

ACT (AW2)series Test Manual

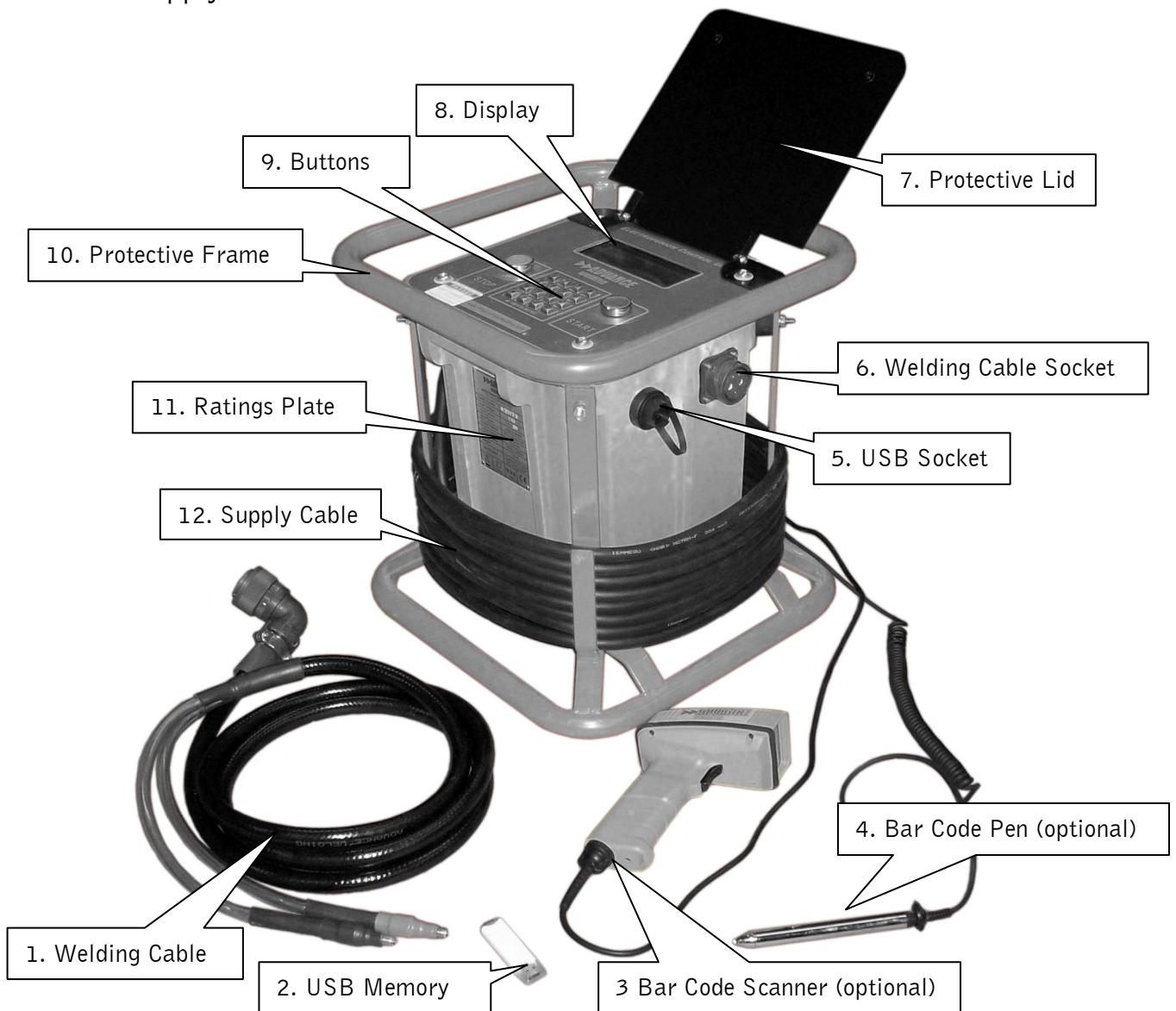
Test

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Operating Controls

1. Welding Cable (can be provided with optional right angle plug)
2. USB Memory Drive
3. Bar Code Scanner (Optional)
4. Bar Code Pen (Optional)
5. USB Socket
6. Welding Cable Socket
7. Protective Lid
8. Display
9. Buttons
10. Protective Frame
11. Ratings Plate
12. Supply Cable





General Safety Notes

- **RISK OF EXPLOSION! This welding unit must not be used in a gaseous atmosphere.**
- **RISK OF ELECTRIC SHOCK! Do not open. No user serviceable parts inside.**
- Before using, always visually inspect the unit to see that the cables and connectors are not worn or damaged. Replace the damaged part before welding.
- Switch off and remove the plug from the mains before adjusting, cleaning, or if the cables are entangled and before leaving the equipment unattended for any period.
- To avoid damaging the unit, do not interrupt the supply voltage or disconnect the welding cable, while the unit is welding a fitting.
- Do not lift or pull the equipment by its cables.
- Do not disconnect the welding cables by pulling on them, always pull off the connectors from the fitting.
- Do not start a weld without the pipe correctly inserted into the fitting.
- Do not touch the fitting while welding.
- Do not weld in the rain or leave the equipment outdoors whilst it is raining.
- Weld only in daylight or in good artificial light.
- The operator is responsible for accidents or hazards occurring to other people or their property while using this equipment. Keep the work area safe!
- Keep bystanders a safe distance away from the machine while welding.
- Never allow people unfamiliar with the instructions to use the welding unit.

Product Specification

Operating Type:	Controlled voltage.
Operating Modes:	Manual, Fusamatic ^{#1} , Bar Code
Operating Languages:	English, French, Dutch, Polish, Russian. (others on request)
Operating Temperature:	-10°C to +40°C ^{#2}
Welding Voltage:	8 to 48 V ac (39,5 V)
Welding Current:	1 to 65 A ac (true rms) (100 A short term)
Welding Power:	8 VA to 3120 VA
Welding Time:	1 to 3600 seconds
Apparent Power Factor:	0.15 to 0.92
Supply Voltage: ^{#3}	110 V ac (+/- 20%) 40 to 60 Hz
Supply Current: ^{#3}	1 to 30 A ac (true rms)
Supply Power: ^{#3}	3,500 W (peak at 0.15 APF)
Supply Voltage: ^{#4}	230 V ac (+/- 20%) 40 to 60 Hz
Supply Current: ^{#4}	1 to 15 A ac (true rms)
Supply Power: ^{#4}	3,500 W (peak at 0.15 APF)
Supply Protection:	Class 1 – Earthed
Data log memory:	2048 welds
Data download/upload:	USB flash memory drive
Weight:	28 kg
Size:	38 cm x 38 cm x 39 cm
Protection Level:	IP65

^{#1} Fusamatic is a welding system owned by The Fusion Group PLC.

^{#2} An extended temperature unit is available with limits -40°C to +50°C.

^{#3} ^{#4} The unit is available in either 110v or 230v operation.

Advance Welding has a policy of continuously improving product design, and as such reserve the right to change specification of its products without prior notice and with impunity.

Intended Use

This equipment is intended to weld constant voltage electrofusion fittings suitable for low, medium and high pressure pipe work systems.

This welding unit has been approved in the UK by Transco to the standard T/SP/ECE/1 2005 'Specification for Electrofusion Control Boxes', and is approved for use on all UK gas distribution networks.

This welding unit complies with the UK Water Industry Specification WIS 04-32-08 'Specifications for the fusion jointing of polyethylene pressure pipeline systems using PE80 and PE100 materials', and is suitable for use on all UK water distribution networks.

This welding unit has been designed to comply with the International Organization for Standardization standard ISO12176-2:2000 "Plastic pipes and fittings, equipment for fusion jointing polyethylene systems , part 2, electrofusion", and can weld all bar coded fittings including extended traceability codes.

Introduction

This manual gives instructions on the correct testing of the welding unit. It is important that you read these instructions carefully, and keep these instructions for the life of the unit.



Electrical Safety

WARNING! Before this unit is plugged in and the power switched on, it should be visually checked for electrical safety.

In practice, approximately 80% of all equipment defects are found during a preliminary visual inspection. A detailed examination will make the greatest contribution to hazard elimination.

1. The exterior of the welding unit should be inspected for:
 - Physical damage
 - Signs of overheating
 - Signs of ingress of liquid or foreign materials

Pay particular attention to possible physical damage around the mains input lead gland, the output socket, the USB socket, the buttons and lid.
2. The mains input lead and output lead should be checked for physical damage. All interconnecting cables inside the unit should also be checked for damage and signs of overheating. All cables showing any sign of damage should be replaced.
3. The cover of the mains input plug must be removed and
 - Terminations and the cord grip should be checked for tightness
 - Terminations should be checked for correct polarity
 - Conductors should be checked for damage or loose strands
 - The contact pins should be checked for signs of damage or burning, and if seen, the plug should be replaced
4. The fuses should be checked for the correct rating and type, and that they has not been replaced with a metal bar, or have been wrapped in metallic foil or similar non standard method.

If there are no visual signs of damage, the unit can now be electrically PAT tested.

Note:

This equipment is classified as “Portable for use on industrial applications”, and must undergo a formal electrical safety check (Portable Appliance Test) as per local regulations. In the UK this is every six months.

It is also the responsibility of the repair centre to return “safe” equipment to the customer. This means that a PAT test must be carried out every time the equipment is tested, repaired or calibrate.

THIS EQUIPMENT IS CLASS 1 EARTHED.

Test 1: Earth Continuity.

This must be carried out with a testing current of 25 amps.

All exposed metal parts must be checked for earth continuity. These are the heatsink, the input lead gland, the output socket, and the metal fascia lid. (The metal lid is anodised and a good earth connection may be difficult through the printed surface. To check the lid, open the unit and test on the earth stud on the back of the lid.)

All measurements must be less than 0.1 ohms.

Test 2: Insulation Resistance.

This must be carried out with a testing voltage of 500 volts DC.

The measurement must be more than 1 megohm. Typically, this reading is over-range.

Test 3: Earth Leakage Test.

During operation (not welding) the equipment will have a leakage current through the EMC filter. The measured current must be less than 2 mA.

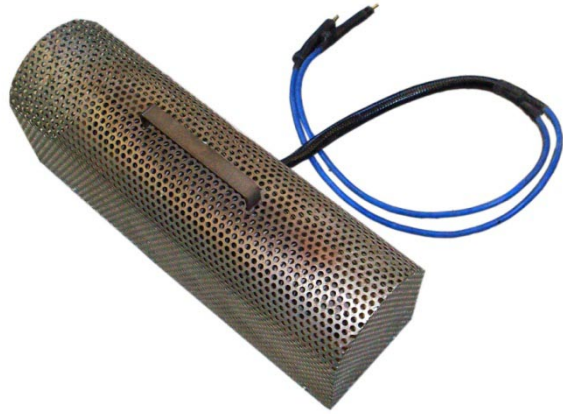
After the PAT test has been carried out, the unit can be plugged in and switched on.

- Plug the unit into the correct power source. Make sure there is no damage to the supply plug or cable.
- The display should light up and start to display messages. Make sure it is not damaged and the back light works.
- Look for damage to the keypad and the Stop Start buttons.

Testing Procedure

If there is no physical damage to the unit, it can now be electrically tested. The following test equipment is required:

Test load for 5 amps and 50 amps at 39.5 volts.



Digital thermometer.



True rms multimeter and
True rms current clamp.



- Connect the output lead to the test load.
- Connect the voltmeter to the output lead.
- Measure the ambient temperature.
- Select a test welding time of 100 seconds.
- The temperature is shown on the display. Check that it is within 2 °C of the actual ambient temperature.
- Start the weld.
- Measure the voltage on the test load and make sure it is centred around 39.5 volts AC true rms. The limits are +/- 0.5 volts.



Fault Finding

During operation, the welding unit monitors all aspects of its operation. If a fault occurs then an error message will be shown.

0: Weld OK

No Fault, weld completed OK.

1: Stuck button on start up

This fault shows when the power is first switched on. Either the Stop, Start, or a keypad button is stuck in. Free the button to clear the fault.

2: Output fault before weld start

This fault shows when the power is first switched on. The unit will check the output terminals to make sure no voltage is present when first switched on. If this fault happens then the internal power relays have stuck in the closed position. The unit will need to be returned for service.

3: Toroid thermal switch tripped

This fault happens when the toroidal transformer becomes too hot. This will happen if the unit is used for a long period of time on large fittings. Let the unit cool down and the fault will clear. If this happens when the unit is cold, then there could be a bad connection on one of the internal plugs. In this case, the unit will need to be returned for repair.

4: No calibration

This fault happens when the unit has no calibration. This will normally not show, and if the unit has been calibrated, would be caused by a fault with the internal memory. Return the unit for service.

5: Case temperature sensor fault (if fitted)

Some units have a case temperature sensor fitted to switch the unit off if the electronics become too hot. This fault will show if the sensor is faulty. Return the unit for service.

6: Case temperature out of limits (if fitted)

Some units have a case temperature sensor fitted to switch the unit off if the electronics become too hot. This fault will show if the temperature is too hot. Let the unit cool down.

7: Ambient temperature less than -40°C.

The unit has detected that the ambient temperature is very cold or the sensor has broken. If the temperature is not below -40°C then the unit will need to be returned to a service agent for repair.

8: Ambient temperature more than +600°C.

The unit has detected that the ambient temperature sensor has broken or a wire has gone open circuit. The unit must be returned to a service agent for repair.

10: Low supply frequency <40Hz

The unit has detected that the supply frequency is below 40 Hz. This will normally be caused by a poor quality generator. If this fault happens then check the supply or change the generator.

11: High supply frequency >70Hz

The unit has detected that the supply frequency is above 70 Hz. This will normally be caused by a poor quality generator. If this fault happens then check the supply or change the generator.

12: High supply voltage >140v (or 280v with a 220v supply)

The unit has detected that the supply voltage is more than 140 volts (280 volts with a nominal 220v supply). Check the supply voltage and if necessary use a different generator.

13: Low supply voltage <95v (or 190v with a 220v supply)

This fault can be caused by a few problems. It could be that the generator is running slowly and so the supply voltage is low. Try speeding the generator up or use a different generator.

It could also be caused by a generator that is too small. If a large fitting is welded, then a large amount of power will be needed from the generator. If it can not supply this power then it will stall and the voltage will drop away. Check that the generator is the correct size, if needs be try another generator.

It could be caused by the use of long extension leads. If a large fitting is welded then a high current will be taken from the supply. If extension leads are used, there will be a volts drop down the lead making the unit sense a low supply voltage. Try not to use extension leads with the unit. If you have to then use just 10 meters of 4.0mm² cable, the same size fitted to the unit.

14: Relay failed to latch on weld start

This fault could happen when the start button is pressed. If the main power relays do not operate correctly then this fault will be shown. The unit needs to be returned for service.

20: Low output volts (-1.25%)

This fault will happen if the output voltage is 1.25% lower than the set point for more than 3 seconds. This can be caused by a generator that is not big enough to supply the required power to the fitting. Check the size of the generator and if needs be try another generator. It can also be caused by using long extension leads with the unit. It is recommended that only 10 meters of extension are used, and the cable should be the same thickness as the input lead on the unit (4.0mm²).

21: High output volts (+1.25%)

This fault will happen if the output voltage is 1.25% higher than the set point for more than 3 seconds. It will normally be caused by a poor quality generator with the supply voltage fluctuating. Try a different generator.

22: Excess output volts (+6.25%)

This fault will happen if the welding voltage is 6.25% more than the set point for more than 2 seconds. This fault is normally caused by a fault within the unit, a short circuit triac. The unit must be returned for service.

23: Low output current (<2.5A)

This fault will happen if the welding current is below 2.5 amps for more than 3 seconds. It can be caused by a faulty fitting. Try another fitting. If this doesn't clear the fault then there is a problem inside the unit and it must be returned for repair.

24: Shorted turn detected in fitting.

While welding, the unit has detected a sharp increase in welding current. This is normally caused by a shorted turn happening in the fitting. (An increase OF 10%). If this happens then it is most likely a faulty fitting. This must be replaced. If the fault persists then it could be a fault within the unit.

25: User stop button pressed

The operator has pressed the stop button.

26: Relay unlatched

During welding, if the main power relay disconnects then this fault will be shown. It could be caused by the unit being knocked or a temporary dip in the power supply. If the fault persists then the unit should be returned for repair.

27: Fitting open circuit

This fault is shown if the output lead disconnects from the fitting while welding. Follow the guidelines from the fitting manufacturer, reconnect the lead and try welding again.

30: Bar Code Mode: No fitting connected

This fault is shown if the output lead is not connected to a fitting when a bar code is read. Connect the fitting.

31: Bar Code Mode: Ohms error

This fault is shown if the connected fitting resistance is different from that coded into the bar code. Try another fitting.

40: Bar Code Invalid: Temperature Compensation.

Digits 22 and 23 of the bar code have been decoded incorrectly.

41: Bar Code Invalid: Resistance Coefficient.

Digit 18 of the bar code has been decoded incorrectly.

42: Bar Code Invalid: Welding Voltage.

Digits 13 and 14 of the bar code have been decoded incorrectly.

43: Bar Code Invalid: Regulation Mode.

Digit 12 of the bar code has been decoded incorrectly.

44: Bar Code Invalid: Fitting Size.

Digits 9, 10 and 11 of the bar code have been decoded incorrectly.

45: Bar Code Invalid: Cooling Time.

Digit 7 of the bar code has been decoded incorrectly.

46: Bar Code Invalid: Fusion Cycle Type.

Digit 5 of the bar code has been decoded incorrectly.

47: Bar Code Invalid: Energy Correction.

Digit 3 of the bar code has been decoded incorrectly.

48: Bar Code Invalid: Component Type.

Digits 1 and 2 of the bar code have been decoded incorrectly.

49: Bar Code Invalid: Check Digit.

Digit 24 of the bar code has been decoded incorrectly.

50: USB Memory: Disc full.

This fault will happen if the USB flash memory pen is full. Delete some files from the device.

51: USB Memory: File allocation table full.

This will happen if the USB flash memory pen's file structure becomes fragmented. Follow the instructions with Windows to defragment the memory pen.

52: USB Memory: File not found.

When performing a software upgrade, the required file was not found on the memory drive. Reload the upgrade files onto the memory drive.

127: Power off failure.

If the power is turned off while the unit is welding, this fault will be recorded to the datalog.

Manufacturer

Manufactured in the UK by:

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