

SFS500 digital flow meter

1. Product description

The SFS500 is a bidirectional digital flow meter capable of measuring extremely wide range of flow rates characterized by high accuracy and low pressure drop. The SFS500 can has micro-USB or JST connectors for both the UART data communication and for the 5 Volt power supply. These features make the SFS500 perfectly

suitable for laboratory, medical or even industrial flow measurements.

The flow meters are manufactured by additive manufacturing technology which means that they can be adapted to special needs in terms of material selection, measured flow limits and installation geometry.

SFS500 features:

- 0.5-500 slm flow rate
- 3% accuracy of reading
- Low pressure drop
- Micro USB/JST connector
- Optional display
- 5v operating voltage
- UART communication
- Additive manufacturing
- Individually calibrated

Application:

- Laboratory
- Medical
- Industrial



2. Measurement specifications

Parameter	Value	Unit
Measurement range	-500...+500	slm
Accuracy¹	± 3	%
	±0.5	slm
Resolution	0.01	slm
Pressure drop	@200 slm	<600 Pa
	@500 slm	<3500 Pa
Calibrated media	Air ²	
Max overpressure (gauge)	0.5	bar
Start-up time	<500	ms
Sampling rate	20-500	Hz

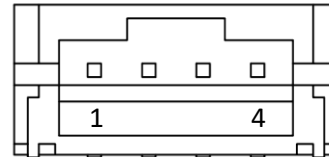
¹ Whichever is greater

² Calibrated at room conditions

3. Electrical specifications

Parameter	Value	Unit
Supply voltage	3.3-5.5	V
Average Current	40	mA
Max Current	60	mA
UART Voltage Level	3.3-5	V

Pin	Function
1	GND
2	RX
3	TX
4	VDD



4. Digital communication

The device uses UART to communicate.

Parameter	Value	Unit
Baud Rate	115200	Bit/s
Data Bits	8	
Parity	None	
Stop Bits	1	
Hardware Flow Control	None	

UART Command Protocol

All communications are in ASCII, commands must be terminated with a carriage return and line feed, hex 0x0D 0x0A. In this document, this is shown as '\r\n'. UART commands that take a parameter always have a space between the letter and the parameter. The sensor will respond with a '?' if a command is not recognized. In the following sections all arbitrary numeric digits (0-9) are represented by "#".

Available Commands:

Name	Command	Argument	Response	Example
Frequency	F #\r\n	Frequency ID	F #\r\n	F 2\r\n
Enable	E\r\n	-	E\r\n	E\r\n
Disable	D\r\n	-	D\r\n	D\r\n

Frequency ID Lookup Table:

ID	Frequency
0	20Hz
1	50Hz
2	100Hz
3	200Hz
4	500Hz

Averaging

The sensor internally works at 2000Hz, all the internal measurements are averaged until the next output. For example, at 100Hz output frequency the last 20 values are averaged and sent out as the current flow rate. Because of the above described behavior the number of values averaged changes depending of the output frequency.

UART Operation

On startup the sensor output is enabled, the default frequency is 100Hz and the measurement is reported as:

```
V &###.##\r\n
```

Where & is the sign (if the value is more than or equal to 0 it is "+", if its less than 0 it is "-") and ###.## is the reported flowrate in slm.

Examples:

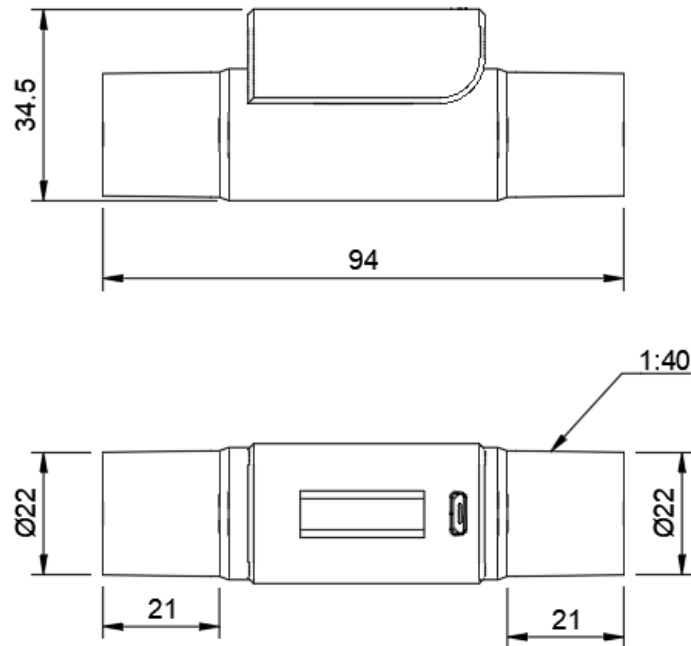
0 l/min:	V +000.00\r\n
-123.45 l/min	V -123.45\r\n
+678.9 l/min	V +678.90\r\n

5. Calibration

Each flow meter calibrated individually at room conditions with ideal inlet and outlet. Any disturbance (eg. elbows, valves) near the inlet may affect the measurement results, therefore a straight pipe of at least 20 cm before the flow meter is recommended. The calibration datasheet attached for the flow meter contains the specific values of air (temperature, humidity, barometric pressure) and the calibrated flow rates³.

³ Custom calibration points also available.

6. Physical dimensions



7. Application notes

Do not use this product as safety or emergency stop devices or in any other application where failure of the product could result in personal injury (including death).