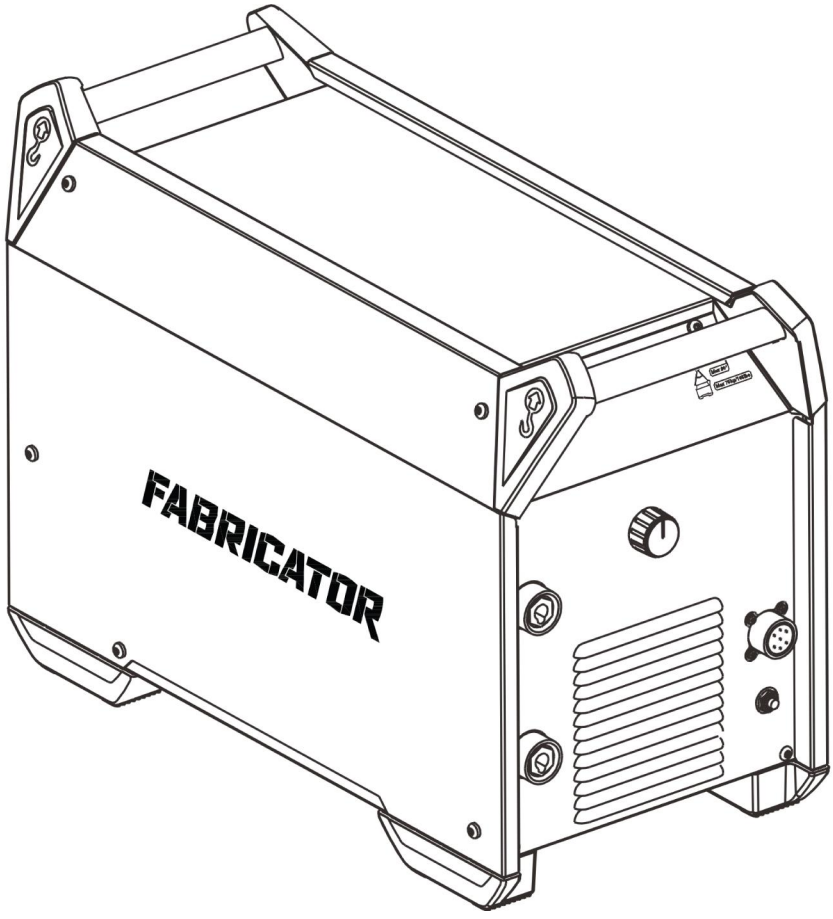
# *Fabricator EM 400i, Fabricator EM 500i*




## Instruction manual

0446 404 101 GB 20210317

Valid for: MC016-xxx-xxxx, MC022-xxx-xxxx

# 1 SAFETY

## 1.1 Meaning of symbols

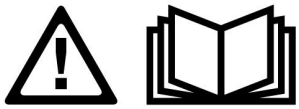
**As used throughout this manual: Means Attention! Be Alert!**

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

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

**CAUTION!**
**Means hazards which could result in minor personal injury.**

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



## 1.2 Safety precautions

**WARNING!**
These Safety Precautions are for your protection. They summarise precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.

**PROTECT YOURSELF AND OTHERS**

**Some welding, cutting and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:**

1. Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching.
2. Always wear safety glasses with side shields in any work area, even if welding helmets face shields and goggles are also required.
3. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
4. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuff less trousers, high-topped shoes and a welding helmet or cap for protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.

5. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned and open pockets eliminated from the front of clothing.
6. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
7. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.

**FIRES AND EXPLOSIONS**

**Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:**

1. Protect yourself and others from flying sparks and hot metal.
2. Remove all combustible materials well away from the work area or cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings paper, etc.
3. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal.
4. Do not weld, cut or perform other hot work until the work piece has been completely cleaned so that there are no substances on the work piece which might produce flammable or toxic vapors. Do not do hot work on closed containers, they may explode.
5. Have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.
6. Do not use equipment beyond its ratings. For example, an overloaded welding cable can overheat and create a fire hazard.
7. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.

**ELECTRICAL SHOCK**

**Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling. Therefore:**

1. Be sure the power source frame (chassis) is connected to the ground system of the input power.
2. Connect the workpiece to a good electrical ground.
3. Connect the work cable to the workpiece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equipment. Replace worn or damaged cables.
5. Keep everything dry, including clothing, work area, cables, torch/electrode holder and power source.
6. Make sure that all parts of your body are insulated from both the work piece and from the ground.
7. Do not stand directly on metal or the earth while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.
8. Put on dry, hole-free gloves before turning on the power.
9. Turn off the power before removing your gloves.
10. Refer to ANSI/ASC Standard Z49.1 for specific grounding recommendations. Do not mistake the work lead for a ground cable.

**ELECTRIC AND MAGNETIC FIELDS**

**May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:**

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

**FUMES AND GASES**

**Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Shielding gases can cause asphyxiation. Therefore:**

1. Keep your head out of the fumes. Do not breathe the fumes and gases.
2. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead beryllium or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.
3. Do not operate near degreasing and spraying operations. The heat or arc can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas and other irritant gases.
4. If you develop momentary eye, nose or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
5. Refer to ANSI/ASC Standard Z49.1 for specific ventilation recommendations.
6. WARNING: This product when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and in some cases cancer (California Health & Safety Code §25249.5 et seq.)

**CYLINDER HANDLING**

**Cylinders, if mishandled, can rupture and violently release gas. A sudden rupture of cylinder valve or relief device can injure or kill. Therefore:**

1. Locate cylinders away from heat, sparks and flames. Never strike an arc on a cylinder.
2. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.

3. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, wall, post or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
4. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks.

**MOVING PARTS**

**Moving parts, such as fans, rotors and belts can cause injury. Therefore:**

1. Keep all doors, panels, guards and covers closed and securely in place.
2. Stop engine or drive systems before installing or connecting unit.
3. Have only qualified people remove covers for maintenance and troubleshooting as necessary
4. To prevent accidental starting of equipment during service, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing and tools away from moving parts.
6. Reinstall panels or covers and close doors when service is finished and before starting engine.

**WARNING!**
**FALLING EQUIPMENT CAN INJURE**

- Only use lifting eye to lift unit. Do NOT use running gear, gas cylinders or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep cables and cords away from moving vehicles when working from an aerial location.

**WARNING!**
**EQUIPMENT MAINTENANCE**

**Faulty or improperly maintained equipment can cause injury or death. Therefore:**

1. Always have qualified personnel perform the installation, troubleshooting and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.
2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.
3. Maintain cables, earthing wire, connections, power cord and power supply in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.

**CAUTION!**

**ADDITIONAL SAFETY INFORMATION**

**For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of “Precautions and Safe Practices for Arc Welding, Cutting and Gouging”, Form 52-529.**

The following publications are recommended:

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

## 1.3 User responsibility

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

All work must be carried out by trained personnel well-acquainted with the operation of the equipment. Incorrect operation of the equipment may lead to hazardous situations which 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.

Recommended ESAB coolant ordering number: 0465 720 002.

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 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!**

**WARNING!**

Do not use the power source for thawing frozen pipes.

**CAUTION!**

This product is solely intended for arc welding.

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

## 1.4 California Proposition 65 warning

**WARNING!**

Welding or cutting equipment produces fumes or gases which contain chemicals known in the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

**WARNING!**

This product can expose you to chemicals including lead, which are known to the state of California to cause cancer and birth defects or other reproductive harm. Wash hands after use.

For more information, go to www.P65Warnings.ca.gov.

# 2 INTRODUCTION

## 2.1 Overview

The **Fabricator EM 400i** and **Fabricator EM 500i** are welding power sources intended for MIG/MAG welding, welding with powder filled cored wire (FCAW-S) and welding with coated electrodes (MMA). The power sources are intended for use with the following wire feed units:

- Feed 364
- Fabricator Feed 364

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

## 2.2 Equipment

The power source is supplied with:

- 5m return cable with earth clamp
- 4.5m mains cable
- instruction manual

# 3 TECHNICAL DATA

| Fabricator EM 400i | | | | |
|---|---|---|---|---|
| **Mains voltage** | 380-440 V ±10%, 3~50/60 Hz | | | |
| **Primary current $I_{max}$** | 380 V | 400 V | 415 V | 440 V |
| MIG/MAG | 24 A | 23 A | 22 A | 21 A |
| MMA | 25 A | 24 A | 23 A | 22 A |
| **Setting range (DC)** | | | | |
| MIG/MAG | 30 A / 12.0 V - 400 A / 34.0 V | | | |
| MMA | 30 A / 21.2 V - 400 A / 36.0 V | | | |
| **Permissible load at MIG/MAG** | | | | |
| 60% duty cycle | 400 A / 34.0 V | | | |
| 100% duty cycle | 310 A / 29.5 V | | | |
| **Permissible load at MMA** | | | | |
| 60% duty cycle | 400 A / 36.0 V | | | |
| 100% duty cycle | 310 A / 32.4 V | | | |
| **Power factor** at maximum current | 0.93 | | | |
| **Maximum** input power at idle mode | <50W | | | |
| **Efficiency** at maximum current | 87% | | | |
| **Open-circuit voltage** | 63.7 V | | | |
| **Operating temperature** | -10 to +40°C | | | |
| **Transportation temperature** | -20 to +55°C | | | |
| **Dimensions l × w × h** | 712 × 325 × 470 mm (28.1 × 12.8 × 18.5 in.) | | | |
| **Weight** | 59 kg (130 lb.) | | | |
| **Insulation class** | H | | | |
| **Enclosure class** | IP 23S | | | |
| **Application class** | S | | | |

| Fabricator EM 500i | | | | |
|---|---|---|---|---|
| **Mains voltage** | 380-440 V ±10%, 3~50/60 Hz | | | |
| **Primary current $I_{max}$** | 380 V | 400 V | 415 V | 440 V |
| MIG/MAG | 34 A | 33 A | 31 A | 30 A |
| MMA | 35 A | 34 A | 32 A | 30 A |
| **Setting range (DC)** | | | | |
| MIG/MAG | 30 A / 15.5 V - 500 A / 39.0 V | | | |
| MMA | 30 A / 21.2 V - 500 A / 40.0 V | | | |
| **Permissible load at MIG/MAG** | | | | |
| 60% duty cycle | 500 A / 39.0 V | | | |
| 100% duty cycle | 390 A / 33.5 V | | | |
| **Permissible load at MMA** | | | | |
| 60% duty cycle | 500 A / 40.0 V | | | |

| Fabricator EM 500i | |
|---|---|
| 100% duty cycle | 390 A / 35.6 V |
| **Power factor** at maximum current | 0.93 |
| **Maximum** input power at idle mode | <50W |
| **Efficiency** at maximum current | 87% |
| **Open-circuit voltage** | 73.3 V |
| **Operating temperature** | -10 to +40°C |
| **Transportation temperature** | -20 to +55°C |
| **Dimensions l × w × h** | 712 × 325 × 470 mm (28.1 × 12.8 × 18.5 in.) |
| **Weight** | 62 kg (136.6 lb.) |
| **Insulation class** | H |
| **Enclosure class** | IP 23S |
| **Application class** | S |

### Duty cycle

The duty cycle refers to the time as a percentage of a ten-minute period that you can weld or cut at a certain load without overloading. The duty cycle is valid for 40 °C / 104 °F, or below.

### Enclosure class

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

Equipment marked IP23S is intended for indoor and outdoor use, but are not intended to be used outside during precipitation unless sheltered.

### 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.**

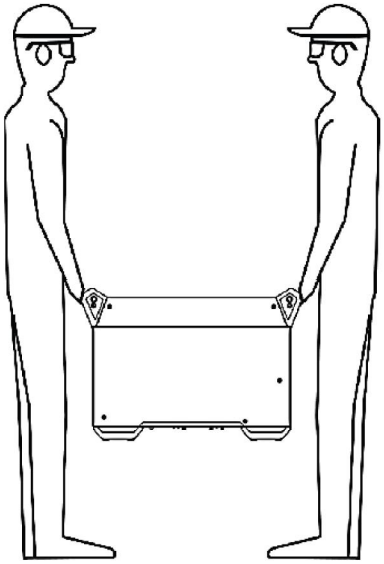
**CAUTION!**
This product is intended for industrial use. In a domestic environment this product may cause radio interference. It is the user's responsibility to take adequate precautions.

## 4.1 Location

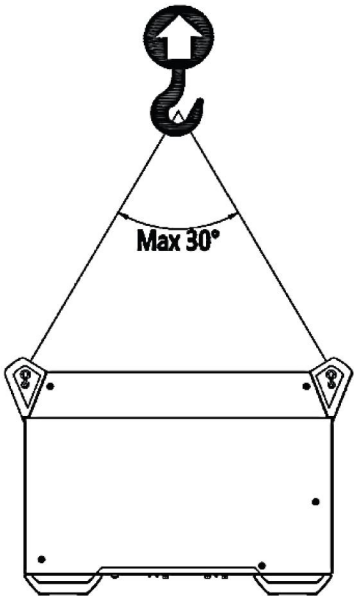
Position the power source so that cooling air inlets and outlets are not obstructed.

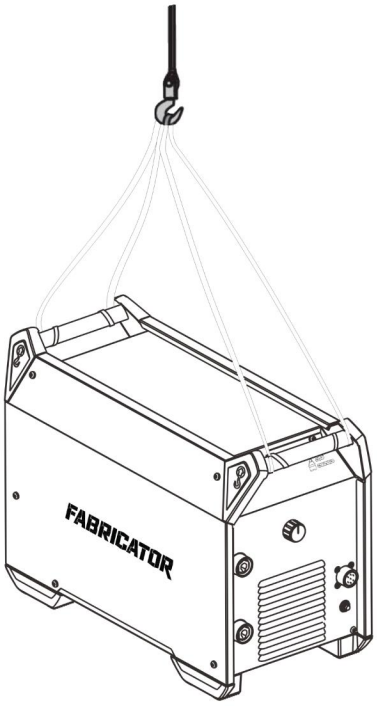
 

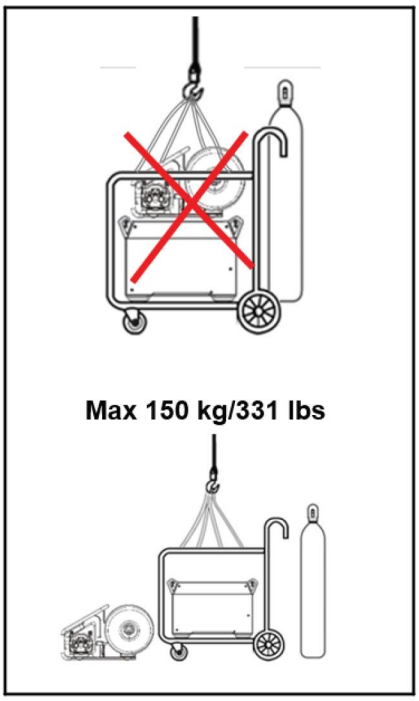
## 4.2 Lifting instructions



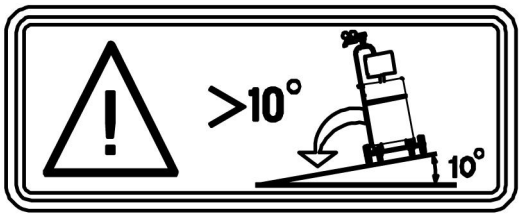
Max 80.3 kg/177 lbs




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



## 4.3 Mains supply

**NOTE!**
This equipment does not comply with IEC 61000-3-12. If it is connected to a public low voltage system, it is the responsibility of installer or the user of the equipment to ensure, by consultation with the distribution network if necessary, that the equipment may be connected.

Make sure that the welding power source is connected to the correct supply voltage and that it is protected by the correct fuse rating. A protective earth connection must be made in accordance with regulations.

The power source will automatically adjust to the supplied input voltage.

**Recommended MCB sizes and minimum cable area**

| **Fabricator EM 400i** | | | | |
|---|---|---|---|---|
| **Mains voltage** | 380 V 3~ 50/60 Hz | 400 V 3~ 50/60 Hz | 415 V 3~ 50/60 Hz | 440 V 3~ 50/60 Hz |
| **Mains cable area** | 4 × 6 mm² | 4 × 6 mm² | 4 × 6 mm² | 4 × 6 mm² |
| **Maximal current rating $I_{max}$** | 28 A | 27 A | 25 A | 21 A |
| **$I_{1eff}$** | | | | |
| MIG/MAG | 20 A | 19 A | 18 A | 17 A |
| MMA | 21 A | 20 A | 19 A | 18 A |
| Input circuit breaker-MCB (distribution box) | Type C & 40 A or greater | | | |

| **Fabricator EM 500i** | | | | |
|---|---|---|---|---|
| **Mains voltage** | 380 V 3~ 50/60 Hz | 400 V 3~ 50/60 Hz | 415 V 3~ 50/60 Hz | 440 V 3~ 50/60 Hz |
| **Mains cable area** | 4 × 6 mm² | 4 × 6 mm² | 4 × 6 mm² | 4 × 6 mm² |
| **Maximal current rating $I_{max}$** | 38 A | 36 A | 35 A | 31 A |
| **$I_{1eff}$** | | | | |
| MIG/MAG | 28 A | 27 A | 26 A | 24 A |
| MMA | 29 A | 28 A | 26 A | 24 A |
| Input circuit breaker-MCB (distribution box) | Type C & 63A or greater | | | |

**NOTE!**
The mains cable areas and fuse sizes as shown above are in accordance with Swedish regulations. For other regions, supply cables must be suitable for the application and meet local and national regulations.

### Supply from power generators

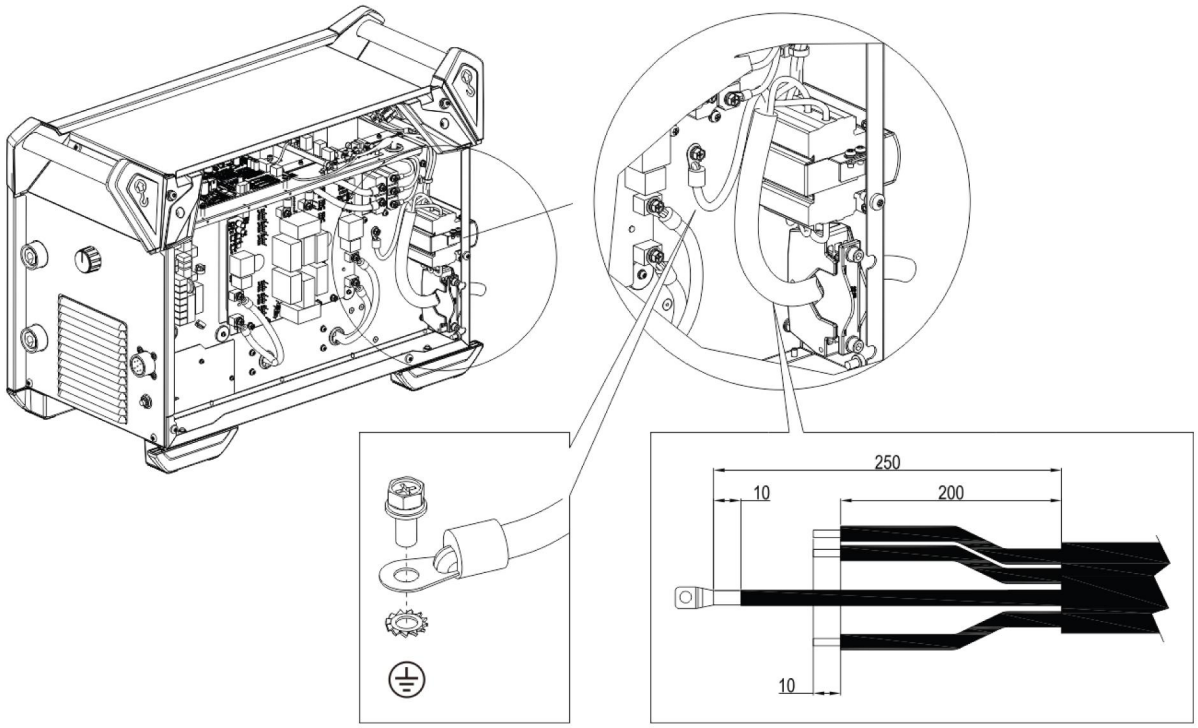
The power source can be supplied from different types of generators. However, some generators may not provide sufficient power for the welding power source to operate correctly. Generators with Automatic Voltage Regulation (AVR) or with equivalent or better type of regulation, with rated power ≥40 kW, are recommended.

### Connection instruction

**WARNING!**
The mains supply must be disconnected during installation.

**WARNING!**
Wait until the DC bus capacitors are discharged. The DC bus capacitor discharge time is at least 2 minutes!

If the mains cable needs to be changed, the earth connection to the bottom plate and the ferrites must be installed correctly. See the picture below for the installation order of the ferrites, washers, nuts and screws.



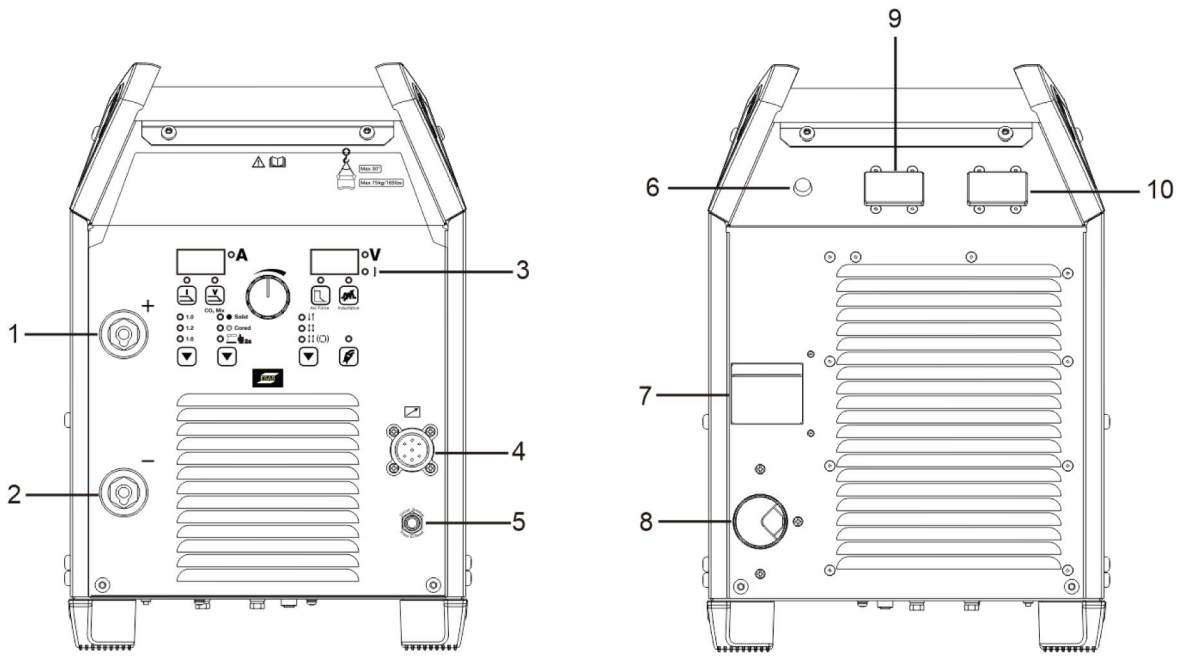
# 5 OPERATION

**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!**

**NOTE!**
When moving the equipment use intended handle. Never pull the cables.

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

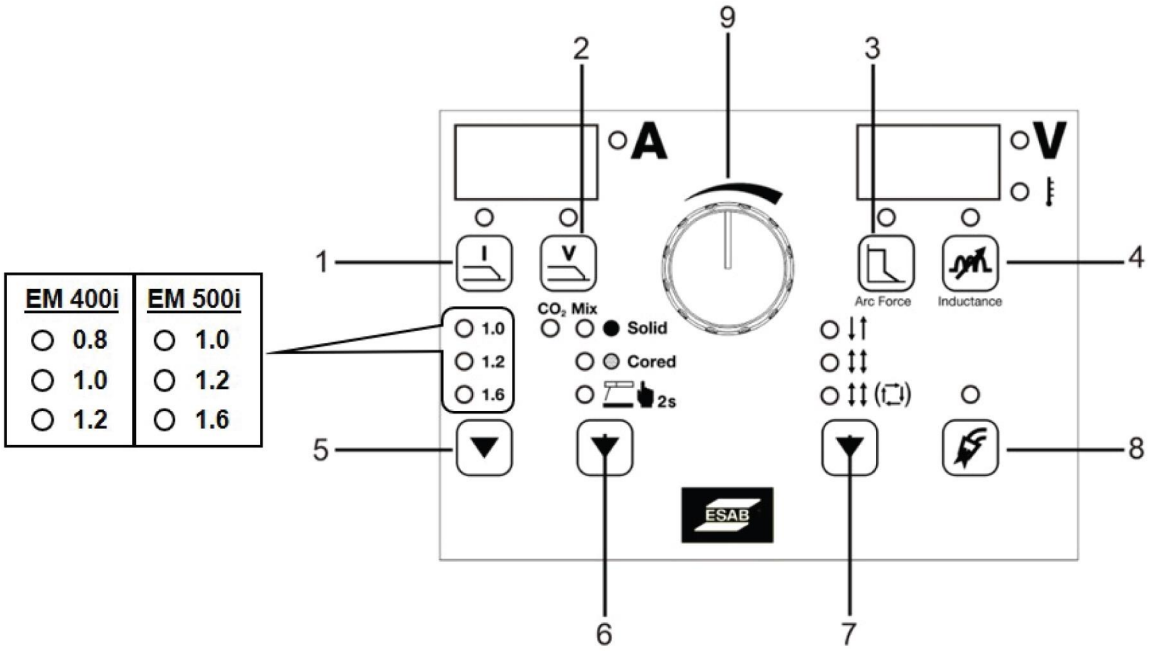
## 5.1 Connections and control devices




1. Connection (+): MIG/MAG: Welding cable, MMA: Welding cable or return cable
2. 2. Connection (-): MIG/MAG: Return cable, MMA: Return cable or welding cable
3. 3. Indicating LED, Overheating
4. Connection of wire feed unit
5. Circuit breaker 10A (wirefeeder motor)
6. Fuse for the gas heater input supply
7. Mains power supply switch, ON/OFF
8. Mains cable inlet
9. 110V AC power supply socket for gas heater
10. CAN communication connector (Factory use)

The following figure shows the front control panel and the buttons on the control panel of the welder.




| S.no. | Name | Function |
|---|---|---|
| 1 | Ending arc current / Crater fill current | Adjusts the crater fill / Ending arc current in 4T and 4T repeat mode |
| 2 | Ending arc voltage / Crater fill voltage | Adjusts the crater fill / Ending arc voltage in 4T and 4T repeat mode |
| 3 | Arc force | The arc force is important in determining how the current changes in response to a change in the arc length. A lower value gives a calmer arc with less spatter. It only applies to MMA welding. |
| 4 | Inductance | Sets the dynamic of arc. The lower inductance will give hardest arc and higher inductance will give softest arc. |
| 5 | Wire diameter | Selects the diameter of the welding wire. Only applicable for MIG welding |
| 6 | Welding process / Wire type and gas | Selects the welding process<br>• Solid wire-CO2, (MIG/MAG)<br>• Solid-Mix gas, (MIG/MAG)<br>• Cored wire (MIG/MAG)<br>• MMA welding<br>If MMA mode to be selected, press and hold for 2 seconds. To come out from MMA mode again press and hold for 2 seconds. |
| 7 | Welding control | Selects the welding control mode. |
| 8 | Gas detection | Detects gas flow. |
| 9 | Value adjusting knob | Manually adjusts<br>• the current for MMA process<br>• the ending arc voltage, ending arc current, Inductance for MIG/MAG process and<br>• the current and voltage within specified ranges. |

**Internal menu feature**

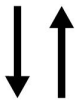
1. Press the arc current and arc voltage buttons at the same time for 3 seconds to enter the internal menu and press the arc current and arc voltage buttons at the same time to exit the internal menu settings.
2. In the internal menu setting, use the knob on the panel to switch between menu options at the same level and adjust parameter values.
3. In the internal menu setting, the inductance button on the panel is used as the parameter selection confirmation button.
4. When setting each parameter in the internal menu, when the digital display shows "OFF", the current parameter is the default parameter of the welding power source, and when the digital display shows other values, it is the user setting parameter.

| Code | Description | Default | Range | Internal Menu Explanation |
|---|---|---|---|---|
| F01 | Restore factory settings | | | |
| F02 | Given wire feeding speed | SPd | | |
| F10 | Slow wire feeding speed (Creep start) m/min | OFF | 1.4 – 18 | The wire feed speed before the welding arc ignites or before the filler wire comes in contact with the workpiece |
| F11 | Pre-gas time | OFF | 0 – 25 s | Gas delivery time before arc starts |
| F14 | Post-gas time | OFF | 0 – 25 s | Gas delivery time after arc ends |
| F20 | DC burn back voltage | OFF | 12 – 45 V | The voltage at the end of welding, to melt a part of wire at the tip to prevent the wire from sticking to the workpiece |
| F21 | DC burn back time | OFF | 0 – 1.00 s | Time for DC burn back voltage. Longer time will lead to melt the contact tip |
| F22 | DC chopping time | OFF | 0 – 1.00 s | The function is to prevent obvious small balls at the end of the wire after welding and improve the success rate of arc starting next time. This parameter is used in conjunction with burn-back voltage and burn-back time |
| F25 | Arc Start voltage | OFF | 12 – 45 V | Higher arc-start current and arc-start voltage to improve the arc-start fusion effect. |
| F26 | Arc Start current | OFF | 30 – 500 A | |
| F27 | Arc Start time | OFF | 0 – 10.0 s | The duration of arc-start current and arc-start voltage. |
| F50 | Arc Striking current | OFF | 30 – 500 A | Current at the moment when electrode contacts base metal |
| F51 | Hot Start current | OFF | 0 – 100 A | Arc start current |
| FB0 | Board software and hardware version query | – | 010 – 104 | For service purpose |
| | | | 110 – 102 | |
| | | | 210 – 103 | |
| | | | 300 – 201 | |

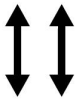
| Code | Description | Default | Range | Internal Menu Explanation |
|---|---|---|---|---|
| FB1 | Fault record query | Err | – | For service purpose |
| FB2 | Machine model query | C50 | – | For service purpose |

### 5.1.1 Welding control mode



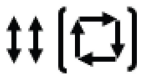
**2-stroke**

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.



**4-stroke**

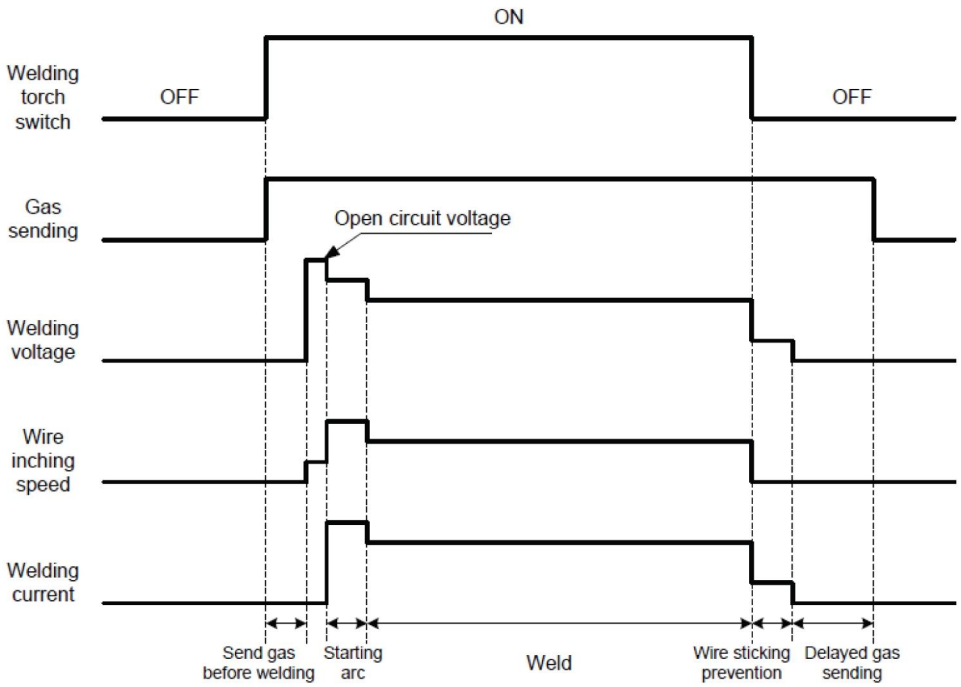
With 4 stroke, the gas pre-flow starts when the welding torch trigger switch is pressed in and the wire feed starts when it is released. The welding process continues until the switch is pressed in again, then the ending arc is generated using the ending arc voltage and current. Releasing the trigger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



**4-stroke repeat**

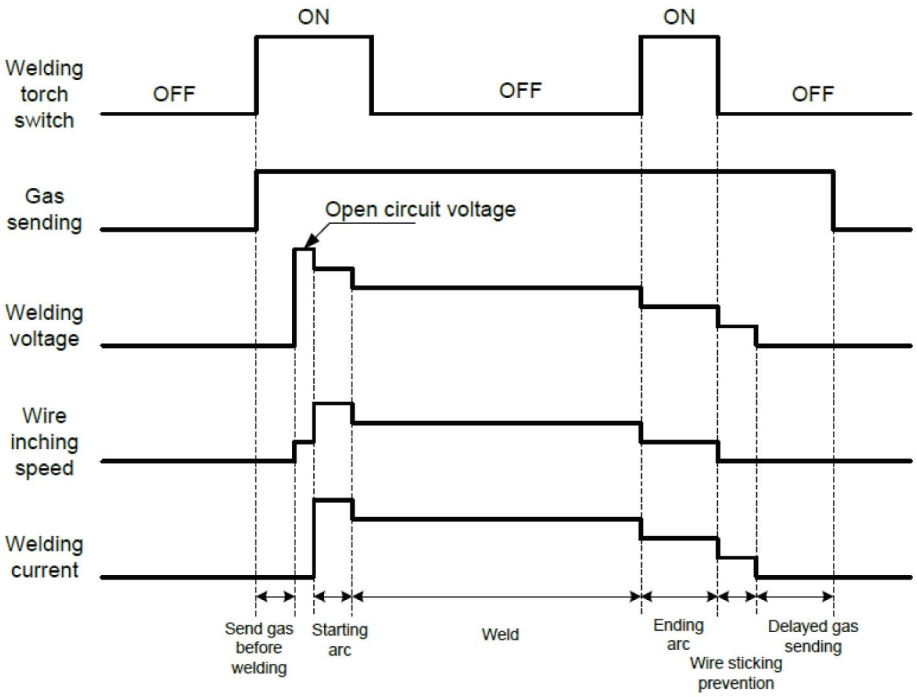
When the torch trigger switch is pressed in, the gas flow starts and an arc is generated. When the trigger switch is released the arc generation is locked. When the trigger switch is pressed in again, the ending arc is generated using the ending arc voltage and current. When the switch is released again, the welding stops. When the trigger switch is pressed in again within two seconds and holding it, welding with repeated ending arc starts. When the switch is released the repeated ending arc stops. If the switch is not pressed in again within 2seconds, the welding with repeated ending arc stops.

**2-stroke mode (welding without ending arc)**

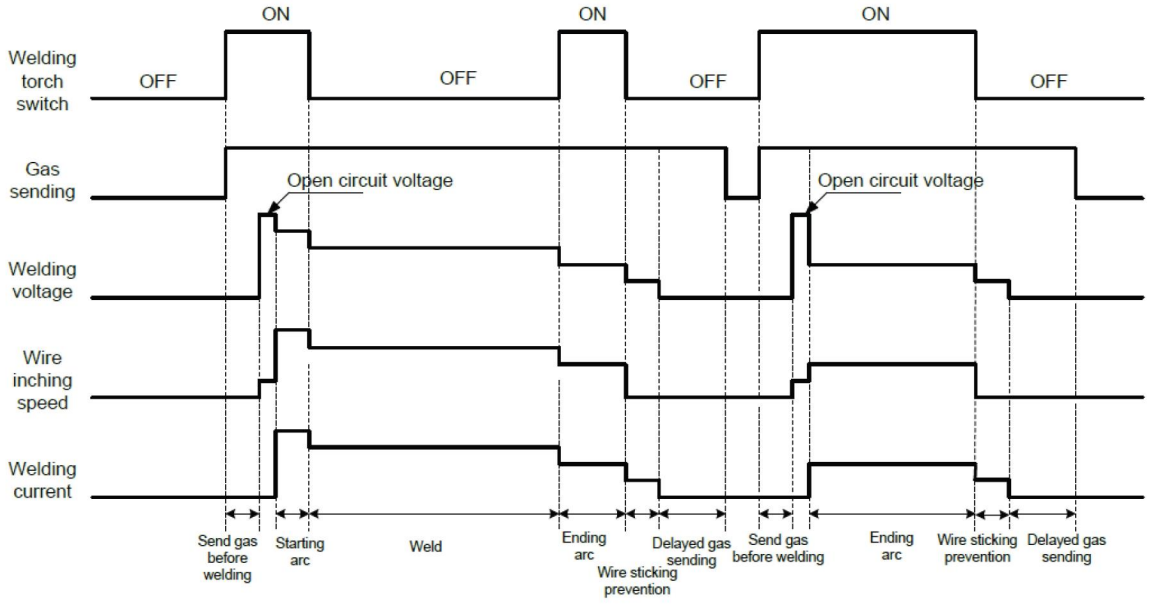


### 4-stroke mode (welding with ending arc)




### 4-stroke repeat mode (Welding with repeated ending arc)




## 5.2 Connection of welding and return cable

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

Connect the return cable to the negative terminal on 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 cable(copper) at an ambient temperature of +25°C and normal 10minutes cycle**

| Cable size mm² | 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 cable(copper) at an ambient temperature of +40°C and normal 10minutes cycle**

| Cable size mm² | 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 |

## 5.3 Symbols and functions

| | | | |
|---|---|---|---|
| ON<br>▬<br>OFF | Mains power supply switch |  | Overheating (3) |
|  | Protective earth |  | Positioning of lifting eye |
|  | Arc force |  | Inductance |
|  | Gas detection |  | MMA welding |
|  | Ending arc current / Crater fill current |  | Ending arc voltage / Crater fill voltage |

## 5.4 Thermal protection

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 with in its normal working temperature.

## 5.5 Fan control

The fan will run during the startup of the machine and will continue to run only for 10 minutes if there is no operation.

In Fabricator EM 400i when the welding current is less than 200A, the fan will run at low speed, if the welding current goes above 200A, the fan will run at high speed.

In Fabricator EM 500i when the welding current is less than 300A, the fan will run at low speed, if the welding current goes above 300A, the fan will run at high speed.

After the welding stops, the fan will continue to run for 10 minutes and the power source switches to idle mode (energy-saving mode).

# 6 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.

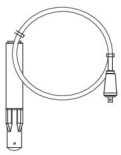
**NOTE!**
Perform maintenance more often during severe dusty conditions.

Before each use - make sure that:

- Product and cables are not damaged,
- The torch is clean and not damaged.

## 6.1 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. | | |

## 6.2 Power source

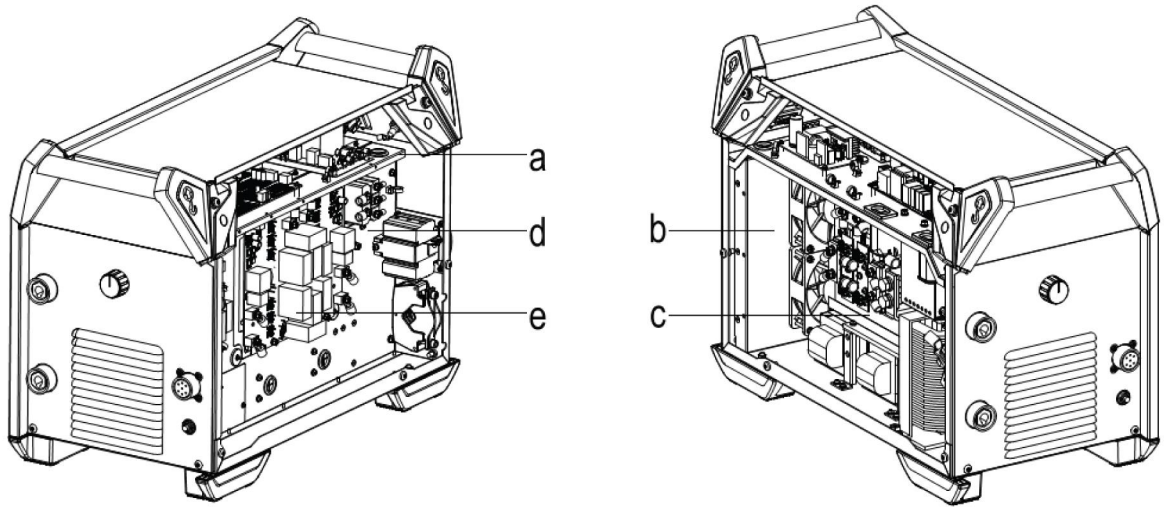
To maintain the performance and increase the lifetime of the power source it is mandatory to clean it regularly. How often depends on:

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

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

### Cleaning procedure




1. Disconnect the power source from the mains supply.

   **WARNING!**
   Wait for 4 minutes for the capacitors to discharge before continuing.
2. Remove the side panels on the power source.
3. Remove the top panel on the power source.
4. Remove the plastic cover between the heat sink and fan (b).
5. Clean the power source with dry compressed air (4 bar) as follows:
   - The upper rear part.
   - From the rear panel through the secondary heat sink.
   - The inductor, transformer and current sensor.
   - The power components side, from the rear side behind PCB15AP1.
   - The PCBs at both sides.
6. Make sure that there is no dust left on any part of the power source.
7. Install the plastic cover between the heat sink and the fan (b) and make sure it is correctly fitted against the heat sink.
8. After having finished cleaning the power source, reattach the power source panels in the reverse order.

# 7 TROUBLESHOOTING

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

**Welder Error Codes and Solutions**

Shows the screens


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

| Error Code | Displayed Content | | Fault | Cause | Solution |
|---|---|---|---|---|---|
| | Left display | Right display | | | |
| F00 | F00 | None | Power-on self-test | | |
| E1 | E1 | None | Welding torch fault | When the equipment is turned on, the welding torch trigger switch is on. the switch may be faulty. | Turn off the switch. Replace the welding torch. |
| E2 | E2 | None | Output terminal over-temperature | The OKC terminal and welding cable is not connected properly. The copper cross-sectional area of the output power cable is too small. The output cable OKC fails to meet the specification requirement. The fan does not work or slows down. | Verify the OKC terminal and welding cable is connected properly. Use cables with correct cross-sectional areas. Select suitable cable OKC. Verify that the fan blades are not stuck with any foreign objects. |

| Error Code | Displayed Content | | Fault | Cause | Solution |
|---|---|---|---|---|---|
| | Left display | Right display | | | |
| E3 | E3 | None | Abnormal input power | The input power cable is not connected properly. Input power overvoltage occurs. Input power under voltage occurs. Input power phase imbalance occurs. The input power frequency exceeds the range. | Verify that the input cables are connected properly. Verify that all the three input phases are present. |
| E4 | E4 | None | IGBT or diode over-temperature | The rated duty cycle is exceeded. The air vent of the housing is blocked. The fan does not work or slows down. | Ensure that the user does not exceeds the rated duty cycle range. Verify that the air vent is not blocked. Verify that the fan blades are not stuck with any foreign objects that the fan blades are not stuck with any foreign objects. |
| E5 | E5 | 1 - 8 | Button error | Button is not working. Button does not rebound after being pressed. | Check the button and make sure it does not stick |
| E6 | E6 | None | Output overcurrent | The output is short-circuited, or the current is too high. | Verify that the output is not short-circuited. |
| E7 | E7 | None | Input power fault | The input power cable is not connected properly. Input power phase loss or phase imbalance occurs. | Verify that the input cables are connected properly. Verify that the input power is normal. |
| E8 | E8 | None | Output overvoltage | The input voltage is too high. The output cables are not connected correctly. | Verify that the input voltage is normal. Verify that the output cables are connected correctly. |
| E9 | E9 | None | Primary side overcurrent | The output is short-circuited. | Verify that the output is not short-circuited. |

| Error Code | Displayed Content | | Fault | Cause | Solution |
|---|---|---|---|---|---|
| | Left display | Right display | | | |
| E10 | E10 | None | Primary side overvoltage | The input voltage is too high. | Verify that the input voltage is normal. |
| E11 | E11 | None | Current Hall connector disconnection | The current Hall connector is disconnected. | Refer note below the table* |
| E12 | E12 | None | PCB not registered | The PCB is not certified. | Refer note below the table* |

**NOTE!**
Call ESAB authorised service personnel.

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

| Type of fault | Corrective action |
|---|---|
| No arc. | • Check that the mains power supply switch is turned on.<br>• Check that the mains, welding and return cables are correctly connected.<br>• Check that the correct current value is set.<br>• Check the mains power supply fuses. |
| The welding current is interrupted during welding. | • Check whether the thermal protection trip has operated (indicated by the orange LED on the front). |
| 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).<br>• 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.<br>• Check that the correct current value is set.<br>• Check that the correct welding wires are being used.<br>• Check the main power supply fuses. |

# 8 ORDERING SPARE PARTS

**CAUTION!**

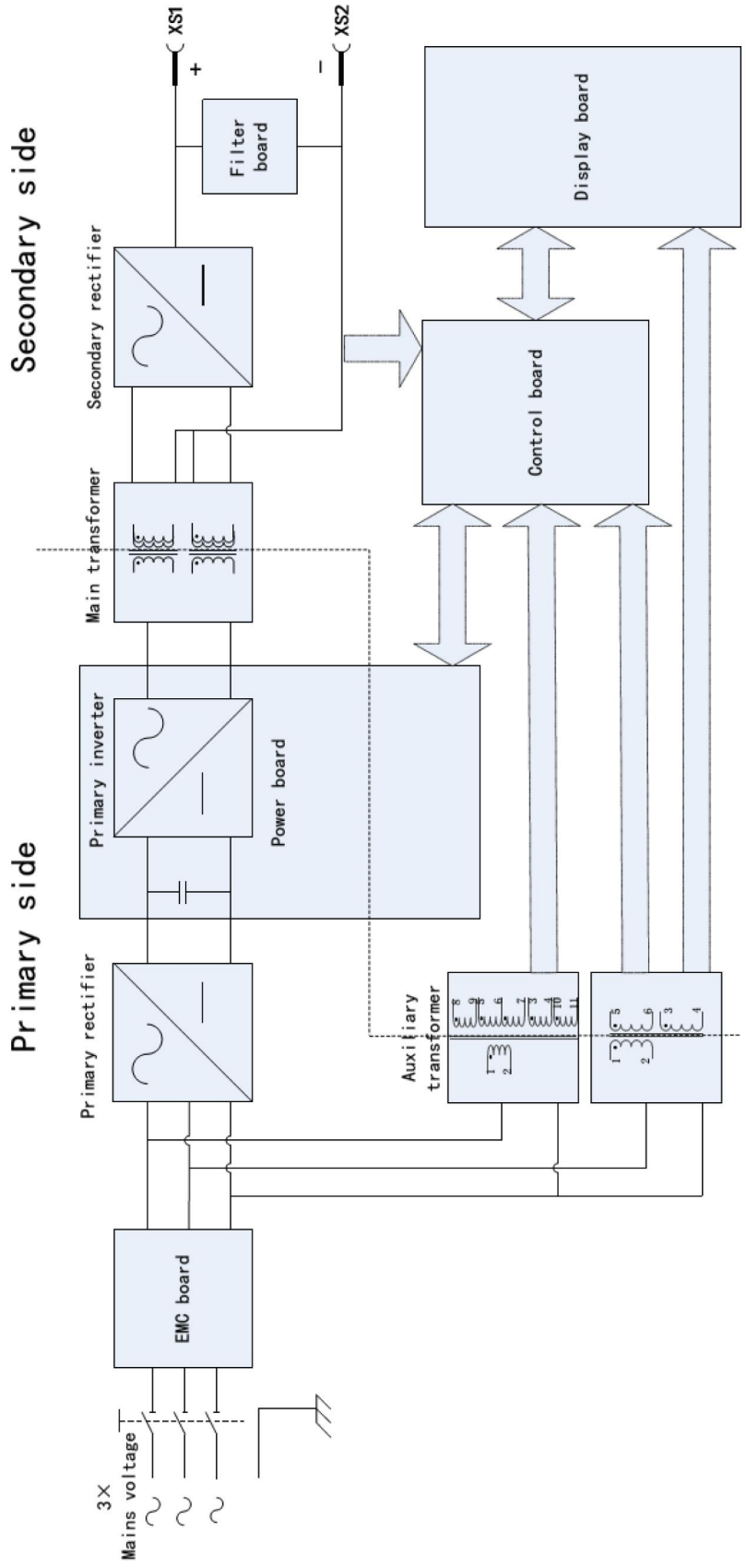
Repair and electrical work should be performed by an authorised ESAB service technician. Use only ESAB original spare and wear parts.

The **Fabricator EM 400i** / **Fabricator EM 500i** is designed and tested in accordance with international standard GB/T 15579.1 & IEC 60974-1. 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. 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.

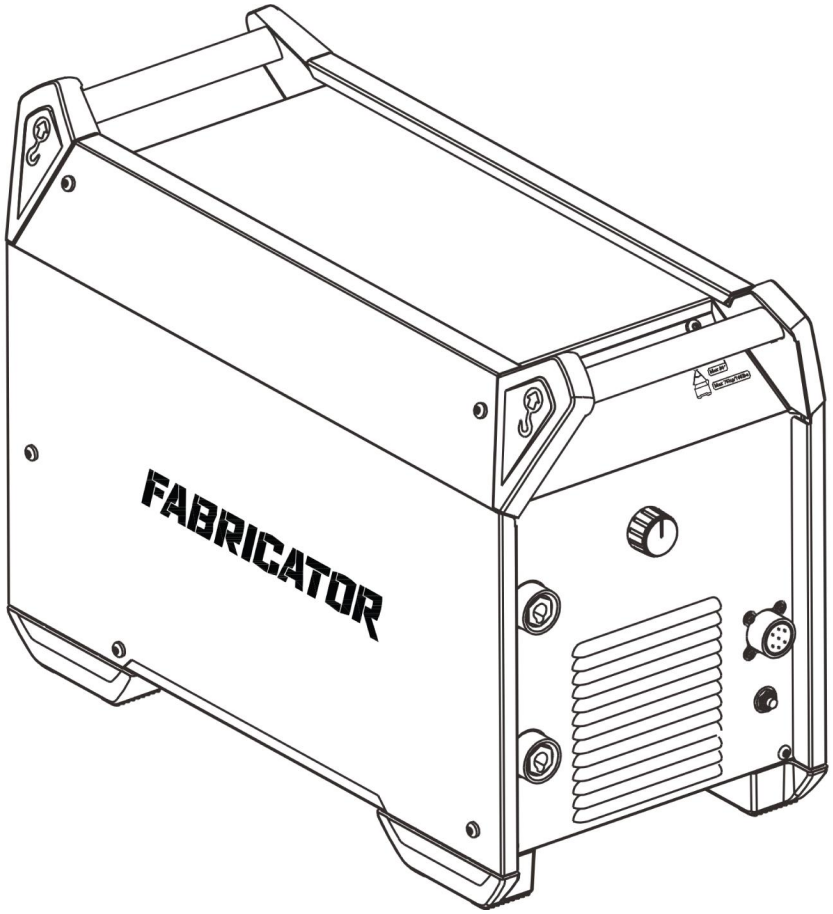
 

# BLOCK DIAGRAM



# ORDERING NUMBERS



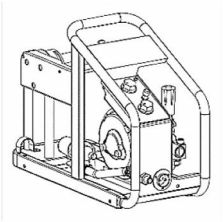
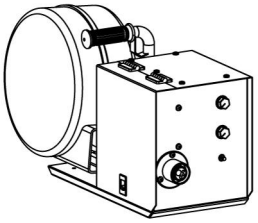
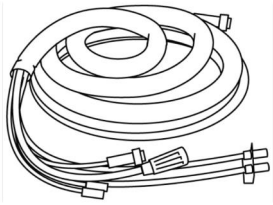
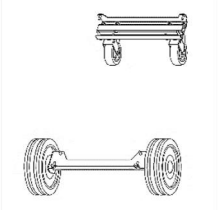
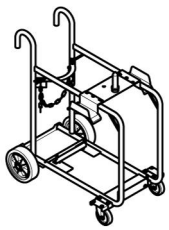

| Ordering number | Denomination | Type | Notes |
|---|---|---|---|
| 0700 020 001 | Power source | Fabricator EM 400i | CCC |
| 0700 020 002 | Power source | Fabricator EM 500i | CCC |
| 0446 575 001 | Spare parts list | | |
| 0446 404 * | Instruction manual | | |

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

# ACCESSORIES

| | | |
|---|---|---|
| 0700 020 003 | Feed 364 |  |
| 0700 020 004 | Fabricator Feed 364 |  |
| 0349 490 624 | 5m 70mm2 inter connection cable |  |
| 0349 490 608 | 10m 70mm2 inter connection cable | |
| 0349 490 607 | 15m 70mm2 inter connection cable | |
| 0349 490 606 | 25m 70mm2 inter connection cable | |
| 0349 305 138 | 5m 50mm2 inter connection cable | |
| 0349 305 357 | 10m 50mm2 inter connection cable | |
| 0349 305 355 | 15m 50mm2 inter connection cable | |
| 0349 305 356 | 25m 50mm2 inter connection cable | |
| 0465 416 880 | Wheel Kit |  |
| 0349 313 450 | Trolley, compatible with Fabricator Feed 364 |  |

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