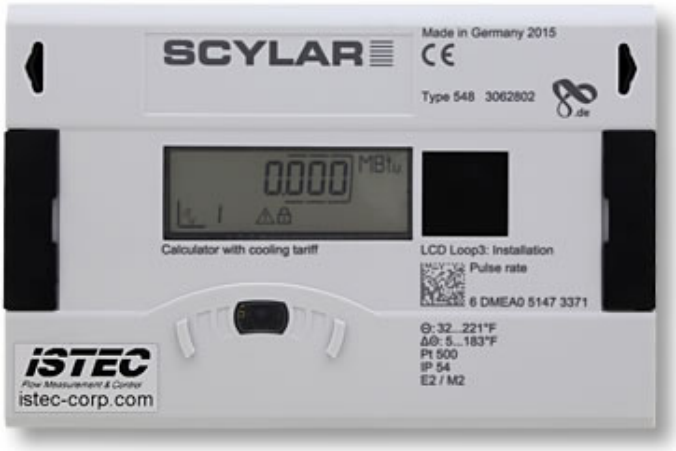
REMOTE TYPE
HEAT/COOL ENERGY METER

ISTEC
Flow Measurement & Control

SCYLAR SERIES – Model 5202S



APPLICATIONS

- Combination Heat/Cool Systems
- Heating Only Systems
- Cooling Only Systems
- Solar Systems
- Geothermal Systems
- Efficiency Measuring/Verification
- Heat Reclaimers

FEATURES

- Automatic Heat/Cool Changeover
- Battery or 24-Volt Powered
- Prog. Pulse & 4-20mA Output
- Liquid Crystal Display
- Data Storage

PRODUCT OVERVIEW

ISTEC's Energy Meter measures the total energy used or transferred in a liquid system. BTUs are calculated by multiplying the system temperature difference by the flow volume.

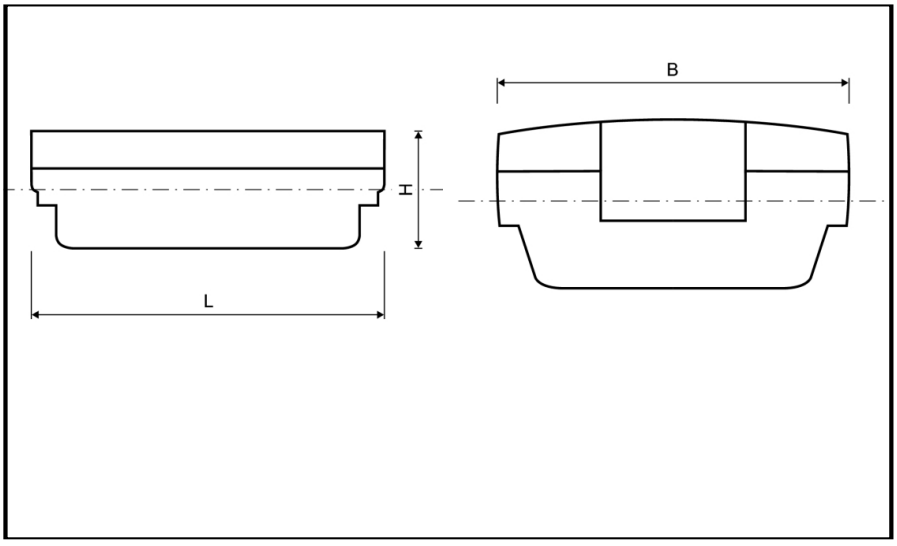
The SCYLAR 5202S Energy Meter is an ideal choice for applications requiring a simple, compact and cost effective unit.

DIMENSIONS

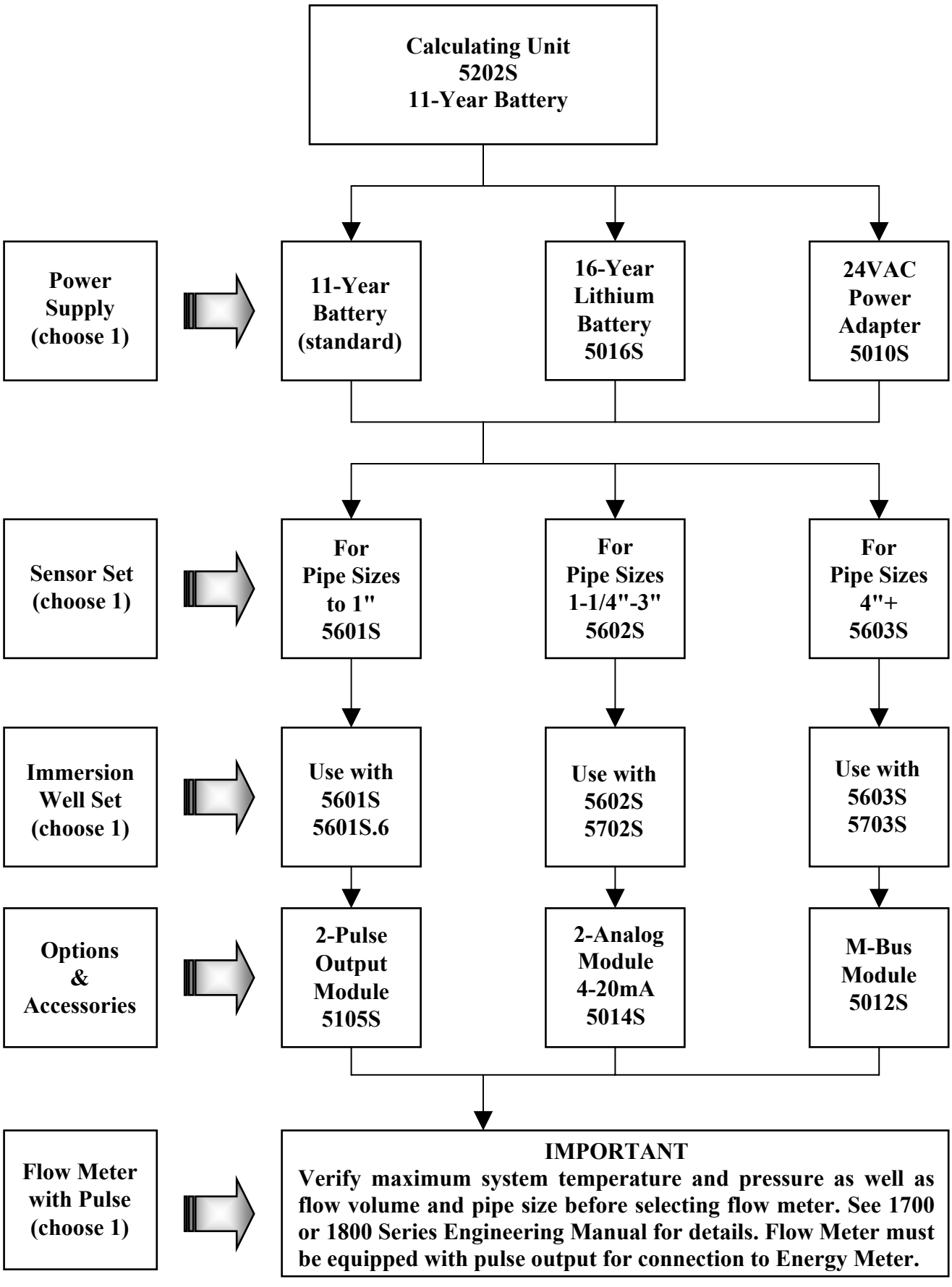
L	**5.9" (128mm)**
B	**2.1" (143mm)**
H	**3.9" (85mm)**

TECHNICAL SPECIFICATIONS

Temperature Range	**41ºF - 302ºF (5ºC - 150ºC)**
ΔT Range	**-4ºF - 374ºF (-20ºC - 190ºC)**
Ambient Conditions	**32ºF – 131ºF (0ºC - 55ºC)**
LCD	**8-Digits**
Sensors	**Platinum RTD**
Power Supply	**Battery or 24VAC**
Output	**MBus, Pulse, 4-20ma**



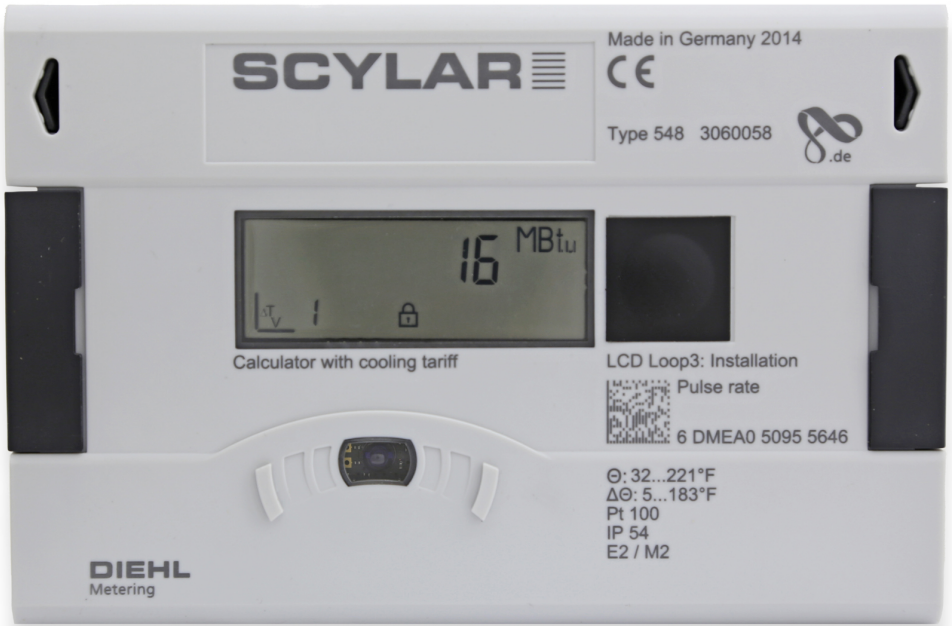
HOW TO SELECT A SCYLAR ENERGY METERING SYSTEM



ISTEC
Flow Measurement & Control

ENERGY METER

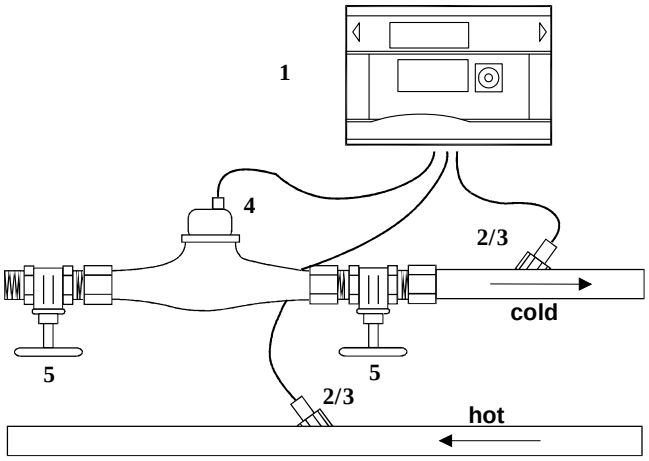
ENGINEERING MANUAL
SCYLAR SERIES
MODEL 5202S



FLOW MEASUREMENT & CONTROL SOLUTIONS

ISTEC Corporation
5 Park Lake Road, Unit 6, Sparta, NJ 07871
Tel: +1-973-383-9888
Fax: +1-973-383-9088
www.istec-corp.com
sales@istec-corp.com

SYSTEM OVERVIEW



ISTEC BTU Meters measure energy usage by multiplying flow volume and temperature difference.

BTUs = Flow x ΔT

As the water (or other liquid) passes through the system piping, the flowmeter's turbine rotates and sends impulses to the electronic calculating unit. The sensors of the electronic calculating unit measure the supply and return water temperature. Flow volume and ΔT are used to calculate BTU's which are displayed on a non-resettable LCD.

COMPONENT DESCRIPTION

All ISTEC Energy Meter Systems consists of the following components:

1) Electronic Calculating Unit (Model 5202S) – Solid State circuitry for accurate and reliable operation with automatic compensation for water density. Non-resettable LCD indicates flow, temperatures and BTUs.

2) Temperature Sensors – Platinum RTDs for fast response and high accuracy. Sensors are available in lengths of 1½"/40mm, 3½"/90mm and 5¾"/145mm.

3) Sensor Wells – Wells are available in three sizes: 1½"/40mm, 4"/100mm and 6"/150mm.

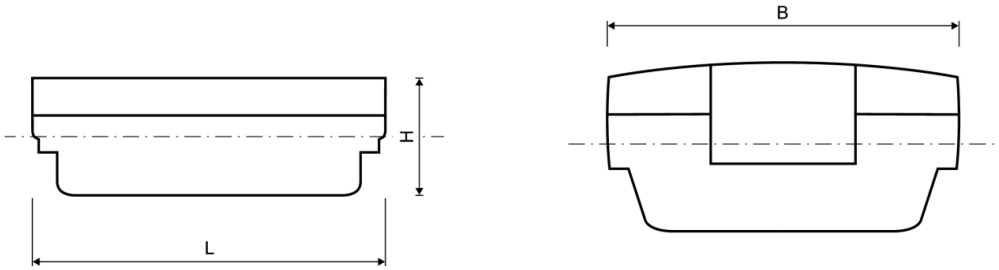
4) Flowmeter – Industrial grade multi-wing turbine type with pulse output. Available in ½" (15mm) through 6" (150mm) sizes. Sizes up to 1½" (40mm) have union connections, 2" (50mm) and larger have ANSI 150-lb flanges.

5) Stop Valves – The flowmeter should always be installed with a stop valve on each side for easier servicing.

TECHNICAL SPECIFICATIONS

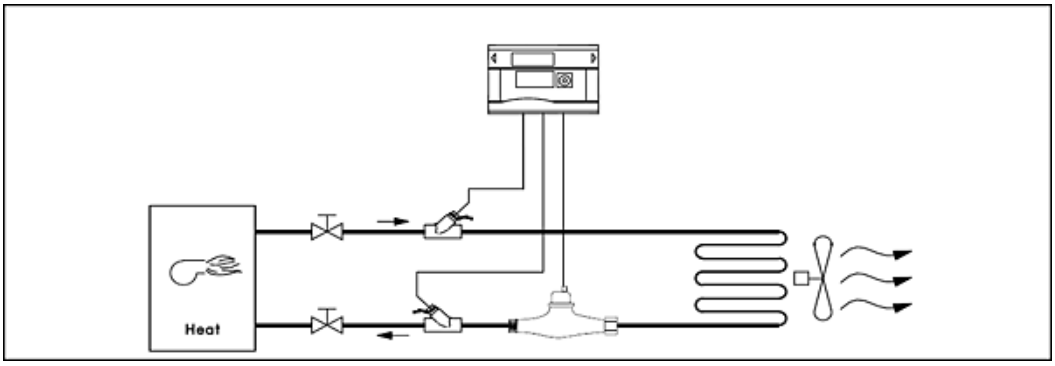
TEMPERATURE RANGE	23°F - 356°F (-5°C - 180°C)
ΔT RANGE	0.225°F – 333°F (0.125K – 185K)
ENVIRONMENTAL PROTECTION	41°F - 302°F (5°C – 150°C)
CLASS	IP54
LCD	8-DIGITS
SENSORS	PLATINUM; PT100 or PT 500
POWER SUPPLY and OUTPUT	11 OR 16-YEAR BATTERY or 24VAC M-BUS, ANALOG (4-20mA) or PROGRAMMABLE PULSE OUTPUTS.

DIMENSIONS

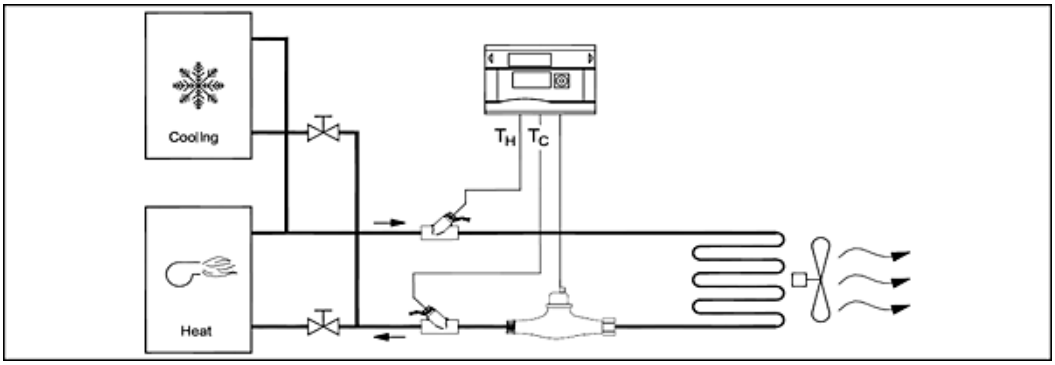


Overall length	L	5.9"
Width of calculator	B	3.9"
Height	H	2.1"

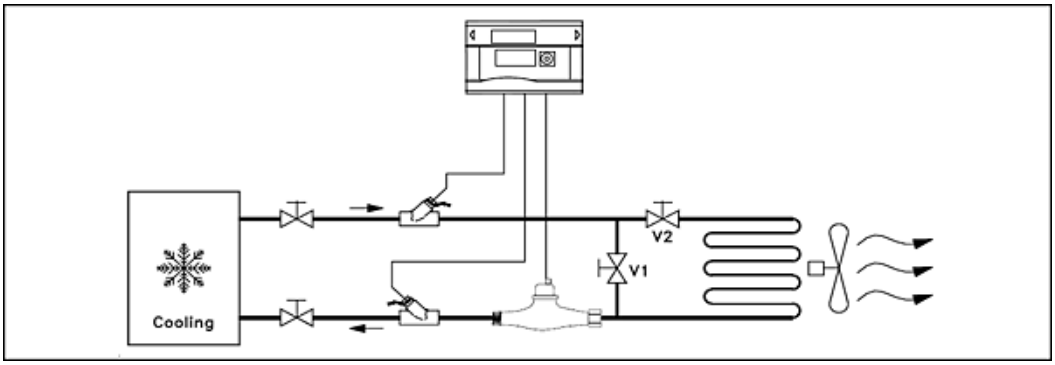
SCYLAT 5202S is able to handle 3 types of applications:



1) District heating/boiler application



2-Pipe Combined heating/cooling application W.S. Heat Pump



3) Condenser or Chilled water application

BTU METERING SYSTEM SPECIFICATION:
SCYLAR Series Model 5202S
AS MANUFACTURED BY ISTEC CORPORATION
5 PARK LAKE ROAD, UNIT 6, SPARTA, NJ 07871 USA

The contractor shall furnish and install as shown on the plans an electronic BTU Metering System. The system shall be designed and programmed exclusively for energy (BTU) metering. It shall be factory assembled, calibrated and tested, incorporating the following features:

ELECTRONIC CALCULATING UNIT

The calculator contains all the necessary circuits for recording the flow rate and temperature as well as for calculating, logging and displaying the data. The calculator can be remotelly mounted from the flow meter. The calculator can be conveniently read from a single line 8-digit display with units and symbols. A push-button provides user-friendly control of the various display loops. All failures and faults are recorded automatically and shown on the LC display. To protect the reading data, all the relevant data are saved in a non-volatile memory (EEPROM). This memory saves the measured values, device parameters and types of error at regular intervals.

POWER SOURCE

The Electronic Calculating Unit shall be powered by an integral 11-year battery. An optional 16-year battery or 24 volt, 60 Hz power adapter shall be available.

SENSORS

Temperature sensors shall be the Platinum RTD PT 100 or PT 500 type to provide high accuracy, stability and long term reliability. They shall be supplied in matched pairs. The sensor probe shall be available in lengths of; 1½"/40mm, 3½"/90mm and 5¾"/145mm to accommodate different pipe sizes. They shall be designed to fit tightly into immersion wells that are inserted into the water flow.

SENSOR WELLS

Sensor Wells shall be 1½"/40mm long x ⅜" NPT for pipe sizes up to 1"/25mm and 4"/100mm long x ½" NPT for pipe sizes 1¼"/32mm to 3"/80mm. For pipe sizes 4"/100mm and above a 6"/150mm long x ½" NPT well shall be available. They shall incorporate a locking screw to secure the sensor.

OUTPUT

The Electronic Calculating Unit shall provide optional open collector, M-Bus or Analog (4-20mA) output modules.

DATA LOGGING

The Electronic Calculating Unit shall provide up to a 24-month history in memory.

FLOWMETER (see ISTEC 1700 or 1800 Series Flowmeter Engineering Manual for complete data)

A separate Flowmeter shall be utilized so various temperatures, pressures and flow rates can be accommodated. It shall be the multi-wing turbine type, ISTEC Model _____. It shall have a line size of _____ inch(s) (_____mm). The body shall be constructed of brass/cast iron. The unit shall have a hermetically sealed mechanical counter, which shall be non-resettable. It shall be constructed so that the flow insert assembly and counter can be replaced without removing the meter body. The Flowmeter shall have an accuracy of ±1.5% at_____ gpm (_____ lph). It shall have a continuous flow rating of_____ gpm (_____ m^3ph). The peak flow, which the meter can not be subjected to for more than one hour per day, shall be_____ gpm (_____ m^3ph). The Flowmeter shall provide a "pulse" type output of 1 contact closure for every 1/10/100 gallon(s) of flow (metric counters provide 1 pulse for every 1/10/100 liter(s) of flow).

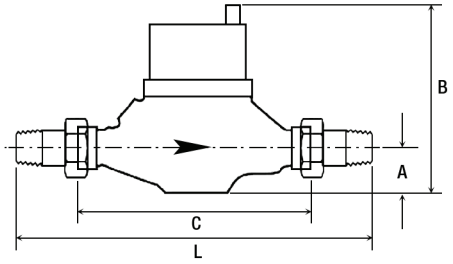
ISTEC's 1800 Series Multi-Jet Water Meter in 3/4" thru 2"

- Multi-Jet Design with only the impeller operating in the flow chamber for reliable performance
- No Straight Pipe required before or after the meter
- Hermetically-sealed Counter is dust and waterproof preventing internal condensation
- Roller Counter can be rotated for easy reading
- Built-in Reed Switch is cast into a waterproof enclosure and can be field replaced (Contact Rating 24V, 0.2A)
- Compact Design for easy installation
- Unique Design allows easy maintenance and repair
- Calibration Test Certification available on request

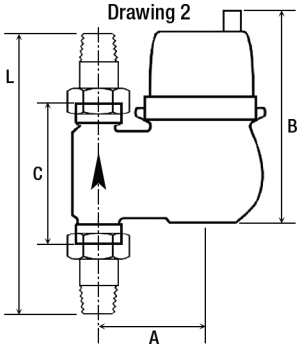
Model Number	1807	1810	1811	1812	1815	1816	1820
Pipe Size	3/4"	1"	1"	1"	1-1/2"	1-1/2"	2"
Min. Flow Rate (gpm)	0.22	0.4	0.4	0.4	0.7	0.7	2.64
Continuous Flow Rate (gpm)	11	26.4	26.4	26.4	44	44	66
Max. Flow Rate (gpm)	22	52.8	52.8	52.8	88	88	132
Max. Operation Temperature (°F)	248	248	248	248	248	248	248
Max. Operation Pressure (psi)	232	232	232	232	232	232	232
Design	Multi-Jet	Multi-Jet	Multi-Jet	Multi-Jet	Multi-Jet	Multi-Jet	Multi-Jet
Mounting Connections	NPT	NPT	NPT	NPT	NPT	NPT	Flanged
Mounting Position	U	H	D	U	H	D	H
Pulse (gal/pulse)	1	1	1	1	1	1	10
Weight (pounds)	5.25	7.5	8.1	8.1	14.2	15.5	27.5

H : Horizontal Installation, D : Vertical Downflow Installation, U : Vertical Upflow Installation

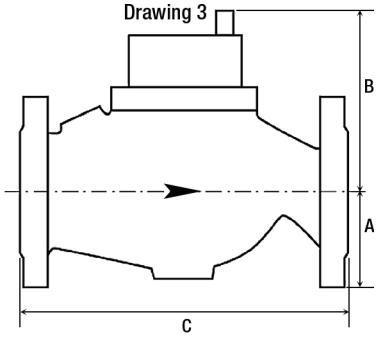
Drawing 1



Drawing 2



Drawing 3

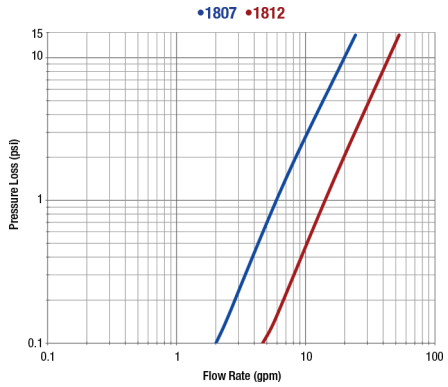


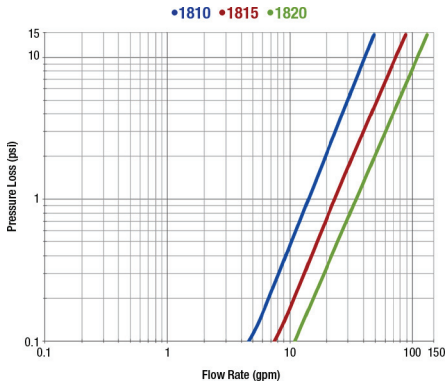
Dimensions	1807	1810	1811	1812	1815	1816	1820
Pipe Size	3/4"	1"	1"	1"	1-1/2"	1-1/2"	2"
A	3-1/4"	2"	3-3/4"	3-3/4"	2-1/4"	4-3/4"	3-1/4"
B	6-1/2"	7"	7-1/4"	7-1/4"	8"	8-1/4"	6-1/4"
C	4-1/4"	10-1/4"	6"	6"	11-7/8"	8"	10-1/2"
L	9-1/4"	15-1/2"	11-1/4"	11-1/4"	17-1/2"	13-3/4"	N/A
Drawing	2	1	2	2	1	2	3

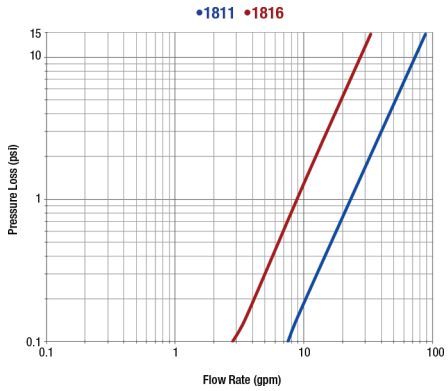
See Next Page for Pressure Loss and Accuracy

ISTEC's 1800 Series Multi-Jet Water Meter in 3/4" thru 2"

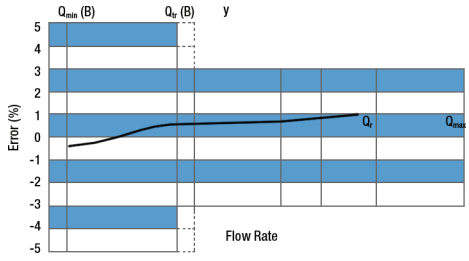
Pressure Loss



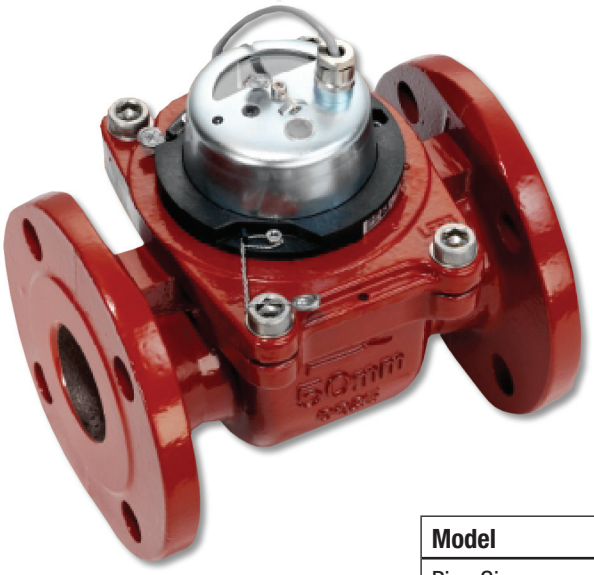




Accuracy

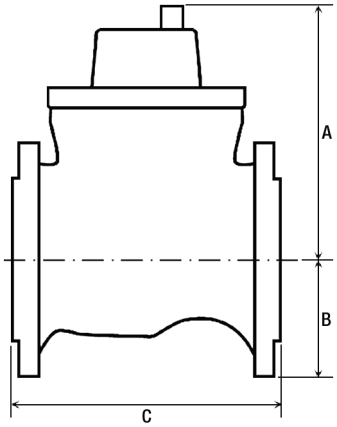


ISTEC's 1800 Series Woltmann Design Water Meter in 2" thru 6"



- Woltmann (Flow Chamber) Design with only the impeller operating in the flow chamber for reliable performance
- Very low Head Pressure loss
- Installation in Horizontal or Vertical positions
- Hermetically-sealed Counter is dust and water proof preventing internal condensation
- Roller Counter can be rotated for easy reading
- Built-in Reed Switch is cast into a waterproof enclosure and can be field replaced (Contact Rating 24V, 0.2A)
- Compact Design for easy installation
- Field Replaceable Flow Chamber is factory calibrated

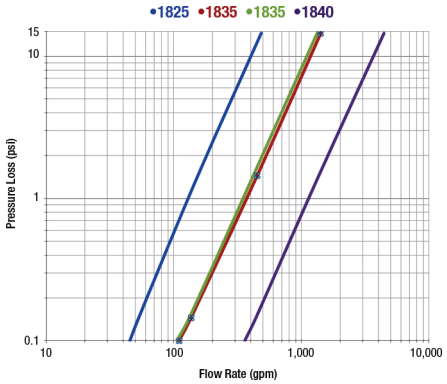
Model	1825	1830	1835	1840
Pipe Size	2"	3"	4"	6"
Min. Flow Rate (gpm)	2.6	14.1	8.8	35
Continuous Flow Rate (gpm)	66	140.9	264	880.6
Max. Flow Rate (gpm)	264	396.3	792.5	1320.9
Max. Operation Temperature (°F)	248	248	248	248
Max. Operation Pressure (PSI)	232	232	232	232
Design	Woltmann	Woltmann	Woltmann	Woltmann
Mounting Connections	Flanged	Flanged	Flanged	Flanged
Mounting Position	Horz or Vert	Horz or Vert	Horz or Vert	Horz or Vert
Pulse (gal/pulse)	10	10	10	100
Weight (pounds)	25	31	48	88



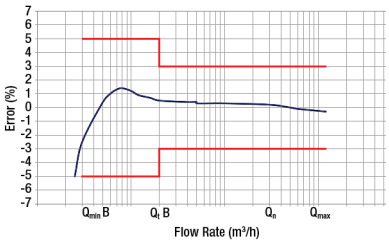
1800 Series Dimensions

Dimensions	1825	1830	1835	1840
Pipe Size	2"	3"	4"	6"
A	5-1/2"	5-1/2"	8-1/4"	9"
B	3"	3-3/4"	4-3/8"	5-3/4"
C	7-7/8"	8-7/8"	9-7/8"	11-7/8"

Pressure Loss



Accuracy



ISTEC
Flow Measurement & Control

SUBMETERING - HEATING OR COOLING

Submetering is nothing new. We are all familiar with electric meters, water meters, gas meters, etc. The user has to be responsible for the consumption of all energy sources and is charged for the quantity used. The thriftier he is in using these energy sources, the more he can save in energy costs. This basic premise has worked for products and services. We are all aware that money is one of the most influential factors in controlling people's actions. Statistics have shown that tenants who have to pay for heating or cooling on a separate invoice soon become energy-conscious, and save approximately 20-25%. If the heating cost is included in the rental agreement, a room thermostat is never lowered and the temperature is regulated by opening the windows. What a waste of energy! What a waste of money for the person who has to pay the energy bill! This is the main reason half of Europe has to allocate energy consumption by law. Energy usage is measured and tenants are billed for energy costs.

ISTEC BTU Meters are modern, high-accuracy measuring instruments that calculate how much energy each tenant has used so that the cost can be allocated. BTU Meters measure the temperature difference between the heating supply and the return lines; they also measure how much hot water has gone through the piping system. This allows the Meter to calculate the exact energy that has been used. Allocation of energy cost is encouraged because it promotes conservation, which is of major importance worldwide.

ISTEC
Flow Measurement & Control

5 Park Lake Road, Sparta NJ 07871
Tel +1-973-383-9888
Fax +1-973-383-9088

www.istec-corp.com

ALLOCATION METHOD BASED ON ENERGY METER READING AND SQUARE FOOT AREA OF APARTMENT

This sample allocation method is for six tenants and is based on Energy Meter readings and area of the tenant's apartment (base cost). The apartments in this example have three different square foot areas. 50% of the total Energy cost will be allocated based on the square foot area of each apartment and 50% will be allocated on the Energy Meter readings.

1. Monthly cost of Energy (oil, gas, electricity, etc.) $480.00
2. Operating Cost:
   Electricity, Maintenance, Reading the meter and invoicing tenants $ 56.00
3. Total Energy Cost **$536.00**

Distribution of Energy Cost

50% - Size of Apartment $268.00
50% - Meter Reading $268.00

4. **Cost Allocation of Square Foot Area**

Amount to be allocated: $268.00
Total sq. foot area (all tenants): 3350 sq. ft.
Cost per square foot area: $268: 3350 = .08 per sq. ft.

Tenant A. 500 sq. ft. @ 8¢ per sq. ft. = $ 40.00
Tenant B. 600 sq. ft. @ 8¢ per sq. ft. = $ 48.00
Tenant C. 550 sq. ft. @ 8¢ per sq. ft. = $ 44.00
Tenant D. 550 sq. ft. @ 8¢ per sq. ft. = $ 44.00
Tenant E. 550 sq. ft. @ 8¢ per sq. ft. = $ 44.00
Tenant F. 600 sq. ft. @ 8¢ per sq. ft. = $ 48.00
$268.00

5. **Cost Allocation on Meter Reading**

Amount to be allocated: $268.00
Total Energy Units used (all tenants): 6700 units
Cost per Energy Unit: $ 268 : 6700 = .04 per unit

Tenant A. 1100 Energy Units @ 4¢ per unit = $ 44.00
Tenant B. 1300 Energy Units @ 4¢ per unit = $ 52.00
Tenant C. 800 Energy Units @ 4¢ per unit = $ 32.00
Tenant D. 1000 Energy Units @ 4¢ per unit = $ 40.00
Tenant E. 1600 Energy Units @ 4¢ per unit = $ 64.00
Tenant F. 900 Energy Units @ 4¢ per unit = $ 36.00
6700 Energy Units $268.00

6. **Individual Billing to Tenants**

	Sq. Ft. Area (Base Cost)	Energy Units Used		Total
Tenant A.	$40.00	$44.00	=	$ 84.00
Tenant B.	$48.00	$52.00	=	$100.00
Tenant C.	$44.00	$32.00	=	$ 76.00
Tenant D.	$44.00	$40.00	=	$ 84.00
Tenant E.	$44.00	$64.00	=	$108.00
Tenant F.	$48.00	$36.00	=	$ 84.00

Total $536.00

ISTEC
Flow Measurement & Control

5 Park Lake Road, Sparta NJ 07871
Tel: +1-973-383-9888, Fax: +1-973-383-9088

www.istec-corp.com
sales@istec-corp.com