THE CHARTMETER™ 5044

A CHART RECORDER, TRANSIT-TIME FLOWMETER AND DATALOGGER

Economically Integrated into a Single Nema 4, 4X Unit

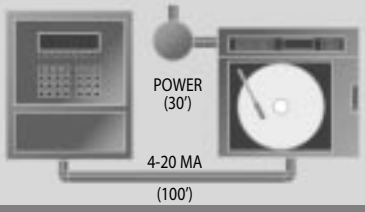
Eastech Badger
ULTRASONIC FLOW MEASUREMENT

THE CHARTMETER™

EASTECH COMBINES THREE PRODUCTS:
A CHART RECORDER, TRANSIT-TIME FLOWMETER, AND DATALOGGER
INTO ONE COST-EFFECTIVE UNIT THAT ELIMINATES
CONDUIT RUNS, WIRING, AND INSTALLATION COSTS.

3 YEAR WARRANTY

COMPARATIVE COST ANALYSIS (100 ft. run)

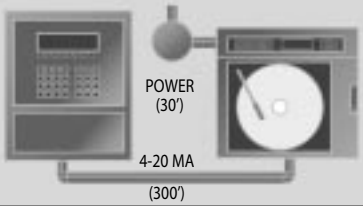
CLOSED PIPE FLOW MEASUREMENT			
			
CONVENTIONAL METHOD		**CHARTMETER™**	
FLOWMETER W/ DATALOGGER[1]	$5483	FLOWMETER W/ DATALOGGER	$4900 INCLUDED
CHART RECORDER[2]	$1572	CHART RECORDER	INCLUDED
INSTALL RECORDER	$100	INSTALL RECORDER	N/R*
130' - 3/4" CONDUIT	$210	130' - 3/4" CONDUIT	N/R*
30' - 3 COND. WIRE	$5	30' - 3 COND. WIRE	N/R*
100' - 2 COND. CABLE	$185	100' - 2 COND. CABLE	N/R*
LABOR (ELECTRICAL)	$1150	LABOR (ELECTRICAL)	N/R*
TOTAL COST	**$8705**	**TOTAL COST**	**$4900**
TOTAL COST SAVINGS: $3805.00			

[1] Meter cost based on Panametrics® list price. [2] Recorder cost based on Chessel® list price. * Not Required

INSTALLATION COST BENEFITS

COMPARATIVE COST ANALYSIS (300 ft. run)

CLOSED PIPE FLOW MEASUREMENT



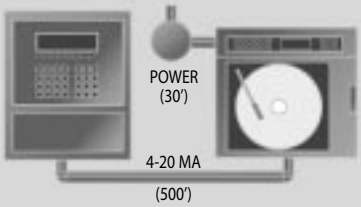
CONVENTIONAL METHOD		CHARTMETER™	
FLOWMETER[1] W/ DATALOGGER	$5483	FLOWMETER W/ DATALOGGER	$4900 INCLUDED
CHART RECORDER[2]	$1572	CHART RECORDER	INCLUDED
INSTALL RECORDER	$100	INSTALL RECORDER	N/R*
330' - 3/4" CONDUIT	$534	330' - 3/4" CONDUIT	N/R*
30' - 3 COND. WIRE	$5	30' - 3 COND. WIRE	N/R*
300' - 2 COND. CABLE	$555	300' - 2 COND. CABLE	N/R*
LABOR (ELECTRICAL)	$3030	LABOR (ELECTRICAL)	N/R*
TOTAL COST	**$11,279**	**TOTAL COST**	**$4900**

TOTAL COST SAVINGS: $6379.00

[1] Meter cost based on Panametrics® list price. [2] Recorder cost based on Chessel® list price. * Not Required

COMPARATIVE COST ANALYSIS (500 ft. run)

CLOSED PIPE FLOW MEASUREMENT



CONVENTIONAL METHOD		CHARTMETER™	
FLOWMETER[1] W/ DATALOGGER	$5483	FLOWMETER W/ DATALOGGER	$4900 INCLUDED
CHART RECORDER[2]	$1572	CHART RECORDER	INCLUDED
INSTALL RECORDER	$100	INSTALL RECORDER	N/R*
530' - 3/4" CONDUIT	$858	530' - 3/4" CONDUIT	N/R*
30' - 3 COND. WIRE	$5	30' - 3 COND. WIRE	N/R*
500' - 2 COND. CABLE	$925	500' - 2 COND. CABLE	N/R*
LABOR (ELECTRICAL)	$4910	LABOR (ELECTRICAL)	N/R*
TOTAL COST	**$13,853**	**TOTAL COST**	**$4900**

TOTAL COST SAVINGS: $8953.00

[1] Meter cost based on Panametrics® list price. [2] Recorder cost based on Chessel® list price. * Not Required

LABOR & MATERIAL COSTS	Labor	Material
3/4" Conduit	$6.35/ft.	$1.62/ft
#14-3 Conductor wire	$0.63/ft	$0.13/ft
#18-2 Conductor wire	$3.05/ft	$1.85/ft

Chart Recorder

Eastech Badger design engineers have successfully combined three separate products; a direct-drive chart recorder, transit-time flowmeter and 8 channel datalogger into a single unit. Engineering and plant personnel may now specify an extremely accurate and cost- efficient system to monitor and measure flow in one compact integrated assembly.The Chartmeter 5044 is the first of it's kind to be recognized as a single Nema 4, 4X assembly that combines high accuracy flow measurement with onboard chart monitoring of closed pipe flow.

Rangeability:40 to 0.1 ft/sec
Turndown: 400:1
Repeatability: 0.25%
Accuracy: ±0.5% of actual rate of flow

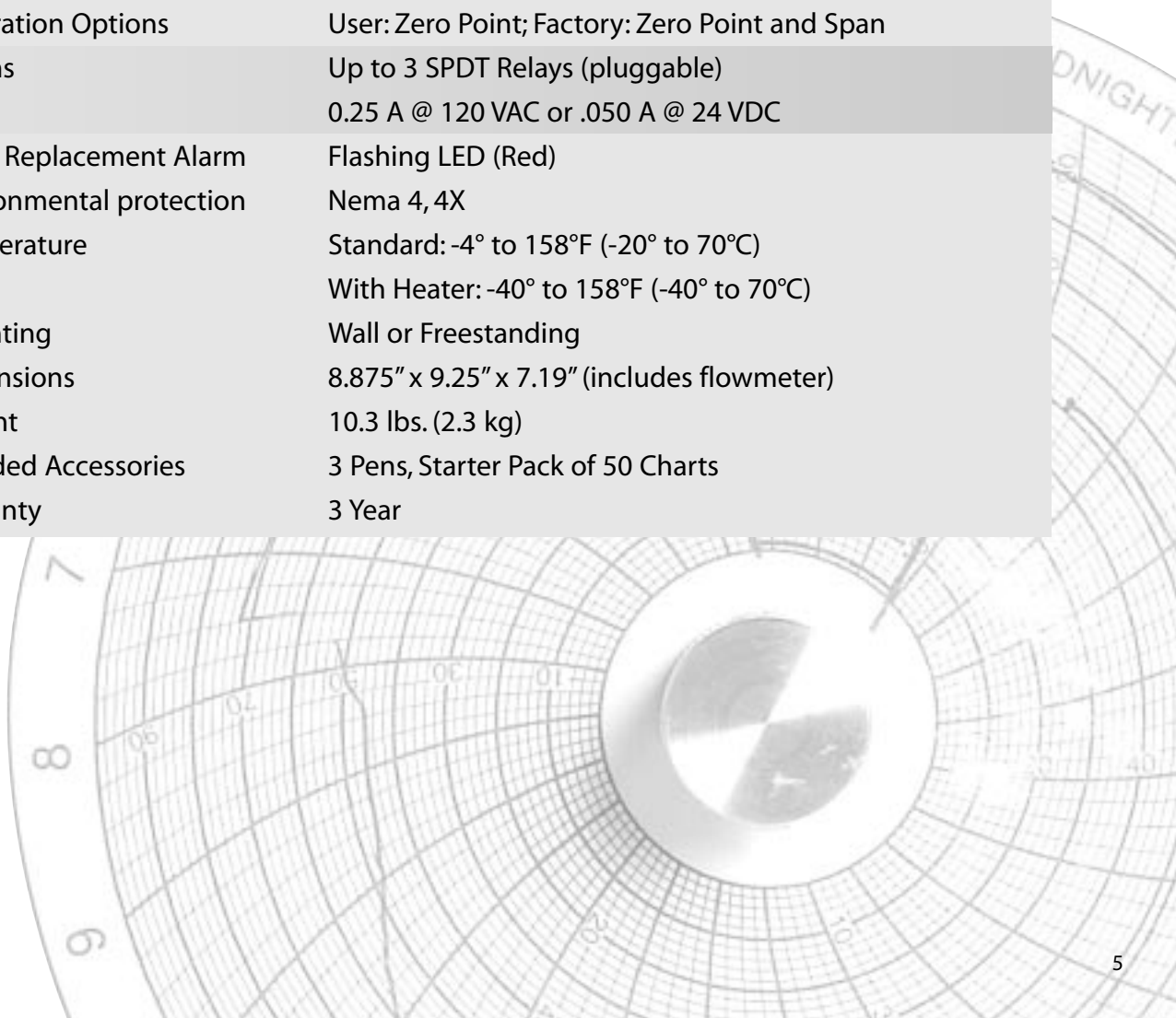
3 year warranty

FEATURES

- **Fully Integrated Package**
- **Powered by Flowmeter**
- **User Selectable Output Ranges and Recording Times**
- **High/Low Alarms and Display of Min/Max Readings**
- **Locking Control Keypad & Door**
- **User Calibration**
- **Wall Mounting Bracket**
- **Floating Point Display with Display Format Selection**
- **Superbright Digital Display**

SPECIFICATIONS

Accuracy	.05% Full Scale
Power Source	80/240 VAC, 50/60 Hz • 12-28 VDC @ 150 mA
Channels	One
Recorder Display	112 x 16 Graphical
Display Dim.	52.5 mm x 11.5 mm
Chart Rotation	User Selectable
Chart Range	0 - 100% of Full Scale
Chart Size:	100 mm Diameter
Recording Time	24 Hour, 7 day, 31 day (user selectable)
Response Time	4 sec. - 60 sec. (user selectable)
Calibration	User Zero Calibration (Keypad)
Calibration Options	User: Zero Point; Factory: Zero Point and Span
Alarms	Up to 3 SPDT Relays (pluggable) 0.25 A @ 120 VAC or .050 A @ 24 VDC
Chart Replacement Alarm	Flashing LED (Red)
Environmental protection	Nema 4, 4X
Temperature	Standard: -4° to 158°F (-20° to 70°C) With Heater: -40° to 158°F (-40° to 70°C)
Mounting	Wall or Freestanding
Dimensions	8.875" x 9.25" x 7.19" (includes flowmeter)
Weight	10.3 lbs. (2.3 kg)
Included Accessories	3 Pens, Starter Pack of 50 Charts
Warranty	3 Year



Engineered for Accuracy and Simple Installation

Simple to install, with a one-piece Speedrail™ sensor mounting system, and factory pre-programmed for ease of start-up, the Model 5044 transit-time flowmeter offers plant operating personnel a highly reliable instrument (±0.5% of actual flow) that is nonintrusive in design and capable of maintaining consistently accurate readings over changing process conditions and time.

- **One 4-20 mA Output**
- **Up to three SPDT Relays**
- **Internal Datalogger**
- **RS232 Serial Port** (Modbus RTU Protocol)
- **RS485 Serial Port** (Modbus RTU Protocol)
- **Profibus®**
- **DeviceNet®**

Factory Mutual System Approved

FACTORY PRE-PROGRAMMING

The engineers at Eastech Badger realized that for a new product to be successful, it must be simple to install and quickly made operational. In order to accomplish this goal, every Model 5044 is shipped to the field factory pre-programmed to the conditions set forth by the customer. Pre-programming specifications are electronically confirmed on the display of the transmitter. If changes to the meter's factory pre-programming is required, re-programming can simply be accomplished on the meter keypad or through the **Auto-Programming** feature. This feature allows plant personnel to re-program the Model 5044 by simply downloading the revised flow data from a PC or laptop.

PROGRAMMING VALIDATION	
PIPE SIZE:	16 IN.
PIPE MATERIAL	DUCTILE
FLOW MEDIA:	WATER
MAX PRESSURE:	100 PSI
FLOW DIRECTION:	UNI-DIR

If re-programming is required in the field, programming of the meter may also be accomplished through the 16 button keypad. The LCD display is a backlit 128 x 64 graphic module. A simple to use drill-down menu structure allows for quick programming and set-up of the meter. Most common pipe sizes and schedules are stored in memory for ease in programming a specific application. Non-volatile memory ensures that programming constants are not lost during disruption of power.

ACCURACY AND RELIABILITY

Rangeability:40 to 0.1 ft/sec
Turndown: 400:1
Repeatability: 0.25%
Accuracy: ±0.5% of actual rate of flow

3 year warranty

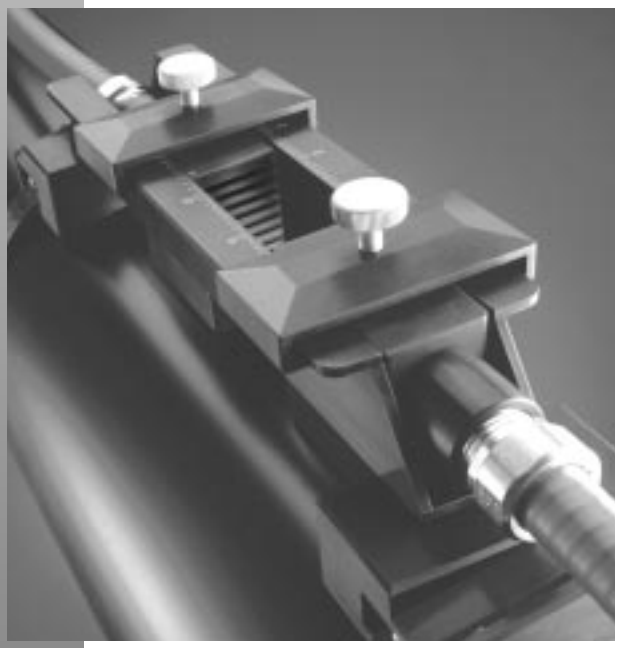
The electronic design of the Model 5044 utilizes the latest microprocessor technology and operates in conjunction with a DSP floating point coprocessor. An exclusive signal processing technique combines correlation and FFT detection methods to ensure the highest degree of accuracy and reliability.

Flash memory is employed for logging of flow data. Up to 8 channels can be logged—including flow, velocity and totals. The storage capacity for a single channel logging at 5 minute intervals is 113 days. In addition, graphs may be visually displayed in pre-programmed time intervals. Daily summary allows viewing of the previous eight days. This includes times, dates, averages, minimums, maximums and totals. Plant operating personnel also have the ability to simply download logger data through the use of a standard laptop.

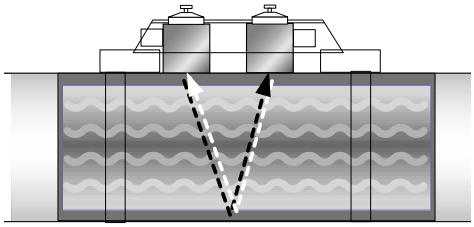
SPEEEDRAIL® SENSOR MOUNTING

Since the externally mounted sensor is the preferred design for transmitting signals through pipe or conduit, a new one-piece **SpeedRail**™ sensor mounting system was developed. Mounting of both sensors is quickly and accurately accomplished in two simple steps. Lock the self-aligning mounting rail to the pipe or conduit and load in the sensors.

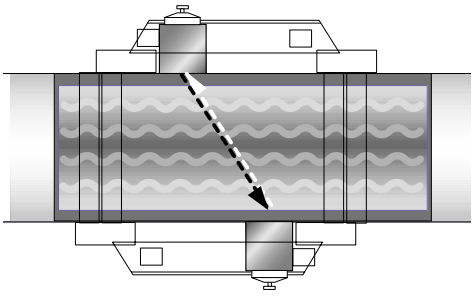
Once the sensors are connected to the transmitter, the Model 5044 is ready to measure flow.



The externally mounted sensor is the preferred design when acoustic signals are capable of being transmitted through pipe or conduit.



Externally mounted non-wetted sensors (V-Shot)



Externally mounted non-wetted sensors (Z-Shot)

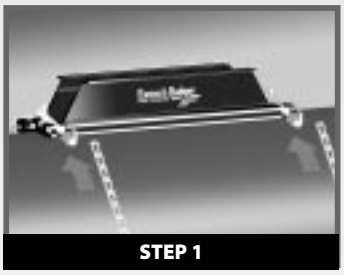
Eastech Badger offers a wide range of sensor options covering a multitude of applications. Simple "walk through" installation instructions are graphically displayed in the operating manual for local reference in the field

Externally Mounted Sensor

Externally mounted sensors are the preferred design when acoustic signals are capable of being transmitted through pipe or conduit. The sensors are fully potted, incorporating an FM approved explosionproof design for use in Class I & II, Division 1 hazardous areas or Division 2 nonincendive areas. Both sensors and mounting hardware are designed to resist corrosion, function when buried or submerged and operate over a wide temperature range of -30° to 150°F (-30° to 300°F optional). External sensors are suitable for placement on all metallic and plastic piping, with the exception of pit cast iron and layered fiberglass pipe.

Application: 1" and larger. Plastic, Metallic, Asbestos Cement and Ductile/Cast Pipe.

SpeedRail™ Mounting

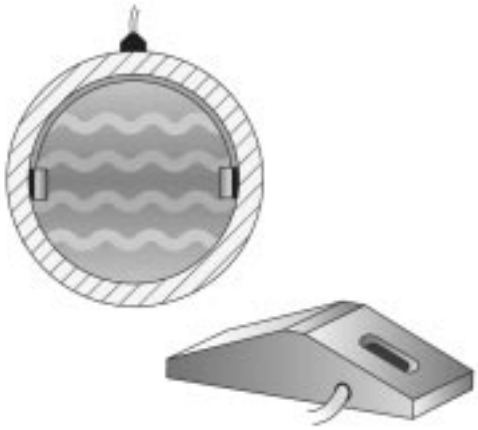


Since externally mounted sensors are the preferred design for transmitting signals through pipe or conduit, a new one piece **SpeedRail**™ sensor mounting system was developed. Mounting of both sensors is quickly and accurately accomplished in two simple steps. Lock the self-aligning mounting rail to the pipe or conduit and load in the sensors.

Once the sensors are connected to the transmitter, the Model 5044 is ready to measure flow.

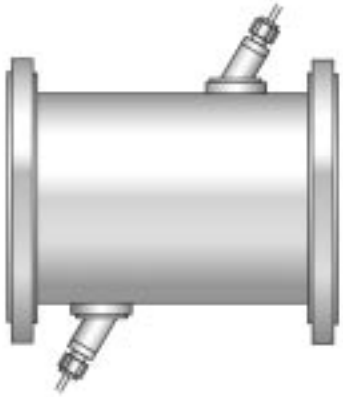
Instream Sensor

In open conduits over 12 inches in width or in large concrete pipes where the outside of the pipe is not accessible, the instream sensor is recommended for accurate fluid velocity measurement. The design of the sensor facilitates simple installation. Sensor configuration allows flush mounting against the sidewall. For accuracy and ease of installation, a unique internal hoop design is available with premounted instream sensors. This mounting arrangement makes installation fast and precise. Sensors are constructed of PVC and are fully potted.
Application: Large diameter pipe and pipe or conduit not accessible from the outside.



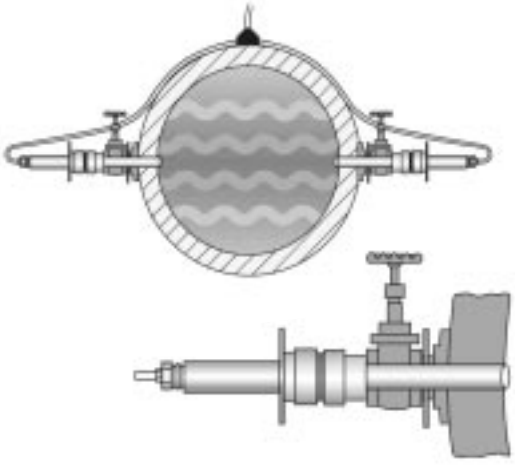
Windowed Sensor

Fabricated spool pieces are available in a windowed sensor design with a wide choice of end connections and materials of construction. Spool pieces are supplied with both sensors mounted and calibrated to the electronics. Windowed sensors transmit and receive ultrasonic pulses through an acoustic window which is in contact with the flow stream. The design allows sensor removal without de-watering of the line. The sensors and windows are constructed of Ultem® thermoplastic material and carry a temperature rating of 150°F and a pressure rating of 150 psi.
Application: 3" to 48" with stainless or carbon steel construction and ANSI, AWWA and plain end connections.



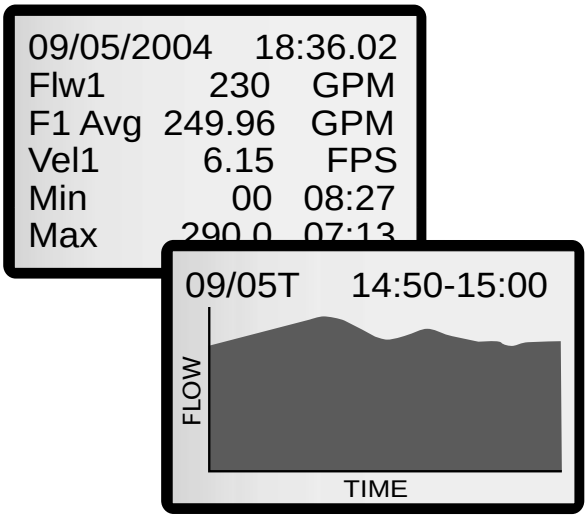
Wetted Sensor

"Hot Shot" sensors are utilized on piping or conduits that inhibit the transmission of acoustic energy. A standard concrete saddle tap is employed for penetration of the pipe wall. "Hot Shot" sensors are available for 12" and larger pipe. The sensor design allows for flush mounting within the conduit, thereby eliminating turbulence or the build-up of solids around the measuring point. Sensors are provided with an integral valve in order to allow sensor removal without shutting the process down. Constructed of PVC and fully potted, the sensors carry a pressure rating of 150 psi.
Application: Concrete, Asbestos, Cement, Fiberglass Wrapped, Wood Stave, heavily corroded steel pipe and pipes with considerable calcium build-up.



Data Logging

Chart recorder data may be visually validated either on the graphical display of the meter or through a laptop or modem housed within the Chartmeter enclosure. The Model 5044 has a 256K Byte logger with storage intervals. The logger can be programmed for various time intervals. Up to 8 channels can be logged—including flow, velocity and totals. The storage capacity for a single channel @ 5 minute intervals is 113 days. IEEE floating point storage is used.



Daily Averages

Flash memory is employed for logging of flow data. Data is retrieved by viewing the local display or downloaded via the serial port. Daily summaries allow viewing of the previous eight days. Included are times, dates, averages, minimums, maximums and totals.

Logger Graph

A graph may be visually displayed on the 5044. The graph will display the stored logger data in pre-programmed time intervals.

Data Retrieval

The Model 5044 is designed for reliable and accurate retrieval of data—either on-site or remotely. The unit is equipped, as standard, with an integrated data logger capable of storing large amounts of information for later analysis. Because of its multiple output capability, this information may simply be retrieved through the use of one of the following methods.

Laptop

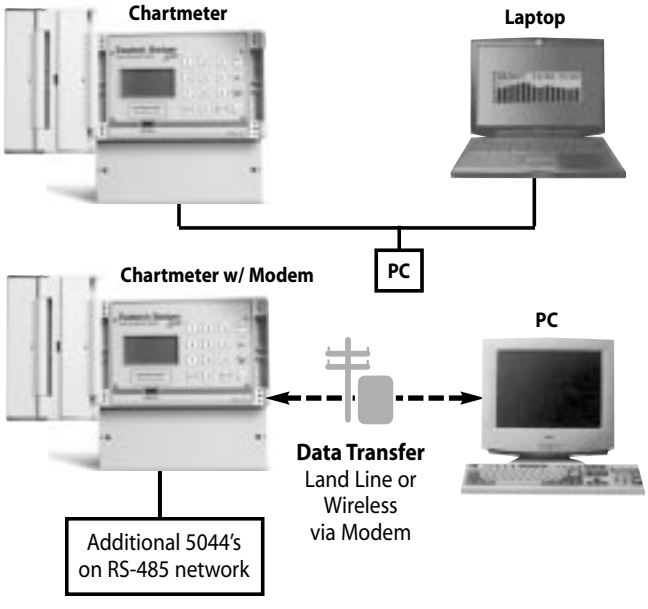
The Eastech Badger data collection system allows plant operating personnel the ability to simply download logger data through the use of a standard laptop. This information can then be transferred to a PC. Free operating software may be downloaded from the Eastech Badger website.

Modem

A modem can be installed within the enclosure of the 5044 for phone line or wireless transfer of data to a central location. Since the Chartmeter has two totally independent communications ports (RS-232 and RS-485), a single modem can provide data for multiple meters communicating serially through a field network such as Modbus®. Profibus® and DeviceNet® communication protocols are additionally available.

Multiple Outputs

One 4-20 mA	Isolated, 800 ohms maximum.
Up to 3 SPDT Relays	Available for alarm conditions.
RS232	With Modbus protocol. Flow control is CTS/RTS or none. DB-9 connection.
RS485	With Modbus protocol, isolated. The RS-232 & RS-485 can be set with different slave I.D.s.
Protocols	Modbus®, Profibus®, DeviceNet®



SPECIFICATIONS

RELIABILITY

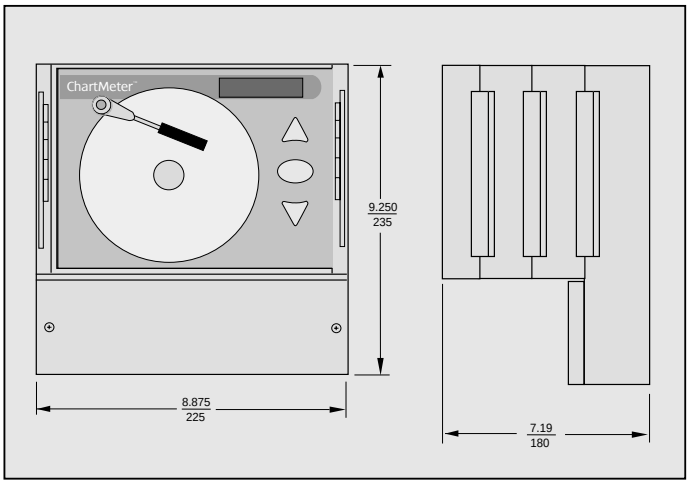
Nonintrusive in design and devoid of any mechanical components, clogging of the meter, corrosion and continual recalibration is eliminated as an operating concern. Due to the auto-corrections feature designed into the electronics of the meter, the Model 5044 will maintain a consistently accurate reading over changing process conditions and time.

3 YEAR WARRANTY

Factory Mutual System Approved

Sensors:
Class I & II,
Div. 1 & 2
Groups A - G
Transmitter:
Class I, Div. 2
Groups A - D

DIMENSIONAL DATA (inches/mm)



PERFORMANCE (forward and reverse flow)

Linearity	± 0.5%
Repeatability	0.25%
Accuracy	±0.5% of actual rate of flow
Rangeability	40 to 0.1 ft./sec.
Turndown	400 : 1
Power Supply	High immunity: Approvals CE, UL, CSA
Input Range	85 to 265 VAC
Input Freq. Range	47 to 440 Hz

SENSORS

Pipe Diameter	1" to 120" (above 120", consult factory)	
Temperature Rating	-30° to 150° F Optional to 300° F (Strap-on only)	
Sensor	**Pressure Rating**	**Max. Cable Distance**
Strap-on (1" - 120")	Not applicable	1000 ft.
Instream (12" - 120")	150 PSI	1000 ft.
Wetted (12" - 120")	150 PSI	1000 ft.
Windowed (3" - 48")	250 PSI	250 ft.
Materials of Construction		
Sensors:	Anod. Alum./Ultem®/PVC	
Strap-on hardware	Anod. Alum. (304 SS optional)	
Hot-shot Valve Body	Brass	
Sensor Cable	Triax Beldon 9222 (50 ft. std.)	

Hazardous Area Installations
All sensors (except windowed spool sensors) have been Factory Mutual approved for use in Class I & II, Division I, Groups A - G, hazardous areas, except in acetic atmospheres.

TRANSMITTER

Factory Mutual System Approved

3 Year Warranty

ENCLOSURE	
Standard	Nema, 4, 4X polycarbonate **(9.25" x 8.87" x 7.19")**
Optional	Nonincendive Class I & II , Grps. A - D, Div. 2 Explosionproof, Aluminum Class I ,Grps. C & D, Class II, Grps. E, F, G. Div. 1 & 2
Accessories	Heater and thermostat, Door Lock, Modem
TEMPERATURE	
Standard	-4° to 158°F (-20 to 70°C)
With Heater	-40° to 158°F (-40 to 70°C)
OUTPUTS	
4-20 mA	Analog isolated into 800 ohms max, monitored to detect open circuits. RFI and gas discharge surge protection and two fuses.
Relay Alarms	SPDT relays (pluggable) 0.25A @ 120 VAC or 0.50A @24 VDC
RS-232 Serial Port	1200-38400 Baud, Modbus RTU protocol
RS-485 Serial Port	Optically isolated, Modbus RTU protocol
Network protocols	Modbus, Profibus, DeviceNet
DC Power Out	12 VDC. 100mA maximum
DISPLAY	
Backlit LCD	128 x 64 Graphic Module
POWER	
Wattage	12
Voltage	80/240 VAC, 50/60 Hz / 12-28VDC @ 250 mA.
DATA LOGGING	
Non-volatile flash memory, storage of up to 32768 records.	

SUGGESTED SPECIFICATION

ChartMeter 5044

An ultrasonic microprocessor-based transit-time flowmeter and an integral circular chart recorder shall be installed at the location on the plans in accordance with manufacturer's recommendation. The ChartMeter must have a single pen chart recorder electronically integrated with a transit time ultrasonic flowmeter. The ChartMeter 5044 shall be programmed for a _____ (size of pipe) and scaled at maximum to _____ (max flow and engineering units). The ChartMeter unit shall have the following features:

Enclosure: IP66/NEMA 4, 4X (optional: Explosion proof, class 1, Groups C & D, Class II, Groups E, F & G, Divisions 1 & 2)

Power: 80 to 240 VAC, 50/60 Hz or 12 to 28 VDC @ 150 mA with surge suppression and fuse. (powered by flowmeter)

Chart: Circular 24 hour, 7 day or 31 day.

Outputs: **MaDC:** 4-20 mA isolated into 1000 ohms, monitored to detect open circuits, with RFI and gas discharge surge protection and two fuses.

Relays: A minimum of 1 relay (with two additional as option) rated at 0.25A @ 120 VAC or 0.5A @ 24 VDC. The relays must be assignable by the front panel keypad for up to three setpoints, loss of signal, 4-20 loop, overange 1, overange 2 or contact integrator.

Datalogger: There shall be a data logger integral to the electronics. The data logger shall have non-volatile flash memory with a storage capacity of 32768 records. Software shall be supplied for downloading the data. The logged data shall have the capability to be displayed on the backlit display in graphing form for daily total flow units for the past eight days.

RS-232/485: There shall be a RS-232/485 serial port of 1200-38400 baud, Modbus RTU.

Warranty: The electronics and sensor shall carry a 3-year warranty.

Sensors: There shall be two sensors type _____ designed for flow measurement of liquids in full pipes and approved for use in Class I, Division 1, Groups A,B,C & D hazardous areas. The sensors shall be manufactured of anodized aluminum and Ultem plastic and be supplied with 50 feet of cable as standard. 1000 ft. maximum cable runs allowed. Splices shall be made waterproof. The sensor cables shall be run in dedicated conduit.

The unit shall be a ChartMeter 5044 as manufactured by Eastech Badger, Tulsa OK.

Ordering Guide

Chart Recorder	Meter	Sensor	Extra Cable	Options	Data Retrieval
 **50** Nema 4, 4X IP66 **Circular Chart** 1 Day 7 Day 31 Day **(please specify)**	**CLOSED PIPE FLOW**  **44** Nema 4, 4X IP66 3 YEAR WARRANTY One 4-20 mA RS 232/485 1 Relay Datalogger	**External Strap-On** (1" - 42" Dia. Pipe) **AS1** **External Strap-On** (48" - 120" Dia. Pipe) **AS2** **External Strap-On** (High Temp.: 300°F) **AS3** **Instream** (12" - 120" Dia. Pipe) **AS4** **Wetted "Hot Shot"** (12" - 120" Dia. Pipe) **AS5** **Windowed** (3" - 48" Dia. Pipe) **AS6**	**Note:** Each sensor is equipped with 50 feet of cable as standard. **100 ft.** **Y** **200 ft.** **Z**	**Factory Calibrated** **A** **(No Charge)** **Heater & Thermostat** **B** **Keylock** **C** **Splice Kit** **D** **Relays** (2) **L** (3) **P**	**Modem** (phone line) **M** **Profibus** **E** **DeviceNet** **F**

Ordering Example: 5044 with external sensor, factory calibration, heater and therm., 2 relays. **5044AS1ABL**

Eastech Badger
ULTRASONIC FLOW MEASUREMENT

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