

# Time Delta M-Flow

Full-Feature Transit-Time Ultrasonic Flow Meter System at an Affordable Price

The Time Delta M-Flow is a state-of-the-art, economical alternative to magnetic, vortex and differential pressure transmitters. Advanced microprocessing detection methods combine with a versatile design to provide accurate and obstructionless flow measurement of clean water applications. The Time Delta M-Flow features high reliability and accuracy (up to 0.5%), and long-term maintenance-free operation. Programming the M-Flow is simple via the front panel keypad; no PC is required for setup. The instrument features a high-resolution, 2-line, backlit display and signal quality indication. The non-intrusive, clamp-on sensors are quickly installed without interrupting process flows or incurring pressure loss.

## Features

- **Flexible output options** – Analog output, totalizer pulse, relay outputs all included as standard options
- **Fast and easy installation** – Simple, menu-driven user interface enables quick setup without need to connect to a laptop PC
- **Compact and lightweight** – Incorporates the latest LSI technology for compact, rugged design. Meter weighs less than 2 lbs
- **Quick response** – Ultra-fast transit-time processing (200 ms) suits high-speed batch processing measurements
- **Multilingual** – Instrument setup and display supported in English, Spanish, German and French
- **Superior temperature effect** – Proprietary temperature and pressure compensation system completely eliminates error created by process temperature and pressure fluctuations

## Performance Specifications for the Converter

### Fluid Conditions

**Measured fluid** Homogeneous liquids with minimal aeration (water, sea water, hydrocarbons or fluid with unknown sound velocity) capable of ultrasonic wave propagation

**Fluid turbidity** 10000 deg. (mg/l) or less

**State of flow** Well developed turbulent or laminar flow in full pipe

**Fluid temperature** -4 to 212°F (-20 to 100°C)

**Velocity range** 0.010 to 33 ft/sec (0 to 10 m/sec) bi-directional flow

### Piping Conditions

**Pipe material** Carbon steel, stainless steel, cast iron, copper, PVC, aluminum, FRP, PEEK, PVDF, PTFE, PFA and other

**Pipe size** 1.0 to 9.0 in. (25 to 225mm)

**Lining material** Tar, epoxy, mortar, rubber, other, none

## Measurement Accuracy

**Accuracy** Up to 0.5%,  $\pm 2\%$  rate typical on calibrated system

**Linearity**  $\pm 0.1\%$  of scale

**Repeatability** 0.5% or better

## Functional Specifications for the Converter

**Power supply** 100 to 120 VAC  $\pm 10\%$ , 50/60 Hz; 200 to 240 VAC  $\pm 10\%$ , 50/60 Hz; 20 to 30 VDC

**Power consumption** Approx. 10 VA/5W (DC)

**LCD display** 2 line, 16 character per line, backlight

**LED display** 2 color, green/red, signal quality

**Keypad** 4-key, full menu-driven setup functionality

**Response time** 200 ms or less

**Analog output signal** 4 to 20mA DC, multirange, fully programmable

**Digital output signal** Digital output 2 mechanical relay, 1 point with socket. Normal open/close selectable, capacity 220 VAC/30 VDC, 1 Amp. Total pulse range: 1 pulse per day to 1 pulse per second. Digital output: 1 open collector transistor, 1 point. Normal on/off selectable, capacity 30 VDC, 0.1 Amp. Total pulse range: 1 pulse per day to 100 pps.

**Digital output functions** Forward/reverse totalizer pulse, flow switch high/low, forward/reverse total alarm and overflow, reverse flow detected

**Communications interface** RS-232C/RS-485. Data: velocity, flow rate, +total, -total, status. Cable length: 50 ft. (15m) for RS-232C, 3280 ft (1000m) for RS-485. Number of connectable units: 31 (RS485), 1 (RS232C)

**Display language** English, French, German, Spanish

**Measurement display screen** System units: English or metric, keypad selectable. LCD display: Configurable from keypad, select from among forward totalizer value,

## Key Features

- **Flexible output options**
- **Fast and easy installation**
- **Compact and lightweight**
- **Quick response**
- **Multilingual**
- **Superior temperature effect**



# Time Delta M-Flow

## Specifications (continued)

reverse totalizer value, flow velocity, output range percentage and flow rate. Velocity/flow rate display: 7 digits. Velocity units: English (ft/sec), metric (m/sec). Flow rate units: English (gal/sec, gal/min, gal/hr, kgal/hr, Mgal/d, ft<sup>3</sup>/sec, ft<sup>3</sup>/min, ft<sup>3</sup>/hr, Mft<sup>3</sup>/d, BBL/sec, BBL/min, BBL/hr, MBBL/d), Metric (L/sec, L/min, L/hr, kL/hr, ML/d, m<sup>3</sup>/sec, m<sup>3</sup>/min, m<sup>3</sup>/hr, Mm<sup>3</sup>/d, BBL/sec, BBL/hr, BBL/min, MBBL/d). Totalizer display: 7 digits. Totalizer units English (gal, kgal, ft<sup>3</sup>, kft<sup>3</sup>, Mft<sup>3</sup>, mBBL, BBL, kBBL, ACRE-in, ACRE-ft), Metric (mL, L, m<sup>3</sup>, km<sup>3</sup>, Mm<sup>3</sup>, mBBL, BBL, kBBL). Zero adjustment: Automatic or manual zero flow reference setting, keypad selectable. Damping function: 0 to 100 sec, keypad selectable. Low flow cutoff: 0 to 16.4 ft/sec (0 to 5 m/sec). Burnout function: Analog output, hold/overscale/underscale/zero, keypad selectable; Totalizer, hold/count, keypad selectable; Working timer, 0 to 100 sec, keypad selectable

### Physical Specifications for the Converter

**Ambient temperature** -4 to 140°F (-20 to 60°C)  
**Ambient humidity** Less than 90% RH  
**Enclosure** ABS Plastic  
**Environmental rating** NEMA-4X (IP65)  
**Dimensions (HxWxD)** 5.51 x 5.47 x 2.68 in. (140 x 139 x 68mm)  
**Weight** 1.76 lbs. (0.8 kg)

### Detector Model FLS

**Mounting method** Detector mounting on outside of pipe via steel bands, nylon belts, or steel wire  
**Straight pipe length** Upstream side: 10D or more recommended. downstream side: 5D or more recommended (*Calibrated system conditions include a minimum of 10 inner pipe diameters of upstream straight pipe run and a minimum of 5 inner*

*pipe diameters of downstream pipe run. Longer runs may be necessary due to pipe configurations.*)

**Signal cable** RG-58, RG-58A/U, 3D2V  
**Cable length** Standard length 16 ft., maximum length 100 ft. (30m)  
**Connection** Converter: internal screw. Detector: BNC (female)  
**Operating characteristics (pipe diameter range/temperature range)**  
 FLSE12: 1.0 to 4.0 in (25 to 100mm)/-4 to 212°F (-20 to 100°C). FLSE22: 2.0 to 9.0 in (50 to 225mm)/-4 to 212°F (-20 to 100°C)  
**Ambient temperature range** -4 to 212°F (-20 to 100°C)  
**Environmental rating** IP65  
**Material** FLSE12 & FLSE22: Plastic PBT housing, stainless steel mounting bracket  
**Dimension (WxHxD)/Weight** FLSE12: 9.45 x 1.10 x 2.00 in./0.7 lbs. (240 x 27.9 x 50.8mm/0.3 kg); FLSE22: 14.20 x 1.10 x 2.00 in./0.9 lbs. (360.7 x 27.9 x 50.8mm/0.4 kg)

*We attempt to provide you with complete information in this catalog. Because of the specific nature of ultrasonic technology, we strongly recommend you contact us regarding application and availability before placing your order.*

### Ordering Information

Included in standard delivery: Converter, manual

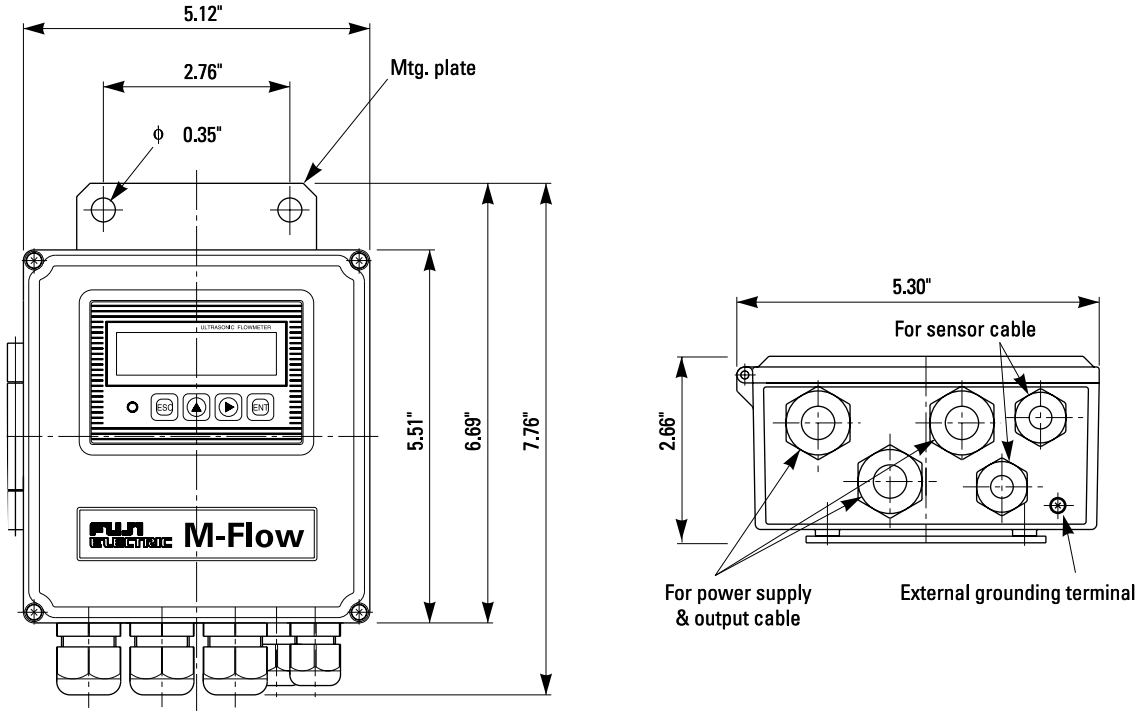
FLRE2	Time Delta M-Flow fixed transit-time flow meter converter, AC power input	\$ 1,475
FLRE4	Time Delta M-Flow fixed transit-time flow meter converter, DC power input	1,475

### Accessories

Each detector kit includes: Detector unit, 16 ft. signal cable, mounting straps, 3.5 oz tube sonic coupling compound

	Description	Pipe diameter range	Temperature range	
FLSE12	FLR type 1 sensor (2 MHz)	1.0 to 4.0 in	-40 to 212°F	\$ 724
FLSE22	FLR type 2 sensor (2 MHz)	2.0 to 9.0 in	-40 to 212°F	749
TKUSTTFLRC1	RS232C Communications			209
TKUSTTFLRC2	RS485 Communications			179
TKUSTTFLRC3	Synchronization			179
TKUSTTFLRC4	RS485 & synchronization			179
TKUSTTNIST	Calibration, NIST traceable (5 pt.)			450
TKUSTTPTG	FS-200 Ultrasonic thickness gauge			1,200
TKUSTTSG	Sonic coupling compound			15
TKUSTTSGN	Sonic coupling compound, silicone-free			35
TKUSTTPCSR	Pipe tape measure			30
TKUSTTPLSS	Line isolator/conditioner			359.95
TKUSTTRG58	Signal cable, 50 ohm (16 ft min)			2.50/ft.

### FLR Converter



### FLSE12 and FLSE22 Sensor Sets

