

## Preparation

**Please refer to warnings and operation section of HB3294 (Issue 02 or above)before using I.S versions of Apex pumps.**

The default settings used by the pump (such as menu language and temperature units) can be specified from within the pump’s Configuration Mode.

## Control Keys

 Switches the instrument ON/OFF. Press to switch ON, press and hold a moment to cancel a command, press and hold down to switch OFF.

 Scrolls up through options or increases a value, has a hold-down to repeat function.

 Scrolls down through options or decreases a value, has a hold-down to repeat function.

 Press to accept a value or option (for example start the pump). Hold down to stop the pump.

## Display Symbols

 Halt - shows when pump is in Hold Mode, or blinks when halt option available.

 Run - shows when pump motor is running.

 Flow - indicates real flow monitoring.

 &  together indicate that the pump is paused, but will start again automatically, for example during TWA or user prepared programs.

 Warning - indicates flow outside permitted limits or other error conditions.

 Battery condition. The symbol empties as the power is drained.

**°C/°F** Instrument temperature (user selectable units).

## Indicators & Display Messages

**Green LED** Flashes when the motor is running.

**Red LED** Flashes when unable to maintain the required flow due to restriction.

**PROGEnd** Displayed when the pump has successfully completed a programmed sample.

**TEMP** Current air temperature.

**VOL** Accumulated volume sampled since it was last reset.

**TIME** Accumulated sample time since the instrument was last reset.

**SERV dUE** Warning after 2500 hours of operation that the instrument should be serviced.

**BATTFAIL** Warning that the voltage from the battery pack is below minimum operating level.

**Buzzer** When activated sounds warnings and indicates keystrokes.

To switch the instrument ON, press and hold  until the instrument display is activated. The display starts to test its segments, shows the pump ID and finally the firmware version number before entering Hold Mode.

*On Apex Pro versions only, the-day-of-the-week and the time-of-day are also displayed during the start up cycle.*

If the display is too bright or dim, shows messages in an unexpected language or unexpected measurement units, make changes as described in the Configuration Mode section.

If  is released before the countdown has finished, the instrument returns to its previous mode.

To switch OFF, press and hold . The display will show a count down in seconds until the instrument switches off and the screen becomes blank.

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When the instrument is switched ON but the pump is not operating, nor a program being executed, it is in Hold Mode where the display cycles between:

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## Set Flow (Single Point Calibration)

Attach a sampling head and flow tube or other flow-measuring device to the pump’s inlet nozzle to measure the actual flow.

In Hold Mode, press  or  several times until **FLOW SET** blinks on the display. Press  to select.

Use  and  to set the flow required at this calibration point, then press  to accept the setting. The pump will start.

A soon as **CAL SET** is displayed, use  and  to adjust the actual flow measured by the flow tube to match the set point, then press  to accept the value.

This calibration point will be saved and used by the pump in all future samples made at this flow.

To return to Hold Mode without setting a new flow, press  and hold for a moment.

If the calibration is not completed within 30 seconds, the pump will revert to Hold Mode automatically.

When basic settings are acceptable, proceed directly to the Manual Sampling section, if not acceptable, go to Configuration Mode.

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Auto displays volumes below 1000 litres in litres, above this the display changes to m<sup>3</sup>.

m<sup>3</sup> always displays volumes in m<sup>3</sup>.

**BUZZER** Allows an audible alarm to be set.

Use  or  to change between:

**OFF**, no buzzer,

**Err**, any error sounds an alarm,

**On**, any error or key press sounds an alarm.

**PROG Mode** Determines whether the program features of an Apex Pro are to be made available.

Use  or  to change between:

**ON** with the program features available,

**OFF** with the program features hidden.

Press  to accept.

**LIFE** Is read-only and shows total run time for the pump.

This can be used to determine suitable maintenance schedules for the instrument.

Press  to move on.

**LCD** Sets LCD contrast (current level blinks).

Use  to increase the value (make darker) and  to decrease it (make lighter).

Press  to accept.

**CAL SET** Activates Calibration Mode, allowing the pump’s calibrated range to be reset.

Use  or  to change between:

**NO** - do not recalibrate the pump, then press  to revert to Hold Mode,

Or,

**YES** - recalibrate the pump, press  to enter calibration Mode and proceed to Calibrating The Pump.

While in Hold Mode, press  to start sampling and enter Run Mode.

In Run Mode the display cycles between, current duration of the sample, volume sampled, and air temperature.

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To stop sampling while the pump is in Run Mode, press and hold  until the  symbol stops blinking and  disappears. The instrument will save the accumulated duration and volume sampled until manually reset.

**PROGEnd** Displayed when the pump has successfully completed a programmed sample.

To stop sampling while the pump is in Run Mode, press and hold  until the  symbol stops blinking and  disappears. The instrument will save the accumulated duration and volume sampled until manually reset.

If the input flow is restricted, both  and the Red LED will flash (and when activated the buzzer sound) to indicate a problem. If the problem lasts for eight or more seconds, the pump motor will switch itself off.

After one minute, the pump will switch on again in an attempt to determine whether the problem has gone. If the problem remains for another eight seconds, the pump will switch off and remain off.

If the output flow is restricted, both  and the Red LED will flash (and when activated the buzzer sound) to indicate a problem. If the problem lasts for three or more seconds, the pump motor will switch itself off and remain off.

Normal operation cannot be resumed until the flow restriction has been removed. When the restriction is removed, the pump may start again automatically; if it does not, switch the Apex unit OFF then ON again.

Select Set Flow then set the flow to less than 0.8 litre/min to activate the mode.

In Bag Mode, the display shows **BAG**. The speed of the pump motor is fixed and the display shows only percentage flow, with no volume or time information.

Once the pump has started, or may be used to change the flow rate to a different percentage.

### Fixed Duration Sampling (DUR)

The duration of a sample can be selected from the instrument keypad. On the Apex Pro it can also be selected via Pump Manager software.

This mode allows the pump to sample for a fixed period and switch off automatically when the period has ended. This is useful when a stated volume of air must be sampled over a long period.

In Hold Mode press or several times until **DUR** blinks on the display. Press to select.

The programmed duration blinks to indicate it can be changed by and . Run durations between 3 minutes and 1 hour can be set in 1-minute steps, and durations between 1 and 25 hours in 10-minute steps.

Press to accept a duration and start sampling.

In addition to the symbol, the display shows **PROG.** to indicate that a program is active. While the program is running, the display cycles through current sample time, volume sampled, air temperature, and programmed duration.

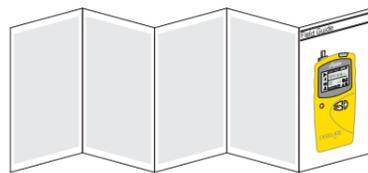
Once completed, the pump will switch off and the display show and a **PROGEnd** message.

Press any key to return the pump to Hold Mode.

### Locking The Keypad

The keypad may be partially or fully locked to prevent unauthorised tampering with instrument settings.

Press three times within 2 seconds to activate Partial Lock Mode at any time. The symbol is displayed, the counters and flow cannot be changed but the following options remain available: start/stop sampling, switch the pump off, unlock



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The programmed duration blinks to indicate it can be changed by and . Run durations between 3 minutes and 1 hour can be set in 1-minute steps, and durations between 1 and 25 hours in 10-minute steps.

Press to accept a duration and start sampling.

In addition to the symbol, the display shows **PROG.** to indicate that a program is active. While the program is running, the display cycles through current sample time, volume sampled, air temperature, and programmed duration.

Once completed, the pump will switch off and the display show and a **PROGEnd** message.

Press any key to return the pump to Hold Mode.

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Press three times within 2 seconds to activate Partial Lock Mode at any time. The symbol is displayed, the counters and flow cannot be changed but the following options remain available: start/stop sampling, switch the pump off, unlock

Partial Lock, and select Full Lock. (Press three times within 2 seconds to unlock.)

Only when the PUMP IS RUNNING, press three times again within 2 seconds while in Partial Lock Mode to activate Full Lock Mode. The symbol is displayed, the pump cannot be switched off and the only option available is to release Full Lock Mode by pressing three times within 2 seconds.

### TWA Sampling (Apex Pro only)

This feature is available only when the Apex Pro Program Mode has been enabled from within Configuration Mode.

This allows the pump to operate for a fixed percentage of a specified sample time. The instrument calculates the required on/off cycle automatically to spread the total exposure time over the entire sample time (as shown).

In Hold Mode press or several times until **TWA** blinks on the display. Press to select.

**RUN** is displayed and the sample time blinks to indicate that it can be changed by and . Run times between 3 minutes and 1 hour can be set in 1-minute steps, and times between 1 and 25 hours in 10-minute steps.

Press to accept a sample time.

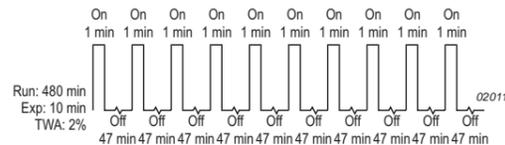
**EXP** is displayed, and the exposure time blinks to show it can be changed by and .

The available range is 2 minutes to 1-minute-less-than-the-run-time, in 1-minute steps.

Press to accept an exposure time and start sampling. In addition to the usual and symbols the display shows **PROG.** to indicate that a program is active.

The pump exposure (on) times are fixed at 1 minute, and the instrument calculates the necessary off-times to spread these 1 minute intervals throughout the sample time. While the program is running, the display cycles through current accumulated sample time, volume sampled, air temperature and calculated TWA (as percentage of run time).

During off-times (pump not running) the and symbols are displayed to show the instrument is paused.



Once the sample is completed, the pump will switch off and the display show the symbol and a **PROGEnd** message. Press any key to return to Hold Mode.

### User Program Modes (Apex Pro only)

This feature is available only when the Apex Pro Program Mode has been enabled from within Configuration Mode. For more comprehensive information, please refer to the User Handbook.

This allows complex sampling schedules (created by the user in Pump Manager PC software and downloaded via the infrared link) to be run by the pump. The programs are stored in two user program areas **Pr1** and **Pr2**.

In Hold Mode, repeatedly press or until **Pr1** or **Pr2** blink. Press to select the program.

The various steps in the program can be viewed using and . Press to accept the program and start it running.

In addition to the usual and symbols the display shows **PROG.** to indicate that a program is active.

During off-times (when the motor is not operating) and are displayed to show the unit is paused.

Once the run is completed, the display will show the symbol and a **PROGEnd** message.

Press any key to return the pump to Hold Mode.

To terminate the program early, press and hold to show the **STOP** option, keep pressed until the pump reverts to Hold Mode.

### Calibrating The Pump

**This procedure changes the basic calibration for the entire flow range of the pump.**

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As the pump will have been accurately calibrated at the factory, DO NOT undertake this procedure without first referring to the Users Handbook.

Casella Instrumentation and Software is designed, manufactured and serviced by:

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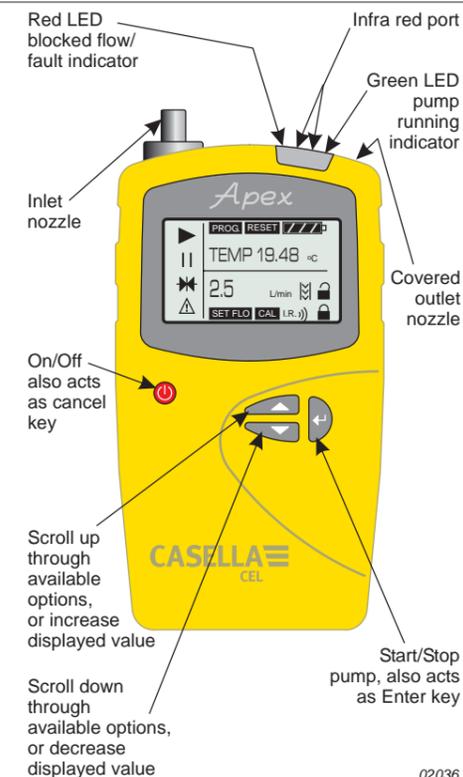
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Apex & Apex Pro  
Sampling Pumps  
HB3295 -02/Jan 05

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## FIELD GUIDE for Apex & Apex Pro Personal Air Sampling Pumps (I.S & non I.S Versions)



02036

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CEL

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Casella Instrumentation and Software is designed, manufactured and serviced by:

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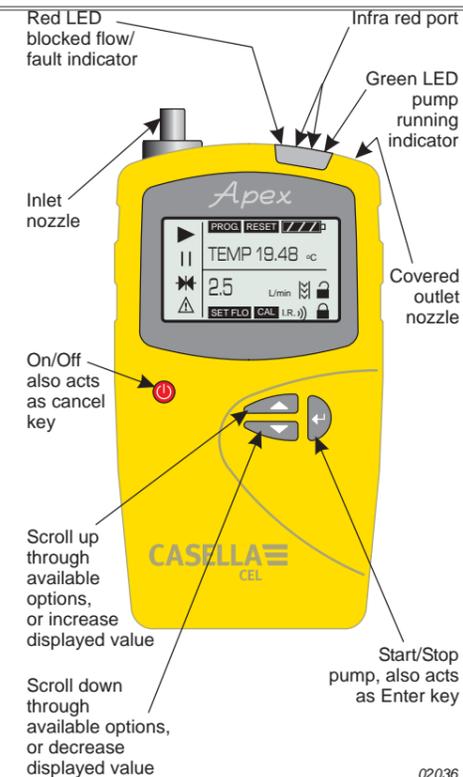
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## FIELD GUIDE for Apex & Apex Pro Personal Air Sampling Pumps (I.S & non I.S versions)



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