Blancett®
Turbine Flow Meters

Signal Conditioner

Intelligent Frequency Converter

Badger Meter

SGN-UM-00283-EN-03 (July 2015)

User Manual

CONTENTS

SCOPE OF THIS MANUAL

This manual is intended to help you get the Intelligent Frequency Converter up and running quickly.

IMPORTANT

Read this manual carefully before attempting any installation or operation. Keep the manual accessible for future reference.

UNPACKING AND INSPECTION

Upon opening the shipping container, visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

SAFETY

Terminology and Symbols

⚠DANGER Indicates a hazardous situation, which, if not avoided, is estimated to be capable of causing death or serious personal injury.

⚠WARNING Indicates a hazardous situation, which, if not avoided, could result in severe personal injury or death.

⚠CAUTION Indicates a hazardous situation, which, if not avoided, is estimated to be capable of causing minor or moderate personal injury or damage to property.

Considerations

The installation of the Intelligent Frequency Converter must comply with all applicable federal, state, and local rules, regulations, and codes.

⚠CAUTION

IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.

⚠ AVERTISSMENT

DANS LE CAS D'UNE UTILISATION NON PRÉVUE PAR LE FABRICANT, LA PROTECTION FOURNIE PAR L'ÉQUIPEMENT PEUT ÊTRE RÉDUITE.

⚠CAUTION

FOR FIELD WIRING CONNECTIONS, WIRE MUST BE RATED AT 158° F (70° C) OR HIGHER.

⚠ AVERTISSMENT

POUR DES CÂBLAGES SUR LE TERRAIN, LES CÂBLES DOIVENT ÊTRE ÉVALUÉS À 70° C (158° F) MINIMUM.

IMPORTANT

Not following instructions properly may impair safety of equipment and/or personnel.

IMPORTANT

Must be operated by a class 2 power supply suitable for the location.

Electrical Symbols

Function	*Direct Current*	*Caution*
Symbol	⎓	⚠

INTRODUCTION

The Intelligent Frequency Converter is a state-of-the-art digital signal processing device designed to provide exceptional accuracy at an affordable price. Designed for use with 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 provides a 0…5V DC output.

CONNECTION

The 4…20 mA output can drive auxiliary devices 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 and the 6V DC minimum needed to drive the F to I converter determines the minimum voltage required from the power supply.

The F to I converter acts as a current controlling device keeping the current output 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 in the circuit generally has 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 exist when the loop current is 20 mA. The power supply must provide enough voltage for the load plus the 6V DC minimum insertion loss of the F to I converter.

NOTE: See examples in *Power Supply Calculations on page 5*.

See the wiring diagrams in *Figure 1* or *Figure 2* for the appropriate wiring configuration for your application.

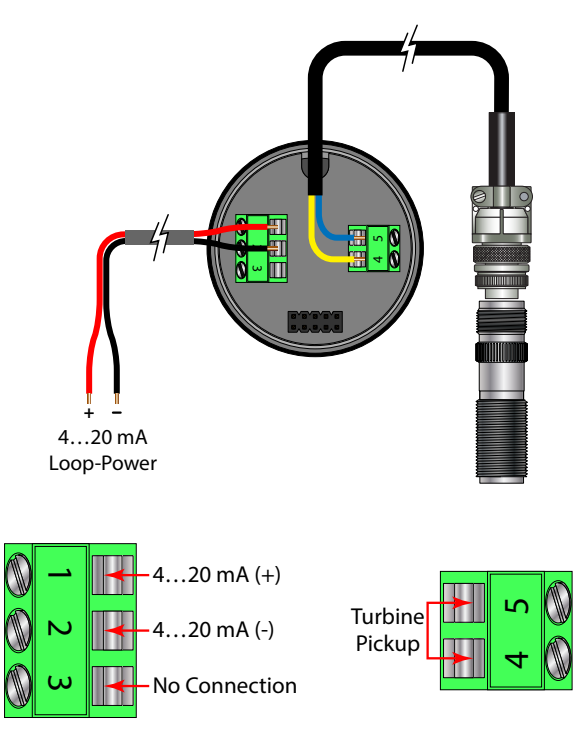

Figure 1: F to I wiring diagram

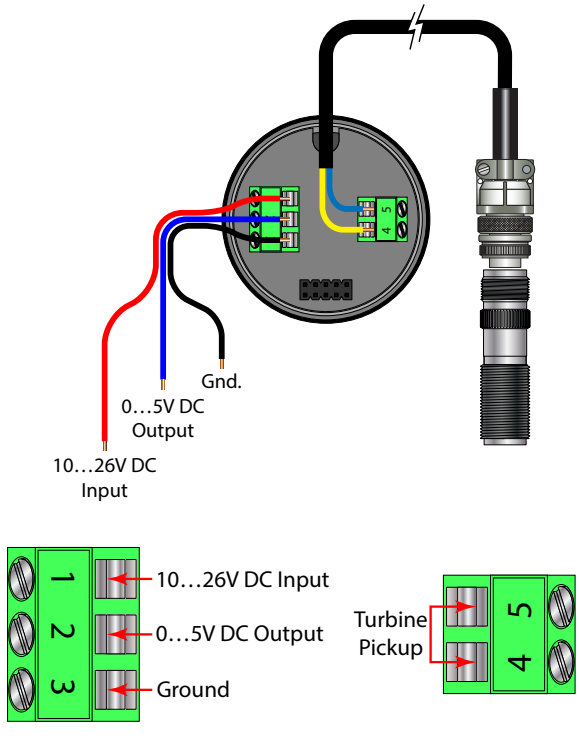

Figure 2: F to V wiring diagram

Loop Resistance

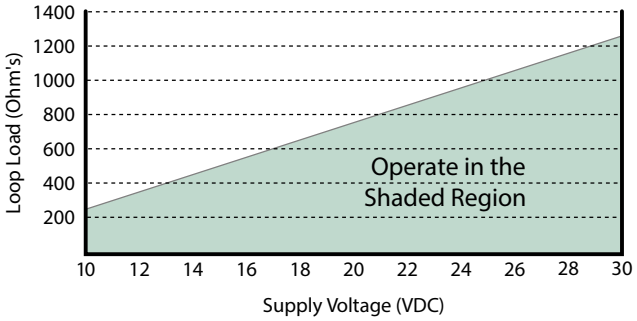

Figure 3: Loop resistance chart

Power Supply Calculations

Example 1

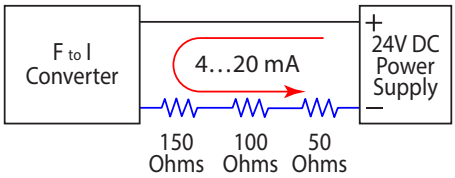

Figure 4: Power supply calculation example 1

Known values are:

Total Load Resistance = 300 Ω

Power Supply = 24V DC

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

300 Ω x 20 mA = 6000 mV (6V)

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

Example 2

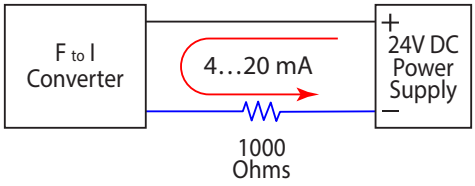

Figure 5: Power supply calculation example 2

Known values are:

Total Load Resistance = 1000 Ω

Power Supply = 24V DC

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

1000 Ω x 20 mA = 20,000 mV (20 Volts)

Subtract 20V from the 24V source to determine that 4V are available to power the F to I converter. The 4V are below the specified 10…30V 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

If your Intelligent Frequency Converter was purchased with a 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 another pulse-generating device, the Intelligent Frequency Converter can be calibrated by the factory, or by using the B220-954 Intelligent Frequency Converter Programming kit. The programming kit is sold separately.

MAINTENANCE

1. Determine a schedule for maintenance checks based on the environment and frequency of use. Inspect the frequency converter at least once a year.
2. Perform visual, electrical and mechanical checks on all components on a regular basis.
   a. Visually check damage and discoloration of wires or other components caused by overheating, damaged or worn parts or water or corrosion in the interior caused by a leak.
   b. Make sure that all electrical 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.

SPECIFICATIONS

	Frequency to Current (F to I) B220-873	**Frequency to Voltage (F to V) B220-874**
Power	Loop powered, 6V 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
Altitude	2000 m	2000 m
Use	Indoor/outdoor	Indoor/outdoor
Enclosure	Kilark aluminum capped elbow Y-3. Class I, Div. 1 & 2, Groups C & D; Class II, Div. 1 & 2, Groups E, F and G; Class III	
Agency Listings		
Ordinary Location	CAN/CSA-C22.2 No. 61010-1-12, UL Std. No. 61010-4 (3rd Edition)	
Pollution Degree 2		
Overvoltage Category I		

Control. Manage. Optimize.

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