Product Specifications	FZ01-377B1	1／6
Clamp-on Ultrasonic Flow Monitor	Model	CU□□Y□

1. Basic specifications

Model		CU08YT	CU15YT	CU25YT
Nominal diameter		8A/10A	15A/20A	25A/32A
Accuracy guaranteed flow velocity range [m/s]		+0.2 ～ +5.0 −0.2 ～ −5.0		
flow-rate range [L/min] Note1		0.8 to 20 / 1.5 to 38	2.4 to 61 / 4.4 to 110	7.2 to 179 / 12.0 to 300
Flow rate at measurement start [L/min]		0.00 to 99.99 Standard : 0.15	0.0 to 999.9 Standard : 0.5	0.0 to 999.9 Standard : 1.5
Repeat precision[% F.S.] Note2		±0.3 Note3		
Measurable fluid		Homogenous liquid where the ultrasonic signal can be transmitted (Water, pure water, oil, etc) Fluid sound velocity : 1,000 to 2,000m/s Dynamic viscosity coefficient : 0.001 to 9.999×10^{-6}m^2/s		
Fluid temperature range		When ambient temperature is 50℃ or below : −15 to 85℃ When ambient temperature is 50 to 55℃ : −15 to 75℃ When ambient temperature is 55 to 60℃ : −15 to 60℃		
Working ambient temperature/ humidity range		−15 to +60℃ ・ 95%RH or less(no condensation)		
Measurement method		Transit time difference method 、Single-path		
Pipe material		Metal piping(stainless steel, steel pipes, copper pipes)、 Plastic(PVC、PP、PTFE) Lining pipes are not supported Note4		
Pipe thickness		1.2 to 4.9mm		
Mounting method/Mounting orientation		Clamp-on Vertical piping: Any Horizontal piping: Standard of ±45° off the central plane to avoid air bubbles and sediment *Do not mount in areas with pipe deformations, flanges, or welded joints.		
Flow direction		Flow direction can be changed using the settings Flow measurement is performed with the set flow direction as “positive flow”		
LED display		4-digit 2-row 7-segment display Instantaneous flow rate value or Accumulated flow volume Flow direction/Digit overflow display/Minus sign display		
Display	Instantaneous flow rate	Unit : L/min、gal/min 4-digits (excluding decimal point)		
	Accumulated flow volume	Unit : L、gal 8-digits(4-digits 2-row)		
	Piping temperature	If instantaneous flow rate is selected on the display, the following will be displayed on the second line.		

Model		CU08YT	CU15YT	CU25YT
Temperature measurements (Optional)		Semiconductor sensor: 1 location Measurement location: Pipe surface Measurement range ,Accuracy guaranteed range : −15 to +85℃ Measurement accuracy: ±2℃ Measurement interval: 1sec		
Power		20～27.5V DC		
Current consumption		2.5W or less		
Ultrasonic measurement interval		0.2 sec		
Response performance		63 %-response damping time : 5sec(Standard) Can be set to 0, 1, 3, 5, 10, 30, 60, 90sec.		
Dedicated cable (option)	Basic specifications	Cable length : Select from 3m, 10m Connector : M12, 8pin 8cores, AWG24, outer diameter φ6		
	Terminal processing	No terminal processing		
	Cable connection	Power supply	(5) Gray (GRY) __ (+) (8) Red (RED) __ (−)	
		Analog current output	(3) Green (GRN) _____ (+) 4 to 20 mA (2) Brown (BRN) _____ (−)	
		Digital output 1	(4) Yellow (YEL) _ (+) (8) Red (RED) _ (−)	
		Digital output 2	(6) Pink (PNK) ___ (+) (8) Red (RED) __ (−)	
		RS-485 communication	(1) White (WHT) _____ (+) (7) Blue (BLU)_____ (−) (8) Red (RED) _____ (GND)	
Protection structure		IP65/IP67(Waterproof performance with the dedicated cable)		
Mass		Approx.400g	Approx.500g	Approx.600g
Main material Note5	Body case	PPS		
	Acoustic coupler	Rubber		
	Bracket	SUS		
	Cable	Polyurethane		
Others		CE marking, RoHS directive compliant		

Note 1: Flow conversion values calculated from the dimensions specified in JIS G3452-2014 for carbon steel pipes (SGP).

Note 2: Accuracy is guaranteed for the flow velocity.

Note 3: Accuracy guaranteed conditions: Fluid temperature: 20℃±1℃、ambient temperature: 20℃
Power supply: 24.0V DC±10%、Dumping time: 5sec
Number of data acquisitions: 50 times、Data acquisition interval: 1sec
Ensure there are no foreign substances or bubbles in the fluid that could interfere with ultrasonic flow measurement.

Note 4: Refers to pipes with a special coating or liner on the inner surface to protect it from corrosion, improve its durability, and prevent deposits from adhering to it.

Note 5: Material symbols

PPS Polyphenylene sulfide resin

SUS Stainless steel

2. Output specifications

2－1. Analog current output

1）Output form

Item	Specifications
Output formats	Current output ： DC4 to 20mA　1 signal
Measuring range	0. . . ±0.2 to 5m/s
Load resistance	550Ω or less
Analog output conversion accuracy	±0.04mA
Response time	0.5sec
Output current lower limit	0.8mA （during backflow）
Output current upper limit	24.2mA （during overflow）

2－2. Contact output

1）Output form

Item	Specifications
Output formats	NPN open collector (non-contact)： 2 locations
Output methods	In case of an alarm, produces an output according to the situation. In case of totalizer pulse, one-shot pulse.
Output form	Normal ： ON/OFF selectable
Contact capacity	27.5VDC,100mA
Residual voltage	2V or less
Output frequency	Max. of 100P/s
ON pulse width	Selectable from 5,10,50,100,200ms (Target ： totalizer　pulse)

2）Settable range

Item	Specifications
Not used	Does not use the contact output.
All alarm	Contact output is activated upon instances of device error or process error
Device error	Contact output is activated when a circuit error (memory, etc.) or a temperature circuit error occurs.
Process error	Contact output is activated when no waves are received or waves are unstable.
Range-over	Contact output is activated when the instantaneous flow rate exceeds the upper limit of 120% or lower limit of -20% of the range.
Pulse range-over	Contact output is activated when the flow rate totalizer pulse output exceeds the maximum frequency limit.
Negative flow direction	Contact output is activated when the flow is in the reverse direction.
Forward totalizer flow pulse Note6	Outputs the forward totalizer flow pulse.

Note 6:Only D01 is set for forward total flow pulse.

2－3. RS-485 communication

1） Communication modes

Item	Specifications
No. of connectable modules	Up to 31
Transmission rate	9600bps, 19200bps, 38400bps (standard)
Parity	None, Odd (standard), Even
Stop bit	1bit (standard), 2bit
Cable length	Up to 1km
Transmission data	Instantaneous flow rate, Accumulated flow volume, Piping temperature, error information,etc. For the transmission specifications, refer to Instruction Manual 7178-602 for information on the Clamp-on Ultrasonic Flow monitor's communication function.

3. Alarm judgment items

Diagnostic indicator lamp STATUS	LED lamp Second row	Condition
● (Red lamp)	E1-1	Backup memory error
● (Red lamp)	E1-2	Temperature circuit error
● (Red lamp)	E1-3	(Display board error)
● (Red lamp)	E2-1	There is no received signal.(There is no receipt wave)
● (Red lamp)	E2-2	Receipt signal error (Weak receipt wave or abnormal receipt wave shape)
● (Red lamp)	E2-3	Calculation error (Error in the detected measurement data)
● (Red lamp)	E2-4	Threshold error (Sensitivity of the receipt signal is low)
● (Red lamp)	E2-5	Data collection error
● (Green lamp)	T. ALM	The temperature exceeds the measurement range.
● (Green lamp)	----	When there is no pipe temperature measurement option
● (Green lamp)	OVER	The analog output or totalizer pulse output exceeds the range.

4. Other function

1）Self-diagnostic function

・Wave form received from the detector

・Analog current output, totalizer pulse output overflow

2）Calibration and verification of analog outputs

【Current calibration mode】

Calibrates the analog signal (4 to 20 mA DC) so that the output is 4 mA at 0% and 20 mA at 100%.

【Constant current setting mode】

This function generates the constant value output for the analog signal.

Setting range: 0.8mA, 4mA, 8mA, 12mA, 16mA, 20mA, 23.2mA

3）Checking the status output and totalizer pulse operation Note7

【Status simulated output (DO1, DO2)】

This function checks the status output.

ON ： Sets the contact to short-circuit.

OFF ： Opens the contact.

【Totalized pulse simulated output (DO1 only)】

This function checks the totalized pulse output.

GO ： Outputs simulated pulses. Note8

STOP ： Stops simulated pulses.

4）How to set flow simulation output (test mode) Note9

This function sets simulated output for the volume flow rate and checks each output (LED display, analog output, DO output).

5）Power failure recovery function

Backup using non-volatile memory

・Accumulated flow volume backup interval: During integration (every 200 ms)

・Configuration parameter backup timing： During setup

Note 7：This operation produces the same output for DO1 and DO2 at the same time.
Before activating it, confirm in advance that you want to change the DO output.

Note 8：The output pulse width corresponds to the currently selected pulse width.

Note 9：This operation changes the output of the analog outputs AO, DO1 and DO2 according to the settings.
Confirm in advance that you want to change each output.

5. Precautions for handling

Before handling the product, be sure to read the handling manual carefully. And, use the product correctly.

5－1. Working environment, fluid to be measured

(1) Cannot be used for fluids that do not allow ultrasonic waves to pass through (e.g., highly viscous fluids, fluids containing air, suspensions, etc.).
(2) A place remote from electrical devices (motor, transformer, etc.) which generate electromagnetic induction noise, electrostatic noise, etc.
(3) This product is intended for use in industrial areas and environments. This equipment has been designed as a Class A product (for industrial environment applications). Use in home environments may cause jamming, and therefore use in such environments should be avoided.
(4) Do not use this product for applications requiring safety, such as nuclear, railroad, airplane, automobile,and recreational equipment.
(5) This product is not explosion-proof. Do not use in atmospheres with explosive gas.
(6) Do not install in locations exposed to direct sunlight, wind or rain, or where it is affected by radiant heat from a furnace or other sources.
(7) Do not use in areas where there is a risk of submersion in water.
(8) Do not use in locations with excessive vibration, dust, dirt, or humidity.
(9) Do not use in areas where the surrounding atmosphere is corrosive.

5－2. Precautions for piping

(1) Do not allow foreign matter or air to mix with the fluid. Contamination will affect measurements.
(2) Do not install the product at a place where air accumulation can easily occur (e.g. upstream side of a falling pipe.). Also, before start measurement, remove air sufficiently.
(3) If installing on a horizontal pipe, mount the flow monitor within ±45° from the center surface to avoid air bubbles and sediments.
(4) Do not mount in an area where the pipe is deformed, where there is a flange, or where there are welding joints
(5) Install in a location where sufficient straight pipe length can be secured. The required straight pipe length should be in accordance with the “Straight Pipe Length” described in “Instruction Manual_7178-601”.
(6) A place not subjected to excessive fluid pulsation such as pump discharge side.
(7) Mount it securely as described in the instruction manual. If it isn’t secured properly, it may fall off, fail, or malfunction, etc.
(8) When installing on hot pipes, pay attention to the following items when carrying out installation work. Failure to observe this may result in burns.
Keep bare skin away from hot parts. If there is a risk of bare skin coming into contact with hot parts, cover the skin by wearing gloves, long-sleeves,long pants, and socks, etc.
(9) Take heat insulation measures if required for work (wearing heat-resistant gloves, etc.).
(10) Ensure there is space for maintenance around the pipe to which the flow monitor is to be mounted.

5－3. Wiring

(1) To prevent output failure due to moisture intrusion, condensation, or damage due to flooding, handle the wiring ports in accordance with the “2.3 Wiring” of the instruction manual.
(2) Before performing the wiring work, be sure to turn OFF the main power.Otherwise, it may cause electric shock.
(3) Do not perform wiring work outdoors in rainy days to prevent insulation deterioration and dew condensation. Otherwise, it may result in trouble,malfunction, etc.
(4) Be sure to connect a power source of correct rating. Use of power source out of rating may cause fire.
(5) Keep the dedicated cables away from the heavy current lines. Otherwise,noise could be generated and cause malfunction.
(6) This will result in malfunction, and therefore the dedicated cable must be wired separately in conduits.
(7) Connect isolated, ungrounded equipment to the power supply, analog output, contact output, and serial communication (RS-485).