

Operation and Maintenance Manual

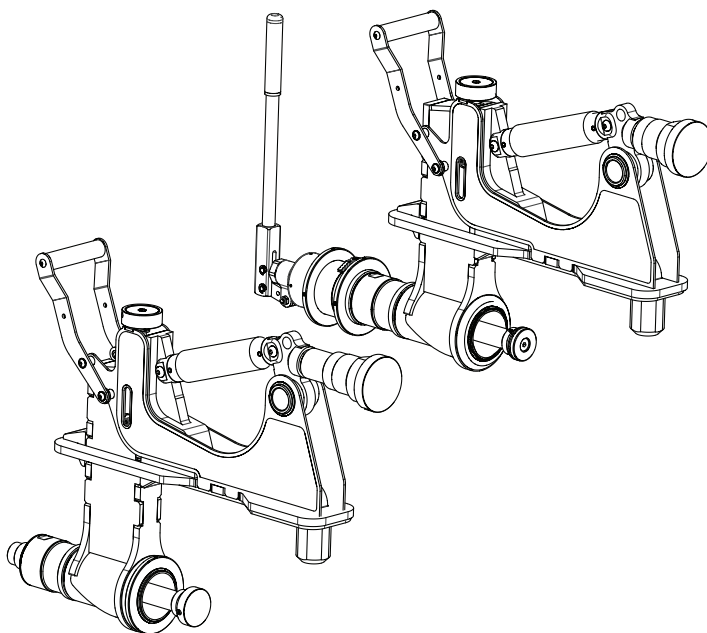
Equalizer Tower Flange Alignment TE External Pump/ TI Integral Pump

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 To reduce the risk of injury, users must read and understand this document before use.

ABOUT US

Enerpac is a global market leader in high pressure hydraulic tools, controlled force products, portable machining, on-site services and solutions for precise positioning of heavy loads. As a leading innovator with a 110-year legacy, Enerpac has helped move and maintain some of the largest structures on earth. When safety and precision matters, elite professionals in industries such as aerospace, infrastructure, manufacturing, mining, oil & gas and power generation rely on Enerpac for quality tools, services and solutions. For additional information, visit www.enerpac.com.



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WARRANTY

Refer to the Enerpac Global Warranty document for terms and conditions of the product warranty. Such warranty information can be found at www.enerpac.com.

AVAILABLE LANGUAGES

L4508 is available in the following languages, visit www.enerpac.com for a copy.

- Weitere Sprachen finden Sie unter www.enerpac.com.
- Para otros idiomas visite www.enerpac.com.

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1. 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 that any questions or concerns arise, contact Enerpac or a local Enerpac distributor for clarification.

Save these instructions for future use.

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.



DO: an illustration showing how the tool should be used.



DON'T: an illustration showing an incorrect way to use a tool.

1.1 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 TFA tools or preparing them for use. Always follow all safety precautions and instructions, including those that are contained within the procedures of this manual.
- Be sure the operator has completed safety induction training, specific to the work surroundings. The operator should be thoroughly familiar with the controls and the proper use of the tool.

- 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. The protective clothing must not interfere with safe operation of the tool or restrict the ability to communicate with co-workers.
- Operating procedures will vary, depending on the system arrangement. Always read, follow, and completely understand all manufacturers' instructions when operating pumps, valves and all other devices used with the TFA tools. Follow all safety precautions contained in the manufacturer's manuals. Use only for intended purpose.
- To minimize risk of personal injury, keep hands and feet away from the tool and workpiece during operation.
- Do not overload equipment.
- Never apply pressure to a damaged hose, doing so 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.
- Do not handle pressurized hoses or couplings; 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.
- Hydraulic circuit must be at zero pressure before couplings are disconnected.
- Do not tamper with air pressure relief safety valve on pump.
- Never leave the system unattended when under pressure. When the system is under pressure DO NOT STAND IN LINE with the direction of force of the TFA tools. This is a danger area. Always keep this area clear of personnel when the system is under pressure.
- Site pump on a secure, flat, level surface. Rope off working area and place warning signs.
- Do not remove gauge covers when fitted.
- Check the date of the calibration certification. If the recalibration date has passed, the gauge must be recalibrated.
- If air supply is interrupted, turn off air stop valve on pump.
- The system operating pressure must not exceed the pressure rating of the lowest rated component in the system.
- Maximum allowable pressure for the TFA12 tools is **7,400 psi [510 bar]**. Do not exceed this pressure setting.
- Maximum allowable pressure for the TFA15 tools is **10,000 psi [700 bar]**. Do not exceed this pressure setting.
- Never strike the tool while it is pressurized or under load. Components under tension may become dislodged, allowing them to become dangerous projectiles. Uncontrolled release of pressurized hydraulic oil could also occur.
- Use only a high-quality non-flammable solvent for cleaning and degreasing parts during wrench repair procedures. To reduce the risk of fire or explosion, do not use flammable solvents.
- It is advised that a pressure gauge(s) is installed in the system when using the TFA_TE tools to monitor operating pressure, to allow the operator to monitor what is happening in the system.
- Care should be taken when using the lanyard to avoid entanglement with body parts.



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.
- Keep hydraulic equipment away from flames and heat. Excessive heat will soften packings and seals, resulting in fluid leaks. Heat also weakens hose materials and packings.
- Lubricate tools as directed in this manual prior to operation. Use only approved lubricants of high quality, following the lubricant manufacturer's instructions.
- Only use the designated anchor point for fixing the lanyard. Do not attach the lanyard to the plastic handle.



Failure to observe and comply with the following precautions could result in property damage and/or void the product warranty.

- Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Enerpac Authorized Service Centre in your area.
- It is strongly recommended that operators always use Enerpac pumps and hoses.
- Always use Enerpac replacement parts.
- Always follow the inspection and maintenance instructions contained in this manual. Perform inspection and maintenance after use, and at regular intervals.
- 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 2.5 m/s².

2. Compliance Statement(s)

2.1 Conformance to National and International Standards

•TFA12TE •TFA15TE

•TFA12TERD37H •TFA12TERD37H



These tools conform with the requirements for CE and UKCA.

•TFA12TI •TFA15TI

•TFA12TIRD37H •TFA12TIRD37H



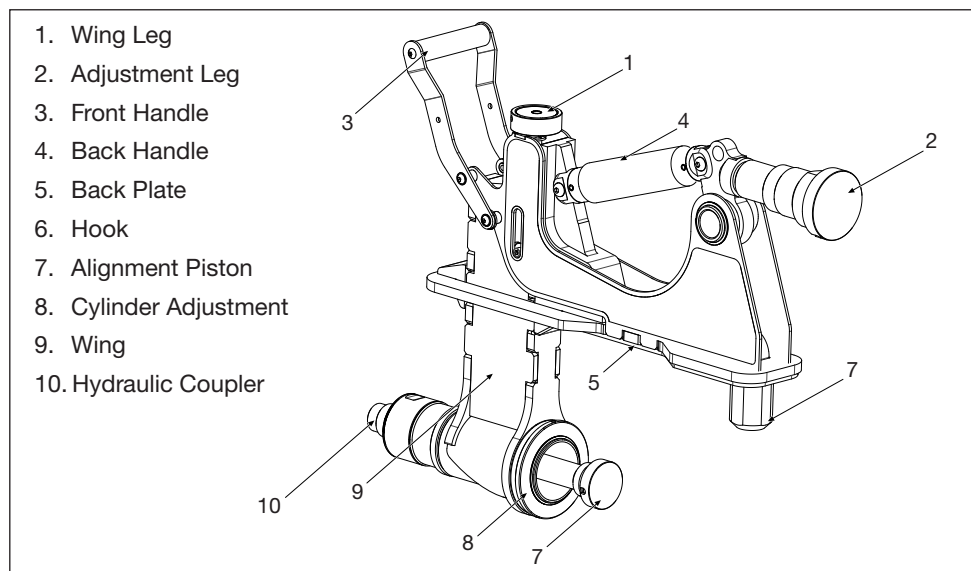
These tools conform with the requirements for CE and UKCA.

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.

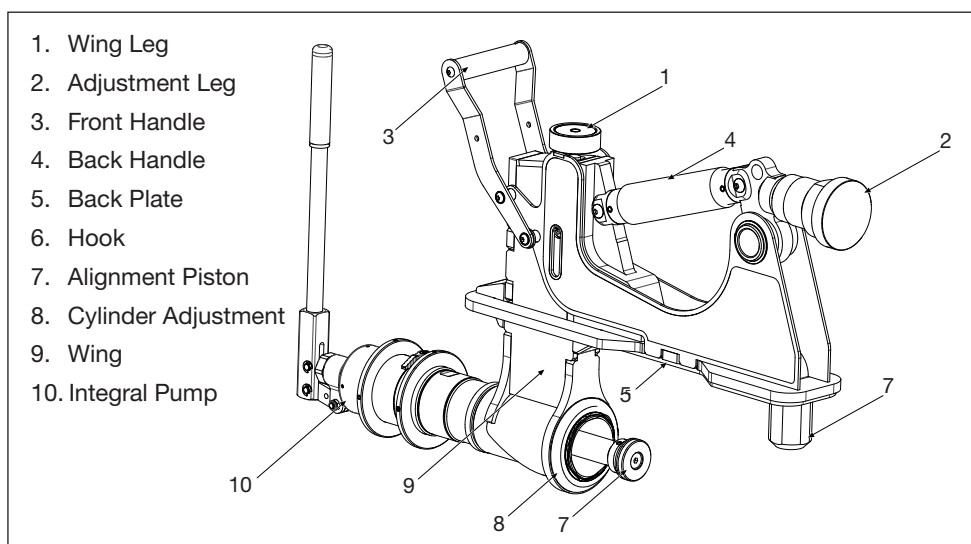
Copies of the EU Declaration as well as the UK Self-Declaration are enclosed with each shipment.

3. Features & Components

3.1 TFA with External Pump (TE) Features Diagram



3.2 TFA with Integral Pump (TI) Features Diagram



3.3 Tool Capabilities

Alignment Force

The following table shows the alignment force (F) through the alignment foot when the maximum external pump pressure is applied. Reaction forces (R_1 & R_2) vary depending on the extension of the wing.

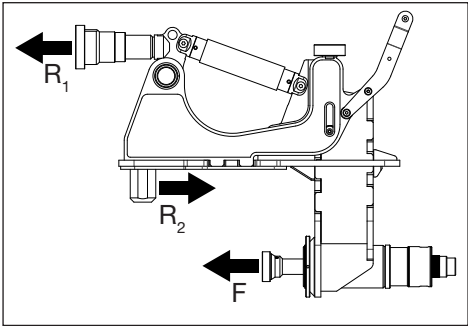


Figure 1: Min/ Max Wing Extension

TFA with External Pump

Force		TFA12TE	TFA15TE	TFA12TE RD37H	TFA15TE RD37H
Alignment Force (F)	Min	12 T	15 T	12 T	15 T
	Max	12 T	15 T	12 T	15 T
Reaction Force 1 (R_1)	Min	10 T	9 T	7 T	6.5 T
	Max	12 T	12 T	8.7 T	8.7 T
Reaction Force 2 (R_2)	Min	22 T	24 T	19 T	21.5 T
	Max	24 T	27 T	20.7 T	23.7 T

TFA with Integral Pump

Force		TFA12TI	TFA15TI	TFA12TI RD37H	TFA15TI RD37H
Alignment Force (F)	Min	12 T	15 T	12 T	15 T
	Max	12 T	15 T	12 T	15 T
Reaction Force 1 (R_1)	Min	10 T	9 T	7 T	6.5 T
	Max	12 T	12 T	8.7 T	8.7 T
Reaction Force 2 (R_2)	Min	22 T	24 T	19 T	21.5 T
	Max	24 T	27 T	20.7 T	23.7 T

3.4 Operating Conditions

Hydraulic Tools:

Minimum Flange Contact Temperature: -30 °C [-22 °F]

Maximum Flange Contact Temperature: 70 °C [158 °F]

3.5 Pump Operation

3.5.1 TFA_TE External Pump Operation

TFA_TE external hydraulic tools use a hydraulic cylinder to advance the Alignment Piston and align the flanges. The hydraulic pressure is applied using an external hand pump, enabling accurate control of the force applied. The maximum working pressure of each TE tools:

- TFA12 510 bar [7400 psi].
- TFA15 700 bar [10000 psi].

Pump Operation

Consult the Instruction Sheet for the Enerpac HP Hand-Pump supplied in the kit. Only use the supplied Hand-Pumps which have been regulated to the correct pressure to suit each tool.

Actuating The TFA_TE External Hydraulic Tool

Follow the Tool Operation instructions detailed in sections 5.4 to 5.11, using the following instructions to actuate the tool.

When the Hand-Pump release valve is closed, pumping the Hand-Pump handle will advance the Alignment Piston.

When using multiple tools, ensure that the spread of all tools correspond to keep the spreading force balanced.

Retracting The TFA_TE External Hydraulic Tool

Opening the release valve will depressurise the cylinder and cause it to retract under the force of its internal spring. The handle does not need to be pumped to retract the tool.

When using multiple tools, exercise caution while retracting to keep the spreading force balanced as the gap is closed.

3.5.2 TFA_TI Integral Pump Operation

Prior to operation, ensure the air-vent in the integral hand pump is not obstructed. Any obstruction in the air-vent can cause a vacuum in the system which can limit the cylinder's travel.

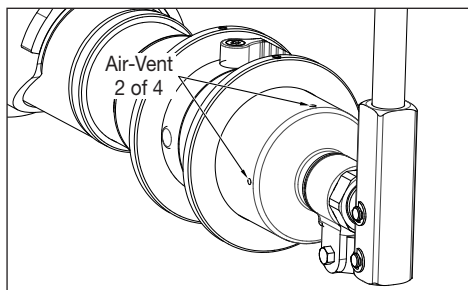


Figure 2: Pump Air-Vents

TFA_TI integral hydraulic tools use a hydraulic cylinder to advance the Alignment Piston and align the flanges. The hydraulic pressure is applied using the integrated hand pump, enabling accurate control of the force applied.

The integral hand pump has a control lever which allows the user to select advance (+) or retract (-).

Actuating The Tool

Follow the Tool Operation instructions detailed in sections 5.2, using the following instructions to actuate the tool.

When advance (+) is selected, pumping the handle will advance the Alignment Piston.

Retracting The Tool

Selecting retract (-) will depressurise the cylinder and cause it to retract under the force of its internal spring. The handle does not need to be pumped to retract the tool.

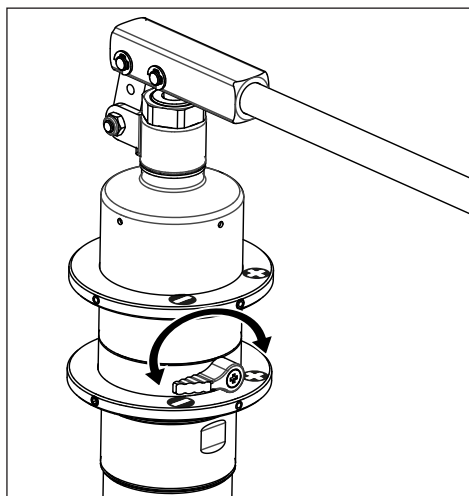


Figure 3: Setting Advance/ Retract

3.6 Handling

TFA12/ TFA15 tools should be lifted and manoeuvred using its two handles.

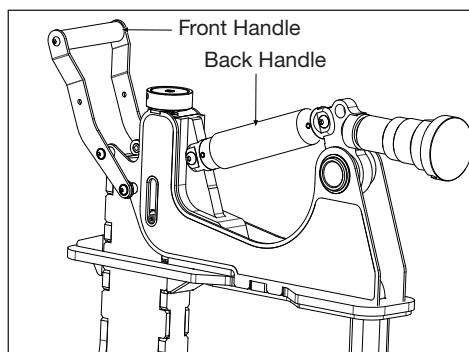


Figure 4: TFA12/ TFA15 Handle

3.7 Kit Contents

External Pump

3.7.1 TFA12TE Kit

- 1 x TFA12TE Tool
- 1 x Safety Lanyard
- 1 x Instruction Manual
- 1 x Carry Case

Dimensions: 640 mm x 540 mm x 165 mm
[25.2" x 21.3" x 6.5"]

Tool only Weight: 21.1 kg [46.5 lb]

Product Code: TFA12TEMIN

3.7.2 TFA15TE Kit

- 1 x TFA15TE Tool
- 1 x Safety Lanyard
- 1 x Instruction Manual
- 1 x Carry Case

Dimensions: 640 mm x 540 mm x 165 mm
[25.2" x 21.3" x 6.5"]

Tool only Weight: 18.9 kg [41.7 lb]

Product Code: TFA15TEMIN

3.7.3 TFA12TERD37H Kit

- 1 x TFA12TERD37H Tool
- 1 x Safety Lanyard
- 1 x Instruction Manual
- 1 x Carry Case

Dimensions: 890 mm x 570 mm x 165 mm
[35.0" x 22.4" x 6.5"]

Tool only Weight: 19.6 kg [43.2 lb]

Product Code: TFA12TERD37HMIN

3.7.4 TFA15TERD37H Kit

1 x TFA15TERD37H Tool

1 x Safety Lanyard

1 x Instruction Manual

1 x Carry Case

Dimensions: 890 mm x 570 mm x 165 mm
[35.0" x 22.4" x 6.5"]

Tool only Weight: 19.1 kg [42.1 lb]

Product Code: TFA15TERD37HMIN

Integral Pump

3.7.5 TFA12TI Kit

1 x TFA12TI Tool

1 x Instruction Manual

1 x Carry Case

Dimensions: 585 mm x 900 mm x 160 mm
[23.0" x 35.4" x 6.3"]

Tool only Weight: 20.5 kg [45.2 lb]

Product Code: TFA12TISTD

3.7.6 TFA15TI Kit

1 x TFA15TI Tool

1 x Instruction Manual

1 x Carry Case

Dimensions: 585 mm x 900 mm x 160 mm
[23.0" x 35.4" x 6.3"]

Tool only Weight: 20.0 kg [44.1 lb]

Product Code: TFA15TISTD

3.7.7 TFA12TIRD37H Kit

1 x TFA12TIRD37H Tool

1 x Instruction Manual

1 x Carry Case

Dimensions: 585 mm x 900 mm x 160 mm
[23.0" x 35.4" x 6.3"]

Tool only Weight: 22.3 kg [49.2 lb]

Product Code: TFA12TIRD37HSTD

3.7.8 TFA15TIRD37H Kit

1 x TFA15TIRD37H Tool

1 x Instruction Manual

1 x Carry Case

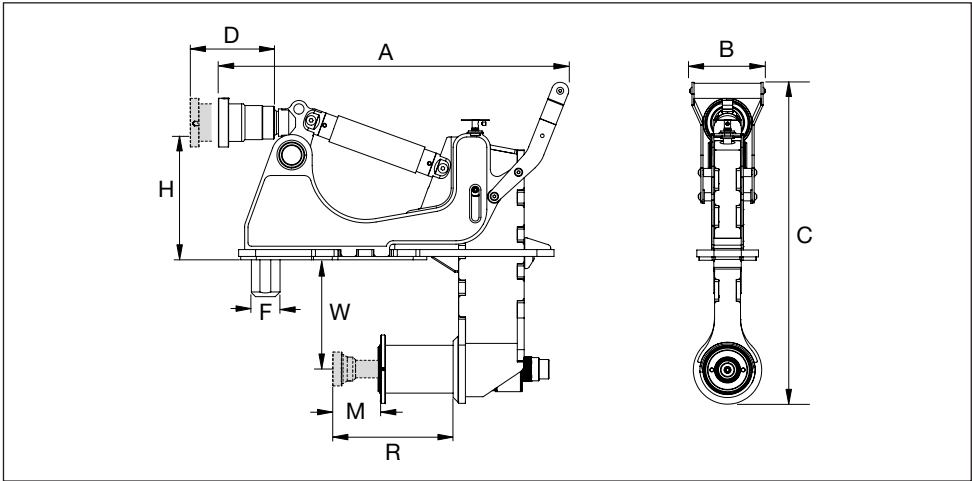
Dimensions: 585 mm x 900 mm x 160 mm
[23.0" x 35.4" x 6.3"]

Tool only Weight: 21.7 kg [49.2 lb]

Product Code: TFA15TIRD37HSTD

4. Technical Product Data

4.1 TFA_TE Dimensional Diagram



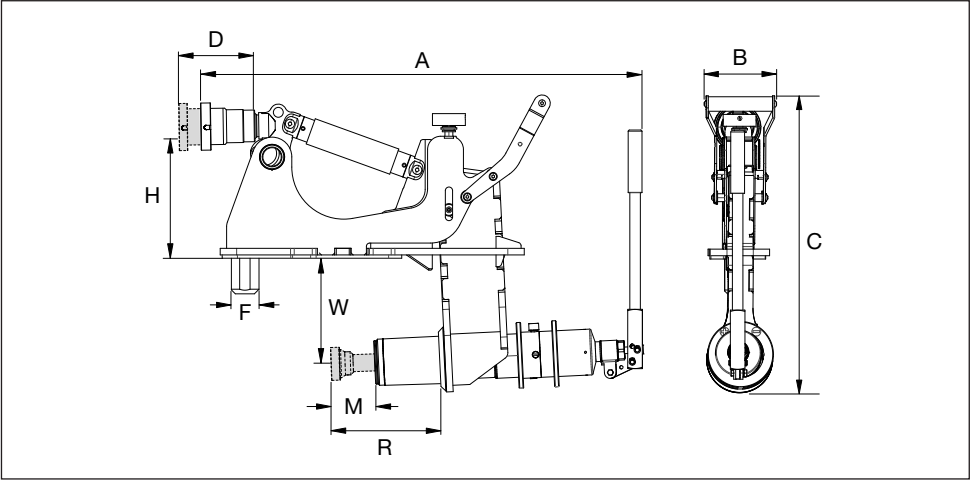
		TFA12TE	TFA15TE	TFA12TE RD37H	TFA15TE RD37H
A	Tool Length	104 mm [4.10"]	104 mm [4.10"]	104 mm [4.10"]	104 mm [4.10"]
B	Tool Width	470 mm [18.5"]	470 mm [18.5"]	522 mm [20.6"]	481 mm [18.9"]
C	Tool Height	513 mm [20.2"]	513 mm [20.2"]	484 mm [19.1"]	484 mm [19.1"]
D	Pipe Leg Drop	Min 90 mm [3.5"]	90 mm [3.5"]	53 mm [2.1"]	53 mm [2.1"]
		Max 132 mm [5.2"]	132 mm [5.2"]	94 mm [3.7"]	94 mm [3.7"]
F	Bolt Hole Diameter	45 mm [1.8"]	45 mm [1.8"]	39 mm [1.5"]	39 mm [1.5"]
H	Reaction Spacing	200 mm [7.9"]	200 mm [7.9"]	275 mm [10.8"]	275 mm [10.8"]
M	Misalign-ment	Min 0 mm [0"]	0 mm [0"]	0 mm [0"]	0 mm [0"]
		Max 65 mm [2.6"]	65 mm [2.6"]	65 mm [2.6"]	65 mm [2.6"]
R	Rise	Min 144 mm [5.7"]	144 mm [5.7"]	148 mm [5.8"]	148 mm [5.8"]
		Max 243 mm [9.6"]	243 mm [9.6"]	247 mm [9.7"]	247 mm [9.7"]
W	Wing Reach	Min 160 mm [6.3"]	120 mm [4.7"]	160 mm [6.3"]	120 mm [4.7"]
		Max 200 mm [7.9"]	160 mm [6.3"]	200 mm [7.9"]	160 mm [6.3"]

NOTES:

- By attaching extension foot to the adjustment leg, the pipe leg drop (E) dimensions are increased by 40mm.

- Various bushes can be attached to the hooks. This alters the pipe leg drop (E) and the rise (F). Please contact Enerpac for more information.

4.2 TFA_TI Dimensional Diagram



		TFA12TI	TFA15TI	TFA12TI RD37H	TFA15TI RD37H
A	Tool Length	104 mm [4.10"]	104 mm [4.10"]	104 mm [4.10"]	104 mm [4.10"]
B	Tool Width	470 mm [18.5"]	470 mm [18.5"]	521 mm [20.5"]	482 mm [19.0"]
C	Tool Height	635 mm [25.0"]	635 mm [25.0"]	635 mm [25.0"]	635 mm [25.0"]
D	Pipe Leg Drop	Min 83 mm [3.3"]	Min 83 mm [3.3"]	Min 53 mm [2.1"]	Min 53 mm [2.1"]
		Max 123 mm [4.8"]	Max 123 mm [4.8"]	Max 93 mm [3.7"]	Max 93 mm [3.7"]
F	Bolt Hole Diameter	45 mm [1.8"]	45 mm [1.8"]	37 mm [1.5"]	37 mm [1.5"]
H	Reaction Spacing	200 mm [7.9"]	200 mm [7.9"]	275 mm [10.8"]	275 mm [10.8"]
M	Misalign-ment	Min 0 mm [0"]	Min 0 mm [0"]	Min 0 mm [0"]	Min 0 mm [0"]
		Max 65 mm [2.6"]	Max 65 mm [2.6"]	Max 65 mm [2.6"]	Max 65 mm [2.6"]
R	Rise	Min 150 mm [5.9"]	Min 150 mm [5.9"]	Min 150 mm [5.9"]	Min 150 mm [5.9"]
		Max 250 mm [9.8"]	Max 250 mm [9.8"]	Max 250 mm [9.8"]	Max 250 mm [9.8"]
W	Wing Reach	Min 160 mm [6.3"]	Min 120 mm [4.7"]	Min 160 mm [6.3"]	Min 120 mm [4.7"]
		Max 203 mm [8.0"]	Max 160 mm [6.3"]	Max 203 mm [8.0"]	Max 160 mm [6.3"]

5. Operation

5.1 General Guidance

Prior to alignment, an assessment should be carried out to determine the most appropriate positioning of the tool on the flange joint.

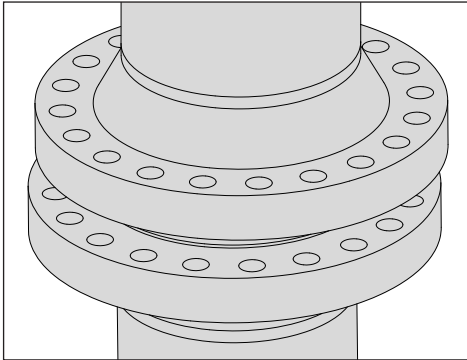


Figure 5: Misaligned Flange

TFA tools should always be installed in such a way that the lower flange is closer to the user and the upper flange is further away. The tool is designed to hook into the bolt-hole of the upper flange and push the lower flange into alignment.

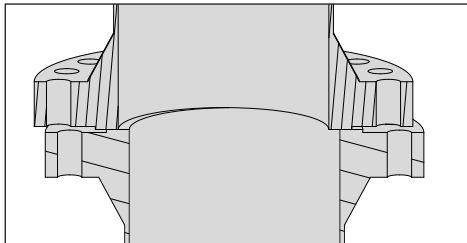


Figure 6: Misaligned Flange X-Section

Prior to installation, ensure the Adjustment Leg and Cylinder Adjustment Sleeve are fully retracted. Ensure that the Alignment piston is fully retracted.

5.2 Tool Installation

Position the tool into the bolt-hole ensuring that the hook is fully located into the bolt-hole and the base plate of the tool is sitting flat against the upper flange.

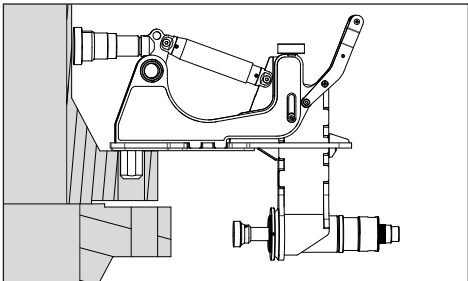


Figure 7: TFA_TI Installation

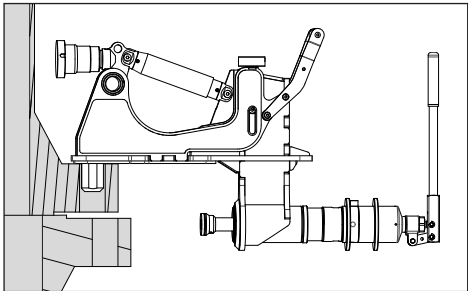


Figure 8: TFA_TE Installation

⚠ WARNING UNDER NO Circumstances shall spacers like him, wedges, or timber be used between the alignment Foot or base plates and the flange face to make up for miss alignment. If the misalignment exceeds the tool's stated capability (see Section 3.3) Stop work and advice Supervisor.

5.2.1 Adjustment Leg

Extend the Adjustment Leg by turning the knurled foot clockwise until it contacts the pipe wall. Ensure that the tool is sitting squarely.

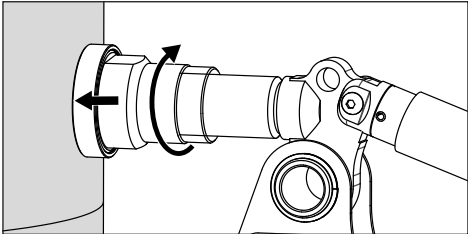


Figure 9: Using Adjustment Leg

TFA_TE Specific

The TFA_TE tool can be supplied with a Foot Extension that can be fixed to the adjustment leg to increase the effective leg length and therefore the range of application.

See Section 4.0 Technical Product Data for TFA tools application data.

To fit the Foot Extension, first remove the plastic cap:

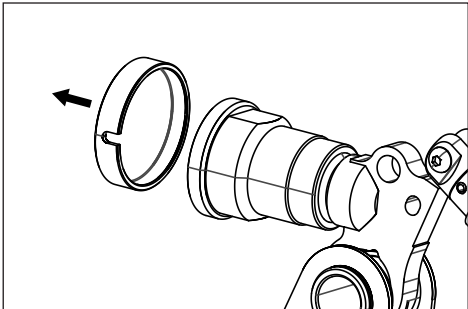


Figure 10: Remove plastic cap

Screw in the Foot Extension fully until the screw-thread is no longer taking load and the foot feels slightly loose:

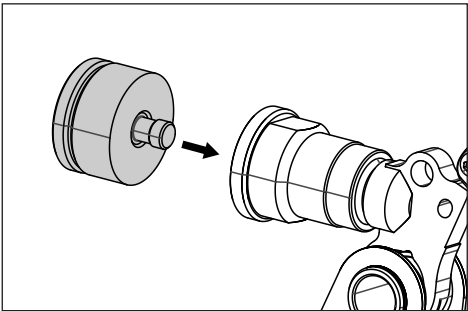


Figure 11: Insert Foot Extension

Fit the plastic cap onto the Foot Extension:

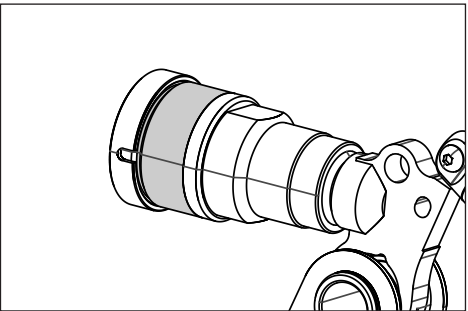


Figure 12: Attach plastic cap

5.2.2 Wing Extension

The Alignment Piston is located on an adjustable wing which can be extended to enable the tool to be used on a variety of flange sizes.

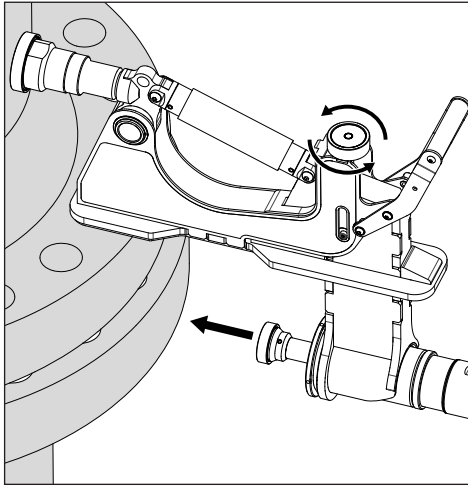


Figure 13: Using Wing Extension

TFA_TE Specific:

TFA12TE's are longer reaching versions of the TFA15TE's and are suitable for thicker flanges that require a longer wing.

Use the Wing Extension adjustment knob to lower the wing until the foot of the Alignment piston is positioned within the space between the upper and lower faces of the lower flange.

5.2.3 Cylinder Adjustment Sleeve

The Alignment Piston has a 65 mm stroke. The Cylinder Adjustment Sleeve extends the reach of the tool to fit a variety of flange sizes, without compromising its maximum alignment capacity.

Turn the Cylinder Adjustment Sleeve by the knurled ring until the Alignment Foot is touching the lower flange.

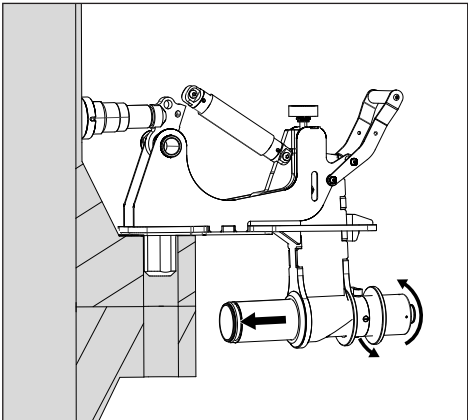


Figure 14: Cylinder Adjustment

5.2.4 Tool Checks

⚠ WARNING Ensure that the tool is sitting square on the flange, that the wing is parallel to the pipe wall and that the Adjustment Leg is adjusted prior to actuating the tool. Actuating the tool when it is not correctly installed could cause injury or equipment damage.

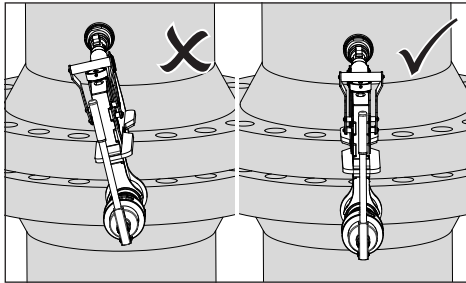


Figure 15: Seat flat On flange

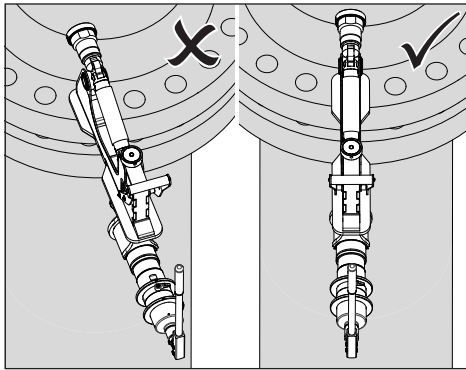


Figure 16: Install parallel to pipe Wall

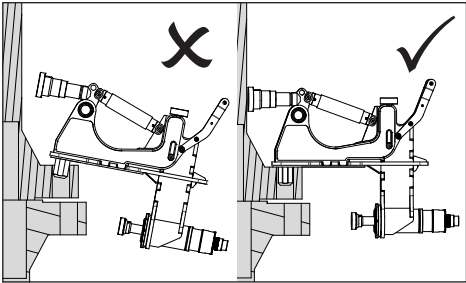


Figure 17: Seat flat on flange

⚠ WARNING Do not allow fingers, hands or other body parts to come into contact with the flange while actuating the tool. Only hold the tool by its designated handles.

5.2.5 Alignment

Refer to Section 3.4.1 for tool actuation instructions for TFA_TE tools or Section 3.4.2 for tool actuation instructions for TFA_TI tools.

Actuating the tool will extend the Alignment Piston and align the flanges.

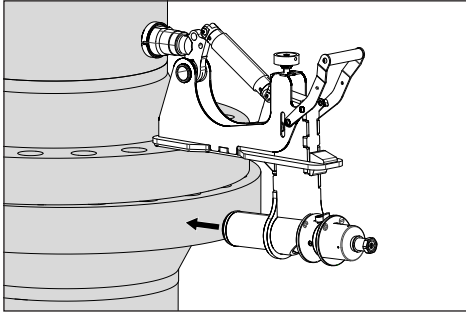


Figure 18: Securely position TFA on fange

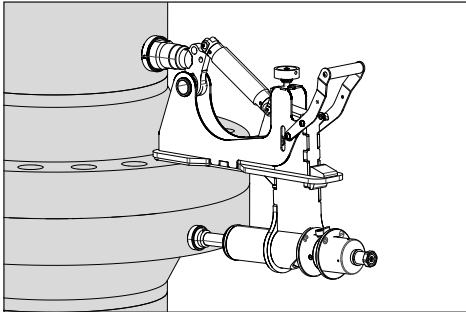


Figure 19: Extend Alignment Piston to align flange faces

5.2.6 Securing the Flange Joint

After the flange joint has been aligned it can be secured by installing as many bolts as possible into the bolt holes.

It may be necessary to repeat the alignment process several times while working around the flange joint.

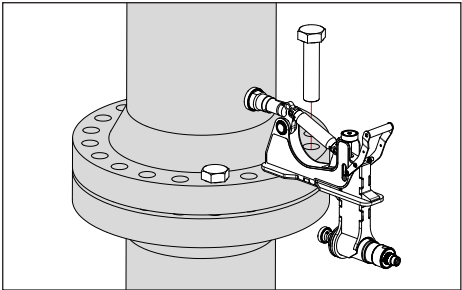


Figure 20: Securing Aligned Flanges with Bolts

NOTICE Always fit and use the Safety Bond assembly (part no. 270800-01) when removing the tool from the flange region. Never lift by hoses or couplers. Maintain clear exclusion zone beneath tool during removal.

5.2.7 Sub-Sea Usage

Using Using TFA_TE tools Sub-Sea

TFA_TE tools are actuated by means of single-acting spring-return hydraulic cylinder and can be used sub-sea providing the following actions are taken:

- The gauge and manifold are removed from the Enerpac HP hand-pump and the coupler is fitted directly to the pump outlet (tools in this configuration can be requested from Enerpac).
- The tool is connected to the Enerpac HP hand-pump whilst still top-side.
- The pump release valve is fully opened and remains open until the tool has descended to the working depth. This will allow the pressure to equalise.
- The tool is actuated via the hand-pump by a diver.
- Upon completion of works the release valve is left in the fully-open position until the tool has ascended to the surface.
- The tool and pump are stripped-down, cleaned and lubricated immediately to minimise corrosion.

Please note that a sub-sea TFAH12 cannot be operated from top-side by use of a down-line. The return springs in the hydraulic cylinders do not have sufficient force to close the tool if used with a down-line from a top-side pump, therefore the standard hydraulic tools will not function correctly and may jam in place if used in this configuration.

Using TFA_TI tools Sub-Sea

TFA_TI tools are actuated by means of a single-acting spring-return hydraulic cylinder and can be used sub-sea providing the following actions are taken:

- The pump release valve is fully opened and remains open until the tool has descended to the working depth. This will allow the pressure to equalise.
- The tool is actuated via the hand pump by a diver.
- Upon completion of works the release valve is left in the fully-open position until the tool has ascended to the surface.
- The tool and pump are stripped-down, cleaned and lubricated immediately to minimise corrosion.

6. Storage

6.1 Recommended Storage

Enerpac tools should be stored in a cool dry place. Tools should always be cleaned, serviced and lubricated prior to storage. Ensure that tools are stored in their designated packing cases.

6.2 Long-term Storage - Maintenance Plan

1. Rub components down with a dry cloth to remove moisture.
2. Coat **EVERY** surface and contact point with a corrosion inhibitor. Where necessary, coat inside and outside of component e.g. VC10
3. Nuts and threads must also be coated with a corrosion inhibitor.
4. Once surfaces have been coated, seal individual components in clear plastic bags or clear vacuum bags or clear shrink wrap.
NOTICE Bags/shrink wrap must be clear for visibility. Take care when using shrink wrap that the tool is/ components are still easy to see.
5. Remove all or, where not vacuum sealed, as much air from bags as possible.
6. Once bags have been closed and sealed **DO NOT** re-open. Any visual inspections must be done with closed and sealed bags. If bags are opened the components will have to be dried, re-coated and re-sealed in bags/shrink wrap.
7. Replace silica gel [100g] **EVERY TIME** the case is opened.
NOTICE Depending on moisture content of air, silica gel should be changed weekly.
8. Visually inspect kits after 30-days and every 30-days thereafter. Remember to replace silica gel before closing case.

7. Maintenance

7.1 Inspection

A thorough inspection should be carried out prior to usage, storage or transportation to ensure the completeness and condition of the tool.

Inspection should include:

- Visual inspection of the outer parts of the tool, checking for obvious damage, degradation or missing parts
- Visual inspection of the Alignment Piston (requiring tool actuation). Damage to the Alignment Piston can be indicative of tool over-load.

Cleaning and servicing should be undertaken as required prior to the tool being used, stored or transported.

7.2 Cleaning

To lightly clean the tool, wipe gently with a damp cloth.

If more thorough cleaning is required (for example following immersion in water) carry out the following cleaning procedure:

- Strip the tool down, observing the schematics in the Section 8 Parts List,
- Clean the components using detergent, following the manufacturer's guidelines,
- Rinse the components to remove traces of detergent,
- Dry the components thoroughly.

Inspect, service and lubricate the tool immediately after the cleaning process.

7.3 Maintenance

7.3.1 Servicing

Replace missing worn or damaged parts. Use only genuine Enerpac parts from approved distributors or service centres. Enerpac parts have been engineered and manufactured to be fit-for-purpose.

Grease all moving parts by following the Lubrication Procedure prior to usage, storage or transportation.

If topping up or replacing hydraulic oil as part of a service, use only premium quality hydraulic oil of the grade 15 cSt.

7.3.2 Lubrication Procedure

Apply grease following cleaning and servicing, prior to usage, storage or transportation. Never assemble and leave a tool without following the greasing procedure as degradation or damage may occur.

Use only high pressure molybdenum disulphide grease.

Apply grease liberally to the following areas:

1. The Adjustment Leg thread,
2. The Wing Extension thread,
3. The Cylinder Adjustment thread.

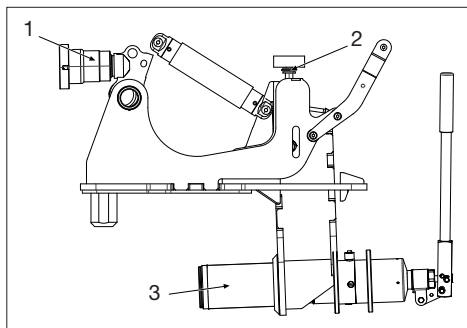
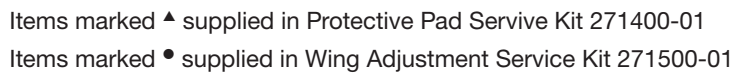


Figure 21: Areas to be greased

8.1 TFA_TE/ TFA_TERD37H



L4508_a

TFA12TE/ TFA15TE Table of Parts

Item	Description	Qty	Part Numbers	
			TFA12TE	TFA15TE
1	Wing Arm Welded Assembly	1	1210100-01	1210100-01
2	Body Assembly - Welded	1	270200-01	270200-01
3	Strut Assembly	1	270300-01	270300-01
4	TFA_TE Cylinder Assembly	1	1320500-01	1320500-01
5	Handle Assembly	1	271300-01	271300-01
6	Adjustable Leg Assembly	1	270400-01	270400-01
7	Adjustment Leg Fixing Shaft	1	270900-01	270900-01
8	Side Spacer Bush	2	272000-01	272000-01
9	Spiral Clip	2	273300-01	273300-01
10	Left Body Plate Sticker	1	070410-01	1323700-01
11	Right Body Plate Sticker	1	070411-01	1323800-01
12	Protection Pad	1	▲	▲
13	M6 Countersunk Hex Screw	2		
14	Foot Cap Tower	1		
15	Adjustment Rod	1	●	●
16	Adjuster Boss	1		
17	Nylon Bush	1		
18	Nylon Washer	1		
19	Wing Adjust Decal	1		
20	Release Knob	1		
21	External Circlip	1		
22	Washer 10mm ID	2		
23	M5 Socket Set Screw	1		
24	M5x12mm Socket Head Capscrew	2		
▲ Available as part of Protective Pad Service Kit 271400-01		● Available as part of Wing Adjustment Service Kit 271500-01		

TFA12TERD37H/ TFA15TERD37H Table of Parts

Item	Description	Qty	Part Numbers	
			TFA12TE RD37H	TFA15TE RD37H
1	Wing Arm Welded Assembly	1	1210100-01	270100-01
2	Body Assembly - Welded	1	1690100-01	1690100-01
3	Strut Assembly	1	270300-01	270300-01
4	TFA_TE Cylinder Assembly	1	1320500-01	1320500-01
5	Handle Assembly	1	271300-01	271300-01
6	Adjustable Leg Assembly	1	1690200-01	1690200-01
7	Adjustment Leg Fixing Shaft	1	270900-01	270900-01
8	Side Spacer Bush	2	272000-01	272000-01
9	Spiral Clip	2	273300-01	273300-01
10	Left Body Plate Sticker	1	2010001-01	2020001-01
11	Right Body Plate Sticker	1	2010002-01	2020002-01
12	Protection Pad	1	▲	▲
13	M6 Countersunk Hex Screw	2		
14	Foot Cap Tower	1		
15	Adjustment Rod	1	●	●
16	Adjuster Boss	1		
17	Nylon Bush	1		
18	Nylon Washer	1		
19	Wing Adjust Decal	1		
20	Release Knob	1		
21	External Circlip	1		
22	Washer 10mm ID	2		
23	M5 Socket Set Screw	1		
24	M5x12mm Socket Head Capscrew	2		
▲ Available as part of Protective Pad Service Kit 271400-01		● Available as part of Wing Adjustment Service Kit 271500-01		

8.2 TFA_TE Cylinder Assembly (1320500-01)

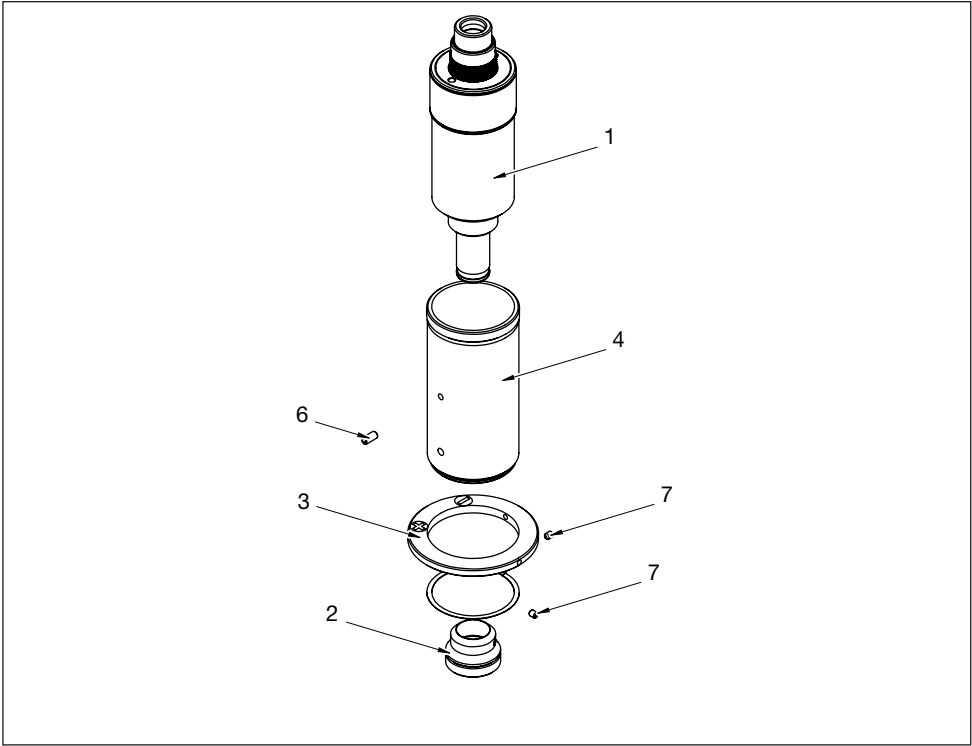


Figure 23: TFA_TE Cylinder Assembly (1320500-01) Exploded View

TFA_TE Cylinder Assembly (1320500-01) Table of Parts

Item	Description	Qty	Part Numbers
1	Hydraulic Cylinder - 10,000 PSI	1	830300-01
2	Cylinder Foot Assembly	1	270600-01
3	Cylinder Adjusting Ring	1	270701-01
4	Hydraulic Cylinder Sleeve	1	270501-01
5	Spiral Retaining Ring	1	830313-01
6	M6 Socket Set Screw	1	301301-01
7	M5 Socket Set Screw	2	300401-01

8.3 TFA_TE Hydraulic Cylinder (830300-01)

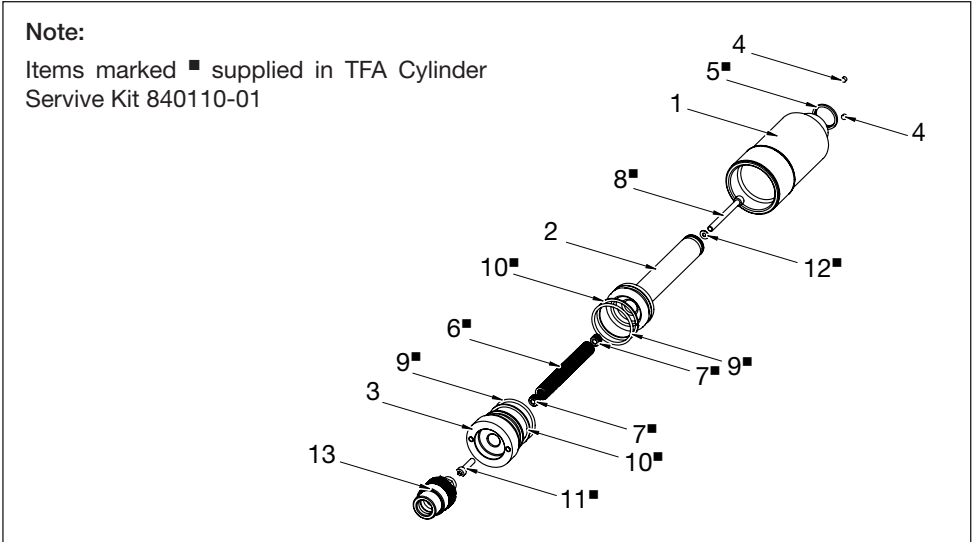


Figure 24: TFA_TE Hydraulic Cylinder (830300-01) Exploded View

TFA_TE Hydraulic Cylinder (830300-01) Table of Parts

Item	Description	Qty	Part Numbers
1	Cylinder Body	1	830301-01
2	Piston	1	830302-01
3	Cylinder End Cap	1	830303-01
4	Cylinder Vent Plug	2	830310-01
5	Wiper Seal	1	■
6	Tension Die Spring	1	
7	Spring Lock	2	
8	M6 Capscrew	1	
9	O-Ring	2	
10	Back-Up Ring	2	
11	M6x25 Socket Head Screw	1	
12	M6 Gasket Seal	1	
13	Coupler	1	300901-01

■ Available as part of TFA Cylinder Service Kit 840110-01

8.4 TFA_TE Cylinder Foot Assembly (270600-01)

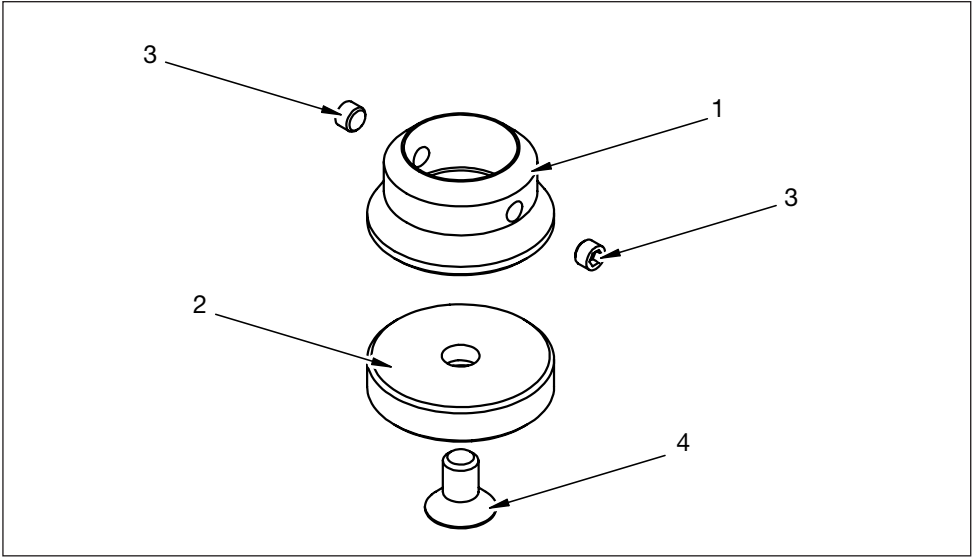


Figure 25: TFA_TE Cylinder Foot Assembly (270600-01) Exploded View

TFA_TE Cylinder Foot Assembly (270600-01) Table of Parts

Item	Description	Qty	Part Numbers
1	Cylinder Foot	1	270601-01
2	Cylinder Foot Pad	1	270602-01
3	M6 Set Screw	2	271200-01
4	M8 Countersunk Hex Screw	1	271900-01

8.5 TFA_TI/ TFA_TIRD37H

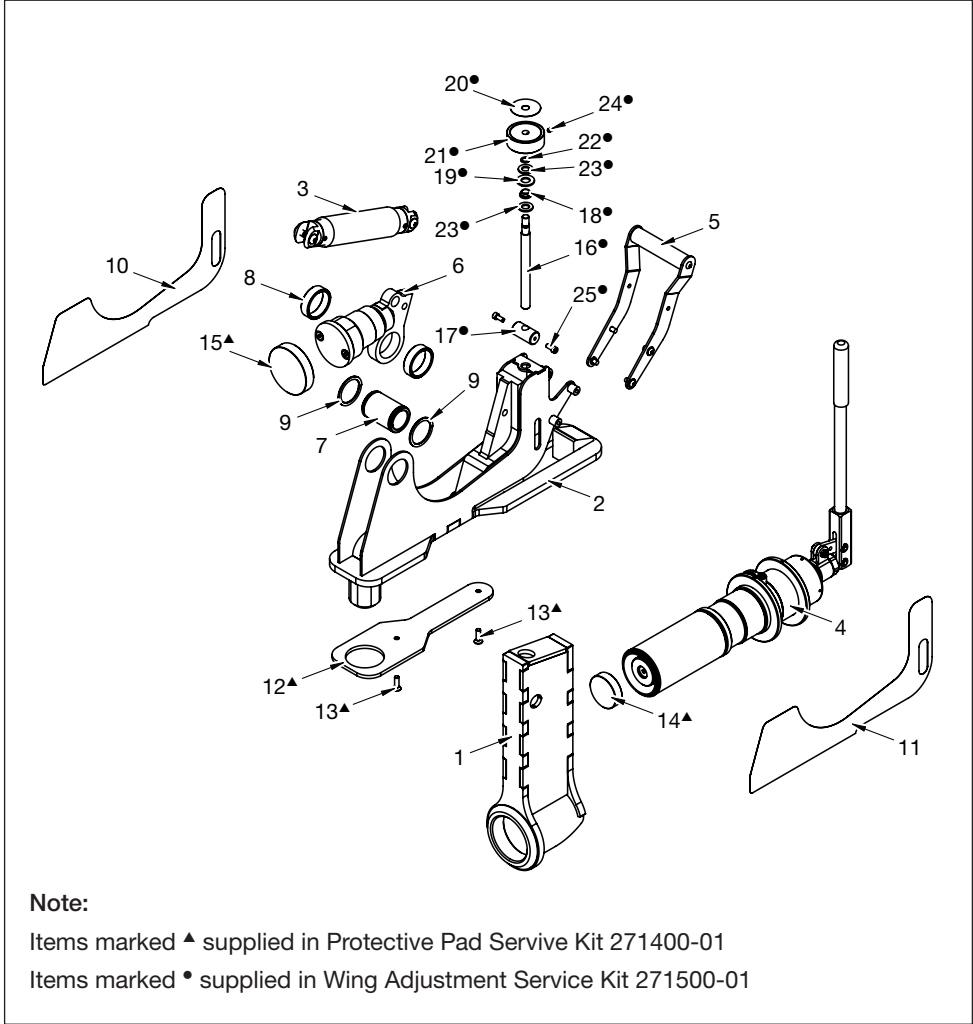


Figure 26: TFA_TI/ TFA_TIRD37H Exploded View

TFA12TI/ TFA15TI Table of Parts

Item	Description	Qty	Part Numbers	
			TFA12TI	TFA15TI
1	Wing Arm Welded Assembly	1	1210100-01	270100-01
2	Body Assembly - Welded	1	270200-01	270200-01
3	Strut Assembly	1	270300-01	270300-01
4	Cylinder Assembly	1	270500-01	270500-01
5	Handle Assembly	1	271300-01	271300-01
6	Adjustable Leg Assembly	1	270400-01	270400-01
7	Adjustment Leg Fixing Shaft	1	270900-01	270900-01
8	Side Spacer Bush	2	272000-01	272000-01
9	Spiral Clip	2	270800-01	270800-01
10	Left Body Plate Sticker	1	1700002-01	070393-01
11	Right Body Plate Sticker	1	1700001-01	070392-01
12	Protection Pad	1	▲	▲
13	M6 Countersunk Hex Screw	2		
14	Foot Cap Flange	1		
15	Foot Cap Tower	1		
16	Adjustment Rod	1	●	●
17	Adjuster Boss	1		
18	Adjustment Bush	1		
19	Adjustment Bush Washer	1		
20	Wing Adjust Decal	1		
21	Release Knob	1		
22	External Circlip	1		
23	Washer 10mm ID	2		
24	M5 Socket Set Screw	1		
25	M5x12mm Socket Head Capscrew	2		
▲ Available as part of Protective Pad Service Kit 271400-01		● Available as part of Wing Adjustment Service Kit 271500-01		

TFA12TIRD37H/ TFA15TIRD37H Table of Parts

Item	Description	Qty	Part Numbers	
			TFA12TI RD37H	TFA15TI RD37H
1	Wing Arm Welded Assembly	1	1210100-01	270100-01
2	Body Assembly - Welded	1	270200-01	270200-01
3	Strut Assembly	1	270300-01	270300-01
4	Cylinder Assembly	1	270500-01	270500-01
5	Handle Assembly	1	271300-01	271300-01
6	Adjustable Leg Assembly	1	1690200-01	1690200-01
7	Adjustment Leg Fixing Shaft	1	270900-01	270900-01
8	Side Spacer Bush	2	272000-01	272000-01
9	Spiral Clip	2	270800-01	270800-01
10	Left Body Plate Sticker	1	1680005-01	1690002-01
11	Right Body Plate Sticker	1	1680004-01	1690001-01
12	Protection Pad	1	▲	▲
13	M6 Countersunk Hex Screw	2		
14	Foot Cap Flange	1		
15	Foot Cap Tower	1		
16	Adjustment Rod	1	●	●
17	Adjuster Boss	1		
18	Adjustment Bush	1		
19	Adjustment Bush Washer	1		
20	Wing Adjust Decal	1		
21	Release Knob	1		
22	External Circlip	1		
23	Washer 10mm ID	2		
24	M5 Socket Set Screw	1		
25	M5x12mm Socket Head Capscrew	2		
▲ Available as part of Protective Pad Service Kit 271400-01		● Available as part of Wing Adjustment Service Kit 271500-01		

8.6 TFA_TI Cylinder Pump Assembly (270500-01)

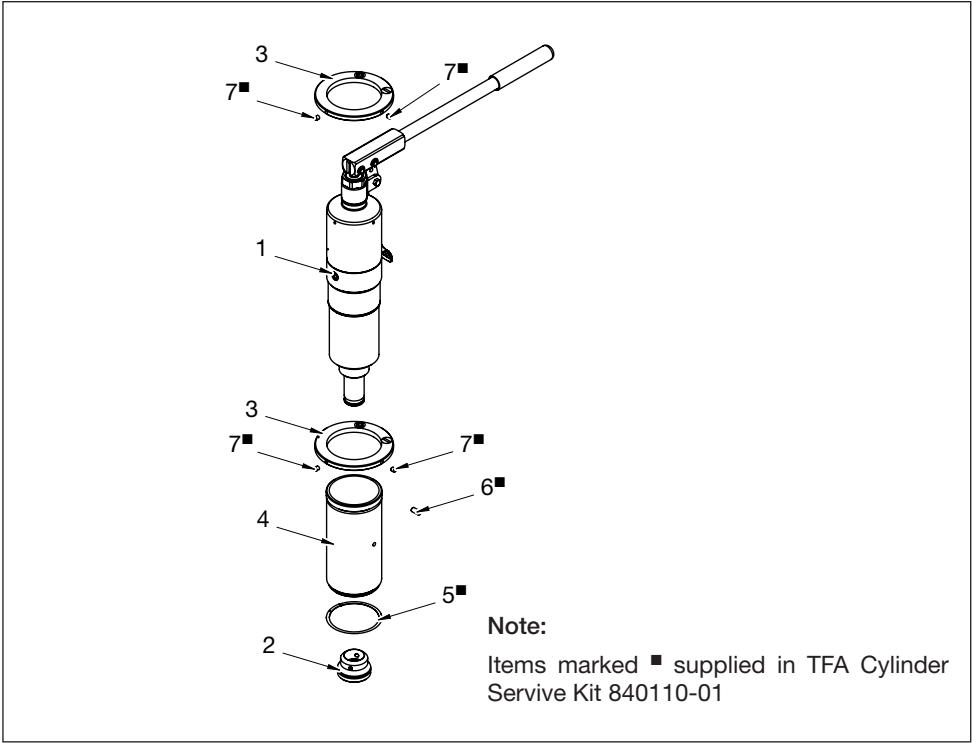


Figure 27: TFA_TI Cylinder Pump Assembly (270500-01) Exploded View

TFA_TI Integral Pump Assembly Table of Parts

Item	Description	Qty	Part Numbers
1	Integral Cylinder & Pump Assembly	1	840300-01
2	Cylinder Foot Assembly	1	270600-01
3	Cylinder Adjusting Ring	2	270701-01
4	Integral Cylinder Sleeve	1	270501-01
5	Spiral Retaining Ring	2	■
6	M6 Socket Set Screw	1	
7	M5 Socket Set Screw	4	
■ Available as part of TFA Cylinder Foot Service Kit 271900-01K			

8.7 TFA_TI Integral Cylinder & Pump Assembly (840300-01)

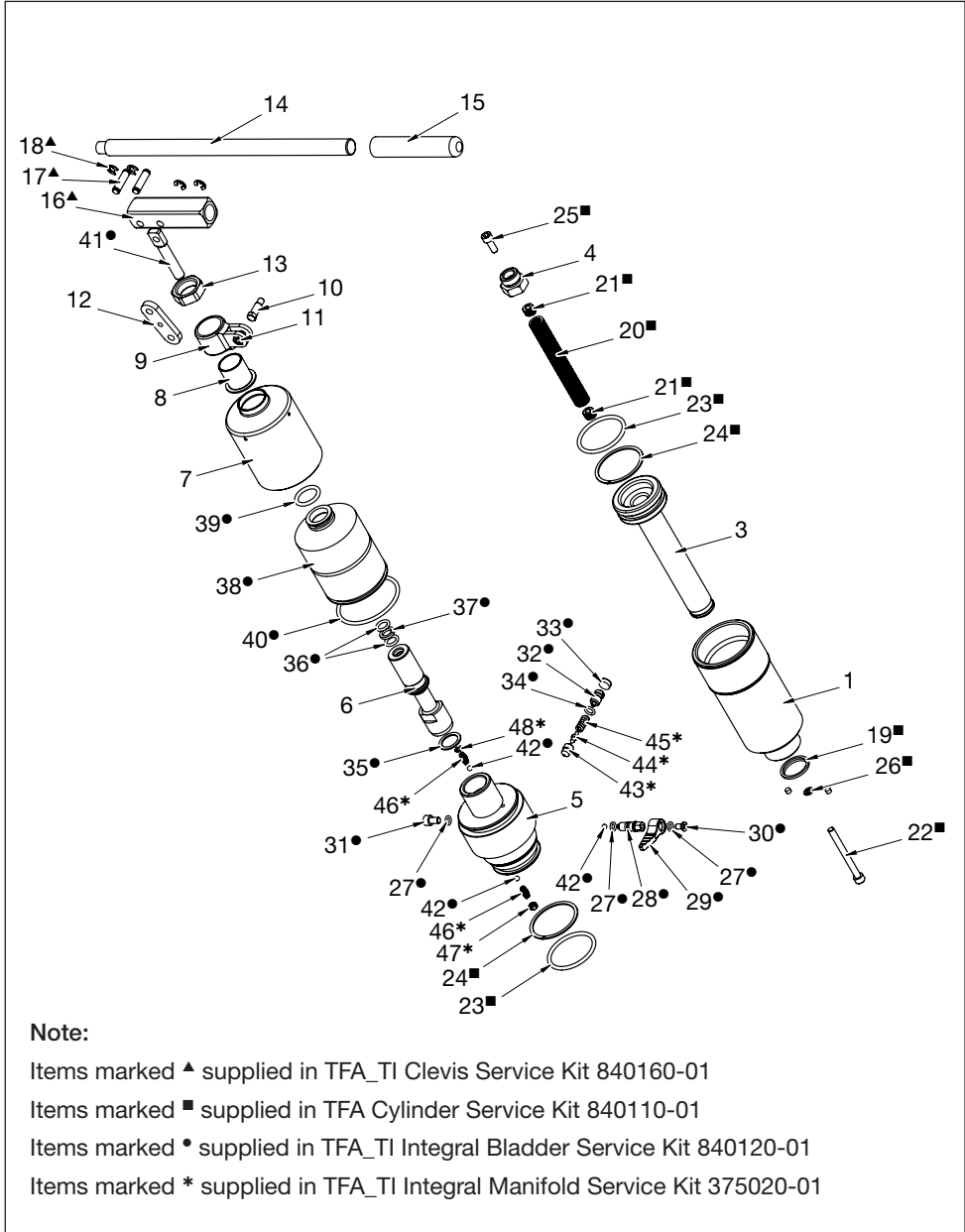


Figure 28: TFA_TI Integral Cylinder & Pump Assembly (840300-01) Exploded View

TFA_TI Integral Cylinder & Pump Assembly (840300-01) Table of Parts

Item	Description	Qty	Part Numbers
1	Cylinder Body	1	830301-01
2	Cylinder Vent Plug	2	830310-01
3	Piston	1	830302-01
4	Nut	1	840100-01
5	Cylinder Base	1	840301-01
6	Pump Piston Housing	1	376901-01
7	Bladder Housing	1	840302-01
8	Piston Housing Cap	1	372401-01
9	Swivel Clevis	1	372501-01
10	Clevis Screw	1	373201-01
11	Anti-Loosen Nut	1	373301-01
12	Link Connector	1	373101-01
13	Retaining Nut	1	372601-01
14	Handle Rod	1	373401-01
15	Handle Grip	1	306502-01
16	Handle Clevis	1	▲
17	Clevis Pin	2	
18	Retaining Ring	4	
19	Wiper Seal	1	■
20	Tension Die Spring	1	
21	Spring Lock	2	
22	M6 Capscrew	1	
23	O-Ring	2	
24	Back-Up Ring	2	
25	Screw	1	
26	M6 Gasket Seal	1	

Item	Description	Qty	Part Numbers
27	O-Ring	3	●
28	Relief Valve Screw	1	
29	Relief Valve Knob	1	
30	Fixing Screw	1	
31	Oil Fill Screw	1	
32	Overload Cover Screw	1	
33	Cap	1	
34	O-Ring	1	
35	Washer	1	
36	O-Ring	2	
37	Back-Up Ring	1	
38	Reservoir Bladder	1	
39	O-Ring	1	
40	O-Ring	1	
41	Pump Piston Rod	1	
42	Steel Ball	1	
43	Steel Ball	2	*
44	Cone Seat	1	
45	Cone	1	
46	Long Separator Spring	1	
47	Spring	2	
48	Screw	1	
49	Spring Lock	1	
▲ Available as part of TFA_TI Clevis Service Kit 840160-01		■ Available as part of TFA Cylinder Service Kit 840110-01	
● Available as part of TFA_TI Integral Bladder Service Kit 840120-01		* Available as part of TFA_TI Integral Manifold Service Kit 375020-01	

8.8 TFA_TI Clevis Service Kit (840160-01) & TFA_TI Integral Manifold Service Kit (375020-01)

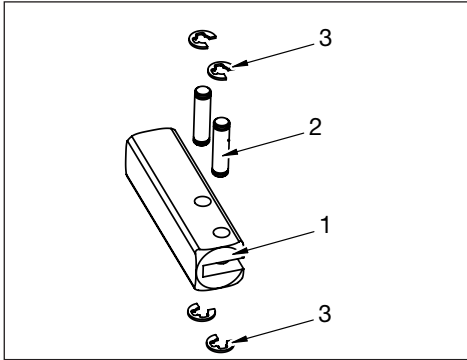


Figure 29: TFA_TI Clevis Service Kit (840160-01) Exploded View

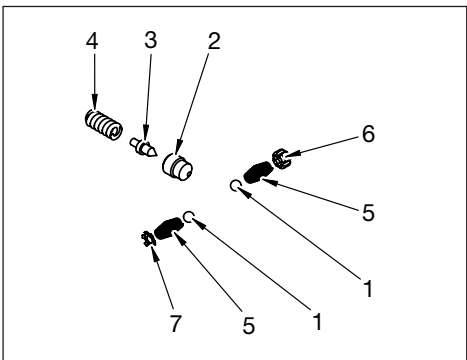


Figure 30: TFA_TI Integral Manifold Service Kit (375020-01) Exploded View

TFA_TI Clevis Service Kit (840160-01) Table of Parts

Item	Description	Qty
1	Handle Clevis	1
2	Clevis Pin	2
3	Retaining Ring	4

TFA_TI Integral Manifold Service Kit (375020-01) Table of Parts

Item	Description	Qty
1	Steel Ball	2
2	Cone Seat	1
3	Cone	1
4	Long Separator Spring	1
5	Spring	2
6	Screw	1
7	Spring Lock	1

8.9 TFA_TI Integral Bladder Service Kit (840120-01)

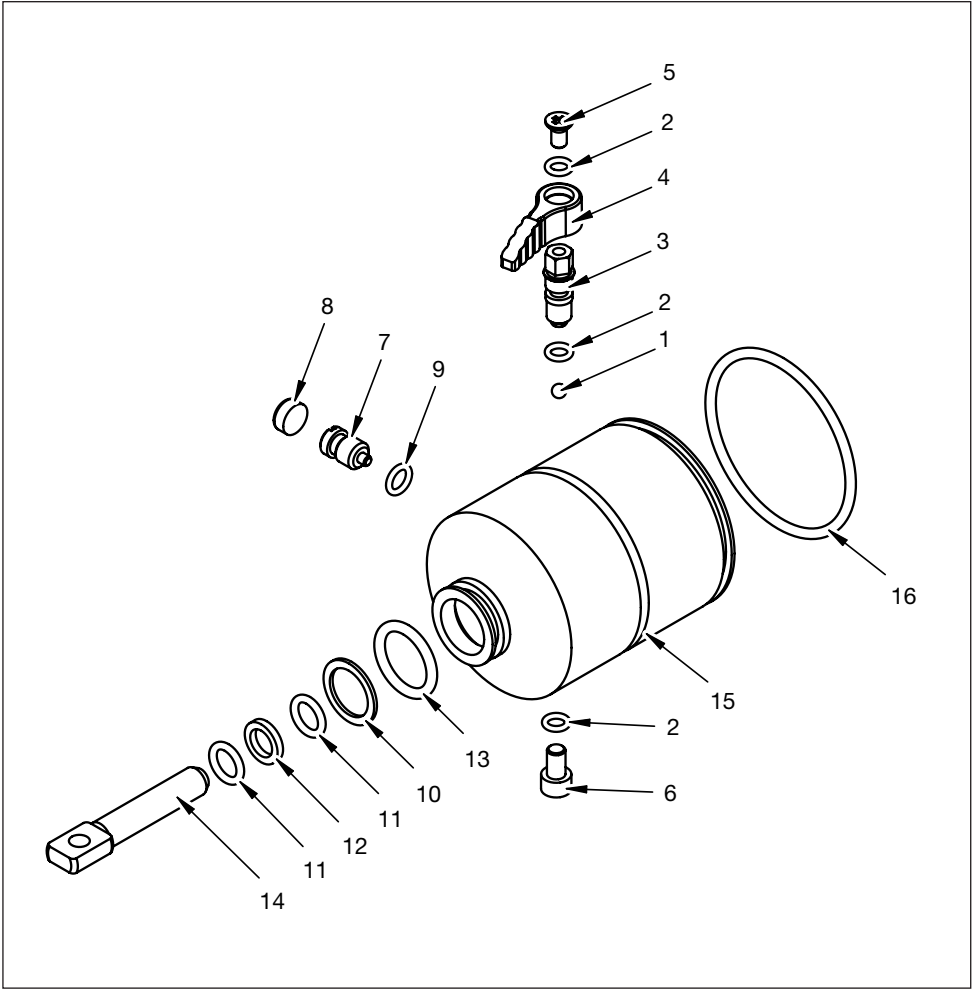


Figure 31: TFA_TI Integral Bladder Service Kit (840120-01) Exploded View

TFA_TI Integral Bladder Service Kit (840120-01) Table of Parts

Item	Description	Qty
1	Steel Ball	1
2	O-Ring	3
3	Relief Valve Screw	1
4	Relief Valve Knob	1
5	Fixing Screw	1
6	Oil Fill Screw	1
7	Overload Cover Screw	1
8	Cap	1
9	O-Ring	1
10	Washer	1
11	O-Ring	2
12	Back-Up Ring	1
13	O-Ring	1
14	Pump Piston Rod	1
15	Reservoir Bladder	1
16	O-Ring	1

8.10 TFA Strut Assembly (270300-01)

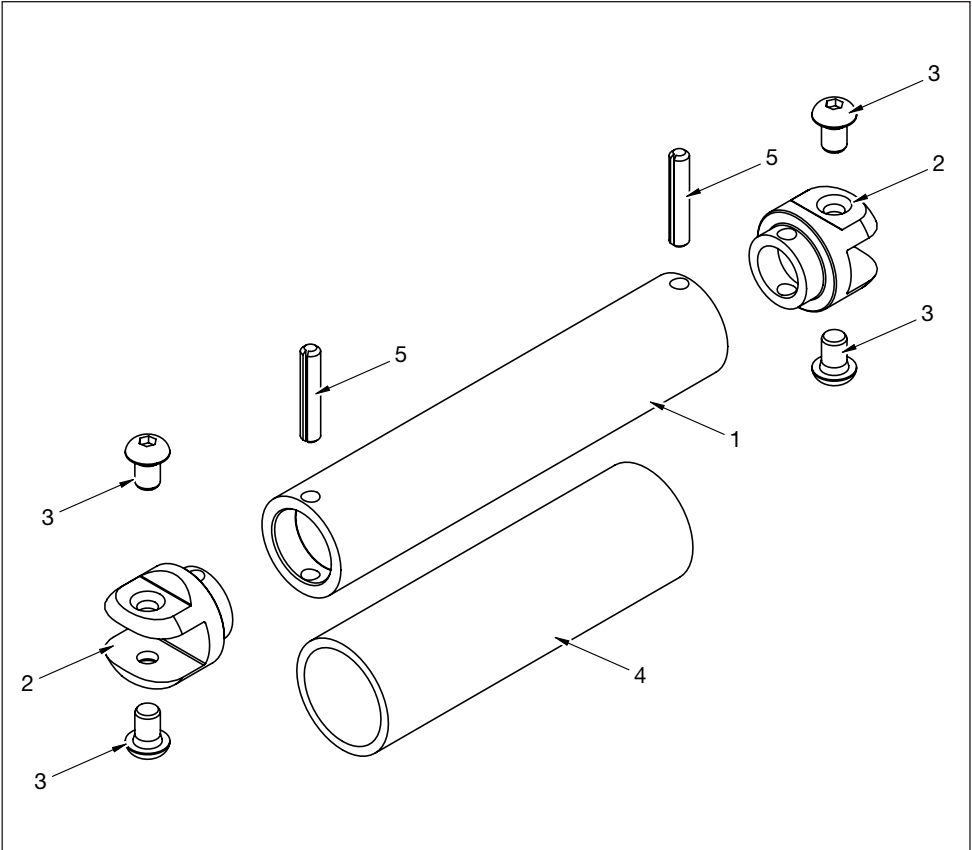


Figure 32: TFA Strut Assembly (270300-01) Exploded View

TFA Strut Assembly (270300-01) Table of Parts

Item	Description	Qty	Part Numbers
1	Strut Tube	1	270301-09
2	Clevis	2	270302-09
3	M8X12mm Button Head Hex Screw	4	270303-01
4	Foam Grip - 34mm x 135mm	1	273000-01
5	6mm Roll Pin	2	273100-01

8.11 TFA Cylinder Service Kit (840110-01)

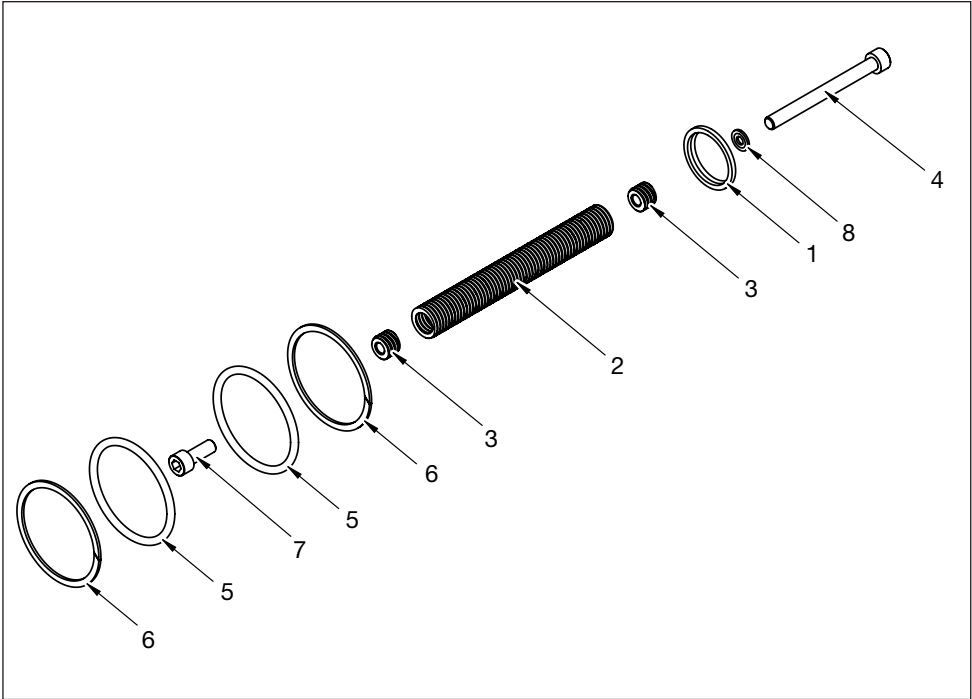


Figure 33: TFA Cylinder Service Kit (840110-01) Exploded View

TFA Cylinder Service Kit (840110-01) Table of Parts

Item	Description	Qty
1	Wiper Seal	1
2	Tension Die Spring	1
3	Spring Lock	2
4	M6 Capscrew	1
5	O-Ring	2
6	Back-Up Ring	2
7	Screw	1
8	M6 Gasket Seal	1

8.12 TFA Handle Assembly (271300-01)

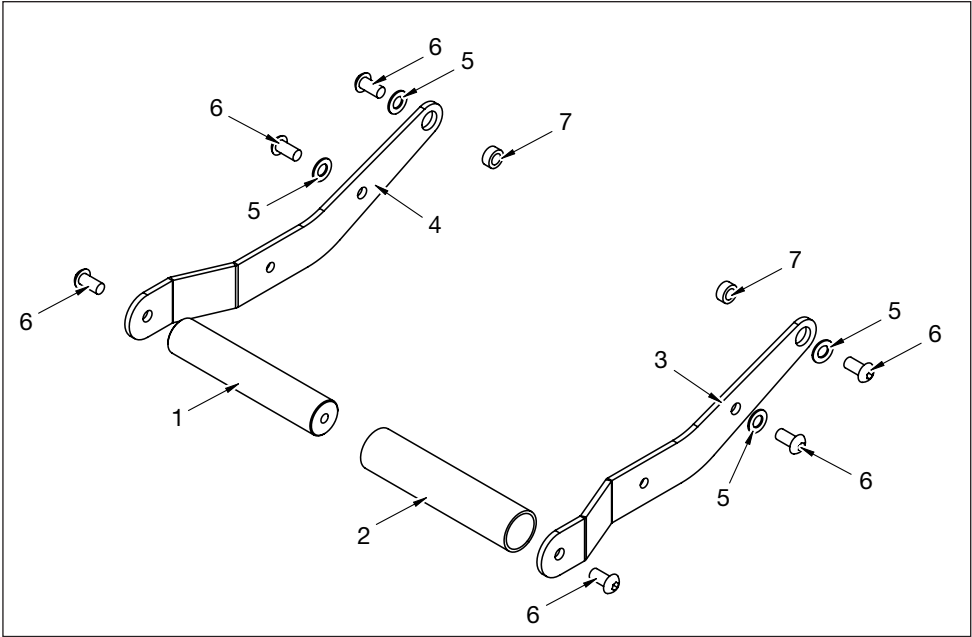


Figure 34: TFA Handle Assembly (271300-01) Exploded View

TFA Handle Assembly (271300-01) Table of Parts

Item	Description	Qty	Part Numbers
1	Handle Bar	1	501301-01
2	Handle Sleeve	1	201203-01
3	Handle Left	1	501101-01
4	Handle Right	1	501201-01
5	Washer (0.8mm)	6	503401-01
6	Screw For Handle	6	402902-01
7	Spacer	2	503501-01

8.13 TFA Adjustment Leg Assembly (270400-01/ 1690200-01)

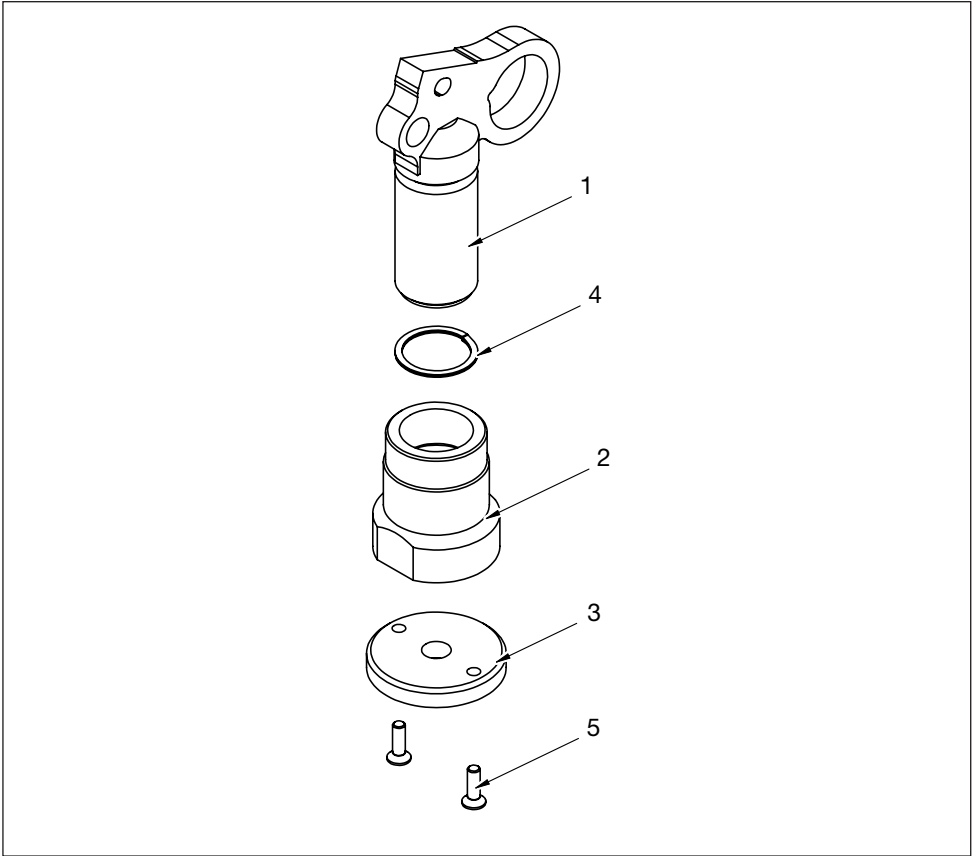


Figure 35: TFA Adjustment Leg Assembly (270400-01/ 1690200-01) Exploded View

TFA Adjustment Leg Assembly (270400-01/ 1690200-01) Table of Parts

Item	Description	Qty	Part Numbers	
			270400-01	1690200-01
1	Clevis Welded Assembly	1	270401-01	1690201-09
2	Adjustment Foot	1	270402-01	270402-01
3	Adjustment Foot Pad	1	1213602-01	1213602-01
4	Spiral Clip	1	273200-01	273200-01
5	M6 Countersunk Hex Screw	2	503703-01	503703-01

8.14 TFA Protective Pad Service Kit (271400-01)

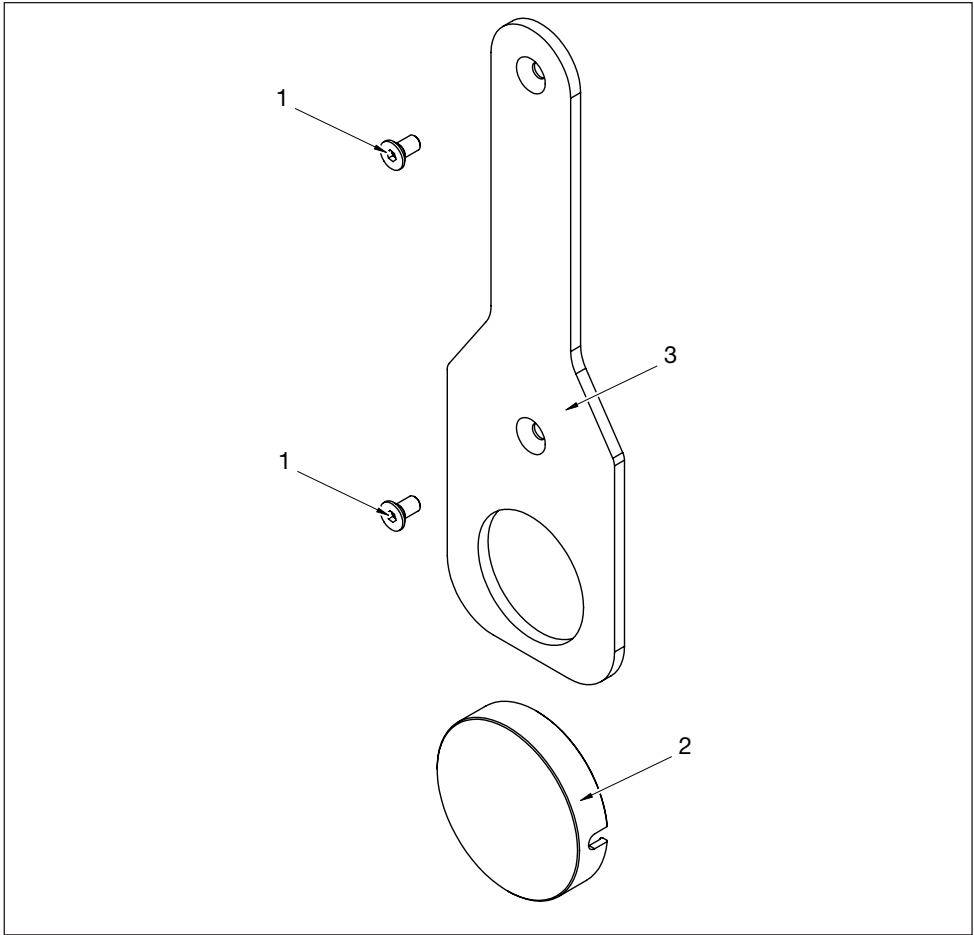


Figure 36: TFA Protective Pad Service Kit (271400-01) Exploded View

TFA Protective Pad Service Kit (271400-01) Table of Parts

Item	Description	Qty	Part Numbers
1	M6 Countersunk Hex Screw	2	273400-01
2	Foot Cap Tower	1	272700-01
3	Protection Pad	1	272500-01

8.15 TFA Wing Adjustment Service Kit (271500-01)

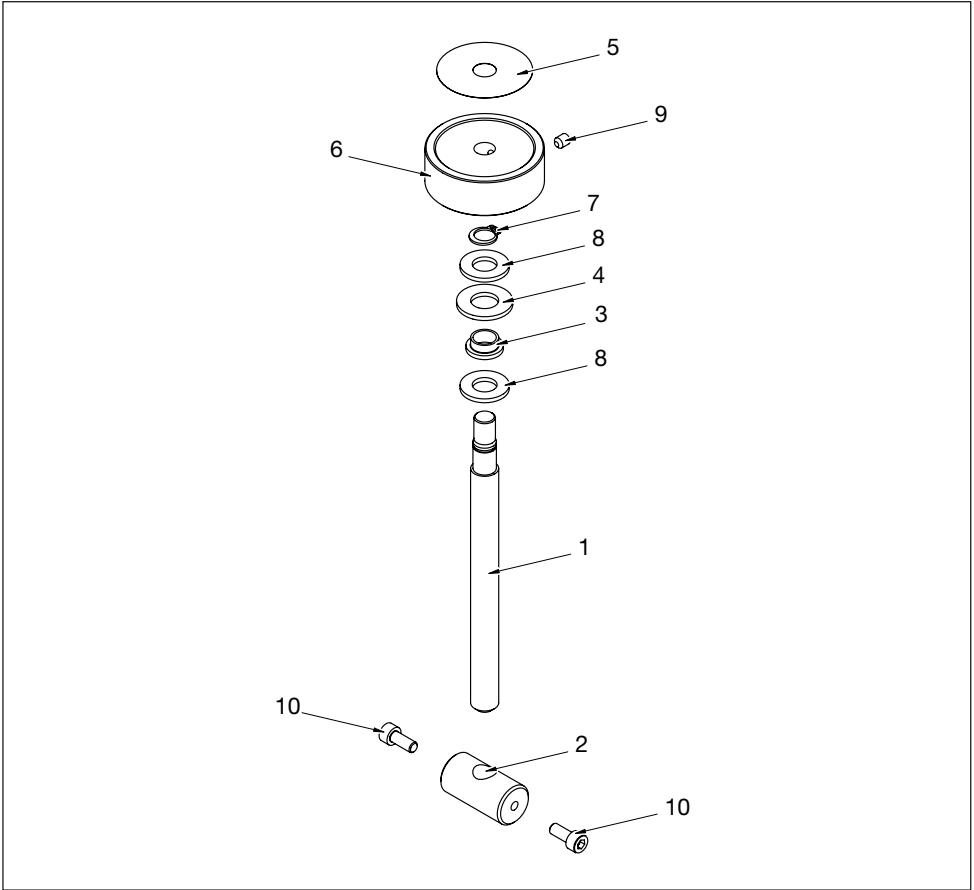


Figure 37: TFA Protective Pad Service Kit (271500-01) Exploded View

TFA Protective Pad Service Kit (271400-01) Table of Parts

Item	Description	Qty	Item	Description	Qty
1	Adjustment Rod	1	6	Release Knob	1
2	Adjuster Boss	1	7	External Circlip	1
3	Nylon Bush	1	8	Washer 10mm ID	2
4	Nylon Washer	1	9	M5 Socket Set Screw	4
5	Wing Adjust Decal	1	10	M5x12mm SHCS	2

8.16 **Safety Bond Assembly (270800-01)**

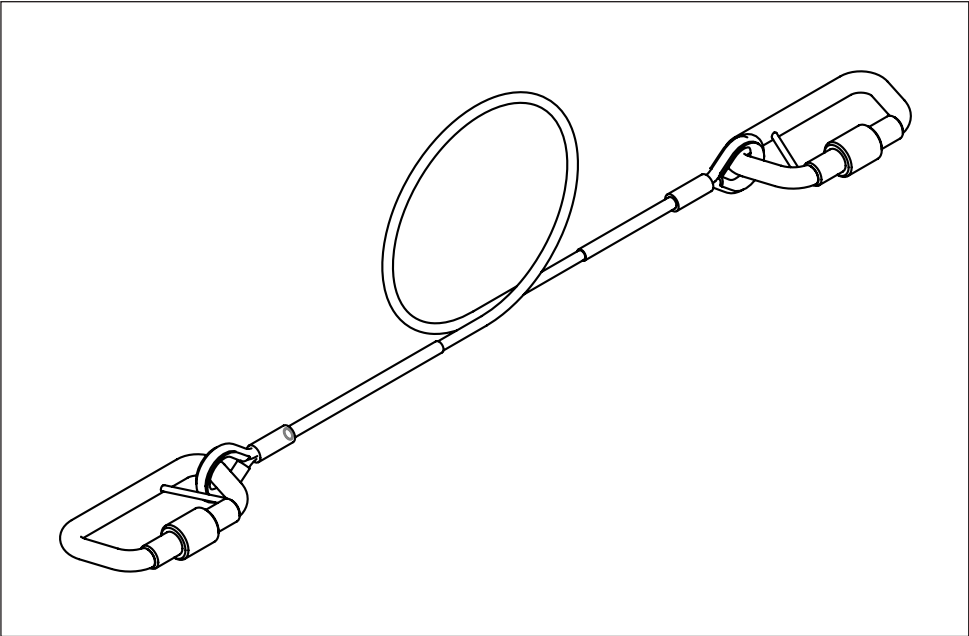


Figure 38: Safety Bond Assembly (270800-01) Exploded View

Safety Bond Assembly (270800-01) Table of Parts

Item	Description	Qty
1	Safety Bond Assembly	1

9. Troubleshooting

9.1 TFA_TE Troubleshooting

Fault	Possible Cause	Corrective Action
The alignment piston advances some of the way and then stops progressing	The air-vent is obstructed by dirt or debris. The tool has reached its maximum load.	Carefully unblock the air-vent using a small blunt object.

9.1.1 AIR-LOCK RELIEF

Connect the hand pump to the tool with the hydraulic hose. Close the release valve on the pump, and prime the pump until the hydraulic cylinder is fully extended and a small pressure is achieved.

With the hand pump elevated above the level of the tool, and the tool in an upright position, open the hand pump release valve causing any air that is within the system to be forced up through the pump and vented into the oil reservoir.

Repeat this process three further times to ensure that all air is removed from the system. The tool should now reach full working pressure.

Disconnect the hand pump from the hydraulic hose, grip the baseplate of the hand pump body in a vice with the pump body vertical and the main handle at the top. Remove the four nuts holding the main handle and lift off. Grip the refilling plug with pliers and extract it by pulling and twisting simultaneously. Ensure the reservoir body is held down when removing the refilling plug as pulling up on the reservoir body will release the bladder within, and oil may spill out. Fill the reservoir to the top with a Enerpac oil of the grade 15 cSt. Reinsert the refilling plug, wipe away any oil, and reassemble by reversing the disassembly process.

9.2 TFA_TI Troubleshooting

Fault	Possible Cause	Corrective Action
The alignment piston advances some of the way and then stops progressing	The air-vent is obstructed by dirt or debris. The tool has reached its maximum load.	Carefully unblock the air-vent using a small blunt object.
The alignment piston 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.	Refer to an approved Enerpac distributor for further instruction.
	Retract (-) is selected.	Select Advance (+) and pump the handle.
	Air has accumulated around pump inlet when used upside down.	Inspect the tool for oil leaks on the reservoir, possibly indicative of a perished bladder. Refer to an approved Enerpac distributor for repair.
The alignment piston moves as intended, but doesn't seem to be achieving full pressure when under load	Intermediate valve not seating / relief valve leaking.	Refer to an approved Enerpac distributor for further instruction.
Hydraulic pressure slowly diminishes and the pump handle rises	The outlet check valve is leaking.	Refer to an approved Enerpac distributor for further instruction.
Hydraulic pressure slowly diminishes and the pump handle does not rise	The release valve is leaking.	Refer to an approved Enerpac distributor for further instructions.
	The piston seal is leaking.	Inspect the tool for oil leaks, possibly indicative of a perished seal or loose blanking plug. Refer to an approved Enerpac distributor for further instructions.
Tool actuation feels soft and unresponsive	There is air in the hydraulic system.	Refer to an approved Enerpac distributor for further instruction.

Notes

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