SoundWater
Only Excellence

SoundWater Flow Computer

A Wall-mounted Flow Computer that Connects to Cypress

Instruction Guide

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SoundWater Flow Computer

A display and computer for Cypress Ultrasonic Flowmeters

Meet SoundWater Flow Computer.
The SoundWater Flow Computer is a wall mounted display and computer that connects to the Cypress Ultrasonic Flowmeter. It accepts one or two flowmeters for displaying measurements, totalizing, averaging flows, adding or subtracting flows, or proportional output (dosing/mixing). It also connects to your SCADA, PLC, or HMI systems, and is ideal when a local display is required.

Industries

- Waterparks, Pools, and Aquariums
- Building Commissioning and Maintenance
- Agricultural Irrigation
- Building Water Management

Fast to install, easy to use.

SoundWater Advantages

MEASUREMENTS YOU CAN TRUST
Our proprietary SoundWater Reciprocity Architecture™ prevents zero-flow drift and eliminates the need for calibration, resulting in long-term measurement stability and accuracy.

INCREASES PRODUCTIVITY
Featuring compact lightweight construction and intuitive apps, our products reduce installation, training, and setup—saving you time and money.

MADE IN USA
Locally owned and operated out of Wenatchee, Washington, our products are built with American quality and ingenuity.

WORKS IN TOUGH APPLICATIONS
Our transducers auto-adjust ultrasonic power output depending upon pipe and fluid conditions—giving you more frequent measurements when things get tough (e.g., corroded pipe or murky fluid).

LONG LIFE / LOW MAINTENANCE
SoundWater products are built to last using the highest quality materials, gasketed & double O-ring seals, and silicone gel to protect electronics.

SERVICE & ACCOUNTABILITY
We establish long-term customer relationships based on trust and service. We will respond to your needs and requests within 24 hours.

Intuitive Touchscreen Display

The built-in touchscreen is your access to the Flow Computer App featuring a familiar user experience similar to our Cypress and Orcas mobile apps. Swipe, tap, scroll, and (if needed) use an on-screen keyboard to specify parameters. The display is backlit for maximum visibility in darkness or sunlight.

Preset menus, plain-language dialogs, and intuitive navigation let you easily choose from pre-loaded settings. There is little to no programming setup required: simply connect power and your Cypress flowmeter, and in seconds the SoundWater Flow Computer displays flow measurements in English or metric units.

Designed to Withstand Tough Electrical Environments

The Flow Computer was designed with electrical isolation and protection to operate in electrically noisy environments. Typical industrial environments with high power, pumps, VFDs and other large machinery often radiate EMF and conduct emissions through pipe and wires that can damage electronics and/or corrupt ultrasound or data communications. The Flow Computer was fitted with the electrical isolations and protections listed below for robust operation and protection in noisy environments:

Flowmeters

- Fully isolated (1.5kV transient; 50VRMS)
- Multiple TVS protection on output
  - Common mode ESD
  - Series protector on data lines
  - Differential varistor

Pulse/Alarm:

- Non-isolated
- Common mode ESD
- Series protector & short circuit protection

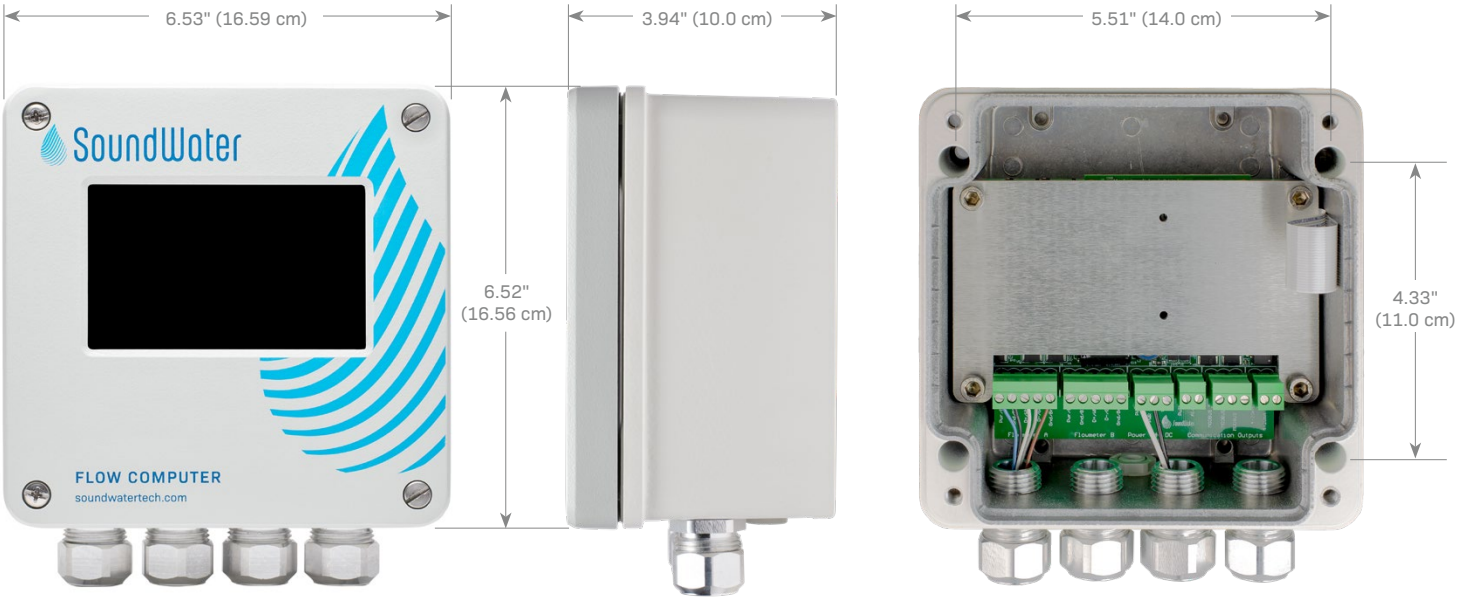
Modbus

- Analog low pass filter to suppress high frequency interference such as static or RFI
- Digital non-linear filter to suppress out-of-band frequencies and mis-timed transitions
- Fully isolated (1.5kV transient; 50VRMS)
- Multiple TVS protection on output:
  - Common mode ESD
  - Series protector on data lines
  - Differential varistor

4-20mA

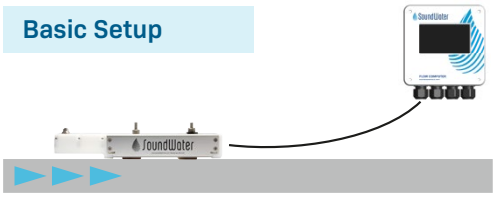
- Fully isolated (1.5kV transient; 50VRMS)
- TVS protection

Dimensions



Typical Applications

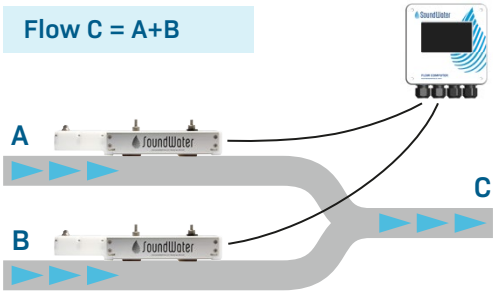
Basic Setup



Basic Setup

Connect the Flow Computer to a single flowmeter — whether it's nearby or thousands of feet away. Display flow rate, total volume, and even fluid temperature (see details below).

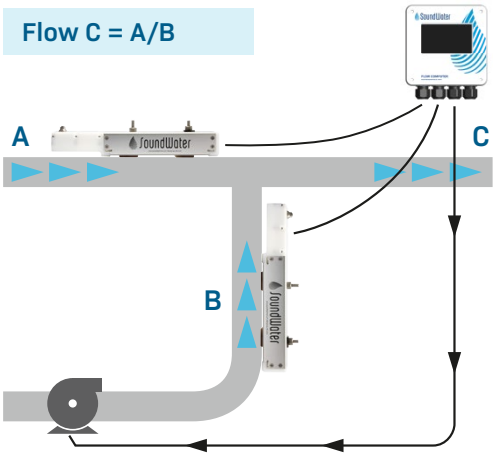
Flow C = A+B



Converging or Diverging Flows

When two pipes converge into one and the combined flow is desired, the Flow Computer can be configured to show the total flow (A + B, which equals C) on the display.

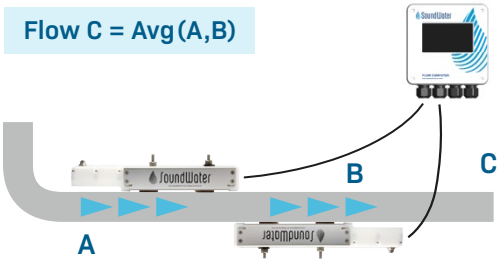
Flow C = A/B



Proportional Pump Control

For mixing and dosing applications, one flow feeds into another flow to produce a controlled proportional mixture. In this case the Flow Computer can be configured to divide one flow by another and display the proportions. In addition, that proportional flow can be output from the Flow Computer's hardware outputs (4-20mA, pulse, Modbus) as feedback to control a pump and accurately regulate the dosed/mixed proportions.

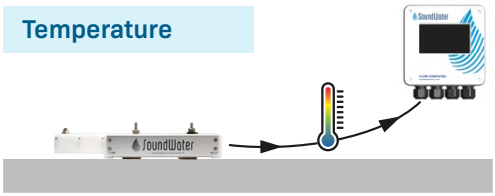
Flow C = Avg (A,B)



Increased Accuracy or Limited Straight Pipe

Need more accuracy? Don't have enough straight pipe? We have a solution: install two flowmeters on one pipe, connect them to the Flow Computer and select to average the two flows. The addition of the second flowmeter adds another ultrasonic beam into the fluid to sample more of the fluid cross section and improves measurement accuracy.

Temperature



Display Fluid Temperature

Need temperature? Our ultrasonic flowmeters not only measure flow, but they also use ultrasound to measure fluid temperature inside the pipe! From the Flow Computer setup menu, simply select to display a temperature measurement, and from which flowmeter.

NOTE: *Temperature measurement for water applications is limited to 32°–176° F (0°– 80°C) and you must provide the fluid's static pressure (defaults to 80 psi). If the pressure in your system is relatively stable and fluid temperature is within the aforementioned range, this may be a great tool for thermal measurement.*

Installation

1 Mount your Flow Computer

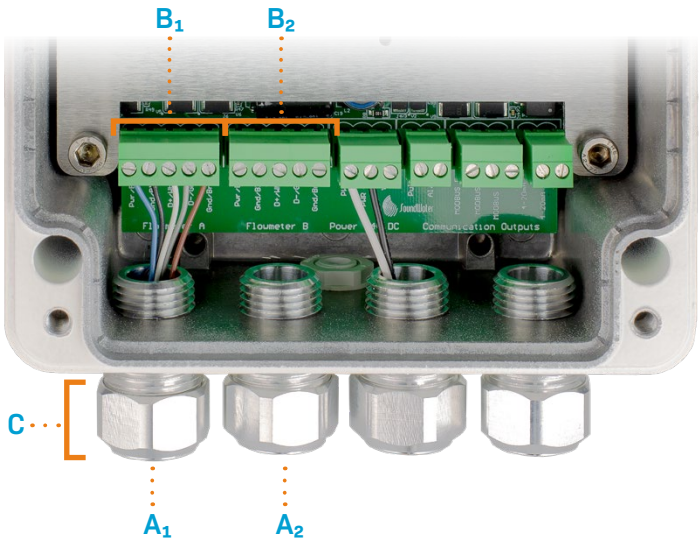
First you'll mount the Flow Computer in any location that's convenient for monitoring ease. The Flow Computer can be mounted near to your flowmeter(s) or thousands of feet away.

Remove faceplate by unscrewing the four corner screws on the front. **Note:** the screws do not pull out of the faceplate; they unscrew from the base and spin freely in the lid so you'll never lose them.

Insert fasteners into internal mounting holes. Hole for screws is 1/4" diameter (screws not included).

2 Connect your Cypress Flowmeter(s).

- Insert flowmeter cord set/cable into strain relief/ cord grip (**A_1**).
- Unplug flowmeter terminal block (**B_1**) from socket *(pluggable terminal blocks for easier wiring).*
- Insert five flowmeter wires into terminals (**B_1**) according to the color specified on the electronics board.
- Plug flowmeter terminal block back into socket labeled Flowmeter.
- Repeat if using a second flowmeter (use **A_2**/**B_2**).
- Remove excess wire slack and tighten strain relief nuts (**C**).



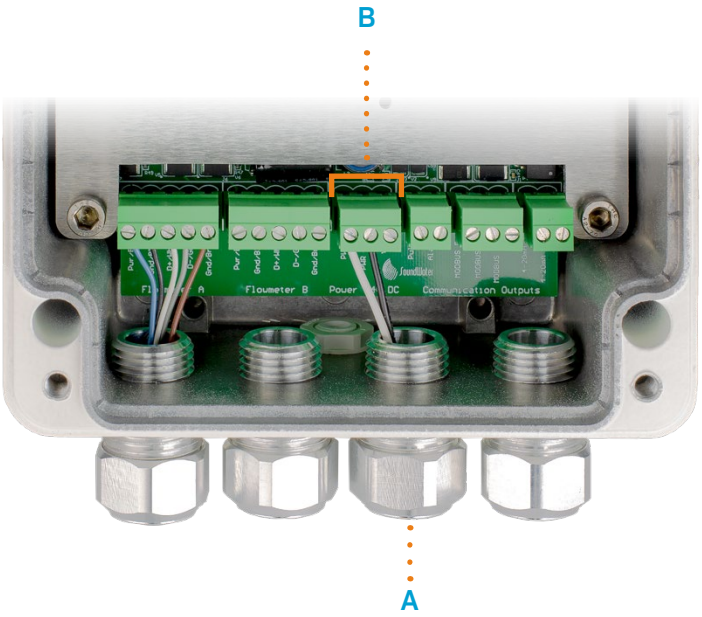
3 Connect power and grounding

Now that your flowmeters are wired into the unit, it's time to connect your power source to the Flow Computer.

Note: A grounding lug is provided for earth grounding and electrical safety.

Connecting to DC power

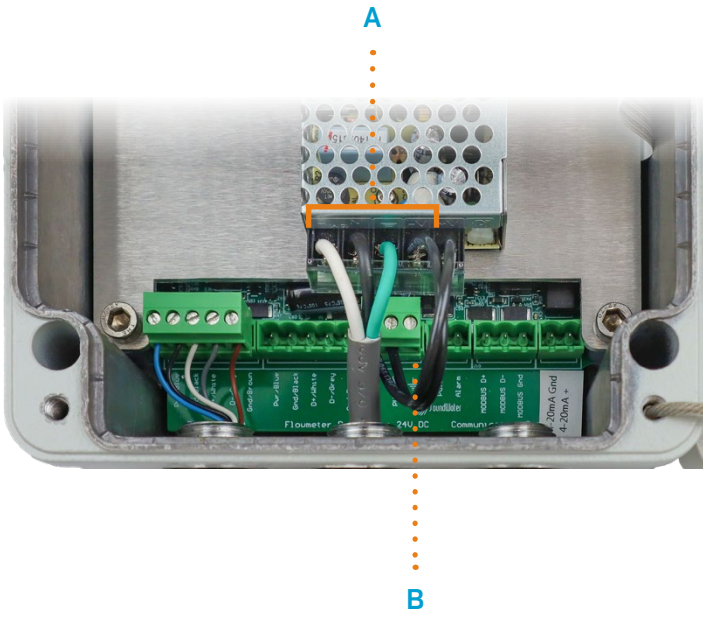
(Model FC100 or FC100-AL):



- Insert power ground, power supply, and earth ground into strain relief/cord grip (A).
- Remove power terminal block (B) from socket *(pluggable terminal block for easier wiring)*.
- Connect power to the terminal labeled **PWR +**
- Connect power ground to the terminal labeled **PWR GND**
- Connect earth ground to the copper grounding lug nut. Secure in place with screwdriver.
- Plug the power terminal block back into the socket labeled **Power**.

Connecting to AC power

(Model FC100-AC or FC100-AC-AL):



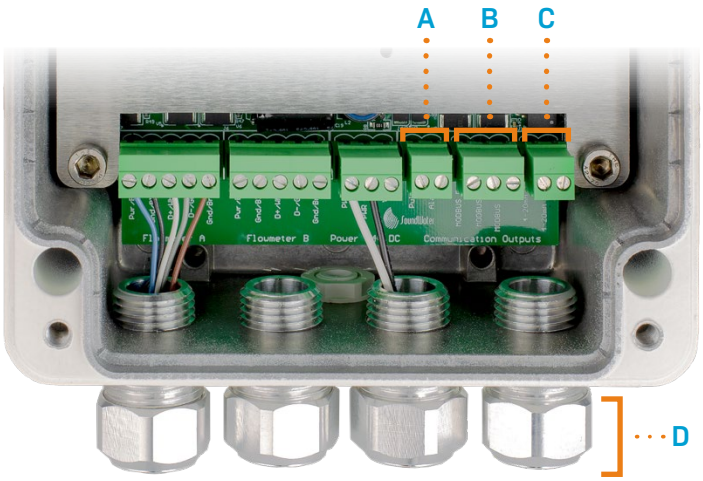
- Connect hot wire to terminal labeled **L** (Line), neutral wire to terminal labled **N** (Neutral) and ground wire to terminal labeled ⏚ (earth ground) on the AC/DC converter terminal block as shown (A).
- SoundWater already connected the 24 DC output power to Flow Computer electronics (B).

Continue to Step 4, next page

4 Connect hardware outputs

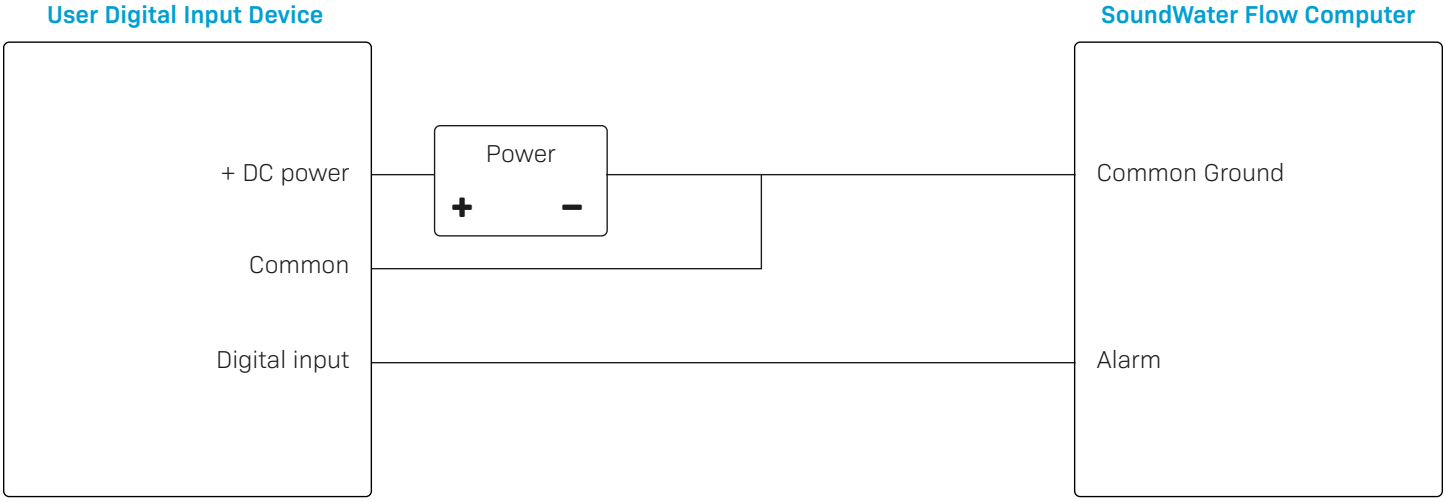
Next, connect your preferred outputs (labeled on the circuit board) using the wiring diagrams provided.

- Unplug desired output terminal block(s)
  - **A** = Pulse and/or Alarm
  - **B** = Modbus
  - **C** = 4-20mA
- For Alarm, Pulse, and 4-20mA, see diagrams below & page 9.
- For Modbus, insert output wires into terminal (**B**) according to the labels: Data +, Data –, Optional Shield for 2-wire RS-485.
- Plug output terminal block back into corresponding socket.
- Repeat for additional outputs, if applicable.
- Remove excess wire slack and tighten strain relief nut (**D**).

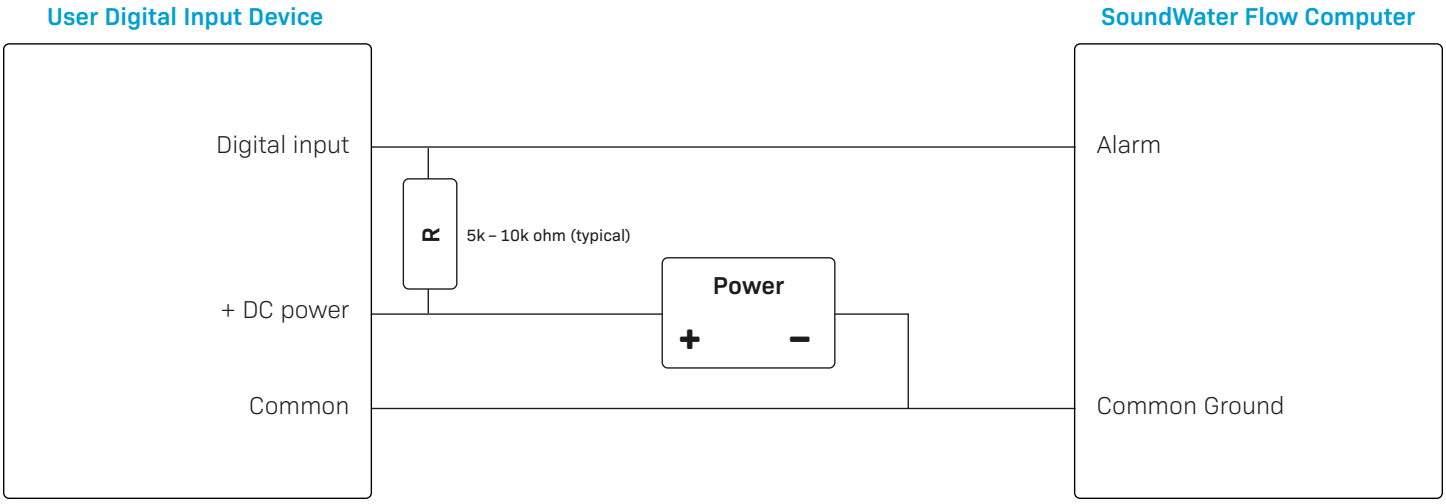


When you're finished with all connections, replace cover and fasten lid screws.

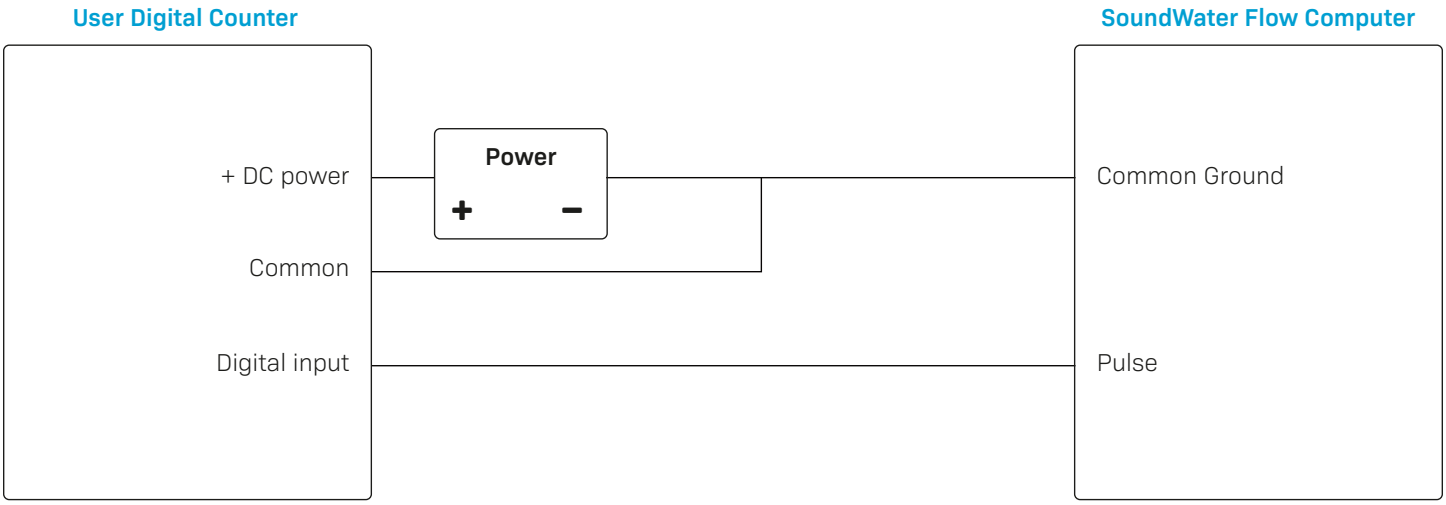
Alarm Output (sourcing input)



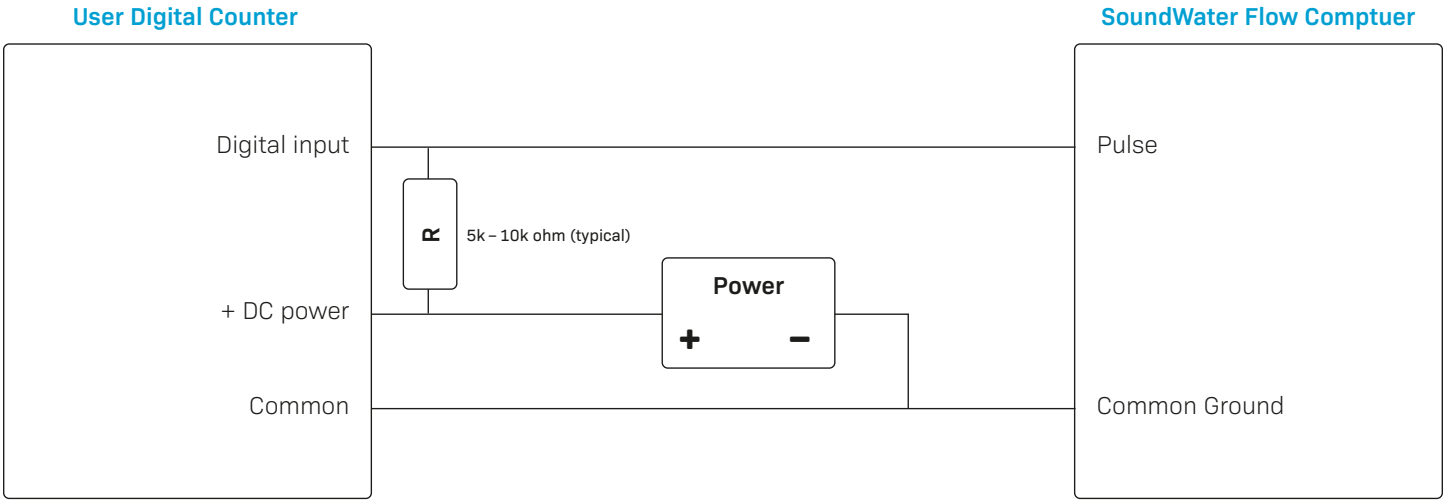
Alarm Output (sinking input)



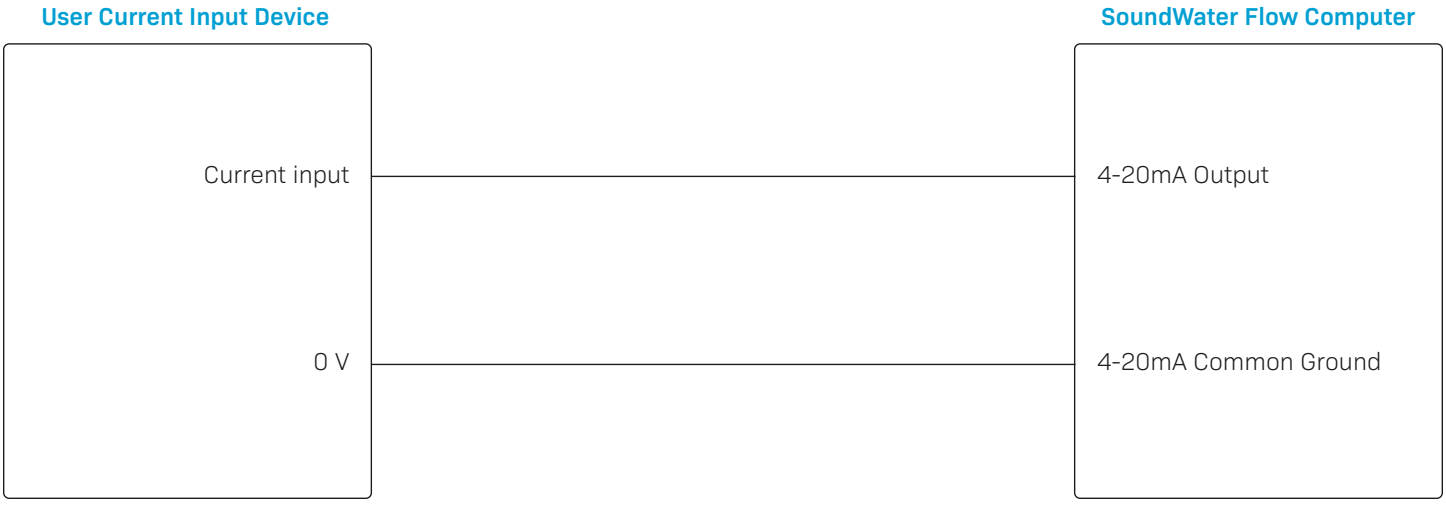
Pulse Output (sourcing input)



Pulse Output (sinking input)



4-20mA Analog Output



Programming Flowmeter(s) & Flow Computer

Your Flow Computer can be programmed to:

- Display flow measurements from one or more SoundWater Cypress flowmeters
- Compute analytical combinations of the flowmeter measurements (for example, flowmeter A + flowmeter B, flowmeter A – flowmeter B, etc.)
- Communicate with external hardware systems (4-20mA, Pulse, RS-485 Modbus RTU)

Use the Flow Computer as a local, always-on wall display of measurements in a fixed setting, or use its advanced features to calculate the difference of flows in two pipes, average of flows in two pipes, or control proportional dosing/mixing by measuring two flows and outputting a proportional pulse or 4-20mA signal to control pump speed.

And if insufficient straight pipe is available, the Flow Computer may be used to average two flowmeters to increase measurement accuracy.

When accuracy is critical, average two flowmeters on the same pipe—measurement performance typically is improved by a factor of 0.7.

Save cost by using the Flow Computer to display measurements from two flowmeters rather than one.

Measure temperature non-invasively ***(water only)***. The Flow Computer and Cypress flowmeter work together to use ultrasound measurements to infer water temperature.

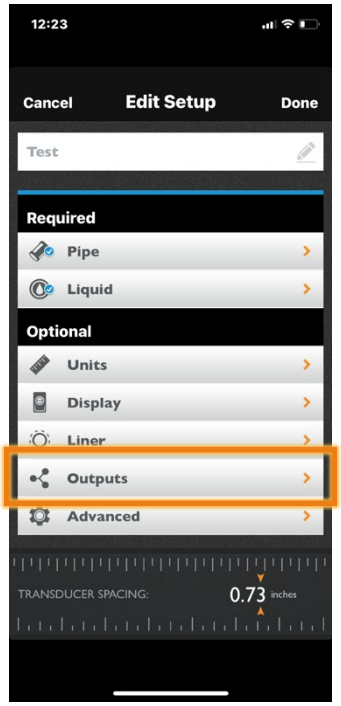
See Typical Applications on page 5 and program your devices using the following steps.

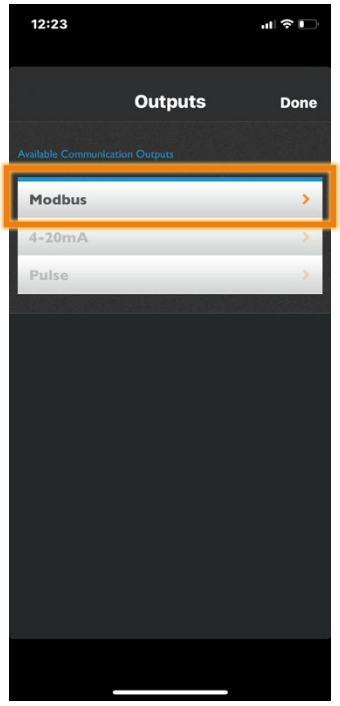
1 Apply power

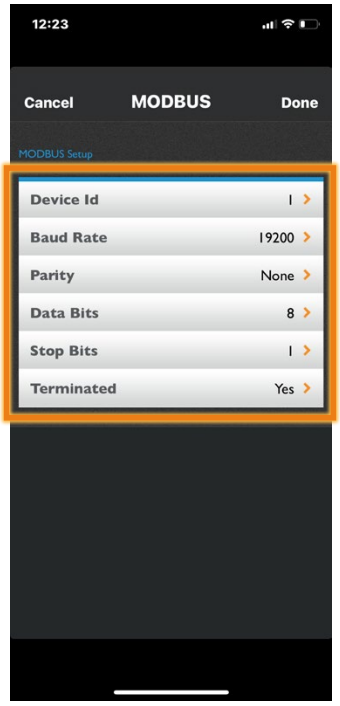
The Flow Computer boots up in about 10-20 seconds and remains on as long as power is connected.

2 Check flowmeter Modbus settings using the Orcas app

Flowmeters are able to communicate with the Flow Computer using their default Modbus settings. For use with the Flow Computer, do not change these settings. If you have already changed the Modbus settings, use the Orcas mobile app to connect to your flowmeter(s) and revert settings to match those shown in the screen shots below.





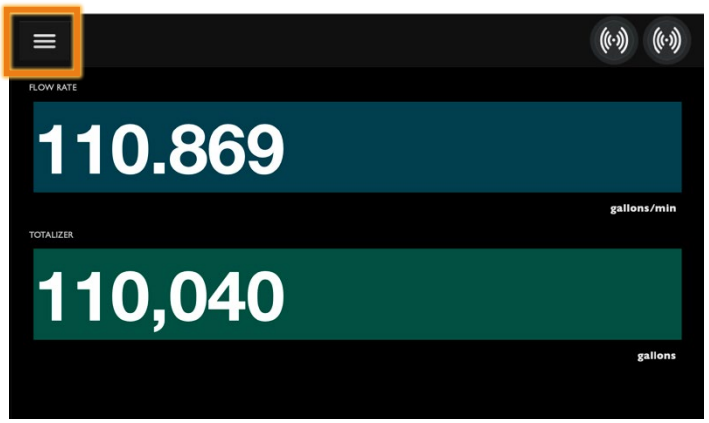


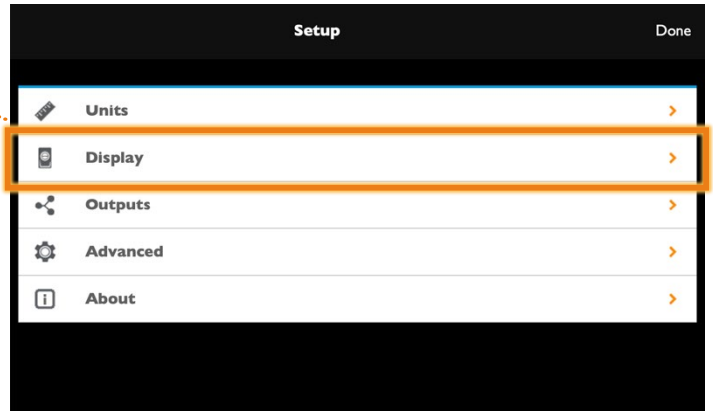
WARNING: The flowmeter connections at A & B use the same default Modbus settings. Do not change the Device ID to anything other than the values shown above. The Flow Computer uses two separate RS-485 buses, and the slave IDs for both flowmeter A and flowmeter B must be configured to 1. Do not change the setup to anything other than the default settings.

3 Choose your display options

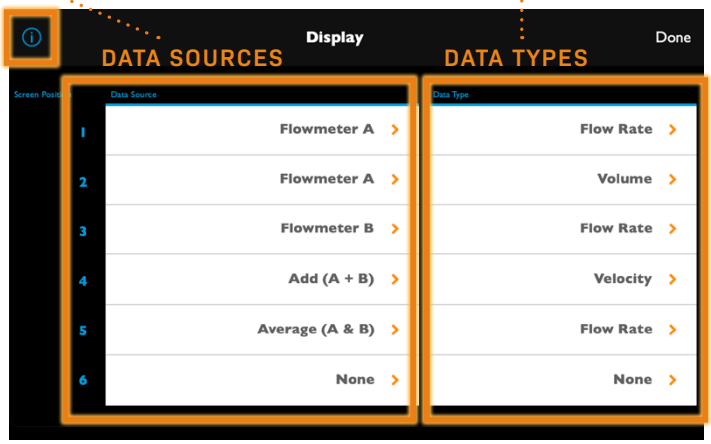
By default, the Flow Computer displays the flow rate and flow totalizer for flowmeter A.

If you want to display other measurements and/or display flowmeter B, tap the Menu icon (☰) and select **Display**.





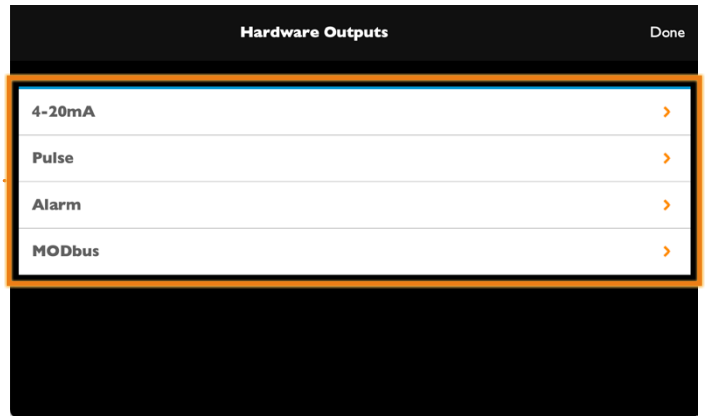
From the Display menu, for each of the 6 display fields, tap to choose the source of the data (Flowmeter A, Flowmeter B, or some combination) and the type of data (flow rate, totalizer, etc.) you want your Flow Computer to display. Tap the help icon (ⓘ) for more detail.

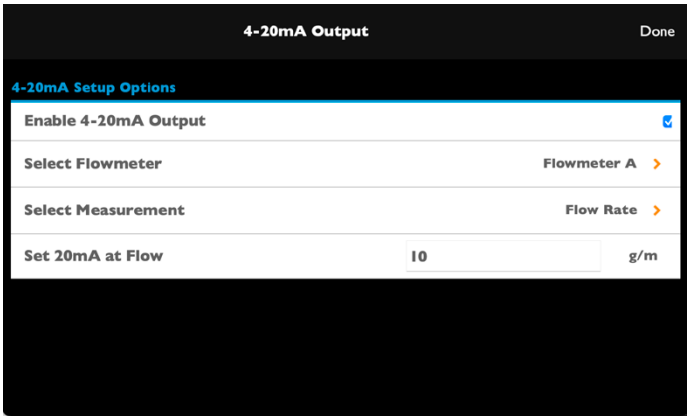


When your preferences are set, tap **Done** in the top right corner of the screen and continue to step 4, next page.

4 Program hardware outputs

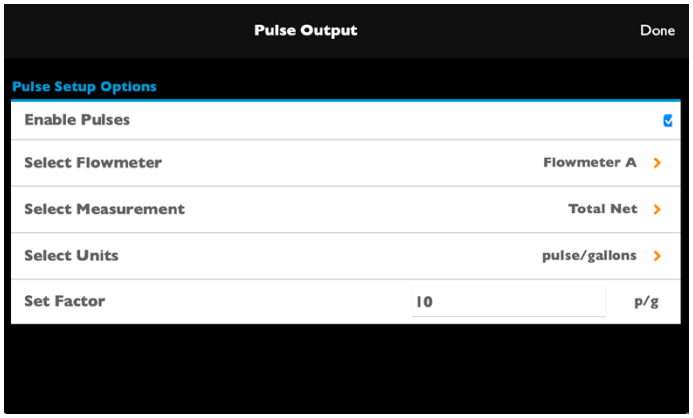
Choose your hardware output then follow steps below to program each output you've connected to your Flow Computer.





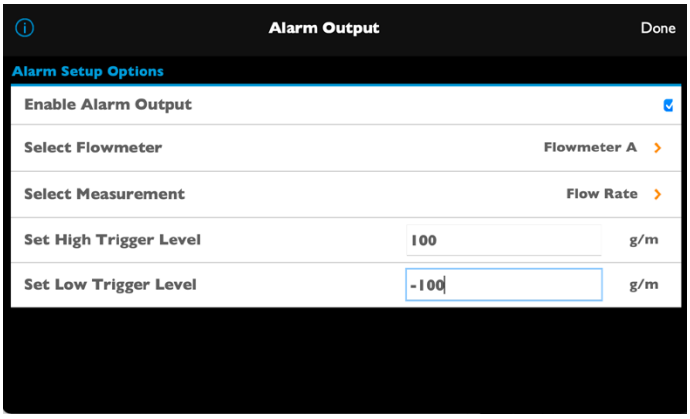
4-20ma Output

1. Select Flowmeter
2. Select Measurement
3. Select Scaling



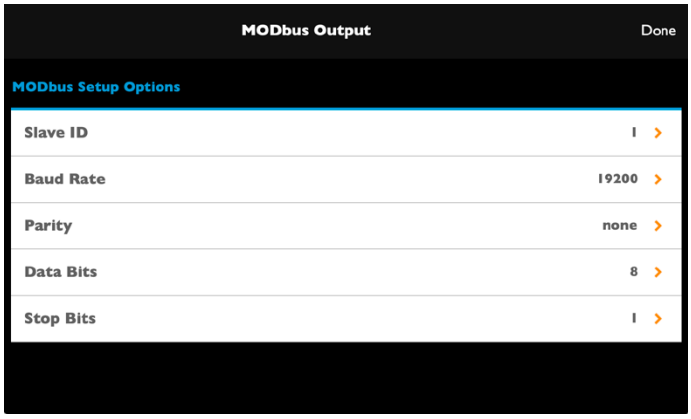
PULSE Output

1. Select Flowmeter
2. Select Measurement
3. Select Units
4. Set Factor



Alarm Output

1. Select Flowmeter
2. Select Measurement
3. Set Trigger Levels (high & low)



Modbus Output

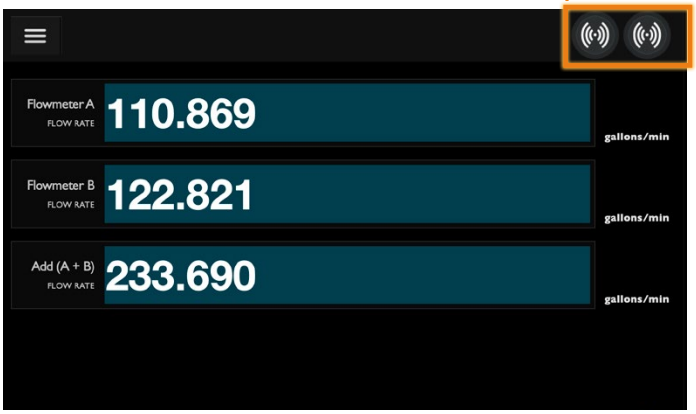
You must enter your Modbus port settings here to match your device.

Display Measurements

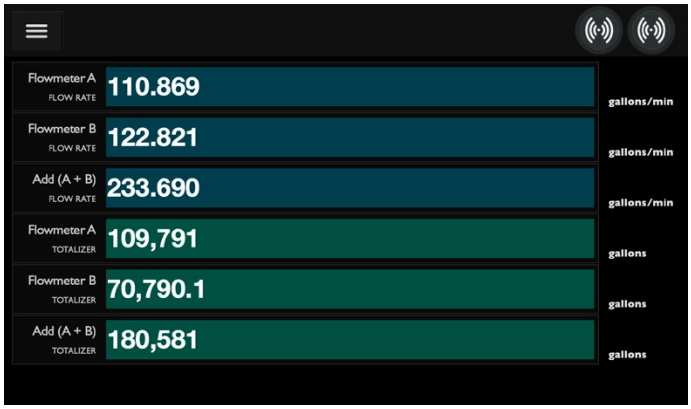
Start measuring and displaying flow!

Now it's time to put your flowmeters and SoundWater Flow Computer to work for you. Accurate, real-time flow measurements and/or flow calculations are at your fingertips.

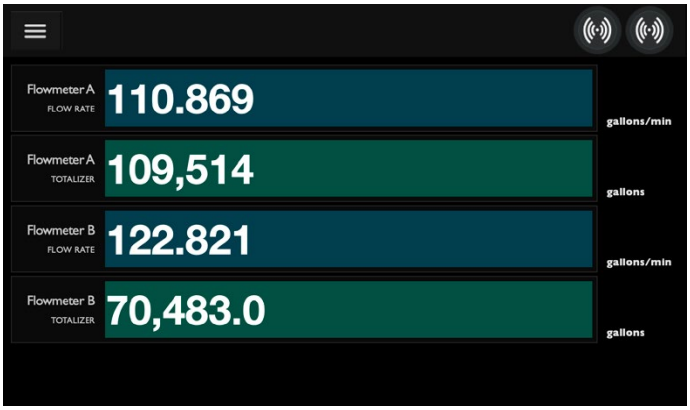
Ultrasound signal strength indicator for flowmeters A & B



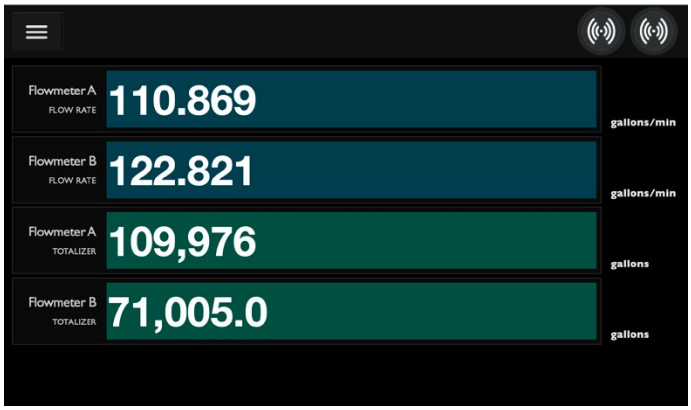
Display flow rate of two flowmeters and their sum



Display flow rate and totalizer of two flowmeters, plus the sum of both measurements



Display the flow rate and totalizer of two flowmeters



Rearrange the view of flow rate and totalizer for two flowmeters

Troubleshooting

Problem	Probable Causes	Things to try...
No information — only dashes	Incorrect wiring or hardware programming	Make sure the Flow Computer is wired correctly following instructions. If using Modbus, make sure settings match device.
	Air in pipe	Rotate meter to 3 o'clock position Remove air Relocate meter to another location where there is no air
	Corroded rusty pipe	Relocate meter to clean section of pipe. If no clean section is available, move meter to other locations until a signal is found—try to find a section of pipe with less corrosion or rust. Older steel and ductile iron pipes may be heavily corroded, which can prevent ultrasound transfer and flow measurements. For these types of applications, SoundWater has a special transducer configuration that helps to penetrate corrosion, making flow measurement possible. Please contact us to discuss your application and how to select the best transducer.

SoundWater

Only Excellence

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