

James H. Heal & Co. Ltd.

FlexiBurn Model 780

INSTALLATION GUIDE

Covering Serial Numbers 780/07/1021 Upwards

James H. Heal & Co. Ltd.
Halifax, England.

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WORLDWIDE SUPPORT
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2 SAFETY INSTRUCTIONS

- Read this manual carefully before operating the machine
- Observe the installation requirements for correct machine performance
- Only use the manufacturer's approved spare parts and consumables
- Have the machine serviced at least once a year by a Healink engineer

3 INTRODUCTION

James H. Heal & Co. Ltd. has many years experience in Flammability testing after launching the Rhoburn some 20 years ago. The FlexiBurn has been designed to improve on the success of the Rhoburn giving more flexibility to users.

3.1 KEY FEATURES

- Ultimate flexibility allows Vertical, Angled, Radiator and Toy Tests
- Compliance with a large number of Standards
- Comprehensive Pre-programmed Standards library
- User definable standards
- User Friendly software
- LCD touch screen single user interface
- Semi-automatic flame ignition and application
- Ergonomic operation
- Robotic arm for quick change from face to edge ignition
- User defined test reports
- Direct connection to A4 printer for output of test reports: no PC required
- Serial interface to PC for test results storage and standards library management
- Purpose designed TEST CHAMBER with automatic control of lighting and extraction

4 STANDARDS

FlexiBurn conforms to the following standards;

BS 5438:1989 Tests 2A & 2B
BS 5438:1976 Tests 1 & 2
BS 5438:1976 Test 3
BS 5722:1991 Test 2A
BS 6249:1982 Part 1
BS EN 1101:1996 (80 × 80mm)
BS EN 1101:1996 (200 × 80mm)
BS EN 1102:1996
BS EN 1103:1996
BS EN 13772:2004
BS EN ISO 6940:1995
BS EN ISO 6940:2004
BS EN ISO 6941:2003
BS EN ISO 15025:2002 Tests A & B

The FlexiBurn is an extremely flexible instrument and the above represents the standards that are pre-programmed into FlexiBurn. This list will continue to be extended throughout the life of the instrument.

5 INSTALLATION

5.1 Unpacking

The FlexiBurn is packed in a large wooden case. Any optional accessories will be packed around the instrument. Remove the case lid and unpack the optional accessories and loose items first. The instrument is bolted to the base of the case. To remove the instrument the case must be stood upright first then remove the brackets which secure the instrument to the base. Remove the sides. Finally lift the FlexiBurn out of the case. Please check that all of your accessories and consumables are present before disposal of any packaging material and report any discrepancy to the manufacturer.

These are the standard items packed with the Flexiburn:-

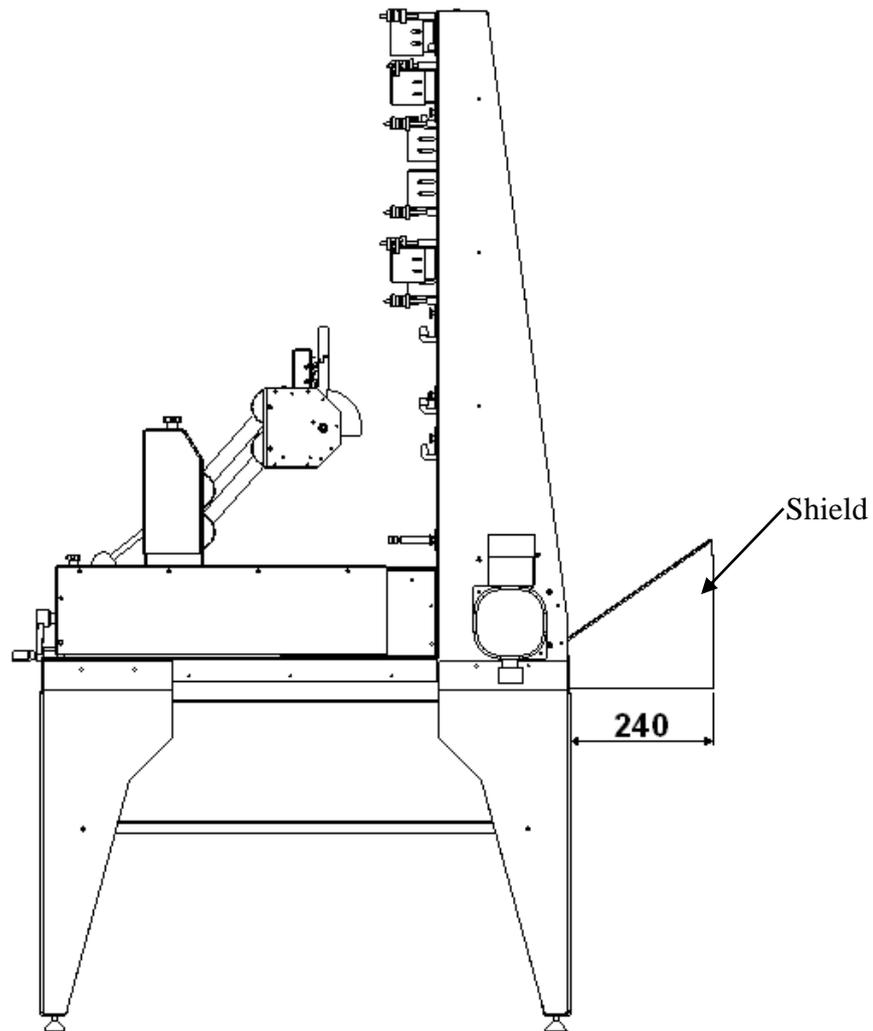
- 1 Mains Lead
- 1 17 mm Spacer (Burner tip to fabric face)
- 1 20 mm Spacer (Burner tip to fabric edge)
- 1 Wire Brush
- 1 Data Logging CD
- 1 Burner Removal Tool
- 1 Pack of 6 Burner O Ring Seals
- 1 Cotton Trip Thread
- 1 10M Cable (FlexiBurn to remote PC)
- 1 Ignition Fabric

Also check that the specimen frames and templates specified on your order are also present and any other optional equipment ordered.

Check the operating voltage stamped on the serial number plate is the same as your electrical supply.

5.2 INSTALLATION

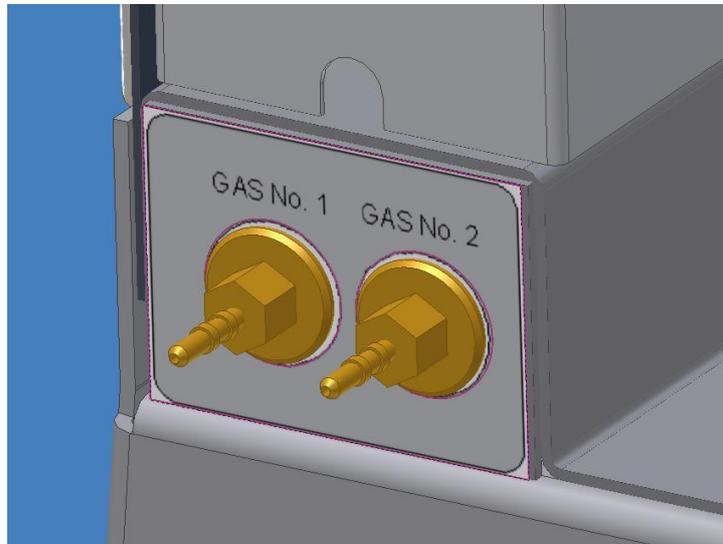
- The FlexiBurn must be located in a separate room, or in part of a room which has been fully partitioned to accommodate it. Alternatively, a purpose built Test Chamber is available.
- On the rear of the machine a shield can be fitted which can be used to space the FlexiBurn from the Test Chamber wall and also cover the gas pipes and electrical cables to protect them from debris. The figure below shows the FlexiBurn with the shield fitted and the distance to the wall.



- The testing room must have a minimum volume of 4 m³.
- The construction of the room must be such to allow location of the rig inside and the control module outside. The rig must be clearly visible from the outside from the control module location.
- The atmosphere within the room must be within the following limits :

Temperature 15 - 30 °C
Relative Humidity 20 - 65 %RH

- Fireproof materials must be used in the construction of the testing room.
- The room must be fitted with an extractor fan or other means of ventilation to facilitate the clearance of smoke and fumes after a test. In certain situations, a sprung-loaded vent located low down on the wall opposite the fan will help to clear the atmosphere by allowing the ingress of fresh air when the fan is operating.
- The control module must be located outside the testing room on a suitable firm support. **A 5 amp single phase power supply is required with earth.**
- Connect the gas supply/supplies to the gas inlet on the left hand side of the FlexiBurn. Two gas supplies can be connected at the same time. (See Fig below).



5.3 Details of gas supply

a	GAS TYPE	Commercial Butane to BS 4250 Commercial Propane for ISO 6940/1
b	SUPPLIER	Calor gas stockist
c	CYLINDER	Either 16 or 32 lb. type
d	REGULATOR	Calor engineering high pressure regulator or similar
e	PIPING	Calor engineering High pressure pipe of 3/16 inch (4.68 mm) internal diameter and complying with BS 3212

The gas cylinder should be placed outside the building/chamber.

The gas cylinder, regulator and piping are not supplied with the equipment.

FlexiBurn is not designed to be connected directly to a gas supply and a Regulator must be included in the connection between the cylinder and the FlexiBurn. The regulator is precisely set by the manufacturer to control the pressure of the supply and must not be adjusted. If a Regulator shows signs of wear, it should be replaced. Regulators must be marked BS 3016 or EN 12864.

For commercial propane, a typical bottle pressure is 20 bar – this must be Regulated down to 37 mbar.

For commercial butane, a typical bottle pressure is 2 bar – this must be Regulated down to 28 mbar.



Propane Regulator



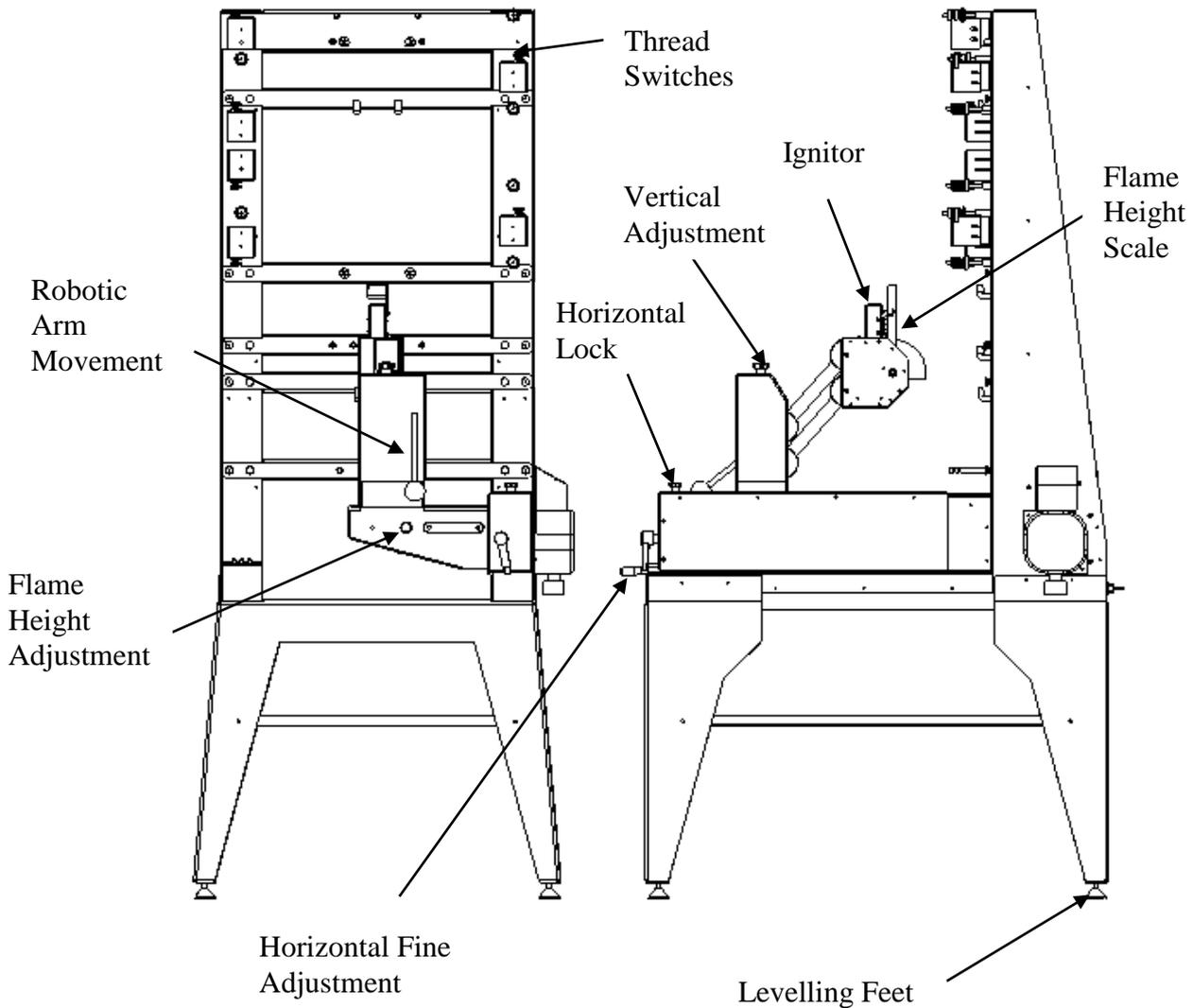
Butane Regulator

- For further information and/or advice on any of these points, consult the building safety officer and/or the local fire prevention officer.
- The FlexiBurn should be levelled using the four adjustable feet fitted at the bottom of the frame legs.
- To prepare the rig for testing, insert the debris tray into the slot at the base of the rig.
- The control module comes with the interconnecting lead already fitted.
- Remove the cover at the back right corner of the Flexiburn. Connect the Flexiburn to the control module using the interconnecting lead. The multipin fitting locates onto the circuit board which is visible once the cover has been removed.
- Replace the cover.
- Switch on the mains supply.
- Ensure the correct burner is in place. Should the burner require changing, the tool on the left hand side of the rig (See Fig 1 – ref. 20), fits over the burner and can be used as a spanner.
- The rig is now ready to carry out tests.

6 SAFETY RECOMMENDATIONS

- If a gas leak is suspected, disconnect the equipment from the gas supply and check it thoroughly. If in doubt, do not use the equipment until it has been checked by the manufacturer or other competent authority.
- Do not enter the test room or cabinet until the test is completed and the smoke and fumes have cleared.
- Always place the specimen frame on the rig before igniting the gas.
- Do not allow debris to accumulate on the rig or specimen frames. Check them and empty the debris tray regularly.
- Always turn off the gas supply at the cylinder after use.
- The rig has been designed for testing textile materials in the vertical plane. Materials with a large mass, with the potential to create a severe fire, must not be tested on this apparatus. E.g. Large toys, large pieces of flammable foams etc.
- Do not adjust the vertical or horizontal adjusters outside the limits engraved on the respective scale.

7 GENERAL DESCRIPTION AND INSTRUMENT LAYOUT



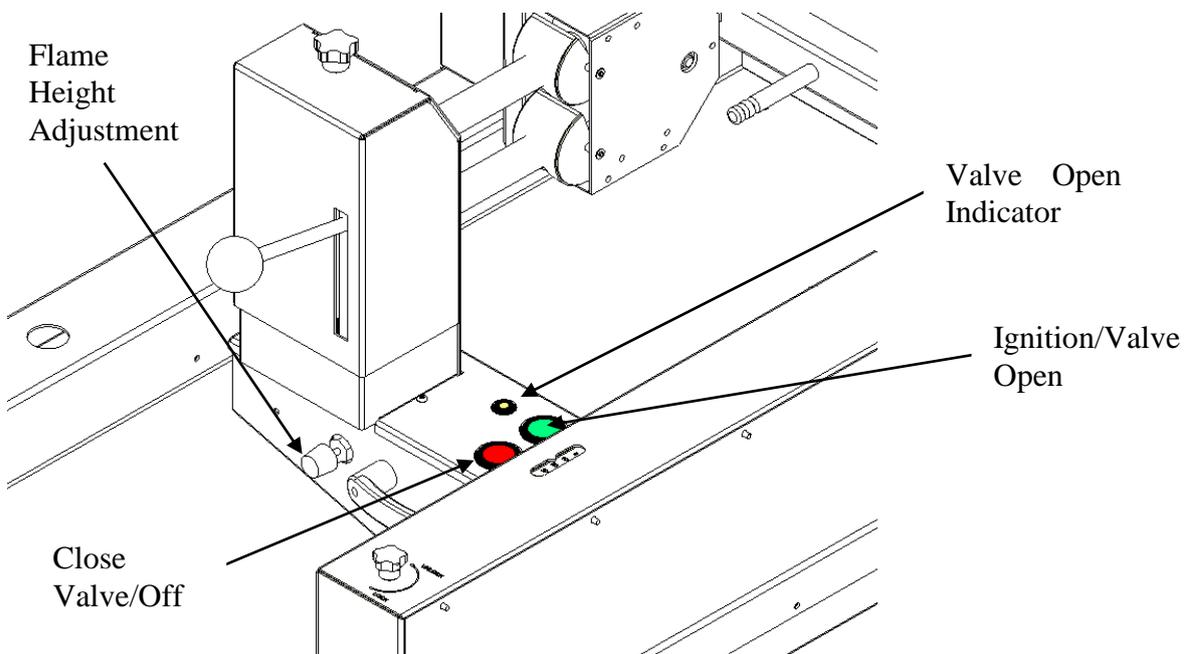
7.1 GENERAL

The whole robotic arm assembly is mounted on a free running slide to add versatility. To the back right hand side of the assembly there is a horizontal locking knob which acts through a screw, to lock the robotic from being slid in the horizontal plane. This knob will only be used when carrying out a test which requires the burner to be in a vertical position.

To the right hand side of the robotic arm assembly there is an adjusting handle which is used to make minor adjustments to the position of the burner to the specimen in the horizontal plane. This handle can be used without having to unlock the locking knob. Minor vertical adjustments can be made using the vertical adjustment knob at the top.

At the rear is a handle which is used to change the position of the robotic arm from its lower position to upper position. When changing the position ensure the arm has fully reached its end stop. The end stops are set at the factory for the face and edge ignition points however it is often necessary to make minor adjustments to the burner position using the above method. Setting gauges E(Edge) and F(Face) should be used when setting the correct distances to the specimen. These are placed over the end of the burner which can then be positioned correctly. The gauges can be stored on the pegs on the left hand side of the instrument.

When carrying out a test which requires vertical flame application adjust the position of the burner as before using the horizontal and vertical adjustment knobs. Release the horizontal locking knob by turning in an anti-clockwise direction and then draw back the whole robotic arm using the handle next the flame height adjustment. The burner should then be lit and the flame height adjusted. The flame height gauge should be rotated down to allow the vertical flame application. The whole arm is then pushed forward until it hits the end position and then the flame application time will commence.



7.2 Ignition

The ignitor can operate in two alternative modes.

Mode 1 To light the burner press the green ignition button and keep it depressed. As the button is depressed the burner will move forward 10 degrees and then backwards to the ignition point underneath the two electrodes. The ignitor will begin to spark rapidly and

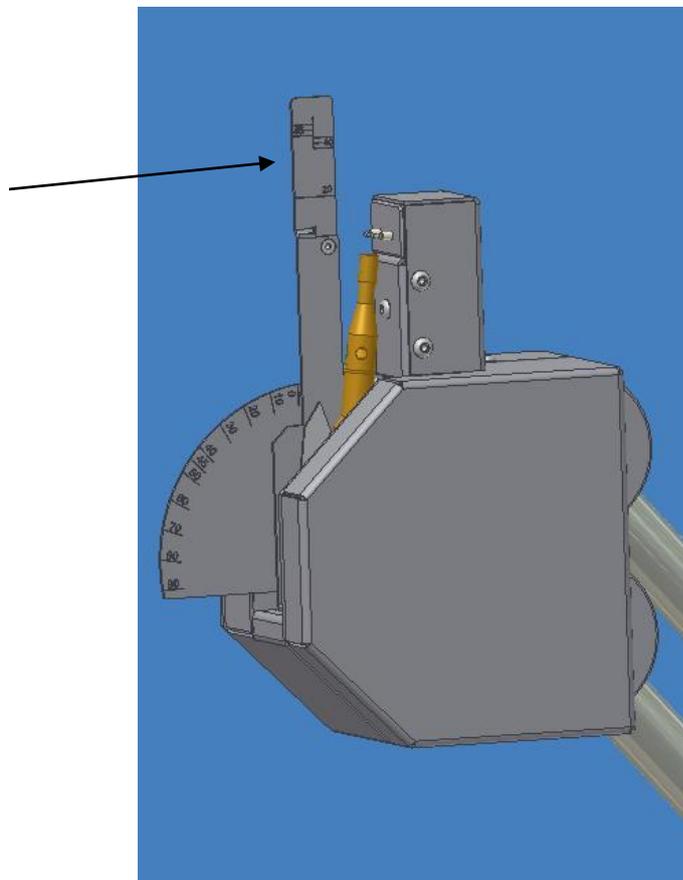
the yellow LED will light up. It is important that the correct amount of gas is being released when the burner is being lit. Too much gas will cause the burner to blow itself out and too little gas will mean it will not light. Use the flame height adjustment knob to control the gas as the ignition button is depressed. When the flame is lit remove your finger from the ignition button. The burner will move back to its vertical position to allow the flame height to be adjusted. The yellow LED will remain lit to signify that the gas valve is open. To stop the flame press the red button. The yellow LED will then go out.

Mode 2 Press the green button once. The burner will move forwards 10 degrees and then backwards to the ignition point underneath the two electrodes. The ignitor will spark for 2 seconds and then the burner will move back to the vertical position. If the flame does not light in this time then repeat the exercise. If the flame still does not light then attempt to light using mode 1 so that the correct amount of gas can be set.

Warning:- do not leave the instrument with the yellow LED lit, but no flame as this means that gas is being released into the atmosphere.

Do not allow the ignitor to become covered in debris as this could affect the performance of the ignitor. If you experience difficulty with the ignition carefully clean the electrodes. If performance still does not improve then the position of the burner can be adjusted in the software to improve the striking performance.

Adjust flame height so that tip of flame is between two lines



Burner shown in Ignition position.

7.3 Specimen Preparation

Each test frame ordered is supplied with a template which is used to mark out the size of the fabric and also the position of the pin holes. Mark the pin positions on the material by marking through the holes in the template with a pen.

The specimen can then be mounted on the test frame, carefully placing the material onto the pins at the points previously marked. The specimen is pushed along the pins up to the studs. The studs position the specimen at the correct distance from the frame.

7.4 Test Frames

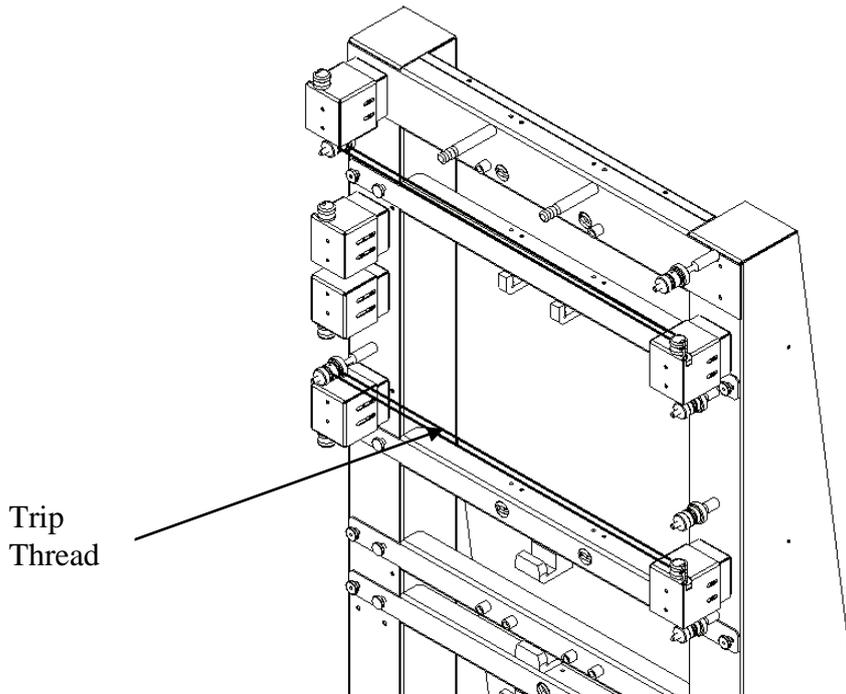
Both large and small specimen frames are mounted on the rig with the longer dimension in the vertical plane, with the pins projecting forwards. Frames for BS 5438 1976 stand on the frame mounts, whilst ISO and BS 5438 1989 hang from the frame mounts.

The frames locate against magnets. The magnet covers should be employed when the equipment is not in use to maintain the strength of the magnets.

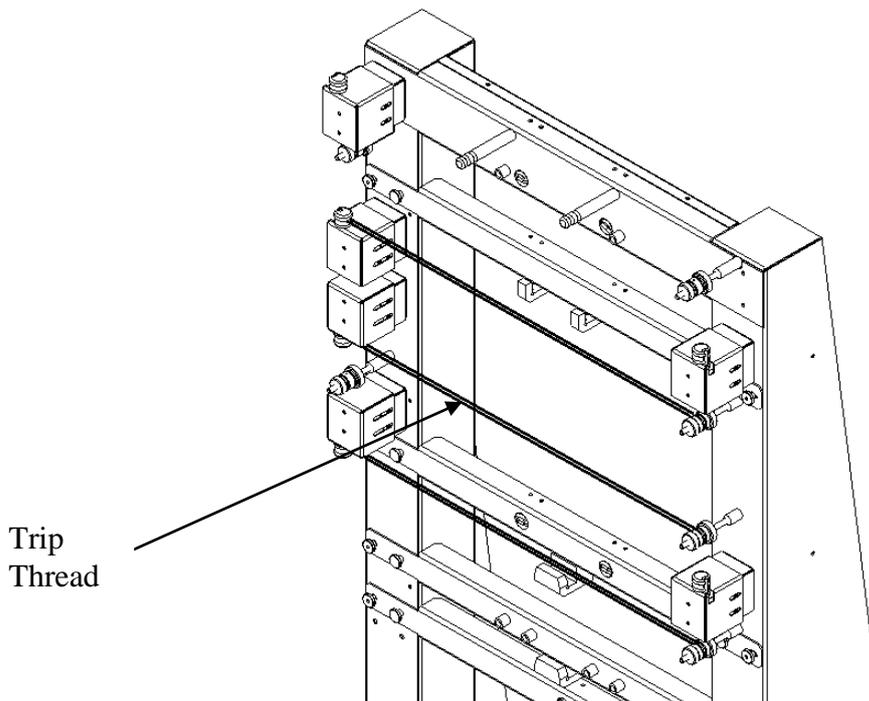
The large BS 5438 1976 Test 3 frame has a removable pinned block which locates in recesses and is fixed with two small set screws behind the two vertical cross members of the frame. This block is used for testing small specimens only and should otherwise be removed.

7.5 Trip Threads

Set up the trip thread markers if required.



Horizontal BS 1976 trip threads run from left to right. These are coloured stainless steel.



ISO and BS 1989 run from right to left and these are coloured brass. The control module will not allow a test to proceed unless the trip threads required for that test are correctly threaded up. Vertical BS 5438 1976 trip thread runs from the top right position to the top left position.

7.6 Burner Adjustment

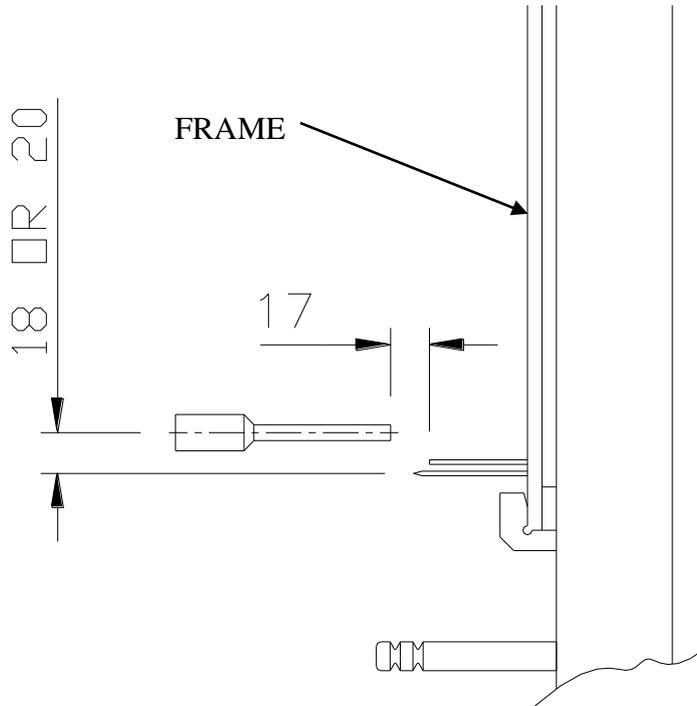
Please consult your chosen standard to check the burner position to the sample before proceeding.

Using the 17 mm (face ignition) or 20 mm (edge ignition) spacer provided, check that the burner tip to specimen distance is correct (See Fig 2). To position the burner correctly send the burner to its 90^o or 30^o position using the control module. Place the spacer over the burner tip so the end of the bore is in contact with the burner tip. If the end of the spacer is not just touching the specimen face or edge, adjust the distance using the vertical and horizontal adjustment knobs (See Fig 1). Remember to remove the spacer before returning the burner to a vertical position otherwise the spacer will catch on the ignitor.

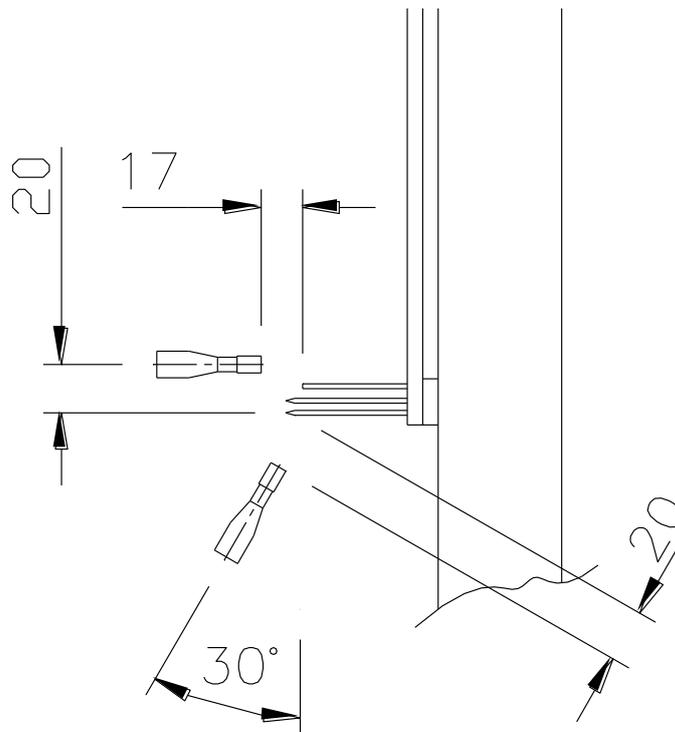
7.7 Gas Supply

If two gases have been connected to the FlexiBurn then the control module allows the user to select between the two gases. When changing between the gases the user should allow approximately 2 minutes for the previous gas to ‘run off’.

7.8 Burner Ignition Location



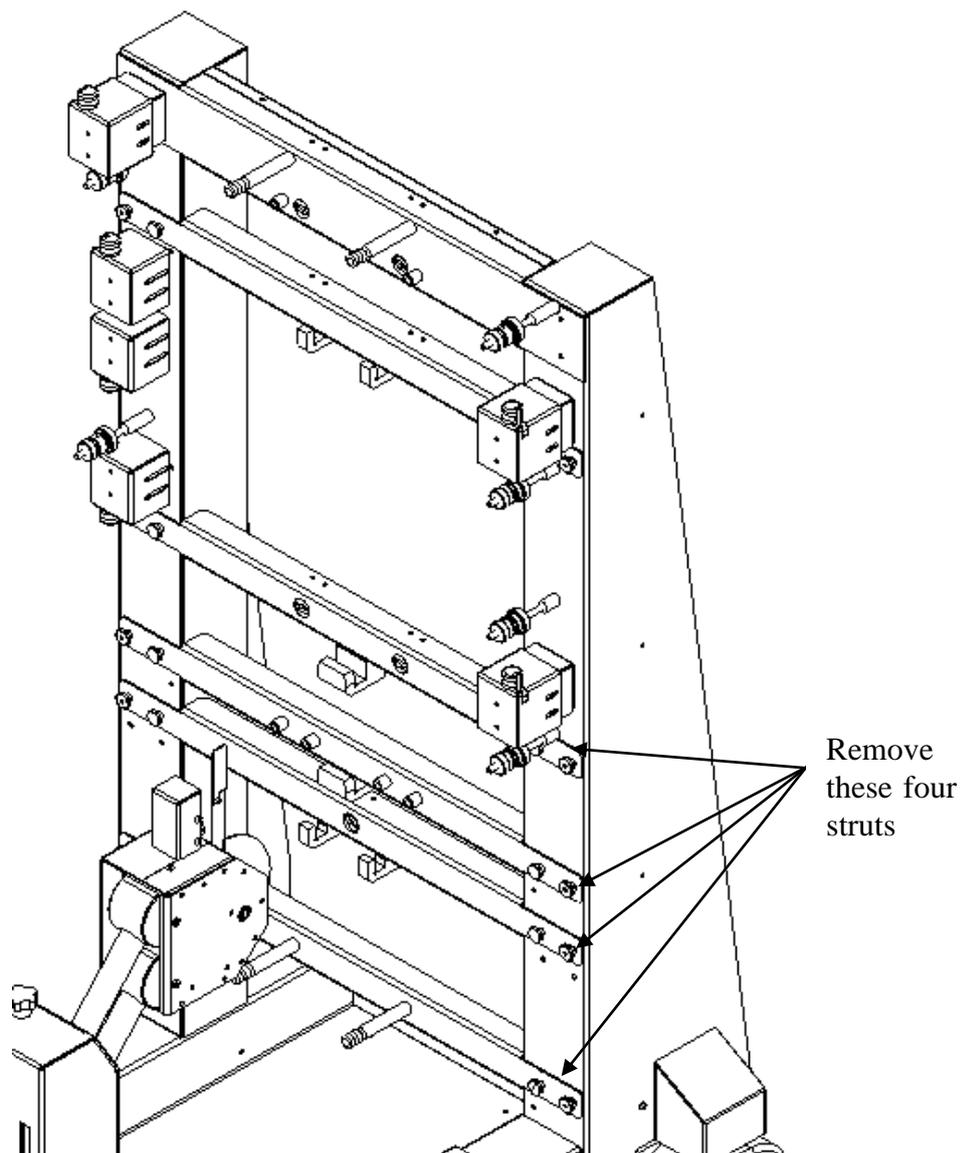
a) BS SURFACE IGNITION

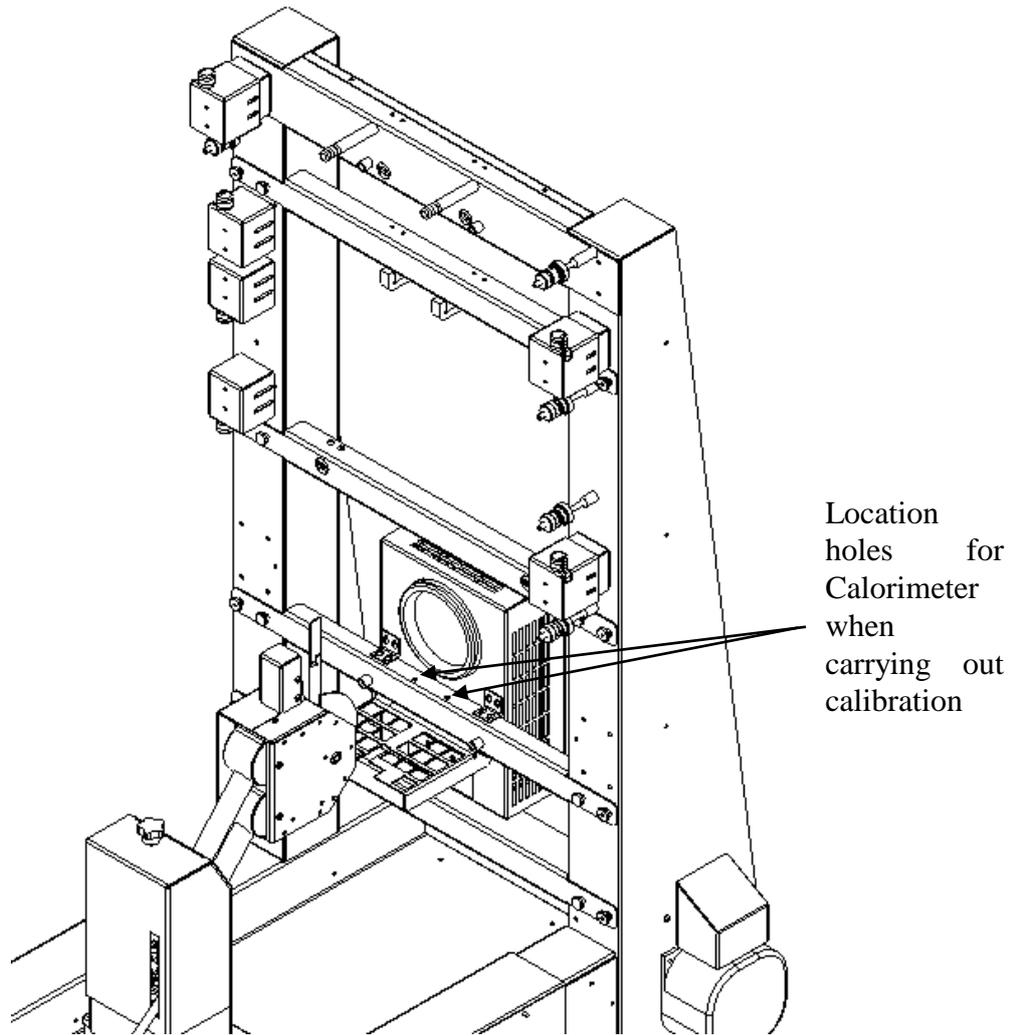


b) ISO EDGE AND SURFACE IGNITION

8 FLEXIBURN WITH RADIATOR OPTION

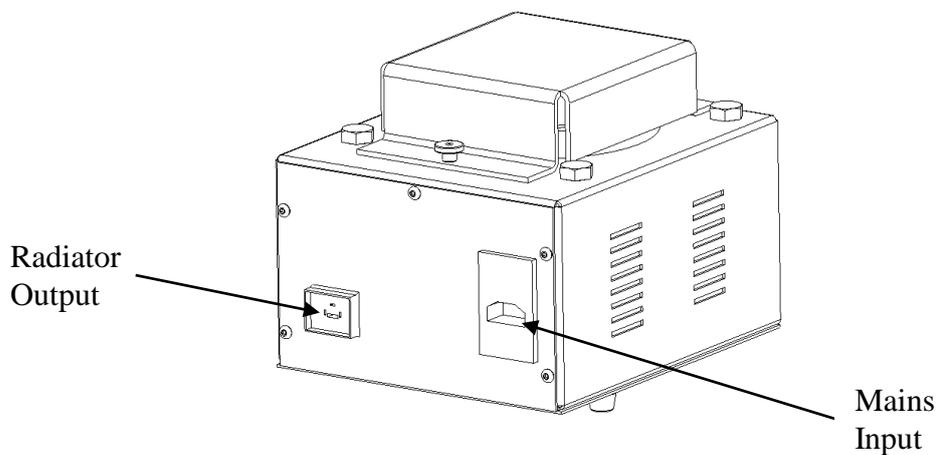
This can be ordered as an optional extra to the standard FlexiBurn. It is used to carry out tests to Standard BS EN 13772:2003. The equipment consists of a ceramic Radiator which is held in a metal case, a brass test frame incorporating a heat shield and a variable transformer. In order to use the equipment the radiator must be fitted to the standard FlexiBurn. To do this four of the support struts must be removed from the FlexiBurn and the radiator fitted in its place. The struts are removed using the four thumb screws located in each strut. Note that the two outer thumb screws are used to position and secure the strut and two inner thumb screws are used for securing only.





View showing FlexiBurn with optional Radiator fitted

Once fitted to the FlexiBurn the radiator should be connected to the Variable Transformer.



View of Variable Transformer

8.1 Safety

Extreme caution is recommended when carrying out tests using this equipment as the Radiator gets extremely hot during operation. The Radiator will glow slightly when at full temperature and turned on, but when it is turned off the glow will disappear, however the Radiator will be extremely hot. Under no circumstances touch the Radiator until you are sure it is completely cool. The brass test frame may also get hot during repeated operation so extreme caution is recommended when handling the test frame.

8.2 Radiator Calibration

The radiator should be calibrated in accordance with the standard BS EN 13772:2003. A Copper Disc Calorimeter used to carry out the calibration is included with the equipment. Please refer to the Standard for the correct temperature rise rate. The rise rate is achieved by adjusting the variable transformer to change the power to the radiator.

The procedure for carrying out the calibration is as follows:-

1. Turn on the Radiator and leave to heat up for at least 20 minutes.
2. Connect the Temperature Meter to the Calorimeter and switch on.
3. Locate the Calorimeter into the location holes on the strut just in front of the Radiator.
4. Watch the display of the Temperature Meter and when the temperature reaches 40°C start the stopwatch.
5. When the temperature reaches 100°C stop the stopwatch.
6. Remove the Calorimeter from the strut. Do not touch the copper disc in the centre.
7. The rise rate = $60 \div \text{Time taken}$.
8. If the rise rate is not in accordance with the Standard then adjust the voltage on the Variable Transformer and repeat steps 2 to 7.

Warning:- do not leave the Calorimeter in position on the strut with the Radiator turned on, after carrying out the calibration, as this could damage the Calorimeter.

