



# ***RobustFeed AVS ECHO***



## **Instruction manual**

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# 1 SAFETY

## 1.1 Meaning of symbols

As used throughout this manual: Means Attention! Be Alert!



### DANGER!

Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.



### WARNING!

Means potential hazards which could result in personal injury or loss of life.



### CAUTION!

Means hazards which could result in minor personal injury.



### WARNING!

Before use, read and understand the instruction manual and follow all labels, employer's safety practices and Safety Data Sheets (SDSs).



## 1.2 Safety precautions



### WARNING!

These Safety Precautions are for your protection. They summarize precautionary information from the references listed in the Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.



### PROTECT YOURSELF AND OTHERS

Some welding, cutting and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure the skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:

1. Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching.
2. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields and goggles are also required.
3. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to look at the arc and not to expose themselves to the rays of the electric-arc or hot metal.
4. Wear flameproof gauntlet-type gloves, heavy long-sleeve shirt, cuffless pants, high-topped shoes, and a welding helmet or cap for protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
5. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned and open pockets eliminated from the front of the clothing.
6. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
7. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly for long distances. Bystanders should also wear goggles over safety glasses.



### FIRES AND EXPLOSIONS

Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

1. Protect yourself and others from flying sparks and hot metal.
2. Move all combustible materials well away from the work area or cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints, and coating paper, etc.
3. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal.
4. Do not weld, cut, or perform other hot work until the work piece has been completely cleaned so that there are no substances on the work piece which might produce flammable or toxic vapors. Do not perform hot work on closed containers, they may explode.
5. Have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.
6. Do not use equipment beyond its ratings. For example, an overloaded welding cable can overheat and create a fire hazard.
7. After completing work, inspect the work area to make sure there are no hot sparks or hot metal that could cause a fire later. Use fire watchers when necessary.



### ELECTRICAL SHOCK

Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling. Therefore:

1. Be sure the power source frame (chassis) is connected to the earth system of the input power.
2. Connect the workpiece to a good electrical earth.
3. Connect the work cable to the workpiece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equipment. Replace worn or damaged cables.
5. Keep everything dry, including clothing, work area, cables, torch/electrode holder and power source.
6. Make sure that all parts of your body are insulated from both the work piece and from the ground.
7. Do not stand directly on metal or the ground while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.
8. Put on dry, hole-free gloves before turning on the power.
9. Turn off the power, before removing your gloves.
10. Refer to ANSI/ASC Standard Z49.1 for specific grounding recommendations. Do not mistake the work lead for a earth cable.



### ELECTRIC AND MAGNETIC FIELDS

May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

1. Welders with pacemakers fitted should consult their doctor before welding. EMF may interfere with some pacemakers.
2. Exposure to EMF may have other health effects which are unknown.

3. Welders should use the following procedures to minimize exposure to EMF:
  - a) Route the electrode and work cables together. Secure them with tape when possible.
  - b) Never coil the torch or work cable around your body.
  - c) Do not place your body between the torch and work cables. Route cables on the same side of your body.
  - d) Connect the work cable to the workpiece as close as possible to the area being welded.
  - e) Keep the welding power source and cables as far away from your body as possible.



### FUMES AND GASES

**Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Shielding gases can cause asphyxiation. Therefore:**

1. Keep your head out of the fumes. Do not breathe the fumes and gases.
2. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead beryllium or cadmium unless positive mechanical ventilation is provided. Do not breathe in the fumes from these materials.
3. Do not operate near degreasing and spraying operations. The heat or arc can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.
4. If you develop momentary eye, nose or throat irritation while operating, this is an indication that the ventilation is not adequate. Stop work and take the necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
5. Refer to ANSI/ASC Standard Z49.1 for specific ventilation recommendations.



### CYLINDER HANDLING

**Cylinders, if mishandled, can rupture and violently release gas. A sudden rupture of cylinder valve or relief device can injure or kill. Therefore:**

1. Locate cylinders away from heat, sparks and flames. Never strike an arc on a cylinder.
2. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adapters. Maintain hoses and fittings in good condition. Follow the manufacturer's operating instructions for mounting a regulator to a compressed gas cylinder.
3. Always secure cylinders in an upright position, by chain or strap, to suitable hand trucks, undercarriages, benches, wall, post or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
4. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks.



### MOVING PARTS

**Moving parts, such as fans, rotors and belts can cause injury. Therefore:**

1. Keep all doors, panels, guards, and covers closed and securely in place.
2. Have only qualified people remove covers for maintenance and troubleshooting as necessary
3. Keep hands, hair, loose clothing and tools away from moving parts.
4. Reinstall panels or covers and close doors when service is finished and before starting the unit.

**WARNING!  
FALLING EQUIPMENT CAN INJURE**

- Only use lifting eye to lift unit. Do NOT use running gear, gas cylinders or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep cables and cords away from moving vehicles when working from an aerial location.

**WARNING!  
EQUIPMENT MAINTENANCE**

**Faulty or improperly maintained equipment can cause injury or death. Therefore:**

1. Always have qualified personnel perform the installation, troubleshooting and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.
2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.
3. Maintain cables, earthing wire, connections, power cord and power supply in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.

**CAUTION!  
ADDITIONAL SAFETY INFORMATION**

**For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging," Form 52-529.**

The following publications are recommended:

- ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
- AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding"
- AWS C5.6 - "Recommended Practices for Gas Metal Arc welding"
- AWS SP - "Safe practices" - Reprint, Welding Handbook
- ANSI/AWS F4.1 - "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances"
- OSHA 29 CFR 1910 - "Safety and health standards"
- CSA W117.2 - "Code for safety in welding and cutting"
- NFPA Standard 51B, "Fire Prevention During Welding, Cutting, and Other Hot Work"
- CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders"
- ANSI Z87.1, "Occupational and Educational Personal Eye and Face Protection Devices"

## 1.3 User responsibility

Users of ESAB equipment have the ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions. Safety precautions must meet the requirements that apply to this type of equipment. The following recommendations should be observed, in addition to the standard regulations that apply to the workplace.

All work must be carried out by trained personnel well-acquainted with the operation of the equipment. Incorrect operation of the equipment may lead to hazardous situations, which could result in injury to the operator and damage to the equipment.

1. Anyone who uses the equipment must be familiar with:
  - its operation
  - the location of emergency stops
  - its function
  - the relevant safety precautions
  - welding and cutting or other applicable operation of the equipment
2. The operator must ensure that:
  - no unauthorized person is within the working area of the equipment when it is started up
  - no-one is unprotected when the arc is struck or work is started with the equipment
3. The workplace must:
  - be suitable for the purpose
  - be free from drafts
4. Personal safety equipment:
  - Always wear recommended personal safety equipment, such as safety glasses, flame-proof clothing, safety gloves
  - Do not wear loose-fitting items, such as scarves, bracelets, rings, etc., which could become trapped or cause burns
5. General precautions:
  - Make sure the return cable is connected securely
  - Work on high voltage equipment **may only be carried out by a qualified electrician**
  - Appropriate fire extinguishing equipment must be clearly marked and close at hand
  - Lubrication and maintenance must **not** be carried out on the equipment during operation



### **WARNING!**

Arc welding and cutting may cause injury to yourself and others. Take precautions when welding and cutting.



### **ELECTRIC SHOCK - Can kill**

- Install and ground the unit in accordance with instruction manual.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves, or wet clothing.
- Insulate yourself from work and ground.
- Ensure your working position is safe



### **ELECTRIC AND MAGNETIC FIELDS - Pose health risks**

- Welders with pacemakers fitted should consult their doctor before welding. EMF may interfere with some pacemakers.
- Exposure to EMF may have other health effects which are unknown.
- Welders should use the following procedures to minimize exposure to EMF:
  - Route the electrode and work cables together on the same side of your body. Secure them with tape when possible. Do not place your body between the torch and work cables. Never coil the torch or work cable around your body. Keep the welding power source and cables as far away from your body as possible.
  - Connect the work cable to the workpiece as close as possible to the area being welded.



### **FUMES AND GASES - Can be dangerous to your health**

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to take fumes and gases away from your breathing zone and the general area.





**ARC RAYS - Can injure eyes and burn skin**

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.



**NOISE - Excessive noise can damage hearing**

Protect your ears. Use ear defenders or other hearing protection.



**MOVING PARTS - Can cause injuries**

- Keep all doors, panels, guards, and covers closed and securely in place.
- Have only qualified people remove covers for maintenance and troubleshooting as necessary.
- Keep hands, hair, loose clothing and tools away from moving parts.
- Reinstall panels or covers and close doors when service is finished and before starting the unit.



**FIRE HAZARD**

- Sparks (spatter) can cause a fire. Make sure there are no inflammable materials nearby.
- Do not use on closed containers.



**HOT SURFACE - Parts can burn**

- Do not touch parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or insulated welding gloves to prevent burns.



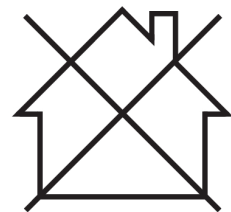
**CAUTION!**

This product is solely intended for arc welding.



**CAUTION!**

Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electromagnetic compatibility of class A equipment in such locations, due to conducted as well as radiated disturbances.



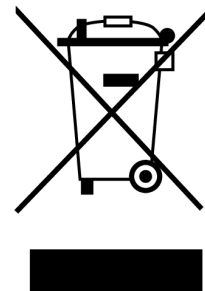
**NOTE!**

**Dispose of electronic equipment at a recycling facility!**

To conform with the European Directive 2012/19/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical and/or electronic equipment that has reached the end of its life must be disposed of at a recycling facility.

As the person responsible for the equipment, it is your responsibility to obtain information on approved collection stations.

For further information contact the nearest ESAB dealer.



## 1.4 California proposition 65 warning



**WARNING!**

Welding or cutting equipment produces fumes or gases which contain chemicals known in the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)



**WARNING!**

This product can expose you to chemicals including lead, which are known to the state of California to cause cancer and birth defects or other reproductive harm. Wash hands after use.

For more information, go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**ESAB has an assortment of welding accessories and personal protection equipment for purchase. For ordering information contact your local ESAB dealer or visit us on our website.**

## 2 INTRODUCTION

The RobustFeed AVS ECHO (Arc Voltage Sensing) is a portable wire feeder. The unit is powered entirely on the arc voltage from a constant current (CC) or constant voltage (CV) welding power source with the output ON feature (AVS/Suitcase/Mobilefeed) feature. It operates with reverse polarity (Direct Current Electrode Positive - DCEP) or straight polarity (Direct Current Electrode Negative - DCEN).

The RobustFeed AVS ECHO is also compatible with Warrior 400i/500i power source with specific Warrior Upgrade Kits for AVS ECHO. The warrior upgrade kit enables communication through the weld cable between the power source and the feeder.

The RobustFeed AVS ECHO will operate as RobustFeed AVS if the Warrior upgrade kits for AVS ECHO is not detected or installed.

The RobustFeed AVS ECHO comes in different variants (see the "ORDERING NUMBERS" appendix).

The RobustFeed AVS ECHO is sealed and contains four-wheel drive wire feed mechanisms as well as control electronics.

It can be used together with standard Ø 200 mm and Ø 300 mm wire bobbin or with ESAB's Marathon Pac™ with a wire adapter to feed the wire.

The RobustFeed AVS ECHO can be placed on a trolley, suspended above the workplace or on the floor (standing up or laying down and with or without a wheel set).

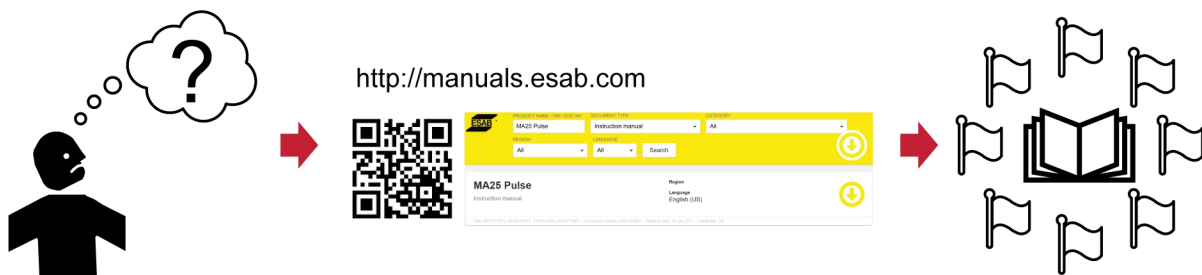
**ESAB accessories for the product can be found in the "ACCESSORIES" chapter of this manual.**

### 2.1 Equipment

The wire feed unit is supplied with:

- Drive rolls:
  - Cored V-K-knurled, 1.2 mm (0.047 in.)
  - Cored V-K-knurled, 1.4 mm (0.055 in.)
  - Cored V-K-knurled, 2.0 mm (0.078 in.)
  - Cored V-K-knurled, 2.0 mm (0.078 in.)
- Wire guides: 0.6–1.6 mm (0.023–1/16 in.)
- Short pig tail interconnection with strain relief kit 600 mm (24 in.)
- Voltage sensing cable, OKC 25 with clamp
- Instruction manual
- Quick start guide

Instruction manuals in other languages can be downloaded from the Internet: [manuals.esab.com](http://manuals.esab.com)



## 3 TECHNICAL DATA

RobustAVS ECHO, Valid from serial no. OP146YY-XXXXXX	
Power Supply voltage	15-100 VDC
Maximum weld voltage	44 VDC
Power requirement	194 VA
Rated supply current I <sub>1</sub>	4.3 A
<b>Settings data:</b>	
Wire feed speed	0.8–25.0 m/min (32–984 in./min)
Torch connection	Tweco 4
Max. diameter wire bobbin	300 mm (12 in.)
<b>Wire dimension:</b>	
Fe	0.023 - 0.078 in. (0.6 - 2 mm)
SS wire	0.6 - 1.6 mm (0.023 - 0.062 in.)
Cored wire	0.9 - 2.4 mm (0.035 - 0.093 in.)
<b>Weight</b>	
RobustFeed AVS ECHO CSA, with flowmeter with Tweco connector	18.4 kg (40.5 lb)
Maximum weight wire spool	20.0 kg (44.1 lb.)
Dimensions (l×w×h)	595×250×430 mm (23.4×9.8×16.9 in.)
Operating temperature	-20 to +55 C (-4 to +131 F)
Transport and storage temperature	-40 to +80 C (-40 to +176 F)
Shielding gas	All types intended for GMAW welding
Maximum gas pressure	0.5 Mpa (5 bar)
<b>Permissible load at +40°C:</b>	
40% duty cycle	500 A / 39 V
60% duty cycle	450 A / 36 V
100% duty cycle	350 A / 31.5 V
Enclosure class	IP54

### Duty cycle

The duty cycle refers to the time as a percentage of a ten-minute period that you can weld or cut at a certain load without overloading.

### Enclosure class

The **IP** code indicates the enclosure class, i.e. the degree of protection against penetration by solid objects or water.

Equipment marked **IP54** is designed for indoor and outdoor use, can withstand dusty environments and splashing water from all directions.

## 4 INSTALLATION

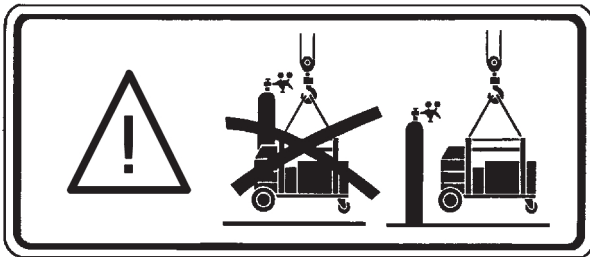
The installation must be carried out by a professional.

**WARNING!**

When welding in an environment with increased electrical danger, only power sources intended for this environment may be used. These power sources are marked with the symbol

**CAUTION!**

This product is intended for industrial use. In a domestic environment, this product may cause radio interference. It is the user's responsibility to take adequate precautions.



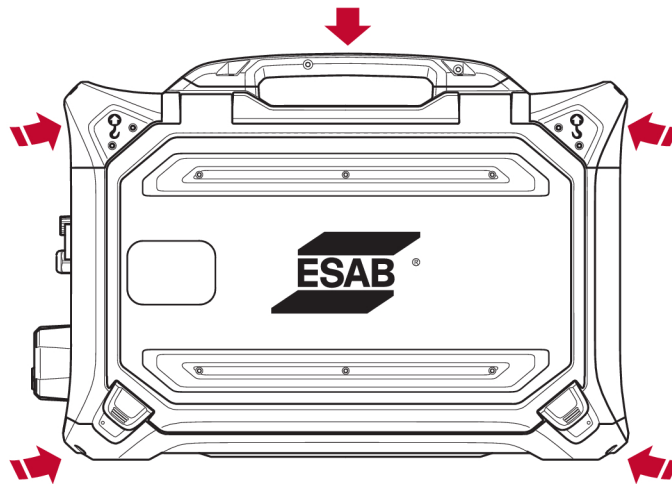
### 4.1 Lifting instructions

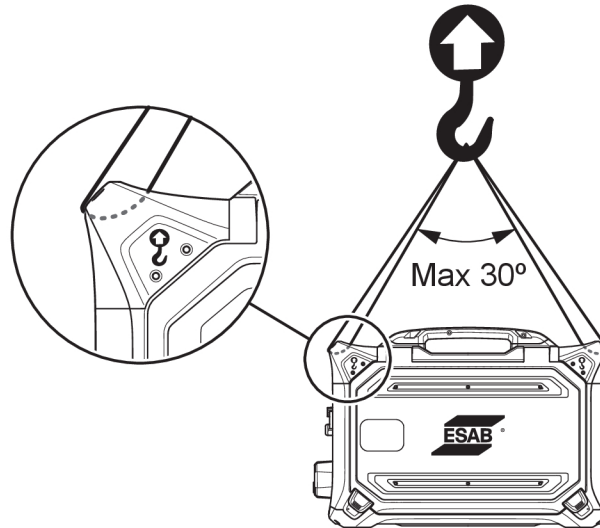
**CAUTION!**

Risk of crushing when lifting the wire feeder. Protect yourself and warn bystanders of the risk.

**CAUTION!**

To avoid personal injury and damage to the equipment, lift using the methods and attachment points detailed below.





**CAUTION!**

Do not place heavy objects on the wire feeder when lifting. Objects should not be secured. The lifting points are rated for a **maximum total weight of 40 kg / 90 lb** when lifted in the two outer upper lifting handles according to the graphic above!

The 40 kg / 90 lb approved weight consists of wire feeder plus accessories (standard feeder weight is 18.4 kg / 40.5 lb, for all weights see the TECHNICAL DATA chapter).

## 5 OPERATION

General safety regulations for handling the equipment can be found in the "SAFETY" chapter of this manual. Read it through before you start using the equipment!



**WARNING!**

To avoid shock, do not touch the electrode wire or parts in contact with it, or uninsulated cable or connections.



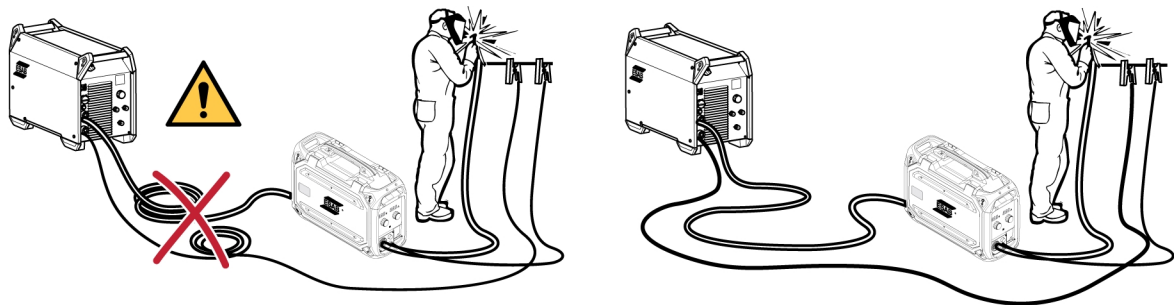
**WARNING!**

The weld cable between power source and the feeder should be maintained uncoiled for proper communication.



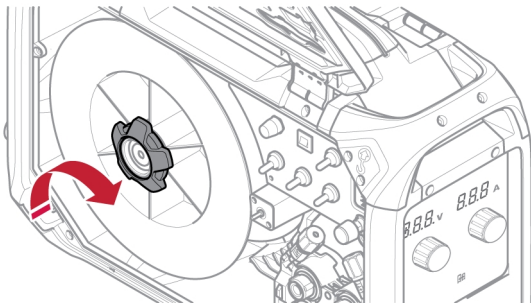
**NOTE!**

When moving the equipment, use the handle intended for transportation. Never pull the equipment by the welding torch.



**WARNING!**

Make sure the side panels are closed during operation.



**WARNING!**

To prevent the reel from sliding off the brake hub, lock the reel in place by tightening the brake hub nut.



**WARNING!**

Rotating parts can cause injury, take great care.



**WARNING!**

Secure the equipment, especially if used on an uneven or sloping surface.

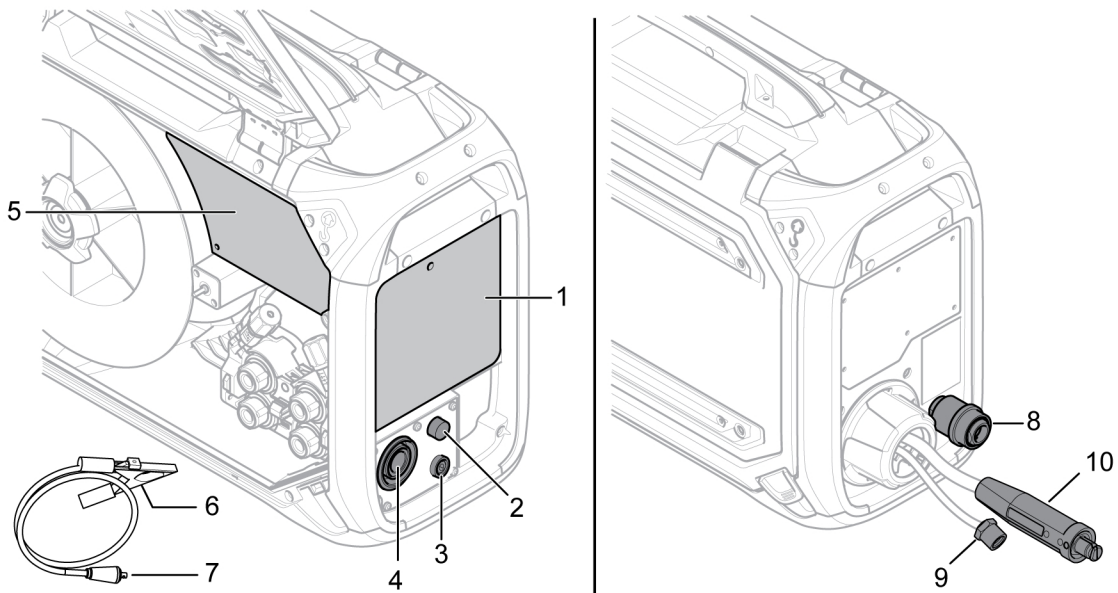
**CAUTION!**

Before threading welding wire, make sure the chisel point and burrs have been removed from the end of the wire to prevent the wire from jamming in the torch liner.

**NOTE!**

Replace the brake hub nut and the brake hub sleeve if they are worn out and don't lock properly.

## 5.1 Connections and control devices



- |                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. External control panel (see the "CONTROL PANEL" chapter)</li> <li>2. Connection for the Tweco trigger cable (2 pin AMP CPC connector)</li> <li>3. Connection for Work lead / Voltage sensing OKC 25 (female)</li> <li>4. Connection for the welding torch (Tweco 4 type)</li> <li>5. Internal control panel (see the "CONTROL PANEL" chapter)</li> </ol> | <ol style="list-style-type: none"> <li>6. Connection for workpiece</li> <li>7. Connection for feeder (3) OKC 25 (male)</li> <li>8. Wire inlet for use with Marathon Pac™ (optional) 16 mm (0.629 in.) Quick connect</li> <li>9. Connection for shielding gas</li> <li>10. Connection for welding current from power source (Tweco 4 MPC-1)</li> </ol> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**WARNING!**

The right and left side doors of the wire feed unit must be closed and locked when welding and/or wire feeding occurs. Never weld or feed the wire unless both doors are closed.

## 5.2 Starting procedure

The AVS ECHO feeder is powered up from the weld voltage of the Welding power supply. So, the following starting procedure need to be followed.

### With Warrior 400i/500i (with Warrior Upgrade Kits for AVS ECHO):

- Set the process selection as AVS (Mobile Feed) in the Warrior power source.
- Connect both AVS ECHO volt sense cable/clamp and the Warrior return clamp to the workpiece.
- Turn ON the power switch in the internal control panel to "I" position.
- Set to CV mode in the internal control panel of the AVS ECHO.
- RobustFeed AVS ECHO will be powered up and will start establishing handshake with the power source.



- Wait at least 30 seconds for the handshake to be completed.
- Once the handshake is completed, the handshake indicator on the external control panel will be lit.
- Set the required voltage and wire feed speed in the external control panel of the AVS ECHO to start the weld.

**With Warrior 400i/500i (without Warrior Upgrade Kits for AVS ECHO):**

- Set the process selection as AVS (Mobile Feed) in the Warrior power source.
- Connect both AVS ECHO volt sense cable/clamp and the Warrior return clamp to the workpiece.
- Turn ON the power switch in the internal control panel to "I" position.
- Set to CV mode in the internal control panel of the AVS ECHO.
- Set the required voltage in the Warrior power source and wire feed speed in the external control panel of the AVS ECHO to start the weld.

**With other Power Sources:**

To power up the AVS ECHO feeder, an open circuit voltage (OCV) is needed from the power source. So, the selected welding power source should have the suitcase feeder (CV Process with OCV in place). If not available, the welding power source shall be set with CC Process setting (SMAW) and the above shown procedure to be followed.

**For CV mode (recommended if CV – output ON is available)**

- Set the process selection as AVS (Mobile Feed) in the power source.
- Connect both AVS ECHO volt sense cable/clamp and the power source return clamp to the workpiece.
- Turn ON the power switch in the internal control panel to "I" position.
- Set to CV mode in the internal control panel of the AVS ECHO.
- Set the required voltage in the power source and wire feed speed in the external control panel of the AVS ECHO to start the weld.

**For CC mode (only if CV – output ON is not available)**

- Set the process selection as SMAW in other power source.
- Connect both AVS ECHO volt sense cable/clamp and the power source return clamp to the workpiece.
- Turn ON the power switch in the internal control panel to "I" position.
- Set to CC mode in the internal control panel of the AVS ECHO.
- Set the required amperage in the power source and corresponding wire feed speed in the AVS ECHO to start the weld.
- It is recommended to set amperage and wire feed speed to correspond to spray arc welding mode for optimal performance. See "Weld data table" for recommended parameters.

## 5.3 Lighting inside the wire feed unit

Lights are fitted inside the cabinet of the wire feed unit.

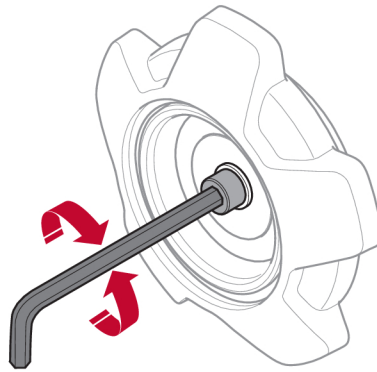
- The feeder mechanism light will turn on and off when the door is opened and closed respectively.
- The wire bobbin light turns on when the door is opened, and live welding is in progress. It will turn off when the welding has been stopped or the door has been closed.

## 5.4 Bobbin brake

The bobbin brake force should be increased just enough to prevent wire feed overrun. The actual brake force required depends on the wire feed speed and the size and weight of the bobbin spool.

Do not overload the bobbin brake. If the brake force is too high, it may overload the motor, resulting in a lower-quality welding result.

The bobbin brake force is adjusted using the 6 mm (0.236 in.) hexagon Allen screw in the middle of the brake hub nut.



## 5.5 Changing and loading wire

- 1) Open the left door of the wire feeder.
- 2) Untighten and remove the brake hub nut and remove the old wire spool.
- 3) Insert a new wire spool into the feeder unit and straighten out the new welding wire 10–20 cm (3.94–7.87 in.). File away burrs and sharp edges from the end of the wire before inserting it into the feeder mechanism.
- 4) Lock the wire spool onto the brake hub by tightening the brake hub nut.
- 5) Thread the wire through the feeder mechanism (according to the illustration on the inside of the feeder unit).
- 6) Close and lock the left door of the wire feeder.



### NOTE!

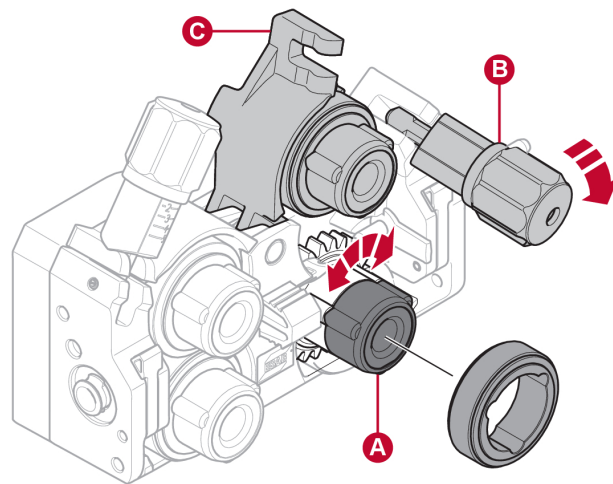
Replace the brake hub nut and the brake hub sleeve if they are worn out and do not lock properly.

## 5.6 Changing feed rollers

When changing to a different type of wire, the feed rollers should also be changed to match the new type of wire. For more information about correct feed rollers depending on wire diameter and type, see the WEAR PARTS appendix. For tips about easy access to essential wear parts, see the "Wear parts storage compartment" section in this manual.

- 1) Open the left door of the wire feeder.
- 2) Unlock the feed rollers to be exchanged, by rotating the roller quick lock (A) for each roller.
- 3) Relieve the pressure on the feed rollers, by folding the tensioner units (B) down and thereby releasing the swing arms (C).
- 4) Remove the feed rollers and install the correct ones (according to the WEAR PARTS appendix).
- 5) Reapply the pressure on the feed rollers, by pushing the swing arms (C) down and secure them using the tensioner units (B).
- 6) Lock the rollers by rotating the roller quick locks (A).

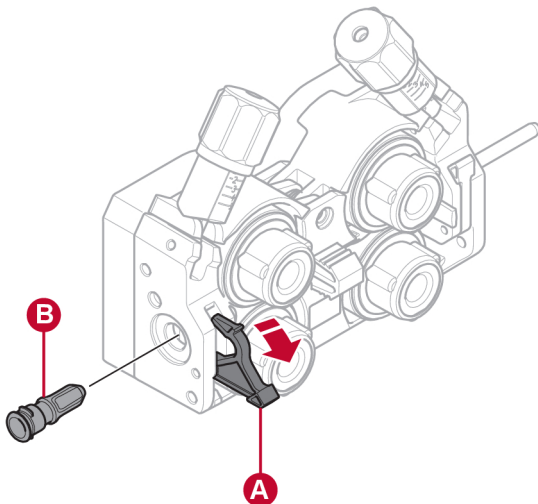
7) Close and lock the left door of the wire feeder.



## 5.7 Changing the wire guides

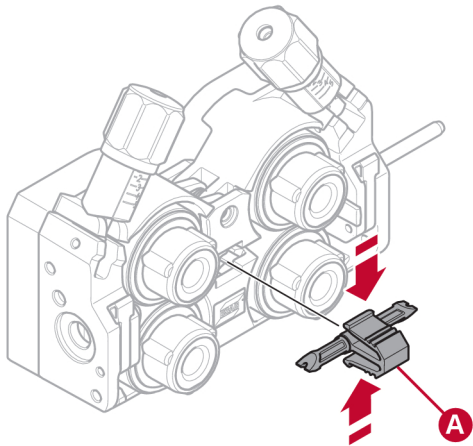
When changing to a different type of wire, the wire guides may need to be changed to match the new type of wire. For information about the correct wire guides depending on wire diameter and type, see the "WEAR PARTS" appendix. (For a tip to easy access to necessary wear parts, see the "Wear parts storage compartment" section in this manual.)

### 5.7.1 Inlet wire guide



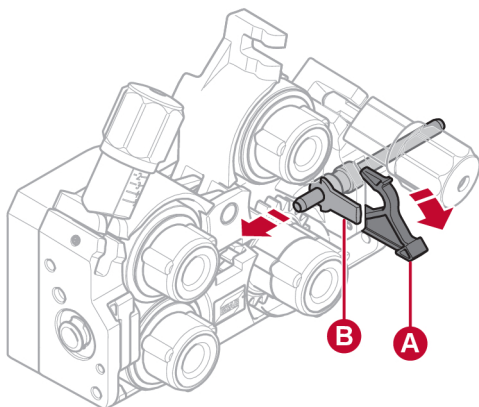
- 1) Unlock the inlet wire guide quick lock (A) by folding it out.
- 2) Remove the inlet wire guide (B).
- 3) Fit the correct inlet wire guide (according to the WEAR PARTS appendix).
- 4) Lock the new inlet wire guide into place using the wire guide quick lock (A).

### 5.7.2 Middle wire guide



- 1) Apply a small amount of pressure to the middle wire guide clip and remove the middle wire guide (A).
- 2) Push in the correct type of wire guide (according to the WEAR PARTS appendix). The clip automatically locks the wire guide when in the correct position.

### 5.7.3 Outlet wire guide



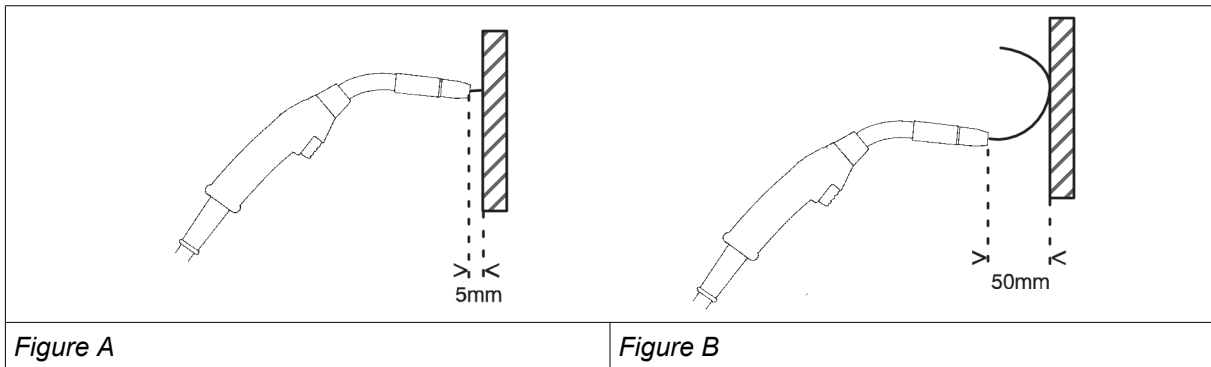
- 1) Remove the lower right feed roller (see the "Changing feed rollers" section).
- 2) Remove the middle wire guide (see the "Middle wire guide" section).
- 3) Unlock the outlet wire guide quick lock (A) by folding it out.
- 4) Remove the outlet wire guide (B).
- 5) Install the correct outlet wire guide (according to the WEAR PARTS appendix).

- 6) Lock the new outlet wire guide into place using the wire guide quick lock (A).
- 7) Reattach the second pair of feed rollers and reapply the roller pressure (see the "Changing feed rollers" section).

## 5.8 Roller pressure

The roller pressure should be adjusted separately on each tensioner unit, depending on the material and diameter of the wire used.

Start by making sure that the wire moves smoothly through the wire guide. Then set the pressure of the wire feeder's pressure rollers. It is important that the pressure is not too high.



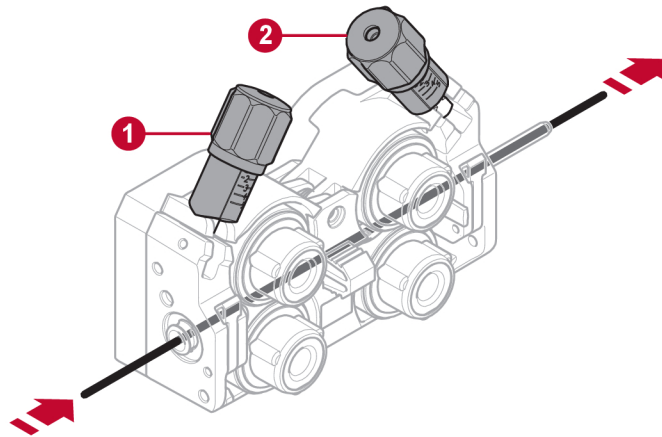
To check that the feed pressure is set correctly, you can feed out the wire against an insulated object, e.g. a piece of wood.

When you hold the welding torch approximately 5 mm (0.2 in.) from the piece of wood (figure A) the feed rollers should slip.

If you hold the welding torch approximately 50 mm (2 in.) from the piece of wood, the wire should be fed out and bend (figure B).

The table below serves as a guideline showing approximate roller pressure settings for standard conditions with correct bobbin brake force. If the torch cables are long, dirty or worn, the pressure setting may need to be increased. Always check the roller pressure setting on a case-by-case basis by feeding out the wire against an insulated object as described above. A table showing approximate settings can also be found on the inside of the left door of the wire feeder.

		Wire diameter (mm)		0.6		0.8		1.8		2.0		2.4		
		(in.)		.023		.030		.070		5/64		3/32		
		Pressure setting												
Wire material	Fe, Ss	Tensioner unit 1	2.5											
		Tensioner unit 2	3–3.5											
	Cored	Tensioner unit 1					2							
		Tensioner unit 2					2.5–3							

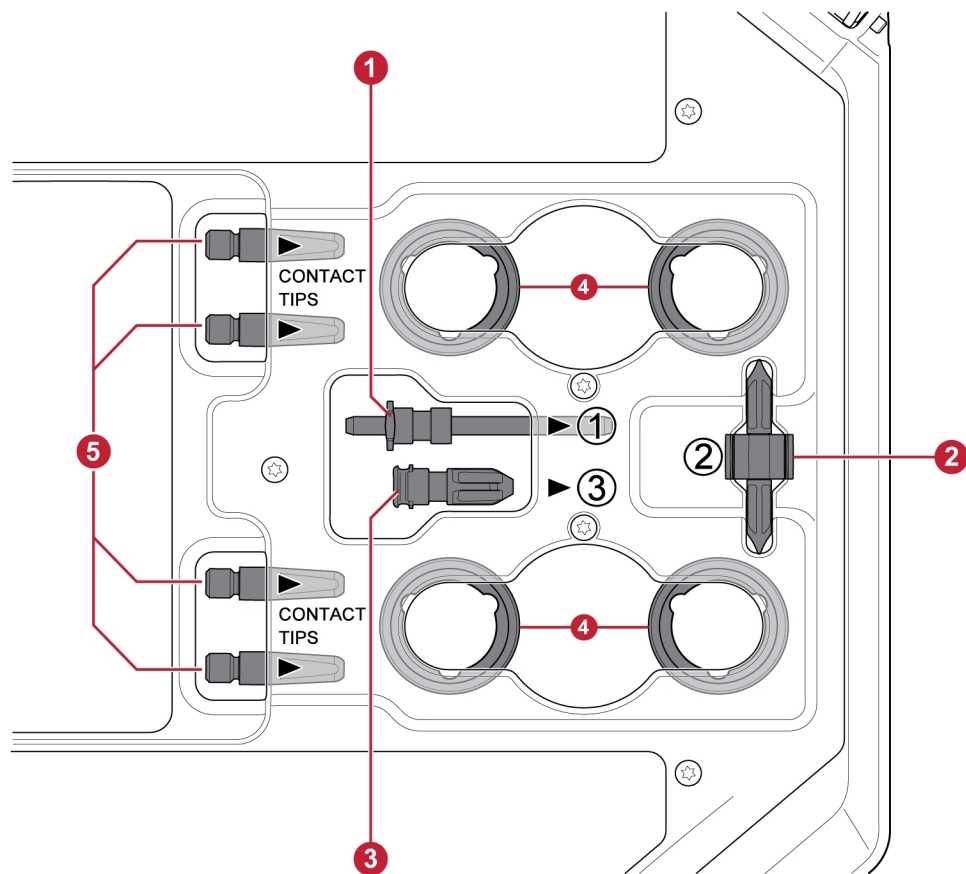


1. Tensioner unit 1

2. Tensioner unit 2

## 5.9 Wear parts storage compartment

A wear parts storage compartment is located on the inside of the left door of the wire feeder, providing easy access to an extra set of rollers and wire guides.



- 1. Inlet wire guide
- 2. Middle wire guide
- 3. Outlet wire guide

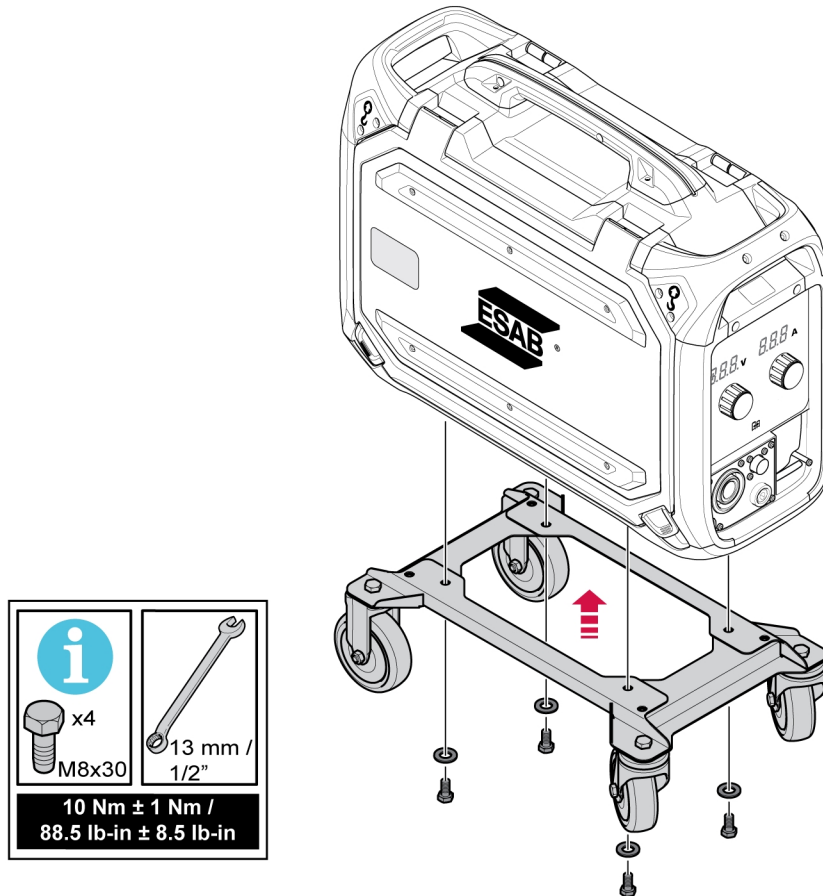
- 4. Feed rollers (×4 pcs.)
- 5. Contact tips for the welding torch (×4 pcs.)

## 5.10 Attaching the wheel kit

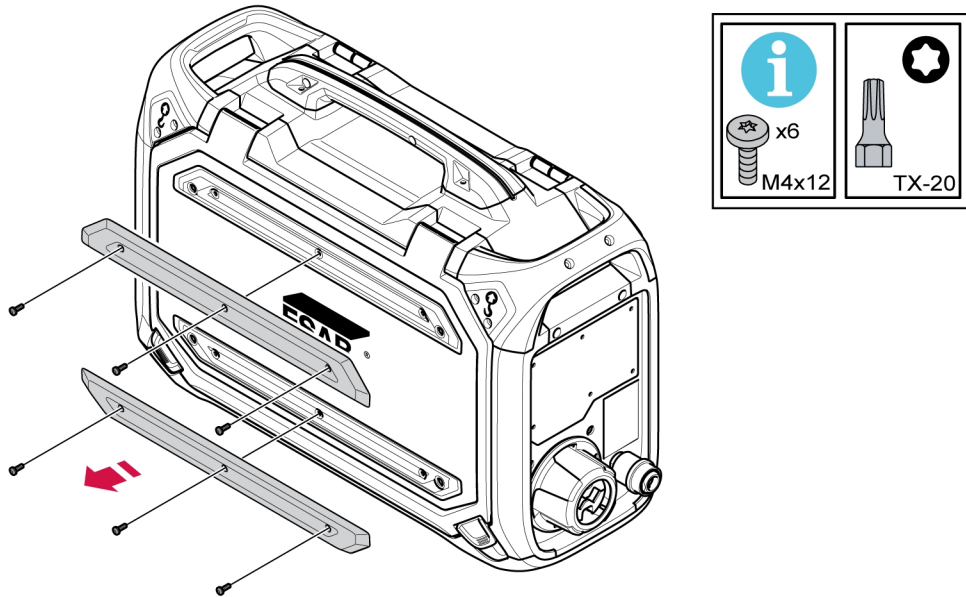
### 5.10.1 Attaching the wheels to the wheel kit frame

Before the wire feed unit is attached to the wheel kit, fasten the wheels to the frame by means of the M12 screws, washers and nuts, using a tightening torque of  $40 \pm 4$  Nm ( $354 \pm 35.4$  in. lb). The fixed wheels at the rear end should be positioned parallel to the frame.

### 5.10.2 Wire feed unit in vertical position

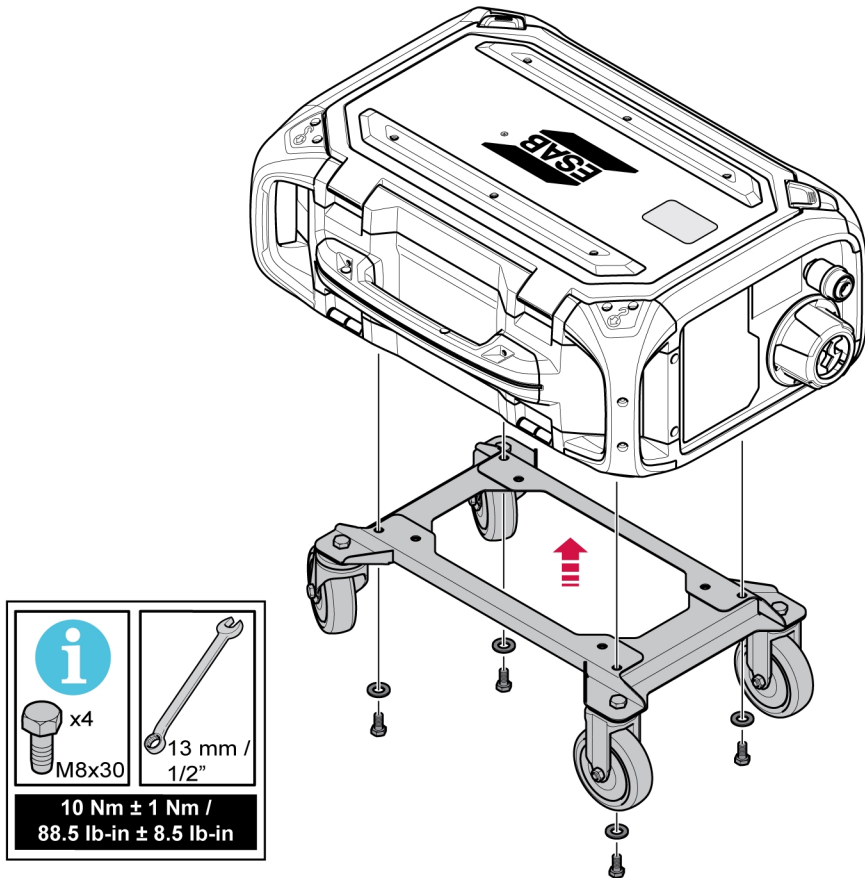


### 5.10.3 Wire feed unit in horizontal position



**NOTE!**

In order to attach the wire feeder to the wheel kit in the horizontal position, the two bumpers on the wire feeder door must be removed.



  x4 M8x30	 13 mm / 1/2"
<b>10 Nm ± 1 Nm /                  88.5 lb-in ± 8.5 lb-in</b>	



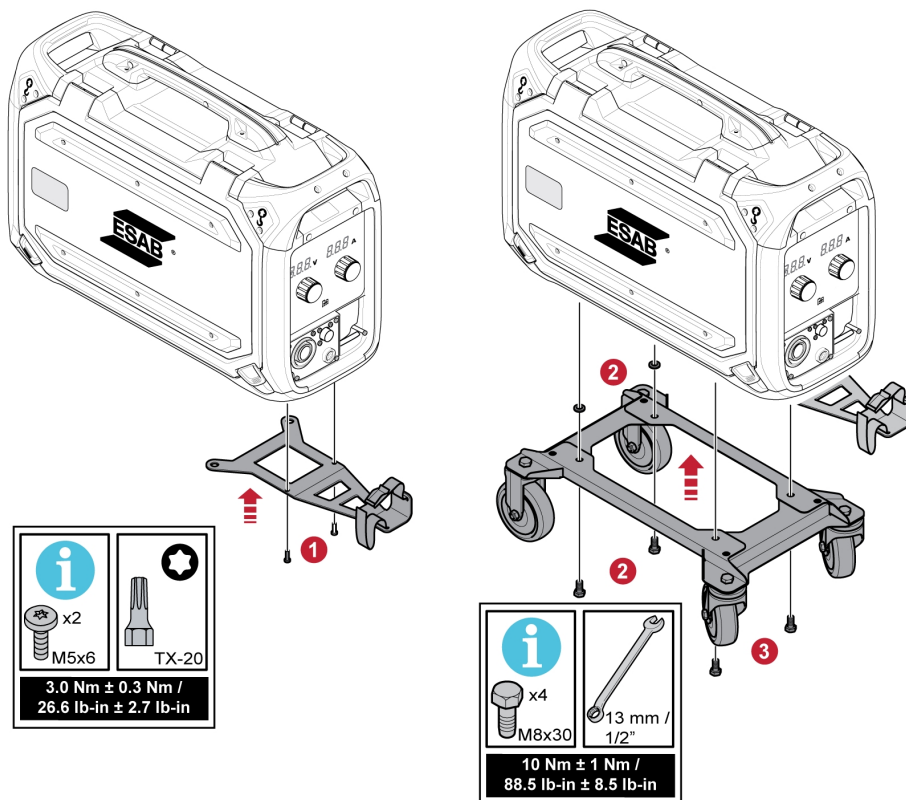
## 5.11 Attaching both the wheel kit and the torch strain relief accessory

- 1) If the torch strain relief accessory is to be used with the wheel kit when it is fitted in the vertical position, the assembly steps below must be completed in the following order:

Attach the torch strain relief to the wire feed unit, using the two Torx 5 screws.

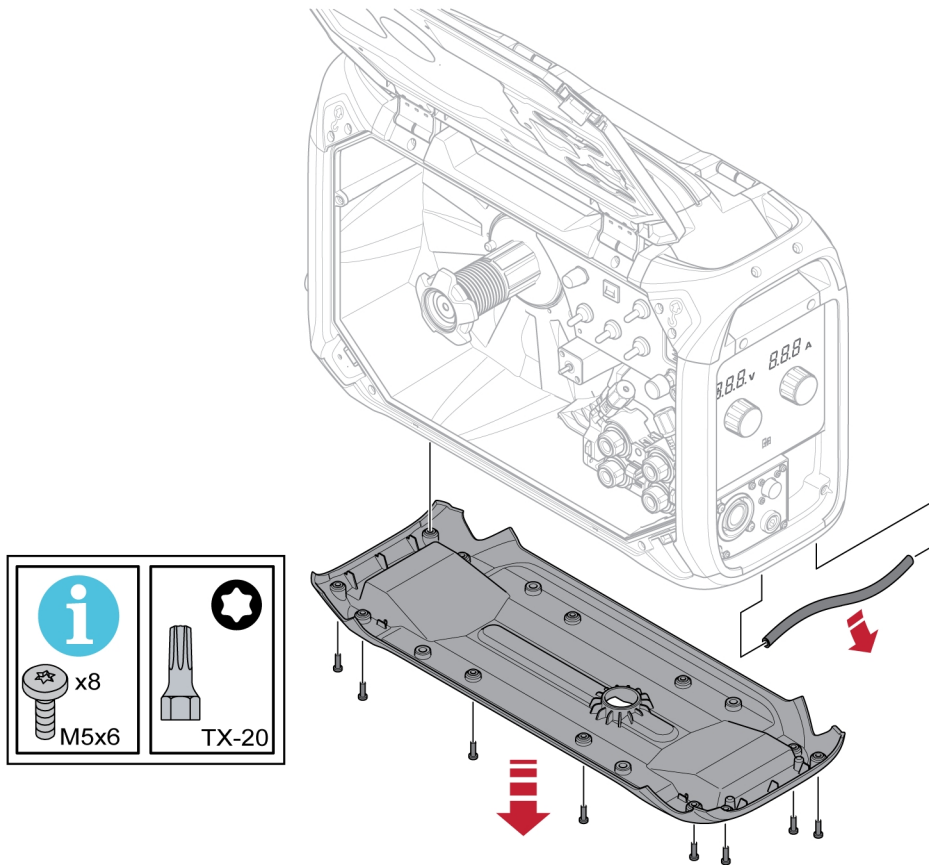
Attach the wheel kit to the wire feeder using the two screw joints near the rear end of the wire feeder. Ensure that the two distance washers are inserted between the wheel kit and the wire feeder.

Fasten the wheel kit and the torch strain relief to the wire feeder using the two screw joints located closer to the front end of the wire feeder.

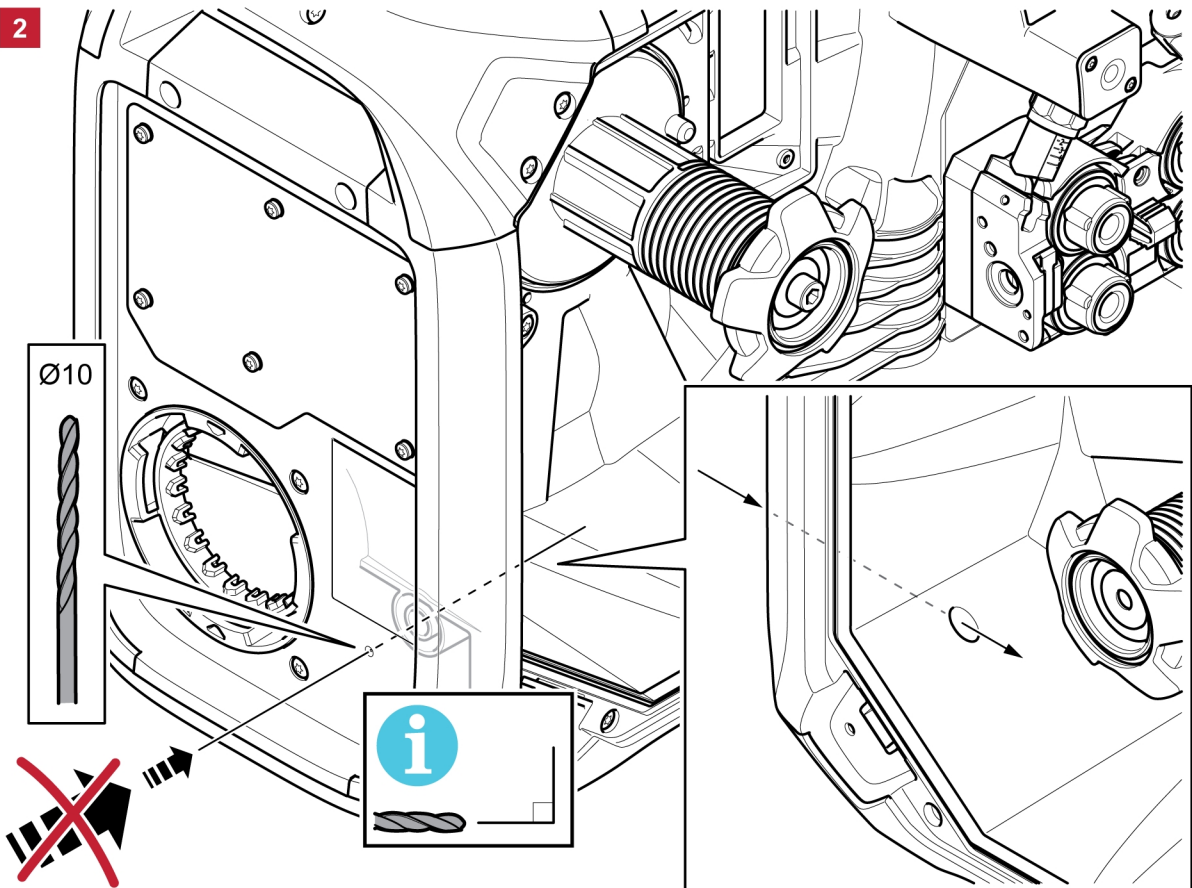


## 5.12 Marathon Pac™ installation

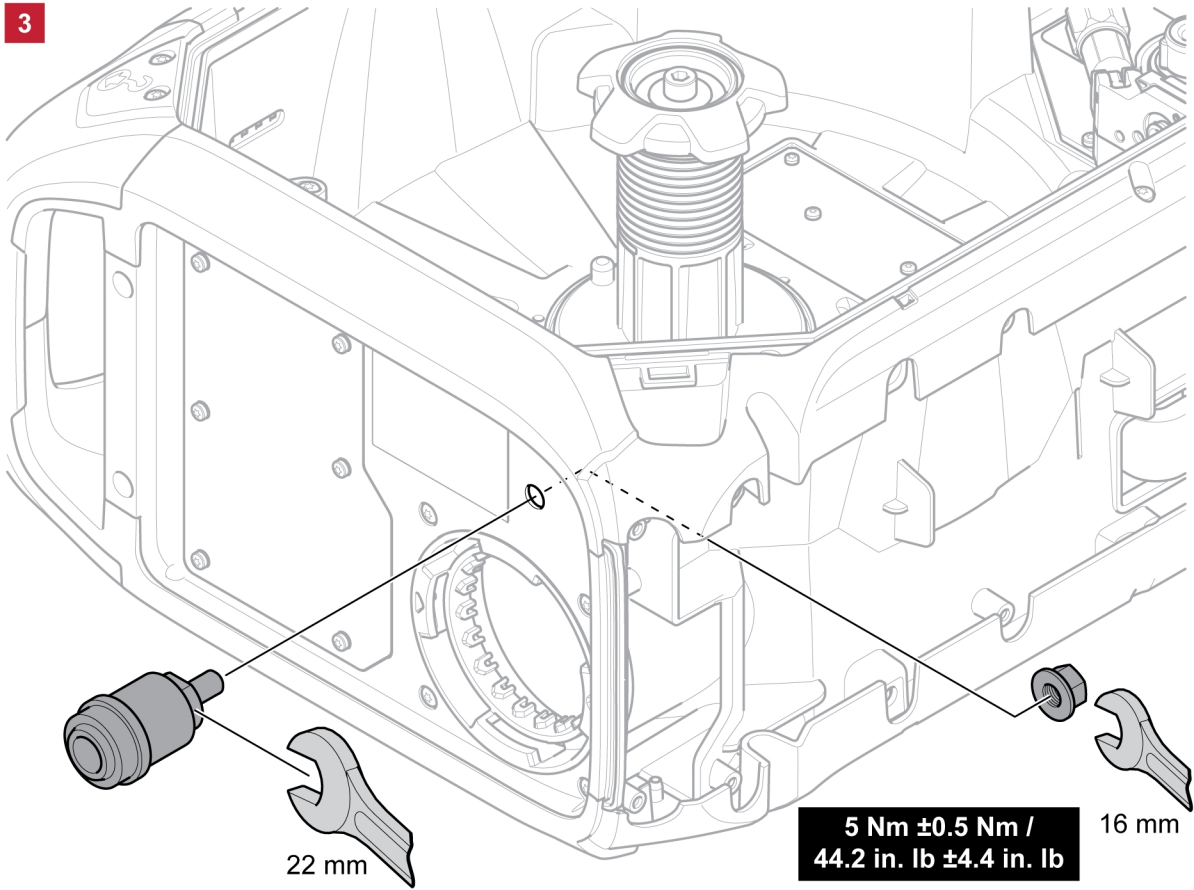
1



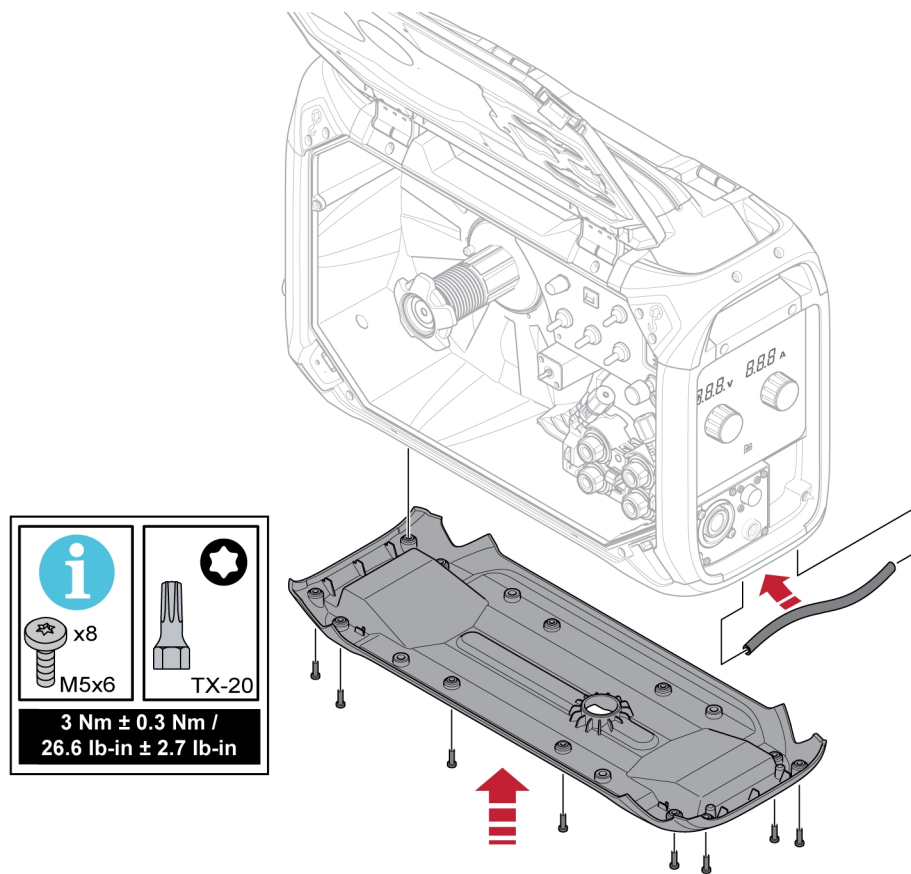
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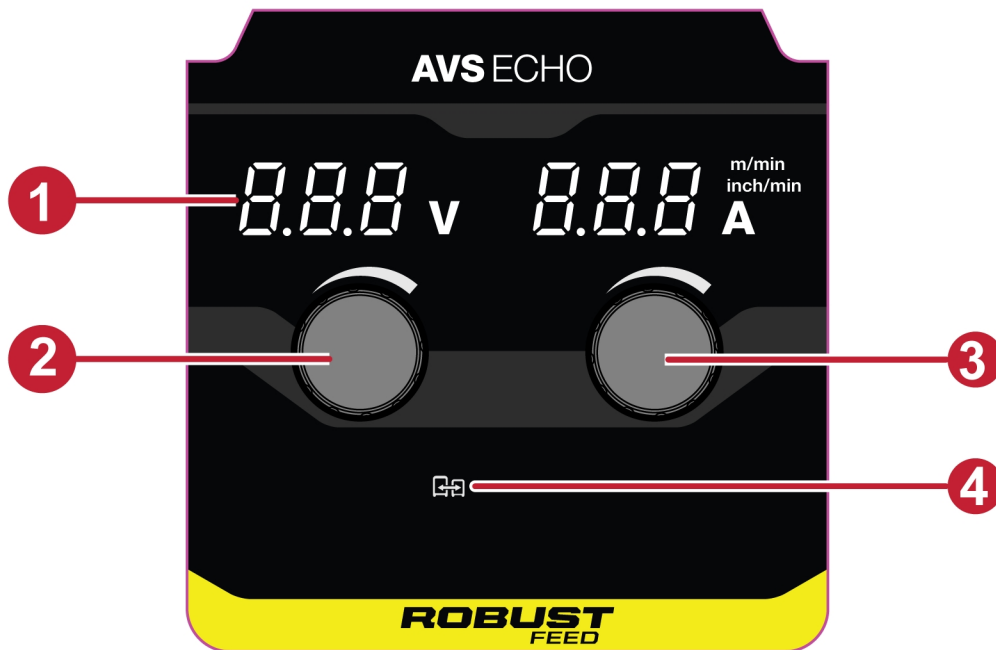


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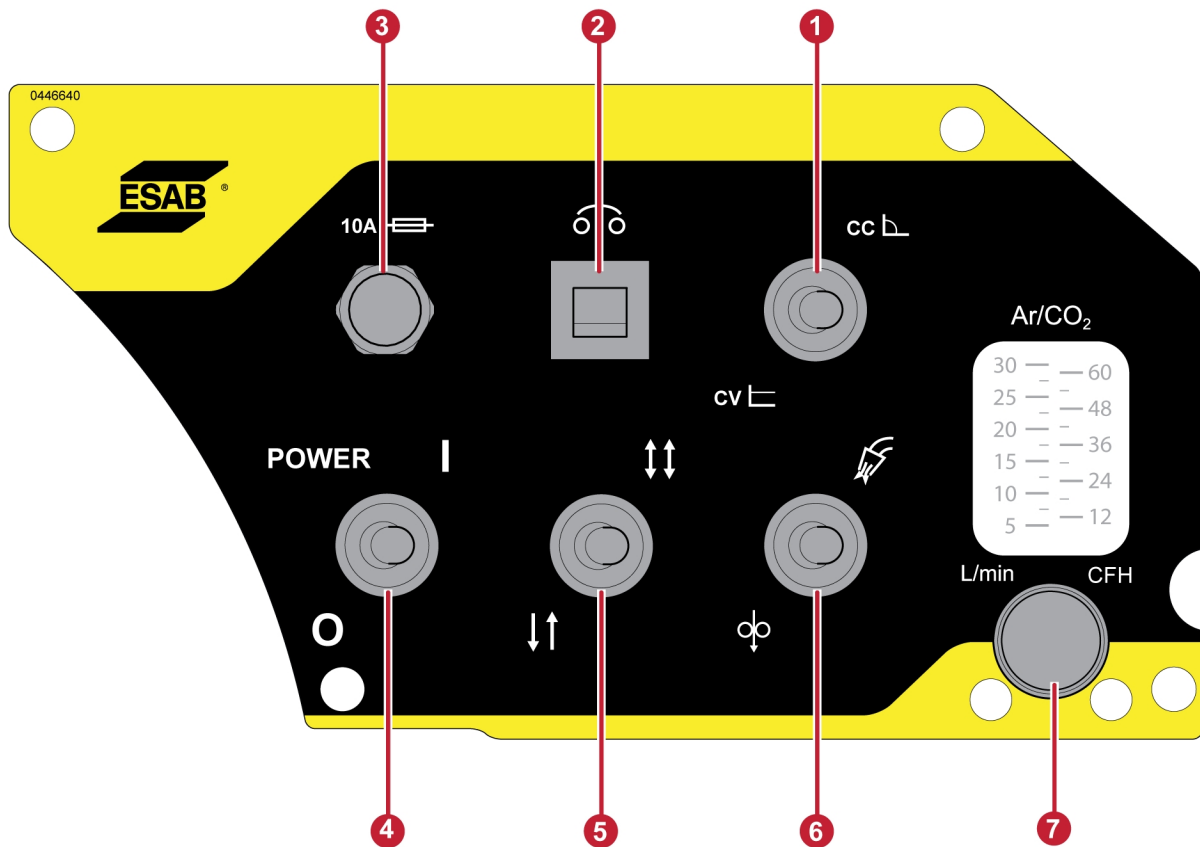
## 6 USER INTERFACE

### 6.1 External control panel



1. Display shows set or measured value.
2. Knob for setting the voltage (V).
3. Knob for setting the wire feed speed (m/min or in./min).
4. ECHO communication handshake indicator, illuminates in "GREEN" when the handshake between the power source and the feeder is detected and illuminates in "RED" when it is not detected.

## 6.2 Internal control panel



1. CC/CV switch
2. Circuit breaker
3. Main fuse, 10 A
4. Power switch
5. 2-stroke or 4-stroke selection switch
6. Gas purging / Wire inching switch
7. Knob for setting the gas flow rate (optional)

## 6.3 Function explanation

### ECHO communication handshake indicator



ECHO communication handshake indicator is used to identify whether there is an ECHO communication between the power source and the feeder. It illuminates in "GREEN" when the communication between the power source and the feeder is detected and illuminates in "RED" when it is not detected.



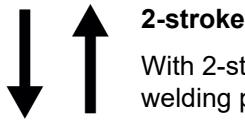
### Gas purging

Gas purging is used when measuring the gas flow or to flush any air or moisture from the gas hoses before welding starts. Gas purging takes place for as long as the button is held depressed and takes place without voltage or wire feed starting.

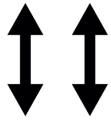


### Wire inching

Wire inching is used when feeding wire without applying a welding voltage. The wire is fed as long as the button is depressed.

**2-stroke**

With 2-stroke, gas pre-flow starts when the welding torch trigger switch is pressed. The welding process then starts. Releasing the trigger switch stops welding entirely and starts gas post-flow.

**4-stroke**

With 4-stroke, the torch trigger can be released once the arc is established, the power source/feeder will continue to weld until the trigger is pressed and released again, or the arc established signal is lost by manually breaking the arc. The trigger will not be locked unless the arc is established before the trigger is released.

**Power switch**

The power switch (0/I) on the internal panel starts the wire feeder when the feeder is connected to the power source and the work piece. The power source must be turned on with the contactor closed.

**CC/CV switch**

The CC/CV switch is used to set CC or CV mode. CC mode is used for constant current power sources. CV mode is used for constant voltage power sources. The selected mode also affects the functions of the wire feeder as shown below:



Mode	Display	Knob for setting the voltage	Knob for setting the wire feed speed / amperage
CC	Wire feed speed shown. While welding, current and voltage shown.	Could not vary the voltage.	Controls the wire feed speed.
CV	Wire feed and voltage speed shown (with Warrior upgrade kit). While welding, current and voltage shown.	Controls the arc voltage (with Warrior upgrade kit).	Controls the wire feed speed.

**Circuit breaker, 5 A**

This resettable 5-ampere circuit breaker, in series with motor armature, protects the control board from damage if the motor stalls.

**Setting the gas flow**

The gas flow is adjusted using the knob on the internal control panel. The present gas flow rate is given on the gas flow meter above the knob.

**NOTE!**

The reading on the flow meter scale will only be correct if the wire feeder is in upright position.

**Units switch feature (Imperial/Metric)**

- Set the voltage on the AVS ECHO wire feeder to 44 V (the maximum value).
- Rotate the voltage setting knob clockwise until the units change.

**Wire feed speed (Arc voltage control)**

The wire feed speed is controlled by the knob for wire feed speed on the front of the wire feeder.

When the wire feeder is connected to a constant voltage (CV) type of power source, the welding voltage is set at the power source and is proportional to the arc length. The welding amperage provided by the power source will be proportional to the wire feed speed set on the wire feeder.

Turning the knob clockwise increases the wire feed speed and proportionally the amperage, turning it counterclockwise decreases the wire feed speed and proportionally the amperage.

When the wire feeder is connected to a constant current (CC) type of power source, the amperage is set on the power source and the wire feed speed on the wire feeder needs to be set to match the set amperage proportionally. Setting a wire feed speed higher than the proportional amperage set on the power source, will result in short arc and proportional low arc voltage. Setting a WFS lower than the proportional amperage set on the power source, will result in a long arc and proportional high arc voltage.

When the CV/CC switch inside the RobustFeed AVS ECHO, is set to "CV", the "Preset" wire feed speed will be shown on the display. The wire feed speed will be kept constant, as set and it will not vary with any changes made to the voltage on the power source.

#### **When RobustFeed AVS ECHO is connected to a Warrior with ECHO upgrade kit**

The Warrior has to be set on AVS. On power-up both the Warrior power source and the RobustFeed AVS ECHO wire feeder will blink "---" until the communication handshake is established. Then the Warrior will display stable "---", while the feeder will display and be able to set voltage and WFS. During welding the display will show measured voltage and amperage.

#### **Cable voltage compensation (CAL---**

After each power-up of the Warrior power source, the first weld will be considered for the voltage compensation. The AVS ECHO wire feeder will display "CAL---

- Set the voltage on the AVS ECHO wire feeder higher than 25 V. If it is lower, the AVS ECHO wire feeder will automatically adjust the voltage to a minimum of 25 V.
- Strike a first arc and weld for at least 5-7 s.
- After welding, wait for at least 3-5 s (no torch trigger press in between) to observe whether the "CAL---
- If "CAL---
- If "CAL---

If there is a big increase in the parameter setting range the voltage compensation procedure needs to be re-initiated. This can be done in two ways:

- Restart the Warrior power source.
- Turn OFF the AVS ECHO wire feeder and wait for at least 30 seconds to turn ON the feeder.

## **6.4 Operating procedures**

### **6.4.1 Weld data table**

The voltage (V) and current (A) values presented in the tables below are the arc voltage and the weld current. Values of current (A) that may flow through the wire feeder may not be higher than rated values of the unit.

#### **Flux Core E70T-1 and 2**

Diameter	Wire Feed Speed (inch/min) / (m/min)								
	150 / 3.8	200 / 5.1	250 / 6.35	300 / 7.6	350 / 8.9	400 / 10.2	450 / 11.4	500 / 12.7	600 / 15.2
.045"		29 V 150 A		29 V 210 A		30 V 250 A		33 V 290 A	34 V 330 A

.052"	25 V 155 A		30 V 300 A						
1/16"	27 V 190 A		30 V 300 A	33 V 365 A	33 V 410 A				

**Metal Core**

Diameter	Wire Feed Speed (inch/min) / (m/min)						
	200 / 5.1	250 / 6.35	300 / 7.6	350 / 8.9	400 / 10.2	450 / 11.4	500 / 12.7
.045"			28 V 250 A	29 V 260 A	30 V 270 A	32 V 300 A	32 V 350 A
.052"		29 V 275 A	29 V 300 A	30 V 325 A			
1/16"	30 V 300 A	30 V 350 A	32 V 400 A				

**Steel Solid Wire**

Diameter	Wire Feed Speed (inch/min) / (m/min)								
	200 / 5.1	250 / 6.35	300 / 7.6	350 / 8.9	400 / 10.2	450 / 11.4	500 / 12.7	550 / 14.0	600 / 15.2
.035"					25 V 180 A	25 V 200 A	26 V 215 A	27 V 230 A	28 V 245 A
.045"			25 V 260 A	26 V 280 A	27 V 300 A	28 V 320 A	30 V 340 A		
1/16"	26 V 290 A	27 V 340 A	30 V 400 A						

**6.4.2 RobustFeed AVS ECHO with CC Power Sources**

- 1) Select the weld current/arc voltage needed for the wire type and diameter to be welded, see section "Weld data table" in this chapter.
- 2) Set the power supply current with the knob for setting the current on the front panel of the power source / feeder.
- 3) Set the wire feed speed value taken from the weld data table using the knob for setting the wire feed speed on the wire feeder.
- 4) Strike an arc and adjust it to the desired wire speed with the knob for setting the wire feed speed.

**6.4.3 RobustFeed AVS ECHO with CV power sources**

- 1) Select the arc voltage/weld current needed for the wire type and diameter to be welded, see section "Weld data table" in this chapter.
- 2) Set the power supply voltage with the knob for setting the voltage on the power source / feeder or use the optional remote voltage control in the wire feeder.
- 3) Read the wire feed speed at the top of the column in the "Weld data table" for the chosen wire type, diameter, and arc voltage/weld current.



- 4) Use the "Weld data table" to find the correct value and set the wire feed speed on the wire feeder.
- 5) Strike an arc and adjust the wire feed speed as needed.



**NOTE!**

It is NOT RECOMMENDED to use the CV switch setting when using a CC power source. Extreme wire feed speed sensitivity exists that makes it difficult to set a stable welding condition. The arc stability is very dependent on maintaining constant "Tip To Work" (TTW) distance which is almost impossible to control when welding manually. CV setting is only recommended for use with CV power sources.



**NOTE!**

On many CV power sources, the actual welding arc voltage is less than the "Open Circuit Voltage" (OCV) set on the power source front panel. Therefore, an extra 3 to 6 volts may be added to the power source front panel setting to achieve the actual arc voltage needed or shown in the tables.

#### 6.4.4 RobustFeed AVS ECHO with Warrior upgrade kits

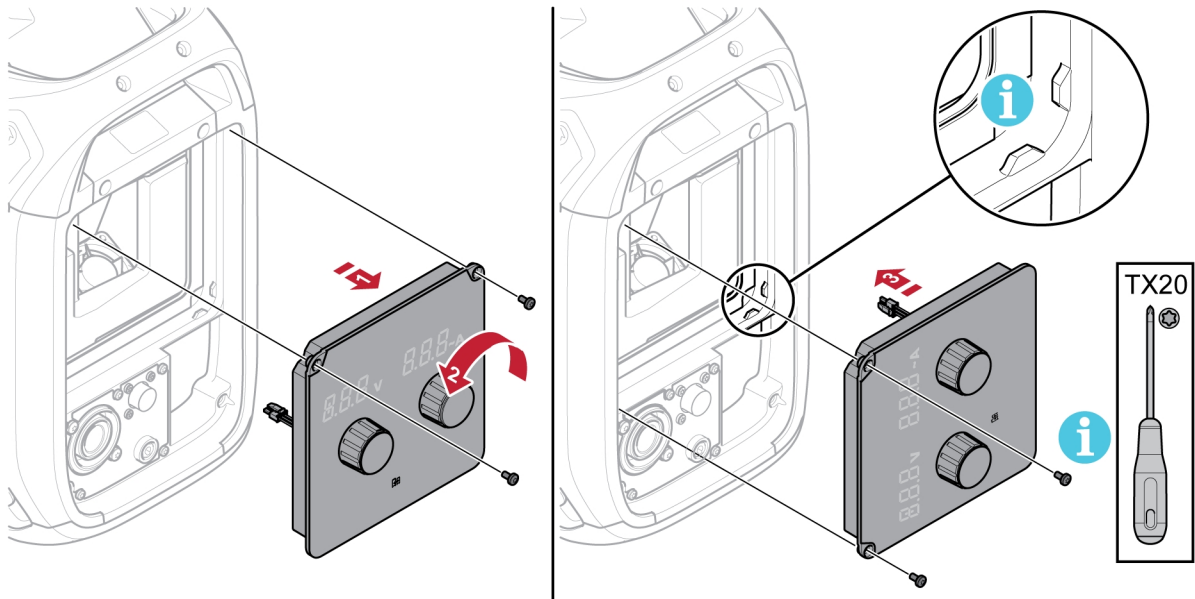
- 1) Select a voltage higher than 20V and corresponding wire feed speed for the wire type and diameter to be welded, see section "Weld data table" in this chapter.
- 2) Strike a first arc and perform a weld of at least 2-3s. This will allow the feeder to measure the voltage losses and set the appropriate compensation. All following welds will automatically receive the voltage compensation.
- 3) Read the wire feed speed at the top of the column in the "Weld data table" for the chosen wire type, diameter and arc voltage.
- 4) Use the "Weld data table" to determine the settings for the wire feed speed and voltage on the wire feeder.
- 5) Adjust the wire feed speed and arc voltage as needed from the wire feeder and weld.

#### 6.4.5 Shutdown

- 1) Release the torch trigger switch to break the arc.
- 2) When leaving the equipment unattended, always turn off and disconnect all power to the equipment and turn off the shielding gas supply at the source.

## 6.5 Rotating the control panel

To use the wire feeder in the horizontal position, the external control panel may be rotated 90°.



- 1) Remove the two screws for the control panel and remove the panel.
- 2) Rotate the control panel 90° counter-clockwise.
- 3) Attach the control panel, ensuring that the small tabs are in the correct position.
- 4) Fasten the screws.

## 7 MAINTENANCE

---

**CAUTION!**

All warranty undertakings from the supplier cease to apply if the customer attempts any work to rectify any faults in the product during the warranty period.

**NOTE!**

Regular maintenance is important for safe and reliable operation.

### 7.1 Inspection, cleaning and replacement

**Wire feed mechanism**

Regularly check that the wire feed unit is not clogged with dirt.

- Cleaning and replacement of worn parts in the mechanism of the wire feed should take place at regular intervals in order to achieve trouble-free wire feeding. Note that if pretensioning is set too hard, this can result in abnormal wear on the pressure roller, feed roller, and wire guide.
- Cleaning of the liners and other mechanical parts of the wire feed mechanism should be carried out at regular intervals or if the wire feed seems slow. Use compressed air for this task.
- Changing nozzles
- Checking the driving wheel
- Changing the cog-wheel package

**Bobbin holder**

- Inspect at regular intervals that the brake hub sleeve and the brake hub nut are not worn out and that they lock properly. Replace if necessary.

**Welding torch**

- The wear parts of the welding torch should be cleaned and replaced at regular intervals in order to achieve trouble-free wire feed. Regularly blow the wire guide clean and clean the contact tip.

## 8 TROUBLESHOOTING

Perform these checks and inspections before contacting an authorized service technician.

<b>Fault symptom</b>	<b>Corrective actions</b>
The feeder doesn't turn on	Check if the voltage sense is connected to the same workpiece as the ground cable of the power source.
The welding equipment is not working properly	Check that the mains power supply switch is turned ON.
	Check that the operating controls are at required settings.
	Check all power cables and connections for evidence of overheating or sparking.
Gas leakage	Check all gas hoses, connections, flowmeters and regulators for possible sources of breakdown or intermittent failure.
The trigger lock does not lock ON	Check that the trigger lock is ON and then release the trigger after the arc is established.
The wire feed is slow/stiff when moving through the wire feed mechanism.	Clean the liners and other mechanical parts of the wire feeding mechanism with pressurized air.
No voltage adjustment at the feeder	No ECHO upgrade kit is installed into the Warrior or upgrade kit fault. Contact authorized service.
The weld voltage does not match with the set voltage	Re-initialize the voltage compensation procedure.

## 9 ORDERING SPARE PARTS

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**CAUTION!**

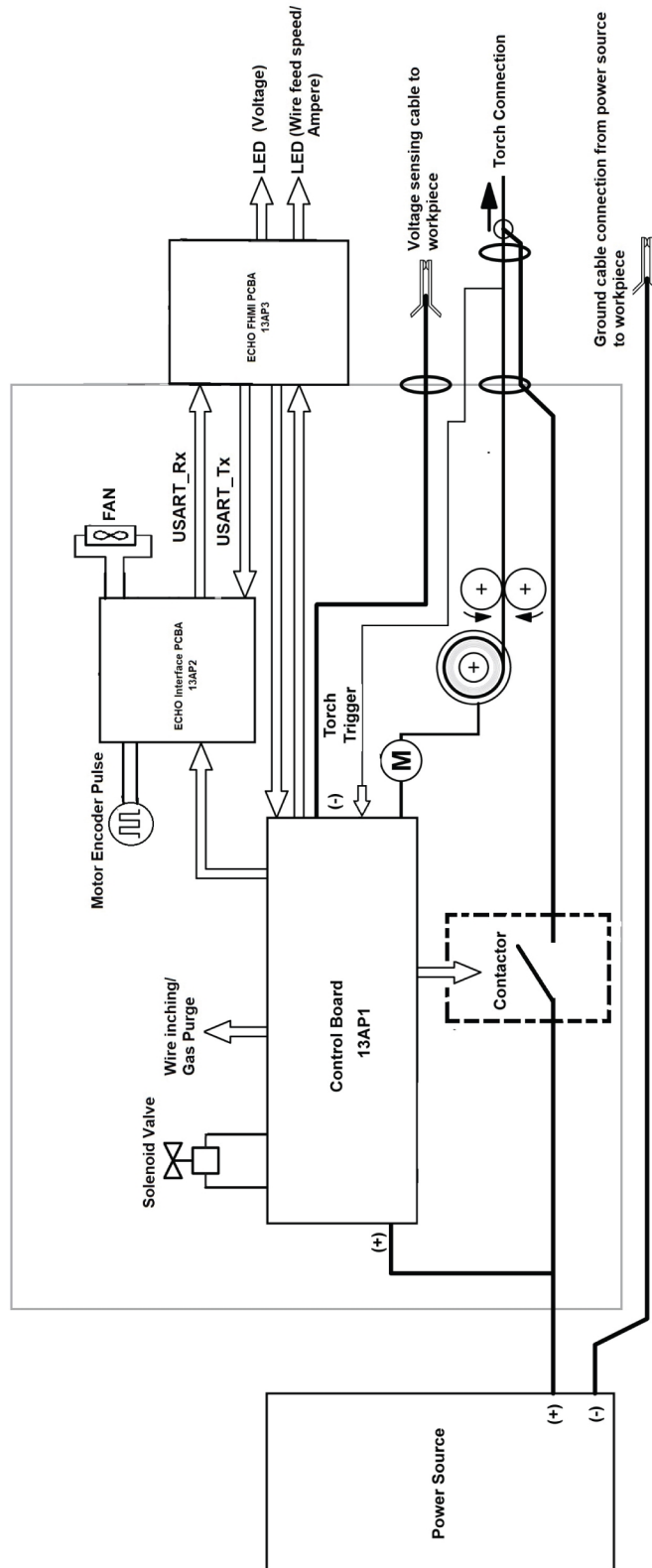
Repair and electrical work should be performed by an authorized ESAB service technician.  
Use only ESAB original spare and wear parts.

RobustFeed AVS ECHO is designed and tested in accordance with the international and European standards **EN IEC 60974-5** and **EN IEC 60974-10 Class A**, Canadian standard **CAN/CSA-E60974-5** and US standard **ANSI/IEC 60974-5**. It is the obligation of the service unit which has carried out the service or repair work to make sure that the product still conforms to the mentioned standards.

Spare parts and wear parts can be ordered through your nearest ESAB dealer, see the back cover of this document. When ordering, please state product type, serial number, designation and spare part number in accordance with the spare parts list. This facilitates dispatch and ensures correct delivery.

# APPENDIX

## BLOCK DIAGRAM



## ORDERING NUMBERS





Ordering number	Denomination	Notes
0448 700 881	RobustFeed AVS ECHO with Rotameter	with Tweco connector
0448 228 *	Instruction manual	CSA




The three last digits in the document number of the manual show the version of the manual. Therefore they are replaced with \* here. Make sure to use a manual with a serial number or software version that corresponds with the product, see the front page of the manual.

Technical documentation is available on the Internet at: [www.esab.com](http://www.esab.com)



## WEAR PARTS




### Fe, Ss and cored wire

Wire diameter (in.) (mm)	.023 0.6	.030 0.8	.040 0.9/1. 0	.045 1.2	.052 1.4	1/16 1.6	.070 1.8	5/64 2.0	 Feed roller
<b>V-groove</b> 	<b>X</b>	<b>X</b>							0445 850 001
		<b>X</b>	<b>X</b>						0445 850 002
			<b>X</b>						0445 850 003
			<b>X</b>	<b>X</b>					<b>0445 850 004</b>
				<b>X</b>					0445 850 005
					<b>X</b>	<b>X</b>			0445 850 006
								<b>X</b>	0445 850 007

Inlet wire guide 	Middle wire guide 	Outlet wire guide 
0445 822 001 (2 mm)	0446 080 882	0445 830 883 (Tweco) 0445 830 881 (Euro)

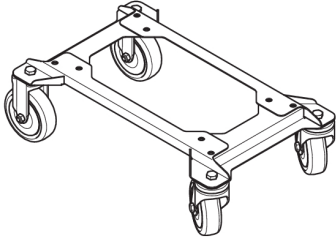
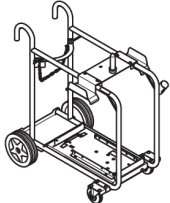
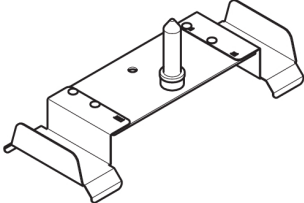

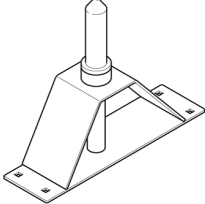
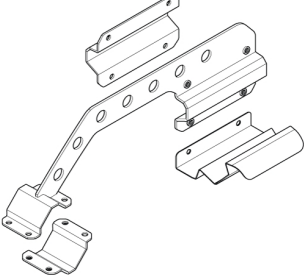
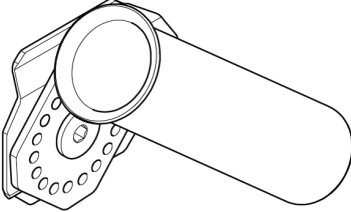
### Cored wire – Different wire guides dependent on wire diameter!

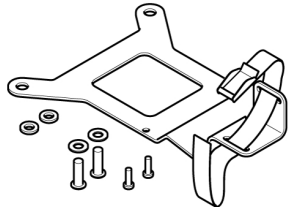
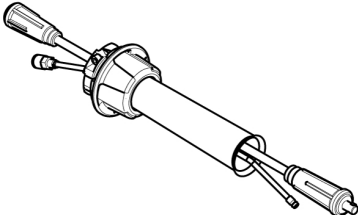
Wire diameter (in.) (mm)	.040 0.9/1. 0	.045 1.2	.052 1.4	1/16 1.6	.070 1.8	5/64 2.0	3/32 2.4	 Feed roller
<b>V-K-knurled</b> 	<b>X</b>	<b>X</b>						0445 850 030
		<b>X</b>						0445 850 031
		<b>X</b>	<b>X</b>					0445 850 032
				<b>X</b>				0445 850 033
					<b>X</b>			0445 850 034
						<b>X</b>		0445 850 035
							<b>X</b>	0445 850 036

	Inlet wire guide 	Middle wire guide 	Outlet wire guide 
<b>Wire diameter 0.040–1/16 in. 0.9–1.6 mm</b>	0445 822 001 (2 mm)	0446 080 882	0445 830 883 (Tweco) 0445 830 881 (Euro)
<b>Wire diameter 0.070–3/32 in. 1.8–2.4 mm</b>	0445 822 002 (3 mm)	0446 080 883	0445 830 884 (Tweco) 0445 830 882 (Euro)



## ACCESSORIES

0446 081 880	<b>Wheel kit</b>	
0349 313 450	<b>Trolley</b> (compatible with RobustFeed and Warrior™ Feed 304)	
0349 313 100	<b>RF retrofit kit</b> (for use with existing Warrior™ trolley with ordering no. 0465 510 880)	
F102 440 880	<b>Quick connector Marathon Pac™</b>	
0465 508 880	<b>Guide pin extension kit</b> For the feeder assembled with the wheel kit	
0446 956 880	<b>Boom adaptor kit</b> including a stopper for RobustFeed door  For assembly instructions, refer to the Boom adaptor assembly instruction manual	
0446 958 880	<b>Torch holder</b>  For assembly on the RobustFeed  For assembly instructions, refer to the Torch holder assembly instruction manual	

0446 082 880	<b>Torch strain relief</b>	
0446 675 881	<b>Interconnection cable SR CSA 0.6 m (24 in.)</b> included with CSA AVS ECHO feeder	





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