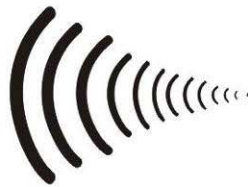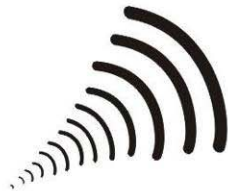# Sentry* Analog-in Monitor System
Pressure & Temperature Monitor
Installation & Setup Guide

EFM, RTU, PLC, etc.

Sentry* DataHub Lite
SR1000-DL1

Sentry* Analog-In Monitor
SM1X00-XXX Series

OleumTech Corporation

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29 Parker Irvine, California 92618
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LIMITED WARRANTY

A. OleumTech warrants that goods described herein and manufactured by OleumTech are free from defects in material and workmanship for eighteen (18) months 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.

F. Any warranties beyond those set forth herein must come directly from OleumTech.

REMEDIES

A. Buyer's sole remedy for breach of any warranty is limited exclusively to repair or replacement without cost to Buyer of any goods or parts found by Seller to be defective if Buyer notifies OleumTech in writing of the alleged defect within the warranty period stated above, and if the Buyer returns such goods to the OleumTech Corporate office, unless the OleumTech Corporate office designates a different location, transportation prepaid, within thirty (30) days of the sending of such notification and which upon examination by OleumTech proves to be defective in material and workmanship. OleumTech is not responsible for any costs of removal, dismantling or reinstallation of allegedly defective or defective goods. If a Buyer does not wish to ship the product back to OleumTech, the Buyer can arrange to have an OleumTech service person come to the site. The Service person's transportation time and expenses will be invoiced and charged to the account of the Buyer. However, labor for warranty work during normal working hours is not chargeable. In the event the OleumTech service person comes to the site and a determination is made that the OleumTech product(s) are functioning properly, the service person's time and travel expenses will be charged to the account of the Buyer.

B. Customized extended warranty and service packages are available to Buyer's that wish to extend their warranty or provide for on site service on an ongoing basis.

C. Under no circumstances will OleumTech be liable for incidental or consequential damages resulting from breach of any agreement relating to items included in this quotation, from use of the information herein or from the purchase or use by Buyer, its employees or other parties of goods sold under said agreement.

1.0 System Description

This guide is designed to assist in quickly installing the OleumTech Sentry System. The Sentry System consists of the Sentry Pressure Monitor (Monitor) and Sentry DataHub Lite (DataHub) and provides a wireless automation solution for the oil and gas industry. It ensures customer's needs are addressed from virtually all aspects by providing key system integration components. The DataHub reads the digital signal from the Monitor and presents it to a host system or to be read as Modbus registers. This enables the superior accuracy of the DataHub for use in a system that has only analog inputs available for receiving pressure data. The Monitor is available in single, dual and 4-port configurations.

The installation of the Sentry* Pressure or Temperature Monitor and DataHub should only be installed by a qualified installer or a factory representative.

1.1 Sentry* Monitor

The Monitor is a data-collection and monitoring unit that utilizes proprietary data-monitoring firmware to collect pertinent data from a wide range of field equipment. The Monitor is equipped with a proprietary short-haul spread- spectrum radio for transmitting the collected data or alarm signals to a Sentry DataHub Lite. The Monitor is available in different models that connect to various types of field equipment and process conditions including pressure points, tanks, compressors and any device with a digital or analog output.

Fig. 1.1: Sentry* Monitor

1.2 Sentry* DataHub Lite

The Sentry* DataHub is a data collection, storage and data communications terminal. It receives the collected data or alarm signals from the Sentry Monitors. The Sentry DataHub Lite can act as a Modbus Master or slave to an RTU, EFM, or PLC device with full read and write Modbus functionality for all controls applications. It can act as a standalone RTU, or work with existing installations.

Fig. 1.2: Sentry* DataHub Lite

2.0   Sentry System Components

2.1   Contents

The items in this list consist of the total components that comprise an OleumTech Sentry* System Integration Kit. Some Items shipped in separate boxes. Please verify you have all contents before beginning system integration process.

1. OleumTech Sentry* Monitor, P/N: SM1X00-XXX Series
2. Sentry* DataHub Lite, P/N: SR1000-DL1
3. Mounting Kit, P/N: SX1000-MX4
4. Extension Antenna (18 inch or 15 foot), P/N: 00-0142-001 or 00-0142-001-002
5. BinComm Configuration Software CD, P/N: SK1000-BCS
6. Sentry* Pressure Monitor Guide, PN: 80-2000-001.

2.2   Unpacking

The Sentry System components are shipped in specially designed shipping cartons that contain the units. Accessories and optional items such as Mounting Kits, Solar Panel and Antenna assemblies often ship in separate cartons. Do not discard packing material until all pieces of the shipment are located or identified.

2.3   Inspection

Carefully remove and inspect the entire contents of each box including cushioning material for any concealed items. Inspect the shipping carton for damage. If the shipping carton is damaged, keep it until the contents have been inspected for damage. Inspect each unit's exterior for dents, chipped paint, etc. Visually inspect all cables and accessory components for damage.

2.4   Damaged Components

If any components have been damaged or if there are noticeable defects, notify your Sentry System representative. Keep all shipping materials for the carrier's inspection. Your Sentry System representative will arrange for immediate repair or replacement.

3.0   System Requirements

3.1   Operating System Requirements

Windows® XP, 2000, ME & 98

3.2   Hardware System Requirements

3.2.1 **Processor:**   90-MHz Intel Pentium-class, AMD Opteron, Athlon64 or Athlon XP

3.2.2 **Memory:**   128 MB of RAM, 256 MB recommended

3.2.3 **Hard Disk Space:** 110 MB of hard disk space required, 40 MB additional hard disk space required for installation (150 MB total).

3.2.4 **COM Port**: Serial COM port or USB port (USB to serial adapter required).

3.2.5 **Browser:**   Microsoft Internet Explorer 5.01 or later is required.

4.0   BinComm Software Installation

BinComm Configuration Software is required to allow configuration and establishment of communications between Monitor, DataHub and AutoPILOT. Locate the BinComm Configuration Software CD supplied with your purchase.

    4.1   Insert the BinComm Software CD into your PC CD-ROM drive.

    4.2   Wait for CD-ROM to auto-start.

> *Note: If the CD-ROM does not auto-start: double-click on the CD-ROM icon in Windows Explorer, then double-click on setup.exe.*

    4.3   Screens should appear similar to Figures detailed in this section. The installer will guide you through the required steps to install BinComm software on your computer.

    4.4   Click on **Next**.
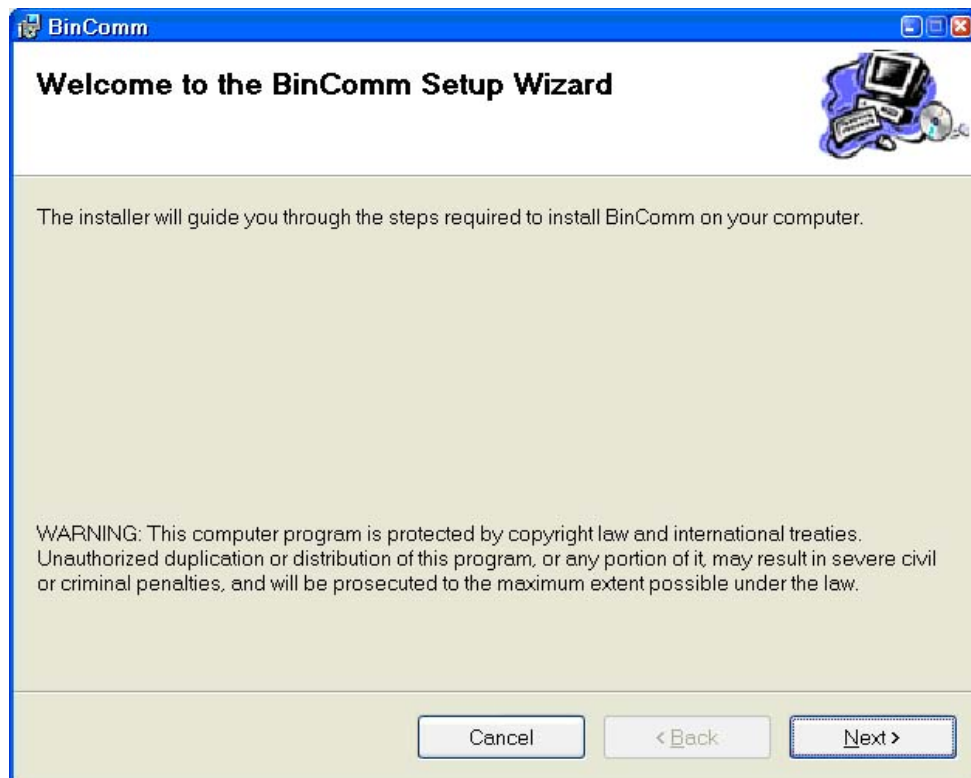
Fig. 4.1: BinComm Setup Screen

4.5   BinComm will install in C:\Program Files\BinComm. You may install BinComm in a different location on your system. To install on a different location, click on Browse, and locate the desired folder, then click on **Next**.
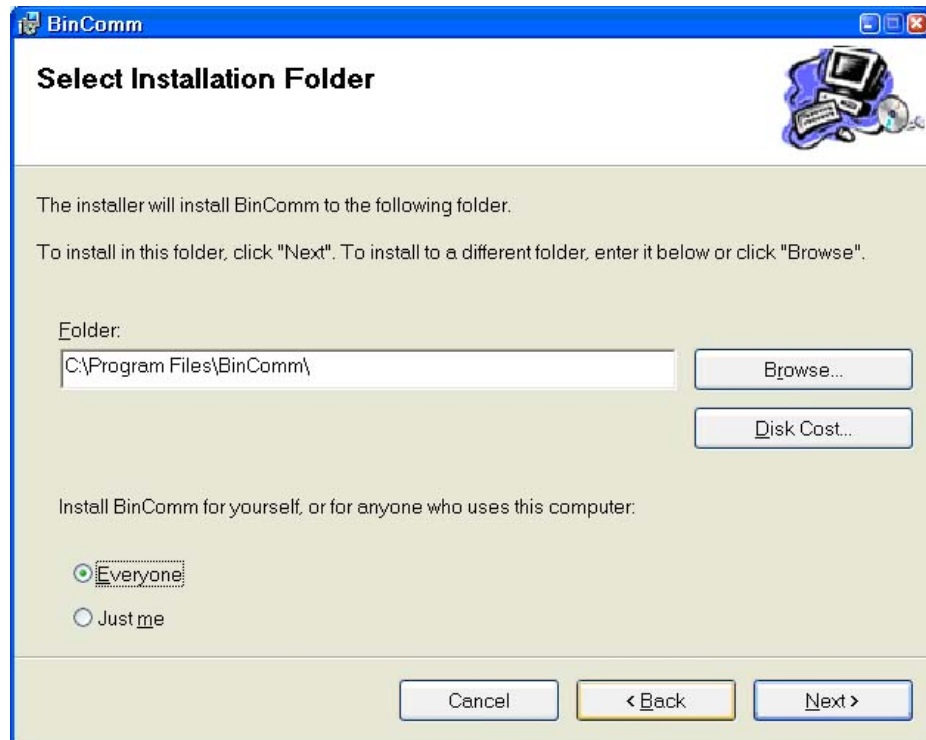
Fig. 4.2: BinComm File Location

4.6   When the installation is finished, you will see a screen similar to Fig. 4.3.
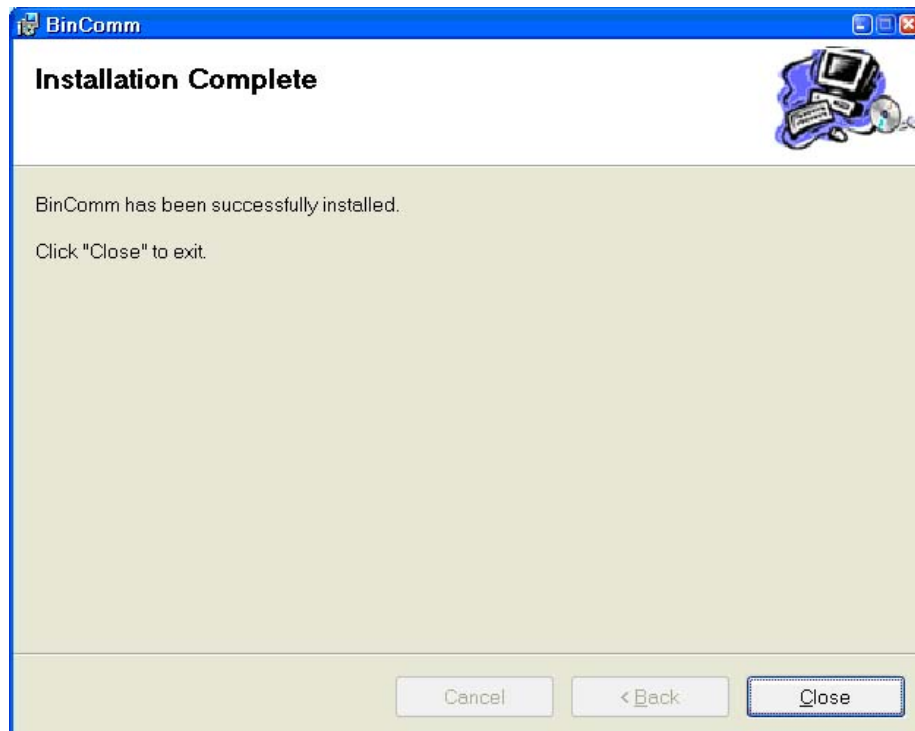
Fig. 4.3: BinComm Installation Complete
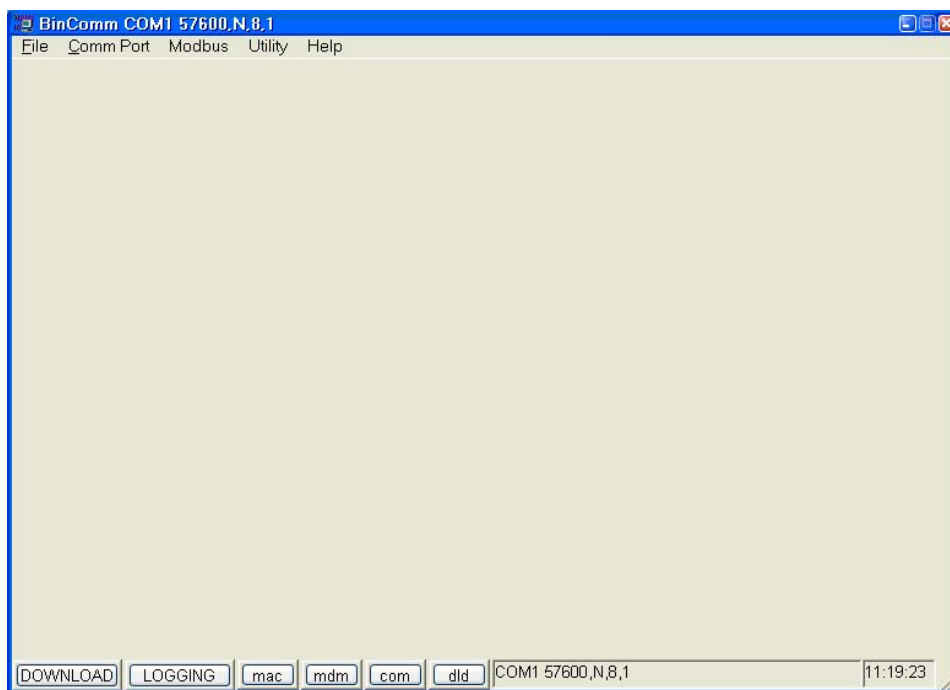
Fig. 4.4: BinComm Com 1 Window

4.7   Click on **Close** to complete the installation.

5.0   Hardware Installation

NOTE: The installation of the Sentry* Pressure Monitor System should only be installed by a qualified installer or a factory representative.

5.1   Before Installing DataHub Lite

Before installing a new system on site, although not required, we recommended you perform a bench top test of the system prior to installation. If any problems are encountered, they will be easier to recognize and correct if the systems are in close proximity.

Verify the Monitor and the NEMA 4 enclosure in which the DataHub is to be installed meet grounding requirements. See section 6.1 for additional details.

### 5.2   DataHub Antenna Installation

Proper placement of the DataHub and Pressure Monitor will optimize RF communications between the two devices. If possible, perform a site assessment prior to installation of Monitors and DataHubs. Mount DataHub Antenna and Pressure Monitor in a location with clear line-of-sight to one another. In some cases, communications may be adequate without clear line-of-sight, such as shorter distances between the Monitor and DataHub. On all installations, OleumTech recommends testing communications between the Monitor and DataHub prior to mounting.
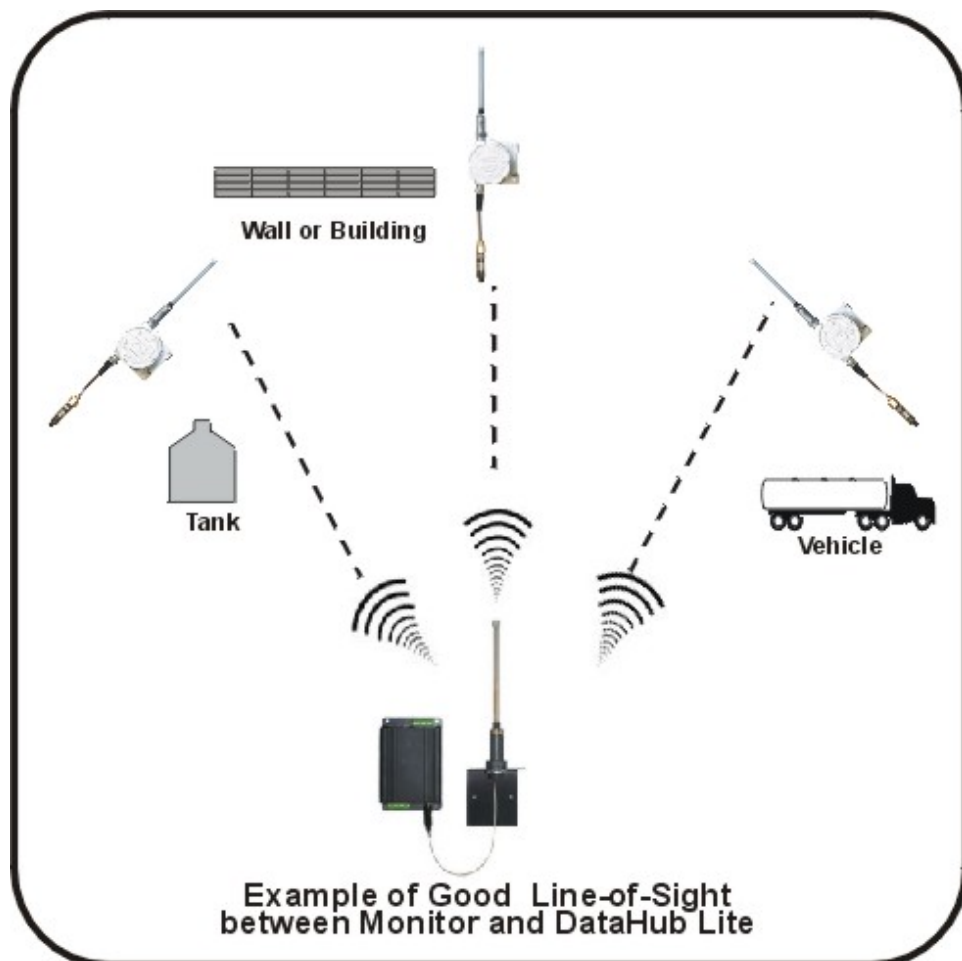
FIG. 5.3: Diagram of Good Line-of Sight
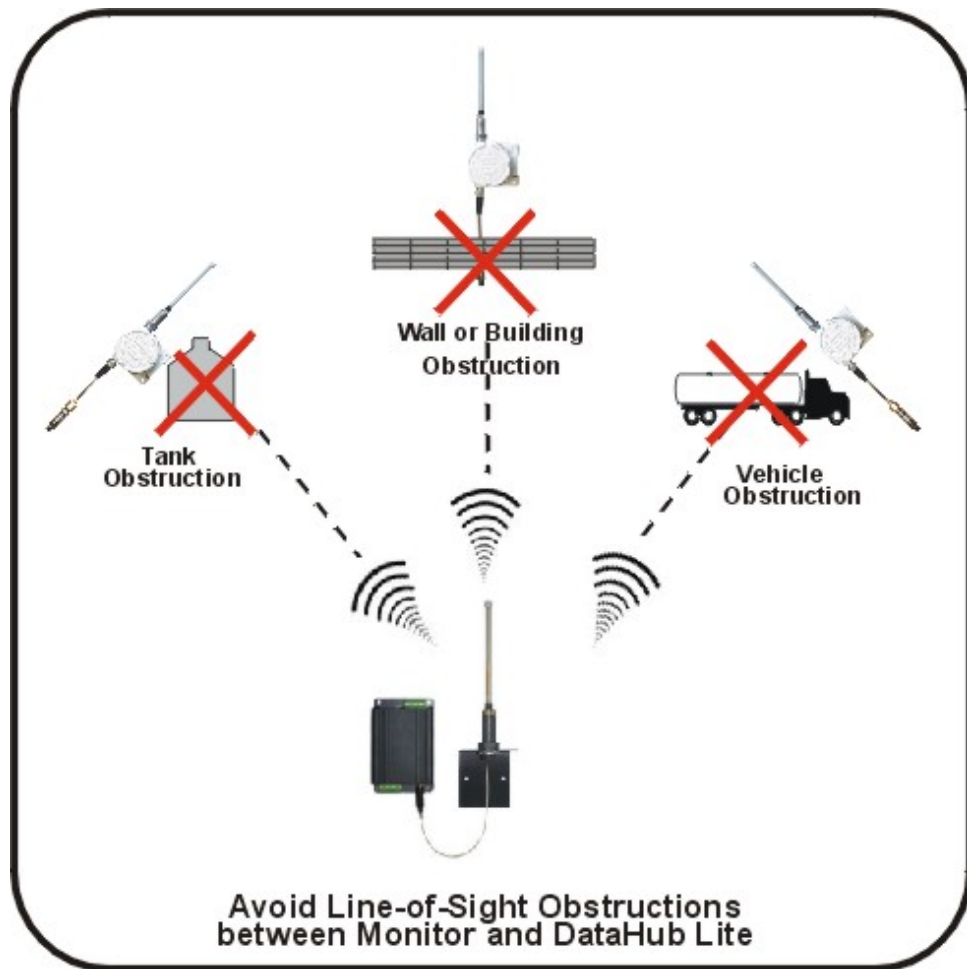
FIG. 5.4: Diagram of Poor Line-of Sight

Fig. 5.5: Antenna

5.2.1 The DataHub antenna will operate reliably over large distances. This distance will vary by application, location of the antenna, the degree of any radio interference in the area or obstructions (such as field equipment, hills or trees) between the Monitor and DataHub.

5.2.2 Connect antenna (Fig. 5.5) to top of Antenna Mounting Bracket. Fig. 5.6

Note: Hand tighten antenna to connector. Do Not over tighten.

When operating this device:

Fig. 5.6:   Antenna Mounting Bracket

> ⚠ **CAUTION** ⚠
>
> 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.

5.3   Mounting DataHub

5.3.1   Use 18 to 24 gauge wires to make I/O connections. Install the DataHub Lite inside the NEMA 4X enclosure.

5.3.2   Identify a suitable location inside the NEMA 4X enclosure that accommodates the DataHub Lite size and allows access to connectors for easy installation and service. See Fig. 5.1 & 5.2 for overall dimensions of the DataHub Lite.

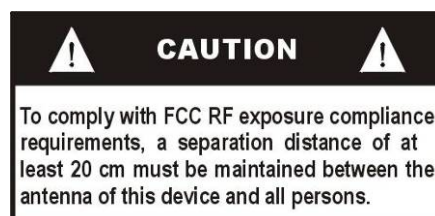**Fig. 5.2: DataHub Lite Dimensions End View**

Fig. 5.7: DataHub Lite Antenna Connection

Fig. 5.1: DataHub Lite Dimensions Overhead View

5.3.4   Loop the connector end of the DataHub through the opening in the bottom of the Nema 4 enclosure, including compression fittings before mounting in enclosure.

5.3.5   Connect the cable end of the antenna to the SMA connector located on the bottom of the DataHub. Fig. 5.7

5.3.6   Mount the antenna above any obstructions that may interfere with the "line of sight" between the DataHub Lite and Monitor(s) to achieve maximum transmission distance and system performance.

Note: *The Antenna supplied with the DataHub is available in 18 inch and 15 foot lengths. Choose the length that provides the best performance characteristics for each application.*

5.4 Installation of Monitor

5.4.1 If purchased, the Monitor was shipped with an optional mounting kit, SX1000-MK1. Use mounting kit to install Monitor either a horizontal or vertical section of a 2" pipe.

5.4.2 Mount the Monitor with antenna in vertical position. Do not mount the Monitor horizontally. Horizontal installation reduces the communications range dramatically.
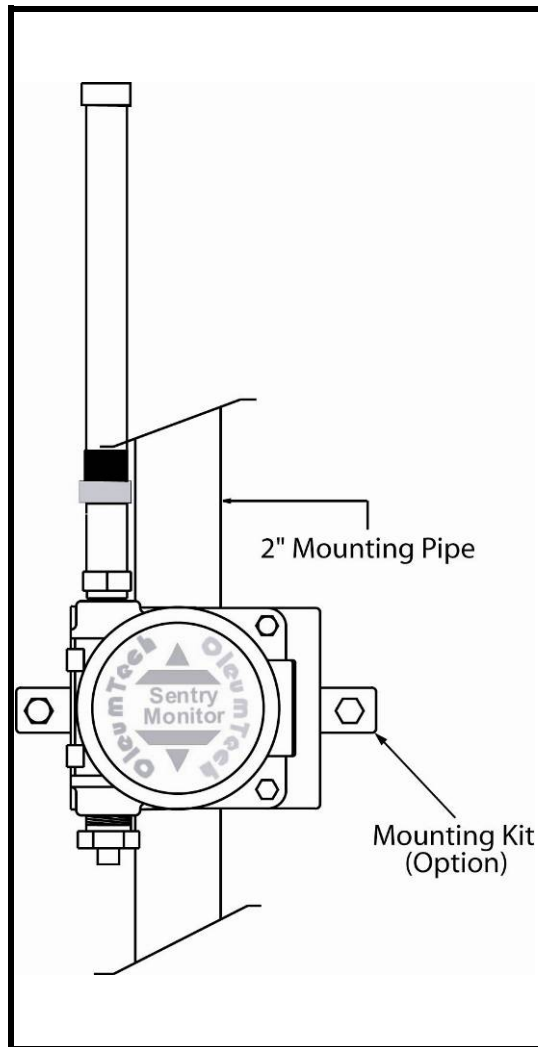
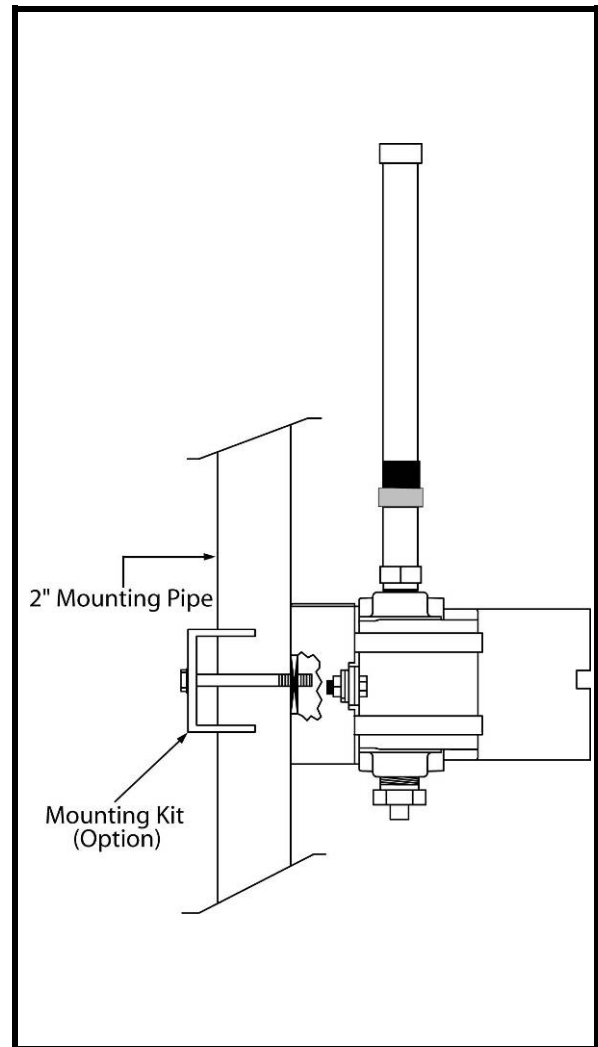

**Fig. 5.8: Monitor Pipe Mounted –
Front View**

**Fig. 5.9: Monitor Pipe Mounted –
Side View**

5.5   Connect Pressure Transducers and/or Temperature Sensors

5.5.1   The Monitors are shipped with 1-port, 2-port or 4-port adaptors (Fig. 5.10, 5.11 & 5.12). Each port has one or more transducers or sensors.
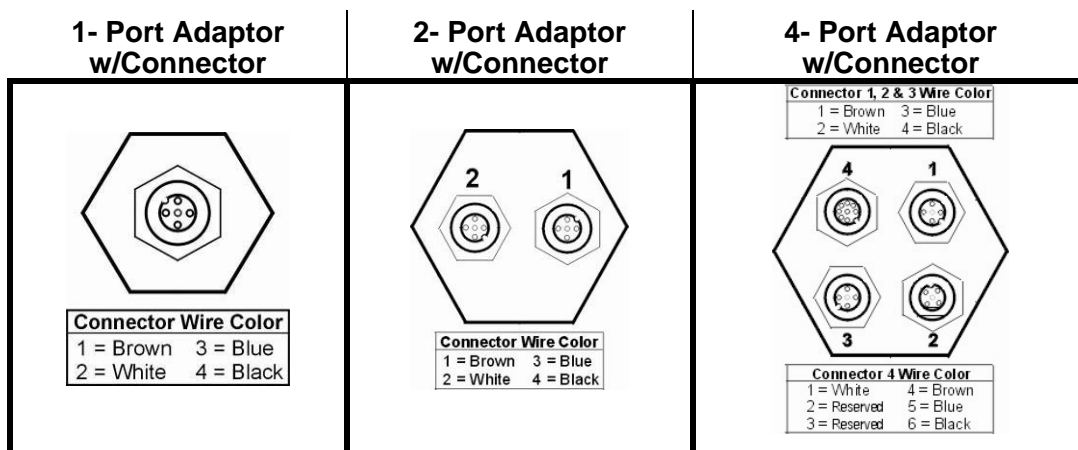
1- Port Adaptor w/Connector	2- Port Adaptor w/Connector	4- Port Adaptor w/Connector
Fig: 10	Fig: 11	Fig: 12

5.5.2 Male connectors and an appropriate number of female ports are on each Monitor and each port is numbered. Maintain the association of the port number to the sensors or transducers. Pre-wired sensors and transducers with extension cables interface with the Monitor.

5.5.3 The sensors and transducers typically come with a ¼" NPT male fitting. Apply proper thread sealer and install the pressure transducer into an appropriate mated fitting in the pipe.

5.5.4 If not already pre-attached, plug the connectors on the sensor or transducer to the appropriate port on the Monitor.

6.0   Hardware Setup

6.1   Ground Protection

WARNING — Connect the enclosure GROUND TERMINAL to earth ground before making any other connections. The ground terminal is located on the bottom of the Monitor enclosure. Use a minimum of an 12-AWG stranded wire, as short as possible.

WARNING — A low resistive true earth ground must be connected to the Monitor to ensure proper operation. Failure to provide a good earth ground to the Monitor can allow the migration of voltage from lightning or line surges into the Monitor resulting in damage to the device and which may void the warranty.

It is important to effectively earth ground the Monitor and DataHub to ensure safety, prevent static electricity damage and protection from lightning and/or electrical surges in the area. If the tank to which the Monitor is mounted is not grounded as defined by the NEC, install or attach the Monitor to a true earth ground. 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:

6.1.1   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.

6.1.2   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.

6.1.3   For more details on proper grounding electrodes and grounding electrode conductors, consult the National Electrical Code, Sections 250-50 through 250-70.

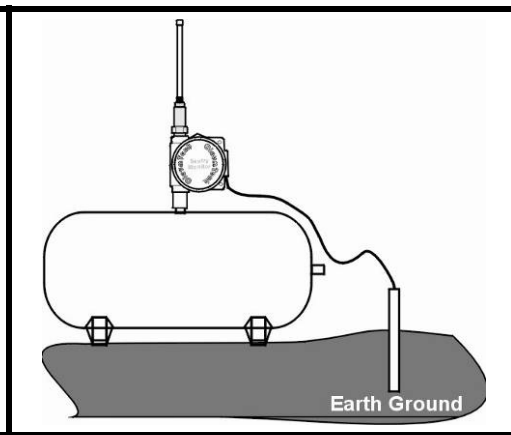**Fig. 6.1: Monitor Grounding Terminal**   **Fig. 6.2: Earth Grounding**

6.2   Monitor Antenna Connection

Connect the antenna to the SMA connector located on the top of the Monitor. Fig. 6.3

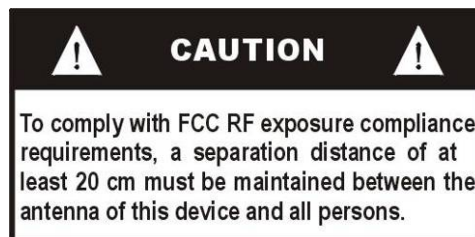*Note:* *Hand tighten antenna to connector located on top of Monitor. Do Not over tighten.*

⚠ **CAUTION** ⚠

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.

Fig. 6.3: Monitor Antenna Connection
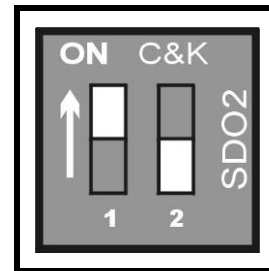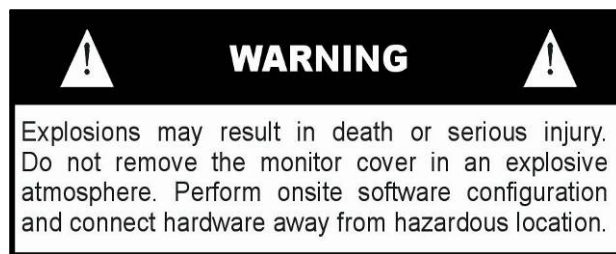
6.3   Power Up Monitor

Fig. 6.4: Monitor Power Switch

6.3.1   Loosen the Monitor enclosure cover and open the Monitor

6.3.2   Locate the power switch (S3) on the lower right hand corner of the PCB.

6.3.3   Set switch 1 to the ON position. Fig. 6.4
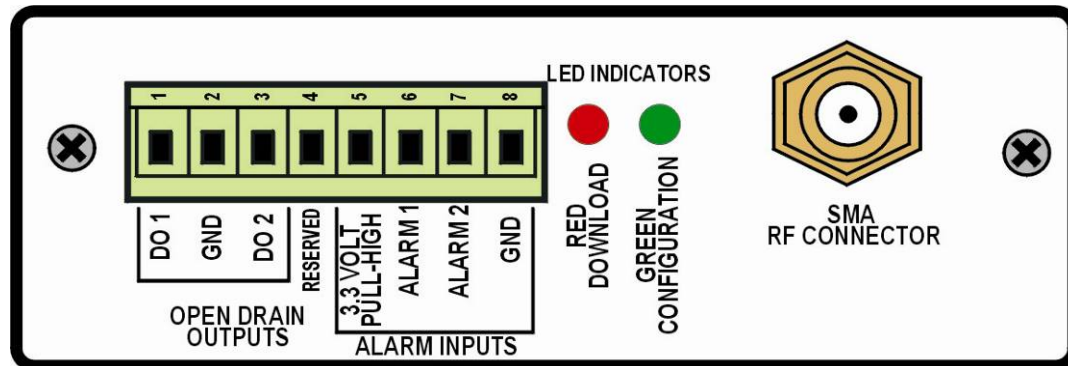
6.4   DataHub Lite Pin-out ID

Fig. 6.5: DataHub Lite Pin-out ID - Top View

6.5   DataHub Lite RS232 Pin-out ID

The DataHub Lite provides an RS232 compatible local COM port (Fig. 6.6) for setup and configuration using a PC and BinComm Configuration Software. The connection is made through the 6-pin connector located on the back of the DataHub Lite enclosure. Oleumtech provides an optional 25-foot cable assembly for connection between the DataHub Lite and PC (PN: SX1000-CC6).
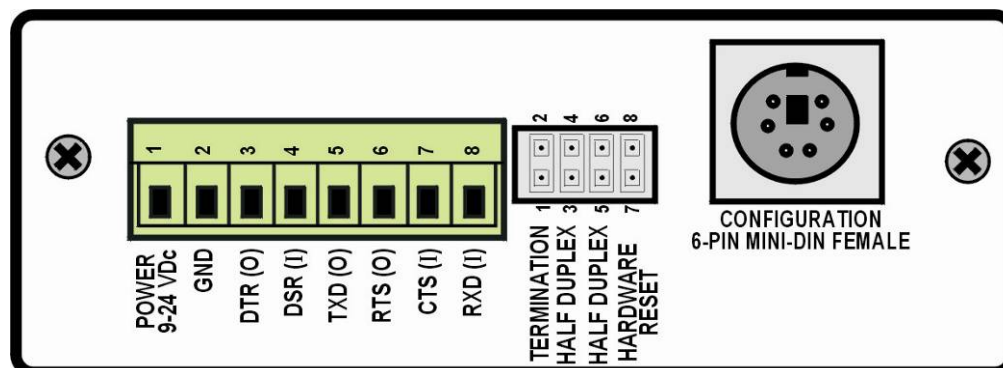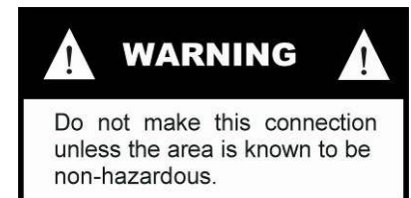

Fig. 6.6: DataHub Lite RS232 Pin-out ID - Bottom View
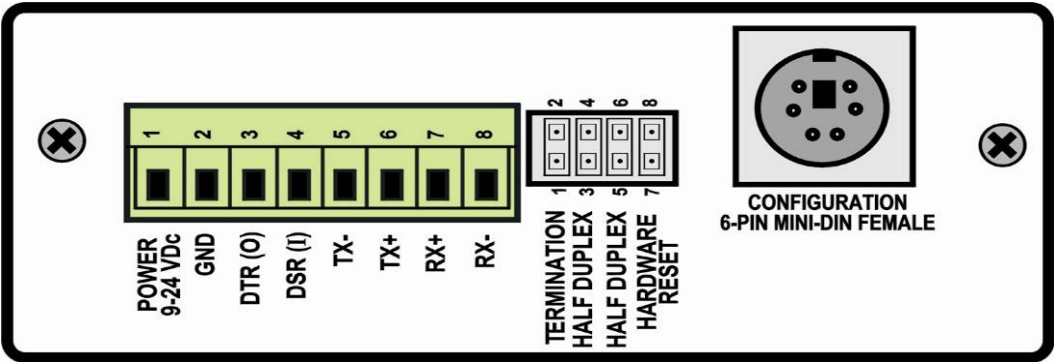
6.6   DataHub Lite RS485 Pin-out ID

Fig. 6.7: DataHub RS485 Wiring Diagram

6.7   Pressure Transducer Wiring Diagram

	Wire Color	
1	Black	Ground
2	Red	Supply
3	Green	Output
4	White	Chassi

Fig. 6.8: Pressure Transducer Wiring

6.8   Pressure Transducer Connector 4-Pin Wiring Diagram

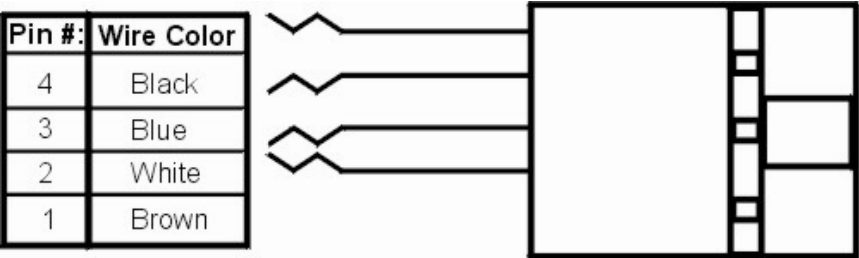| Pin #:	Wire Color
4	Black
3	Blue
2	White
1	Brown

Fig. 6.9: Pressure Transducer 4-Pin Wiring

7.0   Enable Debug in DataHub Lite

The DataHub is the central communications device of all Monitors assigned to it. After you have configured the Monitor and DataHub Lite, you will need to perform additional procedures for test and verification purposes. To perform these procedures you need to enable the Debug mode in the DataHub Lite. To **Enable Debug** perform the following steps:

7.1   Open BinComm software if not already open in background.

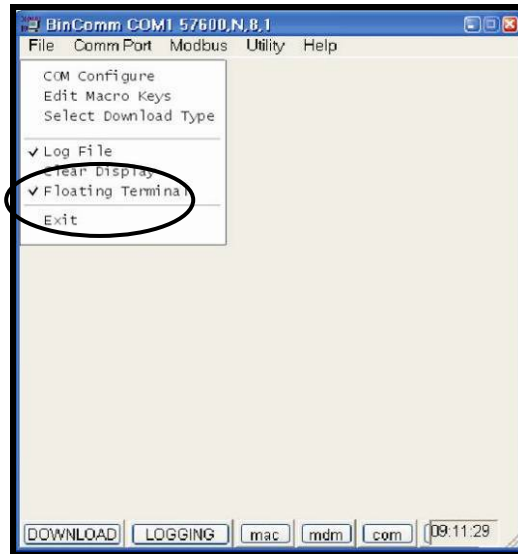7.2   From the BinComm main menu screen, click on **File** > **Floating Terminal**. Fig. 7.1

Fig. 7.1: Check Floating Terminal

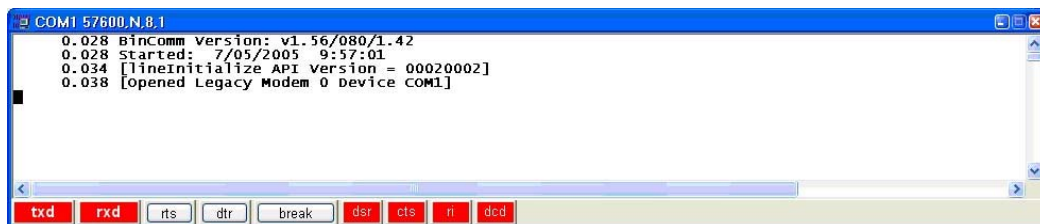7.3   A Floating Terminal screen should appear. Fig. 7.2

Fig. 7.2: Floating Terminal Screen

7.4   On the floating terminal screen, assert **rts**. This awakens the DataHub from sleep mode.

7.5   On the BinComm main menu screen click on **Comm Port** > **Connect to DataHub** > [Connect].

7.6   To turn on debug mode in DataHub, click on **System Parameters**.

7.7   Under **RF Configuration** click on check box **RF Debug Enabled**.

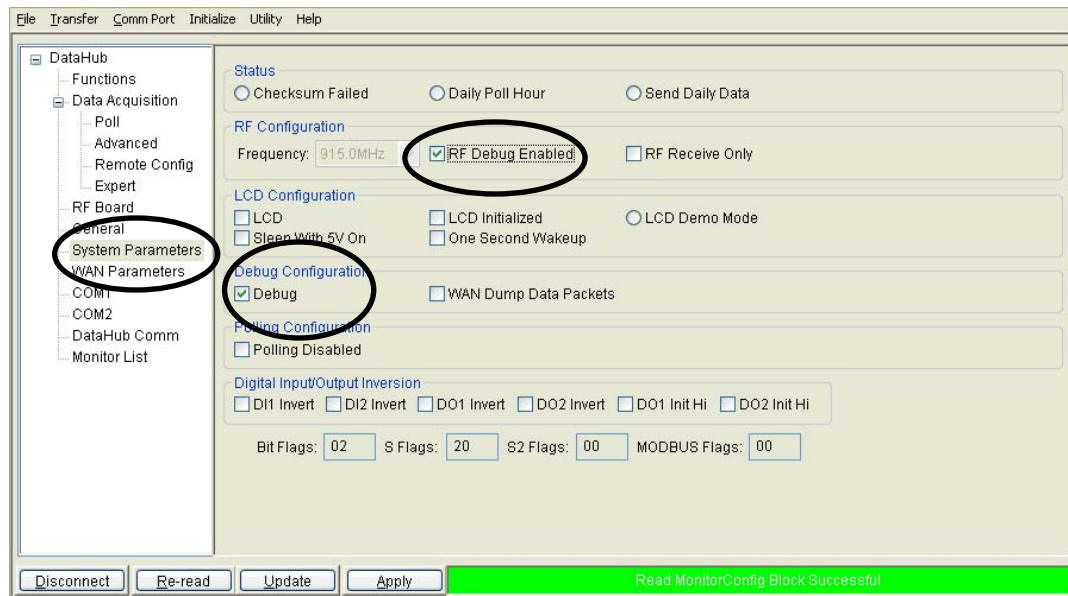7.8   Under **Debug Configuration** click on check box **Debug**. Fig 7.3

Fig. 7.3: Enable Debug Mode in DataHub

7.9   Click on ⌐Apply⌐ then ⌐Update⌐.

7.10   Click on **DataHub Comm**

7.11   Enter Monitor number (i.e. **1, 2,** etc.). This is the total number installed on site. (Example indicates only one Monitor on site. Actual number should be from 1 to 4)

7.12   Press Tab or Enter key

7.13   Click on ⌐Apply⌐ then ⌐Update⌐. Screen similar to Fig. 7.4 should appear.
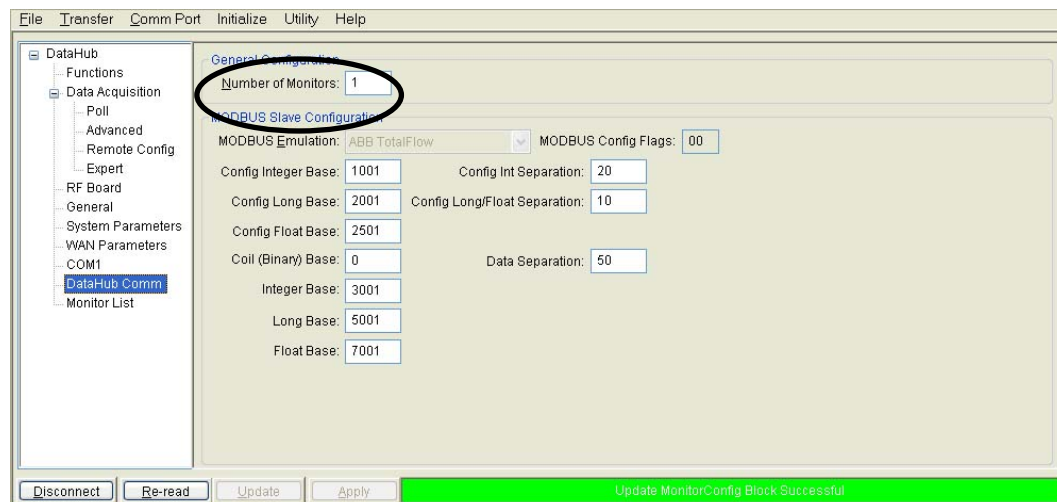

Fig. 7.4: Enter Number of Monitors

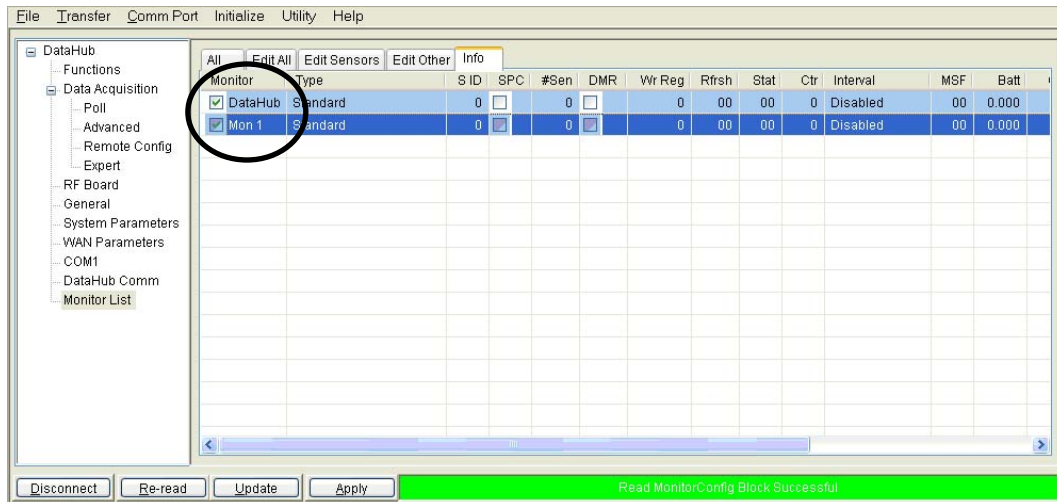7.14   Click on **Monitor List.** Fig. 7.5

7.15   Click on **DataHub** and **Monitor** check boxes. Fig. 7.5

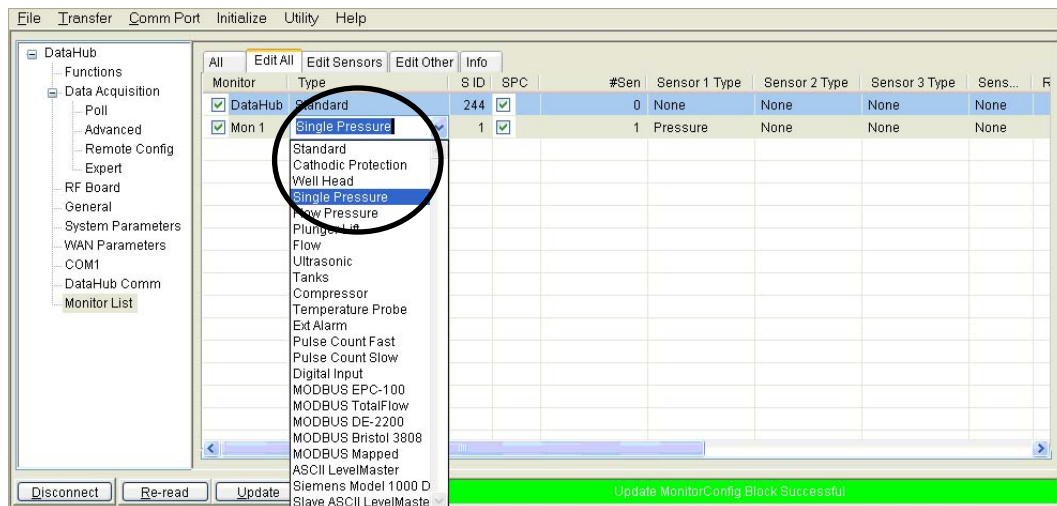**Fig. 7.5: Check DataHub & Monitor**

7.16   Change Monitor **Type**(s) to **Single or Well Head Pressure**. Fig. 7.6
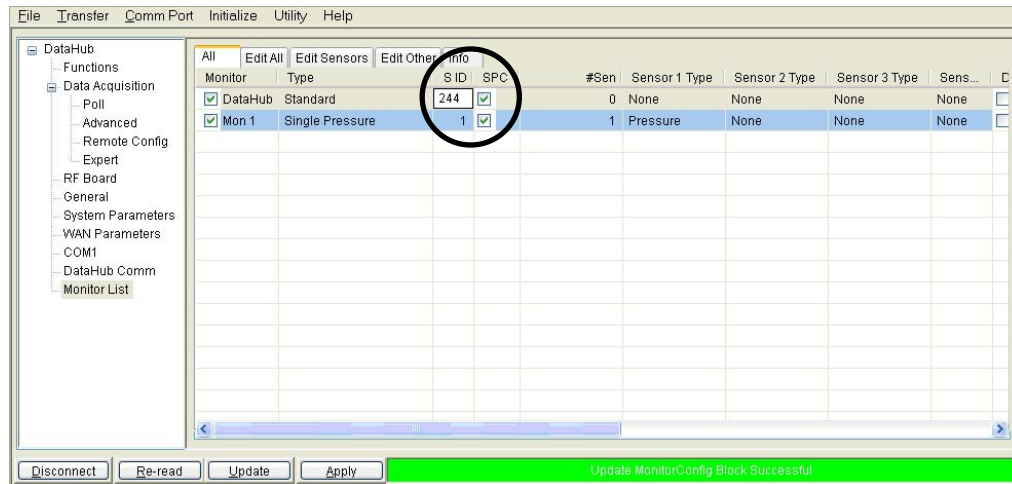

Fig. 7.6: Change Monitor Type

7.17   Change DataHub Slave ID (**S ID**) to **244** and for each Monitor to **1**, **2**, etc. Fig. 7.7

Fig. 7.7: Change DataHub & Monitor Slave ID

Note: **The Monitor slave ID is a sequential number starting with number 1. The total number depends on number of Monitors at site)**
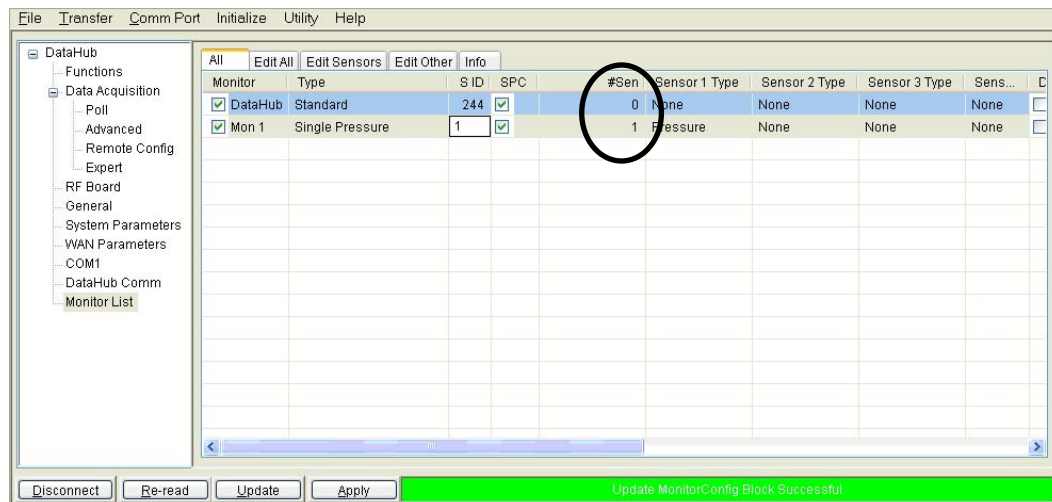
7.18   Change Sensor number **#Sen** to 1, 2, etc. (this number depends on the number of sensors attached to Monitor). Fig 7.8

Fig. 7.8: Change Sensor Number

7.19   Change **Interval** number to desired polling interval level (i.e. **5** minutes). Fig 7.9
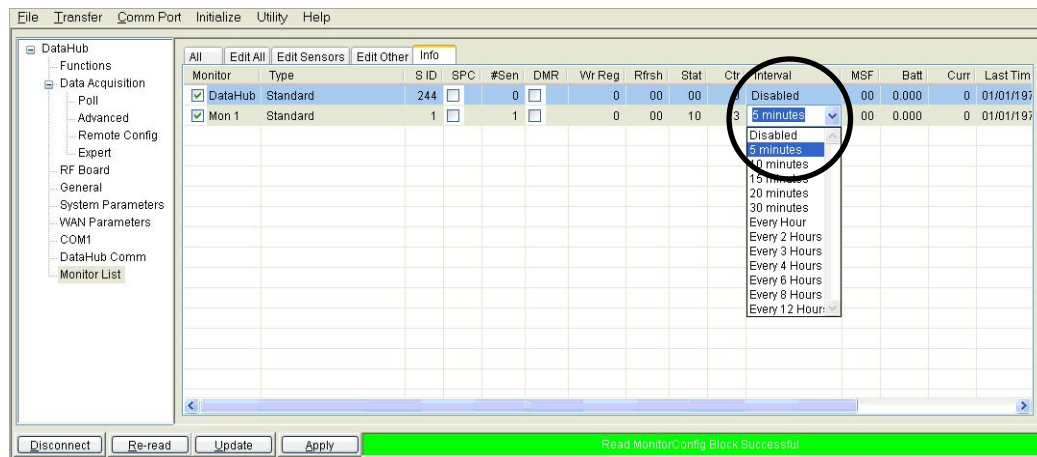

Fig. 7.9: Set Polling Interval

7.20   Click on ⌈ Apply ⌉ then ⌈ Update ⌉ to save the changes made **to** the DataHub Monitor List**.** Fig. 7.10
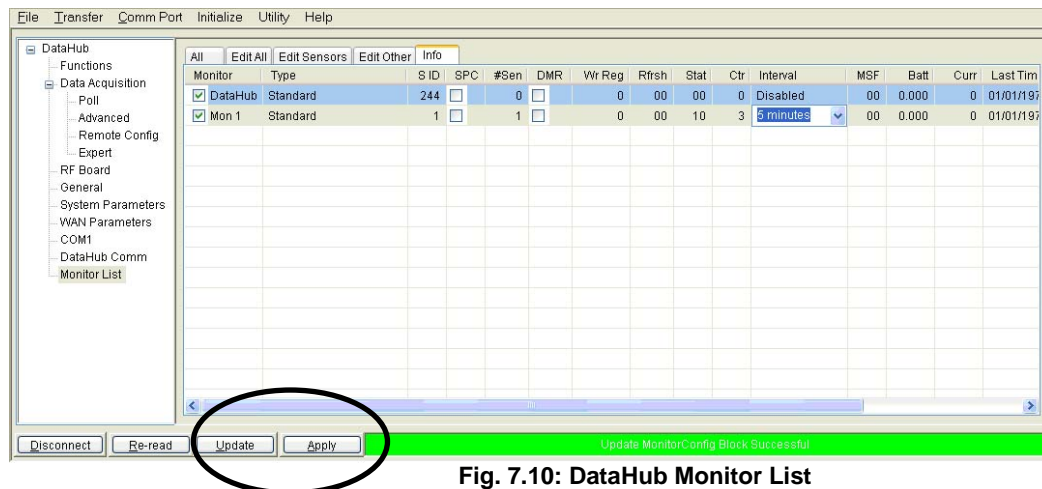

Fig. 7.10: DataHub Monitor List

7.22   Click on ⌈ Disconnect ⌉ **.**

8.0 Configuration

8.1 Connect Monitor

8.1.1 Connect 4-pin connector on the Configuration cable (PN: SX1000-CCM) to P2 on the Monitor PCB.

8.1.2 Connect the DB9 serial connector on the Configuration cable (P/N SX1000-CCM) to the serial port on your PC

⚠ **WARNING** ⚠

Do not make this connection unless the area is known to be non-hazardous.

8.2 Configure Monitor with BinComm

Open BinComm software if not already running in background. The BinComm Main Menu screen should appear. Fig. 8.1

Fig. 8.1: BinComm Main Menu Screen

8.3 Configure COM Port

8.3.1 From the BinComm Main Menu screen click on **File** then **COM Configure**.

8.3.2 Set the COM port to the port to which you attached the serial cable. (Generally, this is COM port 1 if connected directly to PC serial port).

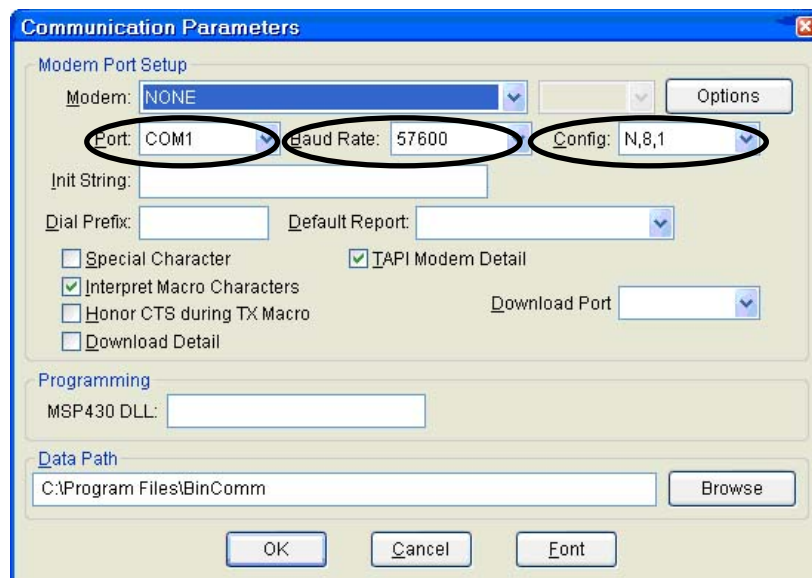8.3.3 Set or verify **Baud Rate** set to **57600** at **Config N,8,1**. Fig. 8.2

Fig. 8.2: BinComm Communications Parameters

8.4   Establish Monitor Communications

On the Floating Terminal screen, click on `rts` button to assert (`RTS` **)** BinComm and establish communications with the Monitor. If communication is established a screen similar to Fig. 8.3 should appear. Verify **Cmd>** prompt appears.

8.4.1   In a screen similar to Fig. 8.3, you should see the Monitor version number (i.e. 3.86) and the device configuration.
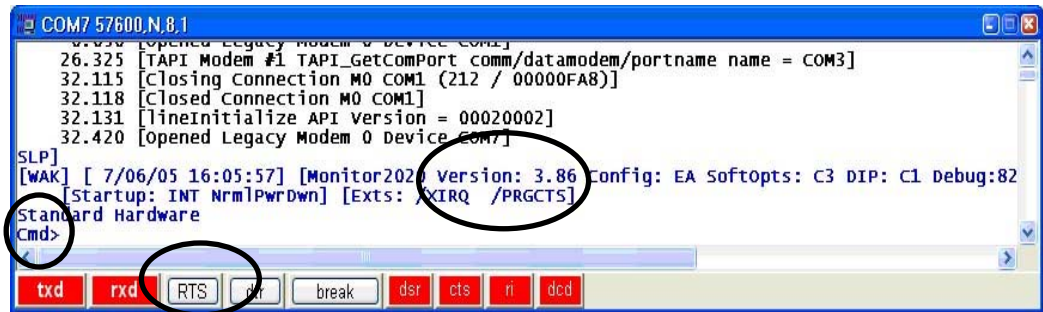

Fig. 8.3 – Monitor Configuration & Version Screen

8.4.2   Appearance of the **Cmd>** prompt indicates the Monitor is communicating with BinComm.

8.4.3   **View/Change Monitor ID**

To set new **Monitor ID(s)**, and/or verify current Monitor configuration on BinComm main menu screen, click on **Access** button. A screen similar to Fig. 8.4 should appear. To change ID, type new number in **Monitor ID** field then click on **Program** button to save the new ID.
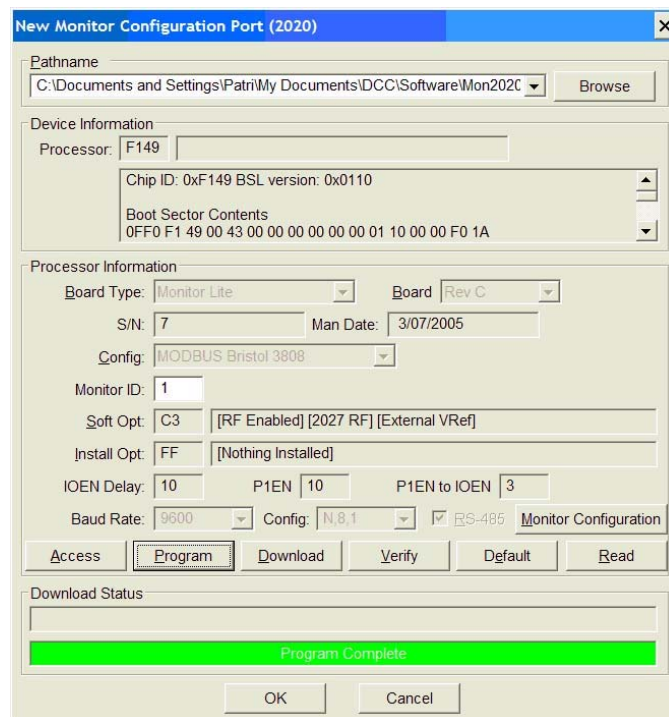

Fig. 8.4: New Monitor Configuration