User Manual for:

TMT001 / TMP001 / TMP001-S

Revision: V2.00 Last Edited 30 May 2025

Before Attempting to connect or operate this product, please read these instructions in its entirety.

Changelog:

CH – May 2025 – Updates w.r.t Antenna and DC version
CDH – October 2024 – Fixed how to clear pairings, updated mounting instructions
CDH - September 2024 – Major revision of content, RemoteFloat name change
JPF - March 2024 – Update from V3 to V4 spec
JPF - Dec 2023 – Initial release of TankMate

Table of Contents

1. Specifications – PumpStation TMP001 / TMP001-S

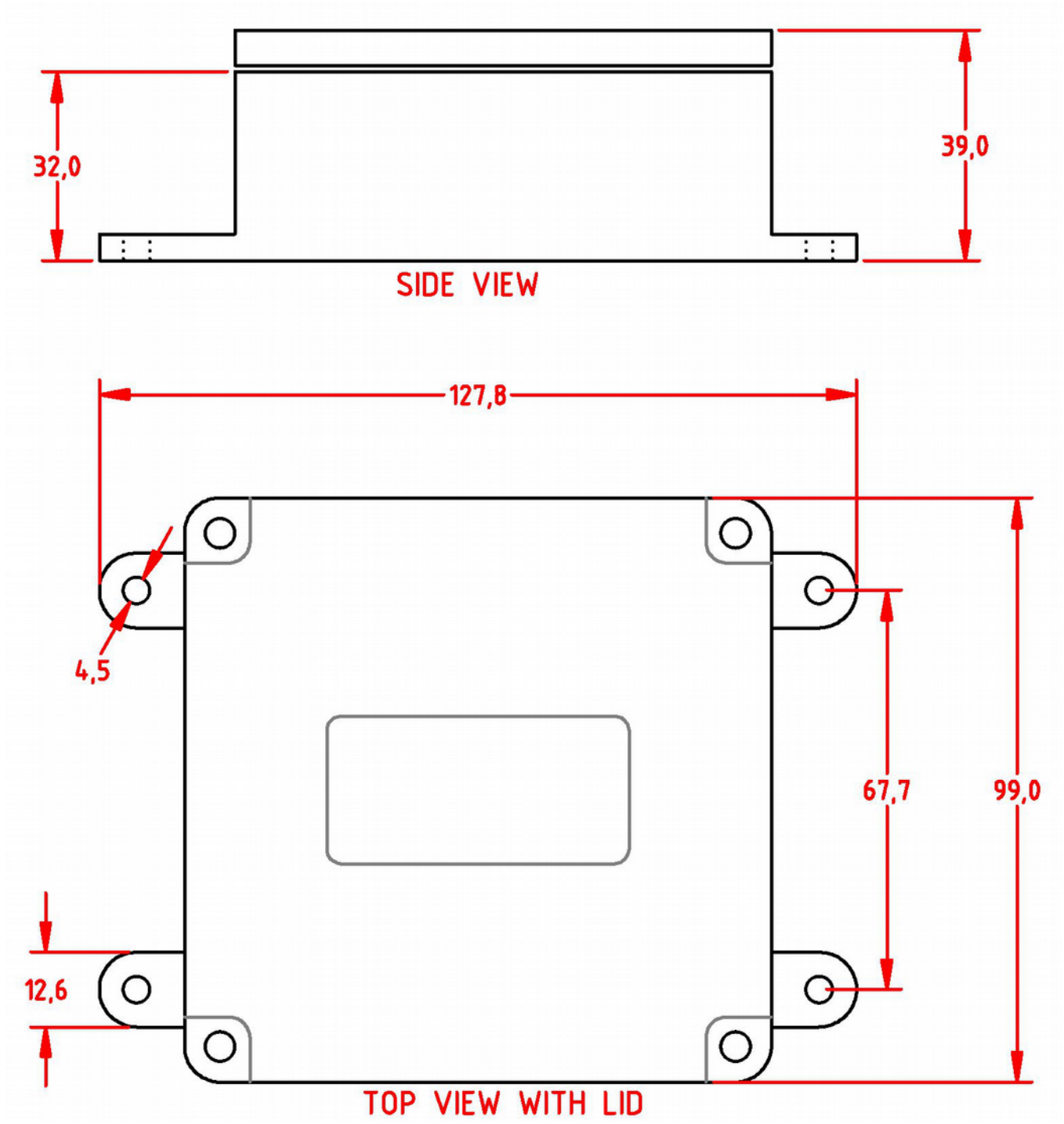
Model Number	TMP001 / TMP001-S
Weight	250 grams
Dimensions	128 x 99 x 39 mm (including tabs)
Power Supply	100-240VAC (TMP001) or 5VDC (TMP001-S)
Power Consumption	< 5W
Operating Temperature	-10°C to +60°C
Relay Output	1 x N/O Relay Contact rating: 30Amp
Wireless Frequency	434MHz Spread Spectrum
Wireless Transmission Power	15dBm
Wireless Range	15km+ (Line-Of-Sight)
Alarm output (Battery low or error)	Open Collector (on 3.5mm screw terminal)

2. Specifications – TankStation TMT001

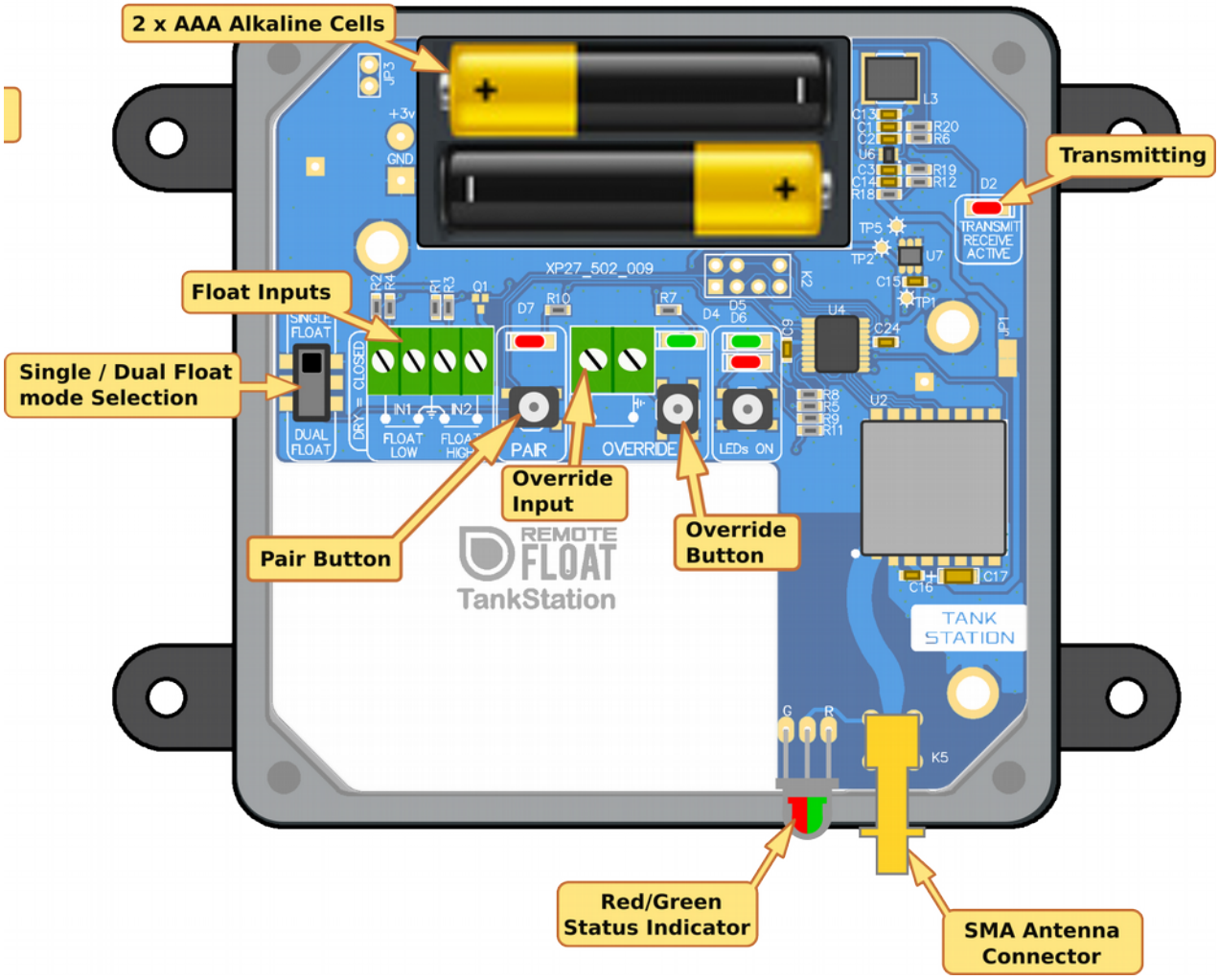
Model Number	TMT001
Weight	200 grams
Dimensions	128 x 99 x 39 mm (including tabs)
Power Supply	2 x AAA Alkaline cells
Battery Life	+- 12 months
Operating Temperature	-10°C to +60°C
Float Input Type	1-2 Dry Contacts from float switch
Override Input Type	1 x Dry Contact
Wireless Frequency	434MHz Spread Spectrum
Wireless Transmission Power	15dBm
Wireless Range	15km+ (Line-Of-Sight)

3. Dimensions

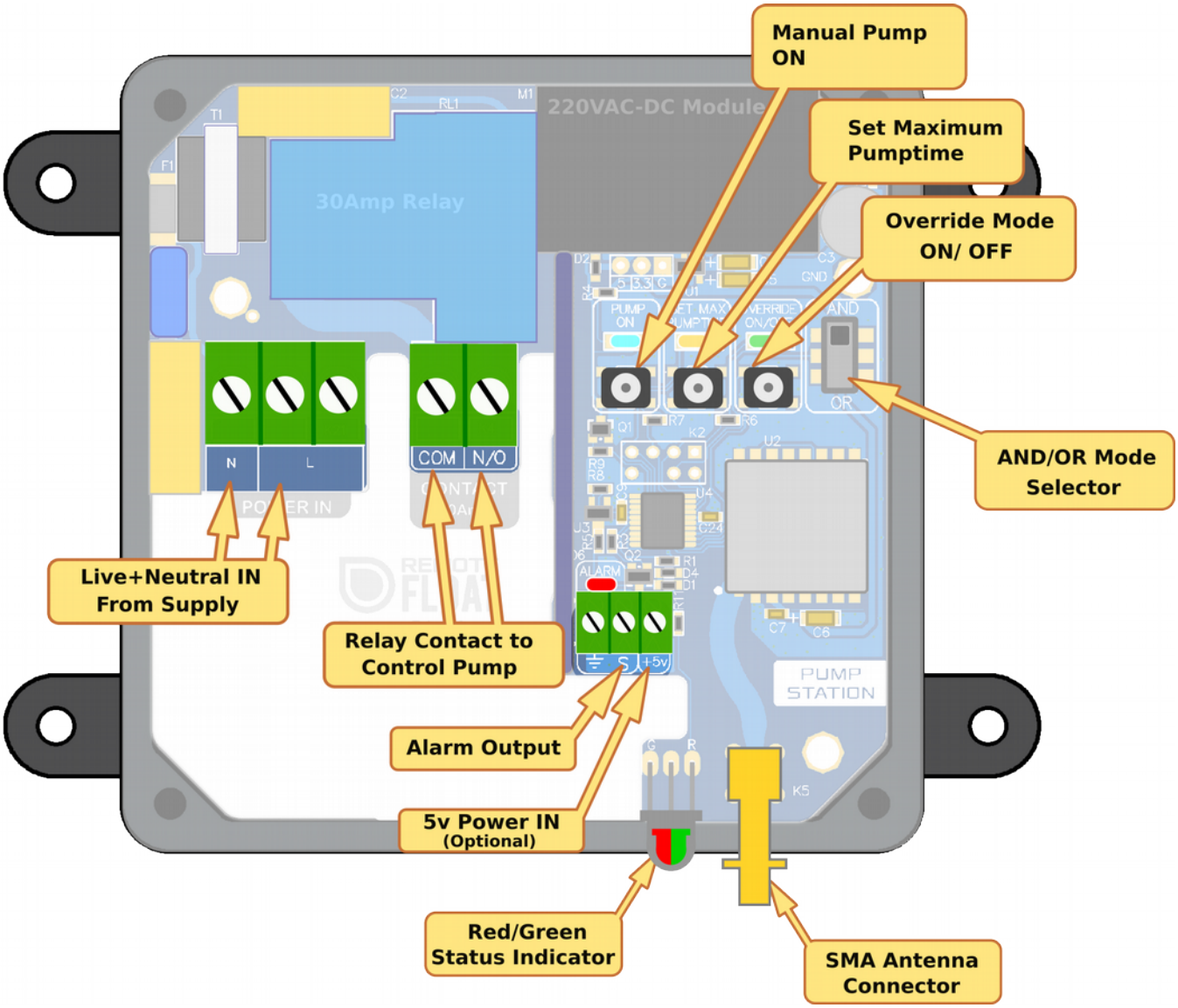
These dimensions apply to both the TankStation and PumpStation. They use the same enclosure.



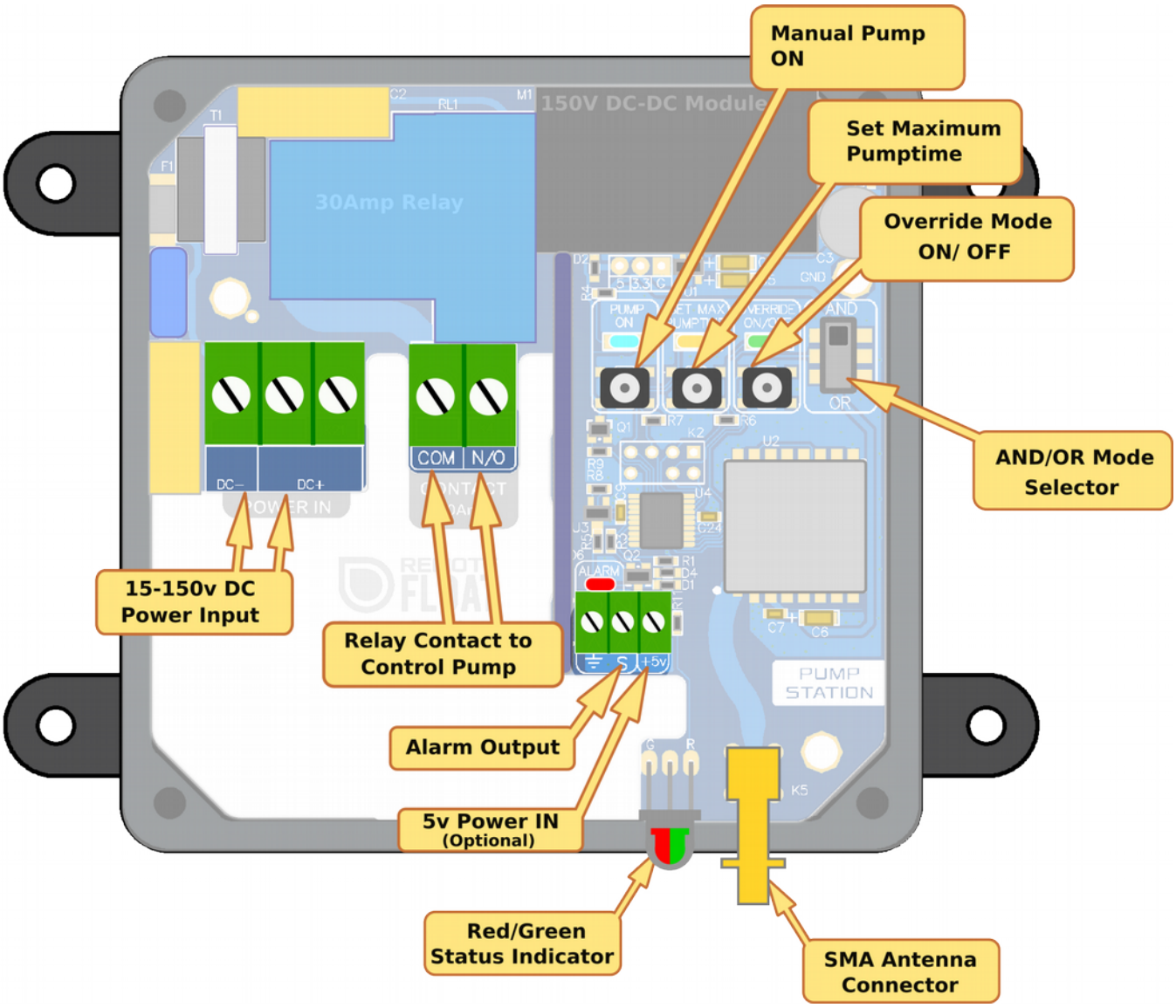
4. TMT001 - TankStation Internal View



5. TMP-001 PumpStation Internal View



6. TMP-001S PumpStation Internal View



7. Wireless Transmissions Explained

7.1. LoRa Technology

RemoteFloat uses LoRa modulation technology at 433MHz. This technology is what allows the massive wireless range. Please note that RemoteFloat does not implement the so-called "LoraWan" specification, but instead a networking protocol known as "PolyWan".

LoRa, being a spread-spectrum technology, prevents multi-path fading, and allows the signal to sometimes reach its destination by bouncing against far-off features, and often provides reliable communication even in cases where clear line of sight is not possible.

7.2. RemoteFloat Transmissions

RemoteFloat transmissions are between paired stations only. This allows multiple RemoteFloat systems to operate in the same vicinity without any issues. It also allows multiple RemoteFloat systems to communicate via the same repeater without any issues.

Each transmission from a paired TankStation is acknowledged by the PumpStation. This way we can be sure the message will always come through. The very first message is always sent at minimum transmit power. If no acknowledgment is received, the transmission is repeated up to 7 times, each time at a higher power level. During transmissions, the Transmit/Receive Active LED on the TankStation will turn on. Once a message is acknowledged, the TankStation will take note of the power level that was successful and will use that in future transmissions.

On power-up, the TankStation will look at its float levels and within 5 seconds will send an introductory message to the paired PumpStation. On acknowledgment of this message, the system will start operating normally.

On a regular basis (every 30 minutes) the TankStation will send a status update to the PumpStation, and expect a response back. If the TankStation fails to reach the PumpStation, it will enter "NO COMMS" mode and retry every 30 minutes. Likewise, if the PumpStation does not hear anything from the TankStation within an hour, it will also indicate an error condition.

7.3. RemoteFloat Antennas

RemoteFloat Devices (both TankStations and PumpStations) are equipped with a built-in SMA connector that is also sealed.

Here is where a suitable antenna must be connected in order for the system to work. RemoteFloat kits are typically supplied with standard antennas, but you can also opt for something more advanced.

Standard Antenna

The Standard antenna can be one of several types, it will typically be one of the following styles, depending on availability:

These antennas screw directly onto the SMA connector of the RemoteFloat unit. When you use one of these antennas, make sure to mount your RemoteFloat device outside of any metal panels, and preferably outdoors. This allows the antenna to give the best performance.

Pro tip: To get the best possible range, try and keep anything and everything away from the antenna, at least 10-20cm. The ideal is for the antenna to sit free and clear of anything else.

Standard antennas are good if your installation does not require extreme range, and if the two stations are within excellent line of sight of each other. A good rule of thumb would be 3km (line-of-sight). That being said, RemoteFloats have been tested to be operational using these simple antennas over distances as far as 30km!

NB: Do NOT install your RemoteFloat inside a metal cabinet with one of these antennas!

High Performance Rugged Antenna (GAO433)

These antennas are supplied with an integral stainless steel mounting bracket and also a 2m coaxial cable to connect the SMA connector on the RemoteFloat to the SMA connector on the bottom of the antenna. For best results, the antenna should be mounted outdoors, as high as possible.

At the bottom of the antenna is a round PVC 50mm fitting, where standard 50mm PVC waste pipe can be slotted in, in order to provide protection for the coaxial cable in environments where baboons are a concern.

This antenna should be used if your installation falls into any of these categories:

* High reliability. If you cannot afford for anything to go wrong, a better antenna is a solid idea.

* Long Range. If you need more than 3km of wireless range.

* Obscured path. If you are unable to get a good line-of-sight, these antennas can make all the difference.

8. TankStation Installation

8.1. Mounting

The TankStation must be mounted against a vertical surface with the compression gland, antenna connector, and LED facing down, to prevent water ingress. The device is weatherproof, but will look nicer for longer if protected from direct sunlight and rain.

8.2. Pairing

Each TankStation has a unique ID internal to the device that cannot be changed. The PumpStation will record and save the IDs of specific TankStation/s that are paired with it. Up to 10 different TankStations can be paired with a single PumpStation. Messages from any TankStations that have not been paired will be ignored by the PumpStation. When supplied together as a kit, the PumpStation arrives pre-paired with the supplied TankStation. This is indicated by the presence of a FP (Factory Paired) sticker within the devices.

How to pair

1. Apply 220Vac to your PumpStation, (Live & Neutral) to the Live IN and Neutral terminal (found on the left hand side of the 4 way green connector) on the PumpStation.

2. Power up your TankStation by inserting 2 x AAA batteries (provided).

3. Press the Pair button on the TankStation.

4. The Pair and Transmit LED will illuminate together for +-1 second as it sends the pair request to the PumpStation.

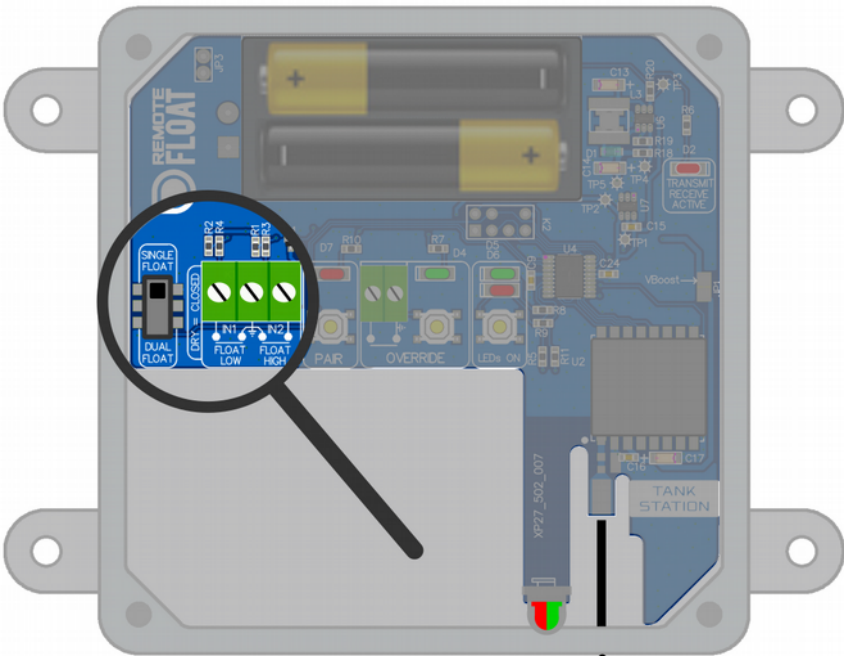
5. If the Pair was successful you will see the Pair LED rapidly flash for 3 seconds, this indicates that the PumpStation has seen the Pair request and saved the TankStations ID to its memory.

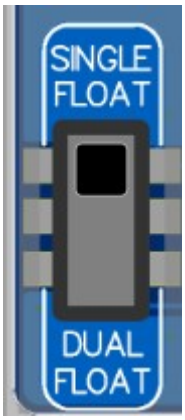
It is important to note that once you have applied power to the PumpStation you will have 2 minutes to commence your Pair from your TankStation, after 2min the PumpStation no longer accepts pair requests from any TankStation.

8.3. Clear all pairings

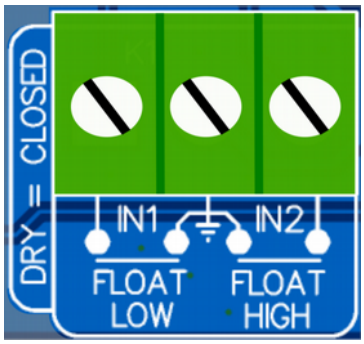
In order to clear all pair information from a PumpStation, simply press and hold down the Override button, the LED above the button will flash 5 times slowly, after the 5th flash, the LED will flash rapidly which indicates the clearing of the memory was successful.

8.4. Single Float & Dual Float Inputs





You can use this switch to select whether you will have a single or dual float setup. A dual float setup allows large swings in tank levels (the pump only switches on when the tank gets empty), while a single float setup will generally be used to keep the tank topped up at all times.

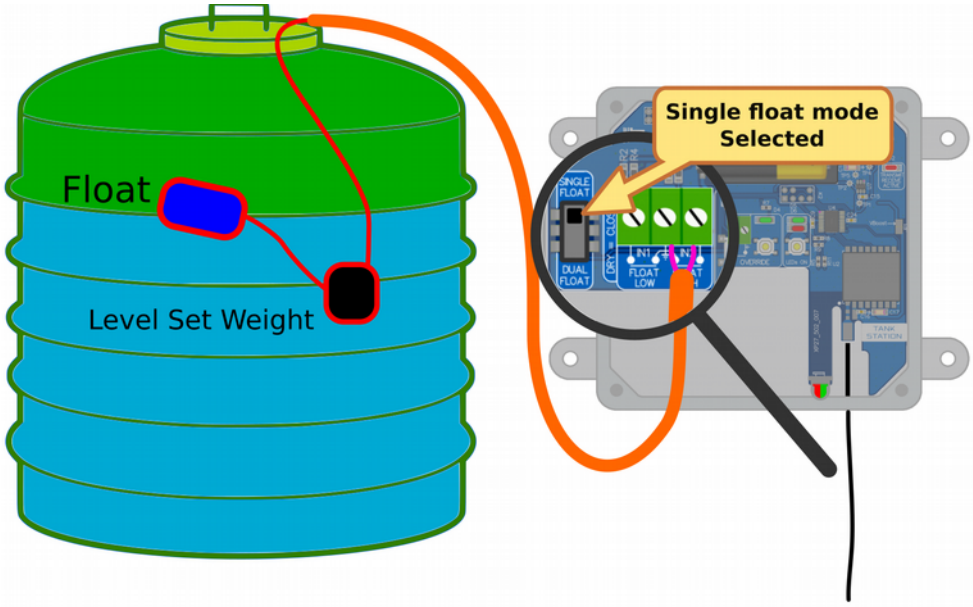


The TankStation will sample the float inputs once per second. Any change in float inputs needs to remain consistent for longer than 10 seconds before it will react.

In all cases, the TankStation expects the float to be closed-circuit when the float is dry (tank empty), and open-circuit when the float is wet (tank full).

Single Float Operation

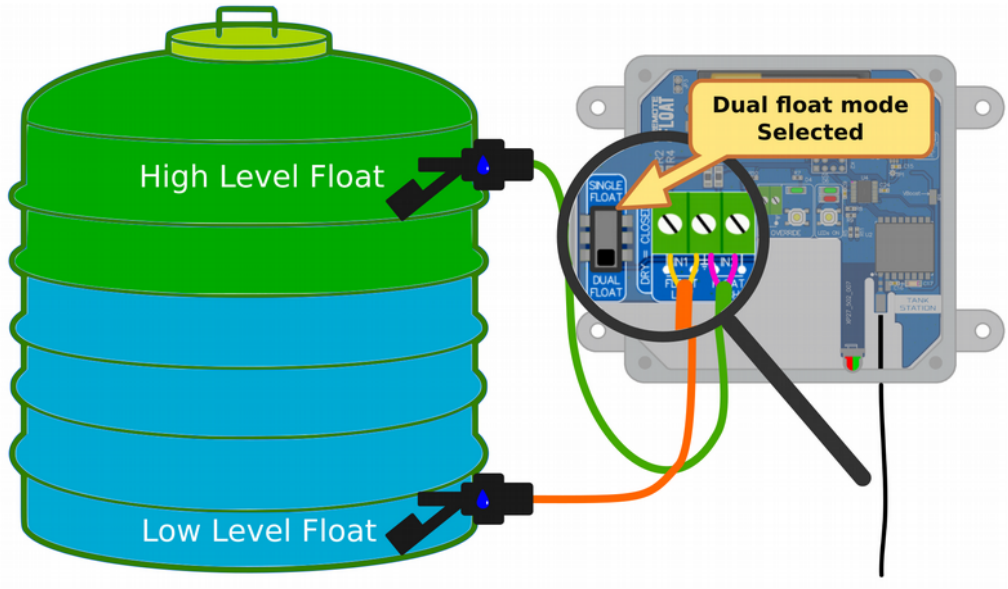
If single float mode is selected then you can wire your float switch to either "IN1" or "IN2". When the float switch is consistently in the closed position, the Tankstation will transmit a message to the PumpStation to start pumping. When the float switch goes open consistently, the TankStation will transmit a message to the PumpStation to stop pumping.



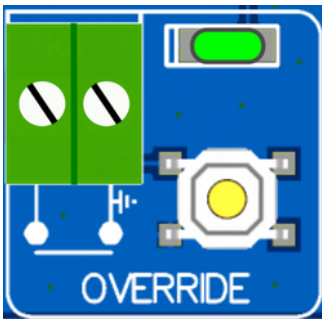
Dual Float Operation

In this mode the TankStation expects two float switches to be connected to "IN1" and "IN2". "IN1" will be connected to the bottom (low level) float switch. "IN2" will be connected to the top (high level) float switch. When both float switches (consistently) report as dry (closed position), the Tankstation will transmit a message to the PumpStation to start pumping. When both float switches goes open (consistently), the TankStation will transmit a message to the PumpStation to stop pumping.

In the event where the bottom float switch reports dry, while the top float switch reports as wet, the system will enter an ERROR state. (The tank cannot be both completely empty and completely full at the same time)



8.5. Override Input & Button



The TankStation has an override button and input. The input is activated when the two terminals are connected to each other. The button is physically wired across this input, so that pressing the button has exactly the same effect as connecting a wire across the two terminals.

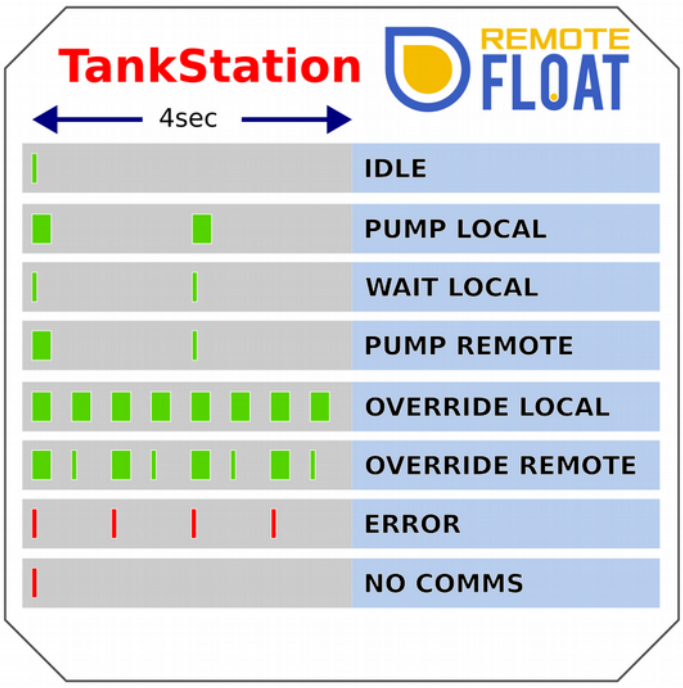
The override is a function that (when activated) will instruct the remote PumpStation to start pumping, regardless of any other conditions.

The override feature is provided so that an external system can request the pump to start when needed, and thus override the float switches. This feature comes in very handy while testing an installation. One seldom has easy access to the installed float switches, so this is a great way to get the system working.

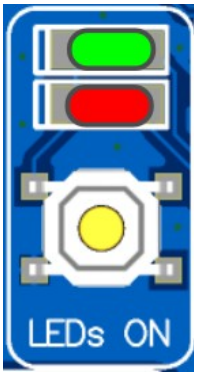
The override input is normally open. When the two terminals of the input are momentarily (<2 seconds) connected to each other (closed), the TankStation will transmit an override message to the PumpStation, which will cause the PumpStation to enter override mode (causing the pump to switch on). If the input is momentarily closed again, the same process will cause override mode to be cancelled. If the input remains closed for longer than 5 seconds, then override mode will be immediately disabled when the input eventually opens. This provides a built-in auto-selection between a latched and non-latched mode.

8.6. Status LED Flash Codes

The externally visible dual-colour LED is there to provide status information from outside. The following table is used to decode the flash code. The same table is also provided inside the lid of your TankStation.



Internal Status LEDs



Sometimes the Tankstation is mounted such that it is difficult to see the external LED at the bottom of the device. Think of the case where you are on a ladder in the full sun. To then have to cup your hands under the device to try and see what the LED is doing, is not exactly fun. This is why we have another set of leds (green and red) inside the device, specifically to make life easier for the installer. There is a button next to the two LEDs. Press it, and the same LED Flash code that we normally see on the external LED is also visible here, except it is much easier to see.

8.7. Battery Life

Battery life depends on how often a transmission is sent. Typically a dual float setup will communicate less frequently than a single float setup, and thus the batteries will tend to last a bit longer.. You can expect your TankStation batteries to last 1-2 years under normal operation. Each transmission from the TankStation includes its current battery state. The PumpStation will pulse it's alarm output if the battery starts to run low. If the battery drops below critical levels, the TankStation will notify the PumpStation of a critical problem, and will shut itself down. The PumpStation will keep its alarm output active in this case until a new battery is installed in the TankStation and the PumpStation receives the new transmission from the Tank.

9. PumpStation Installation

9.1. Mounting

The PumpStation must be mounted against a vertical surface with the compression gland, antenna connector, and LED facing down, to prevent water ingress. The device is weatherproof, but will look nicer for longer if protected from direct sunlight and rain.

9.2. Pairing

Each TankStation has a unique ID internal to the device that cannot be changed. The PumpStation will record and save the IDs of specific TankStation/s that are paired with it. Up to 10 different TankStations can be paired with a single PumpStation. Messages from any TankStations that have not been paired will be ignored by the PumpStation. When supplied together as a kit, the PumpStation arrives pre-paired with the supplied TankStation. This is indicated by the presence of a FP (Factory Paired) sticker within the devices.

How to pair

1. Apply 220Vac to your PumpStation, (Live & Neutral) to the Live IN and Neutral terminal (found on the left hand side of the 4 way green connector) on the PumpStation.

2. Power up your TankStation by inserting 2 x AAA batteries (provided).

3. Press the Pair button on the TankStation.

4. The Pair and Transmit LED will illuminate together for +-1 second as it sends the pair request to the PumpStation.

5. If the Pair was successful you will see the Pair LED rapidly flash for 3 seconds, this indicates that the PumpStation has seen the Pair request and saved the TankStations ID to its memory.

It is important to note that once you have applied power to the PumpStation you will have 2 minutes to commence your Pair from your TankStation, after 2min the PumpStation no longer accepts pair requests from any TankStation.

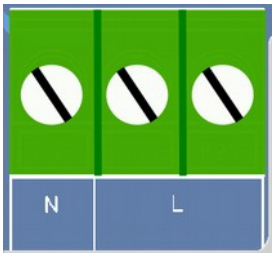
9.3. Clear all pairings

In order to clear all pair information from a PumpStation, Start with power OFF to your Pumpstation. Then press and hold down the Override button while powering up the device. The LED above the button will flash 5 times slowly, after the 5th flash, the LED will flash rapidly which indicates the clearing of the memory was successful.

9.4. Powering the TMP001 PumpStation

The TMP001 PumpStation can be powered either from 220VAC directly, or from a 5v DC power source.

Power from AC mains



The TMP001 PumpStation accepts an AC power supply in the range of 100VAC to 240VAC. The AC voltage range is 100-240VAC. Do not exceed this range.

Note that there are 2 x terminals for L (Live). This makes it easy to link the Live to the adjacent COM terminal to control the pump.

Power from DC Voltage

The PumpStation can be powered from a 5V DC voltage source, and shares a ground connection with the alarm output.

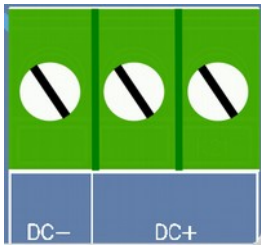
You will connect your DC negative to the far left terminal labeled as "⏚" and DC positive to the far right terminal labeled "+5V",

Interestingly, the +5v terminal can also be used to draw a bit of DC power FROM the PumpStation (in the case where it is powered from mains). There is a maximum of 100mA of current available from this point.

9.5. Powering the TMP001-S PumpStation

The TMP001-S PumpStation is designed for solar pump applications, which typically have relatively high DC voltages from the solar panel.

Power from 15-150vDC



The TMP001-S PumpStation accepts a DC power supply in the range of 15 to 150vDC.

DO NOT exceed 150vDC. It is recommended that you confirm your solar voltage is definitely below 150vDC (in full sun and with the pump OFF) before connecting your TMP001-S PumpStation

Note that there are 2 x terminals for DC+. This makes it easy to link the positive to the adjacent COM terminal to control the pump.

Power from 5vDC

The TMP001-S PumpStation can optionally be powered from a 5V DC voltage source, and shares a ground connection with the alarm output.

You will connect your DC negative to the far left terminal labeled as "⏚" and DC positive to the far right terminal labeled "+5V",

Interestingly, the +5v terminal can also be used to draw a bit of DC power FROM the PumpStation (in the case where it is powered from mains). There is a maximum of 100mA of current available from this point.

9.6. Maximum RunTime

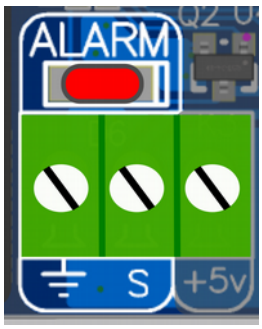
The idea behind this is to allow you to select the maximum time that the pump must be able to run for. If the TankStation starts the pump and then goes offline (eg. battery dies), the pump will automatically be switched off after your specified amount of time has elapsed.

To enter into the Set Max Time mode, hold the button down for 2 seconds, the LED above the button (Typically Yellow) will illuminate. You can now cycle through the modes which are shown using a special combination on the Dual-colour status LED and Set Max LED which is described below, by pressing the button repeatedly until the desired LED combination is achieved. To save the setting into the PumpStation, simply leave the button alone for 10 seconds and the PumpStation will exit the mode and save the settings, this is indicated by the Override LED flashing rapidly.

It is recommended that you consider what is the maximum amount of time you ever expect the pump to be running for, taking into account the pump rating , tank capacity and the effect of water usage during pumping. Set your maximum pump time to be slightly above the maximum time you reasonably expect.

Time	Status LED	SET MAX
30min	OFF	Solid ON
1H	RED SOLID	Solid ON
2H	RED FLASH	Solid ON
4H	GREEN SOLID	Solid ON
6H	GREEN FLASH	Solid ON
8H	RED/GREEN FLASH	Solid ON
10H	OFF	Flashing
16H	RED SOLID	Flashing
20H	RED FLASH	Flashing
24H	GREEN SOLID	Flashing
36H	GREEN FLASH	Flashing
Indefinite	RED/GREEN FLASH	Flashing

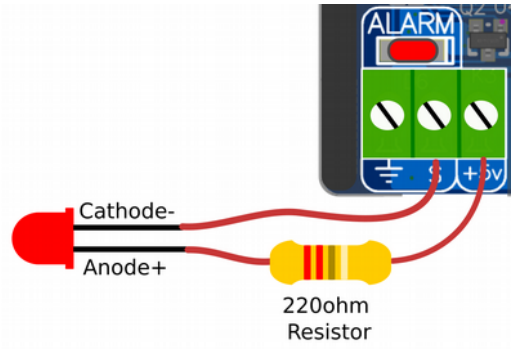
9.7. Alarm Output



The device has an open-collector alarm output. This can be used to drive an input on a GSM Commander or provide local indication via a buzzer or LED.. When active, an internal transistor connects the "S" terminal to the "⏚" terminal.

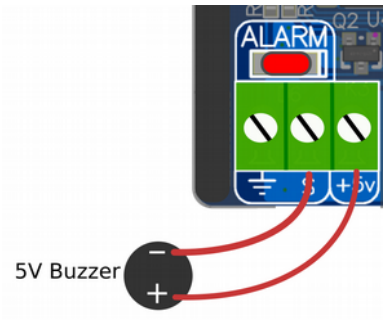
The alarm output will pulse on and off once per second if the battery at the tank side is running low. If the battery is critical, the alarm output will remain on permanently, and the Status LED will indicate ERROR mode.

Connecting an LED to the alarm output



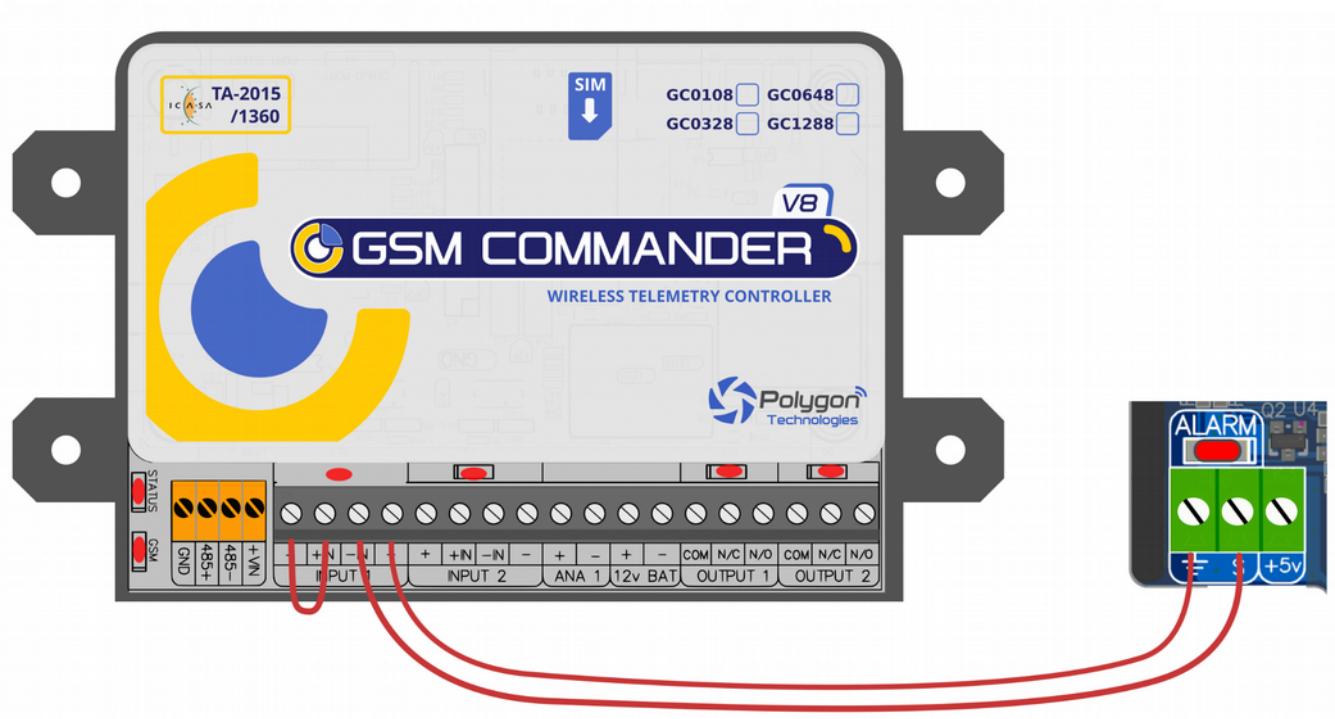
As mentioned before, the +5v terminal can deliver DC power to an external load. In this case we can use it to light up an LED. We include a suitable resistor to limit the current to an appropriate level.

Connecting a Buzzer to the alarm output



The same principle as above, but simply without the resistor. Make sure it is an internal drive 5V buzzer. Ask your supplier for suitable parts.

Connecting a GSM Commander to the alarm output

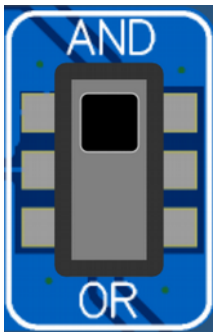


Bringing a GSM Commander into the mix creates a lot of interesting opportunities for monitoring the pump, but can of course also be connected to the alarm output on the PumpStation, allowing you to receive remote notifications of alarm conditions.

9.8. Override Mode / Button

Override is a special state that the PumpStation can be placed into. It overrides the normal behaviour of the RemoteFloat System as a whole. Override can be placed ON or OFF by pressing the button labelled "OVERRIDE ON/OFF". If Override is ON, the LED will be illuminated and the pump will run regardless of the state of the remote tank(s). If Override is OFF, the LED will not be illuminated and the pump is then controlled according to the status of the tank. It is important to understand how this works, especially when there are multiple TankStations paired to your PumpStation. Override mode can be selected from any of the paired TankStations, but can also be selected locally at the PumpStation. So the PumpStation AND any TankStation can place the PumpStation into override, and any of them can take it out of override.

9.9. AND / OR mode



This is where things start to get interesting. In practical cases, one pump is often feeding more than one tank, and sometimes the layout can get quite complex, even including more than one source for a given tank. In some of these cases, one may need more than one TankStation to communicate with a single PumpStation. When we do this, we need to select between AND and OR mode.

To place the pump side in AND or OR mode, simply slide the selector switch to the appropriate location.

Usecase 1

You have one pump but it feeds more than one tank. The tanks are connected in parallel. If either of the tanks go empty, the pump should start. For this, we select OR mode on the PumpStation

Usecase 2

You have one pump but it feeds more than one tank. One or more of these tanks may receive water from elsewhere, such that both tanks should record an empty level before the pump should start. For this, we select AND mode on the PumpStation

Usecase 3

You want an override control at an easily accessible location, so that you can force the pump to go on without being physically present at the pump or the tank station. For this, we use an extra TankStation with a physical button connected to the override terminals, allowing a person to manually and remotely override the system to start the pump.

A deeper understanding of AND/OR mode

Things can get rather complex very quickly when multiple TankStations are paired to the PumpStation. The PumpStation deals with this by maintaining a completely separate device status for each of the paired TankStations. So, if TankStation A requests the pump to start, the PumpStation will respond as if that TankStation is the only one it is paired with. It will report that the pump is started but will in actual fact merely set a flag in its memory to indicate that as far as TankStation A is concerned, the pump is running. It does this for all TankStations that are connected. All of the pump statuses of the paired TankStations are then evaluated together with the AND/OR condition to determine if the pump will actually be turned on or off.

When in AND mode: ALL of the paired TankStations must request the pump to start before it will actually switch on the pump, and when ANY of the TankStations request the pump to turn off, it will then turn off.

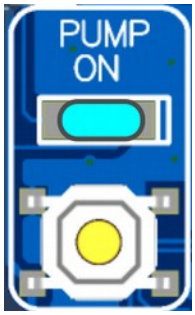
When in OR mode: Any of the paired tanks can request the pump to start and it will start. All of the TankStations must be in "pump off" mode before the pump will be turned off.

Override with multiple paired TankStations

It is important to note that when the PumpStation is put into override mode (by any paired TankStation or by the local switch at the PumpStation), it no longer cares about the status of any of the TankStations.

With multiple TankStations, all of them are communicating to the PumpStation from time to time, either because of float events or because of an elapsed interval where it does a comms check. The response from the PumpStation will include the override status, so if the pump side is placed into override, all paired TankStations will eventually indicate this on their override LED.

9.10. Pump On Button



This button has a simple function, it is there for you to test your pump and ensure it is operational while you are at the system (typically used after installing and wiring up your pump to the PumpStation).

Press and hold the button to turn the pump on (indicated by the Green LED above it being illuminated).

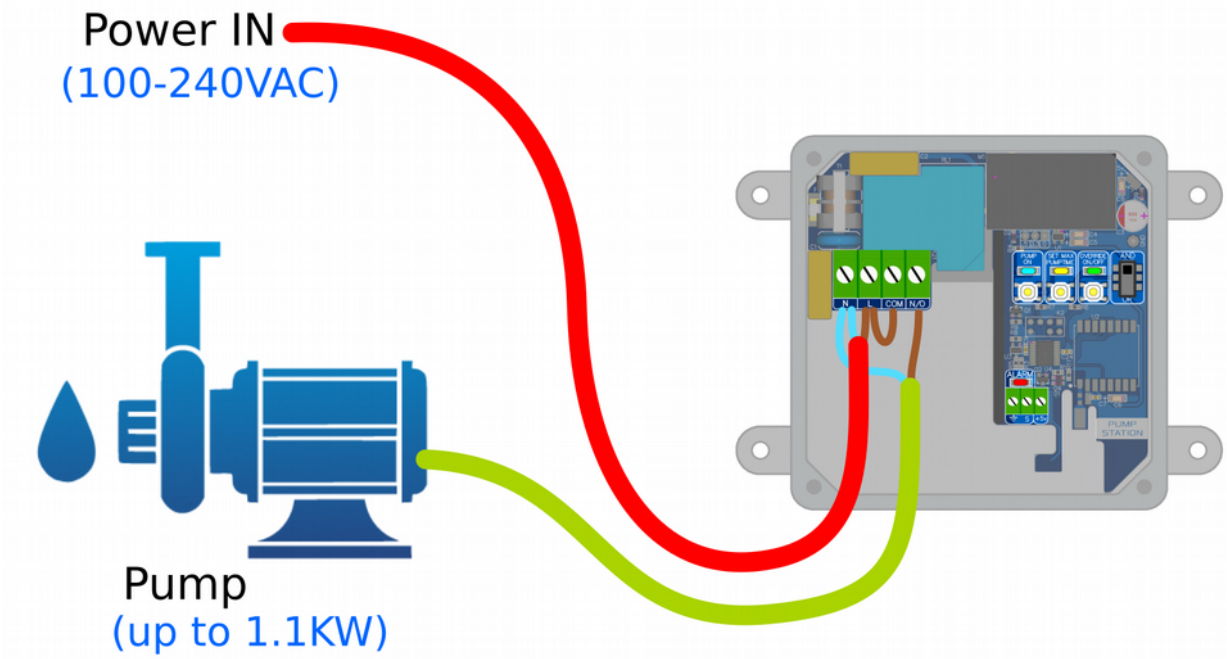
When you release the button the pump will automatically turn off.

9.11. Wiring to your pump

The Pumpstation provides a simple heavy-duty relay contact that you can use to switch AC or DC current. It can be used to directly control a single phase pump, but can also be connected to 3-Phase or solar pumps.

Single Phase pump

Live and Neutral supply is connected to the L and N terminals, respectively. The COM terminal is wired to LIVE, and the Pump is being connected between N/O and N. Very simple.

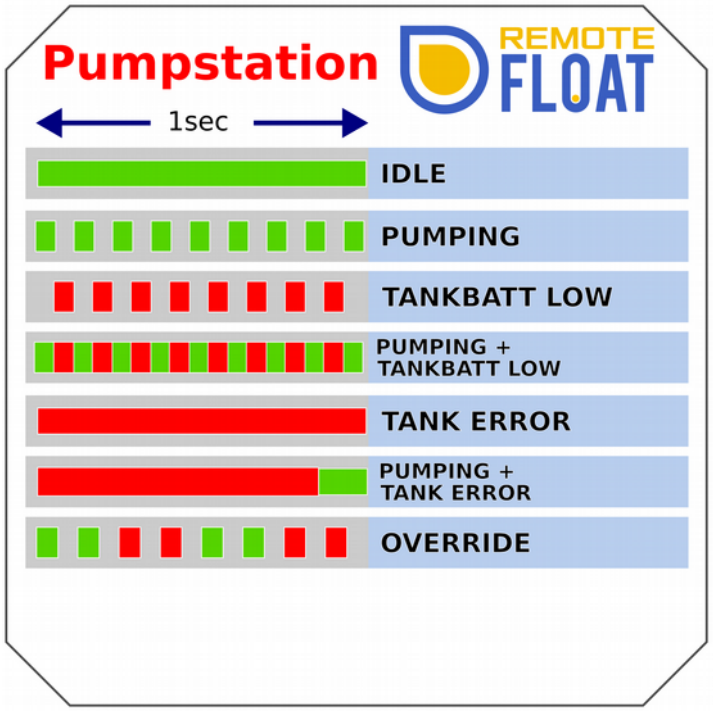


Other Pumps

3Phase pumps are simple to control, because they will have heavy duty switchgear (Start-Delta starters or VSD). The COM and N/O terminals can easily be incorporated into the existing switchgear. It can be as simple as connecting the COM and N/O terminals across the START button on your panel. For solar pump controllers, there is typically an input where a float is meant to be connected to switch the pump on and off. That input can simply be connected to the COM and N/O terminals to get the same effect.

9.12. Status LED Flash Codes

The externally visible dual-colour LED is there to provide status information from outside. The following table is used to decode the flash code. The same table is also provided inside the lid of your PumpStation.



10. Guarantee

RemoteFloat is guaranteed for a period of 24 months against defects in materials or workmanship. Should your product become defective during the guarantee period it will be repaired or replaced at the sole discretion of Polygon Technologies under the following conditions:

A: The unit must not have been tampered with.

B: The guarantee does not cover damage resulting from excessive input voltages, lightning, power surges or water ingress.

A decision about issues A and B will be at the sole discretion of Polygon Technologies. This guarantee does not provide for shipping costs. This will be for the account of the user under all circumstances.

11. Important Notice / Disclaimer

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Much effort has been made to ensure the contents of this manual are complete and without errors. Nonetheless, the Company cannot be held liable for any damages directly or indirectly resulting from any errors in this manual.

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No part of the product (including the hardware, firmware and software) may be copied or reverse-engineered.

Polygon Technologies (PTY) LTD reserves the right to make changes to the contents of this manual, without notice, at any time.

12. Manufacturer Contact Details

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