



Operation and Maintenance Manual

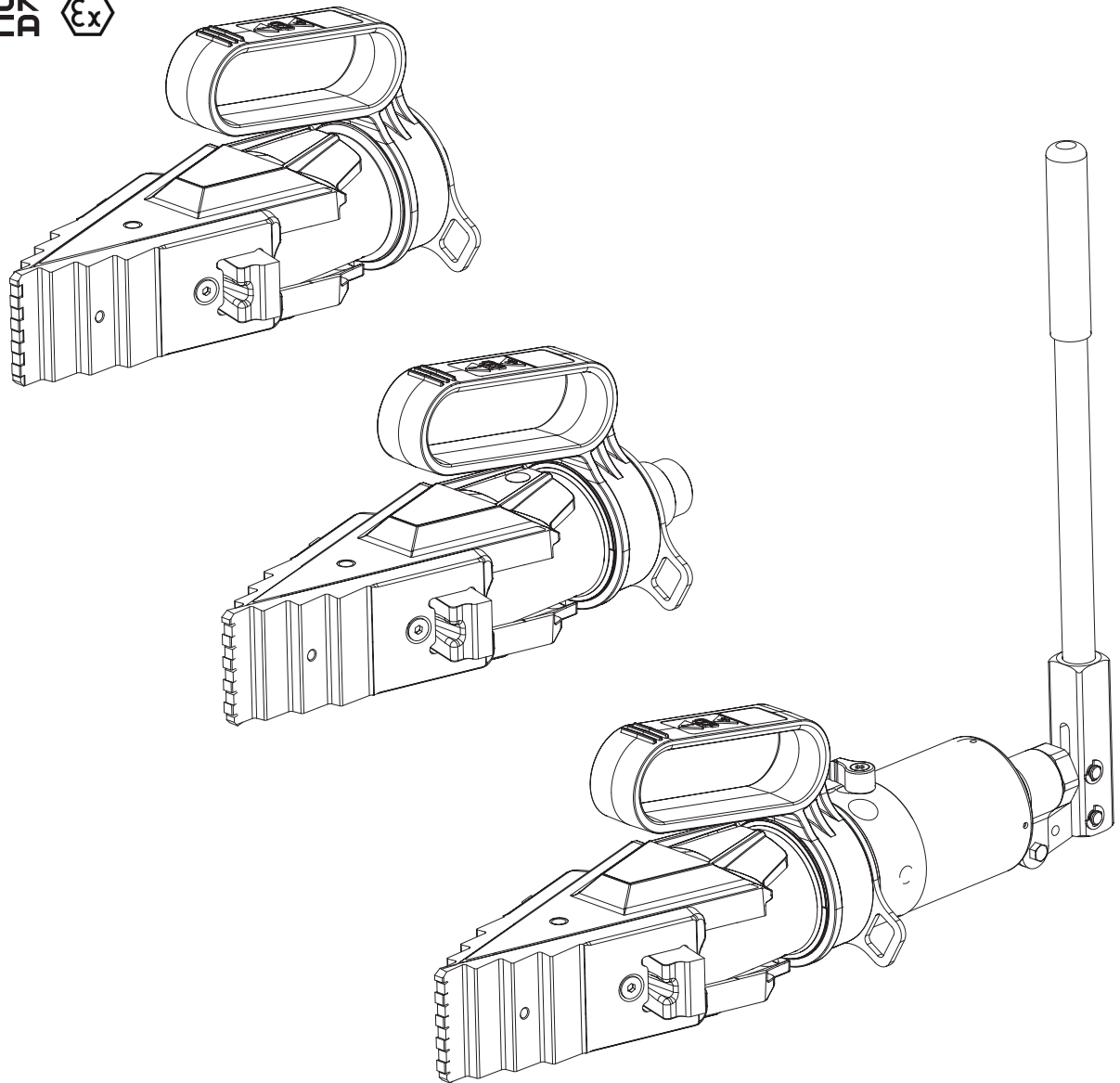
SWi12/14TMEX/ SWi20/25TEEX/ SWi20/25TIEX Flange Spreading Wedge

Document Number: IM_SWi_EX

Document Revision: 14

Document Revision Date: 15-OCT-2021

Document Language: ENGLISH EN



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

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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. Equalizer 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 Equalizer or a local Equalizer 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 Equalizer 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



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 SWi-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 SWi-tools. Follow all safety precautions contained in the manufacturer's manuals. Use only for intended purpose.
- Periodic inspections and maintenance of ATEX certified equipment are essential in order to comply with legal requirements and avoid unsafe operation.
- 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 Equalizer parts from approved distributors or service centers. Equalizer 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.

- 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 tool. 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 tamper with air pressure relief safety valve on pump.
- 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.
- Maximum allowable pressure for the SWi20/25TEEX tool 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 the tool 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 SWi20/25TEEX tool 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.
- 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 SWi-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.
- Electric charges could be caused by fast air movement while case remains open. Keep case closed during work.

NOTICE

- Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Equalizer Authorized Service Centre in your area.
- It is strongly recommended that operators always use Equalizer pumps and hoses.
- Always use Equalizer 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 Equalizer oil is strongly recommended

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.

2. Compliance Statement(s)

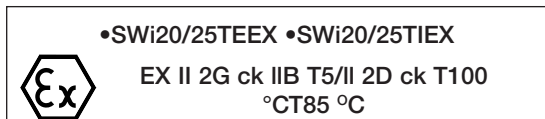
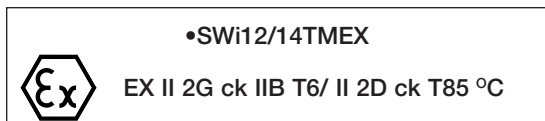
2.1 Conformance to National and International Standards

Equalizer 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.

2.2 ATEX Compliance Statement

In addition to the CE mark, the Equalizer SWi12/14TMEX, SWi20/25TIEEX, and SWi20/25TEEX tools carry the ATEX mark and classification:



These markings mean that the tools have been designed for use in a potentially explosive atmosphere which is:

- Group II (Non-mining equipment)
- Suitable for use in Category 2 (Explosive atmospheres are not expected to occur under normal operations. Where they do occur, it will be for a short period only)
- Gas G or Dust D with protection by constructional safety c and liquid immersion k
- Suitable for use with Gas Group IIB (Ethylene)
- Maximum Surface Temperature of T6/85 °C for the mechanical and T5/100 °C for the hydraulic tools

These tools have been designed and manufactured in accordance with the following transposed harmonised European standards:

- EN 13463-1:2009. Non-electrical equipment intended for use in potentially explosive atmospheres. Part 1: Basic methods and requirements
- EN 13463-5:2011. Non-electrical equipment intended for use in potentially explosive atmospheres. Part 5: Protection by constructional safety 'c'
- EN 13463-8:2003. Non-electrical equipment for potentially explosive atmospheres. Part 8: Protection by liquid immersion.

3. Features & Components

3.1 SWi12/14TMEX Mechanical Spreading Wedge Feature Diagram

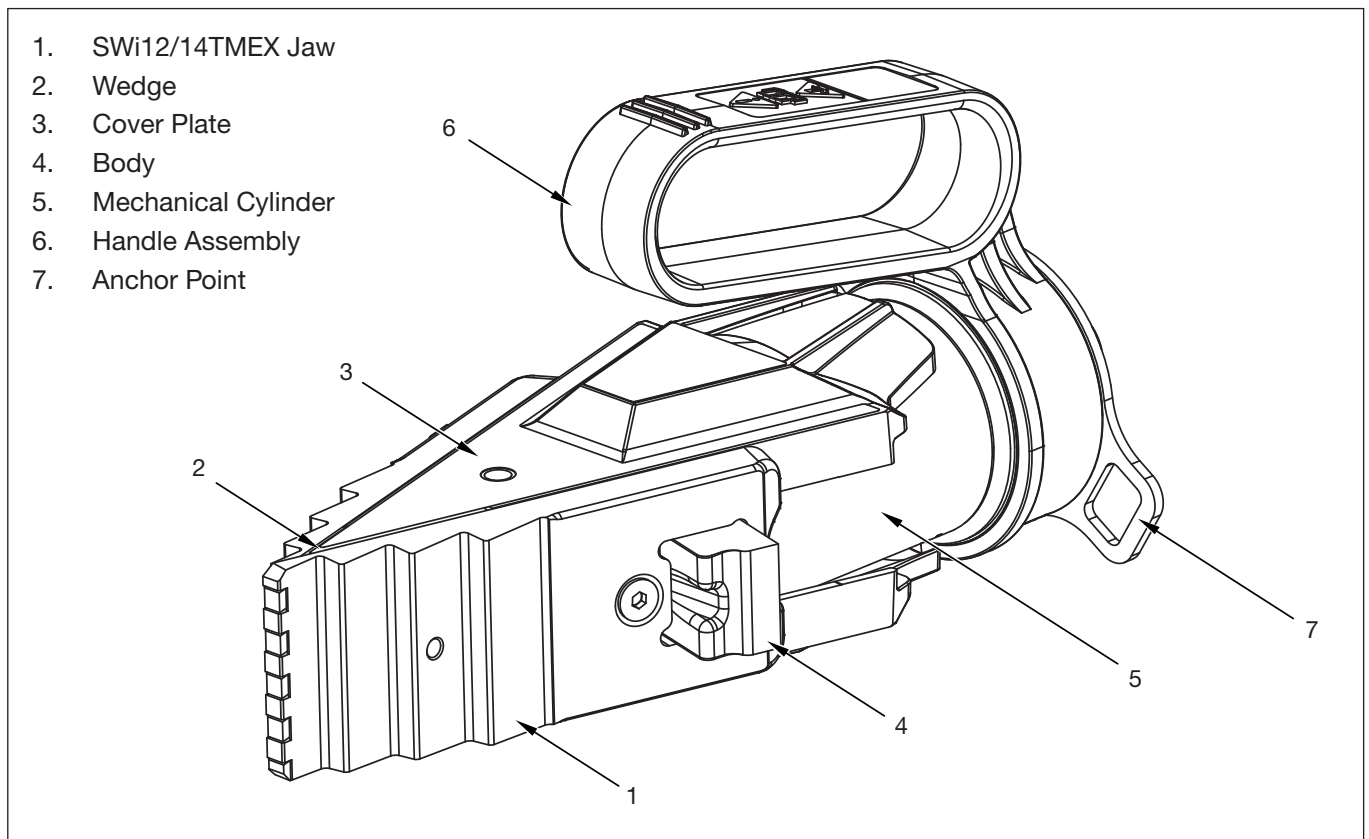


Figure 1:

3.2 SWi12/14TMEX Mechanical Spreading Wedge - Feature Explanation

The SWi12/14TMEX Spreading Wedge uses mechanical torque to advance the wedge and spread the jaws.

3.2.1 SWi12/14TMEX Tool Capabilities

Spreading Force

Maximum SWL torque of 175 N·m [130 ft·lb] will generate 12 T [120 kN] spreading force on the 1st step and 14 T [140 kN] spreading force on the 4th step.

Spreading Gap (See Section 4.1)

Using only the 1st step, the tool can spread from 6.0 mm to 40.0 mm [0.24" - 1.6"].

Using all 4 steps, but without the stepped blocks, the tool can spread from 6.0 mm to 87.5 mm [0.24" - 3.4"].

Using both steps on the stepped blocks, the tool can spread 48.5 mm – 103.5 mm [1.9" - 4.1"].

3.2.2 SWi12/14TMEX Tool Function

Mechanical Tool Operation

The SWi12/14TMEX Spreading Wedge uses mechanical torque to advance the wedge and spread the jaws. The torque is applied using the supplied Torque Wrench, enabling accurate control of the force applied.

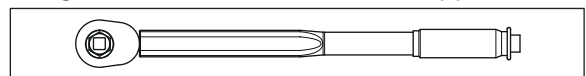


Figure 2:

Torque Wrench Usage

Holding the Torque Wrench in one hand, unlock the knurled handle by turning the locking knob anti-clockwise.

Select the torque setting by turning the knurled handle until the required torque value is indicated.

For example, to set the Torque Wrench to 46 N·m: turn the knurled handle until the 0 on the fine scale aligns with 40 N·m on base scale; now turn slightly further until the 6 on the fine scale aligns with the central line.

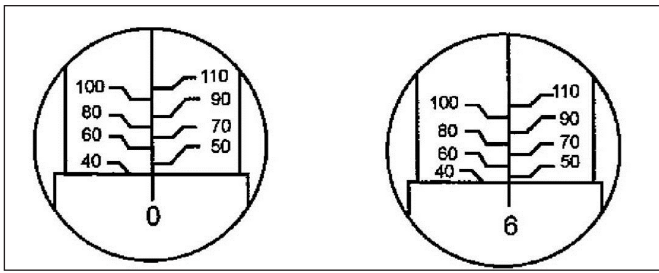


Figure 3:

Setting an imperial torque [in ft-lb] is done in exactly the same way.

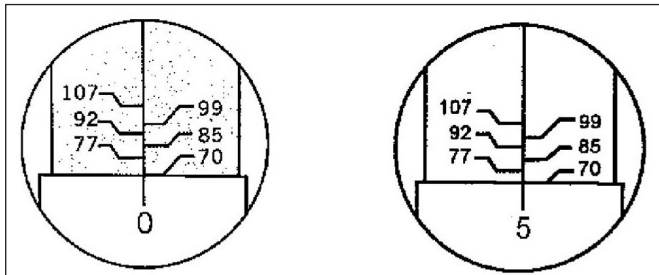


Figure 4:

Lock the handle by turning the locking knob clockwise. Install the supplied socket onto the Torque Wrench and attach to the tool.

Slowly and smoothly pull the handle, gradually applying more force until you feel or hear the Torque Wrench click, indicating that the selected torque has been achieved. Do not continue to apply force after the Torque Wrench has clicked. Special care should be taken when using low torque settings.

Torque Wrench Care

Prior to storing the Torque Wrench, and between use, leave the Torque Wrench with its lowest torque setting selected.

To clean the Torque Wrench, wipe gently with a damp cloth. Avoid using any detergent or solvent as this may detrimentally affect the factory-fitted internal lubrication of the mechanism.

Actuating The SWi12/14TMEX

Follow the Spreading Wedge Tool Operation instructions, using the following instructions to actuate the SWi12/14TMEX tool in particular:

Actuate the tool by manually applying force to the torque wrench in the clockwise direction (see Torque Wrench Usage). Gradually increase the torque setting of the Torque Wrench over several steps, for example 30 N·m [or 20 ft-lb] each time. Do not exceed the maximum SWL torque of 175 N·m [130 ft-lb].

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

Retracting The SWi12/14TMEX

Retract the tool by manually applying force to the torque wrench in the anti-clockwise direction. When using multiple tools, work around all wrenches to keep the spreading force balanced as the gap is closed.

3.2.3 Operating Conditions

Grease Limitations:

Minimum Temperature:	-5 °C [23 °F]
Maximum Temperature:	40°C [104 °F]

Mechanical Tools:

Minimum Jaw Contact Temperature:	-30 °C [-22 °F]
Maximum Jaw Contact Temperature:	150 °C [302 °F]

3.2.4 SWi12/14TMEX Kit Contents

Standard Kit

1 x SWi12/14TMEX Mechanical Spreading Wedge Wedgehead

1 x Mechanical Cylinder

1 x Torque Wrench with 22 mm Socket

1 x Set of Safety Blocks

1 x Pair of Stepped Blocks

1 x Lanyard

1 x Hex Key

1 x Instruction Manual

1 x Carry Case

1 x Carry Case - 580 mm x 400 mm x 180 mm
[22.8" x 15.7" x 7.1"]

Gross kit weight: 17.0 kg [37.5 lb]

Tool only weight: 6.2 kg [13.7 lb]

3.3 SWi20/25TIEX Integral Hydraulic Spreading Wedge Feature Diagram

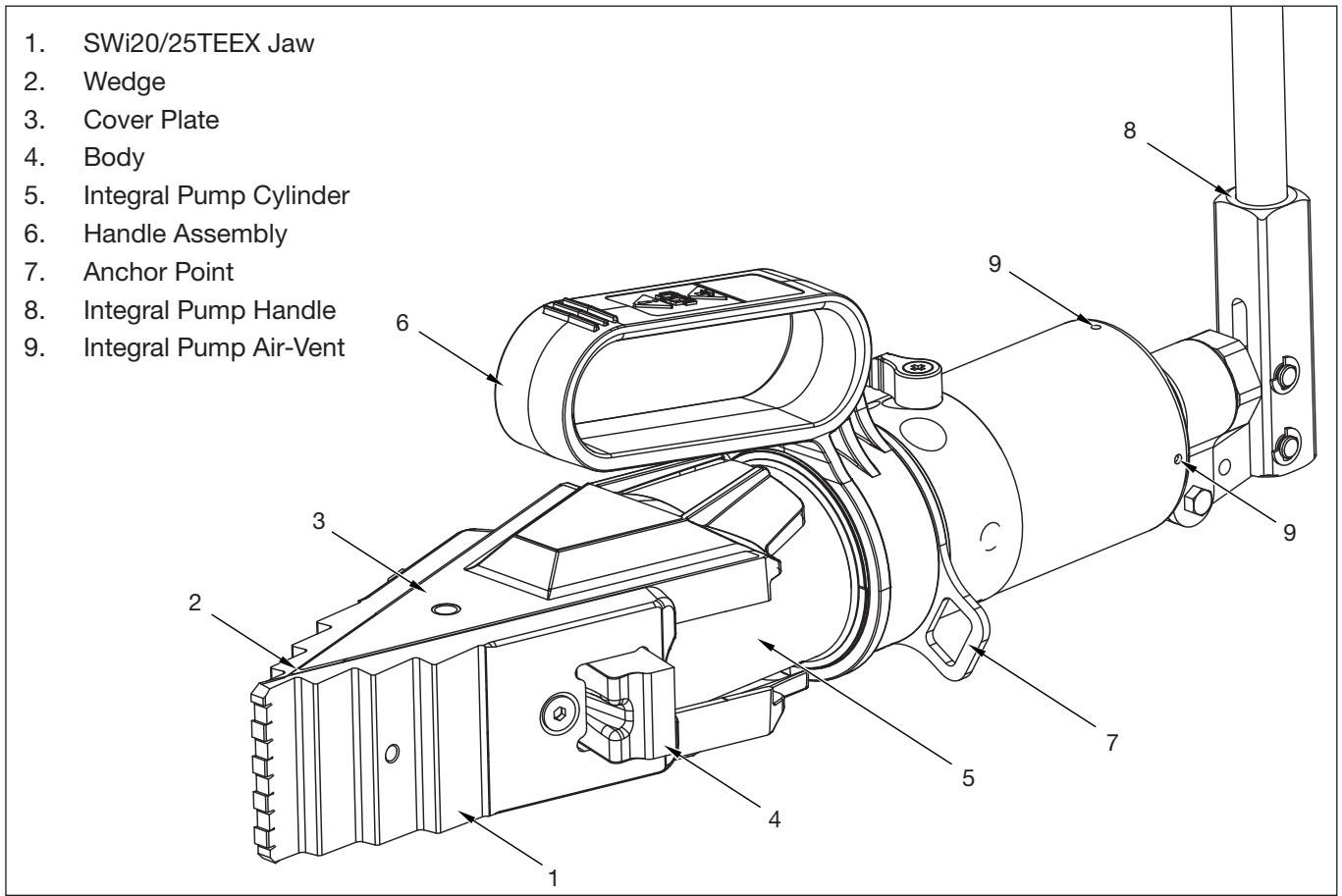


Figure 5:

3.4 SWi20/25TIEX Integral Hydraulic Spreading Wedge - Feature Explanation

The SWi20/25TIEX Spreading Wedge uses an integral hydraulic pump to drive the cylinder to advance the wedge and spread the jaws.

3.4.1 SWi20/25TIEX Tool Capabilities

Spreading Force

With the maximum hydraulic pressure of 700 bar [10 000 psi] applied, the tool can apply 20 T [200 kN] spreading force on the 1st step, up to 24 T [240 kN] spreading force on the 4th step.

Spreading Gap (See Section 4.1)

Using only the 1st step, the tool can spread from 6.0 mm to 40.0 mm [0.24" - 1.6"].

Using all 4 steps, but without the stepped blocks, the tool can spread from 6.0 mm to 87.5 mm [0.24" - 3.4"].

Using both steps on the stepped blocks, the tool can spread 48.5 mm – 103.5 mm [1.9" - 4.1"].

3.4.2 SWi20/25TIEX Tool Function

Hydraulic Tool 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.

The SWi20/25TIEX Spreading Wedge uses a hydraulic cylinder to advance the wedge and spread the jaws. 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 (-).

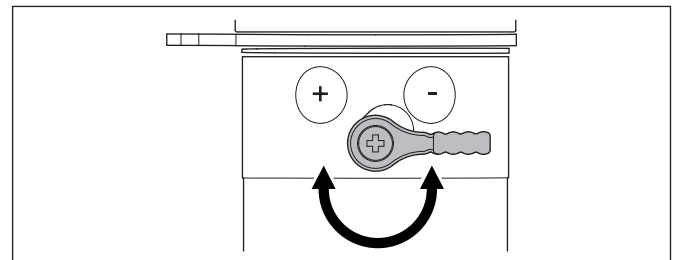


Figure 6:

Actuating The SWi20/25TIEX

Follow the SWi Tool Operation instructions, using the following instructions to actuate the SWi20/25TIEX tool in particular:

When advance (+) is selected, pumping the handle of the pump will advance the cylinder and spread the jaws.

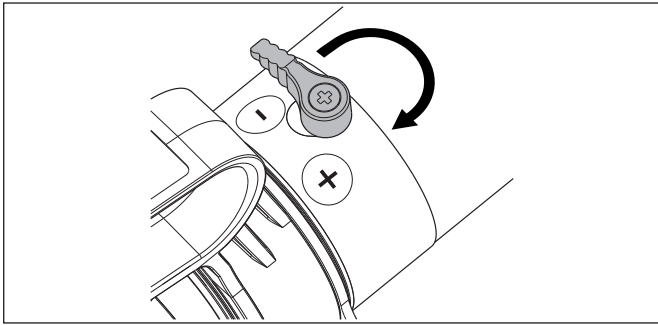


Figure 7:

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

Retracting The SWi20/25TIEX

Selecting retract (-) will de-pressurise 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.

Air Relief Instructions

In the event of air build-up within the cylinder-pump sub-assembly, the following procedure should be executed:

1. Select advance (+), and pump the handle to extend the piston around 30 mm [1.2"].
2. Remove the Oil Fill Screw using an appropriate hex key, ensuring the tool is on its side with the Oil Fill facing upwards.
3. Replenish any missing hydraulic oil by pouring into the Oil Fill hole until excess spills over.
4. Sit the tool with the wedge facing uphill (and the open Oil Fill hole still facing upwards) on a gentle slope, around 30 degrees from horizontal.
5. Very slowly move the selector from advance (+) to retract (-), and wait for the tool to fully retract.
6. Replace the Oil Fill Screw.
7. Repeat this procedure 3 times.

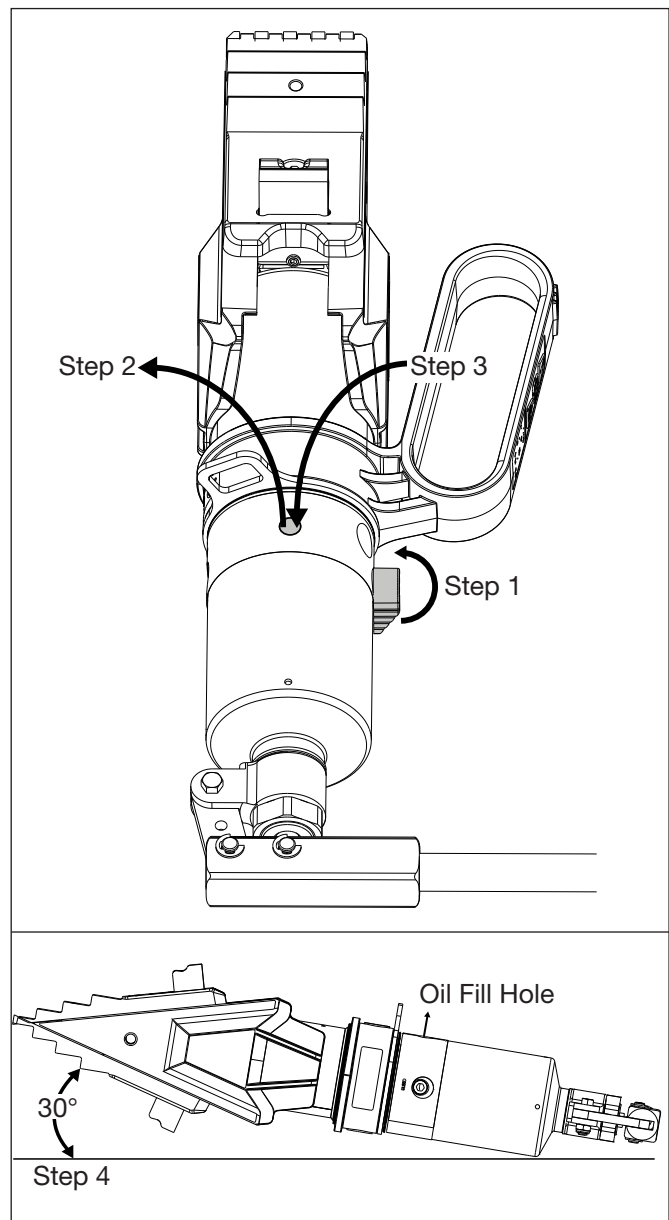


Figure 8:

3.4.3 Operating Conditions

Grease Limitations:

Minimum Temperature: -5 °C [23 °F]

Maximum Temperature: 40°C [104 °F]

Hydraulic Tools:

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

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

3.4.4 SWi20/25TIEX Kit Contents

SWi20/25TIEX Standard Kit

1 x SWi20/25TEEXA Spreading Wedge Wedgehead

1 x 700 bar [10 000 psi] Integral Hydraulic Pump/Cylinder

1 x Set of Safety Blocks

1 x Pair of Stepped Blocks

1 x Lanyard

1 x Hex Key

1 x Carry-Strap

1 x Instruction Manual

1 x Carry Case - 580 mm x 400 mm x 180 mm
[22.8" x 15.7" x 7.1"]

Gross kit Weight 17.5 kg [39.0 lb]

Tool only weight: 8.5 kg [18.7 lb]

3.5 SWi20/25TEEX External Hydraulic Spreading Wedge Feature Diagram

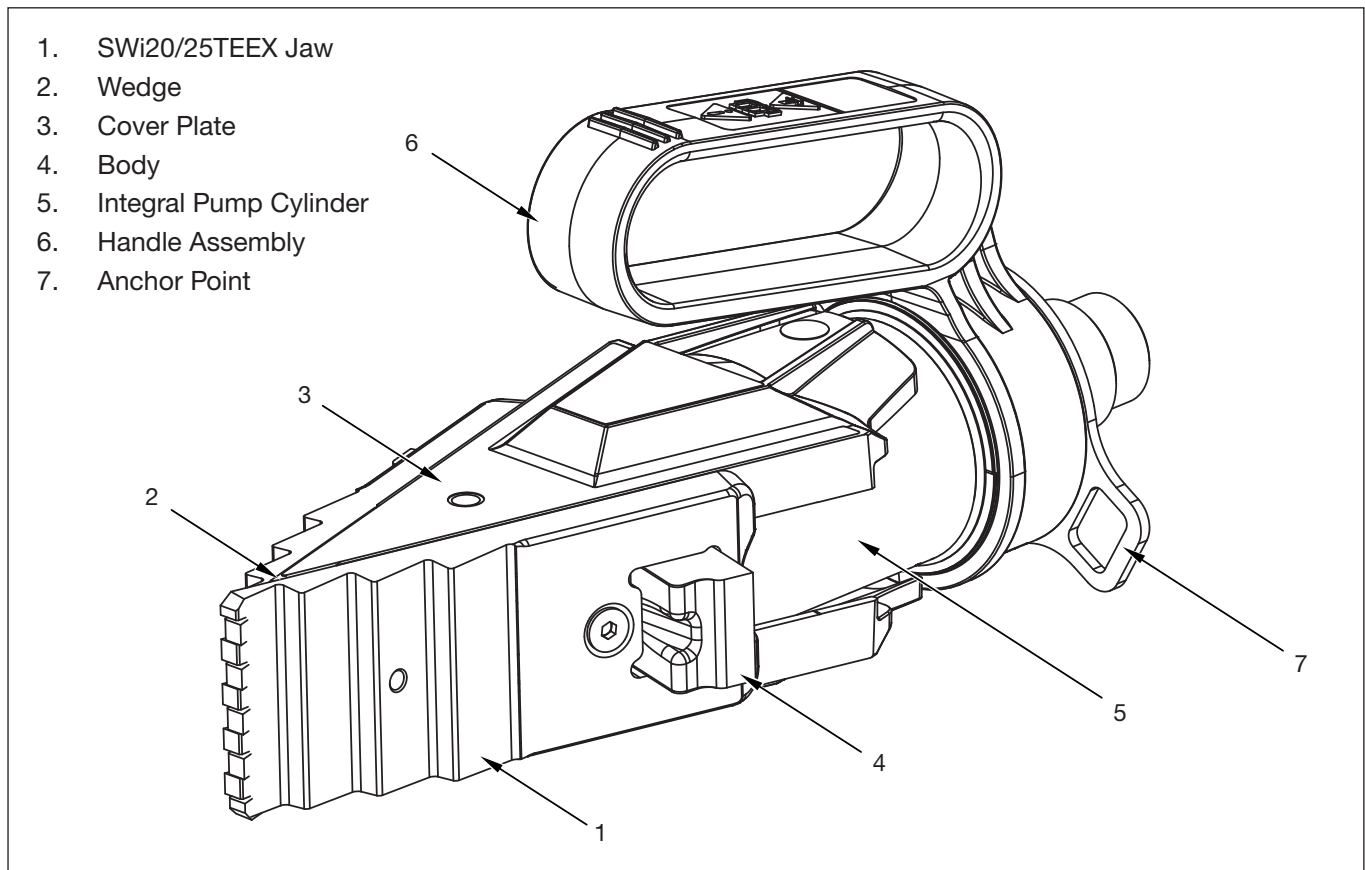


Figure 9:

3.6 SWi20/25TEEX External Hydraulic Spreading Wedge - Feature Explanation

The SWi20/25TEEX Spreading Wedge uses an external hydraulic pump to drive the cylinder to advance the wedge and spread the jaws.

3.6.1 SWi20/25TEEX Tool Capabilities

Spreading Force

With 700 bar [10 000 psi] of hydraulic pressure applied, the tool can apply 20 T [200 kN] spreading force on the 1st step, up to 24 T [240 kN] spreading force on the 4th step.

Spreading Gap (See Section 4.1)

Using only the 1st step, the tool can spread from 6.0 mm to 40.0 mm [0.24" - 1.6"].

Using all 4 steps, but without the stepped blocks, the tool can spread from 6.0 mm to 87.5 mm [0.24" - 3.4"].

Using both steps on the stepped blocks, the tool can spread 48.5 mm - 103.5 mm [1.9" - 4.1"].

3.6.2 SWi20/25TEEX Tool Function

Hydraulic Tool Operation

The SWi20/25TEEX Spreading Wedge uses a hydraulic cylinder to advance the wedge and spread the jaws. The hydraulic pressure is applied using an external hand pump, enabling accurate control of the force applied.

External Pump Operation

Consult the Instruction Sheet for the external pump.

Actuating The SWi20/25TEEX

Follow the Spreading Wedge Tool Operation instructions, using the following instructions to actuate the SWi20/25TEEX tool in particular:

When the pump release valve is closed, pumping the pump handle will advance the cylinder and spread the jaws.

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

Retracting The SWi20/25TEEX

Opening the release valve will de-pressurise 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.

Air Relief Instructions

If full pressure is not achieved an air-lock may be present in the hydraulic system. Refer to the hand pump manual for instructions for corrective actions.

Operating Conditions

Grease Limitations:

Minimum Temperature: -5 °C [23 °F]

Maximum Temperature: 40°C [104 °F]

Hydraulic Tools:

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

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

3.6.3 SWi20/25TEEX Kit Contents

SWi20/25TEEXSSEX Single Kit - ATEX Support Equipment

- 1 x SWi20/25TEEXA Spreading Wedge Wedgehead
- 1 x 700 bar [10 000 psi] Hydraulic Cylinder
- 1 x 700 bar [10 000 psi] ATEX Hydraulic Hose, 2 m [78.8"] with 90 degree elbow
- 1 x 700 bar [10 000 psi] HP350SMINEX Sealed Hand Pump with Gauge
- 1 x Set of Safety Blocks
- 1 x Pair of Stepped Blocks
- 1 x Hex Key
- 1 x Lanyard
- 1 x Instruction Manual
- 1 x Carry Case - 680 mm x 560 mm x 180 mm [26.8" x 22.0" x 7.1"]

Gross kit Weight 27.5 kg [60.5 lb]

Tool only weight: 6.4 kg [14.1 lb]

SWi20/25TEEXSS Single Kit - Non-ATEX Support Equipment

- 1 x SWi20/25TEEXA Spreading Wedge Wedgehead
- 1 x 700 bar [10 000 psi] Hydraulic Cylinder
- 1 x 700 bar [10 000 psi] Hydraulic Hose, 2 m [78.75"] with 90 degree elbow
- 1 x 700 bar [10 000 psi] HP350S Sealed Hand Pump with Gauge
- 1 x Set of Safety Blocks
- 1 x Pair of Stepped Blocks
- 1 x Hex Key
- 1 x Lanyard
- 1 x Set of Instruction Manuals
- 1 x Carry Case - 680 mm x 560 mm x 180 mm [26.8" x 22.0" x 7.1"]

Gross kit Weight 27.5 kg [60.5 lb]

Tool only weight: 6.4 kg [14.1 lb]

SWi20/25TEEXTSEX Twin Kit - ATEX Support Equipment

- 2 x SWi20/25TEEXA Spreading Wedge Wedgeheads
- 2 x 700 bar [10 000 psi] Hydraulic Cylinders
- 2 x 700 bar [10 000 psi] ATEX Hydraulic Hoses, 2 m [78.8"] with 90 degree elbow
- 1 x 700 bar [10 000 psi] HP550DMINEX Sealed Hand Pump with Gauges
- 2 x Sets of Safety Blocks
- 2 x Pairs of Stepped Blocks
- 2 x Hex Keys
- 2 x Safety Lanyards
- 1 x Instruction Manual
- 1 x Carry Case - 930 mm x 600 mm x 180 mm [36.6" x 23.6" x 7.1"]

Gross kit Weight 38.8 kg [85.5 lb]

Tool only weight: 6.4 kg [14.1 lb]

SWi20/25TEEXST Twin Kit - Non-ATEX Support Equipment

- 2 x SWi20/25TEEXA Spreading Wedge Wedgehead
- 2 x 700 bar [10 000 psi] Hydraulic Cylinders
- 2 x 700 bar [10 000 psi] Hydraulic Hoses, 2 m [78.75"] with 90 degree elbow
- 1 x 700 bar [10 000 psi] HP550D Sealed Hand Pump with Gauges
- 2 x Sets of Safety Blocks
- 2 x Pairs of Stepped Blocks
- 2 x Hex Keys
- 2 x Lanyards
- 1 x Set of Instruction Manuals
- 1 x Carry Case - 930 mm x 600 mm x 180 mm [36.6" x 23.6" x 7.1"]

Gross kit Weight 38.8 kg [85.5 lb]

Tool only weight: 6.4 kg [14.1 lb]

4. Technical Product Data

4.1 Dimensional Callout Art

4.1.1 SWi12/14TMEX/ SWi20/25TIEX/ SWi20/25TEEX Dimensions

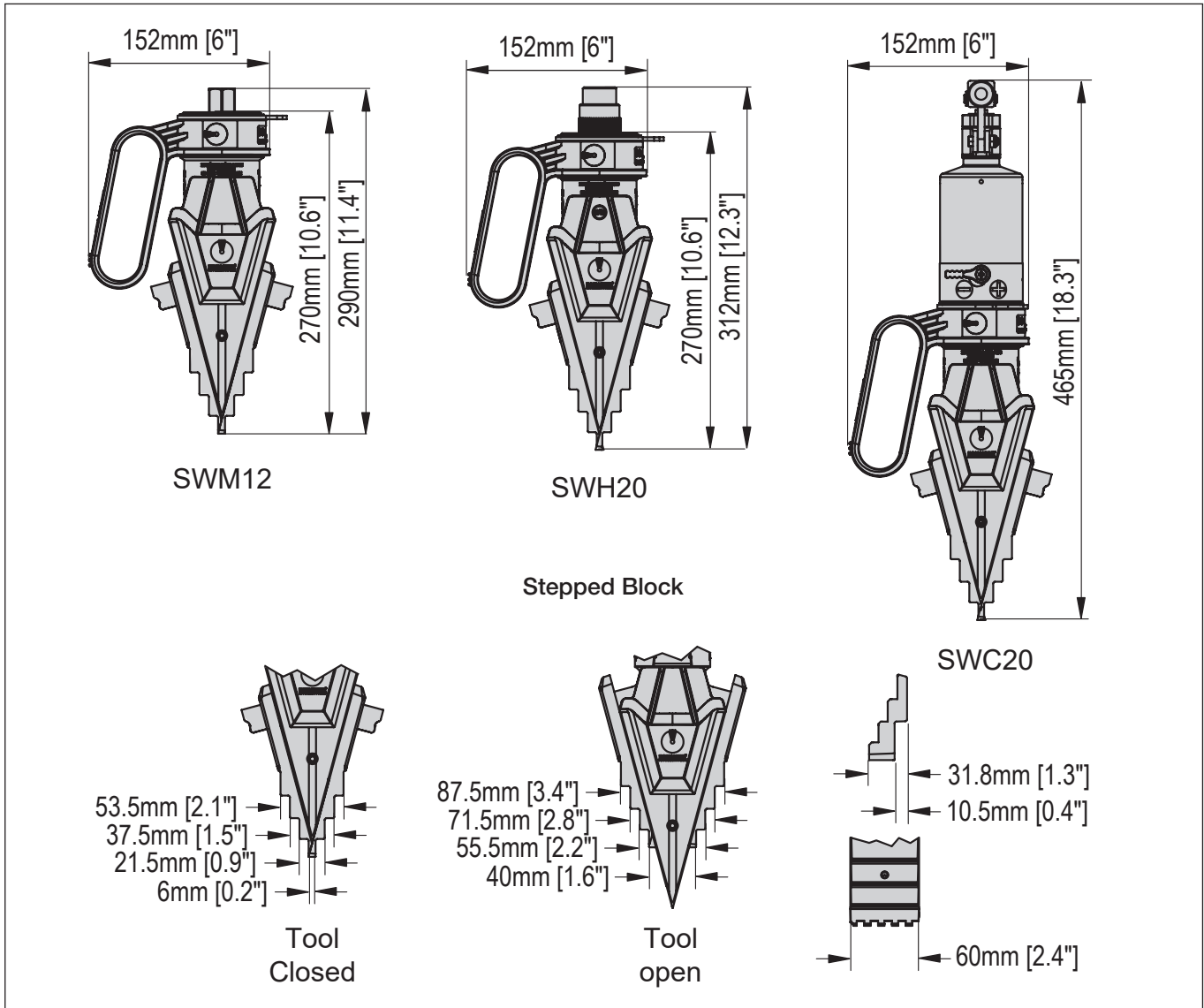


Figure 10:

4.1.2 Safety Block Dimensions for SWi12/14TMEX/ SWi20/25TIEX/ SWi20/25TEEX

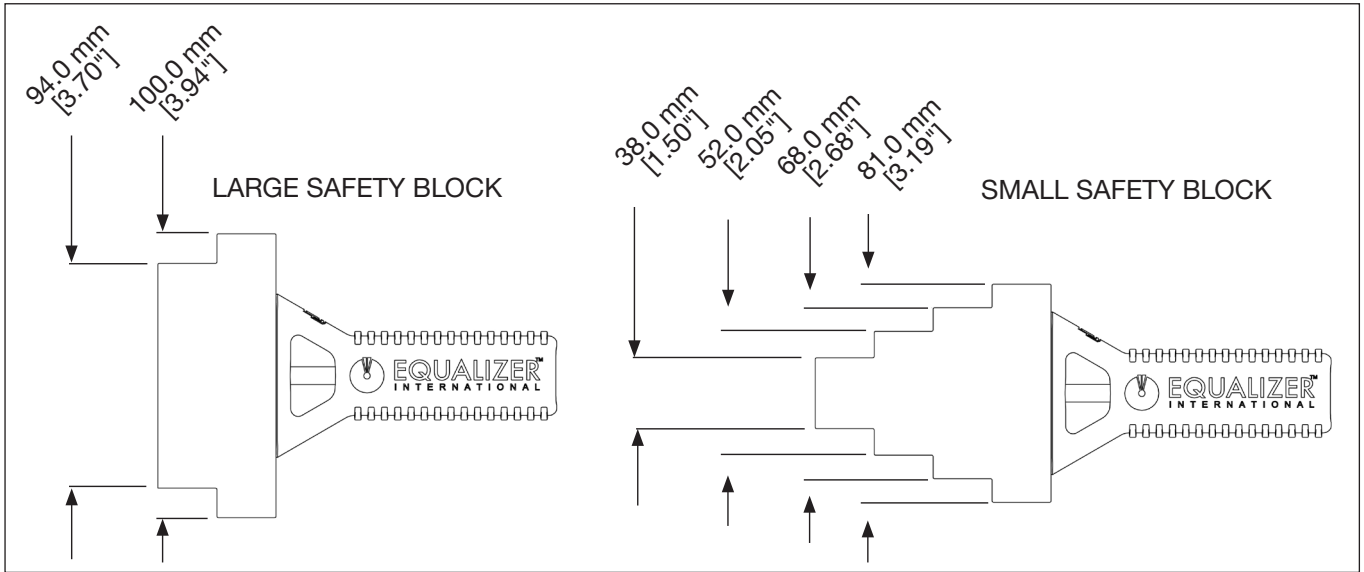


Figure 11:

4.1.3 SWI20/25TIEX Handle Rod

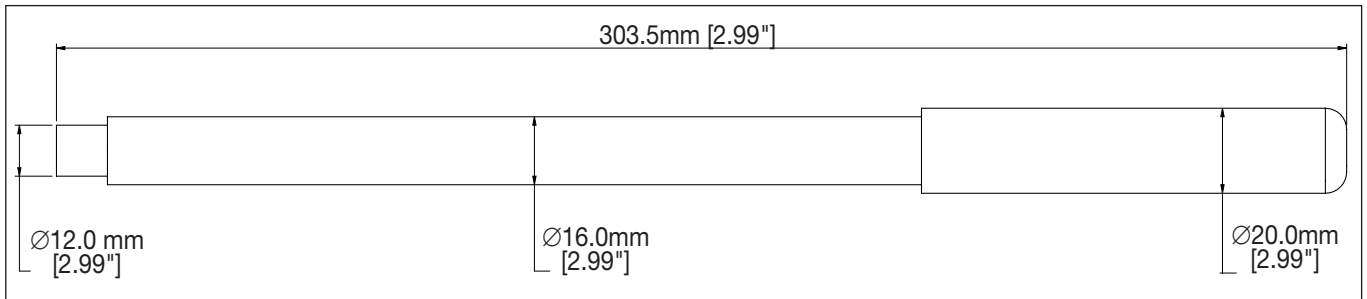


Figure 12:

4.2 Spreading Wedge Specifications Table

(See Fig 27 location of dimensions A)

Model Number	Type	Maximum Spreading Force Per Tool [kN]	Spreading Distance Maximum [mm]	Flange Dimensions	Jaw Width [mm]	Tool Weight [kg]
				Minimum Access Gap A [mm]		
SWi12/14TMEX	Mechanical	140.0 [15.74*]	103.5 [4.07"]	6.0 [0.24"]	60.0 [2.36"]	6.2 [13.7 lbs]
SWi20/25TIEX	Integral Hydraulic	240.0 [26.98*]	103.5 [4.07"]	6.0 [0.24"]	60.0 [2.36"]	8.5 [18.7 lbs]
SWi20/25TEEX	External Hydraulic	240.0 [26.98*]	103.5 [4.07"]	6.0 [0.24"]	60.0 [2.36"]	6.4 [14.1 lbs]

* US tons

See 3.2.3 for individual kits available for SWi12/14TMEX, including contents and kit dimensions.

See 3.4.3 for individual kits available for SWi20/25TIEX, including contents and kit dimensions.

See 3.6.3 for individual kits available for SWi20/25TEEX, including contents and kit dimensions.

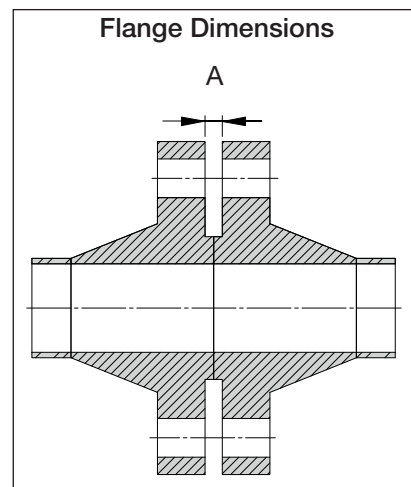


Figure 13:

5. Operation

5.1 Initial Setup and Inspection

Before attaching the tool ensure at least two flange bolts remain in place. These should be 180 degrees apart with their nuts loosened sufficiently to enable flange work to be carried out. Leaving these bolts in place will help to reduce unwanted lateral flange movement during flange spreading.

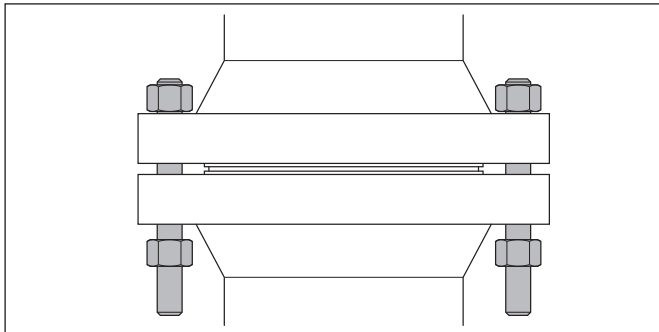


Figure 14:

Prior to spreading, an assessment should be carried out to determine the most appropriate positioning of the tools around the joint. A minimum of 2 tools should always be used.

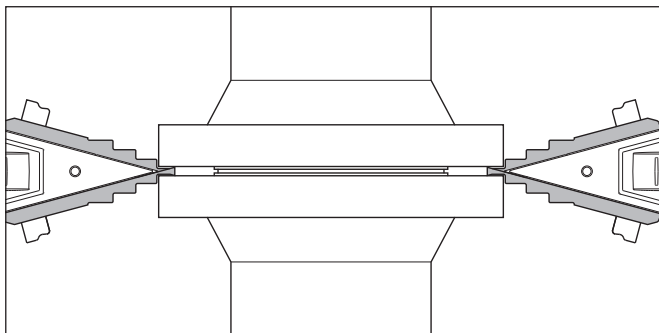


Figure 15:

Determine the flange joint access gap:

- Minimum access gap of 6 mm [0.24"] is required for SWi12/14TMEX/ SWi20/25TIEX/ SWi20/25TEEX tools.

The access gap is the clearance between the surfaces onto which the wedge will apply its spreading force.

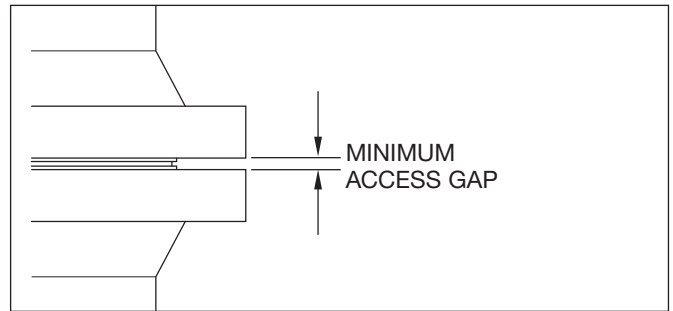


Figure 16:

Place the tool into the access gap, with the full width of the selected step fully inserted up to the heel.

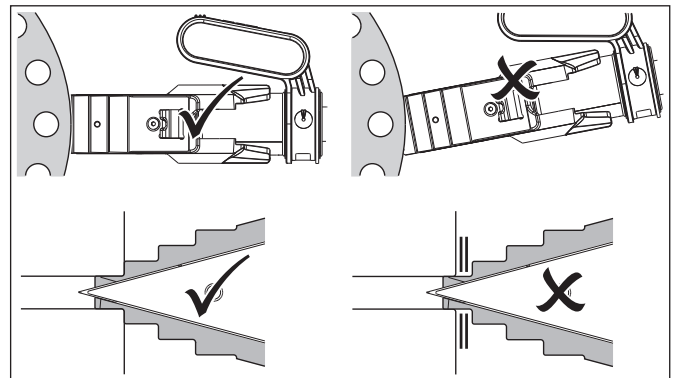


Figure 17:

5.2 Flange Spreading

Spread the flanges apart by actuating the tool. Consult the relevant section of the manual for tool-specific instructions on how to actuate each tool.

Once the joint has been opened to the desired distance, or if the tool has reached its maximum travel, insert the Safety Blocks into the flange joint.

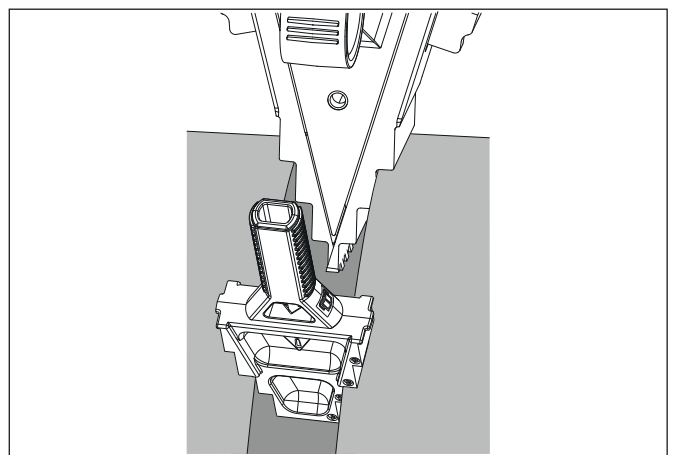


Figure 18:

Ensure the full width of the selected Safety Block step is fully inserted before gradually retracting the tool until the flange load has been applied to the Safety Block.

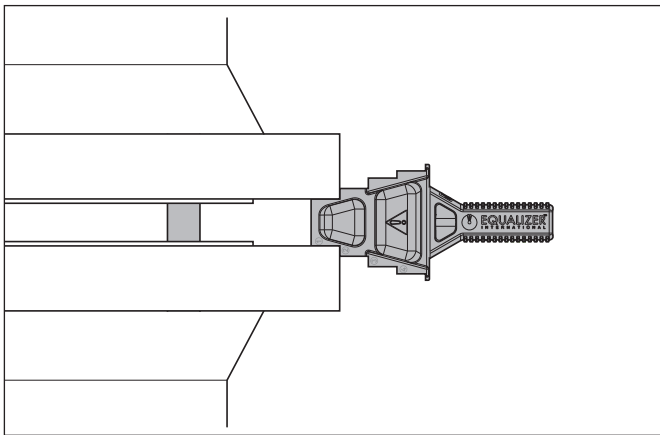


Figure 19:

The wedges can then be retracted fully and inserted again, using the next step. In this way the flange joint can be iteratively opened further until the required spread is reached.

5.3 Flange Work

WARNING Do not rely upon hydraulic systems for supporting the access gap during flange work. Do not allow fingers, hands or other body parts into the space created between the flanges.

5.4 Flange Closure

Allow the flanges to return to their closed position by gradually retracting the tool. Consult the relevant section of the manual for tool-specific instructions on how to retract each tool. Before the tool has fully retracted, insert the Safety Blocks into the flange joint. Ensure the full breadth of the selected Safety Block step is fully inserted, before gradually retracting the tool until the flange load has been applied to them.

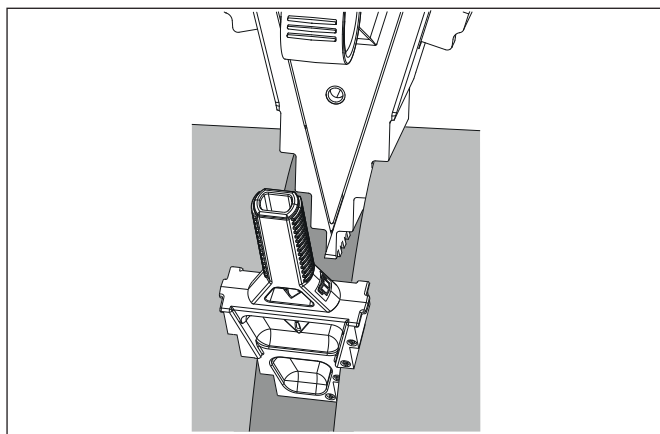


Figure 20:

To use the next smallest step, actuate the wedges to around 75% prior to inserting back into the joint. Place the tool in the gap and actuate enough to relieve the load on the Safety Blocks. In this way the flange joint can be progressively closed.

As the flange approaches its fully closed position, support the tool to avoid it dropping out of the joint. Ensure that care is taken to prevent objects being dropped. Dropped objects pose a risk of personal injury or equipment damage.

5.5 Safety Blocks

Each tool is supplied with a set of 2 Safety Blocks. The Safety Blocks have been designed with steps that match the spreading distance of the SWi tools.

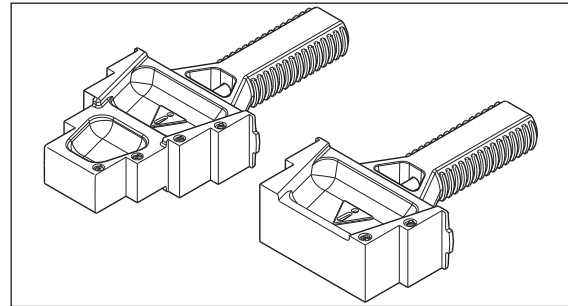


Figure 21:

5.6 Stepped Blocks

SWi12/14TMEX, SWi20/25TIEX, and SWi20/25TEEX tools are supplied as standard with a pair of Stepped Blocks. These can be fixed to the jaws (individually or in pairs) to increase the effective jaw thickness and therefore the maximum spreading distance.

Use of the Stepped Blocks also enables the SWi tools to be used in a joint with a larger access gap.

Wedge protrusion can be minimised by the use of Stepped Blocks, reducing the penetration into the joint. This enables, for example, spectacle blinds to be changed.

Attach the stepped block to the tool using the M6 counter-sunk screw. Use the hex-key supplied to tighten the screw into the threaded hole in the jaw of the tool. Repeat for second Stepped Block to further increase the effective jaw thickness if required.

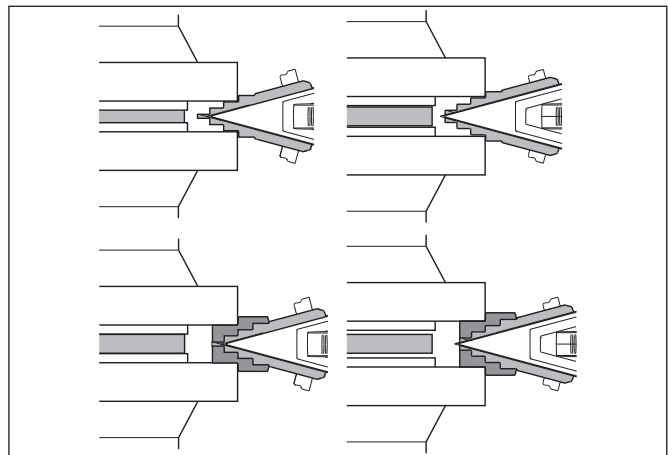


Figure 22:

To remove the Stepped Blocks unscrew the M6 counter-sunk screw. Do not force the screw out of the Stepped Block, it is deliberately retained to prevent it becoming misplaced.

Use the tool as per the Tool Operation instructions. Ensure that there is a minimum hold of 15 mm [0.59"] and that the full width of the block is used.

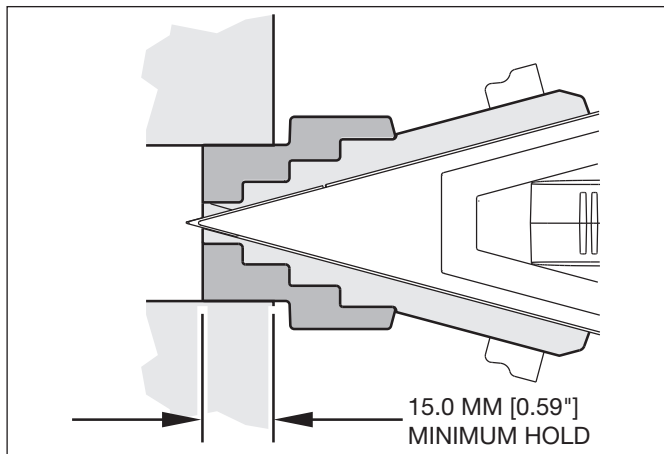


Figure 23:

5.7 Handle

The handle can be swivelled around the central axis of the tool, to improve access to the Flange and allow the tool to be easily held in the vertical or horizontal orientation.

If the tool is being used in an application where access space is very limited, the handle can be removed temporarily.

Removing Handle (SWi12/14TMEX, SWi20/25TIEX, SWi20/25TEEX)

Unclip the spiral ring and remove the anchor point and handle. Special caution should be exercised when working with a tool in this configuration. Replace the handle immediately following the task.

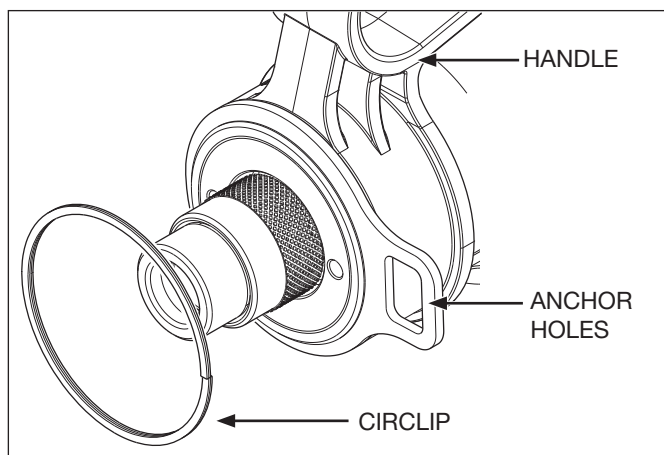


Figure 24:

5.8 Lanyard

SWi tools are supplied with a secure anchor point and a lanyard. 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. 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. Do not fix the lanyard to the handle.

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 anchor point/holes for fixing the lanyard as shown in figures 11 and 12. Do not attach the lanyard to the plastic handle.

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

5.9 Sub-Sea Usage

5.9.1 SWi20/25TIEX

SWi20/25TIEX 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 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 is stripped-down, cleaned and lubricated immediately to minimise corrosion.

5.9.2 SWi12/14TMEX

The SWi12/14TMEX is actuated mechanically and can be used sub-sea providing the following actions are taken:

- The tool is actuated via the torque-wrench by a diver.
- The tool is stripped-down, cleaned and lubricated immediately to minimise corrosion.

5.9.3 SWi20/25TEEX

SWi20/25TEEX tools require a hydraulic hand pump that is fitted with a sealed-bladder type reservoir system to allow for sub-sea operation.

The SWi20/25TEEX is actuated by means of single-acting spring-return hydraulic cylinder and can be used sub-sea providing the following actions are taken:

1. The gauge and manifold are removed from the hydraulic hand-pump and the coupler is fitted directly to the pump outlet.
2. The tool is connected to the hydraulic hand-pump whilst still top-side.
3. 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.
4. The tool is actuated via the hand pump by a diver.
5. Upon completion of works the release valve is left in the fully-open position until the tool has ascended to the surface.
6. The tool and pump are stripped-down, cleaned and lubricated immediately to minimise corrosion.

NOTICE Please note that SWi20/25TEEX 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.

6. Storage

6.1 Recommended Storage

Equalizer Spreading Wedge 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. NOTE: 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. NOTE: 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 wedge-tip (requiring tool actuation or jaw removal). Damage to the wedge-tip is indicative of tool over-load.
- Inspection of the hydraulic coupler, checking for leaks, damage and degradation. If necessary, replace the coupler.
- Inspection of the Tension Die Spring in the hydraulic cylinder, checking for signs of fatigue, damage or degradation (e.g. tarnished surface, microscopic surface cracks). If necessary, replace the spring.

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

⚠ WARNING Periodic inspections and maintenance of ATEX certified equipment are essential in order to comply with legal requirements and avoid unsafe operation.

7.2 Cleaning

To lightly clean the tool, wipe gently with a clean damp cloth using only clear water.

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

- Strip the tool down,
- Clean the components using clear water, 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 Servicing

Missing, worn or damaged parts must be replaced. Use only genuine Equalizer parts from approved distributors or service centres. Equalizer parts have been engineered and manufactured to be fit-for-purpose.

⚠ WARNING Repairs and reconditioning of these tools may only be carried out by Equalizer or an approved distributor or service centre.

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

Do not exceed 5.0 N·m [3.68 ft·lb] of torque when tightening the Jaw retaining screws. The jaws have been engineered to have a small degree of movement when correctly tightened.

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

7.4 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.

Remove the jaws as per the disassembly instructions.

Apply grease liberally to the following areas:

- The large flat surface on the underside of the jaws
- The internal flat surfaces in the square cut-out in the jaws

8. Parts List

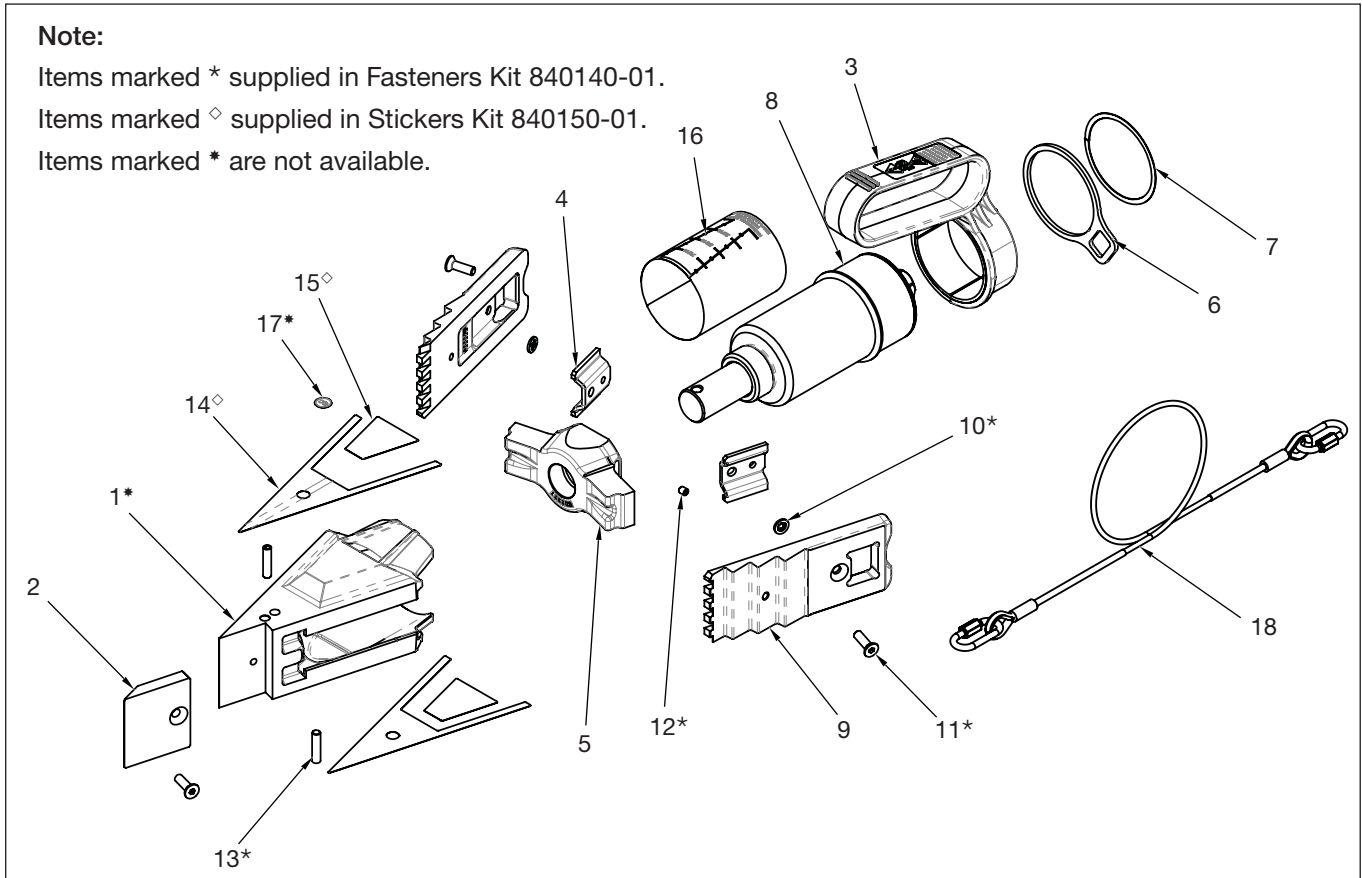
8.1 Exploded Views - SWi12/14TMEX

Note:

Items marked * supplied in Fasteners Kit 840140-01.

Items marked ◊ supplied in Stickers Kit 840150-01.

Items marked * are not available.



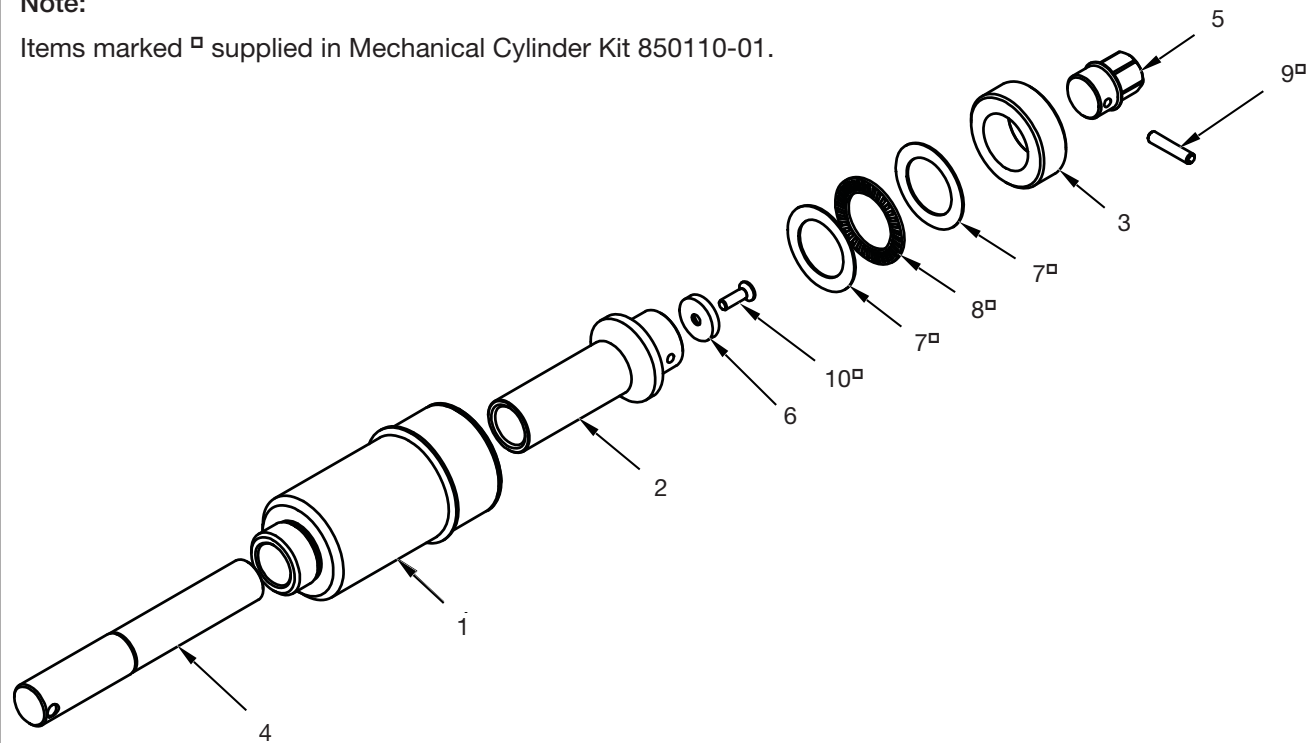
8.2 Table of Parts - SWi12/14TMEX

Item	Description	Qty	Part Numbers
1	Wedge	1	*
2	Wedge Tip	1	830202-01
3	Handle	1	830400-01
4	Captive Fastener	2	830500-01
5	Lugs	1	830600-1
6	Anchor Point	1	830800-01
7	Spiral Retaining Ring	1	830313-01
8	Mechanical Cylinder	1	850300-01
9	SWi Jaw (Pair)	1	830100-01
10	Retaining Washer	2	*
11	M6 CSK Hex Screw	3	*
12	M5 Socket Set Screw	1	*
13	M6 Grub Screw (25mm)	2	*
14	Wedge Sticker (Large)	2	◇
15	Wedge Sticker (Small)	2	◇
16	Decal TMEX Cylinder Wrap	1	Only available upon request
17	QC Sealed Top Plate Sticker	1	*
18	Safety Bond	1	830080-01
* Fastener Kit 840140-01		◇ Stickers Kit 840150-01	
			* Not available

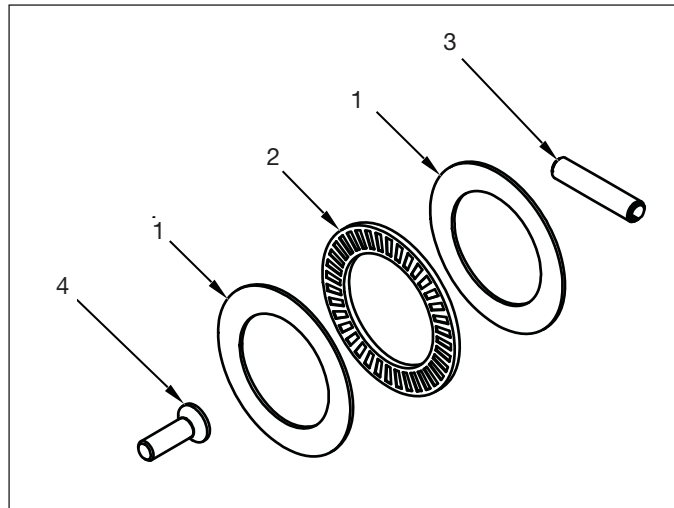
8.3 Exploded Views - SWi12/14TMEX Mechanical Cylinder

Note:

Items marked □ supplied in Mechanical Cylinder Kit 850110-01.



8.4 Exploded Views - SWi12/14TMEX Mechanical Cylinder Service Kit



8.5 Table of Parts - SWi12/14TMEX Mechanical Cylinder

Item	Description	Qty	Part Numbers
1	Cylinder Base	1	850301-01
2	Drive Rod	1	850302-01
3	Cylinder Cap	1	850303-01
4	Push Rod	1	850304-01
5	Drive Hex	1	850305-01
6	Thread Stop	1	850306-01
7	Thrust Washer	2	□
8	Thrust Race	1	□
9	Spring Pin	1	□
10	M6 CSK Hex Screw	1	□
□ Mechanical Cylinder Service Kit 850110-01			

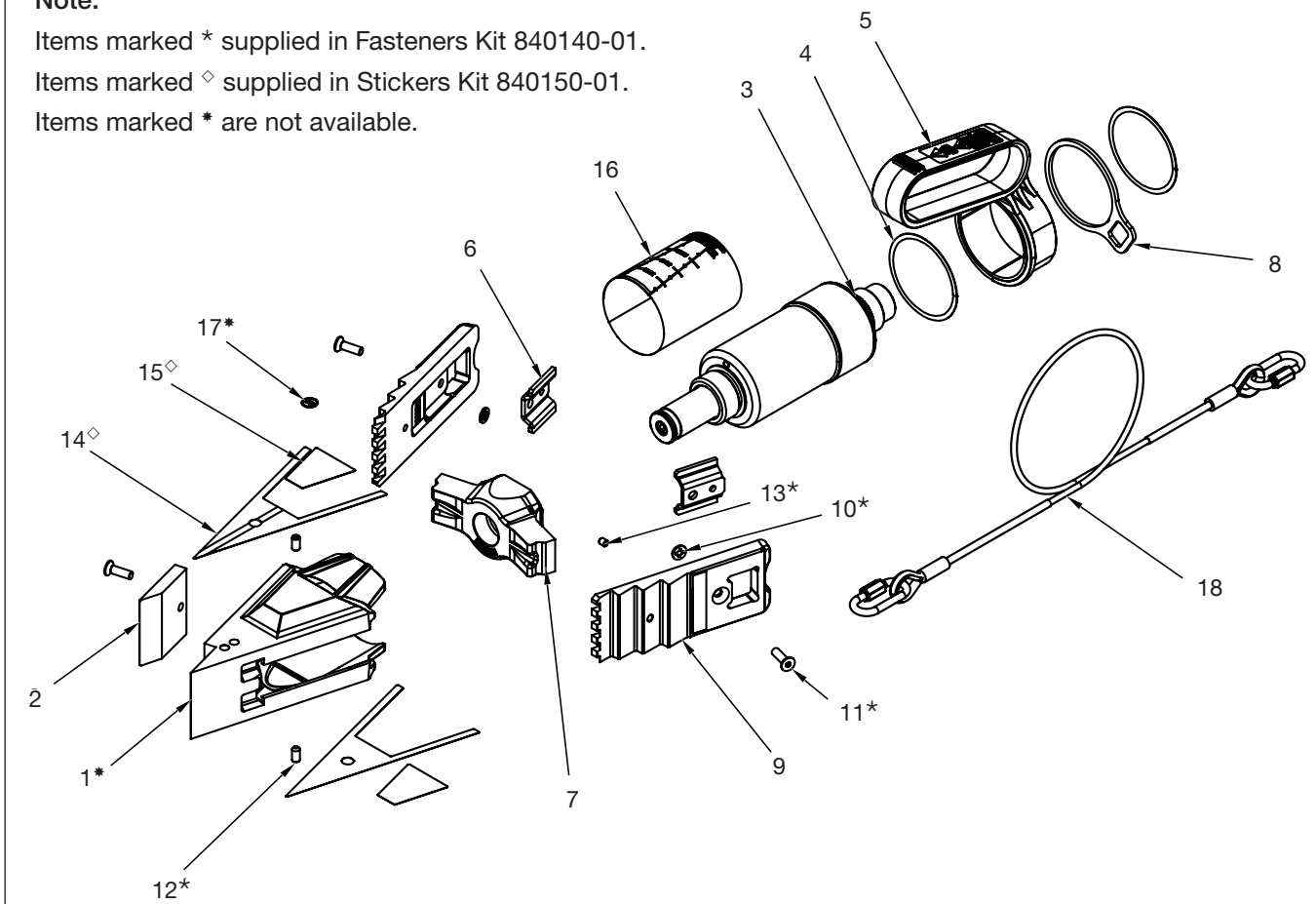
8.6 Exploded Views - SWi20/25TEEX

Note:

Items marked * supplied in Fasteners Kit 840140-01.

Items marked ◊ supplied in Stickers Kit 840150-01.

Items marked * are not available.



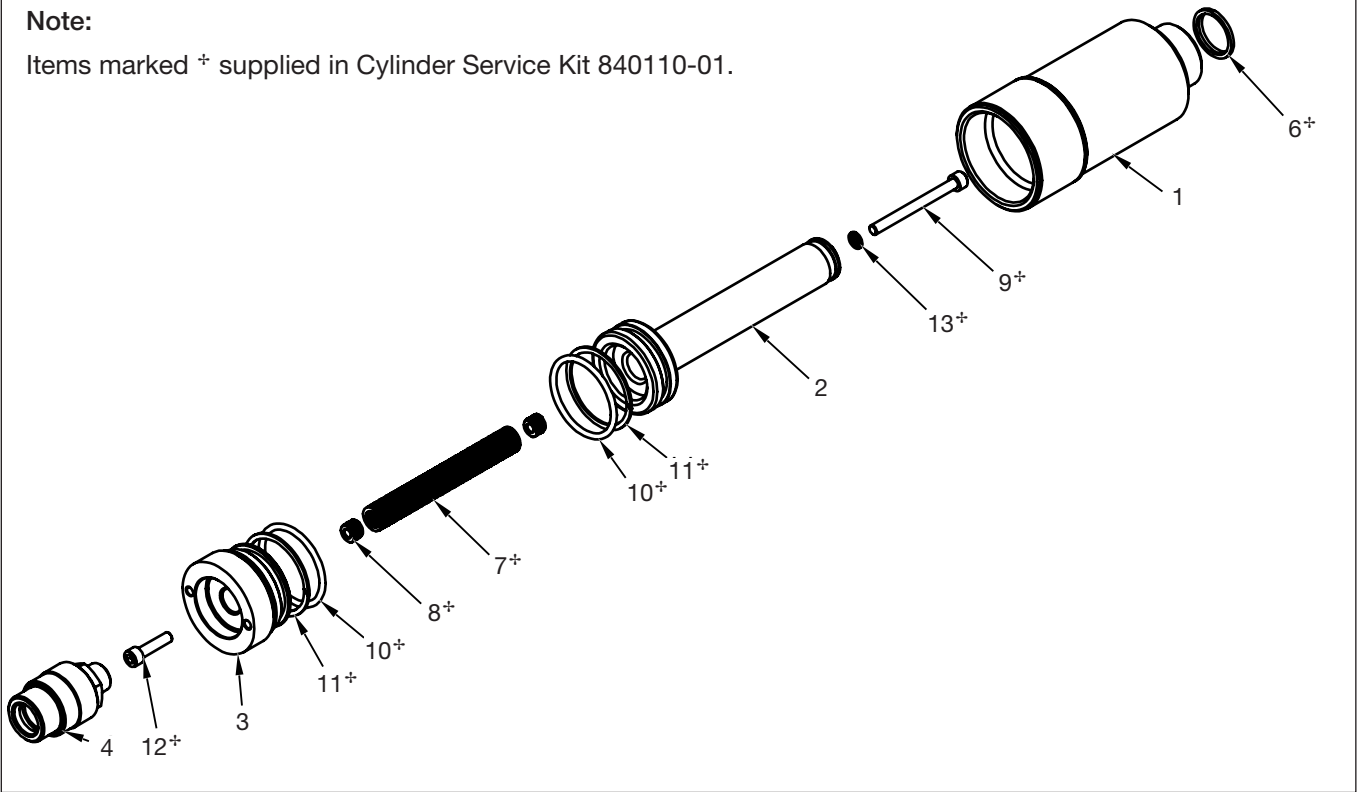
8.7 Table of Parts - SWi20/25TEEX

Item	Description	Qty	Part Numbers
1	Wedge	1	*
2	Wedge Tip	1	830202-01
3	Hydraulic Cylinder - 10,000 psi	1	830300-01
4	Spiral Retaining Spring	2	830313-01
5	Handle	1	830400-01
6	Captive Fastener	2	830500-01
7	Lugs	1	830600-1
8	Anchor Point	1	830800-01
9	SWi Jaw (pair)	1	830100-01
10	Retainer Washer	2	*
11	M6 CSK Hex Screw	3	*
12	M6 Grub Screw (12mm)	2	*
13	M5 Socket Set Screw	1	*
14	Wedge Sticker (Large)	2	◇
15	Wedge Sticker (Small)	2	◇
16	Decal TEEX Cylinder Wrap	1	Only available upon request
17	QC Sealed Top Plate Sticker	1	*
18	Safety Bond	1	830080-01
* Fastener Kit 840140-01		◇ Sticker Kit 840150-01	
			* Not available

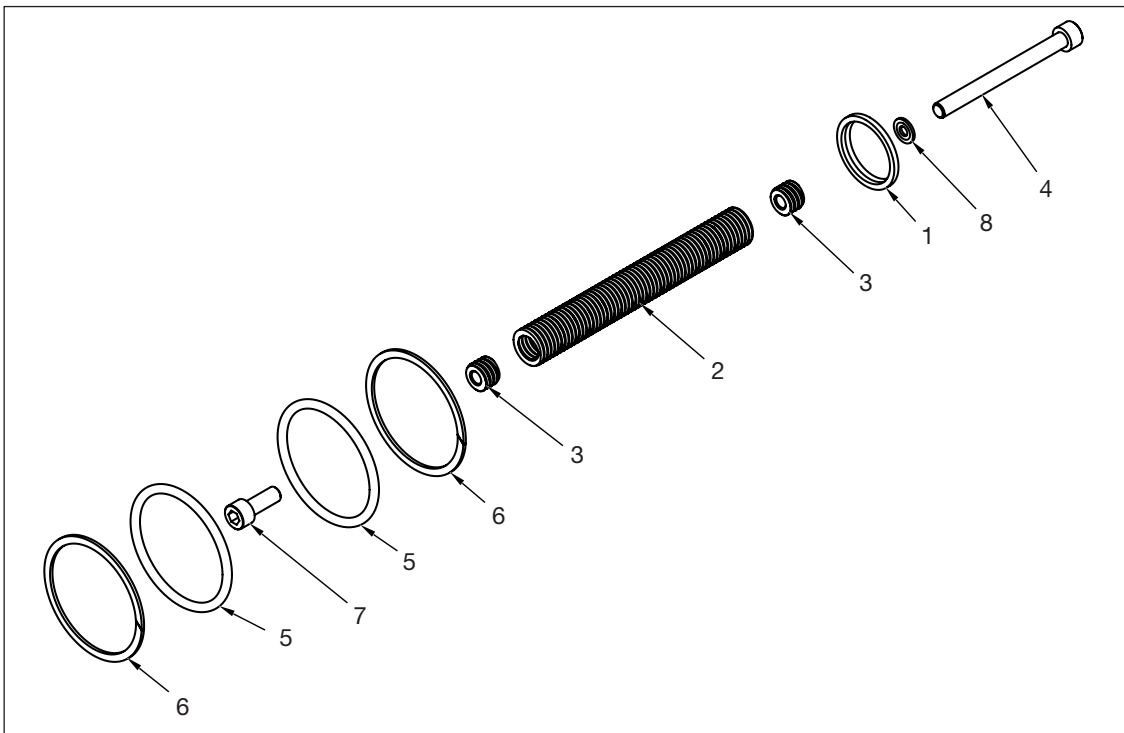
8.8 Exploded Views - SWi20/25TEEX Hydraulic Cylinder

Note:

Items marked + supplied in Cylinder Service Kit 840110-01.



8.9 Exploded Views - SWi20/25TEEX Hydraulic Cylinder Service Kit



8.10 Table of Parts - SWi20/25TEEX Hydraulic Cylinder

Item	Description	Qty	Part Numbers
1	Cylinder Base	1	830301-01
2	Piston	1	830302-01
3	Cylinder End Cap	1	830303-01
4	3/8" NPT Coupler 10kpsi	1	300901-01
6	Wiper Seal	1	+
7	Tension Die Spring	1	+
8	Spring Lock	2	+
9	M6 Capscrew	4	+
10	O-Ring	2	+
11	Back-Up Ring	2	+
12	M6x25 Socket Head Screw	1	+
13	M6 Gasket Seal	1	+
+ Cylinder Service Kit 840110-01			

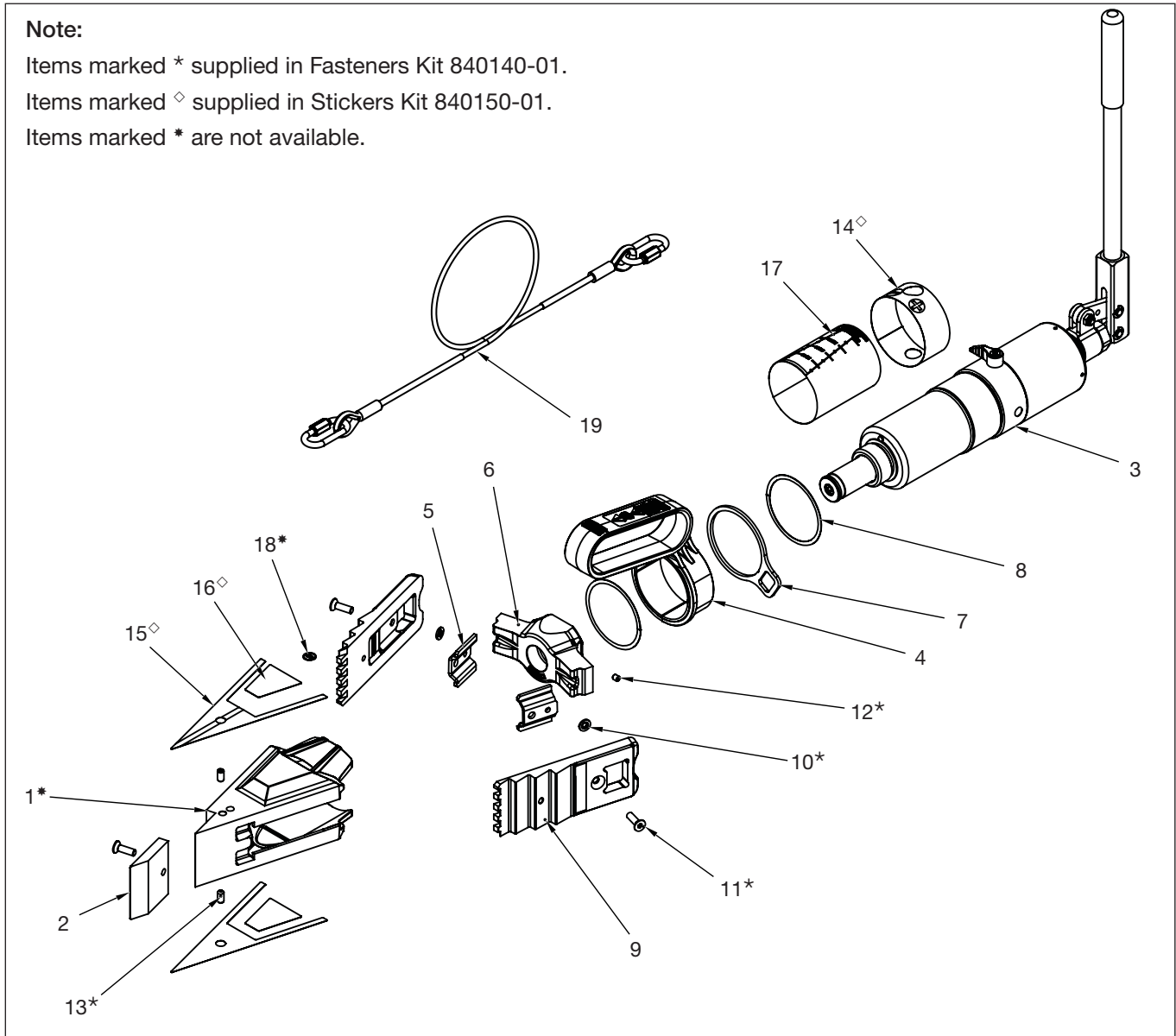
8.11 Exploded Views - SWi20/25TIEX

Note:

Items marked * supplied in Fasteners Kit 840140-01.

Items marked ◇ supplied in Stickers Kit 840150-01.

Items marked * are not available.



8.12 Table of Parts - SWi20/25TIEX

Item	Description	Qty	Part Numbers
1	Wedge	1	*
2	Wedge Tip	1	830202-01
3	Integral Pump Cylinder Assembly	1	840300-01
4	Handle	1	830400-01
5	Captive Fastener	2	830500-01
6	Lugs	1	830600-1
7	Anchor Point	1	830800-01
8	Spiral Retaining Spring	2	830313-01
9	SWi Jaw (pair)	1	830100-01
10	Retainer Washer	2	*
11	M6 CSK Hex Screw	3	*
12	M5 Socket Set Screw	1	*
13	M6 Grub Screw (12mm)	2	*
14	Integral Pump Wrap Sticker	1	◇
15	Wedge Sticker (Large)	2	◇
16	Wedge Sticker (Small)	2	◇
17	Decal TM Cylinder Wrap	1	Only available upon request
18	QC Sealed Top Plate Sticker	1	*
19	Safety Bond	1	830080-01
* Fastener Kit 840140-01		◇ Stickers Kit 840150-01	
			* Not available

8.13 Exploded Views - SWi20/25TIEX Integral Pump Cylinder

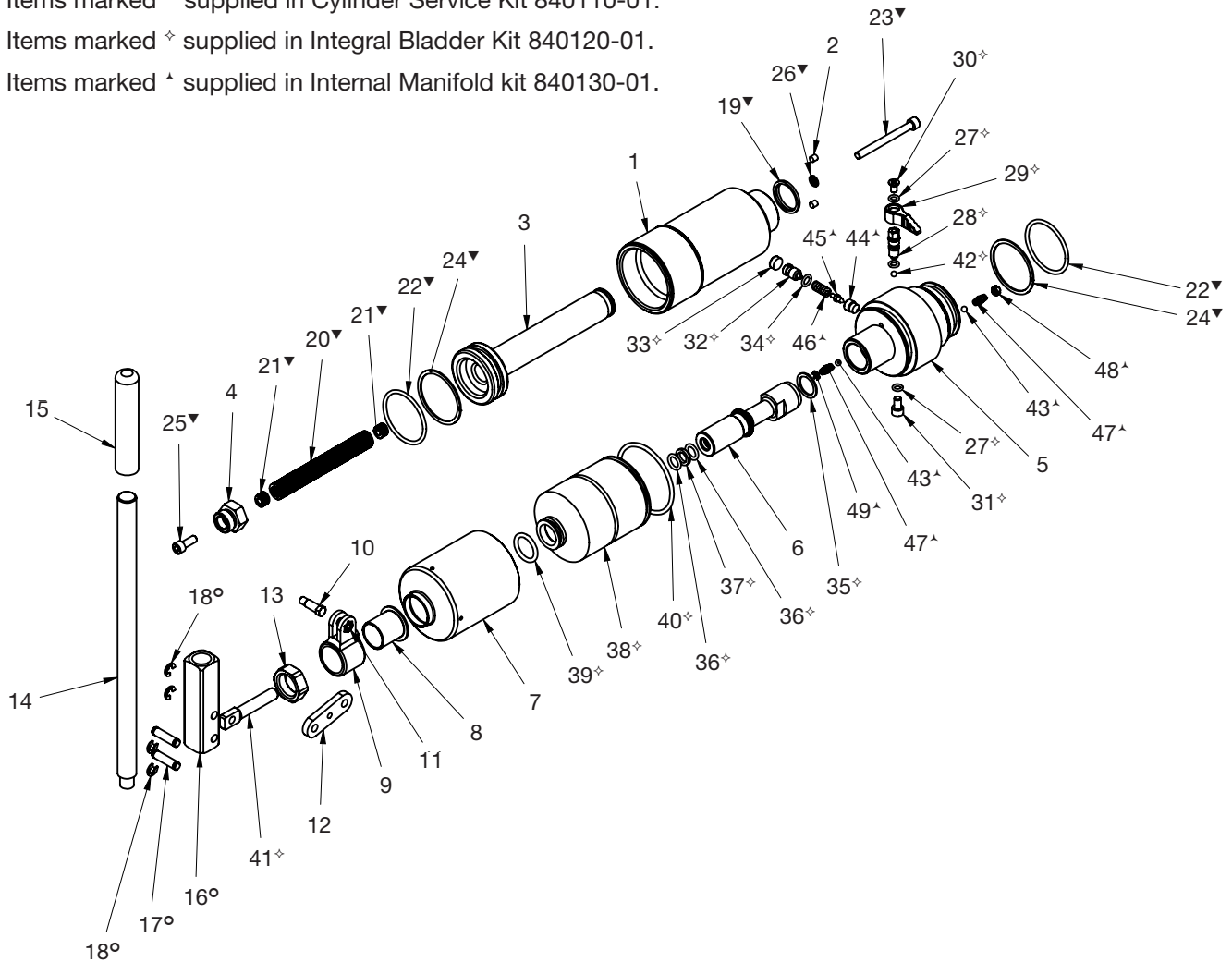
Note:

Items marked ° supplied in Clevis Kit 840160-01.

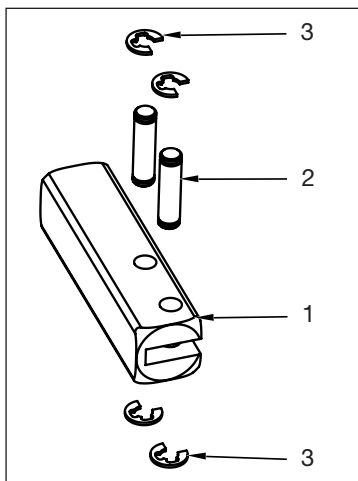
Items marked ▼ supplied in Cylinder Service Kit 840110-01.

Items marked ✦ supplied in Integral Bladder Kit 840120-01.

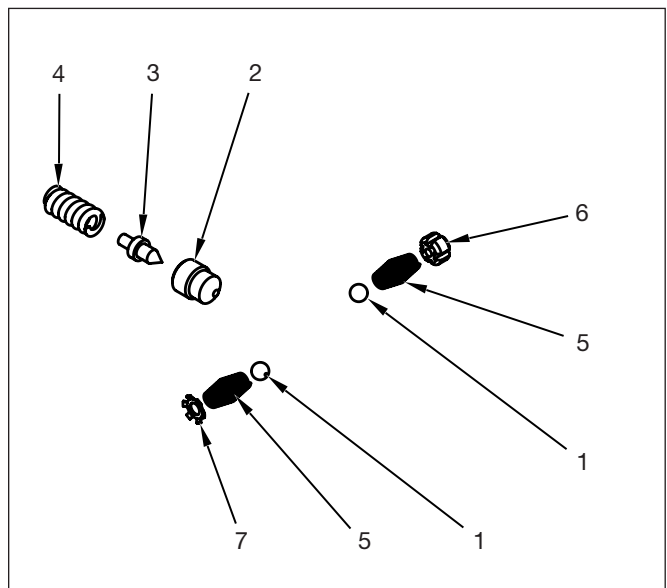
Items marked ^ supplied in Internal Manifold kit 840130-01.



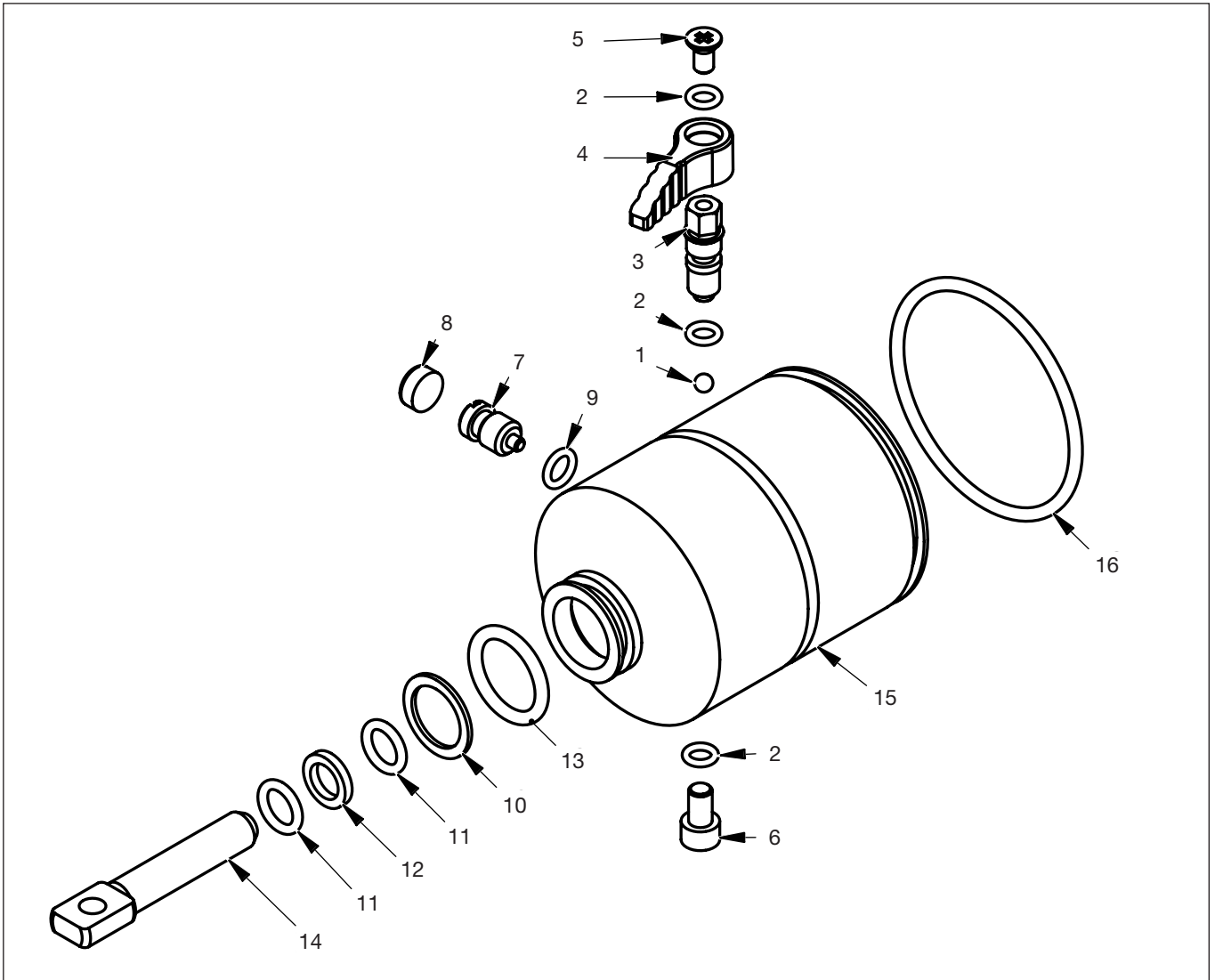
8.14 Exploded Views - SWi20/25TIEX Clevis Service Kit



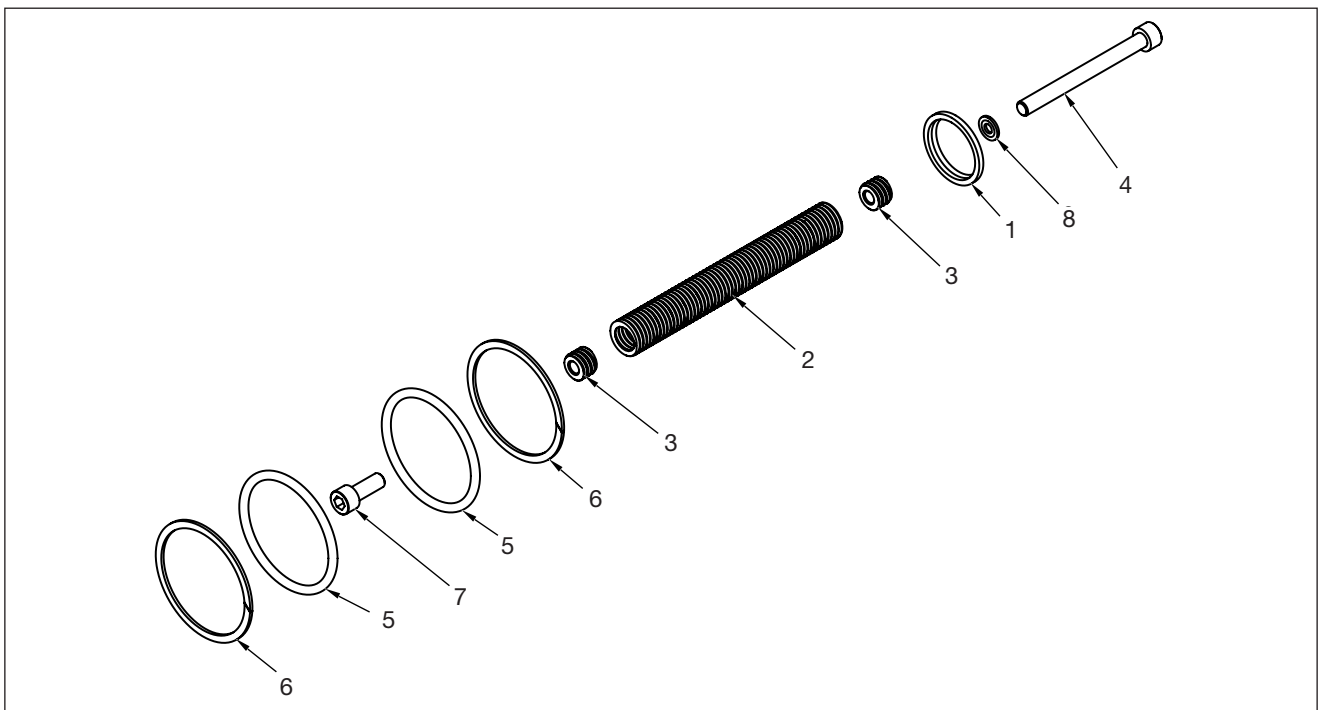
8.15 Exploded Views - SWi20/25TIEX Internal Manifold Service Kit



8.16 Exploded Views - SWi20/25TIEX Internal Manifold Service Kit



8.17 Exploded Views - SWi20/25TIEX Integral Bladder Service Kit

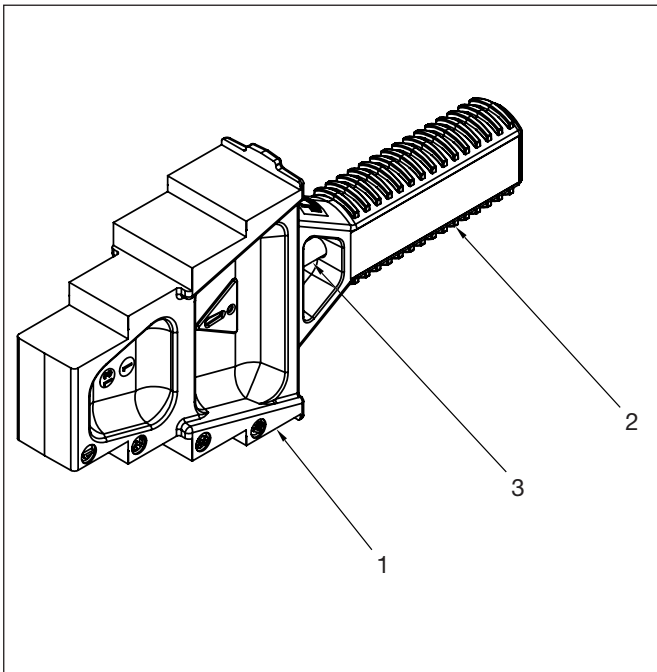


8.18 Table of Parts - SWi20/25TIEX Integral Pump Cylinder

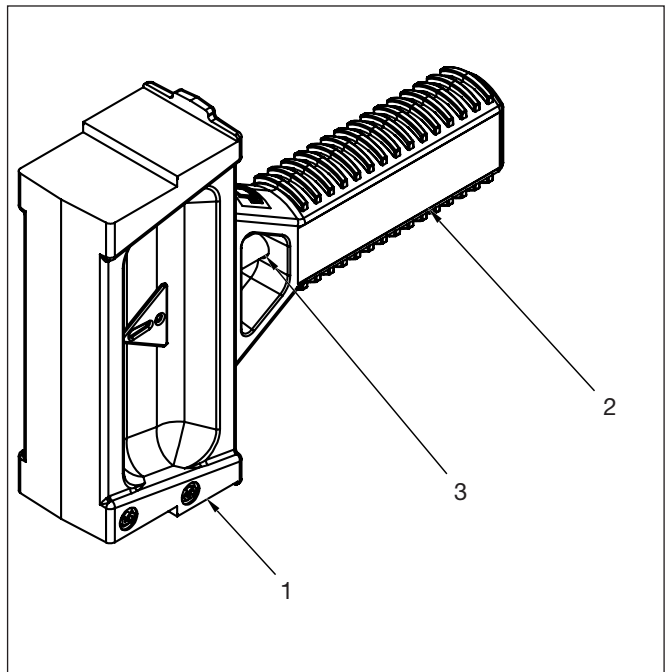
Item	Description	Qty	Part Numbers
1	Cylinder Body	1	830301-01
2	Cylinder Vent Plug	2	830310-01
3	Piston	1	830302-01
4	Nut	1	840100-01
5	Cylinder Base	1	840301-01
6	Pump Piston Housing	1	376901-01
7	Bladder Housing	1	840302-01
8	Piston Housing Cap	1	372401-01
9	Swivel Clevis	1	372501-01
10	Clevis Screw	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	O-Ring	2	▼
23	M6 Capscrew	1	▼
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	▲
○ Clevis Kit 840160-01		▼ Cylinder Service Kit 840110-01	
◇ Integral Bladder Kit 840120-01		▲ Internal Manifold kit 840130-01	

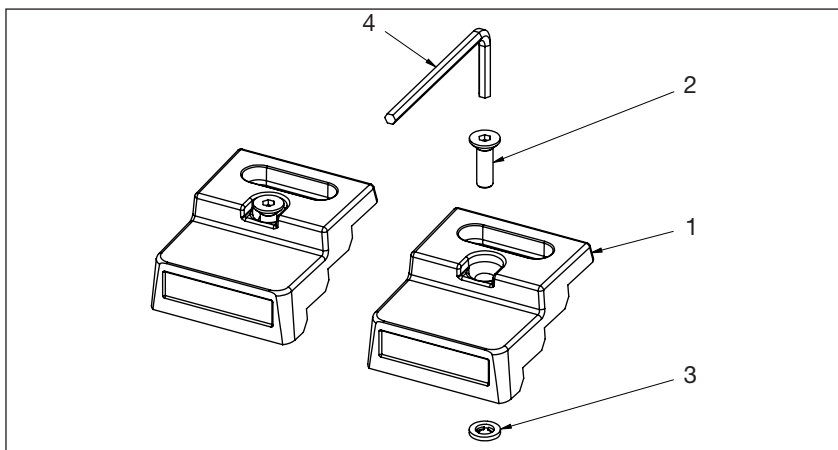
8.19 Exploded Views - Safety Block Small Service Kit



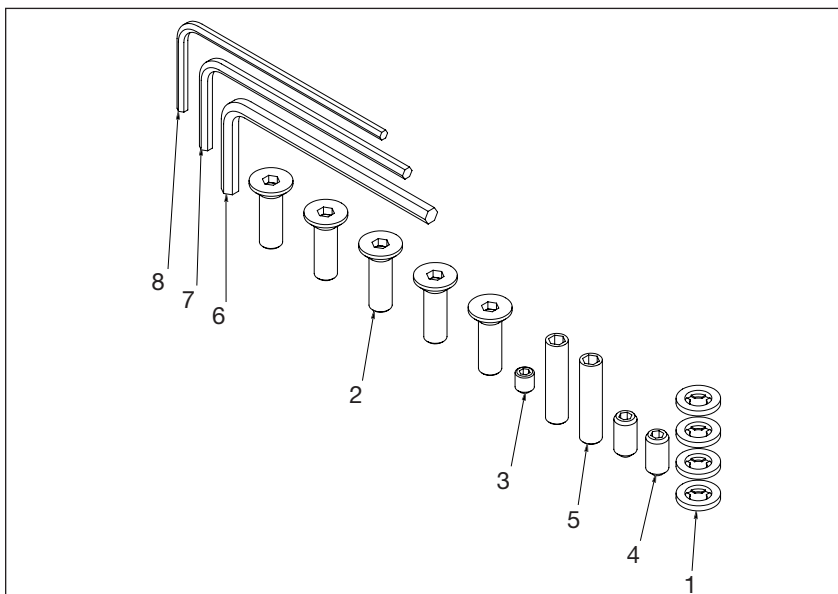
8.20 Exploded Views - Safety Block Large Service Kit Exploded View



8.21 Exploded Views - Step Block Service Kit



8.22 Exploded Views - Fastener Service Kit



8.23 Table of Parts - Safety Block Small Service Kit

Item	Description	Qty	Part Numbers
1	Safety Block Small	1	830021-01
2	Safety Block Handle	1	
3	Cap Screw M6x35	1	

8.24 Table of Parts - Safety Block Small Service Kit

Item	Description	Qty	Part Numbers
1	Safety Block Large	1	830020-01
2	Safety Block Handle	1	
3	Cap Screw M6x35	1	

8.25 Table of Parts - Safety Block Small Service Kit

Item	Description	Qty	Part Numbers
1	Step Block Machined Finish	2	830050-01
2	M6 CSK Hex Screw	2	
3	Retaining Washer	2	
4	4mm Allen Key	1	

8.26 Table of Parts - Safety Block Small Service Kit

Item	Description	Qty	Part Numbers
1	Retaining Washer	4	840140-01
2	M6 CSK Hex Screw	5	
3	M5 Socket Set Screw	1	
4	M6 Grub Screw (12mm) N/A on TMEX	2	
5	M6 Grub Screw (12mm) N/A on TIEX and TEEX	2	
6	4mm Allen Key	1	
7	3mm Allen Key	1	
8	2.5mm Allen Key	1	

9. Troubleshooting

9.1 SWi20/25TIEX Troubleshooting

Fault	Possible Cause	Corrective 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. Refer to an approved Equalizer distributor for repair.
	The inlet check-valve or intermediate valve ball has become stuck.	Dismantle the check valve, free and clean the valve balls. Refer to an approved Equalizer distributor 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 valve ball. Re-seat using a hammer and punch. Refer to an approved Equalizer distributor for further instruction.
Hydraulic pressure slowly diminishes and the pump handle rises	The outlet check valve is leaking.	Check cleanliness of valve ball. Re-seat using a hammer and punch. Refer to an approved Equalizer distributor for further instruction.
Hydraulic pressure slowly diminishes and the pump handle does not rise	The release valve is leaking.	Refer to an approved Equalizer 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 Equalizer distributor for further instructions.
Tool actuation feels soft and unresponsive	There is air in the hydraulic system.	Bleed the hydraulic system. Refer to an approved Equalizer distributor for further instruction.

9.2 SWi20/25TEEX Troubleshooting

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



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