

PRODUCT INFORMATION

LAMINAR FLOW GAUGE

Highly accurate and responsive sensor instantly measures flow rate. Laminar flow tube, differential pressure sensor, and multifunction display are incorporated for production lines that require flow test and leak test.



■ Features

- High accuracy: $\pm 2\%$ of F.S.
- Highly responsive with Laminar Flow Tube
- Various flow ranges available
- Stability and durability using highly accurate and high proof pressure DPS
- Temperature sensor for automatic temperature compensation
- Multifunctional display to meet various measurement requirements

■ Application Examples

- High speed flow measurement
- Pass/Fail judgment based on flow rate
- Leak test by flow rate
- Flow data collection, PC data recording

■ Specifications

Laminar Flow Tube Flow Range	10, 20, 50, 100, 200, 500 mL/min 1, 2, 5, 10, 20, 30, 50, 100, 200, 500 L/min
Pressure Media	Air
Accuracy	$\pm 2\%$ of F.S. ± 1 digit
Conversion Temperature / Atmospheric Pressure	20°C (or 0°C) / Flow rate converted at 1 atm
Operating Temperature	5 to 35°C
Test Pressure	Depends on the range
Temperature Sensor	Built in the Laminar Flow Tube or connected to the outlet of Laminar Flow Tube
Generated Differential Pressure	Approx. 0.6 kPa at full scale flow
Pressure loss	150% of measured differential pressure
Port Size	Differential pressure connection port: Rc1/8 Flow sensor connection port: See "Laminar Flow Tube Ranges".
DPS Proof Pressure	1 MPa (PT-110FC-A), 10 kPa (PT-103B-A)
Power Source	24 VDC $\pm 10\%$, 0.3 A max. With A/C adapter

■ Multifunctional Display

Number of Channels	10 channels
Upper and Lower Limits	4 levels (HH, HI, LO, LL)
Zero Adjustment	One push zero adjustment
Auto-Zero	Auto-Zero button
Display Hold	Hold button
Display Response	Digital Filter (High, Medium, Low)
RS-232C	1200, 9600 and 19200 bps switchable
BCD output	Open collector
Display Digits	3.5 (1999) and 4.5 (19999) switchable
Sampling Rate	250 ms and 50 ms switchable
User Span	0.001 to 9.999 (Default: 1.000)
Panel Cutting Dimension	W133 x H61 mm
External Dimensions	Display: W140 x H66 x D172 mm Sensor: See "External Appearances of Laminar Flow Tube & DPS".
Analog Output *2 (Option)	F1: F.S / 5 V, F2: F.S / 10V F3: Same as display

■ Model Classification

DF-241BA-((1),(2))- (3)(4)-(5)

(1) Flow Range		(2) Line Pressure		(3) Option		(4) Power Source		(5) Conversion Temp.	
Code	Unit	Code	Unit	Code	Description	Code	Description	Code	Description
ML	mL/min	KP	kPa	B	Low line press sensor *1	VG	AC adapter 100 V cable (3 m)	S	Conversion at 20°C
L	L/min	MP	MPa	F1	5 V analog output *2	VH	AC adapter 240 V cable (2 m)	N	Conversion at 0°C
				F2	10 V analog output *2	VJ	Without A/C adapter		
				F3	Same as display *2				

*1 Use the low line pressure sensor (PT-103B-A) for 10 kPa or less.

*2 The analog output during Auto-Zero or Hold is not reflected.

Laminar Flow Tube Ranges

Model	Flow Range (Atm)	Max. Line Pressure	Port Size	Temp. Sensor
LF-104N-10C	0 to 10 mL/min	990 kPa	R1/4	Built-in
LF-104N-20C	0 to 20 mL/min			
LF-104N-50C	0 to 50 mL/min			
LF-104N-100C	0 to 100 mL/min			
LF-104N-200C	0 to 200 mL/min			
LF-104N-500C	0 to 500 mL/min	700 kPa	R1/2	
LF-104N-1L	0 to 1 L/min			
LF-104N-2L	0 to 2 L/min			
LF-104N-5L	0 to 5 L/min	500 kPa	R1/2	
LF-104N-10L	0 to 10 L/min			
LF-104N-20L	0 to 20 L/min			
LF-104N-30L	0 to 30 L/min			
LF-105BN-50L	0 to 50 L/min	350 kPa	R3/4	Accessory
LF-105BN-100L	0 to 100 L/min	200 kPa		
LF2-200L	0 to 200 L/min	50 kPa	R3/4	Accessory
LF2-500L	0 to 500 L/min			

This table shows the ranges when used under atmospheric pressure.

When using under line pressure, use the following equation to select the range.

Laminar flow range: X (mL/min)

Line pressure: P (kPa)

Max. flow (Converted at atm): Q (atm mL/min)

$$X = \frac{101.3}{101.3 + P} \times Q$$

The table below shows Laminar Flow Tubes to be used based on the flow range and the line pressure (pressure applied to the Laminar Flow Tube). The flow range is assigned in the order of 1, 2, and 5.

(Example)

Line pressure: 300 kPa, Max. flow: 500 mL/min
See the point where 300 kPa (x-axis) and 500 mL/min (y-axis) cross each other. The point shows 200C. LF-104N-200C is the most appropriate choice.

Selection of Laminar Flow Tubes The point where the line pressure (x-axis) and the flow range (y-axis) cross each other shows the appropriate choice. Double dash "--" means "unavailable".

Code	Press (kPa)→ Flow Range ↓	-61 to -70	-51 to -60	-41 to -50	-35 to -40	-1 to - 34	0 to 50	51 to 67	68 to 100	101 to 150	151 to 200	201 to 235	236 to 300	301 to 350	351 to 400	401 to 500	501 to 700	701 to 910	911 to 990
10 ML	10 mL/min	50 C	50 C	20 C	20 C	20 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C
20 ML	20 mL/min	100 C	50 C	50 C	50 C	50 C	20 C	20 C	20 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C	10 C
50 ML	50 mL/min	200 C	200 C	100 C	100 C	100 C	50 C	50 C	50 C	50 C	20 C	20 C	20 C	20 C	20 C	10 C	10 C	10 C	10 C
100 ML	100 mL/min	500 C	500 C	200 C	200 C	200 C	100 C	100 C	100 C	50 C	50 C	50 C	50 C	50 C	20 C	20 C	20 C	20 C	10 C
200 ML	200 mL/min	1 L	500 C	500 C	500 C	500 C	200 C	200 C	200 C	100 C	100 C	100 C	100 C	50 C	50 C	50 C	50 C	50 C	20 C
500 ML	500 mL/min	2 L	2 L	1 L	1 L	1 L	500 C	500 C	500 C	500 C	200 C	200 C	200 C	200 C	200 C	100 C	100 C	100 C	50 C
1 L	1L/min	5 L	5 L	2 L	2 L	2 L	1 L	1 L	1 L	500 C	500 C	500 C	500 C	500 C	500 C	200 C	200 C	200 C	100 C
2 L	2 L/min	10 L	5 L	5 L	5 L	5 L	2 L	2 L	2 L	1 L	1 L	1 L	1 L	500 C	500 C	500 C	500 C	500 C	200 C
5 L	5 L/min	20 L	20 L	10 L	10 L	10 L	5 L	5 L	5 L	5 L	2 L	2 L	2 L	2 L	1 L	1 L	--	--	500 C
10 L	10 L/min	50 L	50 L	20 L	20 L	20 L	10 L	10 L	10 L	5 L	5 L	5 L	5 L	5 L	5 L	2 L	2 L	--	--
20 L	20 L/min	100 L	50 L	50 L	50 L	30 L	20 L	20 L	20 L	10 L	10 L	10 L	10 L	5 L	5 L	5 L	5 L	--	--
30 L	30 L/min	100 L	100 L	100 L	50 L	50 L	30 L	20 L	20 L	20 L	20 L	10 L	10 L	10 L	10 L	10 L	--	--	--
50 L	50 L/min	--	--	100 L	100 L	100 L	50 L	50 L	30 L	30 L	20 L	20 L	20 L	20 L	20 L	10 L	--	--	--
100 L	100 L/min	--	--	--	--	--	100 L	100 L	100 L	50 L	50 L	50 L	30 L	30 L	30 L	20 L	--	--	--
200 L	200 L/min	--	--	--	--	--	200 L	--	--	100 L	100 L	--	--	--	--	--	--	--	--
500 L	500 L/min	--	--	--	--	--	500 L	--	--	--	--	--	--	--	--	--	--	--	--

1: When the line pressure is 101 kPa or more, the number of display digits will be 3 digits since the display will vary depending on the relational expression with the pressure.

2: For vacuum or high line pressure (101 KPa or more), the range of the Laminar Flow Tube will be different.

External Appearances of Laminar Flow Tube & DPS



LF-104N φ50 × 230 mm



LF-105BN φ64 × 300 mm



LF2-200L φ59.5 × 334 mm

LF2-500L φ89.5 × 448.5 mm



DPS: PT-110FC-A

W70 × H108 × D66 mm

* The contents in this Product Information are as of January 2021. The specifications are subject to change without prior notice.

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