

# Operating Manual

## Transtig AC/DC 250 HF Square Wave



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





## 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 and 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 WMA 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 WMA. 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 work return cable. Fix an insulated hook to hang the torch on when it is not in use.

## 2. 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.

## 3. 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.

## 4. 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.

## 5. 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.

## 6. Vehicle Electrics

- ⚠ When working on motor vehicles, remove the battery and any circuits 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 250 HF Welding Power Supplies are constant current AC/DC welding power sources for high quality TIG and MMA welding in both the AC and DC mode. The unique characteristics of the magnetic and solid state circuits provide excellent arc conditions for all TIG welding as well as high alloy MMA electrodes. The non-saturating current limiting reactor and electronic feedback control prohibits high current surges inherent with saturable reactors or solid state SCR control alone, therefore reducing spatter on MMA electrodes as well as tungsten spitting when TIG welding. The electronic firing circuit utilises a voltage compensating circuit which compensates for mains voltage variations of +/- 10 percent.

Through its unique design, the AC/DC 250 HF combines all of the latest state-of-the-art magnetic and solid state concepts to provide the wide range of volt-ampere curve characteristics needed for a constant current AC/DC power supply - see Figure 1.

### Equipment Features Include:

- (a) Local/Remote control of welding output.
- (b) AC Waveform balance control.
- (c) Post weld gas flow timer.
- (d) Thermal overload protection.
- (e) Power factor correction
- (f) Arc force control (for MMA welding).
- (g) Auxiliary power output (115v AC).

### Optional Extras Available:

Foot Control Unit.	Part No	558000169
Analogue Volt/Ammeter Unit.	Part No	1414917
Pulse Control Unit.	Part No	1414918
Water Cooling Unit	Part No	1414060
Water Cooling Hose Kit	Part No	365943881

## DUTY CYCLE

Duty cycle is defined as the ratio of load time to the total time. Standard current ratings are based on a ten minute cycle. This machine is rated at 40 percent duty cycle which means the **rated load** (250 amps) is applied for a total of four minutes and shut off for a total of six minutes in a ten minute period. However, if the welding current is decreased, the duty cycle can be increased. Conversely, if the welding current is increased, the duty cycle must be decreased. Figure 2 enables the operator to determine the safe output of the power supply at various duty cycles.

### CAUTION

*Exceeding the indicated duty cycle will cause the welding power source to overheat and may cause damage to the equipment.*

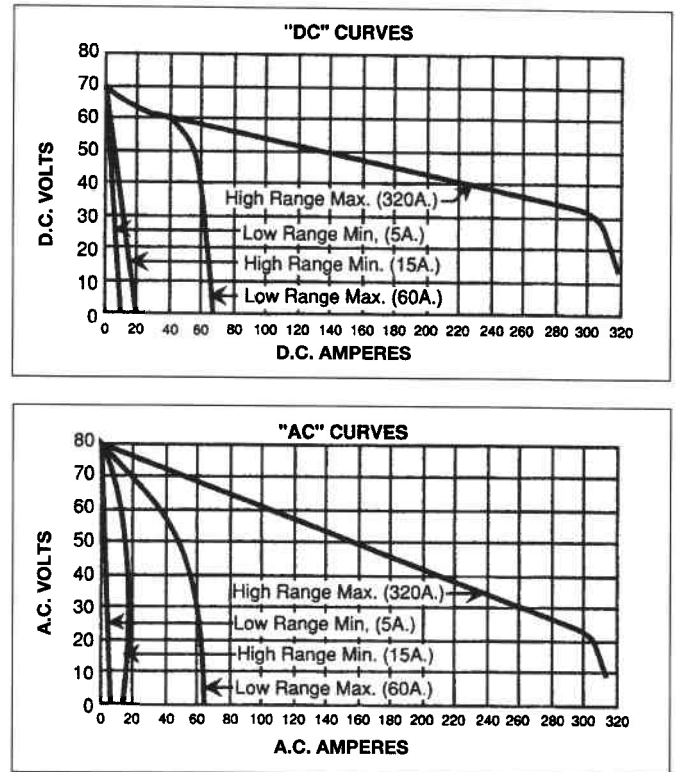


Fig. 1 - Volt-Ampere Curves  
with Arc Force control turned to minimum

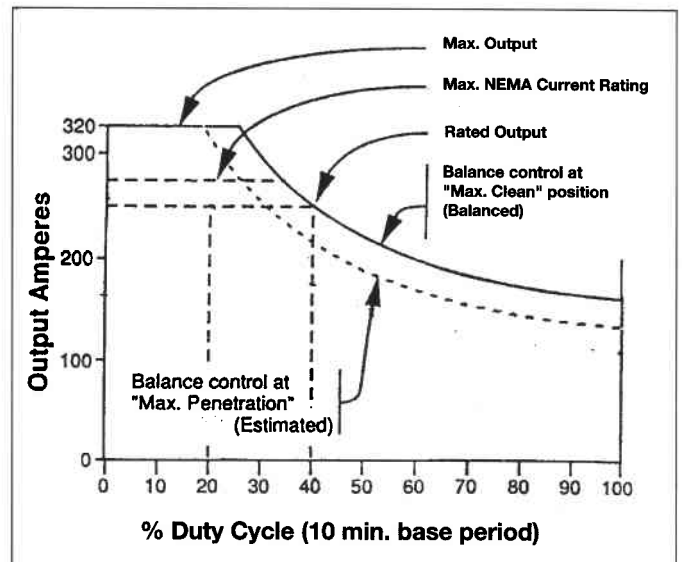


Fig. 2 - Duty Cycle Chart

## INSTALLATION

### WARNING

Review the safety section at the front of this manual and comply with all applicable precautions. Follow the instructions included elsewhere in this manual relative to proper installation to reduce radio interference.

To prepare the unit for installation, several items should be checked. Clear all packing materials from around the unit and carefully inspect for damage which may have been caused by shipping. Be sure to read all the instructions before attempting to operate the unit. If a fork lift is used for lifting the unit, be sure that the lift forks are long enough to extend completely though under the base.

### IMPORTANT

The use of lift forks too short to extend out of the opposite side of the base could cause internal damage should the tip of the lift forks penetrate the bottom of the unit. See 'Safety'.

### Location

A proper installation site should be selected for the welding equipment if the unit is to provide dependable service, and remain relatively maintenance free.

The site should allow air movement into and out of the welding unit, and be free from excessive dust, dirt, moisture, and corrosive vapours. The location should also permit easy removal of the welding unit panels for maintenance.

### IMPORTANT

Do not place any filtering device over the air intake passages of the unit as this will restrict the movement of air and could cause overheating and possible failure. Warranty is void if any type of filtering device is used.

### ▲ Double Links Provided

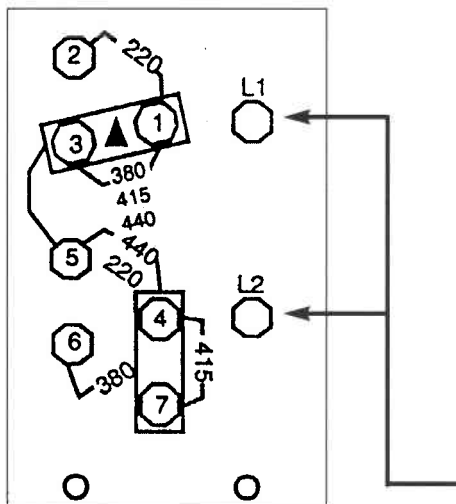


Fig. 3. Voltage Changeover Board Terminal Board (TB)

## Electrical Input Connections

### WARNING

Before making electrical input connections to the welding unit, use 'machinery lockout procedures': If the connection is to be made from a mains disconnect switch, the switch should be padlocked in the off position. If the connection is made from a fuse box, remove the fuses from the box and padlock the cover in the closed position. If locking facilities are not available, attach a red tag to the mains disconnect switch (or fuse box) to warn others that the circuit is being worked on.

Placing the welding unit power switch in the 'Off' position does not shut off all power within the equipment.

Be sure that the switch box is attached directly or by cable to a suitable ground such as a water pipe or ground rod. Do not ground to gas piping or electrical conduits. Comply with local electrical inspection authorities.

### Input Electrical Requirements

This AC/DC welding unit is a SINGLE-phase unit and must be connected to a SINGLE-phase power line or any two phases of a three-phase system of the proper voltage.

If there is any question about the type of system used locally, or the proper connections to obtain a single-phase primary input voltage to the welding unit, consult the local power authorities.

### Input Connections

The welding unit should be operated from a separately fused or circuit breaker-protected circuit. The maximum capacity of the welding unit is affected by the mains voltage and if the circuit is overloaded, the performance of the welding equipment will be impaired.

### CAUTION

Connect the input cable to the unit before making connections to the single phase power line.

### CAUTION

Be sure when installing the welding unit that an earth wire is connected from the ground lug to a suitable ground. This is absolutely necessary as any development of stray currents may give a severe shock should anyone touch the welding unit and at the same time touch any grounded object. The ground lug is connected to the welding equipment chassis and is for ground purposes only. If the welding unit is to be connected to two phases of a three-phase line, do not connect the third wire from a three-phase line to the ground lug as this will result in a 'live' welding unit chassis.

The input cable wires connect to terminals labelled 'L1 and L2'. A third conductor, ground connections, should be fastened to the ground lug, and leave sufficient slack in the earth wire so that, in the event of strain on the cable, the earth wire is the last to be affected.

## Welding Connections

### NOTE

To obtain the full rated output from this unit, it is necessary to select, install and maintain proper welding cables. Failure to comply in any of these areas may result in less than satisfactory welding performance.

### Cable Length

It is recommended that the welding cables be kept as short as possible, spaced as described below, and be of adequate current carrying capacity. The resistance of the welding cables and connections causes a voltage drop which is added to the voltage of the arc. Excessive cable resistance may result in overloading as well as reducing the maximum current output of the welding unit. The proper operation of any welding unit is to a great extent dependent on the use of welding cables and connections that are in good condition and of adequate size. An insulated electrode holder should be used to ensure operator's safety.

### Cable Insulation

It is important, especially where high frequency is used, that lugs or uninsulated portions of the welding cable do not touch or come too close to the case of the welding equipment.

### Cable Spacing

When welding with AC or DC, if the welding cables are coiled up they will operate a magnetic field which will seriously affect the operation of the welding equipment. Always lay the welding cables out. The welding cables should not be taped together when using high-frequency, they should be placed about 1.9 to 2.5cm (3/4 inch to 1 inch) apart on a suitable board and fastened with plastic clamps or clips. Do not use metal clamps as they will tend to serve as an antenna and radiate high-frequency.

### Gas Connections

### CAUTION

When connecting to gas solenoid valve, use non-conductive hose.

1. The gas inlet is located on the front panel. Connect the gas hose from the gas supply, to the gas valve connection labelled 'Gas In'.
2. The gas flow must be controlled accurately with the aid of a regulator and a flow-meter. No specific recommendations for rates of flow can be given, as this depends entirely on the specific welding conditions. Correct argon flow is usually between 227 to 991 litres (8 to 35 cubic feet) of gas per hour. The helium flow is between 510 to 991 litres (18 and 35 cubic feet) per hour.



## CONTROLS

See also 'Operational Safety'

### 1. Power

The power switch, in the on position, energises the fan and control circuitry, and places the welding equipment in a ready-to-weld status. Placing the power switch in the off position shuts down the welding unit.

#### WARNING

Placing the power switch in the off position does not remove power from all the welding unit internal circuits. Completely isolate all electrical power to the power source by employing 'machinery lockout procedures' before attempting any inspection work on the inside of the unit. If the power source is connected to a disconnect switch, padlock the switch in an open position. If connected to a fuse box, remove the fuses and padlock the cover in the closed position. If the unit is connected to a circuit breaker, or other disconnecting device without locking facilities, attach a red tag to the device to warn others that circuit is being worked on.

### 2. AC Wave Balance Control

When the AC wave balance control is set in the 'O' balance position, the output waveform is balanced between positive and negative polarity. By rotating the control clockwise to more negative polarity less tungsten heating results and a higher welding current may be applied to the tungsten to obtain more penetration. Sufficient cleaning action is obtained for most applications over the entire range of the control, but set the control to the 'O' position when maximum cleaning is required, and for MMA welding.

#### NOTE

The AC wave balance control is a continuous type control and may be adjusted whilst welding. The scale surrounding the control does not relate to current or voltage values. It only adjusts the AC wave shape.

#### IMPORTANT

For the AC wave balance control to work properly, it is required that the electrode and work cables be connected to the correct terminals on the welding power source (electrode cable to the electrode terminal, work cable to the work terminal). If the cables are reversed, the AC balance control will appear to function backwards.



Fig 4.

### 3. Arc Force Control

This control is used in the MMA mode only. The lower settings provide less short circuit current and a softer, more stable arc. The higher settings provide more short circuit current and a forceful, more penetrating arc. For most MMA welding, set the knob at 3 or 4 and readjust up (forceful) or down (softer) as desired. Note that with the knob in the MIN. position a longer arc length can be maintained; and at MAX., the arc will extinguish much easier when drawing the electrode away from the work.

### 4. High Frequency (Solenoid) Selector Switch

A three position toggle switch (an integral part of the Logic P.C.B.) controls high frequency and shielding gas in the welding operation.

The functional positions are: **Off** - no high frequency and gas solenoid valve is de-energised (this is the normal position for all MMA welding); **Continuous** - high frequency and shielding gas are provided throughout the entire welding cycle (this is the normal position for all AC TIG

welding); and, **Start** - high frequency initiates immediately and cuts off when the arc is established, and the gas solenoid energises and remain on throughout the welding cycle (this last position is normal for most DC TIG Welding applications.)

### 5. Post Flow Control

This potentiometer (an integral part of the Logic P.C.B.) provides a timed (from 5 to 45 seconds) post-flow of shielding gas after the welding arc is broken.

### 7. Current Control Potentiometer

This potentiometer (an integral part of SCR Control P.C.B.) provides fine adjustment of welding current within the range selected on the Range Switch. The panel-faced dial provides an accurate reference for resetting and/or adjusting the potentiometer.

#### NOTE

The contacts of the weld current control are of the continuous type, thereby making it possible to adjust the output while welding.