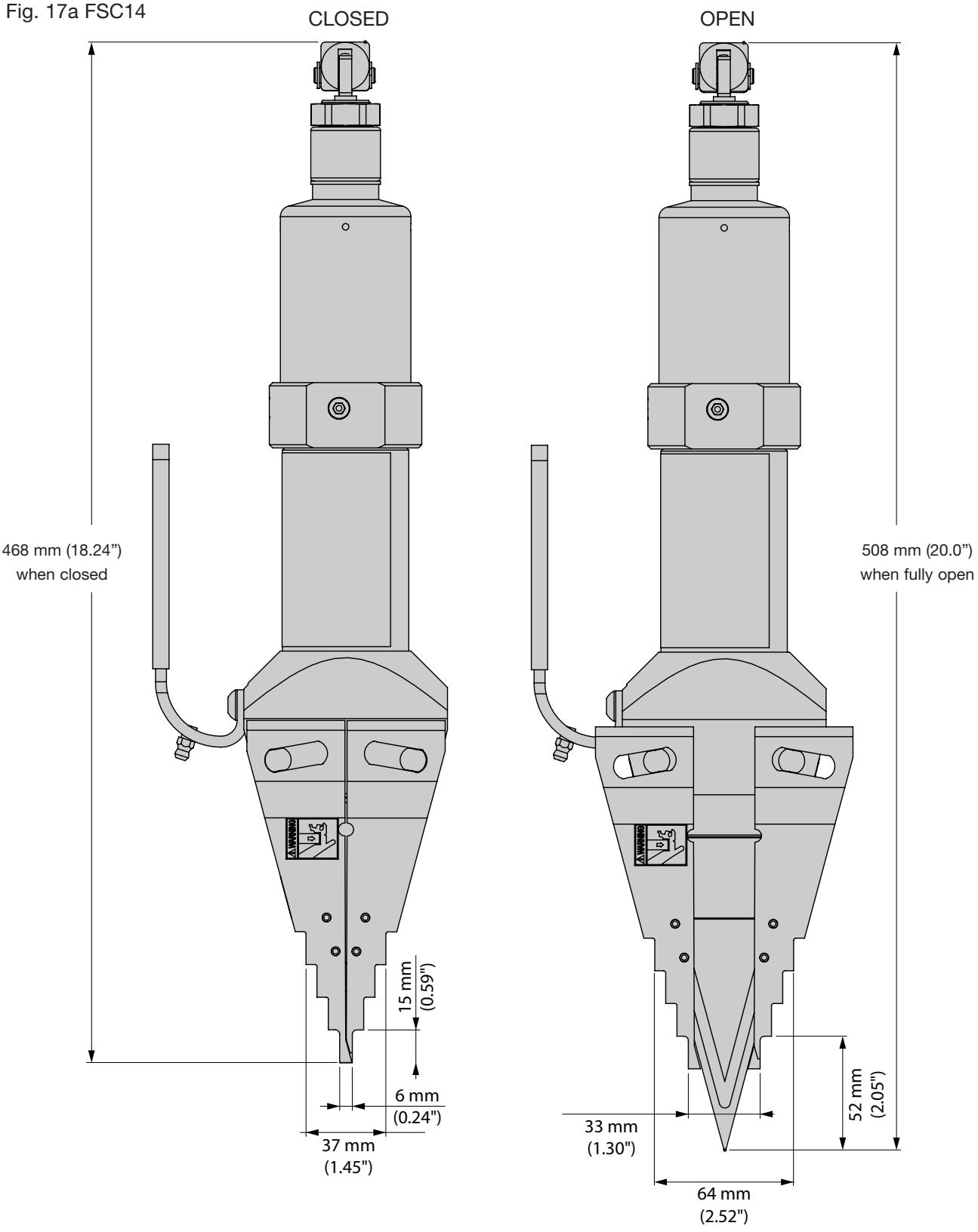
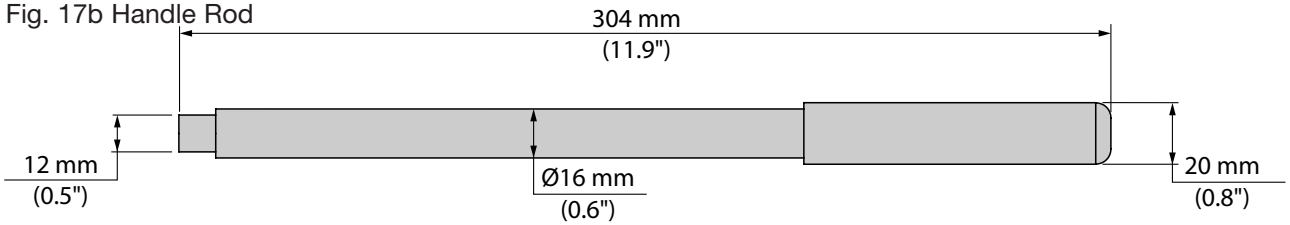


Fig. 17b Handle Rod



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