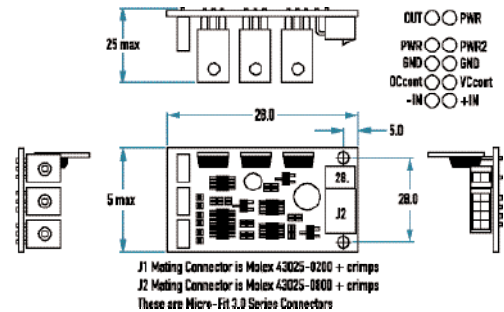
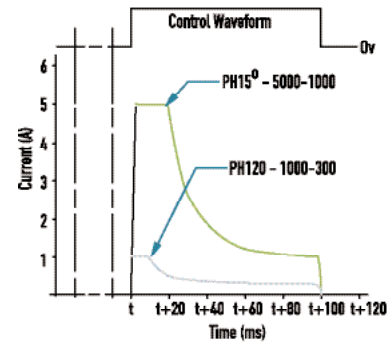


Application of Pick-and-Hold Modules

Geeplus's Pick & Hold Modules are designed to work with a wide range of different solenoids, and over a wide range of operating voltage. We recommend the use of a high source voltage to minimise electrical time constant, but modules will work down to 20v supply.

Control inputs are opto-isolated so local variations in ground potential should not affect operation.

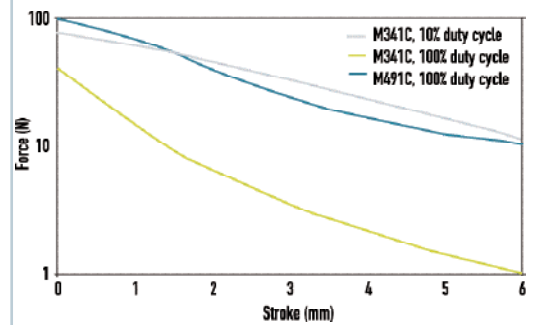
In distributed systems the pick-and-hold circuit should be situated as close as possible to the driven solenoid. In systems where pick-and-hold is used primarily for force/speed benefits, and where the solenoid is situated close to the control system, it may be more cost-effective to build the P&H unit into the control PCB. This eliminates the need for opto-isolation, and reduces the cost of both opto-isolator and connector costs. Geeplus will license the design of P&H circuit for use in such applications.



Pick & Hold Modules

Pick & Hold operation allows you to take advantage of the force and operating speed developed by a solenoid at low duty cycle, whilst keeping the power to the 100% duty level or less. Considerable increases can be realised in force or speed performance.

- Maximise operating speed (use of high supply voltage and low resistance/inductance solenoid minimises electrical time-constant).
- Maximise pull-in force or torque from extended (de-energised) position (may permit a smaller/cheaper solenoid to be used in a given application).
- Minimises power consumption (permits downsizing and cost reduction of PSU).
- Minimise heat dissipation (reduced heat dissipation improves reliability, allows operation at higher ambient temperature, and allows handling of temperature sensitive media such as photochemical or blood products).
- Consistent performance independent of voltage and temperature (supply can be unregulated DC reducing capacity and cost of regulating the high current output side of PSU).



[Miscellaneous devices]

Where to use Pick-and-Hold?

There are two key factors in determining if pick-and-hold drive is suitable for an application.

1. Force/speed with 'pick' drive conditions must meet the requirement of the application.
2. The force in the 'hold' drive condition must be sufficient to maintain holding state in the loaded condition.

Module	PHI 50-5000-1000-100	PHI 20-1000-300-100	PH20-300-150-36
Pick Current	5.0A	1.0A	300mA
Hold Current	1.0A	300mA	150mA
Pick Pulse Width	See graph	See graph	See graph
Supply (min)	20V	20V	20V
Supply (max)	100V	100V	36V
Isolation	1kV	1kV	None
Vcont (high curr)	2.88V	3.46V	1.80V
Vcont (low curr)	3.53V	3.58V	3.15V

Pick-and-Hold drive delivers greatest benefits in applications where the 'ON' time of the solenoid is very much greater than the 'pull-in' (moving) time.

For high force Pick & Hold drive is best used in conjunction with solenoids exhibiting high holding force relative to force in the extended position. Geeplus's Push-Pull solenoids are ideally suited to driving in this way.

For high speed, most solenoids benefit from use of Pick & Hold drive. Speed advantage is gained both due to higher acceleration (the higher pick current produces greater force), and reduced electrical time constant (this is minimised by use of highest possible source voltage).

Where supply voltage or temperature conditions are subject to wide variation, PWM control using current feedback as used in Geeplus's Pick & Hold modules stabilises solenoid performance against fluctuations. Simpler open-loop PWM control does not provide stabilisation against supply or temperature variations.

Pick and Hold Circuit - How to Use

Load Connection - the load device is connected to the 2-pin connector J1.

Power supply - positive supply is connected to pin 2 of the 8-pin connector J2. Ground connection is to pins 3 &/or 4. Pin 1 is usually connected to pin 2 (minimum 20v recommended, maximum 100v). The main supply will normally be highest available voltage within the device specification, this should be DC and should be smoothed to prevent dropping below 20v, but can be un-regulated.

For normal operation, the circuit is controlled via pins 7 & 8, these are opto-isolated (the PH20 unit does not have opto-isolation) from the device power supply. A voltage in the range 5v to 24v is appropriate to control the circuit.

Preset P1 controls the pick current.

Preset P2 controls the pick time.

preset P3 controls the hold current

Pin 5 (Vcont) can be used to provide analogue control of output current, the output current is controlled by varying the control voltage within the specified range.

Pin 6 bypasses the opto-isolator, if this is tied to GND level the circuit can be switched directly.