



Ideal for air flow test and airtightness test
Select Laminar Flow Sensor (Laminar Flow Tube) or Mass Flow Sensor

■ Features



One-touch operation with icons



Waveform display of test pressure and flow



Multilingual (English/Japanese/Chinese/Spanish)



Fieldbus supported (EtherNet/IP, PROFINET)
FTP function (Option)



Easy data collection via USB port



Flow Check (C-CHK)

Flow can be checked in daily inspections



Flow Optimizer

Even if the pressure fluctuates, the flow rate is automatically corrected to that at the set pressure and displayed.

■ Application Examples



Engine assembly leak test



Flow and leak tests for auto parts



Gas equipment flow test

■ Functions

Display	Six types of measurement screens (Display the screen according to your necessity)		User Span	Span value is either manually entered or automatically set.
Test circuit	Blow Check	After the flow test, the fill valve is opened to check there is flow. (Only for F4)	Two Sets of Flow Limits	Upper limits (UL2/UL) Lower limits (LL2/LL)
	C-CHK	The flow is compared with the value of Flow Master	Exhaust Interference Prevention	Exhaust timing will be controlled for the cases where multiple cavities are tested simultaneously
	Flow Check (F-CHK)	Measured flow is compared with the value of Flow Master in every test. (Option: CX)	Data Acquisition	Up to 5000 data are stored. USB can be used for data storing.
Digital Filter	Averages the readings for more stable readings with less variation.		DET Extension	When the flow is in the range between "DET LL and DET LL2" or "DET UL and DET UL2", the DET is repeated.
Data Analysis	Counter, Statistics, Waveform		For options	External Exhaust Valve ready (Exhaust valve unit is sold separately) Bypass circuit ready (Bypass circuit unit is sold separately)

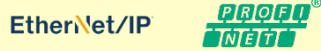
■ Features

Fieldbus

Support for EtherNet/IP and PROFINET has enhanced compatibility with control systems.

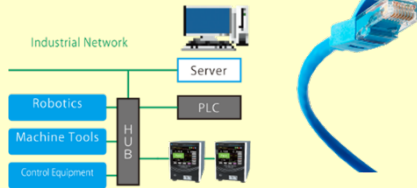
Advantages

- Direct connection to major PLCs and higher-level devices.



- Simplified wiring and reduced man-hours.
- Fast response with real-time communication.
- Visualization and integrated management of the entire facility.

Network Overview



Fieldbus enables faster and easier construction of more flexible production systems.

Flow Optimizer

Flow Optimizer calculates and displays the flow to be obtained when the target test pressure is applied even if the pressure being applied to the work deviates from the target test pressure. Three methods are available. Select one method.

Optimization Methods

Formula Optimizer	Calculates the compensation value with the orifice equation.
Two-Point Optimizer	The flow rates at two points, the reference pressure and ± 10 to 20% of that pressure, are stored and corrected.
Multi-Point Optimizer	Flow rates obtained at multiple pressure points allow compensation based on the work characteristics.



The graph shows an example of Multi-Point Optimizer.

USB Port



CH	Flow	Pressure	Temp	Comp	Unit	Time
1	0.000	0.000	0.000	0.000	L/min	10:10:00
2	0.000	0.000	0.000	0.000	L/min	10:10:01
3	0.000	0.000	0.000	0.000	L/min	10:10:02
4	0.000	0.000	0.000	0.000	L/min	10:10:03
5	0.000	0.000	0.000	0.000	L/min	10:10:04
6	0.000	0.000	0.000	0.000	L/min	10:10:05
7	0.000	0.000	0.000	0.000	L/min	10:10:06
8	0.000	0.000	0.000	0.000	L/min	10:10:07
9	0.000	0.000	0.000	0.000	L/min	10:10:08
10	0.000	0.000	0.000	0.000	L/min	10:10:09
11	0.000	0.000	0.000	0.000	L/min	10:10:10
12	0.000	0.000	0.000	0.000	L/min	10:10:11
13	0.000	0.000	0.000	0.000	L/min	10:10:12
14	0.000	0.000	0.000	0.000	L/min	10:10:13
15	0.000	0.000	0.000	0.000	L/min	10:10:14
16	0.000	0.000	0.000	0.000	L/min	10:10:15
17	0.000	0.000	0.000	0.000	L/min	10:10:16
18	0.000	0.000	0.000	0.000	L/min	10:10:17
19	0.000	0.000	0.000	0.000	L/min	10:10:18
20	0.000	0.000	0.000	0.000	L/min	10:10:19
21	0.000	0.000	0.000	0.000	L/min	10:10:20
22	0.000	0.000	0.000	0.000	L/min	10:10:21
23	0.000	0.000	0.000	0.000	L/min	10:10:22
24	0.000	0.000	0.000	0.000	L/min	10:10:23
25	0.000	0.000	0.000	0.000	L/min	10:10:24
26	0.000	0.000	0.000	0.000	L/min	10:10:25
27	0.000	0.000	0.000	0.000	L/min	10:10:26
28	0.000	0.000	0.000	0.000	L/min	10:10:27
29	0.000	0.000	0.000	0.000	L/min	10:10:28
30	0.000	0.000	0.000	0.000	L/min	10:10:29
31	0.000	0.000	0.000	0.000	L/min	10:10:30

Quality data is automatically saved for each measurement and can be output via USB.

FTP Function



Settings

Settings	IP Address
	Subnet Mask
	User Name
	Password
	FTP Directory

The internally stored quality data can be shared over the network using the FTP function.

■ Specifications

Pressure Media	Air
Accuracy	■ Laminar Flow specification $\pm 1.5\%$ of F.S. ± 1 digit (Specified pressure) ■ Mass Flow specification $\pm 1.5\%$ of F.S. ± 1 digit (Specified test pressure) $\pm 3.0\%$ of F.S. ± 1 digit (Other than the specified test pressure)
Specified Test Pressure Range	Micro (L01): 1 to 10 kPa (without Regulator) Micro low (L03): 10 to 30 kPa (Mass Flow only) Micro low (L05): 10 to 50 kPa (Laminar Flow only) Low (L): 15 to 80 kPa Medium (M): 30 to 500 kPa Vacuum (V): -10 to -70 kPa (Laminar Flow 20L or less)
Number of Channels	32 channels (#0 to #31)
Pressure Source	Clean air. The source pressure must be sufficiently higher than the test pressure.
Pilot Pressure	Clean air regulated between 400 and 700 kPa
Timers	Up to 999.9 s (Resolution: 0.1 s)
Flow display	Up to 4 or 3 digits with a fixed decimal point
Display Unit	Test Pressure kPa, MPa, (psi, kg/cm ² , bar, mbar, mmHg, cmHg, inHg, mmH ₂ O)
	Flow L/min, mL/min, L/s, mL/s, L/h, m ³ /h, mm ³ /s, (SCFH, SCFM, in ³ /min), USP (User Span)
	Atmospheric pressure kPa, hPa, (mmHg)
Conversion Temperature	0 °C, 15 °C, 20 °C, 25 °C, (70 °F)

Port Size	Pressure Source Pilot Pressure Source	Rc 1/4 Laminar flow 100L: Rc 3/8
	WORK Port	200 mL/min or less: Rc 1/4 500 mL/min or more: Rc 1/2
RS-232	Front panel port	T, IL, ML, D and P fixed length outputs, F2
	Rear panel port	T, IL, ML, D and P fixed length outputs, F2
	Save Data	Flow, Pressure, Comp value, Air temp, Flow Limits, Atm press, etc.
	Copy Settings	csv file
Fieldbus	EtherNet/IP, PROFINET	
USB Port	Settings Backup/Restore, System Backup/Restore, Firmware upgrade	
Control I/O Port	NPN/PNP compatible (Phoenix Contact) Input Signal: Start, Stop, etc. Output Signal: Pass, UL Fail, LL Fail, etc.	
LAN Port	FTP functions (Option)	
Power Source	100 to 240 VAC, 50/60 Hz, 60 VA max. (Use the included power cable at 125 VAC or less)	
Temperature	Operation Temp.: +5 to 45 °C	
Humidity	10 to 80% RH or less / No dew condensation	
Weight	Approx. 15 kg	
Standard Accessories	Quick mounting brackets, Interface connectors, Power cable, Inspection record of the product, Calibration Certificate of the Standard	

Model

Laminar Flow Sensor Specs.

AF-R221(F4.A.BCDE.F)(Production specs.)

Specs.	Code	Function
A	Flow Range	10ML, 20ML, 50ML, 100ML, 200ML, 500ML, 1L, 2L, 5L, 10L, 20L, 30L, 50L, 100L
B	Pressure Range *1	L01 Micro pressure: 1 to 10 kPa
		L05 Micro low pressure: 10 to 50 kPa
		L Low pressure: 15 to 80 kPa
		M Medium pressure: 30 to 500 kPa
		V Vacuum: -10 to -70 kPa
C	Pneumatic Circuit *2	BG External Bypass Circuit Unit Ready / External Exhaust Valve Ready
		BG1 External Bypass Circuit Unit Ready / Built-in Exhaust Valve
		B1G Built-in Bypass Circuit Unit / External Exhaust Valve Ready
		B1G1 Built-in Bypass Circuit Unit / Built-in Exhaust Valve
		FBG Dual Pressure Ready / External Bypass Circuit Ready / External Exhaust Valve Ready
		FB1G Dual Pressure Ready / Built-in Bypass Circuit Unit / External Exhaust Valve Ready
		C Secondary pressure method
		UX1 SI units
D	Display Unit	UX2 All units (Only for overseas customers)
		UX3 UL Certification
E	Option	R1 EP Regulator connector for Dual pressure
		CX Automatic CAL Check Circuit (With a driving valve at the CAL port for the calibration)
		FR Dual Range Calibration Range: 1 to 100 L/min only
		P Speed Controller attached at the outlet of the regulator (Mandatory for 100L. Additional price not required.)
		J1 All ports in NPT (Including NPT ball valves)
		W Stop Valve Monitoring
		K Atmospheric Pressure Sensor
		D Memory (For FTP) *3
F	Power Cable	N5A EtherNet/IP *4
		N6A PROFINET *4
		VA 125 VAC, 3 m
		VE 250 VAC, 2 m
		VK 250 VAC, 2 m (Only for Chinese customers)

Production Specs. AF-R221(F4/F3)(G.H.I)

Specs.	Code	Function
G	Flow Calib F.S.	Specify the flow range and test pressure.
H	Test pressure *5, *6	
I	Conversion Temperature	S Conversion at 20 °C
		N Conversion at 0 °C

*5 When the test pressure is in the range from -5 kPa to 10 kPa, calibration at atmospheric pressure will be performed.

*6 Depending on the conditions of use, we may ask you to consult with us separately.

The contents in this Product Information are as of July 2025. The specifications are subject to change without prior notice.

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Mass Flow Sensor Specs.

AF-R221(F3.A.BCDE.F)(Production specs.)

Specs.	Code	Function
A	Flow Range	--- 500ML, 2L, 5L, 20L, 50L, 100L
B	Pressure Range *1	L01 Micro pressure: 1 to 10 kPa
		L03 Micro low pressure: 10 to 30 kPa
		L Micro low pressure: 30 to 80 kPa
		M Medium pressure: 30 to 500 kPa
		V Vacuum: -10 to -70 kPa
C	Pneumatic Circuit *2	BG External Bypass Circuit Unit Ready / External Exhaust Valve Ready
		BG1 External Bypass Circuit Unit Ready / Built-in Exhaust Valve
		B1G Built-in Bypass Circuit Unit / External Exhaust Valve Ready
		B1G1 Built-in Bypass Circuit Unit / Built-in Exhaust Valve
		FBG Dual Pressure Ready / External Bypass Circuit Ready / External Exhaust Valve Ready
		FB1G Dual Pressure Ready / Built-in Bypass Circuit Unit / External Exhaust Valve Ready
		C Secondary pressure method
		UX1 SI units
D	Display Unit	UX2 All units (Only for overseas customers)
		UX3 UL Certification
E	Option	R1 EP Regulator connector for Dual pressure
		CX Automatic CAL Check Circuit (With a driving valve at the CAL port for the calibration)
		P Speed Controller attached at the outlet of the regulator (Mandatory for 100L. Additional price not required.)
		J1 All ports in NPT (Including NPT ball valves)
		W Stop Valve Monitoring
		D Memory (For FTP) *3
F	Power Cable	N5A EtherNet/IP *4
		N6A PROFINET *4
		VA 125 VAC, 3 m
		VE 250 VAC, 2 m
		VK 250 VAC, 2 m (Only for Chinese customers)

*1 Regulator will not be included if the code of the Pressure Range is suffixed with an E.

*2 Bypass Circuit Unit and External Exhaust Valve are sold separately.

*3 Option D (Memory) is required to use the FTP function.

*4 None of the options are UL or CE certified.

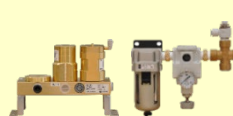
Peripheral Equipment

External Exhaust Valve Unit



Prevents contamination when testing parts having water, oil or other foreign matter on them.

External Bypass Circuit Unit



Reduces test time for low pressure/large-volume works.

<http://www.cosmo-k.co.jp/>

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