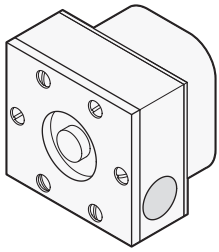
6000 Series

Pulse Flow Meters

This document describes the basic steps necessary to install and make operational your 6000 Series flow meter.

For complete installation and operating instructions, including important safety information, please refer to the 6000 Series Technical Reference Manual, available on the Proteus Industries website at **www.proteusind.com/6000**.



Model Numbers, Flow Ranges, and Connections

MODEL NUMBER			FLOW RANGE*		CONNECTIONS
POLYPROPYLENE	BRASS	STAINLESS STEEL	LPM	GPM	
06004PN06	06004BN06	06004SN06	0.23–2.3	0.06–0.6	1/4" FNPT
06004PN1	06004BN1	06004SN1	0.4–5.3	0.1–1.4	1/4" FNPT
06004PN2	06004BN2	06004SN2	0.95–9.5	0.25–2.5	1/4" FNPT
		06006SA2	0.95–9.5	0.25–2.5	9/16-18 SAE
06004PN4	06004BN4	06004SN4	1.1–17	0.3–4.5	1/4" FNPT
		06006SA4	1.1–17	0.3–4.5	9/16-18 SAE
	06006BN9	06006SN9	2.3–34	0.6–9.0	3/8" FNPT
06006PN10			2.3–38	0.6–10	3/8" FNPT
		06008SA10	3.0–38	0.8–10	3/4-16 SAE
06008PN14	06008BN14	06008SN14	5.3–53	1.4–14	1/2" FNPT
		06012SA16	4.5–61	1.2–16	1 1/16-12 SAE
	06012BN16	06012SN16	4.5–61	1.2–16	3/4" FNPT
06012PN19			5.7–72	1.5–19	3/4" FNPT
	06012BN40	06012SN40	11–151	3.0–40	3/4" FNPT
		06016SA40	15–151	4.0–40	1 5/16-12 SAE
	06016BN40	06016SN40	15–151	4.0–40	1" FNPT
06016PN50			15–189	4.0–50	1" FNPT
	06016BN60	06016SN60	19–227	5.0–60	1" FNPT

*Listed flow ranges are for water at 20 °C / 68 °F.

Temperature and Pressure Limits

FLOW BODY MATERIAL	FACEPLATE MATERIAL	TEMPERATURE LIMIT*		OPERATING PRESSURE LIMIT		BURST PRESSURE (5:1)	
		°C	°F	kPa	psi	kPa	psi
Polypropylene	Clear Polysulfone	70	158	517	75	2586	375
Brass	Clear Polysulfone	100	212	689	100	3447	500
	Brass	110	230	1724	250	8618	1250
Stainless Steel	Clear Polysulfone	100	212	689	100	3447	500
	Stainless Steel	110	230	1724	250	8618	1250

*The fluid temperature that can be sustained with the unit cooled by ambient air up to 30 °C / 86 °F.

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1. Plumbing Connections

The flow response of a 6000 Series flow meter, and thus its accuracy, may be affected by the inner diameter (ID) of the incoming pipe as well as any devices attached to the inlet connection and any nearby upstream devices.

NOTE

The inner diameter (ID) of the inlet pipe or the through-hole of a tube connector, hose barb, or other connecting element must be greater than or equal to the ID of the flow meter.

The table below shows the minimum pipe/connection IDs necessary for standard 6000 Series products. If the ID of your pipe or fitting is less than the orifice ID of your instrument, the flow response values may not be correct.

NOTE

Correct flow response characteristics can be developed to allow 6000 Series instruments to be used with connecting elements with IDs smaller than those shown or to be used with elbows attached directly to the inlet.

For more information, please contact Proteus Applications Support at tech@proteusind.com or (650) 964-4163.

MODEL NUMBER			MINIMUM I.D. OF INLET CONNECTION		MINIMUM STRAIGHT RUN OF PIPE AT INLET	
POLYPRO.	BRASS	STEEL				
06004PN06	06004BN06	06004SN06	2.362 mm	0.093 in	23.62 mm	0.93 in
06004PN1	06004BN1	06004SN1	3.175 mm	0.125 in	31.75 mm	1.25 in
06004PN2	06004BN2	06004SN2	4.775 mm	0.188 in	47.75 mm	1.88 in
		06006SA2	4.775 mm	0.188 in	47.75 mm	1.88 in
06004PN4	06004BN4	06004SN4	6.858 mm	0.270 in	68.58 mm	2.70 in
		06006SA4	6.858 mm	0.270 in	68.58 mm	2.70 in
	06006BN9	06006SN9	9.398 mm	0.370 in	93.98 mm	3.70 in
06006PN10			9.398 mm	0.370 in	93.98 mm	3.70 in
		06008SA10	10.16 mm	0.400 in	101.6 mm	4.00 in
06008PN14	06008BN14	06008SN14	11.68 mm	0.460 in	116.8 mm	4.60 in
		06012SA16	15.49 mm	0.610 in	154.9 mm	6.10 in
	06012BN16	06012SN16	15.49 mm	0.610 in	154.9 mm	6.10 in
06012PN19			15.49 mm	0.610 in	154.9 mm	6.10 in
	06012BN40	06012SN40	20.32 mm	0.800 in	203.2 mm	8.00 in
		06016SA40	22.10 mm	0.870 in	221.0 mm	8.70 in
	06016BN40	06016SN40	22.10 mm	0.870 in	221.0 mm	8.70 in
06016PN50			22.10 mm	0.870 in	221.0 mm	8.70 in
	06016BN60	06016SN60	25.40 mm	1.000 in	254.0 mm	10.0 in

To ensure optimum performance, a run of straight pipe with a length of at least 10 times the pipe ID should be present between the instrument and any upstream devices. Refer to the table above to identify the minimum straight-pipe length required for your instrument.

NOTE

Instruments with upper flow limits below 7.6 LPM / 2.0 GPM (model nos. ending in N06 or N01) are sensitive to flow direction. Liquid should only be introduced from the orifice labeled "IN".

1. Plumbing Connections (Continued)

a. Identify the connection type and size of your 6000 Series instrument from the table on the first page of this document.

b. Make connections to pipe or other fittings as required. It is recommended that you use a non-hardening pipe sealant, such as Teflon® (PTFE) tape or paste, on pipe threads to create leak-tight and lubricated junctions at all connections.

c. Slowly turn on the liquid flow and check for leaks at the connections. Tighten connections as required to eliminate leaks.

d. Eliminate entrained air from the instrument flow cavity.

CAUTION!	
⚠	» **DO NOT install metal fittings into units with polypropylene bodies.** » **DO NOT use hardening pipe sealants on instruments fitted with a polysulfone faceplate. Some organic solvents will crack the faceplate.** » **DO NOT exceed the maximum flow, temperature, or pressure limits of your instrument.**

2. Electrical Connections

The table below shows the wiring assignments for standard 6000 Series products.

WIRE COLOR	FUNCTION
Red	Supply voltage (+5–24 VDC)
Black	Supply common (0 VDC)
Green	Current-sinking (NPN) output
White	Current-sourcing (PNP) output

a. Locate the 5–24 DC power source and turn it OFF.

b. Connect the **BLACK** wire to the negative (-DC) of the power source.

c. If connecting to an input such as an opto-isolator or current loop that requires a current source, connect the input to the **WHITE** wire.

   For all other applications, connect the input to the **GREEN** wire.

d. Connect the **RED** wire to the positive (+DC) of the power source.

e. Confirm that all wire connections are secure.

f. Turn the DC power source ON.

g. If necessary, adjust the DC voltage to between 5 and 24 VDC.

3. Flow Measurement

The pulse output of a 6000 Series flow meter is directly proportional to the volumetric flow rate of the liquid passing through the device. The output is approximately linear and scalable within the meter's flow range; however, the flow response curve does NOT pass through zero.

NOTE

6000 Series flow meters are NOT calibrated devices. There is minor variation in the flow response from unit to unit.

The table below lists the typical output frequencies at the lower and upper flow limits of standard 6000 Series products.

MODEL NUMBER			LOWER FLOW LIMIT			UPPER FLOW LIMIT		
POLYPRO.	BRASS	STEEL	LPM	GPM	Hz	LPM	GPM	Hz
06004PN06	06004BN06	06004SN06	0.23	0.06	8	2.3	0.6	151
	06004BN1	06004SN1	0.4	0.1	11	5.3	1.4	155
06004PN1			0.4	0.1	20	5.3	1.4	242
	06004BN2	06004SN2	0.95	0.25	15	9.5	2.5	229
06004PN2			0.95	0.25	20	9.5	2.5	240
		06006SA2	0.95	0.25	14	9.5	2.5	220
	06004BN4	06004SN4	1.1	0.3	11	17	4.5	216
06004PN4			1.1	0.3	20	17	4.5	240
		06006SA4	1.1	0.3	11	17	4.5	216
	06006BN9	06006SN9	2.3	0.6	11	34	9.0	227
06006PN10			2.3	0.6	20	38	10	240
		06008SA10	3.0	0.8	20	38	10	240
	06008BN14	06008SN14	5.3	1.4	13	53	14	250
06008PN14			5.3	1.4	20	53	14	240
		06012SA16	4.5	1.2	12	61	16	189
	06012BN16	06012SN16	4.5	1.2	12	61	16	189
06012PN19			5.7	1.5	20	72	19	240
	06012BN40	06012SN40	11	3.0	15	151	40	229
		06016SA40	15	4.0	15	151	40	188
	06016BN40	06016SN40	15	4.0	15	151	40	188
06016PN50			15	4.0	20	189	50	240
	06016BN60	06016SN60	19	5.0	20	227	60	240

NOTE

The flow ranges for each model are valid for water at 20 °C / 68 °F. The use of a different fluid type and/or temperature can alter the flow response of the sensor.

Specialized flow characterization of the flow response of an individual flow meter is available for an additional charge. Please contact Proteus Applications Support at tech@proteusind.com or (650) 964-4163 for more information.

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