

**SPECIFICATIONS:**

**POWER SUPPLY REQUIREMENTS:** + 10 VDC minimum with suffix AAA = 100  
 The maximum power supply voltage is + 30 volts DC. The positive supply at terminal number 1 must deliver a minimum of 40 ma. plus the output valve coil current requirement.

**REFERENCE POWER SUPPLY:** + 4.85 to + 5.15 volts dc for all models.  
 The maximum output current from the reference supply must not exceed 10 ma.

**EXTERNAL COMMAND SIGNAL:** + 3 volts dc with suffix BBB = 030  
 + 5 volts dc with suffix BBB = 050 + 10 volts dc with suffix BBB = 100

**INPUT IMPEDANCE AT TAB "A":** 60K ohms with suffix BBB = 030  
 100K ohms with suffix BBB = 050 200K ohms with suffix BBB = 100

**INPUT IMPEDANCE AT TAB "W":** 100K ohms with all BBB suffix identifiers

**RATED OUTPUT CURRENT:** + 250 ma. with suffix CCC = 251  
 + 500 ma. with suffix CCC = 501 + 1000 ma. with suffix CCC = 102  
 + 2000 ma. with suffix CCC = 202 + 3000 ma. with suffix CCC = 302  
 + 4000 ma. with suffix CCC = 402 + 5000 ma. with suffix CCC = 502  
 The absolute output current must not exceed 8 amps under any operating condition.

**OUTPUT CURRENT LIMIT:** The exact current limit value is dependant upon the valve coil inductance and the switching frequency. In general, the current limit will be approximately 150% of the rated output current as defined by suffix CCC.

**ACCELERATION AND DECELERATION RAMP TIMES:** 1 to 10 seconds with suffix D = 0, 2, 4, 6 & 8  
 2 to 20 seconds with suffix D = 1, 3, 5, 7 & 9  
 Ramp times are with 100% step change at input. Times are plus and minus 15%.

**PWM SWITCHING FREQUENCY:** 100 Hz. with suffix D = 2 & 3  
 200 Hz. with suffix D = 4 & 5 400 Hz. with suffix D = 6 & 7  
 1000 Hz. with suffix D = 8 & 9 2200 Hz. with suffix D = 0 & 1  
 The pulse width modulated (PWM) switching frequency tolerance is plus and minus 20% of the value shown.

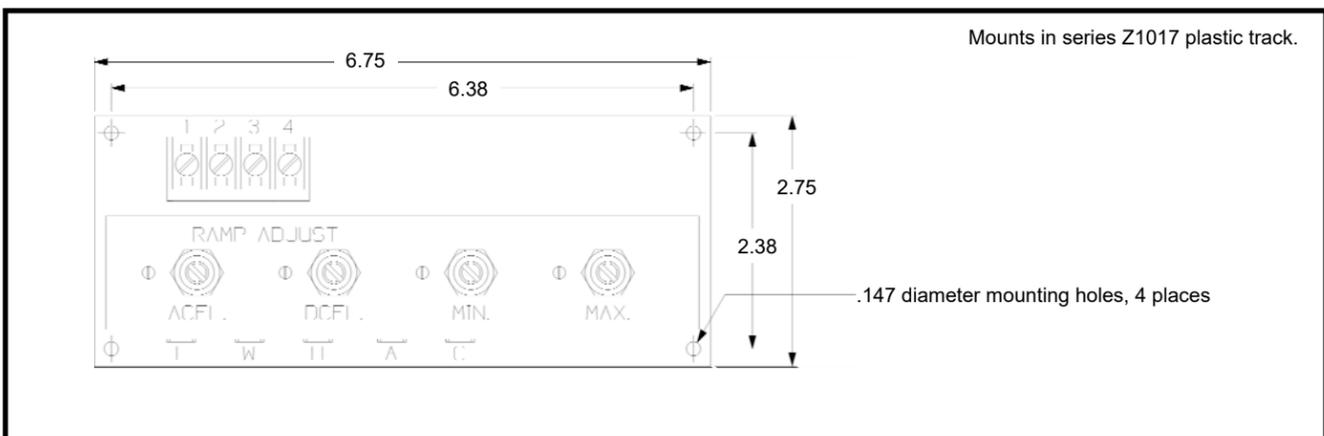
**MINIMUM CURRENT ADJUSTMENT RANGE:** 0% to 40% of the rated output current.

**MAXIMUM CURRENT ADJUSTMENT RANGE:** 75% to 100% of the rated output current.

**STABILITY AND DRIFT:** Better than 1% of maximum with inner loop current feedback.

**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.

**OUTLINE DIMENSIONS:**



**GENERAL DESCRIPTION:**

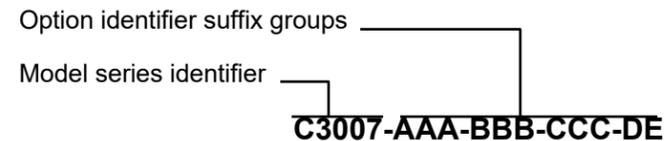
This pulse width modulated valve driver module is designed to be used for open loop motion, speed and pressure control systems. Acceleration and deceleration rates are adjustable. The output is unipolar and will drive all single solenoid proportional and servo valves that have coil current requirements up to 5 amps. The command signal can be obtained from either a potentiometer or an external voltage source.

This industrial grade module is a true high performance current regulator. It incorporates current loop feedback to maintain the output signal to the valve coil within 1% of the setpoint as the load impedance, input voltage, and ambient temperature are varied over the specified operating range. Pulse width modulated switching provides high efficiency as the output current is varied from minimum to maximum.

Each pulse width modulated valve driver module includes the controls required to set the acceleration and deceleration times as well as the minimum and maximum output for the valve coil current. The module contains a regulated 5 volt power supply that can be used to power an external command potentiometer. The valve driver also has the ability to follow a remote command voltage signal. The output current to the valve coil will vary from the minimum to the maximum as the input signal is adjusted from zero to the rated value. The module requires a positive 10 to 30 volt DC power supply for operation.

The circuit board is solder masked. All external power and valve coil connections are made to a barrier type terminal block with #6-32 captive wire clamping plates. External command signals are made to .25 inch male tabs. All external connections are clearly marked on the board.

**PART NUMBERING SYSTEM:**



PART NUMBER SUFFIX GROUP EXPLANATION	
SUFFIX	DESCRIPTION
AAA	Minimum power supply voltage
BBB	Maximum input signal voltage
CCC	Maximum output current to valve coil
D	Ramp times and PWM switching 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 C3007 model series selection sheet for a complete listing of the currently available models.

**DATA SHEET  
 FOR  
 DATATRAN  
 C3007  
 PULSE WIDTH  
 MODULATED VALVE  
 DRIVER BOARD  
 WITH  
 ACCELERATION AND  
 DECELERATION  
 CONTROLS  
 (SINGLE SOLENOID)**

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:**

**LOAD IMPEDANCE:** The maximum and minimum output load resistance can be calculated from the formulas given below:

$$Z(\text{Load maximum}) = \frac{\text{Power supply voltage} * 2}{\text{Rated load current} * 3}$$

$$Z(\text{Load minimum}) = \frac{\text{Power supply voltage} - 1}{8}$$

The formula given for the maximum load resistance assumes a triangle shaped waveform. This waveform is integrated by the valve coil inductance to produce the equivalent dc operating current. Depending on the coil inductance, some valves may operate with coil resistance greater than that given in the formula.

**!!!! CAUTION !!!!**

Minimum load impedances less than those given by the formula above may cause the valve driver to fail as a short circuit. This will apply the full power supply voltage to the connected load.

**EXTERNAL VOLTAGE COMMAND SIGNAL:** The valve driver is capable of following an external voltage signal. This signal should be applied to tabs "A" and "C". The common (0 volt) side of the external signal must be connected to tab "C". Note that the external signal and the amplifier must share the same reference potential. The valve driver does not provide signal isolation.

**EXTERNAL COMMAND POTENTIOMETER:** The valve driver can be used with a remote command potentiometer. This potentiometer uses the amplifiers internal +5 volt reference and should be connected to tabs "H", "L" and "W".

User supplied external command potentiometers should have a linear taper with a value between 1000 and 5000 ohms and be rated .5 watt, minimum.

**INTERNAL REFERENCE VOLTAGE:** A nominal +5 volts DC is available at tab "H" for powering external loads. The maximum output current from this supply must be limited to 10 ma.

**ACCELERATION AND DECELERATION RAMP ADJUST CONTROLS:** The "ACEL" control will increase the ramp time on an increasing input command signal. The "DCEL" control will increase the ramp time for a decreasing input command signal. Clockwise rotation of either control will increase the corresponding ramp time.

**MINIMUM AND MAXIMUM OUTPUT ADJUST CONTROLS:** With the input command signal at zero, use the "MIN" control to set the valve coil bias current. With the input command signal at the maximum rated value, use the "MAX" control to set the maximum valve coil current. As the input command signal is varied from zero to it's rated value the valve coil current will vary from the bias setting to the maximum value.

**PULSE WIDTH MODULATED SWITCHING FREQUENCY:** The switching frequency is specified by the number inserted at suffix D. Standard switching frequencies of 100, 200, 400 1000 and 2200 Hz. are available. Generally, the proportional valve manufacturer will specify the pulse width modulated switching frequency for a specific valve. If you require a switching frequency that is not listed as standard you must specify the required frequency on your purchase order. In this case, a special part number will be assigned to the valve driver module. Datatran can supply this module with switching frequencies from 100 to 10,000 Hz. There is no additional charge for this modification.

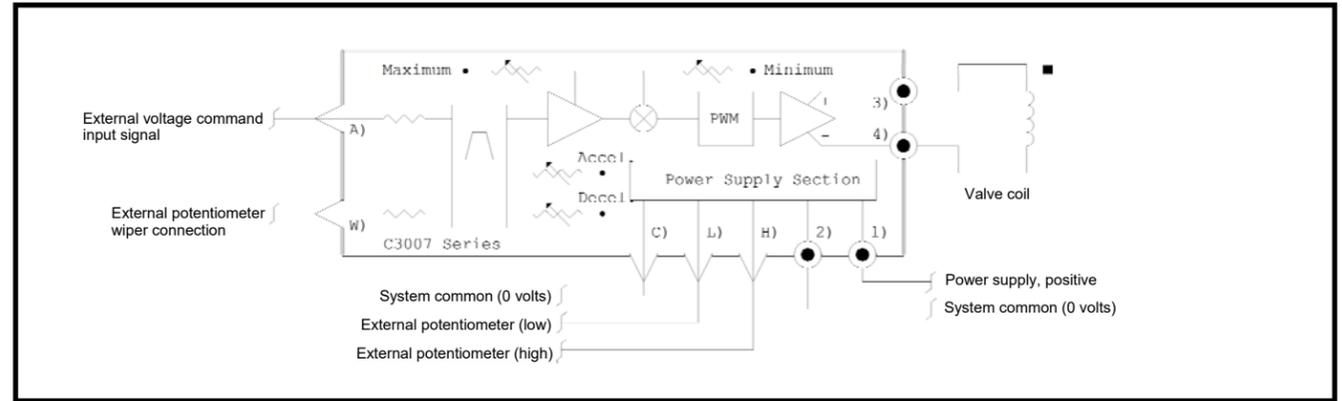
If you do not know the required switching frequency you should specify 2200 Hz. (suffix D = 0). This frequency will provide adequate performance with almost all proportional solenoids.

The valve driver switching frequency can be measured at test point "TP" with an oscilloscope.

**INTRINSICALLY SAFE VALVE COILS:** These devices typically contain zener diodes in order to limit the maximum voltage applied to the coil to safe values. The pulse width modulated valve driver is a current regulator and will always apply the full power supply voltage to the coil. In order to provide proper operation and to prevent failure of the internal zener diodes the power supply output must be limited to the rated voltage of the coil used. In general, Datatran's unregulated power supplies are not suitable for this application. Additional information can be obtained from Datatran's engineering department.

**EXTERNAL WIRING:** External command signals should be twisted and shielded cable. All shields should be terminated at terminal 2 on the amplifier only. Do not expose or connect the shield at any point in its run from the signal source to the valve driver module. Connections to the valve coil need not be shielded, however a reasonable effort should be made to route this cable away from equipment generating electrical noise. For optimum performance, all external connections to the valve driver should be via shielded cable

**FUNCTIONAL DIAGRAM:**

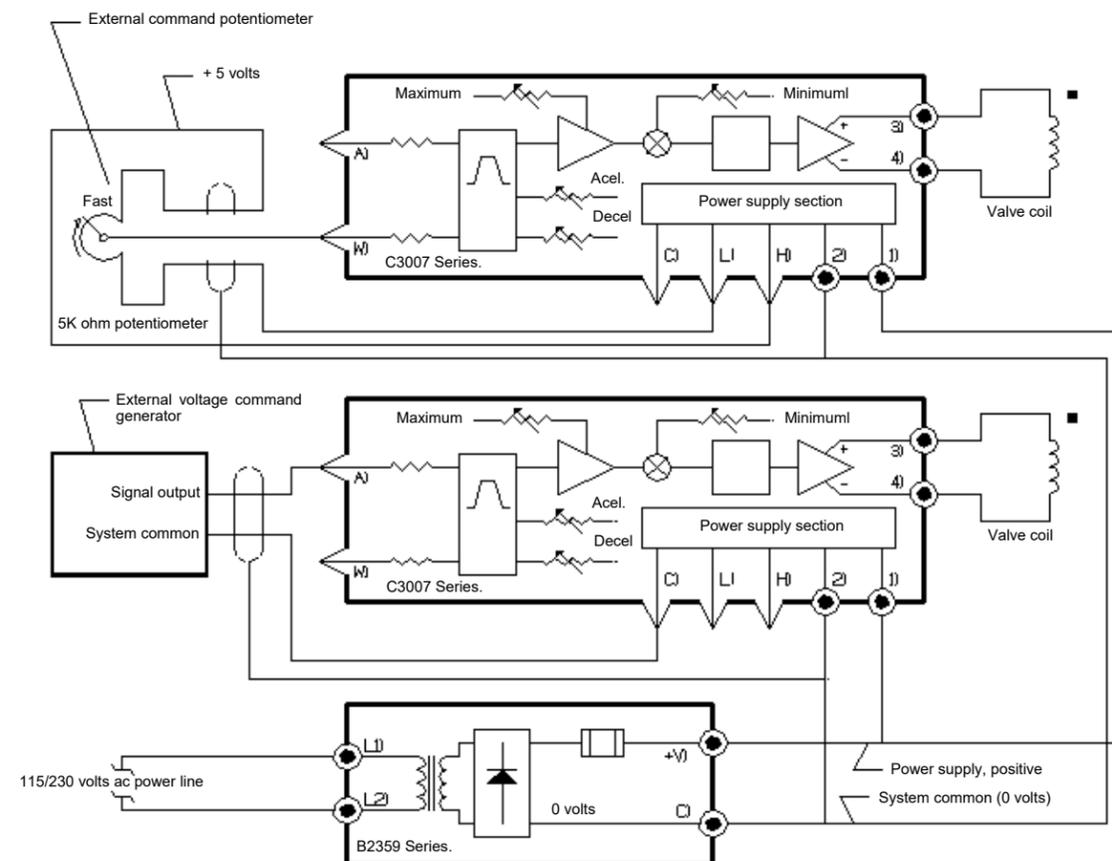


**!!!! WARNING !!!!**

Do not apply voltages less than the system common (0 volt) value to either the "A" or "W" tabs. Negative voltages applied to the "A" or "W" tab may cause the valve driver to apply the full power supply voltage to the connected valve coil.

**APPLICATION EXAMPLES:**

Unidirectional, proportional solenoid valve drivers with the setpoint command signal derived from an external command potentiometer and from an external voltage source.



Note that the positive power supply voltage must be adequate to drive the valve coil at maximum current.