

MO-10 NG Design Features

Overview

The MO-10NG motor operator is a state of the art design utilizing Programmable Logic Controllers (PLC) to provide a variety of configurable options. A Human Machine Interface (HMI) screen provides reliable, secure and straight forward configuration of the MO-10NG.

The MO-10NG includes a wide range of functions that can be configured prior to shipment or in the field through the menu screen of the HMI. The programmable features include:

- Voltage Options of 120, 240 VAC (24, 48, 125 & 250 VDC in process)
- Pushbuttons (Open, Close and Stop)
- Local and/or Remote operation
- Operation time delay and counter
- Six custom outputs
- Positive electro-mechanical Open and Close limit switches
- Open and Close speed control
- Watch Dog condition monitoring

PLC and HMI

Proprietary code within the PLC and HMI are used to control all aspects of the MO-10NG. Access to the code is password protected at the factory and additional password protection can be initiated to limit access to the HMI screen. Feedback from internal sensors provide precise position indication during operation. The HMI incorporates a 7" screen which provides excellent resolution and visibility of the menu screens.

Field Operation

Pushbutton (Local) operation is accomplished through the HMI screen. Separate pushbuttons are configured for Open, Close and Stop operation. If Local operation is not desired all Local pushbutton operations can be disabled from the HMI screen. Remote operation is also configured through the HMI screen. If Remote operation is not desired it can also be disabled. The HMI screen will also indicate if the MO-10 NG is in Local or Remote position as well as the switch position.

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Operation Time Delay and Counter

A time delay function (accessed through the HMI) allows for a 0 to 30 second delay from actuation of the pushbutton to operation of the MO-10NG. This allows operation personnel adequate time to leave the immediate area before the switching operation begins.

A counter has been incorporated into the code. The counter is configured to count each open-close cycle. Access to the count total is easily retrieved from the HMI screen.

Custom Outputs

Six custom outputs are provided for remote status indication. A total of four non-isolated and 2 isolated contacts are provided as standard.

Open and Close Limit Switches

Electro-mechanical limit switches along with their associated cam are used to define full open and closed end positions. The use of the electro-mechanical switches ensure that the MO-10NG stops at the precise open and closed end points.

Open and Close Speed Control

EHV disconnect switches can exhibit blade bounce at the end of an open or close operation due to the length of the blade and operating time of traditional motor operators. The MO-10 NG code incorporates a speed control menu that allows for four separate open and close sectors that are variable in duration. Motor speed can be set between 5 and 100% in each of the sectors. Utilizing the variable sectors and range of motor speed allows for control of the switch blade throughout its travel and virtually eliminating blade bounce.

Watch Dog Condition Monitoring

Condition monitoring is achieved by capturing motor current and operating time measurements. Once the MO-10NG and associated disconnect switch have been adjusted, the motor current and operating time can be archived. All subsequent operations are then compared to the archive data. A trending screen is also incorporated on the HMI screen which shows the last open and close operation as well as the motor current. Increases in the motor current and operating time are key indicators that a switch requires maintenance.

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The data obtained can be easily downloaded from a USB port on the HMI. In addition to the motor current and operating time the date and time of each operation is also recorded. Once saved to a flash drive, the data can easily be imported into an Excel spreadsheet.

Drive Train

The MO-10NG utilizes the same drive train as the standard MO-10. An internal worm gear is coupled with an external spur and pinion gear set to provide excellent torque output and positive output shaft control. Available ratings include 22,000 and 30,000 in-lbs.

The MO-10 NG can also be provided in a multi-revolution configuration. This arrangement is typically used for 500 kV and above applications where transmission of the required operating forces can be hampered by long drive rods. A worm gear mechanism coupled to each switch phase reduces the required force that must be transmitted through the drive linkage and ensures positive trouble free operation.



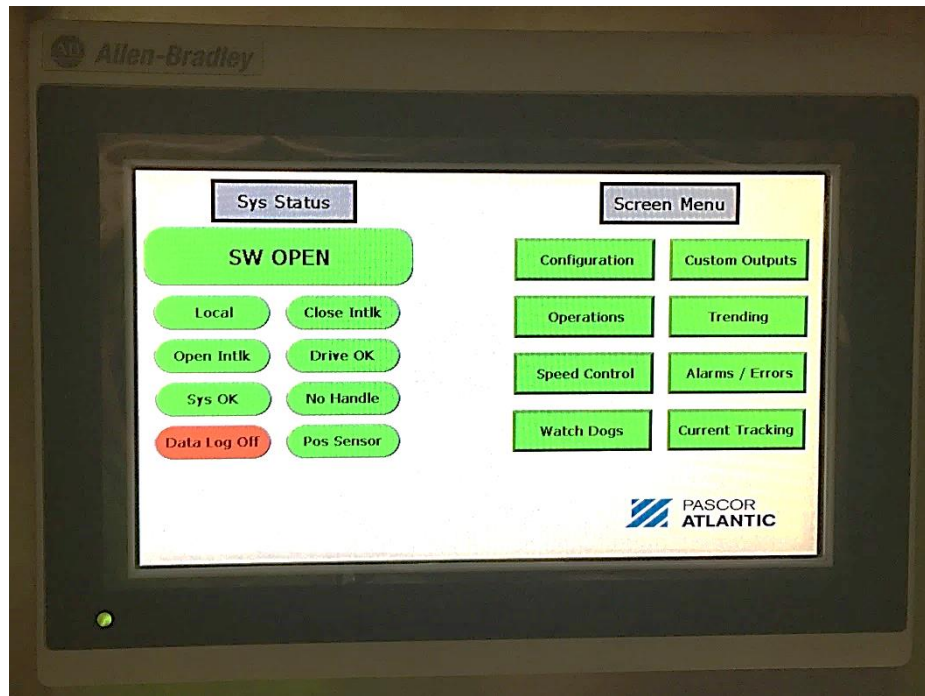
MO-10NG with doors removed

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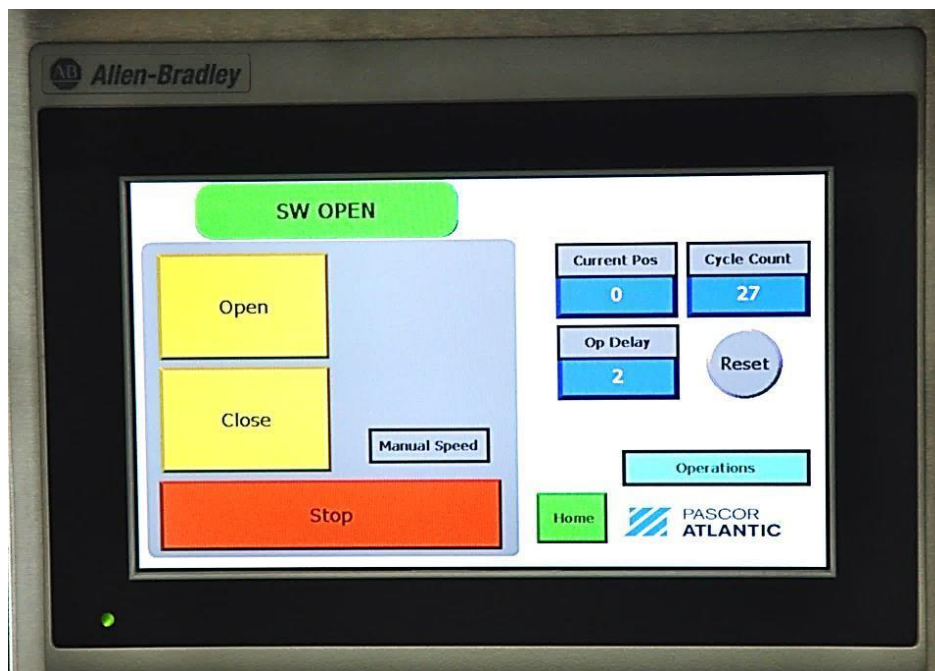
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HMI Home Screen



HMI Operations Screen

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