

InnovaSonic® 207i

Ultrasonic Flow Meter for Liquids With Thermal Energy/BTU Capability Meter

Instruction Manual

Smart Interface Portal (SIP)



Part Number: IM-207SIP Version: C.6/19



GLOBAL SUPPORT LOCATIONS: WE ARE HERE TO HELP!

For Global Service Centers, go to http://www.sierrainstruments.com/facilities.html

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Warnings and Cautions

We use caution and warning statements throughout this manual to draw your attention to important information.

Symbol Key			
Symbol	Symbol Meaning	Descripition	
	Warning	"Warning" statements appear with information that is important to protect people and equipment from damage. Pay very close attention to all warnings that apply to your application. Failure to comply with these instructions may damage the meter and cause personal injury.	
!	Caution	"Caution" indicates that failure to comply with stated instructions may result in damage or faulty operation of the meter. Read and follow all cautions that apply to your application.	
(!)	Note	"Note" indicates that ignoring the relevant requirements or precautions may result in flow meter damage or malfunction.	

General Safety Information



- Consult the flow meter nameplate for specific flow meter approvals before any hazardous location installation.
- To avoid potential electric shock, follow National Electric Code or your local code when wiring this unit to a power source. Failure to do so could result in injury or death. All AC power connections must be in accordance with published CE directives. All wiring procedures must be performed with the power off.



- Calibration must be performed by qualified personnel. Sierra strongly recommends that you return your flow meter to the factory for calibration.
- In order to achieve accurate and repeatable performance, the flow meter must be installed with the specified minimum length of straight pipe upstream and downstream of the flow meter's sensor head.
- The AC wire insulation temperature rating must meet or exceed 85°C (185°F)

Receipt of System Components

When receiving a Sierra flow meter, carefully check the outside packing carton for damage incurred in shipment. If the carton is damaged, notify the local carrier and submit a report to the factory or distributor. Remove the packing slip and check that all ordered components are present. Make sure any spare parts or accessories are not discarded with the packing material. Do not return any equipment to the factory without first contacting Sierra Customer Service.

Technical Assistance

If you encounter a problem with your flow meter, review the configuration information for each step of the installation, operation, and setup procedures. Verify that your settings and adjustments are consistent with factory recommendations. Installation and troubleshooting information can be found in the InnovaSonic 207i Manual, Chapter 2 (Installation) and Chapter 4 (Troubleshooting).

If the problem persists after following the troubleshooting procedures outlined in the InnovaSonic 207i Instruction Manual, Chapter 4, contact Sierra Instruments by fax or by email (see inside front cover). For urgent phone support you may call (800) 866-0200 or (831) 373-0200 between 8:00 a.m. and 5:00 p.m. PST. In Europe, contact Sierra Instruments Europe at +31 72 5071400. In the Asia-Pacific region, contact Sierra Instruments Asia at +8621 5879 8521. When contacting Technical Support, make sure to include this information:

When contacting Technical Support, make sure to include this information:

- The flow range, serial number, and Sierra order number (all marked on the meter nameplate)
- The software version (visible at start up)
- The firmware version display (displayed at meter start up)
- The problem you are encountering and any corrective action taken
- Application information

Additional Resources

Visit Sierrainstruments.com for additional resources. Note: the most current versions of the iSeries documents can be found at <u>www.sierrainstruments.com/downloads/207i</u>.

Chapter 1 | Smart Interface Portal (SIP) Set Up and Installation

This manual provides information needed to install and operate the Smart Interface Portal (SIP) for the InnovaSonic 207i Liquid Flow Meter with Thermal Energy/BTU capability. For your reference, below is the SIP main screen with key functionality. Please note that the data displayed on the graphic below is for illustrating use only. Your data will differ. Please refer to the 207i Instruction manual for more details product installation <u>www.sierrainstruments.com/downloads/207i</u>.



Watch Video Tutorial – a video tutorial for this function is available on Sierra's website <u>www.sierrainstruments.com/207i-how-to</u> (installation) or <u>www.sierrainstruments.com/207iSIP</u> (SIP).



Figure 1. InnovaSonic Smart Interface Portal Home Screen



Figure 2. Transmitter Wall Mount with Pictured Transducers and Clamp-on RTDs (strain relief not included)

Installing Your Smart Interface Software (SIP)

System Requirements

Operation System: Windows The Ultrasonic 207i Sierra Smart Interface Portal is Windows Compatible.

Software & Firmware Updates

If your meter is connected to a computer with internet connection, notifications about SIP software or meter firmware updates will appear when you start your SIP. The notification will inform you if there is a software update to SIP itself or if newer firmware for the meter is available. You will have the option to install or ignore.

If you do not have internet capabilities, we recommend you periodically check this page (<u>www.sierrainstruments.com/downloads/207i</u>) for updates.

SIP Installation Steps Using USB Cable or RS-232

-	You must have internet in order to install the Smart Interface Program (SIP). If you do not have internet capabilities the meter will notify you it tried to connect, but wasn't able to. Sierra recommends you periodically check this page (<u>http://www.sierrainstruments.com/products/sip/sip-is.html</u>) for updates.
	Watch Video Tutorial – a video tutorial for this function is available on Sierra's website <u>www.sierrainstruments.com/207i-how-to</u> (installation) or <u>www.sierrainstruments.com/207iSIP</u> (SIP).

Connect your flow meter to your computer using the provided USB male to USB male cable (See Figure 3). Use the provided plug to install the USB to the terminal board (TB) as shown below, and then install power to the meter.

The USB functionally is the same as the RS-232 connection and uses a FTDI chip to emulate a RS-232 COM port connection. The USB connection is the USB "A" type connector so the cable to connect to a PC would be the "A" to "A" type.

Drivers for the internal FTDI chip should automatically load using Windows.

Configuration of COM setting and functions of these follow:

- Baud Rates; 38400
- Data bits 8, stop bits 1
- Parity; None



Figure 4. InnovaSonic 207i USB male to USB male cable



Figure 3. InnovaSonic 207i USB Connection

You may also use RS-232 to serial port connection.

The RS-232 connection is a simple 3-wire connection with no handshake connections (Tx, Rx, Gnd).

To download and install the SIP software:

- 1) Go to <u>http://www.sierrainstruments.com/products/sip/sip-is.html</u> and download the InnovaSonic 207i Smart Interface Portal (SIP) "InnovaSonic_SIP Setup" file.
- 2) Click on the **"InnovaSonic_SIP Setup.exe"** to begin downloading and let the program install the 207i SIP. This file is self-extracting.
- Follow instructions for installing the files.
 Process takes about 1-10 minutes total depending on speed of your computer.

If you have any questions about downloading the files please contact Sierra at: <u>techsupport@sierrainstruments.com</u>.

SIP Start-Up & Configuration

The Smart Interface Portal (SIP) allows the user to configure the unit and view all unit parameters.

- 1) Power up the meter and connect to the computer with the SIP installed via USB or RS-232 (See Figure 3 & 4 for meter USB connection).
- 2) Click on the InnovaSonic[®] 207i Sierra "S" Icon on your computer to start the program.
- 3) Use the dropdown menu to select and configure the appropriate Communications Port.



4) Once the port is selected, the meter data is read into the SIP program. It may take several seconds for all data fields to become populated. If you get an error, make sure you are connected to the correct Com port.

Chapter 2 | Overview of InnovaSonic Smart Interface Portal (SIP)

Once you open the Smart Interface Application (SIP) on your computer and enter in your Port Settings, you will see the SIP Main menu. The data fields on the Main Menu are ready only. All meter updates and adjustments are performed via the Applications or "Quick Keys" under the Meter Control Section. These functions are discussed in later sections. Note the "Website Downloads" in the upper right corner, this links to all technical data, the 207i manual and the quick start guide.

The various areas of the main screen are discussed below.



Figure 5. Overview of InnovaSonic Smart Interface Portal (SIP) Main Menu

Main Menu: Meter Data Section

The "Meter Data" section on the main menu displays the basic identifying information of the meter: PCA and Firmware versions, and the meter's serial. This information is read only (See Figure 6).



Figure 6. Meter Data Section on SIP Main Screen

Main Menu: Meter Display Section

The "Meter Display" section contains the primary meter output variables. Meter Display (Read Only) shows all the vital data in this section: flow units, energy units, flow rates, energy rates, totalized values, temperature input and output, status of your signal ("Healthy", "Signal Below Minimum" or "Good Signal"), and any alarms.



Figure 7. Meter Display Section on Main SIP

Main Menu: Meter Control Section

Meter Control contains the various applications that the 207i can support. They are also called "Quick Keys." This series of quick keys allow for rapid meter configuration like "Quick Start," "Meter Fit Setup," "EnergyPro Setup," "Validcal Diagnostics," "Sensor Signal Health," "Factory Default," "Master Display," "Master Setup," and "Exit."



Figure 8. Main Menu Meter Control Section

Main Menu: Port Selection

The "Port Selection" allows users to modify RS-232 or USB communications settings. The port is set up in the port settings menu.

Port:	COM11	▼ 0

Chapter 3 | Installation with the Smart Interface Portal (SIP) – Quick Start App

Making installation easier – "Quick Start App" via USB. There are two ways to ensure you are installing your meter correctly. You can either use the "Quick Start" menu on the local display or the "Quick Start App" on the 207i Smart Interface Portal (SIP) software. Using the SIP is recommended for easy setup. Instructions below are for SIP software.

SMART	ASONIC 207		
METER		site Downloads	Instruction Manual
O Row O E	nergy (i) Both	Quic	k Start Fit Setup
vi.80 Flow Serial Number 38.05 cf/m 67978.84 cf 67978.84 cf	Energy 278.03 Btu/s 614748.00 Btu	Energyl ValidCal Sensor Si	Pro Setup Diagnostics gnal Health
	Temp. In: 75.00 °F Temp. Out: 68.00 °F	Factory Master Maste	y Default ⁻ Display er Setup
Alarm	Sensor Status	E	xit
	SMART SMART METER O Row O E Flow 38.05 cf/m 67978.84 cf 7978.84 cf	Aum Serior Status OFF	Arm Sensor Status OFF GOOD SIGNAL

Figure 9. Accessing "Quick Start" menu from main SIP screen

	? ×
SIERRA SMART INTERFACE PORTAL	
Welcome to Quick Start! Follow this step-by-step process to set up your InnovaSonic 207i	flow meter.
Recomended Video: How to ins	tall the InnovaSonic 207i
Inglish O Metric	
Step 1 of 12 What is the outer diameter of the pipe in (inches)? A pipe schedule can be found here. Pipe Outer Diameter: 4.500 In Next Step ->	
	Close

Figure 10. Quick Start App Main Menu

The "Quick Start App" will lead you through the initial set up of the InnovaSonic 207i. There are 12 steps. Enter in the requested data and then select "Next Step."



Step 1 of 12: Pipe Outer Diameter

The first screen is the "Pipe Outer Diameter" setting. Enter the Pipe Outer Diameter of your pipe using numeric side of the keys. This is the actual outside diameter, not just the nominal size. Press the "Next Step" key to save and move to the next screen.

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SIERRA SMART INTERFACE PORTAL	Constanting Second
Welcome to Quick Start! Follow this step-by-step process to set up your InnovaSonic 207i flow me Recomended Video: <u>How to install the</u>	eter. InnovaSonic 207i
English	
Step 1 of 12 What is the outer diameter of the pipe in (inches)? A pipe schedule can be found here. Pipe Outer Diameter: 4.500 Inchest Step ->	
	Close

Step 2 of 12: Pipe Wall Thickness

"Pipe Wall Thickness" is the next setting. Enter the pipe wall thickness of your pipe using the numeric side of the keys. Press the "Next Step" button to go to the next screen or press "Previous," if you need to go back to previous screen.

				? >
S SIERRA	SMART INT		. L	Contraction of Contraction
Welcome to Quick Start	Follow this step-by-step pro	cess to set up your Inno	vaSonic 207i flow met	er. novaSonic 207i
	English	O Metric		
What is t	Step	2 of 12 s)? A pipe schedule can b	e found <u>here.</u>	
	Pipe Wall Thickness: 0.109	Next Step ->		
				Close

Step 3 of 12: Pipe Material

"Pipe Material" is the next setting. Using the pulldown menu, scroll to the pipe material of your pipe. If your pipe material is not on the list, chose other. You will need to enter the speed of sound of your pipe material. Press the "Next Step" to go to the next screen or press "Previous," if you need to go back to previous screen.

Recomended Video: <u>How to install the InnovaSonic 207i</u>	
Step 3 of 12 What is the pipe material? Pipe Material: Carbon Steel	Carbon Steel Carbon Steel Stainless Steel Cast Iron Ductile Iron Copper PVC Aluminium Asbestos Fiber Glass-Epoxy Other
Close	

Step 4 of 12: Liner Material

"Liner Material" is the next setting. Using the pulldown menu, select the liner material of your pipe. Press the "Next Step" to go to the next screen or press "Previous," if you need to go back to previous screen. If there is no pipe liner material, you can jump from Step 4 to Step 6 "Fluid Type."

		?	×	
	RFACE PORTAL	Month and And		
Welcome to Quick Start! Follow this step-by-step proce	ess to set up your InnovaSo	nic 207i flow meter.		
	Recomended Video: I	How to install the InnovaSonic 20	<u>207i</u>	
Inglish) Metric			
Step 4 If the pipe has a liner,	of 12 what is the material?		None	
Liner Material: Epoxy	~ ←		Cement	
<- Previous	Next Step ->			
		Clos	ose	

Step 5 of 12: Liner Thickness "Liner Thickness" is the next setting. Enter in thickness value then press the "Next Step" to go to the next screen or press "Previous," if you need to go back to previous screen.

5		? X
S SIERRA	QUICH START SMART INTERFACE PORT	
Welcome to Quick Start! Fol	low this step-by-step process to set up your Inn Recomended V	ovaSonic 207i flow meter. ideo: <u>How to install the InnovaSonic 207i</u>
	English Metric	
	Step 5 of 12 Enter the thickness of the line in inches Liner Thickness: 0.000 n <- Previous	
		Close

Step 6 of 12: Fluid Type

"Fluid Type" is the next setting. Using the pulldown menu, select the fluid you are measuring. Usually this is water, but there are lots of different fluids listed. After selecting the fluid, press the "Next Step" to go to the next screen or press "Previous," if you need to go back to previous screen.

SIERRA	QUICK START MART INTERFACE PORTAL		
Welcome to Quick Start! Follow thi	s step-by-step process to set up your InnovaSo Recomended Video: <u>H</u>	nic 207i flow meter. How to install the InnovaSonic 207i	Water ▼ Water Sea Water
Fluid Type:	Step 6 of 12 Select the fluid you will be measuring. Water		Kerosene Gasolene Fuel Oil Crude Oil Freon R134a Freon R22 Diesel Oil Castor Oil Peanut Oil Ethylene glycol Glycol/water 50% Alcohol Other
		Close	

Step 7 of 12: Fluid Temperature

"Fluid Temperature" is the next setting. Enter your approximate fluid temperature then press the "Next Step" to go to the next screen or press "Previous," if you need to go back to previous screen.

If the meter is fitted for temperature measurement, the actual measured values of temperature will be used, but enter temperature of the fluid in the pipe here (the temperature of the fluid where the **flow** measurement is being made).



	?
QUICH START SMART INTERFACE PORTA	L
ow this step-by-step process to set up your Innov Recomended Vid	raSonic 207i flow meter . eo: <u>How to install the InnovaSonic 20</u>
● English ○ Metric	
Step 7 of 12	erature, enter your best estimate.
F F <- Previous	
	OUTCH State SMART INTERFACE PORTA OW this step-by-step process to set up your Innov Recomended Vid

Step 8 of 12: Transducer Type

"Transducer Type" is the next setting. Using the pulldown menu choose the type of meter you have: "Standard," "High Temperature," etc. Your unit most likely was sent with a Memkey matched to the transducer that was sent with the unit.; the correct selection will be highlighted. Press the "Next Step" to go to the next screen or press "Previous," if you need to go back to previous screen.

SIERRA SIERRA SMART INTERFACE PORTAL	
Welcome to Quick Start! Follow this step-by-step process to set up your InnovaSonic 207i flow meter. Recomended Video: How to install the InnovaSonic 207i Image: Comparison of English Comparison of Metric	
Step 8 of 12 What type of ultrasonic transducers you are using? Note: Fluid temperature below 212F (100C) will use standard sensors and temperature above 212F (100C) will use high temperature sensors. Transducer Type: Standard	Standard Standard Hi Temp Other
<- Previous Next Step -> Close	

Step 9 of 12: Transducer Mounting Method

"Transducer Mounting" is the next setting. Using the pulldown menu select "V" indicating the "V" mounting method (see below). This is the easiest and most common mounting for smaller pipes. See Chapter 6 of the InnovaSonic 207i product manual for other options. Press the "Next Step" to go to the next screen or press "Previous," if you need to go back to previous screen.

3		? ×	
	JICH STAIT INTERFACE PORTAL		
Welcome to Quick Start! Follow this step-by-st	ep process to set up your InnovaSonic 207	î flow meter.	
	Recomended Video: <u>How to in</u>	nstall the InnovaSonic 207i	
@ Eng	Jish 🔿 Metric		
S What will the Transducer Mounting: V <- Previ	tep 9 of 12 transducer mounting configuration be? Learn More Next Step ->		✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
		Close	10

In most cases you will use the "V" setting. The "V Method" is considered as the standard method. It usually gives a more accurate reading and is used on pipe diameters ranging from 25mm to 400mm (1 inch to 16 inches) approximately. Also, it is convenient to use, but still requires proper installation of the transducer, contact on the pipe at the pipe's centerline and equal spacing on either side of the centerline.



Figure 11. V Installation Method

In big pipes you will use the "Z" Method. The signal transmitted in a "Z Method" installation has less attenuation than a signal transmitted with the "V Method." This is because the "Z Method" utilizes a directly transmitted (rather than reflected) signal which transverses the liquid only once. The "Z Method" is able to measure on pipe diameters ranging from approximately 100mm to 3000mm (4 inches to 120 inches). We recommend the "Z Method" for pipe diameters over 300mm (12 inches).



Figure 12. Z Installation Method

In small pipes use the "W Method." With the "W Method," the sound waves traverse the fluid four times and bounce three times off the pipe walls. It is suitable for very clean small pipes. The measurement accuracy can be improved by extending the transit distance with the "W Method" (uncommonly used). Because this method requires four passes, the signal needs a very clean small pipe to work. After four passes the signal can be very small.



Figure 13. W Installation Method

Step 10 of 12: Transducer Spacing

"Transducer Spacing" is the next setting. The meter will consider all the information you put in (Steps 1-9) and tell you how far apart to space your transducers. In this example, the sensor spacing is 2.63 inches apart. This is measured from "end to end" or "face to face".

The easiest way to install is to fix one sensor in place, then reference the measurement to the other sensor from there.

The meter tuning app and the quick start guide give instruction on how to "fine tune" sensor spacing. You can also use the MeterFit[™] app on your Smart Interface Portal (SIP) software. See Chapter 4 of this manual.

Press the "Next Step" to go to the next screen or press "Previous," if you need to go back to previous screen.

SIERRA'	QUIC Mart inti	Start ERFACE POR	TAL	? X
Welcome to Quick Start! Follow this	step-by-step pro	cess to set up your Ir Recomended	nnovaSonic 207i flow Video: <u>How to install t</u>	meter. ne InnovaSonic 207i
	English) Metric		
The recommended transducer the centerline of the pipe at the r Recommended S	Step spacing has been ecommended dis iensor Spacing: +2.6 <- Previous	10 of 12 calculated and is disp tance. 3in Next Step ->	layed below. Mount the	e transducers to
				Close

Step 11 of 12: Getting a Healthy Signal-Goal Posts

Once your transducers are close to the correct spacing, you will see the waveform of the returning ultrasonic signal on the display as above. You <u>may</u> need to move the transducers closer or further apart (but typically no more than a few inches). The easiest way is to leave one fixed in place and move the other one slowly towards it or away from it. Make sure to maintain a layer of ultrasonic gel between the transducer and the pipe as you move the transducer.

	?	×
SIERRA SMART INTERFACE PORTAL	reformer and	
Welcome to Quick Start! Follow this step-by-step process to set up your InnovaSonic 207i flow meter Recomended Video: <u>How to install the Inno</u>	r. <u>ovaSonic 2</u>	<u>207i</u>
English		
Step 11 of 12		
INSTRUCTIONS: Adjust optimal transducer spacing indicated when the arrow below is between the two vertical lines. The recommended TOM/TOS is 100% +/- 2%. TOM/TOS (shown right) is an indication of sensor spacing health. Healthy Signal	s "Goal Po	sts".
<- Previous Next Step ->	Clo	ose

You will see the waveform move across the screen as you adjust the spacing. It may take several seconds for the electronics to adjust as you move it, so don't rush it. Adjust the suggested spacing between the transducers to get the arrival marker between the goalposts *and* to get the TOM/TOS to 100% +/-2%. If all is well, you will see "Healthy Signal" during and after this process. Important: If you do not see a "Healthy Signal," return to step 1 and ensure the set-up is correct. If you do see a "Healthy Signal," press the "Next Step" to go to the next screen.

Step 12 of 12: Set Up is Complete

Congratulations, you should now be seeing the "Flow Rate," assuming there is flow, the pipe is full and there are minimum amounts of bubbles or particulates in the flow, and all quick start information is entered correctly. "Quality" should be >20%, while "TOM/TOS" should be 100 +/- 2%. If not, try tuning the signal again and check your set up parameters. If all is correct, click done and close.

S SIERRA	QUICH S SMART INTERFA	CE PORT	AL	markSon	?
Welcome to Quick Start! Follo	w this step-by-step process to	set up your In Recomended '	novaSonic 20 Video: <u>How to l</u>	7i flow meter.	Sonic 20
	English	Metric			
Cor	ngratulations! Setu	p is Com	plete		
The signal information to the right indic	Step 12 of 12	H	ealthy Si	gnal	
measured and overall quality of the signal to the signal t	gnal. The recommended	Flow Rate:	97.240	cf/m	
Note: Assure there is flow the pipe is f	full there are a minimal amounts	Quality:	24.8%		
of bubbles or particulate in the flow, and entered is correct. These variables m	ad all quick start information ay impact signal quality.	TOM/TOS:	100.2%		
<- Previ	ious Tune Signal Again	Learn more	Done		

Chapter 4 | MeterFit App

The "MeterFit" App may be used to quickly set up the sensor transducers for optimal measurement by more experienced users. This feature also provides a quick look at the sensor signal. For those unfamiliar with setup and tuning, it is recommended you do this through the "Quick Start" App.



Figure 14. MeterFit App Main Screen

MeterFit Installation Setup Steps:

- 1. Choose "Transducer Type" by selecting either "Standard" or "High Temperature."
- 2. Select your "Transducer Mounting" method using the pull down. Typically, "W," "V," or "Z" methods are chosen.
- 3. The recommended transducer spacing is calculated and shown in the "Spacing" field. Place transducers on the pipe and adjust to fine tune the signal.
- The number of signal passes is displayed. This is dependent on the signal mounting selected a. "W" is 4, "V" is 2, and "Z" is 1.
- 5. The quality of the signal is displayed. This should be >20%.

- 6. The "TOM/TOS" is displayed. This should be 100+/- 2% the meter flow rate is displayed
- 7. If all parameters are within spec, a "Healthy Signal" is displayed. If you do not see this, it is recommended to go through the "Quick Start App" and review the set up and signal tuning.

Chapter 5 | EnergyPro Setup App

The "EnergyPro Setup App" allows the user to configure the 207i for energy measurement. This set up is divided into three steps. Follow the three steps to complete the setup.



Watch Video Tutorial – a video tutorial for this function is available on Sierra's website <u>http://www.sierrainstruments.com/quickstart-app</u> ("EnergyPro Setup" 6:13 time stamp)

Step 1 of 3: EnergyPro Setup Basic Information

EnergyPro allows the user to configure the 207i for energy measurements. Follow the steps below to set up EnergyPro app.

Step 1: Set up the energy display, totalizer and methodology used to calculate energy and displays the variables used in the calculation. Select your energy measurement configuration and click "next steps" to continue.

ific He	eat Capa	S M A	RTINT	ERFACE PORTA	L	
Pro all	Energy (Calc. Method	energy me	asurement. Follow the three	ee steps to com	plete the setur
17			Step 1 c	of 3		
Energy	Calc. Method:	SHC	~	Energy Totalizer:	No	~
Specific I	Heat Capacity:	4.211	J/(g.K)	Energy Totalizer Reset:	No	Ý
	Inlet Enthalpy:	84.358	kJ/kg	Inlet Temperature:	-3.516663	degC
0	utiet Enthalpy:	Gias Jude	KJ/Kg	Outlet Temperature:	20.000000	degC
	Energy Units:	Giga Joure Sec	~	Fluid Pressure:	0.542	MPa
Energ	gy Time Units:					
		Up	date Moter	Next Step ->		

Figure 15. EnergyPro Setup Main Screen

Select parameters for energy configuration:

- 1. Select "Energy Calc. Method": The user is prompted to select the method to be used when making energy calculations from the dropdown menu: "SHS" (default), "Enthalpy," and "Enthalpy Direct."
- 2. Select "Specific Heat Capacity (SHC)": The user can enter a value for the "Specific Heat Capacity" of the fluid flowing in the pipe. Allowed values are ranged 0.0 to 10.0J/(g.K). The SHC (default) method requires specific heat value for the fluid. By default, this value is set to 4.2110 J (g.K) which is water at 68°F (20°C). However, other liquids can be used by entering their SHC at 68°F (20°C). To calculate energy (a value for flow rate), specific heat capacity, inlet temperature, and outlet temperature of the fluid are needed. Inlet temperature and outlet temperature can be obtained dynamically from PT100 probes or 4- 20mA temperature transmitters. See "Input/Output" menu for setup.

- 3. Select "Inlet Enthalpy": If the enthalpy direct method of energy calculation is selected, the user can enter a value for the enthalpy of the fluid flowing in the pipe at the pipe inlet. Allowed values are ranged 0.0 to 1000.0kj/kg, default 83.9kj/kg, water at 68°F (20°C). Otherwise, this value is dynamically updated during measurement using knowledge of "Inlet Temperature" and "Fluid Pressure."
- 4. Select "Outlet Enthalpy": If the enthalpy direct method of energy calculation is selected, the user can enter a value for the enthalpy of the fluid flowing in the pipe at the pipe outlet. Allowed values are 0.0 to 1000.0 kj/kg, default 83.9 kj/kg, water at 68°F (20°C). Otherwise this value is dynamically updated during measurement using knowledge of "Outlet Temperature" and "Fluid Pressure."
- 5. Select "Energy Units": Select the desired energy measurement units from the "Energy Units" dropdown menu (choices shown below).
 - Giga Joule (GJ) (Default)
 - Mega Joule (MJ)
 - Kilo Joule (kJ)
 - Kilo Calorie (kcal)
 - Million Btu (MMBtu)
 - Btu (Btu)
 - American Tons (Tons)
 - Metric (Tonnes)
 - Kilo Watt Hour (kWh)
- 6. **Select "Energy Time Units"**: Under "Energy Time Units" Select the time base from the dropdown menu (shown below).
 - \second
 - \minute
 - \hour (Default)
 - \day
- 7. Select "Energy Totalizer": Using "Energy Totalizer" turn the totalizer on or off by selecting "Yes" or "No." The default is "No."
- 8. Select "Energy Totalizer Reset": This feature resets the totalizer by selecting "Yes" or "No."

- 9. Select "Inlet Temperature": This value is the measured inlet temperature from the PT100. If there is no PT 100, this is the value the user entered for "Fluid Temperature." If this value is used, inlet and outlet temperature will be the same.
- 10. **Select "Outlet Temperature"**: This is value of the measured outlet temperature from the PT100. If there is no PT100, this is the value the user entered for fluid temperature. If this value is used, inlet and outlet temperature will be the same.
- 11. "Fluid Pressure": Pressure can be entered manually fixed (see below), or dynamic from a 4-20mA pressure transmitter, and 4-20 mA Input Module (see "Input/Output" section). The user can enter a value for the pressure of the fluid flowing in the pipe. Allowed values are ranged 0.1 to 1.0MPa, default 0.10325MPa. (1 Mega Pascal = 145.04 Psia)

Step 2 of 3 EnergyPro Setup -Choose Temperature Input Source

Step 2: Select the type of temperature inputs used. This may be PT100 RTD's or analog temperature transmitter inputs. Select your "Temperature Input Source" and hit "Next Step" to move to the next setup window.

sierra	EnergyPro [™] Setup smart interface portal
EnergyPro allows the user to co	nfigure the 207i for energy measurement. Follow the three steps to complete the setup. Step 2 of 3 Temperature input Source O PT100 Sensor O 4-20 mA input <- Previous
	Close

Figure 16. EnergyPro Temperature Input Source

Step 3 of 3: EnergyPro Setup- Configure the PT100

Step 3: Set up the PT100 and select measuring parameters.

5) sier	IRA'	Ene smar	rou T INT	PIO ™ erfac	Setup e portal
nergyPro allow	s the user to configu	re the 207i for	energy me	easuremen	t. Follow the three steps to complete the setup.
PT100 Sensor S	lot 10		Step	o 3 of 3	2
Off/On/Tes	t PT100 Source:	Dynamic	Offset	Value	P1100 lest
PT100 Sensor	lot 11		0.000		20.00 1
Off/On/Tes	t PT100 Source:	Dynamic	Offset	Value	PT100 Test
On ~	Temp Inlet	/ Dynamic v	0.000	20.000	68.00 *F
		<- F	Previous	Updat	te Meter

Figure 17. EnergyPro PT100 Configuration

Select Parameters for PT100 Sensor Input

1. Select the "PT100 Source" in the dropdown.

- "Temp Inlet": The temperature of the upstream fluid.
- "Temp Outlet": The temperature of the downstream fluid.
- "Temp Pipe": The outside temperature of the pipe at the transducers.
- "Temp Inlet Plus Temp Pipe": Assumes the temp pipe is the same as the "Temp Inlet."
- "Temp Outlet Plus Temp Pipe": Assumes the temp pipe is the same as the "Temp Outlet."
2. Select "Dynamic" values. "Dynamic" values are actually measured or "fixed' user inputs.

Step 1. You select "Dynamic." If you have an "Offset," enter the value in the box "Offset" text box.

Step 2. If you select "fixed," enter the values in the "value" text box.

For an Analog Temperature Input:



S sieri	RA	, S		PION PIO	[™] Setup ace portal		
i nergyPro allows t	he use	er to configure the 2	207i fo	or energy measurer	nent. Follow the three	steps to complet	e the setup.
Slot 8, 4-20mA Input Off/On/Test		Input Source		Input Units	Input Span	Span Lower Value	Span Upper Value
On	~	Temp Inlet	~	degF ~	0-20mA ~	0.000	100.000
Hinput Adjustment:	52428	B 🔶			Current IP Test Reading:		
Slot 9, 4-20mA Input Off/On/Test		Input Source		Input Units	Input Span	Span Lower Value	Span Upper Value
On	~	Temp Inlet	~	degF 🗸	0-20mA ~	0.000	100.000
Hinput Adjustment:	52428	8			Current IP Test Reading:		
		[<-	- Previous Up Close	idate Meter		

- 1. Select the parameters for the "Input Source." Dropdown options are:
 - "Temp Inlet": The temperature of the upstream fluid.
 - "Temp Outlet": The temperature of the downstream fluid.

- "Temp Pipe": The outside temperature of the pipe at the transducers.
- "Temp Inlet Plus Temp Pipe": Assumes the temp pipe is the same as the "Temp Inlet."
- "Temp Outlet Plus Temp Pipe": Assumes the temp pipe is the same as the "Temp Outlet."
- "Pressure": Input from a pressure transducer
- "Density": Input from a density meter
- "A1 Batch": Current input
- o "A2 Batch": current input
- 2. Select the "Input units" in the drop down.

The "Temperature" choices are:

- o degC
- \circ degF
- 0 K
- o R

The "Pressure" dropdown choices are:

- o Psi G
- o Psi A
- o Bar G
- o Bar A

The "Density" dropdown choices are:

- o kg/m3
- o g/cc
- o kg/l
- o Lbs/ft3
- 3. For "AI1," "A12" Batch: The "Batching" function allows the user start and stop a totalizing process. For example, a PLC could send a 4-20mA signal to the 207i to start counting the batch at the same time it starts a pump. Once the target amount has been reached, the "Relay" on the 207i could signal the PLC to stop the pump.

Select thru span of the incoming current singal, then select the values that represent 0/4 and 20 $\rm mA$

Span

- o 0..20mA
- 4..20mA

Then

• Lower Value/Upper Value

Chapter 6 | ValidCal Diagnostics

"Validcal Diagnostics" runs a series of automatic tests on the meter hardware. This allows the user to see a display of diagnostic status of various microprocessor, memory and I/O board slots. "I/O slots" 1-5 are fixed and located on the Mainboard. Slots 6-13 are optional card slots. Below is a display of the standard I/O configuration, plus a "Modbus RTU SLAVE" card in Slot 12. Card slot 13 is not being used and is displayed as "N/A" which is an empty slot. Each item is given a simple Pass/Fail indication.

SMA	RT INTERFAC	E PORTAL	Inneration Section And
Cal Diagnostics			
s tool to run a series of tests to diagnose me	iter overall health, micro	processor status, memory, and	l I/O slots.
	HARDWARE VALIDA	TION	Learn More
Slot 1 FIXED RELAY OUT	2	Slot 8 Current Input	2
Slot 2 FIXED OCT OUT	2	Slot 9 Current Input	2
Slot 3 FIXED lout1	2	Slot 10 PT100 4 Wire	2
Slot 4 FIXED lout2	2	Slot 11 PT100 4 Wire	M
Slot 5 FIXED lout3	U	Slot 12 Modbus RTU Slave	1
Slot 6 Ultrasonic	2	Slot 13 Empty Slot	N/A
Slot 7 Empty Slot	N/A		
	10-		

Figure 18. ValidCal Diagnostics Main Screen

Chapter 7 | Sensor Signal Health

The "Sensor Signal Info" is all about the ultrasonic signal and the related flow measurement. It is **read only**. The units will be in English or metric depending on what the user has selected.

5) sier	RA'	Sensor Smart in	S			Married States
ensor Signal Inf	o is a READ ONLY	Y listing of all ultrasor	iic signa	al and flow measurer	nent information.	Learn M
Flow Rate:	.145 54	cf/h		Delta Time:	2 500ps	
Flow Velocity:	-0.13	m/s		Transit Time:	157.42	us
Signal:	14.45	dB		Round Trip:	172.300	
Quality:	22.48	%		dT Offset:	0.000	ns
Noise:	-8.03	dB		Speed of Sound:	10518.373	ft/s
TOM/TOS:	100.0%			Reynold's Number:	13920	I L
Gain:	63.00	%		Profile Correction:	0.941	
Transducer Type:	Standard			Raw Flow:	-0.126	m/s
Transducer Passes:	2			Corrected Flow:	-0.13	m/s
			Close			

Figure 19. Sensor Signal Health Screen

Overall, signal status is displayed as "Healthy Signal" or "Signal Below Minimum." If the signal is below minimum, it is recommended to check flowing conditions (i.e. Is there flow?), then set up, then meter tuning.

Below are descriptions for each read only field found on the Sensors Signal Health menu screen.

- "Flow Rate": Volumetric flow rate is selected units.
- "Flow Velocity": Velocity of the fluid in selected units.
- "Signal Strength": "Amplitude/Gain" of the ultrasonic signal in decibels.
- "Signal Quality": Shape of the ultrasonic waveform as compared to an ideal pulse. It should be >20%.
- "Noise": Signal to Noise ratio
- "TOM/TOS": Theoretical verses actual time of flight of the ultrasonic signal
- "Gain": Amount the raw ultrasonic signal has been amplified
- "Transducer Type": Standard or high temp
- "Transducer Passes": Number of transits. Depends on mounting method.
- "Delta Time": Time differential between upstream and downstream signals.
- "Transit Time": Time for pulse to be transmitted to received.
- "Round Trip": Total time for pulse to transmit, bounce off pipe wall, and be received.
- "dT Offset": A manual offset to transit time that may be entered to offset sensor variability.
- "Speed of Sound": Speed of sound through the measured fluid.
- "Reynolds Number": The calculated Reynold's number.
- "Flow Profile": The calculated flow profile factor.
- "Raw Flow": Flow without Re correction.
- "Corrected Flow": Flow with Re correction.



In-depth explanations of each of the above variables can be found in the InnovaSonic 207i Instruction Manual.

Chapter 8 | Factory Defaults

Factory Defaults		?	×
S SIERRA	Factory Defaults SMART INTERFACE PORTAL	A CONTRACTOR OF	SIERAAA
	Factory Defaults will return all settings to factory conditions.		
	O Reset Meter to Factory Defaults		
	Close		

Figure 20. Factory Defaults App

"Factory Defaults" returns all settings to factory conditions. Use this only when you are promoted to reload "Factory Defaults" and return the meter to its factory configuration.

When you select **"Reset Meter to Factory Defaults," a**ll parameters including "Input/Output" settings, "RS-232/USB," and "Datalogger" can be reset to factory defaults.

When you chose reset "Factory Defaults," the following is reset:

- "Display" contrast is reset to the factory default.
- "Tag" and "Identifier" strings are reset to factory values.
- "Key Code" (password) is not defaulted.
- This does not affect datalogger memory. Data is not erased.
- "Totalizers" are reset to zero.
- Saved setups are not affected.
- By default, the "Factory Reset" is not active.
- o "Load/Save" Setups Menu

This menu allows the user to save, load and delete up to 10-meter configurations for different applications.

Save Configuration: A list of 10 available configuration spaces is displayed by name. Empty spaces are shown as:

- Scroll through the list of names.
- Select a configuration space to write to or to quit.
- Enter a unique "Tag" and then "Identifier," press
- A complete mirror image copy of all meter parameters is saved to memory.

Load Configurations: A list of 10 available configuration spaces is displayed by name. Empty spaces are shown as *BLANK*.

- Scroll through the list.
- Select a configuration space to load or to quit.
- All meter parameters are over written with the stored configuration read from memory.

Delete Option: A list of 10 available configuration spaces is displayed by name. Empty spaces are already shown as *BLANK*.

- Scroll through the list.
- Select a configuration space to delete or to quit.
- The configuration is deleted and the displayed configuration name (Tag) is changed to *BLANK*.

Chapter 9 | Master Display

		Master	Uisplai		www.soutcent
	SI	MART INTER	FACE PORT	Ă.L	
ster Display summ	iarizes all measure	d variables in one pla	ace. This screen is Rf	EAD ONLY.	Learn
Flow Rate:	97.80	cf/m	Energy Rate:	0.00	GJ/s
Flow Velocity:	5.05	m/s	Net Energy Total:	0.00	GJ
Net Flow Totalizer:	12941.56	cf	Pos Energy Total:	0.00	GJ
Pos Flow Totalizer:	12941.56	cf	Neg Energy Total:	0.00	GJ
Neg Flow Totalizer:	0.00	cf	Temp In:	68.00	۴F
Current Period Totalizer:	2050.67	cf	Temp Comp.:	29.50	degC
Last Period Totalizer:	5870.32	cf	Temp out:	68.00	۴
Period Totalizer Interval:	Daily		Enthalpy In:	83.94	kJ/kg
			Enthalpy Out:	83.94	kJ/kg

Figure 21. Master Display App

The "Master Display" summarizes all measured variables in one place. It is read only. The units will be in English or metric as the user has selected.

Below are descriptions for each field found/ displayed on the "Master Display" menu screen:

- "Flow Rate": Instantaneous flow rate
- "Flow Velocity": Instantaneous flow velocity
- "Net Flow Totalizer": Totalized flow. The sum of upstream and downstream flow. Totalizers can be configured and reset from the Totalizer Setup app
- "Flow Totalizer": Flow in the downstream direction
- "Neg Flow Totalizer": Flow in the upstream direction

- "Period Totalizer Interval": Period over which flow is totalized (hourly, daily, etc.)
- "Current Period Totalizer": Current accumulated flow total
- "Last Period Totalizer": Last period's accumulated flow total
- "Energy Rate": Instantaneous Energy rate
- "Energy Total": Totalized Energy
- "Temp In": Inlet Fluid Temperature
- "Temp Out": Outlet Fluid Temperature
- "Temp Ambient": temperature in the surrounding space
- "Pressure Fluid": Pressure in the pipe
- "Enthalpy In": Energy content of the inlet fluid
- "Enthalpy Out": Energy Content of the outlet fluid

Chapter 10 | Master Setup

SIEF	S M.	Master Se	
	Ruid & Pipe	Configure Input/Output	Digital I/O & Batching
	Pipe Setup	Relay Output Setup	Data Logger / Setup
	Fluid & Flow Rate Setup	OCT Output Setup	Meter RS-232/USB
	Flow Totalizer Setup	4-20mA Analog Output Setup	Modbus RTU Setup
	Energy Setup	Tuning & Display	BACnet MS/TP Setup
	EnergyPro Setup	Meter Tuning	Save/Reflash Meter
	PT100 Setup	Meter Display Setup	Flow Batching
	4-20mA Analog Input Setup	MeterFit Setup	

Figure 22. Master Setup App

The "Master Setup" screen allows users to easily access of all the user setup screens. Simply click on the button to go to the desired setup menu. Note: BACnet MS/TP is grayed out, because it is not installed. If the BACnet was installed instead, the Modbus RTU Setup would be grayed out.

Chapter 11 | Pipe Setup

The "Pipe Setup" App is used to set up the pipe in detail.

	Je Se nterfa	CE PORTAL		Transformer 201	X
The Pipe Setup app is an optional menu allowing greater	pipe detail to	be entered to fine tun <u>Pipe Schedule</u>	e the flow rate cal	culation.	
Pipe Outer Perimeter:	14.137	lin			
Pipe Outer Diameter:	4.500	in			
Pipe Wall Thickness:	0.126	in			
Pipe Inner Diameter:	4.248	in			
Pipe Material:	PVC	~			
Pipe Roughness:	0.000	in			
Pipe Sound Velocity:	7874.016	ft/s			
Liner Material:	None	~			
Liner Thickness:	0.000	in			
Liner Sound Velocity:	0.000	ft/s			
Update Me	ter	Close			

Figure 23. Pipe Setup App

Below are descriptions for each field found in the "Pipe Setup menu:

- **Pipe Outer Perimeter**: Enter the Perimeter (circumference) of your pipe. You can use a tape measure to get this. Make sure you enter with the correct units. Note you must enter either the perimeter here or the outer diameter below. The Pipe Setup app can calculate one if it knows the other.
- **Pipe Outer Diameter:** Enter the outside diameter of your pipe. This is the actual outside diameter, not just the nominal size. Make sure you enter with the correct units. You can look this up, if you know the "schedule" of your pipe (for example ANSI Schedule 40). Schedule tables are available in the InnovaSonic 207i Instruction Manual. Note you must enter either the outer

diameter here or the outer perimeter above. The "Pipe Setup" App can calculate one if it knows the other.

- **Pipe Wall Thickness**: Enter the "Pipe Wall Thickness" of your pipe. Make sure you enter with the correct units. You can look this up if you know the "schedule" of your pipe (for example ANSI Schedule 40). Schedule tables are available in the InnovaSonic 207i Instruction Manual. Note you must enter either the wall thickness d here or the inner diameter below. The "Pipe Setup" App can calculate one if it knows the other.
- **Pipe Inner Diameter:** Enter the inner diameter of your pipe. This is the actual inner diameter, not just the nominal size. Make sure you enter with the correct units. You can look this up if you know the "schedule" of your pipe (for example ANSI Schedule 40). Schedule tables are available in the InnovaSonic 207i Instruction Manual. Note you must enter either the inner diameter here or the "Pipe Wall Thickness" above. The "Pipe Setup" App can calculate one if it knows the other.
- **Pipe Material:** Use the dropdown menu to select the material of your pipe. If your "Pipe Material" is not on the list, chose other. You will then need to enter the speed of sound of your pipe.
- **Pipe Roughness:** Absolute "Pipe Roughness" is a measure of pipe wall irregularities of commercial pipes. The absolute roughness has dimensions of height and is usually expressed in millimeter (mm) or inches (in). The Pipe Setup app will use common engineering values based on the pipe material unless you enter a value.
- **Pipe Sound Velocity:** This will be one of two things: 1) the speed of sound (SOS) through the "Pipe Material" as chosen in the dropdown menu or 2) if "Other" was selected, you will need to enter the value of the SOS for the pipe material you are using.
- Liner Material: Use the dropdown menu to select the "Liner Material" of your pipe, if your pipe has a liner (most pipes don't have a liner). In that case select none.
- Liner Thickness: If a "Liner Material" was selected enter the "Liner Thickness. If there is no liner, this value will remain at zero.
- Liner Sound velocity: This will be one of two things: 1) the speed of sound (SOS) through the pipe liner material as chosen in the dropdown menu or 2) if "other" was selected, you will need to enter the value of the SOS for the liner material you are using.

Chapter 12 | Fluid & Flow Rate Setup

The "Fluid & Flow Rate Setup" app allows you to set up the fluid and units, plus the fluid temperature.

SIERRA FILID & F	NTERFACE PORTAL
The Fluid & Flow Rate Setup app allows you to set the f	luid type, engineering units, and fluid temperature.
Fluid Type: Flow Rate Units: Flow Rate Time Units: Fluid Temperature:	Water Cubic Feet Min 68.000 F
Update Met	ler Close

Figure 24. Fluid & Flow Rate Setup

- Fluid Type: Use the dropdown menu to select your fluid. If you don't see your fluid, select "Other." You will then need to know the speed of sound and enter it.
- **Speed of sound:** If a fluid has been selected, the speed of sound at the entered or measured speed of sound will be displayed. If "Other," you will need to enter the speed of sound here.
- Flow Rate Units: Use the dropdown menu to select your "Flow Rate Units." Cubic Meters (m3) is the default value.
 - o Liters (1)
 - o USA Gallons (GAL)
 - Imperial Gallons (Imp gal)
 - Million Gallons (mg)
 - Cubic Feet (cf)
 - o USA Barrels (US bbl)
 - Imperial Barrels (Imp bbl)

- Oil Barrels (Oil bbl)
- Flow Rate Time Units: Use the dropdown menu to select your flow rate time base
 - \circ \second
 - o ∖minute
 - \circ \hour (Default)
 - o ∖day
- **Fluid Temperature:** Enter the temperature of the fluid in the pipe. If the meter is fitted for temperature measurement, the actual measured values of temperature will be used, but enter the base line temperature of the fluid in the pipe here.

Chapter 13 | Flow Totalizer Setup

			ocinh	The second second second
	SMART IN	TERFACE F	PORTAL	emer
e Flow Totalizer Setu	p app allows you to customize the	many flow and ene	ergy totalizers available	with the 207i.
	F - FF J			
	Totalizer Units:	Cubic Feet	~	
	Net Flow Totalizer:	No	~	
	Pos Flow Totalizer:	No	~	
	Neg Flow Totalizer:	No	~	
	Flow Totalizer Reset:	None	~	
	Period Totalizer Interval	Daily	~	
	Energy Totalizer:	No	~	
	Energy Totalizer: Energy Totalizer Reset:	No No	~	

Figure 25. Flow Totalizer Setup App

The "Flow Totalizer Setup" app allows users to customize their flow totalizers.

- Flow Totalizer Units: Set the desired flow totalizer units from the drop down menu (choices below).
 - Cubic Meters (m3) (Default)
 - o Liters (1)
 - o USA Gallons (GAL)
 - Imperial Gallons (Imp gal)
 - o Million Gallons (mg)
 - Cubic Feet (cf)
 - o USA Barrels (US bbl)
 - Imperial Barrels (Imp bbl)
 - o Oil Barrels (Oil bbl)

- Net, Pos and Neg Flow Totalizer: Under "Net," "Pos," or "Neg Flow Totalizer" menus, select "Yes" to activate or "No" to deactivate. Default value is "No" for all three menus. Net is the sum of upstream and downstream flow. Downstream is positive and upstream is negative.
- Flow Totalizer Reset: Under "Flow Totalizer Reset," the user can reset (zero) flow totalizers by selecting from a dropdown list: "None," all "Net," "Pos," or "Neg"
- **Period Totalizer Interval:** "Period Totalizer Interval" allows time value selected by the user to automatically reset (zero) the totalizer. To use this function, select one of the following time periods to totalize: "Minute," "Hourly," "Daily." The 207i displays the total recorded in the previous period on line 2 and the current value being accumulated in the present period on line 1.

Chapter 14 | Meter Tuning

The "Meter Tuning" app allows users to fine tune the flow reading to the specific application.

S SIERRA'	Meter Tuning smart interface portal	?	
The Meter Tuning App allows you to t	Ine tune the flow reading to your specific application. Low Flow Cutoff: 0.025 m/s Profile Correction: Yes ✓ Manual Zero Offset: 5.000 m/s User Scale Factor: 1.000 Set Zero Calibration: Yes ✓ Zero Tracking: OFF ✓ Update Meter Close		

Figure 26. Meter Tuning

- Low Flow Cutoff Value: Enter the desired low flow cut-off value in m/s. "Low Flow Cutoff Value" is typically set around .025 m/s. Velocities below this value are forced to zero.
- **Reynold's Correction:** "Correct Flow" turns on/off the Reynolds correction. Default is set on "On." When turned "On," the meter measurements are corrected for flow profile using Reynolds Number and pipe wall internal roughness values. The ability to turn flow "Profile Correction" "Off" is useful for benchmarking different types and makes of flowmeters where the sophistication of the manufacturers' correction algorithms can lead to different results.
- **Manual Zero Offset:** "Manual Zero Offset" is a manual zero offset method that is not commonly used. It is only suitable for experienced operators to set zero flow velocity in m/s under conditions when it is not preferable to use other methods. Enter the flow velocity value manually

to add to the measured value to obtain the actual value. Allowed values are ranged -30.0 to +30.0 m/s, default 0.0 m/s.

- **Manual Scaling Factor:** This factor is used to adjust the flow readings to match a known reading. Only use this feature if the actual flow readings are known. The default value is 1.000 which means no change to the factory calibration.
- Set Zero Calibration: This should only be used with zero flow in the full pipe. Set to "No" for

normal operation. Set to "Yes" to zero the meter. After you enter "Yes," press the space 2 key then press to start the zero-averaging process. After it is done, it will go back to "Set

Zero Calibration".

• **Zero Tracking:** This is a type of automatic zeroing function. When "Yes" is selected, the meter will start setting a new zero, but only while the velocity is insignificant. Default is "On." When measuring extremely low flows, the meter can mistakenly identify a flow from, for example, a real leak as an erroneous zero offset. To avoid the leak being zeroed out, turn "Zero Tracking" to "Off."

Chapter 15 | Meter Display Setup

The "Meter Display App" allows users to format the display to their specifications.

	SMA				DIVID SERVIC BUT
	5 M F		ERFACE PO	ORTAL	-
Meter D	isplay Setup allows y	ou to format th	e display to your e	exact specifications.	
System D	isplay		System Information	n	2
	Date: 01/10/00		Password:	1234	
6	Time: 22:34:14		System Lock:	No 🗸	
Date Fo	ormat: mm/dd/yy	~	Decimal Places:	2	
Lang	uage: English	~	Damping:	10.000 s	
LCD B	acklit: Yes	~	Model Code:	207i - v1.46	
В	uzzer: No	~	Serial Number:	123456	
	Tag: TAG		HW Issue:	v1.00	
Ider	tifier: IDENT		SW Issue:	v1.46	
	L				

Figure 27. Meter Display App

System Display

Below are descriptions for each field found under the System Display section.

- Date: To adjust the "Date," type in the current date and press "Save."
- Time: To adjust the "Time," type in the current time and press "Save."
- **Date Format:** Select the date format you want by choosing between dd/mm/yy, mm/dd/yy, and yy/mm/dd date formats.
- Language: To select a different language, chose value from list and press "Enter."
- LCD Backlit: You can have the" LCD Backlit" by choosing either "Yes" or "No" and press "Enter."
- Buzzer: Turn the buzzer on or off by choosing either "Yes" or "No" and then press "Enter."
- **Tag:** Enter in your tag by typing value and press "Enter."
- Identifier: Type value of the "Identifier" and press "Enter."

System Information

Below are descriptions for each field found under the System Information section.

- **Decimal Places:** There are two decimal places by default (0-3 accepted).
- **Damping:** Under the "Damping" menu, the user is prompted to enter a display damping/averaging time for flow. This is separate to subsequent "Input/Output" damping which is set elsewhere (see "Input/Output" section). Allowed values are ranged 1 to 255s, default 10s. The damping time can be adjusted to stabilize the flow display. Increasing the damping increases the stability. However, the measurement displayed can be slightly delayed due to over damping. Too much damping may also result in no response to real time fluctuations, especially when flow rate fluctuates wildly. Therefore, damping should be kept at a minimum and increased just enough to reduce the fluctuation to an acceptable degree.
- **Password:** Type password and press Save
- System Lock: Chose "Yes" or "No" to lock system and press "Enter."
- Model Code: Shows the model of the meter. Serial Number: Shows the "Serial Number" of the meter
- **HW Issue:** "HW Issue" shows the version of the hardware.
- SW Issue: "SW Issue" shows the current version of the software.

Chapter 16 | Relay Output Setup

The 207i is equipped with one relay output that has both Normally Open (N.O.) and Normally Closed (N.C.) connections. Both may be used at the same time. The relays are rated for 250V AC or DC at 120 mA Max

The "Relay Output" can be used to set up a relay to remotely activate another device (opening and closing a valve for instance). The "Relay Output Setup" App allows this relay to be configured for a variety of functions.

sierra	Relay (smart in	UTPUT SU TERFACE PO	2 TUD RTAL	
The Relay Output Setup app allow Note: With this app you can set up a re	vs relay configuration for elay to remotely activate	a variety of functions. another device (openi	ng and closing a valv	e for example).
	Relay Output: Slot 1			
	Relay Status:	Off	~	
	Configure Relay Output:	Alam		
	Configure Alarm Type:	Low Signal	~	
	On Point:	50.000		
	Off Point:	25.000		
	Configure Pulse Source:	Net		
	Unit per Pulse:	100.000		
	Pulse Width:	30		
	Update Mete	Close		

Figure 28. Relay Output Setup

- 1. Relay Status: Turn the relay "on" or "off." You can also select "Test" to check relay operation.
- 2. Configure Relay Output: Determines what measurement will activate the relay. Below are the choices.
 - Alarm: Relay activates on a certain alarm
 - Pulse: Relay opens and closes with the associated totalizer
 - Frequency: Relay opens and closes with flow rate
 - Batch: Relay opens and closes once a certain flow has accumulated

- **3.** Configure Alarm Type: If "Alarm" is selected, the "Configure Alarm Type" shows the type of alarm the meter will give. Choices of alarm types below.
 - Low Signal
 - Not Ready
 - System
 - Velocity
 - Rate
 - Energy
- **4. On Point/Off Point:** If "Velocity," "Rate," or "Energy" is selected, at what reading does the alarm turn on and off?
 - On Point (enter value for the alarm to turn on)
 - Off Point (enter value for the alarm to turn off)
- **5.** Configure Relay Pulse Source: If Pulse is selected, for what totalizer do you want the relay to track?
 - Net
 - Pos
 - Neg
 - Energy
- 6. Unit Per Pulse/Pulse Width: If "Pulse" is selected, how much do you want to accumulate before the relay activates and how long do you want the relay to remain activated?
 - Step (enter the units per pulse)
 - Duration (enter the pulse width in ms)
- 7. If "Batch" is selected, at what accumulation do you want the relay to activate? This value is set up in the Batch Output Setup" app.

Chapter 17 | OCT Output Setup

The 207i is equipped with one opto-isolated OCT (Open Collector Transistor) output. This OCT output has many of the same functions of the relay output but can also be operated at speeds up to 10 KHz and can be used as a frequency output.

S SIERRA SMART I	U TPUT Set NTERFACE POR	TAL	
The OCT Output Setup app allows relay configuration for Note: With this app you can set up a relay to remotely activated activation of the setup act	a variety of functions. te another device (opening) and closing a valve for exa	mple).
Relay Output: Slot 1			
Relay Status	Off	~	
Configure Relay Output	Alam	~	
Configure Alarm Type	Low Signal	~	
On Point	50.000		
Off Point	25.000		
Configure Pulse Source	: Net		
Unit per Pulse	100.000		
Pulse Width	: 30		
Update Met	er Close		

Figure 29. OCT Output Setup

- 1. Pulse Output Status: Turn the pulse on or off. You can also select test to check pulse operation.
- 2. Configure Pulse Output: Determine what measurement will activate the pulse:
 - Alarm: Pulse activates on a certain alarm
 - Pulse: Pulse opens and closes with the associated totalizer
 - Frequency: Pulses with velocity, flow or energy rate
 - Batch: pulses once a certain flow has accumulated
- 3. Configure Alarm Type: If "Alarm" is selected, what is the alarm? Below are the choices.
 - Low Signal
 - Not Ready
 - System
 - Flow Velocity
 - Flow Rate

- Energy
- **4. On Point/Off Point:** If "Velocity," "Flow Rate" or "Energy" is selected, at what reading does the alarm turn on and off?
 - On Point (enter value for the alarm to turn on)
 - Off Point (enter value for the alarm to turn off)
- **5.** Configure Pulse Source: If "Pulse" is selected, for what totalizer do you want the pulse to track? Below are the choices for this field.
 - Net
 - Pos
 - Neg
 - Energy
- 6. Unit Per Pulse/Pulse Width: If Pulse is selected, how much do you want to accumulate before the relay activates and how long do you want the relay to remain activated? Below are the choices for this field.
 - Step (enter the units per pulse)
 - Duration (enter the pulse width in ms)
- 7. If Frequency is selected, what do you want to monitor? Below are the choices for this field .
 - Flow Velocity
 - Flow Rate
 - Energy
- 8. What is the lower value, upper value and damping?
 - Set a lower value for the pulse to turn on
 - Set an upper limit for the pulse to turn off
 - Set a value for the damping in seconds

Chapter 18 | Analog Output Setup

There are three analog current outputs available in the "Analog Output Setup" app. The may be used for flow velocity, flow rate and flow energy. The "Analog Output Setup" app allows these outputs to be configured and tested.

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				aluy	UUI	hni	JEII	μ	Interior Social State
			S	MART	INTERF	ACE	PORTAI		
There are thre	e analog output S	curren	it outputs av	ailable on th hese output	ne 207i that ca s to be confic	an be use gured and	d for flow ve I tested.	locity, flow rate	e, and flow energy.
3					•	,			
	Off/On/	Test	Source	4mA	20mA	Dampi	ng Em	or	Current OP Test
Current Out 1:	On	~	Rate	~ 0.000	100.000	10	Hold	~ 60	4mA, 12mA, 20mA
Adjustment 4mA:	11055	+	Update Me	iter Adj	ustment 20mA:	54612	Upda	ste Meter	
Current Out 2:	On	~	Velocity	~ 0.000	100.000	10	Hold	~ 60	
Adjustment 4m.A:	11055	٤	Update Me	ter Adj	ustment 20mA:	5 <mark>4</mark> 612	Upda	ste Meter	
Current Out 3:	On	~	Energy	~ 0.000	100.000	10	Hold	~ 60	
	11055	-	Update Me	iter Adj	ustment 20mA:	54612	Upda	ate Meter	
Adjustment 4mA:									

Figure 30. Analog Output Setup

- 1. Turn the current output on, off or test.
- 2. Set up the output source: flow velocity, flow rate and flow energy.
- 3. Set the" 4mA" value and the "20mA" value.
- 4. Set the "Damping" value in seconds.
- 5. Set the "Error" signal output. It will hold at present value for a given time, then go to an "Error" signal value. Select the Error signal behaviour below.

- Hold (holds last value for Hold time, then drops to 4.00 mA.)
- 3.8mA/Off (holds last value for Hold time, then drops to 3.80 mA.)
- 21.0mA/On (holds last value for Hold time, then rises to 21.00 mA.)
- Hold time (enter time)
- 6. If "Test" is selected, the current output is forced to 4, then 12, then 20mA and displays this in the "Current OP test" box.
- 7. The 4mA and 20mA output calibration has been set at the factory and should not need adjustment. However users can adjust these if needed by adjusting the "Adjustment 4mA" and "Adjustment 20mA" values. These values are the 16 bit D/A conversion values that represent 4mA and 20 mA.

Chapter 19 | Analog Input Setup

The "Analog Input Setup" app allows for up to 2 optional analog 0/4 -20 mA inputs for temperature, pressure and density. You can also set up the current output to control a batch process.

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			SM	ART INT	ER	FACE PORTA	Ľ	
Analog Input	Setup A	pp allows for	up to s	ix optional anal	og (/4-20 mA inputs for ten	nperature, pressu	re and density.
can also set up	the curren	it output to cor	ntrol a b	batch process.				
Slot 8, 4-20mA Input		hard Carry		Local Loba		Innut Span	Carao Laura Malua	Correct House Markers
On On	V Te	Input Source	*		~	0-20mA V	Span Lower Value	Span Opper Value
l-input Adjustment	52428	÷				Current IP Test Reading:	0	0
Slot 9, 4-20mA Input	1	housed				_		
Off/On/Test		Input Source	e	Input Units		Input Span	Span Lower Value	Span Upper Value
201	∼ Te	mp Inlet	~	degF	~	0-20mA ~	0.000	100.000
On	52428	÷				Current IP Test Reading:	0	0
On Hinput Adjustment								
On Hinput Adjustment								
On Hinput Adjustment			_		Ĩ			
On Hinput Adjustment			Up	date Meter	Î	Close		

Figure 31. Analog Input Setup

- 1. Turn on the "4-20mA Input" by selecting Off/On/Test. If "Test" is selected, the input current will be displayed in A/D counts and mA. values.
- 2. Select the Input Source. Your choices are:
 - Temp Inlet: The temperature of the upstream fluid
 - o Temp Outlet: The temperature of the downstream fluid
 - Temp Comp (: The outside temperature of the pipe at the transducers
 - Temp Inlet Plus Temp Pipe: Assumes the temp pipe is the same as the Temp Inlet
 - o Temp Outlet Plus Temp Pipe: Assumes the temp pipe is the same as the Temp Outlet
 - Pressure: Input from a pressure transducer
 - Density: Input from a density meter
 - A1 Batch: current input
 - A2 Batch: current input

3. Select the Input Units:

For Temperature, your choices are:

- o degC
- o degF
- o K
- 0 R

For Pressure, your choices are:

- o Psi G
- o Psi A
- o Bar G
- o Bar A

For Density, your choices are:

- o kg/m3
- o g/cc
- o kg/l
- o Lbs/ft3

For AI1, A12 Batch: The "Batching" function allows the user start and stop a totalizing process. For example, a PLC could send a 4-20mA signal to the 207i to start counting the batch at the same time it starts a pump. Once the target amount has been reached, the Relay on the 207i could signal the PLC to stop the pump.

Select the span of the incoming current singal. Either 0-20mA or 4-20mA may be used. The values that represent 0/4 and 20 mA span in units are not inportant for batching inputs.

4. "I-input Adjustment" The 0/4-20mA inputs are calibrated at the factory and do not normally need adjustment. However the user can adjust the A/D span (20mA point). This value is in 16 bit digital counts and not in engineering units.

Chapter 20 | Data Logger Setup

The 207i has a 16MB internal flash data logger memory. The "Data Logger Setup" App allows user to configure and download the data logger.

Record Interval: 0 Second(s) Download records from : 0 To 763 Total Download 763 Erase: No V Download Resolutions : 1 Download Time: 1.27 Minutes Energy Log: No V Downloaded Files: V Downloaded Time: 1.27 Minutes
Download: No 🗸

Figure 32. Data Logger Setup

Below are descriptions for each box found under the "Data Logger Setup" section:

- **Record Interval:** The user is prompted to enter a datalogger interval. Entering a value for "Interval" starts data logging. An interval of zero turns the datalogger off. When the interval is met then all meter measurement/diagnostic values are written to the datalogger memory. Allowed values are ranged 0 to 255s, default 255s.
- **Erase:** The user is prompted to erase the datalogger memory by selecting "On" or "Off." By default memory is not erased.
- **Energy Log** The user is prompted to turn logging of energy rate and energy totalizers "On" or "Off." By default energy rate and totalizers are not logged.

- **Download records from:** _____ **To** ____: The data logger can hold up to 65,500 records at 256 bytes per record. At a **Record Interval** of 60 seconds per record that's 45.5 days. The SIP app will allow you to only download the records of interest. Downloading the entire log file can take hours. The estimated download time is calculated and displayed in the **Download Time** box.
- **Download Resolutions:** This feature allows you skip records. For example: A setting of 10 will download every 10th record, which will decrease the download time.
- Downloaded Files: This box display the progress of downloaded records.
- **Download:** Set to "Yes" to download log file, normally set to "No" to <u>do not</u> download log now. If you set the Download selection to "Yes", the Download button will turn green.
- **Download Button** at the bottom of the screen will turn green when you are ready to download the log file. Click the "Download" button and a browse window will appear. Browse to the location you wish to store the log file in, and provide a name for the .cvs file. Click Save.
- Close returns to the Master Setup screen.

Example of downloading the data logger:

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			Ud	ld	NUIII	HI -	ЪН				10707	NUSS STATUS	-
			SM	ART	INTERF	ACE	POR	TAL			-	and the	
													100
The 207i has a 1	6MB ir	nternal flas	h drive data l	oggerm	nemory. You d	an config	ure the	the data	alogge	r here.			
Record Inter	val: 2		Second(s)	Downlo	ad records from :	0	_	To 467	_	Total Do	wnload	467	
En	ase: N	lo 🗸		Downl	oad Resolutions	1		Downloa	d Time:	0.78	Minutes		
Energy L	.og: Y	'es 🗸		0	ownloaded Files	20							
					Download	Yes	\sim						
2L:001:0:Record Da total, NEG Energy T	ate, Rec otal, NE	ord Time, Ve T Energy tot	elocity, Flow rate al. Inlet Temp, C	POS flow	total, NEG flow to Status	otal, NET fl	ow total,	Energy ra	te, Energ	y flow rat	e, POS E	ngergy	^
?L:001:1:Date[mm/	Id/yy].T	ime.m/s.cf/n 4 10 328 37	n.cf.cf.cf.J/s.Btu 869.69797.237	/s,Btu,Btu	Btu,InT,OutT, S	atus 25 276 676	141186	8 349 0 00	0 14118	68 349 7	5 000 68	000 *R	
?L:001:3:02/15/19	15:18:0	5,10.334,37. 8 10 326 37	891,69798.500,	0.000,697	98.500,292299.5	31,276,833	141242	1.661.0.00	0,14124	21.661.7	5.000,68.	000.*R	
?L:001:5:02/15/19	15:18:10	0.10.325.37	860,69801.024	0.000,698	01.024,292060.0	31,276,606	141352	8.320,0.00	0,14135	28.320,7	5.000,68.	000.*R	
?L;001;7;02/15/19,	15:18:14	4,10.317,37	830,69803.547,	0.000,698	03.547,291829.9	69,276.388	141463	4.825,0.00	0,14146	34.825,7	5.000,68.	000,*R	
?L;001;9;02/15/19,	15:18:1	8,10.321,37	846,69806.070,	0.000,698	06.070,291951.3	75,276.503	141574	0.623,0.00	0,14157	40.623,7	5.000,68.	000.*R	
?L:001:11:02/15/1) 15:18:	22,10.327,37	7.868,69808.594	0.000,69	808.594,292125	406,276.66	2,14162 8,14168	46.725.0.0	00,1416	846.725.	75.000,68	3.000, R	
?L:001:12:02/15/19 ?L:001:13:02/15/19	9,15:18: 9,15:18:	24,10.316,37 26,10.313,37	7.826,69809.855 7.816,69811.116	0.000,69	809.855,291801 811.116,291725	219,276.36 375,276.28	1,14173 9,14179	99.831,0.0 52.542,0.0	00,1417	399.831, 952.542,	75.000,68 75.000,68	3.000,*R 3.000,*R	
]?L:001:14:02/15/19),15:18:	28,10.316,37	7.825,69812.376	,0.000,69	812.376,291791	063,276.35	1,14185	05.144,0.0	00,1418	505.144,	75.000,68	8.000,*R	~

Figure 30. Data Logger Setup screen after a download

The data logger file will be saved by the name and location you entered when the Download button was clicked. The window in the screen displays the data logger file progress. When done downloading you can view records by scrolling up or down.

Understanding the data file

The data is stored in a common .csv file format which can be opened with Excel. The first 2 rows (records) are the header information showing the description and engineering units. Row 3 to the last show the data values recorded. Anytime the meter is stopped and started a new header is added to the file.

Example in Excel:

X	₩ • (° - -						tes	t.csv - Microsoft	Excel						_	Ø	×
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	A	В	С	D	E	F	G	Н	I.	J		К	L	М	N	C	5 =
1	?L;001;0;Record Date	Record Time	Velocity	Flow rate	POS flow to	NEG flow	NET flow total	Energy rate	Energy flow rate	POS Enge	rgy total	NEG Energy T	otal NET Energy t	otal Inlet Temp	Outlet Ter	mp State	us
2	?L;001;1;Date[mm/dd/yy]	Time	m/s	cf/m	cf	cf	cf	J/s	Btu/s	Btu		Btu	Btu	InT	OutT	Stat	tus 🗏
3	?L;001;2;02/15/19	15:18:04	10.328	37.869	69797.237	0	69797.237	292133.625	276.676	141	1868.349		0 1411868	.349 7.	5	68 *R	
4	?L;001;3;02/15/19	15:18:06	10.334	37.891	69798.5	0	69798.5	292299.531	276.833	141	2421.661		0 1412421	.661 7	5	68 *R	
5	?L;001;4;02/15/19	15:18:08	10.326	37.863	69799.762	0	69799.762	292082	276.627	141	2975.064		0 1412975	.064 7	5	68 *R	
6	?L;001;5;02/15/19	15:18:10	10.325	37.86	69801.024	0	69801.024	292060.031	276.606	14	13528.32		0 141352	8.32 7	5	68 *R	
7	?L;001;6;02/15/19	15:18:12	10.328	37.872	69802.286	0	69802.286	292151.344	276.693	141	4081.557		0 1414081	.557 7	5	68 *R	
8	?L;001;7;02/15/19	15:18:14	10.317	37.83	69803.547	0	69803.547	291829.969	276.388	141	4634.825		0 1414634	.825 7	5	68 *R	
9	?L;001;8;02/15/19	15:18:16	10.321	37.845	69804.809	0	69804.809	291943.531	276.496	141	5187.626		0 1415187	.626 7	5	68 *R	
10	?L;001;9;02/15/19	15:18:18	10.321	37.846	69806.07	0	69806.07	291951.375	276.503	141	5740.623		0 1415740	.623 7	i	68 *R	
11	?L;001;10;02/15/19	15:18:20	10.321	37.844	69807.332	0	69807.332	291939.5	276.492	141	5293.607		0 1416293	.607 7.	5	68 *R	
12	?L;001;11;02/15/19	15:18:22	10.327	37.868	69808.594	0	69808.594	292125.406	276.668	141	6846.725		0 1416846	.725 7.	5	68 *R	
13	?L;001;12;02/15/19	15:18:24	10.316	37.826	69809.855	0	69809.855	291801.219	276.361	141	7399.831		0 1417399	.831 7.	j	68 *R	
14	?L;001;13;02/15/19	15:18:26	10.313	37.816	69811.116	0	69811.116	291725.375	276.289	141	7952.542		0 1417952	.542 7.	5	68 *R	
15	?L;001;14;02/15/19	15:18:28	10.316	37.825	69812.376	0	69812.376	291791.063	276.351	141	8505.144		0 1418505	.144 7	5	68 *R	
16	?L;001;15;02/15/19	15:18:30	10.312	37.812	69813.637	0	69813.637	291693.438	276.259	141	9057.773		0 1419057	.773 7.	j	68 *R	
17	?L;001;16;02/15/19	15:18:32	10.314	37.817	69814.897	0	69814.897	291732.656	276.296	141	9610.332		0 1419610	.332 7	5	68 *R	
18	?L;001;17;02/15/19	15:18:34	10.322	37.847	69816.159	0	69816.159	291963.375	276.515	142	0163.019		0 1420163	.019 7	i	68 *R	
19	?L;001;18;02/15/19	15:18:36	10.327	37.866	69817.421	0	69817.421	292105.938	276.65	142	0716.109		0 1420716	.109 7.	5	68 *R	
20	?L;001;19;02/15/19	15:18:38	10.328	37.87	69818.683	0	69818.683	292134.563	276.677	142	1269.393		0 1421269	.393 7.	j	68 *R	
21	?L;001;20;02/15/19	15:18:40	10.328	37.871	69819.945	0	69819.945	292145.406	276.687	142	1822.714		0 1421822	.714 7.	j	68 *R	
22	?L;001;21;02/15/19	15:18:42	10.32	37.842	69821.207	0	69821.207	291923.5	276.477	142	2375.985		0 1422375	.985 7	ó	68 *R	
23	?L;001;22;02/15/19	15:18:44	10.324	37.856	69822.469	0	69822.469	292030.063	276.578	142	2929.016		0 1422929	.016 7	j	68 *R	
24	?L;001;23;02/15/19	15:18:46	10.327	37.865	69823.731	0	69823.731	292100.219	276.644	14:	23482.18		0 142348	2.18 7	5	68 *R	
25	?L;001;24;02/15/19	15:18:48	10.321	37.843	69824.992	0	69824.992	291929.594	276.483	1424	4035.444		0 1424035	.444 7.	j	68 *R	
26	?L;001;25;02/15/19	15:18:50	10.321	37.843	69826.254	0	69826.254	291929.438	276.482	142	4588.365		0 1424588	.365 7	j	68 *R	
27	?L;001;26;02/15/19	15:18:52	10.319	37.838	69827.515	0	69827.515	291894.5	276.449	142	5141.489		0 1425141	.489 7.	5	68 *R	
28	?L;001;27;02/15/19	15:18:54	10.312	37.812	69828.776	0	69828.776	291694.219	276.26	142	5694.226		0 1425694	.226 7	5	68 *R	
29	?L;001;28;02/15/19	15:18:56	10.32	37.842	69830.037	0	69830.037	291925.313	276.478	142	5246.848		0 1426246	.848 7	j	68 *R	
30	?L;001;29;02/15/19	15:18:58	10.324	37.855	69831.299	0	69831.299	292022.969	276.571	142	5799.847		0 1426799	.847 7.	ó	68 *R	
31	?L;001;30;02/15/19	15:19:00	10.318	37.834	69832.56	0	69832.56	291863.406	276.42	142	7352.801		0 1427352	.801 7	j	68 *R	
32	?L;001;31;02/15/19	15:19:02	10.314	37.821	69833.821	0	69833.821	291757.281	276.319	142	7905.618		0 1427905	.618 7	j	68 *R	× 10
Pa	adv													· · · · · · · · · · · · · · · · · · ·			
INC.															~~ ()	~	-

Figure 31. Data Logger .csv file opened in Excel.

You may now use Excel to manipulate the data as you wish to make graphs, sort or print data.

Chapter 21 | Meter RS-232 / USB Setup

The "RS 232/USB Setup App" allows the user to change serial communication settings for the "RS-232" and "USB" ports. These ports are used to connect to the Smart Interface Portal only.

The RS-232 / USB Setup app allows you to change	7 × C-232 / USB Sctup INTERFACE PORTAL serial communication settings for the RS-232 and USB ports.
Port: Baud Rate: Parity:	RS-232 ~ 38400 ~ None ~
Update	Meter Close

Figure 33. Meter RS-232/ USB Setup

Below are descriptions for each field found under the "Meter RS-232 / USB Setup" App.

- **Port:** The user can select which of the two available serial ports are used for communication from the following list:
 - o Off (Default)
 - o USB
 - o RS-232
- Mode: The user is prompted to select the mode for the "RS-232/USB" from the following list:

- "None" (Default) turns the "RS-232/USB" transmit off. The "RS-232/USB" can still receive.
- o "Line Printer" streams measurement values out on the "RS-232/USB."
- o "Diagnostics" streams key diagnostic values on the "RS-232/USB."
- "Other" is to be decided, future option.
- **Baud:** The user is prompted to select the communication baud rate from the following list:
 - o 9600 (Default)
 - o 19200
 - o 57600
 - o 115200
- **Parity:** The user is prompted to select the communication parity from the following list:
 - o None
 - Even (Default)
 - o Odd

Chapter 22 | PT100 Setup

The InnovaSonic 207i can accept two PT100 inputs. You can configure the PT100 inputs on the "PT100 Setup" screen.

	SI	ER	RA'	p	11	N <mark>Se</mark>		5
				SMAR		ERFACI	PORTAL	-
								-
e 20	07i can	accep	ot two PT100 input	s. The PT100 s	etup confi	gures these	PT100 inputs.	
P	T100 Ser	sor Slo	t 10					
	Off/On	/Test	PT100 Source:	Dynamic	Offset	Value	PT100 Test	
	On	~	Temp Inlet	√ Dynamic ∨	0.000	20.000	25.90 °F	
P	T100 Ser	sor Slo	t 11					
	Off/On	/Test	PT100 Source:	Dynamic	Offset	Value	PT100 Test	
	On	~	Temp Inlet	√ Dynamic √	0.000	20.000	68.00 °F	
				Undate	Meter	C	lose	

Figure 34. PT100 Setup

Below are descriptions for each field found under the "PT100 Setup" section slot 10 & 11:

- 3. Off/On/Test:
- 4. PT100 Source:
 - Temp Inlet: The temperature of the upstream fluid
 - Temp Outlet: The temperature of the downstream fluid
 - Temp Comp: The outside temperature of the pipe at the transducers
 - Temp Inlet + Comp: The transducer are mounted on the Inlet pipe
 - Temp Outlet +Comp: The transducers are mounted on the Outlet pipe
- 5. Dynamic:
 - Select whether these are Dynamic values (actually measured) or Fixed (user input)
 - Offset : If Dynamic, is there a calibration offset ? If so enter it here.
 - Value : If Fixed, enter user input values here.

Chapter 23 | Modbus RTU or BACnet MS/TP Setup

The 207i supports Modbus or BACnet digital communication. Whichever digital communication is not installed will be grayed out.

If "Modbus RTU Setup" is highlighted:

SIERRA	Modbus RTU Setup smart interface portal	
	Slot 12: Modbus RTU: Off/On/Test: Address: 1 Baud Rate: 9600 Parity: Even	

Figure 35. Modbus RTU Setup

Off/On/Test: Address: 1-247 Baud:

- o 9600
- o 19200

Parity:

- o None
- o Even
- o Odd
If "BACnet MS/TP" Setup is highlighted:

S SIERRA	BACnet MS/TP Setup	
Use the BACnet MS/TP Setup and	Slot 12: BACnet MS/TP Off/On/Test: On Address: 1 Baud Rate: 19200	

Figure 36. BACnet MS/TP Setup

Off/On/Test: Address: 1-127

Baud:

96001920038400

Note: Parity not used, pre-set to "None" on BACnet.

Chapter 24 | Flow Batching Setup

Flow batching allows the user start and stop a totalizing process. You can use the "Relay Output," the Pulse output to provide the output signals to an external device to take action, or you can use the analog inputs to accept inputs from an external device to turn flow batching on/off.

	FIOLE Batching Setup SMART INTERFACE PORTAL	Constantial Constantial	X
Flow batching allows you to st Batch function. Signals to an e input flow batching to start.	art and stop a totalization process. Use the <u>Relay</u> or <u>OCT</u> Output Setup app confi xternal device to take action. The batch process may be started with a keyboard o Flow: 95.40 cf/m Total: 12941.56 cf	gured with th r analog	le
	Start Trigger: Al1 < 12mA		
			اد.

Figure 37. Flow Batching Setup

Below are descriptions for each field found under the "Flow Batching Setup" App.

- Flow Batch CTRL: The user can select how the batch process is started from the following list:
 - Key Input (Default)
 - AI1 Up Edge
 - o AI1 Down Edge
 - o AI2 Up Edge
 - o AI2 Down Edge

If AI1 or AI2 is selected, the totalizer will start on a signal from a current input module, see "Input/Output" section.

Depending on whether the trigger is up or down, the totalizer starts as the input current passes through 12 mA going up to 20 mA or down to 0 mA respectively.

• Flow Batch Target: The user is prompted to enter a target value for the batch controller. The value is in the user selected totalizer units, see above. When the batch totalizer reaches this target then a relay or open collector output can be activated, select "BATCH" in the Relay or OCT in the "Input/Output" menus.

Allowed values are ranged 1.0 to 100000.0, default 1.0.

• **Key Input:** Press "Start" to begin the batch. The batch will accumulate until the setpoint is reached