Gentos Measurement & Control Co., Ltd.

pFlow

GFCL Ultrasonic Flowmeter for Liquid Cooling System

Product Introduction

With the rapid development of information technologies such as cloud computing, big data, artificial intelligence, and the metaverse, the continuous increase in computing power has led to a continuous increase in chip power consumption and heat flux density. The liquid cooled ultrasonic flowmeter can manage and monitor the flow rate of the liquid cooling system. Based on the data collected by sensors, a precise temperature control model is constructed to achieve meticulous thermal management, reduce the occurrence of thermal blockage, and ensure the stable and efficient operation of the system.

Product Advantages

Compact size

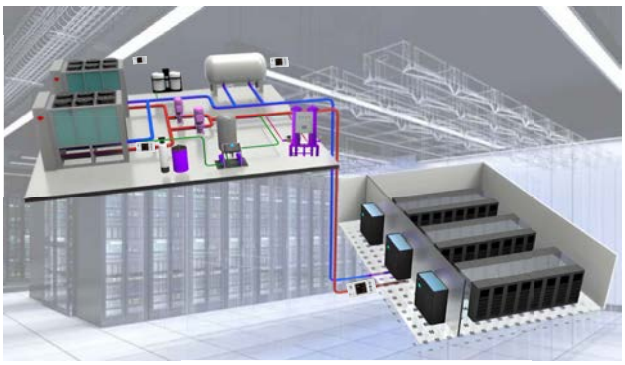
No need to break the pipe, simply clip on and measure

Screen display can be rotated in four directions

LCD color display

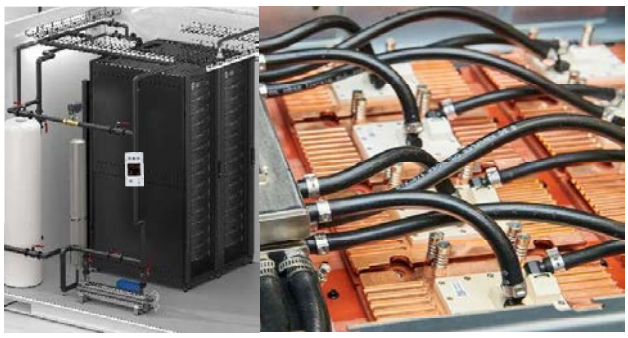
Scope of Application

Through the collected flow data, combined with the temperature data collected by other sensors and other equipment, the temperature control and regulation data model is established to achieve accurate thermal management to maintain a constant temperature state of the heat source equipment, thus assisting the server components to achieve optimal performance.



Outdoor Circulating Cooling Tower Application

Cabinet-type and platform-type CDU applications



Cold Plate Technology

Immersion Technology

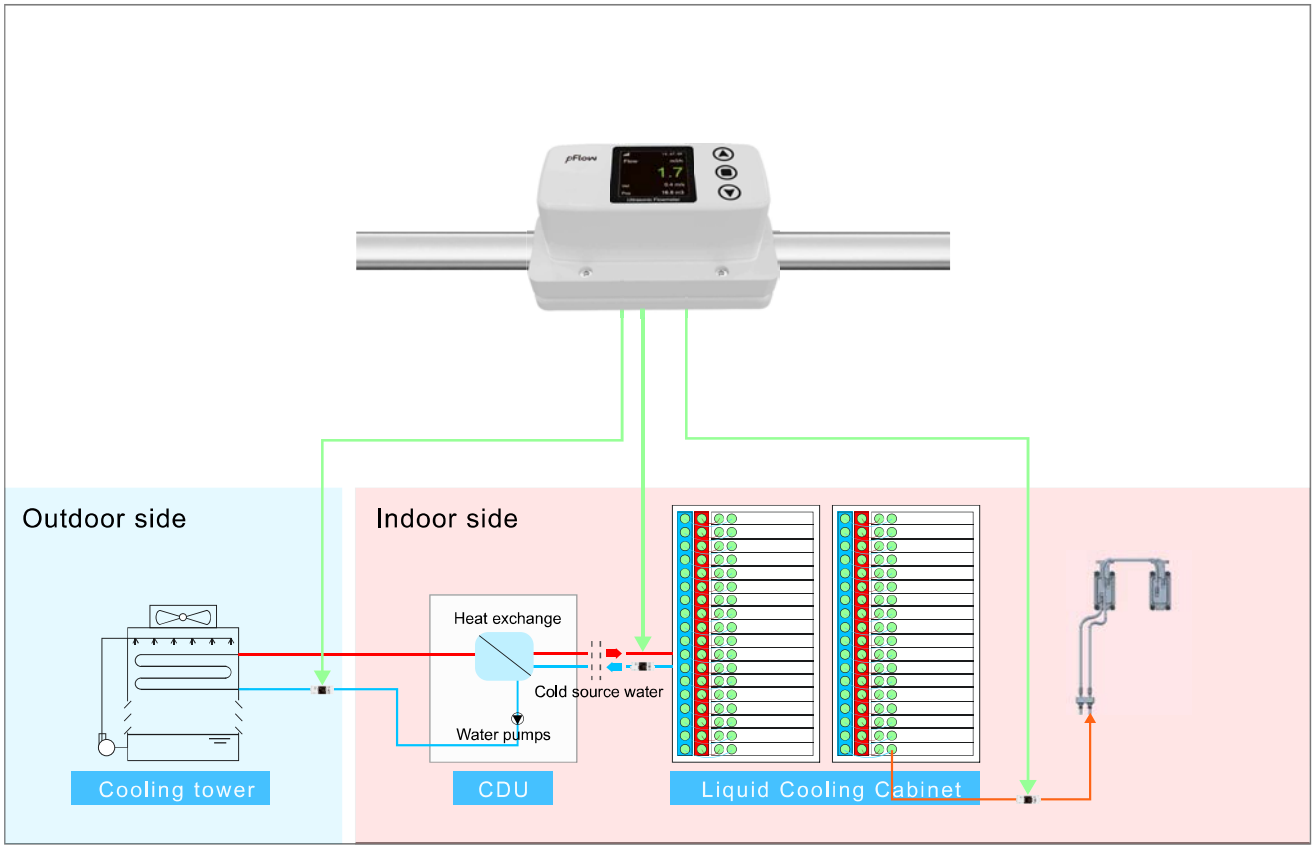
Suitable pipe types

Stainless Steel、Copper

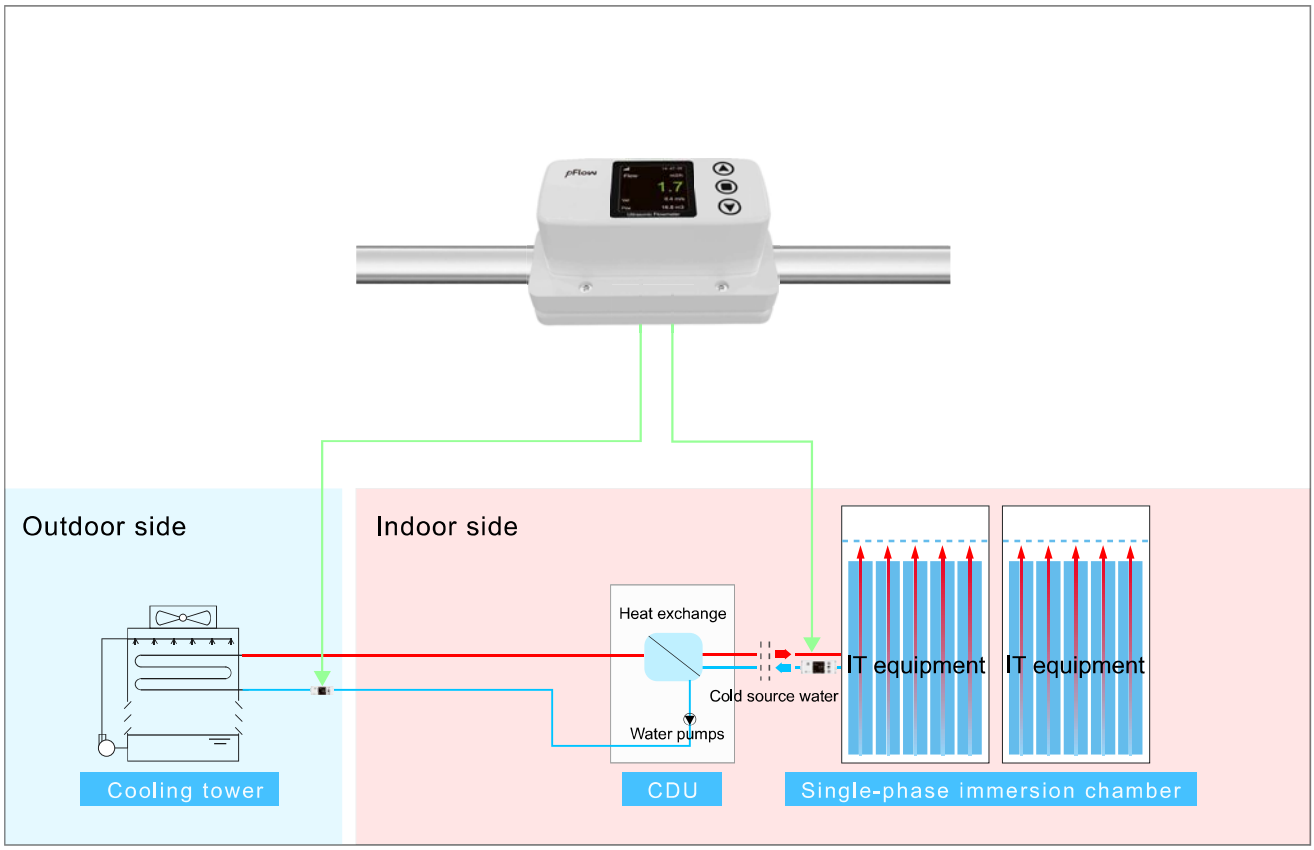
PVC、PPR

Pipe Materials	Pipe Nominal Inside Diameter	Pipe Clamps for Pipe O.D. Range		Flow Range (0.03-5m/s)
		Class A	Class B	
Stainless steel Copper PVC PPR	DN15	(18.5~22.5)mm		(0.02~3.5)m3/h
	DN20	(24~29)mm	(22.5~27.5)mm	(0.04~6)m3/h
	DN25	(30.5~35.5)mm	(29~34)mm	(0.05~9)m3/h
	DN32	(37.5~42.5)mm	(36~41)mm	(0.09~15)m3/h
Remarks: B class is realized by sticking the attached adhesive pads on both sides of the inner wall of the pipe clamp.				

Application System Schematic



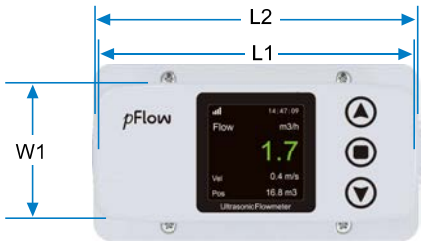
*Technical Principle of Cold Plate Liquid Cooling Systems



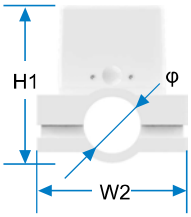
*Technical Principle of Immersion Liquid Cooling Systems

Product Size

Top view



Left view



Front view

Dimension comparison table

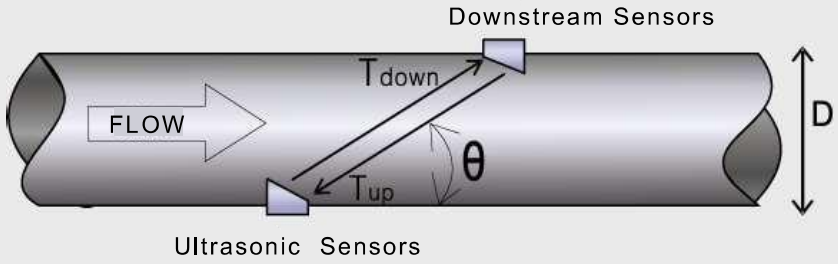
Unit (mm)

Pipe Nominal Inner Diameter	W1	W2	L1	L2	H1	H2	φ
DN15	42	42	96	110	63	32.5	22.5
DN20	42	59.5	96	110	69.5	32.5	29
DN25	42	59.5	96	110	76	32.5	35.5
DN32	42	64.5	96	110	83	32.5	42.5

Working Principle

The GFCL micro flowmeter uses ultrasonic transit time measurement. An ultrasonic signal propagates through the fluid, with the speed increasing downstream and decreasing upstream. By measuring the difference in transmission times in both directions, the flow rate of the fluid is determined.

The flow rate of a fluid varies across different locations in a pipe, with the center having a faster flow than near the pipe wall. This flow velocity distribution can be represented by the cross-sectional distribution. By setting up the flow meter and accounting for this distribution, the average flow rate can be calculated. From the average flow rate and the pipe's cross-sectional area, the volume flow rate of the fluid can be derived.



$$V = \frac{MD}{\sin 2\theta} \times \frac{\Delta T}{T_{up} \cdot T_{down}}$$

Remark

V: Fluid velocity
M: Number of ultrasonic reflections
D: Pipe diameter
θ: The angle between the ultrasonic signal and the fluid
T_{up}: Time for the downstream transducer to transmit a signal to upstream
T_{down}: The time when the upstream transducer transmits a signal downstream
$\Delta T = T_{down} - T_{up}$

Product Model

Format of Selection Model : GFCL Format: GFCL - A

Model	Description of Transmitter
GFCL	Model Name: GFCL-EM Ultrasonic Flowmeter
	Velocity Range: 0.03m/s~5.0m/s
	Accuracy: 2.0% (0.3m/s~5m/s Standard) *
	Repeatability: 0.4%
	Communication Interface: RS485, Support Protocol and MODBUS Protocol
	Output: 4~20mA
	Medium: Water
	IP Rating: IP54
	Power Supply: 10～36VDC/500mA
	Keyboard: 3 touch keys
	Enclosure Material: PC(Polycarbonate)
	Display: 1.54 TFT-LCD Colorful Display. Resolution: 240*240
	Temp: Ambient Temperature: -10℃~50℃
	Fluid Temperature: 0℃~60℃
	Transmitter: All-in-one
	Transducer: Clamp On Type
	Cable: φ5 six-core cable. Standard Length: 2m

A	Pipe Size
Measurement Range	DN15, DN20, DN25, DN32

Selection Example: Model: GFCL Series; Specification: GFCL-EM-DN15
For Example: [Model: GFCL Series; Specification: GFCL, Equipment Matching], DN15]

*The accuracy obtained through Gentos flow standard device may vary due to factors such as the type of pipeline used, the type of fluid being measured, temperature variations, etc.

Noted: Products have been configured with application industry options at the factory, and the data center corresponds to EM (Equipment Matching).

Gentos Measurement & Control Co., Ltd.

Distributor
SCHIBUOLA LAURO
Turin - Italy
www.schibuola.com - info@schibuola.com

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