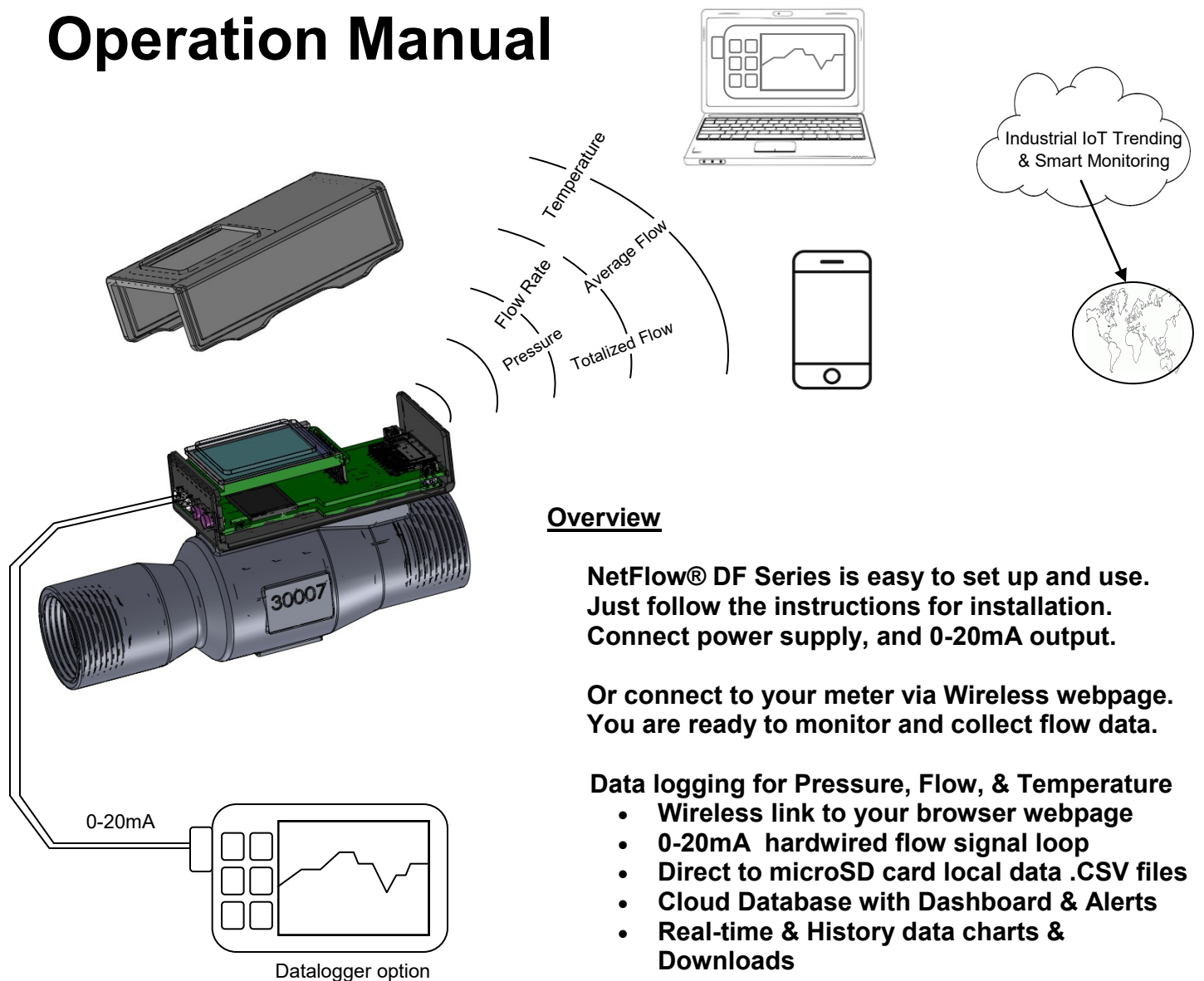


Dynamic Pressure Flowmeter**Installation &
Operation Manual****Overview**

NetFlow® DF Series is easy to set up and use. Just follow the instructions for installation. Connect power supply, and 0-20mA output.

Or connect to your meter via Wireless webpage. You are ready to monitor and collect flow data.

Data logging for Pressure, Flow, & Temperature

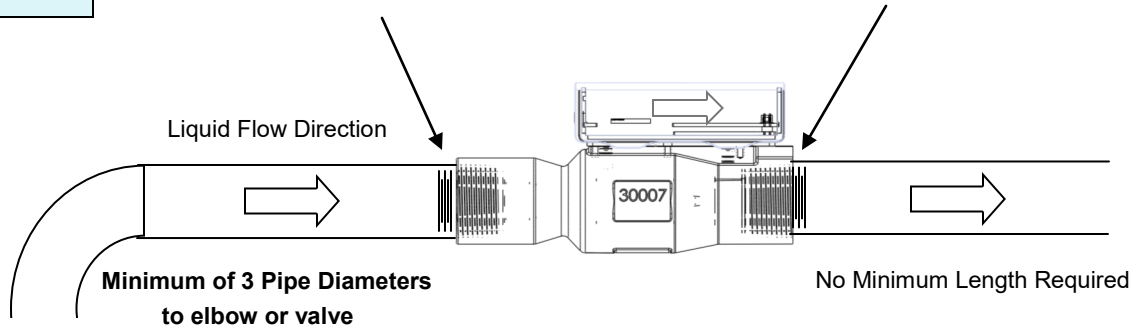
- **Wireless link to your browser webpage**
- **0-20mA hardwired flow signal loop**
- **Direct to microSD card local data .CSV files**
- **Cloud Database with Dashboard & Alerts**
- **Real-time & History data charts & Downloads**

Physical Installation & Connections

Typical Installation showing the Liquid Flow Direction and Required Pipe Lengths

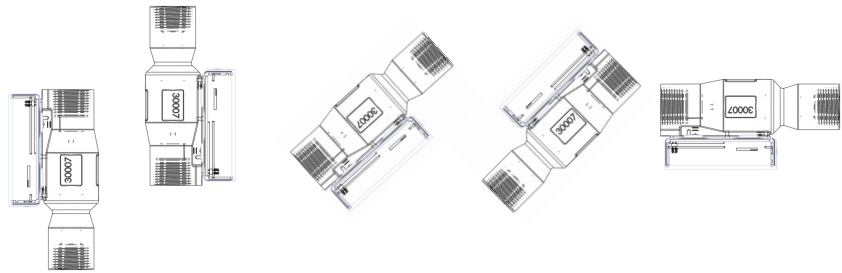
WARNING

Apply a 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.



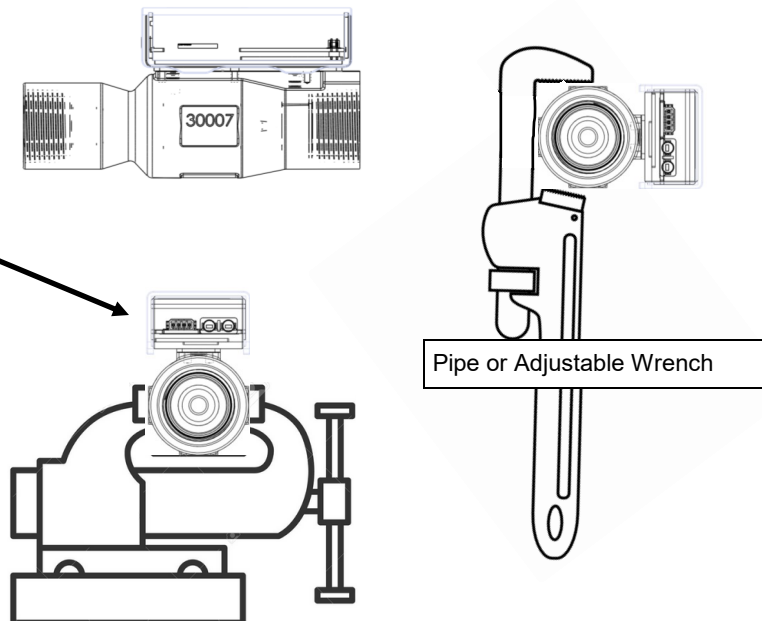
Install in ANY POSITION

The display orientation is adjustable to 2 positions



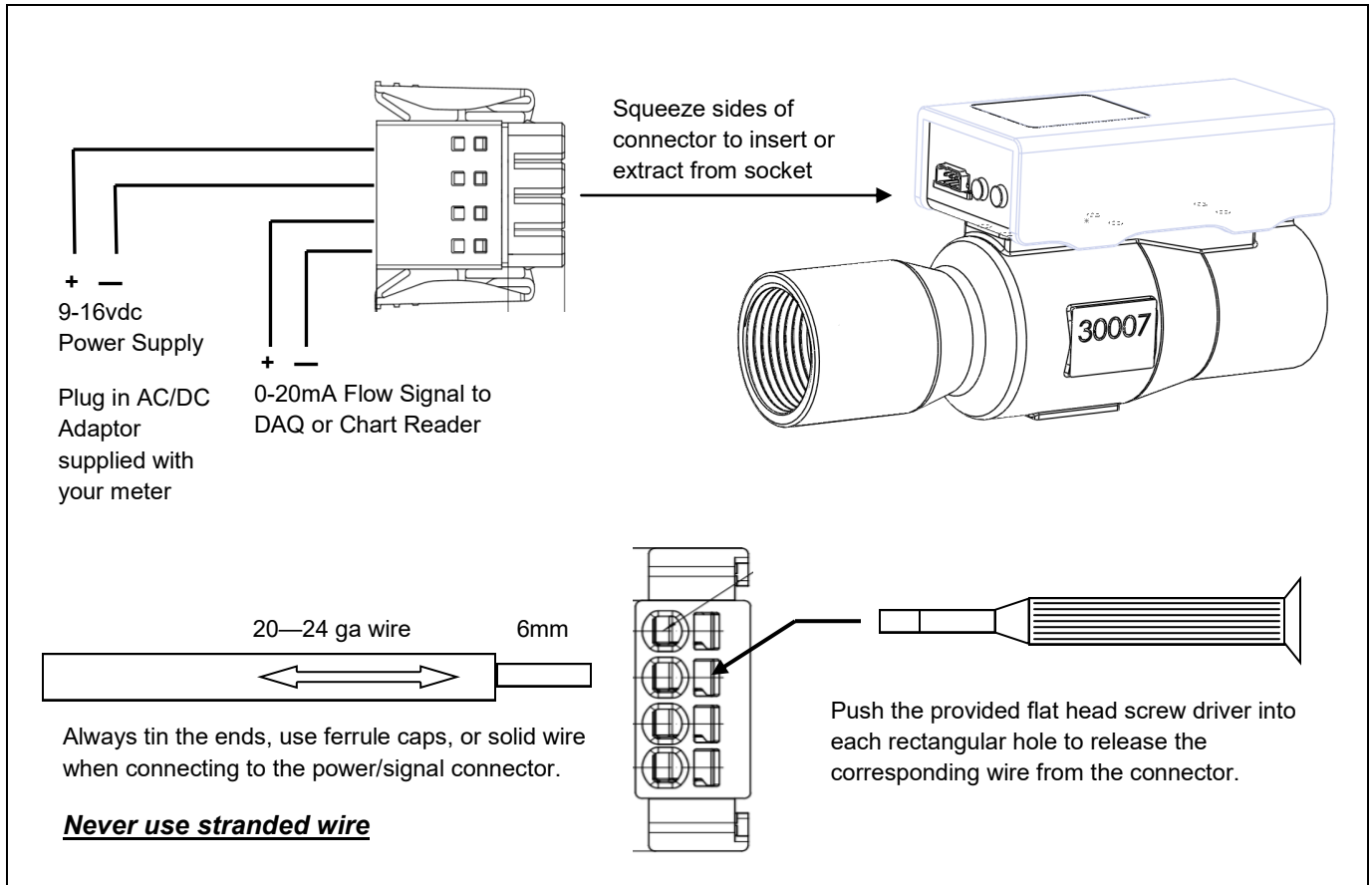
WARNING: Be Careful when making pipe connections. DO NOT allow wrench to damage electronic flow controller/server/display (CSD) module.

Recommended method is to clamp the 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.

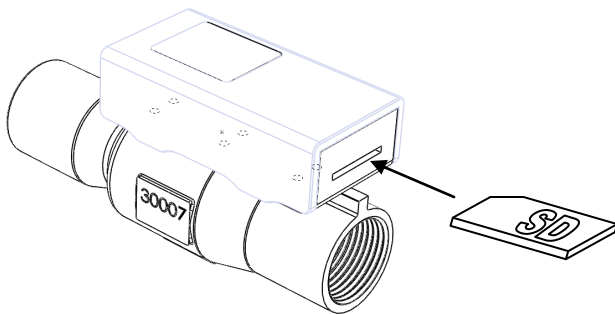


Power Input and Flow Signal Output Connection

Your meter comes with a power supply and cable pre-assembled. This information below is for reference in case you need to replace the parts or connection wires.



Data Logging to Your SD Card

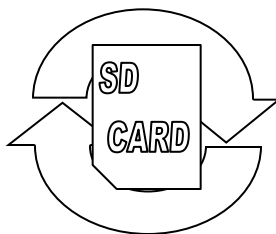


Insert the SD card into the slot as shown. It should enter the controller about 1/2 way and stop. An SD card icon will appear on the display if your card is functioning properly.

The controller will create a file on the SD card named “####.csv” The digits will match the last four digits of the MAC address, which is located on the label above the buttons.

Rotational Memory

If the card gets full, new data will overwrite the oldest data on the card.



Flow rate, temperature, and line pressure data will be logged in this file once per minute, unless a different data-rate was selected in the webpage

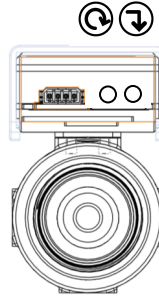
Operating Instructions







Local Button Operation

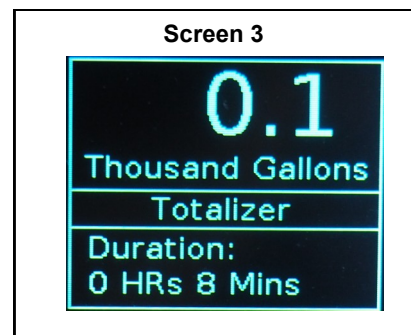
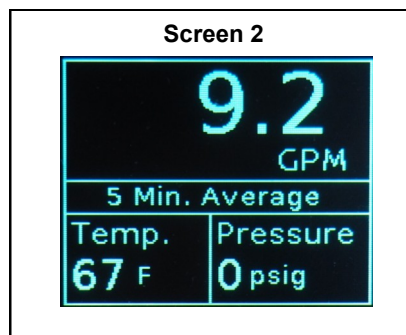
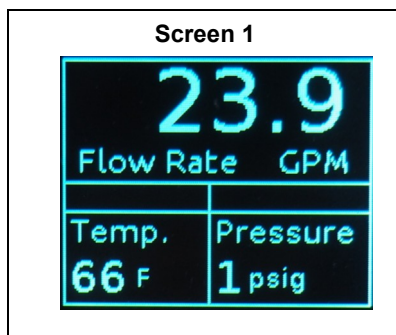
1. Pushing the buttons on the Computer/Server/Display CSD will activate most of the desired functions of the flowmeter; as shown in the table below.
2. Setup and configuration is done via the webpage connection over the WiFi link, as described in the following pages.

Cycle Button (A) 

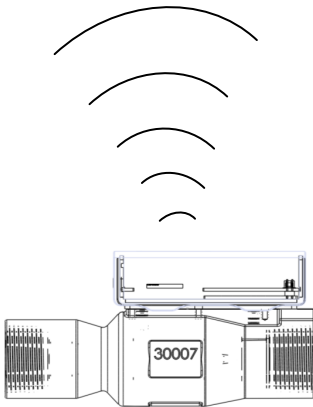
Enter Button (B) 



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 4 seconds		(B)	Sets the zero flow condition for the meter sensors when on Screen 1. The outside box will flash twice when zeroed.
Push & Hold 4 seconds		(B)	Reset Totalizer duration and amount when on Screen 3
Quick Push		(B)	Clears displayed warning if the over temperature or pressure condition has been corrected



Setup and Configure Your WiFi Link



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 Controller/Server/Display (CSD) creates a 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

You can enter your own custom password in the settings tab of the webpage after you are connected

If you can't find the NetFlow network in your WiFi list, make sure the NetFlow meter power is on and search for new WiFi networks. Your device should automatically list NetFlow as an available network, but some need prompting from the user.

Open Chrome, EDGE, or other web browser and enter the

URL: 192.168.1.1 Hit ENTER and the webserver configuration page will load on your browser window

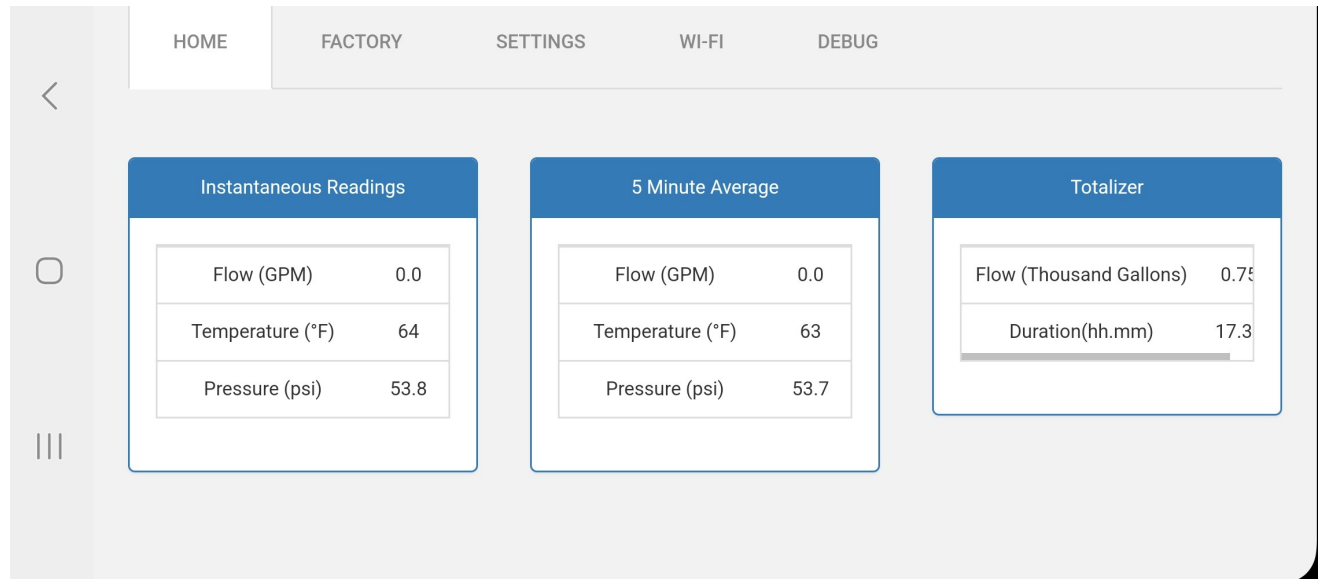
Record your own Password here for future reference:

Record your Serial Number here for future reference:

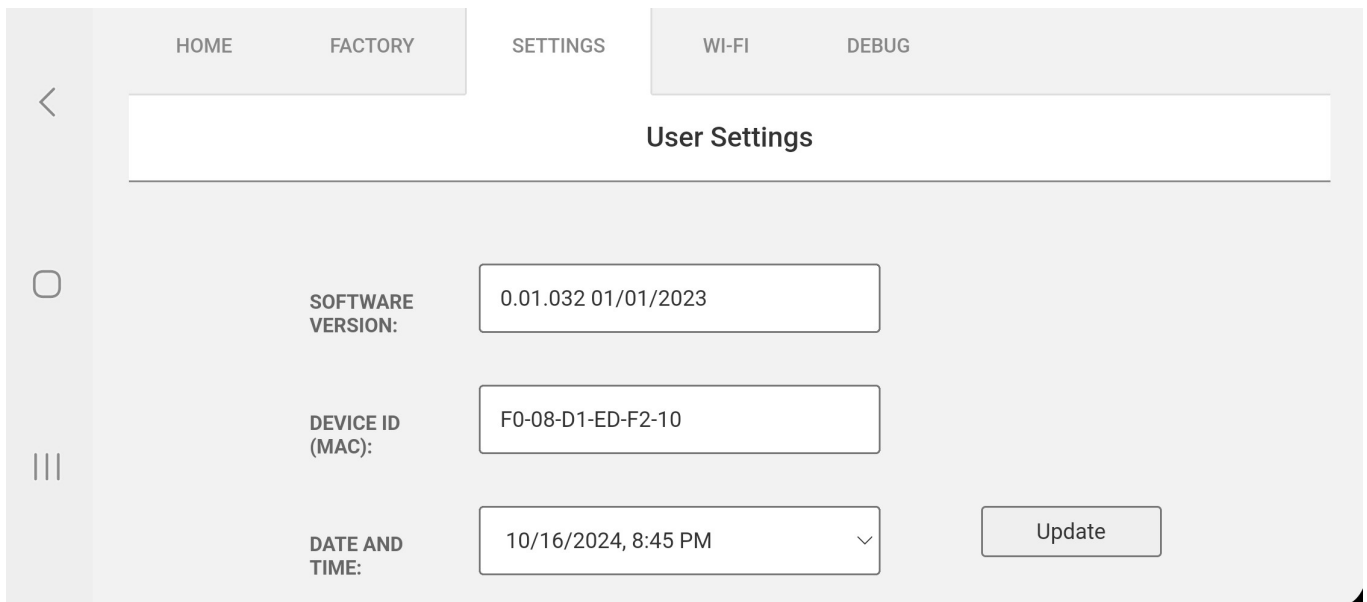
L21- _____

Flowmeter Configuration via Webpage

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



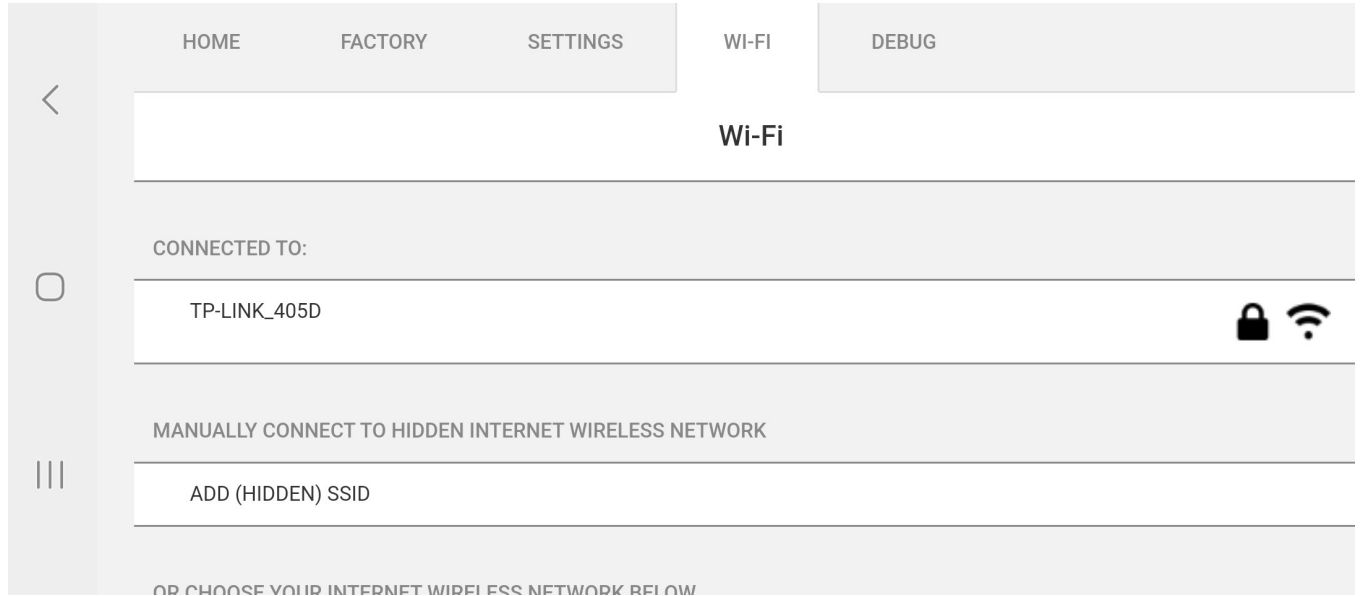
- 4) Click on the “Settings” Tab to open that page as shown below:



- 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 CSD microcontroller.

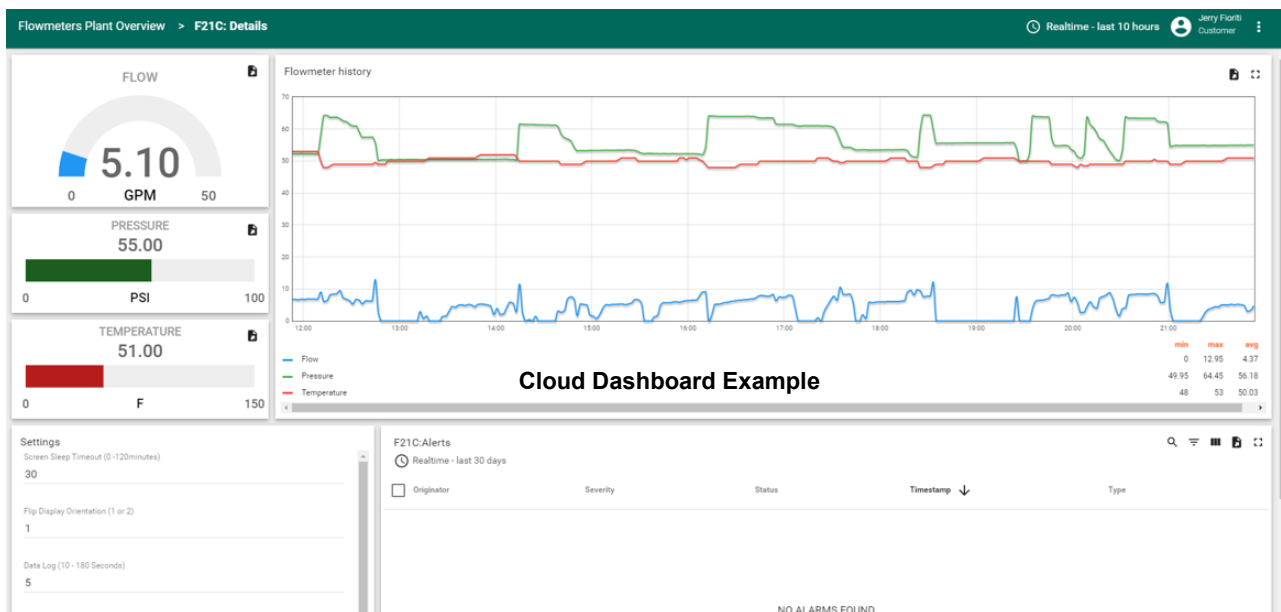
Cloud Dashboard Connection

Use the WiFi Tab to link your NetFlow to the Cloud Dashboard. This will enable performance trending and alarm alerts with a data plan.

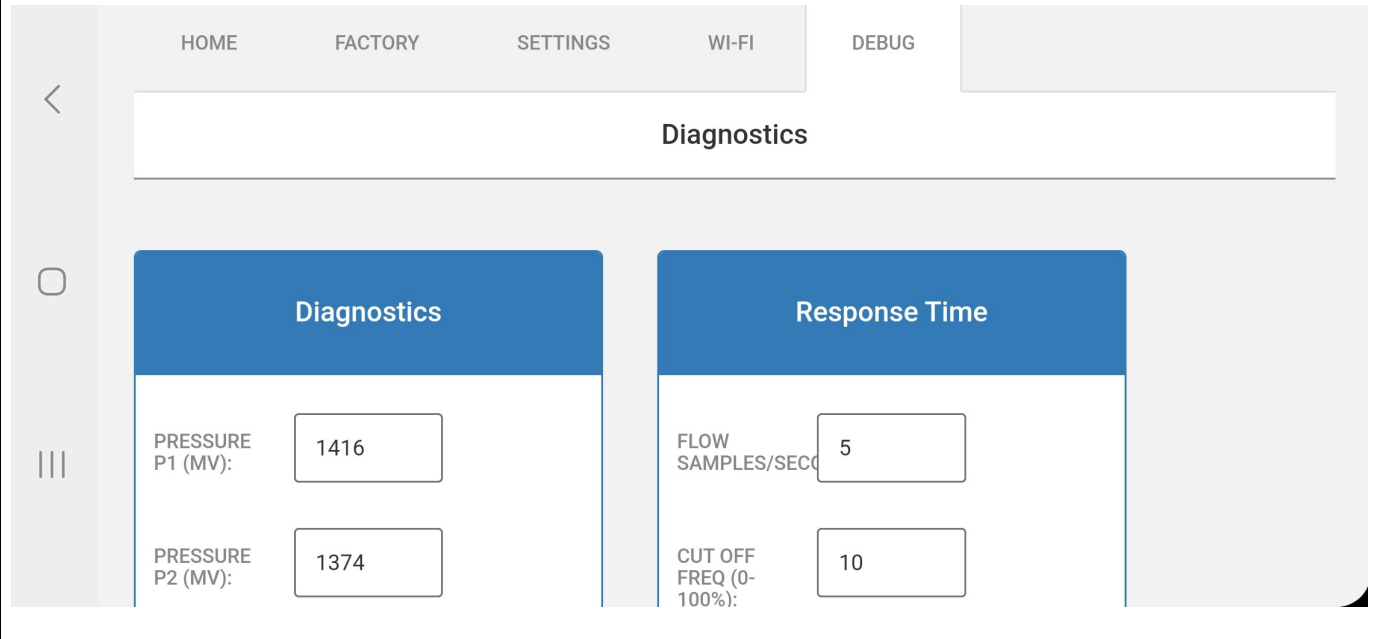


Detailed instructions are covered in a separate document titled, “NetFlow Dashboard Manual” linked on www.flowmetersrvd.com.

Once your complimentary subscription to the Cloud Service expires, you may purchase an extension of that service directly from BluLeaf, LLC. Details are at: www.flowmetersrvd.com.



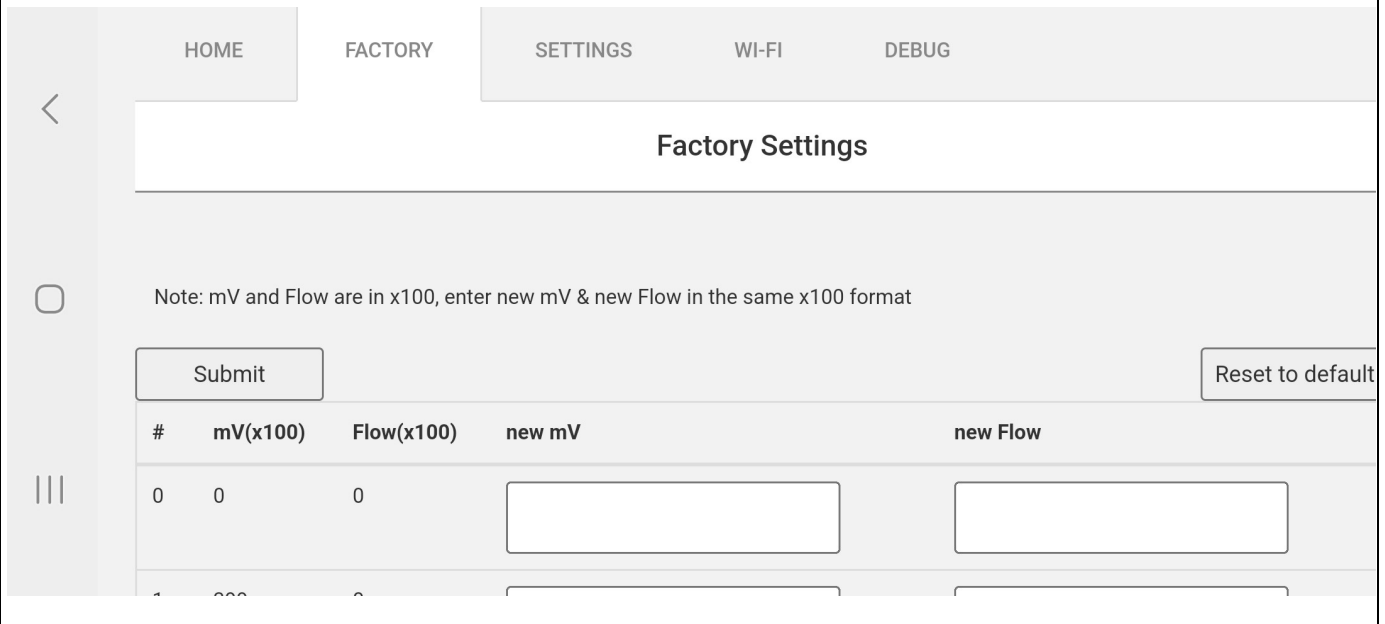
The Debug tab is used by factory and technical personnel to troubleshoot the meter. Do not make any changes to these parameters without guidance from technical support personnel.



The “Factory” calibration tab contains the values used by the microcontroller to correlate the differential pressure signal to flow rate output.

If you choose to create a custom calibration for the meter, this is the page that would need to be modified. Please download our NetFlow Calibration Instructions before attempting to change these values.

WARNING: Altering these values will invalidate your calibration certificate.



Troubleshooting

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

1) Unstable Flow Rate Reading

- Check for electrical interference from VFDs or other high powered 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, 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. Start near the NetFlow meter and moving toward the router, PC, or smart device that is connected to the Net-Flow WiFi to find and resolve object in the path causing signal issues.

3) Calibration Accuracy Drifted

- Isolate the meter with a full pipe of stationary water. Push and hold button (A) for 4 seconds to reset the zero point.
- Flush and clean the pipe connections and the NetFlow meter
- Use the included webpage Factory tab to calibrate to a certified flow-meter in series; or use a water-bucket-test for calibration if properly equipped and trained.
- Recommended Action: Send the meter back to River Valley Design if needed for factory recalibration.

4) Display Blanked Out

- The preset 20 minute time-out can be changed in the “Settings” tab to a range of 1 to 60 minutes; or always on via the checkbox. Then just push button (a) or (b) to reactivate the display.
- If the “Home” tab on the webpage flow rate values are correct and actively updating but the display stays blank, it could be a bad LCD display or LCD board lock up. Reset the power to fix a lock up. Call the factory if you suspect an LCD failure.
- If the “Home” tab webpage flow rate values do not match the controller and are NOT actively updating, there may be an issue with the WiFi connection or a fault in the microcontroller board. Reset the power to fix a lock up. See #2 above for connection issues. Call the factory if you have a controller board failure.

Material Compatibility

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

A List of 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

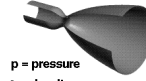
Notes and Operating Information:

Some Information on Dynamic Pressure



Dynamic Pressure

Glenn
Research
Center



From the conservation of fluid momentum:

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

p = pressure
 ρ = density
 u = velocity

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

total pressure

$$\text{dynamic pressure} = q = \frac{\rho u^2}{2}$$

<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

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Rock Tavern, NY
www.FlowmetersRVD.com