



Installation & Operation Manual

**Equipment name: VPM4300 Series
Acquisition & Display Module**

**From:
Connect Version 1.4.8
Firmware Version 1.4.4**

Applicable to Digital APT1000 Systems

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Introduction

The VPM 4300 Series of Display units covered by this manual can be considered as the hub of a complete Tank Gauging System partnered with the PSM APT1000 Series of hydrostatic transmitters.. It acts as both data acquisition and processing modules by collecting tank level data from connected APT1000 tank level transmitters applying the relevant corrections for transmitter fitting height, tank volumetric tables and liquid specific gravity values to provide a display of current tank contents in real time. The displayed information is available in both tabular and bar graph format and is configured individually to suit each installation.

Connection of the APT1000 Transmitters to the VPM is by a multi-drop Modbus network.

The APT1000 Transmitters receive both power and RS485 Modbus communication from the VPM Display. These signals are routed via PSM RFM-ISR safety barrier for hazardous area networks, or RFM-12VDC power regulator for safe area networks modules, and then RFM4 Termination Modules. The VPM is the Modbus master and the APT1000 transmitters are Modbus Slaves.

Interconnection of the RFM4 modules is via a 4 core (2 twisted pair) point to point cable which forms the RS485 network and provides the DC power for the APT1000 level Transmitters. Each RFM4 can accept inputs from up to four APT1000 Transmitters.

The VPM display is always located in a designated Safe Area along with the RFM-ISR Safety Barrier. The RFM4 termination Modules and APT1000 transmitters are certified for location in Hazardous Areas.

A network of transmitters may contain both Safe Area and Hazardous Area locations. In such cases both branches are separated and protected by their own RFM-ISR or RFM-12VDC module, and are generally connected to the VPM via separate RS485 input ports.

A project drawing pack will be provided for each system and this will include an overall system schematic showing the network interconnections.

VPM Displays may be interconnected via Ethernet. For a system with two VPM's a direct connection is used and for 3 or more an Ethernet Network Switch will be used where each VPM has its own unique I.P. address.

Interconnected VPM's share data the data received from their directly connected APT1000 transmitters such that all VPM's can process and display the signals from all tanks. In this way it is possible to optimise the network construction and system installation by sharing the acquisition functions between the VPM's.

The VPM can also provide a Modbus output via a separate RS485 port. This output consists of a range of Modbus registers which is constructed to suit the specific project and can include current tank level, volume, percentage, in the required engineering units. This information can be provided for all or selected tanks and can include status of alarm setpoints. In this case the VPM acts as Modbus slave, with the receiving system AMS, IPMS, etc being the Modbus master. The project drawing pack will contain details of the specific Modbus map if applicable.

Each VPM can also be equipped with a relay card. This card provides 4 discrete relay outputs with changeover contacts. These are generally used to trigger local or remote annunciators in response to a high or low level alarm on all or selected tanks.

In normal operation the VPM continually interrogates each of the APT1000 transmitters on its own directly connected RS485 network using their unique ident number to read the currently measured hydrostatic pressure in mmWG. This interrogation is repeated in sequence such that the VPM holds a continually updated register of all tank and draught levels.

In a system with more than one VPM each unit then shares this data via their ethernet connection. Depending on the requirements for a specific project each VPM can be configured to show the information from its directly connected APT1000 transmitters or from some or all of the values from other VPM's as well. In some cases a VPM may have no directly connected APT1000 transmitters of its own, instead it just processes and displays the raw data received from other VPM's on the Ethernet network.

As stated previously, the VPM stores configuration data which it uses to process and display the raw mmWG signal received from the APT1000 transmitters. In addition, there are specific settings stored for alarms, communication port settings, and the Modbus output register. All settings are held in non-volatile memory and are retained in the event of power failure.

In addition to the primary onboard memory the VPM has a Micro SD card which is used as a back-up memory. This card stores a copy of all configuration settings. If any changes are made to the configuration of the unit, these are automatically stored to the back-up card.

During manufacture, configuration data specific to the application will have been entered and saved by PSM. This includes all tank dimensional data, tank names, etc, and can be considered as fixed data and should need no further changes during installation and commissioning of the VPM.

Note: During commissioning it will be necessary to check the mounting height of the APT1000 transmitter relative to the tank base to ensure an accurate “as fitted” dimension is used. The VPM has a dedicated page accessible in Service Mode where this data can be entered, as detailed in the section [Sensor Fitting Height](#).

System options

Where a larger display is required for specific applications there are two options. VPM Remote and direct connection to a PC.

Both options connect to the VPM via the Ethernet network with the VPM (or VPM's if multiple units are connected) acting as a Server and the VPM Remote or PC acting as a client.

VPM Remote consists of a small cabinet housing a single board computer and may also contain the ethernet network switch depending on the specific system arrangement, and has HDMI and USB outputs to a connected touchscreen display.

Display of the tank gauging data is via an internet browser window, which in the case of the VPM Remote is opened in Kiosk mode. For the PC, the I.P. address of the VPM is entered to access the display.

Both options allow screen layouts and selection to be made independent of the VPM screen, i.e., each can show a different screen.

The additional size of the Remote / PC screen also allows further information and options to be displayed compared to the VPM where the layout is automatically optimised for its 7" touchscreen.

Where a system is delivered with VPM Remote a supplementary manual will be included specifically for this.

This manual covers VPM systems where all inputs are from the APT1000 level transmitters connected via RS485 / Modbus protocol. PSM also provides a range of input modules to allow connection of different sensor types. Where these are included for a particular system a supplementary manual will be included.

Boot up

The VPM is factory set to automatically boot-up when power is applied. Depending on how the system has been configured it will either automatically log in to user mode and a preselected display screen will be displayed (Auto Login) , or a log in screen will be displayed requiring the user to input the appropriate password (Password Login).

For Password Login the specific password for the required access must be entered. These are either “User” which is the normal operational mode, or “Service” which allows access to further diagnostic and service functionality.

[Annex 1](#) of this manual lists the factory assigned passwords for these two operational modes.

As stated previously, the system will have been delivered with configuration data specific to the application and so these two modes, will provide access to all functionality needed for operation of the system.

If necessary, due to fundamental changes in the tanks being monitored, it is possible to make changes to the fixed configuration data. There are two options for this:

- 1) The system has a further level of access – Engineer Mode. This can be accessed by attending PSM Service Engineers who are familiar with the system and can make changes to the fixed configuration data.
- 2) PSM will prepare an updated configuration file which includes the necessary changes to the fixed configuration. Using the functionality included in the Service mode this file can then be uploaded to the system from a temporarily connected USB drive.

In normal operation mode the system is predominantly view only, with the operator selecting the desired display screen. Two possible exceptions which may optionally have been enabled during system configuration are:

- **Specific Gravity Setting:** If the Specific Gravity (S.G.) of the liquid being stored is changed for example by using a different Fuel Oil type, then the display must be updated with the correct S.G. value. This is important for overall system accuracy since the APT1000 transmitters work by measuring the hydrostatic head pressure exerted by the liquid in the tank. The pressure value is read by the VPM which then converts this firstly to a liquid level and then by reference to the configured tank tables, to a volume to be displayed.

The liquid level in the tank is calculated in millimetres as:

$(\text{MM WG value from Sensor} / \text{S.G.}) + \text{Sensor Fitting Height}$

If either the S.G. value or the fitting height are not correctly set the display will not be accurate.

Refer to section [System > Specific Gravity](#) for details of SG setting.

- **Alarm Setpoints:** The Display is configured with a high and low alarm for each tank. These alarms are based on a % volume value. High alarms make on a rising liquid level and low alarms on a falling liquid level. Alarms set points and hysteresis values may be changed by the user as required.

Refer to section [Alarms](#) for details of alarm settings and alarms acknowledgement functions.

Mechanical Installation

With respect to Intrinsic Safety the VPM **MUST** be installed in a designated Safe Area as **MUST** the RFM-ISR Barrier through which the VPM provides power to and communicates with, the APT1000 network.

Depending on the requirements for a specific project the VPM may either be supplied as a panel mount unit or supplied fitted in a wall mount steel cabinet suitable for direct bulkhead mounting where the VPM itself is mounted to the door of this cabinet.

When supplied in a wall mount cabinet this may also include a power supply module accepting 110/240 V AC single phase and providing a 24V DC output as required by the VPM, and other components such as signal isolators and network switches. Reference to the specific project drawings will provide details on this.

For panel mounting units refer to the project drawing pack for details of the panel cutout required. Similarly, the drawing pack will provide details of the mounting brackets and required fixing points.

In general, the unit should be located away from extremes of temperature and vibration and in a position where the display is readily viewable.

For wall mounted units, the location should allow for the side hinged door to be fully opened and latched to facilitate access to the internal terminals for electrical installation, and to the rear of the door mounted unit for access to the internal plugs.

Electrical Installation

The VPM requires 24V DC for operation. There is provision for two separate power sources to be connected i.e., primary and back-up. Provision of power will depend on the specific installation but for panel mounted units this may be from the installations own 24V Instrument supply with back up from the emergency 24V DC supply, and for wall mounted units which include a power supply module, from the installations own single phase supply plus the emergency 24V DC.

These aspects will have been discussed and agreed during the manufacturing phase of the equipment and detailed in the project documentation pack.

Hazard: for wall mounted units ensure that the AC power supply to the VPM is isolated at the distribution point before attempting to connect or make any changes to internal wiring of the unit.

For wall mounted units all internal connections between the plugs on the rear of the VPM and the field terminations are completed during manufacture. All external connections from the Sensor networks, the Ships Supply and any serial or VFCC outputs should be made to the provided terminals.

The base of the wall mount cabinet will have a removable gland plate to allow glands to be fitted by the installer of a size suitable for the cabling being used

All cabling should be identified with permanent markings in accordance with normal practice.

Cable Types

Suitable system interconnection cables are to be supplied by the Shipyard.

RS485 / 24V DC network Supply: A 4 core (2 x twisted pair) cable is required for this. One pair for DC power and one for the RS485 communication network This cable connects from the VPM to the RFM-ISR / RFM-12VDC then on to entire network. The cable must have an overall braided screen with a minimum of 95% coverage. It is essential that correct polarity is maintained throughout the entire network, i.e. positive and negative conductors for the DC power, and A & B conductors for the RS485 network.

Supply cable: Dependent upon power source.

RS485 output: 2 core twisted pair with overall braided screen.

VFCC relay output (where fitted): 2 or 3 core cable depending on how relay is to be used, i.e., 1 core for Common and 1 core for either or both normally closed / normally open contacts.

Using the Display

The 7" capacitive colour screen of the VPM4300 is touch sensitive and can be operated by normal finger pressure. Where required the display has scroll bars for both vertical and horizontal movement of the displayed area. Alternatively, a single finger can be used to swipe vertically and horizontally.

Normal Operation

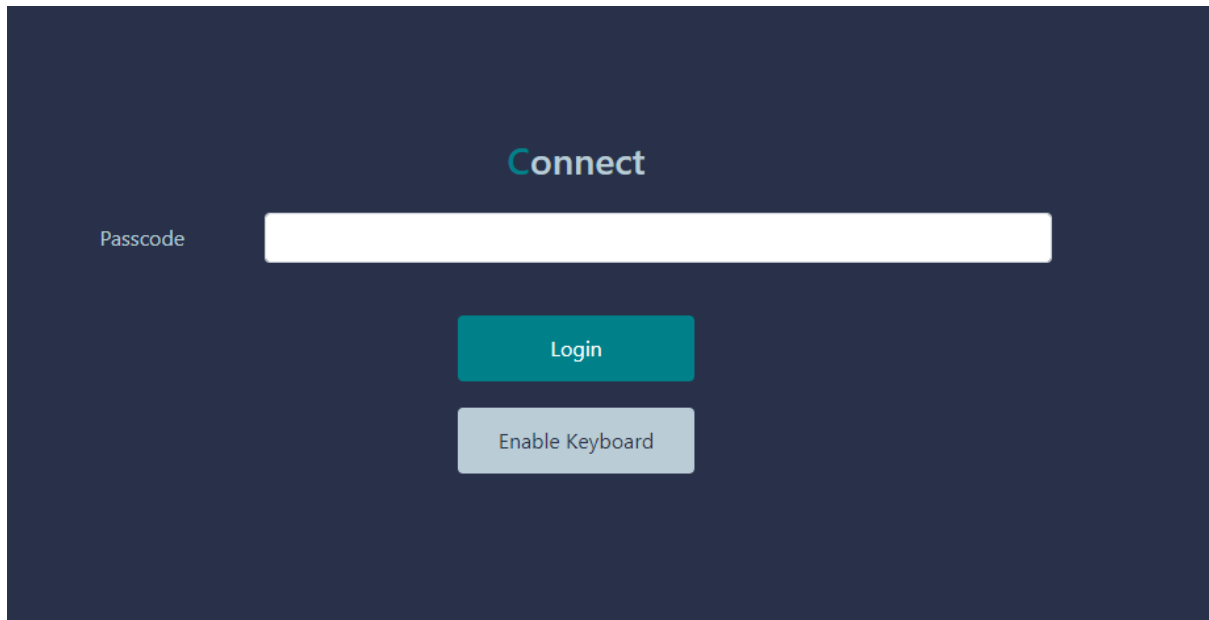
As stated in the introduction, the VPM is supplied fully factory configured with screen display layouts and all fixed tank parameters relating to the monitored tanks

Therefore, following mechanical and electrical installation and validation of the S.G. and sensor fitting heights in use as described in the previous sections, it should be ready for operation.

NOTE: the Screen representations used throughout this manual are indicative of the type of display provided for each page. The content and information displayed will be different for specific projects.

NOTE: The screen representations have been reformatted where appropriate to expand specific areas to ensure clarity of illustration. The actual equipment display may be slightly different in some cases.

Once the display has finished its power up sequence and where Auto login has been enabled in the configuration the unit will boot directly to a preselected display page. Otherwise, the login screen will be presented.

The image shows a login screen with a dark blue background. At the top center, the word "Connect" is displayed in a light blue font. Below it, on the left, is the label "Passcode" in a small, light blue font. To the right of the label is a long, white rectangular text entry field. Below the text field, there are two buttons: a teal button labeled "Login" and a light blue button labeled "Enable Keyboard".

Tapping in the text entry field will bring up an overlay keypad.

CANCEL								ENTER	
1	2	3	4	5	6	7	8	9	0
q	w	e	r	t	y	u	i	o	p
a	s	d	f	g	h	j	k	l	cap
z	x	c	v	b	n	m	_	.	<<

Key in the relevant password (refer to [Annex 1](#)) press enter and then Login from the main screen.

Normal operation Screen

The normal operation screen has a number of buttons from which different information can be displayed:

Your Account



This provides the following options:

About



About - brings up an information screen similar to the typical screen below:

Serial Number:	26028631
Connect Version:	1.4.8
Firmware Version:	1.4.4
Project Owner:	PSM Instrumentation Ltd
Project Name:	Avante 1800+
Call Sign:	-
IMO Number:	-
Alarm Startup Delay (seconds):	1
Auto Alarm Acknowledge	No

Select another menu option to exit this screen.

Sign out



Sign Out will end the current session and return to the initial login screen.

Display Mode

This button switches the display screen between light mode (daytime) and dark mode (nighttime).

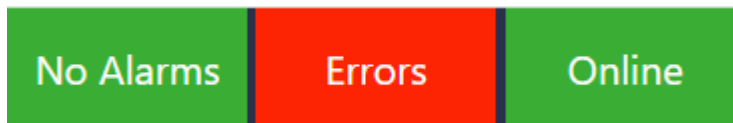


This is shown when the display is in light mode.



This is shown when the display is in Dark Mode

Status Indicators and Error / Alarm viewing



Online: When showing “Online” with a green background this indicates that the Display is in normal operation and sending data requests to the sensor network.

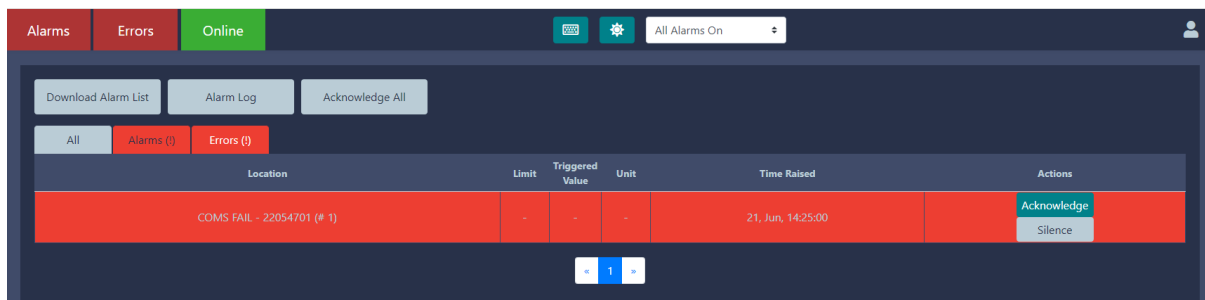
If status changes to “Offline” on a red background this indicates an error in that the system has stopped communication to the sensor network.

To clarify further, this status indicator relates only to the display itself, it is not an indication of network health.

When Online the Display will continue to interrogate the sensor network even where there may be a fault on, or disconnection of the network. Where the display fails to receive data from one or more sensors this is indicated in the errors indicator as detailed below.

Errors: When showing “No Errors” with a green background this indicates that the display is receiving data from all sensors that it has been configured to interrogate. If the status changes to “Errors” on a flashing red background this indicates that there has been a communication loss with one or more connected sensor. When this status indicator changes to red it will become an active button.

Tapping on this button will open a screen which provides an overview of all active alarms and errors.



From this screen there are 3 tabs which allow viewing of active alarms, active errors, or All. These tabs will also flash red where there are active conditions.

To view the active errors, select the Errors tab and a screen similar to the above will be displayed.

Form this screen it is possible to acknowledge a specific error using the button in the “Actions” column, or to use the “Acknowledge All” button to acknowledge all active errors.

When an error is acknowledged its status in the Actions tab will change to “Acknowledged” and the red highlight on the alarm row will revert to normal operational colour. Note that while the error is still actually present, i.e., the communication with the sensor is not restored, the Error tab will continue to flash red, and the Error Status indicator will remain solid red. When the issue is resolved (communication with the affected sensor is restored), The Error Status indicator will revert to green and show “No Errors” and the error record will be removed from the active error list to the History page. This is located in the sidebar menu as detailed later in this manual.

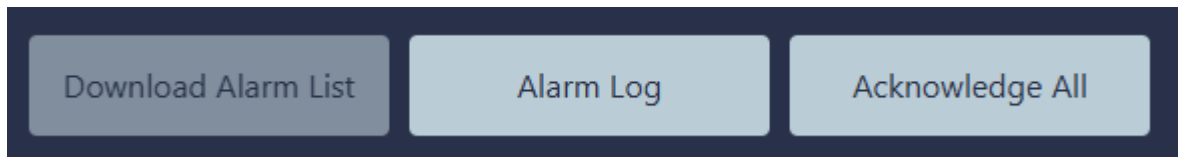
Alarms: This status indicator is used to indicate if there are any active alarms. When shown in green with “No Alarms” indicated there are no alarms present, and flashing red with “Alarms” shown indicates that there are alarms present.

Alarms relate specifically to high- or low-level alarms for the monitored tanks. Navigation of the alarm display and acknowledge functions are as described above for “Errors” A flashing red status indicator becomes an active button which when pressed will bring up the detailed Alarm / Error display page. Selecting the alarm tab will show all active alarms which may be acknowledged in the same way as errors. All unacknowledged alarm rows will be shown flashing red and can be acknowledged individually or the “Acknowledge All” button used. Acknowledged alarms will remain in the list shown as acknowledged for as long as the alarm condition remains.

Once the alarm condition clears the record will be removed from the active list and to the History page located in the sidebar menu.

The “Silence” option in the Actions column enables the silencing of local audible alarms if fitted.

Note: there are two further buttons in the above screen shot of the Alarm / Error Status page:



Due to screen optimisation for the 7" VPM display these buttons will not be present on the VPM itself, and are only available where the system has a VPM Remote repeater display included or a laptop is connected to the system.

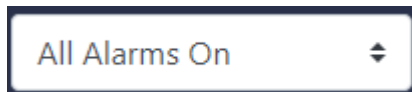
Download Alarm List enables a CSV file to be downloaded the laptop

Alarm Log shows the historical Alarms or Errors that have now cleared. This is the same as the History display as detailed later in this manual.

Acknowledge All allows all active Alarms / Errors to be acknowledged in a single action

Alarm Enable / Disable

Using the selection box shown at the top of the screen it is possible to enable or disable all alarms.



In normal operation this should be set to All Alarms On and only switched to All Alarms Off when the Vessel is not in operation or service work is being undertaken such that changes in tank levels will not cause alarms to trigger.

Note: depending on the configuration settings and the level of password access, the option to turn off all alarms may be disabled while in the normal operation mode.

Note: For some systems alternative Alarm Modes may have been enabled, for example, Seagoing, Bunkering, Tank Cleaning. These will have been set during initial system configuration relevant to the type of installation the system is monitoring.

Display Screen Options – Operator Mode

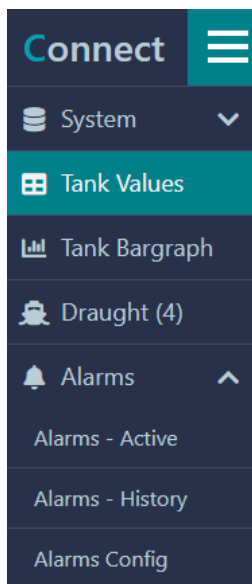
The available display screens will depend on which user type is logged into the system. The following options may be available in normal operator mode depending on the configuration.

Menu Toggle



This button shows / hides the main sidebar menu from which the various display pages can be selected, each represented by a symbol. Once the required display screen has been selected this button can be used to hide the menu to provide additional space for the data display.

User Mode Menu



Note: for clarity of explanation the above illustration shows the function name alongside each symbol. For the 7" VPM screen only the symbols are shown to maximise the available area for information display.

Tap the screen to select a specific display menu page.

System > Specific Gravity



This screen is under the System Symbol

Custom Cargos		
Black Water	1	
DFM	0.845	
Grey Water	1	
JP-5	0.8	
Oily Water	1	
Sludge & O.W.	1	
Water Ballast	1.025	
Lub Oil	0.89	
Fresh Water	1	
Technical Water	1	
Water Mist	1	
Standard Cargos		
Ballast	1.025	
Diesel Oil	0.845	

This screen lists all liquids the system is monitoring together with the Specific Gravity value stored for them. The Specific Gravity value can be edited by selecting the relevant field, entering the new value, and then pressing save.

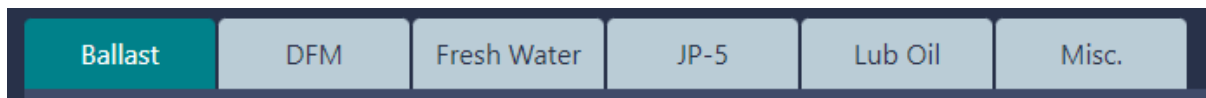
There are two sections Custom Cargos and Standard Cargos. Standard Cargos are default liquids commonly found on vessels and which are included in the basic system firmware. Custom Cargos are liquids which are specific to the systems intended application and so have been added during the factory configuration. There can be as many of these as required for the application.

Note: as detailed in the introduction section of this manual it is important that the correct Specific Gravity value for the liquid is stored in the display. An incorrect value will lead to errors in the calculated display of actual content.

Tank Values



This is the main display screen for normal operation. Tanks are arranged in discrete tabs according to their type. A specific group is selected using the tabs.



The selected group is shown by a highlighted tab.

The number of tabs, their name and the tanks they contain will have been determined specifically for the intended application, and entered during the factory configuration.

A screen similar to the following shows all tanks in the selected group.

	Volume	Volume %	Capacity	Level	Level %	Density
	Litre	%	Litre	Metre	%	t/m ³ vac
T8A01 Ballast	28868.39	77.87	37072.00	3.27	-	1.02
T8A02 Ballast	29886.91	80.62	37072.00	3.36	-	1.02
T9C01 Ballast	3703.31	39.33	9416.00	0.54	-	1.02
T9H03 Ballast	2077.64	15.30	13580.00	0.54	-	1.02
T9I01 Ballast	2658.63	15.35	17322.00	0.54	-	1.02
T9J01 Ballast	75.88	0.68	11230.00	0.05	-	1.02
T9K01 Ballast	15.00	0.05	32997.00	0.05	-	1.02
T9E01 Ballast	135.71	1.36	10007.00	0.05	-	1.02

Values are provided for:

- Volume, in the required engineering units
- Volume, percentage full.
- Capacity, being the 100% capacity of the tank.
- Level, being the liquid level in the tank in Metres.
- Level, percentage full.
- Density, being the Specific Gravity of the liquid in the tank.

The order of columns and the information contained will vary from system to system depending on how it has been configured for the specific application.

Where no valid signal is being received for a tank the display will show a dash, i.e., "-". An associated alarm or error will be triggered if the input from the sensor cannot be read.

Tank Bargraph

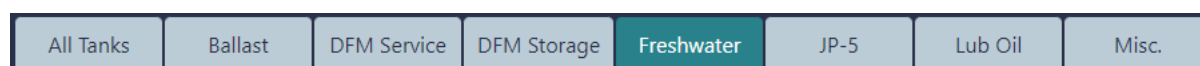


This screen provides an alternative display presentation for all tanks where their current content is represented by a bargraph with a numeric display above each bar.

The bargraph and numeric display show current tank content as % Volume.



Each tank group is separated into different tabs depending on the system configuration – the selected tab is highlighted in a different colour.



Where there are more bars than can be shown on a single page the buttons along the bottom of the screen allows scrolling left / right.

Where no valid signal is being received for a tank the bar will indicate whatever the content is at the sensor fitting height and the numeric display will show a dash, i.e., “-“. An associated alarm or error will be triggered if the input from the sensor cannot be read.

4 Point Draught Indicator (where configured)



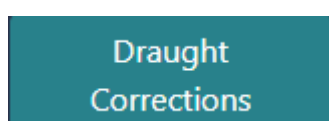
Note: Display of this page requires that the system is equipped with draught measurement transmitters in addition to the tank level measurement transmitters.

Note: This section describes the most usual method of measuring and displaying Draught, Trim and Heel. A specific system may be configured with alternative methods which use a single centrally mounted sensor or up to 8 measurement points. Where this is the case, refer instead to the specific

manual supplement for these alternative measurement principles and their respective displays and settings.

Metre		Metre	
Fwd	3.38	Trim	-0.69
Aft	2.69		Deg -4.00
Port	2.72		
Stbd	3.21	Heel	-4.00
Draught Corrections S.G. Value			

Draught Corrections

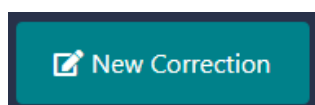


The Draught Corrections button leads to a further screen:

Date	Fwd	Aft	Port	Stbd	Go Back
02 Oct 2023 - 15:10:17	0.00	0.00	0.00	0.00	 Page: 1
02 Oct 2023 - 13:04:01	+0.02	+0.01	+0.04	0.00	

[New Correction](#)

This screen shows the currently applied correction factors and allows manual entry of a correction (offset) value which the system will apply to its displayed results. A correction would be used where the displayed value does not agree with values visually observed at the hull draught marks. To make changes to the system press:



This leads to a further screen:

The calculated Fwd and Aft draughts are given at the vessel centreline. For comparison of the calculated draught with a visual draught it is necessary to use the mean average value of the visual Port and Stbd draught readings for both the Fwd and Aft draughts.

For example : If only the Stbd Aft draught is visually read as the 'Aft draught' then any heel angle on the vessel will cause a false correction to the Indicated Aft draught

The visual draught readings must be made when the vessel is in a steady state condition. The vessel must remain in this condition until after the draught corrections have been entered.

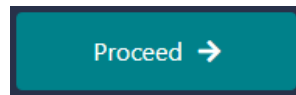
[Go Back](#)
[Proceed](#)

The onscreen caution explains that the system displays Forward and Aft Draughts at the vessel centreline based on it calculating the average of the Port and Starboard readings from the sensors values for each.

For this reason, it is essential that actual observed values are entered for both Port and Starboard draughts. If only one correction value is applied the system will calculate incorrectly.

As also stated, it is essential that the vessel remains stable when all 4 readings are taken to ensure appropriate corrections are made.

Once all above conditions are met and accurate visual readings are taken press the Proceed button



The following screen then allows manual entry of the visually observed readings. These must be entered in Metres to 2 decimal places.

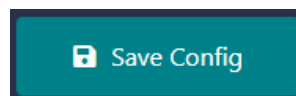
	Enter Visual Reading in Metres	Measured Draught	Corrected Display	Correction Applied
Fwd	3.28	3.38	3.28	-0.10
Aft	2.60	2.69	2.60	-0.09
Port	2.83	2.72	2.83	+0.11
Stbd	3.05	3.21	3.05	-0.16

Enter visual draught to 2 decimal places.

Go Back (top right)

Save Config (bottom right)

Once all 4 observed readings are correctly entered press



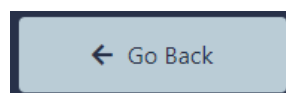
The screen will then show corrections applied in the historical list of corrections.

Date	Fwd	Aft	Port	Stbd
24 Jun 2024 - 14:17:27	-0.10	-0.09	+0.11	-0.16
02 Oct 2023 - 15:10:17	0.00	0.00	0.00	0.00
02 Oct 2023 - 13:04:01	+0.02	+0.01	+0.04	0.00

Go Back (top right)

Page: 1 (bottom right)

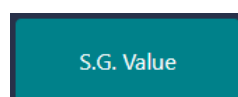
Press



To return to the Draught display page.

Sea Water S.G.

The Draught display page also has a button:



This allows for entry of the Correct Sea Water Density in the current location of the Vessel.

Sea Water

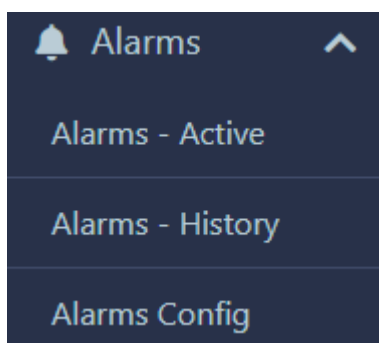
1.025

Save

Alarms



Leads to a menu list



Alarms - Active

Displays all active alarms / errors as described in the earlier section – Status Indicators and Error / Alarm viewing.

Alarms- History

Displays historical alarms / errors which have been acknowledged / cleared.

Alarms Config

This page provides a complete list of all alarms the system is configured with.

Ref Name	Alarm Type	Alarm Name	Set Point	Actions
T8A01 Ballast	High level	High level - T8A01 Ballast	98.000 %	Edit
T8A02 Ballast	High level	High level - T8A02 Ballast	98.000 %	Edit
T9C01 Ballast	High level	High level - T9C01 Ballast	95.000 %	Edit
T9H03 Ballast	High level	High level - T9H03 Ballast	98.000 %	Edit

By pressing the edit button, it is possible to delete or change the current alarm settings.

Configure Alarm

Alarm Type

[Tank] High level⌵

Reference Object

[Tank] T8A01 Ballast⌵

Name

High level - T8A01 Ballast

Extra Details (optional)

Set Point (Volume %)

98.000

Set Point Direction

Make on Rise (MOR)⌵

Trigger Delay (ms)

1000

Hysteresis Set Point (Volume %)

93.000

Hysteresis Timer (seconds)

10

Delete Alarm

Save Changes

Alarm Types for tank level applications the applicable alarm types are [Tank] High, Very High, Low, or Very Low. The other alarm types listed are not used.

Reference Object is the tank the alarm relates to.

Name is the name that will appear in the alarm list.

Extra Details (optional) an optional text description for the alarm can be added.

Set Point (Volume%) enter the value at which the alarm is required to trigger.

Set Point Direction Use Make on Rise for a high-level Alarm and Make on Fall for a Low-level Alarm.

Trigger Delay (ms) the delay in milliseconds before the alarm is considered valid and acted upon.

Hysteresis Set Point (Volume %) this is the differential setting between the alarm active point and the level at which is resets. For a high-level alarm this setting should be below the alarm set point and for a low-level alarm it should be above the alarm set point.

Hysteresis timer (seconds) the time in seconds for which the level must be at, or below for high alarms, or above for low alarms, the hysteresis set point, before the alarm will reset.

Once all changes have been made:

Save Changes

To save the changes made and return to the alarm list.

Delete Alarm

Deletes the alarm and returns to the alarm list.

At the top of the Alarms Config page there is a further button which allows creation of new alarms.

Create Alarm

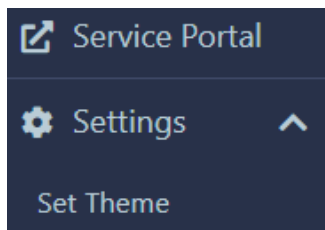
Configuration / Service Mode

This mode of operation is used when commissioning the system or performing any service or fault-finding checks.

To enter Service Mode the appropriate password must be used from the sign in screen. Refer to [Annex 1](#) of this manual. If the display is in normal operation mode, first sign out using the Your Account button.

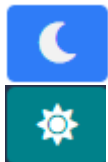


Once signed in additional options will now be presented in the menu bar.



Settings > Set Theme

This allows setting of the display theme to light or dark mode. It duplicates the function of the top menu bar buttons.



Service Portal

The service portal allows the user to view further information of the system to check the status of inputs, see their live values, and to inspect and change various configuration settings. The screens are formatted to provide a complete overview of relevant parameters for all inputs so that simple checks and comparisons can be made.

Selecting service portal leads to a further screen:

Please note: All units of measure throughout the service portal are in their raw base units. Please refer to configuration manual.

View Channel Data

View System Data

View Alarms

Sensor Fitting Height

System Input Offsets

Configuration

Diagnostics

Back to Connect

Main Ethernet: Switch to Static Mode

PLEASE NOTE: When swapping Ethernet modes, the device will automatically reboot.

View Channel Data

View Channel Data

This page provides a live view of the current status of all inputs to the display.

Live I/O Channel Data Only							
Channel data will refresh every second automatically.							
Application is currently ALIVE .							
Last network read took: 4081ms .							
Ch #	ID	Name	Tank / System	Last Read	Raw Value	Raw (filtered)	Sensor Calc
1	1	25065401	No.1 DB FW TK P	09-09-2026 16:19:17	-	-	-
2	2	25065402	No.1 DB FW TK S	09-09-2026 16:19:17	-	-	-
3	3	25065403	No.1 CARGO FW TK P	09-09-2026 16:19:17	-	-	-
4	4	25065404	No.1 CARGO FW TK S	09-09-2026 16:19:17	-	-	-
5	5	25065405	FO DAY TK P	09-09-2026 16:19:17	-	-	-
6	6	25065406	FO DAY TK S	09-09-2026 16:19:17	-	-	-
7	7	25065407	No.1 FO TK P	09-09-2026 16:19:17	-	-	-
8	8	25065408	No.1 FO TK S	09-09-2026 16:19:17	-	-	-
Main Menu							

Ch# Is the number of the channel.

ID is the Modbus Ident of the connected APT1000

Name Is the specific name of the sensor which is connected to the channel. Note that the Name is generally stored in the system as the Serial number of the connected APT1000.

Tank/System Identifies the specific tank or Draught that this sensor relates to.

Last Read Time of last reading.

Raw Value Sensor value in mmWG.

Raw (filtered) Raw value with averaging applied for stabilisation.

Sensor Calc Is the raw and filtered value from the input sensor converted to the base units the system uses, i.e., Metres WG.

Use the button at the bottom of the screen to return to the main menu.

View System Data

View System Data

This page provides a live summary view of all active inputs to the system:

Live System Data						
System data will refresh every second automatically.						
Tank Data						
Name	Volume	Volume %	Weight	Capacity	Ullage	Temp.
T8A01 Ballast	28.87	77.87	29.59	37.07	-	-
T8A02 Ballast	29.89	80.62	30.63	37.07	-	-
T9C01 Ballast	3.70	39.33	3.80	9.42	-	-
T9H03 Ballast	2.08	15.30	2.13	13.58	-	-
T9I01 Ballast	2.66	15.35	2.73	17.32	-	-
T9J01 Ballast	0.08	0.68	0.08	11.23	-	-
T9K01 Ballast	0.02	0.05	0.02	33.00	-	-
T9E01 Ballast	0.14	1.36	0.14	10.01	-	-
T9F02 Black Water	0.12	1.56	0.12	7.80	-	-
T8C01 DFM Service	0.01	0.05	0.01	13.19	-	-
T8C02 DFM Service	0.01	0.05	0.01	13.19	-	-

Name Of the tank / input.

Volume Current tank content.

Volume % Current percentage full,

Weight Of the current tank contents (according to the density value the system is programmed with).

Capacity The full tank capacity.

Ullage This parameter is not generally used unless specifically configured..

Temp This parameter is not generally used unless specifically configured..

Use the button at the bottom of the screen to return to the main menu.

Note: The foot of this screen also shows a number of parameters relating to input types which are not used for this application and are therefore unpopulated.

Use the button at the bottom of the screen to return to the main menu.

View Alarms

View Alarms

This screen shows a summary live status of all alarms configured in the system.

Live Alarm Data						
Alarm data will refresh every second automatically.						
Operation Mode:	All Alarms On					Update
Alarm	Name	Started	Set Point	Trigger	Active	Acknowledge
Low level	Low level - T9I01 Ballast	24/06/2024 13:19	10	0	No	Acknowledge
Low level	Low level - T9H03 Ballast	24/06/2024 13:19	10	0	No	Acknowledge
Low level	Low level - T9C01 Ballast	24/06/2024 13:19	20	0	No	Acknowledge
Low level	Low level - T8A02 Ballast	24/06/2024 13:19	10	0	No	Acknowledge
Low level	Low level - T8A01 Ballast	24/06/2024 13:19	10	0	No	Acknowledge
Error: Sensor comm's	COMS FAIL - 22054701 (# 1)	24/06/2024 13:19	1	1	No	Acknowledge
Error: Sensor comm's	COMS FAIL - 22054702 (# 2)	24/06/2024 13:19	1	1	No	Acknowledge
Error: Sensor comm's	COMS FAIL - 22054703 (# 3)	24/06/2024 13:19	1	1	No	Acknowledge

Alarm Identifies the alarm type.

Name Identifies the tank the alarm is associated with.

Started Shows the time the alarm activated.

Set Point Shows the alarm set point as a percentage of tank volume.

Trigger Shows the delay in seconds before the alarm triggers.

Active Shows if the alarm is currently active (yes) or inactive (no)

Acknowledge allows the alarm to be acknowledged by pressing the button, unacknowledged alarms will show as

Acknowledge

When the button is pressed to acknowledge this will change to

Acknowledged

At the top of the screen there is an option to change the alarm operation mode

Operation Mode:

All Alarms On

⌵

Update

When in service mode it may be helpful to temporarily disable all alarms by updating this to **All Alarms Off**.

Note: before exiting Service Mode ensure that all alarms are re-enabled by changing this to **All Alarms On**.

At the foot of the page there is a further button:

View Log

This allows viewing of historical alarms.

Alarm Log						
Alarm	Name	Started	Set Point	Trigger	Finished	Ack by
Error: Sensor comm's	COMS FAIL - 22054734 (# 34)	24/06/2024 08:21	1	1	24/06/2024 08:21	8
Error: Sensor comm's	COMS FAIL - 22054735 (# 35)	24/06/2024 08:21	1	1	24/06/2024 08:21	8
Error: Sensor comm's	COMS FAIL - 22054728 (# 28)	22/06/2024 06:27	1	1	22/06/2024 06:27	2

Note that this page provides a historical summary of both High / Low tank level alarms and any System Errors that may have occurred.

Alarm Identifies the type of alarm.

Name Identifies which channel or parameter the alarm relates to.

Started Identifies the time the alarm first occurred.

Set Point shows the alarm set point as a percentage of tank volume. If the record relates to an error rather than an alarm it will show 1 as active.

Trigger Shows the delay in seconds before the alarm triggers.

Finished Identifies the time the alarm was cleared.

Ack by Is the unique user ID of the login that acknowledged the alarm.

When finished press Live Alarm Data at the foot of the page to return to the previous screen and then Main menu to exit the Alarm display page to the main diagnostic menu.

Sensor Fitting Height

Sensor Fitting Height

This screen allows entry of the actual fitting height of the sensor above the tank lowest point. This screen should be used during system commissioning to ensure that the correct values are used in the system.

Note that where the tank has a sloping base and the sensor is not located above the lowest point of the tank this must be considered, i.e., the fitting height in this case would not be a direct measurement to the tank floor directly below the sensor.

Note: As detailed in the introduction to this manual it is critical to accurate operation of the system that this dimension is correctly measured and stored in the system. This fitting height acts as the datum for all calculations the system undertakes to determine actual tank content.

Sensor Fitting Height					
Main Menu / Sensor Fitting Height					
Port	Module	Name	Tank / System	Fitting Height (m)	Actions
RS-485 #2	N/A [Modbus ID: 101]	22054701	T8A01 Ballast	0.05	<button>Save</button>
RS-485 #2	N/A [Modbus ID: 102]	22054702	T8A02 Ballast	0.05	<button>Save</button>
RS-485 #2	N/A [Modbus ID: 103]	22054703	T9C01 Ballast	0.05	<button>Save</button>
RS-485 #2	N/A [Modbus ID: 104]	22054704	T9H03 Ballast	0.05	<button>Save</button>

Port Identifies the Serial Port of the VPM that the level sensor is connected to.

Module Identifies the Modbus ident of the level sensor.

Name is the name of the connected sensor – this is its unique serial number. Note that if a sensor is replaced in service as part of the replacement process as detailed later in this manual the system will read and store the serial number of the replacement sensor.

Tank/ System Is the Tank that the sensor is located in.

Fitting Height Is the actual measured fitting height above the lowest point in the tank. This is an editable field which must be entered in Metres to 3 decimal places, e.g. a fitting height of 57mm would be entered as 0.057.

Press Save each time a change is made.

Save

Once all are correctly entered press Main Menu at the foot of the page to return to the main Service page.

System Input Offsets

System Input Offsets

This function is intended for measurement instruments which have no inbuilt ability to adjust their zero calibration. Since this manual is based on all sensors being PSM APT1000 level transmitters which do have this inbuilt ability, it **MUST NOT** be used.

Where a system has different sensor input types that do make use of this function a supplementary manual will be included.

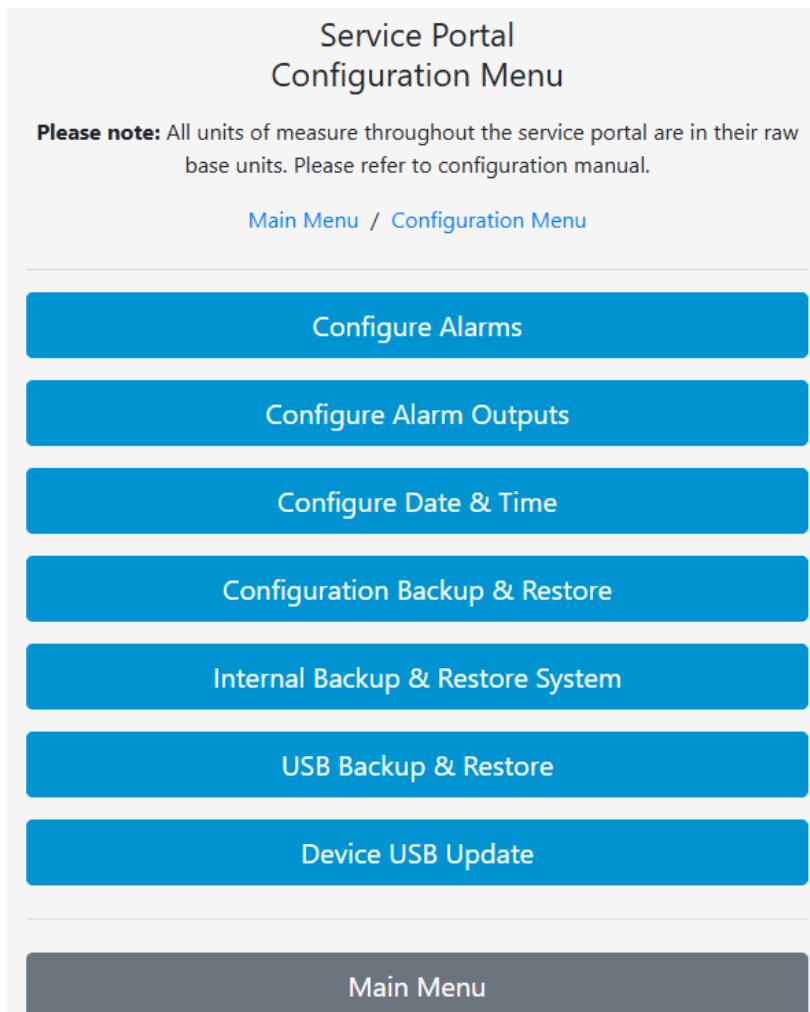
For information only - when used, this function allows the system to store an offset to the input signal where it is known that there is zero pressure being applied but the signal from the external sensor is not reading zero.

Refer to the below Service section > APT Pressure Offset which details how the offset function is covered for the APT1000 sensor.

Configuration

Configuration

This leads to a further screen:



Configure Alarms

Configure Alarms

This leads to a further screen which shows all alarms the system is configured with.

Alarms Overview

[Main Menu](#) / [Configuration Menu](#) / [Alarms Overview](#)

Optional: Set **all** alarms trigger delay (milliseconds):

Change All

Warning: Clicking this button will delete **all** alarm configurations. This cannot be reversed.

Delete All

Ref Name	Alarm Type	Name	Set Point	Actions	
No.1 DB FW TK P	Very high level	Very high level - No.1 DB FW TK P	95 %	Duplicate	Delete
No.1 DB FW TK S	Very high level	Very high level - No.1 DB FW TK S	95 %	Duplicate	Delete
No.1 CARGO FW TK P	Very high level	Very high level - No.1 CARGO FW TK P	95 %	Duplicate	Delete
No.1 CARGO FW TK S	Very high level	Very high level - No.1 CARGO FW TK S	95 %	Duplicate	Delete
FO DAY TK P	Very high level	Very high level - FO DAY TK P	95 %	Duplicate	Delete
FO DAY TK S	Very high level	Very high level - FO DAY TK S	95 %	Duplicate	Delete
No.1 FO TK P	Very high level	Very high level - No.1 FO TK P	95 %	Duplicate	Delete

At the top of this screen it is possible to set a global trigger delay in milliseconds. This is applied to all alarms. A delay is suggested to prevent spurious alarms where the liquid level in the tank is in motion.

Optional: Set **all** alarms trigger delay (milliseconds):

Change All

Enter the required value in milliseconds and then press change all.

Selecting a specific alarm by tapping on it will bring up all details for the alarm which may be edited as detailed in the earlier section [Alarms Config](#).

Below this is an option to “Delete All” this will remove all saved alarm settings.

Delete All

Alarms can be individually deleted or duplicated.

Duplicate

Delete

Deleting will remove the alarm completely.

Duplicating adds a copy of the alarm into the list (immediately below the original). By clicking on the new duplicated alarm, it can then be edited as detailed in the earlier section **Alarms Config**.

Configure Alarm Outputs

Configure Alarm Outputs

This leads to a further screen:

Alarm Outputs Overview			
Main Menu / Configuration Menu / Alarm Outputs Overview			
Output Type	Output #	Trigger Type	Alarm
Relay Output	Output #1	Global Alarm Type	Error: Global error
Relay Output	Output #2	-	-
Relay Output	Output #3	-	-
Relay Output	Output #4	-	-
Relay Output	Output #5	-	-
Relay Output	Output #6	-	-
Relay Output	Output #7	-	-
Relay Output	Output #8	-	-

Configuration Menu

The VPM may be optionally equipped with 2 relay cards. These are plug in modules fitted to the rear of the display. Each module has 4 relays.

Generally these are intended to drive external visual and audible annunciators to alert operators of a common (global) alarm condition, e.g. a high or low alarm active on any tank, or a communications failure to one or more sensors, or a complete network loss of communication.

They may also be assigned to individual tanks that are especially critical.

The type of alarm is defined in Trigger Type

Trigger Type

Not used

Not used

Individual Alarm

Global Alarm Type

Tank Type Alarm

Not used Disabled

Individual Alarm Triggers in response to a specific tank level alarm.

Global Alarm Triggers in response to a common alarm condition from any of the tanks or other conditions such as communications failure or VPM memory backup failure

Tank Type Alarm Triggers in response to a common alarm condition from any of the tanks.

When the appropriate Trigger Type is selected the available options in the next selection field will be updated to allow selection of the actual parameter or condition which triggers the alarm.

Individual Alarm

High level - 9C10 Passive Tank

Global Alarm

Error: Network fail

Tank Type Alarm

[Tank] High level

Note that the Tank Type Alarm also allows a specific Tank Type (the Tank group) to be selected

Tank Type

Tank - Ballast

The Output Type and Output Line parameters are pre-selected according to the relay channel which is being configured

Output Type

Relay Output

Output Line

Output #1

The final parameters which may be set define the status of the relay when inactive / active. For example an Inactive Output State of LOW means the relay is de-energised when no alarm is active and an Active Output State of HIGH means the relay will be energised when the alarm condition is active.

Reset Trigger has two options – Reset when alarm is acknowledged or Rest when the alarm becomes inactive.

Inactive Output State

LOW

Active Output State

HIGH

Reset Trigger

Reset on Acknowledgement

Configure Date & Time

Configure Date & Time

This leads to a further screen.

Configure Date & Time

Note: All dates & times throughout the service portal are in UTC. Please enter the date & time below in UTC.

[Main Menu](#) / [Configuration Menu](#) / [Configure Date & Time](#)

Day	Month	Year
25	06	2024
Hours	Minutes	Seconds
10	31	26

[Save Changes](#)

[Configuration Menu](#)

Note the requirement to enter the time as UTC.

The VPM has an internal supercapacitor backup for the real-time clock. This will retain UTC once set for a period of time. If, however, the system is powered down for an extended period it will be necessary to reset the time when powered up.

Configuration Backup & Restore

Configuration Backup & Restore

This menu option may only be used by service Engineers who have connected a laptop to the system. For backup and restore functions direct from the VPM unit refer to the next section

Internal Backup & Restore System

Internal Backup & Restore System

This leads to a further screen

Internal Backup & Restore System

[Main Menu](#) / [Configuration Menu](#) / [Internal Backup & Restore System](#)

Reload Backups
Create New Backup

Backup Type	Date (dd-mm-yyyy)	Time (UTC)	Name	Actions	
AUTO	02-09-2025	11:22:41	Automatic internal backup	Restore	Delete

Configuration Menu

The VPM has an internal micro SD card which is used to save a copy of system backups. The VPM automatically creates a backup of any changes made to the systems configuration which is named "Automatic internal backup".

In addition a user can create their own backups which can later be restored if required.

To create a user backup select Create New Backup then enter a suitable name and press Create Backup.

Reload Backups
Create New Backup

Create Backup:

Create Backup

The newly created backup will then be shown on the list

Backup Type	Date (dd-mm-yyyy)	Time (UTC)	Name	Actions	
AUTO	02-09-2025	11:43:39	Automatic internal backup	Restore	Delete
USER	02-09-2025	11:47:24	User-Backup-1	Restore	Delete

Backups may be deleted using the Delete button.

Or loaded into the VPM overwriting the current configuration using the Restore button

Note: Typically a backup titled "Factory Backup" will be generated at the end of manufacture and configuration before the system is despatched. Where it is considered that incorrect changes have been made to the configuration this Backup may be used to restore the system to its original configuration.

USB Backup and Restore

USB Backup & Restore

The functions on this screen utilise the front panel USB port of the VPM where a suitably formatted (FAT32) USB Memory Device should be temporarily plugged in. It allows a full backup or restore of the unit's configuration settings.

USB Backup

USB Configuration Backup

This will download a complete copy of the current configuration database to a USB drive that is connected to the device.

[Main Menu](#) / [Configuration Menu](#) / [USB Backup](#)

Include Alarms History?

No

Please ensure a USB drive is plugged into the device BEFORE clicking the button below.

USB Configuration Backup

As indicated on the screen, a complete copy of the current configuration settings will be downloaded to the USB device. If required a copy of the Alarm History log will also be included.

After ensuring the memory device is in place press USB Configuration Backup. Once finished a message confirming successful backup will be displayed and the USB memory device may be removed.

The file is named based on date and time in the format `vpms_(13-33-40_31-01-2024).sql` and is saved to the root of the USB drive.

The database file is typically small – less than 500 kB.

Note: It is recommended that a backup copy of the configuration file is saved in a safe place such that it can be used to restore original settings if needed as detailed below.

USB Configuration Restore

USB Configuration Restore

Please note: This operation is not reversible. Once you perform a configuration restore, the device will completely remove all existing data and replace it with the restore data.

Please ensure a USB drive is plugged into the device BEFORE clicking the button below.

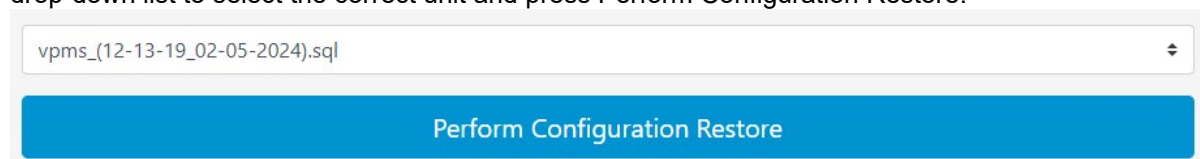
Find USB Restore Files

The restore process will take some time. Only click this button once.

This function is used to overwrite the existing configuration with a new file. Note the onscreen warning that this operation cannot be reversed.

This new file may be a previous backup copy, or it may be a new file provided by PSM which includes new or updated configuration or functionality.

Insert the USB device which containing the new file on its root directory into the front USB port and press **Find USB Restore Files**. If more than one suitable file is present on the USB device use the drop-down list to select the correct unit and press Perform Configuration Restore.

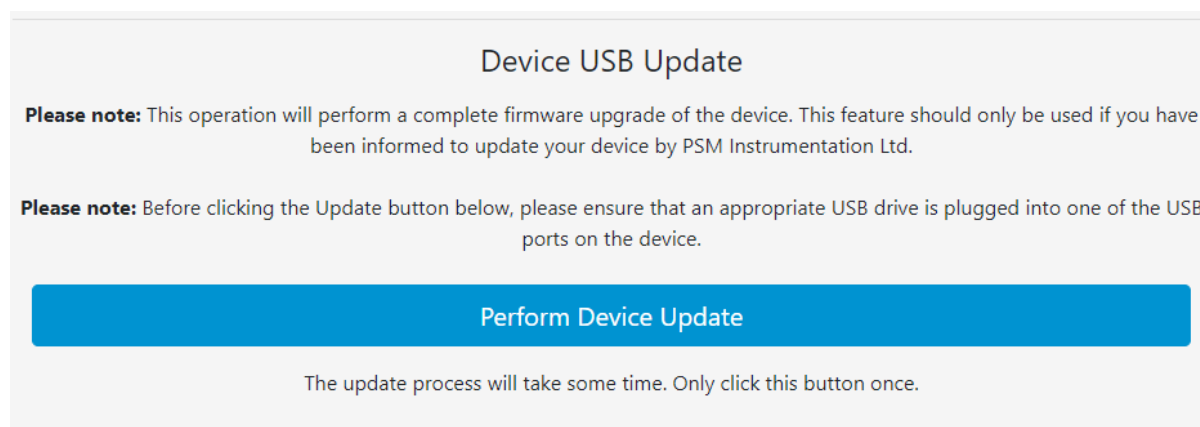
A screenshot of a web interface for configuration restoration. It features a text input field containing the filename 'vpms_(12-13-19_02-05-2024).sql' with a small downward arrow icon on the right. Below the input field is a prominent blue button with the text 'Perform Configuration Restore' in white.

Once completed, the system will confirm that the file has been successfully restored.

Device USB Update

A blue rectangular button with the text 'Device USB Update' in white, centered within the button.

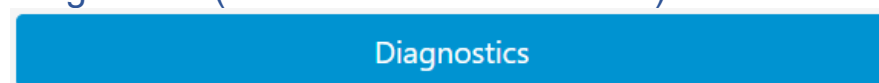
This screen is used to upload updated system firmware to the device. This is different to restoring the configuration settings as detailed in the previous section. System firmware is the underlying operating software whereas the Configuration settings are the data entered for the specific application. System firmware may be updated by PSM to bring additional functionality or to address software bugs. It will be provided by PSM and is uploaded in the same way as backup / restore i.e., via a suitable USB memory device temporarily connected to the front USB port.

A screenshot of the 'Device USB Update' screen. At the top, the title 'Device USB Update' is centered. Below it, two 'Please note' messages are displayed. The first note states that the operation will perform a complete firmware upgrade and should only be used if informed by PSM Instrumentation Ltd. The second note advises ensuring a suitable USB drive is plugged into one of the USB ports before clicking the update button. Below the notes is a large blue button labeled 'Perform Device Update'. At the bottom, a message states: 'The update process will take some time. Only click this button once.'

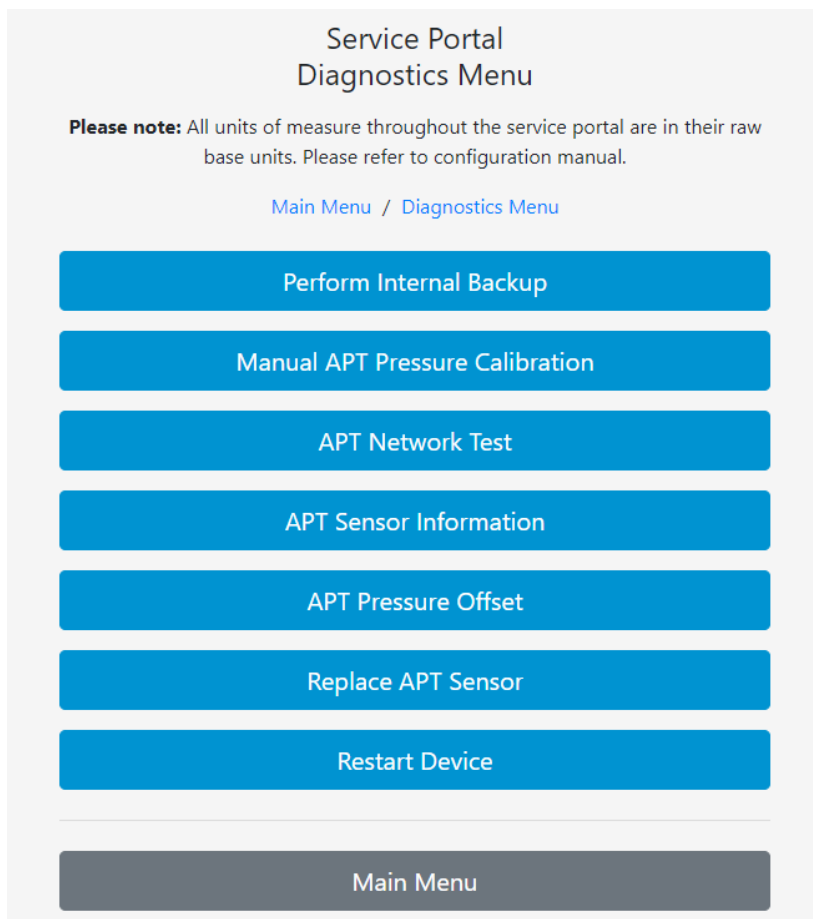
Once the USB device containing the updated firmware is plugged in press **Perform Device Update**. Note that the update can take up to 2 minutes. Once completed, a message confirming successful update is displayed.

Note: This process does not make any changes to the units' configuration settings which will normally still be appropriate. Where a Firmware update will necessitate changes to configuration settings an updated configuration file will also be provided. If this is the case, once the firmware update is completed the updated configuration file should then be uploaded using the Restore function as detailed in the previous section.

Diagnostics (Service Portal Main Menu)

A blue rectangular button with the text 'Diagnostics' in white, centered within the button.

This leads to a further sub-menu as follows:

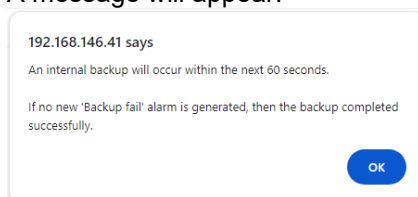


Perform Internal Backup



Selecting this option manually initiates an automatic internal backup of all system configuration data it duplicates the function detailed in the section [Internal Backup & Restore System](#) . The system will store all settings to a backup file on the internal Micro SD card.

A message will appear:



Manual APT Pressure Calibration



This screen allows an APT1000 to be recalibrated.

Note: This function requires physical access to the APT1000 sensor, suitable pressure test connections, and the use of certified calibration equipment to accurately apply a known pressure to

the transmitter at 0, 25, 50, 75, & 100% of its measurement range. It is therefore reserved for Engineers who have full access to this equipment and **should not** otherwise be used.

APT Network Test



This screen allows testing of a network to establish which sensors are connected and responding.

APT Network Test

[Main Menu](#) / [Diagnostics Menu](#) / [APT Network Test](#)

Communications Port

RS-485 #2

Start Modbus ID

Start ID: 1

Finish Modbus ID

Finish ID: 247

Cancel

Start Test

Diagnostics Menu

Start Modbus ID and Finish Modbus ID allow entry of either a range of Modbus ids for the sensors or a specific individual value depending on the sensors being tested. Once the required values are entered press Start Test. The unit will scan the network and provide a summary screen identifying which sensor Modbus Idents have responded.

APT Network Test		
Main Menu / Diagnostics Menu / APT Network Test		
Modbus ID	Found?	Serial #
101	YES	22003902
Process Complete - Exit		

APT Sensor Information

APT Sensor Information

This option allows interrogation of a specific sensor on the network to obtain configuration information and real-time data.

Select the relevant serial port and the Modbus ident number of the sensor to be interrogated.

APT Sensor Information

[Main Menu](#) / [Diagnostics Menu](#) / [APT Sensor Information](#)

Communications Port

RS-485 #2

APT Modbus ID

ID: 101

[Cancel](#) [Read APT Sensor](#)

[Diagnostics Menu](#)

Press Read APT Sensor

[Read APT Sensor](#)

The VPM will interrogate the sensor and present an information screen:

APT Sensor Information

[Main Menu](#) / [Diagnostics Menu](#) / [APT Sensor Information](#)

APT Modbus ID

101

APT Serial Number

22003902

APT Sensor Type

Gauge

APT Firmware

41035

APT Raw Pressure

387.899994

APT Sensor Tag

XXXXXXXXXXXXXXXXXXXX

APT Pressure Offset

0.000000

Refresh
Adjust Offset
Exit

APT Modbus ID: This is the ident number of the sensor being interrogated.

APT Serial Number: This is the unique serial number of the sensor as recorded in its memory.

APT Sensor Type: Identifies if the sensor is Compound or Gauge pressure type

APT Firmware: This is the Firmware version of the APT sensor.

APT Raw Pressure: This is the current pressure the APT sensor is measuring.

APT Sensor Tag: This is a duty name that has been stored in the APT – If used.

APT Pressure Offset: This is a fixed correction value in millimetres that has been applied to the sensor. In effect it is a zero correction for the sensor. It may be either a positive or negative number. Refer to the following paragraphs for a full explanation.

Refresh

The Refresh Buton forces an update of the screen.

Adjust Offset

This button leads to a further screen.

APT Pressure Offset

[Main Menu](#) / [Diagnostics Menu](#) / [APT Pressure Offset](#)

IMPORTANT NOTE

Please ensure the APT sensor does not have any pressure applied.
Once the sensor has no pressure applied, click the button below to start the process.

Communications Port

RS-485 #2
⌵

APT Modbus ID

Please select...
⌵

Cancel

Start Adjustment

Diagnostics Menu

The purpose of this Pressure offset is to apply minor corrections where the sensor is known to have zero pressure applied and should therefore be providing an output of 0mm WG but is providing a value less or greater than this.

After reading the caution and ensuring that the sensor is mounted in its intended orientation (horizontal or vertical) and is in free air select the communications port – default is RS-485 #2 for this application, and the Modbus ident of the sensor to be adjusted, and press Start Adjustment

Once adjustment is complete the following screen will be shown:

APT Pressure Offset

[Main Menu](#) / [Diagnostics Menu](#) / [APT Pressure Offset](#)

IMPORTANT NOTE

Please ensure the APT sensor does not have any pressure applied.
Once the sensor has no pressure applied, click the button below to start the process.

Adjustment completed successfully.

Please click the button below to exit.

Process Complete - Exit

To view the offset correction that has been applied run the APT Sensor Information screen again.

Note: The Pressure Offset value is saved to and stored in the APT1000 sensor and not The VPM Display.

APT Pressure Offset

APT Pressure Offset

This option is accessible directly from the Service menu or from the APT Sensor Information page Its function is detailed in the previous section.

Replace APT Sensor

Replace APT Sensor

This function is used where a new sensor is installed to replace an existing unit. As detailed in previous sections of this manual, the VPM interrogates each sensor on the network by using its unique Modbus address – its Ident (ID) number. The VPM configuration identifies which sensor Ident relates to which tank. Therefore, if a sensor is replaced it is necessary to change the ident number of the replacement sensor to be the same as the original unit.

The current Modbus Ident number of the replacement sensor must also be identified. Replacement transmitters are typically supplied with their Modbus Ident set as the last 2 digits of their unique serial number which will be found etched on the sensor body. However, since this may have been changed at some point, it is possible to use the APT Network Test function as described above to confirm the actual Mobus Ident.

Temporarily connect the replacement APT1000 sensor to the network and, using the [APT Network Test](#) function the test result will identify and confirm the actual Ident number.

Note: If there is any uncertainty regarding the Modbus ident of the replacement sensor, and there is a possibility that it might be the same as one already on the network this would cause network contentions and must be avoided. The replacement units should be temporarily connected at the head of the network, i.e., directly to the RFM-ISR modules and all other sensors disconnected by unplugging the network cables that feed out to them from the RFM-ISR units. Once the replacement sensors Modbus Ident number is confirmed the replacement can continue.

Replace APT Sensor

[Main Menu](#) / [Diagnostics Menu](#) / [Replace APT Sensor](#)

IMPORTANT NOTE

This process will alter the modbus ID stored within the APT1000 sensor.
Please ensure you follow all instructions carefully.

Communications Port

RS-485 #2

Current APT Modbus ID

Current ID: 101

New APT Modbus ID

New ID: 102

Cancel

Start Replacement

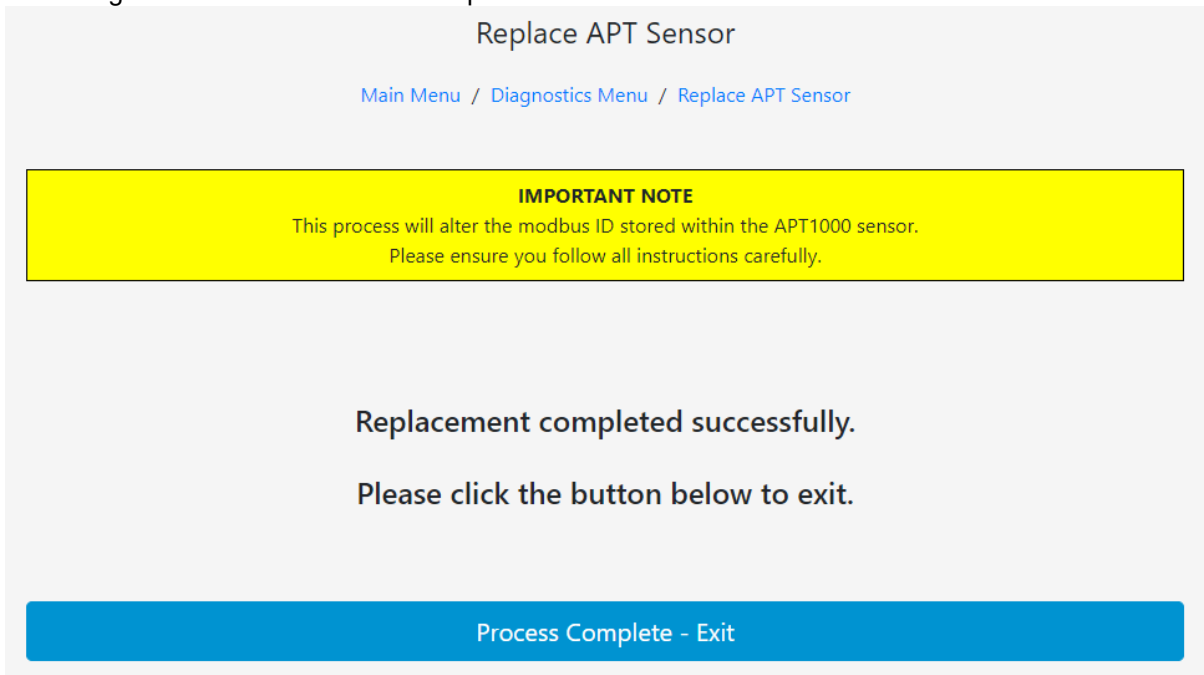
Diagnostics Menu

Communications Port: Set the port of the network the APT1000 sensor is connected to
Current APT Modbus ID: Enter the Modbus Ident of the replacement sensor.
New APT Modbus ID: Enter the Modbus Ident of the sensor to be replaced.

Press

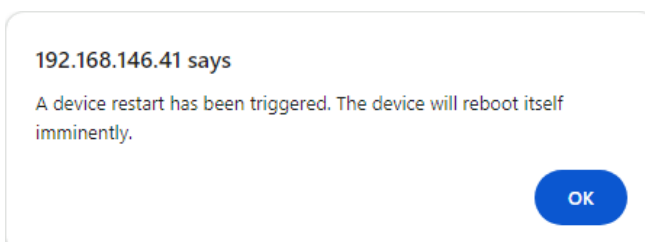


A message will confirm successful completion.



Restart Device

This will perform a full restart of the VPM display. A message similar to the following will be displayed confirming restart will occur.



Optional Modbus Output

The VPM has 3 RS485 serial ports. These can be assigned to either inputs (from APT1000 sensor networks) or outputs to external systems. Communication protocol is Modbus RTU where the external system is the Master and the VPM is the Slave and responds to requests for data.

For systems which include a Modbus Output the format and context of the registers will be agreed before delivery and a specific document issued which details the content and format of all registers as well as the data format settings.

ANNEX 1 – User Access Levels

The VPM may be configured with multiple passwords which permit different levels of access. This manual covers the two normal levels as detailed below. Where a specific system has additional access levels a supplement to this manual will be included.

User: This is the normal operational level which allows viewing of all display screens and changing of Specific Gravity values. It also allows system errors and tank level alarms to be viewed, acknowledged, and downloaded. Further, in the case of tank level alarms it also allows alarm setpoints to be adjusted.

Service: In addition to the User level, Service level provides access to certain system configuration parameters and various utilities to assist in troubleshooting and sensor replacement.

Should there be a need to change the fundamental configuration of the system this can be achieved either by a PSM Service Engineer attending the Vessel or by PSM preparing an updated configuration file which can be uploaded to the system by onboard operators.

Factory Set Passwords

User: 654321

Service: 789654