

Model 402 Pulse Width Modulation Driver / Controller



FEATURES

- RS232 control of PWM output frequency and duty cycle
- signal conditioning style unit, DB-9 dongle, small form factor
- lowest cost PWM Controller Model using accurate, repeatable and reliable APM, Inc. digitally generated PWM technology
- adjustable PWM output square wave:
 - frequency of 10 to 1500 Hz
 - 10 to 1000 Hz, 1 Hz resolution
 - 1000 to 1500 Hz, 50 Hz resolution
- duty cycle output adjustable from 0 to 100% with 0.1% resolution
- RS-232 interface, TX, RX, GND, 9600 baud
- single letter ASCII command interface
- electrically isolated RS-232 version available
- fault indication: open-load, blown fuse
- power MOSFET output with low side load control - PWM output sinks up to 4A at 12V
- output protected with easily accessible, standard mini-blade fuse
- controller operating voltage
 - Model 402R (non-iso) 9 to 28 V DC
 - Model 402T (iso) 9 to 14 V DC
- load may be operated with up to 32V DC
- configurable start-up
- I/O connection using pluggable terminal strip
- operating temperature: -40 °C to +60 °C
- designed for long service life and high reliability using components rated for industrial temperature range
- lead-free, RoHS compliant



APPLICATIONS

- RS-232 to PWM output signal conditioner for PLC, PC, or any Computer Control System to drive high current PWM controlled devices
 - PWM drive for valves, actuators, solenoids
 - solenoid life cycle testing
 - test stands / test cells / bench testing
 - lighting control / dimming
- programmable PWM signal generator
- OEM / production applications

DESCRIPTION

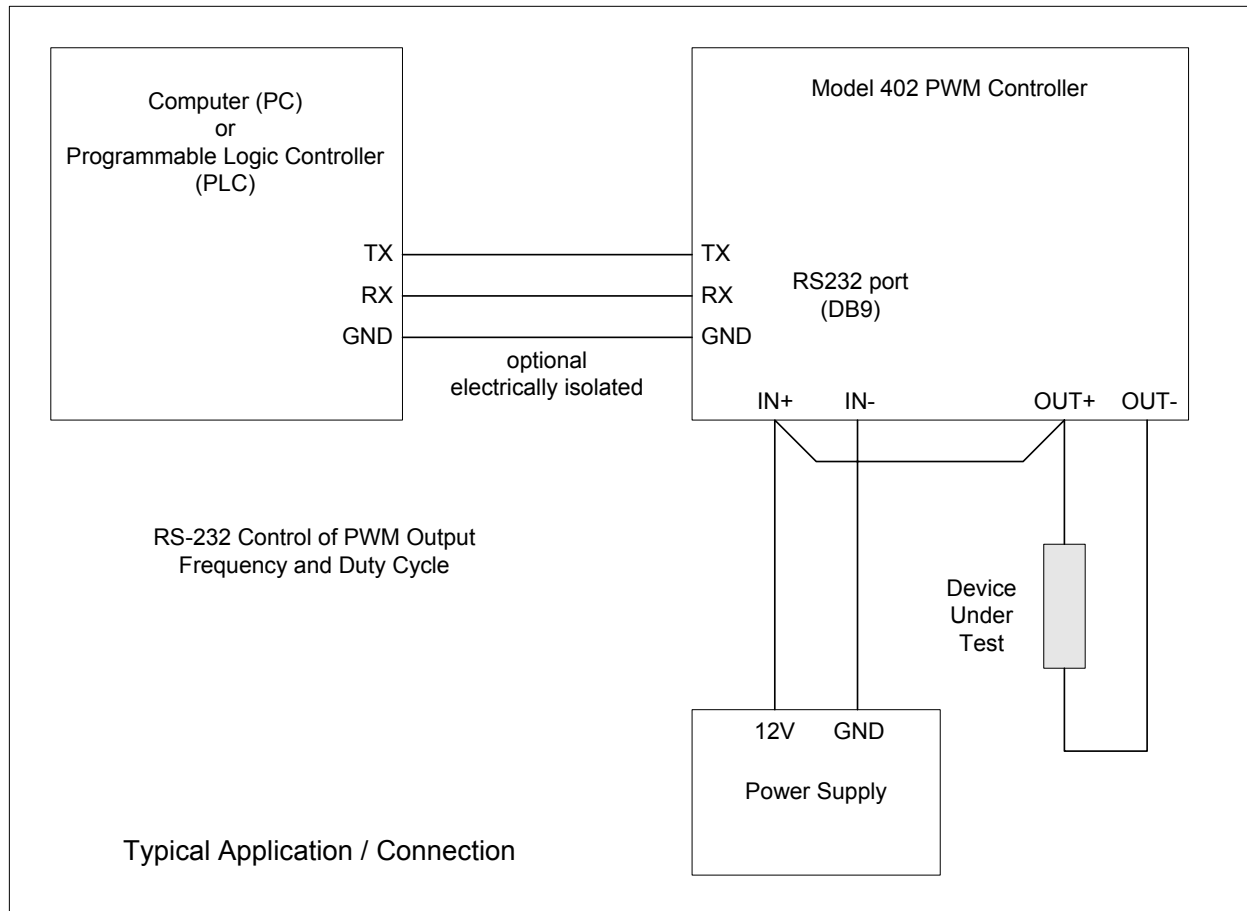
The Model 402 Pulse Width Modulation Driver / Controller from Applied Processor and Measurement, Inc. generates a pulse width modulated, variable frequency and duty cycle, electrical switching signal. The product is used in automotive and industrial applications where valves, solenoids, actuators, or other magnetic / mechanical elements are developed, applied and / or tested. The Model 402 PWM Driver is a low cost, small form factor module designed for signal conditioning applications where computer based control systems or PLC's are used to drive elements containing PWM controlled valves or actuators. Its small size and low cost also make the Model 402 PWM Driver / Controller ideal for OEM applications.

The Model 402 PWM Driver / Controller contains microcontroller based circuitry which allows for precision generation of the output PWM carrier frequency and duty cycle. The output frequency and duty cycle of the Model 402 is controlled via a standard serial port. The Model 402 is capable of operating frequencies from 10 Hz to 1,500 Hz with an output duty cycle resolution of 0.1%. The Model 402 creates the PWM signal using a digital timebase providing excellent accuracy and repeatability over age and temperature. There are no pot adjustments that may drift over time and temperature.

Commands are ASCII character based and the Model 402 may be controlled via a PC using Hyperterm or a PLC serial port. A status command reports on the state of the output fuse or if the load is open circuit. The Model 402 may also be configured (internal EEPROM) to store the current operating settings to power on using a specific frequency and duty cycle.

A typical connection using the controller is shown in the diagram below. In this illustration, the PWM Controller is a signal conditioning element for a host computer or control system, which typically does not have a PWM output capability, or, the direct drive capability for supplying current for PWM controlled solenoids and actuators. An electrically isolated version of the Model 402 is available for applications where common-mode voltages may be present or ground isolation is required.

The PWM Controller output is a fuse protected, open drain power MOSFET output. This provides low side control of the load to be pulse width modulated. An external power source must be provided. This power source may be used to power both the load and the controller, however, the PWM Controller need not be powered by the same power source. This provides maximum flexibility since the load voltage can be set by the user using any variable power supply, or, it can derive power directly from the system under control (provided the controller is operated within the rated specifications). See the User's Manual for dual supply connection configurations.



A comprehensive User's Manual is provided on our website in PDF format, describing the operation and application of the PWM controller.

A control program is supplied on our website which allows control of the Model 402 from a PC Windows based user interface.

SPECIFICATIONS

- PWM Output: open drain Power MOSFET, maximum power dissipation 50W
 - up to 4A @ 12V, pulsed
 - must operate within safe area of IRLR2905
 - built-in fuse on output, standard mini-blade, 4A supplied
- PWM Output Operating Voltage: 32V maximum, 1V minimum
- Frequency: 10 to 1,000 Hz, 1 Hz resolution, typical error < +/- 0.2 Hz
1,000 to 1,500 Hz, 50 Hz resolution, typical error < +/- 1 Hz
- Duty Cycle: 0 to 100 %, adjustable with 0.1% resolution, typical error < +/- 0.1% duty
- Power: requires nominal 12V DC power source
 - (non-isolated) Model 402R, 9 to 28V DC
 - (electrically isolated) Model 402T, 9 to 14V DC
 - controller power consumption
 - (non-isolated) Model 402R, 20 mA (approximate) at 12V DC
 - (electrically isolated) Model 402T, 125 mA (approximate) at 12V DC
 - dual supply required for operating loads outside of controller operating range
- RS-232: TX, RX, GND, 9600 baud, no parity, 8 data bits, 1 stop bit, standard DB-9M connector
 - TX pin 2, RX pin 3, ground pin 5
- I/O connections: Phoenix 1803594 or equivalent pluggable terminal strip
- Operating Temperature: -40 °C to +60 °C
- Size: 4.25 in. x 1.7 in. x 1 in. (maximum, including I/O connectors)
- Packaging: plastic enclosure
- Warranty: 1 year, for manufacturing defects

ORDER NUMBERS – CONTROLLERS AND ACCESSORIES

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|------------|---|
| PWMC-402R | Model 402 PWM Driver / Controller, RS232 to PWM |
| PWMC-402T | Model 402 PWM Driver / Controller, electrically isolated RS232 to PWM |
| PWMCA-CB01 | Serial Cable, DB-9F to DB-9F, straight-thru, 9 ft. |
| PWMCA-FS54 | 10 replacement fuses for the PWM output, mini-blade type, 4A rating |
| PWMCA-FS52 | 10 replacement fuses for the PWM output, mini-blade type, 2A rating |

CUSTOM / SEMICUSTOM CONTROLLERS

All standard products from Applied Processor and Measurement, Inc. including the Model 402 PWM Driver / Controller are available for customization. The Model 402 can be designed to exacting specifications for your application, reducing cost for high volume applications, changing functionality, or adding features. For more information, contact APM, Inc. via our website, or, call to talk to one of our engineers. APM, Inc has been supplying embedded electronic controls for nearly 20 years for a wide variety of industrial, automotive and commercial applications.