

## WARNING - SAFETY RULES

### GENERAL INSTRUCTIONS



Read and understand the following safety instructions before use.  
Any modification or updates that are not specified in the instruction's manual should not be undertaken.

The manufacturer is not liable for any injury or damage caused due to non-compliance with the instructions featured in this manual. In the event of problems or uncertainties, please consult a qualified person to handle the installation properly.

### ENVIRONMENT

This equipment must only be used for welding operations in accordance with the limits indicated on the descriptive panel and/or in the user manual. Safety instructions must be followed. In case of improper or unsafe use, the manufacturer cannot be held liable.

This equipment must be used and stored in a room free from dust, acid, flammable gas or any other corrosive agent. Operate the machine in an open, or well-ventilated area.

Operating temperature:  
Use between -10 and +40°C (+14 and +104°F).  
Storage between -20 and +55°C (-4 and 131°F).  
Air humidity:  
Lower or equal to 50% at 40°C (104°F).  
Lower or equal to 90% at 20°C (68°F).  
Altitude:  
Up to 1000 meters above sea level (3280 feet).

### INDIVIDUAL PROTECTIONS AND OTHERS

Arc welding can be dangerous and can cause serious injury or even death. Welding exposes the user to dangerous heat, arc rays, electromagnetic fields, risk of electric shock, noise and gas fumes. People wearing pacemakers are advised to consult a doctor before using the welding machine. To protect oneself as well as others, ensure the following safety precautions are taken :



In order to protect you from burns and radiations, wear clothing without turn-up or cuffs. These clothes must be insulating, dry, fireproof, in good condition and cover the whole body.



Wear protective gloves which guarantee electrical and thermal insulation.



Use sufficient welding protective gear for the whole body: hood, gloves, jacket, trousers... (varies depending on the application/operation). Protect the eyes during cleaning operations. Contact lenses are prohibited during use. It may be necessary to install fireproof welding curtains to protect the area against arc rays, weld spatter and sparks. Inform the people around the working area to never look at the arc nor the molten metal, and to wear protective clothes.



Ensure ear protection is worn by the operator if the work exceeds the authorised noise limit (the same applies to any person in the welding area).

Keep hands, hair and clothes away from moving parts such as fans, and engines.  
Never remove the safety covers from the cooling unit when the machine is plugged in. The manufacturer is not liable for any injury or damage due to non-compliance with the safety precautions.



Parts that have just been welded will be hot and may cause burns when touched. During maintenance work on the torch or the electrode holder, you should make sure it's cold enough and wait at least 10 minutes before any intervention. When using a water-cooled torch, make sure that the cooling unit is switched on to avoid any burns that could potentially be caused by the liquid. It is important to secure the working area before leaving it to ensure protection of the goods and the safety of people.

### WELDING FUMES AND GAS



Fumes, gas and dust produced during welding are hazardous to health. It is mandatory to ensure adequate ventilation and/or extraction to keep fumes and gas away from the work area. Using an air fed welding helmet is recommended in case of insufficient ventilation in the workplace. Check that the suction is effective by referring to the recommended safety regulations.

Precautions must be taken when welding in small areas, and the operator will need supervision from a safe distance. In addition, the welding of certain materials containing lead, cadmium, zinc, mercury or beryllium may be particularly harmful. Also remove any grease on the metal pieces before welding. Gas cylinders must be stored in an open or ventilated area. They must be stored vertically and held by a support or trolley to limit the risk of fall. Do not weld in areas where grease or paint are stored.

## FIRE AND EXPLOSION RISKS



Protect the entire welding area. Flammable materials must be moved to a minimum safe distance of 11 meters. A fire extinguisher must be readily available near the welding operations. Be careful of spatter and sparks, even through cracks. It can be the source of fire or explosion. Inflammable material, explosive material, containers under pressure must stay at a safety distance. Welding in closed containers or pipes is forbidden and, if they are opened, they must be emptied of any flammable or explosive material (oil, fuel, gas ...). Grinding operations should not be carried out close to the power supply or any flammable materials.

## GAS CYLINDERS



Gas leaking from the cylinders can lead to suffocation if present in high concentration around the work area (ventilation required). Transport must be done safely: cylinders closed and welding machine switched off. They must be stored vertically and held by a support to limit the risk of falling. Close the cylinder between two uses. Beware of temperature variations and sun exposure. The cylinder must not be in contact with a flame, electric arc, torch, earth clamp or all other sources of heat. Always keep gas cylinders away from electrical circuits, and therefore never weld a cylinder under pressure. Be careful when opening the cylinder valve, it is necessary to remove the tip of the valve and make sure that the gas meets your welding requirements.

## SELECTRICAL SAFETY



The electrical mains used must have an earth terminal. Use the recommended fuse size. An electric shock could cause serious injuries or potentially even deadly accidents.

Do not touch any live part of the machine (inside or outside) when it is plugged in (Torches, earth cable, cables, electrodes) because they are connected to the welding circuit. Before opening the device, it is imperative to disconnect it from the mains and wait 2 minutes, so that all the capacitors are discharged. Do not touch the torch or electrode holder and the earth clamp at the same time.

Make sure to replace the torches and cables if they are damaged. This should be done by a qualified and authorised technician. Make sure that the cable cross section is adequate with the usage (extensions and welding cables). Always wear dry clothes which are in good condition in order to be isolated from the welding circuit. Wear insulating shoes, regardless of the workplace/environment in which you work in.

## EMC CLASSIFICATION



This Class A machine is not intended to be used on a residential site where the electric current is supplied by the domestic low-voltage power grid. There may be potential difficulties in ensuring electromagnetic compatibility at these sites, due to conducted interferences as well as radiation.



Provided that the impedance of the low-voltage public electrical network at the common coupling point is less than  $Z_{max} = 0,339 \text{ Ohms}$ , this equipment complies with IEC 61000-3-11 and can be connected to public low-voltage electrical mains.



It is the responsibility of the installer or user of the equipment to ensure, in consultation with the distribution network operator if necessary, that the network impedance complies with the impedance restrictions.

This equipment complies with the CEI 61000-3-12 standard.

## ELECTROMAGNETIC EMISSIONS



The electric current flowing through any conductor causes electrical and magnetic fields (EMF). The welding current generates an EMF around the welding circuit and the welding equipment.

The EMF electromagnetic fields can interfere with certain medical implants, such as pacemakers. Protective measures must be taken for people having medical implants. For example, by restricting access to passers-by or conducting an individual risk evaluation for the welders.

All welders must use the following procedures to minimize exposure to electromagnetic fields from the welding circuit:

- position the welding cables together - fix them with a clamp, if possible;
- position yourself (torso and head) as far away from the welding circuit as possible;
- never wrap the welding cables around the body;
- do not position the body between the welding cables. Hold both welding cables on the same side of your body;
- connect the earth clamp as close as possible to the area being welded;
- do not work too close to, do not lean and do not sit on the welding machine
- do not weld when transporting the welding machine or its wire feeder.



People wearing pacemakers are advised to consult their doctor before using this device. Exposure to electromagnetic fields while welding may have other health effects which are not yet identified.

## RECOMMENDATIONS TO ASSESS THE WELDING AREA AND WELDING INSTALLATION

### Overview

The user is responsible for the installation and use of the arc welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected, the user is responsible for resolving the situation with the manufacturer's technical assistance. In some cases, this corrective action may be as simple as earthing the welding circuit. In other cases, it may be necessary to construct an electromagnetic shield around the welding power source and around the entire piece by fitting input filters. In all cases, electromagnetic interferences must be reduced until they are no longer inconvenient.

### Welding area assessment

Before installing the machine, the user must evaluate the possible electromagnetic problems that may arise in the area where the installation is planned. The following elements should be taken into account:

- the presence (above, below and next to the arc welding machine) of other power cables, remote cables and telephone cables;
- television transmitters and receivers;
- computers and other hardware;
- critical safety equipment such as industrial machine protections;
- the health and safety of the people in the area such as people with pacemakers or hearing aids;
- calibration and measuring equipment;
- the isolation of other pieces of equipment which are in the same area.

The operator has to ensure that the devices and equipment used in the same area are compatible with each other. This may require extra precautions;

h) the time of day during the welding or other activities have to be performed.

The dimension of the cutting area that has to be considered depends on the size and shape of the building and the type of work undertaken. The area taken into consideration might go beyond the limits of the installations.

### Welding area assessment

Besides the welding area assessment, the assessment of the arc welding systems installation itself can be used to identify and resolve cases of disturbances. The assessment of emissions must include in situ measurements as specified in Article 10 of CISPR 11: 2009. In situ measurements can also be used to confirm the effectiveness of mitigation measures.

## RECOMMENDATION ON METHODS OF ELECTROMAGNETIC EMISSIONS REDUCTION

**a. National power grid :** the arc welding machine must be connected to the national power grid in accordance in accordance with the manufacturer's recommendation. In case of interferences, it may be necessary to take additional precautions such as the filtering of the power supply network. Consideration should be given to shielding the power supply cable in a metal conduit or equivalent of permanently installed arc welding equipment. It is necessary to ensure the electrical continuity of the frame along its entire length. The shielding should be connected to the welding current's source to ensure good electrical contact between the conduct and the casing of the welding current source.

**b. Maintenance of the arc welding equipment :** The arc welding machine should be subject to a routine maintenance check according to the recommendations of the manufacturer. All accesses, service doors and covers should be closed and properly locked when the arc welding equipment is on. The arc welding equipment must not be modified in any way, except for the changes and settings outlined in the manufacturer's instructions. The spark gap of the arc starts and arc stabilization devices must be adjusted and maintained according to manufacturer's recommendations.

**c. Welding cables:** Cables must be as short as possible, close to each other and close to the ground, if not on the ground.

**d. Equipotential bonding:** consideration should be given to bond all metal objects in the surrounding area. However, metal objects connected to the workpiece increase the risk of electric shock if the operator touches both these metal elements and the electrode. It is necessary to insulate the operator from such metal objects.

**e. Earthing of the workpiece:** When the part is not earthed due to electrical safety reasons or because of its size and its location (which is the case with ship hulls or metallic building structures), the earthing of the part can, in some cases but not systematically, reduce emissions. It is preferable to avoid the earthing of parts that could increase the risk of injury to the users or damage other electrical equipment. If necessary, it is appropriate that the earthing of the part is done directly, but in some countries that do not allow such a direct connection, it is appropriate that the connection is made with a capacitor selected according to national regulations.

**f. Protection and shielding:** The selective protection and shielding of other cables and devices in the area can reduce perturbation issues. The protection of the entire welding area can be considered for specific situations.

## TRANSPORT AND TRANSIT OF THE WELDING MACHINE



The machine is fitted with handle(s) to facilitate transportation. Be careful not to underestimate the weight of the machine. The handle(s) cannot be used for slinging.

Do not use the cables or torch to move the machine. The welding equipment must be moved in an upright position.

Do not place/carry the unit over people or objects.

Never lift the machine while there is a gas cylinder on the support shelf. The transport rules applying to each item are different.

## EQUIPMENT INSTALLATION

- Put the machine on the floor (maximum incline of 10°).
- The machine must be placed in a sheltered area away from rain or direct sunlight.
- Provide an adequate area to ventilate the machine and access the controls.
- This equipment must be used and stored in a place protected from dust, acid, gas or any other corrosive substance.
- The machine protection level is IP21, which means:
  - Protection against access to dangerous parts from solid bodies of a  $\geq 12.5$ mm diameter and,
  - Protection against vertically falling drops.
- Power, extension and welding cables must be fully uncoil to avoid overheating.

Warning: Increasing the length of the torch or earth return cables beyond the maximum length specified by the manufacturer will increase the risk of electric shock.



The manufacturer does not accept any liability in relation to damages caused to objects or harm caused to persons as the result of incorrect and/or dangerous use of the machine.

## MAINTENANCE / RECOMMENDATIONS



- Maintenance should only be carried out by a qualified person. A yearly maintenance is recommended.
- Ensure the machine is unplugged from the mains, and then wait 2 minutes before carrying out maintenance work. Inside, voltages and currents are high and dangerous.



- Remove regularly the casing and any excess of dust. Take this opportunity to have the electrical connections checked by a qualified person, with an insulated tool.
- Regularly check the condition of the power supply cable. If the power cable is damaged, it must be replaced by the manufacturer, its after sales service or an equally qualified person to prevent danger.
- Ensure the vents of the device are not blocked to allow adequate air circulation.
- Do not use this equipment to thaw pipes, to charge batteries, or to start any engine.



The cooling liquid must be changed every 12 month in order to avoid sediments which could block the torch cooling circuit. Any leak or residual fluid, after use, must be handled within the appropriate purification factory. If possible, recycle the product. It is prohibited to empty the product in a river, a septic tank or a draining system. The diluted fluid must not be emptied in the sewers, unless authorised by the local regulations.



## INSTALLATION – PRODUCT OPERATION

Only qualified personnel authorized by the manufacturer should perform the installation of the cutting equipment. During set up, the operator must ensure that the machine is unplugged.

### DESCRIPTION

The PROTIG 201 AC/DC and PROTIG 201L AC/DC are inverter welding current sources for welding to the coated electrode (MMA) and refractory electrode (TIG) in direct current (DC TIG) and alternating current (AC TIG). The MMA process can weld all types of electrodes : rutile, basic, stainless and cast iron.

TIG welding requires gas shield protection of pure gas (Argon). The PROTIG 201L AC/DC incorporates a cooling unit as standard.

It is recommended to use the welding cables supplied with the unit in order to obtain the best performance.

### POWER SUPPLY - POWER UP

- The PROTIG 201 AC/DC is supplied with a 16A plug type CEE7/7 and must only be used on a single-phase electrical installation (50-60 Hz) with 3 wires including one connected to earth. This machine has the "Flexible Voltage" feature and needs to be powered by an earthed electrical installation between 110V and 240V (50 - 60Hz). For intensive use at 110 V, replace the original plug with a 32 A plug protected by a 32 A circuit breaker. The user must ensure that the socket is accessible.
- The PROTIG 201L AC/DC is supplied with a 16A plug type CEE7/7 and must only be used on a single-phase electrical installation (50-60 Hz) with 3 wires including one connected to earth.

The absorbed effective current (I<sub>1eff</sub>) is displayed on the machine, for optimal use. Check that the power supply and its protection (fuse and/or circuit breaker) are compatible with the current needed by the machine. In some countries, it may be necessary to change the plug to allow the use at maximum settings.

- It switches to protection mode if the power supply voltage is over 265 V. To indicate this fault, the display shows **U51** Once the machine is in protective mode, unplug the machine and plug it into an outlet supplying the correct voltage.
- Fan behaviour: in MMA mode, the fan works continuously. In TIG mode, the fan works only during welding, then stops after the machine has cooled down.
- The arc priming and stabilisation device is designed for manual and mechanically guided operation.

### WORKING OFF A GENERATOR

These machines can work on generators as long as the auxiliary power matches the requirements below:

- The voltage must be AC, always set as specified, and the peak voltage below 700V,
- The frequency must be between 50 and 60 Hz.

It is imperative to check these requirements as certain generators can create high voltage peaks that can damage these machines.

### USE OF EXTENSION LEADS

All extension cables must have an adequate size and section, relative to the machine's voltage. Use an extension lead that complies with national safety regulations.

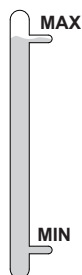
| Voltage input | Length and thickness of the extension lead |                   |
|---------------|--|-------------------|
|               | < 45 m                                     | < 100 m           |
| 230 V         | 2.5 mm <sup>2</sup>                        |                   |
| 110 V         | 2.5 mm <sup>2</sup>                        | 4 mm <sup>2</sup> |

## GAS CONNECTION

The machine has a pneumatic connection. Use the adapters originally supplied with the power source.

## LIQUID COOLING (201L)

### FILLING THE DEVICE



The tank of the cooling unit must be filled to the recommended MAX level of the gauge on the back of the cooling unit, but never below the MIN level, unless a warning message is displayed.  
Use a coolant with low electrical conductivity, anti-corrosion and anti-freeze specific to welding machines (recommended coolant ref 052246).

To obtain the best cooling performance from this unit, distilled or demineralised water should be used. Please note that water can only be used in ambient temperatures above 5°C.

The use of other coolants, and in particular standard automotive coolant, can lead to the accumulation of solid deposits in the cooling circuit through electrolysis, thus degrading the cooling, and even blocking the circuit.

This recommended MAX level is essential to optimise the operating factors of the associated water-cooled torch.

Any damage to the machine caused by the use of a coolant other than the recommended type or distilled or demineralised water will not be considered under the warranty.

### HOW TO USE

- 1.) NEVER USE the cooling unit WITHOUT COOLANT when the pump is running.  
Respect the minimum coolant level. Failure to do so may result in permanent damage to the cooling system's pump.
- 2.) Ensure that the cooling unit is switched off before disconnecting the liquid-cooled torch's inlet and/or outlet pipes. Coolant is hazardous and irritates eyes, mucous membranes and skin. The hot liquid can cause burns.
- 3.) Hot liquid burn hazard. Never drain the cooling unit after use. The liquid inside will be boiling, wait for it to cool down before draining.

The cooling unit must be switched off (OFF) to use an air-cooled TIG torch. For further instructions on how to do this, see page 25.


## ACCESSORIES AND OPTIONS

| Trolley |        | Trolley |        | Torch  |  | Manual remote control | Foot pedal |
|---------|--------|---------|--------|--------|--|-----------------------|------------|
|         |        |         |        |        |  |                       |            |
| 201     | 201L   | 201     | 201L   | 045675 |  | 045682                |            |
| 076341  | 041257 | 038271  | 038202 |        |  |                       |            |

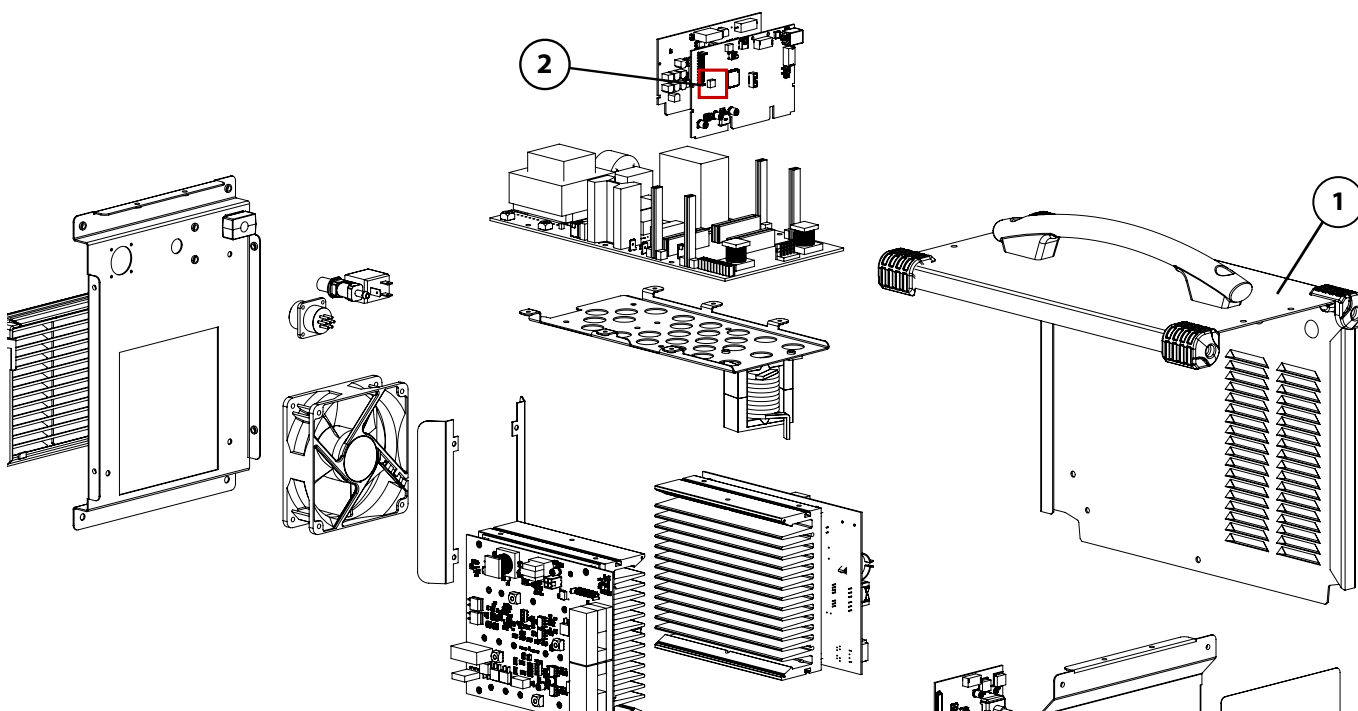
## ACTIVATION OF THE VRD FUNCTION (VOLTAGE REDUCTION DEVICE)

This device protects the welder. The welding current is delivered only when the electrode is in contact with the part (low resistance). As soon as the electrode is removed, the VRD function lowers the voltage to a very low value.

The VRD function is originally disabled. However, this can be activated by means of an ON/OFF switch on the power source control board. To access it, follow the steps below:

1. DISCONNECT THE PRODUCT FROM THE POWER SUPPLY BEFORE HANDLING.
2. Remove the screws to take the power source cover off (n° 1).
3. Locate the switch on the control board (red box on diagram below - n° 2).
4. Turn the switch located on this control card ON. The red LED switches off.
5. The VRD function is activated.
6. Screw the power source cover back on.
7. On the interface (HMI), the LED for the VRD function is lighted : VRD 

To deactivate the VRD function, simply turn the switch located on the control board back to OFF. The VRD LED on the HMI is turned off.



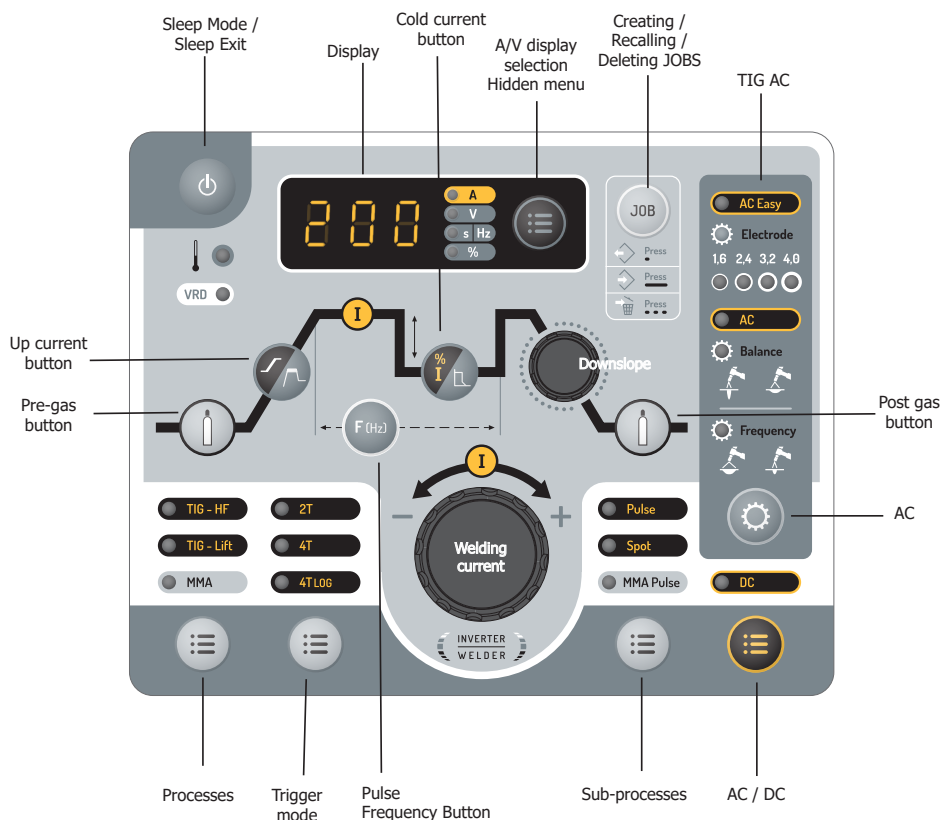
## RESETTING THE WELDING STATION

It is possible to restore the factory settings of the welding machine. When the station is in sleep mode, press the sleep exit push button for 3 seconds. The station then displays "3", "2", "1" and then resets the unit.

## DISPLAY OF SOFTWARE VERSIONS

When the machine is plugged into the mains, it displays the software versions of the power and the HMI boards.

HUMAN-MACHINE INTERFACE (HMI)



| Functions                                | Pictograms | MMA | TIG DC | TIG AC | Comments  |
|--|------------|-----|--------|--------|---|
| Sleep Mode / Sleep Exit                  |            | •   | •      | •      | Button to put the product into and out of sleep mode.   |
| Sub-processes                            | <br><br>   | •   | •      | •      | In MMA process: access to "Pulse MMA" mode,<br>In TIG DC: access the "Pulse" or "Spot" modes.   |
| AC/DC                                    |            |     | •      | •      | Choose between TIG "DC", TIG "AC" and TIG "AC - Easy".  |
| AC                                       |            |     |        | •      | Select the parameter to be adjusted between "Frequency", "Balance" and "Electrode"  |
| - A/V display selection<br>- Hidden menu |            | •   | •      |        | By default, the current setpoint is displayed on the HMI. After welding (MMA and TIG DC), the value that is displayed flashing is the welding current measurement. Pressing this button, the measured welding voltage is displayed. |
| JOB                                      |            | •   | •      | •      | Allows you to recall, create and delete a job. Refer to the JOB section for more information.   |
| Pre-gas                                  |            |     | •      | •      | Setting the Pre-Gas time. This time corresponds to the time it takes to purge the torch and to protect the area with gas before ignition  |
| Up slope current                         |            | •   | •      | •      | Current rise ramp.  |
| Pulse Frequency                          |            |     | •      | •      | Pulse frequency setting (TIG AC/DC).  |
| Cold current                             |            | •   | •      | •      | Setting the cold current in pulse mode (TIG) Arc Force setting (MMA).   |



|           |  |  |   |   |   |
|-----------|--|--|---|---|---|
| Downslope |  |  | • | • | Current lowering ramp setting.  |
| Post gas  |  |  | • | • | Post-Gas time setting. This time corresponds to the duration of gas protection after the arc has been extinguished. It protects the weld pool and the electrode against oxidation when the metal is cooling down. |

## HMI OPERATION AND DESCRIPTION OF ITS BUTTONS

- **On / Off button**

This key is used to activate or deactivate the machine from sleep mode. The sleep mode cannot be activated while the machine is welding.

- **Welding process selection button**

This key is used to select the welding process. Each successive press toggles between the following welding processes: TIG HF / TIG LIFT / MMA. The LED indicates the selected process.

Note: the process selected by default at machine startup corresponds to the last process used before the last sleep or shutdown.

- **Trigger mode selection button**

Use this button to configure how the trigger is used. Each successive press toggles between the following modes: 2T / 4T / 4T LOG. The LED indicates the selected mode.

Note: the trigger mode selected by default at machine startup corresponds to the last trigger mode used before the last sleep or shutdown. For more information, refer to the section "Compatible Torches and Trigger Behavior".

- **Selecting sub-processes button**

This key is used to select the "Sub-process". Each successive press toggles between the following sub-processes: PULSE / SPOT (only in TIG mode) / MMA PULSE (only in MMA mode). The LED indicates the selected sub-process.

SPOT mode is not accessible in 4T & 4T Log trigger configuration and in MMA PULSE welding mode.

Note: the sub-process selected by default at machine startup corresponds to the last sub-process used before the last sleep or shutdown.

- **AC or DC current selection button**

This key is used to select the current type when the TIG process is activated. Each successive press toggles between the following modes : DC / AC / AC - Easy. The LED indicates the selected process.

Note: the process selected by default at machine startup corresponds to the last process used before the last sleep or shutdown.

- **Main incremental encoder**

As default, the incremental encoder allows the adjustment of the welding current.. It is also used to set the values of other parameters which are then selected via the associated keys. Once the parameter setting has been completed, it is possible to press the key of the parameter that has just been set again so that the incremental encoder is again linked to the current setting. It is also possible to press another key related to another parameter to adjust it.. If no action is performed on the HMI for 2 seconds, the incremental encoder is again linked to the welding current setting.

- **Pre-Gas button**

The Pre-Gas adjustment is done by pressing and releasing the Pre-Gas button and then activating the main incremental encoder. Pre-Gas value increases when the incremental encoder is operated clockwise and decreases when it is operated anti-clockwise. Once the setting has been made, it is possible to press and release the Pre-Gas button again to re-link the main incremental encoder to the current setting or to wait for 2 seconds. The setting step is 0.1 sec. The minimum value is 0 sec. and the maximum value is 60 sec.

- **Post-Gas button**

The Post-Gas adjustment is done by pressing and releasing the Post-Gas button and then activating the main incremental encoder. Post-Gas value increases when the incremental encoder is operated clockwise and decreases when it is operated anti-clockwise. Once the setting has been made, it is possible to press and release the Post-Gas button again to re-link the main incremental encoder to the current setting or to wait for 2 seconds. The setting step is 0.1 sec. The minimum value is 0 sec. and the maximum value is 60 sec.

- **Up Slop or current control button**

The current ramp-up setting is done by pressing and releasing the current ramp-up button and then by activating the main incremental encoder. Current ramp-up value increases when the incremental encoder is operated clockwise and decreases when it is operated anti-clockwise. Once the setting has been made, it is possible to press and release the current ramp-up button again to re-link the main incremental encoder to the current setting or to wait for 2 seconds. The minimum value is 0 sec. and the maximum value is 60 sec.

- **Incremental encoder for fading or "Down Slop" adjustment**

The "Down-Slop" incremental encoder is used to set the value of the current fading (clockwise increase and counterclockwise decrease). The value is visible on the 7-segment display and remains displayed for 2 seconds if an action on the incremental encoder is performed. The minimum value is 0 sec. and the maximum value is 60 sec.

- **Cold current control button**

When one of the 2 processes "HF TIG" or "LIFT TIG" is selected, the cold current setting button is used to adjust the value of the cold current (only in 4T Log trigger configuration). The value can be adjusted between 20% and 99% of the welding current. The incremental step is 1%. This value is also adjustable in the "TIG DC Pulse" and "MMA Pulse" processes.

- **" AC " button**

Use of the "AC" button in "AC - Easy" mode : Pressing this button gives access to the tungsten electrode diameter setting. The setting of this parameter is done as follows:

- Press the "AC" key,
- Within 3 seconds, activate the incremental encoder. An clockwise rotation of this encoder leads to an increase in the electrode diameter and a anti-clockwise rotation leads to a decrease in the value of the electrode diameter. The selected electrode value is visible on the HMI LEDs below the AC Easy mode.
- Once the setting has been made, after 2 seconds without activating the incremental encoder, it is again linked to the current setting.



Using the "AC" button in "AC" mode: Pressing this button allows you to select and adjust the "Balance" and "Frequency" parameters (the associated LED lights up according to the selected parameter). The incremental encoder acts on these 2 parameters values and must be actuated within 5 seconds. Beyond that, the power source will display the welding current again.

- **Frequency adjustment in TIG AC (Frequency)**

The welding current frequency setting for TIG AC ranges from 20 Hz to 200 Hz.

- **Balance adjustment in TIG AC (Balance)**

The welding balance setting for TIG AC ranges from 20 % to 60 %. The incremental step is 1%.

Note: The "AC" key is not active in "DC" mode.

- **Setting the electrode diameter (Electrode)**

Adjusting the electrode diameter allows the ignition current to be adjusted.

## HIDDEN MENU


A hidden menu is available for each of the welding processes: DC TIG, AC TIG and MMA. This menu is designed to allow the setting of additional parameters for each of these processes.



The changes of the values of accessible parameters in the hidden menu are kept when saving a job.

### Accessibility, navigation and settings in hidden menu:

DC TIG and AC TIG:


Access the hidden menu by pressing the  (A/V) button for 3 seconds.

The machine now displays "CoU". By turning the main encoder, it is possible to access to "ISA", "TSA", "ISO", "TSO" and "ESC".

To access the setting of these parameters, press the A/V button again.

- **CoU** : Activate or deactivate the Cooling Unit by selecting "ON" or "OFF". The selection between "ON" and "OFF" is made by activating the main encoder and then pressing the A/V button. Only available on the "201 L AC/DC" version.
- **ISA** : Set the starting current. It is set as a percentage of the welding current setpoint. It can be adjusted between 10% and 200%. Validate the entered setting by pressing the A/V button.
- **TSA** : Set the duration of the starting current. Time is adjustable from 0s to 10s, validate the entered setting by pressing the A/V button.
- **ISO** : Set the welding end current, it is set as a percentage of the welding current setpoint. It can be adjusted between 10% and 200%. Validate the entered setting by pressing the A/V button.
- **TSO** : Set the duration of the welding current. Time is adjustable from 0s to 10s, validate the entered setting by pressing the A/V button.
- **ESC** : Press the A/V button to exit the hidden menu. You can also exit the hidden menu by waiting three seconds after setting a hidden menu parameter. The display then returns to the welding current setpoint setting.

MMA :

Access the hidden menu by pressing the  (A/V) button for 3 seconds.

The machine now displays "HST". By turning the main encoder it is possible to access "AST" and "ESC".

- **HST** : Set the duration of the HotStart. This time is adjustable from 0.1s to 2s. Validate the entered setting by pressing the A/V button.
- **AST** : Activate or deactivate the Antisticking by selecting "ON" or "OFF". Validate the entered setting by pressing the A/V button.
- **ESC** : Press the A/V button to exit the hidden menu. You can also exit the hidden menu by waiting three seconds after setting a hidden menu parameter. The display then returns to the welding current setpoint setting.

## COATED ELECTRODE WELDING (MMA)

### CONNECTIONS AND RECOMMENDATIONS

- Connect the electrode holder and the earth clamp into the connectors provided for this purpose, taking care to respect the welding polarities and intensities indicated on the electrodes boxes.
- Remove the electrode from the electrode holder when the machine is not in use.
- The machines have 3 features exclusive to Inverters:
  - The Hot Start creates an overcurrent at the beginning of the weld to prevent sticking.
  - The Arc Force creates an overcurrent which prevents the electrode from sticking to the weld pool.
  - The Anti-Sticking technology makes it easier to unstick the electrode from the metal.

### MMA PULSE

This MMA Pulse welding mode is suitable for applications in the vertical up position (PF). The pulse mode keeps the weld pool cold and eases the transfer of matter. Without the pulse mode, vertical-up welding requires a difficult "Christmas tree" shape triangular movement. With the MMA Pulsed mode, this movement is no longer required and a simple straight up movement is enough (depending on the thickness of the workpiece). If you wish to widen your weld pool, a simple lateral movement is enough (similar to normal welding). This process allows greater control during vertical-up welding. The pulse frequency is adjustable from 0.4 Hz to 20 Hz.

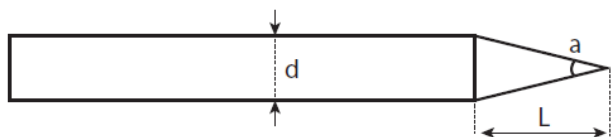
## TUNGSTEN ELECTRODE WELDING WITH INERT GAS (TIG MODE)

### CONNECTION AND ADVICE

- TIG DC and TIG AC welding require gas protection (Argon).
- Connect the earth clamp to the positive connector (+). Connect the torch to the negative plug (-), the trigger cable and the gas hose.
- Make sure that the various components that make up the torch are present (clamp, collar support, diffuser and nozzle) and that they are in good condition.
- The electrode selection is defined according to the TIG DC or AC welding current..

### ELECTRODE SHARPENING

For optimal operation, it is recommended to use a sharpened electrode as follows:



$a = \varnothing 0.5 \text{ mm}$   
 $L = 3 \times d$  for a low current.  
 $L = d$  for a high current

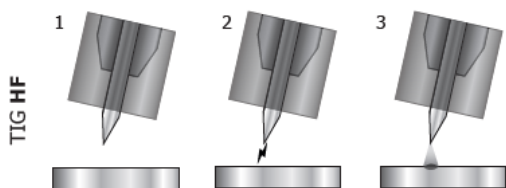
### CHOICE OF ELECTRODE DIAMETER

| Ø Electrode (mm)   | TIG DC        |                      | TIG AC             |                      |
|--------------------|---------------|----------------------|--------------------|----------------------|
|                    | Pure tungsten | Tungsten with oxides | Pure tungsten      | Tungsten with oxides |
| 1                  | 10 > 75 A     | 10 > 75 A            | 15 > 55 A          | 10 > 70 A            |
| 1.6                | 60 > 150 A    | 60 > 150 A           | 45 > 90 A          | 60 > 125 A           |
| 2                  | 75 > 180 A    | 100 > 200 A          | 65 > 125 A         | 85 > 160 A           |
| 2.5                | 130 > 230 A   | 170 > 250 A          | 80 > 140 A         | 120 > 210 A          |
| 3.2                | 160 > 310 A   | 225 > 330 A          | 150 > 190 A        | 150 > 250 A          |
| 4                  | 275 > 450 A   | 350 > 480 A          | 180 > 260 A        | 240 > 350 A          |
| ~ 80 A per mm de Ø |               |                      | ~ 60 A per mm de Ø |                      |

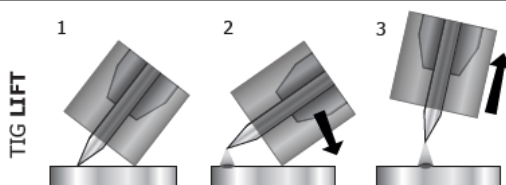
### CHOICE OF THE TYPE OF IGNITION

TIG HF: non-contact high-frequency ignition of the tungsten electrode on the workpiece.

TIG LIFT : Arcing by contact (for environments where HF is not desirable).



1. Place the torch in the welding position above the part (distance of about 2-3 mm between the electrode tip and the part).
2. Press the the torch trigger (the arc starts without contact using High Frequency impulsions).
3. The initial welding current flows, the weld will be continues according to the welding cycle.



1. Position the torch nozzle and the electrode tip on the workpiece and press the torch button.
2. Tilt the torch until the electrode tip is about 2-3 mm away from the work-piece. The arc starts.
3. Return the torch to the normal position to start the welding cycle.

### TIG PROCESS SETTINGS

- TIG DC is dedicated to the welding of ferrous metals such as steel, stainless steel but also copper and its alloys, titanium.
- TIG AC is dedicated to the welding of aluminium and its alloys.

#### TIG DC WELDING

##### • TIG DC - Standard

The TIG DC Standard welding process allows high quality welding on most ferrous materials such as steel, stainless steel, but also copper and its alloys, titanium... The many possibilities of current and gas management allow you to perfectly control your welding operation, from the ignition to the final cooling of your bead.

##### • TIG DC - Pulse

This pulsed current welding mode is a combination of high current pulses ( $I$ , welding pulse) and low current pulses ( $I_{Cold}$ , part cooling pulse). This pulse mode allows to assemble pieces while keeping the machine cooler. It is particularly recommended for assembling thin parts.

(e. g. : The welding current  $I$  is set to 100A and  $\% (I_{Cold}) = 50\%$ , i.e. a cold current =  $50\% \times 100A = 50A$ .  $F(\text{Hz})$  is set to 10 Hz, the signal period will be  $1/10 \text{ Hz} = 100 \text{ ms}$ . Every 100ms, a 100A pulse then a 50A pulse will succeed each other.

##### The choice of frequency

- If thin plate without TIG electrodes ( $< 0.8 \text{ mm}$ ),  $F(\text{Hz}) > 10\text{Hz}$ ,
- If special metal requiring a welding pool sweep for degassing, then  $F(\text{Hz}) 5 < 100\text{Hz}$ .

The frequency adjustment in TIG DC pulsed is done by pressing and releasing the pulse frequency adjustment button and then operating the main incremental encoder. Frequency value increases when the incremental encoder is operated clockwise and decreases when it is operated anti-clockwise. This frequency ranges from 0.1 Hz to 2 KHz.

Example : = 1 KHz.

Once the setting has been done, press the frequency setting button again or wait 2 seconds for the power source to return to the main menu. Pulsed DC welding is available for the "TIG HF" and "TIG LIFT" processes and the "2T" and "4T" trigger modes.

**TIG AC WELDING**

**• TIG AC - Easy**

This mode allows a quick use of AC welding by adjusting the electrode diameter (the selected value is indicated by the different LEDs on the HMI). With this mode, "Balance" and "Frequency" settings parameters are unchangeable. The choice of the electrode diameter affects the welding current and the scraping values as follows :

| Electrode diameter | I <sub>min</sub> | I <sub>max</sub> | Penetration and cleaning |
|--------------------|------------------|------------------|--------------------------|
| 1,6 mm             | 10 A             | 80 A             | 30 %                     |
| 2,4 mm             | 45 A             | 120 A            | 37 %                     |
| 3,2 mm             | 60 A             | 180 A            | 43 %                     |
| 4,0 mm             | 75 A             | 200 A            | 50 %                     |

With this mode, the frequency value is related to the welding current value as follows :

| Current (A) | Frequency (Hz) |
|-------------|----------------|
| 10 > 40     | 117            |
| 41 > 90     | 100            |
| 91 > 140    | 79             |
| 141 > 170   | 70             |
| 171 > 200   | 60             |

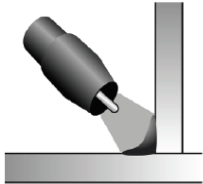
When switching from "AC - Easy" to "AC" mode, the last welding parameters "AC - EASY" are retained and can be used as a basis for further refinement in "AC" (e.g. : welding frequency and balance).

**• TIG AC - Standard**

This TIG AC - Standard welding mode is dedicated to welding aluminium and its alloys (Al, AlSi, AlMg, AlMn...). Alternating current (AC) includes a cleaning phase which is essential for aluminium welding.

The balance: It allows the part to be cleaned during welding. The balance: It allows the part to be cleaned during welding.

The frequency: the frequency is used to adjust the concentration of the arc. A high frequency generates a concentrated arc. A low frequency generates a wider arc.



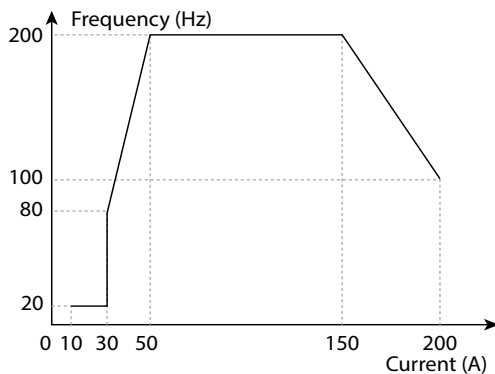
High frequency



Low frequency

The AC/DC current-frequency characteristic: In AC, the value of the welding current and its frequency are linked by the function below :

**AC Current versus Frequency**



- Between 10 A and 30 A, the maximum frequency is limited to 20 Hz.
- Between 30 A and 50 A, the maximum frequency is between 80 Hz and 200 Hz.
- Between 50 A and 150 A, the maximum frequency is 200 Hz.
- Between 150 A and 200 A, the maximum frequency decreases from 200 Hz to 100 Hz.

**• TIG AC - Pulsed**

The Pulse function is available in TIG AC - Easy and TIG AC - Standard. The pulse frequency is adjustable from 0.1 Hz to 10 Hz.

**TIG SPOT DC or AC**

The " SPOT" mode allows the pre-assembly of parts by tacking. The tacking time adjustment allows a better reproducibility and the realisation of non-oxidised tack. As default, when the " SPOT " mode is selected, the start and the end of the welding is done at the trigger. However, the " F(Hz) " button and the main encoder allow the user to refine this time. The time in this "SPOT" tacking mode is adjustable by 0.1 sec. at 60 sec. in steps of 0.1 sec. The ignition is then done with the trigger. To return to an undefined spot time, simply select "0.0s".

**JOBS MANAGEMENT**

The current settings are automatically saved and loaded at start up. In addition to the current settings, it is possible to save and recall so-called "JOB" configurations. The "JOB" button is used to save, recall or delete a configuration. 50 Jobs can be stored per welding process.

**• Job Recall**

- Apart from not being in the welding process, the recall of a job does not require any particular initial condition,
- Press the "JOB" button briefly (not more than 2 sec.),
- "OUT" appears on the HMI display,
- With the incremental encoder, select a job number. Only the numbers associated with existing jobs appear on the display. If no job is stored, the HMI displays "- - -".
- Once the job number has been selected, press the "JOB" button to confirm the configuration. The job number then flickers on the display, indicating that the job has been loaded. The number continues to flicker until another parameter is changed or until the torch trigger is pressed to start the welding cycle.

**• Job deletion**

- Press the "JOB" button briefly (not more than 2 sec.),
- "OUT" appears on the HMI display,
- With the incremental encoder, select a job number. Only numbers associated with existing jobs can be displayed,
- Press successively 3 times on the "JOB" button. The selected job is now deleted and the power source displays the welding current again.





**• Job creation**

- Adjust all desired welding parameters,
- Press and hold the "JOB" button for more than 3 seconds,
- The display shows "IN",
- Select a job number using the incremental encoder. Only numbers that are not already assigned to a previously saved job can be selected and are shown on the display,
- Once the job number has been chosen, press the "JOB" button to validate and save it under the selected number,
- The job number then remains displayed, indicating that the save action has been completed. The number continues to be displayed until another button or the torch trigger is activated.

Note: If all numbers are already assigned to saved jobs, the HMI displays "Full".

Precisions for a job reminder in TIG AC: The special feature of a job reminder in TIG AC is the display of the parameters related to the "AC" functions. When a job configuring the station in "AC" is called up, the HMI then displays successively the values of the welding current (in A), the balance (in %) and the frequency (in Hz) following a repetitive cycle. This cycle lasts until the torch trigger is pulled to start a welding cycle.

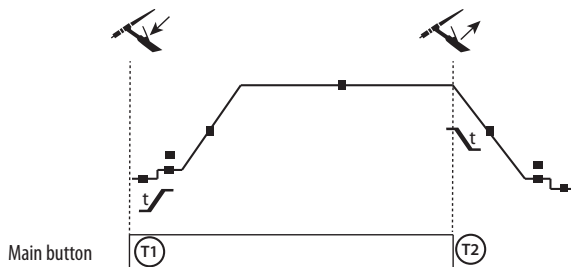
**COMPATIBLE TORCHES AND TRIGGER TYPES**

|   |   |   |  |
|---|---|---|--|
|  |  |  |  |
| Trigger   | Double Buttons  | Double Buttons + Potentiometer  | Up & Down  |
| ✓   | ✓   | ✓   | ✓  |

For the 1 button torch, the button is called "main button".

For the 2 buttons torch, the first button is called "main button" and the second button is called "secondary button".

↕ **2T MODE**

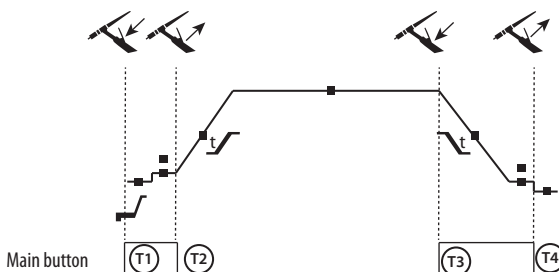


T1: The main button is pressed, the welding cycle starts (PreGas, I\_Start, UpSlope and welding).

T2: The main button is released, the welding cycle is stopped (DownSlope, I\_Stop, PostGas).

For the double button torch and in 2T mode only, the secondary button works like the main button.

↕ **4T MODE**

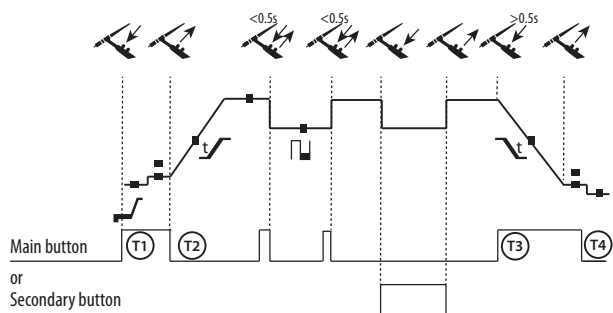


T1: The main button is pressed, the cycle starts at PreGas and stops in the I\_Start phase.

T2: The main button is released, the cycle continues in UpSlope and in welding.

T3: The main button is pressed, the cycle switches to DownSlope and stops in I\_Stop phase..

T4: The main button is released, the cycle ends with PostGas.

**↑↓4T LOG MODE**


T1: The main button is pressed, the cycle starts at PreGas and stops in the I\_Start phase.

T2: The main button is released, the cycle continues in UpSlope and in welding.

LOG : this mode is used during welding :

- A brief press of the main button (<0.5s), the current switches from I welding current to I cold and vice versa.

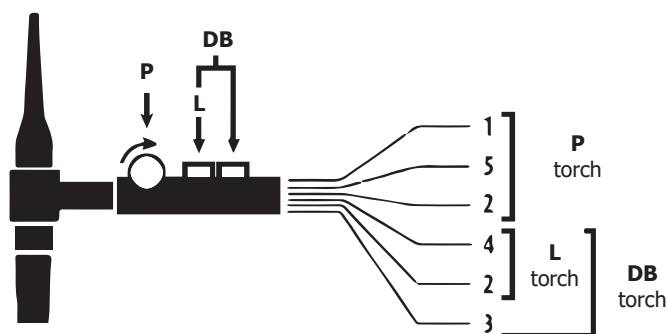
- The secondary button is kept pressed, the current switches from I welding to I cold.

- The secondary button is released, the current switches from I cold to I welding.

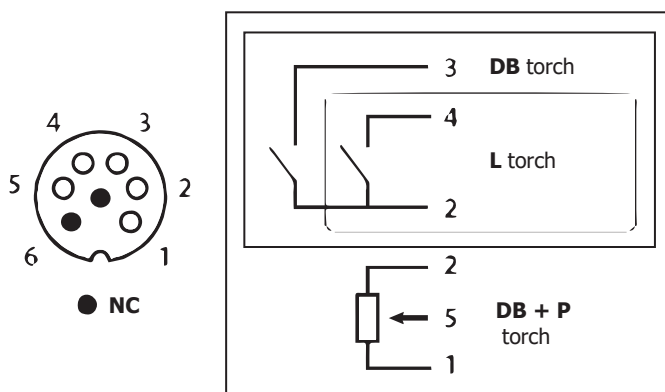
T3: A long press on the main button (>0.5 sec.), the cycle switches to DownSlope and stops in the I\_Stop phase.

T4: The main button is released, the cycle ends with PostGas.

For this mode it may be convenient to use the dual button torch option or dual button with potentiometer. The "up" command keeps the same function as the single button or trigger torch. The secondary button can, when pressed, switch to the cold current. The welding torch potentiometer, when present, allows the welding current to be adjusted from 50 % to 100 % of the setpoint.

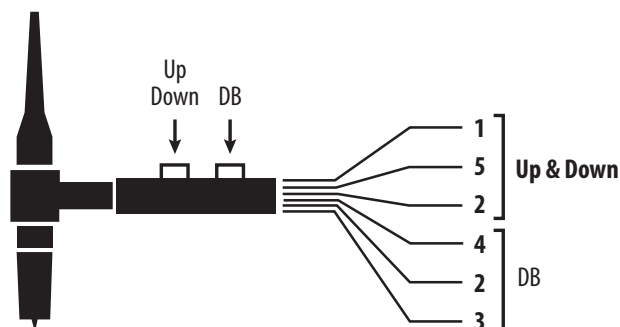
**COMMAND TRIGGER CONNECTOR**


Cabling diagram for the SRL 18 torch.

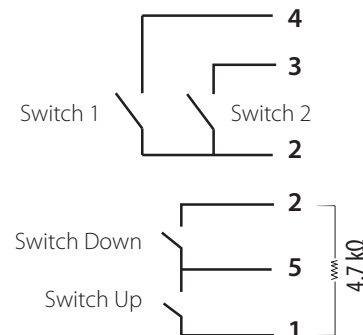


Electric diagram based on type of torch used.

| Torch type                            |                       | Wire description            | Pin        |
|---------------------------------------|-----------------------|-----------------------------|------------|
| Torch with 2 triggers + potentiometer | Torch with 2 triggers | Common/Earth                | 2 (green)  |
|                                       |                       | Switch trigger 1            | 4 (white)  |
|                                       |                       | Switch trigger 2            | 3 (brown)  |
|                                       | Torch with 1 trigger  | Common/ Potentiometer earth | 2 (grey)   |
|                                       |                       | 10 V                        | 1 (yellow) |
|                                       |                       | Cursor                      | 5 (pink)   |




Up &amp; Down torch wiring diagram



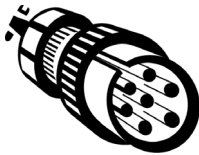
Up &amp; Down torch electrical diagram

| Torch type      | Wire description        | Pin |
|-----------------|-------------------------|-----|
| Up & Down Torch | Common Switch 1 & 2     | 2   |
|                 | Switch 1                | 4   |
|                 | Switch 2                | 3   |
|                 | Common Up & Down Switch | 5   |
|                 | Up Switch               | 1   |
|                 | Down Switch             | 2   |

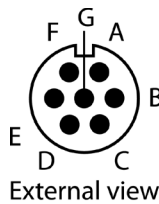


**REMOTE CONTROL**

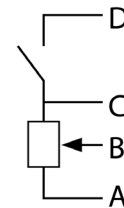
The analog remote control operates in TIG and MMA processes.



Ref. 045699



External view



Electric diagram according to the remote control type.

- 1- Plug the remote control into the connection at the back of the machine.
- 2- The HMI detects the presence of a remote control and offers a selection between a "pedal" type remote control and a "potentiometer" type remote control, accessible via the main incremental encoder.

Connection:

The product is equipped with a female socket for a remote control.

The specific 7 pin male plug (option ref.045699) enables connection to the different types of manual remote control or foot pedal. For the cabling layout, please see the diagram below.

| Type of remote control | Wire description | Pin |
|------------------------|------------------|-----|
| Foot pedal             | 10 V             | A   |
|                        | Cursor           | B   |
|                        | Common/Earth     | C   |
|                        | Switch           | D   |

Operation:

- **Manual remote control (option ref. 045675)** The manual remote control allows the current to be varied from 50% to 100% of the set current. In this configuration, all modes and functions of the machine are accessible and can be set.
- **Foot pedal (option ref. 045682)** :The pedal control enables variation of the current from the minimum current to 100% of the set intensity. In TIG, the welding machine only operates in 2T mode. The upslope and downslope are not automatically managed by the current source, and are controlled by the user with the foot pedal.

**FAN**

The station integrates a controlled fan system.

**VERSION WITH INTEGRATED COOLING UNIT: 201L AC/DC**

The protections supported by the cooling unit to ensure the protection of the torch and the user are:

- Coolant thermal protection

The hot and cold liquid connections are marked with coloured rings, respectively red (coolant inlet) and blue (coolant outlet). At the back of the station, a gauge is used to visually determine the level of liquid in the tank.



Make sure the unit is disconnected from the power supply before connecting or disconnecting the fluid inlet and outlet hoses from the torch.  
The coolant is harmful and irritates the eyes, the mucous membranes and the skin. Hot liquid may cause burns.



## WARRANTY

The warranty covers faulty workmanship for 2 years from the date of purchase (parts and labour).

The warranty does not cover:

- Transit damage.
- Normal wear of parts (eg. : cables, clamps, etc..).
- Damages due to misuse (power supply error, dropping of equipment, disassembling).
- Environment related failures (pollution, rust, dust).

In case of failure, return the unit to your distributor together with:

- The proof of purchase (receipt etc ...)
- A description of the fault reported.