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PULSE OPERATING SYSTEM

Pulse control was developed to operate gearmotor 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 gearmotor 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 gearmotor 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. This is accomplished by keeping the PCP in control. Pulses are not merely motor power commands, but change the target position. The actuator will continue moving until the actual position satisfies the target position. The motion (speed, acceleration, resolution) of the unit will be in accordance with the values set during calibration. The error diagnosis and alarm functions are active. In addition, dual acceleration, minimum modulating and water hammer features are available.

To receive the pulses, an auxiliary pulse board is added to the PCP. 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 PCP based on the values set for the two pulse control parameter, *Pulse Duration* and *Pulse Increment*.

Pulse Control Parameters

Pulse Duration (Pd) specifies the minimum length in milliseconds, minus zero, plus 1 millisecond, that an input pulse must remain ON before it is recognized as a valid input pulse. Any value from 5 milliseconds to 999 milliseconds may be set. Each valid input pulse changes the actuator's target position by the value specified in *Pulse Increment* (PI). 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. 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 actuator by repeated adjustments to the target position.

Pulse Increment (PI) specifies the amount, in percent of calibrated stroke, that the actuator will adjust its target position for each valid input pulse received. *Pulse Increment* may be set to any value from 0.1% to 5.0%.