

# Instructions and user manual

# SL210



# ALNOVA®

**ANOVA** wishes to congratulate you for choosing one of our products and guarantees the assistance and cooperation that has always distinguished our brand over time.

This machine is designed to last for many years and to be of great use if used in accordance with the instructions contained in the user manual. We therefore recommend that you read this instruction manual carefully and follow all our recommendations.

For more information or doubts, you can contact us through our web supports such as [www.Anovamaquinaria.com](http://www.Anovamaquinaria.com).

## **INFORMATION ABOUT THIS MANUAL**

Pay attention to the information provided in this manual and on the machine for your safety and that of others.

- This manual contains instructions for use and maintenance.
- Take this manual with you when you go to work with the machine.
- The contents are correct at the time of printing.
- The rights to make changes at any time are reserved without affecting our legal responsibilities.
- This manual is considered an integral part of the product and must remain with it in case of loan or resale.
- Ask your dealer for a new manual in case of loss or damage.

## **READ THIS MANUAL CAREFULLY BEFORE USING THE MACHINE**

To ensure that your machine provides the best results, please read the usage and safety regulations carefully before using it.

## **OTHER WARNINGS:**

Incorrect use could cause damage to the machine or other objects.

The adaptation of the machine to new technical requirements could cause differences between the content of this manual and the purchased product.

Read and follow all instructions in this manual. Failure to follow these instructions could result in serious personal injury.

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***ALNOVA***<sup>®</sup>

# 1. IMPORTANT SAFETY SYMBOLS AND INDICATIONS

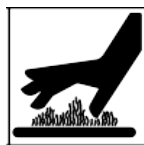
See the related symbols and instructions below for actions to avoid hazards.



Caveat! Watch out! There are potential dangers with this procedure! Possible hazards are shown in the adjacent symbols.



Special security message.



This group of symbols means Warning! Watch out! Potential ELECTRICAL SHOCK, MOVING PARTS, and HOT PARTS hazards.

The symbols shown below are used in this manual to draw attention to and identify potential hazards. When you see the symbol, be careful and follow the related instructions to avoid the danger. Read and follow all safety regulations. Only qualified persons should install, use, service, and repair this unit. During operation, keep all bystanders, especially children, away from the machine's area of use.



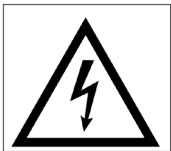
Electrical shock can cause serious injury and even death.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Keep away from metal work and ground using dry insulating mats or covers large enough to prevent any physical contact with metal or ground.
- Do not use the power outlet in wet areas, if your ability to move is reduced, or if there is a danger of falling.
- Use the AC outlet ONLY for the welding process.
- If an AC outlet is required, use the remote output control if present on unit.
- Disconnect input power or stop motor before installing or servicing this equipment. Lockout/Tagout power input per OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment in accordance with national, state, and local codes and standards.
- Always verify supply grounding: Check and make sure the ground wire of the input power cord is properly connected to the ground terminal in the disconnect box or that the cord plug is connected to a properly grounded outlet.
- When making input connections, connect the proper grounding conductor first - check connections .
- Frequently inspect the input power cable for damage or bare wiring; replace it immediately if it is damaged; bare wiring can kill.



Touching live electrical parts can cause fatal shock or severe burns. The electrode and work circuit are electrically active when the power output is on. The input power circuit and the internal circuits of the machine are also active when the unit is turned on. In semi-automatic or automatic wire welding, the cable, wire spool, drive roll housing, and all metal parts that touch the welding cable are electrically live. Improperly installed or poorly grounded equipment is a very serious hazard.

- Turn off all equipment when not in use.
- Do not use frayed, damaged, undersized, or poorly spliced cables.
- Do not place cables across your body.
- If workpiece grounding is required, ground it directly with a separate cable; do not use work clamp or work cable.
- Do not touch electrode if it is in contact with work, ground, or another electrode from a different machine.
- Use only equipment that is well maintained and in good repair. Repair or replace damaged parts at once. Maintain the unit in accordance with the manual.
- Use a safety harness if working on higher levels or at risk of falling.
- Keep all protective panels and covers on the machine in place.
- Fasten the work cable with a good metal-to-metal contact with the workpiece or worktable as close as possible to the weld.



**SIGNIFICANT DC VOLTAGE** exists after removal of input power to the inverters. • Shut down the inverter, disconnect input power, and discharge input capacitors before touching any part with machine elements.



**FUMES AND GASES** can be dangerous to your health. Welding produces fumes and gases. Breathing these fumes and gases can be dangerous to your health.

- Keep your head out of the fumes. Do not breathe welding fumes.
- If indoors, ventilate area and/or use gas exhaust to remove welding fumes and gases.

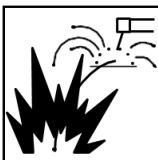
If ventilation is poor, use supplied respirator • Read Material Safety Data Sheets (MSDS) and manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers. • Work in a confined space only if it is well ventilated or if you wear a respirator with air supply. Always have a trained spotter nearby. Welding fumes and gases can displace air and lower the oxygen level and cause injury or death. Make sure breathing air is safe. • Do not weld near degreasing operations, cleaning or spraying. Heat and rays from the welding arc can react with vapors to form highly toxic and irritating gases.



- Do not weld coated metals, such as galvanized steel, lead or cadmium, unless the coating is removed from the welding area, the area is well ventilated and, if necessary, with a supplied air respirator. Coatings and any metal containing these elements can give off toxic fumes if they are welded.



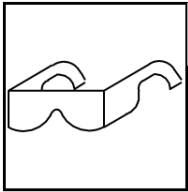
Rays from the welding arc can burn eyes and skin. Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly from the weld. • Wear a welding helmet equipped with a suitable shade filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in the Safety Standards). • Wear approved safety glasses with side shields under your hard hat. • Use protective shields or barriers to protect others from flash and glare; Warn others not to look directly at the welding arc. • Wear protective clothing made of durable, flame-resistant material (leather and wool) and foot protection.



Welding can cause fires or explosions. Welding on closed containers, such as tanks, drums, or pipes, can cause them to burst. Sparks can fly from the welding arc. Emitted sparks, hot workpiece, and hot equipment can cause fires

and burns. Accidental contact of the electrode with metallic objects can cause sparks, explosions, overheating or fire. Check and make sure area is safe before doing any welding. • Protect yourself and others from sparks and hot metal. • Do not weld where emitted sparks may strike flammable material. • Remove all flammable materials to within 35 feet (10.7 m) from the welding arc. If this is not possible, cover them well with approved covers.

- Connect the work cable to the metal to be welded as close to the welding area as possible to prevent welding current from traveling long, possibly unknown paths and causing electrical shock and fire hazards.
- Do not use welder to defrost frozen pipes.
- Remove stick electrode from holder or cut welding wire at contact tip when not in use.
- Wear oil-free protective clothing such as leather gloves, heavy shirt, uncuffed pants, high-heeled shoes and a hat.
- Remove any fuel, such as a butane lighter or matches, from the work area before doing any welding.



Flying metal can injure your eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and metal to be thrown from the work area. As welds cool, they can flake off as slag.
- Wear approved safety glasses with side shields even under your welding helmet.



Gas emission can injure or kill you.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use an approved supplied-air respirator.



HOT PARTS can cause severe burns.

- Do not touch hot parts with bare hands.
- Allow a cooling period before working with the welding gun or on the work material again.

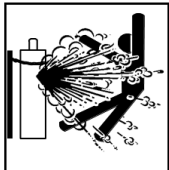


Magnetic fields can affect pacemakers.

- Pacemaker users should stay away from the welding work area.
- Users should consult their physician before approaching arc welding, gouging, or spot welding operations.



- Noise can damage hearing.
- Noise from some processes or equipment can damage hearing.
- Wear approved hearing protection if noise level is high.



Cylinders may explode if damaged.

Welding gas cylinders contain high pressure gas. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process when cutting material, be sure to treat them with care.

- Protect compressed gas cylinders from excessive heat, mechanical shock, slag, open flame, sparks, and arcs.
- Mount cylinders upright by securing them to a stationary stand or cylinder stand to prevent falling or tipping over.
- Keep cylinders away from any welding or other electrical circuits.

- Never place a welding torch on a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – an explosion will occur.
- Use only gas cylinders, regulators, hoses and accessories. correct protective gear designed for the specific application; keep associated parts in good repair.
- When opening cylinder valve, turn valve outlet face.
- Keep protective cap in place over valve except when cylinder is in use or connected for use .
- Read and follow the instructions for compressed gas cylinders, associated equipment, and CGA publication P-1 in the Safety Regulations.



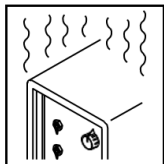
Fire or explosion hazard.

- Do not install or place the unit on, on or near combustable surfaces.
- Do not install the unit near flammable products.
- Do not overload building wiring or power outlets; Make sure the electrical power system is adequately sized, rated, and protected to handle this unit.



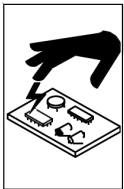
Avoid working in unsafe positions or in danger of falling.

- Use machine lift bail to lift unit only, NOT undercarriage, gas cylinders, or any other attachments.
- Use equipment of adequate capacity to lift and support unit.
- If using forklifts to move unit, make sure they are long enough to extend beyond the opposite side of the unit.



Excessive use of the unit may cause excessive heat.

- Allow a cool down period; follow rated duty cycle of machine.
- Reduce current or reduce duty cycle before starting welding again.
- Do not block or filter airflow to unit.



static current(ESD) can damage PC boards.

- Put on a grounded wrist strap BEFORE handling boards or parts.
- Use static-proof bags and boxes suitable for storing, moving, or shipping PC boards when handling the machine.



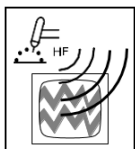
The welding electrode can cause injury.

- Do not press the weld trigger until instructed to do so or in the proper situation.
- Do not point the electrode at any part of the body or at other people.



Moving parts can cause injury.

- Stay away from moving parts such as fans.
- Keep all machine doors, panels, covers, and guards in place.



HF RADIATION may cause interference.

- High frequency (HF) can interfere with radio navigation, security services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform installation.
- User is responsible for having a a qualified electrician promptly correct any interference problems resulting from the installation.
- If you are notified of interference by the FCC, stop using the equipment immediately.
- Have the installation checked and maintained regularly.
- Maintain doors and windows well-enclosed high-frequency source panels, keep spark gaps in the correct

position, and use grounding and shielding to minimize the possibility of interference.



Arc welding can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment, such as computers and computer-operated equipment such as robots.
- Make sure all equipment in the welding area is electromagnetically compatible.
- To reduce potential interference, keep welding cables as short as possible, close together and low, such as on the floor.
- Locate the welding operation 100 meters from any sensitive electronic equipment.
- Make sure this welding machine is installed and grounded in accordance with this manual.
- If interference still occurs, the user must take additional measures, such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

## 2. GENERIC PRECAUTIONS

Welding is a fabrication or sculpting process that joins materials, usually metals or thermoplastics, by using high heat to melt the parts and allowing them to cool causing fusion. Arc welding uses an electric arc to melt the work materials as well as the filler material (sometimes called the welding rod) to weld joints. Arc welding involves connecting a work lead to the welding material or other metal surface. Another wire known as electrode wire is placed over the material to be welded. Once the wire moves away from the material, an electrical arc is generated. The arc then melts the workpieces together with filler material that helps bind the pieces together.

It should also be noted that in addition to proper electrode size selection, it is very important to keep the welding cable and cable connections in good condition. Cracks, cuts, worn spots, etc. in the welding cable can reduce its current-carrying capacity and create dangerous spots. In addition, worn or frayed cable connections to the work clamp, lugs, or twist-lock connectors can also decrease current-carrying capacity and create hot spots. All worn, frayed and damaged sections must be repaired immediately for proper operation and to minimize any potential safety hazards.

This ANOVA inverter welding machine adopts advanced IGBT bridge technology. The presence of inverter type arc welding equipment benefits from the emergence of inverter power supply theory and device. Inverter arc welding power supply uses IGBT large power device, converting 50Hz frequency into rectified return, output large power DC source through pulse width modulation (PWM), the weight and volume of the main transformer are greatly decreased. The efficiency is thus increased by more than 30%.

This machine can weld the following types of metals:

metal type

Cast iron  
Stainless steel  
Carbon steel

Electrodes type

Basic electrode  
Stainless steel electrode  
Rutile electrode

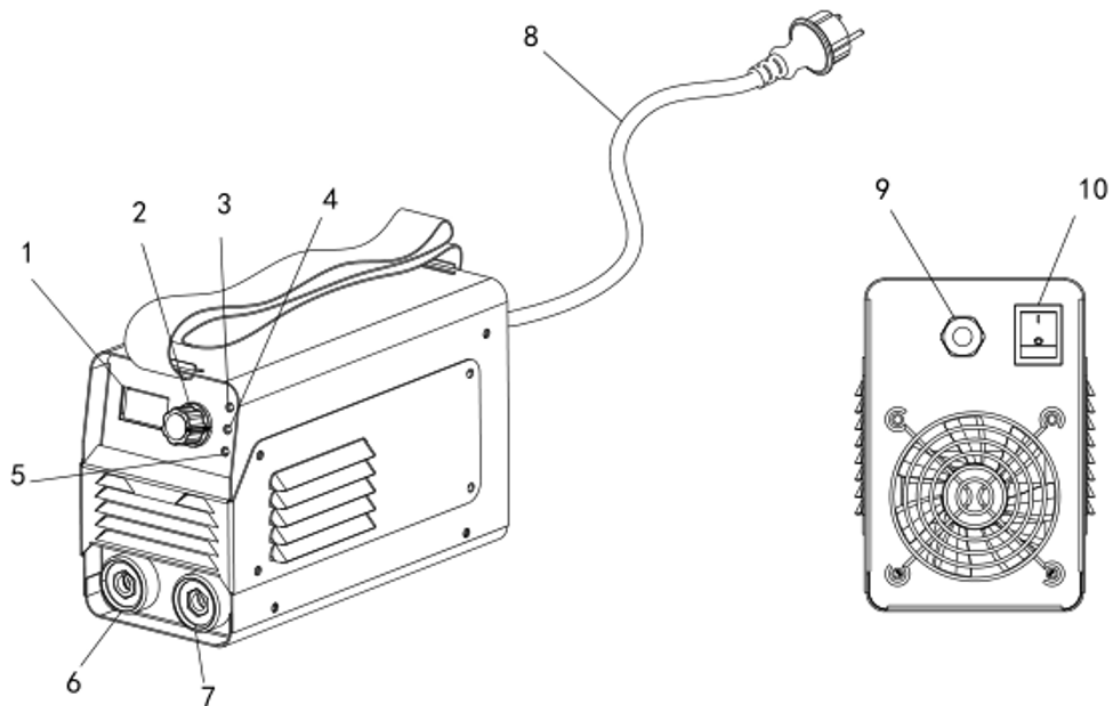
Before using the equipment, always make sure that it has not been damaged during



transportation.

Place the unit on a clean, solid, horizontal surface. Protect it from rain and bad weather. Make sure that the ventilation air circulates freely.

### 3. IDENTIFICATION OF PARTIES



1. Digital display  
2. Current adjustment button  
3. Power Indicator  
4. Protection indicator  
5. Fault protection  
6. (-) Quick plug connector: welding machine outlet (-)  
7. (+)

Quick connector connector: welding machine output (+)  
8. Power plug  
9. Electrical cable anchorage  
10. Switch on and off

#### Controls and operating features

machine start

When the machine is powered on, a self-test runs; during this test all LEDs and display show "888"; After a few seconds, the LEDs and the screen turn off. Only the on/off LED lights up.

- The machine is ready to operate when the power LED on the front control panel illuminates with one of the four weld mode command LEDs.

#### Front panel controls

- Output current control: potentiometer used to adjust the output current used during welding.

- On/Off LED: this LED lights up when the machine is on. If it blinks, this LED indicates that

an Input Voltage Range protection is activated; The machine automatically restarts when the input voltage returns to the correct range. If the Machine does not restart automatically, an Internal Auxiliary Voltage condition may exist: the machine must be powered off and on again to restart.

Note: The fan might turn off automatically if the error condition persists for more than 2 seconds.

- Temperature LED: this indicator will light up when the machine is overheated and the output has been deactivated. This normally occurs when the duty cycle of the machine has been exceeded. Leave the machine on to allow the internal components to cool down. When the indicator turns off, you can use the machine again.

- Quality Control LED: This indicator lights up when the machine is overheated or overloaded.

- Digital display: the meter shows the preset welding current before welding and the actual welding current during welding.

Other controls and features

- Power Switch - Turns on/off the input power to the machine.
- Input cable: Connect it to the electrical network.
- Fan: this machine has a FAN Circuit (fan as needed) inside; the fan turns on or off automatically. This function reduces the amount of dirt that can accumulate inside the machine and reduces energy consumption. When the machine is turned on, the fan turns on. The fan will continue to run as long as the machine is welding. If the machine does not weld for more than five minutes, the fan will turn off.
- Shoulder belt: For easy transport.

**4. TECHNICAL DATA**

MODEL	<b>SL210</b>
RATED INPUT VOLTAGE	1 PHASE – 230V AC ± 15%
POWER FACTOR	0.7
EFFICIENCY	80%

Model	<b>SL210</b>		NO.	
20A/20.8V – 210A/18.4V				
	$U_1=65V$	X	60%	100%
		I2	160A	124A
		U2	26.4V	25V
		I2(SUPER)	210A	162.8A
		U2(SUPER)	18.4V	26.5V
	U1 ~220V	$I_{max}=30.1A$	$I_{eff}=23.3A$	
IP21	F	Fan Cool		

## GRAPHIC SYMBOLS AND INDICATIONS

**U1**: Nominal AV input voltage ( tolerance  $\pm 10\%$ )

**I1max**: maximum rated input current

**I1eff**: Maximum effective input current

**X**: work cycle

Ratio between given duration time / full cycle time Note 1: This ratio must be within 0 ~ 1, and can be indicated by percentage. Note 2: In this standard, the full cycle time is 10 minutes. For example, if the duty cycle is 60%, the load application time will be 6min and the next no-load time will be 4min.

**U0**: no-load voltage Secondary winding voltage open circuit.

**U2**: load voltage Rated load output voltage:  $U2 = (20 + 0.04I2) v$

**AV—AV**: current regulation range and corresponding charging voltage.

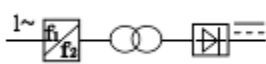
**IP**: degree of insulation protection, such as IP21S



It can be used in the environment that has a high risk of electric shock.

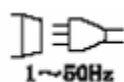


Please read this operation manual carefully before using



Single-phase static frequency converter-transformer rectifier

frequency



Symbol of single-phase AC power supply and rated



Symbol of manual metal arc welding with covered electrodes.



Do not use outdoors

## H Insulation class



Do not dispose of power tools together with household waste.

## 5. INSTALLATION



Caveat! All connections to the machine must be made after ensuring that the main power supply is switched off.

This welding machine is equipped with a supply voltage compensation device. When the supply voltage varies in the range of + 5% of the nominal voltage, it will continue to work the same. If it is exceeded, the machine will shut down. When using a longer cable, to reduce the voltage drop, it is recommended to select a larger section of cable; If the connection cable is too long, it may have a great effect on the arc starting performance of the welding machine or other performance. So we suggest you use the recommended setup length (4m)

### STEPS IN THE CONNECTION

1. Make sure the air vent of the welding machine is not covered and obstructed to avoid failure of the cooling system.
2. Make sure that the additional grounding terminal has been grounded separately and securely.
3. Connect the welding clips (ground clamp and electrode holder) correctly. First of all, make sure the cable, welding clips and quick connectors are connected securely.
4. Insert the quick plug connecting the electrode holder into the quick socket with the polarity of "+", and then forcibly tighten it in a clockwise direction.
5. Insert the quick plug connecting the ground/ground clamp into the quick plug with the polarity of "-" on the panel of the welding machine, forcibly tighten it clockwise, the grounding clamp connects to the work piece.
6. Pay attention to the polarity of the connection. If connected incorrectly, an unstable electric arc, large spatter, and sticky welding rod may occur.
7. Please connect the power plug to the corresponding voltage class of the distribution box according to the input voltage class of the welding machine, do not connect the machine to a power outlet with wrong voltage. Meanwhile, please make sure that the tolerance of the supply voltage is within the allowable range.



Warning Electrical shock can kill; There is still a high-voltage direct current in the equipment, even after power off, do not contact the current-carrying part of the equipment. Inadequate supply voltage can damage the equipment.

8. Make sure the welding machine air vent is not covered and obstructed to avoid cooling system failure.
11. The power cable is suggested to be H07RN-F 3X2.5mm<sup>2</sup> (approved according to EN 50525-2-21), the welding cable should be H01N2-D 1X16mm<sup>2</sup>, and the external fuse should be 16A. The recommended electrode support is 20% 160A

(approved according to EN 60974-11).

Now that you're ready to solder, remember CLAMS. Bringing all these points together in one moment of welding may seem like a lot to think about, but it becomes second nature with practice, so don't get discouraged! Stick welding got its name not because the electrode looks like a stick, but because everyone sticks the stick to the workpiece when learning to weld.

## SETTING

The correct current, or amperage, setting depends primarily on the diameter and type of electrode selected. For example, a 1/8-inch 6010 rod works well at 75 to 125 amps, while a 5/32-inch 7018 rod welds at currents up to 220 amps. The side of the electrode box generally indicates operating ranges. Select an amperage based on material thickness, welding position (approximately 15 percent less heat for overhead work compared to flat welding), and observation of the finished weld. Most new welding machines have a permanent label that recommends amperage settings for a variety of electrodes and material thicknesses.

## ARC LENGTH

The correct arc length varies with each electrode and application. As a starting point, the length of the arc should not exceed the diameter of the metal part (core) of the electrode. Holding the electrode too close lowers the welding voltage. This creates an erratic arc that can die out or cause the rod to freeze, and also produces a high crown weld bead. Excessively long arcs (too much voltage) cause spatter, low deposition rates, shrinkage, and sometimes porosity. Many beginners weld with an arc that is too long, resulting in rough beads with lots of spatter. A little practice will show you that a tight, controlled arc length improves the bead's appearance, creates a tighter bead, and minimizes spatter.

## TRACE ANGLE

Electrode welding in the flat, horizontal, and top positions uses a pull or backhand welding technique. Hold the rod perpendicular to the joint and tilt the top of the electrode in the direction of travel approximately 5 to 15 degrees. To weld vertically up, use a push or right-hand technique and tilt the top of the rod 15 degrees from the direction of travel.

## HANDLING

Each welder handles or weaves the electrode in a unique style. Develop your own style by observing others, practicing, and creating a method that works for you. Note that on 1/4-inch and thinner material, working will generally create a bead that is wider than necessary. In many cases, the simple, straight offset works well. To create a wider bead on thicker material, manipulate the electrode from side to side creating a continuous series of partially overlapping circles, or in a Z-shaped, semi-circle, or stutter-step pattern. Limit side-to-side movement to two and one-half times the diameter of the electrode core. To cover a wider

area, make multiple passes or line passes. When welding vertically, focus on welding the sides of the joint and the center will come up on its own. Pause to allow the far side of the bead to cool and the length of weld to harden and ensure it is securely fastened to the sidewall. If your weld looks like fish scales, you went too fast and didn't stay on the sides long enough.

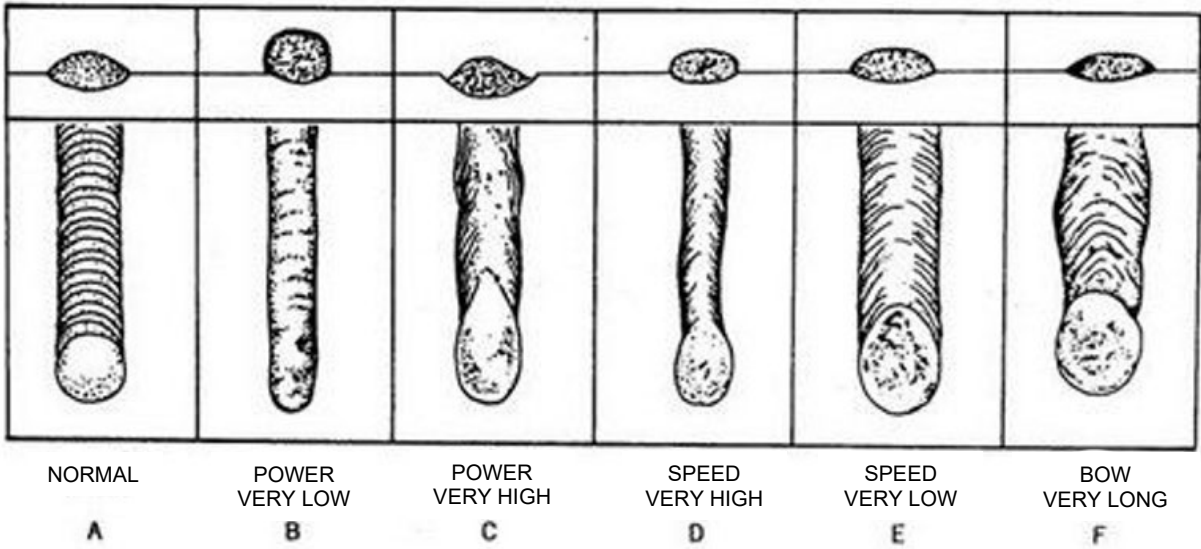
**TRACING SPEED**

Proper travel speed produces a weld bead with the desired contour (or crown), width, and appearance. Adjust the travel speed so the arc stays within the main third of the weld zone. Slow travel speeds produce a wide, convex bead with shallow penetration. Excessively high travel speeds also decrease penetration, create a tighter and/or highly crowned bead, possibly undermining.

A few last tips. Always remember that you need a good view of the welding area. Otherwise, you can't be sure you're welding the joint well, keeping the arc on the leading edge of the area, and using the correct amount of heat (you can actually see an area with too much heat coming out of the joint). For the best view, keep your head to the side and out of the smoke so you can easily see the work area.

Also remember that you learn through mistakes. Do not hesitate to make some first welds without much quality or with errors. Professional welders achieve perfect welds by recognizing imperfections, grinding and softening them.

**WELD CHART COMPARISON**



**6. USE**



**Welding in places where there is a risk of fire or explosion is prohibited!**



**WELDING**

In the MMA type of welding, the welding filler material is melted from the electrode to the welding area. The speed of the welding current is selected

according to the size of the electrode used and the welding position. The arc is formed between the electrode tip and the weld piece. The coating of the fusion electrode forms gas and slag, which protects the welding area. Solidified slag on the weld is removed after welding, e.g. with a chipped hammer or metal brush. OPERATING FUNCTIONS

**Caveat!** Make sure welding cable and ground cable connections are tight. If the connection is loose, there will be a voltage drop that will cause the connection to heat up and may cause a fire.

**Caveat!** During welding, it is forbidden to pull out any plug or cable in use, or it will lead to a risk of death and severe damage to the machine.

1. Always attach the ground cable clamp directly to the welding piece. Clean the connecting surface of the ground clamp from paint and rust. Connect the ground clamp carefully so that the contact surface is as large as possible.
2. Turn the power switch on the rear panel to the "ON" position. The cooling fan inside the machine should start to work once welding begins. The machine is equipped with automatic cooling technology; The fan will only run when welding begins and will help cool the internal circuitry and components.

**Always start and stop the machine from the main switch, never use the plug as a switch!**

3. According to the thickness of the welding piece, the diameter of the welding electrode, the working position and the technical needs, ensure that the welding current is appropriate.
4. Hold the welding electrode in the electrode holder. The machine will be in manual welding mode and standby status.
5. Select the appropriate welding current by adjusting the regulator (1) according to the thickness and work techniques for the piece to be welded, the diameter of the welding rod, the work position and the technical needs; and make sure the welding current is adequate.

In general, the welding current is suitable for welding electrodes according to the following:

Electrode diameter / mm	φ1.6	φ2.0	φ2.5	φ3.2	φ4.0	φ5.0	φ5.8
Welding current / A	40	55	80	115	160	190-260	250-300

Welding steel thickness and diameter of the selected welding rod:

Steel sheet thickness / mm	1 - 2	2 - 5	5 - 10	+ 10
Welding rod diameter / mm	1 - 2.5	2.5 - 4	3.2 - 5.8	4 - 8

## 7. WORK INDICATIONS



Welding fumes can be dangerous to your health, make sure there is enough ventilation during welding. Never look at the arc without a face shield made for arc welding! Protect yourself and the surroundings of the arc from slag splashes! It is recommended that you first test the weld and welding current speed on something other than the actual work piece. This will determine the correct setting of the machine before doing the final job.

You can start welding after you have made the necessary corrections. The arc is ignited by scratching the weld piece with the electrode. The arc length is adjusted by holding the electrode tip at a suitable distance from the weld piece. The proper arc length is usually about half the diameter of the electrode core wire. When the arc strikes, slowly move the electrode forward, tilting it up. Traction angle 10-15 °.



**IMPORTANT:** Do not rub the workpiece with the electrode as it may damage the workpiece, making it difficult to strike the arc. As soon as the arc has struck, try to keep it at a distance from the workpiece equal to the diameter of the electrode. This distance should be kept as constant as possible during the welding process. The electrode angle in the direction you are working should be 20°/30°.



**IMPORTANT:** Always use tweezers or pliers to remove worn electrodes and move parts you just welded. Note that the electrode holder (1) must always be emptied for insulation after the welding job has been completed. Do not remove the slag until the weld has cooled. If you want to continue a weld after an interruption, you must first remove the slag from your initial attempt.

The yellow overheat signal LED will illuminate when the thermostat has tripped due to the unit overheating. The fan will cool the unit and once the signal light goes out, the unit is ready for welding again.

### TIPS TO GET STARTED

For beginners, the first difficulty is getting a good bow. For best results proceed as follows:

Test the current intensity and the electrode on a piece of scrap material.

- Hold the electrode approximately 2 cm above the start of the joint to be welded and hold the face shield in front of your face. Touch the electrode to the workpiece and strike it repeatedly to start the arc, as if striking an object. It may happen that the separating movement of the electrode is not fast enough, which may mean that the electrode sticks to the work piece. Remove the electrode with a firm lateral pull. (If this doesn't work, release the electrode from the clamp on the electrode holder, then use tweezers or pliers to remove the electrode from the work piece.)



- Observe the arc through the lens on the face shield and keep the arc length approximately 1 - 1.5 times the diameter of the electrode. Arc length is very important as it influences welding current and welding voltage.
- Incorrect current intensity results in poor weld quality and a weak joint.
- Hold the electrode at an angle of approximately 70° - 80° to the work piece in the direction of travel. If the angle is too large, the slag can penetrate the joint; If the angle is too small, the arc will flutter and will dislodge molten metal. In both cases, a weak porous solder joint is produced.
- Make sure the arc length remains constant by continuously feeding the electrode into the workpiece as it travels across the joint. At the end of the meeting; Gently pull the electrode down to avoid creating a porous end crater.
- Wait until the joint has completely cooled down before removing the slag. If you want to continue welding a joint after an interruption, you must first remove the slag at the end of the joint. Strike the arc at the joint and melt the electrode at the point where the two joints meet.



CAUTION: Always use tweezers, pliers, or a similar tool to remove hot electrodes or to move hot welded parts. Make sure the electrode holder is placed on an insulated surface when taking a break. Always turn off the welder after work is finished and during breaks, and always disconnect the machine from the mains.

Proceed as follows after connecting the electrical connections as described in this manual:

- Hold down the lever on the electrode holder and slide the bare part of the electrode into the electrode holder.
- Fasten the work lead to the workpiece. Make sure there is a good electrical connection between the work piece and the ground clamp.
- Turn on the machine and adjust the welding current with the regulator. The welding current should be selected according to the size of the part and the type of electrode.
- Hold the face shield in front of your face and strike the tip of the electrode on the work piece as if lighting a match. This is the best method to start the arc.



CAUTION: Do not hit the electrode on the work piece as this could damage the electrode cover, making it difficult to strike the arc.

- As soon as you have started the arc, try to keep the arc length constant. The arc length should be approximately 1 to 1.5 times the diameter of the electrode. The arc length should be kept as constant as possible. Hold the electrode at an angle of approximately 70° - 80° to the work piece.

CAUTION:

The fan will automatically turn off after the internal circuitry and components cool down. Always turn the welding machine OFF after the fan has stopped, this will increase the life of

the circuit and components.

## TYPES OF WELDING SEAM



### Appearance as a function of current intensity:

Arc Too Short – When the arc is too short, irregular masses of weld metal with slag inclusions are produced.



Arc Too Long - A long arc causes poor penetration of base metals, bubbles and porosities in molten metal. A defective gasket may occur.

### Appearance as a function of forward speed:



Feed rate too low - causes a wide deposit and shorter length. Unnecessarily high electrode consumption and loss of working time.

Feed Rate Too High – Causes insufficient base material penetration, a tall, narrow seam, and large slag deposits that can be difficult to remove.



### Appearance as a function of current intensity:

Current intensity too low: poor penetration, easy adhesion, a very irregular bead, difficulty in removing slag.



Current intensity too high: cable too wide with excessive penetration of molten metal base material sprays and a deep crater. High current intensity can also cause minor breaks within the material

High-quality welding: working with the correct arc length, feed rate, current intensity and electrode inclination produces a regular bead, a fine mesh and a joint free of porosity and slag inclusions.



## 8.WARRANTY

This warranty covers all material or production failures, it does not include defects in normal wear parts, such as bearings, brushes, cables, plugs or accessories for the machine, damages or defects resulting from abuse, accidents or alterations suffered; or transportation costs.

Reserves the right to reject any claim where the purchase cannot be verified or where it is clear that the product was not properly maintained. (clean ventilation slots, lubrication, cleaning, storage, etc...)

Your purchase receipt should be kept as proof of purchase date.

Your tool must be returned to your dealer in an acceptable and clean condition, in its original box, if applicable, accompanied by your proof of purchase.

### 13.1. WARRANTY PERIOD

- The warranty period (Law 1999/44 CE) according to the terms described below is 2 years from the date of purchase, in parts and labor, against manufacturing and material defects.

### 13.2. EXCLUSIONS

The guarantee does not cover:

- Natural wear and tear.
- Misuse, negligence, careless operation or lack of maintenance.
- Defects caused by incorrect use, damage caused due to manipulations carried out by personnel not authorized by Anova or use of non-original spare parts.

### 13.4. IN CASE OF INCIDENCE

- The guarantee must be correctly completed with all the information requested, and accompanied by the purchase invoice.

## 9.ENVIRONMENT

Protect the environment. Recycle the oil used by this machine by taking it to a recycling center. Do not pour used oil into drains, land, rivers, lakes or seas.



Please dispose of your machine in an ecological way. We must not dispose of machines together with household waste. Its plastic and metal components can be sorted according to their nature and recycled.

In compliance with the European Directive 2012/19 / EU on waste electrical and electronic equipment, and its implementation in accordance with national legislation, electrical equipment that has reached the end of its useful life must be collected separately and taken to a facility proper and environmentally friendly recycling.

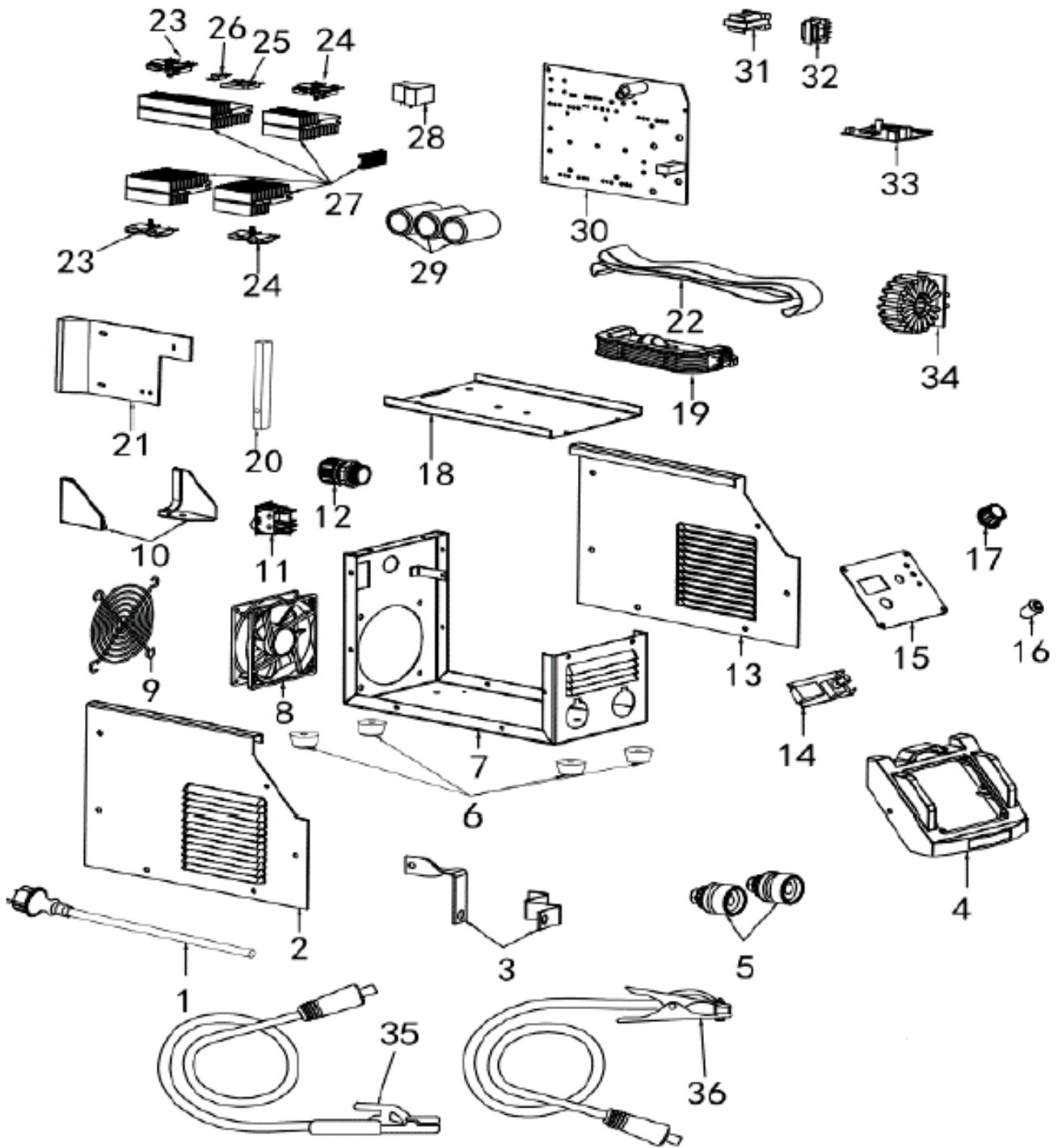


The materials used to pack this machine are recyclable. Please do not dispose of the packaging in household waste. Please dispose of these packages at an official waste collection point.

# 10.EXPLODED

## ALNOVA

SL210



# 11. CE DECLARATION OF CONFORMITY



## DISTRIBUTION COMPANY

MILLASUR, SL  
RUA EDUARDO PONDAL, Nº 23 PISIGÜEIRO  
15688 OROSO - A CORUÑA  
SPAIN



## EC DECLARATION OF CONFORMITY

In compliance with the different CE directives, it is hereby confirmed that, due to its design and construction, and according to the CE mark printed by the manufacturer on it, the machine identified in this document complies with the relevant and fundamental health and safety requirements. of the aforementioned EC directives. This declaration validates the product to display the CE symbol.

In the event that the machine is modified and this modification is not approved by the manufacturer and communicated to the distributor, this declaration will lose its value and validity.

Machine name: MMA WELDING

Model: **SL210**

Recognized and approved standard to which it conforms:

**Directive 2004/108/EC**  
**Directive 2015/863/EU**  
**Directive 2014/30/EU**

**EN 55014-1:2006/+A1:2009/+A2:2011**  
**EN 55014-2:2015 EN 61000-3-2:2014 EN 61000-3-3:2013**

**EN62233:2008 EN60335-2-2:2010+A11:12+A1:13**  
**EN 60335-1:2012+AC:14+A11:14**

Company seal

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01/14/2019