

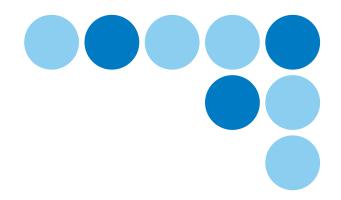
OMRON

Air Flow Sensor

D6FZ-FGT200 D6FZ-FGT500 D6FZ-FGS1000

Air Flow Station

D6FZ-FGX21



AIR FLOW SENSOR



Visualization of Air Flow, Pressure, Leakage quantity enable more **Energy Savings** in production site.

Air compressors consume a much electrical energy in production sites. Production sites, however, prioritize improving productivity, and so energy conversation for compressed air have not much progressed. To advance further energy saving at production site, "visualizing compressed air" is a major step in on-site improvements.

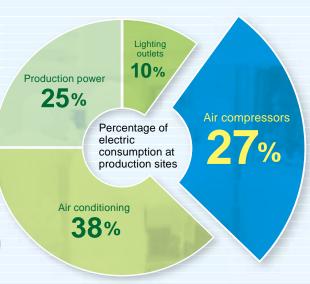
Air compressors shares 27% of total electrical energy.

Despite energy saving activity of air compressors..









Note: Shows the status of use at Omron production sites

As air is invisible, so there is much waste.

Waste 1 Air leakage

Unrecognized as leakage

Waste 2 **Excessive air** usage

Air is used more than the necessary quantity.

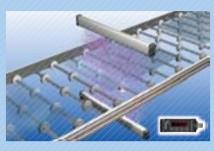
Waste 5 Too much supply pressure

Pressure fluctuation are not monitored, so the supply pressure is set to high.

Increased energy conservation is possible in a variety of applications

Idling stop for ionizer

D6FZ-FGT



By stopping the supply of compressed air with a magnetic valve when there is no work, the quantity of compressed air usage is reduced. At the same, the flow sensor monitors the quantity of compressed air supplied to ensure that it is within a specified range. Therefore, the sensor can help maintain and improve quality.

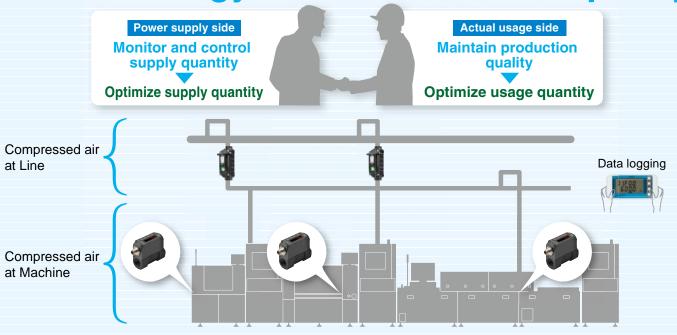
Flow management for D6FZ-FGT molding machines



By prioritizing the monitoring of molding machines and other machines that use large quantity of compressed air, energy conservation can be advanced effectively.

Consequently

Require cooperation both supply side and usage side for visualization. Lead to reduction of electric energy or maintenance of quality.



Identify the waste that had previously been invisible, and further advance the energy saving of compressed air.

Approach Identifying the leakage quantity

Visualizing air leakage in non-operational time

Approach 2

Identifying the usage quantity

Visualizing air quantity in operational time

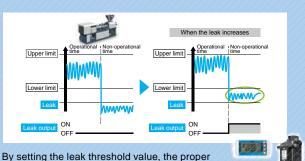
D6FZ-FGS

Approach 3
Identifying the excessive supply pressure

Visualizing the pressure fluctuation in operational time

Leakage management for machines

timing for leak repairs can be identified.



D6FZ-FGT

Flow and pressure management for production line



By monitoring the usage quantity and pressure fluctuations for each production line, bottleneck line or machine can be identified in order to advance on-site improvements and energy conservation.

D6FZ-FGS



The best product to measure compressed air at Line

D6FZ-FGS1000

1 Leakage

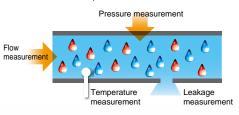
2 Usage 3 Pressure

Pipe size: Rc1/2 (25A)
(Bushing can be used to convert down to 15A)

Multiple sensing

Simultaneous measurement of Leakage, usage and pressure

Equipped with multiple sensing functions
With 1 sensor, the compressed air conditions can be identified.

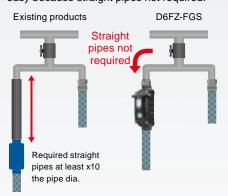


Simple setting

Mountable to curved pipe or coupler

Silencer

The built-in silencer eliminates ultrasonic noise and turbulence flow. It makes installation work easy because straight pipes not required.



High accuracy

High accuracy flow measurement

High measuring accuracy of ±2% R.S. (50L/min≦) is achieved.

High accuracy Flow rate measuring accuracy - D6FZ-FGS (1000L/min max.) Existing products (200L/min max.) 30 - Existing products (1000L/min max.) 20 10 Accuracy R.S. 0 -10 Measuring range 1000L/min max. -20 Measuring accuracy R.S. ±2.0% -30 (50L/min≦) -40 150 1000 Flow rate (L/min) * Data is a comparison with Omron conditions (as of November 2012) Check the actual use environment before use

Wide range flow measurement

Wide range

Wide measuring range of 1~1000L/min is achieved.

Tolerant of oil and mist

Ultrasonic sensor

Featuring ultrasonic sensor It can be installed to rusty pipe, and measured gas discharged from oil flooded compressor.

Main functions

- Analog output (2 outputs)
- Pulse output (2 outputs)
- RS-485 communications
- munications Alarn
 - Alarm hold

Threshold value (peak/bottom/leak)

- IP64
- Operation indicator

Functional comparison

Flow measurement	Leakage measurement	Pressure measurement	Temperature measurement
Curved pipe mounting	Tolerant of oil and mist	Station connection	Multi-sensor connection

The best product to measure compressed air at Machine





3 Pressure

D6FZ-FGT200/500



200L type 500L type
Pipe size: 8A(Rc1/4) Pipe size: 15A(Rc1/2)

Easy to see

11 segment 8 digit LCD display

The characters are easy to recognize, and integrated flow rate can be checked with one glance.



BVE

Reversing the display

You can reverse the display direction to match the installation direction.

Always use one of the specified installation directions.

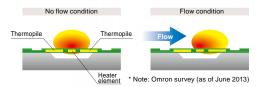




High accuracy

High accuracy flow measurement

Using Omron's MEMS chip, the highest accuracy in the industry* of ±2% F.S. (50L/min≦) is achieved.



Leakage measurement

At a low flow rate (<50L/min), ±0.5% F.S. high accuracy measurement is achieved.

Air flow (money amount) that is discarded as leakage when machines are in non-operational time can be identified.



Same specifications as for the 1000L type.

Zero reset

Using the zero reset, seasonal or day/night variation in the flow rate can be identified.



Other Features

Flow straightener Honeycomb structure

Honeycomb structure with a high performance of flow straightening keep pressure loss low.

Honeycomb structure





functions

- Analog output (1 output)
- Pulse output (2 outputs)
- RS-485 communications
- IP65
- Display
- Threshold value (peak/bottom/leak)
- Peak//Bottom hold
- Auto-tuning
- Key lock

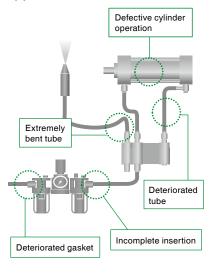


Energy-Saving activity examples

Protecting the leakage

Repair tubing and fitting against air leaks

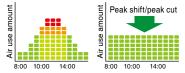
Identifying the flow rate and repairing pipes reduces the air lost to waste.



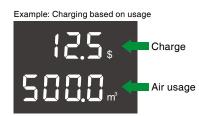
Reducing the air

Charging based on air

Management of consumption rate and charging based on usage helps to continuous activities for energy saving.



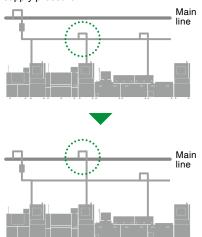
Seeing the air flow during operational time



Reducing the supply pressure

Rearranging the pipe distribution

The machine its supply pressure fluctuate widely should be changed piping as below, and then stabilize and turn down supply pressure.



The PC Software can easily analyze Logged Data

Enables further activity for energy saving to monitor the data of Air Flow Station and analyze the data of Multi Data Viewer Light Software.

At Production Line: Data monitoring and storing by Air Flow Station

The Air Flow Station enables easy data logging



Free The PC software

Data Viewer Light

This software is suits for the display of time period, such as by minute, hour, day, etc. The integrated flow rate is displayed as a bar graph, and the momentary flow rate/pressure using a dotted line graph, so a summary can be identified at a glance.

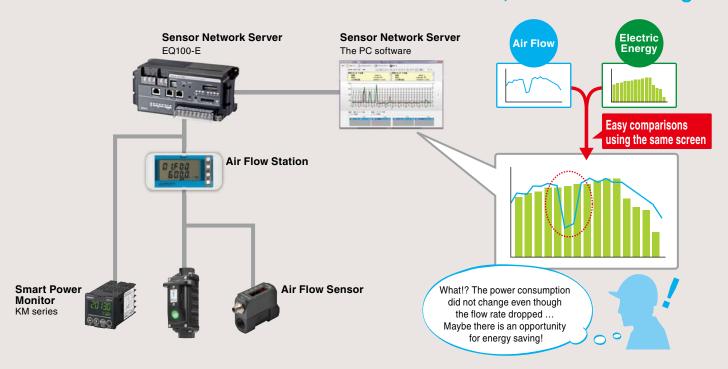
In the office: Data storing and analyzing by PC



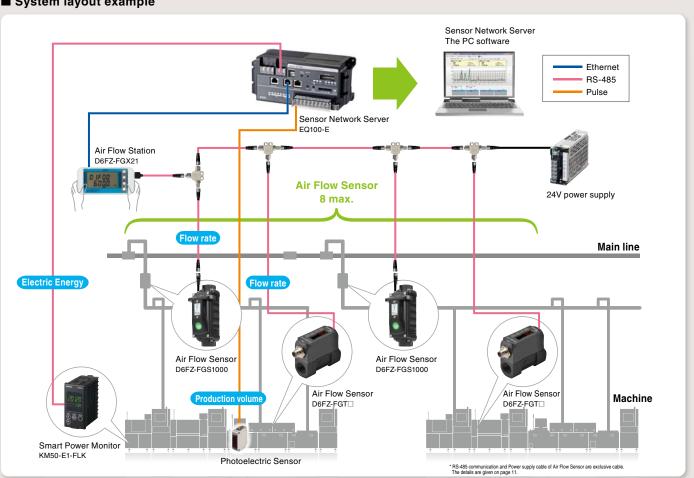


Find the Energy Efficiency by logging the data simultaneously both electric consumption and production volume.

The results of simultaneous measurement, show the following



■ System layout example



List of specifications

Units

Appearance	Product name	Model
	Air Flow Sensor (200L type)	D6FZ-FGT200
	Air Flow Sensor (500L type)	D6FZ-FGT500
	Air Flow Sensor (1000L type, cable length: 0.2m)	D6FZ-FGS1000
0 F 00 6000 _	Air Flow Station (Cable length 1.5m, including T-branch connector cable)	D6FZ-FGX21
0	Air Flow Sensor Set (1000L type) • Air Flow Sensor (1000L type) • Air Flow Station • T-branch connector • Single-end wire cable (3m)	D6FZ-FGS1000-S

Option (sold separately)

Appearance		Product name			
	T-branch connector	T-branch connector			
	(Air Flow Sensor D6FZ-FGT Mounting bracket • Mounting bracket: 1 • Plus screw (M3): 4	Mounting bracket: 1			
0	(Air Flow Station D6FZ-FGX2 Mounting magnet* • Mounting magnet: 2 • Plus screw (M3): 2	Mounting magnet: 2			
		Cable length 3m		D6FZ-JD3A	
	Single-end wire cable	Cable length 10m	M12 connector (8 pin) D6FZ-JD10A	D6FZ-JD10A	
		Cable length 20m		D6FZ-JD20A	
		Cable length 3m		D6FZ-JD3B	
	Double-end connector cable	Cable length 5m	M12 connector	D6FZ-JD5B	
	Double-end connector cable	Cable length 10m	(8 pin)	D6FZ-JD10B	
		Cable length 20m		D6FZ-JD20B	

 $^{^{\}star}$ When magnets are used, the maximum vibration resistance is 55Hz.

Ratings

Air Flow Sensor

Applicable flui		Model	D6FZ-FGT200	D6FZ-FGT500	
Applicable fluid			Air, nitrogen (N ₂)*1		
Working pressure			0.75MPa (withstand pressure 1.5MPa)		
Measurement range*2			0 to 200L/min	0 to 500L/min	
Measurement	accuracy rang	e* ²	2 to 200L/min	5 to 500L/min	
Display Resolu	ution*2		1L/min		
Accuracy*2			±2.0%F.S. at 50L/min or more		
Accuracy			±0.5%F.S. at less than 50L/min		
Temperature of	characteristic		±3%F.S.		
Repeat accura	асу		±1%F.S.		
Operating tem	perature		Operation: -10 to 60°C / Storage: -20 to	70°C (no condensation or icing)	
Operating hun	nidity		Operation: 25 to 90%RH / Storage: 0 to 9	0%RH (no condensation or icing)	
Shock resistar	nce		150 m/s ² in 6 directions (+/-X, +/-Y, and +/-Z directions), 3 times each		
Pressure loss			2kPa max.	4kPa max.	
Power supply	voltage		12 to 24 VDC ±10% ripple (p-p) 10% max	ζ.	
Current consu	ımption		120mA max.		
Functions			Momentary flow / Integrated flow / Reversing display / Zero point Adjustment / Peak and Bottom Hold / Key Lock / Eco Mode / Scaling (Analog Output) / Judgement Hysteresis / Teaching		
Display			11-segment digital display (Red), RUN / FUN / THR (Yellow), Out1 / Out2 (Yellow), Key Lock (Yellow), Flow unit (Green), Flow unit in reversed display (Yellow)		
		Analog	Current output 4 to 20mA (1 contact), maximum load resistance 300Ω max.		
	Output	ON/OFF	Open collector output (2 outputs) 26.4 VDC 50mA max. ON residual voltage 2V max. (Outputs can be selected from judgement output, pulse output and unit error of 2-wire half duplex communication, start-stop synch method Baud rate: 9.6k/19.2k/38.4k/115.2kbps, data bit length: 7/8bit, stop bit length: 1/2bit, parity: none/even/odd, termination resister (120Ω): ON/OFF, communications protocol: compatible with CompoWay/F		
Output	Output interface	RS-485			
	Output values	3	Momentary flow, Integrated flow, Judgement output *3, Unit error output		
Degree of prof	tection		IP65		
Installation Direction and Straight Pipe Section		ght Pipe Section	A straight pipe section must be provided during installation and piping if the Sensor is installed horizontally and the display is on the top. *4		
Connection bore diameter			Rc1/4 (8A)	Rc1/2 (15A)	
Material			Main unit: PBT / Flow channel: Zinc		
Dimensions			$30(W) \times 77(D) \times 63.7(H) \text{ mm}$		
Weight (in package)			Approx. 400 g (500 g)		
Weight (in pac	nage)		Instruction Sheet		

^{*1.} Clean Dry Gas (must not contain large particle e.g. duct, oil and mist)

*2. Converted value assuming the accumulated flow quantity following conditions
std (factory default): 20°C at 1 atmospheric pressure 101.3kPa, nor: 0°C at 1 atmospheric pressure 101.3kPa

*3. To prevent chattering, a judgement output is made when the judgement continues for one minute or longer.

*4. The accuracy will depend on the length of the straight pipe section. Refer to Flow rate accuracy characteristics for a length of straight pipe on page 12 for details.

Item Model		Model	D6FZ-FGS1000		
Applicable fluid			Air, nitrogen (N ₂)		
Working pressure			0.99MPa max.		
		Detection range	1 to 1,000L/min (std)		
	Fla1	Resolution	0.1L/min		
	Flow* ¹	Accuracy	±2.0% of reading at 50 L/min (std) or more ⁻²		
Magazzaant			±0.1%F.S. at less than 50L/min		
Measurement	D	Detection range	0 to 0.99MPa		
	Pressure	Accuracy	±2%F.S.		
	T	Detection range	−10 to 60°C		
	Temperature	Accuracy	±1.5% (absolute temperature)		
	Operating tem	perature	-10 to 60°C (no condensation or icing)		
Resistance	Operating hur	nidity	35 to 85%RH (no condensation or icing)		
to environ- ment	Vibration resis	stance	10 to 55Hz double amplitude: 0.7mm, Acceleration: 50m/s² in X, Y and Z directions (80min)		
	Shock resista	nce	150 m/s ² in 6 directions (+/-X, +/-Y, and +/-Z directions), 3 times each		
Pressure loss			Direct piping:10kPa max. (0.5MPa, at maximum flow) Using coupler (TL type by NAGAHORI INDUSTRY CO., LTD.): 10kPa max. (0.5MPa, at maximum flow)		
Power supply	Power supply voltage		16 to 24 VDC ±10% ripple (p-p) 10% max. (Using single unit), 24 VDC ±10% ripple (p-p) 10% max. (Using multiple units) *3		
Power consur	nption		2W max.		
Measurement	cycle		Approx. 62.5ms		
Dieplay	Display metho	od	Status display by 2-color LED (illumination/blinking)		
Display	Diplay value		Presence or absence of current-carrying, flow and error alarm		
		Analog	Current output 4 to 20mA (2 contact).4 Max. load resistance 270Ω max.		
	Output interface	ON/OFF	Open drain output (2 outputs)*5 24 VDC 50mA max. ON residual voltage 1.5V max., OFF leakage current 50µA max.		
Output		RS-485	2-wire half duplex communication, start-stop synch method Baud rate: 115.2kbps (fixed), Data bit length: 8 bits (fixed), stop bit length: 1 bit (fixed), parity: even (fixed), communications protocol: compatible with CompoWay/F		
	Outpus values		Momentary standard flow, Integrated standard flow, pressure, temperature, unit error output		
Degree of protection			IP64 (except the case with the switch cover removed)		
Wiring connection			M12 connector (8-pin)		
Connection bore diameter			Rc1 (25A) bushing enables conversion to 15A and 20A		
Material			Cable: PVC (Polyvinyl Chloride); Main unit: Aluminum die-cast; Display: Acrylic		
Dimensions			64(W) × 93(D) × 195(H) mm (excluding flange)		
Weight (in package)			Approx. 1.2 Kg (Approx. 1.7 Kg)		
Accessories			Instruction Sheet		

^{*1.} Converted value assuming the accumulated flow quantity under the conditions of 20°C at 1 atmospheric pressure 101.3kPa.

*2. Does not include pressure and temperature accuracy. Conversion accuracy to the standard flow is ±2.5% of reading (at 20°C, 0.5 MPa).

*3. Make sure to ground the 0V terminal, and do not ground the 24V(+) terminal. There is a risk of malfunction.

*4. Analog output comprise the momentary standard flow rate and pressure.

*5. The integrated standard flow of the pulse output can be selected from 1, 10 (factory default), 100, or 1000 L(std)/P.

Air Flow Station

Item Model	D6FZ-FGX21
Connectable sensor	D6FZ-FGT200 / D6FZ-FGT500 / D6FZ-FGS1000
Maximum number of mounted Sensors	8 units*1
Display	7-seg. 5-digit 2-step LCD display, auxiliary information indicator displays
Recording interval	1 s, 2 s, 5 s, 10 s, 20 s, 30 s, 1 min.
Displayed data	Momentary flow rate, integrated flow rate, pressure, temperature, charge/CO ₂ conversion value
Recorded data	Momentary flow rate, integrated flow rate, volume flow rate, pressure, temperature
Operation function	Conversion of integrated flow rate to charge/CO ₂
Recording mode	Continue mode*2, Ring mode*3
External output	Alarm output (Photocoupler output) *4
Communication interface	Ethernet (10BASE-T, 100BASE-TX)
Internal storage device	Internal memory: Approx. 4200 data items when 1 unit is connected, approx. 650 data items when 8 units are connected
External storage device	SD card (measured value saving/set value saving and reading), Recommended SD card: HMC-SD291 (2 GB) *9 and HMC-SD491 (4 GB) (manufactured by OMRON) *5
Power supply voltage	DC input: 24 VDC±10% ripple (p-p) 10% max.
Current consumption	80 mA max.
Operating temperature	Without Ethernet: -10°C to 40°C (no condensation or icing), with Ethernet: 0°C to 40°C (no condensation or icing)
Operating humidity	35 to 85%RH (no condensation or icing)
Storage humidity/temperature	-15°C to 60°C, 20% to 85%RH (no condensation or icing)
Insulation resistance	20 MΩ (500 VDC)
Withstand voltage	1000 VAC, 50/60 Hz, 1 min.
Vibration resistance	10 to 150 Hz, 0.7 mm double amplitude, acceleration: 50 m/s² for each in X, Y and Z directions for 80 min
Shock resistance	150 m/s ² in 6 directions (+/-X, +/-Y, and +/-Z directions), 3 times each ⁺⁶
Material	ABS
Degree of protection	IP30
Mounting	Magnet mounting, screw mounting, hook
Dimensions	117.2(W) × 24.6(D) × 56.8(H) mm (Except protruding part)
Weight (in package)	Approx. 150 g (Approx. 500 g)
Accessories	Instruction Sheet, Startup Guide, T-branch connection cable*7, Alarm Output Connector*8

*1. Up to 8 units can be connected when the recording cycle is 2 seconds or longer; up to 4 units when the recording cycle is 1 second.

The unit stops operation if there is no SD memory card inserted when the internal memory reaches its capacity, or when it is write protected. (Recording can be

*6. When using a mounting magnet, be sure to install it in a location where shock is not applied.
*7. A T-branch connector to connect to D6FZ-FC02.

*8. OMRON's XW4B-02B1-H1 connector

^{*2.} Automatically writes the data to the SD memory card when the internal memory reaches its capacity and continues recording until the SD card memory capacity

resumed after inserting an SD memory card and outputting the data to it at a press of button.)

The factory default is continue mode. Use the PC software to change the recording mode.

*3. Continues the recording of the latest measured values until the internal memory reaches its capacity. (If the internal memory capacity exceeds the capacity, data is overwritten from the oldest one in the memory.)

*4. Output when the range of upper/lower limit of the air flow that has been set in threshold setting mode is exceeded.

*5. When using a third party SD card, it is recommended to use a reliable and durable industrial SD card (SD standard or SDHC standard (not compliant with SDXC standard). Clearly a present the standard of the s

standard), Class 4 or higher, flash memory type SLC or MLC type). You must confirm the operation of the SD card yourself.

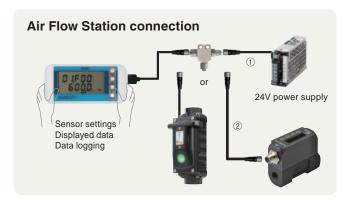
^{*9.} Orders for HMC-SD291 will be accepted until the end of March 2022.

Connection

Connection diagram

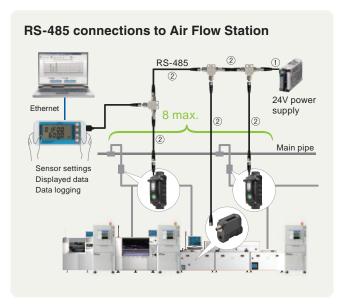
[with 1 sensor]

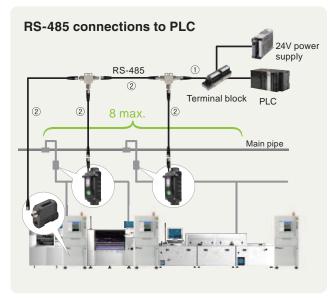
- Single-end wire cable
 Double-end connector cable



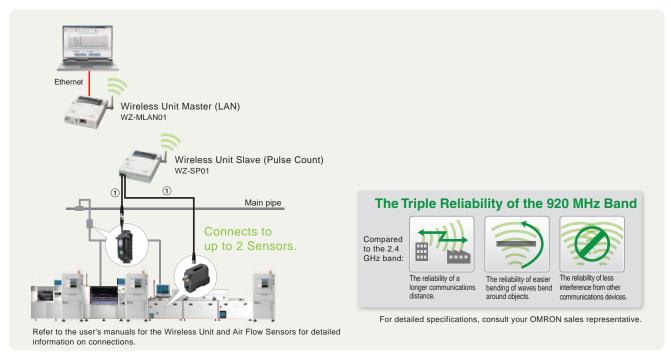


[Data communications with multiple sensor connections]





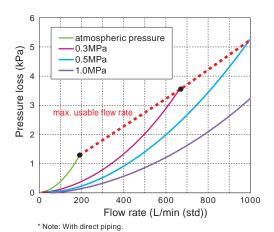
[Wireless Data Collection]



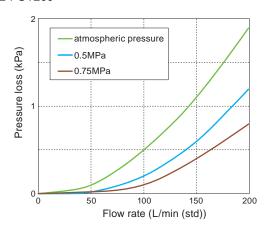
Characteristics data

Pressure loss* (typical example)

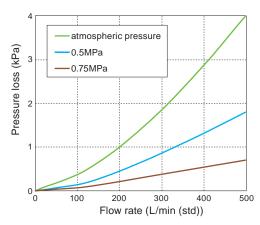
D6FZ-FGS1000



D6FZ-FGT200



D6FZ-FGT500



Min. and max. flow rate conversion table (typical example)

D6FZ-FGS1000

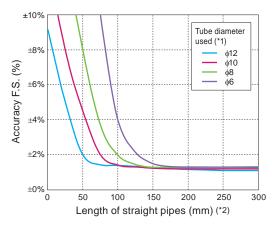
Temperature [°C]	Pressure [MPa]	Min. flow rate [L/min (std)]	Max. flow rate [L/min (std)]
	0.3	3.96	667.37
20	0.5	5.93	999.94
	0.7	7.91	1000.00
	0.3	3.89	656.17
25	0.5	5.83	983.17
	0.7	7.78	1000.00
	0.3	3.83	645.35
30	0.5	5.74	966.96
	0.7	7.65	1000.00

Flow rate accuracy characteristics for a length of straight pipe

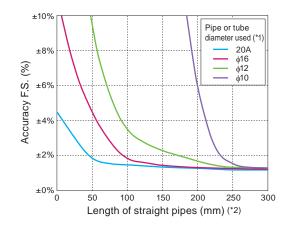
<D6FZ-FGT only>

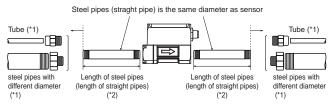
The following graph shows the flow rate accuracy characteristics for a length of straight pipe (reference information).

D6FZ-FGT200



D6FZ-FGT500





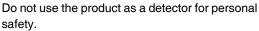
Safety Precaution

Read the agreement when ordering.

Air Flow Sensor

Marning

This device cannot be used to detect people either directly or indirectly for the purpose of assuring safety.





The use of flammable gases may cause explosion.

Do not use the product with flammable gases.



Electric shock may occur. Do not connect the product to a AC power supply.



Caution

Do not use in an ambient atmosphere or environment that exceeds the ratings.

Injury may occur due to explosion.

Flow rate and pressure must be within the range of use.



<D6FZ-FGT only>

If water drop, oil, mist and dust flow in the body, it may mismeasurement and destruction. Use clean fluid. Dust and mist can affect the characteristics of Sensor or damage the Sensor. Install a filter and mist separator on the upstream tube. Moreover, install an air flow sensor after removing the dust remaining in pipe by something like air blow.

Precautions for Correct use

Precaution for piping

<D6FZ-FGT only>

Applicable diameter: D6FZ-FGT200 / 8A, D6FZ-FGT500 / 15A When piping, be sure to use a same diameter steel pipe for the body conduit (straight pipe / elbow).

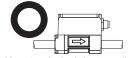
If piping different diameter pipes or using the fittings for air tubing is required, be sure to use the straight same diameter steel pipes with the body at both ends directly to make measurement accuracy better.

For details to p.12, "Flow rate accuracy characteristics for a length of straight pipe".

Precaution for mounting

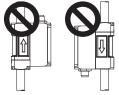
Mounting position

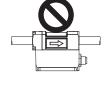
- Be sure to mount the body horizontally, otherwise the detection accuracy might be worse.
- Don't mount the body facing the control panel downward.
 Otherwise, the mist and dust in the pipe accumulates and it might cause breakdown.
- <Correct mounting>



- Mounting the body horizontally
- Control panel Upward

<Incorrect mounting>

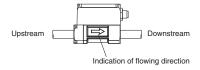




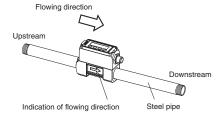
- · Mounting the body Vertically
- · Control panel Downward

Flowing direction

- An arrow in the side of the body indicates the direction where air flows.
- Be sure to check the direction of the arrow before mounting.
- Mounting in the opposite direction causes mismeasurement.
- <The indication of the body>



<The relationship between flowing direction and mounting direction>



Air Flow Station

Marning

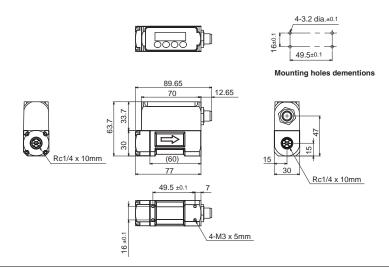
The mounting magnets provided with the product have strong magnetism. If the product is mounted using these magnets, anyone wearing a heart pacemaker must not operate the product; or the product must not be in proximity of such a person.

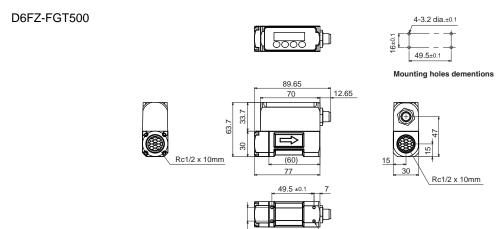


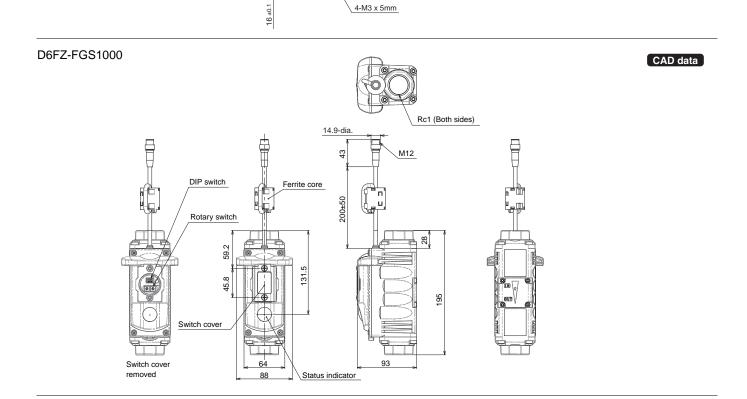
This product contains lithium batteries. Serious injury may occur due to fire or explosion. Do not attempt to disassemble the product, deform it by applying pressure, heat it in a high temperature (100°C or more), or burn it for disposal.



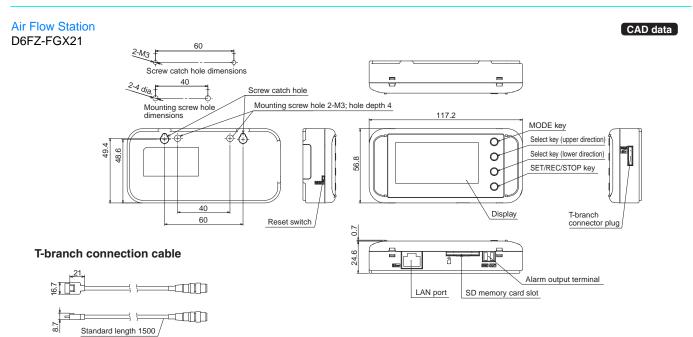


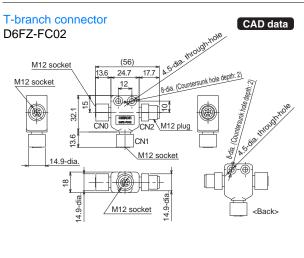


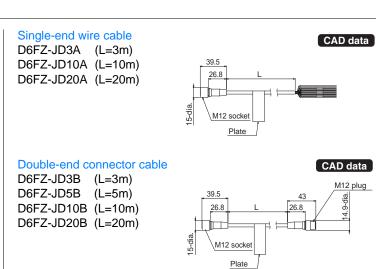


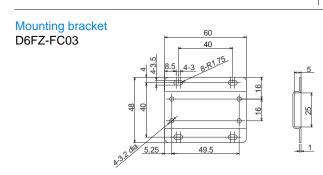


4-M3 x 5mm









MEMO

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