

INSTRUCTION MANUAL FOR STICK WELDING MACHINE

IMPORTANT SAFETY INFORMATION!!!

READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE INSTALLATION, USE, OR SERVICING OF THIS UNIT. PAY CLOSE ATTENTION TO THE SAFETY RULES AND CONTACT YOUR DISTRIBUTOR IF YOU DO NOT UNDERSTAND SOME OR ALL OF THE POINTS COVERED IN THESE INSTRUCTIONS.

1 SAFETY RULES CONCERNING THE USE OF THIS WELDING MACHINE

1.1 INTRODUCTION

All people authorized to use this machine should read the following instructions manual before using or servicing this unit.

A REMINDER: YOUR SAFETY DEPENDS ON YOU!!!

Always follow all safety regulations and instructions when using this machine. It is your responsibility to protect yourself and others against the risks related to the operation of this welding machine. The operator must be familiar with and observe all the safety rules regarding the safe operation and maintenance of this welding machine.

NOTHING REPLACES GOOD COMMON SENSE !!!

1.2 GENERAL PRECAUTIONS

1.2.1 Fire



- Avoid causing fires due to sparks, slag, hot metal and spatter which are produced during normal welding operations.
- Make sure that a suitable fire-extinguisher is located near the welding sight.
- Remove all flammable material within 30 feet of the welding area.
- Do not weld containers (tanks or drums) containing flammable material, even when empty. These must be carefully cleaned before being welded.
- Allow the welded metal to cool down before touching it or putting it into contact with flammable material.
- Do not weld structures with hollow spaces containing flammable substances.
- Do not work in conditions where there are high concentrations of combustible vapours, gases, or flammable dust.
- Always check the work area half an hour after welding so as to make sure that no fire has started.
- Do not keep any flammable material such as lighters or matches in your pockets while using this equipment.
- The welding cables must not be used for current loads which exceed their rated capacity. If the cables draw current in excess of the rated capacity, overheating can occur which will cause the rapid deterioration of the insulation which covers the cables.
- Always weld with are adequately insulated.
- The connections between cables must be well tightened and properly insulated.
- Frequently inspect the cables and repair any cuts or tears that might be found.
- Keep all connections well tightened.

1.2.2 Burns

- Protect your entire body by wearing fire-proof clothing. This will protect your skin against burns caused by: ultra-violet radiation given off by the arc, sparks and molten slag.
- The protective clothing should include: gloves, a hat, and high shoes. Your shirt collar and pocket flaps should be buttoned, and cuff-less trousers should be worn to prevent contact with sparks and molten slag.
- Wear a helmet equipped with the appropriate lens shade and a clear glass cover plate. This is imperative when welding, cutting, and chipping to protect your eyes from ultra-violet arc rays and molten spatter. Replace the glass cover plate when cracked or covered with spatter etc.
- Do not wear clothing spotted with oil or grease as a spark may set them on fire.
- Hot metal, electrode stubs and workpieces, should never be handled without gloves.
- First-aid equipment and a qualified first-aid person should always be available when welding, unless medical facilities are in the immediate vicinity, to treat flash burns of the eyes and skin burns.
- Ear plugs should be worn when working in the overhead position or in confined spaces. A hard hat should be worn when others are working overhead.
- Flammable hair sprays and gels should not be used by those persons intending to weld.

1.2.3 Fumes



- Welding operations produce harmful fumes and metal dusts which may be hazardous to your health, therefore:
- Work in well-ventilated areas.
 - Keep your head out of the fumes.
 - In closed areas, use a fume exhaust system, preferably placed under the welding area if possible.
 - If ventilation is inadequate, use an approved respirator set.
 - Clean the metal to be welded of any solvents or halogen degreasers which give rise to toxic gases. During some welding operations chlorine solvents may be decomposed by arc radiation thus creating phosgene gas.
 - Do not weld coated metals or those containing lead, graphite, cadmium, zinc, chrome, quicksilver, or mercury unless you have an approved respirator set.
 - The electric arc creates ozone. Long exposures to high ozone concentrations may cause headaches; nasal, throat and eye irritation; as well as congestion and chest pains. **WARNING: NEVER USE OXYGEN FOR VENTILATION.**
 - Gas leaks in confined spaces should be avoided. Leaked gas in large quantities can dangerously alter oxygen levels in the air surrounding the weld sight. Do not place gas cylinders in confined spaces.
 - **DO NOT WELD** where solvent vapors can be drawn into the welding shield atmosphere or where arc rays can come into contact with even minute quantities of trichloroethylene or perchloroethylene.

1.2.4 Explosions



- Do not weld above or near containers under pressure.
- Do not weld in environments containing

explosive dusts, gases or vapours.

- This welding machine when used for TIG welding uses ARGON gas to shield the arc. Special precautions must be taken when transporting, handling, and connecting gas cylinders.

A) GAS CYLINDERS

- NEVER DEFACE or alter the name, number, or other markings on a cylinder. It is illegal and dangerous!
- Do not use cylinders whose contents are not clearly identified.
- Do not directly connect cylinder to the unit without using a pressure regulator.
- Handle and use pressure cylinders with care and in conformity with existing safety standards.
- Do not use leaking or damaged cylinders.
- Do not use cylinders which are not well secured.
- Do not transport or move cylinders without the protection of the installed valve and protective valve cap.
- Do not lift cylinders off the ground by: their valves or caps, by chains, by slings, or by magnets.
- Never try to mix gases in a cylinder.
- Never refill a cylinder!
- Never lubricate the cylinder valve with oil or grease.
- Never allow an electrode to touch a cylinder!
- Do not expose cylinders to excessive heat, sparks, molten slag or flames.
- Do not tamper with the cylinder valve.
- Do not try to loosen tight valves by means of a hammer, a wrench, or any other object.

B) PRESSURE REGULATORS

- Keep pressure regulators in good condition. Damaged regulators may cause damages or accidents. They should be repaired by skilled personnel only.
- Do not use regulators for gases other than those for which they were manufactured.
- Never use a leaking or damaged regulator.
- Never lubricate regulators with oil or grease.

C) HOSES

- Replace hoses which appear to be damaged.
- Keep hoses unwound in order to prevent kinks.
- Keep the excess hose neatly wound and out of the working area in order to avoid damage.
- Cylinder fittings should never be modified or exchanged.

1.2.5 Radiation



Ultra-violet radiation emitted by arc rays may damage your eyes and burn you skin. Therefore:

- Wear proper clothing and helmet.
- **Do not use contact lenses!!** The intense heat created by the arc may cause them to stick to the cornea.
- Use a mask or helmet equipped with lens shades that have a minimum DIN rating of 10
- Warn people in the area surrounding the welding sight that you are going to be welding.

Remember: the arc may dazzle or damage the eyes. It is considered dangerous up to a distance of 15 meters (50 feet). Never look at an arc with the naked eye.

- Prepare the welding area so as to reduce the reflection

and transmission of ultra-violet radiation: paint walls and exposed surfaces in black to reduce reflection, install shielding systems or curtains to reduce the transmission of ultra-violet rays.

- Replace protective lenses whenever damaged or broken.

1.2.6 Electric shock



Electric shocks are hazardous and potentially fatal!!!

- Do not touch live electrical parts.
- Insulate yourself from the workpiece and the ground by wearing insulated gloves and clothing.
- Keep garments (gloves, shoes, hats, clothing) and body dry.
- Do not work in humid or wet areas.
- If you are welding near a body of water take precautions to ensure that the machine cannot fall into the water.
- Avoid touching or holding the workpiece by hand.
- Should you work in a dangerous area or close to one, use all possible precautions.
- Stop welding immediately if you should feel even the slightest sensation of electric shock. Do not use the machine until the problem is identified and corrected.
- Often inspect the mains input cable.
- Disconnect the power input cable from the mains supply before replacing cables or before removing the unit covers.
- Do not use the unit without protection covers.
- Always replace any damaged parts with GENUINECEBORA SPARE PARTS.
- Never disconnect any of the unit's safety devices.
- Make sure that the mains power supply line is equipped with a good electrical ground.
- Make sure that the workbench and the workpiece are connected to a good electrical ground.
- Servicing of the machine must be done by qualified personnel who aware of the risks involved with the high voltage levels necessary to make the machine operate.

1.2.7 Pacemaker

Magnetic fields created by the high currents in the weld circuit can affect pacemaker operation. Persons wearing electronic life support equipment (pacemakers) should consult their doctor before going near any arc welding, gouging, cutting, or spot welding equipment in operation.

1.2.8 Noise



The noise emitted by the arc may damage your hearing. Always wear muffs.

2 GENERAL INFORMATION

This manual has been prepared with the intent of instructing the operator on how to install, operate, and properly maintain this electric arc welding machine. This machine is a constant current power source which can weld coated electrodes and scratch start TIG weld. Upon receiving and unpacking the machine, make a careful inspection to ensure that there are no damaged parts. Should there be a claim for losses or damages it must be made by the purchaser directly to the shipper who handled the goods.


When requesting information about this welding machine

please state the machine's part number and serial number to ensure receiving accurate information relating to your machine.


2.1 DESCRIPTION OF TECHNICAL SPECIFICATIONS


IEC 974.1 This machine is manufactured according to these EN 60974.1 international standards.

N° Machine Serial Number which must appear on requests or inquiries relating to the machine.

3~  Three-phase transformer-rectifier.

 Drooping characteristic.

 Shielded Metal Arc Welding. (Stick Welding)

 TIG (Tungsten Inert Gas) welding.

U₀ Secondary no-load voltage.

X Duty-Cycle Percentage.
The duty-cycle is the number of minutes, expressed as a percentage, the machine can operate (arc on) within a ten minute period without overheating. The duty cycle varies according to the output current.

I₂ Output welding current.

U₂ Secondary voltage, welding current = I₂.


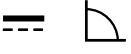
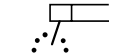
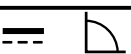

U₁ Nominal supply voltage.

3~ 50/60Hz Three-phase input supply at 50 or 60 Hz.

I₁ Input Amps absorbed corresponding to different output levels (I₂).

IP21 Machine case protection class.
The 1 in the singles digit place means that this unit is not fit to work outdoors in the rain.

 Fit to work in hazardous areas.

		N°				
		EN 60 974-1				
	U ₀	V	- / - - - / -			
			X	-	-	-
			I ₂	-	-	-
	U ₀	V	- / - - - / -			
			X	-	-	-
			I ₂	-	-	-
	U ₁	V	- / - - - / -			
			X	-	-	-
			I ₂	-	-	-
3~ 50/60 Hz	I ₁	V	I ₁	I ₁	I ₁	
			-	-	-	
I. Cl.	H	-	-	-	-	
PROTEZIONE TERMICA THERMAL PROTECTION PROTECTION THERMIQUE TERMISCH GESCHÜTZ PROTECCION TERMICA		IP 21 		VENTILAZIONE FORZATA FORCED VENTILATION VENTILE KÜHLART F VENTILACION		
MADE IN ITALY						

NOTE: This machine has also been designed to work in class 3 pollution areas (see IEC 664).

3 INSTALLATION

3.1 SETUP

Place the machine in a ventilated area.

Dust, dirt, or any other foreign material that might enter the machine may restrict the ventilation which could affect the machine's performance. Keep the machine as clean as possible.

3.2 INPUT CONNECTIONS



WARNING!!

ELECTRIC SHOCK CAN KILL

- This machine must be installed by skilled personnel.
- Make sure the input power plug has been disconnected before inspecting, repairing, or servicing the machine.
- Connect the yellow-green wire to a good electrical ground.
- Never use water pipes as ground conductors.
- **After the final inspection, the machine is connected to the input supply voltage marked on the input power cord.**

• **If you wish to change the input supply voltage, remove the upper cover of the machine and locate the voltage-changing terminal board. Arrange the connections according to your needs, following the diagram which appears next to the voltage changing board.**

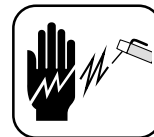
- After having changed the supply voltage, replace the upper cover.

This machine must never be used without the top and side covers. This is both for obvious safety reasons and to avoid interference with the machine's internal cooling system. The warranty is to be considered null and void if this machine is used without the protection of its top and side covers.

- Mount a plug on the power supply cable that corresponds to the input power drawn by the machine.

3.3 OUTPUT CONNECTIONS

3.3.1. Connecting the electrode holder.



WARNING!!

ELECTRIC SHOCK CAN KILL

- Do not touch uninsulated electric parts.
- Do not touch the electrode either with your hands, skin, or greasy clothes.
- Insulate yourselves from the workpiece or the ground.
- The electrode holder must be connected to the machine in compliance with the polarity indicated on the box of electrodes that you are going to use. When you connect the electrode holder cable and the ground cable, make sure that the power cable terminals are well tightened.
- The jaws of the electrode holder must be kept tightened and the surfaces must be kept in good condition to ensure good contact with the electrode rod.
- Defective jaws will allow the electrodes to move which will

make welding difficult.

- The connection between the electrode holder cable and the electrode holder must be well tightened.
- Use well insulated electrode holders.
- Never touch the electrode holders of two different welding machines at the same time.
- Always avoid contact between parts of the body and the electrode holder and/or the electrode.

3.3.2 Connecting the Ground Clamp

- Make sure that the ground clamp makes good contact with the workpiece.
- Check that the ground cable is tightly fitted to the ground clamp; periodically check to make sure that this connection remains well tightened.

A poorly tightened connection can cause current drops during welding and also cause overheating of the ground clamp and cable which can create the danger of burns.

- The weld circuit must not be purposefully placed in direct or indirect contact with the protection lead if not in the workpiece.
- If the workpiece is intentionally connected to the ground by means of a protection lead, the connection has to be as direct as possible and done with a lead that has a cross section at least equal to that of the welding current return cable. The lead must also be connected to the workpiece at the same point as the return cable. A second ground clamp, placed in the immediate vicinity, can also be used.

3.3.3 Choosing the right welding cables

- It is recommended that the shortest possible welding cables of the proper cross section be used for the current loads that will run through them. (see Table)
- Too much resistance in the welding cables can reduce the output available for the welding.
- The performance of any arc welding machine depends, generally, on the condition of the cables and the cable connections.

CROSS SECTIONS OF WELDING CABLES MEASURED IN mm²

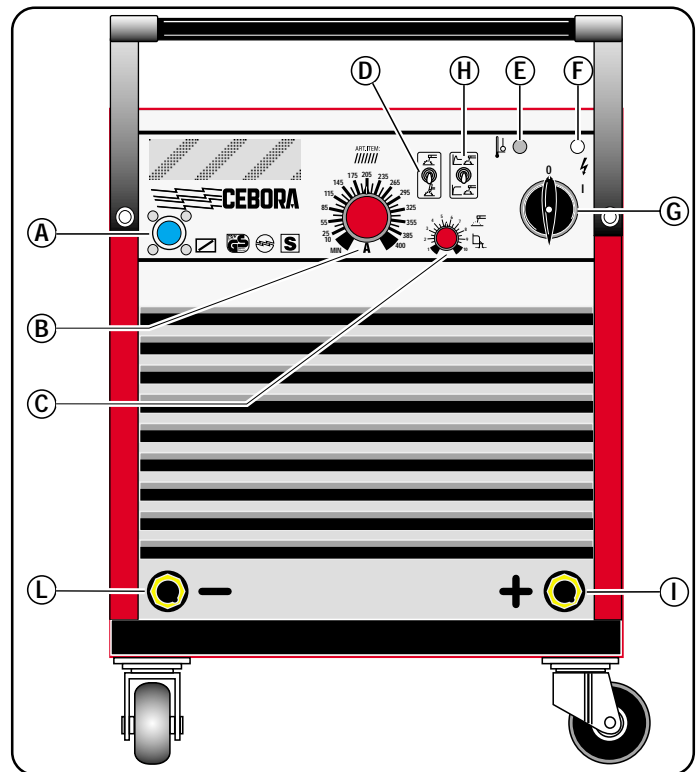
WELDING CURRENT IN AMPERES	DISTANCE FROM THE MACHINE IN METRES						
	15	20	30	40	45	50	60
100	35	35	35	35	50	50	50
150	35	35	50	50	70	70	90
200	35	50	50	70	70	95	100
250	35	50	70	70	95	100	150
300	50	70	70	95	100	150	150
350	50	70	95	100	150	150	200
400	50	95	95	150	150	200	210

NOTE: The cross sections listed in the table are those for each single conductor (electrode holder or ground clamp). The cross sections of the cables can be obtained by connecting in parallel 2 or 3 conductors having the same cross section. For example:
 150 mm²= three 50 mm² cables linked together in parallel.
 200 mm²= 2x95 mm² cables or 3x70 mm² cables linked together in parallel.

3.3.4 Connecting two welding machines in parallel.

- Two welding machines can be connected in parallel so that one obtains an output current greater than the output current of each single machine.
- It is important that the positive pole of one machine is connected to the positive pole of the other machine and likewise that the negative pole of one machine is connected to the negative pole of the other machine.
- When making this connections it is important to abide by the cross sections shown in the table. After having connected two machines in parallel, set the output current potentiometer of each machine to the halfway point so that each machine will produce half of its maximum output current. This is recommended in order to balance the heat produced by each machine, thus allowing the operator to make the best use of the duty cycles of both machines.

4 FRONT PANEL DESCRIPTION.



A - Socket for remote controls.

When a remote control is plugged into this socket, the machine's output can be adjusted by the potentiometer on the remote control. The remote control circuit has been constructed in such a way that the output current set by means of the current potentiometer B, on the machine, determines the maximum current adjustable by means of the remote control. Thus, if the current adjustment knob on

the machine's front panel is set at 235 amperes, then using a remote control you will be able to adjust the current from the minimum up to 235 amperes. If you want to use the full current range then set the current adjustment knob, on the machine, to maximum power:

B - Weld current adjustment potentiometer.

C - Arc- Force

This feature allows you to adjust the dynamic characteristics of the power source. The Arc - Force is the force which is exerted on the drop of molten metal which is transferred from the tip of the electrode to the workpiece. You can adjust this transfer force during welding to suit your individual situation: position-flat, vertical, etc.; diameter of the electrodes being welded; and the current level being used to weld. If the amount of Arc-Force is increased, electrodes sticking to the workpiece can be avoided, especially in critical situations like first pass, root welds at low current levels.

D - Process selector: TIG/MMA (coated electrodes)

When this switch is positioned on TIG, the Arc-Force and Anti-Stick functions are automatically shut out. When this switch is positioned on MMA (coated electrodes) the Arc-Force and Anti-Stick functions are automatically activated.

E - Yellow thermostat light.

This light comes on when the thermostat trips (the machine shuts down).

F - On light (transparent)

This light comes on when the machine is in operation.

G - On/Off switch.

H - Hot start

Hot start is a surge of current that can be activated (position 1) to facilitate arc starting. It can also be used to facilitate starting a TIG arc at low current levels.

NOTE: it is recommended that this feature be shut out (position 0) when welding thin plates with small diameter electrodes (for example, 1mm plate with \varnothing 1.5mm stainless steel electrodes).

I - Positive terminal.

L - Negative terminal.

Note: The Anti-Stick feature which has been mentioned in this manual is a control circuit which cuts in when there is a short circuit of more than 1second at the power source's output terminals. An electrode sticking to the workpiece constitutes an example of such a short circuit. The Anti-Stick circuit immediately reduces the current level to 10 amperes so that the electrode can be released from the workpiece without overloading the power source.

Should the electrode holder inadvertently come into contact with the workpiece, the welding machine has a built in self-protection device which reduces the current level to the minimum to avoid overheating.

5 MAINTENANCE

WARNING:

ALL SERVICING AND REPAIR MUST BE DONE BY QUALIFIED PERSONNEL.

- Before opening the machine case to service or repair, turn the machine off and disconnect the plug from the power supply.
- Keep the welding cables, the electrode holder, and the ground clamp in good condition.
- Periodically clean inside the machine blowing dust and dirt away from internal components with a light jet of dry air.

6 TROUBLESHOOTING

1- TROUBLE- The machine does not turn on

- CAUSES
- Input power cord not plugged in.
 - One power supply phase missing.

2- TROUBLE- The machine switches on but does not supply current

- CAUSES
- Welding accessories not connected.
 - Weld current adjustment potentiometer defective.
 - Machine not connected to the right supply voltage.
 - Thermostat tripped, yellow light on front panel lit up.
 - Remote control accessory plugged into socket **A** and the potentiometer is set to the minimum output level.
 - In MMA (coated electrodes) a lead has come loose from either the positive or the negative terminal inside the machine.

3- TROUBLE-The line fuse blows.

- CAUSES
- Installed line power insufficient.
 - Machine not connected to the right supply voltage.
 - Power transformer in short circuit.
 - S.C.R. diodes in short circuit.

4- TROUBLE-Welding current unstable or incorrect.

- CAUSES
- Primary or secondary connections incorrectly fitted.
 - Inadequate electrode.
 - Incorrect polarity.
 - Welding cables not properly tightened to the output terminals or false contacts in connections.
 - Incorrect use of a remote control current adjustment unit.
 - Machine not connected to the right supply voltage.

5- TROUBLE-The fan does not work but the output welding current is correct.

- CAUSES
- Defective fan motor.
 - Interruption in the leads that supply power to the fan motor.
 - Fan motor fuse blown.