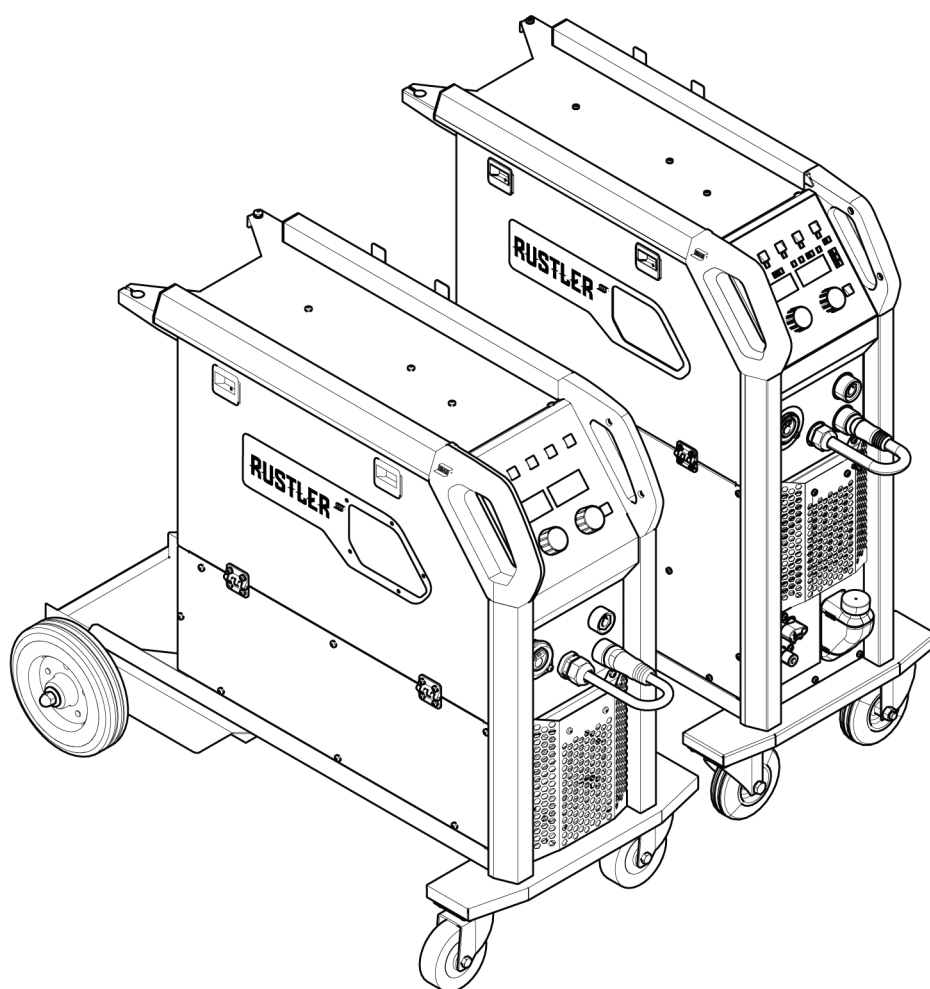


Rustler

***EM 280C PRO, EM 350C PRO,
EM 350C PRO SYNERGIC,
EM 350C PRO MV SYNERGIC,
EM 350Cw PRO SYN, EM 350C PRO PULSE,
EM 350Cw PRO PULSE***



Instruction manual



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; The Ecodesign Directive 2009/125/EC

Type of equipment

MIG/MAG welding power source

Type designation

Rustler EM280C PRO	from serial number OP250 YY XX XXXX
Rustler EM350C PRO	from serial number OP250 YY XX XXXX
Rustler EM350C PRO Synergic	from serial number OP250 YY XX XXXX
Rustler EM350C PRO MV Synergic	from serial number OP316 YY XX XXXX
Rustler EM350C PRO Pulse	from serial number OP515 YY XX XXXX

X and Y represents digits, 0 to 9 in the serial number, where YY indicates year of production.

Brand name or trademark

ESAB

Manufacturer or his authorised representative established within the EEA

ESAB AB
Lindholmsallén 9, Box 8004, SE-402 77 Göteborg, Sweden
Phone: +46 31 50 90 00, www.esab.com

The following EN standards and regulations in force within the EEA has been used in the design:

EN IEC 60974-1:2018/A1:2019	Arc Welding Equipment - Part 1: Welding power sources
EN IEC 60974-5:2019	Arc Welding Equipment – Part 5: Wire Feeders
EU reg. no. 2019/1784	Ecodesign requirements for welding equipment pursuant to Directive 2009/125/EC
EN 60974-10:2014	Arc Welding Equipment - Part 10: Electromagnetic compatibility (EMC) requirements

Additional Information:

Restrictive use, Class A equipment, intended for use in locations other than residential.
All the above products are part of Rustler 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 and environmental requirements stated above.

Place/Date

Signature

Gothenburg
2025-10-30

Peter Burchfield
VP, Global Products



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; The Ecodesign Directive 2009/125/EC

Type of equipment

MIG/MAG welding power source

Type designation

Rustler EM350Cw PRO Synergic from serial number OP420 YY XX XXXX
Rustler EM350Cw PRO Pulse from serial number OP515 YY XX XXXX
X and Y represents digits, 0 to 9 in the serial number, where YY indicates year of production.

Brand name or trademark

ESAB

Manufacturer or his authorised representative established within the EEA

ESAB AB
Lindholmsallén 9, Box 8004, SE-402 77 Göteborg, Sweden
Phone: +46 31 50 90 00, www.esab.com

The following EN standards and regulations in force within the EEA has been used in the design:

EN IEC 60974-1:2018/A1:2019	Arc Welding Equipment - Part 1: Welding power sources
EN IEC 60974-2:2019	Arc welding equipment - Part 2: Liquid cooling systems
EN IEC 60974-5:2019	Arc Welding Equipment – Part 5: Wire Feeders
EU reg. no. 2019/1784	Ecodesign requirements for welding equipment pursuant to Directive 2009/125/EC
IEC 60974-10:2020	Arc Welding Equipment - Part 10: Electromagnetic compatibility (EMC) requirements

Additional Information:

Restrictive use, Class A equipment, intended for use in locations other than residential.
All the above products are part of Rustler 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 and environmental requirements stated above.

Place/Date

Signature

CE

Gothenburg
2025-10-30

Peter Burchfield
VP, Global Products

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1 SAFETY

1.1 Meaning of symbols

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



DANGER!

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



WARNING!

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



CAUTION!

Means hazards which could result in minor personal injury.



WARNING!

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



1.2 Safety precautions

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

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

1. Anyone who uses the equipment must be familiar with:
 - its operation
 - location of emergency stops
 - its function
 - relevant safety precautions
 - welding and cutting or other applicable operation of the equipment
2. The operator must ensure that:
 - no unauthorised person is stationed within the working area of the equipment when it is started up
 - no-one is unprotected when the arc is struck or work is started with the equipment
3. The workplace must:
 - be suitable for the purpose
 - be free from drafts
4. Personal safety equipment:
 - always wear recommended personal safety equipment, such as safety glasses, flame-proof clothing, safety gloves
 - do not wear loose-fitting items, such as scarves, bracelets, rings, etc., which could become trapped or cause burns

5. General precautions:

- make sure the return cable is connected securely
- work on high voltage equipment **may only be carried out by a qualified electrician**
- appropriate fire extinguishing equipment must be clearly marked and close at hand
- lubrication and maintenance must **not** be carried out on the equipment during operation

If equipped with ESAB cooler

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

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



WARNING!

Arc welding and cutting can be injurious to yourself and others. Take precautions when welding and cutting.



ELECTRIC SHOCK - Can kill

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



ELECTRIC AND MAGNETIC FIELDS - Can be dangerous to health

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



FUMES AND GASES - Can be dangerous to health

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



ARC RAYS - Can injure eyes and burn skin

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



NOISE - Excessive noise can damage hearing

Protect your ears. Use earmuffs or other hearing protection.

**MOVING PARTS - Can cause injuries**

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



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

**FIRE HAZARD**

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

**HOT SURFACE - Parts can burn**

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

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

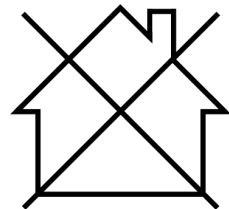
PROTECT YOURSELF AND OTHERS!

**CAUTION!**

This product is solely intended for arc welding.

**CAUTION!**

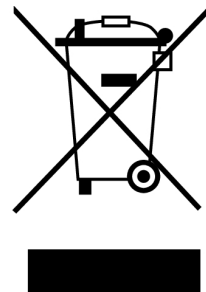
Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electromagnetic compatibility of class A equipment in those locations, due to conducted as well as radiated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

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

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

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

For further information contact the nearest ESAB dealer.



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

2 INTRODUCTION

The **Rustler EM 280 PRO, EM 350 PRO, EM 350 PRO Synergic, EM 350 PRO MV Synergic, EM 350Cw PRO Synergic, EM 350C PRO Pulse, and EM 350Cw PRO Pulse** is a compact welding power source intended for welding with solid wires, flux cored wires and coated electrodes (MIG / MAG / GMAW, FCAW, and MMA / SMAW / Stick).

The **Rustler EM 350Cw PRO Synergic** and **EM 350Cw PRO Pulse** have an integrated cooling unit.

The equipment has built in wheels and gas bottle bracket to move easily around the work place and provide a better reach.

Main features of Rustler EM PRO:

- High output current and duty cycle
- Easy and intuitive set up
- Durable housing
- Superb arc characteristic, optimized for most common based materials
- MMA / SMAW / Stick welding mode

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

2.1 Equipment

The power source is supplied with:

- 4 m black rubber gas hose
- 5 m return cable with crocodile type earth clamp
- Safety instruction
- Quick start guide

3 TECHNICAL DATA

	EM 280C PRO	EM 350C PRO	EM 350 PRO SYN	EM 350C PRO MV SYN
Mains voltage	400 V $\pm 15\%$, 3~ 50/60 Hz			400/230V $\pm 15\%$, 3~50/60 Hz
Mains supply S_{scmin}	0.5 MVA			
Primary current I_{max}				
MIG / MAG / GMAW	14 A	20.6 A	20.6 A	40 A (230VAC input) 20 A (400VAC input)
MMA / SMAW / Stick	13.5 A	20 A	20 A	33 A (230VAC input) 19 A (400VAC input)
I_{eff}	9 A	13 A	13 A	25.3A (230VAC input) 13A (400VAC input)
Setting range				
MIG / MAG / GMAW	40 A/16 V - 280 A/28 V	30 A/15.5 V - 350 A/31.5 V	30 A/15.5 V - 350 A/31.5 V	30 A/15.5 V - 350 A/31.5 V
MMA / SMAW / Stick	20 A/20.8 V - 250 A/30 V	20 A/20.8 V - 320 A/32.8 V	20 A/20.8 V - 320 A/32.8 V	20 A/20.8 V - 320 A/32.8 V
Wire feed speed	1.5 - 22 m/min			
Permissible load at MIG / MAG / GMAW				
40 % duty cycle	280 A/28 V	350 A/31.5 V	350 A/31.5 V	350 A/31.5 V
60 % duty cycle	229 A/25.5 V	286 A/28.3 V	286 A/28.3 V	286 A/28.3 V
100% duty cycle	177 A/22.9 V	222 A/25.1 V	222 A/25.1 V	222 A/25.1 V
Open-circuit voltage	65 V	71 V	71 V	74 V
Permissible load at MMA / SMAW / Stick				
40 % duty cycle	250 A/30 V	320 A/32.8 V	320 A/32.8 V	320 A/32.8 V
60 % duty cycle	204 A/28.2 V	262 A/30.5 V	262 A/30.5 V	262 A/30.5 V
100% duty cycle	158 A/26.3 V	203 A/28.1 V	203 A/28.1 V	203 A/28.1 V
Open-circuit voltage	63 V	66.6 V	66.6 V	74 V
Apparent power at maximum current	9.7 kVA	14 kVA	14 kVA	14 kVA
Active power I_2 at maximum current	8.7 kW	12.6 kW	12.6 kW	12.6 kW
Power factor at maximum current	0.9	0.9	0.9	0.9
Efficiency at maximum output power	90 %	89 %	89 %	89 %

	EM 280C PRO	EM 350C PRO	EM 350 PRO SYN	EM 350C PRO MV SYN
No-load power demand when energy-saving mode	< 30 W	< 30 W	< 30 W	< 30 W
Weight	54 kg	57.5 kg	61 kg	63 kg
Recommended generator	12 kW	17 kW	17 kW	17 kW
Operating temperature	-10 to +40°C (+14 to 104°F)			
Transportation temperature	-20 to +55°C (-4 to +131°F)			
Dimensions l × w × h	977 × 487 × 800 mm			
Insulation class	F			
Enclosure class	IP 23			
Application class	S			

	EM 350Cw PRO SYN
Mains voltage	400 V±15%, 3~50/60 Hz
Mains supply S_{scmin}	0.5 MVA
Primary current I_{max}	
MIG / MAG / GMAW	20.6 A
MMA / SMAW / Stick	20 A
I_{1eff}	13 A
Setting range	
MIG/MAG	30 A/15.5 V - 350 A/31.5 V
MMA	20 A/20.8 V - 320 A/32.8 V
Wire feed speed	1.5 - 22 m/min
Permissible load at MIG / MAG / GMAW	
40 % duty cycle	350 A/31.5 V
60 % duty cycle	286 A/28.3 V
100% duty cycle	222 A/25.1 V
Open-circuit voltage	71 V
Permissible load at MMA / SMAW / Stick	
40 % duty cycle	320 A/32.8 V
60 % duty cycle	262 A/30.5 V
100% duty cycle	203 A/28.1 V
Open-circuit voltage	66.6 V
Apparent power at maximum current	14 kVA
Active power I_2 at maximum current	12.6 kW
Power factor at maximum current	0.8
Efficiency at maximum output power	85.3 %
No-load power demand when energy-saving mode	< 30 W

	EM 350Cw PRO SYN
Weight	78.5 kg
Recommended generator	17 kW
Operating temperature	-10 to +40°C (+14 to 104°F)
Transportation temperature	-20 to +55°C (-4 to +131°F)
Cooling power	1 kW
Coolant volume	1.8 l
Maximum flow	1.9 lpm
Maximum pressure	4.5 bar
Dimensions l × w × h	977 × 470 × 1005 mm
Insulation class	F
Enclosure class	IP 23
Application class	S

	EM350C PRO PULSE	EM350Cw PRO PULSE
Mains voltage	400 V ±15%, 3~ 50/60 Hz	
Mains supply S_{scmin}	0.5 MVA	
Primary current I_{max}		
MIG / MAG / GMAW	20.6 A	
MMA / SMAW / Stick	20 A	
I_{eff}	13 A	
Setting range		
MIG / MAG / GMAW	30 A/15.5 V - 350 A/31.5 V	
MMA / SMAW / Stick	20 A/20.8 V - 320 A/32.8 V	
Wire feed speed	1.5 - 22 m/min	
Permissible load at MIG / MAG / GMAW		
40 % duty cycle	350 A/31.5 V	
60 % duty cycle	286 A/28.3 V	
100% duty cycle	222 A/25.1 V	
Open-circuit voltage	71 V	
Permissible load at MMA / SMAW / Stick		
40 % duty cycle	320 A/32.8 V	
60 % duty cycle	262 A/30.5 V	
100% duty cycle	203 A/28.1 V	
Open-circuit voltage	66.6 V	
Apparent power at maximum current	14 kVA	
Active power I_2 at maximum current	12.6 kW	
Power factor at maximum current	0.8	
Efficiency at maximum output power	89 %	85.3 %

	EM350C PRO PULSE	EM350Cw PRO PULSE
No-load power demand when energy-saving mode	< 30 W	
Weight	61 kg	80.5 kg
Recommended generator	17 kW	
Operating temperature	-10 to +40°C (+14 to 104°F)	
Transportation temperature	-20 to +55°C (-4 to +131°F)	
Cooling power	-	1 kW
Cooling volume	-	4.5 l
Maximum flow	-	1.9 lpm
Maximum pressure	-	4.5 bar
Dimensions l × w × h	977 × 487 × 800 mm	977 × 470 × 1005 mm
Insulation class	F	
Enclosure class	IP 23	
Application class	S	

**NOTE!**

The EM 350C PRO MV Synergic power source can detect the main voltage 400 V or 230 V and adopt accordingly.

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 **IP23** is intended for indoor and outdoor use.

Application class

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

4 INSTALLATION

The installation must be carried out by a professional.



CAUTION!

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

4.1 Location

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



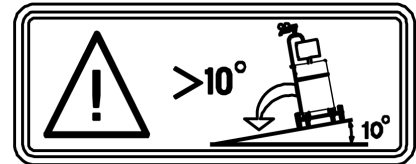
WARNING!

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



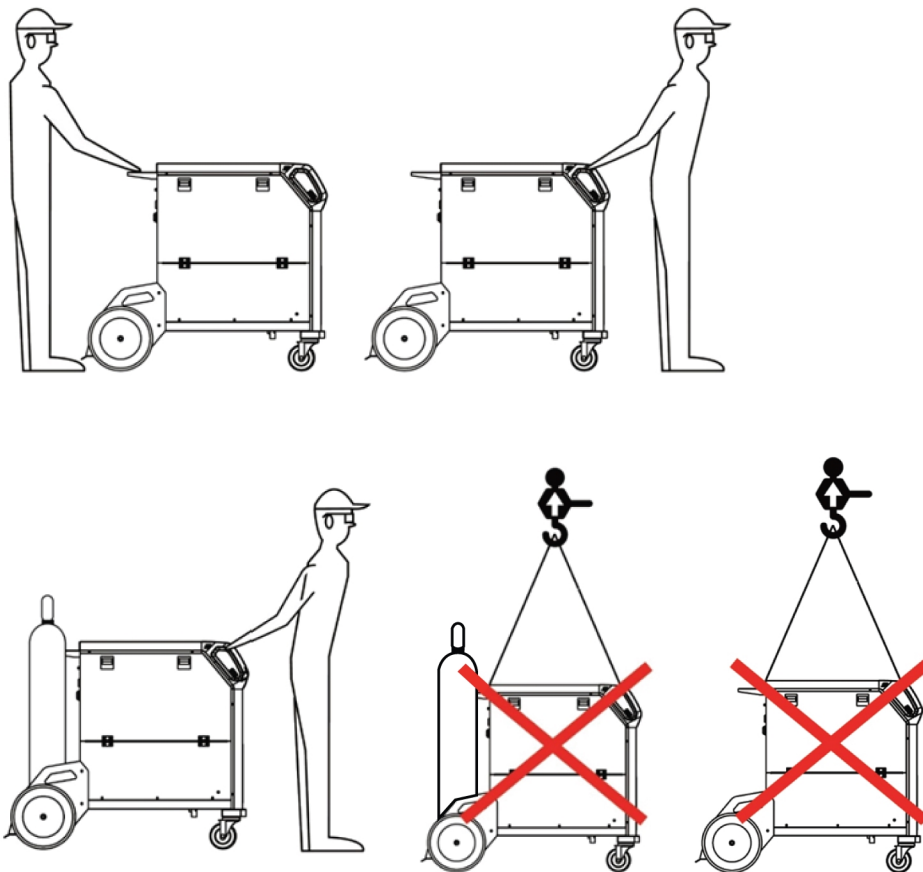
NOTE!

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



4.2 Move instructions (No lifting)

Mechanical lifting must be done with both outer handles.



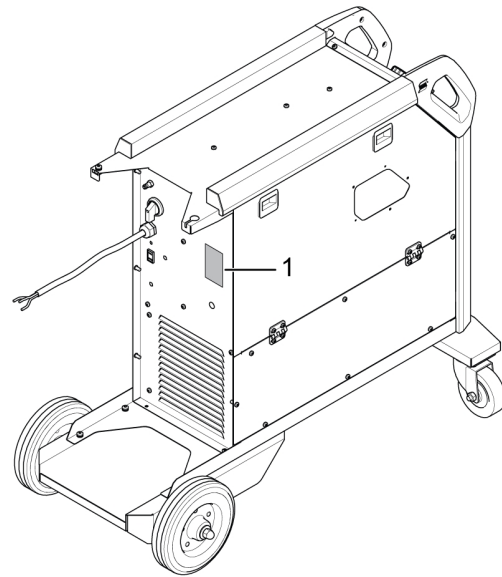
4.3 Mains supply



NOTE! Mains supply requirements

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

1. Rating plate with supply connection data.



Recommended fuse sizes and minimum cable area				
	EM 280C PRO	EM 350C PRO	EM 350C/350Cw PRO SYN	EM 350C PRO MV SYN
Mains voltage	400 V ±15%, 3~50/60 Hz			400/230V±15%, 3~50/60Hz
Mains cable area	4×2.5 mm ²	4×2.5 mm ²	4×2.5 mm ²	4×4 mm ²
Maximal current rating I_{max} (MIG/MAG)	14 A	21 A	21 A	40A (230VAC input) 20A (400VAC input)
I_{1eff}	9 A	13 A	13 A	25.3A (230VAC input) 13A (400VAC input)
Fuse anti-surge type C MCB	20 A 20 A	30 A 30 A	30 A 30 A	40A (230VAC input) 30A (400VAC input)

Recommended fuse sizes and minimum cable area				
Maximum recommended extension cord length	100 m/330 ft.	100 m/330 ft.	100 m/330 ft.	100 m/330 ft.
Minimum recommended extension cord size	4×2.5 mm ²	4×2.5 mm ²	4×2.5 mm ²	4×4 mm ²

Recommended fuse sizes and minimum cable area		
	EM 350C PRO PULSE	EM 350Cw PRO PULSE
Mains voltage	400 V ±15%, 3~50/60 Hz	
Mains cable area	4×2.5 mm ²	4×2.5 mm ²
Maximal current rating I_{max} (MIG/MAG)	14 A	21 A
I_{1eff}	9 A	13 A
Fuse anti-surge type C MCB	20 A	30 A
	20 A	30 A
Maximum recommended extension cord length	100 m/330 ft.	100 m/330 ft.
Minimum recommended extension cord size	4×2.5 mm ²	4×2.5 mm ²

**NOTE!**

EM 350C PRO MV Synergic power source can sense the main voltage 400 V or 230 V and adapt accordingly.

5 OPERATION

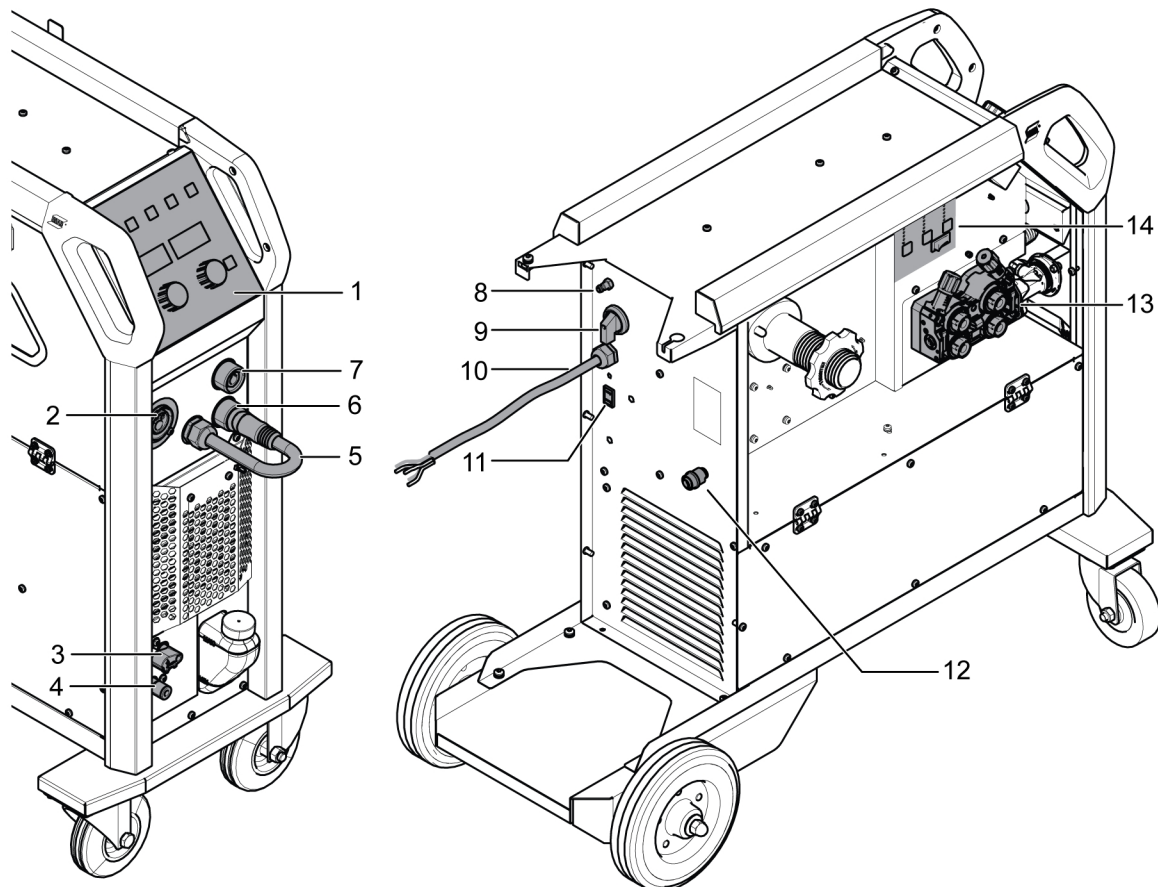
General safety regulations for handling the equipment can be found in the "SAFETY" chapter of this manual. Read it through before you start using the equipment!



WARNING!

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

5.1 Connections



- | | |
|---|--|
| 1. External control panel | 8. Gas inlet connection |
| 2. Euro central connector | 9. Mains supply switch, O/I |
| 3. Coolant connection, BLUE, to the torch
(EM 350Cw only) | 10. Mains cable |
| 4. Coolant connection, RED, from the torch
(EM 350Cw only) | 11. Receptable for CO ₂ heater (optional) |
| 5. Polarity changeover cable | 12. Wire inlet adapter for Marathon Pac™
(optional) |
| 6. Negative welding terminal | 13. Wire feeding mechanism |
| 7. Positive welding terminal | 14. Internal control panel |

5.2 Recommended maximum current values for welding and return cables

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

Cable size mm ²	Duty cycle			Voltage drop/10 m
	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

5.3 Connecting welding and return cables

The polarity changeover cable is used to select the correct polarity for the weld output. The correct polarity is determined by the wire that has been selected to complete the weld. To configure the machine to operate with positive electrode, insert and secure the polarity changeover cable into the positive [+] terminal and the return lead into the negative [-] terminal. Be sure that the connections are tight.

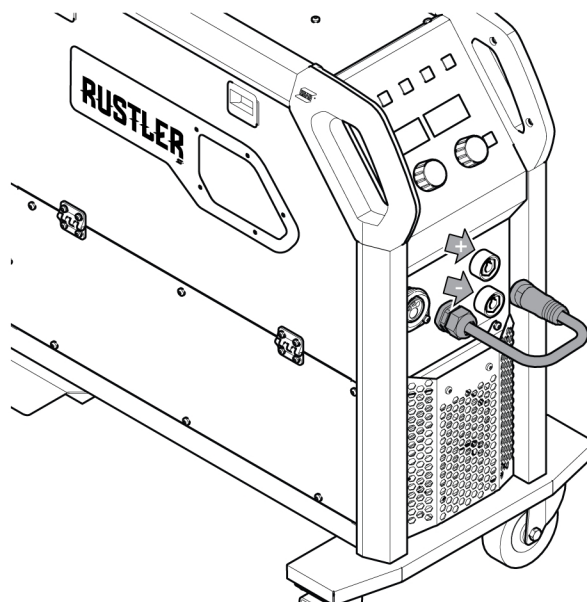
Secure the work clamp to the work piece in a clean, debris free location.

- For MIG / MAG / GMAW and MMA / SAMW / Stick welding, the welding cable can be connected to the positive welding terminal (+) or negative welding terminal (-) depending on the type of electrode used. See the wire/electrode manufacturers recommendation.

5.4 Polarity change

The power source is delivered with the polarity changeover cable connected to the positive welding terminal (+). Some wires, e.g. self-shielded cored wires, are recommended to be welded with negative polarity.

In this case, connect the polarity changeover cable to the negative welding terminal (-) and the return cable to the positive welding terminal (+). See wire/electrode manufacturers recommendation.



5.5 Turning the mains power on/off

Turn on the mains power by turning switch to the "I" position.

Turn the unit off by turning the switch to the "O" position.

Whether the mains power supply is interrupted or the power source is switched off in the normal manner, weld programs will be stored so that it is available next time the unit is started.

**CAUTION!**

Do not turn off the power source during welding (with load).

5.6 Usage of cooling unit

ELP (ESAB Logic Pump)

The EM 350Cw PRO SYNERGIC, EM350Cw PRO PULSE, is fitted with a water recirculator and detection system called ELP (ESAB Logic Pump), which checks that the coolant hoses are connected. The coolant from the cooler automatically starts flowing when welding starts.

**NOTE!**

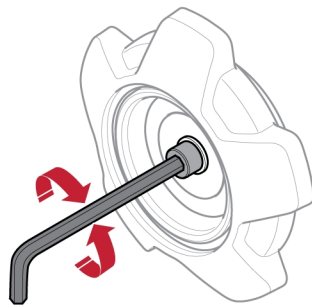
The cooling unit will be applicable only for MIG / MAG / GMAW welding.

5.7 Bobbin brake

The bobbin brake force should be adjusted to prevent wire overrun. The actual brake force needed, is dependent of the wire feed speed and the size and weight of the wire spool.

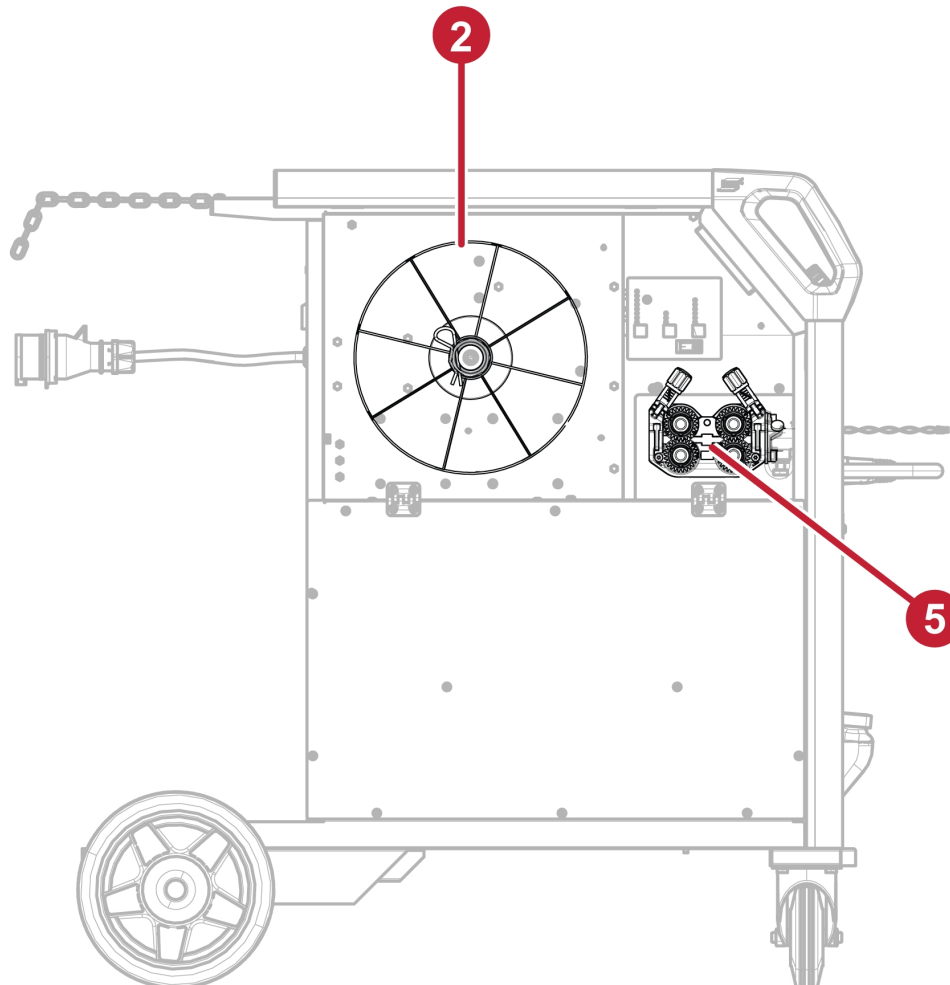
Do not overload the bobbin brake! A high brake force may overload the motor and reduce motor life and result in poor weld quality.

The bobbin brake force can be adjusted by rotating the 6 mm hexagon Allen screw in the middle of the brake hub nut.



5.8 Changing and loading wire

- 1) Open the left door of the power source
- 2) Remove the brake hub nut and remove the wire spool.



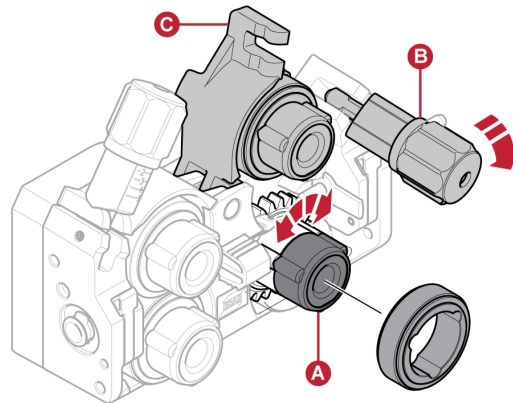
- 3) Insert a new wire spool into the unit by placing the spool of wire on the spool hub.
- 4) Secure the spool of wire on the spool hub, by tightening the spool hub nut.
- 5) Straighten out the new welding wire 10–20 cm and thread the wire through the wire feeder mechanism.
- 6) Close and latch the door.

5.9 Changing feed rollers

When changing to a different type or size of wire, the feed rollers should be changed to match the new type or size of wire. For information about correct feed rolls, see the WEAR PARTS appendix.

- 1) Open the left door of the wire feeder.
- 2) Unlock the feed rollers, by rotating the quick lock 1/3 turn (A) for each feed roll.

- 3) Relieve the pressure on the feed rollers, by folding the tensioner units (B) down to release the swing arms (C).

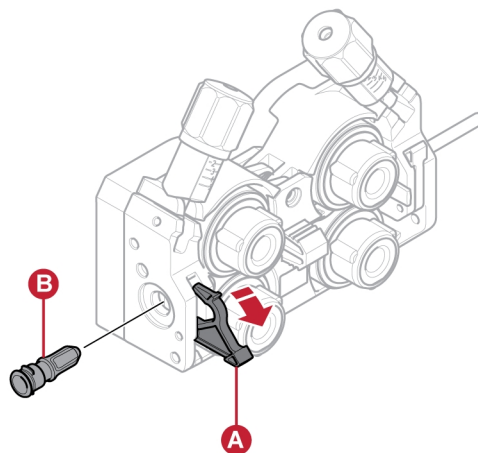


- 4) Remove the feed rollers and install the correct ones (according to the WEAR PARTS appendix).
- 5) Reapply the pressure to the feed rollers, by pushing the swing arms (C) down and secure them using the tensioner arms (B).
- 6) Secure the feed rollers by rotating the quick lock 1/3 turn (A).
- 7) Close and latch the door.

5.10 Changing the wire guides

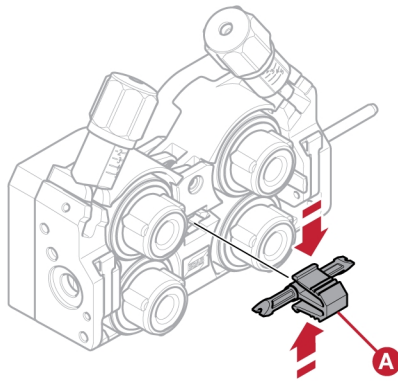
When changing to a different type of wire, the wire guides may have to be changed to match the new type of wire. For information about the correct wire guides depending on wire diameter and type, see the WEAR PARTS appendix.

5.10.1 Inlet wire guides



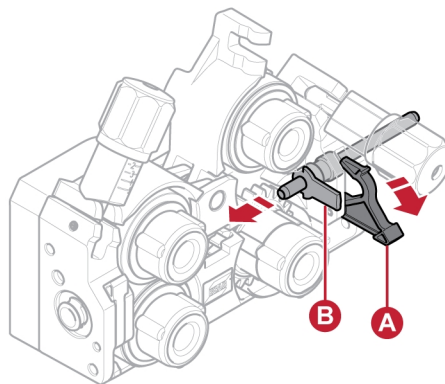
- 1) Unlock the inlet wire guide quick lock (A) by folding it out.
- 2) Remove the inlet wire guide (B).
- 3) Install the correct inlet wire guide (according to the WEAR PARTS appendix).
- 4) Lock the new inlet wire guide using the wire guide quick lock (A).

5.10.2 Middle wire guide



- 1) Pinch the center wire guide and pull out to remove the guide (A).
- 2) To install the center wire guide, pinch the guide and push it into place. The clips will lock the guide into place.

5.10.3 Outlet wire guide



- 1) Release the pressure on the front feed roll pressure arm by rotating the front tensioning arm outwards.
- 2) Remove the lower front feed roll.
- 3) Remove the center wire guide.
- 4) Unlock the wire outlet guide quick lock (A) by folding it out.
- 5) Remove the wire outlet guide (B).
- 6) Install the new wire outlet guide.
- 7) Lock the new wire outlet guide into place using the wire guide quick lock (A).
- 8) Reinstall the lower front feed roll.

5.11 Setting roller pressure

The feed roll pressures should be adjusted independently, determined by the wire type and diameter. The front feed roll pressure should be slightly higher than the rear feed roll pressure.

- 1) Make sure that the wire moves freely through the wire guides and set the feed roll pressure. Do not over tighten.

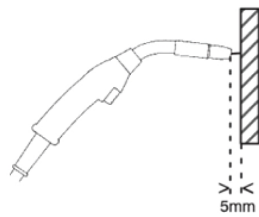


Figure A.

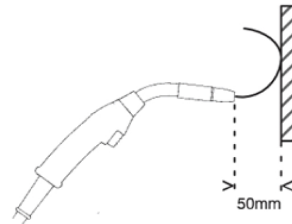


Figure B.

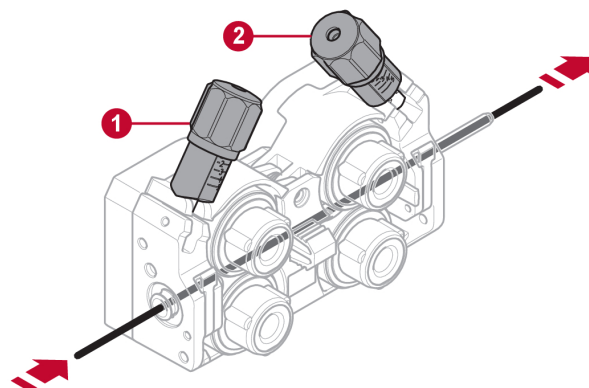
- 2) To check that the feed pressure is set correctly, you can feed the wire against a non-conductive surface, e.g. a piece of wood.

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

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

The table below serves as a guideline showing approximate feed roll pressure settings for standard conditions with correct spool brake force. If the torch cables are long, dirty or worn, the pressure setting may need to be increased. Always check the feed roll pressure setting on a case-by-case basis by feeding out the wire against an insulated object as described above.

Wire diameter (mm) (in.)			0.6 .023	0.8 .030	1.0 .040	1.2 .045	1.4 .052	1.6 1/16
			Pressure setting					
Wire material	Fe, Ss	Tensioner unit 1	2.5					
		Tensioner unit 2	3–3.5					
	Cored	Tensioner unit 1			2			
		Tensioner unit 2			2.5–3			



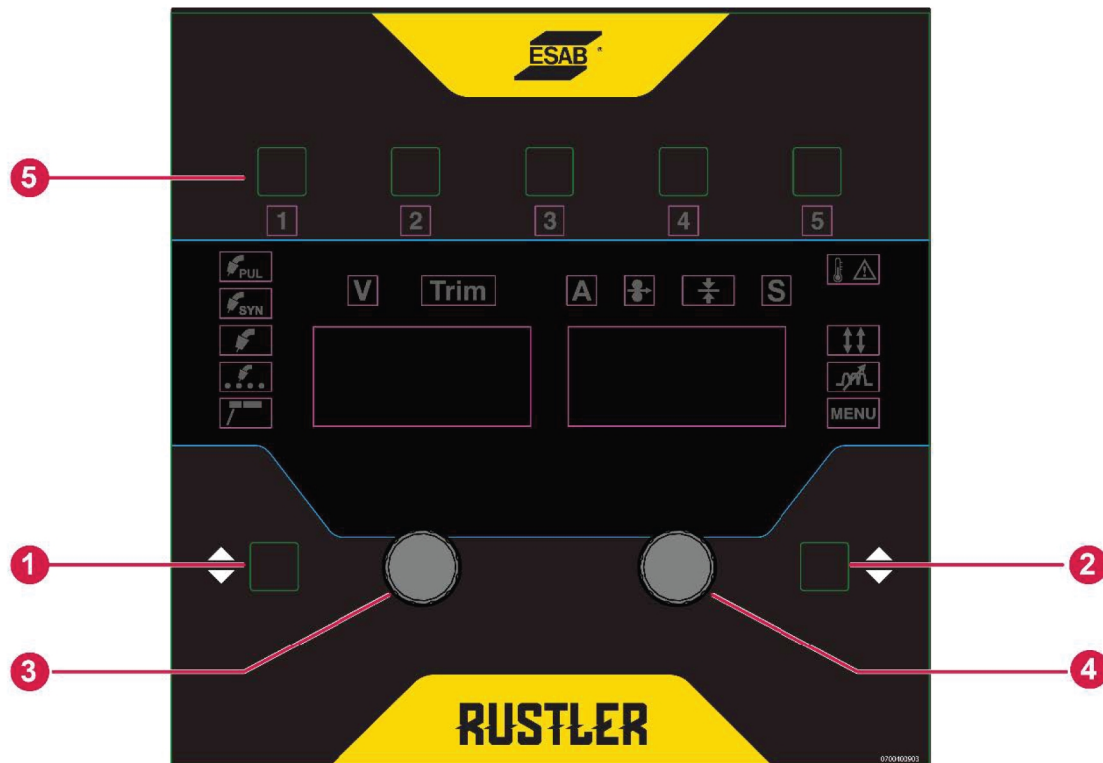
1. Tensioner unit 1

2. Tensioner unit 2

- 3) The wire spool hub incorporates a friction brake. If it is necessary, adjustment can be made by turning the spool locking nut inside the open end of the hub clockwise to tighten the brake. Correct adjustment will result in the wire reel circumference continuing no further than 3–5 mm after release of the trigger. The electrode wire should be slack without becoming dislodged from wire spool.

6 CONTROL PANEL

6.1 External control panel



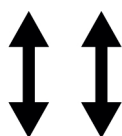
- | | |
|----------------------------|-----------------------------|
| 1. Process select button | 4. Right potentiometer knob |
| 2. Parameter select button | 5. Jobs |
| 3. Left potentiometer knob | |

Process select button (1)

The various welding processes such as MIG, MIG SYN, MIG SPOT and MMA can be selected with this button. When the machine is turned ON, it will be in MIG mode by default. Press this button to change to MIG SYN/MIG SPOT/MMA and repeat.

Parameter select button (2)

Parameter select button is used to switch the functionality of the torch trigger from trigger mode, Inductance and Menu.



Trigger mode

To access the functions, press the parameter select button until the trigger mode symbol is illuminated. The left display will show TRG and right display will show 2T or 4T. Select 2T or 4T by turning the right potentiometer knob (4).



Arc dynamics

To access the functions, press the parameter select button until the arc dynamics symbol is illuminated. The left display will show IND and right display will show a value. Turn the right potentiometer knob to increase or decrease the arc dynamics value.

MENU

MENU

Under the menu there are number of weld variables to be accessed. To access the weld variables press the parameter select button until the Menu ICON is illuminated. Press this button again to enter the weld variable menu. The left display will show the variable to adjust and the right display will show the value.

Use the left potentiometer to select the desired weld variable and use the right potentiometer to increase or decrease the values.



NOTE!

The list of MENU functions will vary depending on the application selected.

Left potentiometer knob (3)

In MIG / MAG / GMAW / FCAW mode, the knob is used to adjust weld voltage, the parameter chart is located in the wire feeder compartment.

In MIG SYN mode (EM 350C PRO SYNERGIC) turning the knob will select the TRIM setting of voltage. In TRIM function, the knob clockwise increases the voltage by 0.1V increments and the maximum value is +5V.

Right potentiometer knob (4)

In MIG / MAG / GMAW / FCAW mode, the right knob adjusts the wire feed speed. The optimum wire feed speed will be dependent on the type of welding application, material type and thickness. Wire feed speed can be set by using the parameter chart is located in the wire feeder compartment.

In MIG SYN mode turning the right Knob will select wire feed speed or thickness. The default value will be wire feed speed and thickness can be selected in the hidden functions.

In MMA modes, the knob adjusts the welding output current.



Jobs (5)





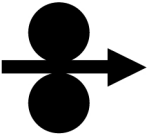
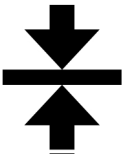
There are 5 job buttons that can be used to store current weld data for later recall. These 5 buttons are reserved to any wire process.

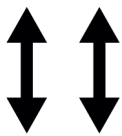


When the desired weld parameters have been established the user can press and hold the button 1-5 to store the current weld data.

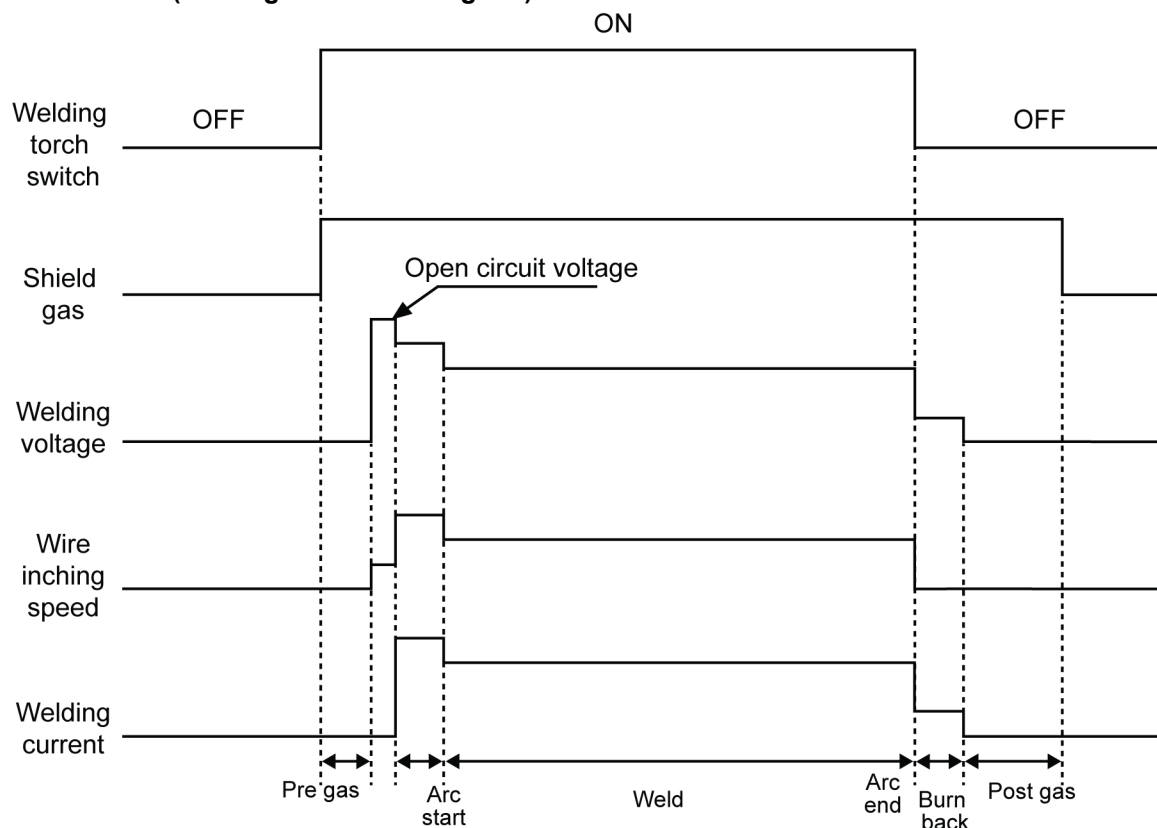
To recall any stored weld data, the user can select any of the 5 stored jobs by pressing the desired button.

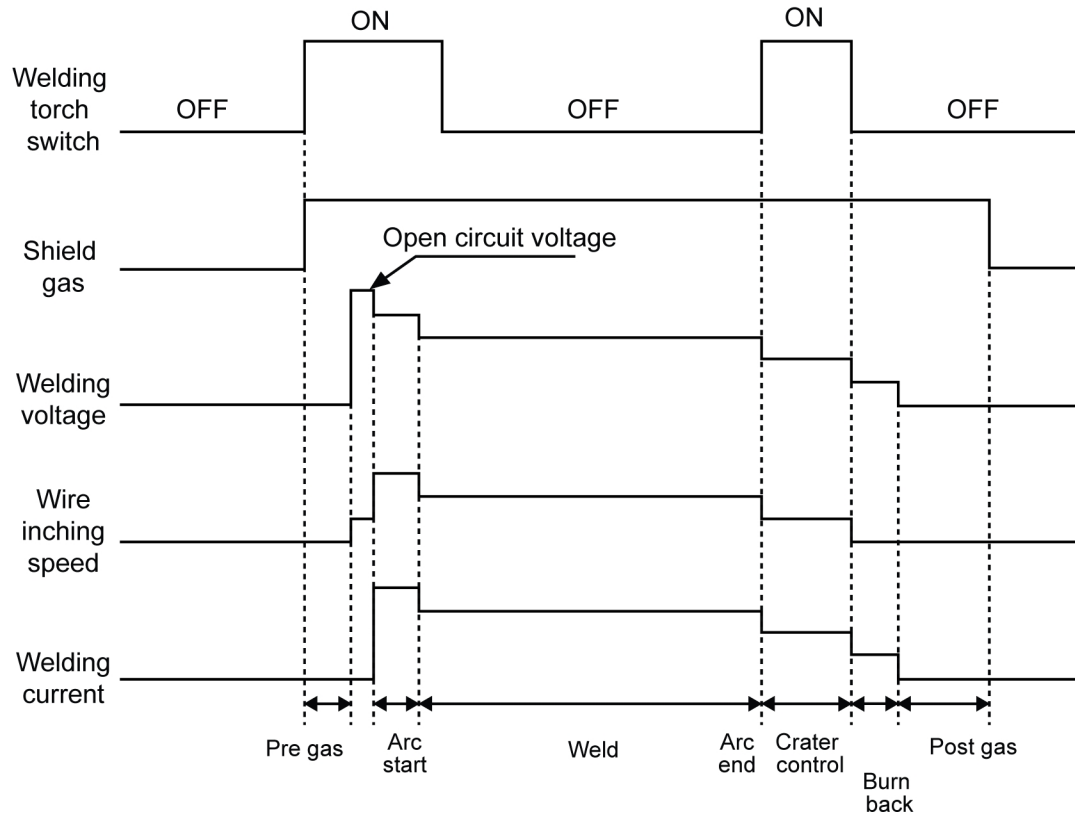
6.2 LED indicators description

Indicator	Description
	MIG/MAG Constant voltage control process is where the set voltage and the wire feed speed are set independent of each other.
	MIG/MAG SYN A process with synergic voltage and inductance, in relation to wire feed speed using predetermined synergic line programs providing stable arc performance. The process operates through short circuit, globular and spray transfer mode.

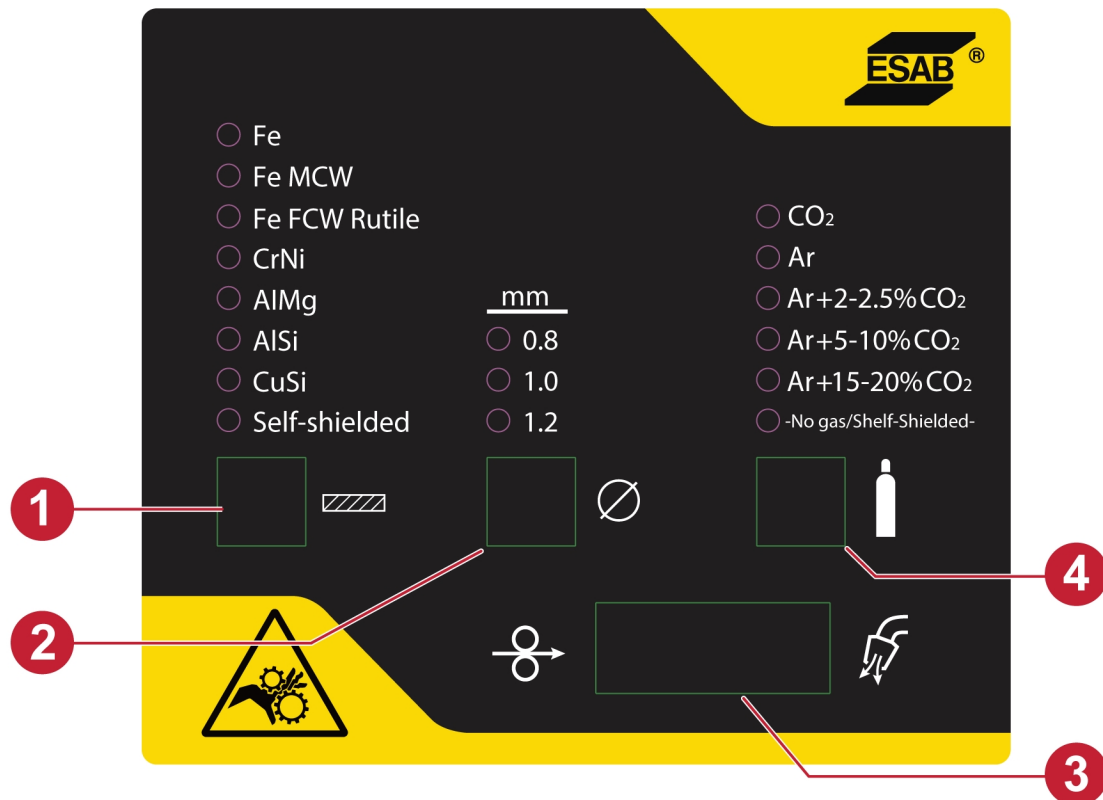
Indicator	Description
	MIG/MAG PULSE Switching the current between a high peak current and a low background current at a set frequency.
	MIG/MAG SPOT Spot welding is used when you want to spot weld thin plates together. <div>  NOTE! It is not possible to shorten the welding time by releasing the trigger switch. </div>
	MMA MMA welding may also be referred to as welding with coated electrodes. Striking the arc melts the electrode, and its coating forms protective slag.
V	Measured voltage Measured value in the display for welding voltage V is an average numerical value which is calculated during the welding excluding the weld termination.
Trim	Trim Trim is the process of adjusting the parameter within an acceptable range. This function is applicable only in MIG/MAG Synergic.
A	Measured amperage Measured value in the display for welding current A is an average numerical value which is calculated during the weld excluding the weld termination.
	Wire feed speed Measured value in the display for wire feed speed is an average numerical value which is calculated during the weld excluding the weld termination.
	Thickness Selected thickness in the display for the welding workpiece. This function is applicable only in MIG/MAG Synergic.
S	Time Selected time in the display for the spot and rest time in seconds. This function is applicable only in MIG/MAG Spot.

Indicator	Description
	<p>2-stroke</p> <p>This indicator blinks in green and displays 2T.</p> <p>With 2-stroke, gas pre-flow starts when the welding torch trigger switch is pressed. The welding process then starts. Releasing the trigger switch stops welding entirely and starts gas post-flow.</p> <p>4-stroke</p> <p>This indicator lit in static green and displays 4T.</p> <p>With 4 stroke, the gas pre-flow starts when the welding torch trigger switch is pressed in and the wire feed starts when it is released. The welding process continues until the switch is pressed in again, the wire feed and arc then stop and when the switch is released the gas post-flow starts.</p>
	<p>Arc dynamics</p> <p>The arc dynamics is used to adjust the intensity of the welding arc. Lower settings make the arc softer with less weld spatter. Higher settings give a stronger driving arc which can increase weld penetration. Soft means maximum inductance while Hard means minimum inductance.</p>
	<p>Thermal protection</p> <p>The welding power source has overheating protection that operates if the temperature becomes too high. When this occurs, the welding current is interrupted, and an overheating indication lamp is lit. The overheating protection resets automatically when the temperature has fallen within its normal working temperature.</p>

2-stroke mode (welding without ending arc)

4-stroke mode (welding without ending arc)

6.3 Internal control panel



- | | |
|--------------------------------|--|
| 1. Material select button | 3. Wire inch and gas purge button |
| 2. Wire diameter select button | 4. Gas select button (Synergic variant only) |

Material select button

This is used to select welded base material for optimal arc characteristics.

Wire diameter select button

This is used to select the diameter of the installed wire.

Wire inching and gas purge button

Wire inching is used to feed wire without welding voltage being applied. The wire is fed as long as the button is pressed. This function is active in MIG / MAG / GMAW applications only.

Gas purging is used while measuring the gas flow or for flushing any air or moisture from the gas hoses before welding starts. Gas purging occurs for 15 seconds when the gas purge button or torch trigger is pressed or until it is pressed again. Gas purge occurs without voltage or wire feed start. This function is active in MIG / MAG / GMAW applications only.

Gas select button

This is used to select the proper gas type that is currently connected to the equipment in the internal control panel.

6.4 Menu selection

6.4.1 MIG / MAG / GMAW and MIG / MAG / GMAW SYN

In MIG / MAG / GMAW mode, press the parameter selection button three times to navigate to MENU option. Select the desired welding function one after other by turning the left potentiometer knob and adjust the desired value by turning the right potentiometer knob.

Left display letter	Function	Default	Right display settings
B-B	Burnback	0.1	0.01-0.35
CRA	Crater fill time	0	0.0-9.9
PRG	Pre-flow	0.1	0.5-9.9
POG	Post-flow	0.5	0.5-9.9
RIN	Creep start (Run in)	ON	ON/OFF

Burnback (B-B)

Burnback time is a delay between the time when the wire starts to brake until the time when the power source switches off the welding output.

Too short burnback time results in a long wire stick out after completion of welding, with a risk of the wire being caught in the solidifying weld pool.

Too long a burnback time results in a shorter stick out, with increased risk of the arc striking back to the contact tip.

Crater fill (CRA)

Crater filling makes a controlled reduction in the heat and size of the weld pool possible when completing the weld. This makes it easier to avoid pores, thermal cracking and crater formation in the weld joint.

Pre/flow (PRG)

Pre-flow controls the time during which shielding gas flows before the arc is struck.

Post/flow (POG)

This controls the time during which shielding gas flows after the arc is extinguished.

Creep start (RIN)

Creep start feeds out the wire at a low wire feed speed until it makes electrical contact with the workpiece.

6.4.2 PULSE

In MIG / MAG / GMAW mode, press the parameter selection button three times to navigate to the MENU option. Select the desired welding function one after other by turning the left potentiometer knob and adjust the desired value by turning the right potentiometer knob.

Left display letter	Function	Default	Right display settings
CRA	Crater fill time	0	0.0-9.9
PRG	Pre-flow	0.1	0.5-9.9
POG	Post-flow	0.5	0.5-9.9
HTS	Hot start sequences	0	50-150 %
HTT	Hot start time	0.1	0.1-10.0s
CRS	Crater fill wire feed speed	100	0-100 %

Burnback (B-B)

Burnback time is a delay between the time when the wire starts to brake until the time when the power source switches off the welding output.

Too short burnback time results in a long wire stick out after completion of welding, with a risk of the wire being caught in the solidifying weld pool.

Too long a burnback time results in a shorter stick out, with increased risk of the arc striking back to the contact tip.

Crater fill (CRA)

Crater filling makes a controlled reduction in the heat and size of the weld pool possible when completing the weld. This makes it easier to avoid pores, thermal cracking and crater formation in the weld joint.

Pre/flow (PRG)

Pre-flow controls the time during which shielding gas flows before the arc is struck.

Post/flow (POG)

This controls the time during which shielding gas flows after the arc is extinguished.

Creep start (RIN)

Creep starts feeding out the wire at a low wire feed speed until it makes electrical contact with the workpiece.

Hot start sequences (HTS)

The Hot start increases the wire feed speed and the voltage for an adjustable time at the start of the welding process.

Hot start time (HTT)

The hot start wire feed speed can be set as a percentage (50-150%) of the set wire feed speed.

Crater fill wire feed speed (CRS)

The crater fill wire feed speed can be set as a percentage (0-100%) of the set wire feed speed

6.4.3 Hidden functions for MIG / MAG / GMAW and MIG / MAG / GMAW SYN / PULSE

Long press the parameter selection button to navigate the hidden MENU option (No welding). Select the desired function by turning the left potentiometer knob and adjust the value by turning the right potentiometer knob.

Left display letter	Function	Default	Right display settings
DIS	Display value during welding	WFS	WFS/AMP
SYN	Workpoint in synergic	WFS	WFS/THI
UNT	Unit (metric or imperial)	MPM	MPM/IPM
TJS	Trigger job select	OFF	ON/OFF
RMT	Remote	OFF	ON/OFF
VEN	Version no.	V4.0	-
RES	Default settings	No	No/Yes

Display (DIS)

This function enables the display to show the wire feed speed (WFS) or amperage (AMP) values during welding.

Synergic (SYN)

This function enables to set the machine work point based on wire feed speed (WFS) or material thickness (THI).

Unit (UNT)

This function enables switching the units of measure for wire feed speed and thickness between the metric or imperial values.

Trigger job (TJS)

This function permits changing between different welding data memories by pressing the trigger of the welding torch. Pressing the trigger once will activate Job 1 and pressing the trigger twice will activate Job 2. The same procedure should be followed for all the Jobs.

Version No. (VEN)

This function enables viewing the software versions of the system.

Reset (RES)

This function resets to the factory default settings. All saved jobs will be deleted as a result of the reset.

RMT

This function disables the remote torch function.

6.4.4 MIG / MAG / GMAW SPOT

In MIG / MAG / GMAW SPOT mode, press the parameter selection button three times to navigate to the MENU option. Select the desired welding function by turning the left potentiometer knob and adjusting the value by turning the right potentiometer knob.

Left display letter	Function	Default	Right display settings
B-B	Burnback	0.1	0.01-0.35
S/T	Spot time	0.1	0.1-5.0
DWE	Dwell time	0.1	OFF/0.1-5.0
POG	Post-flow	0.5	0.5-9.9

Burnback (B-B)

Burnback time is a delay between the time when the wire starts to brake until the time when the power source switches off the welding output.

Too short burnback time results in a long wire stick out after completion of welding, with a risk of the wire being caught in the solidifying weld pool.

Too long a burnback time results in a shorter stick out, with increased risk of the arc striking back to the contact tip.

Spot Time (S/T)

Spot time is a time when the arc will be enabled after pressing the trigger.

Dwell time (DWE)

Dwell time is used to define time without arc between spot welds.

Post-flow (POG)

This controls the time during which shielding gas flows after the arc is extinguished.

6.4.5 Hidden functions for MIG / MAG / GMAW SPOT

Long press the parameter selection button to navigate the hidden MENU option (No welding). Select the desired function by turning the left potentiometer knob and adjust the value by turning the right potentiometer knob.

Left display letter	Function	Default	Right display settings
DIS	Display value during welding	WFS	WFS/AMP
UNT	Unit (metric or imperial)	MPM	MPM/IPM
VEN	Version no.	V4.0	-
RES	Default settings	No	No/Yes

Display (DIS)

This function enables the display to show wire feed speed (WFS) or amperage (AMP) values during welding.

Unit (UNT)

This function enables switching the units of measure for wire feed speed and thickness between the metric or imperial values.

Version No. (VEN)

This function enables viewing the software versions of the system.

Reset (RES)

This function resets to the factory default settings. All saved jobs will be deleted as a result of the reset.

6.4.6 MMA / SMAW / Stick

In MMA mode, press the parameter selection button once the MENU option will appear. Select the desired function (HOT, ARC) by turning the left potentiometer knob and adjust the value by turning the right potentiometer knob.

Left display letter	Function	Default	Right display settings
HOT	Hot start	AUT	0-10
ARC	Arc force	AUT	0-10

Hot start

The hot start function temporarily increases the current in the beginning of the weld, thus reducing the risk of lack of fusion in the starting point.

Arc force

The arc force function determines how the current changes in response to variations in arc length during welding. Use a low value of arc force to get a calm arc with little spatter and use a high value to get a hot and digging arc.

6.4.7 Hidden functions for MMA / SMAW / Stick

Long press the parameter selection button to navigate the hidden MENU option (No welding). Select the desired function (RES, VER) by turning the left potentiometer knob and adjust the value by turning the right potentiometer knob.

Left display letter	Function	Default	Right display settings
VEN	Version no.	V4.0	-
RES	Default settings	No	No/Yes

Version No. (VEN)

This function enables viewing the software versions of the system.

Reset (RES)

This function resets to the factory default settings. All saved jobs will be deleted as a result of the reset.

7 MAINTENANCE

**WARNING!**

The mains supply must be disconnected during cleaning and maintenance.

**CAUTION!**

Only persons with the appropriate electrical knowledge (authorised personnel) may remove the safety plates.

**CAUTION!**

The product is covered by manufacturer's warranty. Any attempt to carry out repair work by non-authorised service centers or personnel will invalidate the warranty.

**NOTE!**



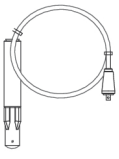

Regular maintenance is important for safe and reliable operation.

**NOTE!**

Perform maintenance more often during severe dusty conditions.

7.1 Routine maintenance

Maintenance schedule during normal conditions. Check equipment prior to every use.

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. Use dry compressed air with reduced pressure.		

7.2 Cleaning the power source

To maintain the performance and increase the lifetime of the power source it is mandatory to clean it regularly. How often depends on:

- the welding process
- the arc time
- the working environment

**CAUTION!**

Make sure that the cleaning procedure is done in a suitable prepared workspace.

**CAUTION!**

During cleaning, always wear recommended personal safety equipment, such as ear plugs, safety glasses, masks, gloves and safety shoes.

**CAUTION!**

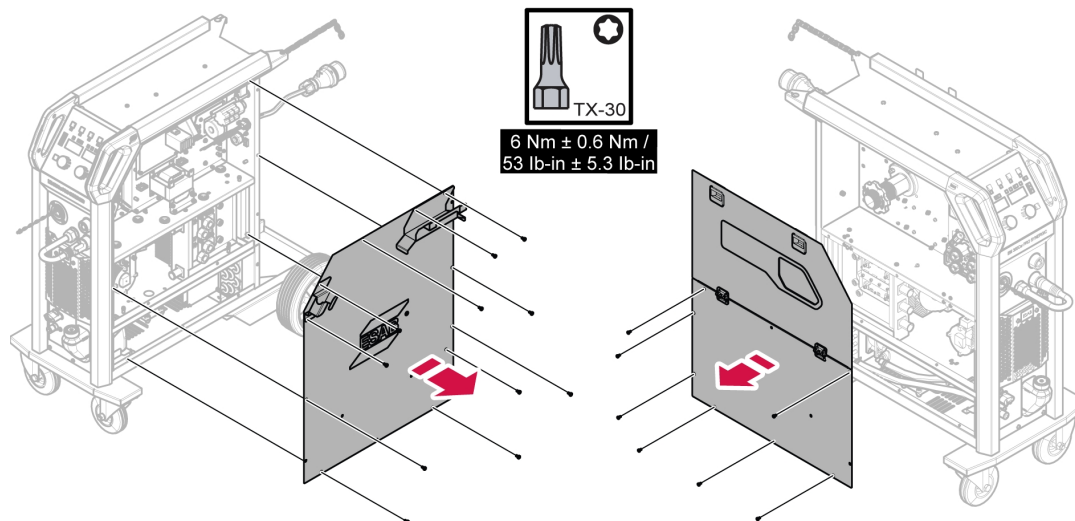
Repair, cleaning, and electrical work should be performed by an authorised ESAB service technician. Use only ESAB original spare and wear parts.

- 1) Disconnect the power source from the mains supply.

**WARNING!**

The mains supply must be disconnected during cleaning and maintenance.

- 2) Remove the screws and panels.



- 3) Clean both sides of the power source, using dry compressed air with pressure of below 4 bar (58 psi).
- 4) Make sure that there is no dust left on any part of the power source.
- 5) Reassemble the power source after cleaning and perform testing according to IEC 60974-4. Follow the procedure in section "After repair, inspection and test" in the service manual.

7.3 Cooling unit

Dust, grinding, swarf, etc...

The airstream through the cooling unit carries particles that become trapped in the cooling element, particularly in dirty working environments.

This results in reduced cooling capacity.

The coolant system

The recommended coolant must be used in the system, otherwise blockage can be created that will block the pump, water connections, water lines, or heat exchanger. Use of any other cooling liquid besides ESAB premixed coolant might damage the equipment and will void product warranty.

7.4 Filling the coolant

Use only ESAB's ready mixed coolant. See chapter "ACCESSORIES".

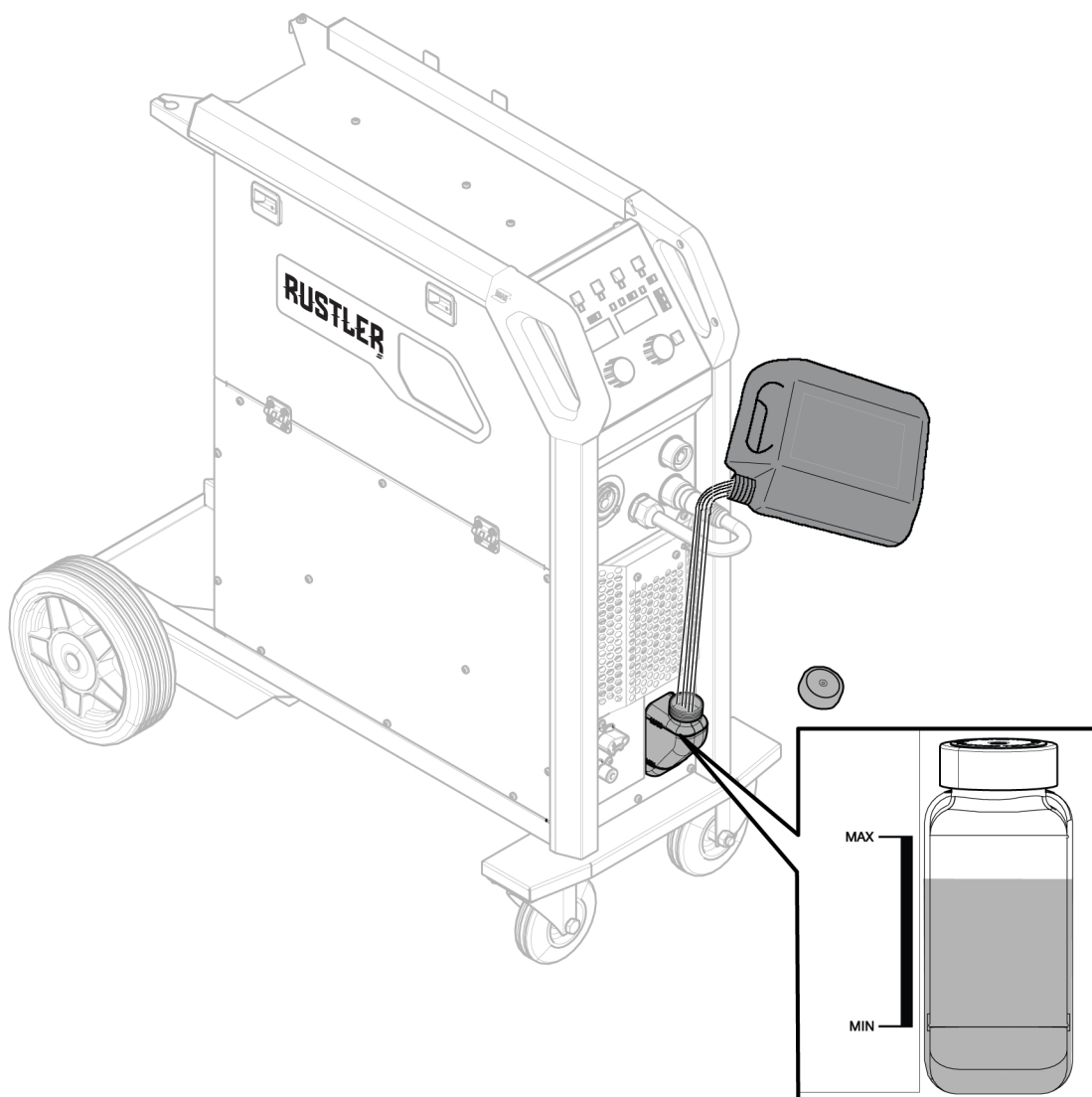
- Fill with coolant (The fluid level must not exceed the upper marking and must not be below lower marking).

**CAUTION!**

The coolant must be handled as chemical waste.

**NOTE!**

Coolant must be topped up if connecting a welding torch or coolant hoses that are 5 m in length or longer. When adjusting the coolant level by topping up, the coolant hoses do not need to be disconnected.



7.5 Inspection, cleaning and replacement



CAUTION!

Make sure that the cleaning procedure is done in a suitable prepared workspace.



CAUTION!

The cleaning procedure should be carried out by authorised service technician.

Wire feed mechanism

Check regularly that the wire feed unit is not clogged with dirt.

- Cleaning and replacement of the wire feed unit mechanism's worn parts should take place at regular intervals in order to achieve trouble-free wire feed. Note that if pre-tensioning is set too hard, this can result in abnormal wear on the pressure roller, feed roller and wire guide.
- Clean the liners and other mechanical parts of the wire feed mechanism, using compressed air, at regular intervals or if the wire feed seems slow.
- Changing nozzles.
- Checking driving-wheel.
- Changing the cog-wheel package.

Bobbin holder

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

Welding torch

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

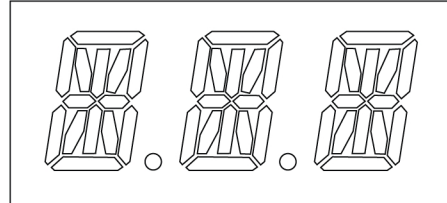
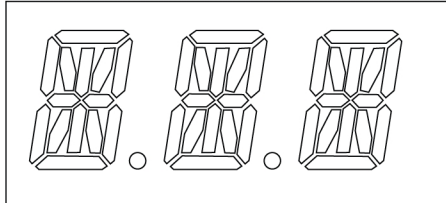
After cleaning and perform testing according to IEC 60974-4. Follow the procedure in section "After repair, inspection and test" in the Service manual.

8 ERROR CODES

The error code is used to indicate that a fault has occurred in the equipment. Errors are indicated by the text "Err" followed by the error code number shown in the display.

Screens

V Trim A   **S**



8.1 Error code descriptions

Error codes that the user can handle are listed below. If any other error code appears, contact an authorised ESAB service technician.

Error code	Description
Err 002	<p><i>Torch trigger-related error</i></p> <p>The torch trigger is pressed all the time or the torch trigger signal is shorted and the ARC will not be established.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Check that the Torch Trigger Switch is not depressed when the Power Source is switched ON. 2. When releasing the trigger, check if the torch switch is shorted.
Err 205	<p><i>Lack-phase protection</i></p> <p>The input socket loses the phase when connecting the input wires to the socket.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Check the condition of the mains supply and make sure they are all good connection. 2. Make sure that the power source connects to the rated input mains supply voltage and turn the mains power supply switch ON.
Err 206	<p><i>Over temperature</i></p> <p>The power source run more than the duty cycle.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Wait until the power source cools down for ten minutes. 2. Make sure that you are not exceeding the rated data for the power source. 3. Make sure that the power source connects to the rated input mains supply voltage and turn the mains power supply switch ON.
Err 215	<p><i>Output Short Circuit</i></p> <p>Short circuit is detected during output activation fault trigger.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the welding cables are properly installed of the weld terminals. 2. Turn OFF the power source and wait a few minutes.

Error code	Description
Err 216	<p><i>Over output current</i></p> <p>The output current over design limitation.</p> <p>Action:</p> <ol style="list-style-type: none">1. Make sure that you are not exceeding the rated data for the power source.2. Turn OFF the power source and wait a few minutes.3. Set the power source to the rated output voltage & current.
Err 311	<p><i>Over output current for wire feeder</i></p> <p>The wire feeder motor current is over design limitation.</p> <p>Action:</p> <ol style="list-style-type: none">1. Check the liner, clean using pressurized air. Replace the liner if damaged or worn out.2. Check the wire pressure setting and adjust if needed.3. Check the drive rolls for wear and replace if needed.4. Make sure the filler metal spool can rotate with limited resistance. <p>Adjust the brake hub if needed.</p>

9 TROUBLESHOOTING

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

Check that the mains voltage is disconnected before starting any type of repair action.

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 mains power supply fuses.
The thermal protection trips frequently	Make sure that you are not exceeding the rated data for the power source (i.e. that the unit is not being 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 current supply 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.
The wire feed is slow/stiff through the wire feed mechanism	Clean the liners and other mechanical parts of the wire feed mechanism, using pressurized air.
	Clean and adjust the roller pressure as per the table on the decal on the left side door.
Poor cooling effect	Clean the cooling element using compressed air.
	Check the coolant level.
	Check that the ambient temperature is not above the one for the rated duty cycle 40°C/104°F.

10 CALIBRATION AND VALIDATION



WARNING!

Calibration and validation should be performed by a trained service technician, possessing sufficient training in welding and measurement technology. The technician should have knowledge of hazards that may occur during welding and measurement and should take necessary protective actions!

10.1 Measurement methods and tolerances

When calibrating and validating, the reference measuring instrument must use the same measuring method in the DC range (averaging and rectification of the measured values). A number of measurement methods are used for reference instruments, e.g. TRMS (True Root Mean Square), RMS (Root-Mean-Square) and rectified arithmetic mean. Rustler EM PRO uses the rectified arithmetic mean value and should therefore be calibrated against a reference instrument using the rectified arithmetic mean value.

In the field application it will occur that a measuring device and a Rustler EM PRO may display different values even though both systems are validated and calibrated. This is due to the measurement tolerances and the method of measurement of the two measurement systems. This can result in a total deviation up to the sum of both measurement tolerances. If the measurement method differ (TRMS, RMS or rectified arithmetic mean), significantly larger deviations are to be expected!

The ESAB Rustler EM PRO welding power source presents the measured value in rectified arithmetic mean and should therefore not show any significant differences compared to other ESAB welding equipment, due to the measurement method.

10.2 Requirements specifications and standards

Rustler EM PRO is designed to meet the accuracy for indication and meters required by IEC/EN 60974-14, by definition Standard grade.

Calibration accuracies of displayed value

Arc voltage	$\pm 1.5 \text{ V}$ ($U_{\min} - U_2$) under load, resolution 0.25 V (Theoretical measuring range in a Rustler EM PRO system is 0.25-199 V.)
Welding current	$\pm 2.5\%$ of I_2 max according to rating plate of the unit under test, resolution 1 A. The measuring range is specified by the rating plate on the used Rustler EM PRO welding power source.

Recommended method and applicable standard

ESAB recommend calibration and validation to be executed according to IEC/EN 60974-14(:2018) or EN 50504:2008 (unless another way of execution is communicated from ESAB).

11 ORDERING SPARE PARTS



CAUTION!

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

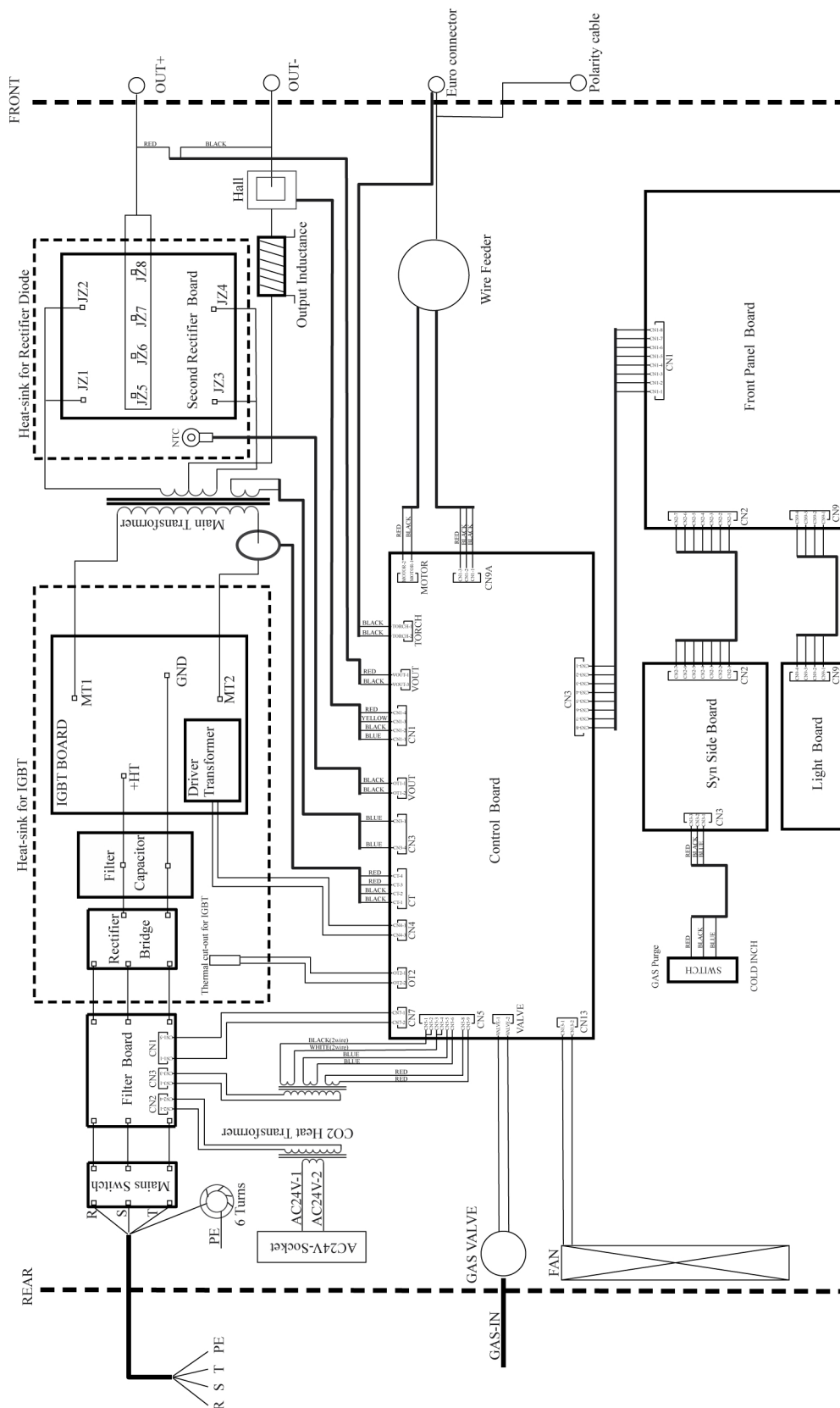
The Rustler EM 280 PRO, EM 350 PRO, EM 350 PRO SYNERGIC, EM 350C PRO Pulse, EM 350Cw PRO Pulse, and EM 350 MV PRO SYNERGIC are designed and tested in accordance with the international and European standards **EN IEC 60974-1**, **EN IEC 60974-2**, **EN IEC 60974-5** and **EN IEC 60974-10 Class A**. On completion of service or repair work, it is the responsibility of the person(s) performing the work to ensure that the product still complies with the requirements of the above standards.

Spare parts and wear parts can be ordered through your nearest ESAB dealer, see [esab.com](https://www.esab.com). When ordering, please state product type, serial number, designation and spare part number in accordance with the spare parts list. This facilitates dispatch and ensures correct delivery.

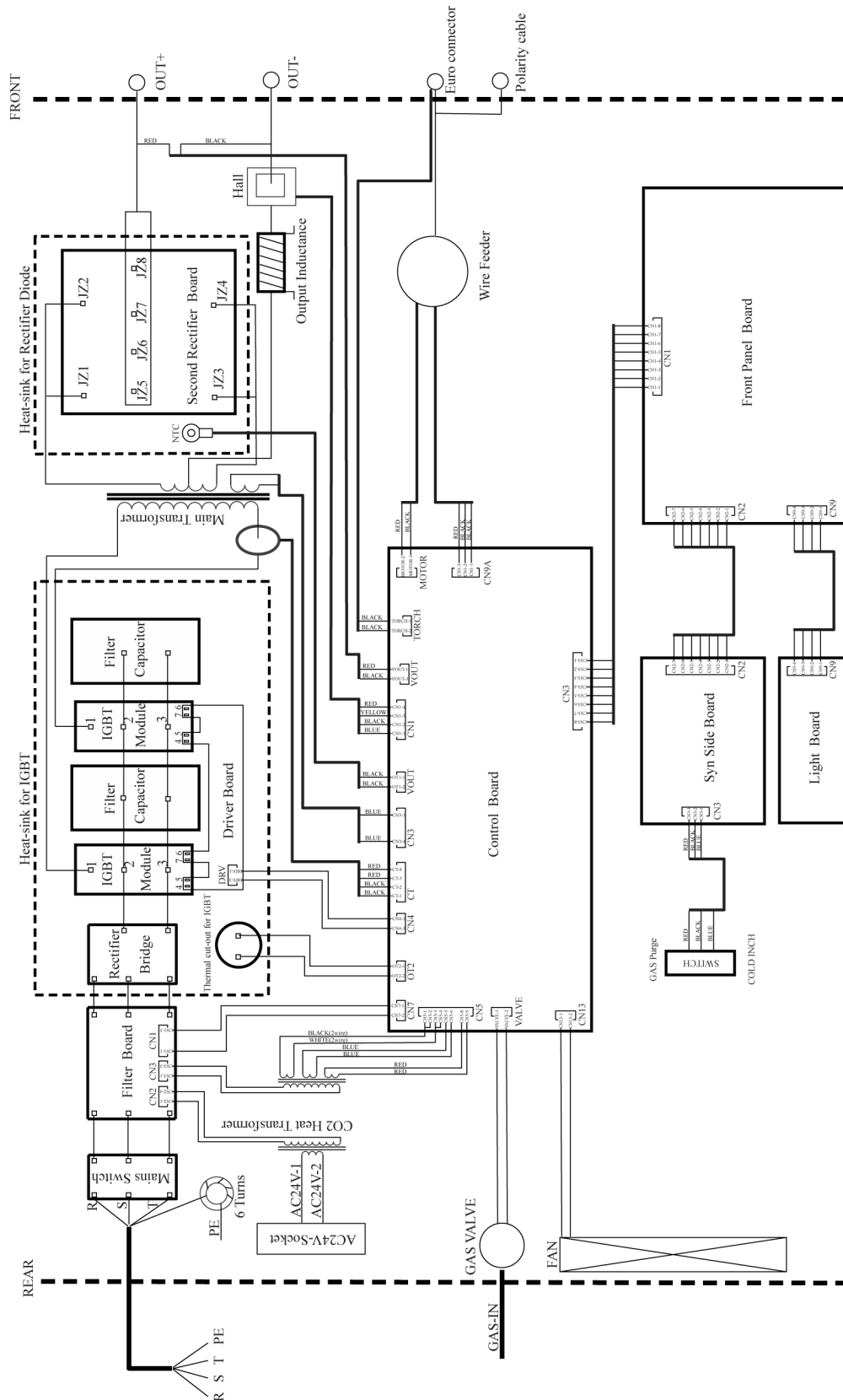
APPENDIX

WIRING DIAGRAM

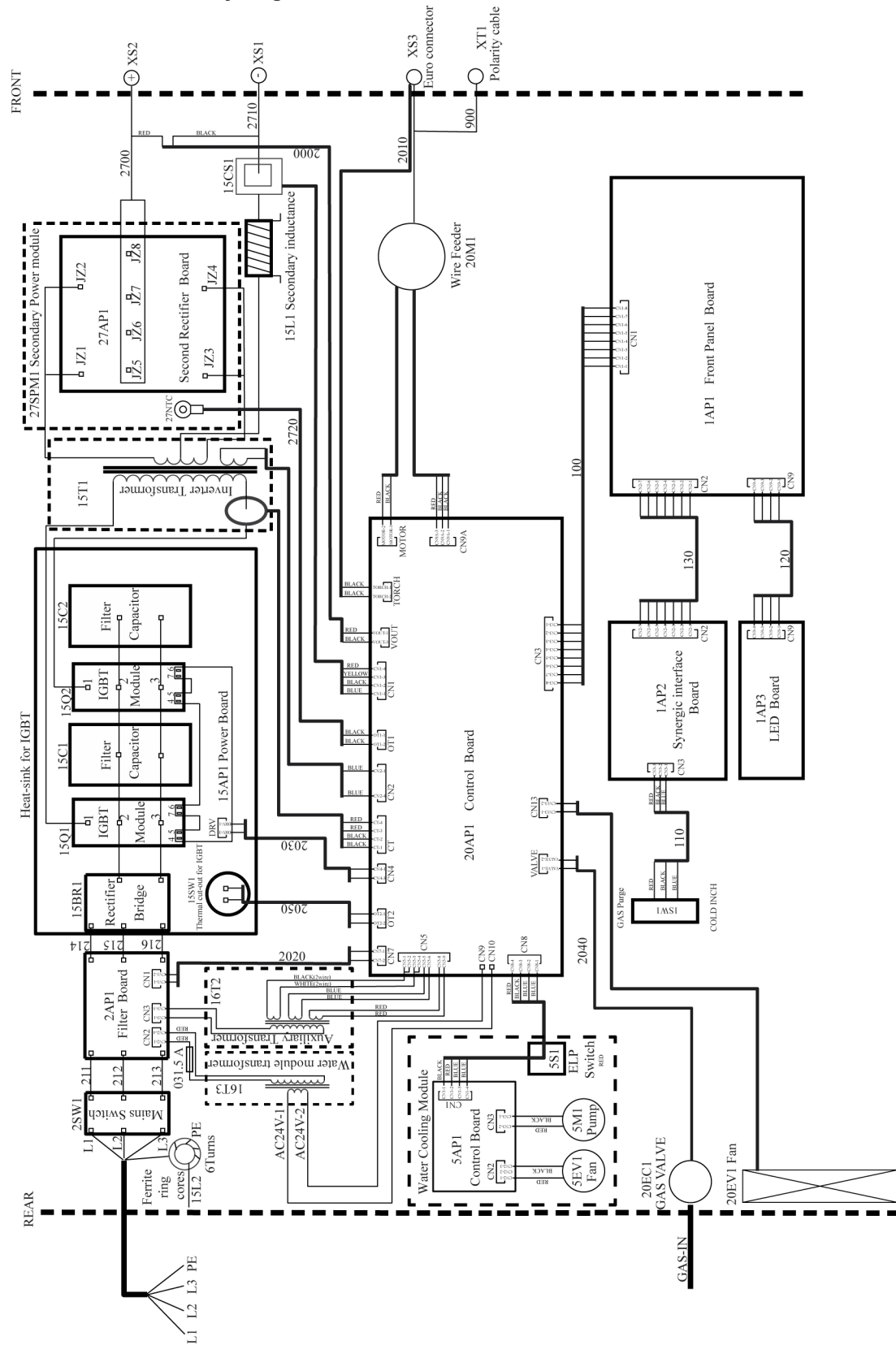
Rustler EM 280 PRO



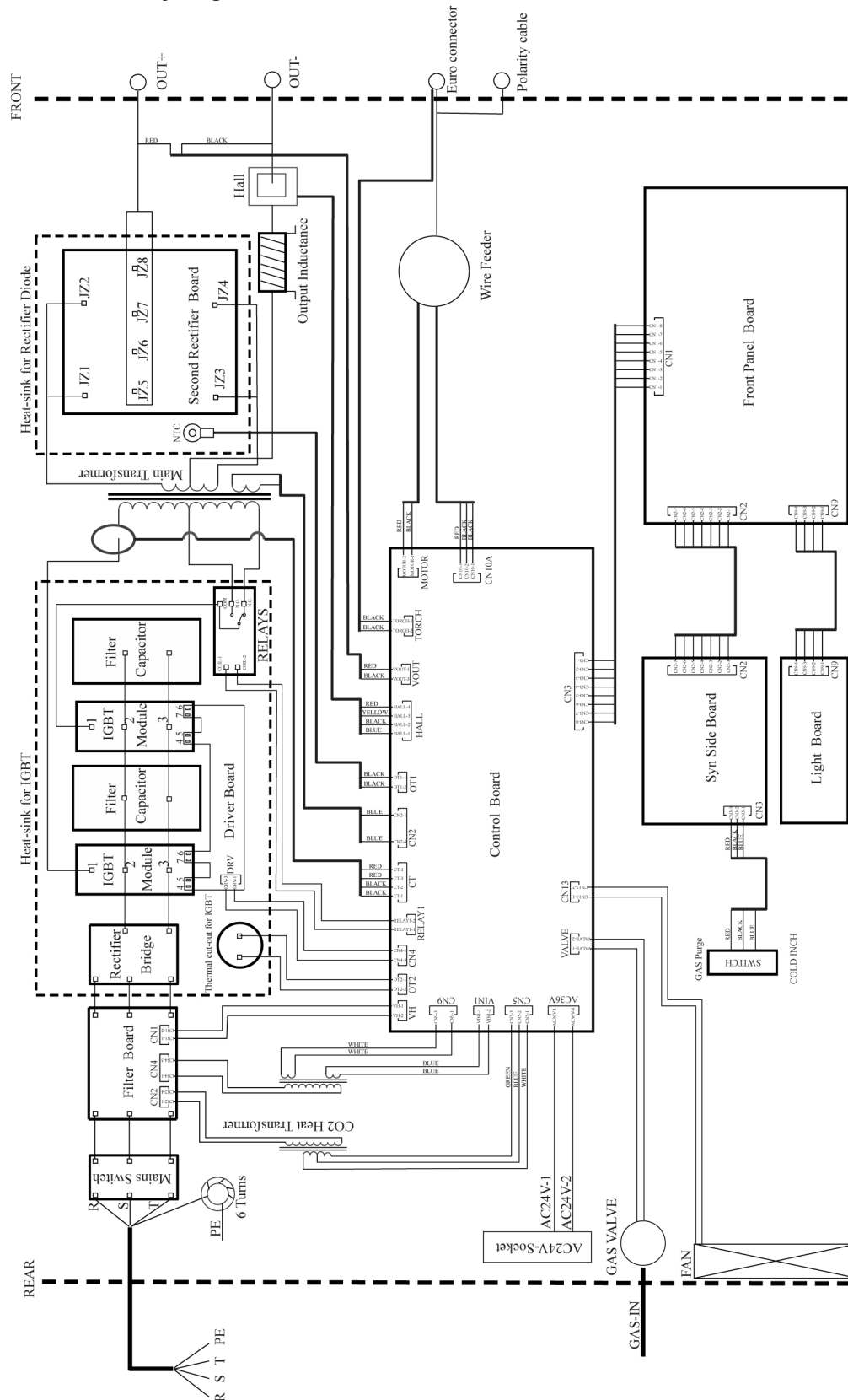
Rustler EM 350C PRO



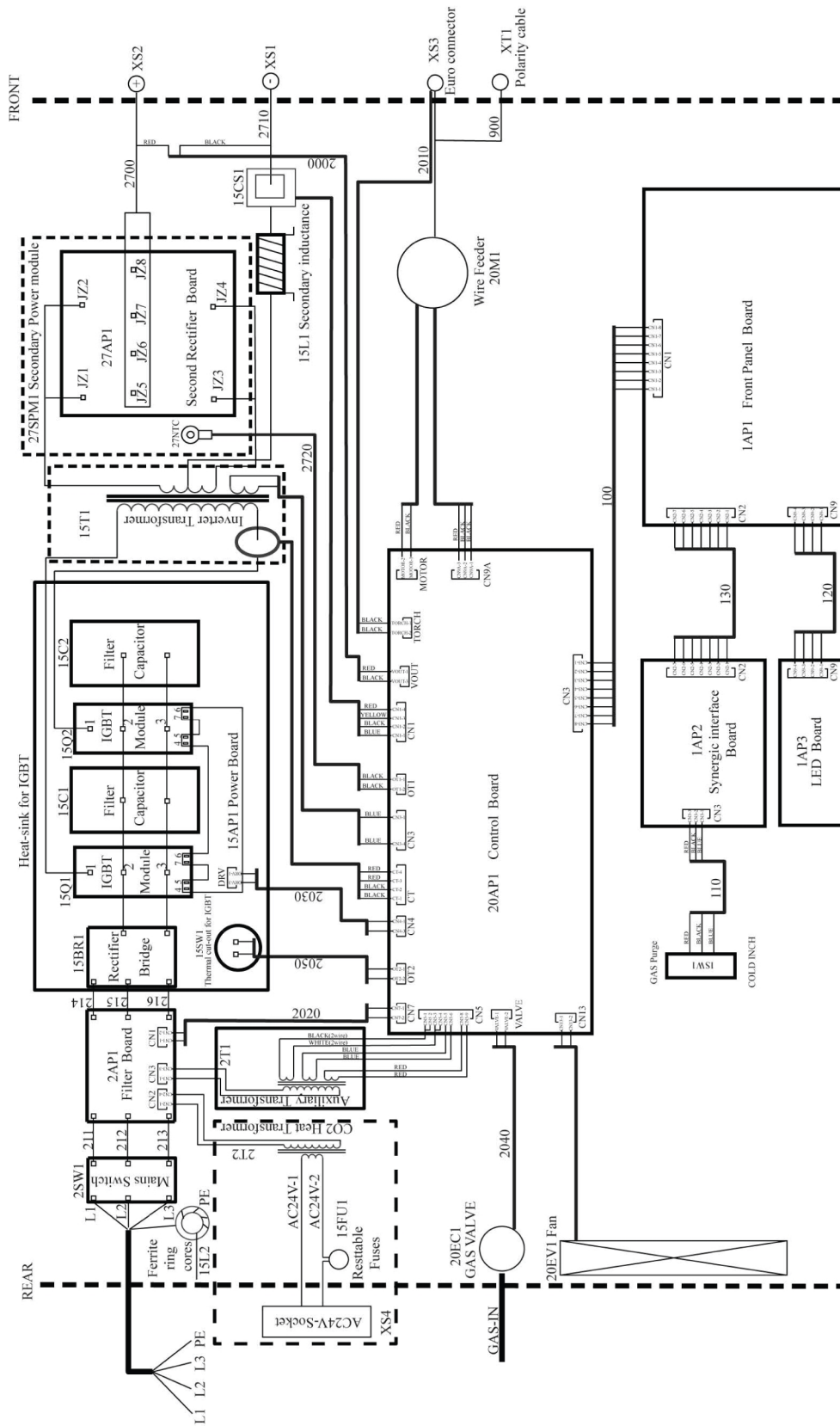
Rustler EM 350Cw PRO Synergic



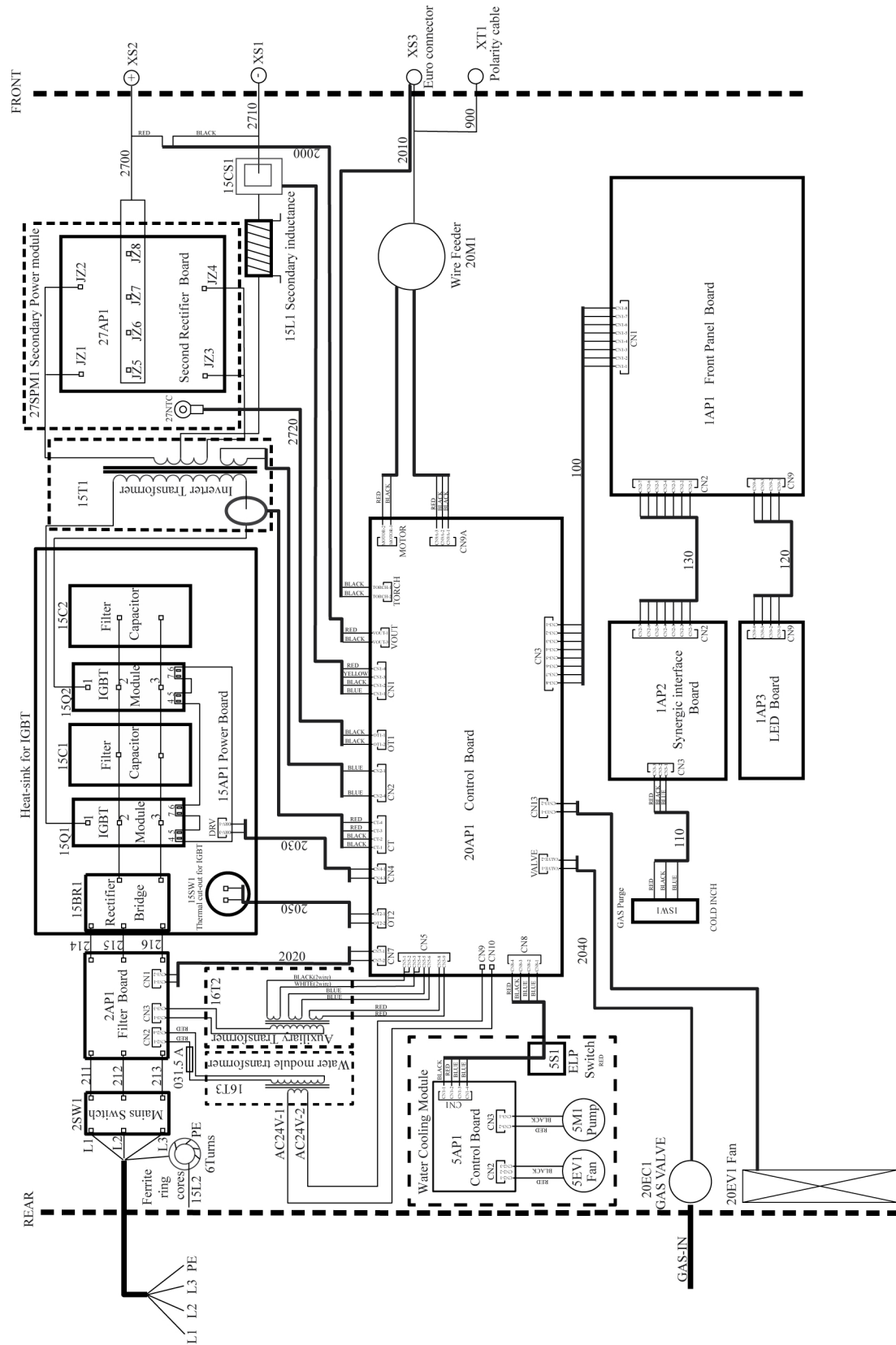
Rustler EM 350C MV Synergic



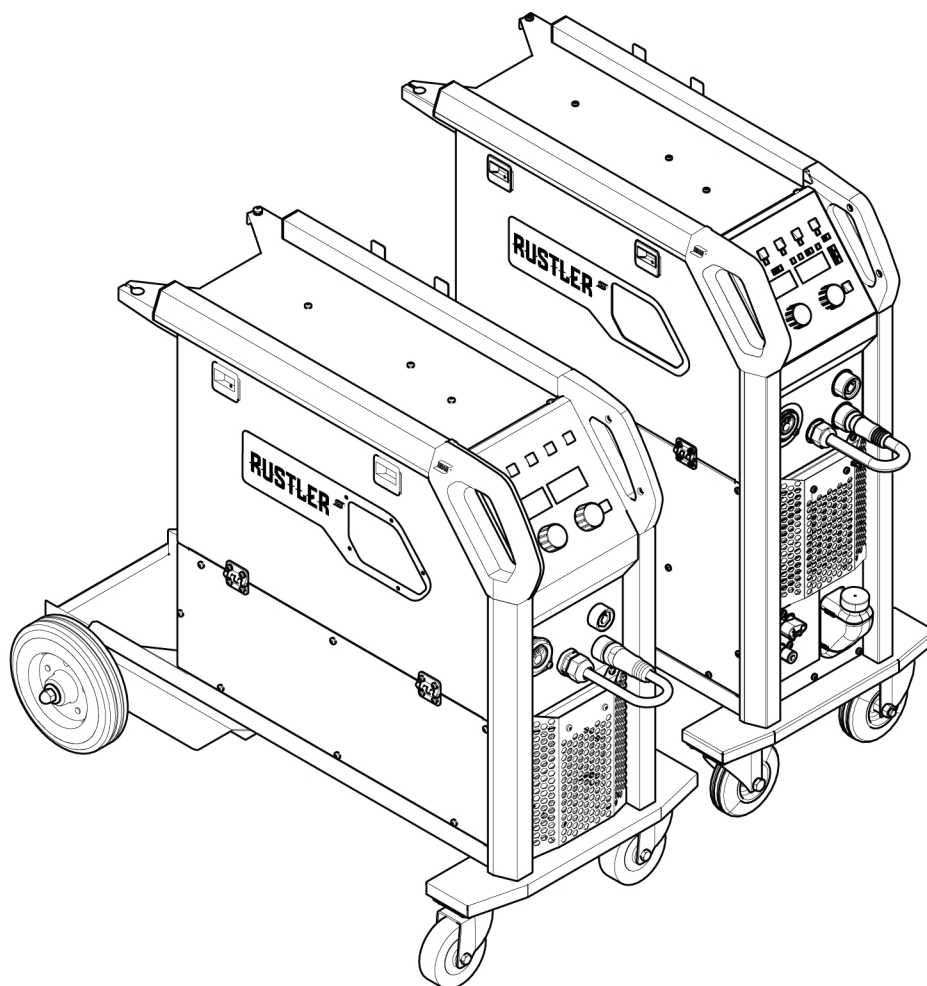
Rustler EM 350C PRO Pulse



Rustler EM 350Cw PRO Pulse



ORDERING NUMBERS





Ordering number	Denomination	Notes
0448 280 880	Rustler EM 280C PRO	With Exeor Torch 315, Remote 4 m
0448 350 881	Rustler EM 350C PRO	With Exeor Torch 315, Remote 4 m
0448 350 882	Rustler EM 350C PRO Synergic	With Exeor Torch 315, Remote 4 m
0448 350 883	Rustler EM 350C PRO MV Synergic	With Exeor Torch 315, Remote 4 m
0448 350 884	Rustler EM 350Cw PRO Synergic	With Exeor Torch 420w, Remote 4 m
0448 350 885	Rustler EM 350C PRO Pulse	With Exeor Torch 315, Remote 4 m
0448 350 886	Rustler EM 350Cw PRO Pulse	With Exeor Torch 420w, Remote 4 m
0448 280 990	Rustler EM 280C PRO	
0448 350 991	Rustler EM 350C PRO	
0448 350 992	Rustler EM 350C PRO Synergic	
0448 350 993	Rustler EM 350C PRO MV Synergic	
0448 350 994	Rustler EM 350Cw PRO Synergic	
0448 350 995	Rustler EM 350C PRO Pulse	
0448 350 996	Rustler EM 350Cw PRO Pulse	
0463 930 *	Instruction manual	Rustler EM PRO
0448 320 001	Spare parts list	Rustler EM PRO




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

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



WEAR PARTS




Fe, Ss and cored wire

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



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




Cored wire – Different wire guides dependent on wire diameter!

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



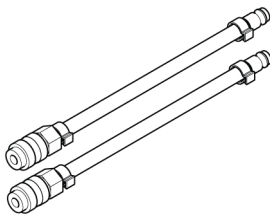


	Inlet wire guide 	Middle wire guide 	Outlet wire guide 
Wire diameter 0.040–1/16 in. 0.9–1.6 mm	0445 822 001 (2 mm)	0446 080 882	0445 830 883 (Tweco) 0445 830 881 (Euro)
Wire diameter 0.070–3/32 in. 1.8–2.4 mm	0445 822 002 (3 mm)	0446 080 883	0445 830 884 (Tweco) 0445 830 882 (Euro)

Al wire

Wire diameter (in.) (mm)	.023 0.6	.030 0.8	.040 0.9/1. 0	.045 1.2	.052 1.4	1/16 1.6	.070 1.8	 Feed roller
U-groove 		X	X					0445 850 050
			X	X				0445 850 051
				X		X		0445 850 052

Inlet wire guide 	Middle wire guide 	Outlet wire guide 
0445 822 001 (2 mm)	0446 080 881	0445 830 886 (Tweco)
		0445 830 885 (Euro)

ACCESSORIES

MIG Torch Exeor 315		
0700 026 150	MIG Torch Exeor 315 R4, Remote, 3 m	
0700 026 151	MIG Torch Exeor 315 R4, Remote, 4 m	
0700 026 152	MIG Torch Exeor 315 R4, Remote, 5 m	
Exeor PSF 420w R4		
0700 026 186	Exeor PSF 420w R4, Remote 3 m	
0700 026 187	Exeor PSF 420w R4, Remote 4 m	
0700 026 188	Exeor PSF 420w R4 Remote 5 m	
0448 479 880	Extension hose kit Water cooled varinat only	
F102 440 880	Quick connector Marathon Pac™	
0448 156 880	Top storage toolbox	
0448 157 880	User Interface protective cover	
0700 401 024	CO ₂ heater kit Air cooled variant only	
0700 006 902	Electrode holder kit, Handy 300, OKC 50, 3 m	
0700 006 888	Electrode holder kit, Handy 300, OKC 50, 5 m	
0349 302 454	Work lead, 300 A, OKC 50, 50 mm ² , 5 m	
0465 720 002	ESAB ready mixed coolant (10 l/2.64 gal). Use of any other cooling liquid than the prescribed one might damage the equipment. In case of such damage, all warranty undertakings from ESAB cease to apply.	



A WORLD OF PRODUCTS AND SOLUTIONS.



For contact information visit [esab.com](https://www.esab.com)

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