OFWM SOFTWARE USER MANUAL

Parker

Contents

1. Overview

This manual describes the Online Ferrous Wear Meter (FWM) PC software, developed for marine use but suitable for other application. Full functionality requires a PEAK PCAN-USB adapter (Mfg. PEAK-SYSTEM, Part No. IPEH-002021) to connect to the sensors; see the Online FWM installation guidelines for hardware and setup details.

The Online Ferrous Wear Meter (OFWM) is a key tool for maximising uptime and reducing operating costs on large two-stroke engines.

Cylinder condition must be monitored, but visual inspection is only possible with the engine shut down. Therefore, monitoring cylinder lubrication oil (CLO) on the underside of the piston while the engine is running provides critical insight into cylinder condition. This process is known as scavenge drain analysis (SDA).

OFWM offers an accurate method to detect, quantify, and trend ferromagnetic material (magnetic iron) suspended in CLO that has been in contact with the piston and liner. With continuous feedback, abrasive and adhesive wear can be monitored in line with OEM guidelines, helping reduce total cost of ownership by:

- Optimising the CLO feed rate
- Wear control
- Optimising overhaul intervals.

To maximise the benefit of the OFWM, it is recommended to install sensors onto each cylinder, to accurately monitor engine and system characteristics. With minimal disruption, installation can be done during port calls and requires minimal drain-line modification together with daisy-chained cabling and a compressed air line.

Optional software can be installed on a standalone PC to trend and log data and generate alerts. Alternatively, the sensor outputs can be integrated directly into the engine's supervisory monitoring system.

2. Software installation

2.1 Software download

1. Scan the QR code on the sensor or go to https://ph.parker.com/gb/en/product-list/on-line-ferrous-wear-meter-ofwm.

2. Download the Online FWM PC software.

2.2 Installing

1. The software can be installed on Windows 10 or later.
2. An internet connection is required when installing for the first time in order to download the necessary drivers.
3. Run the executable and the software will automatically install. Internet access is not required in order to run and operate the software.

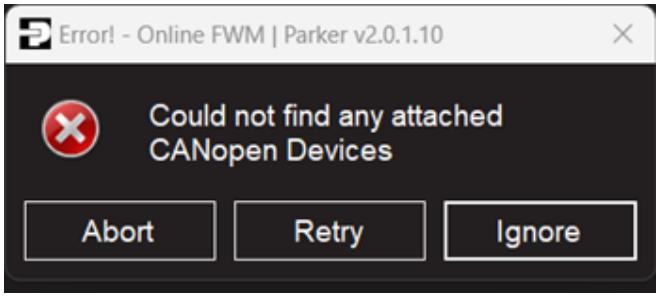
2.3 Updating

1. Download the latest version of software from the Parker website.
2. Running the executable will automatically update the existing installed software.

3. Operating the software

3.1 Starting the software without sensors connected

The software can run without sensors connected. When opening the software, click Ignore on the dialog box to open the software and perform basic tasks such as exporting data, viewing the demo chart, and exploring the interface.



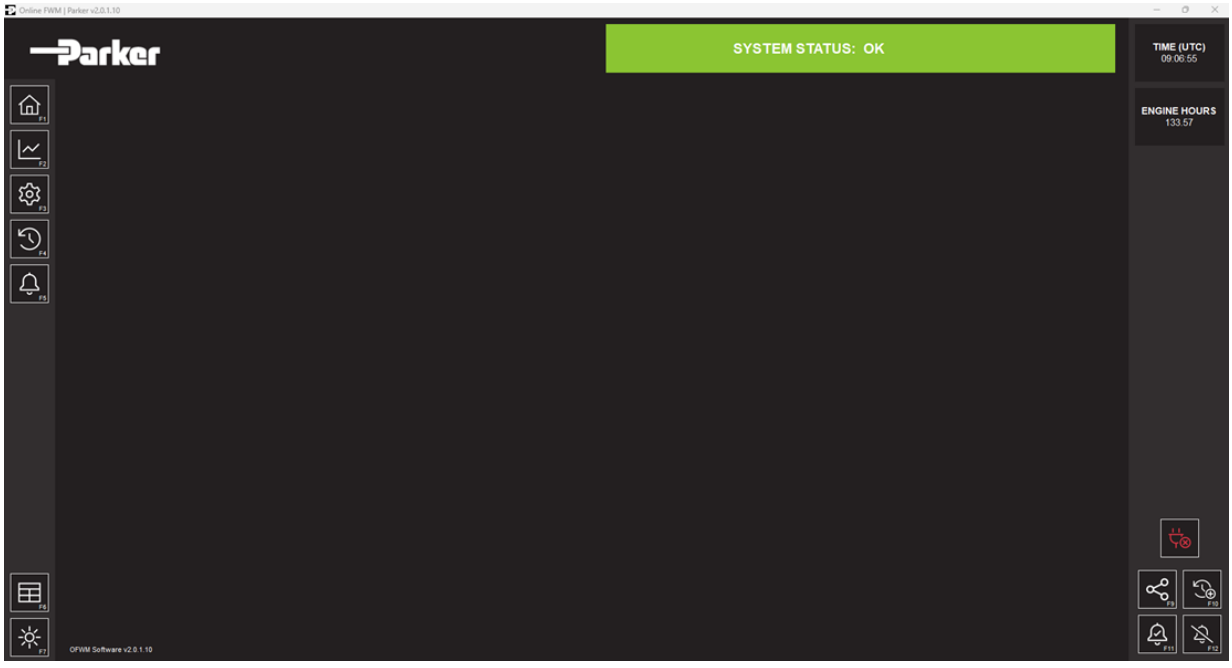
3.2 Starting the software for the first time with sensors connected

Each sensor must have a unique node ID (see Online FWM installation manual). It's recommended to match each sensor's node ID to its cylinder number. All sensor baud rates must be set to 125 kbits/s.

Note: the Online FWM software uses node ID 127.

Before using the software, make sure the sensors are powered and the PC connection with a PEAK PCAN-USB adapter (Mfg. PEAK-SYSTEM, Mfg. Part No. IPEH-002021) to connect to the sensors; see the Online FWM installation guidelines for hardware and setup details.

The image below shows the Main screen (Section 4) with no cylinders displayed. However, if cylinders are displayed continue to Section 3.2.3.



3.2.1 Confirming CAN communication

When the software opens, the Main screen is displayed (Section 3.2). Check that the **Communication** icon is green, confirming the CAN hardware is connected. If it remains red, check the PEAK PCAN-USB adapter connection. Refer to troubleshooting (Section 10) if icon remains in red state.

PEAK PCAN-USB adapter **not connected.**

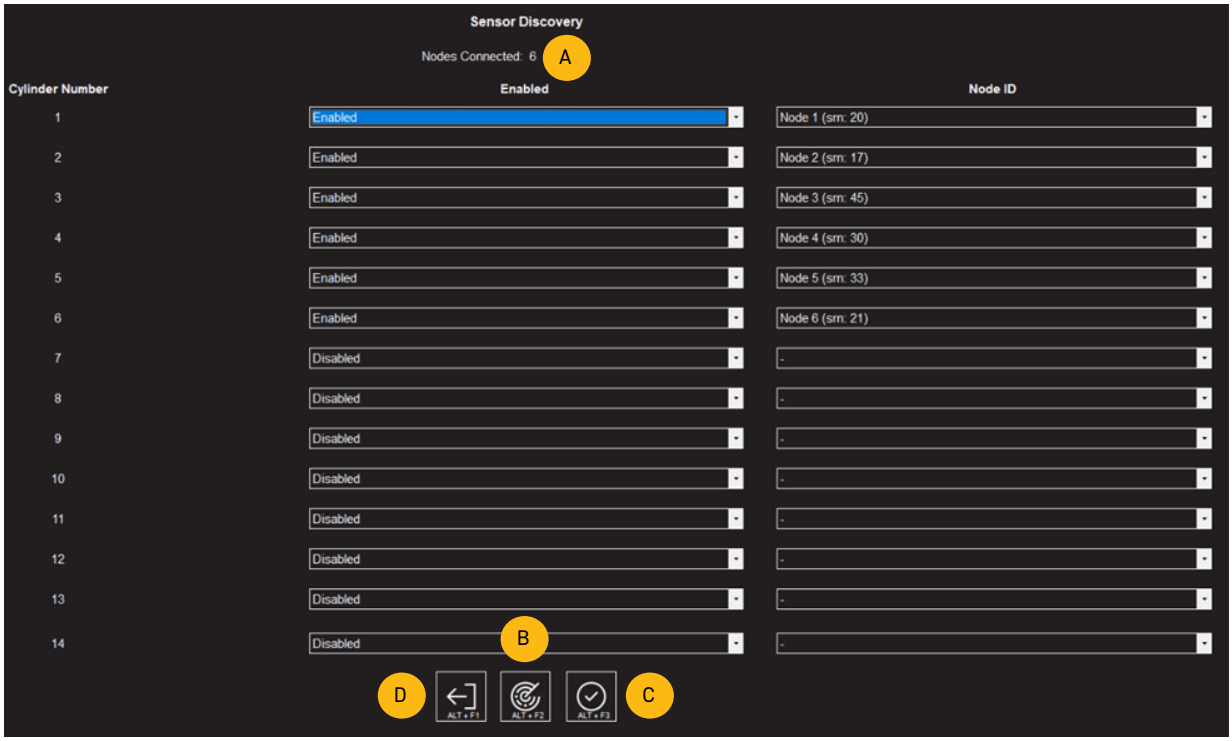
PEAK PCAN-USB adapter **connected.**

3.2.2 Discovering sensors

If cylinders are not displayed within the Main screen, follow with Discovering sensors.

Select the **Settings** icon on the Main screen (Section 4)**.**

and then the **Sensor Discovery** icon on the Settings screen (Section 7).

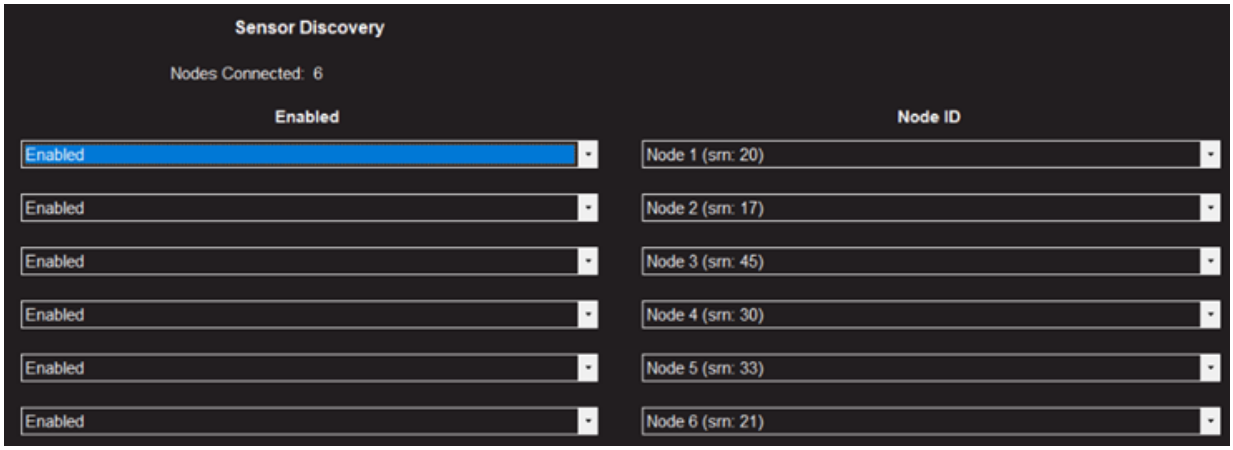


NOTE: Each sensor must have a unique Node ID (see the Online FWM installation manual for how to set them). It's recommended to match each sensor's Node ID to its cylinder number

The software automatically detects connected sensor nodes (A).

To rescan manually, select the **Rescan** icon (B) at the bottom of the Sensor Discovery page.

Cylinders can then be **Enabled** and **Node ID**s assigned. The value in brackets after the Node ID (e.g., srn 20) references the PCB serial number.



Select the **Save and Exit** (C) icon, then confirm when prompted. The software will return to the Settings screen (Section 7).

Select **Exit** (D) icon to exit without savings, then confirm when prompted. The software will return to the Settings screen (Section 7).

When in the Settings screen (Section 7) select the **Home** icon to return to the Main screen.

Detected sensors will appear on the Main screen. The Main screen can be toggled between the **Table** (Section 4) or **Dashboard** (Section 5) views.

3.2.3 Activating sensor into Run mode

All discovered cylinders should be highlighted as green indicating the sensor is in Run mode. If this is the case, then sensor connection and cylinder set-up has been successfully completed. Once sensors and cylinders are set up, the software saves the configuration. When reopening, the software automatically detects the configured sensors and returns them to Run mode.

Grey = Unavailable, no device connected. If cylinders are highlighted in grey, then manual intervention may be required. Continue as follows.

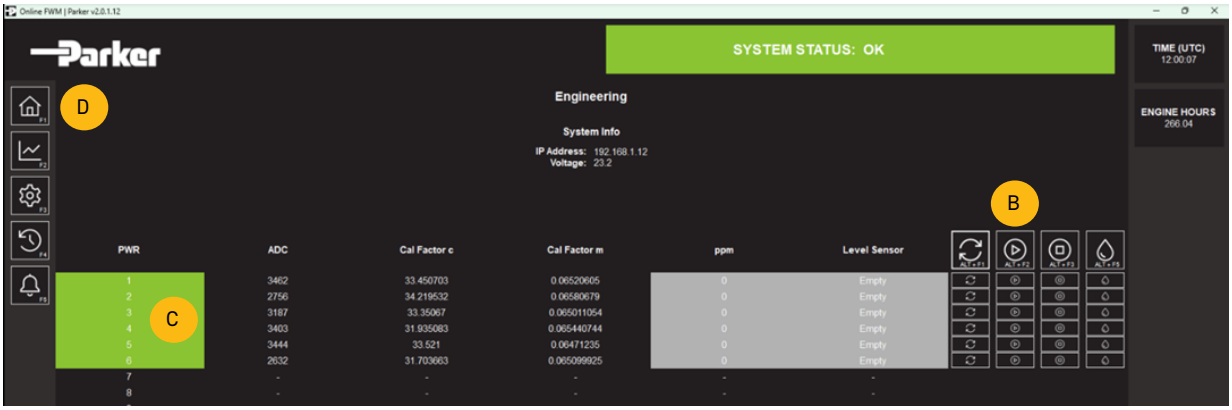
Green = Run Mode. In Run mode, the sensor operates normally — taking measurements, performing blowdown, and operating the angle seat valves.

Red = Stop Mode. The sensor does not measure. The top and bottom angle seat valves stay open for continuous oil flow, and blowdown is disabled.

The Main screen below displays cylinders 1 and 2 connected (green) and in Run mode, whereas Cylinders 3 to 6 not connected (grey).

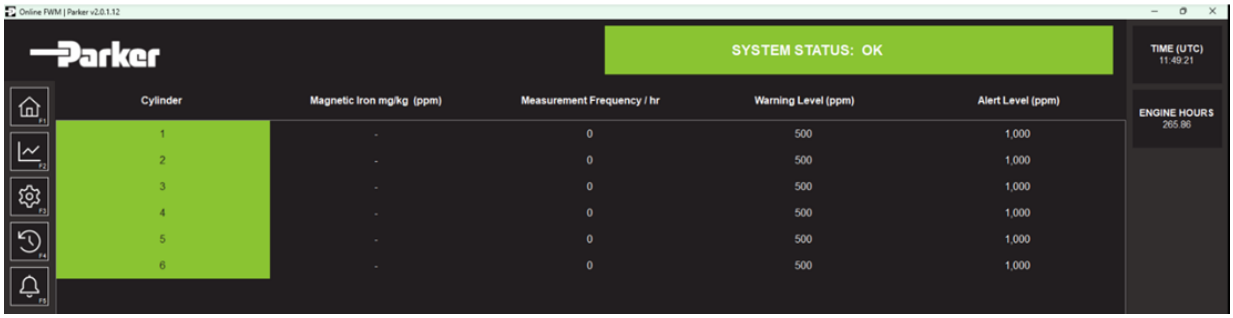
Select the **Settings** icon (A) from the Main screen**.**

Select **Engineering Mode** icon at the bottom of the Settings screen to enter the Engineering screen.



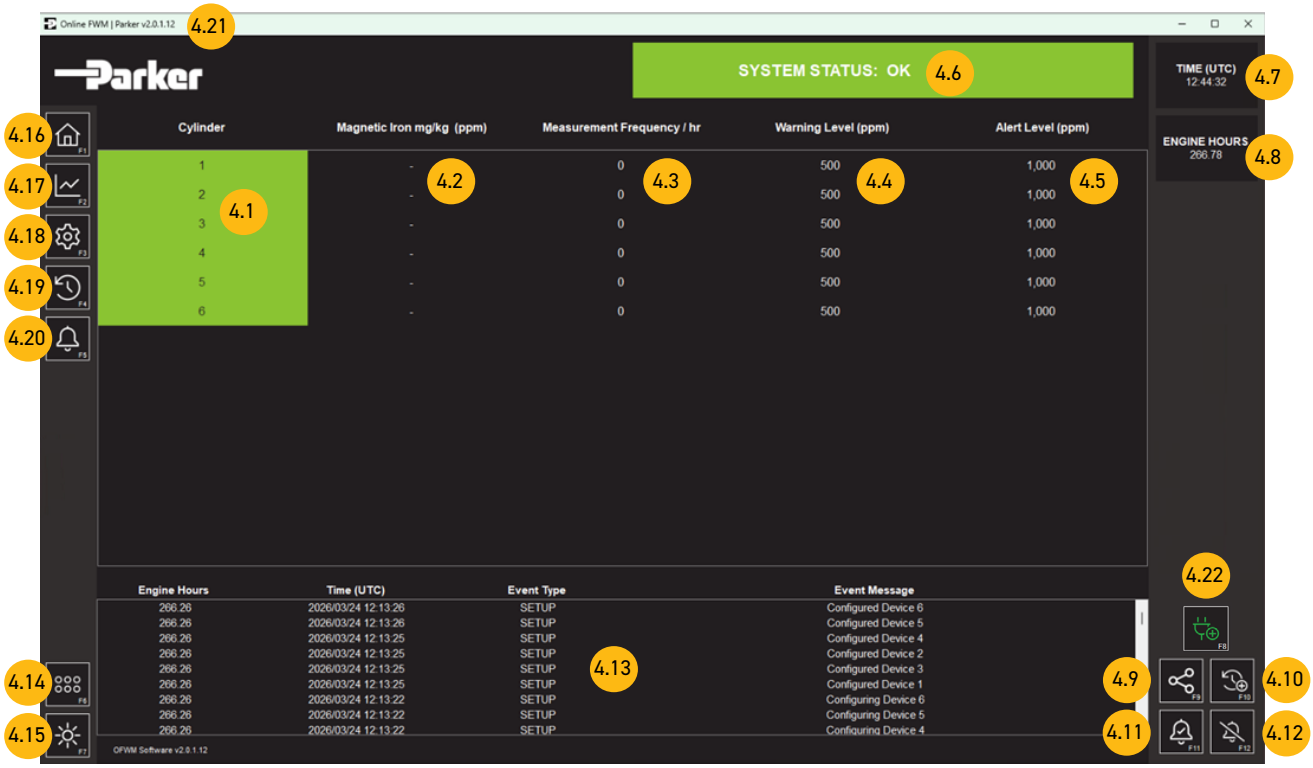
Select the **Run All** icon (B) to set all sensors to Run mode. If any sensors (C) continue to stay not connected (grey), see Troubleshooting (Section 11).

Select the **Home** icon (D) to return to the Main screen. All sensors should be in Run mode (green); if not, see Troubleshooting (Section 11).



NOTE: Once the sensors and cylinders are configured, the software saves the setup. When the application is reopened, it automatically recognises the configured sensors and restores them to their previous mode, so sensor discovery is not required.

4. Main screen



4.1 Displays active cylinders; the colour indicates the sensor mode (Section 3.2.3).

Grey = Unavailable, no device connected.

Green = Run Mode. In Run mode, the sensor operates normally — taking measurements, performing blowdown, and operating the angle seat valves.

Red = Stop Mode. The sensor does not measure. The top and bottom angle seat valves stay open for continuous oil flow, and blowdown is disabled.

4.2 Sensor ppm measurement (magnetic iron mg/kg). The ppm measurement is colour coded based on the threshold levels set in Settings (Section 7).

Green = ppm measurement below 'Warning' and 'Alert' threshold levels (Section 7.2).

Amber = Above ppm 'Warning' threshold but below ppm 'Alert' level (Section 7.2).

Red = Above ppm 'Alert' level (Section 7.2).

NOTE: Alert and Warning thresholds are user-defined and depend on factors such as historical trends, CLO type, fuel type, and engine design.

4.3 Measurement frequency. The number of ppm measurements taken in the last hour.

4.4 Set sensor **Warning Level**: A user-defined, low-level warning threshold to flag a possible issue (it may not always require action). The ppm measurement Warning threshold is set in Settings (Section 7), and the alarm triggers only after the required number of repeat measurements is met (see ppm Alarm Damping, Section 7.2).

NOTE: Limits are user defined and will depend on system factors such as historical trends, CLO type, fuel type, engine design etc.

4.5 Sensor **Alert Level**: A user-defined, high-level warning threshold to flag a possible issue, this may require action. The ppm measurement Alert threshold is set in Settings (Section 7), and the alarm triggers only after the required number of repeat measurements is met (see ppm Alarm Damping, Section 7.2).

NOTE: Limits are user defined and will depend on system factors such as historical trends, CLO type, fuel type, engine design etc.

4.6 This indicates the state of the overall system. This is triggered by multiple factors, ppm thresholds exceeded, blockages, COMMS issues etc.

System OK = System operation running as required.

System Warning = A low-level warning that flags a possible issue, this may not require action.

System Alert = A high-level warning that flags a possible issue, this may require action.

System status alarms can be acknowledged or silenced. Refer to points 4.11 & 4.12.

4.7 Coordinated Universal Time (UTC) is the primary time standard by which the world regulates time.

4.8 The Engine Hours timer starts when the software is first opened and runs continuously until you manually reset using Engine Reset in Settings (Section 7).

4.9 

Select **Export Data** to save sensor data, system data, configuration data, and event logs as a CSV file. Exported data can be filtered, and individual cylinders can be selected as needed.

4.10 

Select **Add Event to Event Log** to add a free-text entry. It is saved with engine hours and UTC date/time, shown in the Event Log, and included in Data Export (4.9).

4.11 

Select **Confirm Alarm** to acknowledge the alarm shown in System Status (4.6). This clears all active alarms and removes them from the active alarm list and records the alarm and acknowledgement in the Event Log.

4.12 

Select **Acknowledge Alarm** to silence all active alarms for 24 hours. After this period the alarm will reactivate.

4.13 The event log window lists events (such as alarms) in time order. It shows the event time (engine hours and UTC), the event type, and the event message. You can also select the Event Log icon (4.19) for a clearer, more detailed view.

4.14 

Select **Dashboard/Table** view icon to toggled between Table or Dashboard view (Section 5).

4.15 

Select this icon to switch between software dark and light visual mode.

4.16 

Select the **Home** icon to return to the Main screen at any time.

4.17 

Select the **Chart** icon to view and analyse sensor data in a chart format. Refer to Section 6 Chart screen.

4.18 

Select the **Settings** icon to access the sensor settings screen. Refer to Section 7.

4.19 

Select **Event Log** to view a list of events (such as alarms) in time order. It shows the event time (engine hours and UTC), the event type, and the event message.

4.20 

Select **Alarms Overview** to view list of alarms. Active or confirmed alarms can be viewed as detailed below:

Select **Active Alarms** icon to display current alarms.

Select **Confirmed Alarms** to view previously acknowledged alarms. The list clears when the software is closed and reopened, but the history is still available in **Data Export** (4.9).

4.21 

Displays current version of software.

4.22 Status of CAN communication (connected or not connected).

PEAK PCAN-USB adapter **not connected.**

PEAK PCAN-USB adapter **connected.**

5. Dashboard screen

The dashboard view shows the same information as the Table view (Section 4), but in a simpler format. Only detected sensors are shown, with their ppm measurement and frequency.

Select **Dashboard/Table** view icon from the Main screen to display Dashboard.

5.1 Displays active cylinders; the colour indicates the sensor mode.

Grey = Unavailable, no device connected.

Green = Run Mode. In Run mode, the sensor operates normally — taking measurements, performing blowdown, and operating the angle seat valves.

Red = Stop Mode. The sensor does not measure. The top and bottom angle seat valves stay open for continuous oil flow, and blowdown is disabled.

5.2 Sensor ppm measurement (magnetic iron mg/kg). The circle is colour coded based on the threshold levels set in Settings screen (Section 7).

White = No PPM measurements have been taken since the software was last opened.

Green = ppm measurement below 'Warning' and 'Alert' threshold levels (Section 7.2).

Amber = Above ppm 'Warning' threshold but below ppm 'Alert' level (Section 7.2).

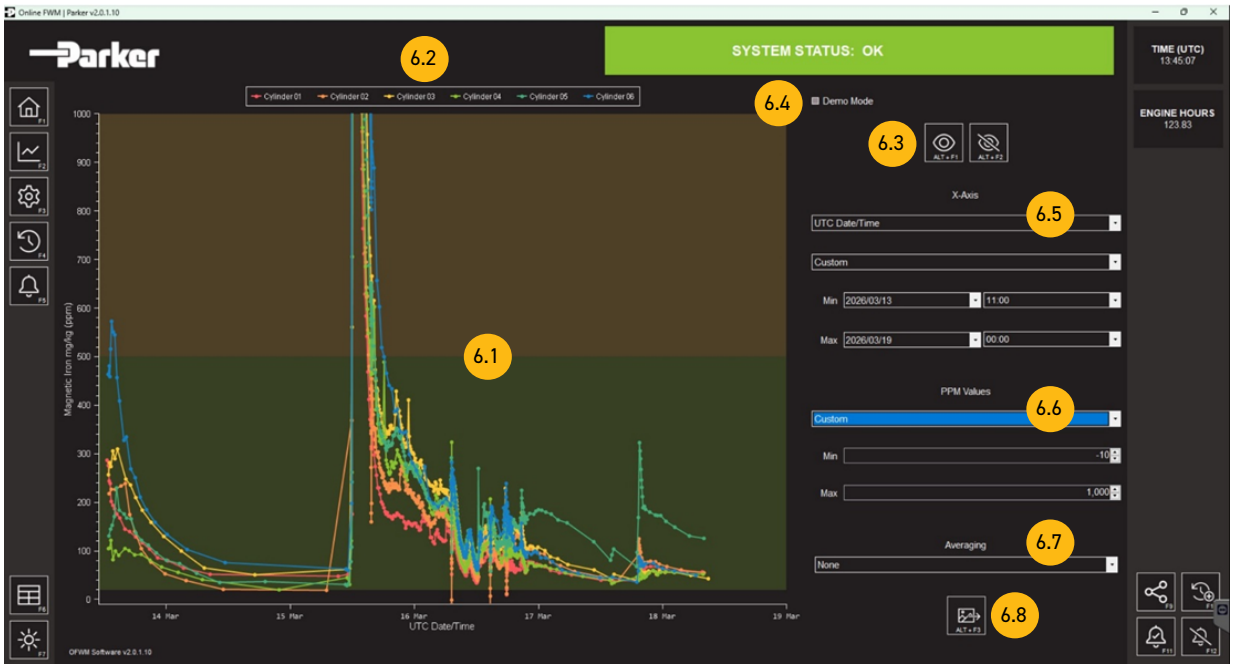
Red = Above ppm 'Alert' level (Section 7.2).

5.3 Measurement frequency. The number of ppm measurements taken in the last hour.

6. Chart screen

The Chart screen shows Cylinder ppm measurements in a visual format so historical data and trends can be visualised. Data can be filtered by engine hours or UTC date/time, with the ability to filter further to focus on individual cylinders.

Select **Chart** icon from the Main screen (Section 4).



6.1 The sensor ppm measurements are displayed as a line chart. The ppm Warning and Alert thresholds are visible in the chart background. To see individual readings, select and hold a point on a graph.

6.2 Toggle visibility of cylinders displayed on the chart by selecting in the legend.

6.3 All cylinders can either be hidden or displayed using these icons.

6.4 Demo mode displays sample test data, enabling chart functionality demonstration.

6.5 The chart's X-axis can be filtered by engine hours or UTC date/time, and the scale adjusted as needed.

6.6 The chart's Y-axis (ppm measurements) scale can be adjusted and customised as required.

6.7 The data set can be averaged over 1-hour, 5-hour or 10-hours. This is applied to all cylinders.

6.8 Select the **Export Chart** icon to save the chart locally as a PNG file.

7. Settings screen

The Settings screen provides access to basic software configuration and system settings. It also lets you enter installation details such as the vessel name and IMO (International Maritime Organisational) number.

Select the **Settings** icon from the Main screen (Section 4).

Select **Save** to save any changes made to software and sensor settings. Confirm when prompted.

7.1 Measurement frequency. The number of ppm measurements taken in the last hour.

Setting	Description
Vessel Name	Sets the vessel name
Vessel IMO	Sets the vessel's IMO number. Only valid IMO numbers are accepted (no free text).
Engine Make and Model	Sets the make and model of the engine

7.2 Software configuration

Setting	Description
Cylinder	Sets the cylinder(s) the settings will be applied to.
Warning Level (ppm)	Sets a warning level in ppm. When a sensor reads a ppm level above the set level, an alarm is triggered.
Alert Level (ppm)	Sets an alert level in ppm. When a sensor reads a ppm level above the set level, an alert is triggered.
PPM Alarm Damping	Sets the number of readings above the alarm level before an alarm is triggered. A lower value ensures a fast response but may increase false alarms.
Slow Fill Alert Time (mins)	Sets how long the system waits before flagging a slow-filling sensor. For example, if set to 60 minutes and no measurement occurs during that time, the software triggers an alarm.

7.3 System settings

Setting	Description
Time format	Choose 24-hour or 12-hour time display.
Date Format	Choose the displayed date format (e.g., YYYY/MM/DD or YYYY/DD/MM).
Number Separator	Choose decimal/thousands separators (e.g., 0,000.0 or 0.000,0).
Low Voltage (volts)	Sets the number of readings above the alarm level before an alarm operates. A lower value ensures a fast response but increases false alarms.
Slow Fill Alert Time (mins)	Sets the low-voltage alarm threshold. If any sensor drops below this value, the software alarms, based on the lowest sensor voltage in the system.

7.4 Setting screen icons

Select to **Discover sensor** and assign to cylinders.

Refer to Section 3.2.2.

Select to **Reset Engine Hours**. Use this function to manually reset the engine hours timer. The timer continues after closing and reopening the software unless reset.

Select to enter **Engineering Mode**. Refer to Section 8.

Select to enter **Configuration Mode**. Refer to Section 9.

Select **Save** to save any changes made to software and sensor settings. Confirm when prompted.

8. Engineering screen

The Engineering screen provides detailed sensor information and access to sensor functions to support, maintenance, diagnostics etc.

Select **Settings** icon from the Main screen.

Select **Engineering Mode** icon at the bottom of the Settings screen to enter the Engineering screen.

8.1 List of active sensors, the colour indicates sensor mode:

Grey = Unavailable, no device connected.

Green = Run Mode. In Run mode, the sensor operates normally — taking measurements, performing blowdown, and operating the angle seat valves.

Red = Stop Mode. The sensor does not measure. The top and bottom angle seat valves stay open for continuous oil flow, and blowdown is disabled.

8.2 The ADC value is the digital conversion of the sensor's raw measured voltage. It is intended for service engineers only and helps support sensor diagnostics.

8.3 Sensor calibration coefficients intended for service engineers to help support with sensor diagnostics.

8.4 The displayed voltage is a live reading of the lowest voltage from any active sensor.

8.5 Sensor ppm measurement (magnetic iron mg/kg). The ppm value is colour coded based on the threshold levels set in Settings screen (Section 7).

Green = ppm measurement below 'Warning' and 'Alert' threshold levels (see Section 7.2).

Amber = Above ppm 'Warning' threshold but below ppm 'Alert' level (see Section 7.2).

Red = Above ppm 'Alert' level (see Section 7.2).

8.6 Level sensor status, this will indicate if the sensor is triggered or not (empty or full).

8.7 User sensor functions

Select to **Reset Sensor** back to factory configuration settings.
This will not modify the CANopen communications settings.

Select to put the sensor into **Run mode**. Individual sensors can be selected or select top icon to enable all sensors.

Select to put the sensor into **Stop mode**. Individual sensors can be selected or select top icon to enable all sensors.

Select to perform manual **Blowdown**. Individual sensors can be selected or select top icon to enable all sensors.

8.8 Engineering screen icons

Select to **Exit** screen and return to Engineering screen.

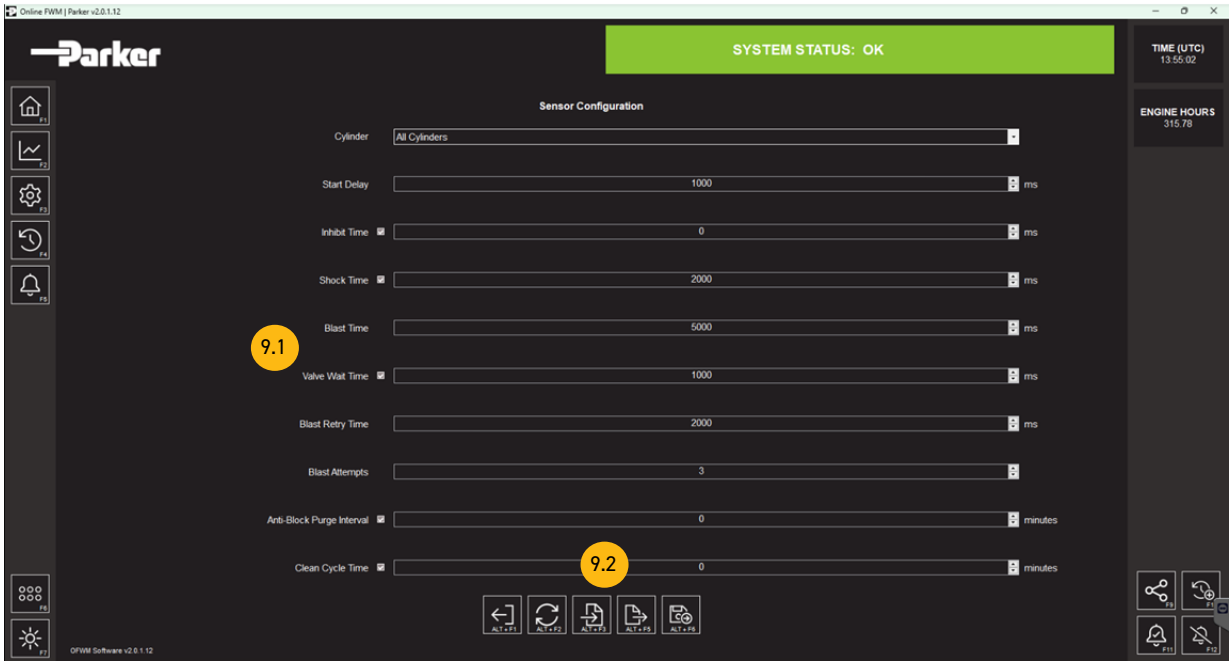
9. Configuration screen

The Configuration screen provides access to advanced sensor parameters, giving users more control over sensor operation.

Select **Settings** icon from the Main screen.

Select **Configuration** icon at the bottom of the Settings screen to enter the Configuration screen.

Select **Save** to save any changes made to sensor configuration. Confirm when prompted.



9.1 Sensor configuration parameters

Parameters with a checkbox can be enabled or disabled by selecting or clearing the box.

Setting	Description
Cylinder	Sets to which cylinder(s) the configuration will be applied.
Start Delay (ms)	Sets the time the sensor waits to start a measurement after entering Run mode or power-up in Run mode.
Inhibit Time (mins)	Sets the minimum time between measurement attempts. If oil flow is high, this prevents the sensor from running too many cycles in a short period.
Shock Time (ms)	Sets the time before a sensor blowdown, to allow pressure in the tube to build up by closing the top and bottom valves.
Blast time (ms)	Sets how long the sensor blowdown lasts. Typical blowdown times are 3000–5000 ms.
Valve Wait Time (ms)	Sets the wait time after a valve changes state (closed to open).
Blast Retry Time (ms)	Sets how long the sensor waits after an unsuccessful clear of oil from the sample tube before retrying.
Blast Attempts	Sets how many times the sensor attempts to clear the oil from the sample tube before entering a blocked state, triggering a software alarm.
Anti-Block Purge Interval (mins)	Sets the minimum time with no measurements before a blowdown sequence runs to help prevent blockages. No measurement is taken during a blowdown, and repeats based on the 'Blast Attempts' setting.
Clean Cycle Time (mins)	Sets how often the sensor runs a clean cycle (air blast down, air blast, up and final air blast down) to help prevent blockages.

9.2 Configuration screen icons

Select to **Exit** screen and return to Engineering screen.

Select to **Refresh Sensor Configuration** of the current sensor configuration.

Select **Save Sensor Configuration** to save the current sensor configuration as a CSV file.

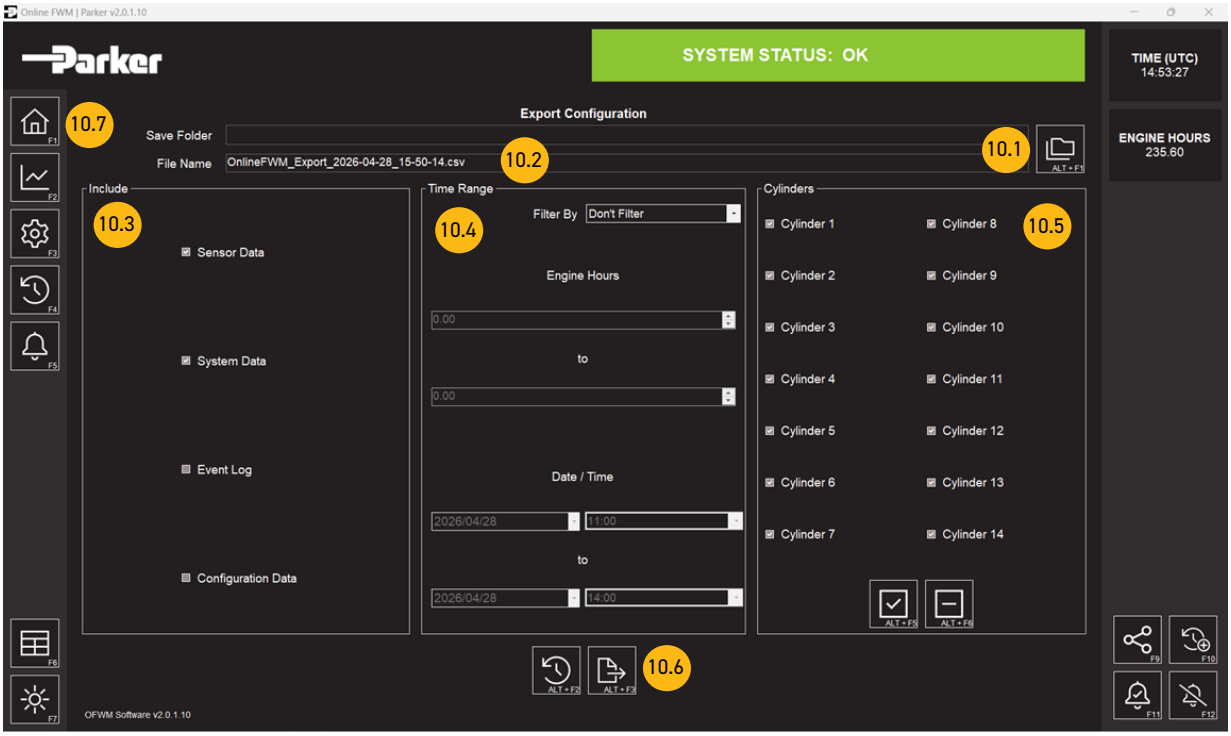
Select **Load Sensor Configuration** to upload CSV file to replace exiting sensor configuration parameters.

Select **Save** to save any changes made to sensor configuration. Confirm when prompted.

10. Exporting Data

Sensor data is exported in CSV format and can be configured to include either all sensor measurements or selected sensor measurements, configuration parameters, fault logs, and more. Data can be filtered by engine hours or by UTC date and time.

Select **Export Data** icon from the Main screen**.**



10.1 

Select **Settings** icon from the Main screen.

10.2 Use this field to specify the filename of the exported data. If no filename is specified, a default name will be used that includes the current UTC time and date.

10.3 Data download can be configured to include multiple parameters, select as required.

10.4 Use this section to filter data by engine hours or by UTC time and date. Select 'Don't Filter' to retrieve the full dataset.

10.5 Select the cylinders to include in the data download.

10.5 Select the cylinders to include in the data download.

Use this icon to select all sensors.

Use this icon to de-select all sensors.

10.6 

Select to export data to specified file location.

10.7 

Select the Home icon to return to the Main screen.

11. Troubleshooting

Problem	Possible reason		Suggested solution
Sensor status LEDs off	Sensor has no power.		Check cables are connected. Check power supply and fuses. Check sensor supply voltage is in the range 18 V – 32 V.
Error message: Could not find any attached CANopen De-vices	Sensor has no power.		See above.
	CAN-USB adapter problem (if using Parker OFWM software)		Disconnect adapter from the PC and reconnect. Make sure drivers are installed on the PC, see the Section 2.
	The sensor communications error status LED shows red blinking. See the Status indicator section.	Sensor node ID and baud rate not configured.	Change DIP switches on the sensor to configure a unique node ID and to configure the correct baud rate for the CAN bus. See the Installation manual.
	The sensor communications error status LED shows a single red flash. See the Status indicator section.	Communications cable disconnected from the PC.	Reconnect the cable.
		Mismatched baud rate.	Make sure the baud rate matches that of the software.
		Short circuited communications cable.	Check cables for short circuit.
		Missing CAN terminator resistors from communications cable.	Make sure 120-ohm terminator resistors are connected to each end of the CAN communications cable.
	The sensor communications error run LED shows blinking green. See the Status indicator section.	Not connected to the PC.	Make sure the CAN-USB adapter is connected to the PC.
	Multiple OFWM Software Applications open.		Close other OFWM Software applications.
Main screen: Cylinder number is grey (unavailable)	Sensor has no power.		See above (Sensor has no power).
	No communications.		Disconnect adapter from the PC and reconnect.
Main screen: Cylinder number is red (unavailable)	Sensor is in Stopped mode.		Put the sensor in Run mode. See section Engineering Screen.

Reporting: System Warning (amber)	Exceeded warning threshold.		Check warning threshold is set as required, see section Software Configuration. Confirm the alarm, see the section Main Screen. Monitor PPM value as appropriate.
	Low Voltage.		Check Low Voltage Limit, see section Settings Screen, is at an appropriate level for your system. Check the actual value, see section Engineering Screen. Check supply voltage of the sensors and assure it meets the system requirements, see Installation Manual.
	Fatal Error.		See troubleshooting sections below.
Reporting: System Alert (red)	Exceeded alert threshold.		Check alert threshold is set as required, see section Software Configuration. Investigate as deemed appropriate. Confirm the alarm, see the section Main Screen. Monitor PPM value as appropriate.
	Slow Fill Alarm.		See troubleshooting sections below.
	Blocked.		See troubleshooting sections below.
	Measurement failed.		Confirm the alarm, see the section Main Screen. This is an engineering only alert. No further action is required.
PPM value is showing amber (Warning), but the system status is green (OK)	Number of measurements to trigger an alarm is below the PPM alarm damping number.		Review PPM alarm damping number in section Software Configuration, if necessary.
PPM value is showing red (Alert), but the system status is green (OK)			
Reporting: Slow Fill Alert	Sensor is not filling.	No system oil flow.	Make sure the system power supply is isolated.
		Blocked upper angle seat valve.	See the Maintenance Section in User Manual.
		Blockage in system.	
		Isolation valves closed.	Open the isolation valves.
		No system air.	Make sure system air pressure and air flow is correct.

		Oil misting.	If you are unable to sample oil, refer to the Installation manual for potential solutions, for example, pipework baffles.
		Faulty angle seat valve.	Make sure the red indicator is positioned correctly. When the red indicator is visible, the valve is open. Replace the angle seat valve. See the Replace angle seat valve section in the User Manual.
		Vessel listing.	Check listing angle and orientation (port/ starboard).
Reporting: Blocked in the event log	Blocked sensor sample tube.		Attempt to restart the measurement from the software by confirming alarm (see section Main Screen) or by pressing and releasing the sensor reset button (see the section Using the reset button in the User Manual). Note the alarm in the software will still need to be confirmed. If this fails, attempt to manually blown down air to clear the blockage from the software. From the Engineering Screen, press the blowdown button. If it is still blocked see the Maintenance section in the User manual.
	Blocked outlet pipe.		
	Blocked lower angle seat valve.		
	Faulty lower angle seat valve.		Make sure the red indicator is positioned correctly. When the red indicator is visible, the valve is open. Replace the angle seat valve. See the section Replace angle seat valve in the User manual.
	No blowdown function.		Check system air pressure is correct and examine pneumatic hoses and fittings. Check sensor supply voltage is in the range 18 V – 32 V. Blocked lower angle seat valve or blockage in system. See the Maintenance section in the User manual.
Reporting: Fatal error in the event log	A software or hardware fault.		The sensor will attempt to restart by itself (selfrecover). The system status warning (amber) can be cleared by confirming the alarm (see section Main Screen). If it does not self-recover, attempt to restart the sensor from the software by confirming the alarm (see section Main Screen) or by pressing and releasing the sensor reset button (see the section Using the reset button in the User manual). Note the alarm in the software will still need to be confirmed. If the sensor fails to restart, note down the fatal code from the software, if possible, and export all the data ensuring the event log is included and report to your Parker distributer.

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