Cox Turbine Flow Meters

Flow Processor

EC80

DESCRIPTION

The Cox EC80 Flow Processor is a programmable electronic processor, providing total compensation to enhance flow meter accuracy, while extending the linear flow range. Packaging is provided for remote, direct or embedded mounting to support most installation or application requirements.

The compact design includes both single and dual frequency inputs from 4 or 10 Ohm pickups, as well an RTD input. The EC80 processor tracks all variables to compensate for viscous and inertial effects, using proven Strouhal-Roshko algorithms. Enhanced DSP technology allows for exceptional signal characterization using a 32-bit floating point processor at 150 MHz, capable of producing a 1 millisecond speed of response.

Features	Benefits
Rotor blade pulse averaging	Enhanced low-flow resolution and output smoothing
Strouhal-Roshko computation, using 16-bit resolution	Dynamic response to changing conditions with fully compensated output
Dual outputs provide both frequency and analog signals	Easily interfaces to data acquisition or control system
Internal amplifier and signal conditioners	No need for additional amplifiers or signal conditioners, yielding cost savings
Assignable outputs	User assigned output variables allows for greater ease of system integration

APPLICATIONS

Meeting the demanding requirements of the aerospace, automotive, industrial processing, and test and measurement industries, the EC80 processor provides significant improvements in flow meter performance under varying process conditions. The processor thrives in, but is not limited to, the following applications:

- Precision monitoring
- Engine test cells and test stands
- On-board automotive and aerospace testing
- Control loops
- Custom OEM flight and commercial applications

MODEL NUMBERS

Description	Part Number
Remote	EC80-R-RM1N-N
Remote with Rate Indicator	EC80-R-RM2N-N
Integral Mount	EC80-R-XP1N-N
Integral Mount with Rate Indicator	EC80-R-RM2N-N-007

CUSTOMIZATION

The EC80 processor design permits custom configurations, allowing you to directly embed the flow processor into the flow meter OEM housing design. Greater customization ability and adherence to application requirements makes the EC80 processor a versatile robust solution for unique applications. Benefits to having the meter electronics embedded onto the flow meter include:

- 100% interchangeability of the flow meter while maintaining the same scaled outputs
- Signal conditioning for temperature sensors embedded in the flow meter
- Compact packaging
- Close coupling to protect signal integrity

PRINCIPLE OF OPERATION

The EC80 processor accepts all types of square wave pulse inputs. Fully compensated and linearized volumetric flow rates, totals and temperature are examples of flow parameters that can be viewed through serial communications, included software program or an embedded rate indicator (depending on product configuration).

Varying fluid temperature and viscosity conditions can be compensated for by means of a universal viscosity curve. In addition, Strouhal- Roshko algorithms are applied for a more comprehensive compensation method, taking into consideration all the secondary effects to which the meter is sensitive, like the expansion and contraction of the meter bore diameter. Inferred mass flow rate is achieved by extracting the density value of a known fluid from a stored temperature/density table, which is multiplied by the volumetric flow rate.

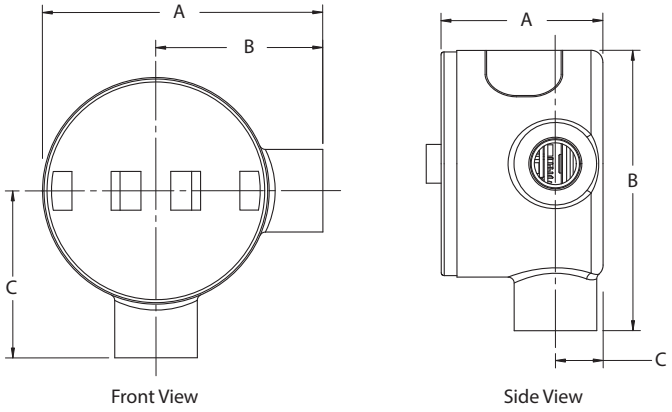
Badger Meter

CXX-DS-01269-EN-04 (November 2021)

Product Data Sheet

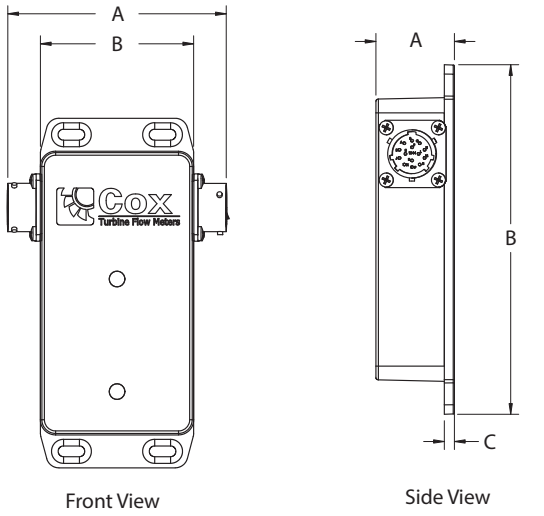
DIMENSIONS

EC80-R-XP1N-N Integral Mount



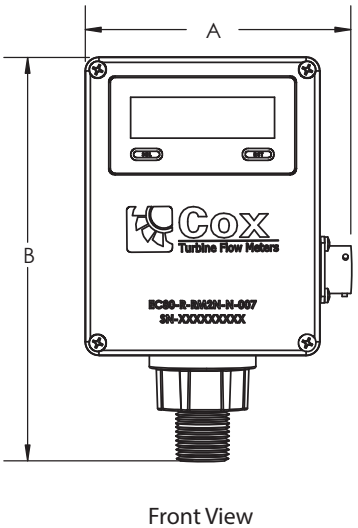
	Front View	Side View
A	4.70 in. (119.38 mm)	2.71 in. (68.83 mm)
B	2.80 in. (71.12 mm)	4.70 in. (119.38 mm)
C	2.80 in. (71.12 mm)	0.80 in. (20.32 mm)

EC80-R-RM1N-N Remote



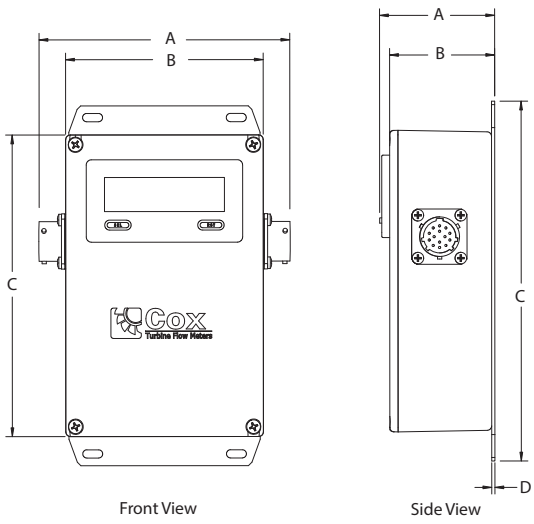
	Front View	Side View
A	3.40 in. (86.36 mm)	1.22 in. (30.99 mm)
B	2.38 in. (60.45 mm)	5.43 in. (137.92 mm)
C	—	0.16 in (4.06 mm)

EC80-R-RM2N-N-007 Integral with Rate Indicator



	Front View
A	4.2 in. (106.68 mm)
B	6.4 in. (162.56 mm)

EC80-R-RM2N-N Remote with Rate Indicator



	Front View	Side View
A	4.75 in (120.65 mm)	2.18 in. (55.37 mm)
B	3.74 in. (95.00 mm)	1.99 in. (50.55 mm)
C	5.71 in. (145.03 mm)	6.81 in. (172.97 mm)
D	—	0.06 in. (1.52 mm)

SPECIFICATIONS

Performance	**Linearized Frequency**	± 0.1% of reading
	Linearized Analog Output	± 0.1% of full scale
	Process Latency	100 µs
Input Power	**Nominal**	24V DC, 2W maximum
	With Digital Output	7…32V DC
	With Analog Output	12…32V DC
Temperature Environment	**Operating**	–40…185° F (–40…85° C)
	Storage	–67…257° F (–55…125° C)
	Humidity	0…80% RH, non-condensing
Flow Meter Input Type (A and B) (Two Independent Channels)	**Pulse TTL Compatible (A and B)**	Frequency range: 5 Hz…5.0 kHz
	RF Carrier 4 or 10 Ohm Pickup	Carrier frequency range: 25…65 kHz
		Frequency range: 5 Hz…5.0 kHz
RTD Temperature Input 4-Wire	**Type**	100 Ohm platinum, 0.00385 alpha
	Usable Range	–65…365° F (–55…185° C)
Analog Input (For Temperature)	**Response**	5 Hz Sine Response
	Voltage	0…5V or 0…10V DC
	ADC Resolution	12 bit (1/4096)
	Input Impedance	>100k Ohms
Raw Frequency Output (Two Independent Channels)	**Output**	0…5V, TTL, 5…3500 Hz, square wave
	Minimum Load Impedance	5k Ohm minimum load
Frequency Output (Two Independent Channels)	**Output**	0…5V, TTL, 1…20,000 Hz, square wave 50% duty cycle
	Measurement	Linearized flow rate, raw rotor frequency, summed rotor frequency (dual rotor) or total flow (accumulation)
	Minimum Load Impedance	10k Ohm (linearized flow), 5k Ohm (raw flow)
Analog Outputs (Two Independent Channels)	**Resolution**	16-bit resolution
	Channel One	4…20 mA, 0…5V DC or 0…10V DC; linearized flow rate or temperature
	Channel Two	0…5V DC or 0…10V DC; linearized flow rate or temperature
	Load Impedance (4…20 mA)	500 Ohms maximum
EIA-485 Serial Data	**Baud**	115k
	Update Rate	Selectable, 0.1 sec minimum
	Data Bits	8
	Stop Bit	1
	Parity	None
Enclosure Environmental Rating	**Blind Remote**	Aluminum enclosure with MS Connectors, weatherproof mounting flange
	Remote with Rate Indicator	Aluminum enclosure with MS Connectors, weatherproof mounting flange
	Blind Integral	NEMA 4 (IP65) with 1/2 in. NPT Class 1, Groups C and D Class 2, Groups E, F and G Class 3, WET LOC — Cast Aluminum
	Integral with Rate Indicator	Aluminum enclosure with MS Connectors, weatherproof
Rate Indicator	**Display**	8 digits, 0.46 in. (11.7 mm) high digits, transmissive LCD with green/red LED backlight
Remote Cable Length	**Flow Meter to EC80**	10 ft (3 m)
	EC80 to DAQ or Control System	100 ft (30.5 m)
Software	Conforms to SAE ARP4990 calculations for temperature	

Control. Manage. Optimize.

www.badgermeter.com