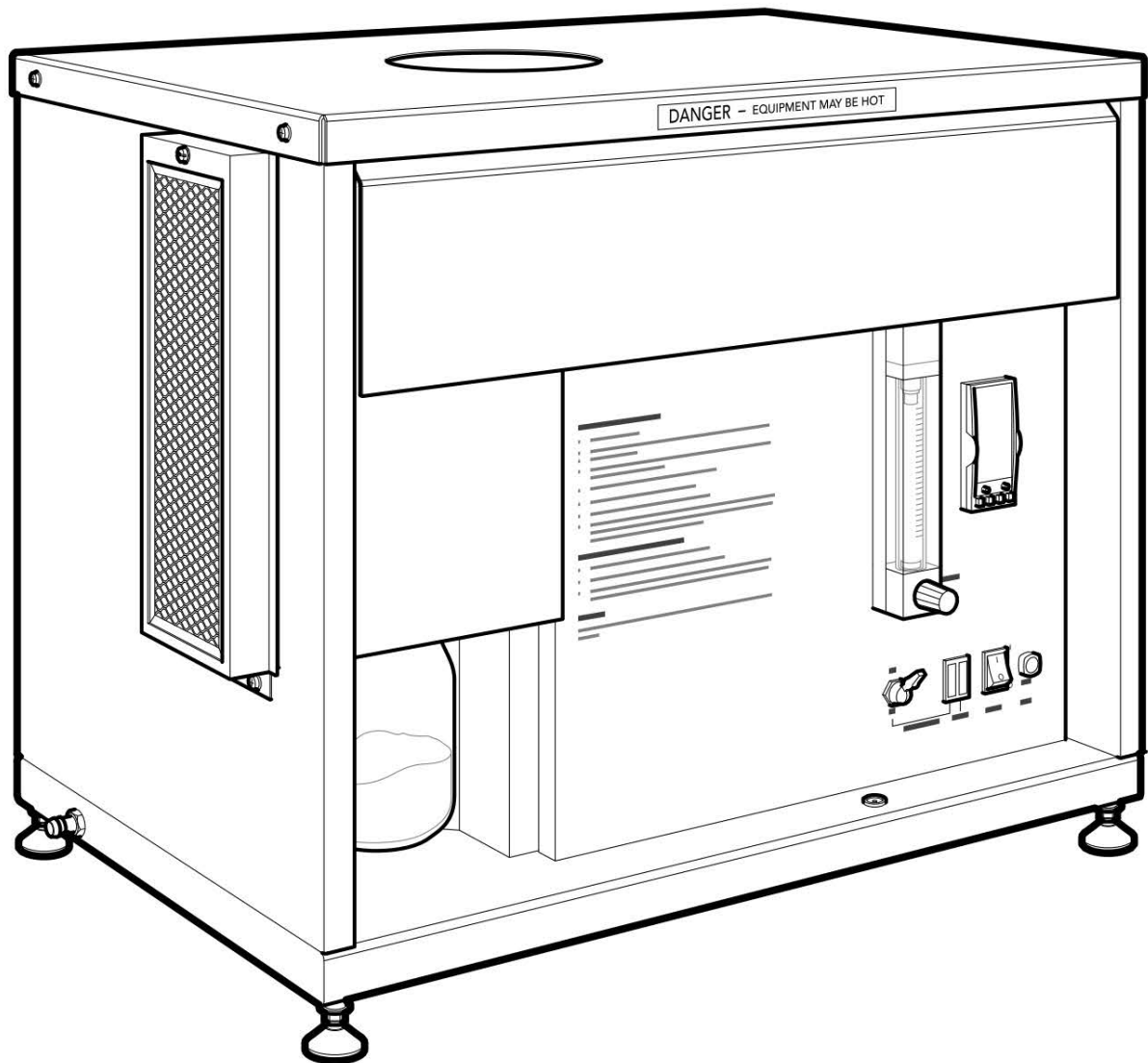


Cole-Parmer[®]

FSB-200 Series

Fluidized Sandbath



Instruction Manual
7002756-CPB Version 16.1

Cole-Parmer[®]
essentials

CONTENTS

IMPORTANT SUPPLEMENTARY SAFETY INFORMATION	4
GENERAL DESCRIPTION	5
Application	5
BEFORE USE	6
SAFETY AND INSTALLATION	7
English	7
Français	9
Deutsch	11
Español	13
Italia	15
WARNING	17
PRINCIPLE OF OPERATION AND SAFETY FEATURES	18
DESCRIPTION OF COMPONENTS AND FRONT PANEL CONTROLS	19
INSTALLATION	20
OPERATION	21
Start-Up	21
FSB-200-P sted flow rate table	22
Calibration of thermal sensors	22
Dead bed calibration	23
Shut-Down	23
OPERATOR MAINTENANCE	24
Emptying the dust collection jar	24
Cleaning the exhaust filter	24
Periodic maintenance	24
To drain the alumina fluidizing medium	25
FAULT FINDING	26
SERVICE, REPAIR AND TECHNICAL SUPPORT	27
TECHNICAL SPECIFICATION REPLACEMENT	28
PARTS	29
ACCESSORIES	29
DECLARATION OF CONFORMITY	31

IMPORTANT SUPPLEMENTARY SAFETY INFORMATION

Introduction

Cole-Parmer fluidized baths are safe and effective equipment when installed and operated correctly in accordance with the user manual. However, if used incorrectly they can pose a safety risk. Antylia Scientific have designed all models of fluidized baths to protect operators from hazards but users should pay attention to the following points.



Caution

1. Please read the Instruction Manual before installation and use.
2. Some Cole-Parmer fluidized 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 recommend regular cleaning of fluidized 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 fluidized baths used for polymer burn-off, please regularly inspect fluidizing medium, remove any foreign debris and replace with clean fluidizing medium as required.
5. Never top-up a hot fluidized bath with cold fluidizing medium. Always cool below 50°C first.

Please note:

1. Please ensure an adequate risk assessment is performed before use of a fluidized 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 fluidized bath.
3. fluidizing airflow must be switched on before heating a fluidized bath and left operational until the bath cools to below 50°C, unless performing dead-bed calibration function.
4. Do not overfill fluidizing media. When fluidized, the aluminum oxide level should be approximately 150mm (6") from the top surface of the bath at your maximum operating temperature.
5. In fluidized baths used for polymer burn-off, always remove excess polymer from sample.
6. In applications where materials being treated produce acidic vapors during thermal decomposition, it is recommended a fume scrubber is utilized 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 Cole-Parmer FSB-200-P employs the principle of fluidization of a mass of finely divided particles (alumina) to provide a safe, essentially isothermal environment with a high rate of heat transfer.

To achieve a state of fluidization, a gas stream is forced to pass vertically through the bed of fine powder; chromatographic alumina (a specially refined grade of aluminium oxide) is the fluidizing medium used in the FSB-200-P. At and above a certain critical value of flow rate, the particles become separated from each other and the whole mass behaves like a liquid. In this state the powder will flow and move as though it were a liquid; low density objects will float on it, while more dense ones will sink; more importantly though, the individual alumina particles will circulate within the bath giving an essentially uniform temperature distribution throughout the working volume of the bath and a high degree of thermal coupling between the heat source and load.

In addition, the mass of fluidized powder changes its basic characteristics very little over a wide temperature range, has no freezing point and no practical boiling point and therefore by suitable choice of fluidizing media, the principle of fluidization can be used to temperatures over 1700°C and below -120°C.

The most commonly used fluidizing gas is compressed air. It is important that it should be clean, dry, free from oil and at a constant pressure. Antylia Scientific can supply a filter/regulator assembly (part code F5915) for compressed air which does not comply with the above requirement. Antylia Scientific are alternatively able to offer a suitable free standing air compressor complete with the necessary filtration system (part code F120D) for installations where a compressed air supply is not available. Any other inert gas, such as nitrogen, could be used for special applications provided appropriate precautions are taken. The FSB-200-P specification applies only when compressed air is used.

APPLICATION

The characteristics of the FSB-200-P in terms of thermal uniformity and heat transfer make it a useful tool in the calibration and testing of a very wide range of temperature sensors; however, the unit is applicable to many other processes, such as thermal testing of sensitive components e.g. semiconductor devices, wire products, delicate transducers - and can be used as a constant temperature environment for chemical reactions.

Because the fluidized bed is composed of a fine dry powder, it does not display the surface tension effects of liquid baths and does not wet any objects immersed in it. The basic electrical insulating property of the alumina used in the FSB-200-P is not affected by fluidization, making it possible to conduct electrical measurements on immersed objects such as assembled printed circuit boards.

Note: Avoid siting the FSB-200-P in a laboratory environment which contains instruments that are sensitive to dust. Although the fluidized bath has its own dust extraction system, a small amount of fine dust may still be emitted during operation.

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

When unpacking the unit please ensure that the following have been removed from the packaging:

Part code	Item description
F949D	FSB-200-P fluidized bath
6007764	Probe plate
6007763	Probe plate holder
6003948	Drain extension tube
6007557/1	Spare dust collection jar
	Instruction manual
	Eurotherm controller instructions
	Warranty card

Please note that the aluminium oxide fluidising medium must be ordered separately:

Part code	Item description
White/AIO	Alumina - white aluminium oxide, 25kg.

The FSB-200-P requires 16kg of aluminium oxide.

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 AND INSTALLATION

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 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. If the equipment is used in a manner not specified by Antylia Scientific the protection provided by the equipment to the operator may be impaired.

All Cole-Parmer units have been designed to conform to international safety requirements and are fitted with an over-temperature cut-out. On some models, the cut-out is adjustable and should be set to suit the application. On all other models the cut-out is pre-set to protect the unit.

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

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
Live	Brown
Neutral	Blue
Earth	Green/yellow

Note: The FSB-200-P is classified as “Permanently Connected Equipment” and should be connected to the electricity supply by a qualified electrician.

A suitable supply for the FSB-200-P is rated at 3kW, 220-240V, 50/60Hz~ single phase.

The equipment is supplied with 2m of flexible, triple core, circular cable to the following specification: 2.5mm², 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 16A at 250V and overcurrent of 16A.

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

GUARANTEE

The unit is guaranteed against any defect in material or workmanship for the period specified on the enclosed guarantee card. This period is from the date of purchase, and within this period all defective parts will be replaced free of charge provided that the defect is not the result of misuse, accident or negligence. Servicing under this guarantee should be obtained from the supplier.

Notwithstanding the description and specification(s) of the units contained in the operator's manual, Antylia Scientific hereby reserves the right to make such changes as it sees fit to the units or to any component of the units.

This manual has been prepared solely for the convenience of Antylia Scientific customers and nothing in this instruction book shall be taken as a warranty, condition or representation concerning the description, merchantability, fitness for purpose or otherwise of the units or components.

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 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.Over-temperature cut-out

In the event of no heater power, check the mains plug and lead. Repeated operation of the cut-out indicates a serious fault: you may need to return the unit to your supplier for repair.

3.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.

SÉCURITÉ ET CONSIGNES D'INSTALLATION

Veuillez lire attentivement toutes les instructions de ce document avant d'utiliser l'appareil.

AVERTISSEMENT

DANGER DE TEMPERATURES ELEVEES: les opérateurs peuvent subir de graves brûlures et les matériaux combustibles risquent de prendre feu.

Antylia Scientific a apporté un soin tout particulier à la conception de ces appareils de façon à assurer une protection maximale des opérateurs, mais il est recommandé aux utilisateurs de porter une attention spéciale aux points suivants :



- UTILISEZ ET PORTEZ DES GANTS DE PROTECTION POUR PROTÉGER VOS MAINS ET DES LUNETTES DE SÉCURITÉ POUR PROTÉGER VOS YEUX.
- NE PAS poser d'objets chauds sur ou près de matériaux combustibles.
- NE PAS utiliser l'appareil à proximité de liquides ou de gaz inflammables.
- NE PAS verser de liquide directement dans l'appareil.
- FAIRE TOUJOURS PREUVE DE BON SENS.

SÉCURITÉ DE L'OPÉRATEUR

Tous les utilisateurs de produits Cole-Parmer doivent avoir pris connaissance des manuels et instructions nécessaires à la garantie de leur sécurité.

Important : cet appareil doit impérativement être manipulé par un personnel qualifié et utilisé selon les instructions données dans ce document, en accord avec les normes et procédures de sécurité générales. Dans le cas où cet appareil ne serait pas utilisé selon les consignes précisées par Cole-Parmer, la protection pour l'utilisateur ne serait alors plus garantie.

Tous les appareils Cole-Parmer sont conçus pour répondre aux normes de sécurité internationales et sont dotés d'un coupe-circuit en cas d'excès de température. Sur certains modèles, ce coupe-circuit est réglable pour s'adapter à l'application désirée. Sur d'autres modèles, il est pré-réglé en usine pour assurer la protection de l'appareil.

En cas de problèmes de sécurité, coupez l'alimentation secteur.

INSTALLATION



Avant de raccorder l'appareil à l'alimentation électrique sur secteur, vérifier la tension requise indiquée sur la plaque d'identification (située au dos de l'appareil). **Il est important que l'appareil soit relié à la terre pour assurer la protection électrique requise.**

Connexions 220V-240V

Phase	Marron
Neutre	Bleu
Terre	Vert/jaune

Remarque : le modèle FSB-200-P est classé en tant qu'« Équipement branché en permanence » et devraient être raccordés au réseau électrique par un électricien qualifié.

Une alimentation électrique adaptée au modèle FSB-200-P correspond à 3 kW, 220-240 V, 50/60 Hz~ monophasé.

L'équipement est doté d'un câble circulaire flexible à trois conducteurs, de 2 m de long, répondant aux spécifications suivantes : 2,5 mm², à BS 6500 ou équivalent et approuvé par <HAR> ou BASEC. La connexion au réseau électrique devrait être faite par le biais d'un disjoncteur à courant continu résiduel bipolaire de 30 mA, doté d'un système de protection de surintensité (RCBO), un disjoncteur isolant avec une capacité de transport de courant de 16 A à 250 V et surintensité de courant de 16 A.

Ne pas allumer avant que l'unité soit complètement installée.

CONDITIONS ENVIRONNEMENTALES

Cet appareil est conçu pour fonctionner dans les conditions suivantes:

- Pour un usage intérieur seulement
- Utilisation dans un lieu correctement ventilé
- Température ambiante +5°C à +40°C
- Altitude inférieure à 2000m
- Humidité relative ne dépassant pas 80%
- Fluctuations de l'alimentation n'excédant pas 10% de la valeur nominale
- Catégorie II IEC 60364-4-443 de surtension
- Degré de pollution 2 IEC664

GARANTIE

L'appareil est garanti contre tout défaut ou vice de fabrication pour la durée figurant sur la carte de garantie, à compter de la date d'achat de l'appareil. Au cours de cette période, toutes les pièces défectueuses seront remplacées gratuitement, dans la mesure où la défaillance n'est pas due à une mauvaise utilisation, un accident ou une négligence. Toute réparation sous garantie sera effectuée par le fournisseur.

Malgré la description et les spécifications de l'appareil données dans le manuel de l'utilisateur, Antylia Scientific se réserve le droit d'effectuer les changements nécessaires à l'appareil ou à tout élément qui entre dans sa composition.

Ce manuel a été exclusivement rédigé à l'attention des clients de Antylia Scientific, et aucun élément de ce guide d'instructions ne peut être utilisé comme garantie, condition ou représentation concernant la description, commercialisation, adaptation aux conditions d'utilisation ou autre des appareils ou leurs composants.

ENTRETIEN UTILISATEUR

IMPORTANT: CET APPAREIL NE PEUT ETRE DEMONTE QUE PAR DU PERSONNEL QUALIFIE.

LORSQUE LES PANNEAUX AVANT, ARRIERE ET LATERAUX SONT DEMONTES, L'OPERATEUR EST EXPOSE A DES TENSIONS QUI PEUVENT ETRE MORTELLES.

CET APPAREIL NE CONTIENT AUCUN ELEMENT QUI DEMANDE UN ENTRETIEN DE LA PART DE L'UTILISATEUR.

Dans le cas peu probable où votre appareil présente un défaut de fonctionnement auquel il est difficile de remédier, il est alors préférable de contacter votre fournisseur et, le cas échéant, de renvoyer le matériel. Veuillez inclure une description détaillée du problème constaté et retourner l'appareil dans son emballage d'origine. Antylia Scientific ne sera pas tenu responsable des dommages subis par tout appareil dont l'emballage est inadéquat pour le transport. Pour plus de sûreté, contactez votre fournisseur.

1. Nettoyage

Avant de nettoyer l'appareil, assurez-vous TOUJOURS que le câble d'alimentation est déconnecté et laissez la température redescendre en dessous de 50°C.

Utilisez un chiffon imprégné d'eau savonneuse pour nettoyer l'appareil. Veillez à ne pas introduire d'eau dans l'appareil. N'utilisez pas de produits abrasifs.

2. Coupe-circuit d'excès de température

- En l'absence de puissance de chauffe, vérifiez la prise et le câble d'alimentation puis réglez la commande du coupe-circuit (si votre appareil est doté de ce mécanisme).
- Si la sécurité se déclenche trop souvent, il s'agit d'un problème plus sérieux. Nous vous conseillons dans ce cas de prendre contact avec votre fournisseur pour réparation.

3. Fusibles

La protection de l'appareil est assurée par un ou deux fusibles dont le remplacement ne peut être effectué que par un personnel qualifié.

Si les fusibles sautent sans arrêt, il s'agit d'un problème sérieux. Nous vous conseillons dans ce cas de rendre contact avec votre fournisseur pour réparation.

SICHERHEITS - UND INSTALLATIONSINFORMATIONEN

Bitte lesen Sie diese Bedienungsanleitung komplett bevor Sie dieses Gerät benutzen.

WARNUNG

HOHE TEMPERATUREN SIND GEFÄHRLICH: sie können dem Bediener ernsthafte Verletzungen zufügen und brennbare Materialien können sich leicht entzünden.

Antylia Scientific hat bei der Konstruktion dieses Gerätes sehr darauf geachtet, daß der Bediener vor Gefahren geschützt ist. Dennoch sollten Sie auf die folgenden Punkte achten:



- TRAGEN SIE SCHUTZHANDSCHUHE ZUM SCHUTZ IHRER HÄNDE UND SETZEN SIE EINE AUGENSCHUTZBRILLE AUF.
- KEINE brennbaren Stoffe in der Nähe heißer Gegenstände verwenden.
- Das Gerät NICHT in der Nähe entzündlicher Flüssigkeiten oder Gase betreiben.
- Flüssigkeiten NICHT direkt auf das Gerät auftragen.
- Benutzen Sie immer den normalen Menschenverstand.

SICHERHEIT DES ANWENDERS

Alle Benutzer von Cole-Parmer Geräten müssen Zugang zu der entsprechenden Literatur haben, um ihre Sicherheit zu gewähren.

Es ist wichtig, daß diese Geräte nur von entsprechend geschultem Personal betrieben werden, das die in dieser Gebrauchsanweisung enthaltenen Maßnahmen und allgemeine Sicherheitsbestimmungen und -vorkehrungen beachtet. Wenn das Gerät anders eingesetzt wird als vom Hersteller empfohlen, kann dies die persönliche Sicherheit des Anwenders beeinträchtigen. Die Geräte von Cole-Parmer entsprechen den internationalen Sicherheitsbestimmungen und sind mit einem automatischen Übertemperaturabschalter ausgestattet. Bei einigen Modellen ist der Übertemperaturabschalter verstellbar und sollte je nach Anwendung entsprechend eingestellt werden. Bei allen anderen Modellen ist der Temperaturschutz voreingestellt um Schäden am Gerät zu vermeiden.

Sollte ein Sicherheitsproblem auftreten, schalten Sie die Hauptstromversorgung aus.

INSTALLATION



Vor dem Anschluss bitte kontrollieren, ob die Stromversorgung den Angaben auf dem Typenschild (auf der Geräterückseite) entspricht. **Um die elektrische Sicherheit zu gewährleisten, muss dieses Gerät geerdet werden.**

Anschluss	220V-240V
Phase	Braun
Neutral	Blau
Erde	Grün/Gelb

Hinweis: FSB-200-P wird als bezeichnet „Permanent angeschlossene Geräte“ eingestuft und sollten von einem qualifizierten Elektriker an den Stromanschluss angeschlossen werden.

Die geeignete Stromversorgung für das Gerät FSB-200-P beträgt 3kW, 220-240V, 50/60Hz~, einphasig.

Das Gerät wird mit einem 2 m langen flexiblen, dreidadrigen Rundkabel mit folgenden Spezifikationen betrieben: 2,5 mm², BS 6500 oder gleichwertig und <HAR>- oder BASEC-zertifiziert. Der Anschluss an das Stromnetz sollte über einen doppelpoligen 30 mA Fehlerstrom-Schutzschalter mit Überstromauslöser (RCBO) und einen Trennschalter mit einer kontinuierlichen Strombelastbarkeit von 16 A bei 250 V und Überstrom von 16 A erfolgen.

Schalten Sie das Gerät erst ein, wenn das Gerät vollständig installiert ist.

UMWELTBEDINGUNGEN

Dieses Gerät ist für den Betrieb unter folgenden Bedingungen ausgelegt:

- Nur für den Betrieb in Innenräumen
- Betrieb in gut belüfteten Räumen
- Umgebungstemperaturbereich: +5°C bis +40°C
- Höhenlagen bis 2000 m
- Relative Luftfeuchtigkeit maximal 80 %
- Schwankungen in der Stromversorgung maximal 10 %
- Überspannungskategorie II IEC60364-4-443
- Verschmutzungsgrad 2 IEC664

GARANTIE

Die Garantiedauer des Gerätes ist auf der beiliegenden Garantiekarte angegeben und schließt Fehler im Material oder der Verarbeitung ein. Die Garantiedauer beginnt am Tag des Einkaufs. Sämtliche defekte Teile werden innerhalb dieses Zeitraumes kostenlos ersetzt unter der Voraussetzung, daß dem Defekt keine unsachgemäße Handhabung, Fahrlässigkeit oder ein Unfall zugrundeliegt. Der unter diese Garantie fallend Service wird vom Lieferanten geleistet.

Ungeachtet der in dieser Gebrauchsanweisung enthaltenen Beschreibungen und Spezifikationen, behält sich Antylia Scientific hiermit das Recht vor, Änderungen an den Geräten bzw. an einzelnen Geräteteilen durchzuführen.

Diese Gebrauchsanleitung wurde ausschließlich dazu erstellt, um Kunden die Handhabung der Cole-Parmer-Geräte zu erleichtern. Nichts in dieser Gebrauchsanleitung darf als Garantie, Bedingung oder Voraussetzung verstanden werden, sei es die Beschreibung, Marktgängigkeit, Zweckdienlichkeit oder sonstiges bezüglich der Geräte oder deren Bestandteile.

WARTUNG DURCH DEN BEDIENER

BEACHTEN SIE, DASS DIESES GERÄT NUR VON TECHNISCHEN FACHKRÄFTEN GEÖFFNET UND DEMONTIERT WERDEN DARF.

DURCH ENTFERNEN DES GERÄUSES ODER GEHÄUSETEILEN SIND BAUTEILE MIT LEBENGEFÄHRLICHEN SPANNUNGEN FREI ZUGÄNLICH.

IM INNERN DES GERÄTES BEFINDEN SICH KEINE TEILE, DIE VOM ANWENDER GEWARTET WERDEN MÜSSEN.

Falls Ihr Gerät nicht ordnungsgemäß arbeitet, wenden Sie sich an Ihren Lieferanten oder senden Sie das Gerät wenn nötig zurück. Fügen Sie eine genaue Beschreibung des Defektes bei. Verpacken Sie das Gerät möglichst im Originalkarton. Bitte beachten Sie, daß Antylia Scientific und thermo-DUX keine Haftung bei Transportschäden aufgrund unzureichender Verpackung übernehmen. Setzen Sie sich im Zweifelsfall mit Ihrem Lieferanten in Verbindung.

1.Reinigen

Bevor Sie Ihr Gerät reinigen, sollten Sie

- zuerst den Netzstecker ziehen
- das Gerät unter 50°C abkühlen lassen.

Ein feuchtes Tuch mit Seifenlösung reinigt Ihr Gerät am besten. Achten Sie darauf, daß kein Wasser in das Gerät gelangt. Verwenden Sie keine Scheuermittel.

2.Übertemperaturabschalter

- Der Übertemperaturschutz ist ein empfindliches mechanisches Teil. Schon eine Erschütterung kann diesenauslösen.
- Falls die Heizung nicht funktioniert, überprüfen Sie zuerst Netzstecker und Kabel. Setzen Sie dann denÜbertemperaturabschalter (an der Rückseite des Gerätes) wieder zurück, indem Sie den roten Knopf einmalbis zum Anschlag drücken.
- Wenn der Übertemperaturabschalter wiederholt auslöst, liegt ein größerer Defekt vor. Das Gerät mußzur Reparatur an Ihren Lieferanten eingeschandt werden.

3.Sicherungen

Die Stromzuleitung ist durch ein oder zwei Sicherungen geschützt. Diese sollten nur durch qualifiziertes Fachpersonal ausgetauscht werden. Wenn die Sicherung wiederholt durchbrennt, liegt ein größerer Defekt vor. Das Gerät muß zur Reparatur an Ihren Lieferanten eingeschandt werden.

INFORMACIÓN DE SEGURIDAD E INSTALACIÓN

Le rogamos lea cuidadosamente la información contenida en este folleto antes de manipular el aparato.

AVISO

LAS TEMPERATURAS ELEVADAS SON PELIGROSAS: pueden causarle graves quemaduras y provocar fuego en materiales combustibles.

Antylia Scientific ha puesto gran cuidado en el diseño de estos aparatos para proteger al usuario de cualquier peligro; aún así se deberá prestar atención a los siguientes puntos:



- UTILIZAR CON PRECAUCIÓN Y CON GUANTES PROTECTORES PARA PROTEGER LAS MANOS Y GAFAS DE SEGURIDAD PARA PROTEGER LOS OJOS.
- NO coloque objetos calientes encima o cerca de objetos combustibles;
- NO maneje el aparato cerca de líquidos inflamables o gases;
- NO introduzca ningún líquido directamente en el aparato;
- UTILICE EL SENTIDO COMUN en todo momento.

SEGURIDAD DEL USUARIO

Todos los usuarios de equipos Cole-Parmer deben disponer de la información necesaria para asegurar su seguridad.

De acuerdo con las instrucciones contenidas en este manual y con las normas y procedimientos generales de seguridad, es muy importante que sólo personal debidamente capacitado opere estos aparatos. De no ser así, la protección que el equipo le proporciona al usuario puede verse reducida.

Todos los equipos Cole-Parmer han sido diseñados para cumplir con los requisitos internacionales de seguridad y traen incorporados un sistema de desconexión en caso de sobretemperatura. En algunos modelos el sistema de desconexión es variable, lo que le permite elegir la temperatura según sus necesidades. En otros, el sistema de desconexión viene ya ajustado para evitar daños en el equipo.

Si encuentra un problema de seguridad, desconecte el dispositivo de la red eléctrica.

INSTALACIÓN



Antes de conectar el instrumento al suministro eléctrico, compruebe que el voltaje coincida con el indicado en la placa de régimen (situada en la parte trasera de la unidad). **El instrumento debe disponer de una toma de tierra para garantizar la seguridad eléctrica adecuada.**

Conexión	220V-240V
Con corriente	Marrón
Neutro	Azul
Toma de tierra	Verde/amarillo

Nota: La FSB-200-P tiene la clasificación de "Equipo Permanentemente Conectado" y deben ser conectados a la red eléctrica por un electricista cualificado.

Un suministro apto para el FSB-200-P tiene una calificación de 3 kW, 220-240 V, 50/60 Hz~ monofase.

El equipo cuenta con un cable circular flexible de triple núcleo de 2 m con la siguiente especificación: 2,5 mm², conforme a BS 6500 o equivalente y <HAR> o aprobado por el BASEC. La conexión a la red eléctrica debe ser a través de un disyuntor por corriente diferencial con protección de sobrevoltaje (RCBO) doble polo de 30 mA con una capacidad de conducción de corriente continua de 16 A a 250 V y sobrevoltaje de 16 A.

No conectar hasta que la unidad esté totalmente instalada.

CONDICIONES AMBIENTALES

Este equipo se ha diseñado para funcionar en las condiciones siguientes:

- Sólo para uso en interior
- Se debe utilizar en un área bien ventilada
- Rango de temperatura ambiente: de +5°C a +40°C
- Altitud: hasta 2000 m
- Humedad relativa: inferior al 80%
- Fluctuación de la alimentación eléctrica: inferior al 10%
- Categoría de sobretensión II: según IEC 60364-4-443
- Grado de contaminación: 2 IEC664

GARANTÍA

Este aparato está garantizado contra cualquier defecto material o de fabricación durante el periodo especificado en la tarjeta de garantía adjunta. Este plazo inicia a partir de la fecha de compra, y dentro de este periodo todas las piezas defectuosas serán reemplazadas gratuitamente siempre que el defecto no sea resultado de un uso incorrecto, accidente o negligencia. Mientras se encuentre bajo garantía las revisiones las debe llevar a cabo el proveedor.

A pesar de la descripción y las especificaciones de los aparatos contenidas en el Manual del Usuario, Antylia Scientific se reserva por medio de este documento el derecho a efectuar los cambios que estime oportunos tanto en los aparatos como en cualquier componente de los mismos.

Este manual ha sido preparado exclusivamente para los clientes de Antylia Scientific y nada de lo especificado en este folleto de instrucciones se tomará como una garantía, condición o aseveración de la descripción, comerciabilidad o adecuación para cualquier fin específico de los aparatos o sus componentes.

MANTENIMIENTO

ESTE APARATO DEBE SER DESMONTADO SOLO Y EXCLUSIVAMENTE POR PERSONAL DEBIDAMENTE CAPACITADO.

EL RETIRAR LOS PANELES LATERALES, FRONTALES O TRASEROS SUPONE DEJAR AL DESCUBIERTO TENSION DE LA RED PELIGROSA.

EL EQUIPO NO CONSTA DE NINGUNA PIEZA DE CUYO MANTENIMIENTO SE PUEDA ENCARGAR EL USUARIO.

En el caso improbable de que experimentara algún problema con su aparato que no pudiera resolver con facilidad, debería ponerse en contacto con su proveedor y devolverlo si fuera necesario. Indique de forma detallada todos los defectos que haya notado y devuelva el equipo en su embalaje original. Antylia Scientific no aceptará responsabilidad alguna por daños causados en equipos que no estuvieran debidamente embalados para su envío; si tuviera alguna duda, póngase en contacto con su proveedor.

1.Limpieza

Antes de limpiar su aparato, desconctelo SIEMPRE de la fuente de alimentación y permita que se enfríe por debajo de los 50°C.

Este aparato se puede limpiar pasándole un paño húmedo enjabonado. Hágalo con cuidado para evitar que caiga agua dentro del mismo. No utilice limpiadores abrasivos.

2.Desconexión en caso de sobretemperaturas

El sistema de desconexión en caso de sobretemperaturas es un dispositivo mecánico sensible (una sacudida mecánica podría desconectarlo).

- Si el calefactor no recibiera alimentación, compruebe el enchufe y el cable de la toma de corriente; al continuación vuelva a ajustar el control del dispositivo (si su equipo lo lleva montado).
- Una desconexión repetida indicaría una avería grave; puede que tenga que devolverle el aparato a su proveedor para su reparación.

3.Fusibles

Su aparato está protegido por uno o dos fusibles. Sólo deben cambiarlos personal debidamente capacitado. Si los fusibles se fundieran repetidamente, esto indicaría una avería grave y puede que tuviera que devolverle el aparato a su proveedor para su reparación.

INFORMAZIONI SULLA SICUREZZA E L'INSTALLAZIONE

Prima di utilizzare l'apparecchio, leggere tutte le informazioni contenute in questo manuale.

ATTENZIONE

Le alte temperature sono pericolose: possono causare ustioni gravi all'utilizzatore e possono causare la combustione di materiale infiammabile. La Antylia Scientific ha posto particolare cura nel progettare questo strumento, al fine di proteggere gli operatori da eventuali pericoli, ma gli utilizzatori devono prestare attenzione ai seguenti punti:



- USARE CON PRUDENZA E INDOSSARE GUANTI PROTETTIVI PER PROTEGGERE LE MANI E OCCHIALI DI SICUREZZA PER PROTEGGERE GLI OCCHI.
- NON usare sostanze combustibili vicino ad oggetti caldi
- NON mettere in funzione lo strumento nei pressi di liquidi o gas infiammabili
- NON collocare alcun tipo di liquido direttamente nello strumento.
- In ogni caso Usare Buon Senso.

SICUREZZA PER L'UTILIZZATORE

Il personale che utilizza l'apparecchiatura Cole-Parmer deve avere a disposizione la documentazione necessaria al fine di assicurare la loro incolumità.

Importante che solo personale adeguatamente addestrato utilizzi questo apparecchio, in conformità alle istruzioni contenute in questo manuale e nel rispetto delle normative e procedure generali di sicurezza. Se l'apparecchio è utilizzato in modo non specificato da Antylia Scientific, la protezione fornita dall'apparecchiatura all'utilizzatore potrebbe essere a rischio.

Tutte le unità Cole-Parmer sono state progettate in conformità ai requisiti internazionali di sicurezza e sono equipaggiate con un interruttore anti surriscaldamento. Su alcuni modelli, l'interruttore è regolabile e dovrebbe essere impostato secondo l'utilizzo. In tutti gli altri modelli l'interruttore è prerogolato per proteggere l'unità.

Se si dovesse verificare un problema di sicurezza, spegnere l'alimentazione generale.

INSTALLAZIONE



Prima di collegare lo strumento all'alimentazione elettrica di rete, controllare la tensione confrontandola con la targhetta riportante i valori nominali (si trova sul retro dell'unità).

Notare che al fine di garantire la corretta sicurezza elettrica, occorre che l'unità sia messa a terra.

Connessione 220V-240V

Sotto tensione Marrone

Neutro Blu

Terra Verde/giallo

Attenzione: FSB-200-P è classificato come "Apparecchiature Collegate Permanentemente" e dovrebbero essere collegati all'impianto elettrico da un elettricista qualificato.

L'alimentazione adeguata per l'FB-08 indicata come monofase a 3kW, 220-240V, 50/60Hz~.

L'attrezzatura viene fornita con 2 m di cavo flessibile, tripolare e a sezione circolare, secondo le seguenti specifiche: 2,5mm², conforme a BS 6500 o equivalenti e approvato da <HAR> o BASEC. Il collegamento all'alimentazione generale dovrebbe essere effettuato tramite un interruttore differenziale bipolare da 30mA con sganciatore di sovracorrente isolante (RCBO) con capacità di trasporto di corrente continua di 16A a 250V e sovracorrente di 16A.

Non accendere fino a quando l'unità non sia stata completamente installata.

ENVIRONMENTAL CONDITIONS

Condizioni di esercizio previste:

- Solo per uso in ambienti chiusi
- Usare in ambienti ben ventilati
- Temperatura ambiente da +5°C a +40°C
- Altitudine fino a 2000 m
- Umidità relativa non superiore all'80%
- Oscillazione dell'alimentazione elettrica non superiore al 10%
- Categoria di sovratensione II IEC60364-4-443
- Grado di inquinamento 2 IEC664

GARANZIA

L'apparecchio è garantito contro ogni difetto del materiale o fabbricazione per il periodo specificato sul certificato di garanzia accluso. Questo periodo decorre dalla data di acquisto, e durante il quale tutte le parti difettose verranno sostituite gratuitamente purché il difetto non sia causato da un uso non appropriato, da cause non imputabili a difetti di fabbricazione o negligenza. L'assistenza durante questo periodo sarà garantita dal fornitore.

Ferme restando la descrizione e le caratteristiche dell'apparecchio contenute nel Manuale d'uso dell'utilizzatore, la Antylia Scientific si riserva in ogni caso il diritto di effettuare le modifiche che riterrà necessarie all'apparecchio o ai suoi componenti.

Questo Manuale è stato realizzato esclusivamente a vantaggio dei clienti della Antylia Scientific e in alcun modo potrà essere utilizzato come garanzia, condizione o rappresentazione concernente la descrizione, commercializzazione, adeguamento alle condizioni di utilizzo o altro degli apparecchi o delle sue componenti.

MANUTENZIONE

QUESTO APPARECCHIO DOVRÀ ESSERE APERTO ESCLUSIVAMENTE DA PERSONALE ADEGUATAMENTE ADDESTRATO.

LA RIMOZIONE DEI PANNELLI LATERALI, FRONTALI O POSTERIORI PUÒ ESPORRE POTENZIALMENTE A VOLTAGGI DI CORRENTE LETALI.

ALL'INTERNO DELL'APPARECCHIO NON CI SONO PARTI MANUTENIBILI DA PARTE DELL'UTILIZZATORE.

Nell'eventualità che si riscontri un problema con l'apparecchio che non può essere facilmente risolto, si dovrà contattare il proprio fornitore e restituire, se necessario, l'apparecchio. Si prega di specificare nel dettaglio i difetti riscontrati e di ricordare di restituire l'apparecchio nel suo involucro originale. La Antylia Scientific non si fa carico di alcuna responsabilità per danni subiti dall'apparecchio che non sia stato propriamente imballato per il trasporto; in caso di dubbio, rivolgersi al fornitore.

1.Pulizia

Prima di pulire il vostro apparecchio, disconnettere sempre la presa di alimentazione e lasciare raffreddare sotto i 50°C. Questo apparecchio può essere pulito passando un panno inumidito con sapone. Si deve prestare attenzione onde prevenire l'ingresso dell'acqua all'interno dell'apparecchio. Non utilizzare per la pulizia sostanze abrasive.

2.Disconnessione in caso di surriscaldamento

In caso di non funzionamento dell'apparecchio, controllare la spina elettrica e il relativo cavo collegati alla rete. Ripetute interruzioni del funzionamento dell'apparecchio indicano un serio malfunzionamento: in questo caso restituire l'apparecchio al fornitore per la riparazione.

3.Fusibili

L'apparecchio è protetto da uno o due fusibili. Questi dovrebbero essere sostituiti solo da personale qualificato. Se i fusibili si bruciano frequentemente ciò indica un malfunzionamento serio e in questo caso si consiglia di contattare il fornitore per le riparazioni.

WARNING



Poor fluidization causes hot spots, heater failure and damage to other parts. Follow this Instruction Manual carefully. For correct fluidization, pay attention to the following:

INSTALLATION

- Ensure the bath is level and air supply is adequate.

OPERATION

- Adjust air valve for even fluidization.
- Do not insert objects larger than recommended.
- Ensure objects do not lie in contact with container wall or porous plate. Sample buckets and probe holders are available.

MAINTENANCE

- Regularly inspect and maintain the air filter to eliminate oil vapour in the air supply.

ALUMINA

- Before handling the alumina, consult the MSDS for safe handling. Contact cptechsupport@antylia.com if you require a copy.
- The principle risk is related to the concentration of dust in the air acting as a nuisance dust.
- Alumina is non-hazardous but dust may irritate the eyes and the respiratory system and cause skin irritation.
- Provide appropriate exhaust ventilation at places where dust is formed.
- For storage: protect from moisture. Avoid dust formation. Keep container tightly closed. Store in a well-ventilated place. Guard against dust accumulation of this material.
- Wear correct PPE whilst handling the Alumina material. Wear safety glasses with side shields, appropriate chemical resistant gloves and suitable protective clothing.
- Should the fluidized bath be stored for a long period under damp or humid conditions, moisture may be absorbed by the alumina which is hygroscopic. To avoid violent fluidization which occurs when damp alumina is heated above 100°C, operate the bath for a period of approximately 8 hours at 90°C prior to operation at elevated temperatures.
- NEVER ADD COLD OR DAMP ALUMINA TO A HOT BATH AS THIS WILL ALSO CAUSE VIOLENT fluidization WHICH CAN BE DANGEROUS. Allow the bath to cool then add the fresh alumina. If this fresh alumina is a large portion of the charge, then dry the whole charge as above.

FUME EXTRACTION

- When used for processing items which may emit toxic or inflammable fumes, it is essential that an adequate fume extraction system be installed. The extraction system must be correctly sized to ensure that any toxic fumes are removed from the working environment. To eliminate the risk of spontaneous ignition, the concentration of inflammable fumes above the bath and within the exhaust duct work must be kept below the lower explosive limit.

PRINCIPLE OF OPERATION

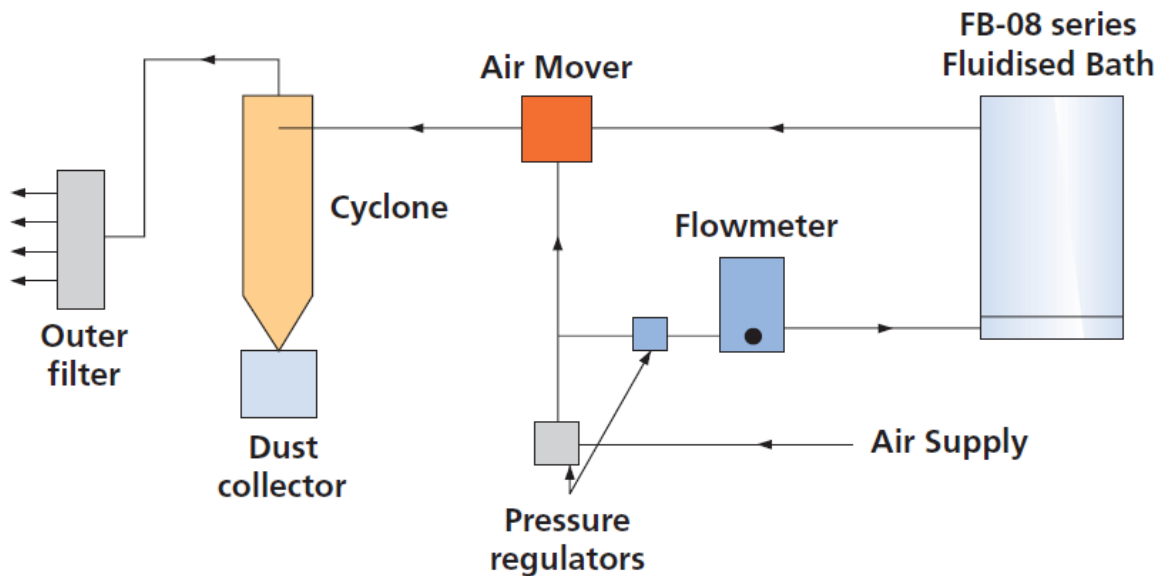


Figure 1: Schematic of the FSB-200-P

Controls for temperature and fluidizing air flow are mounted on a recessed panel on the front of the unit together with on-off switches for the power supply and the dust extraction system. The inner container is well insulated and the outer case is vented so that it remains safe and cool to the touch even when the bath is operating at its maximum temperature. The inner container is filled from the top with alumina. When fluidized, the alumina is heated by the four immersion heaters close to the inner container outer wall with the control thermocouple giving excellent temperature control.

The heater elements are protected from excessive surface temperatures by a pressure switch operated by the fluidized air and the power supply is removed if the air supply to the unit is disrupted. The unit also has an over-temperature cut-out fitted to protect the heater element in the event of an over temperature fault (limit set to 730°C).

Air supplied to the unit passes through two filters to remove oil and moisture from the system. A pressure regulator is also fitted to set the correct pressure for the cyclone extraction system and for optimum fluidization.

The fluidized air passes through a flow meter then to a plenum chamber fitted under the fluidized bath which evenly distributes the fluidized air evenly across the bath inner chamber.

Dust extraction is carried out by ambient air being drawn down (venturi effect) past the probe plate and through a peripheral slot around the top edge of the inner container. The air then passes through a cyclone to separate and remove any alumina particles which are collected in a glass collection jar and then passes through the exhaust filter.

Entrained alumina removed by the cyclone and collected in the collection jar, which is accessible from the front of the unit, can be re-used and simply emptied back into the bath.

DESCRIPTION OF COMPONENTS AND FRONT PANEL CONTROL



Figure 2: FSB-200-P components and controls

Item	Description	Function
1	bath chamber	Heated chamber containing the fluidised alumina.
2	Exhaust filter unit	Collects remaining alumina from air passing through the cyclone.
3	Dust collection jar (6007557/1)	Collects entrained alumina removed by the cyclone.
4	Operating instructions	Quick operating guide.
5	Flow meter	A float indicates the fluidisation air pressure set by the control valve. The flow rate indicated by the float in the tube is on a scale of 2-25 litres/min.
6	Air flow valve	The control valve at the bottom of the flowmeter controls the amount of air for fluidising the bed.
7	Eurotherm 3208 temperature controller	When the mains switch is set to the ON position the indicator panel will display the measured and set temperature in digital form. The control parameters have been factory pre-set.
8	Air extraction switch	Turns the dust extraction system on and off. The extraction system should be used whenever the bath is running.
9	Air extraction indicator	Lights green when the dust extraction system is working.
10	Heater indicator	Lights amber when the heaters are on. Heaters are interlocked so that they will only turn on when fluidising air is also on and exceeds a factory pre-set value.
11	Main power On/Off switch	Controls the mains input to the unit.
12	Fuse (6106042)	The unit is fitted with a 16A fast blow fuse
13	Spirit level	Used to ensure the unit is level.
14	Adjustable feet (x 4)	Adjustable to ensure the unit is level.
15	Compressed air inlet	The air supply should be connected via suitable flexible hose.

INSTALLATION

Avoid siting the FSB-200-P in a laboratory environment which contains instruments that are sensitive to dust. Although the fluidized bath has its own dust extraction system, a small amount of fine dust may still be emitted during operation.

Numbers in the text refer to Figure 2.

POWER

The FSB-200-P requires a power supply of 230V, 50/60Hz at 3kW; please see section ELECTRICAL INSTALLATION.

AIR

The FSB-200-P is supplied with integral filters and regulators suitable for a normal clean dry air line supply between 60 and 125 psi (414 to 862 kPa). If the air supply is excessively dirty Antylia Scientific can supply an additional external filter/regulator assembly which, if used, must be adjusted to its maximum setting of 60 psi (414 kPa). The air supply should be connected via suitable flexible hose to the compressed air inlet (15) at the rear of the left-hand end of the bath.

MECHANICAL

The unit should be mounted on a firm level surface. Normal operation only requires access to the front of the units but periodic maintenance and servicing requires access to the left-hand side also; this should be borne in mind when positioning the unit initially. A spirit level (13) is built into the frame at the base of the front panel; this should be accurately leveled by adjusting the four corner feet (14). After final adjustment, all four feet should be firmly grounded and the unit should be level. Failure to do this can impair the operation of the unit. The surface should also be heat resistant.

ALUMINA

Turn on the dust extraction system (8) during filling to minimize the amount of dust given off. Fill the bath chamber (1) with sufficient of the alumina so that it is approximately 200mm (8") below the top cover of the unit before it is fluidized. Note that the alumina does exhibit expansion with fluidization and heat so you will need to verify the level at your maximum operating temperature. When fluidized, the alumina level should be approximately 150mm (6") from the top surface of the bath at your maximum operating temperature. As shown in Figure 3, the alumina is at the correct level when you just see the tops of the heaters.



Figure 3: fluidized alumina at the correct operating level

When correctly fluidized, the surface of the alumina should be flowing with the motion like violently boiling cream.

Full fluidization is far from instantaneous and it takes several minutes to develop from a single vigorous 'plume' to a more distributed series of plumes and the level slowly rises even after the multiple plumes have formed.

OPERATION

The FSB-200-P fluidized Bath is capable of precise performance, but for reliable and consistent results it must be used by personnel conversant with its operation.

For temperature stability, the heat input to the bath must exactly equal heat losses; the heat input from the immersed heaters is varied by the controller which has a characteristic time constant for its response to a change in demand. The heat losses from the bath are due to:

1. heating fluidising air
2. radiation from the top of the bath
3. conduction through the insulation
4. conduction along loads inserted into the bath
5. heating the mass of cold objects placed in the bath.

Changing any of these will affect the temperature of the bath, but it will recover under the controller's influence; this does mean, however, that after any parameter is changed or the load in the bath is changed, there is a delay before the bath temperature re-stabilises.

START-UP

1. Check that the unit has been set up as described earlier and that required services are available.
2. Check that alumina level is correct and adjust if necessary. Never add new, cold alumina (which may contain moisture) to a hot bath. Should the fluidized bath be stored for long periods of time under damp or humid conditions, moisture may be absorbed by the alumina which is hygroscopic. To avoid violent fluidization which occurs when damp alumina is heated above 100°C, operate the bath for a period of approximately 8 hours at 90°C prior to operation at elevated temperatures.
3. Check that the flow meter control valve (6) is closed and the air extraction switch (8) is off.
4. Connect the bath to the electrical and compressed air supplies.
5. Turn on the mains power switch (11). The internal neon should illuminate.
6. Turn on the dust extraction system switch (8); the green air extraction indicator lamp should illuminate.
7. Open the fluidising air control valve (6) until the surface of the alumina rises and then starts to move with a gentle flowing action, like boiling cream. The amber heater light should illuminate as should the controller when the fluidising air exceeds a pre-set pressure.
8. Set the desired operating temperature on the controller (7). To alter the set point, depress the respective UP/DOWN button and after a delay of two seconds the set point will change in the required direction. The control parameters have been factory pre-set. For comprehensive detailed information about the 3208 controller, refer to the operator's manual.
9. As the bath heats up, the indicated air flow for adequate fluidization can be reduced - excess fluidizing air does not improve performance, but does increase the risk of dust emission from the bath. See the flow rate table below as a guide.
10. When the bath is at operating temperature, the controls should not be adjusted without good cause.

FSB-200-P SUGGESTED FLOW RATE TABLE

Set the fluidizing air flow via the front panel flow meter according to the following table. These values will give good performance and should be used as a starting point. Optimum flow rates can be obtained by performing a thermal analysis and profile at your operating temperature. You should use the lowest flow rate possible that gives acceptable results.

Temperature (°C)	Temperature (°F)	Flow rate (litres/min)
25	77	23.0
50	122	22.0
75	167	21.5
100	212	20.5
125	257	20.0
150	302	18.5
175	347	18.0
200	392	17.0
225	437	16.5
250	482	15.5
280	536	15.0
310	590	14.0
340	644	13.5
370	698	11.5
430	806	11.0
490	914	10.0
550	1022	9.5
610	1130	8.5
670	1238	8.0

CALIBRATION OF THERMAL SENSORS

When using the FSB-200-P to calibrate thermal sensors such as thermocouples and platinum resistance thermometers, it is important to ensure that the working volume of the bath is thermally stable. Use an independent temperature sensor, such as a reference thermocouple, to check the temperature uniformity and stability. See section TECHNICAL SPECIFICATION.

The temperature stability of the fluidized bath at any operating temperature may be improved by tuning the control parameters of the temperature controller to match the performance of the system under any set conditions. Adjustment details are contained within the manufacturers instruction manual for the Eurotherm temperature controller.

For precise calibration, the actual temperature of the fluidized bath should be measured with an independent calibrated reference sensor; the temperature indicated by the temperature controller should only be used as a guide and not as an indication of absolute temperature.

The number of sensors calibrated in the fluidized bath at any one time should be kept to a minimum so as not to disturb the flow pattern within the bath. Typically, up to 10 sensors of approximately Ø10mm may be calibrated without loss of performance.

The probe plate supplied with the FSB-200-P may be machined to allow the sensors being calibrated access to the bath. This probe plate should always be positioned above the surface of the bath in the probe plate carrier to inhibit the loss of fine alumina particles from the surface of the bath. See Figure 4. Accessory probe holders with integral dust extraction systems are also available. Probe holders locate the sensors being calibrated at a known position within the bath and act as equalizing blocks so that the basic isothermal properties of the fluidized bath are further enhanced. See section ACCESSORIES.

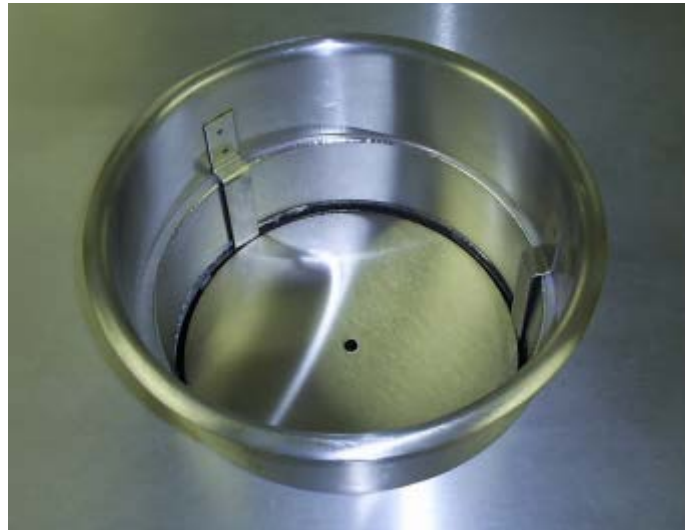


Figure 4: Probe plate with probe plate carrier

Antylia Scientific can also offer a work basket (F7759) which ensures that probes or other items being processed are held within the working volume of the bath.

DEAD BED CALIBRATION

Temperature stability during calibration may be further improved by using a dead bed calibration technique. This technique involves heating the bath to the required calibration point, then allowing the temperature of the bath to stabilize for a period of approximately 20 minutes, dependent upon the actual calibration temperature and the thermal mass of the sensors being calibrated.

The fluidized bed is collapsed by cutting off the fluidizing air to the FSB-200-P so that the sensors being calibrated are surrounded by a solid bed of alumina which acts as a thermal insulator. After a period of approximately 2 minutes at set temperature, a stability of 0.01°C can be achieved for a further period of approximately 8 minutes, dependent upon heat loss along the stem of the sensors being calibrated.

At the end of the required period of dead bed it is necessary to reconnect the fluidizing air to the FSB-200-P.

SHUT DOWN

Before shut down, ramp down the bath temperature to 100-200°C before removing the air supply and power.

1. Turn off the mains power switch (11).
2. Close the air flow valve (6).
3. Turn off the dust extraction system (8).
4. Disconnect the compressed air supply.
5. Disconnect the mains power.

OPERATOR MAINTENANCE

Before any servicing is attempted the unit should be disconnected from the mains power supply and allowed to cool down. In all cases maintenance and repair work should be undertaken only by a skilled technician. Untrained personnel should not attempt to dismantle the instrument.

EMPTYING THE DUST COLLECTION JAR

Empty the dust collection jar as follows (this can be done whilst bath is hot):

1. Turn off the fluidization air.
2. Turn off the dust extraction system.
3. Unscrew the jar from the base of the cyclone unit and remove.
4. Screw on the empty spare jar.
5. Turn on the dust extraction system.
6. Turn on the fluidization air until the bath is just fluidized.
7. Carefully and slowly empty the full jar into the top of the bath. (Except for the first jar from a new charge which should be thrown away).
Note: During normal operation, the collection jar should only become partially full during an 8-hour period. An excessive amount of alumina in the collection jar suggests that the fluidized bath has been overfilled with alumina; check the level in the bath. Add enough from the jar to bring the bath to the correct level and keep the remainder as spare material.
8. Increase fluidization up to the correct working level.
9. Check the filter and clean or replace if necessary, when the extraction system is switched off. (Note the screw and the filter may be hot).

CLEANING THE EXHAUST FILTER

1. Turn off the extraction system.
2. Release the filter housing by removing the retaining screw and vacuum the filter chamber every two weeks with daily bath use.
3. Replace the filter every 6 months with daily bath use.

PERIODIC MAINTENANCE

The fluidized bath requires the following periodical inspection to be carried out to ensure trouble free operation:

The condition of the alumina should be checked to make sure that there are no lumps and, if practical, sieved occasionally. A fresh charge of alumina should be used if the medium is contaminated in any way.

Should the fluidized bath be stored for long periods of time under damp or humid conditions, moisture may be absorbed by the alumina which is hygroscopic. To avoid violent fluidization which occurs when damp alumina is heated above 100°C, operate the bath for a period of approximately 8 hours at 90°C prior to operation at elevated temperatures. The heaters should be checked for discoloration, oxidation or to determine if any build-up of alumina particles has taken place on the surface.

The condition of the porous plate should be checked to see whether there are any oil stains or discoloration: if so, and fluidization is impaired, replace the porous plate. Contact your local Cole-Parmer dealer for further information.

TO DRAIN THE ALUMINA FLUIDIZING MEDIUM

This is best done when the bath is cool as hot alumina can cause severe burns. The drain cap may also be hot.

1. Ensure the fluidized air is turned off at the valve on the flow meter (Figure 5a). If air is supplied to the unit and the flow meter is open, a small jet of alumina will be released when the drain cap is opened.
2. Position a suitable container under the drain situated at the bottom rear of the bath (Figure 5b).
3. Remove the drain cap and fit the drain extension tube (do not over-tighten) (Figures 5c and d).
4. The bath may now be drained by slowly turning the valve at the flowmeter to increase fluidizing air until a steady flow of alumina is obtained (Figures 5e and f). Hot alumina should be drained into a well-insulated container of suitable material to avoid fire hazards.
5. Once the chamber is empty turn off the flowmeter valve, remove the drain extension tube, clean the thread of the drain cap and refit.

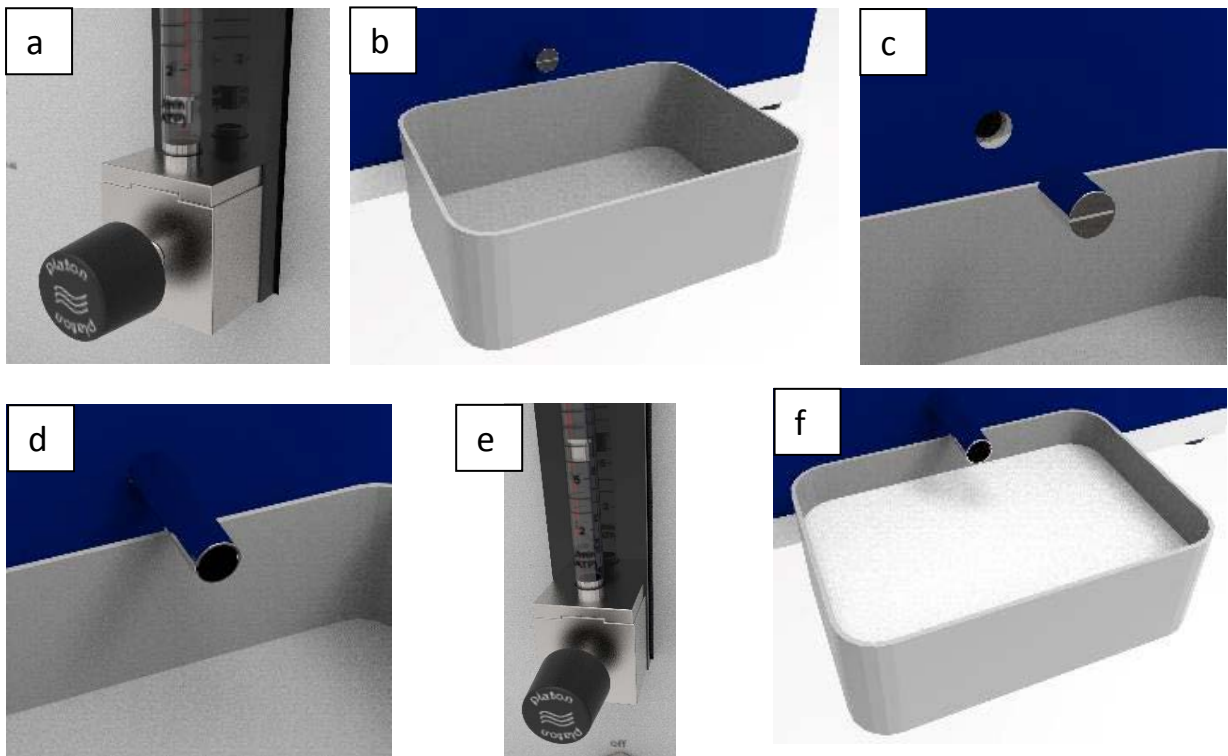


Figure 5: Draining off the alumina.

FAULT FINDING

The following guide has been prepared should a fault develop with the fluidized bath. If the fault cannot be located by using this guide, contact your local Cole-Parmer dealer.

Fault	Possible cause
The unit fails to operate	Check the fuse, electrical and air supplies
Poor fluidization	Unit not level Inadequate fluidizing air flow Inadequate feed air supply Air filters blocked Defective air flow meter Bath over-filled with alumina fluidization restricted by large mass placed in bath Porous plate blocked or damaged
Bed will not fluidise	Inadequate air flow Inadequate feed air supply Check pipe work for kinks, leaks or poor connection Fluidization pressure switch inoperative.
Poor temperature control	Poor fluidization Eurotherm controller faulty Transformer faulty Thermocouple faulty
Power on but air controller does not illuminate.	Inadequate feed air supply Poor hose connection Bath alumina level too low Air flowmeter faulty Inadequate fluidizing air flow
The flowmeter float does not rise.	Check the air inlet supply is 60 psi Check pipe work for kinks, leaks or poor connection Check the regulator has been closed Air flowmeter faulty Flowmeter valve faulty
Air extraction not working	Check the air inlet supply is 60 psi Check the air extraction air pressure is 50 psi Check pipe work for kinks, leaks or poor connection Venturi requires setting up Exhaust filter clogged
Poor heating up of the unit	Heater element faulty Thermocouple faulty Front solid state relay faulty Rear solid state relay faulty Eurotherm controller faulty or parameters incorrect Over temperature circuit not set at correct over current value
Dust collection jar is filling too quickly	Bath over-filled with alumina Bath is over-fluidizing; reduce air flow
Dust leaking from collection jar	Collection jar damaged or chipped; replace jar Seals damaged or loose

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 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.

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

E-mail: cptechsupport@antylia.com

Phone: +44 (0)1785 810433

REPLACEMENT PARTS

The following parts may be purchased if replacements are required:

Part number	Item description
6007558	Exhaust filter
6007557/1	Dust collection jar
6003948	Drain extension tube
6007764	Probe plate
6007763	Probe plate holder
6106042	16A fast blow fuse
White/AIO	25kg alumina, white aluminium oxide

ACCESSORIES

The following accessories are available for use with the FSB-200-P.

Sample basket

The steel mesh sample basket safely holds samples away from the heating elements of the fluidised bath and assists retrieval of items from the bath.

Product code	Item description
F7759	Steel mesh sample basket with collar and sensor plate.

Dust suppression system and probe holder

The Dust Suppression System chimney (FFB08DS1) is combined with a Probe Holder (FFB08PR1 or FFB08PR2) to enable the FSB-200-P user to seal the fluidised bath, making it suitable for calibration labs where airborne dust must be avoided. In addition, Probe Holders allow free flow of alumina around the exterior of the holder preventing dead areas. At the base of each Probe Holder is a large steel equalization block surrounding the sensors, assuring constant uniformity, reduced temperature fluctuation and improved calibration accuracy. Stability and uniformity are $>0.010^{\circ}\text{C}$ in dead-bed mode with a Dust Suppression System.

Note: Dust Suppression System and Probe Holder must be purchased together for correct fitting.

Part number	Item description
FFB08DS1	Dust Suppression System with chimney
FFB08PR1	Probe Holder for 8 probes: 8mm x 281mm deep
FFB08PR2	Probe Holder for 8 probes: 3mm, 4mm(x3), 5mm, 6mm(x2), 8mm x 300mm deep
FFB08FL1	Spare filter for Dust Suppression System

Air Compressor

Antylia Scientific can supply a free-standing moisture and oil free air compressor complete with the necessary filtration system for installations where a compressed air supply is not available.

Part number	Item description
F120D	Air Compressor 230V, 50Hz, 1500W

Air pressure regulator and filter

Antylia Scientific can supply a filter/regulator assembly for compressed air which is not moisture or oil-free.

Part number	Item description
F5915	Air Pressure Regulator and Filter

NOTES



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

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Ordering Information

Order No.	Series	Model	Legacy SKU
12184-03	FSB-200	FSB-200-P	F949D

Warranty Registration



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essentials

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