



MORRISON BROS. CO.

1218C

Electronic Tank Gauge

Installation, Operation, and Maintenance Instructions



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The Morrison Bros. Co. 1218C Electronic Tank Gauge series monitors and displays the liquid level and/or volume of product stored in 1 to 4 aboveground storage tanks. The 1218C provides two “outputs” which are of Form A (SPST, Normally Open) contacts.



Failure to follow any or all of the warnings and instructions in this document could result in a hazardous liquid spill, which could result in property damage, environmental contamination, fire, explosion, serious injury or death.



Le fait de ne pas se conformer à l'un ou l'autre des avertissements ou à l'une ou l'autre des directives apparaissant dans ce document pourrait donner lieu à des déversements de liquides dangereux, lesquels pourraient engendrer des dommages matériels, des risques de contamination environnementale, d'incendie ou d'explosion, des blessures graves ou la mort.

Contents

Specifications	4
Installation and Testing	5
Mounting	6
Warning Tag Installation	6
Quick Reference Guide Installation	6
Steps to Wire the 1218C Electronic Tank Gauge	7
Sensors: Intrinsically Safe Inputs	7
Preparation	7
Wiring	8
Completion	8
Console Power: Mains Connection	9
Preparation	9
Wiring	9
Completion	10
Outputs: Controlled Devices	10
Preparation	10
Wiring	10
Completion	11
Ethernet: Data Connection	11
Preparation	11
Wiring	11
Completion	12
The Other End of the Ethernet Cable	12
Steps to Configure the 1218C	12
Configuring the DIP Switch: SW5	12
Understanding What the Buttons Do: Basics of Keypresses	13
“Silence/Test” Button	13
Up/Down Buttons	13
Configuring Your 1218C Using The Web Portal	14
Entering the Menu System	15
Navigating the Configuration/System Menu	17
Name Guidance	24
Testing	25
Configuration Confirmation	25
Save and Restore Configuration	25
Liquid Levels	26
Sensor Inputs	26

Operation	27
General	27
Sleep / Heartbeat / Wakeup	27
Navigating the Display Data: What Am I Looking At?	28
Normal, All is Well with the World, Home Screen	28
Filling and the Home Screen	29
Alarms	30
Kinds of Alarms	30
Determining Exactly What Caused the Alarm	31
Acknowledging / Silencing an Alarm	31
Navigating the Quick Menu	31
Entering and Navigating the Quick Menu	31
Quick Menu Options	32
Event Logs	33
Viewing Event Logs	33
Downloading Event Logs	33
Clearing Event Logs	35
Navigating the Status Website Page	35
Status Page	35
Info Page	37
Maintenance	37
Periodic Maintenance	37
Testing – MONTHLY	37
Cleaning – ANNUALLY or as needed	38
Inspection - ANNUALLY	38
Battery Replacement – EVERY FIVE YEARS	38
Fuse Replacement	41
Firmware Changes	43
Firmware Upgrades	43
Reverting Firmware	45
Factory Reset	46
Appendix A: Configuration Menu Tree	48
Appendix B: Quick Menu Tree	50
Appendix C: The Anatomy of an Event Log File	51
Appendix D: Configuration Worksheets	52
Channel Configuration Worksheet	53
System Level Settings	54
Appendix E: 1218C Control Drawing	56
Appendix F: The 1218C as a Remote Console	58
Installation	58
Wiring	58
Configuration	59
Completion	60
What It Does	60
What It Doesn't Do	60
How To Upgrade The Firmware When Needed	60
Appendix G: Configure Computer for Direct Connection to the 1218C	62
Appendix H: Installing Security Certificates on the Computer	63
Appendix I: Configuring Microsoft Internet Explorer/Edge	65
Appendix J: Modbus Registers	66
Appendix K: FuelCloud Activation	70

Specifications

The 1218C Electronic Tank Gauge is intended to be located in an Ordinary Location. Its inputs are intrinsically safe for use with Class I, Division 1 Group D, T4 Hazardous location with all Morrison Bros. Co. 1218 Sensors.

WARNING: *This is an intrinsically safe device and must be wired in accordance with National Electrical Code Article 500. This device and its wiring may not share any junction box, conduit, or raceway with any other type circuit or wiring. Do not perform live maintenance. Do not substitute components with anything other than Morrison Bros. Co. components. Care must be taken to avoid an ignition hazard from impact or friction with the enclosure.*

AVERTISSEMENT: *Cet appareil intrinsèquement sécuritaire doit être branché conformément à l'article 500 du code électrique national. Il se peut que ce dispositif et son câblage ne partagent pas de boîte de connexion, de conduit ou de canalisation avec un autre type de circuit ou de câblage. Ne menez pas de travaux de maintenance sous tension. Ne remplacez les composantes que par des composantes de Morrison Bros. Co. Assurez-vous d'éviter le risque d'inflammation pouvant découler d'un impact ou de friction avec l'enceinte.*

Entity Parameters for Channel Inputs (Terminals J5, J6, J7 and J8)

$V_{OC} = 6.51 \text{ VDC}$	$I_{SC} = 1.08 \text{ A}$	$C_a = 1000 \text{ } \mu\text{F}$	$L_a = 245 \text{ } \mu\text{H}$	$P_o = 1.13 \text{ W}$
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Output Contact Rating

Voltage Maximum: 240 VAC
Current Maximum: 3 Amps resistive load
Output Protection Fuse Rating: 5 Amp FA 5x20mm

Console Input Power

Nominal Input Voltage: 100 - 240VAC, Line-to-Neutral
Maximum Current Draw: 200 mA
Maximum Power Consumption: 24 W
Line Frequency: 50/60Hz
Power Supply Protection Fuse Rating: 250 mA FA 5x20mm
Operating Temperature
-40°F to 140°F (-40°C to 60°C) to 100% humidity

Enclosure Rating

NEMA 4X

Maximum Wiring Distance

Maximum wiring distance between 1218C Console and the 1218 Sensor is 1000 ft.

Installation and Testing



WARNINGS

- **Fire Hazard** – Death or serious injury could result from spilled liquids.
- You must be trained to install or maintain this Electronic Tank Gauge. **Stop** now if you have not been trained.
- Any modification of this unit beyond what is outlined in this instruction will void product warranty.
- For your safety, it is important to follow local, state, federal and/or OSHA rules that apply to working inside, above, or around the storage tank and piping area. Use all personal protective equipment required for working in the specific environment.
- This device is intended to be used as an auxiliary warning to the operator of an abnormal condition of the system, such as a possible overfill situation and should not be the only system in place to prevent an unwanted condition, such as preventing a tank from overfilling. It is the sole responsibility of the operator to continuously prevent any spillage regardless of the situation.
- Tanks could be under pressure. Vapors could be expelled from tank vents, piping, valves or fittings while performing maintenance. Vapors could catch fire or cause an explosion. Avoid sparks, open flame, or hot tools when working on tank system.
- Use a dampened cloth when cleaning the alarm enclosure to prevent static buildup and discharge.
- In the event of malfunction, contact Morrison Bros. Co. Customer Service.



AVERTISSEMENTS

- **Risque d'incendie** – Un déversement de liquide pourrait entraîner des blessures graves ou la mort.
- Vous devez avoir reçu une formation pour installer cette jauge de réservoir électronique ou en assurer la maintenance. Arrêtez-vous immédiatement si vous n'avez reçu aucune formation à cet effet.
- Toutes les modifications apportées à cette unité autres que celles indiquées dans ces directives engendreront l'annulation de la garantie du produit.
- Pour assurer votre sécurité, il est important de vous conformer à la réglementation locale, d'État, fédérale ou OSHA régissant les travaux à l'intérieur, au-dessus ou autour du réservoir de stockage et de la zone de canalisation. Utilisez tout l'équipement de protection individuelle exigé pour travailler dans l'environnement spécifique.
- Cet appareil est destiné à être utilisé comme mécanisme avertissant l'opérateur d'un état anormal du système tel une situation de remplissage excessif et ne devrait pas être le seul système en place pour empêcher un état indésirable, par exemple, un réservoir qui se remplit trop. L'opérateur a l'entière responsabilité de s'assurer continuellement de prévenir tout déversement, quelle que soit la situation.
- Les réservoirs pourraient être sous pression. Des vapeurs pourraient être expulsées des conduits d'aération, des canalisations, des soupapes ou des raccords du réservoir durant la maintenance. Les vapeurs pourraient s'enflammer ou engendrer une explosion. Évitez les étincelles, les flammes nues ou les outils chauds lors de travaux menés dans le système du réservoir.
- Utilisez un linge humide pour nettoyer l'enceinte de l'alarme afin de prévenir l'accumulation d'électricité statique et les décharges.
- En cas de défaillance, communiquez avec le service à la clientèle de Morrison Bros. Co.

Note: As defined in Article 501 – Class 1 Locations of NFPA 70, this apparatus and its connected wiring are intrinsically safe. Under normal conditions this apparatus and its wiring cannot release sufficient energy to ignite a specific ignitable atmospheric mixture by opening, shorting, or grounding.

WARNING:

Interconnect wiring between the sensor(s) and the Electronic Tank Gauge unit must be kept totally isolated and separate from any other wiring. This wiring must not share any junction box, conduit, raceway, or fixtures with circuits other than those defined by NEC as being intrinsically safe for all Class 1 locations. These inputs are ground referenced and only require “basic insulation.”

AVERTISSEMENT:

Le câblage d’interconnexion entre la jauge et l’unité d’alarme doit être complètement isolé et distinct du reste du câblage. Le câblage ne doit partager aucune boîte de connexion, aucun conduit, aucune canalisation, ni aucun accessoire avec des circuits autres que ceux définis par NEC comme étant intrinsèquement sécuritaires pour tous les emplacements de classe 1.

Ces entrées sont référencés à la masse et nécessitent seulement “isolation de base.”

**Location:**

The Electronic Tank Gauge enclosure is only approved for operation outside of all hazardous locations as defined by the National Electrical Code or NFPA 70.

Mounting

To maintain the enclosure’s NEMA 4X rating

- Three openings have been provided in the bottom of the NEMA 4X enclosure for connection and wiring. Only use Thomas & Betts Cat. No. H050GR-TB or H050-TB or equivalent hubs in the two openings for ½” conduit and Thomas & Betts Cat. No. H075GR-TB or H075-TB or equivalent hubs in the one opening for ¾” conduit.
- Mounting tabs have been provided with the product to mount the enclosure; do not make additional holes in this enclosure.
- Ensure that both cover latches are latched at all times.
- Secure one of the two latches with the supplied padlock or equivalent.

Failure to follow these instructions voids any assurance that the enclosure is NEMA 4X.

Warning Tag Installation

The included Warning Tag must be placed near the fill point for each tank being measured. The Warning Tag may be attached with the provided cable tie. If additional Warning Tags are required, contact Morrison Bros. Co.

Quick Reference Guide Installation

The included Quick Reference Guide must be attached to the lanyard installed on the bottom, left corner of the 1218C console. It is the owner’s responsibility to properly train ALL operators of the 1218 Electronic Tank Gauge system. The Quick Reference Guide SHALL NOT take the place of proper training.

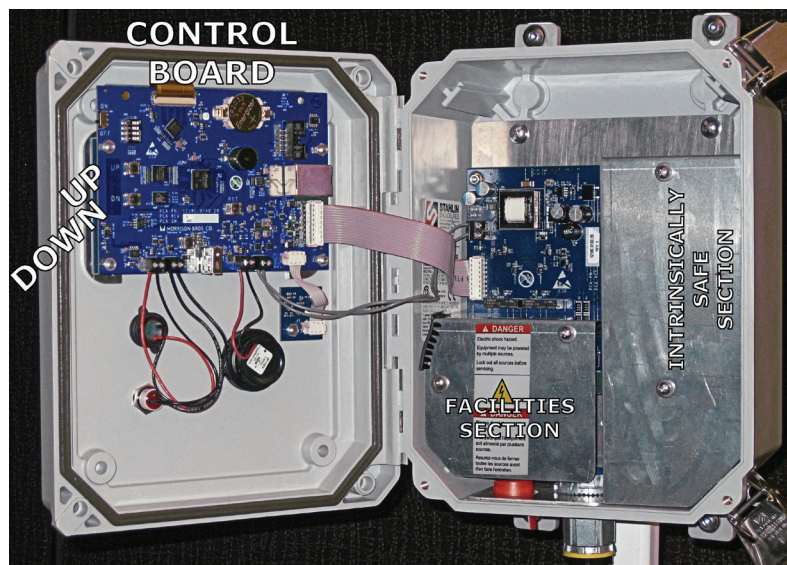


Figure 1 Overview of the inside of the 1218C

Steps to Wire the 1218C Electronic Tank Gauge

SENSORS: INTRINSICALLY SAFE INPUTS

There are four 1218 Sensor inputs in the 1218C. Channel 1 (J5) is the input located closest to the 3/4" conduit entrance of the enclosure.

Preparation

1. Open the front cover of the Electronic Tank Gauge by releasing the two cover latches and swinging the cover open.
2. Remove and retain the two screws with their flat washers holding the cover to Intrinsically Safe Section in place.
3. Remove and retain the cover.

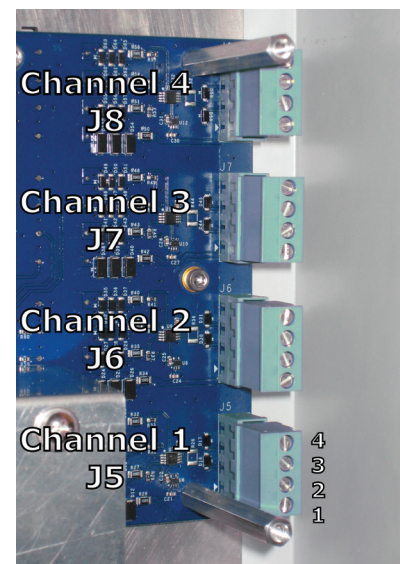


Figure 2 Channel Input Connectors



WARNING: Connecting the wires improperly may severely damage or destroy the Sensor.



WARNING: The Sensor **MUST** be connected using Belden Cable part #7933A, which is a shielded, 4-conductor, low capacitance RS-485 type communications cable. This cable is critical to the proper operation and safety of this device.



WARNING: A maximum distance of 1,000 feet to each Sensor is required for proper operation and safety of this device.

Wiring

Sensor Wires (P4)	Belden #7933A Wire Colors	1218C Connectors (J5, J6, J7, J8) Pins
V-Red	Orange/White	1
C-Red	Green/White	2
C- Black	White/Green	3
V-Black	White/Orange	4 with Drain wire

Table 1 Wiring Table

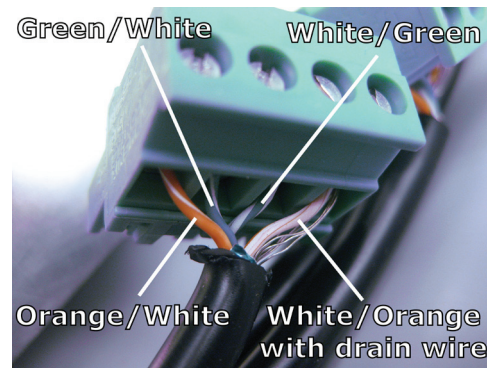


Figure 3 Connections at the 1218C Channel Input Connector

1. Install the Belden #7933A cable from the Channel Input Connector to be wired up through the conduit to the 1218 Sensor conduit junction box.
2. Connect the wiring to the Sensor first. Trim excess cable and then strip 2 to 3 inches of sheathing to expose the shield. Cut away the exposed foil shield, as well as the bare drain/shield wire. Use electrical tape or heat shrink tubing to insulate the exposed end of the drain/shield wire.
3. Use 4 of the provided splice connectors (part number: 1018G-3136 2C) to connect each wire color pair connector (see Table 1 for color code guidance). The wires must remain insulated to work properly. Do NOT strip ends.
4. Insert the corresponding wire color pair all the way into the connector. Use pliers to squeeze the button to the body on the connector. This will pierce the insulation and make the electrical connection. There is a jelly that may squeeze out through the connector. This is to prevent corrosion of the connection, and will not harden.
5. After all 4 of the wire pairs are connected, fold the splices and wires into the junction box and replace the junction box cover.
6. Return to the 1218C Electronic Tank Gauge Console. Trim excess cable 2 inches past the Channel Connector and then strip the sheathing to expose the shield. Cut away the exposed foil shield, but do not cut the bare drain/shield wire.
7. Strip 3/16 of an inch of insulation off each wire and twist the bare shield wire and the White/Orange wire together.
8. Connect the wire colors to the indicated pin of the Channel Input connector (see Table 1 for color code guidance). The connector may be removed for ease of installation.
9. If removed, reinstall the connector.
10. Secure the cable to the cable tie mount adjacent to the channel connector on the inside enclosure wall using the supplied wire tie.
11. Repeat this process for each remaining Channels/Sensors.

Completion

1. Replace the cover previously removed and secure with the screws and flat washers; do not tighten the screws.
2. Slide the cover to the right snugly up against the enclosure wall as shown in Figure 4.
3. Snug the screws in place.

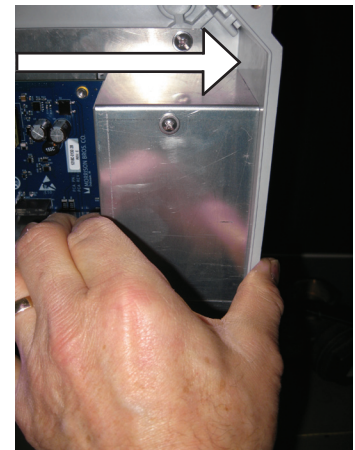


Figure 4 Adjust the position of the cover

CONSOLE POWER: MAINS CONNECTION

Preparation

1. If not already done, open the front cover of the Electronic Tank Gauge by releasing the two cover latches and swinging the cover open.
2. Remove and retain the two screws holding the cover for the Facilities Section in place,
3. Remove and retain the cover.

Wiring

1. Either of the left two entry (intended for a ½ inch conduit connection) openings are intended to be used for the power entry. Bring the ground wire into the enclosure and connect it to the safety ground post.
 - 1.1. Strip the end of the wire approximately ¼ inch (5mm).
 - 1.2. Install an appropriately sized ring tongue terminal on the end of the safety ground wire.
 - 1.3. Remove and retain the top nut and the first flat washer from the safety ground stud.
 - 1.4. Place the safety ground ring tongue terminal onto the safety ground stud.
2. Create a ground jumper to connect the safety ground to the board's power input ground.
 - 2.1. Prepare a 3 inch piece of stranded, 14 AWG wire, green or green with yellow in color.
 - 2.2. Strip both ends approximately ¼ inch (5mm).
 - 2.3. Install a ring tongue terminal on one end.
3. Install this jumper between the safety ground stud and the right-most terminal (pin 3) of the board's power input connector (J1, see Figure 5).
 - 3.1. Place the ring tongue terminal onto the safety ground stud.
 - 3.2. Reinstall the flat washer previously removed from the safety ground stud.
 - 3.3. Reinstall the nut previously removed from the safety ground stud.
 - 3.4. Position the ring tongue terminals and snug the nut down to secure.
 - 3.5. Insert the stripped end of the jumper into the right most terminal (pin 3) of the input power terminal block/connector (J1).
 - 3.6. Snug the terminal screw down to secure the wire in place. Verify that it is secure by gently tugging on the wire. The wire should remain in the terminal block.
4. Connect the mains neutral wire to the center terminal (pin 2) of the board's power input connector.
 - 4.1. Strip approximately ¼ inch of the insulation from the end of the wire.
 - 4.2. Insert the stripped end of the wire fully into the center terminal (pin 2) of the board's power input connector (J1).
 - 4.3. Snug the terminal screw down to secure the wire in place. Verify that it is secure by gently tugging on the wire. The wire should remain in the terminal block.
5. Connect the mains line/hot wire to the left-most terminal (pin 1) of the board's power input connector.
 - 5.1. Strip approximately ¼ inch of the insulation from the end of the wire.
 - 5.2. Insert the stripped end of the wire fully into the left most terminal (pin 1) of the board's power input connector (J1).
 - 5.3. Snug the terminal screw down to secure the wire in place. Verify that it is secure by gently tugging on the wire. The wire should remain in the terminal block.
6. Verify that the wires are properly connected and secure in the terminal block. Properly stripped, inserted and secured wires should look like Figure 6 with no stray wires protruding from any terminal.

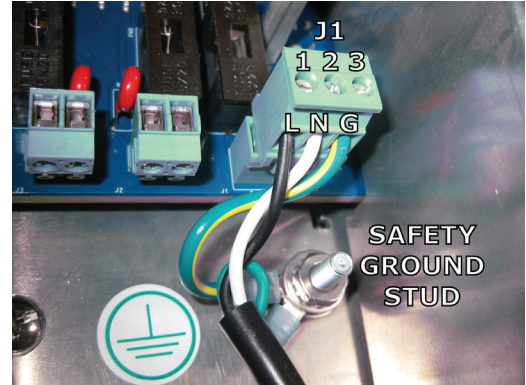


Figure 5 Power Connections

Completion

1. If you are going to be wiring Outputs, proceed to "Wiring" section (below) to wire the outputs.
2. Place the cover back in place from where it was removed in "Preparation" section above.
3. Secure the cover in place with the screws that were retained.
4. Snug the screws in place.
5. Close the front cover of the Electronic Tank Gauge and secure in place by latching the two cover latches.

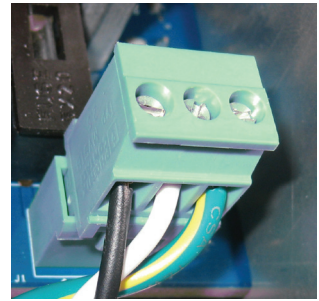


Figure 6 Completed Input Power Connector

OUTPUTS: CONTROLLED DEVICES

Preparation

1. If not already done, open the front cover of the Electronic Tank Gauge by releasing the two cover latches and swinging the cover open.
2. Remove and retain the two screws holding the cover for the Facilities Section in place,
3. Remove and retain the cover.

Wiring

NOTE: The 1218C "outputs" do not provide any power of themselves; these are dry-contact switches only. Supplied power runs through them to control your devices.

IMPORTANT: Power for the 1218C must be on its own, dedicated breaker. Do not tie the Power for the Output(s) to the 1218C's facilities power.

NOTE: While the 1218C Output pluggable terminal blocks are rated to take wires 32 AWG - 12 AWG (0.2mm² - 2.5mm²), we recommend using 22AWG to 14AWG when wiring Outputs.

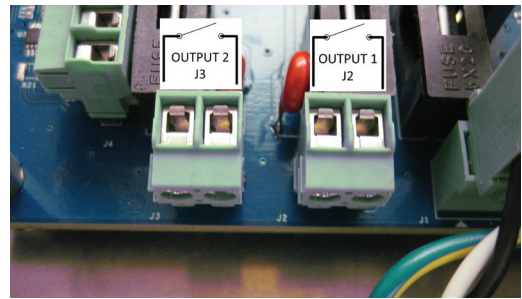
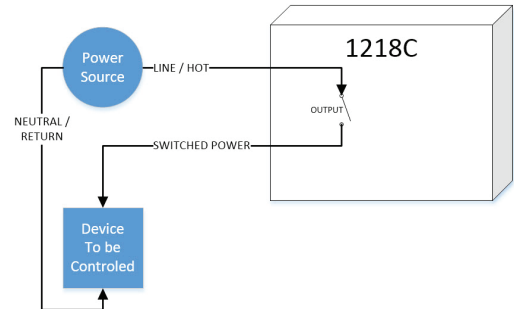


Figure 7 Output Connectors

1. Bring the "LINE/HOT" power for the device to be controlled into the 1218C enclosure. Either of the left two entry points are intended for this purpose.
2. Strip about ¼ inch of insulation from the wire.
3. Insert it fully into the pluggable terminal block. If stripped and inserted properly, the insulation should be butted up against the body of the terminal block and look like Figure 8, with no stray wires protruding from any terminal.
4. Snug the terminal block screw down onto the wire.
5. Verify that the wire is adequately captured by gently tugging on the wire. If properly held in place, the wire will not pull out of the terminal block.
6. Repeat steps 2 through 5 for the "SWITCHED POWER" that goes to the device to be controlled.
7. Verify that both wires are secure and properly inserted into the terminal block. They should look something like what is illustrated in Figure 8 with no wires protruding from the terminals.
8. If more than one Output is going to be used, then repeat steps 1 through 7 for the second Output.

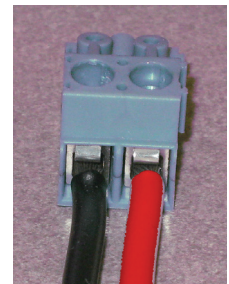


Figure 8 Complete Output Wiring

Completion

1. If you are going to be connecting the console to a Network, proceed to "Wiring" section below to make this connection.
2. Place the cover back in place from where it was removed above.
3. Secure the cover in place with the screws that were retained.
4. Snug the screws in place.
5. Close the front cover of the Electronic Tank Gauge and secure in place by latching the two cover latches.

ETHERNET: DATA CONNECTION

Preparation

1. If not already done, open the front cover of the Electronic Tank Gauge by releasing the two cover latches and swinging the cover open.
2. Remove and retain the two screws holding the cover for the Facilities Section in place,
3. Remove and retain the cover.

NOTE: Ethernet cables with integral strain reliefs will not fit in the 1218C. Use only CAT5 or better Ethernet cables **without** strain reliefs.



IMPORTANT NOTE: We recommend that the Ethernet cable NOT be routed in the same conduit as any 1218C Output wiring.

Furthermore, the Ethernet cable should not be routed in the same conduit with any power wiring.

It would be acceptable for the Ethernet cable to egress the Console Enclosure through the same entry point to a junction box that is less than 2 feet away and then routed separately from there.

Wiring

1. Route the Ethernet cable to the 1218C Electronic Tank Gauge from your network router, switch or hub.
2. The left two entry points may be used to provide access to the enclosure for the Ethernet cable. Ensure that there is about 10 inches of cable extending into the 1218C enclosure.
3. Route the cable to the left side of the standoff near the enclosure wall and up to the Ethernet connector (J3) on the Control Board (see Figure 9).
4. Plug the cable into J3, tab side up.

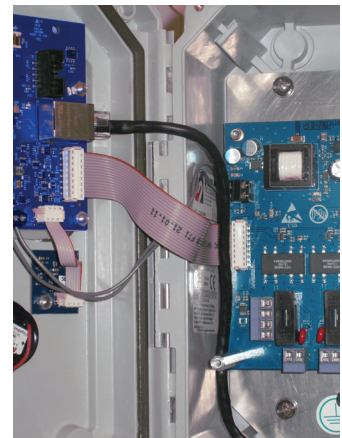


Figure 9 Ethernet Cable Routing

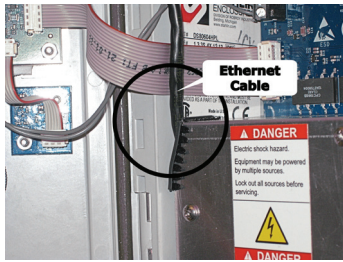


Figure 10 Finishing the Ethernet Cable Routing

Completion

1. Lift the Ethernet Cable up to the level of the top of the standoff while replacing the cover previously removed. Make sure the cable enters the cover at the corner protected by the plastic shield.
2. Secure the cover in place with the screws previously removed and retained.
3. Snug the screws in place.
4. Close the front cover of the Electronic Tank Gauge and secure in place by latching the two cover latches.

The Other End of the Ethernet Cable

NOTE: For the 1218C to operate properly on your Network, it may have to be reconfigured to be compatible to your Network. This can be done either through the Setup menu or through the Website interface (see the “NETWORK SETTINGS: connecting to the outside world” section on page 21).

You may simply plug the other end of the Ethernet cable into your Network router or switch. Morrison Bros. Co. also has various solutions available for interconnectivity with the 1218C.

Item Description	Morrison Bros. Co. Part Number	Details
Outdoor Ethernet Switch	1218C-0171 AS	5-Port (outdoor rated)
	1218C-0172 AS	8-Port (outdoor rated)
Wireless Access Point	1218C-0154 2A	2 Wired Ports, 600ft. wireless range, outdoor rated
Wireless Client	1218C-0163 2C	1 Wired Port, 2000ft wireless range to Wireless Access Point, outdoor rated
Long Range Wireless Base Station Kit	1218C-0164 AK	2+ mile wireless range to Wireless Client, outdoor rated
Cellular Gateway	1218C-0169 AG	1 Wired Port, 4G LTE, outdoor rated

Steps to Configure the 1218C

CONFIGURING THE DIP SWITCH: SW5

Switch	ON	OFF
Top (1)	This is a Remote Secondary Console	This is a Primary Console
Top Middle (2)	Reserved	
Bottom Middle (3)	Reserved	
Bottom (4)	This is a 4 Channel	This is a 2 Channel

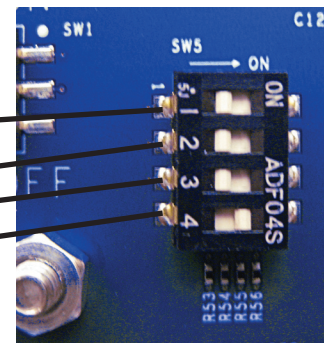


Figure 11 SW5 DIP Switch

A **Primary Console** is the console that has all of the 1218 Sensors and, if utilized, any outputs connected to it. It is the console that is actually doing all of the work associated with your application. This includes any Network connection.

A **Secondary** or **Remote Console** serves only as a point of control and monitoring status, levels and the like. All of its inputs and outputs are disabled. See Appendix F for more information.

Do not connect your Network to the Secondary Console.

UNDERSTANDING WHAT THE BUTTONS DO: BASICS OF KEYPRESSES

“Silence/Test” Button

The front panel “Silence/Test” button (Figure 12) is used in various ways depending on the context of its use. In this document a **Single Tap** is defined as a quick press and release of the button. A **Double Tap** is performing this same operation twice in a row fairly quickly.

In Normal Operation, it is used for the following operations:

- “Wake Up” (a Single Tap when the Display is “asleep” or “dozing”)
- “Acknowledge/Silence Alarm” (a Single Tap while the Display is awake and the 1218C is in alarm mode will Acknowledge and silence an active alarm)
- “Test” (press and hold to test the Indicator Light and Buzzer)
- “Access Quick Menu” (Double Tap)
 - “Move Forward One Entry in Quick Menu” (Single Tap)
 - “Select Quick Menu Option” (Double Tap)
 - “Exit Quick Menu” (press and hold)

In the Console’s System Menu, it is used for the following operations:

- “Select” (Single Tap)
- “Forward” (Single Tap)
- “Back” (Double Tap)
- “Enter Value” (press and hold)
- “Exit” (press and hold)



Figure 12 Test/Silence Button

Up/Down Buttons

The Up and Down buttons are located on the left hand side of the main control board on the back of the front panel

(Figure 13). When configuring the 1218C it is most convenient to position the index finger of the right hand on the UP button and the middle finger of the right hand on the DOWN button while operating the Silence/Test button with a finger of the left hand.

These have the following use depending on context:

- Move to the previous menu item (UP) / Move to the next menu item (DOWN)

NOTE: Moving UP when already positioned at the top of the menu list will wrap around to the end of the menu list. Moving DOWN when you are at the end of the menu list will wrap you around to the top of the menu list.

- Increase (UP) a Value / Decrease (DOWN) a Value

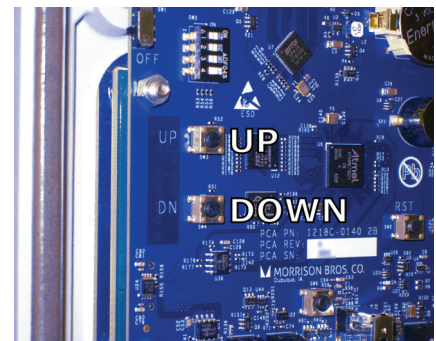


Figure 13 Up/Down Buttons

NOTE: Increasing a value when it is already a nine (9) will wrap around to zero (0). Decreasing a value when it is already a zero (0) will wrap around to nine (9).

- Abort Entering a Value (UP and DOWN simultaneously)
- Delete to End of Line from Cursor (Press and hold UP, DOWN and Silence/Test simultaneously); deletes all of the characters to the right of the cursor.

CONFIGURING YOUR 1218C USING THE WEB PORTAL

It is recommended to use the web portal to configure the 1218C. The web portal makes it quick and easy to configure the 1218C and also provides access to configuration options not available otherwise (e.g. Email notifications, FuelCloud settings, and External I/O Expansion Module). To access the web portal you will need a computer or laptop connected to the 1218C either directly using an Ethernet cable or through a network (LAN).

Network Connection.

If the 1218C is connected to a network it is recommended to leave DHCP enabled (default) and allow the 1218C to acquire all of its network settings from the DHCP server on the network. With DHCP enabled, you will need give the console a unique local host name (e.g. 'morbros1218c_1'), found in the Network Settings section of the System Menu, to ensure all 1218C consoles on the network have different host names. See 'Configuring your 1218C using the System Menu' on page 15 for instructions on accessing the System Menu.

If for some reason you cannot use DHCP, you will need to disable DHCP from the console's system menu. You will also need to acquire a unique IP address from you network administrator along with the other network settings (subnet mask, default gateway, and DNS servers) and configure the 1218C with these settings before you can connect to the web portal. See 'Configuring your 1218C using the System Menu' on page 15 for details on configuring these settings.

Direct Connection.

To connect the 1218C directly to a computer, you will need to disable DHCP status. The 1218C will then be configured with a default IP address (192.168.0.100). You will then need to configure the computer with a static IP address in the same subnet as the 1218C. See Appendix G for instructions on configuring your computer's network adapter settings for direct connection.

Entering the Web Portal

NOTE: For the best experience it is recommended to use the Google Chrome or Mozilla Firefox web browser to access the 1218C website. See Appendix I for configuring Microsoft Internet Explorer / Edge for use with 1218C website. No special configuration is required when using Google Chrome or Mozilla Firefox.

Once the 1218C is configured for networked or direct connection you are ready to access the web portal. If using DHCP you will need to access the 1218C using the host name, otherwise you will need to use the IP address. Open a web browser on your computer and use the 'https' protocol along with the host name or IP address of the 1218C.

https://morbros1218c (DHCP enabled)
https://192.168.0.100 (DHCP disabled)

Your browser will warn you that the web page is not secure as the security certificate is not trusted. Acknowledge the security warning and proceed to the web page. See Appendix H for more details on managing the security settings on the computer to access the 1218C.

After proceeding through the security warning you will be prompted to login to the web portal. Use the default credentials for sign in.

Administrator Account (full-access)
Username: admin
Password: admin

Guest Account (status and event log access only)
Username: guest
Password: guest

NOTE: For security it is highly recommended to change the default passwords. A label is provided inside the console to document the admin password. Use the provided padlock to keep the console protected from unauthorized access.

Once you have entered the web portal, navigate to the 'Configuration' page. Proceed to configure the 1218C by expanding each section and editing the settings. To edit an entry click on the small, yellow pencil to the right of the entry, enter your new value in the field. If the value you entered is acceptable, then click on the checkmark (✓). If you want to abort the value change, then click on the X (×). See 'Configuration Settings' on page 15 for details of all configurable options in the 1218C.

CONFIGURING YOUR 1218C USING THE SYSTEM MENU

If you do not have access to a computer you will need to configure the 1218C through the System Menu using the buttons previously described in "Understanding What the Buttons Do: Basics of Keypresses" section on page 13. Some preparation is required to make the setup go smoothly for you. Use the Worksheet provided in Appendix D on page 52 to help gather the information you need to completely configure your 1218C.

Entering the System Menu

To enter the Console's System Menu, Press and Hold the "UP" button and "Silence/Test Button" simultaneously for more than three (3) seconds. The 1218C will remain in the System Menu for only 60 seconds when there is no activity.

CONFIGURATION SETTINGS

This section provides a complete list of settings available through the web portal. Many of these settings are also configurable through the System Menu. Refer to the "Configuration Menu Tree" in Appendix A for a list of options available from the System Menu.

System Configuration

These are basic system level configuration settings

- **Site Name:** Name of the site/location to help identify the device. (Optional: default is "SITE NAME"); Up to 15 characters (see the "Name Guidance" section on page 24 for guidance in naming).
- **Console Name:** Unique name to help identify the device. (Optional: default is "CONSOLE NAME"); Up to 15 characters (see the "Name Guidance" section on page 24 for guidance in naming).
- **Units:** This part of the configuration sets the Units used in displaying the fluid level. This is a system-wide setting affecting the display all liquid levels.

Selecting "Feet/Inches" or "Gallons" in the Units menu selects the Imperial/English measuring system. The difference between selecting "Feet/Inches" or "Gallons" is in what the fluid level is being reported in. In "Feet/Inches" the level is reported in the height of the fluid in the tank in feet and inches. In "Gallons" the level of the fluid is reported in volume of fluid in gallons.

NOTE: The level in gallons is a calculated value based on the level in feet and inches and the dimensions of the tank as entered in the Tank Setup portion of the configuration. This value is NOT temperature compensated; it is the actual volume of fluid at the moment at the current temperature.

Selecting "Centimeters" or "Liters" in the Units menu selects the Metric measuring system. As with the previous selections, the difference between the two is that of fluid level height and calculated fluid volume at the current temperature.

The default is Feet and Inches.

NOTE: This setting does not affect the units used in configuring or calibrating tanks. All measurements used for Tank configuration and calibration are in inches and tenths.

Tank Configuration

The Minimum Tank Configuration consists of defining the physical characteristics of the tank and telling the system exactly what the present level of the fluid is in the tank.

In order for the 1218C to accurately reflect the level of fluid in a tank, it needs to know certain basic information about each installed.

- **Status:** Enabled {Channel/Tank 1 default} or Disabled {Channel/Tank 2 – 4 default}. By enabling a Channel/Tank, you allow that Channel to be monitored by the 1218C.
- **Tank Name** (optional: default is “TANK 1”, “TANK 2”, etc.): Up to 10 characters (see the “Name Guidance” section on page 24 for guidance in naming. This is assuming each channel of the 1218C is connected to its own Tank. If multiple Sensors exist on a single tank, then this becomes the Name of the Sensor.
- **Tank Shape of the primary tank**
 - Round Vertical (default)
 - Round Horizontal
 - Rectangular
- **Tank Dimensions** of the primary tank (see Table 2 for guidance). ALL dimensions are entered in inches.
- **Top Level:** Level which is considered to be the maximum fill level for the tank. This is not the total height of the tank. It is the maximum liquid level as indicated on the tank chart for the tank you are monitoring.
- **Slope:** ONLY applies to Round Horizontal tanks. If the tank is sloped...
 - The Slope of the tank (rise/run)
 - The Sensor Offset (distance of the probe from the highest end of the tank. See the illustration in Figure 15 on page 17)
- **Manifold Factor:** If two or more IDENTICAL tanks are connected together (Manifold Factor > 0), how many additional tanks are connected?

EXAMPLE: If you have two tanks that have been manifolded together, then the Manifold Factor is one (1) because the second tank represents one additional tank.

NOTE: Manifolded tanks MUST:

- Be identical in shape and size
- Be installed at the same level relative to each other
- Have the Sensor mounted on the tank which acts as the fill point for the system.
- Not exceed three (3) additional tanks (total of four (4) identical tanks connected together).

- **Level Calibration:** This is used to “Calibrate” the Sensor to your tank. To set the Level Calibration of the tank, you need to measure the level of the fluid in the tank in inches and tenths of inches and enter it here. When you enter this calibration mode, the system sets the current measured level as the starting point; if this is the first time you are setting this level, the level initially indicated here will be zero.

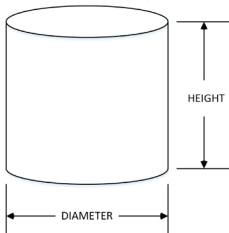
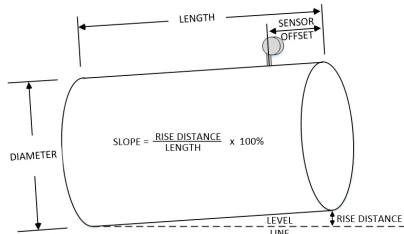
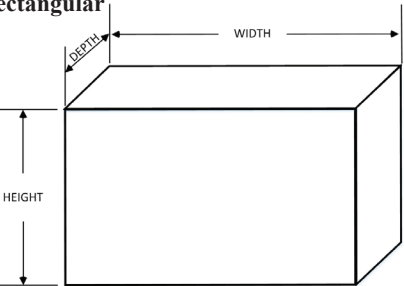
Shape	Dim 1 (Z)	Dim 2 (Y)	Dim 3 (X)	Sloped Tank	
				Slope	Offset
Round Vertical (vertical cylinder)  <p>Figure 14—Round Vertical Tank (Vertical Cylinder)</p>	Height	Diameter	N/A	N/A	
Round Horizontal (horizontal cylinder)  <p>Figure 15—Round Horizontal Tank (Horizontal Cylinder)</p>	Diameter	Length	N/A	Rise/Run x 100%	Distance from Highest End
Rectangular  <p>Figure 16—Rectangular Tank</p>	Height	Width	Depth	N/A	

Table 2 Tank Measurements for Configuration

Level Alarms

Up to four (4) Level Alarms may be defined and enabled for each Sensor. These may be high level or low level alarms. The alarm level is based on the percentage of the tank that is filled (based on the Top Level/Maximum Fill Level of the tank, not its physical dimensions).

These Level Alarms must be configured to be used.

- **Status:** Enabled or Disabled (default) – turns the Level Alarm on and off.
- **Alarm Name** (optional: default is “ALARM 1”, “ALARM 2”, etc.): Up to 8 characters (see the “Name Guidance” section on page 24 for guidance in naming).
- **Alarm Type:** High Level or Low Level
- **Value:** Percentage of Maximum Fill Level which the alarm condition will trip. Allowed values are from 0.1 to 99.9%. The default value is 80%
- **Buzzer:** Should this Level Alarm cause the 1218C’s Buzzer to sound continuously, automatically silence after the configured Autosilence Timeout period (see “INDICATOR SETTINGS” on page 21) or not sound at all? The default is to silence after the Autosilence Timeout period.
- **Log Events:** An “Event” is defined as a change in state. It applies to when an alarm condition begins and when it ends. If you want to add an event log entry when this Level Alarm has an event, you must enable this feature here. Logging events is disabled by default.

NOTE: The Event Log must also be enabled in the Event Log Settings in order to log Level Alarm events; the Event Log is disabled by default. compensated; it is the actual volume of fluid at the moment at the current temperature.

Sensor Inputs

Each 1218 Sensor has two inputs for Simple Apparatus devices. These inputs could be connected to any one of a number of Morrison Bros. Co. products like the Figure 918 Series of Sensors, Figure 924 Liquid Sensor and the 925 Multi-Sensor or Oil/Water Sensor.

Each of these inputs must be configured in the following ways:

- **Status:** Enabled or Disabled (default) – turns the Sensor Input Alarm on and off.
- **Input Name:** (optional: default is “INPUT 1” / “INPUT 2”): Up to 14 characters (see the “Name Guidance” section on page 24 for guidance in naming).
- **Contact Type:** Normally Closed or Normally Open
- **Buzzer:** Should this Input Alarm cause the 1218C’s Buzzer to sound continuously, silence automatically after the configured Autosilence Timeout period (see “INDICATOR SETTINGS” on page 21) or not sound at all? The default is to silence automatically after the configured Autosilence Timeout period.
- **Log Events:** An “Event” is defined as a change in state. It applies to when an alarm condition begins and when it ends. If you want to add an event log entry when this alarm input has an event, this feature must be enabled here. Logging these events is disabled by default.

NOTE: The Event Log must also be enabled in the Event Log Settings in order to log Input Alarm events; the Event Log is disabled by default.

Relay Outputs

The 1218C has two Outputs. **These Outputs do not supply any power for your devices.** They are Dry Contact Outputs, simply closing and opening a switch in response to system conditions and configuration according to their configuration. **Your supplied power must pass through them to control your device.**

The configuration of the Outputs involves the following parameters:

- **Alarm Sources:** Select one or more alarm sources (level alarm, input alarm, error alarm, etc.) to trigger the activation or deactivation of the relay output.
- **Status:** Enabled or Disabled (default) – turns the Relay Output on and off.
- **Output Name:** (optional: default is “OUTPUT 1” / “OUTPUT 2”): Up to 14 characters (see the “Name Guidance” section on page 24 for guidance in naming).
- **Type:** Are the Output contacts going to be Normally Open/Normally Deactivated (default) or Normally Closed/Normally Activated. If they are configured as Normally Activated, they will Open when power is removed. If they are configured as Normally Deactivated, they will remain Open when power is removed. In the absence of power, the Output contacts are always Open.
- **Mode:** Configures how and when the Output contacts return to the inactive state.
 - **Persistent:** Output contacts remain in the active state while the alarm condition is present.
 - **Non-persistent:** Output contacts will become inactive when the alarm is acknowledged or when the alarm condition no longer exists.
 - **Auto-Timeout:** Output contacts will become inactive when the alarm is acknowledged, or when the alarm condition no longer exists, or after a user defined timeout period.
- **Auto-Timeout:** Sets the timeout period of the Relay 'Auto-Timeout' mode from 1 to 10 minutes.
- **Test Mode:** Output contacts will become active while the console is in 'Test' mode (press and hold Test/Silence button). The default is Disabled.
- **Log Output Events:** You have the option to create an Event Log entry every time an Output changes state. The default is Disabled.

External I/O

The 1218C has the ability to expand the number of inputs and outputs using the optional 1218C External Input/Output Expansion Module (1218C-6600 AM). The 1218C-6600 AM provides an additional 6 inputs and 6 relay outputs. These inputs and outputs are configured in the same way as the internal inputs and outputs of the 1218 console and sensor. Refer to the 1218C-6600 AM Installation, Operation, and Maintenance Instructions for complete details on configuring the External I/O Module.

Event Logging

The 1218C has the ability to keep a log of events. It will keep up to the last 1,000 event records in memory. When the 1,001st event record occurs, then the oldest event record is thrown away and the new record takes its place.

By default, Event Logging is Disabled. This does not prevent you from configuring everything associated with Event Logging. You may completely configure everything to do with Event Logging and then enable it at some future time. Note, however, until Event Logging is enabled, no Event Logging will take place.

The following information is logged for each enabled event:

- **Date and Time** of the Event
- **Event Type**—See Table 3 on page 19 for details
- **Channel Number**—This reflects the actual hardware input of the console. As noted elsewhere, the bottom most input is Channel 1. This is used in displaying the Event Log on the Console and appears in the downloaded Event Log, but does not appear on the Website.
- **Tank Name**—The assigned Tank Name. See “TANK CONFIGURATION: minimum tank setup” on page 15 for information on setting the Tank Name. This is only visible on the Website or in the downloaded Event Log.
- **Event Information**—Visible only on the Website or in the downloaded Event Log. This supplies additional information on the event.

Event Type	Displayed Text	
	Logfile & Website	Console
FILL START	FILL STARTED	FILL START
FILL END	FILL ENDED	FILL END
DISCHARGE START	DISCHARGE STARTED	DISCHARGE START
DISCHARGE END	DISCHARGE ENDED	DISCHARGE END
LEVEL ALARM 1	TANK LEVEL ALARM 1	LEVEL ALARM
LEVEL ALARM 2	TANK LEVEL ALARM 2	LEVEL ALARM
LEVEL ALARM 3	TANK LEVEL ALARM 3	LEVEL ALARM
LEVEL ALARM 4	TANK LEVEL ALARM 4	LEVEL ALARM
INPUT 1	INPUT 1 CHANGED	INPUT CHANGE
INPUT 2	INPUT 2 CHANGED	INPUT CHANGE
LOW BATTERY	SENSOR LOW VOLTAGE	LOW VOLTAGE
LOW VOLTAGE	SENSOR LOW BATTERY	LOW BATTERY
COMMUNICATIONS ERROR	SENSOR COM ERROR	COM ERROR
ALARM ACKNOWLEDGED	ALARM ACKNOWLEDGED	ALARM ACK
PERIODIC EVENT	PERIODIC EVENT	PERIODIC EVENT
OUTPUT 1	OUTPUT 1 CHANGED	OUTPUT CHANGE
OUTPUT 2	OUTPUT 2 CHANGED	OUTPUT CHANGE
POWER FAIL	POWER FAILURE	POWER FAILURE
POWER RECOVERY	POWER RECOVERY	POWER RECOVERY
SOFTWARE ERROR	SOFTWARE ERROR	SOFTWARE ERROR
SETTING CHANGE	SETTING CHANGED	SETTING CHANGE
LOG CLEARED	EVENT LOG CLEARED	LOG CLEARED

Table 3 Event Types

The following options are available for configuring the event log:

- **Status:** Enabled or Disabled (default) – turns Event Logging on and off.
- **Power Fail/Recovery Events:** Logs the time and date that the power failed and when the power is restored.
- **Fill Events:** This is a global setting. By enabling this, ALL fills on ALL tanks will be logged. A fill event is defined as a positive change in liquid level of 0.4 inches/1.02cm or greater in a 30 second period.
- **Discharge Events:** This is a global setting. By enabling this, ALL discharge events on ALL tanks will be logged. A discharge event is defined as a negative change in liquid level of 0.6 inches/1.52cm or greater in a 30 second period.
- **Alarm Acknowledge Events:** In the case where there is an active alarm, an Alarm Acknowledge Event is logged when a user presses the Silence/Test button to acknowledge the alarm.
- **Periodic Events:** A Periodic Event is a “snapshot in time” of the current levels of all Tanks, the state of every enabled Alarm (Level and Input) and the state of every enabled Output. You may configure the
 - Days of the Week the snapshot is taken
 - Work Weekdays only (Monday through Friday)
 - Every Day (Sunday through Saturday)
 - Time of Day

Clock Settings

The Console needs to know what the date and time is in order to accurately log events. Furthermore, the date and time is displayed on the Console’s display. If you want to be sure that these are accurate, then you need to take the time to set the Date and Time here. Over time the clock in the 1218C may drift due to temperature variations. To maintain accurate time you should check and update the clock every 6 months.

Display Settings

- **Display Sleep:** By default the Display will dim after 4½ minutes of inactivity and darken 30 seconds later. You can set the amount of time before the Display darkens from 1 to 30 minutes or disable this feature altogether.
 - **Status:** Enable or Disable this feature. If disabled, the Display will neither dim nor darken. Enabled by default
 - **Timeout:** Set the amount of time from 1 to 30 minutes before the Display darkens. The Display will always dim 30 seconds before it darkens.
- **Backlight:** By default the 1218C is aware of the amount of ambient light there is around itself and adjusts its Backlight brightness accordingly. If you would rather have the display Backlight the same intensity all the time, you can set that brightness here. You configure this through the Backlight Status setting.
 - **Auto:** Selecting this enables the aforementioned Automatic mode.
 - **User Setting:** Selecting this disables the Automatic mode and allows you to set the Backlight brightness manually. This may be set from 1% (Backlight as dim as possible without being off entirely) to 100% (Backlight as bright as it will go). As you adjust this value, the display Backlight will assume the brightness level you are selecting so you can see what it will look like.

IMPORTANT: Disabling the Display Sleep will reduce the life of the display. It is recommended to use the default Display Settings (Display Sleep – enabled, Backlight – auto) to achieve the maximum life of the product.

Indicator Settings

- **Auto-Silence Timeout:** In an alarm condition, the 1218C has the option to silence the Audible Alarm automatically after a specified period of time. This is referred to as “Auto-Silence” and the period of time as the “Auto-Silence Timeout.” You may set the global Auto-Silence Timeout for 1 minute to 10 minutes. Configuring a specific alarm condition to use or not use this feature is done when configuring each alarm individually.
- **Heartbeat:** In the absence of an alarm condition and after the display has gone to sleep, the 1218C can appear to be unpowered. To provide a means to dispel this appearance, the 1218C can be configured to periodically quickly flash the front panel Indicator Light; this is referred to as the 1218C’s Heartbeat. The Heartbeat is enabled by default, but may be disabled here if this functionality is not desired.

Network Settings

The 1218C may be connected to a network making it possible to be accessible from anywhere, depending on the configuration of your network. This is accomplished with a hard wired CAT5 or better cable. While it is possible to simply plug and play, it is more likely that you will have to configure the 1218C to conform it to your particular network.

IMPORTANT: Disabling the Display Sleep will reduce the life of the display. It is recommended to use the default Display Settings (Display Sleep – enabled, Backlight – auto) to achieve the maximum life of the product.

- **DHCP Status:** Enabled by default.
- **Local Host Name (default is: “morbros1218c”):** Enter local host name up to 15 characters. “Allowed” names for the supplied security certificate are “morbros1218c” and “morbros1218c_n” where “n” is any number between zero (0) and nine (9). If you choose a Local Host Name that does not conform to this convention, then your browser will complain that this is not a secure connection. It is still just as secure as if you did conform to this convention; the difference is that your web browser won’t believe that it is if you don’t conform. (see Name Guidance on page 24 for guidance in what characters are allowed)
- **IP Address** (default is: 192.168.0.100)*
- **Subnet Mask** (default is: 255.255.255.0)*
- **Gateway Address** (default is: 192.168.0.1)*
- **Primary DNS** (default is: 8.8.8.8)*
- **Secondary DNS** (default is: 8.8.4.4)*
- **Port Number** (default is: 443)
- **View Mac Address:** Displays the console's mac address
- **Admin Account Password** (default is: “admin”): Enter Administrator’s password up to 15 characters (see Name Guidance on page 24 for guidance in what characters are allowed). A person with admin privileges has access to everything.
- **Guest Account Password** (default is: “guest”): Enter Guest’s password up to 15 characters (see Name Guidance on page 24 for guidance in what characters are allowed). A person with guest privileges only has access to the Status and Event Log pages.

*These settings are ignored when DHCP is enabled.

Modbus Settings

The 1218C can be configured as a Modbus server, using the Modbus TCP or Modbus RTU protocols, to interface with a building automation system (BAS) or a programmable logic controller (PLC) and provide system status (level, volume, ullage, alarms, etc.). Refer to Appendix J for the Modbus register addresses of system data variables.

The configuration of the Modbus server involves the following parameters:

- **Modbus Status:** Enabled or Disabled (default). By enabling Modbus with the RTU interface selected, the Remote Console functionality will be disabled.
- **Modbus Interface:** Modbus RTU (default) or Modbus TCP.

Modbus TCP Settings.

- **Modbus TCP Unit Id:** Unit Id can be set from 1 to 255.
- **Modbus TCP Port:** The default is 502. It is not recommended to change the TCP port unless it is absolutely required by the Modbus client.

IMPORTANT: The 1218C network settings (IP address, subnet mask, default gateway) must be properly configured to use Modbus TCP. The 1218C network settings are shared for the web interface and Modbus TCP. That is, changing the IP address of the 1218C will affect both the web interface and the Modbus TCP server.

Modbus RTU Settings.

- **Modbus RTU Slave Address:** Slave address of the 1218C (1 – 247).
- **Modbus RTU Baud Rate:** 9600 or 19200 (default).
- **Modbus RTU Parity:** None, Even (default), Odd, or Mark. The Mark parity can be used to act as a second stop bit when required by Modbus clients.

FuelCloud Settings

The 1218C can be connected to a FuelCloud account and automatically send inventory updates to the Cloud. Refer to Appendix K for details on setting up FuelCloud. More information can also be found at www.fuelcloud.com.

Email Notification Settings

IMPORTANT: Internet connections, emails, and/or text messages are not fail-safe and are subject to errors, delays, and interruptions that are outside of the operational control of the 1218 Electronic Tank Gauge. Therefore, Morrison Bros. Co. is not responsible or liable for any operational issues or problems caused by these types of communication error, delays, or interruptions.

Someone may want to know when particular events occur; they may want it sent to an email address or have a text sent to their mobile device. You can think of this functionality as a special case of the Event Logging that we have already discussed, above. The difference is that the “log entry” is being sent outside the box to an email account or a mobile device via text. In that way, parts of the configuration looks very similar to that of Event Logging.

You may configure up to four (4) separate and completely independent Email Notifications. Each of these requires the following information:

- **Status:** Disabled by default
- **Type:** Is the notification to be sent by Email or Text. Default is Email.

The content of a Text notification is much more concise. The email contains all of the information. Notifications of Periodic Events cannot be sent by text.

- **Email Address:** The email address to send the notification to. For Email Notifications, this is the very familiar standard format Email Address such as “joe.schmoe@friday.net”.

What does this have to do with sending something by text?

Each cellular service provider has a service that converts an email to a text and sends it to your mobile device. To send the text, we email this service with your information and you get the text. You have to enter the information for your provider here to make that connection. The email would take the form of “nnnnnnnnnn@{SMS Gateway}” where nnnnnnnnnn is the phone number and {SMS Gateway} is specific to the carrier.

EXAMPLE: If the phone number of interest was 563-555-1234 and the carrier was Verizon, then the Email Address that I would enter to send a text message to this mobile device would be:

5635551234@vtext.com

See Table 4 for a partial list of SMS Gateway email addresses.

U.S. Carrier	SMS Gateway
Alltel	sms.alltelwireless.com
AT&T	txt.att.net
Boost Mobile	sms.myboostmobile.com
Sprint	messaging.sprintpcs.com
T-Mobile	tmomail.net
U.S. Cellular	email.uscc.net
Verizon	vtext.com
Virgin Mobile	vmobile.com

Table 4 Partial List of SMS Gateway Email Addresses

Now you get to select the kind of events that will generate the Email or Text. All of these are disabled by default. Each of these must be defined elsewhere if an Email/Text is going to be generated by them. You can chose any or all of the following:

- **Periodic Events:** This is not allowed if you have chosen to use a text message as opposed to an email. Periodic Events are defined in the Event Logging portion of the configuration (see the section on Configuring Event Logging on page 19 for details). Whenever a defined and enabled Periodic Event occurs, an email will be sent to the configured email address if this is selected.
- **Level Alarms:** This sends an email/text if a configured and enabled Level Alarm occurs (see the section on LEVEL ALARMS on page 17 to learn how to configure a level alarm). Level Alarms do not have to be enabled in the Event Logging configuration for you to use this feature. If more than one Level Alarm is defined, you cannot choose one and not the other. If any one or more of the defined and enabled Level Alarm occur, then an email/text would be sent.
- **Input Alarms:** As with the Level Alarms, if any defined Input Alarm on a 1218 Sensor occurs, then an email/text would be sent.
- **Fill Events:** email/text notification of Fill events is sent when the fill has completed.
- **Discharge Events:** An email/text notification of Discharge events is sent when the discharge has completed.
- **Power Recovery:** Power was lost and has now returned, then an email/text would be sent.
- **COM Errors:** If a communication error occurs between a 1218 Sensor and the 1218C, then an email/text would be generated if this is enabled.
- **Low Voltage/Battery:** If the voltage used to operate the 1218 Sensor drops below operable levels, then an email/text would be sent.

Name Guidance

You are allowed to assign custom names for various aspects of your specific installation. Your Site has one or more Tanks installed and one or more Consoles. Each Console can have up to four Tanks / Sensors connected to it. Each Tank has one or more Sensors on it. Each Sensor has two independent Inputs associated with it. You can create up to four Level Alarms for each monitored Tank / Sensor based on measured fluid levels (high or low).

If you choose to do so, you can assign each of these entities a custom name which helps you identify what it is in terms what makes sense to your installation; see Figure 17 on page 25.

These names may contain any of the following characters:

- “A” through “Z” (upper case alphabet)
- “0” through “9” (numbers zero through nine)
- “-” (hyphen)
- “/” (forward slash)
- “#” (pound sign/hash tag)
- “ ” (space)

When using Network access, you can also assign a Local Host Name. These may contain the following characters:

- “a” through “z” (lower case alphabet)
- “0” through “9” (numbers zero through nine)
- “-” (hyphen)
- “_” (underscore)

You may also set the Administrator’s and Guest’s passwords. These may contain the following characters:

- “A” through “Z” (upper case alphabet)
- “a” through “z” (lower case alphabet)
- “0” through “9” (numbers zero through nine)
- The following special characters:

!	"	#	\$	%	&	'	()	*	+
,	-	.	/	:	;	<	=	>	?	@
[\]	^	_	`	{		}	~	

Each name is limited in length, depending on what it is associated with.

What is Named	Maximum Length
Tank/Sensor	10
Sensor Input	14
Level Alarm	14
Site Name	15
Console Name	15
Local Host Name	15
Administrator's/Guest's Password	15

Table 5 Maximum Name Lengths

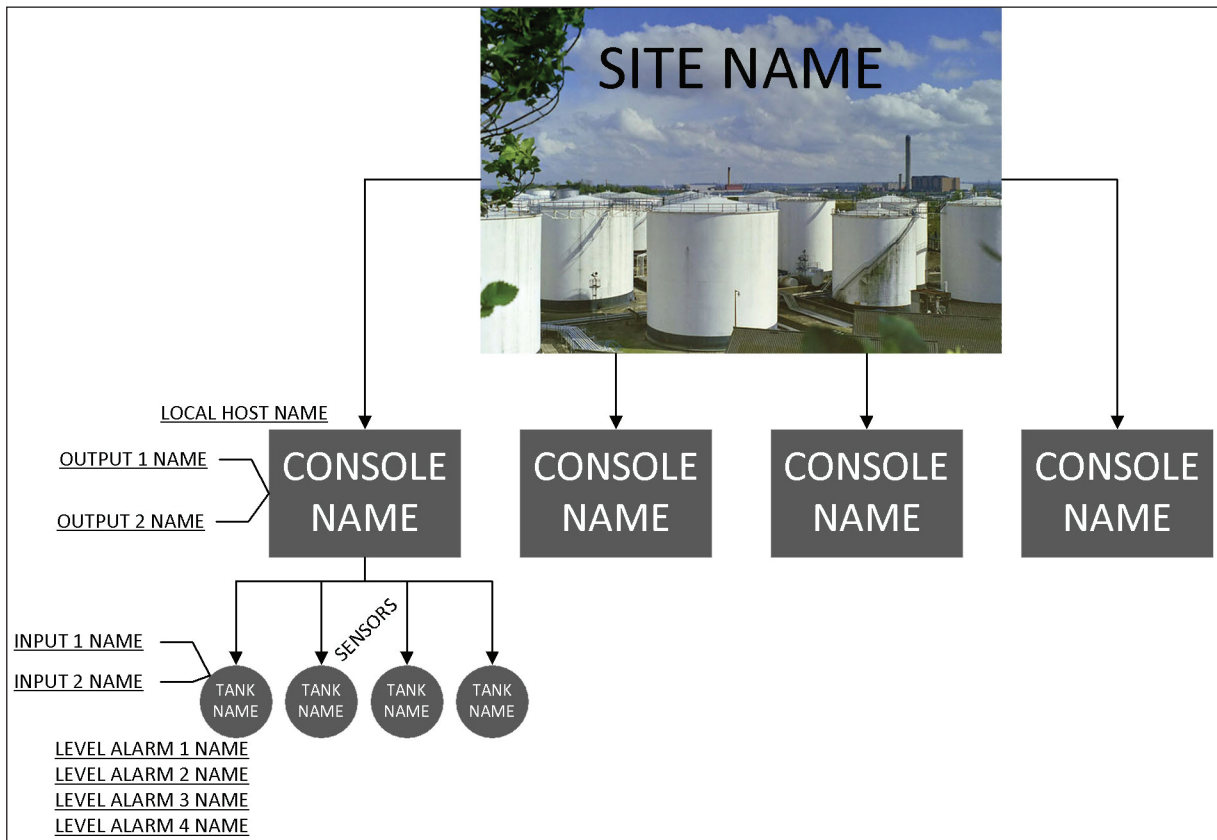


Figure 17 Naming Hierarchy

TESTING

There are two aspects to testing::

- Making sure the system configuration is as intended
 - Tank Names
 - Alarm Names/Limits/ etc.
 - Logging
 - Data connections.
- Making sure the system is functional:
 - Sensor(s) are responding to liquid levels and are accurate
 - Dry contact sensor inputs are responding appropriately (if used)

Configuration Confirmation

It is important to make sure the 1218C is the way you want it. The 1218C provides an easy way to see what it thinks it should be doing. This is accomplished through the “Quick Menu.”

To enter the Quick Menu, Double Tap the Silence/Test button. After the Quick Menu appears, each subsequent Single Tap of the Silence/Test button will advance to the next menu item. Another Double Tap on any menu item enters that menu item. Once you have entered a menu item, the only way to exit is to press and hold the Silence/Test button.

Go into the Quick Menu and move through the various menu items to verify that every aspect of the 1218C’s configuration is exactly the way you want it.

Save and Restore Configuration

Once the configuration has been confirmed to be correct it is important to save the configuration in case it needs to be restored in the future. The configuration can be saved and restored from the console using a USB drive (contact Customer Service for a compatible USB flash drive) or using a PC to access the console's web page.

To Save a Configuration, perform the following steps:

- Unlock, unlatch and swing the 1218C enclosure door open.
- Insert the USB Flash drive into the USB port on the control board.

- If the 1218C display is not awake, then wake it up with a Single Tap of the Silence/Test button.
- Enter the Console's System Menu by pressing and holding the UP button on the control board while simultaneously pressing and holding the Silence/Test button for no less than 3 seconds.
- Using the UP and DOWN buttons on the control board navigate to the "Save/Restore Settings" menu option and Single Tap the Silence/Test button.
- Use the UP and DOWN buttons to select "Save Settings" option and Single Tap the Silence/Test button to perform the action.
- Wait for the operation to complete and remove the USB Flash drive.

To Restore a Configuration, perform the following steps:

- Unlock, unlatch and swing the 1218C enclosure door open.
- Insert the USB Flash drive into the USB port on the control board. The USB Flash drive must have a valid configuration stored on it.
- If the 1218C display is not awake, then wake it up with a Single Tap of the Silence/Test button.
- Enter the Console's System Menu by pressing and holding the UP button on the control board while simultaneously pressing and holding the Silence/Test button for no less than 3 seconds.
- Using the UP and DOWN buttons on the control board navigate to the "Save/Restore Settings" menu option and Single Tap the Silence/Test button.
- Use the UP and DOWN buttons to select "Restore Settings" option and Single Tap the Silence/Test button to perform the action.
- Wait for the operation to complete and remove the USB Flash drive.

Liquid Levels

Measure the current Liquid Level in the Tank. Ensure that the level isn't going to be changing during this verification process.

Set the Units to show Liquid Level (Feet/inches or Centimeters). Compare the displayed value against the measured liquid level in the tank.

To be sure that the tank dimensions have been configured properly, switch the Units to display the Volume of the liquid in the tank (Gallons or Liters). Using the measured liquid level value from above, refer to the tank chart to determine the theoretical volume of liquid currently in the tank. The level from the tank chart and the level displayed on the 1218 Electronic Tank Gauge should be reasonably close to one another.

Sensor Inputs

Each 1218 Series Sensor has two dry contact Sensor Inputs. If you chose to use either or both of these on any of the Sensor(s) attached to the 1218C, you must:

- Configure the 1218C Electronic Tank Gauge to pay attention to these (see above)
- Test them to be sure they are functional.

Testing the functionality of these inputs requires manually activating the sensor being used as the input device for the 1218 Sensor's Sensor Input and observing that the 1218C Electronic Tank Gauge responds according to the way that you have it configured.

- Does the alarm respond properly according to the type of contacts it has? (N.O. vs N.C.)
- Does the alarm condition activate an alarm with the 1218C?
- Does the alarm condition appear on the display with the right name?
- Did the Buzzer sound or not sound with the alarm condition (as configured)?
- Does the proper Output activate when the alarm condition occurs (if so configured)?
- Is the alarm condition logged (if so configured)?
- Did the alarm send a notification via email (if so configured)?

Operation



WARNINGS

- **Fire Hazard** – Death or serious injury could result from spilled liquids.
- You must be trained to install or maintain this Electronic Tank Gauge. **Stop** now if you have not been trained.
- Any modification of this unit beyond what is outlined in this instruction will void product warranty.
- For your safety, it is important to follow local, state, federal and/or OSHA rules that apply to working inside, above, or around the storage tank and piping area. Use all personal protective equipment required for working in the specific environment.
- This device is intended to be used as an auxiliary warning to the operator of an abnormal condition of the system, such as a possible overfill situation and should not be the only system in place to prevent an unwanted condition, such as preventing a tank from overfilling. It is the sole responsibility of the operator to continuously prevent any spillage regardless of the situation.
- Tanks could be under pressure. Vapors could be expelled from tank vents, piping, valves or fittings while performing maintenance. Vapors could catch fire or cause an explosion. Avoid sparks, open flame, or hot tools when working on tank system.
- Use a dampened cloth when cleaning the alarm enclosure to prevent static buildup and discharge.
- In the event of malfunction, contact Morrison Bros. Co. Customer Service.



AVERTISSEMENTS

- **Risque d'incendie** – Un déversement de liquide pourrait entraîner des blessures graves ou la mort.
- Vous devez avoir reçu une formation pour installer cette jauge de réservoir électronique ou en assurer la maintenance. Arrêtez-vous immédiatement si vous n'avez reçu aucune formation à cet effet.
- Toutes les modifications apportées à cette unité autres que celles indiquées dans ces directives engendreront l'annulation de la garantie du produit.
- Pour assurer votre sécurité, il est important de vous conformer à la réglementation locale, d'État, fédérale ou OSHA régissant les travaux à l'intérieur, au-dessus ou autour du réservoir de stockage et de la zone de canalisation. Utilisez tout l'équipement de protection individuelle exigé pour travailler dans l'environnement spécifique.
- Cet appareil est destiné à être utilisé comme mécanisme avertissant l'opérateur d'un état anormal du système tel une situation de remplissage excessif et ne devrait pas être le seul système en place pour empêcher un état indésirable, par exemple, un réservoir qui se remplit trop. L'opérateur a l'entière responsabilité de s'assurer continuellement de prévenir tout déversement, quelle que soit la situation.
- Les réservoirs pourraient être sous pression. Des vapeurs pourraient être expulsées des conduits d'aération, des canalisations, des soupapes ou des raccords du réservoir durant la maintenance. Les vapeurs pourraient s'enflammer ou engendrer une explosion. Évitez les étincelles, les flammes nues ou les outils chauds lors de travaux menés dans le système du réservoir.
- Utilisez un linge humide pour nettoyer l'enceinte de l'alarme afin de prévenir l'accumulation d'électricité statique et les décharges.
- En cas de défaillance, communiquez avec le service à la clientèle de Morrison Bros. Co.

GENERAL

Sleep/Heartbeat/Wakeup

Sleep mode is a Display Sleep mode. That is to say, the only part of the 1218C that goes to sleep is the display; the rest of the 1218C is always awake and aware of what is going on in its world. The 1218C continues to monitor levels and alarms inputs. The 1218C display enters its Sleep mode after the period of inactivity which has been set in the Configuration Menu.

The **Heartbeat** would be the only indication that power is applied to the 1218C when it is in Sleep mode. The display is dark and, in the absence of any active or acknowledged alarms, there is no indication that the 1218C is alive. To provide a way to quickly determine if the 1218C is alive, it was given a visual Heartbeat; the front panel Indicator Light will flash every five (5) seconds if so configured. This option may be enabled and disabled in the configuration menu. This is enabled by default.

Display **Wakeup** occurs when one of two things happen:

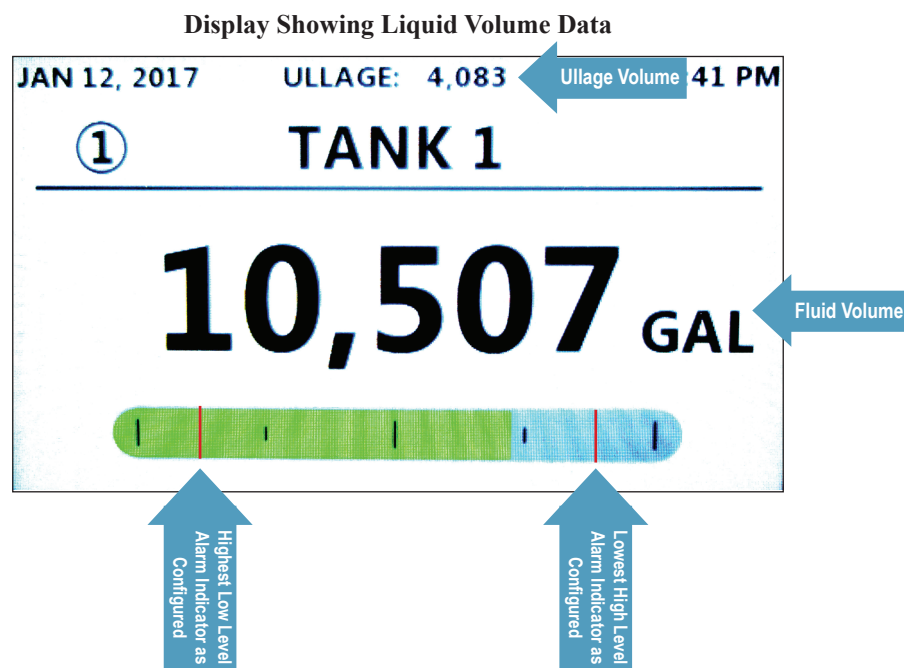
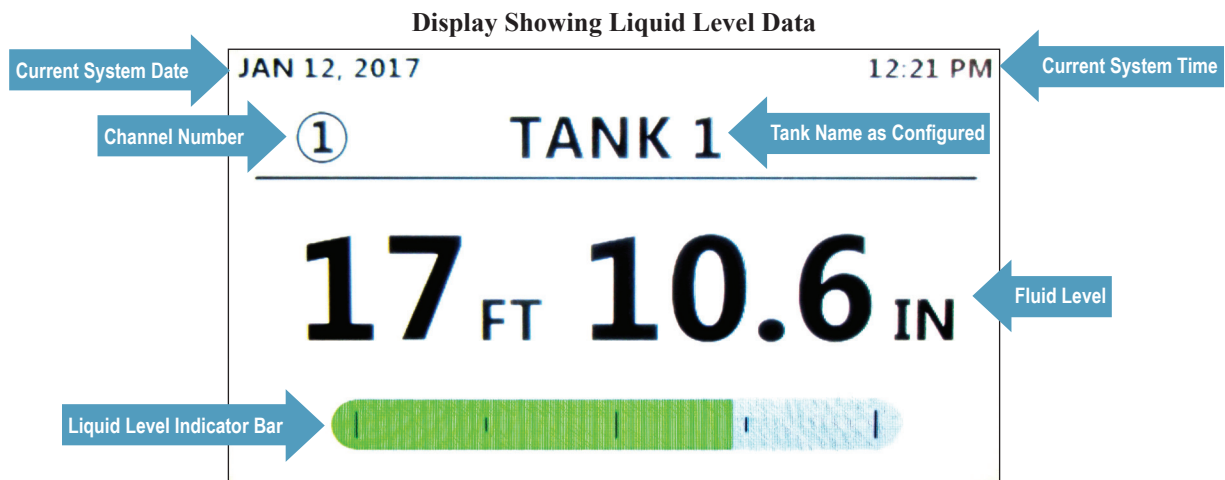
- An operator presses the Test/Silence button on the front panel
- There is a fill event (see EVENT LOGGING: tracking when stuff happens, above, for the definition of a “Fill Event.” on page 19).

Simply put, when the Display Wakeup occurs, the previously darkened display comes to life and system data is displayed.

NAVIGATING THE DISPLAY DATA: WHAT AM I LOOKING AT?

Normal, All is Well with the World, Home Screen

If there is only one 1218 Sensor attached to the 1218C, you will see a display with all of that Sensor’s information. If there is more than one 1218 Sensor connected to the 1218C and enabled in the configuration, the display will cycle through each of the enabled channels, displaying its pertinent information; the display time for each channel is about 8 seconds under normal circumstances. In either case, the information will be presented in the following format:



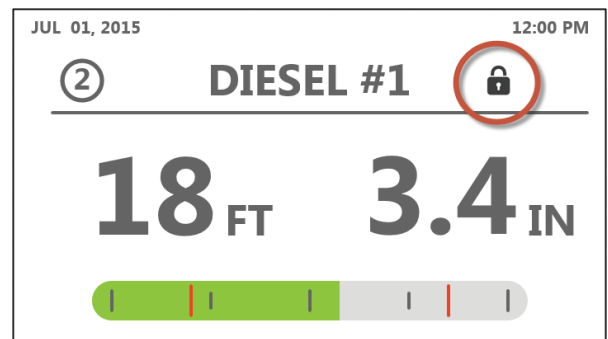
- **Ullage:** If there is no active alarm and the configured Units are for Volume (Gallons or Liters), then the present Ullage will be displayed on the top of the display. The Ullage displayed will be in Gallons or Liters.
- **Current System Date and Time:** The top of the Display where this is shown is referred to as the “Status Banner.” The current system date and time live here. These can be set in the Configuration Menu. If logging is enabled, this is the date and time that will appear in the logs.
- **Tank/Channel Number:** Channel number for the data being displayed
- **Tank/Channel Name:** The Channel Name is set in the Configuration. Default is “Tank1” for channel one and so on. This can be changed in the Configuration Menu.
- **Fluid Level/Volume:** This is the current measured fluid level in the tank. Depending on the Units selected in the Configuration Menu, this could be in:
 - Feet/Inches
 - Gallons
 - Centimeters
 - Liters
- **Liquid Level Indicator Bar:** This is a visual representation of the level of the fluid in the tank relative to its maximum possible level. The very last vertical bar on the left is 0%. The very last vertical bar to the right is 100%.
- **Minimum and Maximum Level Alarm Indicators:** These vertical red bars will only appear if Level Alarms have been configured and enabled. While up to four Level Alarms may be configured in the 1218C, only the Lowest High Level Alarm and the Highest Low Level Alarm is displayed. If only High Level Alarms are defined and enabled, then only one vertical red bar will appear on the right. In a similar manner, if only Low Level Alarms have been defined and enabled, then only one vertical red bar will appear on the left.

Filling and the Home Screen





Prior to any filling operation, always wake up the 1218C by Single Tap of the Silence/Test button on the front panel of the 1218C. Then press hold the Silence/Test button on the front panel of the 1218C to put it in Test Mode. The front panel Indicator Light should flash and the Buzzer should sound. Release the button and proceed with the fill only if it operates as described.



One Tank is Filling. Once a fill event begins on a tank/channel, that channel’s data is shown on the display with the addition of a lock symbol. This indicates that the Display Data is locked on that channel and will not move from that channel unless either the fill event stops or another fill event begins on another tank. This locked condition only affects the Display Data; the 1218C continues to monitor data from all configured and enabled channels.



Two or More Tanks Are Filling. If a fill begins on another tank, the Lock symbol will change as will the Lock behavior of the 1218C. Once more than one Tank/Channel is in the midst of a fill event, the number of channels being filled is indicated by the number to the right of the lock symbol.

-  One Channel Locked/Filling
-  Two Channels Locked/Filling
-  Three Channels Locked/Filling
-  Four Channels Locked/Filling

In a single fill event, the Display Data is locked on the one Channel being filled. In the case of multiple tank fills, we want to be watching the data from more than one Channel. In a normal, non-filling mode, the Display Data cycles through all of the configured and enabled Channels, pausing approximately eight (8) seconds on each Channel. Now that we are in multiple fill mode, the Display Data will cycle only through the data for each Channel in fill mode; the 1218C will cycle at an increased rate, pausing only about five (5) seconds at each channel currently in fill mode.

ALARMS

Kinds of Alarms

All Alarms are configurable and must be configured and enabled for them to be activated by an alarm condition. Alarms can occur at any time; you could be filling, discharging or everything could be reasonably static (e.g. interstitial alarm). There are two possible kinds of alarms that might occur:

- A Level Alarm (if configured and enabled)
- A Sensor Input Alarm (if configured and enabled)



In either case, the Status Banner will turn red and the text “Active Alarm” will appear in the center and the Indicator Light on the front panel will blink. If the Alarm has been configured to sound the Buzzer, the Buzzer will sound. If the Alarm has been configured to activate either or both of the Outputs, then the Output(s) will respond accordingly.

The 1218C will continue to cycle through displaying Channel Data as it did prior to the Alarm Event. This is true whether you are in fill mode or not. The 1218C will continue to monitor all inputs, even in an alarm state.

Level Alarm. The Level Alarms are configured and enabled in the Configuration Menu; these are set in terms of percent full. If the fluid level exceeds a configured and enabled High Level Alarm level, then a High Level Alarm event occurs. This is the most likely kind of Level Alarm event that might occur during a fill.



If the fluid level drops below a configured and enabled Low Level Alarm level, then a Low Level Alarm event occurs. This is the most likely kind of Level Alarm event that might occur during a discharge.

If a Level Alarm occurs, the Liquid Level Indicator will turn from **green** to **red** on the Data Display for the affected Channel, the front panel Indicator Light will flash, the Buzzer will sound if configured to do so and any configured Output event(s) will take place.



Sensor Input Alarm. Each 1218 Sensor has two Inputs for use with simple-switch, dry contact sensors. These may be used as auxiliary high Sensors, interstitial leakage sensors and the like. Morrison Bros. Co. 918, 924 and 925 Series Sensors are an excellent choice for these inputs.

These inputs must be configured and enabled in the Configuration Menu before they can be used.

If a Sensor Input is in an alarm condition, a Triangle with an exclamation mark (!) will appear on the Display Data for the affected Channel.



Additionally, the Indicator Light on the front panel will flash, the Buzzer will sound if configured to do so and any configured Output event(s) will occur.

Determining Exactly What Caused the Alarm

With the indicators discussed above, you can know if it is a Level Alarm or an Input Alarm on a particular Channel, but you won't know which Level Alarm it is (if more than one High Level Alarm is configured and enabled, for instance) or which of the two Input Alarms it might be (if more than one is configured and enabled, for instance).

To discover exactly which condition is being violated to cause the existing alarm condition, then you need to enter and navigate the Quick Menu. See "Navigating the Quick Menu" on page 31, below, to find out how to do this.

Acknowledging/Silencing an Alarm

Some Alarms may automatically Silence themselves after a period of time if they are configured to operate that way. Some may alarm forever until someone pays attention to them. To Silence or Acknowledge all existing alarm conditions, Single Tap the Silence/Test button on the front panel of the 1218C.



NAVIGATING THE QUICK MENU

The Quick Menu is the fast way to access all kinds of information about the system. Its principle use is to access more complete information about Alarms and Event Log entries. As such, it is geared to provide immediate access to this information.

It is important to note that the 1218C continues to monitor all inputs even while you are accessing the Quick Menu.



If an alarm condition occurs, the top banner will turn red and the text "Active Alarm" will appear.

Entering and Navigating the Quick Menu

Everything that can be done with the Quick Menu is accomplished with a single button: the Silence/Test button on the front panel.

See Appendix B for the complete Quick Menu tree.

To enter the Quick Menu, the 1218C Display must be awake if it isn't already. To awaken the 1218C Display, Single Tap the Silence/Test button on the front panel. Next, a Double Tap of the Silence/Test button brings you into the Quick Menu, top level. Your choices are:

- VIEW ALARM STATUS
- VIEW EVENT LOG
- VIEW CONFIGURATION

A Single Tap of the Silence/Test button will move between menu choices. When the cursor reaches the bottom of the list, the next Tap will make the cursor wrap around to the top-most menu item.

To enter any given menu choice, use a Double Tap of the Silence/Test button.

From anywhere in the Quick Menu, press and hold the Silence/Test button to exit and return to the 1218C's Home Screen.

Quick Menu Options

View Alarm Status. Selecting this option gives you access to the descriptions of the Alarms that may be active on any enabled channel. The Tank / Channel Name defined in the Configuration for the Channel appears in the heading. Each subsequent press of the Silence/Test button moves to the next Channel. Here are the various Alarm Status messages that you may encounter:

- NO ALARMS
- INPUT: {configured alarm name}
- LEVEL: {configured alarm name}
- LOW VOLTAGE
- SENSOR ERROR
- COMMUNICATION ERROR

No Alarms.

There are no active alarms on this channel.

Input: {Configured alarm name}.

This entry tells us that one of the configured and enabled 1218 Sensor Inputs is in the alarm state. The Name for the particular input as defined in the channel configuration appears after the text “INPUT:”. For example: “INPUT: OVRFILL”.

Level: {Configured alarm name}.

This entry tells us that one of the configured and enabled Level Alarms has been violated for this channel. The Name for the particular Level Alarm as defined in the channel configuration appears after the text “LEVEL:”. For example: “LEVEL: HIGH-HIGH”.

Low Voltage.

The 1218 Sensor on this channel has detected that the voltage used to provide power to it is dropping below acceptable levels. Investigate wiring system issues. If this fails to correct this error, then contact Morrison Bros. Co. Customer Service.

Sensor Error.

This is a general Sensor internal sensor error and may indicate a failing or faulty 1218 Sensor. Contact Morrison Bros. Co. Customer Service.

Communication Error.

The 1218C is configured to “see” a 1218 Sensor on this channel and it is not finding one. This could be a configuration error (a channel is enabled that doesn’t actually have a 1218 Sensor connected to it), a wiring fault (e.g. connector disconnected, wire severed, and so on), a faulty Sensor (e.g. direct lightning strike disables the Sensor) or a 1218C issue (e.g. blown fuse on the Interface board which could have been caused by a wiring issue, short).

View Event Log. As there is more than one way to access the Event Logs, we decided to put it all in one section rather than sprinkle it through this document. For more information, see “Event Logs” on page 33.

View Configuration. Use this Quick Menu option to view everything there is to know about the 1218C Configuration *EXCEPT* system passwords and email notification setup. This is a great place to go to verify that the system is setup in the way that you think it should be and this should be one of the things you review after installation and before you go live. See **Appendix B: Quick Menu Tree** on page 50 to see a complete listing of what you can expect to see and in what order.

There are a LOT of entries associated with the System Configuration. We have organized this information in scrollable pages. Each page is a specific topic. To scroll down the page to the next screen of information use a Single Tap of the Silence/Test button. When you reach the bottom of a page, the next Tap of the Silence/Test button will move you to the next page/topic. A Double Tap of the Silence/Test button will move you backward within a page or between pages.

When you have reached the last screen of the last page, the next Tap of the Silence/Test button will scroll you back around to the beginning of the first page. Conversely, you can use a Double Tap from the beginning of the first page to move immediately to the last screen of the last page. So, if what you are looking to see is closer to the end, it might be faster and easier to move backward through the screens.

EVENT LOGS

We have already defined what an “event” is in the section on Configuring Event Logging. Event Logging has to be enabled on the “local” level (example: at the Channel 1, Level Alarm 2 configuration) as well as at the “global” level (example: at the Event Logging configuration, selecting to enable event logging for alarms).

In this section we are going to address access to the Event Logs:

- Viewing
- Downloading
- Clearing

Viewing Event Logs

There are two methods of Viewing Event Log entries:

- Quick Menu
- Website interface

See Appendix C for the “Anatomy of an Event Log File.”

Quick Menu. If the 1218C display is not already awake, Single Tap the Silence/Test button once to wake it up.

Enter the Quick Menu with a Double Tap of the Silence/Test button. A Single Tap of the Silence/Test button now moves between menu choices.

Move the selection cursor to the “View Event Log” option one Single Tap of the Silence/Test button at a time

Select this menu option with a Double Tap of the Silence/Test button

The contents of the Event Log is now displayed most recent entries first. Move from page to page of entries with a Single Tap of the of the Silence/Test button

To exit this screen, press and hold the of the Silence/Test button for more than three seconds.

Website Interface. The Status page of the Website interface displays the latest ten or so entries in the Event Log. To see more than this, you must download the entire Event Log to your computer. See section "Website Interface" on page 34 to learn how to do this using the Website interface.

Downloading Event Logs

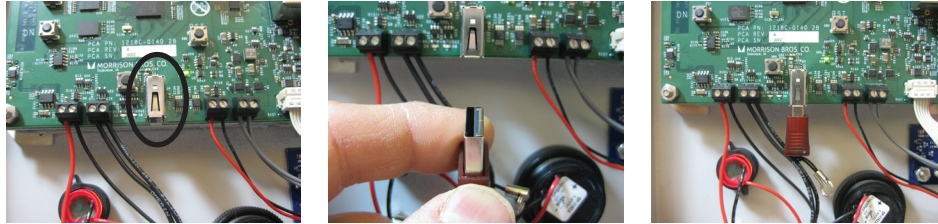
The 1218C only retains the last 1000 events in its internal Event Log memory. You may want to keep all Event Log entries as a matter of record or analyze the Event Log entries for trends. To do these things, we have provided two ways for you to save the current contents of the Event Log to a location outside of the 1218C hardware:

- Save it directly to a USB flash drive at the 1218C using the Console’s System Menu
- Download it from the 1218C using the Website interface

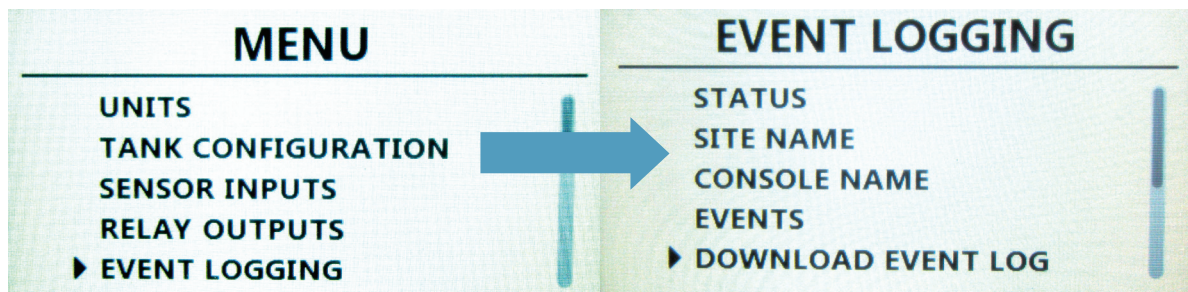
USB Flash Drive at the 1218C. To save the Event Log to a USB Flash drive, you must have access to the inside of the 1218C enclosure. **Perform this operation only if the conditions at the 1218C are such that water, dust and dirt will not infiltrate the enclosure when it is opened.**

To save the Event Log to a file on a USB Flash drive, follow the following steps:

- Unlock, unlatch and swing the 1218C enclosure door open. Located the USB port on the main control board on the back side of the front panel.
- Insert the USB Flash drive into the USB port connector.



- If the 1218C display is not awake, then wake it up with a Single Tap of the Silence/Test button.
- Enter the Console's System Menu by pressing and holding the UP button on the control board while simultaneously pressing and holding the Silent/Test button for no less than three seconds.



- Using the DOWN button, move the selection cursor down to the “Event Logging” menu option and then Single Tap the Silence/Test button.
- Using the DOWN button, move the selection cursor down to the “Download Event Log” menu option and then Single Tap the Silence/Test button.
- You will now see a series of quick information screens as is creates the “event_log.csv” file in the root folder of the USB Flash drive. In the end, you return to the “Event Logging” menu.

IMPORTANT NOTE: Each time the 1218C saves the Event Log to the USB Flash drive, it writes the “event_log.csv” file to the drive. If the file already exists, then it will overwrite the existing file. To prevent previous Event Log data from being overwritten, you must rename this file. This cannot be accomplished using the 1218C.

- Press and hold the Silence/Test button to exit the System Menu.
- Remove the USB Flash drive from the USB port of the control board.
- Close, latch and lock the 1218C enclosure.

Website Interface. When downloading Event Logs using the Website interface, pop-ups must be enabled in your web browser for the 1218C. If popups are blocked, then your web browser will tell you when you attempt to download the Event Log.

To download the entire Event Log to your computer, perform the following steps:

- Locate the menu along the left hand side of the Website interface, click on the Event Log option in that menu.
- Locate the button labeled “Download!” on the Event Log page of the Website interface.
- Click on this button.
- Click on “OK” in the information dialog box that tells you that you are about to download the entire Event Log to a CSV file.

The “event_log.csv” file will be created and placed in the “Downloads” folder on your computer. This is a standard format, comma separated file which contains all of the contents of the Event Log sorted with the oldest at the top of the list.

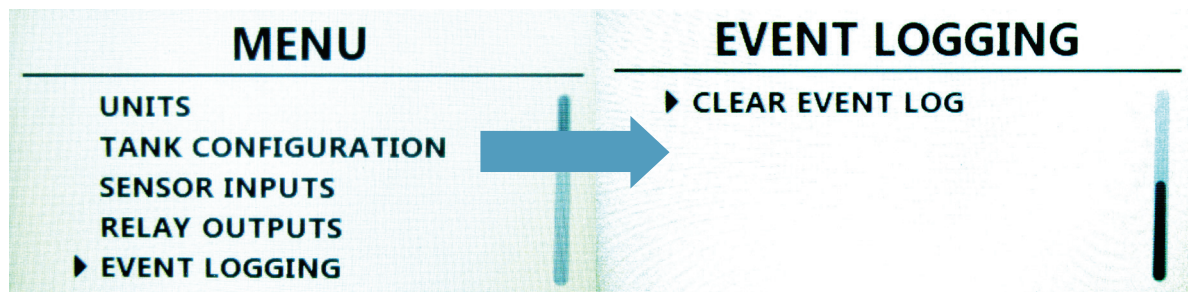
Clearing Event Logs

There are a number of reasons that you might want to totally clear the Event Log. For instance, you might choose to clear the Event Log after each time you save it to the USB Flash drive to avoid overlap in the data from one file save to the next.

To clear the Event Log, you must have access to the inside of the 1218C enclosure. It cannot be done through the Website interface. **Perform this operation only if the conditions at the 1218C are such that water, dust and dirt will not infiltrate the enclosure when it is opened.**

To clear the Event Log, perform the following steps:

- Unlock, unlatch and swing the 1218C enclosure door open.
- If the 1218C display is not awake, then wake it up with a Single Tap of the Silence/Test button.
- Enter the Console’s System Menu by pressing and holding the UP button on the control board while simultaneously pressing and holding the Silent/Test button for no less than three seconds.



- Using the DOWN button, move the selection cursor down to the “Event Logging” menu option and then Single Tap the Silence/Test button.
- Using the DOWN button, move the selection cursor down to the “Clear Event Log” menu option and then Single Tap the Silence/Test button.
- In a moment’s time, an information message screen will appear informing you that the Event Log has been cleared. You will then return to the Event Logging menu screen where you left.
- Press and hold the Silence/Test button to exit the System Menu.
- Close, latch and lock the 1218C enclosure.

NAVIGATING THE STATUS WEBSITE PAGE

The only part of the Website interface that we have not spoken at length about so far is the Status and Info pages. We have addressed the other two pages at length in their respective sections of this document.

Status Page

Refer to Figure 18 on page 36.

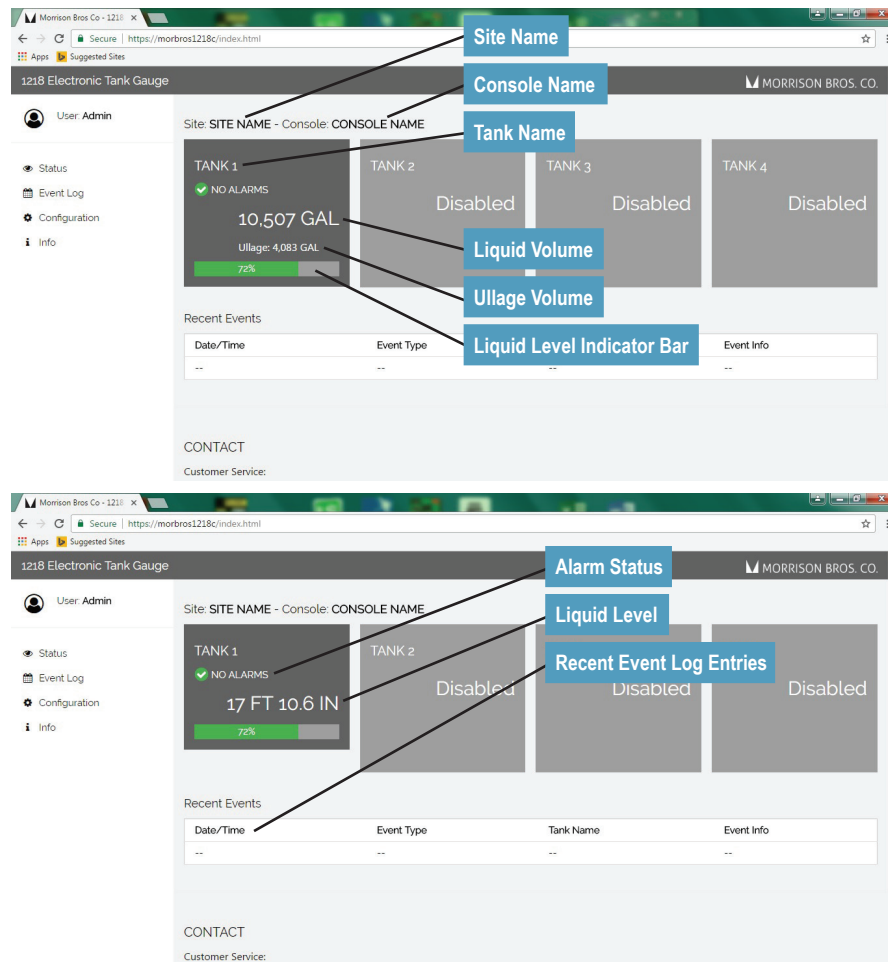


Figure 18 Website Interface Status Page

- **Site Name:** The configured Site Name.
- **Console Name:** The configured Console Name.
- **Tank Name:** The configured Tank Name.
- **Liquid Volume:** If the 1218C is configured to display liquid levels in terms of volume, then this is displayed as Gallons or Liters, whichever has been chosen.
- **Ullage Volume:** Only appears when the configured Units are Gallons or Liters.
- **Liquid Level Indicator Bar:** This is a visual display of the percentage of the tank that is filled in terms of the configured maximum fill level.
- **Alarms Status:** This could be more than one line if there is more than one alarm happening on this channel at the same time. When the alarms occur, the configured name assigned to each alarm will be displayed here.

Example: If you assigned the name “Interst 1” to the first Sensor Input, then “Interst 1” will appear here when that input goes into an alarm state.

Here are the symbols that will accompany the text that will appear here:

- ✓ ← All is well (GREEN circle with a checkmark, “✓”)
- ! ← Alarm! (RED circle with an exclamation mark, “!”) This will ‘flash’ if it is an active, unacknowledged alarm.
- ✗ ← Communications error with the 1218 Sensor (RED circle with an “✗”)

- **Liquid Level:** If the 1218C is configured to display Liquid Level (height of the liquid in the tank), then this will display in distance units (feet and inches or centimeters).
- **Recent Event Log Entries:** This is the place here the last ten or so Event Log Entries will appear. If you need to see more than what is displayed here, you need to download the Event Log. See **Downloading Event Logs** on page 33 for further details on the how to do this.

Info Page

This page is the go to place to see what the Current Firmware versions and Identifiers are for the 1218C and everything attached to it. The identifier (ID) is kind of like a serial number; it is a unique identification number that is specific to that unit.

Maintenance



WARNINGS

- **Fire Hazard** – Death or serious injury could result from spilled liquids.
- You must be trained to install or maintain this Electronic Tank Gauge. **Stop** now if you have not been trained.
- Any modification of this unit beyond what is outlined in this instruction will void product warranty.
- For your safety, it is important to follow local, state, federal and/or OSHA rules that apply to working inside, above, or around the storage tank and piping area. Use all personal protective equipment required for working in the specific environment.
- This device is intended to be used as an auxiliary warning to the operator of an abnormal condition of the system, such as a possible overfill situation and should not be the only system in place to prevent an unwanted condition, such as preventing a tank from overfilling. It is the sole responsibility of the operator to continuously prevent any spillage regardless of the situation.
- Tanks could be under pressure. Vapors could be expelled from tank vents, piping, valves or fittings while performing maintenance. Vapors could catch fire or cause an explosion. **Avoid** sparks, open flame, or hot tools when working on tank system.
- Use a dampened cloth when cleaning the alarm enclosure to prevent static buildup and discharge.
- In the event of malfunction, contact Morrison Bros. Co. Customer Service.



AVERTISSEMENTS

- **Risque d'incendie** – Un déversement de liquide pourrait entraîner des blessures graves ou la mort.
- Vous devez avoir reçu une formation pour installer cette jauge de réservoir électronique ou en assurer la maintenance. Arrêtez-vous immédiatement si vous n'avez reçu aucune formation à cet effet.
- Toutes les modifications apportées à cette unité autres que celles indiquées dans ces directives engendreront l'annulation de la garantie du produit.
- Pour assurer votre sécurité, il est important de vous conformer à la réglementation locale, d'État, fédérale ou OSHA régissant les travaux à l'intérieur, au-dessus ou autour du réservoir de stockage et de la zone de canalisation. Utilisez tout l'équipement de protection individuelle exigé pour travailler dans l'environnement spécifique.
- Cet appareil est destiné à être utilisé comme mécanisme avertissant l'opérateur d'un état anormal du système tel une situation de remplissage excessif et ne devrait pas être le seul système en place pour empêcher un état indésirable, par exemple, un réservoir qui se remplit trop. L'opérateur a l'entière responsabilité de s'assurer continuellement de prévenir tout déversement, quelle que soit la situation.
- Les réservoirs pourraient être sous pression. Des vapeurs pourraient être expulsées des conduits d'aération, des canalisations, des soupapes ou des raccords du réservoir durant la maintenance. Les vapeurs pourraient s'enflammer ou engendrer une explosion. Évitez les étincelles, les flammes nues ou les outils chauds lors de travaux menés dans le système du réservoir.
- Utilisez un linge humide pour nettoyer l'enceinte de l'alarme afin de prévenir l'accumulation d'électricité statique et les décharges.
- En cas de défaillance, communiquez avec le service à la clientèle de Morrison Bros. Co.

PERIODIC MAINTENANCE

Each aspect of this Periodic Maintenance should be performed at the intervals indicated in its heading

Testing—MONTHLY

We recommend that the Test / Acknowledge button be pressed and held (longer than 3 seconds) after the operator has woken up the unit to test the operation of the alarm annunciators (Buzzer and Indicator Light) prior to every fill operation. When this is done, the Indicator Light should flash and the Buzzer should sound until the button is released.

This same test is to be done no less than once a month as part of a preventative maintenance program.

Cleaning—ANNUALLY OR AS NEEDED

Clean the outside of the 1218C using a mild detergent on a soft, damp cloth. Take special care when cleaning the display window area not to scratch the material.

Inspection—ANNUALLY

Exterior. Complete the cleaning as outlined above. Once the cleaning is complete, carefully look over the exterior of the enclosure looking for any damage that might violate the NEMA4 rating or cause ingress of water or dirt into the enclosure. Inspect the Display Window for cuts or cracks.

Interior. If the 1218C is properly installed and the enclosure is kept closed and latched, dust, dirt and water should never infiltrate the enclosure. However, we recommend that you verify that water, dust and dirt has not somehow infiltrated the enclosure every year.

If dust or dirt has infiltrated, then clean out the enclosure using clean, dry, low pressure compressed air such is found in canned compressed gas used to clean computers.

If you discover that water has infiltrated the enclosure, the first step is to totally shut down the unit (shut off the power that feeds the unit at its source). Next, carefully dry out the enclosure while inspecting it to discover the point of ingress. You may find that using the same kind of dry, low pressure compressed gas used to clean computers helpful in blowing water out of hard to reach spots. Once the point(s) of ingress has been discovered, thoroughly, but carefully seal this so as to prevent it from happening again.

If there has been water infiltration, carefully inspect all of the internals of the 1218C for corrosion or water damage. If corrosion or water damage has been found, contact Morrison Bros. Co. Customer Service as this may affect the proper operation of the unit.

BATTERY REPLACEMENT—EVERY FIVE YEARS

The 1218C Control Board uses an Energizer ECR2032, coin cell to maintain its memory of the current date and time as well as key configuration data when the power is lost or the unit is shut off.

IMPORTANT: When replacing the Energizer ECR2032 battery you must do it with the 1218C powered, turned on and functional. Failure to do so will incur loss of date, time and important configuration data.

IMPORTANT: When replacing the Energizer ECR2032 battery, choose a time when opening the enclosure will not cause dust, dirt or water (e.g. rain) to get into the enclosure.

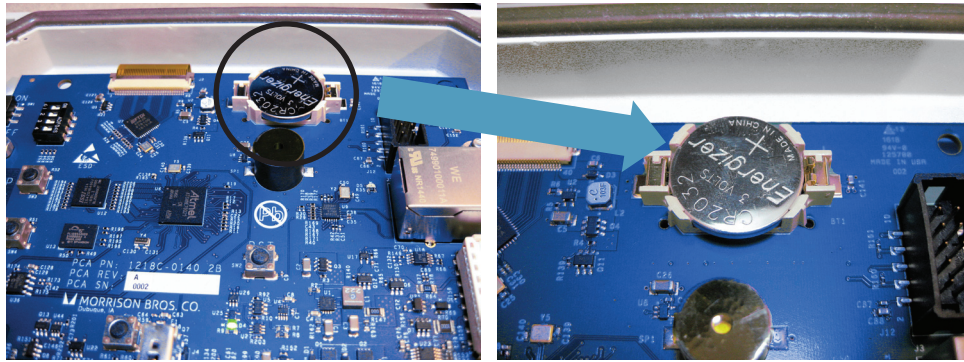
We recommend replacing this battery every five (5) years.

Steps for replacing the CR2032 memory backup battery:



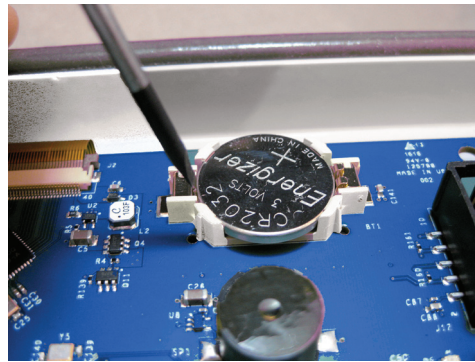
Tools Required: 2.5mm, straight-bladed, Precision/Miniature screwdriver

- Procure a new Energizer ECR2032, coin cell battery.
- Unlock, unlatch and open the 1218C enclosure.
- Verify that the 1218C power is ON and that the unit is functional BEFORE replacing the battery.
Failure to do so will cause a loss of date, time and vital configuration data.
- Locate the battery on the Control Board

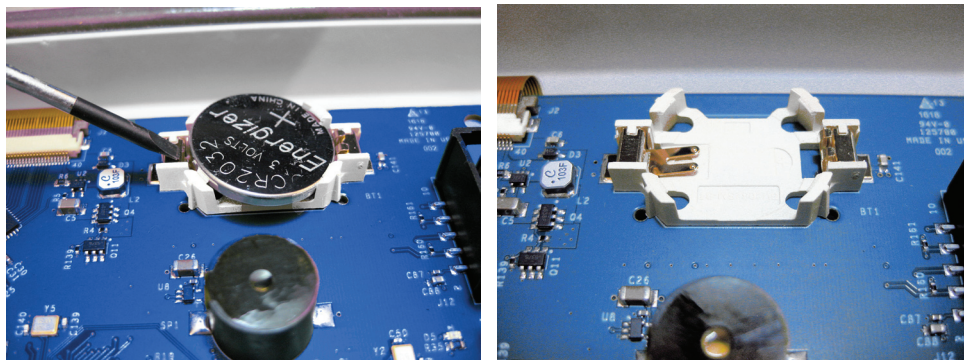


NOTE: The battery may pop/spring out of the holder when removed. Be prepared to catch/capture the battery when removing it.

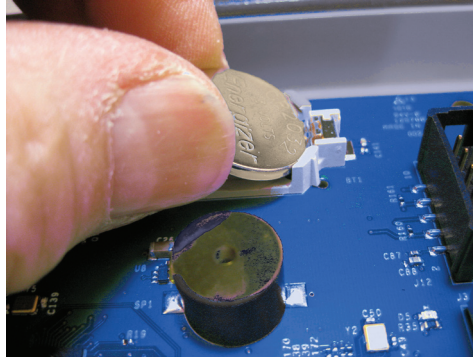
- Gently slide the blade of the screwdriver between the battery and the negative terminal (left side) of the battery holder.



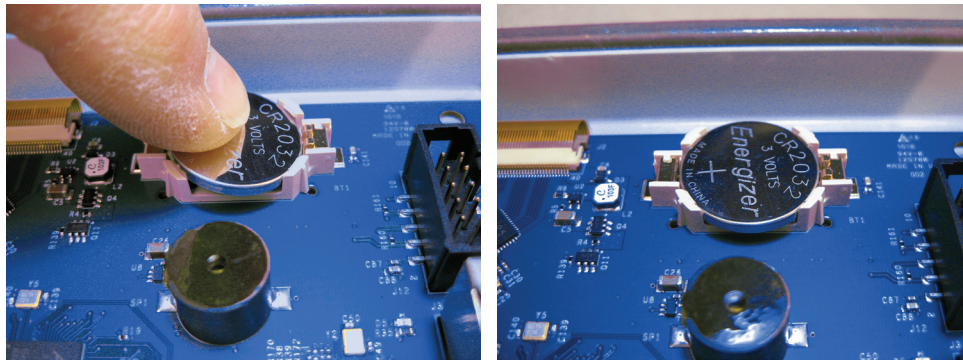
- Pry the battery up gently and remove the battery entirely.



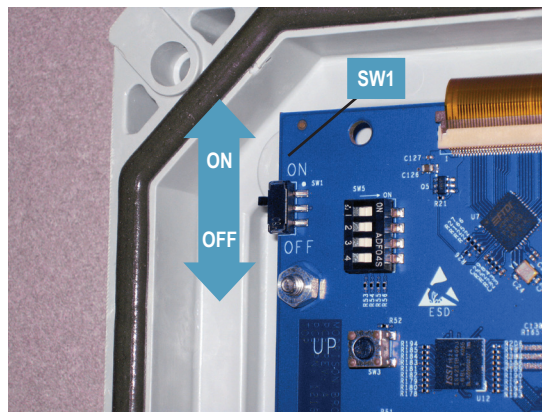
- Slide the new battery into the holder up against the positive terminal (right side) of the holder with the positive (+) side of the battery up.



- Gently press the new battery into the holder until you hear it click into place.



- Power cycle the unit by turning OFF the Control Board's SW1, pausing for about five seconds and then turning the unit back on.



- Verify the proper operation of the 1218C.
- If everything is working properly, then close, latch and lock the Enclosure.
- Dispose of the old battery according to local battery disposal/recycling regulations or guidelines.

FUSE REPLACEMENT

There are three replaceable fuses in the 1218C: one for each of the two outputs and one for the input power. All three exist under the Facilities Section cover plate. As such, it requires access to the inside of the 1218C enclosure.

IMPORTANT: When replacing fuses, choose a time when opening the enclosure will not cause dust, dirt or water (e.g. rain) to get into the enclosure.

Steps to Replace a Fuse:

Tools Required: #2 Phillips head (cross point) screwdriver

- Procure appropriate replacement fuse for the fuse that needs to be replaced. See Specifications on page 4 for specifics.
- Remove all power from the 1218C and anything connected to its outputs using the proper lock-out tag-out procedure.
- Unlock, unlatch and open the 1218C Enclosure.
- Locate the Facilities Section of the 1218C

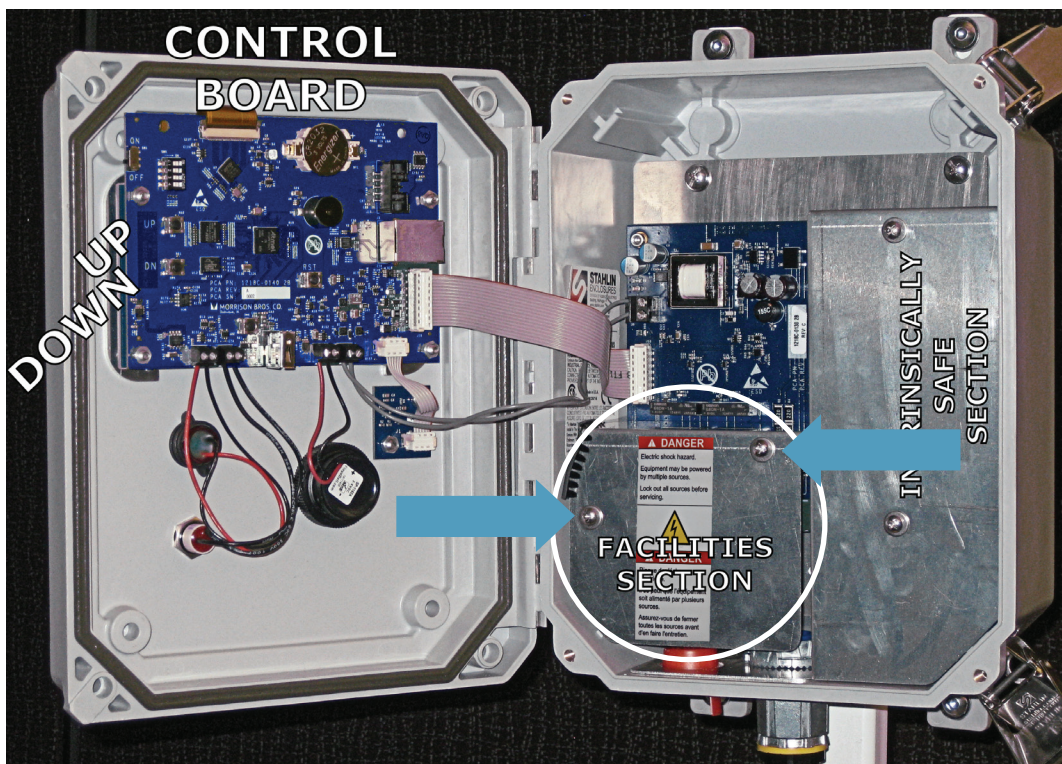
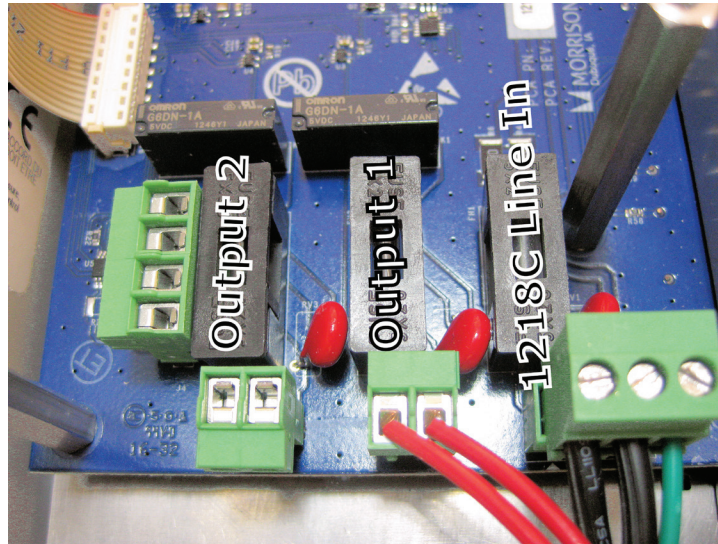


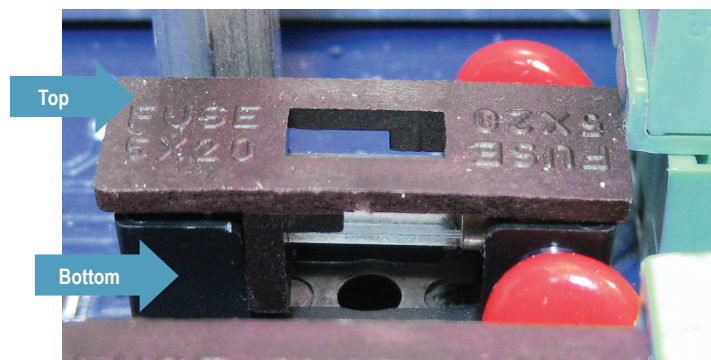
Figure 19 Locate the Facilities Section of the 1218C

- Using a #2 Phillips head (cross point) screwdriver, remove and retain the two screws that secure the cover in place.
- Carefully remove and retain the Facilities Section cover.

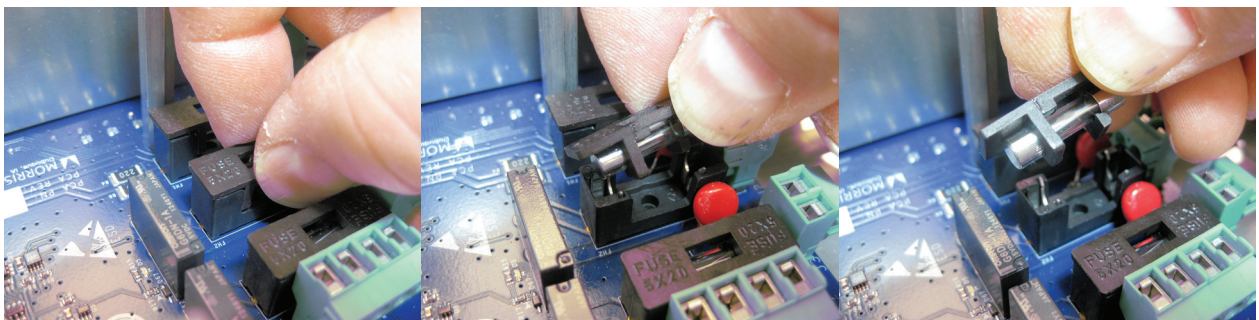
- Locate the fuse that needs to be replaced.



- Notice that the fuse holders are comprised of two halves: the bottom half which is soldered to the board and the top half that contains the fuse. We are going to be pulling the top half of the holder out of the bottom half.



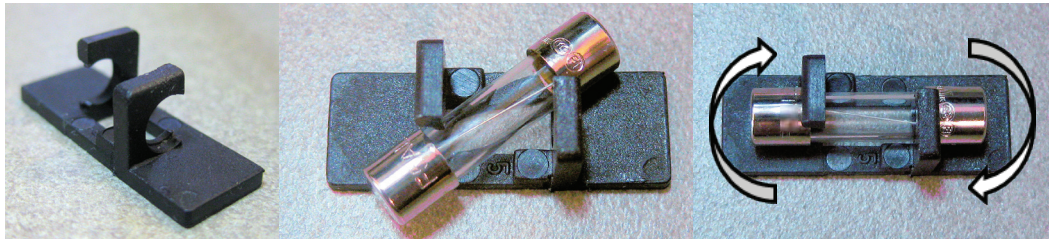
- Gently grasp the top portion of the fuse holder for the fuse you need to replace and carefully pull the top half free. The fuse is held by this top half.



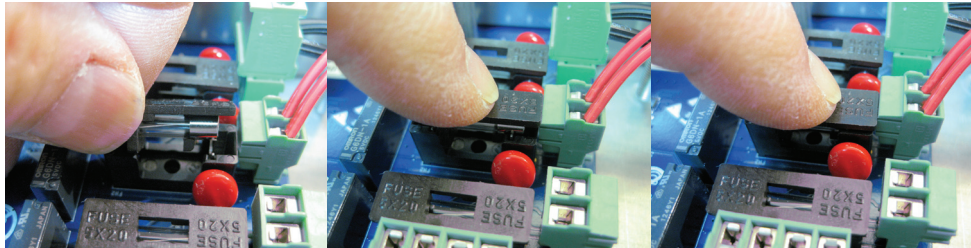
- Remove the fuse from the fuse holder cover by twisting the fuse out while holding the cover stationary.



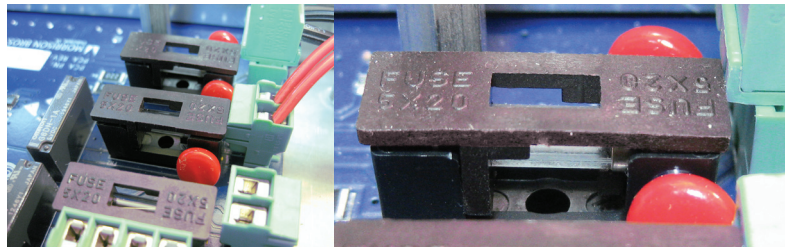
- Install the new, appropriately sized fuse (per the Specifications found on page 4 of this document) in the top half of the fuse holder by reversing this process.



- Position the fuse holder cover with the fuse in place over the fuse holder bottom half to locate it in place. Gently press the fuse into the bottom half; a click may be heard as it engages the contacts of the bottom half.



- Verify that the fuse is fully inserted by visually inspecting to see that the top cover is fully seated in the bottom half.



- Reinstall the Facilities Section Cover previously removed and retained using the screws that were also removed and retained. Snug the screws down.

FIRMWARE CHANGES

The first and most common Firmware Change would be the Firmware Upgrade. Every once in a while we may come out with an improvement to the 1218C that is accomplished through a change in the firmware. This could include new or improved features based on experience or customer feedback. These software upgrades can be accomplished in the field.

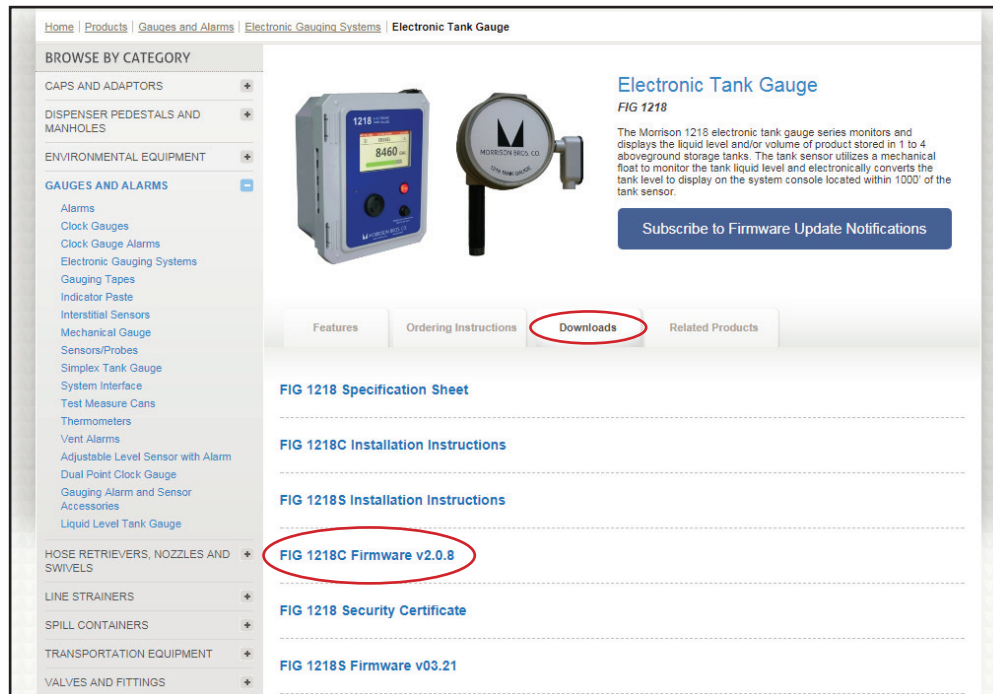
On the other hand, what if a Firmware Upgrade introduced an unexpected side effect? It is possible in that case to Revert the Firmware to the previous version. In a severe case, you might even have to Revert the 1218C Firmware to its Factory Default Firmware.

Firmware Upgrades

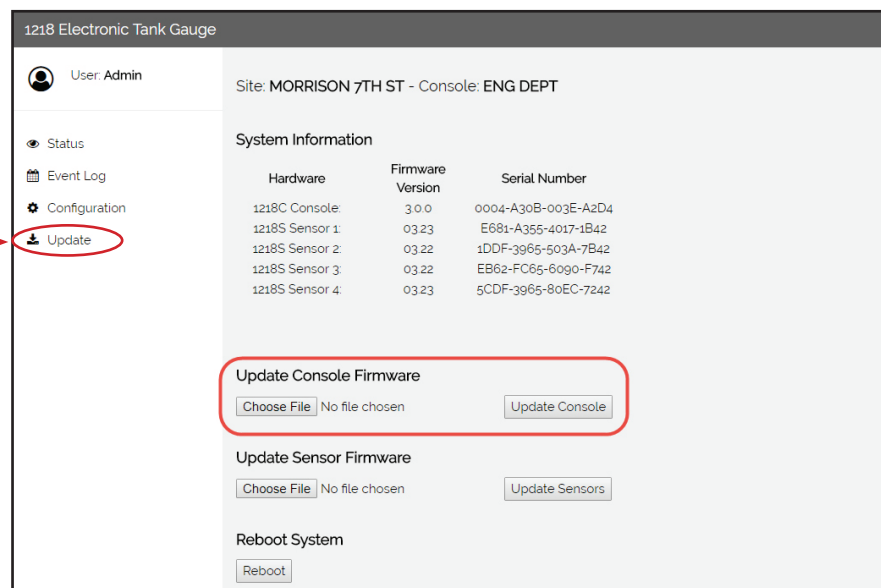
Firmware Upgrades can be accomplished remotely through the web or on-site at the console. The latest Firmware can be downloaded from www.morbro.com/1218.

To perform a **Firmware Upgrade** from the website, perform the following steps:

- Go to www.morbro.com/1218 and click on the Downloads tab.
- Select the 1218C firmware file and save it to your computer. Remember where the file is saved.



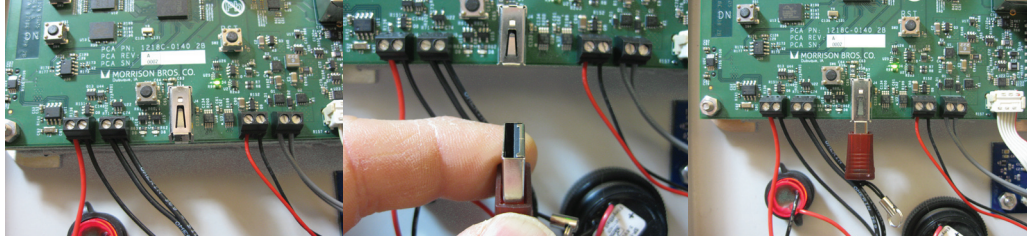
- Next go to the 1218 Electronic Tank Gauge website.
- Click on “Update” in the navigation menu
- Under “Update Console Firmware” click on the CHOOSE FILE button.
- Browse to find the firmware file you saved from the Morrison website.
- Click on the file.
- Click on the UPDATE CONSOLE button.
- Page will automatically refresh when update is complete. Verify 1218C Console Firmware Version has been updated.




IMPORTANT: When performing a Firmware Upgrade, choose a time when opening the enclosure will not cause dust, dirt or water (e.g. rain) to get into the enclosure.

To perform a Firmware Upgrade from the console, perform the following steps:

- Contact Customer Service for a compatible flash drive if this method is preferred. Other USB drives may not work with the system. Using a PC, download the latest firmware version and save to the USB drive provided by Customer Service.
- Unlock, unlatch and swing the 1218C enclosure door open. Locate the USB port on the main control board on the back side of the front panel.
- Insert the USB Flash drive into the USB port connector.



- If the 1218C display is not awake, then wake it up with a Single Tap of the Silence/Test button.
- Enter the Console's System Menu by pressing and holding the UP button on the control board while simultaneously pressing and holding the Silent/Test button for no less than three seconds.
- Using the UP and DOWN buttons on the control board, navigate to the "Firmware Version" menu option and Single Tap the Silence/Test button.
- Using the UP and DOWN buttons on the control board, navigate to the "Update Firmware" option on the Firmware Version menu. Single Tap the Silence/Test button.
- The WARNING screen appears asking you if you are ready to perform the update. A Single Tap on the Silence/Test button tells it to go ahead.

MENU CLOCK SETTINGS DISPLAY SETTINGS INDICATOR SETTINGS NETWORK SETTINGS ▶ FIRMWARE VERSION	FIRMWARE VERSION CURRENT VERSION ▶ UPDATE FIRMWARE REVERT FIRMWARE	WARNING BEGIN FIRMWARE UPDATE? PRESS AND HOLD UP AND DOWN BUTTONS TO CANCEL
INFO FIRMWARE UPDATE IN PROCESS...	INFO FIRMWARE UPDATE IN PROCESS... Updating console... Sector 18 of 31 updated	INFO REBOOTING...
 MORRISON BROS. CO. ELECTRONIC TANK GAUGE FIRMWARE VERSION: 1.1.0	INFO READING SENSORS...	JAN 11, 2017 ULLAGE: 4.083 2:29 PM ① E85 10,507 GAL

NOTE: If "USB Not Found" error message occurs, cycle power and try again.

- Relax while it finds the new firmware on the USB Flash drive, loads it into memory, moves it to its own internal flash and reboots the 1218C. This process can take as long as 2 minutes.
- When the Morrison Bros. Co. "splash screen" appears, note the new Firmware Version displayed at the bottom of the screen.

NOTE: During the reboot, the display will be turned off for about 1 minute. A red LED (to the left of the USB port) will flash during this time. Once the update has completed, the light will temporarily illuminate green upon success, or permanently illuminate red on failure (at which point a power cycle will recover the previous firmware version).

- When the 1218C completes its reboot and successfully reads the sensors, then remove the USB Flash drive from the USB connector on the control board.
- Close, latch and lock the 1218C enclosure.

Reverting Firmware

When Reverting Firmware, you have only two choices:

- Revert to a Previous Version of Firmware. This is only a valid choice if a Firmware Upgrade has been performed on this unit. In this case, you may revert to the version just prior to the current version.
- Revert to the Factory Default Firmware. The 1218C always remembers the firmware that it was shipped with. Reverting to the Factory Default reloads this version as the Current Version and erases all other versions; it is ready for a fresh Firmware Upgrade.

Reverting to the Previous Version of Firmware. Reverting to the Previous Version of Firmware must be accomplished on site and requires access to the inside of the 1218C enclosure.

IMPORTANT: When performing a Firmware Upgrade, choose a time when opening the enclosure will not cause dust, dirt or water (e.g. rain) to get into the enclosure.

To **Revert to the Previous Version of Firmware**, perform the following steps:

- Unlock, unlatch and swing the 1218C enclosure door open.
- If the 1218C display is not awake, then wake it up with a Single Tap of the Silence/Test button.
- Enter the Console's System Menu by pressing and holding the UP button on the control board while simultaneously pressing and holding the Silent/Test button for no less than three seconds.
- Using the UP and DOWN buttons on the control board, navigate to the "Firmware Version" menu option and Single Tap the Silence/Test button.
- Using the UP and DOWN buttons on the control board, navigate to the "Revert Firmware" option on the Firmware Version menu. Single Tap the Silence/Test button.
- Using the UP and DOWN buttons on the control board, navigate to the "Previous Version" option on the Revert Firmware menu. Single Tap the Silence/Test button.
- The WARNING screen appears asking you if you are ready to revert to previous. A Single Tap on the Silence/Test button tells it to go ahead.
- Relax while it erases the current version from flash, does some internal housekeeping and reboots the 1218C. This process can take as long as 1 minute.
- When the 1218C completes its reboot and successfully reads the sensors, close, latch and lock the 1218C enclosure.

Reverting to Factory Default Firmware. Reverting to the Factory Default Firmware must be accomplished on site and requires access to the inside of the 1218C enclosure.

IMPORTANT: When performing Reverting to the Factory Default Firmware, choose a time when opening the enclosure will not cause dust, dirt or water (e.g. rain) to get into the enclosure.

To Revert to the **Factory Default Firmware**, perform the following steps:

- Unlock, unlatch and swing the 1218C enclosure door open.
- If the 1218C display is not awake, then wake it up with a Single Tap of the Silence/Test button.
- Enter the Console's System Menu by pressing and holding the UP button on the control board while simultaneously pressing and holding the Silent/Test button for no less than three seconds.
- Using the UP and DOWN buttons on the control board, navigate to the "Firmware Version" menu option and Single Tap the Silence/Test button.
- Using the UP and DOWN buttons on the control board, navigate to the "Revert Firmware" option on the Firmware Version menu. Single Tap the Silence/Test button.
- Using the UP and DOWN buttons on the control board, navigate to the "Factory Version" option on the Revert Firmware menu. Single Tap the Silence/Test button.
- The WARNING screen appears asking you if you are ready to revert firmware to default. A Single Tap on the Silence/Test button tells it to go ahead.
- Relax while it clears all versions from flash, does some internal housekeeping and reboots the 1218C. This process can take as long as 1 minute.
- When the 1218C completes its reboot and successfully reads the sensors, close, latch and lock the 1218C enclosure.

FACTORY RESET

There may be the occasion where a 1218C is being moved from one site to another. In this case, it may be easier to start from the Factory Default Configuration settings than it is to edit an existing site's settings. For this reason, we have provided a way to Reset all Configurations to Factory Defaults and simultaneously clear the Event Log; this is referred to as a "Factory Reset." This does not in any way affect the state of the firmware in the 1218C.

A Factory Reset must be accomplished on site and requires access to the inside of the 1218C enclosure.

IMPORTANT: When performing Reverting to the Factory Default Firmware, choose a time when opening the enclosure will not cause dust, dirt or water (e.g. rain) to get into the enclosure.

To do a **Factory Reset**, perform the following steps:

- Unlock, unlatch and swing the 1218C enclosure door open.
- If the 1218C display is not awake, then wake it up with a Single Tap of the Silence/Test button.
- Enter the Console's System Menu by pressing and holding the UP button on the control board while simultaneously pressing and holding the Silent/Test button for no less than three seconds.
- Using the UP and DOWN buttons on the control board, navigate to the "Factory Reset" menu option and Single Tap the Silence/Test button.



- The WARNING screen appears asking you if you are ready to restore to factory defaults. A Single Tap on the Silence/Test button tells it to go ahead.
- The process only takes a moment or two and you will be returned to the System Menu where you left.
- At this point you could proceed directly to configuring the 1218C using the System Menu or you can return to the 1218 Home screen and do the configuration later. To return to the 1218C Home screen, press and hold the Silence/Test button for more than three seconds.
- When the 1218C returns to the Home screen and successfully reads the sensors, close, latch and lock the 1218C enclosure.

Appendix A:
Configuration Menu Tree

UNITS ⇒	[FEET/INCHES]	GALLONS	CENTIMETERS	LITERS
TANK CONFIGURATION ⇒				
CHANNEL 1-4 ⇅				
CHANNEL STATUS ⇒				
TANK NAME ⇒				
TANK SHAPE ⇒				
TANK DIMENSIONS ⇒				
LEVEL CALIBRATION ⇒				
LEVEL ALARMS ⇒				
STATUS ⇒				
NAME ⇒				
TYPE ⇒				
VALUE ⇒				
OUTPUT ⇒				
BUZZER ⇒				
LOG ALARM EVENTS ⇒				
SENSOR INPUTS ⇒				
CHANNEL 1-4 ⇒				
INPUT 1-2 ⇅				
STATUS ⇒				
NAME ⇒				
TYPE ⇒				
OUTPUT ⇒				
BUZZER ⇒				
LOG INPUT EVENTS ⇒				
RELAY OUTPUTS ⇒				
OUTPUT 1-2 ⇅				
STATUS ⇒				
TYPE ⇒				
MODE ⇒				
AUTO-TIMEOUT ⇒				
TEST MODE ⇒				
LOG OUTPUT EVENTS ⇒				
EVENT LOGGING ⇒				
STATUS ⇒				
SITE NAME ⇒				
CONSOLE NAME ⇒				
EVENTS ⇒				
POWER FAIL EVENTS ⇒				
FILL EVENTS ⇒				
DISCHARGE EVENTS ⇒				
ACKNOWLEDGE EVENTS ⇒				
PERIODIC EVENTS ⇒				
STATUS ⇒				
EVENT TIME ⇒				
EVENT DAYS ⇒				
DOWNLOAD EVENT LOG ⇒				
CLEAR EVENT LOG ⇒				

Appendix B:

Quick Menu Tree

VIEW ALARM STATUS

VIEW EVENT LOG

VIEW CONFIGURATION

TANK 1

TANK 2

TANK 3

TANK 4

Displays the Alarm Status of each Tank with each having its own page; the label at the top of the page reflects the Tank name as assigned in the configuration. Each Tap of the Silence/Test button moves ahead to the next configured and enabled Tank. When you have reached the last Tank, you will be brought back to the first with the next Tap of the Silence/Test button.

EVENT LOG

Display of the Event Log from the newest Event to the oldest Event. Each subsequent Tap of the Silence/Test button moves ahead one full page. When you have reached the end of the list, the next Tap of the Silence/Test button brings you back to the top of the list.

SYSTEM	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 4	EVENT LOG	NETWORK SETTINGS
CONSOLE NAME	TANK NAME	STATUS	STATUS	STATUS	STATUS	STATUS
FIRMWARE VERSION	SHAPE (V ROUND / H ROUND / RECT)	SHAPE (V ROUND / H ROUND / RECT)	SHAPE (V ROUND / H ROUND / RECT)	SHAPE (V ROUND / H ROUND / RECT)	POWER FAIL	LOCAL HOST
SERIAL NUMBER	DIMENSIONS	DIMENSIONS	DIMENSIONS	DIMENSIONS	FILL	IP ADDR
DISPLAY	DISPLAY SLEEP	HEIGHT / DIA / HEIGHT	HEIGHT / DIA / HEIGHT	HEIGHT / DIA / HEIGHT	DISCHARGE	SUBNET MASK
	SLEEP TIMEOUT	DIA / LEN / WIDTH	DIA / LEN / WIDTH	DIA / LEN / WIDTH	HEIGHT / DIA / HEIGHT	DEFAULT GATEWAY
	DISPLAY BRIGHTNESS	TOP	TOP	TOP	DIA / LEN / WIDTH	STATUS PRI DNS
		DEPTH	DEPTH	DEPTH	PERIODIC EVENT 1	DAYS SEC DNS
INDICATOR SETTINGS	SLOPE (H ROUND only)	SLOPE (H ROUND only)	SLOPE (H ROUND only)	SLOPE (H ROUND only)	PERIODIC EVENT 2	TIME PORT NUMBER
	AUTO-SILENCE TIMEOUT	SENSOR OFFSET (H ROUND only)	SENSOR OFFSET (H ROUND only)	SENSOR OFFSET (H ROUND only)	MANIFOLD FACTOR	MAC ADDR
RELAY OUTPUTS	HEARTBEAT	MANIFOLD FACTOR	MANIFOLD FACTOR	MANIFOLD FACTOR	STATUS	STATUS
	OUTPUT 1 STATUS	LEVEL ALARM 1	LEVEL ALARM 1	LEVEL ALARM 1	STATUS	DAYS
	OUTPUT 1 TYPE	STATUS	STATUS	STATUS	NAME	TIME
	OUTPUT 1 MODE	NAME	NAME	NAME	TYPE	STATUS
	OUTPUT 1 AUTO-TIMEOUT	TYPE	TYPE	TYPE	VALUE	DAYS
	OUTPUT 1 TEST MODE	VALUE	VALUE	VALUE	OUTPUT	TIME
	OUTPUT 1 LOG	OUTPUT	OUTPUT	OUTPUT	BUZZER	STATUS
	OUTPUT 2 STATUS	BUZZER	LOG EVENTS	LOG EVENTS	LOG EVENTS	DAYS
	OUTPUT 2 TYPE	LOG EVENTS	LEVEL ALARM 2	LEVEL ALARM 2	STATUS	TIME
	OUTPUT 2 MODE	STATUS	STATUS	STATUS	NAME	
OUTPUT 2 AUTO-TIMEOUT	NAME	NAME	NAME	TYPE		
OUTPUT 2 TEST MODE	TYPE	TYPE	TYPE	VALUE		
OUTPUT 2 LOG	VALUE	VALUE	VALUE	OUTPUT		
	OUTPUT	OUTPUT	OUTPUT	BUZZER		
	BUZZER	LOG EVENTS	LOG EVENTS	LOG EVENTS		
	LOG EVENTS	LOG EVENTS	LOG EVENTS	LOG EVENTS		
	LEVEL ALARM 3	LEVEL ALARM 3	LEVEL ALARM 3	LEVEL ALARM 3		
	STATUS	STATUS	STATUS	STATUS		
	NAME	NAME	NAME	NAME		
	TYPE	TYPE	TYPE	TYPE		
	VALUE	VALUE	VALUE	VALUE		
	OUTPUT	OUTPUT	OUTPUT	OUTPUT		
	BUZZER	BUZZER	BUZZER	BUZZER		
	LOG EVENTS	LOG EVENTS	LOG EVENTS	LOG EVENTS		
	LEVEL ALARM 4	LEVEL ALARM 4	LEVEL ALARM 4	LEVEL ALARM 4		
	STATUS	STATUS	STATUS	STATUS		
	NAME	NAME	NAME	NAME		
	TYPE	TYPE	TYPE	TYPE		
	VALUE	VALUE	VALUE	VALUE		
	OUTPUT	OUTPUT	OUTPUT	OUTPUT		
	BUZZER	BUZZER	BUZZER	BUZZER		
	LOG EVENTS	LOG EVENTS	LOG EVENTS	LOG EVENTS		
	SENSOR INPUT 1	SENSOR INPUT 1	SENSOR INPUT 1	SENSOR INPUT 1		
	STATUS	STATUS	STATUS	STATUS		
	NAME	NAME	NAME	NAME		
	TYPE	TYPE	TYPE	TYPE		
	OUTPUT	OUTPUT	OUTPUT	OUTPUT		
	BUZZER	BUZZER	BUZZER	BUZZER		
	LOG EVENTS	LOG EVENTS	LOG EVENTS	LOG EVENTS		
	SENSOR INPUT 2	SENSOR INPUT 2	SENSOR INPUT 2	SENSOR INPUT 2		
	STATUS	STATUS	STATUS	STATUS		
	NAME	NAME	NAME	NAME		
	TYPE	TYPE	TYPE	TYPE		
	OUTPUT	OUTPUT	OUTPUT	OUTPUT		
	BUZZER	BUZZER	BUZZER	BUZZER		
	LOG EVENTS	LOG EVENTS	LOG EVENTS	LOG EVENTS		

Appendix C:

The Anatomy of an Event Log File

The Event Log File is a standard format Comma Separated text file (*.CSV). It may be opened and viewed directly in a plain text editor such as Microsoft Notepad. However, it will also import directly into most spreadsheet programs such as Google Sheets®, OpenOffice Calc® or Microsoft Excel®. Once imported into a spreadsheet program, you can do more complete analysis and organization with the data.

At the very top of the file are the Site Name and Console Name to identify where the log file came from.

The very next line contains the headers for each of the columns of data.

Date/Time	Event Type	Channel Number	Tank Name	Event Info
-----------	------------	----------------	-----------	------------

- **Date/Time:** This is the date and time that the event occurred,
- **Event Type:** This is the type of event as defined in Table 3 found on page 21 of this document.
- **Channel Number:** Channel number that the event belongs to. This will be a number from one to four.
- **Tank Name:** This is the name that exists in the configuration and appears on the display for the Channel on this Console.
- **Event Info:** This is an extension to the Event Type to further define what caused the event to be logged.

Here is an example of an Event Log showing a Fill Event, a Discharge Event, Level and Input Alarms, Alarm Acknowledge Events, and Event Log Clearing.

***** Site Name: SITE NAME -- Console Name: CONSOLE NAME *****

Date/Time	Event Type	Channel Number	Tank Name	Event Info
1/13/2017 10:35	EVENT LOG CLEARED			0 RECORDS DELETED
1/13/2017 10:41	FILL STARTED	1	TANK 1	VOL: 10,492 GAL, ULL: 4,098 GAL
1/13/2017 10:42	FILL ENDED	1	TANK 1	VOL: 10,512 GAL, ULL: 4,078 GAL
1/13/2017 10:44	DISCHARGE STARTED	1	TANK 1	VOL: 10,379 GAL, ULL: 4,211 GAL
1/13/2017 10:46	TANK LEVEL ALARM 2	1	TANK 1	ALARM 2, 20.0 %
1/13/2017 10:47	ALARM ACKNOWLEDGED	1	TANK 1	LEVEL ALARM ACKNOWLEDGED - ALARM 2
1/13/2017 10:47	FILL STARTED	1	TANK 1	VOL: 480 GAL, ULL: 14,110 GAL
1/13/2017 10:49	TANK LEVEL ALARM 1	1	TANK 1	ALARM 1, 80.0 %
1/13/2017 10:50	FILL ENDED	1	TANK 1	VOL: 13,895 GAL, ULL: 695 GAL
1/13/2017 10:50	ALARM ACKNOWLEDGED	1	TANK 1	LEVEL ALARM ACKNOWLEDGED - ALARM 1
1/13/2017 10:50	ALARM ACKNOWLEDGED	1	TANK 1	INPUT ALARM ACKNOWLEDGED - INPUT 1
1/13/2017 10:51	DISCHARGE STARTED	1	TANK 1	VOL: 13,728 GAL, ULL: 862 GAL
1/13/2017 10:51	ALARM ACKNOWLEDGED	1	TANK 1	INPUT ALARM ACKNOWLEDGED - INPUT 1
1/13/2017 10:52	DISCHARGE ENDED	1	TANK 1	VOL: 11,383 GAL, ULL: 3,207 GAL

Appendix D: Configuration Worksheets

1. Channel Configuration Worksheet

Default values are shown in light print for your reference.

Tank # _____

Name T A N K 1-4 _____

Shape	Round V <input checked="" type="checkbox"/>	Round H <input type="checkbox"/>	Rectangular <input type="checkbox"/>
Dimensions (inches)	Height <u>300</u>	Diameter <u>300</u>	Height <u>300</u>
	Diameter <u>120</u>	Length <u>120</u>	Width <u>120</u>
			Depth <u>120</u>
Sloped		Slope <u>0.0</u> Sensor Offset <u>0.0</u>	
Manifold Factor Number of Additional Tanks <u>0</u> (0 to 3)			
Current Fluid <u>0.0</u> inches			

Input #1	<input type="checkbox"/> ENABLE	<input checked="" type="checkbox"/> DISABLE
Name	<u>I</u> <u>N</u> <u>P</u> <u>U</u> <u>T</u>	<u>1</u>
Type	Norm Closed <input type="checkbox"/> Norm Open <input checked="" type="checkbox"/>	
Output	Out 1 <input type="checkbox"/> Out 2 <input type="checkbox"/>	(select none, 1, 2 or both)
Buzzer	Auto Silence <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF <input type="checkbox"/>	
Log Events	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	
Input #2	<input type="checkbox"/> ENABLE	<input checked="" type="checkbox"/> DISABLE
Name	<u>I</u> <u>N</u> <u>P</u> <u>U</u> <u>T</u>	<u>2</u>
Type	Norm Closed <input type="checkbox"/> Norm Open <input checked="" type="checkbox"/>	
Output	Out 1 <input type="checkbox"/> Out 2 <input type="checkbox"/>	(select none, 1, 2 or both)
Buzzer	Auto Silence <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF <input type="checkbox"/>	
Log Events	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	

Level Alarm #1	<input type="checkbox"/> ENABLE	<input checked="" type="checkbox"/> DISABLE
Name	<u>A</u> <u>L</u> <u>A</u> <u>R</u> <u>M</u>	<u>1</u>
Type	High Level <input checked="" type="checkbox"/> Low Level <input type="checkbox"/>	
Value	<u>80</u> %	
Output	Out 1 <input type="checkbox"/> Out 2 <input type="checkbox"/> (select none, 1, 2 or both)	
Buzzer	Auto Silence <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF <input type="checkbox"/>	
Log Events	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	

Level Alarm #2	<input type="checkbox"/> ENABLE	<input checked="" type="checkbox"/> DISABLE
Name	<u>A</u> <u>L</u> <u>A</u> <u>R</u> <u>M</u>	<u>2</u>
Type	High Level <input checked="" type="checkbox"/> Low Level <input type="checkbox"/>	
Value	<u>80</u> %	
Output	Out 1 <input type="checkbox"/> Out 2 <input type="checkbox"/> (select none, 1, 2 or both)	
Buzzer	Auto Silence <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF <input type="checkbox"/>	
Log Events	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	

Level Alarm #3	<input type="checkbox"/> ENABLE	<input checked="" type="checkbox"/> DISABLE
Name	<u>A</u> <u>L</u> <u>A</u> <u>R</u> <u>M</u>	<u>3</u>
Type	High Level <input checked="" type="checkbox"/> Low Level <input type="checkbox"/>	
Value	<u>80</u> %	
Output	Out 1 <input type="checkbox"/> Out 2 <input type="checkbox"/> (select none, 1, 2 or both)	
Buzzer	Auto Silence <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF <input type="checkbox"/>	
Log Events	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	

Level Alarm #4	<input type="checkbox"/> ENABLE	<input checked="" type="checkbox"/> DISABLE
Name	<u>A</u> <u>L</u> <u>A</u> <u>R</u> <u>M</u>	<u>5</u>
Type	High Level <input checked="" type="checkbox"/> Low Level <input type="checkbox"/>	
Value	<u>80</u> %	
Output	Out 1 <input type="checkbox"/> Out 2 <input type="checkbox"/> (select none, 1, 2 or both)	
Buzzer	Auto Silence <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF <input type="checkbox"/>	
Log Events	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	

2. System Level Settings

Default values are shown in light print for your reference.

Site Name	SITE NAME			
Console Name	CONSOLE NAME			
Units	<input checked="" type="checkbox"/> Feet/Inches	<input type="checkbox"/> Gallons	<input type="checkbox"/> Centimeters	<input type="checkbox"/> Liters
Relay Outputs				
Output 1	Status: <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Normally..... Type: <input checked="" type="checkbox"/> Deactivated <input type="checkbox"/> Activated Mode: <input checked="" type="checkbox"/> Persistent <input type="checkbox"/> Non-persistent <input type="checkbox"/> Auto-Timeout Auto-Timeout: <u>3</u> Minutes (enter 1 to 10) Test Mode: <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Log Events: <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable			
Output 2	Status: <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Normally..... Type: <input checked="" type="checkbox"/> Deactivated <input type="checkbox"/> Activated Mode: <input checked="" type="checkbox"/> Persistent <input type="checkbox"/> Non-persistent <input type="checkbox"/> Auto-Timeout Auto-Timeout: <u>3</u> Minutes (enter 1 to 10) Test Mode: <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Log Events: <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable			
Event Logging <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable				
Events to Log	Power Fail/Recovery <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Fill Events <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Discharge Events <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Alarm Acknowledgement <input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable			
Periodic Events				
Event 1	<input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disabled Days <input checked="" type="checkbox"/> Mon-Fri <input type="checkbox"/> Sun-Sat Time <u>12</u> Hours <u>00</u> Minutes <u>X</u> AM PM			
Event 2	<input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Days <input checked="" type="checkbox"/> Mon-Fri <input type="checkbox"/> Sun-Sat Time <u>12</u> Hours <u>00</u> Minutes <u>X</u> AM PM			
Event 3	<input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disable Days <input checked="" type="checkbox"/> Mon-Fri <input type="checkbox"/> Sun-Sat Time <u>12</u> Hours <u>00</u> Minutes <u>X</u> AM PM			
Event 4	<input type="checkbox"/> Enable <input checked="" type="checkbox"/> Disabled Days <input checked="" type="checkbox"/> Mon-Fri <input type="checkbox"/> Sun-Sat Time <u>12</u> Hours <u>00</u> Minutes <u>X</u> AM PM			

Display SettingsDisplay Sleep ☒ Enable ☐ DisableSleep Timeout 5 Minutes (enter 1 - 30)Backlight ☒ Auto ☐ UserBrightness 96 Enter 1 to 128 (for User defined Backlight ONLY)

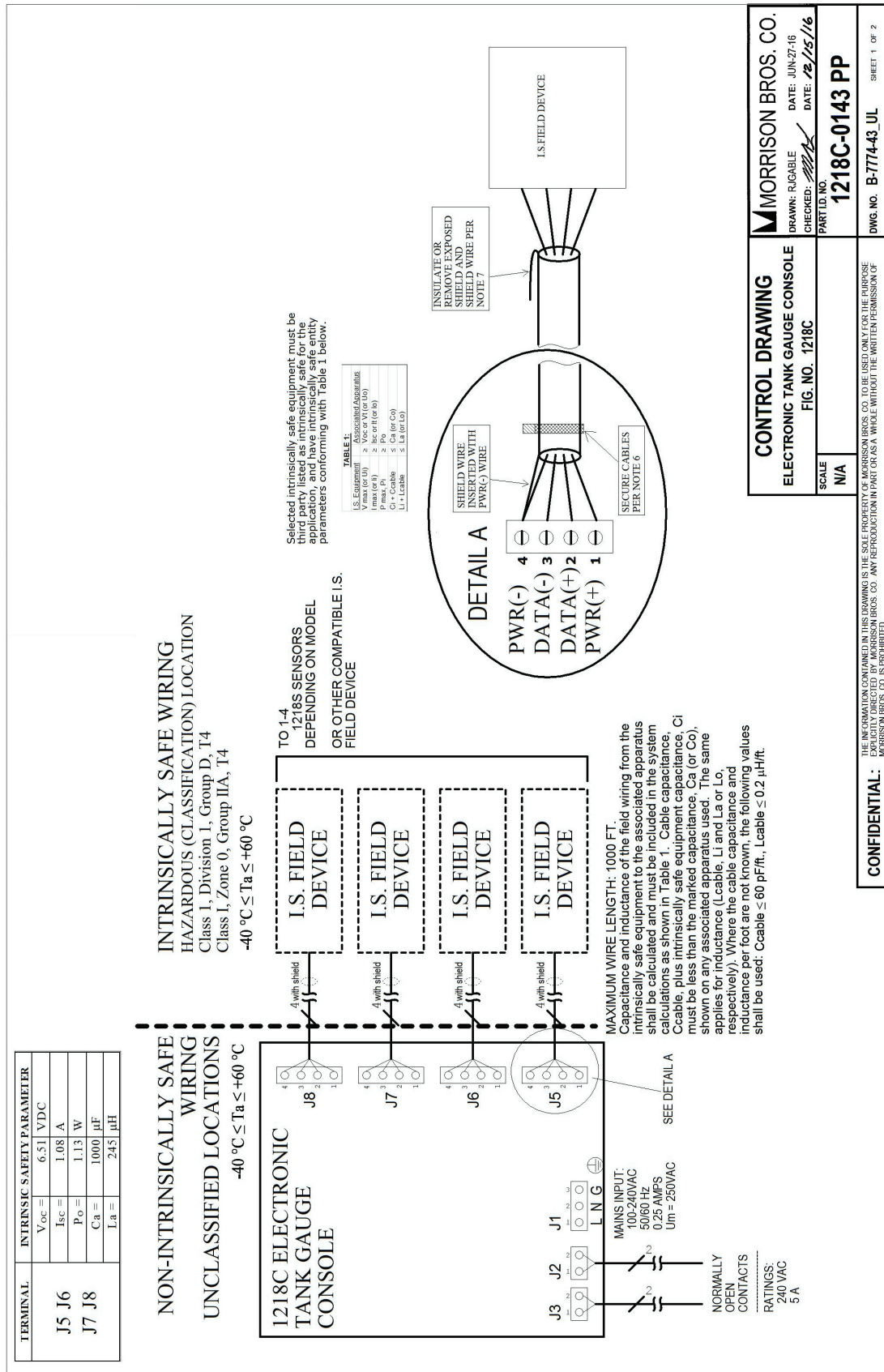
Indicator SettingsAutosilence Timeout 3 Minutes (enter 1 to 10)Heartbeat ☒ Enable ☐ Disable

Network SettingsStatus ☒ Enable ☐ DisableDHCP ☒ Enable ☐ DisableLocal Host Name morbros1218cIP Address 192.168.0.100Subnetmask 255.255.255.0Default Gateway 192.168.0.1Port Number 443Primary DNS 8.8.8.8Secondary DNS 8.8.4.4MAC Address DISPLAY ONLY

Account Passwords

admin adminguest guest

Appendix E: 1218C Control Drawing



Appendix F:

The 1218C as a Remote Console

INSTALLATION

Installation of a 1218C Remote Console requires access to the inside of the 1218C Enclosure at both the Primary and the Secondary Console.

IMPORTANT NOTE: Before performing this installation, completely remove all power from the Primary Console including the power associated with its Outputs. Use appropriate lock-out/tag-out procedures.

IMPORTANT: When installing a Secondary Console, choose a time when opening the enclosure will not cause dust, dirt or water (e.g. rain) to get into the enclosure.

Wiring

Power. The Console Power is installed in exactly the same way that the Primary Console is installed. Refer to the “Console Power: mains connection” on page 9 for details on how to do this.

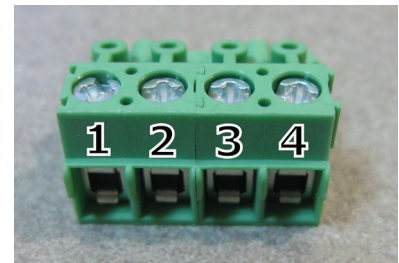
In preparation for the Data Connection, do not re-install the Facilities Section cover.

Data. Use the same Belden #7933A cable that was used to connect the 1218C Primary Console to the 1218 Sensors.

Both ends of the cable are wired the same except for the shield/drain wire connection

Belden #7933 Wire Color	Primary Console Connection	Secondary Console Connection
Green	1	1
Green/White	2	2
Orange	3	3
Orange/White	4	4
Shield/Drain Wire (bare)	4	No Connection

Table 6 Remote Console Communications Wiring



Preparation.

1. If not already done, open the front cover of both the Primary and the Secondary Consoles by releasing the two cover latches and swinging the cover open.
2. Remove and retain the two screws holding the cover for the Facilities Section in place.
3. Remove and retain the covers.

Wiring.

1. Either of the left two entry (intended for a ½ inch conduit connection) openings are intended to be used for the communication cable.

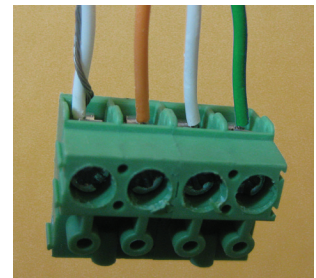
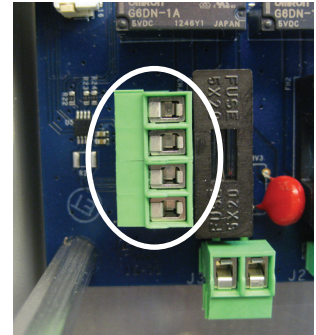
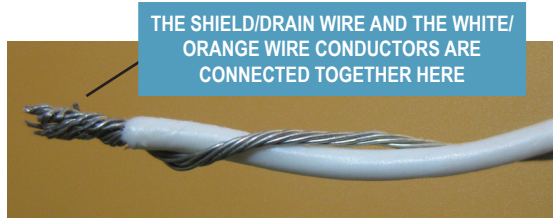
NOTE: We recommend that you do NOT route the Communications cable in the same conduit as the Primary Console’s Output wiring. Furthermore, it is preferable to avoid routing the cable with the Console power. It is reasonable to route the Communications cable to a junction box that is less the 2 feet away with either of these and then complete the run separately.

2. Route appropriate conduit between the two Consoles.
3. Starting at either end of the run, install Belden #7933 between the Primary and Secondary Consoles leaving about a four (4) inch tail at each end.

NOTE: It does not matter which end of the cable you start with. Choose whichever end that is most convenient for you.

4. At the Primary Console end of the cable...

- 4.1. Locate the Remote Console Communications connector, J4 at the lower left corner of the Interface Board located in the body of the enclosure. Remove and retain this connector for ease of wiring.
- 4.2. Strip off approximately two inches of the outer insulation of the Communications cable.
- 4.3. Completely remove all of the exposed foil shield.
- 4.4. Using Electrical tape or shrinkable tubing, completely cover the exposed end of the shield at the end of the cable sheathing.
- 4.5. Strip about ¼ inch (5mm) of the insulation off the end of each wire.
- 4.6. Wrap the bare shield/drain wire around and down the White/Orange wire and **twist the conductors together at the end.**



- 4.7. Insert the end of the prepared White/Orange wire with shield/drain wire into pin 4 of the connector making sure that there are no strands of wire coming out of the terminal. Snug down the retaining screw.
- 4.8. Verify that the wire is properly connected by gently tugging on the wire; it should not come out of the connector terminal.
- 4.9. Repeat steps 4.7 and 4.8 for the remaining wires per Table 6.
- 4.10. Plug the Connector into the Interface Board.



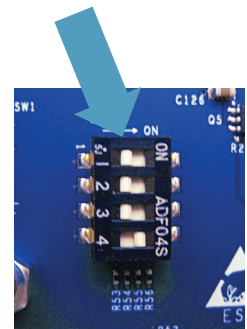
5. At the Secondary Console end of the cable...

- 5.1. Locate the Remote Console Communications connector, J4 at the lower left corner of the Interface Board located in the body of the enclosure. Remove and retain this connector for ease of wiring.
- 5.2. Strip off approximately two inches of the outer insulation of the Communications cable.
- 5.3. Completely remove all of the exposed foil shield **and the bare shield/drain wire.**
- 5.4. Using Electrical tape or shrinkable tubing, completely cover the exposed end of the shield at the end of the cable sheathing.
- 5.5. Strip about ¼ inch (5mm) of the insulation off the end of each wire.
- 5.6. Insert the end of the White/Orange wire into pin 4 of the connector making sure that there are no strands of wire coming out of the terminal. Snug down the retaining screw.
- 5.7. Verify that the wire is properly connected by gently tugging on the wire; it should not come out of the connector terminal.
- 5.8. Repeat steps 5.6 and 5.7 for the remaining wires per Table 6.
- 5.9. Plug the Connector into the Interface Board.

Configuration

To configure a 1218C Console as a Remote Console, perform the following steps:

1. Locate SW5 in the upper left corner of the Control Board. The top-most switch position is position one (1) which controls whether this is a Primary or a Remote Console.
2. Set this dip switch position to the ON position which tells the Control Board that it is now a Remote Console.
3. No configuration is needed on the Primary Console; it is plug and play.



Completion

1. Reinstall the Covers that were removed and retained on both the Primary and Secondary Consoles.
2. Make sure that the Power Switch (SW1) is in the ON (up) position on the Control Boards of both the Primary and Secondary Consoles
3. Close, latch and lock the enclosure covers for both the Primary and Secondary Consoles.
4. Apply power to the Primary and Secondary Consoles.

WHAT IT DOES

Wake Up/Sleep: The 1218C Secondary Console's display will go to sleep in the same fashion as the Primary Console and as configured in the Primary Console. Waking up the display is also the same; a quick Single Tap of the Silence/Test button will wake up the Secondary Console's display.

Channel/Tank Status: The Secondary Console provides access to all of the Channel/Tank status information. The Home Screen looks just like the Home Screen of the Primary Console with all of the same information in all of the same places.

Alarms/Alarm Acknowledge: When there is an Alarm condition, the Silence/Test button may be used to Acknowledge the Alarm condition in the same way as the Primary Console; a Single Tap of the Silence/Test button acknowledges an alarm and silences the Buzzer (if it is sounding).

Test Mode: The Silence/Test button may be pressed and held for more than three (3) seconds to enter the Test mode. In this case, the Indicator Light and Buzzer on both the Primary and Secondary Consoles will be activated.

Quick Menu: You enter the Secondary Console's Quick Menu in the same way as with the Primary Console; Double Tap the Silence/Test button. However, the only menu option available on the Secondary Console's Quick Menu is the Alarm Status option so you can see what is causing specific alarms.

Exiting the Quick Menu is also accomplished in the same manner as with the Primary Console: press and hold the Silence/Test button until the Home Screen appears (about three 3) seconds.

WHAT IT DOESN'T DO

The Secondary Console does not provide:

- Channel Inputs
- Ethernet Connectivity
- USB Capability
- Outputs
- Access to the System Menu

HOW TO UPGRADE THE FIRMWARE WHEN NEEDED

The Secondary Console does not provide access to the USB port on the Control Board. Yet, this is the method for Upgrading the Firmware. In order to perform a Firmware Upgrade, we need to make the Secondary Console think it is a Primary Console just long enough to do the update and then turn it back into a Secondary Console.

Firmware Upgrades must be accomplished on site and requires access to the inside of the 1218C enclosure.

IMPORTANT: When performing a Firmware Upgrade, choose a time when opening the enclosure will not cause dust, dirt or water (e.g. rain) to get into the enclosure.

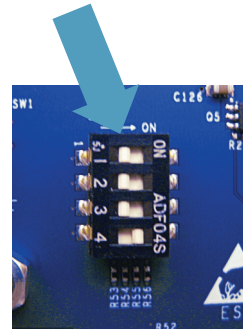
To perform a **Firmware Upgrade**, perform the following steps:

Preparation.

1. If not already done, open the front cover of the Secondary Console by releasing the two cover latches and swinging the cover open.

Upgrading the Firmware.

1. Locate the power switch (SW1) in the upper, left corner of the Control Board of the Secondary Console.
2. Place this switch in the OFF (down) position.
3. Locate SW5 in the upper left corner of the Control Board. The top-most switch position is position one (1) which controls whether this is a Primary or a Remote Console.
4. Set this dip switch position to the OFF position which tells the Control Board that it is now a Primary Console.
5. Place the power switch (SW1) in the ON position and wait for the 1218C to boot. Ignore any alarms or other complaints it may have.
6. Perform the Firmware Upgrade procedure in the Firmware Upgrades section on page 44.
7. Place the power switch (SW1) in the OFF position.



Completion.

1. Set dip switch SW5, position one (1, top most position) to the ON position. This tells the Control Board that it is now a Secondary Console again.
2. Place the power switch (SW1) in the ON position and wait for the 1218C to boot.
3. Close, latch and lock the 1218C enclosure.

Appendix G:

Configuring the Computer for Direct Connection to the 1218C

The Computer (assuming a Windows operating system)

Network Settings

- Start → Control Panel → Network and Sharing Center → Local Area Connection → Properties
- Select “Internet Protocol Version 4” and then properties.
- Select the “Use the following IP address” radio button. Enter the following IP address:

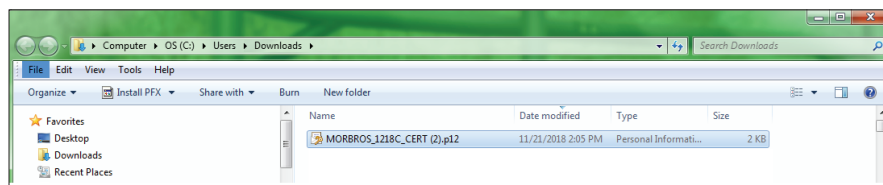
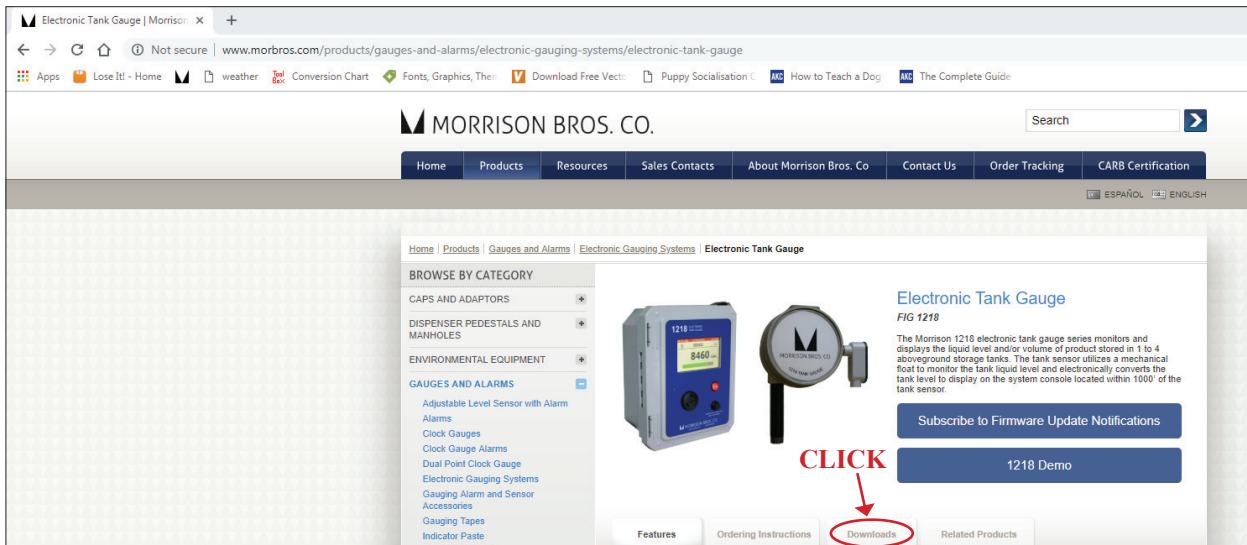
192.168.0.101

- Hitting the <Tab> will populate the “Subnet mask” with 255.255.255.0.
- Click on OK. Click on “Close” and then “Close” again.
- Disable all wireless adapters as the operating system will try to talk through them and we want to be absolutely sure we are only talking to the 1218C and not something else.
- Close the Network and Sharing Center [X].

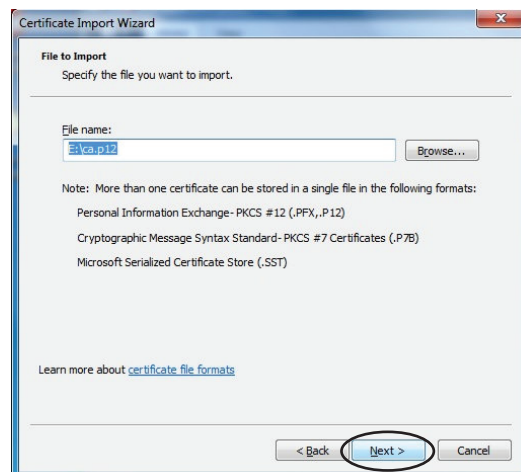
Appendix H: Installing Security Certificates on the Computer

Import the Security Certificate

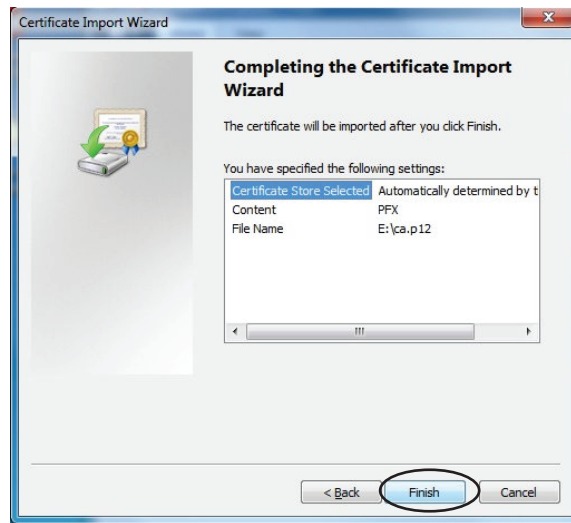
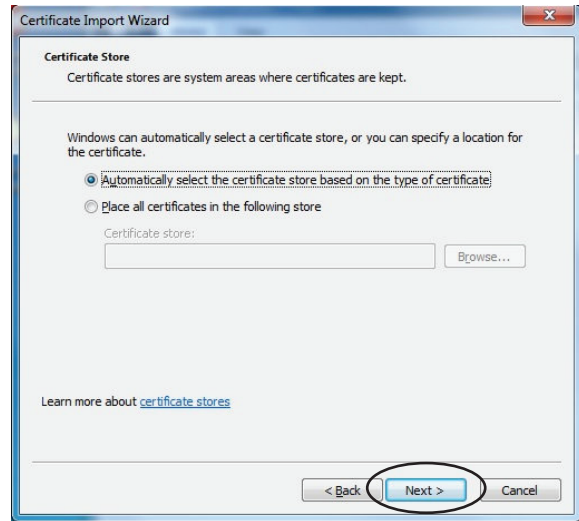
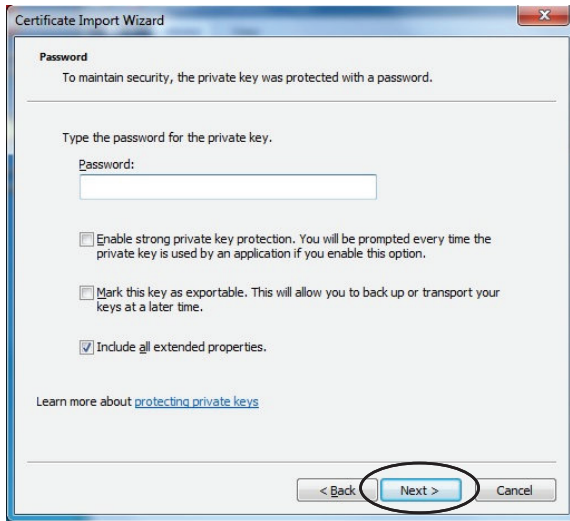
- Please visit www.morbros.com/1218 to download and install Security Certificate.
- Open the folder to view files.



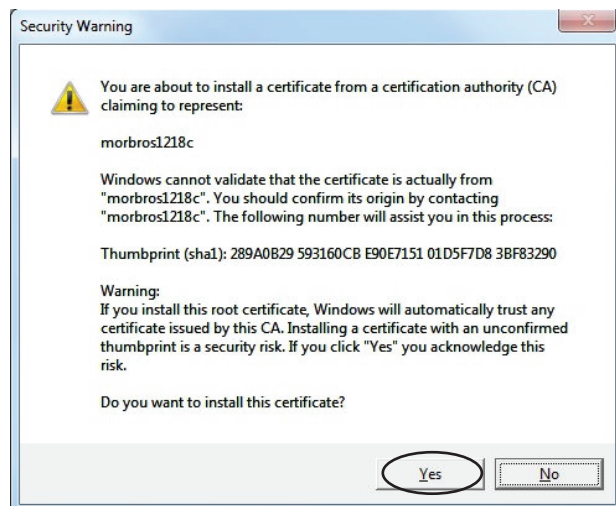
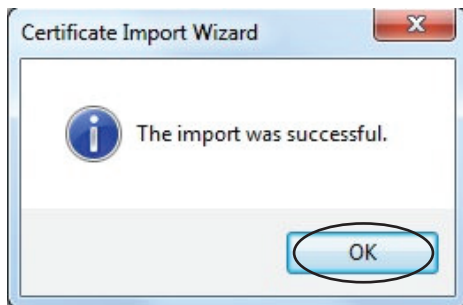
- Locate the "ca.p12" file in the folder and double click on it; this will install a security certificate for the "morbros1218c" local host name as well as "morbros1218c_N" where N is a number from '0' to '9'.
- Click on [Next] and then [Next].
- There is no password, so click on [Next] and then [Next] followed by [Finish].



- If this is the first time you have installed this security certificate on this computer, then you will get a



- security warning. Yes, you do want to install it, so click on [YES].
- You should now see the message that the import was successful; click on [OK].



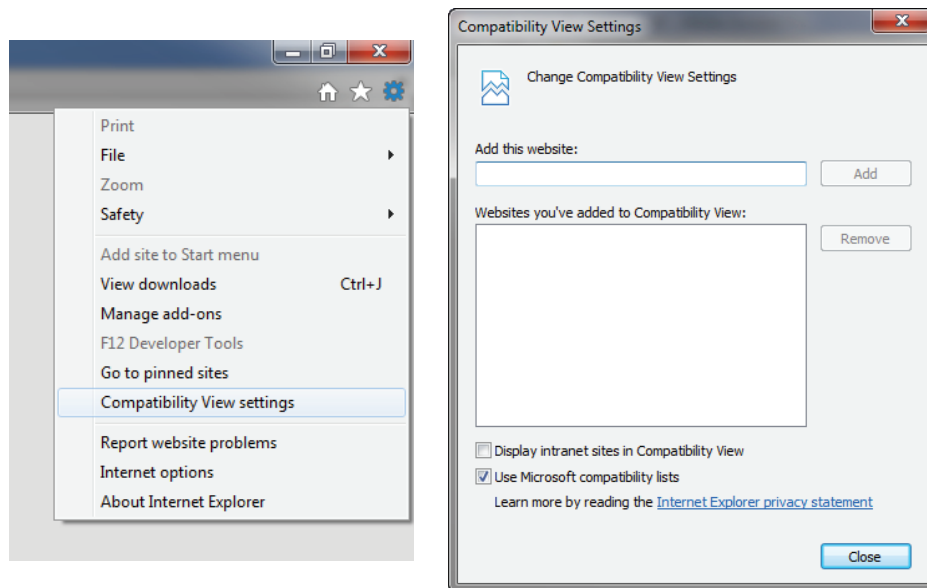
Appendix I:

Microsoft Internet Explorer / Edge Configuration

NOTE: Microsoft Internet Explorer 10 or higher, or Microsoft Edge is required.

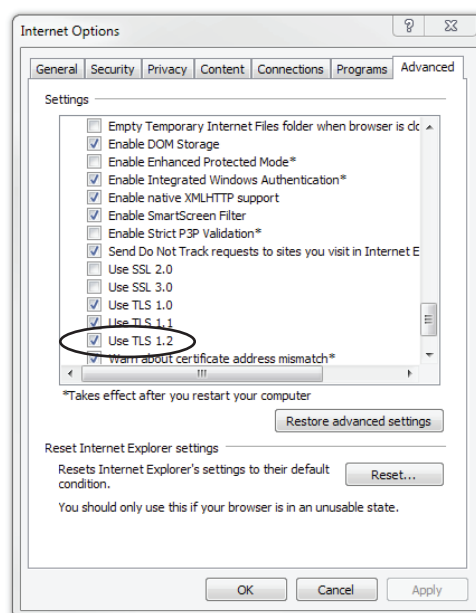
Disable Compatibility View Settings for Intranet Sites.

1. Open Internet Explorer / Edge browser
2. Open the 'Tools' menu and select 'Compatibility View settings'
3. Uncheck 'Display intranet sites in Compatibility View' and close settings window.



Use TLS 1.2 (IE 10 only).

1. If you are using Internet Explorer version 10, you need to perform this additional step. Under "Internet Options" click "Advanced" and scroll to the bottom and check "Use TLS 1.2."



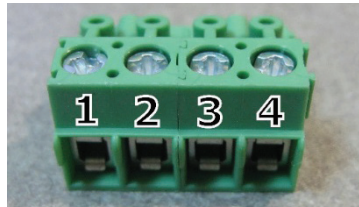
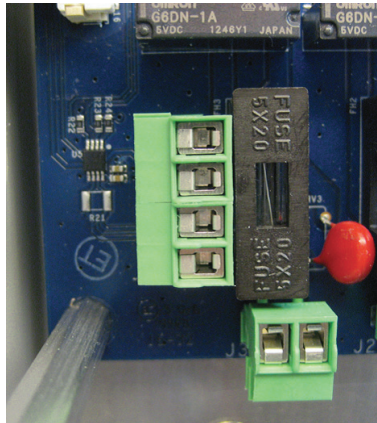
Appendix J: Modbus Registers

The 1218C can provide system status (level, volume, ullage, alarms, etc.) to external 3rd party devices such as PLCs and building automation systems using the Modbus protocol. The 1218C can be configured as a Modbus server using the Modbus TCP or Modbus RTU protocols.

IMPORTANT NOTE: The 1218C repurposes the Remote Console connections to enable the Modbus RTU capability. Therefore, the Modbus RTU mode cannot be used with a Remote Console. If a remote console is present the Modbus TCP mode is available for use.

Wiring

Modbus RTU. The 1218C Modbus RTU connections are made using the Remote Console connector, shown below. Follow Table 7 below to wire the 1218C to the Modbus Client device.



1218C Connection	Modbus Client Connection
1	Data +
2	Data -
3	No Connection
4	Ground

Table 7 Modbus RTU Connections

Modbus TCP. The 1218C Modbus TCP connections are made using the Ethernet port of the 1218C. Connection to the Modbus client device can be made directly or through a network using an Ethernet switch or router. Modbus TCP can be used without affecting the operation of the 1218C web interface.

Configuration

The following Modbus settings can be modified from the configuration menu of the 1218C or through the 1218C website.

- **Modbus Status:** Enabled or Disabled (default). By enabling Modbus with the RTU interface selected, the Remote Console functionality will be disabled.
- **Modbus Interface:** Modbus RTU (default) or Modbus TCP.

Modbus RTU Settings.

- **Modbus RTU Slave Address:** Slave address of the 1218C (1 – 247).
- **Modbus RTU Baud Rate:** 9600 or 19200 (default).
- **Modbus RTU Parity:** None, Even (default), Odd, or Mark. The Mark parity can be used to act as a second stop bit when required by Modbus clients.

Modbus TCP Settings.

- **Modbus TCP Unit Id:** Unit Id can be set from 1 to 255.
- **Modbus TCP Port:** The default is 502. It is not recommended to change the TCP port unless it is absolutely required by the Modbus client.

IMPORTANT NOTE: The 1218C network settings (IP address, subnet mask, default gateway) must be properly configured to use Modbus TCP. The 1218C network settings are shared for the web interface and Modbus TCP. That is, changing the IP address of the 1218C will affect both the web interface and the Modbus TCP server.

Register Mapping

The 1218C provides system status to the Modbus client using Discrete Inputs (1x0000) and Input Registers (3x0000). The Modbus client must use function codes 02 and 04 to read the Discrete Input and Input Registers, respectively. See Table 8 for details.

Type	Function Codes	Description	Max Read Quantity
Discrete Inputs	02	1-bit read only	1 to 2000
Input Registers	04	16-bit read only	1 to 125

Table 8 Modbus register types used by the 1218C.

The Discrete Input registers store 1-bit (true / false) status variables for each channel. Take care to note the value of the first status bit of each channel, “IsEnabled”. If the “IsEnabled” state is “false”, all other status bits for the channel are meaningless and shall be ignored. The “Input State” status bits of each channel represent the current state (active / inactive) of each input, and not the voltage level. Check that each input is enabled and properly configured in the 1218C as “Normally Open” or “Normally Closed” for the “Input State” status bits to report the input states. See Table 9 (on next page) for the complete list of the Discrete Input status bits reported by the 1218C.

Discrete Input	Register (1x0000)	Address (Dec)	Value	Type
Ch 1 - Is Enabled	100001	00000	true/false	1-bit
Ch 1 - Has Alarm	100002	00001	true/false	1-bit
Ch 1 - Is Filling	100003	00002	true/false	1-bit
Ch 1 - Is Discharging	100004	00003	true/false	1-bit
Ch 1 - Input 1 State	100005	00004	active/inactive	1-bit
Ch 1 - Input 2 State	100006	00005	active/inactive	1-bit
Reserved	100007 - 101000	00006 - 00999	N/A	1-bit
Ch 2 - Is Enabled	101001	01000	true/false	1-bit
Ch 2 - Has Alarm	101002	01001	true/false	1-bit
Ch 2 - Is Filling	101003	01002	true/false	1-bit
Ch 2 - Is Discharging	101004	01003	true/false	1-bit
Ch 2 - Input 1 State	101005	01004	active/inactive	1-bit
Ch 2 - Input 2 State	101006	01005	active/inactive	1-bit
Reserved	101007 - 102000	01006 - 01999	N/A	1-bit
Ch 3 - Is Enabled	102001	02000	true/false	1-bit
Ch 3 - Has Alarm	102002	02001	true/false	1-bit
Ch 3 - Is Filling	102003	02002	true/false	1-bit
Ch 3 - Is Discharging	102004	02003	true/false	1-bit
Ch 3 - Input 1 State	102005	02004	active/inactive	1-bit
Ch 3 - Input 2 State	102006	02005	active/inactive	1-bit
Reserved	102007 - 103000	02006 - 02999	N/A	1-bit
Ch 4 - Is Enabled	103001	03000	true/false	1-bit
Ch 4 - Has Alarm	103002	03001	true/false	1-bit
Ch 4 - Is Filling	103003	03002	true/false	1-bit
Ch 4 - Is Discharging	103004	03003	true/false	1-bit
Ch 4 - Input 1 State	103005	03004	active/inactive	1-bit
Ch 4 - Input 2 State	103006	03005	active/inactive	1-bit
Reserved	103007 - 165535	03006 - 65535	N/A	1-bit

Table 9 Modbus Discrete Inputs

The Input Registers are used to read the level, percent full, volume, and ullage of each channel. The level and percentage full are reported in tenths of inches and tenths of percent, respectively. For example, a level value of '1200' represents 120.0" (or 10' 0.0"). The volume and ullage are reported as 32-bit floating point numbers. The byte ordering of the float32 is CD AB (byte swapped) and will need to be considered to properly convert the register values to a 32-bit floating point number.

The Input Registers also report the status of each alarm per channel. The alarm status is reported as an enumerated value as shown in Table 10. By providing the alarm status this way, the Modbus client application can determine if the alarm is inactive, acknowledged by pressing the button on the console, auto-silenced (if configured), or a new active alarm. See Table 11 (on next page) for the complete list of the Input Registers reported by the 1218C.

Alarm Status	Value
Inactive	0
Acknowledged	1
Auto-Silenced	2
Active	3

Table 10 Alarm Status Enumeration

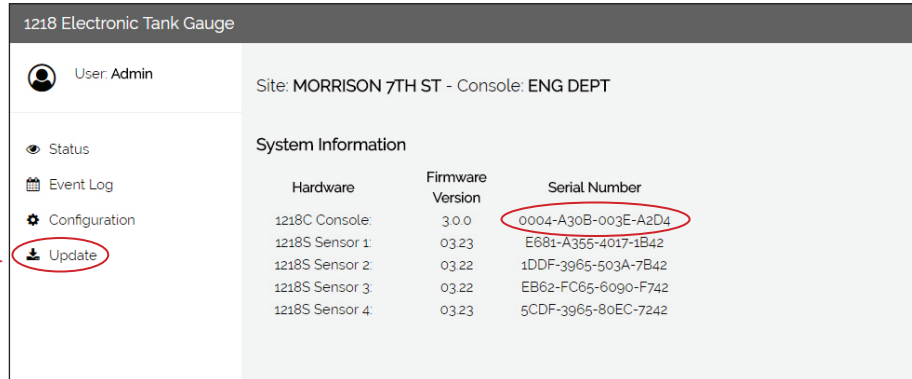
Input Register	Register (3x0000)	Address (Dec)	Value	Type
Ch 1 - Level	300001	00000	Tenths on inches	uint16
Ch 1 - Percent Full	300002	00001	Tenths of percent	uint16
Ch 1 - Volume	300003 - 300004	00002 - 00003	Gallons	float32
Ch 1 - Ullage	300005 - 300006	00004 - 00005	Gallons	float32
Ch 1 - Level Alarm 1	300007	00006	Alarm Status	enum
Ch 1 - Level Alarm 2	300008	00007	Alarm Status	enum
Ch 1 - Level Alarm 3	300009	00008	Alarm Status	enum
Ch 1 - Level Alarm 4	300010	00009	Alarm Status	enum
Ch 1 - Input Alarm 1	300011	00010	Alarm Status	enum
Ch 1 - Input Alarm 2	300012	00011	Alarm Status	enum
Ch 1 - COM Error	300013	00012	Alarm Status	enum
Ch 1 - Low Voltage	300014	00013	Alarm Status	enum
Reserved	300015 - 301000	00014 - 00999	N/A	N/A
Ch 2 - Level	301001	01000	Tenths on inches	uint16
Ch 2 - Percent Full	301002	01001	Tenths of percent	uint16
Ch 2 - Volume	301003 - 301004	01002 - 01003	Gallons	float32
Ch 2 - Ullage	301005 - 301006	01004 - 01005	Gallons	float32
Ch 2 - Level Alarm 1	301007	01006	Alarm Status	enum
Ch 2 - Level Alarm 2	301008	01007	Alarm Status	enum
Ch 2 - Level Alarm 3	301009	01008	Alarm Status	enum
Ch 2 - Level Alarm 4	301010	01009	Alarm Status	enum
Ch 2 - Input Alarm 1	301011	01010	Alarm Status	enum
Ch 2 - Input Alarm 2	301012	01011	Alarm Status	enum
Ch 2 - COM Error	301013	01012	Alarm Status	enum
Ch 2 - Low Voltage	301014	01013	Alarm Status	enum
Reserved	301015 - 302000	01014 - 01999	N/A	N/A
Ch 3 - Level	302001	02000	Tenths on inches	uint16
Ch 3 - Percent Full	302002	02001	Tenths of percent	uint16
Ch 3 - Volume	302003 - 302004	02002 - 02003	Gallons	float32
Ch 3 - Ullage	302005 - 302006	02004 - 02005	Gallons	float32
Ch 3 - Level Alarm 1	302007	02006	Alarm Status	enum
Ch 3 - Level Alarm 2	302008	02007	Alarm Status	enum
Ch 3 - Level Alarm 3	302009	02008	Alarm Status	enum
Ch 3 - Level Alarm 4	302010	02009	Alarm Status	enum
Ch 3 - Input Alarm 1	302011	02010	Alarm Status	enum
Ch 3 - Input Alarm 2	302012	02011	Alarm Status	enum
Ch 3 - COM Error	302013	02012	Alarm Status	enum
Ch 3 - Low Voltage	302014	02013	Alarm Status	enum
Reserved	302015 - 303000	02014 - 02999	N/A	N/A
Ch 4 - Level	303001	03000	Tenths on inches	uint16
Ch 4 - Percent Full	303002	03001	Tenths of percent	uint16
Ch 4 - Volume	303003 - 303004	03002 - 03003	Gallons	float32
Ch 4 - Ullage	303005 - 303006	03004 - 03005	Gallons	float32
Ch 4 - Level Alarm 1	303007	03006	Alarm Status	enum
Ch 4 - Level Alarm 2	303008	03007	Alarm Status	enum
Ch 4 - Level Alarm 3	303009	03008	Alarm Status	enum
Ch 4 - Level Alarm 4	303010	03009	Alarm Status	enum
Ch 4 - Input Alarm 1	303011	03010	Alarm Status	enum
Ch 4 - Input Alarm 2	303012	03011	Alarm Status	enum
Ch 4 - COM Error	303013	03012	Alarm Status	enum
Ch 4 - Low Voltage	303014	03013	Alarm Status	enum
Reserved	303015 - 365535	03014 - 65535	N/A	N/A

Table 11 Modbus Input Registers

Appendix K: FuelCloud Activation

To acquire a license file for an existing 1218 system, perform the following steps:

- Locate the serial number found on the barcode on the back side of the console door or refer to the “Update” section in the navigation menu of the 1218 web portal.

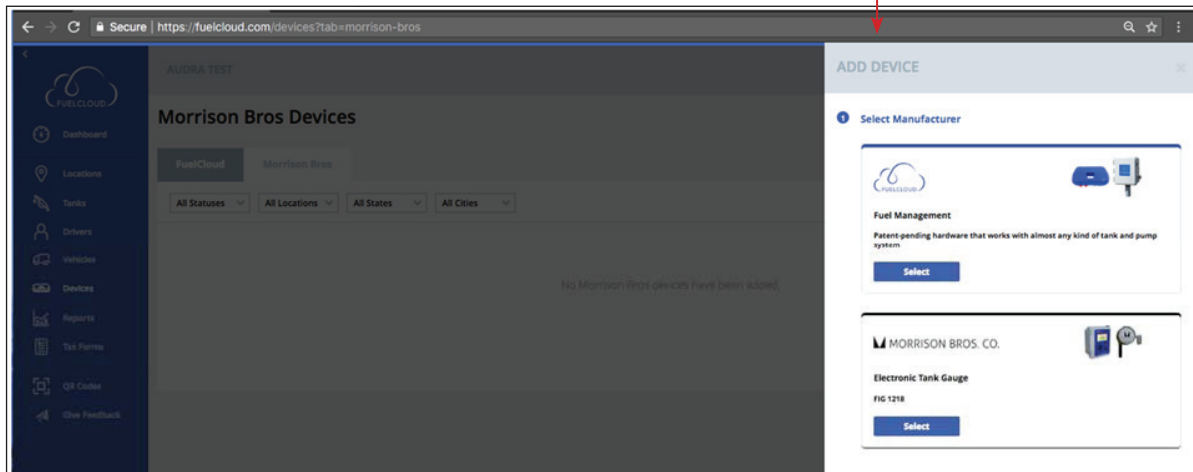


- When contacting Morrison Bros. Co. customer service to receive a license file, the 1218 console serial number will need to be provided.
- Contact Morrison customer service department at 800-553-4840 and request a license file.
- The license file will be emailed to you. Save the file to your computer.
- Under “FuelCloud Settings” on the 1218 dashboard click on the CHOOSE FILE button.
- Browse to find the license file you saved from Morrison Bros.
- Click on the file.
- Click on the UPLOAD LICENSE button.
- Page will automatically refresh when upload is complete.

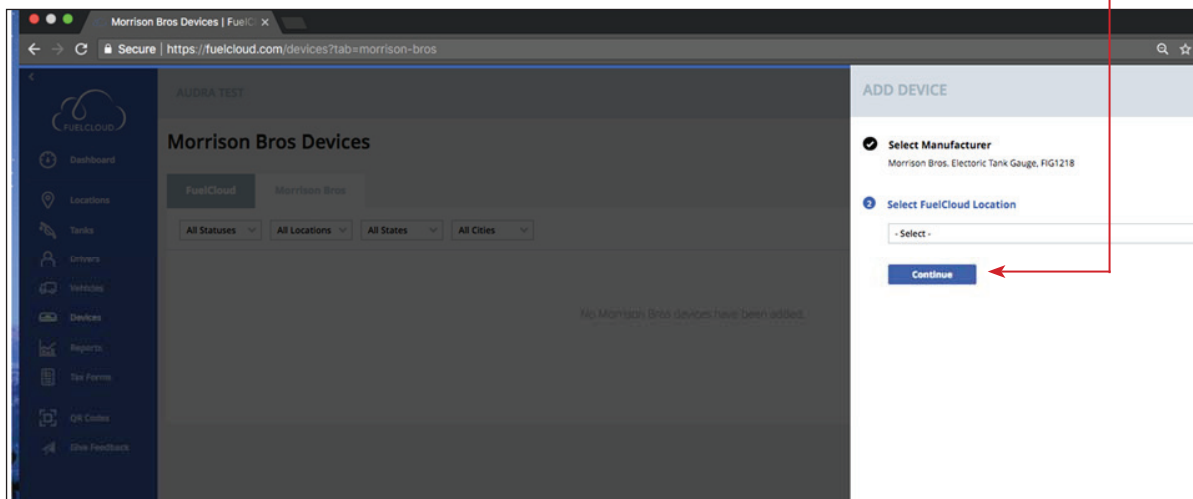


To activate Morrison 1218 tank gauge on FuelCloud account, perform the following steps:

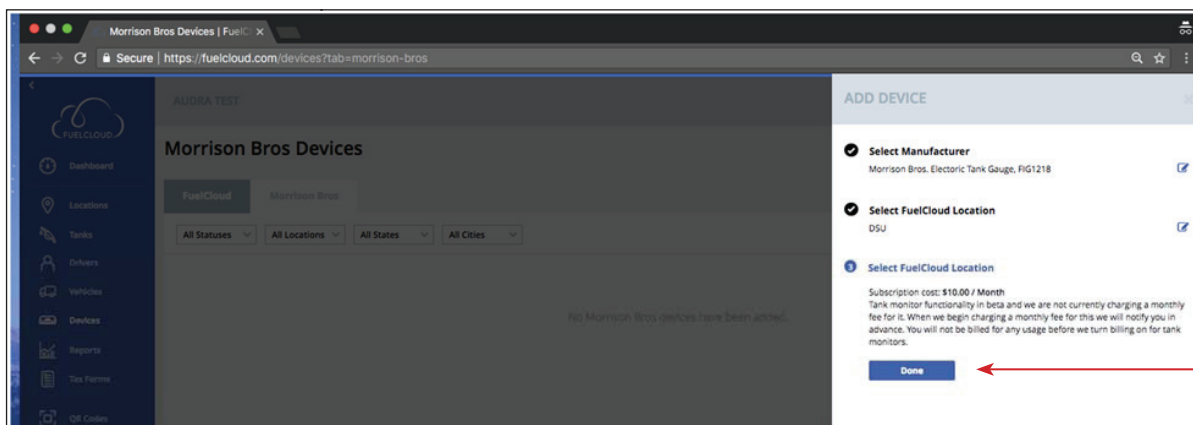
- Sign up for a FuelCloud account or login to your existing FuelCloud Dashboard and select “Devices” on the left navigation bar.
- On the FuelCloud website, go to “Devices.”

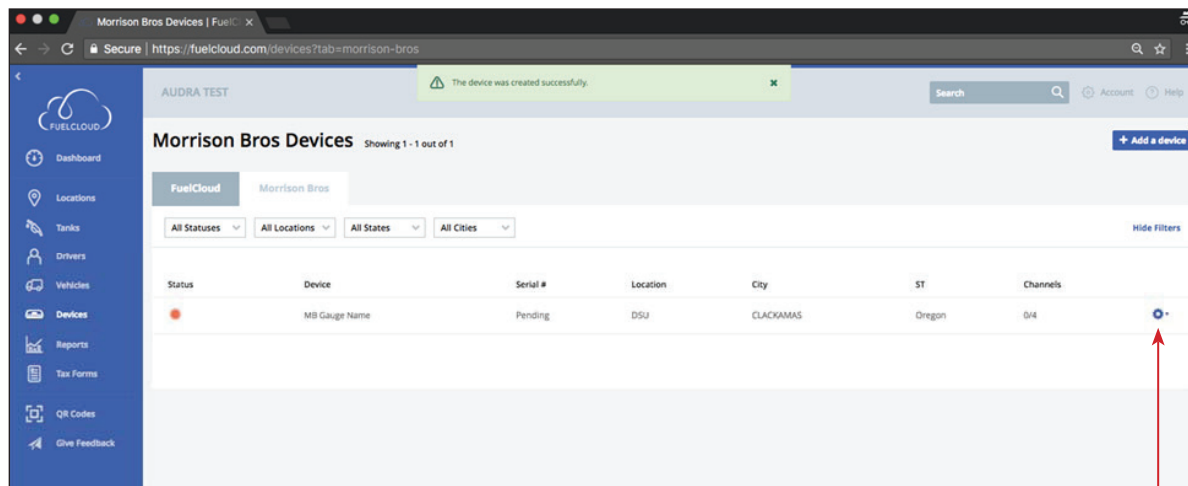


- Select ADD DEVICE
- Select MORRISON BROS CO
- Select location from drop down menu and click CONTINUE

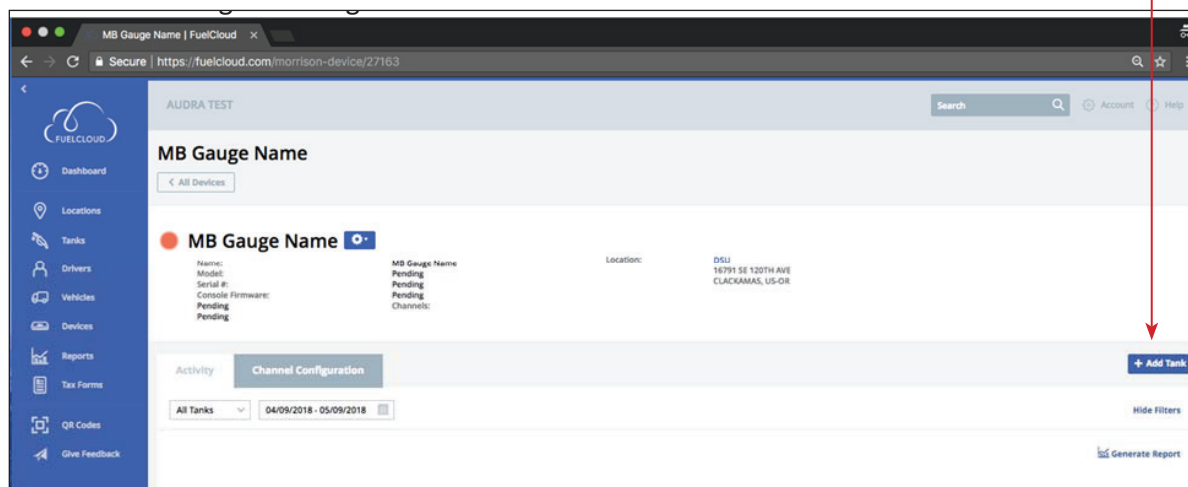


- Select DONE

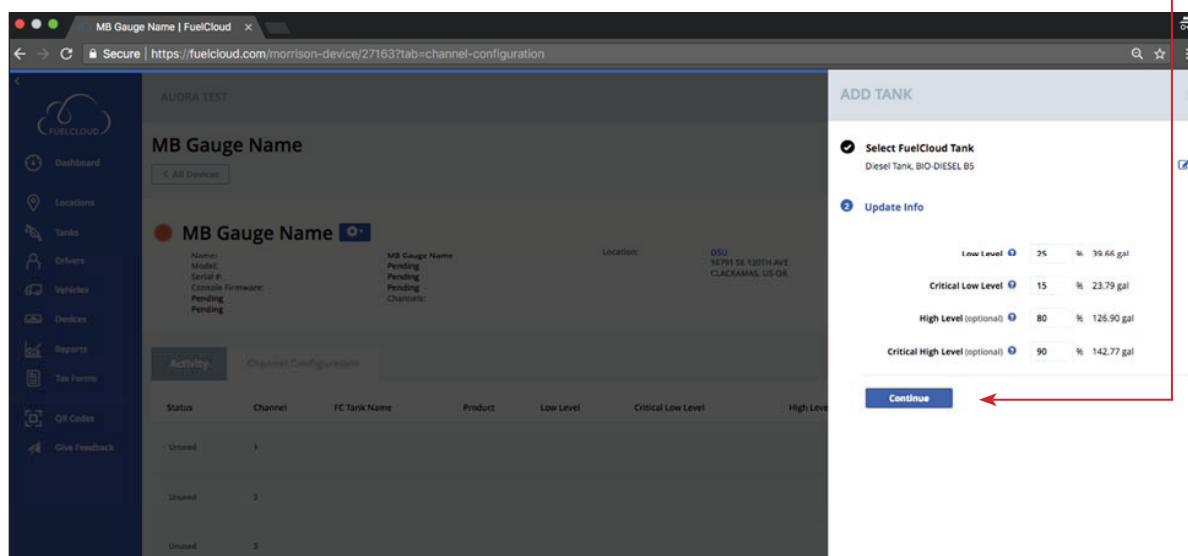


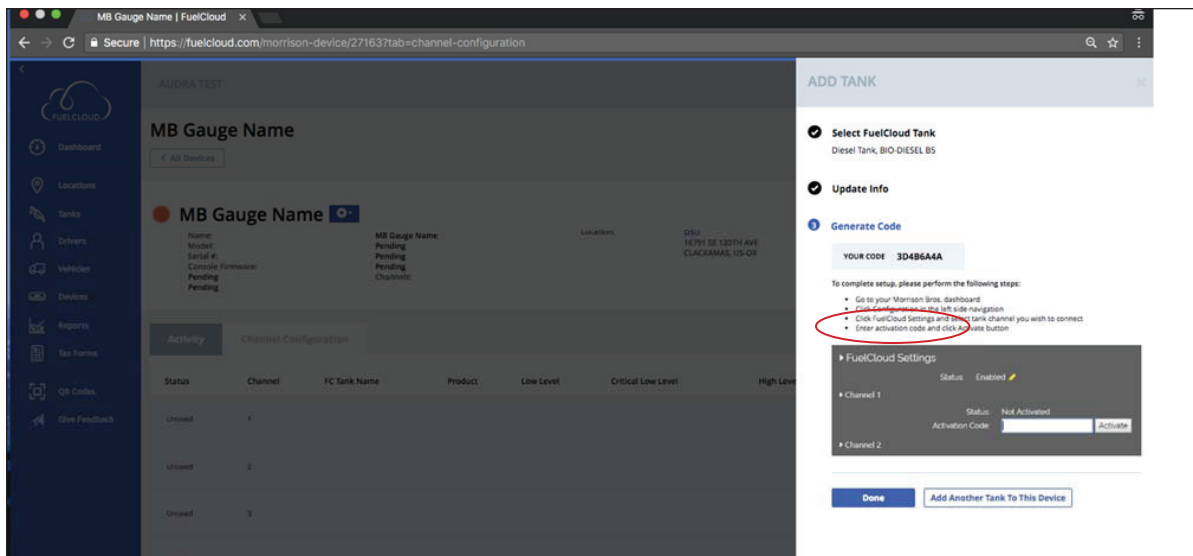


- From the blue cog on the right hand side, select VIEW
- Select ADD TANK

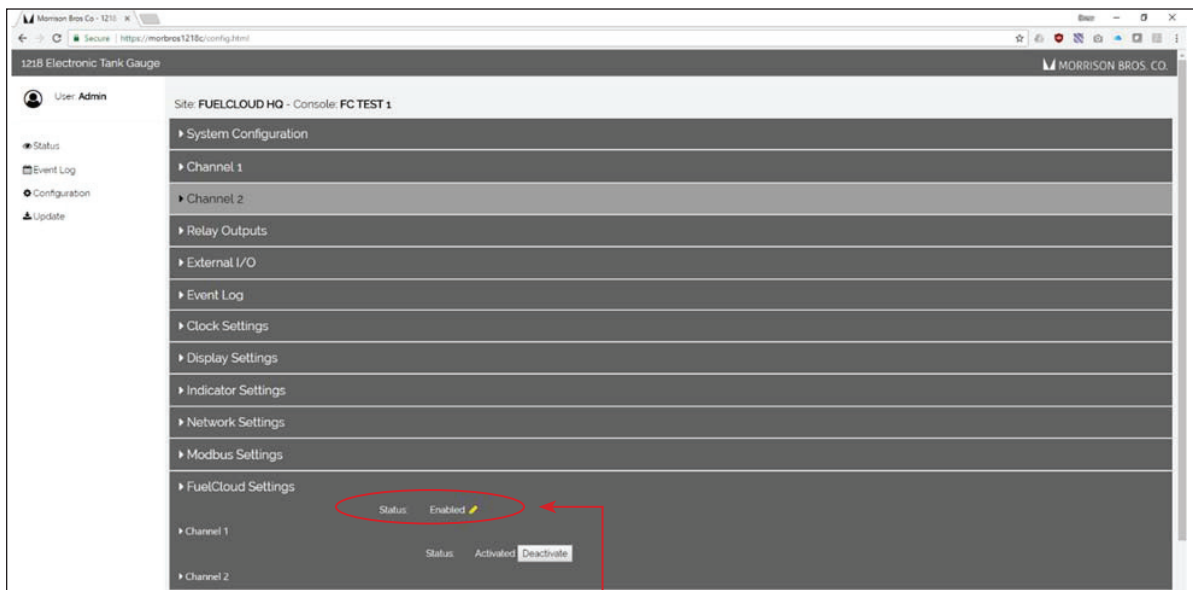


- Select tank to add (if necessary, the user can adjust level alarms here), then click CONTINUE





- Copy activation code
- Enter activation code on Morrison 1218 website



- Ensure FuelCloud is enabled



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