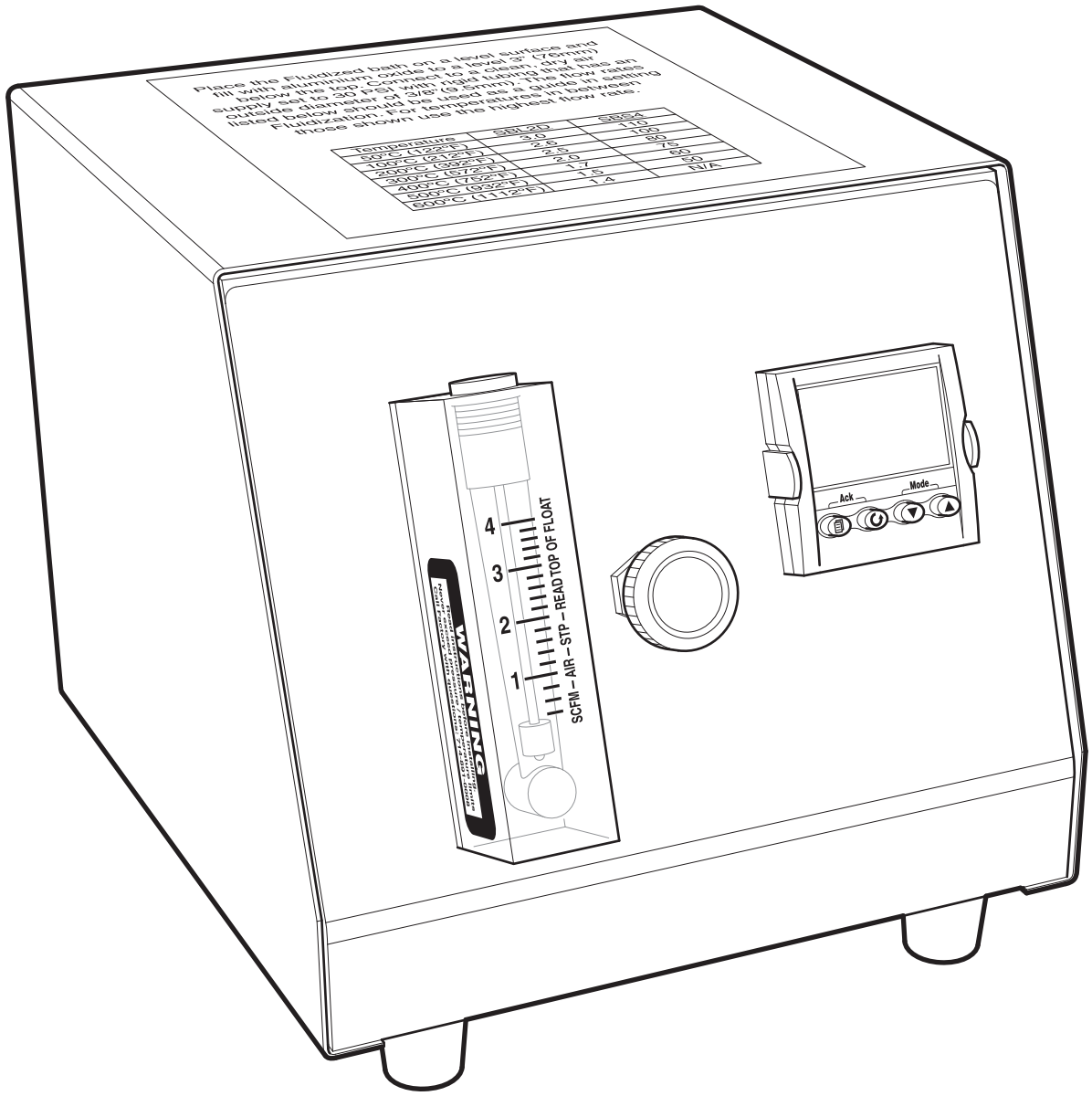



# Instruction Manual

7002943 Version 2

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# IMPORTANT SUPPLEMENTARY SAFETY INFORMATION

**Introduction**

The FSB-200-TC Temperature Controller is designed as an alternative to the energy control provided in the laboratory fluidised baths. It is supplied with a Chromal Alumel Thermocouple which fits into the sheath built into the fluidised bath.

**Symbols Defined**



**WARNING**



**RISK OF ELECTRIC SHOCK**



**HOT SURFACE**



**EARTH**

**Caution**

1. Please read the Instruction Manual before installation and use.
2. Some Cole-Parmer Fluidised Baths can heat up to 700°C. High temperatures are dangerous and can cause serious burns to operators and ignite combustible material.
3. Use care and wear protective gloves to protect hands and protective glasses to protect eyes.
4. Do not put hot objects on or near combustible objects.
5. Do not operate the unit close to inflammable liquids or gases.
6. Do not place any liquid directly in the unit.
7. Always ensure a suitable, adequate ventilation system is used when equipment is in use.
8. Always install fireproof metal ducting with sufficient airflow where applicable.

**Maintenance**

1. When performing maintenance, always disconnect from power supply and cool below 50°C.
2. Antylia Scientific Ltd recommend regular cleaning of fluidised baths. Externally, wipe with a damp soapy cloth. No abrasive cleaners should be used. Care should be taken to prevent any water entering the unit.
3. Regular internal and external inspection of extraction ducting is recommended to detect any damage and ensure the internals are clean. Any build-up of particles or debris discovered in the extraction ducting requires the ducting to be cleaned or replaced.
4. In fluidised baths used for polymer burn-off, please regularly inspect fluidising medium, remove any foreign debris and replace with clean fluidising medium as required.
5. Never top-up a hot fluidised bath with cold fluidising medium. Always cool below 50°C first.

**Please note:**

1. Please ensure an adequate risk assessment is performed before use of a fluidised bath.
2. Please ensure the appropriate temperature is used for the application, always stay safely below the combustion temperature of any material or sample in a fluidised bath.
3. Fluidising airflow must be switched on before heating a fluidised bath and left operational until the bath cools to below 50°C.
4. Do not overfill fluidising media. When fluidized, the aluminium oxide level should be approximately 100mm (4") from the top surface of the bath at your maximum operating temperature.
5. In fluidised baths used for polymer burn-off, always remove excess polymer from sample.
6. In applications where materials being treated produce acidic vapours during thermal decomposition, it is recommended a fume scrubber is utilised to ensure fume emission from the plant conforms to local regulations.
7. If you have any questions, please contact cptechsupport@antylia.com.

# GENERAL DESCRIPTION

The FSB-200-TC consists of a temperature controller mounted in a case with solid state relay switching and is capable of handling up to 20 amps. Connections to the fluidised bath and to the thermocouple are conveniently made with sockets on the back of the instrument. In use, the FSB-200-TC bypasses completely the energy regulator on the fluidised bath and cycles all the heating elements on and off at the same time. The unit is mounted on four rubber feet and provided with a three wire cord and thermocouple.

The FSB-200-TC provides the following features not provided by the energy regulator:

1. Precise temperature setting.

2. Improved temperature stability
   Control is achieved by monitoring the signal from the thermocouple sensor. By this means the controller will react directly to temperature stability.

3. Stable temperature under varying loads.
   With the energy regulator, the dial setting must be manually adjusted to correct for changes in heat requirements due to a variation in bath loading or ambient temperature. The FSB-200-TC will automatically adjust the heater output to take account of these varying conditions.

# BEFORE USE

Thank you for purchasing this Cole-Parmer product. To get the best performance from the equipment, and for your own safety, please read these instructions carefully before use. If there is any doubt relating to the proper use of this equipment, the staff at Antylia Scientific Ltd. or your supplier will be happy to assist you.

**UNPACKING**
Take care when unpacking your unit.

The user is advised to keep the original packaging in case the instrument ever needs to be returned for service or repair. Antylia Scientific Ltd. accepts no responsibility for damage incurred unless the unit is correctly packed and transported in its original packaging.

If the equipment is not used in the manner described in this manual and with accessories other than those recommended by the manufacturer, the protection provided may be impaired.

# SAFETY

Please read all the information in this Instruction Manual before using the unit.

## WARNING

HIGH TEMPERATURES ARE DANGEROUS: they can cause serious burns to operators and ignite combustible material.

Antylia Scientific Ltd have taken great care in the design of these units to protect operators from hazards, but operators should pay attention to the following points:



- USE CARE AND WEAR PROTECTIVE GLOVES TO PROTECT HANDS AND SAFETY GLASSES TO PROTECT EYES.
- DO NOT use combustible substances near hot objects.
- DO NOT operate the instrument in the vicinity of inflammable liquids or gases.
- DO NOT place any liquid directly into the instrument.
- At all times USE COMMON SENSE.

## OPERATOR SAFETY

All operators of Cole-Parmer equipment must have available the relevant literature needed to ensure their safety. It is important that only suitably trained personnel operate this equipment in accordance with the instructions contained in this manual and with general safety standards and procedures.

All Cole-Parmer units have been designed to conform to international safety requirements.

If a safety problem should be encountered, switch off at the mains power supply.

## ELECTRICAL INSTALLATION



Before connecting the instrument to the mains electricity supply, check the voltage against the rating plate (located on the back of the unit). **Please note that the unit must be earthed to ensure proper electrical safety.**

| ***Connections*** | ***220V-240V*** | ***110V-120V*** |
|---|---|---|
| Live | Brown | Black |
| Neutral | Blue | White |
| Earth | Green/yellow | Green |

**Note:** FSB-200-TC is classified as "Permanently Connected Equipment" and should be connected to the electricity supply by a qualified electrician.

The equipment is supplied with 2.5m of flexible, triple core, circular cable to the following specification: 4.0mm$^2$, to BS 6500 or equivalent and <HAR> or BASEC approved. Connection to the mains electrical supply should be via a double pole 30mA Residual Current Breaker with Overcurrent protection (RCBO) isolating circuit breaker switch with a continuous current carrying capacity of 30A at 250V and overcurrent of 30A.

Do not switch on until the unit is fully installed.

## ENVIRONMENTAL CONDITIONS

This equipment is designed to operate under the following conditions:

- Indoor use
- Use in a well-ventilated area
- Ambient temperature range +5°C to +40°C
- Altitude to 2000 m (6500 ft.)
- Relative humidity 80%
- Mains supply fluctuations not exceeding 10%
- Overvoltage category II IEC60364-4-443
- Pollution degree 2 IEC664

## OPERATOR MAINTENANCE

NOTE: THAT THIS EQUIPMENT SHOULD ONLY BE DISMANTLED BY PROPERLY TRAINED PERSONNEL. REMOVING THE SIDE, FRONT OR REAR PANELS EXPOSES POTENTIALLY LETHAL MAINS VOLTAGES. **THERE ARE NO OPERATOR MAINTAINABLE PARTS WITHIN THE EQUIPMENT.**

In the unlikely event that you experience any problems with your unit which cannot easily be remedied, you should contact your supplier and return the unit if necessary. Please include any details of the fault observed and remember to return the unit in its original packing. Antylia Scientific Ltd accept no responsibility for damage to units which are not properly packed for shipping: if in doubt, contact your supplier.

**1.Cleaning**

Before cleaning your unit ALWAYS disconnect it from the power supply and allow it to cool below 50°C. Your unit can be cleaned by wiping with a damp soapy cloth. Care should be exercised to prevent water from running inside the unit. Do not use abrasive cleaners.

**2.Fuses**

Your unit is protected by one or two fuses. These should only be changed by suitably qualified personnel. If the fuses blow persistently, a serious fault is indicated and you may need to return the unit to your supplier for repair.

# INSTALLATION

## SET-UP

The fluidised bath obtains its power through the TC-9D controller. The fluidised bath therefore needs to be connected through the TC-9D to the mains or line supply.

### POWER

The TC-9D requires a power supply of 110 V - 230 V, 50/60Hz, single phase.

### AIR

The compressed air supply to the TC-9D must be clean, dry and free from oil. The pressure delivered to the TC-9D should be 30 psi (207 kPa) and capable of delivering 5 cubic feet/minute (CFM) (142 litres/min).

### MECHANICAL

The unit should be mounted on a firm level surface. It is important to ensure that the bath is level, otherwise it will fluidise incorrectly. This will lead to the formation of large temperature gradients across the bath which results in premature heater failure and possible damage to the porous plate and inner container assemblies.

1. If the fluidised bath has had a plug connected to its mains lead this will need to be removed.

2. Attach the twist lock plug supplied with the TC-9D to the fluidised bath's mains lead.
   The connections to the twist lock plug are as follows:

| 230 V | 120 V | Plug Letter |
|---|---|---|
| LIVE | BLACK | Y |
| NEUTRAL | WHITE | X |
| GROUND | GREEN | G |

3. Plug the twist lock plug into the back of the TC-9D.

4. Plug the thermocouple into the back of the TC-9D.

5. Remove the packing bar from the thermostat sheath on the fluidised bath, refer to instruction manual supplied with bath. It is held in with a nut and olive, a new olive is supplied with the TC-9D. Fit the new olive as appropriate to the thermocouple and push the thermocouple fully into the thermostat sheath. Tighten the nut so that the olive holds the thermocouple firmly in position but do not over tighten.

6. Connect a clean, dry air supply regulated to 30PSI via 9.5mm (3/8") O.D. tubing. This tubing should be plugged into the quick disconnect fitting on the back of the TC-9D labelled "INLET".

7. Connect a 9.5mm (3/8") O.D. tubing between the fluidised bath and the quick disconnect fitting on the back of the TC-9D labelled "OUTLET".

8. Connect the TC-9D to the mains power supply. Before connecting to the mains supply refer to Electrical Installation on page 5.

9. Set the energy regulator on the fluidised bath to 10.

10. Switch all the fluidised bath heaters ON, as the TC-9D will control the temperature by controlling the power input.

# OPERATION

1. Use the UP and DOWN arrows to enter a setpoint temperature. The bath will begin to heat immediately. The top display is the measured thermocouple temperature and bottom is the set point.

2. To change the display from °C to °F and vice versa, press the 2nd button from the left until the lower display shows "UNITS". Next press the UP arrow to reach preferred setting. Press 1st button on the left to exit after changes are made.

3. Two setpoint programming can be used by entering values at menu option "SP1" and "SP2". See step 2 to access options and exit out. Menu option "SP.SEL" tells the controller which to use.

4. A single point calibration offset can be applied by accessing option "PV.OFS". See step 2 to access options and exit out.
   Set a correction value in the opposite direction of your external reading i.e. - reference shows the bath to be 3.0 degrees high, then set "PV.OFS" to "-3.0".

# SAFETY, REPAIR AND TECHNICAL SUPPORT

NOTE THAT THIS EQUIPMENT SHOULD ONLY BE DISMANTLED BY PROPERLY TRAINED PERSONNEL.
**REMOVING THE CASE EXPOSES POTENTIALLY LETHAL MAINS VOLTAGE.**
THERE ARE NO OPERATOR MAINTAINABLE PARTS WITHIN THE EQUIPMENT.

In the unlikely event that you experience any problems with your fluidised bath which cannot easily be remedied, it may be necessary for your equipment to be sent back to our service department for repair. In this case please contact the service department for all the required returns paperwork, including the decontamination certificate, which must be included when you return the equipment. Please also ensure you include a clear description of the fault. The decontamination certificate must be completed to certify that the returned item is not contaminated with any harmful substance. Failure to complete this will prevent the repair of your equipment.

Please return the unit in its original packing. Antylia Scientific Ltd accept no responsibility for damage to units which are not properly packed for shipping: if in doubt, contact your supplier. Clearly mark the package for the attention of the Service Department and post to the following address:

Antylia Scientific Ltd
Beacon Road
Stone
Staffordshire
ST15 0SA
United Kingdom

Only spare parts supplied by the manufacturer or its agent should be used. Fitting of non-approved parts may affect the performance of the safety features of the equipment. If in doubt, please contact Antylia Scientific Ltd.

If you require further technical or application assistance, please contact Antylia Scientific Ltd at:

E-mail: cptechsupport@antylia.com
Phone: +44 (0)1785 810433

# TECHNICAL SPECIFICATION

| | | |
|---|---|---|
| **Temperature range** | | 0 to 620ºC (32 to 1148ºF) |
| **Temperature stability** | | ±0.2 at 100°C (SBL2D)<br>±0.4 at 100°C (SBS4) |
| **Method of control** | | 3 Term PID |
| **Display resolution** | | 1º digital |
| **Temperature sensor** | | Type K |
| **Air pressure** | | 30 psi (207 kPa) |
| **Electrical supply** | | 100 V - 230 V, 50/60Hz, single-phase |
| **Power** | | 20 W |
| **Fuse** | | F20A |
| **Weight** | | 3.75kg |
| **Overall size** | Width<br>Depth<br>Height | 203mm (8”)<br>305mm (12”)<br>191mm (7.5”) |
| **Thermocouple size** | Length<br>Diameter<br>Lead length | 152mm (6”)<br>5mm (3/16”)<br>2.1m (7ft) |

This product meets the applicable CE Directives and UKCA Legislation for radio frequency interference and may be expected not to interfere with, or be affected by, other equipment with similar qualifications. We cannot be sure that other equipment used in its vicinity will meet these standards and so we cannot guarantee that interference will not occur in practise. Where there is a possibility that injury, damage or loss might occur if equipment malfunctions due to radio frequency interference, or for general advise before use, contact the manufacturer.

Declaration of Conformity is available to view online at www.coleparmer.com

**EU Representative address**
Antylia Scientific GmbH
Futtererstraße 16
97877 Wertheim
Deutschland
Tel: +49 9377 9203-0
Email: sales@coleparmer.de

**UK Representative address**
Antylia Scientific
9 Orion Court
Ambuscade Road
Colmworth Business Park
St. Neots
PE19 8YX
United Kingdom
Tel: +44 (0) 1480 277339
Email: enquiries@antylia.com

## Ordering Information

| Order No. | Series | Model | Legacy SKU |
|---|---|---|---|
| 01184-50 | FSB-200 | FSB-200-TC-115 | F937P |
| 01184-55 | FSB-200 | FSB-200-TC | F937D |

Warranty Registration


**UK**
T: +44 (0) 1480 272279
E: uk.sales@antylia.com
W: coleparmer.co.uk

**Germany**
T: +49 (0) 9377 92030
E: de.sales@antylia.com
W: coleparmer.de

**France**
T: +33 (0) 1486 37800
E: fr.sales@antylia.com
W: coleparmer.fr

**Italy**
T: +39 (0) 284349215
E: it.sales@antylia.com
W: coleparmer.it

**India**
T: +9122 61394444
E: info@coleparmer.in
W: coleparmer.in

**China**
T: +1 847 549 7600
E: sales@antylia.com
W: coleparmer.com

**USA**
T: +1 847 549 7600
E: sales@antylia.com
W: coleparmer.com

**Canada**
T: +514 355 6100
E: info@antylia.ca
W: coleparmer.ca

**Other**
T: +1 847 549 7600


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essentials


**Antylia Scientific - UK**
Beacon Road,
Stone,
Staffordshire,
ST15 0SA,
United Kingdom