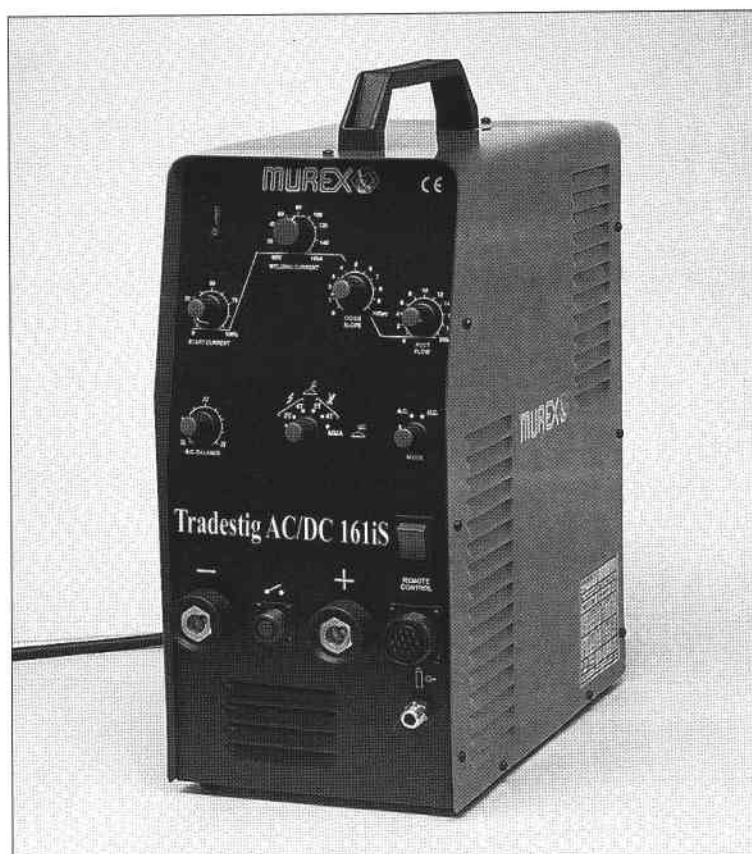




Operating Manual

Tradestig AC/DC 161iS



**Please ensure that this
Instruction Manual and Parts List
is made available to the user of
the equipment**



DECLARATION OF CONFORMITY

Murex Welding Products Ltd.

Declare hereby that:

Murex Tradestig AC/DC 161iS Power Source

Part No: 1415795

- is manufactured in accordance with the Council Directive 73/23/EEC (1973-02-19) and 89/336/EEC (1989-05-03) amended by Council Directive 93/68/EEC relating to electrical equipment designed for use within certain voltage limits.
- conforms with the protection requirements of Council Directive 89/336/EEC, amended by Council Directives 91/263/EEC, 92/31/EEC and 93/68/EEC relating to electromagnetic compatibility.
- is manufactured in accordance with the relevant parts of EN60974-1 Safety Requirements for Arc Welding Equipment.
- is manufactured in accordance with EN50199 Electromagnetic Compatibility for Arc Welding Equipment.

On behalf of Esab Group (UK) Ltd
Hertford Road
Waltham Cross
Herts. EN8 7RP
England

A handwritten signature in black ink, appearing to read "P.G. Dodd".

P.G. Dodd
Managing Director
Esab Group Ltd
1st Jan 2001

Contents

	Page
• Safety	5
• Introduction	6
• Radio Interference	6
• Specification	7
• Installation and Controls	7
• Operation	10
• Maintenance & fault finding	12
• Optional Equipment	13
• Circuit Diagram	14
• Spare Parts	15



WARNING



This welding equipment has been designed, manufactured and tested to the highest standards to ensure long and trouble free life. However, regular maintenance is an essential part of keeping the machine operating in a reliable and safe manner and your attention is drawn to any maintenance instructions that are contained in this manual.

In general, all welding equipment should be thoroughly inspected, tested and serviced at least annually. More frequent checking will be required when the equipment is heavily used.

Wear and tear, particularly in electro-mechanical and moving components, are gradual processes. Caught in time, repair costs are small and the benefits in performance reliability and safety are significant. Left alone, they can put the equipment, and you, at risk.

Have this equipment regularly inspected and maintained by an approved service centre.



WARNING



ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.

ELECTRIC SHOCK - Can Kill

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves, or wet clothing.
- Insulate yourself from earth and work.
- Ensure your working position is secure.

FUMES AND GASES - Can be Dangerous to Health

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

ARC RAYS - Can Injure Eyes and Burn Skin

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

NOISE- Excessive noise can damage hearing

- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risks.

**READ AND UNDERSTAND THE INSTRUCTION MANUAL
BEFORE INSTALLING OR OPERATING AND SEE 18 PUBLICATION 237
'The arc welder at work' AVAILABLE FROM THE MANUFACTURER.**

PROTECT YOURSELF AND OTHERS

SAFETY

In any arc welding or gouging operation, it is the responsibility of the user to observe certain safety rules to ensure his personal safety and to protect those working near him.

Read all safety articles relevant to arc welding published by the 18. Pay particular attention to any **CAUTION** or **WARNING** Notes included in this manual. **CAUTION** indicates possible equipment damage. **WARNING** indicates possible hazard to life.

⚠ **WARNING** ⚠

The ON/OFF switch on this equipment does not isolate the unit from the mains electrical supply. **AC POWER IS PRESENT ON THE ON/OFF SWITCH TERMINALS.**

The On/Off lamp is an indication that the supply is switched on and does not imply that the unit is isolated from the supply. **BEFORE REMOVING THE COVERS FOR MAINTENANCE, ISOLATE THE UNIT FROM THE MAINS ELECTRICAL SUPPLY.**

1. Electrical

- ⚠ Treat electricity with respect. Even the open circuit voltage of this equipment can be dangerous. Adjustments to the torch or replacement of torch parts should be undertaken with the mains supply isolated from the unit.
- If damaged torch cables or torch components are found, the unit must be disconnected from the mains and defective parts must be replaced using only Murex spare parts.
- ⚠ Do not work on live circuits or cables. Disconnect the main power supply before checking the machine or performing any maintenance operation.
- ⚠ Be sure the case of the welding machine is properly connected to a good electrical earth.
- ⚠ Have the wiring for the welding machine installed by a qualified electrician. All connections must be made according to specifications in force and to general safety standards.
- ⚠ Do not stand in water or on damp floors while using an arc welder or cutter. Do not use in the rain.
- ⚠ Do not operate with worn or poorly connected cables. Inspect all cables frequently for insulation failure, exposed wires and loose connections.
- ⚠ Do not overload cables or continue to operate with overheating cables. Cables which are too small for the current carried will overheat, causing rapid deterioration of the insulation.
- ⚠ Pay attention that live parts of the torch do not touch any metal which is connected to the earth cable. Fix an insulated hook to hang the torch on when it is not in use.

1. Ventilation

- ⚠ Do not weld or cut on containers which have held combustible or flammable materials, or materials which give off flammable or toxic vapours when heated, without proper cleaning.
- ⚠ Locate the welding/cutting operation far enough from any vapour-type degreaser using trichlorethylene or other chlorinated hydrocarbons as solvents. The ultraviolet light from the arc can decompose these vapours into toxic gases at a considerable distance from the arc, even though the concentration of the gases is low enough to be undetectable by smell.
- ⚠ Be sure to provide adequate ventilation for removal and dilution of fume and gases. Fume exhaust facilities near the arc, or a ventilated helmet should be used when cutting in confined spaces or on toxic material.

2. Glare

- ⚠ Never look at the arc without wearing eye protection.
- Always use the proper protective clothing, filter glasses, and gloves. Be careful to avoid exposed skin areas. Do not use cracked or defective helmets or shields.
- ⚠ Never strike an arc when there is someone near who is not protected from the strong light of the arc.
- ⚠ Warn bystanders who are not aware of the dangers of ultraviolet light.

3. General

- ⚠ Take care when lifting the unit.
- ⚠ Ensure that cylinders are secured by chains.
- ⚠ Locate the unit so that there is adequate air flow to the ventilation louvres.
- ⚠ Always dress correctly to protect against glare, radiation and spatter.

4. Fire

- ⚠ Ensure that the correct type of fire extinguisher is available in the welding area.
- ⚠ Do not weld near flammable materials or liquids, in or near explosive atmospheres, or on pipes carrying explosive gases.

5. Vehicle Electrics

- ⚠ When working on motor vehicles, remove the battery and any circuitry which may be damaged by the arc.
- ⚠ Whilst welding be aware of the possibility of 'hidden wires' behind panels or bulkheads.

INTRODUCTION

The Tradestig AC/DC 161iS is an inverter based DC and squarewave AC power source suiting both TIG and MMA welding methods. The unit operates from 230V 1 phase mains electricity, see specification, and supplies up to 160A welding output at 35% duty.

Front panel controls enable the operator to set start current, welding current and slope down time. The unit incorporates a gas solenoid and a post purge time control is available on the control panel.

Inbuilt into the unit is an electronic non-contact arc ignition system, note that the unit initiates the TIG arc in "DC mode" even when AC output is selected. Once the arc is struck the unit alternates the output current in AC mode. The AC frequency is not locked to mains frequency (50Hz) but is varied automatically up to 200 cycles per second to provide optimum arc stability. A control on the front panel enables AC balance to be varied from 70:30 to 30:70 to provide either greater cleaning or penetration as required.

The unit provides both 2 and 4 stroke torch switch operation as well as "non-HF" scratch starting modes. A remote control socket enables an FC-5B foot control to be used for bench work and the like. Two axial fans mounted in the rear of the housing cool the internal semiconductor components. A thermal sensor protects the components from excessive temperatures if the duty is exceeded.

RADIO INTERFERENCE

1. Murex 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 minimised.

2. This equipment satisfies the requirements of the EU Directive 89/336/EC on EMC and complies with the limits in EN 50 199, 'EMC product standard for arc welding equipment'. These limits are designed to provide reasonable protection against interference in heavy industrial areas.

3. If this equipment is used in domestic areas, eg. 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.

4. If this equipment caused interference the guidance given below should be considered. If a solution cannot be found please contact your distributor or the manufacturer.

5. 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, eg electronic machine guards, unless they have been suitably protected.

6. Primary cabling and welding cables should be kept separate to other mains wiring and control, signalling or communications (eg telephone) cables. If interference occurs then greater separation or re-routing should be considered. Welding cables should be kept as short as practically possible.

7. 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.

8. To ensure continued compliance to the EMC Directive this equipment should be routinely maintained according to the manufacturers instructions and using only approved spare parts. In particular, the spark gaps of HF units should be adjusted and maintained according to the manufacturers recommendations.

9. All access and service door 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.

SPECIFICATION

Input

Mains Supply	230V 1 phase 50/60Hz	
Power (max)	5.1 KW (efficiency = 83%)	
KVA (max)	6.3KVA (power factor = 0.81)	
Fusing	DC TIG to 160A	} 13A slow
	AC TIG to 130A	
	AC or DC MMA to 100A	
	AC or DC, TIG or MMA to 160A - 16A slow	

Output

Current Range	10 - 160A
Rating	160A/26V at 35% duty
	130A/25V at 60%
	100A/24V at 100%
OCV	50V

Dimensions

Length	360mm
Width	200mm
Height	410mm
Weight	13Kg (net)

Standards

EN60974-1 & EN50199

INSTALLATION & CONTROLS, see Fig. 1.

1. Mains Input Cable (rear panel)

Connect to a suitable 230V single phase electricity supply, see specification. The green/yellow earth lead must be securely connected to earth. A switched outlet containing suitable fusing should be used, refer to specification for fusing details. If in doubt consult a qualified engineer/electrician.

2. Gas Inlet Hose (rear panel)

Connect to the Argon cylinder regulator/flowmeter outlet using the 3/8" BSP RH nut & nipple supplied with the package. The regulator must be set to deliver Argon at 30 psi (otherwise the flowmeter will not read accurately).

3. +Ve Outlet

For TIG welding applications connect to the work using a suitable work return lead and clamp. For MMA this is usually the connection point for the electrode holder (+ve electrode).

4. -Ve Outlet

For TIG welding this is the power connection point for the TIG torch. For MMA welding this is usually the work connection (+v electrode).

IMPORTANT

Site the unit in a safe position free from dust, dirt, moisture or corrosive vapours. Locate it where there is free movement of air to the rear panel air intakes, side and front panel louvres. An off floor position is recommended.

5. Gas Outlet to Torch

Connect the TIG torch gas hose to this fitting using a 1/4" BSP RH coupling.

6. Torch Switch Socket (2 pin)

If a torch mounted switch is being used connect it here using the matching 2 pin amphenol plug.

7. Remote Control Socket (14 pin)

For connection of a remote control device like the FC-5B foot control unit. Connection of a remote control disables both start and main current settings. The remote control provides full range control up to 160A.

8. Power Switch

Setting the switch to on energises the internal circuitry. The switch should be illuminated when set to the on position.

WARNING!

Dangerous voltages may still be present inside the unit when the power switch is off. Always disconnect the unit from the mains electricity supply before accessing internal parts.

9. Process Mode Selector Switch

Four different TIG operating modes are provided as well as MMA welding mode. The TIG modes are as follows:

a) 2 Stroke with HF -The normal method for TIG welding using non-contact arc striking. Press the torch switch (or foot control) to start welding. Release the torch switch to initiate the down-slope and stop welding.

b) 4 Stroke with HF -For long duration welds the torch switch can be electronically latched. Press to initiate the TIG arc, the arc will strike and then remain at the start current level whilst the switch continues to be held. Releasing the switch allows the current to slope up to the main current setting.

Repressing the switch initiates the weld stop procedure. If the switch is repressed and then immediately released the arc will go off immediately. Alternatively, repressing and holding the switch permits the current to slope down to its final level where it will remain until the switch is finally released.

c) 2 Stroke Non HF -When HF may cause problems in surrounding sensitive equipment, see HF Emission Prevention, touch start TIG striking can be used. Press the switch and touch the tungsten momentarily to the work to initiate the arc. Release the switch to slope out and stop welding.

d) 4 Stroke Non HF -See b) above but using scratch start TIG striking method as described in c) above.

When MMA is selected open circuit voltage is immediately available at the output terminals and the HF and gas control circuitry are disabled.

10. Polarity Selector Switch

Selects either AC or DC polarity welding methods.

11. AC Balance Control

For AC TIG (& MMA) welding the control enables the operator to adjust the "balance" of the AC current to achieve either greater cleaning (more positive) or greater penetration (more negative) of the workpiece. As the control is rotated clockwise the balance of the AC wave changes from more negative to more positive.

12. Start Current

Enables the current at which the TIG arc is struck to be preset. Useful when using small diameter tungstens. Start current is set as a percentage of the main welding current.

13. Welding Current

Sets the main welding current in the range 10 to 160A.

14. Slope Down Time

In order to allow the weld crater to fill-up before extinguishing the TIG arc the current can be reduced slowly to background level before arc off. This control sets the time for the down slope in the range 0-10 seconds. Set it to minimum when using a foot control unit.

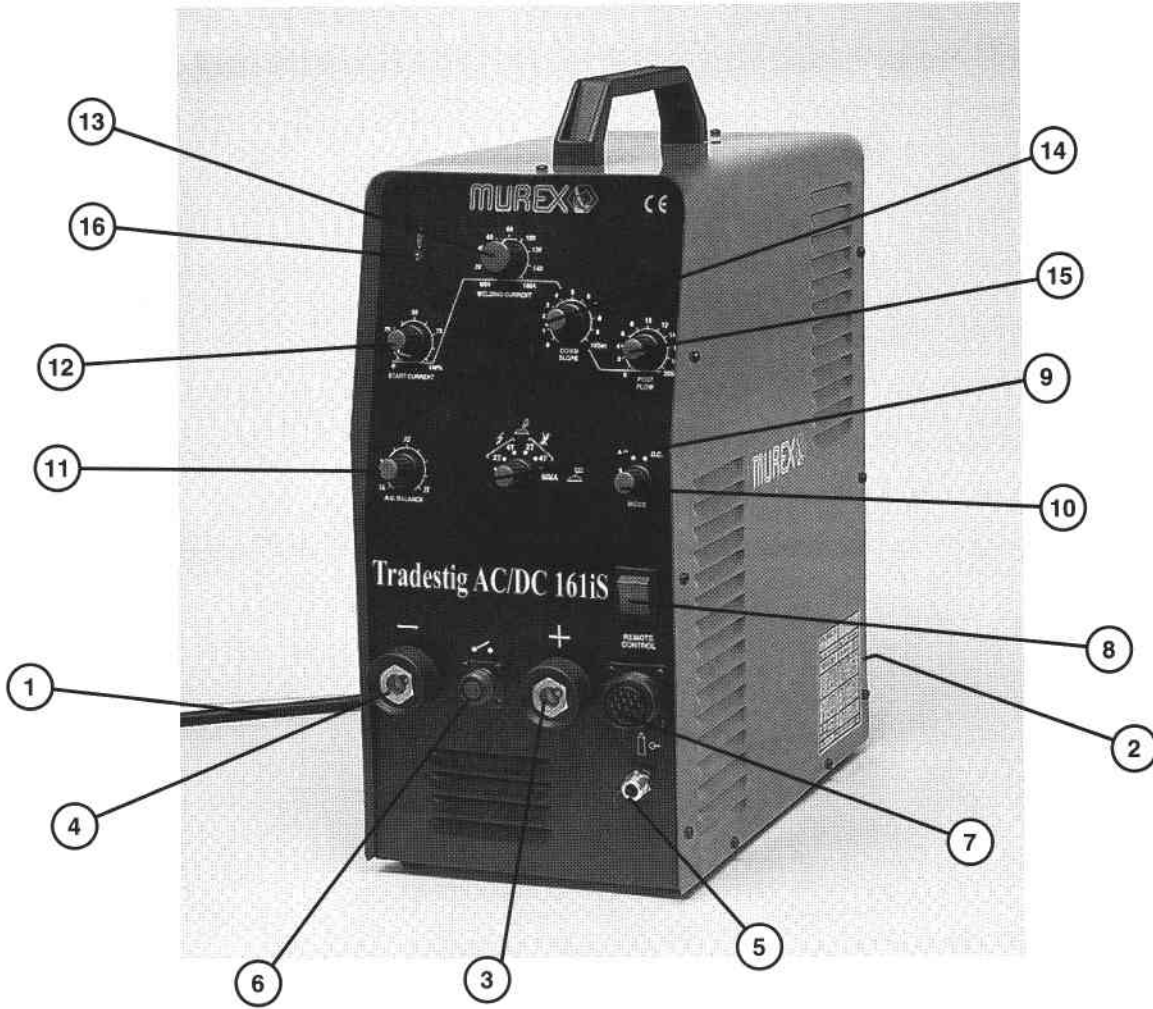
15. Post Gas Purge Time

Sets the duration of the shielding gas flow after the TIG arc is extinguished. Postflow time can be set up to 20 seconds.

16. Over Temperature Light

In the event the unit is over-dutied an internal temperature sensor will switch off welding output and the over temperature light will illuminate. In this event leave the unit switched on with the fans running. Reset is automatic after the unit has cooled.

Fig.1. CONTROLS AND CONNECTIONS



OPERATION

Setting Up for TIG Welding

1. Connect the TIG torch power lead to the -ve output socket.
2. Connect the TIG torch gas hose to the front panel gas outlet.
3. Connect the TIG torch switch to the 2 pole front panel socket, alternatively connect a remote control (foot control) to the 14 way remote control socket.
4. Connect the work/workbench to the +ve output socket.
5. Connect the gas inlet hose to the Argon regulator flowmeter, turn-on the cylinder valve.
6. Check the TIG torch is correctly assembled and the tungsten tip is properly prepared, see later section. Use 2% thoriated tungstens for DC TIG welding and 1% zirconiated for AC. Recommended tungsten diameters are as follows:

DC 2% thoriated 10 - 70A 1.6mm
 50 - 160A 2.4mm

AC 1 % zirconiated 25 - 55A 1.6mm (50:50 balance)
 45 - 120A 2.4mm(50:50 balance)
 100 - 160A 3.2mm (50:50 balance)

Note when AC TIG welding turning the balance control clockwise, to give greater cleaning, increases the heat in the tungsten and hence reduces its maximum current capacity.

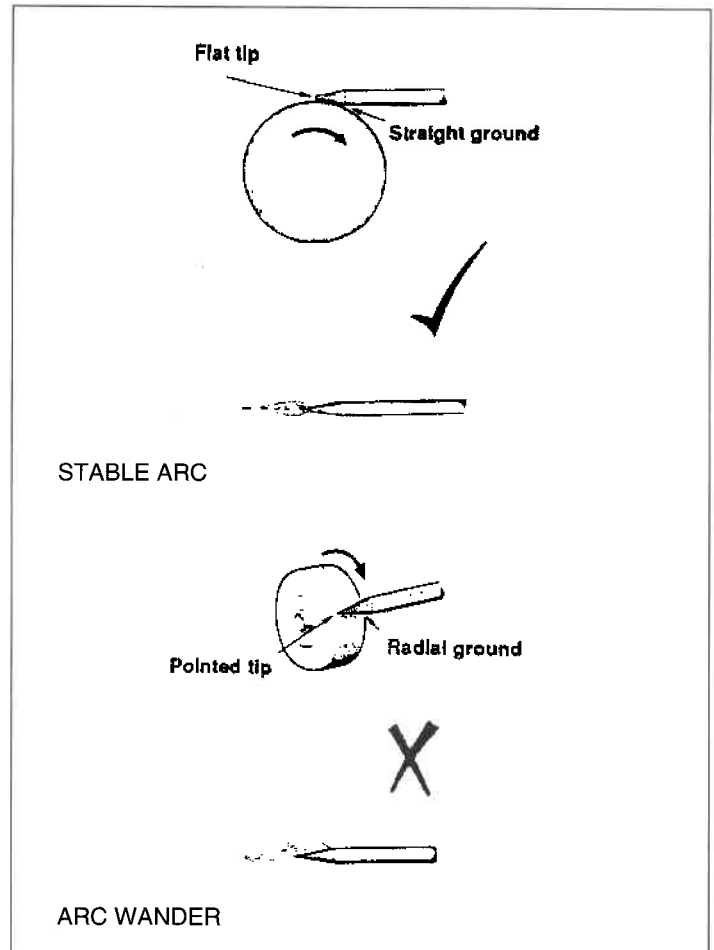
TIG Welding

1. Set the front panel controls as required-.
 - 2 or 4 stroke, HF or touch start TIG mode
 - AC or DC process
 - AC balance if AC TIG welding (50:50 is a good starting point)
 - Start current
 - Main current
 - Slope down time
 - Gas post flow time

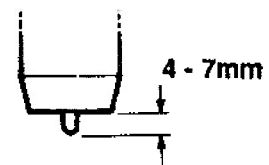
IMPORTANT!

If a remote current control device is connected, eg the FC-5B foot control, start and main current controls have no effect on welding output. Current is set by the remote controlling unit. Always use one of the 2-stroke TIG modes when using a foot control and set the slope down time to minimum.

2. Always commence with a last minute check for safety and protection.
3. Check the tungsten electrode tip is correctly ground, especially for DC applications, see sketches. Confirm the tip sticks out of the ceramic gas lens by 4-7mm.



Electrode Grinding: To obtain a stable arc the electrode should be ground as shown. Use less sharp point for A.C.



Electrode Stickout 4-7mm

WARNING!

Always disconnect the unit from the mains supply when changing tungsten electrodes or whilst converting between TIG and MMA applications.

4. Switch on at the electricity supply. Set the power on/off switch to on.

WARNING!

If MMA mode is selected open circuit voltage is present at the output terminals as soon as the power switch is set to on.

5. Ensure gas flow is correctly set, usually 6-9 l/min (12-18 cu ft/hr).
6. Position the tungsten 3-5mm above the work, warn bystanders to shield their eyes and lower your eyescreen.
7. If HF start mode has been selected depress the torch (foot) switch. The HF output will automatically strike the arc without the need to touch the electrode to the work.
8. If non-HF mode has been selected, press the torch (foot) switch and lightly touch the tungsten tip to the work and lift it off again to initiate the arc.
9. In the 4 stroke mode the torch switch can be released once the arc has struck. Note in 4 stroke the current will continue at the start level setting until the switch is released.
10. Release (repress and release) the torch switch to slope the current out and stop welding
11. Maintain the torch in position over the weldpool whilst the post gas purge is running.

Setting Up for MMA Welding

1. Connect the electrode holder lead to the +ve output connection.
2. Connect the work/workbench to the -ve output connection.

IMPORTANT!

Some MMA electrodes are recommended for use on DC -ve polarity. If so reverse the connections made in 1 and 2 above.

3. Set the polarity switch as required, DC or AC.

4. Set the welding current control to the required welding current value.
5. Set the process selector switch to MMA.
6. Fit the appropriate electrode in the holder.

MMA Welding

1. Keeping the electrode/holder away from the work or exposed metal surfaces connect the unit to the mains supply and switch on the power on/off switch.

WARNING!

Open circuit voltage is now present at the electrode holder.

2. Position the electrode close to the point where welding is to start without touching the work.
3. Cover your eyes with a headsreen or handshield, warn bystanders to protect their eyes.
4. Scrape the electrode on the work surface near the start point (as though striking a match). The arc should strike.
5. Carry on scraping the electrode across the surface of the workpiece until the arc is almost continuous, then feed the electrode into the hot pool of molten metal keeping the electrode at approximately 65-80° to the workpiece.
6. Once the arc is successfully struck, adjust the arc length to about the size of the electrode diameter.
7. The correct length of arc, (size of weld "bead") is acquired by feeding the electrode backwards and downwards into the weld.

If the electrode "freezes", ie. sticks to the workpiece, gently twist the electrode and pull it free. If this is not possible, release the electrode from the holder, switch off the supply and cut the electrode free with a chisel. Freezing will occur if heavy contact is made with the workpiece at too low a current setting.

This combination of backward and downwards movement requires skill which will be acquired after a few practice welds.

Switch off the mains supply when welding is completed or whilst changing electrodes.

MAINTENANCE & FAULT FINDING

Maintenance

With the exception of the 2 rear panel cooling fans the Tradestig 161iS contains no moving parts. The HF generator is "gapless" requiring no adjustment. The internals of the unit should be periodically cleaned using clean dry compressed air at reduced pressure. This should be done every 12 months or more frequently if the unit is used in particularly dirty or dusty environments. Whilst the unit is open check the internal wiring and all connectors are in good condition.

It is recommended that external connections and cables (primary, gas & welding) should be regularly inspected for signs of deterioration or damage. Check that the front panel pins power connection plugs are properly locked in place (push in and twist) and show no evidence of overheating. Inspect the primary lead and its mains connector, ensure the earth conductor is properly connected. Power the unit and confirm that both rear panel cooling fans are running.

Fault Finding

Fault

Remedy

Unit dead, cooling fans not running, no power on light

Check front panel power switch is on. Check mains supply. Check mains supply fuse

Tungsten is blued and weld sooty & black

Check argon shielding gas supply is on and flow is adequate

HF sparks between tungsten and work but no arc formed

Check work return is properly connected to a clean location on the workpiece

Nothing happens when TIG torch switch is pressed.
No gas flows, no HF or power at the tungsten

Check the torch switch is properly connected at the 2 pin socket. Check the switch and switch wires.

Difficulty in initiating DC TIG arc

Check a 2% thoriated tungsten (red tip) is being used. Check for a good work return connection. Test machine in touch start mode to confirm arc will run. Re grind tungsten tip

Tungsten melts and transfers to weld pool

Check torch is connected to -ve output socket. If AC TIG welding reduce setting on balance control towards more negative polarity or use a larger tungsten

Mains fuse frequently blows

Welding current level being used causes primary current to exceed fuse rating. Use a larger fuse, refer to specification section

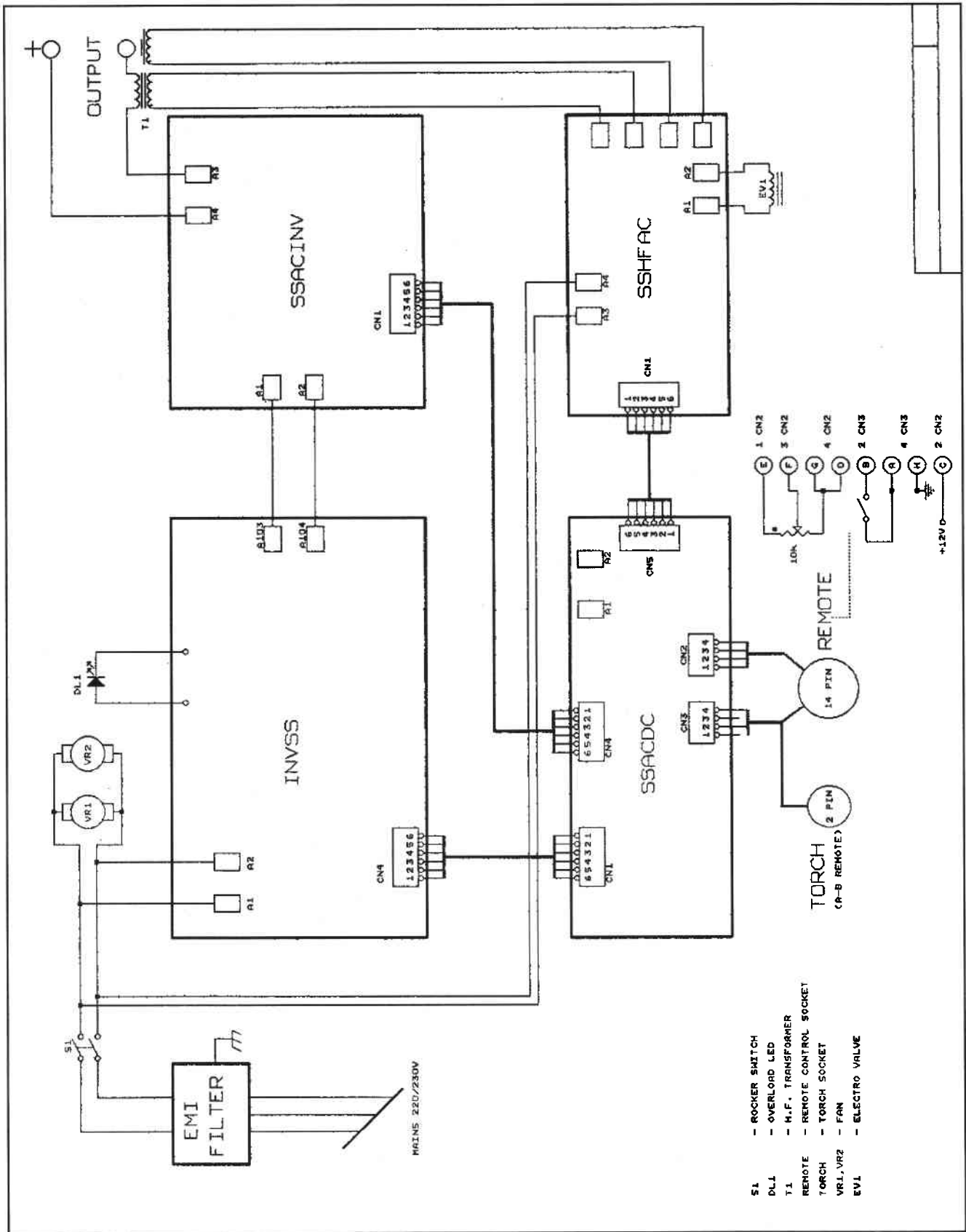
If all else fails

Contact your Murex distributor or an authorised Murex Service Centre

OPTIONAL EQUIPMENT

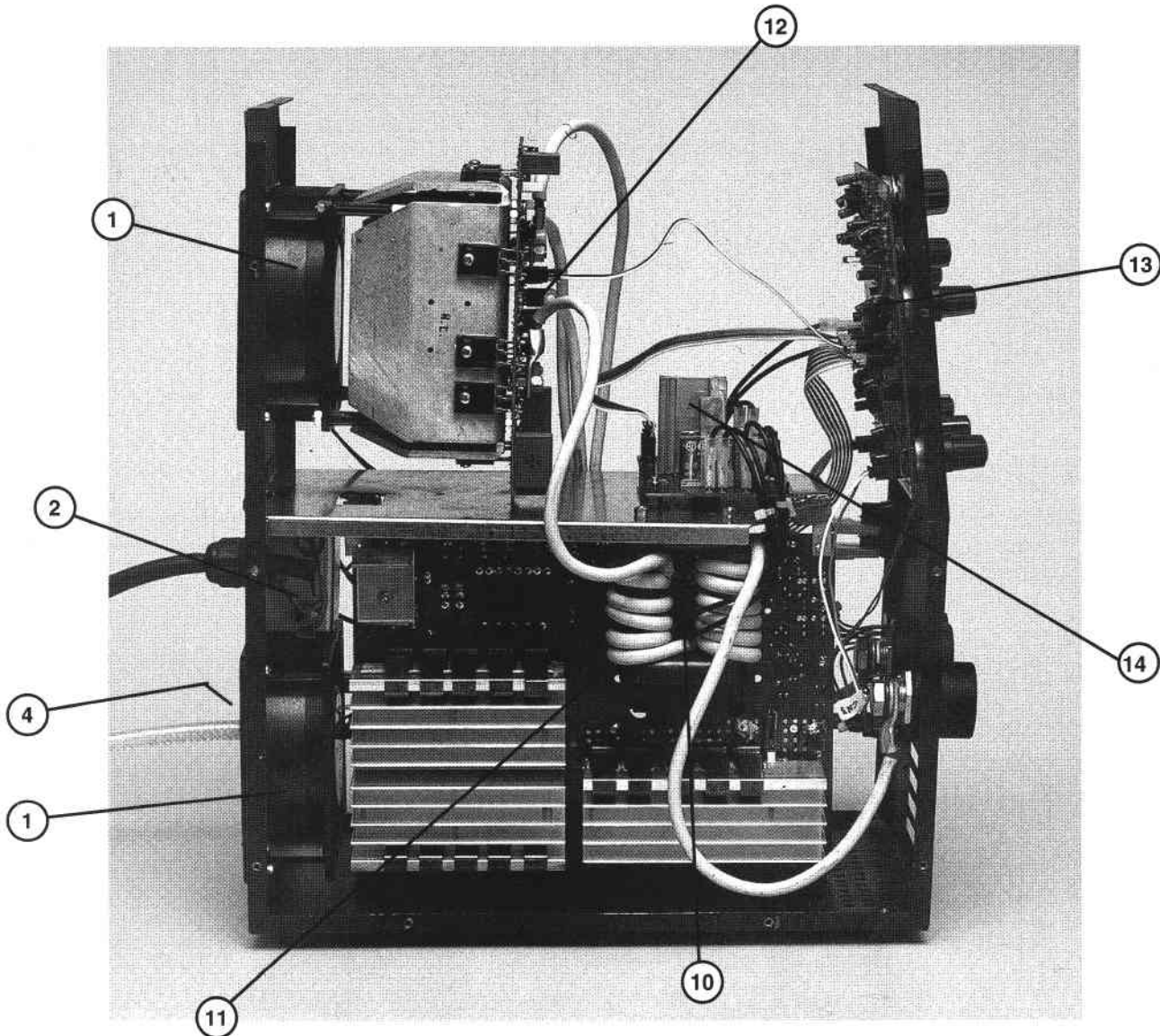
1415291	TG 153 3.8m TIG Torch with switch
1410208	TG 153 Accessory Kit
1415022	TG 203 3.8m TIG Torch with switch
1410207	TG 203 Accessory Kit
1415231	FC-5B Foot Control Unit
1409320	3.5m Work Return Lead and Clamp
1409324	Electrode Holder & Clamp
1281208	AR2 TIG Regulator
603457	Flowmeter
367831885	3/8 BSP Connection Kit

Circuit Diagram Tradestig AC/DC 161iS



PARTS LIST

Pt. No.	Description	Cct. Ref.
1	Fan	VR1 & 2
2	EMC Filter	-
3	LED Yellow	DL1
4	Gas Solenoid Valve	EV1 - 240Vac
5	Dins Socket	+, -
6	2 pin Socket	TORCH
7	14 pin Socket ass'y	REMOTE
8	1/4" Bulkhead fitting	-
9	Power Switch	S1
10	HF Coupling Transformer	T1
11	Inverter pcb ass'y	INVSS
12	Commutator pcb ass'y	SSAC INV
13	Control pcb ass'y	SSACDC
14	HF pcb	SSHFAC



PARTS LIST

