



Optimum for testing discharge flow and airtightness.  
Flow sensor is selectable from Laminar Flow and Mass Flow.

### ■ Features



Easy-to-navigate configuration with icons.  
Each menu opens by simply touching an icon.



Test pressure and flow can be monitored in charts.



Language selectable (English, Japanese, Chinese, Spanish)



FTP (optional) available for Ethernet.



Easy data collection via USB port.

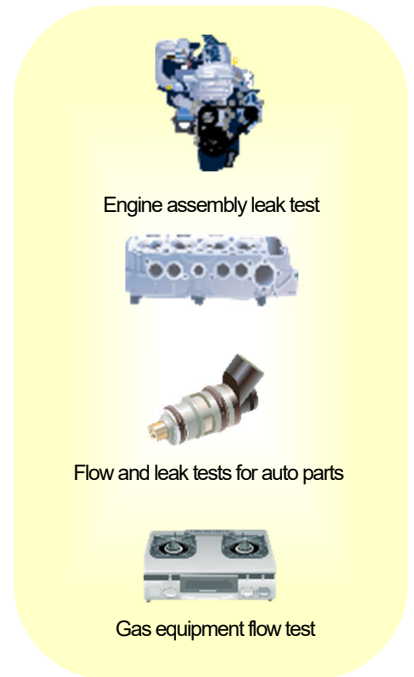


Flow Check (C-CHK) as standard feature

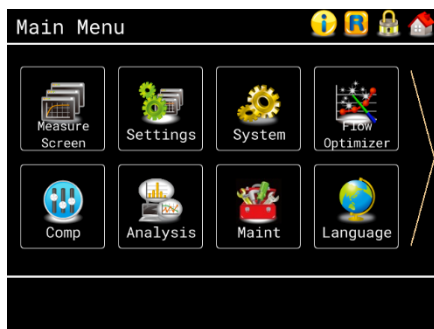


Flow Optimizer. Even when test pressure fluctuates, the flow at the specified test pressure is displayed.

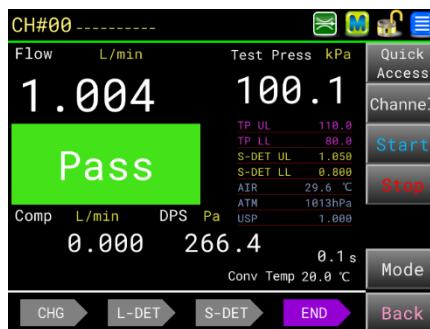
### ■ Application Examples



One-touch icons



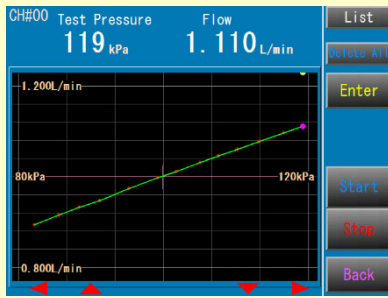
Measure Screen



X-Chart/List and Statistics for Analysis



● Flow Optimizer  
Multi-Point Optimizer Sampling

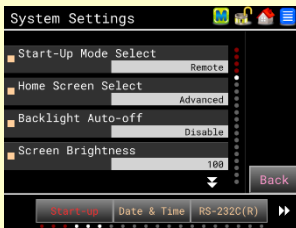


● Test parameters and results can be output to the USB memory.

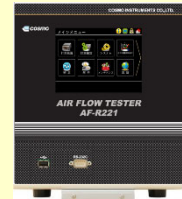
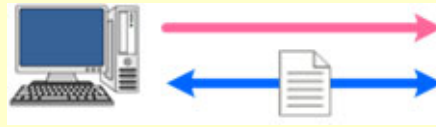


Quality data stored

● FTP Function



- Settings
- IP Address
  - Subnet Mask
  - User Name
  - Password
  - FTP Directory
- FTP parameters



Share the quality data via Ethernet

■ Select Laminar Flow Sensor or Mass Flow Sensor  
Take advantages of excellent features of each Flow Sensor.

Laminar Flow Sensor (Laminar Flow Tube)



- ▶ Wide variety of ranges (F.S.10 mL/min to 100 L/min)
- ▶ Can measure pulsating flow rate such as pump discharge flow
- ▶ Durable & robust with no moving parts

Mass Flow Sensor



- ▶ Can measure with different/variable line pressure
- ▶ No atmospheric compensation required
- ▶ High response speed

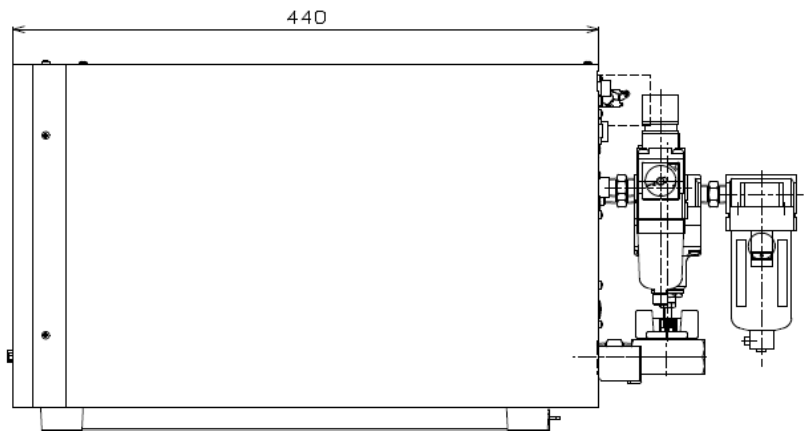
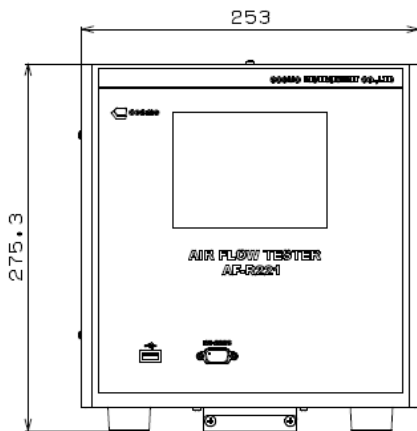
■ Standard Features

Display	6 measurement screens are available.		Digital Filter	Averages the readings for more stable readings with less variation.
Test Reliability	Blow Check	After flow test, the fill valve is opened to check there is flow. Only for F4	Data Analysis	Counter, Statistics, Waveform display
			User Span	Span value is either manually entered or automatically set.
	C-CHK	The flow is compared with the value of Flow Master.	Flow Limits	Upper limits: UL2/UL, Lower limits: LL2/LL
Flow Optimizer	F-CHK	Measured flow is compared with the value of Flow Master in every test. (Option: CX)	Exhaust Interference Prevention	Externally controls the Exhaust timing after air flow test.
	Formula Optimizer	Samples the flows at Target Test Press (P1) to display the optimized flow.	Data Acquisition	Up to 5000 data are stored. USB can be used for data storing.
	Two-Point Optimizer	Samples the flows at two pressure points, Target Test Press (P1) and Off-Target Test Press (P2), to optimize the measured flow when the test pressure is off target.	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.
	Multi-Point Optimizer	Samples the flows at Target Test Press (P1) and other multiple pressure points within the allowable range to optimize the flow when the test pressure is off target.	Optional Feature	External Exhaust Valve (Exhaust valve unit is sold separately)
				Bypass circuit ready (Bypass circuit unit is sold separately.)

## Specifications

Pressure Media	Air	Port Size	Pressure source / Pilot pressure source Rc 1/4 (Laminar Flow Model 100L only: Rc 3/8) WORK Port 200 mL/min or less: Rc 1/4 500 mL/min or more: Rc 1/2	
Accuracy	<ul style="list-style-type: none"> <li>■ Laminar Flow Sensor ±1.5% of F.S. ±1 digit (Specified test pressure)</li> <li>■ Mass Flow Sensor ±1.5% of F.S. ±1 digit (Specified test pressure) ±3.0% of F.S. ±1 digit (Other than the specified test pressure)</li> </ul>		Front panel port	T, IL, ML, D and P fixed length outputs, F2
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 700 kPa Vacuum (V): -10 to -70 kPa (Laminar Flow 20L or less)	RS-232	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, and others
Number of Channels	32 channels (#0 to #31)	USB Port	CSV Copy to USB	csv file
Power Source	100 to 240 VAC±10%, 50/60 Hz, 60 VA max (Use the enclosed power cord at 125 VAC or less)		Parameter Backup System Backup Software update Copy Operation Manual (PDF)	
Timer Setting	Up to 999.9 s (Resolution: 0.1 s)	Flow Unit	L/min, mL/min, L/s, mL/s, L/h, m <sup>3</sup> /h, mm <sup>3</sup> /s, USP (User Span)	
Pressure Source	Clean air The source pressure must be sufficiently higher than the test pressure.	Pressure Unit	kPa, MPa, (psi, kg/cm <sup>2</sup> , bar, mbar, mmHg, cmHg, inHg, mmH <sub>2</sub> O) The units in ( ) are not available for SI unit models.	
Operating Temperature	5 to 45°C	Standard Accessories	Quick mounting brackets, Interface connectors, Power cable (3 m), Inspection record, Operation Manual	
Humidity	80 % RH or less / no dew condensation	Weight	Approx. 15 kg	

## External Appearance



## Peripheral Equipment

### External Exhaust Valve Unit



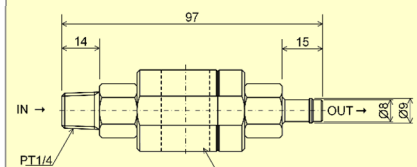
Prevents contamination when testing parts having water, oil or other foreign matter on them.

### External Bypass Circuit Unit



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

### Flow Master FM-2A



Flow can be checked in F-CHK and C-CHK.

## Model

# AF-R221 (A . B . C . D E F . G) (H , I , J)

### A Flow Sensor

Sensor	Mass Flow Sensor	Laminar Flow Sensor
Code	<b>F3</b>	<b>F4</b>

### B Flow Sensor Range

Sensor	Code													
Mass Flow Sensor	<b>500ML</b>	<b>2L</b>	<b>5L</b>	<b>20L</b>	<b>50L</b>	<b>100L</b>								
Laminar Flow Sensor	<b>10ML</b>	<b>20ML</b>	<b>50ML</b>	<b>100ML</b>	<b>200ML</b>	<b>500ML</b>	<b>1L</b>	<b>2L</b>	<b>5L</b>	<b>10L</b>	<b>20L</b>	<b>30L</b>	<b>50L</b>	<b>100L</b>

### C Pressure Range

Pressure	Micro	Micro low	Micro low	Low		Medium	Vacuum
Pressure range	1 to 10 kPa	10 to 30 kPa	10 to 50 kPa	30 to 80 kPa	15 to 80 kPa	30 to 700 kPa	-10 to -70 kPa
Code	<b>L01</b>	<b>L03</b> Mass Flow only	<b>L05</b> Laminar Flow only	<b>L</b> Mass Flow only	<b>L</b> Laminar Flow only	<b>M</b>	<b>V</b>

### D Pneumatic Circuit

	Built-in Bypass Circuit	Built-in Exhaust Valve	Dual pressure ready (Bypass circuit unit is sold separately.)	Secondary Flow Measurement
Function	Effective for large-volume parts. Pressurizes the tested part during CHG.	Exhaust Valve is built in the tester. Prevents testers from oils and dusts.	Reduces pressurization time by applying a pressure higher than the test pressure for a predetermined period of time (or to a target pressure) during CHG.	The flow coming out of the tested part is measured and judged.
Code	<b>B1</b>	<b>G1</b>	<b>F</b>	<b>C</b>

### E Units

Units	SI units (Mandatory for Japanese customers)	All units (Only for overseas customers)	UL certification (Only for US customers, In preparation)
Code	<b>UX1</b>	<b>UX2</b>	<b>UX3</b>

### F Options

Code	Function	Code	Function
<b>R1</b>	EP Regulator connector for Dual pressure. Specify this option when EP Regulator is selected in option F.	<b>J1</b>	US specification (Port size in NPT). All ports in NPT (Including ball valves)
<b>CX</b>	Automatic CAL Check. Automatically checks sensitivity with flow master	<b>W</b>	Stop Valve Monitoring. Checks open/close of the stop valves.
<b>FR</b>	Dual Range (For F4 only). One flow sensor can provide two ranges. (It depends on the flow sensor.)	<b>K</b>	Atmospheric Pressure Sensor (For F4 only). The atmospheric pressure is automatically captured with a high performance atmospheric pressure sensor and compensated.
<b>P</b>	Speed Controller. Speed controller is provided at the regulator outlet.	<b>D</b>	FTP memory. FTP function can be used.

### G Power Cable

Code	VA	VE	VK
	125 VAC, 3 m	250 VAC, 2 m	250 VAC, 2 m (Only for Chinese customers)

### H Flow Range

### I Test Pressure Range

#### Mass Flow Sensor

Code	H Flow Range		I Test Pressure Range	
	Flow Range	Pressure	Vacuum	
<b>500ML</b>	0 to 500 mL/min	10 to 700 kPa	-10 to -70 kPa	
<b>2L</b>	0 to 2 L/min	10 to 700 kPa	-10 to -70 kPa	
<b>5L</b>	0 to 5 L/min	10 to 700 kPa	-10 to -70 kPa	
<b>20L</b>	0 to 20 L/min	10 to 700 kPa	-10 to -70 kPa	
<b>50L</b>	0 to 50 L/min	10 to 700 kPa	—	
<b>100L</b>	0 to 100 L/min	10 to 700 kPa	—	

- Select a flow range from the table.
- Specify the test pressure within the applicable pressure range.
- Consult Cosmo if the test pressure exceeds the range.

#### Laminar Flow Sensor

Code	H Flow Range		I Test Pressure Range	
	Flow Range	Pressure	Vacuum	
<b>10ML</b>	0 to 10 mL/min	10 to 700 kPa	-10 to -70 kPa	
<b>20ML</b>	0 to 20 mL/min	10 to 700 kPa	-10 to -70 kPa	
<b>50ML</b>	0 to 50 mL/min	10 to 700 kPa	-10 to -70 kPa	
<b>100ML</b>	0 to 100 mL/min	10 to 700 kPa	-10 to -70 kPa	
<b>200ML</b>	0 to 200 mL/min	10 to 700 kPa	-10 to -70 kPa	
<b>500ML</b>	0 to 500 mL/min	10 to 700 kPa	-10 to -70 kPa	
<b>1L</b>	0 to 1 L/min	10 to 700 kPa	-10 to -70 kPa	
<b>2L</b>	0 to 2 L/min	10 to 700 kPa	-10 to -70 kPa	
<b>5L</b>	0 to 5 L/min	10 to 700 kPa	-10 to -70 kPa	
<b>10L</b>	0 to 10 L/min	10 to 500 kPa	-10 to -70 kPa	
<b>20L</b>	0 to 20 L/min	10 to 700 kPa	-10 to -70 kPa	
<b>30L</b>	0 to 30 L/min	10 to 500 kPa	-10 to -70 kPa	
<b>50L</b>	0 to 50 L/min	10 to 500 kPa	-10 to -50 kPa	
<b>100L</b>	0 to 100 L/min	10 to 500 kPa	—	

### J Conversion Temperature

Temperature	20 °C	0 °C
Code	<b>S</b>	<b>N</b>

The contents in this Product Information are as of August 2022. The specifications are subject to change without prior notice.

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