

PortaFlow-X

Portable, Accurate Transit-Time Flow Measurement

The Portaflow-X is a portable ultrasonic flow meter utilizing the transit-time difference principle for measuring flow rates through pipes from the outside. It's compact and lightweight, and incorporates the latest breakthroughs in digital signal processing and electronics realizing high performance and easy operation. The most attractive advantage of the Portaflow-X is the non-invasive setup, enabling multiple flow measurements of different running systems, and offering a significant cost advantage over time. Some of the most common applications include: backup for an already installed flow meter system, water supply and sewage treatment, flow measurement systems, boilerwater/feedwater supplies, cooling water, cooling oil, and deionized water for semiconductor manufacturing, among others. The meter may be set up with a wide variety of sensors from small diameters to large diameters, over a wide temperature range.

Features

- **Large LCD backlit display** – both flow rates and totalizing functions may be viewed together
- **Simple setup and easy operation** – typical setup takes approximately 10 minutes
- **Sound velocity measuring function** – eliminates temperature and pressure errors, and enables easy setup for unknown materials
- **Enhanced anti-bubble measurement technology (ABM)** – removes the effect of entrapped and suspended flow bubbles
- **Compact and light-weight** – weighs only 3.3 lbs
- **Built-in data logger** – direct download to PC spreadsheet applications
- **High accuracy** – $\pm 0.5\%$ to $\pm 1.0\%$ of velocity typical on calibrated system
- **Variety of detectors** – for small and large diameter pipes ranging from 0.50 to 235 in.

Performance Specifications for the Converter

Fluid Conditions

Measured fluid Homogeneous liquids (water, sea water, hydro-carbons or fluid of unknown sound velocity) capable of ultrasonic wave propagation

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

State of flow Axis-symmetric flow in pipe filled with fluid

Velocity range 0.06 to 105 ft/sec (.018 to 32 m/sec) bi-directional flow

Fluid temperature

Standard temperature detector -40 to 212°F (-40 to 100°C)

High temperature detector -40 to 390°F (-40 to 200°C)

Piping Conditions

Pipe material Carbon steel, stainless steel,

cast iron, copper, pvc, aluminum, ductile iron, asbestos, frp, peek, pvdf, acrylic and other. If other is selected, pipe materials with a sonic velocity range of 3280 to 12136 ft/sec (1000 to 3700 m/sec) can be selected via the keypad (sonic velocity information for several pipe materials is included in the Operator Manual)

Pipe size Small pipe range detector: 0.50 to 4.0 in. (13 to 100mm); Standard pipe range detector: 2.0 to 16 in. (50 to 400mm); Universal pipe range detector: 8.0 to 48 in. (200 to 1200mm); Large pipe range detector: 8.0 to 235 in. (200 to 6000mm); High-Temperature detector: 2.0 to 16 in. (50 to 400mm)

Lining material Tar, epoxy, mortar, rubber, Teflon, glass, pvc, other, or none. If other is selected, liner materials with a sonic velocity range of 3280 to 12136 ft/sec (1000 to 3700 m/sec) can be selected via the keypad (sonic velocity information for several liner materials is included in the Operator Manual)

Fluid type Water, sea water or other. If other is selected, a sonic velocity range of 1640 to 8200 ft/sec (500 to 2500 m/sec) can be selected via the keypad (sonic velocity information for several fluids is included in the Operator Manual)

Measurement Accuracy

Accuracy $\pm 0.5\%$ to $\pm 1.0\%$ of velocity for velocities > 1.0 ft/sec. typical on calibrated system; $\pm 1.5\%$ to $\pm 2.0\%$ of velocity for velocities < 1.0 ft/sec. typical on calibrated system (*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.*)

Linearity 0.1% of scale

Repeatability 0.5% or better

Key Features

- **Large LCD backlit display**
- **Simple setup and easy operation**
- **Sound velocity measuring function**
- **Enhanced anti-bubble measurement technology (ABM)**
- **Compact and light-weight**
- **Wide pipe range: 0.5 to 235 in.**



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Specifications (continued)



Physical Specifications for the Converter

Ambient temperature Without printer: 14 to 131°F (-10 to 55°C); With printer: 14 to 113°F (-10 to 45°C)

Ambient Humidity less than 90% RH

Enclosure High impact thermoplastic, gray in color, dust-proof (NEMA 3, IP52)

Dimensions Without printer: 9.45H x 5.00W x 2.75D in. (240 x 127 x 70mm); With printer: 14.13H x 5.00W x 2.75D in. (359 x 127 x 70mm)

Weight Without printer: 3.3 lbs. (1.5kg); With printer: 4.4 lbs. (2.0kg)

Functional Specifications for the Converter

Power supply Built-in battery or external power adapter

Built-in battery Special NiCd, Continuous operation: 5 hrs. (without optional printer and back light). Recharging time: 3 hrs. (with supplied external power adapter)

Power adapter External power adapter, input: 90 to 264V AC, 50/60 Hz

Output 17.5V DC, 1.2 A

Power consumption 12 W or less (without optional printer)

LCD display 4.0H x 3.0W in. (102 x 76mm), high resolution, 240 x 320 dot graphic with back light (back light invoked via "LIGHT" button on front panel)

Keypad 10 keys (ON, OFF, ESC, ENT, LIGHT, PRINT →, ←, ↑, ↓)

LED indicators DC IN (green), FAST CHARGE (red)

Power down backup Ram memory backed up by lithium battery (effective term, 5 yrs)

Response time 1 sec. or less

Output signal 0.8-20 mA DC, 4-20mA DC, 20-4-20mA DC, max. load resistance 1K ohms

Input signal 4-20mA DC

Serial communication RS-232C, even, odd or no parity, 1 or 2 stop bits, keypad selectable; Transmission speed: 300, 600, 1200, 2400, 4800 or 9600BPS, keypad selectable; Transmission distance: max. 50 ft. (15m)

Printer (option) Thermal serial dot printing (8 x 256 dots), mounts to top of converter

Display language English, German, French, Japanese (Katakana) and keypad selectable

Measurement display screen Flow velocity and rate (with flow direction) displayed simultaneously. Flow rate units are selectable via keypad; Units: English or Metric system keypad selectable; English system units: flow velocity in ft/sec, flow rate units: gal/sec, gal/min, gal/hr, Mgal/day, ft3/sec, ft3/min, ft3/hr, Mft3/day, bbl/sec, bbl/min, bbl/hr, Mbbl/day; (gal = U.S. gallons); Metric system units: flow velocity in m/sec, flow rate units: l/s, l/min, l/h, Ml/d, m3/sec, m3/min, m3/h, m3/day, Mm3/day, bbl/sec, bbl/min, bbl/hr, Mbbl/day

Totalizer display screen Forward and reverse totalizer values displayed simultaneously. Totalizer units are selectable via keypad; English system units: gal, Kgal, ft3, kft3, Mft3, bbl, Kbbbl, Mbbl (gal = U.S. gallons); Metric system units: ml, l, m3, km3, Mm3, bbl, Kbbbl, Mbbl

Clock display function Time (year, month, day, hour, minute) display and setting, keypad selectable

Damping 0 to 99 sec. (time constant), keypad selectable

Low flow cutoff 0 to 3.30 ft/sec (0 to 1.0 m/sec), keypad selectable

Output setting function Current output scaling, output type: (0.8-20 mA, 4-20 mA, 20-4-20 mA), output calibration and burn out setting (output selectable to hold last

value, force zero, high or low), keypad selectable

Communication function Data logger file transfer, flow velocity, forward and reverse totalizer values, date/time and error status transmission on request from host

Data logging function Site data which includes site name, piping, fluid type, sensor type and mounting method. Up to 20 sites and a maximum of 40,000 data points (flow velocity, flow rate, forward and reverse totalizer values) can be stored in battery backed-up memory

Waveform display function Oscilloscope display of upstream and downstream received signals

Error message library Defines all error messages and recommends solutions for resolving error

Graph display function Display of logged data and flow rate trend graphs

Printing function Printout of screen (invoked from "PRINT" button on front panel), fixed cycle printout including flow velocity, flow rate, forward and reverse totalizer values, error status, logged data trend graph, date/time, site setup and diagnostic waveforms. Printing functions are active only when optional printer is installed.

Transmit output voltage X1, X2, X4 and X8 transmit output voltages, keypad selectable

Detector Models FLD

Mounting method V or Z method mounted to outside of pipe by means of steel bands, nylon belts or steel wire

Straight pipe length Upstream side, 10d or more, downstream side, 5d or more (d = inside pipe diameter).

Signal cable RG-58 or RG-58A/U, 50 ohm coaxial cable

Cable length Standard length 16 ft., maximum length 1000 ft. (300m)

Connection Converter: BNC connectors (female). Detector models FLD22, FLD32, FLD11: BNC connectors (female). Detector Models FLD12, FLD41, FLD50: internal terminal screw, strain-relieved, water-resistant, water-proof optional

Pipe diameter range

FLD22 (Small diam. pipe range): 0.50 to 4.0 in. (13 to 100mm). FLD12 (Small diam. pipe range): 2.0 to 16 in. (50 to 400mm). FLD11 (Standard pipe range): 2.0 to 16 in. (50 to 400mm). FLD41 (Universal pipe range): 8.0 to 48 in. (200 to 1200mm). FLD50 (Large diameter pipe range): 8.0 to 235 in. (200 to 6000mm).

FLD32 (High-Temperature detector): 2.0 to 16 in. (50 to 400mm)
Operating temperature range FLD12, FLD22, FLD11, FLD41, FLD50: -40 to 212°F (-40 to 100°C). FLD32 (High-Temperature): -40 to 390°F (-40 to 200°C)
Ambient temperature range All detector models: 4 to 140°F (-20 to 60°C)
Ambient humidity All detector models: less than 100% RH
Environmental rating Models FLD12, FLD41, FLD50: NEMA 6 (IP67). Models FLD22, FLD32, FLD11: NEMA 3 (IP52)

Material FLD11: Aluminum alloy housing, Aluminum alloy/stainless steel/high impact plastic mounting bracket.
 FLD12, FLD41, FLD50: Polyurethane/stainless steel housing. FLD22: High impact plastic housing, aluminum alloy/high impact plastic mounting bracket.
 FLD32: Stainless steel, housing, aluminum alloy/high impact plastic mounting bracket.
 FLD11, FLD22, FLD41, FLD50: Epoxy resin crystal wedge. FLD32: Stainless steel crystal wedge

Dimension (WxHxD)/weight FLD11: 21.25 x 2.08 x 1.40 in./2.2 lbs.(540 x 53 x 36mm/1kg). FLD22: 12.50 x 2.08 x 1.40 in./1.5 lbs. (320 x 53 x 36mm/.68kg). FLD32: 20.86 x 2.05 x 1.30 in./3.53 lbs. (530 x 52 x 33mm/1.6 kg). FLD41 (each transducer): 2.83 x 2.36 x 1.57 in./0.9 lbs. (72 x 60 x 40mm/.4kg). FLD50 (each transducer): 4.30 x 3.66 x 2.45 in./3.53 lbs. (109 x 84 x 62mm/1.6 kg). FLD dimensions include rail assembly and transducers.

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, hard carrying case, power adapter/charger, manual

FLCS1	PortaFlow-X portable transit-time flow meter converter	\$ 5,045
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Accessories

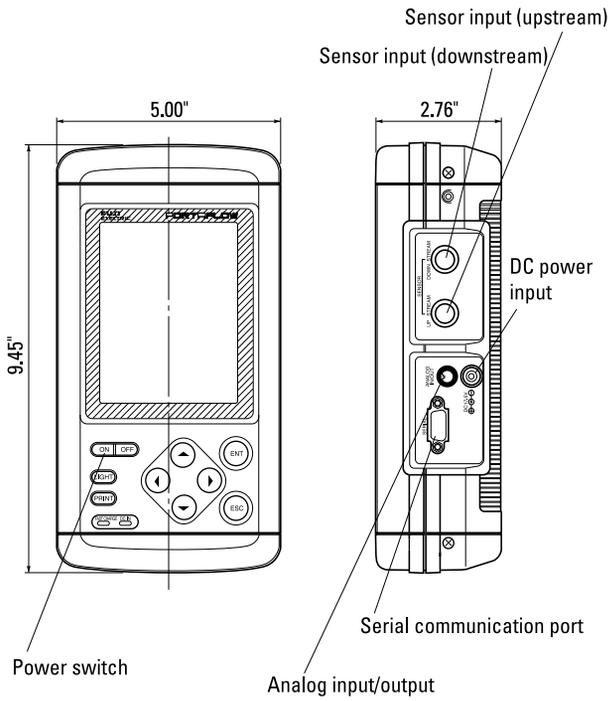
Each detector set includes: Detector unit, 16 ft. signal cable, 5 ft. velcro mounting straps, 3.5 oz. tube sonic coupling compound

	Description	Pipe diameter range	Temperature range	
FLD22	Small diameter sensor (2 MHz)	0.50 to 4.0 in	-40 to 212°F	\$ 1,150
FLD12	Small diameter sensor (2 MHz)	2.0 to 16.0 in	-40 to 212°F	1,150
FLD11	Standard sensor (1 MHz)	2.0 to 16.0 in	-40 to 212°F	950
FLD41	Universal sensor (1 MHz)	8.0 to 48.0 in	-40 to 212°F	950
FLD50	Large diameter sensor (0.5 MHz)	8.0 to 235.0 in	-40 to 212°F	2,500
FLD32	High-temperature sensor (2 MHz)	2.0 to 16.0 in	-40 to 390°F	3,500
TKUSTTNIST	Calibration, NIST traceable (5 pt.)			450
TKUSTTPTG	FS-200 Ultrasonic thickness gauge			1,200
TKUSTTBAT	Battery, NiCad			350
TKUSTTLITHP	Battery, memory backup			35
TKUSTTPU	Thermal printer			1,400
TKUSTTTP	Thermal printer paper roll			12
TKUSTTCAB	BNC-BNC signal cable, 16 ft.			60
TKUSTTPI	Cig. lighter adapter, 12VDC			175
TKUSTTDLS	Data logger software & cable			75
TKUSTTAIO	Analog input/output cable			110
TKUSTTRC	Raincover/with printer extension			75/90
TKUSTTPAC	Power adapter/charger, AC/DC*			350
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.

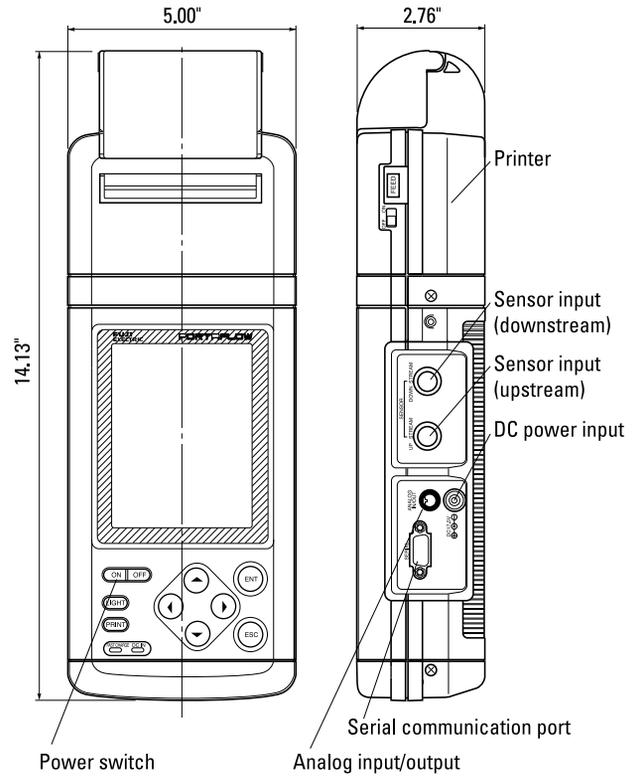
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Specifications (continued)

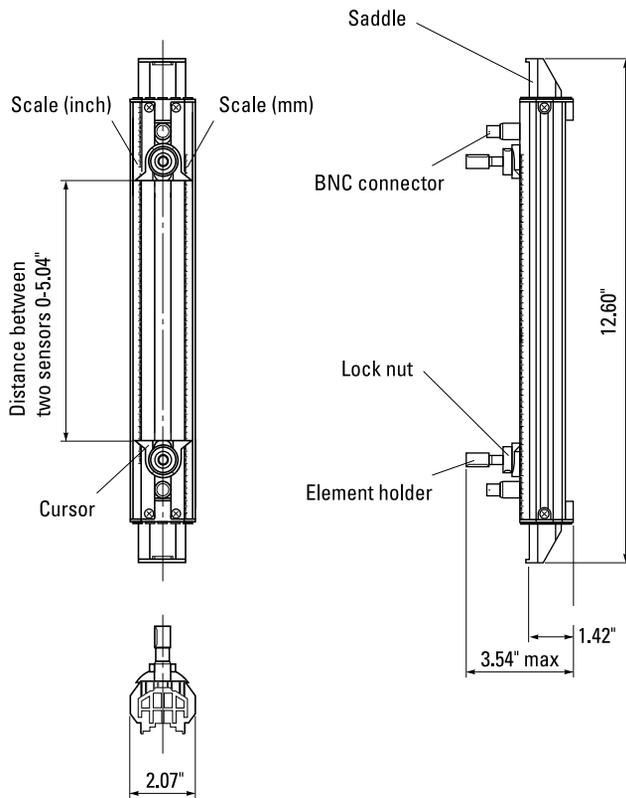
FLC Converter



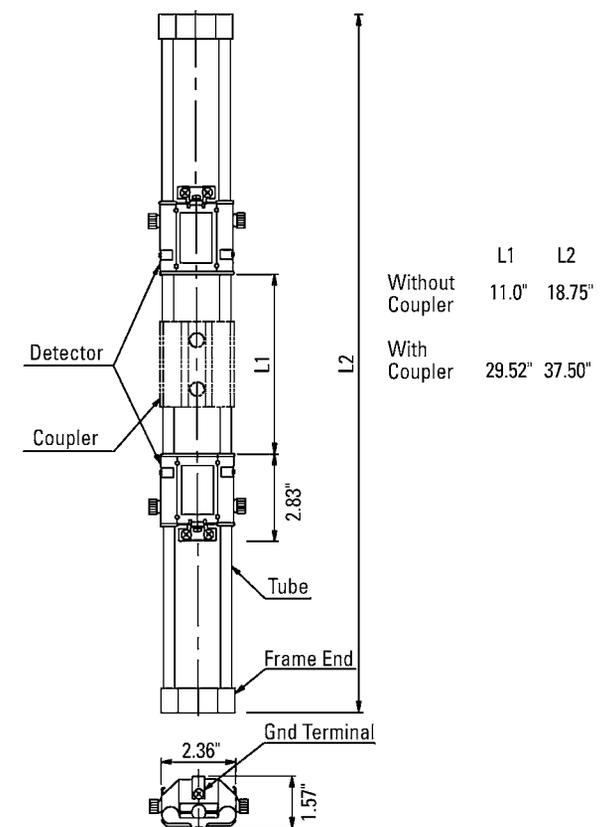
FLC Converter with printer



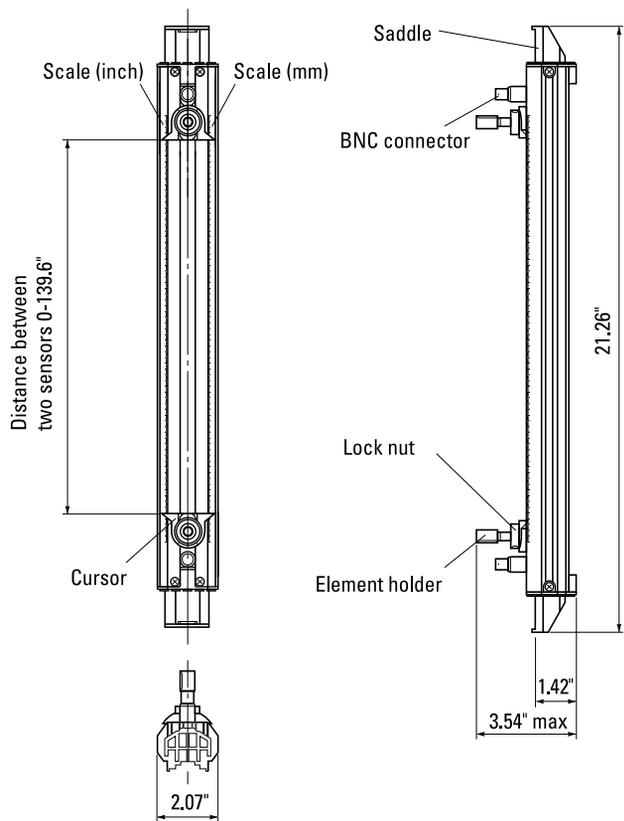
FLD22 Small Diameter Sensor Set



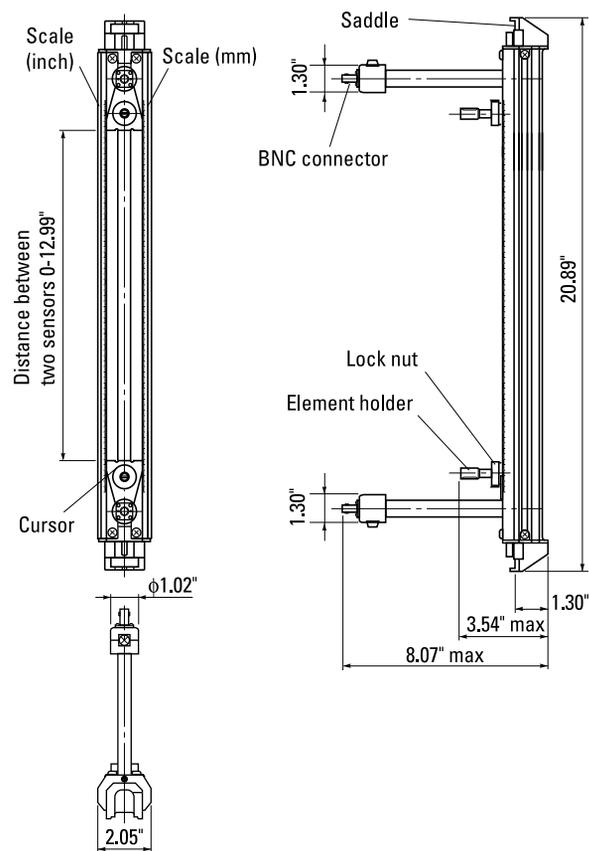
FLD12 Small Diameter Sensor Set



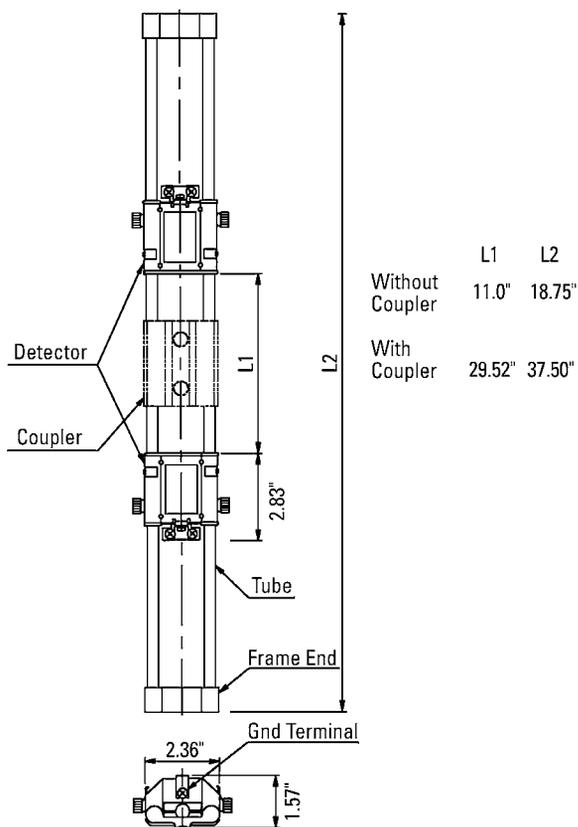
FLD11 Standard Sensor Set



FLD32 High-Temperature Sensor Set



FLD41 Universal Sensor Set



FLD50 Large Diameter Sensor Set

