



Ultrasonic Thermal Energy/BTU Flow Meter D116

BTU / Thermal

ENERGY

METERING

QUICK

RELIABLE

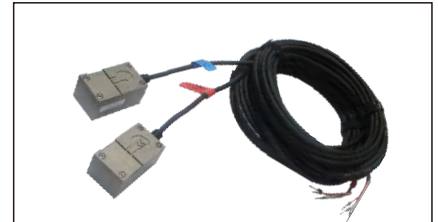


Feature

- Precise bi-directional and highly dynamic flow measurement with the non-intrusive clamp-on technology
- High precision at fast and slow flow rates, high temperature and zero point stability
- Water and clean liquids; Tolerant of liquids with small amounts of air bubbles or suspended solids
- Automatic loading of calibration data and transducer detection for a fast and easy set-up (less than 5 min), providing precise and long-term stable results
- Clear ,user-friendly menu selections
- Clamp on transducer and insertion transducer versions
- Transducers available for a wide range of inner pipe diameters (25~1200mm) and fluid temperatures (0~80°C)
- Thermoelectric sensor is to use conversion element characteristics of electromagnetic parameters change with temperature, the temperature and temperature related parameters for testing device.The resistance change of the temperature change can be converted to known as thermal resistance sensors.Widely used in industrial, medical, chemical, environmental, and other fields.



D116 ultrasonic flowmeter



Cp037 Transducer



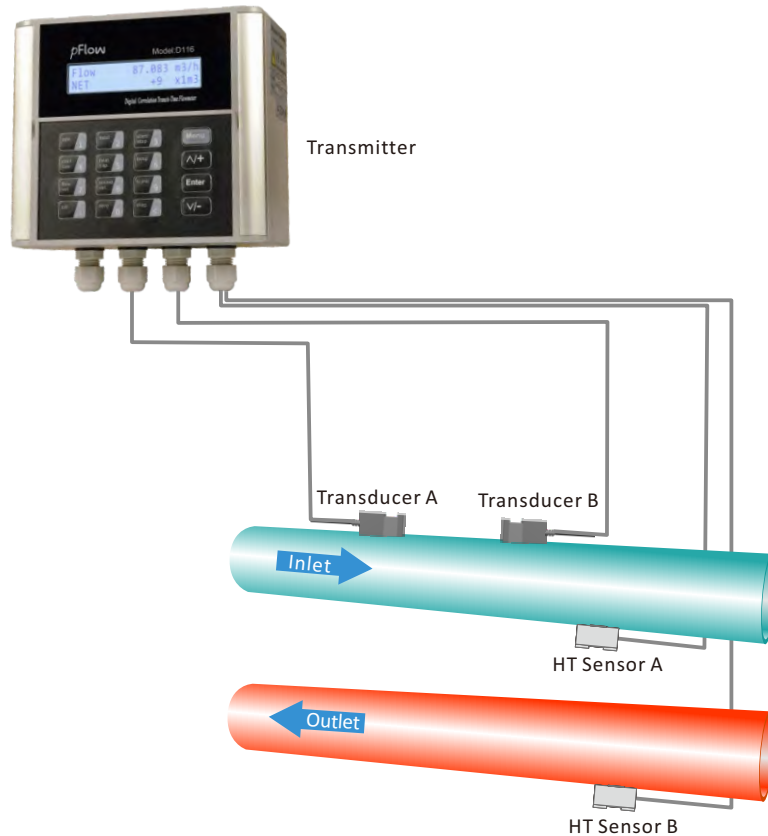
Pt1000 Temperature sensor

Applications



Installation Instruction

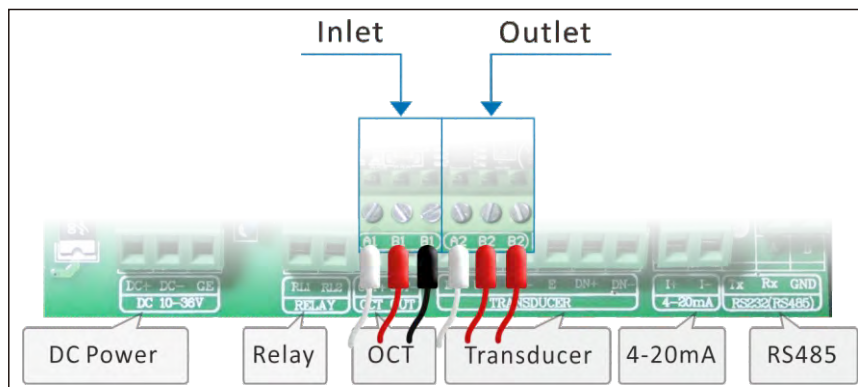
Energy measures the thermal energy consumed by a system by determining the heat or cold flows entering and exiting it (difference method). For doing so, temperature measurements at the inlet and outlet lines as well as the measurement of the volume flow through the system are required.



Wiring

Three - wire connections methods is used for the RTD module and PT1000 temperature sensors, connections methods is as follows.

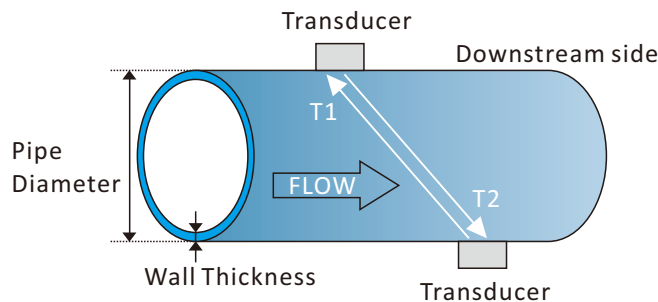
The two PT1000 temperature sensors are installed on the inlet and outlet pipes and they will input temperature signals to the D116 transmitter.



Measuring principle of transit-time

The transit-time utilizes the propagation time of the ultrasonic signal in the fluid.

A pair of transducers are installed on the outer surface of the pipe as shown in the diagram. Each transducer works alternatively as both transmitter and receiver of ultrasonic signals.



When the ultrasonic signal is transmitted toward the upstream side against the flow direction, more propagation time is required (T1). On the other hand, when it is transmitted toward the downstream side with the flow direction, the propagation time is less (T2). That is, the signal is delayed or speeded up by the moving fluid. The difference in time between "T1" and "T2" is proportional to the flow velocity, and the flow volume can be calculated by multiplying it by the cross-sectional area, which is obtained by using the pipe diameter and wall thickness.

Energy Measurement Methods

Energy Measurement Methods:

Formula: $Q = m (h_1 - h_2)$

Q—Energy Value

m—quality of the medium

(density× transit time water volume)

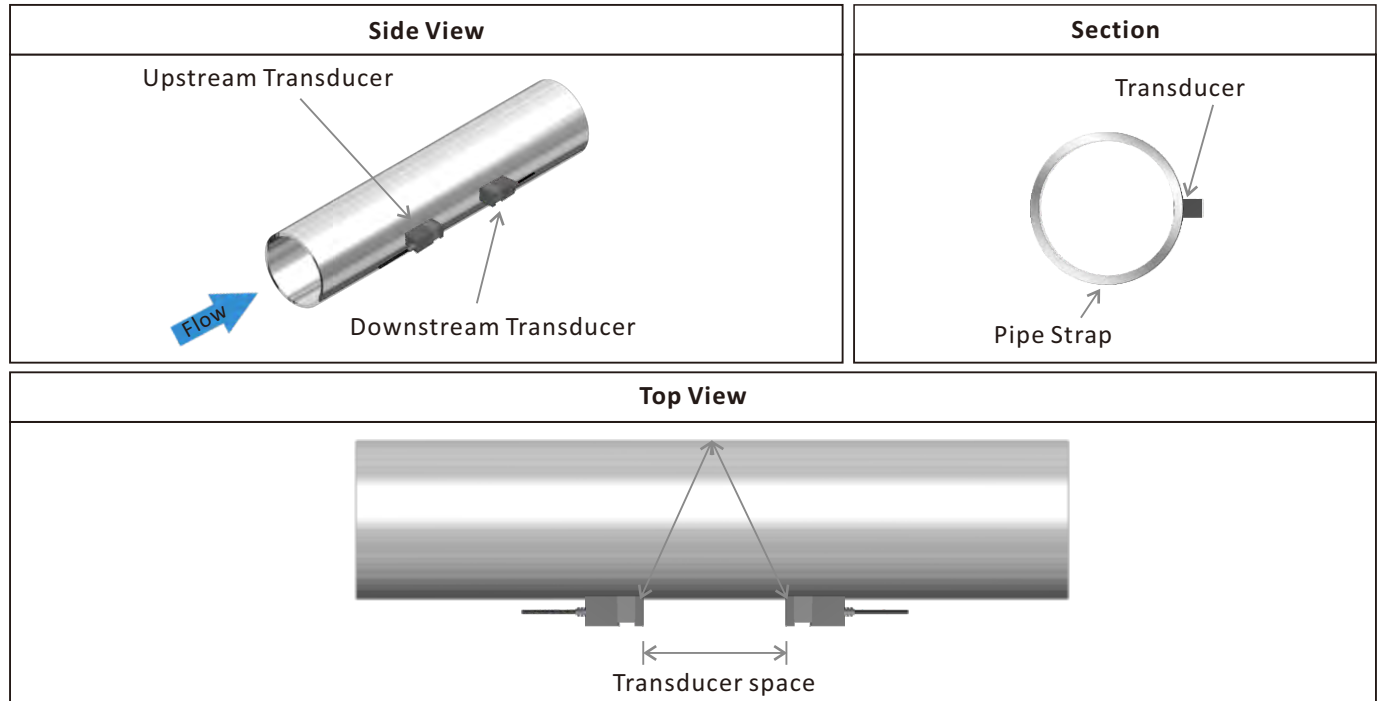
h1—enthalpy value of the inlet water

h2—enthalpy value of the return water

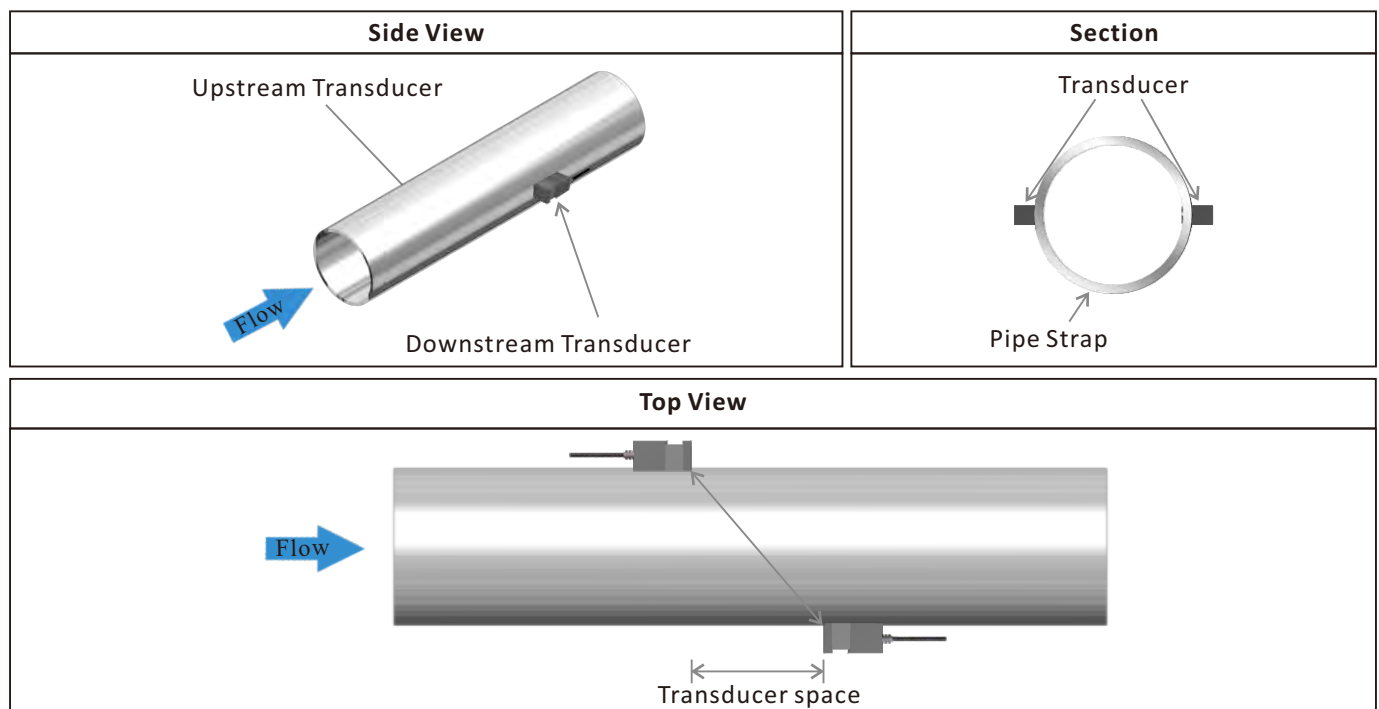
The temperature and pressure at the inlet and return water points can be measured by temperature sensors and a transmitter, and pressure sensors and a transmitter. Then the enthalpy value at the inlet and return water points can be calculated through the enthalpy values table. The flow of the medium can be measured via the ultrasonic flow sensors and D116 transmitter, and the caloric value can be derived according to the above formulas and the caloric calibration index.

Transducer Installation Methods

V method measuring pipe size : 25mm-400mm



Z method measuring pipe size: 100mm-1200mm



Installation Site Selection

When selecting a measurement site, it is important to select an area where the fluid flow profile is fully developed to guarantee a highly accurate measurement. Use the following guidelines to select a proper installation site:

Choose a section of pipe that is always full of liquid, such as a vertical pipe with flow in the upward direction or a full horizontal pipe.

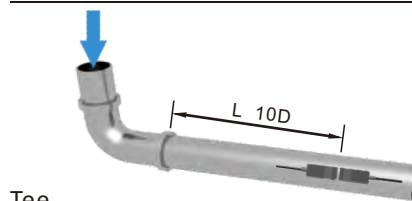
Ensure enough straight pipe length at least equal to the figure shown below for the upstream and downstream transducers installation.

Ensure that the pipe surface temperature at the measuring point is within the transducer temperature limits.

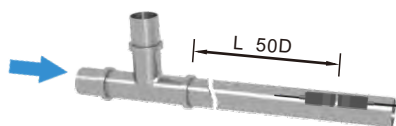
Consider the inside condition of the pipe carefully. If possible, select a section of pipe where the inside is free of excessive corrosion or scaling.

Straight length of upstream piping

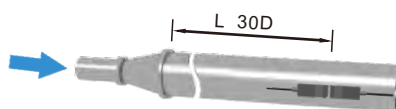
90° Bend



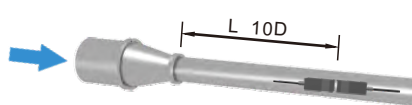
Tee



Diffuser



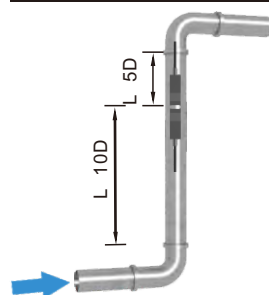
Reduce



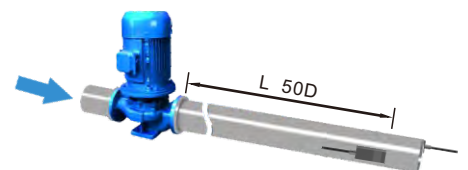
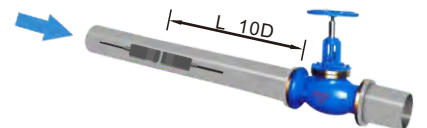
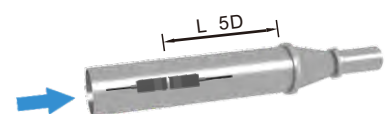
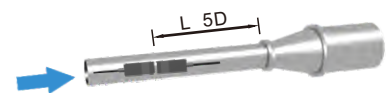
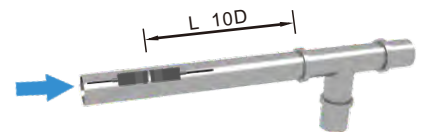
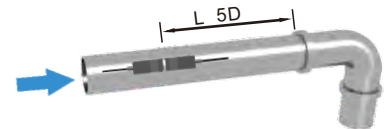
Valve






Vertical



Straight length of downstream piping

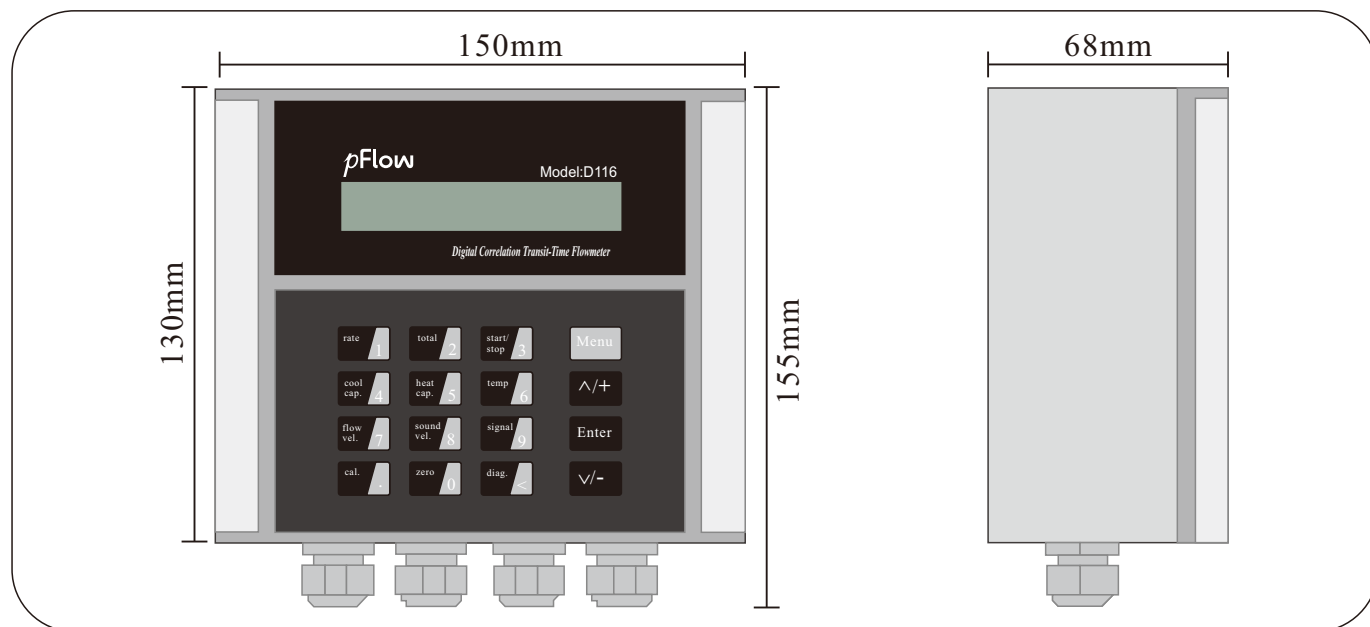


Specification

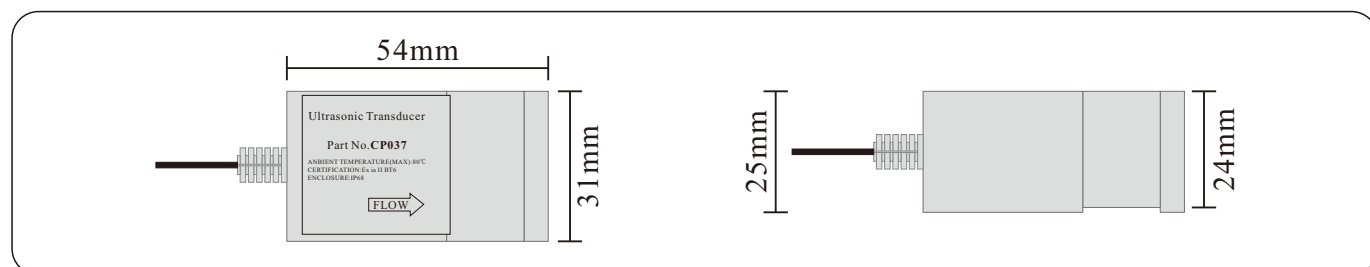
Energy Meter			
Performance specifications			
Flow range	±0.03ft/s ~ ±16ft/s (±0.01m/s ~ ±5.0m/s)		
Accuracy	±1.0% of measured value Energy: class 2		
Pipe size	1"to 48" (25mm to 1200mm)		
Function specifications			
Outputs	Analog output: 4~20mA, max load 750Ω. Pulse output: 0~9999Hz, OCT, (min. and max. frequency is adjustable)		
Communication	RS232&RS485		
Power supply	10 to 36VDC/1A		
Keypad	16(4x4) keys with tactile action		
Display	20x2 lattice alphanumeric, back lit LCD		
Temperature	Transmitter:14°F~122°F(-10°C~50°C) Transducers(CP037):32°F~176°F(0°C~80°C) Temperature sensors(PT1000): 32°F~212°F(0°C~100°C)		
Humidity	Up to 99% RH,non-condensing		
Physical specifications			
Transmitter	PC/ABS,IP65		
Transducer	Encapsulated design double-shielded transducer cable Standard/maximum cable length:30ft/985ft(9m/300m) Temperature difference: min temperature 3K max temperature difference 15K activated temperature difference 0.2K		
Weight	Transmitter:approximately 0.7kg Transducer:approximately 0.4kg		
HT Sensor			
Technical type	Pt1000		
Connction	3 wire		
Measuring range	0°C~100°C		

Transmitter Dimensions

Transmitter



Transducer CP037



Temperature sensor PT1000





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