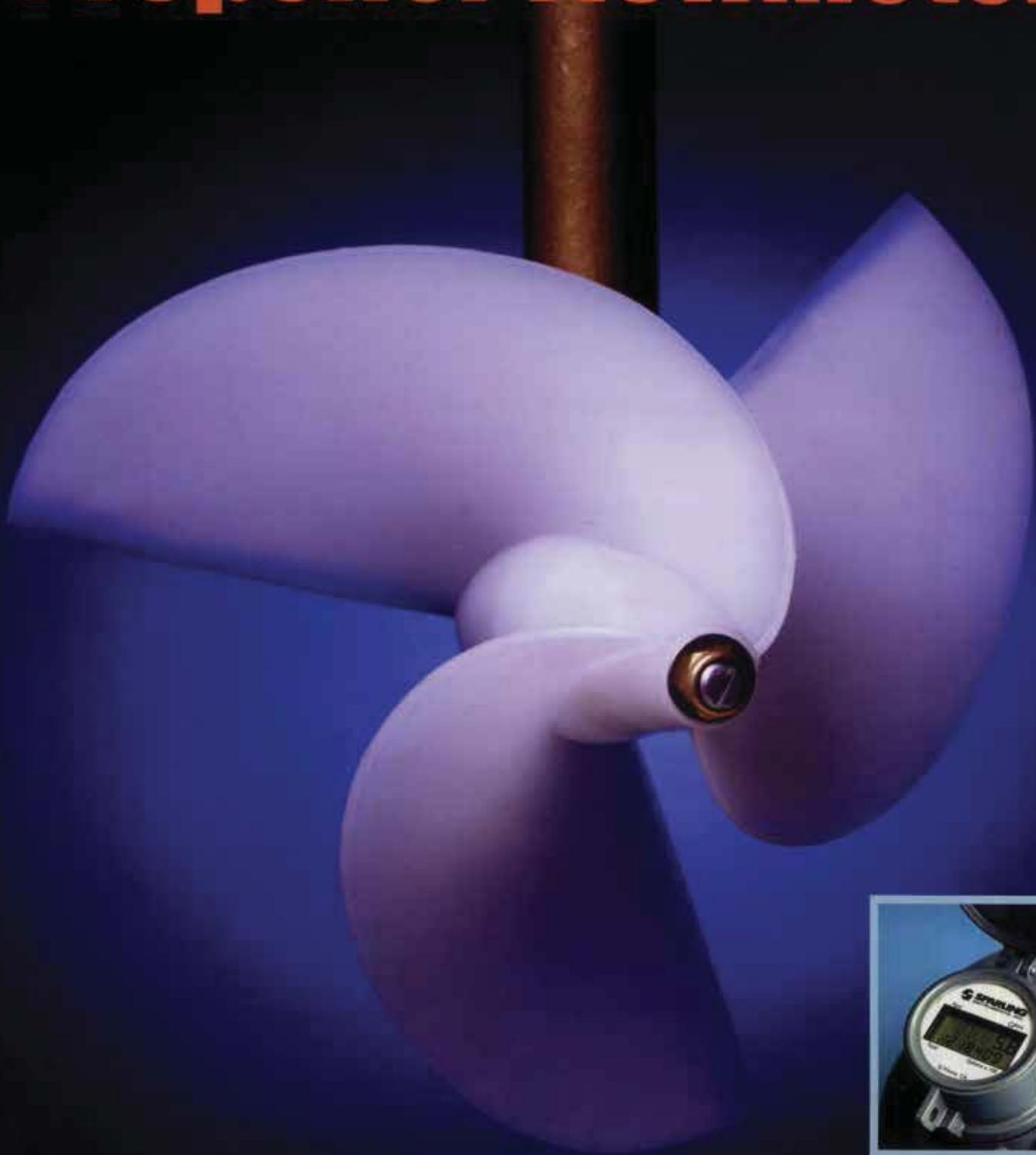


Propeller Flowmeters



S SPARLING

Introduction

Quality Policy

Sparling's policy is to supply products and services that meet or exceed the requirements and expectations of our customers. We are committed to the continuous improvement of our people, our products and our processes.

Mission Statement

The Sparling Mission is to serve process measurement markets with flow and level instruments of superior quality. We are customer focused and driven to excellence.

Warranty

Sparling Propeller Meters are warranted to be free from defects in material and workmanship at the time of original shipment and for a period of one year thereafter.



Sparling Propeller Meters

All Sparling Mainline Propeller Meters are engineered for long term reliability and low maintenance. Many Sparling meters have been in service for over 50 years with only minor service!



We have optimized the wear resistance of our design by utilizing full-radius tungsten carbide tips on the propeller and vertical shafts, tungsten carbide disks on the thrust screws and precision ground worm gears heat treated to Rockwell C-60.

Our propellers have the same specific gravity as water and virtually “float”, eliminating any side loading of the bearings and resultant wear. A hex insert, molded in place, incorporates machined grooves and a key to ensure a positive drive and prevent slippage.



Features

- Measures accurately over a flow range of 10:1 or greater
- $\pm 2\%$ of rate accuracy, guaranteed by certified wet calibration at three test points in Sparling’s National Institute of Standards and Technology (NIST) traceable hydraulic flow lab
- Sturdy cast or fabricated steel construction
- Easily maintained with standard tools
- Registration can be furnished in any standard Engineering Unit

Flow

Your Sparling meter utilizes specially designed propellers and bearings matched to your flow range to insure a long life. Maximum flow ranges can be safely exceeded by 50% when used intermittently. See the Flow Range chart on page 19. **In order to insure proper meter configuration, anticipated flow ranges including minimum and normal flow rates expected, should always be specified on application sheets.**

Applications

Sparling propeller meters have been developed for “clean” water applications where the temperature of the water does not exceed 100° F and suspended solids do not exceed 0.5% of volume.

Sparling propeller meters are not recommended where: .

- Suspended solids are over 0.5% of volume
- Operating temperatures are over 100° F (unless higher temperature construction is specified)



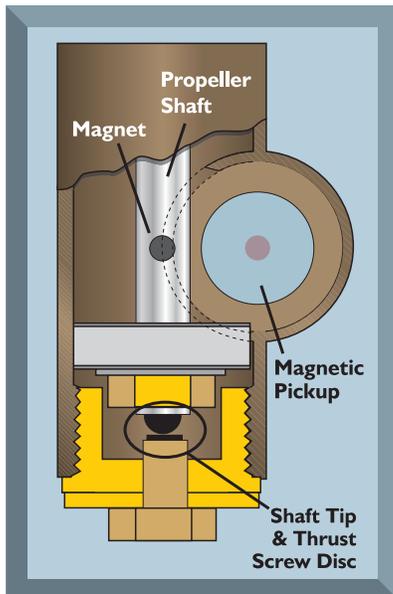


The Model 104/184 electronic propeller meter provides accurate and reliable flow measurement where main line water service is required in municipal and industrial facilities, where isolation of the drive element from the flow stream is desirable or where durable, cost-effective measurement is required.

The Model FM104/184 features the FT194 battery powered electronic rate/totalizer which senses the rotation of the propeller by means of a magnetic pickup sensor located in the gearbox. The rate/totalizer and pickup are completely isolated from the flow stream.

Fewer moving parts combined with a proven Sparling design results in less wear, reduced maintenance costs and longer life. As with all Sparling MainLine propeller meters, the FM104/184 is available with a choice of factory fabricated tubes, saddles and as a meterhead only.

REMOTE OPTION – For remote indication of rate and total the FT194 display/transmitter may be mounted up to 50 ft. from the FM104/184 meterhead. This is ideal for situations where it is inconvenient to have the indicator mounted integrally to the meterhead, such as in a pit or frequently flooded area.



FIELD PROGRAMMABLE – Registration can be changed in the field with the optional Sparling Model 703 programmer.

CHOICE OF OPTIONAL OUTPUTS – The FM104/184 is available with 4-20mA output when the digital rate/totalizer is connected to an outside power source.

Existing Sparling propeller meters can be retrofitted at the factory to accommodate the digital display. Please see FT194 on pages 6-7 for more information.

Model FM104/184 *Electronic Propeller Meter*

Installation —

The FM104/184 MainLine Meter must be installed in full flowing suction or discharge lines. Avoid valves, fittings or obstructions immediately upstream of the meter which may cause jetting or non-symmetrical flow profiles. It is recommended that a minimum of five straight pipe diameters be maintained upstream and one diameter downstream of the meter.

Specifications —

Temperature Limits

| | |
|--|-----------------|
| Operating (Higher Temperature construction is available) | 32° F to 100° F |
| Storage | -40° to 175° F |

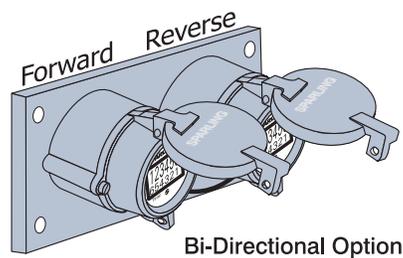
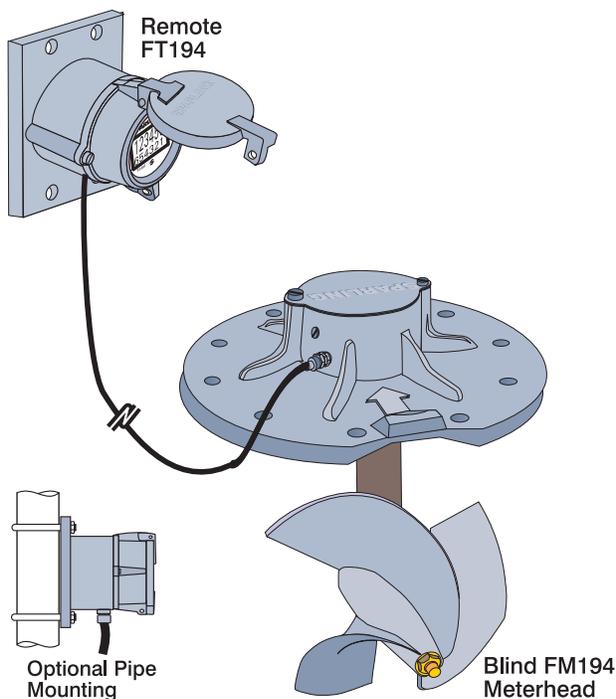
Materials of Construction

| | |
|------------------------------|---|
| Coverplate | Cast Iron (2" – 14") / Fabricated Steel (16" – 72") |
| Propeller | Polyethylene |
| Gearbox | Bronze (2 – 30") / Cast Iron (36" – 72") |
| Mechanical Parts | Stainless Steel |
| Meter Tubes / Coatings | Cast Iron / stainless steel metering section (2" - 3") Fabricated Steel (4" – 36") / Wetted parts high build epoxy polyamide paint EPA approved for potable water. |

Sizes

| | |
|------------------|-------|
| 2" to 14" | FM104 |
| 16" to 72" | FM184 |

Flow Ranges (Shown on page 20)



Also Available —

- Indicator/Totalizer/Transmitter options - see pages 6-7
- MA-160 Register Extension - maximum length 5'0"

Model FT194 *Digital Indicator/Totalizer*

The FT194 is a digital flow rate and totalizer with an easy to read 2-line LCD display which features simultaneous 5-digit rate and 8-digit totalizer indication. The FT194 is standard on the FM104/184.

NON-VOLATILE EEPROM memory chip holds all meter parameters such as full scale, span, calibration factors, engineering units, damping parameters and flow totals, even in the event of a power failure.

A PHOTOELECTRIC CELL ACTIVATES THE DISPLAY when the cover is opened. The display reverts to an energy saving "sleep mode" after a user programmed time interval. Flow totals are continuously updated even when in the "sleep mode". To reactivate the display, simply close and open the cover. The 3.6V lithium battery has an 8 year average life. A low battery indication will display approximately 6 months before the battery requires replacement. Totalization accuracy is not affected when a "low battery" indication is displayed.



Specifications

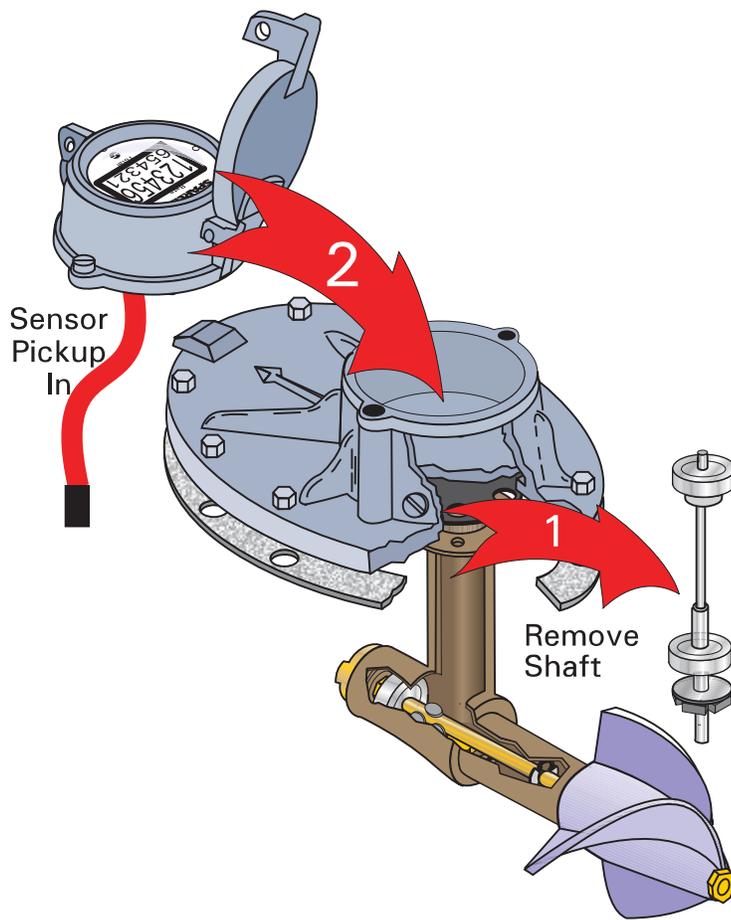
| | |
|--|--|
| Accuracy: | |
| Rate | ±0.25% of full scale |
| Totalization | ±0.1% of rate (in addition to propeller meter accuracy) |
| Power: | |
| 3.6V Lithium battery (8 year avg. life) | |
| 4-20 mA and scaled pulse output with external 24Vdc power source | |
| Operating Temperature | -10°F to 158°F (-23°C to 70°C) |
| Storage Temperature | -40°F to 158°F (-40°C to 70°C) |
| Display | 5-digit rate indicator (0.35 inches high) 8 digit totalizer indicator (0.25 inches high). LCD 2 line display with simultaneous rate, total, and low battery indication |
| Construction | Sturdy Die Cast Aluminum bonnet NEMA-6P & IP67 environmental ratings |
| Optional Outputs | 4-20mA & pulse output, contact on time 100 milliseconds User can select how many units of measure for every contact closure |
| Scaling | Totalizer Scaler - 0.0001 to 9999.0 / Rate Scaler - 0.0001 to 9999.0 Decimal point can be moved to five positions |
| Scaling Units | Totalizer - Gallons, Ft ³ , Liters, M ³ , Acre Feet Rate - GPM, CFS, MGD, LPS, M ³ /Hr |
| Electrical Rating | General Purpose |

Model FT194 Factory Retrofit

FT194 Retrofit Available for your Existing Sparling Meters

Sparling's factory technicians can upgrade your existing Sparling FM102/182 or FM103/183 propeller meters to be compatible with the FT194 digital indicator/totalizer. You'll have all the benefits of the electronic Model FM104/184 propeller meter: fewer moving parts, digital readout and longer life.

Sparling factory technicians remove the vertical shaft and inspect the propeller shaft, bearings and bushings to insure proper operation. The magnetic sensor pickup, which is completely potted and isolated from moisture, is then inserted into the gearbox and the electronic indicator totalizer is mounted to the meter body. Finally, the meter is wet flow calibrated at a minimum of three test points.





*Models FM102 & FM182
Direct Drive Propeller Meter*



For over 70 years Direct Drive propeller meters have earned a reputation for rugged continuous duty with minimum maintenance.

STAINLESS STEEL WORM GEARS—precision ground and heat treated to Rockwell C-60 prevent the possibility of slippage and low readings. Full-radius tungsten carbide tips on the propeller shafts and tungsten carbide thrust bearings ensure years of trouble-free operation. Propellers have the same specific gravity as water and virtually “float”, eliminating any side loading of the bearings and resultant wear. A hex insert molded in place, incorporates machined grooves to prevent movement. A Woodruff key ensures a positive drive.

No special equipment is required for maintenance of Sparling meters - they are easily maintained with standard hand tools. See page 24 for installation considerations.

Specifications —

Temperature Limits

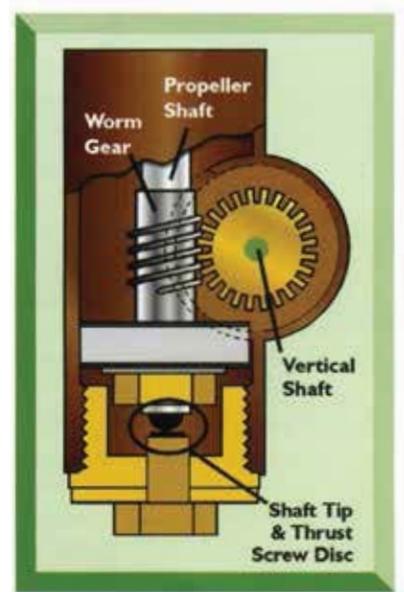
- Operating 32°F to 100°F*
*Higher Temperature construction is available.
- Storage -40°F to 175°F

Materials of Construction

- Coverplate Cast Iron (2-14") / Fabricated Steel (16" - 72")
- Propeller Polyethylene
- Gearbox Bronze (2"-30") / Cast Iron (36" - 72")
- Mechanical Parts Stainless Steel
- Bearings Low Range - Stainless Steel
Standard Range - Rubber Front Bearings
- Meter Tubes/Coatings
Cast Iron / stainless steel metering section (2" - 3")
Fabricated Steel (4" - 36") / Wetted parts high build epoxy
polyamide paint approved by the EPA for potable water

Also Available—

- Indicator/Totalizer/Transmitter options - see pages 18, 19
- MA-146 Register Extension - maximum length 10'0"



Sparling MainLine™ direct drive, magnetic drive, or electronic propeller meters may be furnished with a flanged tube or with a saddle for field welding on to the customer's pipe.



Tubes — 2" to 36"

2" - 3" tubes are provided in heavy duty cast iron. 4" and larger tubes are fabricated steel, coated with an epoxy polyamide paint.

6" - 36" tubes are equipped with three integrally mounted straightening vanes. Standard flanges are 150# or 250# with AWWA bolt hole pattern. Meter mounting flanges are Sparlings' standard bolt hole pattern (2" - 14") or AWWA standard (16" - 36"). See page 22.

Saddles — 6" to 72"

Saddles for meterheads from 6" - 14" are provided in heavy duty cast steel with meter mounts in the Sparling standard bolt pattern. Saddles for meterheads from 16" - 72" are fabricated steel and have meter mounts in the AWWA standard bolt hole pattern. See page 23.

Specifications —

Materials of Construction

Tubes

| | |
|---|---|
| Tube | Cast Iron (2" - 3") / Fabricated Steel (4" - 36") |
| Flanges | 150 or 250# AWWA standard as required |
| Bolt Pattern (meterhead mounting) | Sparling Standard (2" - 14") AWWA flange compliant (16" - 36") |
| Straightening Vanes* | 2" - 4" not required 6" - 36" integrally welded |

Saddles

| | |
|----------------------------|---|
| Saddle | Cast Steel (6" - 14") / Fabricated Steel (16" - 72") |
| Bolt Pattern | Sparling Standard (6" - 14") AWWA flange compliant (16" - 72") |
| Straightening Vanes* | Sold Separately |

*See chart on page 24 for straightening vane requirements.



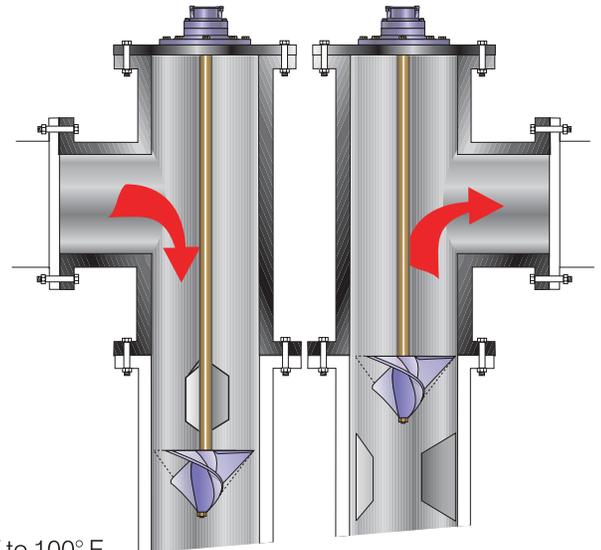
Sparling VertiFlo™ meters are ideal for installations where space limitations or piping configurations preclude the use of Sparling MainLine™ tube or saddle mounted meters. VertiFlo™ meters are used in wells equipped with submersible pumps and installations on the suction side of centrifugal pumps. Standard sizes range from 4" to 14". Flow ranges are shown on page 20.

VertiFlo™ meters are economical - the meter is installed in a standard flanged tee and can be configured for up or down flow conditions.

Installation —

VertiFlo™ meterheads are provided with 150 lb. or 300 lb. flanges as specified, and are simply bolted into position on the flanged tee. The length of the meter drop pipe is per customer requirements. See page 26 for dimensions.

For down-flow installations, the straightening vanes are supplied integrally welded to the drop pipe and no further work is required. For up-flow, three welded or bolted straightening vanes are recommended upstream of the meter. Welding vanes, bolting type vanes and stainless-steel liner and vane assemblies are available from Sparling.



Specifications —

Temperature Limits

| | |
|-----------------|-----------------|
| Operating | 32° F to 100° F |
| Storage | -40° to 175° F |

Materials of Construction

| | |
|--------------------------|-----------------|
| Coverplate | Cast Iron |
| Propeller | Polyethylene |
| Gearbox | Bronze |
| Mechanical Parts | Stainless Steel |
| Wetted metal parts | Coal Tar Epoxy |

Also Available —

- Indicator/Totalizer/Transmitter options - see pages 18, 19

Vertiflo™

Model FM134

Electronic Propeller Meter



Sparling's electronic VertiFlo™ meters are ideal for installations where space limitations or piping configurations preclude the use of Sparling MainLine™ tube or saddle mounted meters. VertiFlo™ electronic meters are used in wells equipped with submersible pumps and installations on the suction side of centrifugal pumps. Standard sizes range from 4" to 14". Flow ranges are shown on page 20.

Electronic VertiFlo™ meters are economical - the meter is installed in a standard flanged tee and can be configured for up or down flow conditions.

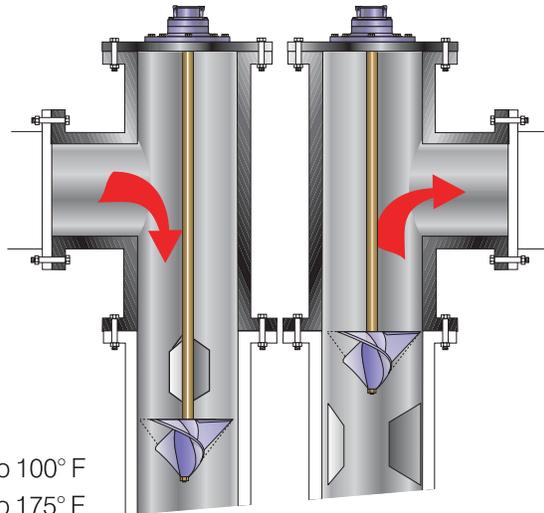
The Model FM134 interfaces with the FT194 battery powered electronic rate/totalizer which senses the rotation of the propeller by means of a magnetic pickup sensor located in the coverplate. The rate/totalizer and pickup are completely isolated from the flow stream. Fewer moving parts combined with a proven Sparling design results in less wear, reduced maintenance costs and longer life.

Installation —

VertiFlo™ meterheads are drilled in accordance with standard 125 lb. or 250 lb. cast iron flanged tee requirements, as specified on customer order, and are simply bolted into position. The length of the meter drop pipe is manufactured in accordance with overall dimensions as stated in the customers order.

For down-flow installations, the straightening vanes are supplied integral with the meter and no further work is required.

For up-flow, three straightening vanes are recommended to be welded upstream of the meter. Welding vanes, bolting type vanes and stainless-steel liner and vane assemblies are available at extra cost.



Specifications —

Temperature Limits

| | |
|-----------------|-----------------|
| Operating | 32° F to 100° F |
| Storage | -40° to 175° F |

Materials of Construction

| | |
|--------------------------|-----------------|
| Coverplate | Cast Iron |
| Propeller | Polyethylene |
| Gearbox | Bronze |
| Mechanical Parts | Stainless Steel |
| Wetted metal parts | Coal Tar Epoxy |

Also Available —

- Indicator/Totalizer/Transmitter options - see pages 6, 7



Economical and easily installed, the Waterworks Intake meter is designed for large volume flow measurement at the discharge end of a closed conduit, inverted siphon or reservoir. The meter can easily be mounted on existing structures.

The conical shape and flexibility of Sparling's propeller design reduces damage and minimizes maintenance by shedding debris such as algae clumps or rags. The wetted drop pipe and gear box are fabricated from heavy duty materials designed to provide many years of trouble-free service. Materials used are resistant to normal water corrosion.

Flow —

The FM142 utilizes specially designed propellers and bearings matched to your flow range to insure a long life. Maximum flow ranges can be safely exceeded by 50% when used intermittently. See the Flow Range chart on page 20. ***For proper configuration of meter construction, anticipated flow ranges, including minimum and normal flow rates expected should always be specified on application sheets accompanying your order.***

Installation —

The meter propeller is installed fully submerged and facing the center of the flow at the discharge end of a pipe, closed conduit, or inverted siphon. It is suspended from a pipe column attached to a wall or simple support structure. Concrete pipe or a simple culvert structure acts as a meter tube. Gate valves or other obstructions should be at least ten pipe diameters upstream from the meter. Straightening vanes may be furnished as a separate item to insure stable flow conditions and accurate measurement.

Specifications —

Materials of Construction

| | |
|------------------------|---|
| Drop Pipe | Brass (10" - 30") / Fabricated Steel (36" - 72") |
| Propeller | Polyethylene |
| Gearbox | Bronze (10" - 30") / Cast Iron (36" - 72") |
| Mechanical Parts | Stainless Steel |
| Coatings | Not required (10" - 30") / Galvanized (36" - 72") |

Also Available —

- Indicator/Totalizer/Transmitter options - see pages 18, 19
- Revolving mounting bracket and dimensions - see page 27

Waterworks Intake

Open Channel

Model FM144

Electronic Propeller Meter

Economical and easily installed, the Waterworks Intake meter is designed for large volume flow measurement at the discharge end of a closed conduit, inverted siphon or reservoir. The meter can easily be mounted on existing structures.

The conical shape and flexibility of Sparling's propeller design reduces damage and minimizes maintenance by shedding debris such as algae clumps or rags. The wetted drop pipe and gear box are fabricated from heavy duty materials designed to provide many years of trouble-free service. Materials used are resistant to normal water corrosion.

The Model FM144 interfaces with the FT194 battery powered electronic rate/totalizer which senses the rotation of the propeller by means of a magnetic pickup sensor located in the gearbox. The rate/totalizer and pickup are completely isolated from the flow stream. Fewer moving parts combined with a proven Sparling design results in less wear, reduced maintenance costs and longer life.

Flow —

The FM144 utilizes specially designed propellers and bearings matched to your flow range to insure a long life. Maximum flow ranges can be safely exceeded by 50% when used intermittently. See the Flow Range chart on page 20. ***For proper configuration of meter construction, anticipated flow ranges, including minimum and normal flow rates expected should always be specified on application sheets accompanying your order.***

Installation —

The meter propeller is installed fully submerged and facing the center of the flow at the discharge end of a pipe, closed conduit, or inverted siphon. It is suspended from a pipe column attached to a wall or simple support structure. Concrete pipe or a simple culvert structure acts as a meter tube. Gate valves or other obstructions should be at least ten pipe diameters upstream from the meter. Straightening vanes may be furnished as a separate item to insure stable flow conditions and accurate measurement.

Specifications —

Materials of Construction

| | |
|------------------------|---|
| Drop Pipe | Brass (10" - 30") / Fabricated Steel (36" - 72") |
| Propeller | Polyethylene |
| Gearbox | Bronze (10" - 30") / Cast Iron (36" - 72") |
| Mechanical Parts | Stainless Steel |
| Coatings | Not required (10" - 30") / Galvanized (36" - 72") |

Also Available —

- Indicator/Totalizer/Transmitter options - see pages 6, 7
- Revolving mounting bracket and dimensions - see page 27



Fire Hydrant Meter

Model FM162

Sparling's Fire Hydrant Meter is fitted for fire hydrant hose connection and is designed to measure flows from 35 GPM. The pressure drop through the meter is approximately 1 psi at 200 gallons per minute.

Weighing only twenty pounds, it is convenient to carry and attach. Hydrant and hose connections can be made in a few minutes.

The connections are 2-1/2 inch National Fire Hose, 7-1/2 thread coupling and spigot. 3" Standard National Pipe Thread tapped at both ends may be supplied if preferred. See page 28 for dimensions.



Specifications —

Materials of Construction

| | |
|------------------------|--|
| Body | |
| Cast Aluminum | |
| Liner | |
| Stainless Steel | |
| Propeller | Polyethylene |
| Mechanical Parts | Bronze or Stainless Steel |
| Weight | 20 lbs. |
| Coatings | Standard Sparling coating |
| Connections | 2-1/2 National Fire Hose Fitting or 3" National Pipe Thread |
| Totalizer | FT191 (see page 6, 7, 18) |

Sparling began supplying meters for irrigation applications in the early 1900's. They provided a low cost, reliable flow measurement device that was easy to install.

Irrigation meters are factory calibrated and ready to mount to existing pipe or on plain end steel tubes. See page 28 for dimensions.



Installation —

This meter may be installed at any convenient angle in a full flowing suction or discharge line. Avoid any valve, fitting or obstruction directly upstream from the meter propeller. At least five diameters of straight pipe upstream and one diameter downstream from the meter are recommended.

Specifications — (Flow ranges shown on page 20)

Temperature Limits

| | |
|-----------------|----------------|
| Operating | 32°F to 100°F |
| Storage | -40°F to 175°F |

Materials of Construction

| | |
|------------------------|--|
| Saddle | Cast Iron (4" - 12") / Cast Aluminum (14") |
| Gear Box | Cast Bronze |
| Propeller | Polyethylene |
| Mechanical Parts | Stainless Steel |
| Coatings | Grey water base paint |

Mounting Options

| | |
|--|--------------|
| Plain end steel tube | 4" |
| Plain end steel tube w/straightening vanes | 6" - 14" |
| Meterhead only with stainless steel straps | 4" - 14" |
| Meterhead only with U-bolts | 4" - 8", 14" |
| Meterhead only with anchor bars | 10" - 12" |

Also Available —

- Indicator/Totalizer/Transmitter options - see pages 18, 19
- Dummy covers



*Model FM314
Electronic Propeller Meter*

Metering of irrigation water was pioneered by Sparling more than 75 years ago in the era when water was less expensive and plentiful and irrigation was limited to a few farming areas. As specialists in the design, engineering and servicing of irrigation meters, Sparling occupies an enviable position having acquired the “know how” that only long experience can validate.

The Model 314 interfaces with the FT194 battery powered electronic rate/totalizer which senses the rotation of the propeller by means of a magnetic pickup sensor located in the gearbox. The rate/totalizer and pickup are completely isolated from the flow stream. Fewer moving parts combined with a proven Sparling design results in less wear, reduced maintenance costs and longer life.

Irrigation meters are factory calibrated and ready to mount to existing pipe or on plain end steel tubes. See page 28 for dimensions.

Installation —

This meter may be installed at any convenient angle in a full flowing suction or discharge line. Avoid any valve, fitting or obstruction directly upstream from the meter propeller. At least five diameters of straight pipe upstream and one diameter downstream from the meter are recommended.

Specifications — (Flow ranges shown on page 20)

Temperature Limits

| | |
|-----------------|----------------|
| Operating | 32°F to 100°F |
| Storage | -40°F to 175°F |

Materials of Construction

| | |
|------------------------|--|
| Saddle | Cast Iron (4" - 12") / Cast Aluminum (14") |
| Gear Box | Cast Bronze |
| Propeller | Polyethylene |
| Mechanical Parts | Stainless Steel |
| Coatings | Grey water base paint |

Mounting Options

| | |
|--|--------------|
| Plain end steel tube | 4" |
| Plain end steel tube w/straightening vanes | 6" - 14" |
| Meterhead only with stainless steel straps | 4" - 14" |
| Meterhead only with U-bolts | 4" - 8", 14" |
| Meterhead only with anchor bars | 10" - 12" |

Also Available —

- Indicator/Totalizer/Transmitter options - see pages 6, 7
- Dummy covers

Sparling provides four Indicator/Totalizer/Transmitter packages as optional equipment. The FT190, FT191, FT193 and the electronic FT194. Integrally mounted to the meterhead, these housings are made of die cast aluminum and have a locking hasp for security. See page 25 for dimensions.



FT191 —

Mechanical Flow Totalizer
 Compatible with all Sparling propeller flowmeters
 Accuracy $\pm 2\%$ of rate
 4-20mA output accuracy $\pm 0.5\%$ of full scale
 Available with optional P, B & E switches
 Enclosure: NEMA 3R

FT190 —

Mechanical Flow Totalizer and Indicator
 Compatible with all Sparling propeller flowmeters, **except Model 162**
 Enclosure: NEMA 3R
 Accuracy: Visual Indicator $\pm 5\%$ full scale,
 Totalizer $\pm 2\%$ of rate
 Available with optional P, B, & E switches



FT190/FT191 Output Specifications (optional)

P Switch - for meterheads up to 30" (ambient temperature limits 30° F to 130° F (-1°C to 55°C))

Pulse output - three-wire solid state switch using external power supply

- External power supply 11 to 20 Vdc, 60 mA max.
- Pulse output load 1500 ohms (min.)
- Output pulse rate 0-20 Hz
- Duty cycle 50/50 + 20%

Isolated Switching Output Two-wire isolated solid state switch (optocoupled)

- External Power 10-30 Vdc & 100mA (functional only when pulse output is powered)
- Switching output rate 0-20 Hz
- Duty cycle 50/50 + 20%

B Switch

- 3-wire, single pole, double throw, break-before-make contact closure
- Contact rating 115 VAC $\pm 10\%$, 1 amp max. non-inductive
- Contact rate 30 full cycles/minute
- Contact duration Variable with flow rate
- ON Time 450 ms (min.) / Continuous (max.)
- Accuracy $\pm 2\%$ of actual flow over rated meterhead range

E Switch

- Single pole, single throw, 2-wire, contact closure
- Contact rating 115 Vac $\pm 10\%$, 1 amp max. non-inductive
- Contact rate Scalable 0-1 pulse/minute to 0-150 pulses/minute
- Contact duration 100 ms (min.) / Continuous (max.)
- Accuracy $\pm 2\%$ of actual flow over rated meterhead range



FT193 —

Mechanical Flow Totalizer with 4-20 mA and scaled pulse output
 Accuracy: Totalizer $\pm 2\%$ of rate, 4-20 mA output $\pm 0.5\%$ full scale
 Ambient temperature limits: +30° F (-1° C) to +130° F (+55° C)
 Compatible with Sparling Models 102, 103, 132, 182, 183, 142
 Construction: Die Cast Aluminum standard Sparling coating
 Enclosure: NEMA 3R
 Electrical Rating: General Purpose

Output Specifications —

All output connections - pigtail leads through 1/2" NPT
 grommeted or potted sealed conduit connection

4-20 mA Output

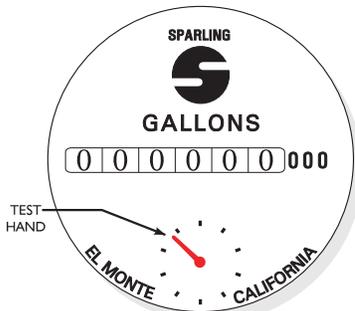
True two-wire requiring external power supply

- External power supply 18 - 30 Vdc
- Output load capability See power supply vs. output load curve
- Reverse polarity protection 35 Vdc (max.)
- Accuracy $\pm 0.5\%$ of full scale (over and above flow meter accuracy)

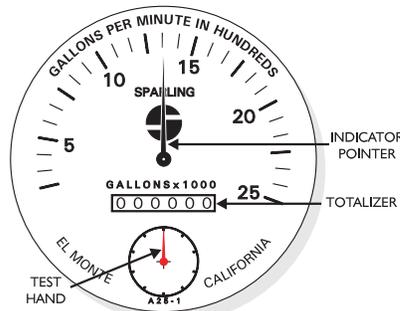
Scaled Electronic Pulse Rate

Two-wire isolated solid state switch (optocoupled)

- External power supply 10 Vdc to 30 Vdc
- Pulse amplitude 0 Vdc (off) to external supply voltage minus 3 Vdc (on)
- Output load 4 Watts max.
- Pulse on time 100 ms
- Pulse output registration Equal to mechanical totalizer least significant digit
- Accuracy $\pm 2\%$ Actual flow over rated meterhead range



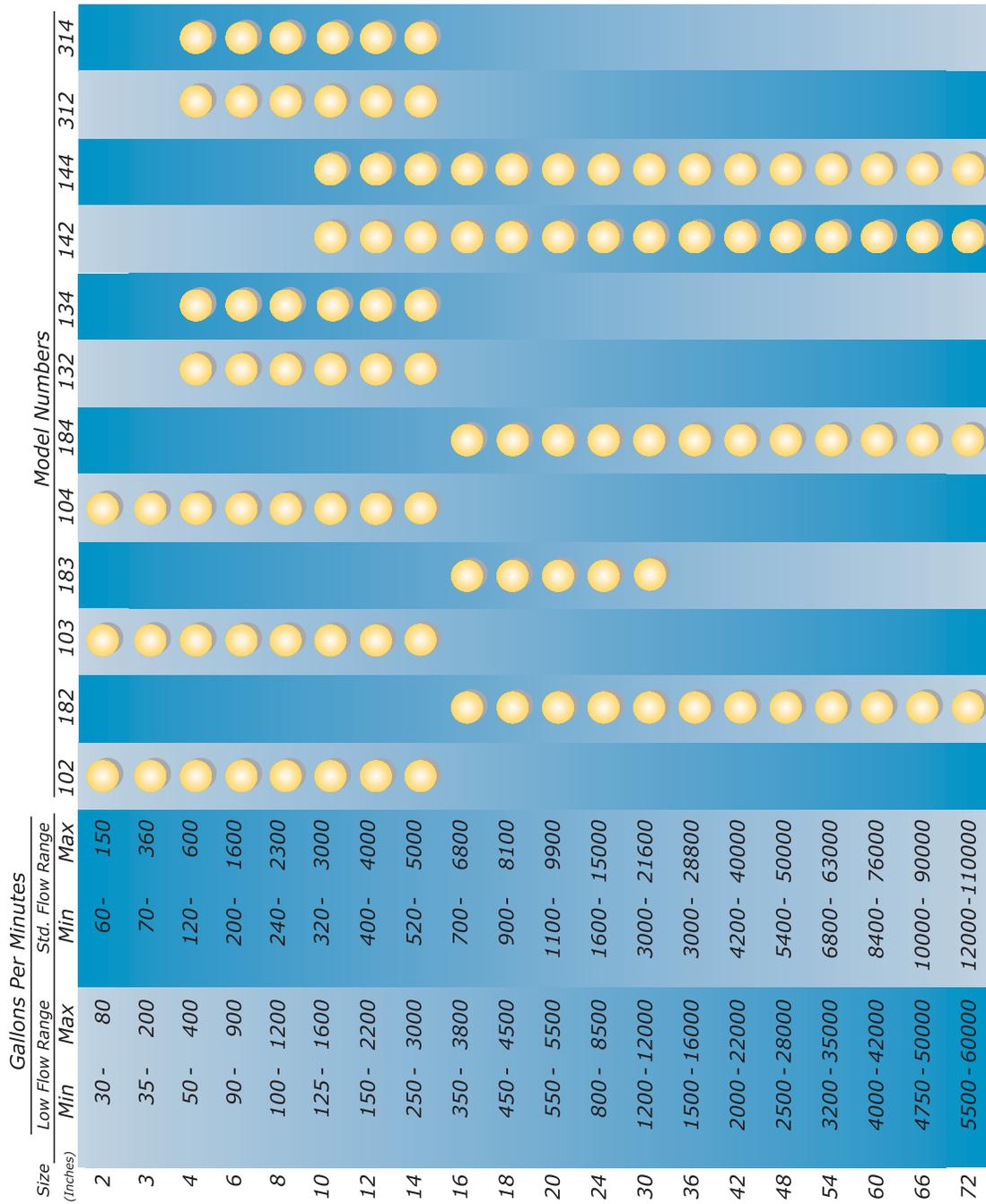
**FT191 & FT193
 Mechanical**



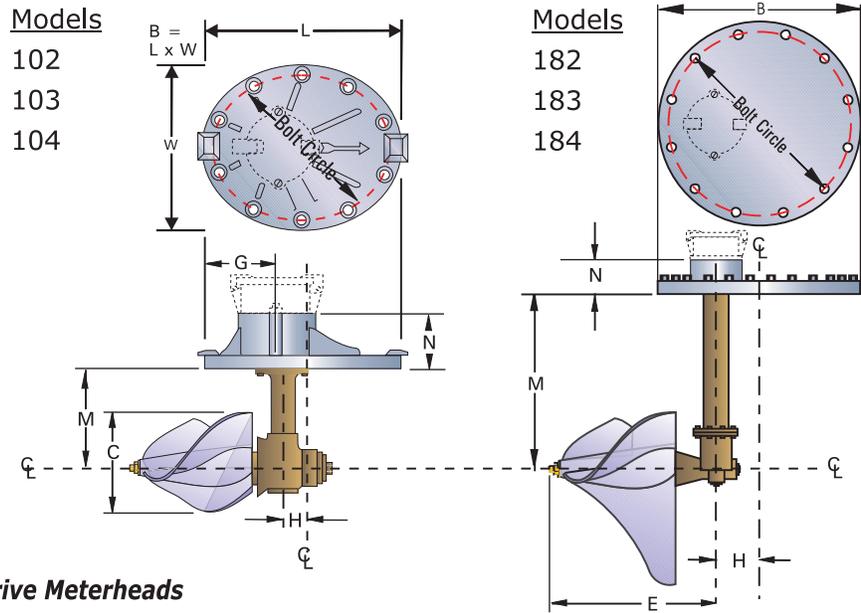
**FT190
 Mechanical**



**FT194
 Digital**

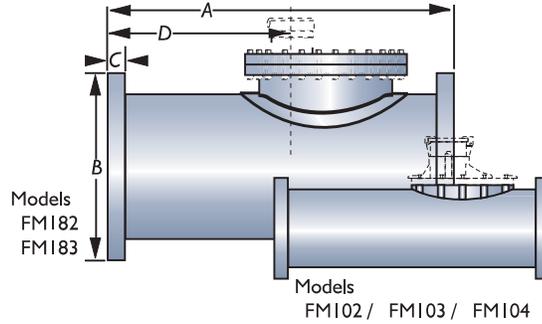
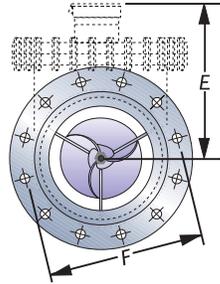


Maximum flow ranges can be safely exceeded by 50% when use is intermittent (10-15% of the time). See the Flow Range chart above. The Sparling meter utilizes specially designed propellers and bearings matched to your flow range to insure reliability and long life. **For proper configuration of meter construction, anticipated flow ranges including minimum and normal flow rates expected, should always be specified on application sheets accompanying your order.**



Direct and Magnetic Drive Meterheads

| SIZE | WT (lbs.) | | Dimensions (inches) | | | | | | | | | |
|------|-------------|-----------|---------------------|---------------|-------|-------|------|-------|---------|---------|------|--|
| | Fabr. Steel | Cast Iron | B | | C | E | G | H | M | | N | |
| | | | 150 lbs. | 250 lbs. | | | | | 150 lbs | 250 lbs | | |
| 2 | - | 20 | 8.13 x 5.13 | 8.13 x 5.13 | 2.38 | 4.00 | 3.13 | 0.50 | 1.75 | 1.75 | 2.56 | |
| 3 | - | 20 | 8.25 x 6.25 | 8.25 x 6.25 | 2.75 | 4.00 | 3.18 | 0.63 | 2.75 | 2.75 | 2.56 | |
| 4 | 20 | - | 9.50 x 6.75 | 9.50 x 6.75 | 3.50 | 6.94 | 4.13 | 0.63 | 3.44 | 3.44 | 2.56 | |
| 6 | 25 | - | 10.38 x 7.31 | 10.38 x 7.31 | 4.75 | 6.31 | 3.69 | 0.94 | 4.25 | 4.25 | 2.93 | |
| 8 | 29 | - | 11.00 x 10.63 | 11.00 x 10.63 | 7.00 | 6.31 | 5.81 | -0.32 | 5.31 | 5.31 | 2.81 | |
| 10 | 34 | - | 11.00 x 10.63 | 11.00 x 10.63 | 8.00 | 6.31 | 5.81 | -0.32 | 6.31 | 6.31 | 2.81 | |
| 12 | 36 | - | 11.00 x 10.63 | 11.00 x 10.63 | 10.00 | 6.31 | 5.81 | -0.32 | 7.31 | 7.31 | 2.81 | |
| 14 | 37 | - | 11.00 x 10.63 | 11.00 x 10.63 | 11.00 | 6.31 | 5.81 | -0.32 | 8.00 | 8.00 | 2.81 | |
| 16 | 210 | - | 23.50 dia. | 25.50 dia. | 13.00 | 12.00 | 4.56 | 4.25 | 12.25 | 12.25 | 2.88 | |
| 18 | 210 | - | 23.50 dia. | 25.50 dia. | 16.00 | 12.00 | 4.56 | 4.25 | 13.25 | 13.50 | 2.88 | |
| 20 | 215 | - | 23.50 dia. | 25.50 dia. | 16.00 | 12.00 | 4.56 | 4.25 | 14.25 | 14.50 | 2.88 | |
| 24 | 215 | - | 23.50 dia. | 25.50 dia. | 16.00 | 12.00 | 4.56 | 4.25 | 16.25 | 16.50 | 2.88 | |
| 30 | 220 | - | 23.50 dia. | 25.50 dia. | 16.00 | 12.00 | 4.56 | 4.25 | 19.25 | 19.50 | 2.88 | |
| 36 | 825 | - | 32.00 dia. | 36.00 dia. | 25.25 | 18.75 | 6.81 | 6.50 | 23.00 | 24.00 | 3.13 | |
| 42 | 835 | - | 32.00 dia. | 36.00 dia. | 25.25 | 18.75 | 6.81 | 6.50 | 26.00 | 27.00 | 3.13 | |
| 48 | 1350 | - | 38.75 dia. | 43.00 dia. | 38.38 | 20.00 | 9.81 | 9.50 | 29.50 | 30.50 | 3.25 | |
| 54 | 1360 | - | 38.75 dia. | 43.00 dia. | 38.38 | 20.00 | 9.81 | 9.50 | 32.50 | 33.50 | 3.25 | |
| 60 | 1370 | - | 38.75 dia. | 43.00 dia. | 38.38 | 20.00 | 9.81 | 9.50 | 35.50 | 36.50 | 3.25 | |
| 66 | 1380 | - | 38.75 dia. | 43.00 dia. | 38.38 | 20.00 | 9.81 | 9.50 | 38.50 | 39.50 | 3.25 | |
| 72 | 1390 | - | 38.75 dia. | 43.00 dia. | 38.38 | 20.00 | 9.81 | 9.20 | 41.50 | 42.50 | 3.25 | |

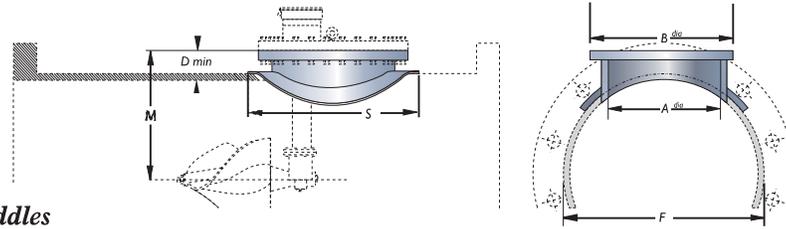


150 PSI Flanged Tubes, Flat Faced

| Size | Wt. (lbs.) | | Dimensions (inches) | | | | | | Bolt Size | # of Bolts |
|------|-------------|-----------|---------------------|--------|--------|----------|---------|--------|-----------|------------|
| | Fabr. Steel | Cast Iron | A | B | C | D | E | F | | |
| 2 | - | 20 | 13-1/4 | 6 | 5/8 | 6-1/8 | 6-1/2 | 4-3/4 | 5/8 | 4 |
| 3 | - | 25 | 12-3/4 | 7-1/2 | 3/4 | 5-7/16 | 7-7/16 | 6 | 5/8 | 4 |
| 4 | 40 | - | 18 | 9 | 15/16 | 10-3/16 | 8-1/8 | 7-1/2 | 5/8 | 8 |
| 6 | 95 | - | 22 | 11 | 11/16 | 12 | 9-1/4 | 9-1/2 | 3/4 | 8 |
| 8 | 155 | - | 24 | 13-1/2 | 11/16 | 14-1/2 | 10-5/16 | 11-3/4 | 3/4 | 8 |
| 10 | 260 | - | 26 | 16 | 11/16 | 15-1/2 | 11-5/16 | 14-1/4 | 7/8 | 12 |
| 12 | 310 | - | 28 | 19 | 13/16 | 17-1/4 | 12-5/16 | 17 | 7/8 | 12 |
| 14 | 325 | - | 32 | 21 | 15/16 | 21-1/4 | 12-5/16 | 18-3/4 | 1 | 12 |
| 16 | 410 | - | 46 | 23-1/2 | 1 | 25-7/16 | 17-3/4 | 21-1/4 | 1 | 16 |
| 18 | 480 | - | 48 | 25 | 1-1/16 | 26-15/16 | 18-3/4 | 22-3/4 | 1-1/8 | 16 |
| 20 | 540 | - | 50 | 27-1/2 | 1-1/8 | 28-7/16 | 19-3/4 | 25 | 1-1/8 | 20 |
| 24 | 695 | - | 54 | 32 | 1-1/4 | 31-15/16 | 21-3/4 | 29-1/2 | 1-1/4 | 20 |
| 30 | 860 | - | 60 | 38-3/4 | 1-3/8 | 36-15/16 | 24-3/4 | 36 | 1-1/4 | 28 |
| 36 | 1180 | - | 80 | 46 | 1-5/8 | 49-11/16 | 28-7/8 | 42-3/4 | 1-1/2 | 32 |

250 PSI Flanged Tubes, Flat Faced

| Size | Wt. (lbs.) | | Dimensions (inches) | | | | | | Bolt Size | # of Bolts |
|------|-------------|-----------|---------------------|--------|---------|----------|----------|--------|-----------|------------|
| | Fabr. Steel | Cast Iron | A | B | C | D | E | F | | |
| 2 | - | 35 | 13-1/4 | 6-1/2 | 7/8 | 6-1/8 | 6-1/2 | 5 | 5/8 | 8 |
| 3 | - | 40 | 12-3/4 | 8-1/4 | 1-1/8 | 5-7/16 | 7-7/16 | 6-5/8 | 3/4 | 8 |
| 4 | 60 | - | 20-5/8 | 10 | 1-1/4 | 13-1/8 | 8-1/4 | 7-7/8 | 3/4 | 8 |
| 6 | 130 | - | 22 | 12-1/2 | 1-7/16 | 12 | 9-1/4 | 10-5/8 | 3/4 | 12 |
| 8 | 285 | - | 24 | 15 | 1-5/8 | 14-1/2 | 10-5/16 | 13 | 7/8 | 12 |
| 10 | 290 | - | 26 | 17-1/2 | 1-7/8 | 15-1/2 | 11-5/16 | 15-1/4 | 1 | 16 |
| 12 | 360 | - | 28 | 20-1/2 | 2 | 17-1/4 | 12-5/16 | 17-3/4 | 1-1/8 | 16 |
| 14 | 420 | - | 32 | 23 | 2-1/8 | 21-1/4 | 12-15/16 | 20-1/4 | 1-1/8 | 20 |
| 16 | 530 | - | 46 | 25-1/2 | 2-1/4 | 25-7/16 | 18-9/16 | 22-1/2 | 1-1/4 | 20 |
| 18 | 600 | - | 48 | 28 | 2-3/8 | 26-15/16 | 19-9/16 | 24-3/4 | 1-1/4 | 24 |
| 20 | 680 | - | 50 | 30-1/2 | 2-1/2 | 28-7/16 | 20-9/16 | 27 | 1-1/4 | 24 |
| 24 | 825 | - | 54 | 36 | 2-3/4 | 31-15/16 | 22-9/16 | 32 | 1-1/2 | 24 |
| 30 | 990 | - | 60 | 43 | 2-15/16 | 36-15/16 | 25-9/16 | 39-1/4 | 1-3/4 | 28 |
| 36 | 1480 | - | 80 | 50 | 3-3/16 | 49-11/16 | 29-3/4 | 46 | 2 | 32 |



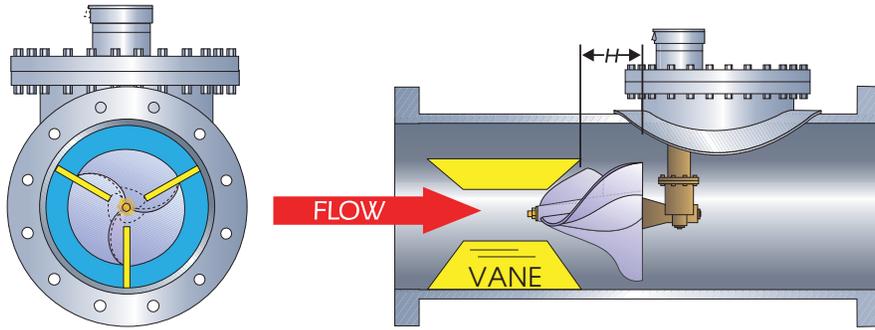
150 PSI Welding Saddles

| Size | Wt. (lbs.) | | Dimensions (inches) | | | | | Bolt Circle | Bolt Size | # of Bolts | |
|------|-------------|--|---------------------|--------|-------|--------|--------|-------------|-----------|------------|----|
| | Fabr. Steel | | A | B | D | F* | M | | | | S |
| 6 | 20 | | 7-5/8 | 9-1/4 | N/A | 6-5/8 | 4-1/4 | 9-1/4 | N/A | 7/16 | 10 |
| 8 | 30 | | 8-1/4 | 11-3/4 | N/A | 8-5/8 | 5-5/16 | 11-3/4 | N/A | 7/16 | 10 |
| 10 | 35 | | 8-1/4 | 11-3/4 | N/A | 10-3/4 | 6-5/16 | 11-3/4 | N/A | 7/16 | 10 |
| 12 | 55 | | 8-1/4 | 11-3/4 | N/A | 12-3/4 | 7-5/16 | 11-3/4 | N/A | 7/16 | 10 |
| 14 | 70 | | 8-1/4 | 11-3/4 | N/A | 14 | 8 | 11-3/4 | N/A | 7/16 | 10 |
| 16 | 145 | | 16 | 23-1/2 | 4 | 16 | 12-1/4 | N/A | 21-1/4 | 1 | 16 |
| 18 | 150 | | 16 | 23-1/2 | 4 | 18 | 13-1/2 | 26 | 21-1/4 | 1 | 16 |
| 20 | 155 | | 16 | 23-1/2 | 4 | 20 | 14-1/2 | 26 | 21-1/4 | 1 | 16 |
| 24 | 165 | | 16 | 23-1/2 | 4-1/2 | 24 | 16-1/4 | 26 | 21-1/4 | 1 | 16 |
| 30 | 185 | | 16 | 23-1/2 | 4-1/2 | 30 | 19-1/4 | 26 | 21-1/4 | 1 | 16 |
| 36 | 275 | | 24 | 32 | 5 | 36 | 23 | 36-1/2 | 29-1/2 | 1-1/4 | 20 |
| 42 | 295 | | 24 | 32 | 5 | 42 | 26 | 36-1/2 | 29-1/2 | 1-1/4 | 20 |
| 48 | 550 | | 30 | 38-3/4 | 5-1/2 | 48 | 49-1/2 | 46-3/4 | 36 | 1-1/4 | 28 |
| 54 | 560 | | 30 | 38-3/4 | 5-1/2 | 54 | 32-1/2 | 46-3/4 | 36 | 1-1/4 | 28 |
| 60 | 580 | | 30 | 38-3/4 | 5-1/2 | 60 | 35-1/2 | 46-3/4 | 36 | 1-1/4 | 28 |
| 66 | 600 | | 30 | 38-3/4 | 5-1/2 | 66 | 38-1/2 | 46-3/4 | 36 | 1-1/4 | 28 |
| 72 | 625 | | 30 | 38-3/4 | 5-1/2 | 72 | 41 | 46-3/4 | 36 | 1-1/4 | 28 |

250 PSI Welding Saddles

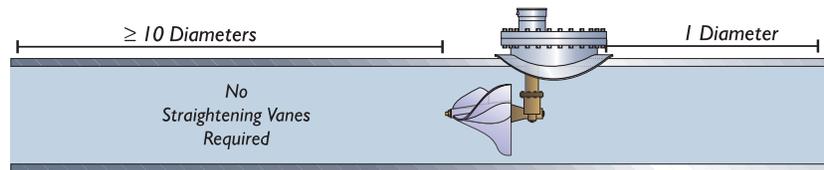
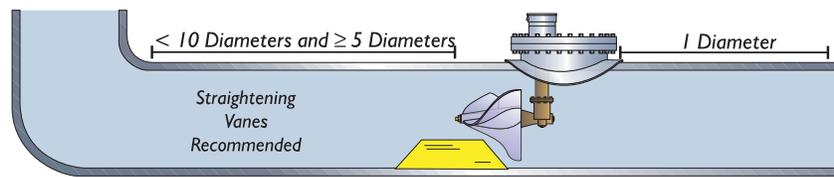
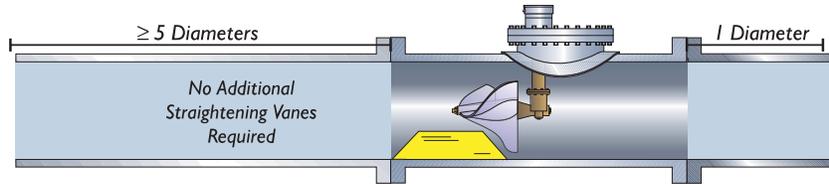
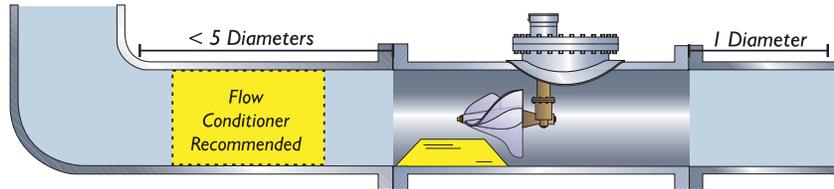
| Size | Wt. (lbs.) | | Dimensions (inches) | | | | | Bolt Circle | Bolt Size | # of Bolts | |
|------|-------------|--|---------------------|--------|-------|--------|--------|-------------|-----------|------------|----|
| | Fabr. Steel | | A | B | D | F* | M | | | | S |
| 6 | 20 | | 7-5/8 | 9-1/4 | N/A | 6-5/8 | 4-1/4 | 9-1/4 | N/A | 7/16 | 10 |
| 8 | 30 | | 8-1/4 | 11-3/4 | N/A | 8-5/8 | 5-5/16 | 11-3/4 | N/A | 7/16 | 10 |
| 10 | 35 | | 8-1/4 | 11-3/4 | N/A | 10-3/4 | 6-5/16 | 11-3/4 | N/A | 7/16 | 10 |
| 12 | 55 | | 8-1/4 | 11-3/4 | N/A | 12-3/4 | 7-5/16 | 11-3/4 | N/A | 7/16 | 10 |
| 14 | 70 | | 8-1/4 | 11-3/4 | N/A | 14 | 8 | 11-3/4 | N/A | 7/16 | 10 |
| 16 | 145 | | 16 | 25-1/2 | 4-1/4 | 16 | 12-1/4 | N/A | 22-1/2 | 1-1/4 | 20 |
| 18 | 150 | | 16 | 25-1/2 | 4-1/4 | 18 | 13-1/2 | 26 | 22-1/2 | 1-1/4 | 20 |
| 20 | 155 | | 16 | 25-1/2 | 4-1/4 | 20 | 14-1/2 | 26 | 22-1/2 | 1-1/4 | 20 |
| 24 | 165 | | 16 | 25-1/2 | 4-1/4 | 24 | 16-1/4 | 26 | 22-1/2 | 1-1/4 | 20 |
| 30 | 185 | | 16 | 25-1/2 | 4-1/4 | 30 | 19-1/4 | 26 | 22-1/2 | 1-1/4 | 20 |
| 36 | 275 | | 24 | 36 | 5 | 36 | 23 | 36-1/2 | 32 | 1-1/2 | 24 |
| 42 | 295 | | 24 | 36 | 5 | 42 | 26 | 36-1/2 | 32 | 1-1/2 | 24 |
| 48 | 550 | | 30 | 43 | 5-1/2 | 48 | 29-1/2 | 46-3/4 | 39-1/4 | 1-3/4 | 28 |
| 54 | 560 | | 30 | 43 | 5-1/2 | 54 | 32-1/2 | 46-3/4 | 39-1/4 | 1-3/4 | 28 |
| 60 | 580 | | 30 | 43 | 5-1/2 | 60 | 35-1/2 | 46-3/4 | 39-1/4 | 1-3/4 | 28 |
| 66 | 600 | | 30 | 43 | 5-1/2 | 66 | 38-1/2 | 46-3/4 | 39-1/4 | 1-3/4 | 28 |
| 72 | 625 | | 30 | 43 | 5-1/2 | 72 | 41-1/2 | 46-3/4 | 39-1/4 | 1-3/4 | 28 |

Straightening Vanes



| | | | | | | | | | | | | | | | | | |
|-----------------------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Pipe Dia. (inches) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| H | 4 | 4 | 4 | 4 | 4 | 8 | 8 | 8 | 8 | 8 | 12 | 12 | 15 | 15 | 15 | 15 | 15 |

H = Straightening vane mounting distance from pipe opening.

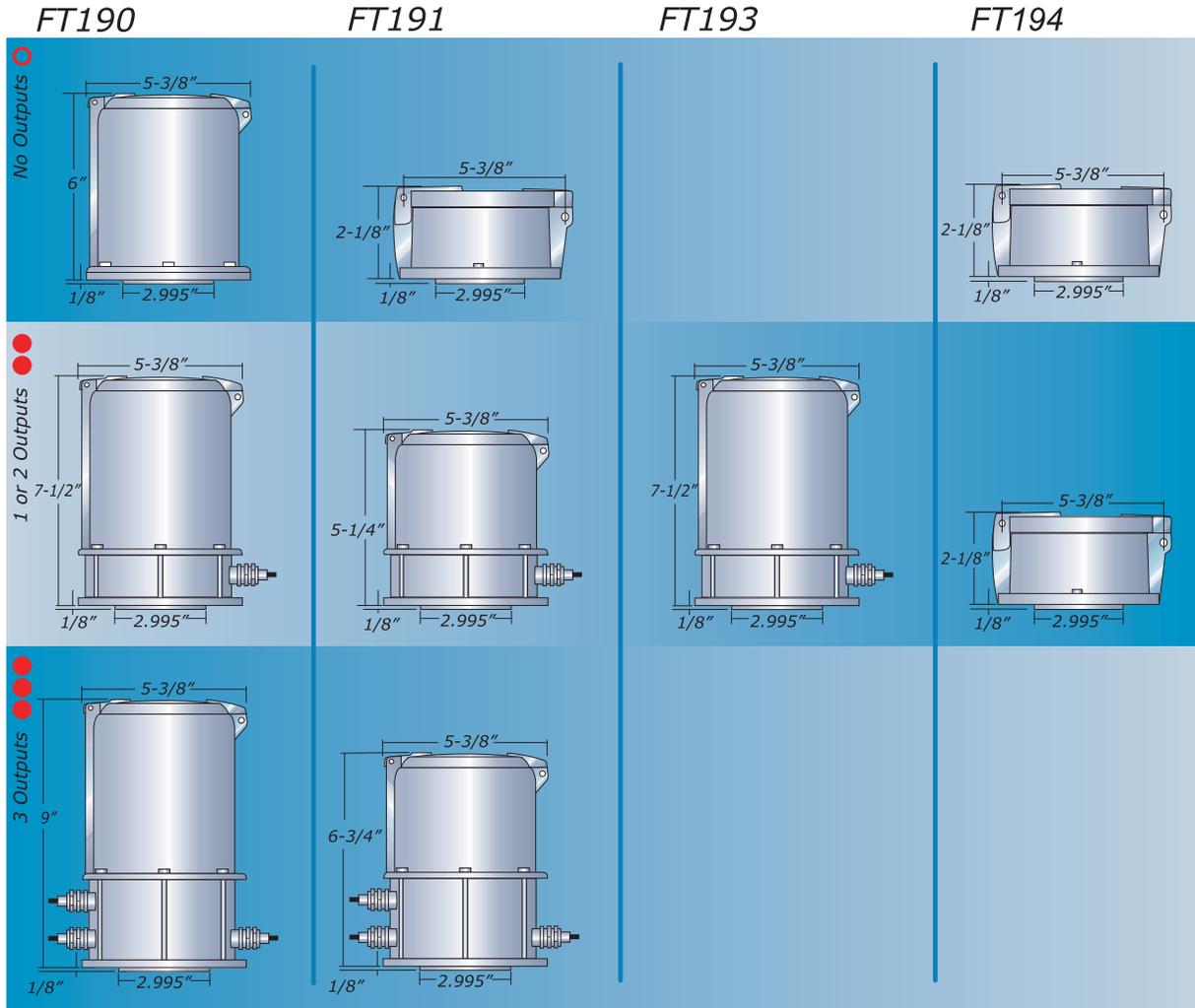


Installation —

Meters must be installed in full flowing suction or discharge lines. Avoid valves, fittings or obstructions immediately upstream of the meter which may cause jetting or uneven flow profiles. It is recommended that a minimum of five straight pipe diameters be maintained upstream and one diameter downstream of the meter.

Dimensions

Indicators/Totalizers

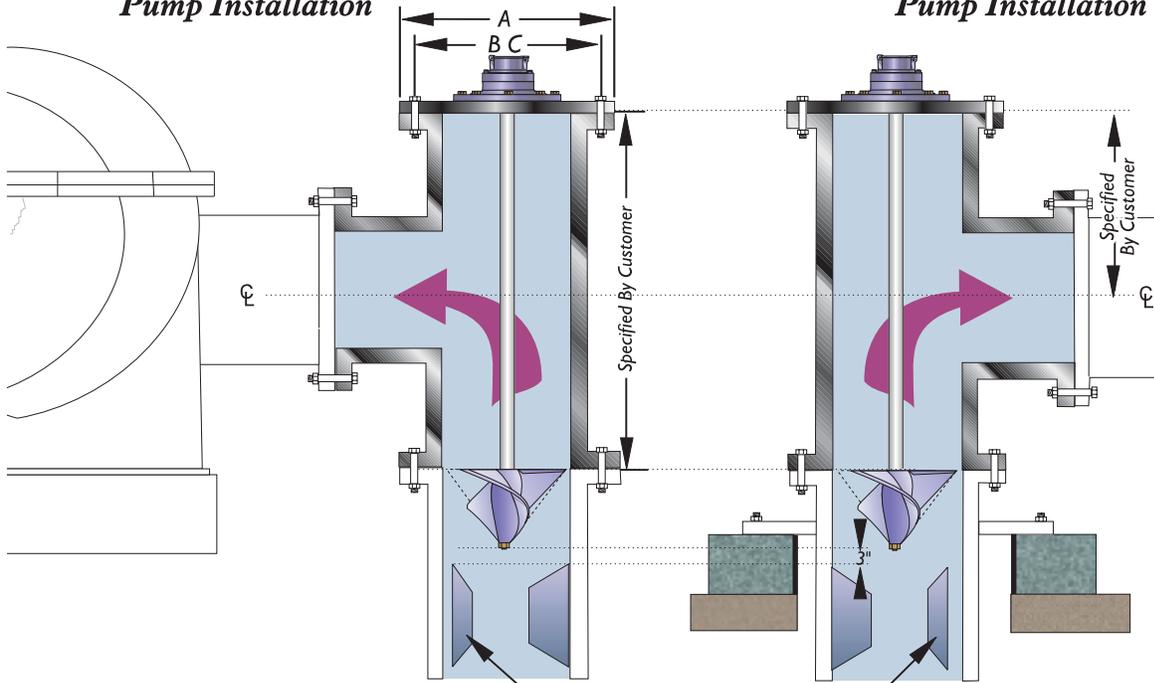


Indicator/Totalizer Compatibility

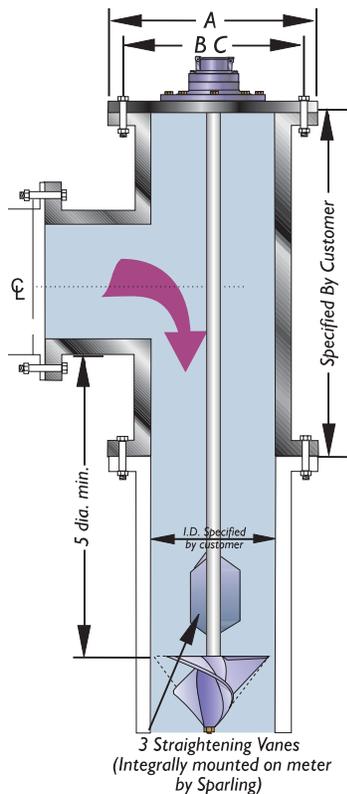
| Model | 102 | 182 | 103 | 183 | 104 | 184 | 132 | 134 | 142 | 144 | 162 | 312 | 314 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| FT190 | ● | ● | ● | ● | | | ● | | ● | | | | |
| FT191 | ● | ● | ● | ● | | | ● | | ● | | ● | ● | |
| FT193 | ● | ● | ● | ● | | | ● | | ● | | | | |
| FT194 | | | | | ● | ● | | ● | | ● | | | ● |

Typical Centrifugal Pump Installation

Typical Submersible Pump Installation



3 Straightening Vanes
OPTIONAL
(Supplied separately with meter
for installation by customer)



150 PSI

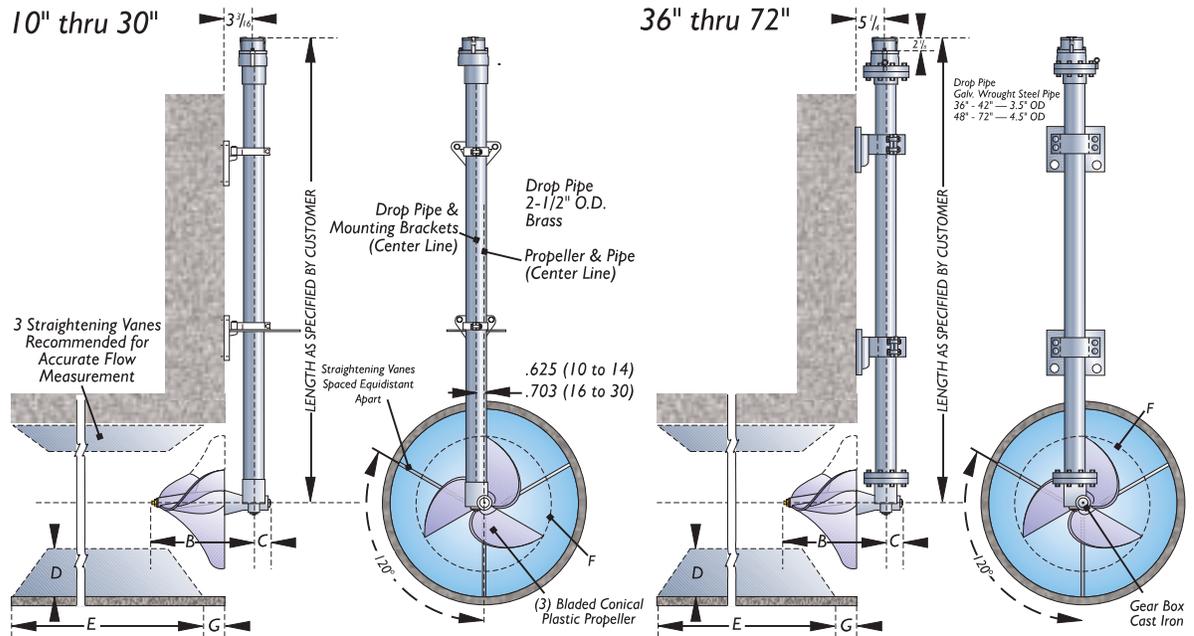
| Size | Wt. (lbs.) | A | BC | Bolt Size | # of Bolts | Drop Pipe Length (in.) Up-Flow | Dn-Flow |
|------|------------|--------|--------|-----------|------------|-----------------------------------|---------|
| 4 | 75 | 9 | 7-1/2 | 5/8 | 8 | 18 | 28.5 |
| 6 | 105 | 11 | 9-1/2 | 3/4 | 8 | 21 | 41 |
| 8 | 155 | 13-1/2 | 11-3/4 | 3/4 | 8 | 23 | 53 |
| 10 | 165 | 16 | 14-1/4 | 7/8 | 12 | 27 | 66 |
| 12 | 180 | 19 | 17 | 7/8 | 12 | 29 | 78 |
| 14 | 225 | 21 | 18-3/4 | 1 | 12 | 34 | 91 |

250 PSI

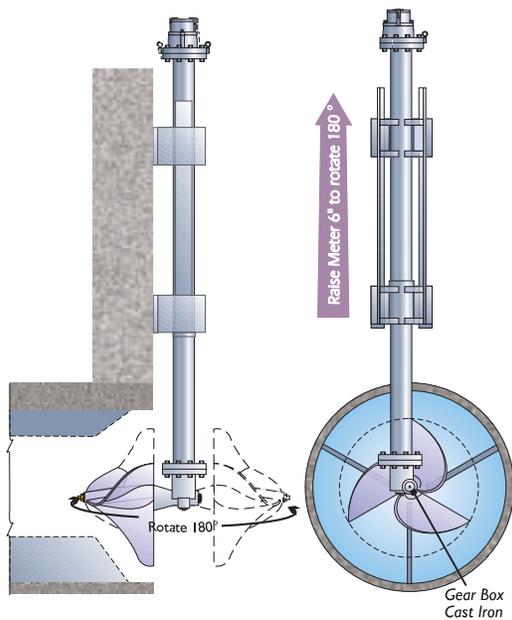
| Size | Wt. (lbs.) | A | BC | Bolt Size | # of Bolts | Drop Pipe Length (in.) Up-Flow | Dn-Flow |
|------|------------|--------|--------|-----------|------------|-----------------------------------|---------|
| 4 | 80 | 10 | 7-7/8 | 3/4 | 8 | 18 | 28.5 |
| 6 | 135 | 12-1/2 | 10-5/8 | 3/4 | 12 | 21 | 41 |
| 8 | 200 | 15 | 13 | 7/8 | 12 | 23 | 53 |
| 10 | 240 | 17-1/2 | 15-1/4 | 1 | 16 | 27 | 66 |
| 12 | 280 | 20-1/2 | 17-3/4 | 1-1/8 | 16 | 29 | 78 |
| 14 | 450 | 23 | 20-1/4 | 1-1/2 | 20 | 34 | 91 |

Dimensions

Waterworks Intake Models FM 142/144



Optional Revolving Type Bracket Mounting

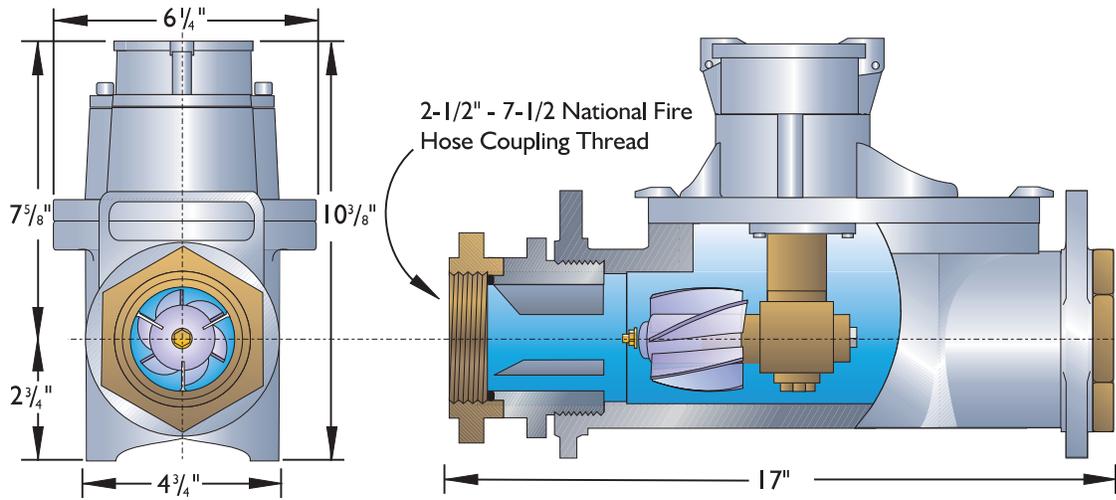


| Size | Wt. (lbs.)* | Dimensions (inches) | | | | |
|------|-------------|---------------------|-------|--------|--------|---|
| | | B | C | E | H | G |
| 10 | 90 | 9-1/2 | 2-1/8 | 16-1/2 | 8 | 4 |
| 12 | 90 | 9-1/2 | 2-1/8 | 16-1/2 | 10 | 3 |
| 14 | 90 | 9-1/2 | 2-1/8 | 28 | 11 | 2 |
| 16 | 105 | 12 | 2-5/8 | 28 | 13 | 5 |
| 18 | 105 | 12 | 2-5/8 | 30 | 16 | 3 |
| 20 | 105 | 12 | 2-5/8 | 33 | 16 | 2 |
| 24 | 105 | 12 | 2-5/8 | 36 | 16 | 1 |
| 30 | 115 | 12 | 2-5/8 | 45 | 16 | 1 |
| 36 | 350 | 18-1/8 | 4-3/8 | 54 | 25-1/4 | 4 |
| 42 | 350 | 18-1/8 | 4-3/8 | 60 | 25-1/4 | 4 |
| 48 | 580 | 20 | 4-1/2 | 72 | 38-3/8 | 4 |
| 54 | 580 | 20 | 4-1/2 | 80 | 38-3/8 | 4 |
| 60 | 580 | 20 | 4-1/2 | 90 | 38-3/8 | 4 |
| 66 | 580 | 20 | 4-1/2 | 96 | 38-3/8 | 4 |
| 72 | 580 | 20 | 4-1/2 | 108 | 38-3/8 | 4 |

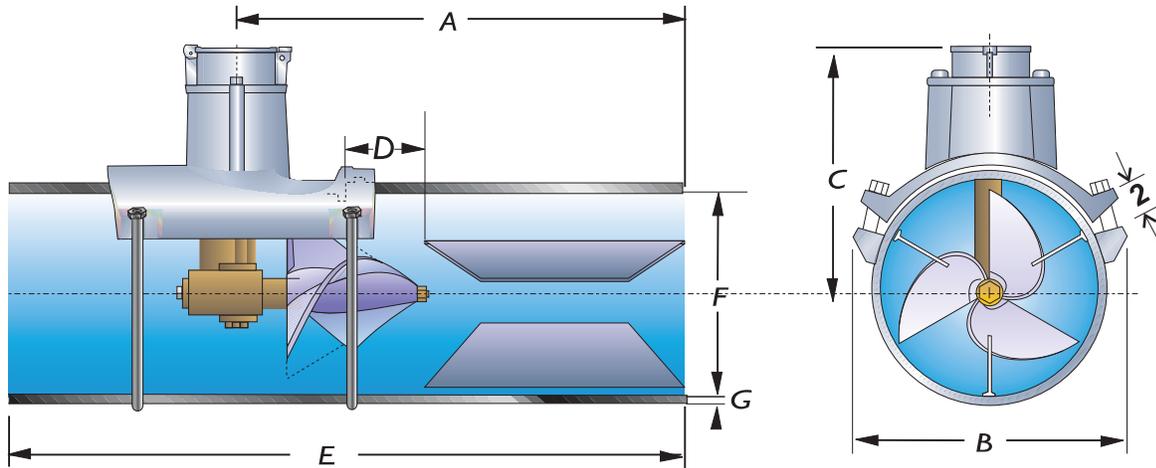
*Weights are for 5-foot drop pipe.

Dimensions

Fire Hydrant Model FM 162



Low Pressure Irrigation Meter Models 312/314



| Size | Wt. (lbs.) | | Dimensions (inches) | | | | | | | Mounting | | | |
|------|------------|--------|---------------------|-------|-------|------|------|-------|-----|----------|-----------|-------------|----------------------|
| | Meterhead | w/Tube | A | B | C | D | E | F | G | U-bolts | SS Straps | Anchor Bars | Plain End Steel Tube |
| 4 | 20 | 40 | 9.19 | 8.00 | 7.63 | N/A | 16.0 | 4.03 | .24 | ● | ● | | ● |
| 6 | 25 | 45 | 14.44 | 9.00 | 7.88 | 2.75 | 22.0 | 6.36 | .13 | ● | ● | | ● |
| 8 | 30 | 65 | 15.94 | 10.50 | 9.44 | 3.00 | 24.0 | 8.36 | .13 | ● | ● | | ● |
| 10 | 35 | 80 | 19.94 | 11.50 | 9.56 | 3.25 | 30.0 | 10.38 | .19 | | ● | ● | ● |
| 12 | 40 | 125 | 23.94 | 12.38 | 11.50 | 3.25 | 36.0 | 12.38 | .19 | | ● | ● | ● |
| 14 | 30 | 140 | 28.00 | 17.63 | 11.13 | 4.88 | 42.0 | 13.63 | .19 | ● | ● | | ● |

How to Order

Models 102/182, 103/183

Table 1 – Model #

| | | | |
|-------|------------|-------|------------|
| FM102 | 2" to 14" | FM103 | 2" to 14" |
| FM182 | 16" to 72" | FM183 | 16" to 30" |

Table 2 – Size

02 = 2", 03 = 3", 14 = 14"

Table 3 – Pressure Rating

| | |
|---|---------|
| 1 | 150 psi |
| 2 | 250 psi |

Table 4 – "M" Dimension

| | |
|---|--|
| 1 | Standard (all sizes) |
| 6 | Special (available for sizes 16"-72" only) |

Table 5 – Flow Range (see pg. 20)

| | |
|---|----------------|
| 1 | Low Range |
| 2 | Standard Range |

Table 6 – Readouts

| | |
|---|--|
| 0 | None (order separately) See pages 6,7,18,19 for options |
|---|--|

Table 7 – Accessories

| | |
|---|--------------------|
| 0 | None |
| 1 | Register Extension |

FM1 Specify:
"M" Dimension (if special)
High velocity-constant flow rate

Model 104/184

Table 1 – Model #

| | |
|-------|------------|
| FM104 | 2" to 14" |
| FM184 | 16" to 72" |

Table 2 – Size

02 = 2", 03 = 3", 14 = 14"

Table 3 – Pressure Rating

| | |
|---|---------|
| 1 | 150 psi |
| 2 | 250 psi |

Table 4 – "M" Dimension

| | |
|---|----------------------|
| 1 | Standard (all sizes) |
|---|----------------------|

Table 5 – Flow Range (see pg. 20)

| | |
|---|----------------|
| 1 | Low Range |
| 2 | Standard Range |

Table 6 – Readouts

| | |
|---|---------------------------------------|
| 0 | None (order separately) See page 6 |
|---|---------------------------------------|

Table 7 – Accessories

| | |
|---|--------------------|
| 0 | None |
| 1 | Register Extension |

FM1 Specify:
High velocity-constant flow rate

Mainline Meter Tubes

Table 1 – Model #

| | |
|-----|----------------------------|
| MT1 | Basic Meter Tube 2" to 36" |
|-----|----------------------------|

Table 2 – Size

02 = 2", 03 = 3", 16 = 16"

Table 3 – End Connections

| | |
|---|---|
| 1 | 125 AWWA (150 psi) |
| 2 | 250 AWWA (250 psi) |
| 4 | Plain End (6" - 36" standard material only) |

Table 4 – Flow Direction

| | |
|---|--------------|
| 1 | Forward Flow |
|---|--------------|

Table 5 – Tube Coating

| | |
|---|------------------|
| 1 | Standard Coating |
|---|------------------|

MT1

Mainline Meter Saddles

Table 1 – Model #

| | |
|-----|--------------------------------------|
| MS1 | Basic Meter Welding Saddle 6" to 72" |
|-----|--------------------------------------|

Table 2 – Size

06 = 6", 08 = 8", 16 = 16"

Table 3 – Pressure Rating

| | |
|---|---------|
| 1 | 150 psi |
| 2 | 250 psi |

Table 4 – "M" Dimension

| | |
|---|----------|
| 0 | Standard |
|---|----------|

Table 5 – Accessories

| | |
|---|------------------|
| 0 | Standard Coating |
| 1 | Welding Vanes |
| 2 | Bolting Vanes |

Specify:
Pipe I.D.
Pipe O.D.

MS1

How to Order

VertiFlo Models 132/134

Table 1 – Model

| | |
|-------|------------------------|
| FM132 | 4" to 14" (Direct) |
| FM134 | 4" to 14" (Electronic) |

Table 2 – Size

04 = 4", 06 = 6", 14 = 14"

Table 3 – Head Connections

| | |
|---|--------------------------------|
| 1 | 125 lbs. AWWA Flange (150 psi) |
| 2 | 250 lbs. AWWA Flange (300 psi) |

Table 4 – Construction

| | |
|---|------------------------------|
| 4 | Up-flow (vanes not included) |
| 5 | Down-flow (vanes included) |

Table 5 – Flow Range (see pg. 20)

| | |
|---|----------------|
| 1 | Low Range |
| 2 | Standard Range |

Table 6 – Readouts

| | |
|---|--|
| 0 | None (order separately) See pgs. 6, 7, 18, 19 for options |
|---|--|

Table 7 – Accessories

| | |
|---|----------------------|
| 0 | None |
| 1 | Welding Vanes |
| 2 | Bolting Vanes |
| 5 | Additional Drop Pipe |
| 6 | 1 & 5 above |
| 7 | 2 & 5 above |

Fire Hydrant Meters Model 162

Table 1 – Model

| | |
|-------|---|
| FM162 | 3" Fire Hydrant Meter w/tube & register |
|-------|---|

Table 2 – Size

03 = 3"

Table 3 – End Connections

| | |
|---|--|
| 5 | National Pipe Thread (3" less couplings) |
| 7 | 2½-7½ Thread-National Fire Hose |

Table 4 – Construction

| | |
|---|----------|
| 1 | Standard |
|---|----------|

Table 5 – Flow Range

| | |
|---|------------------------|
| 1 | Low Range 35-200 gpm |
| 2 | Std. Range 100-400 gpm |

Table 6 – Readouts

| | |
|---|-----------------------|
| 1 | Standard Registration |
|---|-----------------------|

Table 6 – Accessories

| | |
|---|----------|
| 0 | None |
| 1 | Strainer |

Waterworks Intake Meters Models 142/144

Table 1 – Model

| | |
|-------|-------------------------|
| FM142 | 10" to 72" (Direct) |
| FM144 | 10" to 72" (Electronic) |

Table 2 – Size

10 = 10", 16 = 16", 72 = 72"

Table 3 – Mounting

| | |
|---|--|
| 6 | Standard Wall Brackets |
| 7 | Guide rail & revolving bracket (36" - 72") |

Table 4 – Construction

| | |
|---|----------|
| 1 | Standard |
|---|----------|

Table 5 – Flow Range (see pg. 20)

| | |
|---|----------------|
| 1 | Low Range |
| 2 | Standard Range |

Table 6 – Readouts

| | |
|---|--|
| 0 | None (order separately) See pgs. 6, 7, 18, 19 for options |
|---|--|

Table 7 – Accessories

| | |
|---|----------------------|
| 0 | None |
| 1 | Welding Vanes |
| 2 | Bolting Vanes |
| 5 | Additional Drop Pipe |
| 6 | 1 & 5 above |
| 7 | 2 & 5 above |

Irrigation Meters Models 312/314

Table 1 – Model

| | |
|-------|--------------------------------------|
| FM312 | Low Pressure Irrigation Meter 4"-14" |
| FM314 | w/mounting hardware & gasket |

Table 2 – Size

04 = 4", 14 = 14"

Table 3 – Configuration

| | |
|---|---|
| 0 | Meterhead only w/U-Bolts (4", 6", 8" & 14") |
| 1 | Meterhead only w/SS straps (4" - 14") |
| 2 | Meterhead only w/Anchor Bars (10" & 12") |
| 3 | With Plain End Steel Tube |

Table 4 – Readout

| | |
|---|----------------------------------|
| 0 | None |
| 1 | Standard Register (FT191) |
| 2 | Rate Indicator Totalizer (FT190) |
| 4 | Rate Indicator (FT194 for FM314) |

Table 5 – Flow Range (See pg.20)

| | |
|---|----------------|
| 1 | Low Range |
| 2 | Standard Range |

Table 6 – Accessories

| | |
|---|---------------|
| 0 | None |
| 1 | Bolting Vanes |

How to Order

Indicators/Totalizers/Transmitters Series 190

Table 1 – Model

FT190 Mechanical Flow Totalizer & Indicator
FT191 Mechanical Flow Totalizer
FT193 Mechanical Flow Totalizer
with 4-20mA and Scaled Pulse Output

Table 2 – Outputs

000 No Outputs (FT190 & FT191 only)
B00 One "B" switch (190/191)
BB0 Two "B" switches (190/191)
E00 One "E" switch (190/191)
EE0 Two "E" switches (190/191)
EEE Three "E" switches (190/191)
BE0 One "B" and one "E" switch (190/191)
BEE One "B" and two "E" switches (190/191)
P00 One "P" switch (190/191)
PB0 One "P" and one "B" switch (190/191)
PE0 One "P" and one "E" switch (190/191)
111 4-20 mA and Scaled Pulse Rate (FT193 only)

Table 3 – Mounting

2 For mounting on meterhead on same order
3 Replacement for existing meterheads

Specify:

FT191- Registration from page 32)
FT190- Registration & Full Scale Indication
From pages 33 & 34)
FT193- Customers' Full Scale
Registration from page 32)

Digital Indicator/Totalizer FT 194

Table 1 – Model

FT194 Digital Rate/Flow Totalizer

Table 2 – Outputs

0 Display only, no Outputs
1 4-20mA & Pulse Output

Table 3 – Mounting

1 Integral
2 Remote - Wall or Pipe Mount

Specify:

•Registration
(from page 32)
•Full Scale

Options for FT194

•Calibrator
•Programmer
•Mounting Hardware (pipe)

Standard Registration for FT191, FT193 & FT194

| Nom. Size | Cubic Feet | U.S. Gallons | Imperial Gallons | Acre Feet | Cubic Meters | Liters | Acre Inches |
|-----------|------------|--------------|------------------|-----------|--------------|----------|-------------|
| 2 | 1.0 | 10.0 | 10.0 | 0.00001 | 0.01 | 10.0 | 0.001 |
| 3 | 1.0 | 10.0 | 10.0 | 0.0001 | 0.1 | 100.0 | 0.001 |
| 4 | 10.0 | 100.0 | 100.0 | 0.0001 | 0.1 | 100.0 | 0.001 |
| 5 | 10.0 | 100.0 | 100.0 | 0.0001 | 0.1 | 100.0 | 0.001 |
| 6 | 10.0 | 100.0 | 100.0 | 0.001 | 1.0 | 100.0 | 0.001 |
| 8 | 10.0 | 100.0 | 100.0 | 0.001 | 1.0 | 1000.0 | 0.01 |
| 10 | 100.0 | 100.0 | 100.0 | 0.001 | 1.0 | 1000.0 | 0.01 |
| 12 | 100.0 | 1000.0 | 1000.0 | 0.001 | 1.0 | 1000.0 | 0.01 |
| 14 | 100.0 | 1000.0 | 1000.0 | 0.001 | 1.0 | 1000.0 | 0.01 |
| 16 | 100.0 | 1000.0 | 1000.0 | 0.01 | 10.0 | 10000.0 | 0.1 |
| 18 | 100.0 | 1000.0 | 1000.0 | 0.01 | 10.0 | 10000.0 | 0.1 |
| 20 | 100.0 | 1000.0 | 1000.0 | 0.01 | 10.0 | 10000.0 | 0.1 |
| 24 | 100.0 | 1000.0 | 1000.0 | 0.01 | 10.0 | 10000.0 | 0.1 |
| 30 | 100.0 | 1000.0 | 1000.0 | 0.01 | 10.0 | 10000.0 | 0.1 |
| 36 | 1000.0 | 10000.0 | 10000.0 | 0.01 | 10.0 | 10000.0 | 0.1 |
| 42 | 1000.0 | 10000.0 | 10000.0 | 0.01 | 10.0 | 10000.0 | 0.1 |
| 48 | 1000.0 | 10000.0 | 10000.0 | 0.1 | 100.0 | 100000.0 | 0.1 |
| 54 | 1000.0 | 10000.0 | 10000.0 | 0.1 | 100.0 | 100000.0 | 0.1 |
| 60 | 1000.0 | 10000.0 | 10000.0 | 0.1 | 100.0 | 100000.0 | 0.1 |
| 66 | 1000.0 | 10000.0 | 10000.0 | 0.1 | 100.0 | 100000.0 | 0.1 |
| 72 | 1000.0 | 10000.0 | 10000.0 | 0.1 | 100.0 | 100000.0 | 0.1 |

Standard Indicator Scale and Registration for FT190

| Size | Full Scale Indication | Registration | Size | Full Scale Indication | Registration | Size | Full Scale Indication | Registration | Size | Full Scale Indication | Registration |
|-----------|-----------------------|----------------|---------------|-----------------------|----------------|----------------|-----------------------|----------------|----------------|-----------------------|----------------|
| 14" | 200 LPS | 10 CU. MTRS. | 18" | 5000 GPM | 1000 GALLONS | 24" Cnt. | 17000 GPM | 10000 GALLONS | 42" Cnt. | 25000 IGPM | 10000 IMP GAL. |
| | 200 LPS | .01 MEGA LTR. | | 5000 IGPM | 1000 IMP GAL. | | 17000 IGPM | 10000 IMP GAL. | | 35000 GPM | 10000 GALLONS |
| | 3500 GPM | 1000 GALLONS | | 5000 GPM | 100 CF | | 18.0 CFS | 100 CF | | 35000 IGPM | 10000 IMP GAL. |
| | 3500 IGPM | 1000 IMP GAL. | | 6000 GPM | 100 CF | | 18.0 CFS | 1000 CF | | 45000 GPM | 10000 GALLONS |
| | 3500 GPM | 100 CF | | 14.0 CFS | 1000 CF | | 18.0 CFS | .01 AF | | 45000 IGPM | 10000 IMP GAL. |
| | 3500 GPM | 1000 CF | | 7.5 MGD | 1000 GALLONS | | 20.0 CFS | 1000 CF | | 50.0 CFS | 1000 CF |
| | 3500 GPM | .01 AF | | 300 LPS | 10 CU. MTRS. | | 20.0 CFS | .01 AF | | 50.0 CFS | .01 AF |
| | 4500 GPM | 1000 GALLONS | | 10000 GPM | 10000 GALLONS | | 25.0 CFS | 1000 CF | | 75.0 CFS | 0.1 AF |
| | 4500 IGPM | 1000 IMP GAL. | | 10000 IGPM | 10000 IMP GAL. | | 25.0 CFS | .01 AF | | 100 CFS | 1000 CF |
| | 4500 GPM | .01 AF | | 10000 GPM | .01 AF | | 30.0 CFS | 1000 CF | | 40.0 MGD | 10000 GALLONS |
| | 4500 GPM | 100 CF | 10000 IGPM | 10000 IMP GAL. | 34.0 CFS | .01 AF | 60.0 MGD | 10000 GALLONS | | | |
| | 10.0 CFS | 100 CF | 10000 GPM | 100 CF | 15.0 MGD | 1000 GALLONS | 75.0 MGD | 10000 GALLONS | | | |
| | 10.0 CFS | .01 AF | 18.0 CFS | 100 CF | 15.0 MGD | 10000 GALLONS | 2000 LPS | 100 CU. MTRS. | | | |
| | 7.5 MGD | 1000 GALLONS | 18.0 CFS | 1000 CF | 20.0 MGD | 10000 GALLONS | 5000 LPS | 100 CU. MTRS. | | | |
| | 250 LPS | 10000 LITERS | 18.0 CFS | .01 AF | 30.0 MGD | 10000 GALLONS | 48" | 35000 GPM | 10000 GALLONS | | |
| | 250 LPS | 10 CU. MTRS. | 20.0 CFS | 1000 CF | 750 LPS | 10 CU. MTRS. | | 35000 IGPM | 10000 IMP GAL. | | |
| | 5000 GPM | 1000 GALLONS | 20.0 CFS | .01 AF | 1000 LPS | 100 CU. MTRS. | | 45000 GPM | 10000 GALLONS | | |
| | 5000 IGPM | 1000 IMP GAL. | 25.0 CFS | 1000 CF | 1500 LPS | 100 KILOLTRS. | | 45000 IGPM | 10000 IMP GAL. | | |
| | 5000 GPM | 100 CF | 25.0 CFS | .01 AF | 30" | 15000 GPM | | 10000 GALLONS | 75.0 CFS | 0.1 AF | |
| | 14.0 CFS | 100 CF | 15.0 MGD | 1000 GALLONS | | 15000 IGPM | | 10000 IMP GAL. | 100 CFS | 1000 CF | |
| 300 LPS | 10 CU. MTRS. | 15.0 MGD | 10000 GALLONS | 17000 GPM | | 10000 GALLONS | | 60.0 MGD | 10000 GALLONS | | |
| 16" | 4500 GPM | 1000 GALLONS | 750 LPS | 10 CU. MTRS. | | 17000 IGPM | | 10000 IMP GAL. | 75.0 MGD | 10000 GALLONS | |
| | 4500 IGPM | 1000 IMP GAL. | 20" | 6000 GPM | | 1000 GALLONS | | 25000 GPM | 10000 GALLONS | 2000 LPS | 100 CU. MTRS. |
| | 4500 GPM | .01 AF | | 6000 IGPM | | 1000 IMP GAL. | | 15000 IGPM | 10000 IMP GAL. | 5000 LPS | 100 CU. MTRS. |
| | 10.0 CFS | 100 CF | | 6000 GPM | | 10000 GALLONS | 30.0 CFS | 1000 CF | 54" | 40000 GPM | 10000 GALLONS |
| | 10.0 CFS | .01 AF | | 7500 GPM | | 10000 GALLONS | 34.0 CFS | .01 AF | | 40000 IGPM | 10000 GALLONS |
| | 7.5 MGD | 1000 GALLONS | | 10000 GPM | | 10000 GALLONS | 50.0 CFS | 1000 CF | | 75 CFS | 1000 CF |
| | 250 LPS | 10000 LITERS | | 10000 IGPM | | 10000 GALLONS | 50.0 CFS | .01 AF | | 75 CFS | 0.1 AF |
| | 250 LPS | 10 CU. MTRS. | | 10000 GPM | .01 AF | 20.0 MGD | 10000 GALLONS | 75 MGD | | 10000 GALLONS | |
| | 5000 GPM | 1000 GALLONS | | 10000 IGPM | 10000 GALLONS | 30.0 MGD | 10000 GALLONS | 3000 LPS | | 100 CU. MTRS. | |
| | 5000 IGPM | 1000 IMP GAL. | | 10000 GPM | 100 CF | 40.0 MGD | 10000 GALLONS | 60" | | 45000 GPM | 10000 GALLONS |
| 5000 GPM | 100 CF | 15.0 CFS | | 100 F | 1000 LPS | 100 CU. MTRS. | 45000 IGPM | | | 10000 IMP GAL. | |
| 14.0 CFS | 100 CF | 15.0 CFS | .01 AF | 1500 LPS | 100 KILOLTRS. | 60000 GPM | 10000 GALLONS | | | | |
| 300 LPS | 10 CU. MTRS. | 18.0 CFS | 100 CF | 2000 LPS | 100 CU. MTRS. | 60000 IGPM | 10000 IMP GAL. | | | | |
| 6000 GPM | 1000 GALLONS | 18.0 CFS | 1000 CF | 36" | 17000 GPM | 10000 GALLONS | 75000 GPM | | 10000 GALLONS | | |
| 6000 IGPM | 1000 IMP GAL. | 18.0 CFS | .01 AF | | 17000 IGPM | 10000 IMP GAL. | 75000 IGPM | | 10000 IMP GAL. | | |
| 6000 GPM | 10000 GALLONS | 20.0 CFS | 1000 CF | | 25000 GPM | 10000 GALLONS | 100 CFS | | 1000 CF | | |
| 6000 GPM | 100 CF | 20.0 CFS | .01 AF | | 25000 IGPM | 10000 IMP GAL. | 150 CFS | | 10000 CF | | |
| 7500 GPM | 10000 GALLONS | 25.0 CFS | 1000 CF | | 35000 GPM | 10000 GALLONS | 150 CFS | | .01 AF | | |
| 15.0 CFS | 100 CF | 25.0 CFS | .01 AF | | 35000 IGPM | 10000 IMP GAL. | 75.0 MGD | | 10000 GALLONS | | |
| 15.0 CFS | .01 AF | 10.0 MGD | 1000 GALLONS | | 50.0 CFS | 1000 CF | 100 MGD | 10000 GALLONS | | | |
| 10.0 MGD | 1000 GALLONS | 10.0 MGD | 10000 GALLONS | | 50.0 CFS | .01 AF | 5000 LPS | 100 CU. MTRS. | | | |
| 10.0 MGD | 10000 GALLONS | 15.0 MGD | 1000 GALLONS | | 75.0 CFS | .01 AF | 66" & 72" | 60000 GPM | 10000 GALLONS | | |
| 350 LPS | 10 CU. MTRS. | 15.0 MGD | 10000 GALLONS | | 30.0 MGD | 10000 GALLONS | | 60000 IGPM | 10000 IMP GAL. | | |
| 400 LPS | 10 KILOLTRS. | 350 LPS | 10 CU. MTRS. | 40.0 MGD | 10000 GALLONS | 75000 GPM | | 10000 GALLONS | | | |
| 18" | 10000 GPM | 10000 GALLONS | 400 LPS | 10 KILOLTRS. | 60.0 MGD | 10000 GALLONS | | 75000 IGPM | 10000 IMP GAL. | | |
| | 10000 IGPM | 10000 IMP GAL. | 750 LPS | 10 CU. MTRS. | 42" | 25000 GPM | | 10000 GALLONS | | | |
| | 10000 GPM | .01 AF | 24" | 10000 GPM | | 10000 GALLONS | | 1500 LPS | 100 KILOLTRS. | | |
| | 10000 GPM | 100 CF | | 10000 IGPM | | 10000 IMP GAL. | | 2000 LPS | 100 CU. MTRS. | | |
| | 15000 GPM | 10000 GAL | | 10000 GPM | | .01 AF | | 30" | 15000 GPM | 10000 GALLONS | |
| | 15000 IGPM | 10000 IMP GAL. | | 10000 GPM | | 100 CF | | | 15000 IGPM | 10000 IMP GAL. | |
| | | | | 15000 GPM | | 10000 GALLONS | | | 17000 GPM | 10000 GALLONS | |
| | | | | 15000 IGPM | | 10000 IMP GAL. | 17000 IGPM | | 10000 IMP GAL. | | |
| | | | | | | | 25000 GPM | | 10000 GALLONS | | |
| | | | | | | | 25000 IGPM | | 10000 IMP GAL. | | |
| | | | | | | 30.0 CFS | 1000 CF | | | | |
| | | | | | 34.0 CFS | .01 AF | | | | | |
| | | | | 15.0 MGD | 1000 GALLONS | | | | | | |
| | | | | 15.0 MGD | 10000 GALLONS | | | | | | |





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