



Clamp-On Gas Flow Meter

NEW FD-G Series



**Clamp-On
to Access
Limitless Data**



FD-G Series

Monitor Compressed Air and Gases Throughout Your Facility



NEW

Clamp-On
Gas Flow Meter
FD-G Series

ENDLESS OPPORTUNITIES

- Variety of Applications
- Wide Range of Pipe Sizes
- Monitor Consumption and Leaks



➔ P.6

EFFORTLESS INSTALLATION

- No Pipe Modification
- Completely Non-Invasive
- No Special Tools Required



➔ P.8

LIMITLESS INFORMATION

- Impressive Display
- Versatile Output Options
- Intuitive Optional Software



➔ P.10

ENDLESS OPPORTUNITIES

● Main/Compressor Pipes

● Branch Pipes

● Drop/Machine Pipes

Compressors

Receiver tank

Compressor Monitoring



Energy saving
(cost reduction)

Stable operation

By monitoring the discharge amount from each compressor, performance issues can be recognized and preventative maintenance can be performed.

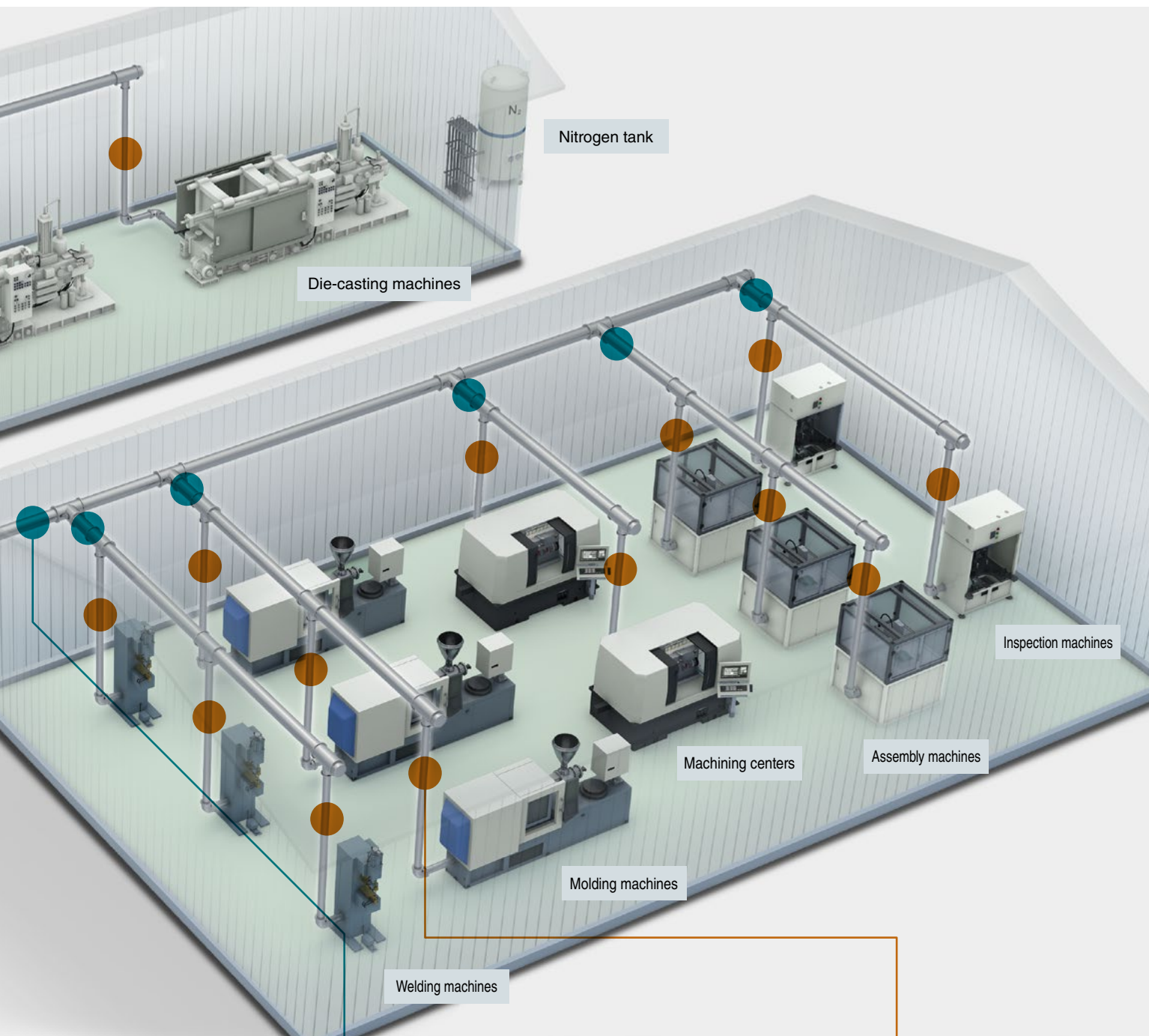
Facility Air Consumption



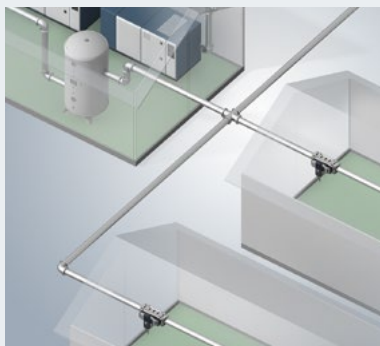
Energy saving
(cost reduction)

Stable operation

Finally determine how much compressed air your facility consumes and optimize your compressor usage.



Branch Pipe Comparisons

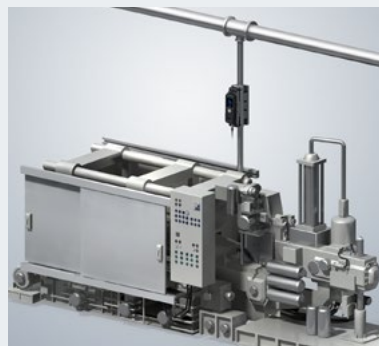


Energy saving
(cost reduction)

Stable operation

Easily identify which lines are potentially leaking the most air, by comparing overall consumption and leakage amounts between branch pipes.

Machine Gas Usage/Leakage

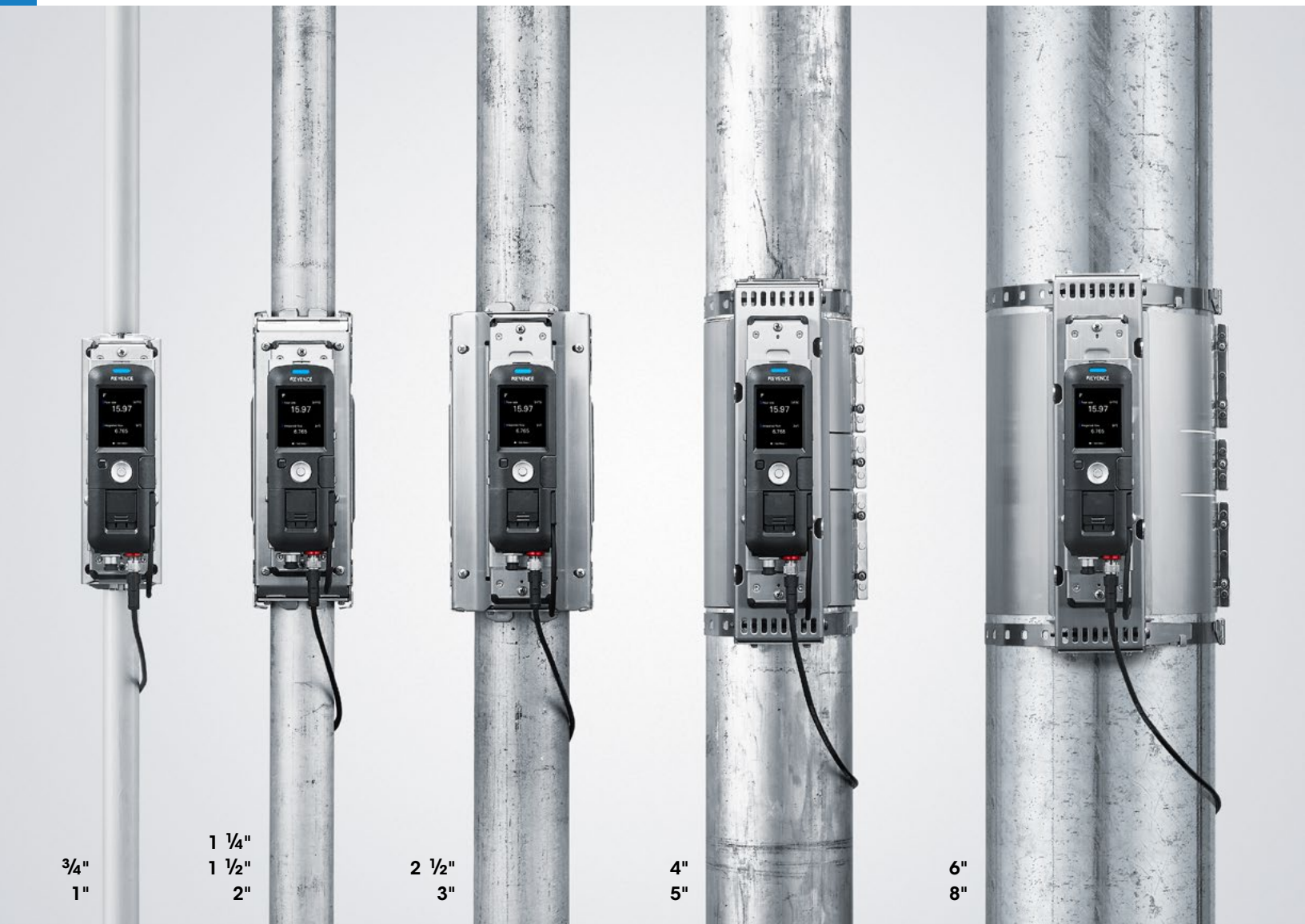


Stable operation

Quality control

Maintain quality at the machine level, by monitoring gas or compressed air usage and also identifying potential leakage concerns.

ENDLESS OPPORTUNITIES



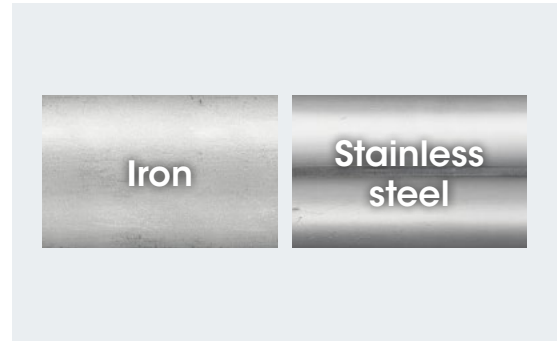
Range of Sizes

The FD-G Series is designed to work with a variety of pipe sizes throughout the facility. With five distinct models, the FD-G Series can fit on pipes from 3/4" up to 8" in size.

NPS (Nominal Pipe Size)	DN (Diameter Nominal)	Compatible model
3/4", 1"	20A/25A	FD-G25
1 1/4", 1 1/2", 2"	32A/40A/50A	FD-G50
2 1/2", 3"	65A/80A	FD-G80
4", 5"	100A/125A	FD-G125
6", 8"	150A/200A	FD-G200

Compatible Pipes

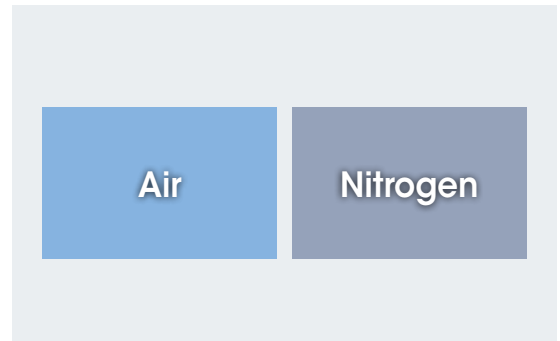
Clamp directly onto a variety of metal pipes throughout your facility. This includes painted pipes, as well as pipes that may be rusted on the inside, which will not affect the detection stability of the unit.



Compatible Gases

Monitor air as it moves through the compressors, receiving tanks, main lines, and machines throughout the facility. Along with compressed air, the FD-G Series is designed to detect Nitrogen, as well as other pressurized* gases in the facility.

*Gases must be pressurized to 58 PSI or greater to be detected



Consumption & Leakage Monitoring

The FD-G Series is designed to not only monitor air/gas consumption for an entire facility, but also measure large and small amounts of leakage at all levels. With an impressive rangeability of 1:100, the FD-G Series can help identify costly leakage points for easy cost savings.



EFFORTLESS INSTALLATION

No pipe modification
required for installation



Mount in Minutes

With zero pipe modification necessary and no special tools or knowledge required for installation, the FD-G Series units can be mounted in mere minutes.



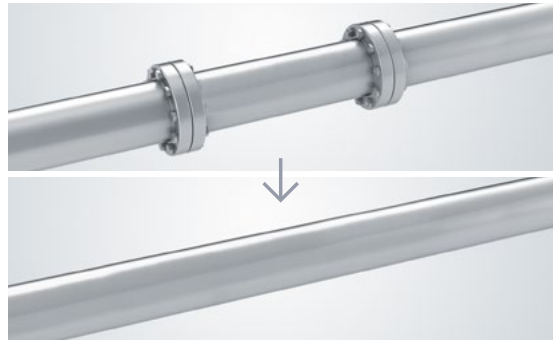
Completely Non-Invasive

Unlike conventional air flow meters that require probes or pipe modifications, the FD-G Series has zero impact on the air or gas inside the pipe.



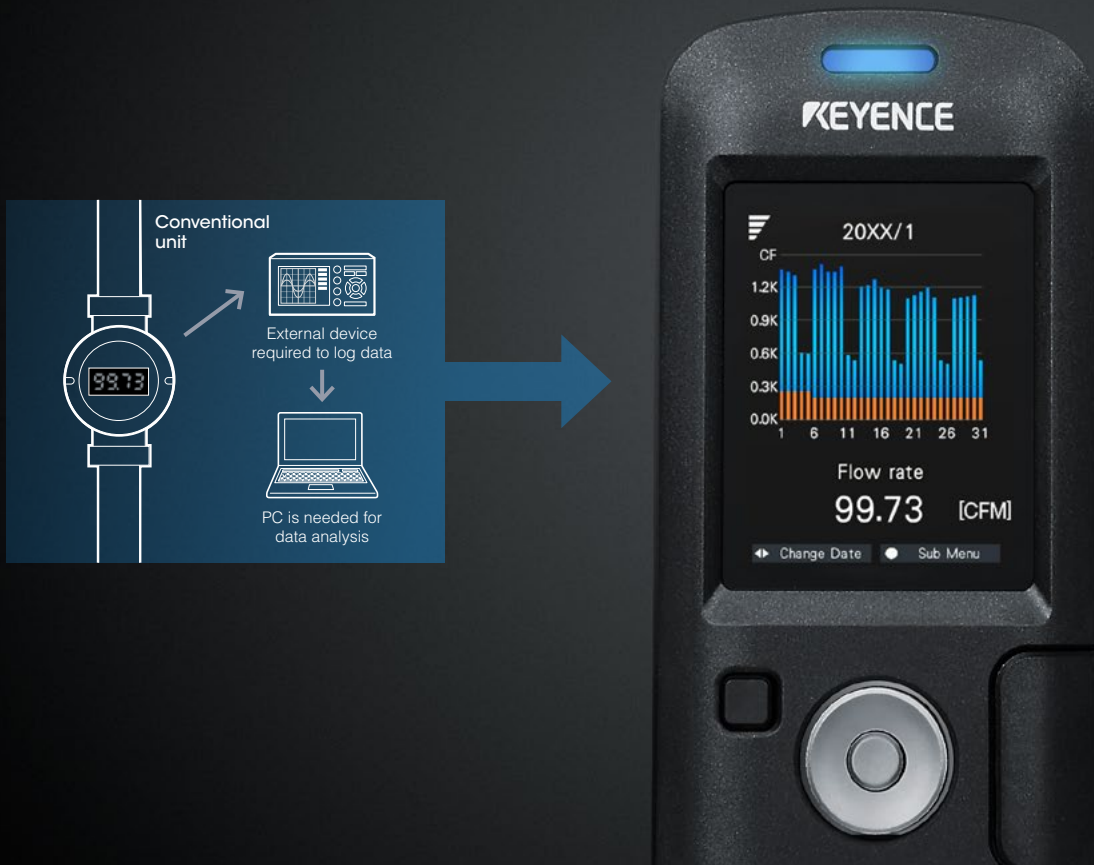
No Added Leakage Points

Avoid new sources of costly leakage by simply clamping the unit around the pipe. No modifications means no new spots for air or gas to escape.



LIMITLESS INFORMATION

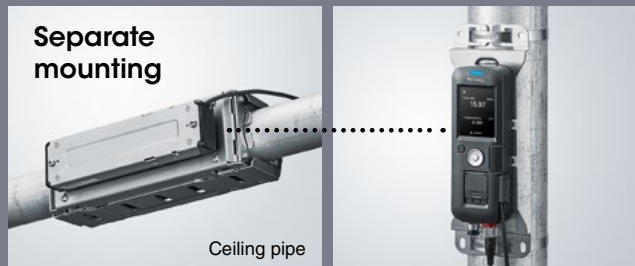
Revolutionary display offers easy to understand
graphical and numerical interface



Flexible Mounting

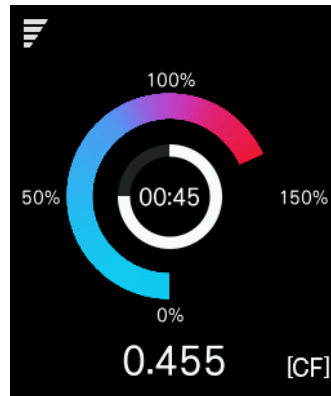
The innovative detachable display can be mounted in an easily accessible location, while the sensing portion is mounted on pipes in the ceiling or other difficult to reach locations.

Separate mounting



A wide range of functions and displays are at your fingertips

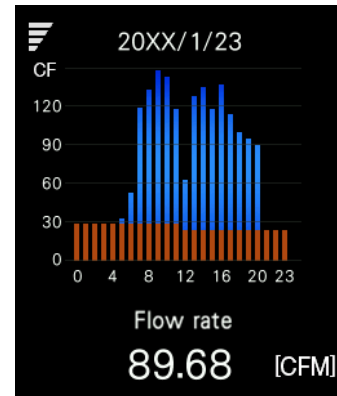
Measure the amount of leakage when the equipment is shut down



Static Leak Function

Easily determine the amount of leakage, and associated costs, by shutting down the equipment that is consuming the air/gas, and then measuring the amount of air that is still flowing through the leak points.

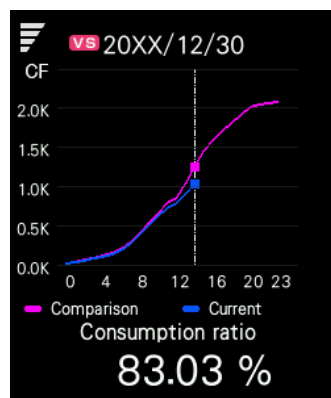
Measure and update the leakage amount during operation



Dynamic Leak Function

If it is not possible to shut down your equipment, the Dynamic Leak Function can judge and update the leakage rate during operation. By monitoring the change in leakage rate, you can also identify when preventative maintenance is necessary.

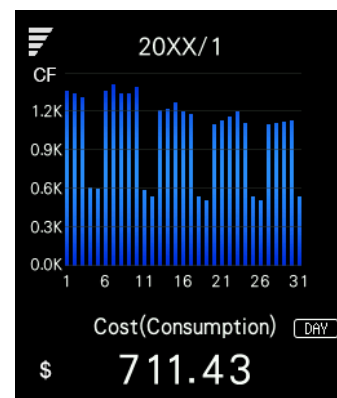
Compare current data to previous dates or times



Historical Comparison Function

Observe the impacts of your consumption reduction efforts, or simply look for anomalies, by comparing your current data against previous days, months, or years. With up to 5 years of data storage, comparison has never been easier.

Visualize the cost of compressed air & other gases

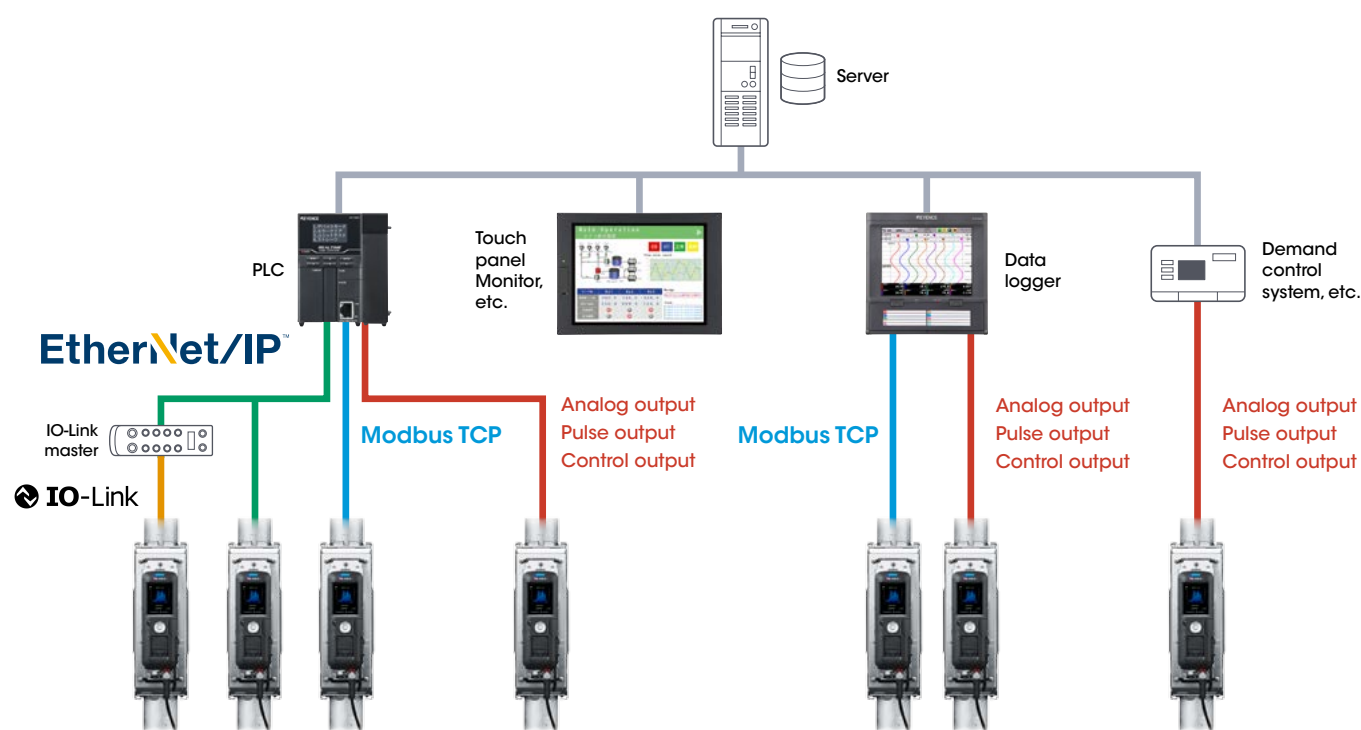


Monetary Value Conversion

Clearly calculate the true ROI of your efforts by converting the consumption and leakage amounts into true monetary values. The results of any cost or energy saving projects can now be easily visualized and monetized.

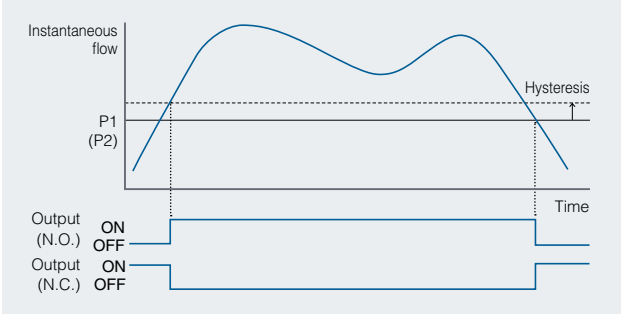
LIMITLESS INFORMATION

Versatile Outputs



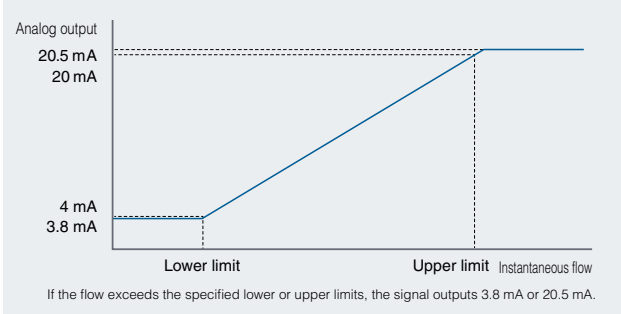
Control outputs

Monitor the instantaneous flow rate or total consumption/leakage amount and trigger an output signal when they pass a certain level or enter a particular area.



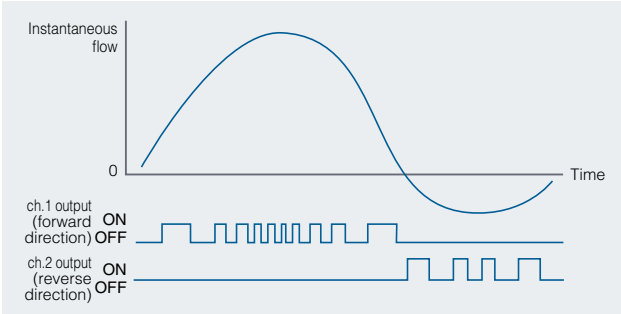
Analog output

Track the instantaneous flow rate over time with a continuous analog signal that can range from 4 to 20 mA or 0 to 20 mA with customizable upper and lower limits.



Pulse output mode

Ideal for data loggers and counters, the pulse output mode sends a signal each time a specified amount of flow has passed, with the ability to also distinguish direction of flow.

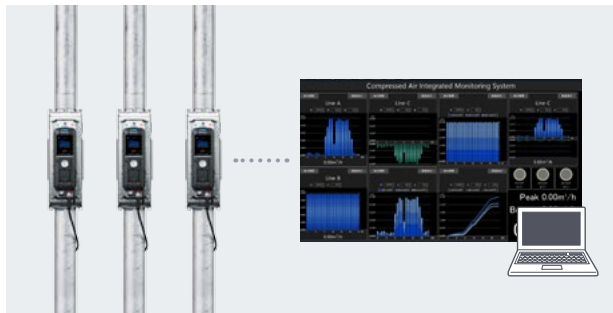
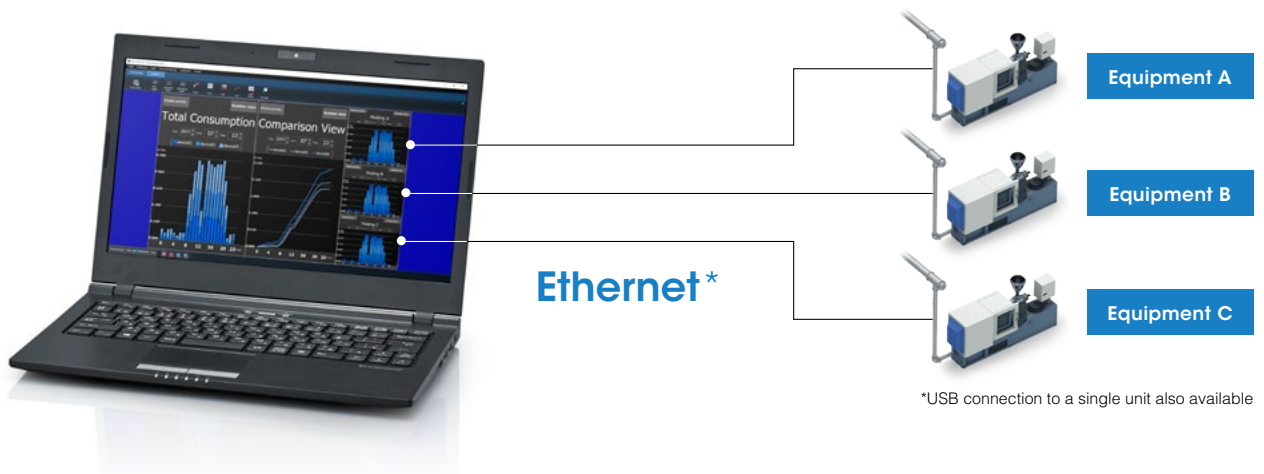


Network communication capabilities

	EtherNet/IP™		Modbus TCP	IO-Link	
	Cyclic communication	Message communication		Process data	Service data
Output status readout	✓	✓	✓	✓	✓
Instantaneous flow readout	✓	✓	✓	✓	✓
Total consump. readout	✓	✓	✓	✓	✓
Accumulated flow/leak rate readout*	✓	✓	✓	—	✓
Settings readout	—	✓	✓	—	✓
Execution of external input operations	✓	—	✓	—	✓

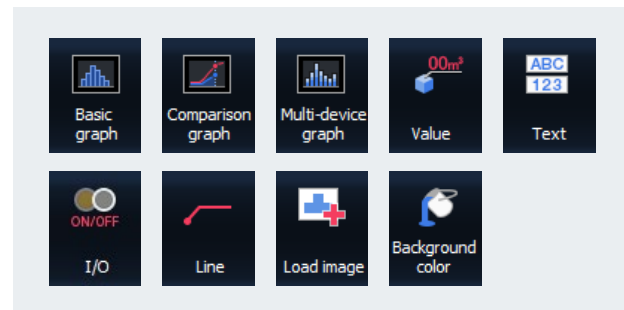
* For these values, the graph displayed on the FD-G unit can be displayed on an external monitor or other device.

Intuitive Software



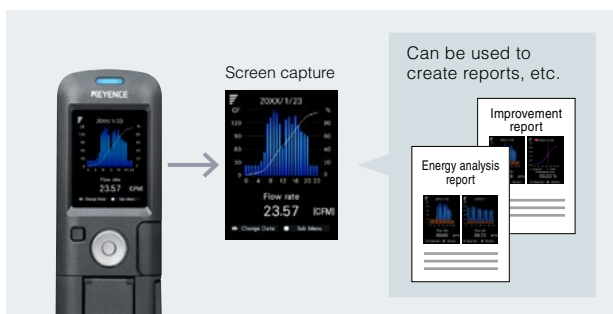
Batch monitoring

Monitor FD-G units all throughout the facility via Ethernet on a single PC with the FD-G Monitor software. Quickly and easily compare consumption and leakage amounts across different locations to identify new energy saving opportunities.



Fully customizable monitor

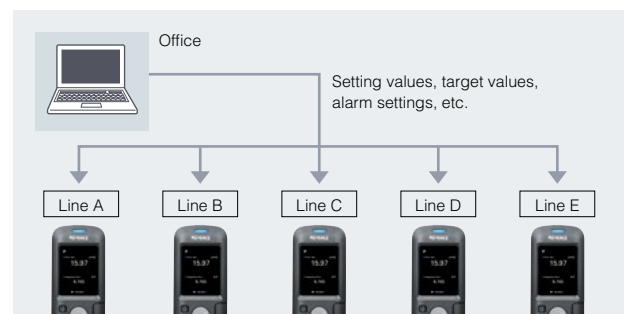
In the past, monitoring screens needed to be programmed by specialist over months of times. Now with the FD-G Monitor, anyone can create an intuitive interface in minutes by simply selecting what information they want and laying it out how they best see fit.



Screen output function

The data that is being monitored can be output as a screen capture and used to improve clarity in reporting.

*Data can be transmitted to the PC via USB or Ethernet.



Copy settings function

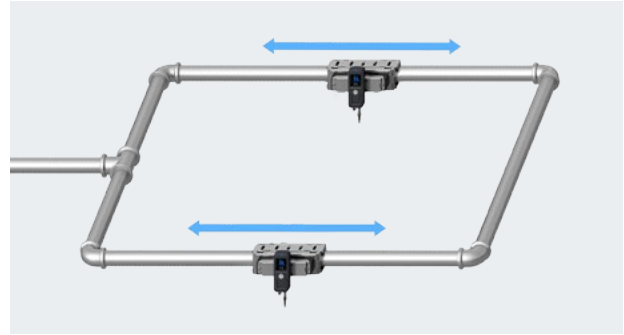
Flow meter settings can be configured via the PC. Settings can then be saved and copied to several different units saving time.

ADDITIONAL FEATURES



Temperature and pressure correction

To ensure proper volume readings, pressure, and temperature must be monitored. Automatic temperature correction is carried out constantly and the pressure can be input numerically or the unit can be connected directly to a pressure sensor.



Compatible with loop piping

The FD-G Series is able to detect bi-directional flow, making it compatible with pipe loops. This can be utilized for not only instantaneous flow, but also for accumulated flow monitoring.



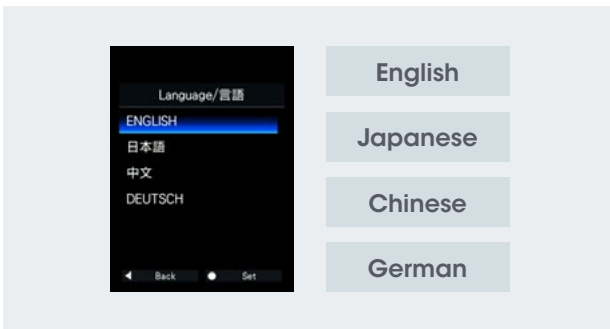
IP65/67 enclosure rating, robust cover

Designed for use in all sorts of environments, the FD-G is IP65/67 compliant. A robust protection cover (optional) is also available to protect against damage from impact.



AC power unit

KEYENCE offers an IP65/67-compliant AC power unit. This can help when the installation location is far from a DC power source.



Selectable language options

As a Global Sensor provider, KEYENCE is dedicated to making our products as easy to use as possible. This includes adding language selection options for English, Japanese, Chinese, and German.

	NTP (Normal conversion)	STP (Standard conversion)
Display method	m ³ /h (N) L/min (N)	CFM (S) m ³ /h (S) L/min (S)
Definition	Volume at 0°C 32°F, 101.3 kPa 14.7 psi (atmospheric pressure)	Volume at 20°C* 68°F, 101.3 kPa 14.7 psi (atmospheric pressure)

*Can be set to a value between 0 32°F and 100°C 212°F

Normal and standard conversion displays

The volume of gas changes according to temperature and pressure. On FD-G series models, the display can be switched between normal and standard conversion, enabling the flow amount to be shown under the same conditions.

CLEAR RETURNS

Example 1

Compressor Optimization

Situation

Compressors are one of the largest energy consumers in most facilities, and in turn have some of the biggest impacts on electricity costs. Sadly most facilities do not understand how much air is consumed on a regular basis and only know the risk associated with not having compressed air available. Due to this, multiple compressors are run continuously to make sure there is always enough.

Advantage of The FD-G

With the FD-G Series, it is now possible to determine a baseline for how much air your facility truly needs by monitoring overall usage after the receiver tank. This means you can optimize your compressor usage and save money.

Cost Savings

Run fewer compressors

Extend compressor lifetime with less wear

Only turn on additional compressors when absolutely necessary



Example 2

Leakage Identification

Situation

Air and gas leakage is all too common throughout any facility, but it is near impossible to recognize how much air or gas is being lost and the associated energy costs. Due to this, most facilities rarely take actions to reduce leakage, as the impacts are hard to realize.

Advantage of The FD-G

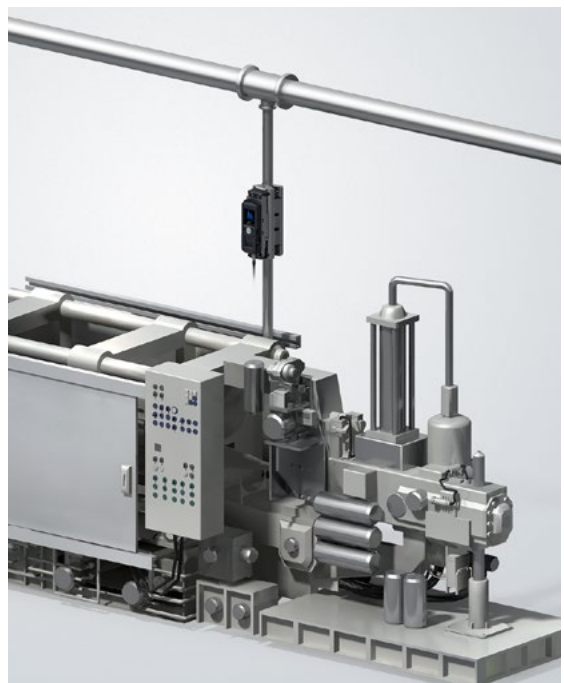
With the FD-G Series, all main lines, branch pipes, and machine drop points can be monitored to determine how much they are leaking and show the true monetary value associated with the unchecked leakage. Now users can identify their biggest leakage points and measure the true impact of improvements.

Cost Savings

Less leakage = Lower energy costs

Prevent unnecessary maintenance

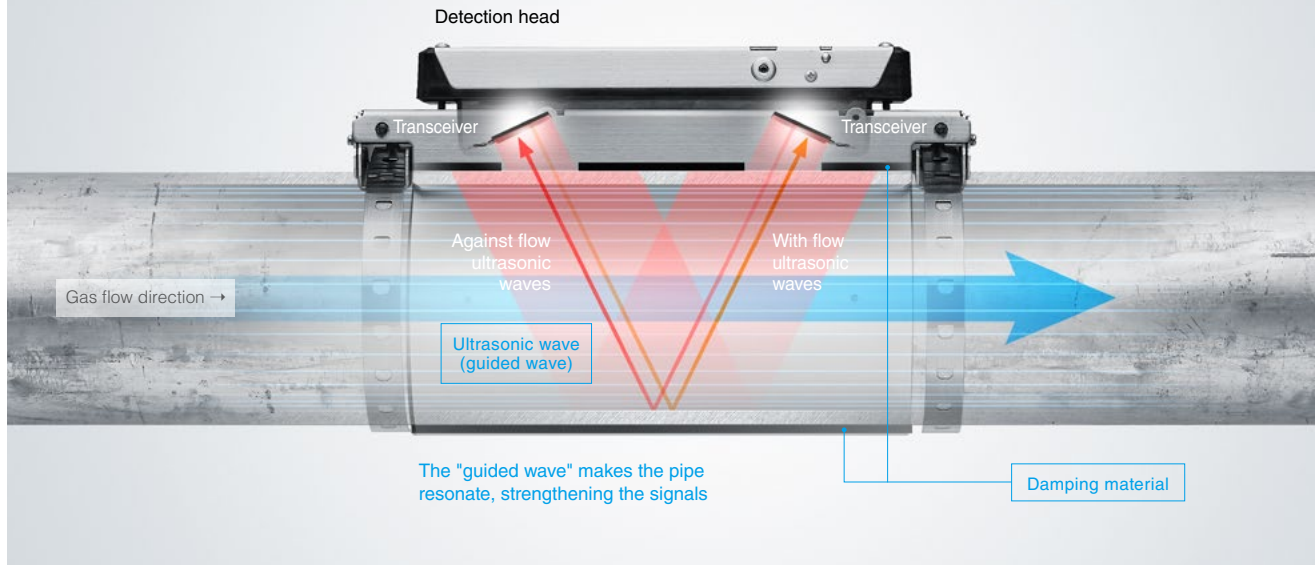
Identify valuable preventative maintenance opportunities



DETECTION PRINCIPLES

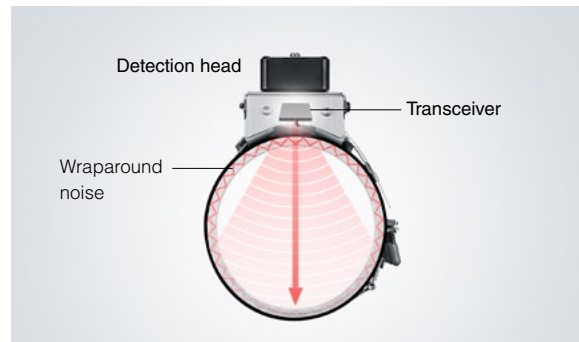
Delta TOF (Time of Flight)

The FD-G monitors gas flow by emitting and receiving two different sets of ultrasonic pulses. One pulse travels in the same direction as the gas flow and the other travels in the opposite direction of the gas flow. By doing this, the FD-G can monitor the gas flow rate by measuring the time differences between the two signals. This method offers stable detection and eliminates the effects of external factors.



Guided Wave & Damping Material

Signal strength is key to proper ultrasonic transmission. The FD-G Series utilizes a guided wave technique that resonates the pipe and strengthens the overall signal inside the pipe. Damping material is used to prevent this signal from wrapping around the pipe and affecting detection.



Impressive Detection Capabilities

From detecting tiny leaks to measuring all the air coming from a receiving tank, the FD-G Series can monitor it all. This series boasts an impressive $\pm 2\%$ RD accuracy rating, which is even more impressive with its 1:100 rangeability.

Measurement accuracy: $\pm 2.0\%$ of RD^{*1}

Minimum detectable flow: **0.018 CFM**^{*2}

Rangeability^{*3}: **1:100**

*1 Value obtained under conditions specified by KEYENCE. For details, see the specifications.

*2 Detectable flow taking account of zero point error in a 3/4" pipe.

*3 "Rangeability" is the ratio of the maximum to minimum flow for which accuracy is guaranteed.

How to Choose a Clamp-On Gas Flow Meter

To select the best FD-G series components for your installation location, follow the steps shown below.

STEP 1

Select a flow meter main unit and unit damping material

[→ P.18](#)

Flow meter main unit



FD-G25



FD-G50



FD-G80



FD-G125



FD-G200



FD-GDxxU

Unit damping material

STEP 2

Select upstream/downstream damping material(s), if deemed necessary

[→ P.19](#)

Upstream/downstream damping material



FD-GDxxB

STEP 3

Determine mounting and power supply requirements

[→ P.20](#)

Unit connection cable



M12 power supply cable



AC power unit



FD-GU1

Separate system mounting bracket



OP-88394

STEP 4

Select any additional components that may be necessary

[→ P.22](#)

Robust protection cover



FD-GP1

Pressure sensor connection cable and connector



M8 power supply cable



Loose wires - M12 adapter connector (female)

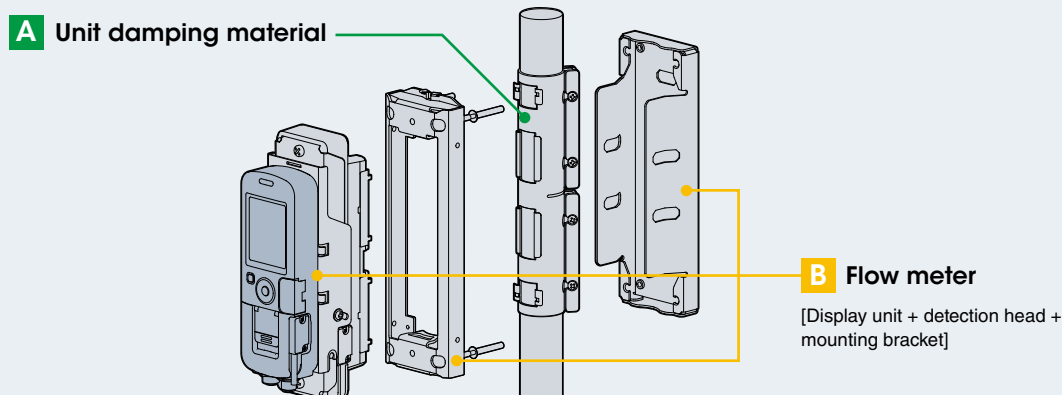
Communication cables



USB cable (A-mini B)



Ethernet cable

STEP 1**Check the diameter of the pipe on which the FD-G is to be mounted**

- 1** Select the unit damping material based on the size/diameter of the pipe it is to be mounted on.

- 2** This will also determine the flow meter main unit.

Pipe size/ Outer diameter [mm inch]	A Unit damping material			B Flow meter main unit		
	Appearance	Model	Weight	Appearance	Model	Weight
3/4" (20 A) ø25 to ø29 ø0.98" to ø1.14"		FD-GD20U	Approx. 0.19 kg		FD-G25	Approx. 2.2 kg
1" (25 A) ø32 to ø36 ø1.26" to ø1.42"		FD-GD25U	Approx. 0.21 kg			
1 1/4" (32 A) ø41 to ø45 ø1.61" to ø1.77"		FD-GD32U	Approx. 0.29 kg		FD-G50	Approx. 2.7 kg
1 1/2" (40 A) ø47 to ø51 ø1.85" to ø2.01"		FD-GD40U	Approx. 0.31 kg			
2" (50 A) ø58 to ø62 ø2.28" to ø2.44"		FD-GD50U	Approx. 0.34 kg			
2 1/2" (65 A) ø72 to ø78 ø2.83" to ø3.07"		FD-GD65U	Approx. 0.41 kg		FD-G80	Approx. 3.6 kg
3" (80 A) ø86 to ø92 ø3.39" to ø3.62"		FD-GD80U	Approx. 0.46 kg			
4" (100 A) ø111 to ø117 ø4.37" to ø4.61"		FD-GD100U	Approx. 0.56 kg		FD-G125	Approx. 2.7 kg
5" (125 A) ø138 to ø144 ø5.43" to ø5.67"		FD-GD125U	Approx. 0.65 kg			
6" (150 A) ø163 to ø171 ø6.42" to ø6.73"		FD-GD150U	Approx. 0.77 kg		FD-G200	Approx. 2.8 kg
8" (200 A) ø214 to ø222 ø8.43" to ø8.74"		FD-GD200U	Approx. 0.96 kg			

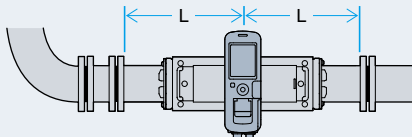
STEP 2

Check the location where the FD-G will be installed

In order to detect the ultrasonic signals correctly, upstream/downstream damping material may be required, depending on the FD-G unit's installation location.

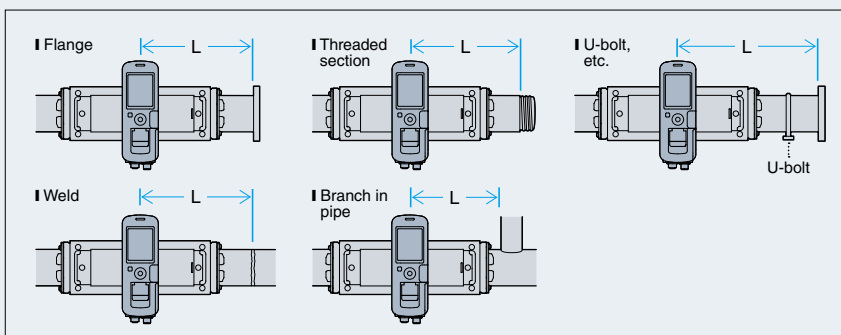
1 Check the distance "L" to the nearest upstream and downstream junctions

"L" is the distance from the center of the sensor head to the nearest junctions on the pipe.



A "junction" is defined as follows:

A weld, a threaded area, a flange or a branch in the pipe (U-bolts and other items not directly connected to the pipe itself are not included)



2 Determine if upstream/downstream damping material is required

The length "L" from the sensor head to the junction on the upstream and downstream sides determines whether or not upstream/downstream damping material is required.

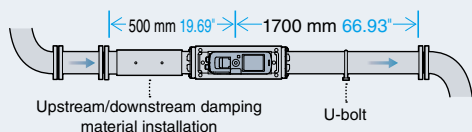
If L is smaller than Lmin: The flow meter cannot be installed in this location. Look for another installation location.

If Lmin < L < Lmax: Upstream/downstream damping material is required on that side of the unit.

If L is greater than Lmax: Upstream/downstream damping material is not required on that side of the unit.

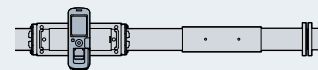
Pipe size/Outer diameter [mm inch]	Lmin [mm inch]	Lmax [mm inch]	C Upstream/downstream damping material			
			Appearance	Model	Length x quantity in pack	Weight
3/4" (20 A) ø25 to ø29 ø0.98" to ø1.14"	321 12.64"	1200 47.24"		FD-GD20B	200 7.87" x 1	Approx. 0.2 kg
1" (25 A) ø32 to ø36 ø1.26" to ø1.42"	321 12.64"	1200 47.24"		FD-GD25B	200 7.87" x 1	Approx. 0.22 kg
1 1/4" (32 A) ø41 to ø45 ø1.61" to ø1.77"	387 15.24"	1100 43.31"		FD-GD32B	245 9.65" x 1	Approx. 0.3 kg
1 1/2" (40 A) ø47 to ø51 ø1.85" to ø2.01"	387 15.24"	1200 47.24"		FD-GD40B	245 9.65" x 1	Approx. 0.32 kg
2" (50 A) ø58 to ø62 ø2.28" to ø2.44"	387 15.24"	1500 59.06"		FD-GD50B	245 9.65" x 1	Approx. 0.35 kg
2 1/2" (65 A) ø72 to ø78 ø2.83" to ø3.07"	471 18.54"	1900 74.80"		FD-GD65B	320 12.60" x 1	Approx. 0.52 kg
3" (80 A) ø86 to ø92 ø3.39" to ø3.62"	471 18.54"	2200 86.61"		FD-GD80B	320 12.60" x 1	Approx. 0.58 kg
4" (100 A) ø111 to ø117 ø4.37" to ø4.61"	690 27.17"	2000 78.74"		FD-GD100B	260 10.24" x 2	Approx. 1.13 kg
5" (125 A) ø138 to ø144 ø5.43" to ø5.67"	690 27.17"	2400 94.49"		FD-GD125B	260 10.24" x 2	Approx. 1.32 kg
6" (150 A) ø163 to ø171 ø6.42" to ø6.73"	727 28.62"	2800 110.24"		FD-GD150B	275 10.83" x 2	Approx. 1.57 kg
8" (200 A) ø214 to ø222 ø8.43" to ø8.74"	727 28.62"	3600 141.73"		FD-GD200B	275 10.83" x 2	Approx. 1.95 kg

[Example] When the meter is mounted in the following location on a 2" (50 A) pipe:

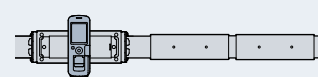


Lmin is 387 mm 15.24", and Lmax is 1500 mm 59.06", so the flow meter can be used if upstream/downstream damping material is installed on the upstream side. There is no need to install upstream/downstream damping material on the downstream side. Therefore, only one upstream/downstream damping material is needed.

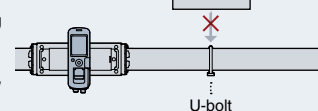
*Install the upstream/downstream damping material in any position between the flow meter and the junction.



*If using the FD-GD100B/FD-GD125B/FD-GD150B/FD-GD200B, 2 upstream/downstream damping materials need to be installed on one side.



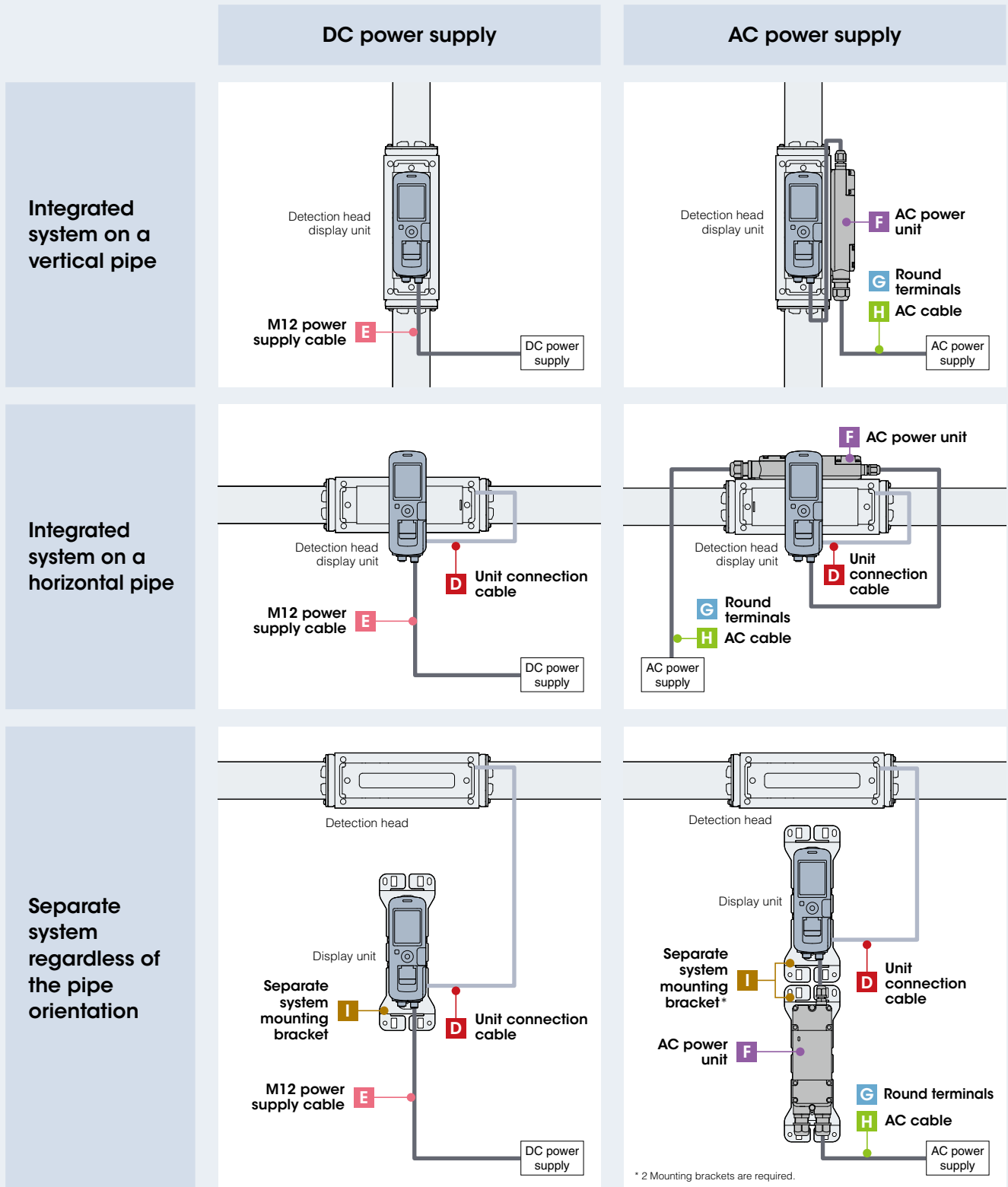
*Ensure that the upstream/downstream damping material does not interfere with U-bolts and other such piping supports. If it does interfere, mount the piping support around the upstream/downstream damping material.



**STEP
3**

Determine the mounting style and power supply method for the display unit

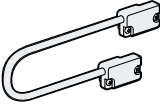
The components required vary depending on the mounting style and power supply method for the display unit.
Determine the most appropriate mounting style and power supply method for the display unit from the table below.
Then select the appropriate components shown in the diagram from the tables on the right.



* 2 Mounting brackets are required.

Unit connection cable


D Unit connection cable

Appearance	Specifications	Model	Length	Material	Weight
	Horizontal integrated system	OP-88390	0.3 m 0.98'	PVC	Approx. 20 g
		OP-88391	5 m 16.40'		Approx. 200 g
	Separate system	OP-88392	15 m 49.21'		Approx. 600 g
		OP-88393	30 m 98.43'		Approx. 1200 g

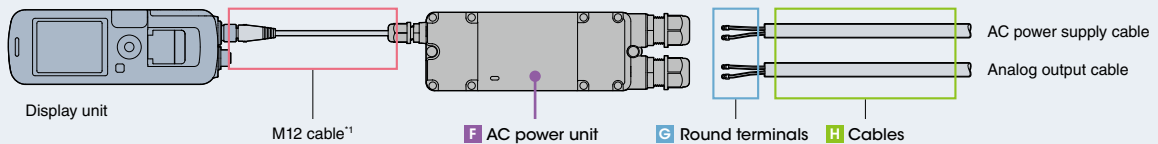
*The unit connection cable for a vertical integrated system is included with the flow meter.

Cable for DC power supply options Select a M12 power supply cable according to the required cable length and specification.


E M12 power supply cable

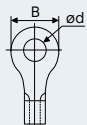
Specifications	Appearance	Model	Length	Material	Weight
Standard (PVC)		OP-75721	2 m 6.56'	PVC nickel-plated brass	Approx. 55 g
		OP-85502	10 m 32.81'		Approx. 220 g
Oil proof (PUR)		OP-87636	2 m 6.56'	PUR zinc nickel plating	Approx. 55 g
		OP-87637	10 m 32.81'		Approx. 260 g

AC power supply options The AC power unit convert AC power to 24 VDC for the FD-G.



F AC power unit

Appearance	Model	Material	Weight
	FD-GU1	PBT	Approx. 400 g



G Round terminals (to be provided separately by customer)

Type	Round terminal size	Number required	B (outer diameter)	ød (inner diameter)
AC power supply	M4	2	8.2 mm 0.32" or less	4.3 mm 0.17" or more
Analog output ^{*2}	M3	2	5.5 mm 0.22" or less	3.2 mm 0.13" or more


*1 A 350 mm **13.78'** M12 cable is supplied with the AC power unit. If the display unit is to be installed distant from the AC power unit, an extension cable such as OP-85503 (2 m **6.56'**) or OP-85504 (5 m **16.40'**) must be purchased separately. *2 The use of an analog output cable is optional.

H Cables (to be provided separately by customer)

Type	No. of core wires	Overall outer diameter	Nominal cross-sectional area
AC power supply cable	2	ø6.5 to ø12.5	1.2 to 2.1 mm ²
Analog output cable ^{*2}	2	ø0.26" to ø0.49"	0.3 to 1.75 mm ²

Separate system mounting bracket

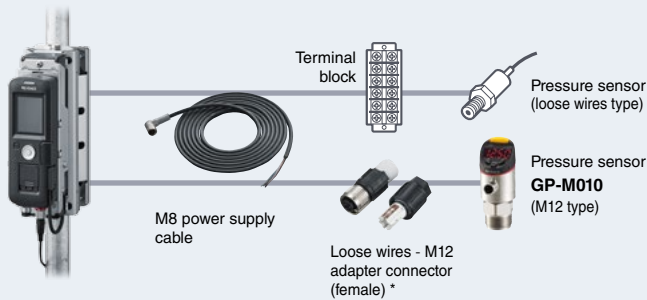
I Separate system mounting bracket

Appearance	Model	Material	Weight
	OP-88394	SUS304	Approx. 210 g

*If the flow meter is to be installed as a separate system with an AC power supply, 2 separate system mounting brackets will be required.

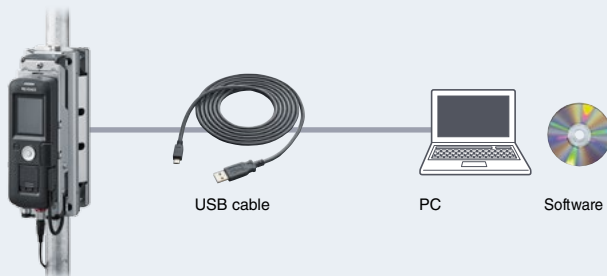
STEP
4**Select any additional components that may be necessary****Protection cover for display unit**

Name	Appearance	Model	Material	Weight
Robust protection cover		FD-GP1	SUS304 Polycarbonate	Approx. 180 g

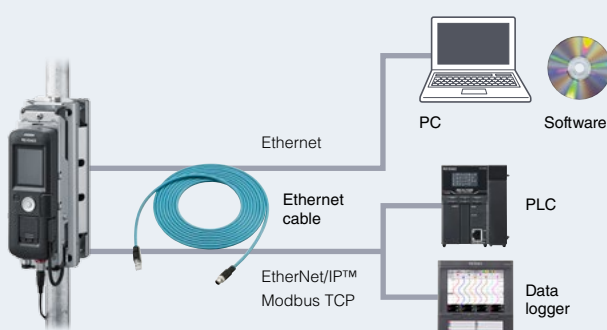
Cable components to integrate the analog signal from a pressure sensor

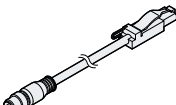
Name	Appearance	Model	Length	Material	Weight
M8 power supply cable		OP-87632	2 m 6.56'	PUR Nickel-plated brass	Approx. 55 g
		OP-87633	10 m 32.81'		Approx. 260 g
Loose wires - M12 adapter connector (female)*		OP-88395	—	Nylon Zinc nickel plating	Approx. 12 g

*Use this when using a M12 connector type pressure sensor.

Connection to PC (via USB)

Name	Appearance	Model	Length
USB cable	A-mini B	OP-51580	2 m 6.56'
		OP-86941	5 m 16.40'
Name		Model	
Software		FD-GH1	

Connections to PC, PLC, data logger, and other external devices on LAN

Name	Appearance	Model	Length
Ethernet cable		OP-88086	2 m 6.56'
		OP-88087	5 m 16.40'
		OP-88088	10 m 32.81'

Name	Model
Software	FD-GH1

Clamp-On Gas Flow Meter

Model		FD-G25		FD-G50			FD-G80		FD-G125		FD-G200	
Pipe size	DN (Diameter Nominal)	20 A	25 A	32 A	40 A	50 A	65 A	80 A	100 A	125 A	150 A	200 A
	NPS (Nominal Pipe Size)	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"
	Outer diameter of pipe (mm inch)	ø25 to 29 0.98" to 1.14"	ø32 to 36 1.26" to 1.42"	ø41 to 45 1.61" to 1.77"	ø47 to 51 1.85" to 2.01"	ø58 to 62 2.28" to 2.44"	ø72 to 78 2.83" to 3.07"	ø86 to 92 3.39" to 3.62"	ø111 to 117 4.37" to 4.61"	ø138 to 144 5.43" to 5.67"	ø163 to 171 6.42" to 6.73"	ø214 to 222 8.43" to 8.74"
	Pipe thickness (mm inch)	2 to 4.2 0.08" to 0.17"	2.2 to 4.5 0.09" to 0.18"	2.4 to 5.3 0.09" to 0.21"	2.4 to 5.3 0.09" to 0.21"	2.6 to 5.7 0.10" to 0.22"	2.9 to 6.3 0.11" to 0.25"	2.9 to 6.3 0.11" to 0.25"	3.1 to 6.8 0.12" to 0.27"	3.1 to 6.8 0.12" to 0.27"	3.5 to 7.5 0.14" to 0.30"	4.0 to 8.7 0.16" to 0.34"
Supported pipe materials		Iron, steel, stainless steel										
Supported fluids		Air, Nitrogen, other gases ^{*1}										
Fluid temperature		0 to 60°C 32 to 140 °F										
Recommended pressure		0.4 MPa or greater (58 PSI or greater)										
Rated velocity of flow range		Up to 15 m/s										
Actual flow rate range (typical)	m³/h	20.00	32.00	54.00	72.00	120.00	200.0	280.0	470.0	720.0	1000.0	1800.0
	L/min	330.0	540.0	900.0	1200.0	2000.0	3300	4600	7800	12000	17000	30000
	CFM	12.00	19.00	32.00	42.00	70.00	120.00	160.00	280.00	420.00	600.00	1100.00
Standard flow rate range (typical) [CFM]	20°C 68°F 60 psi 0.41 MPa	56.84	90.00	151.58	198.95	331.58	568.43	757.91	1326.34	1989.51	2842.15	5210.62
	20°C 68°F 80 psi 0.55 MPa	72.06	114.10	192.17	252.22	420.37	720.64	960.85	1681.49	2522.23	3603.18	6605.84
	20°C 68°F 100 psi 0.69 MPa	87.28	138.20	232.76	305.49	509.16	872.84	1163.79	2036.63	3054.95	4364.21	8001.06
	20°C 68°F 120 psi 0.83 MPa	102.50	162.30	273.35	358.77	597.95	1025.05	1366.73	2391.78	3587.67	5125.24	9396.28
	20°C 68°F 140 psi 0.97 MPa	117.73	186.40	313.93	412.04	686.73	1177.25	1569.67	2746.93	4120.39	5886.27	10791.50
Display		QVGA 2.2" LCD color monitor										
Display update cycle		Approx. 3 Hz										
Display resolution	Instantaneous flow rate	0.01 m³/h, 0.1 L/min					0.1 m³/h, 1 L/min					
	Consumption/leakage amount	0.001 CFM		0.01 CFM				0.1 CFM				
		0.001 m³, 1 L		0.01 m³, 1 L				0.1 m³, 1 L				
		0.1 CF					1 CF					
Response time		1.0 s/2.5 s/5.0 s/10.0 s/30.0 s/60.0 s/120.0 s/200.0 s (variable)										
Measurement accuracy	Between 10 and 100% of F.S.	±2.0% of RD ^{*2, 3, 4, 5}										
	Between 1 and 10% of F.S.	±1.0% of F.S. ^{*2, 3, 4, 5}										
Zero point error		±0.15% of F.S. ^{*2, 6}										
Static leakage repeatability		±1.0% of RD ^{*4, 7}										
Hysteresis		Variable										
Flow units		CFM(S), CFM, m³/h (N), m³/h (S), m³/h, L/min (N), L/min (S), L/min										
I/O wiring connection port		M12 4-pin connector (male)										
Detection mode (switchable) ^{*8}	ch.1	Instantaneous flow mode/area mode/pulse (+) mode/integrated flow mode/warning mode (consump)										
	ch.2	Instantaneous flow mode/area mode/pulse (-) mode/warning mode (leak)/error output mode/analog output/integrated flow reset/flow rate zero input/origin adjustment input										
Standard I/O (switchable)	Control output (ch.1/ch.2)	NPN/PNP setting switchable, open collector output 30 VDC or less, max. 100 mA/ch, residual voltage: 2.5 V or less										
	Analog output (ch.2)	4 to 20 mA/0 to 20 mA, load resistance: 500 Ω or less										
	External input (ch.2)	Short-circuit current: 1.5 mA or less, input time: 20 ms or more										
Power supply	Power supply voltage	20 to 30 VDC including 10% ripple (P-P), Class 2										
	Current consumption (analog output of the pressure sensor excluded)	350 mA or less at 20 V, 290 mA or less at 24 V, 230 mA or less at 30 V (load current excluded), 550 mA or less at 20 V, 490 mA or less at 24 V, 430 mA or less at 30 V (Maximum load current excluded)										
Protection circuit		Power supply reverse connection protection, power supply surge protection, short-circuit protection for each output, surge protection for each output										
Analog input (for volume conversion)		M8 4-pin connector (female), analog current input (4 to 20 mA), input resistance: 100Ω or less										
Power supplied to pressure sensor		Supply voltage: Equivalent to voltage applied to the FD-G, Supply current: 70 mA or less (analog output of the pressure sensor included)										
Communication interface	USB	USB 2.0										
	Ethernet	Standard	IEEE 802.3u (100BASE-TX)									
		Transmission rate	100 Mbps									
		Cable	Category 5 or higher STP (shielded twisted pair) or UTP (unshielded twisted pair) cable									
	Connector	M12 connector (female, D-code)										
Recording capacity	Consumption amount/leakage amount	Approx. 5 years										
	Events	100										
Network function		Modbus TCP, EtherNet/IP™, IO-Link										
Environmental resistance	Enclosure rating	IP65/67 (IEC 60529) ^{*10}										
	Ambient temperature	Detection head: -10 to +60°C 14 to 140°F (no freezing), display unit: -10 to +55°C 14 to 131°F (no freezing)										
	Ambient humidity	5 to 85%RH (no condensation)										
	Vibration resistance	10 to 500 Hz, power spectral density: 0.816 G²/Hz, XYZ axes										
Material	Shock resistance	100 m/s², 16 ms pulse, XYZ axes, 1000 times for each axis										
	Display unit	Body: PBT + coating, display: PMMA, Power supply port: SUS304-equivalent, Ethernet port: zinc nickel plating										
	Detection head	Body: PPS/SUS304, rear surface: rubber										
	Mounting/damping bracket	SUS304										
Weight		Approx. 2.2 kg		Approx. 2.7 kg			Approx. 3.6 kg		Approx. 2.7 kg		Approx. 2.8 kg	

*1 The gas must be uniform and capable of transmitting ultrasonic waves. Measurement may be unstable due to the pressure inside of the pipe and the type of gas.

*2 This value is guaranteed by KEYENCE inspection facilities. Errors will be introduced by factors such as the type and status of the pipe and the type and temperature of the gas.

*3 This is the value when considering linearity + span error in a stable environment with a temperature of 25°C 77°F.

*4 Defined with stable velocity of flow distribution. Does not include pulsations and fluctuations in the velocity of flow distribution primarily attributable to the equipment.

*5 The linearity error characteristic due to the pipe is not included in this value.

*6 It is possible to reduce zero point errors by performing an origin adjustment.

*7 This is the value within the range where measurement accuracy is guaranteed.

*8 When Bi-directional is specified, the following functions cannot be used. The selection of the comparison view/leak ratio view/static leakage, the measurement/display of the leakage amount/integrated flow, the setting of the target value/warning set value, and money conversions. Also, the I/O settings are limited as shown below.

- ch.1: Pulse(+) mode
- ch.2: Pulse(-) mode, Error output mode, Integrated flow reset, Flow zero input, Origin adjustment input

*9 IO-Link: Compatible with specification v1.1/COM1 (4.8 kbps). IO-Link is a trademark or registered trademark of PROFIBUS Nutzerorganisation e.V. (PNO).

*10 The IP65/67 enclosure rating is lost when a USB connection is established.




AC power unit

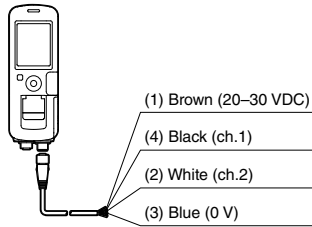
Model	FD-GU1	
System	Switching type	
Input supply voltage	100 to 240 VAC; +10%/–15% (50/60 Hz)	
Output voltage	24 VDC ±5%	
Overvoltage category	II	
Ripple noise	260 mV (p-p) or lower	
Output capacity	9.1 W (0.38 A) (Class 2)	
Power consumption	100 VAC: 0.3 A or lower; 200 VAC: 0.2 A or lower	
Pollution degree	2	
Withstand voltage	3000 VAC, 1 minute (between input and output, between all external terminals and case)	
Momentary interruption	20 ms or lower	
Wiring specifications	AC input: power supply M4 terminal block, 2 poles; Analog output: M3 terminal block, 2 poles; DC output: M12 4-pin connector	
Protection circuit	Protection against power supply surge, protection against output short-circuiting	
Environmental resistance	Enclosure rating	IP65/67 (IEC60529)
	Operating ambient temperature	–20 to +50°C -4 to 122°F (no freezing)
	Operating ambient humidity	5 to 90%RH (no condensation)
	Vibration resistance	10 to 500 Hz power spectral density: 0.816 G ² /Hz in X, Y, Z axis directions
	Shock resistance	Shock resistance 50 m/s ² ; 16 ms pulses, 1000 times each for X, Y, and Z axes
Material	PBT	
Weight	Approx. 400 g	
Main unit size	63 2.48" × 240 9.45" × 40 1.57" mm	

Wiring examples

When FD-G unit is used alone

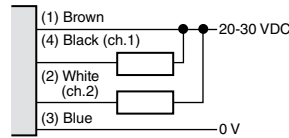
Wiring varies according to the functions selected. I/O wires that will not be used should be insulated independently.

-  Load (input device)
-  Analog current input device (4–20 mA or 0–20 mA)
-  Pin layout on display unit side

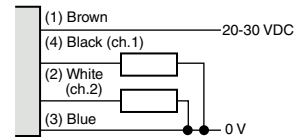


When control output is used

NPN

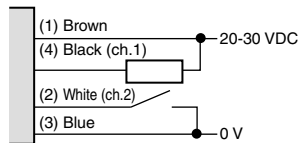


PNP

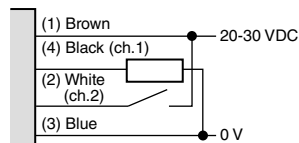


When control output + external input is used

NPN

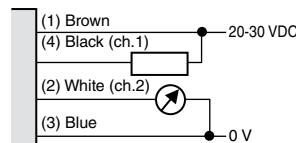


PNP

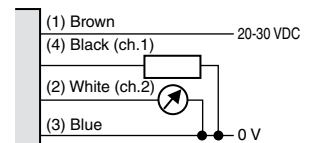


When control output + analog output is used

NPN



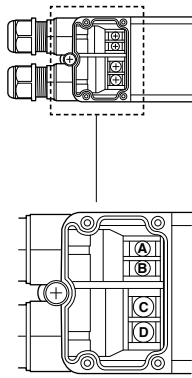
PNP



When the AC power unit FD-GU1 is used

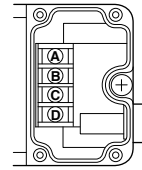
Inside AC terminal block cover

Terminal block	Terminal symbol	Role
A	ANLG	Analog output
B	COM	Common (0 VDC)
C	N	AC power supply
D	L	

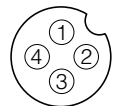


Inside DC terminal block cover

Terminal block	Terminal symbol	Role
A	ANLG	Analog output
B	N.C.	(Not used)
C	0 V	0 V DC
D	24 V	24 V DC

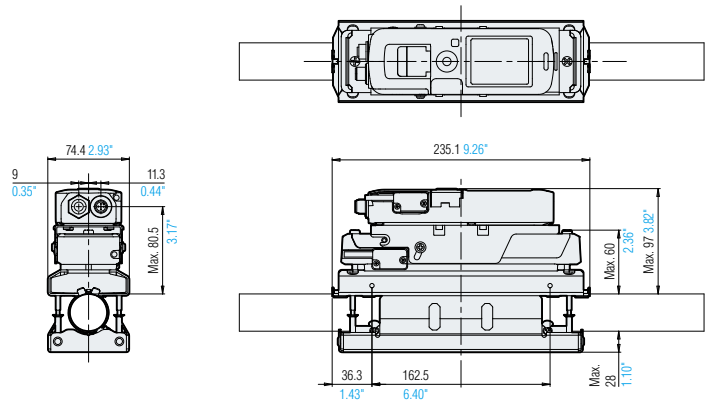


M12 connector cable (female) pin layout

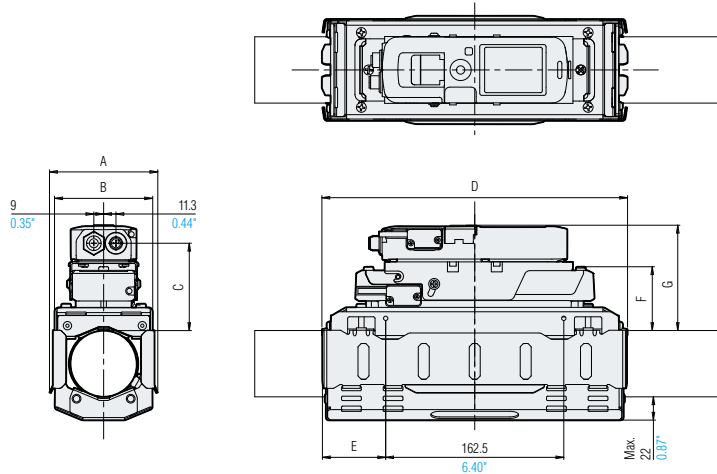


Flow meter

FD-G25

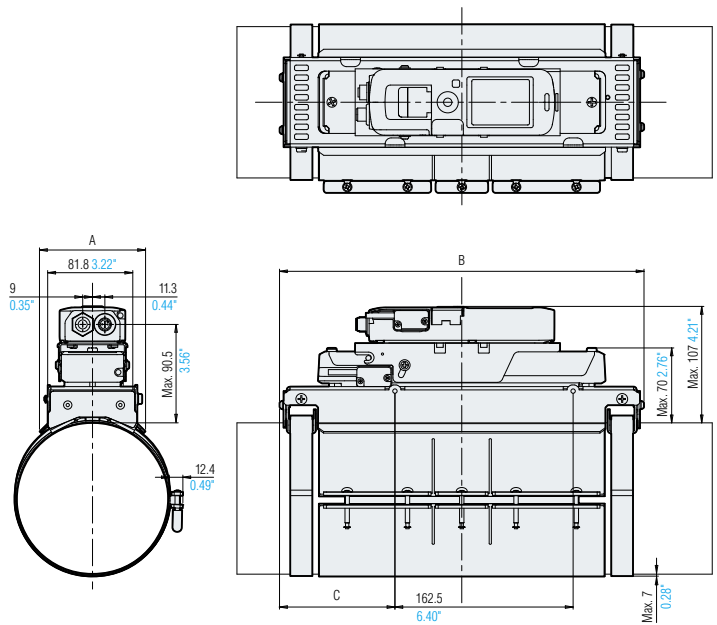


FD-G50/FD-G80



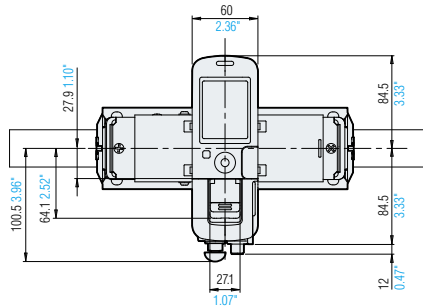
	FD-G50	FD-G80
A	98.8 3.89"	139.6 5.50"
B	89.6 3.53"	130.3 5.13"
C	Max.80.5 3.17"	Max.90.5 3.56"
D	278.9 10.98"	296.1 11.66"
E	58.2 2.29"	66.8 2.63"
F	Max.60 2.36"	Max.70 2.76"
G	Max.97 3.82"	Max.107 4.21"

FD-G125/FD-G200

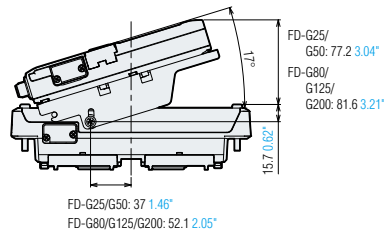


	FD-G125	FD-G200
A	96.8 3.81"	97.5 3.84"
B	332.4 13.09"	347.4 13.68"
C	105.3 4.15"	112.8 4.44"

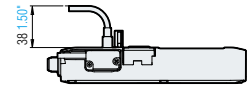
When mounted on a horizontal pipe



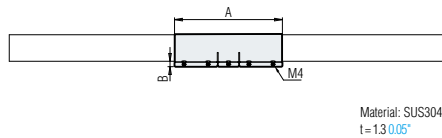
When tilted



When USB cable is connected



Upstream/downstream damping material

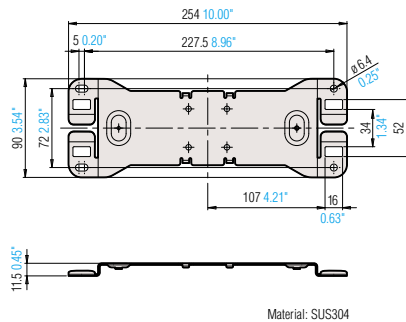


Model	A	B
FD-GD20B/FD-GD25B	200 7.87"	Max. 18
FD-GD32B/FD-GD40B/ FD-GD50B	245 9.65"	
FD-GD65B/FD-GD80B	320 12.60"	
FD-GD100B/FD-GD125B*	260 10.24"	
FD-GD150B/FD-GD200B*	275 10.83"	

* 2 Upstream/downstream damping materials need to be installed on one side.

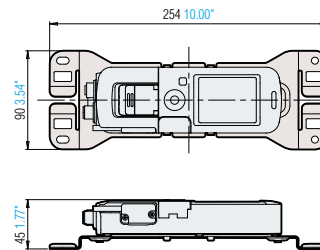
Separate system mounting bracket

OP-88394



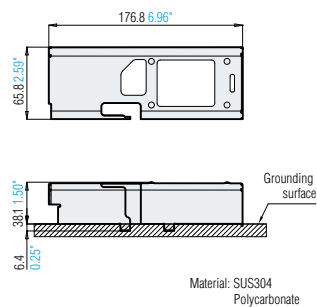
Material: SUS304

When used with display unit



Robust protection cover

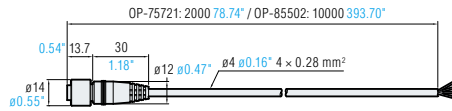
FD-GP1



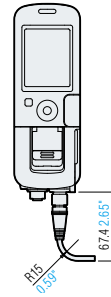
Material: SUS304
Polycarbonate

M12 power supply cable

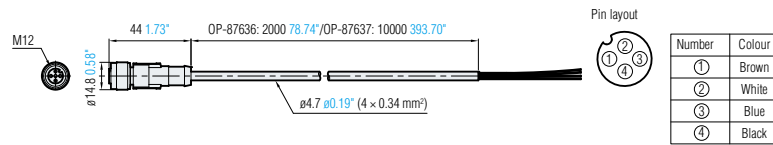
Standard PVC OP-75721/85502



When M12 power supply cable is connected

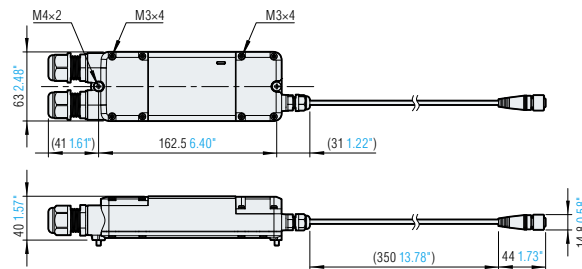


Oil proof PUR OP-87636/87637

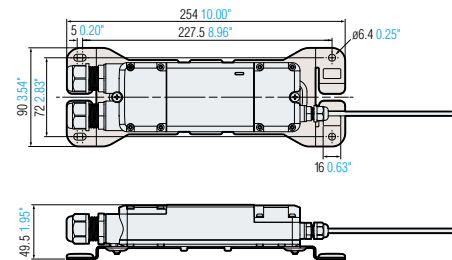


AC power unit

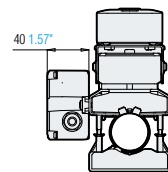
FD-GU1



When separate system mounting bracket OP-88394 is used

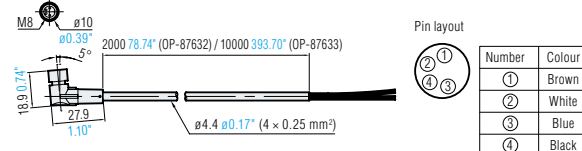


When mounted on flow meter



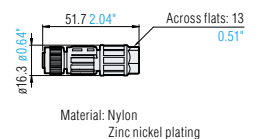
M8 power supply cable (for use with pressure sensor signal input)

OP-87632/87633



Loose wires - M12 adapter connector (female)

OP-88395



CAD DATA DOWNLOAD
www.keyence.com/CADG






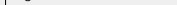

GP-M Series



Key Features

- > Multiple adapter options ensure fit
- > Clog resistant step flush diaphragm
- > Rotatable display requiring no union joint

Sensors

Appearance	Rated pressure range		Fluid type	Thread diameter	Model
	0				
		-14.50 to +14.50 PSI (-100 to +100 kPa)	Gas Liquid	G3/4	GP-M001
		-14.5 to +145.0 PSI (-0.1 to +1 MPa)			GP-M010
		-14.5 to +362.6 PSI (-0.1 to +2.5 MPa)			GP-M025
		0 to +1450 PSI (0 to +10 MPa)	Liquid		GP-M100
		0 to +3626 PSI (0 to +25 MPa)			GP-M250
	0 to +5802 PSI (0 to +40 MPa)	GP-M400			

Accessories

Adapters

Appearance	Type	Model
	R male 1/8	OP-87281
	R male 1/4	OP-87282
	R male 3/8	OP-87280
	G female 1/4	OP-87283
	NPT male 1/8	OP-87284
	NPT male 1/4	OP-87285
	Rc female 1/2	OP-87286

Do not use unauthorized adapters.

Cables: Please refer to the GP-M Series Brochure

Display protection cover

Appearance	Material	Model
	Polysulfone	OP-87289

Throttles (Attach to the adapter before use)

Appearance	Material	Applicable adapter	Model
	SUS303	OP-87280/OP-87281 OP-87282/OP-87284 OP-87285	OP-87311
	SUS303	OP-87283	OP-87312

It is recommended to attach a throttle to the **GP-M100/M250/M400**. For the other models, use it when excessive pulses or surge pressure is expected.

AP-V80 Series



Key Features

- > IP67 full stainless steel structure
- > Up to 7,250 PSI range
- > Up to 100°C (212°F) heat resistance

Sensor Heads

Appearance	Pressure port	Pressure type	Pressure range	Model
	NPT 1/8	Compound	-29.9 to +29.9 inchHg	AP-10SK
		Negative	-29.9 to 0 inchHg	AP-11SK
		Positive (Low)	0 to 14.5 PSI	AP-12SK
		Positive	0 to 145 PSI	AP-13SK
	NPT 1/4 (with a throttle)	Positive (High)	0 to 1,450 PSI	AP-14SK
		Positive (High)	0 to 2,900 PSI	AP-15SK
			0 to 7,250 PSI	AP-16SK

Amplifiers

Type	Appearance	Model	
		NPN	PNP
DIN	Standard	AP-V80W	AP-V80WP
	Differential pressure	AP-V82W	AP-V82WP
Panel	Standard	AP-V85W	AP-V85WP
	Differential pressure	AP-V87W	AP-V87WP

Accessories

Appearance	Designation	Model
	Panel mounting bracket kit for AP-V85W(P)	OP-51476
	Panel spacer kit for AP-V85W(P)	OP-51605
	Head connectors (x2)	OP-42367

AP-C30 Series



Key Features

- > Compact size
- > Large display
- > Various mounting options

AP-C40/V40 Series



Key Features

- > Small heads
- > Fast response time
- > Pre-programmed modes for various applications

FL Series

Liquid Level Sensors









Key Features

- > Completely trouble-free operation
- > Sensing Guide-Pulse Technology
- > Multiple output options







3 Different Models Designed for Varying Applications

		
Standard type FL-001	Sanitary type FL-S001	Plastic/Chemical type FL-C001
<ul style="list-style-type: none"> • Water/oil model • Applicable for liquids containing solid particulates • Applicable for viscous liquids 	<ul style="list-style-type: none"> • Food/chemical industry model • Ready for CIP/SIP cleaning • Applicable for viscous liquids 	<ul style="list-style-type: none"> • Chemical resistant model • Applicable for corrosive liquids • Applicable for viscous liquids

Sensors

CONTROLLER (Required)		PROBE (Required)	
Standard type FL-001		FL-P20 (200 mm 0.66') FL-P40 (400 mm 1.31') FL-P60 (600 mm 1.97') FL-P80 (800 mm 2.62') FL-P100 (1000 mm 3.28') FL-P120 (1200 mm 3.94') FL-P140 (1400 mm 4.59') FL-P160 (1600 mm 5.25') FL-P180 (1800 mm 5.91') FL-P200 (2000 mm 6.56')	
Sanitary type FL-S001		FL-SP20 (200 mm 0.66') FL-SP40 (400 mm 1.31') FL-SP60 (600 mm 1.97') FL-SP80 (800 mm 2.62') FL-SP100 (1000 mm 3.28') FL-SP120 (1200 mm 3.94') FL-SP140 (1400 mm 4.59') FL-SP160 (1600 mm 5.25') FL-SP180 (1800 mm 5.91') FL-SP200 (2000 mm 6.56')	
Plastic/Chemical type FL-C001		FL-CP20 (200 mm 0.66') FL-CP40 (400 mm 1.31') FL-CP60 (600 mm 1.97') FL-CP80 (800 mm 2.62') FL-CP100 (1000 mm 3.28') FL-CP120 (1200 mm 3.94') FL-CP140 (1400 mm 4.59') FL-CP160 (1600 mm 5.25') FL-CP180 (1800 mm 5.91') FL-CP200 (2000 mm 6.56')	

Cables

Appearance	Standard power supply cable	Model
Straight cable OP-87564 (2 m 6.56') OP-87565 (5 m 16.40') OP-87566 (10 m 32.81') 	The following are standard PVC cables.	OP-87564 OP-87565 OP-87566
L-shaped cable OP-87568 (2 m 6.56') OP-87569 (5 m 16.40') OP-87570 (10 m 32.81') 		OP-87568 OP-87569 OP-87570
Straight cables OP-87647 (2 m 6.56') OP-87648 (5 m 16.40') OP-87649 (10 m 32.81') 	The following are PVC cables with stainless steel (SUS316L) connectors. Use in situations where rust is a concern for the connectors.	OP-87647 OP-87648 OP-87649
L-shaped cables OP-87650 (2 m 6.56') OP-87651 (5 m 16.40') OP-87652 (10 m 32.81') 		OP-87650 OP-87651 OP-87652
Straight cables OP-87582 (2 m 6.56') OP-87583 (5 m 16.40') OP-87584 (10 m 32.81') 	The following are PUR cables with high resistance to oily environments.	OP-87582 OP-87583 OP-87584
L-shaped cables OP-87586 (2 m 6.56') OP-87587 (5 m 16.40') OP-87588 (10 m 32.81') 		OP-87586 OP-87587 OP-87588

Accessories: Please refer to the FL Series Brochure

FD-X Series

Clamp-On Flow Sensors



Key Features

- > Detect micro flow rates
- > Compatible with tubes and metal pipes
- > Stable detection of nearly any liquid

Supported pipes	Supported pipe diameters		Clamp set		Sensor head		Rated flow range
	Pipe outer diameter*	Installable range	Appearance	Model	Appearance	Model	
Plastic piping/ tubing	ø3	ø2.7 to 3.7 0.11" to 0.15"		FD-XC1R1		FD-XS1	0 to 1000 mL/min
	1/8" (3.18 mm)			FD-XC1R2			
	ø4	ø3.5 to 4.5 0.14" to 0.18"		FD-XC8R1		FD-XS8	0 to 3000 mL/min
	ø6	ø5.5 to 6.5 0.22" to 0.26"		FD-XC8R2			
	1/4" (6.35 mm)	ø5.9 to 6.9 0.23" to 0.27"		FD-XC8R3			
	ø8	ø7.5 to 8.5 0.30" to 0.33"		FD-XC20R1		FD-XS20	0 to 15 L/min
	3/8" (9.53 mm)	ø9.0 to 10.0 0.35" to 0.39"		FD-XC20R2			
	ø10	ø9.5 to 10.5 0.37" to 0.41"		FD-XC20R3			
	ø12	ø11.5 to 12.5 0.45" to 0.49"		FD-XC20R4			
	Metal piping	ø3	ø2.8 to 5.5 mm 0.11" to 0.22"		FD-XC1M		FD-XS1
1/8" (3.18 mm)							
ø4							
ø6		ø5.5 to 8.3 mm 0.22" to 0.33"		FD-XC8M		FD-XS8	0 to 3000 mL/min
1/4" (6.35 mm)							
ø8							
3/8" (9.53 mm)		ø8.3 to 10.8 mm 0.33" to 0.43"		FD-XC20M1		FD-XS20	0 to 15 L/min
ø10							
ø10.5							
ø12		ø10.8 to 14 mm 0.43" to 0.55"		FD-XC20M2			0 to 20 L/min
1/2" (12.7 mm)							
ø13.8							

*Inch notation does not refer to the B-nominal in the JIS or ANSI standards, but to the standard whereby 1 inch = 25.4 mm.

*For a complete FD-X Series setup, please reference the FD-X Series brochure or contact your local KEYENCE office.

FD-Q Series

Clamp-On Flow Sensors



Key Features

- > No pipe modification necessary
- > Detects a large variety of liquid types
- > Adapts to all sorts of pipe materials

Flow Sensors

Appearance	Maximum rated flow range		Connection Bore Diameter	Model
	20 L/min 5.2 gal/min		1/4"(8 A)	FD-Q10C
	30 L/min 7.9 gal/min		3/8"(10 A)	
	60 L/min 15.9 gal/min		1/2"(15 A)	FD-Q20C
	100 L/min 26.4 gal/min		3/4"(20 A)	
	200 L/min 52.8 gal/min		1"(25 A)	FD-Q32C
	300 L/min 79.3 gal/min		1 1/4"(32 A)	
	400 L/min 105.7 gal/min		1 1/2"(40 A)	FD-Q50C
	500 L/min 132.1 gal/min		2"(50 A)	

Cables *When using the sensor without the controller

Appearance	Material	Connector type	Cable termination	Length	Model
	PVC (Polyvinyl chloride)	M12 4 pins L-shape	Loose wire	2 m 6.56'	OP-75722
				10 m 32.81'	OP-87274
	PUR (Polyurethane) (Oil Resistant)	M12 4 pins L-shape	Loose wire	2 m 6.56'	OP-87640
				10 m 32.81'	OP-87641

FD-R Series













Clamp-On Flow Meters



Key Features


- > No pipe modification necessary
- > Compatible with countless liquids and pipe materials
- > Integrated temperature monitoring

Flow Meters

Supported pipe size (Outer diameter)	Appearance	Rated flow velocity range	Flow rate range (Typical)	Weight	Model
1 1/2" (40A) (ø44 to ø55)		0.3 m/s to 5 m/s	36 to 400 L/min 9 to 100 gal/min 2.4 to 24 m³/h 	Approx. 2.5 kg	FD-R50
2" (50A) (ø55 to ø64)			36 to 600 L/min 9 to 150 gal/min 2.4 to 36 m³/h 		
2 1/2" (65A) (ø64 to ø83)			90 to 1000 L/min 24 to 260 gal/min 5.4 to 60 m³/h 	Approx. 3.0 kg	FD-R80
3" (80A) (ø83 to ø100)			90 to 1500 L/min 24 to 390 gal/min 5.4 to 90 m³/h 		
4" (100A) (ø100 to ø127)			220 to 2500 L/min 60 to 660 gal/min 12 to 150 m³/h 	Approx. 3.3 kg	FD-R125
5" (125A) (ø127 to ø152)			220 to 3700 L/min 60 to 990 gal/min 12 to 220 m³/h 		
6" (150A) (ø152 to ø191)			570 to 5500 L/min 150 to 1400 gal/min 36 to 330 m³/h 	Approx. 3.5 kg	FD-R200
8" (200A) (ø191 to ø220)			570 to 9500 L/min 150 to 2500 gal/min 36 to 570 m³/h 		

*The minimum flow rates (zero cut flow rates) can be changed in the settings.

Cables

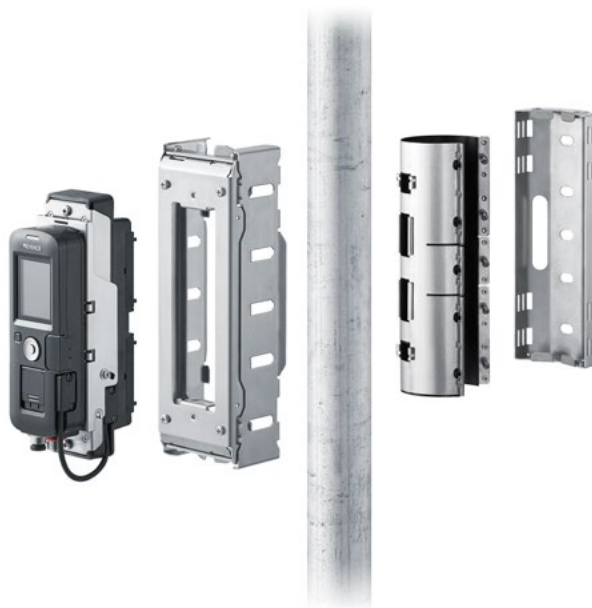
Specifications	Appearance	Length	Material	Weight	Model
Indoor use (standard)		2 m 6.56'	PVC	Approx. 55 g	OP-75721
		10 m 32.81'	Brass nickel plating	Approx. 220 g	OP-85502
Indoor use (oil resistant)		2 m 6.56'	PUR	Approx. 75 g	OP-87636
		10 m 32.81'	Zinc nickel plating	Approx. 260 g	OP-87637
Outdoor use		10 m 32.81'	PUR	Approx. 310 g	OP-88196
			SUS316L		

Cable gland *When supplying AC power to the unit

Appearance	Material	Compatible cable outer diameter	Number of pieces	Weight	Model
	PA/FKM/EPDM	ø7 to ø12	2 Pieces	Approx. 20 g 2 pieces	OP-88199

Accessories

Description	Appearance	Usage	Weight	Model
Protection cover		Prevent damage to the main unit or unintended settings changes Material : SUS304, Polycarbonate	Approx. 285 g	FD-RP1
Modular cable		Send recorded data stored in FD-R to a computer	Approx. 72 g	OP-26487
RS-232C conversion adapter [9-pin]			Approx. 25 g	OP-26401



Clamp-On Gas Flow Meter FD-G Series



**CALL
TOLL
FREE**

TO CONTACT YOUR LOCAL OFFICE
1-888-KEYENCE
1 - 8 8 8 - 5 3 9 - 3 6 2 3

www.keyence.com



SAFETY INFORMATION

Please read the instruction manual carefully in order to safely operate any KEYENCE product.

CONTACT YOUR NEAREST OFFICE FOR RELEASE STATUS

KEYENCE CORPORATION OF AMERICA

Head Office 500 Park Boulevard, Suite 200, Itasca, IL 60143, U.S.A.

PHONE: +1-201-930-0100 **FAX:** +1-855-539-0123

E-mail: keyence@keyence.com

AL Birmingham
AR Little Rock
AZ Phoenix
CA San Francisco

CA San Jose
CA Cupertino
CA Los Angeles
CA Irvine

CO Denver
FL Tampa
GA Atlanta
IA Iowa

IL Chicago
IN Indianapolis
KY Louisville
MA Boston

MI Detroit
MI Grand Rapids
MN Minneapolis
MO Kansas City

MO St. Louis
NJ Elmwood Park
NY Rochester
NC Charlotte

NC Raleigh
OH Cincinnati
OH Cleveland
OR Portland

PA Philadelphia
PA Pittsburgh
SC Greenville
TN Knoxville

TN Nashville
TX Austin
TX Dallas
WA Seattle

WI Milwaukee

KEYENCE CANADA INC.

Head Office **PHONE:** +1-905-366-7655 **FAX:** +1-905-366-1122 **E-mail:** keyencecanada@keyence.com

Montreal **PHONE:** +1-514-694-4740 **FAX:** +1-514-694-3206 **Windsor** **PHONE:** +1-905-366-7655 **FAX:** +1-905-366-1122

KEYENCE MEXICO S.A. DE C.V.

PHONE: +52-55-8850-0100 **FAX:** +52-81-8220-9097

E-mail: keyencemexico@keyence.com

The information in this publication is based on KEYENCE's internal research/evaluation at the time of release and is subject to change without notice.
Company and product names mentioned in this catalog are either trademarks or registered trademarks of their respective companies.
The specifications are expressed in metric units. The English units have been converted from the original metric units. Unauthorized reproduction of this catalog is strictly prohibited.
Copyright © 2019 KEYENCE CORPORATION. All rights reserved.

KA1-1049

FDGSeriesCatalog-KA-C-US 1089-1 611K09