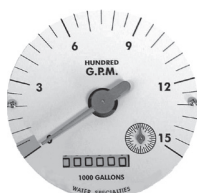


Water Specialties Flow Meter Specification Sheet

Totalizer



Indicator-Totalizer



FlowCom Register



FlowConnect Wireless Telemetry



Water Specialties Model TP1 and TP2 150 psi and 300 psi Replacement Meter Head Assembly Sizes 2" to 72"

Description

MODEL TP1 AND TP2 METER HEAD ASSEMBLIES are manufactured to the highest standards. Materials used on all meters and flow ranges for the low velocity meter meet or exceed AWWA standard C704-02. The bolt-on design permits use in a wide range of existing applications with up to 150 psi or 300 psi working pressure. It is necessary, upon ordering, to furnish the meter size, model number and serial number of the meter it is replacing.

Register Options

TOTALIZER is O-ring sealed and magnetically coupled with the driving mechanism, and features a six digit totalizer with a full 3" diameter, 100 division, center sweep dial that permits extremely accurate readings for timing purpose in determining flow rates. The totalizer dial can be furnished in gallons, cubic feet, acre feet, or any standard liquid measuring units. The bonnet, with pad-lock hasp, can be positioned in four different directions for the easiest possible reading when the meters are mounted in unusual positions.

Description	1
Register Options	1
Features	2
Registers and Totalizers	3
TP1 / TP2 Specifications	5
Dimensions	6
Part Numbers, Digital Registers	7
Part Numbers, Mechanical Registers	9
FlowCom Digital Register Specifications	10
FlowCom Part Number Matrix	12
FlowConnect Specifications	13
FlowConnect Dimensions	15



INDICATOR-TOTALIZER is mechanically driven by the meter mechanism and features a full 4" diameter, 250 degree sweep dial with a six digit, straight reading type totalizer and sweep test hand. The indicator drive mechanism is temperature compensated so the indicator will be accurate at all points on the dial when operated between 32° and 140° F. The indicator dial can be furnished in GPM, CFS, MGD or any standard liquid measuring units with choice of standard totalizer measuring units. The bonnet, with padlock hasp, is O-ring sealed to the meter head.

FLOWCOM DIGITAL REGISTER displays a flowmeter's flowrate and volumetric total. Available are four optional outputs: 4-20mA loop, open collector, optically isolated, and contact closure. Unique units of measurement for rate, total, 4-20mA, and pulse outputs. The FlowCom can be fitted to any new or existing McCrometer propeller flowmeter.

Features

PROPELLER is magnetically coupled with the drive mechanism through the sealed oil filled gearbox. This completely eliminates water entering the meter assembly, as well as the need for any packing gland. The propeller is a conical shaped three bladed propeller, injection molded of thermoplastic material resistant to normal water corrosion and deformity due to high flow velocities.

BEARING in propeller is a water lubricated ceramic sleeve and spindle bearing system with a ceramic/stainless steel spindle. Dual ceramic thrust bearings, standard on all meters, handle flows in both forward and reverse directions. The bearing design promotes extended periods of maintenance free propeller operation. Bearings within the sealed meter mechanism are shielded precision stainless steel bearings and are factory lubricated for the life of the meter.

CHANGE GEARS may be easily exchanged in the field when changing the dial, or when recalibrating for different pipe sizes. It is not necessary to remove pressure from the line for these changes.

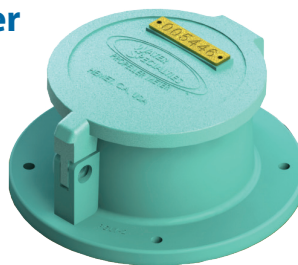
O-RING SEALS are used at the meter head and all points where seals are required, making the meter mechanism completely immune to any of the corrosive effects of atmospheric moisture or the liquids measured by the meter assembly.

Registers and Totalizers

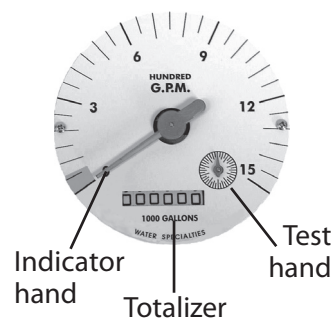
Mechanical Register and Indicator-Totalizer

The instantaneous flow rate indicator is standard and available in gallons per minute, cubic feet per second, liters per second and other units.

The register housing protects both the register and cable drive system from moisture while allowing clear reading of the flow rate indicator and totalizer.



Standard register



Indicator-totalizer

Digital Totalizer

The optional FlowCom digital register displays a flowmeter's flowrate and volumetric total. Available are four optional outputs: 4-20mA loop, open collector, optically isolated, and contact closure. Unique units of measurement for rate, total, 4-20mA, and pulse outputs. The FlowCom can be fitted to any new or existing McCrometer propeller flowmeter.



FlowCom register

Wireless Telemetry

The optional FlowConnect is designed specifically for wireless telemetry via either satellite or cellular data service. Manual meter reading is never required. It uses either the mechanical register or the digital register (both shown above).

You can determine how often readings are made and transmitted to the cloud database, which you can view on a PC or on a cell phone. The viewing utility provides data tools that can analyze flow rate, consumption, and possible anomalies in an irrigation system.



FlowConnect



INSTALLATION

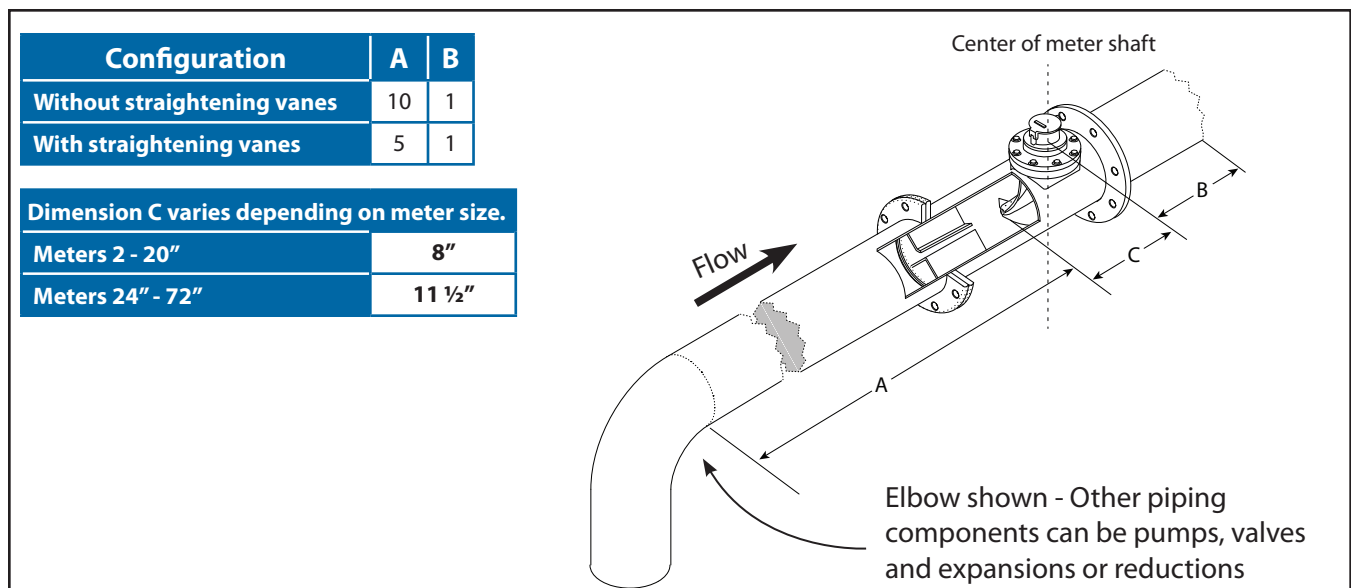
Flanged end meters: A tube is inserted into a section of open pipe and each flanged end is joined to the existing pipe using the provided gaskets and bolts.

Plain, grooved, or threaded end meters: A tube is inserted into a section of open pipe and each end is joined to the existing pipe as appropriate to its type.

The meter can be installed horizontally, vertically, or inclined on suction or discharge lines. The meter must have a full flow of liquid for proper accuracy. Complete installation, removal, and reinstallation instructions can be found in the meter's Installation, Operation, and Maintenance Manual.

PIPE RUN REQUIREMENTS

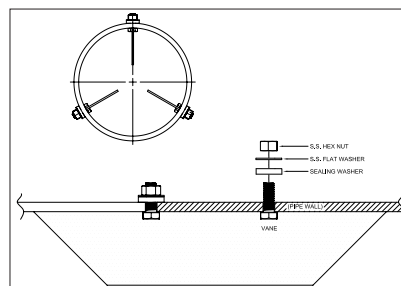
Fully opened gate valves, fittings or other obstructions that tend to set up flow disturbances should be a minimum of ten pipe diameters upstream and two pipe diameters downstream from the meter. Installations with less than ten pipe diameters of straight pipe require straightening vanes. Meters with straightening vanes require at least five pipe diameters upstream and two pipe diameters downstream of the meter.



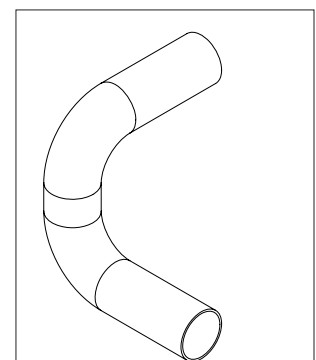
STRAIGHTENING VANES

Special attention should be given to systems using two elbows "out of plane" or devices such as a centrifugal sand separator. These cause swirling flow in the line that affect propeller meters. Well developed swirls can travel up to 100 diameters downstream if unobstructed. Since most installations have less than 100 diameters to work with, straightening vanes become necessary to alleviate the problem.

Straightening vanes will break up most swirls and ensure more accurate measurement. McCrometer actively encourages installing vanes just ahead of the meter. Straightening vanes are available in weld-in and bolt-in.



Bolt-in straightening vanes



Elbows out of plane

TP1 / TP2 Specifications

Performance

Accuracy	Plus or minus 2% of actual flow within the range specified for each meter size
Range	2" to 72"
Pressure Range	Up to 150 PSI maximum working pressure
Temperature Range	140° F maximum. Consult factory for special construction for higher temperatures
Flow Ranges	See Min-Max-Int Flow Ranges column in the table of meter specifications on page 8. • Size and construction are rated for continuous operation. • Min and max flow ranges will vary according to meter size and construction. • Min flow will be higher when auxiliary equipment is added. • Intermittent flow is rated for 10%-15% of the total time the meter is operating. • Consult factory for high velocity construction when intermittent flows are higher than shown in the table of meter specifications on page 8 and/or when longer operating periods are required.

Materials

Materials used in construction are chosen to minimize the corrosive effects of the liquids measured by the meter assembly.

Magnets	Anticorrosive aluminized barrier coated magnets; Everlube 6155
Interior Bearings	Shielded stainless steel
Propeller Bearing	Ceramic sleeve type
Propeller Spindle	Ceramic sleeve/stainless steel
Propeller	Injection molded thermoplastic
Gearbox	Stainless steel
Separator	Stainless steel
Shafts	Stainless steel
Meter Head Bolts	Stainless steel
Meter Head	Cast iron or fabricated steel, NSF approved fusion epoxy coated

Optional Equipment

Totalizer extensions and a wide range of controls and instruments for indicating, totalizing and recording flow data for each meter. Special constructions and materials are available upon request.

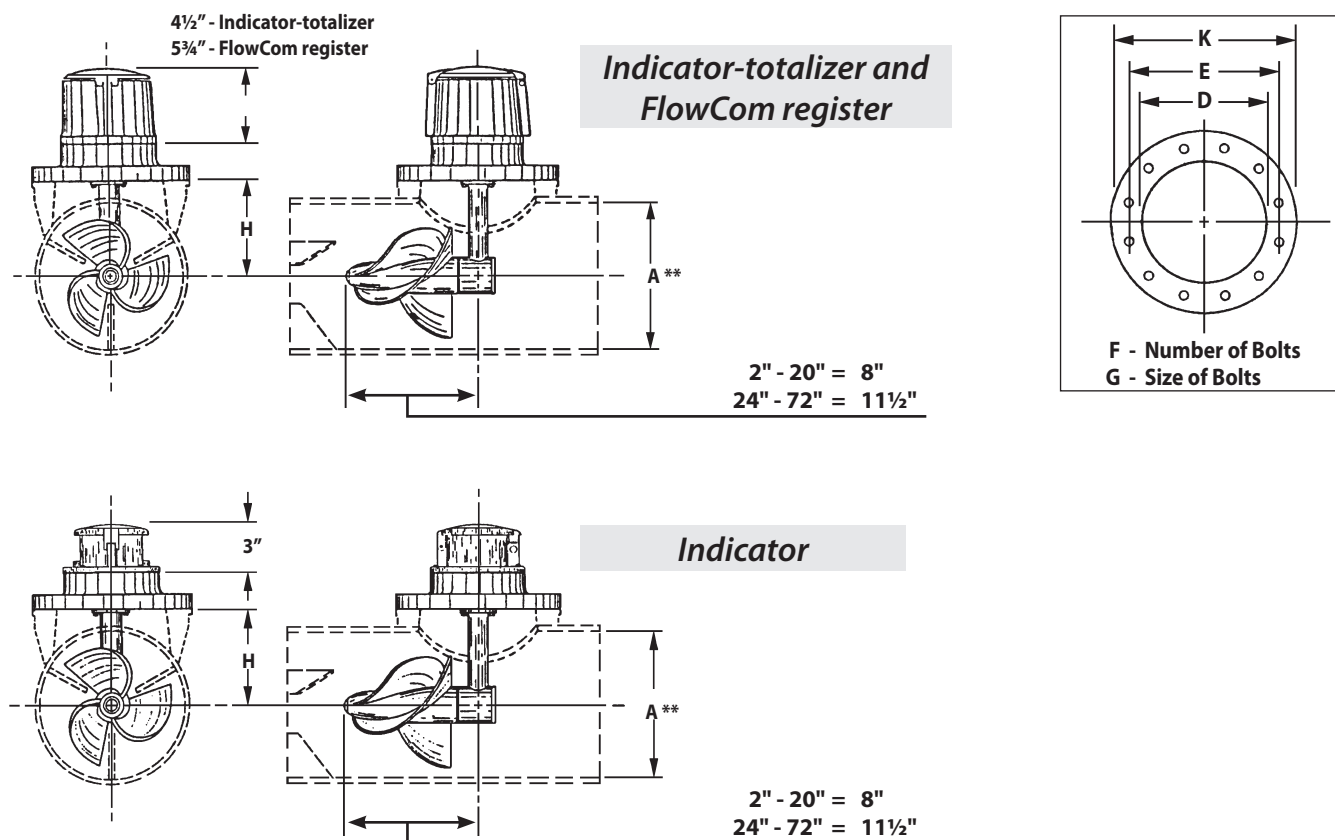
Ordering Info

Meters must be specified by the customer and includes:

- Meter size
- Model number
- Serial number of the meter it is replacing
- Minimum & maximum flow ranges
- Temperature of meter environment
- Indicator scale & units
- Totalizer dial units
- Type of materials and construction
- Optional equipment desired
- Installation requirement - Horizontal or vertical



Dimensions



Meter & Pipe size (inches)	Flow Ranges, GPM		Dimensions							Est. Shipping Weight (lbs.)
	Standard Construction Min - Max - Int	High Velocity Construction Min - Max	A	D	E	F	G	H	K	
2	40-160	N/A	3	3 1/4	7 3/4	8	1/2	3 1/4	9	35
3	45-250-350	N/A	3	3 1/4	7 3/4	8	1/2	3 1/4	9	35
4	55-500-700	200-700	4	4 3/8	7 3/4	8	1/2	3 1/4	9	35
6	120-1200-1500	300-1500	6	5 3/8	7 3/4	8	1/2	4 1/4	9	35
8	150-1500-2000	400-2500	8 1/8	6 1/2	7 3/4	8	1/2	5 1/4	9	35
10	180-2000-3000	500-3500	10 1/4	8 1/4	9 3/4	8	1/2	6 1/2	11	45
12	200-3000-3500	800-5000	12 1/4	8 1/4	9 3/4	8	1/2	7 1/2	11	50
14	300-4000-4500	1000-6000	13 1/2	10	12 1/4	8	1/2	8 1/2	13 1/2	55
16	400-5000-6000	1200-7500	15 1/4	10	12 1/4	8	1/2	9 1/2	13 1/2	55
18	700-6000-7500	1500-9000	17 1/4	10	12 1/4	8	1/2	10 1/2	13 1/2	55
20	850-8000-9000	2000-12000	19 1/4	10	12 1/4	8	1/2	11 1/2	13 1/2	55
24	1000-10000-13500	3000-15000	23 1/4	13 3/8	18 3/4	12	1	15 1/2	21	190
30	1800-15000-21000	4000-25000	29	13 3/8	18 3/4	12	1	18 1/2	21	190
36	2000-20000-30000	5000-35000	35	13 3/8	18 3/4	12	1 1/4	21 1/2	21	190
42	3000-30000-40000	6000-50000	41	23 3/8	29 1/2	20	1 1/4	25	32	365
48	5500-35000-50000	7000-60000	47	23 3/8	29 1/2	20	1 1/4	28	32	365
54	6500-45000-55000	8000-65000	53	23 3/8	29 1/2	20	1 1/4	31	32	365
60	7500-60000-80000	10000-90000	59	23 3/8	29 1/2	20	1 1/4	34	32	365
66	8500-75000-95000	12000-105000	65	23 3/8	29 1/2	20	1 1/4	37	32	365
72	9500-90000-115000	15000-125000	71	23 3/8	29 1/2	20	1 1/4	40	32	365

TP						-	-	-	-	-		
CONNECTION OPTIONS:												
Top Plate Only 150 PSI (MLI1/MLT1)		1										
Top Plate Only 300 PSI (MLI2/MLT2)		2										
METER SIZE											MODEL SIZES OFFERED:	
											TP1	TP2
2" Top Plate Meter	02										X	X
3" Top Plate Meter	03										X	X
4" Top Plate Meter	04										X	X
6" Top Plate Meter	06										X	X
8" Top Plate Meter	08										X	X
10" Top Plate Meter	10										X	X
12" Top Plate Meter	12										X	X
14" Top Plate Meter	14										X	X
16" Top Plate Meter	16										X	X
18" Top Plate Meter	18										X	X
20" Top Plate Meter	20										X	X
24" Top Plate Meter	24										X	
30" Top Plate Meter	30										X	
36" Top Plate Meter	36										X	
42" Top Plate Meter	42											
48" Top Plate Meter	48											
Top Plate Configuration Options												
Standard Top Plate		A										
Non Standard Top Plate		X										
Prop Options												
Standard		1										
High Velocity		2										
Standard Velocity Slip on Seperator		3										
High Velocity Slip on Seperator		4										
Register Options												
Flowcom (FC200)		F										
Flow Connect (FC Smart Part on 2nd Line)		T										
Output Options												
No Outputs												
Open Collector Pulse		1										
4-20mA Analog Only		2										
4-20mA Analog + Open Collector Pulse		3										
Output Cable Options												
No Output Cables												
6 ft		C1										
15 ft		C2										
25 ft		C3										
50 ft		C4										
75 ft		C5										
100 ft		C6										
150 ft		C8										



Part Numbers, Digital Registers (cont.)

TP		-	-	-	-	-
Smart Output Protocol / Telemetry Options						
No AMI Outputs/Telemetry Options						
Sensus Protocol (6ft cable, Nicor Connector hardwired only)		SEN				
Itron 6 digit Protocol (6ft cable, Nicor Connector hardwired only)		IT6				
Itron 9 digit [100W] Protocol (6ft cable, Nicor Connector hardwired only)		IT9				
Neptune Protocol (6ft cable, Nicor Connector hardwired only)		NEP				
2 ft SmartTrax Standalone Unit ExactRead Cable		S02				
6 ft SmartTrax Standalone Unit ExactRead Cable		S06				
25 ft SmartTrax Standalone Unit ExactRead Cable		S25				
50 ft SmartTrax Standalone Unit ExactRead Cable		S50				
Register Remote and Extension Options						
Meter Mount (Standard)						
6 ft Cable Remote Mount (Flowcom only)		R06				
25 ft Cable Remote Mount (Flowcom only)		R25				
50 ft Cable Remote Mount (Flowcom only)		R50				
6" Long Extension		006				
1" Increments for Extensions Lengths		XXX				
240" Maximum extension length		240				
SPECIAL OPTIONS						
High Temp Prop and Seals		H				
No Batteries, Battery Tray Options						
Includes Batteries (Standard)						
No Batteries (Alkaline Tray)		NBA				
No Batteries (Lithium Tray)		NBL				

TP							-		-		
CONNECTION OPTIONS:											
Top Plate Only 150 PSI (MLI1/MLT1)		1									
Top Plate Only 300 PSI (MLI2/MLT2)		2									
METER SIZE										MODEL SIZES OFFERED:	
2" Top Plate Meter		02								TP1	TP2
3" Top Plate Meter		03								x	x
4" Top Plate Meter		04								x	x
6" Top Plate Meter		06								x	x
8" Top Plate Meter		08								x	x
10" Top Plate Meter		10								x	x
12" Top Plate Meter		12								x	x
14" Top Plate Meter		14								x	x
16" Top Plate Meter		16								x	x
18" Top Plate Meter		18								x	x
20" Top Plate Meter		20								x	x
24" Top Plate Meter		24								x	x
30" Top Plate Meter		30								x	
36" Top Plate Meter		36								x	
42" Top Plate Meter		42								x	
48" Top Plate Meter		48								x	
Top Plate Configuration Options											
Standard Top Plate		A									
Non Standard Tube		X									
Propeller Options											
Standard		1									
High Velocity		2									
Standard Velocity Slip on Seperator		3									
High Velocity Slip on Seperator		4									
Register Options											
Totalizer		1									
Indicator/Totalizer		2									
Output Options											
No Outputs		-									
4-20 Analog Only (TR15/TR16)		A									
Dry Contact Pulse & 4-20 Analog (TR04/TR12 + TR15/TR16)		B									
Dry Contact Pulse (TR04/TR12)		C									
Extension Options											
Meter Mount (Standard)		-									
6" Long Extension (Mech or Digtal)		006									
1" Increments for Extensions Lengths		XXX									
144" Maximum extension length		144									
High Temp Option											
High Temp Prop and Seals		H									



FlowCom Digital Register Specifications

Physical Specifications

Electronic Housing	Diecast aluminum, powder coated enclosure w/ tamper resistant seal, 6½" x 6½" x 43/8" tall
Digital register Dimensions	See "Dimensions" section for meter mount and remote mount digital register dimensions.
Power	Battery: Standard: three 3.6V lithium-thionyl chloride (Li-SOCI2) D size batteries
Electrical Connections	Optional shielded cable for pulse out

Performance and Operational Specifications

Battery Life	Five-year expected battery life, five-year battery warranty
Location	Indoor or outdoor use
Altitude	Operating: 2000 meters Storage: 12,000 meters
Operating Temperature	-4° to 140° F (-20° to 60° C)
Storage Temperature	-4° to 140° F (-20° to 60° C)
Relative Humidity	0% to 100%
IP Rating	IP67 Die cast aluminum digital register
Outputs	Digital output: Digital pulse (open collector) output for volumetric - Two isolated digital pulse (open collector) outputs for volumetric - AMI output Analog output: 4-20mA: Galvanically Isolated, 16 Bit resolution. All power configurations (including battery). Note: 9-30 VDC loop power required (not supplied via digital register)

Display and Measurement

Display	• 2-Line LCD display (no backlight) • Non-volatile memory • Anti-reverse totalizer (standard) • Total (to 9 digits of precision)	• Flow rate and velocity (to 5 digits of precision) • Two alarms: low battery and empty pipe (optional) • Opening lid activates display
Digits	5 Rate, 9 Total	
Units	GPM Gallons per minute MGD Mega gal per day CFS Cubic feet per second MLD Megaliters per day LPS Liters per second CMH Cubic meters per hour LPM Liters per minute GPH Gallons per hour IGM Imperial gal per minute MI9 Miners inch (9G) MI1 Miners inch (11.22G) APD Acre feet per day	KLH Kiloliters per hour LPH Liters per hour CMM Cubic meters per minute CFM Cubic feet per minute CFM Cubic feet per minute B5M Barrels per minute (55G) B5H Barrels per hour (55G) B5D Barrels per day (55G) B4M Barrels per minute (42G) B4H Barrels per hour (42G) B4D Barrels per day (42G)

**FlowCom Digital Register Specifications (cont.)**

Totalizer Units	GAL	Gallons	AIN	Acre Inch
	CUF	Cubic Feet	TON	Ton (Short)
	AFT	Acre Feet	MM1	Miners Inch Minute (11.22G)
	CUM	Cubic Meters	MM9	Miners Inch Minute (9G)
	LIT	Liters	MH1	Miners Inch Hour (11.22G)
	MML	Megaliter	MD1	Miners Inch Day (11.22G)
	MTT	Metric Ton (KL)	MH9	Miners Inch Hour (9G)
	B31	Barrel (31G)	MD9	Miners Inch Day (9G)
	B42	Barrel (42G)	KGL	Kilo Gallons
	B46	Barrel (46G)	MGL	Mega Gallons
	B55	Barrel (55G)	IN3	Cubic Inch
	IMG	Imperial Gallon		
	Data Logger			
	Standard with all models, minimum of five years of data stored (4gb)			

Other Specifications**Options and
Accessories**

- Data Logger - included as standard with five years of data storage at default (12hr) interval. (Cable sold separately)
- AC, DC, and battery powered available



FlowCom Part Number Matrix

FC2							
Product Line							
McCrometer		00					
Water Specialties		01					
Assembly Component Options							
Conversion Kit (From Mechanical)		K					
Flowcom (FC100 to FC200) Upgrade Kit		R					
Flowcom (FC200) Replacement Kit		F					
Output Options							
No Outputs							
Open Collector Pulse		1					
4-20mA Analog		2					
4-20mA Analog and Open Collector Pulse		3					
Output Cable Options							
No Output Cables							
6 ft		C1					
15 ft		C2					
25 ft		C3					
50 ft		C4					
75 ft		C5					
100 ft		C6					
150 ft		C8					
Smart Output Protocol / Telemetry Options							
No AMI Outputs/Telemetry Options							
Sensus Protocol (6ft cable, Nicor Connector hardwired only)		SEN					
Itron 6 digit Protocol (6ft cable, Nicor Connector hardwired only)		IT6					
Itron 9 digit [100W] Protocol (6ft cable, Nicor Connector hardwired only)		IT9					
Neptune Protocol (6ft cable, Nicor Connector hardwired only)		NEP					
2 ft SmartTrax Standalone Unit ExactRead Cable		S02					
6 ft SmartTrax Standalone Unit ExactRead Cable		S06					
25 ft SmartTrax Standalone Unit ExactRead Cable		S25					
50 ft SmartTrax Standalone Unit ExactRead Cable		S50					
Register Remote and Extension Options							
Meter Mount (Standard)							
6 ft Cable Remote Mount (Flowcom only)		R06					
25 ft Cable Remote Mount (Flowcom only)		R25					
50 ft Cable Remote Mount (Flowcom only)		R50					
No Batteries, Battery Tray Options							
Includes Batteries (Standard)							
No Batteries (Alkaline Tray)		NBA					
No Batteries (Lithium Tray)		NBL					

FlowConnect Specifications

Communication

Network Type	Cellular	Satellite
Protocols	GSM/GPRS	Iridium
Operating Frequency (MHz)	824–849 869–894 1850–1910 1930–1990 1710–1755	1616-1626.5
Antenna	External Bulkhead Extension TNC Antenna 800/1800/1900 MHz	External Bulkhead Extension TNC Antenna 1,600 Mhz

Power

Batteries	Batteries can be replaced by user on-site Battery Only: 2 Primary D-Cells 3.6V 13Ah (Both batteries need to be replaced at the same time) Rechargeable: 1 Primary D-Cell 3.6V and 3 Secondary C-Cells, 1.2V in series
External Power	Requires Rechargeable Battery Configuration listed above. Recommended 9-12 VDC, 0-1000mA Max: 14.5 VDC (Power supply or solar panel)
Recommended Battery Replacement Interval	Battery Only: 3 years (Daily Report Interval) Rechargeable: 4 years

Environmental

Operating Temperature	- 30°C to 70°C (-22°F to 158°F)
Electrical / Mechanical Protection	All electrical components are grounded to fluid column and pipe. Manufactured in accordance with IP-67 Standards and ESD-safe
Environmental Protection	Ingress Protection (Dust Tight / Water Tight) to IP67 Vibration proof while operating: Validated Vibration and 20G Sinusoidal testing to JEDEC 22B103B Section 4.3, Table 3, Service Condition C, for all axis and 20G sin sweep 20 - 2,000Hz for all axis.
Tamper Protection	Factory installed tamper-evident wire lock system



FlowConnect Specifications (cont.)

Other Characteristics

Mounting	Top Plate compatible with any McCrometer Propeller or Water Specialties (Digital Register Only)
External Interface	Five-pin serial-USB cable
Flow Indicator	Digital Register or McPropeller Mechanical Register
Operating Temperature	- 30°C to 70°C (-22°F to 158°F)
Inputs	Two analog sensors, 1 pulse accumulator (for rain gauge)
Outputs	Mechanical Register: None Digital Register: 4-20 mA, Open Collector Pulse, Dry Contact Pulse, Optically Isolated Pulse (via 5-pin output cable)
Data Collection Method	Digital Register: Serial interface between FlowConnect and digital register allows FlowConnect to read totalizer and rate value directly. No pulse counting required and always a perfect match. Mechanical Register (McPropeller only): Pulse counter and high-low digital signal for forward-reverse pulses. Accuracy between meter and Web totalizer: $\pm 0.25\%$
Data Storage	Capable of storing up to 1,000 reports in local memory

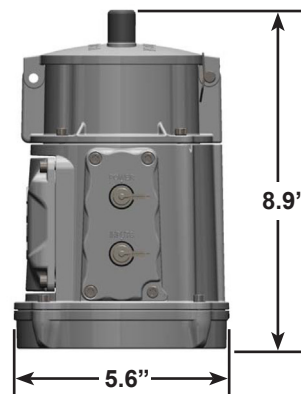
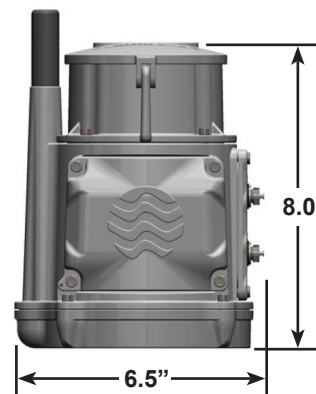
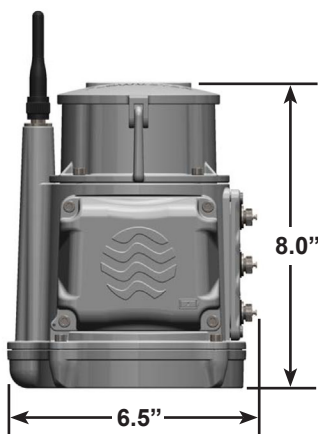
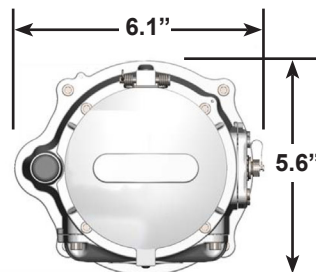
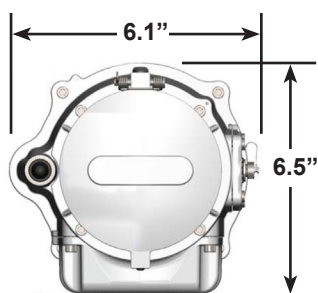
Accessories

Optional Protective Cover	Gray boot cover, p/n TOB065		
Serial Accessories	200.720.542 serial-USB cable		
Power Accessories	Rechargeable: 200.723.520 2.5W 220mA Solar Panel 200.733.522 5W 540 mA Solar Panel 200.720.523 115V Power Supply Battery Only: No Power Accessories		
Sensor Accessories	Adcon PA1 Cables - Pressure 10bar 500.000.120 - 16 ft. Cable 500.000.119 - 32 ft. Cable 200.733.048 - RGI Rain Gauge 200 200.720.510 - Y Cable 200.733.902 - A902 1/2/3 Cable		
Communication Accessories	Cellular		Satellite
	900.000.590 TNC Rigid Antenna (Included)		TOB039 Helical Antenna (Included)
	900.000.565 Directional Antenna		MCC-510-AI-A Extension Antenna, Magnet Mount
	900.000.567 Extension Antenna		

FlowConnect Dimensions

Dimensions

Network Type	Cellular	Satellite
Unit Enclosure Size	W x D x H	W x D x H
Non-Rechargeable	6.5" x 5.6" x 9.9"	6.5" x 5.6" x 9.8"
Rechargeable	6.5" x 6.1" x 9.9"	6.5" x 6.1" x 9.8"
Packaged Dimensions	11" x 11" x 11"	11" x 11" x 11"
Packaged Weight	6 lbs.	6 lbs.





McCrometer, Inc.
3255 West Stetson Avenue
Hemet, CA 92545 USA
Tel: 951-652-6811
800-220-2279
Fax: 951-652-3078
customerservice@mccrometer.com
www.mccrometer.com