User Guide

Document Rev #: 80-7036-001_R

OleumTech® OTC Wireless Sensor and I/O Network

Wireless Flow Totalizer Transmitter

Class I, Division 1 (Zone 0)

WT-0900-FT1 | WT-0915-FT1 | WT-2400-FT1 | WT-0868-FT1

Table of Contents

1. SAFETY, CERTIFICATIONS, COMPLIANCE

1. Safety

CAUTION: Ensure installation of the transmitter meets applicable state and national electrical code requirements. The installation of the transmitter should only be performed by a qualified installer or a factory representative.

WARNING: Replacement battery MUST ONLY be the 3.6 Volt Lithium Battery Pack, SX1000-BP3, supplied by OleumTech. Use of any other battery or battery packs may negatively affect device performance, void device warranty, and may result in an explosion.

WARNING: To prevent static discharge, wipe with damp cloth only.

WARNING: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

WARNING: Although the transmitter is very durable, do not install it on high vibration applications or where transmitter is subject to severe mechanical shock.

CAUTION: Disconnect the battery when the device is not in use.

CAUTION: Replace the battery when it reaches ≤ 2.90 Vdc.

Sécurité

MISE EN GARDE: Veiller à l'installation de la passerelle répond Etat et des exigences nationales de code de l'électricité. L'installation de la transmitter ne doit être effectuée par un installateur qualifié ou un représentant de l'usine.

AVERTISSEMENT: Batterie de remplacement ne doit être la Volt Lithium Battery Pack 3.6, SX1000 - BP3, fourni par OleumTech. L'utilisation d'autres batteries ou batterie peut affecter négativement les performances de l'appareil, la garantie de l'appareil vide, et peut entraîner une explosion.

AVERTISSEMENT: Pour éviter une décharge statique, essuyer avec un chiffon humide.

AVERTISSEMENT: Pour éviter l'inflammation d'atmosphères inflammables ou combustibles, débrancher l'alimentation avant l'entretien.

AVERTISSEMENT: Bien Bien que l'émetteur soit très durable, ne l'installez pas sur des applications soumises à de fortes vibrations ou lorsque l'émetteur est soumis à des chocs mécaniques importants.

MISE EN GARDE: Déconnectez la batterie lorsque l'appareil n'est pas utilisé.

MISE EN GARDE: Remplacez la pile batterie lorsqu'elle atteint ≤ 2,90 Vcc.

2. Certifications

EMC/EMI

· FCC Part 15 (USA)

· IC ICES-003 (Canada)

· AS/NZS CISPR 32 Class A

· AS/NZS 4268:2017

Safety

· Class I, Division 1, Groups A, B, C, D T3C; Ex ia IIC T3

· Class I, Zone 0; AEx ia IIC T3

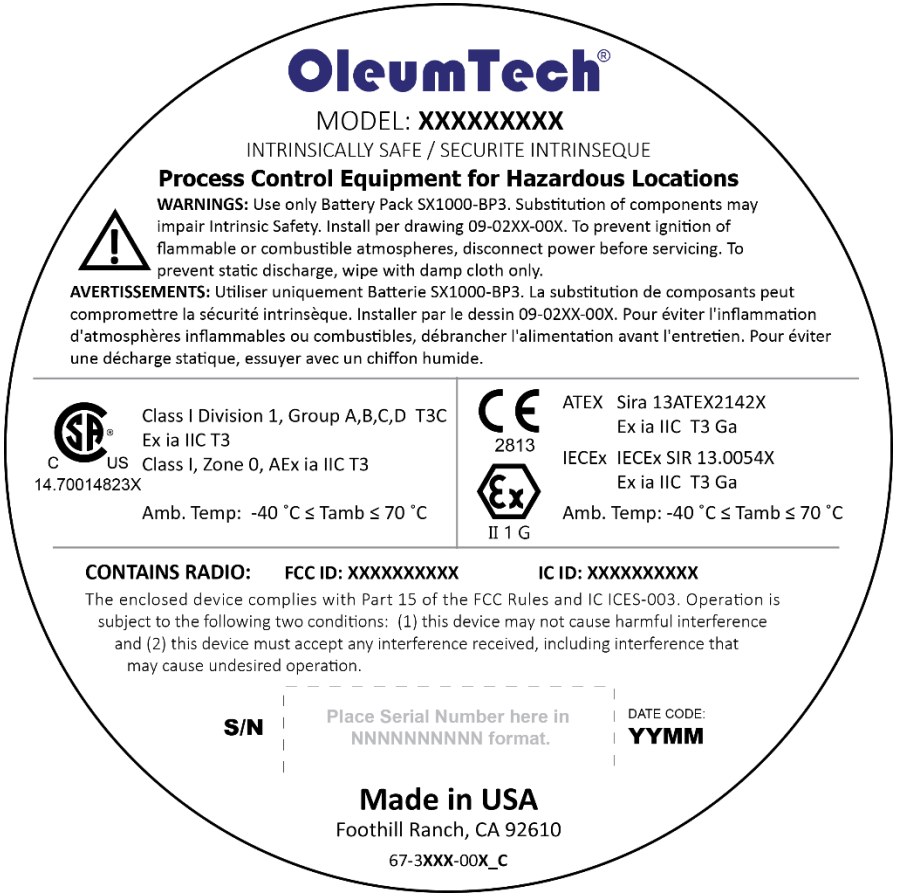
· ATEX: Sira 13ATEX2142X; Ex ia IIC T3 Ga; II 1 G

· IECEx: SIR 13.0054X; Ex ia IIC T3 Ga

Amb. Temp.

· Ta = -40 °C to 70 °C (-40 °F to 158 °F)

The certification marking shall be as detailed on drawing number 67-3XXX-00X below:



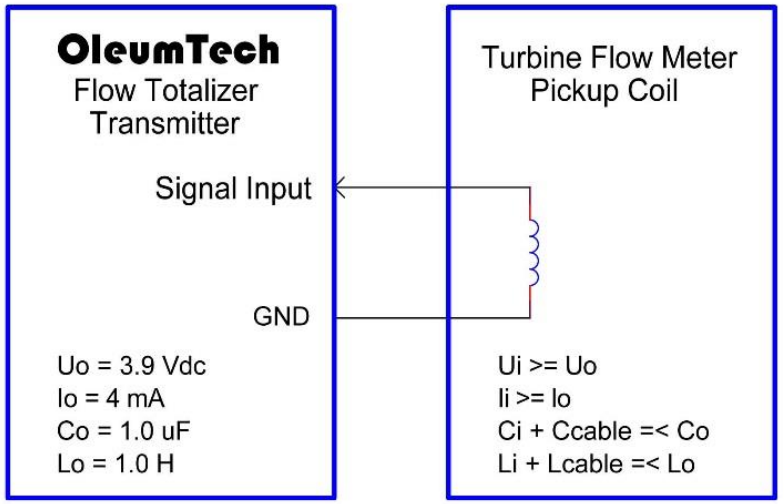
3. Intrinsic Safety Control Drawings

REVISION HISTORY

Rev:	ECO No:	Description:	Approved:		Date:
A	001097	Initial release	K.C.	P.C.	01/06/11
B	001860	Update Hazardous Location Classifications	K.C.	P.C.	06/27/13

HAZARDOUS (CLASSIFIED) LOCATION

Class I, Division 1, Group A, B, C & D, T3C
Class II, Division 1, Group E, F & G, T3C
Class III, T3C
Class I, Zone 0, Ex ia, IIC, T3
Class I, Zone 0, AEx ia, IIC, T3



Notes:

1. Third party pickup coil may be attached to the Flow Totalizer that meet the Intrinsic Safety Entity concept, which allows the interconnection of two Intrinsically Safe devices with entity parameters not specifically examined in combination as a system when: Ui >= Uo, Ii >= Io, Ci + Ccable =< Co, Li + Lcable =< Lo.
3. Unless otherwise known, a cable capacitance of 60 pF/ft (197pF/m) and 0.20 uH/ft (0.66 uH/m) can be used to calculate the cable parameters.
4. Installlation must be in accordance with ANSI/ISA-RP12.6, and the National Electrical Code, NFPA 70 Article 504 or CEC Part 1, Appendix F.

OleumTech CORPORATION
IRVINE, CA 92618

APPROVALS:	DATE:	Title:	Rev:
Engineer: Larry Cleghorn	01/06/2011	CONTROL DRAWING, INTRINSIC SAFETY, FLOW TOTALIZER	B
Checked: Ken Chang	01/06/2011	Size: A / Document No: 09-0212-001	Sheet: 1 of 1

DCC Copy

4. Special Instruction for Use

a. ATEX/IECEx

i. The enclosure is manufactured from aluminum. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered during installation, particularly if the equipment is installed in a Zone 0 location.

ii. Under certain extreme circumstances, the exposed non-metallic antenna cover may store an ignition capable level of electrostatic charge. Therefore, the user/installer shall implement precautions to prevent the buildup of electrostatic charge, e.g. locate the equipment where a charge-generating mechanism (such as wind-blown dust) is unlikely to be present and clean with a damp cloth. The enclosure shall be earthed to the local metalwork.

Copies of Certificate of Compliance are available on https://support.oleumtech.com (Look under Resources)

b. cCSAus

Equipment shall not be installed in gasoline or ethyl acetate atmospheres.

5. EMC/EMI

a. Important Information to the User

- This device MUST be professionally installed only by a factory representative or a trained authorized technician.
- Changes or modifications not expressly approved by the manufacturer may void the user's authority to operate the equipment.
- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.
- This product contains a FHSS (Frequency Hopping Spread Spectrum) and FSK (Frequency Shifting Key) modulation RF transceiver for the 902-928 MHz ISM band, designed to meet FCC 15.247, and is used in industrial control and monitoring applications.
- To reduce potential radio interference to other users, install and use only the antenna supplied by the manufacturer to ensure successful communications.
- The antenna is factory sealed and MUST NOT be modified by the user.

b. Compliances

i. FCC RF Exposure

To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

ii. FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful communications to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the antenna.
- Increase the separation between the equipment and receiver.
- Consult the manufacturer for technical help.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or use of unshielded cables is likely to result in interference to radio and television reception. The user is cautioned that changes or modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate this equipment.

c. Australia

The operator does not require a specific license issued by ACMA to operate this equipment. This equipment has been set up by the manufacturer to meet the technical requirements of Class License and should be so maintained.

The device shall be installed in such manner that no member of the general public can be closer than 20cm (0.2 m) from the antenna.

CONFORMITÉ

Informations importantes à l'utilisateur

- Ce dispositif doit être installé par un professionnel que par un représentant de l'usine ou par un technicien formé et autorisé.
- Les changements ou modifications non expressément approuvés par le fabricant peuvent annuler l'autorité de l'utilisateur à utiliser l'équipement.
- Cet appareil est conforme à la partie 15 des règles de la FCC. Son fonctionnement est soumis aux deux conditions suivantes: 1) ce dispositif ne doit pas causer d'interférences nuisibles et 2) cet appareil doit accepter toute interférence reçue, y compris les interférences qui peuvent causer un mauvais fonctionnement.
- Ce produit contient un FHSS (Frequency Hopping Spread Spectrum) émetteur-récepteur RF pour la bande ISM 902-928 MHz en utilisant FSK (Frequency Shifting Key) modulation, conçu pour répondre FCC 15.247, et est utilisé dans le contrôle industriel et les applications de surveillance.
- Pour réduire les interférences radio potentielles aux autres utilisateurs, installer et utiliser uniquement l'antenne fournie par le fabricant pour assurer une communication réussie.
- L'antenne est scellé en usine et ne doit être modifié par l'utilisateur.

Exposition RF de la FCC

Pour se conformer à la FCC exigences de conformité de l'exposition, une distance de séparation d'au moins 20 cm doit être maintenue entre l'antenne de cet appareil et toutes les personnes.

Déclaration de Conformité FCC

Cet équipement a été testé et déclaré conforme aux limites d'un appareil numérique de classe B, conformément à la partie 15 des règles de la FCC. Ces limites sont conçues pour fournir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle. Cet équipement génère, utilise et peut émettre de l'énergie radiofréquence et, si non installé et utilisé conformément aux instructions, peut provoquer des communications nuisibles aux communications radio. Cependant, il ne est pas garanti que des interférences ne se produiront pas dans une installation particulière. Si cet équipement provoque des interférences nuisibles à la réception radio ou de télévision, ce qui peut être déterminé en mettant l'équipement hors et sous tension, l'utilisateur est encouragé à essayer de corriger l'interférence par une des mesures suivantes:

- Réorienter ou déplacer l'antenne.
- Augmenter la distance entre l'équipement et le récepteur.
- Consultez le fabricant de l'aide technique.

Cet équipement a été certifié conforme aux limites d'un dispositif informatique de classe B, conformément aux règles de la FCC. Afin de maintenir la conformité aux règlements de la FCC, des câbles blindés doivent être utilisés avec cet équipement. L'utilisation d'équipement ou l'utilisation de câbles non blindés non approuvé est susceptible d'entraîner des interférences dans la réception radio et télévision. L'utilisateur est averti que les changements ou modifications apportées à l'équipement sans l'approbation du fabricant pourraient annuler l'autorité de l'utilisateur à utiliser cet équipement.

2. PRODUCT OVERVIEW

Works with a Third-Party Turbine Flow Meters

The OleumTech® OTC Wireless Flow Totalizer Transmitter is designed to work with virtually any third-party turbine flow meters for accumulating volume of liquid with high accuracy of ±0.01 %. You can set the contract hour and set the flow rate to per second, minute, hour, or day. You can also match the k factor and k factor units and display the volume output in barrels, liters, gallons, or cubic meters. The WT-FT1 provides a 2-pin pickup coil connector and a 1-inch mating union for connecting to a turbine meter. This ultra low-power transmitter is powered by a replaceable battery pack that provides up to a 10-year life. The push button LCD interface allows for device configuration and instant access to process data.

Reliable, Scalable, and Safe

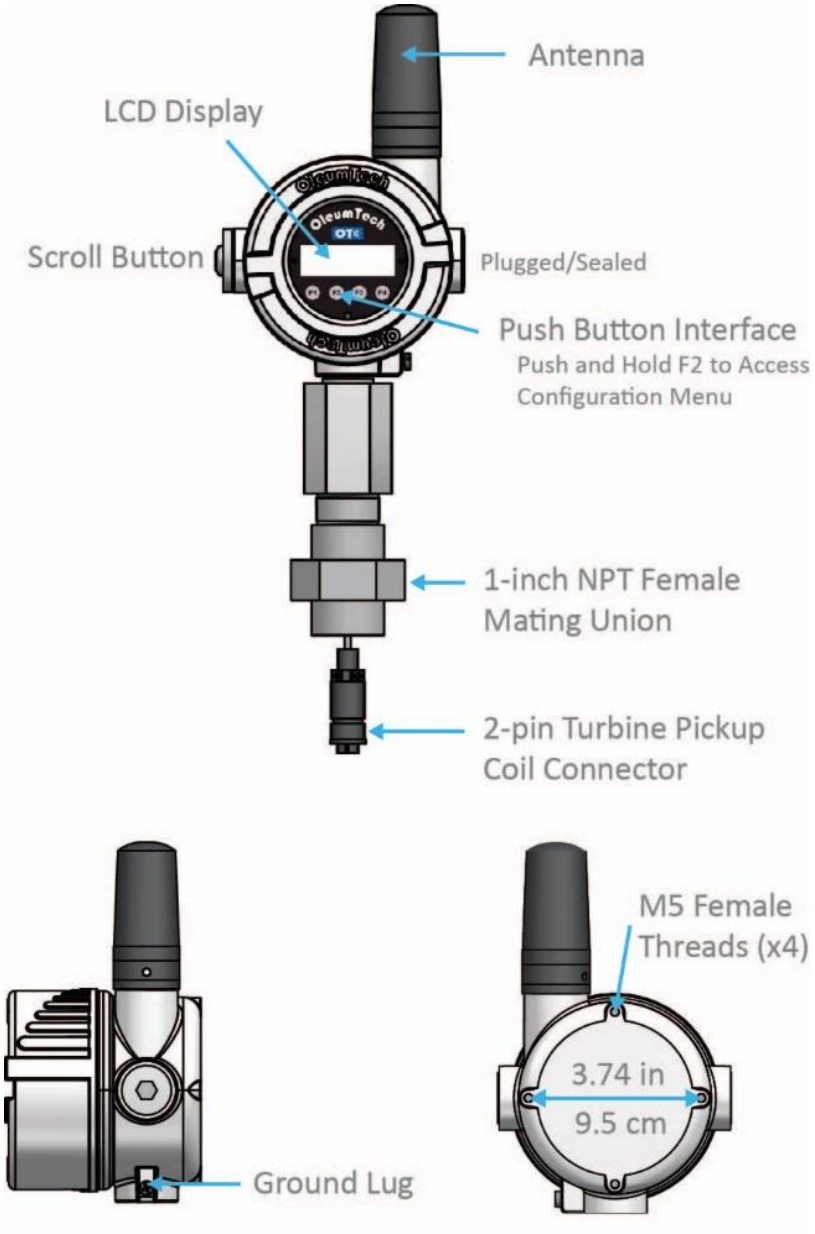
The field-proven wireless transmitter communicates with an assigned wireless gateway within the OTC Wireless Sensor and I/O Network creating a highly scalable network, accommodating virtually any I/O requirement.

The OleumTech wireless transmitter is certified for use in Class I, Division 1 (Zone 0) hazardous locations. It is intrinsically safe, designed not to cause a spark, and can be serviced without being removed from a process.

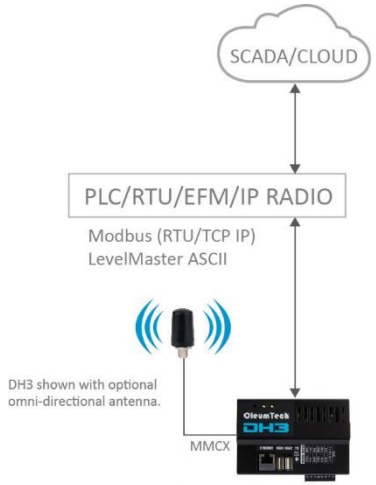
Highlights

- Works with a 3rd-party turbine flow meter
- Captures today's & yesterday's totals, raw totals, and instantaneous rate
- High accuracy of ± 0.01 % / 1 Hz - 10 KHz
- Up to a 10-year battery life
- Advanced local LCD display interface
- Self-contained, rugged design
- Installs in minutes
- IP66, -40 ˚C to 70 ˚C (-40 ˚F to 158 ˚F)
- 900 MHz / 915 MHz / 2.4 GHz / 868 MHz
- Secure AES encryption
- Class I, Division 1 (Zone 0), Intrinsically Safe

3. HARDWARE OVERVIEW



4. NETWORKING DIAGRAM



5. TECHNICAL SPECIFICATIONS

Download Datasheet / Technical Specifications

HARDWARE FEATURES	
Device Functionality	· Flow Totalizer Wireless Transmitter
Embedded Controller	· Ultra-Low Power RISC Microcontroller with Internal FLASH (Field Upgradeable)
Configuration	· Standard RS232 Serial / BreeZ® Software for PC
Inputs	· High-Speed Pulse Counter Input: 1 Hz to 10 KHz · Up to 10 K Cycles per Second
Input Voltage Range	· 15 mV to 3300 mV
Accuracy and Stability	· Flow Rate Accurate to ±0.01 % of Reading · Excluding Turbine Meter and Magnetic Pickup
Power Source	· Self-Contained, Internal 3.6 Vdc Lithium Battery
Internal Battery Life	· Up to 10 Years, Based on User Defined Reporting Intervals[1]
Local LCD Display	· 32-Character Display (16x2 Lines) with 4 Function Keys + Read Button
Instant Displayable Read	· Current Flow Rate / Today's Totals / Yesterday's Totals / Battery Voltage / RF Status
Local Configuration	· Integral LCD with Push Button Interface
Device Diagnostics	· Health Tags: Battery Voltage, Received Signal Strength Indication (RSSI), RF Refresh, RF Timeout
WIRELESS COMMUNICATIONS	
Radio Band	· ISM Band (License-Free)
900 MHz / 915 MHz	· FHSS, FSK, AES Encryption 256-bit (900 MHz), 128-bit (915 MHz)
2.4 GHz	· DSSS, AES Encryption 128-bit
868 MHz	· LBT-AFA, AES Encryption 128-bit
Bit Rate	· 900/915 MHz: 9600 bps / 115.2 kbps; 2.4 GHz: 250 kbps; 868 MHz: 80 kpbs
Output Power (Max)	· 900/915 MHz: 10 mW; 2.4 GHz: 63 mW; 868 MHz: 25mW
Receiving Sensitivity	· 900/915 MHz: -110 dBm @ 9600 bps, -100 dBm @ 115.2 kbps · 2.4 GHz: -101 dBm @ 250 kbps; 868 MHz: -106 dBm @ 80 kbps
RF Range	· 900/915 MHz: Up to 7500 Feet / 1.4 Miles (2.3 km) with Clear Line of Sight[2] · 2.4 GHz: Up to 4.3 Miles (7 km) with Clear Line of Sight[2] · 868 MHz: Up to 5.2 Miles (8.4 km) with Clear Line of Sight[2]
CERTIFICATIONS & COMPLIANCE	
EMC/EMI	· FCC Part 15 (USA), IC ICES-003 (Canada), ACMA (Australia) · AS/NZS CISPR 32 (Australia), EN55032 & EN55024 (EU)
Safety	· Class I, Division 1, Groups A, B, C, D T3C; Ex ia IIC T3 · Class I, Zone 0; AEx ia IIC T3 · ATEX: Sira 13ATEX2142X; Ex ia IIC T3 Ga; II 1 G · IECEx: SIR 13.0054X; Ex ia IIC T3 Ga
MECHANICAL SPECIFICATIONS	
Dimensions	· 5.5" (W) x 16" (H) x 4.4" (D) / 140 mm (W) x 406 mm (H) x 112 mm (D)
Package Dimensions	· 10.25" (W) x 14" (H) x 6.5" (D) / 260mm (W) x 356mm (H) x 165mm (D)
Package Weight	· ~7 lbs / 3.2 kg
Connection Fitting	· 1" NPT Female, 1" Mating Union to Flow Turbine Included
Enclosure Casing Material	· Type 4X Aluminum; IP66
Mating Assembly	· 304 Stainless Steel
Magnetic Pickup Coil Connection	· 2-Pin Circular Connector (Part # MS3106A-10SL-4S)
GENERAL SPECIFICATIONS	
Operating Conditions	· Ambient Temperature (Class I, Division 1 / Zone 0): -40 °C to 70 °C (-40 °F to 158 °F) · LCD Screen -20 °C to 70 °C (-4 °F to 158 °F) · Ambient Temperature (Non-Hazardous Applications): -40 °C to 80 °C (-40 °F to 176 °F) · LCD Screen -20 °C to 70 °C (-4 °F to 158 °F) · Humidity: 0 to 99 %, Non-Condensing
Warranty	· 2-Year Parts and Labor
Country of Origin	· USA

6. REQUIRED ITEMS FOR BASIC SETUP

Transmitter Setup

- WT Series Flow Totalizer Transmitter
- Use only SX1000-BP3 Transmitter Battery Pack (supplied with the transmitter)
- 1-inch mating union (included with the transmitter)
- Turbine flow meter (sold separately)

Gateway Setup

- OTC Wireless Gateway (fully set up, refer to the specific User Guide)
  - DH3
  - DH1 or DH2
  - DH2-W
- External power source for gateway (9-30 Vdc)
- External enclosure for wireless gateway

Configuration Cable

- Optional All-in-One Configuration Cable (SX1000-CC2). The cable is not required for local configuration via the local display interface.

Software and PC

- Latest BreeZ® Configuration Software
- Latest gateway firmware
- Latest firmware package
- PC with:
  - Microsoft Windows® 7 or later
  - 1 GHz or faster processor
  - 1 GB or more RAM
  - 500 MB Hard Disk Space or more
  - USB or Serial port

Tools

- Screwdriver set
- Needle nose pliers
- Industrial-grade thread sealant or tape
- Adjustable wrench
- Any other tools or equipment for proper installation

Internet Access

- Internet access required for downloading software and firmware
- Access to OleumTech OTC Download Center: https://support.oleumtech.com

7. BATTERY PACK INSTALLATION

Internal battery power: 3.6 Vdc

Battery level is read under load.
Note: Once a new battery pack is installed, it is perfectly normal to get a reading of 3.2 to 3.3 Vdc.

The transmitter reads the battery level while it is under load, providing a reliable method of monitoring battery health. Using the RF Timeout and RF Refresh tags along with the Battery Voltage tag are strongly recommended for monitoring device and RF communication health.

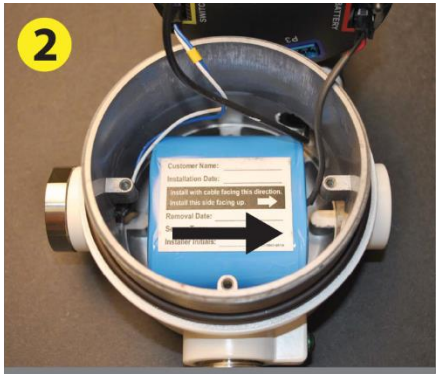
When a new battery pack is taken from storage and initially installed, the battery level may need to be read a couple of times to ensure a stable and accurate reading.

- Use only battery pack part number SX1000-BP3.
- Disconnect the battery when device is not in use.
- Replace the battery pack when it reaches ≤ 2.90 Vdc.

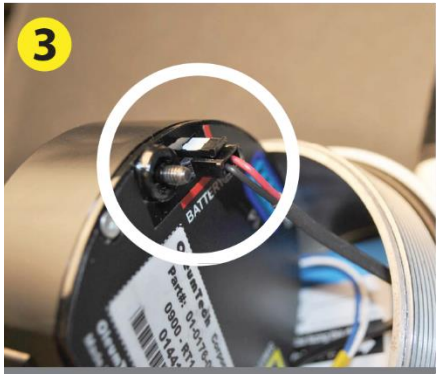
- Utilisez uniquement le numéro de pièce de la batterie SX1000-BP3.
- Déconnecter la batterie lorsque l'appareil n'est pas utilisé.
- Remplacez la batterie lorsqu'elle atteint ≤ 2,90 Vdc.

Click here to view the Battery Life Chart

Remove the enclosure cover and detach the LCD Module secured by the screws.



Insert the Battery Pack with the label facing up and arrow pointing to the right.



Connect the battery to the battery terminal on the LCD Module.

Program the transmitter using the PC or through the LCD interface.

Tighten the enclosure cover by hand only.

WARNING

The LCD Module MUST be fully seated and fastened securely BEFORE tightening the enclosure cover.

Tighten the cover(s) only by hand. DO NOT use any tools.

Replace the battery if:

a. Nothing appears on the LCD screen after plugging in the battery.
b. Battery level ≤ 2.9 Vdc.
c. ONLY use Battery Pack SX1000-BP3.

8. INSTALLATION

1. Installation Best Practices

a. **WARNING:** Although the transmitter is very durable, do not install it on high vibration applications or where transmitter is subject to severe mechanical shock.

b. Follow your organization's best grounding practices.

c. Always install the transmitter in the upright position so that the antenna pole is correctly oriented.

d. When possible, have at least 10 ft ground clearance for optimal RF performance.

e. Have at least 10 ft of vertical separation with other antennas.

f. Be sure to tightly seal all orifices using industrial-grade thread sealant or tape.

g. Tighten the enclosure cover by hand only.

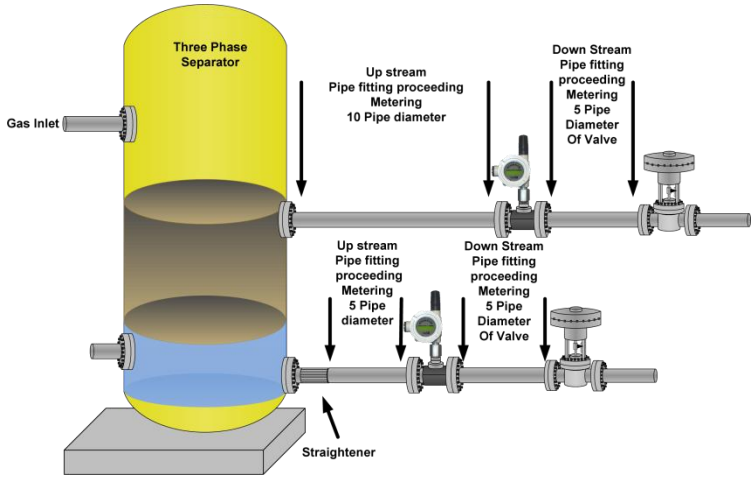
h. Face the LCD away from the sun when possible for better visibility.

2. Recommended Pipe Length for Proper Installation

a. Upstream (Outlet to the Flow Totalizer)
   i. 10 ft of straight pipe length from outlet
   or
   ii. 5 ft of straight pipe length if used with straightener

b. Downstream
   i. 5 ft of straight pipe length from Flow Totalizer

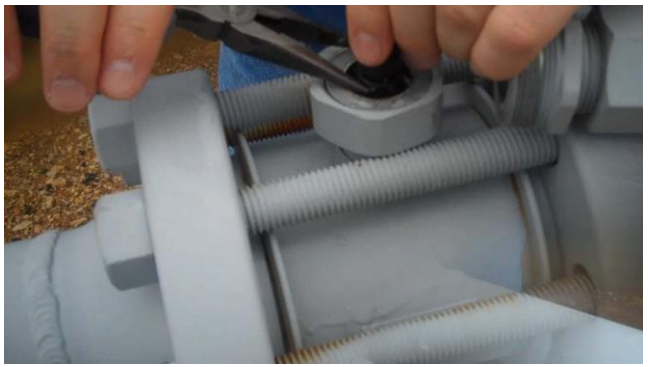
The term swirl is used to describe the rotational velocity or tangential velocity component of fluid flow in a pipe or tube. Depending on its degree and direction, swirl will change the angle between the fluid and the turbine rotor blades, causing a different rotor speed at a constant flow rate to non-swirling conditions at the same flow rate. Liquid swirl and non-uniform velocity profiles may be introduced upstream of the turbine flow meter by variations in piping configurations or projections and protrusions within the piping. Swirl may be effectively reduced or eliminated through the use of proper lengths of straight pipe and/or a combination of pipes and straightening vanes installed upstream of the turbine flow meter as displayed in the drawing below.



3. Remove the unit being replaced.

a. Disconnect the mating union.

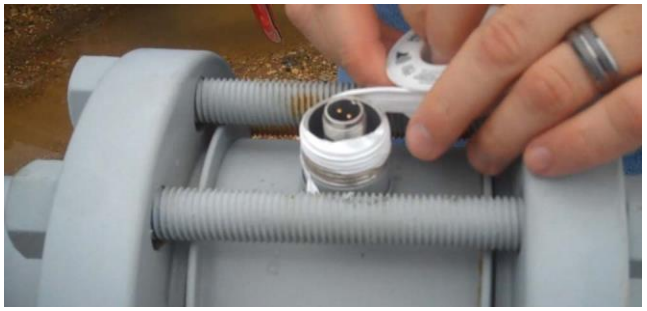
b. Safely disconnect the 2-pin pickup coil connector.



c. Remove the bottom piece of the old mating union.

4. Install Flow Totalizer Transmitter

a. Apply thread sealant/tape on the threads.



b. Connect the new mating union supplied with the transmitter.

c. Connect and tighten the 2-Pin pickup coil connector.

d. Mount and align the Flow Totalizer Transmitter to the turbine flow meter.

e. Tighten the mating union to the turbine flow meter.

⚠ Do not turn or twist the transmitter to avoid damaging pickup coil cable!

9. GROUNDING RECOMMENDATIONS

It is important to effectively earth ground the transmitter to ensure safety, prevent static electricity damage, and to protect from lightning and/or electrical surges in the area. Ensure the equipment to which the transmitter is mounted is properly earth grounded as defined by the National Electrical Code.

- A true earth ground physically consists of a conductive pipe or rod driven into the earth. Rod electrodes shall not be less than 8 feet (2.44 m) in length and consist of the following materials and installed in the following manner:
- Electrodes shall be copper clad or their equivalent and shall be not less than 5/8 inch (15.875 mm) in diameter or listed non-ferrous rods or their equivalent and not less than 1/2 inch (12.7 mm) in diameter.
- The electrode shall be installed such that at least 8 feet (2.44 m) of length is in contact with the soil. It shall be driven to a depth of not less than 8 feet (2.44 m). The electrode shall be driven at an oblique angle not to exceed 45 degrees from vertical or shall be buried in a trench that is at least 2 1/2 feet (.762 m) deep. The upper end of the electrode shall be flush with or below ground level. If ground end and the grounding electrode conductor attachment are above ground, ensure protection against physical damage.

Transmitter Grounding

- Ground the transmitter to the equipment using the grounding screw or connect directly to the grounding rod if the mounting the transmitter to non-grounded equipment. We recommend 12 to 16 AWG for ground cable. We recommend 12 to 16 AWG for ground cable. The grounding screw connections are located on the outside of the housing and identified by ground symbol. ⏚
- Once all wiring and grounding recommendations have been followed it is important to test the ground resistance at the grounding rod to assure a good ground. The most effective grounding method is direct connection to earth ground with minimal impedance. An impedance of less than 5 Ohms recommended.
- For more details on proper grounding electrodes and grounding electrode conductors, consult the National Electrical Code.

RECOMMANDATIONS DE MISE À LA TERRE

Dans le cas où l'équipement sur lequel le transmitter est monté n'est pas correctement mis à la terre, il est important de mettre à la terre efficacement le transmitter pour assurer la sécurité, éviter les dommages d'électricité statique et la protection contre les éclairs et / ou les surtensions électriques. Assurer la citerne à laquelle l'émetteur est monté correctement relié à la terre tel que défini par la Code national de l'électricité.

- Une véritable prise de terre se compose physiquement d'un tuyau conducteur ou tige entraînée dans la terre. Électrodes de Rod ne sont pas moins de 8 pieds (2,44 m) de longueur et se compose des matières suivantes et installé de la manière suivante:
- Les électrodes doivent être en cuivre plaqué ou leur équivalent et ne doit pas être moins de 5/8 de pouce (15,875 mm) de diamètre, ou listé tiges non - ferreux ou leur équivalent et pas moins de 1/2 pouce (12,7 mm) de diamètre.
- L'électrode doit être installée de telle sorte que au moins huit pieds (2,44 m) de longueur est en contact avec le sol. Il est conduit à une profondeur d'au moins 8 pieds (2,44 m). L'électrode doit être conduit à un angle oblique de ne pas dépasser 45 degrés de la verticale ou sera enterré dans une tranchée qui est au moins 2 1/2 pieds (0,762 m) de profondeur. L'extrémité supérieure de l'électrode doit être de niveau avec ou au-dessous du niveau du sol. Si la fin du sol et le conducteur l'attachement de l'électrode de mise à la terre sont au dessus du sol, assurer une protection contre les dommages physiques.

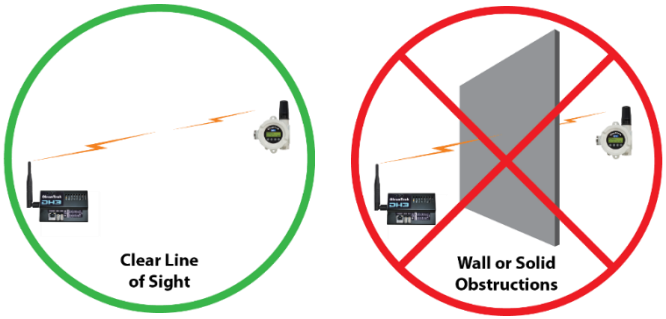
Mise À La Terre De L'émetteur

- Reliez l'émetteur vers le réservoir en utilisant la vis de mise à la terre, ou se connecter directement à la tige de mise à la terre si l'émetteur de montage sur un réservoir non métallique. Nous recommandons 12-16 AWG pour le câble de masse. Les connexions à vis de mise à la terre sont situés à l'extérieur du boîtier et identifiés par le symbole de terre. ⏚
- Une fois toutes les recommandations de câblage et de mise à la terre ont été suivies , il est important de tester la résistance du sol à la tige de mise à la terre pour assurer un bon sol. La méthode de mise à la terre la plus efficace est la connexion directe à la terre avec une impédance minimale . Une impédance inférieure à 5 Ohms recommandée.
- Pour plus de détails sur les électrodes de mise à la terre et de mise à la terre des conducteurs d'électrodes , consulter le Code national de l'électricité .

10. RF SETUP / RF SECURITY

1. Clear Line of Sight

A clear line of sight with minimal obstructions is necessary for best wireless (RF) communication. Performing a RF survey is highly recommended prior to commissioning.



2. Maximum RF Range*

900/915 MHz: Up to 7500 Feet / 1.4 Miles / 2.3 km
Refer to 900/915 MHz RF Range Guide

2.4 GHz: Up to 4.3 Miles / 7 km with Clear Line of Sight*
Refer to 2.4 GHz RF Range Guide

868 MHz: Up to 5.2 Miles / 8.4 km

*The maximum RF range data was collected under optimal test conditions, including a clear line of sight between antennas. Actual wireless RF range may vary depending on location, RF interference, weather, antenna type, cable type, and line of sight.

3. Received Signal Strength Indication (RSSI)

RSSI value can be exported as a Modbus register to monitor the RF health from end Transmitter(s) to Gateway.

RSSI Reading:
Excellent = 40-75; Good = 76-90; Weak = 91-115

4. RF Timeout Tag

When setting up Transmitters, RF Timeout tag can be added as a Modbus register for monitoring RF health. The timeout trigger is normally set to three times the Tx interval. This means when the data packet is missed on three consecutive interval attempts, the RF timeout will be flagged.

0=RF OK; 1= RF Timeout

5. RF Refresh Tag for Ensuring RF and Device Health

When setting up transmitters, RF Refresh tag can also be added as a Modbus register for trending RF data using a third-party device.

6. Maximum Number of End Transmitter Support per Gateway

Each Gateway can support a maximum of 63 Transmitters. This can be a combination of Wireless Transmitters and Wireless I/O Modules.

Major factors that contribute to actual support of maximum End Transmitters depends on transmission frequency, RF frequency, RF propagation, RF data (bit) rate, and physical/geographical limitation or challenges as well as RF interferences.

If a Gateway is also connected wirelessly to other Gateways for peer-to-peer data sharing and control applications, achieving 63 maximum end Transmitter support may not be feasible due to limitation of RF budget, speed, and processing payload.

When a project requires usage of more than 10 end Transmitters per Gateway or is more complex than a basic Wireless Sensor Network that involves a Gateway and a handful of End Transmitters, please consult with an OleumTech Application Engineer or a Certified Specialist to properly commission a project.

7. RF Enhancements

To ensure data reliability and delivery over RF, OleumTech Wireless Sensor and I/O Network provides RF collision detection for the 900 MHz and 915 MHz and RF collision avoidance with 868 MHz and 2.4 GHz radio versions.

8. RF Security

AES Encryption

OTC Wireless Sensor and I/O Network provides the ability to enable over-the-air encryption using AES. The 900 MHz radio version supports 256-bit AES encryption whereas the 868 MHz, 915 MHz, and 2.4 GHz versions support 128-bit AES encryption.

Minimum software/firmware revision levels for AES Encryption feature:

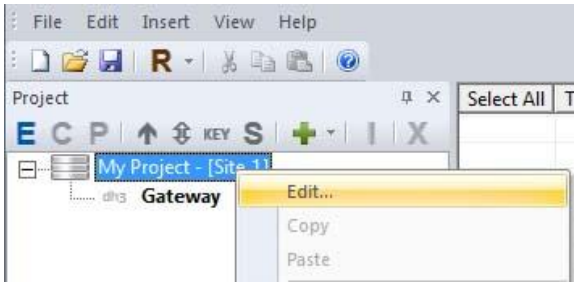
- BreeZ Software v5.1 or later
- DH3 v1.0 or later
- DH1 (Base Unit) / DH2 / DH2-W v2.0 (RF2) or later
- WT Series Transmitters v2.0 (RF2) or later
- SM/LM Series Transmitters v3.0 (RF2) or later
- SM Series Resistive Transmitter v1.1.0.0 or later
- Wireless I/O Modules v2.0 or later

Site Authentication

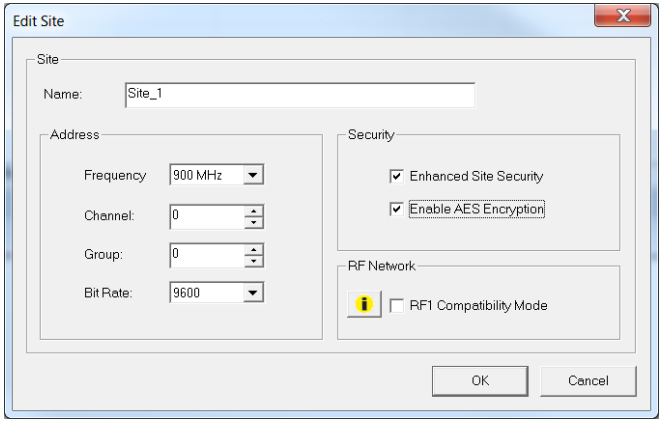
OleumTech Wireless Sensor and I/O Network also provides users the ability to enable Site Authentication. This method further extends security measures and eliminates or minimizes crosstalk with neighboring networks.

How to enable RF security in BreeZ v5.1 or later.

a. Open or create a BreeZ project file (v5.1 or later)
b. Right-click on “site” in project tree and select “edit”



c. Check **Enhanced Site Security** to enable Site Authentication.
d. Check **Enable AES Encryption** to enable AES encryption.



e. Save project file.
f. Upgrade all wireless device firmware to version that supports AES.
g. Update all wireless devices in the project file.

9. 900/915 MHz Bit Rate

The Edit Site dialog contains two bit rate options for a 900 MHz network configuration, 9600 and 115,200 bps. If a network contains heavy RF traffic and/or fast Tx interval, using the higher 115,200-bit rate will a solve majority of RF issues. When using the higher bit rate, be sure to check RSSI to ensure RF signal integrity due to shortened RF range.

11. DOWNLOAD & INSTALL THE SOFTWARE

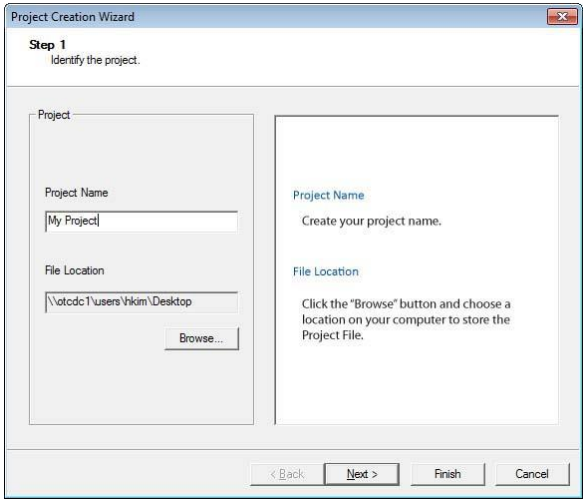
1. Go to the OleumTech Download Center and register to gain access. https://support.oleumtech.com/
2. Find latest version of the BreeZ Software and download it.
3. Install the BreeZ Software on your PC.

12. CREATE A PROJECT FILE USING THE SOFTWARE

1. **Run the BreeZ Software on your PC.**

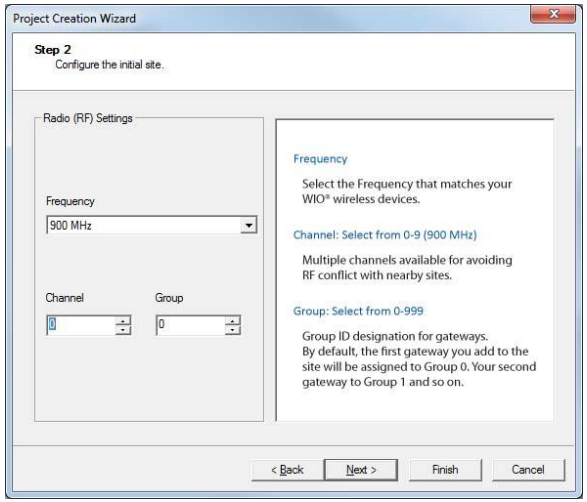
2. **Click "New Project" in the project creation wizard.**

3. Edit the project file settings.



a. Create a **Project Name**.
b. Select a **File Location** by clicking on the **Browse** button.
c. Click **Next**.

4. Configure the RF settings.

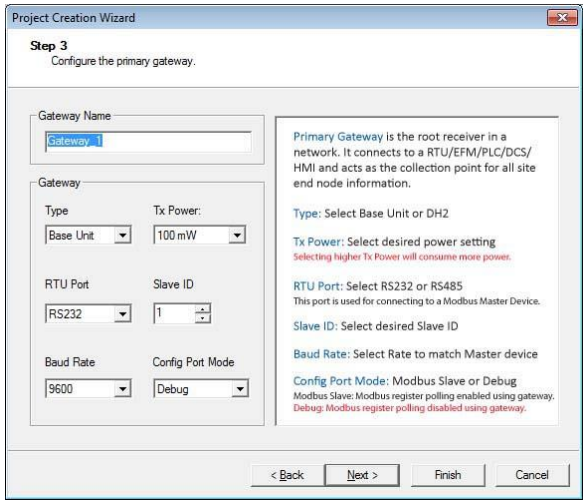


a. Select the **Frequency** that matches the radio frequency of the wireless devices.
b. Select a **Channel** to avoid any RF conflict with any nearby sites.
c. Select a **Group** - by default, the first gateway you add to the site will be assigned to 0. The second gateway added will be assigned 1 and so on.

⚠ Do not use Channel 0, Group 0. It is too common.
N'utilisez pas Channel 0, Group 0. C'est trop commun.

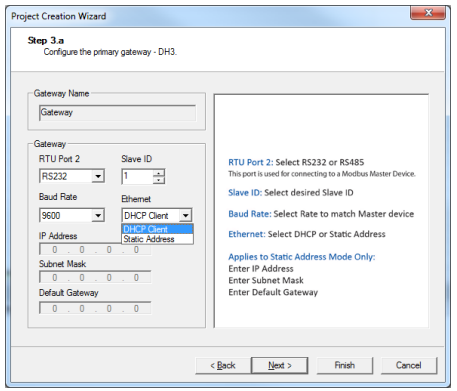
d. Click **Next**.

5. Configure the primary wireless gateway.



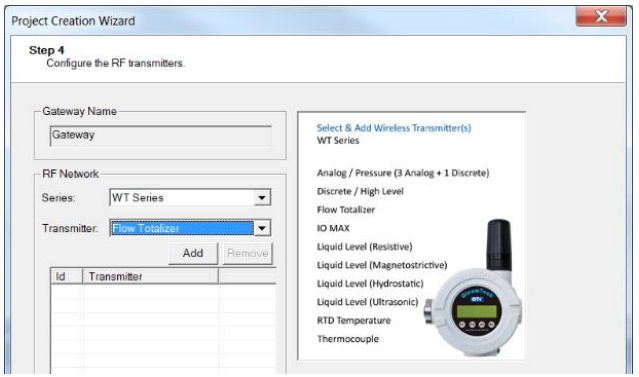
a. Create a **Gateway Name**.
b. Select the **Type**.
c. Select **Tx Power** – Selecting a higher transmit setting consumes more power.
d. Select **RTU Port** RS232 or RS485 (terminal block).
   This port is used for connecting to a third-party device such as PLC, RTU, DCS, HMI, or EFM.
e. Select **Slave ID**.
f. Select **Baud Rate** that matches the Master device.
g. Select **Config Port Mode** (RS232): Modbus Slave option enables Modbus polling/writing feature using the BreeZ Software. The **Debug** option is only for advanced users and polling register capability is disabled.
h. Click **Next**.

6. Edit Ethernet / RTU Port 2 settings (DH3 only).



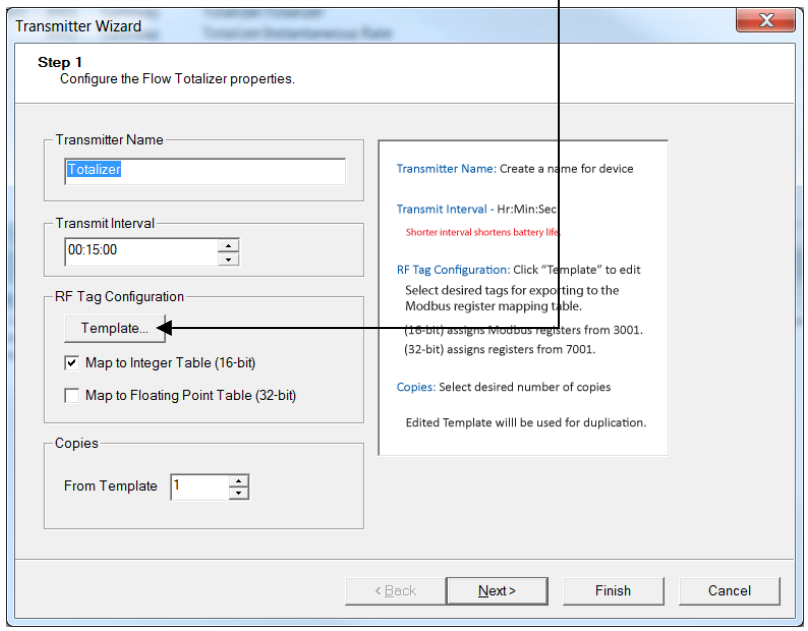
a. **Ethernet**: Select the **DHCP Client** or **Static Address** option.
   i. If using the **Static Address** option, enter the network information.
   ii. For help setting up the Ethernet connectivity, please consult with your IT Specialist.
b. **RTU Port 2**: See previous section.
c. Click **Next**.

7. Add the transmitter(s).

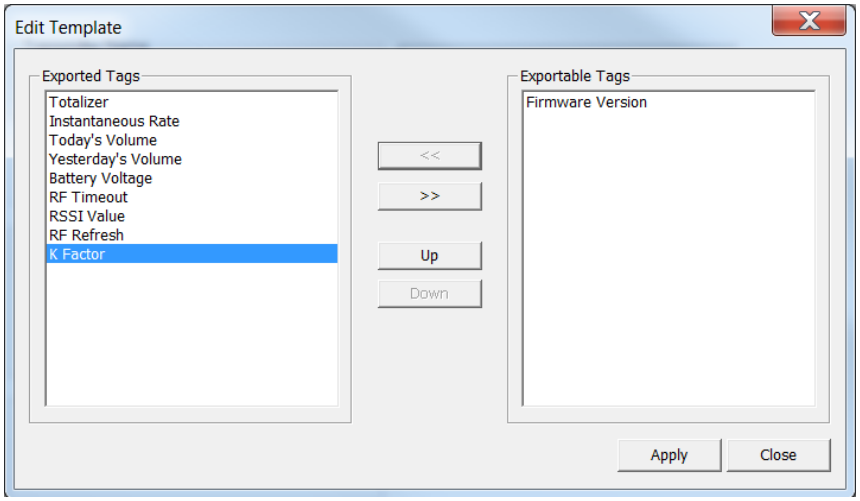


a. **Series** – Select the **WT Series** – LCD.
b. **Transmitter** - Select the **Flow Totalizer**.
c. Click **Add**.

8. Configure the transmitter – part 1



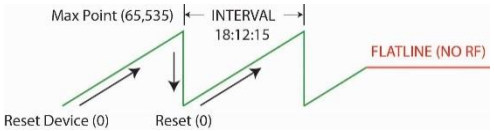
a. Create a **Transmitter Name**.
b. Enter a **Transmit Interval** in Hr:Min:Sec.
c. Select **Map to Integer Table** or **Map to Floating Point Table**.
    i. Default **Integer Table** begins at register **3001**.
    ii. Default **Floating Point Table** begins at register **7001**.
d. **Copies**: Enter the number of transmitters that you want to populate to the project using these settings.
e. Click **Template** to open **Edit Template** window.



f. Modify the **Edit Template** to desired settings.
The tags listed under the **Exported Tags** will automatically be added to the Modbus Mapping Table.

i. **Totalizer**: Accumulates the turbine's raw pulses.
ii. **Instantaneous Rate** = Current flow rate.
iii. **Today's Volume**: The measured volume since the Contract Hour.
iv. **Yesterday's Volume**: The measured volume the day before the Contract Hour.
v. K Factor
vi. **Battery Voltage**: Indicates the battery level: >2.9 V is good.
vii. **RF Timeout**: 0 = RF OK; 1 = RF Transmission Failure
viii. **RSSI Value**: Received Signal Strength Indication (Transmitter to Gateway)
Excellent signal = -40 to -75; Good signal = -76 to -90; Weak signal = -91 to -115

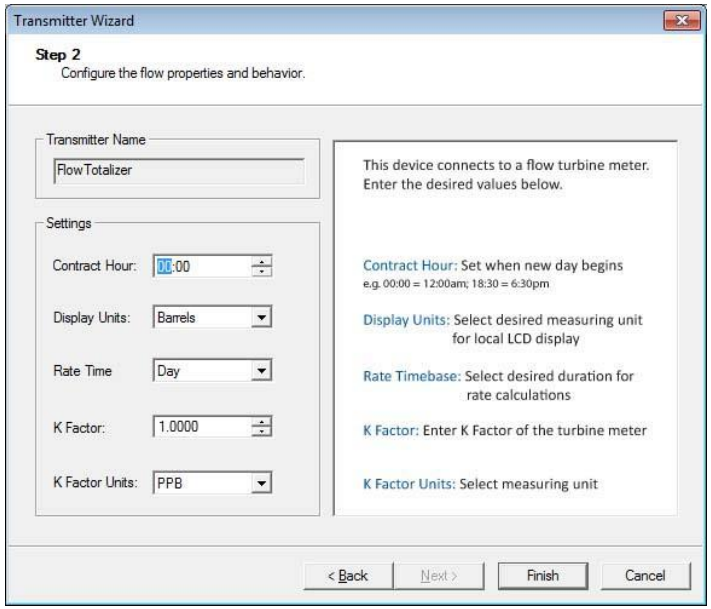
ix. **RF Refresh**: Helpful when trending RF data using a third-party device.



x. **Firmware Version**

g. Click **Apply**.
h. Click **Close** to exit the **Edit Template** window.
i. Click **Next**.

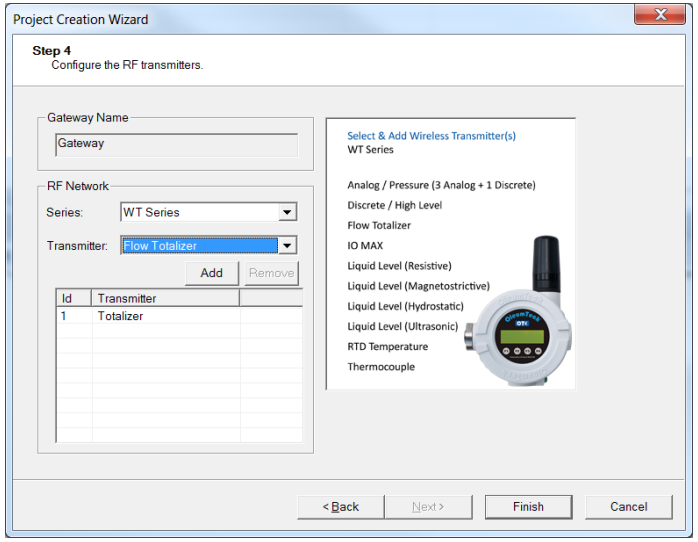
9. Configure the transmitter – part 2



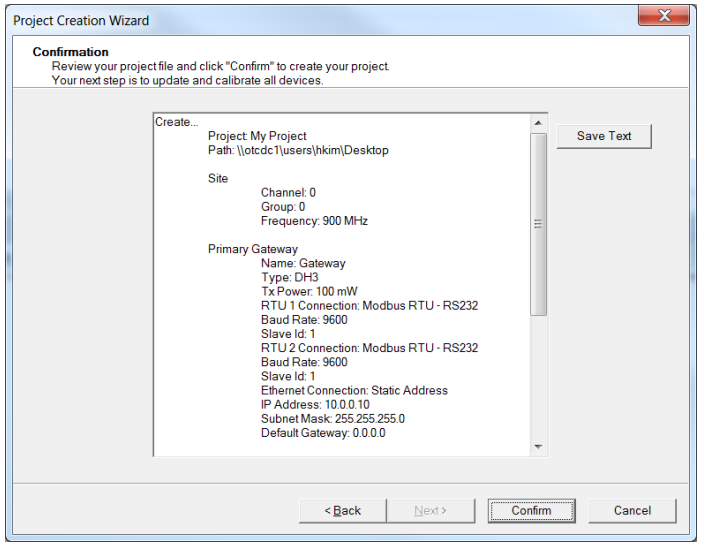
a. Enter the **Contract Hour** e.g. 00:00 = 12am; 18:30 = 6:30pm
b. Select the desired **Display Units**.
c. **Rate Time** Base - Select the desired duration for flow rate calculations.
d. Enter **K Factor** value - Must acquire the value from the turbine flow meter.
e. Select **K Factor Units** - Must match the unit the turbine flow meter was calibrated to.
f. Click **Finish**.

10. Confirm addition of the transmitter.

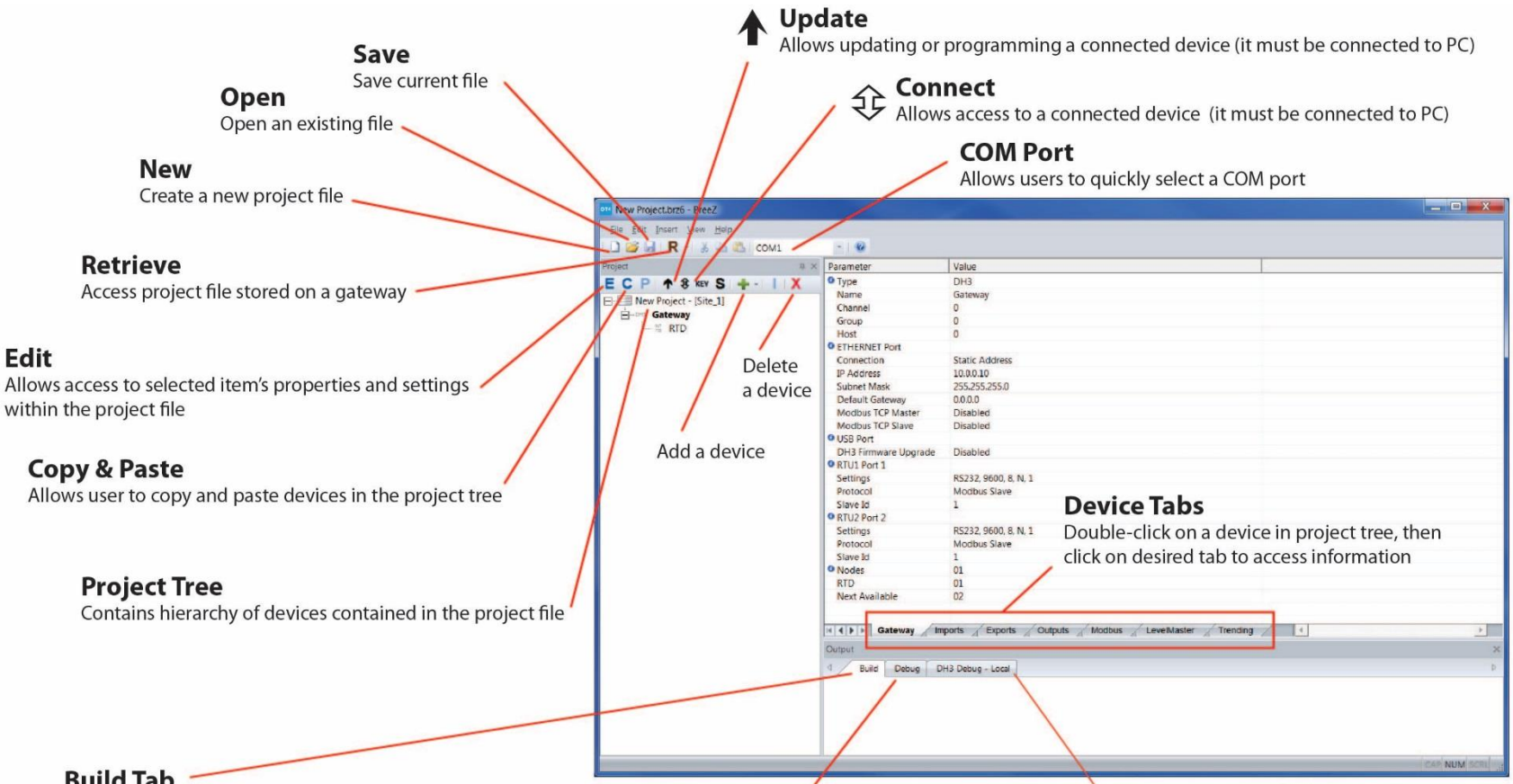
a. Verify the added transmitter(s) in the device table.
b. Add more transmitters if desired.
c. Click **Finish**.

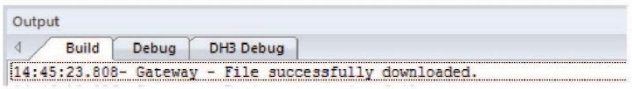


d. Click **Confirm**.

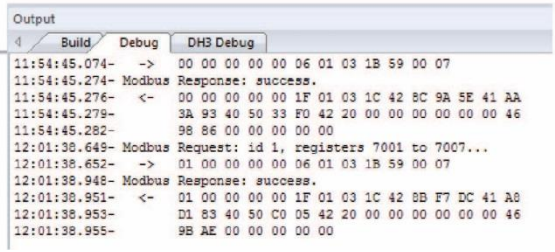


13. SOFTWARE MAIN SCREEN VIEW

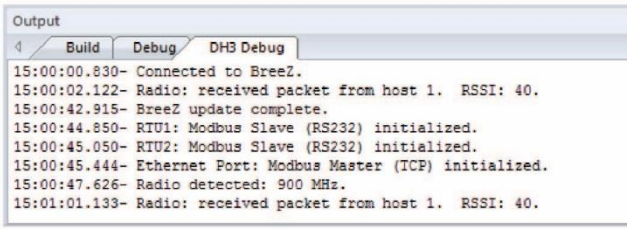




Debug Tab
Shows debug information reported from the connected device e.g. RF traffic and diagnostics



DH3 Debug Tab
If a debug connection to a DH3 gateway exists, this tab shows debug info reported from the DH3



How to manage devices in the BreeZ Software.

1. **Editing device properties:**
   a. Click on the desired device in the project tree.
   b. Click the **E** icon (Edit) button.

2. **Adding another transmitter or I/O module:**
   a. Click on the gateway in the project tree.
   b. Click the **+** icon (insert) button.
   c. Select a desired device.

3. **Adding another gateway:**
   a. Click on the site in the project tree.
   b. Click the **+** icon (Insert) button.
   c. Select a desired gateway.

4. **Renaming a device:**
   a. Right-click over a device in the project tree.
   b. Select rename.

5. **Removing a device from the project tree:**
   a. Click on the desired device.
   b. Click the **X** icon (Delete) button.

When a transmitter is removed from the project tree, it also removes the RF host address, which leaves a gap in the addressing sequence. To remove any gap in the RF Host Address table or modify a transmitter's RF host address, see the instructions provided in the gateway User Guide under the Managing RF Host Addressing Table section.

6. **Disabling a device from the project tree:**
   a. Right-click on the desired device.
   b. Select "disable device" function.
   c. Once a device is disabled, it will be completely disregarded from the project and the device name will be displayed in grey text.

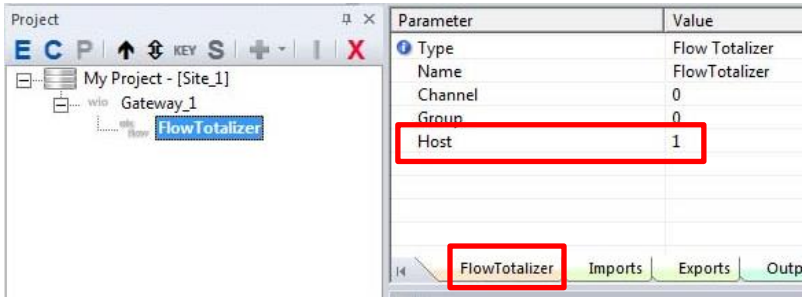
14. UPDATING THE TRANSMITTER – LCD METHOD

1. **Create a project file using BreeZ, then update the gateway.**

2. **Get the device and network information from the project file.**

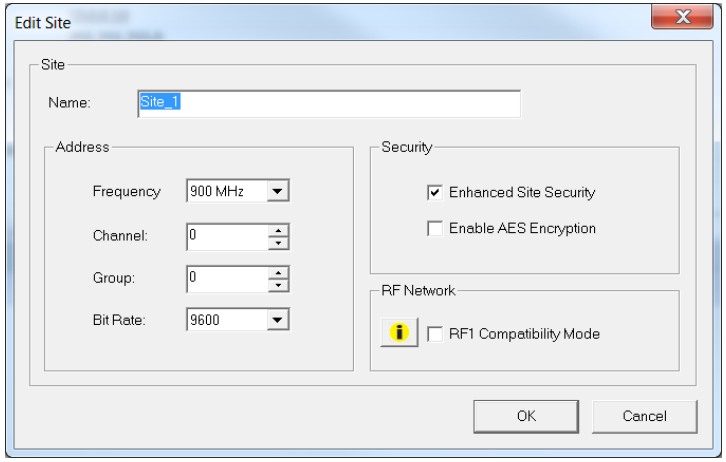
   a. Double-click on transmitter in the project tree.

   b. Click on **FlowTotalizer** tab and get the Host ID number.



   c. Get the **Channel**, **Group**, and **Bit Rate** info.

      i. Click on the Site in the project tree, then click the **E Edit** button.

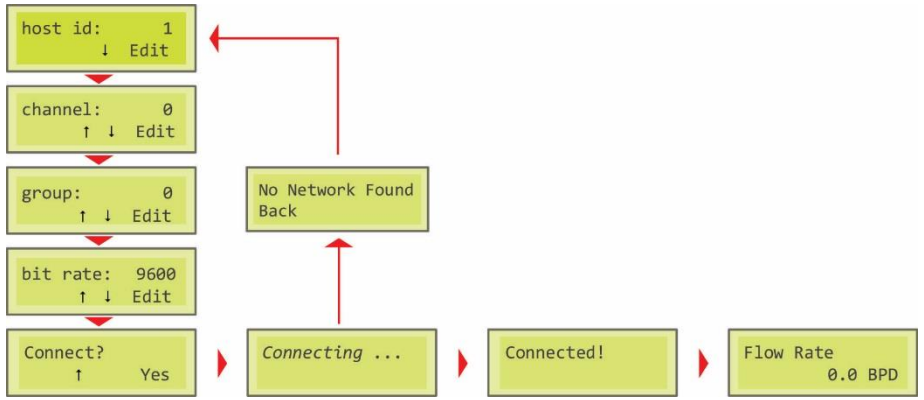


3. **Connect the transmitter Battery Pack to the LCD Module.**

   a. Press any button to activate the LCD screen.

4. **Connect the transmitter to the network.**

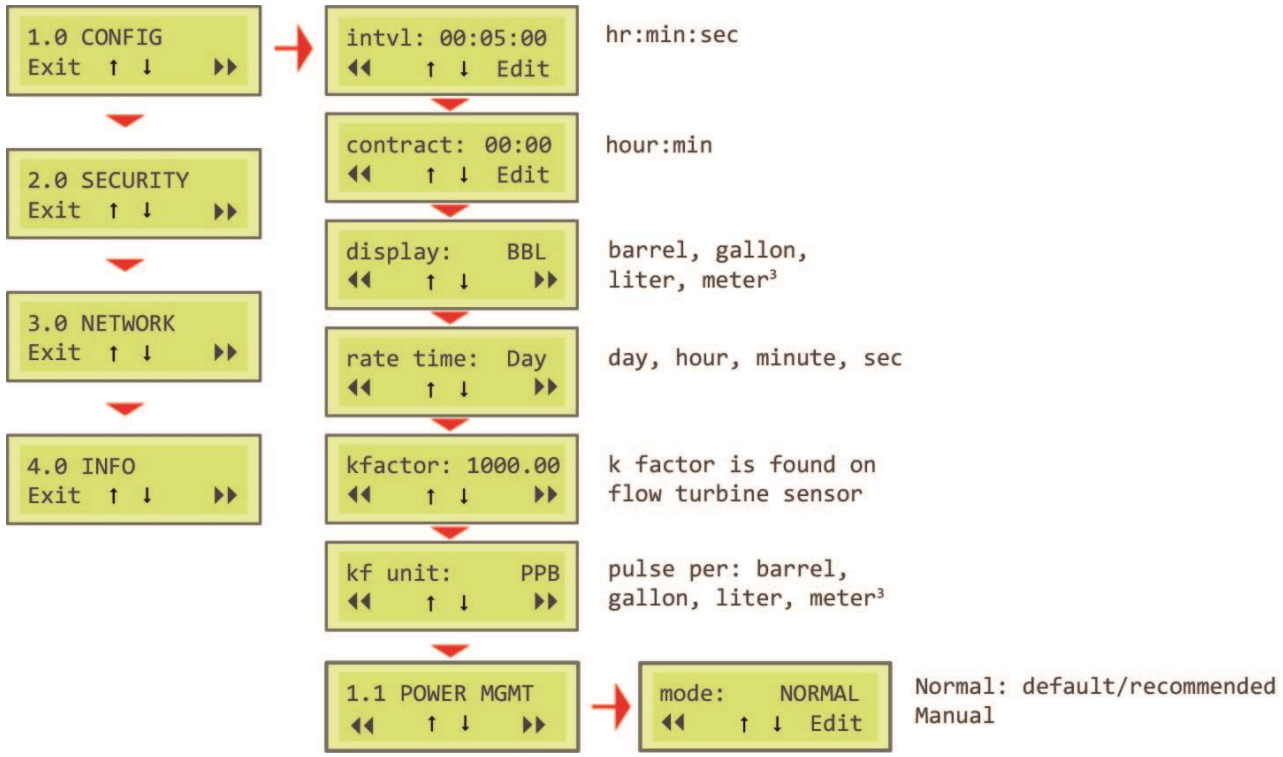
   a. Enter the device and network properties on the LCD Module.



5. Configure the transmitter and sensor / calibration.

a. Press and hold the F2 button until you see the CONFIG menu appears on the screen.

b. Use the menu system view or edit the parameters.

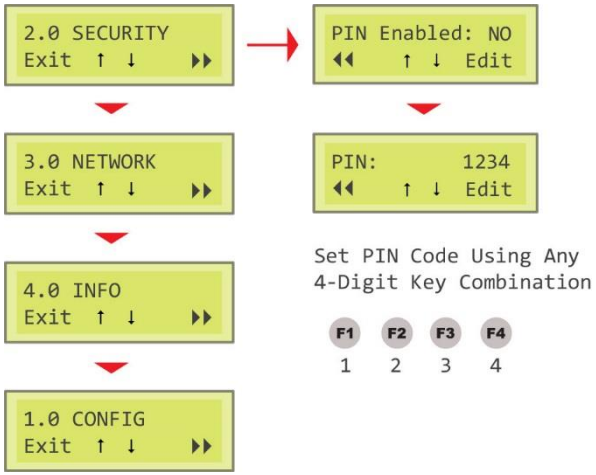


Power Modes:
Normal (recommended): automatic management of entering/exiting low power modes of operation.

Manual: In addition to automatic lower power mode management, users have the ability to manually enter and wake up from a very low power mode where no activity (RF, LCD, etc) takes place.

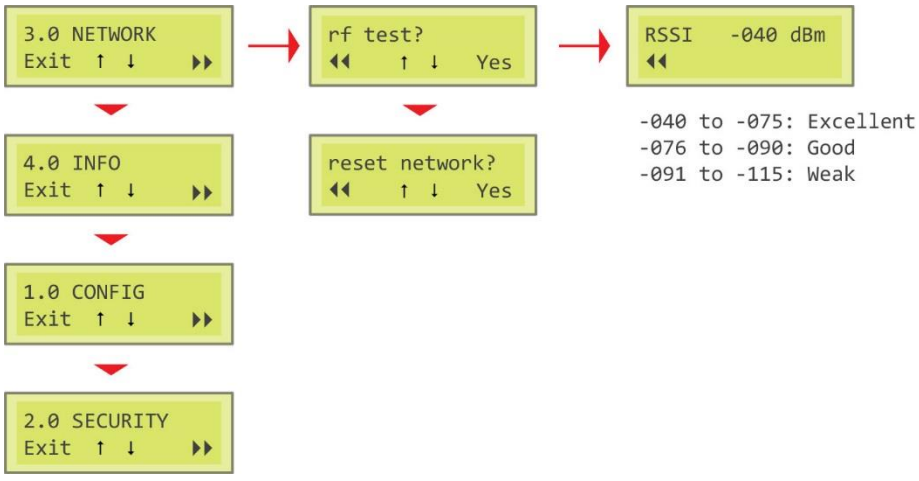
6. Editing SECURITY properties.

a. Navigate to **SECURITY** and enter ➔➔ menu to view or edit parameters.



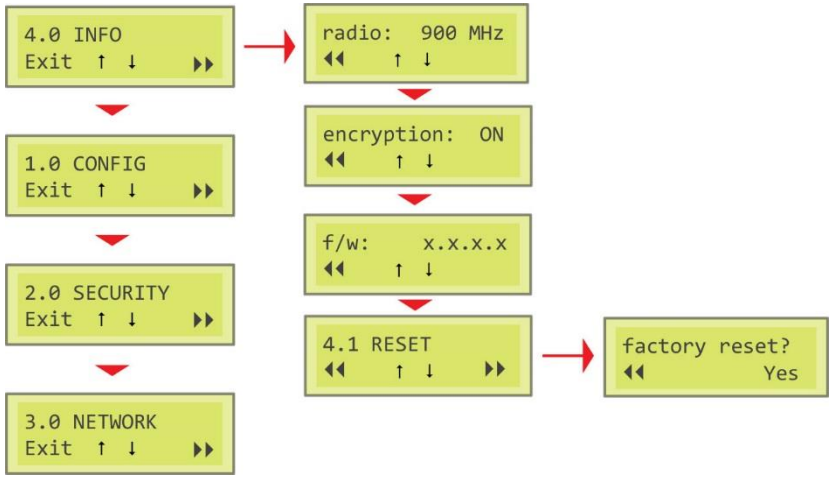
7. Editing NETWORK properties.

a. Navigate to **NETWORK** and enter ➔➔ menu to view or edit parameters.



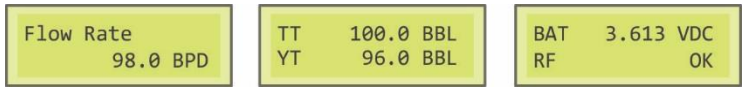
8. Editing INFO properties.

a. Navigate to **INFO** and enter ➔➔ menu to view or edit parameters.



9. How to EXIT CONFIG mode.

a. Press the **F1** button continuously (<<).
b. When prompted to **EXIT CONFIG?**, press the **F2** button "**Yes**".
c. Use the side scroll button or any function key to read data.



10. How to re-enter the configuration mode with security enabled.

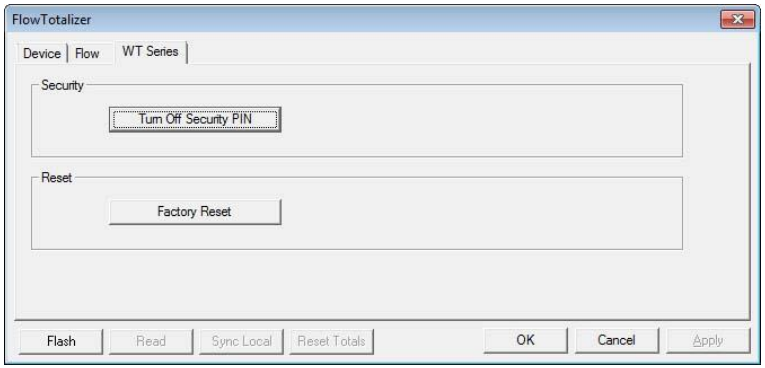
a. Press and hold down the **F2** button until **LOGIN** appears on the screen.

b. Enter the 4-digit security key.

c. Incorrect security key entry locks user out for ten seconds.

d. If the security key is forgotten, disabling the security key can only be achieved using the BreeZ software.
   i. Open the BreeZ project file on the PC.
   ii. Connect the PC to the transmitter.
   iii. Click the transmitter in the project tree.
   iv. Click the ⇳ icon (**Connect to Device**) button.

v. Click on **WT Series** tab.



vi. Click **Turn Off Security PIN**.
vii. Re-enable security key on the transmitter if desired using the transmitter's LCD interface.

11. How to reset the transmitter / power cycle.

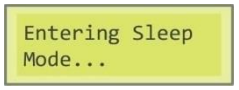
a. The device hardware can be reset or perform a power cycle without disconnecting the battery pack.

b. Press and hold down the **F1** + **F4** buttons for ~4 seconds and release the buttons.

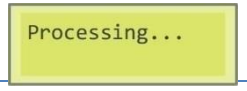
12. Deep sleep mode, manual power management.

a. Deep sleep mode conserves battery life while the device is not in use without having to disconnect the battery pack from the LCD Module. Use the LCD interface to set the power management mode to "manual".

b. Hold the external side scroll button until following message is shown on the screen.



c. To turn the transmitter back on, hold the external side scroll button until the following message is shown on screen.



15. UPDATING THE TRANSMITTER – CABLE METHOD

1. Connect the Battery Pack to the transmitter.

2. Connect the PC to the transmitter.

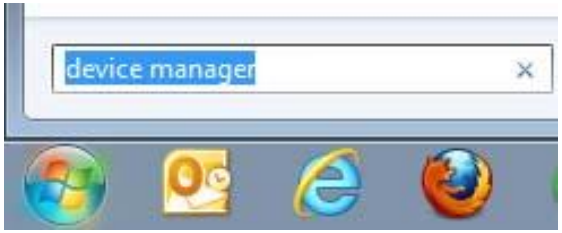
a. Connect the **black 4-pin** end of the SX1000-CC2 cable to the transmitter's configuration port.

b. Must follow the correct orientation of the connector.
c. Do not force the connection.
d. You may need to loosen the two top screws to fit the connector.

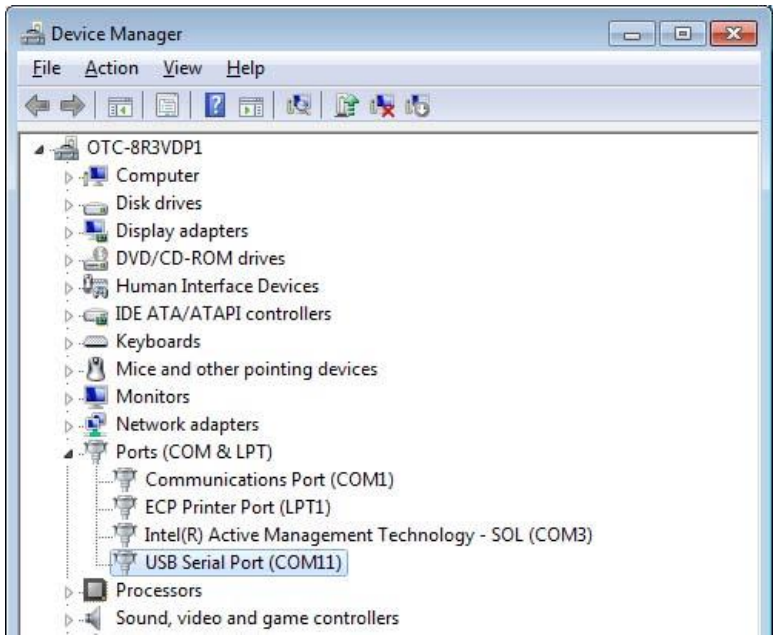
e. Connect the **black USB** end of the SX1000-CC2 cable to the PC.

3. Identify the COM port on the PC.

a. Open the Device Manager on the PC.
   i. Must have admin rights to the PC.
   ii. Click on the Windows icon at bottom left corner of computer screen.
   iii. Type "device manager" in the search box and press the enter key.

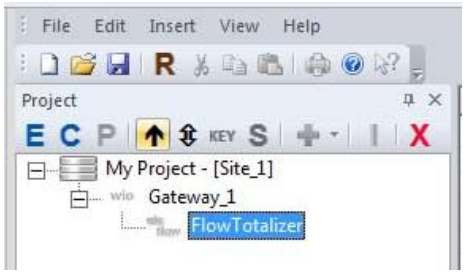


   iv. Identify the COM port ID under the list of ports.

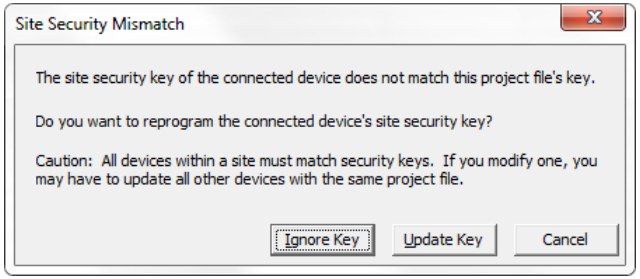


4. **Select the COM port in BreeZ.**
   a. Use the dropdown box to select the correct COM port.

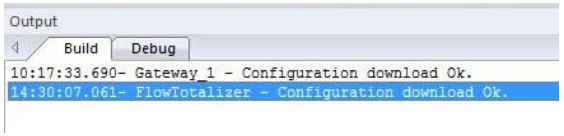
5. **Update/program the transmitter from the BreeZ Software.**
   a. Click on the transmitter in the project tree.
   b. Click the ↑ icon (Update Device).



   i. If the transmitter was used with another project file, the site security mismatch window will appear. Click **Update Key** to program key to match the desired project file.



   c. Check the **Output Build** window tab for visual verification of update.

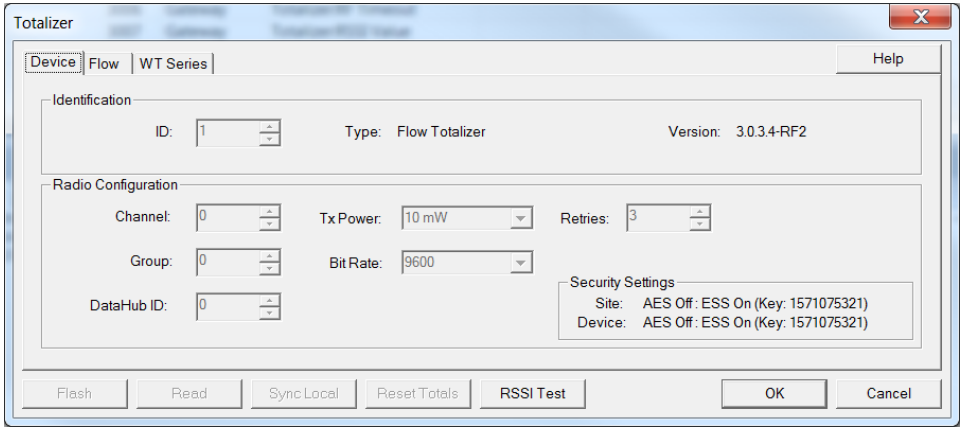


16. CONNECTING TO THE TRANSMITTER VIA THE SOFTWARE / RESETTING TOTALS / TIME SYNC

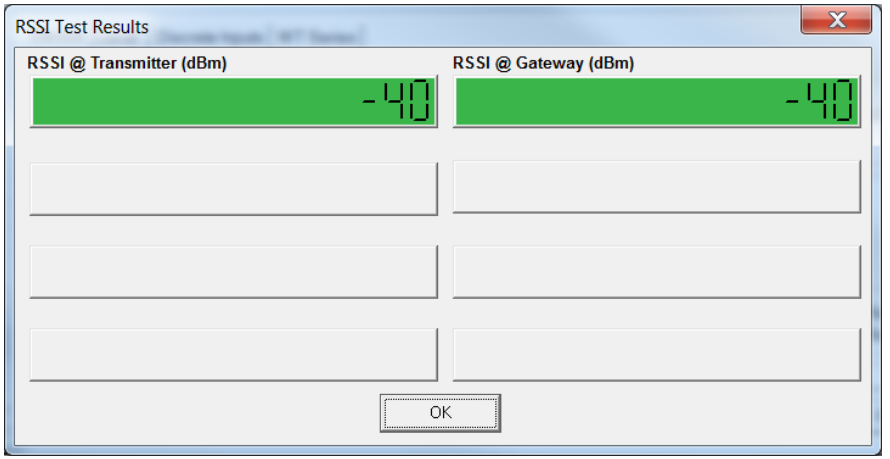
When a transmitter is connected to the BreeZ Software, users can directly access the settings stored on the device. Once connected, there are a variety of actions that can be performed such as resetting the totals, reading the values, and syncing the device to the local time, checking the firmware version, and testing the RF RSSI strength.

1. **Supply power to the transmitter.**
2. **Connect the PC to the transmitter.**
3. **Open the BreeZ project file.**
4. **Click on the transmitter in the project tree and click the Connect to Device button.**

5. **Device Tab**
   a. Displays how the device is set up.
   b. Displays firmware version.
   c. Displays RF security settings.



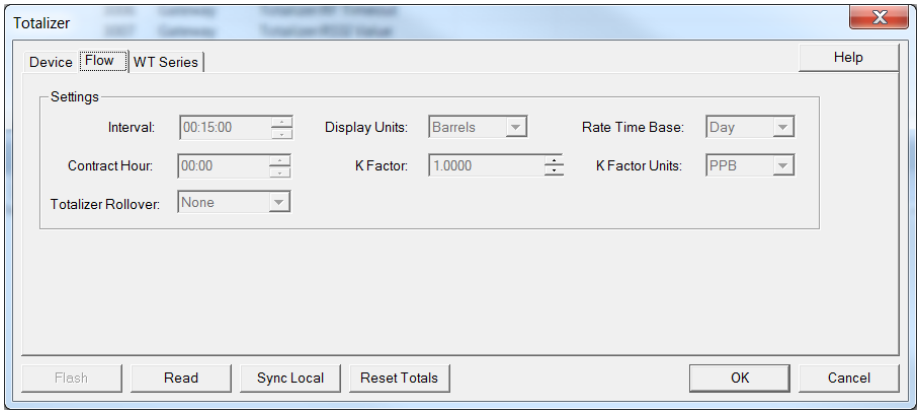
   d. Click the **RSSI Test** button to test radio connection.



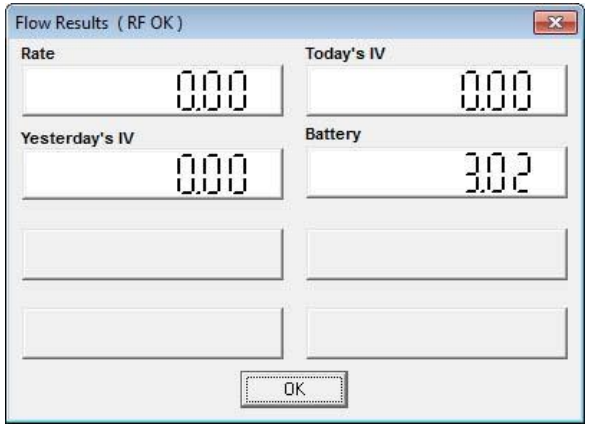
6. Flow Tab

a. Displays the Flow Totalizer configuration settings.

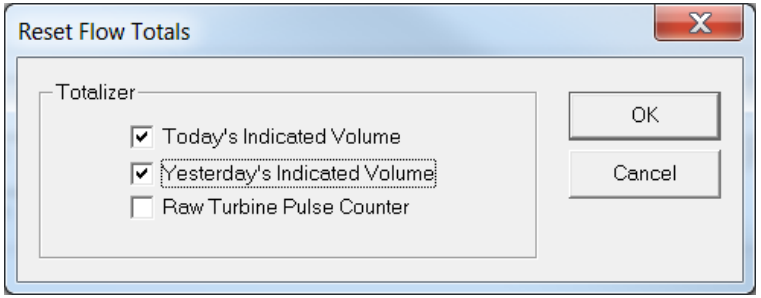
b. Provides the ability to instantly read the process variables and perform various tasks.



c. Click the **Read** button to read the totals.



d. Click the **Reset Totals** button to reset the totals.



e. Click the **Sync Local** button to sync the transmitter with the PC's local time or manually set the time on the LCD module.

17. PROGRAMMING/UPDATING THE WIRELESS GATEWAY

Please refer to the instructions provided in the specific wireless gateway User Guide.

DH3

DH1 or DH2

DH2-W

18. UPGRADING THE TRANSMITTER FIRMWARE

The WT Series Wireless Transmitters utilize the OleumTech Firmware Update Utility for all firmware upgrades. Simply download and install the latest version of the Firmware Update Utility, which contains the currently released firmware versions for the entire line of WT Series products.

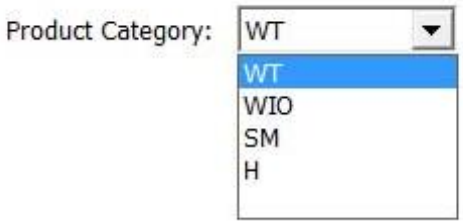
Note: This device does not use the BreeZ Software for upgrading firmware.

1. **Close the BreeZ Software – The Firmware Update Utility and BreeZ cannot be running at the same time.**

2. **Download and install the latest Firmware Upgrade Utility.**
   a. The latest installer contains the latest firmware package.
   b. Click here to download it.

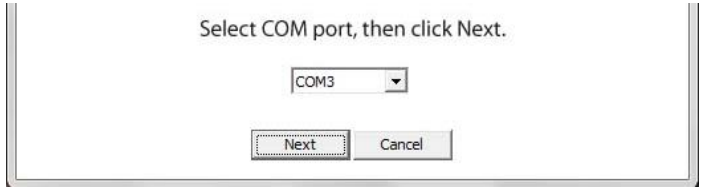
3. **Open the Firmware Update Utility.** 

   a. Select **WT** in the product category box, then click **Next**.

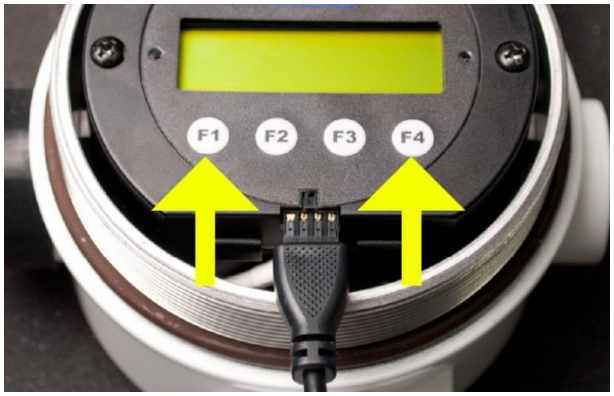


   b. Connect the PC to the transmitter.

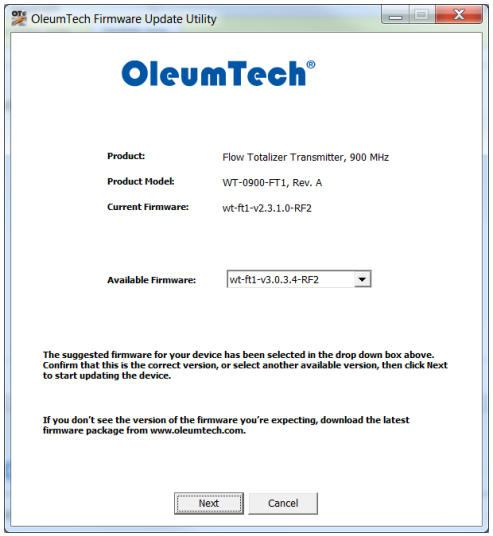
   c. Select the COM Port and click **Next**.



   d. Enter the transmitter into the firmware upgrade mode.
      i. Press and hold down the **F1** + **F4** buttons for 4 seconds, then release to reset hardware to enter firmware upgrade mode.

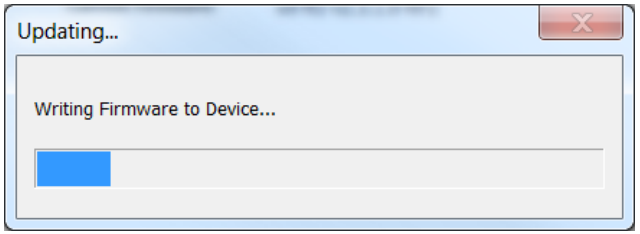


e. Select the firmware version from the dropdown box, then click **Next**.

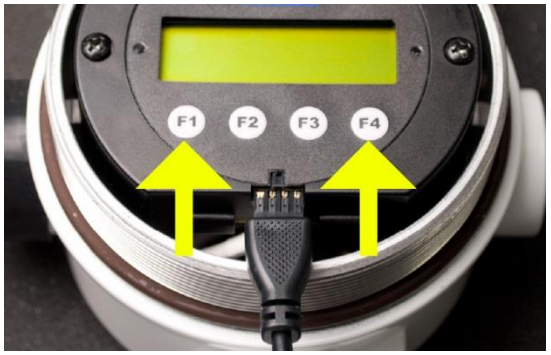


f. Wait until the firmware updating process is fully complete.

Do not disconnect cables while it is updating!
Ne déconnectez aucun câble pendant la mise à jour!



g. Return the transmitter back into the normal operating mode.
   i. Press and hold down the **F1** + **F4** buttons for 4 seconds, then release to reset hardware to exit the firmware upgrade mode.



h. Exit the program once finished.

19. TROUBLESHOOTING

1. Battery and Power Input

Symptom:	Action/Resolution:
Battery voltage lower than 2.9V	• Replace the Battery Pack if power level is less than 2.9 V.
Device does not power on	• Verify the Battery Pack is securely connected to the device. • Replace the Battery Pack.
Excessive battery drain	• Set the retries to default. • Increase the transmit interval time.

2. Radio / Antenna

Symptom:	Action/Resolution:
No communication with the wireless gateway	• Confirm that the antenna has a clear line of sight to all devices. • Reset the device. • Site Security Key may not match the gateway and other devices. Update Site Security and update all the devices with the same BreeZ project file. • Increase the Tx power to all devices (if applicable). • The antenna should be installed at 10 ft or higher above ground for better line of sight.
Wireless communication cannot reach the wireless gateway	• Change the bit rate to the devices to 9600. • Use a different Antenna type with higher gain for the Wireless Gateway.
Wireless communication is intermittent	• Change the bit rate of the devices to 115,200. • Antenna should be installed at 15 ft or higher for better line of sight. • Change the Channel of your Project File and update all of your system's devices. • To eliminate possible crosstalk or radio interference with other sites in the area, verify that the Enhanced Site Security (ESS) feature is enabled.

3. Hardware Connection

Symptom:	Action/Resolution:
Device cannot communicate with BreeZ	• Verify the battery pack is securely connected to the device. • Verify the configuration cable is securely connected to the device and PC. • Verify the COM port settings in BreeZ are correct. Verify the Baud Rate is 57600 and the Parity is 8-N-1. • Connect another transmitter to verify communication with BreeZ Software.
Issues when installing the turbine flow meter	• When installing the turbine flow meter, NEVER rotate the transmitter. Always use the mating union with thread sealant/tape for tightening the connection. • Verify the wiring is not damaged.
LCD display does not power on	• Verify the battery pack is securely connected to the device. • Check the transmitter for damage.

4. Configuration

Symptom:	Action/Resolution:
Transmitter is not communicating with the wireless gateway	• Update all the devices with the same project file. • Confirm that the antenna has clear line of sight to all devices and are within approved distances. • Change the site channel ID and update all devices. • Increase the Tx power to all devices. • Confirm the interval setting for the transmitter and gateway are correct. • Set the Retries to the default setting of 3 if it has been changed.
Device cannot communicate with BreeZ	• Verify the battery pack is securely connected to the device. • Verify configuration cable is securely connected to the device and PC. • Verify the COM port settings in BreeZ are correct. Verify the Baud Rate is 57600 and the Parity is 8-N-1. • Connect another transmitter to verify communication with BreeZ Software. • Replace the battery pack.
Error while updating the device but connection is still present	• Verify that the device has the latest firmware revision. • Reset the device.
The Contract Hour does not reset at the expected time	• Verify the device is properly updated through BreeZ Software. • Verify the device enabled the Sync'd Local function and the time in the device is the same as it set on PC.

5. Measurement

Symptom:	Action/Resolution:
Flow Totalizer reports no data	• Update all devices with the same Project File. • Ensure the parameters for the turbine flow meter are correct on the Flow Totalizer. • Check the Gateway's Firmware for the latest version. • Verify the stops are locked in correct position to enable the floats switch.
RF Transmitter Timeout fails	• Set 3x higher than the transmit interval time.
No Read Panel is displayed when taking a reading	• Verify Configuration Cable is securely connected to the device and PC. • Replace the Battery Pack. • No RF communication to the Gateway. Check the Gateway for proper configuration.
Transmitter reports incorrect measurements	• Check the Transmitter for damage or malfunctions.
Measurements fluctuate	• Change the Channel of your Project File and update all of your system's devices. • To eliminate possible crosstalk or radio interference with other sites in the area, verify Enhanced Site Security (ESS) is enabled.

20. GENERAL MAINTENANCE

The Wireless Flow Totalizer Transmitter is easy to maintain and does not require periodic system checks. The Transmitter generally only needs a yearly visual inspection to monitor the following:

- Is the Battery life still 2.9 V or above? (Check more frequently if using shorter transmit interval)
- Is the Flow Totalizer Transmitter still securely fastened to the mounting location?
- Are there any visible signs of corrosion, cracks or residue build-up on the unit?
- Has anything about the intended use of the original application changed?

If the Wireless Flow Totalizer Transmitter is securely fastened, with no signs of corrosion, cracks, or residue build-up, or if nothing has changed about the location of its intended use, it should continue to operate within designed specification.

If the Wireless Flow Totalizer Transmitter is not securely fastened; if there are signs of corrosion, cracks, residue build-up; or if there has been a change to the location of its intended use resulting in undesirable performance, contact the manufacturer for service instructions.

Cleaning: To prevent static discharge, wipe the outer casing with a damp cloth only.

21. LIMITED WARRANTY

a. OleumTech warrants that goods described herein and manufactured by OleumTech are free from defects in material and workmanship for two (2) years from the date of shipment. Batteries are expressly excluded from this warranty. Battery life and replacement batteries may be warranted under separate agreement depending on specific customer needs and applications.

b. OleumTech warrants that goods repaired by it pursuant to the warranty are free from defects in material and workmanship for a period to the end of the original warranty or ninety (90) days from the date of delivery of repaired goods, whichever is longer.

c. Warranties on goods not manufactured by OleumTech are expressly limited to the terms of the warranties given by the manufacturer of such goods.

d. All warranties are void in the event that the goods or systems or any part thereof are (i) misused, abused or otherwise damaged, (ii) repaired, altered or modified without OleumTech's consent, (iii) not installed, maintained and operated in strict compliance with instructions furnished by OleumTech, (iv) worn, injured or damaged from abnormal or abusive use in service time, (v) subjected to acts of God, or extreme weather phenomenon including, but not limited to, flood, lightning, tornado or hurricane, or (vi) intentional acts including, but not limited to vandalism, sabotage, explosion or acts of terrorism.

e. THESE WARRANTIES ARE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED (INCLUDING WITHOUT LIMITATION WARRANTIES AS TO MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), AND NO WARRANTIES, EXPRESSED OR IMPLIED, NOR ANY REPRESENTATIONS, PROMISES, OR STATEMENTS HAVE BEEN MADE BY OLEUMTECH UNLESS ENDORSED HEREIN IN WRITING. FURTHER, THERE ARE NO WARRANTIES, WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. ANY WARRANTIES BEYOND THOSE SET FORTH HEREIN MUST COME DIRECTLY FROM OLEUMTECH.

22. REVISION HISTORY

Revision G
Completely rewritten.

Revision H
Added ATEX/IECEx special conditions for safe use – sec 25.

Revision J
Added deep sleep mode function to sec 12.8 and 12.15.
Vibration info added to section 9.

Revision K
Revised document template.
Updated product image to reflect most recent hardware design.
Revised ordering of sections.
Updated product overview section.
Updated hardware overview section.
Updated networking diagram.
Section added technical specifications.
Revised required items for basic setup.
Revised battery pack installation section.
Section added installation best practices.
Minor updates to BreeZ project creation section.
Section added for managing RF host addressing table.
Updated com port setup section.
Section added for programming gateways.
Revised updating transmitter section.
Revised upgrading firmware section.

Revision L
Revised networking diagram.

Revision M
Added high vibration warning to safety section.
Added K Factor as one of available Modbus register tag.
Added Flexible Modbus Table Management System subsection at the end of Section 17.
Updated various scrnshots to match BreeZ v6.1.
IECEx temperature range changed to -40 °C to 70 °C.
Added 868 MHz radio option.

Revision N
Updated specs with revised 2.4 GHz RF range data.
Revised RF maximum range data.
DH3 removed from COM port setup.
Revised DH3 connection to PC procedure via Mini-USB port.

Revision Q
Revised document template, styling, and section ordering.
Removed index and glossary sections.
Minor instructional revisions made throughout the document for improving clarity.
Revised safety section.
Revised product overview section.
Updated hardware diagram.
Revised battery section.
Updated required items section.
Removed configuration/installation sequence section.
Updated technical specifications.
Combined installation and installation best practice sections.
Revised grounding recommendation section.
Revised RF setup and security section.
Removed COM port setup section and combined with transmitter update section.
Revised download and install software section.
Revised creating a project file section.
Revised software main screenshot section.
Revised updating transmitter via lcd section.
Revised updating transmitter via cable section.
Revised connecting to the transmitter via the software section.
Revised firmware upgrade section.
Revised troubleshooting section.

Revision R
Revised mating union material spec to 304 stainless steel.

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