Picard Industries

Specializing in Miniature Smart Motors and Sensors

Programmable Solenoid (PPS-1)

- Size 17 motor – 1.5” square
- Simple Control Interface – only 3 wires: Power, Ground and CMD signal
- Constant Current / Torque
- Ball bearing brushless stepper (for longer life)
- 0.9 degree position resolution
- +/-0.5” position repeatability
- Onboard programming
- Status LEDs to verify solenoid motion
- Wide operating voltage (12 volts to 28 volts)
- Self-contained electronics

The new Picard Programmable Solenoid (PPS-1) delivers the motion capability of a sophisticated stepper motor system with the simplicity of a linear solenoid. A solenoid can now have a smooth motion without the need for an expensive motor control system. The PPS-1 provides the motion of an angular solenoid without the non-linear torque and erratic banging motion against a hard stop. The electronics of the PPS-1 allows the user to program and store the desired motion profile using the simple user interface. Three buttons and two LEDs are used to set the distance of motion and velocity. After programming, the PPS-1 operates as a rotary solenoid. The PPS-1 requires power, ground, and a control signal. The control signal extends or retracts the solenoid. Any device that can connect a wire to ground (switch, sensor, PLC, an open-collector or open-drain transistor output, etc.) can control the PPS-1. The innovative PPS-1 gives programmability to the motion of a rotary solenoid without the expense of a costly motor control system.

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Mating Connector Pin Outs

PIN 1 Power (12-28 volts at 0.5 amps maximum)
PIN 2 Ground (power return path)
PIN 3 CMD signal (commands the solenoid to extend when connected to ground, to return to home when open)
PIN 4 ACK signal (optical feedback, logic Hi when in the home position. Logic Lo when in the extended position)
PIN 5 Reset (optional signal used to remotely reset an error condition, resets the PPS-1 when connected to Ground, runs normally when left open)

Molex P/N 50-57-9405 Pins P/N 16-02-0103

Operation

The PPS-1 has two modes of operation, RUN and PGM (program). The PPS-1 defaults to RUN mode on power up. In this mode, the PPS-1 operates as a rotary solenoid. The PPS-1 is controlled through the five pin latch connector. This connection supplies power, ground and the CMD (command) signal. Optional is an ACK (acknowledge) signal. This signal provides feedback and motion status. To extend the solenoid, the CMD signal is connected to ground. This will cause the CMD LED (red) to be lit. The ACK signal will sink to ground when the solenoid is fully extended, causing the ACK LED (yellow) to light. When the CMD signal is open (not grounded), the CMD LED will go out and the solenoid will begin retracting to its home position. When it reaches home position, the ACK signal will go to a 5-volt level, and the ACK LED will turn off. This signifies the completion of the motion. The motions (both extending and retracting) will use the motion profiles programmed by the user. The MODE LED (green) is not lit when in the RUN mode.

The MODE LED (green) will be lit when in the PGM mode. To enter this mode, both the INC and DEC switch should be depressed and held until the MODE LED becomes lit (approximately 3 seconds). You are now in the programming mode. The SEL button is now used to select which of the two parameters you can program. They are "Position" and "Velocity." By momentarily pushing the SEL button, the MODE LED will begin to blink differently. One blink denotes the Position parameter, and two blinks denote Velocity. When the LED is lit but not blinking, the user can leave the programming mode by holding both the INC and DEC button until the MODE LED extinguishes.

Programming

When entering the "Position" parameter mode (one blink), the solenoid will extend to it's current programmed position. The up and down buttons on the solenoid control board are used to move (signal step) the solenoid to a new position. Push the SEL button to store this new position. The solenoid will now return to its home (retracted) position.

When entering the "Velocity" parameter programming mode (two blinks), the ACK LED will also blink to indicate which velocity value is currently selected (there are over ten selectable velocity values). One blink of the ACK LED is the fastest speed value. The more it blinks, the slower it moves. Use of the up and down buttons can change the blinking of the LED until the desired speed is reached. Pushing the SEL button will store your new velocity and move on to the beginning of the PGM mode (MODE LED on without blinking.)

At the beginning of the PGM mode (MODE LED on steady), it is optional to continue reprogramming the two parameters or leaving the PGM mode back to the RUN mode. To continue reprogramming, push the SEL button and follow the instructions above. To leave the PGM mode, depress and hold both the INC and DEC button until the MODE LED extinguishes (approximately 3 seconds). Now it returns to the RUN mode. Pushing the SEL button can now test your new motion profile. If the new motion is correct, you have completed the programming and the PPS-1 will now operate using the new stored parameters. If the motion is still not correct, re-enter the PGM mode and select new parameters to achieve the desired motion profile.

Customization

The parameter values available with the PPS-1 should satisfy the vast majority of applications. If your needs are specialized, a custom solenoid may be necessary. Picard Industries can customize the software for your specific application. We can scale the PPS-1 design to bigger or smaller sized motors, as well as linear motors that act as push/pull solenoids. Please contact us to discuss your needs.

The cost of the PPS-1 unit is $95.00 or $85.00 for orders of 10 or more, plus additional shipping and handling.