



SERVOTOUGH FluegasExact 2700

QUICK START MANUAL

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1. INTRODUCTION

1.1 Warnings, Cautions and Notes

This manual includes **WARNINGS**, **CAUTIONS** and **NOTES** which provide information relating to the following:



WARNING

Warnings highlight specific hazards which, if not taken into account, may result in personal injury or death.

CAUTIONS

Cautions highlight hazards which, if not taken into account, can result in damage to the analyser or to other equipment or property.

NOTES

Alert the user to pertinent facts and conditions.

1.2 Scope of this manual

This manual describes the operation of the SERVOTOUGH FluegasExact Combustion Gas Analyser, abbreviated to “the analyser” in the remainder of this manual, and details the various options that are available.

- For installation details and technical specification, see the Installation Manual (part no. **02700005D**).
- For servicing details, see the Service Manual (part no. **02700002D**). This is written for use by suitably qualified personnel.
- For the addresses for technical assistance and spares, see the rear cover of this manual.

About this manual

Reference: 02700/003D/1
Order as part number: 02700003D

Figure 1

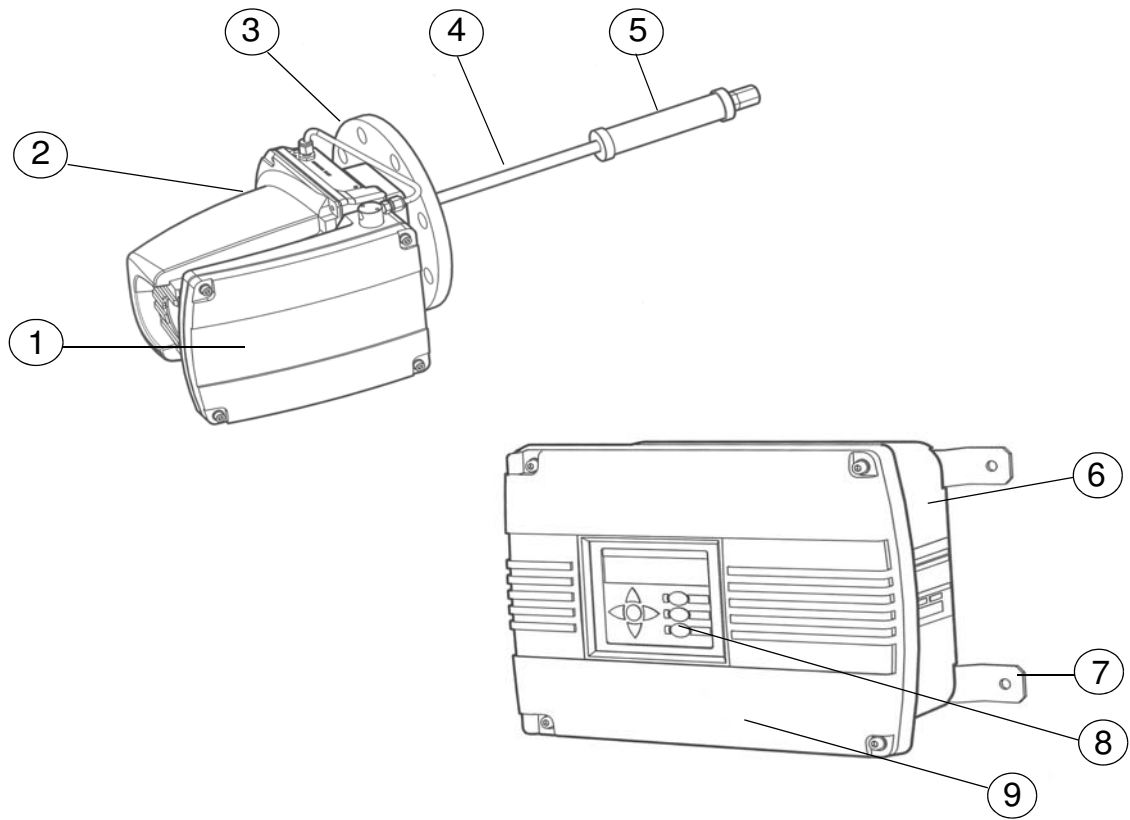
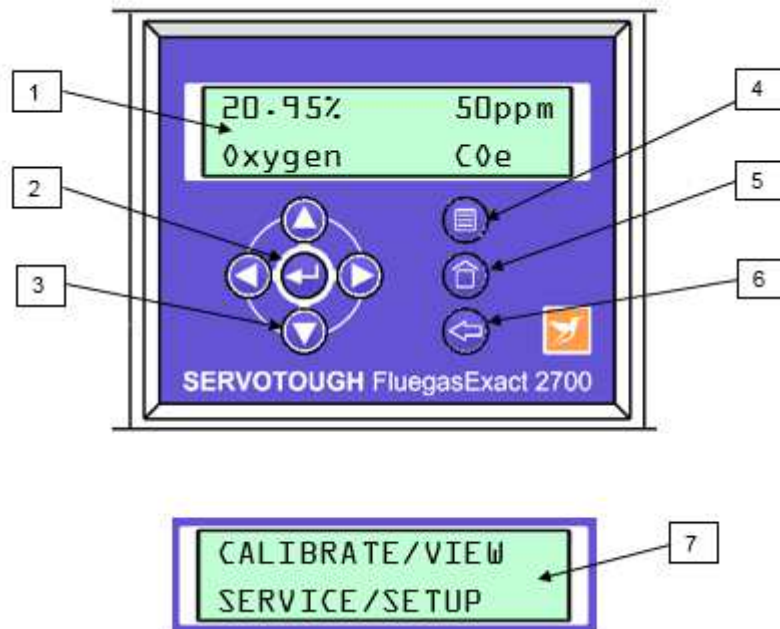


Figure 2



1.3 Key to Figures on inside of front cover of this manual

(Figures 3a and 3b can be found at the end of this manual)

Key to Figure 1 - Typical sensor head and control unit

- | | | | |
|---|--------------------|---|----------------------|
| 1 | Terminal box | 6 | Control unit |
| 2 | Sensor head | 7 | Wall mounting straps |
| 3 | 4" mounting flange | 8 | Display and keypad |
| 4 | Sample probe | 9 | Hinged access door |
| 5 | Sample filter | | |

Key to Figure 2 - Control unit display and keypad layout

- | | | | |
|---|------------------------------|---|-------------------------------|
| 1 | LCD with measurement display | 5 | MEASURE/HOME key |
| 2 | ENTER key | 6 | QUIT key |
| 3 | ARROW keys | 7 | Alternative main menu display |
| 4 | MENU key | | |

NOTES

As good practice it is recommended that the analyser is checked/validated with check gas every month and then calibrated as required. This period can be extended as a result of operating experience.

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2. STARTUP AND SHUTDOWN

2.1 Analyser startup

CAUTION

If the analyser is to be installed in a low temperature environment (-20°C) then it should be powered up for a period of two hours before the compressed air aspirator supply is applied. This prevents corrosive sample gases from condensing inside the sensor head pipe work.

If the sensor head and sample probe have been removed from the flue, then refit the sensor head and sample probe to the flue and reconnect any interconnecting wiring (see Installation Manual).

Switch on the electrical power to the sensor head and to the control unit.

Leave the unit for two hours to warm up and then check that no faults are indicated on the control unit display screen.

Connect the aspirator air supply to the sensor head. The correct operating pressure is stated on a label attached to the inside of the terminal enclosure on the side of the sensor head.

If necessary, connect calibration gases to the sensor head to verify correct operation. See Section 3.4 for Calibration procedure.

NOTES

- The analyser should be allowed to stabilise for several hours (typically overnight) before calibration.
- It is then recommended that calibration gases be passed through the sensor head to confirm operation of the analyser.

2.2 Analyser shutdown



WARNING

The sensor head is heated and may be attached to a hot flue. The external surfaces will be uncomfortably hot even after power down for several hours. Exercise care when handling the sensor head even when unpowered on a hot flue.

CAUTION

- The sensor head should always be powered when left on a flue which is in use. If left un-powered, the sensor head can suffer corrosion damage.
- If the process is out of service for a short time it is recommended that the analyser sensor head is left powered. It is not essential that the aspirator air is left flowing.
- If the analyser has to be switched off for more than 1 week whilst on a flue which is in use, it is recommended that a flow of dry air be connected to the calibration port. Alternatively, the sensor head can be removed from the flue and a blanking plate fitted. This will prevent corrosive gases from entering the sensor head.

Attach a dry air supply to the calibration port of the sensor head and purge the sensor head for 5 minutes at 600 ml/min flow rate. The aspirator air supply should be left on at this point.

Switch off the aspirator air supply to the sensor head.

Switch off the electrical supply at the control unit and then at the sensor head.

Leave the sensor head to cool down for a minimum of two hours.

If the analyser is to be un-powered for more than 1 week then please note the cautions above.

3. OPERATION

3.1 Operating the analyser (Refer to Figure 2)

The control unit has a tactile 8 button keypad and back lit LCD (2 lines x 16 characters). During normal use the LCD will display either the default measurement display or a menu-based screen editor display. A user can toggle between the menu display and measurement display and access the menu-based screen editor using the keypad.

The functions of the keys on the keypad are:

MEASURE/ HOME	Returns the analyser to the measurement display.
MENU	Activates the top level menu of the screen editor.
QUIT	Aborts the current activity returning the screen editor to the menu level at which the activity was selected.
ARROWS	Arrow keys select the desired option. When entering numeric information, the left and right arrow keys are used to move between digits and the up and down arrow keys are used to change the value of each digit. The active digit is highlighted by blinking. The user presses the ' ENTER ' key to indicate that the numeric input is complete and the data is to be saved. If the ' QUIT ' key is pressed then the data is not saved and the input is aborted. Measurement display - Scrolls through alarm and/or fault messages
ENTER	Indicates that the menu selection is to be processed or that numerical input is complete.

To initiate any menu operation the **MENU** key should be pressed. The LCD will then present the top level menu, which in turn leads on to other menus.

At each menu, the user highlights the desired option using the arrow keys and then presses **ENTER**. Blinking is used to highlight the selected menu option. During any menu operation, the fundamental measurements are still being made by the analyser and all relevant outputs, alarms and diagnostics remain active.

The measurement display is shown in Figure 2. The top line of the display shows the current measured value (with its units) for each of the sensors fitted.

In normal operation the bottom line of the display labels the gases measured. Should a fault or alarm occur then the lower line of the display will detail the nature of the fault or alarm. Should more than one fault and/or alarm be active then arrow keys on the keypad may be used to scroll through these messages.

The fault messages that may appear are as follows:

OXYGEN LOW	Oxygen too low for reliable COe measurement
OXYGEN °C LOW	Oxygen sensor temperature too low
OXYGEN °C HIGH	Oxygen sensor temperature too high
COe mV LOW	Combustibles sensor output voltage low
COe mV HIGH	Combustibles sensor output voltage high
COe °C LOW	Combustibles sensor temperature too low
COe °C HIGH	Combustibles sensor temperature too high
SENSOR °C HIGH	Sensor head temperature too high (OPTIONAL)
SENSOR °C LOW	Sensor head temperature too low (OPTIONAL)
AUTO CAL FAIL	Autocalibration out of tolerance error
COe mV OUTPUT LOW	Combustibles sensor sensitivity low (updated after calibration only)
COe CONC HI	Combustibles sensor has been exposed to very high Coe levels
mV OUT OF TOLERANCE	Combustibles sensor mV greater than +/- 60mV
DISPLAY OVER RANGE	Measurement is too large to display
COe WARMING	Combustibles sensor is warming up
O ₂ WARMING	Oxygen sensor warming up

The **MEASURE/HOME** key may be used to return to the measurement display at any time.

3.2 View/Configure functions (Refer to Figures 3a & 3b)

The view functions allow the user to interrogate the analyser diagnostics and examine the alarm and fault history logs. No password is required to access the view functions. The view functions are updated dynamically and values may change while they are being viewed. To access this display, press the **MENU** key and then select **VIEW**. If the **DIAGNOSTICS** option is chosen, the diagnostics appear as a scrolling list of values and associated descriptions. There are up to ten diagnostics depending on which sensors are fitted.

The $\uparrow\downarrow$ keys are used to switch between the following diagnostic measurements:

- Software version
- Oxygen sensor output voltage in mV
- Oxygen sensor temperature in °C
- Oxygen high calibration point in mV
- Oxygen low calibration point in mV
- Combustibles sensor output voltage in mV
- Combustibles sensor temperature in °C
- Combustibles high calibration point in mV
- Combustibles low calibration point in mV
- (Negative values are unfiltered and will differ from those displayed at top level)
- Probe head temperature in °C (if connected)

If the **HISTORY** option is chosen, either the alarm or fault history logs can be examined. The $\uparrow\downarrow$ keys are used to scroll through the list of history entries in chronological order.

The configure function allows the user to modify and view the analyser settings. These functions are password protected. To access these functions, press the **MENU** key, select **CONFIGURE** and then enter a password. There are two passwords that can be entered; a supervisor password (default - 2700) which gives access to **CALIBRATE**, **VIEW**, **SERVICE** & **SETUP** and an operator password (default - 2000) which gives access to **CALIBRATE** and **VIEW** only. Both passwords are factory set and may be changed if required.

3.3 Analyser setup (Refer to Figures 3a and 3b)

The setup function allows the user to modify and view the analyser configuration (outputs, alarms, blowback, clock and passwords).

3.3.1 Setting up the concentration alarms

The control unit has 2 concentration alarms that can be assigned to either of the 2 possible sensors in the sensor head. Each concentration has a user configurable level, hysteresis and polarity (high or low alarm).

Each alarm may also be configured to either freeze (remain fixed at the last value) or follow (track the concentration changes) during analyser calibration.

The setup process is as follows:

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid password, select **SETUP** and then **ASSIGN**.
2. Select **ALARMS** to set up the concentration alarms.
3. Select **AL1** or **AL2** to specify which alarm is to be set up.
4. Select either **NONE**, **OXYGEN** or **COe** to disable the alarm or to specify the measurement to be the subject of the alarm.
5. Select either **FREEZE** or **FOLLOW** to specify if the alarm is to be fixed at its current value or to track the concentration during analyser calibration.
6. Select either **LOW** or **HIGH** to specify the alarm as a low alarm or a high alarm.
7. Use the **arrow keys** followed by the **ENTER** key to set the concentration level at which the alarm is to be triggered.
8. Use the **arrow keys** followed by the **ENTER** key to set the hysteresis on the alarm level.

The alarm assignment is now complete and the user is returned to the select alarms display (step 3 above) to allow other alarms to be configured. Use the **QUIT** or **MEASURE/HOME** key to return to the assign menu or the measure display as required.

3.3.2 Setting up the relay outputs

The analyser is supplied with 4 relay outputs that can be assigned to a number of outputs. Output options include concentration alarms, analyser fault, calibration in progress, blowback in progress, autocalibration solenoid valve control lines and blowback solenoid valve control line.

Default relay assignments are:

Relay 1	Concentration alarm (AL1)
Relay 2	Concentration alarm (AL2)
Relay 3	Analyser Fault (AF)
Relay 4	'IN CALIBRATION' message.

The default assignments can be changed as follows:

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid password, select **SETUP** and then **ASSIGN**.
2. Select **RELAYS** to set up relay outputs.
3. Select **1**, **2**, **3** or **4** for the relevant relay number.
4. The available assignments are presented as a scrolling list. Use the **↑** or **↓** keys to select the required assignment and then press the **ENTER** key.

The possible relay assignments are:

ALARM 1	Concentration alarm AL1
ALARM 2	Concentration alarm AL2
FAULTS	Analyser fault present AF
IN CALIBRATION	Calibration in progress
IN BLOWBACK	Blowback in progress
GAS 1	Autocalibration gas 1 solenoid valve
GAS 2	Autocalibration gas 2 solenoid valve
GAS 3	Autocalibration gas 3 solenoid valve
BLOWBACK AIR	Blowback air solenoid valve

5. The display is returned to the relay number select screen to allow other relays to be assigned. Use the **QUIT** or **MEASURE/HOME** keys to return to the assign menu or measurement display as required.

3.3.3 Setting up the analogue outputs

The analyser is supplied with one dedicated analogue output for each sensor fitted in the sensor head (maximum of 2 analogue outputs). Each analogue output has a minimum and maximum analogue output range.

For the oxygen sensor, 0-1% is the minimum range and 0-25% is the maximum. For the combustibles sensor, 0-500ppm is the minimum range and 0-30000ppm is the maximum.

Each analogue output can be configured as either 0-20mA or 4-20mA and can either freeze (remain at the last value) or follow (track the concentration changes) during calibration and blowback. The 20mA high point is limited to an over-range of 20.5mA during normal operation. If 4-20mA is selected, an under-range can also be configured down to 3.6mA in 0.1mA increments.

An optional "Jam" facility is available to allow the output to set to 0mA (LOW) or 21mA (HIGH) when an analyser fault is detected. The outputs are capped so that their value can not exceed 21mA. The setup process is as follows:

1. Press the **MENU** key, then select **CONFIGURE**, enter the supervisor password, select **SETUP** and then **ASSIGN**.
2. Select **mA OUTPUTS** to set up the analogue outputs.
3. If two sensors are fitted then the analyser will prompt the user to select the output to be configured. Select either **OXYGEN** or **COe** to specify the output dedicated to the oxygen sensor or combustibles sensor as required.
4. Select the measuring range required, then **ENTER**.
5. Select either **FREEZE** (to freeze the output at the last value) or **FOLLOW** (to follow concentration changes during calibration or blowback).
6. Select either **4-20mA** or **0-20mA** for the analogue output type.
7. If 4-20mA is selected, set the low limit desired.
8. Select either **LOW**, **HIGH** or **NONE** to specify whether the output should be fixed at 0mA (LOW), 21mA (HIGH) or be unaffected should an analyser fault occur.

The analogue output configuration is now complete. The user is returned to the sensor selection display (step 3 above) to allow other analogue outputs to be configured. Use the **QUIT** or **MEASURE/HOME** keys to return to the assign menu or measurement display as required.

3.3.4 Setting up a blowback process

The blowback procedure allows the user to apply a burst of a selected gas to the calibration port of the analyser to back flush the sample probe and filter. The blowback gas is controlled via a solenoid valve switched by one of the relay outputs. The required relay output must be assigned before starting a blowback operation. The blowback setup will include a start time and date, a time period between blowback processes, and a duration for the blowback process.

A blowback operation may be executed by one of the following means:

1. By timer when the indicated start time and date is reached.
2. By external contact closure between pins 13 and 14 on terminal block TB2 on control unit PCB.
3. From the keypad using the **START BLOWBACK** entry in the setup blowback menu. The supervisor password will be required and a relay output must be assigned to blowback.

If a start date and time is not set then the blowback can only be initiated by contact closure or from the keypad. If the period between blowback processes is set to zero then only a single timed blowback will be executed. The process for setting the blowback parameters is as follows:

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid password, select **SETUP** and then **BLOWBACK**.
2. Select **SET UP BLOWBACK** to set the blowback parameters.
3. Use the arrow keys to define the duration in minutes (**MM**) and seconds (**SS**) of the blowback. Use the **ENTER** key to save the value.
4. Use the arrow keys to define the period in days and hours, between successive blowback processes. Use the **ENTER** key to save the value.
5. Use the arrow keys to define the start date for the first blowback. The format will be either day/month/year (**DDMMYY**) or month/day/year (**MMDDYY**) as defined in the setup clock procedure (see Section 3.3.5). Use the **ENTER** key to save the value.
6. Use the arrow keys to define the start time for the first blowback. Use the **ENTER** key to save the value. Successive blowback operations will start at the time and frequency previously set.

NOTE

After completion of the BLOWBACK process, if FREEZE has also been selected the analogue outputs remain at freeze and display shows 'flushing' for a fixed period of 120 seconds.

3.3.5 Setting up the real time clock and date format

The process for changing the time, date and the date display format is as follows:

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid password, select **SETUP** and then **UTILITY**.
2. Select **CLOCK** to change the time and date.
3. The current time and date will be shown on the display for 4 seconds before proceeding. Select **YES** to continue changing the time/date or **NO** to return to the utility menu.
4. Use the arrow keys to define the new date. The date will be specified either as day/month/year (**DDMMYY**) or month/day/year (**MMDDYY**). Press the **ENTER** key to save the new date.
5. Use the arrow keys to define the new time. The format is hours:minutes (**HH:MM**).
6. Select either **DDMMYY** or **MMDDYY** to specify if dates are to be displayed in day/month/year or month/day/year format.
7. The new time and date will be displayed in the selected format for 4 seconds before returning to the utility menu.

3.3.6 Setting a new password

Both passwords are factory set and can be changed as follows:

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid password, select **SETUP** and then **UTILITY**.
2. Select **PASSWORD** to change the passwords.
3. Select either **SUPERVISOR** (default - 2700) or **OPERATOR** (default - 2000) to define which password is to be changed.
4. Use the arrow keys to set a new 4 digit password. Use the **ENTER** key to save the new password.
5. The new password will be repeated by the analyser. Select either **YES** or **NO** to accept or reject the new password value.

3.3.7 Setting the auxiliary air option

The auxiliary air is integrated into the sensor head and therefore this feature must always be set to **YES** when the combustibles sensor is used

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid password, select **SETUP** and then **UTILITY**.
2. Select **AUX AIR** to set the auxiliary air status.
3. Select either **YES** or **No** to indicate if auxiliary air is applied to sensor head or not.

3.4 Calibration (Refer to Figures 3a & 3b)

The operator/supervisor passwords are required to access the calibration functions. The user may either perform a manual calibration, set up the automatic calibration parameters or execute an automatic calibration. Servomex recommend that the oxygen sensor is calibrated every three months and the combustibles sensor every one month. In some applications the calibration interval may be extended as a result of operating experience.

During manual calibration, a LOW calibration must be made prior to a HIGH calibration for the combustibles sensor. For the oxygen sensor a HIGH oxygen calibration must be made before a LOW calibration.

If fitted, the optional flow alarm should be checked and calibrated as described in the Installation Manual.

NOTE

- When a low calibration is performed, the zero may be offset between the limits of -500 and +99ppm which enables the effects of non-CO combustibles to be compensated for. If this is done, the span calibration target value should be adjusted by the same amount in order to maintain accuracy. E.g. if the zero is adjusted by -50ppm then the span should be set to 450ppm when using a 500ppm CO calibration gas.
- In calibration mode negative ppm combustibles values are unfiltered and will differ from those displayed at top level.

3.4.1 Manual calibration procedure

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid password and then select **CALIBRATE**.
2. If two sensors are fitted in the sensor head then select either **OXYGEN** or **COe** for the sensor to be calibrated.
3. Select **LOW CAL** or **HIGH CAL** for a low calibration or high calibration measurement. The procedure for performing the low or high calibration of an OXYGEN or COe sensor are the same.
4. Use the arrow keys to set the actual concentration value for the calibration gas used. Press the **ENTER** key to accept the value.
5. Use the arrow keys to set the required tolerance level. This is the permitted change in the stored calibration value. Press the **ENTER** key to accept the value.
6. Apply the calibration gas to the sensor head calibration port at a flow of 600ml/min. Note: if autocalibration is selected then the relay outputs will be automatically set to admit the required calibration gas.

7. Wait until the value displayed on the screen is stable. Select **Y** and the **ENTER** key to accept the measured value. Note: the displayed value will be calculated using the existing stored calibration value.
8. Should the user accept a value that is outside of the tolerance limits an **OUT OF TOLERANCE** message will be displayed. Select **Y** or **N** and press the **ENTER** key to accept or refuse the new calibration value.
9. Press **MEASURE/HOME** to view and check the actual concentration value and then remove the calibration gas from the analyser.

3.4.2 Automatic calibration

The automatic calibration facility allows the analyser to perform routine calibrations without user intervention. The calibration procedure to be used is specified by a number of calibration parameters. These parameters must be set up before an autocalibration is started. The autocalibration procedure can perform either a low calibration only or a high and low calibration on either one or both of the possible sensor combinations in the analyser.

An automatic calibration may be started in three ways:

1. **By timer**

The automatic calibration will commence when a specified start time and date is reached. If the start time is not specified then the timed start is disabled. The calibration procedure will then be repeated at specified time intervals. If the specified time interval is zero then only one calibration process will be done.

2. **By contact closure**

The automatic calibration will commence when the automatic calibration initiation contacts (TB2 pins 11 and 12) are closed.

3. **From the keypad**

From the **CALIBRATE** menu, select **AUTOCALIBRATE** and then **START AUTOCAL**.

In the automatic calibration process the calibration gases are admitted to the sensor head via remotely actuated solenoid valves. These solenoid valves are controlled by the relay outputs on the control unit PCB. If a single sensor is being calibrated then two gases and two relay outputs will be required. If two sensors are being calibrated then three gases and three relay outputs will be required. The relay outputs to be used are configured and assigned by the user in the Setup facility (see Section 3.3). Table 1 specifies the composition and calibration duty for the three calibration gases.

Table 1: Recommended calibration gas

Solenoid number	Gas composition	Oxygen sensor	Combustibles sensor
GAS 1	Zero air (20.95%(v) O ₂)	HIGH	LOW
GAS 2	0.3%(v) O ₂ balance N ₂ *	LOW	N/A
* gas composition can be between 0.25% and 2.5% O ₂ in N ₂			
GAS 3	1000ppm(v) CO balance air**	N/A	HIGH
** gas composition can be between 500ppm and 1000ppm CO balance air.			

The following procedure is executed on automatic calibration.

- The relay assignments are checked to ensure that the required relay contacts have been assigned as solenoid valve drives. If the relay assignments are incorrect then the autocalibrate will abort with an appropriate error message being displayed for 5 seconds.
- The required calibration gases will be admitted to the sensor head in turn. When each gas is admitted the process will wait for a user-defined flushing time before recording the calibration response values. Between 1 and 3 gases will be admitted depending on the calibrations to be performed.
- The new calibration parameters are calculated and compared with the existing stored values. If the change in the calibration parameters is outside of the specified tolerance values then the autocalibration is aborted, a fault is raised and the calibration values are not updated.

3.4.3 Setting up the automatic calibration parameters

From the **CALIBRATE** menu, select **AUTO CALIBRATE** and then **SET UP AUTO CAL**.

1. If two sensors are fitted in the sensor head then select **OXYGEN, COe** or **OXYGEN & COe** to calibrate either the oxygen sensor only, the combustibles sensor only or both the oxygen and combustibles sensors.
2. Select **LOW CAL ONLY** to perform a low point only calibration for the selected sensors or **LOW AND HIGH CAL** to perform both a low point and high point calibration.
3. The user will be prompted to enter a calibration level and tolerance level (see manual calibration procedure, Section 3.4.1) for the low (and, if selected, high) calibration gas for each sensor to be calibrated.
4. Use the arrow keys to select the flushing time to be used. This is the time delay to allow the reading to stabilise after each change of gases. The up/down keys alter the selection by 0.5 minutes over the range 0.5 to 8.0 minutes.
5. Use the arrow keys to set the time period between successive automatic calibrations. The period is specified in days with a range 0 to 999 days. If the period is set as 0 then only the first automatic calibration will be made.
6. The current date and time are displayed for five seconds for reference. Then use the arrow keys to set the start date and start time for the first automatic calibration. The start date and time will then be displayed for five seconds.
7. When the automatic calibration parameters are complete the display will return to the start time entry screen. The user should press the **QUIT** key if all is satisfactory.

3.5 Service functions (Refer to Figure 3b)

The supervisor password is required to access the service functions. The service functions are accessed by pressing the **MENU** key, then selecting **CONFIGURE**, enter a valid password and then select **SERVICE**.

3.5.1 Testing the analogue outputs

This function allows the user to test and adjust the analogue outputs. Select **SET OUTPUTS**, then **mA OUTPUTS**, then **0mA**, **4mA** or **20mA** and then press **ENTER** to set all the analogue outputs to 0, 4 or 20mA. If the span of the analogue outputs needs adjustment, then potentiometers RV3 and RV4 on the control PCB may be used to set the 20mA point for the combustibles and oxygen sensor outputs. Select **QUIT** or press the **MEASURE/HOME** key to return to normal measurement. The test function times out after 5 minutes.

3.5.2 Testing the relay outputs

CAUTION

Do not use this function if autocalibration is assigned to the relays as this could cause damage to the transformer in the utilities unit and cause the analyser to read incorrectly due to the introduction of calibration gases.

This function allows the user to test the operation of the relay outputs. Select **SET OUTPUTS**, then **RELAYS** and then **SET TO DISABLED** or **SET TO ENABLED** to set all 4 of the relay outputs to enabled or disabled state. Select **QUIT** or **MEASURE/HOME** to return to normal measurement. The test function times out after 5 minutes.

3.5.3 Delete history

Select **SERVICE** and then **HISTORY**. The option to delete the alarm and fault history logs is then available.

3.6 Software filtration (Refer to Figure 3b)

Due to the fast response of the analyser, it maybe required to 'slow' the measurement signal, allowing it to be integrated into certain control systems more easily.

This function allows the user to achieve this by setting a filtration rate for the analyser from 0 to 9, in unit increments; 0 being unfiltered and 9 being the maximum filtration rate. As a default the filtration rate is set to 0.

The software filter will also progressively reduce the output fluctuation of the instrument as the filter setting is increased from 0 to 9.

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid supervisor password, select **SETUP**.
2. From the **SETUP** menu, select **FILTER**.
3. If two sensors are fitted in the sensor head then select **OXYGEN** or **COe**.

4. Input a value from 0 to 9, then press the **QUIT** or **MEASURE/HOME** key when all is satisfactory.

The user may need to make several adjustments to optimise the filter settings for their process conditions and control system requirements.

3.7 Language options (Refer to Figure 3b)

The user is able to configure the display of the analyser to one of three languages; English, French or German.

1. Press the **MENU** key, then select **CONFIGURE**, enter a valid supervisor password and select **SETUP**.
2. From the **SETUP** menu, select **UTILITY**, then **LANG** and then select **ENGLISH**, **FRANCAIS**, or **DEUTSCH**.
3. Press the **QUIT** or **MEASURE/HOME** key, when all is satisfactory.

Figure 3a

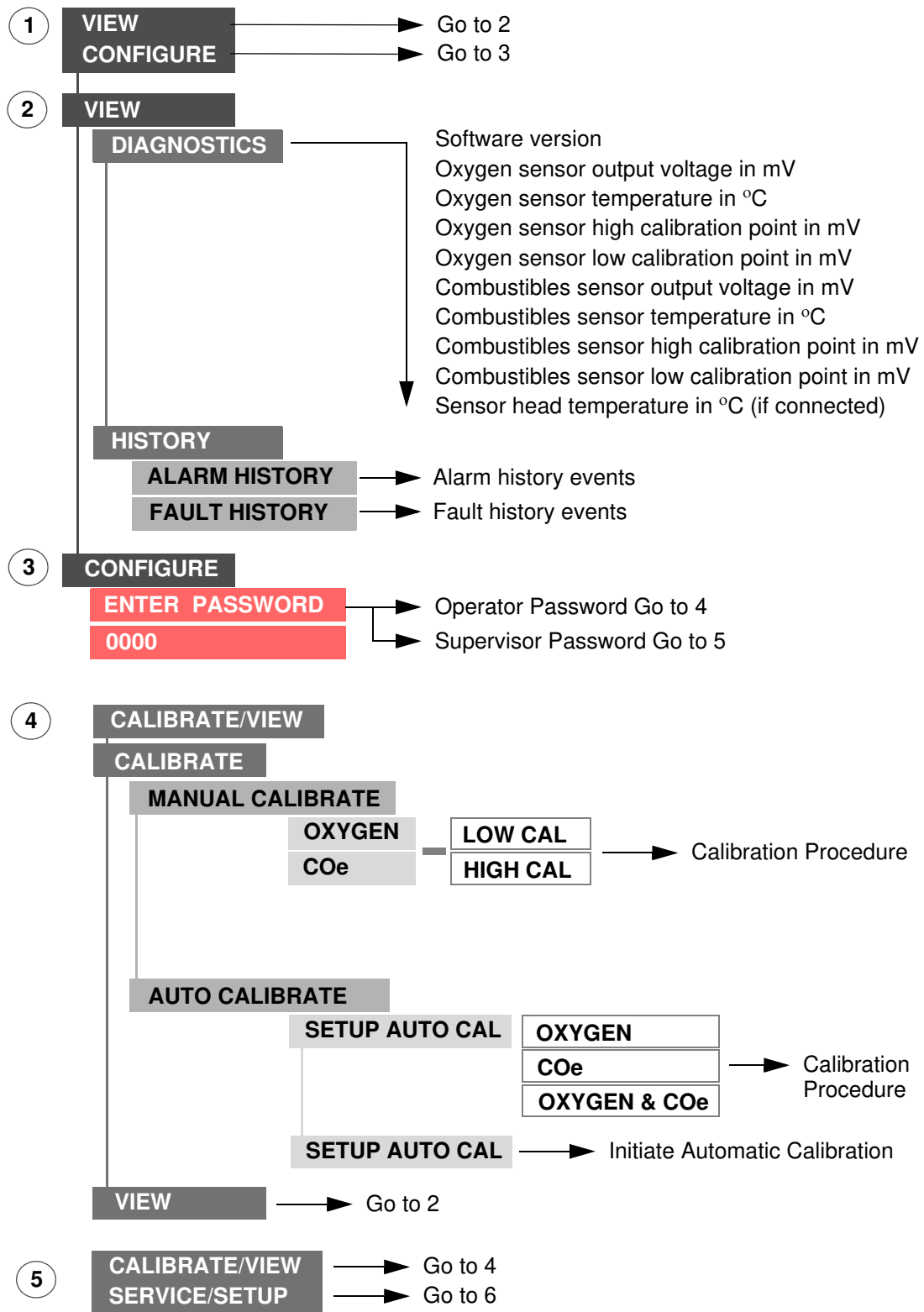
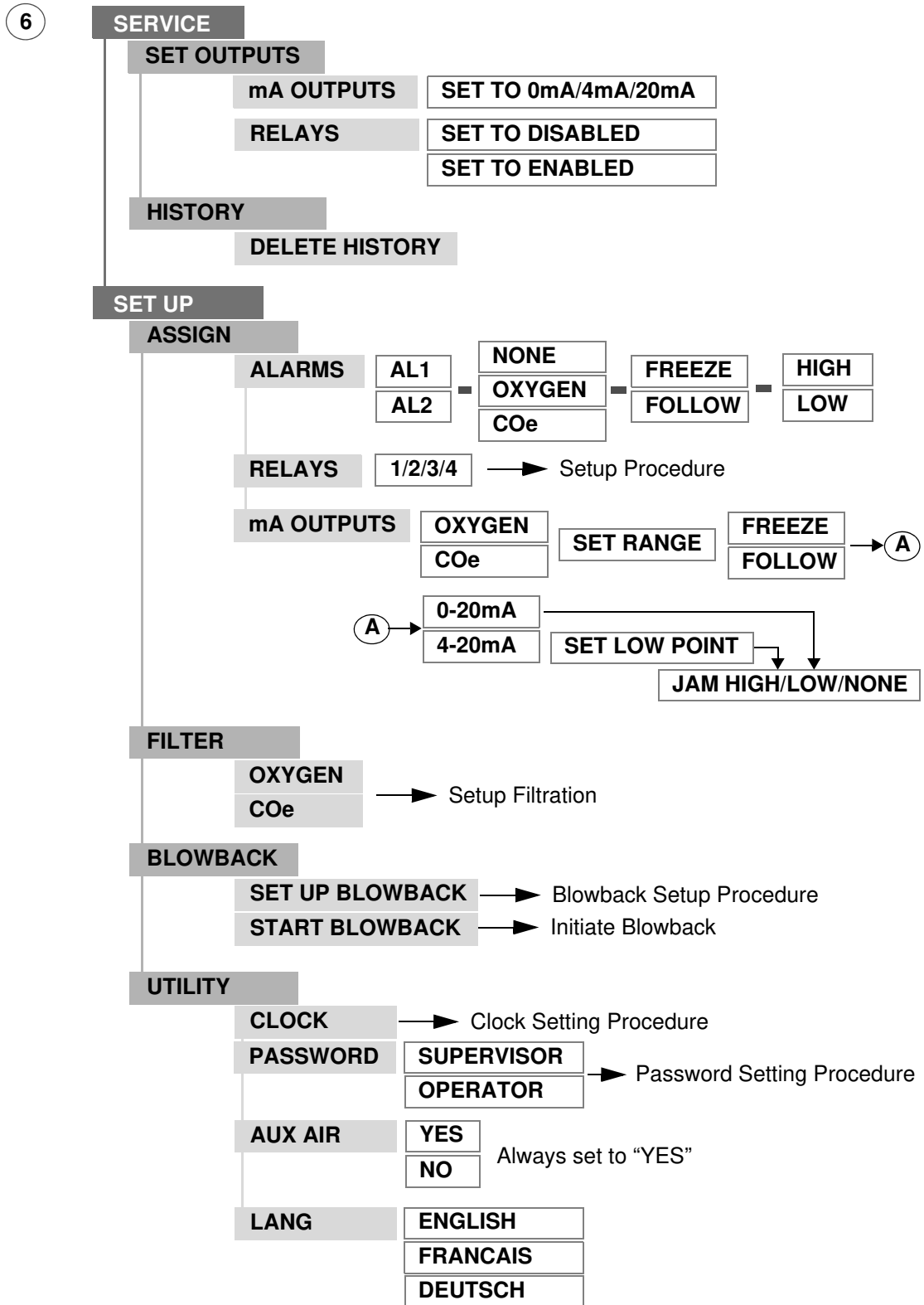
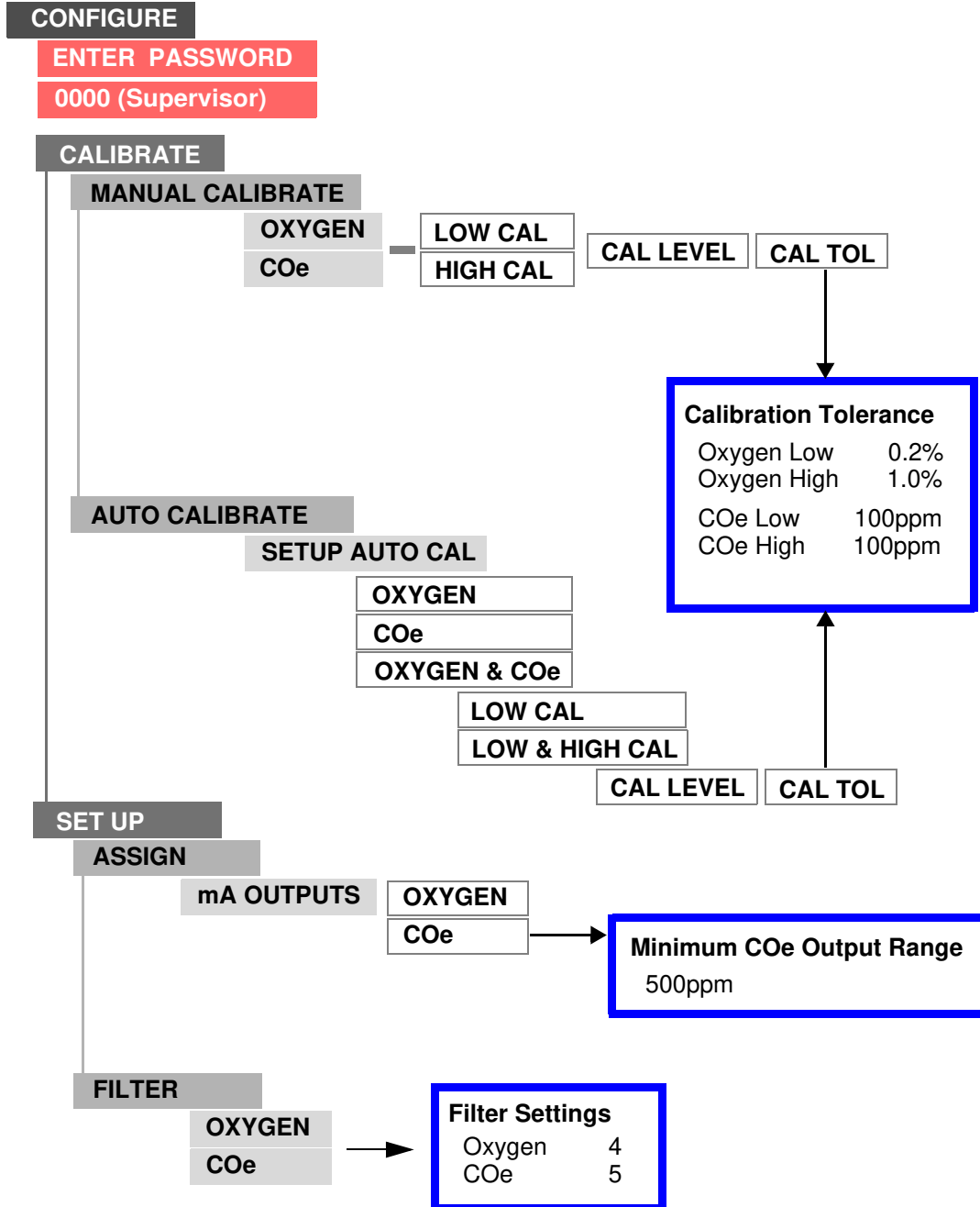


Figure 3b



It is advised that the parameters for the Calibration Tolerances, Combustibles Output Ranges and Filters are set as follows.

Figure 3c



NOTES