

**ELECTRICAL SPECIFICATIONS:**

**POWER SUPPLY REQUIREMENTS:** +/- 10 VDC minimum with suffix AAA = 100  
 +/- 15 VDC minimum with suffix AAA = 150  
 The maximum power supply voltage is +/- 30 volts DC. The positive supply must deliver a minimum of 40 ma. plus the external transducer current requirement.

**TRANSDUCER POWER SUPPLY VOLTAGE:** + 5 volts dc with suffix BBB = 050  
 + 12 volts dc with suffix BBB = 120  
 The +12 volt transducer power supply output requires that suffix AAA = 150.

**TRANSDUCER POWER SUPPLY CURRENT:** 200 ma., maximum at + 55 degrees C., ambient.

**INPUT SIGNAL FREQUENCY RANGE, BOTH CHANNELS:**  
 100 Hz., maximum with suffix D = 1  
 200 Hz., maximum with suffix D = 2      500 Hz., maximum with suffix D = 3  
 1000 Hz., maximum with suffix D = 4      2000 Hz., maximum with suffix D = 5  
 5000 Hz., maximum with suffix D = 6      10000 Hz., maximum with suffix D = 7  
 20000 Hz., maximum with suffix D = 8      50000 Hz., maximum with suffix D = 9

**INPUT SIGNAL LEVEL, LOW LEVEL:** + .8 volts dc at 1.6 ma., maximum sink current.  
 The voltage value shown will be the maximum with any transducer power supply voltage.

**INPUT SIGNAL LEVEL, HIGH LEVEL:** + 2.0 volts dc at .1 ma., maximum sink current.  
 The voltage value shown will be the minimum with any transducer power supply voltage.

**ANALOG OUTPUT VOLTAGE SIGNAL:** +/- 3 volts dc with suffix CCC = 030  
 +/- 5 volts dc with suffix CCC = 050      + 10/- volts dc with suffix CCC = 100

**ANALOG OUTPUT CURRENT:** +/- 5 ma., maximum with all suffix CCC versions.  
 The output current specification is with the power supply voltage equal to 10 volts dc.

**ANALOG OUTPUT RIPPLE VOLTAGE:** Less than 20 mv., peak to peak at maximum input frequency.

**ANALOG OUTPUT VOLTAGE SYMMETRY:** Better than 1% with quadrature reversal.

**ANALOG OUTPUT VOLTAGE STABILITY AND DRIFT:** Better than 1% at unity gain.

**ANALOG OUTPUT GAIN ADJUSTMENT RANGE:** 50% to 100% of the rated input frequency range (suffix D) when applied to both inputs.

**DIGITAL OUTPUT LOW LEVEL SIGNAL:** .2 volts dc maximum at 100 ma. maximum sink current.

**DIGITAL OUTPUT HIGH LEVEL SIGNAL:** 40 volts dc maximum at 10 uamp, maximum leakage current.  
 The digital output is a NPN transistor with open collector. The voltage shown is the maximum blocking voltage.

**DIGITAL OUTPUT TRIP POINT ADJUSTMENT RANGE:** 2% to 110% of rated analog output voltage (suffix CCC) range.

**OPERATING TEMPERATURE RANGE:** - 20 degrees C to + 55 degrees C.  
 Extended temperature range operation is available, contact Datatran's Sales Department for availability and price.

**GENERAL DESCRIPTION:**

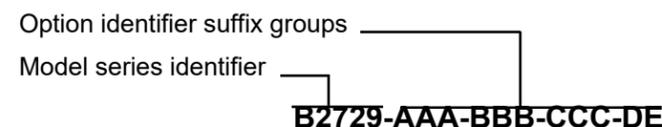
This bipolar frequency to voltage module is designed to convert a continuous series of digital pulses into an analog voltage that is proportional to the input signal frequency. The two input channels allow the module to provide a bipolar output voltage when the input signal is arranged in a standard quadrature format. In this mode both the velocity and direction of the input device are indicated by the voltage output signal. Besides the analog output voltage, the module provides a digital output signal with an adjustable trip point that may be used to signal an overspeed condition of the input velocity transducer.

This industrial grade module includes a transducer power supply as well as a stable reference that maintains the output signal linearity and drift too less than 1% as the input power supply voltage and ambient temperature are varied over the specified range.

Each bipolar frequency to voltage modules includes controls to set the output signal span and the digital output signal trip point as well as the polarity of the output voltage for a specific rotation direction of the input transducer. Lights are supplied to indicate the direction of the input transducer and the status of the digital output. The module requires a bipolar 10 to 30 volt DC power supply for operation.

The circuit board is solder masked. All external connections are made to a barrier type terminal block with #6-32 captive wire clamping screws. All external connections and controls are clearly marked.

**PART NUMBERING SYSTEM:**



PART NUMBER SUFFIX GROUP EXPLANATION	
SUFFIX	DESCRIPTION
AAA	Minimum power supply voltage
BBB	Transducer power supply voltage
CCC	Rated output signal voltage.
D	Maximum input frequency
E	Factory installed option identifier

Parts shipped from the factory will have the correct alphanumeric option identifier in place of the suffix letters indicated in the table above.

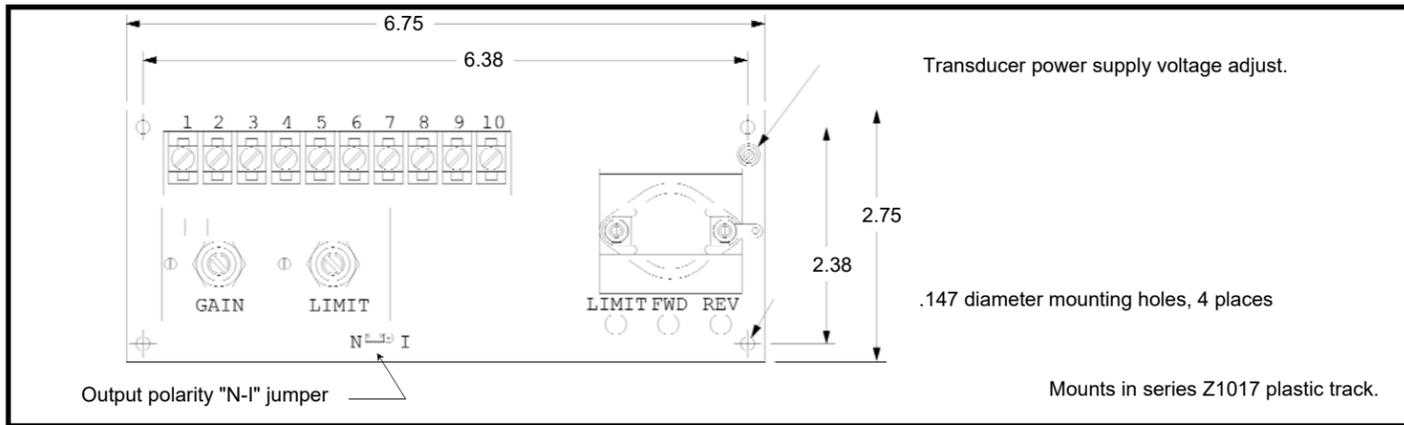
**ORDERING INFORMATION:**

Refer to the B2729 model series selection sheet for a complete listing of the currently available models.

**DATA SHEET  
 FOR  
 DATATRAN  
 B2729  
 FREQUENCY  
 TO  
 VOLTAGE  
 CONVERTER MODULE  
 (BIPOLAR)**

FOR TECHNICAL ASSISTANCE CONTACT  
 CONIC SYSTEMS INC.  
 11 REBEL LANE, PORT JERVIS, NY 12771  
 TEL: (845) 856-4313 FAX (845) 858-2824  
 www.conicsystems.com

## OUTLINE DIMENSIONS:



## APPLICATION INFORMATION:

**FUNCTION OF THE OUTPUT POLARITY SELECT "N-I" JUMPER:** This is a two position pin header with a shorting bar, located just below the bracket. When the "FORWARD" indicator is on and this jumper is in the "N" position, the analog output voltage will be positive. With the jumper set to the "I" position, the analog output voltage will be negative.

When the "REVERSE" indicator is on the analog output voltage polarity will be opposite to the above.

**DUAL CHANNEL (QUADRATURE) OPERATION:** This mode allows the module to provide both direction and magnitude as an analog output voltage. In this mode, the input transducer must provide two signals that are displaced from each other by 90 electrical degrees. The board will sense direction via the phase shift between the two channels when the transducer rotation is reversed. When the "N-I" jumper is set to the "N" position, the "FORWARD" indicator will illuminate and the analog output voltage will be positive when the input applied to terminal number 7 leads the input applied to terminal number 8. Conversely, the "REVERSE" indicator will illuminate and the analog output voltage will be negative when the input applied to terminal number 7 lags the input applied to terminal number 8.

The transducer inputs are pulled up to the transducer supply voltage via resistors mounted on the board. The value for these resistors depend on the transducer power supply voltage. 3.3K ohms resistors are used with the 5 volt supply, 8.2K ohm resistors are used with the 12 volt supply.

**SINGLE CHANNEL OPERATION:** This mode will not provide direction information with the analog output signal. The polarity will not change with the direction of the input transducer. With the "N-I" jumper set to the "N" position the "FORWARD" indicator will illuminate and the analog output voltage will be positive with the input signal applied to terminal number 7 and terminal number 6 jumpered to terminal number 8.

*Do not operate the module with the input signal applied only to terminal number 8. The polarity of the analog output signal may change at random intervals.*

In the normal quadrature mode of operation, the input frequency signal for each channel is first converted to an analog voltage. The voltage signals from the two channels are added to produce the final analog output voltage. Single channel operation always sets the input on terminal number 8 to zero, thus the final analog output voltage will only be 1/2 the value obtained for the same input frequency when the unit is operated in quadrature mode.

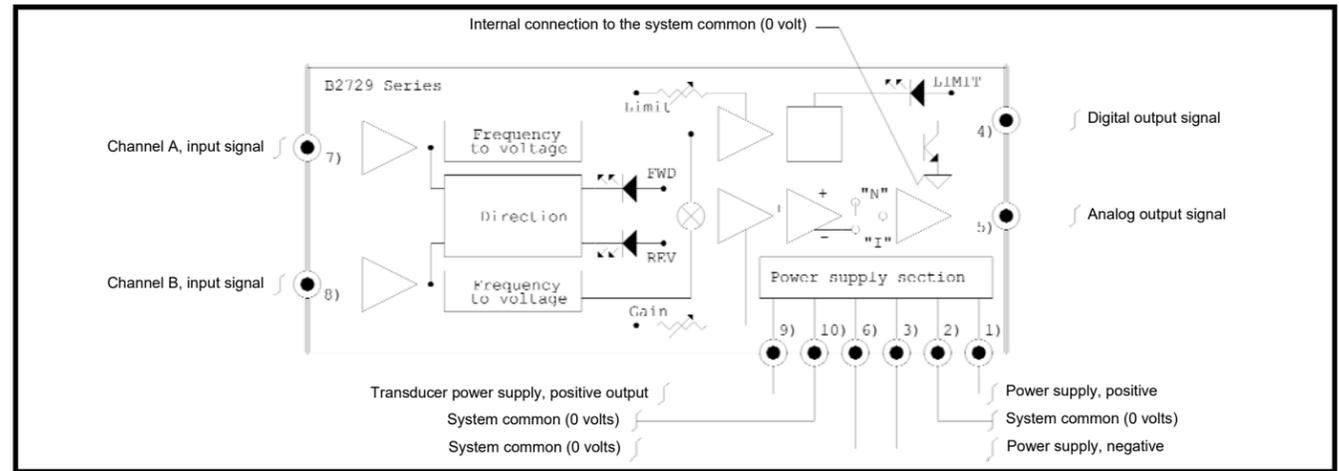
*Single channel operation at a frequency of less than 50% of the rated maximum may not deliver the rated analog output voltage, even with the "GAIN" control set to maximum. If the card is to be operated in the single channel mode the output frequency range (suffix D) should be selected for 1/2 the actual maximum input frequency in order to ensure that the rated output voltage (suffix CCC) is obtained.*

**ANALOG OUTPUT GAIN ADJUSTMENT:** Set the input frequency to maximum. Adjust the "GAIN" control until the required output voltage is obtained at terminal number 5.

**DIGITAL OUTPUT LIMIT ADJUSTMENT:** Set the input frequency to the value where the digital output should turn on. Adjust the "LIMIT" control until the "LIMIT" indicator illuminates. The digital output is a type NPN transistor with an open collector, it will sink current when turned on. The board does not contain a pullup resistor, if required, it must be added external to the board by the user. Pullup resistors should not load the output transistor beyond 100 ma. when combined with the external load current.

**EXTERNAL WIRING:** All connections to the external transducer must be made with twisted and shielded cable. All shields should be terminated at terminal 2 on the module only. Do not expose or connect the shield at any point in its run from the signal source to the frequency to voltage converter module. For optimum performance, all connections to the module should be twisted and shielded cable. These connections must be run in signal level conduit only.

## FUNCTIONAL DIAGRAM:



## APPLICATION EXAMPLE:

The application shown, illustrates the basic components and connections required to construct a closed loop, bidirectional, servo drive with adjustable acceleration and deceleration. The velocity feedback signal is obtained from an incremental shaft encoder with quadrature outputs.

This application drawing is not complete. It is missing the operator's controls to start and stop the drive as well as the zero speed integral clamp circuit. User's who wish to construct a closed loop drive are invited to contact Datatran Labs Engineering Department for technical assistance.

