STAYER WELDING

ES Manual de instrucciones
IT Istruzioni d'uso
GB Operating instructions
P Manual de instruções

PROGRESS 1700 L
POTENZA TIG170 HF
TIG-DC200HF
TIG AC/DC 200HF
TIG AC/DC 315HF

STAYER

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Fig 1: PROGRESS 1700L

Fig 2: TIG DC 200 HF

Fig 3: TIG AC/DC 200 HF

Fig 4: TIG AC/DC 315 HF

Fig 5: PANEL CONTROL TIG AC-DC 315 HF PULSED

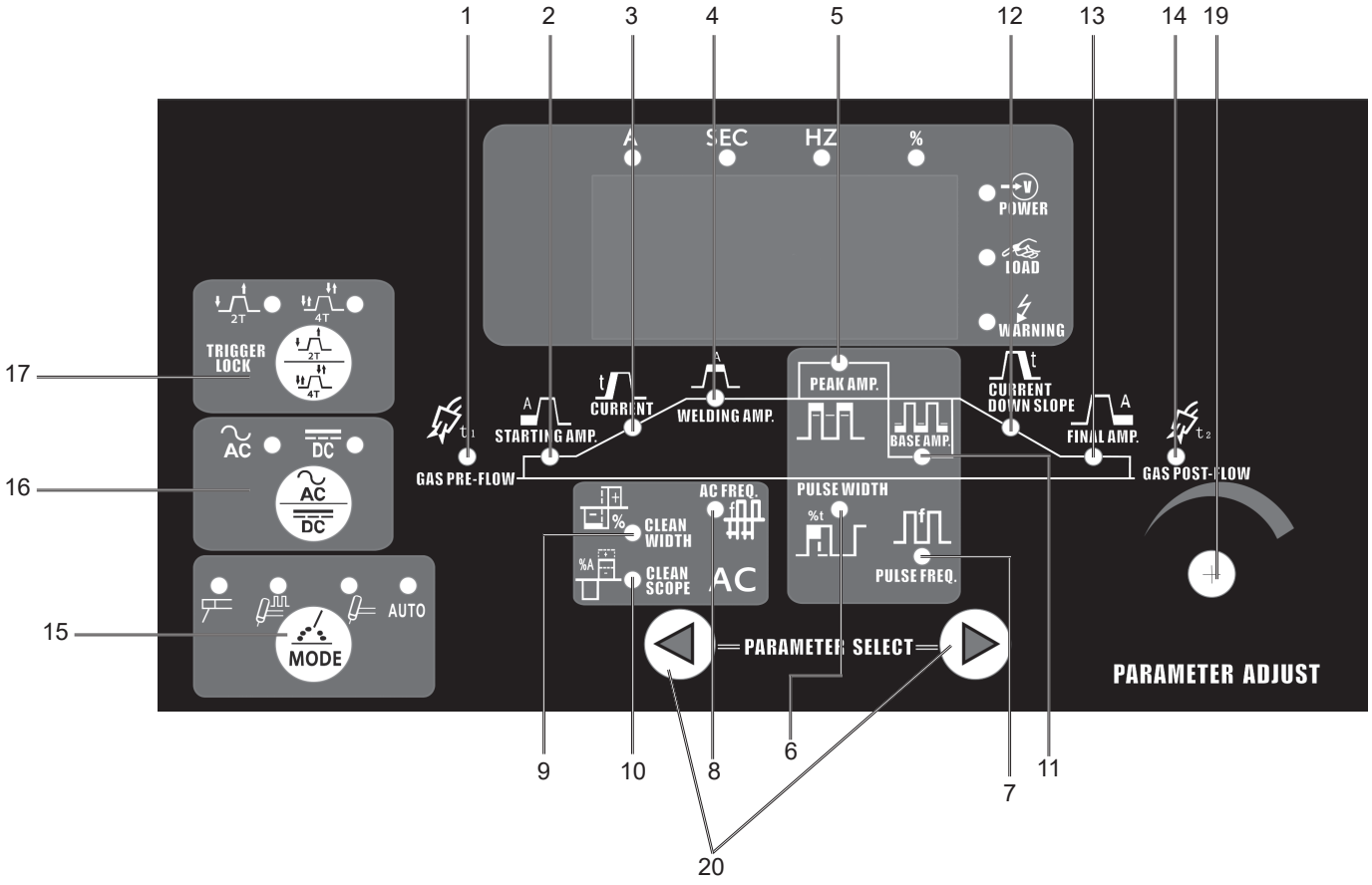


Fig 6: PANEL CONTROL TIG AC/DC 200 HF

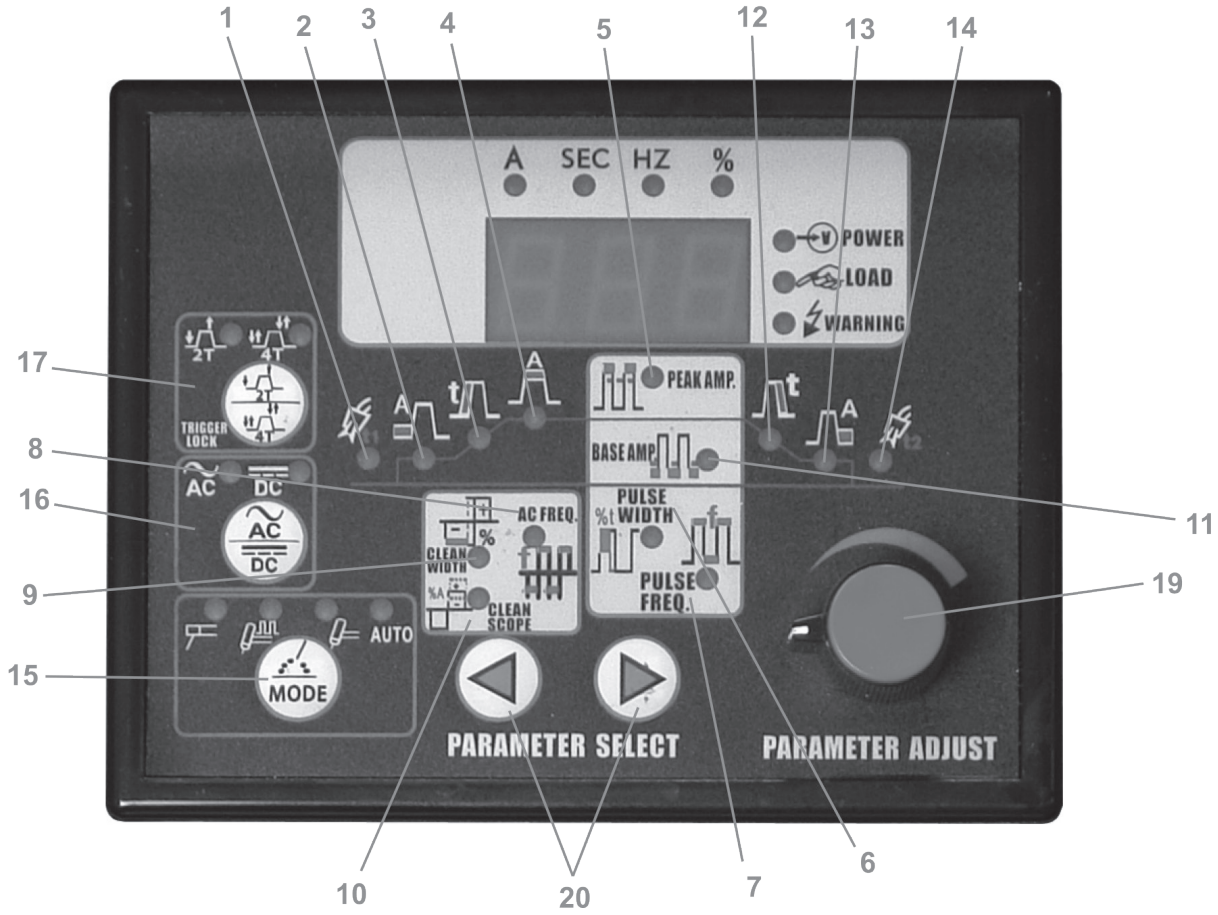
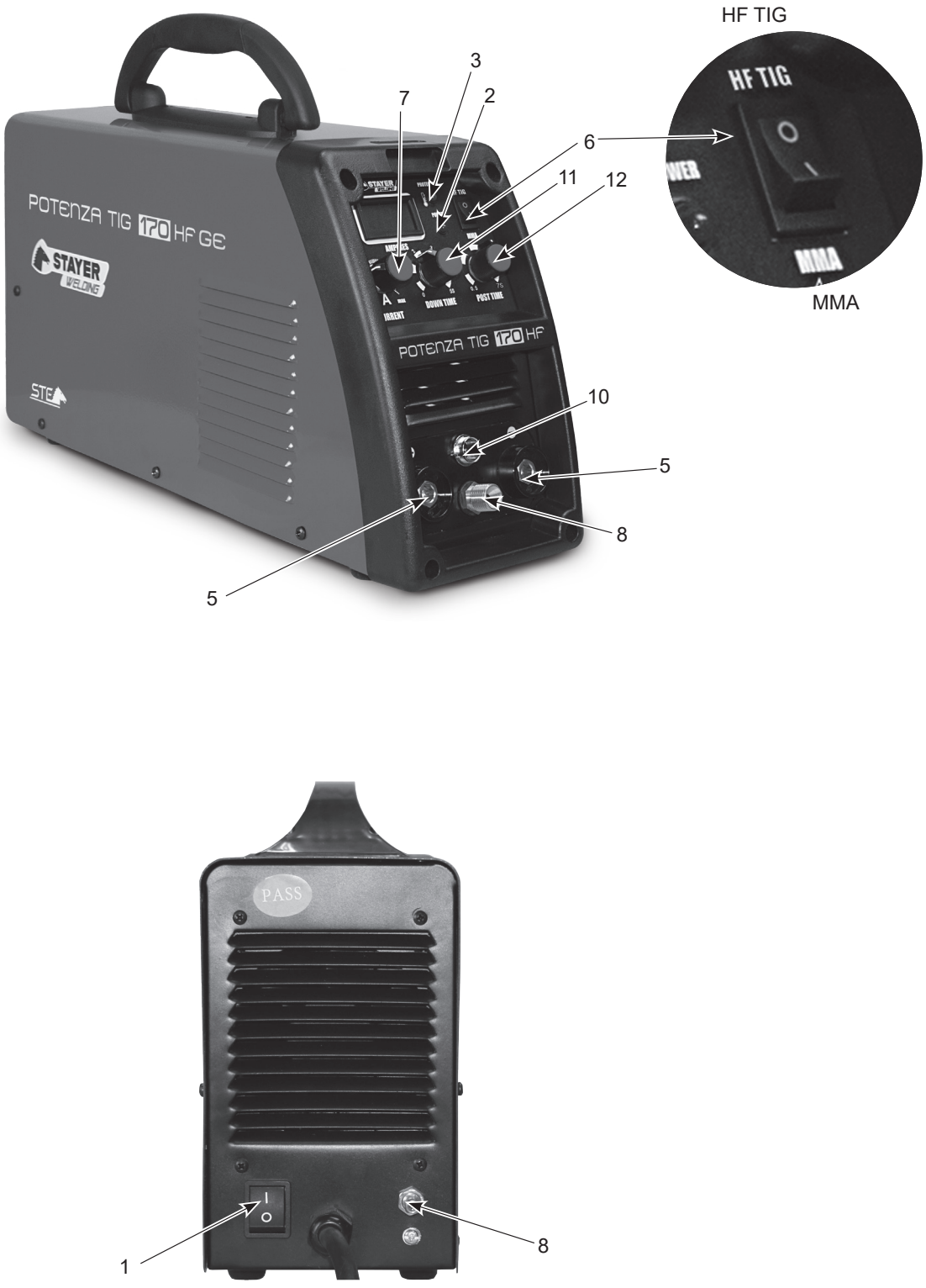


Fig. 9: POTENZA TIG 170 HF



		PROGRESS 1700L	TIG DC 200 HF	TIG AC/DC 200 HF	TIG AC/DC 315 HF
	V	1ph 230	1ph 230	1ph 230	3ph 400
	A	22	27	27	92
	A	0 - 170	0 - 200	0 - 200	0-315
	%	60	100	40	40
	Kg	5	14	27	71
	cm	34x12.5x18.5	41x18x29	51x44x25	105x50x110
	KVA	5	6.5	7	8

EXTENDED TECHNICAL FEATURES

Parameter	Unidad	PROGRESS 1700L	POTENZA TIG 170 HF	TIG DC 200 HF	TIG AC/DC 200 HF	TIG AC/DC 315 HF
Nominal voltage	V	1ph/230	1ph/230	1ph/230	1ph / 230	3ph/400
Frequency	Hz	50/60	50/60	50/60	50/60	50/60
No-load voltage	V	82	57	64	64	92
AC pulse frequency	Hz	-	-	-	0.2 - 20	0.2 - 20
Priming		Lift arc	HF	HF	HF	HF
DC pulse frequency	Hz	-	-	-	0.2 - 500	0.2 - 500
Pulse width	%	-	-	-	1 - 99	1 - 99
AC frequency	Hz	-	-	-	20 - 150	20 - 150
AC clean width	%	-	-	-	(-) 20 - 20	(-) 20 - 20
AC cleaning amplitude	%	-	-	-	(-)15 - 40	(-)15 - 40
Current slope: start/end	s	-	0-15	-	0 - 15	0 - 15
Pre-gas time	s	-	0-15	-	0 - 15	0 - 15
Post-gas time	s	0-99.95	0-99.95	0-99.95	0 - 99.95	0 - 99.95
Efficiency	%	>0.85	>0.85	>0.85	>0.85	>0.85
Duty cycle	cosφ	0.7-0.9	0.7-0.9	0.7-0.9	0.7 - 0.9	0.7 - 0.9
Protection degree	EN60529	IP21S	IP21S	IP21S	IP21S	IP21S
Cooling		no	no	no	Air	Yes
Torch	Model	-	TIG HF	SR17	SR17	SR18

DESCRIPTION OF THE EQUIPMENT

This product is an equipment for manually welding metals by means of heat generated by an electric arch.
Technologically, the Stayer Welding equipment is an electric power supply source for high-frequency power transfer managed by intelligent control logics.
In contrast to traditional technology which is based on transformers operating at 50 Hz public grid frequency, Stayer Welding has a larger power density per weight unit, is more economizing and has the possibility of accurate, instantaneous and automatic control of all welding parameters.
As a result, you will more easily produce improved welding with equipments that consume less and have a lower mass than equivalent traditional equipments based on heavy transformers.
All Stayer Welding equipments of the TIG series are capable of shielded electrode welding and tungsten electrode torch welding with inert gas protection.

ILLUSTRATED DESCRIPTION OF OPERATIONS

PROGRESS 1700 L / POTENZA TIG 170 HF/, TIG DC 200 HF - TIG AC/DC 200 HF - TIG AC/DC 250 HF (FIG. 1,2,3 y 4)

1. On/off switch
2. Luminous power-on indicator
3. Luminous warning indicator
4. Welding-intensity setting control
5. Welding cable connection terminals
6. Electrode mode / TIG switch
7. Pre-gas and post-gas timer switch for inert gas discharge (only model TIG DE 200HF)
8. Gas outlet for torch
9. Torch cooling water connection
10. Torch trigger connection
11. Commutator “Down time” TIG 170 HF
12. Commutator “Post time” TIG 170 HF
13. Treadle Connection TIG AC/DC 315 HF
14. Mass Connection and AC welding

CONTROL PANEL TIG AC/DC 200 HF - TIG AC/DC 315 HF (FIG. 5 y 6).

1. Initial gas time
2. Initial amperes
3. Current-up slope
4. Welding Amperes
5. Pulse peak current
6. Pulse width
7. Pulse frequency
8. Alternating current (AC) frequency
9. Cleaning half-wave width
10. Cleaning half-wave amplitude
11. Pulse base amperes
12. Current-down slope
13. Final amperes
14. Final gas time
15. Welding process selector: MMA (shielded electrode), pulsed TIG, standard TIG, automatic TIG
16. AC/DC TIG welding selector
17. 2T/4T working mode selector: with up, down or standard slope
18. Torch cooling type selector: AIR/WATER
19. Parameter selector
20. Parameter value selector

1.- Explanation of regulatory markings

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Pos. 1 Name and address and brand of the manufacturer, distributor or importer.
Pos. 2 Identification of the model.
Pos. 3 Model traceability.
Pos. 4 Symbol of the welding power source.
Pos. 5 Reference to regulation complied with by the equipment.
Pos. 6 Symbol for the welding process.
Pos. 7 Symbol for use in environments with increased risk of electric shock.
Pos. 8 Symbol for the welding current.
Pos. 9 Nominal no-load output tension.
Pos. 10 Nominal output voltage and current range.
Pos. 11 Duty cycle of the power source.
Pos. 11a Duty cycle at 45%
Pos. 11b Duty cycle at 60%
Pos. 11c Duty cycle at 100%
Pos. 12 Nominal cut-off current (I2)
Pos. 12a Current value for 45% duty cycle
Pos. 12b Current value for 60% duty cycle
Pos. 12c Current value for 100% duty cycle
Pos.13 Load tension (U2)
Pos. 13a Load tension for 45 % duty cycle
Pos. 13b Load tension for 60 % duty cycle
Pos. 13c Load tension for 100 % duty cycle
Pos. 14 Symbol for power supply
Pos. 15 Nominal value of supply tension
Pos. 16 Maximum nominal supply current
Pos. 17 Maximum effective supply current
Pos. 18 IP degree of protection

2.- Safety instructions

READ THE INSTRUCTIONS.

• Read the User Manual completely and understand it before using or giving service to the unit.

• Only use genuine manufacturer's parts.

2.1. Symbols used

DANGER! - Indicates a dangerous situation which, when not avoided, will lead to death or serious injury. Possible hazards are shown in the attached symbols or explained in the text.

Indicates a dangerous situation which, when not avoided, will lead to death or serious injury. Possible hazards are explained in the text.

2.2. Arc-welding hazards

Only qualified persons may install, operate, maintain and repair this machine.

During its operation, keep anyone away, especially children.

ELECTRIC shock may kill you.

Touching live current carrying parts may cause fatal electric shock or serious burns. The working and electrode circuit is always electrically live when the machine output is on. The input circuit and the inner circuits of the machine are also electrically live when the machine is on. When welding with automatic or semiautomatic equipment, the wire, the reel, the frame containing the supply rolls and all metal parts touching the welding wire are electrically live. Incorrectly-installed or not-earthed equipment is a very serious danger.

• Do not touch electrically live parts.

• Use dry isolating gloves without openings, and protection on your body.

• Isolate yourself from the work and from the ground by using carpets or covers that are sufficiently large to prevent any physical contact with the work or ground.

• Do not use the AC output in humid areas, when movement is restricted or when in risk of falling down.

• Use an AC output ONLY when required by the welding process.

• When an AC output is required, use a remote control if there is one present in the unit.

• Additional safety precautions are required when any of the following dangerous electric conditions is present in humid rooms or while you are wearing humid clothing, when working on metal structures such as floors, grates or scaffolds; when you are in a tight position such as seated, kneeling, laying down or when there is a high risk of having unavoidable or accidental contact with the workpiece or ground.

• Disconnect power input or stop the motor before installing or servicing this equipment.

• Install equipment and connect it to ground in accordance with the operator's manual and national, state and local codes.

• Always check the supply to ground – check and make sure that the power input to the ground wire is appropriately connected to the grounding terminal at the disconnection box or that its plug is appropriately connected to the output receptacle that is connected to ground. When making these input connections, first connect the ground conductor and double-check the connections thereof.

• Keep supply cords free of oil and fat, and protected from hot metal and sparks.

• Inspect power input cord frequently regarding damage or bare cable. Replace cord immediately if damaged – a bare cable may kill you.

• Switch off the whole equipment when you are not using it.

• Do not use cables which are worn-out, damaged, very small-sized or wrongly connected.

• Do not wrap cables around your body.

• When a grounding clamp is required for a work, make ground connection using a separate cable.

• Do not touch the electrode when you are in contact with the work or the grounding circuit or another electrode of a different machine.

• Do not put into contact two electrode carriers that are connected to different machines at the same time, because in that case there will be open-circuit double voltage.

• Use equipment in a well-maintained condition. Repair or replace damaged parts immediately. Maintain the unit in accordance with the manual.

• Use safety braces to prevent it from falling down when working above floor level.

• Keep all panels and covers in place.

• Put the clamp of the work cable in good metal-to-metal contact to the work or the work table as close as possible to the weld as it is practical.

• Keep or isolate the grounding clamp such that there is no contact with any metal or any grounded article.

• Isolate the grounding bracket when not connected to the workpiece to prevent it from contacting any metal article.

HOT PARTS may cause serious burns.

• Do not touch hot parts with your hand without glove.

• Allow that there is a cooling period before working at the machine.

• To handle hot parts, use appropriate tools and/or put on heavy gloves, with insulation for welding and clothing to prevent burns.

SMOKE and GASES may be dangerous.

Welding produces smoke and gases. Breathing in these gases and smoke may be dangerous for your health.

• Keep your head out of the smoke. Do not breathe in smoke.

• When you are indoors, ventilate the area and/or use forced local ventilation in front of the arc to withdraw welding smoke and gases.

• When ventilation is bad use an authorized respirator.

• Read and understand the Data Sheets on Material Safety (MSDSs) and the manufacturer's instructions regarding materials, consumables, coatings, cleansers, degreasing agents.

• Do work within a closed space only if it is well ventilated or while using an air respirator. Always have near a trained person. Welding smoke and gases may displace air and reduce oxygen level causing harm to health or death. Make sure that air for breathing is safe.

• Do not weld at locations near to operations involving grease, cleaning or spraying paint. Heat and bolts of the arc may react with vapors and form strongly irritating and toxic gases.

• Do not weld on coating materials such as galvanized steel, lead, or cadmium-coated steel, unless the coating has been removed from the welding area, the area is well ventilated and while using a respirator with a source of air. Coatings of any material containing these elements may cause smoke being emitted when welding.

BOLTS EMITTED BY THE ARC may burn your eyes and skin.

Bolts emitted by the arc of a welding process produce intense heat and strong ultraviolet rays that may burn eyes and skin.

• Use an authorized welding mask having a lens-filter shade to protect your face and eyes while welding or looking, cf. safety standards ANSI Z249.1, Z175, EN379.

• Use authorized safety goggles having lateral protection.

• Use protective screens or barriers to protect others from flashes, reflections and sparks; alert others not to look at the arc.

• Use protective clothing made of durable, flame-resistant material (leather, thick cotton or wool) and protection to your feet.

WELDING may cause fire or explosion.

Welding at a closed container such as tanks, drums or tubes may cause explosion. Sparks may fly from a welding arc. Flying sparks, the hot workpiece and the hot equipment may cause fire and burns. Accidental contact of the electrode with metal articles may cause speaks, explosion, overheating, or fire.
Check and make sure that the area is safe before starting any welding.

• Remove any inflammable material from within a distance of 11 m of the welding arc. When this is not possible, cover it tightly with authorized covers.

• Do not weld where sparks may impact on inflammable material. Protect yourself and others from flying sparks and hot metal.

• Be alert to that weld sparks and hot materials from the welding operation may pass through small cracks or openings in adjacent areas.

• Always watch that there is no fire and keep near an extinguisher.

• Be alert to that, when welding a ceiling, floor, wall or any kind of separation, heat may cause fire at a hidden part which cannot be seen.

• Do not weld within closed receptacles such as tanks or drums or piping unless they have been prepared appropriately in accordance with AWS F4.1.

• Do not weld where the atmosphere might contain inflammable dust, gas or vapors from liquids (such as gasoline).

• Connect the work cable to the work area as near as possible to the place where you will be welding, in order to prevent welding current from long traveling possibly through unknown parts causing electrical shock, sparks and fire hazard.

• Do not use welding to deice frozen pipes.

• Remove electrode from the electrode carrier or cut the welding wire close to the contact pipe when you are not using it.

• Use protective clothing without oil, such as leather gloves, heavy shirt, closed trousers without patches, high shoes or boots and a cap.

• Keep away from you any fuel as butane lighters or matches, before starting to weld.

• After completing work, inspect area to make sure that it is free of sparks, embers and flames.

• Only use correct fuses or circuit breakers. Do not put ones of larger size or pass them by one side.

• Follow the regulations in OSHA 1910.252(a) (2) (iv) and NFPA 51B for hot work and have near a person to take care of fire and an extinguisher.

FLYING METAL OR SLAG may injure eyes

• Welding, grinding, wire brushing or polishing may produce sparks or flying metal. When welds are cooling down they may release slag.

• Use authorized safety goggles with lateral guards down to underneath your mask.

GAS ACCUMULATION may make you sick OR KILL YOU.

• Close shielding gas when not using it.

• Always give ventilation to closed spaces, or use an authorized respirator that replaces air.

MAGNETIC FIELDS may affect implanted medical devices.

• Persons using pace makers or other implanted medical devices must stay away.

• Persons using implanted medical devices must consult their doctor and the manufacturer of the apparatus before approaching arc welding, point welding, slotting, plasma cutting, or induction heating operations.

NOISE may injure your inner ear.

• The noise of some processes or equipment may harm your inner ear. Use authorized ear protection when the level of noise is very high or above 75 dBa.

THE CYLINDERS may burst when they have failures.

Cylinders containing shielding gas contain that gas under high pressure. The cylinders may burst when they have failures. As the cylinders are usually part of the welding process, always handle them with care.

• Protect pressurized gas-containing cylinders from excessive heat, mechanical impacts, physical damage, slag, flames, sparks and arcs.

• Install and secure the cylinders in a vertical position securing them to a stationary support or a cylinder holder to prevent them from falling down or collapsing.

• Keep cylinders far away from electric or welding circuits.

• Never wrap the welding torch about a gas cylinder.

• Never allow an electrode to contact any cylinder.

• Never weld at a pressurized cylinder; there will be an explosion.

• Use correct shielding gas only, as well as regulators, hoses and connections designed for the specific application; maintain them, the same as the parts, in a good condition.

• Always keep your face away from a valve outlet except when operating the cylinder valve.

• Keep the protective cover in place over the valve except when the cylinder is in use or connected for being used.

• Use the correct equipment, correct proceedings and a sufficient number of persons to lift and move the cylinders.

• Read and follow the instructions regarding compressed gas cylinders, associated equipment and the publication of the Compressed Gas Association (CGP) P-1 as well as local regulations.

FIRE OR EXPLOSION hazard.

• Do not place the unit on, over or close to combustible surfaces.

• Do not install the unit close to inflammable articles.

• Do not overcharge your building’s wiring – make sure that your power supply system is suitable in size, capacity and protected to comply with the requirements of this unit.

A UNIT THAT FALLS DOWN may cause injuries.

• With heavy equipment, do use the lifting eye only for lifting the unit, NOT the wheel train, gas cylinders or other accessories.

• Use equipment having a suitable capacity to lift the unit.

• When using a fork lift, make sure that the tines of the fork lift are sufficiently long to extend beyond the opposite side of the unit.

OVERUSE may cause OVERHEATING OF THE EQUIPMENT.

• Allow for a cooling period, follow the nominal working cycle.

• Reduce the working cycle or current before welding again.

• Do not block or filter the airflow to the unit.

FLYING SPARKS may cause injuries.

• Use a face guard to protect your eyes and face.

• Shape the tungsten electrode only in a grinder with appropriate guards at a safe location using necessary protection for your face, hands and body.

• Sparks may cause fire – keep inflammables far away.

THE WELDING WIRE may cause you injuries.

• Do not press the trigger of the torch until receiving these instructions.

• Do not point the tip of the torch towards any point of your body, any other persons or any metal object when passing the wire.

MOVING PARTS may injure.

• Keep away from any moving parts such as fans.

• Keep any doors, panels, lids and guards closed and in place.

• Achieve that only qualified persons remove doors, panels, lids and guards to provide maintenance as necessary.

• Reinstall doors, panels, lids and guards after having completed maintenance and before reconnecting input power.

HIGH FREQUENCY RADIATION may cause interferences.

• High frequency radiation (H.F.) may interfere with radio navigation, safety services, computers and communication equipment.

• Make sure that only qualified persons familiarized with electronic equipment install the equipment. The user takes responsibility for having a trained electrician who will correct any problem caused by the installation soon.

• Make sure that the installation receives regular checking and maintenance.

• Keep doors and panels of a high frequency source completely shut, keep the distance of the spark at the contact points in its correct fixation and is grounded and protects countercurrent to minimize the possibility of interference.

ARC WELDING may cause interference.

• Electromagnetic energy may interfere with sensitive electronic equipment such as computers or computer-driven equipment such as industrial robots.

• Make sure that any equipment within the welding area is electromagnetically compatible.

• To reduce possible interference, keep welding cables as short as possible, as close together as possible or, on the floor, if possible.

• Place your welding operation at a distance of at least 100 meters away from any electronically sensitive equipment.

• Make sure that the welding machine is installed and grounded in accordance with this manual.

• If there still is interference, the operator has to take extraordinary measures, such as moving the welding machine, use shielded cables, use line filters, or shield the work area in one way or another.

2.3.- Reducing electromagnetic fields

To reduce magnetic fields (EMF) in the work area, the following proceedings should be used:

1. Keep cables as close together as possible, by braiding them, or joining them with sticky adhesive tape, or using a cable cover.
2. Place cables at one side and away from the operator.
3. Do not wrap or hang cables about your body.
4. Keep welding power sources and cables as far away as practical.
5. Connect grounding clamp to the piece you are working at, as near as possible to the weld.

Warning: In environments with increased risk of electric shock and fire, such as in the proximity of inflammable products, explosives, height, restricted free moving space, physical contact with conductive parts, warm and humid environments that reduce the electrical resistance of human skin and apparatus, observe the risk prevention in the workplace and the national and international provisions as pertinent.

3.- Instruction for putting into operation

3.1.- Positioning

The machine must be positioned in a dry, ventilated area and with a separation of at least 15cm from any wall. The equipment may slip when supported on surfaces having an inclination of more than 3º, so that it shall always be placed on a flat and dry surface. When placing it on surfaces with a greater slope, secure the machine with chains or belts. Avoid placing the equipment when facing wetness or rain.
Avoid the entry of steel shavings into the machine's inside. Do not use the grinder next to the equipment.

3.2.-Assembling

The equipment shall be assembled respecting its environmental limits and positioning it correctly.

3.3.- Mains connection

The equipment is powered by the cable and connector provided as standard, through a differential circuit breaker and a slow-feature electromagnetic circuit breaker having an intensity in accordance with the table of technical features. Any connection must have a regulatory ground connection and comply with any national electricity regulations.
In the case of a connection to a power generator, the power requirements stated in the technical specification are to be observed. It shall be taken into account that an equipment will be able to operate with a generator providing less power than the stated one, with the limitation to use it with a lower maximum intensity than the nominal one.

3.4.- Limitations to environmental conditions

The equipment shall be installed respecting its IP21 class, which means that the equipment is protected at the most against vertical impact of water drops and access to dangerous parts

with one finger against solid 12.5 mm ø or larger foreign bodies. The equipment is prepared for working within a temperature range from -15ºC to 70ºC, taking into account the limitation of a decrease in performance (duty cycle) as of ambient temperatures above 40ºC.

4.- OPERATING INSTRUCTIONS

4.1.- Positioning and testing

All Steyer Welding machines of the series must be handled using the handle which is arranged for transport.
A fee space of at least 15cm must be arranged around the equipment, and free circulation of air must be secured for correct heat dissipation. Before each work, good operation and correct tightening of all external elements of the equipment shall be verified: power supply plug, cable, housing structure and connection terminals and switches.

4.2.- Tool changing

All Steyer Welding machines of the series have a 1/2 inch DINSE quick connector for the welding cables. To remove or put the connector on, it is sufficient to turn the connector a quarter turn leftward or rightward.

WARNING: Always connect the DINSE connector as far as it will go and make sure that the splice with the cable is in a good condition and that the contact surface is clean. A bad splice or a dirty connection will result in a bad performance and make the front panel to become overheated, fused or burnt.

4.3.- Setting operations

All Steyer Welding machines contain a complex electronic system and come completely calibrated ex works, so that, for the sake of efficiency and safety, it is not authorized to be manipulated by the user. In case of any doubt regarding a malfunction, contact your distributor or our helpdesk system.

4.4.- Limits regarding the size of the workpiece

The main restriction regarding the size of the workpiece is its thickness which is limited by the power of the equipment. With more power, you may carry out accurate welds (with suitable penetration of the welding bead) in pieces having a higher thickness. The following table may serve you as an orientation:

SHIELDED ELECTRODE WELDING

Thickness of the piece to be welded	E6013 electrode diameter	Amperage setting range
1 a 2 mm	1,6 mm	30 – 60
1,5 a 3 mm	2,0 mm	50 – 70
2,5 a 5 mm	2,5 mm	60 – 100
5 a 8 mm	3,2 mm	85 - 140
8 a 12 mm	4,0 mm	120 – 190
More than 12 mm	5,0 mm	180 – 240

ALUMINIUM WELDING

Thickness of the piece to be welded	Tungsten electrode diameter	Filler rod diameter	Amperage setting range	Argon gas flux	Joint size	Joint shape
mm	mm	mm	A	l/min	mm	
0.6	1.0 - 1.6	0 - 1.0	25 - 40	4 - 5	1	a.b
1.0	1.0 - 1.6	0 - 1.6	40 - 60	4 - 7	1	a.b
1.5	1.0 - 1.6	0 - 1.6	60 - 90	6 - 9	1	b
2.5	1.6 - 2.4	1.6 - 2.4	80 - 120	6 - 9	1	b
3.0	1.6 - 2.4	1.6 - 2.4	100 - 160	7 - 10	1 - 2	b.c
4.0	2.4	1.6 - 2.4	130 - 200	10 - 15	2 - 3	c.d
5.0	2.4 - 3.2	2.4 - 3.2	150 - 250	10 - 15	2 - 3	c.d
6.0	2.4 - 3.2	2.4 - 3.2	200 - 280	10 - 15	3 - 4	c.d
8.0	3.2 - 4.0	3.2 - 4.0	200 - 300	12 - 18	4 - 5	d

STAINLESS STEEL

Thickness of the piece to be welded	Tungsten electrode diameter	Filler rod diameter	Amperage setting range	Argon gas flux	Joint size	Joint type
mm	mm	mm	A	l/min	mm	
0.6	1.0 - 1.6	0 - 1.0	15 - 30	4 - 5	1	a.b
1.0	1.0 - 1.6	0 - 1.6	25 - 30	4 - 7	1	a.b
1.5	1.0 - 1.6	0 - 1.6	50 - 70	6 - 9	1	b
2.5	1.6 - 2.4	1.6 - 2.4	65 - 95	6 - 9	1	b
3.0	1.6 - 2.4	1.6 - 2.4	65 - 95	6 - 9	1	b.c
4.0	2.4	1.6 - 2.4	110 - 150	10 - 15	2 - 3	c.d
5.0	2.4 - 3.2	2.4 - 3.2	120 - 180	10 - 15	2 - 3	c.d
6.0	2.4 - 3.2	2.4 - 3.2	150 - 200	10 - 15	2 - 3	c.d
8.0	3.2 - 4.0	3.2 - 4.0	160 - 220	12 - 18	4 - 5	d
12.0	3.2 - 4.0	3.2 - 4.0	180 - 240	12 - 18	6 - 8	d

Joint type

4.5 General instructions for use

Before starting, make sure you read, understand and apply the safety instructions and other instructions included in the present manual.
Below you will find a series of general indications that will allow you initiating yourself in the world of welding and working efficiently. In the present manual, instructions are provided with regard to the rudiments of shielded-electrode welding of relatively moderate difficulty in execution and regarding TIG welding having a relatively greater difficulty. Take into account that welding on professional level is a qualified and specialized activity. For further information, refer to specialized books and regulated professional training courses.

4.5.1 Shielded electrode welding

In this class of electric arc welding, the electrode itself produces heat in the form of an electric arc, the shielded environment, and it improves the weld puddle and the filler metal itself as the electrode's metal core progressively melts as welding is carried out.

You have to choose the electrode (size and type) that is suitable for carrying out the work to be performed. An electrode we recommend due to its medium quality, suitability for most works and for being easy to find, is the E-6013 electrode, popularly known as the "rutile electrode". The material par excellence for welding with shielded electrode is carbon steel. The following table may serve you as an initial orientation for electing the kind of electrode and operation amperage setting for a S275-type medium carbon steel.

After having confirmed all safety measures and inspected the equipment, cleaned, prepared and fastened the piece to be welded, cables are connected according to the indications in the tables. For the usual case of an E-6013 electrode, the output of negative polarity (marked -) shall be connected to the piece by means of the grounding clamp. The output of positive polarity (marked +) shall be connected to the electrode carrier clamp which shall have the working electrode connected to its bare end.

The welder will put on his/her individual protective equipment using a welding mask or helmet that is suitable for the work and suitably covering any portion of his/her skin to avoid splashes or radiation.
Welding shall be started by priming the arch. There are several proceedings, the simplest of which is scratching the piece.
Once the arc has commenced, the electrode shall be kept at a distance approximately equal to the diameter of the electrode itself, and advancing of the weld shall be commenced by drawing backwards as if a right-handed occidental person started writing, The electrode shall be held in a position close (65o to 80o) to the vertical with respect to the horizontal and balanced with respect to weld puddle center. Depending on the kind of weld pass (initial or filling) and the need of covering the joint, advance in a straight line, zigzag movement or small circles. Good setting of intensity, position and advance speed of the weld will result in a pleasant, gentle sound, similar to that of a good barbecue roast. When performing an accurate work, the resulting bead will be homogeneous, with uniform surface marks shaped as half moons.

Once the bead has been made, remove slag with a hammer and brush before making the subsequent bead.

4.5.2.- TIG welding

In electric arc welding by means of an inert-gas-protected tungsten electrode, the consumable material is not the electrode itself but a filler rod of a material similar to, or compatible with the material to be welded. Compared with the shielded electrode system, this system has greater productivity and greater difficulty in exchange for very high weld quality regarding almost any metal and alloys thereof, including all stainless steels and situations of joints of low thickness with or without filler material. Welding takes place without slag, projections or smoke.

Do neither use nor sharpen thorium-doped tungsten electrodes with a red mark, because of the risk derived from the moderate radioactive activity of the material. You may recognize the presence and concentration of thorium dioxide by the indicative strip on the electrode according to EN ISO 68848:2004 (colors: yellow, red, purple and orange). Avoid these electrodes and use substitute products without contents as for example electrodes with lanthanum and cerium derivatives (strips: black, grey, blue, gold) which do not have radioactive activity.

Prepare the electrode by sharpening the tip with the emery stone in such a way that a cone with a height of approximately 2 times the electrode's diameter remains. For a better arc and current handling capacity, the correct attack of the tip on the stone must be longitudinal and the tip must be slightly flat.

In order to correctly position the electrode in the torch, it must protrude about 5 mm above the nozzle.

As a general rule, connect the output inversely than the usual connection of the electrode i.e. the TIG torch to the equipment's negative terminal and the grounding clamp to the positive terminal. Prepare and secure the piece.

As a general rule, supply pure argon at a flow of 6-7 l / minutes.

Adjust current intensity in accordance with the needs of the kind of material and the joint to be made, making first a test on a test piece. Refer to tables 5 and 6, specialized literature or regulated professional training for further information in respect hereof.

The torch shall receive inert gas supply (usually pure argon) proceeding from a cylinder, through a pressure reducing system capable of suitably regulating the necessary gas flow volume.

Models **TIG AC/DC 200HF y TIG AC/DC 315 HF** present features of maximum professionalism as explained in chapter "advanced TIG welding".
Model **PROGRESS 1700 L** requires a TIG torch (not included, STAYER references 38.71 and 38.73) with a direct connection to the flow meter and as control by a flow valve that is incorporated in the TIG torch itself.

Except for model **PROGRESS 1700 L**, internal start and stop control is incorporated, so that the gas flow is governed internally by means of the control pushbutton of the TIG torch.
In the PROGRESS 1700L, it is necessary to use a torch with manual valve on the handle.
The TIG DC 200 HF model presents the advantage of having the commutator of selection 2T / 4T in order not to hold the trigger down in the position 4T.

Model **PROGRESS 1700 L** has the improved feature of a touch start system (Lift Arc). This system allows for a minimum electrode contamination. To start TIG welding, move switch 7 to position TIG, open the gas outlet valve and put the tip of the torch in contact with the piece to be welded. Wait two seconds and then slowly raise the torch slowly to make the arc to start automatically and smoothly.
The remaining models have HF (High Frequency) priming with a maximum priming quality as they do not need to have physical contact with the piece so that the conditions of the arc and welding are not deteriorated by contamination of the tungsten electrode. To start TIG welding, move switch 7 to position TIG and simply move the tip about 3-5mm close to the piece to be welded. Press the pushbutton of the torch to strike the arc automatically. Should there be starting difficulties, you may slightly lean the ceramic nozzle against the piece to facilitate priming of the electrode.

Once the welding arc has been struck, proceed to carrying out welding in accordance with the needs thereof. As a general orientation, you shall have to advance inversely to electrode welding such that, instead of drawing backwards, you act pushing forwards as if you helped the gas flow to act on the weld puddle.

Slowly deposit the filler material of the rod by successively bringing it closer to the puddle of fused material. To finish, simply stop pushing the switch of the torch, separate the torch very slightly until the arc is interrupted and close the manual gas flow valve. Finally, close the general flow valve of the inert gas cylinder.

The **POTENZA TIG 170 HF** includes two adjustments of welding end:

1. The 11 "Down Time" control stablishes a current ramp down when welding stops. The ramp starts in the selected work intensity and it finishes at zero amps. The duration time of the ramp (from 0 to 5 seconds) is what it is adjusted with the control. The aim is having a soft arc stop and a precise control of the crater point of the end of the cord. As a general rule, increase the time with increasing welding amperage.

2. The 12 "Post Time" control stablishes the time (from 0,5 to 7 seconds) of additional gas outlet (argon) after finishing de welding arc. The aim is that the weld is not be polluted with the air when it is liquid or too hot. As a general rule, increase the time with increasing welding amperage.

MMA for TIG AC/DC 200HF

Welding intensity (0A – 200A) is set by means of the xy parameter setting button. By means of the two xz parameter selector buttons, you may increase (0 – 80A) the Arc Force module depending on the kind of electrode, kind of steel and kind of welding.
For example, for penetration welding where the risk of the electrode becoming stuck in the insert is high, you will be able to increase Arc Force until achieving a clean weld.

4.5.3.- ADVANCED TIG WELDING

This applies to models **TIG AC/DC 250HF and TIG AC/DC 200HF**

WELDING PARAMETER SETTING

The welding parameters are selected by sequentially pushing button/control 19. Parameter magnitude is precision adjusted by moving control 20. When, in addition to rotating control 20, you push it while rotating, you may quickly increase or decrease the value.
The machine is provided with an EEPROM memory so that the machine's settings are preserved when it is turned off.

In order to know the setting range of each parameter, please refer to the table of extended technical features at the beginning of the manual. Functionally, the parameters are:
1. Gas discharge time before appearance of the electric arc (pre-flux).
2. Gas discharge time after appearance of the electric arc (post-flux).
3. Electric arc intensity at the initial intensity slope.
4. Electric arc intensity at the final intensity slope.
5. Increase time for the initial intensity slope.
6. Decrease time for the final intensity slope.
7. Consolidated welding intensity of the electric arc.
8. Pulse peak intensity of the welding arc.
9. Pulse base intensity of the welding arc.
10. Percentage of the pulse peak of the welding arc versus the pulse base.
11. Pulse frequency of the welding arc.
12. Proportion of the negative half-wave of the alternating welding current versus the positive half-wave.
13. Proportion of the negative half-wave of the alternating welding current versus the positive half-wave.
14. Frequency of the polarity change of the alternating welding arc.

SETTING OF THE WELDING TYPE

The 4 modes are selected by pushing button 15.

1.- Shielded electrode
The machine operates as a standard electrode welding machine where the functions for enhancement of welding Hot Start, Anti Stick and adjustable Arc Force become activated.

2.- Standard TIG
The machine is programmed as TIG welding machine without pulsed arc, in direct current 'DC' or alternating current 'AC' (button 16).

3.- Pulsed TIG
The four pulsed-arc functions are added to the standard TIG features.

4.- Easy TIG mode
You only need to adjust the work intensity to start operating. The machine will set by itself all parameters assuming that a carbon steel is welded when it is in the direct current 'DC' mode (button 16), or aluminium when it is the alternating current 'AC' mode.
Notice. The easy mode only applies to model **TIG AC/DC 200 HF.**

SETTING OF THE 2T/4T TRIGGER PROCESS

Pushbutton 17 allows choosing among two touch and four touch modes. Basically, the 2T mode achieves welding when keeping the trigger pressed, while the 4T mode allows welding without pulling the trigger, whereby behavior of the intensity slopes is affected. It is essential to understand and respect the cycles when wishing to use the machine without problems and without false failures.

2T MODE

1.- The machine welds when the trigger of the torch is pulled.
2.- The machine does not weld when the trigger of the torch is not pulled.

Bear in mind that, each time the trigger is pulled again, the machine starts from zero the welding process you have configured including gas flow times and slopes. Respect the configured cycles and wait for the appearance of the arc in due time.

4T MODE

1.- While the trigger is pulled for the first time, the pre-flux cycle is executed, the arc is struck, and the starting amperage of the initial welding slope is maintained.
2.- When the trigger is released for the first time, the slope up cycle and the programmed welding process are executed.
3.- When pulling the trigger for the second time, the slope down cycle is executed and the final amperage of the final welding slope is maintained.
4.- When the trigger is released for the second time, the machine stops supplying current and executes the gas post-flux cycle.

The same as in connection with the 2T mode, please respect the cycles as configures and wait for the time periods you may have programmed the machine with.

PULSED TIG

This process allows for improved control of heat supply of the arc. The use of this process is recommended for:
1.- Welding small thicknesses.
2.- Welding metals or heat-sensitive finishing.
3.- Welding materials with risk of twisting.

Pulsed TIG consists in transforming the flat and continuous direct welding current of the standard TIG into a periodic square current of two levels that is generated by a micro-processed inverter. The high level (simply called pulse) achieves the actual weld while the low level (called base) maintains the arc ignited without overheating the workpiece.

SETTING. The pulse is defined by parameters 8, 9, 10 and 11:

1. Pulse frequency. At low frequency, as for example 1 Hz, an accurate filling of 1 drop per pulse with a perfect finishing is achieved. At high frequency, as for example starting at 80 Hz, improved finishing and improved ratios of bead width and its penetration are achieved.

2. Electric intensity of the high half-wave of the pulse. Refer (in this manual) to the table of working intensities and apply, according to the material, the thickness of the piece, penetration, finishing and joint type.
3. Electric intensity of the low half-wave of the pulse. It is normally between 20% and 50% of the intensity of the high half-wave.
4. Duty cycle respect to pulse width. This is the ratio between the width of the high pulse and the low pulse. Usual ratios are 40% pulse versus 60% base.

Bear in mind that nominal amperages will be higher in order to achieve an effective amperage equivalent to standard welding.

In single-pulse-per-drop mode, you must bear in mind that the 4 factors are intimately related. Prior to production welding, test the advance of the filler rod per each drop, and the excess or lack of fusion in accordance with the intensities of pulse and base and the duty cycle thereof. Higher intensities allow a higher speed in exchange of a greater difficulty in controlling the weld puddle and a decrease of the life of the tungsten electrode.

SETTING OF THE DIRECTION OF THE WELDING ARC

Select the direction of the electric current of the welding arc using button 16.

• Select alternating current (AC) for welding aluminium, magnesium and alloys thereof.
• Select direct current (DC) for steels and the rest of materials.
Alternating current facilitates welding on material having high surface fusion temperatures while having low fusion temperature in their insides. A portion of the half-wave is used to strip and penetrate the material, and the other to effectively fuse the mass thereof.

SETTING. The alternating (AC) mode is defined by parameters 12, 13 and 14:

1. Duty cycle with respect to pulse polarity (clean width) to obtain greater cleanliness in exchange for smaller penetration and vice versa. You may modify the width within a time range of -40% to + 40%.

2. Wave balance with respect to polarity change. It allows moving the polarity volume from -20% to +20% depending on the needs of the stability of the welding arc cone (opening it or closing it), of the advancing speed and cleanliness.

3. Alternating welding current frequency. 20 Hz to 100 Hz. Use low frequency to achieve wider beads, and in reconstruction operations. Use high frequency to penetrate into narrower beads.

In turn, the alternating mode (AC) mode may be pulsed to provide special features, such as facilitating drop-per-drop filling, caloric control or improved surface finishing. This mode produces pure square wave without any passing time and excellent cleanliness.

DIAGNOSIS TIG AC/AC:
Error code in TIG AC/DC

804 Thermal Protection
805 Broken torch, switch short
806 Water loss

5.- SERVICING AND MAINTENANCE INSTRUCTIONS

5.1.- Cleaning, maintenance, lubrication, sharpening.

For cleaning, always disconnect the equipment and wait at least 10 minutes for the sake of safety regarding the discharge of the power capacitors. Clean the housing using a slightly wet cloth. Depending on the pollution of the work environment or at least each 1000 hours, clean the inside with dry pressurized air, removing the upper housing and removing dust, metal pollutants and fluff, paying special attention to the dissipators and the fan. The equipment does not need special maintenance by the user, whereby careful use within the environmental limits is the best guarantee for long years of safe service. It is recommended to send the equipment to the technical services after each 3000 work hours or every 3 years for verification and recalibration.

5.2.- Repair services with directions.

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List of user-replaceable parts
Due to the complexity and potential hazard, qualified intervention is required, except for minor repairs as inspection of connections and replacement of the standard power supply plug and revision of the welding cables, which thus are not considered user-replaceable parts.

6.- Regulations

6.1.- Technical features

 = tension input

 = current input

 = current output

 = work cycle

 = mass

 = dimensions

 = generator power

We declare under our exclusive responsibility, that the machines: POWER SOURCES FOR WELDING, models: PROGRESS 1700L, POTENZA TIG 170 HF, TIG DC 200 HF, TIG AC/DC 200 HF, TIG AC/DC 315 HF satisfy all essential safety and health requirements in conformity with regulations EN60974, 2004/108/EC, 2006/95/EC, 2002/96/EC and 2003/11/EC in conformity with WEEE / RoHS.

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January 5, 2015

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