

Tender documents

For flow metering and level measurement
in water & waste water plants

We measure the resources of our world



Every drop counts.

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1. Stationary meters

1.1 Level measurement in open channels and partially filled pipes

1.1.1 Ultrasonic flow meter type Dynasonics® iSonic 4000

1.1.1.1 Description

The Dynasonics® iSonic 4000 has been designed to measure level, volume and open channel flow. In fresh and waste water applications, iSonic 4000 measures level and calculates flow rates in combination with weirs or flumes. The meter can save up to 130.000 data records.

1.1.1.2 Specifications

- Measuring range: 0 - 6000 mm; depending on level sensor
- Measuring accuracy: Within the flow range $\pm 0,5$ %
- Analog output 4-20 mA, 0-20 mA, 0-10 mA selectable
- 2 digital outputs max. 32 VDC / 100 mA
- RS485 Modbus RTU, Modbus TCP/IP Ethernet, BEACON®/AquaCUE® connection
- 2 MB, programmable time intervals, records available as table
- Metal housing IP67
- Protection class IP68 for sensors
- Supply voltage 90 – 230 VAC
- Cable length of sensors: 10 m (standard), max. 900 m (other lengths on request)
- Operating temperature range -20°C to +60°C

Brand: Dynasonics® iSonic 4000

Manufacturer: Badger Meter



1.1.2 Manhole flume

In conjunction with a Badger Meter model type Dynasonics® iSonic 4000 ultrasonic flow meter

1.1.2.1 Description

The Manhole flume is a variation of the Venturi concept designed for easy installation in standard manholes. Its fiberglass reinforced polyester construction, for long life and corrosion resistance, incorporates a low head trapezoidal design in conjunction with a hooded outlet collector and pipe spud.

1.1.2.2 Specifications

Manhole flume in fiberglass reinforced polyester construction according to the Venturi principle for installation in straight manholes.

Minimum diameter of manhole 1 000 mm for DN 100, 150, 200 and 250.

Minimum diameter of manhole 1 200 mm for DN 300.

- Manhole flume DN 100, measuring range 0,30 up to 5 l/s
- Manhole flume DN 150, measuring range 0,60 up to 16 l/s
- Manhole flume DN 200, measuring range 0,70 up to 35 l/s
- Manhole flume DN 250, measuring range 1,00 up to 63 l/s
- Manhole flume DN 300, measuring range 3,00 up to 94 l/s

In conjunction with a Badger Meter model type Dynasonics® iSonic 4000 ultrasonic flow meter



Brand: Manhole flume
Manufacturer: Badger Meter



1.1.3 Parshall flume

In conjunction with a Badger Meter model type Dynasonics® iSonic 4000 ultrasonic flow meter

1.1.3.1 Description

The Parshall flume is one of a large class of open channel primary elements known as critical flow venturi flumes. A distinguishing characteristic of the Parshall flume is the downward sloping invert of the throat. This feature gives the Parshall flume its ability to operate at higher ratios of downstream to upstream head than any other such device.

The Parshall flume is a monolithic fiberglass reinforced polyester structure to assure maximum strength and accuracy of dimension while minimizing installation time. Its weight is light, the installation easy and there is no need for special tools. Its short length makes the installation possible in areas where further constructions are limited.

1.1.3.2 Specifications

•	Throat			W = 75 mm/3"
	Measuring range	Qmin = 0,77 l/s	up to	Qmax = 54 l/s
•	Throat			W = 150 mm/6"
	Measuring range	Qmin = 1,50 l/s	up to	Qmax = 114 l/s
•	Throat			W = 230 mm/9"
	Measuring range	Qmin = 2,50 l/s	up to	Qmax = 284 l/s
•	Throat			W = 305 mm/12"
	Measuring range	Qmin = 3,30 l/s	up to	Qmax = 598 l/s
•	Throat			W = 455 mm/18"
	Measuring range	Qmin = 4,80 l/s	up to	Qmax = 898 l/s
•	Throat			W = 610 mm/24"
	Measuring range	Qmin = 12,0 l/s	up to	Qmax = 1210 l/s
•	Throat			W = 915 mm/36"
	Measuring range	Qmin = 17,0 l/s	up to	Qmax = 1840 l/s

Brand: Parshall flume
Manufacturer: Badger Meter



1.2 Full filled pipes

1.2.1 Ultrasonic flow meter type Dynasonics® TFX-Ultra

1.2.1.1 Description

Clamp-on ultrasonic flow and energy meters for liquids

1.2.1.2 Specifications

- Measuring : Flow and energy/BTU
- Suitable medium : Clean liquids or liquids containing small amounts of suspended solids
- Measuring range : Bidirectional transit-time >12 m/s
- Measuring accuracy :
 - DTTN/DTTH/DTTL/DTTR/Easy Rail: $\pm 1\%$ of measured value or $\pm 0,003$ m/s which value is higher
 - DTTS/DTTC $\leq 1"$ (DN25): $\pm 1\%$ of measured value or $\pm 0,012$ m/s which value is higher.
 - DTTS/DTTC $\leq \frac{3}{4}"$ (DN19): $\pm 1\%$ from full measuring range
- Outputs : 4 – 20 mA
 - For energy meters : Total pulse output – separated open collector transistor
 - For flow meters : 0-1000 Hz open collector, 12-bit
 - Two alarm outputs : Open collector, programmable
- Interfaces : USB port
 - RS485 : Modbus RTU, optional BACnet MSTP
 - 10/100 base-T : RJ45, communication via Modbus TCP/IP, Ethernet/IP or BACnet/IP
- Configuration : Via keypad or PC running ULTRALINK software
- Protection class (housing) : IP65
- Power supply : 95 – 264 VAC, 20-28 VAC or 10-28 VDC selectable
 - DN $\frac{1}{2}"$ up to 2" with integrated or remote sensors
 - DN 2" and larger with remote sensors
- Sensor cable length : 6 m standard, other cable lengths upon request
- Operating temperature range on pipe wall / Medium :
 - DTTN, DTTL max. 90°C
 - DTTR max. 120°C
 - Easy Rail max. 120°C
 - DTTH max. 176°C
 - DTTS max. 60°C
 - DTTC max. 85°C
- CE conform : Yes

Brand: Dynasonics® TFX Ultra
 Manufacturer: Badger Meter





1.2.2 Electromagnetic flow meter type ModMAG® M1000

1.2.2.1 Description

ModMAG® M1000 is provided with an optional power supply of 230 VAC with display, active and passive outputs. It can be programmed via 3 buttons or a RS232 interface. The meter can be preconfigured with customer specifications at the factory and connected on site. The ModMAG® M1000 has been designed especially for applications in machinery plants, vehicles and batching processes. The applications range from DN 6 to DN 200 with the most various process connections like DIN flanges, dairy pipe connections, TriClamp®, etc.

1.2.2.2 Specifications / Compact design

Detector

- Connections : Flanges EN 1092-1 or others DN....., PN.....
- Flow range :Unit.....
- Electrodes :(standard Hastelloy C)
material
- Grounding : Yes / no
electrode
- Liner material :
- Temperature :°C
of medium
- Housing : St. 37 grey painted, welded;
option 1.4301 / 1.4571
- Protection : IP65
class
- Lay length : standard; optional.....mm

Amplifier

- Display : Graphical LCD display 64x128, lighted
- Measuring : $\pm 0,3\%$ of measuring value, ± 2 mm/s of measuring value
accuracy
- Power supply : 92-275 VAC (50 / 60 Hz), <10 VA optional 9-36 VDC
- Housing : Powder coated aluminium die cast
- Input/Output : 2 free programmable digital outputs
1 digital input, 1 power output
- Status output : Min/max. alarm, preselection, flow direction, error message,
free configurable
- Empty pipe : Separate electrode
detection



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- Cable insertion : 2 x M 20
- Mounting : Compact design
- Interface : RS232/RS485 Modbus RTU

Brand: ModMAG® M1000
Manufacturer: Badger Meter



1.2.2.3 Specifications / Remote version

Detector type

- Connections : Flanges EN 1092-1 or several
: DN....., PN.....
- Flow range :unit.....
- Electrodes :(standard Hastelloy C) material
- Grounding electrode : Yes / no
- Liner material :
- Temp. of medium :°C
- Housing : St. 37 grey painted, welded;
Option 1.4301 / 1.4571
- Protection class : IP65
- Lay length : standard; optional.....mm

Amplifier

- Display : Graphical LCD display 64x128, lighted
- Measuring accuracy : $\pm 0,3\%$ of value, ± 2 mm/s of value
- Power supply : 92-275 VAC (50 / 60 Hz), <10 VA optional 9-36 VDC
- Housing : Powder coated aluminium die cast
- Input/Output : 2 free programmable digital outputs
1 digital input, 1 power output
- Status output : Min/max. alarm, preselection, flow direction, error message,
free configurable
- Empty pipe detection : Separate electrode
- Cable insertion : 2 x M 20
- Mounting : Remote mounting withm cable

Brand: ModMAG® M1000
 Manufacturer: Badger Meter



1.2.3 Electromagnetic flow meter type ModMAG® M2000

1.2.3.1 Description

The amplifier ModMAG® M2000 can measure flows from DN50 up to DN2000. This model shows a high accuracy, is easy to use and can be chosen for a large and flexible applications spectrum. The meter is provided with an RS232 interface allowing easy programming. The backlit, four-line display shows all actual flow measuring data, daily and complete information, including alarm messages. The standard amplifier has 4 programmable digital outputs, one digital input, power output and a Modbus interface. Further functions like upper and lower flow limit values, preselection for easy batch applications can be entered.

1.2.3.2 Specifications / Compact design

- Connections : Flanges according to EN 1092-1 or others
: DN....., PN.....
- Electrodes material :Unit.....
- Grounding electrode :(standard Hastelloy C)
- Liner material :
- Temperature of medium :°C
- Housing : St. 37 grey painted, welded;
Option 1.4301 / 1.4571
- Protection class : IP67 acc. to DIN 40050
- Lay length : Standard; optional.....mm
- Display : LCD, 4 lines / 20 characters, backlit, actual flow, 2 totalizers, status display
- Measuring accuracy : $\pm 0,2\%$ of measuring value, ± 1 mm/s
- Power supply : 85-265 VAC, optional 9 – 36 VDC
- Input/Output : 4 programmable digital outputs
1 digital input, 1 power output
- Status output : Min./max. alarm, preselection, flow direction, error message, free configurable
- Empty pipe detection : Separate electrode
- Cable insertion : 3 x M 20
- Interface : RS232, Modbus RTU
- Mounting : Compact design

Brand: ModMAG® M2000
 Manufacturer: Badger Meter

1.2.4 Electromagnetic flow meter type ModMAG® M3000 & M4000

1.2.4.1 Description

The amplifier with modular design allows flow measurements in ex-zones 1 and 2, in either the mounted or remote version. The programmable excitation frequency even enables the amplifier to be adjusted for difficult metering applications. The ModMAG® is especially suited for flow measurements in the chemical and pharmaceutical industry, as well as water and waste water plants with explosion-proof zones

1.2.4.2 Specifications / Mounted version

- Connections : Flanges according to EN 1092-1 or several
: DN....., PN.....
- Measuring range :Unit.....
- Electrodes :(standard Hastelloy C)
material
- Grounding electrode : Yes / no
- Liner material :
- Temperature of medium :°C
- Housing : St. 37 grey painted, welded;
Option 1.4301 / 1.4571
- Protection class : IP67 according to DIN 40050
- Lay length : Standard; optional.....mm
- Display : LCD, 4 lines / 16 characters, backlit, actual flow,
3 totalizers, status display
- Measuring accuracy : $\pm 0,20\%$ of measuring value, ± 1 mm/s
- Power supply : 85-265 VAC, 50/60 Hz, optional 24 VDC
- Input/Output : Analog: 0/4-20 mA
Pulse output active or passive selectable (max. 10 kHz)
- Protection class : IP67
- Status output : Min./max. alarm, preselection, flow direction, error
message, free configurable
- Empty pipe detection : Separate electrode
- Cable insertion : 3 x M20
- Mounting : Compact version

Brand: ModMAG® M3000 / M4000
 Manufacturer: Badger Meter



1.2.4.2 Specifications / Remote version

- Connections : Flanges according to EN 1092-1 or others
: DN....., PN.....
- Measuring range :Unit.....
- Electrodes :(standard Hastelloy C)
material
- Grounding : Yes / no
electrode
- Liner material :
- Temperature :°C
of medium
- Housing : St. 37 grey painted, welded;
Option 1.4301 / 1.4571
- Protection : IP67 according to DIN 40050
class
- Lay length : Standard; optional.....mm
- Display : LCD, 4 lines / 16 characters, backlit, actual flow,
3 totalizers, status display
- Measuring accuracy : $\pm 0,20\%$ of measuring value, ± 1 mm/s
- Power supply : 85-265 VAC, 50/60 Hz, optional 24 VDC
- Input/Output : Analog: 0/4-20 mA
Pulse output: Active or passive selectable (max. 10 kHz)
2 open collector and 2 solid state relays
- Protection : IP67
class
- Status output : Min./max. alarm, preselection, flow direction,
error message, free configurable
- Empty pipe detection : Separate electrode
- Cable insertion : 3 x M20
- Mounting : Remote version withm cable

Brand: ModMAG® M3000 / M4000
 Manufacturer: Badger Meter



1.2.5 Electromagnetic water meter type ModMAG® M5000

1.2.5.1 Description

ModMAG® M5000 is a battery-powered electromagnetic water meter which does not require power supply.

With an accuracy better than 0,4%, the ModMAG® M5000 can be delivered in a mounted or remote version.

The electronics is in a powder-coated Aluminium housing with easy access to all connection and programming functions.

1.2.5.2 Specifications / Mounted version

- Connections : Flanges according to EN 1092-1 or others
: DN....., PN.....
- Measuring range :Unit.....
- Electrodes material :(standard Hastelloy C)
- Grounding electrode : Yes / no
- Liner material :
- Temperature of medium :°C
- Housing : St. 37 grey painted, welded; Option 1.4301 / 1.4571
- Protection class : IP67/68 (standard) according to DIN 40050
- Lay length : Standard; optional.....mm
- Installation position : Any
- Power supply : Lithium battery
- Housing : Powder coated cast aluminium
- Accuracy : $\pm 0,4\%$ of measuring value, ± 2 mm/s
- Outputs : 4 digital outputs, passive open collector, 30V / 20mA
- Low-flow cut off : 0 up to 10%
- Flow-direction : Uni- or bidirectional
- Galvanic isolation : All outputs, min. 500 V. short-circuit safe
- Protection class : IP67/68 according to DIN 40050
- Cable insertion : 4 x M20
- Ambient temperature : -20°C up to +60°C
- Empty pipe detection : Automatic
- Display : 2 lines à 15 characters, 2 totalizers, battery status alert
- Limit values : 1 min. / max programmable
- Interface : Modbus RTU RS232, M-Bus
- Mounting : Compact version

Brand: ModMAG® M5000
Manufacturer: Badger Meter



1.2.5.3 Specifications / Remote version

- Connections : Flanges according to EN 1092-1 or others
 : DN....., PN.....
- Measuring range :Unit.....
- Electrodes material :(standard Hastelloy C)
- Grounding electrode : Yes / no
- Liner material :
- Temperature of medium :°C
- Housing : St. 37 grey painted, welded;
 Option 1.4301 / 1.4571
- Protection class : IP67/68 (standard) according to DIN 40050
- Lay length : Standard; optional.....mm
- Installation position : Any
- Power supply : Lithium battery
- Housing : Powder coated cast aluminium
- Accuracy : $\pm 0,4\%$ of measuring value ± 2 mm/s
- Outputs : 4 digital outputs, passive open collector, 30V / 20mA
- Low-flow cut off : 0 up to 10%
- Flow-direction : Uni- or bidirectional
- Galvanic isolation : All outputs, min. 500 V. short-circuit safe
- Protection class : IP67/68 according to DIN 40050
- Cable insertion : 4 x M20
- Ambient temperature : -20°C up to +60°C
- Empty pipe detection : Automatic
- Display : 2 lines à 15 characters, 2 totalizers, battery status alert
- Limit values : 1 Min. / Max programmable
- Interface : Modbus RTU RS232, M-Bus
- Mounting : Remote version withm cable

Brand: ModMAG® M5000
 Manufacturer: Badger Meter



2. Handheld meters

2.1 Portable transit-time/Doppler flow and energy meter type DXN

2.1.1 Description

The DXN portable ultrasonic flow meter is a true hybrid ultrasonic flow meter, capable of measuring liquid flow with multiple technologies, including: Doppler, transit-time and liquid thermal (heat energy) flow. The portable meter is ideal for flow and energy measurement of clean fluids with particles in closed pipes of DN 15 to DN 3000 (1/2" to 120").

2.1.2 Specifications

- Measurement : Transit-time, Doppler
Hybrid: Transit-time + Doppler
Energy
Wall thickness
- Measuring range : Transit-time and Doppler: 12 m/s (40 FPS)
- Measuring accuracy : Transit-time: 1% of measuring value
Doppler: 2% of full scale
- Inputs : Digital: Totalizer reset, external pull-up-resistance
Auxiliary inputs: 0–5 V, 0–10 V; software scaling and control 80k ohms input impedance
- Outputs : Energy / temperature: 2x PT1000
Current output: 4 – 20 mA active/passive 1% accuracy;
external auxiliary input 14V@50mA max.
- Interfaces : USB connection
Breakout box
- Protection class : IP64 (DXN electronics)
- Power supply : 10 – 30 VDC
- Desktop adapter : 100 – 240 VAC, 50/60Hz, 50W
Cigarette lighter adapter 5A fused
Selectable power cables for USA, UK, Singapore, Europe, Japan and China
- For pipe sizes : ½" up to 120" (DN15 – DN3000)
- Sensor cable length : Transit-time sensors: 6 m (standard)
Doppler sensors: 6 m (standard)
Other cable lengths upon request
- Operating temperature range : DTTSU/DTTL -40°C to +90°C
DTTR -40°C to +120°C
DT94 -40°C to +90°C
DTTH -40°C to +176°C
- CE conform : Yes

Brand: Dynasonics® DXN
 Manufacturer: Badger Meter



Product range

- Electromagnetic flow meters
- Ultrasonic flow meters
- Flumes
- Turbine meters
- Nutating disc meters
- Impeller meters
- Vortex meters
- Variable area flow meters
- Differential pressure flow
- Venturi tubes
- Mass meters
- Heat meters
- Hydraulic testers
- Flow calibrators
- Lubrication meters
- Oil management systems
- Control valves

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