

YJ-TMS

Installation and User manual



Yellow Jacket Tank Monitor System:

- 3 tanks standard, 4th Auxiliary tank optional.
- Auto-Fill capability with adjustable fill levels
- Auxiliary output control for turning on Bay heaters or other devices
- RS-232 communications for the Main display panel or use with other RS-232 communication devices, such as Crestron or AMX.
- Supports up to 3 additional analog tank displays in addition to Main display.
- Tanks can be of any shape or material and must be a Non-pressurized (Vented) tank.
- Built in Temperature and Humidity sensor.
- Victron compatibility.

Mode of Operation:

- Uses compressed air to blow through the Tank Tube installed in each tank. As water rises back into the Tank Tube, the system measures the amount of water in each tank. This Purge cycle happens at power up and then again only as needed.
- When using YJ-TLCD display, audible alarm sounds (if enabled) when Black or Gray tank are at 90% full, or if the Fresh drops below 20%.
- AutoFill (if enabled) will start filling the fresh water tank at < 25% and stop filling at >90% (default) The Start/Stop levels are configurable from the YJ-TLCD main Panel or via RS-232.

YJ-TMS Wiring Instructions

Basic Installation requirements:

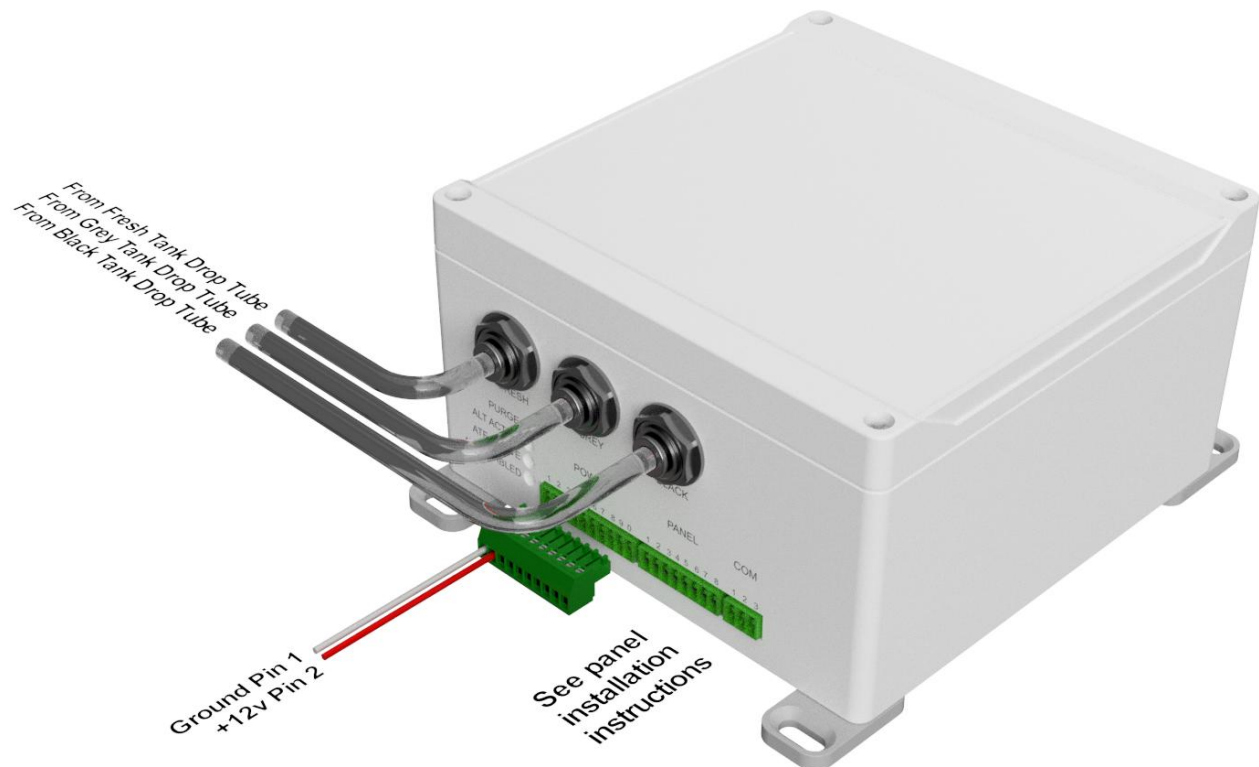
YJ-TMS Unit Location: located in Bay near the tanks in an accessible location, recommended.

- Power: +12v, **FUSED 3AMP** and Ground is needed to power the system.
- 2 additional wires from the YJ-TMS location to the location of the YJ-TLCD Main panel for RS-232 communication. Alternatively, to a RS-232 device.

Tanks: A ¼” Tank Tube must be installed in each tank. See Tank Tube Installation below.

Power Connector (10 Pin): Pin 1 and 2 required, 3-10 are optional

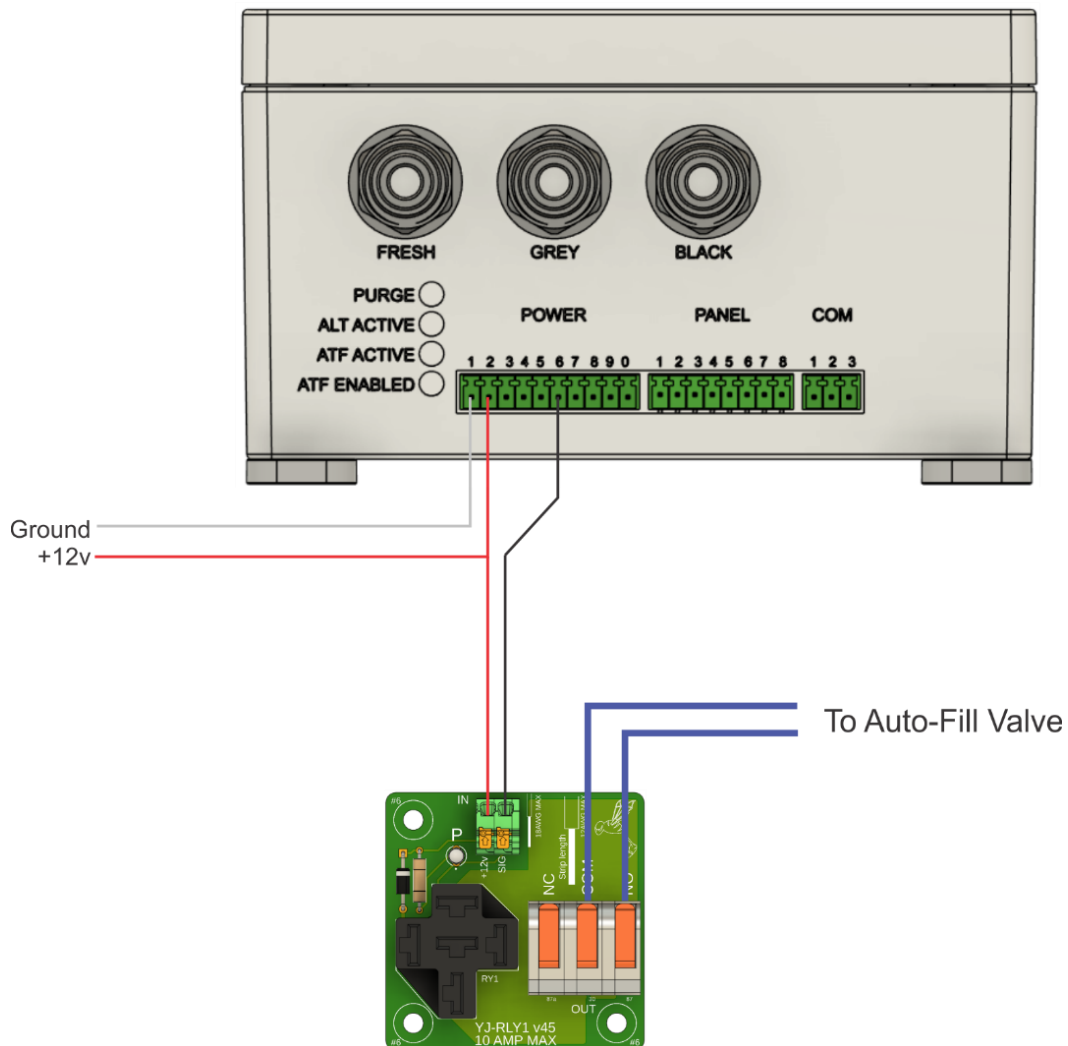
Pin 1: Ground	Pin 2: +12volt	Pin 3,4,5: Reserved for External Temperature Sensor
Pin 6: Auto-fill	Pin 7: ALT out	Pin 8: ALT control switch
Pin 9:	Pin 10:	



Connect ¼” air line from each Tank Port to the corresponding tank tube installed in the top of each tank.

Auto-Fill Connection: Pin 6

Use YJ-RLY1 Relay module* to control loads larger than 1 amp. Connect Pin 6 to the SIG input on the Module to pass the load through Relay contacts.



*Note: If using a different Relay module, be sure the Relay has a built in Diode suppressor across the relay coil and has a 12v coil current of 0.6 amps (600mA) or less.

Display Panel Options

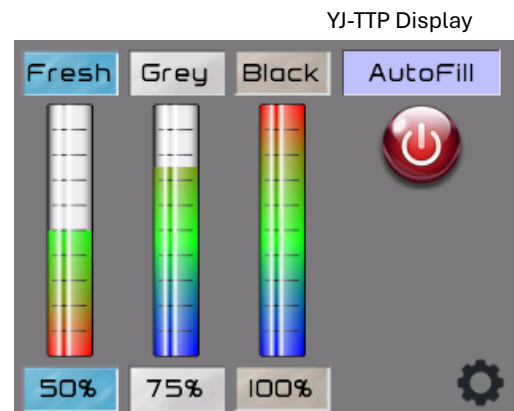
Primary Panel (Digital RS-232)

- YJ-TLCD display panel is a 4.3" Touch panel that can be connected as the Primary display, or as a secondary display. This panel can be used to configure the TMS and set the Tank Depths for calibration. See YJ-TLCD manual for details.
- An Alternative RS-232 device can be connected such as a Crestron device for customization. See COM Commands at the end of this manual.
- A laptop can also be connected to the COM port of the TMS system using a USB to Serial adaptor. Using a Terminal program on the laptop to send commands or set tank depths. See Appendix A: COM commands at end of this manual.



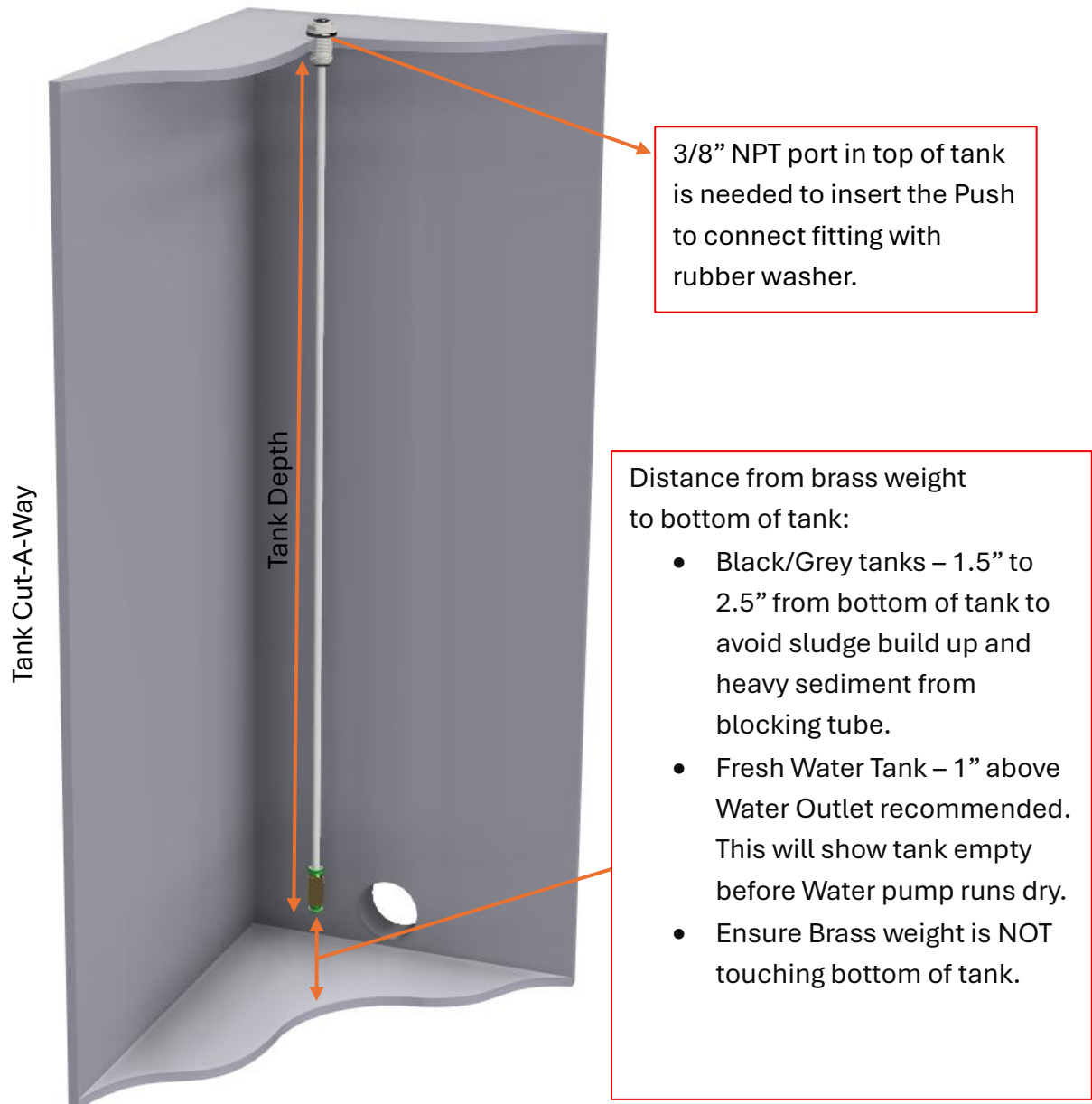
Secondary Panel (Analog)

- YJ-TTP Display panel is a 2.8" Touch screen designed to be used as a second panel located in the bay. This panel connects to the Analog outputs. Tank depths can be set using this panel with the optional programing cable – See YJ-TTP manual for details.
- YJ-TLCD display can also be used as a second panel wired to the analog outputs - See YJ-TLCD manual for details
- The Analog panel outputs can also be used to connect to a Victron GX Tank 140 Module.
- There can be up to 3 Analog devices connected to the analog (Panel) outputs.



Tank Tube Installation

Each tank to be measured must have a tank tube installed in the tank. Location should be above the deepest part of the tank, normally near the drain port. Measurable water depth is from the bottom of the brass weight to the top of the tank. This value should be entered as 'Tank Depth' in Settings: of the YJ-TLCD main panel. (see: YJ-TLCD Installation/user manual).



Cut Nylon tube to appropriate length, attach Brass weight to one end of Nylon tube, Attach 3/8" fitting to other end of tube. Insert assembly into 3/8" NPT port and secure fitting until rubber washer is slightly compressed. Use of silicone grease or petroleum jelly on all Push-to-Connect fittings is recommended to help ensure a good seal. Leaks at these fittings will show inaccurate results.

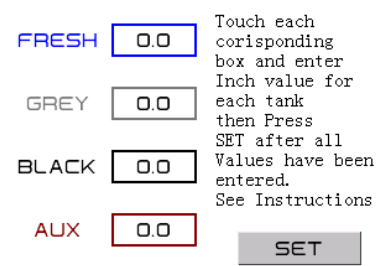
Setting Tank Depths

The tank depth default is set at 25.0” and should be configured in the YJ-TMS system for best accuracy in reading tank levels. Tank Depth is the distance from the Inside top of tank to the bottom of the Tank Tube. Use any of these methods to set the Tank depths.

- YJ-TLCD main panel. (Recommended)
 - In Settings > Tank Depths Enter the length of the Tank Tube in each tank. See YJ-TLCD Instruction Manual for Details.

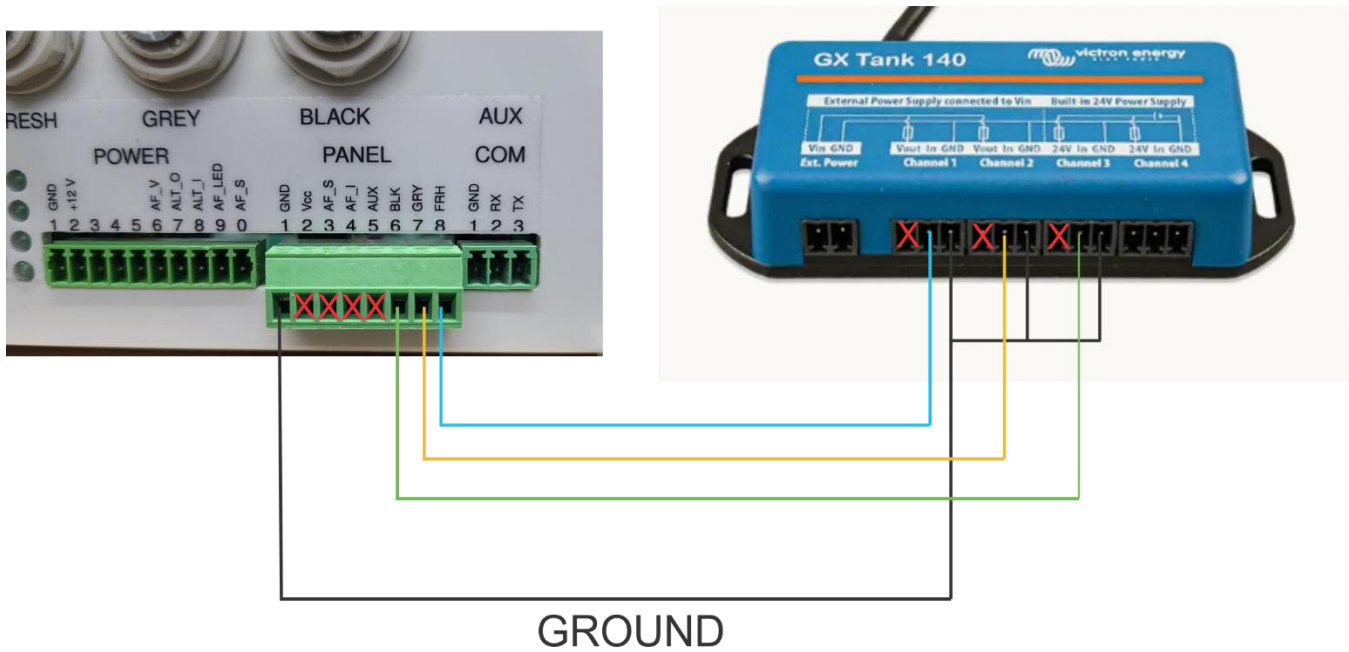


- YJ-TTP Secondary panel.
 - Separate programing cable required.
 - Connect Programing cable as per YJ-TTP instructions. Set Tank depths for each tank.



- A Laptop or other RS232 device. (Advanced)
 - Using a terminal program or other RS-232 method, send commands to the COM port on the YJ-TMS. See appendix A for details and complete list of commands. This allows the use of control systems such as Crestron, AMX, Victron and other automation control systems that have RS-232 ports available.

Interfacing with the Victron system



****** DO NOT connect any power between the two systems. ******

Victron is 24v while the YJ-TMS operates on 12v.
min/max values will need to be set in the Victron.

- Minimum value 0.0 - 0.4v = Tank Empty
- Maximum value 4.6v - 5v = Tank full

Appendix A (for use with a laptop or other RS-232 Device)

Communications:

Communication: 9600, 8, n, 1

Data is returned as a single string separated by Commas once per second.

Format:

`ffff,ff.f,ff,ff.f,ggggg,gg.g,gg,gg.g,bbbb,bb.b,bb,bb.b,aaaa,aa.a,aa,aa.a,x0,x1,x2,x3,vv.v1,vv.v2,ee,ff;`

- `ffff` = Fresh Tank raw data NOTE: This value will always be 111 (See command D)
- `ff.f` = Fresh Tank actual inches of water inside tank. (measured from bottom of tank tube)
- `ff` = Fresh Tank % of full
- `ff.f` = Fresh tank set height in inches.

- `ggggg` = Grey Tank raw data
- `gg.g` = Grey Tank actual inches of water inside tank.
- `gg` = Grey Tank % of full
- `gg.g` = Grey tank set height in inches.

- `bbbb` = Black Tank raw data
- `bb.b` = Black Tank actual inches of water inside tank.
- `bb` = Black Tank % of full
- `bb.b` = Black tank set height in inches.

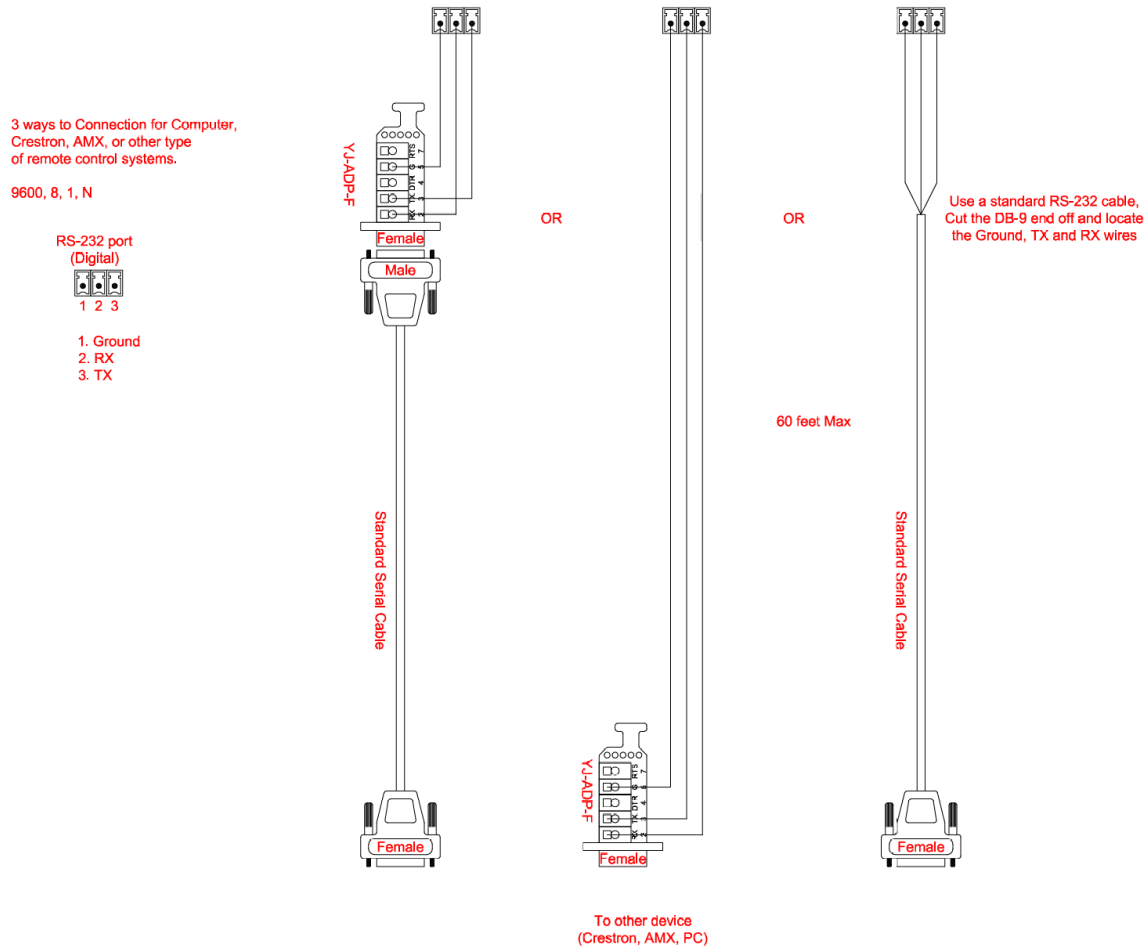
- `aaaa` = Aux Tank raw data (Optional)
- `aa.a` = Aux Tank actual inches of water inside tank.
- `aa` = Aux Tank % of full
- `aa.a` = Aux tank set height in inches.

- `x0` = Auto-fill status LED 0 = off, 1 = on
- `x1` = Auto-fill output active 0 = off, 1 = on
- `x2` = Alternate output active 0 = off, 1 = on
- `x3` = reserved

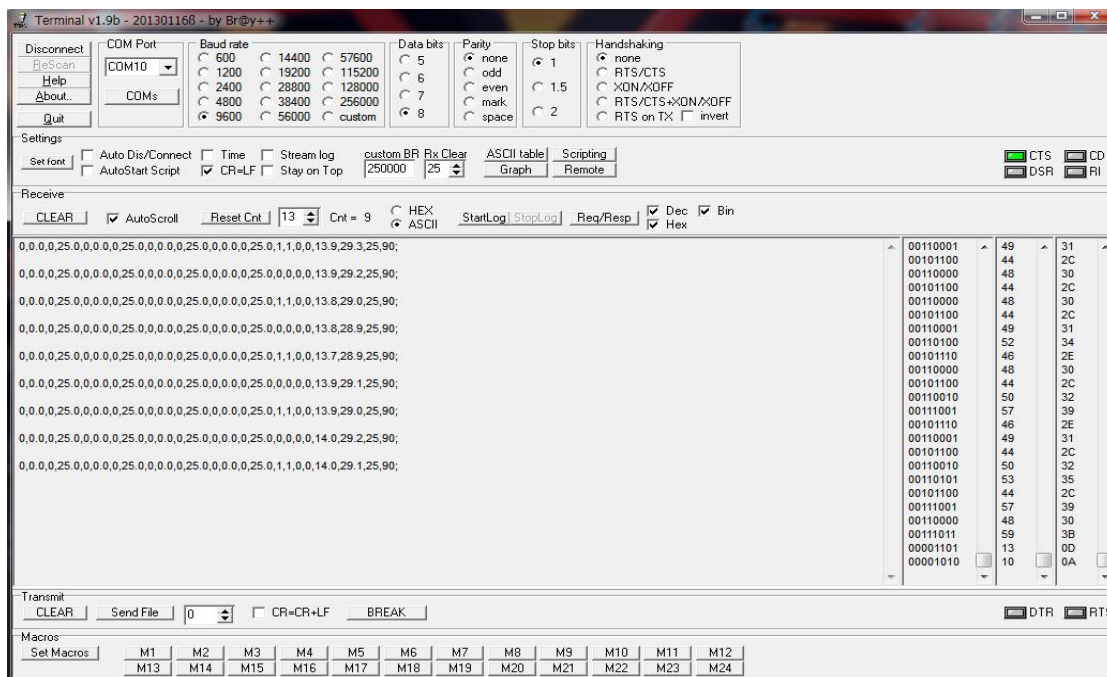
- `vv.v1` = 12 volt supply voltage reading.
- `vv.v2` = reserved

- `ee` = Auto-fill trigger empty point 25% default
- `ff` = Auto-fill trigger full point 90% default

Laptop or Other RS-232 Device: Using a terminal program with a USB to serial adaptor.



Once communication is established, a string of data will start to display in the terminal window once per second, similar to the following.



Each value is separated by a comma. The first 4 values are the Fresh Tank, the next set of 4 values are the Grey Tank, the next set of 4 is the Black tank, and then the Auxiliary tank.

Fresh	Grey	Black	AUX	
0,0.0,0,25.0,	0,0.0,0,25.0,	0,0.0,0,25.0,	0,0.0,0,25.0,	0,0,0,0,13.9,27.8,25,90;

Notice the 25.0 in each section, fresh, grey, black, and aux. This is the default height of 25.0 inches. This is the number Tank Depth value that will be set for each tank.

The Command to set the Fresh Tank Depth is **S0** followed by the tank tube length in inches and ending with a semicolon ; . For example, if the Tank tube is 32.0", enter **S0320;** in the send command line as shown,



and click SEND. The 25.0 in the fresh column should then change to 32.0. If not, be sure you have entered the command correctly and try again. Note: a carriage return may be necessary after command.

Do the same for each tank using command **S1** for the grey tank, **S2** for the black tank and **S3** for the AUX tank if used.

NOTE: DO NOT include the decimal point when setting the Tank Depth.

Examples:

- Set the fresh tank to 26.7 inches > Enter command S0267; <enter>
- Set the Grey tank to 35.0 inches > Enter command S1350; <enter>
- Set Black Tank to 12.4 inches > Enter command S2124; <enter>

Commands:

Commands are a single letter character followed by numerical information if needed and ending in a ";" plus carriage return.

TOGGLE_AUTO_FILL: Toggle the Auto-Fill ON or OFF

Command: A;

Parameters: none

SET_TANK_SIZE: Specify the tank size for tank depth calibration

Command: Stxxx;

Parameters:

t = Tank number

0 = Fresh

1 = Grey

2 = Black

3 = Aux

xxx = Size of tank in inches from 020 (2.0") to 600 (60.0") inches, do not include the decimal when sending this command.

Example: To Set the fresh tank size to 25.5" send a command of "S0255;" To set the black tank to 14" send a command of "S2140;"

Note: the tank depth should be set to the length of the tube inserted into the tank. See tank tube installation instructions. Adjust the tank size values as needed for best accuracy.

SET_LOW_FILL: Set the low % level to trigger Auto-Fill ON

Command: Lxx;

Parameters:

xx = Number between 5 and 95 percent. Low point cannot be set higher than the high point.

Example: Set the low trigger level to 30% send a command of "L30;"

SET_HIGH_FILL: Set the high % level to trigger Auto-Fill OFF

Command: Hxx;

Parameters:

xx = Number between 5 and 95 percent. High point cannot be set lower than the low point.

Example: Set the high trigger level to 80% send a command of "H80;"

ALT_OUTPUT: Set ALT Output Active LOW (Ground when Active)

Command: Rx;

Parameters: x

1 = Active

0 = Inactive

Will set the output pin 7 on the Power connector to an active ground, send command R1; to activate, R0; to deactivate. Can be used to drive a relay or LED, max 1 amp.

VERSION: Retrieve software version number

Command: V;

Parameters: None

Sending a command of "V;" will return the current version number of the monitor system software.

Note: Some commands are not available with software version 2.8 or earlier.

PURGE: Run air pumps to clear tank tubes or to check tank levels

Command: Px;

Parameters:

x = a number between 1 and 5 in seconds. Crestron note: if sending this command from Crestron, this number needs to be specified in seconds, i.e. 5s, not decimal.

Use this command to purge the tank tubes for immediate accurate level reading if the air lines have been disconnected and then reconnected to the system. Otherwise tanks will read correctly after next purge cycle, approximately every 5 min.

DEBUG: Sets software to display Fresh Tank Raw Data.

Command: D;

Parameters: None

Sending command "D;" will tell the YJ-TMS to report the actual fresh Raw Data if needed instead of the "111" header. Note the YJ-TLCD main display will not receive information once in this mode. Clear by sending another command "D;" or re-power the System.

POLE_TEMP_SENSOR: Returns Temperature and Humidity ***CAUTION***

Command: T;

Parameters: None

Sending command "T;" will return the current Temperature and Humidity of the DHT22 Temp sensor. Returns "T,t_Value,h_Value," If an Error occurs the command will return a "T,E,E,"

NOTE: Do not pole the sensor in more than 3 second intervals. An error will occur and may require rebooting the system.

CAL_EMPTY: Calibrates Empty point ***CAUTION***

Command: C;

Parameters: None

Sub-Command: c;

Command “C;” will calibrate the empty point of the tank sensors. This command is sometimes necessary if the system is reading more than 0% when the tank is known to be empty. Over time, Changes in Temperature, barometric pressure, and altitudes can cause the sensor 0 point to offset slightly. Before sending this command, first try a simple reboot of the YJ-TMS system. Be sure tank tubes are disconnected before sending this command.

NOTE: Only send this command with the Tank Tubes disconnected from the YJ-TMS system and only if tanks read greater than 0% when empty with tubes disconnected.

Sub-Command “c;” will return the current calibrated empty point for each tank. Fresh, Grey, Black, Aux respectively. The values should be between 99 – 110.

Tank depth adjustment may be necessary after this calibration.