

Product Manual

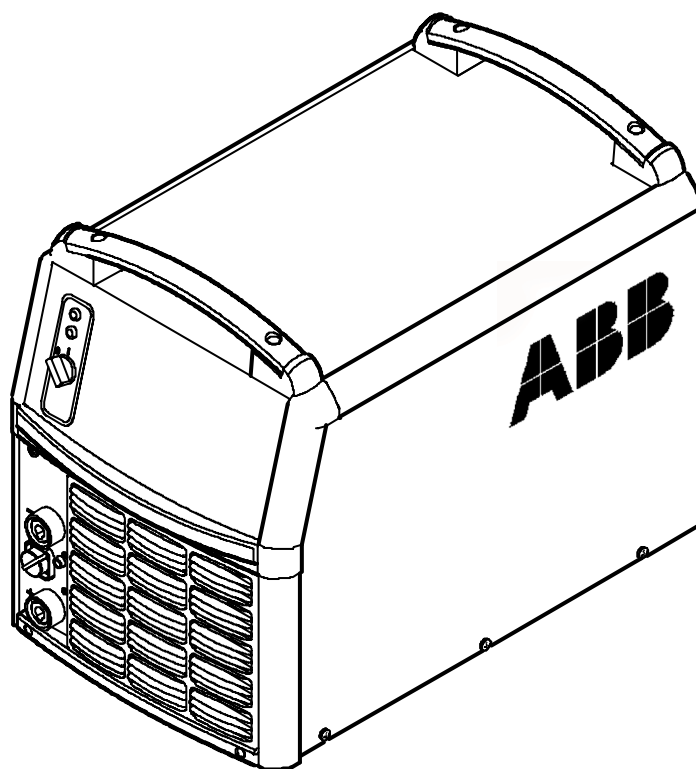
Welding power source

MigRob 500

3HEA 801740-001 2006 10 16

Valid for serial no. 517-xxx-xxxx, 524-xxx-xxxx, 610-xxx-xxxx,

640-xxx-xxxx



ABB

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1 DIRECTIVE

DECLARATION OF CONFORMITY

ESAB AB, Welding Equipment, SE-695 81 Laxå, Sweden, gives its unreserved guarantee that welding power source MigRob 500 from serial number 517 complies with standard IEC/EN 60974-1, in accordance with the requirements of directive (73/23/EEC) and addendum (93/68/EEC) and with standard IEC/EN 60974-10 in accordance with the requirements of directive (89/336/EEC) and addendum (93/68/EEC).

Laxå 2006-03-01



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2 SAFETY

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

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



WARNING



ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.

ELECTRIC SHOCK - Can kill

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

FUMES AND GASES - Can be dangerous to health

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

ARC RAYS - Can injure eyes and burn skin.

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

FIRE HAZARD

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

NOISE - Excessive noise can damage hearing

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

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

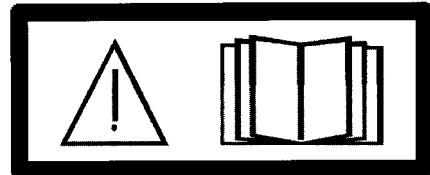
READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!



WARNING!

Read and understand the instruction manual before installing or operating.

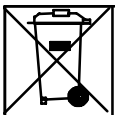


WARNING!

Do not use the power source for thawing frozen pipes.



This product is solely intended for arc welding.



Do not dispose of electrical equipment together with normal waste!

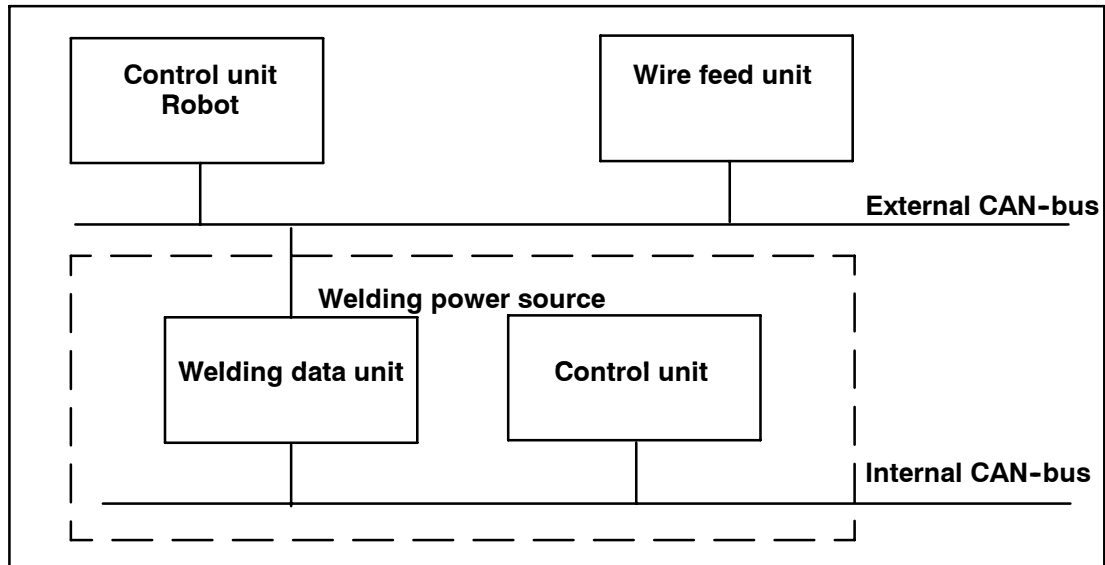
In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from our local representative.

By applying this European Directive you will improve the environment and human health!

3 INTRODUCTION

MigRob 500 is a welding power source intended for MIG/MAG welding.

The welding power source comprises a control unit and a welding data unit. All man-machine communication is performed from the robot's control panel.



3.1 Communication

All exchange of information between the welding equipment and the robot system takes place via a CAN-bus. The welding data unit in the welding power source handles this communication.

3.2 Equipment

The MigRob 500 power source is supplied with 2 terminating resistors, a 5 m return cable and an instruction manual.

Note! One terminating resistor for the internal bus and one for the external bus.

4 TECHNICAL DATA

MigRob 500	
Mains voltage	400 V, $\pm 10\%$, 3~ 50/60 Hz
Primary current I_{max}	39 A
No-load power demand when in the energy-saving mode, 6.5 min. after welding	50 W
Setting range	8-60 V / 16-500 A
Maximum permissible load at 60% duty cycle 100% duty cycle	500 A / 39 V 400 A / 34 V
Power factor at maximum current	0.85
Efficiency at maximum current	86%
Open-circuit voltage	72 - 88 V

MigRob 500	
Operating temperature	-10 to +40°C
Constant A-weighted sound pressure	< 70 dB
Dimensions l x w x h	625 x 394 x 496 mm
Weight	72 kg
Insulation class transformer	H
Enclosure class	IP 23
Application class	S

Duty cycle

The duty cycle refers to the time as a percentage of a ten-minute period that you can weld at a certain load without overloading.

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 designed 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.

5 INSTALLATION

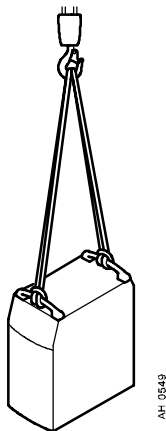
The installation must be executed by a professional.



WARNING!

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.

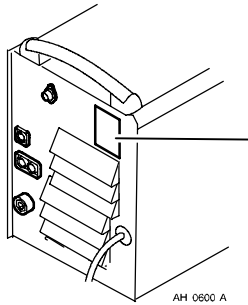
5.1 Lifting instructions



5.2 Location

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

5.3 Mains power supply



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

Rating plate with supply connection data

Recommended fuse sizes and minimum cable area

MigRob 500	400 V 3~ 50 Hz
Mains voltage	400 V
Mains cable area mm ²	4G6
Phase current, I RMS	31 A
Fuse	
Anti-surge	35 A
Type C MCB	40 A

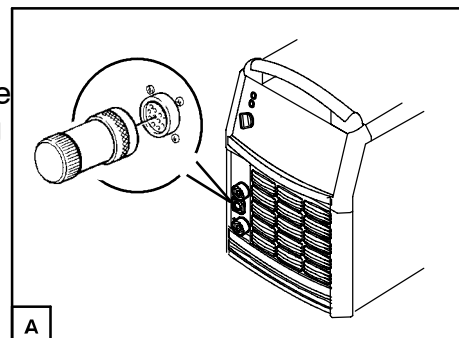
Note! The mains cable areas and fuse sizes as shown above are in accordance with Swedish regulations. Use the welding power source in accordance with the relevant national regulations.

5.4 Terminating resistors

The ends of the CAN bus must be fitted with terminating resistors to avoid communication interference.

Internal CAN-bus

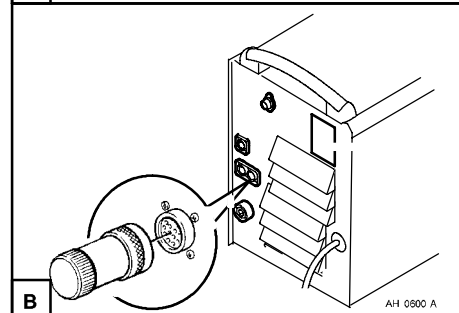
One end of the CAN-bus is at the welding data unit, which has an integral resistor. The other end is at the power source and must be fitted with the terminating resistor, as shown in figure **A**.



External CAN-bus

The power source has two connections for the external CAN-bus, "EXT CAN IN" and "EXT CAN OUT".

The cable from the robot system is connected to the connector marked "EXT CAN IN". If the power source is located at the end of the CAN-bus, the terminating resistor must be located in "EXT CAN OUT" in accordance with figure **B**. If the power source is not the final unit on the CAN-bus, "EXT CAN OUT" is used to connect the bus on to additional CAN units (in such cases the terminating resistor is placed in the final unit on the bus.)

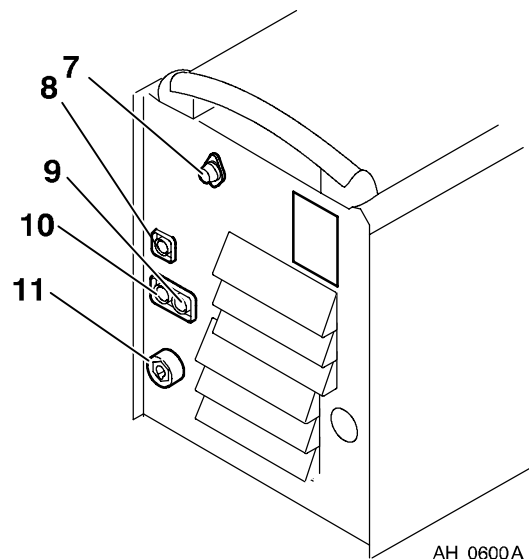
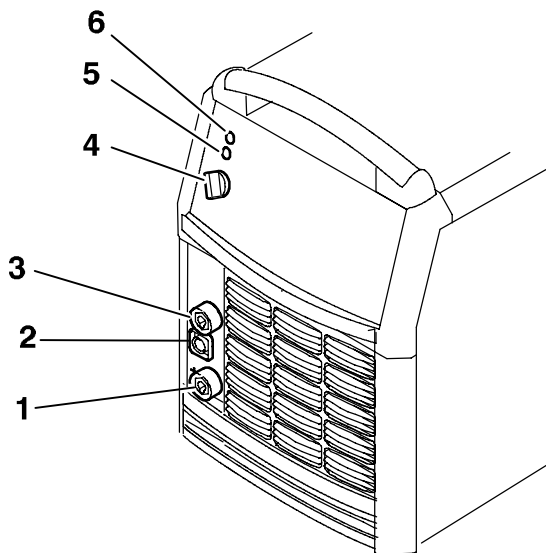


6 OPERATION

General safety regulations for the handling of the equipment can be found on page 4. Read through before you start using the equipment!

6.1 Connections and control devices

- | | | | |
|---|--|----|---|
| 1 | Connection for welding current cable (+) | 7 | Fuse, 4 A |
| 2 | Connection for terminating resistor, 42 V, Internal CAN-bus. | 8 | Connection measurement cable, (arc voltage detection welding wire / workpiece), MEASURE |
| 3 | Connection for return cable (-) | 9 | Connection for terminating resistor, EXTERN CAN OUT |
| 4 | Mains power supply switch, 0 / 1 / START | 10 | Connection for communication with robot system, EXTERN CAN IN |
| 5 | White indicating lamp – Power supply ON | 11 | Connection for welding current cable (+) |
| 6 | Orange indicating lamp – Overheating | | |



AH 0600A

6.2 Turning on the power source

Turn on the mains power by turning switch (4) to the "START" position. Release the switch, and it will return to the "1" position.

If the mains power supply should be interrupted while welding is in progress, and then be restored, the power unit will remain de-energised until the switch is again turned manually to the "START" position.

Turn the unit off by turning the switch to the "0" position.

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

6.3 Fan control

The power source has a time control that means that the fans continue to run for 6.5 minutes after welding has stopped, and the unit switches to energy-saving mode. The fans start again when welding restarts.

The fans run at reduced speed for welding currents up to 180 A, and at full speed for higher currents.

6.4 Overheating protection

The welding power source has three thermal overload trips that operate if the temperature becomes too high. When this occurs the welding current is interrupted and the orange indicating lamp on the front of the power source comes on. The thermal overload trip resets automatically when the temperature has fallen.

6.5 Arc voltage measurement

Arc voltage measurement can be carried out in two ways:

Alternative 2 means that a measurement cable must be connected to the workpiece. This method gives the most accurate arc voltage measurement.

Alternative 1 (delivery version)

Measurement between welding wire and OKC outlet.

Connections to connector XS31.		
Required external connections	Sleeve	Explanation of existing connections in the power source
	J	Welding minus, detection
	M	Welding minus from OKC outlet
	H	Arc voltage from the welding wire in the wire feed unit.
	C	Forced welding stop, interrupted connection between C and F entails stop.
	F	

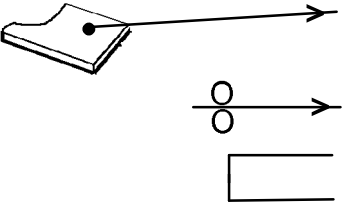
Alternative 2A

Measurement between welding wire positive polarity, workpiece negative.

Connections to connector XS31.		
Required external connections	Sleeve	Explanation of existing connections in the power source
	J	Welding minus, detection
	M	
	H	Arc voltage from the welding wire in the wire feed unit.
	C	Forced welding stop, interrupted connection between C and F entails stop.
	F	

Alternative 2B

Measurement between welding wire negative polarity, workpiece positive.

Connections to connector XS31.		
Required external connections	Sleeve	Explanation of existing connections in the power source
	J	Welding plus, detection
	M	
	H	Arc voltage from the welding wire in the wire feed unit.
	C	Forced welding stop, interrupted connection between C and F entails stop.
	F	

6.6 Forced welding stop

During normal operation, this inlet must be bridged.

Note! In an emergency, the welding power source can be stopped immediately by opening this inlet. See table above.

Note! The welding power source remains connected to power, even when welding stop is activated.

7 MAINTENANCE

Regular maintenance is important for safe, reliable operation.

Maintenance may only be carried out by an authorised technician.

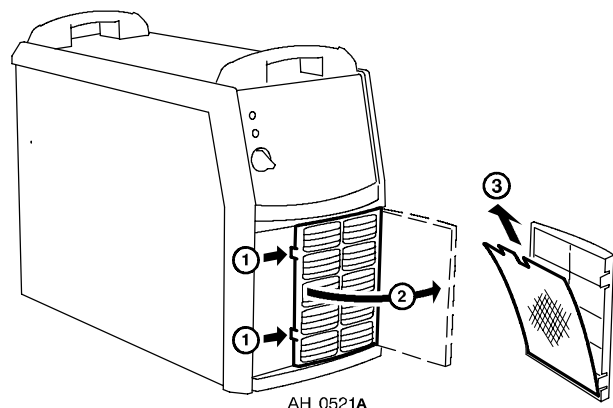
Only personnel with the appropriate electrical skills (authorised staff) may remove safety plates.

Note!

All guarantee undertakings from the supplier cease to apply if the customer himself attempts any work in the product during the guarantee period in order to rectify any faults.

7.1 Cleaning the dust filter

- Remove the fan grille with the dust filter (1).
- Swing out the grille (2).
- Release the dust filter (3).
- Blow the filter clean with compressed air (reduced pressure).
- Replace if necessary.
- Replace the filter with the finer mesh on the side against the grille (2) (out from the power source).
- Replace the fan grille with the dust filter.



8 FAULT-TRACING

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

Type of fault	Action
No arc.	<ul style="list-style-type: none"> • Check that the mains power supply switch is turned on. • Check that the welding current supply and return cables are correctly connected. • Check that the correct current value is set. • Check that the fuse is intact.
The welding current is interrupted during welding.	<ul style="list-style-type: none"> • Check whether the thermal cut-outs have tripped (indicated by the orange lamp on the front panel). • Check the mains power supply fuses.
The thermal cut-out trips frequently.	<ul style="list-style-type: none"> • Check to see whether the dust filter is clogged. • Make sure that you are not exceeding the rated data for the power source (i.e. that the unit is not being overloaded).
Poor welding performance.	<ul style="list-style-type: none"> • Check that the welding current supply and return cables are correctly connected. • Check that the correct current value is set. • Check that the correct wire is being used. • Check the mains power supply fuses.

9 LIST OF FAULT CODES

Fault code	Description	Welding data unit	Power unit
1	EPROM memory error	x	x
2	RAM memory error	x	x
3	External Read/Write RAM memory error	x	
4	5 V power supply	x	x
5	High DC intermediate voltage		x
6	High temperature		x
7	High primary current		x
8	Mains power supply 1*	x	x
9	Mains power supply 2*		x
10	Mains power supply 3*		x
12	Communication error (warning)	x	x
14	Communication error (bus off)	x	
15	Messages lost	x	x
18	Lost contact with the power unit	x	
19	Incorrect set values in external RAM	x	
20	Unacceptable settings stored in RAM	x	
21	Incompatible settings stored in RAM	x	
22	Transmitter buffer overflow	x	
23	Receiver buffer overflow	x	

Fault code	Description	Welding data unit	Power unit
26	Program error	x	x
28	Lost program data	x	x

Unit	Power supply 1*	Power supply 2*	Power supply 3*
Welding data unit	+3 V		
Power unit	+15 V	-15 V	+24 V

9.1 Fault code descriptions

Fault code	Description
1	<p>Program memory error (EPROM) The program memory is damaged. This fault does not disable any functions. Action: Restart the machine. If the fault persists, send for a service technician.</p>
2	<p>Microprocessor RAM error The microprocessor is unable to print/read to the internal memory. This fault does not disable any functions. Action: Restart the machine. If the fault persists, send for a service technician.</p>
3	<p>External RAM error The microprocessor is unable to print/read to the external memory. This fault does not disable any functions. Action: Restart the machine. If the fault persists, send for a service technician.</p>
4	<p>5 V power supply low The power supply voltage is too low. The current welding process is stopped and starting is prevented. Action: Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.</p>
5	<p>Intermediate DC voltage outside limits The voltage is too high or too low. Too high a voltage can be due to severe transients on the mains power supply or to a weak power supply (high inductance of the supply or a phase missing). The power unit is stopped and cannot be started. Action: Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.</p>
6	<p>High temperature The thermal overload cut-out has tripped. The current welding process is stopped and cannot be restarted until the cut-out has reset. Action: Check that the cooling air inlets or outlets are not blocked or clogged with dirt. Check the duty cycle being used, to make sure that the equipment is not being overloaded.</p>
7	<p>High primary current The power unit takes too much current from the DC voltage that supplies it. The power unit is stopped and cannot be started. Action: Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.</p>

Fault code	Description
8	<p>Low battery voltage +3 V, (welding data unit) Battery voltage too low. If the battery is not replaced, all stored data will be lost. This fault does not disable any functions. Action: Send for a service technician to replace the battery.</p>
8	<p>+15 V power supply, (power unit) The power supply is too high or too low. Action: Send for a service technician.</p>
9	<p>-15 V power supply, (power unit) The power supply is too high or too low. Action: Send for a service technician.</p>
10	<p>+24 V power supply The power supply is too high or too low. Action: Send for a service technician.</p>
12	<p>Communication error (warning) The load on the system's CAN-bus is temporarily too high. The power unit / wire feed unit has lost contact with the welding data unit. Action: Check that all the equipment is correctly connected. If the fault persists, send for a service technician.</p>
14	<p>Communication error The system's CAN-bus has temporarily stopped working due to the load being too high. The current welding process stops. Action: Check that all the equipment is correctly connected. Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.</p>
15	<p>Messages lost The microprocessor is unable to process incoming messages sufficiently quickly and information has been lost. Action: Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.</p>
18	<p>Lost contact The welding data unit has lost contact with the power unit. The current welding process stops. Action: Check the cables. If the fault persists, send for a service technician.</p>
19	<p>Memory error in battery-supplied data memory RAM The battery has lost voltage Action: Turn off the mains power supply to reset the unit. The welding data unit is reset. The settings are in English, with MIG/MAG, DIP/SPRAY, Fe, CO₂, 1.2 mm</p>
20	<p>Non-permitted set values stored in RAM Non-permitted values have been discovered at start-up. Delete all data contained in the welding data unit. Action: Turn off the mains power supply to reset the unit. The welding data unit is reset. The settings are in English, with MIG/MAG, DIP/SPRAY, Fe, CO₂, 1.2 mm</p>
21	<p>Incompatible set values stored in RAM Non-permitted welding data combinations have been specified. Action: Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.</p>
22	<p>Transmitter buffer overflow The welding data unit does not manage to transmit information to the other units sufficiently quickly. Action: Turn off the mains power supply to reset the unit.</p>

Fault code	Description
23	<p>Receiver buffer overflow</p> <p>The welding data unit does not manage to process information from the other units sufficiently quickly.</p> <p>Action: Turn off the mains power supply to reset the unit.</p>
26	<p>Program error</p> <p>Something has prevented the processor from performing its normal duties in the program. The program restarts automatically. The current welding process will be stopped. This fault does not disable any functions.</p> <p>Action: Review the handling of welding programs during welding. If the fault is repeated, send for a service technician.</p>
28	<p>Lost program data</p> <p>Program execution does not work.</p> <p>Action: Turn off the mains power supply to reset the unit. If the fault persists, send for a service technician.</p>

10 ORDERING SPARE PARTS

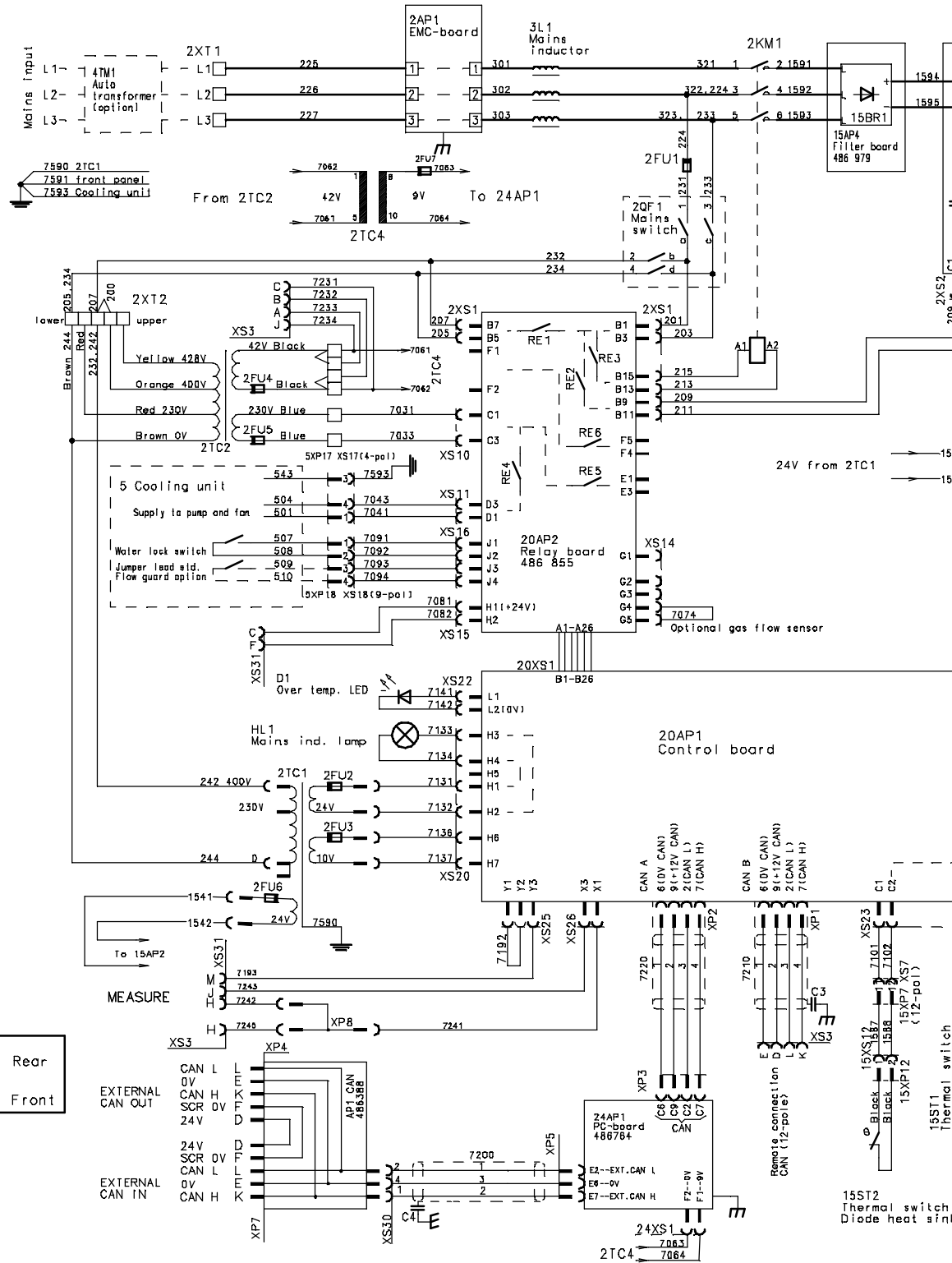
MigRob 500 is designed and tested in accordance with the international and European standards IEC/EN 60974-1 and EN 60974-10. It is the obligation of the service unit which has carried out the service or repair work to make sure that the product still conforms to the said standard.

*Repair and electrical work should be performed by an authorized serviceman.
Use only original spare and wear parts.*

Spare parts are ordered through ABB Automation Technologies AB. When ordering, please specify type and production number, as well as designation and order number.

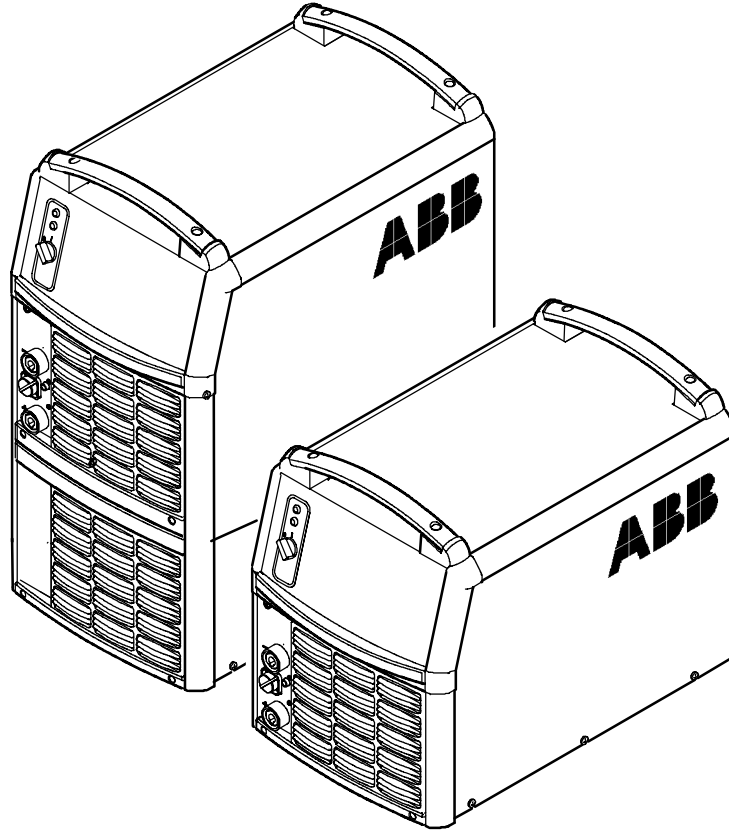
ABB Automation Technologies AB reserves the right to alter specifications without prior notification.

Diagram



MigRob 500

Ordering number



Ordering no.	Denomination	Type
3HEA801700-001	Welding power source	MigRob500
3HEA801700-002	Welding power source with autotransformer	MigRob500 and TUA2

MigRob 500

Spare parts list

Item	Ordering no.	Denomination
1	3HEA801730-002	Filter
2	3HEA801730-003	Front grill
3	3HEA801730-001	Fuse 4 AT, 10.3x38.1mm

