



PROMATION ENGINEERING

Precision Actuation for Industry

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Data Sheet

D2/D3..S Series

Reversible Spring Return

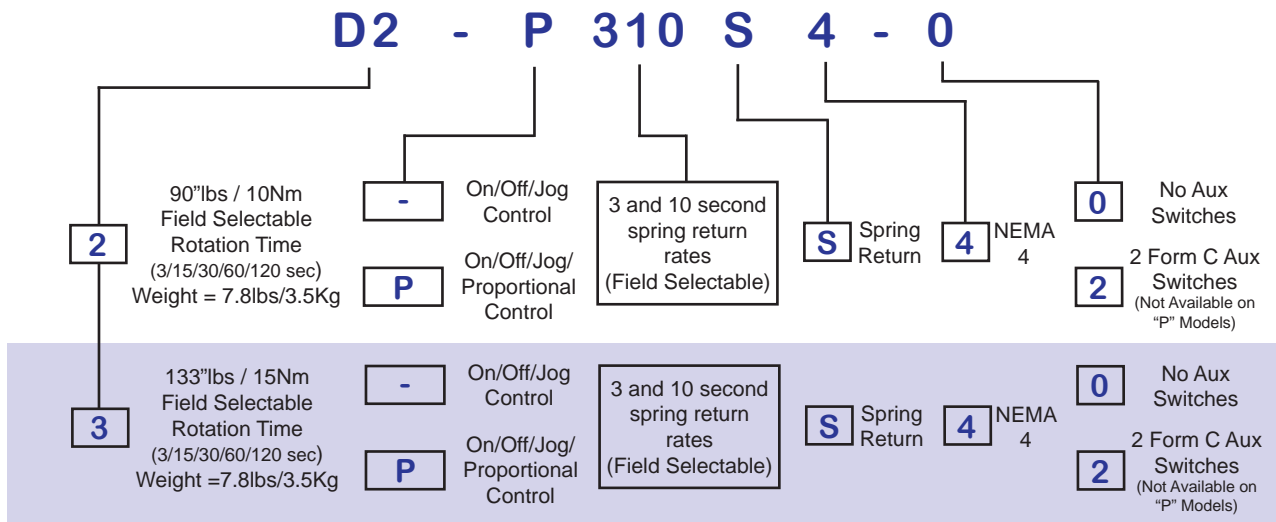
w/ Manual Override

Actuator Specifications	D2..S	D3..S
Torque (motor) Minimum	90"lb/10Nm	133"lb/15Nm
Torque (spring) Minimum	90"lb/10Nm	133"lb/15Nm
Minimum Required Torque	27"lb/3Nm	
Supply Voltage/Frequency	24...230vac/dc, +15% / -20% AC:50/60Hz	
Current Draw	4.7A @ 3 sec Mode MAX (see table P2)	
Wiring Class	Class 1 (grounded)	
Angle of Rotation	95 deg including 5 deg pre-load	
Runtime (Power) selectable	3/15/30/60/120 @ 90 deg (Field selectable)	
Motor Type	Brushless DC	
Runtime (Spring)	3 or 10 seconds @ 90 deg, (Field Selectable)	
3 second Mode (Spring)	3 -4 seconds @ 90 deg, (load dependent)	
Life Cycles at 10 sec Spring	Minimum 10,000 Cycles at 10 sec Spring	
Life Cycles at 3 sec Spring	Minimum 1,000 Cycles at 3 sec Spring	
Response Time (Spring)	Up to 1 second after power failure	
Control Mode	On/Off/Jog or Proportional Control	
Drive Configuration	12mm Double Square, 100% Overload-Proof Self-Locking up to 133"lbs/15Nm	
Electrical Connections	1m Cable, Multiconductor (Opt EMT)	
Environmental Rating	NEMA 4 / IP66	
Manual Override	Supplied Hex Key (Opt Handwheel)	
Integral Heater	Thermostatically controlled	
Housing Material	Aluminum die casting	
Physical Dimensions	8.3"L x 3.7"W x 3.2"D / 210mm x 95mm x 80mm	
Weight	7.8 lbs / 3.5Kg (no options installed)	
Ambient Operating Range	Storage Temp: -40F/+158F (-40C/+70C) Working Temp: -40F/+122F (-40C/+50C)	
Duty Cycle (>14 sec Mode)	100%, all control types	
Duty Cycle (3 sec Mode)	10%, One Power/Spring cycle per minute MAX	
Maintenance	Maintenance Free	
Default Mode:		
Power	90"lb/10Nm	133"lb/15Nm
Speed	30 sec @ 90 deg	30 sec @ 90 deg
Spring	90"lb/10Nm	133"lb/15Nm
Speed	10 sec @ 90 deg	10 sec @ 90 deg



A REVERSIBLE SPRING RETURN electric actuator designed for load requirements up to 133"lbs. These are industrial electric actuators designed to IP66 standards (conforming to NEMA 4). They are available in two configurations including models designed for On/Off/Jog applications, and models that are designed for On/Off/Jog/Proportional control applications. Both types have FIELD adjustable speeds ranging from 3 seconds to 120 seconds under power, and a FIELD selectable spring return rate of 3 or 10 seconds. The actuators have auto-switching power supplies that are ready to connect to AC or DC power sources from 24V to 230V. An internal low-power heater is standard. The D2/D3 Series mechanical connections utilize a 12mm double-square drive shaft and include four (4) M4x100mm mounting bolts to solidly attach the actuator to damper frames and valve top works.

SD08_D23S Series Ver A 071008



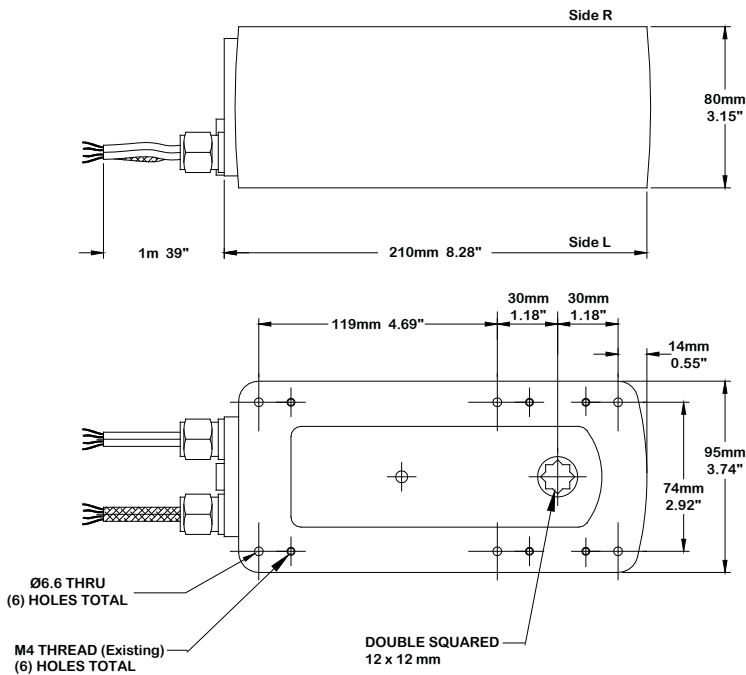
Options (Not all combinations are possible - consult Factory)

- EMT** EMT Enclosure
1/2" Conduit Entry
Terminal Strips
- OVD** Manual Override
Handwheel
Option
- AUX** Dual Auxiliary
Switches
(Externally Mounted)
- MKT** ISO5211
Conversion
Mounting Kit

Application Notes:

- When installing the D Series actuators in environments where ambient temperatures are less than +50 deg F (+10 deg C), it is important to immediately connect the actuator to power to enable the heater and prevent internal condensate build-up.
- The actuator will NOT activate until the internal temperature reaches at least -8 deg F (-20 deg C). All functions are disabled until after this heating-up period.
- The actuator must be operated with a load requirement of AT LEAST 27"lbs/3Nm.
- Electrical connections are via a 39" (3m) cable that enters the end of the actuators through water-proof cable glands. Optionally, a cast aluminum NEMA 4 enclosure is attached to the end of the actuator housing to provide a 1/2" conduit entry direct into the actuator.
- To reverse the direction of the spring return from CW to CCW, simply turn the actuator over during the mounting onto the actuated device. The direction of spring return is easily identified by verbiage printed on each side of the actuator label.
- These actuators are designed to be used in ANY mounting position.
- Connection to cable leads should be done in appropriate electrical enclosures per local codes.
- When installing conduit using the EMT option, use proper techniques for entry into the actuator. Use drip loops to prevent conduit condensate from entering the actuator.
- Use proper wire size to prevent actuator failure (see chart below for proper wire sizing).
- The actuator does NOT have any mechanical stop adjustments. it is designed for 0 to 90 degree operation. On spring return models, there is a 5 degree pre-load to provide end-of-travel spring force.

D2/3..S Series Dimensional Data



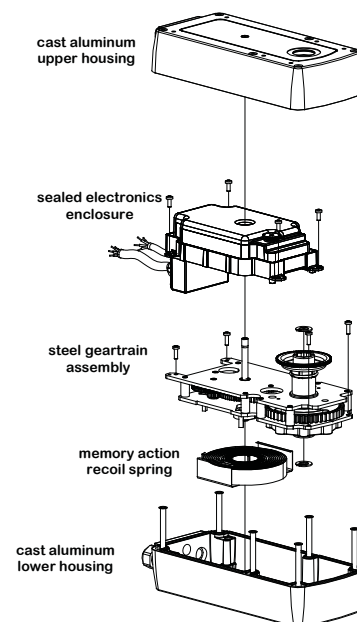
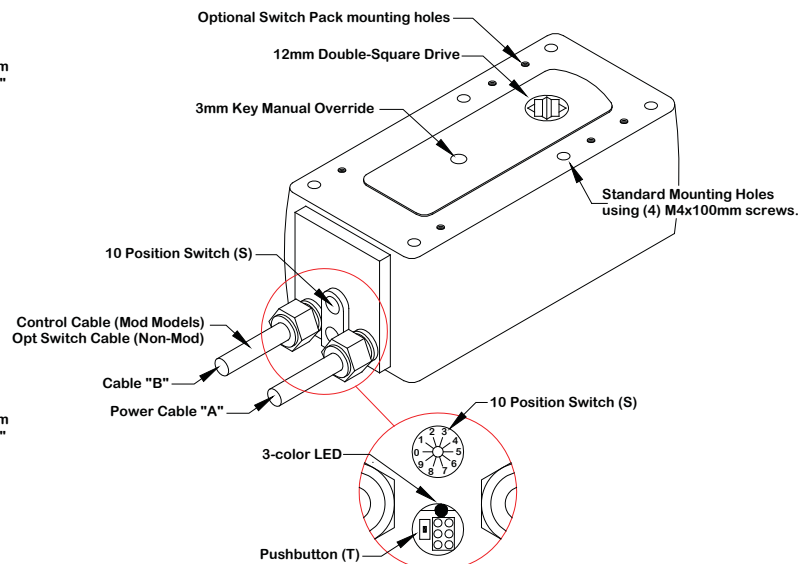
Wire sizing data is provided in the table below to assist in the selection of the proper wire size for ProMation D2/3..S series actuators using various wire sizes over distance. Please make sure to reference the correct voltage and do not exceed the indicated length of the wire run for each model.

Wire Sizing Data

Calculations based on maximum current draw at 3 seconds for 90 degrees motor rotation time. Slower rotation times decrease the current draw up to 80% at 120 seconds for 90 degrees rotation.

MAX distance between Actuator and Supply (feet)			
Wire Gage	D2/3..S 24VAC/DC	D2/3..S 120VAC	D2/3..S 230VAC
24	18	566	1627
22	29	903	2597
18	70	2204	6336
16	111	3463	9957
14	179	5594	16084
12	273	8556	24599

D2/3..S Series Key Points



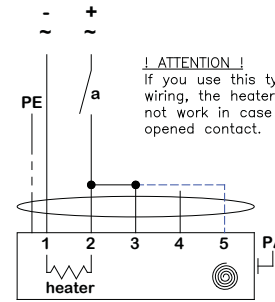
SD08_D23S Series Ver A 071008

Wiring Diagrams for D23..S Series

On/Off/Jog Control

2 Wire - Drive OPEN (CLOSED),
Spring CLOSED (OPEN).

24 to 230 VAC/DC



! ATTENTION !
If you use this type of wiring, the heater does not work in case of opened contact.

See Application Notes Item 2 concerning low temperature applications.

Warnings!

! Do NOT operate the spring return actuator in 3 second mode without a MINIMUM LOAD of 27"lbs (3Nm)!

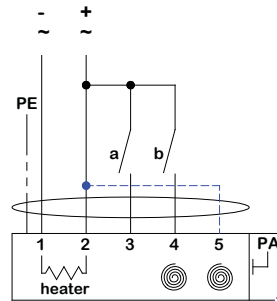
! If using the 3 second spring return mode, do NOT exceed one complete drive / spring return cycle per minute!

Standard wiring = 10 Sec Spring Rtn
Additional wiring terminal 5 = 3 Sec Spring Rtn

4 Wire - Drive OPEN or CLOSED,
Spring CLOSED or OPEN.

...Shown with the optional INTERNAL aux switches...fixed at 5 and 85 degrees rotation. (Replace -0 with -2 at end of actuator part number).

24 to 230 VAC/DC



(OPTIONAL)

Integral aux. switches
potential free contacts
Switching at 5° and 85°
Angle of rotation
max. 24V/3A, 230V/0.25A

Standard wiring = 10 Sec Spring Rtn.
Additional wiring terminal 5 = 3 Sec Spring Rtn.

Additional wiring of the integral aux. switches

Proportional Control

Control Modes
(select by wiring method):

- On/Off
- Jog
- 0-10vdc
- 4-20mA

Input impedance:

- 20k ohms (0-10vdc)
- 250 ohms (4-20mA)

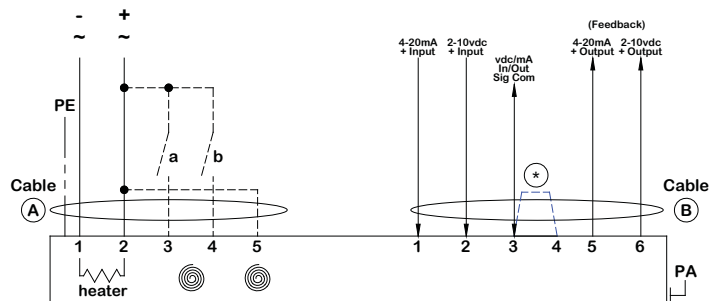
Feedback Signal Output: 4-20mA
Referenced to the common terminal.

Max Load: 500 ohms

Note: -2 Option (internal aux switches) NOT available on proportional control models.

SELF ADJUSTMENT:
To adjust the signal input/output to the angle of rotation of the damper/valve, the button T must be pushed for a minimum of 3 sec.

24 to 230 VAC/DC



SECTION OF RUNNING TIME FOR SPRING RETURN:

Standard wiring = spring return in-10 sec.
Additional wiring terminal 5 = spring return in-3 sec.

FUNCTION OF SWITCH a AND b:

Closing switch a or b overrides the proportional control of the actuator.
Direction of rotation is a function of which side (CW or CCW) of actuator is UP.

REVERSE FUNCTION: *

Add jumper between 3 & 4 for REVERSE acting control. This affects both INPUT and FEEDBACK signal processing.

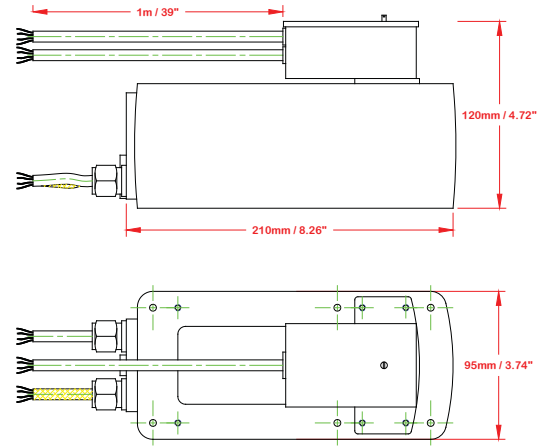
Options and Accessories

(Please refer to Accessory data Sheets for more detailed information)



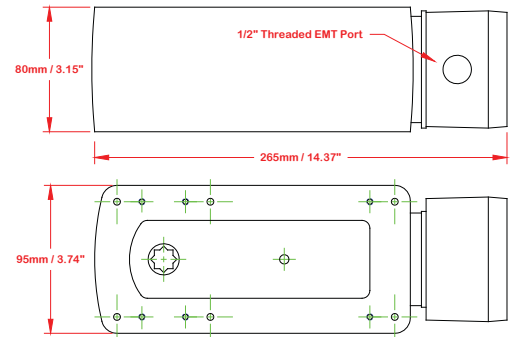
AUX

External Auxiliary switch option includes an externally mounted switch pack. Each mechanical switch is independently adjustable and is rated at 230vac @ 250mA MAX and 24vac/dc @ 3A MAX.



EMT

The EMT option consists of a cast aluminum enclosure firmly attached to the back end of the actuator. It is sealed to the actuator housing, contains a screw cover utilizing captured screws, and provides access to internal wiring, switches and indicators.



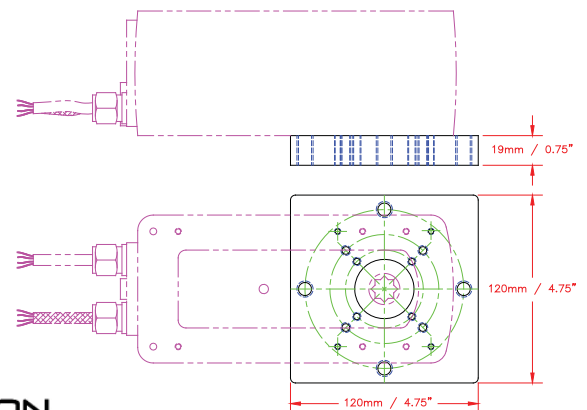
OVD

The OVD option provides a manual handwheel that is attached to either side of the actuator and allows manual positioning of the actuator when power is NOT present. The handle rotates during normal operation and can be locked in position ONLY during power outages.



MKT

The MKT option is a mounting kit that converts the existing mounting holes in the D Series into an ISO5211 compatible actuator. This would most likely be utilized in direct mount valve applications. The drive shaft contained in the kit is a blank that can be machined to match the requirements of the valve.



SD08_D23S Series Ver A 071008

