Wireless Tank Level System

User Guide

smart water

WARRANTY 2 YEAR WARRANTY

OR

OR

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FEATURES

- ✓ Latest release of the ultimate tank level indicator system incorporating a fully upgraded hardware and software design

- ✓ WiFi Enabled with free app available for both iOS and Android. A subscription app is also available providing additional feature

- ✓ Ultra-long range LoRa wireless communication technology

- ✓ Full colour, high resolution, super-bright IPS 2.8" TFT touchscreen display

- ✓ WiFi Gateway option with full app connectivity

- ✓ Up to 12 Tank Senders and 12 Pump Controllers can be connected to a single system

- ✓ Easy DIY installation, view our detailed online video for instructions on how to get up and running

- ✓ Wall mounting and desk mounting WiFi LCD Keypad options for total installation flexibility

- ✓ Set custom names for your Tank Senders and Pump Controllers for simple identification

- ✓ On screen graphic display showing tank level history over the preceding 30 days

- ✓ "Time to Empty" indication based on your actual tank usage. Just like the trip computer in your car, Smart Water will estimate the time you have until your tank level gets low!

- ✓ "One Glance" LCD Keypad design for the ultimate in simple, intuitive, user-friendly operation

- ✓ Smart Water will learn your tank usage and assist with the efficient management of your water supply

- ✓ "ALERT" features for low days remaining, low tank level and abnormal usage

- ✓ Different fluids can be monitored by simply setting a custom Specific Gravity (SG) value

- ✓ Fully programmable automatic wireless pump control. Set it and forget it!

- ✓ Water can be pumped between different tanks, or alternatively from unlimited sources such as bores and rivers

- ✓ Fully sealed and ruggedized solar powered Tank Sender means virtually zero maintenance. AC mains powered option is also included for sites with low/no access to sunlight

- ✓ Filter replacement/tank cleaning timer with on-screen alerts

- ✓ Wireless reception strength and battery level indicators

- ✓ Automatic system calibration of "full tank" (100%) level

- ✓ Smart Water can measure tanks from 0.5M to 5M in height

- ✓ High quality construction including 316 Stainless Steel sensor and ultra-high UV resistant plastic

- ✓ Two-Year full replacement warranty

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INTRODUCTION

Congratulations on your purchase of the SW900, the most advanced wireless tank level monitoring system available. Our New Zealand based team is extremely proud of this latest innovation which incorporates a completely new hardware and software design to offer far superior performance and reliability. Smart Water will revolutionise the way you manage your tanks and will provide a stylish yet functional addition to your home or rural operation. The system is perfect for both domestic households and rugged farm or industrial applications and has been designed to withstand the harshest of outdoor environments. The product is made from the highest quality materials available and is offered with a **TWO-YEAR** full replacement warranty coupled with dedicated after sales technical support.

The latest SW900 Smart Water system takes another huge step forward in tank monitoring and fluid management technology. The system boasts unmatched LoRa wireless communications performance to easily conquer even the most challenging installations. Twelve Tank Senders and twelve Pump Controllers can be accurately monitored/controlled through only one WiFi LCD Keypad, WiFi Gateway and via the iOS or Android app.

The Smart Water system provides the user basic tank level information, but also has the capability to support much more advanced applications. These include an estimated "Time to Empty" indication, historical usage feature, trending, automatic wireless pump control and a series of alerts, including if the system detects a leak or abnormal usage. These features allow the user to manage water consumption to become more economical and maximise efficiency. If coupled with the Smart Water wireless Pump Controller the system can provide a complete solution to your water management requirements. The iOS or Android app also offers enhanced features including weather forecasting (probability of rain) and a range of historical level and usage graphs.

It is important to take the time to read through this manual carefully. The correct installation of the product is essential and will ensure maximum performance and long-term reliable operation.

Please enjoy our product and enjoy the peace of mind that Smart Water offers.

Thank You for Purchasing Smart Water
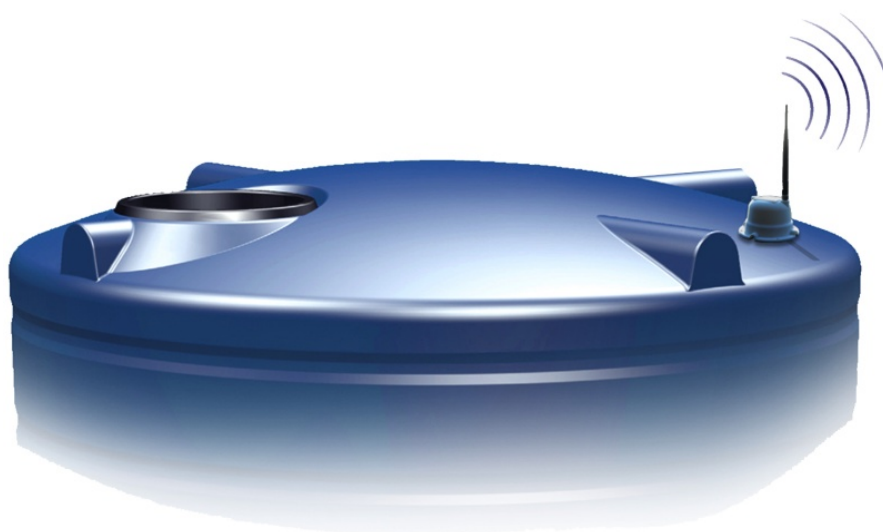
FCC COMPLIANCE AND RF RADIATION EXPOSURE STATEMENT

The Smart Water equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The devices and their antennae must not be co-located or operating in conjunction with any other antenna or transmitter.

To comply with FCC RF exposure compliance requirements, the antenna used for the Smart Water equipment must be installed to provide a separation distance of at least **20cm** from all persons. This requirement applies to both the initial set-up of the system and ongoing operation.

Ivent Solutions Limited
trading as
Smart Water Technology

FCC Grantee Code: 2AUIO
GC Registration Number: GC742518

Pump Controller (12VDC and C/O) FCC ID: **2AUI0SW900PMP12**
Pump Controller (230VAC) FCC ID: **2AUI0SW900PMP**
WiFi LCD Keypad FCC ID: **2AUI0SW900LCD**
Tank Sender FCC ID: **2AUI0SW900TNK**
WiFi Gateway FCC ID: **2AUI0SW900BBOX**
Active Repeater FCC ID: **2AUI0SW900REP**

INSTALLATION INSTRUCTIONS

The Smart Water SW900 system is very simple to install. However, it is important that the installation instructions are followed in the specified <u>step by step</u> sequence as illustrated below. This will ensure the correct function of the product and long term reliable service.

Not following these instructions could cause the system to function incorrectly, or not function at all.

Step 1 – Tank Sender:

Plug the water sensor cable into the Tank Sender connector. The cable should be aligned as shown below and the water sensor connector should be locked into position by turning the "thumb lock" on the body of the connector. Take care plugging the water sensor in as damage can occur to the electrical pins. Turn the connector thumb-lock clockwise until it clicks firmly into the locked position. It is important that the connector is locked as this provides the required weather/water resistance. The Tank Sender LED will flash <u>GREEN</u> until it has successfully booted up.

** If the Tank Sender LED flashes **<u>RED</u>** please refer to the "Fault-Finding" section at the rear of this manual.

Attach the blue antenna onto the Gold SMA connector on top of the Tank Sender. Turn the antenna in a clockwise direction until it is "finger tight". Do not over-tighten.
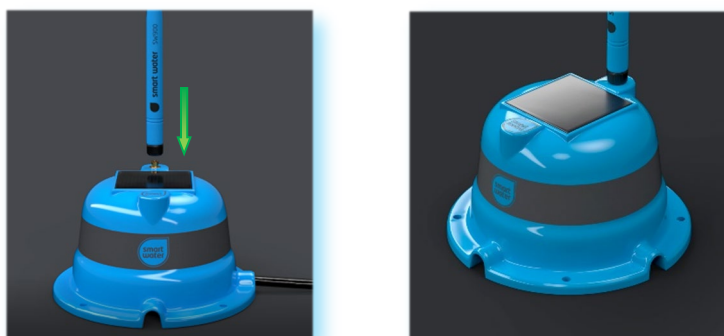
➢ **<mark>RECOMMENDED PROCEDURE:</mark>** *Prior to installation connect the 12VDC power supply to the DC jack on the base of the Tank Sender. The Tank Sender should be charged for approximately 3-4 hours to ensure a maximum charge level of the Lithium-ion battery prior to installation.*

Step 2 – Desk Mount and Wall Mount WiFi LCD Keypad:

**go to step 4 if you have purchased a WiFi Gateway

Plug in the USB power adaptor to an AC mains power supply and connect the USB cable to the rear of the Desk Mount WiFi LCD Keypad. You will hear an audible "beep", and the LCD will display the Smart Water logo and then the "Add Device" screen. The status LED on the rear of the LCD Keypad will be flashing **ORANGE**.

If you have a Wall Mount WiFi LCD Keypad, connect the power adaptor to an AC mains power source and carefully plug in the 3-pin JST connector to the white 3-pin connector on the LCD PCB (Printed Circuit Board). Do not touch the components on the PCB as this could cause damage to the circuitry. Smart Water strongly recommends that the Wall Mount WiFi LCD Keypad is installed by a certified electrician.

Attach the black <u>hinged</u> antenna onto the Gold SMD antenna connector on the back of the product. Turn the antenna in a clockwise direction until it is "finger-tight". Do not over-tighten.

Desk Mount WiFi LCD Keypad

After the LCD Keypad has booted up it will automatically show the **ADD DEVICE** screen on the display. If this screen is not shown it can also be accessed manually by pressing the **MENU** icon on the main screen and then **MENU -> ADD DEVICE**

Add Device

Add Device Screen

Step 3 – Connecting the Tank Sender to the LCD Keypad:

The sensor must **NOT** be in the tank. The sensor should be connected to the Tank Sender, but not in fluid of any type. If the sensor is submerged, it will **NOT** connect to the LCD Keypad.

Confirm the LCD Keypad "**ADD DEVICE**" screen is showing "**WAITING…**", then press and hold the blue circular push button on the base of the Tank Sender as shown below. The LED will illuminate **BLUE** for two seconds, followed by two short **WHITE** flashes. This confirms that the Tank Sender has successfully connected to LCD Keypad and passed software test criteria.

The LCD Keypad will beep and the message **"TANK ADDED"** will be displayed on the LCD.

** If the Tank Sender LED flashes **RED** please refer to the "Fault-Finding" section at the rear of this manual.

If additional Tank Senders need to be connected to the system (your Smart Water system can monitor up to **twelve** different Tank Senders) simply repeat the above procedure prior to proceeding to Step 5.

Your Tank Sender is now connected to the system. Do not put the sensor in your tank, please proceed to Step 5 to continue the installation process.

Step 4 – Tank Settings:

Smart Water recommends entering the *approximate* height of your tank before final installation. Set the tank height of your water tank through the **MENU** screen. After touching the **MENU** icon on the main screen, go to the **SETTINGS -> TANK SETTINGS -> TANK HEIGHT** screen.

The system has a default tank height set to 2.0 metres (2.0M). Set your tank height approximately **10% lower** than the actual height of your tank. For example, if your tank height is 2.2M, then set your tank height to **2.0M**. Once your tank fills to its maximum level the system will automatically re-calibrate to the exact 100% level (maximum tank level) for each individual tank. If the tank height menu is re-visited at a later stage, the height displayed will be the exact height (100%) that your tank has reached. This figure may not be the number you originally entered; however, this is normal operation and indicates that the system is operating at optimum performance. Please note, if the tank height has changed **do not** change it back to the original manual setting entered during installation.

To change the tank height manually, touch the up/down icons to customize your settings. Touch and hold the up/down button for faster setting (scrolling).

DOWN   UP

❖ **CAUTION:** *If the tank height is not set correctly the system may not perform accurately. Smart Water strongly recommends that the tank height be set slightly lower than the actual height of your tank. This process gives the system the opportunity to automatically calibrate to a precise 100% level when your tank fills to its maximum level.*

Step 5 Tank Sender Installation:

Take the Tank Sender and the Stainless Steel Sensor to your tank and lower the sensor to the bottom. Please ensure that the sensor is located at the very base of the tank and away from the main water outflow (draw-off position) on your tank. Any excess cable can be lowered into the tank also (it is not necessary to "hang" the sensor in the tank).

<div align="center">

Stainless Steel Tank Sensor   *Tank Sender Installed*

</div>
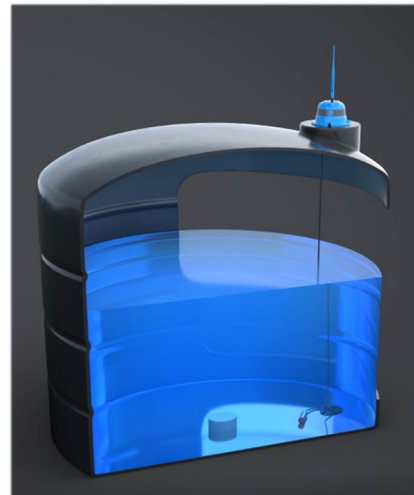
❖ **CAUTION:** *The sensor is a delicate measurement instrument. Please always take great care in the handling of the sensor. Dropping or knocking the sensor can damage it and will void the warranty.*

The Tank Sender should be positioned on top of the tank with maximum exposure to sunlight. Battery charging performance will be enhanced if the solar panel is positioned as per the "Solar Panel Set-Up Guide" at the rear of this manual. Your system is also provided with an AC main powered option. Simply connect the 12V power supply to the DC jack on the base of the Tank Sender if required for continuous power.

Included with the Smart Water product is a mounting kit consisting of four 10mm x 25mm self-tapping Stainless Steel screws. These can be used to mount the Tank Sender to the top of your tank. The Tank Sender does <u>not</u> need to be screwed onto your tank, but Smart Water does recommend this step as part of a good installation. Glue and other attachment methods can be used as an alternative for fixing the Tank Sender to the tank. If using glue **DO NOT** cover up the venting drains around the perimeter of the Tank Sender base.

➢ **RECOMMENDED PROCEDURE:** *If the sensor cable is required to enter the tank beneath the Tank Sender, manually bend/shape the cable **prior** to connecting the sensor cable. If the cable is bent/shaped once connected to the Tank Sender, the waterproof connector may be damaged.*

➢ **RECOMMENDED PROCEDURE:** *When mounting the Tank Sender ensure that the three venting grooves around the base are positioned to allow water to drain away freely from underneath. If water accumulates or floods around the black water sensor connector this could cause the Tank Sender to operate intermittently or possibly fail.*

WiFi Gateway Instructions

1

Firstly, connect the antenna to the gold SMA connector on top of the WiFi Gateway. Turn the antenna clockwise until it is gently tightened.

2

Once the antenna is fitted connect the 12VDC power pack to mains power and then connect it to the DC jack on the base of the WiFi Gateway.

3

The "STATUS" LED should now be flashing ORANGE in preparation for the "Blink Up" procedure. Once connected to WiFi, the WiFi Gateway can be mounted on a wall, or any convenient position.

Dipole Antenna

Solar Panel

Mounting Holes

Drain Vents

Congratulations… your Smart Water system is installed!

For further information please view our installation video online:

www.smartwateronline.com

MAIN SCREEN SUMMARY

Time to Empty

Menu

System Status

Tank Percentage

Trend Indicator

Tank Level

103 Days

Status

67%

Next Tank

Connected Tanks

Previous Tank

Southern Tank

Tank Name

Signal Strength

Next System Icon

Tank Battery

smart water
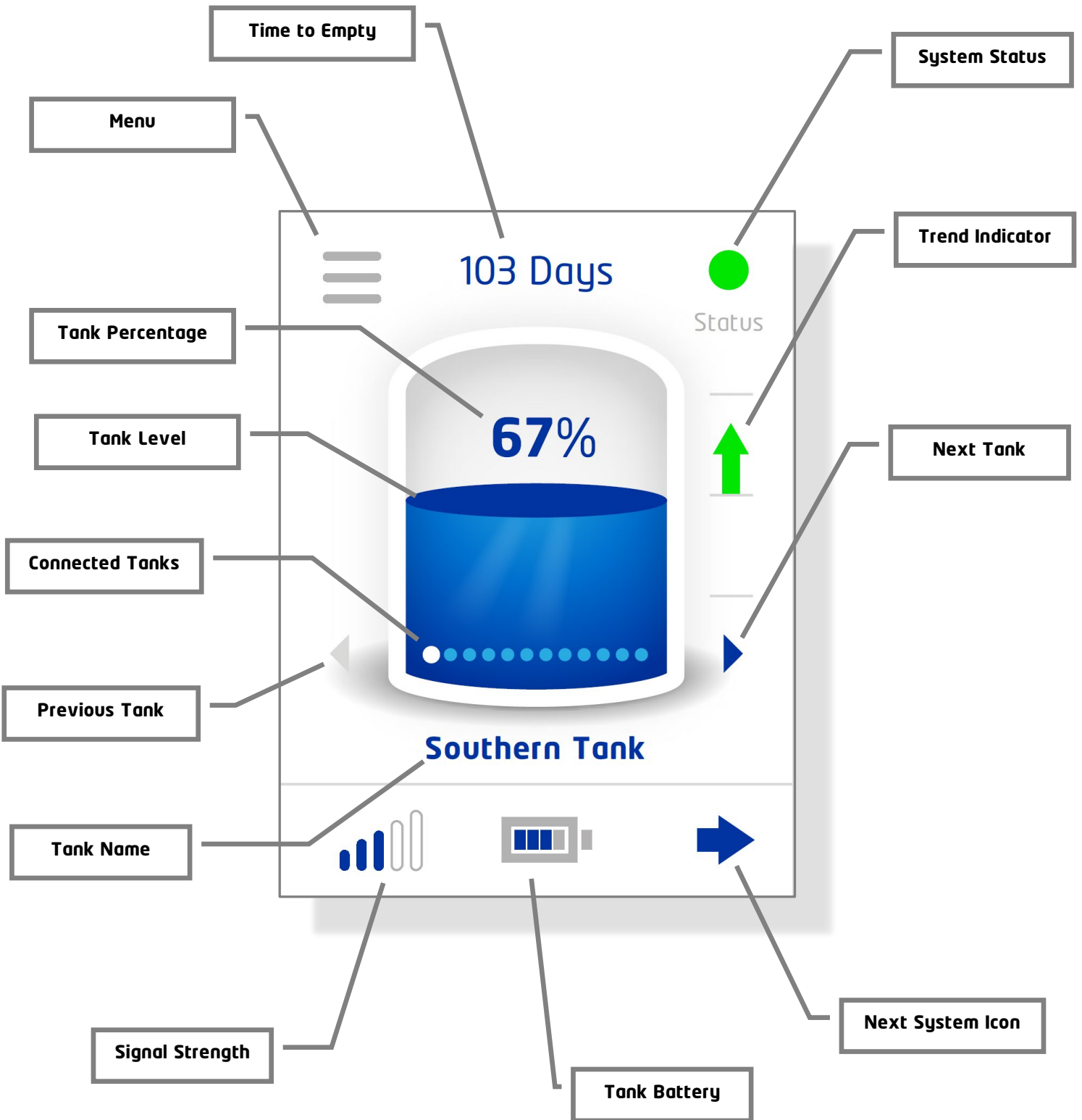
ICON DEFINITIONS

Menu

Touch this icon to access the full set of system settings and menus that are available.

System Status

Status   Status

Touch this icon to see the system status and any system notifications or alerts. By touching this icon, you will be taken into the system status screen. When the status icon is "**green**" the status of the system is normal, and the status screen will show the text "Normal Operation". When it is "**red**" there is an issue that the system wants to notify the user about. The status screen will show a list of the problems detected. For example, an abnormal usage alert could be generated by a leak in your water tank plumbing, a toilet constantly flushing or simply a tap left on. Other alerts include low Tank Sender battery, low signal strength and Pump Controller warnings. By pressing the status icon, the alert is cleared, and the icon will return to green, however the alert will remain in the status screen until the alert condition is rectified.

Days to Empty

56 Days

This icon displays the estimated "time to empty" that is available before your tank supply will run out (based on your current water usage and rainfall). If for example you were getting low on water and subsequently became more efficient with your water usage, the estimated "time to empty" would increase. The maximum "time to empty" is displayed as 100+ days. When Smart Water is first installed the status button will default to 200+ days once your water usage has been learned and stored into memory by the system the time to empty will update to a new value.

Tank Number

1

The tank number shows which tank is currently displayed on the LCD Keypad. If only one tank is connected to the system, this number will default to 1. If more than one tank is connected, the tank number icon will show the number of the tank that is currently displayed. Touch the tank number to allow selection of a different tank via the device selection matrix. Please note that this function is only applicable if you have more than one tank connected to the system.

Other tanks can also be selected by touching the tank selection icons (shown above). These allow the user to scroll left and right through the tanks connected to the system. Please note that this function is only applicable if you have more than one tank connected to the system.

A maximum of twelve (12) tanks can be connected to a single Smart Water WiFi LCD Keypad or WiFi Gateway.

Tank Percentage

67%

This percentage figure is an accurate representation of how full your tank is referenced to the maximum recorded level of 100%. This value will change as the level in your tank rises and falls. The maximum level of 100% will auto-calibrate when your tank reaches it maximum level. Further accuracy can be obtained by setting the tank outflow height.

Tank Level

A simple "one glance" indication showing the current level of water in your tank. This indication represents the last reported level of water in the selected tank (see "tank number" and "tank name").

The water level in this icon will rise and fall as the level in your tank changes.

Touching the centre of the tank level icon on the screen will take you to the "History" graph, showing your tank level trend over the past 30 days (see above).

Trend Indicator

A simple "one glance" indication showing if the level of water in the tank is increasing or decreasing. If the trend indicator is not displayed, this means that there has been no change in tank level over the last two tank level reports.

Tank Signal Strength

The tank signal strength indicator displays the signal strength being received by the WiFi LCD Keypad from the Tank Sender, in the form of a rising "bar graph". If only one bar is shown (highlighted in red), consider moving the Tank Sender or WiFi LCD Keypad/WiFi Gateway to a position with better reception. Alternatively consider fitting an external high-power antenna (a range of antenna options are available from Smart Water to suit most installation requirements). If two bars only are shown this is still adequate for reliable operation.

Please contact Smart Water or your local retailer for further installation assistance on maximizing wireless performance.

Battery Level

Indicates the level of charge in the Tank Sender battery. The battery level will change according to which Tank Sender is selected on the main screen (if multiple tanks are connected to the system). If the icon shows only one bar (in red) this indicates that the Li-ion rechargeable battery in the Tank Sender has a low state of charge, consider plugging in the battery charger to increase the battery charge.

If multiple tanks are connected to the system, touch the battery low icon to display a list of tanks and their respective battery levels.

Make sure that the Tank Sender solar panel has clear access to direct sunlight. Even if the Tank Sender battery has a low state of charge, it will recharge when moved/returned to a position with exposure to direct sunlight. Alternatively, the DC power pack supplied with your kit can be connected to the Tank Sender to provide mains power and/or recharge the battery. The acceptable voltage input range is **12-36V** for the battery charger port on the Tank Sender.

Replace Filter

This icon is displayed when the time-period set for filter replacement has expired. The time-period for filter replacement can be set via the **MENU -> SETTINGS -> TANK SETTINGS -> FILTER TIME** menu screen. To find out which tank filter needs to be replaced, touch the **WARNING ICON** or the **STATUS** button.

To clear the filter timer warning indication reset the relevant tank filter timer that has expired.

System Warning

When the warning icon is displayed, the system is alerting you to a possible problem with the system. Touch the warning icon or the **STATUS** icon to see details on the alert. Possible causes are:

- Battery too low
- Tank Sender wireless strength low
- Filter replacement timer expired
- Clean tank timer expired
- Days remaining low
- Abnormal usage detected
- Pump forced to stop

Pump
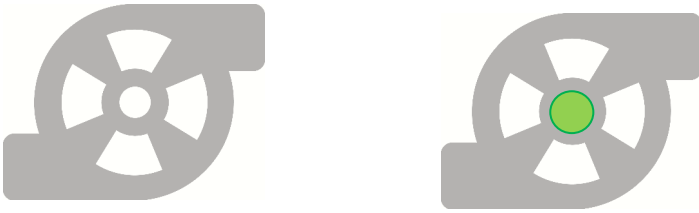
The pump icon is displayed when a Pump Controller has been connected to the system. When the pump icon is rotating this shows that a Pump Controller connected to the system is in operation. Touch the pump icon to control the pump (also see **MENU -> SETTINGS -> PUMP SETTINGS ->** in the menu section). A pump can be added to the system by the user through the **MENU -> ADD DEVICE** screen.

Selection Button

 ON

 OFF

The selection buttons confirm if a user selectable option in the system is set to **ON** or **OFF**. These icons are self-explanatory confirming if the user setting is **ON** (**green** icon) or **OFF** (**red** icon).

INCREASE/DECREASE Buttons

Used to increase or decrease the value of a selected menu item. If the button is pressed and held the number selection will increase or decrease at a faster rate of change.

Tank (or Pump) Selection Matrix
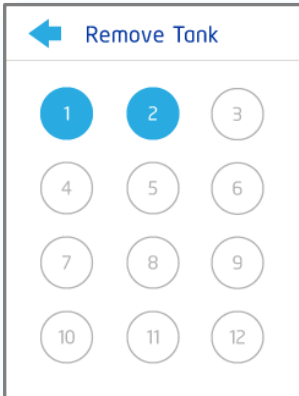
The "Selection Matrix" is displayed when multiple Tank Senders or Pump Controllers are connected to the system. The numbers highlighted in blue represent the number of devices connected, simply touch on the device number you want to edit to move forward to the next screen. Numbers that are not highlighted indicate the remaining slots available in the system. If a tank has been renamed and the user is unsure of the tank number, revert to the main screen where the tank number is shown in the lower left-hand corner of the display.

Tank Name

TANK 1

The "Tank Name" is displayed directly beneath the Tank Level icon. This defaults to "Tank #" when the Tank Sender is initially connected to the system. If the tank is renamed, then the new name will replace the "Tank #" value.

Next System Icon

The "Next System Icon" is displayed in the system icon bar on the lower part of the main screen. The arrow icon indicates further system icons are available to view on the next page.

History Screen

Touch the tank percentage icon on the main screen to display the **HISTORY** graph. This screen shows a graph of the recorded tank level for the preceding 30 days. Touch the centre of the graph to scroll through the different tanks connected to your system.

Once the system has been installed for 30 days the graph will continue to plot up until the previous day. If the LCD Keypad is de-powered at any stage this will not affect the historical usage information stored in memory.

If the system is reset using the either the **MENU -> SETTINGS -> RESET -> FACTORY RESET** or **MENU -> SETTINGS -> RESET -> USAGE RESET** option, all stored data will be erased for connected devices.

MENU OPTIONS

MENU

Touch the **MENU** icon on the main screen to access all menu options in the Smart Water system.

MENU -> ADD DEVICE

Use to connect any device to the system including Tank Senders and Pump Controllers.

ADDING A TANK SENDER: Once in the "ADD DEVICE" screen, ensure that prior to adding a Tank Sender the sensor is out of the tank and free of water. Press and hold the Tank Sender "CONNECT" button (on the underside of the Tank Sender) until the LED light is illuminated **BLUE** for 2 seconds then flashes **WHITE** twice. Release the button and confirm on the LCD Keypad or app that the Tank Sender has been added. The water sensor can be gently lowered into the tank after this step. Tank Sender installation is then complete. See below for how to re-name your device. If a Tank Sender is already connected to the system and is added again in error, the message **"Tank # already added"** will be displayed (where # is the sequenced tank number).

ADDING A PUMP CONTROLLER: Once in the "ADD DEVICE" screen, press the "CONNECT" button on the Pump Controller. The START/STOP LED's will flash, **RED**, **RED**, **GREEN**, **GREEN.** Confirm on the LCD Keypad or app that the Pump Controller has been added. Pump Controller installation is then complete. See below for how to re-name your device. If a Pump Controller is already connected to the system and is added again in error, the message **"Pump # already added"** will be displayed (where # is the sequenced pump number).

MENU -> SETTINGS -> TANK SETTINGS -> TANK HEIGHT

A default tank height of two metres (**2.0m**) is factory set with your system. Once the tank is completely full the system will automatically re-calibrate to 100% (the maximum recorded tank level) for each individual Tank Sender installation. This will also automatically update the value in the TANK HEIGHT screen.

Smart Water recommends to initially set your tank height approximately 10% lower than your actual measured tank specification. This allows for the auto-calibration software to work efficiently. For example, for a **2.4m** high tank, set **2.2m**.

Select the tank you wish to modify from the tank number matrix. To change the tank height, touch the **+/-** buttons to set your customized level, and then touch "SET". Touch and hold down the **+/-** buttons for faster setting. The minimum tank height that can be set is **0.2m**, the maximum height is **5.0m**. Each individual tank connected to the Smart Water system can have different heights set if required.

❖ **CAUTION:** *If the tank height is set too high then it is possible that the system will read incorrectly. Smart Water strongly recommends that the tank height be set lower than the actual height of your tank. The system will then automatically calibrate 100%. This technique will provide the most accurate ongoing performance. It is recommended to also set your outflow height to further enhance the system accuracy.*

MENU -> SETTINGS -> TANK SETTINGS -> OUTFLOW HEIGHT

"OUTFLOW HEIGHT" allows the user to set the height of the outflow point of each tank. The outflow height is the height above the base of the tank where water is drawn off for supply. Water below this level is effectively unusable. By setting the outflow height Smart Water will re-calibrate the system to represent a more accurate overall level measurement. The system is supplied with a factory default outflow height setting of **0.1m**.

Select the tank you wish to modify from the tank number matrix. To change the outflow height, touch the **+/-** buttons to set your customized level, and then touch "SET". Touch and hold down the **+/-** buttons for faster setting. The minimum outflow height that can be set is **0.0m**, the maximum height is **1.0m**. Each individual tank connected to the Smart Water system can have different heights set if required.

MENU -> SETTINGS -> TANK SETTINGS -> DENSITY

The density of the fluid being measured can be modified by adjusting the specific gravity (SG) value. Select the tank number you wish to set using the matrix and then use the up and down arrow keys to set the density. For example, molasses can be measured by setting a density of between **1.2** and **1.4**. The default factory density setting is **1.0** (water).

Select the tank you wish to modify from the tank number matrix. To change the density, touch the **+/-** buttons to set your customized value, and the touch "SET". Touch and hold down the **+/-** buttons for faster setting. The minimum specific gravity value that can be set is **0.2** and the maximum value is **2.0**. Each individual tank connected to the Smart Water system can have different densities set as required.

MENU -> SETTINGS -> TANK SETTINGS -> NAME TANK

The name of your tank is defaulted to "TANK #" where the "#" is the number of the tank as per the numeric sequence that it was connected to the system.

Customised names can be allocated to the connected tanks via the "NAME TANK" screen. A name of up to 11 characters can be used to name each tank. The "CAPS" button allows transition from upper case to lower case. The "SPACE" button allows a space to be entered into the tank name. Use the left and right arrows to scroll through the alphabet and numerals. Touch the letter or number to add it to the name of your tank. Use the "DELETE" icon to remove characters from your tank name.

Once your custom name is entered, touch "SET" to set the name of your tank.
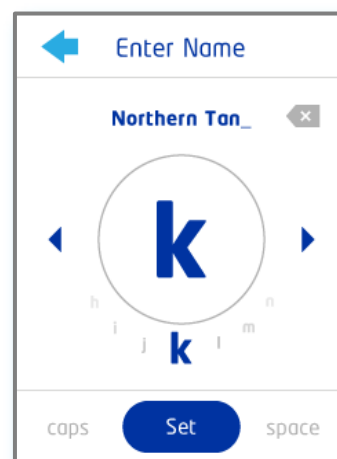
MENU -> SETTINGS -> TANK SETTINGS -> FILTER TIMER

This useful feature will remind the user when a tank filter needs to be replaced. Simply select the number of months for replacement and touch **SET**. The filter replace icon will be displayed and an alert generated when the timer expires.

To change the filter timer, touch the **+/-** buttons to set your customized value, and then touch "SET". Touch and hold down the **+/-** buttons for faster setting. The maximum time that can be set on the filter timer is 48 months (4 years) and can be set in 1-month increments. The factory default setting is 12 months.

To disable the filter timer, select **OFF** by decreasing the value below 1 month and then touch **SET**.
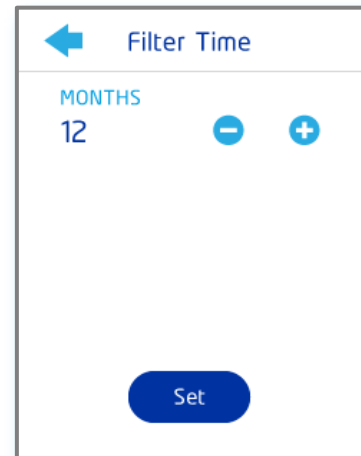
MENU -> SETTINGS -> TANK SETTINGS -> TANK ALERT

When a Tank Sender communicates to the LCD Keypad, there is an acknowledgement message sent back to the Tank Sender. If this message is not received it will create an alert in the system status screen. These alerts can be disabled by selecting this feature **OFF**.

MENU -> SETTINGS -> TANK SETTINGS -> ABNORMAL USAGE

The system will start collecting water usage data as soon as it is installed. Over time this data will build a range of usage that is considered "normal" for each tank. If the system detects a usage that is considered "abnormal" an alert will be generated and shown in the system status screen. These alerts can be disabled by selecting this feature **OFF**.

MENU -> SETTINGS -> TANK SETTINGS -> REMOVE TANK

Used to remove a Tank Sender from the system. When the REMOVE TANK option is selected the user has the option to remove any one of up to twelve tanks connected to the system. Once a Tank Sender is removed it will need to be re-connected using the **MENU -> ADD DEVICE** method. In the unlikely event that a Tank Sender needs to be reconnected or replaced, it will need to be removed first by using this process.

❖ CAUTION: *Once a Tank Sender has been removed from the system, all settings, historical usage and associated customized data (such as tank names) will be lost.*

MENU -> SETTINGS -> PUMP SETTINGS -> AUTO PUMP

Changes the Pump Controller from manual mode to automatic mode. Ensure that the automatic rules are created in the **MENU -> SETTINGS -> PUMP SETTINGS -> SOURCE** and the **MENU -> SETTINGS -> PUMP SETTINGS -> SOURCE -> DESTINATION** screens. When operating in AUTO mode Smart Water recommends to also set the run timer to provide additional system redundancy.

When the Pump Controller is set to MANUAL mode, the only way to control the pump is via the **MENU -> SETTINGS -> PUMP SETTINGS -> CONTROL** screen or directly via the Pump Controller control panel. In this mode the pump will run continuously until manually turned off by the user either at the Pump Controller or via the CONTROL screen.

When the Pump Controller is set to AUTO mode, it will turn on and off as per the pumping rules set up in the SOURCE and DESTINATION SCREENS.

MENU -> SETTINGS -> PUMP SETTINGS -> CONTROL

Provides the user the ability to turn the Pump Controller on and off via the LCD Keypad. Simply click on the grey circle in the ON/OFF bar to change the status between ON and OFF.

The CONTROL screen will work in both MANUAL and AUTO modes. In MANUAL mode this function acts as a simple switch. In AUTO mode, the CONTROL function will override the rules set up in the SOURCE and DESTINATION screens. If the Pump Controller is turned OFF whilst in AUTO mode, it will turn on again automatically once the ON/OFF rules in the SOURCE and DESTINATION screens are met.

MENU -> SETTINGS -> PUMP SETTINGS -> SOURCE

The SOURCE menu allows the user to choose the type of source for your pump, and controls when the pump will turn off in AUTO mode. The type of source can be a "TANK" connected to your system, or "NOT A TANK" (for example and infinite source such as a bore or a river).

If a TANK is chosen, the user will be prompted to select which tank should be the source with the tank selection matrix. Once selected a pump stop level is required to be set. This ensures that the source tank will not run dry, or pumping is stopped at a user desired level. To change the SOURCE level, touch the **+/-** buttons to set your customized value, and then touch "SET". Touch and hold down the **+/-** buttons for faster setting. The minimum SOURCE level that can be set is **10%** and the maximum SOURCE level is **100%**.

MENU -> SETTINGS -> PUMP SETTINGS -> DESTINATION

The DESTINATION menu allows the user to choose the destination for your pump, and controls when the pump will turn off in AUTO mode. The type of destination can be a "TANK" connected to your system, or NOT A TANK (for example and infinite destination such as a run-off)

MENU -> SETTINGS -> PUMP SETTINGS -> START

The START menu must be completed when in AUTO mode and when the destination is set to a TANK. Set the START level that the destination tank must reach before the pump will automatically turn on. When multiple tanks are connected to the system the tank selection matrix will appear, prompting the user to confirm the tank.

Once the SOURCE, DESTINATION and START rules are completed, and the pump is in AUTO mode, the Pump Controller will automatically switch on or off based on the rule set.

MENU -> SETTINGS -> PUMP SETTINGS -> NAME PUMP

The name of your pump is defaulted to "PUMP #" where the "#" is the number of the tank as per the numeric sequence that it was connected to the system.

Customised names can be allocated to the connected pumps via the "NAME PUMP" screen. A name of up to 11 characters can be used to name each pump. The "CAPS" button allows transition from upper case to lower case. The "SPACE" button allows a space to be entered into the pump name. Use the left and right arrows to scroll through the alphabet and numerals. Touch the letter or number to add it to the name of your pump. Use the "DELETE" icon to remove characters from your tank name.

Once your custom name is entered, touch "SET" to set the name of your pump.

MENU -> SETTINGS -> PUMP SETTINGS -> PUMP DIAGNOSTICS

The PUMP DIAGNOSTICS menu offers the user a full report of the rule set that has been applied via the SOURCE, DESTINATION and START settings. This page is useful to check and ensure that the rule set applied is as per the user requirements.

MENU -> SETTINGS -> PUMP SETTINGS -> REMOVE PUMP

REMOVE PUMP allows the user to remove a Pump Controller that has been connected to the system. If more than one Pump Controller is connected, the pump selection matrix will be displayed prompting the user to select the pump to be removed.

Once a Pump Controller is removed from the system, all automatic rule sets will be lost. If the Pump Controller is *re-connected* to the system in the future, rule sets will need to be re-entered manually.

MENU -> SETTINGS -> RESET -> FACTORY RESET

FACTORY RESET is a full reset of the system. All recorded historical data and connected devices will be erased. If this option is selected the system will need to be re-installed.

MENU -> SETTINGS -> RESET -> USAGE RESET

USAGE RESET will reset only the recorded historical data stored in the system memory. All connected devices will remain connected to the system. If this option is selected the system data will be lost, including level history, usage, and time to empty.

MENU -> SETTINGS -> SOUND

The SOUND menu provides the user the ability to turn on or off the beep associated with touchscreen activations and system alerts.

MENU -> SETTINGS -> ABOUT

The ABOUT menu displays company information and the software version number in use on the LCD Keypad.

MENU -> SETTINGS -> DISPLAY -> DIM LEVEL

The DIM LEVEL menu provides the user the ability to change the brightness of the TFT LCD Keypad. This can be useful in low light environments as the backlight used in the product is very bright.

Set the DIM LEVEL from a minimum value of **5**, up to a maximum value of **100** and then touch the SET button.

The display will return to maximum brightness and then dim after **1 minute** to the set level. If the user touches the screen again, the screen will return to maximum brightness, the timer will be reset, and the screen will dim again after **1 minute**.
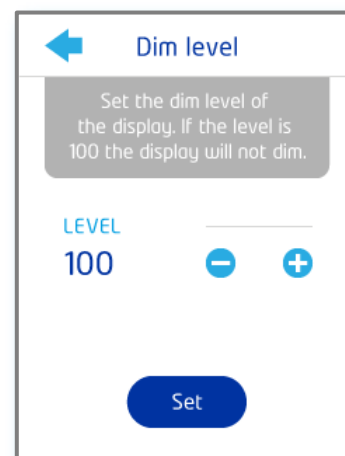
MENU -> SETTINGS -> DISPLAY -> TREND VECTOR

The TREND VECTOR displays whether the selected tank is filling or emptying based on a rising or falling arrow icon. This feature can be disabled if desired by setting **ON/OFF** in the TREND VECTOR menu.

MENU -> SETTINGS -> DISPLAY -> DAYS TO EMPTY

DAYS TO EMPTY is a feature designed to offer the user and approximate "range" left in the tank based on the average usage and tank level. Days to empty is calculated over time once usage data has been accumulated in the system database. This feature can be disabled by selecting **ON/OFF** in the DAYS TO EMPTY menu.

Disabling the DAYS TO EMPTY value on the main screen may be useful for tanks that are rapidly filled and discharged multiple times a day using high volume pumps. In these scenarios DAYS TO EMPTY may not provide an accurate representation of tank usage.

MENU -> SETTINGS -> DISPLAY -> FILTER ALERT

The FILTER ALERT can be disabled by selecting **ON/OFF** in the FILTER ALERT menu. The FILTER ALERT is a simple feature designed to provide the user an alert to change/check system filters based on a customized time setting.

MENU -> SETTINGS -> SET TIME

SET TIME allows the user to set the current time. The system includes real time clock hardware to ensure accurate time keeping. Setting the time is optional but can be useful in….

To set the time touch the **+/-** buttons to set the correct value for HOUR, MINUTES and SECONDS, and then touch "SET". Touch and hold down the **+/-** buttons for faster setting. The time mode is set based on a 24-hour clock format.
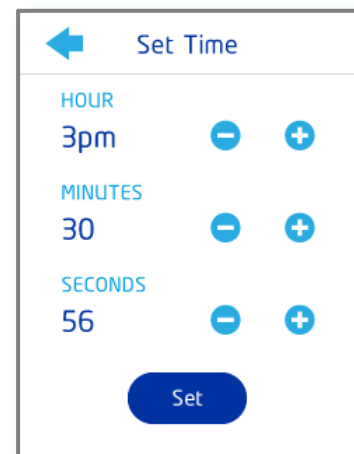
MENU -> SETTINGS -> CLEAN SCREEN

The CLEAN SCREEN menu provides the function to completely disable the LCD touchscreen from accepting touch inputs for **30 seconds**. This allows for the screen to be cleaned without any unwanted touch commands being entered.

Smart Water recommends using a mildly moist cloth, or dedicated LCD screen cleaner if cleaning is required. Harsh detergents may damage the LCD and void the warranty.

MENU -> DIAGNOSTICS

The DIAGNOSTICS screen shows system information on connected devices. Diagnostic information presented are raw data values and are generally only used for fault finding and by Smart Water technicians.

Touching the centre of the screen will allow the user to scroll through the different devices connected to the system.

SOLAR PANEL SET-UP GUIDE

Optimising Tank Sender Solar Panel Performance:

The angle that your Tank Sender is mounted to the tank is of particular importance. The following steps (**in order of importance**) will help ensure maximum charging performance:

1.) Ensure that the Tank Sender solar panel has as much access to sunlight as possible. Avoid shady areas.

2.) If you are in the **Southern Hemisphere**, position the Tank Sender so it is tilted to the **North**. If you are in the **Northern Hemisphere**, position the Tank Sender so it is tilted to the **South**.

3.) The map below shows the optimum tilt angle for all regions around the globe.
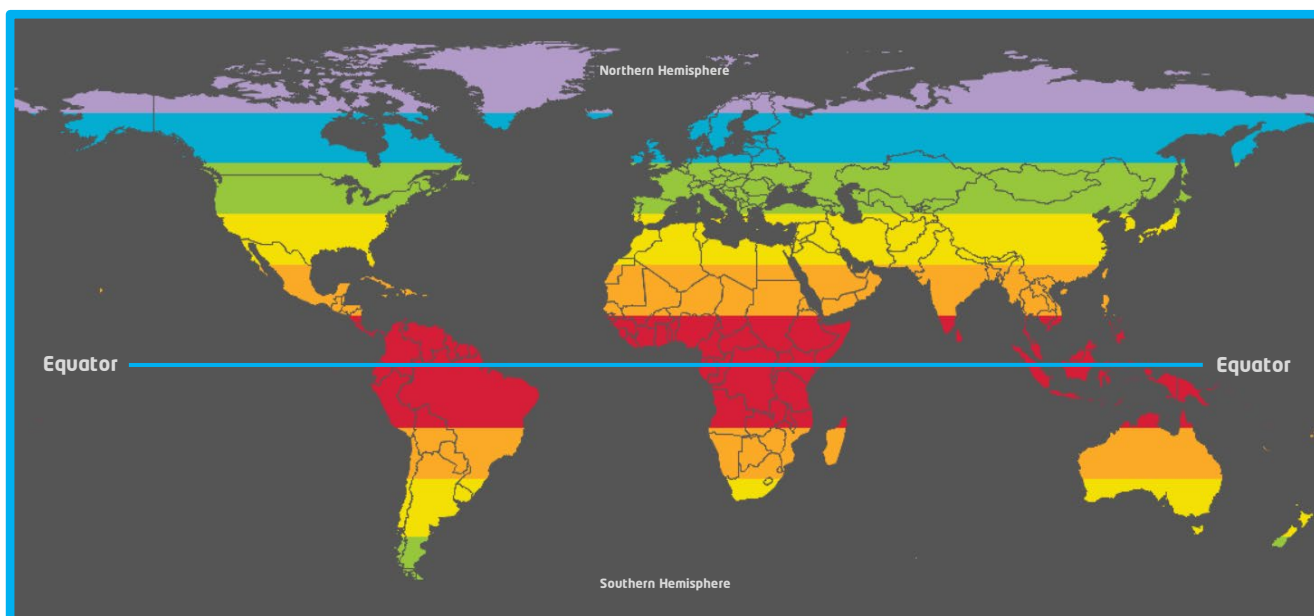
- 0°-13° Solar panel angle

- 13°-26° Solar panel angle

- 26°-37° Solar panel angle

- 37°-45° Solar panel angle

- 45°-55° Solar panel angle

- 55°-90° Solar panel angle

Examples: In Los Angeles, California, set the solar panel with an optimum angle of 26°-37° facing South
In Brisbane, Australia set the solar panel with an optimum angle of 13°-26° facing North

APPENDIX

Installation Notes:

- Ensure there are no obstacles (especially large metal buildings) between the LCD Keypad and the Tank Sender. This will assist with optimum wireless performance

- Hills, vegetation, and buildings preventing line of sight from the LCD Keypad to the Tank Sender may require the use of high power antenna or an Active Repeater

- Ensure that the Tank Sender is in direct sunlight (unless connected to an AC mains power source)

- Ensure that the Tank Sender venting grooves around the base are not blocked and water is not allowed to accumulate underneath

- The water sensor should be free of water and not submerged when initially connected to the system. If a Tank Sender needs to be *re-connected* to the system, the sensor needs to be removed from the tank and free of any water to proceed

- Position the sensor on the bottom of the tank away from the water outlet pipe position

- For optimum wireless performance of the <u>wall mount</u> LCD Keypad position the dipole antenna away from the circuit board, away from the power transformer and any AC mains wiring. Positioning the antenna vertically will also assist reception performance. Alternatively, consider utilising an external mount antenna to connect your wall mount LCD Keypad

- Smart Water strongly recommends the <u>wall mount</u> LCD Keypad should be installed by a qualified/certified electrician

- When installing the wall mount LCD Keypad do not over-tighten the two screws that hold the plastic chassis to the wall or flush box. Over tightening these screws could cause the touchscreen to function incorrectly

- If the Pump Controller is mounted in a pump shed or closed/sealed structure, the use of an external antenna is recommended

- If the sensor cable is required to exit beneath the Tank Sender at 90 degrees (directly underneath the product), manually bend/shape the cable **prior** to connecting the sensor cable to the Tank Sender. If the cable is bent/shaped once connected to the Tank Sender, the waterproof connector can be damaged

- Take care when plugging in the sensor connector to the Tank Sender. The sensor connector has a locating slot that must be aligned with the Tank Sender connector. Excess force SHOULD NOT be used to force this connection

APPENDIX

Operational Notes:

- Increased Tank Sender communication rates can be activated by <u>momentarily</u> pressing the Tank Sender CONNECT button. This feature is helpful when wanting increased Tank Sender communications when optimising signal strength with the use of high power antenna. Tank Sender communications will be increased for a period of 30 minutes before reverting to normal operation. Tank Sender communication reports are increased to a frequency of every 10 seconds and are indicated by a BLUE/WHITE status LED indication

- If a RED flashing light is noted on the Tank Sender, record the number of red flashes (1 through to 5), and contact Smart Water. This is an error code issued by the Tank Sender that will require Refer to the last page of this user manual for contact details

- Ensure that the sensor once lowered into tank is resting at the bottom of the tank, away from the main water outflow point

- The Tank Sender can be powered down/turned off by unplugging the sensor cable

- If the Tank Sender is installed in an elevated, exposed location there will be an increased risk of a lightning strike. Smart Water recommends installing a lightning rod near the Tank Sender which stands taller than any antenna

- If a Pump Controller status of **"Auto start blocked"** is displayed, then the pump has been commanded to stop while the destination tank level is below the pump automatic start level and/or the runtime has expired. This is a safety feature to avoid the pump starting again after it has been commanded to stop, or in a situation where the destination tank is not filling as commanded. To cancel this safety feature, start the pump manually through the menu screen (**PUMP -> CONTROL)**. Once the pump is started manually the **"Auto start blocked"** status is cleared automatically. The **"Auto start blocked"** feature is also cleared automatically if the destination tank level reaches the automatic start level set

- For further detailed information on Pump Controller operation please refer to our advanced user "Pump Controller Installation Guide" in this manual, on page **36**.

APPENDIX

Tank Sender LED Status Codes:

- Booting up sequence   Flashing **GREEN** until boot up is complete, then as below

- Failed boot-up

3 x **RED** flashes	Serial number fault
4 x **RED** flashes	RF module fault

- Successful binding (Pressure)   **BLUE** (for 2 seconds), then **WHITE, WHITE**

- Successful binding (Flow)   **WHITE** (for 2 seconds), then **BLUE, BLUE**

- Failed binding

5 x **RED** flashes	Sensor out of offset range
6 x **RED** flashes	Unknown sensor

- Boot loader waiting   **PURPLE**… on continuously

- Boot loader updating   **PURPLE**… continuously flashing until app update complete

- Receive signal   **BLUE**

- Transmit signal   **WHITE**

- Battery charging (DC)   **GREEN** flashing (only when DC jack is powered, no response when solar charging only)

- Battery full   **GREEN** constantly on (only when DC jack plugged in to a powered mains source)

- Battery low   **ORANGE** flashing when battery level drops below 3.5V

- Battery warning   **RED** flashing when battery level drops below 3.3V

Active Repeater LED Status Codes:

- Successful Boot-Up
  (Status LED)

  BLUE (for 3 seconds), then **WHITE, WHITE**

- Failed Boot-Up
  (Status LED)

  3 x **RED** flashes   Serial number fault
  4 x **RED** flashes   RF module fault

- Receive signal
  (Status LED)

  BLUE

- Transmit signal
  (Status LED)

  WHITE

- Switch turned "ON"
  (Power LED)

  GREEN flashing, 0.5 seconds on, once every 3 seconds

- Switch turned "OFF"
  (Power LED)

  Two **RED** flashes

- Battery charging
  (Power LED)

  GREEN flashing (when battery requires charge and DC jack is connected... the LED does not flash when solar charging

- Battery full
  (Power LED)

  GREEN constantly on (when powered by battery, or when DC jack plugged in and battery is full

- Battery low
  (Power LED)

  ORANGE flashing when battery level drops below 7.0V

- Battery warning
  (Power LED)

  RED flashing when battery level drops below 6.5V

Pump Controller LED Status Codes:

- Successful Boot-Up

  RED, **GREEN**, **GREEN**, **RED**

- Failed Boot-Up

  3 x **RED** flashes   Serial number fault
  4 x **RED** flashes   RF module fault

- Binding confirmation

  RED, **RED**, **GREEN**, **GREEN**

smart water

- Transmit signal   **RED**

- Pump ON   **GREEN** constantly on, flashes once if OFF is pressed

- Pump OFF   **RED** constantly on, flashes once if ON is pressed

WiFi LCD Keypad LED Status Codes:

- Successful Boot-Up   **ORANGE** continuously flashing (STATUS LED)
  (not blinked up)

- Successful Boot-Up   **GREEN** continuously flashing (STATUS LED)
  (blinked up)

- WiFi LED   **BLUE** constantly on once successfully connected to the internet

WiFi Gateway LED Status Codes:

- Status LED   Successful Boot-Up, **ORANGE** continuously flashing
  (not blinked up)

- Status LED   Successful Blink-Up **GREEN** continuously on
  (blinked up)

- Status LED   Normal operation, **GREEN** continuously flashing

- WiFi LED   **BLUE** constantly on once successfully connected to WiFi/internet

- WiFi LED/Status LED   **BLUE** WiFi LED constantly on, **RED** Status LED flashing, lost internet
  connection

- Data LED   **YELLOW** flashing as per data input/output via RS485

- Ethernet LED   **ORANGE** flashing as per data input/output via Ethernet

- LoRa LED   **WHITE** (for 3 seconds), then **WHITE, WHITE**
  (Binding confirmation)

- LoRa LED   **WHITE, WHITE (two x 0.5s flashes)**
  (Receive/transmit signal)

BlinkUp LED Status Codes:

Pre-BlinkUp and BlinkUp Patterns

No network settings or enrollment credentials	500ms	500ms	Repeat	
imp005 waiting for Ethernet	500ms	500ms	250ms 250ms	Repeat
BlinkUp Successful	For three seconds			

WiFi-only Connection Patterns

WPS in progress (press WPS button on router)	500ms	250ms 250ms 250ms	Repeat	
Searching for WiFi network	500ms	500ms	500ms	250ms 250ms 250ms Repeat
Joining WiFi network	500ms	500ms	500ms	250ms 250ms 250ms 250ms 250ms Repeat

WiFi and Ethernet Connection Patterns

Getting IP address	500ms	250ms 250ms	Repeat	
Resolving server name	500ms	250ms 250ms	Repeat	
Connecting to server	500ms	500ms	500ms	250ms Repeat
Connected to server	500ms	500ms	Repeat	
Proxy address or port incorrect	500ms	500ms	250ms 250ms 250ms 250ms	Repeat
Proxy credentials rejected	500ms	500ms	250ms 250ms 250ms 250ms 250ms	Repeat

Generic Connection Patterns

Device lost connection	500ms	500ms	Repeat	
Device deliberately offline	500ms	250ms 250ms 250ms	Repeat	
Updating impOS™	Continuous for duration of update			
Normal operation	LED not illuminated			

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WARRANTY

Smart Water provides a full **TWO-YEAR** workmanship warranty on its products. The Smart Water replacement warranty is void if the product has been tampered with, opened or damaged outside the range of normal use (including acts of God).

Full details of the warranty are available on the Smart Water website: www.smartwateronline.com

PRIVACY POLICY

Introduction

Ivent Solutions Limited built the Smart Water app as a free and paid subscription app. This Privacy Policy is used to inform customers regarding our policies with the collection, use, and disclosure of personal information if anyone decided to use our app. If you choose to use our app, then you agree to the collection and use of information in relation to this policy. The personal information that we collect is used for providing and improving the app. We will not use or share your information with anyone except as described in this Privacy Policy. The terms used in this Privacy Policy have the same meanings as in our Terms and Conditions, which is accessible at Smart Water unless otherwise defined in this Privacy Policy.

Information Collection and Use

For a better experience, while using our app, we may require you to provide us with certain personally identifiable information. The information that we request will be retained by us and used as described in this privacy policy. The app does not use third party services that may collect information used to identify you.

Log Data

We want to inform you that whenever you use our app, in a case of an error in the app we collect data and information (through third party products) on your phone called Log Data. This Log Data may include information such as your device Internet Protocol ("IP") address, device name, operating system version, the configuration of the app when utilizing our Service, the time and date of your use of the Service, and other statistics.

Cookies

Cookies are files with a small amount of data that are commonly used as anonymous unique identifiers. These are sent to your browser from the websites that you visit and are stored on your device's internal memory. This app does not use these "cookies" explicitly. However, the app may use third party code and libraries that use "cookies" to collect information and improve their services. You have the option to either accept or refuse these cookies and know when a cookie is being sent to your device. If you choose to refuse our cookies, you may not be able to use some portions of this app.

Service Providers

We may employ third-party companies and individuals due to the following reasons:

• To facilitate our app;

• To provide services on our behalf;

• To perform app-related services; or

• To assist us in analysing how our app is used.

We want to inform users of this app that these third parties have access to your personal information. The reason is to perform the tasks assigned to them on our behalf. However, they are obligated not to disclose or use the information for any other purpose.

Security

We value your trust in providing us your personal information, thus we are striving to use commercially acceptable means of protecting it. But remember that no method of transmission over the internet, or method of electronic storage is 100% secure and reliable, and we cannot guarantee its absolute security.

FREQUENTLY ASKED QUESTIONS

- **What is the maximum wireless range of the Smart Water system?**
    - ✓ *5-10km "line of sight" is the standard range however ranges of 15km to 20km have been successfully tested in good line of sight installations. Additionally, our range of higher power antenna can also improve range and assist if the installation is hampered by obstacles. Our high power Wireless Active Repeater can further enhance and extend the range of your system.*

- **Can Smart Water monitor more than one tank?**
    - ✓ *Yes. Up to **TWELVE** separate tanks can be monitored from one LCD Keypad, WiFi Gateway or app. Each tank will need a separate Tank Sender installed unless your tanks are interconnected. For example, if two tanks are interconnected and the level rises and falls in parallel, then only one Tank Sender is required.*

- **Can my Smart Water system control my pump?**
    - ✓ *Yes. The product range includes a fully automatic "plug and play" Wireless Pump Controller. Your system comes with the pump control software already installed. Simply purchase the Pump Controller, connect it into your system and you will have full control of your water pump via the LCD Keypad or the mobile app. Up to **TWELVE** Pump Controllers can be added to a single Smart Water system.*

- **What is the maximum tank depth the system will work with?**
    - ✓ *5.0M (16ft) is the maximum depth the system will measure. However, custom depth systems are available on request. Please contact Smart Water for more information.*

- **Do I need to change the batteries in the Tank Sender?**
    - ✓ *No. The battery is continuously recharged by the integrated solar panel. The Tank Sender will continue to operate for up to 3 months without any direct sunlight.*

- **Is the legacy SW800 system compatible with the new generation SW900 system?**
    - ✓ *Unfortunately, it is not. There were limitations in the engineering of the SW800 that meant we needed to develop a fresh new advanced communications protocol and software suite. The SW900 is vastly superior to the SW800, however it did mean that the two systems were deemed incompatible.*

- **Will the battery in the Tank Sender run flat if it is cloudy?**
    - ✓ *No. The battery will recharge at a slower rate in cloudy conditions, but it should not run flat. Exposure to direct sunlight is of course recommended for maximum charging performance.*

- **Does the system work with underground tanks?**
    - ✓ *Yes. The Smart Water system will work with all types of tanks both freestanding and underground. The solar powered Tank Sender will need to be connected to the power pack to provide charging if there is zero access to sunlight (for the solar panel).*

- **How long does Smart Water take to learn my water usage?**
    - ✓ *Smart Water will start calculating and learning your water usage and trends from the moment it is installed. The longer the system is running the more intuitive, accurate and "smart" the system will become.*

After a couple of weeks system performance will be very good and provide accurate indications of days to empty and average usage. This will also provide for system generated warnings such as "Low Days Remaining" and "Abnormal Usage".

● **When will Smart Water detect a water leak in my system?**

  ✓ *Smart Water will provide you an alert for abnormal usage (potential leaks) after approximately 3-4 hours. This alert will also be generated on the iOS and Android app (notification settings can be controlled via the app).*

● **Can I install the Smart Water system myself?**

  ✓ *Absolutely! The Smart Water system has been designed as a true DIY product. It is very easy to install and no technical skills are required. We do however recommend that the Wall Mount WiFi LCD Keypad should be installed by a qualified electrician as this is connected directly to mains power.*

● **What is the "Blink Up" process?**

  ✓ *The blink up process is how you get the Smart Water system online. It is an ingenious way of transferring your WiFi network details into the LCD Keypad or WiFi Gateway. Blinking up is very intuitive and there are simple steps to follow on the app to guide you through the process.*

● **Do I need to charge the battery in the Tank Sender?**

  ✓ *No, the Tank Sender is completely sealed. There is a high-power Lithium-ion battery powering the product and it is continuously recharged by the integrated solar panel. The product is designed to solar charge even in very low light conditions and has extremely efficient energy usage, so even a small amount of sunlight should provide sufficient charging. The Tank Sender will operate for up to 3-6 months without any direct sunlight. However, if your tank has no access to sunlight (ie under a building), then you can simply recharge the Tank Sender from time to time using the provided power pack, or alternatively leave it permanently plugged in. For peace of mind our software will alert the user via the LCD Keypad (also via the app) if battery levels are detected to be low in any Tank Sender's connected to the system.*

● **Will the Wall Mount LCD Keypad fit into a standard electrical flush box?**

  ✓ *The Wall Mount WiFi LCD Keypad is designed to mount easily into any standard Clipsal or PDL style electrical flush box. Mounting accessories are provided with the LCD Keypad installation kit. Alternatively, a 50mm hole can be made in the wall and the LCD Keypad can be mounted directly onto the wall surface.*

● **Will reception be reduced if obstructions are between the Tank Sender and the LCD Keypad?**

  ✓ *Any wireless system will have range/reception reduced by obstacles. This is like the poor reception of radio stations experienced in valleys and mountainous areas. Smart Water recommends minimising obstructions in the direct path of the wireless signal. If required, wireless performance can be enhanced by use of the Smart Water range of high- power antenna and/or the Wireless Active Repeater.*

● **What happens if there is a power cut or the power to the LCD Keypad or WiFi Gateway is interrupted?**

  ✓ *Nothing. Rest easy! Once power has been restored the LCD Keypad or WiFi Gateway will automatically regain communications with your Tank Senders and Pump Controllers. Current and historical data will be restored to the screen and normal operations will resume.*

- **Does the Tank Sender need to be installed horizontally on the tank?**
  - ✓ *The position of the Tank Sender on the tank is not critical. For optimum solar charging performance, position the Tank Sender in direct sunlight and ideally facing North in Southern Hemisphere, and South in the Northern Hemisphere.*

- **I have two tanks, but they are interconnected. Do I need two Tank Senders?**
  - ✓ *No. If any tanks are interconnected then you will only need one Tank Sender on one of the tanks. The fluid level in interconnected tanks rises and falls proportionately and as Smart Water works on a proportionate level basis, the system will work correctly.*

- **Does the Tank Sender have to be solar powered? What if my tank has no direct sunlight?**
  - ✓ *No, the Tank Sender can be constantly powered by AC mains if required. This is particularly useful for customers with underground tanks, or tanks with little or no exposure to direct sunlight. The Tank Sender is supplied as standard with a 12VDC power pack for this purpose.*

- **Can I measure different liquids other than water with the Smart Water system?**
  - ✓ *Yes. Smart Water allows for different liquids to be measured. For example, Urea and Molasses can be measured simply by setting the Specific Gravity (SG) of the fluid being measured through the settings menu.*

- **I have very challenging terrain around my tanks, will Smart Water still operate?**
  - ✓ *The system does feature very powerful LoRa wireless performance which enables reliable operation in most applications. If there are significant terrain or obstacle issues affecting reception these can normally be resolved with the use of higher power antenna and/or the Wireless Active Repeater.*

- **Should I "hang" the sensor in the tank, so it is just touching the bottom?**
  - ✓ *No. The sensor should be carefully lowered to the bottom of the tank (ideally away from any outflow plumbing) and then any excess cable can also be fed into the tank. If the sensor is on the bottom of the tank it will operate correctly.*

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