



# Petrel Firmware v27 Release Notes

DocRev: A

Date: 2014-11-19

## NOTE: Hardware Versions for Petrel 1 and Petrel 2

Petrel firmware v27 is the first version to support the new hardware features of the Petrel 2, which are:

- Tilt compensated digital compass.
- Smart Ready Bluetooth (to add support for iOS devices).

A single firmware file and version number will be used for both the Petrel 1 and Petrel 2. All new features will apply to both models, except those related to the hardware differences listed above.

## Listing of changes in Petrel Firmware v27

### Petrel 2 Only:

- **NEW FEATURE:** Tilt compensated digital compass. Accessed by pressing the right button once.

#### IMPORTANT

Calibrate the compass, using the "System Setup⇒Compass" menu, before first use.

Instructions in the manual or at:

[www.youtube.com/user/ShearwaterResearch](http://www.youtube.com/user/ShearwaterResearch)

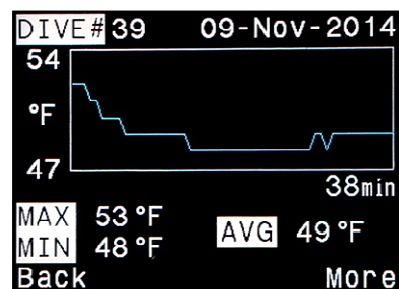


Digital compass view on the Petrel 2

- **NEW FEATURE:** Bluetooth Smart Ready for Apple iOS device support. The Bluetooth Smart Ready module supports both Bluetooth Classic (v2.1) standard and the new low energy Bluetooth Smart (v4.0) standard.

### All Models:

- **NEW FEATURE:** A plot of the dive temperature is now shown in the dive log view. Also shows minimum, maximum, and average temperature for the dive. Accessed after the dive log graph.



Temperature graph in the dive log



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- **NEW FEATURE:** Additional information can now be viewed in the dive log view. Accessed after the temperature graph (see above). Includes:
  - Mode (OC Tec, OC Rec, OC/CC, Gauge, etc)
  - Surface Interval
  - Surface pressure in millibar
  - Deco model and conservatism
  - Start CNS %
  - End CNS %

DIVE# 39	09-Nov-2014
Mode	OC/CC
Surface Int	01h 30m
Surface mbar	1004
Deco Model	GF 30/70
Start CNS	008%
End CNS	018%
Back	Edit

Additional dive information can now be viewed in the dive log

- **CHANGE:** When surface pressure is less than 960 millibar, now forces the use of auto altitude setting (i.e. cannot use the SeaLvl setting). This does not change the saved setting.
- **CHANGE:** The dive planner now inserts ascent legs in the results table to perform gas switches during the initial ascent to the first deco stop. The decompression calculations always included these switches, but the planner results were only showing a single ascent to the first deco stop using the bottom gas. This change results in more accurate gas usage results for some dives.



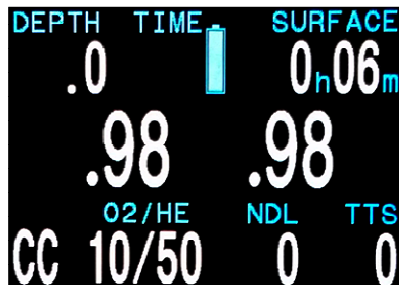
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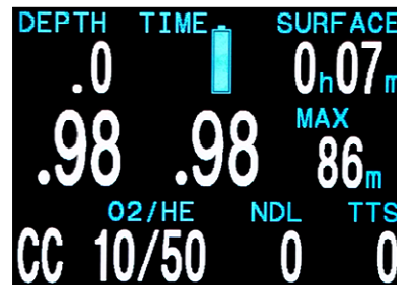
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## EXT Model:

- **NEW FEATURE:** External PPO2 monitoring is now supported for 2 sensors (previously only allowed 1 or 3 sensors). Access the 2 sensor mode by performing a PPO2 calibration with only sensors #1 and #2 connected (single sensor mode accessed by calibrating with only sensor #2 connected). When using the 2 sensor mode, a configurable value may be displayed on the right side of the screen.



Two sensors can now be used in the external PPO2 monitoring mode (not available on controller models)



A configurable value (maximum depth in the above image) can optionally be displayed

The voting works as follows in 2 sensor mode:

### Voting Passed

- If sensors within 20%, voting passes and the average PPO2 of the two sensors is used for decompression and CNS calculations.

### Voting Failed

- If the two sensors differ by more than 20%, voting has failed.
- Failed sensors are shown in yellow (unless below 0.4 or above 1.6, then they will be shown in red).
- PPO2 display will alternate with the message "VOTING FAILED".
- The lower PPO2 value will be used for decompression calculations.
- The higher PPO2 value will be used for CNS calculations.



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## Previous Release Notes

**NOTE:** Versions v23 to v26 were not publically released

### Version 22:

- Chinese language version of v21.

### Version 21:

#### DiveCAN Rebreather Controller Models

- **CHANGE:** Removed auto-promotion of setpoint from 0.19 to low setpoint when wet.  
**Reminder that the 0.19 setpoint is not intended for use when breathing on the loop. The 0.19 setpoint is a convenience feature for use when setting up and storing the rebreather only.**

#### EXT Model

- **CHANGE:** When the “Cal FO2” setting is changed, no longer deletes the existing calibration data to force a new calibration.

#### All Models

- **CHANGE:** No longer suggests a better gas (by changing displayed gas color to yellow) if the O2 content is the same (this can only happen if O2 content is the same, but Helium content is different). Not a typical situation, but encountered occasionally by divers, who found the better gas suggestions confusing.
- **FIX:** When switching to/from OC Rec mode, now immediately updates the ‘Altitude’ setting (in OC Rec mode this setting can only be set to ‘Auto’). Previously this change would occur after the next on/off cycle following the mode change.
- **FIX:** For the 1.5V Photo Lithium battery type, fixes an issue where the battery bar graph always showed 100%. The low battery warnings and color coded alerts were correct however.
- **FIX:** Fixed a problem that could cause “Watchdog Reset” when the battery is changed, especially when battery removed for a few hours.

### Version 20:

#### Standalone and EXT Models

- **NEW FEATURE:** Chinese language translation. Produced as separate build. Contact Shearwater or Chinese dealers for more information.



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**NOTE:** Firmware version v19 was not publicly released.

### Version 18:

#### All Models

- **NEW FEATURE:** Dive log parameters can now be edited. To access, press right button while viewing the dive log graph. Allows editing of:
  - Dive #
  - Dive start time and date
  - Delete dive
- **NEW FEATURE:** Added Clear Log menu option to clear all dives. When dives are deleted, doesn't actually delete data, but flags logs so they do not display on Petrel or desktop software. However, logs can still be undeleted or downloaded with special commands. Reason for the ability to recover logs is in the case of a diving accident, where logs have been accidentally or maliciously deleted.
- **NEW FEATURE:** Green can be set as the main color instead of white. Set in Adv. Config. 1 menu.
- **NEW FEATURE:** Added commands for setting and getting time over Bluetooth.
- **IMPROVEMENT:** For 1.5V lithium battery type, added temperature compensation for more accurate battery gauge and warning levels.
- **IMPROVEMENT:** Changed VPM-B convergence criteria to handle corner cases better.
- **IMPROVEMENT:** When using external PPO2 monitoring and voting has failed (i.e. no consensus between cells), the CNS is now calculated off the highest PPO2 measurement. Previously used the lowest measurement. Deco calculations continue to use the lowest PPO2 measurement. This is the most conservative approach for both deco and CNS.
- **IMPROVEMENT:** In "Adv. Config.->System Info" now shows the total lifetime dive count and dive time (in hours and minutes).
- **IMPROVEMENT:** For long operations that lock-up the user interface (for example, drawing a dive log graph or auto-calibration), now clears the button press queue when operation completes. Previous behavior was that after the long operation all queued button presses executed, which could perform random and unintended operations.
- **CHANGE:** 24-hour times are now displayed with leading 0 when hours less than 10.
- **CHANGE:** Subtracts temperature offset due to self-heating of electronics for better measure of actual water temperature.
- **CHANGE:** Shearwater logo updated to reflect new re-branding.
- **FIX:** Improvements to GF and VPM-B NDL calculations for more accurate NDL times. Most dives unaffected, but improvements can be few minutes more accurate in extreme cases especially during ascents when NDL has dropped to below 2 or 3 minutes.
- **FIX:** In VPM-B, if a better gas was available, but user remained on a different gas, then when approaching a stop, the deco calculations would switch back and forth between using the better gas and using the current gas depending on slight changes to depth. Proper behavior is to assume user will select the better gas, and always use that for deco calculations.



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- **FIX:** Better healing of triplicate setting storage in case of third copy being corrupted (third copy getting wasn't healed properly if it was corrupted).
- **FIX:** If the dive is interrupted (for example, battery dies), now ensures that the dive log is properly closed so that dive appear in the dive log list and it can be downloaded.

### Standalone and EXT Models

- **NEW FEATURE:** Recreational Nitrox Mode. An open-circuit only, 3 gas Nitrox mode. With simpler main screen, optional safety stops, and a configurable bottom row. Also adds a NDL planner, gas MOD warnings, N2 bar graph, and simpler settings.
- **NEW FEATURE:** Added temperature display as option on configurable center row.
- **IMPROVEMENT:** Gauge mode metric depth display now uses larger font for tenths digit.

### EXT Model

- **NEW FEATURE:** PPO2 Mode. Non-deco mode like Gauge Mode, but with PPO2 display from external O2 cells. With stopwatch and resettable average depth.

### DiveCAN Controller Models

- **NEW FEATURE:** Petrel DiveCAN Controller can now be plugged into the OBOE to calibrate at high altitude or for O2% other than 100%.
- **IMPROVEMENT:** For models that use PPO2 auto-calibration, now displays live updates of both mV and PPO2 from previous calibration (**Requires SOLO firmware v05 or higher**). A countdown bar is also displayed to indicate that something is happening and total timeout period.
- **IMPROVEMENT:** Appearance of the PPO2 Calibration Results screen improved.
- **CHANGE:** When on surface and not wet, the no-activity shutdown timeout increased from 15 minutes to 45 minutes (non-controller models still have 15 minute timeout).
- **CHANGE:** When bailing out to OC, automatically switch to low setpoint (to make buoyancy control easier).
- **CHANGE:** If setpoint is 0.19, and wet contacts detect water, then promote setpoint to low setpoint.
- **CHANGE:** When setpoint is 0.19, center row displays yellow warning "SetP = .19" above the PPO2 readings.

**Reminder that the 0.19 setpoint is not intended for use when breathing on the loop. The 0.19 setpoint is a convenience feature for use when setting up and storing the rebreather only.**

- **CHANGE:** The "System Setup->Dive Setup" menu page now shows "Mode" (fixed at OC/CC) and "PPO2 Mode" (fixed at Ext.). These values appear grayed-out and can't be edited.
- **CHANGE:** In Adv. Config. 2, the CC PPO2 warning limits are now more restricted. CC Min PPO2 low bound is now 0.4. CC Max PPO2 high bound is now 1.6.



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### rEvo rMS Model (changes in DiveCAN Controller Model section also applies)

- **IMPROVEMENT:** Petrel now transmits scrubber times on DiveCAN bus, so they get recorded in the DiveCAN log.
- **CHANGE:** Startup logo now includes "rMS".
- **CHANGE:** Removed "Force Ready" and "Scrubber Reset" menu items.

### Version 12:

- Public release. Recommended for all users of previous firmware versions.
- **CHANGE:** No longer updates average depth when depth is less than 0.9m (3ft). This removes the post-dive surface interval from the average depth.
- **CHANGE:** Improvements to Bluetooth driver.
- **FIX:** Fixed problem where if Petrel was powered off for more than 15 minutes prior to a battery change, the tissues were being cleared even if successfully restored.
- **FIX:** Fixed 1.5V Photo Lithium battery warning levels. Previously went to critical (red) too soon.

### Version 11:

- Public release. Recommended for all users of previous firmware versions.
- **NEW FEATURE:** Added support for Petrel EXT (external PPO2 monitoring with Fischer connector).
- **NEW FEATURE:** User configurable center row displays (Max depth, avg depth, CNS, DET, etc). Not available in all modes.
- **NEW FEATURE:** Dive End Time (DET) time. The time of day when the dive will end. For example, if the current time is 2:45pm and the current TTS is 45 minutes, then the DET is 3:30pm. Only available on the new configurable center row display positions.
- **NEW FEATURE:** Dive log downloading now allows individual logs to be selected for download. The entire dive log memory can now be downloaded (previous versions only downloaded the last 20 hours of diving).
- **CHANGE:** Adjusted low battery levels for 1.5V Photo Lithium battery type.



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- **CHANGE:** Added compression to dive logs for faster downloading.
- **FIX:** Fixed issue where the new values for max and avg depth of the previous dive were not saved to permanent memory when units (feet/meters) were changed.
- **FIX:** Fixed issue where shallow repetitive VPM-B dives (less than 12m/40ft) were too conservative.
- **FIX:** Improved accuracy of Buhlmann GF NDL times.
- **NOTE:** Versions V08, V09 and V10 were internal releases only

## Version 07:

- Public release. Recommended for all users of previous firmware versions.
- **CHANGE:** Changed some VPM-B calculations to improve NDL time accuracy.
- **CHANGE:** Improved internal storage of settings.

## Version 06:

- Internal release. Not a public release.
- **CHANGE:** Added a hard time limit of 15 minutes that the battery can be removed until the deco tissues are reset. Previously tissues would be retained as long as super-capacitor able to keep the clocking running. However, 15 minutes is ample time for battery change, and a hard 15 minute time limit adds consistency.

## Version 05:

- Internal release. Not a public release.
- **NEW FEATURE:** Added new style of Gas Select and Define Gas menus. The old style (classic) still available. Switch between styles in Adv Config 1 menu.
- **CHANGE:** Color of turned-off gases is now magenta (purple). The dark gray was more intuitive, but unfortunately was too hard to read in some lighting conditions.





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- **CHANGE:** Default Title Color changed from blue to cyan. Note that title color can still be customized in the Adv Config 1 menu.
- **NEW FEATURE:** Battery info screen added to Advanced Config. Includes battery type, current battery voltage, time on since last change, and date of last change.
- **FIX:** Changed so a gas that is set to 00/00 cannot be selected as the active gas. The only way for this bug to occur was to have a zeroed gas turned on, and then turn the active gas off in the System Setup menu. Also, zeroed gases can no longer be turned on.
- **FIX:** Fixed bug entering time when AM.

### Version 04:

- Public release.
- **CHANGE:** Button label font color now white.
- **CHANGE:** Changed Bluetooth Class of Device from 0 to 0x80704 (Wearable Wrist Watch with Capturing Service). This change to allow Bluetooth connections to older Android phones that have a bug in their Bluetooth stack.
- **CHANGE:** Internal change to how serial number is generated. No external effect.

### Version 03:

- First public release to customers.
- **FIX:** Fixed problem where Missed Deco Stop error would be generated if last deco stop cleared while diver slightly shallower than last stop.

### Version 02:

- **CHANGE:** Added additional checking on stored settings.

### Version 01:

- First release to production.