Blancett®
Turbine Flow Meters

Signal Conditioner

Intelligent Frequency Converter

Badger Meter

SGN-UM-00283-EN-02 (April 2014)

User Manual

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INTRODUCTION

The Intelligent Frequency Converter is a state-of-the-art digital signal processing device designed to provide exceptional accuracy at a very affordable price. Designed for use with B220-954 turbine meters, the sensor measures and calculates the flow rate to produce an analog current or voltage output representative of the meter's flow rate.

The Intelligent Frequency Converter is offered in two versions:

- The F to I converter provides a 4…20 mA output in a two wire, loop powered setup.
- The F to V converter offers a 0…5V DC output for those applications where a voltage output is preferred.

SPECIFICATIONS

	Frequency to Current (F to I) B220-873	**Frequency to Voltage (F to V) B220-874**
Power	Loop powered, 6 V insertion loss maximum 10… 30V DC supply range	10…26V DC supply range
Inputs		
Source	Magnetic Pickup	Magnetic Pickup
Frequency	0…3500 Hz	0…3500 Hz
Trigger Sensitivity	30 mV_{p-p}	30 mV_{p-p}
Frequency Measurement Accuracy	±1%	±1%
Analog Output		
Type	4…20 mA current loop	0…5V DC
Resolution	1:4000	1:4000
Temperature Drift	50 ppm / ° C (maximum)	50 ppm / ° C (maximum)
Environmental		
Ambient Temperature	–22…158° F (–30…70° C)	–22…158° F (–30…70° C)
Humidity	0…90% non-condensing	0…90% non-condensing

CONNECTION

The 4…20 mA output can drive auxiliary devices (resistive loads) such as displays, recorders and computers, provided that the voltage supplied by the power supply is adequate. Devices must be wired in series with the F to I converter and power supply. The voltage drop across the load(s) and the 6V DC minimum needed to drive the F to I converter determine the minimum voltage required from the power supply.

Determine the necessary voltage required to adequately drive the F to I converter and auxiliary device(s).

The F to I converter acts as a current controlling device. Thus, the current output remains the same even if the power supply voltage fluctuates or the load resistance changes. The current varies only with respect to the flow rate from the turbine flow meter, as long as the voltage drop across the F to I converter is at least 6V DC.

The load(s) in the circuit will generally have some electrical resistance, 100 ohms for this example. The 4…20 mA loop current will produce a voltage drop across each load. The maximum voltage drop across a load(s) will exist when the loop current is 20 mA. The power supply must provide enough voltage for the load(s) plus the 6V DC minimum insertion loss of the F to I converter.

NOTE: See examples on *Power Supply Calculations on page 7*

Refer to the wiring diagram in *Figure 1* or *Figure 2* that corresponds to the converter that you have selected for your application.

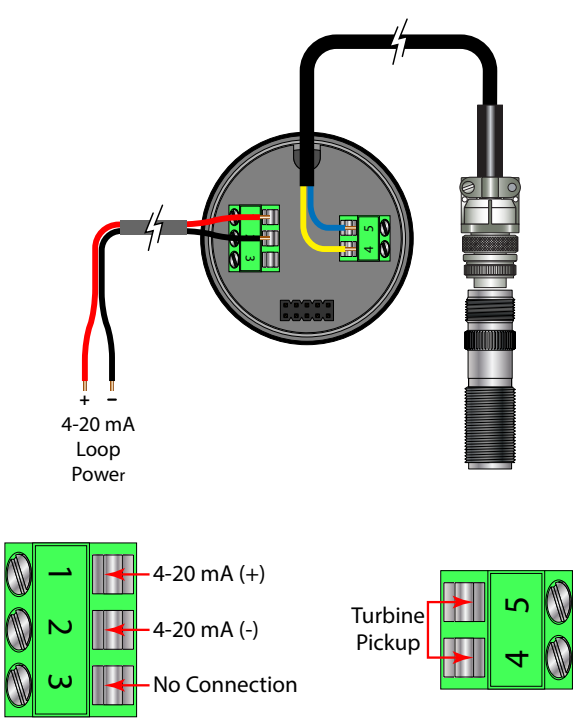

Figure 1: F to I wiring diagram

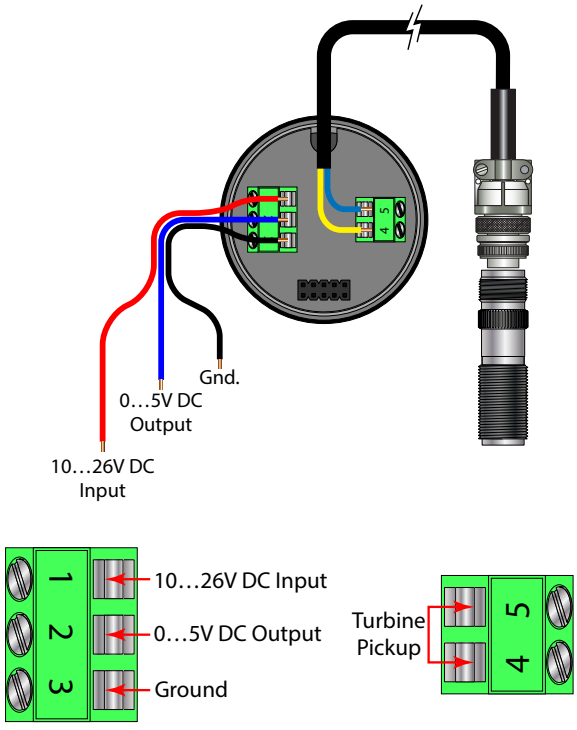

Figure 2: F to V wiring diagram

Loop Resistance

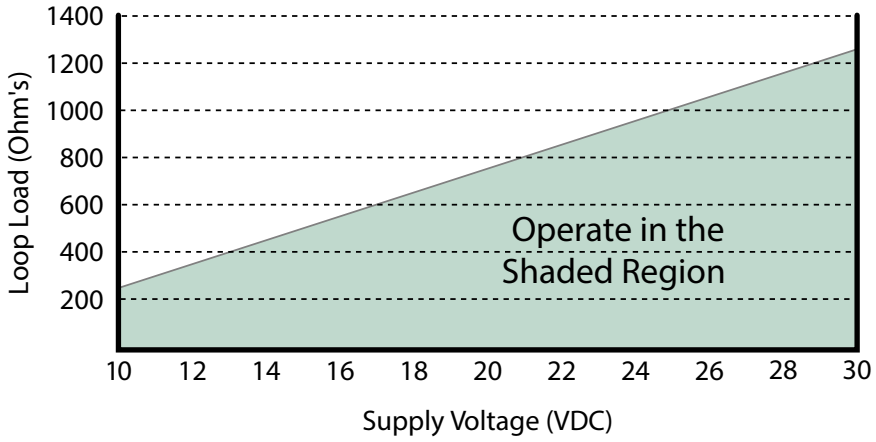

Figure 3: Loop resistance chart

Power Supply Calculations

Example 1

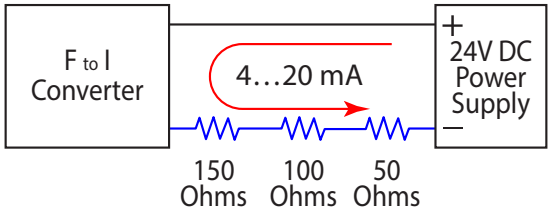

Figure 4: Power supply calculation example 1

Known values are:

Total Load Resistance	=	300 Ω
Power Supply	=	24V DC

At 20 mA loop current, the voltage drop across the load(s) is:

300 Ω x 20 mA = 6000 mV (6 Volts)

Subtract 6 volts from the 24 volt source to determine that 18 volts is available to power the F to I converter. The 18 volts is within the specified 10…30 volt range and is sufficient to power the F to I converter.

Example 2

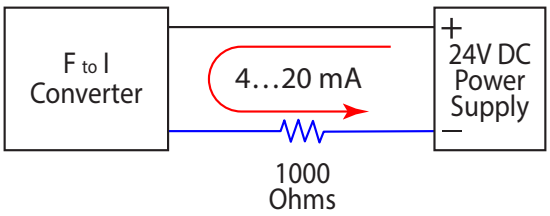

Figure 5: Power supply calculation example 2

Known values are:

Total Load Resistance	=	1000 Ω
Power Supply	=	24V DC

At 20 mA loop current, the voltage drop across the load(s) is:

1000 Ω x 20 mA = 20,000 mV (20 Volts)

Subtract 20 volts from the 24 volt source to determine that 4 volts is available to power the F to I converter. The 4 volts is below the specified 10…30 volt range and is not sufficient to power the F to I converter.

In this instance either the supply voltage must be increased of the load resistance decreased.

CALIBRATION

NOTE: If your Intelligent Frequency Converter was purchased with a B220-954 turbine meter, the two components ship from the factory calibrated as a set. If the Intelligent Frequency Converter is a replacement, the turbine's K factor has changed, or the converter is being used with some other pulse-generating device, programming will be necessary.

Requirements:

- B220-954 Intelligent Converter Programming Kit (B220-954)
- IBM Compatible PC running Windows 95 and newer
- DC Power Supply

After installing the programming software and attaching the programming cable to the Intelligent Frequency Converter through an available Com Port on your PC, you are now ready to power up your Intelligent Frequency Converter and continue with the calibration procedure. Using a DC power supply, apply 10…26V DC to the Intelligent Frequency Converter. Run the programming utility software shown in *Figure 6*.

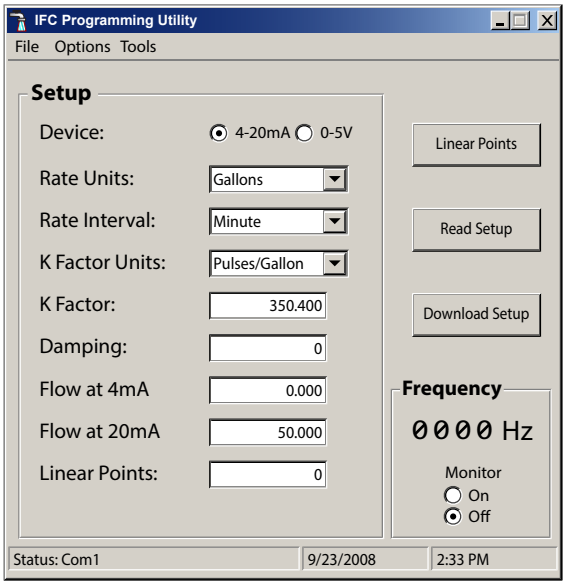

Figure 6: IFC programming software

Pressing **Read Setup** will read the current configuration of your sensor. After entering your desired values for *Device*, *K factor*, rate and flow span, press **Download Setup** to save your settings. Please consult the factory for any further calibration requirements.

NOTE: If communication fails, please check cabling and/or ComPort address and try again.

NOTE: For complete programming instructions refer to the IFC Programming Kit manual.

MAINTENANCE

1. Frequent inspection should be made. A schedule for maintenance checks should be determined by the environment and frequency of use. It is recommended that it should be inspected at least once a year.
2. Perform visual, electrical and mechanical checks on all components on a regular basis.
   a. Visually check for undue heating evidenced by discoloration of wires or other components, damaged or worn parts, or leakage evidenced by water or corrosion in the interior.
   b. Electrically check to make sure that all connections are clean and tight, and that the device is operating correctly.

PART NUMBER INFORMATION

Description	Part Number
Aluminum "Y" enclosure	B220239
Pickup cable	B222-120
Complete programming package	B220-954
F to I device only	B220803
F to V device only	B220806

TROUBLESHOOTING GUIDE

Trouble	Remedy
No current output	• Check polarity of the current loop connections for proper orientation. • Make sure receiving device is configured to provide loop current.
Analog output reads a constant reading	• Make sure there is flow in the system. • Verify that the rotor inside the turbine meter turns freely.
Analog output is not stable	• External noise is being picked up by the sensor. Keep all AC wires separate from DC wires. • Check for radio antenna in close proximity. This usually indicates a weak signal.

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