CB315-U

Electrofusion Control Unit



OPERATION AND MAINTENANCE MANUAL GB

IMPORTANT NOTICE

This manual outlines the operation, basic troubleshooting and maintenance of the Akatherm CB315-U Electrofusion Control Unit.

The manual forms a part of the product to which it relates. It (and any amendments issued by Ritmo s.p.a.) should be kept for the life of the product and passed to any subsequent holder or user of this equipment.

This equipment contains no user-serviceable parts. All repairs and maintenance should be carried out by suitably qualified personnel. It is recommended that the unit (with output leads) be returned annually for checking and calibration.

CE This equipment complies with the following:

European Communities EMC directive 2004/108/CE
European Communities low voltage directive 2006/95/CE
European Communities machinery directive 2006/42/CE
European Norm EN 50 082-1: Electromagnetic compatibility, emission standard
European Norm EN 50 081-2: Electromagnetic compatibility, generic emission standard. Industrial environment

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WARRANTY

Subject to the conditions listed below the Akatherm control box CB315-U is guaranteed against faulty materials, workmanship or design, for a period of two (2) years from the date of purchase by the end user.

- The buyer must examine the goods immediately after receiving them and check them for faults or absence of guaranteed features.
- This warranty provides for the repair or, at the manufacturer's option, replacement of the control unit or any defective component therein.
- This guarantee shall only apply to defects that are notified within two (2) years of the date of purchase by the end user.
- The faulty unit or defective parts thereof must be returned carriage paid and suitably packaged together with a claim in writing detailing the defect and the date of purchase by the end user.
- This warranty does not cover operator misuse/abuse, use outside the parameters of its intended purpose or defects related to use of a poor quality electricity supply.
- This warranty does not cover use for hire purposes.
- Repairs may only be effected by the manufacturer or an approved service facility. Unauthorised repairs will invalidate this warranty.
- No person has any authority to vary the conditions of guarantee.
- This guarantee excludes fair wear and tear, glass, leads, consumable or replacement parts.

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1. INTRODUCTION

Dear Customer,

Thank you for choosing a machine from the Akatherm range of products.

This manual and its enclosure have been prepared by the manufacturer for the purpose of illustrating the features and usage of the **CB315-U** electrofusion control unit. They contain all the information and recommendations you need for the safe and proper use of the equipment by trained welders. We urge you to read completely both the manual and its enclosure before using the welding equipment. We also advise you to keep these papers with the machine for future reference and/or eventual next users.

We are sure that you will soon become familiar with your equipment and that it will give you many years of entirely satisfactory service.

With best wishes,
Akatherm B.V.

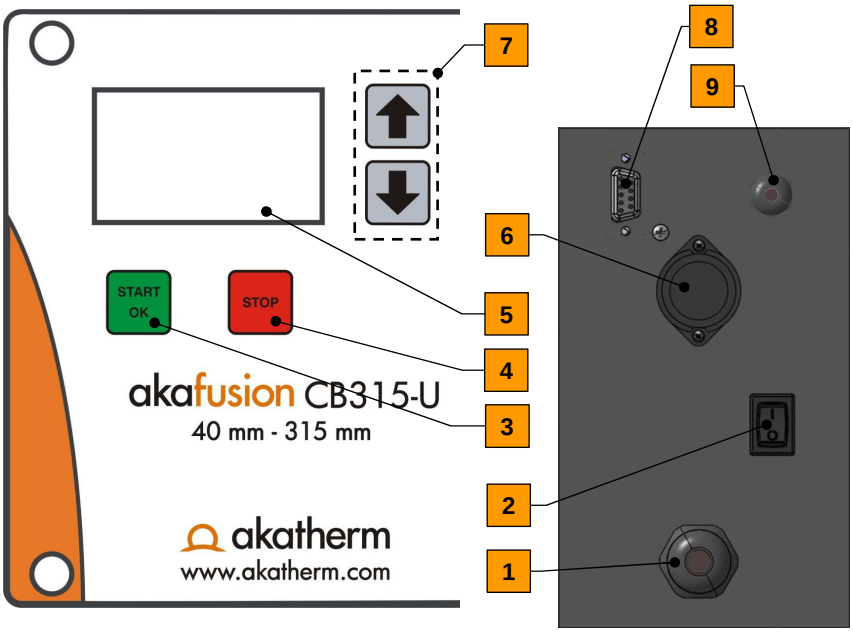
2. TECHNICAL SPECIFICATIONS

OVERALL WEIGHT ……..……	7,2 kg
CONTROL UNIT WEIGTH .....……	3,4 Kg
CONTROL UNIT SIZE …….……..	240×180×110 mm
POWER SUPPLY ……...	230V ± 10% ~ 50-60Hz
MAX POWER ABSORBED ……..	2470W
WATER AND DUST PROTECTION GRADE ..…	IP54
PROTECTION CLASS …….....	I
OPERATING TEMPERATURE ….……	-10 °C to +45 °C
HUMIDITY ...……...	10%-90% RH Noncondensing
STORAGE TEMPERATURE ……	-30 °C to +70 °C
OPERATING VOLTAGE LIMITS ……..	175 ÷ 270V

STANDARD ACCESSORIES:

- Carrying case
- Welding cables yellow (A00) and blue (A01)
- Welding extension cable
- Manual scraper

PARTS DESCRIPTION



FRONT PANEL **SIDE PANEL**

1. Power cable
2. On/Off main switch
3. **START/OK** (start begin welding/confirm parameters)
4. **STOP** (stop welding/previous menu)
5. Display
6. Electrofusion welding cable connector
7. Arrow keys (scroll menu, change the values)
8. USB/serial connector (to print and data download)
9. Ambient temperature sensor

3. OPERATING PRINCIPLES AND FIELD OF APPLICATION

Jointing by electrically induced melting is based on the Joule effect. A given quantity of current is made to pass, during a specific period, through a resistor housed in a sleeve, at the ends of which a potential difference is applied. The heat thus produced is used for welding.

Three parameters must therefore be defined for each welding job:

- Welding time
- Current intensity
- Voltage at coupler ends

The CB315-U is an electrofusion control unit that uses electrically-induced melting for jointing Akatherm polyethylene (PE) drain pipes and/or fittings by means of electrofusion couplers in the range 40 to 315 mm. The coupler is recognized by the machine by means of the cable, which is selected by the operator from among the two different colour options available. It can perform two different welding methods based on the cable and coupler combination.

WELDING CABLES CHART

Cable colour	Range of diameters	Welding code
Yellow	Ø 40 ÷ 160 [mm]	**A00**
Blue	Ø 200 ÷ 315 [mm]	**A01**

The CB315-U provides differentiated control of parameters time, current and voltage, according to the type of welding enabled by the sleeve in use:

Welding method A00:

- **Voltage at coupler ends:** obtained by the machine according to the type of sleeve utilized (Ohm's law).
- **Welding time:** set and controlled by the machine according choice of coupler brand and ambient temperature.
- **Current intensity:** constant, according to the choice of coupler brand.

Welding method A01:

- **Voltage at coupler ends:** mains supply power:
- **Welding time:** set and controlled by the machine. In case of mains voltage variation, in order to control power transmitted to the sleeve, the machine suitably adapts welding time, indicating it on the display in real time. Should over-voltages occur, welding time is automatically reduced and vice-versa for under-voltages
- **Current intensity**: obtained and maintained by the machine according to the sleeve used (Ohm's law).

4. SAFETY RECOMMENDATIONS

You are strongly urged to comply strictly with legal requirements concerning job safety and accident prevention in the work place. The structural features and usage of the welding equipment make it essential to pay particular attention to the following recommendations:

Ambient conditions:
Do not use the equipment in damp or wet environments.

Work place:
Make sure that the work place is inaccessible to unauthorized persons.

Operator's presence during welding:
Never leave the equipment unattended during welding operations.

Cramped spaces:
If it proves necessary to work in cramped spaces, it is compulsory to have a person on hand outside to help the operator in case of need.

Burning hazard:
The electric melting process involves the reaching of high temperatures in the welding area. Do not touch the coupler or joint during the welding and cooling phases.

Electrical hazard:
Protect the equipment from rain and/or damp; use only pipes and couplers that are perfectly dry.

Use chemically inert pipes:
Never perform welding on pipes that contain (or previously contained) substances which, combined with heat, can produce gases that are explosive or dangerous to human health.

Personal protection:
Wear insulating footwear and gloves.

Be careful with the cables:
Never disconnect the plug from the power socket by tugging on the power cable.

Be careful with the cables:
Never detach the pins from the coupler by tugging on their power cables.

Be careful with the cables:
Never move the equipment by dragging it along by its power cables.

Prevent overvoltage:
Prevent power supply sources with frequent overvoltage's like unstabilized generator sets. It is advisable in such cases to use a stabilizer.

Fire or explosion:
This welding equipment must not be used in areas where there is any risk of fire or explosion. It is compulsory in such conditions to use specifically designed and constructed equipment.

Disconnect power plug after welding:
On completion of the welding operation, always remember to disconnect the plug from the mains power socket.

5. GENERAL WELDING CRITERIA

The quality of the joint depends on your scrupulous compliance with the following recommendations.

5.1 HANDLING THE PIPES AND COUPLERS

During welding, the pipes and couplers must be at near-ambient temperature, as detected by the control unit's temperature sensor. They must consequently be protected from direct sunlight both before and during welding, since they could otherwise become much warmer than the ambient temperature, with a consequent negative effect on the electro-melting process (i.e. excessive melting of the pipe and coupler). In the case of excessively high temperatures, move the pipes and couplers to a cool, shady place and wait for their temperature to return to near-ambient values.

5.2 PREPARATION

Cut the ends of the pipes being prepared for welding at right-angles, using suitable pipe-cutting tools. Be careful attention to avoid any bending or ovalizing of the pipe.

5.3 SCRAPING AND MARKING

Smoothly scrape off the oxidized surface layer from the end of the pipe or fitting using suitable tools. Make sure that you obtain an even, overall scraping action extending over at least 1 cm for each half of the coupler. If this scraping is not done accurately, only a superficial bond will be achieved, because the oxidized layer prevents molecular penetration between the parts and thus interferes with the proper outcome of the welding action. Scraping with sand paper, rasps, or emery grinding wheels is absolutely unsuitable.

Remove the coupler from its packaging only just before it is used and clean the inside of the coupler in compliance with the manufacturer's instructions.

5.4 POSITIONING

Slide the ends of the pipes into the coupler. It is advisable to align the pipe and couplers in order:

- to ensure that the parts remain in a stable position throughout the welding and cooling phases;
- to avoid any mechanical strain on the joint during the welding and cooling phases.

An aligning device can be used to achieve optimal aligning.

5.5 WELDING

The area where welding is done must be protected against particularly unfavourable weather conditions, such as damp or temperatures below -10 °C or above +45 °C.

Warning : Never weld a coupler twice.

5.6 COOLING

The cooling temperature varies, depending on the diameter of the couplers and the ambient temperature. Always comply with the timing recommendations in the Akatherm technical manual.

The removal of the aligning devices and disconnection of the welding cables must be done only after the cooling phase has come to a complete end.

6. OPERATING INSTRUCTIONS

6.1 PREPARATION

Prepare the pipes and the coupler for welding in compliance with the recommendations given in the "General Welding Criteria" section of this manual and furthermore the instructions in the Akatherm technical manual.

6.2 SWITCH OFF AND DISCONNECT

Make sure that the main on/off switch **2** on the side panel is in the **"0"** position (OFF). Disconnect the equipment from the mains power by taking out the plug in the power socket.

6.3 SELECT CABLE AND CONNECT COUPLER

Select the cable suitable for the type of coupler as per the welding cables chart in chapter 3. Connect the welding cable with the cable extension, locking the two sockets. Insert the extension plug in the socket on the side panel **6**. Make the electric connection to the coupler used for the welding, inserting the cable terminal pins in the holes provided on the coupler itself.

6.4 CONNECT AND SWITCH ON

Connect the equipment to the mains power supply by inserting the plug in the power socket. Turn the main on/off switch **2** on **"1"** position (ON).

6.5 CONFIRM COUPLER CHOICE

The display will show the recognized cable type and information regarding the coupler. Moving with the arrow button you can change the brand of the coupler. Press START/OK button **3** to confirm coupler.

6.6 CONFIRM DIAMETER

Press the arrows button to set diameter value of joint to be welded and press START/OK to confirm diameter.

If notes are enabled*, use the arrow buttons to enter the building site name or other notes, press the **START/OK** button to move to the next character (24 character are available). **If you do not want to enter notes, skip this step by holding down the START/OK button for 2 seconds.**

6.7 START WELD

On the display the selected cable, the diameter and the brand of the coupler will appear. Carefully check the data and if not corrected, press the **STOP** button to return to previous item. Check for positive scraping and alignment and then press the **START/OK** button to begin welding.

Warning : if the coupler does not comply or is faulty, you cannot proceed with welding. Press the STOP button and repeat the operation by replacing the coupler.

6.8 COOLING

Allow for the joint to cool in compliance with the recommended cooling times as per the Akatherm technical manual. During this time, the welding must undergo no mechanical strains, such as twisting, pulling or bending, so do not remove the aligning devices or disconnect the pins until the welding has cooled completely.

The **STOP** button is used to restore the waiting mode, ready to enable a new welding operation, or to suspend a welding operation that is underway.

***** The use of notes is useful when the operator wishes to make comments before you start welding, such as the building site name in which the machine uses. Press the **STOP** button to enter the OPTIONS menu, scroll with the arrow buttons and go to "Notes" then press the **START/OK** button. Use the arrow buttons to enable/disable notes, press the **START/OK** button to confirm.

OPTIONS MENU AND SPECIAL FEATURES

To access the option menu, turn on machine and press the **STOP** button.

Notes:
Displays information such as:

- Revision
- Serial number
- Memory free
- Firmware version

Other functions:
To access a "Special features" menu, enter a four digits code:

- Time/date setting - **code 1000**
- Choice of language - **code 1100**
- Celsius/Fahrenheit degrees setting - **code 1110**
- Reset welding report - **code 2110**

Copy via USB
Using the serial/USB adapter is possible transfer data to a pen-drive. Connect a flash drive and press the **START/OK** button to activate the transfer, when the transfer is finished unplug the key and connect to a computer for viewing welding reports.

Print last one
Allows direct printing of the last welding report. Connect the serial printer (optional), use the arrows button to view previous reports then press the **START/OK** button to start printing the report you want.

Print all
Allow direct printing of all welding reports.

7. TESTING AND MAINTENANCE

Before proceeding with any welding operations or connecting the electrofusion control unit to the mains power supply, always check the following points:

7.1 ELECTRIC PROTECTION

The power point must be protected with a differential circuit-breaker (I_{Δ}=30mA).

7.2. RATED POWER SUPPLY VOLTAGE

This must be 230V.

7.3. EXTENSION PLUGS AND CABLES

These must be suitable for the power absorbed by the machine, see table below:

Cable conductor cross section [mm^2]	1.5	2.5	4	6
Maximum length [m]	30	50	80	120

7.4. CABLES

These must have suitable insulation in perfect order; they must not be laid in areas affected by the transit of vehicles or walkers; and they must not be susceptible to the effects of chemical agents and/or particular physical strains.

7.5. MACHINE HOUSING

This must be insulated and placed in a stable position.

Keep the machine and connection cables clean and dry. Before proceeding with any cleaning operations, always disconnect the plug from the mains power socket. For cleaning, use a soft cloth dampened with water or methylated spirit (never use any kind of solvent).

The CB315-U is an electronic apparatus and must consequently be handled with care, avoiding violent shocks or abrupt changes in temperature.

To ensure the long-term reliability of the electrofusion control unit, the user must inspect the apparatus regularly, paying particular attention to the following:

7.6 CONNECTOR PINS
Check for damage.

7.7 POWER SUPPLY AND WELDING CABLES
Check for damage and correct connection.

7.8 TEMPERATURE SENSOR
Measures the ambient temperature with a thermometer and make sure that the reading coincides with the temperature given on the display.

7.9 DISPLAY DEVICE
Check for proper functioning.

7.10 MECHANICAL STRUCTURE
Check housing and frame for damage.

If any anomalies are detected in one or more of these components, it is essential to have the welder checked by the manufacturer or by one of the authorized service centres.

The electrofusion control unit must in any case be submitted to the manufacturer or one of the authorized customer service centres for general overhaul at least once every two years.

8. WHAT TO CHECK IN THE EVENT OF FAULTY OPERATION

In the event of faulty operation, check:

8.1 THE MAINS POWER SUPPLY
Must be within supply range.

8.2 MAIN ON/OFF SWITCH 2
This should be in the **"1"** position (ON)

8.3 THE INTEGRITY OF THE ELECTRIC POWER CABLES
All cables must undamaged and properly connected.

ATTENTION!

If the  **symbol is displayed, you are invited to take the machine to the manufacturer or an authorized service centre, for overhaul.**
Press STOP to suspend the symbol; it will reappear once the machine is turned off and then turned on again.

- If you fail to identify the fault, send the equipment to the manufacturer or to one of the **authorized** customer service centres.
- The guarantee is automatically held forfeit in the event of any repairs or other action being taken on the machine by unauthorized persons.

9. ALARM CODES AND THEIR MEANING

Attention please!
The welding cycle is interrupted whenever an error code is displayed. The interruption may cause the deterioration of the material being welded. In no event shall AKATHERM be liable for any direct, indirect, incidental, or consequential damages of any kind whatsoever with respect to the use of pipes/fittings/couplers previously involved in welding cycles resulting in error codes.



5 – POWER SOURCE VOLTAGE
Probable cause: Power source voltage out of range.

Solution: Verify the power source characteristics.



10 – POWER SOURCE FREQUENCY
Probable cause: Power source frequency out of range
F_{min} = 40Hz ÷ F_{max} = 70Hz.

Solution: Verify the power source characteristics.



20 – AMBIENT TEMPERATURE OUT OF RANGE
Probable cause: The ambient temperature is out of range (-10°C ÷ +45°C).

Solution: Protect the working site where the welding is taking place in order to reach an ambient temperature within the allowable limits.

30 – WELDING VOLTAGE OUT OF CONTROL-RANGE

Probable cause: The power source is supplying an out-of-range voltage.

Solution: Verify the power source characteristics.

35 - MACHINE OVERHEATED

Probable cause: The machine reached a too high temperature after a welding cycle.

Solution: Wait until the machine has cooled off.

45 – MAXIMUM CURRENT VALUE EXCEEDED

Probable cause: The heating wires inside the coupler are creating a short circuit.
Probable cause: The coupler diameter is bigger than allowed.

Solution: Repeat the welding with another coupler

50 – NOT ACHIEVED MINIMUM VALUE OF WELDING CURRENT

Probable cause: One or both welding cables were unplugged during the welding.

Solution: Repeat the welding with another coupler.

Probable cause: The heating wires inside the coupler are interrupted.

Solution: Repeat the welding with another coupler.

Probable cause: The coupler is too small (the electrical resistance is too high).

Solution: Repeat the welding with a compatible coupler.

55 – WELDING CYCLE INTERRUPTED BY THE OPERATOR

Probable cause: The operator pressed the STOP pushbutton.

Solution: Repeat the welding with another coupler.

60 – SHORT CIRCUIT

Probable cause: The coupler is damaged.

Solution: Repeat the welding with another coupler.

65 – LACK OF VOLTAGE AT THE POWER SOURCE

Probable cause: Power supply cable unplugged.

Solution: Plug the power supply cable.

Probable cause: The voltage supply was interrupted.

Solution: Wait until the service is restored.

Probable cause: The safety micro switches have intervened.

Solution: Re-arm the safety micro switches.

70 – 75 HARDWARE ERROR

Solution: Contact an authorized service centre.

Attention please! If the **ATTENTION! FREE MEMORY: 5** message is displayed at the ignition of the machine, follow the steps (page 32): "Reset welding reports". If you don't do this and continue to use the machine, the last report will replace the first one in memory, then the second report will be replaced, and so forth.