

**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 at terminal number 1 must deliver a minimum of 85 ma. The negative supply at terminal number 3 must deliver a minimum of 25 ma.

**INPUT SIGNAL VOLTAGE RANGE:** +/- 1 volts dc with suffix BBB = 010  
 +/- 5 volts dc with suffix BBB = 050 +/- 10 volts dc with suffix BBB = 100  
 +/- 12 volts dc with suffix BBB = 120 +/- 24 volts dc with suffix BBB = 240  
 +/- 48 volts dc with suffix BBB = 480 +/- 100 volts dc with suffix BBB = 101  
 All voltage input lines will withstand up to 200% of the rated range or +/- 100 volts dc without damage. The higher of the two limits applies to all suffixes.

**INPUT SIGNAL CURRENT RANGE:** 4 to 20 ma. with suffix BBB = 420  
 The current signal must be limited to 50 ma., maximum.

**INPUT SIGNAL IMPEDANCE:** All voltage inputs are 100K ohms. Current inputs are 75 ohms.

**OUTPUT CONTACT CURRENT RATING:** 10 ma. minimum, 2 amps maximum with suffix CCC = 202  
 100 ma. minimum, 4 amps maximum with suffix CCC = 402  
 500 ma. minimum, 8 amps maximum with suffix CCC = 802  
 The current ratings shown are for 28 volt dc or 115 volt ac, resistive loads only. Contacts must be derated for inductive loads.

**OUTPUT CONTACT VOLTAGE RATING:** 230 volts rms (325 volts peak), maximum for all models.

**OUTPUT CONTACT TRANSFER TIME:** Pickup 25 msec., dropout 50 msec.  
 The times shown are derived from the relay supplier's literature. They are approximate and are not tested.

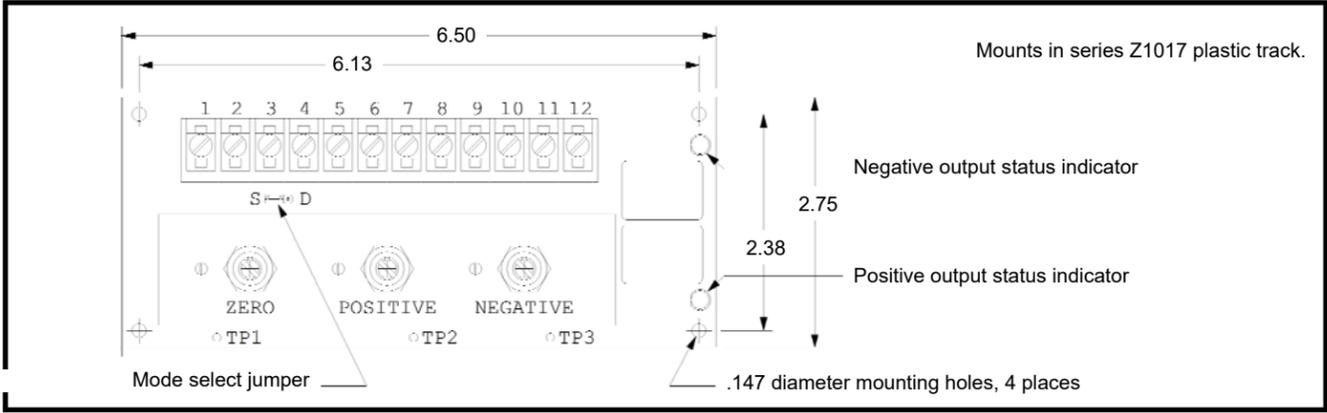
**CONTACT MECHANICAL LIFE:** Life expectancy for all models is greater than 10 million cycles.

**TRIP POINT ADJUSTMENT RANGE:** 2% to 100% of the rated input voltage or current.

**TRIP POINT DROPOUT HYSTERESIS:** Approximately 1.5% of the rated input voltage or current.

**OPERATING TEMPERATURE RANGE:** - 20 degrees C to + 55 degrees C.

**OUTLINE DIMENSIONS:**



**GENERAL DESCRIPTION:**

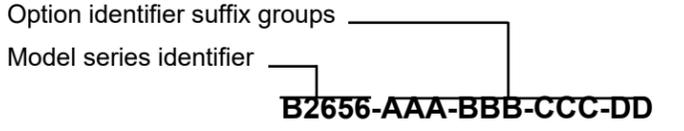
This bipolar limit detector module is designed to provide a relay contact transfer whenever the input signal exceeds one of the trip point settings. Separate relay outputs are supplied for the positive and negative setpoints. Once the contacts transfer, they will remain so until the input signal returns below the trigger threshold. Models are available for use with either voltage or current input signals. This module can be used in bidirectional applications to indicate a direction change or with double solenoid valves as a level controller. The differential input mode allows the module to transfer the relays based upon the absolute difference between two input signals of the same polarity.

This industrial grade module utilizes a stable reference to maintain the preset trip points within 1%, as the ambient temperature and power supply are varied over the specified operating range. The relay pickup point can be adjusted from 2% to 100% of the rated signal range. A small amount of hysteresis is included to prevent relay chatter due to noisy or slowly changing input signals.

Adjustment controls are included on the board to set both the positive and negative trip points as well as remove the offset from unipolar signals that do not go to zero. Visual indicators are provided to show the state of the output relays. Each output relay provides one form C contact. Provisions are included for either single ended or differential inputs. This 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	Maximum input signal voltage
CCC	Maximum output contact current
DD	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 B2656 model series selection sheet for a complete listing of the currently available models.

**DATA SHEET  
 FOR  
 DATATRAN  
 B2656  
 BIPOLAR  
 LIMIT DETECTOR  
 MODULE**

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

## APPLICATION INFORMATION:

**MODE SELECT (S-D) JUMPER:** This jumper is a three position pin header with a shorting bar. It is located just below the bracket, between the two test points. For single ended input signals set the jumper to the "S" position. For differential inputs, set the jumper to the "D" position.

Single ended operation expects that the signal applied to terminal number 4 will swing positive and negative around the system common (0 volt) reference, terminal number 6. Differential input signals applied to terminal numbers 4 and 5 must be referenced to the system common (0 volt) reference, terminal number 6.

**SINGLE ENDED OPERATION:** This is the normal mode of operation. A single input signal is applied to terminal number 4. As the signal swings from zero in a positive direction the positive output relay will pickup and remain energized as long as the signal is more positive than the positive trip point level. As the signal swings from zero in a negative direction the negative output relay will pickup and remain energized as long as the signal is more negative than the negative trip point level.

**DIFFERENTIAL OPERATION:** In this mode, the action of the output relays depends on the result of the algebraic summation of the input signals applied to terminal numbers 4 and 5. With two positive input signals, the signal applied to terminal number 4 is subtracted from the signal applied to terminal number 5. As the result of these two signals swing from zero in a positive direction the positive output relay will pickup and remain energized as long as the resultant signal is more positive than the positive trip point level. As the result of the two signals swings from zero in a negative direction the negative output relay will pickup and remain energized as long as the resultant signal is more negative than the negative trip point level.

**TRIP POINT ADJUSTMENT:** The point at which the output relay contacts will transfer is determined by the setting of the "POSITIVE" and "NEGATIVE" controls. Clockwise rotation will require a larger signal to pickup the relay. Due to the circuit hysteresis, the user should confirm that the relay will drop out again as the signal returns to its minimum value. The "POSITIVE" control adjusts the pickup point for input signals on terminal number 4 that are positive with respect to terminal number 6 when the mode select jumper is in the "S" position or positive with respect to terminal number 5 with the mode select jumper in the "D" position. Two red indicator lights are supplied, one for the positive relay and one for the negative relay. The indicator will illuminate when the relay is energized.

**BIAS ADJUSTMENT PROCEDURE:** The bipolar limit detector module contains a "ZERO" adjustment control that can be used to remove any unwanted offset from the input signal. *The bias is set at the factory so that zero input volts or 4 ma. will produce a zero output signal.* It can be readjusted, if necessary, by attaching a voltmeter between the system common terminal, number 6 and the test point on the board marked "TP1". The bias potentiometer should be adjusted so that with the minimum input signal applied to terminal number 4, the voltmeter reads zero.

**MULTIPLE SIGNAL SUMMING:** The bipolar limit detector module is capable of summing two input signals and acting on the result. In this mode of operation the mode select jumper must be placed in the "S" position and the input signals applied to terminal numbers 4 and 5. This mode of operation requires that the user add external resistance in series with the signal applied to terminal number 5. The value for this resistor can be calculated from the formula below.

$$R \text{ (external)} = \text{Signal voltage} * 33333 \quad \text{(Single ended operation only.)}$$

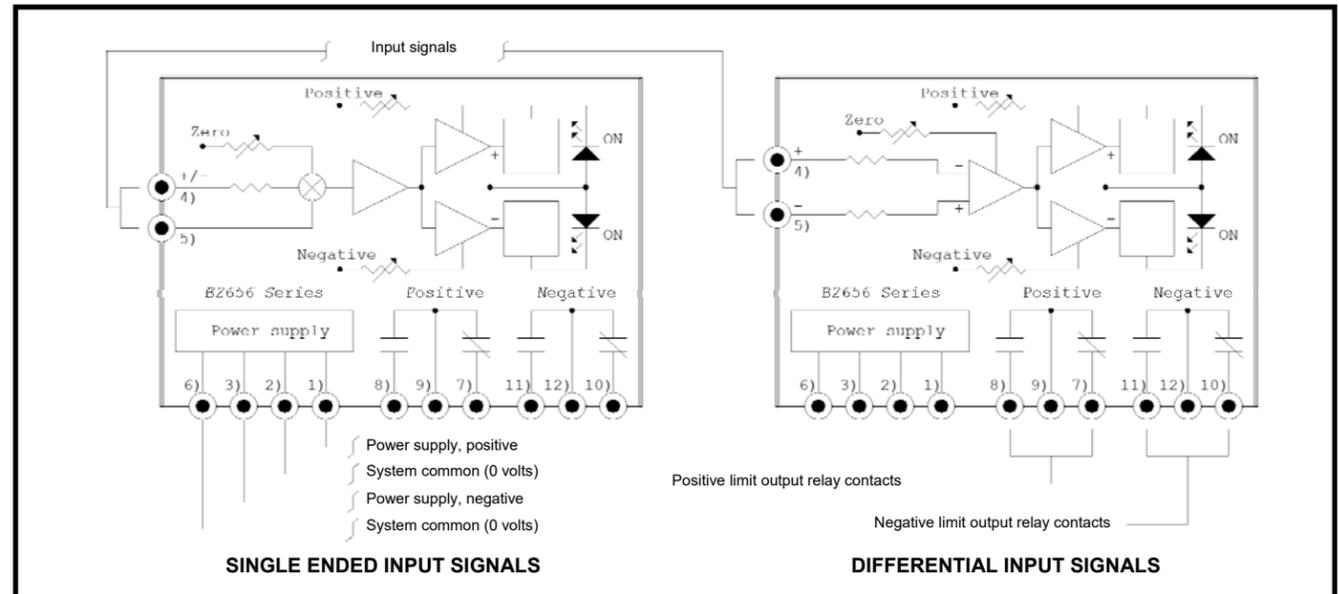
*Caution, signals applied to terminal number 5 with the mode select jumper in the "S" position and no external series resistor installed will destroy the limit detector module.*

**VALVE DRIVER CURRENT MONITORING:** The bipolar limit detector module can be used to monitor the current output signal from most of Datatran's linear or pulse width modulated valve drivers. However, the user should be aware of the fact that some of these devices sink current only, in which case the signal input must be derived from the return line (low signal side) of the driver. The maximum input signal to the bipolar limit detector module from the valve coil return line will not exceed .5 volts at the valve drivers rated load. Because of the high peak currents generated by the pulse width modulated drivers, the bipolar limit detector module may require that additional filtering be installed to provide positive switching and chatter free operation around the trip point. Specific application information may be obtained by contacting Datatran's engineering department.

**REVERSE LOCKOUT:** Applications requiring that the direction of operation not be changed unless the process command or output is zero may be better handled with Datatran's Zero Signal Detector module, model series B2671. This device includes a full wave rectifier that allows a single trip point that is set symmetrically around the zero point. It has a single relay with one form C contact. The trip point adjustment range is from 1% to 10% of the rated input signal..

**EXTERNAL WIRING:** External signal input wiring should be twisted and shielded cable for optimum operation. The shield should be terminated at terminal number 2 on the module only. Do not expose or connect the shield at any point in its run from the signal source to the module. The output connections to the relay contacts need not be shielded. They should however, be routed away from the input signal and power supply leads to prevent electrical noise pickup that could possibly cause variations in the trip point setting at low signal levels.

## FUNCTIONAL DIAGRAM:



## APPLICATION EXAMPLE:

The application shows the bipolar signal detector module used as a tank level control system. When the high limit is reached the feed valve will close and prevent the tank from overflowing, the low level limit will close the drain valve to prevent the fluid from dropping to a point that would expose the heater coils.

