

accuSTREAM™ Meters

Displacement Type Magnetic Drive Cold Water Meters

Description

5/8" (DN 15mm), 3/4" (DN 20mm) and 1" (DN 25mm) Sizes

Measurement of cold water where flow is in one direction only; in residential, commercial and industrial services.



Features

CONFORMANCE TO STANDARDS

Sensus accuSTREAM water meters meet the requirements of NSF/ANSI Standard 61 Annex F and G and comply with AWWA Standard C710 latest revision. Each meter is tested to insure compliance with AWWA standards.

CONSTRUCTION

Sensus accuSTREAM water meters consist of three basic components: maincase; measuring chamber; and sealed register. Maincases (including bottom plate) are made of composite material with externally-threaded spuds. Registers are housed in a bonnet of synthetic polymer. Measuring chambers are of Rocksyn®, a corrosion-resistant, tailored thermoplastic material formulated for long-term performance and especially suitable for aggressive water conditions. The accuSTREAM can be installed horizontal.

SEALED REGISTER

Hermetically sealed; proven magnetic drive design eliminates dirt and moisture contamination, tampering and lens fogging problems. Standard register includes a straight-reading, odometer-type totalization display; a 360° test circle with center sweep hand; and a low flow (leak) detector. Gears are self-lubricating, molded plastic for long life and minimum friction.

No change gears are required for accuracy calibration. An electronic encoded register is available for all accuSTREAM meters. The LCD identifies the AMR digit (with a bar above the digit). Rate of flow is viewable by closing and opening the lid. The display will remain on for 30 seconds then will turn off. Close and re-open the lid to view the display.

TAMPERPROOF FEATURES

A unique locking system prevents customer removal of the register to obtain free water. A special tool, available only to water utilities, is required to remove the register assembly.

MAGNETIC DRIVE

The accuSTREAM features a hydrodynamically cushioned design that eliminates premature wear of components. The meter utilizes a patented positive, reliable drive coupling. The high-strength magnets used will eliminate "drive slip" in normal use and also provide adequate strength to drive remote register units.

OPERATION

Water flows through the meter's strainer and into the measuring chamber where it drives the piston. The hydrodynamically balanced piston oscillates around a central hub, guided by the division plate.

A drive magnet transmits the motion of the piston to a sensor located within the hermetically sealed register. The sensor is connected to the integrated circuit design that encodes the rotations of the measuring chamber. It reduces the piston oscillations into volume totalization units displayed on the register face.

MAINTENANCE

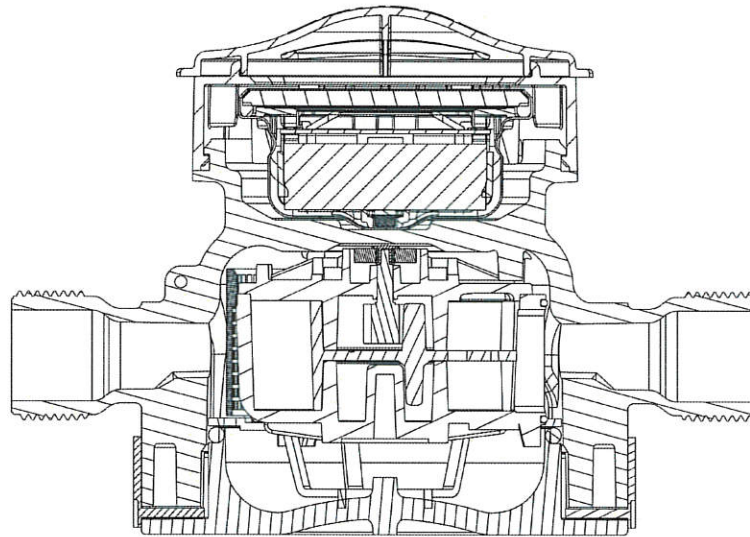
Sensus accuSTREAM water meters are engineered to provide long-term value and virtually maintenance-free operation. Simplicity of components allows interchangeability of parts of like-size meters, reduced parts inventory requirements, and ease of maintenance. The register can be removed without relieving the water pressure or removing the maincase from the installation.

AMR / AMI SYSTEMS

Meters and encoders are compatible with current Sensus AMR/AMI systems.

GUARANTEE

Sensus accuSTREAM water meters are backed by "The Sensus Guarantee." Ask your Sensus representative for details or see Bulletin G-500.



DIMENSIONS AND NET WEIGHTS

Meter Size	A	B	C	Width	Net Weight ¹
5/8" (DN 15mm)	7-1/2" (190mm)	5.3" (135mm)	1-3/4" (44mm)	3-7/8" (98mm)	2.3 lb. (1.04 kg)
5/8" x 3/4" (DN 15mm X 33mm)	7-1/2" (190mm)	5.3" (135mm)	1-3/4" (44mm)	3-7/8" (98mm)	2.4 lb. (1.09 kg)
3/4" (DN 20mm)	9" (229mm)	5.8" (147mm)	2-1/8" (54mm)	6" (152mm)	3.3 lb. (1.5 kg)
3/4" Short (DN 20mm)	7-1/2" (190mm)	5.8" (147mm)	2-1/8" (54mm)	6" (152mm)	3.3 lb. (1.5 kg)
1" (DN 25mm)	10-3/4" (273mm)	6.9" (175mm)	2-5/8" (67mm)	7-1/8" (181mm)	5.6 lb. (2.5 kg)

¹ With Rocksyn® measuring chamber.

SPECIFICATIONS

SERVICE	Measurement of potable and reclaim water. Operating temperature range of 35 °F (56 °C) - 150 °F (65.6 °C)
NORMAL OPERATING FLOW RANGE ¹	5/8" (DN 15mm) size: 1 to 20 gpm (0.25 to 4.5 m ³ /hr) 3/4" (DN 20mm) size: 2 to 30 gpm (0.45 to 7.0 m ³ /hr) 1" (DN 25mm) size: 3 to 50 gpm (0.7 to 11.0 m ³ /hr)
LOW FLOW REGISTRATION	5/8" size: 1/4 gpm (0.06 m ³ /hr) 3/4" size: 1/2 gpm (0.1 m ³ /hr) 1" size: 3/4 gpm (0.15 m ³ /hr)
MAXIMUM PRESSURE LOSS	5/8" size: 8 psi at 15 gpm (0.55 bar at 3.4 m ³ /hr) 3/4" size: 4 psi at 15 gpm (0.27 bar at 3.4 m ³ /hr) 1" size: 3.5 psi at 25 gpm (0.24 bar at 5.7 m ³ /hr)
MAXIMUM OPERATING PRESSURE	150 psi (10.0 bar)
MEASURING ELEMENT	Oscillating piston
REGISTER ³	Straight reading, hermetically sealed, magnetic drive. Remote reading unit optional.
STANDARD METER REGISTRATION ³	10 gallons, 1 cubic foot, or 0.01 m ³ or 0.1 m ³ /sweep hand revolution. 10,000,000 gallons, 1,000,000 cubic feet or 100,000 m ³ capacity 8 odometer wheels

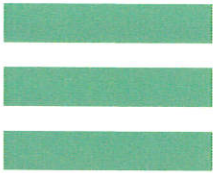
METER CONNECTIONS ³	5/8" (DN 15mm) size: 3/4" (19) threads 5/8" x 3/4" (DN 15mm x 33mm) size: 1" (25) threads 3/4" (DN 20mm) size: 1" (33.25mm) threads 3/4" x 1" (DN 20mm x 42mm) size: 1-1/4" (32) threads 1" (DN 25mm x 42mm) size: 1-1/4" (32) threads (All threads are straight pipe, external type, conforming to ANSI B1.20.1 or ISO R228, if specified.)
MATERIALS	Maincase—Composite Register box—Synthetic polymer Measuring chamber—Rocksyn® Bottom plate—Composite Magnets—Plasticized material Strainer—Synthetic polymer

¹ Maximum rates listed are for intermittent flow only. Maximum continuous flow rates as specified by AWWA are:

5/8" (DN 15mm)—10 gpm (2.3 m³/hr)
3/4" (DN 20mm)—15 gpm (3.4 m³/hr)
1" (DN 25mm)—25 gpm (5.7 m³/hr)

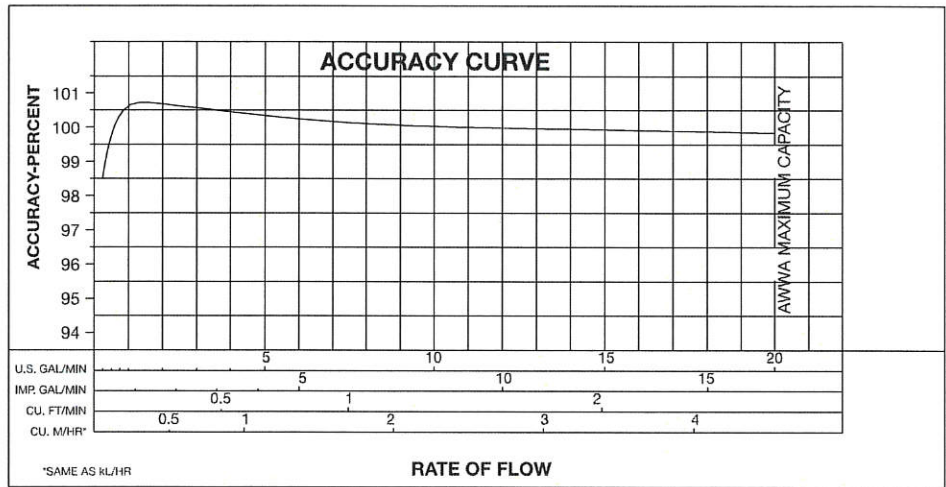
² Unless otherwise noted, 5/8" size and 5/8" x 3/4" characteristics are identical. 5/8" x 3/4" designates 5/8" with 3/4" connection thread. Metric designation is the normal bore x the outside diameter.

³ See AMR Systems Register datasheet AMR-275 for details specifications.



TYPICAL PERFORMANCE CURVES

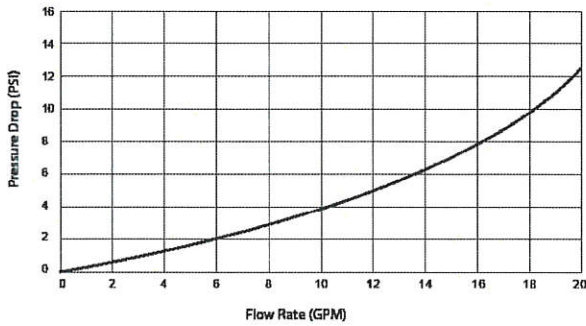
accuSTREAM METER



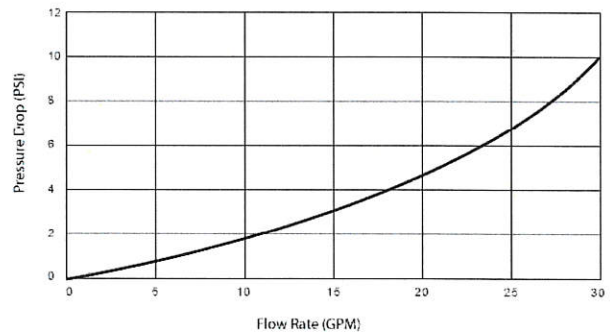
HEADLOSS CURVES

accuSTREAM METER

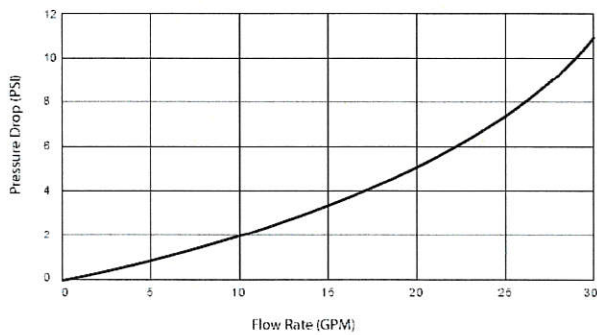
5/8" Headloss Curve



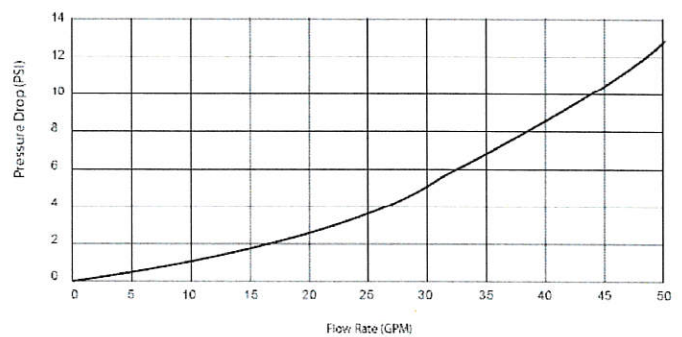
3/4" with 7-1/2 LL Headloss Curve



3/4" with 9" LL Headloss Curve



1" Headloss Curve



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8601 Six Forks Road, Suite 700
 Raleigh, NC 27615
 1-800-638-3748
www.sensus.com/water



For Cold Water Meters Displacement Type with Direct Read Registers

TYPE

Magnetic Drive, Sealed Register, Positive Displacement Type Oscillating Piston only.

SIZE

Must conform to American Water Works Standard C-710-02 as most recently revised.

LENGTH

Must conform to American Water Works Standard C-710-02 as most recently revised.

CASES

All Meters shall have a composite outer case with a separate measuring chamber which can be easily removed from the case. All Meters shall be marked with the size and direction of water flow through the meter. Composite bottoms shall be provided. The materials used shall meet the requirements of NSF/ANSI Standard 61, Annex F and G.

REGISTER

The register must be of the straight reading type with a large red test or sweep hand and shall include a low flow indicator on the dial face. The numeral wheel assembly shall be located at the bottom of the dial face with reading obtained from left to right. All reduction gearing shall be contained in a permanently hermetically sealed, tamperproof enclosure made from a stainless steel material, covered with a heat tempered glass lens.

The register shall be attached to the meter utilizing a plastic bonnet register box. The register shall be secured to the maincase by means of a tamper-resistant bonnet so that the register cannot be removed without the bonnet being destroyed. The register must be field replaceable.

MEASURING CHAMBER

The measuring chamber shall be a suitable synthetic polymer and shall not be cast as part of the maincase. All piston assemblies shall be interchangeable in all measuring chamber assemblies of the same size. The measuring chamber piston shall operate against a replaceable control

roller, allowing for repair to AWWA standards. The control roller shall rotate on a stainless measuring chamber steel pin, to provide added strength, wear resistance and corrosion resistance. There shall be an elastomeric seal or seals between measured and unmeasured water, preventing leakage around the measuring element.

MAGNETIC COUPLING

The motion of the piston will be transmitted to the sealed register through the use of a magnetic coupling.

STRAINERS

All meters must be provided with a corrosion-resistant strainer, with an effective straining area at least twice the bore diameter which can be easily removed from the meter without the meter itself being disconnected from the pipeline.

CHANGE GEARS

Change gears will not be allowed to calibrate the meter. All registers of a particular registration and meter size shall be identical and completely interchangeable.

ACCURACY AND HEADLOSS TESTS

Meters shall conform to current AWWA C-710-02, current revision, test flows, headloss and accuracy standards.d G.

PRESSURE CAPABILITY

Meters shall operate up to a working pressure of 150 pounds per square inch (psi), without leakage or damage to any parts. The accuracy shall not be affected by variation in pressure up to 150 psi.

PERFORMANCE WARRANTIES

In evaluating bid submittals, warranty coverage will be considered. All bidders are required to submit their most current nationally published warranty statements for water meter maincases, registers and measuring chambers.

SHIPMENT VERIFICATIONS

A statistically controlled sample of each meter shipment will be tested by the utility to insure each shipment meets the utility performance and materials specifications.

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accuSTREAM™ Meters

Installation and Operating Instructions

INSTALLATION INSTRUCTIONS

The Sensus accuSTREAM Meter is a positive displacement oscillating piston meter. It is constructed to meet the general requirements of American Water Works standard specifications C710-02. Meters should be installed in a horizontal line in such a position that the register is readily accessible for reading. They should be installed on the discharge side of any pump, with the flow directional arrow pointed toward the downstream. If a pump is installed on the outlet side of the meter, a minimum of ten diameters of straight pipe should be immediately downstream of the meter to obtain valid meter registration.

Suitable shut-off valves should be installed adjacent to the inlet and outlet of the meter so that service may be shut off if it is necessary to remove the meter. If a meter is set in a service that cannot be shut off during maintenance, a bypass should be installed around the meter, or some other approved means should be provided to keep the service open. Care should be taken when cutting, threading, or joining pipe that cuttings, pipe dope, solder, or other debris do not get into the inside of pipe. Before any meter is placed in service, the line adjacent to the meter inlet should be flushed to remove any debris.

An electrical grounding strap should be connected across the meter opening to both pipes. This protects the operator whenever repair or meter removal is required.

If a pressure reducing valve is required in the service line, it is to be installed downstream of the meter (between the meter and the end user). Local plumbing codes or local practices usually determine when this is needed.

OPERATING INSTRUCTIONS

After the meter is installed and service is ready to be turned on, make sure that both shut-off valves adjacent to the inlet and outlet of the meter are closed. Start the pump or other source of water supply. Slowly open the valve adjacent to the meter's inlet to fill the meter with water. Then, slowly open the valve adjacent to the meter's outlet to fill the balance of system with water. By opening the valves slowly in this sequence, the piston and other meter parts will be protected from breakage due to hydraulic shock which often occurs when a swift flow of water is suddenly emptied into a dry meter.

In the Sensus accuSTREAM Meter, the motion of the oscillating piston in the measuring chamber is transmitted by permanent face drive type magnets to the sealed register. This powerful magnetic coupling operates between a driver magnet, rotated by the piston hub, and a follower magnet, sealed inside the register case which is mounted to the meter maincase above the measuring chamber. The motion of the follower magnet turns a shaft which is attached to the first pinion of the register's gear reduction. The instrument type gearing requires only a small portion of the driving force available from the magnetic coupling. Thus, the register accurately and positively follows every movement of the piston, no matter how slight it may be.

Below is a table showing standard meter capacities and the minimum acceptable meter accuracy specified by AWWA Standard C710-02 in services at pressures not exceeding 150 PSI and water temperatures not in excess of 80°F. The Sensus accuSTREAM Meter exceeds these requirements.

SIZE	MAXIMUM OPERATING CAPACITY	NORMAL TEST FLOW	REQUIRED ACCURACY	MINIMUM TEST FLOW	REQUIRED ACCURACY
5/8"	20 GPM	1-20 GPM	98.5-101.5%	1/4 GPM	95%
3/4"	30 GPM	2-30 GPM	98.5-101.5%	1/2 GPM	95%
1"	50 GPM	3-50 GPM	98.5-101.5%	3/4 GPM	95%

Meters properly selected as to size and type will give satisfactory service over a long period of time without maintenance. However, certain operating conditions should be observed. The safe maximum operating capacity listed above represents the maximum rate of flow at which water should be passed through a meter. Maximum or peak loads should only be imposed on the meter for short, intermittent periods. In general, any 5/8" through 1" displacement type meter should not be operated on a continuous 24-hour service at flows greater than 1/2 the maximum capacity.

Under ordinary conditions, meters should be inspected and maintained at regular intervals to insure that they are functioning properly. It is essential that meters be subjected to periodic testing. The interval between tests must be governed by local water conditions. Under average conditions, the following intervals are recommended for Sensus accuSTREAM Water Meters:

5/8" - 15 years
 3/4" - 15 years
 1" - 15 years

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iPERL™ Water Management System

Electromagnetic Flow Measurement System

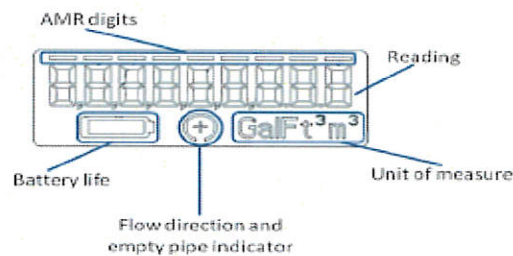
Description

5/8" (DN 15mm), 3/4" (DN 20mm) and 1" (DN 25mm) Sizes

With no moving parts, the Sensus iPERL water management system is based on innovative electromagnetic flow measurement technology. The iPERL system family has an operating range as low as 0.03 gpm (0.007 m³/hr) to 55 gpm.



Electronic Register LCD Display



Features

CONFORMANCE TO STANDARDS

The iPERL system far exceeds the most recent revision of ANSI/AWWA Standard C-700 and C-710 for accuracy and pressure loss requirements. All iPERL systems are NSF/ANSI Standard 61 Annex F and G compliant and tested to AWWA standards.

PERFORMANCE

The patented measurement technology of the iPERL system allows enhanced accuracy ranges at both low and high flows and perpetual accuracy over the life of the product and can be installed horizontally, vertically or diagonally.

CONSTRUCTION

The iPERL system is an integrated unit that incorporates an electronic register and measuring device encased in an external housing. The measuring device is comprised of a composite alloy flowtube with externally-threaded spud ends. Embedded in the flowtube are

magnetic flow sensors. The all electronic, programmable register is hermetically sealed with a tempered glass cover. The iPERL system has a 20 year life cycle, along with a 20 year battery life guarantee.

ELECTRONIC REGISTER

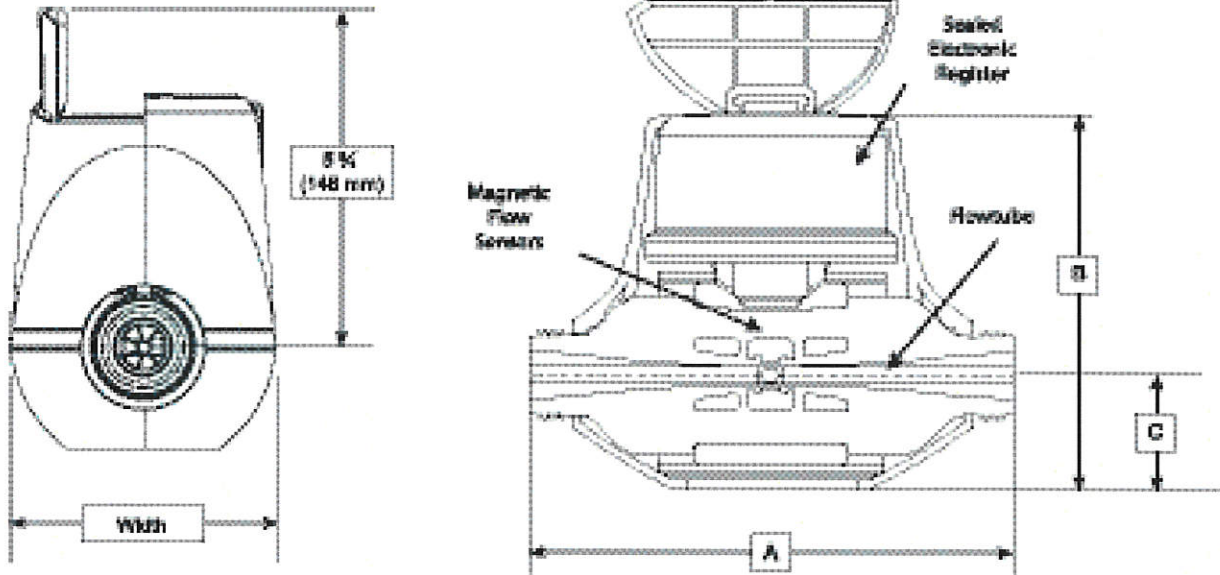
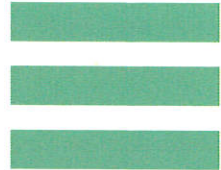
The high resolution 9-digit hermetically sealed electronic register with LCD display was designed to eliminate dirt, lens fogging issues and moisture contamination in pit settings with built in tamper protection. The tempered glass register cover displays readings with the AMR digits highlighted. Direction of flow and units of measure are also easily readable on the register display. The iPERL register features; AMR resolution and unit of measure that are fully programmable, integral customer data logging compatible with UniPro software tools. The large, easy to read display also includes battery life, empty pipe and forward/reverse flow indicators.

TAMPERPROOF FEATURES

The integrated construction of the iPERL system prevents removal of the register to obtain free water. The magnetic tamper and low field alarms will both indicate any attempt to tamper with the magnetic field of the iPERL system.

AMR / AMI SYSTEMS

iPERL systems are compatible with current Sensus AMR/AMI systems.

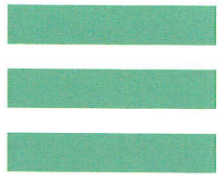


DIMENSIONS AND NET WEIGHTS

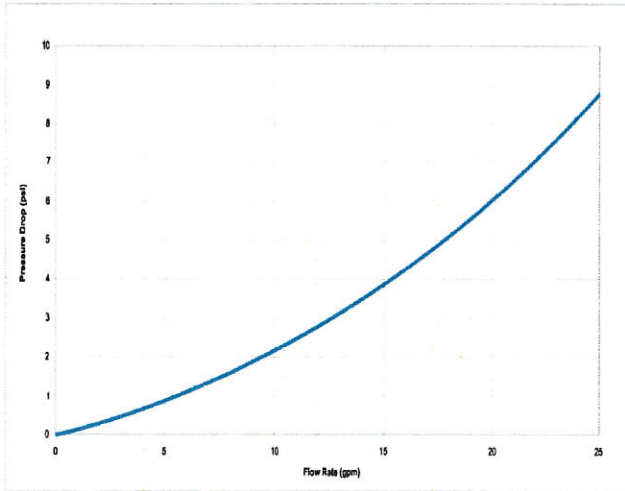
Size	A (lay length)	B	C	Spud Ends	NPSM Thread Size	Width	Net Weight
5/8" (DN 15 mm)	7-1/2" (190 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	5/8" (15 mm)	3/4" (19 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
3/4"S (5/8" x 3/4") (DN 20 mm)	7-1/2" (190 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
3/4" (DN 20 mm)	9" (229 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.2 lb. (1.5 kg)
1" (DN 25 mm)	10-3/4" (273 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	1" (25 mm)	1-1/4" (32 mm)	4-1/2" (114 mm)	3.3 lb. (1.6 kg)

SPECIFICATIONS

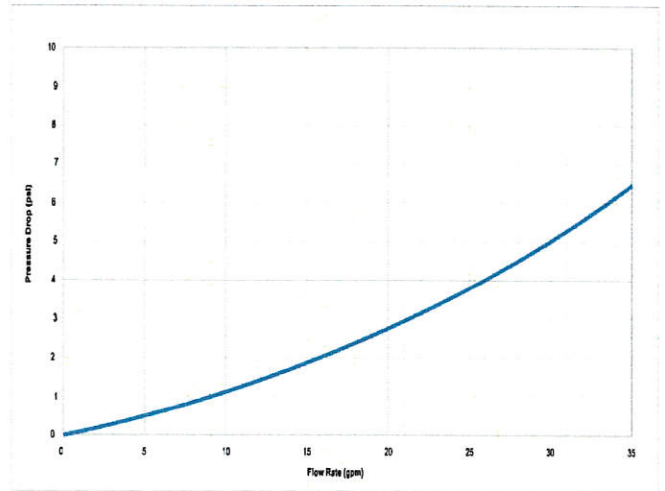
SERVICE	Measurement of potable and reclaim water. Operating temperature range of 33 °F (0.56 °C) - 150 °F (65.6 °C)	MEASUREMENT TECHNOLOGY	Solid state electromagnetic flow
NORMAL OPERATING FLOW RANGE (±1.5%)	5/8" (DN 15mm) size: 0.18 to 25 gpm (0.04 to 5.7 m ³ /hr) 3/4" (DN 20mm) size: 0.18 to 35 gpm (0.04 to 8.0 m ³ /hr) 1" (DN 25mm) size: 0.4 to 55 gpm (0.09 to 12.5 m ³ /hr)	REGISTER	Hermetically sealed, 9-digit programmable electronic register AMR/AMI compatible iPERL system register programmable using the UniPro programming package
LOW FLOW RANGE (±3%)	5/8" (DN 15mm) size: >0.11 gpm (0.025 m ³ /hr) to <0.18 gpm (0.041 m ³ /hr) 3/4" (DN 20mm) size: >0.11 gpm (0.025 m ³ /hr) to <0.18 gpm (0.041 m ³ /hr) 1" (DN 25mm) size: >0.3 gpm (0.068 m ³ /hr) to <0.4 gpm (0.09 m ³ /hr)	MATERIALS	External housing – Thermal plastic Flowtube – Polyphenylene sulfide alloy Electrode – Silver/silver chloride Register cover – Tempered glass
STARTING FLOW	5/8" (DN 15mm) size: 0.03 gpm (0.007 m ³ /h) 3/4" (DN 20mm) size: 0.03 gpm (0.007 m ³ /h) 1" (DN 25mm) size: 0.11 gpm (0.025 m ³ /h)	ALARM DEFAULTS	Alarm Duration – 90 days Leak Duration – 24 hours Datalog Interval – 1 hour Alarm Mask – All alarms reported History Mask – All event types reported
MAXIMUM OPERATING PRESSURE	200 psi (13.8 bar)		



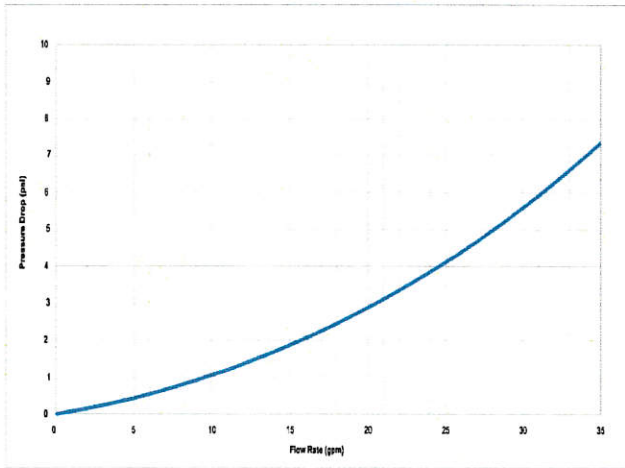
HEADLOSS CURVES



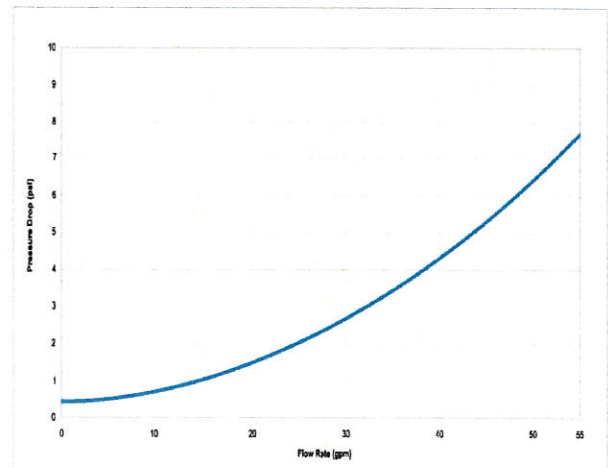
5/8" Headloss Curve



3/4" Short Headloss Curve



3/4" Headloss Curve



1" Headloss Curve

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iPERL™ Water Management System

Specifications

TYPE

Solid state, battery operated electromagnetic flow measurement system with a hermetically sealed, glass covered, electronic register with a programmable 9-digit display.

CONFORMANCE TO STANDARDS

Must conform to American Water Works Standard C-700 and C-710 as most recently revised with respect to accuracy and pressure loss requirements, or other appropriate American Water Works Standard. Must be compliant with NSF/ANSI Standard 61 Annex F and G.

REGISTER

The register must be an electronic device encapsulated in glass with 9 programmable digits utilizing a liquid crystal display (LCD). It will have indicators for flow direction, empty pipe, battery life and unit of measurement. The register must be hermetically sealed with a heat tempered glass cover and be tamperresistant. The register shall not be removable from the measuring sensor. The register shall utilize a magnetic coupling technology to connect to a touch read, radio read or fixed base meter reading system in either an inside or pit set installation.

MEASURING ELEMENT

The measuring element shall be made of a noncorrosive, lead-free glass fiber reinforced, composite alloy material. A battery powered magnetic flow sensor utilizing silver/silver chloride electrodes will be utilized to measure the velocity of the water which is linearly proportional to the volume. The measuring element will have no moving parts and will be specific for each size.

EXTERNAL HOUSING

The register and measuring element will be an integrated unit housed within a thermal plastic external casing. This integrated unit will not be removable from the external housing. The systems shall have the size and direction of water flow through the system imprinted on the external housing.

PRESSURE CAPABILITY

System shall operate up to a working pressure of 200 pounds per square inch (psi), without leakage or damage to any parts. The accuracy shall not be affected by variation of pressure up to 200 psi.

PERFORMANCE WARRANTIES

In evaluating bid submittals, warranty coverage will be considered. All bidders are required to submit their most current nationally published warranty statements for water meter maincases, registers and measuring chambers.

OPERATING CHARACTERISTICS

Under normal operating conditions, the unit shall be calibrated for flow as low as:

Sizes	Starting Flow (GPM)	Low Flow Range (+/-3%)	Normal Operating Range (+/-1.5%)	Pressure Loss (Not to Exceed)
5/8"	0.03	>0.11<0.18	0.18 to 25	4psi @ 15gpm
5/8" x 3/4"	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
3/4" Short	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
3/4" Reg	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
1"	0.11	>0.3<0.4	0.4 to 55	2psi @ 25gpm

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iPERL™ Water Management System Installation Guidelines

To ensure proper performance, the following factors should be considered when installing an iPERL system:

- Suitable shutoff valves should be installed adjacent to the inlet and outlet of the iPERL system so that the service may be shutoff if it is necessary to remove the iPERL system.
- Clean and flush the service line thoroughly on the inlet side before installing the iPERL system.
- Make sure that metallic water service plumbing is properly grounded as per local electrical codes. If installing indoors, install an electrical grounding strap for safety.
- The water lines must be coaxially aligned within 3 degrees (0.4 inches) to ensure a proper seal.
- It is recommended that old gaskets be completely removed and discarded and new 3/32" thick rubber gaskets be used with every installation.

To install an iPERL system:

1. Unpack the iPERL system from the packaging and remove the spud thread protectors.
2. Inspect the iPERL system for any parts that may have been damaged during shipping.
3. If a new install, thoroughly flush new water service plumbing before installing the iPERL system.
4. Turn off the water supply valves.



Insure the metallic water service plumbing is properly grounded per electrical codes.
If installing indoors, install an electrical grounding strap for safety.

5. If an existing install, pull the current meter out of the pit or disassemble current meter.
6. Orientate the iPERL system so that the direction of the flow arrow on the system body is aligned with the direction of the flow arrow in the plumbing system.
7. Install new iPERL system connection gaskets in both meter couplings.
8. Align the threads and hand-tighten the coupling nuts.
9. Using a wrench, tighten an extra 1/4 to 1/2 turn on each coupling nut.

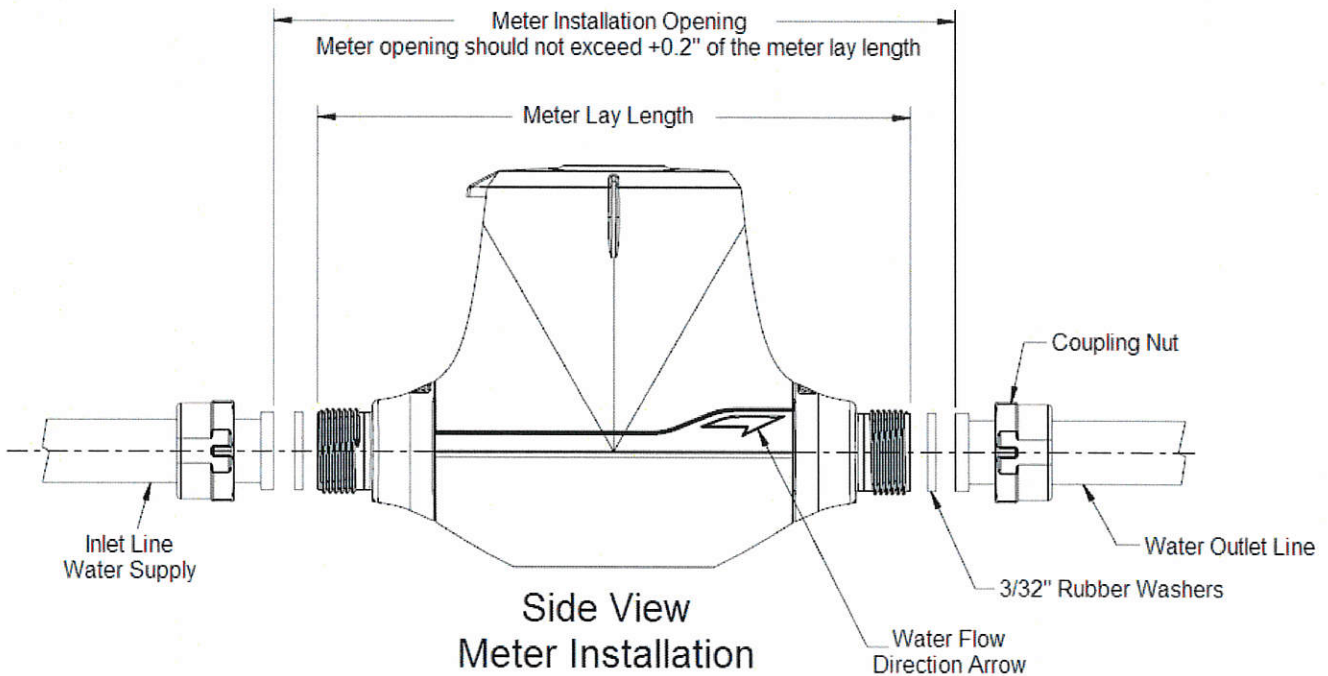
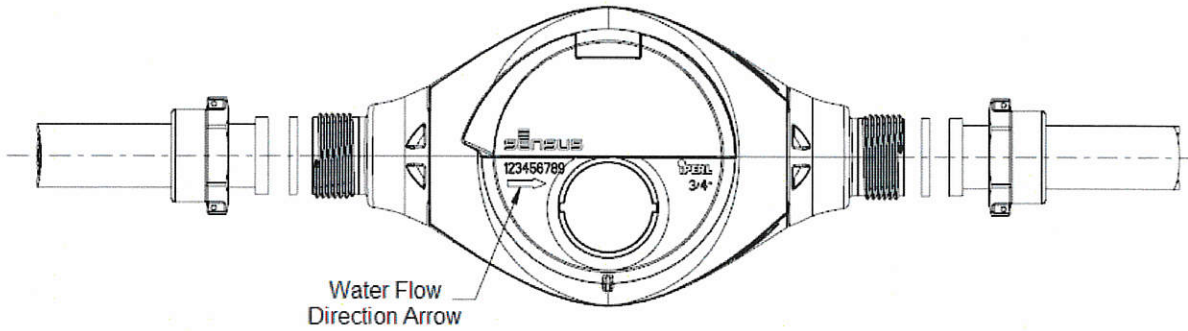


Do not over-tighten. You may tighten after turning on the water (if leaks are present).

10. After the iPERL system is installed, shut-off the outlet shut-off valve.
11. Open the inlet shut-off valve slowly until the iPERL system is full of water and ensure that there are no leaks.
12. Open the outlet valve slowly until air is out of the meter and service line.
13. Open a valve downstream of the iPERL system to ensure that no foreign debris in the water obstructs the operations of the system.
14. Check the read on the iPERL system to make sure it is registering a positive number. If it is not, make sure the iPERL system is installed in the correct direction.
15. Attach an endpoint to the iPERL system via a coupler cable, if required.
16. Record read information as required by the utility.

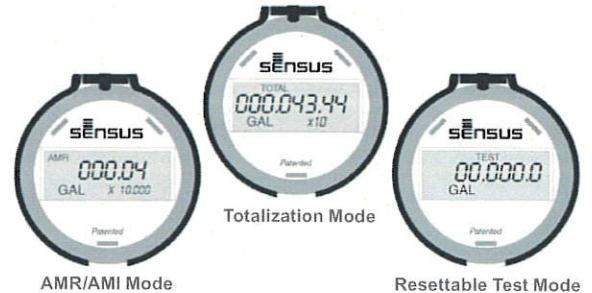
iPERL™ Water Management System Installation Guidelines

Top View
Meter Installation



OMNI™ C²1-1/2", 2", 3", 4", 6", 8" and 10" OMNI C² Meter**Description****1-1/2", 2", 3", 4", 6", 8" and 10" Sizes**

The OMNI C² meter operation is based on advanced Floating Ball Technology (FBT).

**Features****CONFORMANCE TO STANDARDS**

The OMNI C² meter meets and far exceeds the most recent revision of AWWA Standard C701 and C702 class II. Additionally, the meter does not require a valve to meet these standards. Each meter is performance tested to ensure compliance. All OMNI meters are NSF/ANSI Standard 61, Annex F and G approved latest standards.

PERFORMANCE

The patented measurement principles of the OMNI C² meter assure enhanced accuracy ranges, an overall greater accuracy, and a longer service life than any other comparable class meter produced. The OMNI C² meter has no restrictions as to sustained flow rates within its continuous operating range. The floating ball measurement technology allows for flows up to its rated maximum capacity without undue wear or accuracy degradation when installed in any orientation.

CONSTRUCTION

The OMNI C² meter consists of two basic assemblies; the maincase and the measuring chamber. The measuring chamber assembly includes the "floating ball" impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all electronic programmable register with protective bonnet. The maincase is made from industry proven Ductile Iron with an approved NSF epoxy coating. Maincase features are; easily removable measuring chamber, unique chamber seal to the

maincase using a high pressure o-ring, testing port and an AWWA compliant strainer.

OMNI ELECTRONIC REGISTER

The OMNI C² electronic register is hermetically sealed with an electronic pickup containing no mechanical gearing. The large character LCD displays AMR, Totalization and a Resettable Test Totalizer. OMNI register features; AMR resolution units that are fully programmable, Pulse output frequency that are fully programmable, Integral customer data logging capability, Integral resettable accuracy testing feature compatible with UniPro Testing Assistant Program, Large, easy-to-read LCD also displays both forward and reverse flow directions and all with a 10-year battery life guarantee.

MAGNETIC DRIVE

Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the "floating ball" impeller.

MEASURING ELEMENT

The revolutionary thermoplastic, hydrodynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI C² meter.

STRAINER

The OMNI C² with the AWWA compliant "V" shaped strainer using a stainless steel screen along with Floating Ball Technology (FBT) create a design that gives far improved accuracy even in those once thought questionable settings. A removable strainer cover permits easy access to the screen for routine maintenance.

MAINTENANCE

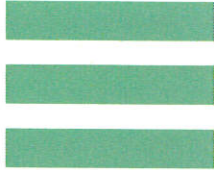
The OMNI C² meter is designed for easy maintenance. Should any maintenance be required, the measuring chamber and / or strainer cover can be removed independently. Parts and or a replacement measuring chamber may be utilized in the event repairs are needed. Replacement Measuring Chambers are available for the OMNI C² meters and may also be utilized for retrofitting to competitive meters to achieve increased accuracy and extended service life.

AMR / AMI SYSTEMS:

Meters and encoders are compatible with current Sensus AMR/AMI systems.

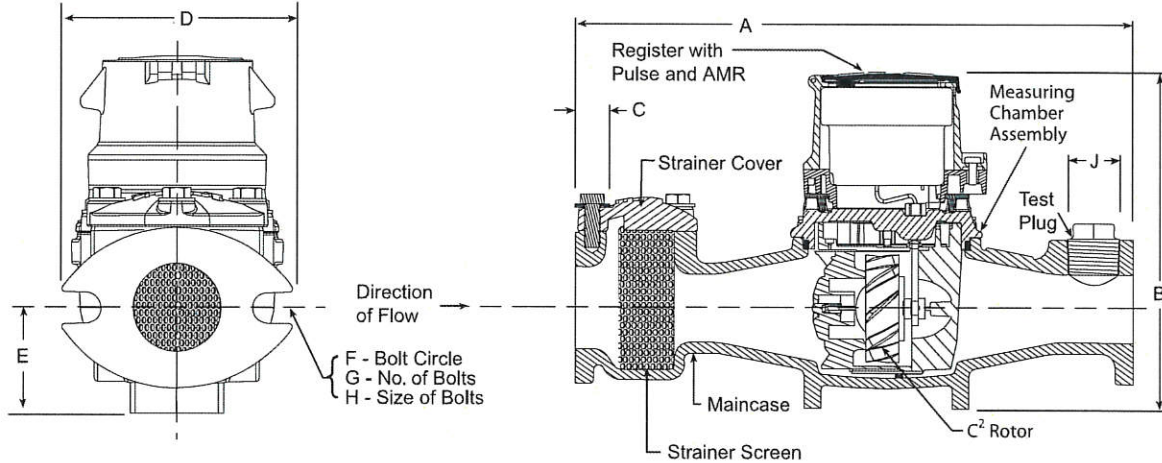
GUARANTEE:

Sensus OMNI C² Meters are backed by "The Sensus Guarantee." Ask your Sensus representative for details or see Bulletin G-500.

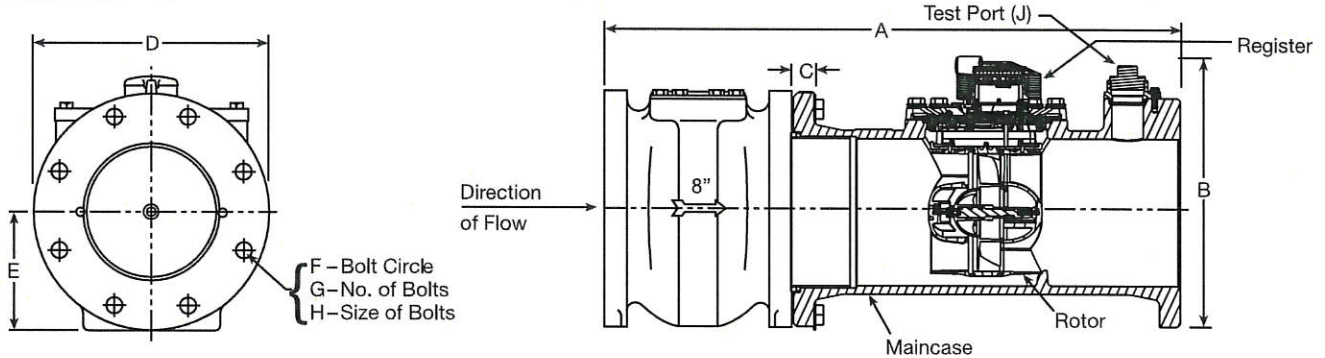


OMNI C²: 1-1/2", 2", 3", 4", 6", 8" and 10" Sizes

OMNI C²: 1 1/2" - 6"



OMNI C²: 8" - 10"



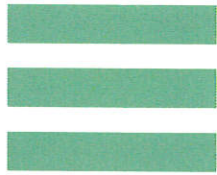
DIMENSIONS AND NET WEIGHTS

Meter and Pipe Size	Normal Operating Range		Connections	A	B	C	D	E	F	G	H	J	Net Weight	Shipping Weight
1-1/2" DN 40mm	.5 gpm .11 m ³ /hr	200 gpm 45 m ³ /hr	Flanged	13" 330mm	7-7/8" 200mm	15/16" 24mm	5-1/8" 130mm	2-5/16" 59mm	4" 102mm	2	5/8" 16mm	1" 25mm	18.8 lbs. 8.53 kg.	22.5 lbs. 10.20 kg.
2" DN 50mm	.5 gpm .11 m ³ /hr	200 gpm 45 m ³ /hr	Flanged	15-1/4" 387mm	7-7/8" 200mm	1" 25mm	5-3/4" 146mm	2-5/16" 59mm	4-1/2" 114mm	2	3/4" 19mm	1" 25mm	25.4 lbs. 11.39 kg.	32.5 lbs. 14.74 kg.
3" DN 80mm	1 gpm .23 m ³ /hr	500 gpm 114 m ³ /hr	Flanged	17" 432mm	8-3/4" 222mm	3/4" 19mm	7-7/8" 200mm	4-1/8" 105mm	6" 153mm	4	5/8" 16mm	1" 25mm	45 lbs. 20.41 kg.	72.8 lbs. 33.02 kg.
4" DN 100mm	1.5 gpm .34 m ³ /hr	1000 gpm 227 m ³ /hr	Flanged	20" 508mm	11-3/16" 284mm	15/16" 24mm	9-1/8" 232mm	4-3/4" 121mm	7-1/2" 191mm	8	5/8" 16mm	1-1/2" 40mm	64.9 lbs. 29.44 kg.	72.8 lbs. 33.02 kg.
6" DN 150mm	3 gpm .68 m ³ /hr	2500 gpm 5687 m ³ /hr	Flanged	24" 610mm	13-1/4" 336mm	15/16" 24mm	11" 279mm	5-3/4" 146mm	9-1/2" 242mm	8	3/4" 19mm	1-1/2" 40mm	130 lbs. 48.5 kg.	155 lbs. 57.8 kg.
8" DN 200mm	4 gpm .91 m ³ /hr	2700 gpm 614 m ³ /hr	Flanged	30-1/8" 765 mm	15" 381 mm	11/16" 17 mm	13-1/2" 343 mm	6-3/4" 172 mm	11-3/4" 300 mm	8	3/4" 19 mm	2" NPT	471 lbs. 214 kg.	521 lbs. 236 kg.
10" DN 250mm	5 gpm 1.1 m ³ /hr	4000 gpm 908 m ³ /hr	Flanged	41-1/8" 1045mm	19" 485mm	11/16" 17mm	16" 406mm	8-1/2" 216mm	14-1/4" 362mm	12	7/8" 22mm	2" NPT	685 lbs. 311 kg.	745 lbs. 338 kg.

OMNI C²: 1-1/2", 2", 3", 4", 6", 8" and 10" Sizes

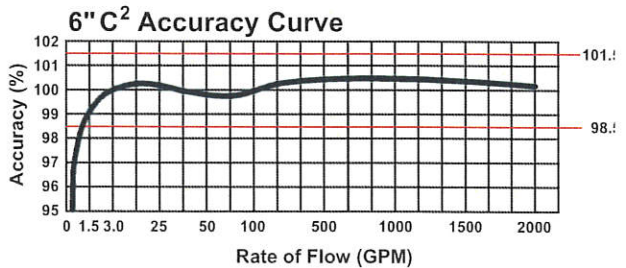
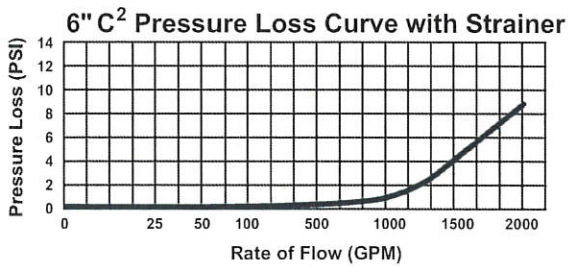
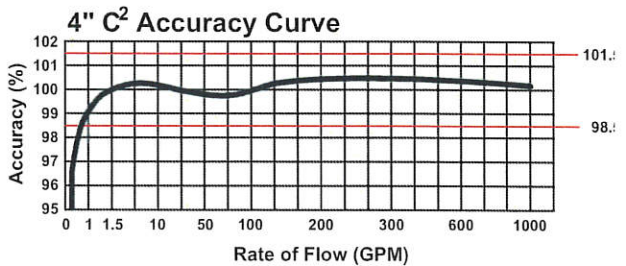
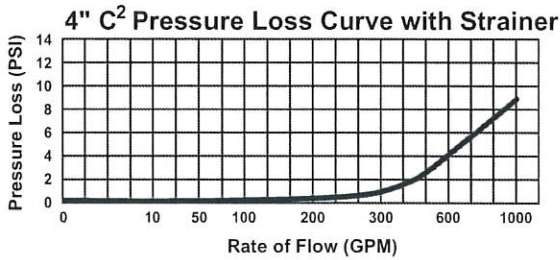
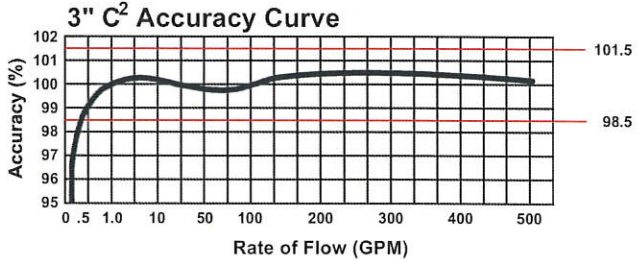
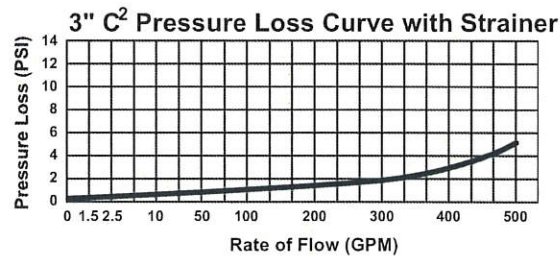
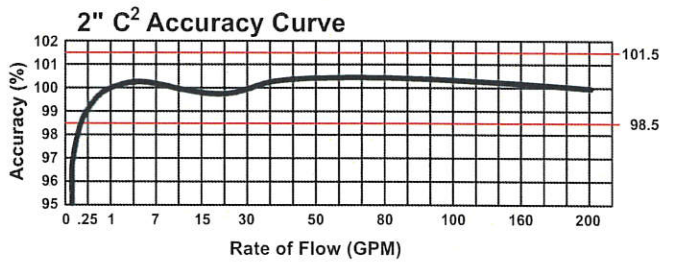
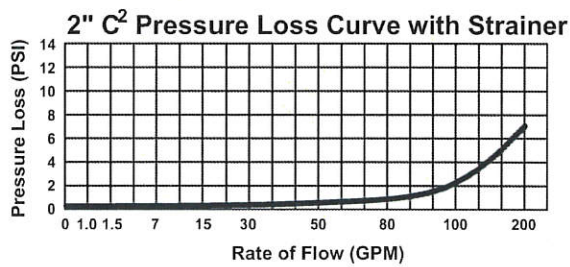
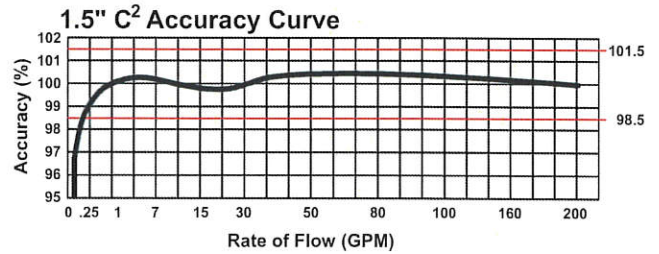
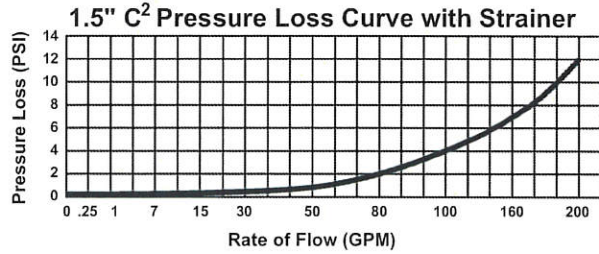
SPECIFICATIONS

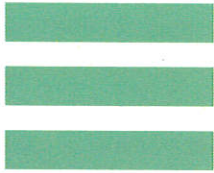
SERVICE	Measurement of potable and reclaim water. Operating temperature range of 33 °F (56 °C) - 150 °F (65.6 °C)																		
OPERATING RANGE (100% ± 1.5%)	1-1/2": .5 – 200 GPM (.11 - 45 m ³ /hr) 2": .5 – 200 GPM (.11 - 45 m ³ /hr) 3": 1.0 – 500 GPM (.23 - 114 m ³ /hr) 4": 1.5 – 1000 GPM (.34 - 227 m ³ /hr) 6": 3 – 2000 GPM (.68 - 454 m ³ /hr) 8": 4 – 2700 GPM (0.91 – 614 m ³ /hr) 10": 5-4000 GPM (1.1-908 m ³ /hr)																		
LOW FLOW (95% – 101.5%)	1-1/2": .25 GPM (.06 m ³ /hr) 2": .25 GPM (.06 m ³ /hr) 3": .5 GPM (.11 m ³ /hr) 4": .75 GPM (.17 m ³ /hr) 6": 1.5 GPM (.34 m ³ /hr) 8": 2.5 GPM (0.57 m ³ /hr) 10": 3.5 GPM (0.8 m ³ /hr)																		
MAXIMUM CONTINUOUS OPERATION	1-1/2": 160 GPM (36m ³ /hr) 2": 160 GPM (36 m ³ /hr) 3": 400 GPM (91 m ³ /hr) 4": 800 GPM (182 m ³ /hr) 6": 1600 GPM (363 m ³ /hr) 8": 2700 GPM (614 m ³ /hr) 10": 4000 GPM (908 m ³ /hr)																		
MAXIMUM INTERMITTENT OPERATION	1-1/2": 200 GPM (45 m ³ /hr) 2": 200 GPM (45 m ³ /hr) 3": 500 GPM (114 m ³ /hr) 4": 1000 GPM (227 m ³ /hr) 6": 2000 GPM (454 m ³ /hr) 8": 3400 GPM (773 m ³ /hr) 10": 5000 GPM (1136 m ³ /hr)																		
PRESSURE LOSS	1-1/2": 6.9 psi @ 160 GPM (48 bar @ 36 m ³ /hr) 2": 4.3 psi @ 160 GPM (.30 bar @ 36 m ³ /hr) 3": 3.2 psi @ 400 GPM (.22 bar @ 91 m ³ /hr) 4": 6.4 psi @ 800 GPM (.51 bar @ 182 m ³ /hr) 6": 5.5 psi @ 1600 GPM (.56 bar @ 363 m ³ /hr) 8": 4 psi @ 2700 GPM (.27 bar @ 614 m ³ /hr) 10": 4.5 psi @ 4000 GPM (.31 bar @ 908 m ³ /hr)																		
MAXIMUM OPERATING PRESSURE	200 PSI (13.8 bar)																		
FLANGE CONNECTIONS	U.S. ANSI B16.1 / AWWA Class 125																		
REGISTER	Fully electronic sealed register with programmable registration (Gal. /Cu.Ft./ Cu. Mtr. / Imp.Gal / Acre Ft.) Programmable AMR/AMI reading and pulse outputs Guaranteed 10 year battery life																		
NSF APPROVED MATERIALS	<table> <tr> <td>Maincase:</td> <td>Coated Ductile Iron</td> </tr> <tr> <td>Measuring Chamber:</td> <td>Thermoplastic</td> </tr> <tr> <td>Rotor "Floating Ball":</td> <td>Thermoplastic</td> </tr> <tr> <td>Radial Bearings:</td> <td>Hybrid Thermoplastic</td> </tr> <tr> <td>Thrust Bearings:</td> <td>Sapphire/Ceramic Jewel</td> </tr> <tr> <td>Magnets:</td> <td>Ceramic Magnet</td> </tr> <tr> <td>Strainer Screen:</td> <td>Stainless Steel</td> </tr> <tr> <td>Strainer Cover:</td> <td>Coated Ductile Iron</td> </tr> <tr> <td>Test Plug:</td> <td>Coated Ductile Iron</td> </tr> </table>	Maincase:	Coated Ductile Iron	Measuring Chamber:	Thermoplastic	Rotor "Floating Ball":	Thermoplastic	Radial Bearings:	Hybrid Thermoplastic	Thrust Bearings:	Sapphire/Ceramic Jewel	Magnets:	Ceramic Magnet	Strainer Screen:	Stainless Steel	Strainer Cover:	Coated Ductile Iron	Test Plug:	Coated Ductile Iron
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OMNI C²: 1-1/2", 2", 3", 4", and 6" Sizes

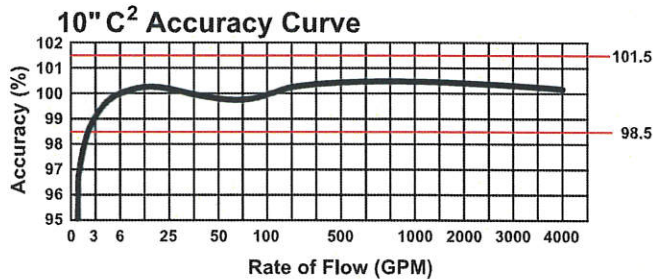
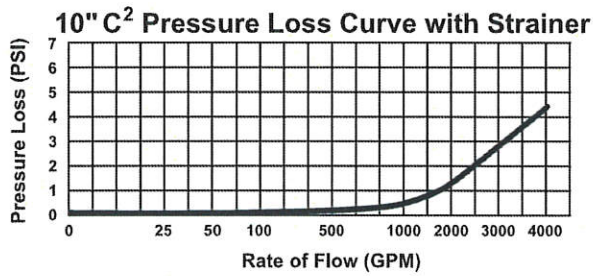
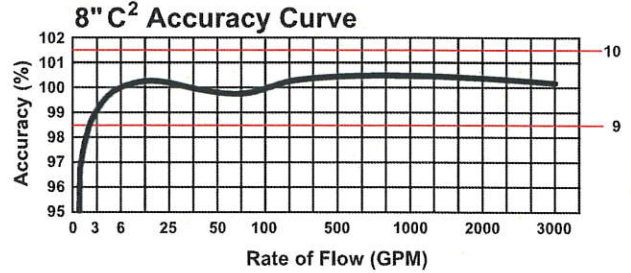
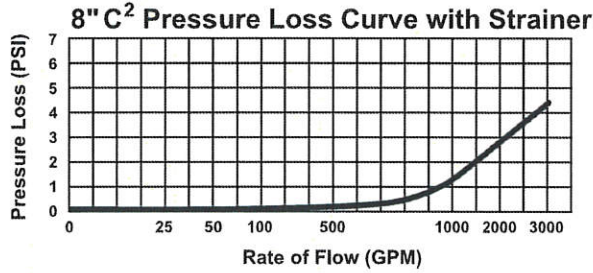
Headloss Curves





OMNI C²: 8" and 10" Sizes

Headloss Curves



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1-1/2", 2", 3", 4", 6", 8" and 10" Sizes

SCOPE

These specifications set forth the minimum acceptable design criteria and performance requirements for Compound-type cold water meters including the following potential service applications and general considerations:

- Intended where a wide flow range is anticipated
- Measurement of water usage for critical billing applications
- Measurement intended for typical commercial and industrial applications requiring lower flow sensitivities
- Measurement of low flow usage below OMNI T² Meter threshold levels
- Measurement of constant low to medium flows up to high flow usage

CONFORMANCE TO STANDARDS

The meter package shall meet or exceed all requirements of ANSI/AWWA Standard C701 and C702 for Class II compound and turbine meter assemblies. Each meter assembly shall be performance tested to ensure compliance.

The meter package shall meet or exceed all requirements of NSF/ANSI Standard 61, Annex F and G.

MAINCASES

The meter maincase shall be of epoxy coated ductile iron composition. The epoxy coating shall be provided as standard fusion-bonded and adhere to NSF for non-lead regulation compliance.

PERFORMANCE

The meter assembly shall have performance capability of continuous operation up to the rated maximum flows as listed below without affecting long-term accuracy or causing any undue component wear. The meter assembly shall also provide a 25% flow capacity in excess of the maximum flows listed for intermittent flow demands. Maximum headloss through the meter / strainer assembly shall not exceed those listed in the following table per meter size.

OPERATING CHARACTERISTICS

Meter Size	Low Flow (95% Min.)	Operating Range (98.5 - 101.5%)	Intermittent Flows (98.5 - 101.5%)	Pressure Loss (Not to Exceed)
1-1/2"	.25 GPM	.5 to 160 GPM	200 GPM	6.9 PSI @ 160 GPM
2"	.25 GPM	.5 to 160 GPM	200 GPM	4.3 PSI @ 160 GPM
3"	.5 GPM	1.0 to 400 GPM	500 GPM	3.2 PSI @ 400 GPM
4"	.75 GPM	1.5 to 800 GPM	1000 GPM	6.4 PSI @ 800 GPM
6"	1.5 GPM	3.0 to 1600 GPM	2000 GPM	5.5 PSI @ 1600 GPM
8"	2.5 GPM	4 to 2700 GPM	3400 GPM	4 PSI @ 2700 GPM
10"	3.5 GPM	5 to 4000 GPM	5000 GPM	4.5 PSI @ 4000 GPM

MEASURING CHAMBER

The measuring chamber shall consist of a measuring element, removable housing, and all-electronic register. The measuring element shall be mounted on a horizontal, stationary stainless steel shaft with sleeve bearings and be essentially weightless in water. The measuring element comes integrated with the advanced Floating Ball Technology design. The measuring chamber shall be capable of operating within the above listed accuracy limits without calibration when transferred from one maincase to another of the same size. The measuring shall be so configured to capture all flows as specified above, without the requirement of an automatic valve.

DIRECT MAGNETIC DRIVE SYSTEM

The direct magnetic drive shall occur between the motion of the measuring element blade position and the electronic register. The OMNI direct drive system with Floating Ball Technology is designed to extend service life, enhance low flow sensitivity and provide extended flow capacity and overall accuracy of the meter assembly. Any and all additional intermediate, magnetic or mechanical, drive couplings are not acceptable.

ELECTRONIC REGISTER

The meter's register is all-electronic and does not contain any mechanical gearing to display flow and accurate totalization. The electronic register includes the following partial list of features:

- AMR resolution units fully programmable
- Pulse output frequency fully programmable
- Integral data logging capability
- Integral resettable accuracy testing feature
- Large, easy-to-read LCD display
- 10-year battery life guarantee

MAXIMUM OPERATING PRESSURE

The meter assembly shall operate properly without leakage, damage, or malfunction up to a maximum working pressure of 200 pounds per square inch (psig).

STRAINERS

The meter strainer shall be integral and cast as part of the meter's maincase. The strainer's screen shall have a minimum net open area of at least two (2) times the pipe opening and be a V-shaped configuration for the purpose of maintaining a full unobstructed flow pattern. The strainer body shall be a coated ductile iron fusion-bonded epoxy identical to that of the meter's maincase. All fasteners shall be stainless steel capable of maintaining the following static pressure ratings and physical dimensions:

Meter Size	Maximum Working Pressure	Centerline to Strainer Base	Overall Length (Not to Exceed)
1-1/2"	200 PSIG	2-5/16 INCHES	13 INCHES
2"	200 PSIG	2-5/16 INCHES	15-1/4 INCHES
3"	200 PSIG	4-1/8 INCHES	17 INCHES
4"	200 PSIG	4-3/4 INCHES	20 INCHES
6"	200 PSIG	5-3/4 INCHES	24 INCHES
8"	200 PSIG	6-3/4 INCHES	30-1/8 INCHES
10"	200 PSIG	8-1/2 INCHES	41-1/8 INCHES

STRAIGHTENING VANES

A straightening vane assembly is mandatory and shall be positioned directly upstream of the measuring element. The straightening vane assembly shall be an integral component of the measuring chamber.

CONNECTIONS

Flanges for the 1-1/2" and 2" size meter assemblies shall be of the 2-bolt oval flange configuration. The 3", 4", 6", 8" and 10" size meter assemblies shall have flanges of the Class 125 round type, flat faced and shall conform to ANSI B16.1 for specified diameter, drilling and thickness.

CERTIFICATIONS AND MARKINGS

All sizes of meter packages shall display the sizes, model, manufacturer name, and direction of flow. Such display shall be cast on the side of the meter maincase.

GUARANTEE AND MAINTENANCE PROGRAM

Meters shall be guaranteed against defects in material and workmanship for a period of one (1) year from date of shipment. In addition, the meter supplier shall submit nationally published literature clearly outlining its factory maintenance program and current price schedule covering complete measuring chamber exchange.

INTENT

Subject meter specifications are designed to establish minimum guidelines for selecting an extremely critical metering device. Areas of concern to be evaluated in the selection process include, but are not limited to, ease of installation, operational features and benefits, readability and future system maintenance expense. A design, which reflects longevity of proper operation in all elements and high degree of sustained accuracy within the entire range of the meter assembly, is to be considered mandatory. Enhanced accuracy levels and performance are desired and will not be compromised.

RECOMMENDATION

Sensus OMNI C² Meter

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INSTALLATION INSTRUCTIONS

To insure valid registration, proper performance and meter longevity, the following factors should be considered when installing Sensus OMNI Meters.

1. *When installing Sensus OMNI Meters with the strainer, a minimum of 2 1/2 pipe diameters of straight run of pipe or equivalent full open components is required upstream and downstream of the meter or strainer flanges. Full open flow components may consist of: straight pipe, full open gate valves, bypass tees and concentric reducers (1 nominal pipe size reduction only). For all other installation configurations, a minimum of 5 pipe diameters of straight run is required upstream.
2. Gate valves located immediately upstream or downstream are acceptable, provided they are fully open during meter service and are not used to throttle flow rates through the meter.
3. Install nonconcentric reducers, check valves, back flow preventers, PRV (pressure reducing valves), throttling devices, altitude valves no closer than 4 pipe diameters downstream of the meter. Always avoid placing any of these devices upstream of any meter since the placement will put the meter in a low pressure zone thus possibly causing inconsistent accuracy and reduced longevity.

Accuracy levels may be determined by comparison accuracy testing either by using a Sensus Portable Large Meter Tester,

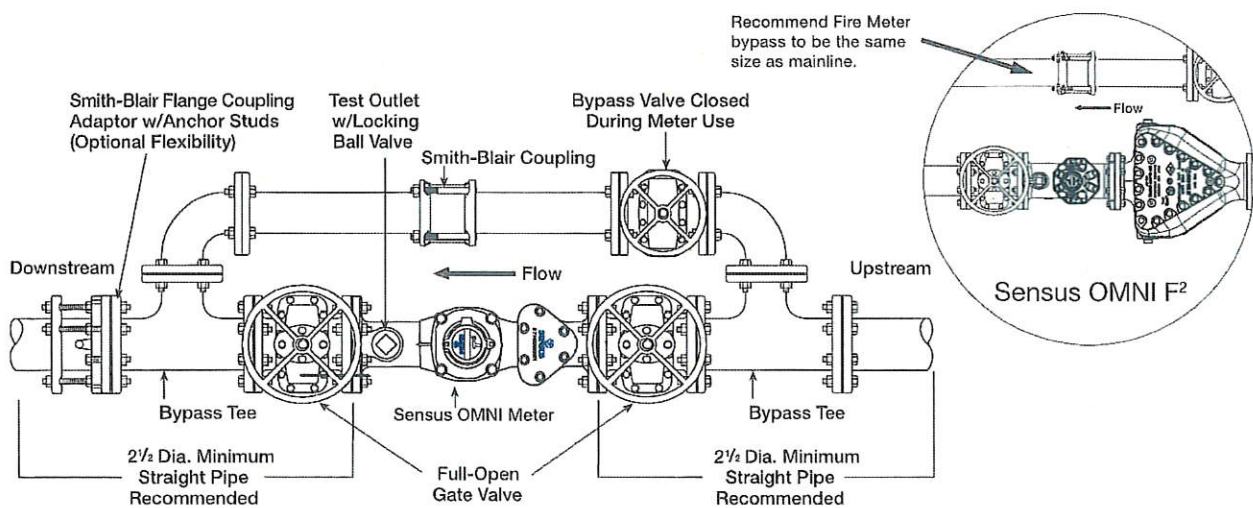
by removing the suspect meter and testing it on a calibrated test bench or returning the suspect measuring chamber or complete meter to Sensus for a certified accuracy test.

NOTE: High flow meter applications or near open to air discharge must maintain a minimum 25 psi downstream pressure to assure accuracy and meter longevity. Pumps should not be located downstream unless pressure sustaining devices are utilized to maintain at least the 25 psi at the meter outlet. OMNI meters are designed for potable drinking water applications without debris, sand, rocks or plating chemicals/minerals. For these applications, use the propeller or accuMAG meters.

OMNI meters can be installed vertically or rotated on the bolt pattern in any orientation above ground and pit sets up to 10 feet of intermittent submersion. Contact Sensus with any questions.

*Ford-type setters acceptable on 1 1/2" and 2" OMNI R² Meters.

For more detailed OMNI meter installation instructions, please see the OMNI Operation & Maintenance manual. The manual is available on the Sensus website (www.Sensus.com) or by contacting Technical Services at 1-800-METER-IT, option 2. This OMNI installation sheet takes precedence over all other OMNI installation documents.



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