



# Operating Manual

## Transtig AC/DC 201iS, 203iS & 353iS



**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 Transtig AC/DC 201iS, 203iS & 353iS Power Sources**

Parts Nos: 1416271, 1416273, 1416275

- are 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.
- conform 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.
- are manufactured in accordance with EN60974-1 Safety Requirements for Arc Welding Equipment.
- are manufactured in accordance with EN50199 Electromagnetic Compatibility for Arc Welding Equipment.

On behalf of Esab Group (UK) Ltd  
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P.G. Dodd  
Managing Director  
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1st September 2003



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## 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.

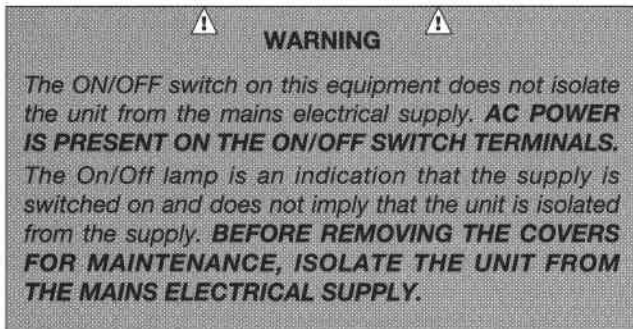
**READ AND UNDERSTAND THE INSTRUCTION MANUAL  
BEFORE INSTALLING OR OPERATING AND SEE 18 PUBLICATION 237  
'The arc welder at work' AVAILABLE FROM THE MANUFACTURER.**

**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.



### 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 ultra-violet 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 Transtig AC/DC 201iS, 203iS and 353iS are state of the art DC and squarewave AC power sources for MMA or TIG welding. They utilise inverter based technology in combination with microprocessor control. The 201iS and 203iS models are rated up to 200A at 40% duty and the more powerful 353iS model up to 350A also at 40% duty.

The common operator control panel comprises both encoder type rotary controls together with membrane press-key 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/DC201iS operates from 1Ph 240V supplies on a 16A slow fuse (30A slow for full current MMA duty). The AC/DC203iS and 353iS require balanced 3Ph 415V industrial electricity supplies fused at 16/32A slow 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.

A 230Vac auxiliary supply is available, accessed through the rear panel, when using the units with the Transtig TWCU torch water-cooling unit. A trolley unit is another option available for these power sources.

The Transtig AC/DC 201iS, 203iS and 353iS are designed, manufactured and tested to meet the requirements of EN60974-1 "Safety Requirements for Arc Welding Power Sources" and EN50199 covering Electromagnetic Compatibility Requirements.

## SPECIFICATION

	AC/DC201iS	AC/DC203iS	AC/DC353iS
<b>Input</b>			
Mains Supply	220-240V 1Ph 50/60Hz	400-440V 3Ph 50/60Hz	400-440V 3Ph 50/60Hz
Fusing	16A slow (30A for full MMA)	3x16A slow	3x32A slow
KVA	5.6 (4.5kW)	6 (5.4kW)	14 (13kW)
PF	0.9	0.9	0.9
<b>Output</b>			
Current Range	4-200A	4-200A	4-350A
TIG Rating	200A 40% duty 160A 60% 135A 100%	200A 40% duty 160A 60% 135A 100%	350A 40% duty 300A 60% 250A 100%
MMA Rating	190A 35% duty 150A 60%	190A 35% duty 150A 60%	320A 35% duty 250A 60%
OCV (max)	65V	65V	65V
AC Frequency	20 – 200Hz	20 – 200Hz	20 – 200Hz
AC Balance	10 – 90%	10 – 90%	10 – 90%
Pulse Mode Frequency	0.4 – 300Hz DC 0.4 - 2Hz AC	0.4 – 300Hz DC 0.4 - 2Hz AC	0.4 – 300Hz DC 0.4 - 2Hz AC
Pulse Duty (mark:space)	30 to 65% (in 5% steps)	30 to 65% (in 5% steps)	30 to 65% (in 5% steps)
Background Current	10 - 90% of main current	10 - 90% of main current	10 - 90% of main current
Slope Down Time	0.1 - 10 Seconds	0.1 - 10 Seconds	0.1 - 10 Seconds
Start/Crater Current (4T)	10 - 90% of main current	10 - 90% of main current	10 - 90% of main current
Post Purge Time	0.5 - 30 Seconds	0.5 - 30 Seconds	0.5 - 30 Seconds
Remote Start Point Current	4-100A	4-100A	4-100A
<b>Dimensions (Power Source)</b>			
Height	510mm	510mm	520mm
Width	240mm	240mm	290mm
Depth	500mm	500mm	540mm
Weight (Net)	30Kg	30Kg	40Kg
<b>Standards</b>	EN60974-1 & EN50199	EN60974-1 & EN50199	EN60974-1 & EN50199

## INSTALLATION

### 1. Radio Interference

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.

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 2. 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 Transtig AC/DC 201iS requires a single phase 240V 50Hz electricity supply fused at 16A slow for all TIG welding applications. When MMA welding at 150A to 200A (4 to 5mm electrodes) a 30A slow fuse is recommended.

The 203iS and 353iS need a standard 3 phase 415V 50Hz electricity supply, note no neutral connection is required. Supplies should be fused at 16A for the 203iS and 32A for the 353iS, 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. T.W.C.U. Torch Water Cooler (Pt. No. 1415509)

If supplied install the T.W.C.U. on the base of the trolley, the 4 moulded feet should sit inside the retaining corner angles.

#### WARNING!

Ensure power source is isolated from the mains supply.

Remove the 8 retaining screws and lift the top lid off the power source. Locate the 230Vac auxiliary access hole/strain relief in the upper RH corner of the rear panel. Loosen the 2 screws that mount the strain relief moulding and feed the T.W.C.U. primary cable through the hole/strain relief.

The 230Vac auxiliary supply 3 way terminal block is located next to the access hole on the inside of the rear panel, see Figure 1. Install the 3 insulated push-on connectors as shown. Ensure the green/yellow earth wire connection is made to the LH terminal as viewed from the front of the machine. The position of the other 2 connections is not important.

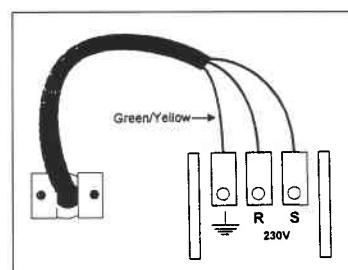


Figure 1. 230V ac Auxiliary Connection

## Assembly Instructions

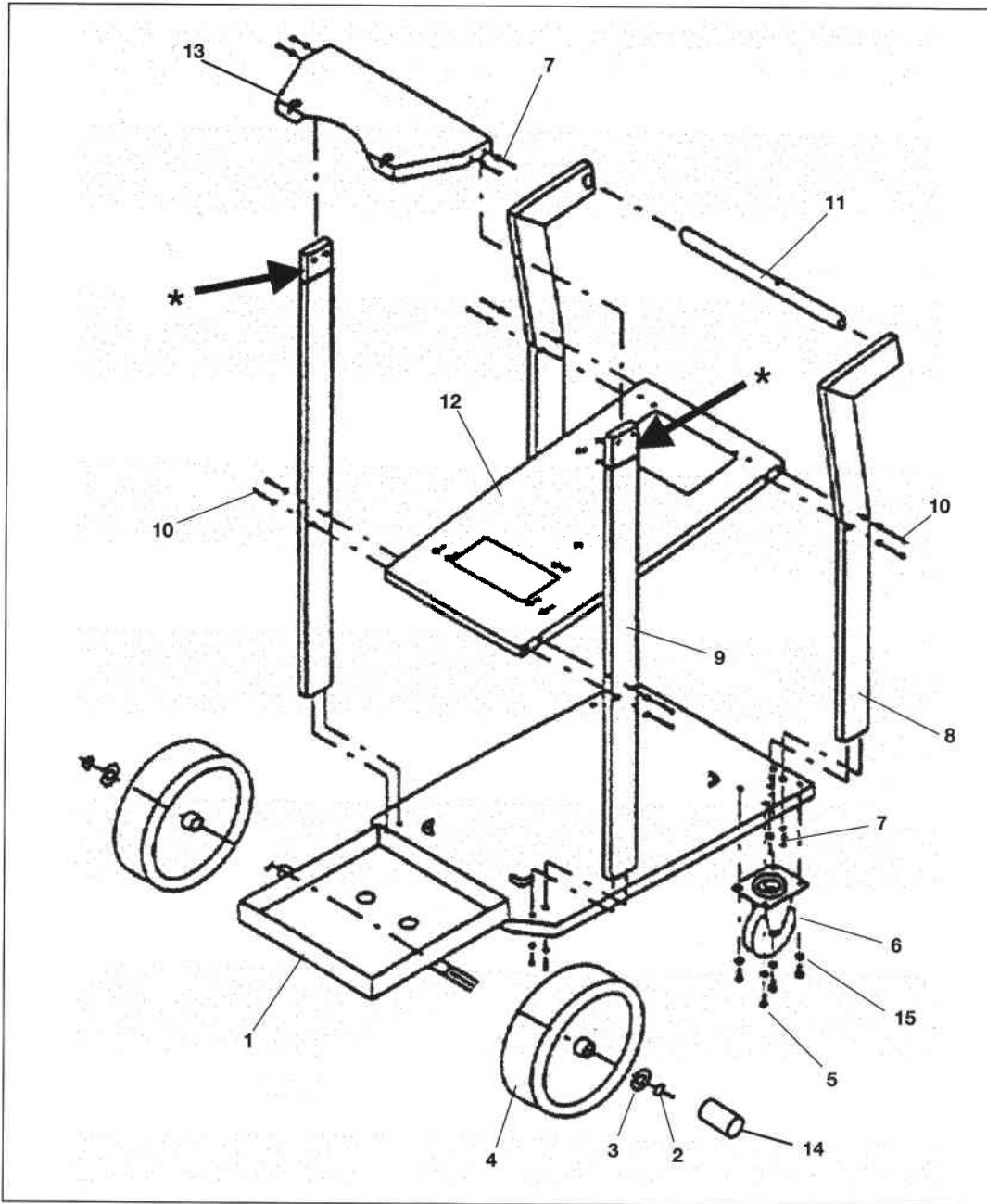


Figure 2. Transtig AC/DC Trolley Pt. No. 1415510

1. Fix rear uprights (9) to upper tray (12) using M6 x 30 bolts and washers (10). Ensure the uprights are correctly oriented so that the upper tray slopes up towards the front and the bolts attaching the upright extension pieces are on the outsides.
2. Fit front uprights (8) to upper tray (12) using M6 x 30 bolts and washers (10). Ensure the handle bar (11) is inserted between the uprights before fastening.
3. Fit the upper cylinder plate (13) to the rear uprights (9) using M6 x 15 bolts and washers (7).
4. Fit the cylinder/lower tray assembly (1) to the bottoms of the 4 uprights using M6 x 15 bolts and washers (7).
5. Fit the 2 front caster wheels (6) to the underside of (1) using M8 x 12 bolts and washers (15).
6. Slide the rear wheels (4) onto the axle stubs. Fit a large washer (3) onto each axle and then fit the hammer-on internal star-clips (2) to retain them using the special sleeve tool (14) provided in the kit.

### WARNING!

Remove upper extension pieces \* for 201iS & 203iS.

### WARNING!

Ensure the green/yellow earth wire is correctly connected to the LH terminal.

Tighten the 2 strain relief mounting screws so as to retain the T.W.C.U. primary cable. Refit the lid of the power source ensuring star washer(s) are properly refitted. Before energising the cooler ensure it is correctly filled with coolant, refer to T.W.C.U. Instruction Sheet, and connect the TIG torch cooling hoses to its front panel.

### IMPORTANT!

Ensure the T.W.C.U. is correctly filled with coolant and that the TIG torch water hoses are connected before switching on. Failure to do so may damage the motor and pump.

When MMA welding ensure the T.W.C.U. is switched off using its front panel on/off switch.

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 dings plug to the negative dings socket on the lower front of the power source (marked with the torch symbol), see Figure 3.
- 5.2 Water cooled TIG torches have the water return hose exiting from the side of the dings plug. This must be connected to the red water return fitting on the T.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  $\frac{1}{4}$ " 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-5B foot control, to the 14 pin socket.
- 5.6 Connect the  $\frac{1}{4}$ " BSP gas-in fitting on the rear panel to the shielding gas regulator/flowmeter.
- 5.7 Connect the work return lead dings plug to the positive dings socket on the lower front panel.

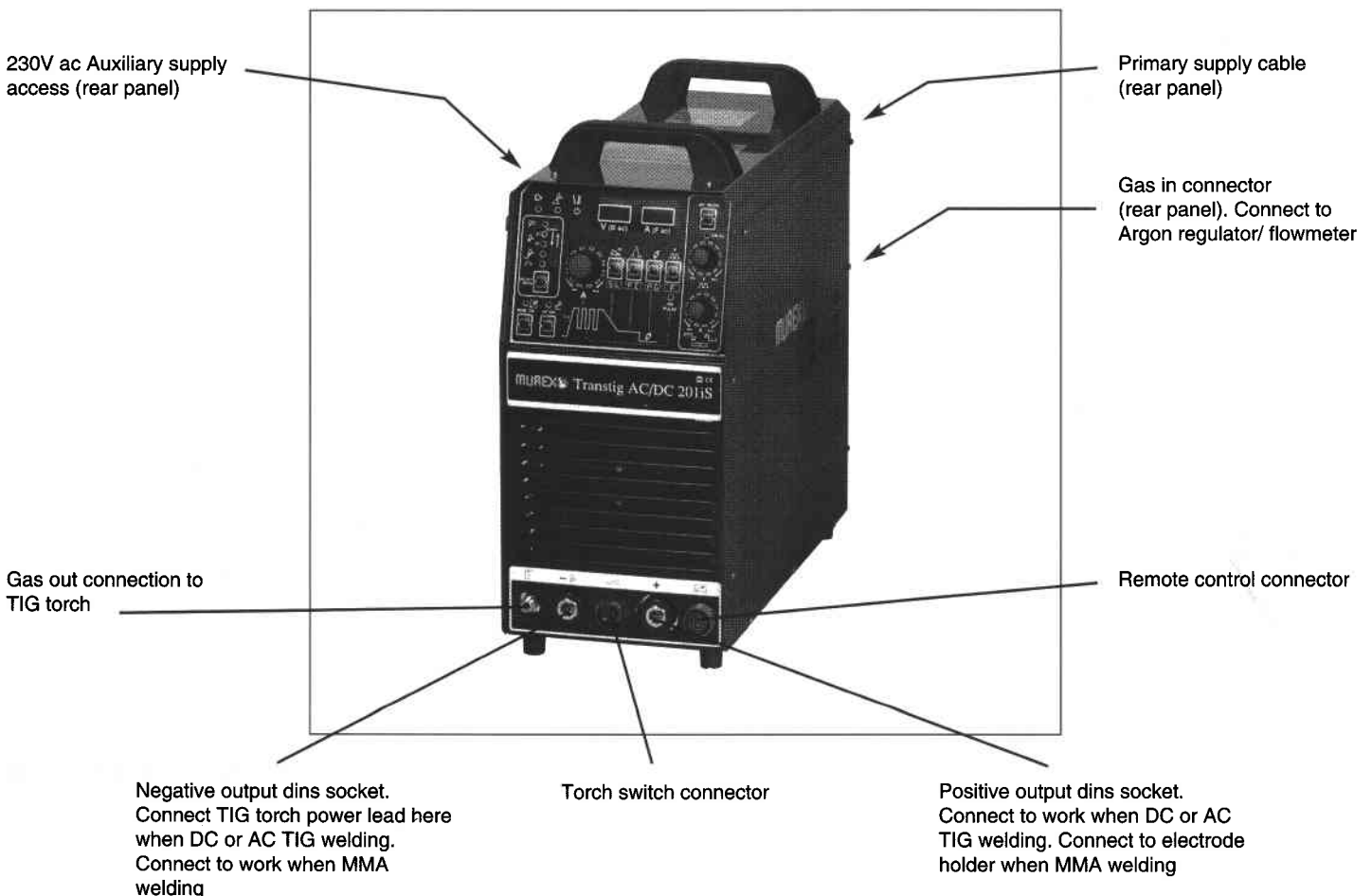
## 6. Connections for MMA Welding

- 6.1 Connect the MMA electrode holder lead to the positive dings socket on the lower front of the power source. Note that for DC MMA applications this will make the electrode positive polarity, see Figure 3.
- 6.2 Connect the work return lead dings plug to the negative dings socket.

### WARNING!

If a Transtig T.W.C.U. torch water cooler is fitted to the power source when MMA welding, remember to either switch off the cooler or to leave the TIG torch go and return water hoses connected to it. Failure to do this may damage the cooler.

**Figure 3. Transtig Connections**



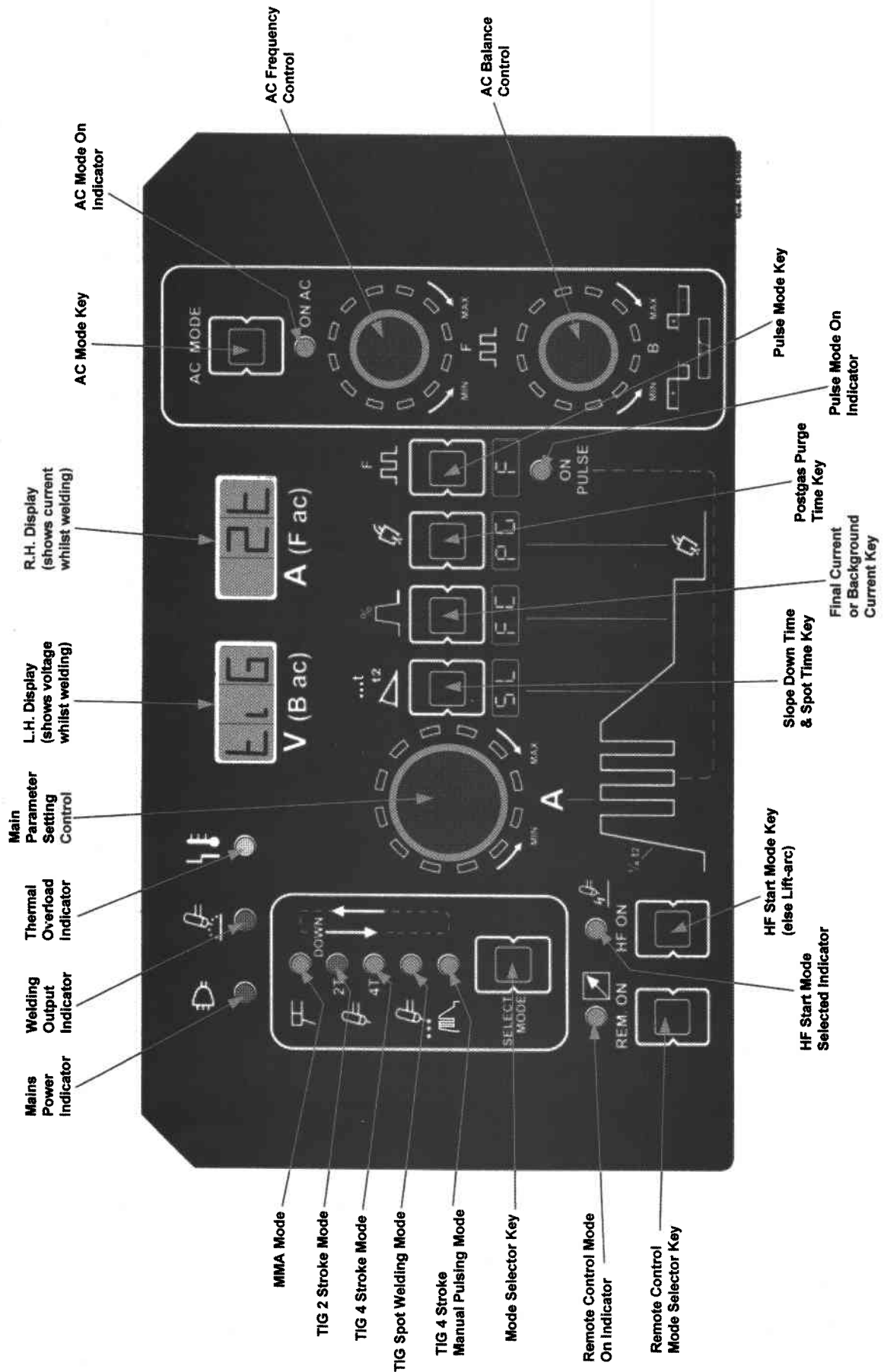


Figure 4. Transtig Control Panel Layout

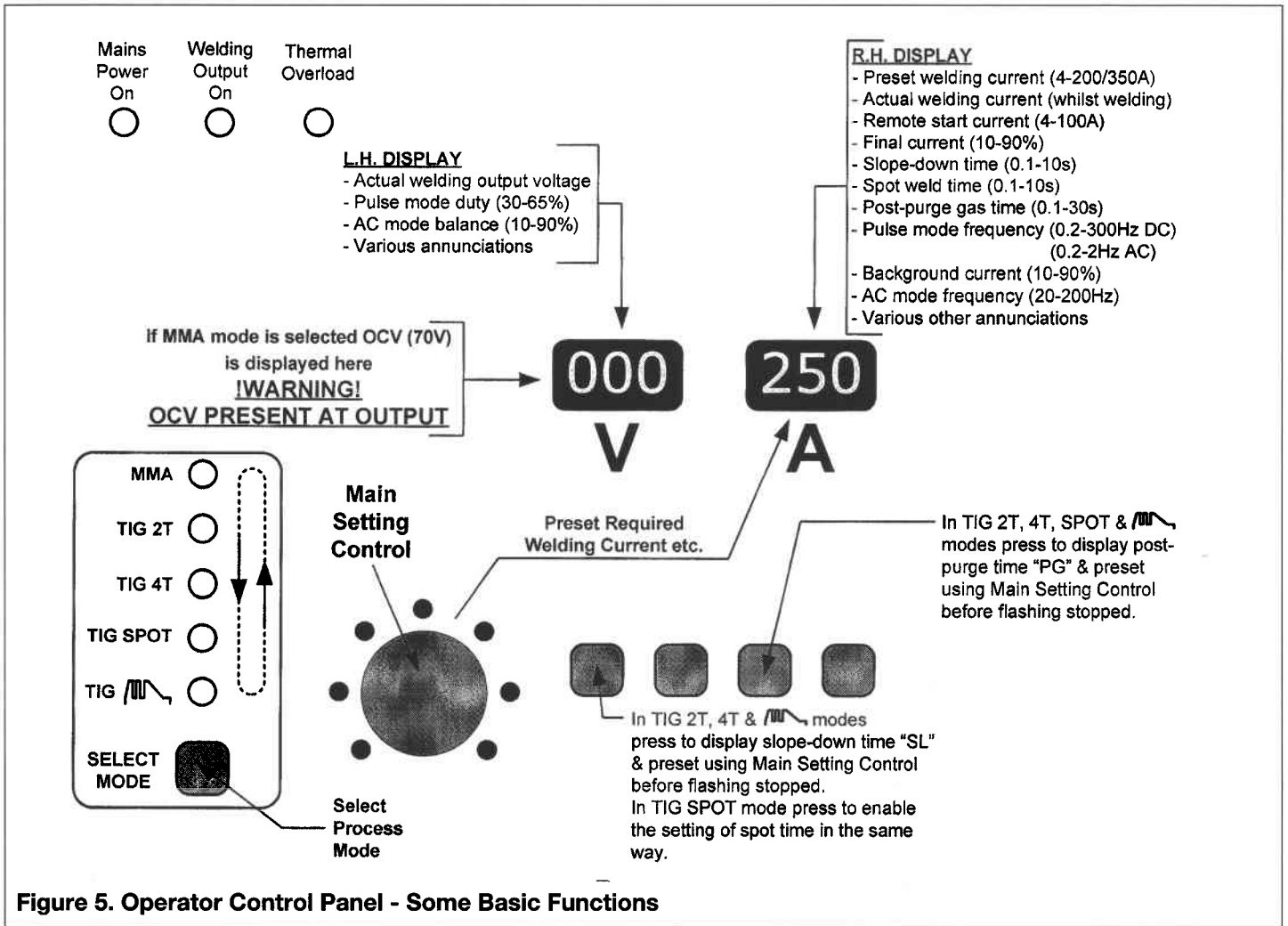


Figure 5. Operator Control Panel - Some Basic Functions

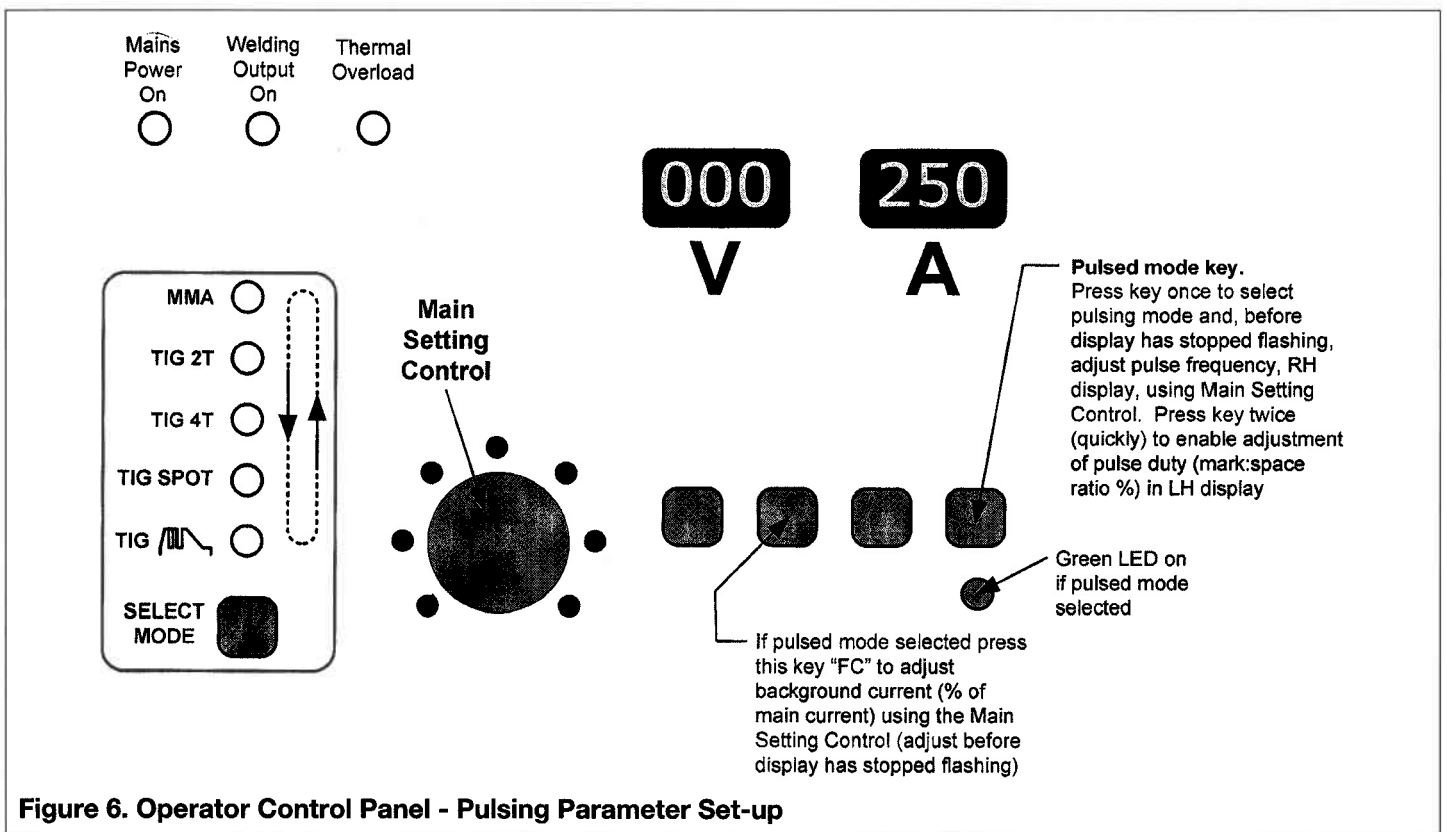


Figure 6. Operator Control Panel - Pulsing Parameter Set-up

## CONTROLS & OPERATION

Refer to Figures 4, 5, 6

### 1. Switching On

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

#### WARNING!

The computer control system memorises 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 energises the internal circuitry including the rear panel cooling fans and 230Vac auxiliary supply for the optional T.W.C.U. torch water cooler. All the various LED indicators on the operator control panel will momentarily illuminate and the left and right hand LED readouts, for a short period, will flash indicating the process/mode selected i.e.

	arc	=	MMA/Stick
or	TIG 2t	=	TIG 2x torch switch
or	TIG 4t	=	TIG 4x torch switch
or	pun	=	TIG spot
or	rep	=	TIG 4x MSP

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 MMA 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 MMA 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. etc. the display will always revert to the standby mode within 3-5 seconds of the change being completed.

- 1.4 Whilst 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-5B foot control, to the 14-way remote control socket.
- 2.2 Set the required maximum welding current, corresponding with the maximum position of the remote control, using the Main Setting Control whilst the unit is in standby mode.
- 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).

## 5. Selecting Pulse Mode, see Figure 7.

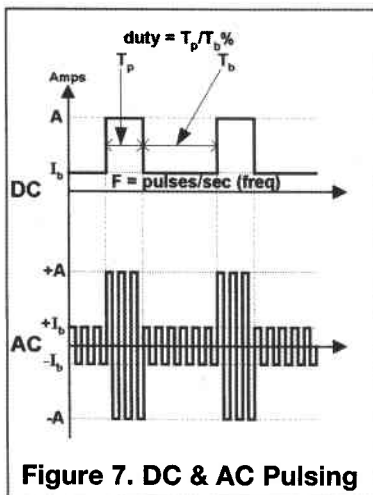


Figure 7. DC & AC Pulsing

- 5.1 At the standby display 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 At the standby display 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 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 4. above, left. Set the AC frequency (F) and balance (B) as desired, normally 50Hz and 50% Balance.
- 6.4 The machine is now ready to weld.

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

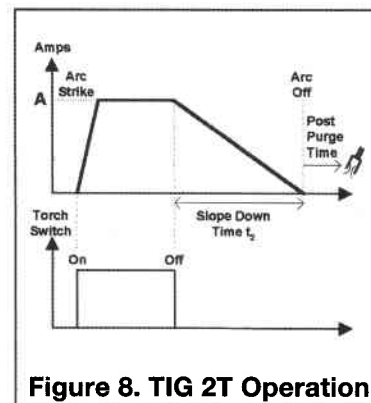
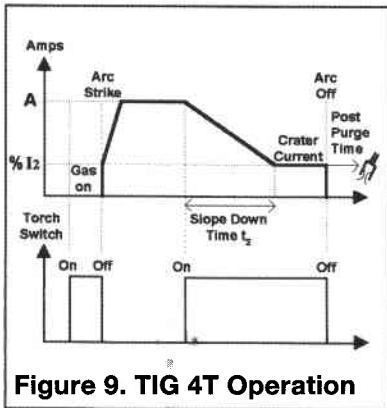


Figure 8. TIG 2T Operation

- 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 down key and main setting control.
- 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 4. above left.
- 7.6 If required choose pulse mode when the display is in standby mode see 5. above left.
- 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.

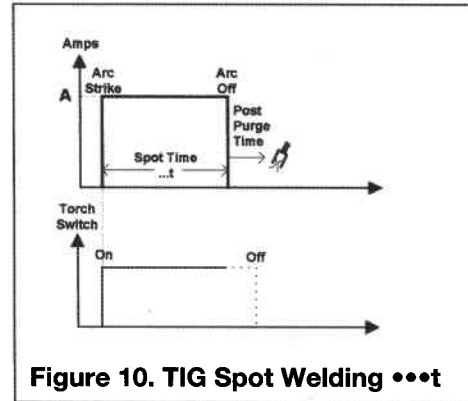
**8. TIG Welding with 4 Stroke Torch Switch (4T) and HF Start, see Figure 9.**



**Figure 9. TIG 4T Operation**

- 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 Set the required slope down time (0.1-10 secs) using the SL slope down key and main setting control.
- 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 4. & 5. above.
- 8.7 Position the electrode 3-5mm 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 hold 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. Whilst the torch switch is held the current will remain at the final level. Release the torch switch to extinguish the arc and initiate the gas post purge.

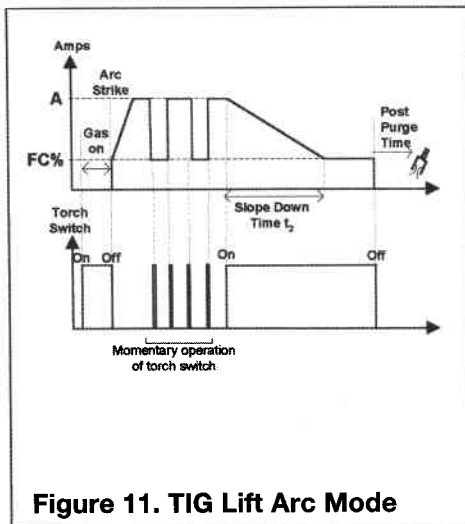
**9. TIG Spot Welding (2 Stroke Torch Switch and HF Start), see Figure 10.**




**Figure 10. TIG Spot Welding ●●●t**

- 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 3-5mm 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.

**10. 10. TIG Welding with Manually Sequenced Pulsing, see Figure 11.**



- 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 3-5mm from the work. Press the torch switch to initiate the gas flow.
- 10.5 On releasing the torch switch the arc will strikes (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.

## OPTIMISING TIG WELDING PERFORMANCE

### 1. Tungsten Electrode Types

For DC TIG welding Murex recommends the use of thoriated tungstens. Either 1% or 2% thoriated types are suitable although, for optimum arc striking performance, 2% is the better choice (red tip).

For AC TIG applications either pure or zirconiated tungstens should be used. Zirconiated types (white tip) generally withstand higher currents than pure tungstens of the same diameter and are therefore recommended.

Newer ceriated tungstens (grey tip) can be used for both DC and AC TIG modes although their performance is a compromise between DC arc striking performance and AC current capability.

### 2. Tungsten Tip Preparation, see Figure 12

For 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.

Most welders do not bother to grind the tungsten tip before AC TIG welding. Short term pre-operation of the tungsten at high current is used to create the characteristic hemispherical shape to the tip. Pre-grinding the tip to a wide angle does help to initially focus the arc however.

### 3. Maximum Current Ratings for Tungsten Electrodes

	1.6mm	2.4mm	3.2mm	4.0mm	4.8mm
DC (2% Thoriated)	150A	240A	380A	450A	500A
AC (1% Zirconiated)*	60A	100A	150A	220A	280A

\* Balanced squarewave (balance = 50%)

### 4. AC TIG Welding Using FC-5B Foot Control

Unlike other AC TIG equipments the Transtig AC/DC 201iS, 203iS and 353iS 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-energise 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 "Amin" 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:

1.6mm	10A
2.4	20A
3.2	30A
4.8	40A

If at the end of welding it is required to slope out the current below the level set by the Amin 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.

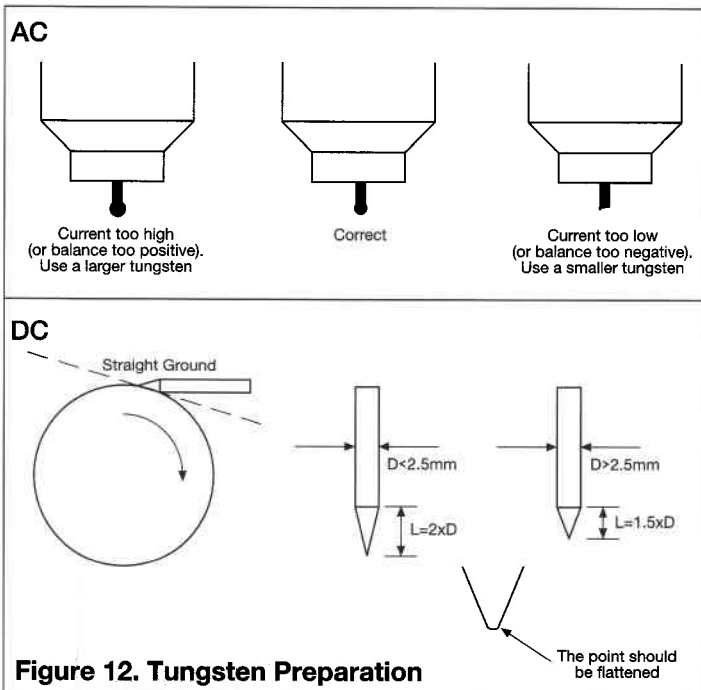


Figure 12. Tungsten Preparation

## MAINTENANCE

### WARNING!

Maintenance involving the removal of the outer cover must only be undertaken by qualified or suitably trained personnel.

Switch off and disconnect the unit from the mains supply before undertaking any maintenance tasks.

### Daily (Operator task)

1. Check all welding and electrical cables for signs of cracking or general deterioration.
2. Check that all electrical connections are in good physical condition.
3. Check the TIG torch or electrode holder for damage. Replace any suspect part(s).

**ALWAYS CHECK THE WELDING AREA DAILY FOR POSSIBLE SAFETY HAZARDS. IF IN DOUBT CONSULT YOUR SAFETY OFFICER.**

4. Ensure that the water cooling unit is always filled with distilled water or if required a mixture of glycol and water (20-25% mix).

### Monthly (Maintenance Department Task)

### WARNING

Be sure that the circuit or main isolation switch is open or electrical input circuit fuses are removed before attempting any inspection or work on the inside of the welding unit. Placing the POWER switch on the welding unit in the OFF position does not remove all power from inside the welding unit.

1. Switch off the unit and disconnect from the mains electrical supply.
2. Remove the covers (retain the fixing screws).
3. Using a soft brush, remove any dust or dirt from the interior of the unit. If compressed air is used to clean the unit the pressure must not exceed 2kg/cm<sup>2</sup> (30lbs/in<sup>2</sup>), and the air must be clean and dry.

**SUITABLE EYE AND MOUTH PROTECTION SHOULD BE WORN.**

4. Replace the cover.
5. Reconnect the unit to the mains supply.

### IMPORTANT!

Inspection, troubleshooting, and repair of this equipment may ordinarily be undertaken by a competent individual having at least general experience in the maintenance and repair of semiconductor electrical equipment. Maintenance should not be undertaken or attempted by anyone not having such qualifications.

### Fan Motor

All models are equipped with cooling fans and rely on forced draft for adequate cooling for high duty cycles and overloads. The fan motors are manufactured with lifetime lubricated sealed bearings and no attention should be required.

### Input Power and Welding Cables

These cables should be inspected periodically. Fraying and broken wires may occur at the electrode holder and work clamp. The insulation should be checked for cracks and bare spots.

### Thermal Protection

This welding unit is protected with normally closed overload thermostats. Any excessive overloading will cause the 'contactor' to open, stopping the welding unit's output. The thermal overload indicator light on the control panel will also illuminate. If this occurs leave the unit switched on with the fans running. Reset is automatic when the unit has cooled.

### Spark Gap

The spark gap can be readily inspected by removing the left side of the unit.

The spark gap is set at 0.90mm (0.035ins) at the factory. It will be necessary to adjust it periodically after extended operation. Usually inspection, cleaning by blowing out dust and dirt and adjustment every three or four months will suffice. Re-adjustment is also indicated when intermittent operation of the HF is noted. Usually this occurs when the setting has increased to 1.0mm (0.040ins) or greater.

Proceed as follows to adjust the spark gap:

1. Disconnect all power to the unit.

### WARNING!

Be sure the branch circuit or main isolation switch is open or electrical input circuit fuses are removed before attempting any inspection or work on the inside of the welding unit. Placing the POWER switch in the OFF position does not remove all power from inside the unit.