

Product Data Sheet  
PDS-104/184/194-II  
2021-01-09

## MainLine Electronic Propeller Meter

### FT194-II Digital Indicator



#### Description

The MainLine electronic propeller meter was designed to provide accurate and reliable flow measurement where main line service is required in municipal and industrial areas.

The Model FM104/184 features the FT194-II 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.

The FM104/184 Series II is available with an optional 4-20mA output for remote totalizations using either the Sparling Model 787, 710 or the customer's remote totalizer with 24VDC power supply. Registration can be changed in the field with the Sparling Model 705 programmer.

#### Certified Accuracy

Accuracy is within 2% of actual flow for the specified meter range. This accuracy is guaranteed by certified wet calibration at three test points in Sparling's NIST traceable primary flow laboratory. Each meter is tested at low flow, mid-range, and high flow. A test certificate is provided with each meter.

#### Principle of Operation

Sparling propeller meters utilize the simple principle of the screw propeller to register the total flow, much as an odometer registers auto mileage. The rotation of the propeller affords a basis for indicating and recording gallons per minute or other rates.

#### Applications

MainLine meters are ideal for irrigation, water well production, pumping stations and golf course and park water management.

#### Features

- Standard  $\pm 2\%$  Accuracy
- Sizes available from 2" - 120"
- Environmental Rating NEMA 4X
- Accurately measures over flow range: 10:1
- 8 digit totalizer/indicator
- Display "sleep mode" conserves battery life while continuously totalizing
- Temporary backup power with 3.6VDC battery
- User selectable photocell light sensitivity from low to bright

#### Optional Features

- Remote Mounted Totalizer - up to 50ft from meterhead
- Open collector unsealed pulse output with 12-24VDC loop power.
- 4-20mA Output

#### Materials

- Cover Plate: Cast Iron
- Propeller: Molded Polyethylene
- Gearbox: Brass up to 30" and Cast Iron above 30".
- Bearings: SST or Rubber (High Speed)
- Coating: Epoxy based paint

## 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 non-symmetrical flow profiles. It is recommended that a minimum of five straight pipe diameters be maintained upstream and one diameter downstream of the flow meter.

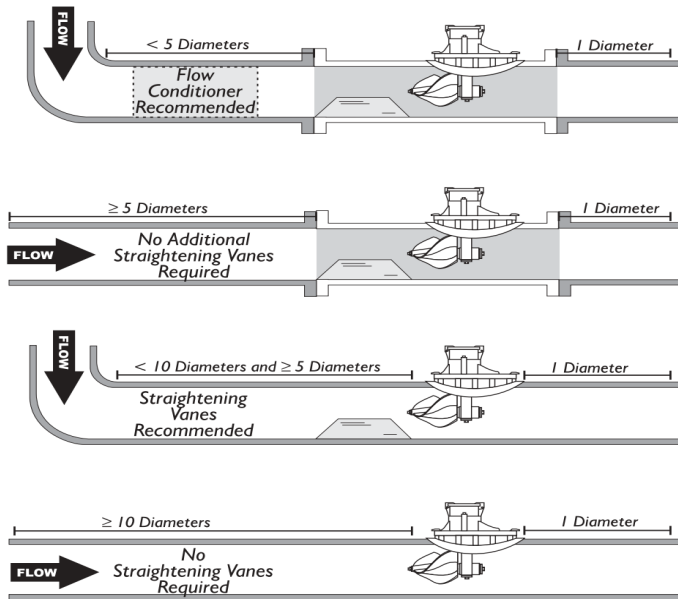


Figure 2  
Installation Considerations

## Temperature Limits

Liquid working temperatures should not exceed 100°F. Propellers may be stored in air temperatures up to 175°F.

## Flow Ranges

These meters measure accurately over a wide flow range of 10:1 or greater. The maximum flow ranges can be safely exceeded by 50% when used intermittently. Flow rates are provided in the table under specifications for each of the sizes.

Anticipated flow ranges and minimum and normal flow rates should always be specified on application sheets accompanying your order.

## Easy To Repair

The FM104/184 is easily repaired with common hand tools. No special tools are required.

## Outputs

Optional outputs include Scaled Pulse Outputs (Open Collector) and 4-20mA.

## FT194-II Digital Rate/Flow Totalizer

The FT194-II is a digital flow rate and totalizer with an easy to read LCD display which features simultaneous rate and totalizer indication. The FT194-II is standard on the FM104/184 but may also be retrofit to existing Sparling meters see Figure 4.

A non-volatile memory 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. After a user programmed time interval the display reverts to an energy saving "sleep mode" while continuing to track total flow. To reactivate the display, simply close and open the cover. The 3.6VDC lithium battery has 3 years average life. A low battery indication will display before battery requires replacement. Low battery display will not affect totalization accuracy.

## Remote Mounted Transmitter

For remote indication of rate and total the FT194-II display/transmitter may be mounted up to 50ft from the meter head. This is ideal for situations where it is inconvenient to have the indicator mounted integrally to the meterhead, such as a pit or frequently flooded area. See Figure 3

The remote totalizer is furnished ready to bolt to a wall or customer supplied plate. Optional U-bolts can be obtained for pipe mounting. 15ft of cable is supplied standard with the remote unit. Additional cable may be purchased when the order is placed, up to 50ft.

The optional 4-20mA and Pulse Output require connection to a customer supplied 24VDC power supply

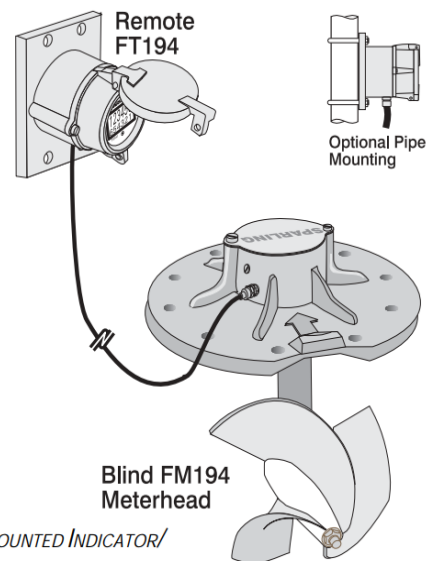


FIGURE 3  
REMOTE MOUNTED INDICATOR/  
TOTALIZER

You may also use Series 710 Local and Remote Indicator/Totalizer

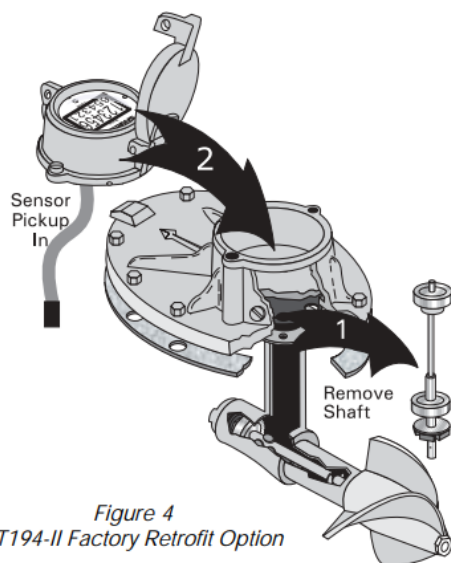
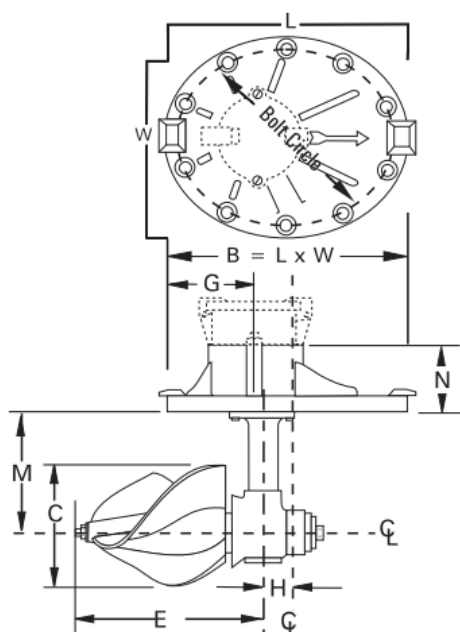


Figure 4  
FT194-II Factory Retrofit Option

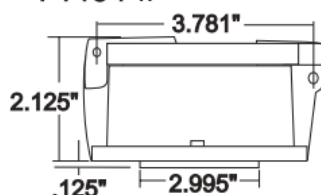
FT194-II Retrofit Available for your Existing Sparling Meters  
Sparling's factory technicians can upgrade your existing Sparling propeller meters to the new FT194-II indicator/totalizer. You'll have all the benefits of the Model 104/184 Propeller Meter: fewer moving parts, digital readout and longer 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.

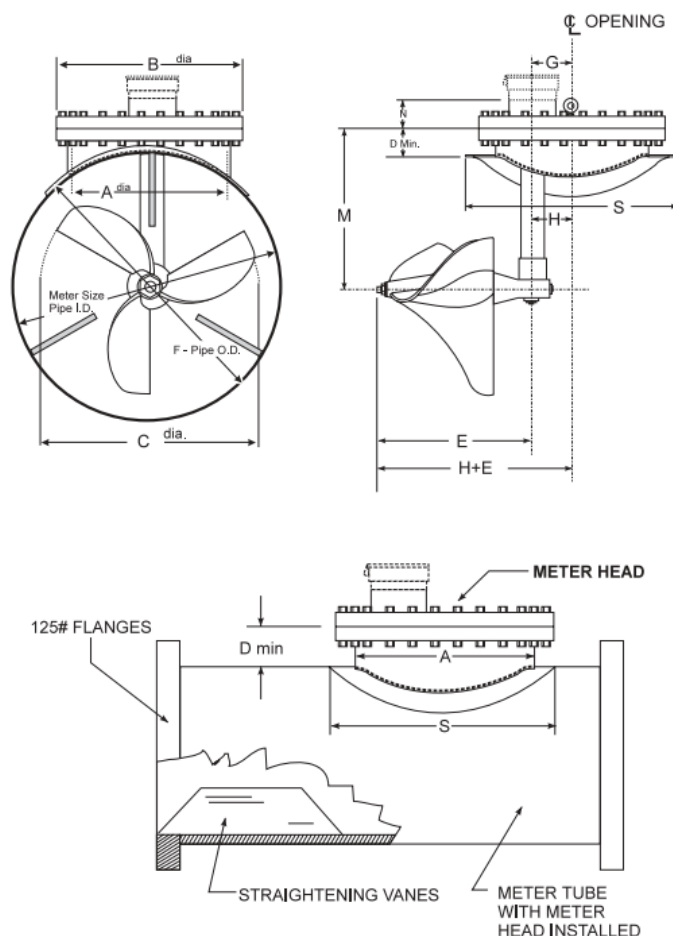
FM104



FT194-II



FM184



For detailed metering tube dimensions please visit our website:  
[www.sparlinginstruments.com](http://www.sparlinginstruments.com) and download [PDS-110](#) Propeller  
Meter Tubes & Saddles.

## Flow Rates & Dimensions

Size (in)	Fabr. Steel	Cast Iron	A	B		C	D	E	G	H	M		N	S	Flow Range (GPM)		Size of Bolts	# of Bolts
				150#	250#						150#	250#			Low	Standard		
2.00	*	20.0	*	8.13 x 5.13	8.13 x 5.13	2.38	*	4.00	3.13	0.50	1.75	1.75	2.56	*	30.0 - 80.0	60.0 - 150	*	*
3.00	*	20.0	*	8.25 x 6.25	8.25 x 6.25	2.75	*	4.00	3.18	0.63	2.75	2.75	2.56	*	35.0 - 200	70.0 - 360	*	*
4.00	20.0	*	*	9.50 x 6.75	9.50 x 6.75	3.50	*	6.94	4.13	0.63	3.44	3.44	2.56	*	50.0 - 400	120 - 600	*	*
6.00	25.0	*	*	10.4 x 7.31	10.4 x 7.31	4.75	*	6.31	3.69	0.94	4.25	4.25	2.93	*	90.0 - 900	200 - 1600	*	*
8.00	29.0	*	*	11.0 x 10.6	11.0 x 10.6	7.00	*	6.31	5.81	-0.32	5.31	5.31	2.81	*	100 - 1200	240 - 2300	*	*
10.0	34.0	*	*	11.0 x 10.6	11.0 x 10.6	8.00	*	6.31	5.81	-0.32	6.31	6.31	2.81	*	125 - 1600	320 - 3000	*	*
12.0	36.0	*	*	11.0 x 10.6	11.0 x 10.6	10.0	*	6.31	5.81	-0.32	7.31	7.31	2.81	*	150 - 2200	400 - 4000	*	*
14.0	37.0	*	*	11.0 x 10.6	11.0 x 10.6	11.0	*	6.31	5.81	-0.32	8.00	8.00	2.81	*	250 - 3000	520 - 5000	*	*
16.0	210	*	16.0	23.5	25.5	13.0	4.00	12.0	4.56	4.3	12.3	12.3	2.88	*	350 - 3800	700 - 6800	1.00	16.0
18.0	210	*	16.0	23.5	25.5	16.0	4.50	12.0	4.56	4.3	13.3	13.5	2.88	26.0	450 - 4500	900 - 8100	1.00	16.0
20.0	215	*	16.0	23.5	25.5	16.0	4.00	12.0	4.56	4.3	14.3	14.5	2.88	26.0	550 - 5500	1100 - 9900	1.00	16.0
24.0	215	*	16.0	23.5	25.5	16.0	4.50	12.0	4.56	4.3	16.3	16.5	2.88	26.0	800 - 8500	1600 - 15000	1.00	16.0
30.0	220	*	16.0	23.5	25.5	16.0	4.50	12.0	4.56	4.3	19.3	19.5	2.88	26.0	1200 - 12000	3000 - 21600	1.00	16.0
36.0	825	*	24.0	32.0	36.0	25.3	5.00	18.8	6.81	6.5	23.0	24.0	3.13	36.5	1500 - 16000	300 - 28800	1.25	20.0
42.0	835	*	24.0	32.0	36.0	25.3	5.00	18.8	6.81	6.5	26.0	27.0	3.13	36.5	200 - 22000	4200 - 40000	1.25	20.0
48.0	1350	*	30.0	38.8	43.0	25.3	5.50	20.0	9.81	9.5	29.5	30.5	3.25	46.8	2500 - 28000	5400 - 50000	1.25	28.0
54.0	1360	*	30.0	38.8	43.0	25.3	5.50	20.0	9.81	9.5	32.5	33.5	3.25	46.8	3200 - 35000	6800 - 63000	1.25	28.0
60.0	1370	*	30.0	38.8	43.0	25.3	5.50	20.0	9.81	9.5	35.5	36.5	3.25	46.8	4000 - 42000	8400 - 76000	1.25	28.0
66.0	1380	*	30.0	38.8	43.0	25.3	5.50	20.0	9.81	9.5	38.5	39.5	3.25	46.8	4750 - 50000	10000 - 90000	1.25	28.0
72.0	1390	*	30.0	38.8	43.0	25.3	5.50	20.0	9.81	9.2	41.5	42.5	3.25	46.8	5500 - 60000	12000 - 110000	1.25	28.0

The maximum flow ranges can be safely exceeded by 50% when used intermittently. Your Sparling meter utilizes specially designed propellers and bearings matched to your flow range to insure long life.

Anticipated flow ranges and minimum and normal flow rates should always be specified on application sheets accompanying your order.

**Table 2 - Standard Registration For FT194**

Nom. Size	Cubic Feet	U.S. Gallons	Imperial Gallons	Acre Feet	Cubic Meters	Liters
2.0	1.0	10.0	10.0	0.00001	0.01	10.0
3.0	1.0	10.0	10.0	0.0001	0.1	100.0
4.0	10.0	100.0	100.0	0.0001	0.1	100.0
5.0	10.0	100.0	100.0	0.0001	0.1	100.0
6.0	10.0	100.0	100.0	0.001	1.0	100.0
8.0	10.0	100.0	100.0	0.001	1.0	1000.0
10.0	100.0	100.0	100.0	0.001	1.0	1000.0
12.0	100.0	1000.0	1000.0	0.001	1.0	1000.0
14.0	100.0	1000.0	1000.0	0.001	1.0	1000.0
16.0	100.0	1000.0	1000.0	0.01	10.0	10000.0
18.0	100.0	1000.0	1000.0	0.01	10.0	10000.0
20.0	100.0	1000.0	1000.0	0.01	10.0	10000.0
24.0	100.0	1000.0	1000.0	0.01	10.0	10000.0
30.0	1000.0	10000.0	10000.0	0.01	10.0	10000.0
36.0	1000.0	10000.0	10000.0	0.01	10.0	10000.0
42.0	1000.0	10000.0	10000.0	0.01	10.0	10000.0
48.0	1000.0	10000.0	10000.0	0.1	100.0	100000.0
54.0	1000.0	10000.0	10000.0	0.1	100.0	100000.0
60.0	1000.0	10000.0	10000.0	0.1	100.0	100000.0
66.0	1000.0	10000.0	10000.0	0.1	100.0	100000.0
72.0	1000.0	10000.0	10000.0	0.1	100.0	100000.0

**How to Order a FM104/184**

Table 1: Base Model Number						
FM104 - MainLine Electronic Propeller Meter (2-14")						
FM184 - MainLine Electronic Propeller Meter (16-120")						
Table 2: Size						
02 - 2"	OH - 2.5"	03 - 3"	04 - 4"	06 - 6"	08 - 8"	
10 - 10"	12 - 12"	14 - 14"	16 - 16"	18 - 18"	20 - 20"	
24 - 24"	30 - 30"	36 - 36"	42 - 42"	48 - 48"	54 - 54"	
60 - 60"	66 - 66"	etc.				
Table 3: Pressure Rating						
1 - 150 psi						
2 - 250 psi						
Table 4: "M" Dimension						
1 - Standard						
6 - Special						
Table 5: Flow Range						
1 - Low Range						
2 - Standard Range						
Table 6: Readouts						
0 - None						
Table 7: Accessories						
0 - None						
1 - Register Extension						
Model	Size	Pressure	M Dim	Flow	Read	Access.
FM104	02	1	1	1	0	0

**How to Order a FT194-II**

Table 1: Base Model Number		
FT194-II - FT194-II Digital Rate/Flow Totalizer		
Table 2: Outputs		
0 - Display Only, No Outputs		
1 - 4-20mA and Pulse Output		
Table 3: Mounting		
1 - Integral Mount		
2 - Remote Mount - Wall or Pipe Mount		
3 - Remote Mount - Forward & Reverse Totalization		
Table 4: Options		
Calibrator		
Programmer		
Mounting Hardware (Pipe)		
Model	Outputs	Mount
FT194-II	0	1

**Available Accessories:**

- ☐ Model 705 Programmer
- ☐ Model 704 Calibrator
- ☐ Register Extension

**Important:** This meter requires a metering tube or saddle to complete installation.