



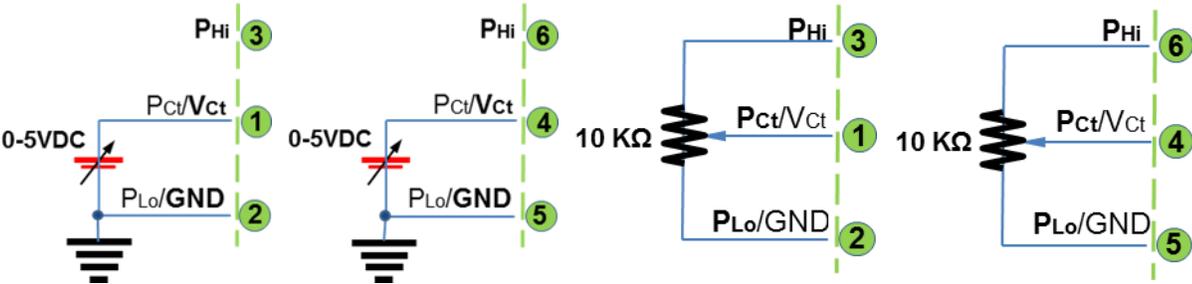
**MODEL P550A  
PWM TRANSMITTER**

**COMPASS INSTRUMENTS MODEL P550A  
DUAL PWM TRANSMITTER**

**SPECIFICATION, INSTALLATION AND APPLICATION NOTES**



The Compass Instruments P550A Dual PWM Transmitter is a dual voltage to pulse width modulator. Each channel of the transmitter may be driven with a variable 0 to 5VDC signal to produce a proportional pulse width modulated output capable of directly controlling devices requiring up to 5 amps of current. Each output operates at 488 Hz and can sink up to 5 amps of current and switch up to 30 volts DC. The input circuits are also designed to accommodate a 10K ohm potentiometer.





## MODEL P550A PWM TRANSMITTER WHAT IT IS, HOW IT WORKS

### Theory of Operation:

PWM is short for Pulse Width Modulation and is a very efficient method of control. By keeping the overall supply voltage consistent, but varying the duty cycle of the signal, the amount of energy, required by the device, can be controlled without the inherent problems found in a direct voltage/current controlled system.

The output stage of the P550A is a MOSFET with a very low on resistance. When the MOSFET is conducting, the supply current through it is close to the circuit maximum, with most of the voltage drop occurring across the load and very little dropping across the MOSFET. Therefore, the power dissipation across the MOSFET is very small. When the MOSFET is not conducting, the voltage drop across the MOSFET is close to maximum, but there is no current flow or power being dissipated.

### Key features of the P550A Dual PWM transmitter:

1. High power MOSFET output transistors, switching up to 5 amps of current.
2. Two independent channels with discrete inputs and outputs.
3. Capable of independently switching up to 30 VDC per channel. Each channel can switch different supply voltages.
4. DIN rail mounting with removable terminals. The enclosure includes a clear, flip-up cover on top that allows for ease of labeling/marketing.
5. Wide module supply voltage, from 7 to 30 VDC at less than 10 mA. The supply to power the module is independent of the supply power for each of the outputs.

### Specifications:

Module Supply Voltage: 7 to 30 VDC

Module Supply Current: Less than 10 mA

PWM Control Input Voltage: 0 to 5 VDC

PWM Control Input Current: Less than 2 mA

PWM Outputs: sinking up to 5 amps at up to 30 volts DC

Temperature Range: -20°C to +85°C

Mounting: DIN rail

### Dimensions:

w=17.5mm (0.7")

h=85mm (3.35")

d=70.4mm (2.8")

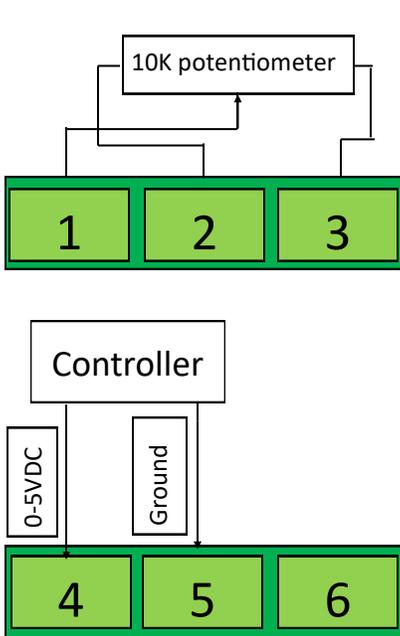
Weight: 66g (2.3oz)



## CONNECTIONS

The illustration below shows typical control connections.

With power connected to terminals 8(+) and 9(-) (7 to 30 VDC), an internal voltage regulator applies +5VDC to terminals 3 and 6. The terminal 9 "Ground" is internally connected to terminals 2 and 5. An external 10K ohm potentiometer, connected between terminals 2 and 3 is connected between +5VDC and ground, providing 0 to 5VDC output on the wiper. The wiper is connected to terminal 1 to set the duty cycle of the output pulse.



In the application shown to the left:

Channel one is controlled with a manual potentiometer.

The input for channel two is a zero to 5VDC signal from a controller. Note that the common (or ground) must be connected from the controller to the P550A.

The second channel shown above is connected to a controller, such as a PLC, an embedded system or the output from a PC controlled interface.

The method of control is flexible, as long as the input control voltage is connected to pin 1 and/or pin 4 as referenced to pin 2 and/or pin 5.

The input control voltage to output duty cycle is linearly proportional. The output is as follows:

INPUT	OUTPUT	INPUT	OUTPUT
0V	0%	3V	60%
1V	20%	4V	80%
2V	40%	5V	100%



# MODEL P550A PWM TRANSMITTER USAGE TUTORIAL

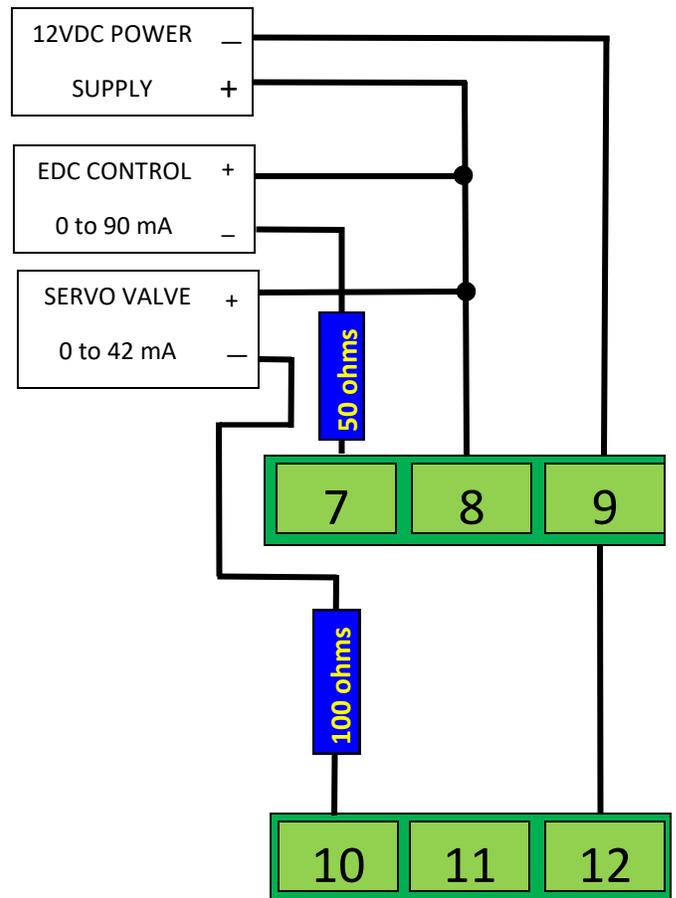
## OUTPUT CONNECTIONS, PRECAUTIONS AND INSTRUCTIONS:

When driving hydraulic or pneumatic inductive devices such as various kinds of valves or electronic displacement controls, it is very important to set the drive voltage/current correctly. If the drive signal is too low, the expected results will not be present. If the drive signal is too high, it can damage the device being driven. The controls being driven should be rated, either with a maximum voltage, or a maximum current. In the illustration below, the servo valve is rated for a maximum current of 42 milliamps and a coil resistance of 185 ohms. The EDC control coil has a maximum current of 90 milliamps and coil resistance of 85 ohms.

Based on the servo valve resistance of 185 ohms, when subjected to 12 volts, 185 ohms generates approximately 65 milliamps, which is greater than the 42 milliamp maximum. Working backwards, Twelve volts divided by 0.042 amps is approximately 285 ohms. Since the servo coil is only 185 ohms, a 100 ohm resistor must be added to the circuit to limit the current to achieve the manufacturers specifications. Install the 100 ohm resistor externally to limit the current.

Based on the EDC coil resistance of 85 ohms, when subjected to 12 volts, 85 ohms would generate approximately 140 milliamps, which is also greater than the 90 milliamp maximum required by the manufacturer. Again, 12 volts divided by .09 amps yields approximately 133 ohms. Subtracting the coil resistance of 85 ohms from 133 ohms shows a difference of 48 ohms. A commonly available resistor value close to the calculated value is acceptable.

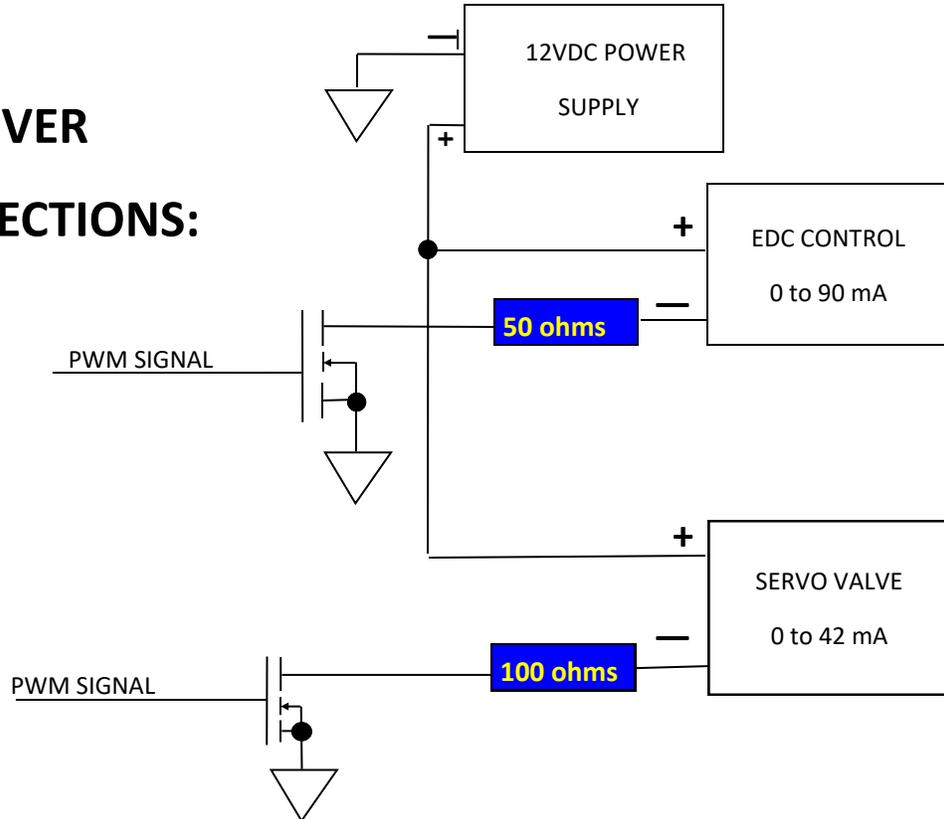
Be sure to calculate the wattage and insure that the current limiting resistors are sized properly.





## MODEL P550A PWM TRANSMITTER USAGE TUTORIAL

### SIMPLIFIED DRIVER OUTPUT CONNECTIONS:



### CONTROL IN THE ACTIVE REGION:

To make the system more responsive, follow this procedure:

#### **BEFORE PREFORMING THIS PROCEDURE, GET CLEARANCE TO RUN THE SYSTEM!**

When powering a hydraulic motor, a pump, or some other device, watch the RPM to the device being controlled (or what ever movement can be observed).

Beginning at 0 volts, increase the control voltage very slowly until the device begins to move, then reduce the voltage slowly until the device stops. Record this voltage as the zero point.

Increase the control voltage and slowly approach maximum. When increasing the voltage does not increase the RPM, stop and record this voltage as the maximum control voltage.

On a closed loop control system, this will make the system more responsive and prevent "hunting" on start up.

NOTE: If when applying 0 volts there is an RPM reading or the device begins to move, there is an adjustment needed in the hydraulics and they may need to be nulled.