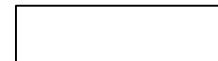
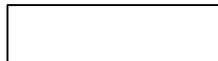
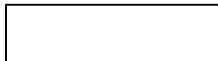




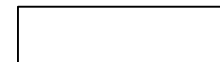
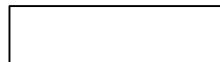
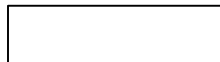
Gas Measurement Instruments

Detection, Protection, Innovation

PS500 USER TRAINING



- Single Button User Operation
- Integral Impact Resistant Housing
- Graphic Display with Screen Light
- 4 Gases Detected Simultaneously
- High Intensity Audible / Visual Alarms
- Datalogging
- Infrared interface for data download
- Rechargeable battery



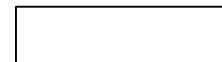
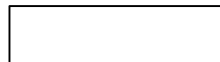
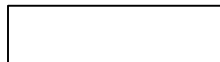
- **Certification**

Hazardous areas – flammable atmospheres:

- ATEX - required for all member countries of the EU
- UL - allows use in America

Performance testing:

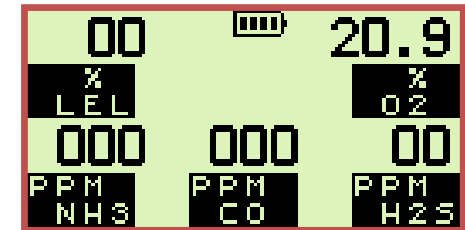
- MED (Ships' Wheelmark) - EU Marine Equipment Directive



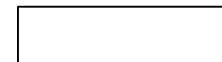
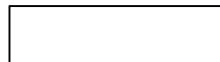
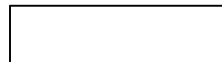
- Ranges of Operation

- 4 gases are monitored:

- 0-100% LEL propane
- 0-25% Oxygen (O₂)
- 0-1000 ppm Carbon Monoxide (CO)
- 0-5% Carbon Dioxide (CO₂)
- NB: this slideshow shows pics of 5 gas version



- Gases displayed simultaneously

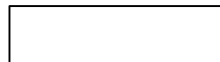
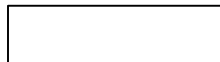


• Operating Procedure

– Check the Following Before Use:

- instrument is clean and in good condition
- battery is fully charged and fitted correctly
- Sensor gas inlets are clean and in good condition
- all gas ranges are operational and the instrument is zeroed
- instrument is within the calibration period

– Switch on in Fresh Air / No Faults Displayed

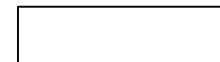
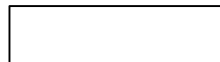
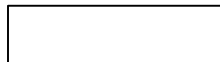


- Switching the Instrument On

- Press and Hold right button for 1 s.



- Instrument begins warm-up routine. During 30 second warm-up a countdown timer appears on the screen
 - The instrument display identifies the model, serial number, software version, datalogging option and battery status during warm-up.





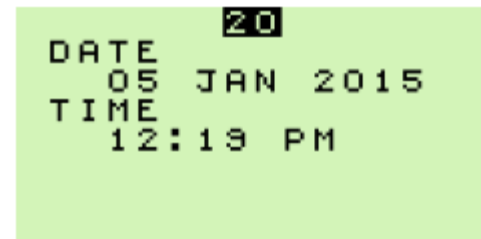
Gas Measurement Instruments

Detection, Protection, Innovation

• Warm-up Information

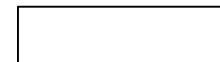
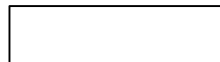
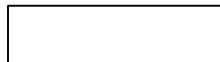
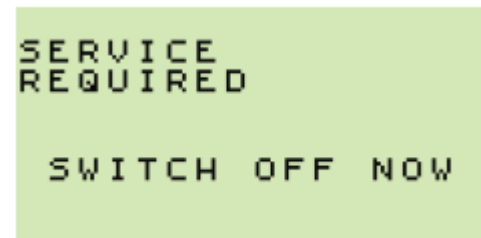
– Time and Date

- The time and date from the instrument's built-in clock is displayed



– Calibration Required

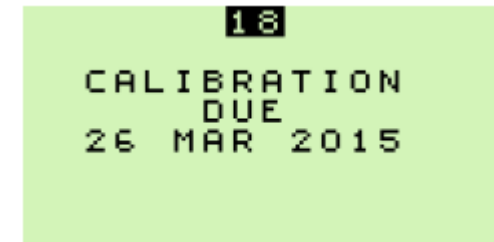
- If the display below appears (audible / visual alarms are also activated), the instrument has detected a fault in the calibration memory. It must be switched off.



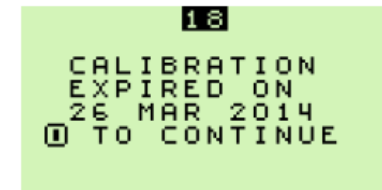
• Warm-up Information

– Calibration Due Date

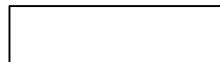
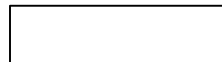
- The calibration due date is shown on the display



- If the calibration due date has expired, the audible and visual alarm activates



- Press right Button once to acknowledge overdue calibration due date, cancel alarms and continue with warm-up

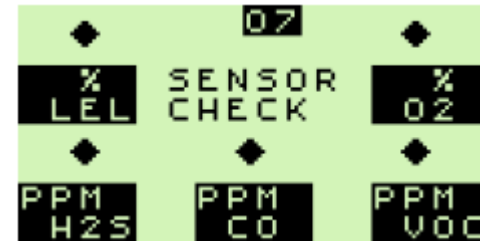


- Warm-up Information

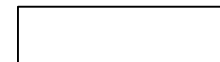
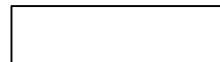
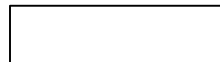
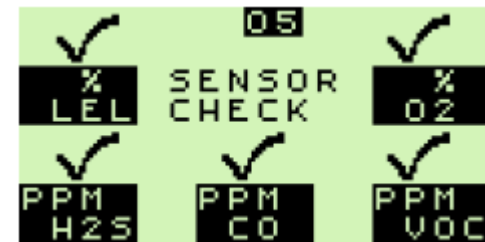
- Sensor Confirmation Check

- A diamond symbol appears above each sensor to confirm that the sensor

- has been recognised
- is working correctly
- is being zeroed



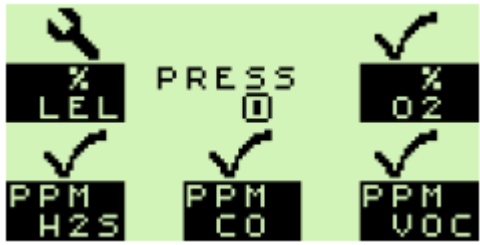
- When sensors are zeroed correctly a tick appears above each sensor



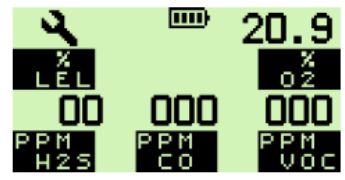
• Warm-up Information

– Sensor Check Failure

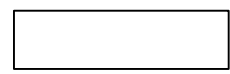
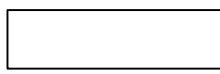
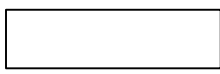
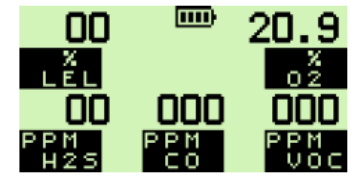
- If sensor(s) fail the zero check at the end of warm-up, the audible and visual alarms activate. The instrument display will show a spanner symbol.



- To acknowledge the alarm, press the right button. This clears the audible / visual alarm. The instrument display will show a flashing spanner symbol alternating with the faulty sensor zero reading.

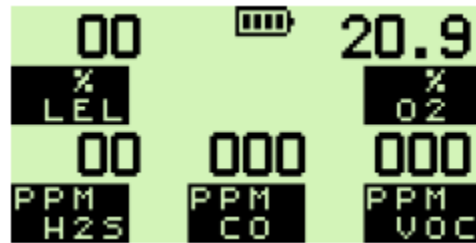


alternating with

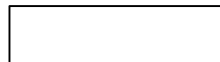
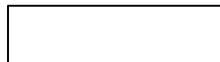


- Normal Operating Display

- When warm-up is completed successfully, screen light switches off and normal operating screen is shown

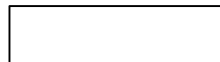
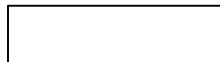
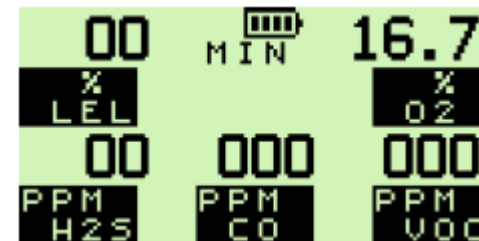
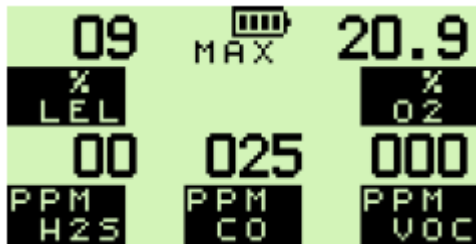


- Each gas the instrument can measure is displayed
- Display screen light can be manually switched on with a single press of the right button. Remains on for 20 seconds and then switches off



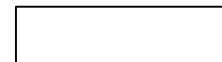
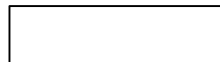
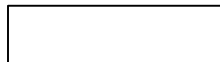
Viewing Maximum and Minimum Recorded Values

- Start from normal operating screen. Press the right button to switch screen light on. Press right button again while light is on to view maximum values for each gas.
- Press right button again to view the minimum gas values for each range.
- Stored readings can be removed from memory by pressing holding the right button for 2 seconds



• Alarms

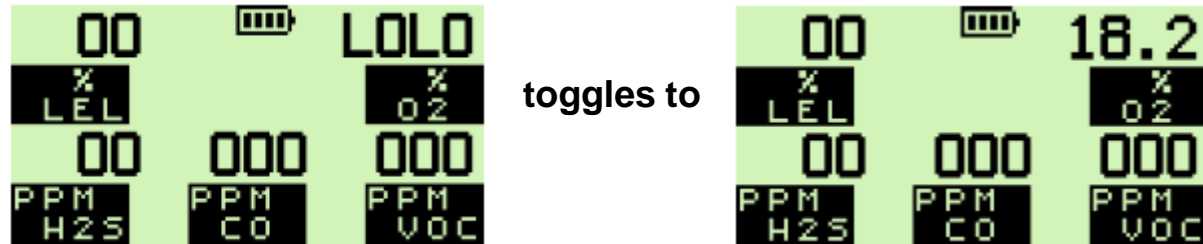
- All gas ranges have alarm limits that trigger an alarm when the measured value exceeds the set level
- If a pre-set alarm is exceeded, the audible alarm sounds, LEDs flash red and the gas range in alarm flashes on the display
 - Flammable LEL Alarm Limits - Up to 2 alarm levels are programmable
 - Over-Range Flammable Gas Alarm - If the flammable gas readings exceed 120% LEL, a safety alarm is activated
 - Oxygen Alarm Limits - Up to 1 upper and 2 lower alarm limits are programmable
 - Toxic Alarm Limits - Up to 2 instantaneous and 2 Time Weighted Average (TWA) alarms are programmable for each toxic range



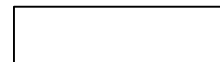
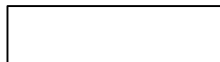
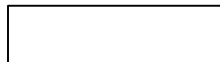
- Alarms

- The instrument display will signal the range in alarm.

- Example of LoLo Oxygen Alarm Display



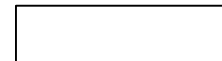
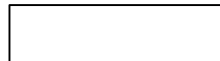
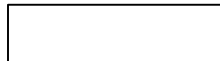
- Example of HiHi LEL Alarm Display



- Alarms

- Alarms can be latching or non-latching

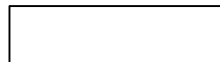
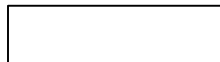
- Latching - alarm will stay on until the user resets by a press and hold of the right button when the gas level return to within the pre-set alarm limits
 - Non-Latching - the audible and visual alarm will reset automatically when the reading returns to within the pre-set alarm limits



- Alarms

- Acknowledging Gas Alarms

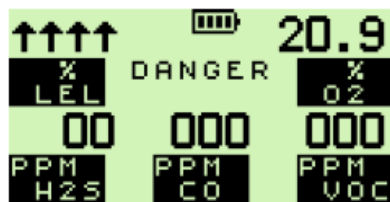
- Once in a safe gas free area, or the gas reading has returned to within pre-set limits, press and hold the right button to acknowledge/clear the alarm sounder and extinguish the red LED's.
 - Alarms can have the mute function enabled or disabled



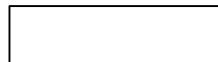
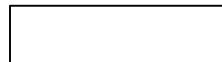
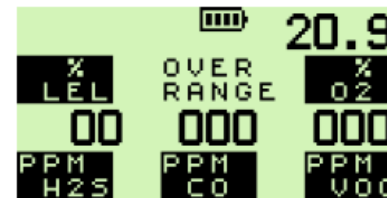
Alarms

– High Flammable Gas Over-Range Alarms

- Protects the user from danger in event of the LEL sensor being over exposed to a high concentration of flammable gas
- When over 120% LEL has been detected, the displayed value will change to four rising arrows, tone of audible alarm will change and a flashing message will be shown



alternating
with



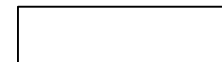
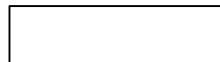
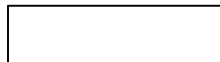
- Alarms

- High Flammable Gas Over-Range Alarms

- The instrument must be returned to a gas free area and switched off
 - Switch off by a press of both buttons together. A timer from 10 to zero will appear with the messages below alternating

GET OUT
OFF 10

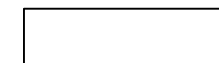
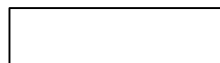
HIGH GAS
OFF 9



Default Alarm Settings (Table 1)

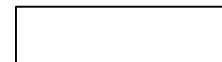
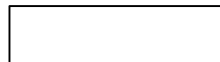
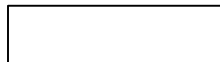
– For more alarm levels, refer to contract review

GAS	LTEL	STEL	TYPICAL INSTANTANEOUS				
			Lo Lo	Lo	Hi	Hi Hi	Maximum Adjustment
Flammable LEL	None	None	None	None	Disabled	20	100
0 to 30% Oxygen(O ₂)	None	None	19	Disabled	None	23	25
0 to 100 ppm Hydrogen Sulphide (H ₂ S)	5	10	None	None	Disabled	15	100
0 to 1000 ppm Carbon Monoxide (CO)	30	200	None	None	Disabled	300	500





- Confidence Signal

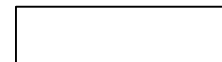
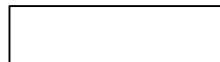
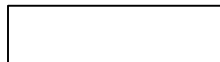
- During normal operation, the instrument sounds a confidence beep and illuminates the right LEDs briefly every 15 seconds.
- This function makes the user aware that the instrument is working correctly.
- However, for this project we have disabled the audible beep



• Fault Alarms

– Low Battery

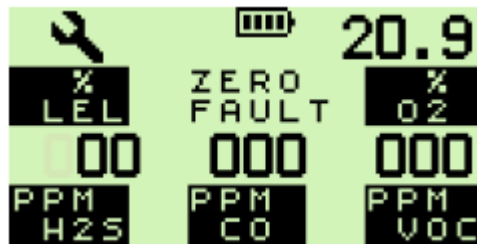
- The 'Low  Battery' flag is displayed intermittently when the instrument's battery power is low (approx. 30 mins operating time remaining). The audible alarm sounds every 2 secs and a red LED flashes.
- The 'Bat  Fault' flag shows constantly when approx 3 mins operating time remains. The audible alarm sounds continuously and the red LED illuminates constantly.



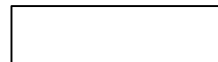
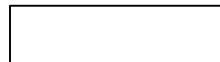
Fault Alarms

– Zero Fault

- The 'Zero Fault' flag and a flashing spanner appears, after warm-up, if the instrument is switched on in the presence of gas or the instrument has been unable to zero all sensors correctly. The audible alarm sounds, once every 2 secs, and the red LED flashes.
- The instrument can still be used to detect and alarm on the other sensors fitted. Press the right button, as per the screen prompt, to continue. A flashing spanner symbol will be displayed against the faulty sensor.



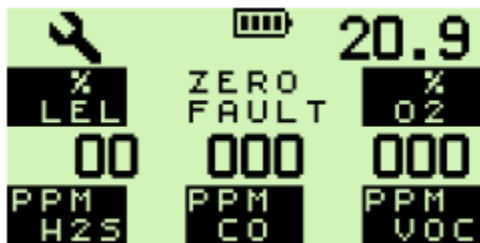
Toggles
to



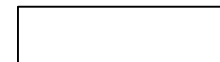
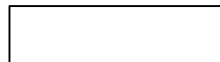
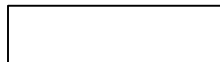
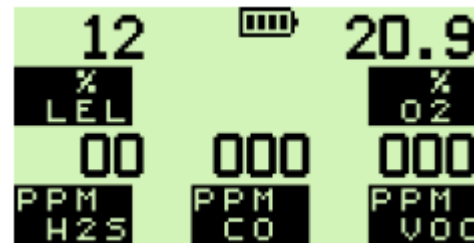
- Fault Alarms

- Zero Fault

- If a Zero Fault flag and a spanner appears above gas type, then sensor requires replacement or an electrical fault exists.
 - If a Zero Fault flag and a flashing spanner symbol alternating with a zero LEL reading appear, apply test gas for 2 minutes to allow the display to return to zero. Switch instrument Off and On again.
 - If a Zero Fault flag and a flashing spanner symbol alternating with an LEL gas value appears, leave instrument on for 30-60 mins. Switch Off and On.



alternating
with



- Calibration Expired

- During normal operation where the calibration date has expired, a warning flag will flash on the display every 30 seconds to warn the user that the expiry date has been exceeded.



• Switching Instrument Off

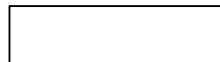
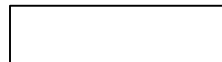
– Press and hold the left and right button together to switch the instrument off.

– The instrument will start a countdown from three (3) to OFF. Both buttons must be pressed together until the display goes blank.



OFF 3

– While both buttons are pressed, the audible alarm sounds to alert the user that the instrument is switching OFF.



- Operator Maintenance

- Recharging a Battery Pack

- Battery should be left overnight connected to the standard charger
 - Battery pack can be removed from the instrument and connected to the charger or it can be charged while still connected to the instrument

