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# Flow Rate Sensor FRS

Optimises flow rate measurement for compendial-compliant testing

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The Flow Rate Sensor FRS, a dedicated flow sensor, shown below as part of an inhaler test system set-up with the Inhaler Testing Workstation ITW, Critical Flow Controller TPK 100i and Low Capacity Vacuum Pump LCP6.

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The integrity of delivered dose uniformity (DDU) and aerodynamic particle size distribution (APSD) data can be compromised if the inlet flow rate (the flow rate at the entrance to the DUSA or induction port) used during testing is inaccurate/inconsistent.

Designed and manufactured using Copley expertise, the Flow Rate Sensor FRS provides consistent and accurate inlet flow rate measurement for delivered dose uniformity (DDU) testing and aerodynamic particle size distribution (APSD) measurement. The FRS is tailor-made for use with our range of Flow Controllers to determine and control test flow rate in an optimised orally inhaled and nasal drug product (OINDP) testing system.



## FRS: Flow Controller Connectivity



The Flow Rate Sensor FRS connects directly to a Breath Actuation Controller BAC 100i or Critical Flow Controller TPK 100i via an RS-232 connection. The inlet flow rate is displayed clearly on the flow controller screen.

All flow rate data can also be conveniently output and reported for auditing purposes.

🔶 Critical Flow Controller TPK 100i

### **Technical Specifications**

Operation principle	Thermal (MEMS)
Standard flow rate range	- 200 to + 200 StdL/min
Standard flow rate resolution	0.1 StdL/min
Standard flow rate accuracy	Typically +/-1.75 % of reading Maximum +/- 2.5 % of reading or ± 0.2 StdL/min, whichever is greater
Volumetric flow rate range	- 200 to + 200 L/min
Volumetric flow rate resolution	0.1 L/min
Volumetric flow rate accuracy	Typically +/- 2.25 % of reading Maximum +/- 2.75 % of reading or ± 0.2 L/min, whichever is greater
Flow resistance	< 4 kPa at 200 StdL/min
Volumetric flow calculation	Yes
Inlet filter	Required (one supplied, replacements available)
Connectivity	Interface to external devices, such as: - Breath Actuation Controller BAC 100i - Critical Flow Controller TPK 100i - PC
Reporting	Flow rate and calibration data via RS-232
Calibrations	Factory calibrations only
Power	5V DC, mains power supply provided with the FRS

Application	
Pharmacopoeial	Yes
IVIVC	Yes
Inlet flow	Yes
In-line flow	Yes

#### **Qualification & Maintenance**

• Calibration certificate of compliance to Ph. Eur./USP provided as standard.

### Flow Rate Sensor FRS

Cat. No.	Description
8100	Flow Rate Sensor Model FRS
8105	Inline Adapter Kit for FRS
8139	ITW Holder for FRS
8106	Pack of 12 Inlet Filters for FRS
8110	Re-calibration Certificate for FRS
5239	FRS Flow Meter Adapter for Induction
	Port, DUSA, WSC2, Filter Holder and Child
	Alberta Idealised Throat
8517	FRS Flow Meter Adapter for Adult Alberta
	Idealised Throat
8920	FRS Flow Meter Adapter for Glass Twin
	Impinger and FP Induction Port

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The FRS is compatible with the following versions of Breath Actuation Controller and Critical Flow Controller: BAC 100i/BAC 100i-R, firmware v1.2.0 and above. TPK 100i/TPK 100i-R, firmware v1.2.0 and above.

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