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.

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 "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.

PWM SWITCHING FREQUENCY: 100 Hz. with suffix D = 1

200 Hz. with suffix D = 2   400 Hz. with suffix D = 3

1000 Hz. with suffix D = 4   2200 Hz. with suffix D = 0

The pulse width modulated (PWM) switching frequency tolerance is plus and minus 20% of the value shown.

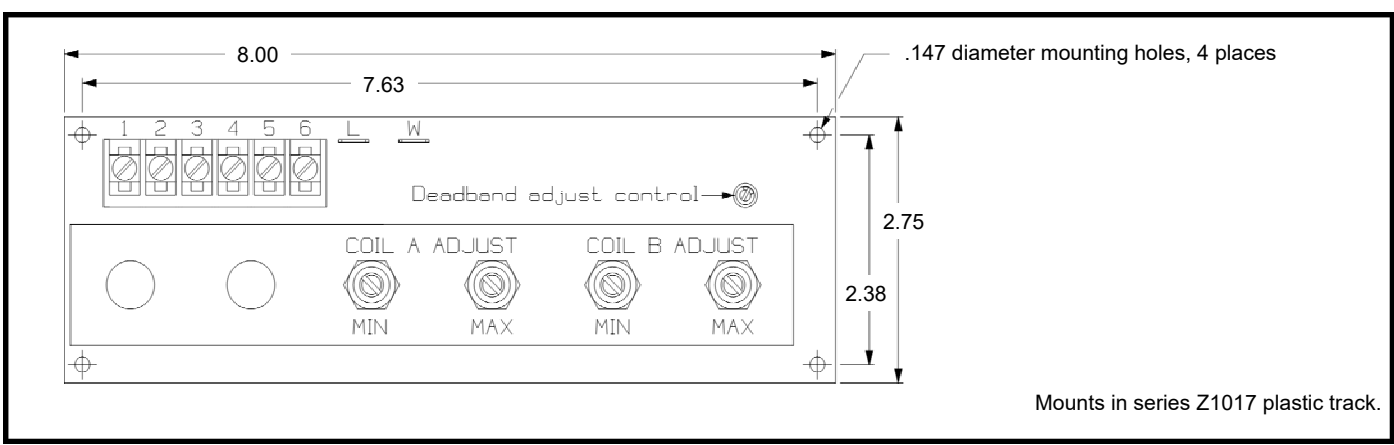**MINIMUM CURRENT ADJUSTMENT RANGE**:   0% to 40% of the rated output current.

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

DEADBAND ADJUSTMENT RANGE: 1% to approximately 20% of rated input volts.

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:

8.00
7.63
.147 diameter mounting holes, 4 places
1 2 3 4 5 6   L   W
Deadband adjust control →
COIL A ADJUST   COIL B ADJUST
MIN   MAX   MIN   MAX
2.75
2.38
Mounts in series Z1017 plastic track.

GENERAL DESCRIPTION:

This pulse width modulated valve driver module is designed to be used for open loop motion and speed control systems. Each of the two outputs is unipolar and will drive all dual 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 minimum and maximum output for each valve coil current as well as the deadband around zero. The input command signal is bipolar and can be obtained from an external command potentiometer or from a remote 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. Positive input signals will drive coil A, negative signals will drive coil B. The module requires a positive 10 to 30 volt DC power supply to drive the valve coils. In addition, the user must supply the bipolar source for the input command voltage signal. Both power supplies must operate at the same common potential.

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:

Option identifier suffix groups ⎯⎯⎯⎯⎯

Model series identifier ⎯⎯⎯⎯⎯

D3055-AAA-BBB-CCC-DE
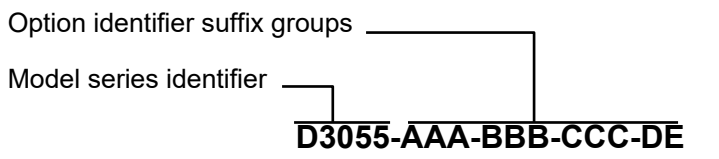
PART NUMBER SUFFIX GROUP EXPLANATION	
SUFFIX	**DESCRIPTION**
AAA	Minimum power supply voltage
BBB	Maximum input signal voltage
CCC	Maximum output current to valve coil
D	Pulse width modulated switching frequency
E	Factory installed option identifier

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 D3055 model series selection sheet for a complete listing of the currently available models.

DATA SHEET FOR DATATRAN D3055 PULSE WIDTH MODULATED VALVE DRIVER BOARD (DOUBLE 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

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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 designed to follow an external voltage signal. A positive signal applied to the "W" tab will control the output current to coil A. A negative signal applied to the "W" tab will control the output current to coil B. The common (0 volts) side of the external command voltage source must be connected to the "L" tab. Note that the external signal source and the valve driver must share the same reference potential. The valve driver does not provide signal isolation. **The minimum value of the external voltage signal applied to the "W" tab must be less than the deadband adjustment control setting.**

EXTERNAL COMMAND POTENTIOMETER: The valve driver can be used with a remote command potentiometer. This potentiometer requires external power that must be supplied by the user. The wiper signal from the command potentiometer must be connected to tab "W". The external power supply must have it's common (0 volt) potential connected to the amplifiers "L" tab.

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

MINIMUM AND MAXIMUM OUTPUT ADJUST CONTROLS: With the input command signal at the lowest value that will overcome the deadband and produce an output, 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. This must be done for both coils using a positive and negative command voltage. Once set, as the input command is varied from a value equal to the deadband setting to the maximum rated value, the valve coil current will vary from the pilot value to the maximum.

The minimum current should be set before adjusting the maximum control.

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:
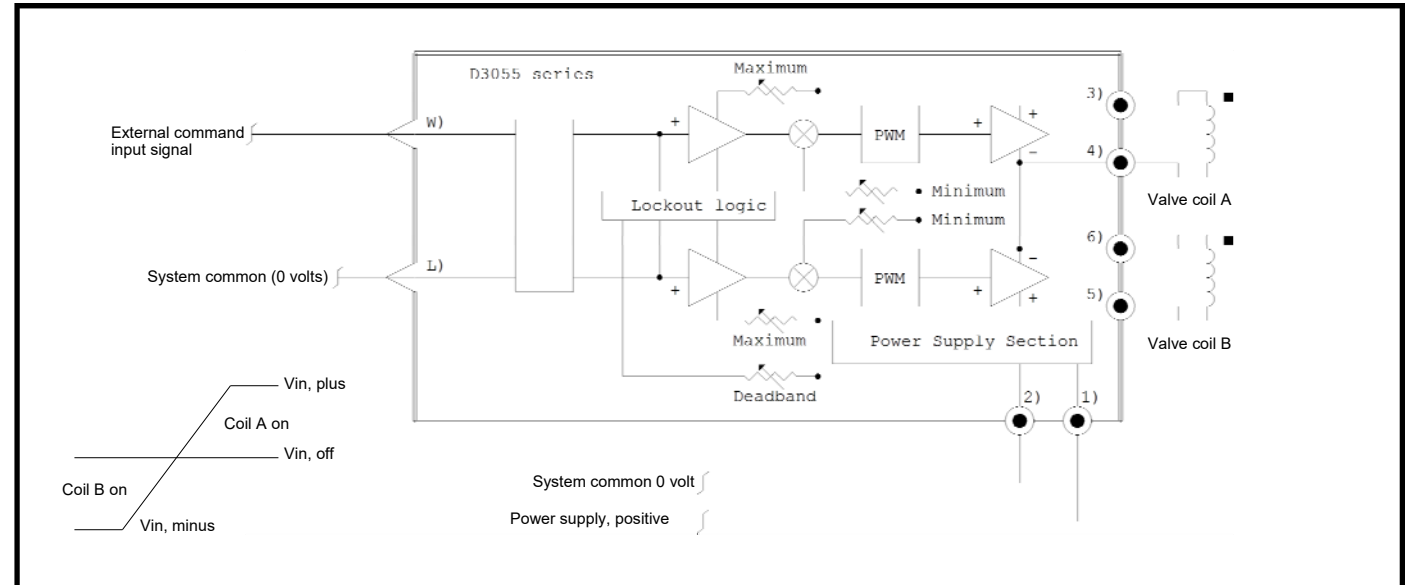
APPLICATION EXAMPLES:

Bi-directional proportional valve driver with the command signal derived from a potentiometer. Both solenoids will be off with the potentiometer in the center position. As the potentiometer is moved from the center towards the positive voltage, solenoid A will be powered. Once the potentiometer output exceeds the deadband, the valve coil current will vary from the pilot current value to maximum. Potentiometer movement towards the negative voltage will energize solenoid B, in a similar manner.

Notice the external bipolar power supply for the command potentiometer. Although not shown, the connections between the potentiometer and the power supply should be shielded cable. The shield should be exposed and connected at the power supply common point, only.
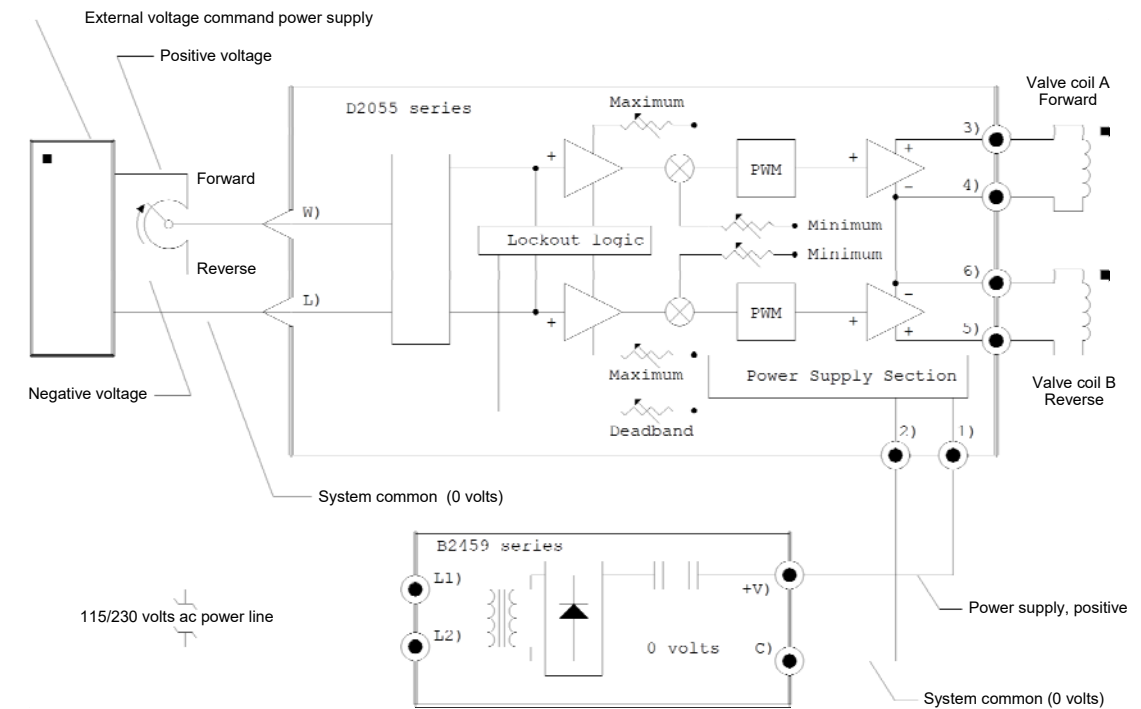
Coil "A" will be energized with a positive voltage at the "W" tab.
Coil "B" will be energized with a negative voltage at the "W" tab.