



FCC – A00772
FREQUENCY CURRENT
CONVERTER
VERSION 1.0

Operation Manual

Frequency Current Converter Manual
Part number: A00772

Version 1.0
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Bramco Electronics

Unit 2&3 Callistemon Close,
Warabrook NSW 2304
Australia
www.bramco.com.au

Ph: +61 2 4014 4444
Fax: +61 2 4967 4100
Email: sales@bramco.com.au

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Overview

The Frequency Current Converter is designed to convert an input frequency from a Namur proximity sensor located in the hazardous area into a 4 – 20mA current signal.

The Namur proximity sensor is connected via a 2 channel I.S. Zener barrier.

Optional, direct, no barrier connection is available for Non I.S. installations.

The Frequency Current Converter is powered from external 24VDC supply.

The prox sensor signal conditioning and 4 - 20mA circuits are isolated from the 24VDC supply.

1. Operation

Module Functions and Setup.

LEDs are provided for:

Power On

Sensor Pulsing

Sensor Open

Sensor Short

Process loop closed (4 – 20mA Output)

4 mA Adjustment

20 mA Adjustment

Sensor Protection.

Open and Short.

1. Physical Layout



2. Terminal Connections

Terminal Number	Description
1	No connection
2	No connection
3	Earth
4	24VDC POS
5	24VDC NEG
6	No connection
7	No connection
8	No connection
9	4 – 20mA OUT POS
10	4 – 20mA OUT NEG
11	Earth
12	Namur Sensor Neg - Direct
13	NAMUR Sensor NEG to I.S. Barrier
14	Earth
15	NAMUR Sensor POS to I.S. Barrier
16	Namur Sensor POS - Direct

3. Installation

General Recommendations

4. Setup

1. Attach Proximity Sensor between terminals 13 (Brown +) and 15 (Blue -)
2. Connect 4-20mA loop between terminals 9(-) and 10(+) (or 220R resistor for test purposes).
3. Set Filter switches "1".."4" to ON position.
4. Set required Frequency using 10-way, BCD switches as follows.
 - Set EXP to "1" (Frequency = Setting Divided by 10)
 - Set Frequency as desired (Range is 5.0 – 99.9 Hz)
 - (Refer to Appendix for details of switch settings)
5. Apply 24V DC to terminals 4(+) and 5(-).
 - Green PWR LED should be on
 - Green PROCESS LED should be on
 - 4-20 loop should produce 4mA.
6. Start machinery that provides signal to Proximity sensor.
 - Green SENSOR LED should flicker dimly
 - Green PROCESS LED should brighten slightly as
 - Input frequency gets nearer to Frequency Set-Point
 - And dimmer when machinery stopped
 - Loop current should be 20mA when machinery is
 - Running at Speed of Frequency Set-Point.

Front Panel Indicators

Short	Red LED Indicates short circuit of Proximity Sensor.
Open	Amber LED indicates Proximity Sensor Open circuit
SENSOR	Green LED indicates pulse from sensor detected
PROCESS	Green LED in series with 4-20 loop indicates current present
PWR	Green LED indicates power supply
4mA Fault	Red LED Indicates fault condition on 4-20 loop

Operating Modes

Normal

Green PWR LED ON

Green PROCESS LED ON

Green SENSOR LED flickers when signal present

4mA present when machinery not moving

20mA present when machinery at or above set frequency

4-20mA present when machinery between off and set point

Frequency setting error ($F < 5\text{Hz}$ or $F > 700\text{Hz}$)

Green POWER LED ON

Both Red SHORT LED and Amber OPEN LED Flashing

4mA on loop

Short Circuit

Green POWER LED ON

Red SHORT LED ON

0mA on loop

Open Circuit

Green POWER LED ON
Amber OPEN LED ON
0mA on loop

4-20mA loop fault

Green POWER LED ON
Red 4mA Fault LED ON
0mA on loop

5. Appendix

(4-20mA is Factory Pre-set and should not require adjustment)

- Adjustment of 4-20mA loop output

The 4mA and 20mA currents can be set using the front panel settings (4mA Adj and 20mA Adj respectively).

- 4mA Adjustment

With the device in normal operating mode but machinery not running, adjust the 4mA Adj control until 4mA is available on the 4-20 loop.

- 20mA Adjustment

With the device in normal operating mode and the machinery running, progressively lower the frequency set point until the 4-20mA current does not rise for any further lowering of frequency setting.

Adjust the 20mA adjust control for 20mA on 4-20 loop.

- Filtering

The front panel DIP switches (1..4) change the filter time constant on the 4-20mA output. This function prevents the loop from responding too quickly to changes (transients) in the output current. The time constants are as shown below.

Switch	Response Time (ms)
None	5
1	50
2	100
3	200
4	500

- **Frequency Selection**

The frequency is set by using the first 3 BCD switches (100,10,1) to set the value and the last switch to set the exponent (EXP). The Exponent values are shown below.

EXP setting	Division Factor	Range(Hz)	Step Size(Hz)	Value Format
0	1	5 to 700	1	XXX
1	10	5 to 99.9	0.1	XX.X
2	100	5 to 9.99	0.01	X.XX
All Others	Not Valid			

Examples:

Frequency Setting	Switch Setting	EXP setting
12.5 Hz	"1" "2" "5"	"1"
7.88 Hz	"7" "8" "8"	"2"
125 Hz	"1" "2" "5"	"0"
6.2 Hz	"0" "6" "2"	"1"

Note: There is usually more than 1 way to select a value (compare 6.2 Hz setting with that of 7.88 Hz. The difference with these settings is the step size)

6. Specifications

Frequency Current Converter Module

Proximity sensor input: Namur 2 wire or 3 wire open collector prox sensor.

Input Frequency range: 0.5 – 700 Hz

Output Current range: 4 – 20mADC

Step delay range: 50 mS – 850 mS

Select delay with 4 way Dip switch

Power Input:

24VDC 1W

Operating Temp: 0 - 50 Deg Celsius

Enclosure:

<i>Dimensions:</i>	55W x 75H x 110D
<i>Material:</i>	High impact resistant polycarbonate enclosure.
<i>Mounting:</i>	Din Rail and 2 x screw mounting.
<i>Terminals:</i>	Cage screw slotted terminals.
<i>Weight:</i>	300g

Ordering:

A00772 - 24VDC

7. Typical Connections

Frequency Current Converter Wiring Diagram

