

RUSTLER



EM 215i/300i/455i



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Instruction manual

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1 SAFETY

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

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

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

**WARNING!**

Arc welding and cutting can be harmful to you and others. Therefore, please take precautions when welding and cutting. Ask your employer about safety practices, which should be based on manufacturers' risk data.

ELECTRIC SHOCK - Can kill

- Install and ground the 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 work and ground.
- Ensure your working position 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 screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD

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

NOISE - Excessive noise can damage hearing

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

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

Read and understand the user instruction before installation or operation.

PROTECT YOURSELF AND OTHERS!**WARNING!**

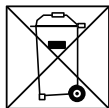
Do not use the power source for thawing frozen pipes.

**CAUTION!**

Read and understand the user instruction before installation or operation.

**CAUTION!**

This product is solely intended for arc welding.



Do not dispose of electrical equipment with normal waste!

In observance of European Directive 2002/96/CE 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.

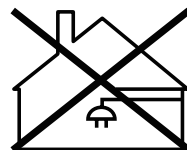
As the owner of the equipment, it is your obligation to obtain information on approved collection systems from the local representative.

By applying this Standard, the owner is improving the environment and human health!



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.



ESAB can supply all the necessary protective equipment and welding accessories.

2 INTRODUCTION

2.1 Overview

With its unique, modern design and every detail taken into account, the Rustler family is the ideal solution for the most common challenges faced by welders in all sectors. Designed by the top engineers in the world, it is equipped with the latest inverter technology, offering the advantage of low energy consumption and excellent weld quality.

The machines are optimized for welding the most diverse metals, with specific programs for electrodes, solid and flux cored wires, mild steel, stainless steel and aluminium.

For more demanding welders, they're also equipped with additional settings, such as 2T or 4T welding, inductance, creep start, burn-back, crater filling, pre- and post-flow, for setting optimized arc adjustment for the MIG/MAG application, and hot start, arc force and anti-stick for coated electrode applications.

Main features:

- Available in the 215i version for single-phase 220V network, 300i for single or three-phase 220V and 380V networks, and 455i for three-phase 220V, 380V or 440V networks.
- Easy to operate, set up and weld, designed for both experienced welders and beginners.
- Intelligent design with angled panel, large handles and protected panel.
- Guaranteed robustness, tested and approved in the most rigorous tests around the world.
- Inverter technology that promotes energy savings.
- Fan on demand, providing cooling when needed, reducing energy consumption and the amount of dust entering the equipment.

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

2.2 User responsibility

This equipment will function in accordance with the information contained in the manual when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment should be checked periodically. Defective equipment (including welding cables) must not be used. Parts that are broken, missing, partially worn, deformed or contaminated must be replaced immediately. Should such repairs or replacements become necessary, it is recommended that such repairs are carried out by appropriately qualified persons approved by ESAB.

This equipment or any of its parts must not be altered from its standard specification without the prior written approval of ESAB. The user of this equipment shall bear sole responsibility for any malfunction resulting from improper use or unauthorised modification from the standard specification, faulty maintenance, damage or improper repair by anyone other than a qualified person approved by ESAB.

2.3 Equipment

The power source comes with:

- Quick setup guide and instruction manual
- Grounding clamp cable 2m (EM 215i, EM 300i), 3m (EM 455i)
- Gas hose 1.5m (EM 215i, EM 300i), 4m (EM 455i)
- SS feed rollers 0.8/1.0mm (EM 215i, EM 300i), 1.0/1.2mm (EM 455i)
- Additional V-K feed rollers 0.8/1.0mm (EM 215i, EM 300i), 1.0/1.2mm (EM 455i)

3 TECHNICAL DATA

Duty cycle

The duty cycle refers to the ratio of the welding (arc-on) time within a given period of time to the total time. To explain the 10 minute duty cycle period is used in the following example. Suppose a Welding power source is designed to operate at a 15% duty cycle, 90 amperes at 23.6 volts. This means that it has been designed and built to provide the rated amperage (90A) for 1.5 minutes, i.e. arc welding time, out of every 10 minute period (15% of 10 minutes is 1.5 minutes). During the other 8.5 minutes of the 10 minute period the Welding power source must remain ON and allowed to cool.

Protection class

The IP code indicates the protection 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.

Application class

The **S** symbol indicates that the power source has been designed for use in areas with increased electrical hazards.

Efficiency ratings

Efficiency rating of Rustler EM 215i, Level 3 efficiency

Efficiency rating of Rustler EM 300i, Level 3 efficiency

Efficiency rating of Rustler EM 455i, Level 1 efficiency

TABLE 3.1			
TECHNICAL DATA			
Model	Rustler EM 215i	Rustler EM 300i	Rustler EM 455i
Mains voltage	220VAC $\pm 10\%$, 1ph	380VAC $\pm 10\%$, 3ph 220VAC $\pm 10\%$, 3ph 220VAC $\pm 10\%$, 1ph	440VAC $\pm 10\%$, 3ph 380VAC $\pm 10\%$, 3ph 220VAC $\pm 10\%$, 3ph
Network frequency	50Hz / 60Hz		
Maximum rated current	48.3 A	16A (380V 3ph) 50A (220V 3ph) 50A (220V 1ph)	24A (440V 3ph) 27.3A (380V 3ph) 30A (220V 3ph)
Effective rated current	21.6 A	10.1A (380V 3ph) 32A (220V 3ph) 3A (220V 1ph)	15.2A (440V 3ph) 17.3A (380V 3ph) 19A (220V 3ph)
MIG/MAG current range	30-200A	30-250A	30-300A (220V) 30-420A (440V/380V)
MIG/MAG permissible load	200A @ 20% / 24V 116A @ 60% / 19.8V 90A @ 100% / 18.5V	250A @ 40% / 26.5V 204A @ 60% / 24.2V 158A @ 100% / 21.9V	440VAC / 380VAC: 420A @ 40% / 35V 343A @ 60% / 31.2V 266A @ 100% / 27.3V 220VAC: 300A @ 40% / 29V 245A @ 60% / 24.3V 190A @ 100% / 23.5V
MIG/MAG open-circuit voltage	59V	68V (380VAC) 78V (220VAC)	82V (440VAC) 72V (380VAC) 67V (220VAC)
Current range (MMA)	20-200A	20-200A	20-300A (220VAC) 20-350A (440V/380VAC)
Load (MMA)	200A @ 20% / 28V 116A @ 60% / 24.7V 90A @ 100% / 23.6V	200A @ 40% / 28V 163A @ 60% / 26.5V 126A @ 100% / 25V	440VAC / 380VAC: 350A @ 40% / 34V 286A @ 60% / 31.4V 222A @ 100% / 28.9V 220VAC: 300A @ 40% / 32V 245A @ 60% / 29.8V 190A @ 100% / 27.6V
Open-circuit voltage (STICK)	59V <15V (VRD ON)	68V (380VAC) 78V (220VAC) <15V (VRD ON)	78V (440VAC) 68V (380VAC) 65V (220VAC) <15V (VRD ON)
Recommended circuit breaker	32A	25A (380V 3ph) 50A (220V 3ph) 50A (220V 1ph)	20A (440V 3ph) 25A (380V 3ph) 25A (220V 3ph)
Recommended transformer	11 kVA	18 kVA	20 kVA
Max efficiency	85%	88%	89%
Apparent power at maximum current	10.6 kVA	17.1 kVA	18.3 kVA
Power factor at maximum current	0.66	0.70	0.93
Weight	40 kg	47 kg	70 kg
Protection class	IP23S		
Application class	S		
Dimensions (l x w x h)	921 x 434 x 576 mm	946 x 450 x 716 mm	951 x 460 x 806 mm
Technical standard	IEC 60974-1, GB/T 15579.1		
Operating temperature	-10 ~ +40°C		

4 INSTALLATION

4.1 Overview

The installation must be carried out by a professional.

**WARNING!**

This product is designed for industrial use. In domestic environments this product may cause radio interference. It is the user's responsibility to take appropriate precautions.

4.2 Receipt of equipment

On receipt of the equipment, remove all material from the packaging and check for any damage that may have occurred during transportation. Before disposing of the packaging, check that all materials, accessories, etc. have been removed. Any claims for damage in transit should be addressed to the Transport Company.

NOTE!

Connect the equipment to the mains supply with a mains impedance of 0.210 ohm or less. If the mains impedance is higher, there is a risk that the lighting devices will fail.

**WARNING! - DANGER OF TIPPING OVER!**

There is a risk of tipping during transport if the machine is tilted more than 10°. In this case, make sure that the appropriate brakes are in place.

4.3 Environment

These units are designed for use in environments with increased hazard of electric shock.

A. Examples of environments with increased hazard of electric shock are:

1. In locations in which freedom of movement is restricted, so that the operator is forced to perform the work in a cramped (kneeling, sitting or lying) position with physical contact with conductive parts.
2. In locations which are fully or partially limited by conductive elements, and in which there is a high risk of unavoidable or accidental contact by the operator.

B. Environments with increased hazard of electric shock do not include places where electrically conductive parts in the near vicinity of the operator, which can cause increased hazard, have been insulated.

4.4 Location

To ensure safe operation of the equipment, make sure that the workplace is:

- A. In areas, free from moisture and dust.
- B. Ambient temperature between -10° C to 40° C.
- C. In areas, free from oil, steam and corrosive gases.
- D. In areas, not subjected to abnormal vibration or shock.
- E. In areas, not exposed to direct sunlight or rain.
- F. Place at a distance of 300mm or more from walls or similar that could restrict natural air flow for cooling.

4.5 Ventilation

Since the inhalation of welding fumes can be harmful, ensure that the welding area is effectively ventilated.

4.6 Mains supply voltage requirements

The mains supply voltage should be within $\pm 10\%$ of the rated mains supply voltage. If actual mains supply voltage is outside this range Welding Current may not be available and may cause internal components to fail.

The equipment has automatic input voltage recognition, as long as the mains supply meets the specifications below:

Table 4.1			
Rustler EM 215i		Rustler EM 300i	Rustler EM 455i
Input voltage	220V, 1ph	220V, 1ph (brown and gray cables)	220V, 3ph
		220V, 3ph	380V, 3ph
		380V, 3ph	440V, 3ph

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 mains with a properly specified fuse.



WARNING!

Any electrical work must be carried out by a qualified electrician.



IMPORTANT!

The grounding terminal is connected to the chassis of the power supply. It must be connected to an efficient grounding point in the general electrical installation. Be careful not to reverse the grounding conductor of the input cable (green/yellow cable) to any of the phases of the main switch or circuit breaker, as this would put the chassis under electrical voltage. Do not use the mains neutral for earthing.

4.7 Electromagnetic compatibility



WARNING!

Extra precautions for electromagnetic compatibility may be required when this welding power source is used in a domestic situation.

A. Installation and use - users 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. In some cases this remedial action may be quite simple, see NOTE below. In all cases, electromagnetic disturbances shall be reduced to the point where they are no longer troublesome.

NOTE!

The welding circuit may or may not be earthed for safety reasons. Changing the earthing arrangements should only be authorised by a qualified person. Welding equipment, when connected to a poorly grounded electrical network, can damage the ground circuits of other equipment.

B. Assessment of area

Before installing welding equipment, the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

1. Other supply cables, control cables, signalling and telephone cables near 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.

C. Methods of reducing electromagnetic emissions

C1. Mains supply

Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of welding equipment in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The grounding shielding of the power cable must be connected to the welding equipment enclosure to ensure effective electromagnetic shielding.

C2. Maintenance of welding equipment

The welding equipment should be routinely maintained according to the manufacturer's recommendations. Before operating the equipment, you must ensure that it is tightly closed and that there is no access to the internal components. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturer's instruction manual.

C3. Welding cables

The welding cables should be kept to the length determined by the manufacturer and must be positioned close to each other, running at or close to the floor level.

C4. Earthing of the workpiece

Where the workpiece is not bonded to earth for electrical safety, nor connected to earth because of its size and position, e.g. ship's hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances.

C5. Screening and shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening the entire welding installation may be considered for special applications.

4.8 MIG /FCAW process setup

4.8.1 Drive roller

The Rustler's wire feed mechanism has a flat pressure roller for all wire types and diameters and a drive roller that can be changed according to the wire type and diameter. The equipment is configured to be used with feed rollers for different wire diameters, depending on the equipment model, limited to 1.0mm on the EM 215i model, 1.2mm on the EM 300i model, and 1.6mm on the EM 455i model.

4.8.2 Installation of wire drive roller

- Open the pressure roller arm (top).
- Remove the screw from the drive roller shaft (bottom).
- Place the drive roller corresponding to the wire to be used on the shaft; a roller has 2 grooves, each for a different wire diameter; the roller must be positioned so that the engraving corresponding to the wire diameter used is visible to the operator.
- Replace and tighten the screw so that the roller won't become loose on the shaft.
- Close the pressure roller arm.

4.8.3 MIG/MAG torch

ESAB supplies various torch models according to different applications. Connect the torch directly to the Euro connector.

4.8.4 Shielding gas (only for MIG)

In MIG welding, the type of shielding gas depends on the intended application (transfer mode and type of wire material); refer to the table below. The table should only be used as a guide. Other gases or mixtures can be used depending on the material to be welded and the other welding parameters.

Table 4.2		
Gas	Transfer mode	
	Short-circuit	Spray
Argon	---	Aluminium
Argon + 2% CO ₂	Stainless steel *	---
Argon + 4% CO ₂	Stainless steel *	Low alloy steel
Argon + 8% CO ₂	Except LC and ELEC	---
Argon + 20 - 25% CO ₂	Low alloy steel / Carbon steel	Carbon steel
Argon + 5% CO ₂	---	Stainless steel
CO ₂	Carbon steel	---

*The gas must be specified according to the composition of the wire.

4.8.5 Welding wire

Installing the wire in the brake centre

- a) Unscrew all plastic knobs on the end of the brake centre and place the wire spool with the corresponding plastic adapter so that the locking pin of the brake centre go into the holes of the plastic adapter.
- b) Adjust the brake centre
 - Rotate the brake centre bolt to the left to reduce braking force.
 - Rotate bolt to the right to increase braking force.
 - Re-screw all plastic knobs back onto the end of the brake centre.

NOTE!

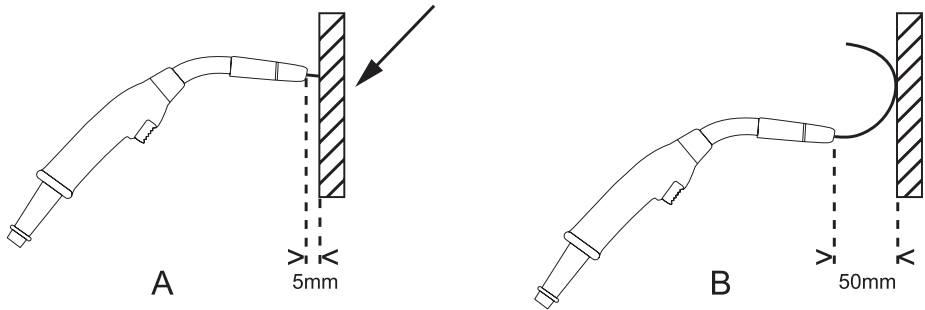
The braking force applied to the wire spool must be just enough so that the spool cannot rotate freely by inertia when the wire feed motor stops.

Inserting wire into the wire feed mechanism

- a) Turn the "ON/OFF" switch to "OFF" position. This prevents the wire from moving and becoming electrically live if the welding torch trigger is pressed accidentally, which could cause an electric arc.
- b) Trim the free end of the wire so that it is free of burrs and does not injure the operator or damage the inlet guide of the welding torch.
- c) Open the pressure arm of the wire feed mechanism. Manually bring the wire tip through the inlet guide of the wire feed mechanism over the "useful" groove of the drive roller, and insert it into the outlet guide of the wire feed mechanism.
- d) Close the pressure arm.
- e) Turn the "ON/OFF" switch to "ON" position and operate the torch switch to bring the free end of the wire through the contact tip to the welding torch nozzle.
- f) Adjust the pressure on the wire

To determine whether the feed pressure is set correctly, please check whether the wire moves smoothly through the wire guide of the torch. Then set the pressure on the wire feeder's pressure rollers. It is important that the pressure is not too high as this will damage the wire and make feeding difficult. To make sure that the feed pressure is set correctly, feed the wire out of the torch against an insulated object, such as a piece of wood, and adjust the pressure via the pressure lever so that:

- When you hold the torch approx. 5 mm from the piece of wood the wire should slip (Fig. A).
- When you hold the torch approx. 50 mm from the piece of wood, the wire should be fed out and bend (Fig. B).



4.9 Grounding clamp

Welding circuit

The Rustler's performance depends on the use of a copper grounding cable, which should be insulated, with the shortest possible length, of a gauge compatible with the relevant application, in good condition and firmly attached to its terminals, the connections on the piece to be welded or on the workbench and the machine connector must be firm. Whatever its total length (which must always be as short as possible) and whatever the welding current is, the section of the grounding cable must correspond to the maximum current that the equipment can supply at 100% duty cycle.

The resistance of the welding circuit causes voltage drops that are added to the natural internal drop of the equipment itself, which reduces the arc voltage and maximum current available and makes the arc unstable.

4.10 MMA (STICK) process setup

4.10.1 Electrode holder cable

Connect the electrode holder cable to the quick connector on the front panel.

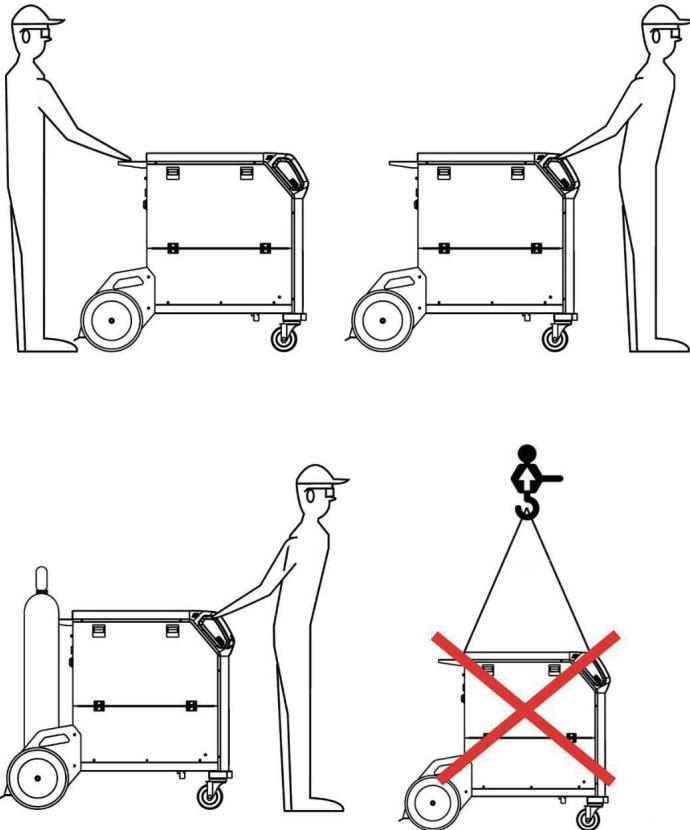
Note: See section 5.2 for the connections.

4.10.2 Grounding clamp cable

Connect the grounding clamp cable to the quick connector on the front panel.

Note: See section 5.2 for the connections.

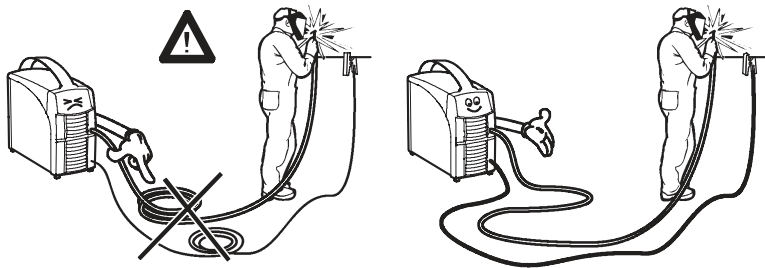
4.11 Moving instructions (without lifting)



5 OPERATION

5.1 Overview

General safety regulations for handling the equipment can be found in section 1 of this manual. Read it through before you start using the equipment!



WARNING!

The user is responsible for defining the process and the welding procedure for the consumables (wire and gas) as well as the results of the operation and application.



WARNING!

Do not disconnect the power supply during welding (with load).

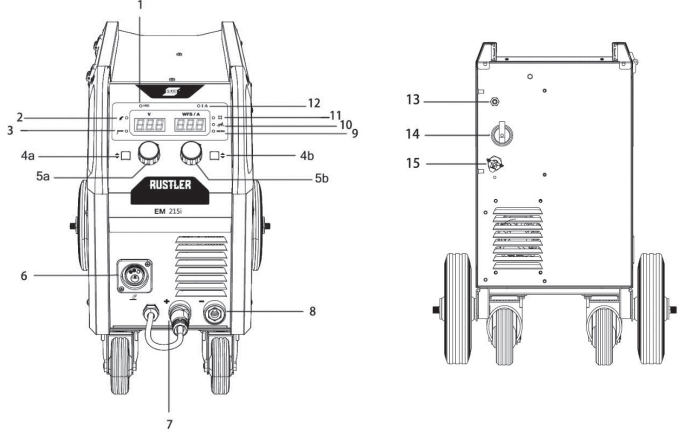


WARNING!

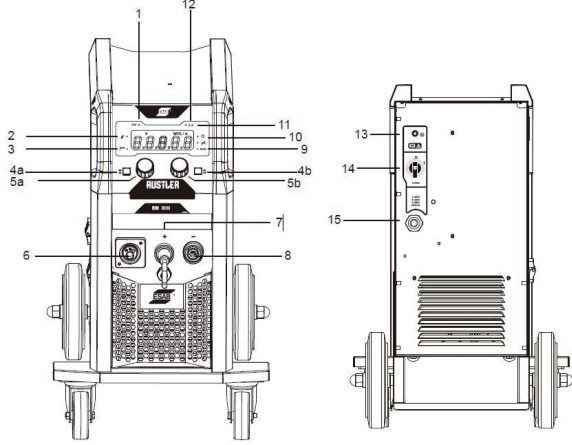
Rotating parts can cause injury. Take great care!

Standard operating procedures apply when using these welding machines, i.e. connect the work clamp directly to the workpiece. The MIG wire is fed from the spool via the wire feed system to the MIG torch. The welding amperage range values should only be used as a guide. The current supplied to the arc depends on the wire feed speed and the welding arc voltage and, as the welding arc voltage varies between the different classes of MIG wire, the welding current in given configurations can vary according to the type of MIG wire in use. The operator should use the pre-set welding current value of the plate thickness as a guide and finally adjust the current setting to suit the application by fine-tuning the current (WFS/Amps) and voltage (Volts/Trim) settings.

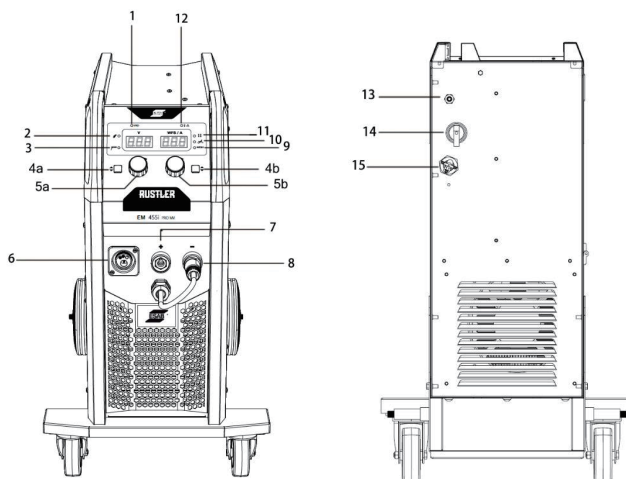
5.2 **Connections and control devices**



Rustler EM 215i



Rustler EM 300i



Rustler EM 455i

1. VRD LED indicator

Note: (The VRD is disabled at the factory. There is a switch on the back of the front display to activate it. We recommend that you contact an authorised ESAB technical service to make this change.)

2. MIG/MAG mode LED indicator

3. MMA mode LED indicator

4a. Left button for selecting welding mode

4b. Right button for selecting 2T or 4T/ Inductance function / main menu / advanced menu (3s)

5a. Left encoder for selecting functions

5b. Right encoder for selecting parameters

6. EURO MIG torch connector

7. Positive (+) connection in MIG/MAG mode: polarity selection cable; MMA mode: electrode holder cable

8. Negative (-) connection in MIG/MAG/MMA mode: work cable

9. Menu selected LED indicator

10. Inductance selected LED indicator

11. 4T mode activated LED indicator

12. Overheat protection activated LED indicator

13. Gas inlet connector

14. ON/OFF switch

15. Power cable

The figure below shows the details of the front panel and the buttons accessible to the operator:



Table 5.1

ITEM	NAME	FUNCTION
4a	Welding mode selection button	Switch between MIG/MAG and MMA mode
4b	Parameter selection button	In MIG/MAG mode: Trigger mode, inductance, main menu and advanced menu (press for 3 seconds) In MMA mode: Hot Start and Arc Force
5a	Left encoder	In MIG/MAG mode: welding voltage In MMA mode: no function In menu: select the type of function
5b	Right encoder	In MIG/MAG mode: wire feed speed In MMA mode: welding current In menu: select the parameter of function

Main functions available in MIG/MAG mode

- Press button (4b) once to select the trigger type and configure between 2T or 4T via the encoder (5b);
- Press button (4b) twice to select the inductance function and configure between -10 and 10 via the encoder (5b);
- Pressing button (4b) for three times to select the welding material and switch between filler metal and wire diameter by turning the encoder (5a) (selection of different materials and wire diameters affects welding performance).

Table 5.1.1				
CODE	DESCRIPTION	STANDARD	RANGE	EXPLANATION OF THE INTERNAL MENU
TRG	Trigger mode	2T	2T or 4T	2T or 4T torch trigger control
IND	Inductance	0	-10 to 10	Inductance control
MAT	Welding material type	Fe	Fe, Ss, Al, Cu, FLX, FCG	Iron (Fe), aluminium (Al), stainless steel (SS), copper (Cu), self-shielded wire without gas (FCS) and flux cored wire requiring shielding gas (FCG)
DIA	Wire diameter	EM 215i: 0.8 EM 300i: 1.0 EM 455i: 1.2	EM 215i: 0.6-1.0 EM 300i: 0.6-1.0 EM 455i: 0.6-1.2	The minimum and maximum wire diameter may vary according to the material selected

Advanced functions in MIG/MAG mode

Press button (4b) for 3 seconds to access the advanced menu and turn the encoder (5a) to select among the following functions.

Table 5.1.2				
CODE	DESCRIPTION	STANDARD	RANGE	DETAILS
CRE	Creep start	OFF	ON/OFF	The voltage and feed speed will be reduced for 3 seconds after pressing the trigger to ensure a more controlled arc striking and bead start.
PRG	Gas pre-flow	0.0s	0.0 - 9.9s	Gas purge time before arc striking
B-B	Burn-Back	0.01s	0.01 - 0.35s	The burn-back time prevents the wire tip from getting stuck in the puddle when the trigger is released
CRA	Crater filling	0.0	0.0 - 9.9s	The wire feed speed is gradually reduced after the trigger is released so that the end of the weld is completely filled with filler metal (4T mode only).
POG	Gas post-flow	0.5	0.5 - 9.9s	Gas purge time after the arc extinguishes to prevent oxidation
DIS	Display	AMP	WFS, AMP	Choose to display wire feed speed in m/min (WFS) or actual current (AMP) during MIG welding.
UNT	Unit selection	MPM	MPM, IPM	Unit for MIG wire feed speed, MPM is m/min, IPM is inches/min

Functions in MMA mode

Select the button (4b) to switch between the Hot Start and Arc Force functions and set them from 0 to 10 via the encoder (5b), or keep them in automatic mode (factory set to automatic).

Table 5.1.3				
CODE	DESCRIPTION	STANDARD	RANGE	EXPLANATION OF THE INTERNAL MENU
HOT	Hot Start	AUT	0-10	It increases the voltage during the arc striking, ensuring stability and less spatter, as well as preventing the electrode from sticking to the workpiece.
ARC	Arc Force	AUT	0-10	Adjust the current to keep the arc open and stable for various welding positions.
N/A	Anti Stick	AUT	N/A	When the electrode sticks, the current and voltage will be reduced until the machine automatically shuts down, preventing damage to the machine and cables.

5.2.1 Welding control mode



2-stroke (2T)

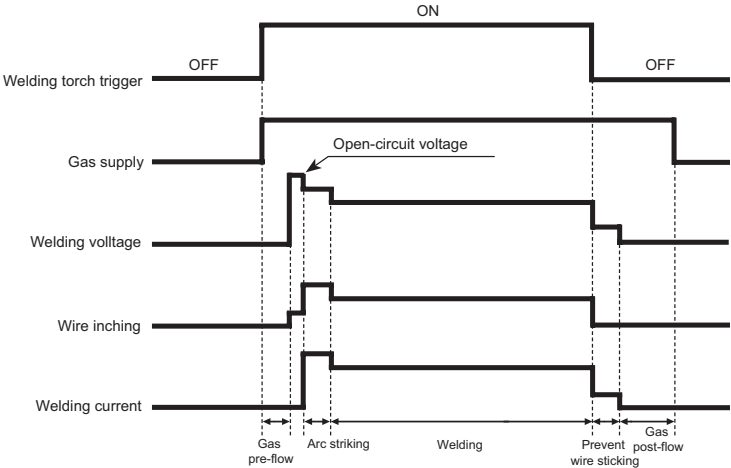
With 2-stroke, gas pre-flow starts when the welding torch trigger switch is pressed. The welding process then starts. Releasing the trigger switch stops welding entirely and starts the gas post-flow.



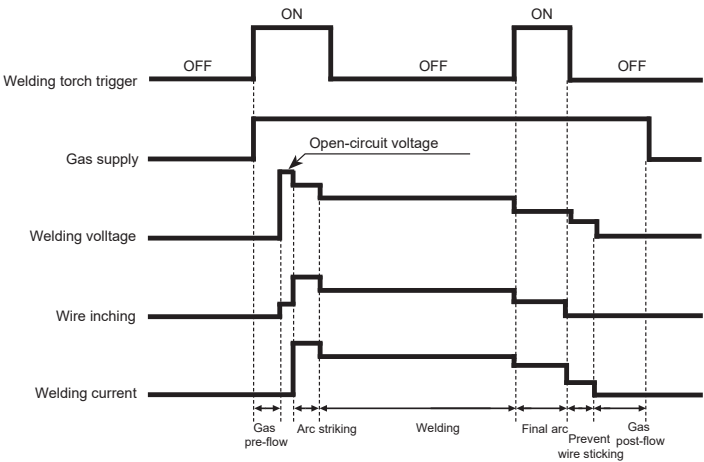
4-stroke (4T)

With 4-stroke, the gas pre-flow starts when the welding torch trigger switch is pressed and the wire feed starts when it is released. The welding process continues until the switch is pressed again and then the final arc is generated using the final arc voltage and current. Releasing the trigger stops welding and starts the gas post-flow.

2T mode (welding without final arc)



4T mode (welding with final arc)



5.3 Connecting welding and return cables

The welding power source has two outputs, a positive welding terminal (+) and a negative welding terminal (-), for connecting welding and return cables.

Connect the return cable to the negative terminal of the power source. Secure the return cable's contact clamp to the work piece and ensure that there is good contact between the work piece and the output for the return cable on the power source.

Recommended maximum welding current values for the welding / return cables (copper) at an ambient temperature of +25°C and normal 10 minutes cycle:

CABLE AREA mm ²	DUTY CYCLE				Voltage drop /10m
	100%	60%	35%		
50	285 A	320 A	370 A		0.352 V / 100 A
70	355 A	400 A	480 A		0.254 V / 100 A
95	430 A	500 A	600 A		0.189 V / 100 A

Recommended maximum welding current values for the welding / return cables (copper) at an ambient temperature of +40°C and normal 10 minutes cycle:

CABLE AREA mm ²	DUTY CYCLE				Voltage drop /10m
	100%	60%	35%		
50	250 A	280 A	320 A		0.352 V / 100 A
70	310 A	350 A	420 A		0.254 V / 100 A
95	375 A	440 A	530 A		0.189 V / 100 A

5.4 Symbols and functions

SYMBOL	FUNCTION
	Power supply switch
	Protective earthing
	Arc force
	Gas purging
	Final arc current / Crater filling current

SYMBOL	FUNCTION
	Overheating
	Lifting eye positioning
	Inductance
	MMA welding
	Final arc current / Crater filling voltage

5.5 Thermal protection

This welding power source includes a thermal protection circuit that operates if the temperature becomes too high. If this occurs, the welding current will be interrupted and the overheat indicator will light up. The thermal protection is automatically reset when the temperature has dropped to normal operating temperature.

6 MAINTENANCE

6.1 Overview

Regular maintenance is important for safe and reliable operation.

ESAB recommends that only trained personnel can service the welding equipment.



WARNING!

All of the supplier's warranty commitment terms will cease to apply if the customer attempts any repair work to any fault in the product during the warranty period.

6.2 Preventive maintenance

Under normal operating conditions, the equipment does not require any special maintenance. It is only necessary to clean them internally at least once a month with dry, oil-free compressed air under low pressure.

After cleaning with compressed air, check that the electrical connections are tight and that the components are secure. Check for any cracks in the insulation of electrical wires or cables, including welding, or in other insulators and replace them if defective.

6.3 Corrective maintenance

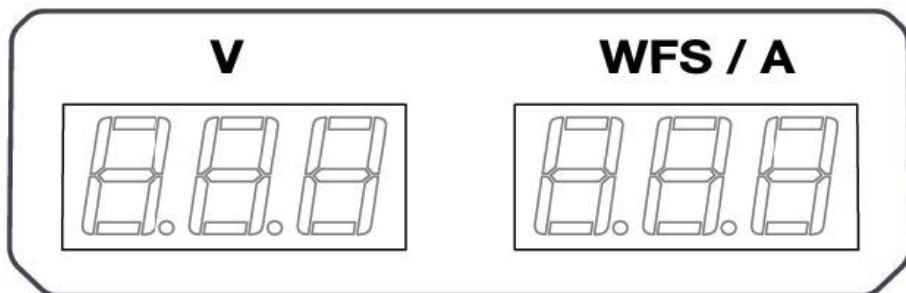
Only use original spare parts supplied by ESAB. The use of non-original or non-approved parts will automatically void the warranty.

Spare parts can be obtained from ESAB Authorised Services or from the Sales branches indicated on the last page of this manual. Always state the model and serial number of the equipment in question.

7 TROUBLESHOOTING

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

The left (V) and right (WFS/A) displays will alert the user if an error occurs.



The following table describes the error code displayed, as well as the causes and solutions.

Table 7.1		
ERROR CODE	FAULT	SOLUTION
Err 206	Overheating, the machine has exceeded its duty cycle	Keep the machine running, and let the fan run for a while to cool the internal temperature until the error disappears.
Err 215	Output short circuit	Check whether the machine's output cables are short-circuited
Err 205	Lack of input phase	Check the machine plug for poor contact.
Err 002	Torch trigger activated when the machine is energized	Check that the torch trigger is activated. If not, check the torch or whether its connection to the circuit board is correct. If no problems are found, replace the main board.
Err 216	Output current too high	Reduce the wire feed speed or change the welding wire to one with a smaller diameter.
Err 311	Wire feeding motor overcurrent	Check whether the motor is working normally or is stuck. If it is working normally, replace the control board. If it is not working, replace the motor.
Err 19	Insufficient main board supply voltage (15V)	Contact an authorised ESAB service centre.
Err 15	Overvoltage / Unbalanced input voltage	Adjust the input voltage or switch to another power supply.



NOTE!

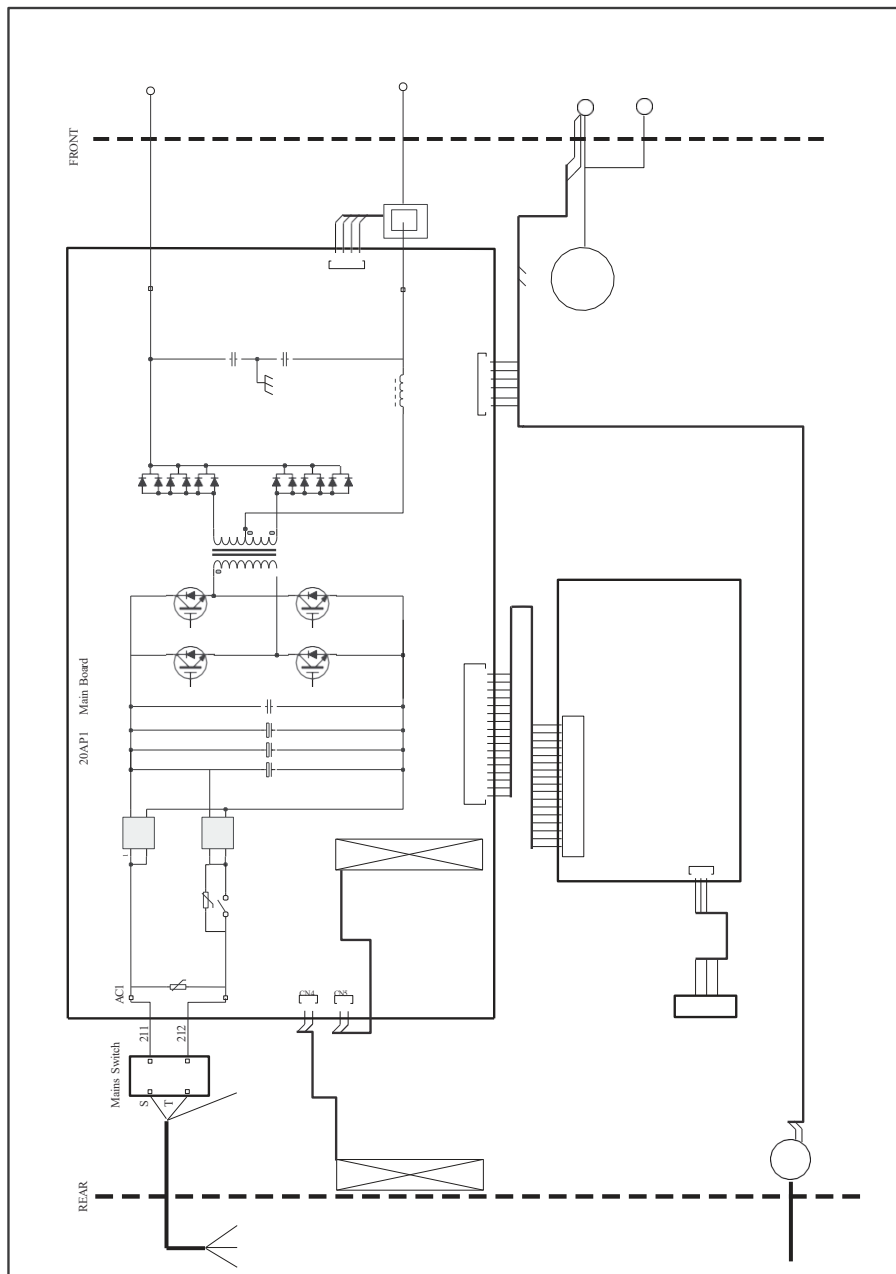
Call authorised ESAB service personnel.

Perform the following checks and inspections before sending for an authorised service technician.

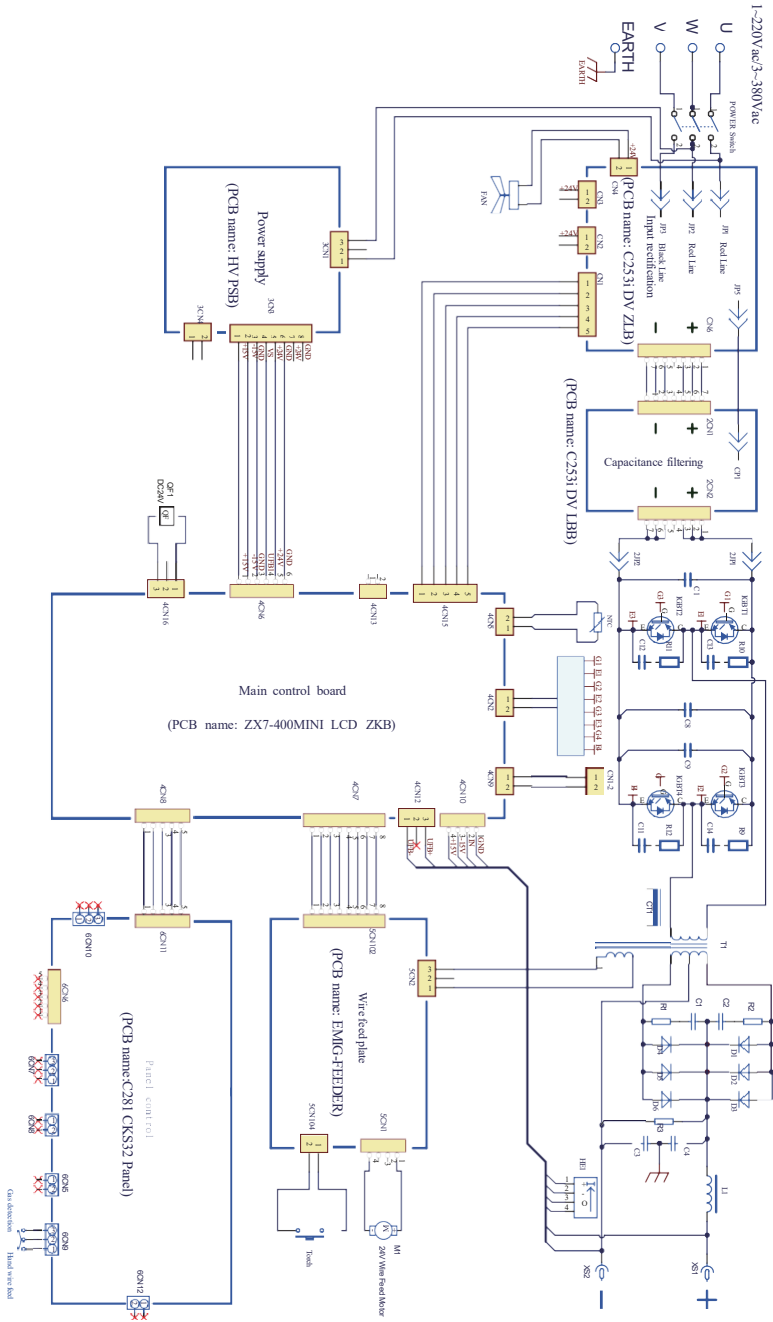
Table 7.2	
TYPE OF FAULT	CORRECTIVE ACTION
No arc	• Check that the mains power supply switch is turned on. • Check that the mains, welding and return cables are correctly connected. • Check that the correct current value is set. • Check the main power supply fuses.
The thermal protection trips frequently	• Make sure that the rated parameters of the welding power source have not been exceeded (i.e. the equipment is not overloaded). • Check that the ambient temperature is not above the one for the rated duty cycle 40°C/104°F.
Poor welding performance	• Check that the welding and return cables are correctly connected. • Check that the correct current value is set. • Check that the correct welding wires are being used. • Check the main power supply fuses.

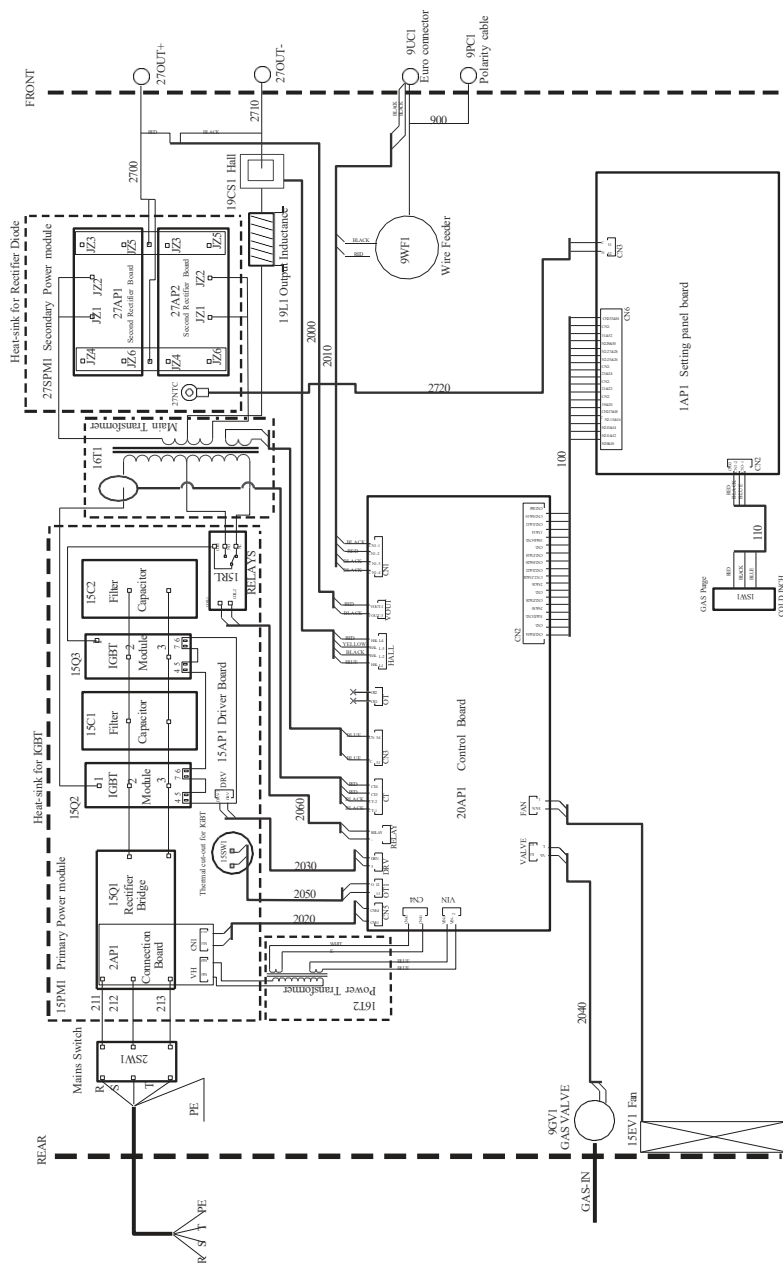
8 WIRING DIAGRAM

Rustler EM 215i



Rustler EM 300i





Rustler EM 215i



Rustler EM 300i



Rustler EM 455i



10 ORDERING SPARE PARTS

NOTE!

Rustler machines have been designed and tested in accordance with the standard IEC 60974-1 and GB/T 15579.1. On completion of service or repair work, it is the responsibility of the repairer to ensure that the product still complies with the requirements of the above standard.

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

Spare parts and wear parts can be ordered through your nearest ESAB dealer, see Spare parts can be ordered through your nearest ESAB distributor. See the last page of this manual.

For spare parts visit **esab.com**

ESAB

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