

# Ultrasonic Flowmeter for Air

Type: FWD

**Ideal for proper management for compressor etc...!**

**Abundant applicable pipe diameters.**

Applicable pipe diameter 25mm up to 200mm.

**No energy loss due to no pressure loss.**

Measurement principle is ultrasonic method. There is no pressure loss without protrusion in the pipe.

**No need of filter such as mist separator thanks to FWD has high resistance to oil mist.**

Accurate flow rate measurement including oil mist. Strong durable and reliable to use.

**No need of power source installation work by means of battery driven.**

Lithium-battery build-in type (approx. 10 years operating) is provided without painful wiring work of the power.

**NORMAL conversion function is provided as standard.**

Converted amount of used air ,temperature and pressure into normal status are displayed.

**Capable of forward/reverse measurement and output.**



# Airflow rate measurement supported by ultrasonic method!

## "Visualization" is supported meeting customer's demands.



Nominal diameter 25 and 32mm  
(screwed type)



Nominal diameter 40, 50, 65 and 80mm  
(wafer connection type)



Nominal diameter 100, 150, and 200mm  
(flange connection type)

### Features

#### No energy loss due to no pressure loss.

- Ultrasonic method is adopted as a measurement principle.
- There is no pressure loss due to no protrusion in a pipe.

#### High durability thanks to it has strong resistance to oil and mist.

- Strong structure to oil, mist and fluid containing dust due to no moving parts.
  - Capable of using even with old pipe and refueling type compressor.
- Note) In case of a large amount of oil and mist contained, a vertical piping is recommended to use.

#### Capable of forward/reverse measurement and output.

- Capable of forward/reverse measurement and output according to measurement setting.
- Comprehending an using air rate where flows between factories, also applicable to loop pipe.

#### Abundant output functions enables a system management/control.

- Not only unit pulse but also 4 to 20mA DC analog output and upper /lower alarm output are provided.
- Note) When 4 to 20mA DC analog output is selected, instantaneous flow rate, pressure and temperature can be switched in the field.

#### Capable of detecting the air leakage.

#### No need of power source installation work by means of battery driven.

- Build-in battery type (10 years operating) is also provided which eliminates painful power source installation work.
- Note) Battery driven type is to indicate only.

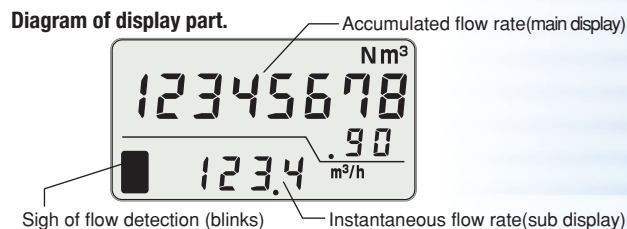
#### 1: 60 Wide range ability

- Having wide range ability enables little amount of flow rate to be measured accurately.
- Furthermore, it realize that wide rage with 1:400 from sensitive flow rate (beginning of the measuring flow rate) to maximum flow rate.

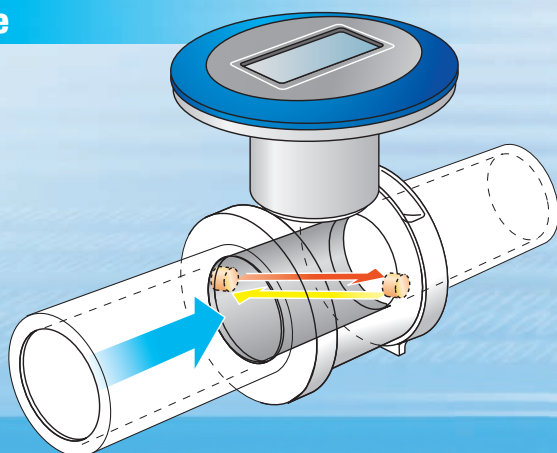
#### Easy to read display

- LCD digital display with large size of characters allows to read easily and capable of reading an accumulated flow rate and instantaneous flow rate simultaneously.
- Additionally, indication part can be rotated in 90 degrees in the field.

#### Diagram of display part.



### Principle



#### Excellent repeatability "Transit Time" Method.

Two ultrasonic sensors are installed on the side of flow entrance and exit for flow meter.

When liquid flows in the direction of the arrow as shown on the diagram, difference of transit time by flow velocity occurs between sound waves generated from flow entrance and exit.

This time lag is using for detecting the flow velocity of the fluid and calculating the volumetric flow according to cross-section area of the flow meter and flow velocity.

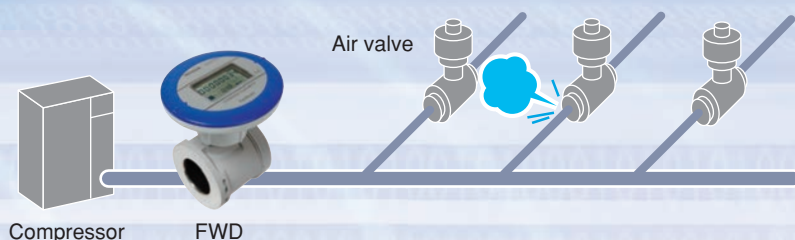
Furthermore, capable of converting into NORMAL flow rate by means of build-in pressure sensor in the flowmeter.



## Application example

### 1 Capable of detecting the air leakage.

When compressor is operated with closing valve, at the place where flow rate is measured air leakage occurs.



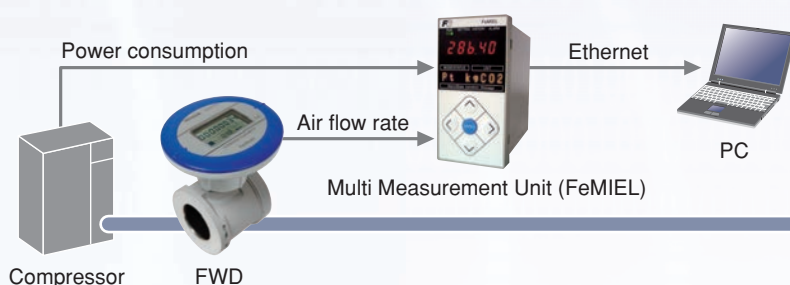
### 2 Connecting to Multi Measurement Unit (FeMIEL) allows "visualization" furthermore and saving energy.

Multi Measurement Unit (FeMIEL) is capable of monitoring a power consumption and flow rate simultaneously, additionally, communicating PC through Ethernet.

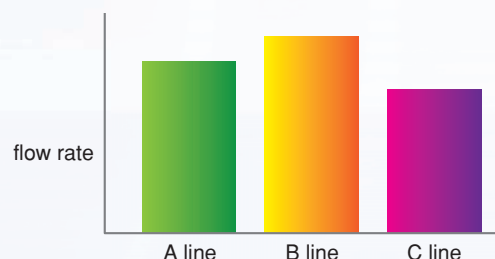
#### Multi Measurement Unit (FeMIEL)

This unit is applicable to multi measurement using PT,CT, Pulse, Analog and Contact input.

Build-in Memory can store one year volume of data (when every 5 min. measurement cycle)  
Compact size with front dimension 96 x 48mm.



### 3 Available to comprehend the used amount of air for each building, floor, line in the factory.



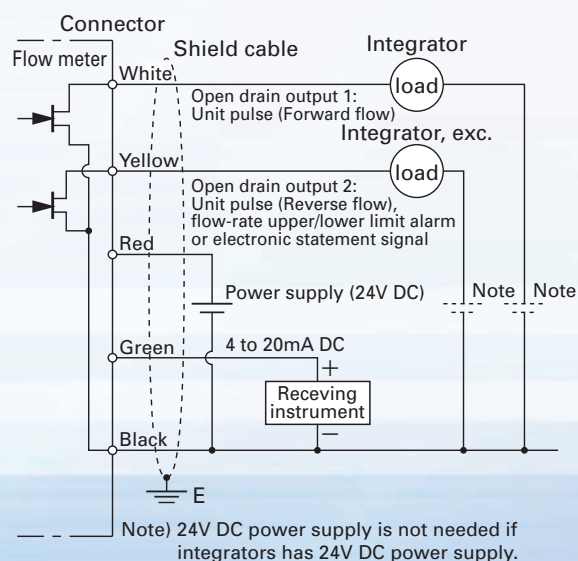
## Code symbols

Digit	Specifications	Note	FWD	4	5	6	7	8	9	10	11
4	<Nominal diameter(mm)>										
5	25			0	2	5					
6	32			0	3	2					
	40			0	4	0					
	50			0	5	0					
	65			0	6	5					
	80			0	8	0					
	100			1	0	0					
	150			1	5	0					
	200			2	0	0					
7	<Power supply>										
	24V DC										
	Build-in Battery										
8	Modification No.										
9	<Fluid to be measured>										
	Air										
	Nitrogen	Note1									
10	<Power supply/output cable>	Note2									
	None										
	5m										
	20m										
11	<Instruction Manual>										
	None										
	Japanese										
	English										

Note1) for nitrogen, subject nominal diameter is from 25 to 80mm

Note2) When power supply is build-in battery, please select the "none" regarding cable

## Connection diagrams (External power supply type)



#### Accessory Part

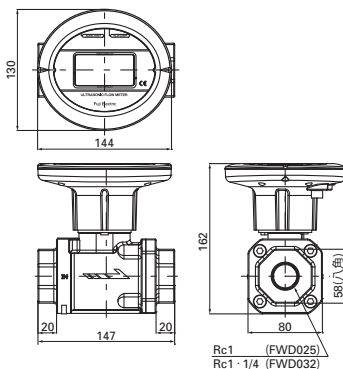
Nominal diameter	Accessory
25, 32mm	M4 Hexagonal wrench
40, 50, 65, 80mm	M4 Hexagonal wrench, Center adjusting collar, Flange gaskets, Bolt set
100, 150, 200mm	M4 Hexagonal wrench, Center adjusting collar

## Specification

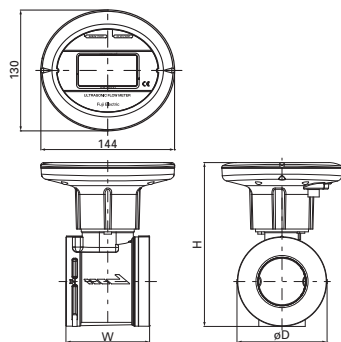
Nominal diameter (mm)		25,32,40,50,65,80,100,150,200				
Power supply		24V DC±10% or Built-in battery type (battery life : approx.10years at 20℃ environment temperature)				
Power consumption		24V DC : 1.1W or less				
Applicable fluid		Air or Nitrogen				
Temperature and humidity of fluid		-10 to 60℃, 90%RH or less				
Working pressure		0 to 1MPa or less (gauge pressure)				
Flow-rate range (actual flow) Accuracy		Nominal diameter (mm)	Flow rate range (m³/h)	Accuracy		Low flow cutoff (m³/h)
				±2.0% of rate	±5.0% of rate	
		25	±0.6 to 35	±3.5 to 35 m³/h	±0.6 to 3.5 m³/h	±0.1
		32	±1.1 to 65	±6.5 to 65 m³/h	±1.1 to 6.5 m³/h	±0.2
		40	±1.3 to 80	±8 to 80 m³/h	±1.3 to 8 m³/h	±0.2
		50	±2.5 to 150	±15 to 150 m³/h	±2.5 to 15 m³/h	±0.4
		65	±4 to 240	±24 to 240 m³/h	±4 to 24 m³/h	±0.6
		80	±5 to 300	±30 to 300 m³/h	±5 to 30 m³/h	±0.8
		100	±10 to 500	±50 to 500 m³/h	±10 to 50 m³/h	±2.6
		150	±24 to 1200	±120 to 1200 m³/h	±24 to 120 m³/h	±5.0
200	±40 to 2000	±200 to 2000 m³/h	±40 to 200 m³/h	±9.0		
Accuracy of conversion into NORMAL		±2.5% of rate (at 0.5MPa and normal temperature)				
Display (switched by button)	Main display	"Forward or Forward/reverse display mode" ■ Diameter 25 to 80mm : Accumulated flow rate (N/m³) 9digits, Trip accumulated flow rate (N/m³) 8digits, Instantaneous flow rate (N/m³) 7digits ■ Diameter 100 to 200mm : Accumulated flow rate (N/m³) 10digits, Trip accumulated flow rate (N/m³) 9digits, Instantaneous flow rate (N/m³) 7digits				
	Sub display	■ Diameter 25 to 80mm : Instantaneous flow rate N/m³ 5digits (4digits over 2000), Pressure (kPa) 5digits, Temperature (℃) 3digits. ■ Diameter 100 to 200mm : Instantaneous flow rate N/m³ 5digits (4digits over 2000), Pressure (kPa) 4digits, Temperature (℃) 3digits.				
Output signal (not available for battery driven type)	Current output	4-20mA DC(±0.5% FS), Load resistance : 400Ω or less, Output of “Instantaneous flow-rate”, “pressure” and “temperature” are switched and selected by a button.				
	Contact output	■ 2 open drain outputs Maximum load : 24VDC 10mA, Maximum frequency : 10Hz, Duty : 35 to 65% ■ Output1: Unit pulse (forward), Output2 : Unit pulse (reverse), Upper/lower alarm ■ Pulse output unit : 0.1Nm³/P, 1Nm³/P				
Connection method	Nominal diameter 25,32mm	Screw connection (25mm : Rc1, 32mm : Rc1-1/4)				
	Nominal diameter 40 to 80mm	Wafer (installation between JIS10K flanges)				
	Nominal diameter 100 to 200mm	JIS 10K flange				
Pipe condition (straight pipe length)	Nominal diameter 25,32mm	Upper stream 20D or more, downstream 5D or more When using with forward/reverse display mode, both of upper / lower stream 20D or more				
	Nominal diameter 40 to 200mm	Upper stream 10D or more, downstream 5D or more When using with forward/reverse display mode, both of upper / lower stream 10D or more				
Installation position		Horizontal position or vertical position				
Material of fluid contacting part		Flow meter body : Aluminum alloy, PPS, fluoro-silicone rubber etc				
Mass		Shown on Outline diagram				
Installation place		Indoors and outdoors (conforming to IP64)				
Storage temperature		-20 to +70℃, No dew condensation				

## Outline diagram (unit : mm)

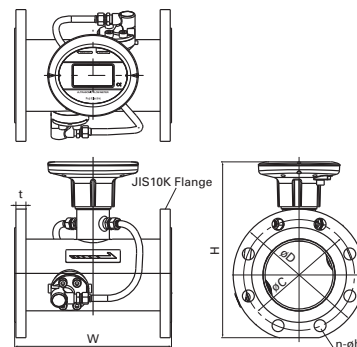
■ Nominal diameter 25 and 32mm (screwed type)    ■ Nominal diameter 40 to 80mm (wafer connection type)    ■ Nominal diameter 100 to 200mm (flange connection type)



Type	Mass (kg)
FWD025	1.7
FWD032	1.6



Type	W	H	φ D	Mass (kg)
FWD040	76	163	82	1.1
FWD050	90	176	97	1.3
FWD065	108	197	116	1.6
FWD080	117	220	127	1.8



Type	W	H	φ D	φ C	t	n	φ h	Mass (kg)
FWD100	250	280	210	175	18	8	19	10.0
FWD150	300	341	280	240	22	8	23	18.3
FWD200	350	391	330	290	22	12	23	24.1

## ⚠ Cautions on safety

\*Be sure to read the instruction manual before using the flowmeter.

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