

INSTRUCTIONS FOR

# INVERTERS

Models:

**MW100**

**MW140**

**MW165**



## Models: MW100, MW140, MW165,

Thank you for purchasing a Sealey Welder. Manufactured to a high standard this product will, if used according to these instructions and properly maintained, give you years of trouble free performance.

**IMPORTANT: BEFORE USING THIS PRODUCT, PLEASE READ THE INSTRUCTIONS CAREFULLY. MAKE CAREFUL NOTE OF SAFETY INSTRUCTIONS, WARNINGS AND CAUTIONS. THIS PRODUCT SHOULD ONLY BE USED FOR ITS INTENDED PURPOSE. FAILURE TO DO SO MAY CAUSE DAMAGE OR PERSONAL INJURY, AND WILL INVALIDATE THE WARRANTY. RETAIN THESE INSTRUCTIONS FOR FUTURE USE.**

### 1. SAFETY INSTRUCTIONS

**1.1 ELECTRICAL SAFETY.** **WARNING! It is the user's responsibility to check the following: You must** check all electrical equipment and appliances to ensure they are safe before using. **You must** inspect power supply leads, plugs and all electrical connections for wear and damage. **You must** ensure the risk of electric shock is minimised by the installation of appropriate safety devices. An RCCB (Residual Current Circuit Breaker) should be incorporated in the main distribution board. We recommend that an RCD (Residual Current Device) is used with all electrical products. It is particularly important to use an RCD together with portable products that are plugged into an electrical supply not protected by an RCCB. If in doubt consult a professional electrician. You may obtain a Residual Current Device by contacting your Sealey dealer. **You must** also read and understand the following instructions concerning electrical safety.

1.1.1. The *Electricity At Work Act 1989* requires all portable electrical appliances, *if used on a business premises*, to be tested by a qualified person at least once a year by using a Portable Appliance Tester (PAT).

1.1.2. The *Health & Safety at Work Act 1974* makes owners of electrical appliances responsible for the safe condition of the appliance, and the safety of the appliance operator. **If in any doubt about electrical safety, contact a qualified electrician.**

1.1.3. Ensure the insulation on all cables and product itself is safe before connecting to mains power supply. See 1.1.2. use a (PAT) and 1.1.1.

1.1.4. Ensure that cables are always protected against short circuit and overload.

1.1.5. Regularly check power supply, leads, plugs and all electrical connections for wear or damage, especially power connections to ensure none are loose.

1.1.6. Check the voltage marked on the product is the same as the electrical power supply to be used. Check fused plugs are fitted with correct capacity fuse.

1.1.7. DO NOT pull or carry the powered appliance by its power supply lead. Products such as inverters must not be pulled or carried by their output cables.

1.1.8. DO NOT pull power plugs from sockets by the power cable.

1.1.9. DO NOT use worn or damage leads, plugs or connections. Immediately replace or repair by qualified persons. A U.K. 3 pin plug with ASTA/BS approval is fitted. In case of damage, cut off and fit a new plug according to the following instructions (UK only - see diagram).

a) **WARNING!** Ensure the unit is correctly earthed via a three-pin plug.

b) Connect the Green/Yellow earth wire to the earth terminal 'E'.

c) Connect the Brown live wire to live terminal 'L'.

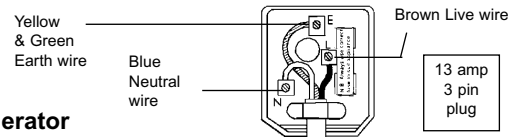
d) Connect the Blue neutral wire to the neutral terminal 'N'.

NOTE: Model MW100 should already be connected to a power plug.

1.1.10. **WARNING! Be very cautious if using a diesel generator. The generator**

**must be stable with regard to frequency (H3), voltage and wave form. The power must be higher than the power in KVA of the inverter machine. The diesel generator must also be self regulating. If any A.M. feature is not respected the working of the regulation card may be affected.**

**NOTE: Use of a generator without a regulator may be dangerous and will invalidate your inverter warranty.**



### 1.2 GENERAL SAFETY

**DANGER! unplug the inverter from the mains power supply before connecting or disconnect cables or performing maintenance or service. Direct contact with the inverter circuit is dangerous.**

3 Keep the inverter and cables in good working order and condition. (Take immediate action to repair or replace damaged parts).

3 Use genuine parts and accessories only. (Non recommended parts may be dangerous and will invalidate the warranty).

3 Keep the inverter clean for best and safest performance.

3 Locate inverter in adequate working area for its function. Ensure area has adequate ventilated as welding fumes are harmful.

**WARNING! Connecting cables must be turned fully into the quick plugs to ensure a good electrical contact, loose connection will cause overheating, rapid deterioration and loss in efficiency.**

3 Ensure there is no obstruction to the flow of clean cool air and ensure there are no conductive dusts, corrosive vapours or humidity which could enter the inverter and cause serious damage.

3 Keep working area clean and tidy and free from unrelated materials. Also ensure the working area has adequate lighting.

**WARNING: use welding head shield to protect eyes and avoid exposing skin to ultraviolet rays given off by electric arc. Wear safety welding gauntlets.**

3 Remove ill fitting clothing, remove ties, watches, rings, and other loose jewellery, and contain long hair.

3 Ensure the workpiece is correctly secured before operating the inverter.

3 Avoid unintentional contact with workpiece. Accidental or uncontrolled switching on of the torch may be dangerous and will wear the nozzle.

3 Keep unauthorised persons away from the working area, and any persons working within the area must adorn the same protective items.

3 Operators must receive adequate training before using the inverter. The inverter must only be operated under supervision.

3 Stand correctly keeping a good footing and balance, ensure the floor is not slippery, and wear non-slip shoes.

**WARNING: When unit is switched off the short-circuit light (fig 4. B) will come on for 10-15 seconds whilst capacitor discharges. DO NOT open unit until light goes out.**

3 Turn voltage switch to "0" (off) when not in use.

7 DO NOT operate the inverter if it or its cables are damaged.

7 DO NOT use welding cables over 10m in length.

7 DO NOT attempt to fit any non genuine torches, components, or parts to the inverter unit.

7 DO NOT use any metallic structure which is not part of the work piece to substitute the return cable of the welding current. This may jeopardise results and may be dangerous. *Exception:* Metallic work bench but connect as near to weld as possible.

7 DO NOT hit the electrode on the workpiece, this may damage the electrode and make strike-up difficult.

7 DO NOT get inverter wet or use in damp or wet locations or areas where there is condensation.

7 DO NOT weld without a welding safety head shield.

**DANGER! DO NOT weld near inflammable materials, solids, liquids, or gases.**

7 DO NOT weld containers or pipes which have held flammable materials or gases, liquids or solids. Avoid operating on materials cleaned with chlorinated solvents or near such solvents.

7 DO NOT pull the inverter by the cable, or the torch, and DO NOT bend or strain cables, protect from sharp or abrasive items, and DO NOT stand on cables or leads. Protect from heat. Long lengths of slack must be gathered & neatly coiled. DO NOT place cables where they endanger others.

7 DO NOT touch the workpiece close to the weld as it will be very hot. Allow to cool.

7 DO NOT touch the torch immediately after use. Allow the torch to cool.

7 DO NOT operate inverter while under the influence of drugs, alcohol or intoxicating medication, or if fatigued.

3 When not in use store the inverter in a safe, dry, childproof area.

## 2. DESCRIPTION & SPECIFICATIONS

### 2.1. INTRODUCTION

These Inverters are lightweight, powerful and versatile. They are suitable for ARC or TIG welding using "Scratch-Start" method. Models have Arc-Force circuitry making the units suitable for welding a wide variety of rods including rutile, basic and stainless of various sizes (see specifications). Machines also include thermal cut out and mains voltage LED's. Fitted with Hot-Start systems to counter electrode sticking during scratch starting. Model MW165 also uses aluminium welding rods, and has thermostatic, over-voltage, under-voltage and over-current protection circuitry.

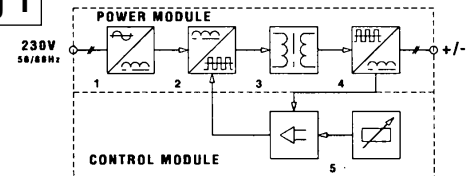
### 2.2. DESCRIPTION

These models are "constant current rectifiers" for ARC welding and are controlled by a transistor bridge with a normal frequency of 32khz. The specific characteristics of the "INVERTER" system provides high speed and precise regulation, ensuring a high quality result with both stick electrode and TIG welding (DC). The "INVERTER" system, regulated at the input of the primary mains, also allows for a drastic reduction in the volumes of both the transformer and the reactance. This reduction in volume and weight enhances the mobility of the machine. The unit is comprised of power modules which have been developed on a specially printed circuit designed to maximise reliability and reduce maintenance.

### 2.3. CIRCUIT SYSTEM DESCRIPTION Refer to fig 1.

1. Mains input (single phase), rectifier unit and condenser.
2. Transistors and drivers switching bridge (IGBT). Turns the mains rectified voltage into high frequency alternate voltage (32khz) and permits power regulation according to the current / Voltage of weld.
3. High frequency transformer: The primary windings are fed by the voltage converted by Block 2, it has the function of adapting Voltage and current to the values required by the ARC welding procedure and, simultaneously, isolates the welding circuit from the mains.
4. Secondary rectifier bridge with inductance. Changes the alternate Voltage/current supplied by the secondary windings into continuous current/Voltage at a low wave-length.
5. Electronic and regulation board: Instantly checks the value of the welding current against that selected by the user. It modulates the commands of the IGBT drivers, which control regulation. The control board also determines the dynamic response of the current transient during the phases of electrode fusion (instant short circuit), and is responsible for the safety system.

fig 1



### 2.4. SPECIFICATIONS

Model No:	MW100	MW140	MW165
Power Output:	5-85 A	5-130 A	5-160 A
Duty Cycle:	25% @ 85 A	25% @ 130 A	40% @ 160 A
Electrode Capacity:	Ø1.6-2.5 mm	Ø1.6-3.2 mm	Ø1.6-4.0 mm
Max Cutting Thickness:			
Air Requirements:			
Air Pressure:			
Power Efficiency:	2.2 Kva	4.1 Kva	5.3 Kva
Mains Voltage:	230V-1ph	230V-1ph	230V-1ph
Insulation Class:	H	H	H
Protection:	IP22	IP22	IP22
Weight:	1.9 kg	5.0 kg	9.3 kg
Accessories Included:	Yes	No	No
ARC Accessory Ref:	.INV/10	.INV/10	.INV/16
TIG Accessory Ref:	.INV/TIG	.INV/TIG	.INV/TIG



## 3. ASSEMBLY

Unpack the product and check contents. Should there be any damaged or missing parts contact your supplier immediately.

- ⚠ **WARNING! Ensure the inverter is not plugged into the mains power supply before assembling, connecting or disconnect cables. Electrical installation, see: safety instructions (Chapter 1).**

- ⚠ **WARNING! failure to follow the electrical safety instructions will effect machine's operating performance and could damage inverter's built in safety system. This may result in personal injury of fatality, and will invalidate the warranty.**

### 3.1. WELDING CABLE "ELECTRODE HOLDER" CONNECTION

Before connect cables it is important to refer to the cable manufacturer's instructions indicated on the "Stick Electrode" packaging which will indicate the correct polarity connection for the electrode, together with the most suitable current to use.

#### 3.1.1. ARC WELDING.

In principle, when ARC welding the ELECTRODE HOLDER "POSITIVE" is normally connected to the "POSITIVE" (+) terminal, (fig 2).

#### 3.1.2. TIG WELDING

- In principle, when TIG welding alloys, the ELECTRODE HOLDER "POSITIVE" is normally connected to the inverter's "NEGATIVE" (-) pole.

### 3.2. WELDING "RETURN CABLE" - (WORK CLAMP) CONNECTION.

The "return cable, Work Clamp" is normally connected to the Inverter's "NEGATIVE" pole (-).

The other end is connected to:

- The workpiece.
- A metallic work bench. The connection must be as close to the proposed weld as possible.

- ⚠ **WARNING! Connecting cables must be turned fully into the quick plugs to ensure a good electrical contact, loose connection will cause overheating, rapid deterioration and loss in efficiency. DO NOT use welding cables over 10m in length. With exception of a metallic workbench" DO NOT use any metallic structure which is not part of the work piece in order to substitute the return cable of the welding current. as this may jeopardise results and may be dangerous.**

fig 2

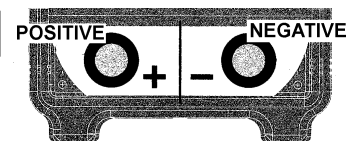
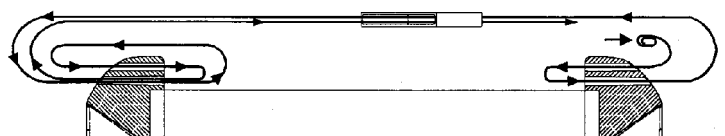


fig 3



### 3.3. CARRY STRAP

If not already fitted, follow the carrying strap assembly as pictured in figure 3.

## 4. CONTROLS & PREPARATION

### 4.1. CONTROLS Figure 4.

**A. Potentiometer:** to regulate welding current with graduated scale in Amps. May be regulation during welding.

**B. Yellow LED:** normally off, when on it means no welding current due one of the following faults:

1. Thermal protection: Inside machine the temperature is excessive. The machine is ON but does not deliver current until a normal temperature is reached. Once this happens the re-start is automatic.
2. Mains over/under voltage protection: When mains voltage is too high (over 260V ac) or too low (under 190V ac) the machine is blocked.
3. Short Circuit protection: in case there is a short-circuit lasting more than 1.5 seconds (i.e. electrode sticking), machine stops. Re-start is automatic.

**C. Model MW165 Function Selection Switch:** enables the setting of the machine dynamics:

1. TIG to gain maximum arc current stability.
2. HARD: to get maximum welding dynamics (hot start and arc force. Suitable for welding with "hard" electrodes (basic, aluminium etc).
3. SOFT: to weld with "soft" electrodes (rutile, inox etc).

**Models MW100 & MW140: Green LED,** mains power indicator, machine ready (fig 5).

fig 4

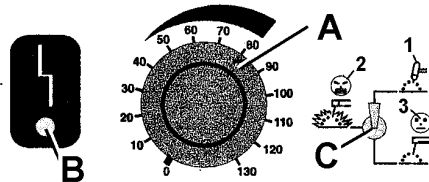


fig 5



The welding current must be regulated according to the diameter of the electrode in use and the type of joint to be welded. See following diameter / current charts:

Electrode Diameter (mm)	Welding Current (Amp)	
	Min	Max
1.6	.25	.50
2	.40	.80
2.5	.60	.110
3.2	.80	.160
4	.120	.200

Further consideration must be given to the location of a weld, for example: Welds that are performed on a horizontal surface require a higher voltage than those performed on a vertical or overhead surface.

The mechanical character of the weld will be determined not only by the current intensity used, but also by the diameter and quality of the electrode, the length of arc, the speed and position of the user. The condition of the electrode is an important factor and must never be wet or damp.

## 5. WELDING PROCEDURE

⚠ **WARNING! Ensure you have read, understood and follow the safety instructions. Place the welding mask in front of your face before striking the arc.**

### 5.1. ARC WELDING

5.1.1. Strike the electrode tip on the workpiece as if you were striking a match.

⚠ **WARNING! DO NOT hit the electrode on the workpiece, as this may damage the electrode.**

5.1.2. As soon as the arc is ignited, maintain a distance from the workpiece equal to the diameter of the electrode being used. Keep this distance as constant as possible for the duration of the weld. As you advance along the workpiece the angle of the electrode must be sustained between 20° to 30°.

5.1.3. At the end of the weld bead, bring the end of the electrode backward in order to fill the weld crater, quickly lift the electrode from the weld pool to extinguish the arc.

### 5.2. TIG WELDING (TIG Welding accessory kits available, contact you Sealey dealer).

TIG (Tungsten inert gas) shielded welding uses an arc between a tungsten electrode and the work to fuse the joint. The electrode itself is not molten but filler metal is required to build the weld profile. The process is protected from atmospheric contamination by a shield of inert gas. This gas is normally pure argon, but helium by itself or a mixture of helium and argon may be used for special applications. For stainless steel use a mixture of argon and hydrogen.

5.2.1. Strike the electrode tip on the workpiece as if you were striking a match.

⚠ **WARNING! DO NOT hit the electrode on the workpiece, as this may damage the electrode.**

5.2.2. Point the electrode in the direction of the weld at about 2.5mm distance from the surface, and use the arc to melt the metal at the joint.

5.2.3. To increase or decrease flow of gas, use the control knob on the torch handle.

5.2.4. Filler metal may be added by using cut lengths of wire over 1.5mm diameter (usually 1 metre in length). To use filler metal (for example when making a fillet weld), add such to the leading edge of the weld pool.

## 6. MAINTENANCE

⚠ **WARNING! DISCONNECT FROM THE MAINS ELECTRICAL SUPPLY AND WAIT FOR CIRCUIT LIGHT TO GO OUT BEFORE ATTEMPTING TO OPEN THE UNIT.**

Periodically remove cover and lightly remove dust inside the machine by passing a low pressure air flow through. Ensure the cover is correctly replaced and secured before attempting to use the welder.

Keep the outside of the machine clean by wiping with a soft dry cloth.

For any other service or maintenance, contact your local Sealey service agent.

## 7. TROUBLESHOOTING

Should you have a problem with the welder check to ensure the following are correct:

1 Check the welding current, which is regulated by the potentiometer with a graduated amp scale, is correct for the diameter and type of electrode being used.

1 When general switch is on, check that the relative lamp is ON. If this is not the case then there may be a mains supply problem.

1 Check the yellow LED i.e. has the thermal protection interruption activated? This indicates either an over or under voltage or short circuit. If the thermal interrupter has activated, wait for the machine to cool down before restarting.

1 Check the normal intermittence ratio is correct, and check that the fan is working correctly.

1 Ensure you are using the correct voltage.

1 Check the machine output and ensure there is nothing causing a short-circuit.

1 Check all circuit connections are correct. In particular check work clamp is correctly attached to the workpiece. Ensure there is no grease, paint etc on the surface.