



# *EMP 255ic & EMP 320ic*



## Instruction manual



## EU DECLARATION OF CONFORMITY

According to  
The Low Voltage Directive 2014/35/EU, entering into force 20 April 2016  
The EMC Directive 2014/30/EU, entering into force 20 April 2016  
The RoHS Directive 2011/65/EU, entering into force 2 January 2013

**Type of equipment**

Welding power source

**Type designation**

EMP 320ic, from serial number 730 xxx xxxx (2017 w30)  
EMP 255ic, from serial number 735 xxx xxxx (2017 w35)

**Brand name or trade mark**

ESAB

**Manufacturer or his authorised representative established within the EEA****Name, address, and telephone No:**

ESAB AB  
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Phone: +46 31 50 90 00, www.esab.com

**The following harmonised standard in force within the EEA has been used in the design:**

EN 60974-1:2012, Arc Welding Equipment – Part 1: Welding Power Sources  
EN 60974-5:2013, Arc Welding Equipment – Part 5: Wire Feeders  
EN 60974-10:2014, A1:2015 Arc, Welding Equipment – Part 10: Electromagnetic Compatibility (EMC) requirements

**Additional Information:**

Restrictive use, Class A equipment, intended for use in location other than residential

**By signing this document, the undersigned declares as manufacturer, or the manufacturer's authorised representative established within the EEA, that the equipment in question complies with the safety requirements stated above.**

**Date**

Gothenburg

2018-02-27

**Signature**

Pedro Muniz

**Position**

Standard Equipment Director

CE 2018

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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

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 can result in injury to the operator and damage to the equipment.

1. Anyone who uses the equipment must be familiar with:
  - its operation
  - location of emergency stops
  - its function
  - relevant safety precautions
  - welding and cutting or other applicable operation of the equipment
2. The operator must ensure that:
  - no unauthorised person is stationed 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 can be injurious 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 - Can be dangerous to health**

- Welders having pacemakers should consult their physician 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 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 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 earmuffs or other hearing protection.

**MOVING PARTS - Can cause injuries**



- Keep all doors, panels and covers closed and securely in place. Have only qualified people remove covers for maintenance and troubleshooting as necessary. Reinstall panels or covers and close doors when service is finished and before starting engine.



- Stop engine before installing or connecting unit.
- Keep hands, hair, loose clothing and tools away from moving parts.

**FIRE HAZARD**



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

**MALFUNCTION - Call for expert assistance in the event of malfunction.**

**PROTECT YOURSELF AND OTHERS!**



**CAUTION!**

This product is solely intended for arc welding.



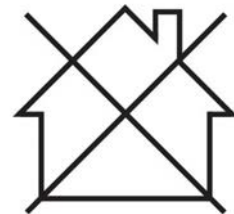
**WARNING!**

Do not use the power source for thawing frozen pipes.



**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 those locations, due to conducted as well as radiated disturbances.



**NOTE!**

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

In observance of 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.



**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

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### 2.1 Overview

The ESAB, EMP 255ic and EMP 320ic product family is a new generation of multi-process (MIG, TIG, MMA) welding power sources designed to match the needs of the user across a variety of welding applications.

The EMP features a 11 cm (4.3 in.) color TFT (Thin Film Transistor) user interface (UI) display which provides quick and easy selection of weld process and parameters, suitable for both newly trained and intermediate-level users. For more advanced users, any number of functions could be introduced and customized to give maximum flexibility.

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

### 2.2 Equipment

The power source is supplied with:

- USB stick including instruction manual
- Safety manual
- 3 m (9.8 ft) mains cable with CEE 16A plug
- Gas hose for with Quick Connector
- Return cable with ground clamp, 4.5 m, 300A
- Guide tubes: 0.8 mm (0.030 in) – 1.2 mm (0.045 in)
- Drive rolls
  - 1.0 mm (0.040 in)/1.2 mm (0.045 in)
  - 0.8 mm (0.030 in)/1.0 mm (0.040 in)
- Thickness gauge tool



### 3 TECHNICAL DATA

	<b>EMP 320ic (0700 300 991)</b>	<b>EMP 255ic (0700 300 992)</b>
<b>Mains voltage</b>	400 V $\pm$ 10%, 3~ 50/60 Hz	400 V $\pm$ 10%, 3~ 50/60 Hz
<b>Primary current</b>		
$I_{\max}$ MMA / $I_{\text{eff}}$ MMA	18.0 A / 11.4	13.0 A / 9.4 A
$I_{\max}$ TIG / $I_{\text{eff}}$ TIG	16.0 A / 10.1	15.0 A / 6.3 A
$I_{\max}$ MIG / $I_{\text{eff}}$ MIG	18.0 A / 11.4	17.0 A / 8.5 A
<b>No-load power demand when in the energy-saving mode</b>		
$U_{\text{in}}$ 400 V	68 W	
<b>Setting range</b>		
MMA	16 A / 20 V - 300 A / 32 V	16 A / 20 V - 255 A / 30 V
TIG	5 A / 10 V - 320 A / 23 V	5 A / 10 V - 255 A / 20 V
MIG	15 A / 15 V - 320 A / 34 V	15 A / 15 V - 300 A / 34 V
<b>Permissible load at MMA</b>		
40% duty cycle	300 A / 32.0 V	255 A / 30.0 V
60% duty cycle	255 A / 30.0 V	170 A / 27.0 V
100% duty cycle	180 A / 27.0 V	130 A / 25.0 V
<b>Permissible load at TIG</b>		
40% duty cycle	320 A / 23.0 V	255 A / 30.0 V
60% duty cycle	265 A / 21.0 V	215 A / 19.0 V
100% duty cycle	220 A / 19.0 V	170 A / 17.0 V
<b>Permissible load at MIG</b>		
40% duty cycle	320 A / 23.0 V	255 A / 27.0 V
60% duty cycle	265 A / 27.0 V	200 A / 24.0 V
100% duty cycle	200 A / 24.0 V	160 A / 22.0 V
<b>Efficiency</b>	86%	86%
<b>Power factor</b>	0.87	0.87
<b>Open-circuit voltage <math>U_0</math> max</b>	68 V	68 V
<b>Open-circuit voltage <math>U_0</math> max with VRD activated</b>	35 V	35 V
<b>Wire feed speed</b>	1.3 – 20 m/min (50 – 800 in./min)	
<b>Wire diameter</b>		
Mild steel solid wire	0.8 – 1.2 mm (0.030 – 0.045 in.)	
Stainless steel solid wire	0.8 – 1.2 mm (0.030 – 0.045 in.)	
Flux-cored wire	0.8 – 1.6 mm (0.030 - 0.045 in.)	
Aluminum	0.8 – 1.2 mm (0.030 – 0.045 in.)	
<b>Operating temperature</b>	-10 to +40 °C (+14 to +104 °F)	
<b>Transportation temperature</b>	-20 to +55 °C (-4 to +131 °F)	
<b>Bobbin size</b>	100 – 300 mm (4 – 12 in.)	

<b>Dimensions</b> l × w × h	686 × 292 × 495 mm (27.0 × 11.5 × 19.5 in.)
<b>Weight</b>	31.75 kg (70.0 lb)
<b>Enclosure class</b>	IP23

**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. The duty cycle is valid for 40 °C (104 °F).

**Enclosure class**

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

Equipment marked **IP 23S** is intended for indoor and outdoor use; however, should not be operated in precipitation.

**Application class**

The symbol **S** indicates that the power source is designed for use in areas with increased electrical hazard.

## 4 INSTALLATION

The installation must be carried out by a professional.

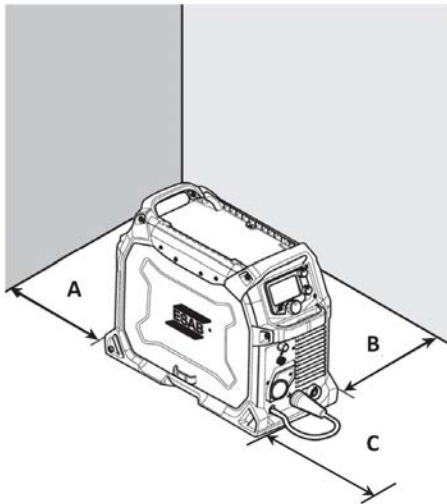


### CAUTION!

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 Location

Position the power source so that its cooling air inlets and outlets are not obstructed.



A. 152 mm (6 in.)

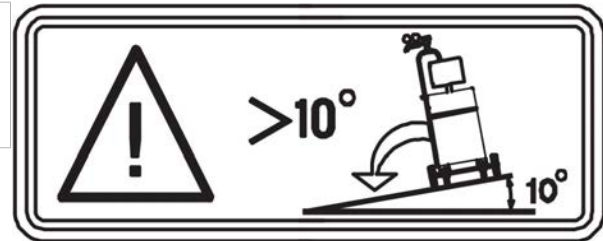
B. 100 mm (4 in.)

C. 152 mm (6 in.)



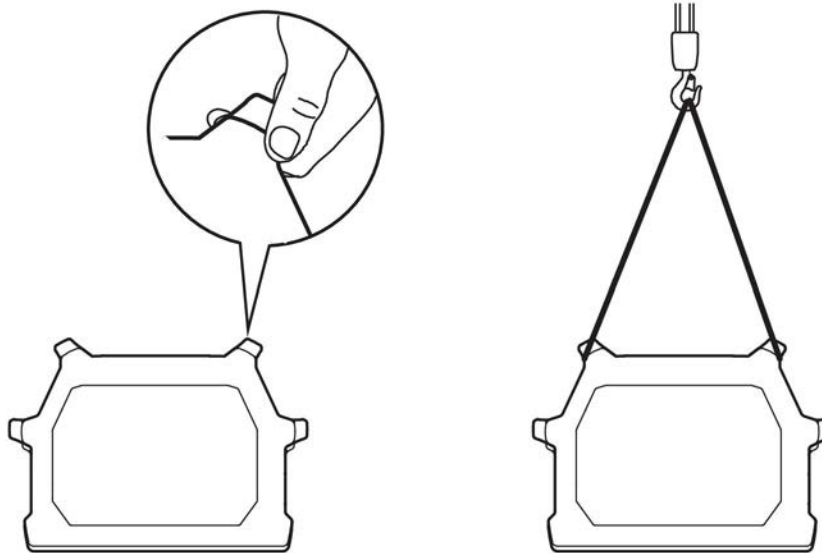
### WARNING!

Secure the equipment - particularly if the ground is uneven or sloping.



### 4.2 Lifting instructions

The power source can be lifted using any of the handles. Mechanical lifting must be done with both outer handles.



### 4.3 Mains supply



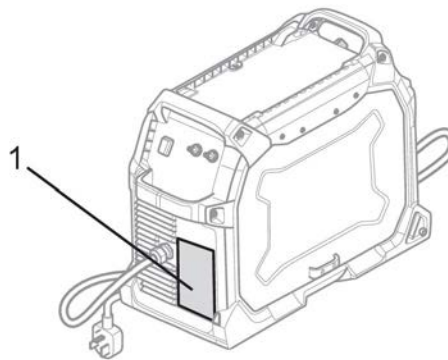
#### NOTE!

#### Mains supply requirements

This equipment complies with IEC 61000-3-12 provided that the short-circuit power is greater than or equal to  $S_{scmin}$  at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power greater than or equal to  $S_{scmin}$ . Refer to the technical data in the TECHNICAL DATA chapter.

The power source is delivered with a 4×2.5 mm<sup>2</sup> mains cable and 16 A mains plug which in combination can handle the rated data given for 3-phase 380–415 V mains supply.

1. Rating plate with supply connection data



Recommended fuse sizes and minimum cable area	
Mains voltage	3~ 50/60 Hz
	400 V ±10%
Input current at maximum output	18 A
Maximum recommended fuse <sup>1)</sup> or circuit breaker rating	16 A

Mains cable area	4 x 2.5 mm <sup>2</sup> (13 AWG)
Maximum recommended extension cord length	15 m (50ft)

<sup>1)</sup>Time delay fuse.

**Supply from power generators**

The power source can be supplied from different types of generators. However, some generators may not provide sufficient power for the welding power source to operate correctly. Generators with Automatic Voltage Regulation (AVR) or with equivalent or better type of regulation, with rated power 15 kW 3-phase, are recommended.

## 5 OPERATION

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General safety regulations for handling the equipment can be found in the chapter "Safety". Read it through before you start the equipment.



**NOTE!**

When moving the equipment use intended handle. Never pull the cables.



**WARNING!**

Rotating parts can cause injury, take great care.



**WARNING!**

Electric shock! Do not touch the workpiece or the welding head during operation!



**WARNING!**

Assure that the side covers are closed during operation.



**WARNING!**

Tighten the bobbin bolt to prevent it from sliding off the hub.

## 5.1 User connections and controls

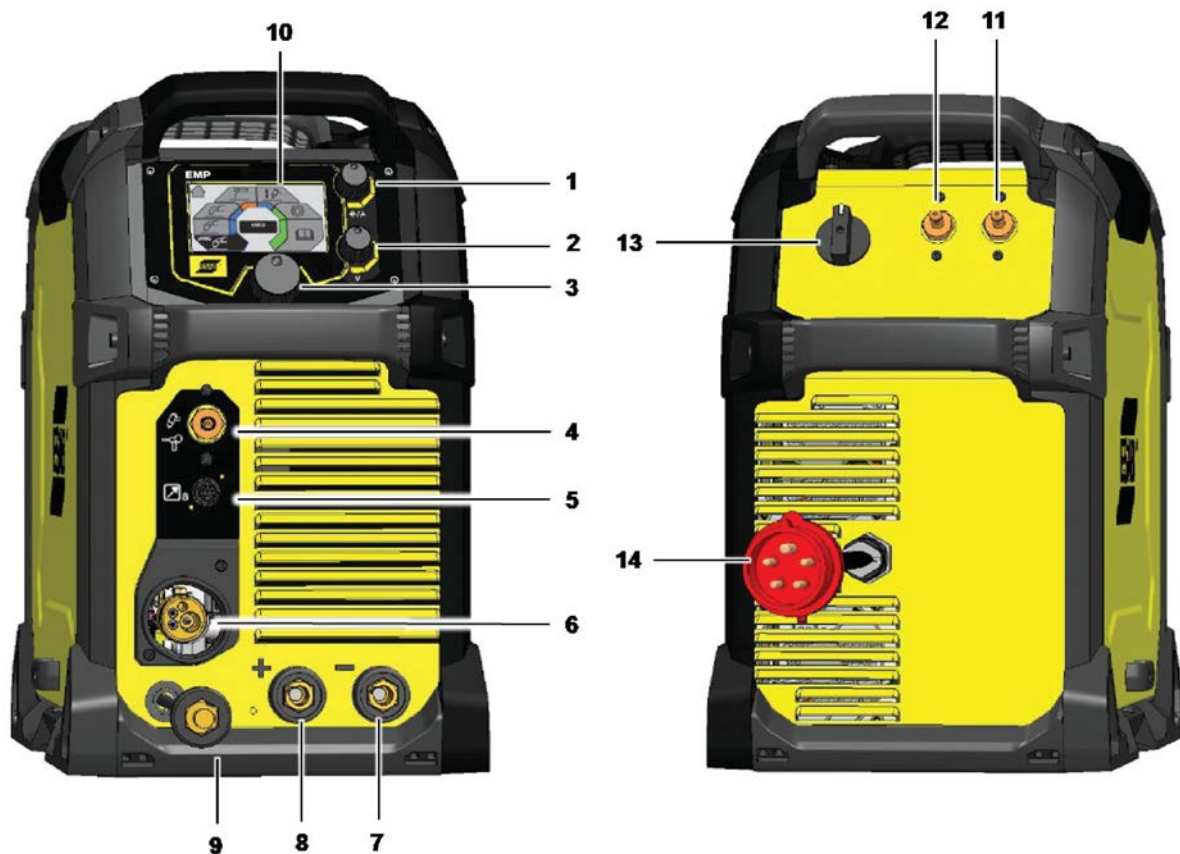
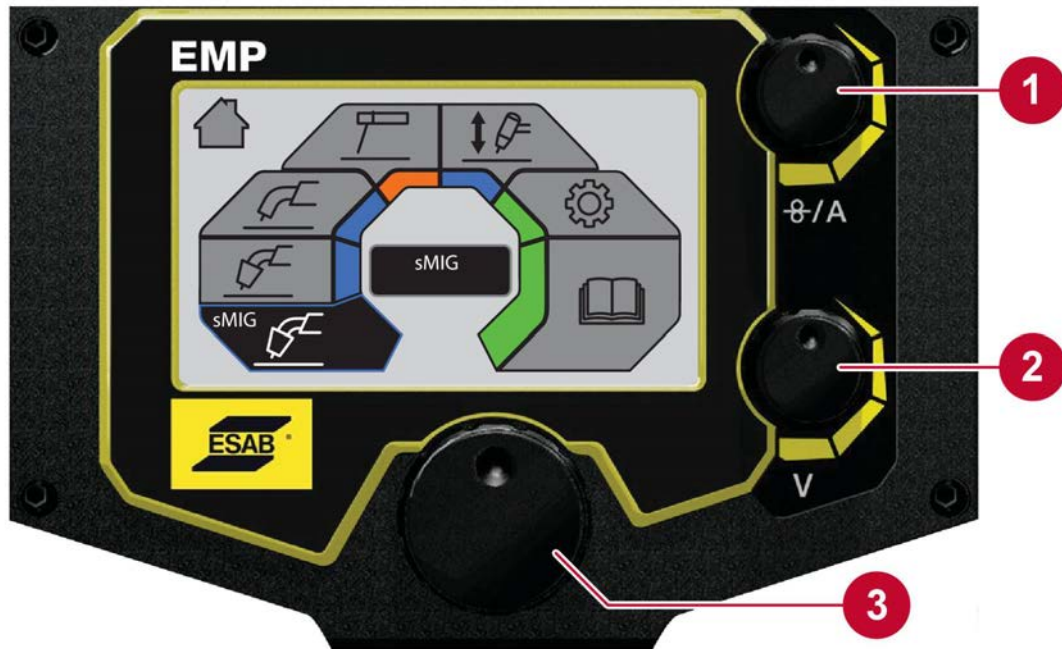


Figure 1. Front & rear views: Model EMP 255ic & EMP 320ic

- |   |                              |
|---|------------------------------|
| 1. Knob for current or wire feed speed selection    | 8. Positive output [+]       |
| 2. Knob for voltage selection                       | 9. Polarity changeover cable |
| 3. Main knob for navigation and parameter selection | 10. Display                  |
| 4. Gas outlet for TIG & spool torch                 | 11. Gas inlet for MIG/MAG    |
| 5. Torch/remote control connection                  | 12. Gas inlet for TIG        |
| 6. Torch connection and MIG/MAG gas outlet          | 13. Main power switch ON/OFF |
| 7. Negative output [-]                              | 14. Main power cable         |



1. Upper control knob:
  - (a) Set current output value
  - (b) Set wire feed speed
2. Lower control knob:
  - (a) MIG voltage selection
  - (b) SMIG voltage trim
  - (c) MMA mode: Arc ON/OFF
3. Menu navigation:
  - Rotate and push to select menu option.

**NOTE!**

Lower control knob in MMA Mode turns output power ON/OFF. When output power is ON, background of display turns orange (see "CONTROL PANEL" chapter).

## 5.2 Connection of welding and return cables

The power source has two outputs for connecting welding and return cables: a negative [-] terminal (7) and a positive [+] terminal (8).

### 5.2.1 For MIG/MMA process

For MIG/MMA process, the output to which the welding cable is connected depends on the type of electrode. Refer to electrode packaging for information relating to the correct electrode polarity. Connect the return cable to the remaining welding terminal (9) on the power source.

Secure the return cable's contact clamp to the work piece and ensure that there is good electrical contact.

**NOTE!****MIG welding guidance chart:**

The backside of the door on the bobbin side displays a MIG welding guidance chart for initial selection of welding controls. This is intended as a guide for setting parameters on this equipment.



### 5.2.2 For TIG process

For TIG process (requires optional TIG accessories: see "ACCESSORIES" chapter), connect the TIG torch power cable to the negative [-] terminal (7). Connect the gas inlet nut on the TIG torch to the gas outlet connector (4) located on the front of the power source. Connect the gas inlet nut (12), on rear panel, to a regulated shielding gas supply. Connect the work return lead to the return-cable terminal (9). Connect the torch connector to the Euro-torch connection (6).

### 5.3 Polarity change

The unit's power source is delivered with the polarity changeover cable connected to the positive terminal. Some wires, e.g. self-shielded cored wires, are recommended to be welded with negative polarity. Negative polarity means that the polarity changeover cable is connected to the negative terminal and the return cable remains as the connection for the torch return-cable.

**Check the recommended polarity for the welding wire you want to use. Refer to electrode packaging for information relating to the correct electrode polarity. The polarity can be changed by moving the polarity changeover cable to suit the applicable welding process.**

### 5.4 Shielding gas

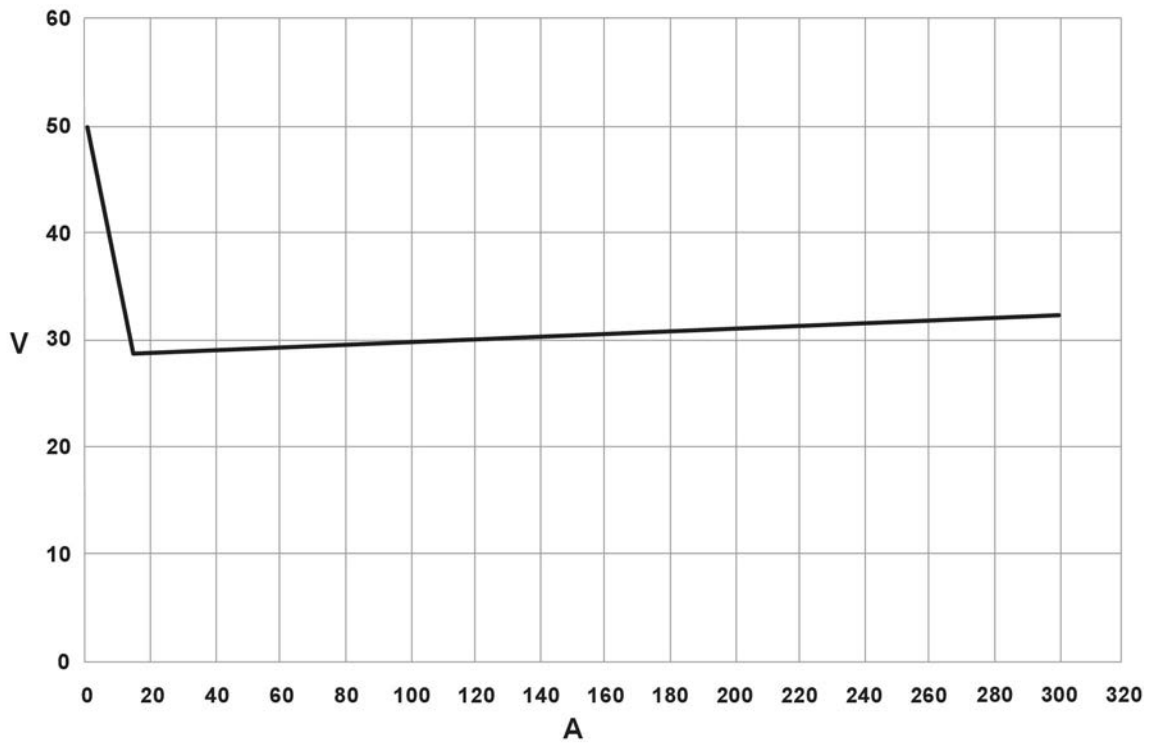
The choice of suitable shielding gas depends on the material and weld process. Typically, in MIG/MAG process, mild steel is welded with mixed gas (Ar + CO<sub>2</sub>) or 100% carbon dioxide (CO<sub>2</sub>). Stainless steel can be welded with mixed gas (Ar + CO<sub>2</sub>) or trimix (He + Ar + CO<sub>2</sub>). Aluminum and silicon bronze use pure argon gas (Ar). In the sMIG mode (see "sMIG mode" section in the "CONTROL PANEL" chapter), the optimal welding arc with the gas used will be automatically set. In TIG process 100% argon is typically used.

### 5.5 Volt-ampere curves

The curves below show the maximum voltage and amperage output capabilities of the power source for three common welding process settings. Other settings result in curves that fall between these curves.

**A**= Welding current (AMPS), **V** = Output voltage

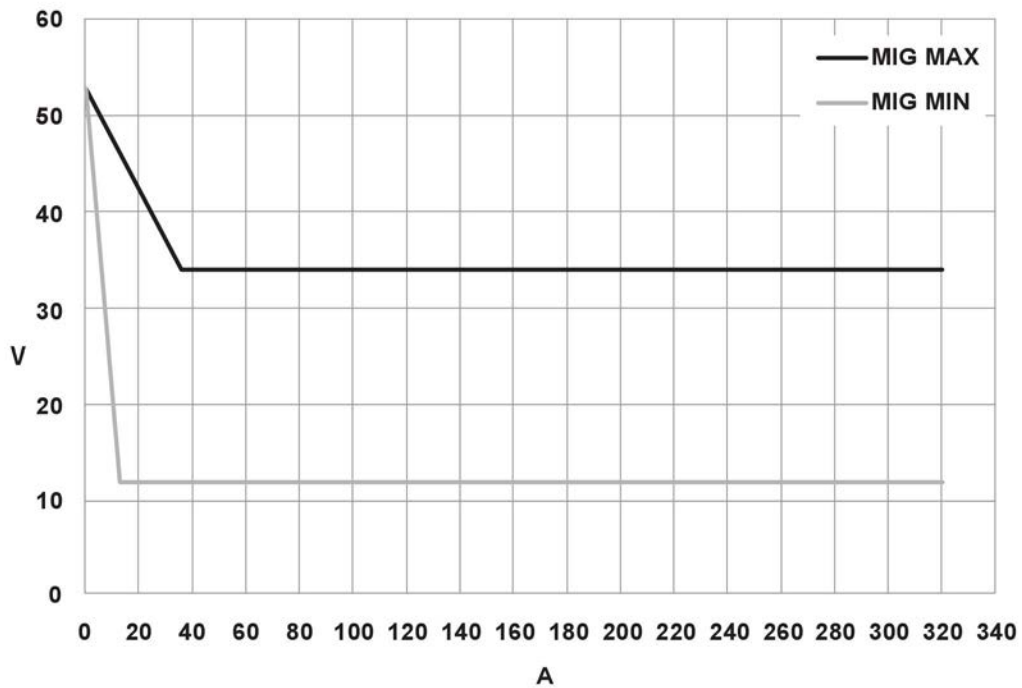
**5.5.1 SMAW (Stick) 400 V**



V = Output voltage

A = Welding current (Amps)

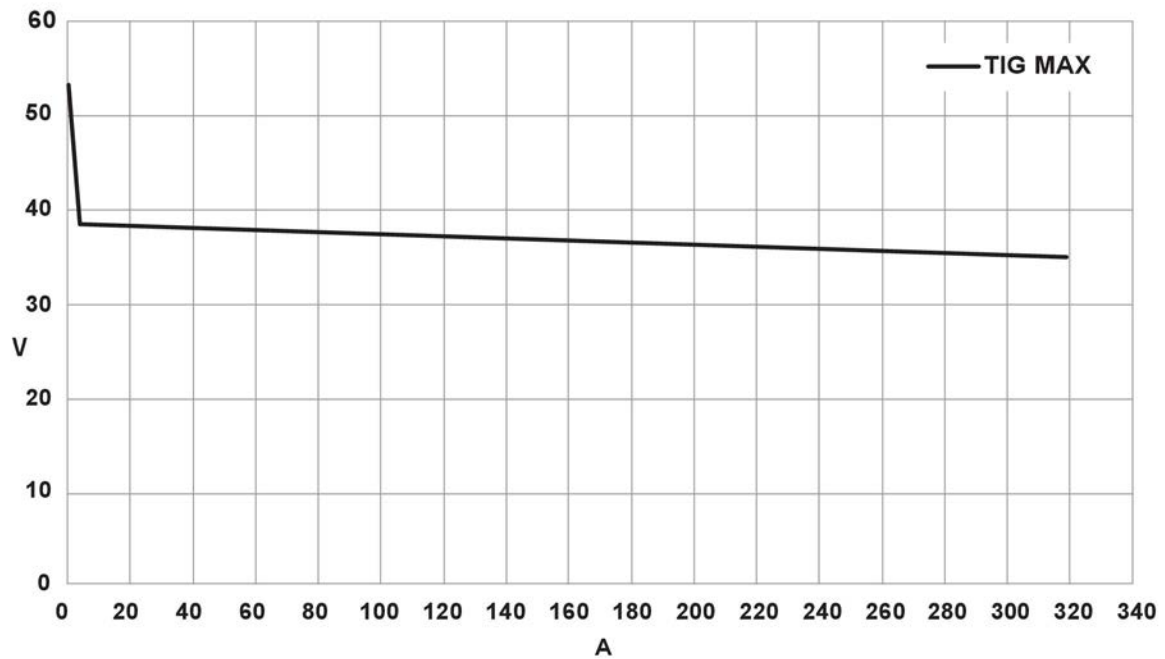
**5.5.2 GMAW (MIG) 400 V**



V = Output voltage

A = Welding current (Amps)

### 5.5.3 GTAW (TIG) 400 V



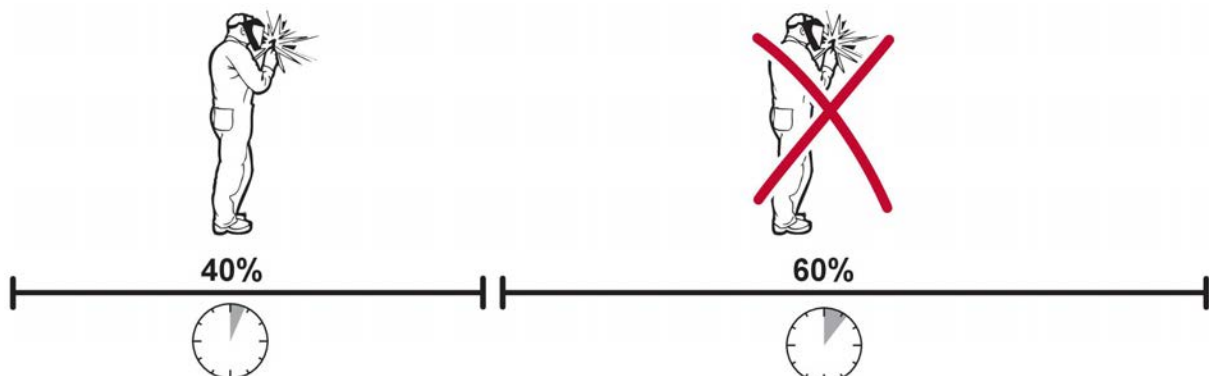
V = Output voltage

A = Welding current (Amps)

### 5.6 Duty cycle

The EMP 255ic has a welding current output of 255 A at 40% duty cycle. The EMP 320 has a welding current output of 320 A at 40% duty cycle. A self-resetting thermostat will protect the power source if the duty cycle is exceeded.

**Example:** If the power source operates at a 40% duty cycle, it will provide the rated amperage for a maximum of 4 minutes out of every 10-minute period. The remaining time, 6 minutes, the power source must be allowed to cool down with fans running.



A different combination of duty cycle and welding current can be selected. Use the graphs below to determine the correct duty cycle for a given welding current.

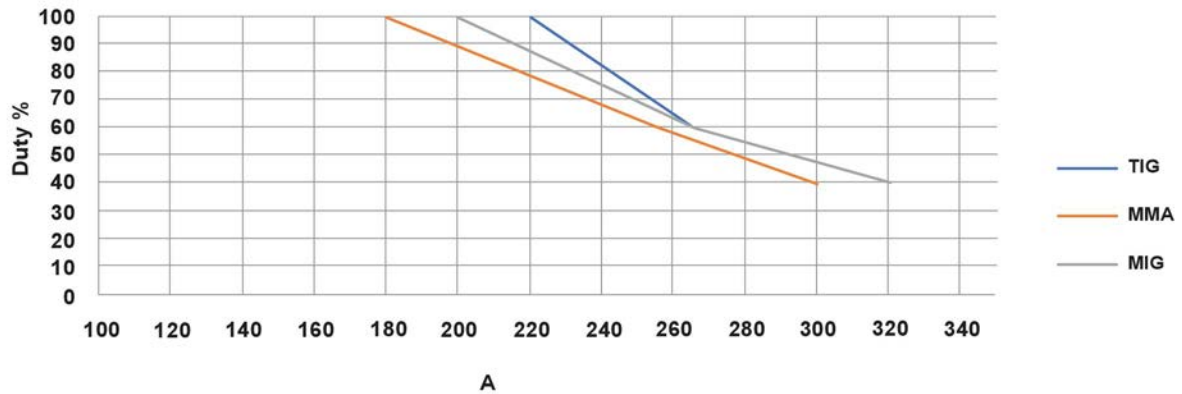


Figure 2. Plotting duty cycle for 400 V AC

## 5.7 Removing/installing bobbin



### NOTE!

The gas need not be connected for this procedure. **Power should be turned off for this procedure.**

The spring sets the “braking value” working against the wire-feed motor and the pull of the roller-feed wheels. Tighten the bolt “A”, see illustration below, until spool does not free-wheel.

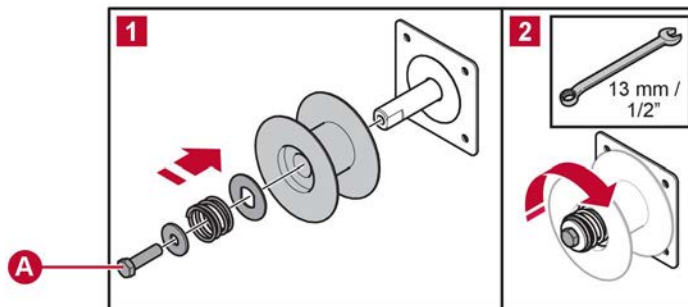
Remove/Install the bobbin as shown in below.



### NOTE!

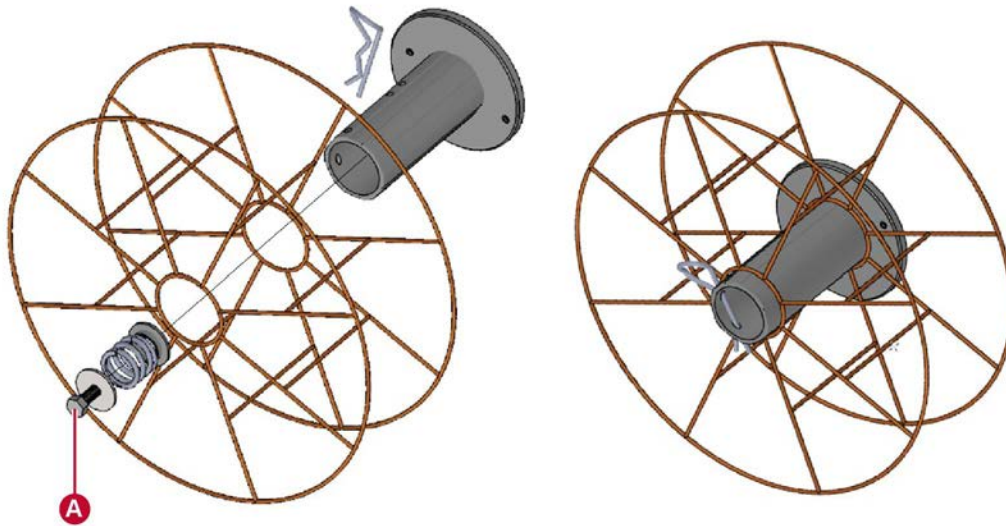
To use the 100 mm (4 in.) spool, the plastic bobbin must be removed from the equipment.

Tightening the bobbin locking nut for 100 mm (4 in.) spool:



A. Bobbin locking nut

Tightening the bobbin locking nut for 200 mm (8 in.), 300 mm (12 in.):



A. Bobbin locking nut



**NOTE!**

The larger bobbin may come in the wire form shown in the illustration or may be molded plastic form. Either mounts the same way as shown.

## 5.8 Removing/installing wire



**NOTE!**

If installing aluminum wire, see "Welding with aluminum wire" section.

The EMP 255ic or the EMP 320ic will handle bobbin sizes of 100 mm (4 in.), 200 mm (8 in.) and 300 mm (12 in.). See "TECHNICAL DATA" chapter for suitable wire dimensions for each wire type.

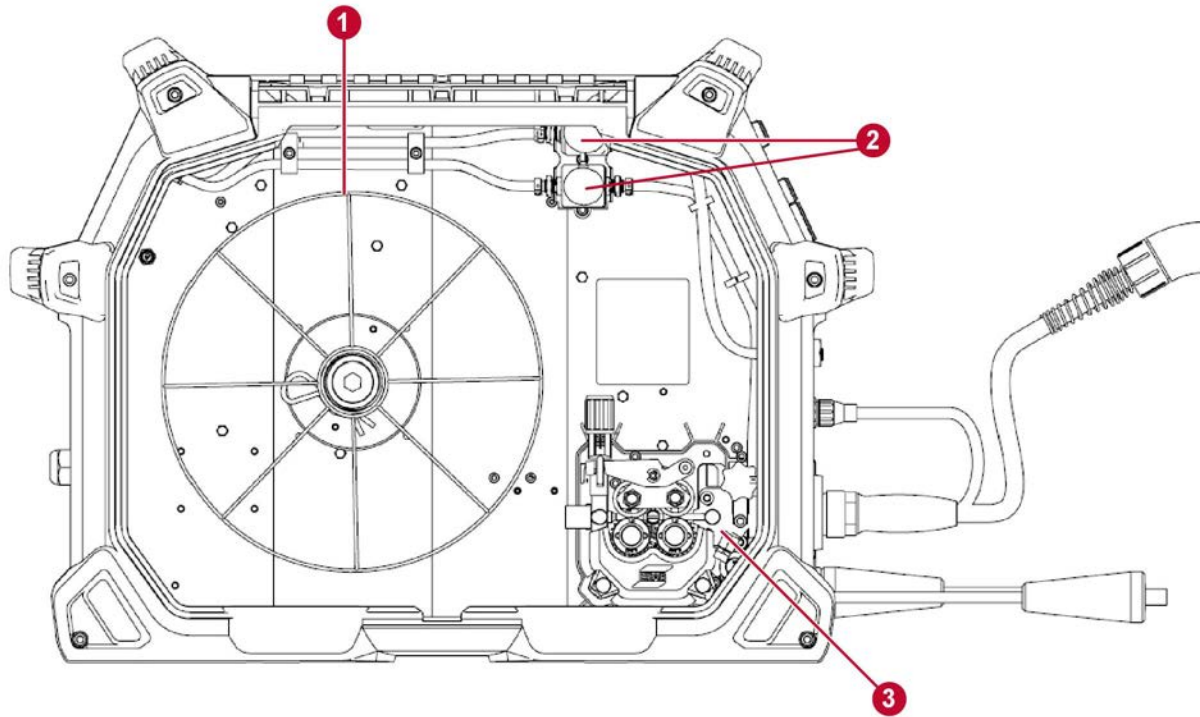


Figure 3. View of wire-bobbin side

- 1. Wire-bobbin
- 2. Gas valves

- 3. Wire-feed assembly



**WARNING!**

Do not place or point the torch near the face, hand or body as this may result in injury.



**NOTE!**

Make sure the correct wire-feed rollers are selected.



**NOTE!**

Remember to use the correct contact tip in the welding torch for the wire diameter used.

### 5.8.1 Removing wire

1. Disconnect the electrical power source from the unit.
2. Open the wire-bobbin side door of the EMP unit.



1. Wire-bobbin
2. Wire-feed assembly
3. Locate the wire-feed assembly and its tension-arm.

4. On the wire-feed assembly release the tensioning arm by partially unscrewing the tension knob, pulling it up out of its detent and rotating it toward you. The tensioning arm is spring-loaded. It will pop-up when the tension knob in the previous step is rotated out-of-the-way, see illustration below.

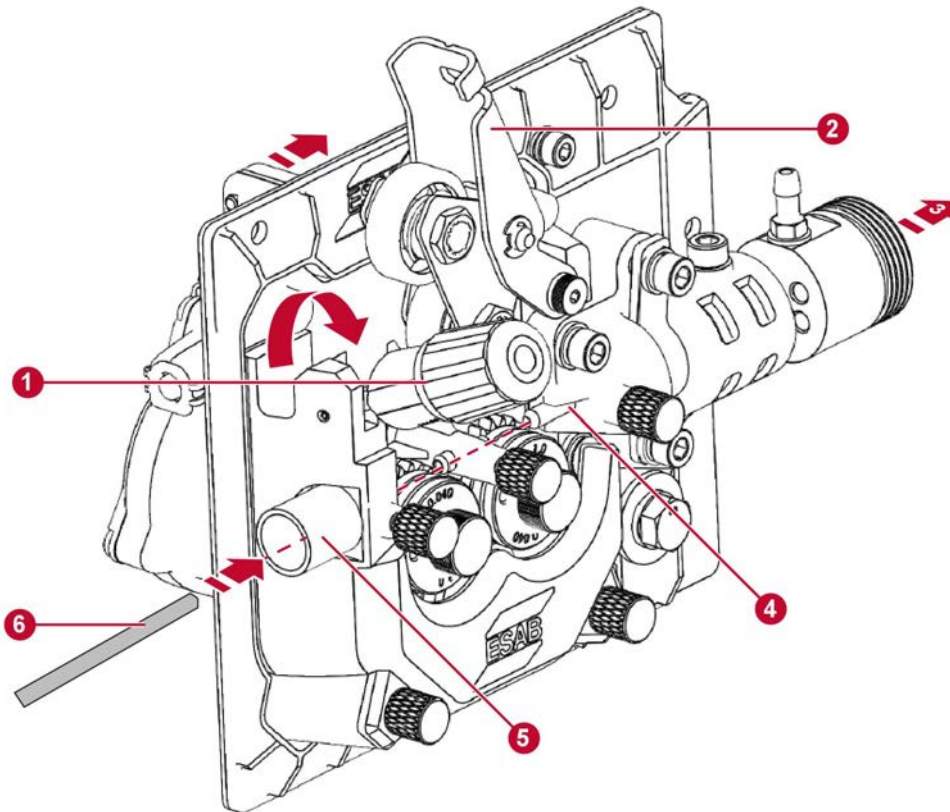


Figure 4. Wire-feed mechanism

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Tension knob</li> <li>2. Tensioning arm</li> <li>3. To torch</li> </ol> | <ol style="list-style-type: none"> <li>4. Output wire-feed guide</li> <li>5. Input wire-feed guide</li> <li>6. Wire-in</li> </ol> |
|---|---|
5. **If wire remains in the torch assembly:**  
Near the input end of the wire-feed guide on the wire-feed assembly cut the wire while holding the bobbin-end (so the wire does not unravel from the bobbin after cutting it loose). Secure the cut end of the wire to the bobbin (if any wire is left on the bobbin) to prevent the wire from unraveling from the bobbin.
  6. **If wire remains in the torch assembly:**  
Disconnect the torch assembly from the EMP unit pulling the remaining length of the wire through the wire-feed assembly and set the torch assembly aside (with the loose wire still installed in the torch). The old wire should now be completely removed from the wire-feed assembly.
  7. Remove the bobbin from the unit (see "Removing/installing bobbin" section). The old wire and its bobbin should now be completely removed from the unit. The wire in the torch assembly remains to be removed in the next step.
  8. **If wire remains in the torch assembly:**  
Pull the length of old wire out of the torch assembly from either end of the torch assembly.



### 5.8.2 Installing wire



#### CAUTION!

Too long a torch liner risks damage to the wire-feed assembly if forced to fit when attempting to connect the torch to the power unit.

Refer to the torch manual for instructions for torch liner replacement.



#### NOTE!

If wire replacement requires a replacement of the torch liner in the torch assembly, the liner may be too long and will then require trimming. For installing a new liner in the torch hose, refer to the torch manual.

1. Disconnect the electrical power source from the unit.
2. Open the Wire-Bobbin side door of the EMP unit.
3. Install the new Bobbin (see "Removing/installing bobbin" section).
4. On the Wire-feed assembly release the tensioning knob by pulling it up out of its detent and rotating it toward you. The tension arm is spring-loaded. It will pop-up when the tension knob in the previous step is rotated out-of-the-way.
5. Install correct rollers for wire size (See "Removing/installing wire-feed rollers" section).
6. With a clean-cut (no bends) strait end pull the wire from the newly-installed bobbin and feed it into the input wire-feed guide, through the center wire-guide, then across the feed roller groove and through the output wire-feed guide until it protrudes out of the Euro-adapter output end about three centimeters (3 cm).
7. Close the tension-arm on to the wire in its groove on the wire-feed rollers and secure with the tension arm. Verify that the wire is in its groove and not floating out of the groove on the roller surface.
8. Re-connect the torch assembly to the EMP unit being careful to insert the bitter end of the wire protruding from the Euro-adapter into its proper guide tube on the torch connector.
9. Power up the EMP unit. Gas does not need to be connected for this procedure.
10. With the torch cable laid out reasonably straight, feed the wire through the torch cable till visible at its welding tip by depressing the trigger switch on the torch. Refer to the relevant torch manual for length of wire-protrusion at tip end.
  - Model EMP 255ic uses torch model: PSF 305 (Manual 0458 870 201)
  - Model EMP 320ic uses torch model: PSF 305 (Manual 0458 870 201)
11. To more accurately set and verify the wire-feed tension for correct wire-feed pressure, see "Setting wire-feed pressure" section.
12. Close the door on the wire-bobbin side of the EMP unit.

### 5.9 Welding with aluminum wire



#### NOTE!

After completing the instructions in this section return to "Removing/installing wire" section.

To weld aluminum using the standard torch, refer to MIG torch instruction manual for replacing standard steel torch conduit liner with a teflon torch conduit liner.

- Model EMP 255ic uses torch model: PSF 305
- Model EMP 320ic uses torch model: PSF 305

Order the following accessories:

- Torch teflon conduit liner (PTFE liner)
- Teflon coated center and output wire-guide tubes (select size to match wire from "ROLLER & WIRE-GUIDE SELECTION" section in Appendix)
- U-groove, aluminum feed-roller (select size to match wire from "ROLLER & WIRE-GUIDE SELECTION" section in Appendix)

## 5.10 Setting wire-feed pressure



### NOTE!

This procedure requires the unit be powered ON. The gas does not need to be connected for this procedure.

1. Turn power to the unit ON.
2. Start by making sure that the wire moves smoothly through the wire guide.

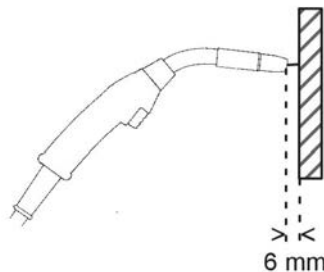


### CAUTION!

It is important that the feed-pressure is not too high.

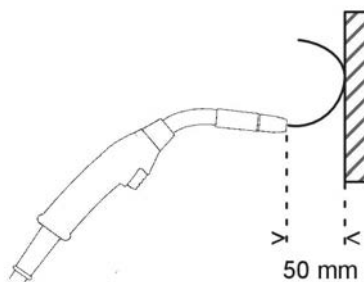
3. **Adjusting for minimum roller pressure:**

When you hold the welding torch approximately 6 mm (¼ in.) from the piece of wood the wire-feed rollers should slip. If they don't reduce the tension on the wire by adjusting the tension knob on the wire-feed assembly.



4. **Adjusting for correct roller pressure:**

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



## 5.11 Removing/installing wire-feed rollers



### WARNING!

Power should be turned off for this procedure.



### NOTE!

Gas does not need to be connected for this procedure.

Two different-size pairs of dual-groove feed-rollers is supplied as standard (Listed in Appendix as "DEFAULT" and as "ACCESSORY"). Change the feed rollers to match the wire size/type on the wire bobbin. See "ROLLER & WIRE-GUIDE SELECTION" section in Appendix for feed roller selection.

### 5.11.1 Removing wire-feed rollers

1. If new rollers are being installed select the correct size and type (steel or aluminum) for wire being installed.
2. Disconnect the electrical power source from the unit.
3. Open the door on the wire-bobbin side of the EMP unit.
4. Release the tensioning arm by pulling it up out of its detent and rotating it toward you, (see Figure 5). Since the wire-feed pressure must be disturbed to release this arm, the tension on the rollers will have to be re-adjusted in a later step. The tensioning arm (2) is spring-loaded. It will pop-up when the tension knob in the previous step is rotated out-of-the-way.
5. Remove the wire from the wire-feed mechanism.



### CAUTION!

When removing the drive roller (roller located on left side) be careful **not** to remove the drive gear with it. Doing so risks losing the small woodruff key on the motor shaft. Failure to comply will render the entire unit useless until this part is replaced.

6. Remove the two wire-feed rollers by removing their retaining screws and washers and then sliding each roller from its shaft (see Figure 7).

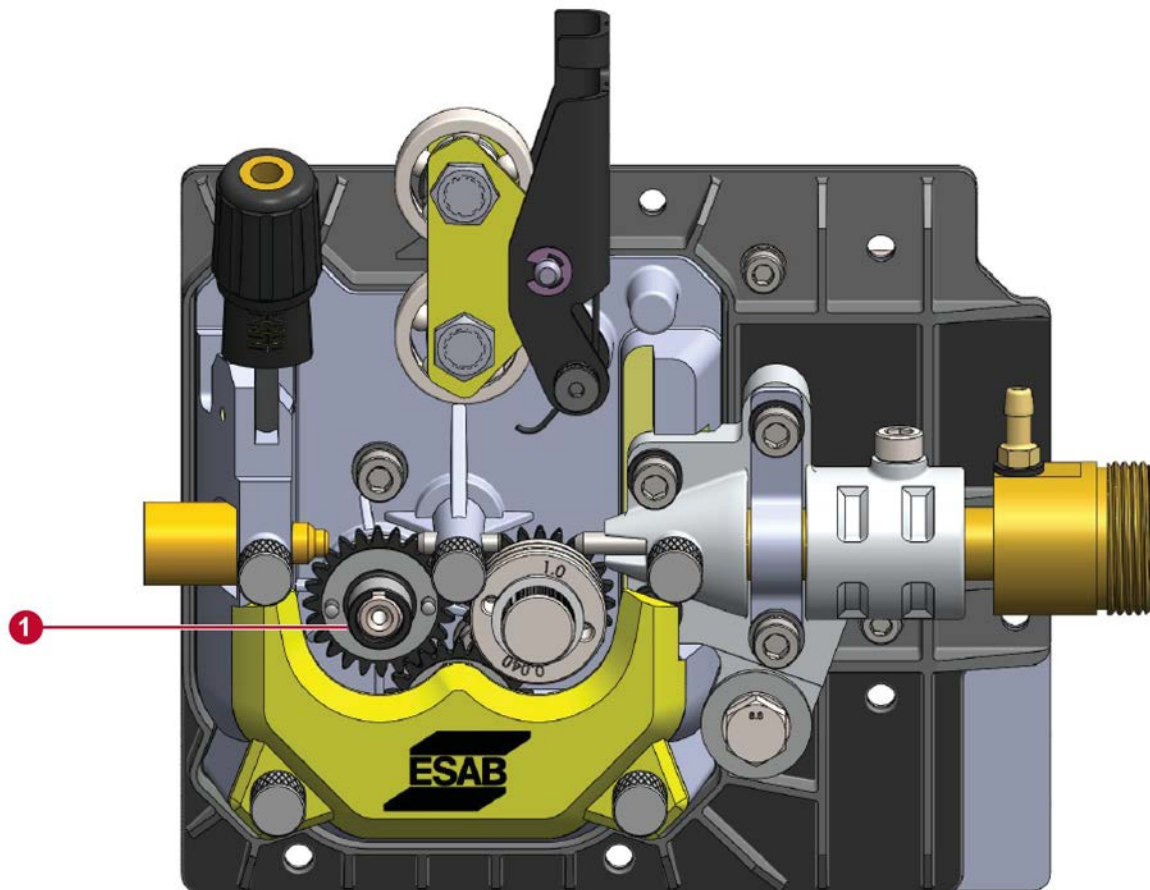


Figure 5. Drive gear with woodruff key on motor shaft

1. Drive gear



**CAUTION!**

Avoid removing drive gear (see (1) in Figure 6). (Risk losing drive-shaft woodruff key.)

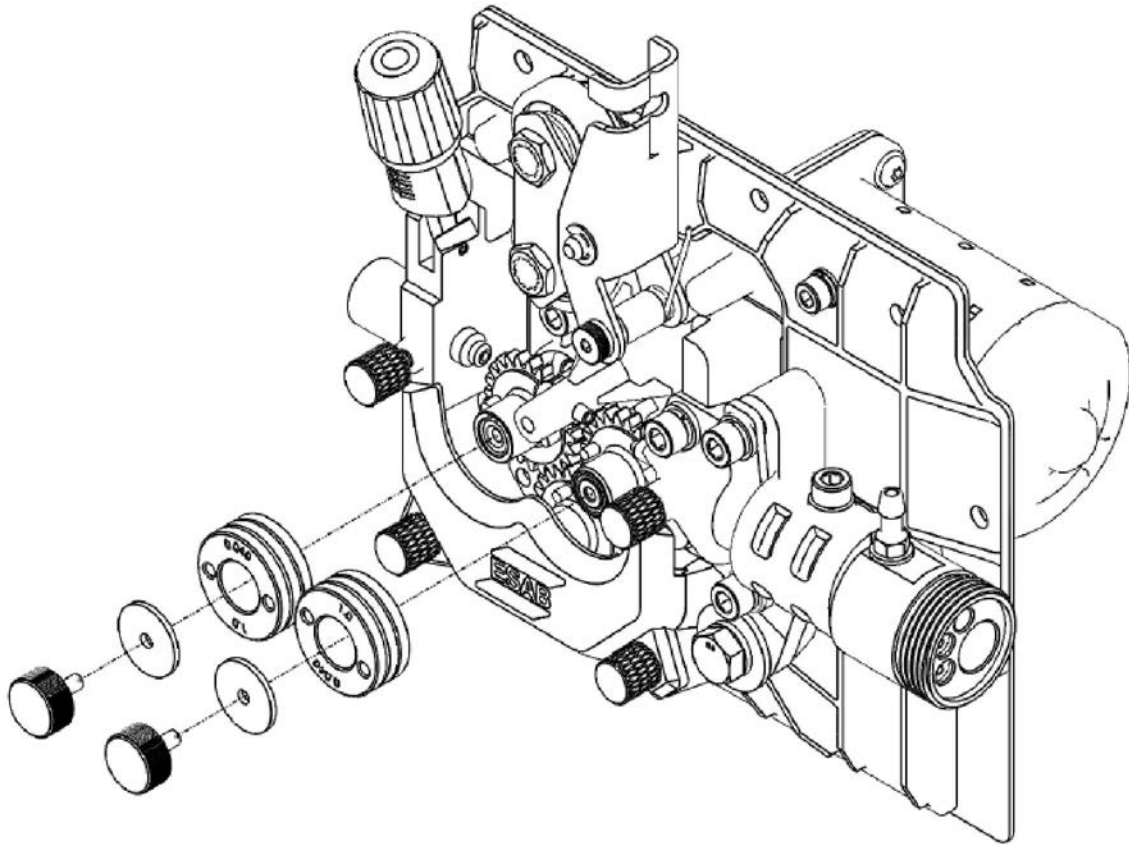


Figure 6. Feed roller removal and installation

### 5.11.2 Installing wire-feed rollers



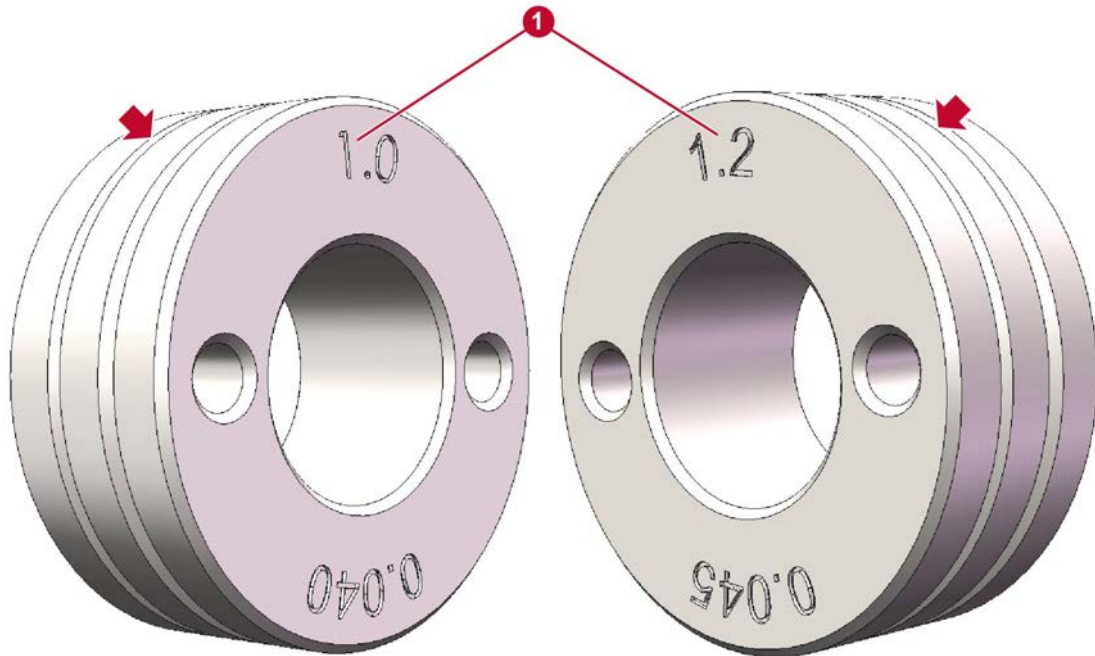
#### **CAUTION!**

When installing the wire-feed rollers avoid (and do not force) installing a roller if either wire guide's position interferes. Slide the offending wire guide slightly to provide clearance for the roller. The wire-guides are adjusted **after** the rollers are installed.

1. Install the two new drive rollers (both the same part number and in the same and correct groove orientation). Verify that the correct size groove is oriented on the **inside**.

**NOTE!**

The wire-feed rollers will either be replaced (to correspond with the size and type of the new wire being installed) or reused if the same size and type of wire is being replaced.



1. Labels

**NOTE!**

Label on roller-side matches with the groove on the opposite-side of the roller.

2. Tighten the drive-roller retaining screw by turning it in the clockwise direction. Hand-tight is sufficient.
3. The wire must be installed through the wire-feed assembly (see "Installing wire" subsection).

**NOTE!**

If the wire was removed the wire will have to be re-installed (see "Installing wire" subsection).

4. Close the pressure rollers on the wire.
5. Adjust the wire-feed pressure by adjusting the tension on the wire at the wire-feed rollers by turning the tension knob using the procedure in "Setting wire-feed pressure" section.
6. Close the door on the wire-bobbin side of the EMP unit.

## 5.12 Removing/installing/adjusting wire-guides

**NOTE!**

The gas does not need to be connected for this procedure.

**NOTE!**

The **Output wire-guide tube** must be selected to match the size that corresponds with the wire size and type (SS or aluminum) selected for use. The other two wire-guides are standard parts which fit all wires.

There are three wire-feed guide tubes: input wire-guide tube, center wire-guide tube and output wire-guide tube. The input wire-guide tube and the center wire-guide tube are standard parts for all wire types/sizes, so they are not mentioned here. This procedure addresses the removal/installation and then adjustment of the output wire-guide tube. See Figure 22 for the location of the tubes and their holding screws.

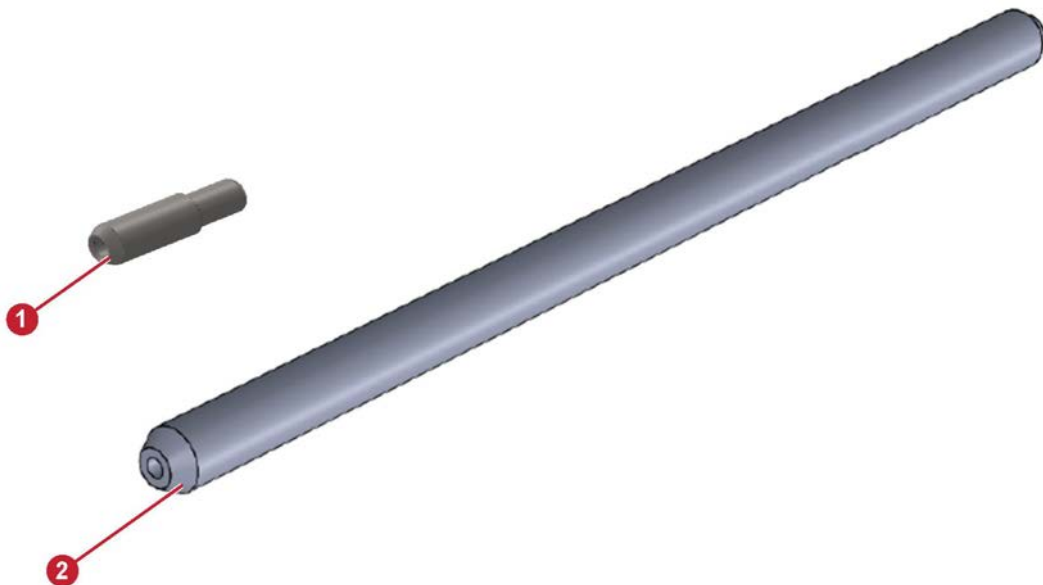
**NOTE!**

This chapter requires that the wire-feed rollers have been removed to provide access to the wire-guides. Perform wire-feed roller removal and, later in this procedure, roller install steps. See "Removing/Installing wire-feed rollers" section when referred in the steps below.

1. Select and obtain the correct replacement output wire-guide (see "ROLLER & WIRE-GUIDE SELECTION" section in Appendix).

**NOTE!**

Since this is based on the size and type (steel or aluminum) wire selected, it is assumed that the wire is already-selected, obtained and available for this procedure.

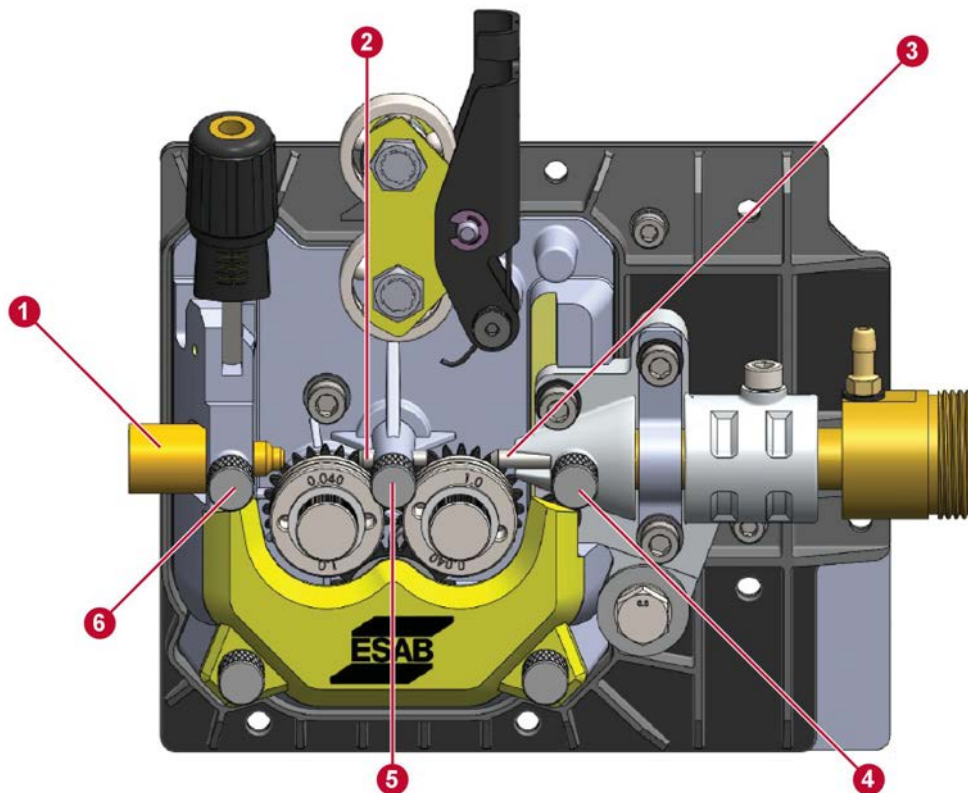


1. Center wire-guide: one size fits all.      2. Output wire-guide: 4 sizes for steel, 3 sizes for aluminum (select from table in manual).
2. Disconnect the electrical power source from the unit.
3. Open the door on the wire-bobbin side of the EMP unit.
4. Release the tensioning arm by loosening the tension knob (see (1) in Figure 5), pulling it up out of its detent and rotating it toward you. The tensioning arm (see (2) in Figure 5) is spring-loaded. It will pop-up when the tension knob in the previous step is rotated out-of-the-way.

5. To remove the wire from the EMP unit cut the wire just before entry into the wire-feed assembly. Be sure to hold the bobbin-end of the wire before cutting to restrain the wire from unravelling from its spooling on the bobbin. Secure the bitter end by any convenient means to the wire frame of the bobbin to mechanically restrain it while this procedure continues.
6. Remove the torch assembly from the EMP unit and remove the remainder of the old wire still in the torch assembly and properly dispose of it. The torch assembly will be re-connected near the end of this procedure.
7. **Remove wire-feed rollers:**  
See steps in "Removing/Installing wire-feed rollers" section for removing.

### 5.12.1 Output wire-guide removal/installation

1. Loosen the output wire-guide thumb screw.



- |                           |                                  |
|---------------------------|----------------------------------|
| 1. Input wire-guide       | 4. Output wire-guide thumb screw |
| 2. Center wire-guide      | 5. Center wire-guide set screw   |
| 3. Output wire-guide tube | 6. Input wire-guide set screw    |
2. Remove the output wire-guide tube out-through and out-of the Euro-adaptor assembly.



**NOTE!**

It is not necessary to remove the euro-adaptor assembly to access the output wire-guide. A slight, quick, tap on the input-side of the output wire-guide (after loosening its thumb screw) should be sufficient to project it out far enough on its output side to be able to grasp it and pull it out. If not, it can be pushed back in and a second attempt made to project it out far enough for grasping it or use needle-nose pliers to grasp it and pull it out.

3. Replace with the new, correct-size tube in the reverse order. Do **not** tighten its set-screw now (will be done below in "Adjustment").



### 5.12.2 Center wire-guide removal/installation

1. Loosen and remove the original center wire-guide tube. This center wire-guide tube removes/installs only from the left side.
2. Install the new center wire-guide tube. This center wire-guide tube removes/installs only from the left side. Slide this tube (narrow part first and to the right) into its center post until it stops and hand-tighten its thumb screw.
3. **Install (re-install) wire-feed rollers:**



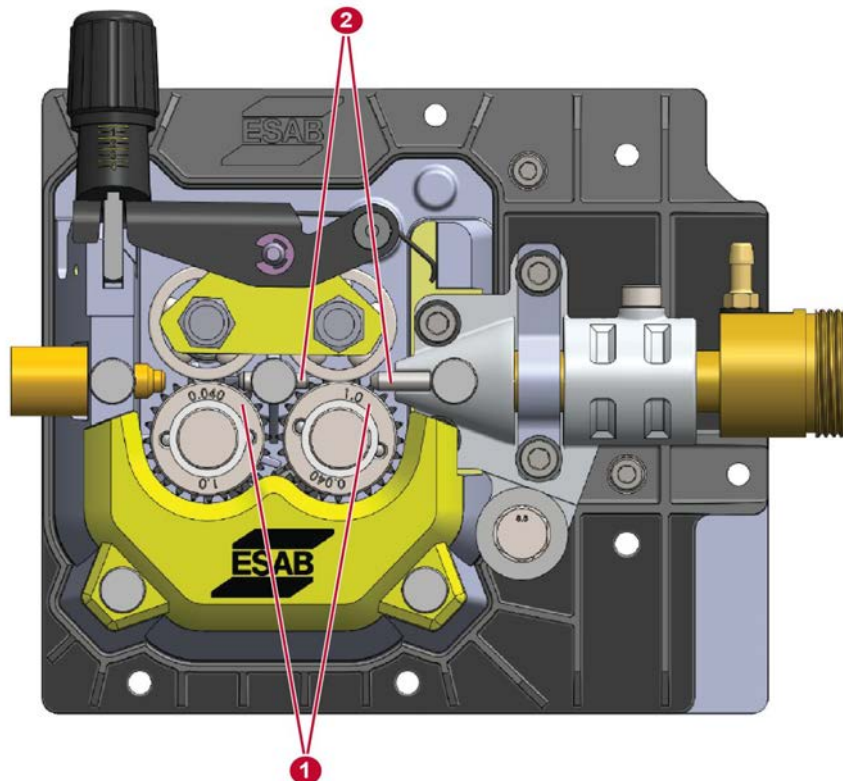
#### CAUTION!

Since neither wire-guide has been adjusted (done after this step) the arbitrary position of a wire-guide may interfere when attempting to install a roller. **Do not force a roller on to its shaft.** Inspect the cause of the interference and move the offending wire-guide tube out of the way.

a) See steps 8 – 11 in "Removing/Installing wire-feed rollers" section (for installing).

### 5.12.3 Adjusting wire guides

1. Verify center wire-guide tube has clearance from each feed-roller. The center wire-guide tube thumb screw should be finger-tight.
2. Adjust the output wire-guide tube for approximately 1 mm (0.03 in.) of clearance from the right feed-roller and tighten its thumb screw finger-tight.



1. Feed-rollers
2. Wire-guide tubes
3. Access the bitter-end of the wire on the bobbin and cut off the length from the bitter end to have a clean, straight, bitter-end. This is needed to allow a low-resistance-travel re-install of the wire along the length of the torch cable to the torch tip.
4. Feed the wire from the bobbin through the wire-feed guides laying the wire in the grooves of the wire-feed rollers. Lay the wire into the **inside** groove of the wire-feed rollers. Continue feeding the wire until it projects beyond the Euro-adapter output side by a few centimeters.

5. Close the pressure rollers on the wire.
6. Re-connect the torch assembly on the EMP unit.
7. Power ON the EMP unit.

**NOTE!**

The gas does not need to be connected for this procedure.

8. With the torch cable reasonably straight, feed the wire through the torch cable till visible at its welding tip by depressing the trigger switch on the torch. Refer to the relevant Torch manual for length of wire-protrusion at tip end.
9. Adjust the wire-feed pressure by adjusting the tension on the wire at the wire-feed rollers by using the procedure in "Setting the wire-feed pressure" section for a more accurate adjustment of this tension knob.
10. Close the door on the wire-bobbin side of the EMP unit.

### 5.13 Overheating protection

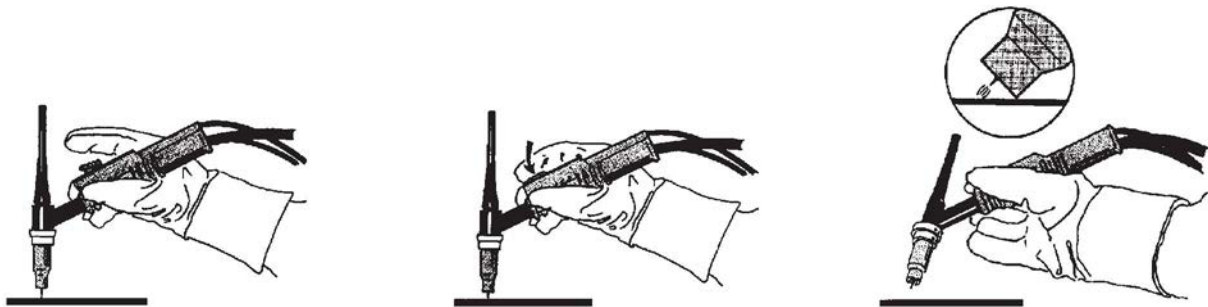
**CAUTION!**

This unit is equipped with overheating protection for its power supply.

The welding power source has overheating protection that operates if the internal temperature becomes too high. When this occurs, the welding current is interrupted, and an overheating symbol appears on the display. The overheating protection resets automatically when the temperature has returned to normal working temperature.

### 5.14 Lift-TIG welding

#### 2-stroke and 4-stroke welding process illustrated

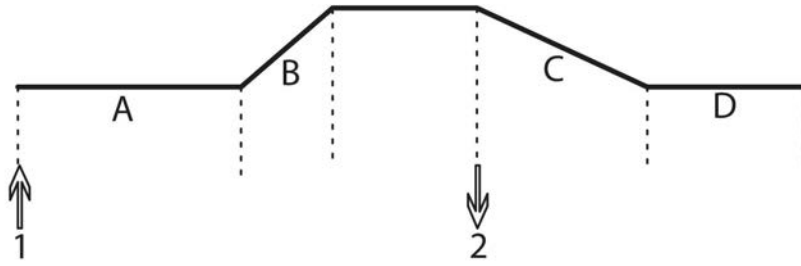


The trigger is used and some current flows already when lifting away the electrode to strike it.

1. The electrode is touched on to the work piece.
2. The trigger switch is pressed, and a low current starts to flow.
3. The welder lifts the electrode from the work piece: the arc strikes, and the current rises automatically to the set value.



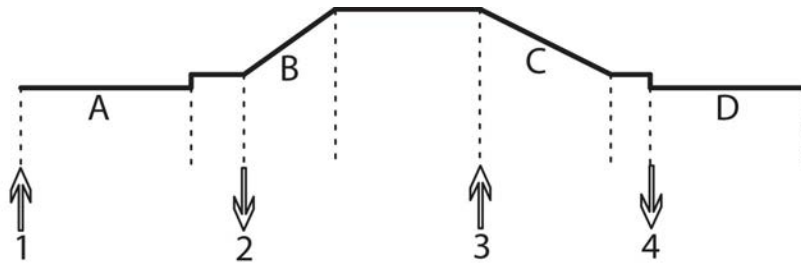
**2-stroke**



- A = Gas pre flow
- B = Slope up
- C = Slope down
- D = Gas post flow



**4-stroke**



- A = Gas pre flow
- B = Slope up
- C = Slope down
- D = Gas post flow

## 6 CONTROL PANEL

General safety regulations for handling the equipment can be found in the "Safety precautions" section in the "SAFETY" chapter of this manual. General information about operation can be found in the "OPERATION" chapter of this manual. Read both chapters thoroughly before you start using the equipment!



### NOTE!

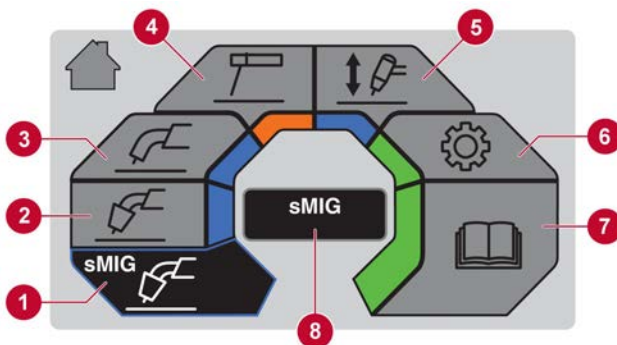
After power-on has completed the main menu appears on the user interface.

### 6.1 How to navigate



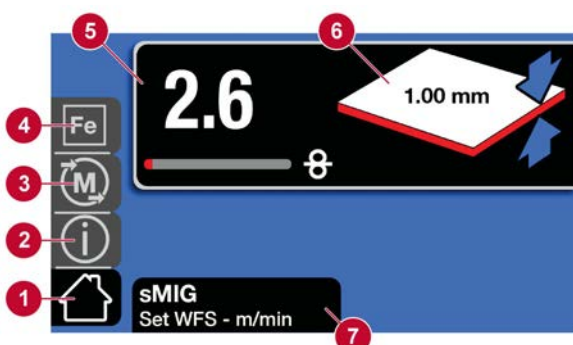
1. Upper control knob
  - a) Set current output value
  - b) Set wire-feed speed
2. Lower control knob
  - a) MIG Voltage Selection
  - b) sMIG Voltage Trim
  - c) MMA Mode: ARC ON/OFF
3. Menu navigation: Push to select

### 6.2 Main menu



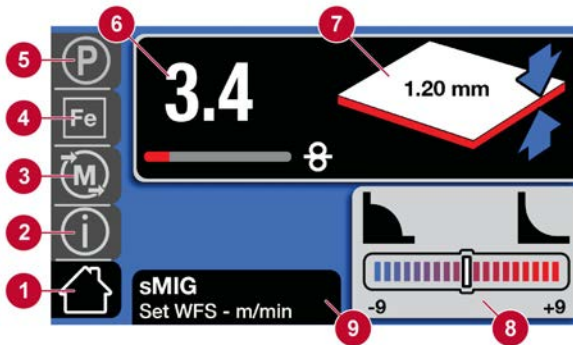
1. sMIG mode
2. Manual MIG mode
3. Flux-cored (MIG/MAG) mode
4. MMA mode
5. Lift-TIG mode
6. Settings
7. User manual
8. Dialogue box

### 6.3 sMIG mode: Basic



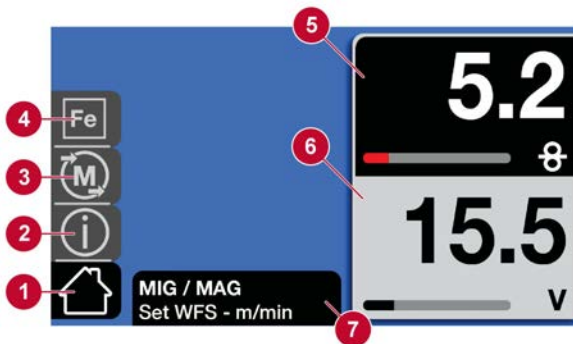
1. Home screen
2. Information
3. Memory
4. Material selection
5. Wire-feed speed selection
6. Material thickness indicator
7. Dialogue box

### 6.4 sMIG mode: Advanced



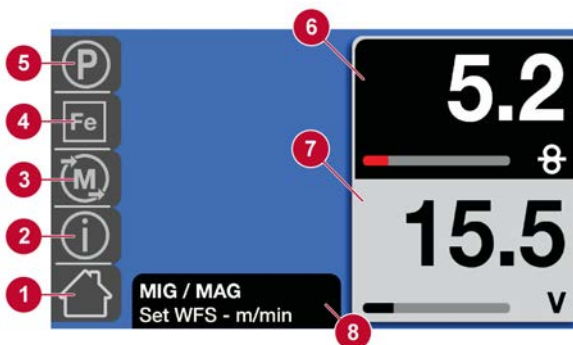
1. Home screen
2. Information
3. Memory
4. Material selection
5. Parameter
6. Wire-feed speed
7. Material thickness indicator
8. Voltage trim adjustment
9. Dialogue box

### 6.5 Manual MIG mode: Basic



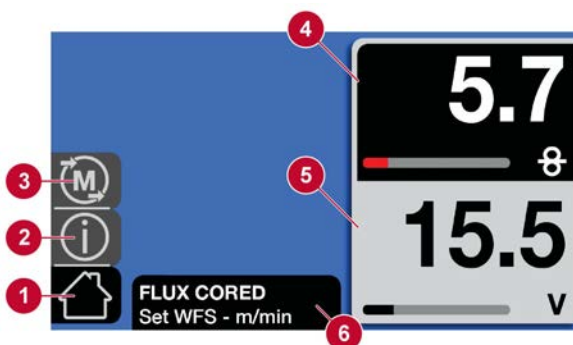
1. Home screen
2. Information
3. Memory
4. Material selection
5. Wire-feed speed
6. Voltage adjustment
7. Dialogue box

### 6.6 Manual MIG mode: Advanced



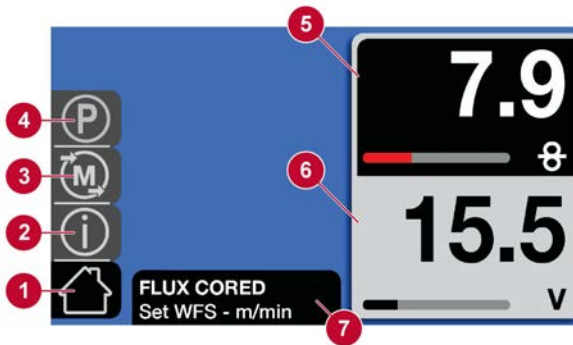
1. Home screen
2. Information
3. Memory
4. Material selection
5. Parameter
6. Wire-feed speed
7. Voltage adjustment
8. Dialogue box

### 6.7 Flux cored wire mode: Basic



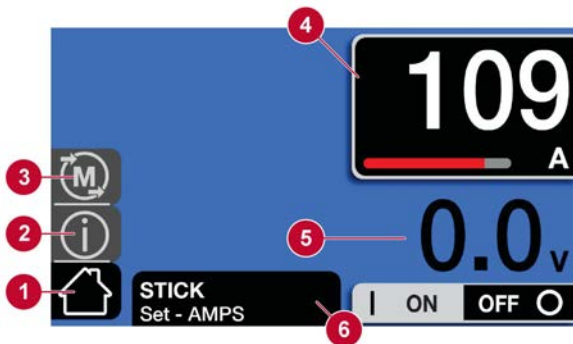
1. Home screen
2. Information
3. Memory
4. Wire-feed speed
5. Voltage adjustment
6. Dialogue box

### 6.8 Flux cored wire mode: Advanced



1. Home screen
2. Information
3. Memory
4. Parameter
5. Wire-feed speed
6. Voltage adjustment
7. Dialogue box

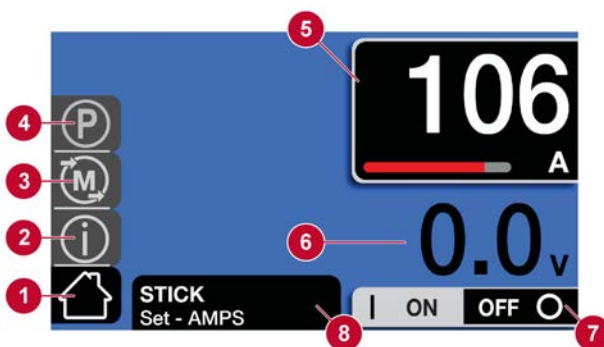
### 6.9 MMA mode: Basic



1. Home screen
2. Information
3. Memory
4. Amperage adjustment
5. Power-supply output voltage (Open Circuit Voltage)
6. Dialogue box
7. Arc ON/OFF

Blue changes to orange when output is "hot".

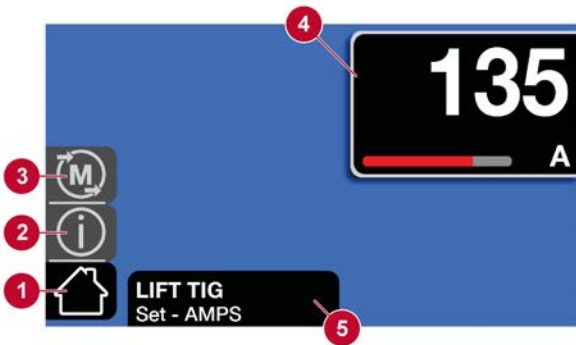
### 6.10 MMA mode: Advanced



1. Home screen
2. Information
3. Memory
4. Parameter
5. Amperage
6. Power-supply output voltage (Open Circuit Voltage)
7. Arc ON/OFF
8. Dialogue box

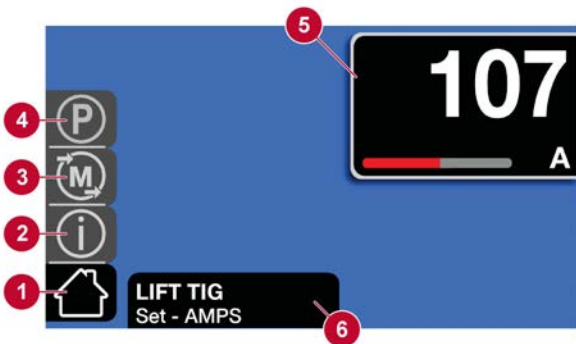
Blue changes to orange when output is "hot".

### 6.11 Lift-TIG mode: Basic



1. Home screen
2. Information
3. Memory
4. Amperage
5. Dialogue box

### 6.12 Lift-TIG mode: Advanced



1. Home screen
2. Information
3. Memory
4. Parameter
5. Amperage
6. Dialogue box

### 6.13 Settings




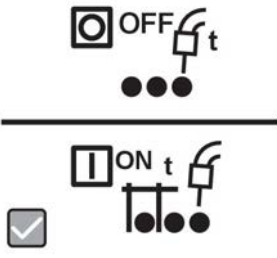















1. Reset mode
2. Inch/Metric
3. Basic/Advanced
4. Language
5. Information
6. Home screen
7. Dialogue box

### 6.14 User manual information









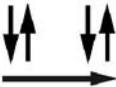

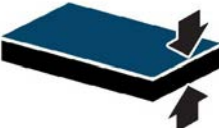










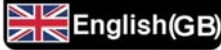






1. Maintenance information
2. Wear/Spare parts
3. Operation information
4. Home screen
5. Dialogue box

## 6.15 Icon reference guide

ICON	MEANING	ICON	MEANING
	Home		Spot time on/off selection
	Information		Wire feed speed
	MIG Torch		Spot time on adjustment
	Parameters		Flux cored
	Parameters		Manual MIG
	Percent		MMA
	<b>Pre-flow</b> The time the shielding gas stays on before the welding arc is started		Smart MIG
	<b>Post-flow</b> The time the shielding gas stays on after the welding arc is stopped		Lift-TIG
	Seconds		Saving welding programs for a specific application when in the Memory Mode



ICON	MEANING	ICON	MEANING
	<b>Settings</b> on user manual menu		<b>Cancel</b>
	<b>Spool torch</b> (Not all markets)		<b>Remote</b>
	<b>Settings</b>		<b>Foot control</b>
	<b>2T, Trigger On/OFF</b>		<b>Burn back</b> Adjusting the time when the voltage stays on after the wire feed is stopped to keep the wire from freezing in the weld puddle
	<b>4T, Trigger Hold/Lock</b>		<b>User manual</b> on main menu
<b>A</b>	<b>Amps</b>		<b>Plate thickness</b> at sMIG mode
	<b>Arc force</b> On stick welding-increasing amps when the arc length is shortened to reduce or eliminate the freezing of the stick electrode in the weld puddle		<b>Trim bar</b> Changing the weld bead profile from flat to convex or flat to concave
	<b>Downslope</b> Sloping the current down over a period of time at the end of the weld cycle		<b>Advanced Settings</b>
	<b>Hot start</b> The increase of amps when striking the electrode to reduce sticking		<b>Basic Settings</b>

ICON	MEANING	ICON	MEANING
	<b>Inductance</b> The addition of inductance into the arc characteristics to stabilize the arc and reduce spatter when in the short circuit process	<b>V</b>	<b>Volts</b>
	<b>Memory</b> , able to save welding programs for a specific application		<b>Language selection</b>
	<b>Stick electrode choice</b>		<b>Unit of Measure</b>
	<b>Upslope</b> , Sloping the current up over a period of time at the beginning of the weld cycle		<b>Bead profile, concave</b>
<b>.8 mm</b> <b>(.030")</b> 	<b>Wire diameter</b>		<b>Bead profile, convex</b>

## 7 MAINTENANCE



### WARNING!

Power should be turned off for maintenance.



### CAUTION!

Only authorized persons may remove the cover of this product or carry out service, maintenance or repair.



### CAUTION!

This product is covered by manufacturer's warranty. Any attempt to carry out repair work by non-authorized service centres will invalidate the warranty.



### CAUTION!

Before each use, make sure:

The torch body and torch cable and leads are not damaged.

The contact tip on the torch is not damaged.

The nozzle on the torch is clean and does not contain any debris.



### NOTE!

Perform maintenance more often during severe dusty conditions.



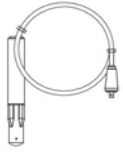



### NOTE!

There are no user serviceable parts inside of the power supply side of the EMP unit. Any need for service on the electronics/electrical-power side should be referred to the nearest ESAB service center.

### 7.1 Routine maintenance

#### Maintenance schedule during normal conditions:

Interval	Area to maintain		
Every 3 months	 Clean or replace unreadable labels.	 Clean weld terminals.	 Check or replace weld cables.
Every 6 months	 Clean inside equipment.		

### 7.2 Wire-feeder assembly maintenance

General good practice is to perform this procedure each time a wire bobbin is replaced.

### 7.2.1 Wire-feeder assembly cleaning



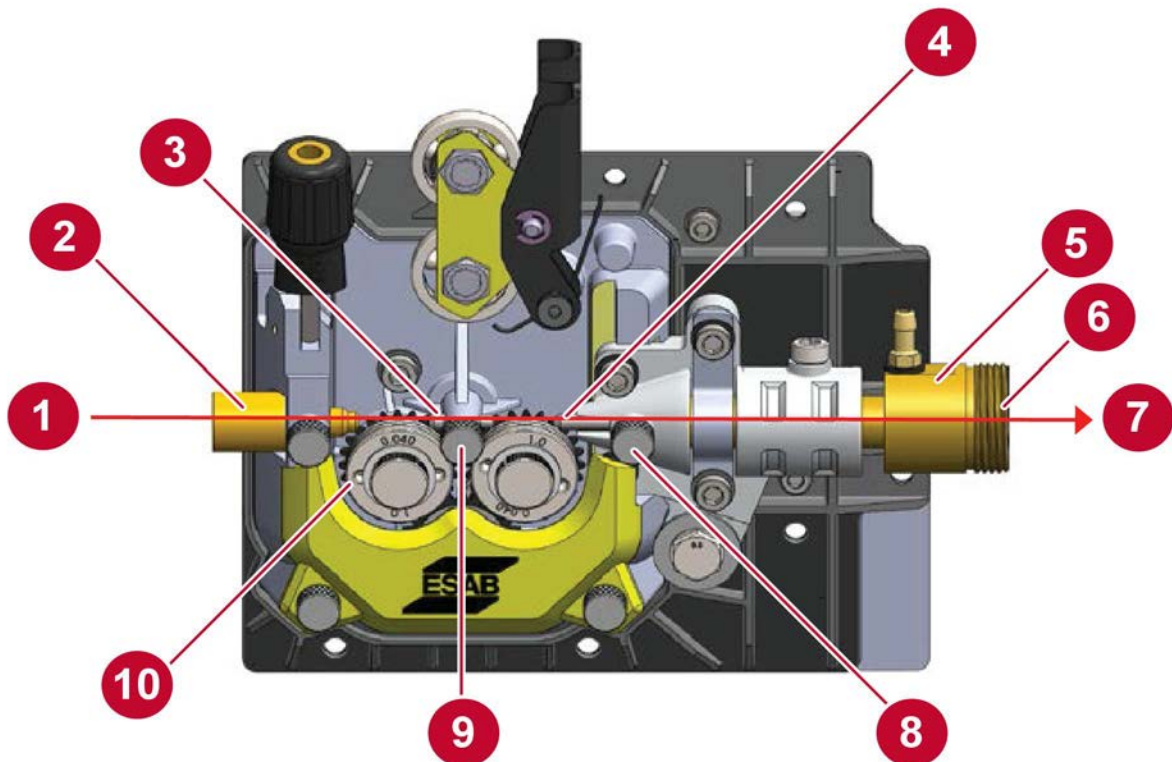
**WARNING!**

Always use hand and eye protection when cleaning.

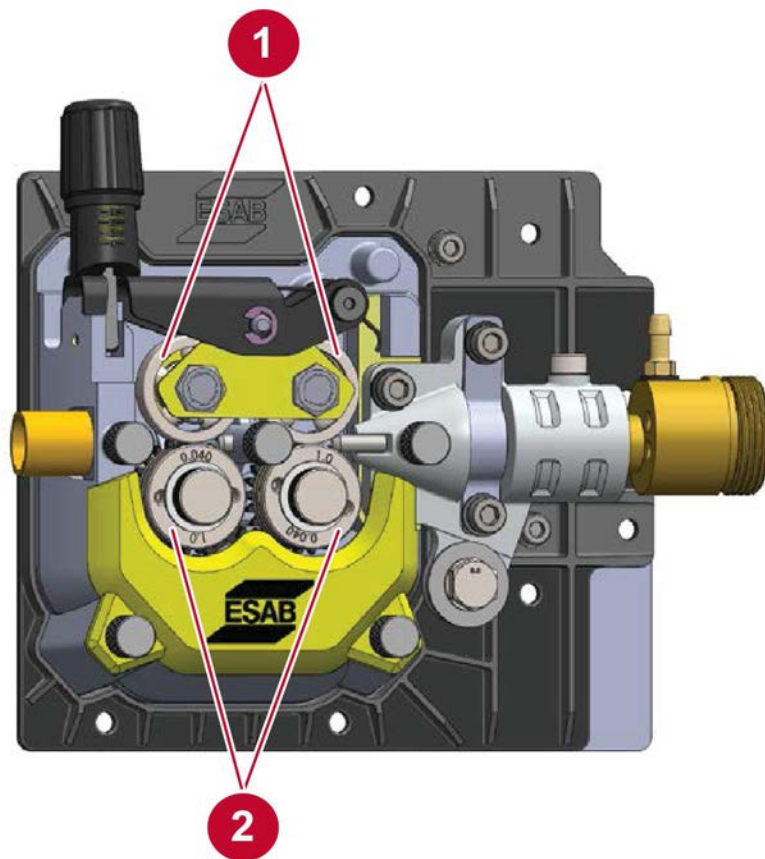


**NOTE!**

Use the following three illustrations for reference during this procedure.

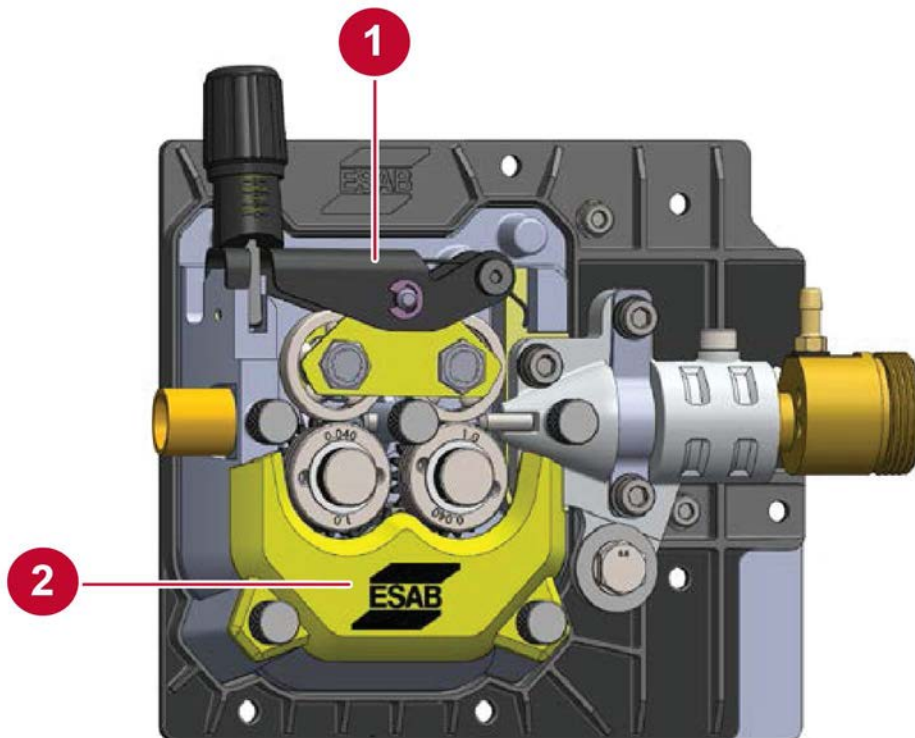


- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Wire from bobbin</li> <li>2. Input wire-guide</li> <li>3. Center wire-guide</li> <li>4. Output wire-guide tube</li> <li>5. Euro-adaptor assembly</li> </ul> | <ul style="list-style-type: none"> <li>6. Output wire-guide<br/>(inside of Euro-adaptor assy.)</li> <li>7. Wire-path through assembly</li> <li>8. Output wire-guide thumb</li> <li>9. Center wire-guide set screw</li> <li>10. Wire-feed rollers</li> </ul> |
|---|---|



1. Pressure rollers

2. Wire-feed rollers



1. Tension arm

2. Wire-feed assembly cover

1. Disconnect the electrical power source from the unit.
2. Release the tension from the pressure rollers by turning the tension knob on the tension arm counter-clockwise enough to pull it first up (out of its detent slot) and then toward you (see 1 in illustration above). The tension arm will spring-up as soon as the tension arm is released. This should free the wire movement to remove the wire.
3. Using (as needed) either soft-bristle brush or use a forced air source by blowing compressed air (max. 5 bar) to remove all debris which may have accumulated in this space. WEAR EYE PROTECTION.
4. Inspect if the input wire-feed guide, the output wire-feed guide, the center wire-feed guide, or the feed rollers are worn and need replacement. See "WEAR PARTS" section for ordering wear-part numbers. See "Removing wire-feed rollers" subsection in "Removing/Installing wire-feed rollers" section and/or "Removing/Installing/Adjusting wire-guides" section in the "OPERATION" chapter. If none need replacement – only cleaning – go to the next step.

**CAUTION!**

Avoid removing the drive gear behind the left wire-feed roller. Doing so risks losing the Woodruff key on the motor shaft. Losing this key renders the unit useless until the key is replaced.

5. Remove the wire-feed rollers per "Removing wire-feed rollers" subsection in "OPERATION" chapter.
6. Clean the wire-feed rollers with a soft brush.
7. Clean the pressure rollers attached to the tension arm with a soft brush.

**CAUTION!**

Do not loosen any of the set screws for any of the three components listed in this next step.

Loosening any one will require re-adjusting their position as performed in "Adjusting wire guides" section in "OPERATION" chapter.

8. Clean the input wire-feed guide, the output wire-feed guide, the center wire-feed guide by blowing compressed air (max. 5 bar) through them (see illustration in "Output wire-guide removal/installation" subsection in the "OPERATION" chapter.).
9. Replace the wire-feed rollers per "Installing wire-feed rollers" subsection in the "OPERATION" chapter.
10. Close the tension-arm on to the wire in its groove on the wire-feed rollers.

**NOTE!**

Verify that the wire is in its groove and not floating out of the groove on the roller surface.

11. Visually verify that the wire appears as a straight line through the entire wire-feed assembly.

**NOTE!**

The bobbin may be turned counter-clockwise to take up any slack. Do this only AFTER step 12 because the tension on the wire is the only force preventing the movement of the wire at the torch tip.

12. Visually verify that the wire protrudes per specification at the torch tip and has not been pulled into the torch head.
13. Adjust the wire-feed pressure by adjusting the tension on the wire at the wire-feed rollers by turning the tension knob using the procedure in "Setting wire-feed pressure" subsection in "OPERATION" chapter.
14. Close the door on the wire-bobbin side of the EMP unit.

## 7.3 EMP-unit power side maintenance



### NOTE!

There are no user-serviceable parts on the power-side. In dusty environments, the power-side should be checked periodically for any dust/debris accumulation because of the fan forced-air cooling used on this side.

Because of the electro-static sensitive components and exposed circuit boards any maintenance on this side should be done by an authorized ESAB service technician.

## 7.4 Torch liner maintenance

Refer to MIG torch instruction manual (0458 870 \*01) for replacing standard steel torch conduit liner with a Teflon torch conduit liner.

- Model EMP 255ic uses torch model: PSF 305
- Model EMP 320ic uses torch model: PSF 305

### 7.4.1 Torch liner cleaning

1. Disconnect the power source from the input power socket.
2. Disconnect the torch assembly from the unit.
3. Remove the wire from the torch wire-liner by pulling the wire out from the torch wire-liner and laying it neatly for re-installation at the end of this procedure.
4. Remove the liner from the torch hose and inspect it for damage or kinks. Clean the liner by blowing compressed air (max. 5 bar) through the end of the liner that was mounted closest to the unit.
5. Re-install the liner.
6. Re-install the wire through the wire-feed assembly until visible at the torch tip. Verify that the wire does correctly feed out of the torch.

## 8 TROUBLESHOOTING

### 8.1 Preliminary checks

Try these checks and inspections before sending for an authorized service technician.

**Before attempting to troubleshoot the ESAB Rebel it is recommended to first perform a WELD DATA RESET (navigate to HOME/SETTING/RESET/WELD DATA RESET). A WELD DATA RESET of the system will restore the unit to its default welding condition. Performing this Reset will not lose any user stored memory values but will establish a baseline from which all troubleshooting should start. If the WELD DATA RESET is not successful it is recommended to perform a Factory Reset and repeat testing.**



#### CAUTION!

A Factory Reset will also erase all user stored memory locations. If this does not correct the problem, follow the table where possible.

Type of fault	Corrective action
Porosity within the weld metal	<ul style="list-style-type: none"> <li>• Check gas bottle is not empty.</li> <li>• Check gas regulator is not closed.</li> <li>• Check gas inlet hose for leaks or blockage.</li> <li>• Check that the correct gas is connected and the correct gas flow is used.</li> <li>• Keep the distance between the MIG torch nozzle and the work piece to a minimum.</li> <li>• Do not work in areas where drafts, which would disburse the shielding gas, are common.</li> <li>• Make sure the work piece is clean, with no oil or grease on the surface, before welding.</li> </ul>
Wire feeding problems	<ul style="list-style-type: none"> <li>• Make sure the wire spool brake is adjusted correctly.</li> <li>• Make sure the feed roller is correct size and not worn.</li> <li>• Make sure the correct pressure is set on the feed rollers.</li> <li>• Make sure the proper direction of motion is set based on the wire type (into the weld pool for aluminum, away from the weld pool for steel).</li> <li>• Make sure the correct contact tip is used and it is not worn.</li> <li>• Make sure liner is the right size and type for wire.</li> <li>• Make sure the liner is not bent so that friction is caused between the liner and the wire.</li> </ul>
MIG (GMAW/FCAW) welding problems	<ul style="list-style-type: none"> <li>• Make sure the MIG torch is connected to the correct polarity. Refer to the electrode wire manufacturer for the correct polarity.</li> <li>• Replace contact tip if it has arc marks in the bore causing excessive drag on the wire.</li> <li>• Make sure the correct shielding gas, gas flow, voltage, welding current, travel speed and MIG torch angle is used.</li> <li>• Make sure the work lead has proper contact with the work piece.</li> </ul>
MMA (SMAW) basic welding problems	<ul style="list-style-type: none"> <li>• Make sure you are using the correct polarity. The electrode holder is usually connected to the positive polarity and the work lead to the negative polarity. If in doubt, consult the electrode data sheet.</li> </ul>



Type of fault	Corrective action
TIG (GTAW) welding problems	<ul style="list-style-type: none"> <li>• Make sure the TIG torch is connected to the power source: Connect the TIG torch to the negative [-] welding terminal. Connect the welding ground cable to the positive [+] welding terminal.</li> <li>• Use only 100% Argon gas for TIG welding.</li> <li>• Make sure the regulator/flow meter is connected to the gas bottle.</li> <li>• Make sure the gas pipe for the TIG torch is connected to the gas outlet connector (M12) on the front of the power source.</li> <li>• Make sure the work clamp has proper contact with the work piece.</li> <li>• Make sure the gas bottle is opened and check the gas flow rate on the regulator/flow meter. The flow rate should be between 4.7 – 11.8 l/min (10 - 25 CFH).</li> <li>• Make sure the power source is turned on and TIG welding process is selected.</li> <li>• Make sure all connections are tight and leak-free.</li> </ul>
No power/No arc	<ul style="list-style-type: none"> <li>• Check that the input power supply switch is turned on.</li> <li>• Check if a temperature fault is shown on display.</li> <li>• Check if system breaker is tripped.</li> <li>• Check that the input power, welding and return cables are correctly connected.</li> <li>• Check that the correct current value is set.</li> <li>• Check the input power supply fuses.</li> </ul>
The overheating protection trips frequently.	<ul style="list-style-type: none"> <li>• Make sure that you are not exceeding the recommended duty cycle for the weld current you are using. See the "Duty cycle" section in the "OPERATION" chapter.</li> <li>• Make sure the air inlets or outlets are not clogged.</li> </ul>

## 8.2 User interface (UI) software displayed error codes

The following table exhibits fault codes that may appear to assist in troubleshooting.

Severity Level Meaning (see **Severity Level** Column in table):

- **(C)** Critical Service Required - Unit not functional or locked, not recoverable
- **(NC)** Non-Critical - Service may be desired - unit functional with limited performance
- **(W)** Warning - Unit functional and will recover on its own

Error Code	Severity Level	Functional Circuit Failure Explanation
001	W	PFC Heatsink, IGBT Heatsink or Main transformer has overheated > 85 °C.
002	W	Output diode Temperature fault, Analog temperature sensor.
003	W/C	<p><b>Warning</b> - If occurred during load/arc-start, cause is due to low input AC volts - Err009</p> <p><b>Critical</b> - If occurred at power-up under no-load condition.</p> <p>DC Bus (400 V) fault droop under load, PFC not supplying 400 V to inverter.</p>
004	C	Output voltage is above VRD levels when VRD switch is active.

<b>Error Code</b>	<b>Severity Level</b>	<b>Functional Circuit Failure Explanation</b>
<b>005 – 007</b>		(reserved)
<b>008</b>	<b>C</b>	OCV error, Output voltage not sensed at Control Board CN1 as expected
<b>009</b>	<b>W</b>	Low Voltage Error, AC Mains voltage is less than 108 V AC, this could trip Err 003
<b>010</b>		(reserved)
<b>011</b>	<b>C</b>	User has attempted a parameter or factory reset, and this was not confirmed by the system.
<b>012</b>	<b>C</b>	Communication Link Down, no communication between UI and Ctrl PCB at CN6
<b>013</b>	<b>C</b>	Low Internal Power Supply (IPS) Voltage Error, +24 V IPS is less than 22 V DC
<b>014</b>	<b>C</b>	Secondary Current Sensor output not detected at Control PCB CN18
<b>015 – 019</b>		(reserved)
<b>020</b>	<b>C</b>	No Image found in Flash
<b>021</b>	<b>C</b>	The image read from the flash is corrupted
<b>022</b>	<b>NC</b>	Failed two attempts of saving user memory to permanent memory in SPI Flash.
<b>023</b>	<b>NC</b>	Failed two attempts of recovering user memory permanent memory from SPI Flash.

## 9 ORDERING SPARE PARTS

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### CAUTION!

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

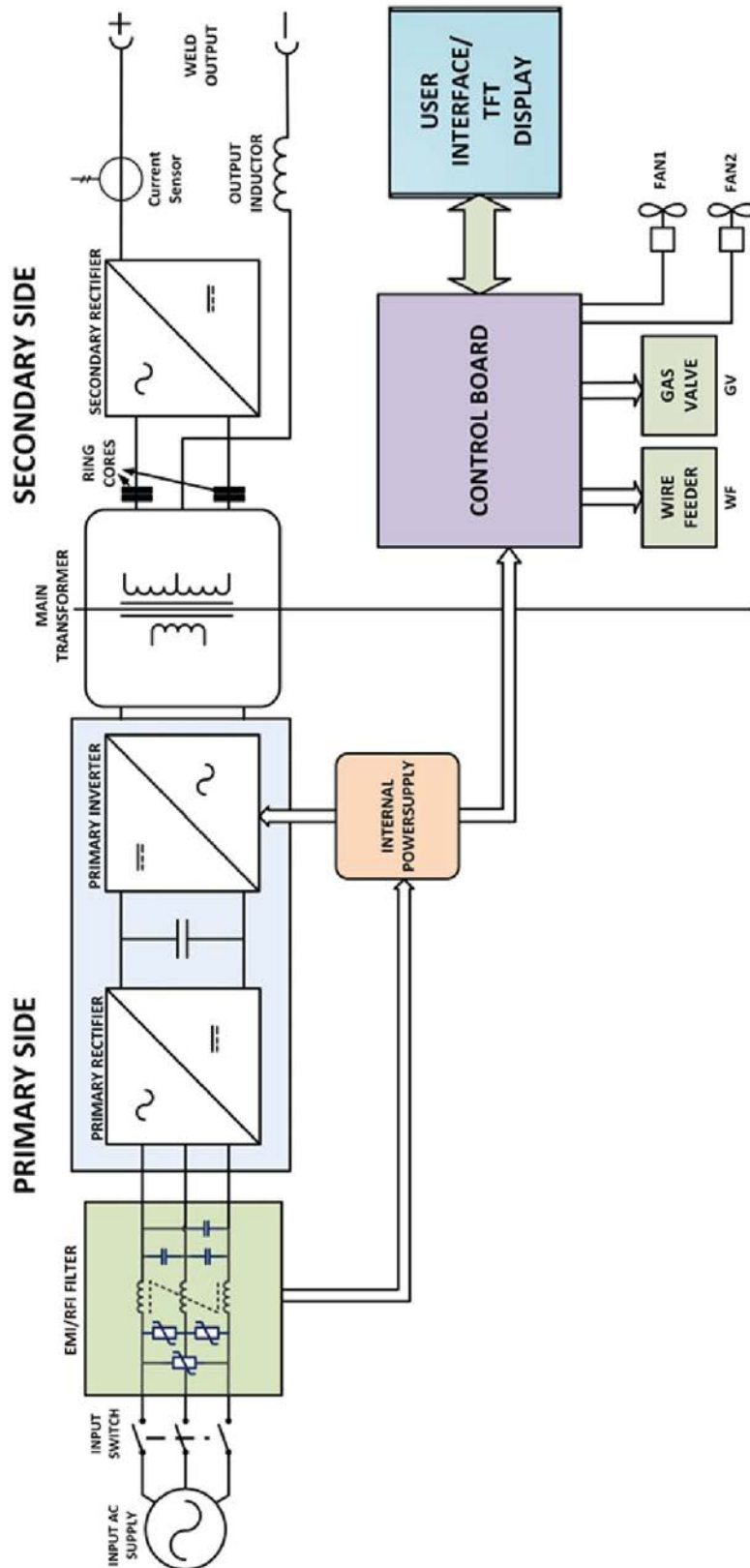
The EMP 255ic and the EMP 320ic are designed and tested in accordance with international standards **IEC-/EN 60974-1, IEC-/EN 60974-5, IEC-/EN 60974-7, IEC-/EN 60974-10, IEC-/EN 60974-12** and **IEC-/EN 60974-13**. It is the obligation of the authorized service centre carrying out the service or repair work to ensure that the product still conforms to the aforementioned standards.

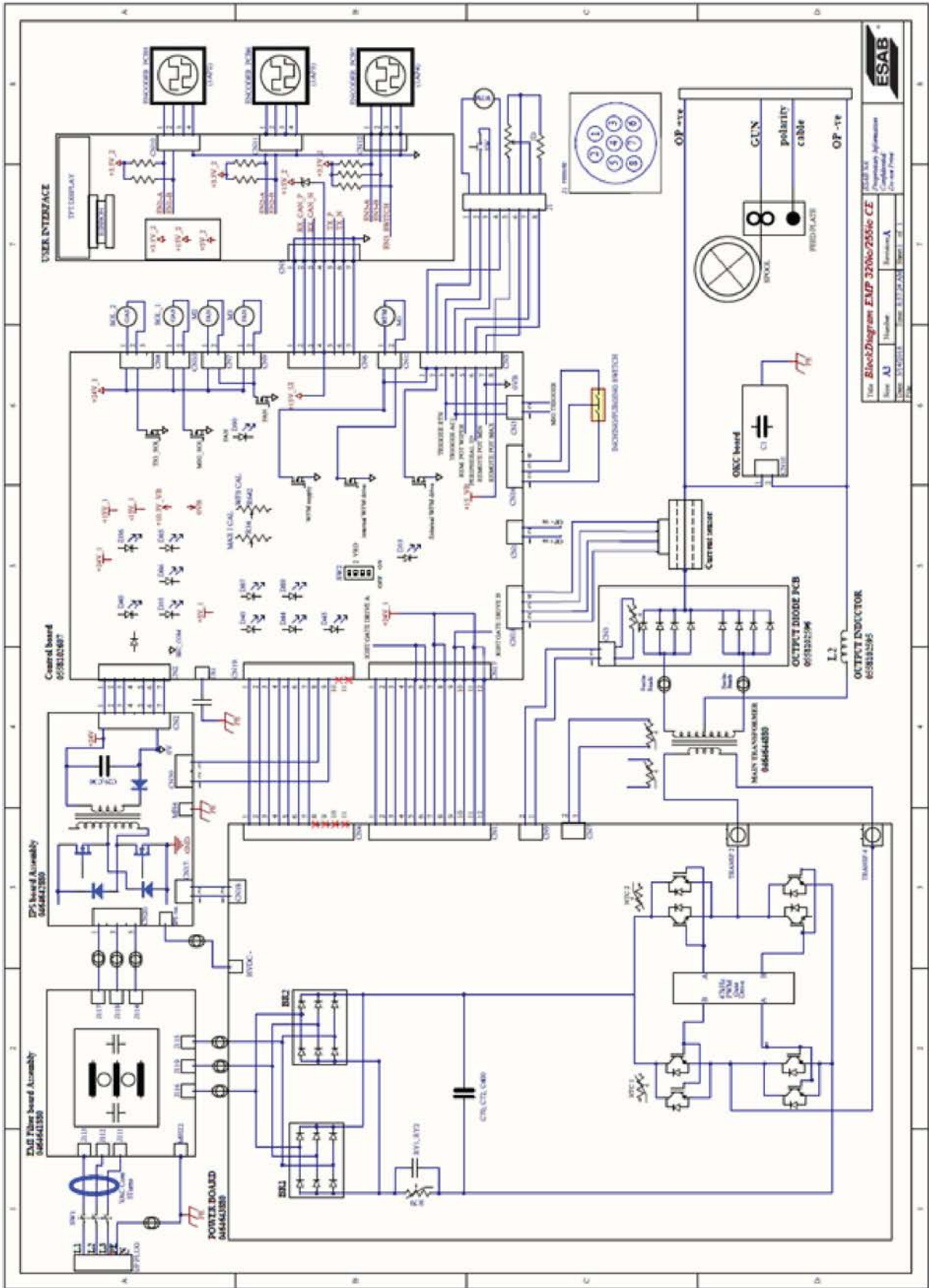
The spare parts list is published in a separate document that can be downloaded from the Internet: [www.esab.com](http://www.esab.com)

# DIAGRAM

## Functional Block Diagram

Functional Diagram of Power Circuit





ESAB  
 The BlockDiagram EAP 3200/2500 CE  
 Rev. A J  
 Issue 3.1.1.2.05  
 Date 01.01.05

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**ORDERING NUMBERS**

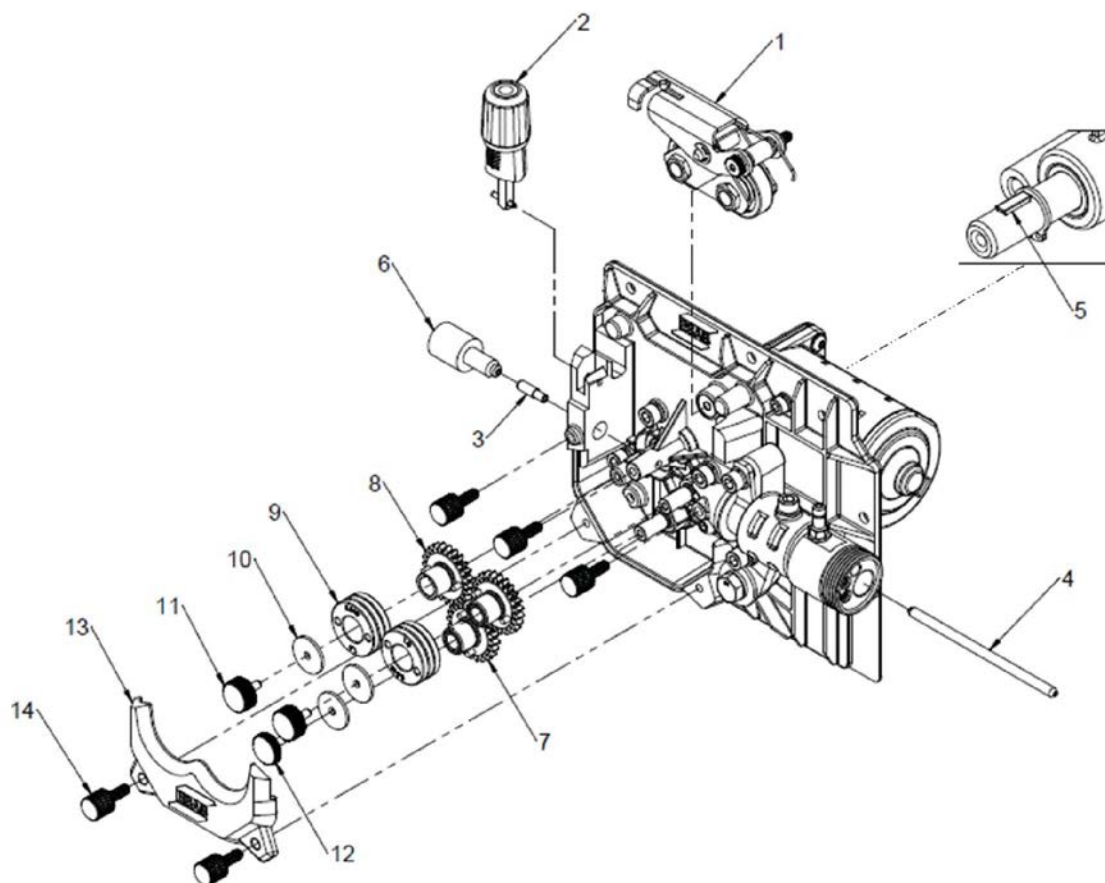
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Ordering no.	Description	Note
0700 300 992	EMP 255ic	Bobbin Size Ø100–300 mm (4–12 in.) Euro Connector
0700 300 991	EMP 320ic	Bobbin Size Ø100–300 mm (4–12 in.) Euro Connector
0463 606 001	EMP 255ic/EMP 320ic Spare Parts manual	

## WEAR PARTS

Certain mechanical parts on the wire-feed assembly are subject to more frequent use hence may wear more frequently. These are exhibited here.



Item	Ordering no.	Description	Qty
1	0558 102 591	PRESSURE ROLLER ASSEMBLY	1
2	0558 102 592	TENSION ADJUSTMENT ASSEMBLY	1
3	0558 102 608	CENTER WIRE-GUIDE TUBE	1
3	0558 102 643	CENTER WIRE-GUIDE TUBE, ALUMINUM	1
4	(See "Roller & wire guide selection" section in Appendix)	OUTPUT WIRE-GUIDE TUBE	1
5	0558 102 609	MOTOR-GEAR SHAFT WOODRUFF KEY	1
6	0558 102 597	INLET QUAD WF	1
7	0558 102 605	DRIVEN GEAR ASSEMBLY	2
8	0558 102 606	DRIVE GEAR ASSEMBLY	1
9	(See "Roller & wire guide selection" section in Appendix)	WIRE-FEED ROLLERS	2
10	0558 102 600	WASHER FLAT M4 LARGE OD	3
11	0558 102 601	THUMB SCREW M4 X 10 X 8 KNURLED	1
12	0558 102 602	THUMB SCREW M4 X 10 KNURLED	2


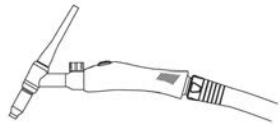

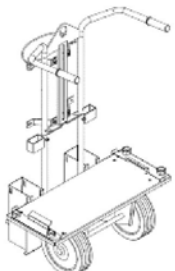


WEAR PARTS

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<b>Item</b>	<b>Ordering no.</b>	<b>Description</b>	<b>Qty</b>
13	0558 102 603	QUAD WF COVER	1
14	0558 102 604	THUMB SCREW M5 X 14 KNURLED	5



## ACCESSORIES

0458 401 880	<b>MIG torch:</b> PSF 305, 3 m (9.86 ft)	
0458 401 881	<b>MIG torch:</b> PSF 305, 4.5 m (14.75 ft)	
0700 300 857	<b>TIG torch:</b> TXH™ 202, 4 m (12 ft.) TIG torch c/w 8 pin plug	
W4 014 450	<b>Foot control:</b> Contactor on/off and current control with 4.5 m (14.74 ft) cable and 8-pin male plug	
0700 300 872	<b>Rebel single cylinder trolley</b> Accommodates 1 × 228.6 mm (9 in.) diameter cylinder	
0558 102 491	<b>Rebel single cylinder cart</b> Accommodates 1 × 228.6 mm (9 in.) diameter cylinder	
0558 102 492	<b>Rebel dual cylinder cart</b> Accommodates 2 × 228.6 mm (9 in.) diameter cylinders	

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## REPLACEMENT PARTS

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<b>Item</b>	<b>Ordering no.</b>	<b>Description</b>
1	0349 312 105	Gas hose, 4.5 m (15 ft.)
2	0700 006 901	Return welding cable kit, 3 m (10 ft.)
3	0700 006 900	MMA welding cable kit, 3 m (10 ft.)

## ROLLER & WIRE-GUIDE SELECTION

### Roller Selection

Item	Ordering no.	Description (Values = wire diameter)	Comment
<b>Feed roller for steel wire</b>			
1	0369 557 003	ROLLER, .040 (1.0) - .045 (1.2), V-SOLID	DEFAULT*
2	0369 557 002	ROLLER, .030 (.8) - .040 (1.0), V-SOLID	ACCESSORY**
3	0369 557 001	ROLLER, .024 (.6) - .030 (.8), V-SOLID	OPTIONAL FOR PURCHASE
4	0369 557 013	ROLLER, .052 (1.4) - .062 (1.6), V-SOLID	OPTIONAL FOR PURCHASE
<b>Feed roller for aluminum wires</b>			
5	0369 557 006	ROLLER, .040 (1.0) - .045 (1.2), ALUM (U-GROOVE)	OPTIONAL FOR PURCHASE
6	0369 557 011	ROLLER, .030 (0.8) - .040 (1.0), ALUM (U-GROOVE)	OPTIONAL FOR PURCHASE
* DEFAULT (size included in package)			
** ACCESSORY (optional size included with each model 255 or 320 unit)			

### Wire-Guide Selection

Item	Ordering no.	Description (Values = Inner diameter (ID) of tubes)	Comment
<b>Output wire-guide tube for steel wire</b>			
1	0464 652 880	TUBE, WIRE GUIDE .040 (1.0) - .045 (1.2), V-SOLID	DEFAULT*
2	0464 653 880	TUBE, WIRE GUIDE .030 (.8) - .040 (1.0), V-SOLID	ACCESSORY**
3	0464 657 880	TUBE, WIRE GUIDE .024 (.6), V-SOLID	OPTIONAL FOR PURCHASE
4	0464 658 880	TUBE, WIRE GUIDE .052 (1.4) - .062 (1.6), V-SOLID	OPTIONAL FOR PURCHASE
<b>Output wire-guide tubes for aluminum wires</b>			
5	0464 659 880	TUBE, WIRE GUIDE .040 (1.0), ALUM	OPTIONAL FOR PURCHASE
6	0464 660 880	TUBE, WIRE GUIDE .045 (1.2), ALUM	OPTIONAL FOR PURCHASE
7	0464 661 880	TUBE, WIRE GUIDE .052 (1.4) - .062 (1.6), ALUM	OPTIONAL FOR PURCHASE
* DEFAULT (size included in package)			
** ACCESSORY (optional size included with each model 255 or 320 unit)			



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<http://manuals.esab.com>



CE

