IMPORTANT: BEFORE STARTING THE EQUIPMENT, READ THE CONTENTS OF THIS MANUAL, WHICH MUST BE STORED IN A PLACE FAMILIAR TO ALL USERS FOR THE ENTIRE OPERATIVE LIFE-SPAN OF THE MACHINE.

THIS EQUIPMENT MUST BE USED SOLELY FOR WELDING OPERATIONS.

1 SAFETY PRECAUTIONS

WELDING AND ARC CUTTING CAN BE HARMFUL TO YOURSELF AND OTHERS. The user must therefore be educated against the hazards, summarized below, deriving from welding operations. For more detailed information, order the manual code 3.300.758

ELECTRIC SHOCK - May be fatal.
- Install and earth the welding machine according to the applicable regulations.
- Do not touch live electrical parts or electrodes with bare skin, gloves or wet clothing.
- Isolate yourselves from both the earth and the work-piece.
- Make sure your working position is safe.

FUMES AND GASES - May be hazardous to your health.
- Keep your head away from fumes.
- Work in the presence of adequate ventilation, and use ventilators around the arc to prevent gases from forming in the work area.

ARC RAYS - May injure the eyes and burn the skin.
- Protect your eyes with welding masks fitted with filtered lenses, and protect your body with appropriate safety garments.
- Protect others by installing adequate shields or curtains.

RISK OF FIRE AND BURNS
- Sparks (sprays) may cause fires and burn the skin; you should therefore make sure there are no flammable materials in the area, and wear appropriate protective garments.

RISK OF EXPLOSIONS
- Do not weld in the vicinity of containers under pressure, or in the presence of explosive dust, gases or fumes. All cylinders and pressure regulators used in welding operations should be handled with care.

NOISE
- This machine does not directly produce noise exceeding 80dB. The plasma cutting/welding procedure may produce noise levels beyond said limit; users must therefore implement all precautions required by law.

PACEMAKERS
- The magnetic fields created by high currents may affect the operation of pacemakers. Wearing of vital electronic equipment (pacemakers) should consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.

EXPLOSIONS
- Do not weld in the vicinity of containers under pressure, or in the presence of explosive dust, gases or fumes. All cylinders and pressure regulators used in welding operations should be handled with care.

ELECTROMAGNETIC COMPATIBILITY
This machine is manufactured in compliance with the instructions contained in the harmonized standard IEC 60974-10, and must be used solely for professional purposes in an industrial environment. There may be potential difficulties in ensuring electromagnatic compatibility in non-industrial environments.

DISPOSAL OF ELECTRICAL AND ELECTRONIC EQUIPMENT
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!

IN CASE OF MALFUNCTIONS, REQUEST ASSISTANCE FROM QUALIFIED PERSONNEL.

2 GENERAL DESCRIPTIONS

The devices Sound MIG 4000/T Synergic and Sound MIG 5000/T Synergic are multi-process systems suitable for synergic MIG/MAG, conventional MIG/MAG and MMA welding, developed using inverter technology. The welding machines are supplied complete with wire feeder with 4-roller gearmotor and cooling unit. These devices may be used only for the purposes stated in the manual. These welding machines must not be used to defrost pipes.

2.1 POWER SOURCE

2.1.1 Explanation of technical specifications

IEC 60974.1 The welding machine is manufactured according to these international standards.

EN 50199 Serial number. Must be indicated on any type of request regarding the welding machine.

Three-phase static frequency converter transformer-rectifier.

MIG Suitable for MIG welding.

TIG Suitable for TIG welding.

MMA Suitable for welding with covered electrodes.

U0. Secondary open-circuit voltage.

X. Duty cycle percentage

The duty cycle expresses the percentage of minutes during which the welding machine may run at a certain current without overheating.

I2. Welding current

U2. Secondary voltage with current I2

U1. Rated supply voltage

3~ 50/60Hz 50- or 60-Hz three-phase power supply
I$_1$ Max  Max. absorbed current at the corresponding current I$_2$ and voltage U$_2$.
I$_1$ eff  This is the maximum value of the actual current absorbed, considering the duty cycle. This value usually corresponds to the capacity of the fuse (delayed type) to be used as a protection for the equipment.

IP23 C. Protection rating for the housing. Grade 3 as the second digit means that this equipment is suitable for use outdoors in the rain. The additional letter C means that the equipment is protected against access to live parts of the power circuit by a tool (diameter 2.5 mm).

Suitable for use in high-risk environments.

NOTE: The welding machine has also been designed for use in environments with a pollution rating of 3. (See IEC 664).

2.1.2 Description of the power source (Fig. 1)

BO - Socket: In MIG and MMA welding, connect the earth cable connector.
BP - Connector: Connector type DB9 (RS 232) to be used to update the microprocessor programs.
BR - Socket: In MIG welding, connect the patch connector of the power source/wire feeder connection power cable (pole +)
BS - Connector: Connect the connector of the power source/wire feeder connection service cable
BU - Switch ON/OFF.
BV - Power cord.

2.2 WIRE FEEDER

2.2.1 Description of the wire feeder (Fig. 1)
BA - Central adapter:
Connect the MIG welding torch.
BB - Connector: 
for connecting the remote controls.
A clean contact is available between pins 4 and 5 that closes when the arc is lit (Arc On).
Between pins 1 and 9 it is possible to command the welding start and stop.

BC - Support:
Support for the welding torch

BD - Connector:
Connect the connector of the power source/wire feeder connection service cable

BE - Gas hose fitting:
Connect the gas hose of the power source/wire feeder connection

BF - Socket:
Connect the patch connector of the power source/wire feeder connection power cable

BG - Opening:
Slot for cooling hoses

BI - Quick-fitting sockets:
Connect any hoses leaving a water-cooled torch.
NOTE: Match the hose and socket colours correctly.

BJ - Door.

BL - Wire coil cover.

BM - Coil support:
Suitable for standard coils up to Ø 300 mm, 16 Kg.

2.3 COOLING UNIT

This cooling unit has been designed to cool the torches used for MIG/MAG welding.
Must be used exclusively with this power source.

2.3.1 Explanation of technical specifications

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>Rated supply voltage</td>
</tr>
<tr>
<td>1x230V</td>
<td>Single-phase power supply</td>
</tr>
<tr>
<td>50/60 Hz</td>
<td>Frequency</td>
</tr>
<tr>
<td>I1max</td>
<td>Maximum absorbed current</td>
</tr>
<tr>
<td>Pmax</td>
<td>Maximum pressure</td>
</tr>
<tr>
<td>P (1l/min)</td>
<td>Refrigerant power measured at 1L/min</td>
</tr>
</tbody>
</table>

2.3.2 DESCRIPTION OF PROTECTIONS

2.3.2.1 Coolant pressure protection

This protection is achieved by means of a pressure switch, inserted in the fluid delivery circuit, which controls a microswitch. The message H2O flashes on the display M to indicate the pressure (control panel instructions).

2.3.2.2 Fuse

This fuse was inserted to protect the pump, and is located on the control circuit inside the unit.

2.3.3 DESCRIPTION OF THE COOLING UNIT (Fig. 1)

BX - Slot:
Slot to inspect the coolant fluid level

BW - Cap.

BT - Quick-fitting valves:
Connect the red and blue lines of the wire feeder/machine connection.

NOTE: Match the hose and socket colours correctly.

2.3.4 INSTALLATION

Unscrew the cap BW and fill the tank (the equipment is supplied with approximately one liter of fluid). It is important to periodically check, through the slot BX, that the fluid remains at the "max" level. As a coolant, use water (preferably deionized) mixed with alcohol in percentages defined according to the following table:

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Water/Alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C up to -5°C</td>
<td>4L/1L</td>
</tr>
<tr>
<td>-5°C up to -10°C</td>
<td>3.8L/1.2L</td>
</tr>
</tbody>
</table>

NOTE: If the pump turns with no coolant present, you must remove all air from the tubes.

If so, turn off the power source, fill the tank, disconnect the fitting of the power source/wire feeder connection from the fitting BT( ), and connect a hose. Insert the other end of the hose in the tank.

Start the power source for approximately 10/15 seconds, then connect the hoses of the power source/wire feeder connection.

2.4 TROLLEY (Fig. 1)

BY - Cylinder support.

BZ - Cylinder holding straps.

BK - Hole:
Fasten the plate connected to the wire feeder/power source connection.

3 DESCRIPTION OF THE PANEL (Fig. 2)

Selection key V. Each time it is pressed briefly, it selects the value adjustable via the knob I. The values that may be selected are in relation to the type of welding process selected and are displayed on the LEDs A/B/C/D.

LED A  Current.
Indicates that the display M shows the preset welding current or, in combination with the lighting of the LED F, the actual welding current.
Active in all welding processes.

LED B  Wire speed.
Indicates that the display M shows the welding wire speed. Active in all welding processes.

LED C  Thickness.
The display M shows the recommended thickness based on the current and wire speed set. Active only in synergic MIG processes.

LED D  JOB.
Indicates that the display M shows the program number set. Active only in MIG processes.

LED E  Globular position.
May not be selected. Active in synergic MIG mode. When lit, it signals that the pair of values selected for welding may generate unstable arcs and cause spatters.
LED F Hold.
May not be selected. Activated in MIG and MMA welding, signals that the values shown on displays M and N (normally Amperes and Volts) are those used in welding. Activated at the end of each welding session.

LED G SYN.
Activated in MIG welding. Lights to signal that the welding machine is working in synergic mode.

LED H Voltage.
In all MIG welding processes, indicates that the display N shows the preset voltage or, in combination with the lighting of LED F, the actual welding voltage. In MMA mode it remains lit at all times and cannot be selected. Indicates that the display N shows the open-circuit voltage or welding voltage or, in combination with LED F lit, the actual welding voltage.

Knob I.
The following values must be adjusted based on the type of process:
- Welding current A, wire speed B, thickness C, program number JOB.
In the service functions select the abbreviations: Prc, TRG, HSA, SP, PrF, PoF, Acc, BB, L, Ito, H2O, Fac. In synergic programs when one measurement is adjusted, the others also change as a result. All of these values are shown on the display M.

Knob L.
The following values must be adjusted based on the type of process:
In synergic MIG the arc length, in conventional MIG the welding voltage.
Based on the symbol set via the knob I, from the service menu it selects the value set, whether to activate or deactivate it, or make another choice from within the function itself.

Display M.
In all welding processes, it numerically displays the selections made via the selection key E and adjusted via the knob I.
For the welding current (LED A) it displays the Amperes. For the wire speed (LED B) it displays the meters per minute.
For the thickness (LED C) it displays the millimeters. For the (LED D) it displays the program number set.
In service functions it displays the abbreviations: Prc, Sin, (Fac, AF, HS only for MMA mode), TRG, HSA, SP, PrF, PoF, Acc, bb, L, Ito, H2O, Fac.
For the parameters located within the service functions that are shown on the display M, see the paragraph service functions.
It flashes the message “OPn” if the wire feeder door is open. In error messages it displays the abbreviation Err.

Display N.
In all welding processes it numerically displays the arc length in synergic MIG and the welding voltage in conventional MIG.
For the welding voltage (LED H) it displays the Volts. For the arc length (LED H) it displays a number between -9.9 and +9.9; 0 is the recommended value.
For the parameters located within the MMA service function that are shown on the display N, see the paragraph service functions.
For the parameters located within the MIG service function that are shown on the display N, see the paragraph service functions.
**Button O**  
Wire test. 
Allows wire to advance even when no voltage or current are present. To increase or decrease the wire speed output from the torch, adjust the knob L.

**Button P**  
Test Gas. 
When this key is pressed, gas begins to flow out; press it again to stop the output. If the button is not pressed again after 30 seconds, the gas output is interrupted.

**Button Q**  
Saving and calling up saved programs. 
To save a current/voltage parameter, simply press the button Q for at least 5 seconds. The LED R lights, the display M flashes the message STO, and the display N flashes the first free number. Use the knob L to choose the number to which to save the previously chosen pair of current/voltage values. 
Press the button Q again until you hear the save confirmation sound, and the number stops flashing. Now, pressing the key Q briefly exits the function and the LED R shuts off. 
To recall a saved number, simply press the button Q briefly and call up the number using the knob L. You may save up to 99 pairs of current/voltage values. 
To erase a saved number, press the button Q for at least 5 seconds, turn the knob L until the display M shows the message DEL, and press the button Q again for another 5 seconds. 
A current/voltage parameter may be called up beyond saving, to change or use it. To call up the parameter, press the button Q for 3 seconds. Use the knob M to display the number to recall and show on the display M, using the knob L, the message rcL. Now simply hold down the button Q for at least 5 seconds.

**SERVICE FUNCTIONS**

Press the key V, and hold it down for at least 5 seconds to enter the submenu. Turn the knob I to select the function, and use the knob L to select the type of operation or value. 
To return to the normal display, press and immediately release the key V.

1. **Prc**  
Choice of MIG, TIG or MMA mode.
2. **AF**  
Activated in MMA welding. It may be adjusted from 0 to 100%. Adjusts the dynamic characteristic of the arc, a value adjusted using the knob L.
3. **HS**  
Activated in MMA welding. It may be adjusted from 0 to 100%. Adjusts the overcurrent delivered when the arc strikes, a value adjusted using the knob L.
4. **Syn**  
Activated in MIG welding. Activation indicates that the welding machine is working in synergic mode.
5. **Trg**  
Activated in MIG and TIG welding. Choice between 2 stage, 4 stage, 3 levels. 2t the machine begins welding when the torch trigger is pressed, and stops when released. 4t to begin welding press and release the torch trigger; to interrupt, you must press and release it again. 3L this process is active in synergic processes. Particularly recommended for welding aluminum. Three currents are available, which may be called up during welding using the torch start button. The currents and slope settings are as follows:

- **SC** starting current (Hot Start). May be adjusted from 1 to 200% of the welding current, a value adjusted using the knob L.
- **Slo** slope. Possible range from 1 to 10 seconds. Defines the interface time between the first current SC with the welding current and the second current with the third current CrC (crater filler current), a value adjusted using the knob L.
- **CrC** “Crater filler” current. May be adjusted from 1 to 200% of the welding current, a value adjusted using the knob L.

Welding begins when the torch button is pressed; the current called up will be the starting current SC. This current is maintained until the torch trigger is pressed; when the button is released the first current switches to the welding current, set with the knob I, and is maintained until the torch trigger is pressed again. The next time the torch trigger is pressed, the welding current switches to the third current CrC and remains active as long as the torch trigger is held down. Welding stops when the button is released.

In the TIG process 3L is different in the way in which the torch button is pressed. 
Welding starts when the welding button is pressed and immediately released, the recalled current will be the starting current SC.

This current is kept until the welding button is pressed and released; at this time the original current connects to the welding current, set by means of knob I. 
When the welding torch button is pressed and released again, the welding current connects to the third current CrC and is kept activated until the welding torch button is pressed and released again; now welding is interrupted.

This function is inhibited when the function 3L is active, and only works with synergic programs. 
Once the function enabled using the knob L, the operator may adjust the level of the starting current SC (Hot Start). It may be adjusted from 1 to 200% of the welding current, a value adjusted using the knob L. 
It can adjust the duration ScT of this current from 0.1 to 10 seconds.

The Slo time of switching between the SC current and the welding current may be adjusted from 0.1 to 10 seconds.

7. **SP** (spot-welding). 
This function is inhibited when the function 3L is active. 
Selecting the function SpT (spot-welding time) adjusts the spot welding time from 0.3 to 5 seconds. 
Activating the function int (interval time) adjusts the pause time between one spot-weld and another, and the
time ranges from 0.3 to 5 seconds.

8. **SLd (Slop Down).**
Possibility of adjusting from 0 to 10 seconds.
Defines the current slope down time from the welding value to the arc shutdown

9. **PrF (Pre-gas).** Active in all MIG and TIG processes.
The adjustment may range from 0 to 10 seconds.

10. **PoF (post-gas).** Active in all MIG and TIG processes.
The adjustment may range from 0 to 30 seconds.

11. **Acc (Soft Start).** Active in all MIG processes. The adjustment may range from 0 to 100%. It is the wire speed, expressed as a percentage of the speed set for the welding, before the wire touches the workpiece. This adjustment is important in order to always achieve good starts.
Manufacturer setting “Au” automatic.
The value can be changed using the knob L. If, once changed, you wish to return to the original settings, press the key E until the message “Au” reappears on the display N.

12. **BB (burn back).** Active in all MIG processes. The adjustment may range from 0 to 100%. Serves to adjust the length of the wire leaving the contact tip after welding.
The higher the number, the more the wire burns.
Manufacturer setting “Au” automatic.

13. **L (impedance).** Active in all MIG processes. The adjustment may range from -9.9 to +9.9. Zero is the manufacturer’s setting. If the number is negative the impedance falls and the arc becomes harder; if it increases the arc becomes softer.

14. **ITO (inching time out).** Active in all MIG processes.
The purpose is to stop the welding machine if the wire flows from the torch after starting with no passage of current.
The wire output from the torch is adjustable from 5 to 50 centimeters using the knob L. Once the function has been recalled it can be enabled (On) or off (Off).

15. **H2O (Cooling unit).** Active in all MIG and TIG processes. Turning the knob L selects the type of operation: **OFF** = off, **On C** = always on, **On A** = automatic start-up. When the machine starts, the unit is running. If the torch trigger is not pressed, it shuts off after 15 seconds.
When the torch button is pressed, the unit begins operating, and shuts off 3 minutes after the button itself is released.
If the coolant pressure is too low, the power source delivers no current and the display O will show the message “H2O,” flashing.

16. **Fac.** (factory). The purpose is to return the welding machine to the original settings provided by the manufacturer.

With the function selected, the display N shows, **noP** = returns the welding machine to the originally supplied settings without affecting the saved programs, **Prg** = deletes all saved programs, and **ALL** = returns the welding machine to its originally supplied settings.
To confirm the desired function simply press the button E for 5 seconds. The abbreviation shown on the display N will begin to flash, and after a few seconds a sound will confirm that it has been saved.

### 4 INSTALLATION

The welding machine must be installed by skilled personnel. All connections must be made in full compliance with current safety laws.

#### 4.1 PLACEMENT

The weight of the welding machine is 110 Kg, thus for lifting see Fig. 3

Position the equipment in an area that ensures good stability, efficient ventilation so as to prevent metal dust (i.e., from grinding) from entering.

#### 4.2 SETUP

Position the wire feeder on the power source.
Connect the wire feeder to the power source via the connection art. 1178 or 1178-20, using the plate provided to fasten it on the trolley shelf.
NOTE: avoid coiling the connection to reduce to a minimum the inductive effects that could affect the results in synergyc MIG/MAG welding.
Mount the plug on the power cord, being especially carefully to connect the yellow/green conductor to the earth pole.
Make sure that the supply voltage corresponds to the rated voltage of the welding machine.
Size the protective fuses based on the data listed on the
technical specifications plate.
Position the cylinder on the support **BY**, fasten it with the straps **BZ** and connect the gas hose to the pressure regulator output.
Assemble the torch.
Make sure that the groove of the rollers matches the wire diameter used. To replace (Fig. 4):

Open the door **BJ**, remove the cover **CA**, release the wire press rollers using the pressure setting knob **BN**, replace the rollers and remount the cover **CA**.
Mount the wire coil and slip the wire into the feeder and torch sheath.
Block the wire press rollers with the knob **BN** and adjust the pressure.
Turn on the machine.
Adjust the gas using the key **P**, then move the wire forward using the key **O**. The machine is supplied with the cooling unit set to OFF. If a water-cooled torch is used, set the operation of the cooling unit as described in paragraph 3.5.1 of the control panel manual.

5 WELDING

Synergic MIG Welding LED **G** lit.
Select the **JOB** number based on the wire diameter to be used, the type and quality of the material, and the type of gas, using the instructions inside the wire feeder trolley.
Adjust the functions in the submenu according to the instructions in the paragraph “**Service functions**".
The welding parameters may be adjusted using the knob **I**.
Conventional MIG welding LED **G** off.
Select the **JOB** number based on the wire diameter to be used, the type and quality of the material, and the type of gas, using the instructions inside the wire feeder trolley.
Adjust the functions in the submenu according to the instructions in the paragraph “**Service functions**".
Adjust the wire speed and the welding voltage, respectively, using the knobs **I** and **L**.

MMA Welding.
NOTE: the wire feeder must remain connected to the power source.
Select **MMA** mode in the service functions.
Connect the connectors of the electrode clamp cable and mass cable to the connectors **BR** and **BO**, observing the polarity required by the electrode manufacturer.

TIG Welding.
Select **TIG** process from the service functions.
Connect the earth cable to the positive pole **BR**.
Connect the power cable connector of the trolley/power source connection to the negative pole **BO** and to the trolley pole **BF**.
Connect **TIG** welding torch to adapter **BA**.
Connect the torch 19-pin connector to the socket **BB**.
Set the functions in the submenu according to the instructions under paragraph «**Service functions**». Adjust the welding current using the knob **I**.

6 ACCESSORIES

6.1 CONTROL BOX TO REGULATE CURRENT ART. 187 (POTENTIOMETER) + EXTENSION CORD (M5) ART. 1192 + ADAPTER CABLE ART. 1191

Possible settings in the various welding processes:
**MMA** Adjusts the current from the minimum (10A) to the current set with the knob **I** on the panel.
**TIG** The tray executes the same function as **MMA**.

6.2 MIG TORCH ART 1241 AND 1243
MIG Torch type CEBORA PW 380 and PW 500 water-cooled 3.5 m

6.3 MIG TORCH ART. 1245 (with dual U/D command)
MIG Torch type CEBORA PW 500 U/D water-cooled 3.5 m
The left U/D command:
· in synergic programs, adjusts the welding parameters along the synergic curve.
· in conventional MIG, adjusts the wire speed.
· within saved programs, selects them numerically.
The right U/D command:
· in synergic programs, adjusts the arc length.
· in conventional MIG, adjusts the voltage
· not active within saved programs

6.4 Kit for welding with push-pull torches (Art. 126).
Installing this optional board makes it possible to use the water-cooled push-pull torch art. 2009.

7 MAINTENANCE

Periodically make sure that the welding machine and all connections are in good condition to ensure operator safety.
After making a repair, be careful to arrange the wiring in such a way that there the parts connected to the power supply are safely insulated from the parts connected to the welding circuit.
Do not allow wires to come into contact with moving parts or those that heat up during operation. Mount the clamps as on the original machine to prevent, if a conductor accidentally breaks or becomes disconnected, a connection from occurring between power supply and the welding circuits.