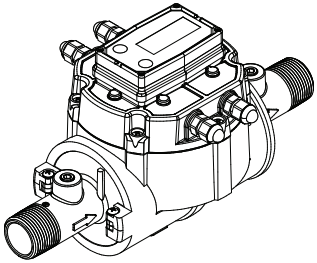
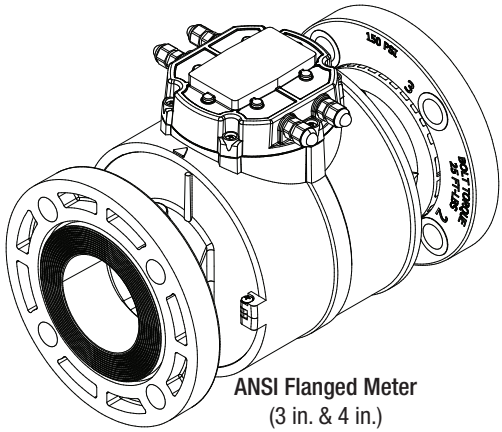
QSE (Q-Star) Series Electromagnetic Meter

Owner's Manual



NPT or BSP Meter
(1/2 in. to 2 in.)
Shown with Display Mount
Cover Plate and Display



ANSI Flanged Meter
(3 in. & 4 in.)
Shown with Plain Cover Plate
and Pulse Out Transmitter (QSB)

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INTRODUCTION

The QSE meter has multiple types of output electronics available. The electronics for the operation of the meter coils and flow tube are housed within the meter body casing. The cover plate is designed in two versions; a plain cover plate or a display mount cover plate. The output electronics (QSB, QSI1, QSI2 or QSI3) can be housed within either of the two cover plates. A display (Q09) is also available mounted to the "display mount" cover plate. All meters are equipped with galvanically isolated pulse-out electronics (QSB) as the default standard, regardless of style of cover plate.

This manual contains overall information related only to the meter. This meter is externally powered and all external wiring connects

to the electronics within the cover plate through its threaded ports. The magnetic coils, electrodes and other electronic components within the main meter body receive power from the electronics housed within the cover plate through a ribbon cable. See the included electronics manuals for meter wiring diagrams specific to your meter electronics.

IMPORTANT NOTICE

Your QSE meter is supplied ready for operation in a wide variety of applications. The meter has been factory configured to your order. It is suitable for volumetric flow measurement of electrically conductive liquids that have a minimum fluid conductivity of 10 µS/cm, and are compatible with the wetted components of the meter (See Specification Section).

Fluid conductivity below 50 µS/cm may result in uncertain readings. Consult factory for use with fluids having a conductivity below 50 µS/cm.

Use QSE series meters with water, aqueous solutions and other electrically conductive fluids. A fluid conductivity chart of common liquids is in the back of this manual for your reference. Do not use the meter with petroleum products (diesel fuel, unleaded gasoline, jet fuel, kerosene, etc.) or incompatible chemicals.

QSE series meters are very sensitive to electric noise if operated within 6 inches of some electric motors, relays, transformers or other sources of electronic noise.

PRINCIPLE OF OPERATION

Faraday's Law of Electromagnetic Induction is the operating principle on which the QSE series meters are based. Faraday's Law (paraphrased) states that a voltage will be induced in a conductor when it passes through a magnetic field, and the induced voltage will be directly proportional to the velocity of the conductor passing through that magnetic field. In this case, flowing liquid is the conductor and the QSE meter creates the magnetic field. The velocity of the flowing liquid, which must pass through the magnetic field, is the velocity of the conductor. A voltage is induced in the conductive liquid as it passes through the magnetic field. By placing electrodes in calculated locations on the flow tube of the meter, it is possible to accurately measure the induced voltage, thus determining the corresponding velocity and volumetric flow of the liquid.

SAFETY

- **This product is not approved for use with petroleum products (diesel fuel, unleaded gasoline, jet fuel, kerosene, etc.), aromatic hydrocarbons or other incompatible chemicals**
- This product is not approved for use in hazardous locations.
- Be sure O-rings and seals are kept in good repair.
- When applying power, adhere to specifications listed in appropriate electronics manual.
- Disconnect external power before attaching or detaching input or output wires.

EARTH GROUND

As part of the installation, it is important to understand the importance of having the meter connected to “earth ground”. Earth grounding helps ensure electronic component stability and reliability by using the earth to absorb any static charge buildup or spurious signal noise that can affect the meter electronics.

Each meter has a ground lug with removable ring terminal located in the circular wall adjacent to the outlet end of the meter. One end of a customer supplied 14-16 AWG ground wire should be crimped to the ring terminal and the other end of the wire connected to earth ground. (See Figure 1 below.)

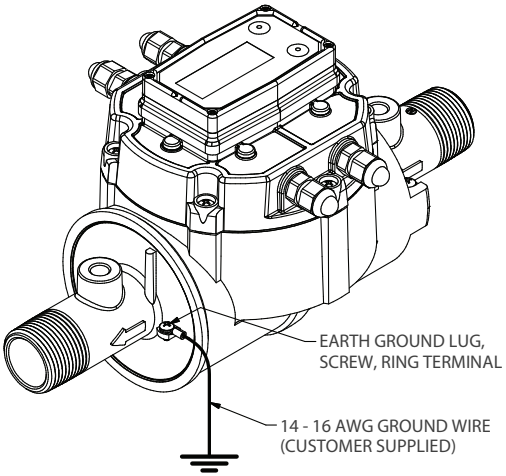
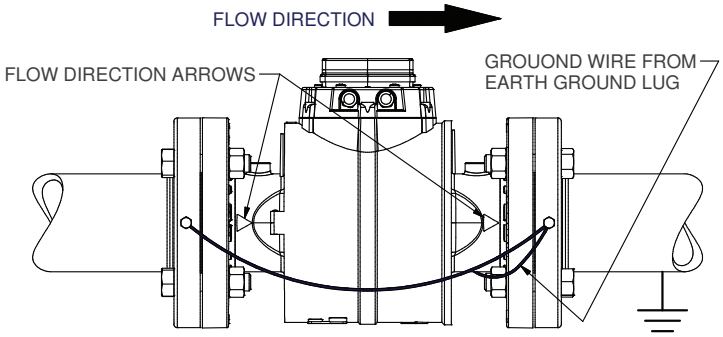


Figure 1

TYPICAL INSTALLATION



TYPICAL INSTALLATION IN STEEL CONDUCTIVE PIPE
TO MAINTAIN GROUND CONTINUITY (ANSI Flange Version Shown)

Figure 2

CONNECTIONS

Install your meter in-line with either horizontal flow or vertical flow. The best meter position for horizontal flow setups is with the meter rotated slightly (about 1 o'clock or 2 o'clock) to tilt the top from the horizontal plane *(see Figures 2 & 4)*. This prevents sediment from settling on the lower set of sensing electrodes. Install the meter with the flow arrow pointing in the direction of fluid flow.

Plan to install meter with minimum straight pipe lengths at inlet and outlet ends. The straight run lengths noted below represent the minimum requirements for accurate flow measurement *(see Figure 4)*. For optimum performance, provide as much additional straight run as possible.

- Upstream from the meter, allow a minimum straight pipe length of (10) times the pipe diameter from bends and obstructions.
- Downstream from the turbine, allow a minimum straight pipe length of (5) times the pipe diameter from bends and obstructions.
- Avoid downward flow that can lead to partially filled pipes.

For NPT Fittings:
Seal all pipe threads with an appropriate non-lubricated thread sealant (such as Loctite® No More Leaks™ Plastic Pipe Thread Sealant or NSF equivalent for NSF applications). Make sure the thread sealant does not intrude into the flow path. Hand tighten the meter at the housing ends. Do not use a wrench or similar tool to tighten as this can damage the housing.

NOTE: *If connecting to new female pipe threads, burrs and curls can adversely affect accuracy. Correct the problem prior to meter installation.*

For ANSI and DIN Flange Fittings:
The flanges supplied with your meter allow the meter to be oriented regardless of the mating flanges position. The meter flanges and their steel half-ring "keys" must be installed onto the meter by the customer before meter installation *(see Figure 3)*.

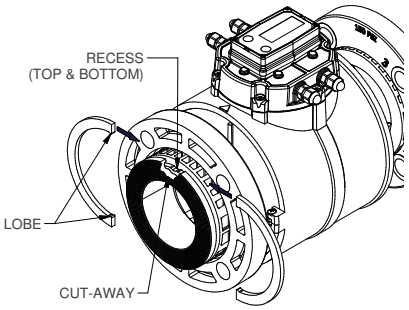


Figure 3

- Installing flanges on meter: With the mating face of the flange facing outboard, slide flange over one end of the meter. Position (2) half-rings in the retaining groove and snap into place. Each end of a half-ring has a small lobe that snaps into a recess at the top and bottom of the groove for retention. Repeat at other end.

Customer to provide:

- Ring Gaskets or Full-Face Gaskets approved for use with type flange installed (ANSI or DIN) and the fluid being monitored (2 required).

- 5/8 in. bolts and nuts for ANSI flanges. Four per side for 3-inch meters; eight per side for 4-inch meters.
- 16mm bolts and nuts for DIN flanges. Four per side for 3" meters (DN80/PN10 flanges); Eight per side for 4" meters (DN100/PN10 flanges).
- Torque bolts using a star pattern to 25 ft-lbs (33.9 N•m). For best results, always verify torque accuracy before use.

NOTE: *Do not over tighten the flange bolts. This may cause the gasket to be compressed into the flow stream and may decrease the accuracy of the meter.*

When properly installed, the flow meter will only measure flow in that portion of the piping system where the meter is installed. Choose the location with the longest straight unobstructed run of pipe, keeping in mind that in some applications it may be possible to locate the meter in either the supply or return pipe.

NOTE: *The two 1/8 in. NPT pipe plugs on top of the flow tube near each end are installed and sealed at the factory. They are for use only with optional temperature sensing probes for energy use calculations in specialized applications.*

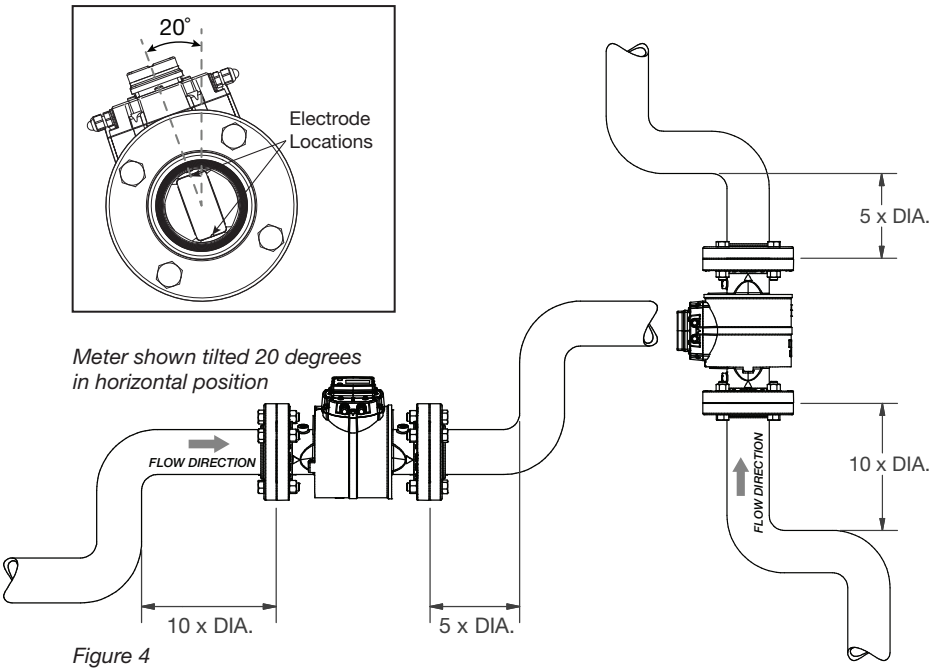


Figure 4

RECOMMENDED INSTALLATION

WARNING: *Compatibility of this product's material and the process fluid and/or environment should be considered prior to putting into service.*

WARNING: *Product should never be operated outside its published specifications for temperature or pressure. See specifications for your model.*

WARNING: *Make sure flow and pressure have been eliminated from process pipe prior to installing or removing product.*

WARNING: *For NPT/BSP fittings use non-lubricated thread sealant (such as Loctite® No More Leaks™ Plastic Pipe Thread Sealant or NSF equivalent for NSF applications) or flange gaskets on flange fittings when connecting product to process piping.*

WARNING: *To protect against leakage, seal all pipe threads with an appropriate thread sealant (NSF approved for NSF applications). Make sure the thread sealant does not intrude into the flow path.*

CAUTION: *Installation near high electromagnetic fields and high current fields is not recommended and may result in inaccurate readings.*

CAUTION: *Do not allow water to freeze in meter. Ice expansion may burst the plastic housing.*

CAUTION: *Do not allow this meter to be used with steam.*

CAUTION: *Using metal fittings on the plastic threaded pipe ends of the meter is not recommended.*

WIRING

All electronic options are associated with a matching style of meter cover plate. This cover plate has four 1/2-20 UNF threaded ports, compatible with PG7 threads, for wiring access to the electronics inside the cover plate. The meter is shipped with the ports environmentally sealed with PG7 threaded strain reliefs fitted with mushroom plugs. The mushroom plugs are inserted into the cable glands of the strain reliefs to maintain the seal until the port is used for wiring. Strain reliefs with mushroom plugs can be left in any unused port indefinitely. Remove the mushroom plugs to run cable into the cover plates.

The strain reliefs will accommodate a cable diameter of 0.11 - 0.26 inches (2.79 - 6.6mm) and provide an environmental seal around the cable when tightened.

- Cable to be provided by customer to accommodate job requirements. Cable is not included with meter.
- This meter is externally powered. The magnetic coils, electrodes and other electronic components within the main meter body receive power from the electronics housed within the cover plate. All external wiring connects to the cover plate through threaded ports. See the included electronics manuals for meter wiring diagrams specific to this meters electronics.

MAINTENANCE

The meter is virtually maintenance-free. However, it is important to keep the meter clean and free of contaminants.

CAUTION: *Do not allow liquids to dry inside the meter. The electrodes may develop a film that degrades accuracy.*

Remove internal debris or deposits using soft brush or small probe.

NOTE: *Make sure the arrow on the meter is pointed in the direction of fluid flow (see Figure 2).*

TROUBLESHOOTING

MEASUREMENT IS NOT ACCURATE	
PROBABLE CAUSE	**SOLUTION**
Debris/particles in liquid	Need proper filtration
Air in liquid - No back pressure	Increase back pressure on meter to eliminate air
Air in liquid - Plumbing installation	Install meter away from other fittings or flow obstructions. Do not allow meter to discharge to atmosphere.
Air in liquid - Pump cavitation	Install meter away from pump
Pipe not full - No back pressure	Increase back pressure on meter to eliminate air.
Pipe not full - Plumbing installation	Install meter where pipe is always full of liquid. Do not allow meter to discharge to atmosphere.
Conductivity of fluid too low	Consult liquid properties
Operating outside meter limits	Increase/decrease flowrate to proper meter specification. Review temperature limits.
Electrical noise	Install meter away from devices that emit EMF.
Ground loop	Meter may need to be earth grounded
Electrodes not clean	Clean electrode tips
Interface device not properly calibrated	Consult device instructions and specifications.
NORMAL FLOW BUT METER DOES NOT WORK	
PROBABLE CAUSE	**SOLUTION**
Wiring not correct	Consult wiring diagrams. Review installation.
Operating outside meter limits	Review voltage requirements
Meter installed backwards	Check to see if the direction of the arrows on the meter match flow direction.

SPECIFICATIONS

Design Type: Electromagnetic	
INLET AND OUTLET	
NPT MODELS	
QSE05NPT	1/2 inch NPT
QSE07NPT	3/4 inch NPT
QSE10NPT	1 inch NPT
QSE15NPT	1-1/2 inch NPT
QSE20NPT	2 inch NPT
BSP MODELS	
QSE05BSP	1/2 inch BSP (ISO-7 R-Series External Tapered)
QSE07BSP	3/4 inch BSP (ISO-7 R-Series External Tapered)
QSE10BSP	1 inch BSP (ISO-7 R-Series External Tapered)
QSE15BSP	1-1/2 inch BSP (ISO-7 R-Series External Tapered)
QSE20BSP	2 inch BSP (ISO-7 R-Series External Tapered)
ANSI FLANGE MODELS	
QSE30FAP	3 inch 150 # ANSI Flange (Polymer)
QSE40FAP	4 inch 150 # ANSI Flange (Polymer)
QSE30FAS	3 inch 150 # ANSI Flange (Steel)
QSE40FAS	4 inch 150 # ANSI Flange (Steel)
DIN FLANGE MODELS	
QSE30FDS	3 inch DN80/PN10 Flange (Steel)
QSE40FDS	4 inch DN100/PN10 Flange (Steel)

WETTED COMPONENTS	
Housing	NORYL™ GFN3 PPE+PS
Electrodes	316L Stainless Steel
Temperature Probes	316 Series Stainless Steel
Pipe Plugs	300 Series Stainless Steel
O-Rings	NBR (Nitrile)
MAXIMUM WORKING PRESSURE	
De-rate maximum working pressure 0.682 PSIG per each degree °F above 70° F	
NPT	150 PSIG @70° F 10.3 BAR @ 21° C
BSP	150 PSIG @70° F 10.3 BAR @ 21° C
ANSI FLANGE	150 PSIG @70° F 10.3 BAR @ 21° C
DIN FLANGE	150 PSIG @70° F 10.3 BAR @ 21° C
POWER SUPPLY	
Voltage Requirement	Min. 12 VDC or 12 VAC (Lower voltage will cause inaccurate readings)
	Max. 36 VDC or 36 VAC (higher voltage may damage unit)

See electronics manuals for electronic specifications.

U.S. MEASUREMENT

Unit of Measure:		Gallon		
FLOW RANGE:				
Line Size	**Flow Min. (GPM)**	**Flow Max. (GPM)**	**Turn Down**	**Typ. K-factor (PPG)**
1/2 inch	0.15	10	66.667:1	4347
3/4 inch	0.3	20	66.667:1	1937
1 inch	0.6	40	66.667:1	1089
1 1/2 inch	1.2	80	66.667:1	484.1
2 inch	2.25	150	66.667:1	400
3 inch	4.5	300	66.667:1	121
4 inch	9	600	66.667:1	68.1
ACCURACY: (% OF READING)				
Line Size	**Range (GPM)**	**Accuracy**	**Range (GPM)**	**Accuracy**
1/2 inch	0.15 to 0.6	2.0%	0.61 to 10	0.5%
3/4 inch	0.30 to 1.2	2.0%	1.21 to 20	0.5%
1 inch	0.60 to 2.4	2.0%	2.41 to 40	0.5%
1 1/2 inch	1.20 to 4.8	2.0%	4.81 to 80	0.5%
2 inch	2.25 to 9.0	2.0%	9.01 to 150	0.5%
3 inch	4.50 to 18.0	2.0%	18.01 to 300	0.5%
4 inch	9.00 to 36.0	2.0%	36.01 to 600	0.5%
FLUID OPERATING TEMPERATURE:	+32° F to +210° F (NPT & BSP)			
	+32° F to +180° F (Polymer and Steel Flanges)			
	(Do not allow fluid to freeze inside meter.)			
STORAGE TEMPERATURE:	–40° F to +228° F			
AMBIENT AIR OPERATING TEMPERATURE	0° F to +140° F ALL METERS			

There is a correlation between ambient air temperature and maximum fluid operating temperature. As ambient air temperature increases, the maximum fluid operating temperature decreases. See Maximum Temperature Conditions graph named “TEMPERATURES” on page 14 to verify that your process is within allowable meter operating limits.

METRIC MEASUREMENT

Unit of Measure:		Litre		
FLOW RANGE:				
Line Size	**Flow Min. (LPM)**	**Flow Max. (LPM)**	**Turn Down**	**Typ. K-factor (PPL)**
1/2 inch	0.57	37.85	66.667:1	1148.5
3/4 inch	1.14	75.71	66.667:1	511.8
1 inch	2.27	151.42	66.667:1	287.7
1 1/2 inch	4.54	302.83	66.667:1	127.9
2 inch	8.52	557.81	66.667:1	105.7
3 inch	17.03	1135.62	66.667:1	30
4 inch	34.07	2271.25	66.667:1	18
ACCURACY: (% OF READING)				
Line Size	**Range (LPM)**	**Accuracy**	**Range (LPM)**	**Accuracy**
1/2 inch	0.57 to 2.27	2.0%	2.28 to 37.85	0.5%
3/4 inch	1.14 to 4.54	2.0%	4.55 to 75.71	0.5%
1 inch	2.27 to 9.08	2.0%	9.09 to 151.42	0.5%
1 1/2 inch	4.54 to 18.17	2.0%	18.18 to 302.83	0.5%
2 inch	8.52 to 34.07	2.0%	34.08 to 567.81	0.5%
3 inch	17.03 to 68.14	2.0%	68.15 to 1135.62	0.5%
4 inch	34.07 to 136.28	2.0%	136.29 to 2271.25	0.5%
FLUID OPERATING TEMPERATURE:		0° C to +98° C (NPT & BSP)		
		0° C to +82° C (Polymer and Steel Flanges)		
		(Do not allow fluid to freeze inside meter.)		
STORAGE TEMPERATURE:		–40° C to +108° C		
AMBIENT AIR OPERATING TEMPERATURE	-18° C to +60° C ALL METERS			

There is a correlation between ambient air temperature and maximum fluid operating temperature. As ambient air temperature increases, the maximum fluid operating temperature decreases. See Maximum Temperature Conditions graph named “TEMPERATURES” on page 14 to verify that your process is within allowable meter operating limits.

U.S. PRODUCT WEIGHT

PRODUCT WEIGHT – lb:*				
	NPT / BSP	**ANSI Polymer Flange**	**ANSI Steel Flange**	**DIN Steel Flange**
1/2 in.	2.5	-	-	-
3/4 in.	2.6	-	-	-
1 in.	2.7	-	-	-
1 1/2 in.	3.9	-	-	-
2 in.	4.3	-	-	-
3 in.	-	14	24.4	22.5
4 in.	-	16.3	29.5	23.7

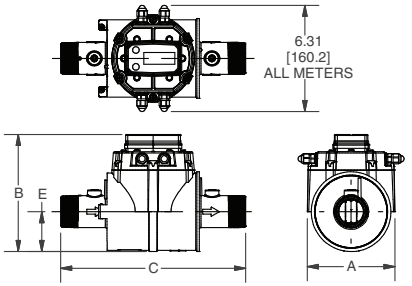
* Weight with display. For plain cover plates, subtract 0.2 lb.

METRIC PRODUCT WEIGHT

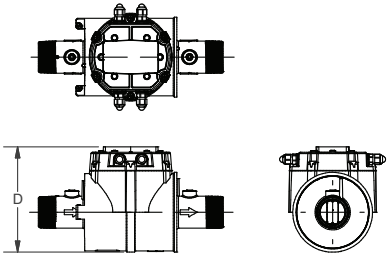
PRODUCT WEIGHT – lb:*				
	NPT / BSP	**ANSI Polymer Flange**	**ANSI Steel Flange**	**DIN Steel Flange**
1/2 in.	1.1	-	-	-
3/4 in.	1.2	-	-	-
1 in.	1.2	-	-	-
1 1/2 in.	1.8	-	-	-
2 in.	2.0	-	-	-
3 in.	-	6.4	11.1	10.2
4 in.	-	7.4	13.4	10.8

* Weight with display. For plain cover plates, subtract 0.2 lb.

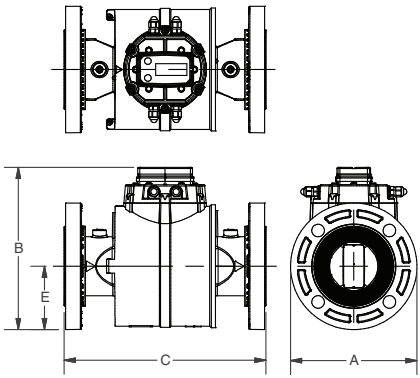
DIMENSIONS



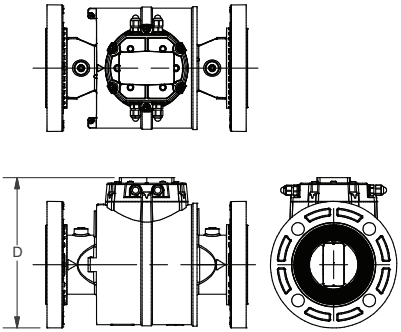
NPT / BSP WITH 09 ELECTRONICS



NPT / BSP WITH QB ELECTRONICS



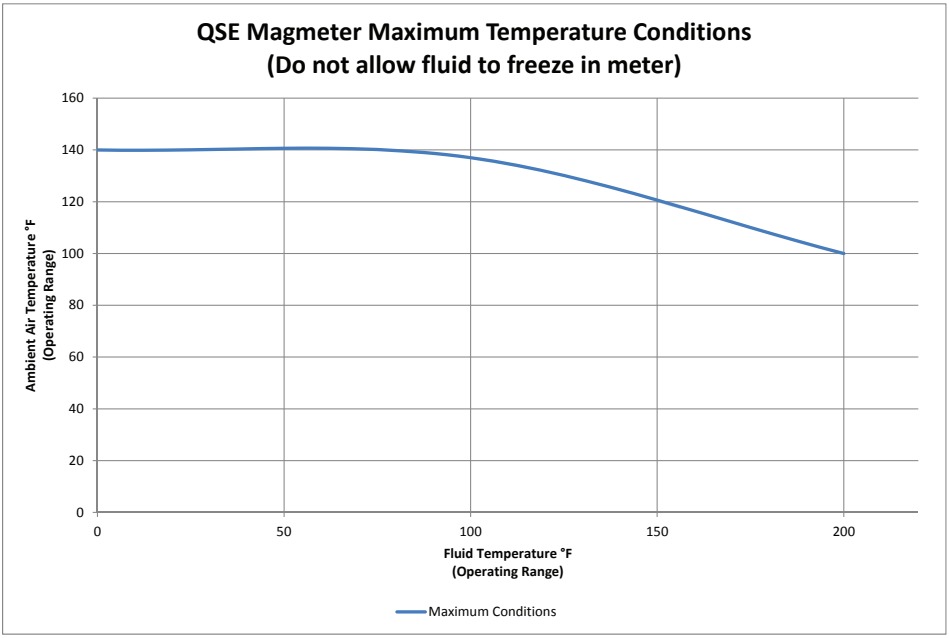
FLANGE WITH 09 ELECTRONICS



FLANGE WITH QB ELECTRONICS

QSE METER DIMENSIONS (NPT, BSP, ANSI FLANGE, DIN FLANGE) listed in inches; millimeters listed in [ ] brackets					
METER SIZE & FITTING	**A**	**B**	**C**	**D**	**E**
1/2 in. NPT & BSP	5.20 [132.1]	5.83 [148.1]	10.50 [266.7]	5.13 [130.9]	1.83 [46.5]
3/4 in. NPT & BSP	5.20 [132.1]	5.83 [148.1]	10.75 [w273.1]	5.13 [130.9]	1.83 [46.5]
1 in. NPT & BSP	5.20 [132.1]	5.83 [148.1]	11.00 [279.4]	5.13 [130.9]	1.83 [46.5]
1-1/2 in. NPT & BSP	5.22 [132.6]	6.95 [176.5]	11.00 [279.4]	6.25 [158.8]	2.37 [60.2]
2 in. NPT & BSP	5.22 [132.6]	6.95 [176.5]	11.00 [279.4]	6.25 [158.8]	2.37 [60.2]
3 in. ANSI Flange	7.50 [190.5]	9.62 [244.3]	12.00 [304.8]	8.92 [226.6]	3.75 [95.3]
4 in. ANSI Flange	9.00 [228.6]	10.37 [263.4]	12.00 [304.8]	9.67 [245.6]	4.50 [114.3]
3 in. DIN Flange	7.87 [200.0]	9.80 [248.9]	12.00 [304.8]	9.10 [231.1]	3.94 [100.0]
4 in. DIN Flange	8.66 [220.0]	10.2 [259.1]	12.00 [304.8]	9.5 [241.3]	4.33 [110.0]

TEMPERATURES



FLUID ELECTRICAL CONDUCTIVITY

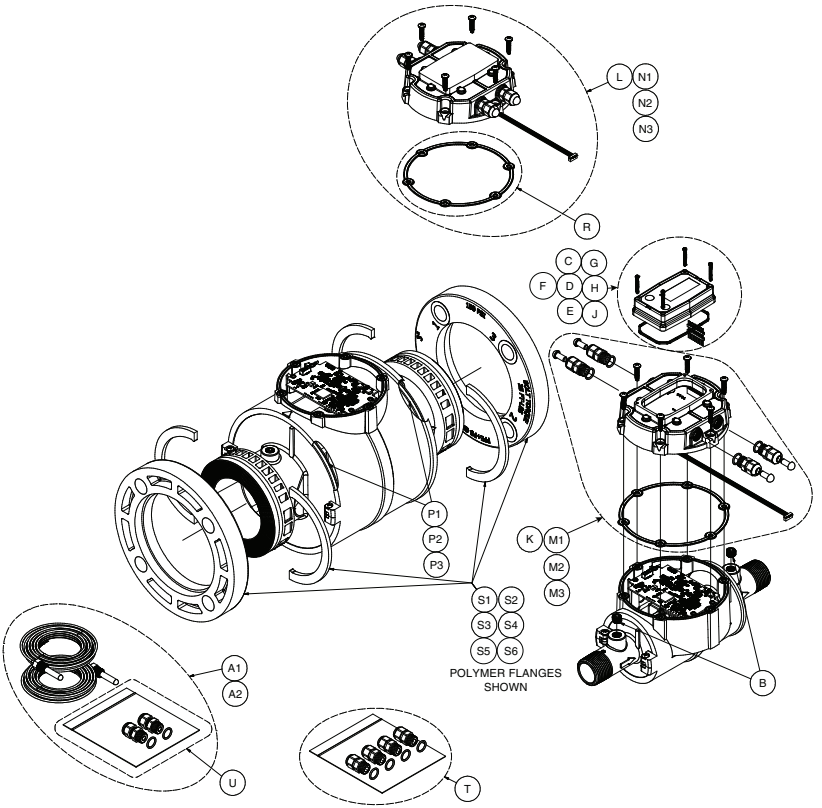
Fluid Electrical Conductivity Reference:

The basic unit of fluid conductivity is “mho/cm”, otherwise known as 1 Siemen. However, this unit does not really occur in water, so we typically use one thousandth (mili-) or one millionths (micro-) of it for natural waters (1000 milimhos and 1,000,000 micromhos are equal to one mho).

The useful unit for seawater is milimhos/cm (mS/cm); seawater is around 55 mS/cm. The useful unit for freshwater is micromhos/cm (µmhos/cm, or µS/cm); tap water ranges between 50 and 800 µS/cm (depending on the source).

Electrical Conductivity of Common Fluids

FLUID	TEMPERATURE (°F)	CONDUCTIVITY (µs/cm)
Coca Cola Syrup	68	600
Coffee Extract	183.2	5000
Corn Syrup	89.6	16
Ethylene Glycol (Pure)	68	1.07
Gin 90 Proof	77	10
ISO-propyl Alcohol	77	3.5
Molasses	50	300
RC Cola Syrup	77	600
Sugar Solution Dilute	86	585
Urea	77	5000
Vodka 100 Proof	77	4
Water, Distilled	-	0.04
Water, NYC	77	72



REPLACEMENT PARTS, ILLUSTRATED

REPLACEMENT PARTS LIST

REF.	PART NUMBER	DESCRIPTION	NO REQ'D.
A1	145500-01	Kit, 1 in. temperature sensor probe Includes: (2) probes, (2) strain reliefs w/O-rings	1
A2	145500-02	Kit, 2 in. temperature sensor probe Includes: (2) probes, (2) strain reliefs w/O-rings.	1
B	145500-03	Kit, pipe plug, 1/8-27 NPT stainless steel Includes: (2) plugs.	1
C	145501-01	Kit, Q09 computer display, 1/2 in. Includes: Computer display w/decal, seal, 10 pin connector.	1
D	145501-02	Kit, Q09 computer display, 3/4 in. Includes: Computer display w/decal, seal, 10 pin connector.	1
E	145501-03	Kit, Q09 computer display, 1 in. Includes: Computer display w/decal, seal, 10 pin connector.	1
F	145501-04	Kit, Q09 computer display, 1-1/2 in. Includes: Computer display w/decal, seal, 10 pin connector.	1
G	145501-05	Kit, Q09 computer display, 2 in. Includes: Computer display w/decal, seal, 10 pin connector.	1
H	145501-06	Kit, Q09 computer display, 3 in. Includes: Computer display w/decal, seal, 10 pin connector.	1

J	145501-07	Kit, Q09 computer display, 4 in. Includes: Computer display w/decal, seal, 10 pin connector.	1
K	145500-14	Kit, QSB w/display cover plate Includes: Display cover plate, QSB electronics with ribbon cable, (6) screws, cover plate seal.	1
L	145500-15	Kit, QSB w/plain cover plate Includes: Plain cover plate w/decal, QSB electronics with ribbon cable, (6) screws, cover plate seal.	1
M1	145502-01	Kit, QSI1 w/display cover plate Includes: Display cover plate, QSI1 electronics with ribbon cable, (6) screws, cover plate seal.	1
M2	145502-02	Kit, QSI2 w/display cover plate Includes: Display cover plate, QSI2 electronics with ribbon cable, (6) screws, cover plate seal.	1
M3	145502-03	Kit, QSI3 w/display cover plate Includes: Display cover plate, QSI3 electronics with ribbon cable, (6) screws, cover plate seal.	1
N1	145503-01	Kit, QSI1 w/plain cover plate Includes: Plain cover plate w/decal, QSI1 electronics with ribbon cable, (6) screws, cover plate seal.	1
N2	145503-02	Kit, QSI2 w/plain cover plate Includes: Plain cover plate w/decal, QSI2 electronics with ribbon cable, (6) screws, cover plate seal.	1
N3	145503-03	Kit, QSI3 w/plain cover plate Includes: Plain cover plate w/decal, QSI3 electronics with ribbon cable, (6) screws, cover plate seal.	1
P1	145500-04	Kit, O-rings, 1/2 in., 3/4 in. and 1 in. housings Includes: (2) O-rings.	1
P2	145500-05	Kit, O-rings, 1-1/2 in. and 2 in. housings Includes: (2) O-rings.	1
P3	145500-06	Kit, O-rings, 3 in. and 4 in. housings Includes: (2) O-rings.	1
R	145500-07	Kit, seal, cover plate Includes: (1) Cover plate seal.	1
S1	145500-08	Kit, ANSI flange, polymer, 3 in. Includes: (2) 3 in. polymer flanges, (4) 3 in. half-ring keys.	1
S2	145500-09	Kit, ANSI flange, polymer, 4 in. Includes: (2) 4 in. polymer flanges, (4) 4 in. half-ring keys.	1
S3	145500-10	Kit, ANSI flange, steel, 3 in. Includes: (2) 3 in. steel flanges, (4) 3 in. half-ring keys.	1
S4	145500-11	Kit, ANSI flange, steel, 4 in. Includes: (2) 4 in. steel flanges, (4) 4 in. half-ring keys.	1
S5	145500-16	Kit, DIN flange, steel, DN80, PN10 Includes: (2) 3 in. steel flanges, (4) 3 in. half-ring keys.	1
S6	145500-17	Kit, DIN flange, steel, DN100, PN10 Includes: (2) 4 in. steel flanges, (4) 4 in. half-ring keys.	1
T	145500-12	Kit, strain relief, cover plate Includes: (4) PG7 thread strain reliefs, .11 - .26 cable diameter range	1
U	145500-13	Kit, strain relief, temperature sensor Includes: (2) PG7 thread strain reliefs (reduced fit), .08 - .20 cable diameter range	1

SERVICE

For warranty consideration, contact your local distributor. If you need further assistance, contact the GPI Customer Service Department at:

1-888-996-3837

You will need to:

- Provide information from the decal on your meter.
- Receive a Return Authorization number.
- Flush any fluid from the meter before shipping to the factory.

If possible leave customer installed fittings or ample length of bare pipe for reinstallation.

CAUTION: *Do not return the meter without specific authority from the GPI Customer Service Department. Due to strict regulations governing transportation, handling and disposal of hazardous or flammable liquids, GPI will not accept meters for rework unless they are completely free of liquid residue.*

The Waste Electrical and Electronic Equipment (WEEE) directive (2002/96/EC) was approved by the European Parliament and the Council of the European Union in 2003. This symbol indicates that this product contains electrical and electronic equipment that may include batteries, printed circuit boards, liquid crystal displays or other components that may be subject to local disposal regulations at your location. Please understand those regulations and dispose of this product in a responsible manner.

RoHS Compliant (2011/65/EU)

This product is in compliance with the RoHS Directive of the European Parliament and of the Council on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment.

Environmental Rating: IP65

LIMITED WARRANTY

Great Plains Industries, Inc. 5252 E. 36th Street North, Wichita, KS USA 67220-3205, hereby provides a limited warranty against defects in material and workmanship on all products manufactured by Great Plains Industries, Inc. This product includes a 1 year warranty. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. The warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of manufacture or on the date of purchase with an original sales receipt. This warranty shall not apply if:

A. the product has been altered or modified outside the warrantor's duly appointed representative;

B. the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, contact the GPI Customer Service Department at

316-686-7361 or 888-996-3837. Or by mail at:
Great Plains Industries, Inc.
5252 E. 36th St. North
Wichita, KS, USA 67220-3205

The company shall, notify the customer to either send the product, transportation prepaid, to the company at its office in Wichita, Kansas, or to a duly authorized service center. The company shall perform all obligations imposed on it by the terms of this warranty within 60 days of receipt of the defective product.
GREAT PLAINS INDUSTRIES, INC., EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.
The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.
This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.
Note: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT – Part 702 (governs the resale availability of the warranty terms).

Wichita · Sydney · Mexico City

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