

# Residential Meters



# About Sensus Metering Systems

**Q**uality is a philosophy--an attitude at Sensus Metering Systems. We take pride in our craftsmanship; and through a team effort we construct top quality for our customers.

Active Engineering and Research and Development Groups utilize state-of-the-art computer aided engineering and diagnostic equipment to design and produce gas metering products to meet the uncompromising demands of today's gas industry. This special balance of philosophy, attitude, dedicated workers and modern equipment assures that quality and performance have been skillfully designed into every product.

In our advanced proving room, every Sensus gas metering product is inspected and proved to be accurate. Sensus products are built with our reputation at stake; a reputation founded on years of experience, earned by the pride and skills of hundreds of dedicated professionals and backed by sophisticated Quality Assurance instrumentation used at critical points throughout the manufacturing process.

## How to Order

When submitting orders or inquiries, please specify the following:

1. Size and type of meter (model number, standard or temperature compensated, etc.)
2. Kind of gas to be metered
3. Rate of flow to be metered - maximum SCFH
4. Maximum operating and test pressure
5. Ferrule size
6. Swivel specifications
7. Type of index
8. Special requirements (sealing, paint, accuracy spec., etc.)

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**In the Sensus residential gas meter proving room, meters are individually calibrated to ensure accuracy is within the tolerance required by our customers.**



# Single Joint Residential Gas Meters



**R-275**  
275 SCFH

The Class 250 residential meters combine the latest design concepts and modern engineering materials to provide a lighter weight, easier to handle, more durable meter which requires less maintenance and offers greater life expectancy.



**R-315**  
315 SCFH

The Model #415 continues to be the real workhorse in the Class 400 residential meter series. Its durable construction permits operation up to 2" w.c. differential to provide 900 CFH of 0.6 specific gravity gas.



**#415**  
415 SCFH

**Note:**

All capacities are maximum, based on 0.6 specific gravity gas measured at 4 oz. base pressure and 60° F at 1/2" w.c. differential pressure – in accordance with B109.1 specifications.

Recommended meter operating temperature range:

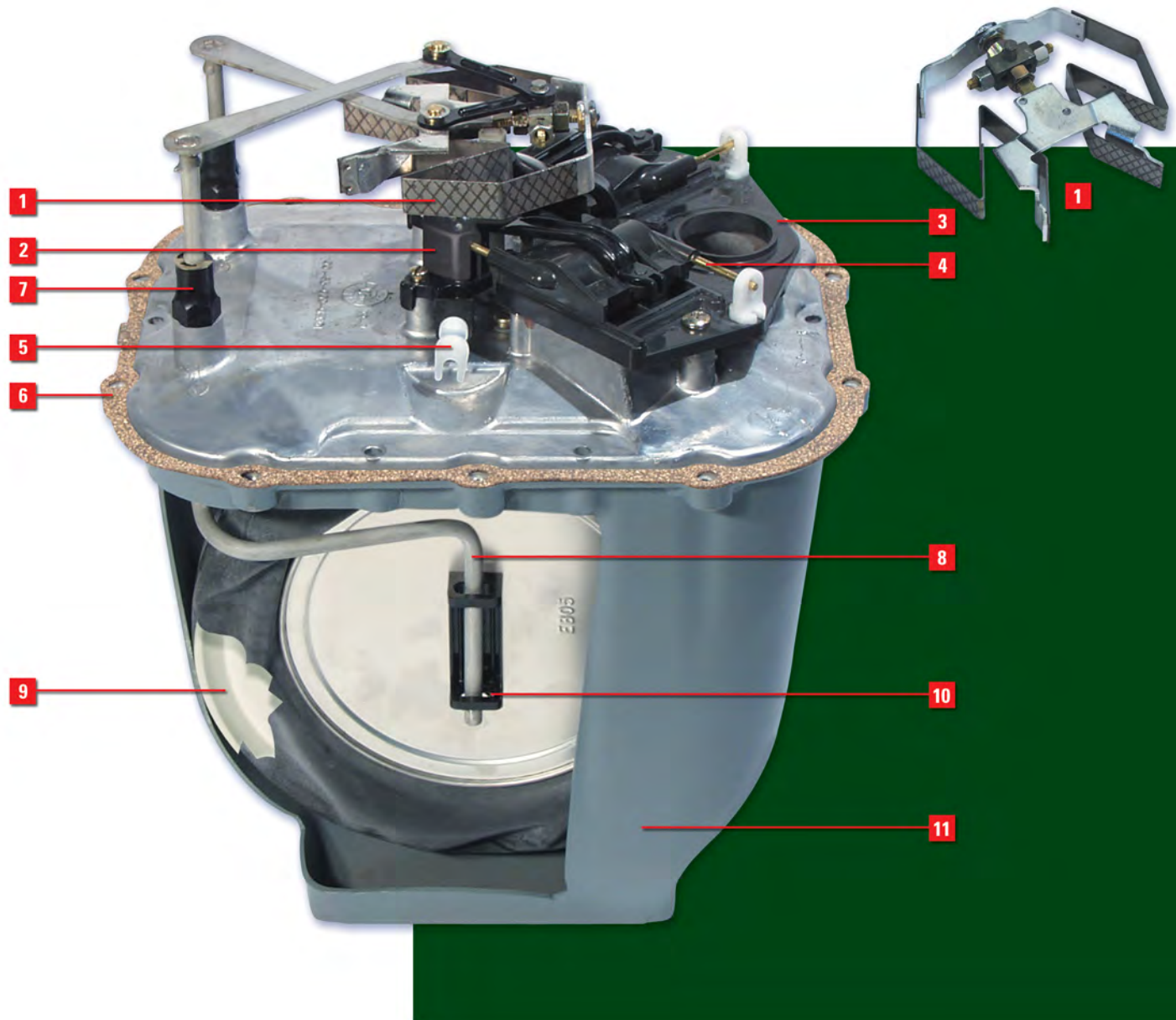
-30° F to +150° F. See temperature compensation description page 7.

## Design Features

**1. Temperature Compensation Element** – a design with increased strength to minimize deflection from valve drag, the TC element is more rugged and linear in movement, thus, more accurate in compensation.

**2. Crank Bracket** – a simplified multi-purpose design incorporating internal valve guides and index shaft support. Fine tolerance, attained through precision molding, provides accurate positioning of the crank support. Low friction polymer eliminates the need for lubrication.

**3. Valve Seat** – close tolerances achieved through molded phenolic construction minimize seat wear while providing a much smoother operation with a significantly lower differential. Incorporates easily installed external valve guides.



**7. Synthetic Rubber Glands** – in the cover stuffing box and in the valve plate to seal the flag rods assure positive pressure sealing at these critical points. The gland design produces pressure integrity with a minimum amount of drag.

**8. One Piece Flag Rod** – closely controlled dimensions improve parallelism of all vertical segments. Greater distance between bearing points has been designed to provide lateral stability. Easy to position and install.

**9. Molded Port & Pan** –with Integral Diaphragm Stabilizers – one piece construction of glass fiber reinforced material, increases strength and eliminates a potential leak point. Integral stabilizers provide positive positioning of the diaphragm assembly.

**4. Valve Cover and Links** – precision parts of engineered plastic materials reduce friction and are inert to chemicals and condensates commonly found in gas lines. Simple snap-on design with common left and right link reduces your parts inventory. This design reduces the job of valve replacement.

**5. Index Drive Shaft** – molded “dog” locks to brass index shaft eliminating “slop” often encountered in proving.

**6. Gaskets** – are made of tough, resilient cork and neoprene composition and the linear amount of gasket is an absolute minimum due to “single-joint” design. This significantly reduces the chance of leakage.



**10. E-Clips** – plated steel clips install easily, facilitate repairs, and minimize parts inventory.

**11. Bodies and Covers** – are of die-cast aluminum alloy to provide corrosion protection with minimum weight. Meters receive both prime and finish coats of paint to provide additional protection and enhance exterior appearances.

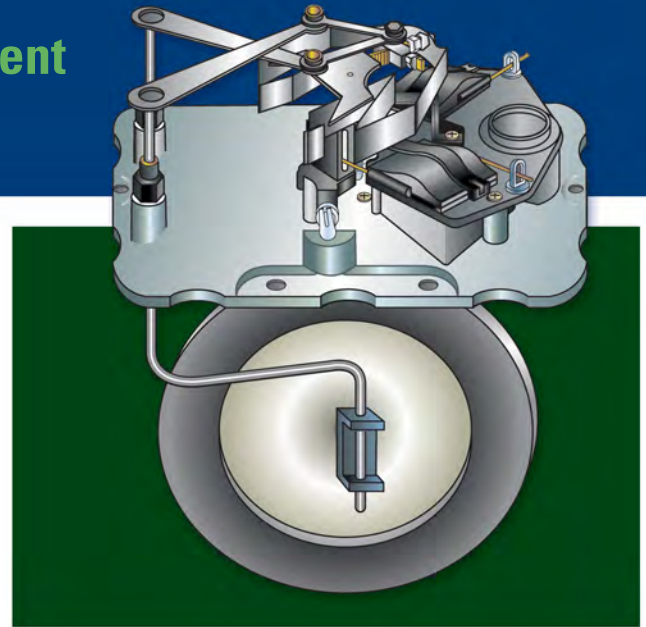
## Module Replacement Program

Because of the “single joint” design of the Sensus residential meter, easy replacement of all internal working parts is possible. A new measuring module can be installed simply by removing and replacing several screws.

Listed below are the modules available for our current line of residential meters. They are available in standard or temperature compensated construction and can be inserted into existing bodies and covers and calibrated in your shop.

This program is important in your long-range planning. It means that the Sensus meters you purchase today can be updated to new condition years from now at about two-thirds of the cost of new meters.

Consider updating your meter population at a fraction of the cost of new meters. For your immediate planning, many of the modules listed below fit into older meters – those currently in your system that need attention now.



### Base Module Part Numbers

Meter Model	Non-Temperature Compensated	Temperature Compensated
S-275, R-275, R-315	001-63-502-06	001-63-502-07
MR-5, MR-8, MR-9	001-63-502-19	001-63-502-20
#415	001-41-502-70	001-41-502-71
MR-12	001-41-502-72	001-41-502-73

## The Meter Replacements

Sensus offers a complete line of residential meter replacements for the 5 Lt. and 10 Lt. tin meters, without any need for special connections or modifications to the meter set.



The RT-230 has 5 Lt. connections on 11-1/4" centers and makes use of the internal working parts of the R-275 residential meter.

**#415**  
210 SCFH

**Note:**

All capacities are maximum, based on 0.6 specific gravity gas measured at 4 oz. base pressure and 60° F at 1/2" w.c. differential pressure – in accordance with B109.1 specifications. Recommended meter operating temperature range: -30° F to +150° F. See temperature compensation description page 7.

**RT-275**  
250 SCFH

The same R-275 is converted to an RT-275 by fitting it with 10 Lt. connections on 11-1/4" centers.

# Temperature Compensation

All Sensus residential gas meters can be equipped with a bi-metallic element that will automatically correct for changes in gas temperature and convert line volumes to the common base temperature of 60° F.

The fundamental difference in a temperature-compensated meter is the tangent. It features twin bi-metallic elements as the active or compensating members. The tangent is mounted in such a way that temperature variations, causing expansion or contraction of the bi-metallic element, alter the volume of gas displaced per revolution of the meter. This automatically causes the meter to speed up or slow down as required and does not affect valve timing.

The Sensus TC element ensures stable meter operation and accurate correction for gas temperature variations.

A temperature compensated meter can be outwardly identified by a difference in the manufacturer's badge



color along with a "TC" notation on both the badge and the meter index. Standard meters have blue badges. TC meters have red manufacturer's badges.

The typical temperature compensation performance is within an accuracy band of  $\pm 2\%$  over a flowing gas temperature range of -20° F to 120° F.

## Test Meters

Sensus Test Meters are applicable where minute quantities of gas must be measured with a high degree of accuracy. They are used in factories, showrooms, laboratories, and various testing departments. Some utilities use them to demonstrate to customers the amount of gas consumed by ranges, furnaces, clothes dryers, and other gas appliances.

One of the more popular uses of the test meter has been in the area of pollution control. The Environmental Protection Agency has set standards of performance for limiting gaseous and particulate emissions from

factories. Federal, state and local pollution control authorities have discovered a need for dependable precision instruments to sample and evaluate pollutants. Sensus Test Meters are being used extensively in stack sampling and pollution monitoring devices.

### Operation

All Sensus Test Meters are equipped with a special test index. This test index has a sweep hand which can be compared to the sweep hand on a stopwatch. Minute amounts of flow are precisely measured on the finely graduated sweep hand circle. Timing of the sweep hand accurately determines small flow rates.

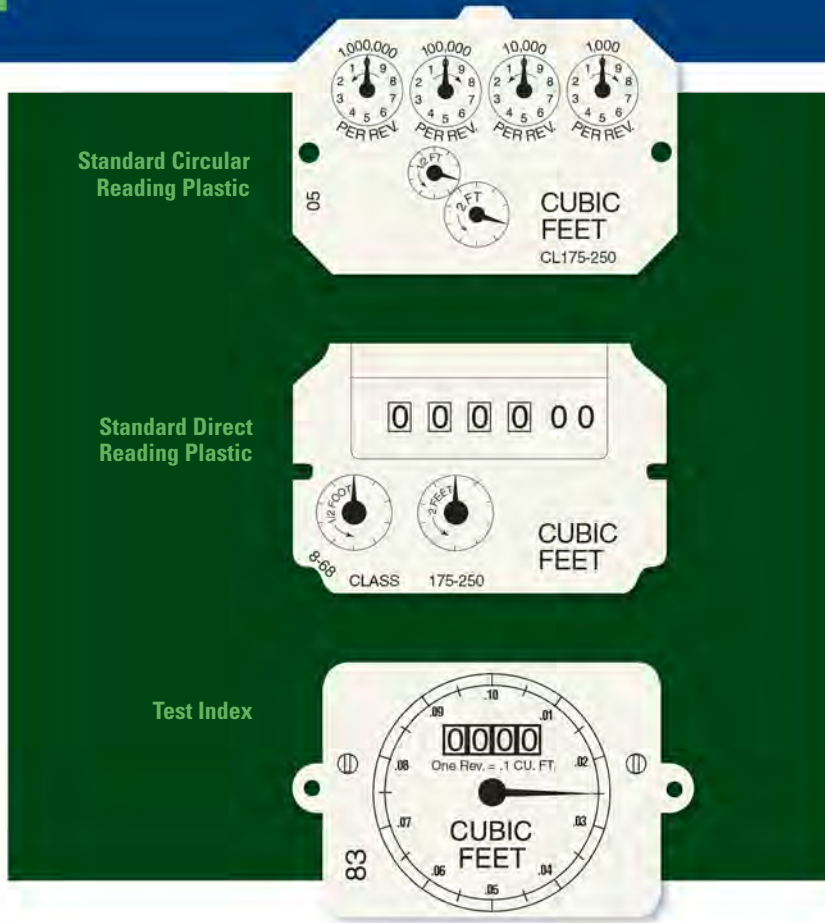


### Test Meter Models Available

Model	Capacity – SCFH of 0.6 specific gravity gas @ w.c. diff.
S-275	250
R-275	275
R-315	315
#415	415

**Note:** Capacity rating based on connections as per ANSI B-109.1.

# Residential Gas Meter Indexes



## Index Assemblies

Type	S-275, R-275, R-315			#415			Dial
	Index Assembly with Drive Gear Part Number	Number of Teeth		Index Assembly with Drive Gear Part Number	Number of Teeth		
		Index Drive Gear	Stuffing Box Gear		Index Drive Gear	Stuffing Box Gear	
Plastic Circular Reading	001-63-538-05	11	11	001-41-538-05	18	18	4 Circle
	001-63-538-10			001-41-538-10			
	001-63-538-11			001-41-538-11			
	001-63-538-15			001-41-538-15			
				001-41-538-25			
Plastic Direct Reading	001-63-538-62	11	11	001-41-538-25	18	18	5 Wheel
	001-63-538-63	11	11	001-41-538-62	18	18	5 Wheel
	001-63-538-68	11	11	001-41-538-68	18	18	4 Wheel
	001-63-538-69	11	11	001-41-538-69	18	18	4 Wheel
	001-63-538-66	12	24	001-41-538-66	12	24	4 Wheel
	001-63-538-70	11	11	001-41-538-70	18	18	4 Wheel
	001-63-538-64	16	16	001-41-538-64	16	16	6 Wheel
High Resolution Index	001-63-537-97	12	24	001-63-537-97	12	24	4 Wheel
Test Indexes	001-63-537-83	16	20	001-41-537-83	13	20	4 Wheel
	001-63-538-93	12	30	001-41-538-93	22	10	



# Rockseal "Tamper Obvious" Devices

## Rockseal Index Box

The UV Stabilized Clear Polycarbonate Rockseal index box has molded recesses at the upper left and lower right corners into which molded plastic plugs are inserted to cover index box mounting screw heads.

## Rockseal Index Box Kit

- 1 index box
- 2 Rockseal plugs
- 4 screws
- 001-63-656-50 with drains
- 001-63-656-51 without drains

Front View:

Part Number 001-63-006-05 with drains  
001-63-006-06 without drains  
Sensus Clear Polycarbonate Index Box

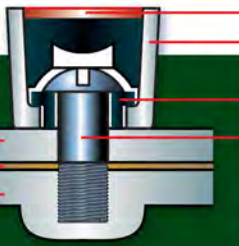
Rockseal index box screws,  
Fil. Hd. Stl. Mach. Screw  
(10-24x11/16")  
Part Number 950525

Rockseal plug  
001-63-056-05  
packaged either  
100 or 1000  
pieces per package



## Rockseal Handhole Plate Device Cross-Section

Handhole Plate 001-60-004-00  
Handhole Plate Gasket 001-63-160-50  
Meter Cover Casting



Rockseal Plug 001-63-056-05  
Handhole Plate Seal Cup 001-63-057-02  
Handhole Plate Seal Spacer 001-63-053-01  
Handhole Plate Mounting Screw  
(#10-24 x 11/16") 950532

## Rockseal Plug Kit

Plug, seal cup, seal spacer and mounting screw. Part number 001-63-656-00  
Components packaged individually in lots of 100 pieces per package

## Index Assemblies

Legend	First Reading Circle	Proving Hand	Description	S-275, R-275, R-315, #415		Type
				Index Assembly with Drive Gear Part Number		
Cubic Feet	1000	2' 1/2'	Standard-C.C.W.	001-63-538-05	001-41-538-05	Plastic Circular Reading
		2'	Standard-C.C.W.	001-63-583-10	001-41-538-10	
		2'	T.C. – C.C.W.	001-63-538-11	001-41-538-11	
		2'-1/2'	T.C. – C.C.W.	001-63-538-15	001-41-538-15	
		2'-1/2'	415 on Dial		001-41-538-25	
Cubic Feet	10	2'-1/2'	Standard-C.C.W.	001-63-538-62	001-41-538-25	001-41-538-68
Cubic Feet	10	2' 1/2'	T.C. – C.C.W.	001-63-538-63	001-41-538-62	
Cubic Feet	Cubic Feet	100	2'-1/2'	Standard-C.C.W.	001-63-538-68	
Plastic Cubic Feet	100	2'-1/2'	T.C. – C.C.W.	001-63-538-69	001-41-538-69	Direct Reading
Cubic Feet	100	1'	Standard	001-63-538-66	001-41-538-66	
Cubic Feet	100	2'	Standard	001-63-538-70	001-41-538-70	
Cubic Meters	0.1m <sup>3</sup>	0.05m <sup>3</sup>	Fully Metric	001-63-538-64	001-41-538-64	High Resolution Index
Cubic Feet	1	1'	High Resolution	001-63-537-97	001-63-537-97	
Cubic Feet	.1	.1	Test	001-63-537-83	001-41-537-83	
Cubic Meters	.01m <sup>3</sup>	.01m <sup>3</sup>	Fully Metric Meter Test	001-63-538-93	001-41-538-93	

# Rockseal "Tamper Obvious" Devices

## Liquefied Petroleum Gas Metering (LPG)

The Sensus S-275 was designed especially for the LPG industry. The S-275 has been tested and proven for all services, and can particularly measure LP gases from bottle sets, bulk storage and distribution systems to the house.

Manufactured under the same exacting Quality Control requirements as Sensus' residential gas meters, the S-275 contains the same joint design and utilizes the same corrosion resistant materials that exhibit high lubricity for low differential operation. The major difference is the connections. The S-275 is available with 3/4" FPT connections. The "S" denotes side-connection.

## Industrial Gas Measurement

Industry today is placing a tremendous amount of emphasis on fuel conservation and fuel allocation within its facilities. Plant accountants are making efforts to keep increasingly accurate records of fuel gas consumption as well as consumption of various



(All Sensus residential meters described in this brochure can be used to measure liquefied petroleum gases.)

special process gases within their facilities. Sensus' complete line of single joint diaphragm meters provides industry with the specialized metering equipment they need to do the job and to do it accurately. Listed below are some of the special type service gases used by industry that Sensus meters are capable of handling. See your local Sensus representative or distributor for further information regarding in-plant metering and special gas services.

## Gas

Air	A <sub>2</sub> Argon	CO <sub>2</sub> Carbon Dioxide*	C <sub>2</sub> H <sub>6</sub> Ethane	H <sub>2</sub> Hydrogen†	CH <sub>4</sub> Methane	Ne Neon	C <sub>3</sub> H <sub>8</sub> Propane
	C <sub>4</sub> H <sub>10</sub> Butane	CO Carbon Monoxide*	He <sub>2</sub> Helium†	Kr <sub>2</sub> Krypton	N <sub>2</sub> Nitrogen	C <sub>5</sub> H <sub>12</sub> Pentane	Xe <sub>2</sub> Xenon

\* Gas must be 100% dry.

† Because of the low density of these gases, meters for this service may not be used in excess of 50% of their pressure rating

## Metric Meters

For bell provers calibrated with metric scales, meters must be equipped with a metric output (50 liters). It is also necessary that the meters have some number of full revolutions of the tangent assembly for that given metric output. Listed are current meter modules along with their metric counter parts with metric outputs.

For further information about Sensus metric meters, consult your local Sensus representative.

Cubic Foot Models	Metric Model	Capacity m <sup>3</sup> /hr.
S-275	MR-5	7
R-275	MR-8	8
R-315	MR-9	9
#415	MR-12	12

Std. Meters<sup>3</sup>/Hr. x 35.31 = Std. Ft.<sup>3</sup>/Hr. (SCFH)  
Std. Ft.<sup>3</sup>/Hr.(SCFH) x 0.0283 = Std. Meters<sup>3</sup>/Hr.

Kilograms/centimeter<sup>2</sup> (Kg/cm<sup>2</sup>) x 14.22 = psi  
psi x 0.0703 = Kilograms/centimeter<sup>2</sup> (Kg/cm<sup>2</sup>)

Kilo Pascals (Kpa) x 0.145 = psi  
psi x 6.90 = Kilo Pascals (Kpa)

Bars x 14.50 = psi  
psi x .0689 = Bars

millimeters water (mm H<sub>2</sub>O) x 0.039 = in. w.c.  
in. w.c. x 25.4 = millimeters water (mm H<sub>2</sub>O)

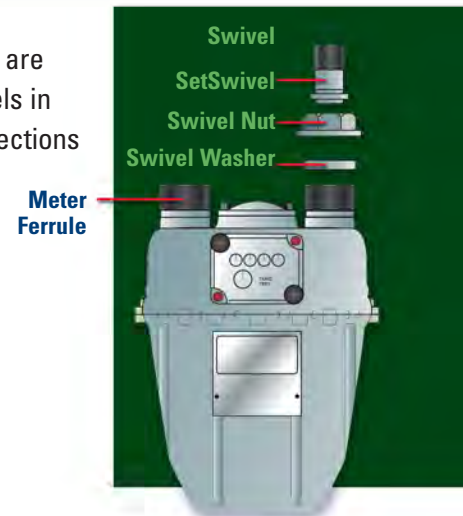
millimeters mercury (mm Hg) x 1.868 = in. w.c.  
in. w.c. x 0.535 = millimeters mercury (mm Hg)



## Meter Connections

Sensus offers a complete line of meter connections for meter installations. Listed below are some of the more common swivel nut and swivel washer sizes available. Common swivels in standard and insulated varieties can be found of page 12. Black iron or galvanized connections are available. For sizes other than those listed, contact your local Sensus representative.

Ferrule Size	Swivel Washers Part Number	Swivel Nuts	
		Galvanized Part Number	Black Iron Part Number
1-1/4"	001-61-153-02	001-61-165-07	001-41-165-07
10 Lt.	003-51-131-04	003-51-130-00	003-51-230-00
20 Lt.	001-61-154-02	001-61-166-00	001-41-166-00
30 Lt.	001-61-155-03	001-61-167-07	001-41-167-07
45 Lt.	001-62-156-02	001-62-168-00	001-41-168-00
1A Spg.	001-61-153-02	001-61-165-16	001-41-165-16
2 Spg.	001-62-156-03	001-41-130-00	001-41-230-00
3 Spg.	011-14-131-01	001-64-167-02	001-64-168-02

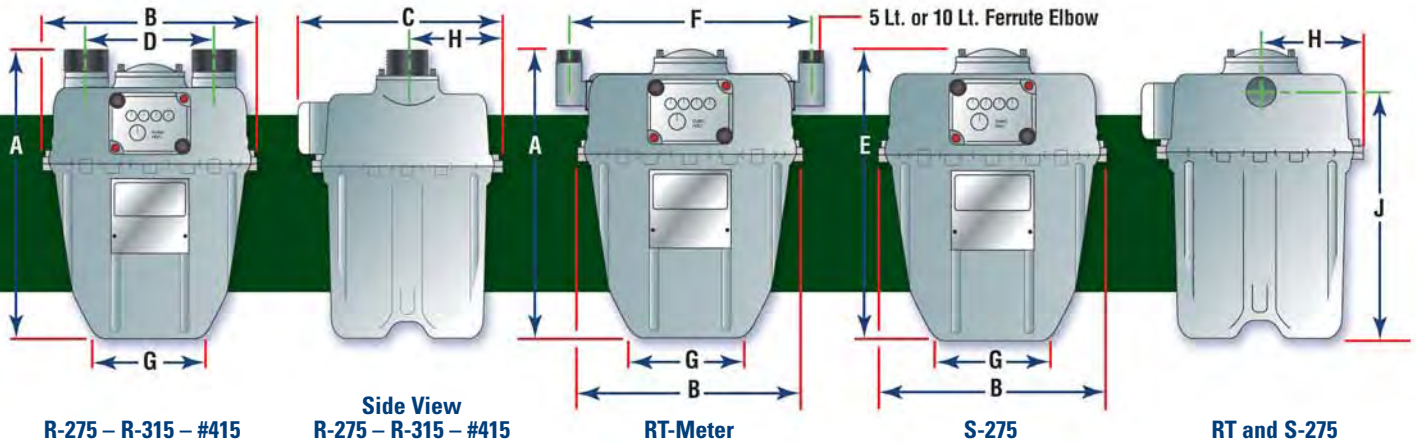


Swivels									
Meter Ferrule Size	Straight or Offset	Galvanized Part Number	Black Iron Part Number	Pipe Size	Amount of Offset	Height	Insulating Yes/No*	Galvanized Swivel Set Part Number	Black Iron Swivel Set Part Number
1-1/4"	S	001-61-165-08	001-41-165-08	1"	2-3/4"	2-7/32"	No	001-61-365-08	001-41-365-08
	O	001-61-165-27	001-41-165-26	1/2"		3-5/16"	No	001-61-365-27	
	S	001-61-165-58		1"		2-7/32"	Yes	001-61-365-58	
	O	001-61-165-26	3/4"	1"	2-11/16"	No	001-61-365-26	001-41-365-26	
	S	001-61-165-02	3/4"		2-3/8"	No	001-61-365-02		
	S	001-61-165-52	3/4"	2-3/8"	Yes	001-61-365-52			
	O	001-61-165-55	3/4"	2-11/16"	2-15/16"	Yes	001-61-365-55		
	O	001-61-165-05	3/4"	2-11/16"	2-15/16"	No	001-61-365-05		
10 Lt.	S	003-51-134-00	003-51-236-50	3/4"	1"	2-5/16"	No	003-51-334-00	003-51-436-50
	S	003-51-134-50		3/4"		2-5/16"	Yes	003-51-334-50	
	O			3/4"		3-1/4"	Yes		
20 Lt.	S	001-61-165-11	001-41-165-11	1"	3-3/16"	2-3/4"	No	001-61-365-11	001-41-365-11
	S	001-61-166-15	001-41-165-61	3/4"		2-3/8"	No	001-61-366-15	
	O	001-62-168-11		3/4"		3-13/16"	No	001-62-368-11	
	O	001-61-166-13	1/2"	2-11/16"	3-7/16"	No	001-61-366-13	001-41-365-61	
	S	001-61-165-61	1"	2-3/4"	Yes	001-61-365-61			
	S	001-61-166-65	3/4"	2-3/8"	Yes	001-61-366-65			
	S	001-61-165-61	001-41-165-61	1"	2-3/4"	Yes	001-61-565-61	001-41-565-61	
	S	001-61-166-15	3/4"	2-3/8"	No	001-61-566-15			
	O	001-61-166-63	1/2"	2-11/16"	3-7/16"	Yes	001-61-366-63		
	S	001-61-165-61	1"	2-3/4"	Yes	001-61-665-61			
30 Lt.	S	001-61-167-02	001-41-167-02	1-1/4"	2-7/8"	2-7/8"	No	001-61-367-02	001-41-367-02
	S	001-61-167-52	001-41-167-52	1-1/4"		2-7/8"	Yes	001-61-367-52	001-42-367-52
	S	001-61-165-62	001-41-165-62	1"		2-27/32"	Yes	001-61-365-62	00-141-365-62
	S	001-61-165-12	001-41-165-12	1"		2-27/32"	No	001-61-365-12	001-41-365-12
	S	001-61-165-62	001-41-165-62	1"		2-27/32"	Yes	001-61-565-62	001-41-565-62
	S	001-61-167-52	001-41-167-52	1-1/4"		2-7/8"	Yes	001-61-467-52	001-41-567-52
45 Lt.	S	001-62-168-02	001-41-168-02	1-1/4"	3-7/8"	3-7/8"	No	001-62-368-02	001-41-368-02
	S	001-62-168-52	001-41-168-52	1-1/4"		3-7/8"	Yes	001-62-368-52	001-41-368-52
	S	001-62-168-04	001-41-168-04	1-1/2"		3"	No	001-62-368-04	001-41-368-04
	S	001-61-168-54	001-41-168-54	1-1/2"		3"	Yes	001-62-368-54	001-41-368-54
	S	001-62-168-52		1-1/4"		3-7/8"	Yes	001-62-468-52	
	S	001-62-168-54		1-1/4"		3"	Yes	001-62-468-54	
#2 Spg.	S	001-62-168-21	001-41-168-21	1-1/4"		3-1/8"	No	001-62-368-21	001-41-368-21
#3 Spg.	S	001-14-134-04		1-1/2"		3-1/16"	No	011-14-334-04	

\*The minimum insulation breakdown voltage for insulating swivels (Assembled Joint) is 2500 volts.

# Residential Meters

## Dimensions



Meter Model	A*	B	C	D	E	F	G	H	J
S-275		10-1/8"	8-1/2"		13-1/4"		5-1/4"	3-15/16"	11-1/16"
R-275*	13-23/64"	10-1/8"	8-1/2"	6"			5-1/4"	3-15/16"	
R-315*	13-23/64"	10-1/8"	8-1/2"	7"			5-1/4"	3-15/16"	
#415*	14-37/64"	11-1/8"	9-3/8"	7" or 8-1/4"			6"	3-15/16"	
RT-230	13-5/8"	10-1/8"	8-1/2"			11-1/4"	5-1/4"	3-15/16"	11-1/16"
RT-275	13-5/8"	10-1/8"	8-1/2"			11-1/4"	5-1/4"	3-15/16"	11-1/16"

\*The "A" dimension assumes 20 Lt. connections. This may vary slightly for other connections.

## Specifications

Meter Model	Natural Gas				Max W.P. PSI	Approx. Shipping Wt. Lbs.	No. of Rev. per Ft <sup>3</sup>	Stuffing Box Shaft Ft <sup>3</sup> /Rev.	Meter Connections Available
	Butane	Propane	Air						
R-275	275	150	175	215	5-10	14	8	2	10, 20, 30 Lt., 1-1/4", 1A Spg, #2 Spg.
R-315	315	170	200	245	5-10	14	8	2	20, 30, 45 Lt. 1-1/4", 1A Spg, #2 Spg.
#415	415	225	260	320	10-25	21	6.5	2	20, 30, 45 Lt, 1-1/4", 1A Spg, #2 Spg, #3 Spg.
S-275	250	150	175	195	5-10	14	8	2	3/4" NPT
RT-230	210				5	14	8	2	5 Lt.
RT-275	250				5	14	8	2	10 Lt.

## Authorized Distributor



805 Liberty Boulevard  
 DuBois, PA 15801  
 800-375-8875  
 Fax: (814) 375-8460  
[www.sensus.com/gas](http://www.sensus.com/gas)

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