Pro-Series/ Electromechanical Linear Actuator

Control Option Guide

DANAHER MOTION

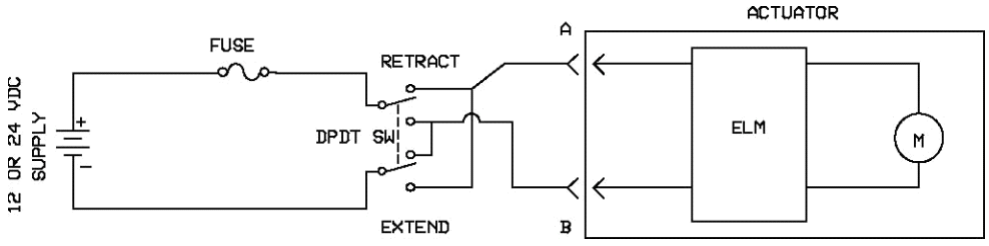
*Helping you build a better machine, **faster.***

Pro-Series actuators are offered with many control options to suit specific customer needs. Recommended wiring diagrams are shown below for each option.

Electronic Load Monitoring (Option “S”)

The integral Electronic Load Monitoring (ELM) shuts off power to the motor any time the actuator speed drops below a factory-set threshold (either at ends of stroke, or during a mid-stroke overload), or by exceeding a temperature limit (excessive duty cycle). The threshold value is scaled based upon available input voltage and ambient temperature. The control will dynamically brake the actuator anytime the ELM is activated. The ELM function requires the actuator to be at a complete stop prior to direction reversal (approximately 100 milli-seconds).

Interconnection is achieved by the integral 2-wire input to the actuator with directional control provided via a double-pole, double-throw switch (not included) with a contact rating for actuator rated load current.

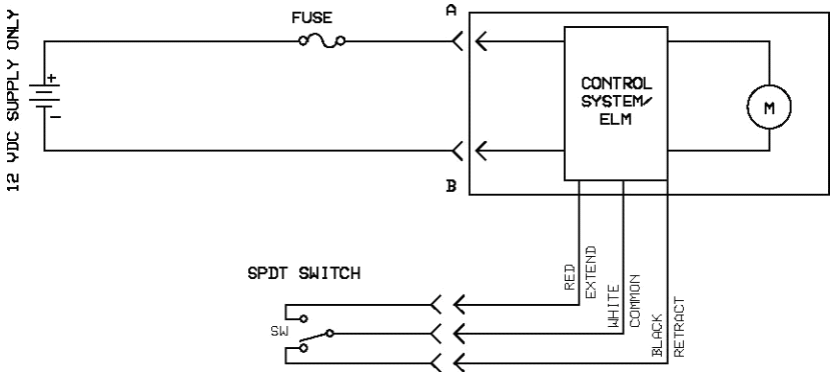


Low Level Switch Input (Option “T” – 12VDC Only)

This design allows microprocessor outputs to extend or retract the actuator. Polarity changes to the motor are controlled internal to the actuator using a second relay.

Interconnection requires 5 wire inputs to the actuator, 2 power leads directly from battery to the integral connector and 3 signal input leads through an auxiliary harness. The customer control must supply 2 contact closures to indicate direction (contacts must be rated for 20 milli-amperes at 12 VDC).

The control will dynamically brake the actuator anytime the ELM is activated.

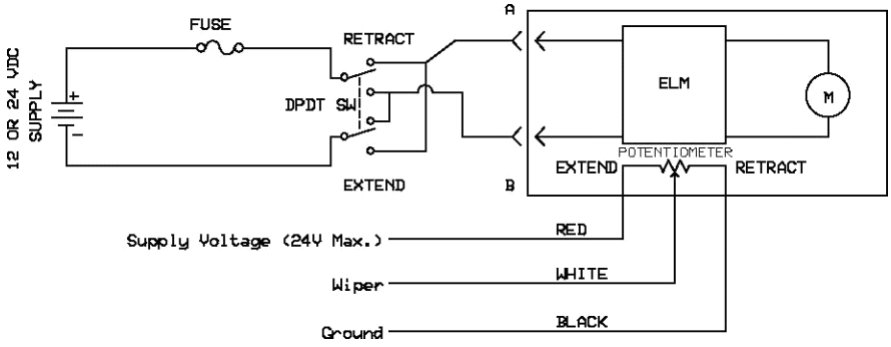


Analog Linear Potentiometer Feedback (Option “L”)

This design includes a 5k linear potentiometer for strokes equal to or less than 6 inches or 10k linear potentiometer for strokes greater than 6 inches, integral to the actuator that is powered and read by the customer’s control (1 watt maximum power dissipation). Total resistance is +/- 15% with essentially infinite linear resolution. The application should apply control voltage to one end of the potentiometer, ground the other end of the potentiometer, and compare the wiper to ground voltage to the input control voltage to determine position.

The integral Electronic Load Monitoring (ELM) will shut off power to the motor anytime the actuator speed drops below a pre-set threshold (either at ends of stroke or during a mid-stroke overload), or by exceeding a temperature limit (excessive duty cycle). The control will dynamically brake the actuator anytime the ELM is activated.

The analog feedback requires 3 signal level interconnections (one for each end of the resistance element and one for the wiper).

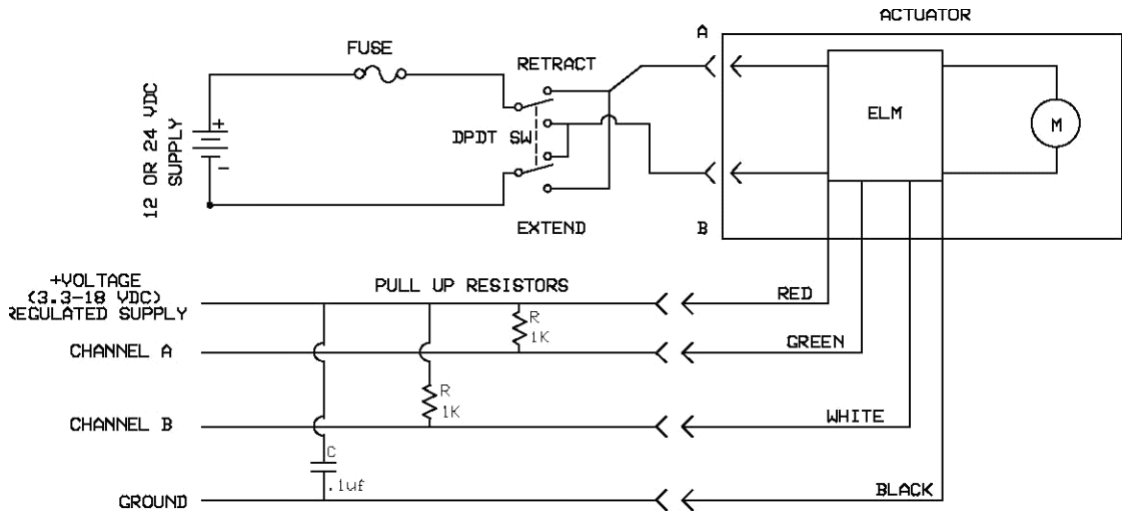


Digital Hall Effect Feedback (Option “D”)

This design utilizes two Hall Effects (in quadrature) triggered by the multi-pole magnet on the rotating motor shaft. The customer’s control must provide a 3.3 to 18 VDC input power for the Hall Effects, count the pulses, interpret the actuator position, and control the start/stop of the actuator; the customer control must also provide an initialization process when power is re-started. Linear resolution is 0.0012 inches (0.03 mm) for the lowest gear reduction; 0.0006 inches (0.015 mm) for the middle gear reduction; and 0.0003 inches (0.008 mm) for the highest gear reduction. Protection for the Hall Effect is integral to the actuator. Because the feedback is generated from the motor, the actuator extension tube must be restrained from rotating to ensure accurate positioning under all applications. Optional anti-rotation feature is available.

The integral Electronic Load Monitoring (ELM) will shut off power to the motor anytime the actuator speed drops below the pre-set threshold (either at ends of stroke or during a mid-stroke overload), or by exceeding a temperature limit (excessive duty cycle). Dynamic braking is provided anytime the ELM is activated.

The digital feedback interconnection requires 4 signal level leads (2 for hall-effect power input of 3.3 to 18 VDC and 2 ground-referenced signal outputs).

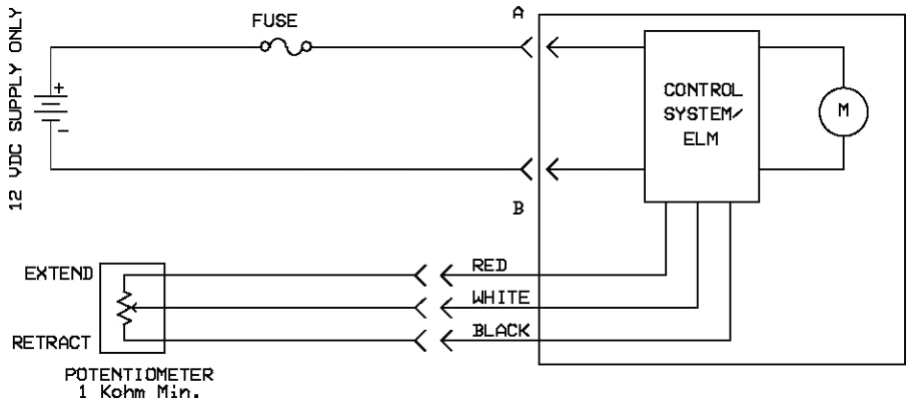


Signal Follower (Option “K”)

This feature will enable the actuator to “follow” an analog input “signal”. The customer must provide the “signal” potentiometer; a second potentiometer integral to the actuator will provide the “follow” signal. The actuator control also provides a 5 VDC power supply for the customer’s “signal” potentiometer. The actuator microprocessor continuously compares the “signal” voltage from the customer potentiometer to the “follow” voltage from the actuator potentiometer. Any differences cause the control to drive the actuator until the signals match. The control will dynamically brake the actuator anytime power is cut. The ELM circuit will still function as described above for mid-stroke overloads or when the duty cycle is exceeded.

Interconnection requires 3 signal-level leads for the customer potentiometer (one for each end of the resistance element and one for the wiper), and 2 power-leads directly from the battery to the integral actuator connector.

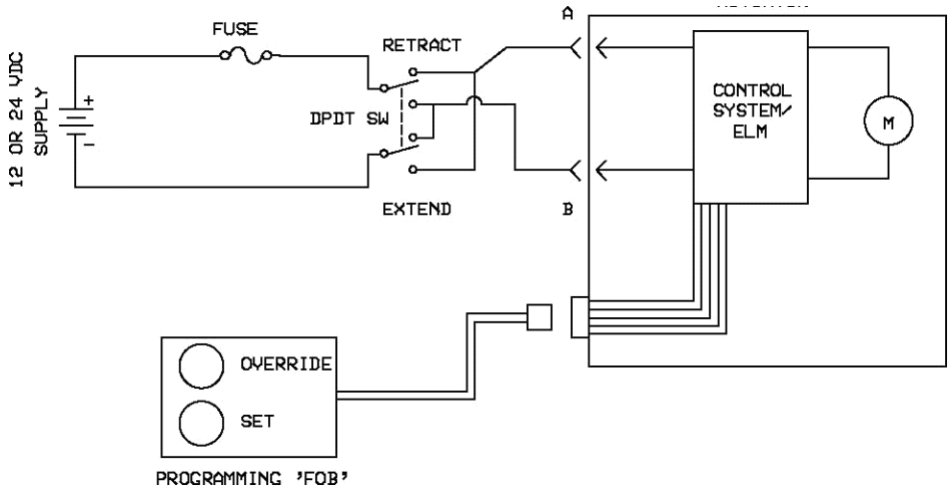
For more repeatable positioning, customers may want to consider a multi-position rotary switch with discreet resistance values.



Programmable Limit Switches (Option “P”)

This feature will enable the customer to “program” end limit points in the application without requiring the end of stroke to be limited by either the actuator or the mechanism. These “programmed” points will trigger the ELM circuit to control ends of stroke. The ELM circuit will still function as described above for mid-stroke overloads or when the duty cycle is exceeded.

The design requires 2 wire input power switching to the actuator integral connector plus a 5 wire custom cable connector. A 2-button “Programming FOB” with cable and mating connector is available for programming. With power applied to extend the actuator, the customer presses the O/R (override) button on the “FOB” to manually jog the actuator to the desired extend position and then presses the SET button on the “FOB” to input the position into the microprocessor. Similarly, with power applied to retract the actuator, the customer presses the O/R (override) button on the “FOB” to manually jog the actuator to the desired retract position and then presses the SET button on the “FOB” to input the position into the microprocessor. The microprocessor stores the last two positions programmed into its memory. When the voltage at the potentiometer equals the voltage of one of the “program” settings, the microprocessor will shut power to the actuator off via the ELM circuitry. The control will dynamically brake the actuator anytime the ELM is activated. The “FOB” can be removed from the actuator once the positions are stored.

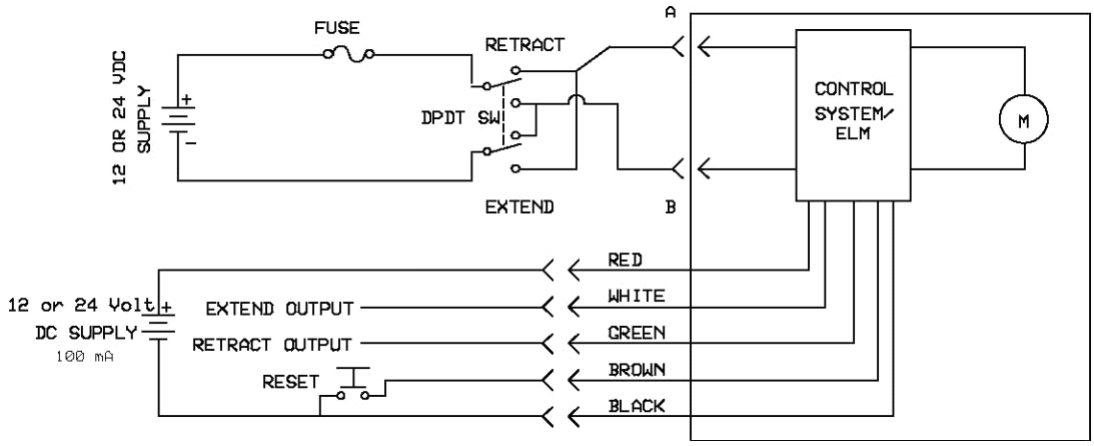


End of Stroke Indication (Option “R”)

This feature uses a continuously powered control system to monitor the self programmed end of stroke locations. This allows an output indication even if the actuator is not running. The limits are established approximately 0.2 inches from the mechanical limit. Either output can supply 20mA at 12 or 24 VDC. The feature includes an anti-rotation feature (standard on ball nut units, optional on acme units) that does not affect the retracted length of the ball nut actuator, but will add approximately 0.25" to the acme. The ELM function shuts off power to the motor anytime the actuator speed drops below a preset threshold (either at ends of stroke, or during a mid-stroke overload), or by exceeding a temperature limit (excessive duty cycle).

Interconnection is achieved by a 2 wire motor control input to the actuator’s integral connector with a directional control provided via a double-pole, double-throw switch (not provided) with a contact rating for actuator rated load current. Also, a 5 wire system includes the 12 or 24 VDC control supply voltage input (continuous), end of stroke outputs, and an end of stroke reset (attaching the reset lead to common ground will reset the set points).

End of Stroke set points are self programmed by running actuator to full extend, then full retract.



Load Monitoring Indication (Option “U”)

This feature provides an output signal from the actuator microprocessor anytime the ELM feature is activated. The ELM function shuts off power to the motor anytime the actuator speed drops below a pre-set threshold (either at ends of stroke, or during a mid-stroke overload), or by exceeding a temperature limit (excessive duty cycle).

Interconnection is achieved by a 2 wire input to the actuator integral connector with directional control provided via a double-pole, double-throw switch (not provided) with a contact rating for actuator rated load current; and 2 low level connections to monitor a contact closure whenever the ELM is activated with a maximum contact rating of 20 milli-amps and 24 VDC.

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USA, Canada and Mexico
Danaher Motion 203A West Rock Road Radford, VA 24141 USA Phone: 1-540-633-3400 Fax: 1-540-639-4162 E-mail: DMAC@danahermotion.com

www.danahermotion.com

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