



# ***HELIARC AC/DC 281i, 283i & 353i***



## ***Operating Manual***

**BE SURE THIS INFORMATION REACHES THE OPERATOR.  
YOU CAN GET EXTRA COPIES THROUGH YOUR SUPPLIER.**

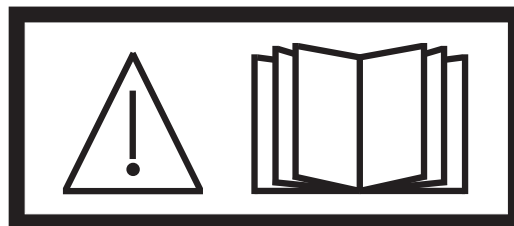


**These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding and cutting equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging," Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.**

## **USER RESPONSIBILITY**

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Malfunctioning or poorly maintained equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom it was purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.



**READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.**

**PROTECT YOURSELF AND OTHERS!**

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## Safety - Introduction

ESAB welding equipment is designed to operate both safely and effectively. Sensible attention to operating procedures, precautions, and safe practices is required to achieve a full measure of usefulness. Whether an individual is involved with operation, servicing, or as an observer, compliance with established precautions is mandatory. Failure to observe precautions could result in equipment damage, serious injury, or death. The following precautions are guidelines when working with cutting machines and associated equipment. More explicit precautions are found within the instruction literature. For specific safety and industry-related information, obtain and read publications listed in *Recommended References*.

The following words and symbols are used throughout this manual to indicate different levels of required safety involvement:

**DANGER**

USED TO CALL ATTENTION TO HIGH RISK HAZARDS, WHICH IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

**WARNING**

USED TO CALL ATTENTION TO MEDIUM RISK HAZARDS, WHICH IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

**CAUTION**

USED TO CALL ATTENTION TO LOW RISK HAZARDS, WHICH IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY.



USED TO CALL ATTENTION TO IMPORTANT INFORMATION NOT DIRECTLY RELATED TO SAFETY HAZARDS OR COULD POTENTIALLY CAUSE EQUIPMENT DAMAGE.

## Safety



**WARNING:** These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.



**PROTECT YOURSELF AND OTHERS --** Some welding, cutting, and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, and goggles are also required.
2. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
3. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
4. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing.
5. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
6. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.



**FIRES AND EXPLOSIONS --** Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

1. Remove all combustible materials well away from the work area or cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal."
3. Do not weld, cut or perform other hot work until the work piece has been completely cleaned so that there are no substances on the work piece which might produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.
5. Do not use equipment beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
6. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
7. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.



**ELECTRICAL SHOCK -- Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling.**

1. Be sure the Plasma Console frame (chassis) is connected to the ground system of the input power.
2. Connect the work piece to a good electrical ground.
3. Connect the work cable to the work piece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equipment. Replace worn or damaged cables.
5. Keep everything dry, including clothing, work area, cables, torch/electrode holder, and Plasma Console.
6. Make sure that all parts of your body are insulated from work and from ground.
7. Do not stand directly on metal or the earth while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.
8. Put on dry, hole-free gloves before turning on the power.
9. Turn off the power before removing your gloves.
10. Refer to ANSI/ASC Standard Z49.1 (listed on next page) for specific grounding recommendations. Do not mistake the work lead for a ground cable.

**ELECTRIC AND MAGNETIC FIELDS — May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:**



1. Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.
2. Exposure to EMF may have other health effects which are unknown.

3. Welders should use the following procedures to minimize exposure to EMF:

- A. Route the electrode and work cables together. Secure them with tape when possible.
- B. Never coil the torch or work cable around your body.
- C. Do not place your body between the torch and work cables. Route cables on the same side of your body.
- D. Connect the work cable to the work piece as close as possible to the area being welded.
- E. Keep welding Plasma Console and cables as far away from your body as possible.



**FUMES AND GASES -- Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation.**

**Therefore:**

1. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.
2. Do not operate near degreasing and spraying operations. The heat or arc rays can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.
3. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
4. Refer to ANSI/ASC Standard Z49.1 (see listing below) for specific ventilation recommendations.

5. **WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)



**CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:**

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.
2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
3. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
4. Locate cylinders away from heat, sparks, and flames. Never strike an arc on a cylinder.
5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.



**EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can cause injury or death. Therefore:**

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.

2. Before performing any maintenance work inside a Plasma Console, disconnect the Plasma Console from the incoming electrical power.
3. Maintain cables, grounding wire, connections, power cord, and Plasma Console in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.

#### **ADDITIONAL SAFETY INFORMATION -- For more**



**information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.**

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting".
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding".
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting".
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting".
5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding".
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding".
7. AWS SP - "Safe Practices" - Reprint, Welding Handbook.
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."
9. CSA Standard - W117.2 = Safety in Welding, Cutting and Allied Processes.





**MEANING OF SYMBOLS - As used throughout this manual: Means Attention! Be Alert! Your safety is involved.**



**DANGER**

Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.



**CAUTION**

Means potential hazards which could result in personal injury or loss of life.



**WARNING**

Means hazards which could result in minor personal injury.

### Enclosure Class

The **IP** code indicates the enclosure class, i.e. the degree of protection against penetration by solid objects or water. Protection is provided against touch with a finger, penetration of solid objects greater than 12mm and against spraying water up to 60 degrees from vertical. Equipment marked **IP21S** may be stored, but is not intended to be used outside during precipitation unless sheltered.



**CAUTION**

This product is solely intended for plasma cutting. Any other use may result in personal injury and / or equipment damage.



**CAUTION**

If equipment is placed on a surface that slopes more than 15°, toppling over may occur. Personal injury and / or significant damage to equipment is possible.

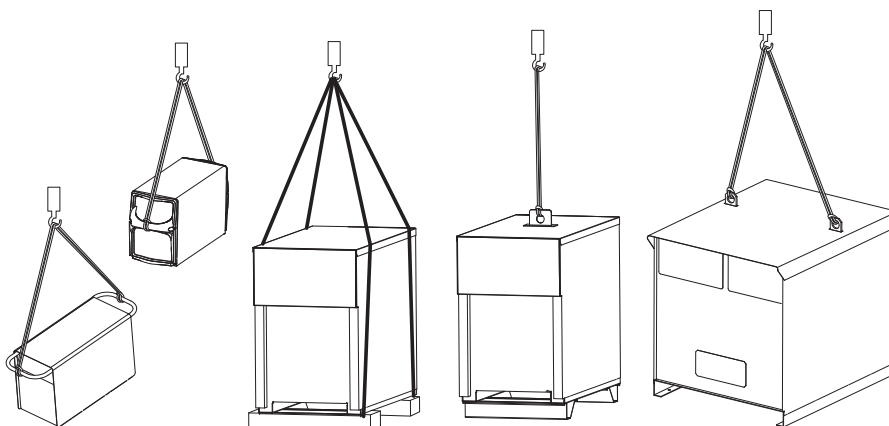


**CAUTION**

To avoid personal injury and/or equipment damage, lift using method and attachment points shown here.

maximum  
allowable tilt

15°





## **INTRODUCTION**

The Heliarc AC/DC 281i, 283i and 353i are state of the art DC and squarewave AC power sources for SMAW (MMA) or GTAW (TIG) welding. They utilize inverter based technology in combination with microprocessor control. The 281i and 283i models are rated 250A / 280A at 100% duty and the more powerful 353i model up to 350A@ 45% duty.

The operator control panel utilizes both rotary knobs together with membrane key-press switches to enable the precise setting of the required welding parameters. Two easy to read digital displays provide a precise and clear readout of the various welding data, both preset and actual.

For DC TIG welding applications the units feature both non-contact electronic arc ignition as well as non-HF lift arc facilities. HF starting is employed for AC TIG but, unlike with other AC TIG systems, the HF is switched off once the arc is established. This fact means that the possibility of electrical interference from the equipment is greatly reduced.

The AC/DC 281i can be operated from a 1 Ph 208-240V supply protected with a 50A fuse or circuit breaker. The AC/DC 283i and 353i require balanced 3Ph 460V industrial supply protected by a 16/32A fuse or circuit breaker respectively, see specification below.

The power sources are constructed in rugged all metal enclosures incorporating convenient carrying handles. Multiple fans at the rear provide cooling for the internal components. Full thermal overload protection is standard.

An auxiliary W.C.U. power receptacle is available on the rear panel when using a Heliarc Water Cooling Unit. A trolley unit is another option available for these power sources. The Heliarc AC/DC 281i, 283i and 353i are designed, manufactured and tested to meet the requirements of EN60974-1 "Safety Requirements."

# Heliarc 281i/283i/353i AC/DC

## For advanced GTAW (TIG) welding



### Specifications

	Heliarc 281i AC/DC	Heliarc 283i AC/DC	Heliarc 353i AC/DC
Input voltage	208-240 V 1 ph 50/60 H	460 V 3 ph 50/60 Hz	460 V 3 ph 50/60 Hz
Open circuit voltage	75	75	75
Setting range, TIG AC/DC	4-280 A	4-280 A	4-350 A
Amps input at rated load, TIG	47 A	16.6 A	16.6 A
Amps input at 250 A, TIG	38 A	12.5 A	12.5 A
Maximum output, TIG AC/DC			
100% duty cycle	250 A	280 A	280 A
60% duty cycle	270 A	-	300 A
50% duty cycle	280 A	-	-
45% duty cycle	-	-	350 A
Power factor at maximum current, TIG	0.80	0.75	0.80
KVA max, TIG	10.5	11	14.5
Gas pre-flow, sec	0.1-2.5	0.1-2.5	0.1-2.5
Gas post-flow, sec	0.1-30	0.1-30	0.1-30
Slope down, sec	0.1-10	0.1-10	0.1-10
Slope up, sec (for 283i and 353i)	Not Applicable	0.1-10	0.1-10
Frequency AC	20-200 Hz	20-200 Hz	20-200 Hz
AC balance, %	10-90	10-90	10-90
DC pulse mode frequency	0.4-300 Hz	0.4-300 Hz	0.4-300 Hz
AC pulse mode frequency	0.4-2 Hz	0.4-2 Hz	0.4-2 Hz
Pulse duty (pulse time/background time) %	30-65	30-65	30-65
Background current % of main A	10-90	10-90	10-90
Start/crater current (4 stroke) % of main A	10-90	10-90	10-90
Setting range, Stick AC/DC	4-250	4-280	4-350
Maximum output, Stick AC/DC			
100% duty cycle	200 A	220 A	220 A
60% duty cycle	220 A	240 A	240 A
40% duty cycle	250 A	280 A	-
20% duty cycle	-	-	350 A
KVA max, Stick	12	14.2	19
Dimensions L x W x H	23.6 x 11.8 x 24.4 in. (600 x 300 x 620 mm)	23.6 x 11.8 x 24.4 in. (600 x 300 x 620 mm)	23.6 x 11.8 x 24.4 in. (600 x 300 x 620 mm)
Weight	110 lb (50 kg)	110 lb (50 kg)	110 lb (50 kg)
Enclosure class	IP 21S	IP 21S	IP 21S

## INSTALLATION

### 1. Radio Interference

ESAB welding power sources have been designed to high standards of electromagnetic compatibility. However, arc welding, by its very nature, generates radio-frequency energy and may cause interference. By installing and using the equipment correctly, in accordance with these instructions, the problems of interference may be minimized.

This equipment satisfies the requirements of the EU Directive 89/336/EC on EMC and complies with the limits in EN50199, 'EMC product standard for arc welding equipment'. These limits are designed to provide reasonable protection against interference in heavy industrial areas.

If this equipment is used in domestic areas, e.g. for repair or maintenance, particular care should be taken. The time of day should be chosen and the duration of welding limited, to minimise any potential problems. If this equipment causes interference the guidance given below should be considered. If a solution cannot be found please contact your distributor or the manufacturer.

Before installing this welding equipment an assessment should be made of potential EMC problems that may occur. It is good practice not to install welding equipment next to computers or safety critical control circuits, e.g. electronic machine guards, unless they have been suitably protected.

This equipment should be connected to the primary supply using the cable provided. However, for permanent installation, if interference problems occur, shielded cable or conduit should be considered. The primary cabling and welding cables should be kept separate to other mains wiring and control, signalling or communications leg (telephone) cables. If interference occurs then greater separation or re-routing should be considered. Welding cables should be kept as short as practically possible.

Interference may also be reduced by separating the welding equipment from the other equipment affected. A partition, brick wall or particularly, a metal screen will also reduce interference. Earthing and equi-potential bonding should also be considered but guidance should be sought from a competent person, the distributor or manufacturer.

To ensure continued compliance to the EMC Directive this equipment should be routinely maintained according to the manufacturer's instructions and using only approved spare parts. In particular, the spark gaps of HF units should be adjusted and maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the equipment is being used. This equipment should not be modified in any way except for those changes and adjustments approved by the manufacturer.

### 2. Trolley Unit

Assemble the trolley/cylinder carrier unit if supplied. Refer to Figure 4.1 for assembly details. Locate the power source on the sloping shelf; temporarily removing the gas cylinder support/chain holder bracket makes this easier.

## **WARNING**

**DO NOT LET THE POWER SOURCE SLIDE BACKWARDS OFF THE SHELF WHEN THE CYLINDER SUPPORT BRACKET IS NOT FITTED.**

### 3. Connection to the Supply

The Heliarc AC/DC 281i requires a single phase 208-240V 60Hz electricity supply fused at 50A for all TIG welding and Stick applications.

The 283i and 353i need a standard 3 phase 460V 60Hz electricity supply, note no neutral connection is required. Supplies should be fused at 20A for the 283i and 32A for the 353i, using HRC type fuses.

If circuit breaker protection, rather than fuses, is to be used for any of the 3 machines, type D/4 breakers should be used.

Ensure the green/yellow earth conductor is securely connected to a good mains earth.

### 4. Water Cooler Unit W.C.U. (0558101703)

If supplied install the W.C.U. in the base of the trolley by sliding it part way into the trolley base. Feed the W.C.U.

## WARNING

ENSURE POWER SOURCE IS ISOLATED FROM THE MAINS SUPPLY.

primary cable through the hole/strain relief located on the rear of the W.C.U. compartment in the trolley. Slide the W.C. unit completely into the housing. Locate the auxiliary W.C.U. receptacle on the upper left corner of the rear panel. Plug the Water Cooler input plug into receptacle until it clicks. Secure with the W.C. unit with the retaining bolt in the left side panel.

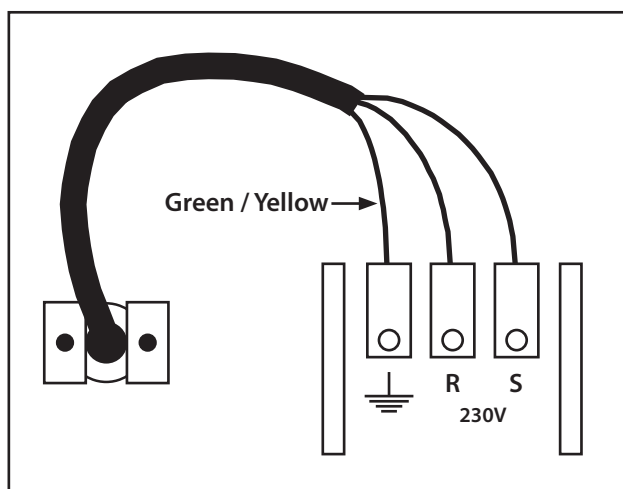
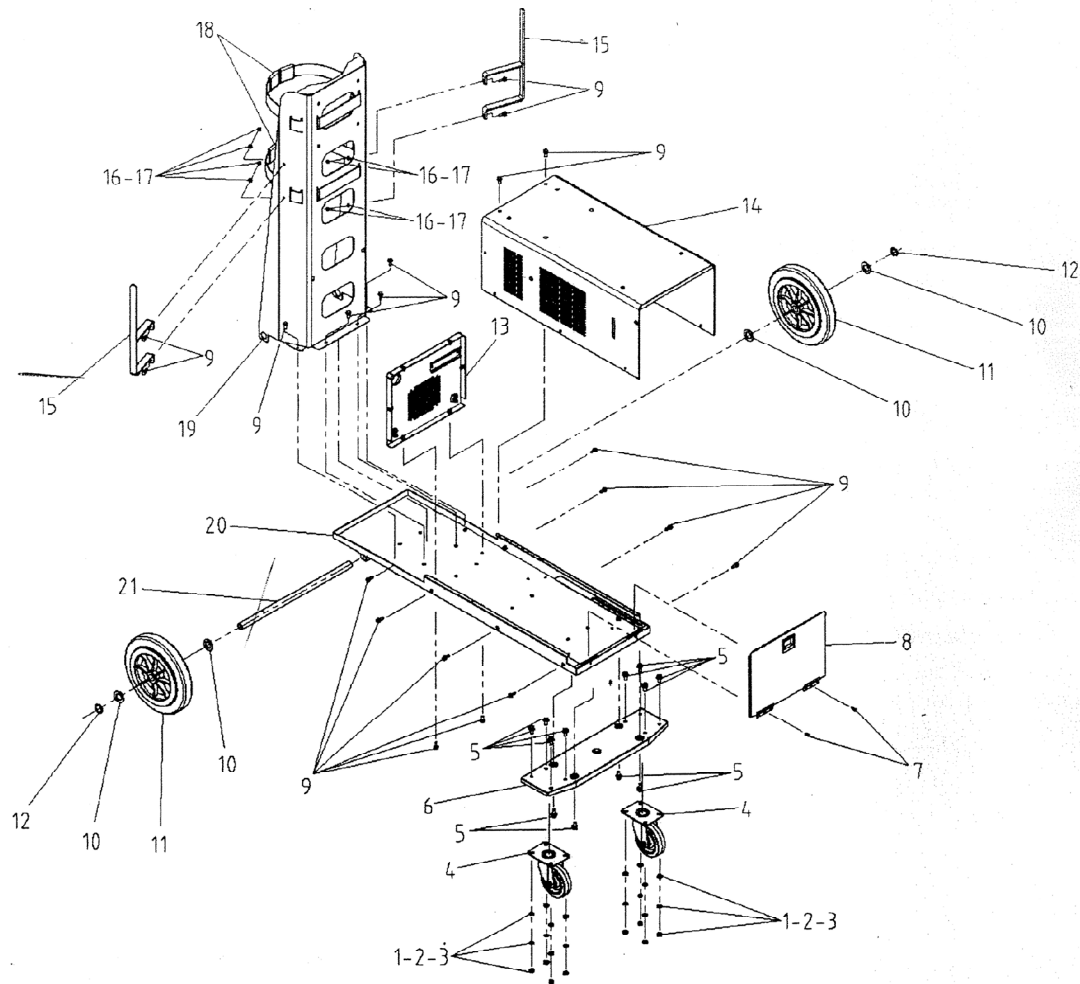










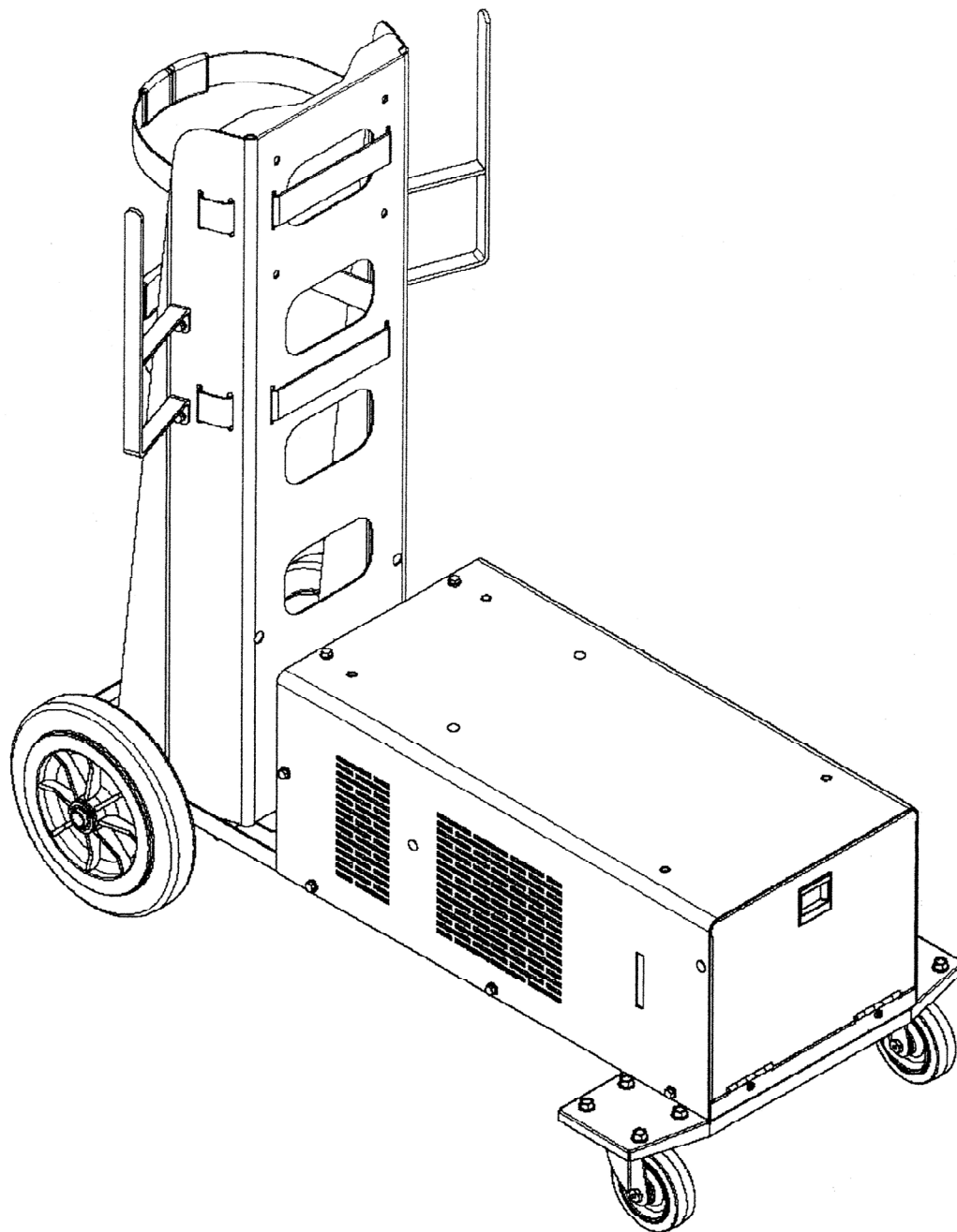


Figure 1 - 230VAC Auxiliary Connection

## TROLLEY ASSEMBLY fig. 4-1



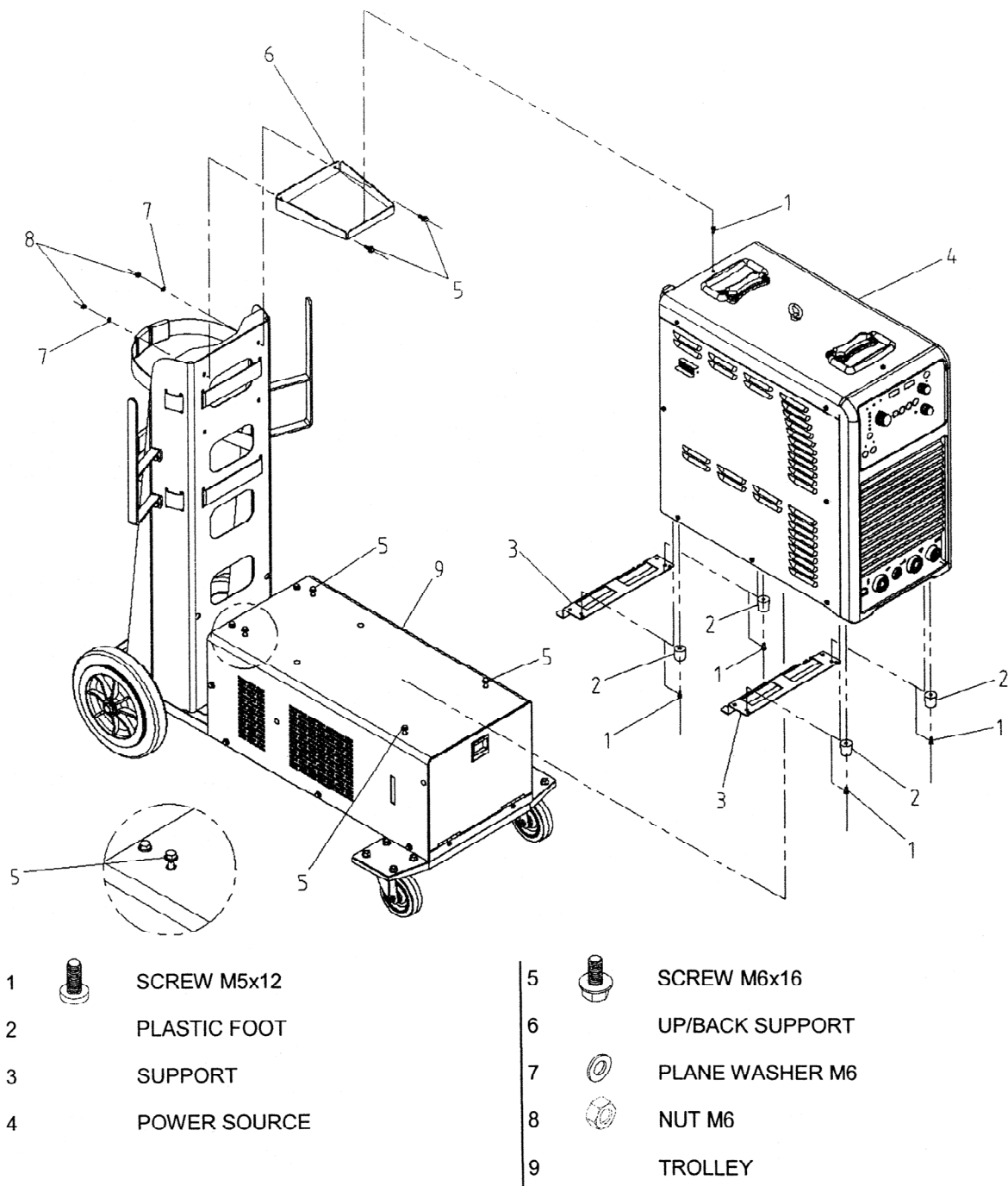
- |    |   |                  |    |   |                     |
|----|---|------------------|----|---|---------------------|
| 1  |  | NUT M8           | 12 |  | WASHER SEEGER d.20  |
| 2  |  | LOCK WASHER M8   | 13 |   | REAR PANEL          |
| 3  |  | FLAT WASHER M8   | 14 |   | COVER               |
| 4  |   | WHEEL d.100      | 15 |   | CABLES HOLDER       |
| 5  |  | SCREW M8x16      | 16 |  | FLAT WASHER M6      |
| 6  |   | FRONT WHEEL AXLE | 17 |  | NUT M6              |
| 7  |  | SCREW M5 TORCX   | 18 |   | BELT                |
| 8  |   | DOOR PANEL       | 19 |   | GAS CILINDER HOLDER |
| 9  |  | SCREW M6x16      | 20 |   | BASE                |
| 10 |  | WASHER M20       | 21 |   | REAR WHEEL AXLE     |
| 11 |   | WHEEL d.250      |    |   |                     |

**TROLLEY ASSEMBLY fig. 4-2****ASSEMBLY SEQUENCE**

- 1\_ Install the gas cilinder holder (19\*) on the base (20\*) with 4 screws M6 (9\*).
- 2\_ Install the rear wheel axle (21\*) and place wheels with wahers 10\* and 12\*.
- 3\_ Install the wheels (4\*) on the front wheel axle(6\*).
- 4\_ Install the assembly front wheel axle with screw M8 (5\*)
- 5\_ Install the Rear Panel (13\*) on the base with screws M6 (9\*)
- 6\_ Install the the cover (14\*) on the base with screws M6 (9\*)
- 7\_ Install the Door Panel (8\*) on the base with screws M5 (7\*) in case there is not the cooler.
- 8\_ Install Cable Holders (15\*) with nuts (9-16-17\*)
- 9\_ Install the 2 belts (18\*) on the Gas Cilinder Holder. Both Belts are required.

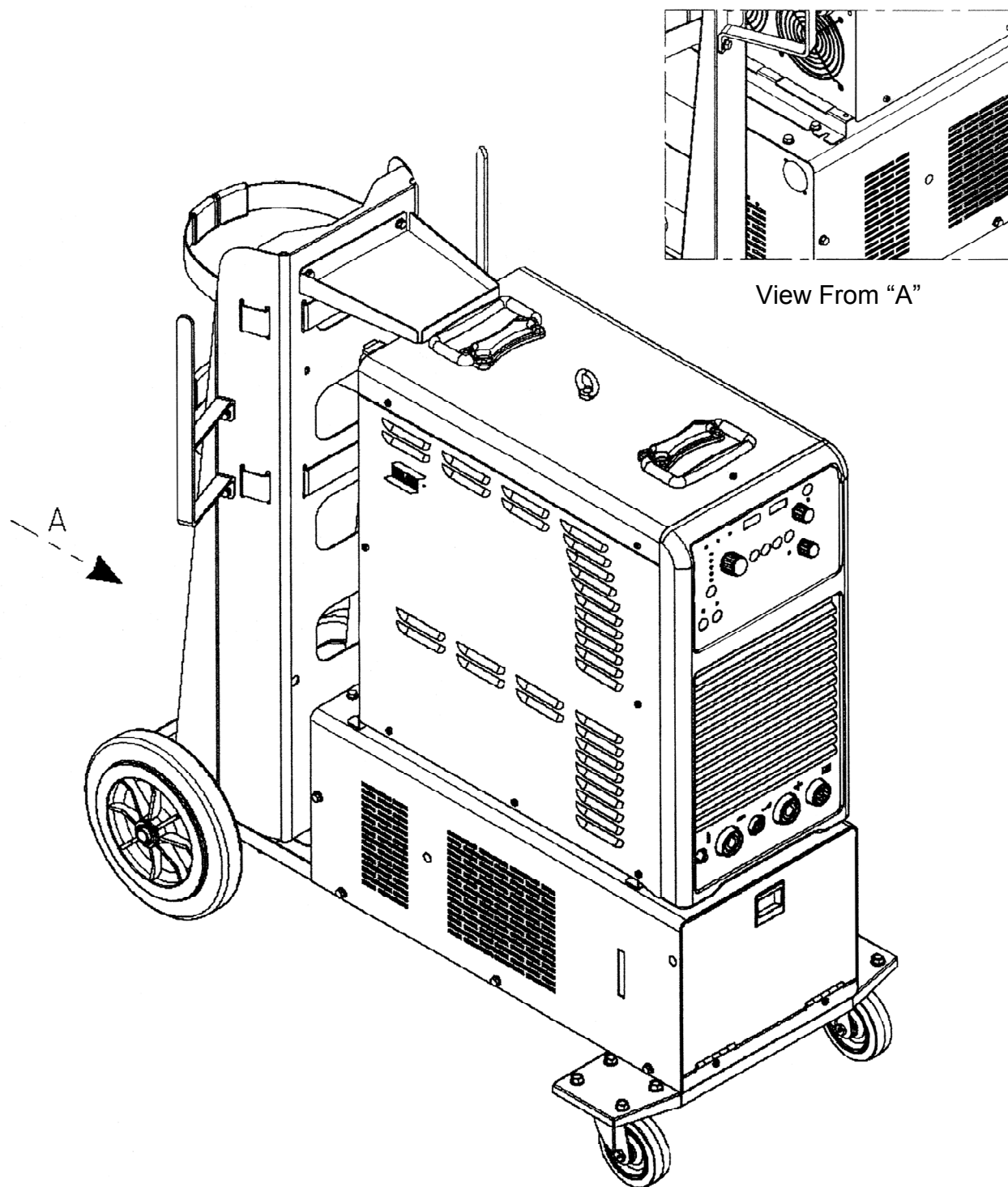
\*Numbers refer to the exploded view at page1

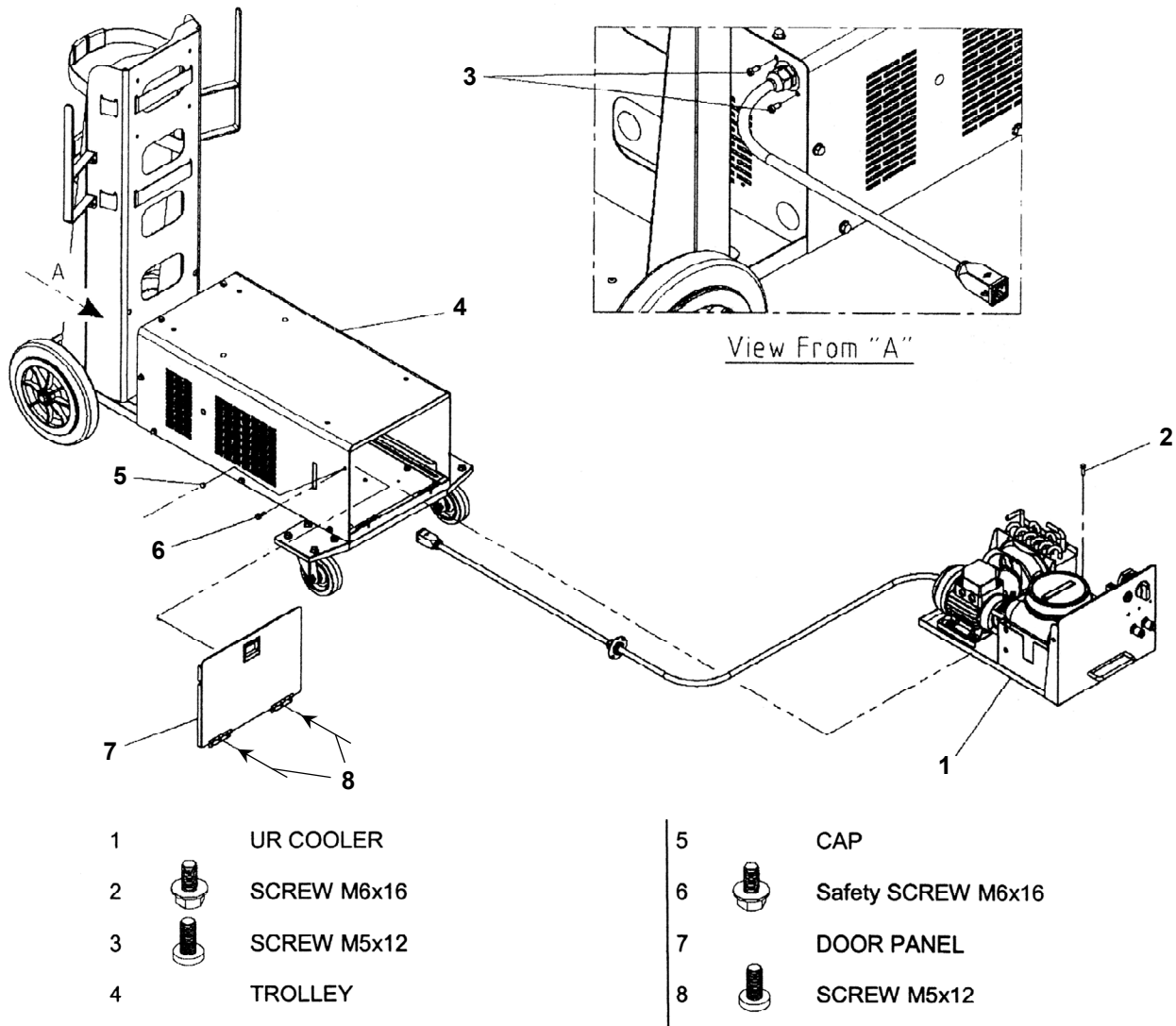
## POWER SOURCE TO TROLLEY ASSEMBLY fig. 4-3

**ASSEMBLY SEQUENCE**

- 1\_ Remove 4 screws M5x12 (1) and plastic feet of the Power Source base.
- 2\_ Fasten the supports (3) on the Power Source base with screws M5x12 (1).
- 3\_ Partially fasten the 4 screws M6x16 (5) on the trolley and place the Power Source
- 4\_ Once the Power Source is placed correctly fasten the 4 screws M6x16 (5) tight.
- 5\_ Remove the screw M5x12 (1) on the top of the Power Source
- 6\_ Fasten the UP/BACK Support (6) on the gas cilinder support with screws M6x16 (5) and nuts (7-8)
- 7\_ Fasten the UP/BACK Support on the Power Source with screw M5x12 (1) earlier removed.



**POWER SOURCE TO TROLLEY ASSEMBLY fig. 4-4**

**COOLER ASSEMBLY** fig. 4-5**ASSEMBLY SEQUENCE**

- 1\_Remove screws M5x12 (8) and door panel (7)
- 2\_Insert the input cable with plug into the trolley. Take it out from the back hole (remove first the plastic cap). Fasten the input cable with screws M5x12 (3) on the back panel (see view "A").

**IMPORTANT OPERATION**

- 1\_Remove the plastic cap (5)
- 2\_Once the Cooler is instal fasten the safety screw M6x16 (6)

**COOLING LIQUID FILL UP**

- 1\_Turn off Cooler and Power Source and remove the cooler plug before filling up with liquid.
- 2\_Remove the safety screw (6)
- 3\_Pull out the Cooler and fill up with liquid.
- 4\_Push back the Cooler and fasten the safety screw (6).

**WARNING**

REMOVE UPPER EXTENSION PIECES \* FOR 281i & 283i.

ENSURE THE GREEN/YELLOW EARTH WIRE IS CORRECTLY CONNECTED TO THE LH TERMINAL.

Before energizing the cooler ensure it is correctly filled with coolant, refer to W.C.U. Instruction Sheet, and connect the TIG torch cooling hoses to its front panel.

**IMPORTANT**

ENSURE THE W.C.U. IS CORRECTLY FILLED WITH COOLANT AND THAT THE TIG TORCH WATER HOSES ARE CONNECTED BEFORE SWITCHING ON THE POWER SOURCE. FAILURE TO DO SO MAY DAMAGE THE MOTOR AND PUMP. USE PLASMA TORCH COOLANT.

NEVER USE AUTOMOTIVE ANTI-FREEZE TYPE COOLANTS. THEY WILL CLOG THE TORCH AND CAUSE PREMATURE FAILURE.

After running the cooler for a few minutes the coolant level should be checked and topped-up if necessary.

**5. Connection of the TIG Torch, Work Return and Gas Hose**

- 5.1 Connect the TIG torch power lead dins plug to the negative dins socket on the lower front of the power source (marked with the torch symbol).
- 5.2 Water cooled TIG torches have the water return hose exiting from the side of the dins plug. This must be connected to the red water return fitting on the W.C.U. front panel. Connect the other water-in hose of the torch to the blue water-out fitting of the cooler.
- 5.3 Connect the TIG torch shielding gas hose to the ¼" BSP fitting on the lower front panel.
- 5.4 Connect the TIG torch switch, if fitted, to the 2 pin socket.
- 5.5 If required connect the remote control unit, eg. FC-5C foot control, to the 14 pin socket.
- 5.6 Connect the "B" 5/8"-18 gas-in fitting on the rear panel to the shielding gas regulator/flowmeter.
- 5.7 Connect the work return lead dins plug to the positive dins socket on the lower front panel.

**6. Connections for Stick SMAW (MMA) Welding**

- 6.1 Connect the SMAW electrode holder lead to the positive dins socket on the lower front of the power source. Note that for DC SMAW applications this will make the electrode positive polarity.
- 6.2 Connect the work return lead dins plug to the negative dins socket.

**WARNING**

IF A HELIARC W.C.U. TORCH WATER COOLER IS FITTED TO THE POWER SOURCE WHEN SMAW WELDING, REMEMBER TO EITHER SWITCH OFF THE COOLER OR LEAVE THE TIG TORCH GO AND RETURN WATER HOSES CONNECTED TO IT. FAILURE TO DO THIS MAY DAMAGE THE COOLER.

## OPERATION

### CONTROLS & OPERATION

#### 1. Switching On

1.1 The rear panel mounted rotary switch is the mains power ON/OFF switch.

### WARNING

**THE COMPUTER CONTROL SYSTEM MEMORIZES THE POWER SOURCE CONTROL SETTINGS AT POWER OFF. IF THE UNIT WAS IN MMA MODE AT SWITCH-OFF THEN WHEN THE UNIT IS SWITCHED ON, OCV WILL BE PRESENT AT THE WELDING OUTPUT.**

Setting the power switch to "ON" energizes the internal circuitry including the rear panel cooling fans and auxiliary W.C.U. supply for the optional torch water cooler. All the various LED indicators on the control panel will momentarily illuminate. The left and right hand LED readouts will flash for a short period indicating the process/mode selected i.e. depending on the machine settings at the previous mains switch-off.

1.2 After 3 seconds approx., the display will change to 'STANDBY MODE'. See Figure 5 indicating the process/mode selected according to the LED illuminated in the SELECT MODE window. The L.H. ("V") digital display will read 000 except in SMAW mode when it will show the open circuit voltage (70V approx.). The R.H. display shows the preset main welding current "A" as adjustable by the Main Setting Control. In addition the mains power indicator will be on and, if the unit is in SMAW mode, the welding output indicator LED will also be on showing that welding output voltage is present.

Other LEDs may also be illuminated depending on the machine's previous usage.

1.3 After changing the process/mode selection or any other parameters, slope down time, AC frequency etc., the display will always revert to the standby mode within 3-5 seconds of the change being completed.

1.4 While welding the L.H. and R.H. digital displays show the actual values of the welding voltage V and welding current A. Note the welding voltage measurement is at the power source output terminals and may be slightly higher than the actual arc voltage due to cable drops etc.

#### 2. Local/Remote Control Operation

2.1 Connect the remote control unit, e.g. FC-5C foot control, to the 14 pin remote control receptacle.

2.2 Set the required maximum welding current, corresponding with the maximum position of the remote control, using the Main Setting Control while the unit is in standby mode.

**CONTROLS & OPERATION (con't.)**

- 2.3 Momentarily press the Remote Control mode key. The REM. ON LED will light and the L.H. display will flash "REM". Whilst the display is flashing set the minimum/start value of the remote control as required between 4A and 100A using the Main Setting Control and R.H. display.

**NOTE:**

If the remote minimum/start current value of the remote control is set higher than the main welding current the arc will strike at the main welding current setting and no remote variation will be possible.

- 2.4 To quickly check or readjust the start current value momentarily press the Remote Control key.
- 2.5 To revert to local control mode, whilst the display is at standby, press and hold the Remote Control mode key until the "REM ON" LED goes out.

**3. TIG Arc Initiation**

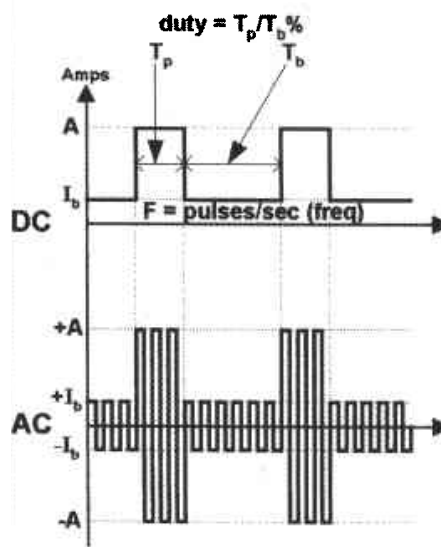
- 3.1 Pressing the HF ON key selects HF start mode and the associated LED illuminates for confirmation. Pressing the key again selects Lift-arc mode (the LED off). For DC TIG welding either HF or Lift-arc strike modes can be used, but HF should be used for AC TIG to prevent contamination of the tungsten.
- 3.2 Once the arc is established, in either AC or DC TIG, the HF is automatically turned off. HF is also disabled for MMA operation.

**4. AC or DC Process Selection**

- 4.1 With the display in standby mode press the AC MODE key. The green ON AC light will illuminate and the digital displays will flash with the L.H. showing "Bal"(short for Balance) and the R.H. "Fre"(short for Frequency). Whilst the displays flash, the AC Balance level can be preset using the lower "B" control knob between 10% and 90% in the L.H. display. Also the AC Frequency can be adjusted from 20-200Hz as required using the upper "F" control knob and the R.H. display.

Note the percentage balance refers to the negative "melting effect" of the arc so a lower balance % will provide more cleaning action.

- 4.2 The AC Balance and AC Frequency settings can be adjusted whilst welding if required. To check the actual values in use momentarily press the AC MODE key and the settings are shown in the L. H. and R.H. displays.
- 4.3 To revert to DC process, at standby press and hold the AC MODE key until the ON AC indicator LED turns off (2-3 seconds).

**CONTROLS & OPERATION (con't.)****5. Selecting Pulse Mode - See Figure 7****Figure 7 - DC & AC Pulsing**

- 5.1 In the standby mode, press the Pulse mode key (F). The associated green ON PULSE LED will illuminate and the digital displays will flash "dut" L.H. and "Fre" in the R.H. Use the Main Setting Control to set the desired pulse repeat frequency (0.4-300Hz DC; 0.4-2Hz AC) as indicated in the R.H. display.
- 5.2 Press the Pulse mode key (F) a 2nd time to set the pulse peak to background time ratio or "duty" shown in the L.H. display using the Main Setting Control. Note this is settable in 5% increments in the range 30- 65%.
- 5.3 In the standby mode, press the Final Current/Background key (FC). Before the display stops flashing set the required background current using the Main Setting Control. Note that background (or final current) is adjustable between 10% and 90% of the main (peak) current value. So for example, if the peak current were set to 150A, and the background to 20%, during the background time the current would be 30A (20% of 150A).

**6. MMA Welding**

- 6.1 Set the process/mode to Stick SMAW (MMA).

**WARNING**

**OPEN CIRCUIT VOLTAGE WILL NOW BE PRESENT AT THE WELDING OUTPUT TERMINALS.**

- 6.2 Set the desired welding current using the welding current control A.
- 6.3 If required select AC process. See Subsection 4. Set the AC frequency (F) and balance (B) as desired, normally 60Hz and 50% Balance.
- 6.4 The machine is now ready to weld.

## CONTROLS &amp; OPERATION (con't.)

## 7. TIG Welding with 2 Stroke Torch Switch (2T) and HF Start - See Figure 8

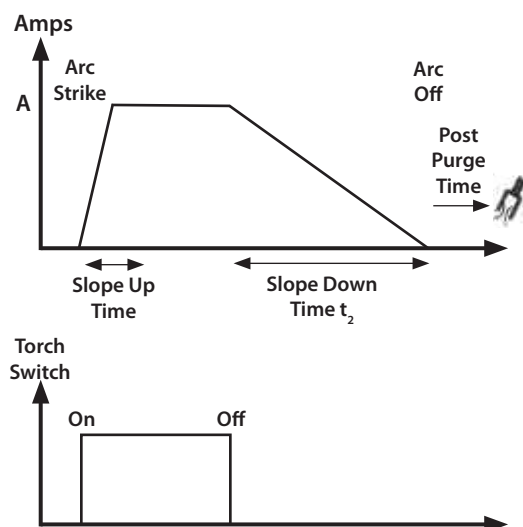


Figure 8 - TIG 2T Operation

- 7.1 Set the process/mode to TIG 2T and press the HF ON key to select HF start.
- 7.2 Set the desired welding current with the main setting control A.
- 7.3 Set the required slope down time (0.1 - 10 secs) using the SL slope up/down
- 7.4 Set the required gas post purge time (0.2 - 30 secs) using the PG post gas key and main setting control.
- 7.5 If required choose AC process when the display is in standby mode. See Subsection 4.
- 7.6 If required choose pulse mode when the display is in standby mode. See Subsection 5.
- 7.7 Position the electrode within 3 - 5mm of the work.
- 7.8 Press the torch switch, after 0.5 second gas pre-flow time the arc will strike at the current set.
- 7.9 Release the torch switch to initiate the slope-down time after which the arc will go off and the gas post purge time will commence.

## 8. TIG Welding with 4 Stroke Torch Switch (4T) and HF Start - See Figure 9

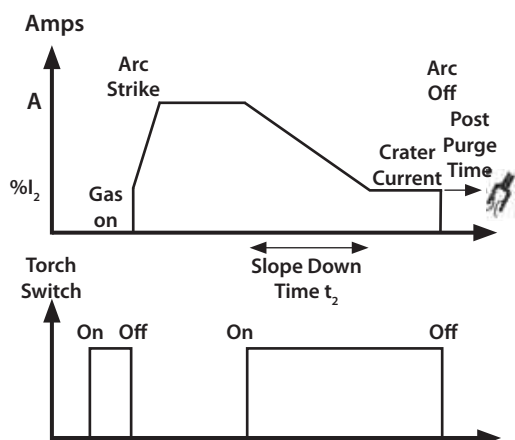
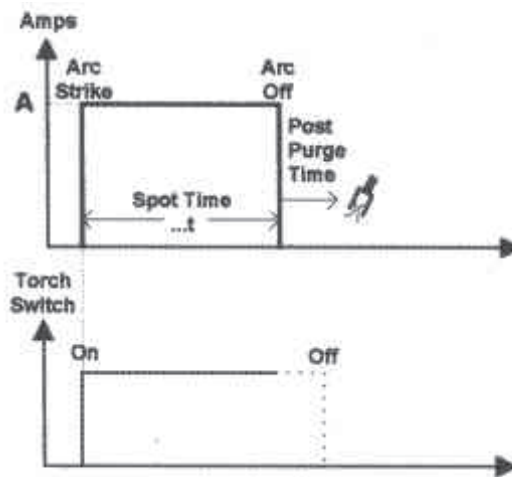


Figure 9 - TIG 4T Operation



**CONTROLS & OPERATION (con't.)**

- 8.1 Set the process/mode selector to TIG 4T and press the HF ON key to select HF start.
- 8.2 Set the desired welding current with the main setting control A.
- 8.3 Press the SL slope up/down key once to adjust the down slope (DS displayed in V window).  
Press the SL slope up/down key twice to adjust the up slope (US displayed in V window).  
Use the encoder knob to adjust the slope time, 0.1 to 10 seconds.
- 8.4 Set the final crater current level (10-90%) using the FC final current key and the main setting control.
- 8.5 Set the required gas post purge time (0.2-30 secs) using the PG post gas key and main setting control.
- 8.6 If required choose AC process and/or Pulse Mode when the display is in standby mode. See Subsections 4 & 5.
- 8.7 Position the electrode 1/8" (3mm) from the work, press the torch switch and shielding gas will flow.
- 8.8 Release the switch and the arc will strike and the welding current will slope up to the value set by the current control A.
- 8.9 Press and release the torch switch again and the current will slope down to the final crater level set in 7.4 above in the time set in 7.3 above.

**9. GTAW (TIG) Spot Welding (2 Stroke Torch Switch and HF Start) - See Figure 10****Figure 10 - GTAW (TIG) Spot Welding**

- 9.1 Set the process/mode selector to ...t.
- 9.2 Set the process/mode to TIG 2T and press the HF ON key to select HF start.
- 9.3 Set the spot welding time (0.1-10 secs) using ...t spot time key and main setting control .
- 9.4 Set the required gas post purge time (0.2-30 secs) using the PG post gas key and main setting control.
- 9.5 Position the electrode 1/8" (3mm) from the work.
- 9.6 Press and hold the torch switch, after an 0.5 sec preflow time the arc will be struck at the preset welding current.
- 9.7 After the preset spot time the arc will go off and gas will post flow. The torch switch can now be released.

## CONTROLS &amp; OPERATION (con't.)

## 10. GTAW (TIG) Welding with Manually Sequenced Pulsing - See Figure 11

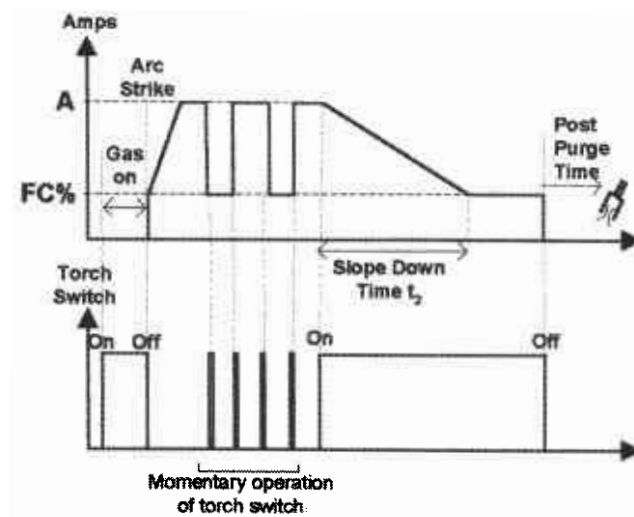



Figure 11 - TIG Lift Arc Mode

- 10.1 Set the process to TIG  mode using the mode selector key.
- 10.2 Set the desired "peak" welding current using the main setting control.
- 10.3 Set the slope-down time, final/background current and post-purge gas time using the SL, FC and then PG time keys respectively together with the main setting control as necessary. See above.
- 10.4 Position the electrode 1/8" (3mm) from the work. Press the torch switch to initiate the gas flow.
- 10.5 On releasing the torch switch the arc will strike (assuming HF mode selected) and the current will up-slope to its peak/main value. Momentary operation (press & release) of the torch switch will now step the current back to its base level. Repeated momentary operations will alternately step the current from base to peak levels and back as required for the application.
- 10.6 To stop welding press and hold the torch switch when the current is at its peak level. The current will now slope down to its base or final current level (per the slope-down time as set above) and then remain at this level until the torch switch is released when the post gas purge will run.

## OPTIMIZING TIG WELDING PERFORMANCE

### 1. Tungsten Electrode Types

ESAB recommends the use of either lanthanated or ceriated tungstens for both AC and DC applications. Either type is suitable for optimum arc striking and stable performance.

In the past, for AC TIG applications, pure tungsten would be used. Not the case for these new Heliarc ACDC Square Wave Inverter machines due to the new enhancements in Waveform/Balance control.

Lanthanated or ceriated tungstens can be used for both DC and AC TIG modes due to their higher current capacity and offer improved performance by maintaining a point in highly "unbalanced" AC conditions.

### 2. Tungsten Tip Preparation - See Figure 12

For AC and DC TIG the tungsten electrode tip should be straight ground. Radial grinding tends to cause arc wander and may result in the tungsten point breaking off and transferring to the weld metal. Equally, using a large tungsten at low currents by excessively sharpening the tip may result in tip break-off problems.

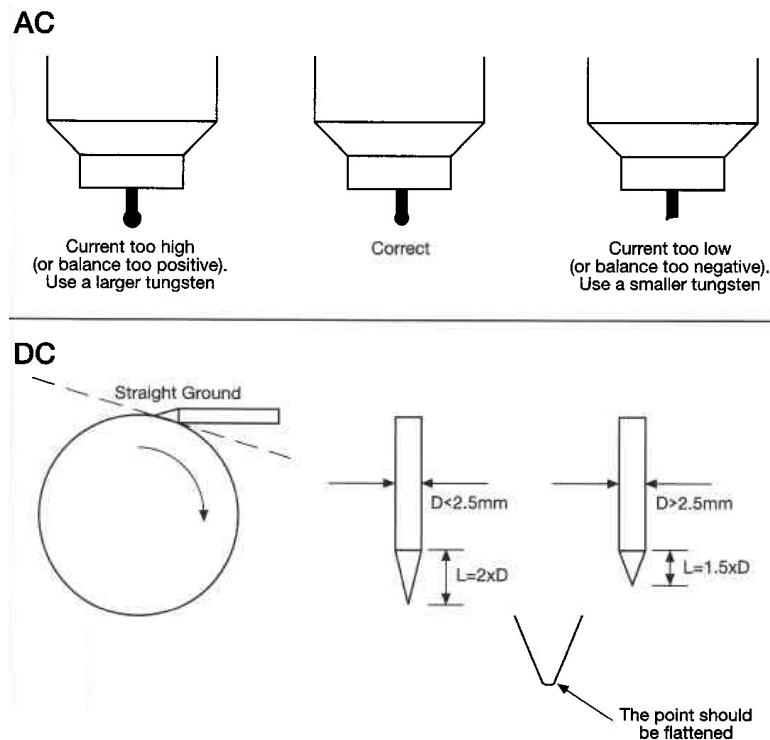


Figure 12 - Tungsten Preparation

**OPTIMIZING TIG WELDING PERFORMANCE (con't.)****3. Maximum Current Ratings for Tungsten Electrodes**

	<b>1/16</b>	<b>3/32"</b>	<b>1/8"</b>		
DC	150A	240A	380A		
AC Balanced	60A	100A	150A		

**4. AC GTAW (TIG) Welding Using FC-5C Foot Control**

Unlike other AC TIG equipments the Heliarc AC/DC 281i, 283i and 353i do not use continuous HF to maintain the AC TIG arc. Once the arc is struck the HF generator is turned off and will not re-energize unless the arc voltage rises to above 40V or until the torch switch/foot control is reoperated. This feature means that the likelihood of electrical interference from the welding equipment is greatly reduced.

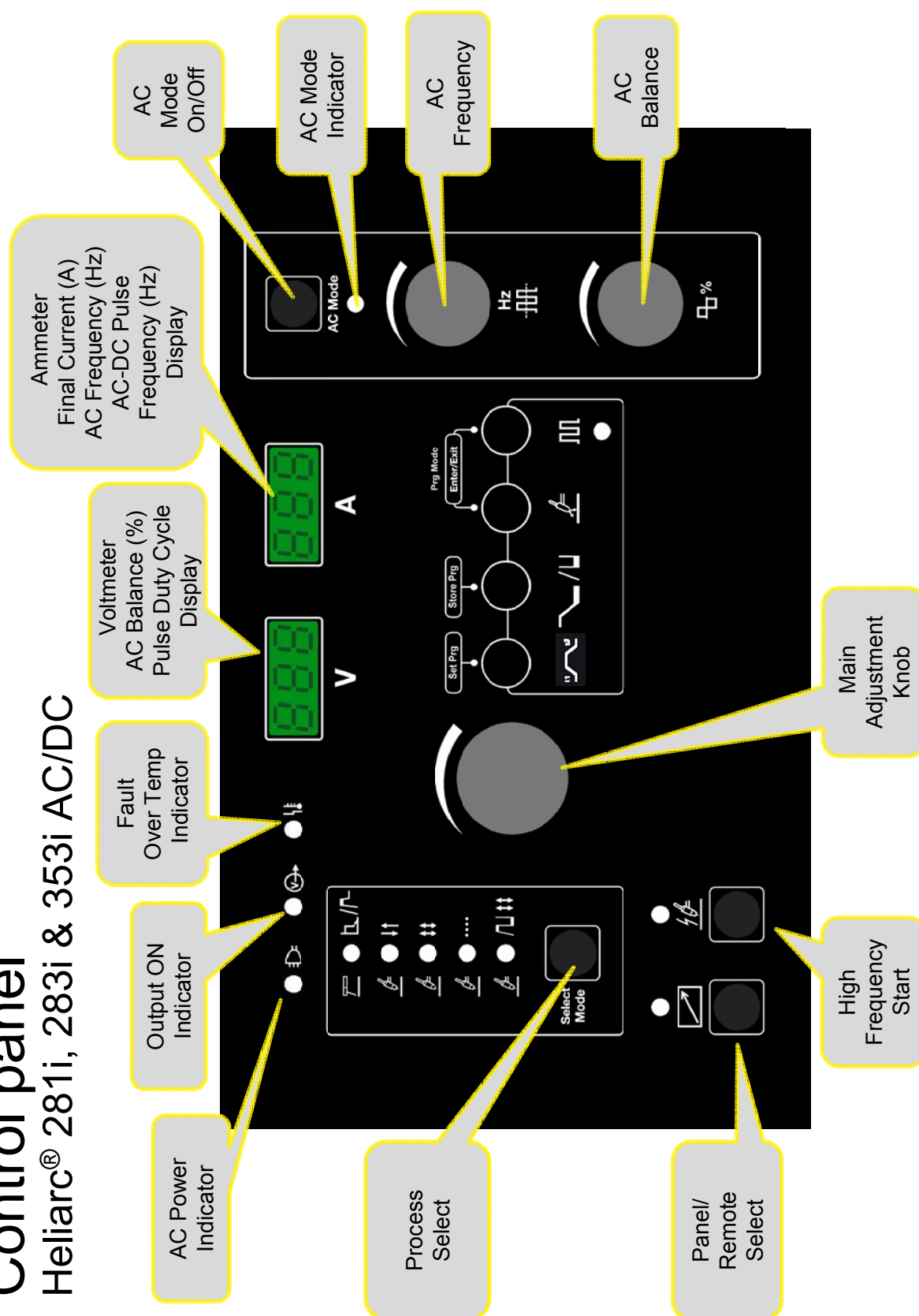
When using a large and cold tungsten the very low starting current that would normally occur when using a foot control can on occasion result in poor arc stability until the current is raised to a reasonable level and the tungsten is hot. To prevent this the power source has an "A<sub>min</sub>" control enabling the minimum current as set by the remote foot control to be independently preset, see CONTROLS & OPERATION section 2. Recommended minimum AC current settings, according to tungsten diameter, are as follows:

1/16" (1.6mm)	10A
3/32" (2.4mm)	20A
1/8" (3.2)	30A

If at the end of welding it is required to slope out the current below the level set by the "A<sub>min</sub>" control, a short final slope-out time can be set using the T2 up/down keys, see CONTROLS & OPERATION section 6, usually around 1 second is adequate. This will continue the slope down after the pedal has been fully released filling in any residual crater.

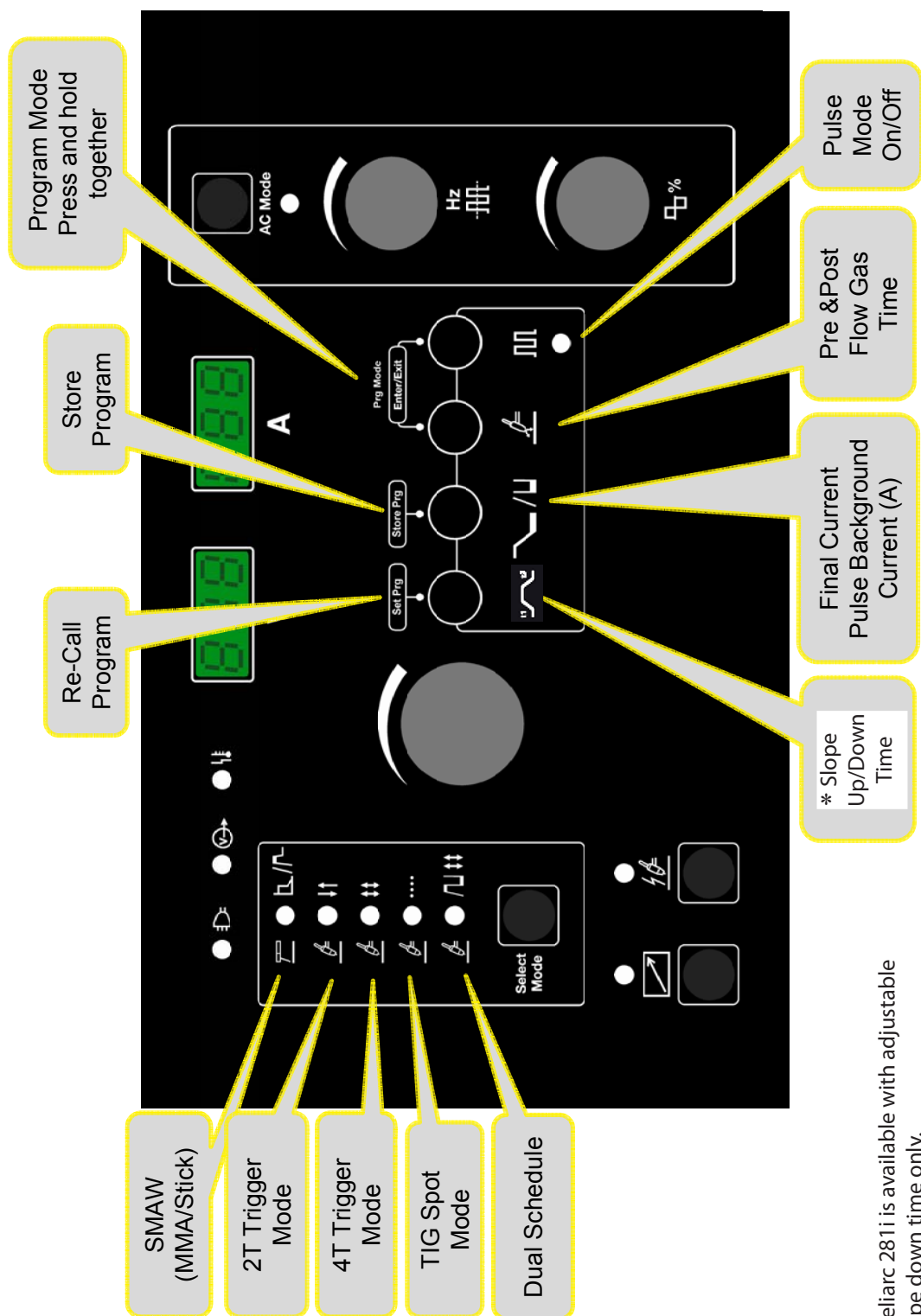
# Control panel

# Heliarc® 281i, 283i & 353i AC/DC



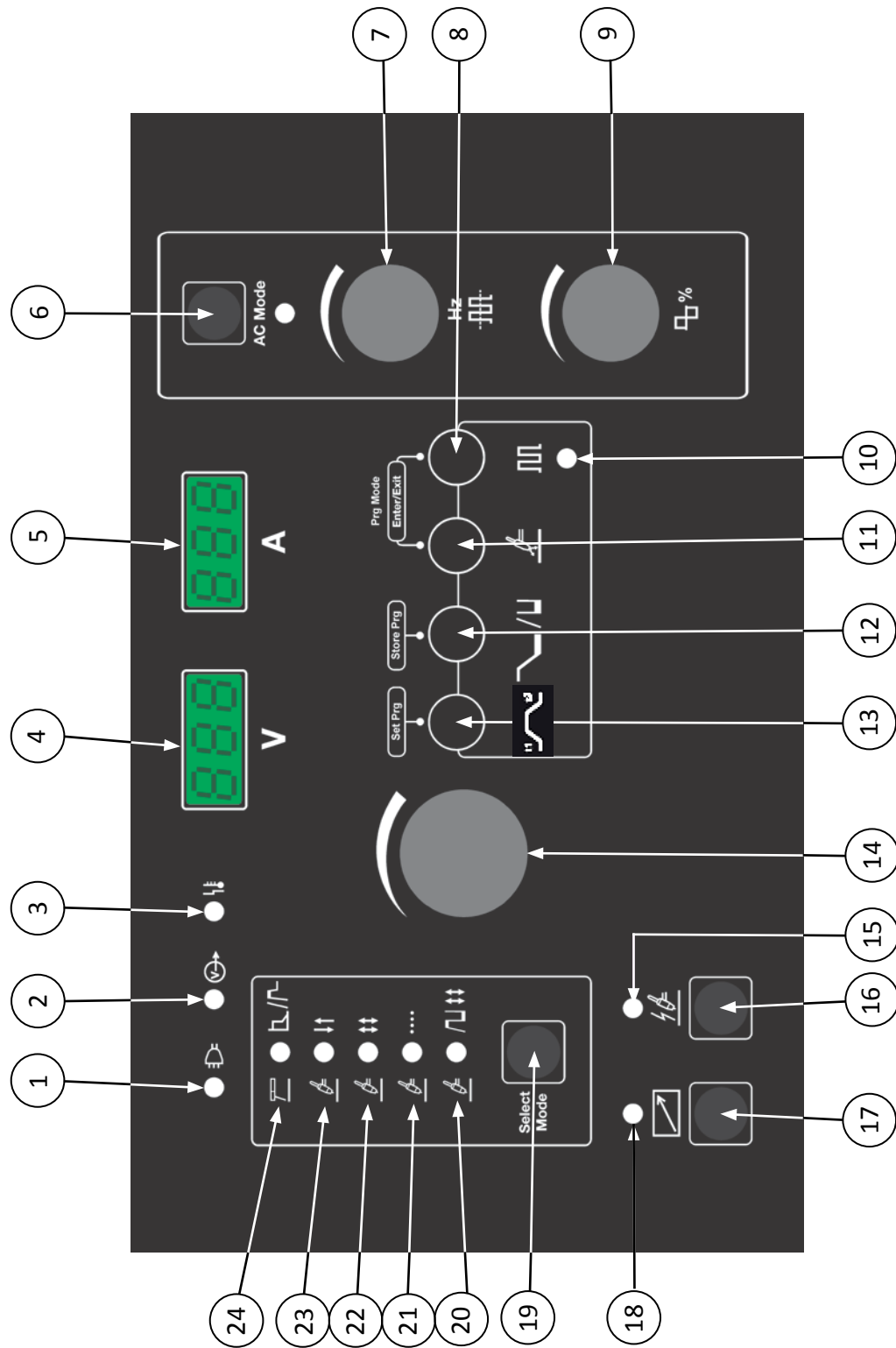
# Control panel

## Heliarc® 281i, 283i & 353i AC/DC



\*Heliarc 281i is available with adjustable slope down time only.

## 5. Front Control Panel Description and Parameters (con't.)



Front Control Panel - Heliarc 281i, 283i and 353i AC/DC



**5. Front Panel Description and Parameters (con't.)**

1. LED Voltage input - The LED is lit when there is presence of input voltage.
2. LED Voltage output - The LED is lit when there is presence of output voltage (in Tig mode only when you press the trigger).
3. LED Thermal Protection / Failure - The LED is lit when the machine achieves the duty cycle or there is a failure.
4. Display Voltage / Other Adjustments - The display shows the output voltage during the stand-by and the real voltage during the welding.
5. Display Amper / Other Adjustments - The display shows the set current during the stand-by and the real amperage during the welding.
6. AC button - The button activates the AC mode for AC welding and the LED is lit. The display shows the wording TIG - AC.
7. Frequency Encoder - The encoder adjusts the AC frequency from 20-200 Hz. The value is shown on the Display A (5). During the operation of adjustment the LED AC Mode is blinking.
8. Pulse Button - The button activates the Pulsing DC and AC function. In DC you can pulse from 0-300Hz in AC from 0-2Hz. The duty in Pulse is also adjustable from 30-65%. The values are set with the encoder Amper (14).
9. Balance Encoder - The encoder adjusts the balance of the AC from 10-90% of the set current. The value is shown on the Display V(4).
10. Pulse LED - The LED is lit when the Pulse Button (8) is pressed and the Pulse function in ON. During the Frequency and Duty adjustment the LED is blinking.
11. Pre-Post Gas Button - This button adjust both Pre-gas and Post-gas. By pressing the button the display V shows PRE (pre-gas) or POS (Post gas). Adjust the Pre-gas or Post gas with the Amper Encoder (14) from 0.5-30 seconds.
12. Final/Base Current button - This button adjust both Base Current and Final Current. By pressing the button the display A shows the value in %. Adjust the Final/Base current with the Amper Encoder (14) from 10-90% of the main welding current.
13. Slope Up/Down Button - This button adjust the slope down time. By pressing the button the Display A shows the value in seconds. Adjust the slope down time with the Amper Encoder (14) from 0.1-10 seconds. Heliarc 281i is available with adjustable slope down time only.
14. Main Encoder - Encoder for welding current and other adjustments.
15. HF LED - The LED is lit when the HF start is activate.
16. HF button - This button turns on the HF.

### **5. Front Panel Description and Parameters (con't.)**

17. Remote Control Button - This button sets the remote control function. The Display A shows the maximum current. By pressing the button the LED is blinking and adjust the minimum current. The Display V shows MIN and Display A the value from 0-100 Amp. Adjust the values with the Amper Knob (14). Press the button for three seconds to deactivate Remote Control mode.
18. LED Remote - The LED is lit when the remote is on and is blinking when the minimum current is adjusted.
19. Select Mode Button - This button selects the welding modes.
20. GTAW Tig 4 Stroke / Repeat - With this function the operator can change from the main set current to the base current values by pressing the torch trigger quickly.
21. Spot Time Welding - With this function the operator decide a certain time of welding. The Display A shows the time. The Amper Knob (14) changes the time. The amperage is the one set in GTAW Tig mode.
22. GTAW Tig 4T Mode
23. GTAW Tig 2t Mode
24. SMAW Stick Mode - On stick mode the Arc-Force and Hot-Start are adjustable. By pressing the button select mode (19) enter in a sub-menu to adjust Arc-Force (0-50%) and Hot Start (0-50%) with the Amper knob (14).

### **6. Additional Features**

- a) GTAW Tig Hot-Start in AC Mode - It is possible to adjust the Hot-start in AC welding from 0-35% of the Welding Current. In any of the Tig modes (20,21,22,23) by pressing the Select Mode button (19) enter in a sub-men to adjust the Hot-Start.
- b) Welding Programs - The Heliarc allows to store 60 welding programs.

#### **Storing programs:**

1. Press both Prg Mode Enter/Exit buttons (pulse and gas buttons) (10,11).
2. Select your program from 1 to 60 using the Main Control Knob.
3. Press and hold the Store Prg. button (base/final current) (12) until Unit signals with 1 beep, pause, then 4 beeps. Prg is stored and Exits to Stand by mode.

#### **Recalling the welding programs:**

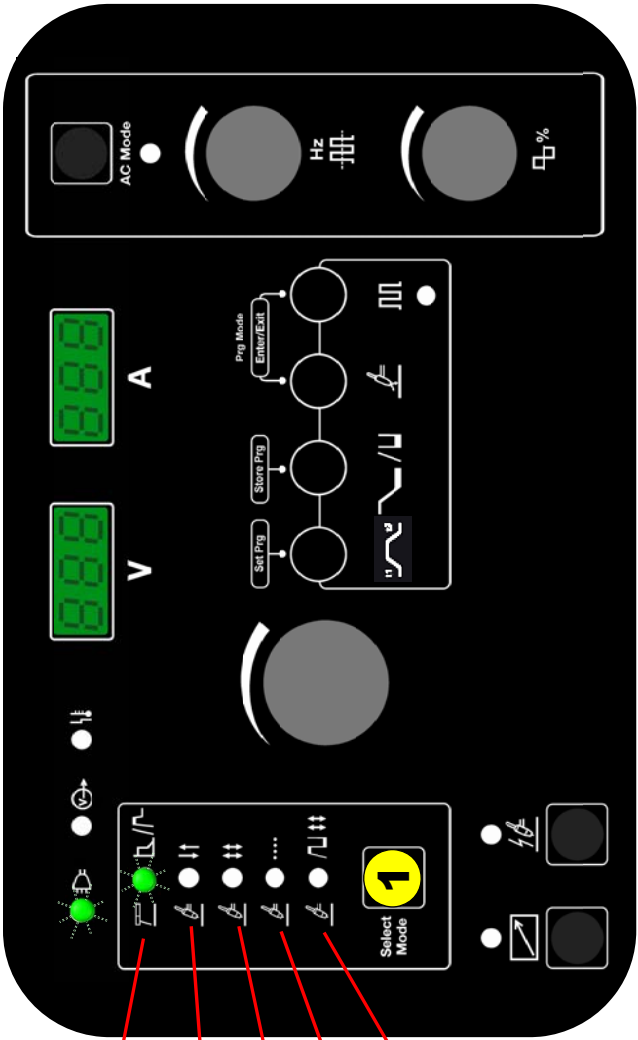
1. Press both Prg Mode Enter/Exit buttons (pulse and gas buttons) (10,11).
2. Select the program you want to recall.
3. Press the Set Prg. button for 3 seconds (slope down) (13).
4. Unit signals with 1 beep, short pause, then 1 beep signaling prg. has been recalled. with all parameters previously set on that program.

# Modes & Functions

The Table below list the five Modes and the Functions that are available in each of the modes for the Heliarc 281i, 283i, and 353i power supplies

MODE	Remote Control	Min Current	High Freq Start	Slope Time	Final Current	Pre/Post Flow	Pulse	DC Mode	AC Mode
STICK HS/AF	Yes	Yes	NA	NA	NA	NA	NA	Yes	Yes
TIG 2 Stroke	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes
Tig 4 Stroke	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tig Spot	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes
Tig Dual Schedule	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

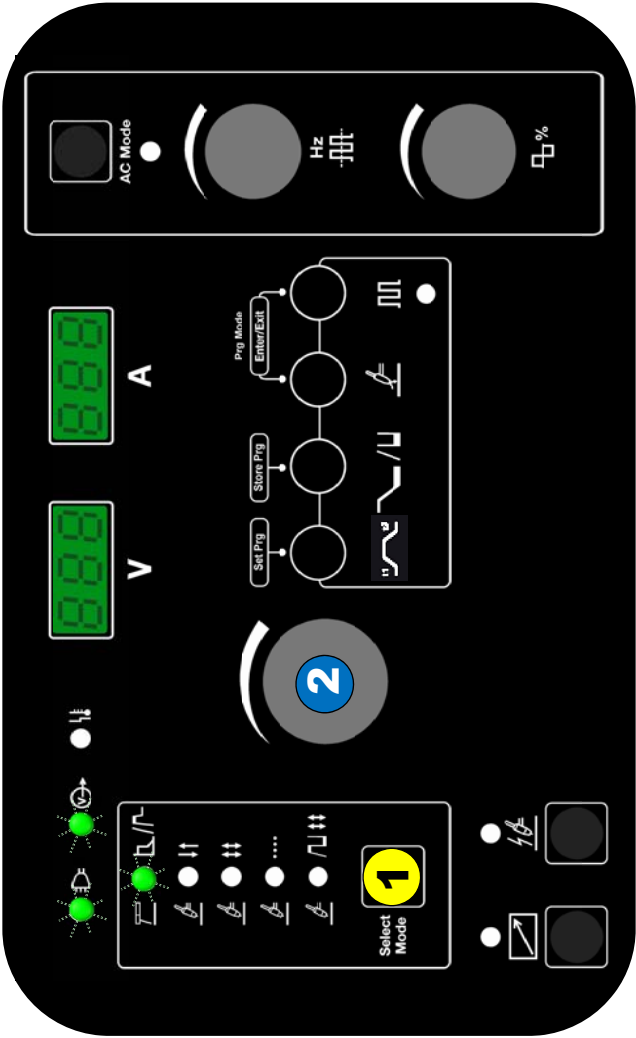
# Operation Mode Selection Quick Set Up



- Stick w/ Hot Start & Arc Force
- Tig - Two Stroke
- Tig - Four Stroke
- Tig - Spot Mode
- Tig - Dual Schedule

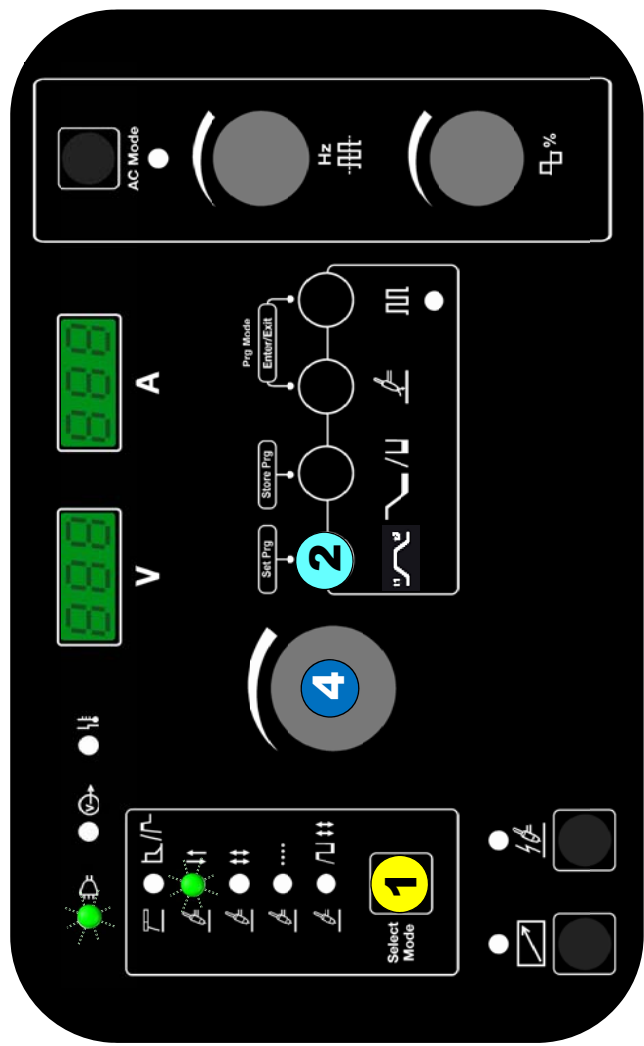
Function	Control	Procedure	Range
Operation Mode	<b>1</b>	Press Select Mode Button Repeatedly until the Desired Mode is Selected (Indicator illuminates ON)	Sequential
		Each time the Select Mode Button is pressed, the Mode Indicator Sequences One Position Down until it Reaches Bottom. Then it returns to the top Position and Starts Over.	5 Modes

# Stick (SMAW) Mode Quick Set Up



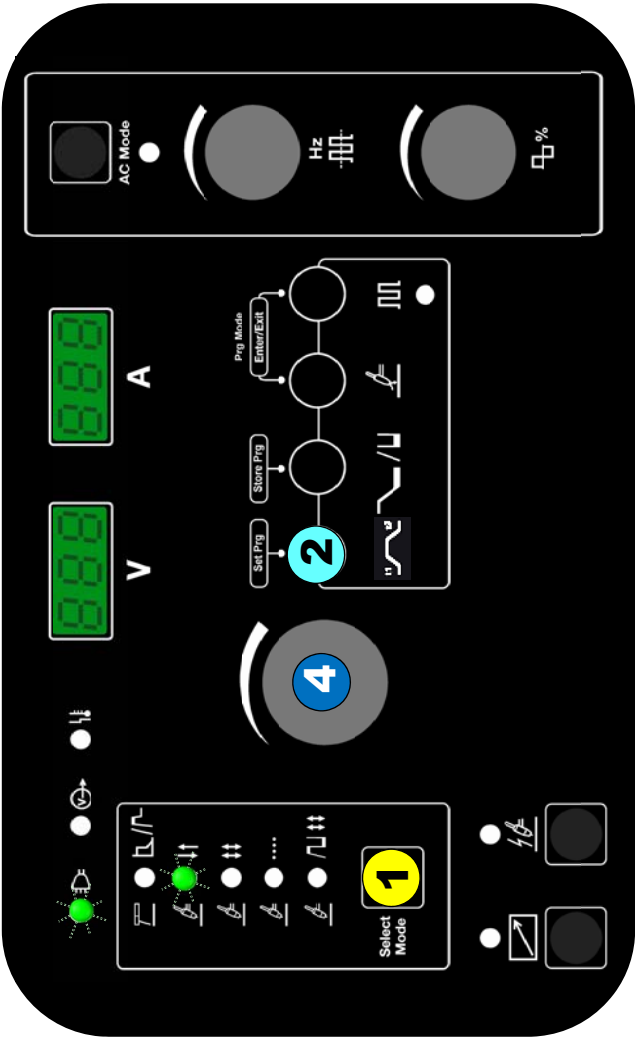
Function	Control	Procedure	Range
Stick (SMAW) Mode ON	<b>1</b>	Press Select Mode Button Repeatedly until the Stick Indicator illuminates (ON)	ON - OFF
Hot Start	<b>1 2</b>	Once in Stick Mode, Press and hold Select Mode Button until HS is displayed in the V Display Window. Adjust main current control to set Hot Start.	0 – 50 Percent of Current Setting
Arc Force	<b>1 1 2</b>	Once in Stick Mode, Press and hold Select Mode Button until HS is displayed in the V Display Window then press it once more. Adjust the main current control to set Arc Force.	0 – 50 Percent of Current Setting

# Tig (GTAW) Two Stroke Mode with Remote Switch Quick Set Up



Function	Control	Procedure	Range
Tig Two Stroke Mode	<b>1</b>	Press Select Mode Button Repeatedly until the Tig Two Stroke Mode Indicator illuminates (ON)	ON - OFF
Down Slope Time	<b>2</b>	Press and Adjust <b>4</b> to desired time	.1 to 10 Seconds

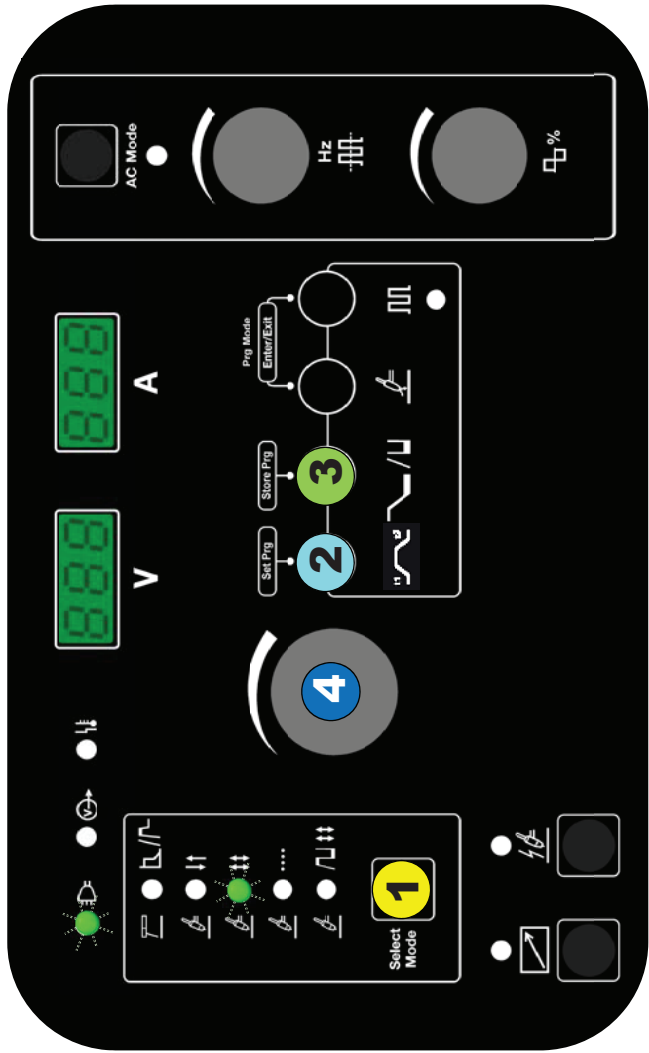
# Tig (GTAW) Two Stroke Mode with Foot Control Quick Set Up



Function	Control	Procedure	Range
Tig Two Stroke Mode	<b>1</b>	Press Select Mode Button Repeatedly until the Tig Two Stroke Mode Indicator illuminates (ON)	ON - OFF
Down Slope Time	<b>2</b>	Press and Adjust <b>4</b> to minimum time	Minimum

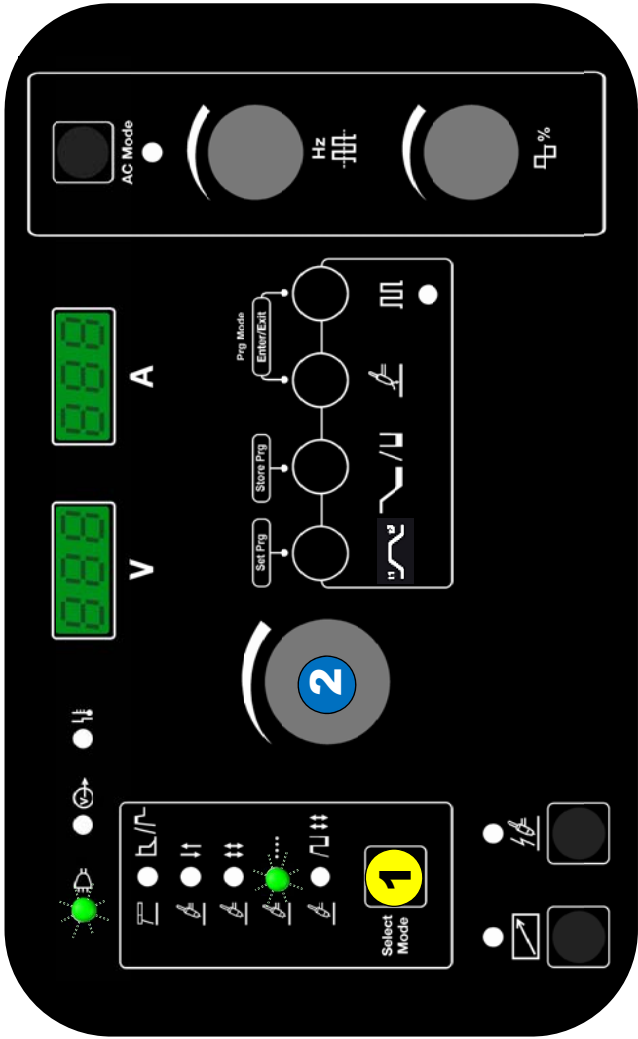


# Tig (GTAW) Four Stroke Mode Quick Set Up



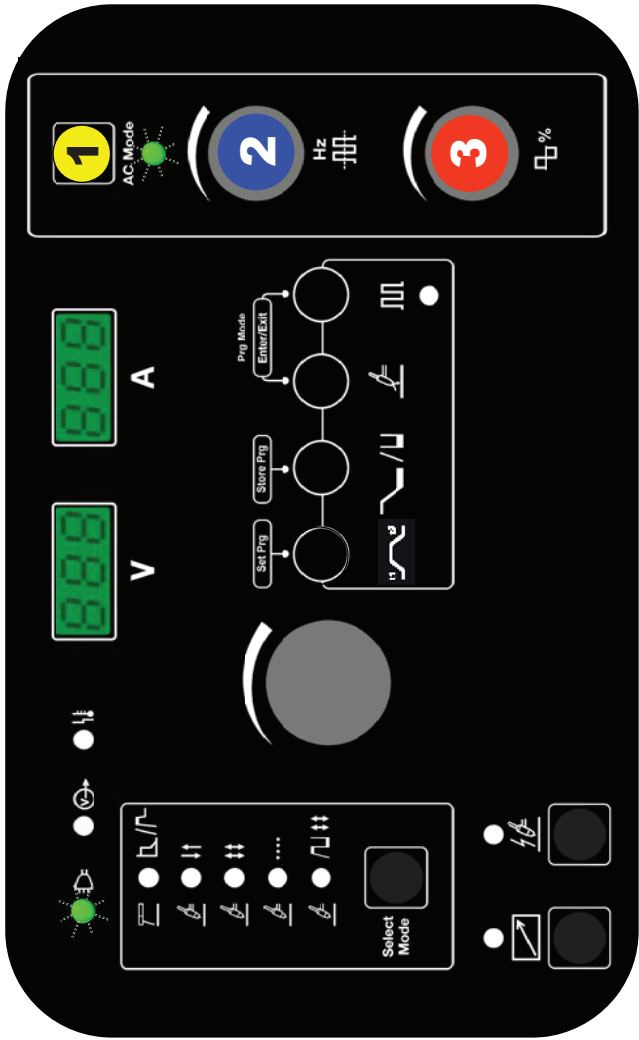
Function	Control	Procedure	Range
Tig Four Stroke Mode	<b>1</b>	Press Select Mode Button Repeatedly until the Tig FourStroke Mode Indicator illuminates (ON)	ON - OFF
Down Slope Time	<b>2</b>	Press and Adjust <b>4</b> to desired time	.1 to 10 Seconds
Up Slope Time	<b>2</b>	Press twice and Adjust <b>4</b> to desired time	1 to 10 Seconds
Final Current Level	<b>3</b>	Press and Adjust <b>4</b> to desired current level	10 to 90 % of Main A

# Tig (GTAW) Spot Mode Quick Set Up



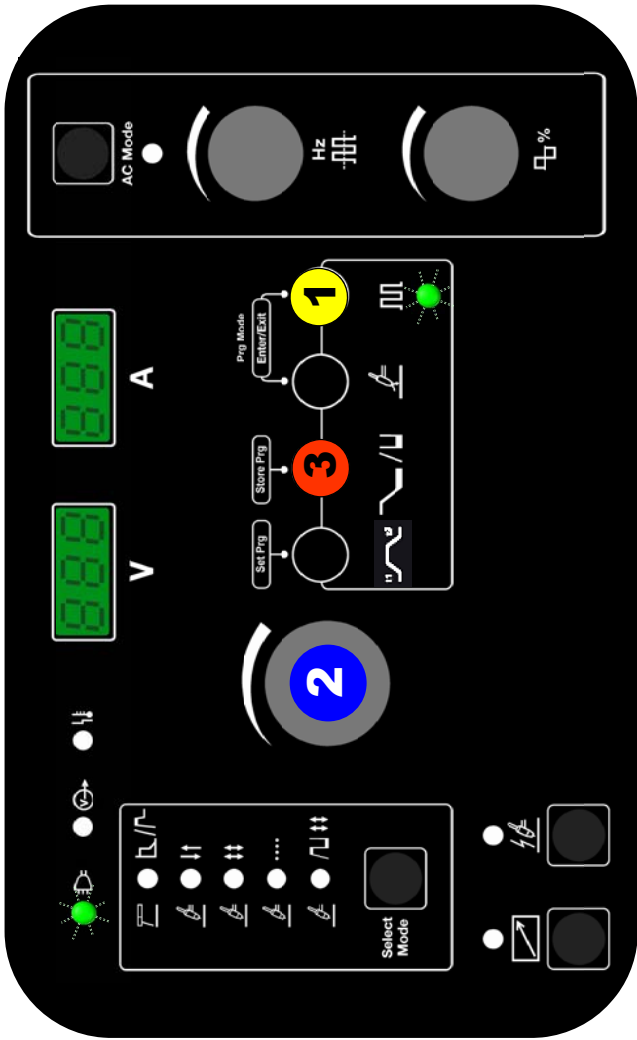
Function	Control	Procedure	Range
Tig Spot Mode ON	1	Press Select Mode Button Repeatedly until the Tig Spot Mode Indicator illuminates (ON)	Sequence
Spot Time	2	Adjust Spot Time in the A Display Window	.1 – 10 sec
Spot Weld Current Level	2	Set Spot Weld Current Level in Normal Tig Mode then reselect TIG Spot Mode with the Mode Select Button	Min to Max Output Current

AC Mode  
Quick Set Up



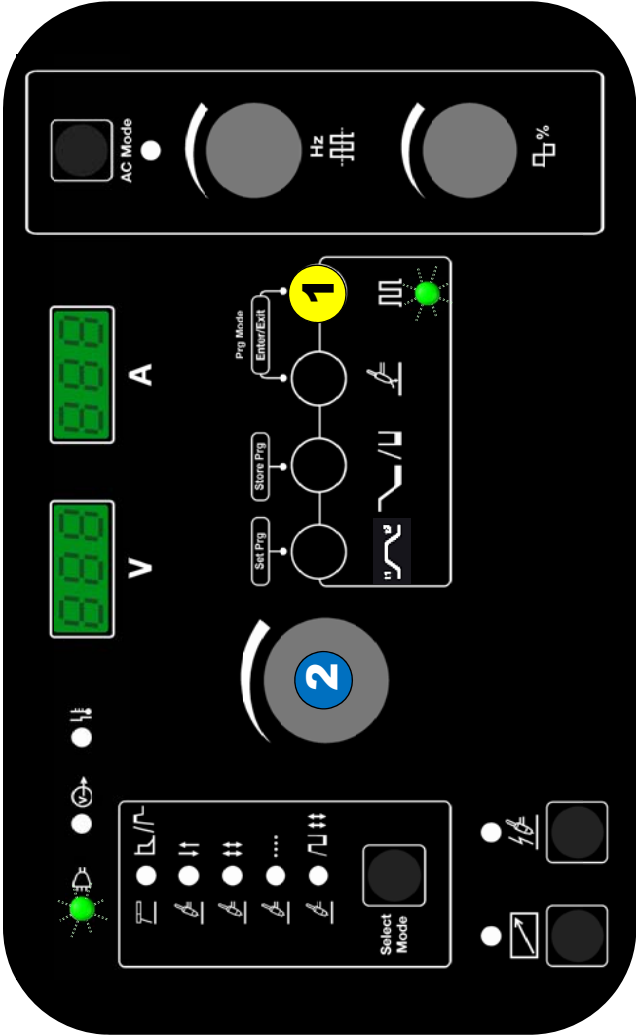
Function	Control	Procedure	Range
AC Mode ON	<b>1</b>	Press to turn AC Mode ON	ON - OFF
AC Frequency	<b>2</b>	Adjust to desired Frequency	20 to 200 Hz.
AC Waveform Balance	<b>3</b>	Adjust to desired Balance	10% to 90% Electrode Negative (Penetration)
AC Mode OFF	<b>1</b>	Press and HOLD for three seconds to turn AC Mode OFF	ON - OFF

Pulse Mode – Peak/Background  
Quick Set Up



Function	Control	Procedure	Range
Pulse Mode ON	1	Press to turn Pulse Mode ON	ON - OFF
Pulse Peak Current	2	Adjust to desired Peak Current Level	Min to Max of Machine
Pulse Background Current	3	Adjust to desired Background Current Level	10% to 90% of Peak Setting
		Pulse Operation Continued on Next Page	(Frequency / Duty Cycle)

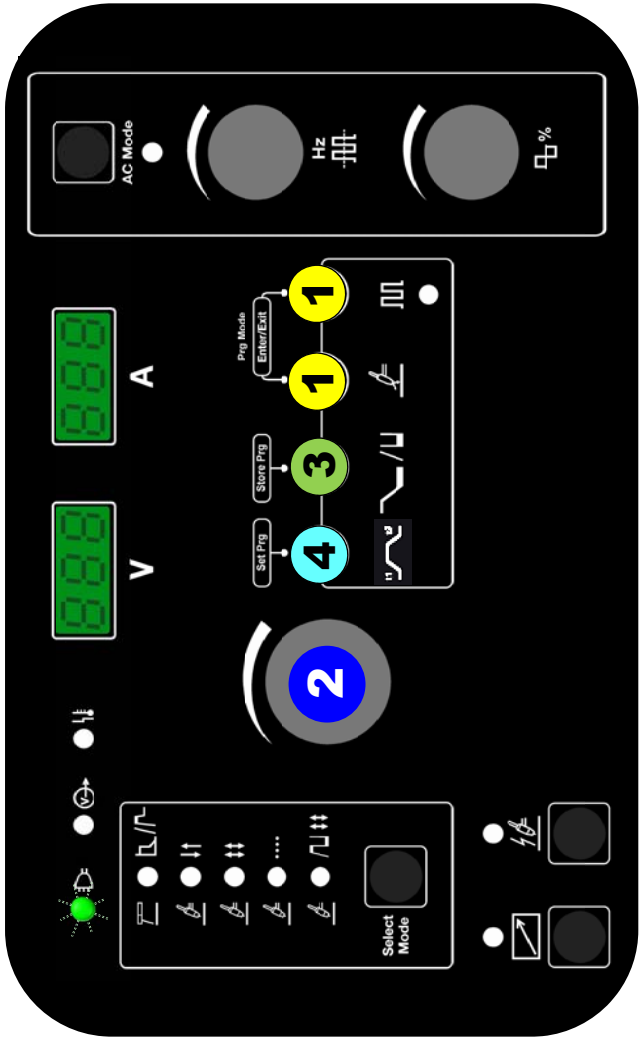
Pulse Mode – Frequency/Duty Cycle  
Quick Set Up



Function	Control	Procedure	Range
Pulse Frequency / Duty Cycle	<b>1</b>	With Pulse ON, Press to toggle between “Fre” (Frequency) and “dut” (Duty)	Frequency / Duty Cycle
Pulse Frequency	<b>1</b> <b>2</b>	Adjust to desired Pulse Frequency (Pulses / Sec)	AC Mode = .4 to 2 Hz. DC Mode = .4 to 300 Hz.
Pulse Duty Cycle	<b>1</b> <b>1</b> <b>2</b>	Adjust to desired Duty Cycle (Percent of Peak Time vs Background Time)	30% to 65% Peak Width
Pulse Mode OFF	<b>1</b>	Press and HOLD for three seconds to turn Pulse Mode OFF	ON - OFF

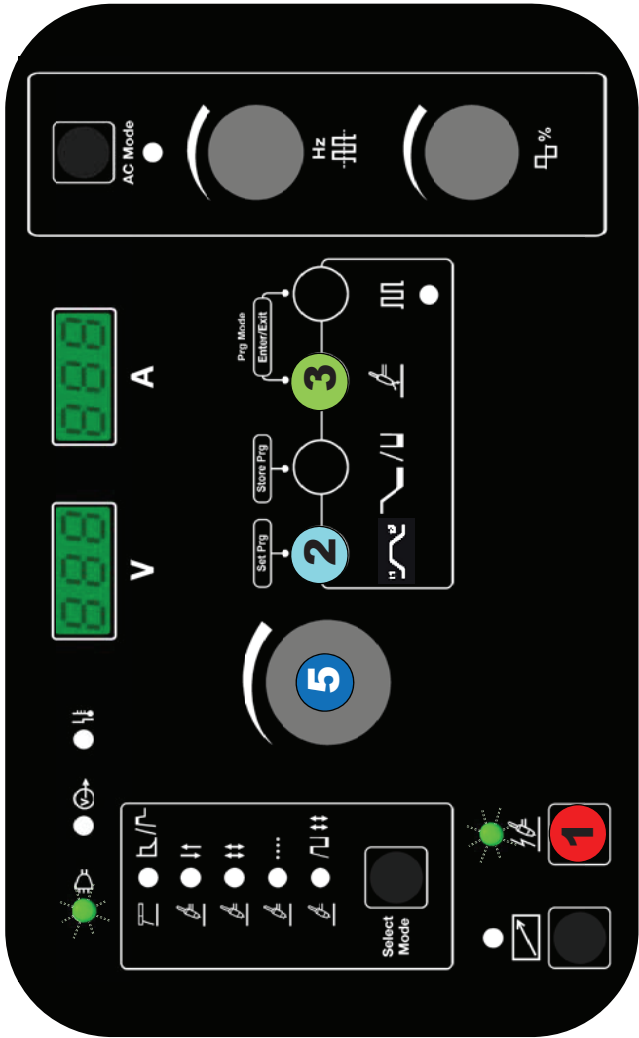
# Store & Recall Programs

## Quick Set Up



Function	Control	Procedure	Range
Program Mode	1	Press and Hold both Buttons for Three Seconds. Unit will Display Prg and Program Number.	Enter - Exit
Program (Parameter Set)	2	Adjust to desired Program Number	1 through 60 Programs
Store Program	3	Press and Hold Three Seconds. Unit Beeps Four Times to Signal Completion of Storage	
Recall Program	4	Press and Hold Three Seconds. Unit Flashes Display to Signal Completion of Program Recall.	

General Functions  
Quick Set Up



Function	Control	Procedure	Range
HF Start (Tig Modes Only)	<b>1</b>	Press ON - Press OFF	ON - OFF
Down Slope Time	<b>2</b>	Press and Adjust <b>5</b> to desired time	.1 to 10 Seconds
Up Slope Time	<b>2</b>	Press twice and Adjust <b>5</b> to desired time	1 to 10 Seconds
Pre & Post (Press Once) Gas Flow Time (Press Twice)	<b>3</b>	Press and Adjust <b>5</b> to desired time	Pre-flow .1 to 2.5 Sec Post-flow .5 to 30 Sec

## 6.1 Overview

Regular maintenance is important for safe, reliable operation.

Only personnel with the appropriate electrical skills (authorized staff) may remove safety plates.



### CAUTION!

All warranty undertakings from the supplier cease to apply if the customer attempts any work to rectify any faults in the product during the warranty period.

## 6.2 Power source

Check regularly that the welding power source is not clogged with dirt. Clogged or blocked air inlets and outlets can result in overheating.

How often and which cleaning methods apply depend on:

- the welding process
- the arc times
- the environment
- the surrounding environment

It is normally sufficient to blow down the power source with dry compressed air (reduced pressure) once a year.

## 6.3 Welding torch

A regular programme of care and maintenance reduces unnecessary and expensive downtime.

Each time a wire bobbin is changed, the welding torch should be removed from the power source and blown clean with compressed air.

The wire end must not have sharp edges when inserted into the wire liner.

For detailed information see instruction manuals for welding torches.

## 6.4 Cooling unit

For the cooling unit it is sufficient to keep the inside clean. A dusty environment requires a more frequent cleaning.



### WARNING!

Before any actions are taken, disconnect the cooling unit from the mains power supply (disconnect the ILME 4-way connector from the power source).

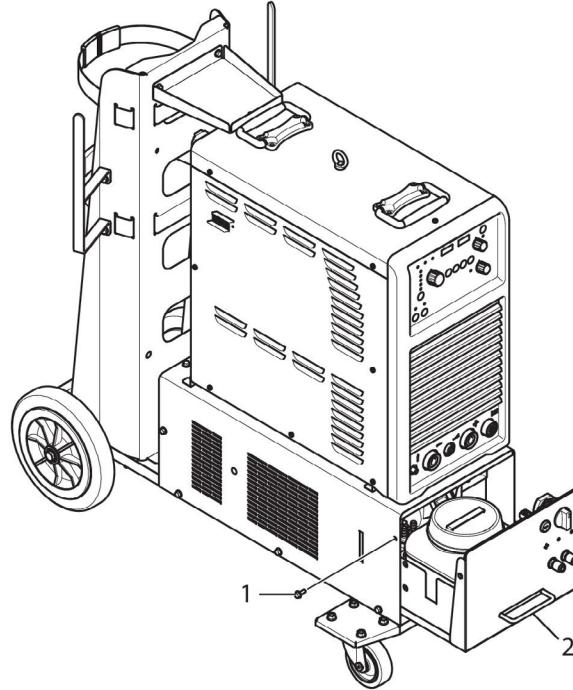
To clean the cooling unit do the following:

1. Disconnect and remove the cooling unit from the power source.
2. Remove all the coolant from the cooling unit.
3. Clean the inside of the cooling unit with compressed air, not higher than 3 bar.
4. Check that all the electrical connections are tightened.
5. Check that all the hydraulic connections are tightened.
6. Replace damaged or worn parts.
7. Fill up the cooling unit with coolant to the maximum level.
8. Put the cooling unit in position and connect it.



### 6.5 Fill up the cooling unit with coolant

To fill up the cooling unit with coolant do the following:



1. Turn off the cooling unit and the power source.
2. Disconnect the cooling unit connector from the power source.
3. Remove the safety bolt (1).
4. Carefully pull out the cooling unit (2), enough to access the coolant tank.
5. Fill up the cooling unit with coolant to the maximum level.
6. Carefully push back the cooling unit and fasten it with the safety bolt (1).

**WARRANTY**

ESAB offers a full, normally on-site, guarantee on all its welding and cutting equipment. The Heliarc AC/DC 281i, 283i and 353i power sources are guaranteed for a period of 36 months from date of purchase. If during this period the product proves defective due to incorrect design, materials or workmanship, ESAB or its authorized Service Center will, free of charge, repair or at the discretion of the company replace the product or its defective parts.

Please see complete Warranty Statement in the ESAB Standard Terms and Conditions publication.

**This guarantee excludes:**

1. Normal wear and tear of consumable parts, electrodes, nozzles, motor brushes, relay/contactors contacts etc.
2. Damage resulting from misuse, accident, lack of maintenance, incorrect installation or misapplication.
3. Repairs carried out by non-authorized personnel or the use of non ESAB replacement parts.
4. Loss of use of the product and other incidental or consequential costs incurred by the purchaser.



**ESAB Welding & Cutting Products, Florence, SC**  
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