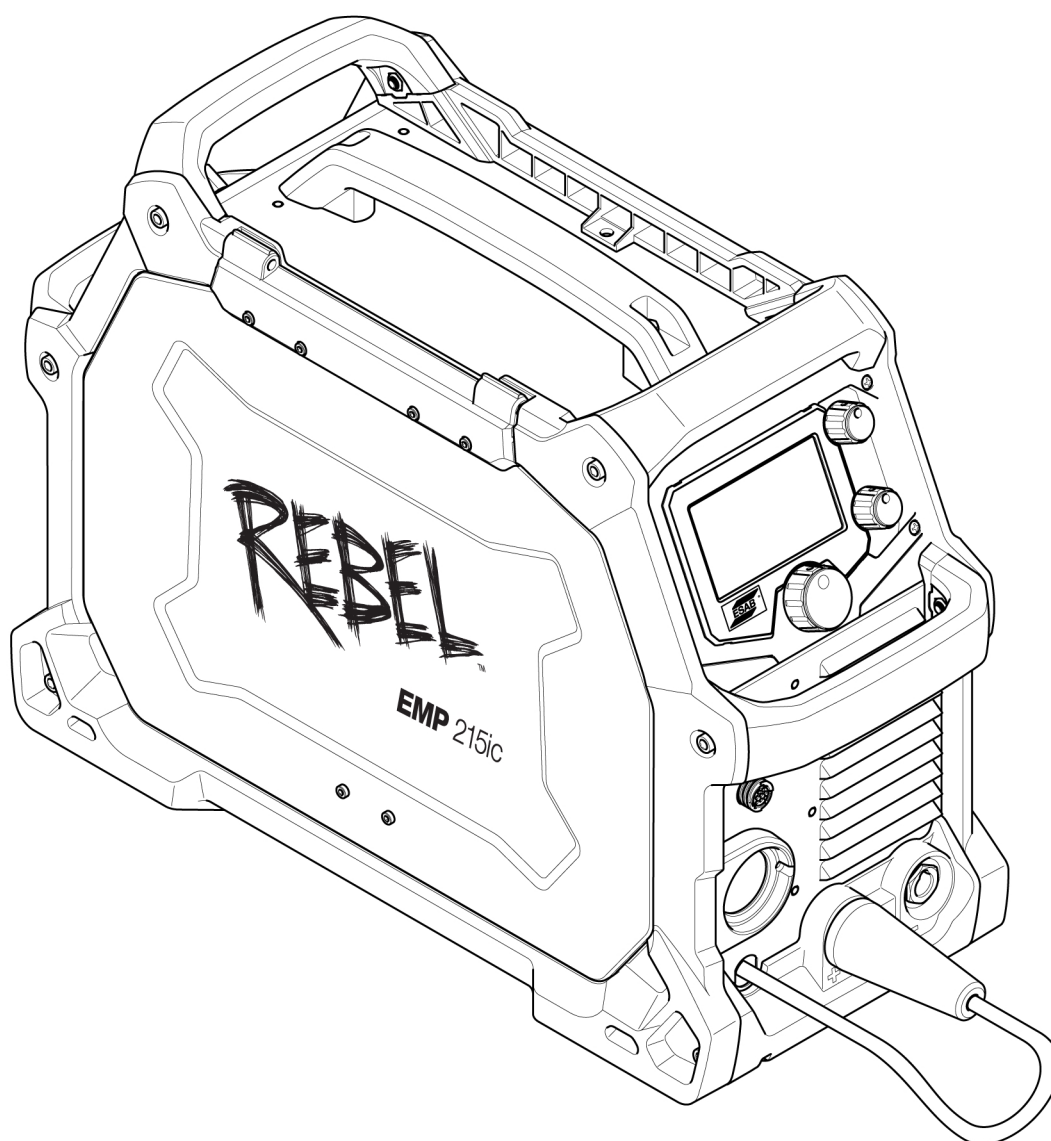


Rebel EMP 215ic



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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.
6. **WARNING:** This product when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and in some cases cancer (California Health & Safety Code §25249.5 et seq.)



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. Stop the engine or drive systems before installing or connecting a unit.
3. Have only qualified people remove covers for maintenance and troubleshooting as necessary

4. To prevent accidental starting of equipment during service, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing and tools away from moving parts.
6. Reinstall panels or covers and close doors when service is finished and before starting engine.



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!**

Wire feeders are intended to be used in GMAW (MIG/MAG) mode only.

If used in any other welding mode, such as SMAW (Stick), the welding cable between wire feeder and power source must be disconnected, or else the wire feeder becomes live or energized.

If equipped with ESAB cooler

Use ESAB approved coolant only. Non-approved coolant might damage the equipment and jeopardize product safety. In case of such damage, all warranty undertakings from ESAB cease to apply.

For ordering information, see the "ACCESSORIES" chapter in the instruction manual.

**WARNING!**

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

**ELECTRIC SHOCK - Can kill**

- 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 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 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 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 a fire. Therefore, make sure that 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.

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

PROTECT YOURSELF AND OTHERS!



CAUTION!

This product is solely intended for arc welding.

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.

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.

2 INTRODUCTION

The Rebel EMP 215ic product family is a new generation of Multi-Process (GMAW/Stick/GTAW) welding (EMP series) power sources.

The new series of 215ic power sources are designed to match the needs of the user. They are tough, durable and portable, providing excellent arc performance across a variety of welding applications.

The Rebel EMP 215ic family features a 4.3 in. (11 cm) color TFT user interface 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 a number of functions could be introduced and customized to give maximum flexibility.

Exclusive to ESAB, sMIG provides users with excellent short circuit transfer arc characteristics.

The Rebel EMP 215ic family connects to 120 V – 230 V, 1 ~ 50/60 Hz input power supplies, supplied by mains or generator power. Incorporating a PFC (Power Factor Correction) circuit significantly increases power efficiency.

Key features:

- Excellent GMAW/Stick characteristics
- Excellent multi-process welding capabilities
- Automatic recognition of input power with PFC (120 V – 230 V)
- Large 4.3 in. (11 cm) high resolution customizable user interface
- Rugged case design and internal hardware
- Portable
- High grade cast aluminum wire drive system provides excellent control of drive roll geometry ensuring smooth, precise wire feeding
- Professional high grade accessories

2.1 Equipment

Package consists of the following:

Rebel EMP 215ic full package

- Power source
- Tweco Fusion™ 180 GMAW gun with 10 ft (3 m) cable, 0.023 in (0.6 mm), 0.030 in (0.8 mm), 0.035 in (0.9 mm), Tips & Allen Key
- ESAB Heliarc 17 V GTAW torch with accessories
- Victor® Flow Meter with 10 ft (3 m), gas hose
- Tweco® 200 A electrode holder and lead assembly
- Tweco® 200 A work clamp and lead assembly
- OK AristoRod 12.50 0.030 in. (0.8 mm), 1 kg
- Feed roll 0.023 in./0.030 in. (0.6/0.8 mm), V fitted
- Feed roll 0.023 in./0.035 in. (0.6/0.9 mm), V (Spare)
- Feed roll 0.030 in./0.035 in. (0.8/0.9 mm), VK (Spare)
- Thickness gauge
- Power adapter (230 V – 120 V, 15 A)
- Safety manual
- USB stick including manuals
- Weld parameter chart
- Quick start guide

3 TECHNICAL DATA

	Rebel EMP 215ic	
Voltage	120 V, 1 ~ 50/60 Hz	230 V, 1 ~ 50/60 Hz
Primary current		
I_{\max} GMAW - MIG	Breaker 20 A: 28.6 A Breaker 15 A: 20.8 A	30 A (27.6 A at 25% duty cycle)
I_{\max} GTAW - TIG	Breaker 15 A: 20.8 A	19 A
I_{\max} SMAW - Stick	Breaker 15 A: 20.8 A	25 A
I_{eff} GMAW - MIG	Breaker 20 A: 18.0 A Breaker 15 A: 14.7 A	14 A
I_{eff} GTAW - TIG	Breaker 15 A: 14.7 A	10 A
I_{eff} SMAW - Stick	Breaker 15 A: 14.7 A	13 A
Permissible load at GMAW - MIG		
100% duty cycle	Breaker 15 A: 75 A / 17.75 V Breaker 20 A: 90 A / 18.5 V	110 A / 19.5 V
60% duty cycle	Breaker 15 A: 90 A / 18.5 V Breaker 20 A: 110 A / 19.5 V	125 A / 20.25 V
40% duty cycle	Breaker 15 A: 100 A / 19 V	150 A / 21.5 V
25% duty cycle	-	205 A / 24.25 V
20% duty cycle	Breaker 20 A: 130 A / 20.5 V	-
15% duty cycle	-	235 A / 26 A
Setting range (DC)	15 A / 14.75 V – 130 A / 20.5 V	15 A / 14.75 V – 235 A / 26.0 V
Permissible load at GTAW - TIG		
100% duty cycle	100 A / 14 V	110 A / 14.4 V
60% duty cycle	120 A / 14.8 V	125 A / 15 V
40% duty cycle	130 A / 15.2 V	-
30% duty cycle	-	180 A / 17.2 V
20% duty cycle	-	200 A / 18 V
Setting range (DC)	5 A / 10.2 V – 130 A / 15.2 V	5 A / 10.2 V – 200 A / 18 V
Permissible load at SMAW - Stick		
100% duty cycle	65 A / 22.6 V	100 A / 24 V
60% duty cycle	80 A / 23.2 V	125 A / 25 V
40% duty cycle	85 A / 23.4 V	-
25% duty cycle	-	180 A / 27.2 V
20% duty cycle	130 A / 25.2 V	-
Setting range (DC)	6 A / 20.6 V – 130 A / 25.2 V	16 A / 20.6 V – 180 A / 27.2 V
Open circuit voltage (OCV)		
VRD deactivated	52 V	52 V

	Rebel EMP 215ic	
VRD activated	35 V	35 V
Idle power	21 W	21 W
Efficiency	83.6 %	83.6 %
Power factor	0.99	0.98
Wire feed speed	80–475 in./min (2–12.1 m/min)	80–475 in./min (2–12.1 m/min)
Wire diameter		
Mild steel solid wire	0.023–0.035 in. (0.6–0.9 mm)	0.023–0.035 in. (0.6–0.9 mm)
Stainless steel solid wire	0.030–0.035 in. (0.8–0.9 mm)	0.030–0.035 in. (0.8–0.9 mm)
Flux cored wire	0.030–0.045 in. (0.8–1.1 mm)	0.030–0.045 in. (0.8–1.1 mm)
Aluminum	0.030–3/64 in. (0.8–1.2 mm)	0.030–3/64 in. (0.8–1.2 mm)
Spool size	Ø 4– 8 in. (100–200 mm)	Ø 4– 8 in. (100–200 mm)
Dimensions l×w×h	23 × 9 × 16 in. (548 × 229 × 406 mm)	23 × 9 × 16 in. (548 × 229 × 406 mm)
Weight	42 lb (19.1 kg)	42 lb (19.1 kg)
Operating temperature	14 to 104 °F (-10 to +40 °C)	14 to 104 °F (-10 to +40 °C)
Enclosure class	IP23S	IP23S
Application classification	S	S

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 104 °F (40 °C) or below.

Enclosure class

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

Equipment marked **IP23S** is intended for indoor and outdoor use; however, it should not be operated in precipitation.

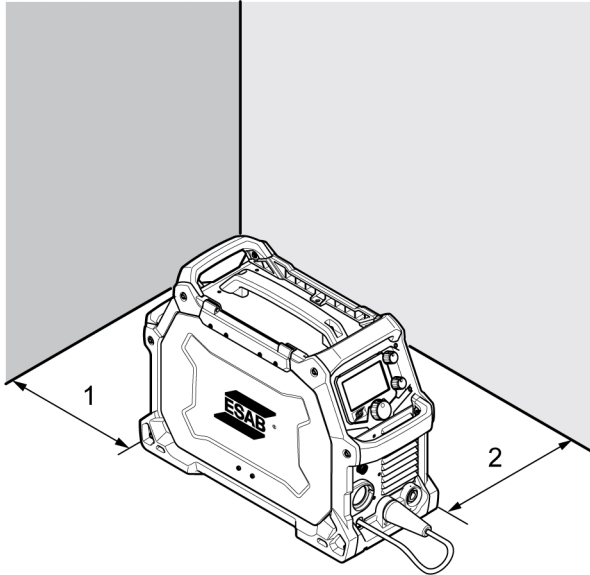
Application class

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

4 INSTALLATION

4.1 Location

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

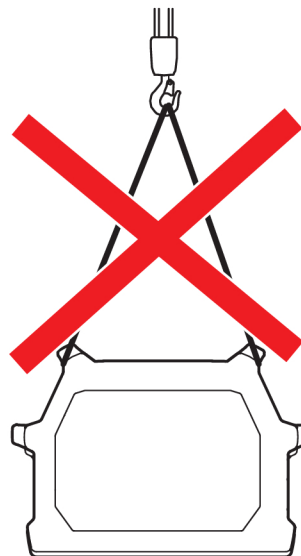
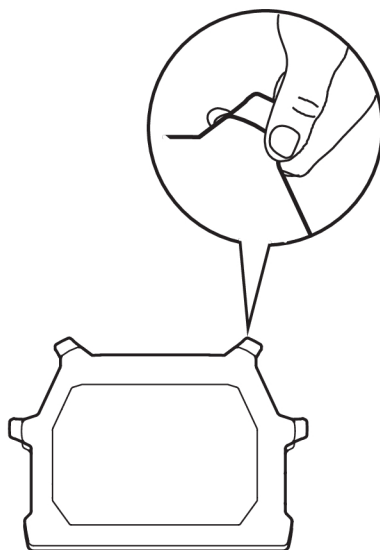


1. 4 in. (100 mm)

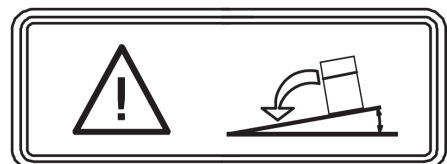
2. 4 in. (100 mm)

4.2 Lifting instructions

The power source can be lifted using any of the handles.



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



4.3 Electrical supply

The supply voltage should be 120 V AC $\pm 10\%$ or 230 V $\pm 10\%$. Too low of supply voltage may cause poor welding performance. Too high of welding supply voltage will cause components to overheat and possibly fail. Contact the local electric utility for information about the type of electrical service available, how proper connections should be made, and inspection required.

The Welding power source must be:

- Correctly installed, if necessary, by a qualified electrician.
- Correctly grounded (electrically) in accordance with local regulations.
- Connected to the correct size power point and fuse as indicated in table below.



WARNING!

Do not connect an input (WHITE or BLACK) conductor to the ground terminal.

Do not connect the ground (GREEN/YELLOW) conductor to an input line terminal.



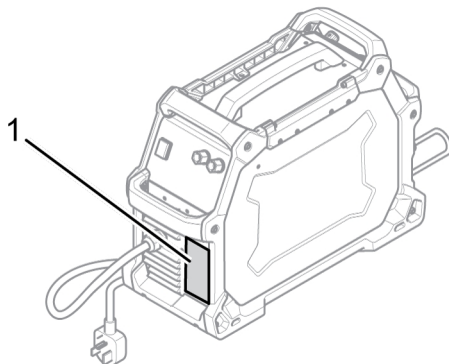
NOTE!

Use the welding power source in accordance with the relevant national regulations.



CAUTION!

Disconnect input power and secure employing 'Lock-out' / 'Tagging' procedures. Ensure input power line disconnect switch is locked (Lock-out/Tagging) in the 'Open' position BEFORE removing input power fuses. Connection/Disconnect should be carried out by competent persons.



1. Rating plate with supply connection data

4.3.1 Recommended fuse sizes and minimum cable area



WARNING!

An electrical shock or fire hazard is probable if the following electrical service guide recommendations are not followed. These recommendations are for a dedicated branch circuit sized for the rated output and duty cycle of the welding power source.

	120 – 230 V, 1 ~ 50/60 Hz	
Supply voltage	120 V AC	230 V AC
Input current at maximum output	30 A	30 A
Maximum recommended fuse* or circuit breaker rating *Time delay fuse UL class RK5, refer to UL 248	30 A	30 A
Maximum recommended fuse* or circuit breaker rating *Normal operating UL class K5, refer to UL 248	50 A	50 A

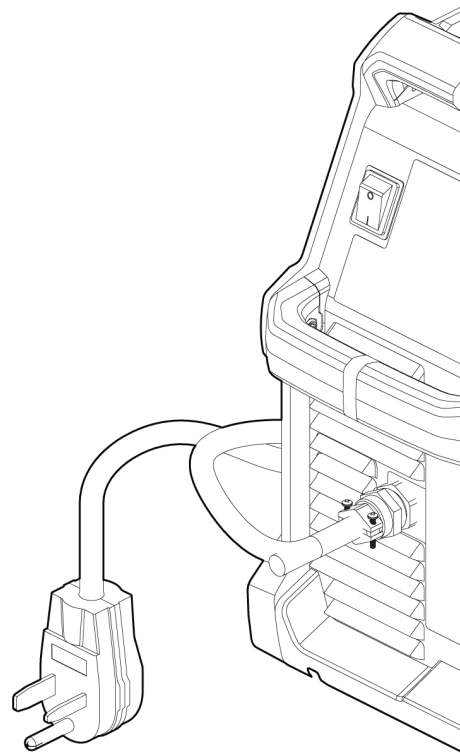
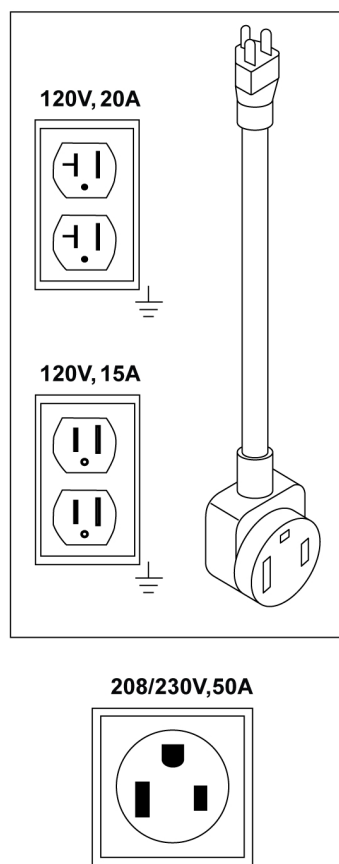
	120 – 230 V, 1 ~ 50/60 Hz	
Minimum recommended cord size	12 AWG (4 mm ²)	12 AWG (4 mm ²)
Maximum recommended extension cord length	25 ft (8 m)	50 ft (15 m)
Minimum recommended grounding conductor size	12 AWG (4 mm ²)	12 AWG (4 mm ²)

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 8 kW rated power, are recommended.

4.3.2 Connecting the power source to input supply

Use one of the supplied adapters to connect the power source to mains.



5 OPERATION

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



NOTE!

When moving the equipment, use the handle. Never pull on the cables.



WARNING!

Rotating parts can cause injury, take great care.



WARNING!

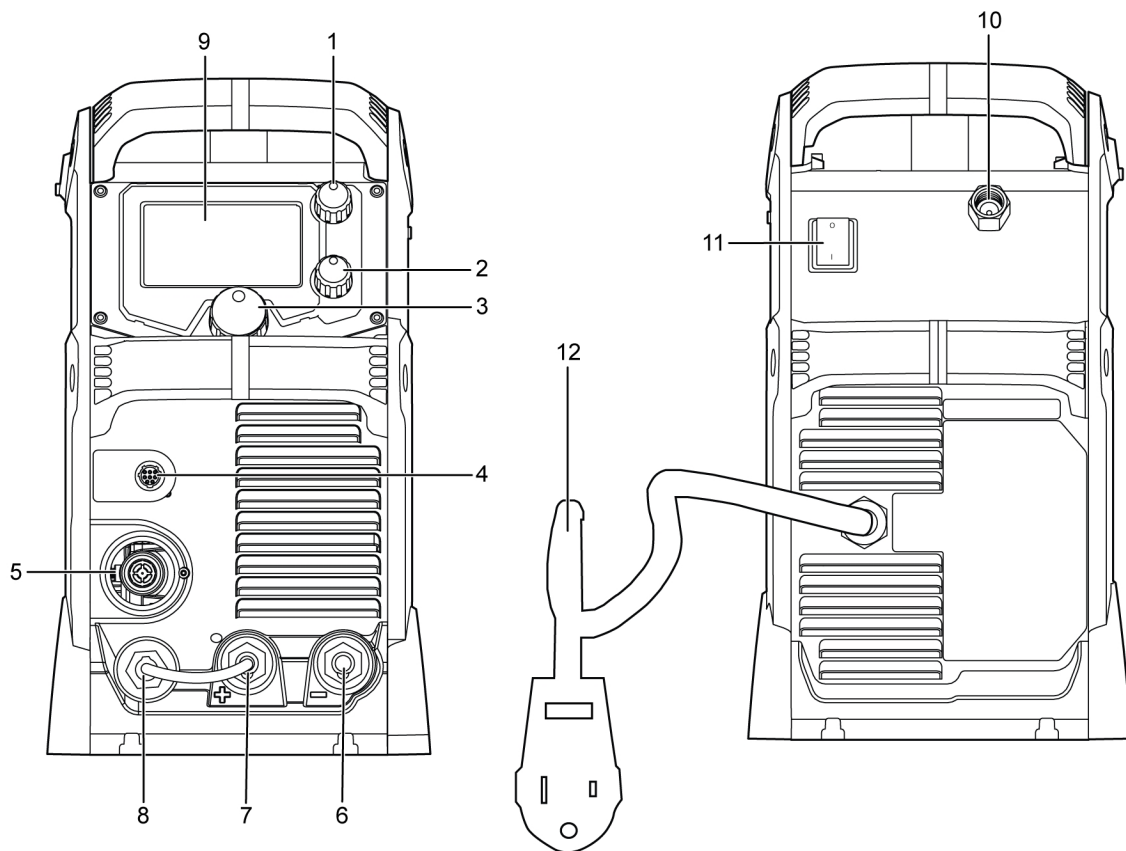
Electric shock! Do not touch the workpiece or the welding head during operation!



WARNING!

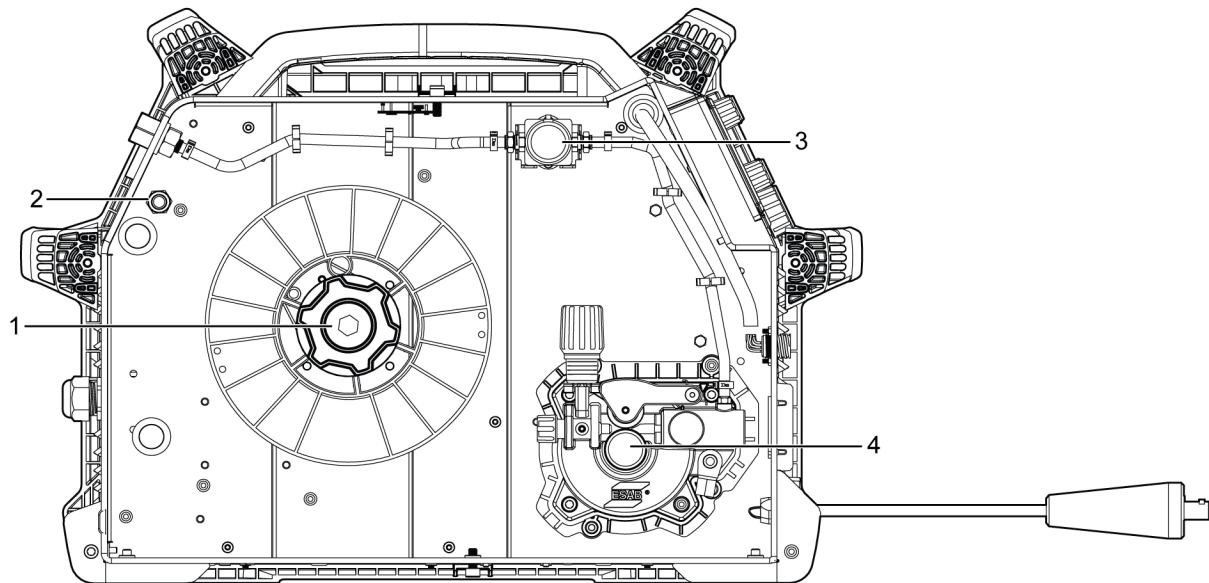
Make sure that the side covers are closed during operation.

5.1 Connections and control devices



- | | |
|--|------------------------------|
| 1. Knob for current or wire feed speed selection | 7. Positive output [+] |
| 2. Knob for voltage selection | 8. Polarity changeover cable |
| 3. Main knob for menu navigation | 9. Display |
| 4. Torch/remote control connection | 10. Gas inlet for GMAW |
| 5. Torch connection | 11. Main power switch ON/OFF |
| 6. Negative output [-] | 12. Main power cable |

Drive system diagram



- | | |
|-----------------------|-------------------------------|
| 1. Spool hub assembly | 3. GMAW Solenoid gas assembly |
| 2. Circuit breaker | 4. Wire feeder mechanism |

5.2 Connecting welding and return cables

The power source has two outputs for connecting welding and return cables: a negative [-] terminal (6) and a positive [+] terminal (7), see "Connections and control devices" section.

The polarity changeover cable is used to select the correct polarity for the weld output. The correct polarity is determined by the wire that has been selected to complete the weld.

To configure the machine to operate with electrode positive, see the following instructions.

- 1) Insert and secure the polarity changeover cable into the positive [+] terminal.
- 2) Insert and secure the return lead into the negative [-] terminal.
- 3) Make sure that the connections are tight.
- 4) Secure the work clamp to the work piece in a clean, debris-free location.

5.2.1 For GMAW (MIG) process

For GMAW process, the output to which the welding cable is connected depends on type of electrode (solid wire/flux cored).

Solid wire - Connect the polarity changeover cable to positive OKC.

Flux cored - Connect the polarity changeover cable to negative OKC.

**NOTE!**

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

5.2.2 For Stick (SMAW) process

For Stick process, the output to which the welding cable is connected depends on type of electrode. Refer to electrode packaging for information relating to the correct electrode polarity.

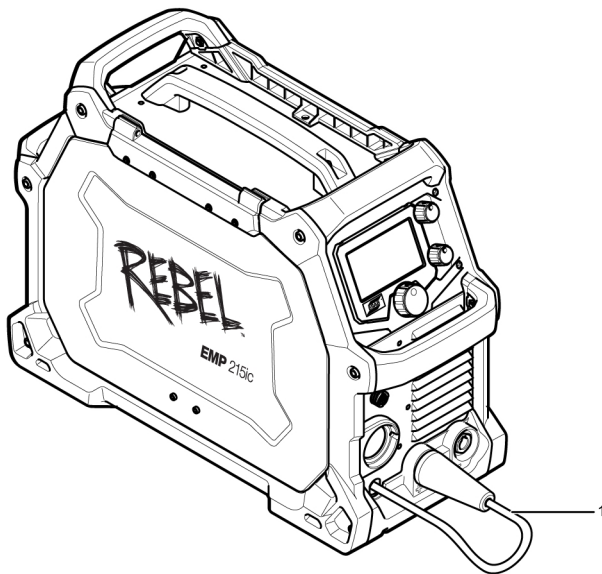
Disconnect the polarity changeover cable from the terminals, connect the electrode holder to OKC positive and return cable to OKC negative. Secure the return cable's contact clamp to the work piece and ensure that there is good electrical contact.

5.2.3 For GTAW process

For GTAW process, connect the GTAW torch power cable to the negative [-] terminal (7), see illustration. Connect the work return lead to the return-cable terminal positive output [+] (7). Connect the torch connector to the negative output [-] (6) (see "Connections and control devices" section).

5.3 Polarity change

Polarity changeover connections



1. Polarity changeover cable (not connected in Stick or GTAW modes)

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 Spool hub assembly

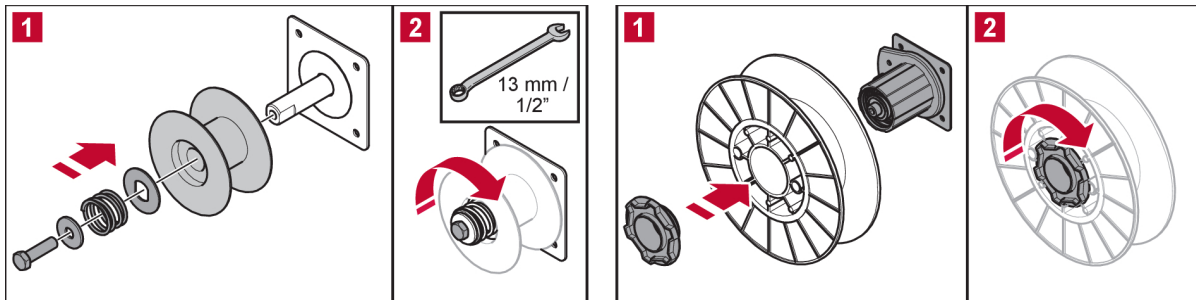


WARNING!

Tighten the spool hub locking nut in order to prevent it from sliding off the hub.

4 in. (100 mm)

8 in. (200 mm)



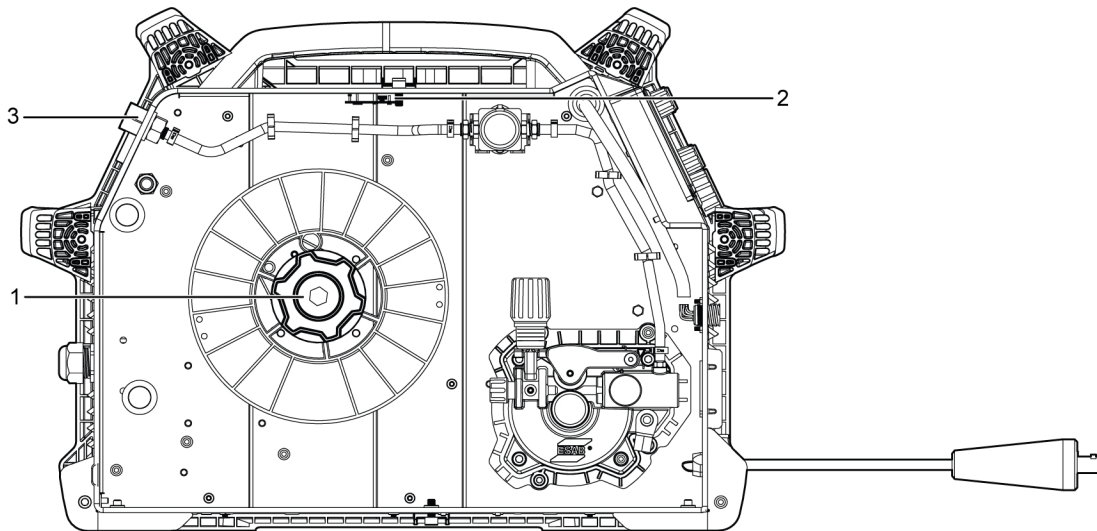
5.5 Inserting and replacing wire



NOTE!

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

The Rebel EMP 215ic will accept smaller spool sizes of 100 mm (4 in.) and 200 mm (8 in.). See "TECHNICAL DATA" chapter for suitable wire dimensions for each wire type.



1. Brake hub kit
2. LED wire harness assembly
3. Gas connection



WARNING!

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



WARNING!

Risk of crushing or pinching when replacing the wire spool! Do not use safety gloves when inserting the welding wire between the feed rollers.



NOTE!

Make sure the correct feed/pressure rollers are used. For more information see "WEAR PARTS" chapter of this manual.

**NOTE!**

Remember to use the correct contact tip in the welding torch for the wire diameter used. The torch is fitted with a contact tip for 0.8 mm (0.030 in.) wire. If you use another diameter you must change the contact tip and drive roll. The wire liner fitted in the torch is recommended for welding with Fe and SS wires.

5.5.1 Installing wire

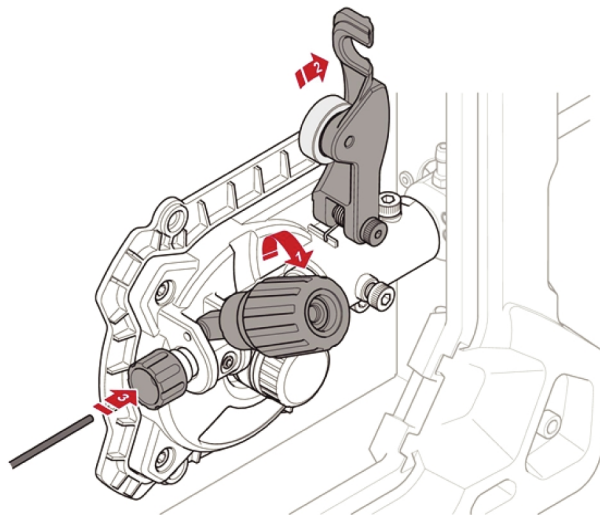
- 1) Turn power to the unit OFF
- 2) Open the side cover.
- 3) Release the pressure roller arm by pushing the tension screw toward you (1).
- 4) Lift the pressure roller arm up (2).

**CAUTION!**

Hold GMAW welding wire tightly to prevent it from unraveling.

- 5) With the GMAW welding wire feeding from the bottom of the spool pass the electrode wire through the inlet guide (3), between the rollers, through the outlet guide and into the GMAW gun.
- 6) Re-secure the pressure roller arm and wire drive tension screw and adjust the pressure if necessary.
- 7) Turn power to the unit ON.
- 8) With the GMAW gun lead reasonably straight, feed the wire through the GMAW gun by depressing the trigger switch.
- 9) Close the side cover.

Wire-feed mechanism



5.5.2 Removing wire

- 1) Turn power to the unit OFF.
- 2) Cut off end of GMAW welding wire protruding from torch.
- 3) Open the side cover.

- 4) Release the pressure roller arm by pushing the tension screw toward you (1).
- 5) Lift the pressure roller arm up (2).

**CAUTION!**

Hold GMAW welding wire tightly to prevent it from unraveling.

- 6) Rewind wire onto spool by manually turning the spool clock-wise. Once wire is fully re-wound onto spool, secure the end to the spool to prevent unraveling.
- 7) Close the side cover.

5.6 Welding with aluminum wire

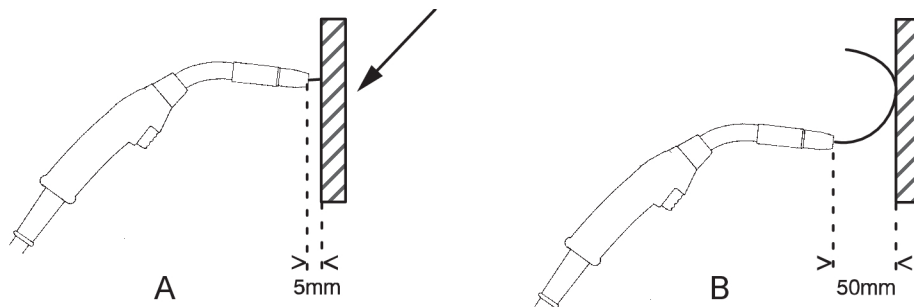
**NOTE!**

After completing the instructions in this section return to Section 5.5.1 "Installing wire", page 22 and Section 5.5.2 "Removing wire", page 22.

To weld aluminum using the standard supplied torch, refer to GMAW gun instruction manual for replacing standard steel torch conduit liner with a Teflon® torch conduit liner.

- Rebel EMP 215ic uses torch model: Tweco Fusion™ 180 GMAW gun with 10 ft (3 m) cable.
- To weld with aluminum wire, use optional spool gun for the best result.

5.7 Setting the wire feed pressure



- 1) Make sure that the wire moves smoothly through the wire guide.
- 2) Set the pressure of the wire feeder's pressure rollers. It is important that the pressure is not too high.
- 3) To check that the feed pressure is set correctly, feed out the wire against an insulated object, e.g. a piece of wood.
 - When you hold the welding torch approximately 1/4 in. (6 mm) from the piece of wood (illustration A) the feed rollers should slip.
 - When you hold the welding torch approximately 2 in. (50 mm) from the piece of wood, the wire should be fed out and bend (illustration B).

The wire reel hub incorporates a friction brake which is adjusted during manufacture for optimum braking. If necessary, tighten the brake by turning the tension nut inside the open end of the hub clockwise. Correct adjustment results in the wire reel circumference continuing no further than 1/8 in.-3/16 in. (3-5 mm) after release of the trigger.

The electrode wire should be slack without becoming dislodged from wire spool.

5.8 Changing the feed/pressure rollers

Three dual groove feed rollers are supplied as standard. Change the feed roller to match the filler metal type and wire diameter.



NOTE!

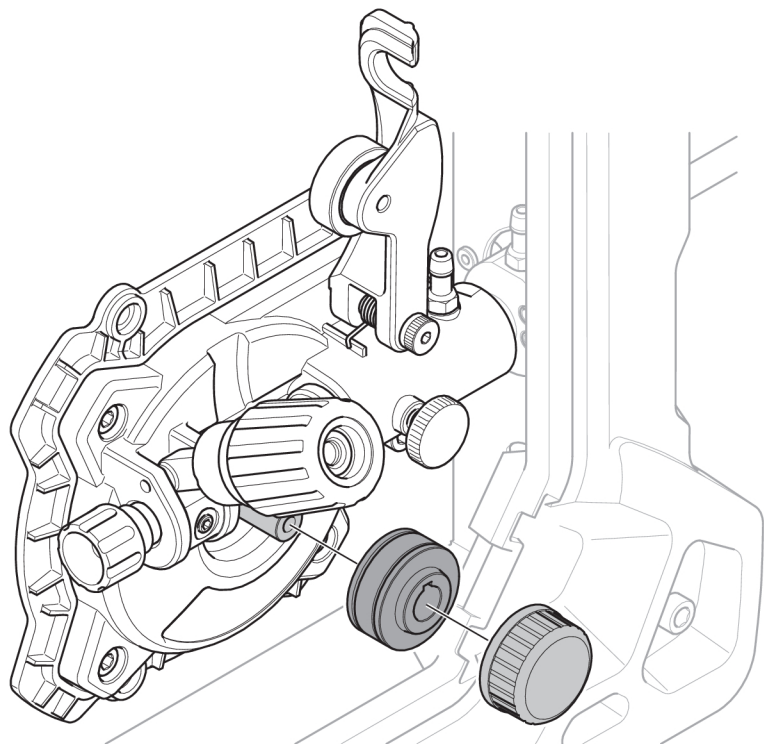
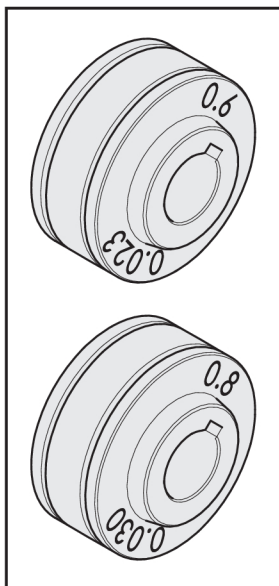
Be sure not to lose the key that is located on the drive motor shaft. This key must be in place and align with drive roll slot for proper operation.

- 1) Open the spool side door.
- 2) Release the pressure roller arm by levering the tension screw.
- 3) Lift the pressure roller arm.
- 4) Remove the feed roll retaining screw by turning it counterclockwise.
- 5) Change the feed roll.
- 6) Tighten the feed roll retaining screw by turning it clockwise.
- 7) Secure the pressure roller arm and wire drive tension screw.
- 8) Close the spool side door.



NOTE!

Visual indication on the face of the drive roll indicates the diameter of the groove on the outside of the drive roll and the groove that is in use for the selected wire diameter.



5.9 Shielding gas

The choice of suitable shielding gas depends on the material. Typically mild steel is welded with mixed gas (Ar + CO₂) or 100% carbon dioxide (CO₂). Stainless Steel can be welded with mixed gas (Ar +

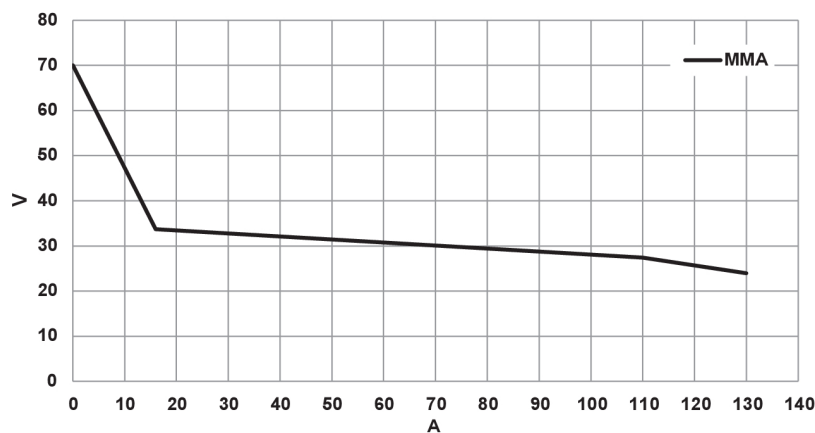
CO₂) or Trimix (He + Ar + CO₂). Aluminum and silicon bronze use pure argon gas (Ar). In the sMIG mode (see "sMIG mode basic" section of this manual) the optimal welding arc with the gas you use will be automatically set.

5.10 Volt-Ampere curves

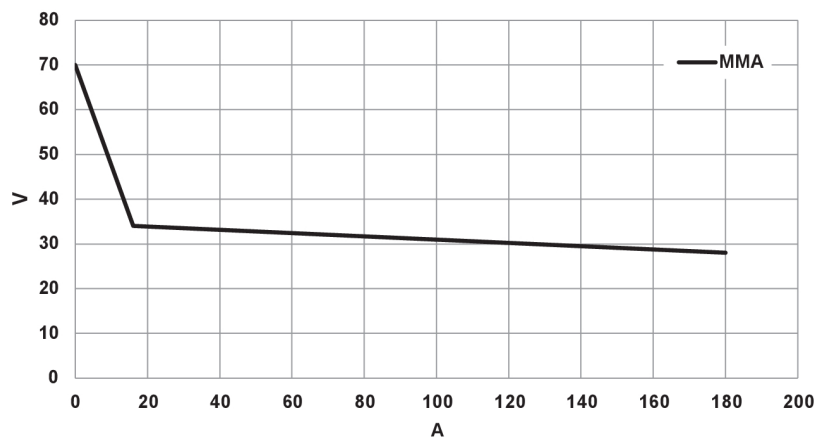
The curves below show the maximum voltage and amperage output capabilities of the power source for three common welding process settings. Other settings result in curves that fall between these curves.

A=Welding current, V=Output voltage

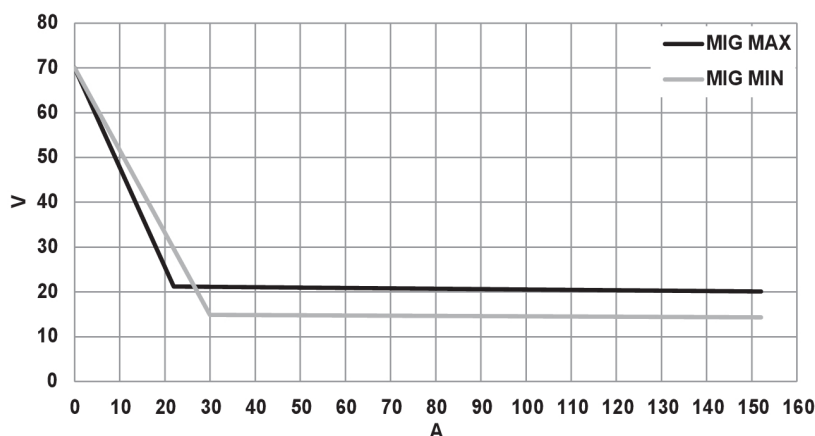
SMAW (Stick) 120 V

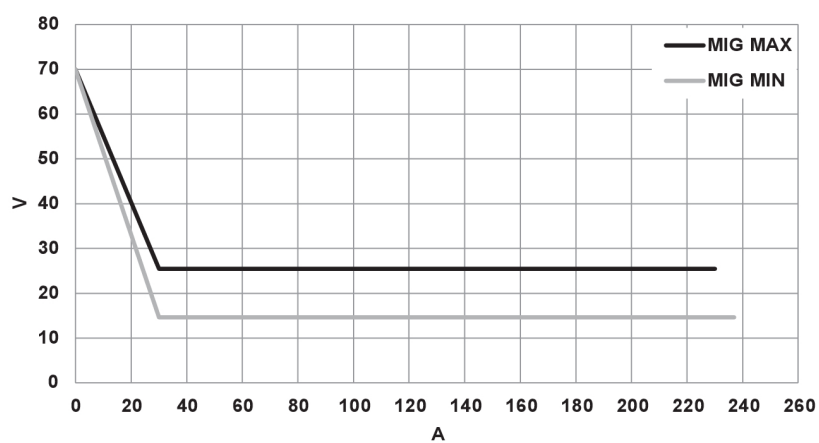
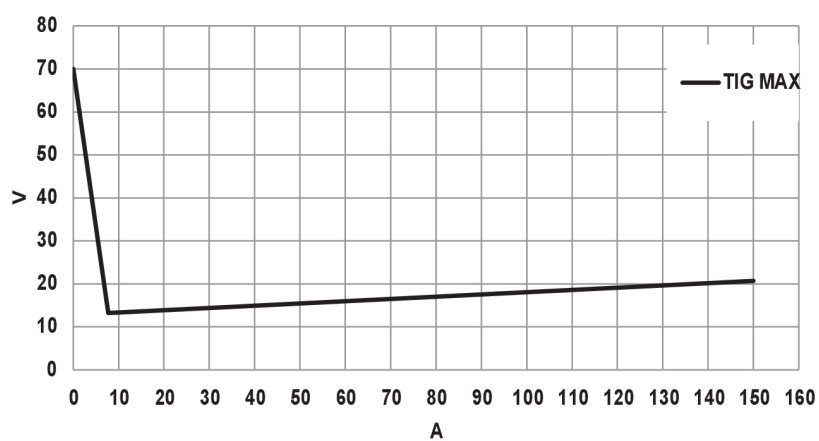
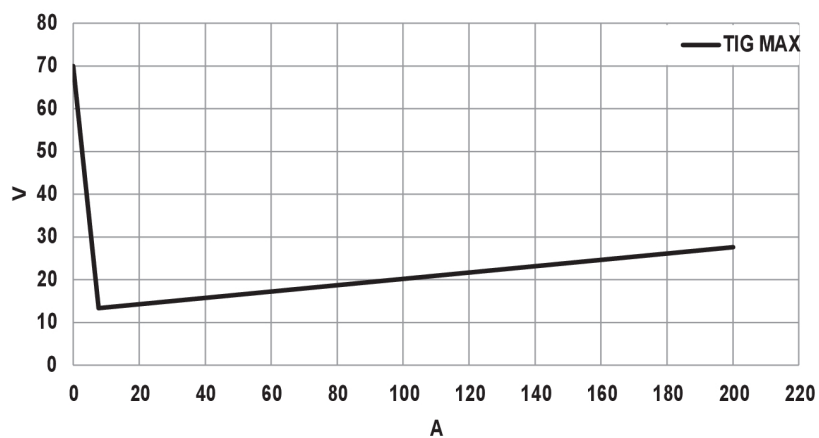


SMAW (Stick) 230 V



GMAW (MIG) 120 V

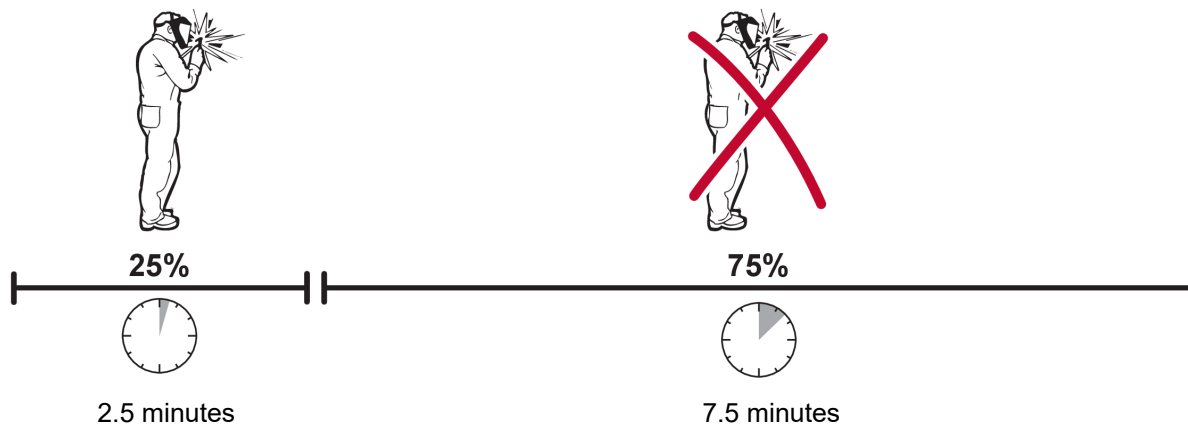


GMAW (MIG) 230 V**GTAW (TIG) 120 V****GTAW (TIG) 230 V**

5.11 Duty cycle

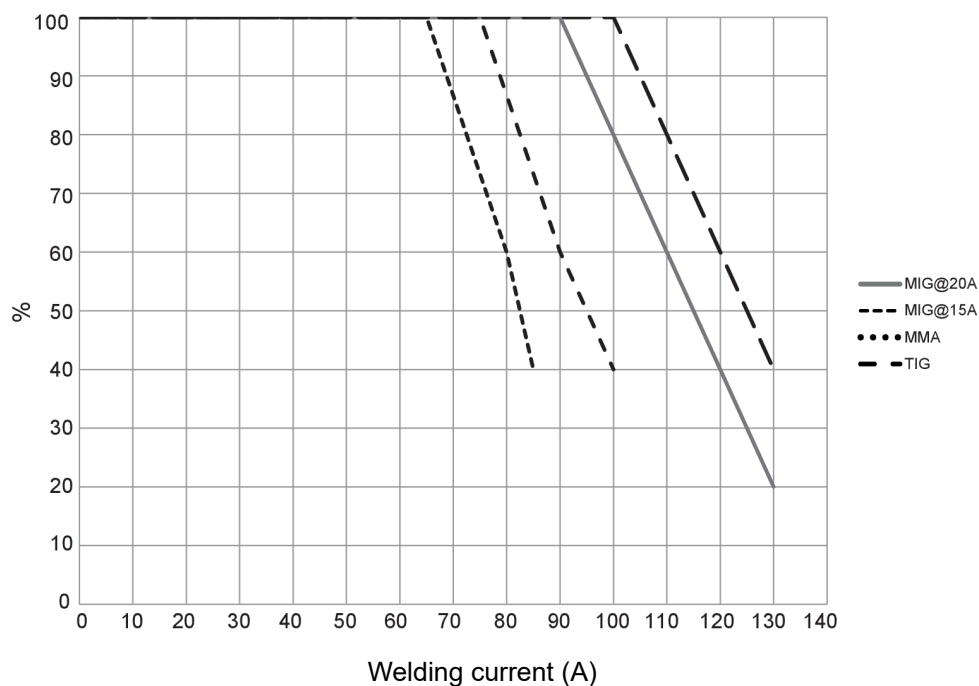
The Rebel EMP 215ic has a welding current output of 205 A at 25% duty cycle (230 V). A self-resetting thermostat will protect the power source if the duty cycle is exceeded.

Example: If the power source operates at a 25% duty cycle, it will provide the rated amperage for a maximum of 2.5 minute out of every 10 minute period. The remaining time, 7.5 minutes, the power source must be allowed to cool down.

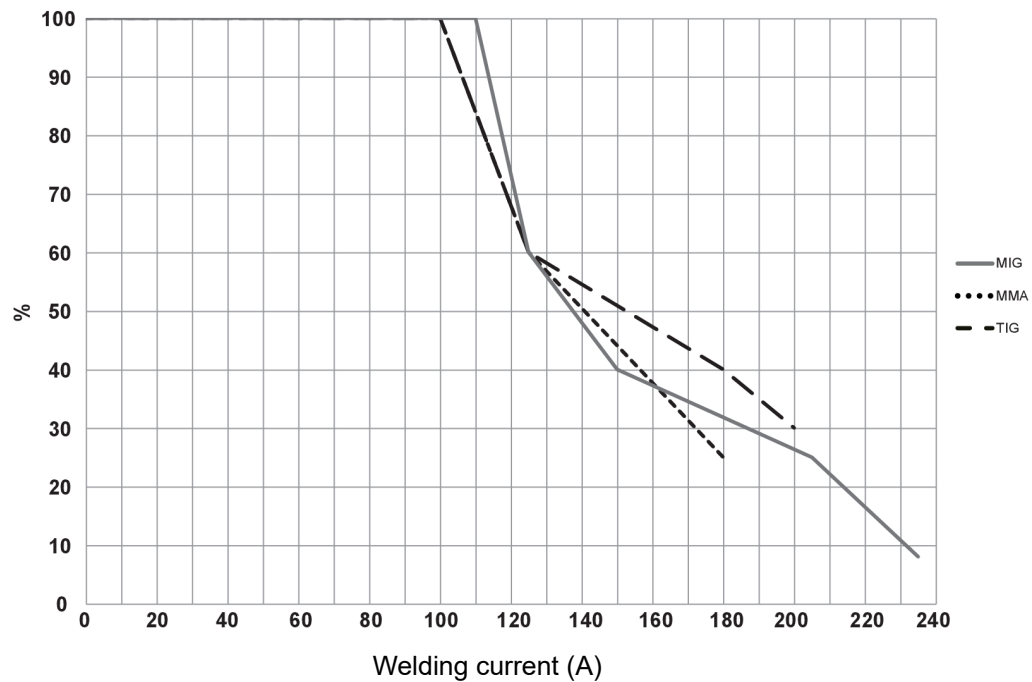


A different combination of duty cycle and welding current can be selected. Use the graphs below to determine the correct duty cycle for a given welding current.

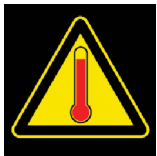
Duty cycle on 120 V AC



Duty cycle on 230 V AC



5.12 Overheating protection



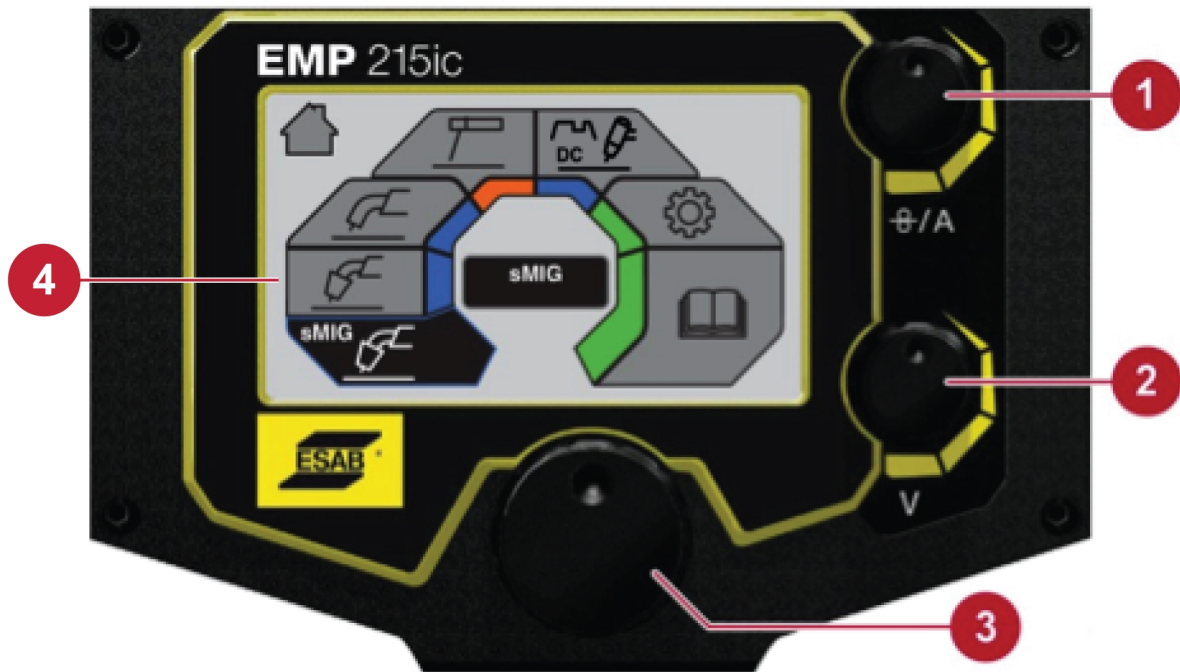
The welding power source has overheating protection that operates if the internal temperature becomes too high. When this occurs the welding current is interrupted and an overheating symbol appears in the display.

The overheating protection resets automatically when the temperature has returned to normal working temperature.

6 USER INTERFACE

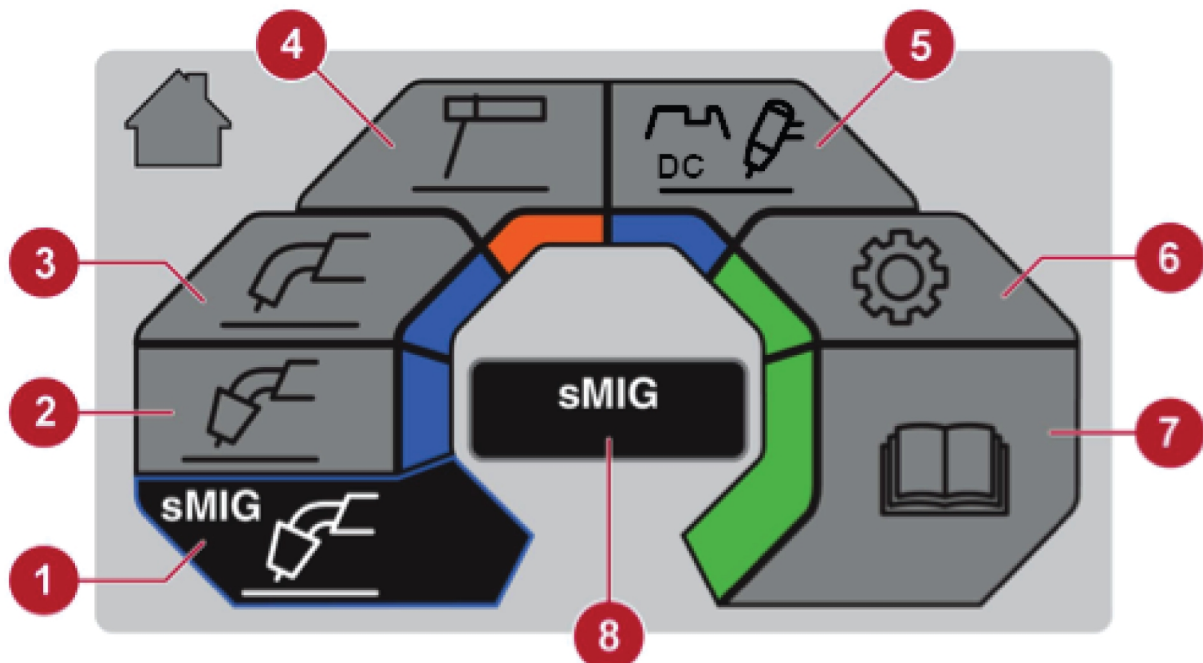
6.1 How to navigate

After power on has completed the main menu appears on the control panel.



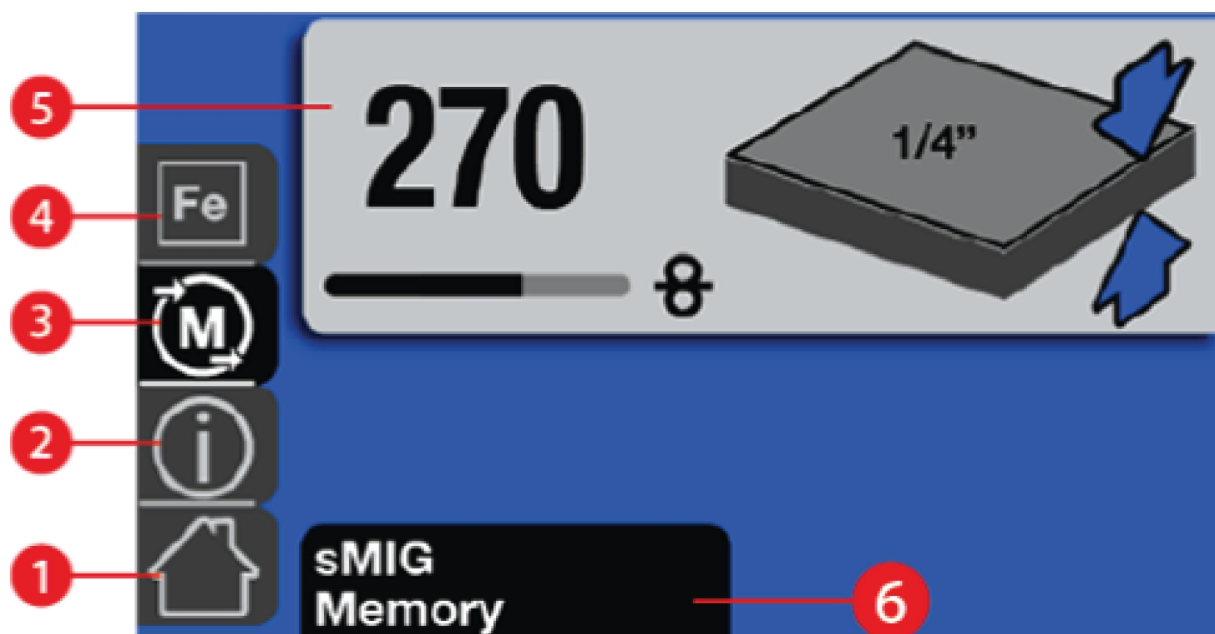
- | | |
|---|--|
| 1. Current / Wire feed speed adjustment | 3. Menu navigation. Rotate and push to select menu option. |
| 2. Voltage adjustment | 4. Display - Home view |

6.1.1 Home screen



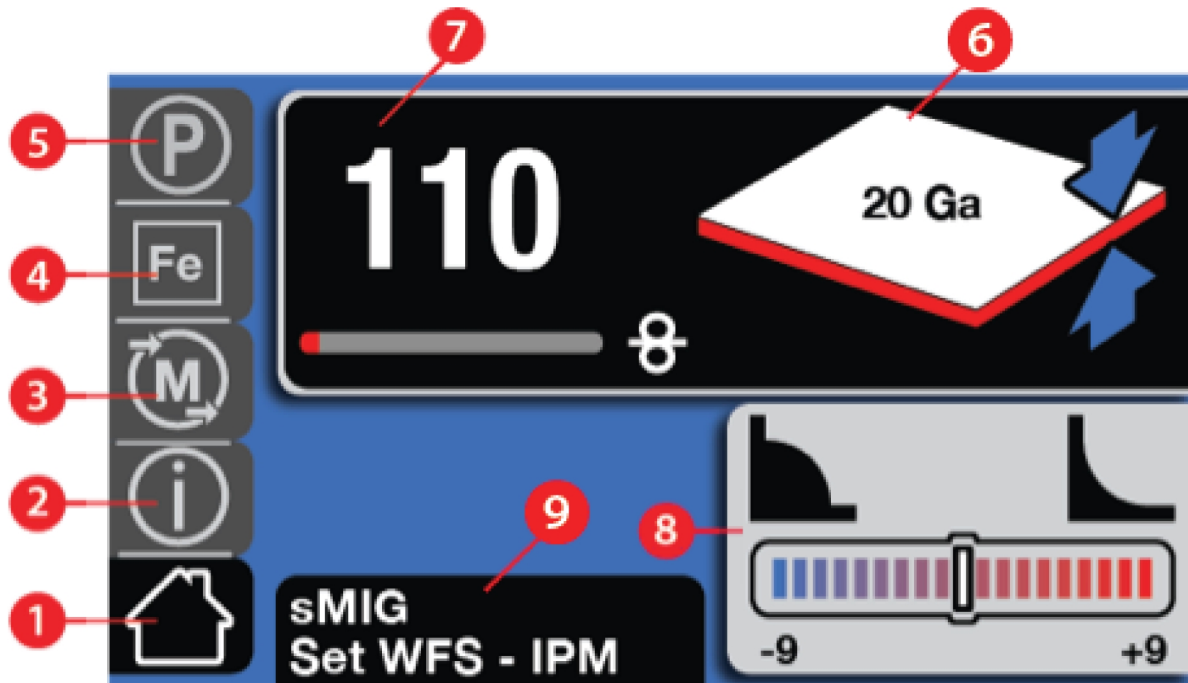
- | | |
|-------------------------|----------------------------|
| 1. sMIG mode | 5. DC-GTAW mode |
| 2. Manual GMAW mode | 6. Settings |
| 3. Flux cored wire mode | 7. User manual information |
| 4. Stick mode | 8. Dialogue box |

6.1.2 sMIG mode basic



- | | |
|--------------------------|----------------------------|
| 1. Home selection | 4. Material selection |
| 2. Information selection | 5. Wire feed speed display |
| 3. Memory selection | 6. Dialogue box |

sMIG mode advanced

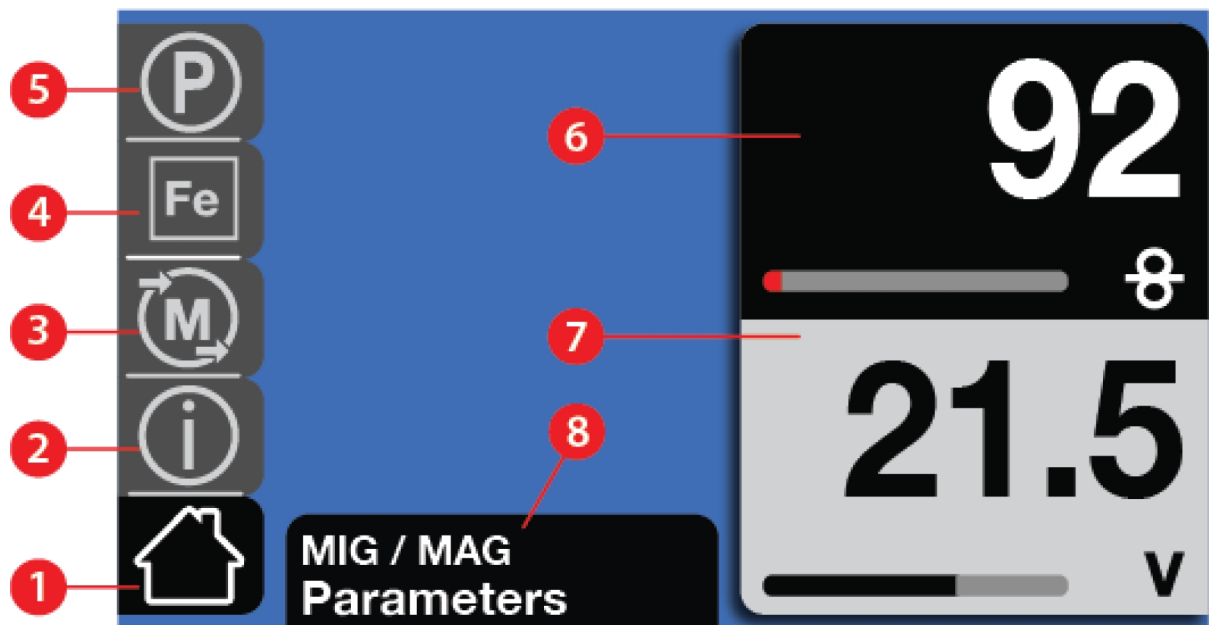


- | | |
|--------------------------|------------------------------------|
| 1. Home selection | 6. Material thickness |
| 2. Information selection | 7. Wire feed speed display |
| 3. Memory selection | 8. Arc dynamics adjustment display |
| 4. Material selection | 9. Dialogue box |
| 5. Parameter selection | |

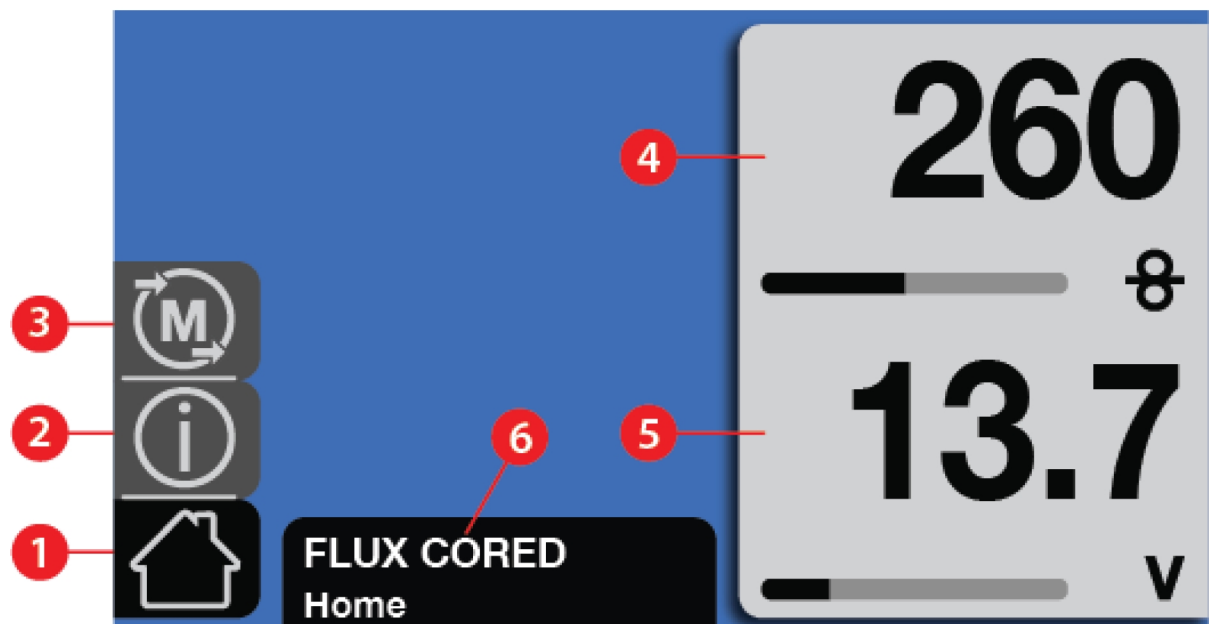
6.1.3 Manual GMAW basic mode



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

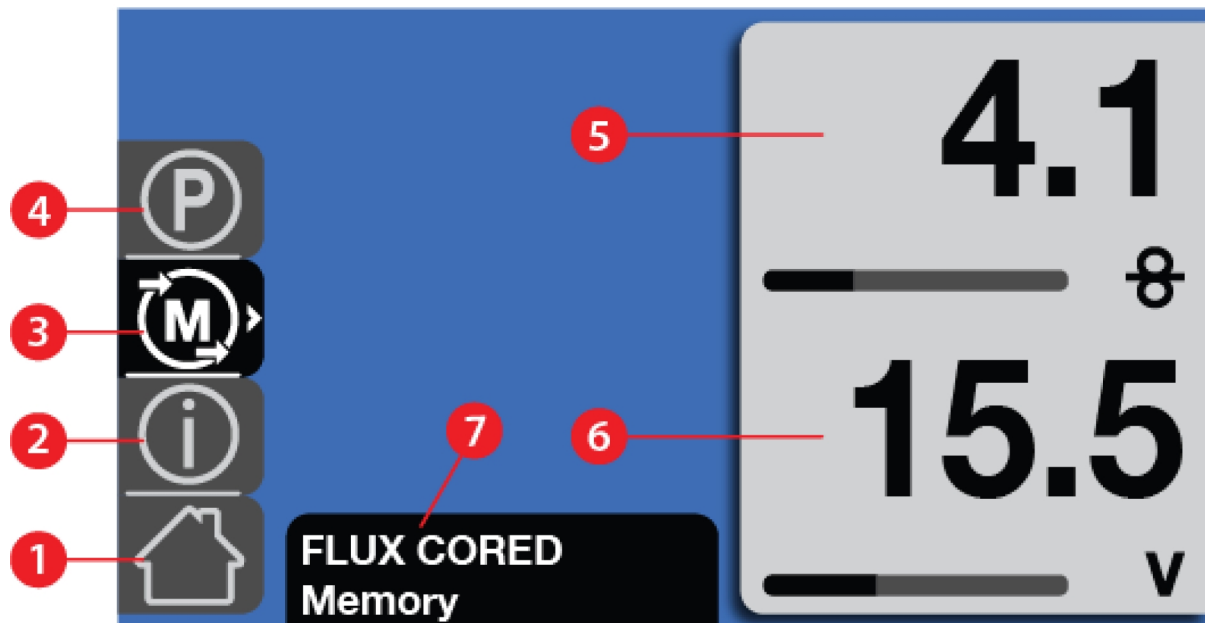
Manual GMAW advanced mode

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

6.1.4 Flux cored basic mode

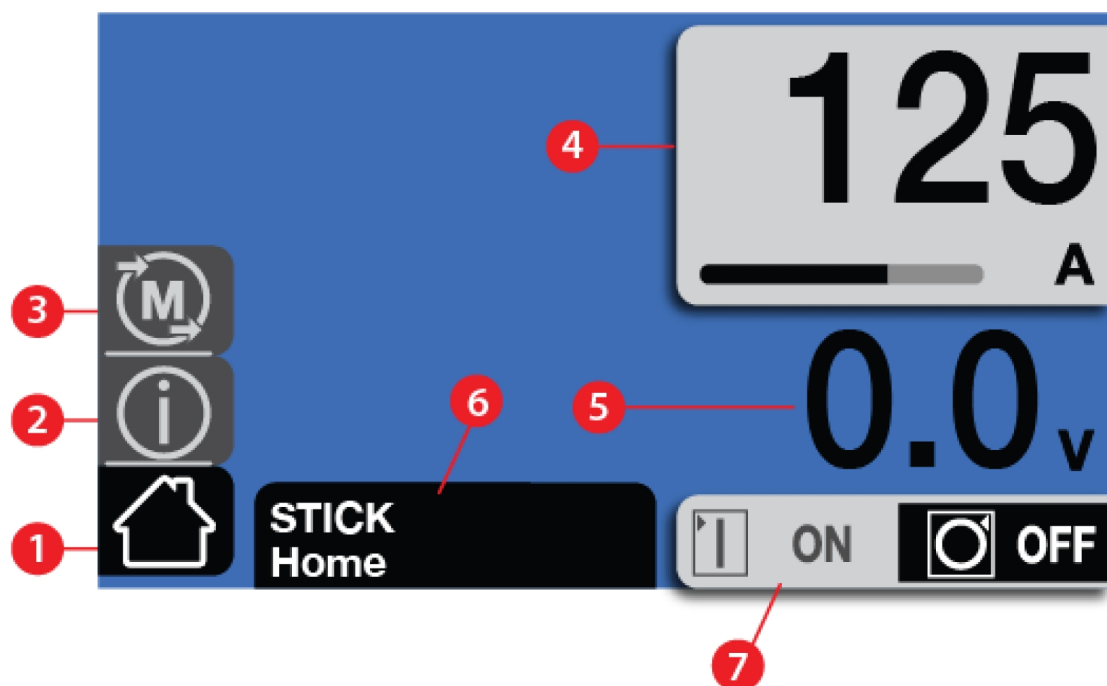
- | | |
|--------------------------|----------------------------|
| 1. Home selection | 4. Wire feed speed display |
| 2. Information selection | 5. Voltage display |
| 3. Memory selection | 6. Dialogue box |

6.1.5 Flux cored advanced mode

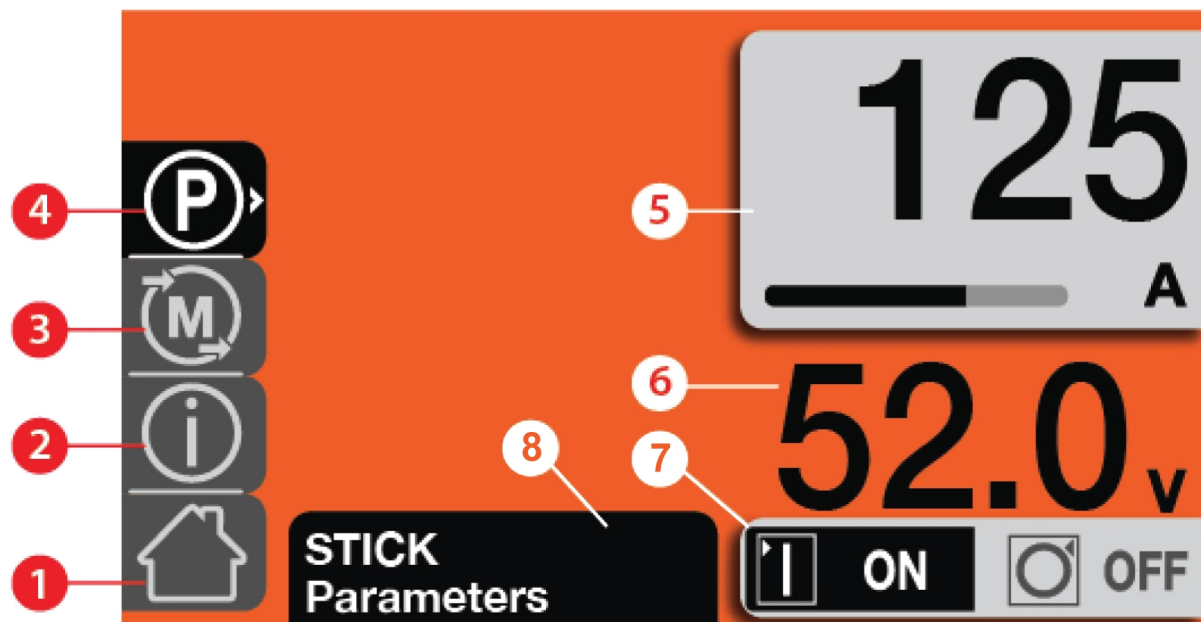


- | | |
|--------------------------|----------------------------|
| 1. Home selection | 5. Wire feed speed display |
| 2. Information selection | 6. Voltage display |
| 3. Memory selection | 7. Dialogue box |
| 4. Parameter selection | |

6.1.6 Stick basic mode



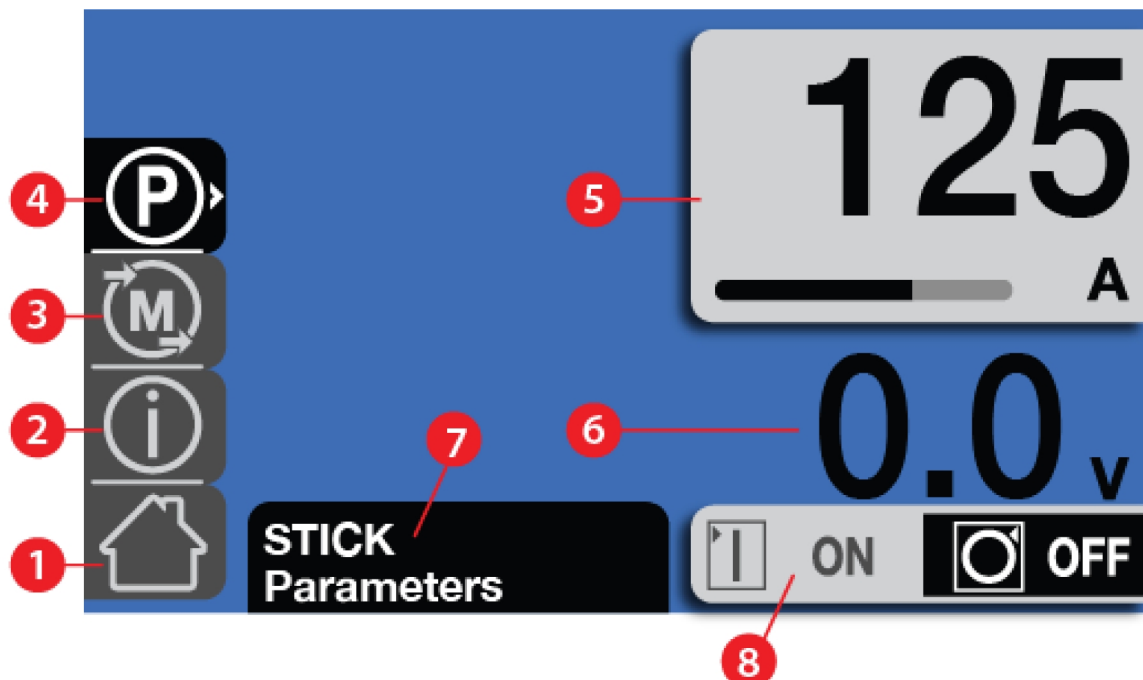
- | | |
|--------------------------|---------------------------|
| 1. Home selection | 5. Voltage |
| 2. Information selection | 6. Dialogue box |
| 3. Memory selection | 7. OFF/ON mode indication |
| 4. Amperage | |

Stick mode advanced

- | | |
|--------------------------|---------------------------------|
| 1. Home screen selection | 5. Voltage display (OCV or Arc) |
| 2. Information selection | 6. Amperage display |
| 3. Memory selection | 7. OFF/ON mode indication |
| 4. Parameter selection | 8. Dialogue box |

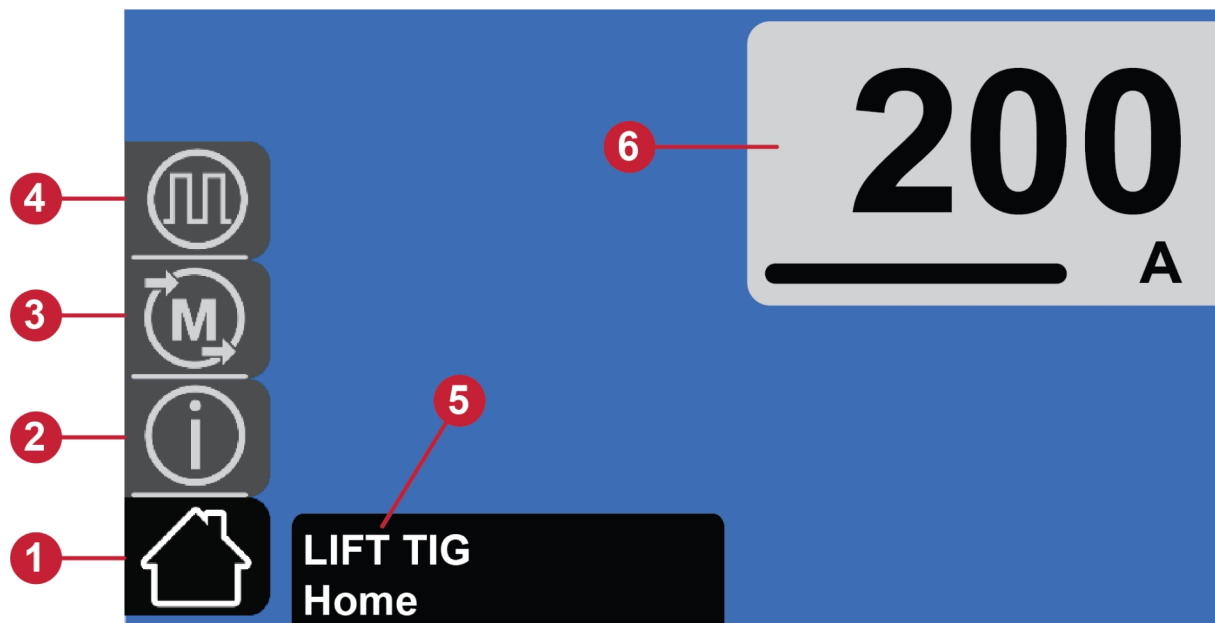
The user must select the ON position to have output voltage and weld current available to weld.

Also the background color indicates the output state, where blue indicates an "off" state and orange indicates an "on" state.



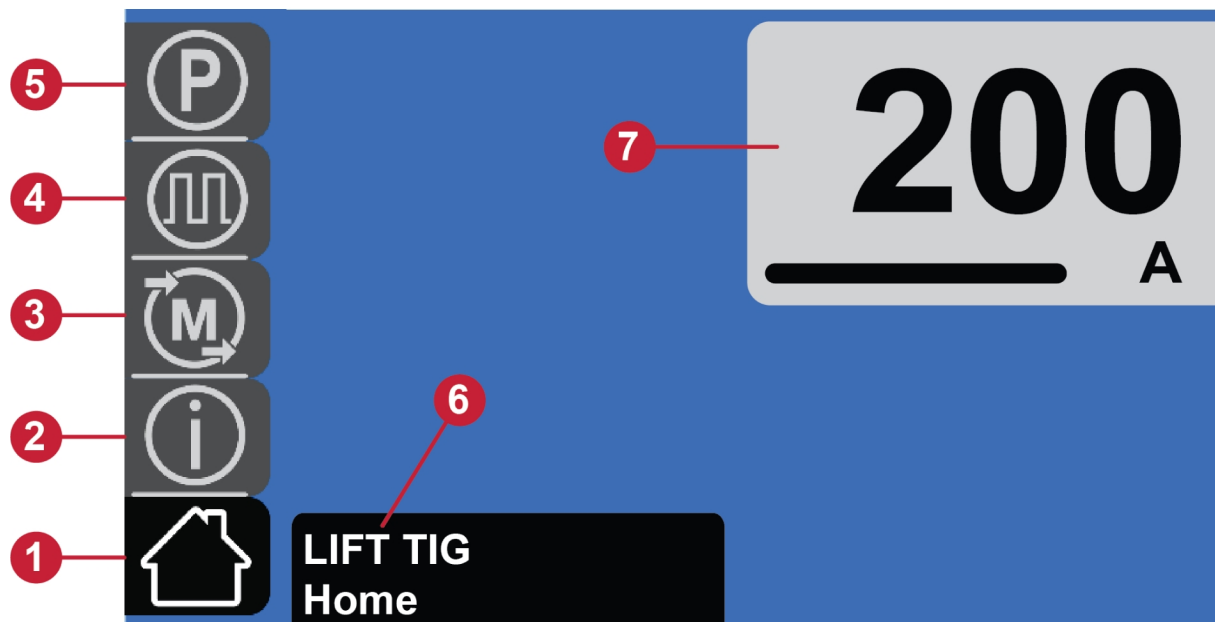
- | | |
|--------------------------|---------------------------|
| 1. Home selection | 5. Amperage display |
| 2. Information selection | 6. Voltage display |
| 3. Memory selection | 7. Dialogue box |
| 4. Parameter selection | 8. OFF/ON mode indication |

6.1.7 LIFT-GTAW basic mode



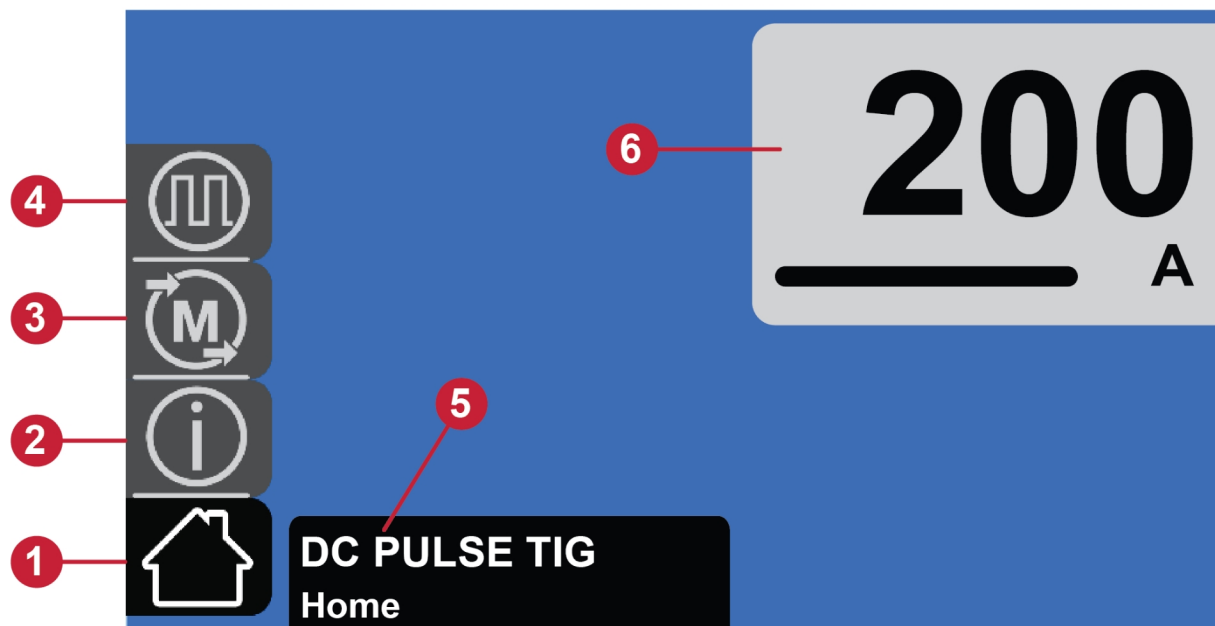
- | | |
|--------------------------|---------------------|
| 1. Home selection | 4. Pulse selection |
| 2. Information selection | 5. Dialogue box |
| 3. Memory selection | 6. Amperage display |

DC-GTAW advanced mode (EMP 215ic only)



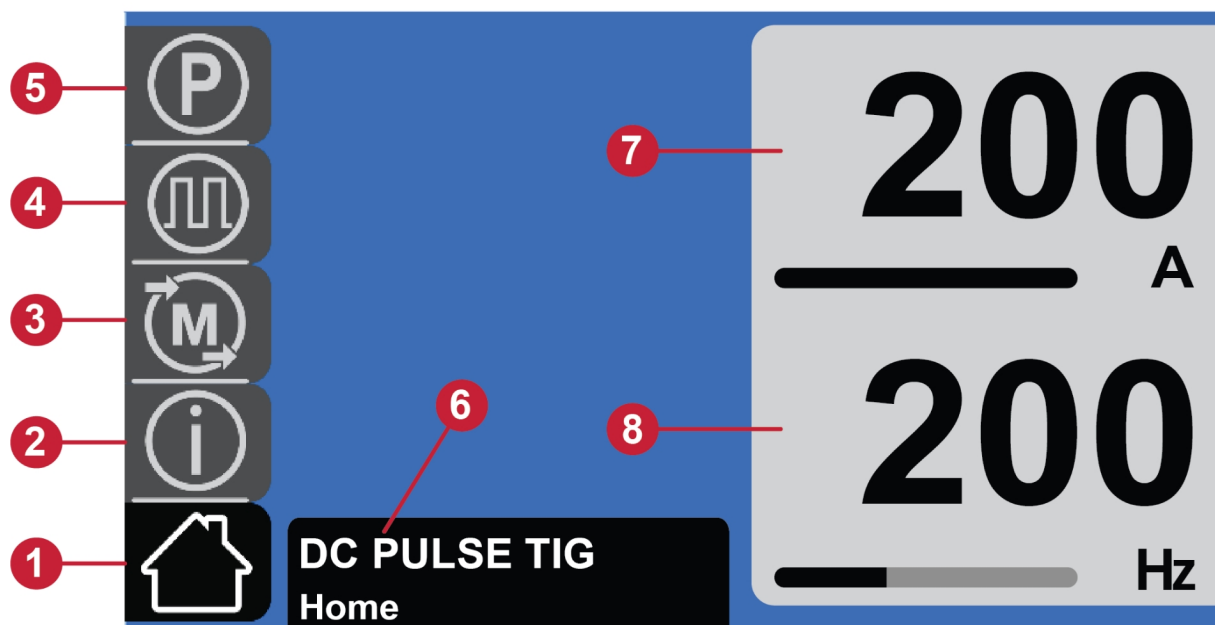
- | | |
|--------------------------|------------------------|
| 1. Home selection | 5. Parameter selection |
| 2. Information selection | 6. Amperage display |
| 3. Memory selection | 7. Dialogue box |
| 4. Pulse selection | |

6.1.8 DC-PULSE GTAW Basic mode



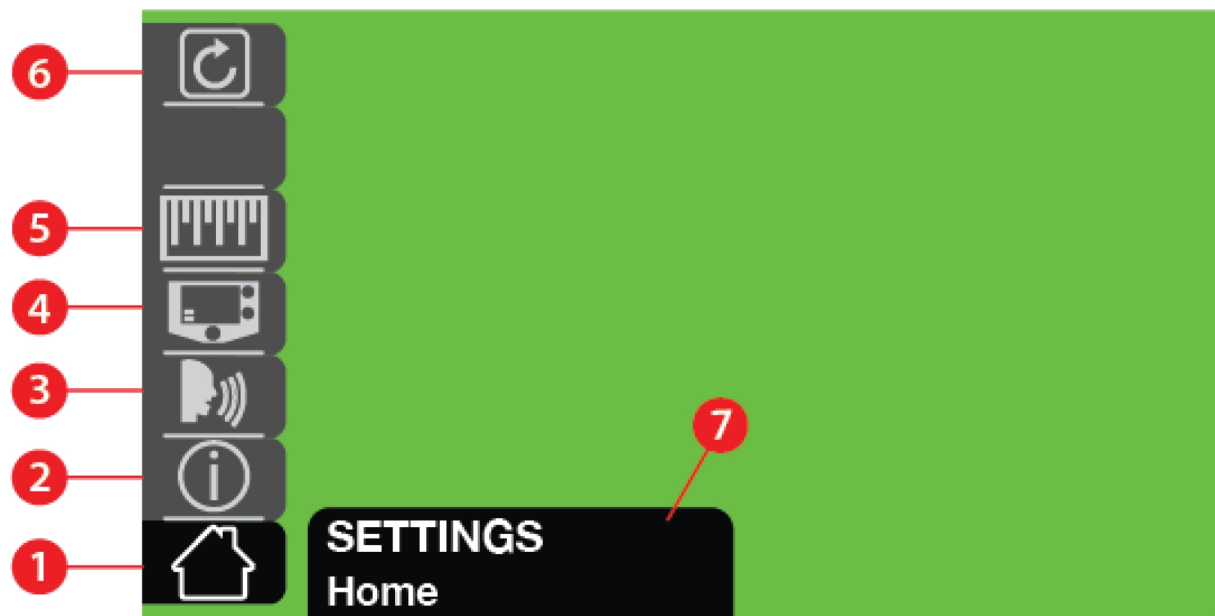
- | | |
|--------------------------|---------------------|
| 1. Home selection | 4. Pulse selection |
| 2. Information selection | 5. Dialogue box |
| 3. Memory selection | 6. Amperage display |

DC-PULSE GTAW advanced mode



- | | |
|--------------------------|------------------------|
| 1. Home selection | 5. Parameter selection |
| 2. Information selection | 6. Dialog Box |
| 3. Memory selection | 7. Amperage display |
| 4. Pulse selection | 8. Frequency display |

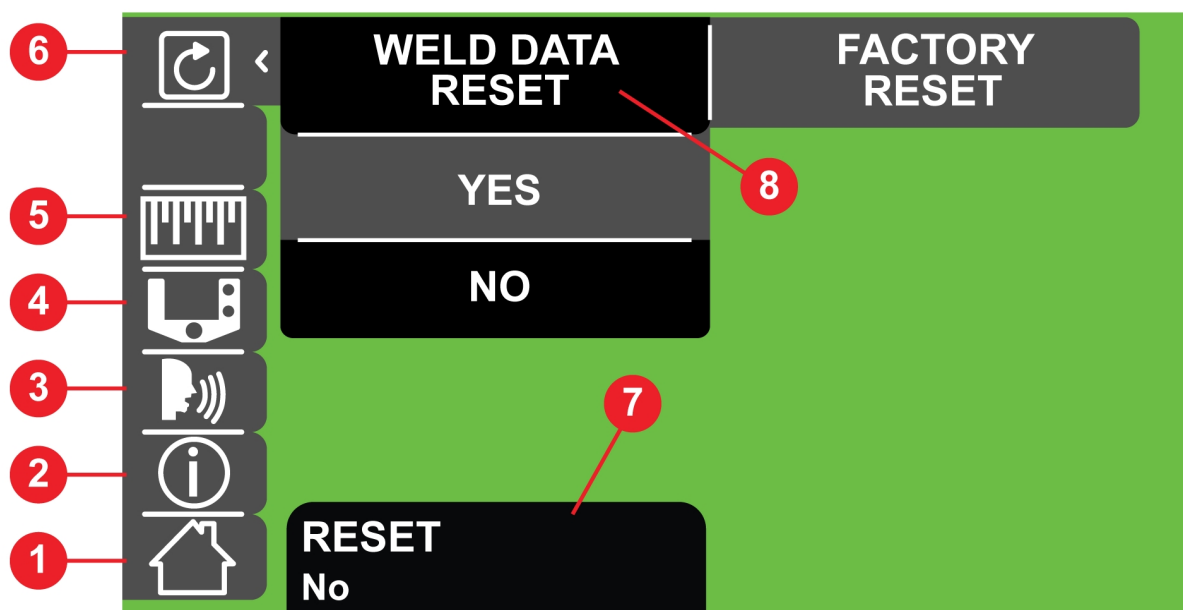
6.1.9 Settings



- | | |
|-----------------------------|-----------------------------------|
| 1. Home selection | 5. Imperial/metric mode selection |
| 2. Information selection | 6. Reset mode |
| 3. Language selection | 7. Dialogue box |
| 4. Basic/advanced selection | |

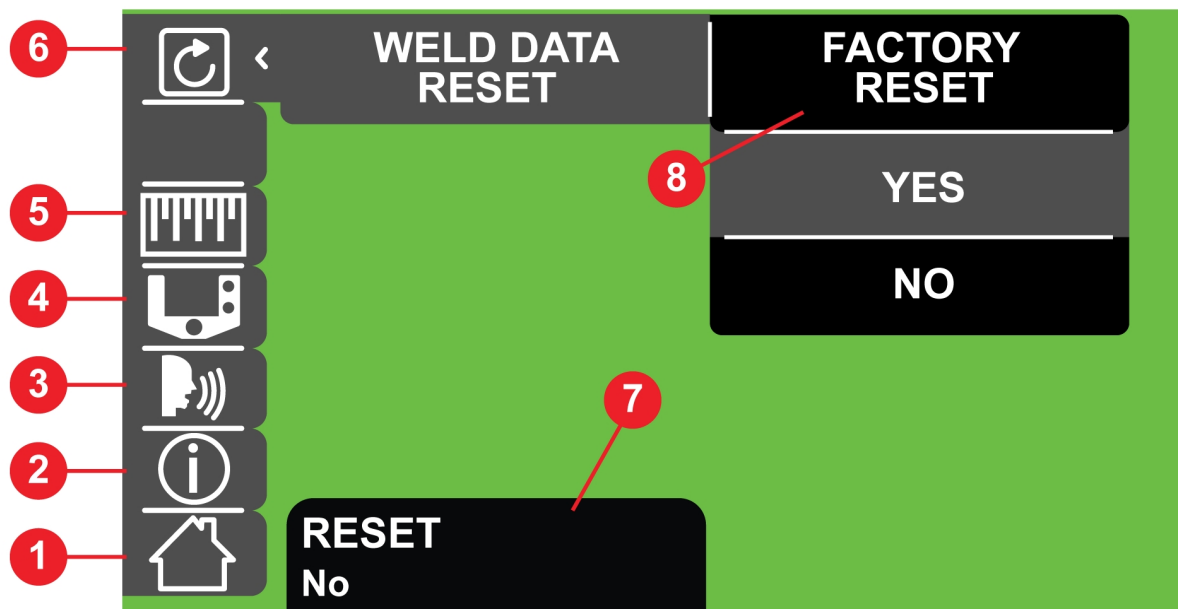
6.1.10 Reset mode

Weld data reset



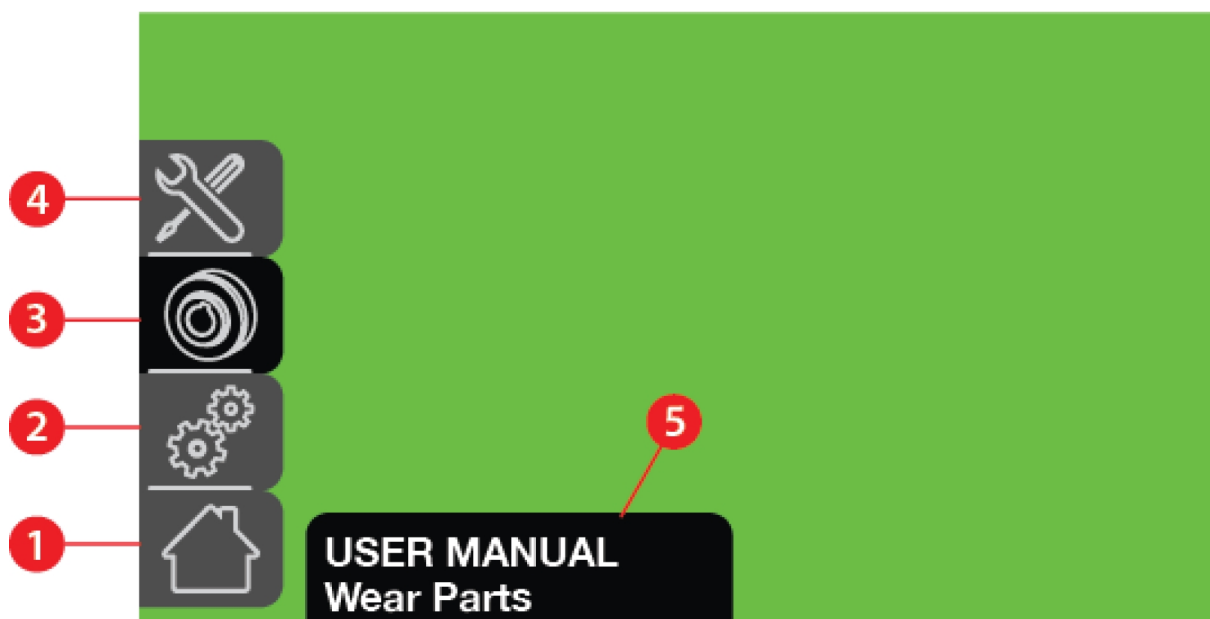
- | | |
|----------------------------------|------------------------------|
| 1. Home selection | 5. Imperial/Metric selection |
| 2. Information selection | 6. Reset mode |
| 3. Language selection | 7. Dialogue box |
| 4. Basic/Advanced mode selection | 8. Weld data reset |

Factory reset





















- | | |
|----------------------------------|------------------------------|
| 1. Home selection | 5. Imperial/Metric selection |
| 2. Information selection | 6. Reset mode |
| 3. Language selection | 7. Dialogue box |
| 4. Basic/Advanced mode selection | 8. Factory reset |









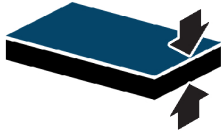



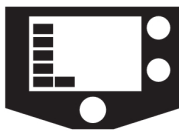

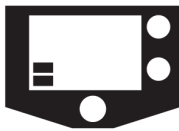


6.1.11 User manual


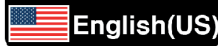





















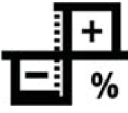







- | | |
|-------------------------|-----------------|
| 1. Home selection | 4. Maintenance |
| 2. Settings | 5. Dialogue box |
| 3. Wear parts selection | |

6.1.12 Icon reference guide

ICON	MEANING	ICON	MEANING
	Home		Spot time on/off selection
	Information		
	GMAW gun		Spot time on adjustment
	Parameters		Flux cored
	Parameters		Manual GMAW
	Percent		Settings
	Pre-flow The time the shielding gas stays on before the welding arc is started		Smart GMAW
	Post-flow The time the shielding gas stays on after the welding arc is stopped		Cancel
	Seconds		Saving welding programs for a specific application when in the Memory Mode

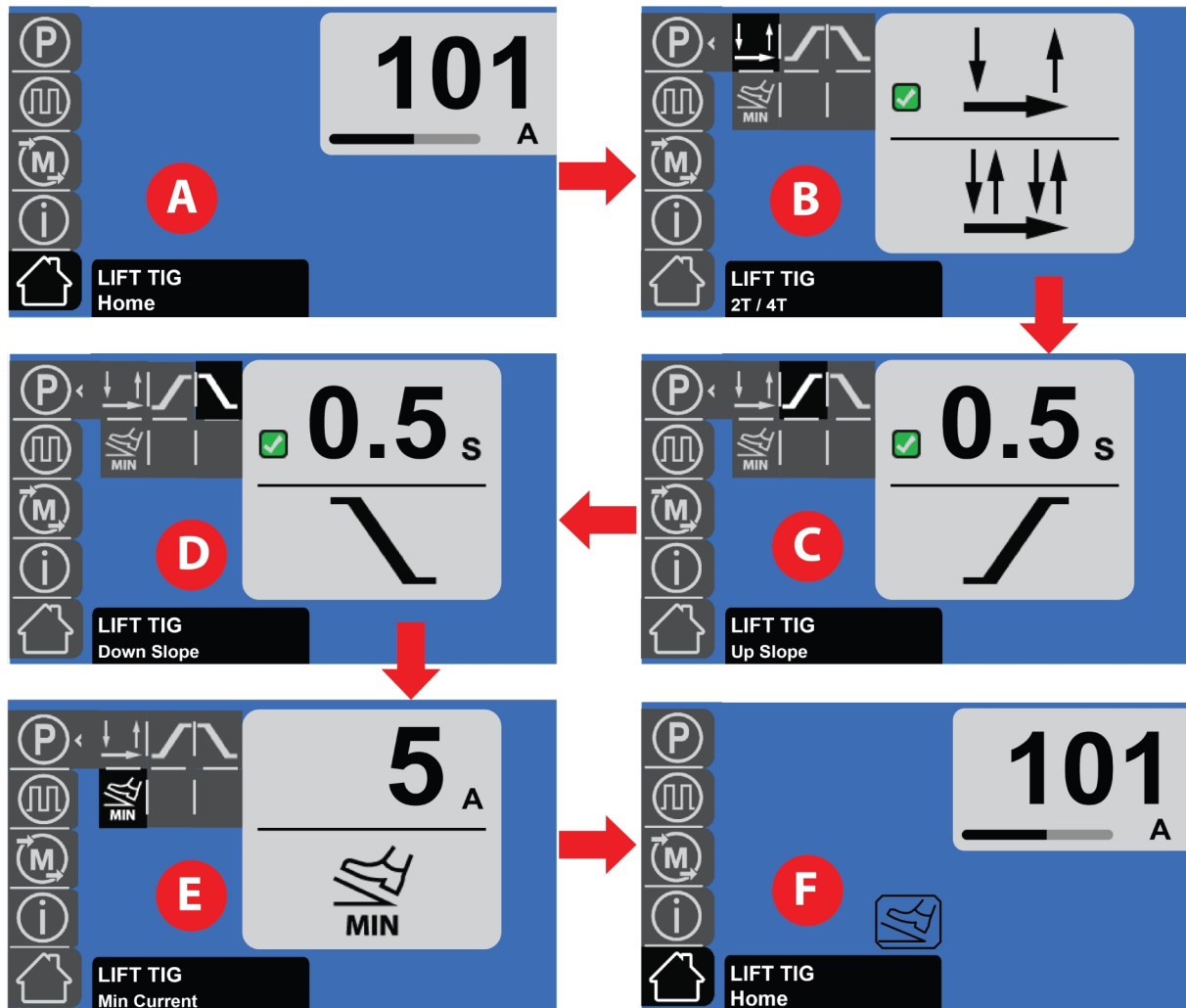
ICON	MEANING	ICON	MEANING
	Settings on user manual menu		Burnback Adjusting the time when the voltage stays on after the wire feed is stopped to keep the wire from freezing in the weld puddle
	Spool gun (Not all markets)		STICK
	2T, Trigger On/OFF		Lift-GTAW
	4T, Trigger Hold/Lock		User manual on main menu
A	Amps		Plate thickness at sMIG mode
	Arc force 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		Trim bar indicator Changing the weld bead profile from flat to convex or flat to concave
	Downslope Sloping the current down over a period of time at the end of the weld cycle		Advanced Settings
	Hot start The increase of amps when striking the electrode to reduce sticking		Basic Settings
	Arc dynamics The addition of inductance into the arc characteristics to stabilize the arc and reduce spatter when in the short circuit process		Preflow/Postflow

ICON	MEANING	ICON	MEANING
	Memory Ability to save welding programs for a specific application		Language selection
	Stick electrode choice		Unit of Measure
	Upslope, Sloping the current up over a period of time at the beginning of the weld cycle		Bead profile, concave
	Volts		Bead profile, convex
	Wire feed speed		Wire diameter
	Manual GMAW		Hz
	Dual Current		Lift Arc
	Pulse ON/OFF		Amin
	Retrieve		Erase
	DC GTAW		AC GTAW

ICON	MEANING	ICON	MEANING
	Peak Time		Balance
sMIG	Smart GMAW		Wire feed speed
	Wire diameter (sMIG mode only)		Material thickness (sMIG mode only)
	Frequency (Hz)		PEAK time
	Background current		Settings

6.2 LIFT GTAW welding

Below illustration shows the navigation/setup of LIFT GTAW Welding in advanced mode (A-B-C-D-E-F).

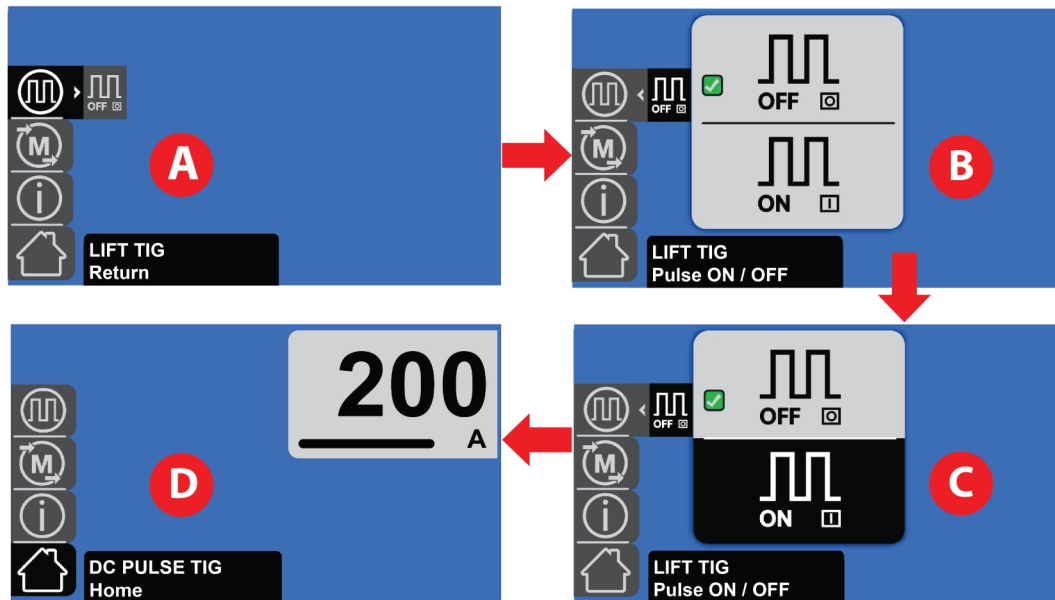


6.3 DC PULSE GTAW

DC pulse GTAW welding is used mainly on thin metals but can also be used on thicker material based on the application. Pulsing allows the user to control the amount of heat input that the work piece is subjected to. Pulse setting gives user more control over the weld puddle and weld process.

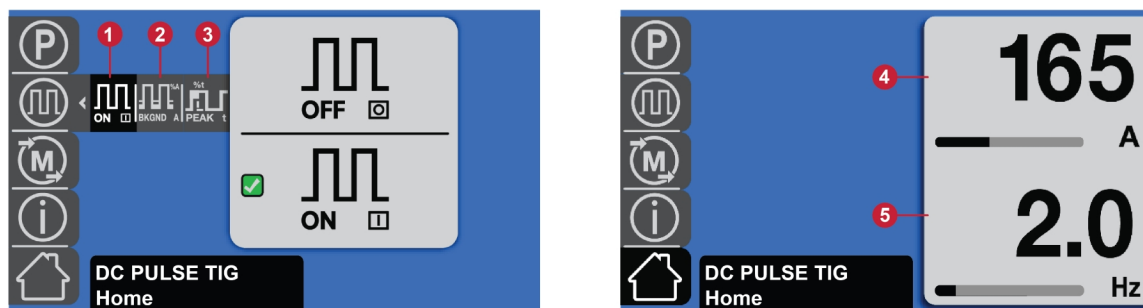
Basic mode

In basic mode DC GTAW pulse has default settings as Background current = 50%, Peak Time = 50%, PPS = 2. User must be in advance mode to adjust these parameters. Below illustration shows the navigation/setup of DC GTAW pulse in basic mode (A-B-C-D).



Advanced mode

In advanced mode, the user has the ability to adjust the DC pulse GTAW parameters as explained below.



1. Pulse ON/OFF
2. Background Current (%)
3. Peak Time (%)
4. Peak Current (A)
5. Frequency (Hz)

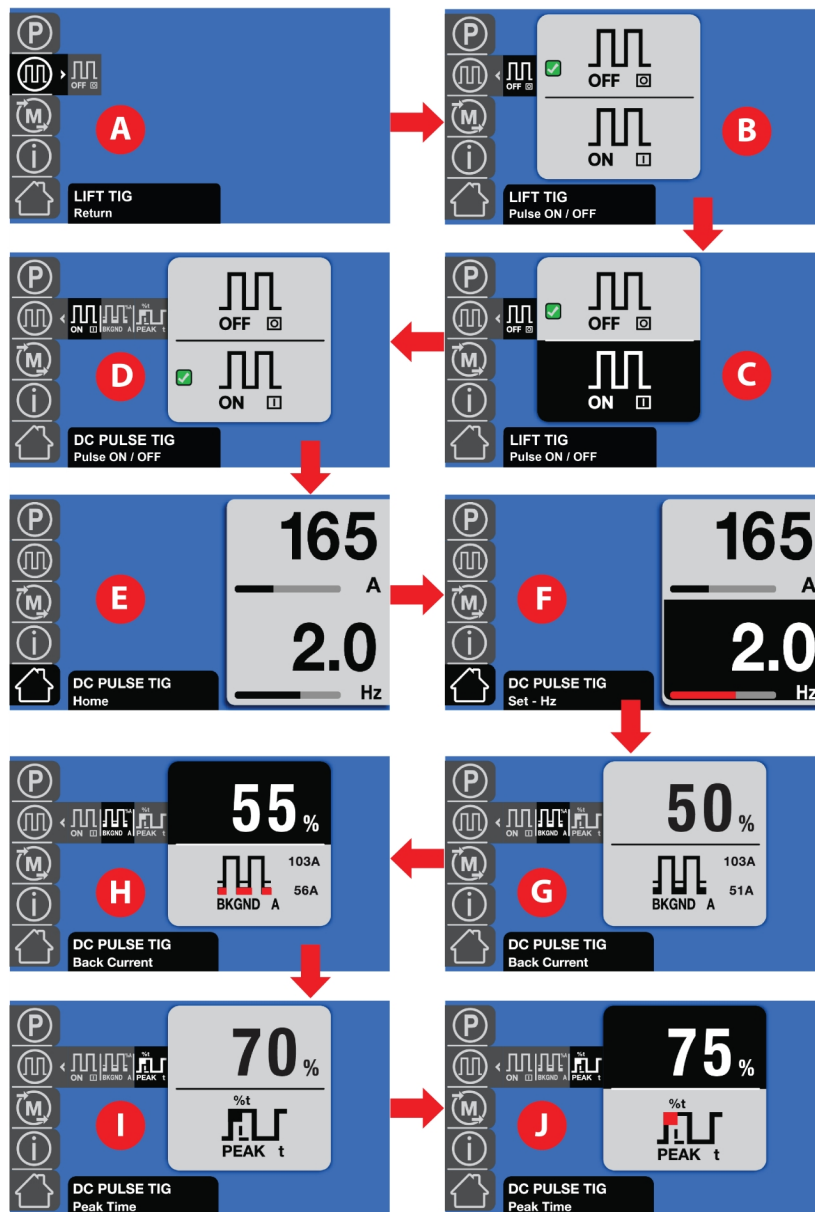
Background Current (%): Background current is the amount of the current at which the DC GTAW pulse waveform achieves as a percentage (%) of the peak current value. The background current is adjusted in the pulse menu. Range can be adjusted between 1 and 99%.

Peak Time (%): The peak time % is the time at which the DC GTAW pulse waveform is at peak current level. Range can be adjusted between 1 and 99%.

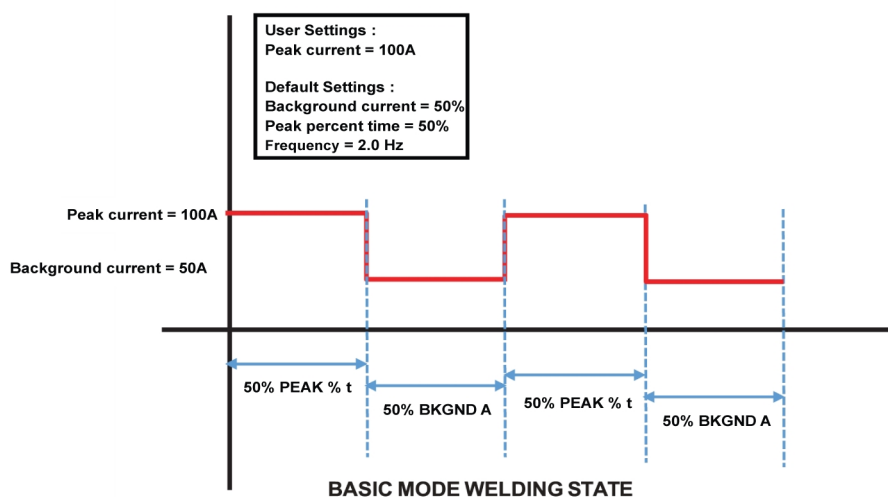
Peak Current (A): Peak current is set by using the Upper control knob. Range can be adjusted between 5 and 200 A.

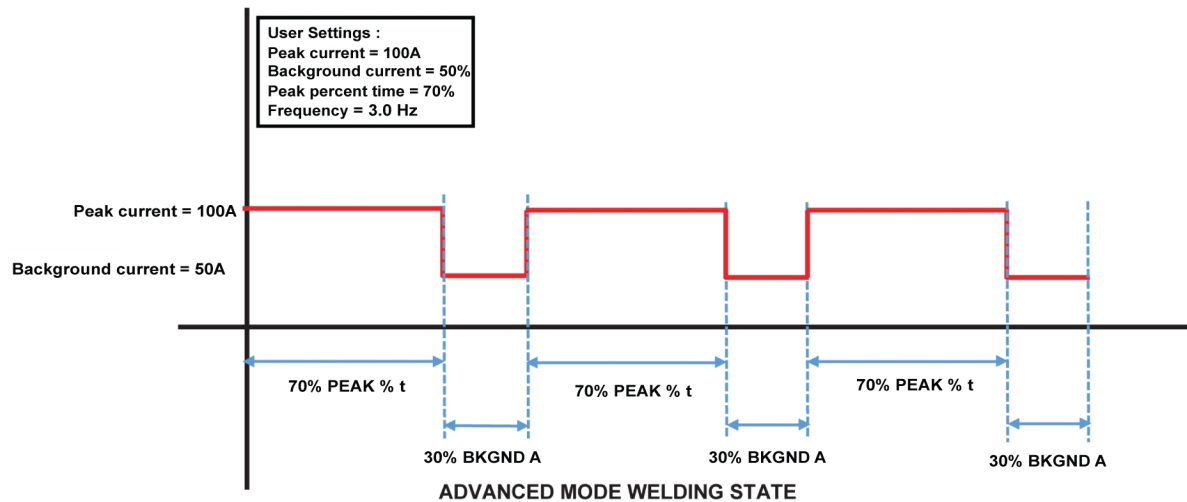
Frequency (Hz): The rate at which output current toggles between peak current and background current. Frequency can be adjusted by the Lower control knob. Range can be adjusted between 0.1 and 500.

Below illustration shows the navigation/setup of DC GTAW pulse in advanced mode (A-B-C-D-E-F-G-H-I-J).



Below illustration shows an example of DC GTAW pulse output current default waveforms in basic and recommended waveform in advanced modes.





DC pulse GTAW operation with remote current control connected

Rebel EMP 215ic power source supports following different Remote Current Controllers supplied by ESAB.

- Foot pedal
- Remote hand pendant
- Remote thumb controller (separate or as part of GTAW torch assembly)

When remote control is connected to Rebel EMP 215ic power source using 8-pin receptacle on the front panel, the background current calculations are different than with regular GTAW torch with On/Off trigger. Without remote control the background current value is the set percentage of the user set current but with remote control it is the set percentage of the remote control set current. Example:

Basic mode: If user sets current as

$$I_{\text{peak}} (\text{A}) = 100$$

The default settings for other parameters in basic mode are:

Background (%) = 50, Peak Time (%) = 50

Frequency (Hz) = 2.0, Background current (A) = 5

The calculated value of

$$\text{Background current (A)} = 50 \text{ A, (Peak current} \times 50\% = 100 \times 0.5)$$

For example, if remote control set to maximum then,

Peak current = 100 A, Background current = 50 A

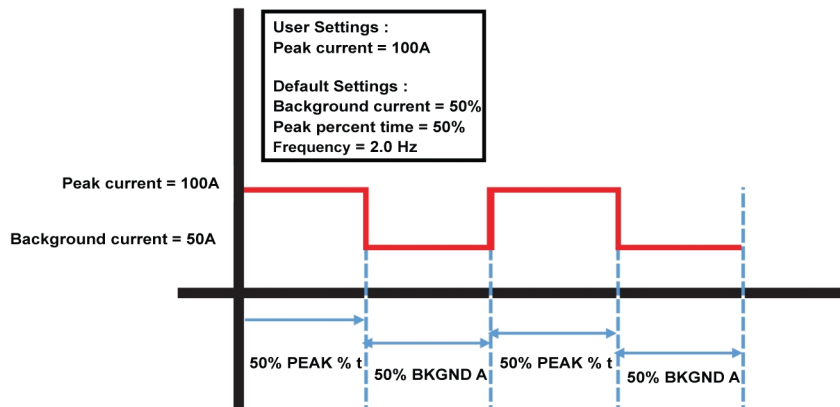
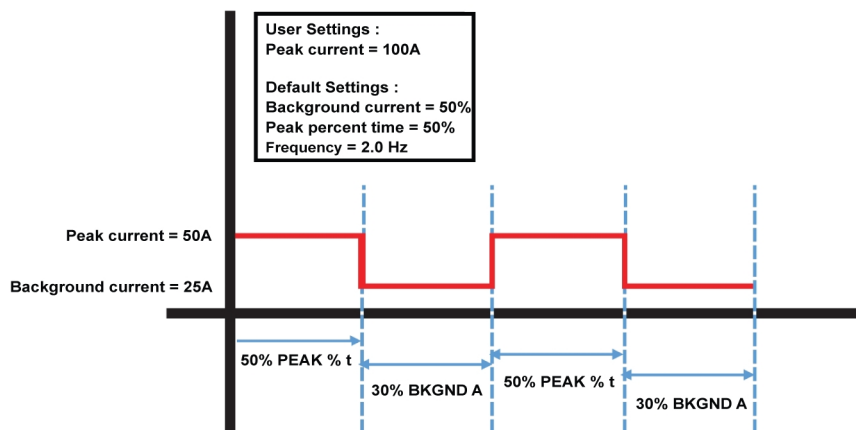
but if user sets the remote control to 50% then,

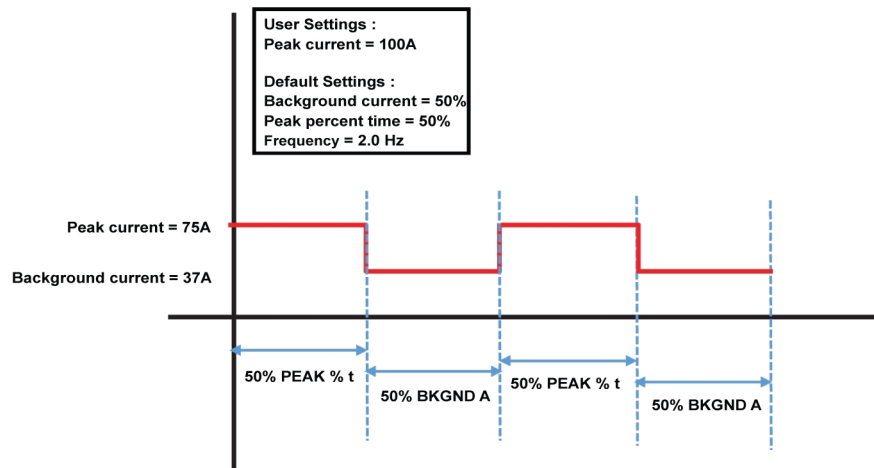
Peak current = 50 A, Background current = 25 A

and if user sets the remote control to 75% then,

Peak current = 75 A, Background current = 37 A

Below illustration shows the above example in terms of output current waveforms in basic mode.

Basic mode welding state with remote set to maximum**Basic mode welding state with remote set to 50%**

Basic mode welding state with remote set to 75%**Advanced mode - If user sets parameters as:**

Peak current (A) = 100

The default settings for other parameters in basic mode are:

Background current (%) = 80 Peak Time (%) = 70

Frequency (Hz) = 3.0 I_{min} (A) = 5

The calculated value of

Background current (A) = 80 A (Peak current * 80% = 100 * 0.8)

This means if the remote controller set to all the way then,

Peak current = 100 A, Background current = 80 A

but if user sets the remote controller to half way then,

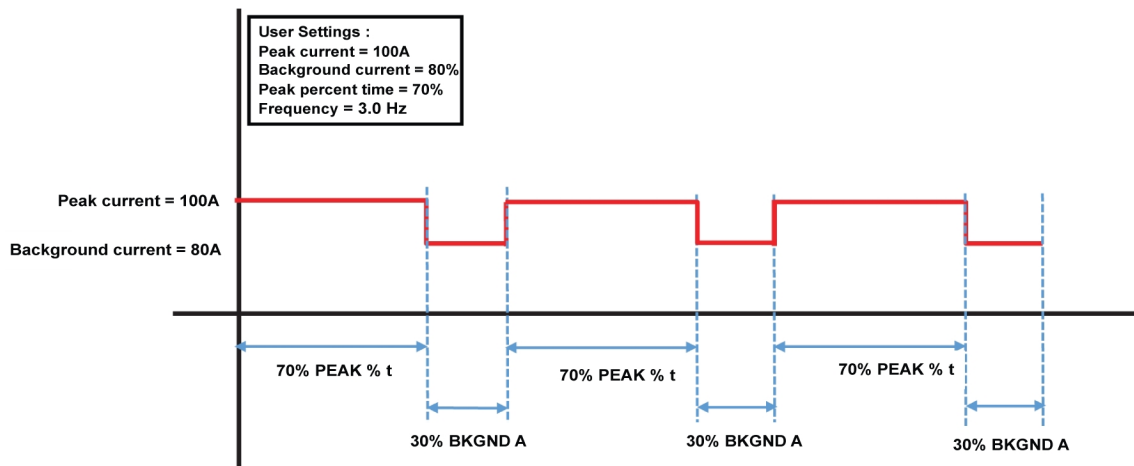
Peak current = 50 A, Background current = 40 A

and if user sets the remote controller to three-fourth way then,

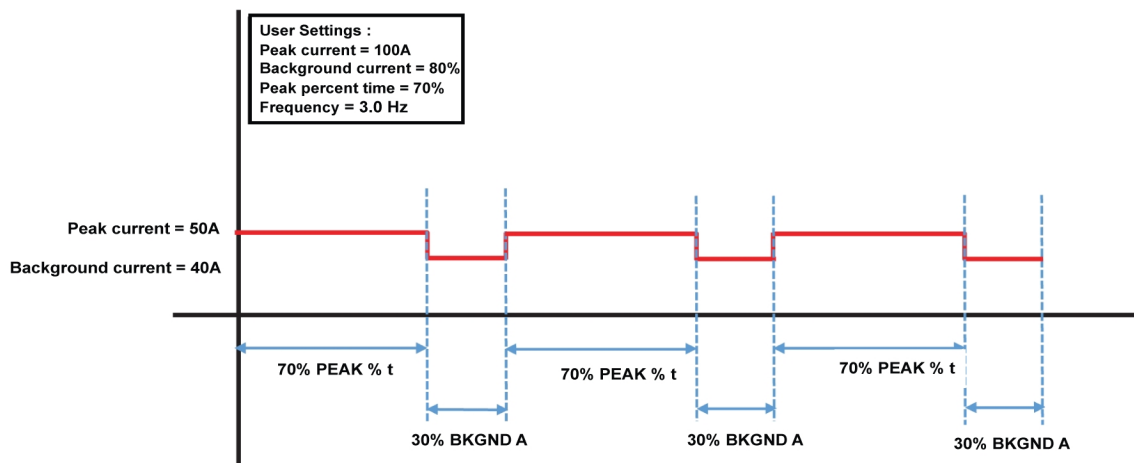
Peak current = 75 A, Background current = 60 A

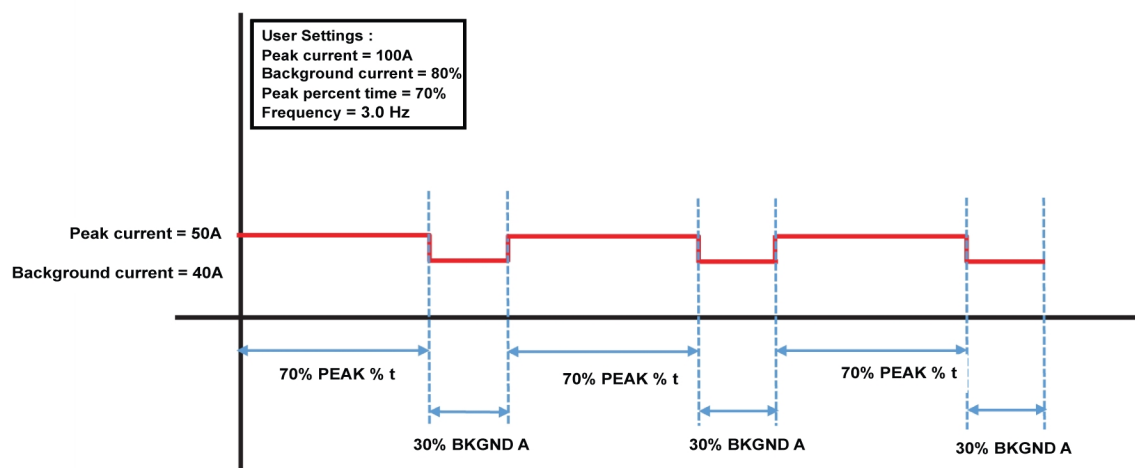
Below illustration shows the above example in terms of output current waveforms in advanced mode.

Advanced mode welding state with remote set to maximum



Advanced mode welding state with remote set to 50%



Advanced mode welding state with remote set to 75%

7 MAINTENANCE

**WARNING!**

The mains supply must be disconnected during cleaning and maintenance.

**CAUTION!**

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

**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.

**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!**



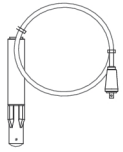

Perform maintenance more often during severe dusty conditions.

**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.

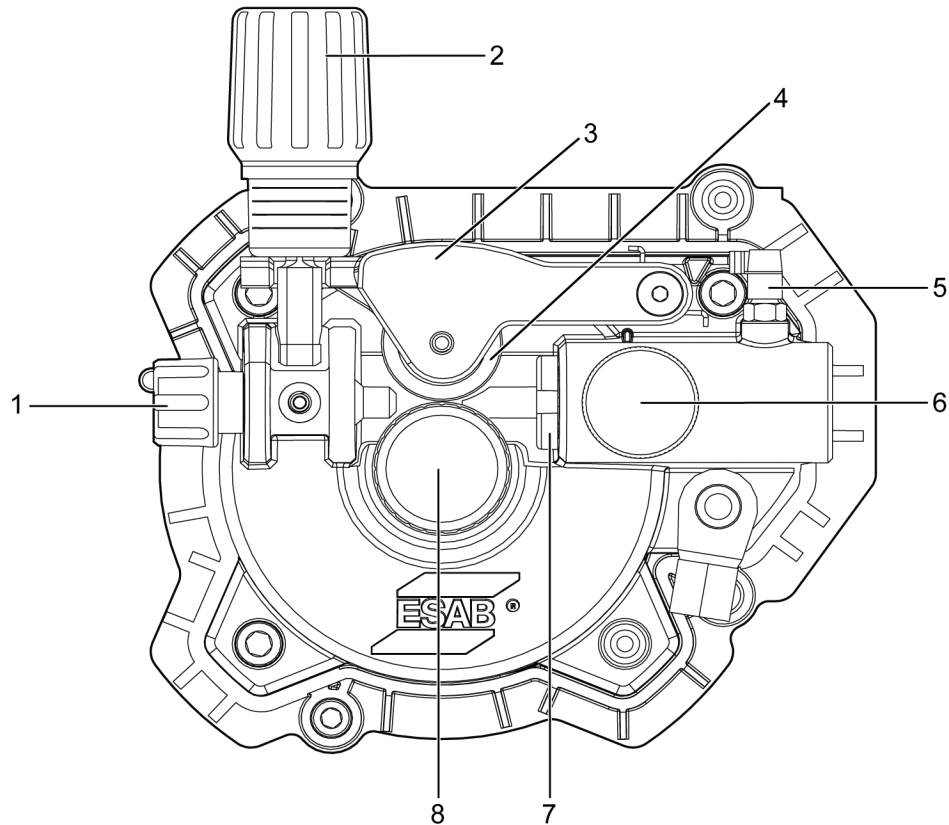
7.1 Routine maintenance

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 spool is replaced.



- | | |
|-----------------------------------|-------------------------------|
| 1. Wire inlet guide | 5. Gas inlet |
| 2. Locking knob (wire tension) | 6. GMAW gun locking knob |
| 3. Pressure arm complete assembly | 7. Wire outlet guide |
| 4. Pressure feed roll | 8. Feed roller retaining knob |

7.3 Wire-feeder assembly cleaning



WARNING!

Always use hand and eye protection when cleaning.

1. Disconnect the electrical power source from the unit.
2. Open the cover on the wire spool side of the EMP unit.
3. Before moving the tension knob: note its numerical setting as indicated on its body right below the handle. Record this number to reset the tension in its approximate range. "Setting the wire feed pressure" section describes the fine adjustment for this tension adjustment.



NOTE!

Since the wire-feed pressure adjustment may be disturbed to release this arm, the tension on the rollers will have to be re-adjusted at the end of this procedure. Recording the undisturbed scale number in the previous step facilitates the process at the end of the procedure to accurately set the tension.

4. 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 in the next step.
5. Use (as needed) either soft-bristle brush or 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.

6. Inspect if the input wire-feed guides and the feed rollers for wear and need replacement. See "WEAR PARTS" chapter for ordering wear-part numbers. See "Inserting and replacing wire" section. If none need replacement – only cleaning – go to the next step.

**CAUTION!**

When removing the roller be careful **not** to lose the drive-shaft key on the motor shaft. Failure to comply will render the entire unit useless until this part is replaced.

7. Clean the wire-feed roller with a soft brush.
8. Clean the pressure roller attached to the tension arm with a soft brush.
9. 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.

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

**NOTE!**

The spool 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.

11. Visually verify that the wire protrudes per specification at the torch tip and has not been pulled into the torch head.
12. 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 the wire feed pressure" section.
13. Close the cover on the wire spool side of the EMP unit.

7.4 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.

7.5 Torch liner maintenance

Refer to GMAW gun instruction manual for replacing standard steel torch conduit liner with a Teflon torch conduit liner.

7.6 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"> • Check gas bottle is not empty. • Check gas regulator/flow meter is not closed. • Check gas inlet hose for leaks or blockage. • Check that the correct gas is connected and the correct gas flow is used. • Keep the distance between the GMAW gun nozzle and the work piece to a minimum. • Do not work in areas where drafts, which would disburse the shielding gas, are common. • Make sure the work piece is clean, with no oil or grease on the surface, before welding.
Wire feeding problems	<ul style="list-style-type: none"> • Make sure the wire spool brake is adjusted correctly. • Make sure the feed roller is correct size and not worn. • Make sure the correct pressure is set on the feed rollers. • 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). • Make sure the correct contact tip is used and it is not worn. • Make sure the liner is the right size and type for the wire. • Make sure the liner is not bent so that friction is caused between the liner and the wire.
MIG (GMAW/FCAW) welding problems	<ul style="list-style-type: none"> • Make sure the GMAW gun is connected to the correct polarity. Refer to the electrode wire manufacturer for the correct polarity. • Replace contact tip if it has arc marks in the bore causing excessive drag on the wire. • Make sure the correct shielding gas, gas flow, voltage, welding current, travel speed and GMAW gun angle is used. • Make sure the work lead has proper contact with the work piece.
Stick (SMAW) basic welding problems	<ul style="list-style-type: none"> • 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.

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

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 >185 °F (85 °C).
002	W	Output diode temperature fault, analog temperature sensor.
003	W/C	<p>Warning - If occurred during load/arc-start, cause is due to low input AC voltages - Err009</p> <p>Critical - 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.
005	C	IPS voltage is low

Error code	Severity level	Functional circuit failure explanation
006	W	VRD configuration error
007		(reserved)
008	C	OCV error, output voltage not sensed at control board CN1 as expected
009	W	Low voltage error, AC mains voltage is less than 108 V AC, this could trip Err 003
010		(reserved)
011	C	User has attempted a parameter or factory reset, and this was not confirmed by the system.
012		(reserved)
013		(reserved)
014	C	Secondary current sensor output not detected at control PCB CN18
015		(reserved)
016		(reserved)
017 – 019		(reserved)
020	C	No Image found in flash
021	C	The image read from the flash is corrupted
022	NC	Failed two attempts of saving user memory to permanent memory in SPI flash.
023	NC	Failed two attempts of recovering user memory permanent memory from SPI flash.
030	C	Control firmware error

9 ORDERING SPARE PARTS



CAUTION!

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

The Rebel EMP 215ic is designed and tested in accordance with international standards **IEC 60974-1, IEC 60974-5**, Canadian and US standards **CAN/CSA-E60974-1:12** and US standards **ANSI/IEC 60974-1:2008**. It is the obligation of the authorized service center carrying out the service or repair work to ensure that the product still conforms to the aforementioned 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.



NOTE!

The parameter chart, wiring diagram, ordering numbers, wear parts, accessories, and replacement parts, can be found in the appendix.

APPENDIX

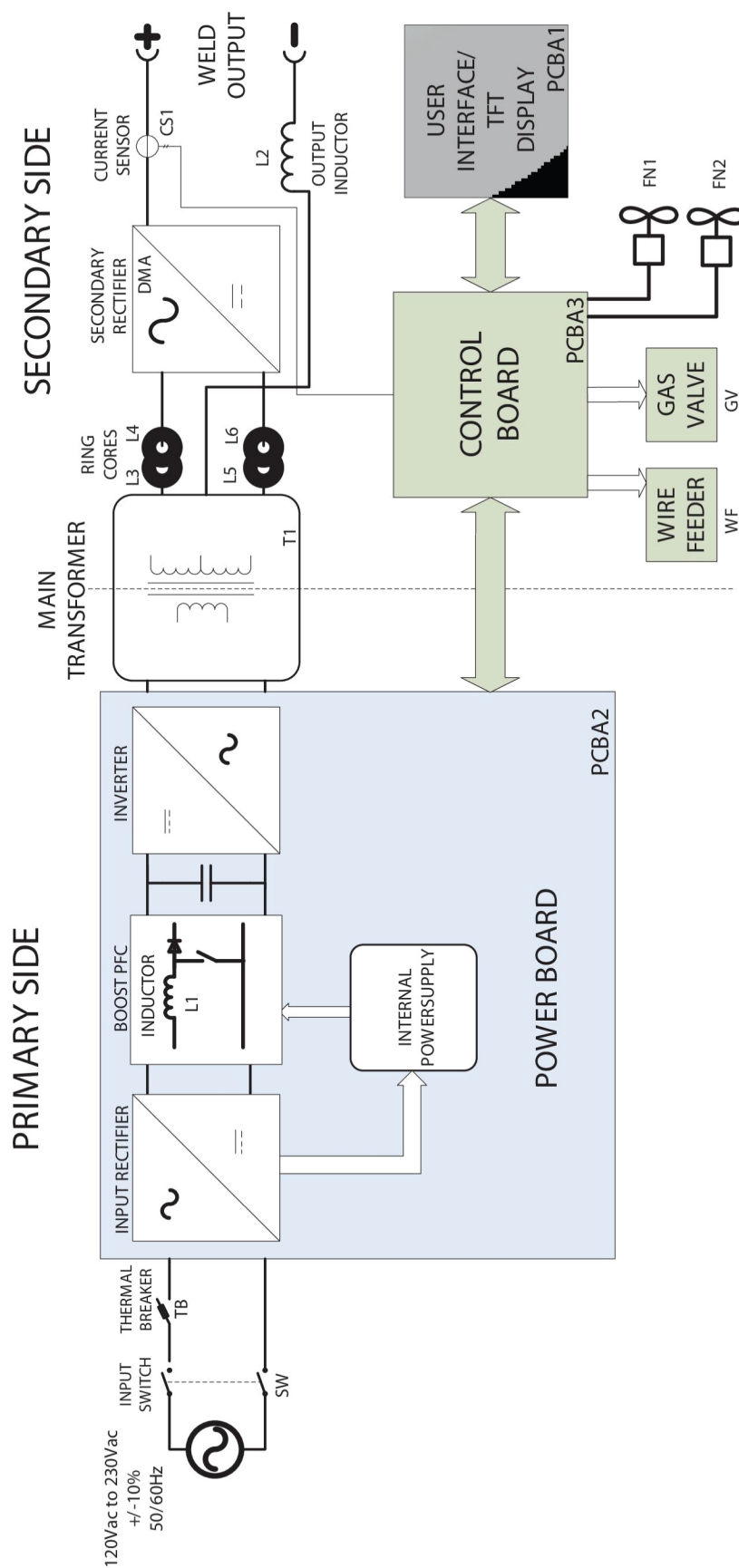
MIG WELD PARAMETER CHART

Rebel EMP 215ic MIG Weld Parameter Chart																
SELECT PROCESS		SELECT WIRE DIAMETER			<div>120 VAC / 30A Electrical Outlet Thru 1/4"***</div> <div>120 VAC / 20A Electrical Outlet Thru 3/16"</div> <div>120 VAC / 15A Electrical Outlet Thru 1/8"</div>											
sMIG		.023"/.030"/.035" (0.6/0.8/0.9 mm)														
Just pick wire diameter and plate thickness, Smart MIG will figure out the rest. The easiest way to weld mild steel, stainless steel and aluminum in the short circuit transfer process.																
SELECT PROCESS	MATERIAL SELECTION	WELDING WIRE TYPE	SHIELD GAS TO BE USED	MATERIAL THICKNESS	120 VAC					230 VAC						
					SELECT PLATE THICKNESS					SELECT PLATE THICKNESS						
					22 ga. thru 3/16"					22 ga. thru 5/16"						
					22 ga. 0.8mm	18 ga. 1.2mm	16 ga. 1.6mm	1/8" 3.2mm	3/16" 4.7mm	22 ga. 0.8mm	18 ga. 1.2mm	16 ga. 1.6mm	1/8" 3.2mm	3/16" 4.7mm	1/4" 6.4mm	5/16" 7.9mm
MIG	Mild Steel	ER70S-6 .023" (0.6 mm)	75% Ar, 25% CO ₂	Wirespeed	165	295	325	385	430	165	295	325	385	430	-	-
				Voltage	14.2	16.2	17	19.2	19.5	14.2	16.2	17	19.2	19.5	-	-
				*Inductance	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	-	-
	Mild Steel	ER70S-6 .030" (0.8 mm)	75% Ar, 25% CO ₂	Wirespeed	86	129	153	232	-	86	129	153	232	283	325	-
				Voltage	15	17	17.5	19	-	15	17	17.5	19	20	21	-
				*Inductance	35%	35%	35%	35%	-	35%	35%	35%	35%	35%	35%	-
	Mild Steel	ER70S-6 .035" (0.9 mm)	75% Ar, 25% CO ₂	Wirespeed	95	118	129	224	-	95	118	129	224	271	326	370
				Voltage	15	15.5	16.5	18.5	-	15	15.5	16.5	18.5	19	20	21
				*Inductance	35%	35%	35%	35%	-	35%	35%	35%	35%	35%	35%	35%
	Stainless Steel	ER308L/316L .030" (0.8 mm)	90% He 7.5% Ar 2.5% CO ₂	Wirespeed	150	160	180	300	350	150	150	180	300	350	375	-
				Voltage	16.5	17	18.5	20	25	16.5	17	18.5	20	25	25	-
				*Inductance	90%	90%	90%	90%	-	90%	90%	90%	90%	90%	90%	-
Mild Steel	E71T-11 E71T-14 .030" (0.8 mm)	No Gas Required	Wirespeed	-	70	90	173	-	-	70	90	173	220	251	-	
			Voltage	-	14	14.0	16	-	-	14	14	16	17.0	17.5	-	
			*Inductance	-	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	
Aluminum Use Spool Gun	ER4043 .035" (0.9 mm)	100% Ar	Wirespeed	-	270	300	375	-	-	270	300	375	425	474	-	
			Voltage	-	14.5	15.5	20	-	-	14.5	15.5	20	23.0	24.0	-	
			*Inductance	-	35%	35%	35%	-	-	35%	35%	35%	35%	35%	-	

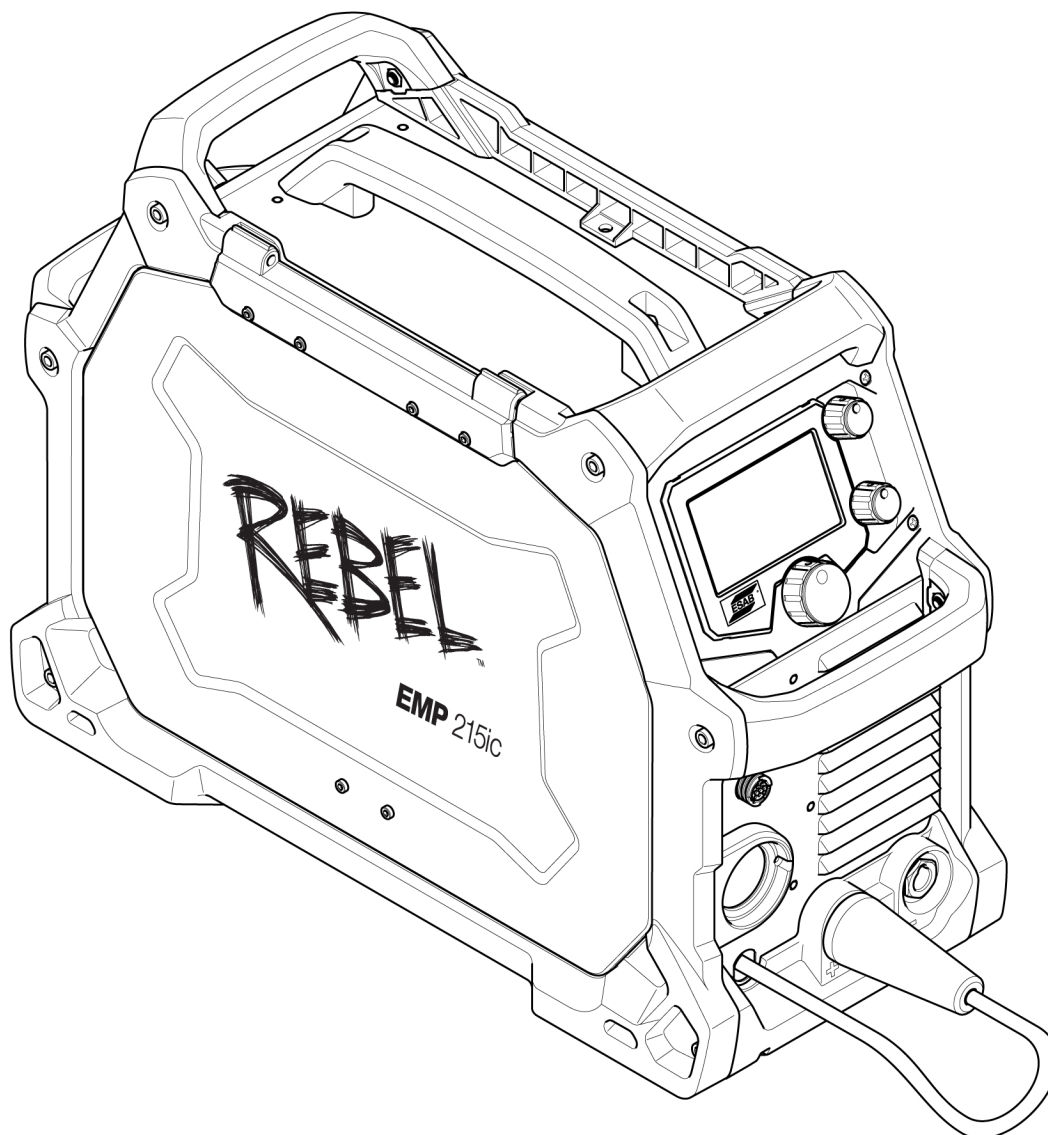
*Not applicable for EM 215ic

**Refer to operating manual

WIRING DIAGRAM



ORDERING NUMBERS



Ordering number	Denomination	Notes
0558 102 240	Rebel EMP 215ic Full Package	Spool Ø4–8 in. (100–200 mm), CSA/Bayonet
0463 789 *	Instruction manual	
0463 791 001	Spare parts list	

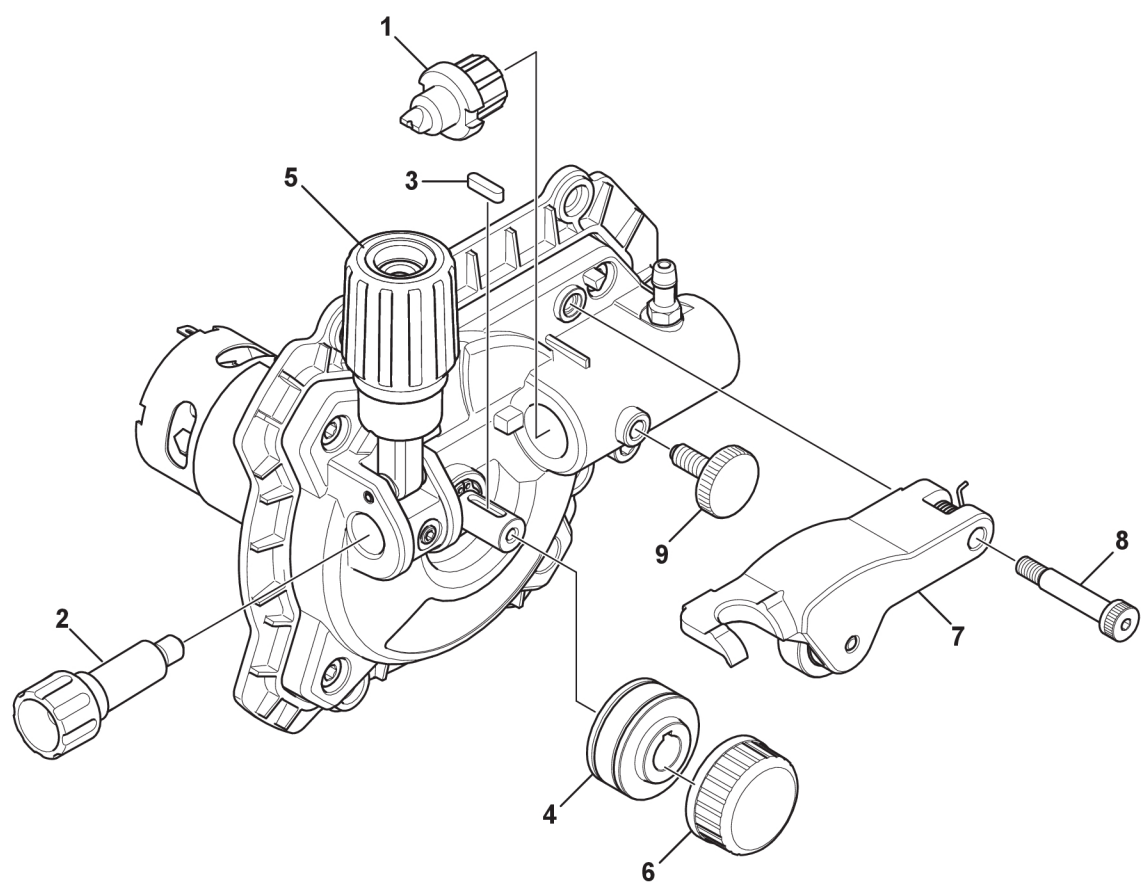
The three last digits in the document number of the manual show the version of the manual. Therefore they are replaced with * here. Make sure to use a manual with a serial number or software version that corresponds with the product, see the front page of the manual.

Technical documentation is available on the Internet at: www.esab.com

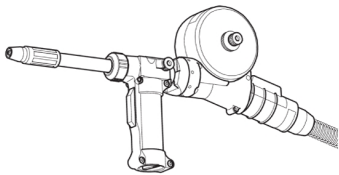
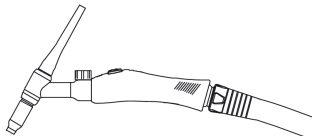
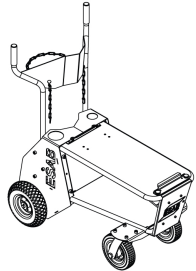
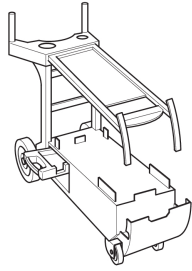
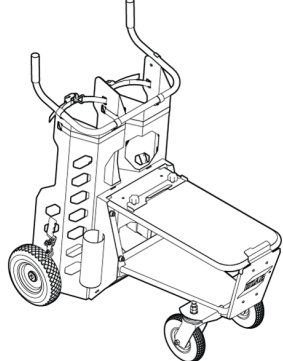
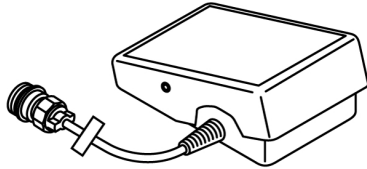
WEAR PARTS

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.	Denomination	Wire type	Wire dimensions
1	0558 102 326	Wire outlet guide	Fe/SS/Flux Cored	0.030 in. / 0.035 in. / 0.045 in. (0.8 mm / 0.9 mm / 1.2 mm)
	0558 102 327	Wire outlet guide	Fe/SS/Flux Cored	0.024 in. (0.6 mm)
2	0558 102 328	Wire inlet guide	Fe/SS/Flux Cored	0.024 in. / 0.030 in. / 0.035 in. / 0.045 in. (0.6 mm / 0.8 mm / 0.9 mm / 1.2 mm)
3	0558 102 334	Key-drive shaft	N/A	N/A
4	7977036	Feed roll "V" groove	Fe/SS	0.024 in. / 0.030 in. (0.6 mm / 0.8 mm)
	W4014800	Feed roll "V" groove	Fe/SS	0.024 in. / 0.035 in. (0.6 mm / 0.9 mm)
	7977732	Feed roll "V" knurled	Flux Cored	0.030 in. / 0.035 in. (0.8 mm / 0.9 mm)
	7044277	Feed roll "V" knurled	Flux Cored	0.045 in. (1.1 mm)
5	0558 102 329	Locking knob (Wire tension)	N/A	N/A
6	0558 102 518	Feed roller retaining knob		
7	0558 102 331	Pressure arm complete assembly	N/A	N/A
8	0558 102 330	Screw	N/A	N/A
9	0558 102 333	MIG gun locking knob	N/A	N/A



ACCESSORIES

1017-1338	Tweco Fusion™ 200 A MIG gun with 10 ft (3 m) cable	
1023-1297	Tweco Fusion™ 160 A MIG gun with 10 ft (3 m) cable	
W4013802	TIG Torch Heliarc 17 V TIG torch 12.5 ft (4 m), 8 pin and accessory kit	
0558 102 491	Rebel single cylinder cart Accommodates 1×9 in. (228.6 mm) diameter cylinder	
W4015001	Single Cylinder Cart Accommodates maximum 9 in. diameter cylinder with accessory drawer plus 1 parts storage box	
0558 103 000	Dual cylinder cart Accommodates maximum 9 in. diameter cylinder with accessory drawer plus 1 parts storage box.	
W4014000	Foot control Contactor on/off and current control with 15 ft. (4.5 m) cable and 8-pin male plug.	

REPLACEMENTS PARTS

Item	Ordering no.	Denomination
1	1017-1338	Tweco Fusion™ 180 A MIG gun with 10 ft. (3 m) cable
3	W4013802	Tweco® 17 V TIG torch, 12.5 ft (4 m), 8 pin and accessory kit
4	0558 102 667	Tweco® 200 A electrode holder and lead assembly, 13 ft (4 m), 50 mm dinse
5	0558 102 749	Tweco® 200 A ground clamp and lead assembly, 10 ft (3 m), 50 mm dinse
6	0781-2743	Victor CutSkill Flow Meter HRF 1425 Argon/CO2 CGA 580 10ft
7	W4014000	Power adapter (230 V – 120 V, 15 A)



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