



# FLOWSWITCH

Process Instrumentation

## Non-Intrusive Flow Switch and Velocity Sensor!

**Doppler Ultrasonic Technology**

The **ECHO FlowSwitch** is a simple, reliable Doppler flow switch and liquid velocity meter. It is an encapsulated, self-contained clamp-on flow sensor for dirty water and wastewater flow conditions. It is low cost and pre-calibrated from the factory 0-20 ft/s (6.096 m/s) equals 0-5 VDC proportionally (higher velocities available as an option). It can be custom ordered to any velocity range or provide a TTL Pulse output up to 5000 Hz with the factor supplied on the calibration sheet.

It uses the very advanced and unique Adaptive Zoom Windowing and Auto Flow-profile Algorithms to produce factory calibrated +/- 1.0% accuracy. It is an economical solution compared to traditional flow meters. It can measure liquid velocities in any pipe from 1... 256 inch diameters.

It requires no programming or calibration. Just clamp it on the pipe and connect the 0-5V DC velocity output. That's It!

### **Principle of Operation**

The Doppler flowmeter utilizes the well known Doppler effect, which is named after Christian Doppler, who documented the effect in 1842. In general terms it is the change in frequency and wavelength of a wave as perceived by an observer moving relative to the source of waves. The ECHO FlowSwitch has an array of piezoelectric crystals; part of the array transmits a beam of high frequency ultrasonic pressure waves so as to form a fixed cross angle with the pipe axis. As the beam travels into the non-homogeneous fluid, some energy is scattered back by solid particles or gas bubbles entrained in the wave, which is received and analyzed by the ultrasonic flow meter. The difference in frequency is known as the Doppler shift. This is linearly proportional to the fluid velocity. As the internal cross sectional area of the pipe is easily measured so the volumetric flow rate is easily calculated via a PLC or Process Meter.

**Measures virtually any dirty liquid in any pipe - 60 day Performance Guaranteed!**



- **Doppler Technology with High Accuracy +/- 1.0% of measured value (process conditions can reduce accuracy)**
- **Low cost non-invasive flow switch and velocity meter**
- **Precalibrated 0-20 ft/s (0-40 ft/s is optional). No Programming Needed!**
- **Easy to install clamp-on transducer**
- **Reliable measurements on any pipe diameter from 1 to 256 inches**
- **Signal Strength output (optional)**
- **Measure flow, no flow or liquid velocity without cutting the pipe**
- **Zero head loss results in improved pumping efficiency**

# Technical Specification: Arrow Hunter - FlowSwitch



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TECHNOLOGY / OPERATION	
Measuring Principle	Doppler Clamp-on Velocity Meter and Flow Switch
PERFORMANCE	
Measuring Range	0 ... 20 ft/sec (0 ... 6.096 m/s) (option: up to 40 ft/s)
Time Resolution	1 to 256 inch (20 to 6500 mm) diameter
Response Rate	+/- 1% (process conditions and flow profile can reduce accuracy)
Time Resolution	24 VDC (18-34 VDC), 40 mA
OUTPUTS	
Analog	One 0-5 VDC output proportional to 0-20 ft/s (custom ranges from 0-40 ft/s)
Pulse	Optional TTL Pulse output up to 5000 Hz (K factor supplied)
Signal Strength	Standard Signal Strength output
PROGRAMMING	
User-interface	None, comes preprogrammed
Display	None
ENVIRONMENT	
Temperature Range (Electronics)	21°F to +167°F (-6°C to +75°C)
Outdoor Rating (Electronics)	NEMA 4X (IP 66)
DESIGN	
Dimensions	4.41 x 1.37 x 1.26 inch (112 x 35 x 32 mm)
Enclosure Material	Stainless Steel and plastic combination
Cable Length	33 ft (10 m) standard, optional lengths available
Weight	Approximate 0.44 lbs (200 g)
WARRANTY	
Product Warranty	1 year

Our policy is one of constant development and improvement. ECHO reserves the right to amend details as necessary. Environmental conditions can affect accuracy slightly.

PART NUMBER CONFIGURATOR															
MODEL (BASE PRICE)	Flow Switch	F	S	-	6	0	0	-							
CONFIGURATION	Doppler Mode (Single Channel)								0						
POWER SUPPLY	24 VDC								0						
OUTPUT	Voltage 0-5 VDC and ranged 0-20 ft/s								0						
	Voltage 0-5 VDC and custom ranged (user specify)								1						
	Pulse TTL up to 5000 Hz (supplied with calibrated K factor)								2						
CABLE LENGTH	33 ft (10 m) Standard									0	3	3			
	66 ft (20 m) Standard									0	6	6			
	100 ft (30 m) Standard									1	0	0			
	Custom Non-spliced cable (user specify)									X	X	X			
REQUIRED													X	X	X