EMP 205ic AC/DC

Instruction manual

0463 703 001GB 20240807 Valid for: serial no. 937-xxx-xxxx

WARNING
Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.
While the information contained in this Manual represents the Manufacturer's best judgment, the Manufacturer assumes no liability for its use.

Welding System
EMP 205ic AC/DC
Operating Manual Number 0463 703 001

Published by:
ESAB Group Inc.
2800 Airport Rd.
Denton, TX 76208
(940) 566-2000

www.esab.eu

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Revision Date:

Record the following information for Warranty purposes:

Where Purchased:_____

Purchase Date:_____ _____

Power Supply Serial #:_____ _____

ESAB operates a policy of continuous improvement. We therefore reserve the right to make changes and improvements to any of our products without notice.

Be sure this information reaches the operator.
You can get extra copies through your supplier.

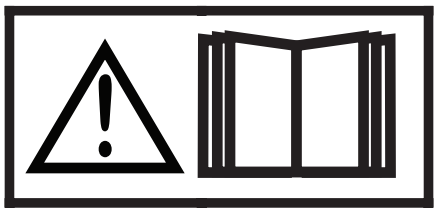
CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding and cutting equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging," Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.

USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Malfunctioning or poorly maintained equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom it was purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.



READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.
PROTECT YOURSELF AND OTHERS!

EU DECLARATION OF CONFORMITY

According to
The Low Voltage Directive 2014/35/EU
The EMC Directive 2014/30/EU
The RoHS Directive 2011/65/EU

Type of equipment
Arc welding power source

Type designation
EMP 205ic AC/DC, from serial number 937 xxx xxxx

Brand name or trademark
ESAB

Manufacturer or his authorised representative established within the EEA
Name, address, and telephone No:
ESAB AB
Lindholmsallén 9, Box 8004, SE-402 77 Göteborg, Sweden
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 60974-3:2014, Arc welding equipment - Part 3: Arc striking and stabilizing devices
EN 60974-5:2013, Arc welding equipment - Part 5: Wire feeders
EN 60974-10:2014, Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements

Additional Information:
Restrictive use, Class A equipment, intended for use in location other than residential
EMP 205ic AC/DC is part of the ESAB Rebel™ product family

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, 2020-03-13

Signature

Pedro Muniz
Global Director, Welding Equipment

CE 2020

TABLE OF CONTENTS

TABLE OF CONTENTS

1 SAFETY

1.1 Meaning of symbols

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

NOTE!
An operation, procedure, or background information which requires additional emphasis or is helpful in efficient operation of the system.

CAUTION
A procedure which, if not properly followed, may cause damage to the equipment.

WARNING
A procedure which, if not properly followed, may cause injury to the operator or others in the operating area.

WARNING
Gives information regarding possible electrical shock injury. Warnings will be enclosed in a box such as this.

WARNING
Gives information regarding possible electrical shock injury.

1.2 Safety precautions

WARNING!
These Safety Precautions are for your protection. They summarize precautionary information from the references listed in 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 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 you 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 watch 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, cuff less trousers, 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 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. Remove 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 coatings 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 do 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, overloaded welding cable can overheat and create a fire hazard.
7. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. 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 ground system of the input power.
2. Connect the workpiece to a good electrical ground.
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 work and from ground.
7. Do not stand directly on metal or the earth 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 ground 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 having pacemakers should consult their physician 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 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 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 ventilation is not adequate. Stop work and take 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. 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 adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting 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 and covers closed and securely in place.
2. Stop engine before installing or connecting 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, grounding 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 to you:

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

1.3 User responsibility

Users of ESAB welding and plasma cutting 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 welding or plasma cutting 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 welding or plasma cutting 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 welding or plasma cutting equipment must be familiar with:
   - its operation
   - location of emergency stops
   - its function
   - relevant safety precautions
   - welding and / or plasma cutting
2. The operator must ensure that:
   - no unauthorized person stationed within the working area of the equipment when it is started up.
   - no one is unprotected when the arc is struck.
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.

Dispose of electronic equipment at the recycling facility!
In observance of European Directive 2002/96/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 can provide you with all necessary cutting protection and accessories.

WARNING	**Arc welding and cutting can be injurious to yourself and others. Take precautions when welding and cutting. Ask for your employer's safety practices which should be based on manufacturers' hazard data.**

ELECTRIC SHOCK - Can kill.

- Install and earth (ground) the welding or plasma cutting unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the workpiece.
- Ensure your working stance is safe.

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 / plasma cutting screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD

- Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.

NOISE - Excessive noise can damage hearing.

- Protect your ears. Use earmuffs or other hearing protection.
- Warn bystanders of the risk.

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

READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!

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.**	

CAUTION	**This product is solely intended for metal removal. Any other use may result in personal injury and / or equipment damage.**

CAUTION	**Read and understand the instruction manual before installing or operating.**	

2 INTRODUCTION

The ESAB EMP 205ic AC/DC product is a new generation of multi-process (MIG/Stick/TIG:AC or DC) welding power sources.

All Rebel 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 EMP family 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.

2.1 Equipment

The ESAB EMP 205ic AC/DC power source is supplied with:

- ESAB EMP 205ic AC/DC power source
- ESAB MXL 201 MIG torch, 3 m (10 ft) with contact tips M6 for 0.8 mm and 1.0 mm
- ESAB SR-B 26 TIG Torch with accessories
- Gas hose, 4.5 m (14.8 ft), Quick connector
- MMA welding cable kit, 3 m (10 ft)
- Return cable kit 3 m (10 ft)
- Drive roll
  - 0.6 / 0.8 mm (0.023 in. / 0.030 in.) Cored, Steel and Stainless wire (installed on drive system)
  - 0.8 / 1.0 mm (0.030 in. / 0.040 in.) Cored, Steel and Stainless wire (in accessory box)
- Guide tube
  - 1.0 mm - 1.2 mm (0.040 in. - 0.045 in.) (installed on drive system)
  - 0.6 mm - 0.8 mm (0.023 in. - 0.030 in.) (in accessory box)
- Mains cable 3 m (10 ft), fixed with plug
- Safety manual
- USB with Operator's Manual
- Material thickness guide

2.2 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.

The procedures to recover the overheating condition:

- Allow system to cool, Rebel recovers on its own.
- Allow system to fully cool to point when fans stop before additional welding.
- If not reaching full 'Duty Cycle' and both fans operating, and no obstruction then return from service.

3 TECHNICAL DATA

3.1 EMP 205ic AC/DC specifications

	EMP 205ic AC/DC	
Voltage	230 V,1 ph, 50/60 Hz	120 V, 1 ph, 50/60 Hz
Primary current		
$I_{max.}$ GMAW - MIG	29.6 A	Breaker 20 A: 27.1 A Breaker 15 A: 20.2 A
$I_{max.}$ GTAW - DC TIG	24.0 A	Breaker 15 A: 20.7 A
$I_{max.}$ GTAW - AC TIG	26.5 A	Breaker 15 A: 21.4 A
$I_{max.}$ SMAW - Stick	28.3 A	Breaker 15 A: 20.5 A
$I_{eff.}$ GMAW - MIG	14.8 A	Breaker 20 A: 15.8 A Breaker 15 A: 14.5 A
$I_{eff.}$ GTAW - DC TIG	12 A	Breaker 15 A: 14.3 A
$I_{eff.}$ GTAW - AC TIG	13.3 A	Breaker 15 A: 14.9 A
$I_{eff.}$ SMAW - Stick	14.1 A	Breaker 15 A: 14.4 A
Permissible load in GMAW - MIG		
100% duty cycle*	110 A (V_{out} = 19.5 V)	Breaker 15 A: 65 A (V_{out} = 17.25 V) Breaker 20 A: 70 A (V_{out} = 17.5 V)
60% duty cycle*	125 A (V_{out} = 20.25 V)	Breaker 15 A: 85 A (V_{out} = 18.25 V) Breaker 20 A: 90 A (V_{out} = 18.5 V)
40% duty cycle*	150 A (V_{out} = 21.5 V)	Breaker 15 A: 90 A (V_{out} = 18.5 V)
25% duty cycle*	205 A (V_{out} = 24.25 V)	-
20% duty cycle*	-	Breaker 20 A: 115 A (V_{out} = 19.75 V)
Setting range (DC)	15 A (V_{out} = 14.75 V) - 235 A (V_{out} = 26.0 V)	15 A (V_{out} = 14.75 V) - 130 A (V_{out} = 20.5 V)
Permissible load in GTAW - DC TIG		
100% duty cycle*	110 A (V_{out} = 14.4 V)	Breaker 15 A: 80 A (V_{out} = 13.2 V)
60% duty cycle*	125 A (V_{out} = 15.0 V)	Breaker 15 A: 100 A (V_{out} = 14.0 V)
40% duty cycle*	-	Breaker 15 A: 110 A (V_{out} = 14.4 V)
25% duty cycle*	205 A (V_{out} = 18.2 V)	
Setting range (DC)	5 A (V_{out} = 10.2 V) - 205 A (V_{out} = 18.2 V)	5 A (V_{out} = 10.2 V) - 130 A (V_{out} = 15.2 V)
Permissible load in GTAW - AC TIG		
100% duty cycle*	110 A (V_{out} = 14.4 V)	Breaker 15 A: 75 A (V_{out} = 13.0 V)
60% duty cycle*	125 A (V_{out} = 15.0 V)	Breaker 15 A: 95 A (V_{out} = 13.8 V)
40% duty cycle*	-	Breaker 15 A: 105 A (V_{out} = 14.2 V)
25% duty cycle*	205 A (V_{out} = 18.2 V)	
Setting range (AC)	5 A (V_{out} = 10.2 V) - 205 A (V_{out} = 18.2 V)	5 A (V_{out} = 10.2 V) - 130 A (V_{out} = 15.2 V)
Permissible load in SMAW - Stick		
100% duty cycle*	100 A (V_{out} = 24 V)	55 A (V_{out} = 22.2 V)
60% duty cycle*	125 A (V_{out} = 25 V)	70 A (V_{out} = 22.8 V)
40% duty cycle*	-	75 A (V_{out} = 23.0 V)
25% duty cycle*	170 A (V_{out} = 26.8 V)	-
Setting range (DC)	16 A (V_{out} = 20.6 V) - 180 A (V_{out} = 27.2 V)	16 A (V_{out} = 20.6 V) - 130 A (V_{out} = 25.2 V)

	EMP 205ic AC/DC
Open circuit voltage (OCV)	
VRD deactivated	68 V
VRD activated	35V
Efficiency	78%
Power factor	0.98
Wire-feed speed	2-12.1 m/min (80-475 in./min)
Wire diameter	
Mild steel solid wire	0.6 - 0.9 mm (0.023 - 0.035 in.)
Stainless steel solid wire	0.8 - 0.9 mm (0.030 - 0.035 in.)
Flux-cored wire	0.8 - 1.1 mm (0.030 - 0.045 in.)
Aluminium	0.8 - 1.2 mm (0.030 - 0.047 in.)
Bobbin size	100-200 mm (4- 8 in.)
Dimensions L×W×H	548 × 229 × 406 mm (23 × 9 × 16 in.)
Weight	25.5 kg (56 lb,)
Operating temperature	-10 ° to + 40 °C (14 ° to 104 °F)
Enclosure class**	IP23S
Application classification***	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 40 °C (104 °F) or below.

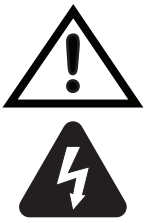
****Enclosure class**

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

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

*****Application class**

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



WARNING!
The welding circuit may or may not be earthed for safety reasons. Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury. For example: by allowing parallel welding current return paths which may damage the earth circuits of other equipment or cause injury/death to individuals.

4 INSTALLATION

The installation must be carried out by a professional.

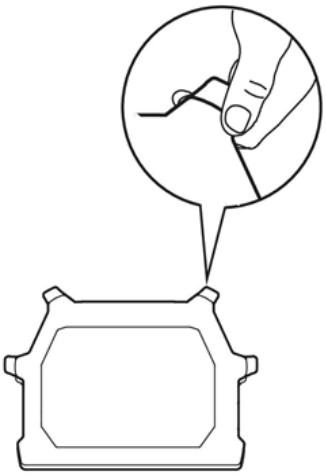
CAUTION!
This product is intended for industrial use. In a domestic environment, this product may cause radio interference. It is the user's responsibility to take adequate precautions.

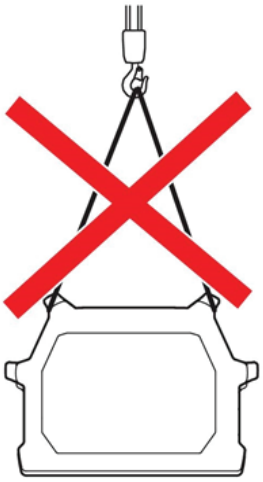
4.1 User's responsibility

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected, then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. This remedial action may be as simple as earthing the welding circuit. In other cases, it could involve constructing an electromagnetic screen enclosing the welding power source and the work, complete with associated input filters. In all cases, electromagnetic disturbances shall be reduced to the point where they are no longer troublesome.

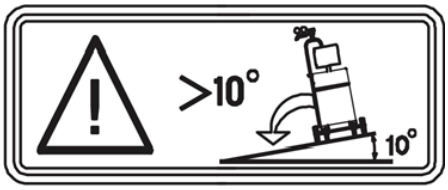
4.2 Lifting instructions

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



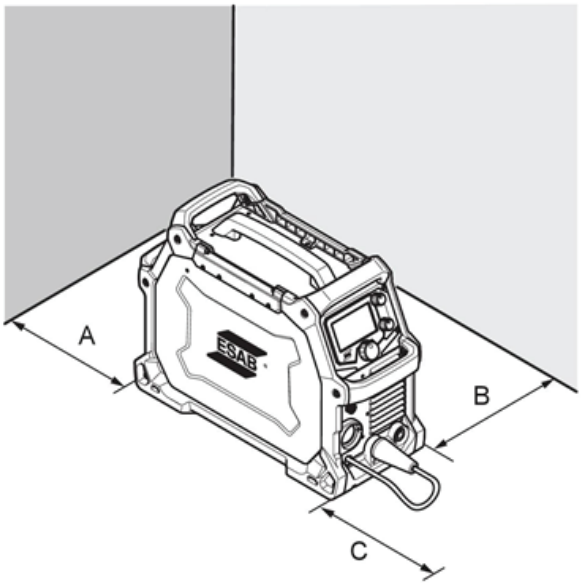


WARNING!
Secure the equipment - particularly if the ground is uneven or sloping.



4.3 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.)

If in a permanent installation leave enough room to open door and access bobbin side.

4.3.1 Assessment of area

Before installing welding equipment, the user/installer shall assess potential electromagnetic problems in the surrounding area. The following shall be considered:

1. Other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment.
2. Radio and television transmitters and receivers.
3. Computer and other control equipment.
4. Safety critical equipment, e.g. guarding of industrial equipment.
5. The health of people around, e.g. the use of pacemakers and hearing aids.
6. Equipment used for calibration and measurement.
7. The time of day that welding or other activities are to be carried out.
8. The immunity of other equipment in the environment, the user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures.
9. The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

Interference may be transmitted by a high frequency initiated or stabilized arc welding power source in the following ways:

- **Direct radiation:** Radiation from the equipment can occur if the case is metal and is not properly grounded. It can occur through apertures such as open access panels. The shielding of the high frequency unit in the power source will prevent direct radiation if the equipment is properly grounded.
- **Transmission via the supply lead:** Without adequate shielding and filtering, high frequency energy may be fed to the wiring within the installation (mains) by direct coupling. The energy is then transmitted by both radiation and conduction. Adequate shielding and filtering is provided in the power source.
- **Radiation from welding leads:** Radiated interference from welding leads, although pronounced near the leads, diminishes rapidly with distance. Keeping leads as short as possible will minimize this type of interference. Looping and suspending of leads should be avoided wherever possible.
- **Re-radiation from unearthed metallic objects**: A major factor contributing to interference is re-radiation from unearthed metallic objects close to the welding leads. Effective grounding of such objects will prevent re-radiation in most cases.

4.4 High frequency interference

WARNING!
The high frequency section of this machine has an output like a radio transmitter.

The power source should NOT be used near blasting operations due to the danger of premature firing.

WARNING!
Operation close to computer installations may cause computer malfunction.

WARNING!
HIGH FREQUENCY FIELDS CAN BE DANGEROUS TO HEALTH. Extra precautions may be required when this welding power source is used in a domestic situation. Welders with medical pacemakers should consult their doctor before welding. EMF may interfere with some pacemakers.

WARNING!
Equipotential bonding:

Bonding of all metallic components in the welding installation and adjacent to it might be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching the metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

WARNING!
Earthing/grounding of the work place:

Care should be taken to prevent the earthing of the work piece increasing the risk of injury to users, or damage to other electrical equipment. Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury.

WARNING!
The importance of correct installation of high frequency welding equipment cannot be overemphasized. Interference due to high frequency initiated or stabilized arc is almost invariably traced to improper installation. A duly authorized person such as a properly licensed electrician should perform the installation to avoid injury, death, or any equipment damage.

4.5 Main 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 supply voltage should be 230 V AC ±10% or 120 V AC ±10%. Too low supply voltage may cause poor welding performance. Too high 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:

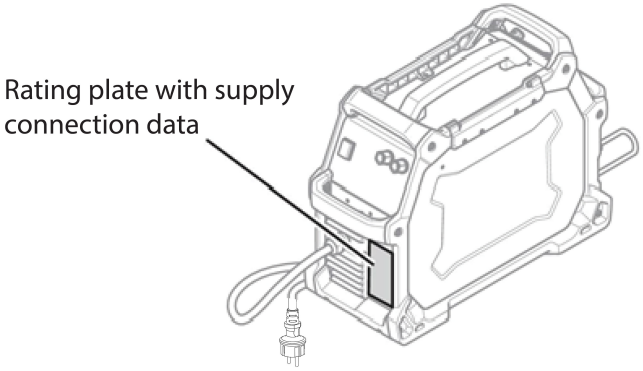
- Correctly installed, if necessary, by a qualified electrician.
- Correctly earthed (electrically) in accordance with local regulations.
- Connected to the correct size power point and fuse as tables below.

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. Connecting/disconnecting should be carried out by competent persons.



4.6 Recommended electrical-supply specifications

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.

Recommended electrical supply specifications: 120–230 V, 1 – 50/60 Hz		
Specification	**230 V AC**	**120 V AC**
Input current at maximum output	33 A	30 A
Maximum recommended fuse* or circuit breaker rating *Time delay fuse UL class RK5, refer to UL 248	40 A	30 A
Maximum recommended fuse* or circuit breaker rating Normal operating UL class K5, refer to UL 248	50 A	50 A
Minimum recommended cord size	2.5 mm² (13 AWG)	2.5 mm² (13 AWG)
Maximum recommended extension cord length	15 m (50 ft)	8 m (25 ft)
Minimum recommended grounding conductor size	2.5 mm² (13 AWG)	2.5 mm² (13 AWG)

4.7 Supply from power generators

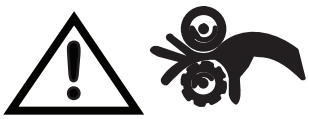
The power source can be supplied from different types of generators. However, some generators may not provide sufficient power for the welding power source to operate correctly.

Generators with Automatic Voltage Regulation (AVR) or with equivalent or better type of regulation, with rated power of minimum 8 kW 1 phase, are recommended.

5 OPERATION

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.

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.

5.1 Connections and controls

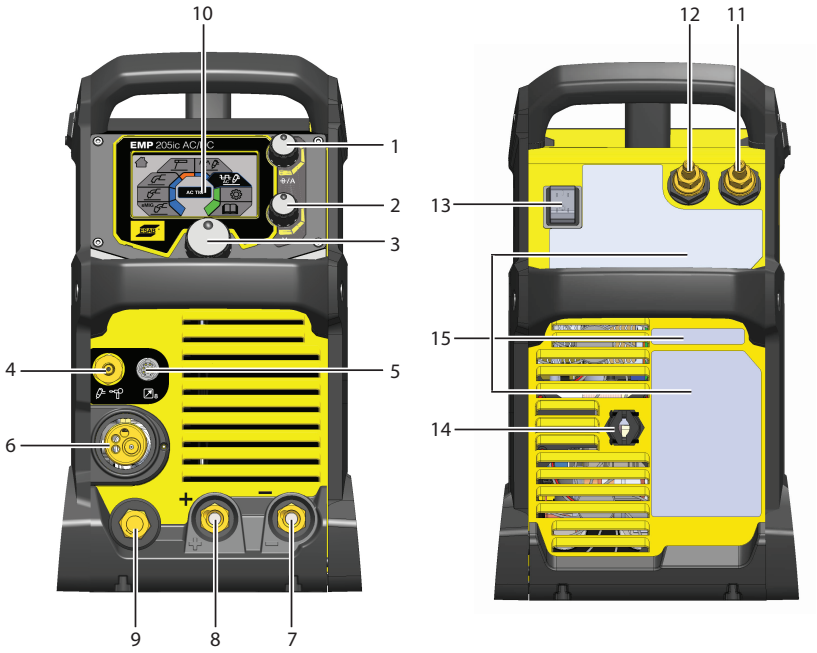


Figure 1. Front & rear views: Model EMP 205ic AC/DC

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

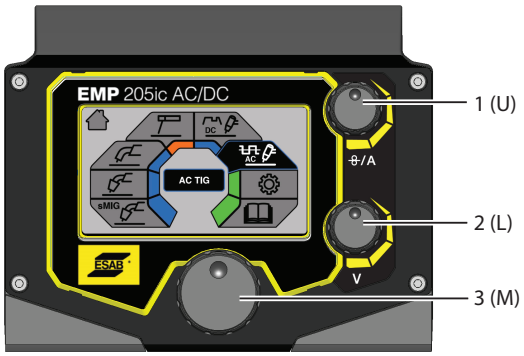


Figure 2. Function of user interface control dials

1. (U) Upper control knob: (a) Set current output value (b) Set wire-feed speed

2. (L) Lower control knob: (a) MIG voltage selection (b) SMIG voltage trim (c) MMA mode: Arc ON/OFF

3. (M) Menu navigation: Push to select

NOTE!
Lower control knob (2) 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) (see Figure 1).

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. Connect the torch connector to the Torch connection (6).

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, connect the TIG torch power cable to the negative [-] terminal (7), see illustration. 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 quick connect (12), on rear panel, to a regulated shielding gas supply. Connect the work return lead to the return-cable terminal positive output [+](9). Connect the torch connector to the negative output [-] (7) (see Figure 1).

5.3 Polarity change

Figure 3. Polarity changeover connections

1. Polarity changeover cable (not connected in Stick or TIG 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 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" section in the "CONTROL PANEL" chapter), the optimal welding arc with the gas used will be automatically set.

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) 120 V

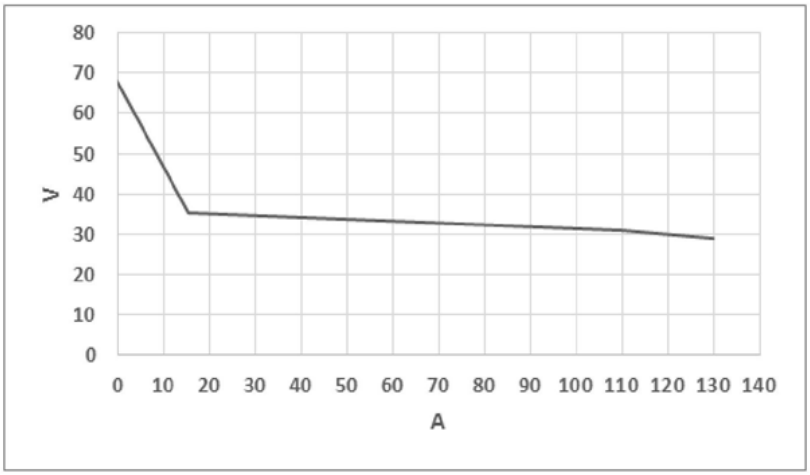


Figure 4. SMAW (Stick) 120 V Duty cycle

5.5.2 SMAW (Stick) 230 V

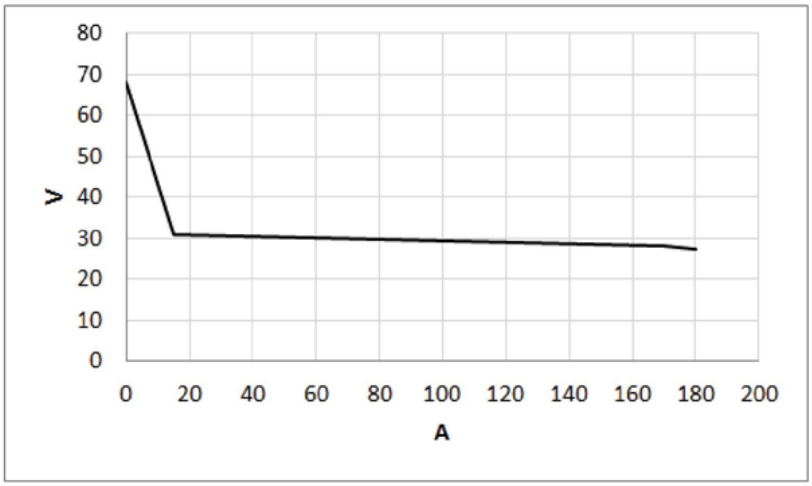


Figure 5. SMAW (Stick) 230 V Duty cycle

5.5.3 GMAW (MIG) 120 V

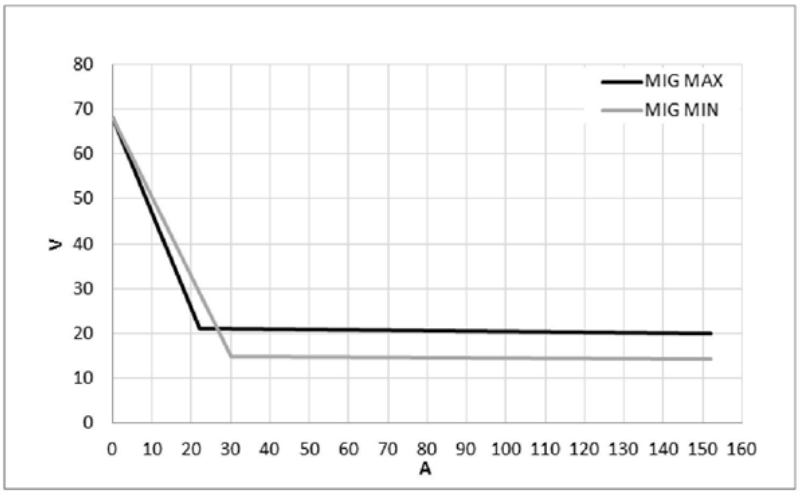


Figure 6. GMAW (MIG) 120 V Duty cycle

5.5.4 GMAW (MIG) 230 V

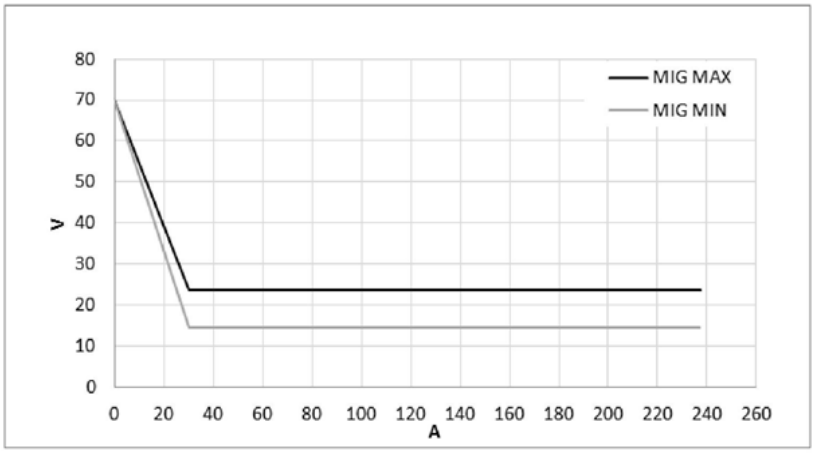


Figure 7. GMAW (MIG) 230 V Duty cycle

5.5.5 GTAW (DC TIG) 120 V

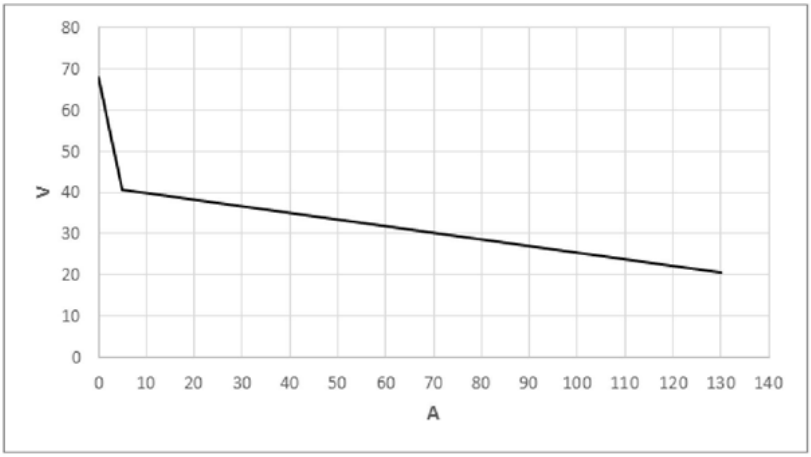


Figure 8. GTAW (DC TIG) 120 V Duty cycle

5.5.6 GTAW (DC TIG) 230 V

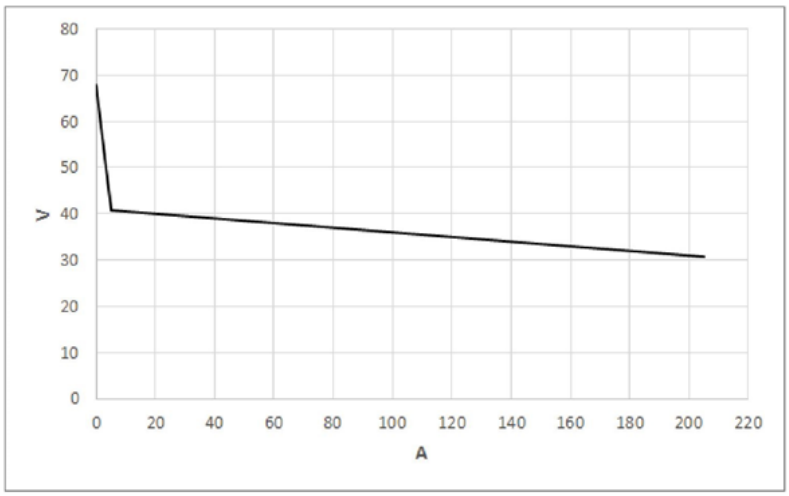


Figure 9. GTAW (DC TIG) 230 V Duty cycle

5.5.7 GTAW (AC TIG) 120 V

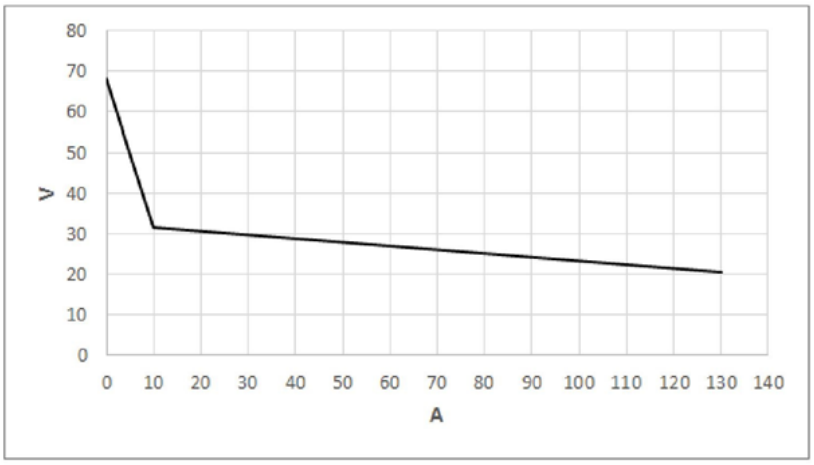


Figure 10. GTAW (AC TIG) 120 V Duty cycle

5.5.8 GTAW (AC TIG) 230 V

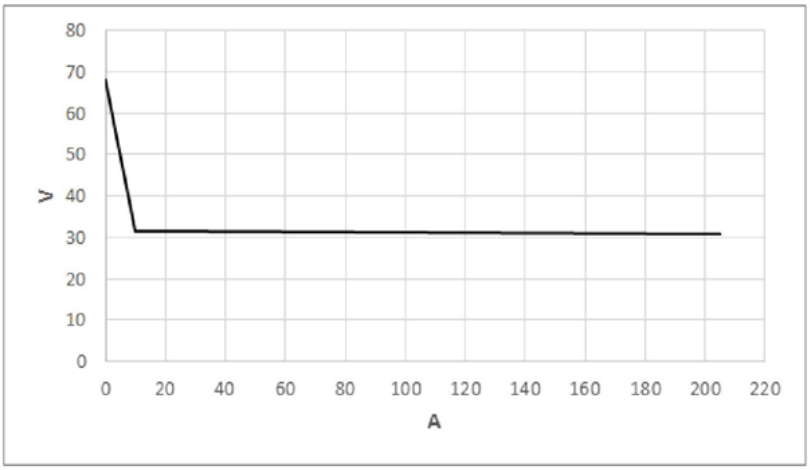


Figure 11. GTAW (AC TIG) 230 V Duty cycle

5.5.9 Duty cycle

25% duty cycle

The EMP 205ic AC/DC 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 minutes out of every 10-minute period. The remaining time, 7.5 minutes, the power source must be allowed to cool down.

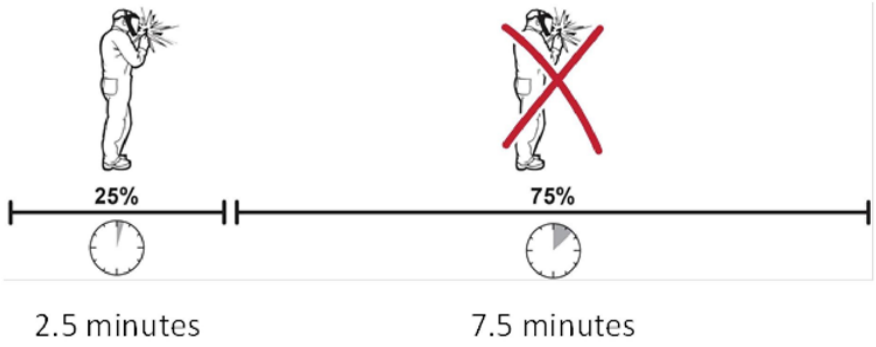


Figure 12. Example of 25% duty cycle

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.

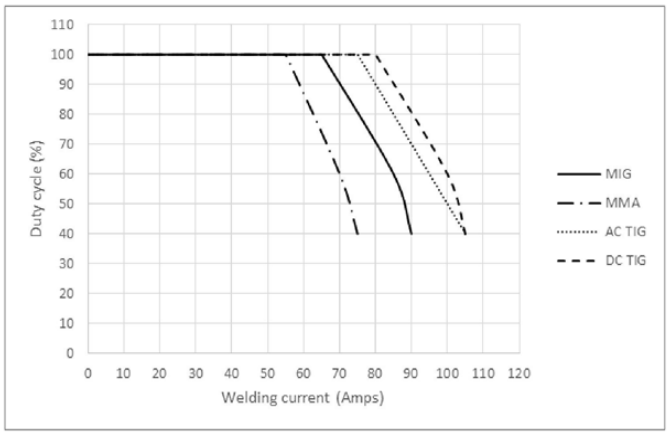


Figure 13. Plotting duty cycle for 120 V

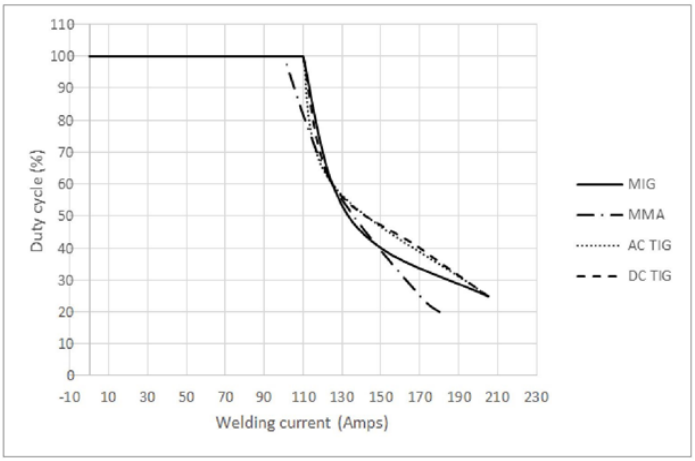


Figure 14. Plotting duty cycle for 230 V

5.6 Removing/installing bobbin

NOTE!
The gas does not need to 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 illustrations below, hand tight.

Remove/Install the bobbin as shown in below.

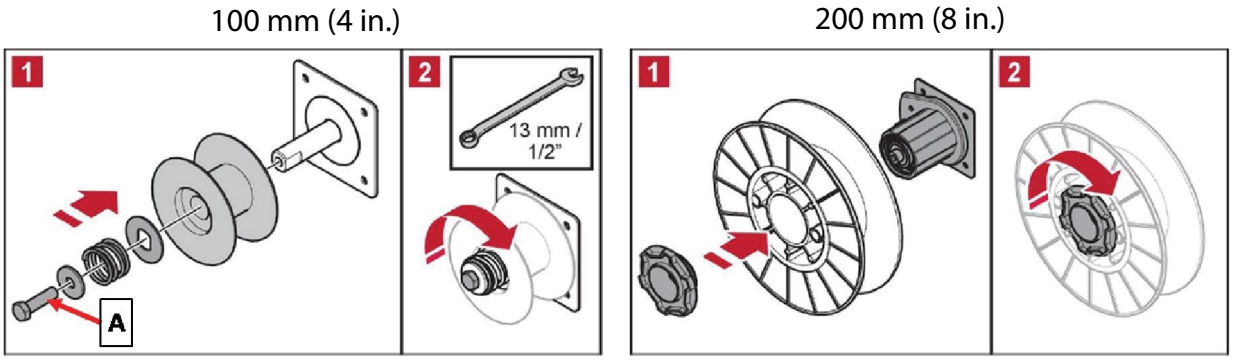


Figure 15. Tightening the bobbin locking nut for 100 mm (4 in.)

5.7 Liner selection

Refer to the torch user's guide, on the USB stick, to select the proper replacement liner for the wire type and diameter in use.

5.8 Installing/Removing wire

NOTE!
If installing aluminium wire, see "Welding with aluminium wire" section.

The EMP 205ic AC/DC will handle the two smaller bobbin sizes of 100 mm (4 in.) and 200 mm (8 in.). See "TECHNICAL DATA" chapter for suitable wire dimensions for each wire type.

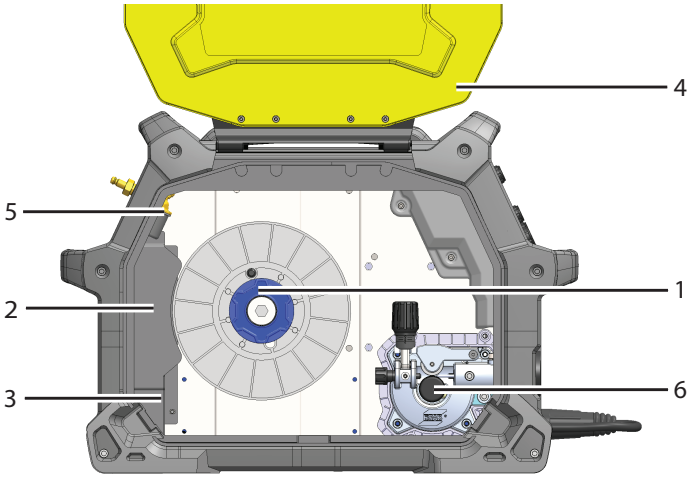


Figure 16. View of wire-bobbin side

1. Bobbin hub
2. EMC filter
3. Circuit breaker
4. Opening side cover
5. Gas valve
6. Wire-feed mechanism

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 bobbin! 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.

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.

5.8.1 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 MIG welding wire tightly to prevent it from unraveling.

5. With the MIG 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 MIG torch.
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 MIG torch lead reasonably straight, feed the wire through the MIG torch by depressing the trigger switch.
9. Close the side cover.

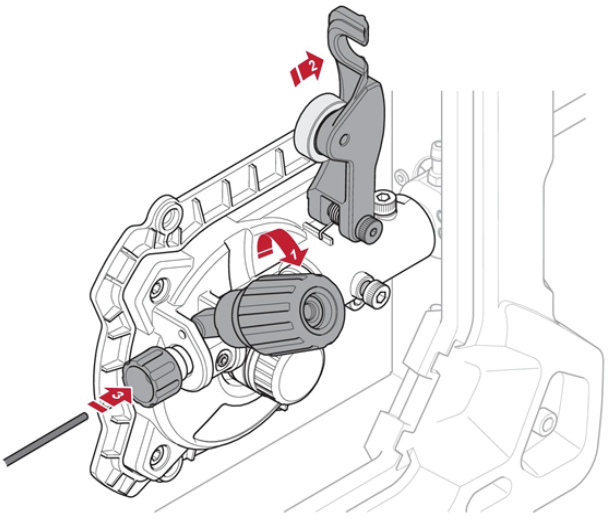


Figure 17. Wire-feed mechanism

5.8.2 Removing wire

1. Turn power to the unit OFF.
2. Cut off end of MIG 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 MIG 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.

5.9 Welding with aluminum wire

NOTE!
After completing the instructions in this section return to "5.8 Installing/removing wire" section.

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

- Model EMP 205ic AC/DC uses torch model: MXL™ 270 A MIG torch with 3 m (10 ft) cable (for FCW 1.2 mm)

Order the following accessories:

- Torch Teflon® conduit liner (PTFE liner), 3 m (10 ft): See PARTS section (Wire liner Table) in the ESAB Torch Instruction Manual (see Note above).
- Teflon® coated output wire-guide tube (select size to match wire from Table in Wear parts section).

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 or too low.

3. Check that the feed-pressure is set correctly, feed out the wire against an insulated object, e.g. a piece of wood.
4. **Adjusting for minimum roller pressure:**

   When you hold the welding torch approximately 6 mm (¼ in.) from the piece of wood (see Figure 12), 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.

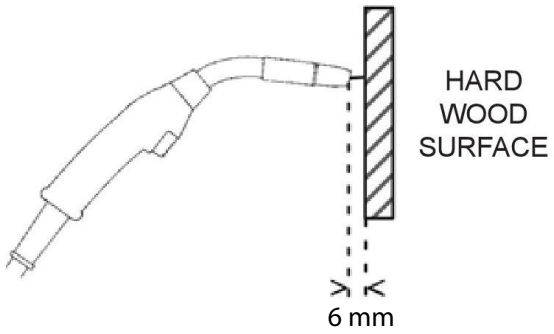


Figure 18. Check feed-roller for slip, indicating no over-pressure

5. **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 (Figure 13).

CAUTION!
Wear or protect the face/eyes/body parts from the wire end.

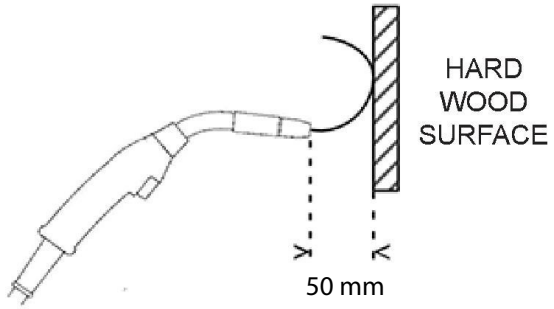


Figure 19. Checking for proper feed-roller pressure

5.11 Changing wire-feed roller

WARNING!
Disconnect power to the unit before starting this task.

NOTE!
Gas does not need to be connected for this procedure.

Different-size pairs of dual-groove feed-rollers are supplied as standard (Listed in Wear parts section). Change the feed rollers to match the wire size/type on the wire bobbin. See Wear parts section for feed roller selection. Figure 20 shows location of wire-feed rollers. The pressure rollers are not replaced.

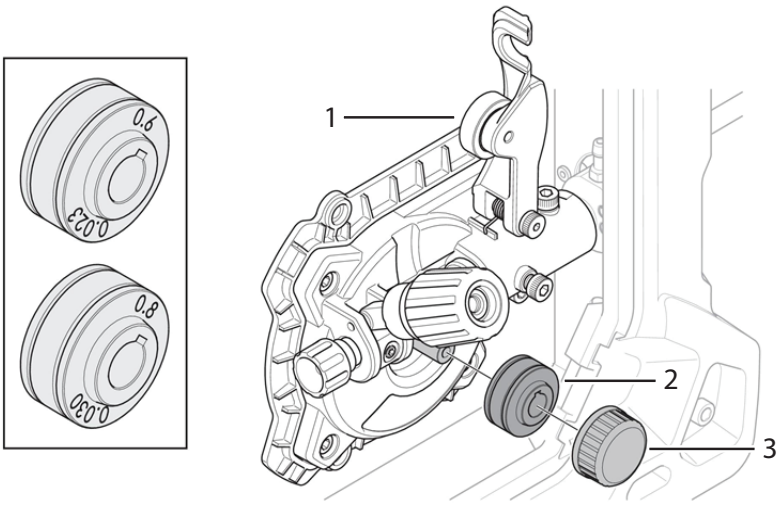


Figure 20. Location of wire-feed rollers and pressure rollers

1. Pressure roller
2. Wire-feed rollerr
3. Locking knob

NOTE!
The visual label stamped on the side of a wire-feed roller and facing you designates the wire-groove size on the opposite (inner) side of the roller. The selected groove should match the wire size being used. Each roller is designed to accommodate two groove-sizes. The groove size on a roller, when facing you matches the groove on the far side of the roller. Install the desired size groove with the label on the roller's side facing you.

5.11.1 Removing wire-feed roller

1. If new rollers are being installed select the correct size and type (U-groove, V-groove or knurled) for wire being installed (see Wear parts section).
2. Disconnect the electrical power source from the unit.
3. Open the cover on the wire-bobbin side of the EMP unit.
4. Before moving the tension knob: note its numerical setting as indicated on its body immediately below the handle. Record this number to reset the tension in its approximate range. Section "Setting wire-feed pressure" describes the fine adjustment for this tension adjustment.

> **NOTE!**
> Since the wire-feed pressure adjustment must 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.

5. Release the tensioning arm by loosening the tension knob, pulling it up out of its detent and rotating it toward you, (see 1 in Figure 10). Since the wire-feed pressure adjustment must be disturbed to release this arm, the tension on the rollers will have to be re-adjusted at the end of this procedure.

> **NOTE!**
> The tensioning arm is spring-loaded. It will pop-up when the tension knob is rotated out-of-the-way.

6. Lift the wire out of its groove.
7. Remove the wire-feed roller by removing its locking knob and sliding the roller from its shaft.

> **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.

5.11.2 Installing wire-feed roller

1. Install the drive roller (in the correct size and in the correct groove orientation). Verify that the correct size groove is oriented on the inside (see Figure 21).

> **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.

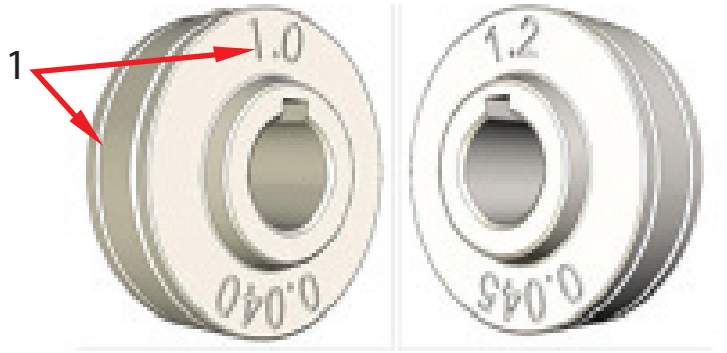


Figure 21. Wire-feed rollers offered in multiple sizes

1. Label and respective groove

> **NOTE!**
> Label on roller-side matches with the groove on the opposite-side of the roller.

2. Tighten the drive-roller locking knob by turning it in the clockwise direction. Hand-tight is sufficient.
3. Lay the wire into the inside groove of the Wire-Feed roller.

> **NOTE!**
> If the wire was removed (not just lifted from the groove in the roller) then the wire will have to be re-installed (see "Installing wire" subsection).

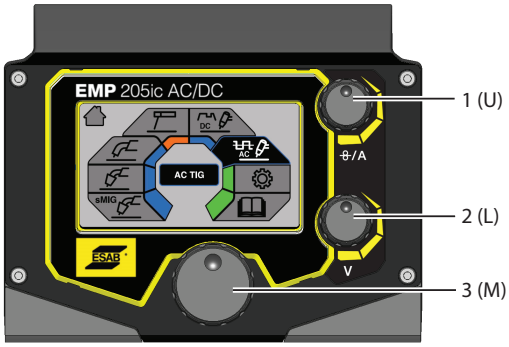
4. Close the pressure rollers on the wire.
5. Adjust the wire-feed pressure by adjusting the tension on the wire at the wire-feed rollers by turning the tension knob using the procedure in "Setting wire-feed pressure" section.
6. Close the cover on the wire-bobbin side of the EMP unit.

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 and follow your employer's safety practices before installing, operating, or servicing this equipment.

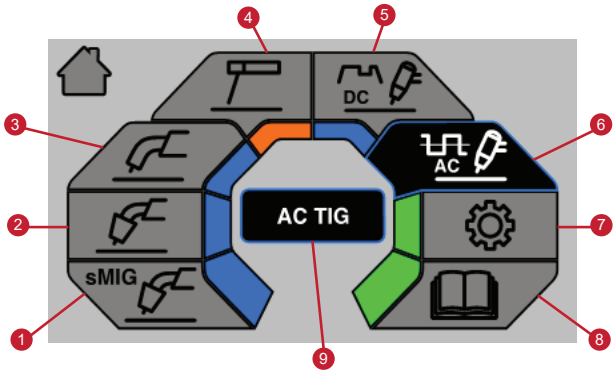
NOTE!
After power-ON has completed the main menu appears on the control panel.

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
   d) DC TIG: Set PPS
   e) AC TIG: Set Balance
3. Menu navigation: Push to select

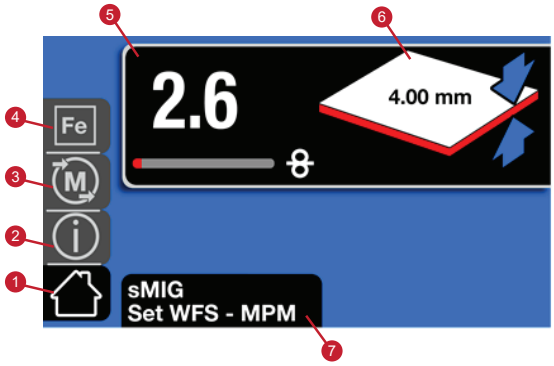
6.2 EMP 205ic AC/DC Home screen



1. sMIG mode
2. Manual MIG mode
3. Gasless flux cored wire mode
4. MMA mode
5. DC TIG mode
6. AC TIG mode
7. Settings
8. User manual
9. Dialogue box

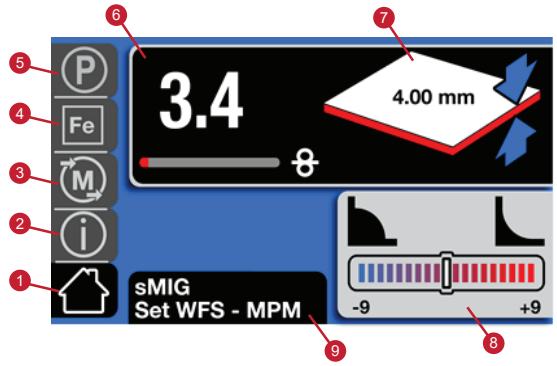
6.2.1 sMIG mode

- **Basic:**



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

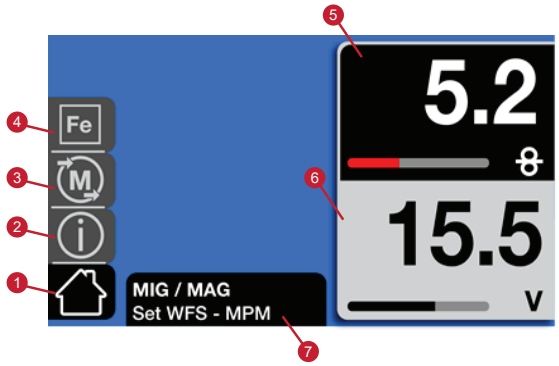
- **Advanced:**



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

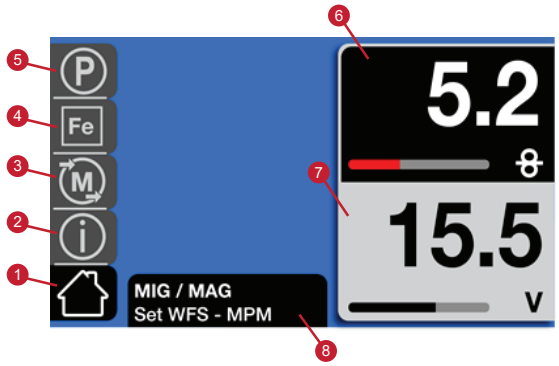
6.2.2 Manual MIG mode

- **Basic:**



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

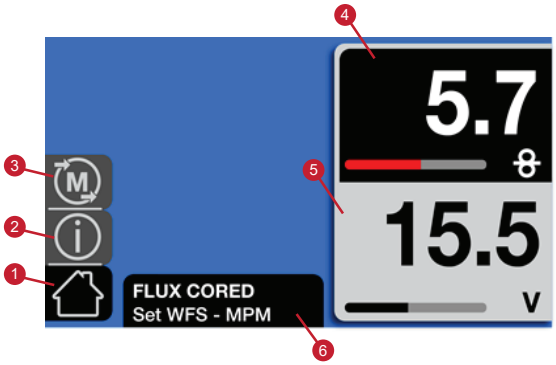
- **Advanced:**



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

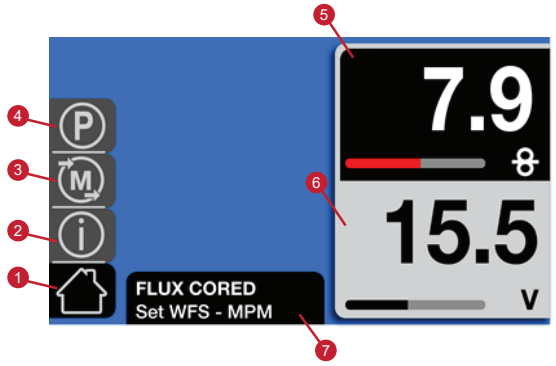
6.2.3 Gasless flux cored wire mode

- **Basic:**



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

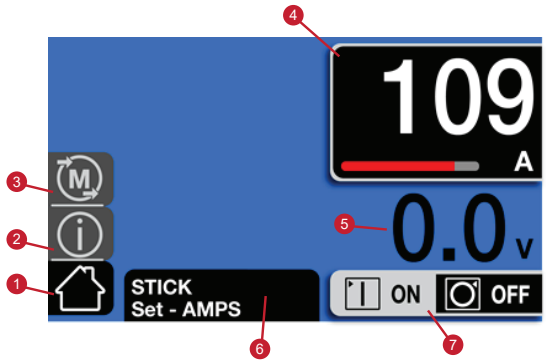
- **Advanced:**



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

6.2.4 MMA mode

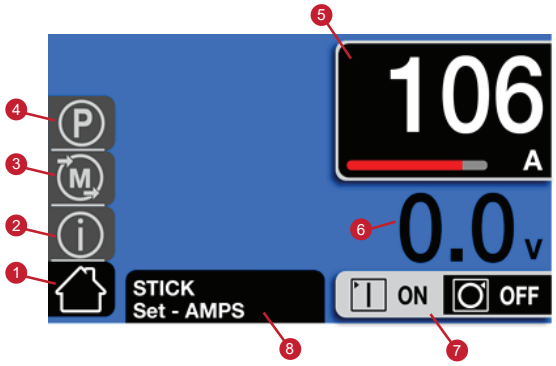
- **Basic:**



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

Blue changes to orange when output is "hot".

- **Advanced:**

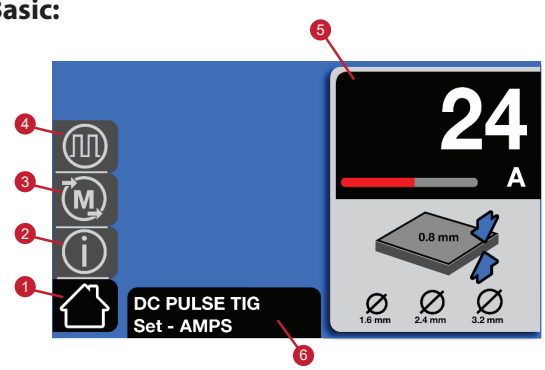


1. Home screen
2. Information
3. Memory
4. Parameter selection
5. Amperage
6. Weld output voltage
   (Open Circuit Voltage or Arc)
7. Arc ON/OFF
8. Dialogue box

Blue changes to orange when output is "hot".

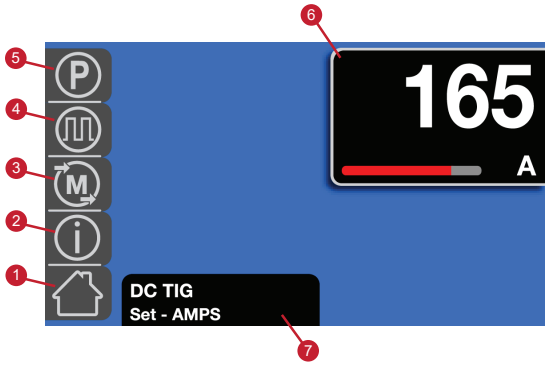
6.2.5 DC TIG mode

- **Basic:**



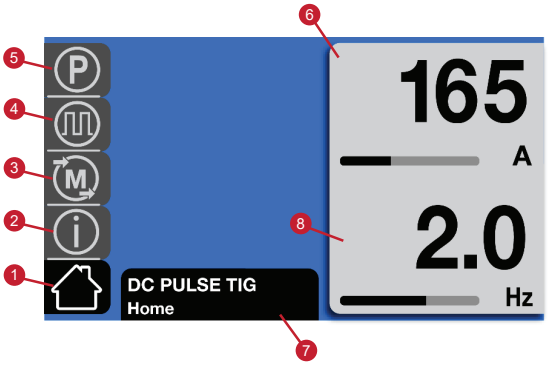
1. Home screen
2. Information
3. Memory
4. Pulse
5. Amperage
6. Dialogue box

- **Advanced with Pulse OFF:**



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

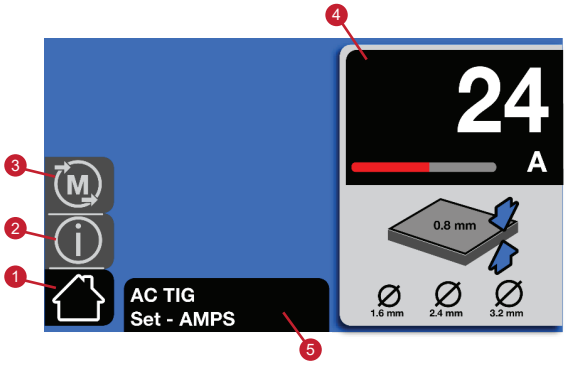
- **Advanced with Pulse ON:**



1. Home screen
2. Information
3. Memory
4. Pulse
5. Parameter selection
6. Amperage
7. Dialogue box
8. Peak time

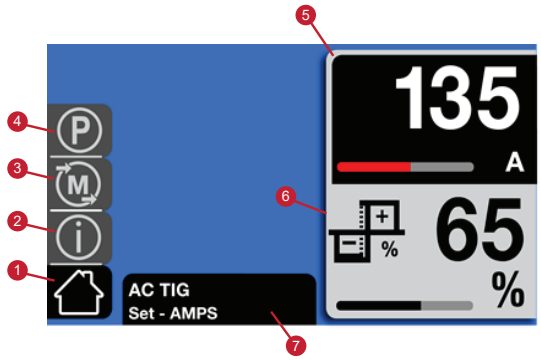
6.2.6 AC TIG mode

- **Basic:**



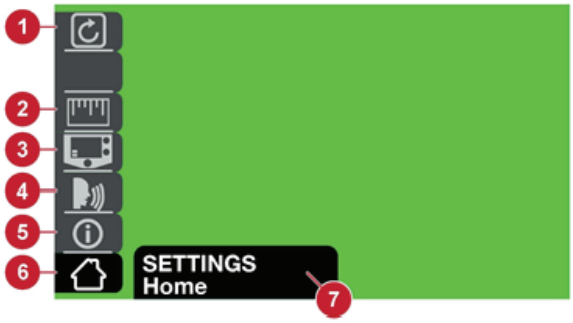
1. Home screen
2. Information
3. Memory
4. Amperage
5. Dialogue box

- **Advanced**



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

6.3 Settings



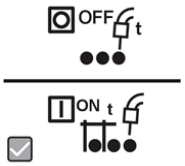
1. Reset modes
2. Inch/Metric
3. Basic/Advanced
4. Language settings
5. Information
6. Home screen
7. Dialogue box

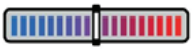
6.4 User manual information

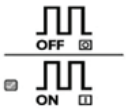
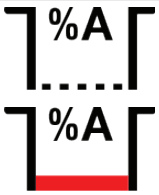
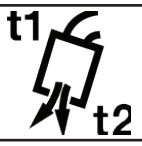
1. Maintenance information
2. Wear/Spare parts
3. Operation information
4. Home screen
5. Dialogue box

6.5 Icon reference guide

NOTE!
SCT – Short Circuit Termination is a method of automatic burn back at the end of the weld to electrically cut the wire by pulsing high current in a controlled process. The result is a nice clean wire end with no balling or sticking to the weld pool or tip. This allows exceptional restarting of subsequent welds. This feature is primarily for Mild and Stainless steel short-arc welding. For spray and flux core welding, traditional burn back is recommended. When burn back time is set to zero, SCT automatically is enabled. A non-zero burn back setting will disable SCT.

ICON	MEANING	ICON	MEANING
	**Home**		**Spot time ON/OFF selection** (use navigation knob and push to select from display)
	**Burn back** Adjusting the time when the voltage stays on after the wire-feed is stopped to keep the wire from freezing in the weld puddle	**SCT SELECTION ON DISPLAY**	**Short Circuit Termination** (SCT: see NOTE above) ON: burnback set to zero OFF: burnback set to non-zero.
	**Information**		**Wire-feed speed**

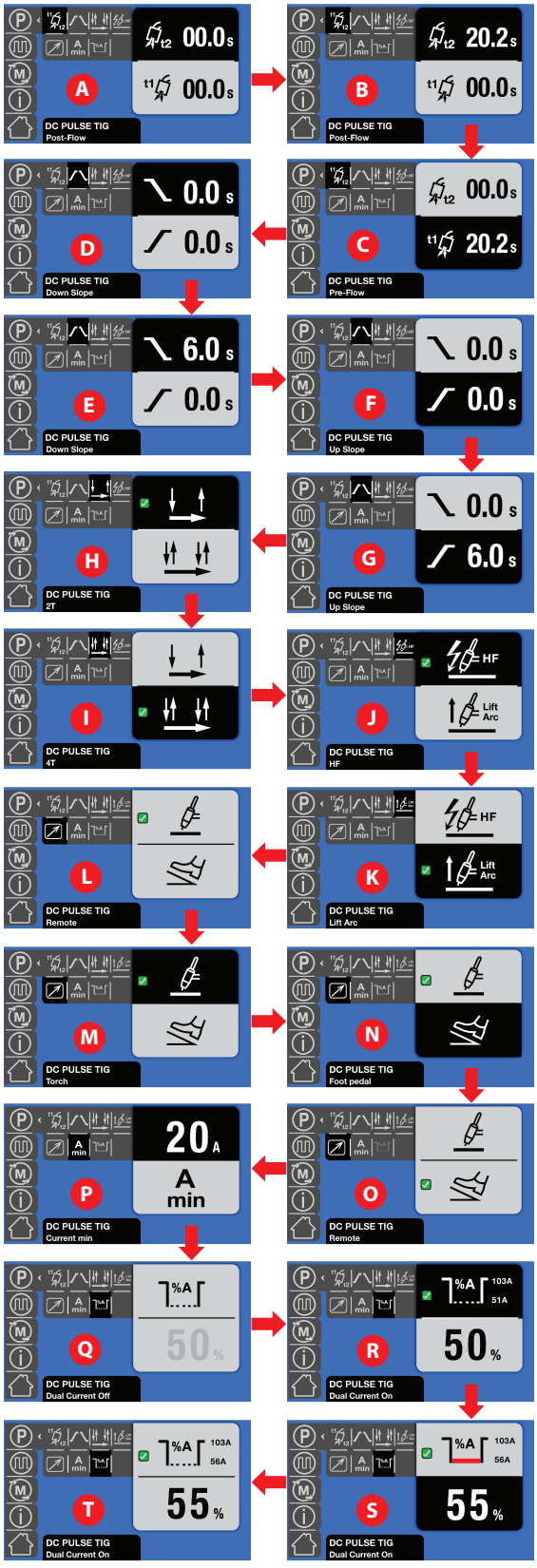
ICON	MEANING	ICON	MEANING
	**MIG Torch**		**Spot time ON adjustment**
	**Parameters**		**Flux cored**
	**Parameters**		**Manual MIG**
	**Percent**		**STICK**
	**Pre-flow** The time the shielding gas stays on before the welding arc is started		**Smart MIG**
	**Post-flow** The time the shielding gas stays on after the welding arc is stopped		**Lift-TIG**
	**Seconds**		**Saving** welding programs for a specific application when in the Memory Mode
	**Settings** on user manual menu		**Cancel**
	**Spool torch** (Not all markets)		**Remote**
	**Settings**		**Foot control**
	**2T, Trigger ON/OFF**		**Volts**
	**4T, Trigger Hold/Lock**		**User manual** on main menu
	**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** Changing the weld bead profile from flat to convex or flat to concave
	**Down-Slope** 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**

ICON	MEANING	ICON	MEANING
	**Inductance** The addition of inductance into the arc characteristics to stabilize the arc and reduce spatter when in the short circuit process		**Language selection**
	**Memory** Ability to save welding programs for a specific application		**Stick electrode choice**
	**Up-Slope** Sloping the current up over a period of time at the beginning of the weld cycle		**Unit of Measure**
.8 mm (.030") ∅	**Wire diameter**		**Bead profile, concave**
	**DC-TIG**		**Bead profile, convex**
	**AC-TIG**		**Pulse**
	**Up-Slope/Down-Slope**		**Pulse ON/OFF**
Hz	**Hz**		**Back Current**
	**Peak Time**		**Balance**
	**Offset**		**Frequency**
	**Retrieve**		**Erase**
	**Dual Current**	A min	**Amin**
	**HF Start**		**Lift Arc**
	**Preflow/Postflow**		

7 TIG WELDING OPERATION

7.1 DC TIG Welding

Below illustration shows the navigation/setup of DC TIG Welding in advanced mode (A-B-C-D-E-F-G-H-I-J-K-L-M-N-O-P-Q-R-S-T).



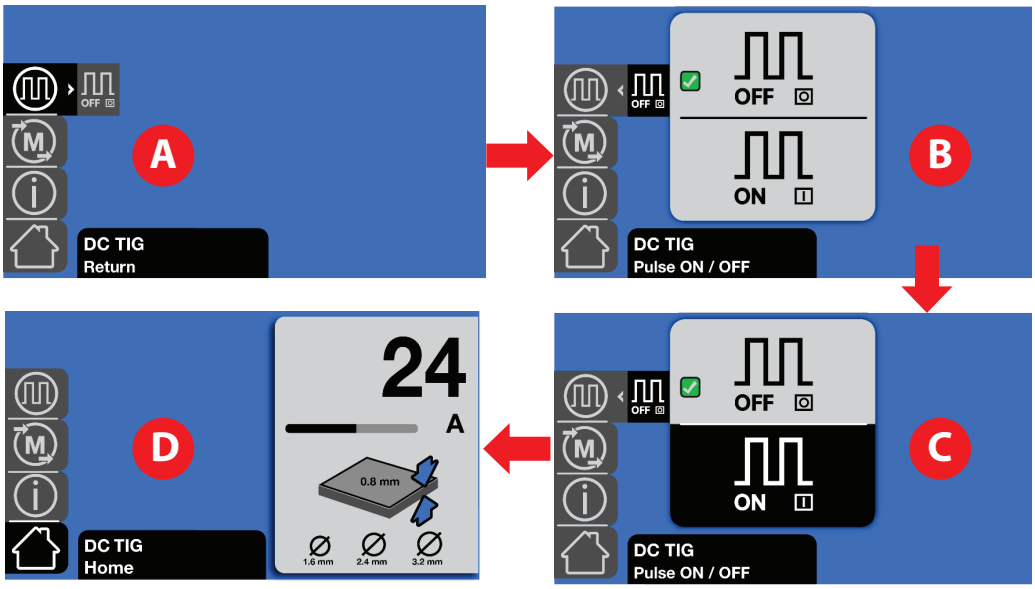
7.1.1 DC TIG Pulse

DC TIG Pulse 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 applied to the work piece. Pulse setting gives user far more control over the welding process without compromising the strength and integrity of the weld and helps in having a smooth and clean weld.

Basic Mode:

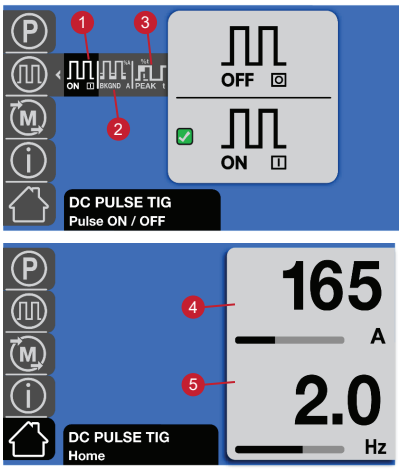
In basic mode DC TIG pulse has default settings as Back Current = 50 %, Peak Time = 50 %, PPS = 2.

User must be in Advance Mode to adjust these parameters. Below illustration shows the navigation/setup of DC TIG Pulse in basic mode (A-B-C-D).



Advanced Mode:

In advanced mode, the user has the ability to adjust the DC Pulse TIG settings as explained below.



1. Pulse ON/OFF
2. Back Current (%)
3. Peak Time (%)
4. Peak/Set Current (A)
5. Hz/PPS (Pulses Per Second)

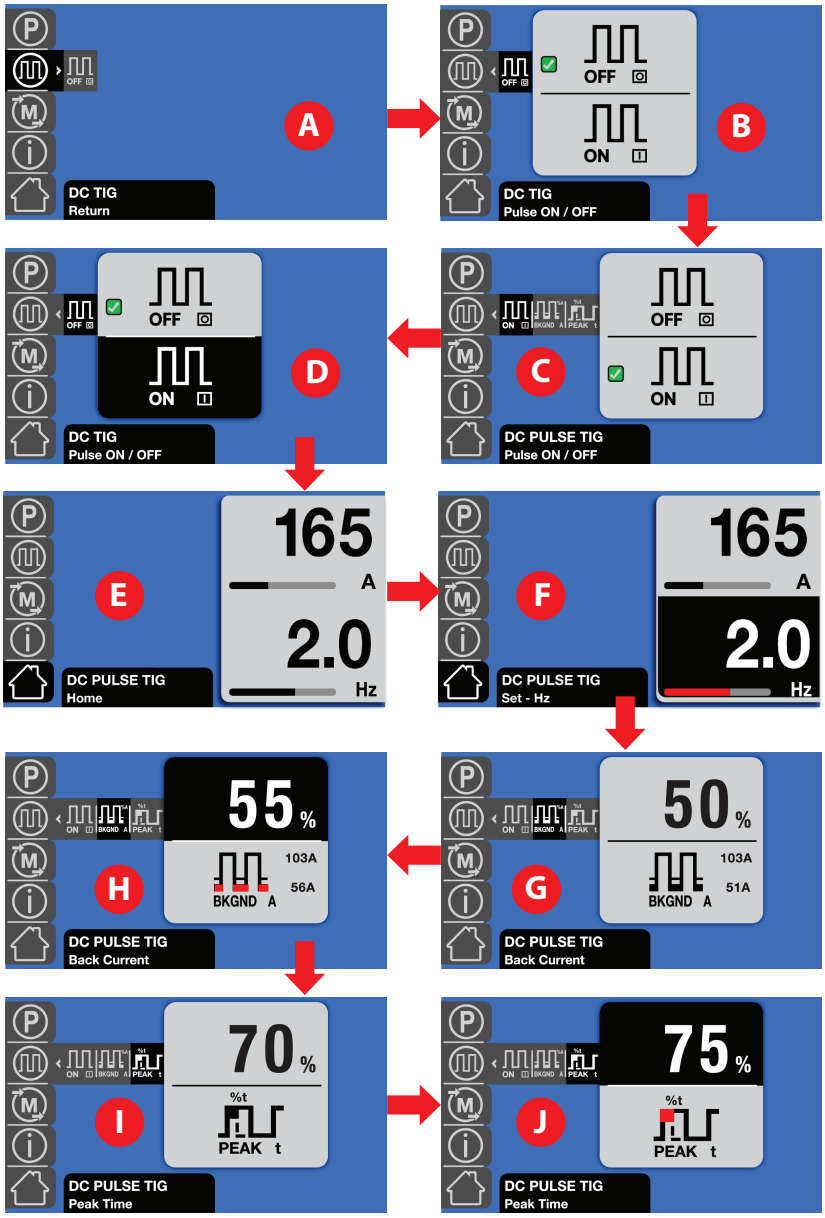
Back Current (%): Background Current is the amount of the current at which the DC TIG Pulse waveform is in the background time. The back ground current is adjusted in percentage of peak current in the pulse menu. Can be adjusted between 1 and 99 %.

Peak Time (%): The peak time is the time at which the DC TIG Pulse waveform is at peak current. Peak time is adjusted in the percentage quantity of PPS. Can be adjusted between 1 and 99 %.

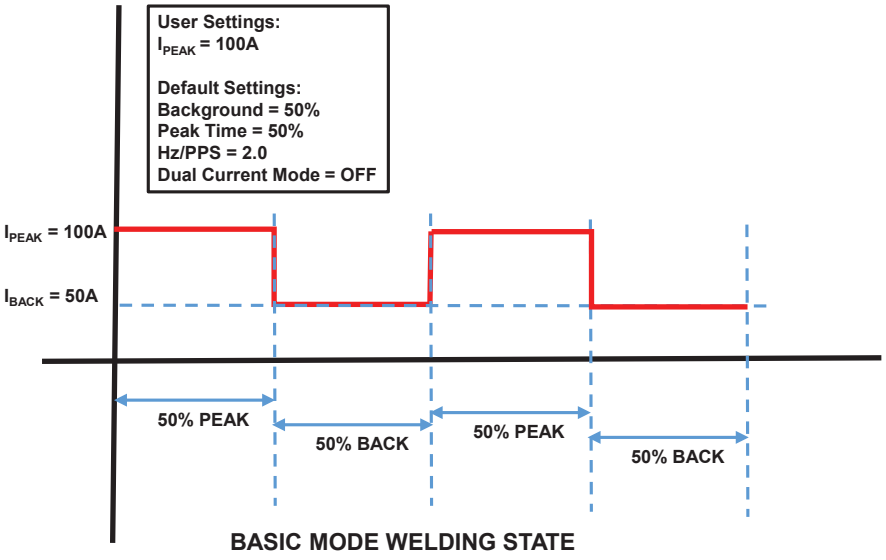
Peak/Set Current (A): The peak current is set by using the Upper control knob. Can be adjusted between 5 and 205 A.

Hz/PPS (Pulses Per Second): The rate at which DC TIG Pulse output current waveform toggles between peak current and background current is set by using the Lower control knob. Can be adjusted between 0.1 and 500.

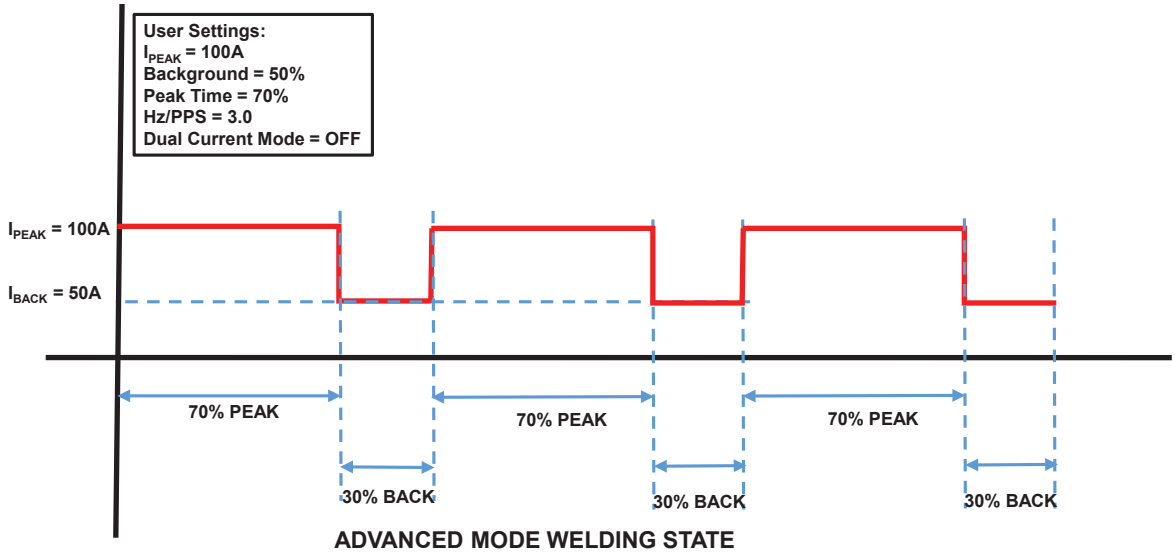
Below illustration shows the navigation/setup of DC TIG Pulse in advanced mode (A-B-C-D-E-F-G-H-I-J).



Below illustration shows an example of DC TIG Pulse output current ideal waveforms in Basic and Advanced modes.



BASIC MODE WELDING STATE



ADVANCED MODE WELDING STATE

DC TIG Pulse Operation with Remote Current Controller Connected:

EMP 205 machine supports following different Remote Current Controllers supplied by ESAB.

1. Foot Pedal
2. Remote Hand Pendant
3. Remote Thumb Controller (separate or as part of TIG Torch assembly)

When Remote controller is connected to EMP 205 machine using 8-pin receptacle on the front panel, the background current calculations are different than that with regular TIG torch with trigger. Without Remote controller the background current value is the set percentage times the user set current but with Remote controller it is the set percentage times the Remote controller set current.

Example:

Basic Mode: If user sets current as

I_{peak} (A) = 100

The default settings for other parameters in basic mode are

Background (%) = 50

Peak Time (%) = 50

Hz/PPS (Pulses Per Second) = 2.0

I_{min} (A) = 5

The calculated value of

I_{back} (A) = 50A (I_{peak} * 50% = 100 * 0.5)

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

I_{peak} = 100A

I_{back} = 50A

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

I_{peak} = 50A

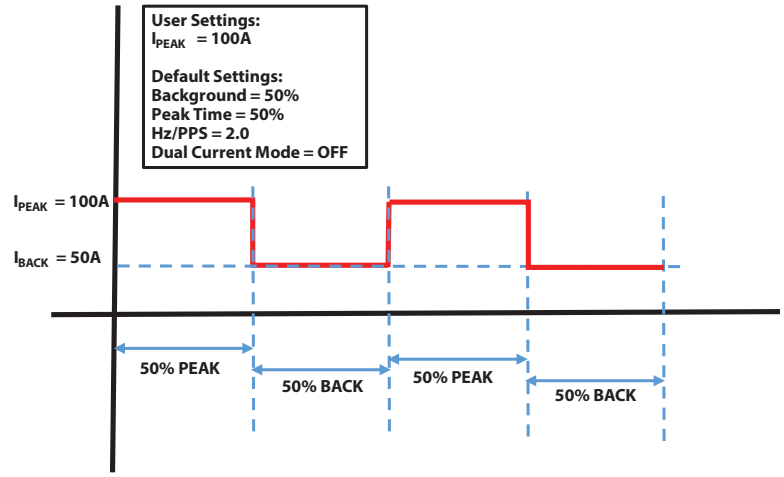
I_{back} = 25A

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

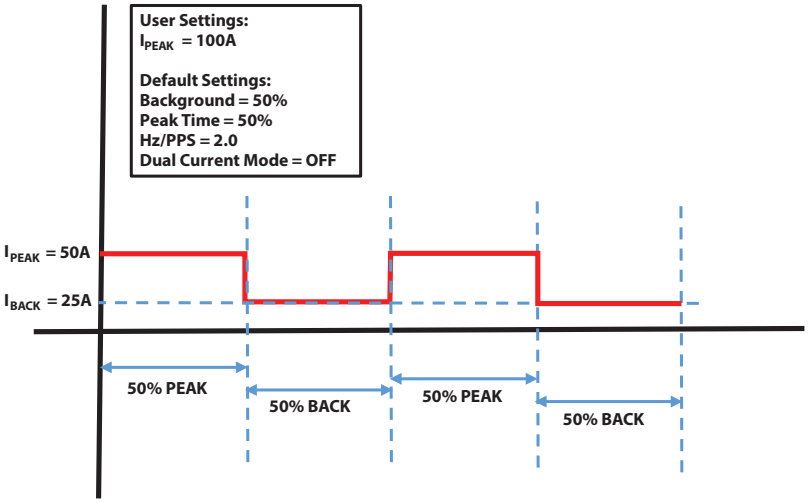
I_{peak} = 75A

I_{back} = 37A

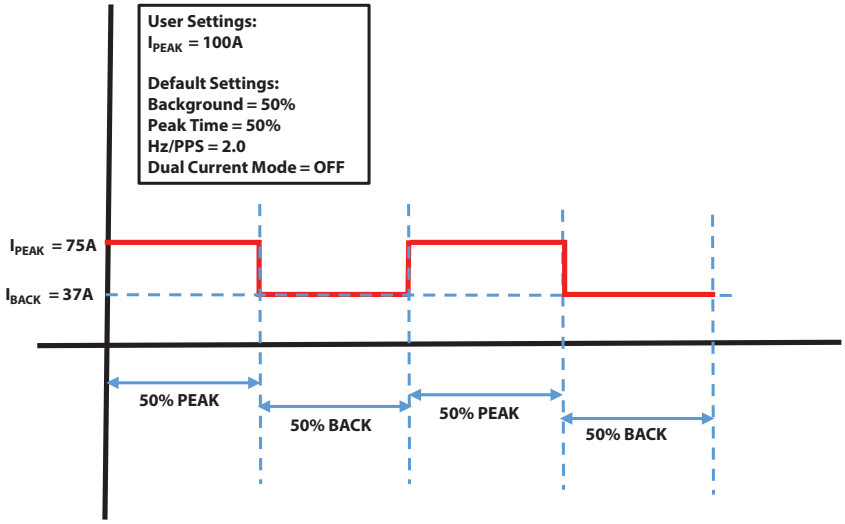
Below illustration shows the above example in terms of output current waveforms in basic mode.



BASIC MODE WELDING STATE WITH REMOTE SET TO ALL THE WAY



BASIC MODE WELDING STATE WITH REMOTE SET TO HALF WAY



BASIC MODE WELDING STATE WITH REMOTE SET TO THREE - FOURTH WAY

Advanced Mode: If user sets parameters as

I_{peak} (A) = 100
Background (%) = 80
Peak Time (%) = 70
Hz/PPS (Pulses Per Second) = 3.0
I_{min} (A) = 5

The calculated value of

I_{back} (A) = 80A (I_{peak} * 80% = 100 * 0.8)

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

I_{peak} = 100A
I_{back} = 80A

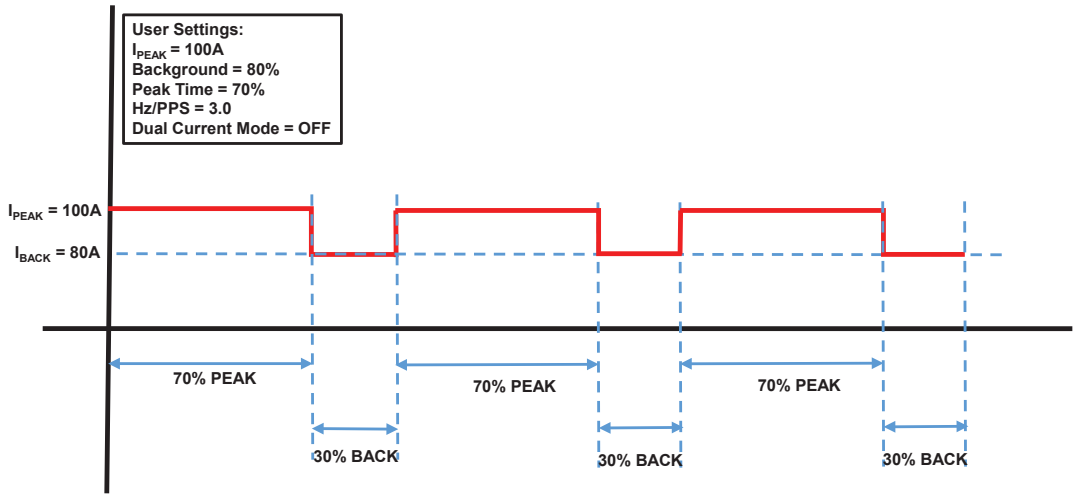
but if user sets the Remote controller to half way then,

I_{peak} = 50A
I_{back} = 40A

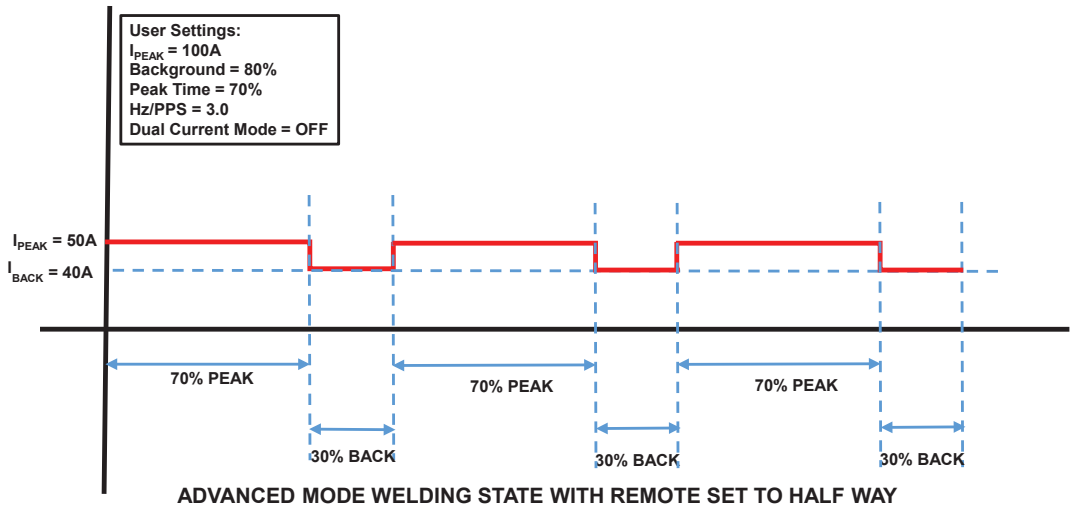
and if user sets the Remote controller to three-fourth way then,

I_{peak} = 75A
I_{back} = 60A

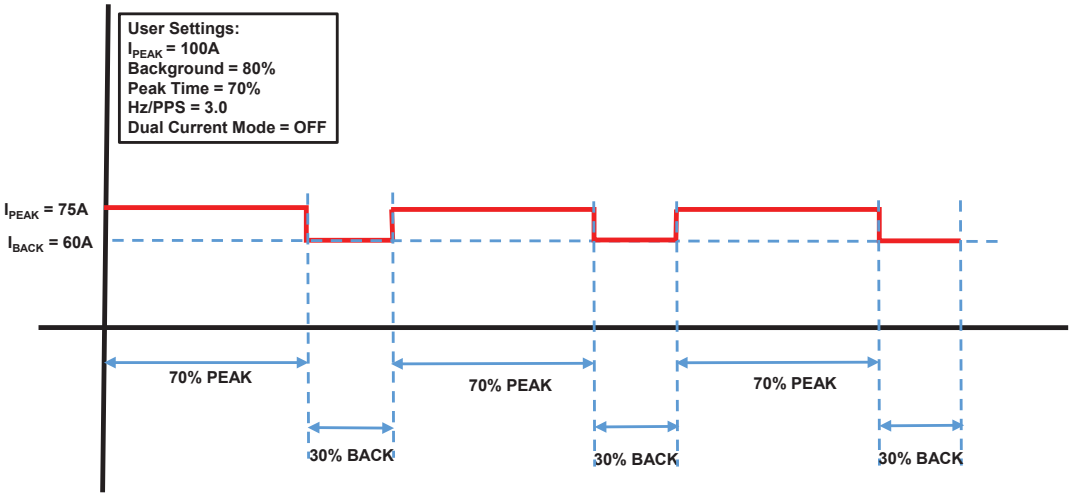
Below illustration shows the above example in terms of output current waveforms in advanced mode.



ADVANCED MODE WELDING STATE WITH REMOTE SET TO ALL THE WAY



ADVANCED MODE WELDING STATE WITH REMOTE SET TO HALF WAY



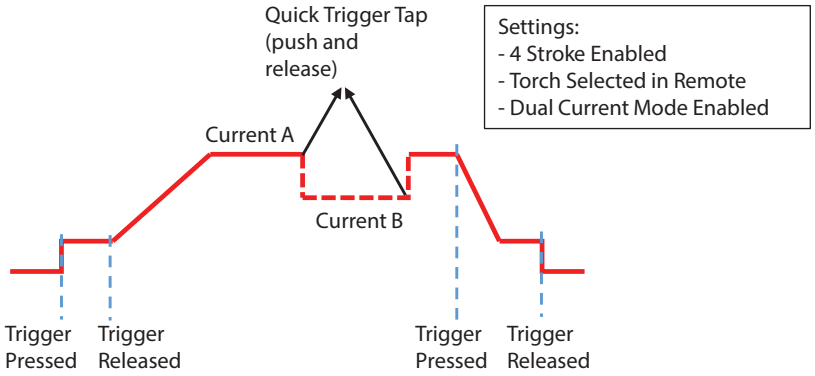
ADVANCED MODE WELDING STATE WITH REMOTE SET TO THREE-FOURTH WAY

7.1.2 DC TIG Dual Current

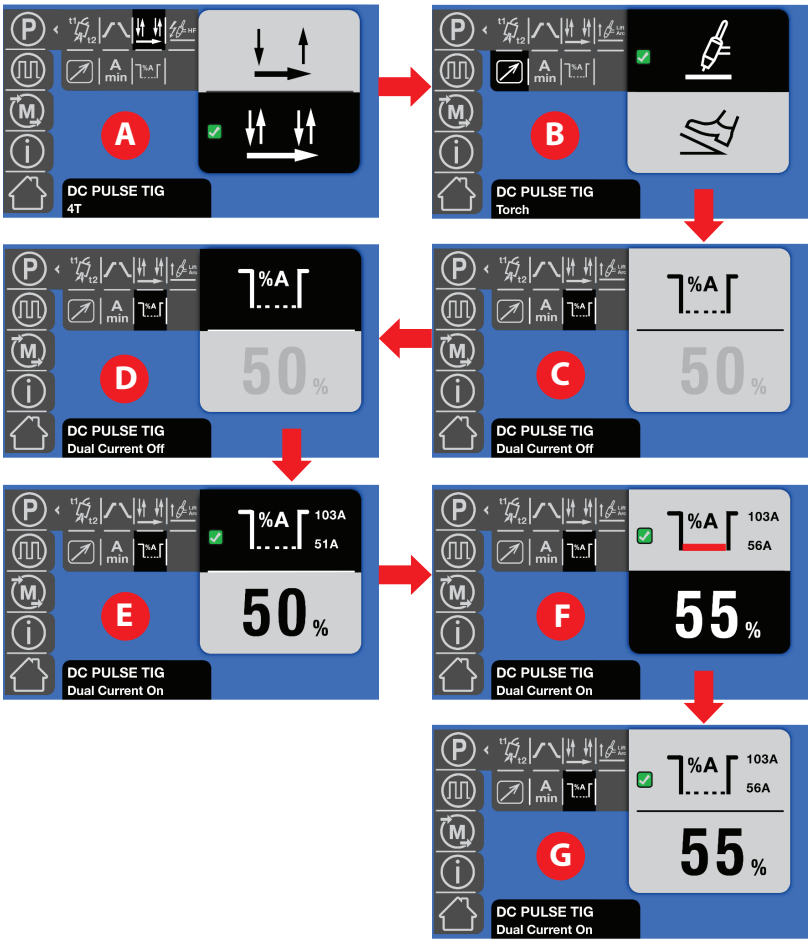
EMP 205 CE introduces new feature called Dual Current operation in DC TIG (both straight and pulse DC operation) in Rebel family. Dual Current feature lets the user to switch to lower current during welding the corners or edges without stopping the weld.

Dual Current operation is available only in Advance Mode when 4-stroke is enabled and Remote set to Torch.

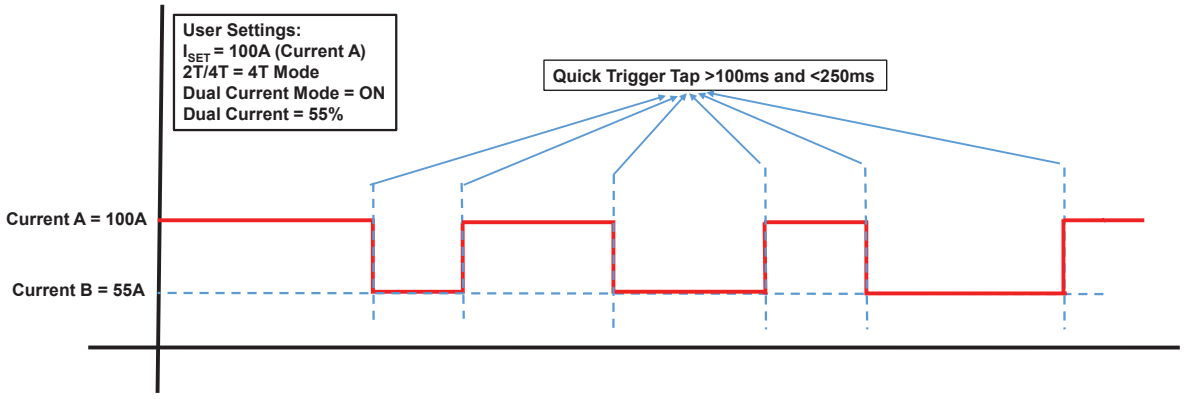
When Dual Current mode is enabled, it can be activated by quick trigger tap action during welding. One quick tap on trigger (push and release) will switch the output weld current from "Current A" to "Current B", another quick tap on trigger will switch the current from "Current B" to "Current A". See below picture.



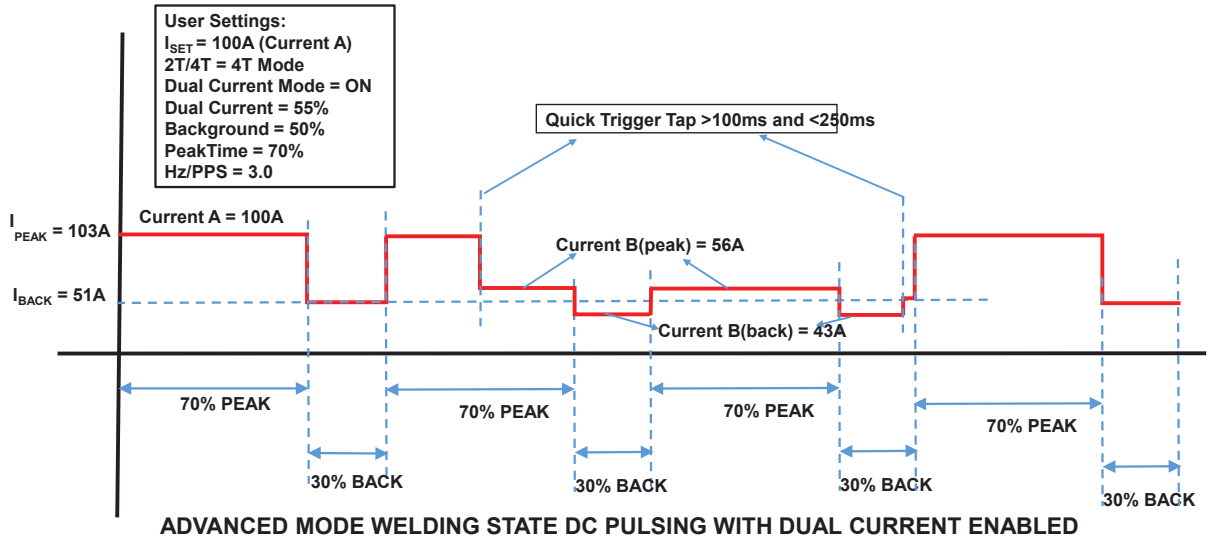
Below picture illustration shows the navigation/setup of Dual Current in DC TIG Welding in advanced mode (A-B-C-D-E-F-G).



The "Current B" value is the percentage of user set current ("Current A"). From above illustration the Dual Current percentage set to 55% and user set current ("Current A") set to 103A, the "Current B" value is 103 x 55% = 56A. When pulsing the "Current B" value for Peak current value is the Dual Current percentage times the peak current and for Back current the "Current B" value is Background current times 0.85. See below pictures.



ADVANCED MODE WELDING STATE WITH DUAL CURRENT ENABLED



ADVANCED MODE WELDING STATE DC PULSING WITH DUAL CURRENT ENABLED

7.2 AC TIG Welding

AC TIG Welding is used mainly for non-ferrous materials like aluminum. In AC TIG Welding the output current polarity is switched between Electrode Positive (EP) and Electrode Negative (EN). In Rebel 205ic AC/DC the switching of output polarity ranges from 25 – 400 Hz. EN polarity provides the welding action and EP polarity provides cleaning action.

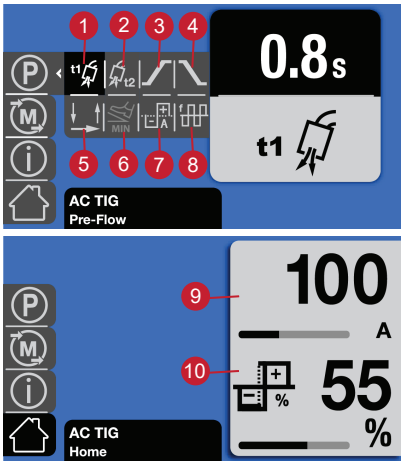
Basic Mode:

In basic mode AC TIG has default settings as Pre-Flow = 0.8 sec, Post-Flow = 8 sec, Up-Slope = 0.5 sec, Down-Slope = 0.5 sec, Offset = 0, MIN = 5 A, Frequency = 120 Hz, and Balance = 70%.

User must be in Advance Mode to adjust these parameters.

Advanced Mode:

In advanced mode user has the ability to adjust the AC TIG settings as explained below.



1. Pre-Flow
2. Post-Flow
3. Up-Slope
4. Down-Slope
5. 2T/4T Mode
6. MIN (A)
7. Offset (A)
8. Frequency (Hz)
9. Amperage (A)
10. Balance (%)

MIN (A): MIN current is used when in remote/foot-pedal mode. The default value is 5 A, user can adjust this value up to the user set weld current to establish the lower limit.

Up-Slope and **Down-Slope** settings are adjustable only in non-remote/non-foot-pedal mode.

Frequency (Hz): Frequency is the number of times the AC TIG Arc switches between EP and EN in one second. Frequency in Rebel 205 AC/DC machine varies from 25 – 400 Hz with a default value of 120 Hz. Frequency helps in narrowing the weld bead and focus the arc in special application. Higher frequencies narrows the weld bead, has more focused arc and increases the arc stability. In other words the arc cone is much tighter at 400 Hz and focused at the same spot the tungsten electrode is pointing than the arc cone operating at 60 Hz.

Balance (%): Main Screen and lower right encoder is used to adjust the Balance (%) in AC TIG advanced mode. Balance lets you control the arc width, heat, and cleaning action etc.

Benefits of increasing the balance (i.e., increasing the EN portion of the AC TIG waveform):

- Achieve greater penetration
- Helps in increasing travel speeds
- Helps in narrowing the weld bead
- Helps in increasing the tungsten electrode life and reduces balling action
- Reduces the size of etched zone for improved cosmetics

Benefits of decreasing the balance (i.e., increasing the EP portion of the AC TIG waveform):

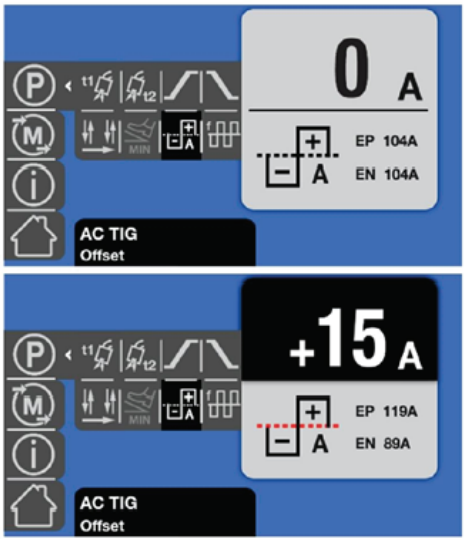
- Better cleaning action to remove heavier oxidation on the work plate
- Minimizes penetration which help prevent burn-through on thin materials
- Widens the bead profile and helps in catching both sides of the joint

NOTE!
Decreasing the balance to a lower value at a particular weld current will have more balling action on the tungsten, which will reduce the tungsten electrode life and may lose arc stability, so care must be taken when adjusting the balance too low.

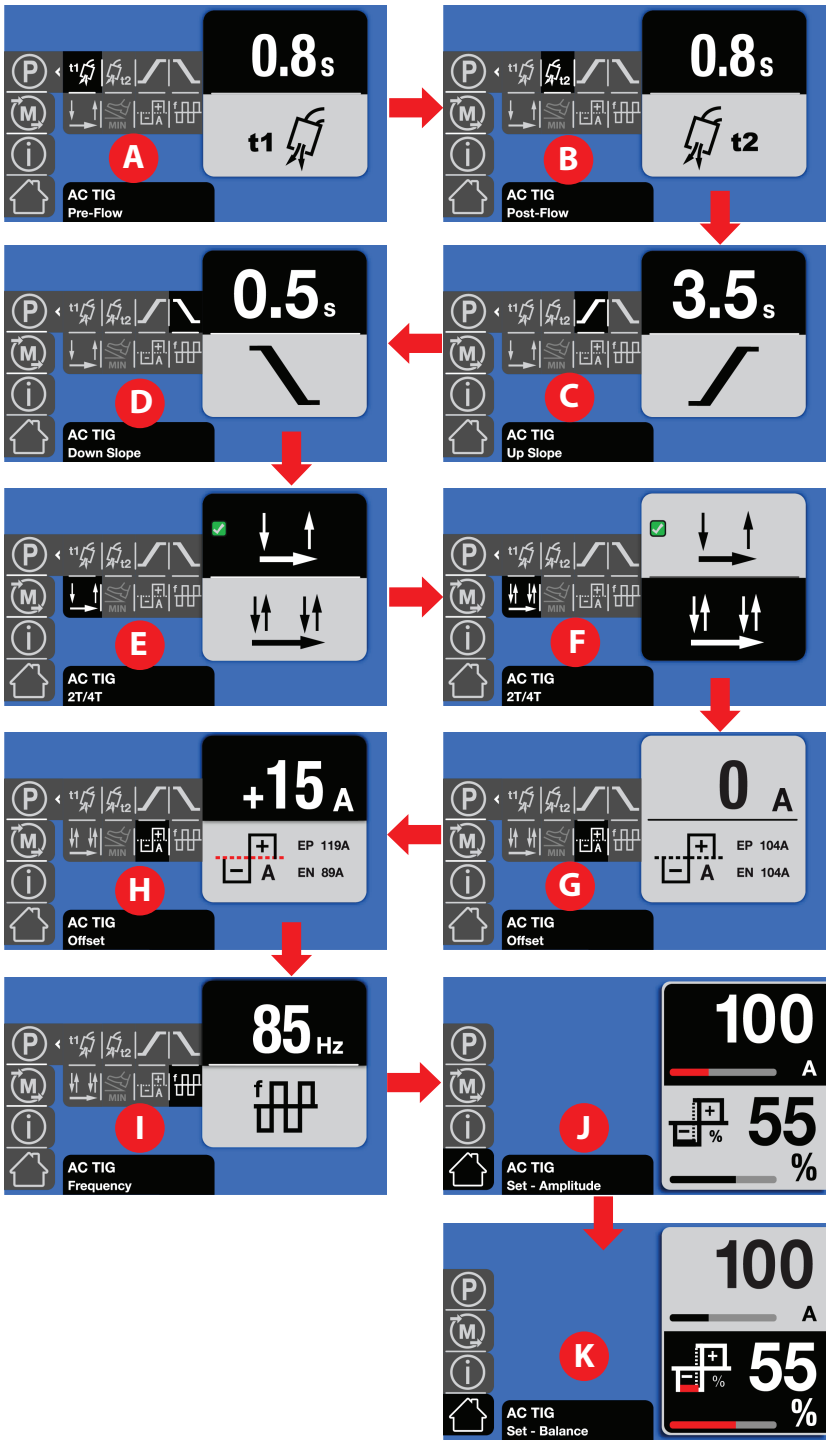
Offset (A): Offset feature in AC TIG is used to vary the EP or EN currents to have better cleaning or better penetration respectively without adjusting the balance (duty) and/or user set current. Offset gives the user ability to have a narrower bead with deeper penetration and no visible cleaning action or wider bead with less penetration and clear visible cleaning action based on which direction the Offset is adjusted.

In advanced AC TIG mode, the user can adjust the Offset parameter which will range from - (UserSetCurrent – MIN) to + (UserSetCurrent – MIN). When using a foot petal, the set value of MIN current affects the usable Offset range. Example, if UserSetCurrent is set to 104 A then the Offset adjustable range is from -99 A to +99 A, because MIN current is 5 A and adding 5 A to 99 A results in 104.

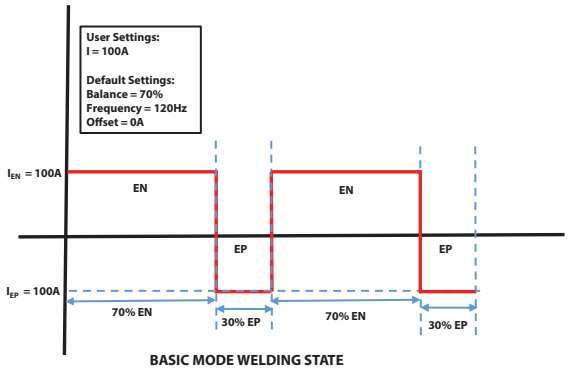
Another example; in the case of Offset set to +15 A with a user set current of 104 A, the weld current drives to EP = 119 A and EN = 89 A as shown in the pictures below.



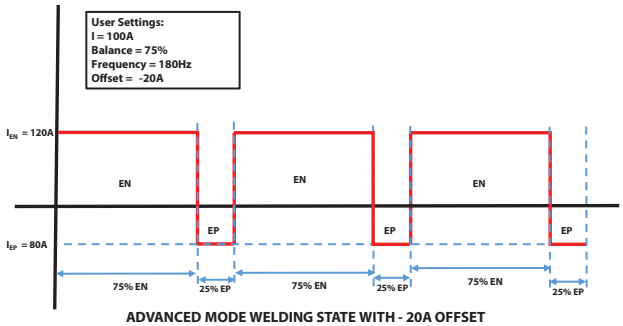
Below illustration shows the navigation/setup of AC TIG Welding in advanced mode (A-B-C-D-E-F-G-H-I-J-K).



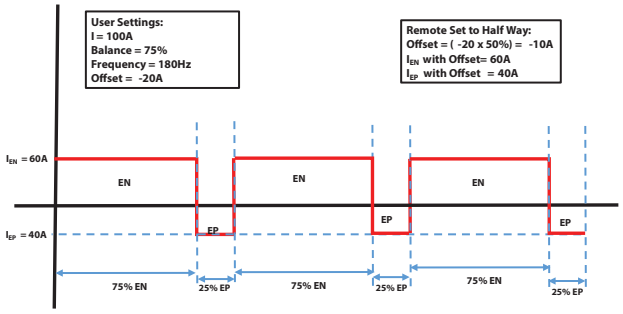
Below illustration shows an example of AC TIG output current ideal waveforms in Basic and Advanced modes.



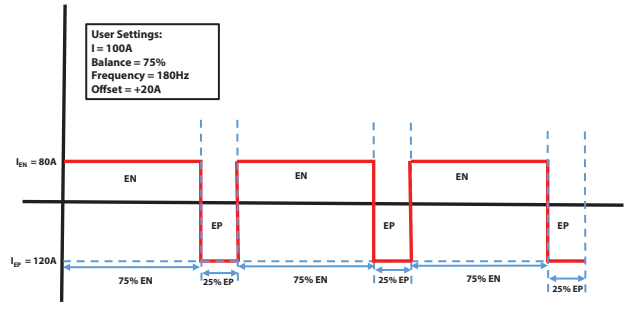
BASIC MODE WELDING STATE



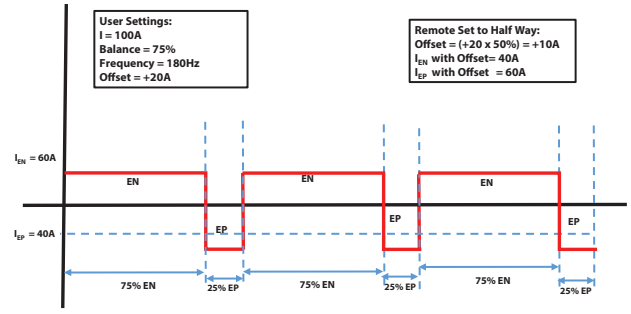
ADVANCED MODE WELDING STATE WITH - 20A OFFSET



ADVANCED MODE WELDING STATE WITH - 20A OFFSET WITH REMOTE SET HALF WAY



ADVANCED MODE WELDING STATE WITH +20A OFFSET

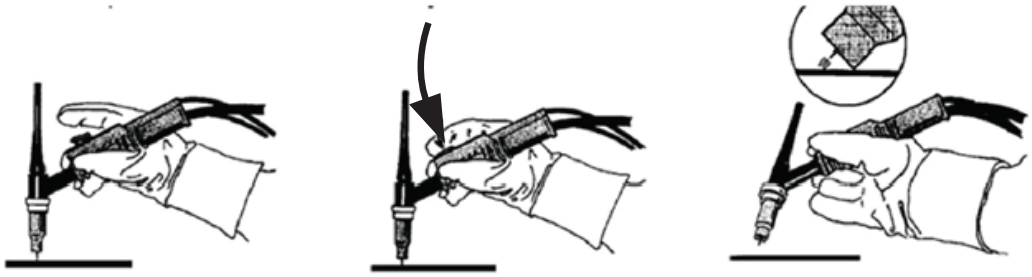


ADVANCED MODE WELDING STATE WITH +20A OFFSET WITH REMOTE SET HALF WAY

7.3 DC TIG Lift Arc and 2-stroke/4-stroke Illustration

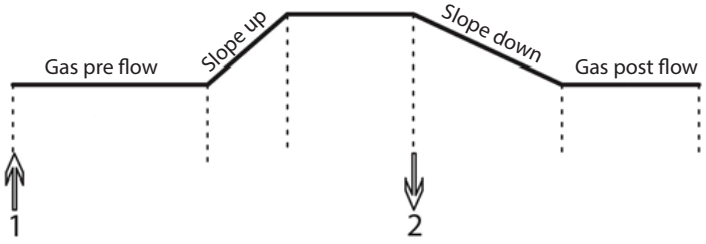
2-stroke and 4-stroke welding process illustrated

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



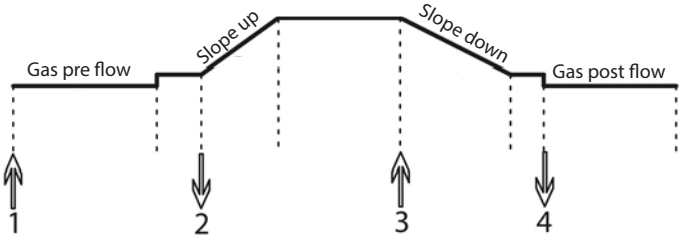
2- Stroke

In 2-stroke mode, press the TIG torch trigger switch (1) to start the shielding gas flow and initiate the arc. The current slopes up to the set current value. Release the trigger switch (2) to start to slope down the current and terminate the arc. The shielding gas will continue to flow in order to protect the weld and the tungsten electrode.



4- Stroke

In 4-stroke mode, press the TIG torch trigger switch (1) to start shielding gas flow and initiate the arc at a pilot level. Release the trigger switch (2) to slope up the current to the set current value. To stop the welding, press the trigger switch again (3). The current will slope down to the pilot level again. Release the trigger switch (4) to terminate the arc. The shielding gas will continue to flow in order to protect the weld and the tungsten electrode.



7.4 Selection and Preparation of Tungsten Electrodes

Tungsten Electrode Color Coding:

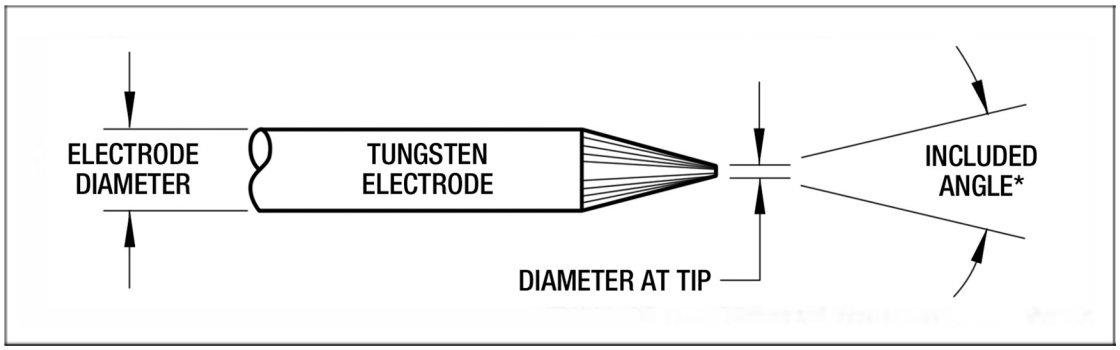
It is important to select proper type tungsten electrode for TIG welding either DC or AC. Below are some of the types of tungsten electrodes available in the market. We recommend using Gold color coded 1.5% lanthanated tungsten electrode rods with Rebel EMP 205ic AC/DC machine.

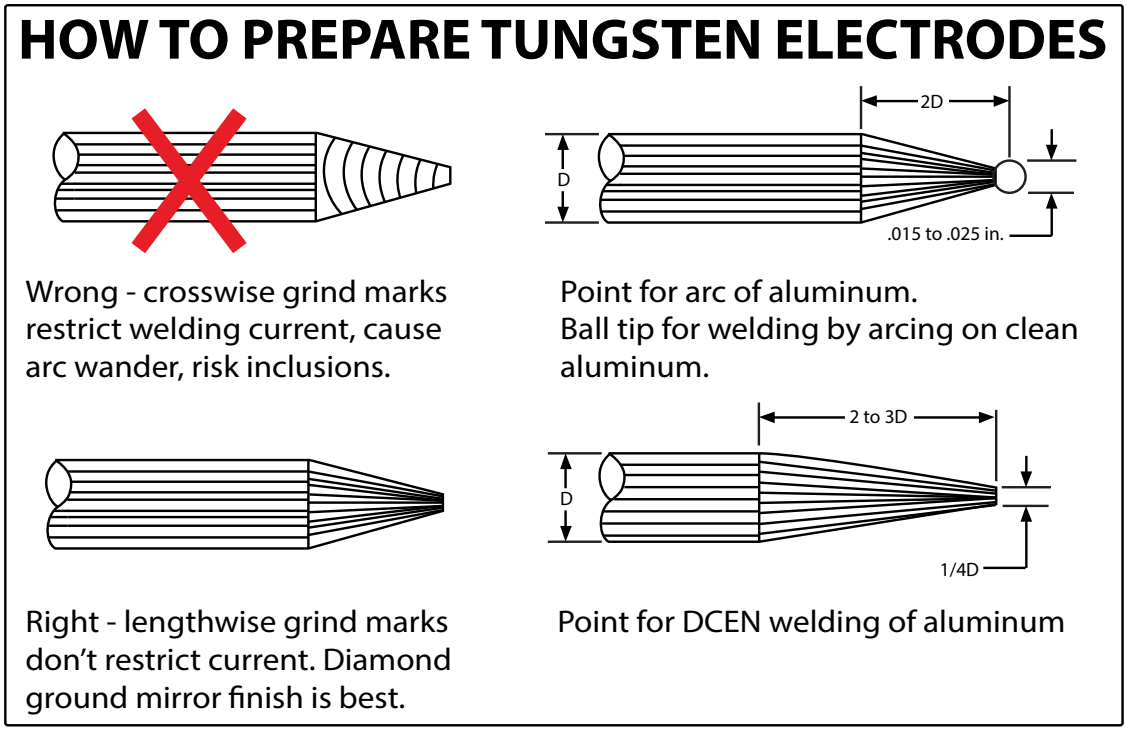
- Orange: 2% ceriated (on AC)
- Blue: 2% lanthanated (AC and DC)
- Gold 1.5% lanthanated (AC and DC)*
- Red: 2% thoriated (DC only)
- Green: pure tungsten (DC only)

* Shipped with Rebel EMP 205ic AC/DC machines.

Tungsten Electrode Grinding Techniques:

The shape of the tungsten electrode tip plays an important role in TIG welding. So care must be taken when grinding the tungsten electrode. Below are some recommendations on how to grind the tungsten electrode for Rebel 205 machine use.





8 MAINTENANCE

WARNING!
Disconnect the electrical power source from the unit.

CAUTION!
Do not remove panels. User access is limited to only persons with the appropriate electrician skills (authorized personnel) can remove safety plates for wire/spool maintenance.

CAUTION!
The product is covered by a manufacturer's warranty. Any attempt to carry out repair work by unauthorized service centers will invalidate the warranty.

NOTE!
Additional maintenance should be performed if you operate in severe dusty condition.

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

8.1 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.		

8.2 Power source and wire-feeder maintenance

Perform a power source cleaning each time you replace a Ø100 mm (4 in.) or Ø200 mm (8 in.) wire bobbin.

WARNING!
Always use hand and eye protection when cleaning.

1. Disconnect the power source from the input power socket.
2. Open the lid and release the tension from the pressure roller by turning the tension screw (1) counter-clockwise and then pull it toward you.
3. Remove the wire and the wire bobbin.
4. Remove the torch and use a low pressure airline, taking care not to let the wire consumable unravel, to clean the power source interior and power source air inlet and outlet.
5. Inspect if the inlet wire guide (4), outlet wire guide (2) or the feeder roller (3) are worn and need replacement. See WEAR PARTS for ordering numbers of parts.
6. Remove and clean the feeder roller with a soft brush. Clean the pressure roller attached to the wire-feeder mechanism with a soft brush.

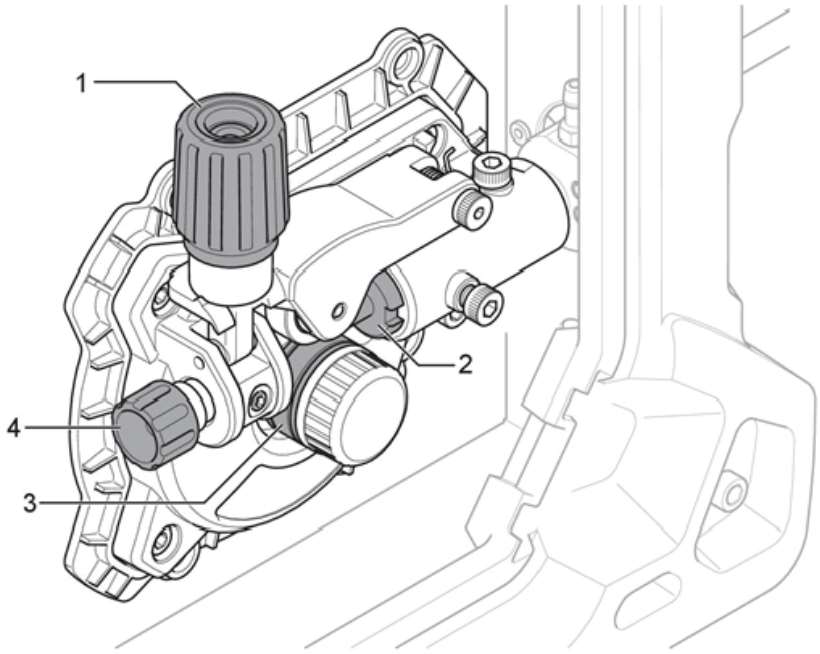


Figure 22. Wire-feed assembly parts

1. Tension knob
2. Outlet wire guide
3. Feeder roller
4. Inlet wire guide

8.2.1 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-bobbin side of the EMP unit.
3. Before moving the tension knob (1): note its numerical setting as indicated on its body right below the handle. Record this number to reset the tension in its approximate range. Section "Setting wire-feed pressure" describes the fine adjustment for this tension adjustment.

NOTE!
Since the wire-feed pressure adjustment must 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. 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.
6. Inspect if the input wire-feed guides and the feed rollers for wear and need replacement. See "WEAR PARTS" section for ordering wear-part numbers. See "Removing wire-feed roller" subsection in "Removing/Installing wire-feed roller" section in the "OPERATION" chapter. 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.
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 wire-feed pressure" section.
13. Close the cover on the wire-bobbin side of the EMP unit.

8.3 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.

8.4 Torch liner maintenance

Refer to MIG torch instruction manual for replacing standard steel torch conduit liner with a Teflon® torch conduit liner.

8.4.1 Torch liner cleaning

1. Disconnect the electrical power source from the unit.
2. Unlock tension knob, rotate spool clockwise while holding the wire until wire is no longer in the torch. Re-secure the wire between tensor knob and roller.
3. Disconnect the torch assembly from the unit.
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 as per the instructions of the MIG torch instruction manual
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.

NOTE!
Excessively worn torch liners require periodic replacement. If above steps fail to re-solve feeder issues, replace the liner as per section 5.7 Liner selection

9 TROUBLESHOOTING

9.1 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	• Check gas bottle is not empty. • Check gas regulator is 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 MIG torch 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	• Make sure the wire spool brake is adjusted correctly (Refer Section "5.6 Removing/installing bobbin"). • Make sure the feed roller and tension is properly adjusted (Refer Section "5.11 Changing wire-feed roller"). • Make sure the correct pressure is set on the feed rollers (Refer Section "5.8 Setting wire-feed pressure"). • Make sure the proper direction of motion is set based on the wire type (into the weld pool for aluminum). • Make sure the correct contact tip is used and it is not worn. • Make sure liner is the right size and type for wire (Refer Section "3.1 EMP 205ic AC/DC specifications"). • Make sure the liner is not bent so that friction is caused between the liner and the wire.
MIG (GMAW/ FCAW) Welding problems	• Make sure the MIG torch 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 MIG torch angle is used. • Make sure the work clamp has proper contact with the work piece.
MMA (SMAW) basic welding problems	• 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.
TIG (GTAW) welding problems	• 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. • Use only 100% Argon gas for TIG welding. • Make sure the regulator/flow meter is connected to the gas bottle. • Make sure the gas pipe for the TIG 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 work piece. • 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 TIG welding process is selected. • Make sure all connections are tight and leak-free.

Type of fault	Corrective action
No power/No arc	• 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.	• 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. • Make sure the air inlets or outlets are not clogged. • Make sure fans are operating when welding.

9.2 User interface (UI) software displayed error codes

The following table exhibits fault/error 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 until fault is repaired.
- **(NC)** Non-Critical - Service may be desired - unit functional with limited performance
- **(W)** Warning - Unit functional and will recover on its own. Wait recovery time can range between 1 to 5 minutes.

Error code	Severity Level	Functional Circuit Failure Explanation
001	**W**	PFC Heatsink, IGBT Heatsink or Main transformer has overheated > 85 °C (185 °F)
002	**W**	Output diode Temperature fault
003	**W/C**	**Warning** - If occurred during load/arc-start, cause is due to low input AC volts - ERR009 **Critical** - If occurred at power-up under no-load condition. DC Bus (400 V) fault droop under load, PFC not supplying 400 V to inverter.
004	**C**	Output voltage is above VRD levels when VRD switch is active
005-007		(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 ERR003
010		(Reserved)
011	**C**	User has attempted a parameter or factory reset, and this was not confirmed by the system.
012	**C**	Communication Link Down, no communication between UI and Ctrl PCB at CN6
013	**C**	Low Internal Power Supply (IPS) Voltage Error, +24 V IPS is less than 22 V DC
014	**C**	Secondary Current Sensor output not detected at Control PCB CN18
015	**C**	Communication Link Down, no communication between Ctrl PCB at CN14 and AC DC inverter PCB at CN3
016	**C**	AC DC Inverter Temperature fault
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.

10 ORDERING SPARE/WEAR PARTS

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

The EMP 205ic AC/DC is designed and tested in accordance with international standards

IEC-/EN 60974-1, IEC-/EN 60974-3, IEC-/EN 60974-5, IEC-/EN 60974-7, IEC-/EN 60974-10

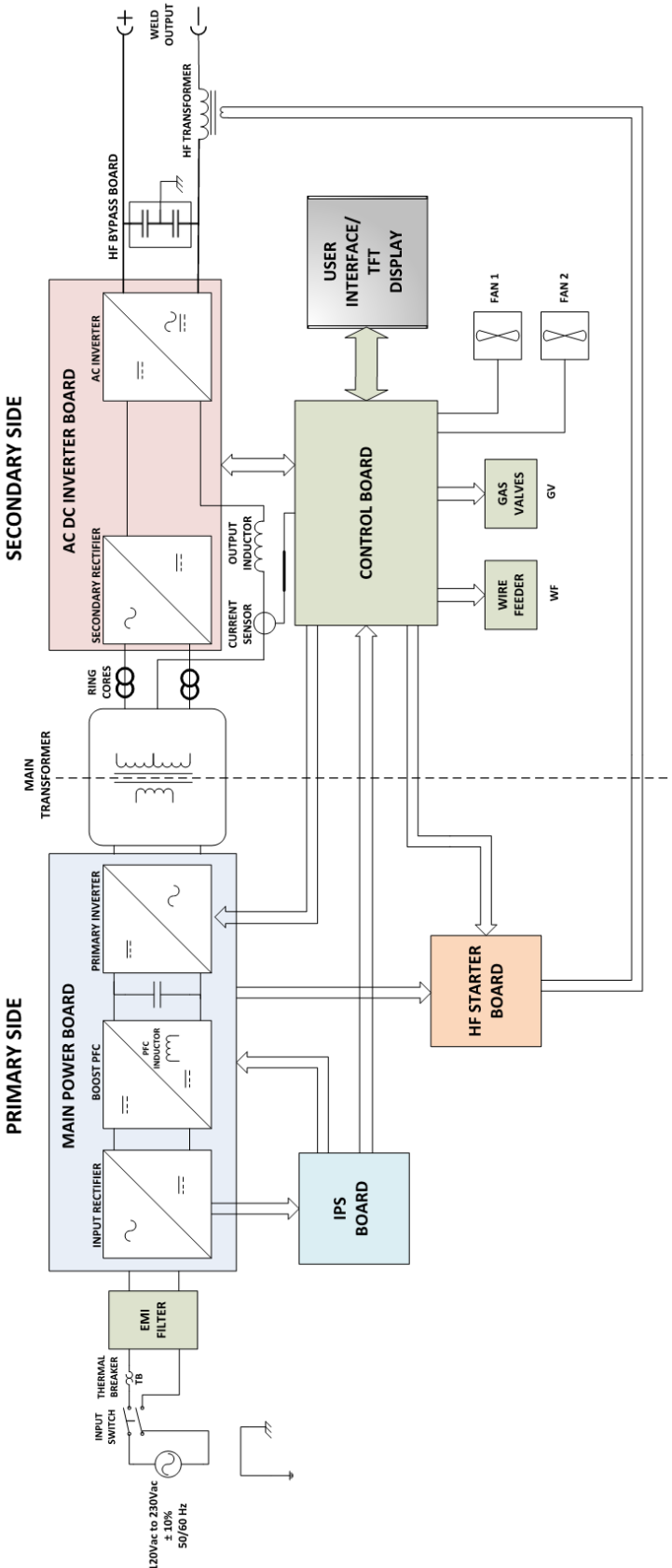
IEC-/EN 60974-11, IEC-/EN 60974-12 and IEC-/EN 60974-13. It is the obligation of the authorized service centre carrying out the service or repair work to ensure that the product still conforms to the aforementioned standards.

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.

DIAGRAM

Functional block diagram

Schematic

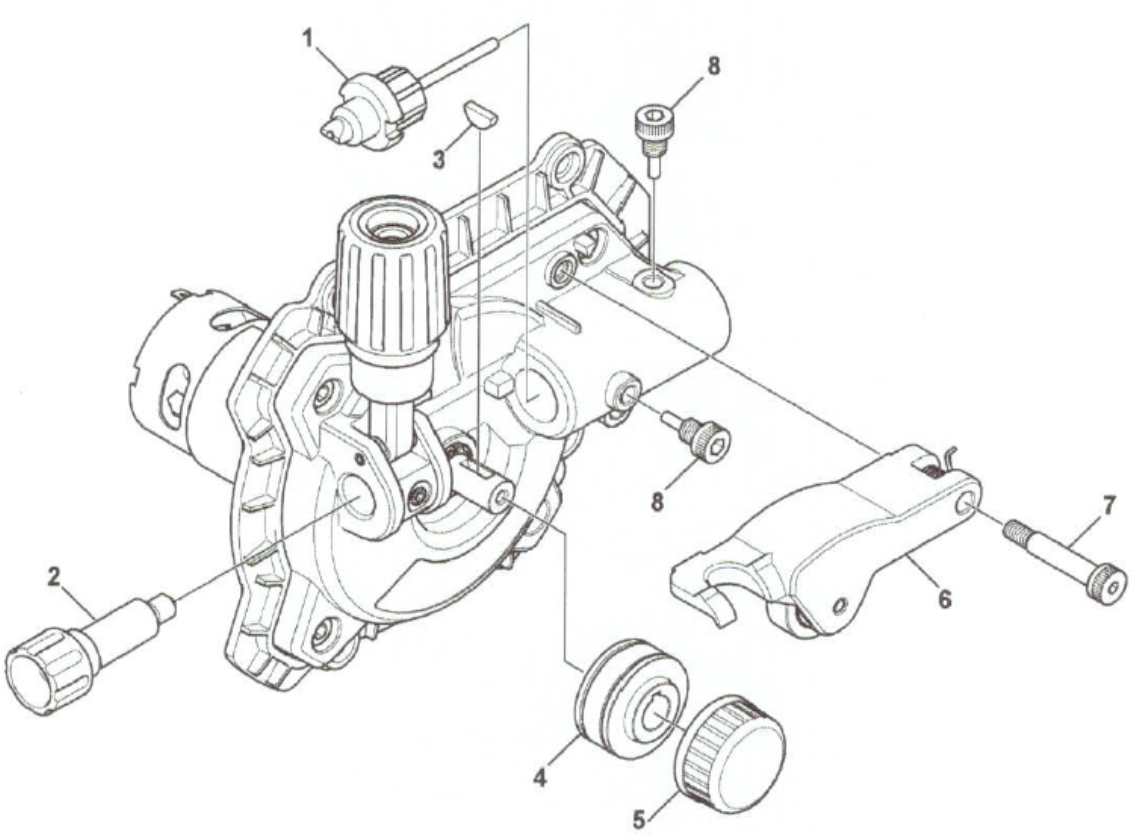


ORDERING NUMBERS

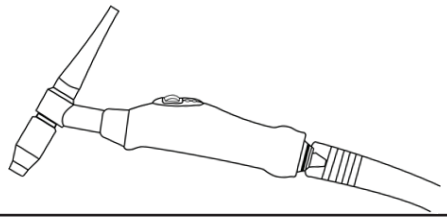
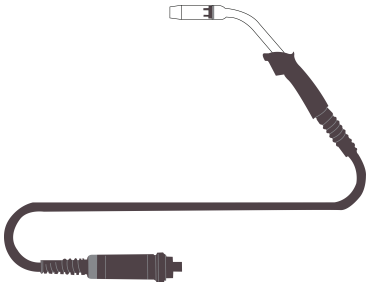
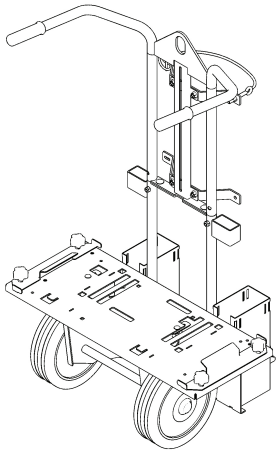
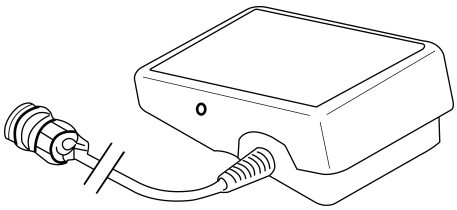
Ordering number	Denomination	Notes
0700 300 998	EMP 205ic AC/DC	Bobbin size 100–200 mm (4–8 in.)
0463 704 001	Spare parts list	

WEAR PARTS

Item	Ordering no.	Denomination	Wire type	Wire dimensions
1	0558 102 460	Wire outlet guide steel	Fe/SS/Flux Cored	0.8 mm / 0.9 mm / 1.0 mm (0.031 in. / 0.035 in. / 0.040 in.)
	0558 102 461	Wire outlet guide steel	Fe/SS/Flux Cored	0.6 mm (0.024 in.)
	0464 598 880	Wire outlet guide Teflon®	Aluminium	1.0 mm - 1.2 mm (0.040 in. - 0.045 in.)
2	0558 102 328	Wire inlet guide	Fe/SS/Flux Cored	0.6 mm / 0.8 mm / 0.9 mm / 1.2 mm (0.023 in. / 0.030 in. / 0.035 in. / 0.045 in.)
3	0191 496 114	Key-drive shaft crescent	N/A	N/A
4	0367 556 001	Feed roll "V" groove	Fe/SS/Flux Cored	0.6 mm / 0.8 mm (0.023 in. / 0.030 in.)
	0367 556 002	Feed roll "V" groove	Fe/SS/Flux Cored	0.8 mm / 1.0 mm (0.030 in. / 0.040 in.)
	0367 556 003	Feed roll "V" groove	Fe/SS/Flux Cored	1.0 mm / 1.2 mm (0.040 in. / 0.045 in.)
	0367 556 004	Feed roll "U" groove	Aluminium	1.0 mm / 1.2 mm (0.040 in. / 0.045 in.)
5	0558 102 329	Locking knob	N/A	N/A
6	0558 102 331	Pressure arm complete assembly	N/A	N/A
7	0558 102 330	Screw	N/A	N/A
8	0558 102 459	Euro adapter locating screw	N/A	N/A



ACCESSORIES

0700 025 557	**TIG Torch** TIG torch, 4 m, 200A, flexible head	
0700 200 004	**MIG Torch** MXL™ 270 3 m (for FCW 1.2 mm)	
0459 366 887	**Trolley**	
W4014450	**Foot control** Contactor ON/OFF and current control with 4.6 m (15 ft) cable and 8-pin male plug	

REPLACEMENTS PARTS

Item	Ordering no.	Denomination
1	0700 200 002	MIG Torch MXL™ 201, 3 m (10 ft)
2	0700 025 556	ESAB SR-B 26 TIG Torch, 4 m, 200 A
3	0349 312 105	Gas hose, 4.5 m (14.8 ft)
4	0700 006 900	MMA welding cable kit, 3 m (10 ft)
5	0700 006 901	Return welding cable kit, 3 m (10 ft)

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