

# CDI 6000 Series PRELIMINARY

## FLOWMETERS FOR COMPRESSED-AIR AND NITROGEN SYSTEMS

- Easy to install
- Housing and display rotate to suit piping orientation
- IP-66 rating; suitable for wet locations
- Milliamp and pulse outputs
- No calibration or setup required
- Complete flowmeter in one package
- Optional RS-485 output for networking



The flowmeter clamps onto a pipe, with two flow-sensing probes projecting into the pipe through 3/16-in. drilled holes. It seals directly to the pipe; no cutting or welding is required for installation. Because each flowmeter is made and calibrated for a specific size of pipe, the display indicates flow directly, with no setup or adjustment.

The meter measures flow by maintaining one probe warmer than the other. It calculates the mass velocity from the amount of heat required, and then calculates the flow on the basis of pipe area. The flow rate, in scfm, is shown on a large, four-digit display; a 4-20 mA output and a pulse output permit remote display, totalizing and data collection.

Table 1: AVAILABLE SIZES			
Nom Size	Calibrated Range (scfm) <sup>a</sup>	Model No. for Sch 40 Steel	Model No. for Type L Copper
½ in. (DN15)	1 - 90	6200-05S	..
¾ in. (DN20)	1 - 120	6200-07S	6200-07C
1 in. (DN25)	1 - 160	6200-10S	6200-10C
1-¼ in. (DN32)	2 - 150	6200-12S	6200-12C
1-½ in. (DN40)	2 - 200	6200-15S	6200-15C
25 mm	1 - 160	6200-25M for 22mm x 25 mm Aluminum	
40 mm	2 - 200	6200-40M for 36mm x 40 mm Aluminum	
2 in. (DN50)	3 - 350	6400-20S	6400-20C
2.5 in. (DN65)	5 - 500	6400-25S	6400-25C
3 in. (DN80)	7 - 700	6400-30S	6400-30C
4 in. (DN100)	15 - 1500	6400-40S	6400-40C
5 in. (DN125)	20 - 2500	6400-50S	-
6 in. (DN150)	30 - 3000	6400-60S	-
63 mm	5 - 500	6400-63M for 59mm x 63mm Aluminum	
76 mm	7 - 700	6400-76M for 72mm x 76 mm Aluminum	
101 mm	15 - 1500	6400-101M for 97mm x 101 mm Aluminum	

(a) Accuracy will be reduced when flow is outside of specified range. Milliamp scale ranges differ.

## SPECIFICATIONS

### Accuracy:

5 percent of reading plus one percent of full scale at air temperatures between 40 and 120 degrees Fahrenheit

### Fluids:

Compressed air and nitrogen

### Operating pressure:

200 psig maximum on Sch. 40 steel and Type L copper; consult CDI for other materials.

### Input power:

250 mA at 20 to 28 Vdc

### Output resistance:

400 Ohms max.

### Materials exposed to measured fluid:

Stainless steel, gold, thermal epoxy and Viton (seal)

### Ring material:

Aluminum

### Display:

Four-digit LED display

### Response time:

One second to 63 percent of final value

## OPTIONS AND ACCESSORIES

See separate data sheets for:

Drill Guides

High Pressure Applications

Serial Communications

Summing and Averaging Remote Displays

US Patent 6,802,217

## APPLICATION

The meter is designed for use with compressed air and nitrogen. If the meter will be used at pressures below 15 psig, consult CDI about velocity limitations. The air must be free of oil, dirt that could foul the probes, and suspended water droplets. In a compressed-air application, the meter should be installed downstream of a dryer. Each meter is calibrated for a specific size and type of pipe. If a meter will be used in a type or size of pipe that is not listed, consult CDI about a special calibration.

The meter is not to be used in safety or life-support applications. It should not be used as a sole means of determining required capacity of air compressors and related equipment. The meter must not be used in hazardous locations.

## INSTALLATION

Drilling the holes to install the meter will release some metal shavings into the pipe. When planning the installation, make sure that all downstream equipment is protected by filters, or take other precautions to ensure that shavings do not reach critical equipment or get blown out in a way that could cause injury.

For best accuracy, the meter should be installed with at least 20 diameters of straight pipe upstream and three diameters downstream. Avoid installing the meter downstream of any item that could distort or concentrate the flow, such as a partially-closed valve, a regulator, a filter or moisture separator, two closely-spaced elbows in different planes, a long-radius elbow or a curved hose. Allow at least 30 diameters of straight pipe between any such item and the meter. Select a location that meets these requirements and also provides good visibility from the plant floor. If this is not possible, consider using the remote display discussed below.

To install the meter, first shut off the supply of air to the pipe where the meter will be mounted and allow the pressure to bleed down. Clamp the drill guide firmly to the pipe, orienting it for best visibility of the meter. Drill the two holes and remove any resulting burrs from the outside of the pipe. Make sure the outside surface of the pipe is clean and smooth.

Once the pipe is prepared, remove the back half (or halves) of the ring(s), insert the probes into the holes in the pipe with the flow arrow pointing in the proper direction, and re-assemble the rings. Tighten the cap screws firmly and evenly so that the gaps between the halves of the rings are about equal on both sides of the pipe. If necessary, to orient the cable connections or to make the display horizontal, rotate the meter housing relative to the base by removing the cover, removing the four mounting screws, rotating the housing as required and re-assembling. Do not rotate the housing more than 180 degrees. If the display is upside down, remove the cover of the meter, rotate it 180 degrees, and re-install it.

## MILLIAMP AND PULSE OUTPUTS

The meter has an isolated, unpowered, milliamp output. The meter is shipped with a jumper in place to power the output from the instrument's dc supply. With the jumper in place, the meter will source a dc signal. The pulse output is an open collector, referenced to the instrument ground. For applications in which a contact-closure output is required, the isolated pulse output (CDI 5200-IPO) should be used. It installs inside the meter.

## RANGES AND SCALING

Displays are available in scfm, Nm<sup>3</sup>/min and Nm<sup>3</sup>/hr. The published scale range of each meter is its calibrated range; the meter will continue to function, at reduced accuracy, at higher and lower flow rates. The milliamp output increases linearly from four milliamps at zero flow to 20 milliamps at a pre-determined flow rate that is displayed for a few seconds as the meter starts up. The pulse output produces five pulses for each standard cubic foot of air in all meter sizes.

## CALIBRATION ADJUSTMENTS

Table 1 indicates the stock ring sizes and it indicates the types of pipe on which meters are normally calibrated. Calibrations are also performed on some thinner-walled pipes in the same outside diameters. For other pipe types and wall thicknesses, an adjustment will be made to the calibration for small differences in inside area. This is commonly done for British or DN pipe sizes.

Meter output varies by about two percent per 100 psi. Standard calibrations are for 100 psig; adjustments can be provided for applications at substantially higher or lower pressures; they are not needed for most compressed-air applications.

## POWER SUPPLY

The meter requires 24 Volt +/- 15 percent dc power and it draws approximately 250 mA. Surge suppression is provided to protect the meter against spikes that may occur in industrial dc power systems.

## LIMITED WARRANTY

CDI warrants solely to the buyer that Model 6200 and 6400 Flowmeters shall be free from defects in materials and workmanship, when given normal, proper and intended usage, for three years from the date of purchase. During the warranty period, CDI will repair or replace (at its option) any defective product at no cost to the buyer. The foregoing warranty is in lieu of any other warranty, express or implied, written or oral (including any warranty of merchantability or fitness for a particular purpose). CDI's liability arising out of the manufacture, sale or supplying of the flowmeter, whether based on warranty, contract, tort or otherwise, shall not exceed the actual purchase price paid by the buyer, and in no event shall CDI be liable to anyone for special, incidental or consequential damages.