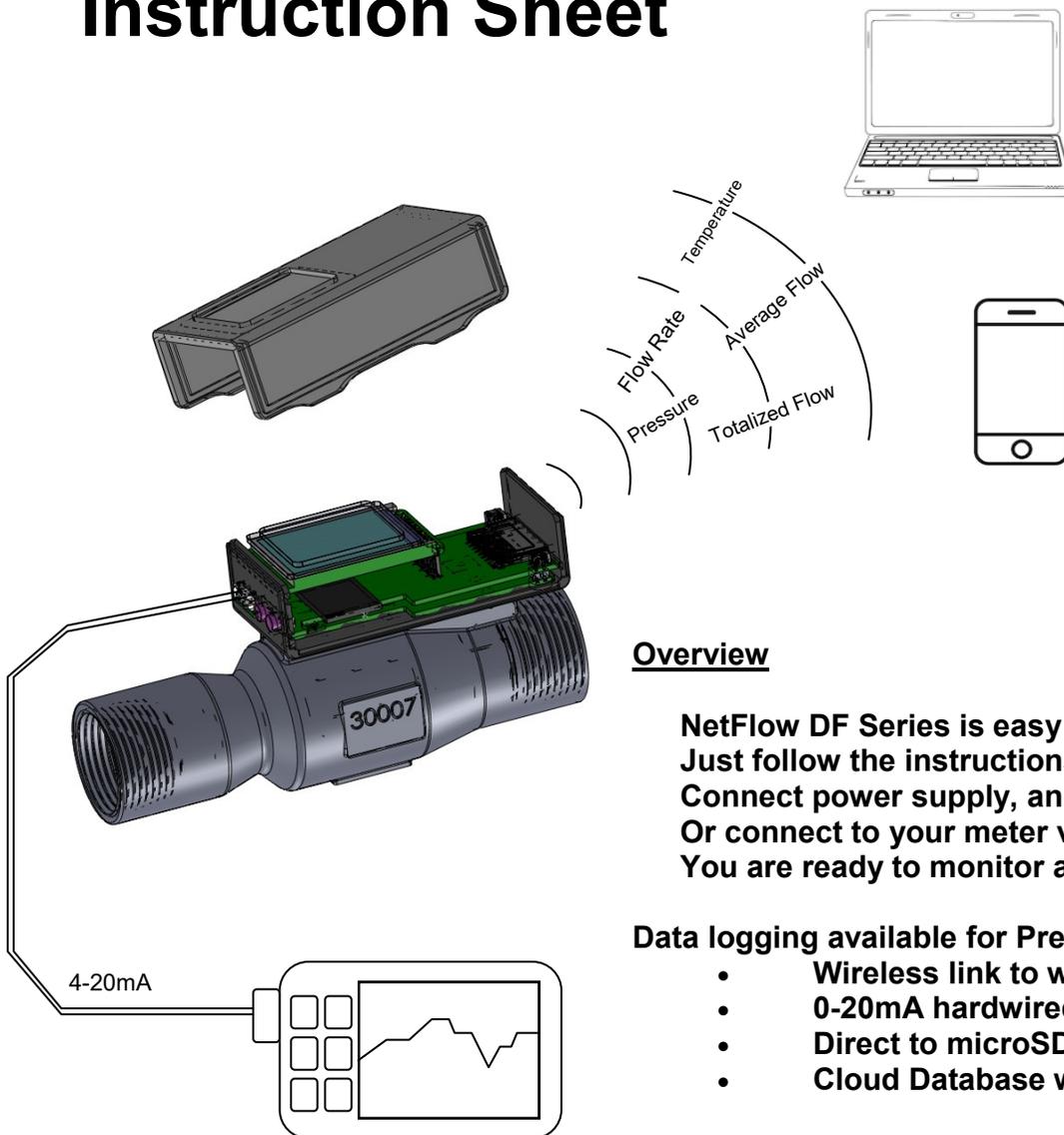


NetFlow

WiFi Connected and Configured

Dynamic Pressure Flowmeter

Instruction Sheet



Overview

**NetFlow DF Series is easy to set up and use
Just follow the instructions for installation
Connect power supply, and 0-20mA output if you wish
Or connect to your meter via Wireless webpage
You are ready to monitor and collect flow data**

Data logging available for Pressure, Flow, & Temperature

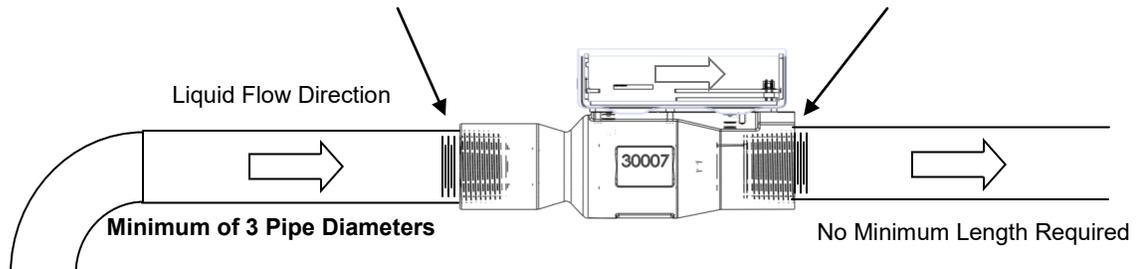
- **Wireless link to webpage**
- **0-20mA hardwired loop**
- **Direct to microSD card local data .CSV files**
- **Cloud Database with Dashboard & Alerts (soon)**

River Valley Design, LLC

Physical Installation & Connections

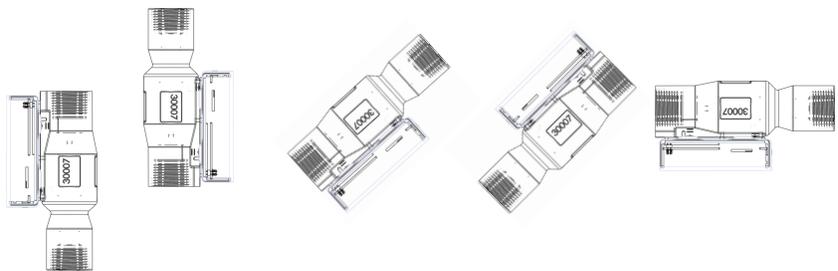
Typical Installation showing the Liquid Flow Direction and Required Pipe Lengths

Apply small amount of pipe sealant or PTFE tape to the MALE THREADS ONLY.
Application to the female threads may cause sealant to contaminate the pressure sensors in the meter.



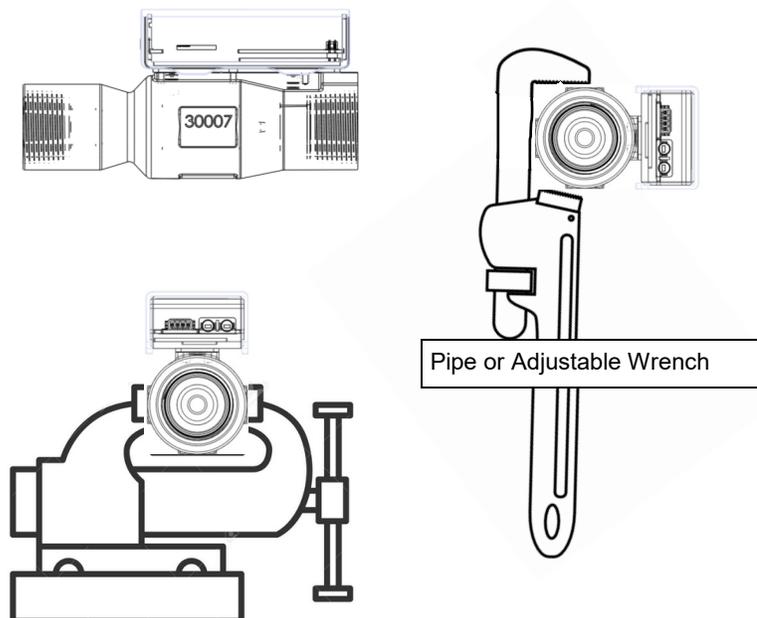
Install in ANY POSITION

The display orientation is adjustable to 2 positions

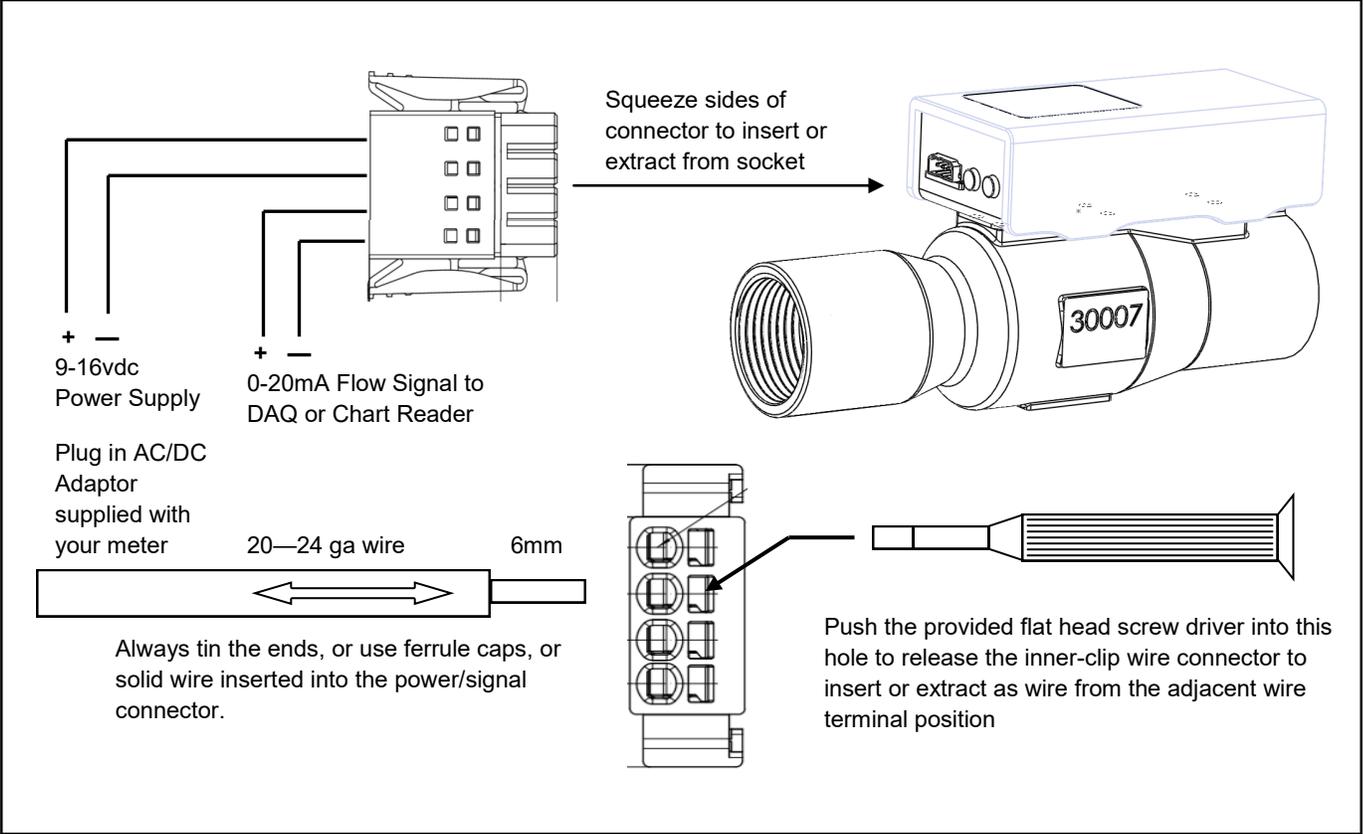


WARNING: Be Careful when making pipe connections. DO NOT allow wrench to damage electronic flow computer/server display module.

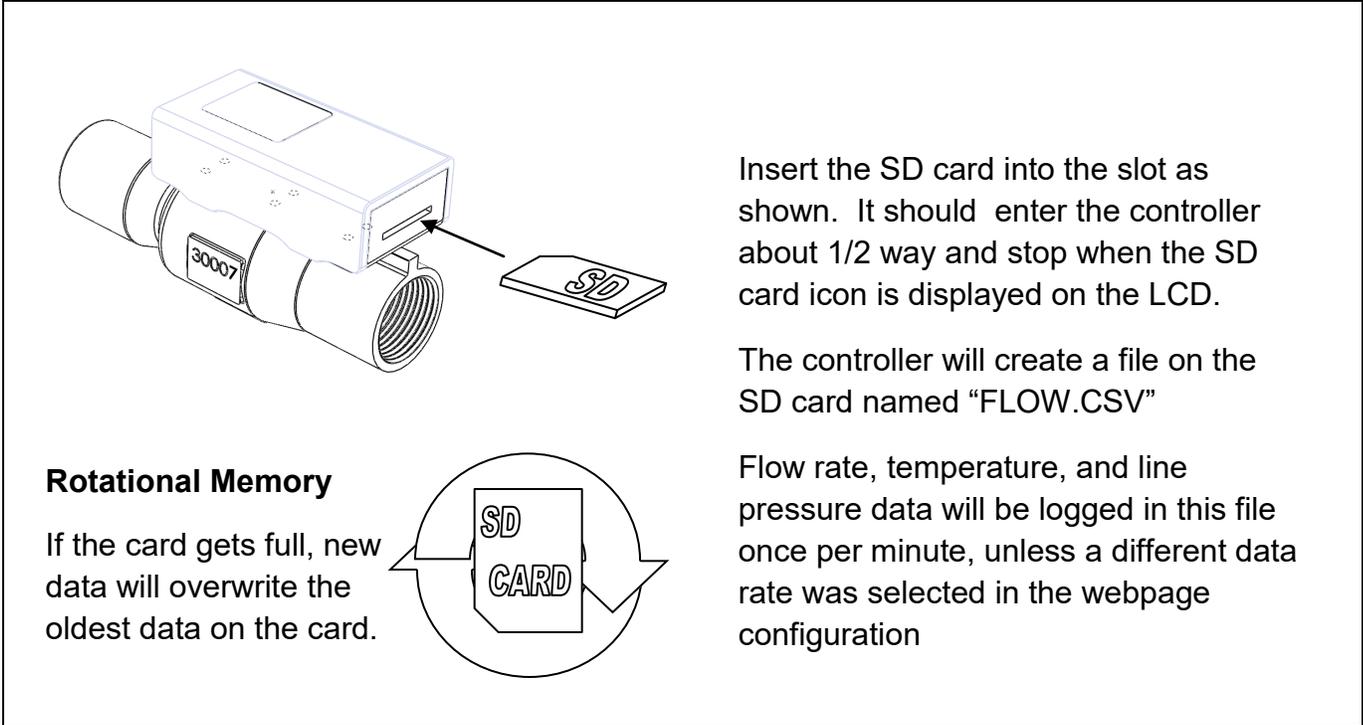
Recommended method is to clamp meter in a bench vise on the flats provided on the stainless steel body and connect the pipe fittings to the meter before installing into the rest of your piping system.



Power input, and Flow Signal Output Connection



Data Logging to your SD card



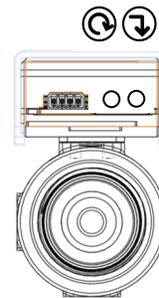
Operating Instructions

Local Button Operation

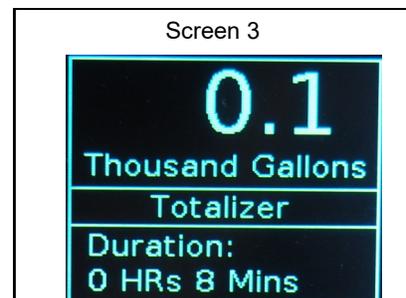
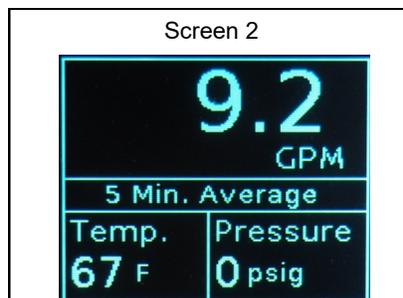
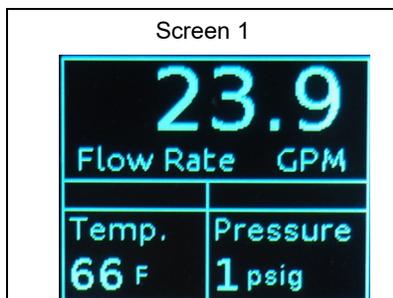
1. Pushing the buttons on the Computer/Server/Display CSD will activate most of the desired functions of the flow meter; as shown in the table below.
2. Setup and configuration is better done via the webpage connection over the WiFi link, as described in Section II of Operating Instructions

Cycle Button (A) 

Enter Button (B) 



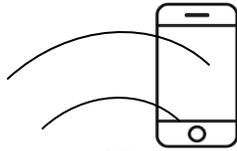
Action	Button	(A) or (B)	Controller Response
Quick Push		(A)	Scrolls from Screen 1 instantaneous flow rate/temperature/pressure, to Screen 2 averages
Quick Push		(A)	Scrolls from Screen 2 Average flow rate/temperature/pressure, to Screen 3 Totalizer
Quick Push		(A)	Scrolls from Screen 3 Totalizer, back to Screen 1 instantaneous flow rate/temperature/pressure.
Push & Hold		(B)	Reset Totalizer duration and amount when on Screen 3
Push & Hold		(B)	Sets the zero flow condition for the meter sensors when on Screen 1. The outside box will flash twice when zeroed.
Quick Push		(B)	Clears displayed warning if the over temperature or pressure condition has been corrected



WiFi Connection to Configuration/Display Webpage



The NetFlow meter creates its own secure local WiFi network and acts as the server for that network. You can connect smart devices to your NetFlow meter on that WiFi network to view the operation, or reconfigure the meter settings.



The Configuration/Display webpage uses a local WiFi connection.

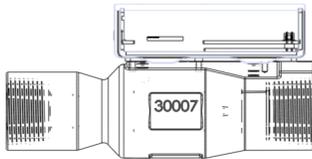
Look in your list of available WiFi networks for one like this:

NetFlow_1d-5c

Your WiFi will be unique, but formatted: NetFlow_## - ##

Select the NetFlow network and enter the password below:

123456789



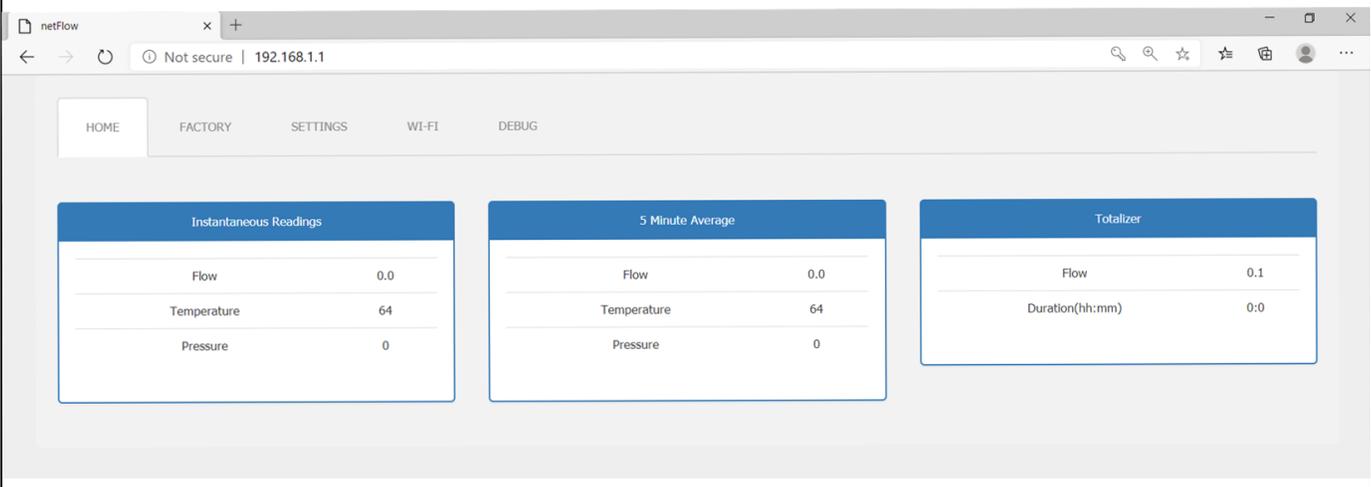
If you can't find the NetFlow network in your WiFi list, make sure the NetFlow meter power is on and figure out how to get your smart phone or pc to search for new WiFi networks. Most will do this automatically, but some need prompting from the user.

Open Chrome or EDGE web browser and enter the

URL: 192.168.1.1 Enter

Flow Meter Configuration via Webpage

- 1) Connect to the WiFi as described above
- 2) This will display the "Home" page as shown below
- 3) The other tabs; "FACTORY" for example activate with a mouse click

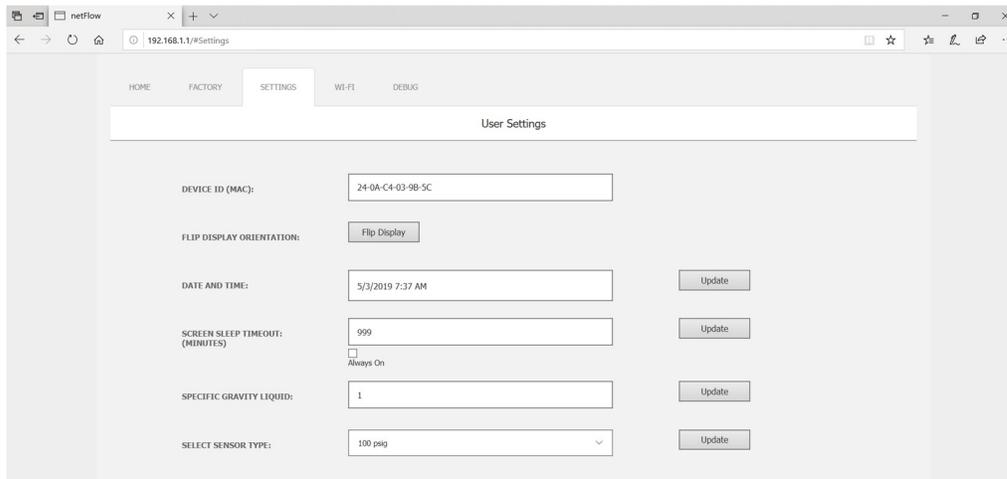


Instantaneous Readings	
Flow	0.0
Temperature	64
Pressure	0

5 Minute Average	
Flow	0.0
Temperature	64
Pressure	0

Totalizer	
Flow	0.1
Duration(hh:mm)	0:0

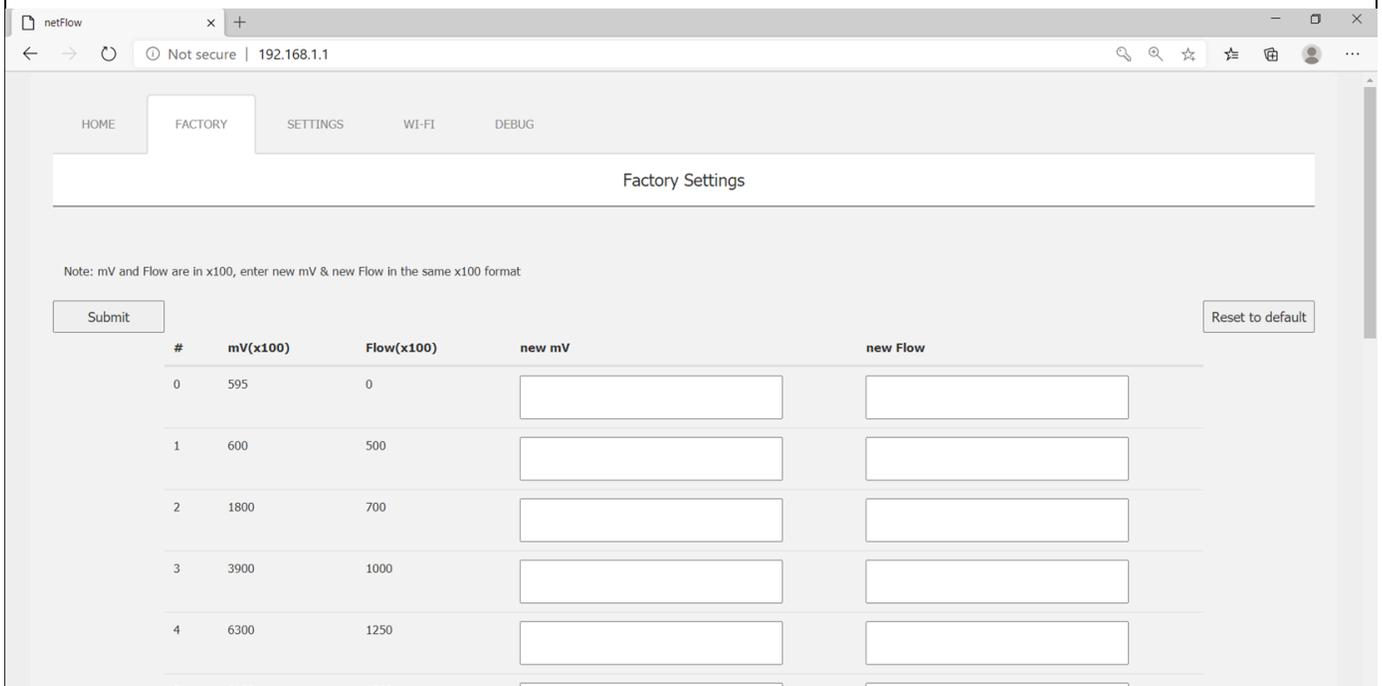
4) Click on the “Settings” Tab to open that page as shown below:



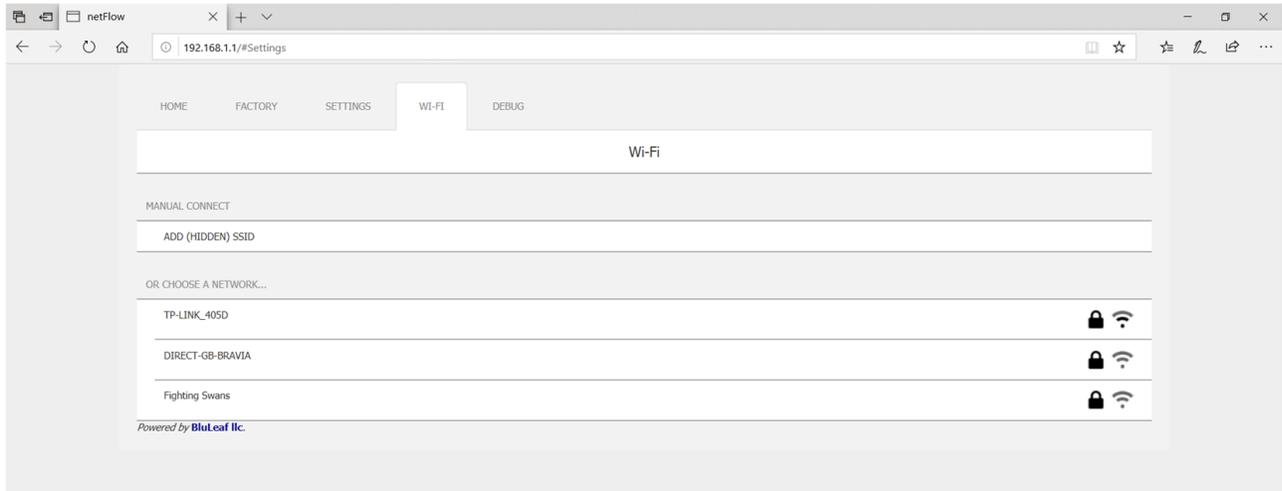
5) You can click on and adjust the parameters as needed.

6) After each adjustment click on “Update” and that change will be instantly written to non-volatile memory in the NetFlow microcontroller.

The Factory Calibration page contains the values used by the microcontroller to correlate dp signal to flow rate output. If you have the desire or need to create a custom calibration for the meter, this is the page that would be modified. Please request or download our NetFlow calibration instructions before attempting to change these values. Altering these values will invalidate your calibration certificate.



WiFi Connection Page for CLOUD link to Dashboard

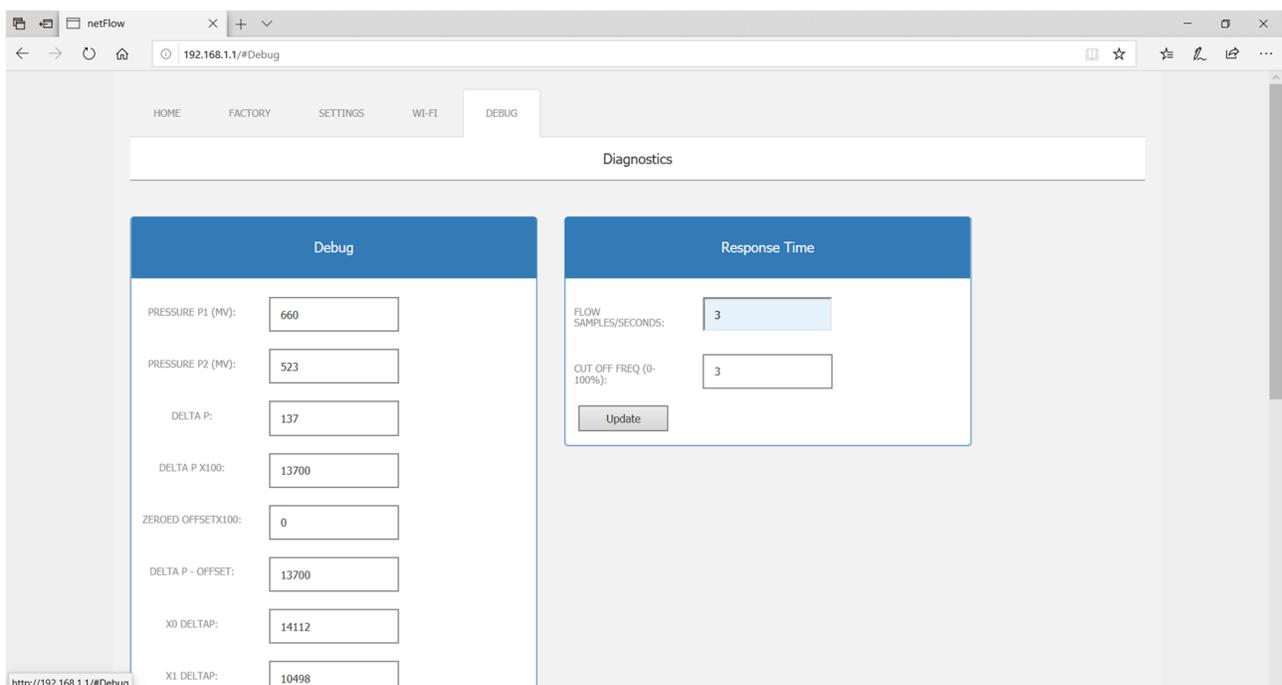


This page is used to connect to the cloud dashboard for performance trending and alarm alerts.

Detailed instructions are covered in a separate document titled, "NetFlow Dashboard Manual"

You may have received a complimentary subscription to the Cloud Service with your purchase. You may purchase an extension of that service at the end of the subscription.

The Debug page is used by factory and technical personnel to troubleshoot the meter. Do not make any changes to these parameters without guidance from technical support personnel.



Troubleshooting

The NetFlow meter has a robust trouble-free design. If you do have issues with the unit, try these solutions before contacting your vendor.

1) Unstable flow rate reading

- Check for electrical interference from VFDs or other high power equipment. Shield the meter as needed.
- Check the fluid flow stream for large air pockets and pump surges. Small bubbles will not effect the flow reading.

2) WiFi signal weak or not connected

- Check for electro-magnetic interference.
- Distance and metal or concrete obstructions reduce the WiFi signal just like full size WiFi routers.
- Use a WiFi signal app (like NetSpot) on your smart phone to check the WiFi signal strength near NetFlow meter and moving toward the PC or smart device that is connected to the NetFlow WiFi to see if something in the path is causing signal issues.

3) Calibration accuracy drifted

- Use the included webpage Factory menu to calibrate to a known flow meter or use a water bucket test for calibration if properly equipped and trained.
- Recommended: Send the meter back to River Valley Design for certified calibration.

4) Display blanked out

- Automatic time out after 20 minutes can be changed in settings webpage, with a range of 1 to 60 minutes, or always on. Just push one of the buttons to reactivate the display.
- If the “Home” tab on the webpage flow rate values are correct and actively updating but the display does not activate after a button push on the display unit, it could be a bad LCD display or LCD board lock up. Try reset power to fix.
- If the “Home” tab webpage flow rate values do not match the controller and are NOT actively updating, that could be a fault in the microcontroller board. Remove the plastic controller housing cover and look for the LED heartbeat to determine if your controller is operating properly. Try reset power to fix.

Some Information on Dynamic Pressure



Dynamic Pressure

Glenn
Research
Center



From the conservation of fluid momentum:

$$\rho u \frac{du}{dx} = - \frac{dp}{dx}$$

Algebra: $\frac{dp}{dx} + \rho u \frac{du}{dx} = 0$

Simplify: $\frac{dp}{dx} + \frac{d}{dx} \left(\frac{\rho u^2}{2} \right) = 0$

Collect: $\frac{d}{dx} \left(p + \frac{\rho u^2}{2} \right) = 0$

Integrate: $p_s + \frac{\rho u^2}{2} = \text{constant} = p_t$

static pressure $\quad \quad \quad$ total pressure
dynamic pressure = $q = \frac{\rho u^2}{2}$

<https://www.grc.nasa.gov/WWW/K-12/airplane/dynpress.html>

Dynamic pressure is the **kinetic energy** per unit volume of a fluid.

Dynamic pressure is in fact one of the terms of [Bernoulli's equation](#), which can be derived from the [conservation of energy](#) for a fluid in motion. In simplified cases, the dynamic pressure is equal to the difference between the [stagnation pressure](#) and the [static pressure](#).¹

https://en.wikipedia.org/wiki/Dynamic_pressure

Material Compatibility

Wetted Parts: 2205 Duplex SS, 316L SS, PEI, PPS (RytonR-4), Viton O-Rings, Medical Grade Epoxy

Fluids with Excellent Material Compatibility Ratings for All Wetted Parts

Acetylene
Ammonium Nitrate
Arsenic Acid
Barium Chloride
Beer
Boric Acid
Butane
Calcium Bisulfite
Carbonic Acid
Citric Acid
Copper Nitrate
Detergents
Diesel Fuel
Ferric Sulfate
Fuel Oils
Gasoline (high-aromatic)
Glycerin
Glycolic Acid
Isooctane
Jet Fuel (JP3, JP4, JP5)
Lubricants
Magnesium Hydroxide
Oxalic Acid (cold)
Potassium Chloride
Potassium Sulfate
Salt Brine (NaCl saturated)
Silicone
Soap Solutions
Sodium Bicarbonate
Stannous Chloride
Sulfur Dioxide
Sulfur Dioxide (dry)
Tannic Acid
Tomato Juice
Vinegar
Water, Deionized
Water, Distilled
Water, Fresh
Zinc Sulfate