



Operating & Maintenance Instructions

Asphalt Binder Analyser
Model ABA 7/35

This manual is for the guidance of operators of the above Carbolite product and must be read before the equipment is connected to the electricity supply.

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This manual should supply all the information required for safe and trouble-free operation. If, however, any questions remain unanswered please contact our Service Department at the address at the end of this manual.

1.0 SUPPLIED ITEMS LIST

1.1 Parts Supplied

The following items should be present. These should all be checked and identified as soon as possible after receipt of the equipment. The next page shows pictures of many of the parts for identification purposes.

quantity	item	
1	Asphalt Binder Analyser: ABA 7/35	
1	Chimney	
(1)	Stand (only if ordered)	
1	Ohaus Balance	Photo 1.1
1	Balance Pan Extension	Photo 1.2
4	Sample Baskets	Photo 1.3
2	Sample Basket Lids	Photo 1.3
2	Small Sample Basket Clips	Photo 1.3
2	Large Sample Basket Clips	Photo 1.3
2	Sample Catch Trays	Photo 1.3
1	Sample Basket Loading Handle	Photo 1.4
1	Hot Sample Safety Guard	Photo 1.5
1	Hot Sample Guard Handle Fixing Kit	Photo 1.6 & 1.7
2	Door Lock Keys	
1	Front Brick Cover	Photo 1.8
1	Calibration Plate	Photo 1.9
2	Printer Paper Rolls (inc. 1 installed in printer)	
1	Operating Instruction Manual	
1	Ohaus Balance Instruction Manual	

In addition, any spare parts ordered should be separately identified and put aside in safe storage.

1.2

Identifying the Parts

The following pictures are to assist in identification of the components supplied.

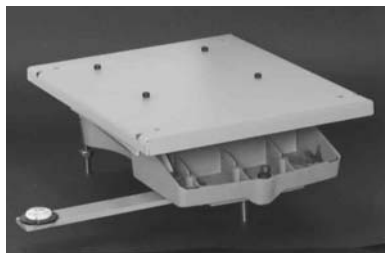


Photo 1.1 - Ohaus balance

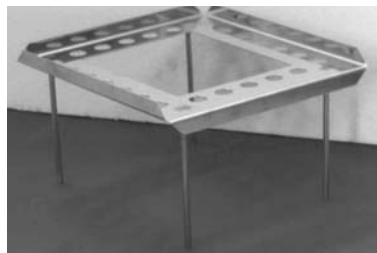


Photo 1.2 - balance pan extension

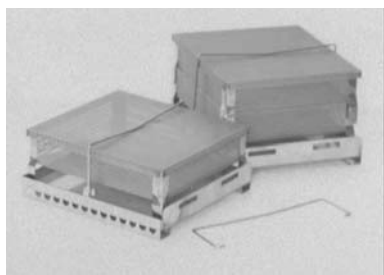


Photo 1.3 - sample baskets on catch trays with lids & clips



Photo 1.4 - sample basket loading handle

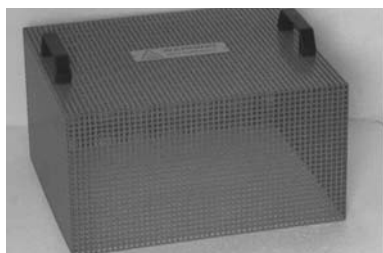


Photo 1.5 - hot sample safety guard (assembled)



Photo 1.6 - hot sample safety guard handle fixing kit



Photo 1.7 - warning label for hot sample safety guard



Photo 1.8 - front brick cover

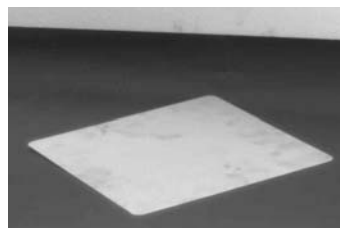


Photo 1.9 - calibration plate

2.0

SAFETY FEATURES

In this section the word “user” is to be interpreted as any person with access to or responsibility for the ABA 7/35 and its ancillary equipment.

2.1 Electric Shock Risk Lamps

Opening the chamber door causes power to the heating elements to be disconnected at both ends of the circuit.

Any failure of the relays involved in this switching causes one or two red Electric Shock Risk lamps to illuminate; see section 5.2 and section 11.0.

The user is thereby warned that if, when the door is open, either or both of the electric shock risk lamps are illuminated, then there is risk of electric shock from the exposed heating elements. The user should disconnect the equipment from the power supply.

A switch is provided to test that the warning lamps are themselves working; see section 5.1. The user is responsible for regular checking using the test switch.



2.2 Power Failure Safety Feature

A power failure could occur during a test, leaving an incompletely burnt sample and a chamber containing explosive or volatile matter. An interruption of power is normally signalled by the display of the Carbolite logo on the balance display screen.

On a power failure, the door remains locked, and automatically opens only on restarting and safe completion of the test. See section 8.7.

It may be necessary in some circumstances to bypass the door lock, and a key is provided for this purpose. Safe use of the key is the user’s responsibility.



2.3 Access to the Plenum Chamber

Soot can accumulate in the airway following the after-burner, giving rise to fire risk.

There is a plenum chamber with removable panels to give access to cleaning; see section 10.3.

The user is responsible for maintaining a clean plenum chamber, and also for regular cleaning of the chimney and the external flue or ducting system.




2.4 Door Lock Indication Lamps

A lamp indicates when the door is locked. The user should always check that the “door locked” lamp is lit when a test is started.



Note that a label on the door states :



- ALWAYS SELECT ‘START PROCESS’ AND CHECK THAT THE ‘DOOR LOCKED’ LAMP IS LIT WHEN STARTING A TEST.
- REFER TO OPERATING INSTRUCTIONS

2.5 Maintenance or Dismantling

The user should read the warning on refractory fibrous insulation, given in section 10.1, before undertaking any work involving exposure to the internal insulation material.



The user should disconnect the equipment from the electrical supply before removing panels to access the electrical connections and control equipment.



3.0

ABA INSTALLATION

3.1 Tools Required

10mm spanner, 12mm spanner, cross point screwdriver, flat blade screwdriver, allen key (supplied).

3.2 Unpacking, Handling & Siting

When unpacking and moving the ABA always lift it by its base; never lift it by the door or any other protruding part.

Remove any packing material from the chamber before use. The ABA is fitted with a safety door lock; when there is no power connected to the equipment the door has to be opened using the key supplied. The keyhole is located on the right hand side of the case.



Lock the door again after checking and clearing the interior. See section 2.2.

Install the ABA 7/35 in a well ventilated room, ideally away from sources of dust. The surface on which the equipment is mounted should be resistant to accidental spillage of hot materials and must not be inflammable. The surface should be stable and not subject to movement or vibration. If the optional metal stand is supplied, this is best placed on a solid (concrete) floor.

If sited in a prefabricated or mobile laboratory additional stiffening of the floor may be required to ensure stability of the internal weighing system.

The height of the mounting surface is important to avoid operator strain when loading and unloading samples. A surface height of about 600mm is recommended to give a sample loading height of about 960mm.

Ensure that there is free space around the ABA. Do not obstruct any of the vents in the case: they are needed to keep the controls and the case exterior cool.

Ensure that the ABA is placed in such a way that it can be quickly switched off or disconnected from the electrical supply - see below.

3.3 Fitting the Chimney

- Remove the chimney panel (photo 3.2).
- Fasten the chimney to the top of the ABA using the screws provided (photo 3.1 & 3.3).
- Replace the chimney panel (photo 3.2).

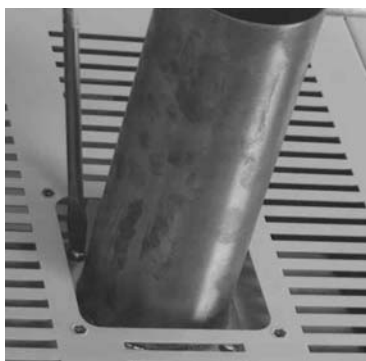


Photo 3.1 - fastening the chimney

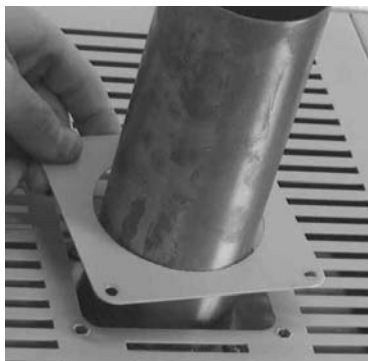


Photo 3.2 - replacing the panel



Photo 3.3 - screws

3.4 Ducting

The chimney must either be placed under a powered exhaust hood, or connected directly to a 76mm duct (not supplied) to the outside of the building; any such duct must NOT have powered extraction.

The fumes should be ducted by either of the above methods to at least 1m above the level of the building.

Rules for ducting:

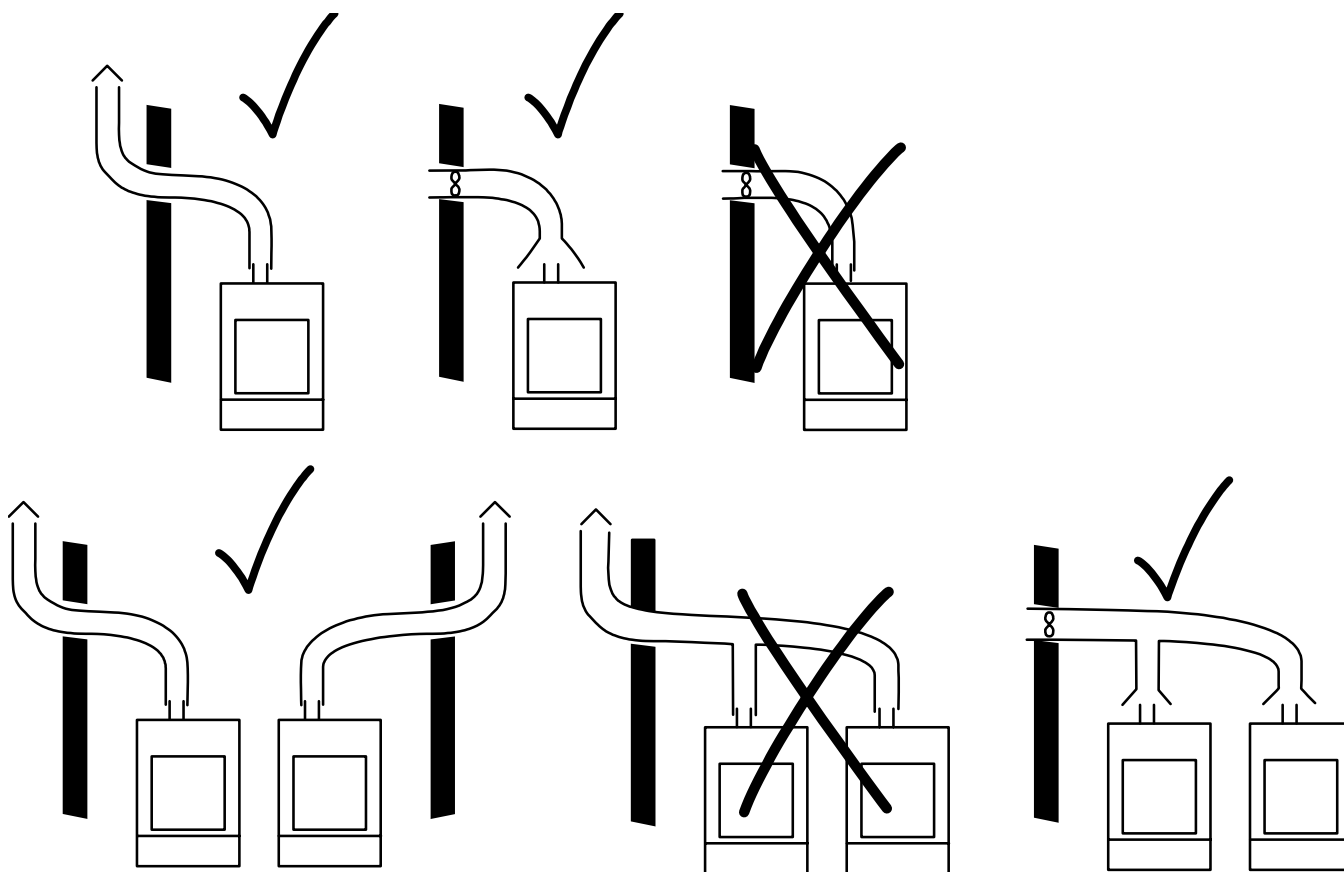
Ducting diameter must be 76mm or more. Ducting must be 76mm where it connects to the chimney.

Ducting length must not exceed 3m for 76mm diameter; for longer lengths consult a ducting engineer.

Flexible ducting, if used, must be suitable for exhaust gas extraction.

If an extraction fan is fitted an extraction hood is required with free flow of air around the chimney.

Do not connect more than one unit to a single duct. Exception: fanned duct with hoods.



3.5 Hot Sample Guard Assembly

The hot sample safety guard is supplied as a kit comprising the guard, the handle and fixing screws, and a warning label and fixing screws. See photos 1.5 to 1.7. Assemble the handle and the warning label to the guard.

3.6

Electrical Connections

Connection by a qualified electrician is recommended.

Model ABA 7/35 is designed for connection to a range of power supplies with the minimum of circuit modifications. It is initially supplied to suit the voltage for which it was ordered; or for 240V 1-phase for a “multivoltage” order.

Look at the rating label before connection to check the supply voltage and frequency for which the unit is configured. If there is a difference between the actual supply and the rating label, reconnect the wires between the terminal block and the EMC filters according to the appropriate diagram below.



Caution: on units prior to serial number 4-01-943 (April 2001) the after-burner fan motor only operated over the frequency range stated on the rating label. If the frequency on the label was 50Hz, do not use the ABA on 60Hz; if it was 50-60Hz, then either frequency is acceptable. On newer models the motors this restriction is removed. If in doubt, contact Carbolite.



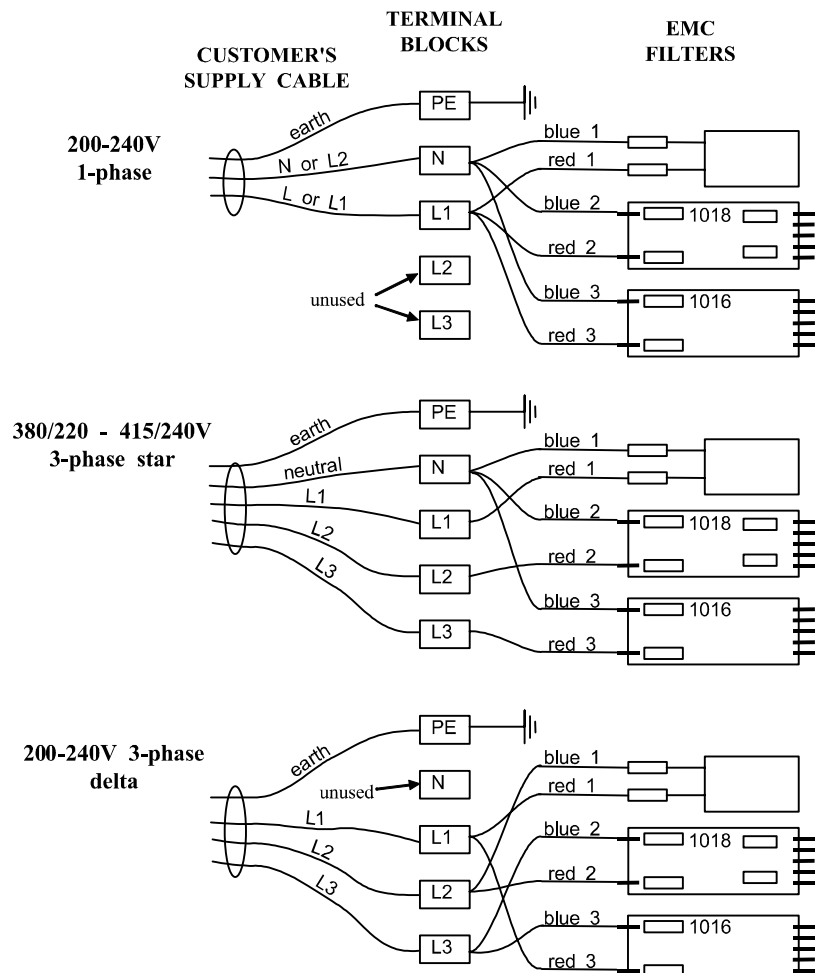
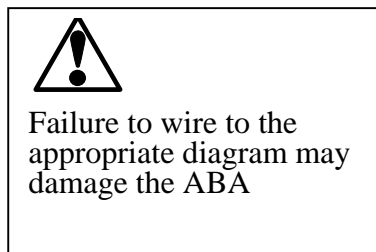
When connecting to a supply voltage different from that on the original rating label, check the table of power limits in section 5.5.3. If the power limit for the new voltage is different, then adjust it on the first occasion that the ABA is switched on. See 5.5.3. Also affix to the ABA a new label stating the new voltage (2 blank ones are supplied with the 50/60Hz model for this purpose).

The supply should be fused at the next standard size equal to or higher than the rated amperage. A table of fuse ratings is given in section 12.3 of this manual.

Either wire directly to an isolator or fit with a line plug. An isolating switch should operate on both conductors (single phase) or on all live conductors (three phase); it should be within reach of the operator. A line plug should be easily removable and should be within reach of the operator.

The supply MUST incorporate an earth (ground).

4.0



BALANCE INSTALLATION

4.1 Fitting the Balance

Remove the balance from its packing and isolate the ABA from the electrical supply. Remove both lower side covers.

Open the chamber door and make sure that there are no obstructions, such as loose packing or insulation material, in the four holes in the chamber hearth for the balance pan extension.

Position the front brick cover over the front lower bricks (photo 4.1).

In the base compartment, slacken the four screws holding the balance location plate.

Partly insert the balance into the left side opening. Connect the balance supply lead, the display lead and the interface board lead. Insert the back first, and then turn the balance through 90° when it is inside the base compartment, locating the feet in the bottom balance location plate.



Photo 4.1 - positioning the front brick cover



Photo 4.2 - connecting the cables to the balance



Photo 4.3 - balance cable positions



Photo 4.4 - inserting the balance



Open the door lock with the key provided. See section 2.2.

Insert the balance pan extension into the main chamber with the extension legs fitting through the four holes in the chamber hearth (photos 4.5 & 4.6). Note that the front edge of the extension is folded down.



Photo 4.5
inserting the balance pan extension



Photo 4.6

Fasten the balance pan extension to the balance using the four screws and Allen key supplied (photos 4.7 & 4.8).



Photo 4.7 - fastening the balance pan extension



Photo 4.8 - Allen key and screws

Level the balance by adjusting the two back legs of the balance using the “big” nuts until the spirit level bubble is central (allowing for view point), then tighten the two top nuts on the legs (photo 4.9).

Adjust the balance position so that the balance pan extension legs pass centrally through the holes in the chamber floor; this can be seen from the balance side access panel (photo 4.10). Tighten the four screws holding the balance location plate (photo 4.11).



Close the door and lock using the door lock key. See section 2.2. Replace the side panels.



Photo 4.9 - levelling the balance

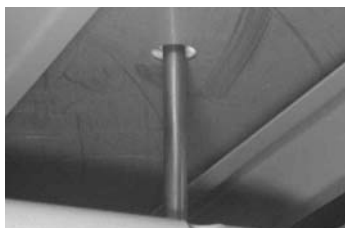


Photo 4.10 - checking that the balance pan legs are central



Photo 4.11 - the spirit level; tightening the balance location screws

4.2 Installing Printer Paper

The printer is located on the right hand side of the control panel.

Twist the black knob on the front of the printer and pull the printer unit panel downwards. Insert the paper roll into the back of the printer. Push the paper into the slot at the bottom of the panel (photo 4.13). Close the panel, checking that the paper is not caught. Turn on the power (main and printer switch). Press the Paper Feed button, at the bottom left of the printer panel, to pull the paper through.



Photo 4.12

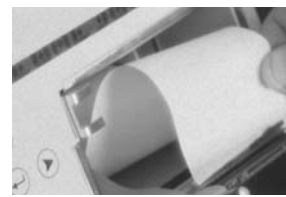


Photo 4.13

4.3 Calibrating the Balance

The balance must be calibrated after installation and at other times if the equipment is moved. The calibration should be done with the chamber at room temperature and the built in extraction fan off.

Place the calibration plate (photo 1.9) on the balance extension (photo 1.2). See section 7.1 to enter the calibration mode and then follow the calibration procedure given in the Voyager Balance manual, using standard or known weights.

After calibration, remove the calibration plate. The display shows an error – this is normal. Switch off the instrument switch and switch it on again: the balance will adjust itself to the absence of the plate.

4.4 Setting Up an External Balance

An external balance (not supplied) has to be used to weigh both the tray and sample weights before the test. An Ohaus Explorer 12kg (photo 4.14) is recommended for this purpose, and can be connected to the ABA 7/35 to input these weights directly. The following describes how to connect this balance and the settings required. Refer to its handbook.

Connect the balance to the RS232 socket labelled External Balance on the back of the case (photo 4.15).

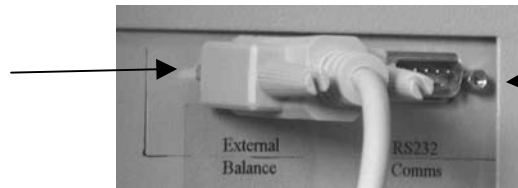
In the PRINT option set Autoprint to Off or Disabled.



Photo 4.14 - Ohaus Explorer 12kg balance

In the RS232 option (Interface) set Baud rate to 2400
 Parity to None
 Data to 8
 Stop to 1.

External
balance
connection



RS232 connection (for
future use)

Photo 4.15 –
connectors at back of
ABA

5.0

ABA OPERATION

This section describes how to heat the chamber up to temperature, and how the automatic door locking system operates.

5.1 Switches – Control Panel

The main control switches are on the left hand side of the control panel (photo 5.1).

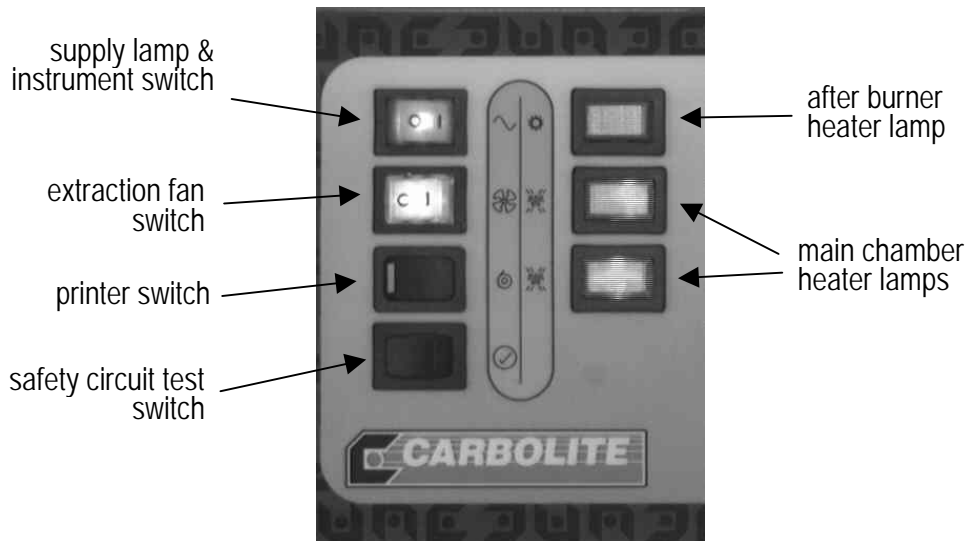


Photo 5.1

The Supply Lamp is on whenever the ABA is connected to the supply. The Instrument Switch cuts off power to the controllers, other devices (including the balance) and heating circuit contactors. Note: when the instrument switch is switched on there is a short alarm tone and the extraction fan starts. To stop the fan, open and close the chamber door.

The Extraction Fan Switch is used in calibration of the lift correction factor (see section 9.1).

The Printer Switch enables power to the printer to be turned on or off.



The Safety Circuit Test Switch is used to check the operation of the two red warning lamps referred to in section 5.2 (see also section 2.1).

The heater lamps indicate when the power control relays are on; they flash while the chamber is heating or maintaining temperature. They are also used to diagnose faults – see section 10.12.

5.2 Door Operation and Status Display Panel

This small display panel is at the top right of the front (photo 5.2).

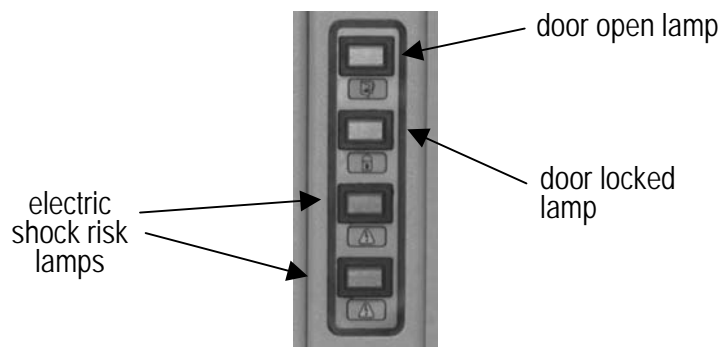


Photo 5.2



When the door is open the power to the elements is automatically cut off. If a fault occurs in this circuit then one or both of the red warning indicator lamps above the door will light up. These warning lamps should be tested daily by pressing the test switch on the lower control panel (photo 5.2) when the door is closed and there is no test running.

The door open warning lamp will light up if the door is open or if the lock is not properly shut.

The door locked lamp shows that the door is locked after a test is started.



If either or both of the shock risk warnings light up when the door is open, do not load or remove a sample. Samples may be removed if the power is first turned off. Consult Carbolite. See sections 2.1 and 11.0.

The door lock is automatically controlled, but has an override key, the lock being on the right hand side of the ABA case. Ensure that the key override has been correctly left in the “locked” position after installation.

The logic is as follows:

- when the ABA is disconnected from the supply the door is locked;
- when the instrument switch is switched on, the door normally unlocks;
- if, however, there has been an interruption in a running test, for example by a power cut or the ABA being switched off, the door lock remains locked when the ABA is switched on (section 8.7);
- at the start of a test, the door locks automatically when “start process” is entered (section 8.6).
- at the end of a test, the door unlocks automatically.

5.3 General Operating Notes

Heating element life is shortened by use at temperatures close to maximum. Do not leave the ABA at high temperature when not required. The maximum temperature for the main chamber is 750°C (1380°F), and for the after burner 950°C (1740°F).



The chimney and extraction ducting should always be correctly fitted and unobstructed: see sections 3.3 & 3.4.



See sections 10.2 and 10.3 for information about maintenance.

5.4 Operator Safety



The ABA incorporates a safety switch which interrupts the heating element circuit when the door is opened. This prevents the user touching a live heating element, but also prevents heating up if the door is left open.



When a test is started the door is automatically locked until constant weight loss is achieved. This is to prevent the operator from opening the door whilst volatiles are being driven off the test sample. If the door were to be opened during this time the volatiles would ignite in an explosive manner.



The red sample basket cover must be used to cover the hot sample baskets whilst they are allowed to cool.



Before removing any hot object from the chamber make sure you have a safe place to put it down. Do not place hot objects on inflammable surfaces.



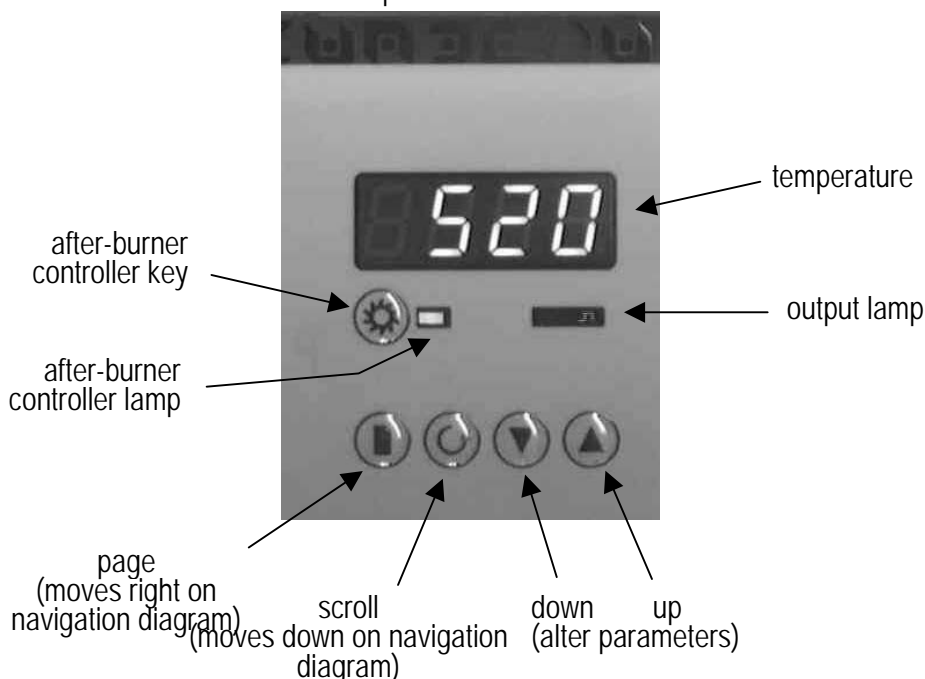
Wear appropriate safety clothing: gloves, a mask and safety glasses are recommended.

5.5

Temperature Control

5.5.1 201 Temperature Controller

Photo 5.3 – 201 temperature controller



The ABA is fitted with a dual temperature controller. One part controls the main chamber, and the other the after-burner. The display and the controls normally refer to the main chamber, but pressing and holding the **After-burner Controller** key swaps the display and the buttons to the after-burner controller.

When switched on, the controller lights up, goes through a short test routine, and then displays the measured temperature and starts to control. The output lamp glows or flashes as heating occurs.

The **Page** key allows access to parameter lists within the controller; most lists and parameters are hidden and cannot be accessed by the operator because they contain factory-set parameters which should not be changed. A single press of the page key displays the temperature units, normally set to °C; further presses reveal the lists indicated in the Navigation Diagram below.

The **Scroll** key allows access to the parameters within a list. A single press displays the temperature units; further presses reveal the parameters in the current list indicated in the Navigation Diagram. Some parameters are display-only; others may be altered by the operator. To return to the Home list at any time, press Page and Scroll together, or wait for 45 seconds.

The **Down** and **Up** keys are used to alter the setpoint or other parameter values.

Press the **After-burner Controller** key to view the after-burner temperature. Hold down the **After-burner Controller** key and operate the **Down** and **Up** keys to alter the after-burner setpoint.

The After-burner Controller Lamp normally glows, and indicates that the second controller is operating correctly.

5.5.2 Operation

To start the ABA, switch the Instrument Switch on (**I**) (photo 5.1). The controller becomes illuminated and goes through a short test cycle. There is a short alarm tone; the balance displays a welcome message (see 6.2) and the extraction fan starts automatically. Stop the fan by opening the chamber door.

Close the chamber door and adjust the temperature controller as above as follows:

- 1) Main chamber: Press **Up** or **Down** to reveal the current setpoint (i.e. the target temperature) of the main chamber; further press or hold **Up** or **Down** to adjust the setpoint. The recommended operative temperatures are 480°C to 540°C.
- 2) After-burner: Hold down the **After-burner Controller** key. Press **Up** or **Down** to reveal the current setpoint of the after burner chamber; further press or hold **Up** or **Down** to adjust the setpoint. Release the **After-burner Controller** key. The recommended operating temperature of the after-burner is 900°C.

As the chamber heats up the Heat Lamps (photo 5.1) flash. The heat lamps are immediately to the right of the switches; the top heat lamp corresponds to the after burner chamber, the lower two to the main chamber.

To switch off, set the instrument switch off (**O**). If the ABA is to be left off, isolate it from the electrical supply.

5.5.3 Adjustment of Power Limit

The power limit is a feature which is used to match the heating elements to the supply voltage. If the voltage is stated at the time of order, no adjustment is necessary. Adjustment is required if the equipment is relocated to a different voltage power supply.

Adjustment of the power limit should not be made arbitrarily (for example “to increase the power”) – the heating elements could burn out, or heating could become slow.

To adjust the power limit, page to the output list, and scroll to the OP.Hi parameter. Use Up and Down to adjust the parameter value. This must be done for both the main chamber and the after-burner controllers. Correct values are:

supply voltage	OP.Hi
240V, 415V	69%
230V, 400V	76%
220V, 380V	83%
208V	92%
200V	100%

5.5.4 User Calibration

The controller is calibrated for life at manufacture against known reference sources, but there may be sensor errors or other system errors. User calibration allows compensation for such errors, and the 201 allows for a user 2-point calibration. This setting is password protected to avoid accidental alteration.

Page to iP, scroll to CAL.P, and use Up▲ to alter the password. The password is 3. If the correct password is entered, the display shows PASS. Scroll to CAL and use ▼ or ▲ to observe the setting FACT (factory values, as manufactured) or USER (user values). Change to USER.

NOTE: before checking the calibration of the controller, or of the complete system, remember to reset the 201 to factory calibration values by setting the CAL.P parameter to FACT.

To enter a user calibration, scroll to each or the following parameters in turn and set the desired values.

Pnt.L low temperature for which an offset is to be entered

OFS.L offset value for the low temperature

Pnt.H high temperature for which an offset is to be entered

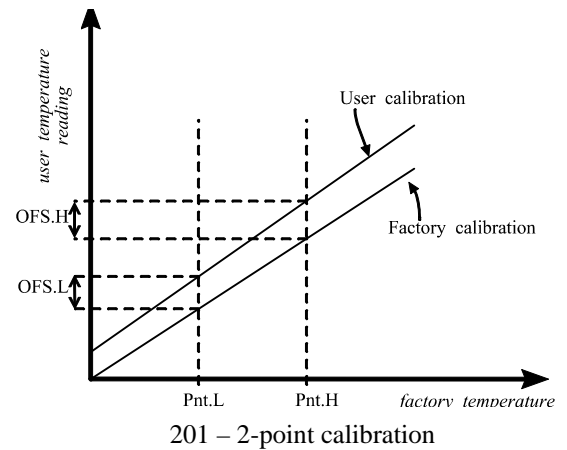
OFS.H offset value for the high temperature

Example: the controller reads 3°C low at 400°C, and 5°C low at 750°C. The parameter values should be Pnt.L=400, OFS.L=3, Pnt.H=750, OFS.H=5.

Negative or positive values can be entered: if the controller is reading high, negative offsets would be appropriate.

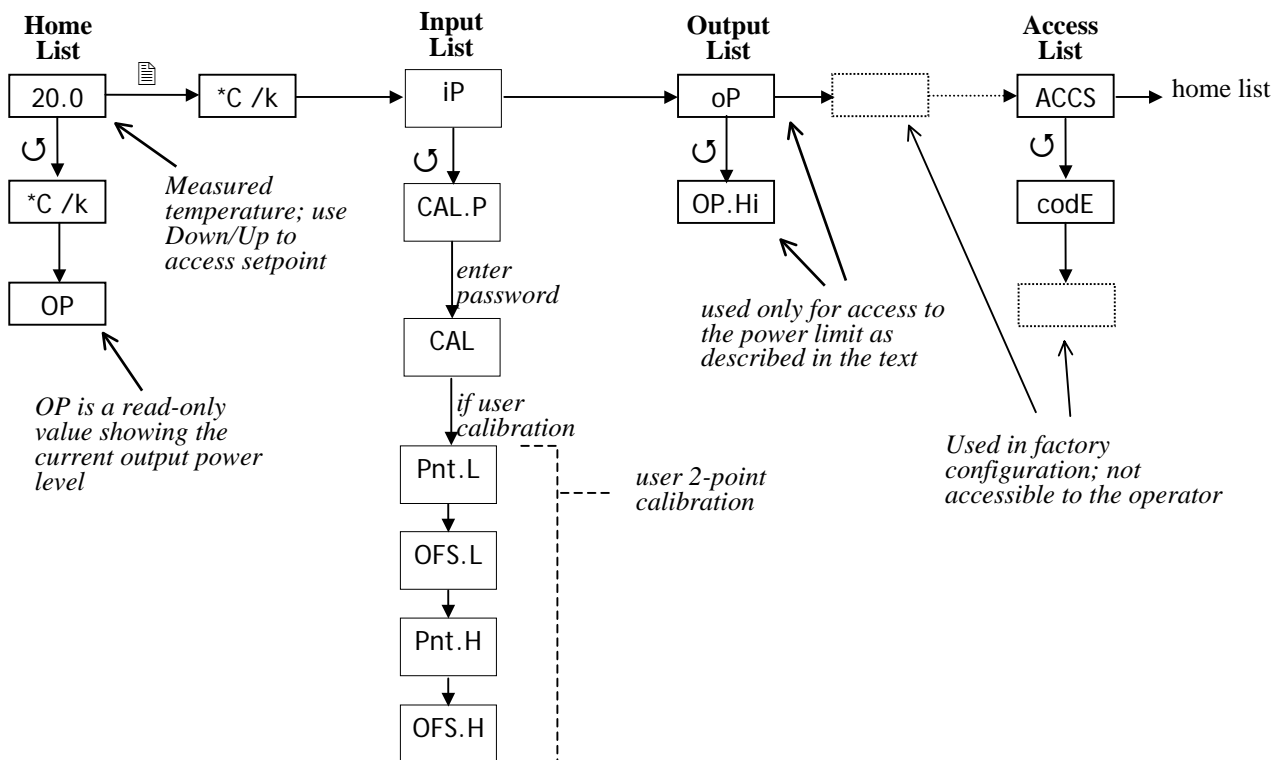
The diagram gives a graphical representation of the 2-point calibration.

Note that each part of the controller is calibrated separately: to calibrate the after-burner controller, hold down the after-burner key during the operations described above.



5.5.5 201 Navigation Diagram

This diagram applies to both the main chamber and after-burner controllers. Hold down the After-burner Controller key for access to the after-burner controller.



6.0

OVERVIEW OF TEST PROCEDURES

6.1 Equipment & Overall Procedures

These procedures assume that the following equipment is available:

- the Asphalt Binder Analyser complete with its internal balance and built-in printer.
- an External Balance for weighing samples before the test; this can be one of two alternatives:
 - an Ohaus Explorer 12kg balance connected by the RS232 interface; use of this model recommended (see section 4.4).
 - any balance (including the Ohaus Explorer not connected) with at least 8.5kg capacity for weighing combined tray & sample, or at least 5kg capacity for separate weighing of tray and sample.
- all other equipment not covered in this manual but required for sample preparation.

When the ABA is first installed, several stages of preparation will be required before routine testing can commence:

- 1 Calibrate the balance – see section 4.3. This must be done otherwise the results will be wrong.
- 2 Obtain the Tray Lift Compensation factor – see section 9.1.
- 3 Enter the parameters required for the type of test to be undertaken, and store them in the “library”. This is described in section 7.0 (Setting Up).
- 4 Obtain the Test Calibration Factor. This involves testing a known sample, using a version of the standard test procedures to compare the test results with the known binder content. The system calculates the factor automatically. See section 9.2.
- 5 Run an actual test. This is described in section 8.0.

It is necessary to gain some familiarity with the internal balance and the computer-style software by which it operates. Some basic information is given in the next few sections.

6.2 Switching On

When the balance is powered up it displays a Welcome message. Press Enter (see photo 6.2) to accept the welcome message. The balance unit displays “LOADING PARAMETERS” followed by the ASPHALT TEST Screen. The screen shows the currently loaded parameters, always the same as those present when the unit was last switched off.

If, with the ABA powered up, the Display On/Off switch (photo 6.2) is operated to switch the balance display off, and then on again, the Carbolite logo is briefly displayed followed by the ASPHALT TEST screen. Note that this switch only affects the display screen.

6.3 Terminology


In this manual the following words are used:

“Menu” is a list of options on the screen. An “option” is one of the items on a menu.

“Scroll” means press one of the arrow keys, perhaps several times. Scroll Up means press the upward arrow, etc.. Scrolling is used to select an option on a menu, or for entering numerical values and library names.

“Highlighted” means white-on-black instead of black-on-white (or the other way round, on the main screen); at any time, one option on the current menu is highlighted. To highlight an option scroll to the option, which will automatically become highlighted.

“Enter” is the name of the key placed in the middle of the scroll keys. To “enter” an option (for example “Enter TRAY WEIGHT”) means: highlight the option, by scrolling if necessary, and then press Enter. See photo 6.2.

“Go Back” is the name of the key marked . This key is rather like a computer Escape key; it goes back to the previous menu. Use of Go Back is a useful way of backtracking from accidental entry to a screen. See photo 6.2.

The “Library” is a storage feature inside the balance. Sets of data (“parameters”) can be stored once and used repeatedly by saving to and loading from the library.

6.4 Entering Values

As well as menu screens, there are several screens where values are to be entered. The general rule is that two values are displayed; the second is the current value, while the first, highlighted, is where the new value is to be entered. There may be a “default value” in the entry area – this is the value which will be accepted if the Enter key is depressed without any alterations to it. Note that using the Go Back key does not enter the value, but leaves the current value unchanged.

To enter a value, scroll left and right to move to the digit position to be altered, and scroll up and down to alter the value of the digit. Up increases the digit value; down decreases the digit value, and also gives access to the minus sign (-) and decimal point (.).

The following picture shows several overlaid menu screens, with a screen for entering values.



Photo 6.1 – tray weight entry screen

6.5 Key Layout

The keys, with their names, are shown here:

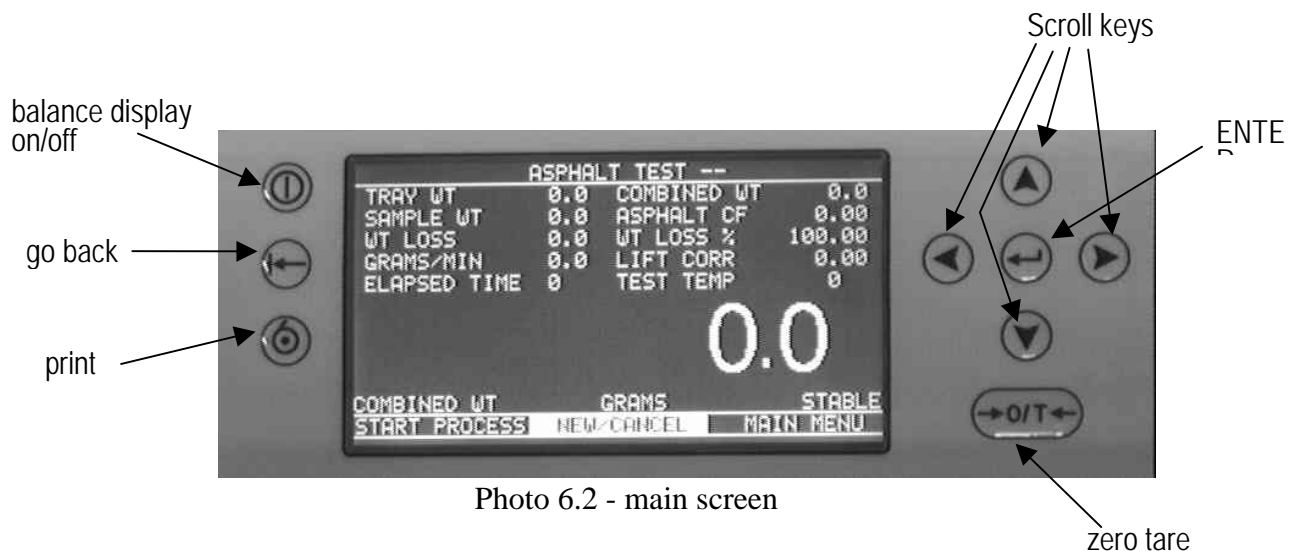


Photo 6.2 - main screen

6.6 Loading Sample Trays

Depending on sample size, either a single sample basket or two baskets can be used. It is recommended that two baskets should be used for samples greater than 1500g to 2000g.. The sample baskets are designed to stack, so two can be fitted on top of the catch tray.

The sample must be evenly spread within the sample basket or baskets.



Always fit the lid and use the clip to secure the lid. An unfastened lid could distort and make contact with a heating element, causing failure.

Use the loading handle to place samples in the chamber, hooking the handle into the front of the catch tray.

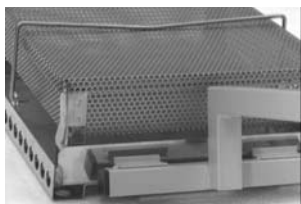


Photo 6.3

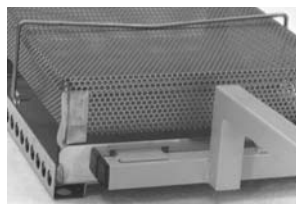


Photo 6.4

6.7 Notes on Temperature Control

When switched on from cold the main chamber temperature quickly rises to the set level, but is not ready for use until “soaked” for 30 minutes. When the ABA has been switched off, remember to switch on 30 minutes before use.

When a test is under way the temperature controller shows an increased temperature. The temperature indicated may be as high as 750°C. This is the flame temperature, and arises from the position of the control thermocouple, which has been chosen to give the best control of the aggregate temperature in the later stages of the test. The sample temperature has been shown by extensive testing not to rise by more than 40°C above the set temperature.

As binder is burnt off heat is given off. The heating elements switch off for part of the test. This is normal; the elements switch on again towards the end of the test cycle.

7.0

SETTING & SAVING TEST PARAMETERS

See flowcharts – section 14.0.

Note: in the current version of the balance software there are two menu screens with the same heading. In the following instructions these are described as ASPHALT TEST SETUP (1) and ASPHALT TEST SETUP (2). The (1) and (2) do not actually appear on the screen.

When the system is first used, it will be necessary to enter a complete set of parameters for controlling tests, and to save these into the library. In some cases, later sections are referred to for obtaining the parameters.

Read through the whole of this section before starting.

The following sections describe how to enter the parameters for a test, excluding the actual starting weights, and save them in the library.

The starting point is the screen headed “ASPHALT TEST -- nn” which appears after switching on (see 6.2). The nn represents the library name (if any) of the current test setup.

At the bottom of this screen is a menu with the options arranged horizontally:

START PROCESS	NEW/CANCEL	MAIN MENU
---------------	------------	-----------

7.1 The Main Menu

Scroll right to MAIN MENU and press Enter. The main menu is displayed:

MAIN MENU
ASPHALT BINDER SETUP
ASPHALT BINDER LIBRARY
SET BALANCE
CHANGE UNITS
BASIC WEIGHING
CALIBRATION
CONTRAST

All the options below the first two are standard Voyager balance features which are covered in the Voyager balance instruction manual. You may wish to enter SET BALANCE to set the date format (to suit US or European format) and to set the date and time; or enter CONTRAST to alter the screen contrast and brightness; or enter CALIBRATION to calibrate the balance (see section 4.3). Take care not to alter other settings under the set balance option.

ASPHALT BINDER LIBRARY allows stored test set-ups (including calibration set-ups) to be retrieved, and also allows unwanted library entries to be deleted. This is referred to later.

7.2 The Asphalt Test Setup (1) Menu

Scroll to ASPHALT BINDER SETUP and press Enter. The setup menu is displayed:

ASPHALT TEST SETUP (1)
ASPHALT TEST (TRAY & SAMPLE WT)
ASPHALT TEST (TRAY & COMBINED WT)
CAL FACTOR (TRAY & SAMPLE WT)
CAL FACTOR (TRAY & COMBINED WT)

The recommended selection for asphalt testing is “tray & combined weight”. This applies when the procedure used for weighing samples is to weigh first the empty tray, then weigh the tray complete with the sample; if it is necessary, because of balance capacity, to weigh the tray and samples separately, select “tray & sample weight”.

The calibration factor set-up is used when testing known samples of hot mix or dry aggregate to define the test calibration factors. Running a hot mix or aggregate calibration test is identical to a

standard test, except that the actual binder content is entered (zero for an aggregate only calibration) and the calibration factor is printed out as either an Asphalt Calibration Factor or an Aggregate Calibration Factor. This calibration factor can then be used in all testing of samples of that nominal specification. See section 9.2.

7.3 **The Asphalt Test Setup (2) Menu**

Scroll to ASPHALT TEST (TRAY & COMBINED WEIGHT) and press Enter. This gives the menu:

ASPHALT TEST SET UP (2)
TRAY WEIGHT
COMBINED WEIGHT
CALIBRATION FACTOR
TRAY LIFT COMPENSATION
FURNACE TEMPERATURE
SET TEST PARAMETERS
SAVE TO LIBRARY
RUN

Notes:

If, in 7.2, ASPHALT TEST (TRAY & SAMPLE WT) is entered, then SAMPLE WEIGHT will show instead of COMBINED WEIGHT.

The bottom line RUN will be “below the screen”, but can be seen by scrolling down.

When setting up for the first time, each of these items requires user values to be entered. It is advisable to set the tray weight and combined weight figures to zero, before the data is stored in the library; actual weight figures should be left until a test is to be made (see section 8.0).

7.4 **Entering the Test Calibration Factor**

The Test Calibration Factor must be obtained by running a special test. This is described in section 9.2.

Scroll to CALIBRATION FACTOR and press Enter. A data screen appears of the type described in 6.4. Enter the calibration factor to the data screen and press Enter. It is not necessary to enter a value if the correct one is already shown (the default value is always the current value) – just press Enter. Pressing Go Back does not enter the value.

If the calibration factor is not yet known, enter zero.

After entering the calibration factor the cursor key moves to RUN. Scroll to highlight other options which need to be entered.

7.5 **Entering the Tray Lift Compensation Factor.**

This parameter allows for compensation for the tray lift caused by the extraction fan. This must be measured after the ABA is installed and should be checked from time to time. To measure the lift, see section 9.1.

Enter TRAY LIFT COMPENSATION and enter the value to the data screen which appears.

7.6 **Entering the Furnace Temperature.**

Enter FURNACE TEMPERATURE to allow entry of the test temperature to be recorded. The value entered does not have any effect on the control of the ABA: this value is included as part of the final test result printout.

7.7

The Test Parameter Setup Screen.

Entering SET TEST PARAMETERS gives the screen

TEST PARAMETER SET UP
SELECT CALIBRATION FACTOR FORMAT
SET MINIMUM GRAMS/MIN TRIGGER
SET MINIMUM % WEIGHT TRIGGER
SET CONSTANT WEIGHT TIME
SET CONSTANT WEIGHT DELAY
SELECT PRINT OUT FORMAT
RETURN TO TEST SET UP

All the items in sections 7.8 to 7.14 must be set before the first test.

7.8 Calibration Factor Format.

Entering SELECT CALIBRATION FACTOR FORMAT gives the options:

SELECT CAL FACTOR FORMAT
ASPHALT BASED CAL FACTOR
AGGREGATE BASED CAL FACTOR

There are some differences in the final calculations. Highlight the appropriate choice and press Enter. The existing setting or default is not shown: if the screen is entered by mistake, press Go Back to exit without making a choice. The type of calibration factor being used is shown on the main screen (photo 6.2).

7.9 Setting the End of Test Trigger Type.

The options SET MINIMUM GRAMS/MIN TRIGGER and SET MINIMUM % WEIGHT TRIGGER are alternatives; they allow the setting of the conditions for the end of the test. In ASTM, the end of test is defined as when the change in weight of the sample does not exceed 0.01% of the initial sample weight. In the British standard it is defined in grams rather than percent, with different values for different aggregate sizes.

Highlight the desired option and press Enter, and then enter the desired weight or percentage value. The type of trigger set is shown on the main screen (photo 6.2).

7.10 Setting the End of Test Trigger Values.

Enter the SET CONSTANT WEIGHT TIME option to define the length of time in minutes for which the weight must be constant for the End of Test to be assumed. For ASTM this is “three consecutive one minute intervals”. Enter the value (e.g. 3) to set this constant weight time; adjust as required to suit other standards or to tighten the test.

Enter the SET CONSTANT WEIGHT DELAY to prevent a false End of Test condition from being detected at the start of the test. It allows for a delay in minutes before the end of test trigger (based on constant weight time) can cut in. Set a suitable value, such as 10 minutes.

When testing an aggregate to determine an aggregate only calibration factor the weight change may be so small that the trigger would cut in prematurely. The constant delay weight delay should be set to an extended time, say 40 minutes.

7.11 **The Printout Format.**

Enter SELECT PRINT OUT FORMAT to choose Full Data or Basic Data, with the screen

SELECT PRINT OUT FORMAT
PRINT OUT BASIC DATA
PRINT OUT FULL DATA

Full data gives a print out every minute with calculated results at the end; basic data just gives the end results. Highlight the desired choice and press Enter. The existing setting or default is not shown: if the screen is entered by mistake, press Go Back to exit without making a choice.

7.12 **Leaving the Test Parameter Setup screen.**

Enter RETURN TO TEST SET UP to go back to the Asphalt Test Set Up (2) screen. The RUN line will be highlighted.

All the parameters which have been entered can now be saved to the “library”. This will avoid re-entry of the same data next time, and allow test parameters to be retrieved in future quickly and reliably. If you do not want to save the parameters to the library, proceed to section 7.14.

7.13 **Saving to the Library.**

Scroll up to SAVE TO LIBRARY and press Enter. The next screen asks for the Library Name: this means the name that the particular set of parameters is to be saved under. The default name is the last name loaded or save, reset to blank when the power is turned off. Note that accepting the default name, or using a previously used name, does not overwrite the previous data, but creates another library entry of the same name. This could be confusing.

To set the name, use the scroll buttons to select the characters from the set Space, 0-9 and A-Z and then press Enter. It is probably helpful to use simple names such as ASTM, or A1, A2, etc.. When it comes to retrieval of the library parameters, each entry is identified by both the name and the calibration factor. For a setup with a calibration factor based on asphalt, the calibration factor in the library name is preceded by CFAS=. For a setup with a calibration factor based on aggregate, the equivalent is CFAG=. This means that the same name can be used for more than one entry: for example, for the same test (e.g. ASTM), but for different sample types which have different calibration factors.

The picture shows an example of a library containing two entries.

Another possibility is to include the unit identity in the library name. The balance does not print out any form of self-identification; if there are several binder analysers in the laboratory, inclusion of an identity code (e.g. ABA1, ABA2) in the library name will assist traceability procedures.

The library has a capacity of 25.



Photo 7.1

7.14 **Returning to the Asphalt Test Screen.**

Enter RUN to go back to the original screen. Note that the RUN option just goes back to the main screen: it does not actually start a test.

8.0 RUNNING A TEST

See flow charts – section 14.0.

8.1 Starting the Furnace

Switch the ABA on and set the controller to the desired test temperature. The main chamber temperature is normally set to around 480°C to 540°C; after switching on from cold allow it to soak at this temperature for 30 minutes. The after-burner should be set at 900°C. See section 5.5.

8.2 Setup

Before the first test it will necessary to go through all the setup procedure of section 7.0. At other times it will normally only be necessary to select a setup from the library. To do this, enter MAIN MENU, then ASPHALT BINDER LIBRARY. A list of library names (if any) is displayed. Scroll to the desired library name, and press Enter. Then scroll to RUN and press Enter. The selected library name then appears as part of the heading of the ASPHALT TEST screen.

8.3 Entering Weights

If the external balance (not supplied) being used has capacity under 7kg then you may need to enter the weight using the tray & sample weight option.

If separate tray weights and sample weights are to be entered, enter MAIN MENU, then ASPHALT BINDER SETUP, then ASPHALT TEST (TRAY & SAMPLE WEIGHT), as described in sections 7.0 to 7.2 above.

If the combined weight approach is being used, then there is a short-cut. With NEW/CANCEL highlighted, press Enter. This leads directly to TRAY WEIGHT on the Asphalt Test Setup (2) screen.

ASPHALT TEST SET UP (2)
TRAY WEIGHT
COMBINED WEIGHT
CALIBRATION FACTOR
TRAY LIFT COMPENSATION
FURNACE TEMPERATURE
SET TEST PARAMETERS
SAVE TO LIBRARY
RUN

Enter TRAY WEIGHT. A screen of the type described in 6.4 appears containing two numbers (they may be 0.0 and 0.0). Unless the weight is to be entered automatically using an external balance linked through the RS232 interface, enter the weight of the empty sample basket assembly and catch tray.

To enter a value directly from the external balance, where the balance is an Ohaus Explorer connected by an RS232 cable, then, with the tray in place and being weighed on the external balance, press the Print key on the external balance. The weight will be sent to the internal balance and displayed on the screen. This procedure speeds up data entry and avoids operator error. See section 4.4 for setting up the external balance.

After entering the tray weight the display changes to a screen for combined weight; again, manual or automatic entry can be used, in the way described above.

Enter COMBINED WEIGHT in the same manner, manually or using the external balance (if the SAMPLE WEIGHT option was earlier selected, then enter this manually).

8.4 **Entering the Calibration Factor**

This may need to be entered at this point, depending on whether the test is of the same type as the previous.

Enter CALIBRATION FACTOR in the same manner as the weights above. The default value may be correct for this entry.

8.5 **Returning to the Main Menu**

Enter RUN to return to the main menu. Run does not cause a test to start: it just goes back to the main screen.

8.6 **Starting the Test**

Ensure that the chamber is at temperature, and empty, and that the fan is off.

Press the Zero Tare button to zero the balance (photo 6.2). Then open the door and place the sample basket assembly and catch tray complete with the sample into the chamber; shut the door.

Note that the combined weight display is typically 1g to 5g higher than that measured on the external balance, because of temperature effects. This gives the odd effect of showing a negative weight loss in the first few minutes of the test, and is normal: this error is eliminated by the end of the test when the sample and baskets have reached the same temperature as the chamber.



Scroll left to START PROCESS and press Enter. The door locks and the extraction fan starts automatically. Check that the door locked lamp is lit – see section 2.4.

A flashing asterisk next to Elapsed Time on the main display indicates that the test is underway. During the test the main display shows the progress by constantly updating the elapsed time and the weight. The weight shown is the present Sample Weight: the balance automatically subtracts the tray weight. All key functions except NEW/CANCEL are locked out.

During test, at the time when the rate of weight loss of the sample is at its highest, there may be some light smoke emitted from the chimney.

8.7 **Power Failure During Test**



The door remains locked after a power failure. The key switch can be used to override the lock, but this feature is not recommended because of danger to the operator. Note that when power returns the display shows the Carbolite logo on the screen.

The correct way to make it safe to open the door after an interrupted test is to restart the test (select START PROCESS from main menu) - it is not necessary to input correct parameters - and allow the system to end the test automatically, at which point the door safely unlocks. The test results should be discarded.

If the sample temperature within the chamber is under 120°C, or if there is no sample present in the chamber, then it is permissible to start a test and immediately cancel it using the procedure given in section 8.9.

8.8 **Ending the Test**

When a test is completed, i.e. when constant weight is achieved for the length of time specified in the parameters, it ends automatically. An end-of-test alarm sounds, with bleeps every 10 seconds. The screen shows the Binder Content result, and a final printout is produced. The door lock indication lamp goes out, and the door can be opened. The alarm can be cancelled by pressing Zero Tare (O/T) or by entering NEW/CANCEL, but it cannot be cancelled during printing.

Additional final prints can be obtained by pressing the Print button (photo 6.2).

8.9 Cancelling the Test

A test can be cancelled. Select NEW/CANCEL and press Enter. A password must then be entered. The password should be communicated only to authorised operators: this is a safety feature because of the danger of opening the door part way through a test (the operator should know the danger: others may not). The password is fixed at 728.

It is safe to cancel a test by this method if there is no sample in the chamber (e.g. if a “test” has been started by accident), or if the sample temperature is less than 120°C. At other times it is not safe to cancel a test, and the test should be allowed to go to completion even if the results are not required.



9.0 CALIBRATION & TRAY LIFT

9.1 Tray lift Compensation

The air flow through the chamber causes lifting of the sample tray and balance; the amount of lift should be measured as follows, to obtain the Tray Lift Compensation factor.

Load the chamber with empty sample basket assembly and catch tray (see section 6.6) after it has reached its normal running temperature (e.g. 500°C). Allow the baskets to heat up for 10 minutes. Zero the balance using the Tare button (photo 6.2), and switch on the extraction fan using the manual switch (photo 5.1). The fan starts and the load appears to reduce in weight, and shows about -0.2 to -0.5 g. This value is the TRAY LIFT COMPENSATION factor, and is entered as a positive value (e.g. -0.2 gives a compensation of 0.2).

9.2 Test Calibration Factor

The overall test procedure is calibrated by running the test procedure with a known sample. There is a special variant of the test procedure for this purpose, and the system automatically calculates the calibration factor.

Obtaining the calibration factor is similar to setting up (section 7.0) and running a test (as in section 8.0), but with minor differences as follows.

In the ASPHALT TEST SETUP screen scroll to CAL FACTOR (TRAY & COMBINED WEIGHT) instead of Asphalt Test. The next screen is similar to the ASPHALT TEST SETUP screen except for the heading and the third menu option:

CALIBRATION FACTOR SET UP
TRAY WEIGHT
COMBINED WEIGHT
CALIBRATION BINDER CONTENT %
TRAY LIFT COMPENSATION
FURNACE TEMPERATURE
SET TEST PARAMETERS
SAVE TO LIBRARY
RUN

Use CALIBRATION BINDER CONTENT % to enter the known content. This is zero for an aggregate only test.

Enter all the other required data, as for a normal test. The final print out will give the Calibration Factor.

Make sure that the correct type of calibration factor is selected: see section 7.8.

10.0 MAINTENANCE & REPAIRS

10.1 Safety Note - Refractory Fibrous Insulation



This ABA contains refractory fibres in its thermal insulation. These materials may be in the form of fibre blanket or felt, vacuum formed board or shapes, mineral wool slab or loose fill fibre.

Normal use of the ABA does not result in any significant level of airborne dust from these materials, but much higher levels may be encountered during maintenance or repair.

Whilst there is no evidence of any long term health hazards, we strongly recommend that safety precautions are taken whenever the materials are handled.

Exposure to dust from fibre which has been used at high temperatures may cause respiratory disease.

When handling fibre always use an approved mask, eye protection, gloves and long sleeved clothing.

Avoid breaking up waste material. Dispose of waste fibre in sealed containers.

After handling rinse exposed skin with water before washing gently with soap (not detergent). Wash work clothing separately.

Before commencing any major repairs we recommend reference to the European Ceramic Fibre Industry Association Bulletin No. 11 and the UK Health and Safety Executive Guidance Note EH46.

We can provide further information on request. Alternatively our Service Department can quote for any repairs to be carried out at your premises or ours.

10.2 General Maintenance

Regularly clean the plenum chamber, as described below.



The outer surface of the unit may be cleaned with a damp cloth. Do not allow water to enter the interior of the case or chamber. Do not clean with organic solvents.

Occasionally remove the lower side panels and clean out any accumulated dust in the balance compartment. If necessary, remove the balance assembly and give a thorough cleaning.

If the ABA is used below its maximum temperature of 750°C, then regularly heat it up to 750°C for one hour, without load, to burn off any accumulated soot.

10.3 Cleaning the Plenum Chamber & Fan Impeller



Remove the upper side access panel, and the cover of the plenum chamber. Clean out all accumulated soot and debris using a vacuum cleaner. Also clean any accumulated soot from the fan impeller located at the back of the plenum chamber. If the accumulation of soot on the impeller is great it may be necessary to remove the motor/impeller assembly from the back of the plenum chamber to give good access for cleaning.

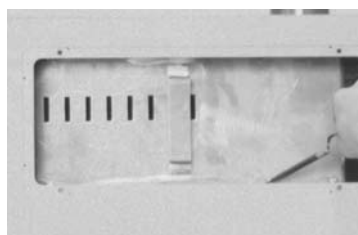


Photo 10.1



Photo 10.2

accessing the plenum chamber

10.4 Temperature Control Calibration

After prolonged use the controller and/or thermocouple could require recalibration. A quick check using an independent thermocouple and temperature indicator should be made from time to time to determine whether full calibration is required. Carbolite can supply these items. Details on calibration of the 201 controller are given in section 5.5.4.

10.5 After Sales Service

Carbolite has a team of Service Engineers who repair furnaces both at our factory and at our customers' premises throughout the world. We also sell spares by mail order. A telephone call or fax to our Service Department often enables a fault to be diagnosed and the necessary spare part despatched.

Each unit made has its own record card at Carbolite. In all correspondence please quote the model type (ABA 7/35) and serial number as given on the rating label. The serial number and model type are also given on the front of this booklet when supplied together with a new unit.

10.6 Recommended Spares

Carbolite can supply individual spares, or a kit of the items most likely to be required. Please consult Carbolite Sales Department for details of recommended spares. See also section 13.3.

10.7 Temperature Controller Replacement



Disconnect the equipment from the power supply.

The 201 controller is fitted to the back of the control panel. The control panel can be separated from the base by slackening two screws and sliding the panel to the left.

Before handling the controller: **wear an anti-static wrist strap** or otherwise avoid any possibility of damage to the unit by static electricity.

See the instructions supplied with the replacement controller.

10.8 Solid-state Relay Replacement



Disconnect the equipment from the supply and remove the back panel.

Make a note of the wire connections to the solid state relay, and disconnect them.

Remove the solid state relay from the aluminium plate.

Replace and reconnect the solid state relay ensuring that a thin layer of white, heat-conducting silicon paste (as supplied) is applied between the new relay and the base panel.

The new solid state relay contains a built-in MOV which protects it from short periods of excess voltage. If the old relay had a separate disc-shaped "MOV" connected between the high voltage terminals of the old relay, discard the old MOV.

Replace the removed panel.

10.9 Thermocouple Replacement



Disconnect the equipment from the supply, and remove the back panel.

Make a note of the thermocouple connections. The negative leg of the thermocouple is marked blue. Compensating cable colour codings are *negative*: white, *positive (type K)*: green

Disconnect the thermocouple from its terminal block.

Unscrew the screw and wire fixing to release the thermocouple sheath, withdraw the sheath, and shake out any fragments of thermocouple.

Re-assemble with a new thermocouple observing the colour coding, ensuring that the thermocouple is not twisted as it is being inserted and that screw fixing is used to grip the sheath.

10.10 Element Replacement

If the elements should require replacement a complete insulation assembly or a new insulated chamber will be supplied.

10.11 Door Plug Replacement

Contact Carbolite Service Department should this require maintenance.

10.12 Catch Tray Straightening

The stresses caused by repeated heating and cooling can cause the catch tray (page 3) to distort, allowing the catch tray to rock in use, giving an unstable balance reading. The distortion takes the form of two opposite corners bending up and the other two opposite corners bending down.

Straighten the tray by resting the two lower corners on supports, and pressing down on the higher corners. Repeat this operation until the tray is flat.

11.0 FAULT FINDING

Disconnect the equipment from the supply before carrying out any internal investigation.

Furnace Does Not Heat Up

The Heat lamp is On	→	The heating element has failed		→	Check also that the SSR is working correctly	
The Heat lamp is Off	→	The controller shows a very high temperature or a code such as S.br		→	The thermocouple may have broken or may have a wiring fault	
	→	The controller shows a low temperature		→	The door switch may be faulty	
				→	A relay may be faulty	
				→	The SSR could be failing to switch on due to internal failure, faulty logic wiring from the controller, or faulty controller	
	→	There are no lamps glowing on the controller	→	The Supply lamp is On	→	The controller may be faulty or not receiving a supply due to a faulty switch or a wiring fault
			→	The Supply lamp is Off	→	Check the supply fuses and any fuses in the control compartment

Furnace Slow To Heat Up

One of the Heat lamps does not light	→	A fuse may have blown	→	Check the Supply fuses
The Heat lamps all light up	→	An element may have failed		

Furnace Overheats

The Heat lamp goes Off with the instrument switch	→	The controller shows a very high temperature	→	The controller may be faulty
	→	The controller shows a low temperature	→	The thermocouple may have been shorted out or may have been moved out of the heating chamber
			→	The thermocouple may be mounted the wrong way round
			→	The controller may be faulty
The Heat lamp does not go off with the instrument switch	→	The SSR has failed "ON"	→	Check for an accidental wiring fault which could have overloaded the SSR
A high temperature (750°C) is shown during test	→	No fault – see section 6.7		

Chimney Emits Smoke

Some light smoke is emitted in the middle of the test	→	No fault – see section 8.6		
Dense smoke is emitted	→	The after-burner chamber temperature may not be set high enough	→	Set the secondary controller temperature to 900°C
	→	The after-burner elements or control may have failed	→	Investigate or contact Carbolite
	→	A fuse may have blown	→	Check the Supply fuses

continued

<u>Warning Lamp & Door Faults</u>			
Red Electric Shock Risk lamp lights when door is opened	→	Failed cut-off relay SR1 or SR2	→ DO NOT USE until relay replaced
	→	Fuse for left side of chamber blown	→ Check and replace fuse
Red Electric Shock Risk lamp does not light when tested	→	Faulty lamp	→ DO NOT USE until lamp replaced
	→	Faulty relay SR3 or SR4	→ DO NOT USE until relay replaced
	→	Faulty momentary switch	→ DO NOT USE until switch replaced
	→	Faulty door switch	→ DO NOT USE until door switch replaced
Door does not unlock	→	Furnace may have been turned off during a test or there may have been a power failure during a test	→ Enter START PROCESS then cancel the test.
	→	Failure of interface board	
	→	Loose connection lead	→ Check all leads
Door does not lock at start of test	→	The key has been used and left in unlocked position	→ Set the manual override to the locked position
	→	Wrong internal or external balance set up	→ Check baud rate etc.
	→	Door switch failure	
	→	Interface board failure	
	→	Loose connection lead	→ Check all leads
	→	Printer fault or printer turned off	→ Turn printer on
<u>Balance Errors</u>			
Error message on selection of tray weight etc.	→	Printer not turned on	→ Turn printer on
	→	Loose connection lead	→ Check all leads
	→	Failure of interface board	
Error message on selection of start of process	→	Printer not turned on	→ Turn printer on
	→	Loose connection lead	→ Check all leads
	→	Failure of interface board	
Balance display not stable	→	Balance not properly installed	→ Re-install balance
	→	Balance pan extension not free to move	→ Check for obstructions such as aggregate in the balance pan extension holes
	→	Loose wires obstructing balance pan	→ Check control compartment
	→	Unit not on firm base	→ Reposition ABA or adjust stand
	→	Fan motor support bracket has failed	→ Check/adjust motor support bracket
	→	Fan failure causing vibration	→ Check/replace motor or impellor

continued

Balance parameters not loading properly. Error 1.2 displayed	→	Faulty display relay board	→	Replace – contact Carbolite
	→	Loose connection lead	→	Check all leads
	→	Faulty balance	→	Contact Carbolite
Carbolite logo screen displayed after a test has started	→	Power interruption during test	→	See section 8.7
Balance display locks up	→	Software problem	→	Switch the Instrument switch off and on to re-boot the balance software
Dot Matrix display not lighting up	→	Connection lead or power lead may be loose	→	Check all balance connection leads
	→	Internal low voltage supply may have failed	→	Replace power supply
	→	Other component failure		

Fan Problems

Fan not switching off	→	Furnace just switched on	→	Open the door
	→	Fan switch in On position	→	Put Fan Switch into Off position
	→	Power interruption during test	→	See section 8.7
	→	Faulty relay in fan circuit	→	Check relays FL and FS
Fan not switching on	→	Fan motor failure	→	Replace motor
	→	Faulty relay FS	→	Replace relay
	→	Interface board failure		
	→	Loose connection lead	→	Check all leads
	→	Printer turned off	→	Turn printer on

Test Problems

Early termination of test	→	Test parameters of trigger weight set too high	→	Adjust to suitable setting
	→	Test parameter of constant weight delay set too low or zero	→	Adjust to correct setting and save; delete any old setting
	→	Balance unstable	→	See balance errors

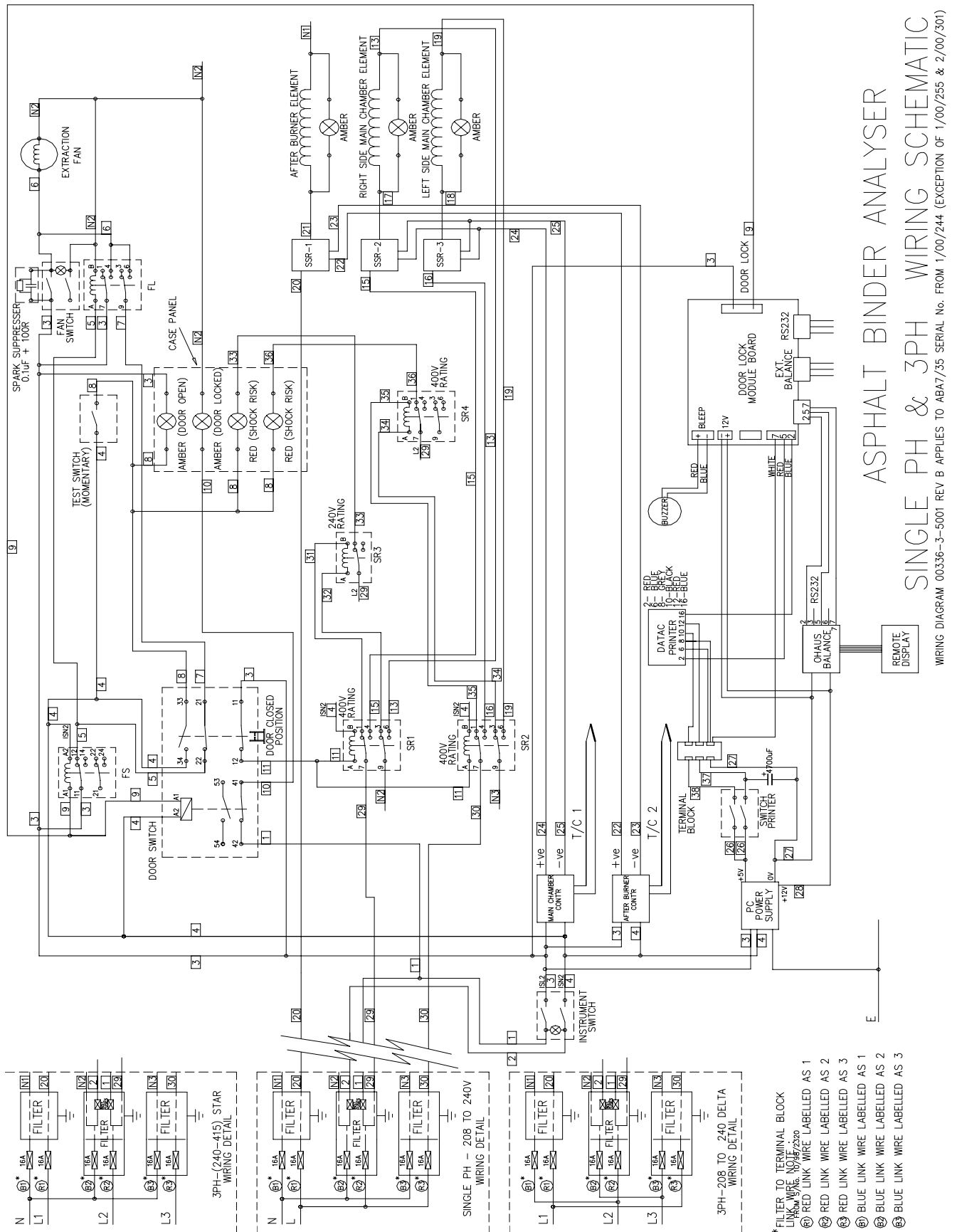
Printer Problems

Printer does not print	→	Faulty supply switch		
	→	Faulty printer		
	→	Loose lead	→	Check connector at back of printer
	→	Wrong settings in printer	→	See 13.1

12.0 CIRCUIT DIAGRAMS & FUSES

12.1 Circuit Diagram

Note that the diagram applies to single and three phase models, with differences only in the connections to the supply terminal blocks.



12.2 Fuses

The following fuse types are present:

Supply Fuses: 32mm x 6mm glass type F, 16A – 6 total
(4 on board EMC filter units; 2 in separate holders)

Auxiliary Fuses (on board EMC filter unit): 20mm x 5mm glass type F, 2A.

12.3 Customer Supply Fusing

High break capacity fuses should be used. Avoid fast-blow fuses and magnetic trip circuit breakers - consult Carbolite if in doubt.

The supply fuse rating should be as follows:

Phase/Volts	Supply Fuse Rating
1-phase models, 200V to 240V	40A
3-phase with neutral, 380/220V to 415/240V	16A per phase
3-phase delta, 200V to 240V	25A per phase

12.4 Power Settings

The ABA 7/35 uses electronic power limiting to enable the same heating elements to be used over the complete range of voltages from 200V to 240V.

If the equipment is to be connected to a different voltage then it is important to alter the power limit parameter; instructions, and a table of values, are given in section 5.5.3.

13.0 USEFUL DATA**13.1 Printer Configuration**

To access the printer configuration mode:

- Twist the black knob on the front of the printer and pull the printer panel downwards.
- Turn the power on with the printer X button held down.
- To select the next parameter press the printer scroll button.
- To change a parameter setting press the X button.
- To accept changes press X and Scroll simultaneously

The following parameters are set as standard:

Data bits	7
Parity	none
Baud Rate	2400
Country	UK
Print Mode	Text
Auto-off	Disabled
Emulation	Standard
DTR	Normal
Interface	Serial
Mechanism	M192
Loop-back	Not Present

Up to serial no. 1/01/5 the standard data bits parameter was 8.

13.2 Ohaus Balance Configuration

To access the balance parameters, select SET BALANCE from the main menu.

The following parameters are set as standard:

Read out	
Averaging level	1
Stability level	1
Auto zero	0.5
Legal for trade	Off

Interface	
Baud Rate	2400
Data bits	7
Parity	none
Stop bits	2

Up to serial no. 1/01/5
the standard data bits and
stop bits parameters were
8 and 1.

Print Options	
<i>all items</i>	Off

Set-up GLP	
<i>all items</i>	leave existing settings

13.3 Spare Parts

Spare parts for the equipment can be obtained from Carbolite. The telephone number for sales is on the back page of this manual. Identify the part; if in doubt about its name, describe its function, appearance or position.

Always quote the model name (ABA 7/35) and serial number. See the rating label for the serial number (or this manual, if supplied with a unit).

Technical note: this model is designed with components which are “universal” for most voltages and frequencies. This may not apply to replacement fans issued before April 2001 – see the note on frequency in section 3.6.

13.4 Consumables

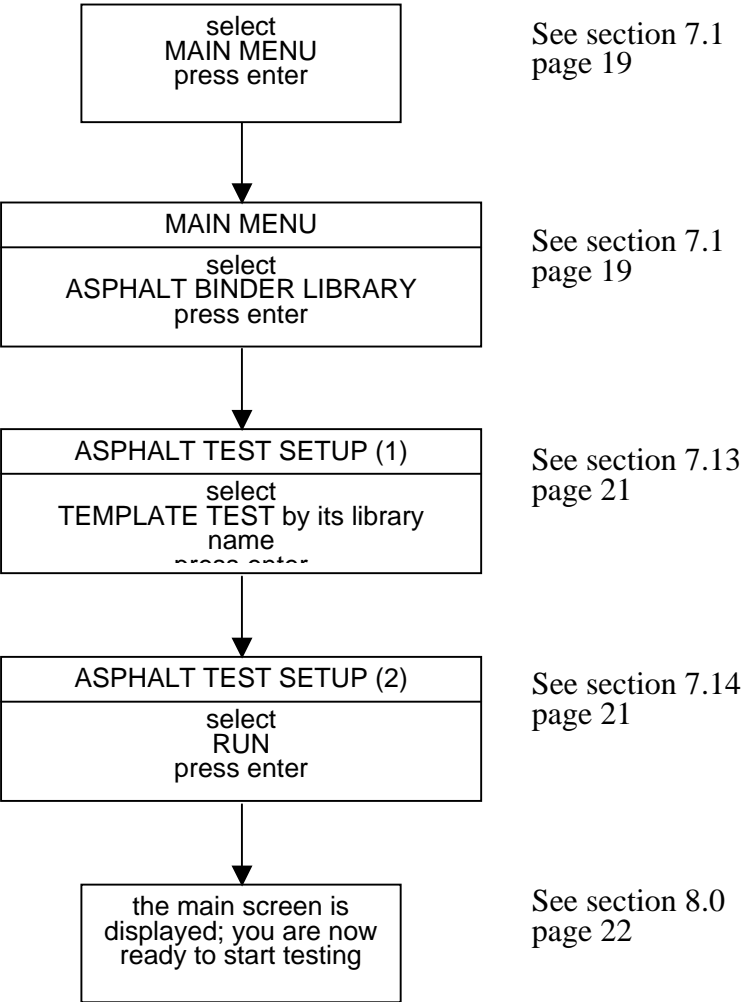
Printer Paper: standard till roll paper 2¼" (57mm) wide.

Printer Ribbon: Epson ERC-09.

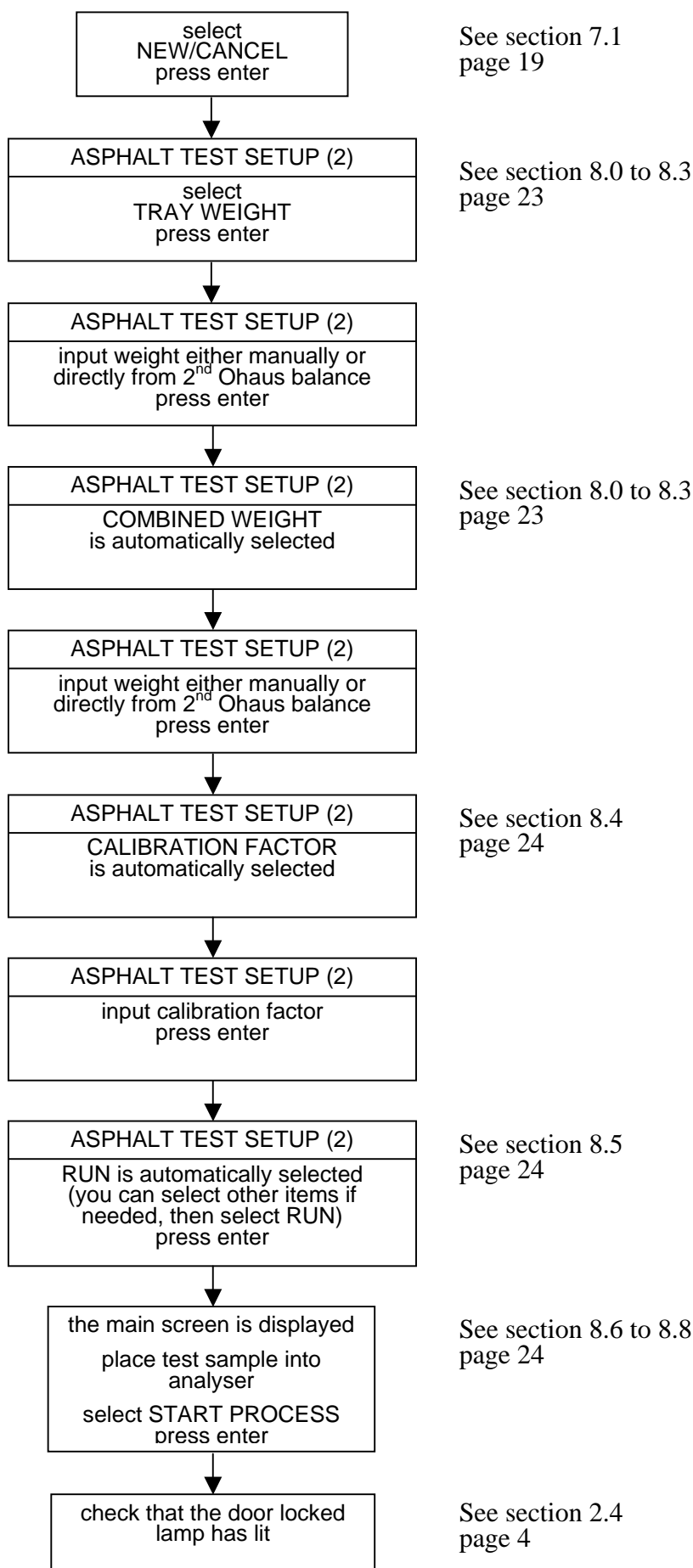
14.0 **FLOW CHARTS**

The flow charts summarise the operations explained in detail in sections 7.0 & 8.0, and can be used by the operator for rapid familiarisation with the ABA operation.

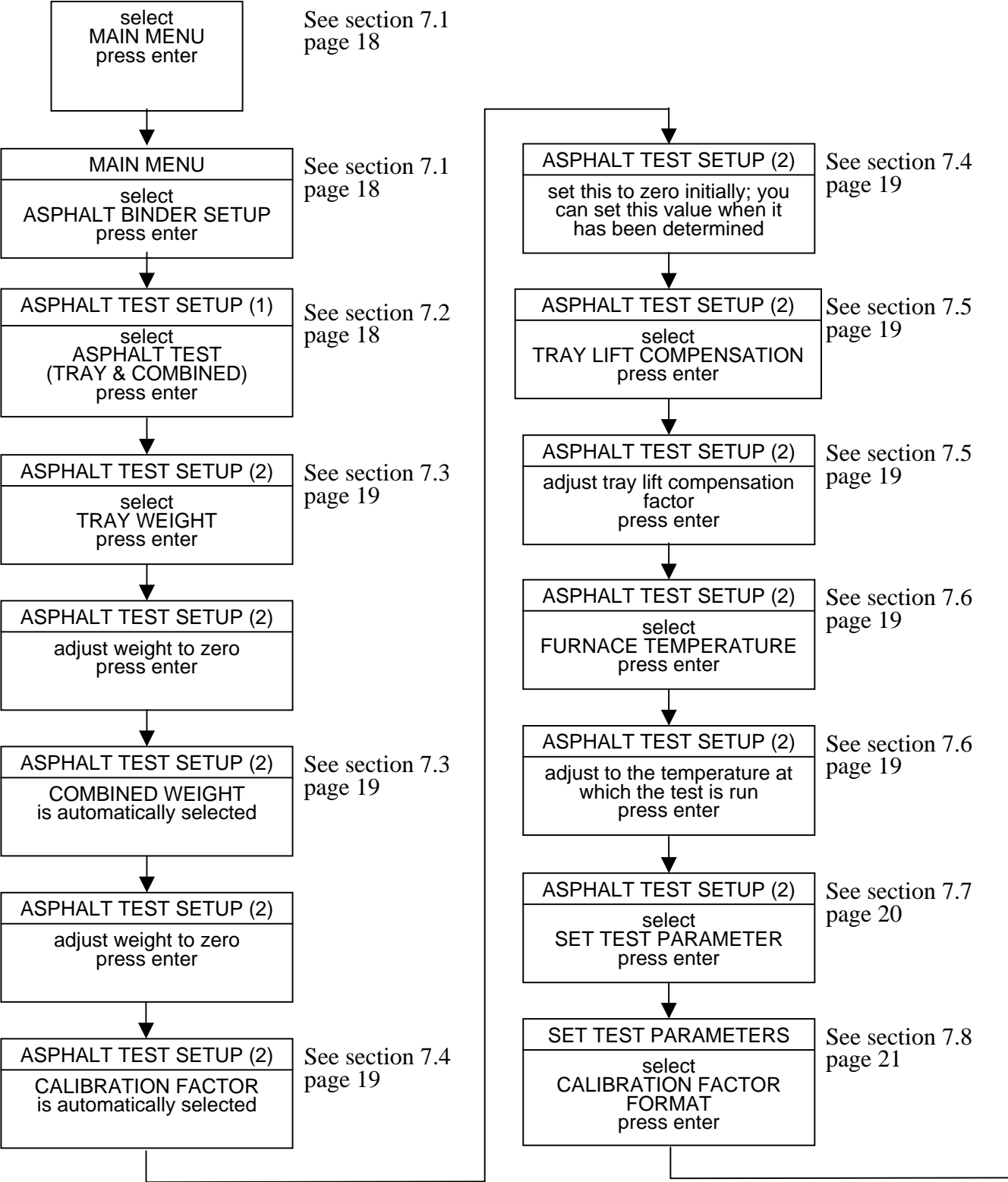
14.1 **Loading a Template from the Library**

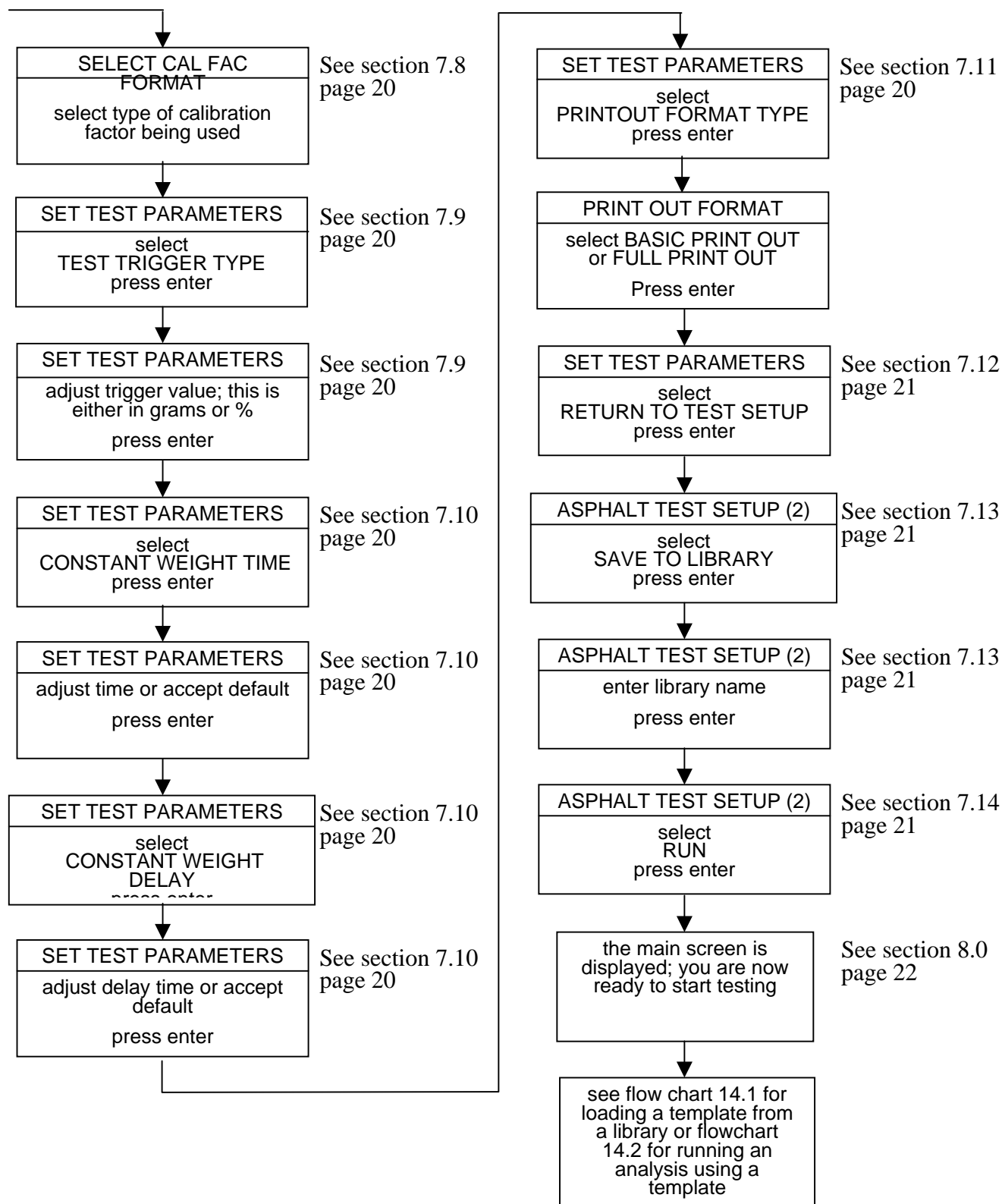


14.2 Running an Analysis



14.3 Setting Up a Template for Testing







Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.



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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.