



## SYSTEMS M200

## INTERFACE MODULES

### M273: HIGH SPEED SOLENOID DRIVER

- High speed solenoid driver that improves solenoid response time, repeatability, and reliability
- Provides 39 volt DC turn “on” pulse for faster solenoid “on” response and 13.5 volt holding voltage for faster solenoid “off” response
- Adjustable turn “on” pulse (5 to 25 milliseconds)
- Optically isolated 10-30 VDC differential input
- Optimized for 24VDC solenoids
- Rated for 5 Amp inrush and 3 Amp continuous current
- LED status indication of solenoid energized
- Powered from external +24VDC and –15VDC user power supplies
- Removable Field Wiring Connector
- Standard 3” x 3” x 1” DIN Rail Mountable Module



### General Description

The M273 is a High Speed Solenoid driver which reduces the response time (both “on” and “off”) and improves the repeatability of +24VDC solenoids. Compared to a standard solid-state output, which applies and maintains +24VDC to the solenoid, the M273 applies a pulsed turn “on” voltage of 39VDC for a user adjustable number of milliseconds when the solenoid is first energized. It then drops to a holding voltage of 13.5 volts until the solenoid is de-energized. Improvement in solenoid response time from 50 to 100% can be obtained using the M273.

The advantages of this type of driver are: When the solenoid is energized, the initial pulse provides a turn

“on” voltage which is considerably greater than the rated voltage of the solenoid (which causes no damage to the solenoid since it is of a short duration). This provides a greater degree of energy to overcome the initial inertia of the spool quicker with a greater degree of repeatability. After a user adjustable number of milliseconds, the voltage drops to a holding voltage which is lower than the rated voltage of the solenoid but enough to maintain the solenoid in the energized state (at a lower energy level). When the solenoid is then de-energized, it will then turn “off” quicker because less energy needs to be dissipated from the coil. The M273 incorporates a transient suppressor

## General Description (cont'd)

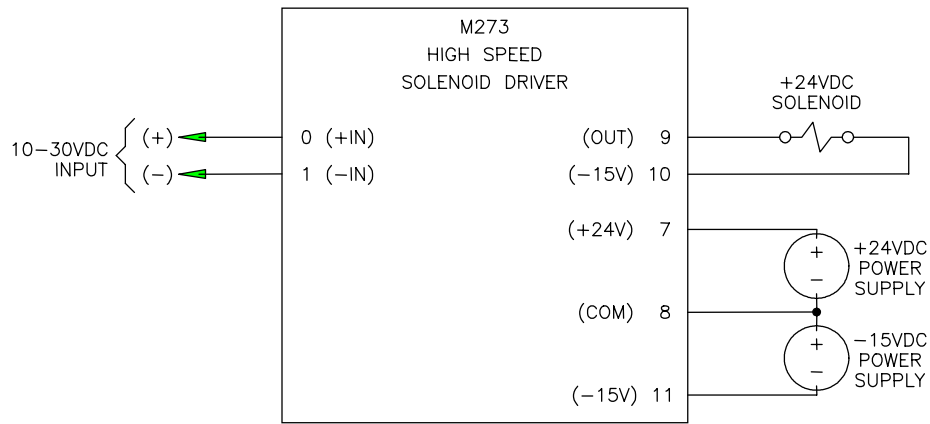
which allows the inductive back-EMF of the coil at turn “off” to drop to  $-39$  volts. This also contributes to a quicker turn “off” since the energy is dissipated at a higher voltage. Note that fly-back diodes should not be added to the solenoid coil for this reason.

The M273 input is a 10-30VDC optically isolated differential input. This is usually driven from a 10-30VDC output from a PLC. The output of the M273 is then wired directly to the respective solenoid (see figure 1 for a typical wiring diagram). The output of the M273 is rated for up to a 5 amp inrush current for 50 milliseconds with a continuous holding current of 2 amps. An LED is provided on the front of the M273 to indicate when the solenoid is “on”. This LED is driven directly from the

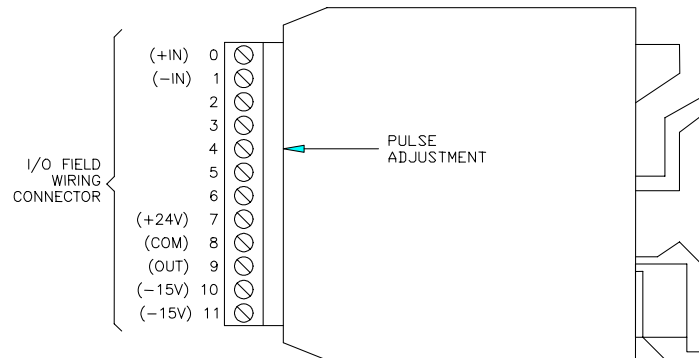
M273 output. The M273 requires +24VDC and  $-15$ VDC power from user supplied power supplies rated appropriately for the required current.

The initial high voltage turn “on” pulse is user adjustable from 5 to 25 milliseconds via a potentiometer accessible through the front of the M273 (factory preset to 10 milliseconds). This is used to optimize the turn “on” time of the solenoid. Turning the potentiometer counter-clockwise decreases the pulse time. Turning the potentiometer clockwise increase the pulse time.

Typical applications include any +24VDC solenoid applications which require the quickest possible solenoid response times or the greatest degree of repeatability.



**Figure 1**  
Typical Wiring Diagram of M273



**Figure 2**  
Connector Pin-Out



## **M273: HIGH SPEED SOLENOID DRIVER**

### **Specifications**

#### **Module Size:**

Length: 3.25"  
Height: 3.75"  
Width: 1.00"

#### **Input Section:**

Vin (on-min): 10.0 volts  
Vin (on-max): 30.0 volts  
Vin (off-min): 5.0 volts  
  
Input Current (max): 27 milliamps at Vin=30volts  
  
Input to Output Optical Isolation: 1500 Vrms  
  
Input Configuration: Can be wired for Sourcing,  
Sinking, or Differential

#### **Output Section:**

Vout (Turn "on"): 39 volts DC (typical)  
Vout (Hold): 13.5 volts DC (typical)  
  
Output Current (Inrush < 50msec): 5 Amps  
Output Current (Continuous): 2 Amps  
  
Output Impedance ("on"): 0.50 ohms  
Output Impedance ("off"): 2.5K ohms  
  
Output Response Time ("on"): 10 microseconds (max)  
Output Response Time ("off"): 100 microseconds (max)

#### **Power Required:**

+24VDC Power:  
Voltage: +24VDC +/-25% Regulated or  
Unregulated  
  
Current: Rated for inrush current of solenoid (min)  
  
-15VDC Power:  
Voltage: -15VDC +/-10% Regulated  
  
Current: Rated for inrush current of solenoid  
Plus 100mAmp

#### **Temperature Ranges:**

Storage: 0 to 85 degrees C  
Operating: 0 to 60 degrees C

#### **Relative Humidity:**

5 to 95% non-condensing

