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Pulse Operating System

Pulse control was developed to operate gear motor actuators. In its classic form, a low voltage relay would power a contactor to turn a 440 Vac motor in the appropriate direction. When the relay was activated, the motor would turn. With the relay off, all power to the unit was cut and the gear motor would remain in place. Crude positioning was caused by low duty cycle, motor run on, relay cycle time and gear wear. Resolution in excess of 2% could be expected. As modern electronic controllers were developed, provisions to continue with pulse control were included. Innovative methods to turn pulses into true control signals by varying the frequency and duration were tried. Although potentially effective, the real stumbling block, i.e. the gear motor actuator, remained in the control loop. Increased frequency and decreased duration of pulses only served to exacerbate the low duty cycle and to compound maintenance problems.

The REXA pulse operating system developed for the Xpac makes optimum use of the actuator's capabilities by keeping the CPU in control. Pulses are not merely motor power commands as in a classic form of Pulse Control in the Process Industry; the REXA controller reads the input pulses as changes in the target position of the actuator. The actuator will continue moving until the actual position satisfies the target position. The motion (speed, acceleration, resolution) of the actuator will be in accordance with the values set during calibration. All standard REXA error and alarm functions are active in pulse mode.

To receive pulses, the Contact In/Relay Out Board assembly is added to the Electronic Sub-Assembly (ESA). This board receives 3 or 4 wire, low-power signals in the range of 24 to 120 volts, AC or DC. The pulses are interpreted by the CPU based on the values set in Setup Mode for *Pulse Duration* and *Pulse Increment*.

PULSE CONTROL PARAMETERS

Pulse Duration (parameter Pulse Dur) sets the minimum time that the Pulse Input must remain active in order to be recognized as a valid signal. A continuous signal may be measured as multiple pulses. Any value from 10 to 999 milliseconds may be set.

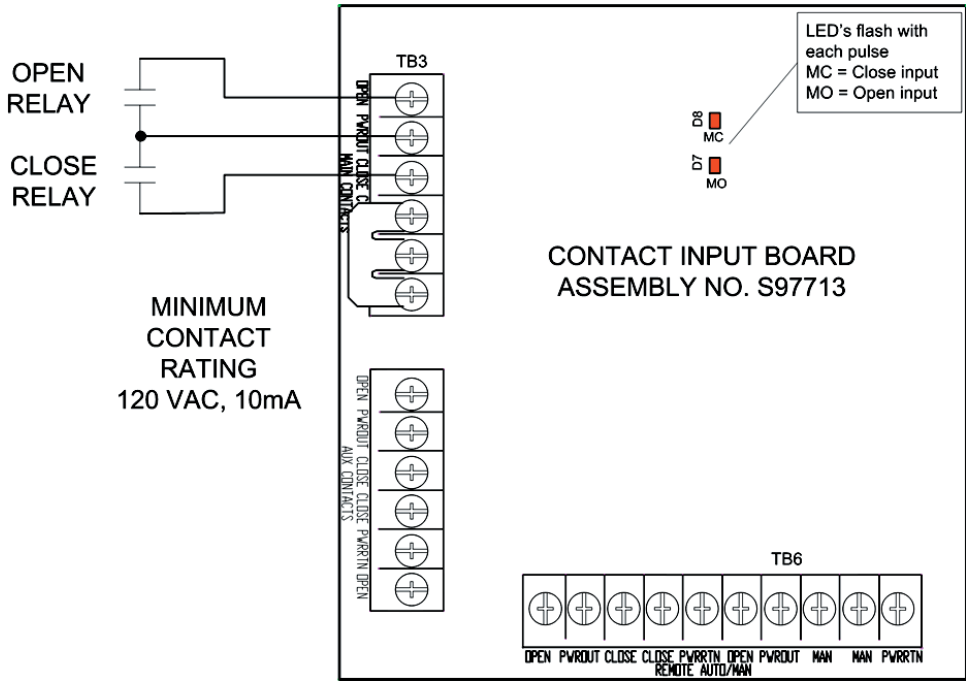
Ex.: *If Pulse Duration is set at 50 milliseconds, a 100 millisecond pulse equals two pulses.*

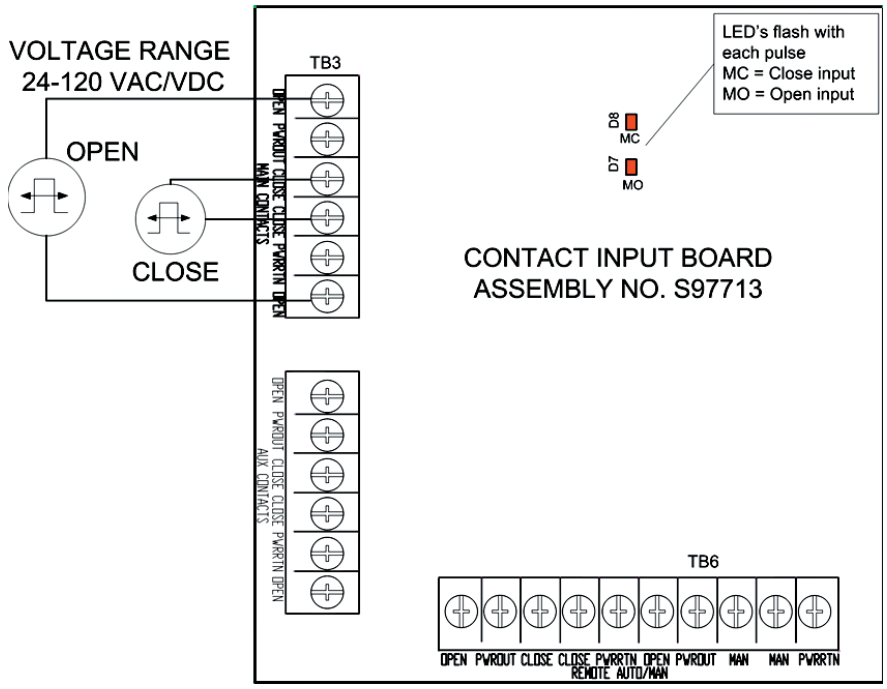
Pulse Increment (parameter Pulse Inc) sets the amount of actuator travel for each valid pulse received. A value from 0.1 to 5.0% of calibrated stroke may be set.

Each valid input pulse changes the actuator's target position by the value specified in *Pulse Increment*. If the resulting target position differs from the actuator's current position by an amount greater than the deadband, the actuator will move to the new position. The OFF time between successive input pulses must be greater than 1 millisecond. Again, long input pulses; that is, input pulses which remain ON for multiples of the value set in Pulse Duration, cause an equal number of incremental target position changes. Pulses which arrive in rapid succession are accumulated in the CPU and cause repeated adjustments to the target position.

PULSE INPUT WIRING OPTIONS

The following diagrams show the different ways to wire a Pulse Operating system to the Electronic Sub-Assembly.





Contact Input Board Wiring Options