PRODUCT DATA SHEET

Battery-Powered

Clamp-on Ultrasonic Flowmeter

For Liquid

UC-1

intelligent DIGITAL

TOKYO KEIKI

TOKYO KEIKI INC.

1. Outline

1) Transit times of ultrasonic pulses transmitted in a liquid vary with the flow velocity of the liquid and ultrasonic flowmeters utilize this characteristic to measure flow.

2) No complicated set-up

3) UC-1 can detect & measure wide range of pipe sizes, needs config changes only. Conductive or non-conductive, ultrasonic flowmeters can measure various types of liquids such as potable water, river water, industrial water, agricultural water, wastewater, seawater, and pure water.

4) Transducers are clamped on to the outside of the pipe so it is not necessary to cut pipes or stop flow for installation and there is no pressure loss.

5) Flow measurements are possible over a wide range, 0.03m/s to 10m/s.

6) Economical measurements of flow from 25mm to 100mm can be obtained.

7) Inside logged data can be output to PC by serial communication software via USB-C cable.

2. Features

1) No power supply required

UC-01 can be operated up to 10 years with only built-in battery.

2) No additional installation tools required

Neither fixing mounting fixture or grease is required.

The hand-tight band eliminates installation without any of tools.

3) No impact on the pipeline

No pressure loss due to the flowmeter, no need to stop the flow for both metal & non-metal pipe..

4) No complicated set-up

UC-1 can measure wide range of pipe sizes by DRY Couplant, needs config changes only.

5) No Contamination and pressure loss

Due to non-contact, clamp-on type.

3. Configuration

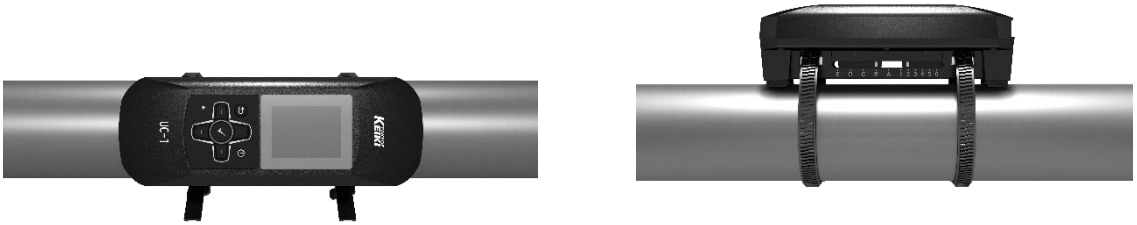
Flowmeter components are as follows.

Components	Quantity	Material	Weight (approx.)
1. Main unit	1pc	Polycarbonate Silicone rubber Stainless Steel Poly Phenylene Sulfide Nitrile rubber	UC1-MBNW (No output) 450g UC1-MBCW (Pulse output) 460g
2. Plastic Band (DN25-DN50)	2pcs	Polyamide PA66	
3. Plastic Band (DN50-DN100)	2pcs	Polyamide PA66	
4. Plastic Screw for Band	4pcs	Polyamide PA66	
5. M8 connector cable (2m) (*)	1pc		

(*) In case of selected UC1-MBCW (Pulse output model).

UC1-MBNW (No output model)

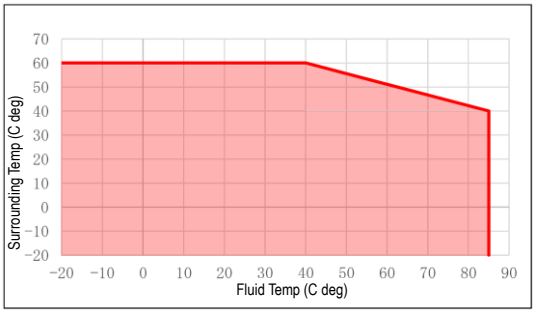
UC1-MBCW (Pulse output model)



Installation example

4. Specifications

4-1. Overall Specifications

Measurement	Fluids	Homogeneous and ultrasonically conductive liquids (Clean water, waste water, industrial water, river water, sea water, pure water, etc.)
	Temperature range	-20°C to +85°C Note1:For main unit, -20°C to +60°C Note2:Temperature derating will be as listed below. 
Pipes	Material	Pipes made of materials that allow stable transmission of ultrasonic waves, such as steel, stainless steel, cast iron, ductile cast iron under JIS and ASME standard less than sch40. Non-metal pipe such as PVC, FRPM, etc. Note) Applicable pipe bores may vary depending on the pipe material and condition.
	Diameters	DN25mm to DN100mm
	Lining	None, polyethylene, PVC etc. Note) Linings must be closely adhered to the base pipe.
Measurement range	Converted to flow velocity: 0.03 m/s to 10 m/s	
Number of measurement paths	1 measurement path	
Measurement cycle	1 sec / 10sec / 30sec / 60sec (Selectable / Default; 1sec)	
Measurement Performance	Accuracy	±3.0% R.D. (10%-100% of Max. flow range) ±0.3% F.S. (0.3%-10% of Max. flow range)
	Repeatability	±1.0%
	Range ability	1 : 300
	Note: 1) For volumetric flow rate. 2) Fully developed and rotationally symmetrical flow profile required. 3) Verified by manufacturer's conditions.	
Measurement method	Ultrasonic pulse transit time difference method	

Measuring Range	

Diameter	Min.Flow (m^3/h)	Max. Flow (m^3/h)
DN25	0.07	22.80
DN32	0.12	38.92
DN40	0.16	52.28
DN50	0.26	85.22
DN65	0.42	139.73
DN80	0.59	195.25
DN90	0.78	258.41
DN100	0.99	331.63

Reverse flow is displayed as a negative value and an alarm is output.
If reverse flow occurs that exceeds the low flow cutoff, an alarm will be issued.
The alarm can be deactivated by changing the flow direction setting.

Operating temperature range	-20 to +60°C	
Operating humidity range	Less than 90% RH, non-condensation	
Main unit construction	Protection Degree IP65 (IEC 60529), No direct sunshine.	
Battery (*1)	Manganese dioxide lithium primary battery	
Battery Life	10 years (Average ambient temperature; 25°C)	
Dimension And Mass	UC1-MBNW (No output)	W199 x H62 x D72 (Approx. 450g)
	UC1-MBCW (Pulse output)	W203 x H62 x D72 (Approx. 460g)
Main unit Material	Polycarbonate, Silicone rubber, Stainless Steel, Poly Phenylene Sulfide, Nitrile rubber	
European compliance (CE marking)	TBI	
KC mark	TBI	

Note1; This product uses a 4-cell lithium metal battery.
This lithium metal battery is packaged in a state where it is installed in the device.
This lithium metal battery is classified as a Class 9 dangerous goods by the United Nations Recommendation, and is assigned the UN number UN3091. It is shipped according to the IATA-GDR Packaging Instructions (PI) PI0970 with following label onto the outside of carton.

Class 9 Label

4-2. Output

Output	UC1-MBNW	No output
	UC1-MBCW	NPN Open collector
		3ch selectable from: 1. Always open 2. Always close 3. Alarm (output by no.4-10) 4. Hi-Limit alarm 5. Lo-Limit alarm 6. Lo battery 7. No echo received warning 8. Reverse flow 9. Full scale over 10. Pulse failure 11. Error 12. Pulse output (unit will be selectable)
	Pulse Width (*2)	10ms ~ 100ms (Default ; 10ms)
	Output format	Photo coupler (insulated)
	Contact point capacity	Max. Voltage 26.4 VDC Max. Current 0.25A
	Cable	M8 connector 2m cable included.
USB communication	St'd / Option	Standard
	No. of channels	1 port
	Functions	Downloadable for Flowmeter setting parameters, measurement value and log data readout.
	Connector	USB-C terminal, hot plug possible

Note2; Pulse width must be selected in accordance with following logic.
Average number of pulses output per second ≦ 10ms / Pulse width (ms) x 2
Maximum number of pulses output per second x Pulse width (ms) x 2 ≦ 500ms

4-3. Display

Display	Display method	Reflective LCD (240 x 320)	
	Display indication	The measurement display screen orientation can be manually set to one of four directions	
	Display content	The following items displayed in the LCD can be selected. • Instantaneous flow rate and units • Flow totalized value and units	
	Display digits	Instantaneous flow rate :	Max. 4 digits Decimal position auto defined by pipe size.
		Totalized flow (m3) :	6 integer digits, 2 decimal digits (ID≦56.05mm) 7 integer digits, 1 decimal digits (ID≧56.05mm)
		Totalized flow (L) :	8 integer digits
		Totalized flow (Others) :	6 integer digits, 2 decimal digits

Status	Flow Direction	Selectable from following 4 directions. 	
	Signal Strength	 Display ultrasonic signal strength when adjusting.	
	Disturbance detected	 Display when a measurement obstacle is detected, such as a large number of previously reported obstacles	
	Power	Battery Operation mode	
		Battery ECO mode	
		Lo battery	
		No battery	
		USB connection	
	Alarm	Hi-Limit alarm	 **Hi-Limit** Default; 100% of Max flow rate
		Lo-Limit alarm	 **Lo-Limit** Default; 0.3% of Max flow rate
		No echo received warning	 **No-Echo**
		Reverse flow	 **ReverseFlow**
		Full scale over	 **F.S. Over**
		Pulse failure	 **PLS Over**
		Error	 **Error** When equipment malfunctions, an error code is displayed
	LED	Colour	Red
		Alarm status	1 sec interval
		Error status	Always on
	Menu	Operatable by 4 direction keys, Enter and Return key	
	Display refresh rate	2sec, 10sec, 1min, 5min and 10min (Default; 2sec)	

Units	Flow rate units	m^3/min, m^3/h, m3/day, L/s, L/min, bbl/min, bbl/h, gal/min, gal/h, ft^3/min, ft^3/h
	Totalizing units	L, m^3, bbl, gal, ft^3

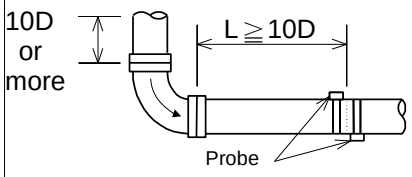
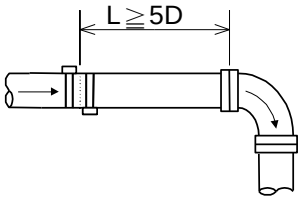
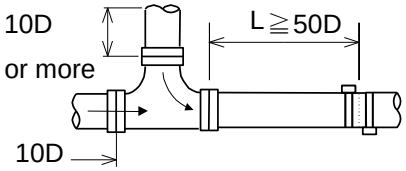
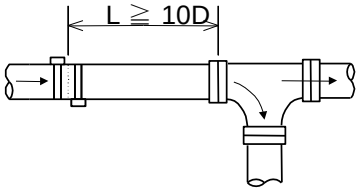
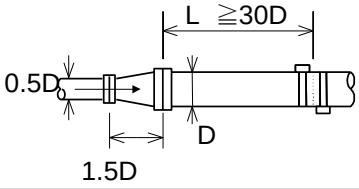
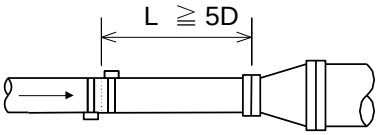
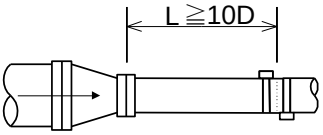
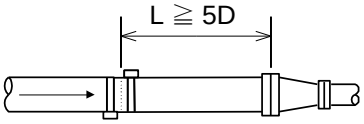
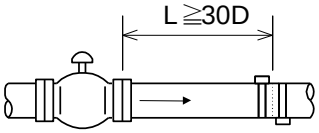
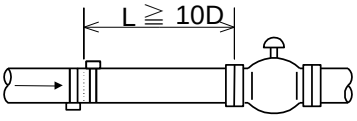
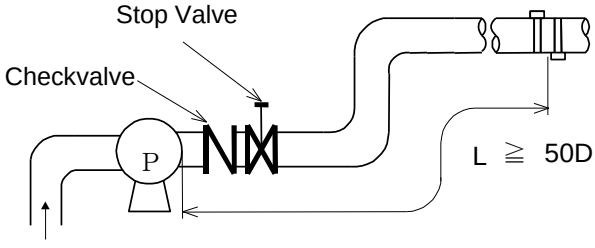
4-3. Functions

Function	Flow direction	User can set flow direction
	Reverse Flow detection	Reverse flow displays and outputs a negative flow rate and an alarm, and logs occurrence history.
	Pipe info table	Selectable JIS and ASME standard
	Liquid info table	Selectable predefined liquid info
	Low flow cut	Cuts (Zeros) flow when flow falls below prescribed instantaneous flow rate. Used in order to avoid output of flow values other than 0 when measurement value during still flow becomes disordered. (Default ; ±0.3%F.S.)
	Output Filter	Rapid flow rate changes would be smoother by this filter. (Default; 15sec)
	Totalizing value Reset	Reset the integrated value counter to zero
	Limit Alarm	Set upper and lower alarm limits. When the set values are exceeded, an alarm is displayed and output, and the occurrence history is logged.
	No Echo receiving warning	If the system is unable to obtain a received signal for a certain period of time and is therefore unable to perform measurements, it will display and output an alarm, log the history of the occurrence, and increment the number of occurrences. The number of occurrences can be reset by the user.
	Disturbance detection	When a measurement obstacle such as a large amount of air bubbles is detected in the liquid, the number of occurrences is incremented. The number of occurrences can be reset by the user.
	Impossible Pulse output	When the number of pulses that can be output per second at the set pulse width is exceeded, an alarm is displayed and output, the occurrence history is logged, and the occurrence count is incremented. The count can be reset by the user.
	Zero point correction	Zero point can be automatically compensated (shifted) at zero flow condition.
	Span correction	Slope of span line can be corrected for flow rate.
	Lo battery Alert	When the battery level becomes low, an alarm is displayed and output, and the occurrence history is logged.
	Data retention	Totalized flow values and all setting parameters are retained in memory with lithium battery even if battery failure.
	Parameter Logging	Log the history of configuration changes.
	Measurement value Logging	Measurement values are logged at regular intervals, and any alarms or errors that occur are also logged. (Default interval; 1 hour for 30days)
	Password	The setting operation is protected by a password. The user can set a 4-digit number during initial setup. It can also be changed afterwards.
	Eco mode operation	If no operations are performed for the set time from the start of measurement, the device will switch to energy saving mode to reduce power consumption. (Default; 30sec / selectable from 30sec, 60sec and 120sec)
	USB connection	General-purpose terminal software allows various settings, flow rate monitoring, and log reading
	Self-diagnostics	Diagnoses malfunctions in the device's measurement section and displays an error if a malfunction is detected

5. Recommended Installation position

- To minimize measurement errors arising from flow profile, a straight pipe run is necessary for transducer installation.
- Liquid should fill the pipes completely and transducers should be installed in locations which have no air bubbles.
- For measurements in underground piping, the usual means is to locate the flowmeter in a pit to facilitate transducer installation, maintenance, and testing.

[Refer to JEMIS 032- 1987]

Structural condition	Upstream straight pipe length	Downstream straight pipe length
90°bend		
T shape joint		
Increasing Diameter		
Reducing Diameter		
Control Valves	 Flow Control at upper side	 Flow Control at lower side
Pump		

D : Pipe Diameter

6.Dimensions


203mm
KEIKI
UC-1
72mm
62mm

7.Ordering Code

Main Unit

UC1 -	M	B	N/C	W	-	CT

CT1:	Inspection Record
CT2:	Inspection Record with Traceability certificate
CT3:	WET Calibration certificate
W:	Overseas Model
N:	No output
C	Non-voltage pulse output
B:	Battery Driven
M:	DN25 - DN100

Spare Parts

Code	Item	Q'ty
53032204	Dry Couplant Seat	1pc
00046058	Plastic Band (DN25-DN50)	1pc
00046059	Plastic Band (DN50-DN100)	1pc
00046103	Output M8 Cable (2m)	1pc

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