HYBRID ULTRASONIC FLOW METER
Doppler or Transit Time in One Unit

ΩE OMEGA™

FDH-1A Series

1 YEAR WARRANTY CE RoHS

- ✔ **Selectable Doppler or Transit Time Operating Mode**
- ✔ **Quick and Easy Clamp-On Transducer Installation**
- ✔ **User Programmable Via 5-Button Menu Driven Interface**
- ✔ **High Quality 320 x 240 Pixel QVGA Backlit LCD**
- ✔ **Data Logging to Standard SD Card Format**
- ✔ **Isolated 4 to 20 mA or 0 to 1 Khz Pulse Output (Fully Configurable)**
- ✔ **Optional Relays and Communications**

Doppler technology is used to measure the flow rate of liquids with particulate and/or bubbles suspended in it. Transit time technology is used for clean liquids OMEGA's FDH-1A Series hybrid ultrasonic flow meter allows customers to select between doppler and transit time technology with a single instrument. Isolated analog output, frequency output and the ability to data-log to standard SD cards are standard included features. The FDH-1A is programmed via a menu driven QVGA LCD display with a 5 button interface panel. Optional control functions with relay outputs are optional (-R3). The communications option package (-COMM) gives user's RS232, RS485, USB and Ethernet for interfacing to a PC.

FDH-1A, shown smaller than actual size.

SPECIFICATIONS

Measuring Principle: Hybrid; user selectable doppler or transit time operating modes
Fluid Types: Virtually any acoustically conductive fluid
   Transit Time Mode: 0 to 10% (0 to 100,000 ppm) particulate
   Doppler: 0.02 to 15% (200 to 150,000 ppm) 50 micron particles
Fluid Velocity Range: 0.07 to 9.14 m (0.25 to 30') per second
Flow Sensitivity: 0.0003 m (0.001') per second
Nominal Pipe Sizes: 63 to 2500 mm (2.0 to 100")
Enclosure: NEMA 4X (IP66), powder coated aluminum, SS clamps and hardware
Dimensions: 279 H x 218 W x 127 mm D (11.00 x 8.60 x 5.00")
Weight: 9.5 lb. (4.3 Kg)
Mounting: Wall, pipe (vertical or horizontal) or panel mounting. Hardware included
   Panel Opening: 270 H x 206 W mm (10.63 x 8.10")
   Panel Depth
      Rear: 71 mm (2.78")
      Front: 55 mm (2.18")

Power Requirements: 95 to 264 Vac 50/60 Hz or 15 to 30 Vdc; 30 watts max
Operating Temperature: -10 to 60ºC (14 to 140ºF)
Storage: -40 to 70ºC (-40 to 158ºF)
Display: 320 x 240 pixel QVGA backlit LCD, UV resistant. Simultaneous rate and Total; 10 digit max + exponent to E+32 decimal location configurable to 10 places
Display Languages: English, Spanish, French or German selectable
Keypad: Five-button positive action tactile switch keypad
Security: Programmable master password and individual configuration passwords
Display Volume Units: Independently configurable rate and total display units in U.S. Gallons, ounces, barrels (US liquid), barrels (US oil), cubic ft, acre ft, Imperial (British) gallons, liter, cubic meter, or user defined "custom" units. Rate display in feet or meters per second.
Display Time Units: Seconds, minutes, hours, days
Display/Output Response Time: Selectable; 0.25, 0.50, 1.0 (default), 2.5, 5.0 seconds

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Flow Rate Display Averaging:
Selectable; 0.50, 1.0, 2.5, 5.0 (default), 10.0 sec
Data Outputs: Isolated 4 to 20 mA output fully configurable, invertible; 0 to 1000 Hz pulse output fully configurable, invertible
Data Logging: Date/time stamped flow rate and flow total data in FAT32 file format, easily imported into Excel. Configurable to trigger on time interval (1-999,999 sec), rate and/or total set-point values. Over 500,000 log events possible with included 32 MB SD card.

Process Control (-R3 option): Three independently configurable 10 amp Form C, NO/NC relays. Configure to flow rate for high/low/range rate alarm. Programmable release values enable auto release or manual latching operation. Configure to flow total for manual trigger batch operations or automatically triggered, timed batch operations.
External Communications (-COMM Option): Computer connection via RS232, RS485, USB, Ethernet. Includes user communication and configuration software. Permits remote internet access through local network set-up. Remotely access and upload data logging files.

Clamp-On Transducers
Housing: NEMA 6P (IP67), Plastic: (PVDF base with Polypropylene cover), SS clamps and hardware
Dimensions: 79 H x 75 W x 41 mm D (3.12 x 2.95 x 1.60")
Weight (Excluding Cable): 0.8 lb (0.4 kg) each
Cable: Shielded coaxial RG/U Type; 59. PVC jacket, black. RoHS Compliant
Standard length: 3 m (10')
Optional Lengths Available:
15 m (50'), 30 m (100')
Pipe Surface Temperature:
-34 to 121ºC (-20 to 250ºF)
Shipping Specifications
Carton Dimensions:
533 H x 432 W x 241 mm D (21 x 17 x 9.5")
Carton Weight: 24 lb (10.9 kg)

Note: For fluid, flow stream, minimum straight pipe and mounting requirements see the FDH-1A operator's manual available online.

Accuracy

Flow Rate Averaging Time	Transit Time Accuracy at Nominal Pipe Sizes
5.0 Seconds (default setting)	±1% of rate > 1 ft/sec, ±0.01 ft/sec < 1 ft/sec
1.0 Seconds	±1% of rate > 5 ft/sec, ±0.05 ft/sec < 5 ft/sec
0.5 Seconds	±2% of rate > 12 ft/sec, ±0.25 ft/sec < 12 ft/sec
Flow Rate Averaging Time	Doppler Accuracy at Nominal Pipe Sizes ¾ to 100" Nominal Pipe Size
5.0 Seconds (default setting)	±2% of rate > 12 ft/sec, ±0.25 ft/sec < 12 ft/sec
1.0 Seconds	±2% of rate > 12 ft/sec, ±0.25 ft/sec < 12 ft/sec
0.5 Seconds	±2% of rate > 12 ft/sec, ±0.25 ft/sec < 12 ft/sec

Pipe Materials/Requirements (Most Metal and Plastic Pipes)

Pipe Material	Pipe Size Ranges (Doppler) mm (inch)	Pipe Size Ranges (Transit Time) mm (inch)	Max Pipe Wall mm (inch)
Brass (Naval)	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
Copper	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
FRP (Fiberglass Reinforced Plastic)	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
Iron (cast)	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
Iron (ductile)	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
Nylon	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	50 (2)
Polyethylene (HDPE)	25 to 2500 (1 to 100)	25 to 2500 (1.5 to 100)	50 (2)
Polyethylene (LDPE)	25 to 2500 (1 to 100)	25 to 2500 (1.5 to 100)	25 (1)
Polypropylene	25 to 2500 (1 to 100)	25 to 2500 (1.5 to 100)	13 (0.5)
PVC / CPVC	25 to 2500 (1 to 100)	25 to 2500 (1.5 to 100)	50 (2)
304 Stainless Steel	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
304L Stainless Steel	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
316 Stainless Steel	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
Steel (1% carbon hard)	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
Steel (carbon)	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)
Titanium	63 to 2500 (2 to 100)	63 to 2500 (2 to 100)	13 (0.5)

Note: The outside surface of the pipe must be clean and smooth. Insulation, coatings, rust and other surface imperfections should be removed before installing the transducers. The inside surface of the pipe must be smooth to properly reflect the sound wave.
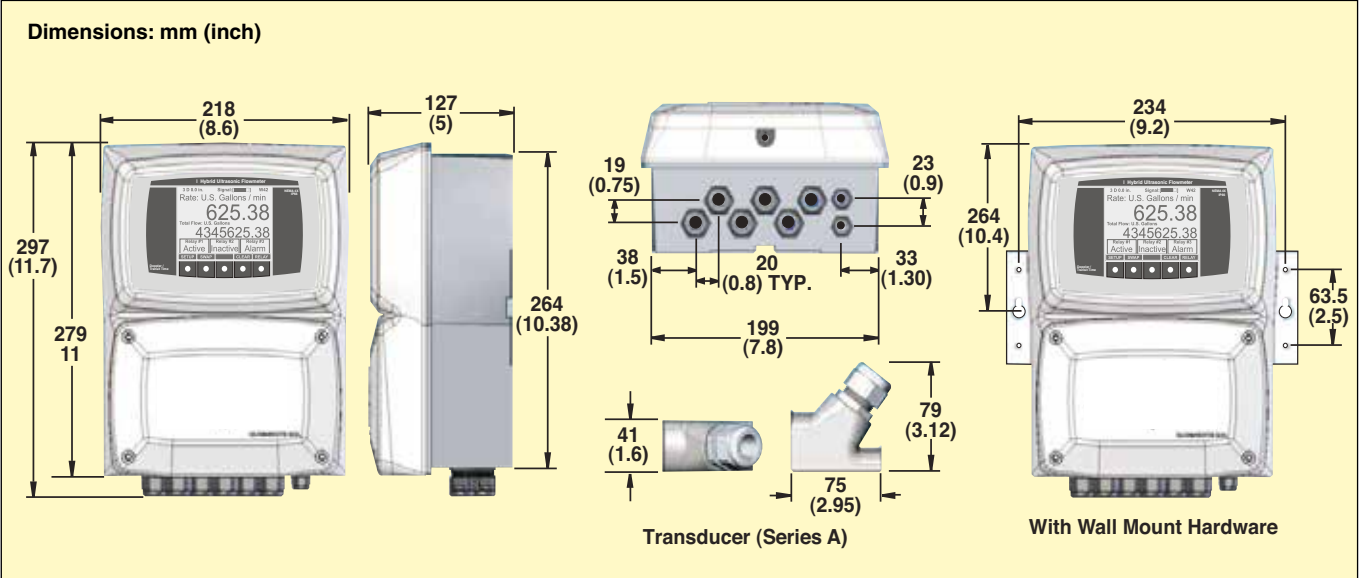
Communications Options

Any FDH-1A can be equipped with a communications package (-COMM) that includes Ethernet, USB, RS232, and RS485 connections, and proprietar user PC Software. When connected to a PC running the software, the user can access the configuration menu for program editing and data logging downloads directly into a PC.

The software user interface mimics the 5-button touch pad so learning to use the software application is simple. Simply clicking on the buttons is the same as pressing the buttons on the FDH-1A touch pad. Pressing and holding shift while clicking on a button simulates pressing and holding a button on the touch pad

Process Control Options

Any FDH-1A model can be equipped with a process control relay package (-R3) that includes three independently programmable 10 A relays. Each relay can be configured to respond to changes in either the measured rate of flow or the accumulated total flow value. When assigned to monitor flow rate, high/low/range rate alarms are possible. When assigned to monitor accumulated total, manual trigger batch operations or automatically triggered, timed batch (proportional feed) operations are possible.

Dimensions: mm (inch)

Transducer (Series A)

With Wall Mount Hardware

To Order	
Model No.	**Description**
FDH-1A	Hybrid doppler or transit time ultrasonic flow meter
FDH-1A-COMM	Hybrid ultrasonic flow meter with all communications options (RS232, RS485, USB and ethernet)
FDH-1A-R3	Hybrid ultrasonic flow meter with relay outputs
FDH-1A-COMM-R3	Hybrid ultrasonic flow meter with all communications and relays (RS232, RS485,USB and ethernet)

Comes complete with mounting hardware, stainless steel clamps, and operator's manual.
*For units with 250V power and a CEE 7/VII plug add **"-250VE"** to the model number, no additional charge.*
*For units with 250V power and a NEMA 6/15 plug add **"-250V"** to the model number, no additional charge.*
*For units with 15.2 m (50') of sensor cable add **"-50FT"** to the model number for additional cost.*
*For units with 30.5 m (100') of sensor cable add **"-100FT"** to the model number for additional cost.*
***Ordering Examples: FDH-1A-50FT,** hybrid doppler or transit time ultrasonic flow meter with 50' of transducer cable.*
***FDH-1A-R3-250V,** hybrid doppler of transit time ultrasonic flow meter with relay outputs, 250V power and NEMA 4X (IP66) electrical plug.*