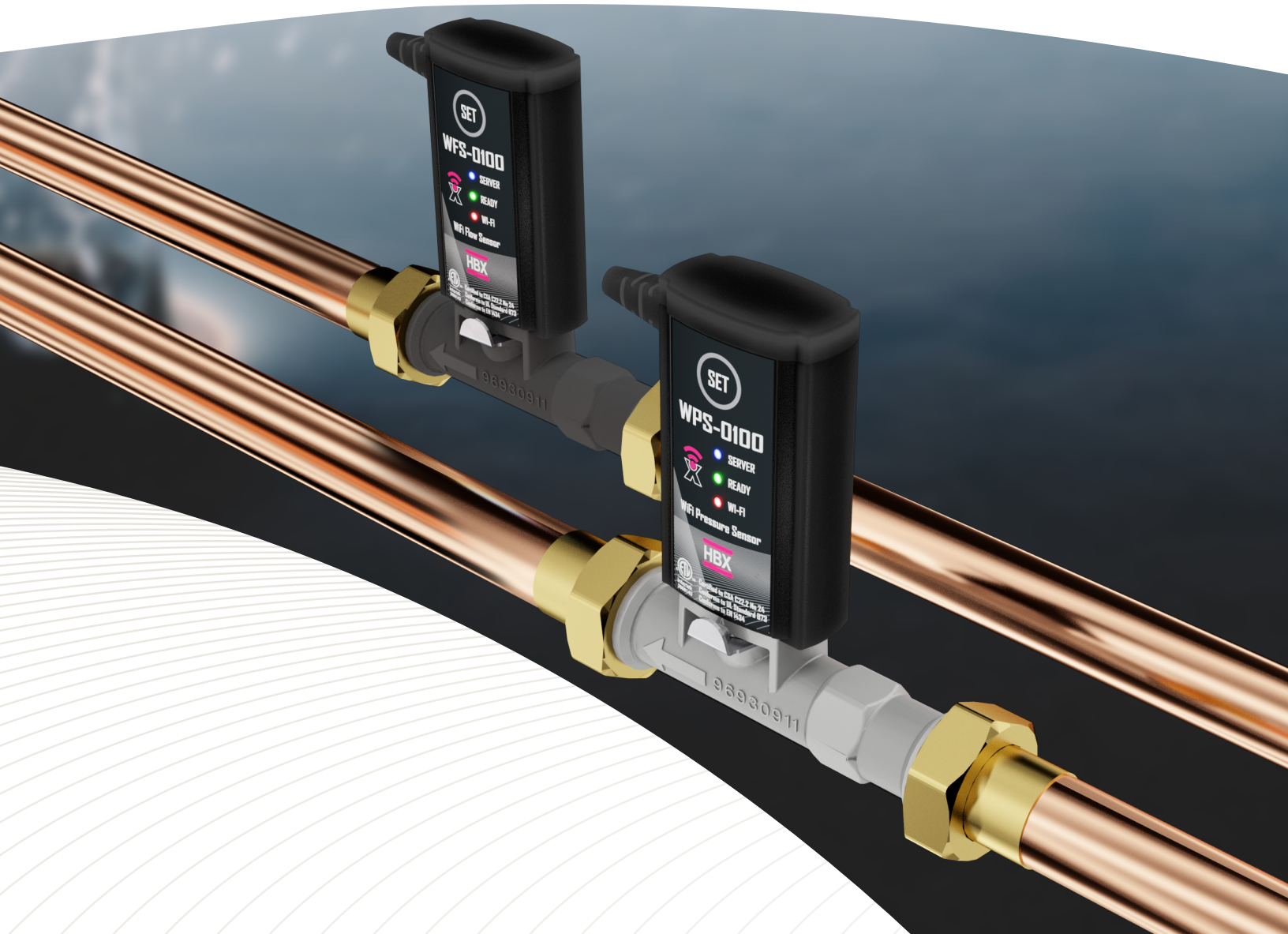# HBX
Control Systems Inc.

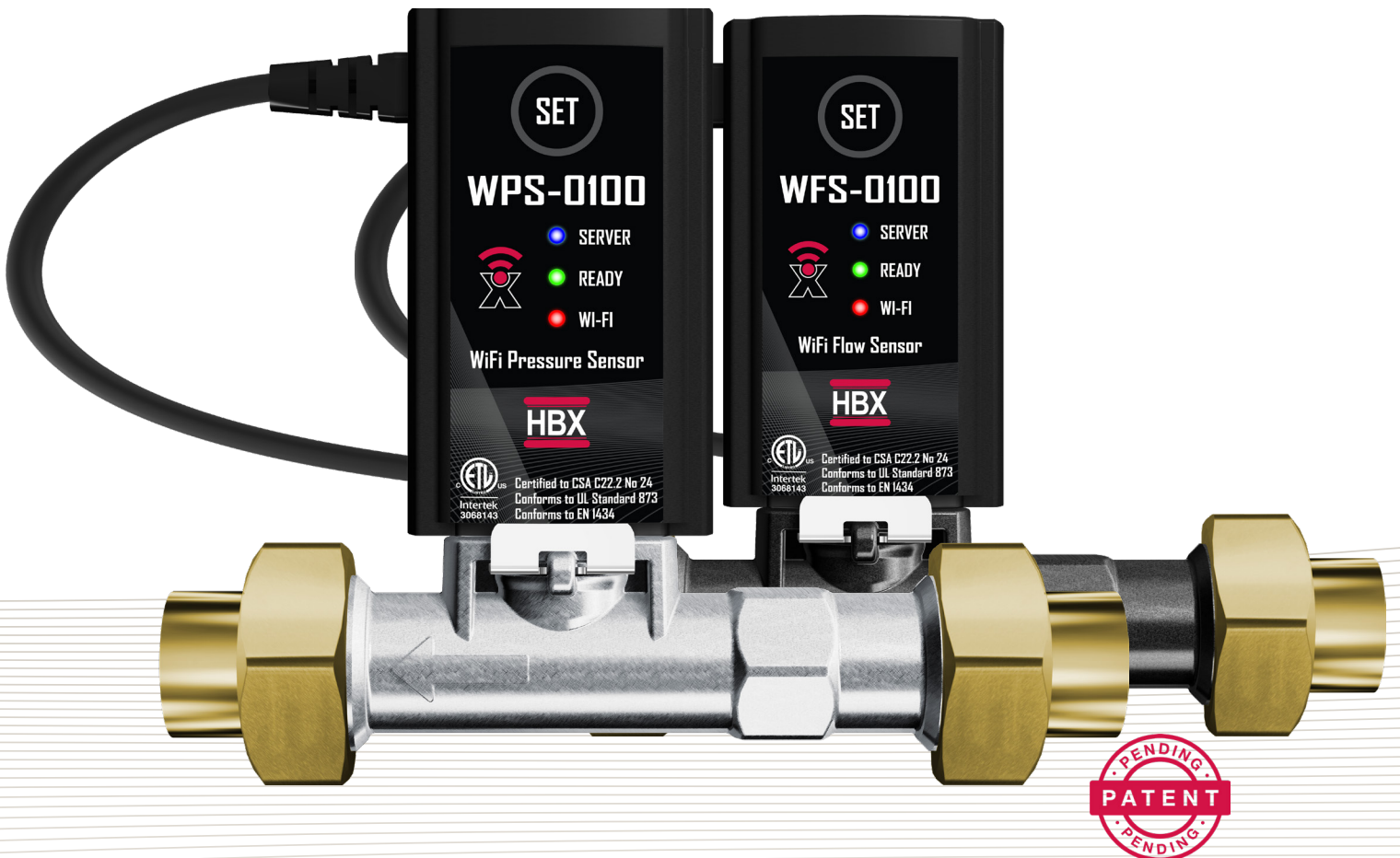# SensorLinx™
Smart Meter Solutions

INTRODUCING

SensorLinx™
Smart Sensor Solutions

SensorLinx™ Sensor System is designed to measure the energy used or transferred in liquid heating applications, including HVAC, Solar Thermal Heating and Geothermal. Utilizing precision matched temperature sensors provides excellent differential accuracy and in-line flow meters with a very wide turndown, they provide the accurate data required to calculate totalized usage and allocate cost.

HYDRONIC HEATING CENTRALIZED SYSTEMS | FLOW & TEMPERATURE METERING
RESIDENTIAL AND COMMERCIAL TENANT BILLING | SYSTEM BALANCING

Features and Benefits

- Heat Metering (BTU)

- DHW Metering

- SensorLinx Management System

- Residential and commercial tenant billing

- Remote monitoring and configuration via the Thermolinx App

- Graphs calculated BTU's based on hour, day, week and monthly

- Vortex in-flow sensor

- Supply and return do not have to be within 2 meters like conventional BTU meters

- Accurate calculations in glycol, methanol, and water at any concentration

- Suitable for a wide range of applications

- Measure System pressure, flow, and temperature for easy and cost-efficient installation

- Triac output for relay operation

- External strap on thermistor for simple BTU calculations.

- Hydronic system balancing

- EN1434 Approved

Heat Metering (BTU)

SensorLinx™ is a customizable sensor solution incorporating the **WFS Sensor** (Wi-Fi Flow & Temperature Sensor) and **WPS Sensor** (Wi-Fi Pressure & Temperature Sensor). The system includes 2 pre-paired sensors that feature a wireless communication protocol between them that eliminates the need for the supply and return piping to be within 2 meters of each other. The system is based on vortex in-fluid sensors rather than other sensing technologies for more precise and accurate sensing calculations with a built-in electronic calculator and data logger via the ThermoLinx mobile app.

INCLUDES

💧 WFS Sensor (Wi-Fi Flow and Temperature Sensor) (x1)

💧 WPS Sensor (Wi-Fi Pressure and Temperature Sensor) (x1)Vortex in-flow sensor

💧 EPDM O-rings (x4)

💧 Dual unions, tailpieces - NPT, sweat (x2)

💧 Composite flow pipe and tube with connection fittings (x2)

✳ STAINLESS STEEL OPTION AVAILABLE IN ALL SIZES EXCEPT FOR THE **BTU-0400**

Technical Data

	BTU-0014	BTU-0030	BTU-0070	BTU-0130	BTU-0400
mm	82	88	129	137.5	180
in	3.32	3.46	5.08	5.41	7.09

Flow Pipe (Housing)	Union Pipe Configuration	Flow Pipe Size	HBX Part #
Composite	3/4"	1/2"	BTU-0014
Composite	3/4"	1/2"	BTU-0030
Composite, Stainless Steel	1"	3/4"	BTU-0070
Composite, Stainless Steel	1 1/4"	1"	BTU-0130
Composite	1 1/2"	1 1/4"	BTU-0400

Flow Ranges

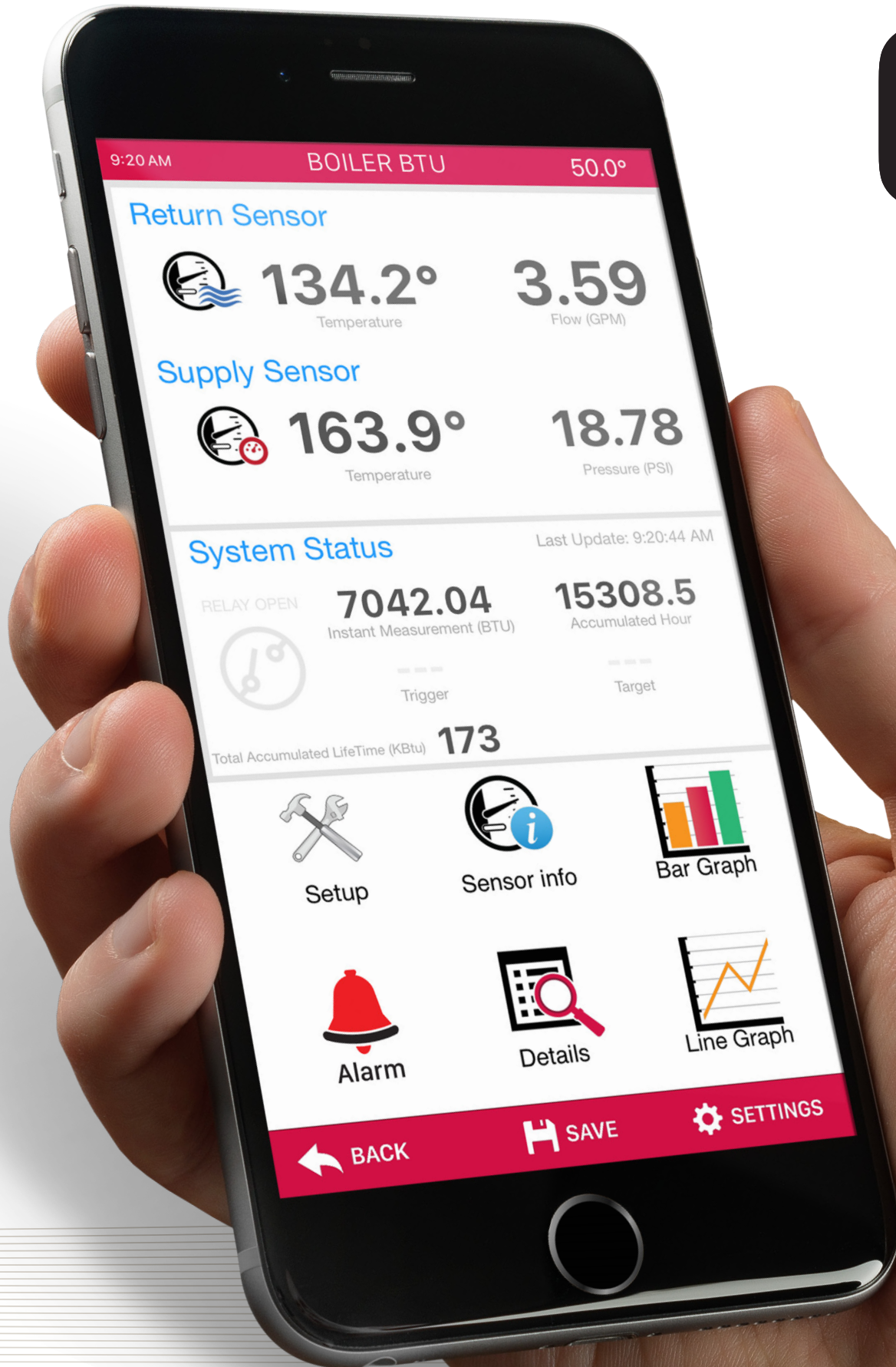|	BTU-0014	BTU-0030	BTU-0070	BTU-0130	BTU-0400
L/Min	1.4-14	3-30	7-70	13-130	20-400
GPM	0.36-3.69	0.70-7.92	1.84-18.49	3.43-34.34	5.28-105.67

Triac Output

The control module incorporates a triac output for relay operation that will allow for equipment to turn on/off manually or based off a flow, temperature, and pressure trigger limit for system safety purposes. The traic output also allows for a modulating output signal to external devices.

Features

- Pump or valve control
- Modulating Output (0.5-3.5 VDC)
- Equipment safety operation (ex.leaks)
- External thermistor input for BTU measurement

BOILER BTU

9:20 AM | BOILER BTU | 50.0°

Return Sensor
134.2° Temperature
3.59 Flow (GPM)

Supply Sensor
163.9° Temperature
18.78 Pressure (PSI)

System Status — Last Update: 9:20:44 AM
RELAY OPEN
7042.04 Instant Measurement (BTU)
15308.5 Accumulated Hour
- - - Trigger
- - - Target
Total Accumulated LifeTime (KBtu) 173

Setup
Sensor info
Bar Graph
Alarm
Details
Line Graph

BACK | SAVE | SETTINGS

Wi-Fi Network Protocol

The **SensorLinx**™ incorporates a Wi-Fi communication protocol that allows for an easy setup to connect any system to any surrounding 2.4GHz Wi-Fi network available. For systems that do not have a Wi-Fi connection, the user can connect the system using an internal local Wi-Fi connection to view current and historical BTU consumption. Data logging capabilities will also be available for Bacnet or Modbus interfaces through the **SensorLinx**™ API communication protocol.

Features

- Connect each sensor directly to a Wi-Fi network
- Unlimited amount of sensors per location
- Realtime BTU calculations on supply and returns
- Local, on-site network connections available
- Bacnet or Modbus capabilities

ThermoLinx Hydronic Network

The free ThermoLinx app allows for remote monitoring and system configuration for each individual sensor for your entire system. The app is capable of datalogging flow, temperature, and pressure daily, monthly, and yearly totalized usage in real time that can be utilized for billing purposes for residential or commercial tenants.

Features

- Available for Apple® and Android Devices®
- Remote monitoring and system configuration
- One year of data storage
- System Alarm notification
- Data logging for tenant billing

ThermoLinx™
Hydronic Network

GET IT ON
Google Play

Download on the
App Store

WFS Sensor

WI-FI FLOW AND TEMPERATURE SENSOR

The WFS Sensor is a combined flow and temperature sensor (two-in-one). The sensor is fully compatible with wet, aggressive liquids. The sensor is based on the principle of vortex shedding behind a bluff body. The sensor is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the sensor chip. The sensor is a lightweight and robust compact flow meter than be installed in tight spaces vertically or horizontally.

The WFS sensors can be used in conjunction with the WPS sensors for heat metering (BTU) applications as well as a standalone sensor for flow metering for individual billing. The meters can measure flow up to 106 GPM. The WFS sensor(s) meets the requirements of the EN 1434 Class 2 certification.

Flow Ranges

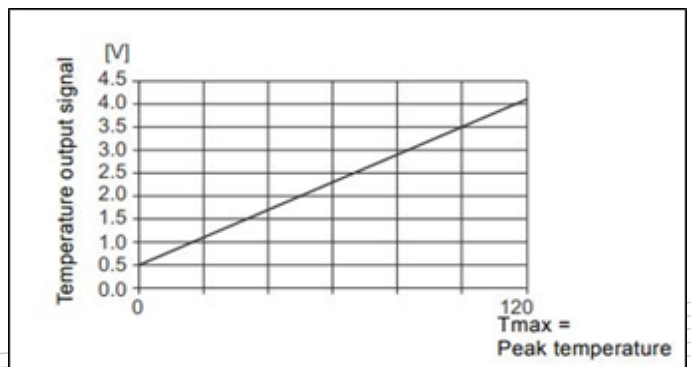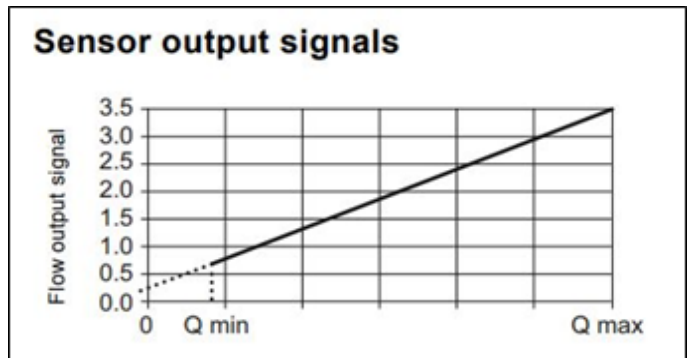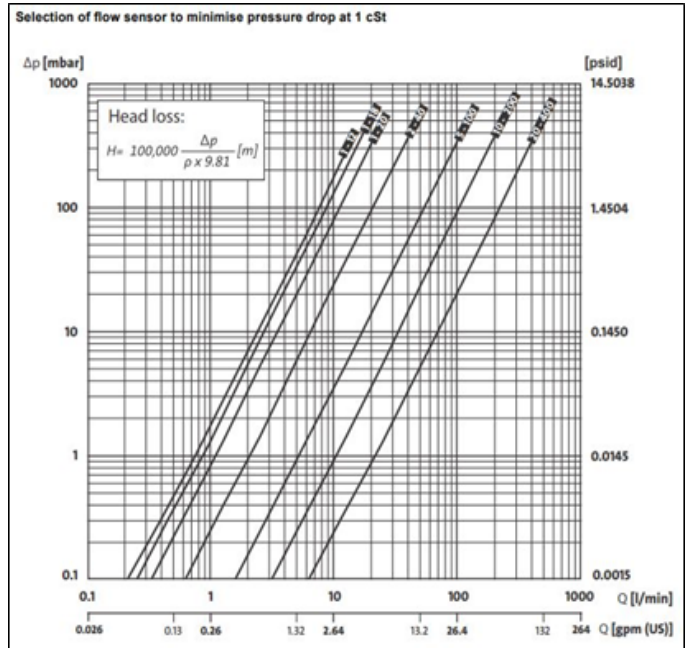|	WFS-0020	WFS-0040	WFS-0100	WFS-0200	WFS-0400
L/MIN	1-20	2-40	5-100	10-200	20-400
GPM	0.26-5.28	0.52-10.6	1.32-26.4	2.64-52.8	5.28-106

The WFS sensors measure temperature from 0°C -100°C (32°F – 212°F).

The sensor consists of a composite flow pipe and a sensor fitted with cable.

✳ STAINLESS STEEL OPTION AVAILABLE

Features and Benefits

- Flow metering for individual billing

- Temperature monitoring

- Measure flow up to 106 GPM

- Accurate and reliable measurement

- Triac output for pump or valve operation

- EEPROM memory (keeps data stored in case of power failure)

- 1 year of data collection

- Alarm notification

- Suited for glycol, methanol, ethanol mixtures

- No moving parts, thus no wear
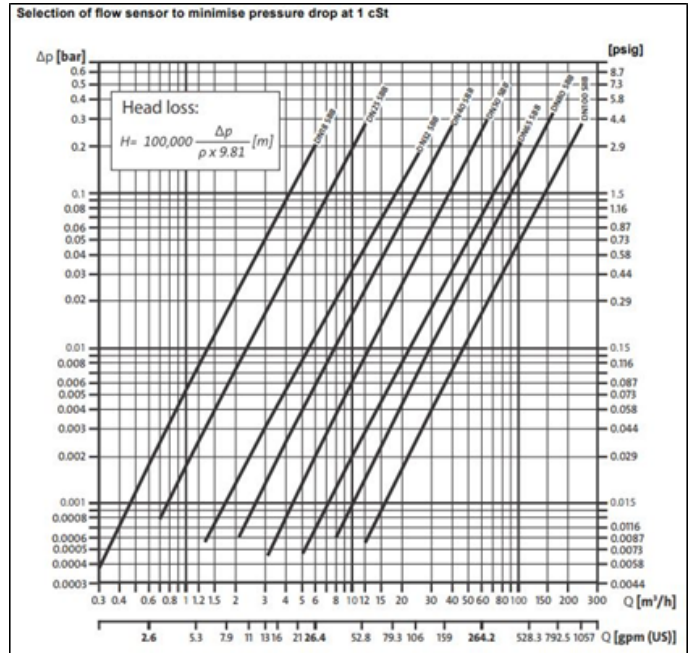
- Corrosion resistant material

- Compact and robust

Selection of flow sensor to minimise pressure drop at 1 cSt

Head loss:

$$H = 100,000 \frac{\Delta p}{\rho \times 9.81} \ [m]$$

Sensor output signals

Tmax = Peak temperature

WPS Sensor
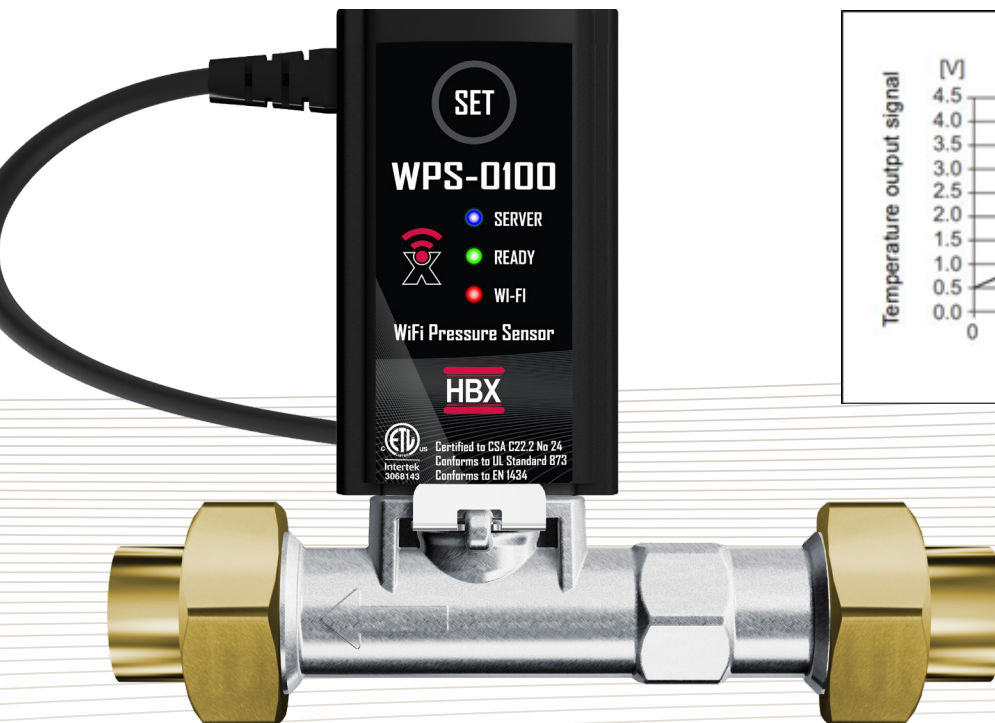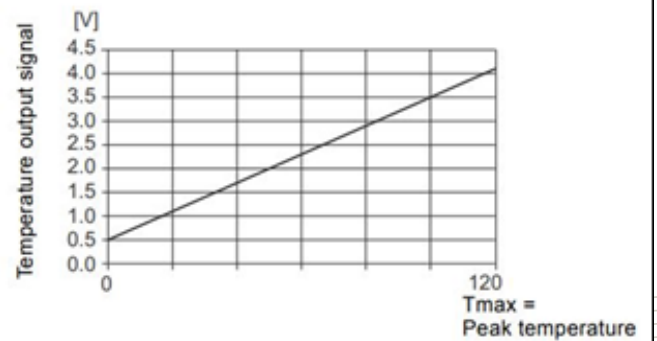
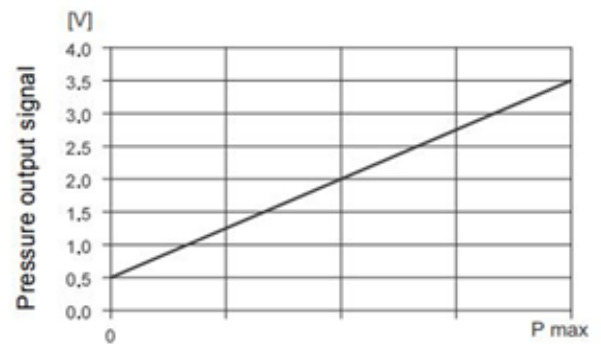### WI-FI PRESSURE AND TEMPERATURE SENSOR

The WPS sensor is a combined pressure and temperature sensor (two-in-one). The sensor is fully compatible with wet, aggressive liquids. The sensor is based on the principle of vortex shedding behind a bluff body. The sensor is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the sensor chip. The sensor can be used as a standalone pressure sensor or used in conjunction with the WFS sensor series for heat metering (BTU) applications.

The sensor is suitable for a wide range of applications with a measuring range >10 BAR (145 PSIG).

∗ STAINLESS STEEL OPTION AVAILABLE

∗ THE SENSOR CONSISTS OF A COMPOSITE FLOW PIPE AND A SENSOR FITTED WITH CABLE

Selection of flow sensor to minimise pressure drop at 1 cSt

Head loss:
$$H = 100,000 \frac{\Delta p}{\rho \times 9.81} [m]$$

Output signals

Specifications

Flow	
Measuring Range	1-14L (0.36-3.69 GPM), 3-30L (0.70-7.92 GPM), 7-70L (1.84-18.49 GPM), 13-130L (3.43-34.34 GPM), 20-400L (5.28-105.67) *Composite only
Accuracy (± 1σ) in water, 0-100 °C (32-212 °F)	± 1 % FS
Response time (63.2 %)	Less than 1 s
Maximum range	105 GPM

Pressure	
Measuring Range	0-10 bar (0-145 psig)
Accuracy (± 1σ), 15-90°C (59-194°F)	± 1.5 % FS
Accuracy (± 1σ), 0-120 °C (32-248 °F)	± 2 % FS
Response time	Less than 1 s
Resolution	0.6 mbar (0.009 psig)

Temperature	
Measuring Range	0-120 °C (32-248 °F)
Accuracy (± 1σ), 15-90 °C (59-194 °F)	± 0.5 K
Accuracy (± 1σ), 0-120 °C (32-248 °F)	± 1 K
Response time (63.2 % at 50 % FS flow)	250 ms
Resolution	0.006 K

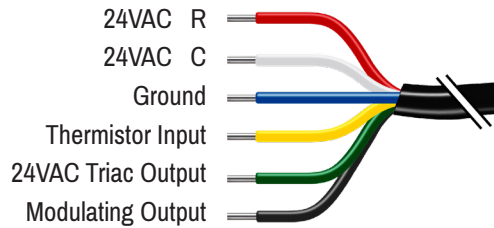| System Conditions and Environment	
Liquid Types	Aqueous media compatible with wetted materi-als. Kinematic viscosity less than or equal to 2 mm2/s (cSt)
Liquid temperature, operation	Water: 0-100 °C (32-212 °F)
Liquid temperature, peak	-25 to +120 °C (-13 to +248 °F), non-freezing
Ambient temperature	operation -25 to +60 °C (-13 to +140 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Maximum System Pressure	24 bar (348 psig) Composite, 30 bar (435 psig) Stainless
Burst Pressure	30 bar (435 psig) Composite, 40 bar (580 psig) Stainless

Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM O-rings, FKM O-rings or EPDM sealing cap with FKM O-rings
Housing	Composite (PPS, PA66),
Flow pipe	Stainless steel AISI 316 EN 1.4408, PPA 40-GF
Piping connection	Dual unions, tailpieces - NPT, sweat, press
Wetted materials	Corrosion-resistant coating, EPDM or FKM, PPS, PPA 40-GF

Electrical	
Power Supply	24 VAC, 1A
Triac Output	24 VAC, 1A
Analog Output	0.5 - 3.5 V

Wiring Specifications

24VAC R
24VAC C
Ground
Thermistor Input
24VAC Triac Output
Modulating Output

SET

WPS-0100

● SERVER
● READY
● WI-FI

WiFi Pressure Sensor

HBX

ETL Certified to CSA C22.2 No 24
Conforms to UL Standard 873
Conforms to EN 1434
Intertek
3068143

PATENT PENDING

Power	Pins 1, 2
	9V - 24V (AC or DC)
	(if using triac, 24VAC is required)
Thermistor	Pins 4, 3
	10k thermistor type 3
24VAC Triac	Pins 5, 2
	0 - 0.75VDC
Modulating Output	0.5 - 3.5VDC

⚠️ If wiring more than one sensor to same power supply, ensure the same connections are made on pins 1, 2 to the power supply. **Do not swap.**

Technical Data

Input Voltage 24VAC, ±10%, 60Hz, 0.1A

1x Thermistor Output

1x Modulating Output 0.5VDC - 3.5VDC

Microprocessor 8Bit, 64MHz

Languages English

Temperature Measuring Range 10-90°C (50-194°F)

Max. Pressure Range 0-10 bar (0-145 psig)

Wi-Fi 2.4GHz Network Only

FCC ID 2AHMRESP125

EN1434 Approved

Liquid Types

Aqueous media compatible with wetted materials. Kinematic viscosity less than or equal to 2 mm2/s (cSt). Potable water, or a water mixture with Glycol, Methanol, or Ethanol.

**ETL Listings**

Meets CSA C22.2

No. 24 Meets UL Standard 873

ETL Control No. 3068143

Storage: +10°C to +40°C

Typical Installation

Install the **WFS (Flow and temperature) Sensor** and **WPS (pressure and temperature) Sensor** in a location that will be easy to perform periodic maintenance. Install shut-off valves upstream and downstream of the sensors to aid installation and maintenance. Install a strainer or other filtering device upstream of the flow and pressure sensors.

Supply Pipe

WPS Pressure Sensor must be installed.

Return Pipe

WFS Flow Sensor must be installed.
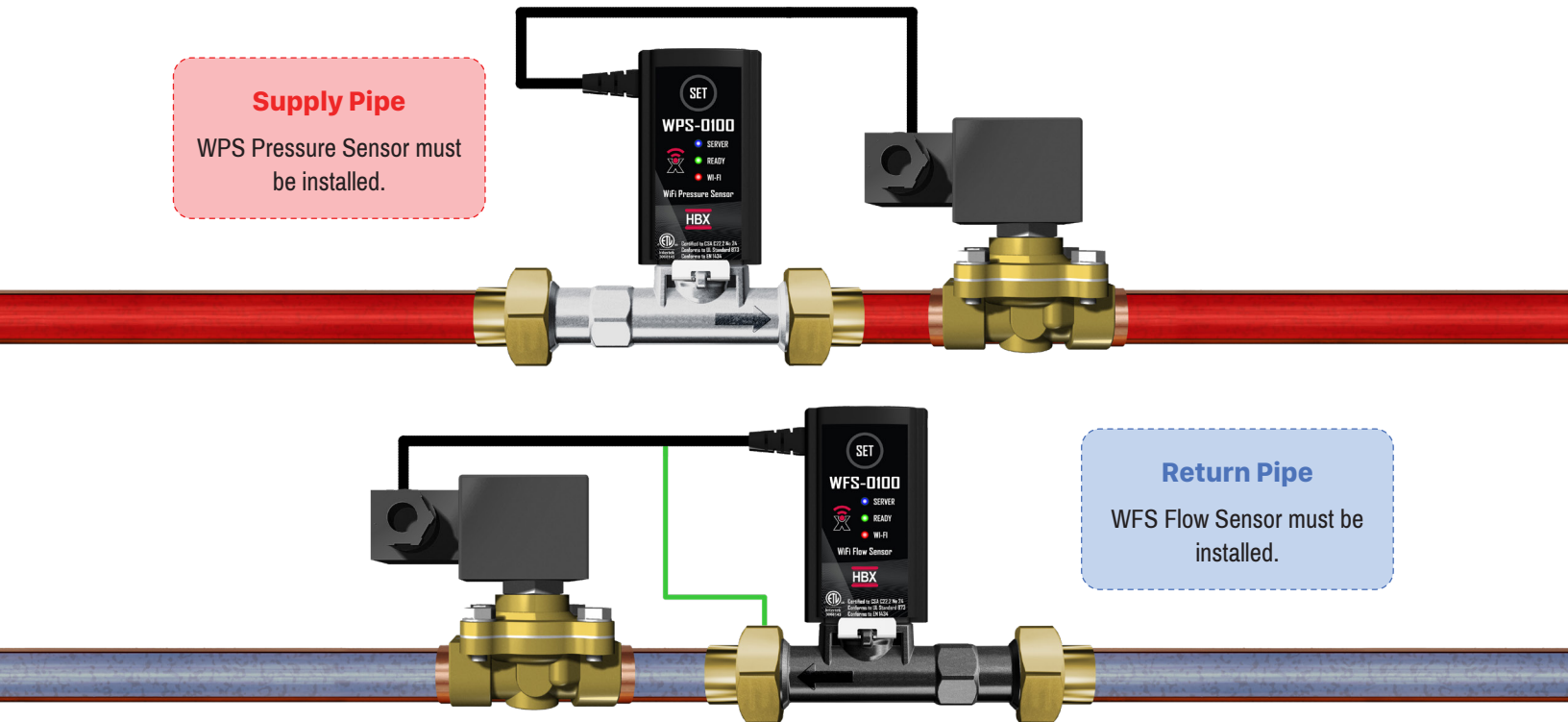
The corresponding supply and return pipes must be integral to the same flow rate as measured by the flow meter. The WFS flow meter must be installed on the return pipe and the WPS pressure sensor on the supply pipe. The sensors can be installed in a horizontal or vertical position, following the flow direction indicated by the arrow on the body. The first length of straight of pipe connected to the flow sensor must be a minimum of 3" long prior to a bend for the sensor to register a proper reading.

Connect. Measure. Monitor. Bill.

The **SensorLinx™** Management System is a monitoring and billing solution for homeowners and building managers. The web based program provides individual tenant billing capabilities to ensure accurate and real time data for heating and DHW billing consumption rather than a flat rate. The program also provides raw or graphical data for heating BTU consumption as well system historical flow, temperature and pressure data with alarm notifications.

The management system solution automates the tenant billing process by eliminating manual meter readings for more accurate measurement and eliminates human error readings. The management system also allows building owners to customize and generate bill runs to tenants. Tenants will also have the ability to pay their utility bills through the management system. With direct tenant metering, tenants are more likely to reduce their energy usage which will reduce the cost savings and faster money recovery to the building owner.

Already Using another Building Management System?

If you are already using a building management system the SensorLinx System also provides an API from our servers to provide all your data management request calls to your building management system. The API will also let the SensorLinx sensors communicate with BACnet or BMS systems.
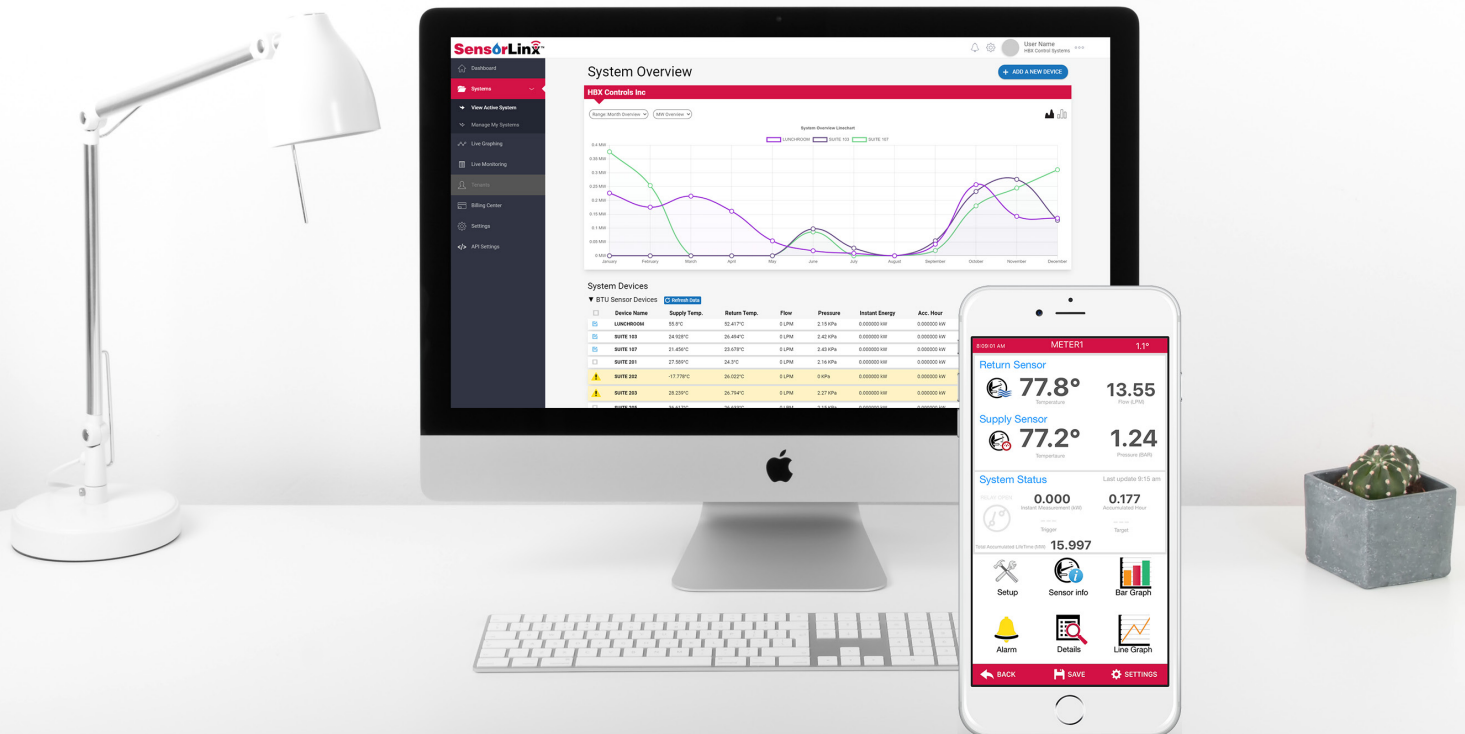
How it works

SensorLinx Sensors

Calculates monthly BTU, pressure, flow readings.

No third party reader meters required.

Collect and monitor data through ThermoLinx App.

SensorLinx Software

Collects historical and real time meter readings from each tenant.

Building owner can bill tenant based on usage or flat rate.

Receive real time alert notification.

Tenants

Building owner can issue bills and receive funds through SensorLinx.

Tenants can set up payment

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