

# LF Series

Ultrasonic Liquid Flow Controller

## Ultrahigh Purity Liquid Flow Controllers



Model LF200

### Overview

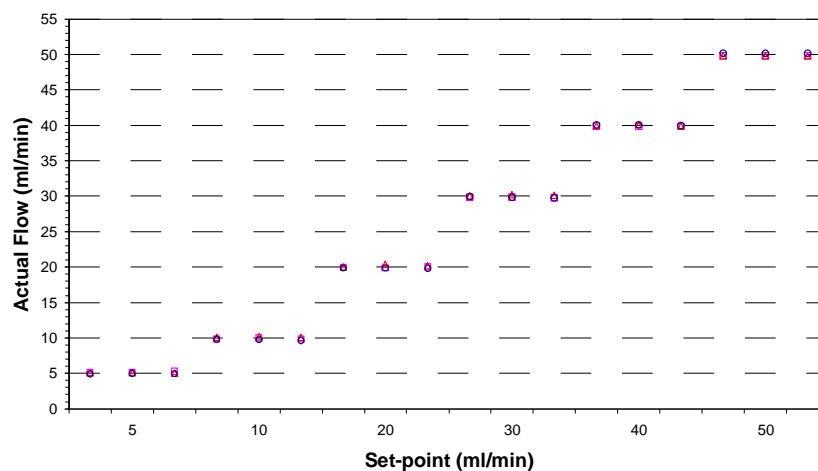
Brooks' LF200 Series liquid flow controllers exceed the needs of your most demanding chemical mechanical planarization and wet chemical processes. Proprietary conical ultrasonic sensor and signal processing algorithms provide highly accurate and repeatable flows. A straight flow path, non-intrusive ultrasonic sensor prevents detrimental impact on delivered fluids (agglomeration of slurry and breakdown of sensitive chemicals due to shear force). Brooks' unique software takes into account the dual phase nature of slurry and manages anomalies, including bubbles. Both needle and pinch valve options are available.

### Product Description

#### Accuracy

Proprietary conical ultrasonic sensor and signal processing algorithms provide 30X improvement in signal to noise ratio over the competition and enable industry leading 1% set-point accuracy. Even for ultra-low flow rates (<50 ml/min), the Brooks LF200 Series can perform with a repeatability within +/-0.5 ml/min.

Set point accuracy at 50 ml/min FS



## Features and Benefits

Top View of LF200 Series Interface Readout



### Display Button

- The display has seven display modes, which can be cycled through by pressing the DISPLAY button

### Zero Button

- The device can be zeroed by pressing the ZERO Button and following a few simple steps

### Electrical Connections

- The LF200 Series devices are available with either the pigtail (shown at right) or bulkhead configurations (shown below)



### Device Specification Labels

- The LF200 Series devices have the device specification labels located on the sides of the housing



### Process Connections

- The LF200 Series devices are available with Nippon Pillar S300 or Flaretek® connections (Consult factory for other options)

## Product Specifications

Performance	LF200/LF205	LF210/LF215
Full Scale Flow Range	50-500 ml/min (LF200)	150-500 ml/min (LF210)
	50-1000 ml/min (LF205)	150-1000 ml/min (LF215)
Control Range	5-100% F.S.	
Accuracy	+/- 1% of SP, 50 to 1000 ml/min	+/- 3% of SP, 150 to 1000 ml/min
	+/- 0.75 ml/min, 25 to <50 ml/min	+/- 5% of SP, 50 to <150 ml/min
	+/- 0.75 ml/min, from 10-50 ml/min for 50 to 100 ml/min FS	
Repeatability	+/- 0.5% of SP, 50 to 500 ml/min	+/- 1.5% of SP, 150 to 1000 ml/min
	+/- 0.5 ml/min, 25 to <50 ml/min	+/- 2.5% of SP, 50 to <150 ml/min
	+/- 0.5 ml/min, 10-50 ml/min for 50 to 100 ml/min FS	
Response Time	<3 sec; <5s for 50 ml/min FS; please consult factory for faster response time	
Shut-Off Time	<2 sec	
Zero Offset	<+/- 1% of 500 ml/min FS output	
Temperature Coefficient	0.05% of FS/Deg C	0.2% of FS/Deg C

### Ratings

Inlet Pressure	10-60 psig (LF200, LF210)
	10-45 psig (LF205, LF215)
Minimum Differential Pressure	10 psig
Process Fluid Temperature	15-65°C (LF200, LF210)*
	15-50°C (LF205, LF215)*
Ambient Temperature	20 to 45°C

### Mechanical

Valve Type	Needle (LF200, LF210), Pinch (LF205, LF215)
Wetted Materials	PTFE and PFA; Platinum-cured silicone (pinch valve only LF205/LF215)
Non-Wetted Components	Polypropylene, Viton® fluoroelastomers, PFA, CoolPoly® D1202
Process Connections	1/4", 3/8"; Flaretek® and Nippon Pillar S300

### Electrical

Electrical Connections	Pigtail, Bulkhead
Power Supply Voltage	24 Vdc, 0.5 A
Analog Input/Output	4-20 mA / 5 Vdc / 10 Vdc; Alarm relay for flow error
Digital Input/Output	RS-485 - capable interface

### Compliance

Environmental Compliance	ROHS/WEEE Compliant per 2002/95/EC
	CE Compliant per EN 61326-1 (2006) Class A

\* LFC calibrated at room temperature. Please consult factory for high temperature operation.  
S300 fitting recommended for >65°C fluid temperature.  
LF200 Series devices can withstand hot DIW flush up to 80°C.

# Electrical Interface Options

## Pigtail Interface Option:

14 Pin Analog Connector



Analog Pigtail Connector Pin Functions

Pin No.	Color	Function
1	BLK/WHT	ALARM+
2	ORG/BLK	COMMON, SETPOINT
3	BLK	POWER GROUND
4	ORG	SETPOINT, VOLTAGE
5	WHT/BLK	ALARM-
6	BLU	FLOW OUTPUT, 0-5V or 0-10V
7	BLU/WHT	COMMON, FLOW OUT (V)
8	GRN/WHT	FLOW OUTPUT, 4-20 mA
9	GRN	RE-ZERO
10	WHT	FLOW LOOP POWER, +24 Vdc
11	RED/WHT	SETPOINT 4-20mA
12	RED	+24VDC
13	GRN/BLK	ALARM 2+
14	RED/BLK	ALARM 2-

## Power/Input/Output Bulkhead Option:

Power/Input/Output Bulkhead Connection Pin Functions, Voltage Mode

4-Pin Male Connector  
(Power)



3-Pin Male Connector  
(Input)

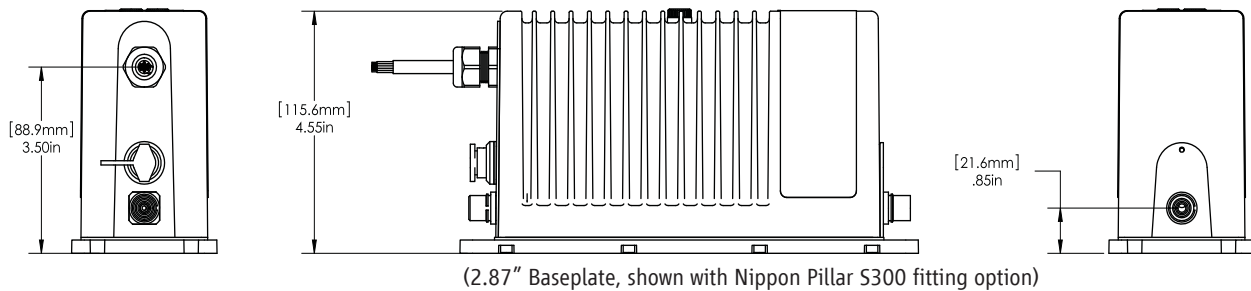
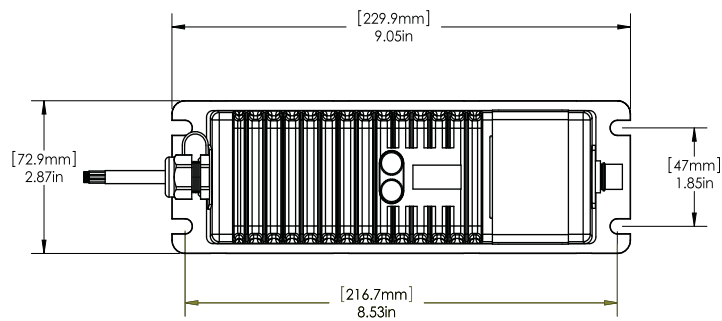
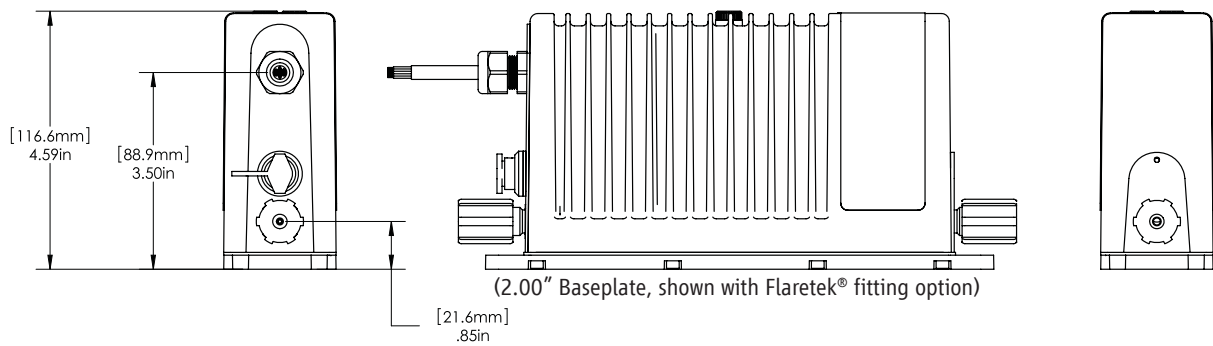
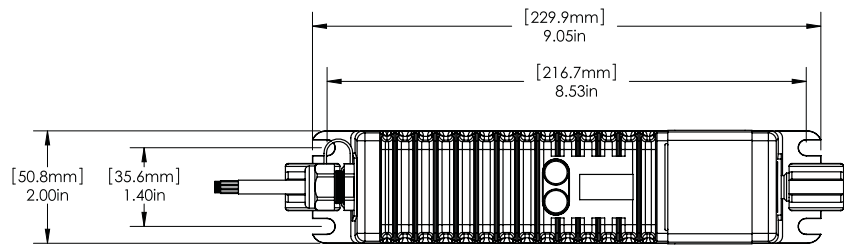
3-Pin Female Connector  
(Output)

PWR (P1): MFS 4F (MALE)		
PIN	FUNCTION	
1	N/C	
2	+24VDC	
3	N/C	
4	PWR COMM	
IN (P2): MFS 3F (MALE)		
PIN	FUNCTION	
1	N/C	
3	SETPOINT COMM	
4	SETPOINT VOLTAGE	
OUT (J3): MFKS 3F (FEM)		
PIN	FUNCTION	
1	N/C	
3	FLOW COMM	
4	FLOW OUT VOLTAGE	

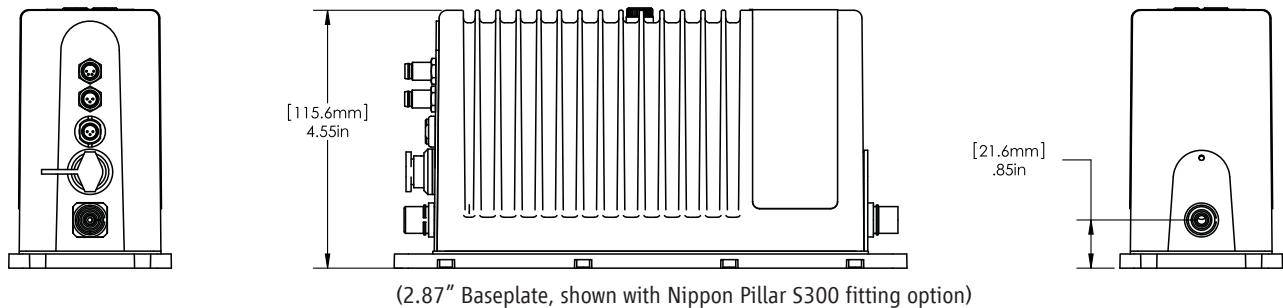
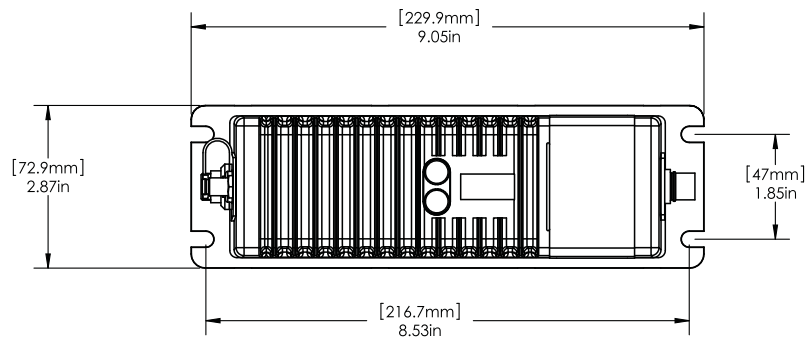
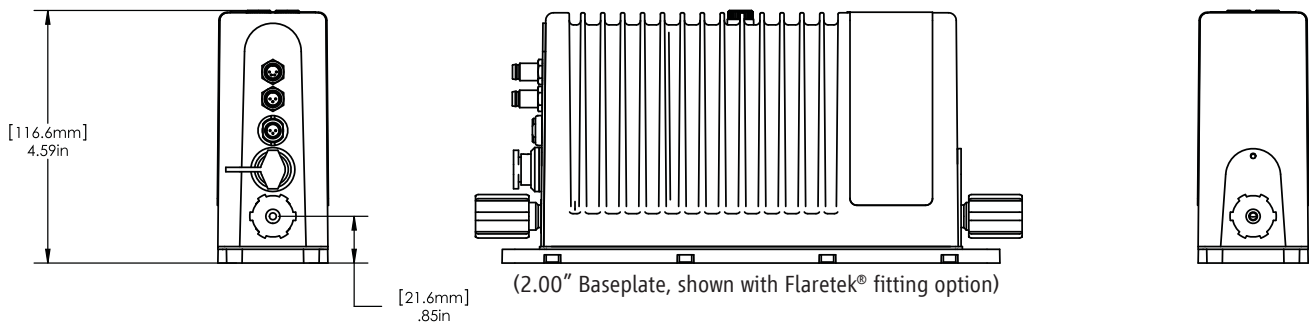
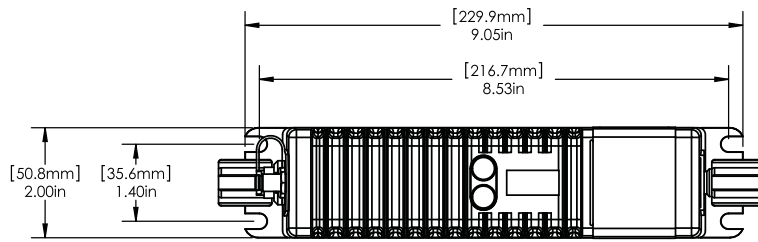
Power/Input/Output Bulkhead Connection Pin Functions, Current Mode

PWR (P1): MFS 4F (MALE)		
PIN	FUNCTION	
1	ALARM+	
2	+24VDC	
3	ALARM-	
4	PWR COMM	
IN (P2): MFS 3F (MALE)		
PIN	FUNCTION	
1	RE-ZERO	
3	SETPOINT COMM	
4	SETPOINT CURRENT	
OUT (J3): MFKS 3F (FEM)		
PIN	FUNCTION	
1	FLOW LOOP PWR 24V	
3	FLOW COMM	
4	FLOW OUT CURRENT	

# Product Dimensions



## Product Dimensions



## Model Code

Code Description	Code Option	Option Description
I. Model and Valve Type	LF200	1% accuracy, needle valve, full scale flow rate 50-500 ml/min.
	LF205	1% accuracy, pinch valve, full scale flow rate 50-1000 ml/min.
	LF210	3% accuracy, needle valve, full scale flow rate 150-500 ml/min.
	LF215	3% accuracy, pinch valve, full scale flow rate 150-1000 ml/min.
II. I/O Configuration	0	4-20 mA input / output
	1	0-5 Vdc input / output
	2	0-10 Vdc input / output
	3	0-5 Vdc input / 4-20 mA output
	4	0-10 Vdc input / 4-20 mA output
	5	4-20 mA input / 0-5 Vdc output
	6	4-20 mA input / 0-10 Vdc output
III. Form Factor	2	2" wide baseplate
	3	2.87" wide baseplate
IV. Process Fitting Configuration	1	1/4" flare fitting
	2	3/8" flare fitting
	4	1/4" Nippon Pillar S300 fitting
	5	3/8" Nippon Pillar S300 fitting
V. Full Scale Flow Rate in ml/min.	#####	F.S. flow value in ml/min (example: 500ml/min = 00500); only increments of 50ml/min allowed
VI. Min Controllable Flow Rate in ml/min.	####	Minimum controllable flow in ml/min (example: 50 ml/min = 0050)
VII. Electrical Connection Configuration	0	Pigtail
	2	Power, input and output Bulkhead connectors, voltage mode
	8	Power, input and output Bulkhead connectors, current mode, with alarm and re-zero
VIII. Electrical Cable Length Option	0	No cable length option (not valid for connector option 0)
	1	4.0m pigtail cable (valid for connector option 0 only)
	2	6.3m pigtail cable (valid for connector option 0 only)
	3	1.2m pigtail cable (valid for connector option 0 only)
	4	10.0 pigtail cable (valid for connector option 0 only)
IX. Firmware Option	XXXX	Latest released firmware
	###	Specific firmware revision
X. Special Option	XXXX	No special options
	0001	Normally closed alarm relay

### Sample Model Codes

I	II	III	IV	V	VI	VII	VIII	IX	X
LF200	0	2	1	00500	0050	0	1	XXXX	XXXX
LF215	2	3	5	01000	0100	2	0	2.06	0001

## Brooks Service and Support

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit [www.BrooksInstrument.com](http://www.BrooksInstrument.com) to locate the service location nearest to you.

### START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

### CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users, and maintenance persons.

Please contact your nearest sales representative for more details.

### HELP DESK

In case you need technical assistance:

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Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

DS-US-LF200 Series-eng (0111)

### TRADEMARKS

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CoolPoly ..... Cool Polymers, Inc.  
Flaretek ..... Entegris, Inc.  
Viton ..... DuPont Performance Elastomers



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