Note: The following FLOMEC[®] user's guide has images that may vary slightly from what is shown on your device. The images in this document were taken from an Android tablet running Android OS version 5.1.1. Android phone images or different Android OS versions will vary slightly.

Note: The minimum requirements of the Android device is Android OS version 4.4.2 or newer and Bluetooth Wireless capability.

Download the FLOMEC Android Application from the Google Play Store

To download the FLOMEC app from the Google Play Store, open the Play Store App on your Android device and enter "FLOMEC" into the search bar. The Play Store should find the FLOMEC App and should allow you to download it for free. See below image for reference.



To start the download process, select the app box (shown above) with the FLOMEC logo.



To start the download, select the INSTALL button shown above.



To complete the download process, select the ACCEPT button shown above.

Congratulations! The FLOMEC Application is now installed and ready to use to monitor and configure your FLOMEC meter. To begin using the FLOMEC app you can either select the OPEN button in the Play Store screen shown below or...



...you can also start the app from the Android system applications menus by selecting the FLOMEC app icon. The FLOMEC app icon will look like the icon in the image below.



Note: The FLOMEC app requires that at least one FLOMEC meter (equipped with QSI electronics) is within a distance of 100 feet of the Android device and that the FLOMEC meter is also powered ON.

Starting the FLOMEC App for the first time

When you start the FLOMEC app for the first time after installation the main screen will look very empty as shown below.



This is because the app will need to initially search for and pair your Android device with any FLOMEC meters within range (typically less than 100 feet) of the Bluetooth wireless interface. To search for nearby devices press the Android devices menu button and you will see 'Search' in the pop up menu. Select the 'Search' menu option as shown in the image below.



Your Android device will now begin to search for FLOMEC meters nearby and populate them in a list on the left side of the screen. In the following image, you can see that the Android device has found three different FLOMEC meters. Select the meter you would like to connect to by selecting it from the list on the left side of the screen.

Note: Your device list will not be the same as what is shown throughout this document.

Note: As the FLOMEC app connects to the meter, the Android OS will "pair" with the meter. This pairing process may popup a message that asks permission to "pair" with the meter. If successful connection is made with the meter, the meter's device name will populate into the Android device's OS memory and can be seen in the paired devices list in the Android OS settings under the Bluetooth settings. To "unpair" from a meter, you will need to navigate to the Android device's Bluetooth settings and "unpair" from the device in the Bluetooth settings list.



In this first example, I have chosen to connect to a meter with a QSI version 1. This version of QSI has temperature inputs and MODBUS (RS485) communication. As such, the main screen of the app may look different than the meter which you connect to if your meter has a different QSI version.

Note: For QSI version 1 and version 2, if the 'Show Energy' option is not selected in the main screen menu (see image below) of the app then the Energy Rate, Energy Total, Temp 1, and Temp 2 variables will not show on the main screen. After you first install the app, the default of the 'Show Energy' option is disabled. Select the 'Show Energy' option in the main screen menu if you intend to use your FLOMEC meter as a BTU meter.

Search	
Configure	
Measurement Units	
Info	
Show Energy	

After successful connection to your meter, you should get one of the following three screens on the right side of the main screen. The FLOMEC brand logo will start spinning the "O" in the FLOMEC logo to indicate that the meter is successfully communicating with your Android device. If the "O" in the logo does not start spinning, then there is a communication problem that will need to be corrected.

For QSI version 1 the main screen should look similar to the image below if the 'Show Energy' option is selected.

ar 🕑 🙋			\$ 141 T 6	25 Q 4:	16 PI
FLOMEC		FL() MEC			
QSI RS485 V1	QSI RS485 V1				
QSI 4_20mA V3	QSI - Q1 (RS485) QSE 2 in.				
	Flow Rate		0.00	Gal	/m
QUITULUE VE	Cumulative Total		161852.94	Gal	
	Batch Total		59351.38	Gal	
	Input Freq		0.00	HZ	0
	Energy Rate		0.00	KBIU	/n
	Energy Total		1.13	KBIU	
	Temp 1		20.24	F	
	Temp 2		20.90	r	
	Disconnect				

For QSI version 2 the main screen should look similar to the image below if the 'Show Energy' option is selected.

√ 21. ⊙ @			未1419日	25 g 4:	16 PM
5 Flomec					
FLOMEC		FL()MEC			
QSI RS485 V1	QSI PULSE V2				
QSI 4_20mA V3	QSI - Q2 (Pulse) QSE 2 in.				
OSI PULSE V2	Flow Rate		0.00	Gal	/m
Construction of the second	Cumulative Total		162675.06	Gal	
	Input Free		102073.00	Hz	
	Energy Rate		0.00	KBTU	/h
	Energy Total		277240.88	kBTU	
	Temp 1		-5866.24	F	
	Temp 2			F	
	Disconnect				

For QSI version 3 the main screen should look similar to the image below.

A. 21 🔯			* (4) (∞ 🔒 2:	49 PM
5 Flomec					
FLOMEC [®] QSI 4_20mA	QSI 4_20mA QSI - Q3 (4-20mA) QSE 2 in.	FL©MEC			
	Flow Rate Cumulative Total Batch Total Input Freq Disconnect		0.00 65546.57 993.88 0.00	Gal Gal Gal Hz	/m

Note: Because the QSI version 3 does not have temperature sensor capabilities, the temp and BTU features are disabled.

Navigating the main screen menu options

After connecting to a meter, the app's menu options will update with four additional items. These items are 'Configure', 'Measurement Units', 'Info' and 'Show Energy'. See image below. This section of the manual only covers the 'Measurement Units' and 'Info' screens. The 'Configure' screen is covered in its own section of this manual.

FLOMEC FLOMEC QSI RS485 V1 QSI RS485 V1 QSI 4,20mA V3 QSE 2 in. QSI PULSE V2 Flow Rate 0.00 Gal //m QSI PULSE V2 Cumulative Total 161852.94 Gal Batch Total 59351.38 Gal Input Freq 0.00 KBTU //h Energy Rate 0.00 KBTU //h Energy Rate 0.00 KBTU //h Temp 1 2624 F Temp 2 26.96 F	× 25 @ 🖻			★ 译制 🌹 62% 🔓 4:16 PM
FLOMEC FLOMEC QSI RS485 V1 QSI RS485 V1 QSI - 20mA V3 QSE 2 in. QSI PULSE V2 Cumulative Total Batch Total 151852.94 Gal Input Freq 0.00 kBTU /h Energy Rate 0.00 kBTU /h Temp 1 26.24 F Temp 2 26.96 F	5 Flomec			
QSI R5485 V1 QSI R5485 V1 QSI 4_20mA V3 QSI 2 in. QSI 4_20mA V3 QSE 2 in. QSI PULSE V2 Flow Rate 0.00 Gai Cumulative Total 161852.44 Gai Batch Total 59351.38 Gai Input Freq 0.00 Hz Energy Rate 0.00 Hz Temp 1 26.24 F Temp 2 26.96 F Disconnect Configure	FLOMEC	5	FL() MEC	
QSI 4_20mA V3 QSE 2 in. QSI PULSE V2 Flow Rate Cumulative Total Batch Total Input Freq 0.00 Gal /m 0.0	QSI RS485 V1	QSI RS485 V1		
QSI PULSE V2 Plove Rate QUINT State QUINT State Cumulative Total Batch Total State Batch Total State Cumulative Total Batch Total State Cumulative Total State Cumulative Total State Stat	QSI 4_20mA V3	QSE 2 in.		
Batch Total 59351.88 Gai Input Freq 0.00 Hz Energy Rate 0.00 KBTU /h Energy Total 1.13 KBTU Temp 1 26.24 F Temp 2 26.96 F Disconnect	QSI PULSE V2	Flow Rate Cumulative Total		0.00 Gal /m 161852.94 Gal
Input Freq 0.00 H2 Energy Rate 0.000 kBTU /h Energy Total 1.13 kBTU Temp 1 26.24 F Temp 2 26.96 F Disconnect Search Configure Measurement Units Info		Batch Total		59351.38 Gal
Liengy Tatal 0.03 K/T U/T Energy Total 1.13 KBTU Temp 1 26.24 F Temp 2 26.96 F Disconnect Search Configure Measurement Units Info		Input Freq		0.00 Hz
Temp 1 26.24 F Temp 2 26.36 F Disconnect Search Configure Measurement Units Info		Energy Total		1.13 kBTU
Temp 2 26.96 F		Temp 1		26.24 F
Disconnect Search Configure Measurement Units Info		Temp 2		26.96 F
Search Configure Measurement Units Info		Disconnect		
Search Configure Measurement Units Info				
Configure Measurement Units Info				Search
Measurement Units Info				Configure
Info				Measurement Units
				Info
Show Energy E				Show Energy 🗹

Measurement Units Screen

If you select the 'Measurement Units' option from the menu list, the screen shown below should show if you are connected to either a QSI version 1 or version 2 and the 'Show Energy' option is 'checked'.

		2 m	2 - 00 - 1 - 4.0
	Cubic Feet		
	Cubic Meters cc Barrel		
Minute) Hour	🔿 Day	
) Minute	MegaBTU Joules KiloJoules Ton Hour	🔿 Day	
	Celsius		
	Minute Minute	Cubic Feet Cubic Meters cc Barrel Minute Hour MegaBTU Joules KiloJoules Ton Minute Hour Cetsius	Cubic Feet Cubic Meters c c Barrel Minute Hour Day MegaBTU Joules KitJoules Ton Minute Hour Day

If you prefer to change the Volume, Energy, Temperature, and Time base units displayed in the app, you can simply select the appropriate units. This procedure changes what is shown by the app, it does not change the meter configuration. It will not change the measurement units on the meter's local digital display for example.

The screen shown below should show if you are connected to a QSI version 3, or if you are connected to a QSI version 1 or version 2 and the 'Show Energy' option is 'unchecked'.

ittSActivity Galions Galions Gubic Feet Gubic Feet Gubic Feet Gubic Meters Guarts Guarts Guarts Guarts Guarts Guarts Guarts Gubic Meters Gubic Mete	wity	IsActivity Salons Galions Duites Galions Cubic Feet Duites Cubic Meters Cubic Meters Cubic Meters Cubic Meters Cubic Meters Second Minute Minute Minute Day	2				★ 59%
Second Minute Hour Day	Nons Cubic Feet Serial Gallons Cubic Meters srts cc es Barrel sos sod ® Minute Hour Day	Second Minute Day	nitsActivity				
olume Cubic Feet Cubic Feet Cubic Meters Quarts Quarts Cubic Meters Cubic Meters Cubic Meters Cubic Meters Cubic Meters Cubic Minute Cu	Ions Cubic Feet serial Galions Cubic Keters arts C C es Barrel ses sond Minute Hour Day	lume Galions Galions Cubic Keet mpreprial Galons Cubic Meters Cubic					
Galons Cubic Feet Imperial Gallons Cubic Meters Quarts Cubic Meters Garrel Second Minute Hour Day	Ions Cubic Feet Sential Gallons Cubic Keters arts Cubic Keters arts Coc es Barrel coss cond Minute Hour Day	Salons Cubic Feet Imperial Callons Cubic Meters Cubic Meters Cubic Meters Cubic Meters Cuc S Curres Second Minute Hour Day	Volume				
Imperial Gallons Cubic Meters Quarts Cc Utres Barrel Ounces Second Minute Hour Day	serial Gallons Cubic Meters arts C CC es Barrel ices iond ® Minute Hour Day	 Imperial Galaions ○ Cubic Meters Quarts ○ Cc Utres ○ Barrel Ounces Second ● Minute ○ Hour ○ Day 	Gallons		Cubic Feet		
Quarts Cc Litres Barrel Ounces Counces	arts C CC es Barrel noes ond ® Minute Hour Day	Quarts ⊂ cc Utres ⊖ Barel ⊂ Ounces ⊂ Cartes	O Imperial Gallons		Cubic Meters		
Litres Barrel Ounces Second Minute Hour Day	es Barrel noes ond ® Minute O Hour O Day	Utres Barrel Ounces Second	O Quarts		⊖ cc		
Ounces O Second @ Minute O Hour O Day	nces cond Minute Hour Day	Ounces Second	O Litres		O Barrel		
Second Minute Hour Day	cond Minute Hour Day	Second 🛞 Minute i Hour i Day	Ounces				
			O Second	Minute	O Hour	O Day	

Note: The default settings after installing the FLOMEC App is that 'Seconds' is selected for both the Volume and Energy as the unit of time. This may not be the desired time base for most applications. Changing the time base or unit of measure will change the way the app displays the measured variables monitored from the meter. However, changing the time base or unit of measure in the app will not change either of the meter's display (if attached to the meter) or the MODBUS interface units (if connected to a QSI version 1).

Info Screen

Press the Android device's 'back' button and select 'Info' from the main screen's popup menu. This will bring up the meter's basic information. This information screen can be useful to retrieve serial number information for warranty and customer service purposes. This screen is informational only.

× 22. (2) 12	≉ i≈i 穿 62% 🙀 4:16 PM
5 InfoActivity	
Android App Version 4 debug	
QSI Model	QSI - Q1 (RS485)
Serial Number	QSI1234
Firmware Version	02
Meter	QSE 2 in.
Serial Number	2345678
Firmware Version	02

If connected to a QSI version 1, a screen similar to the one shown above should be visible.

If connected to a QSI version 2, a screen similar to the one shown below should be visible.

× 10 12	★ 1¥41 🛜 62% 🔓 4:17 PM
G InfoActivity	
Android App Version 4 debug	
QSI Model	QSI - Q2 (Pulse)
Serial Number	QSI1234
Firmware Version	04
Meter	QSE 2 in.
Serial Number	2468102
Firmware Version	02

If connected to a QSI version 3, a screen similar to the one shown below should be visible.

ه (٢)	★ (純) 〒 62% @ 4:
InfoActivity	
Android App Version 4 debug	
QSI Model	QSI - Q3 (4-20mA)
Serial Number	QSI1234
Firmware Version	04
Meter	QSE 2 in.
Serial Number	3412569
Firmware Version	01

Changing Device Name

To change a device name to a custom name, select the device name of the device you want to rename on the main screen as shown below. You must be connected to the device you want to rename.

A 29 💹		* 1861 6	0% 着 2:4	19 PM
5 Flomec				
FLOMEC	FL. MEC			
QSI 4_20mA	QSI 4_2UMA QSI - Q3 (#-20mA) QSE 2 in.			
	Flow Rate Cumulative Total Batch Total Input Freq	0.00 65546.57 993.88 0.00	Gal Gal Gal Hz	/m
	Disconnect			

The following administration password popup box will ask you to enter the administration password. The default password for the initial release of the app is 'gpi5252e36'. Enter this password to continue to changing the device name.



Note: This password is not user customizable for the initial release of the FLOMEC application, but GPI plans to allow the meter administrator to change the administration password in future releases of the app.

On the next screen, enter the new device name. The name field allows up to 16 ASCII characters.



After the FLOMEC app sends the new name to the device, the meter's device name will be permanently changed to its new name. Therefore the FLOMEC app will also automatically disconnect from the device and remove it from the Android device's Bluetooth settings as a paired device. Therefore the user must press the disconnect button as shown below.



To find the device with its new name, select 'Search' to start a Bluetooth scan for new devices and new device names.



The search will allow the Android device to show the new device name in the device list as shown below. Select the new device name from the list on the left of the main screen and the Android device will "pair" with the new device name.



If the device is successfully "paired", then the main screen should start showing the monitoring variables.

S Flomec			
QSI 4_20mA V3 QSI 4_20mA V3 QSE Flow Cum Bate	SI 4_20mA V3 1- 03 (4-20mA) E 2 in. ww Rate 0.00 mulative Total 65546.57 Cth Total 993.88 nut Freq 0.00	Gal Gal Gal Hz	/m

Configure Screen

To enter the meter configuration screen, select the 'Configure' option from the main screen popup menu list as shown below.

🔍 29° 🌌			* 6	0% 💼 2:	50 PM
5 Flomec					
FLOMEC*	QSI 4_20mA QSI - 03 (4-20mA) QSE 2 in. Flow Rate Cumulative Total Batch Total Input Freq Disconnect	FL\MEC	0.00 65546.57 993.88 0.00	Gal Gal Hz	/m
			Search Configure Measurement Un Info	its	

Note: The configure screen images shown in this section will change depending on the version of QSI that your meter has installed.

Temp Probe Configuration

If your meter has either a QSI version 1 or 2, you have the option to install temperature probes (sold as an accessory option with the meter) for BTU metering purposes. The Android application allows the administrator to install and calibrate the temperature probes. To configure the probe type for the meter, select the 'Temp Probes Config' option from the list as shown below.

√ 20. ⊙ t Ģ	* i≪i 😤 sek 🔒 4:00 PM
🌀 Input Config	
FLG	MEC
Temp Probes Config	a provide a start of the second s
Temp Circuit Calibrate	
Calibration Curve	
Scaled Pulse Config	
Btu Config	
Reset Totals	we consider and the second s
	Date (hand H. selations of location (no. 1) 101 (handrooks (hadd) from advantage (hand

The default setting for the temperature probes is a 0.003850 ohms/°C coefficient, which is the standard for platinum RTDs. The temperature probes that are sold as an accessory with the QSE meter are 3-wire 100 ohm platinum RTDs with a temperature coefficient of 0.003850 ohms/°C. These are the recommended RTDs to use with the QSI. However, if the meter administrator is comfortable other RTD brands, the QSI can also support the use of 0.003920 ohms/°C RTDs, this is another standard coefficient. Either can be selected from the radio button options in this menu.

Note: It is always best to press the 'Retrieve' button for any of the options on the Configuration screen. The FLOMEC will often show default values that are not what is actually set in the meter. Pressing the 'Retrieve' button will get the actual meter settings. Each section of the Configuration screen has an independent 'Retrieve' button.

× 30 @ @	≉ i¥di 😤 59% 🙆 4:01 PM
🌀 Input Config	
FLOMEC	
Temp Probes Config	
Temp Probe 1 Coef Retrieve © .003950 ohms/chms/*C 0.003920 ohms/chms/*C Custom	
Temp Probe 2 Coeff 003850 ohms/ohms/*C 003920 ohms/ohms/*C Custom	
Temp Circuit Calibrate	
Calibration Curve	
Scaled Pulse Config	
Btu Config	
Reset Totals	

It is also possible to select a custom coefficient by selecting the 'custom' radio button and entering a value and selecting the 'Save' button as shown below.

		∦ i≋i 🚏 100% 🛢 2:57 PM
5 Input Config		
	FLOMEC	
Temp Probes Config		
Temp Probe 1 Coeff Retrieve		
.003850 ohms/ohms/°C		
003920 ohms/ohms/°C		
Custom		
+	0.003889 Save	
Temp Probe 2 Coeff		
.003850 ohms/ohms/°C		
003920 ohms/ohms/°C		
Custom		
Temp Circuit Calibrate		
Calibration Curve		
Scaled Pulse Config		
Btu Config		
Reset Totals		

Temp Circuit Calibration

For meters with temperature sensors, the temperature circuit is already calibrated at the factory. However, the FLOMEC app allows a field calibration of the temperature sensor circuit by doing the following:

Note: the temperature sensors need to be removed during the calibration procedure. The expected reading is approximately 1.0V DC.

- 1. Always start this process by selecting 'Retrieve' and writing down the values set by the factory.
- Connect a digital DC voltmeter with a resolution of at least +/- 0.001 Volts between J3 pin 1 (+) and J3 pin 3 (-). Enter the voltage shown on the voltmeter display into the text field below 'Supply Voltage Temp 1' and select the 'Save' button next to the entered value.
- Connect a digital DC voltmeter with a resolution of at least +/- 0.001 Volts between J4 pin 1 (+) and J4 pin 3 (-). Enter the voltage shown on the voltmeter display into the text field below 'Supply Voltage Temp 2' and select the 'Save' button next to the entered value.

√ 30 [.] ⊙ @	🗴 i 💐 🍞 59% 🔓 4:01 PM
🕥 Input Config	
FL [©] MEC [®]	
Temp Probes Config	
Temp Circuit Calibrate	
Supply Voltage Temp 1 Retrieve	
1.0 Save 0.000	
Supply Voltage Temp 2	
1.0 Save 0.000	
Calibration Curve	
Scaled Pulse Config	1_n = _1 = = 1.
Btu Config	
Reset Totals	
	Re-research a R.S.

Calibration Curve

The calibration curve options are the most important settings of the meter as changing or entering these values will determine the accuracy of the meter. This section could also be referred to as 'linearizing the meter output'. To start the configuration of this section, select the 'Calibration Curve' menu item as shown below.



The calibration curve table will then show up on the screen as shown below. To see the Calibration Curve values already programmed into the meter, select the 'Retrieve' button.

🔧 25° 🚾 🕑		≉ i≋i 56% 🖥 3:03 PM
🌀 Input Config		
	FLOMEC	
Calibration Curve		
Retrieve Saverage Clear		
Pulserate Hz	0 K factor PPG	0.0
Pulserate Hz	0 K factor PPG	0.0
Pulserate Hz	0 K factor PPG	0.0
Pulserate Hz	0 K factor PPG	0.0
Pulserate Hz	0 K factor PPG	0.0
Scaled Pulse Config		
4 - 20 mA Config		
4-20 mA Circuit Calibrate		
Reset Totals		

Warning: All of the values will default to zeros as shown above. Do NOT press 'Save Curve' before you retrieve the values or you will overwrite the device's factory calibration settings with all zeros and the device will no longer measure flow or calculate energy correctly. The FLOMEC app should retrieve the values stored on the meter as shown below. Although not recommended, these values can be changed and saved to the meter by selecting the 'Save Curve' button.

💐 25: 🌌 🖉		* i⊯i 56% 🖬 3:03 PM
🌀 Input Config		
	FLOMEC	
Calibration Curve		ومسالق فرمين ومستري وسلامي ومروسي وسلاق
Retrieve Save Curve Clear		
Pulserate Hz	500 K factor PPG	400.0
Pulserate Hz	1020 K factor PPG	400.0
Pulserate Hz	1020 K factor PPG	400.0
Pulserate Hz	1020 K factor PPG	400.0
Pulserate Hz	1020 K factor PPG	400.0
Scaled Pulse Config		
4 - 20 mA Config		
4-20 mA Circuit Calibrate		
Reset Totals		

Recovery of Factory Calibration

The factory calibration settings have been printed on the Certificate of NIST Traceability which is shipped with each meter in the meter packaging. If you have changed your settings and wish to change them back to factory calibration settings, you can enter the numbers from your NIST Certificate and select the 'Save Curve' button.

a 29. 🌌 📀		∦ i≋i 56% 🖥 3:03 PM
🌀 Input Config		
	FLOMEC	
Calibration Curve		
Retrieve Save Curve Clear	^	0
Pulserate Hz	500 k factor PPG	400.0
Pulserate Hz	1020 K factor PPG	400.0
Pulserate Hz	1020 K factor PPG	400.0
Pulserate Hz	1020 K factor PPG	400.0
Pulserate Hz	1020 × factor PPG	400.0
Scaled Pulse Config	\bigcirc	\lor
4 - 20 mA Config		
4-20 mA Circuit Calibrate		
Reset Totals		

From your NIST certificate (example on next page), enter the Pulse rate Hz (PPS) into the column of numbers on the left. Then enter the Kfactor numbers (PPG) into the column of numbers on the right. Then save the values to the meter by selecting the 'Save Curve' button.



Certificate of NIST Traceability

The equipment used in the calibration of this flowmeter is traceable to the National Institute of Standards & Technology (NIST). Evidence of this traceablility is on file at our factory and is available on request.

			Fluid Type	Water	
UUT Serial #			Fluid Conductivity	789 נ	uS/cm
Operator Name	11/18/2016		Fluid Temperature	45 (- be/gal
Time	1:16 PM		Default Kfactor	121 6	PPG
Order#			Default Kfactor	31.965 F	PPL
Target Setting	Actual Measu	ured Values	Martin (DDC)	UUT Calculated Values	N
Flow Rate (GPM)	Mstr How Kate (GPM) 4 500	9 000	Mactor (PPG)	Flow Rate (GPM)	76 err -0.826%
30.000	30.000	60.500	121.000	30.000	0.000%
75.000	75.000	151.000	120.800	74.876	-0.165%
150.000	150.000	302.000	120.800	149.752	-0.165%
300.000	300.000	604.000	120.800	299.504	-0.165%
GPM = Gallon Per Minute	1	\mathbf{X}		Cal Slope	
Mstr = Master Meter		\mathbf{X}		Cal Offset	
UUT = Unit Under Test					
PPS = Frequency measure	d in Pulses per second				
% err = accuracy stateme	nt in percent of error				
Target Setting	Actual Measu	ured Values		UUT Calculated Values	
Flow Rate (LPM)	Mstr Flow Rate (LPM)	UUT Freq (PPS)	Kfactor (PPL)	Flow Rate (LPM)	% err
17.034	17.034	9.000	31.701	16.894	-0.826%
113.562	113.562	60.500	31.965	113.562	0.000%
283.906	283.906	151.000	31.912	283.436	-0.165%
1135 622	567.812	302.000	31.912	566.873	-0.165%
1135.623	1135,823	604.000	51.912	1122.740	-0.165%
LPM = Liter Per Minute					
Mstr = Master Meter					
UUT = Unit Under Test					
PPS = Frequency measure DPL = Pulses Pes Lites	d in Pulses per second				
Frit = ruises Per Liter	at in percent of error				
A er - accuracy stateme	in the parcent of all of				
Calibration data is programmed into t readout device to p recommended flow	raw pulse data from th he integral electronics provide an output that v range.	e electromagnetic me that power the reado will meet or exceed a	eter assembly. This d out, or it can be progr dvertised product ac	ata, or its average, is rammed into another curacy over	
Calibration data is programmed into t readout device to g recommended flow The instrument refe and Technology. Evi	raw pulse data from th he integral electronics provide an output that v range. erence above was calib idence of traceability is	e electromagnetic me that power the reado will meet or exceed a rated using standards s on file at our laborat	eter assembly. This d out, or it can be prog dvertised product ac traceable to the Na ory and is available to	ata, or its average, is rammed into another curacy over tional Institute of Star upon request. The vol	ndards umetric
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Note: The NIST Certificate above shows the location of the values to be used in the Calibration Curve table, do not use the values shown above, use the values on the NIST Certificate that was provided with your meter.

Scaled Pulse Configuration (Volumetric Flow)

All QSI versions allow for a scaled pulse output for remote totalization of the fluid volume. The scaled pulse output options can be configured under the 'Scaled Pulse Config' section as shown below.

Note: The QSI Version 3 cannot generate scaled pulses for energy because it does not have temperature sensor inputs. Therefore the 'Energy' option is not selectable. The QSI Version 1 and 2 can support energy pulse output.

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5 Input Config	
FL SM	EC
Calibration Curve	
Scaled Pulse Config	
Retieve	
C Energy	
Scaled Pulse Off	
Pulse Width ms	Save
Pulses/Gal	Save
4 - 20 mA Config	
4-20 mA Circuit Calibrate	
Reset Totals	

Select the 'Retrieve' button as shown above to read the configuration values from the meter.

4 22 🛛 🖉 🕜	≉ i¥di sev 🔒 3	3:04 PM
🌀 Input Config		
FLOM	IEC"	
Calibration Curve		
Scaled Pulse Config		
Retrieve		
Flow		
C Energy		
Scaled Pulse Off		
Pulse Width ms	1	Save
Pulses/Gal	400.0	Save
4 - 20 mA Config		
4-20 mA Circuit Calibrate		
Reset Totals		

The application allows the user to set two values. The first is the Pulse Width in milliseconds of the low going edge of the pulse output. The second value is a custom Kfactor (Pulses/Volume Unit) for the pulse output of the meter. The Volume Unit is selectable on the "Measurement Unit" screen shown previously.

Both of the Pulse Width and Pulses/Volume Unit values can be set to any custom value that the meter administrator requires, however care must be taken when setting these values as there are limitations.

1. The Pulses/Volume Unit in the Scaled Pulse Config options cannot be larger than the largest Kfactor value in the Calibration Curve settings stored on the meter. The QSI cannot scale up the pulses/Volume Unit. The QSI can only scale down.

Note: If the Pulses/Volume Unit in the Scaled Pulse Config options is set larger than the largest Kfactor of the meter's Calibration Curve, the scaling will be set to 1:1.

2. The Pulse Width (ms) option cannot be larger than the highest frequency output of the meter will allow. To calculate it use the following formulas:

To calculate max flow rate based on known positive and negative pulse widths; use this formula:

$$Max \ Flow \ Rate \ (GPM) = \frac{60,000}{(Neg \ Pulse \ Width \ in \ mSec + Min \ Pos \ Pulse \ Width \ in \ mSec) * \ Scaled \ Output \ Kfactor \ PPG}$$

To calculate the maximum negative pulse width based on the expected max flow rate for your application and a known minimum positive pulse width; use this formula:

$$Max Neg Pulse Width (ms) = \left(\frac{60,000}{Max GPM of Application * Scaled Output K factor PPG}\right) - Min Pos Pulse Width (ms)$$

Note: If the Pulse Width is set too high and the meter's flow rate increases above the max flow rate from the calculations above, this could cause the frequency of the meter's pulse output to exceed the application's min positive and min negative pulse width settings. This could result in one of two situations:

- 1. The negative pulse width is a guaranteed value, so the min positive pulse width might begin to fall below the value used to calculate the max flow rate. Having a positive pulse width fall below the applications requirement could result in attached equipment from properly receiving pulses.
- 2. If the flow rate continues to increase above the max flow rate limit, the positive pulse width will eventually decrease to zero time. Therefore; the positive side of the pulses will appear to stop and the pulse output will remain at 0VDC until the flow rate drops below the max flow rate value calculated above.

WARNING: If the max flow rate for the required pulse widths is exceeded, the consequential result of no pulses coming from the meter on the pulse output is that the attached equipment will very likely incorrectly interpret the loss of pulses as a loss of flow, but the meter is actually operating above the max flow set by the administrator. Careful attention to the intended application's max flow rate and pulse width requirements must be observed when configuring this function of the meter.

Scaled Pulse Configuration (Energy)

QSI version 1 and version 2 allow for a scaled pulse output for remote totalization of the Energy Consumption measured by the meter. To select the energy consumption as the scaled output variable, select the 'Energy' radio button as shown below. Select 'Retrieve' to view the meter's current setting.

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9 Input Config	
FLOMEC	
Temp Probes Config	
Temp Circuit Calibrate	
Calibration Curve	
Scaled Pulse Config	
Retrieve Flow © Energy Scaled Pulse Off Pulse Width ms Pulses/kBTU	Save 1 Save
Btu Config Reset Totals	

Note: The Pulses/kBTU is not adjustable. The QSI will output one pulse for every kBTU totalized by the meter. The option to adjust the energy unit and energy Kfactor may be available in future releases of the app and meter firmware.

The Pulse Width (ms) field can be changed to any required value for your application. The value will be saved to the meter by selecting the 'Save' button as shown below.

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5 Input Config		
FLOMEC		
Temp Probes Config		
Temp Circuit Calibrate		
Calibration Curve		
Scaled Pulse Config		
Retrieve		
⊖ Flow		
Energy		
Scaled Pulse Off		
Pulse Width ms	50 sa	/e
Pulses/kBTU	1, Sm	ie.
Btu Config		
Reset Totals		

Scaled Pulse Config (Raw Volumetric)

All versions of QSI allow for the raw volumetric pulse input from the meter's flow sensor to be output on the pulse output connector. To configure the meter to output the raw pulse from the meter's flow sensor, select the 'Scaled Pulse Off' radio button. This will disable scaling and the true raw volumetric pulse from the meter will be available on the pulse output connector. This option does not turn the meter's pulse output off.



4-20mA Config

QSI version 3 allows for configuration of a 4-20mA output. Both QSI version 1 and version 2 do not have this capability and therefore the screen below will not be available on these versions of QSI. To view the current meter's 4-20mA settings, select the 'Retrieve' button.

4 25 🖾 (2)	\$ 1≪1 56% 着 3:0)4 PM
5 Input Config		
FLOMEC		
Calibration Curve		-
Scaled Pulse Config		
4 - 20 mA Config		
Retrieve Flow Forgy 4 - 20 mA Off		
Zero Value	Gal/m	Save
Span Value	Gal/m	Save
4-20 mA Circuit Calibrate Reset Totals		

Note: The 'Energy' option is not available for the 4-20mA output.

Note: The units for the Zero and Span value are selectable on the 'Measurement Units' screen.

4-20mA Config (Volumetric Flow)

To set the 4-20mA output to act as a 4-20mA sensor for volumetric flow, select the 'Flow' radio button as shown below. As the meter administrator you can set the zero and span values to whatever volumetric flow rates the meter application is expected to experience during normal operation.

4 22 🖾 📀	\$ 1¥\$1 58%∰ 3:0)5 PM
🕤 🖉 Input Config		
FLOMEC		
Calibration Curve		
Scaled Pulse Config		
4 - 20 mA Config		
Relative # Flow		
Zero Value 4.0	Gal/m	Save
Span Value 20.0	Gal/m	Save
4-20 mA Circuit Calibrate Reset Totals		

As an example, the screen shot below shows a 4.0 GPM setting for the Zero Value and a 20.0 GPM setting for the Span Value. This means that at 4.0 GPM the meter will sink 4.0mA of current and that at 20.0 GPM the meter will sink 20.0mA of current. The measured flow rate range of this example is approximately 0 GPM to 24.0 GPM, with best accuracy between 4.0 to 20.0mA.

Note: The Zero value is the volumetric flow rate at which point the meter is programmed to sink 4.0mA of current. The Span value is the volumetric flow rate at which point the meter is programmed to sink 20.0mA of current. The meter will set the current sink at an appropriate value between 0.025mA to 24.0mA based on the measured flow rate of the meter and the Zero and Span settings. The 4-20mA output is limited to a minimum value of 0.025mA due to the 4-20mA circuit design.

4-20mA Config (4-20mA Off)

To turn the 4-20mA output Off, select the '4-20mA Off' radio button. This will completely disable the current sinking of the 4-20mA output regardless of the measured flow rate.

4 * 🖾 🙆	★ R4J 56% a 3:0	05 PM
5 Input Config		
FLŐME	C	
Calibration Curve		
Scaled Pulse Config		
4 - 20 mA Config		
Retrieve		
○ Flow		
Energy		
4 - 20 mA Off		
Zero Value 4.0	Gal/m	Save
Span Value 20.0	Gal/m	Save
4-20 mA Circuit Calibrate		
Reset Totals		

4-20mA Circuit Calibration

QSI version 3 also allows for the meter administrator to perform a field calibration of the 4-20mA output. The 4-20mA circuit has been calibrated at the factory. However, the FLOMEC app allows a field calibration of the 4-20mA output circuit by doing the following:

Warning: The following steps will adjust the 4-20mA output of the meter regardless of the measured flow rate. It is not recommended to attempt calibration of the meter while the meter is currently being used in an active flow control loop. To perform the calibration, it is best to connect the meter to an external power supply and DC milliamp meter or similar equipment.

1. Connect a DC milliAmp meter with a resolution of at least +/- 0.01 mA in series with a DC voltage source (+9 to +36VDC) to J9 pin 1 (+) and J9 pin 2 (-). See connections in the following image:



- Select the 'Factory Default' button below the 'Low End 4mA' text. Selecting this button will change the 4-20mA output to approximately 4.00mA regardless of the measured flow rate passing through the meter when the button is selected.
- 3. View the result on the attached milliamp meter connected to the flow meter. If the value shown on the milliamp meter is less than 4.00mA, then select the 'Trim Up' button for the 4mA output setting. If the value shown on the milliamp meter is greater than 4.00mA, then select the 'Trim Down' button for the 4mA output setting. Using the buttons shown in the image below, set the output as close to 4.00mA as possible.

4 29: 💹 🕖		\$ 1¥\$ 555
5 Input Config		
	FLOMEC	
Calibration Curve		
Scaled Pulse Config		
4 - 20 mA Config		
4-20 mA Circuit Calibrate		
Low End - 4mA		
Factory Default	Trim Up	Trim Down
High End 20 mA		
Factory Default	Trim Up	Trim Down
Reset Totals		

- 4. Select the 'Factory Default' button below the 'High End 20 mA' text. Selecting this button will change the 4-20mA output to approximately 20.00mA regardless of the measured flow rate passing through the meter when the button is selected.
- 5. View the result on the attached milliamp meter connected to the flow meter. If the value shown on the milliamp meter is less than 20.00mA, then select the 'Trim Up' button for the 20mA output setting. If the value shown on the milliamp meter is greater than 20.00mA, then select the 'Trim Down' button for the 20mA output setting. Using the buttons shown in the image below, set the output as close to 20.00mA as possible.

4 28 🖾 🙆		≉ i¥¢i 555∰ 3:06 PM
5 Input Config		
	FLOMEC	
Calibration Curve	-	
Scaled Pulse Config		
4 - 20 mA Config		
4-20 mA Circuit Calibrate		
Low End - 4mA		
Factory Default	Trim Up	Trim Down
High End 20 mA		
Factory Default	Trim Up	Trim Down
Reset Totals		

6. Select the back button on the Android device to return to the main screen and allow the meter to return to normal operation where the measured flow rate is output to the 4-20mA circuit in real time.

BTU Config

QSI version 1 and version 2 have the ability to calculate energy numbers based on the measured flow rate and a measured temperature differential of the two RTDs. In addition to the measured variables, the BTU calculations require that the user enter values for both the Specific Weight and Specific Heat of the process fluid flowing thru the meter.

Select the 'Retrieve' button to view the programmed values. The default factory values as seen in the image below are the typical values for water. The meter administrator should change these values to whatever process fluid is being used in the application. To save the changed values to the meter, select the 'Save' button next to each variable.



In addition to the variables for Specific Heat and Specific Weight, the app also allows the user to pick whether Temp 1 or Temp 2 is greater than the other. This selection can be used to determine if the calculated BTU value is negative or positive. This is important because the energy is not only measured as a rate per unit of time, but is also totalized. If the user always wants energy to accumulate a positive total amount regardless of the differential of the temperature sensor readings, the administrator should chose 'Absolute Difference'.

Totalizer Resets

All versions of QSI allow the QSI to accumulate totals for Cumulative Total, Batch Total, and Energy Total. Each of these totalizing accumulators can be reset under the Configure screen/Reset Totals, unless a display is attached. If a GPI09 display is attached then only the Energy accumulator is resettable with the app. Please see the additional sections of this document regarding resetting the Batch and Cumulative totals with a GPI09 display. If no display is attached, reset each of the totals independently by selecting the respective button.

FLOMEC	
Calibration Curve	
Scaled Pulse Config	
4 - 20 mA Config	
4-20 mA Circuit Calibrate	
Reset Totals	
Reset Batch Total Reset Cumulative Total	
Reset Energy Total	

Resetting Batch Totalizer on Meter with GPI09 Display

The Batch Total and Cumulative totals are accumulated and stored on the QSI and GPI09 display if a display is attached. With a display attached, the batch must be reset on the display by pressing and holding the 'Display' button while the Batch total is showing on the display. Resetting the batch totalizer on the display while it is connected to the QSI will also reset the batch total stored on the QSI.

Resetting Cumulative Totalizer on Meter with GPI09 Display

With a display attached, the cumulative total must be reset on the display by pressing and holding the 'Display' button while the display is reset with the app. To reset the display with the app select the 'Reset GPI09' option from the Configure Screen popup menu item. Resetting the cumulative totalizer on the display while it is connected to the QSI will also reset the cumulative total stored on the QSI.

4.8 🛛 🖸	★ 1≪1 551 🔒 3:06 PM
🌀 Input Config	
FLO	MEC
Calibration Curve	
Scaled Pulse Config	
I - 20 mA Config	
-20 mA Circuit Calibrate	
leset Totals	
	Network
	Network Data Log
	Network Data Log GPI09 Config
	Network Data Log GPI09 Config QLUpgrade
	Network Data Log GPI09 Config QL Upgrade QSE Upgrade

Network Configuration (RS-485 Setup)

The QSI version 1 allows serial communication to external equipment via an RS-485 communications bus. This bus is currently used for MODBUS configuration only. In the future this bus will also be allowed to be used for BACNET communication. To set the communications options on the QSI select the 'Network' option from the Configure screen popup menu as shown in the menu below.

4 ≈ ⊠⊘	≭ ⊪ ∎ 3:06 PM
5 Input Config	
FLOI	MEC
Calibration Curve	
Scaled Pulse Config	
- 20 mA Config	
I-20 mA Circuit Calibrate	
Reset Totals	
	Network
	Data Log
	GP109 Config
	QI Upgrade
	QSE Upgrade

Under the 'RS/485 Set Up' item, the first step is to 'Retrieve' the current settings programmed into the QSI. If you need to change any of the settings, simply select the radio button you require for your application. To save your settings and restart the RS-485 hardware interface, select the 'Reset 485' button as shown below. The default configuration for the RS-485 interface is 9600-8-N-1.

O NetworkActivity	≉ ⊯41 ssa∰ 3.0.
RS/485 Set Up	
RS485 Baud Rate Retrieve	
9600	
0 19200	
38400	
O 57600	
0 115200	
Parity	
None	
Odd	
O Even	
Stop Bits Reset 485	
• 1	
0 2	
Modbus Setup	
BacNet Setup	

RS-485 Default Settings:

Serial Port: 9600-8-N-1 Address: 10 (each meter requires a unique address to be configured as shown previously) Protocol: MODBUS RTU

Network Configuration (MODBUS Setup)

The QSI version 1 serial interface currently only allows for the MODBUS protocol to be run on the serial port. The configuration for the QSI is simple to choose the MODBUS address. To change the MODBUS address enter the new MODBUS address and select the 'Save' button. It is always a good idea to select 'Retrieve' button to verify that the change was saved correctly. The default address for the meter is address 10. Each meter will need its own unique address to properly communicate with the MODBUS master.

29 🔟 🕑		≉ 1¥U 555 🔒 3:07 PM
RS/485 Set Up		
Modbus Setup		
Modbus Address	10	
Mode	Ascii	
BacNet Setup		

Note: Currently only the RTU version of the MODBUS protocol is supported. ASCII may be supported in future versions of the QSI firmware.

Network Configuration (External Master MODBUS Map)

Your external MODBUS master will need to be configured for communication with the meter using the following mapping:

All values below are Holding Registers, byte order is normal, and parity is none.

<u>Address</u>	TYPE	<u>Multiplier</u>	Label	<u>Units</u>
41001	UINT16	x0.01	Flow Rate	Gal/Min
41002	UINT32	x0.01	Cumulative Total	Gal
41004	UINT32	x0.01	Batch Total	Gal
41006	UINT32	x0.01	Energy Rate	KBTU/Hr
41012	INT32	x0.01	Energy Total	KBTU
41008	UINT32	x0.01	Input Frequency	Hz
41010	INT16	x0.1	Temp Sensor #1	°C
41011	INT16	x0.1	Temp Sensor #2	°C

All holding register values above are 'read only' for monitoring and data logging purposes. The meter does not support writing to the MODBUS registers or configuration of the meter via the MODBUS interface.

GPI09 Config

If a GPI09 display is attached to the meter, the 'FLOMEC' app will allow the administrator to change the appearance of the display. The administrator can turn on/off the Batch totalizers, the Low Flow Cut Off, the Fast Flow Update, the measurement units for totalization, and the time bases for rate.

GPI09 Config	Send Config to GP109	
Batch 1		
Batch 2		
Low Flow Cut Off		
E Fast Flow Update		
Barrel		
Imperial Gallons		
Cubic Centimeter		
Ounce		
Quart		
🖌 Gal		
✓ Litre		
Cubic Foot		
Cubic Meter		
Elow Rate Per Hour		
E Flow Rate Per Day		

Note: Some settings (like Cumulative Total, Gallons, Liters, and Flow Rate per Min) are always enabled and cannot be disabled.

Firmware Updates

QSI Firmware Update

This section assumes that the administrator has already downloaded the appropriate firmware update files from either email or another appropriate source.

To enter the meter firmware update screen for the QSI, select the 'QSI Upgrade' option from the Configure screen popup menu list as shown below.



To choose the correct firmware file from the download folder, select the 'Choose Flash File' button shown below.



Then select the 'Download' folder by selecting it from the popup menu list as shown below.



In the 'Download' folder, select the "QSIE.txt" file

4, 25 🔯 🕗		¥ 1¥\$1 555∰ 3:09 PM
UpgradeActivity		
Choose Flash File		
No Flash File Chosen		
	/storage/emulated/0/Download	
	ж	
	wedding	
	QSIE_BETA_2.txt	
(QSIE_BETA_4.txt	

To start the flashing of the new firmware to the QSI electronics on the meter, select the 'Start Flash' button as shown below.

▲ n ⊠ Ø ∫ UpgradeActivity	≉ 1¥41 son 🛔 3:09 PM
Choose Flash File	
QSIE_BETA_41xt	

After pressing 'Start Flash' the Android device will send the flash programming file to the QSI as it is programming. This process will take approximately 8 min to complete depending on the speed of your Android device's Bluetooth connection.

Warning: It is best to make sure you do not take the Android device more than 100 feet from the meter or you risk losing the Bluetooth connection and potentially disconnecting and corrupting the programming process. Additionally, you should also make sure to not turn off the meter during the flashing process.

	≹ 1861 Sets 🚔 3:11 PN
UpgradeActivity	
Choose Fleah File Start Fleah	
QSIE_BETA_4.txt	16%
0000 No Demonstra Na Demonstra I Monkim BSI Unionkim BSI Enation Ellash Enation Ellash Enation Ellash Observation Successful	
No ResponseNo ResponseUnlocking BSLUnlocking BSLtrasing Flashtrasing Flashtrasing FlashUperation Successful	

After the meter has successfully downloaded and flashed the new firmware to the QSI, the app will attempt to restart the QSI electronics. Select 'OK' from the popup message to continue.

4, 25 🔀		≵ 18\$J 555 🖀 3:19 PM
UpgradeActiv	4 	
Choose Flash	le Start Flash	
QSIE_BETA_4	txt	
0000 No Response	No Basoonsa Uninckino RSI - Infordrino RSI - Erseino Elseb, Erseino Elseb, Daration Succassful	
The mapping	Eile Sent	
	File Sent to Device, This will reboot the device, you may have to reconnect.	
	ОК	

After selecting 'OK', select the Android device's 'Back' button until you get back to the main menu. On the main menu, make sure that the new QSI firmware is running by verifying that the measured variables are being updated appropriately. If the measured variables are not updating properly, or the FLOMEC logo is not properly spinning, power cycle the meter and re-connect to it with the FLOMEC app.

QSE Firmware Update

This section assumes that the administrator has already downloaded the appropriate firmware update files from either email or another appropriate source.

To enter the meter firmware update screen for the QSE, select the 'QSE Upgrade' option from the Configure screen popup menu list as shown below.



To choose the correct firmware file from the download folder, select the 'Choose Flash File' button shown below.



Then select the 'Download' folder by selecting it from the popup menu list as shown below.



In the 'Download' folder, select the "AFEE.txt" file.



To start the flashing of the new firmware to the QSI electronics on the meter, select the 'Start Flash' button as shown below.

< n 20 0 O UpgradeActivity	≉ n¥ti sse∰ 3:09 PM
Choose Flash File	
QSIE_BETA_4.txt	

After pressing 'Start Flash' the Android device will send the flash programming file to the AFE as it is programming. This process will take approximately 4 min to complete depending on the speed of your Android device's Bluetooth connection.

Warning: It is best to make sure you do not take the Android device more than 100 feet from the meter or you risk losing the Bluetooth connection and potentially disconnecting and corrupting the programming process. Additionally, you should also make sure to not turn off the meter during the flashing process.

	≉ i≋i s2%≣ 3:23 i
UpgradeActivity	
Choose Flash File Start Flash	
AFEE_BETA_2.txt	42%
000000000 No Response. Unlocking BSL_No Response. Unlocking BSL_Header Incorrect Unlocking BSL_Operation Successful Erasing FlashErasing FlashDeration Successful	

After the meter has successfully downloaded and flashed the new firmware to the AFE, the app will attempt to restart the AFE electronics. Select 'OK' from the popup message to continue.

4. 75 🛛	≉ i≋J 51%∎ 3:26 PM
UpgradeActivity	
Choose Flash File Start Flash	
AFEE_BETA_2.txt	
00000000	
No Response. Unlocking BSL. No Response. Unlocking BSL. Beader Incorrect Unlocking BSLOperation Successful Erasing Flash. Erasing Flast. Erasing Flast	
File Sent to Device, This will reboot the devic	ce, you may
	>

After selecting 'OK', select the Android device's 'Back' button until you get back to the main menu. On the main menu, make sure that the new QSI firmware is running by verifying that the measured variables are being updated appropriately. If the measured variables are not updating properly, or the FLOMEC logo is not properly spinning, power cycle the meter and re-connect to it with the FLOMEC app.