

# INW BaroSCOUT

Barometric/Temperature  
Smart Sensor and Datalogger





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## Introduction

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### What is the BaroSCOUT?

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The INW BaroSCOUT Smart Sensor is designed to measure barometric pressure, along with temperature. It is an ideal companion to INW's absolute pressure/level sensors and can be used to adjust their readings for atmospheric pressure.

This industry standard digital RS485 interface device records up to 50,000 records of pressure, temperature, and time data, operates with low power, and features easy-to-use software with powerful features. Constructed with 316 stainless steel, acetal, and Viton<sup>®</sup>, this sensor provides high-accuracy readings in rugged and corrosive field conditions.

The BaroSCOUT utilizes an extremely rugged and stable piezo-electric media-isolated pressure element combined with a 16-bit analog-to-digital converter. This provides extremely accurate and stable pressure input into the microprocessor on the circuit board that measures the pressure and stores the data in non-volatile memory.

A 1/2 AA 3.6v lithium battery powers the BaroSCOUT. The unit is programmed using INW's easy-to-use Aqua4Plus Lite or Aqua4Plus control software. Once programmed the unit will measure and collect data at the time interval programmed.

While most will use the BaroSCOUT with INW's Aqua4Plus Lite or Aqua4Plus software, it is by no means limited to that software. You can use your own Modbus<sup>®</sup> RTU software or logging equipment to read measurements via RS485, tying into your existing systems and data bases.

Note: The BaroSCOUT is intended for use in atmosphere—not to be submerged.

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### Initial Inspection and Handling

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Upon receipt of your smart sensor, inspect the shipping package for damage. If any damage is apparent, note the signs of damage on the appropriate shipping form. After opening the carton, look for concealed damage, such as a cut cable. If concealed damage is found, immediately file a claim with the carrier.

Check the etched label on the sensor to be sure that the proper range and type were provided. Also check the label attached to the cable at the connector end for the proper cable length.

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### Do's and Don'ts

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**Do** handle the device with care.

**Do** store the device in a dry, inside area when not in use.

**Do** install the device so that the cable connector is kept dry.

**Don't** support the device with the connector. Use a strain relief device to take the tension off the connectors.

**Don't** allow the device to free-fall down a well as impact damage can occur.

**Don't** bang or drop the device on hard objects.

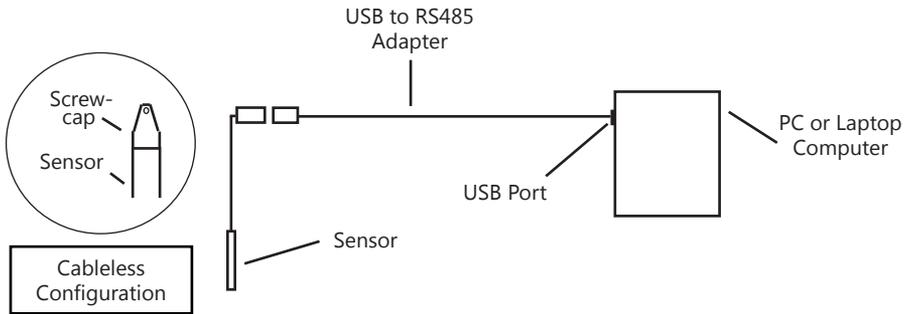
**Installation and Operation**

**Power**

The BaroSCOUT comes with a 1/2 AA 3.6v lithium battery.

**Connecting the BaroSCOUT to a Computer**

In its cabled configuration, the sensor cable is terminated with a weather-resistant connector. In its cableless configuration, the sensor is terminated with a weather-resistant connector inside a screw-cap. Connect the weather-resistant connector to your computer's USB port as shown below. (For alternate connection options, see Appendix C.)



*Connect the sensor to your PC using INW's USB to RS485 adapter. (See Appendix C for alternate connections.)*

**Installing the Aqua4Plus Lite or Aqua4Plus Software**

The BaroSCOUT comes with the Aqua4Plus Lite host software that is installed on your PC or laptop. Use this software to program the datalogger, to retrieve data from the logger, to view collected data, and to export data to external files for use with spreadsheets or databases.

Refer to the Aqua4Plus Lite software manual for details on installing and using Aqua4Plus Lite. BaroSCOUT can also be used with the full Aqua4Plus software.

Using the BaroSCOUT Without Aqua4Plus Lite or Aqua4Plus

Most users will use the BaroSCOUT with INW's Aqua4Plus Lite or Aqua4Plus software. However, the BaroSCOUT is quite versatile, communicating via Modbus® RTU, allowing you to use your own software or logging equipment. (See Appendix D for further details.)

### Installing the Sensor

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The BaroSCOUT can be installed outdoors, in a building, or inside the top of a well head. If installing inside a well head, be sure that it will be above the waterline at all times. If installed outside in direct sunlight, provide a shade cover to prevent overheating.

On cabled units be sure the supplied cap is securely placed on the weather-resistant connector at the top of the cable. Do not install such that the connector might become submerged with changing weather conditions. The connector can withstand incidental splashing but is not designed to be submerged.

The sensor can be installed in any position; however, when it leaves the factory it is tested in the vertical position. Strapping the sensor body with tie wraps or tape will not hurt it.

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### Battery Life Calculator

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The BaroSCOUT has a battery life calculator that is set at the factory when batteries are first put in the sensor. If you need to replace the batteries, see the Maintenance section for replacement information and for information on resetting the battery life calculator. ***If the battery life calculator is not reset, the remaining life information will be incorrect.***

**Collecting Data**

Following is a brief overview on using Aqua4Plus Lite or Aqua4Plus to collect data. Please refer to the software instruction manuals for further details.

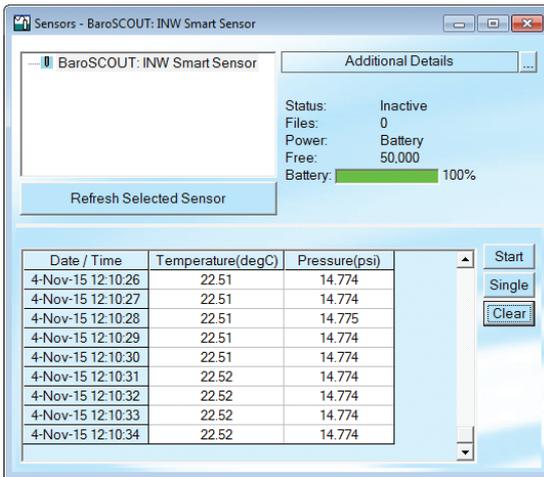
**Real Time Monitor**

Click Single to get a single reading.

Click Start to get a reading once a second for 60 seconds.

Click Stop to stop the reading.

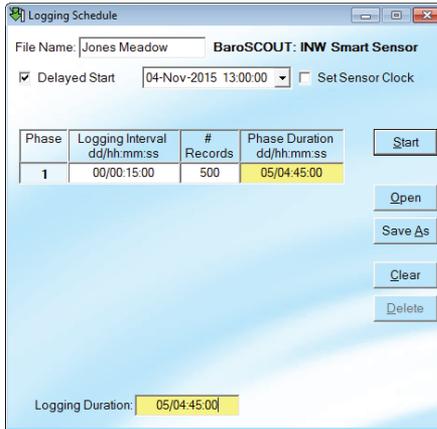
Note: These are snapshot readings and are not recorded on the sensor.



*The Real Time Monitor gives a snapshot of the current readings on the sensor.*

### Setting up Data Recording

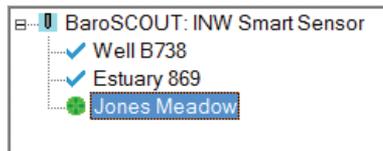
Click the  tool button. A Logging Schedule window will open. Refer to the software manual for details in describing your schedule. Click the Start button to send the schedule to the sensor and begin recording. Note: The BaroSCOUT is limited to only one phase.



*Using the Logging Schedule Window, describe the test steps for your particular test.*

### Retrieving Data from the Sensor/Datlogger

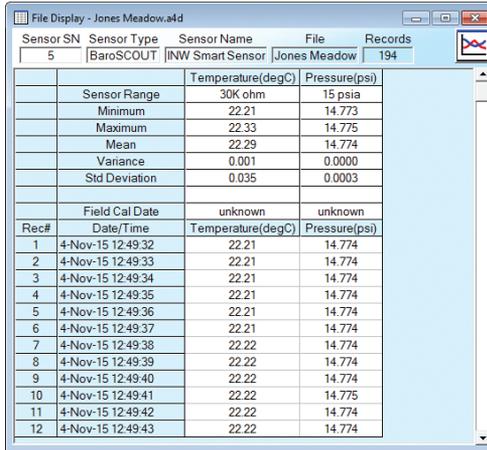
- Click on the file you want to retrieve.
- Click the  tool button.
- Select a file location.
- Click Save.
- Click Start.



*Select the data file you are ready to retrieve.*

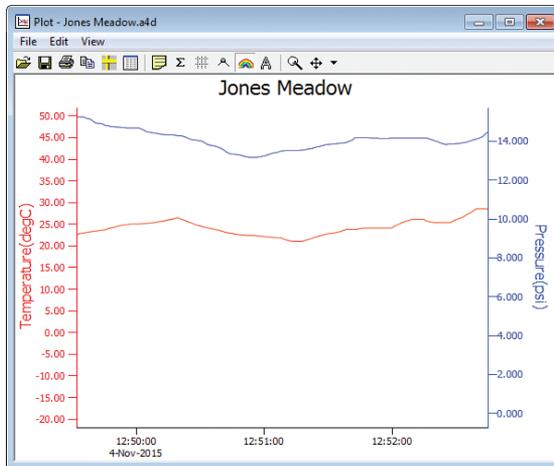
**Viewing Data**

- Click the  or  tool button to view data as a table.
- Click the  tool button to view data as a graph.
- Navigate to the desired file, then click the Open button.



Sensor SN	Sensor Type	Sensor Name	File	Records
5	BaroSCOUT	INW Smart Sensor	Jones Meadow	194
Sensor Range		Temperature(degC)	Pressure(psi)	
Minimum		22.21	14.773	
Maximum		22.33	14.775	
Mean		22.29	14.774	
Variance		0.001	0.0000	
Std Deviation		0.035	0.0003	
Field Cal Date		unknown	unknown	
Rec#	Date/Time	Temperature(degC)	Pressure(psi)	
1	4-Nov-15 12:49:32	22.21	14.774	
2	4-Nov-15 12:49:33	22.21	14.774	
3	4-Nov-15 12:49:34	22.21	14.774	
4	4-Nov-15 12:49:35	22.21	14.774	
5	4-Nov-15 12:49:36	22.21	14.774	
6	4-Nov-15 12:49:37	22.21	14.774	
7	4-Nov-15 12:49:38	22.22	14.774	
8	4-Nov-15 12:49:39	22.22	14.774	
9	4-Nov-15 12:49:40	22.22	14.774	
10	4-Nov-15 12:49:41	22.22	14.775	
11	4-Nov-15 12:49:42	22.22	14.774	
12	4-Nov-15 12:49:43	22.22	14.774	

*The File Display window displays your data in a tabular format.*



*The Graph Window displays your data on an X Y coordinate graph.*

### Exporting Data to .csv or .xls Files

- Click the  or  tool button to view data as a table.
- Click on the  tool button.
- Select a file location and enter a name for the file.
- Select a file type.
- Click Save.

### A Word About Units

Readings from the BaroSCOUT Smart Sensor can be displayed in various units, such as PSI, Ft. H<sub>2</sub>O, or mm H<sub>2</sub>O for pressure, or degrees Celsius or degrees Fahrenheit for temperature. Select the units you want from the Options | Display Units menu or from the Configure Menu | Program Configuration | Set Computer Display Units.

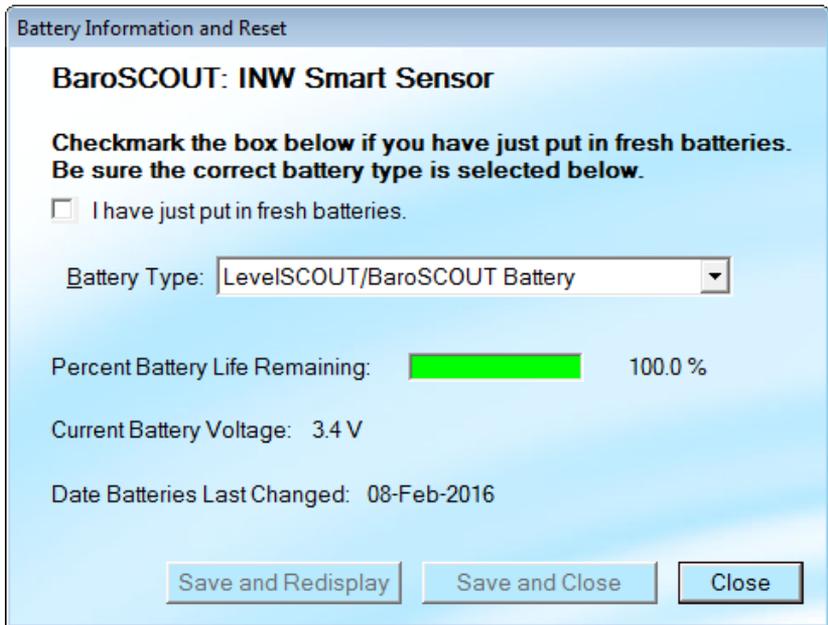
*Maintenance*

**Changing Batteries**

The BaroSCOUT is powered by a single 1/2 AA 3.6 lithium battery. In most situations the battery will last for years. If you need to replace the battery, contact INW for information on getting it replaced. You cannot simply replace the battery itself but must replace the entire compartment.

**IMPORTANT NOTE!**

When changing batteries, it is important to reset the Battery Life Calculator. ***If the battery life calculator is not reset, the remaining life information will be incorrect.*** Access the Battery Life Calculator from the Configure Menu - Battery Information and Reset. If you have put in new batteries, checkmark the box "I have just put in fresh batteries." Click Save and Close.



*Reset the Battery Life Calculator if you change the battery.*

**Miscellaneous**

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**Sensor:** There are no user-serviceable parts, other than the batteries. If problems develop with sensor stability or accuracy, contact INW. If the sensor has been exposed to hazardous materials, do not return it without notification and authorization.

**Cable:** Cable can be damaged by abrasion, sharp objects, twisting, crimping, crushing, or pulling. Take care during installation and use to avoid cable damage. If a section of cable is damaged, it is recommended that you send your sensor back to replace the cable harness assembly.

**End Connections:** The connectors used by INW are not submersible, but are designed to be splash-resistant.

## Troubleshooting

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### Erratic Readings

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Erratic readings can be caused by a poor connection, damaged cable, moisture in the unit, or a damaged transmitter. In most cases, erratic readings are due to moisture getting into the system. The first thing to check is the connection. Look for moisture between contacts or a loose or broken wire. Next, check the cable for cracking or fraying. If the connections and cable appear OK, but the readings are still erratic, the transmitter may be damaged. Contact INW for evaluation and repair. Erratic and erroneous readings can also occur due to improper grounding. See Grounding Issues, below.

### Zero Readings

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Continuous zero readings are usually caused by an open circuit which may indicate a broken cable, a bad connection, or possibly a damaged transmitter. Check the connector to see if a wire has become loose or if the cable has been cut. If damage is not readily apparent, contact INW for evaluation and repair.

### Grounding Issues

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It is commonly known that when using electronic equipment, both personnel and equipment need to be protected from high power spikes that may be caused by lightning, power line surges, or faulty equipment. Without a proper grounding system, a power spike will find the path of least resistance to earth ground – whether that path is through sensitive electronic equipment or the person operating the equipment. In order to ensure safety and prevent equipment damage, a grounding system must be used to provide a low resistance path to ground.

When using several pieces of interconnected equipment, each of which may have its own ground, problems with noise, signal interference, and erroneous readings may be noted. This is caused by a condition known as a *Ground Loop*. Because of natural resistance in the earth between the grounding points, current can flow between the points, creating an unexpected voltage difference and resulting erroneous readings.

The single most important step in minimizing a ground loop is to tie all equipment (sensors, dataloggers, external power sources, and any other associated equipment) to a **single common grounding point**. INW recommends connecting the shield to ground at the connector end.

**Appendix A: Technical Specifications**

**General Specification**

The INW BaroSCOUT is a microprocessor based digital intelligent sensor designed to measure and record pressure, temperature, and time, utilizing state-of-the-art low power, battery operated circuitry.

Pressure is measured with an extremely rugged and stable piezo-electric media-isolated pressure element combined with an analog-to-digital converter. This provides extremely accurate and stable pressure input into the microprocessor on the circuit board.

Temperature is measured with an epoxy bead thermistor. The data is stored in non-volatile memory. A serial communication link (RS485) provides communication to the host computer.

<b>Length (cabled version)</b>	6.6" (16.7 cm)
<b>Length (cableless version)</b>	5.1" (12.9 cm)
<b>Diameter</b>	0.875" (2.22 cm)
<b>Body Material</b>	316 stainless steel
<b>Wetted Materials</b>	316 stainless steel, acetal, fluoropolymer
<b>Communication</b>	RS485 Modbus® RTU
<b>Direct Modbus Read Output</b>	32-bit IEEE floating point
<b>Internal Math</b>	32-bit floating point
<b>Operating Temp. Range</b>	-20° C to 60° C
<b>Storage Temp. Range</b>	-40° C to 80° C

**Logging**

<b>Memory</b>	50,000 records
<b>Logging Rate</b>	1x per second
<b>Software</b>	Complimentary Aqua4Plus Lite
<b>File Formats</b>	.xls / .csv / .a4d

**Power**

<b>Internal Battery</b>	One 1/2 AA 3.6 lithium battery
<b>Expected Battery Life</b>	4 years (depending on use)

**Temperature**

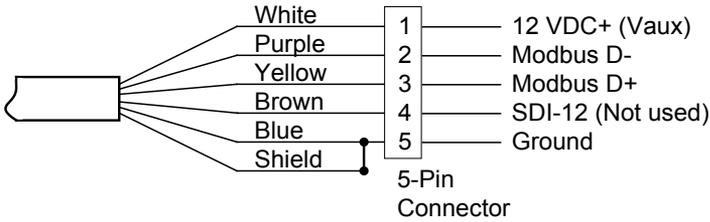
<b>Element Type</b>	Thermistor
<b>Accuracy</b>	± 0.1° C (from -20° C to 60° C)
<b>Resolution</b>	0.01° C
<b>Units</b>	Celsius, Fahrenheit, Kelvin

Pressure

<b>Transducer Type</b>	Silicon strain gauge
<b>Transducer Material</b>	316 stainless steel
<b>Units</b>	PSI, FtH2O, inH2O, cmH2O, mmH2O, mH2O, inHg, cmHg, mmHg, Bars, mBars, kPa
<b>Accuracy</b>	± 0.008 PSI ( 0.55 mbar) (@ 20° C) ± 0.02 PSI (1.34 mbar) (@ -20° C to 60° C)
<b>Resolution</b>	0.001% FS (typical)

NOTE: Intended for use in atmosphere—not to be submerged.

Wiring and Component Information



## Appendix B: Settings and Calibration

Settings and calibration values can only be changed when there is no data on the sensor. Be sure to retrieve any data and then erase the data on the sensor before proceeding.

The temperature channel rarely needs adjustment. If you think your temperature channel needs calibrating, contact your service representative.

Before leaving the factory, your BaroSCOUT has been inspected using precision instruments. However, you may adjust the settings for the pressure channel if needed, as shown in this section.

### -- Preparation --

- Run Aqua4Plus Lite or Aqua4Plus and scan for sensors.
- On the Sensor Map, click the sensor you want to adjust.
- From Aqua4Plus Lite:
  - Select the units you want to use for measurements, i.e., psi, feet of water, inches of mercury, etc. Set this from the Configure Menu | Program Configuration | Set Computer Display Units.
  - Open the Settings and Calibration window by clicking on the  Settings button.
- From Aqua4Plus:
  - Select the units you want to use for measurements, i.e., psi, feet of water, inches of mercury, etc. Set this from the Options Menu | Display Units.
  - Open the Settings and Calibration window from the Configure Menu | Settings and Calibration.

### -- Computing Offset --

- Using a barometric pressure indicator or other measuring device, determine the current barometric pressure.
- Enter this value in the **Ref** box.
- Click the **Measure** button.
- When readings have stabilized to your satisfaction, click the **Accept** button in the pop-up box.

### -- Applying Offset --

- Click the **Apply** button to apply calculated offset.
- The calculated offset will be transferred to the offset field near the top of the window.
- **Click OK to save the value to the sensor!!!**

### -- Verifying Settings --

- Using the Real Time Monitor, take a few readings to verify it is reading as expected.

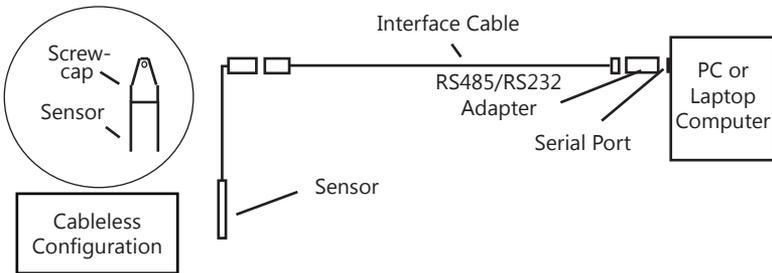


## Appendix C: Alternate Connection Options

INW recommends connecting the sensor to your computer using the INW USB cable. However, when using Aqua4Plus, the sensor can also be connected using an RS232 serial port or a USB-to-Serial cable, as described below. (Note: Aqua4Plus Lite can only communicate using the INW USB cable.)

### Connecting via RS232 Serial Port

In its cabled configuration, the sensor cable is terminated with a weather-resistant connector. In its cableless configuration, the sensor is terminated with a weather-resistant connector inside a screw-cap. Connect the weather-resistant connector to your computer's serial port as shown below.



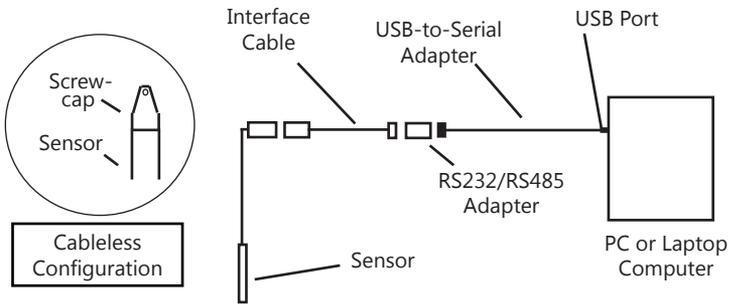
*Connect the sensor to your computer using an RS485/RS232 adapter and an interface cable.*

### Connecting with a USB/Serial Adapter

USB-to-Serial cables are readily available from many electronics and computer stores, as well as numerous sites on the Internet. INW has tested and recommends the Keyspan USA-19HS. It is available from INW as well as from many sites on the Internet. Install as follows:

- Plug into USB port.
- Install the drivers provided with the particular unit.
- Determine the port number to which the adapter is assigned.
  - Right-click on My Computer.
  - From the popup menu, select Manage to open the Computer Management window.
  - On left panel, click on Device Manager.
  - On right panel, double-click on Ports.
  - A list of active COM ports will be displayed. Note the COM number assigned to the adapter you just installed.
  - For example:  Keyspan USB Serial Port (COM4)
  - Close Manager.
- Connect to the sensor.

- On the Aqua4Plus software, select the COM port noted above. (If you do not see your new COM port in the dropdown box, open the Communications dialog box from the Options menu. Increase the Highest COM port number, up to a maximum of 15.)



*Connect the sensor to your computer using a USB to Serial adapter and an interface cable.*

## Appendix D: Reading the BaroSCOUT via Direct Read

While the BaroSCOUT comes with INW's easy to use Aqua4Plus Lite or Aqua4Plus software, you can also use standard Modbus® RTU equipment to easily take readings, so as to tie into your existing equipment or networks.

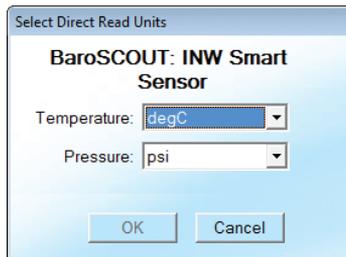
### Setting Units for Direct Read

By default, the BaroSCOUT uses the following units:

Temperature	Degrees Celsius
Pressure	PSI

However, you can select from a variety of units for direct read measurements. If you want to change to different units, for example, degrees Fahrenheit for temperature or feet of water for pressure, set these units using Aqua4Plus/Aqua4Plus Lite.

- From Aqua4Plus select Direct Read Units from the Configure | Advanced menu.
- From Aqua4Plus Lite select Set Direct Read Units from the Sensor configure menu.
- On the popup box, click the down-arrows next to the channel types you want to change, and then select the units you want.
- Click OK.



*Select the units for your direct read Modbus measurements*

Once set, these units are saved on the sensor and direct readings will return values using these units. (Note: These settings do not affect the units used on the Aqua4Plus Lite or Aqua4Plus display. Refer to the software manual for details.)

**Reading Via Modbus® RTU**

**Taking Measurements**

*Reading Registers*

Read measurements using Modbus function 03 – Read Holding Registers. Readings are located in two registers each, starting at address 62592. (PT2X register addressing is zero based, i.e., starts at zero. If your equipment uses one based addressing, you will need to add one to the register addresses.)

<b>Register addresses for BaroSCOUT</b>		
	Zero Based	One Based
Temperature	62592	62593
Pressure	62594	62595

*Measurement Timing*

When you request a reading via Modbus, the sensor wakes up, returns the current values in the registers, and then starts taking new readings and updating the registers. After approximately four seconds, if no more readings have been requested, the sensor goes back to sleep.

Because of this, the first reading you get will be old. If you are taking readings at intervals of less than four seconds, simply ignore the first reading — all remaining readings will be current. On the other hand, if you are taking readings at intervals of greater than four seconds, take a reading, ignore it, wait one second, take another reading. Record this second reading.

*Data Format*

The data is returned as 32-bit IEEE floating-point values, highword first, also referred to as big-endian or float inverse.

For further information and detailed Modbus examples, see INW application note, “Modbus Direct Read on INW Smart Sensors” available from our web site at <http://www.inwusa.com/appnotes.htm>.

## **Appendix E: Converting Absolute Readings to Barometrically Compensated Readings**

### **Using the Barometric Compensation Utility**

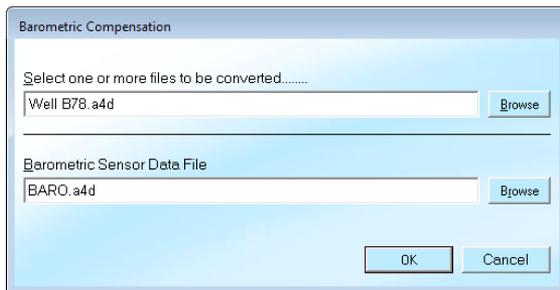
Absolute pressure sensors (PSIA) report pressure that includes the current barometric (atmospheric) pressure. Aqua4Plus/Aqua4Plus Lite provides a Barometric Compensation Utility to subtract out the barometric portion from the readings, leaving only the submerged water pressure portion of the reading. PT2X-BV and BaroSCOUT barometric sensors can be used to compensate data files from absolute pressure sensors. Follow the steps below to use the Barometric Compensation Utility.

- Start recording on the barometric sensor, taking periodic readings. This data will be used to convert the absolute pressure readings from your data files to be water pressure only.
- Start recording on your sensor, taking readings as desired. If you have several sensors that will be using the same barometric data, start the recording on all of them.

**TIPS:**

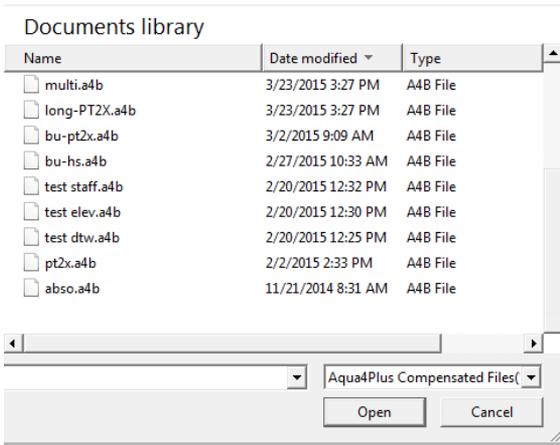
- Before starting to record, be sure the clocks on the barometric sensor and on the other sensors are set to the same time.
- For best results in most situations, there should be at least one barometric reading within 60 minutes of each sensor reading. In areas where the barometric pressure changes rapidly, set the same recording frequency for both the barometric and submerged sensors.

- After the data is collected, retrieve the data from all the submerged sensors and from the barometric sensor.
- Open the Barometric Compensation Utility:  
 In Aqua4Plus from the Utility Menu  
 In Aqua4Plus Lite from the Configure Menu | Program Configuration.
- The following box will open:



*Barometric Compensation File Selection Box*

- First, select one or more data files to be converted. Click the top Browse button and navigate to the file(s) you want to convert. To select one file, simply double-click on the file name. To select two or more files, click on the first file, then hold down the Ctrl key and click on each of the other files you want to convert. Then click OK.
- Next, select the barometric file you wish to use for the compensation. Click on the lower Browse button and navigate to the file you want to use. Double-click on the file name.
- The files to be converted and the file to use for the compensation values will be listed in the dialog box. To begin the conversion, click OK.
- The program will take each record in each data file, subtract the barometric reading closest in time to that reading, and then create a new, converted file. The original data files will have an extension of .a4d. The converted files will have the same file name but with an extension of .a4b.
- Click the  or  tool button to view the converted file.



*File Open Box*

- On the File Type box, click the down arrow and select "Aqua4Plus Compensated Files." The box will then list your compensated files. (If you select "Aqua4Plus Data Files" instead, original data files will be listed.) Double-click on the file you want to open. Your data will display in the File Display window.

Columns represent the following:

- Rec#: Record number in the original data file
- Date/Time: Date and time of sample from original data file
- Pressure: Barometrically compensated pressure
- Temperature: Temperature

The screenshot shows a window titled "File Display - Jones Meadow.atb". It contains two tables. The first table lists sensor calibration parameters, and the second table lists data records.

Sensor SN	Sensor Type	Sensor Name	File	Records
5	LevelSCOUT	INW Smart Sensor	Jones Meadow	194

	Pressure(psi)	Temperature(degC)
Sensor Range	15 psia	
Minimum	0.148	22.21
Maximum	0.149	22.33
Mean	0.148	22.29
Variance	0.0000	0.001
Std Deviation	0.0005	0.035
Gain	1.000000	1.000000
Offset	0.0000	0.000

Rec#	Date/Time	Pressure(psi)	Temperature(degC)
1	4-Nov-15 12:49:32	0.149	22.21
2	4-Nov-15 12:49:33	0.149	22.21
3	4-Nov-15 12:49:34	0.149	22.21
4	4-Nov-15 12:49:35	0.149	22.21
5	4-Nov-15 12:49:36	0.149	22.21
6	4-Nov-15 12:49:37	0.149	22.21
7	4-Nov-15 12:49:38	0.149	22.22
8	4-Nov-15 12:49:39	0.149	22.22
9	4-Nov-15 12:49:40	0.149	22.22
10	4-Nov-15 12:49:41	0.149	22.22
11	4-Nov-15 12:49:42	0.149	22.22
12	4-Nov-15 12:49:43	0.149	22.22

*File Display Window*

- To view your data as a graph, click the Graphing icon . Graphs will show the compensated pressure values. (Refer to the graphing section of the software instructions manuals for details on using graphing features.)
- To export your data to a comma separated value file or an Excel file, click the Export icon . Exports will show general file information and calibration values for both the original data file and the barometric file that was used to do the conversion. The data will be displayed in the following columns.

Rec#: Record number in the original data file

Date/Time: Date and time of sample from original data file

Pressure: Barometrically compensated pressure

Temperature: Temperature

Sensor Pressure: Pressure from the original data file (absolute pressure)

Barometric Date/Time: The time of the reading on the barometric file that was used on each line in the data file. If the barometric file being used does not have a reading within one hour of the date/time for a record in the data file, that record(s) will be displayed in red.

**Using the Microsoft® Excel to Convert Absolute Readings**

If you do not want to use the Barometric Conversion Utility, or if your pressure data is from a different INW smart pressure sensor, or if you are obtaining the barometric data from another device, you can use Microsoft® Excel, or any similar spreadsheet, to do the compensation.

Rec #	Date/Time	Temperature(degC)	Pressure(psi)	BaroMetric Pressure(psi)	Compensated Pressure(psi)
1	3/6/2015 8:19:03	23.56	35.301	14.745	20.556
2	3/6/2015 8:19:04	23.63	35.305	14.800	20.505
3	3/6/2015 8:19:05	23.56	35.200	14.750	20.450
4	3/6/2015 8:19:06	23.56	35.251	14.745	20.506
5	3/6/2015 8:19:07	23.63	35.301	14.800	20.501
6	3/6/2015 8:19:08	23.63	35.305	14.750	20.555
7	3/6/2015 8:19:09	23.63	35.200	14.745	20.455
8	3/6/2015 8:19:10	23.63	35.251	14.800	20.451
9	3/6/2015 8:19:11	23.63	35.301	14.750	20.551

*Using Excel to Compute Barometrically Compensated*

- Retrieve your data files, as usual, and export to Excel. (See the software manuals for details on retrieving and exporting data.)
- Open the Excel file. The original data from the sensors will display.
- Adjust as follows:
  - Add a new column and enter the barometric data corresponding to the records.
  - Add another new column and subtract the barometric column from the pressure to get the barometrically compensated pressure.

**Note:** On units with firmware lower than 2.0, the pressure channel will display first, followed by the temperature channel. On units with firmware 2.0 or higher, the temperature channel will display first.

**LIMITED WARRANTY/DISCLAIMER**  
**BaroSCOUT BAROMETRIC SENSOR**

A. Seller warrants that products manufactured by Seller when properly installed, shall be free from defects in material and workmanship. Seller's obligation under this warranty shall be limited to replacing or repairing the part or parts or, at Seller's option, the products which prove defective in material or workmanship within TWO (2) years from the date of delivery, provided that Buyer gives Seller prompt notice of any defect or failure and satisfactory proof thereof. Any defective part or parts must be returned to Seller's factory or to an authorized service center for inspection. Buyer will prepay all freight charges to return any products to Seller's factory, or any other repair facility designated by Seller. Seller will deliver replacements for defective products to Buyer (ground freight prepaid) to the destination provided in the original order. Products returned to Seller for which Seller provides replacement under this warranty shall become the property of Seller.

This limited warranty does not apply to lack of performance caused by abrasive materials, corrosion due to aggressive fluids, mishandling or misapplication. Seller's obligations under this warranty shall not apply to any product which (a) is normally consumed in operation, or (b) has a normal life inherently shorter than the warranty period stated herein.

In the event that equipment is altered or repaired by the Buyer without prior written approval by the Seller, all warranties are void. Equipment and accessories not manufactured by the Seller are warranted only to the extent of and by the original manufacturer's warranty.

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