TL-WELD
Thermocouple and Fine Wire Welder

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MADE IN UNITED KINGDOM
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Operating Instructions

The TL-WELD welder is designed for sensor manufacturers to produce commercial grade thermocouple junctions, and by users of large numbers of exposed junction thermocouples such as test and development laboratories where multipoint temperature sensing of test pieces is required.

No special skills are required and most people will be capable of producing quality work with minimal practice. A satisfactory thermocouple junction is produced without using argon, but where argon is available a momentary purge is automatically triggered immediately prior to the weld to give optimum weld integrity.

Safety Note

1. Always protect the eyes with a suitable filter during welding – never view the weld discharge with the naked eye.
2. Avoid touching the rear of the welder during operation as the power switch heat sink may run hot. This is a normal operating condition.
3. Do not allow the hand to directly contact the welding electrode during operation.
Accessories

**Standard:**
- Wire Holding Pliers With Lead
- Safety Glasses
- Magnifying Eyeglass
- Spare Carbon Electrode
- Spare 2A Fuse
- Argon Hose
- Hexagon key (for electrode change)
- Mains Lead
- Footswitch (Allows One Handed Operation)

**Optional:**
- Spare Carbon Electrodes
Front Panel Controls

A. Arc  
Argon gas and weld current controlled by the “Weld” switch. LED indication.

B. Purge  
Allows the gas line and electrode shield to be purged of air prior to a new welding period.

C. Weld Switch  
Initiates a welding operation (in “arc” mode also opens the Argon valve).

D. Argon LED  
Indicates when the Argon control valve is open and gas is flowing.

E. Wait LED  
Glows when weld charge is building.

F. Ready LED  
“Ready to Weld” indication.

G. Power  
Rotary control of the capacitor charge voltage.

H. Level selector  
Selects the total capacitance available giving the following values with LED indication.  
“LO” = 0 to 6 Joules  
“MED” = 0 to 28 Joules  
“HI” = 0 to 64 Joules

I. Electrode Holder  
Holds the replaceable carbon electrode which is accessible by removing the outer Argon Shield.

J. Red socket  
Output socket for using the pliers supplied.

K. Black socket  
Output socket, this provides an additional earth point if required.
Rear Panel Controls

A. ON/OFF switch  
Power to instrument ON/OFF

B. Weld jack socket  
Footswitch connection

C. Argon inlet  
For connection to Argon supply

D. IEC power inlet module  
For selection of 110-120 Vac or 220-250 Vac power supply. Factory default setting 220-250 Vac.

Setting Up

1. Using a suitable connector fused at 5 amps, connect to mains supply.
2. If Argon is to be utilised, couple argon hose to rear of welder. Do not over-tighten as a good seal will be made with the nut slightly more than finger tight.
3. Connect free end of argon hose to the argon supply via an argon flow regulator.
4. Switch on.
5. Hold welding mode switch in “purge” position and adjust argon flow to 8 litres per min.

The apparatus is now ready for use.
Welding

Arc Welding
1. Connect the work-holding pliers to the red output socket.
2. Depress the purge switch for 3 or 4 seconds to rid the system of air.
3. Reset the mode to “Arc”.
4. Set the energy level to the desired value.
5. Prepare the wires to be welded and grip in the pliers, leaving about 1mm or more protruding.
6. Position the wires 5 or 6mm in front of the carbon, whilst steadying the hand.
7. Press the “weld” switch or foot switch and slowly move the work towards the carbon until the arc is struck.
8. Release the switch and remove the work for examination.

Preparation of Wires for Arc welding
For small diameter wires, strip off about 12mm of insulation and twist together. Then, with side cutters or scissors cut the wire off square leaving sufficient un-insulated material to give approximately 1mm protruding when gripped in the welding pliers. Larger diameter wires may be held side by side in the welding pliers, but ensure that they are in firm contact with each other and trimmed off square. This method will be found useful for attaching solid leads to resistance thermometer detectors. However, when attaching stranded leads, it will be found more convenient to use the twisting method and then to carefully untwist after welding.
Energy Settings

Arc Welding
The following settings may be used as a guide. The correct setting for a particular metal combination and wire gauge will produce a spherical bead. A flattened bead indicates that the energy setting is too high.

**Wire Diameter (mm)**

<table>
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<tr>
<th>Switch at “LOW”</th>
<th>Switch at “HIGH”</th>
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<tbody>
<tr>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>0.15</td>
<td>0.5</td>
</tr>
<tr>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>0.25</td>
<td>0.8</td>
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</table>

**Electrodes**

To replace or adjust carbon electrode, first turn the welder on its side and slacken screw on base of argon shield, which may be then pulled off. This reveals grub screw which holds carbon electrode in place.
### Maintenance

Apart from keeping the electrode in good order, no other maintenance is required.

### Specifications

<table>
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<tr>
<th><strong>General</strong></th>
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<tr>
<td><strong>Energy Output</strong></td>
<td>0-60 Joules</td>
</tr>
<tr>
<td><strong>Welding Capacity</strong></td>
<td>Wires up to 1.1mm diameter</td>
</tr>
<tr>
<td><strong>Duty Cycle</strong></td>
<td>Minimum 5-10 welds/min</td>
</tr>
<tr>
<td><strong>Weld Voltage</strong></td>
<td>49 V</td>
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<tr>
<th><strong>Mechanical</strong></th>
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<tr>
<td><strong>Physical Dimensions</strong></td>
<td>220mm Wide x 120mm High x 250mm Depth</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>4kg</td>
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<tr>
<th><strong>Electrical</strong></th>
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<tr>
<td><strong>Power Supply</strong></td>
<td>110-120 Vac or 220-250 Vac, 50-60Hz</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>Max 170VA dropping to 20VA during charging</td>
</tr>
<tr>
<td><strong>Fuse Characteristics</strong></td>
<td>12A/250V</td>
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</table>

All information given is correct at time of going to press. Please note that specifications and availability of certain items may be subject to change.
EC DECLARATION OF CONFORMITY

in accordance with the following Directive(s):

2004/108/EEC  Electromagnetic Compatibility directive, as applicable to arc welding equipment.


hereby declare that:  TL-WELD Fine Wire Welder

is in conformity with the applicable requirements of the following documents


The basis on which Conformity is being declared
The manufacturer / distributor hereby declares that the products identified above comply with the protection requirements of the EMC directive and with the principal elements of the safety objectives of the Low Voltage Equipment directive.

Note:
Installation compliance aspects
The attention of the specifier, purchaser, installer or user is drawn to special measures and limitations to use which must be observed when these products are put into service to maintain compliance with the above directives. The recommendations and connection configurations indicated in the Installation & Operating Instructions relevant to each product must be observed and applied during the installation of the product (with particular regard to wiring & connections and precautions when operating the equipment).
OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 13 months from date of purchase. OMEGA’s WARRANTY adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA’s customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA’s Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA’s WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA’s control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA’S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:
1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:
1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA’s policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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