

Perma Pure Gas Drying Solutions

Humidity Exchangers (FC) Series

Application

The FC Series humidifiers from Perma Pure are designed for applications requiring precise moisture control in gas streams. Typical uses include calibration of gas analyzers, fuel cell research, materials testing, and environmental monitoring. Their ability to deliver gas with controlled and stable humidity makes them ideal for lab environments and test setups. They also ensure consistent and reproducible results in automated measurement systems.

Technology

The FC Series uses selective permeation of water vapor through Nafion™ membranes to humidify gases actively. These membranes allow only water vapor to pass through while blocking all other gas components. Depending on the configuration, humidification is achieved via liquid water contact or steam in a counterflow.

This technology ensures highly accurate moisture control without generating aerosols.

Functions

The FC humidifiers deliver constant relative humidity over a wide range of temperatures and flow rates. They support both continuous operation and rapid humidity changes, for example, to simulate real conditions in fuel cells or emissions testing. Thanks to their modular design, various sizes and performance levels are available. This allows precise adaptation to the specific application.



- ✓ Active gas humidification with Nafion™
- ✓ No aerosol formation
- ✓ Ideal for labs, research, and calibration
- ✓ Precise relative humidity control
- ✓ Suitable for fuel cell and sensor testing
- ✓ Operates with water or steam saturation
- ✓ Compact, modular design
- ✓ Real-time, reproducible results
- ✓ Long service life, low maintenance
- ✓ Custom configurations available

Technical Data

Model					
Type		FC100	FC125	FC150	FC200
Number of Nafion™ Tubes		80	240	480	780
Operating					
Max. Operating Pressure		172 kPa/ 25 PSIG			207 kPa/ 30 PSIG
Max. Differential Pressure		35 kPa / 5 psi			
Flow Rate Recommendation					
Gas-to-Gas ¹	alpm	4-16	15-75	35-150	50-300
Water-to-Gas ²	slpm	< 75	< 150	200-300	300-450
Design Data					
Housing / Shell Material		<ul style="list-style-type: none">▪ Kynar / Kynar▪ Kynar / Stainless▪ Stainless / Stainless	<ul style="list-style-type: none">▪ Molded Polypropylene	<ul style="list-style-type: none">▪ Machined Polypropylene	<ul style="list-style-type: none">▪ Molded Polypropylene
Humidifier Active Length		<ul style="list-style-type: none">▪ 5" (12 cm) (FC125 Only)▪ 6" (15 cm) (FC100 Only)▪ 7" (18 cm)▪ 15" (38 cm)			
Available Ports ³		1/4" FNPT	1/4" FNPT	3/4" FNPT	1" FNPT
Available Port Configurations		<ul style="list-style-type: none">▪ Ports on opposite sides of shell▪ Ports on same side of shell (in line)▪ Ports rotated 90° clockwise▪ Ports rotated 90° counter-clockwise			

Model						
Type		FC300	FC300 HP	FC400	FC400 HP	FC600
Number of Nafion™ Tubes		1660		2500		7000
Operating						
Max. Operating Pressure		69 kPa/10 PSIG	310 kPa/45 PSIG	69 kPa/10 PSIG	310 kPa/45 PSIG	35 kPa/5 PSIG
Max. Differential Pressure		35 kPa / 5 psi				
Flow Rate Recommendation						
Gas-to-Gas¹	alpm	120-625		200-1000		500-2500
Water-to-Gas²	slpm	450-2000		1000-7000		1500 +
Design Data						
Housing / Shell Material		▪ Molded Noryl	▪ High Pressure PPO (10" FC300 and FC 400 only)	▪ Molded Noryl	▪ High Pressure PPO (10" FC300 and FC 400 only)	▪ Machined Polypropylene
Humidifier Active Length		▪ 5" (12 cm) (FC125 Only) ▪ 6" (15 cm) (FC100 Only) ▪ 7" (18 cm) ▪ 15" (38 cm)				
Available Ports³		1-1/2" FNPT		2" FNPT		
Available Port Configurations		▪ Ports on opposite sides of shell ▪ Ports on same side of shell (in line) ▪ Ports rotated 90° clockwise ▪ Ports rotated 90° counter-clockwise				

Notes:

- 1 Inch = 2,54 cm
- 1 bar = 14,504 psi

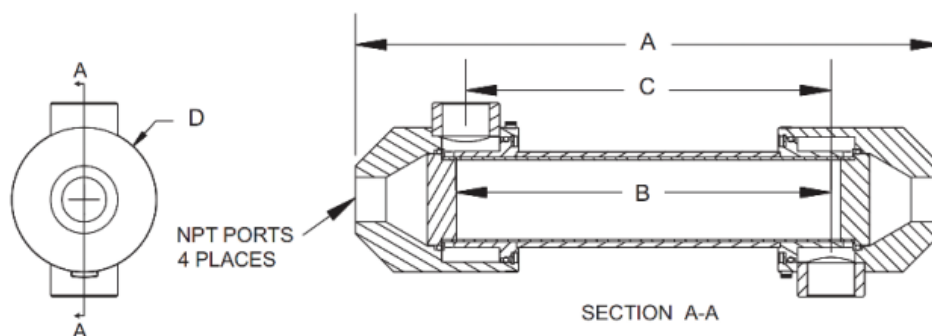
¹Flow rate recommendations based upon an approach temperature between 4-6 degrees. The optimal dry air inlet temperature range is between 35 and 55°C.

²Water-to-gas flow rate is based upon a 80-85%RH. See actual performance curves for specific flow rates. Note that the gas pressure must be higher than the water pressure

³When ordering, specify port orientation as same side or 180 degree rotation

Technical Data

Depiction



Model	A		B		C		D	Port Sizes	Operating Fluid Pressure Range	
	inches	mm	inches	mm	inches	mm	inches	inches	kPa	psig
FC100-80	8.8	223	?	?	5.4	135	1.3	1/4 air inlet 1/8 wet stream	0 to 35 @ 80°C (176°F)	0 to 5 @ 80°C (176°F)
FC125-240-5MP	7.9	200.7	5	127	4.6	116.8	2.5	1/2	0 to 172 @ 80°C (176°F)	0 to 25 @ 80°C (176°F)
FC125-240-7MP	9.9	251.5	7	177.8	6.6	167.6				
FC125-240-10MP	12.9	327.7	10	254	9.6	243.8				
FC150-480-7PP	11.5	292.1	7	177.8	6.75	171.5	3.5	3/4	0 to 172 @ 80°C (176°F)	0 to 25 @ 80°C (176°F)
FC150-480-10PP	14.5	368.3	10	254	9.75	247.7				
FC150-480-15PP	19.5	495.3	15	381	14.75	374.7				
FC200-780-7MP	11.1	281.9	7	177.8	6.16	156.5	3.52	?	?	?
FC200-780-10MP	14.1	358.1	10	254	7.16	181.9				
FC300-1660-7LP	12.1	307.3	7	177.8	5.6	142.2				
FC300-1660-10LP/HP	15.1	383.5	10	254	8.6	218.4	5.2	1 1/2	?	?
FC300-1660-15LP	20.1	510.5	15	381	13.6	345.4				
FC400-2500-7LP/HP	12.8	325.1	7	177.8	5.0	127				
FC400-2500-10LP	15.8	401.3	10	254	8.0	203.2	6.11	1 (2 optional)	?	?
FC600-7000-7PP	14.75	374.7	7	177.8	5.75	146.1				
FC600-7000-10PP	17.75	450.9	10	254	8.75	222.3				
FC600-7000-15PP	22.75	577.9	15	381	13.75	349.3	8.5	2	0 to 35 @ 80°C (176°F)	0 to 5 @ 80°C (176°F)