



SPA SERIES

LINEAR ACTUATOR WITH **INTELLI-**
MOTION™

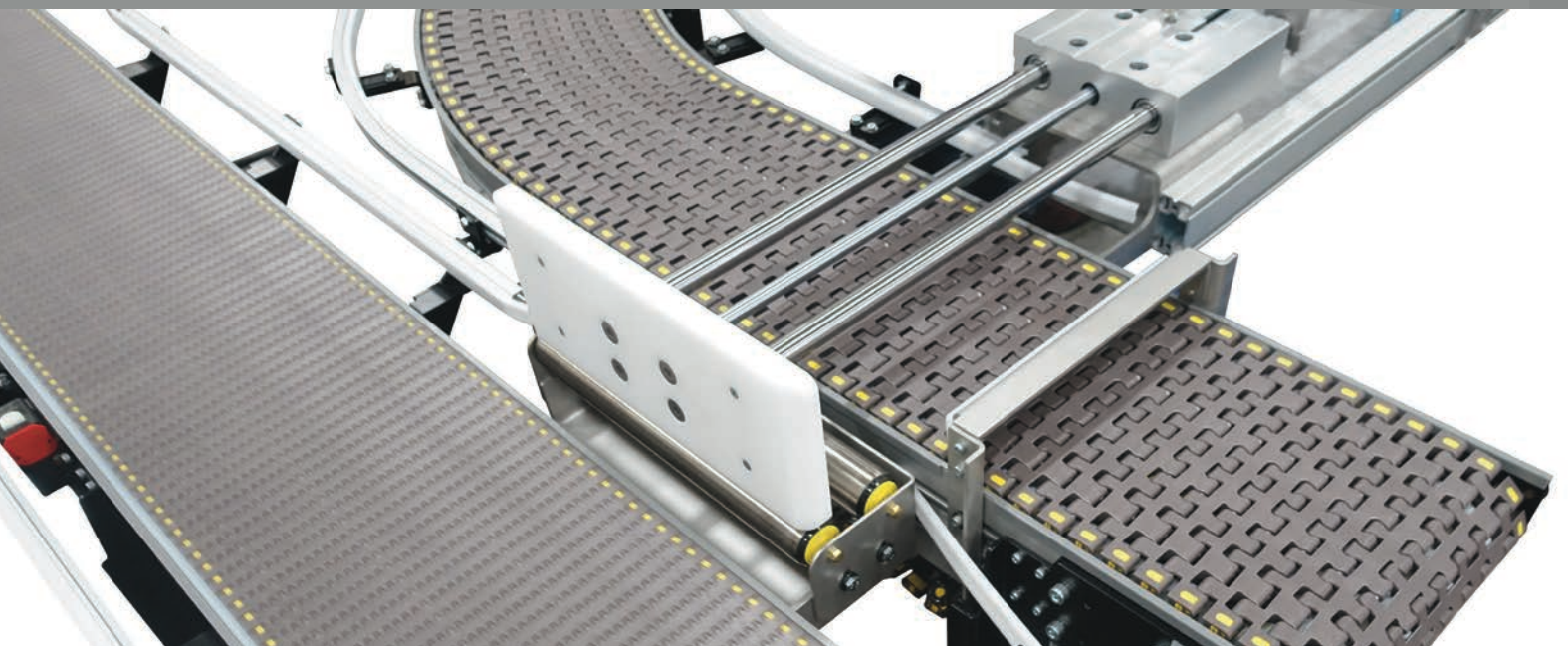


C O L U M B U S M C K I N N O N C O R P O R A T I O N

Combining intelligent solutions with robust machinery for your unique challenges.

Modern motion control technology is expected to lift, move, and precisely position heavy loads, often under extreme or adverse conditions. Duff-Norton's most advanced linear actuator, the SPA with Intelli-Motion™ technology, is designed to provide reliable operation and simplify applications, especially those that can benefit from automation technology. As the latest product to join our family of automation-focused solutions, this intelligent actuator offers ease of installation, quick configuration, and simple operation to ensure your system can get up and running quickly. The Intelli-Motion platform combines robust actuators from Duff-Norton with modern variable frequency drive (VFD) technology to bring plug-and-play control to industrial material handling applications.

Getting the most from a motion system means finding the right linear actuator, one that works efficiently, is durable, moves the load safely, and operates at the desired speed. The SPA with Intelli-Motion can do all of that and more. It's robust enough to handle high duty cycle applications while providing precise, repeatable motions. By incorporating VFD control, the SPA linear actuator with Intelli-Motion gives operators the ability to program specific movement patterns with variable speeds, expanding the range of production applications it can be applied to, including balancing loads on automated guided vehicles (AGVs), synchronizing lifting tables, timing critical steps in a manufacturing process, and more.



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FEATURES & BENEFITS

INCREASED DUTY CYCLE

The SPA with Intelli-Motion provides a full load duty cycle of 30%, an increase of 75% as compared to similar ACME screw actuators. This extends the length of time the actuator can operate, increasing production rates and reducing the need for wait times or external forced cooling devices. At decreased loads, the actuator can achieve a duty cycle of 50%.

IMPROVED CONTROL AND FEEDBACK

Onboard analog and digital I/O provide enhanced control and position feedback capabilities. An analog input enables position control from an external 0-10 VDC or 4-20 mA source. A selectable 0-10 VDC or 4-20 mA analog output provides feedback on the actuator's position. Digital inputs provide a means of extending or retracting the actuator, while digital outputs provide indications when limits are reached.

PRECISION MOTION CONTROL

Optional integrated analog and digital I/O provide positioning feedback and enable precise position control via a programmable logic controller (PLC). Optional Ethernet/IP connectivity enables direct connection to a PLC, providing an infinite number of control options and configurations to choose from when programming complex patterns and motion sequences. Variable frequency drive (VFD) technology, combined with an absolute position encoder, results in precise motor movements that ensure products are moved safely and efficiently.

EASY INSTALLATION

The Intelli-Motion platform enables the actuator to connect with a PLC without any intermediary components. Other actuator configurations require a separate VFD or contactor control system housed in an external control panel. Intelli-Motion technology features an integrated VFD and onboard I/O, reducing installation costs and product footprint and simplifying the component purchasing process.

SIMPLIFIED LIMIT SWITCH SETUP

Electronic programmable limit switches (EPLS) provide greater precision and accuracy and increased ability to repeat motions compared to other actuators using mechanical limit switches. An EPLS can be set with either a pushbutton on the actuator or the easy-to-use digital configuration software. Simply connect the actuator to your PC to troubleshoot and adjust parameters.

EXTENDED OPERATIONAL LIFE

Typical actuators apply 100% power to the motor at startup, resulting in up to six times the normal running current at startup. This places stress and strain on the motor and mechanical components, ultimately reducing the actuator's life. The SPA with Intelli-Motion soft starts the motor automatically by limiting startup current and gradually ramping up the acceleration until full speed is reached. Automatic soft starting and smooth ramp-up acceleration prolong the motor's life and reduce the stress placed on mechanical components during startup.



STANDARD FEATURES

- **Maximum Capacity:** 1,500 lbs.
- **Maximum Speed, Full Load:** 0.83 in/sec
- **Maximum Speed, No Load:** 1.52 in/sec
- **Voltage:** 115V, 1P, 50-60 Hz
- **Stroke Lengths:** 6 to 24 inches
- **Temperature Range:** 25°F–104°F (-4°C–40°C)
- **Environmental Rating:** IP54
- **Duty Cycle:** Up to 30% at full load, up to 50% at reduced load
- **Discrete Extend and Retract Inputs**
- **Electronic Programmable Limit Switches**
- **Digital Configuration Interface**
- **Overcurrent and Overtemperature Protection**

FLEXIBILITY FOR YOUR APPLICATION NEEDS

The integrated VFD and onboard control system enable operators to program specific motion patterns and adjust the actuator speed to the optimal rate to match applications. The EPLSs define specific stopping points, and the integrated VFD provides options for variable operating speeds and increased duty cycles. In addition, adjustable clevis end connections can be configured for an ideal installation orientation to fit your application. Plus, the SPA with Intelli-Motion is available as a standalone product or can be used as part of a complete automated system.

FEATURE PACKAGES

MODELS	Extend and Retract Inputs	Electronic Programmable Limit Switches	Adjustable Speed and Duty Cycle	Analog Position Input (Selectable 0-10 VDC or 4-20 mA)	Analog Position Output (Selectable 0-10 VDC or 4-20 mA)	Digital Position Output	Ethernet/IP Connectivity
Base Model	•	•	•				
Base Model + Analog and Digital I/O	•	•	•	•	•	•	
Base Model + Ethernet/IP Communication*	•	•	•	•	•	•	•

*Ethernet/IP units contain full functionality but do not contain individual inputs and outputs. All control and feedback is delivered over the network.

MECHANICAL SPECIFICATIONS

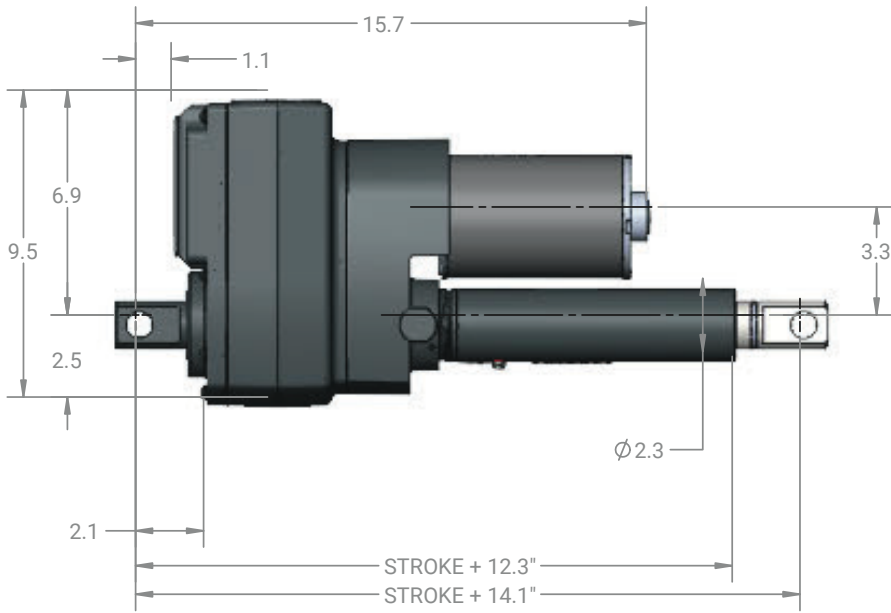
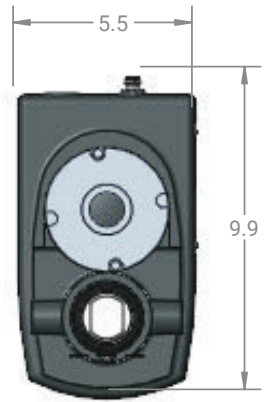
Dynamic Rated Load	1,500 lbs. (6.7 kN)
Minimum Stroke Length*	6 in. (152 mm)
Maximum Stroke Length*	24 in. (610 mm)
Stroke Length Increments*	6 in. (152 mm)
Speed Range at Dynamic Rated Load	0.42 in/sec (11 mm/sec)–0.83 in/sec (21 mm/sec)
Maximum Duty Cycle at Dynamic Rated Load	30%
Maximum Duty Cycle at Reduced Load	50%
Operating Temperature Range	25–104°F (-4–0°C)
Ingress Protection Rating (Static and Dynamic)	IP54
Anti-Rotation Feature	Yes
Restraining Torque	215 in-lbs. (24.2 Nm)
Screw Type	ACME
Minimum Weight (6 in. Stroke Unit)	35 lbs. (16 kg)
Maximum Weight (24 in. Stroke Unit)	41 lbs. (19 kg)

*Custom stroke lengths are available. Consult the factory or a sales representative.

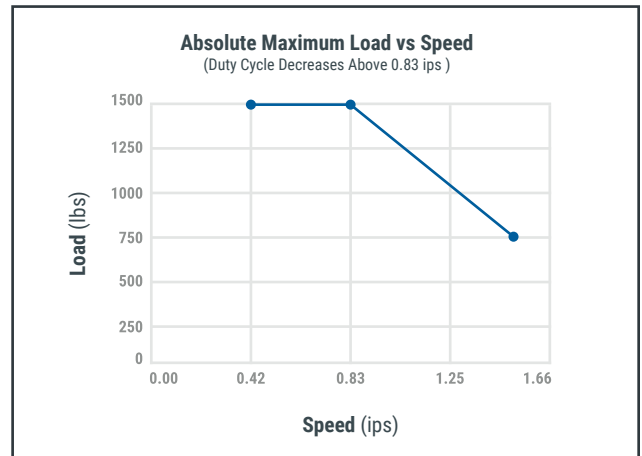
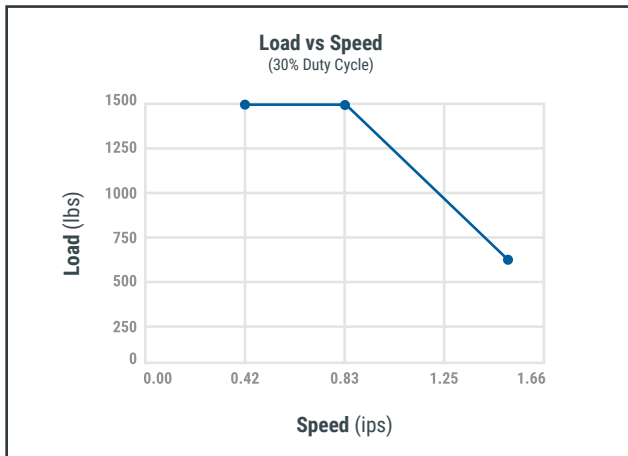
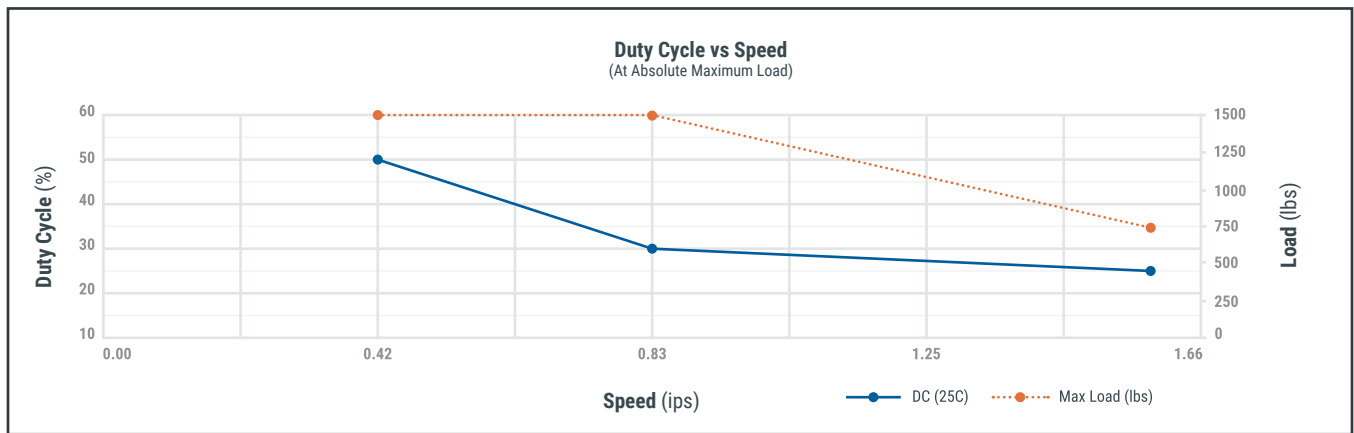
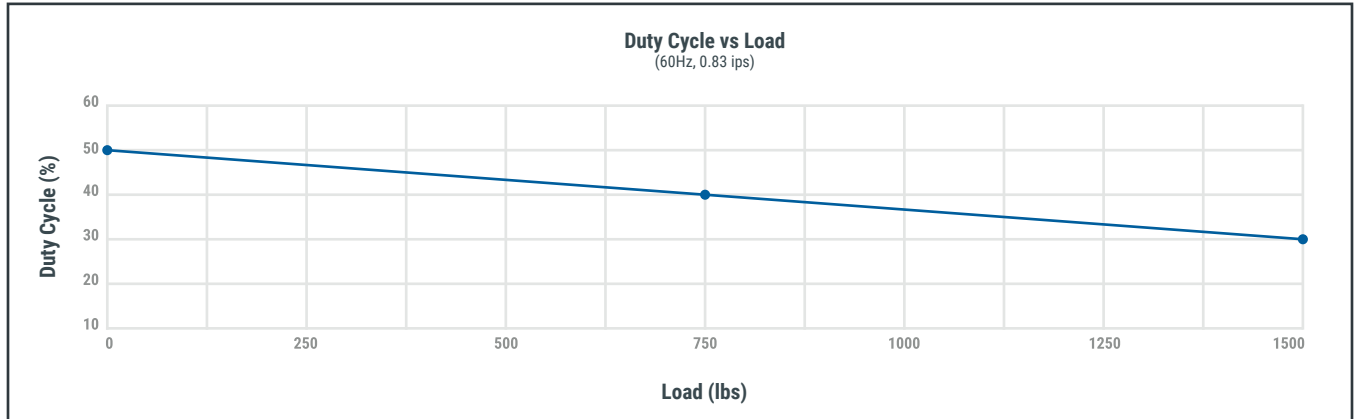
ELECTRICAL SPECIFICATIONS

Supply Voltage	115 VAC, 1P, 50-60 Hz
Current at No Load	2.0A +/- 15%
Current at Dynamic Rated Load and Max. Duty Cycle	8.0A +/- 15%
Control Voltage	24 VDC +/- 30%
Analog Input Range	0-10 VDC or 4-20 mA, selectable
Analog Output Range	0-10 VDC or 4-20 mA, selectable
Digital Inputs	
Rin	3150 Ohms
Tolerance	+/- 4%
Voltage Range	15-32 VDC, 24 VDC Nominal
ON Voltage	>15 VDC
OFF Voltage	<8 VDC
Maximum Voltage	40 VDC
Minimum ON Current	4.7 mA
Maximum OFF Current	2.4 mA
Digital Outputs	
Rin	75-80 Ohms
Tolerance	+/- 4%
Voltage Range	15 -32 VDC, 24 VDC Nominal
ON Voltage	>15 VDC
OFF Voltage	<8 VDC
Maximum Voltage	40 VDC
Maximum Load Current	240 mA

DIMENSIONAL DRAWINGS



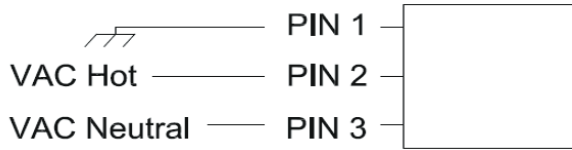
PERFORMANCE DATA



WIRING DIAGRAMS

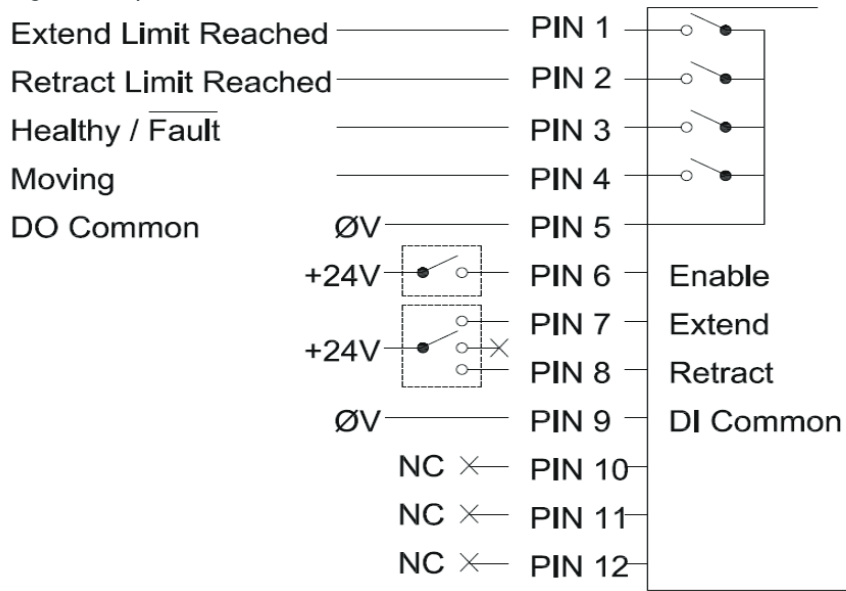
POWER WIRING DIAGRAM (ALL MODELS)

Power Receptacle 7/8"



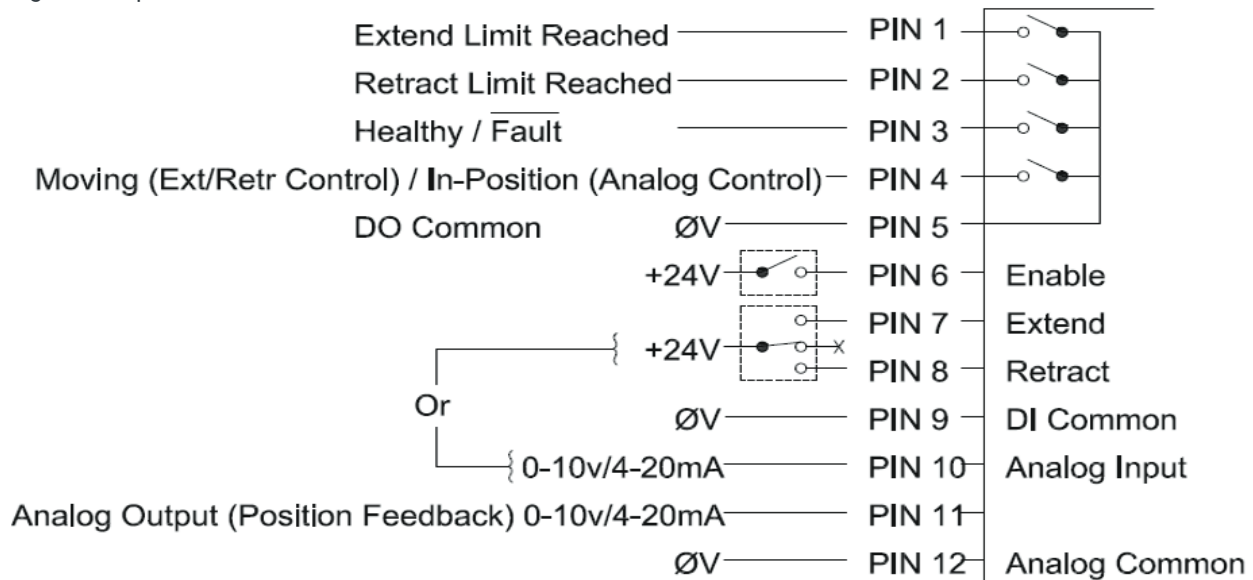
BASE MODEL WIRING DIAGRAM

Signal Receptacle M12



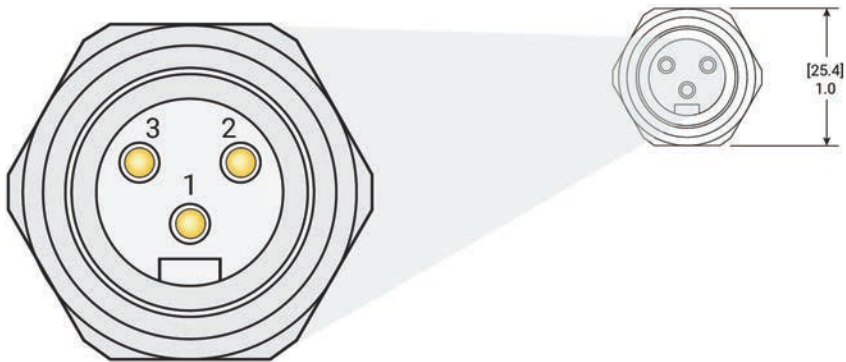
BASE MODEL + ANALOG AND DIGITAL I/O

Signal Receptacle M12



POWER RECEPTACLE

Receptacle Part Number: MINH-3MR-1



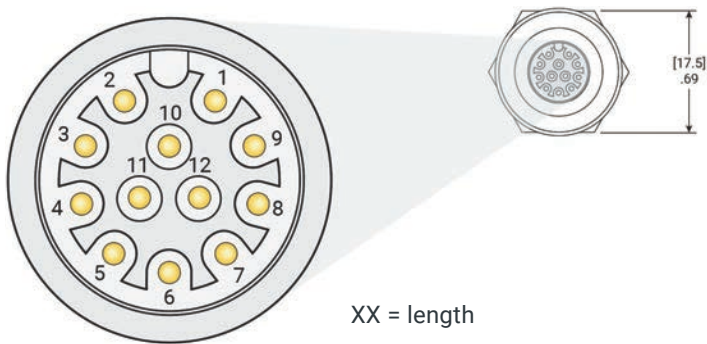
Pin	Function
1	Earth Ground
2	Hot
3	Neutral

Mating Power Cable: MINH-3FP-XX
Note: XX notes the cable length

SIGNAL RECEPTACLE

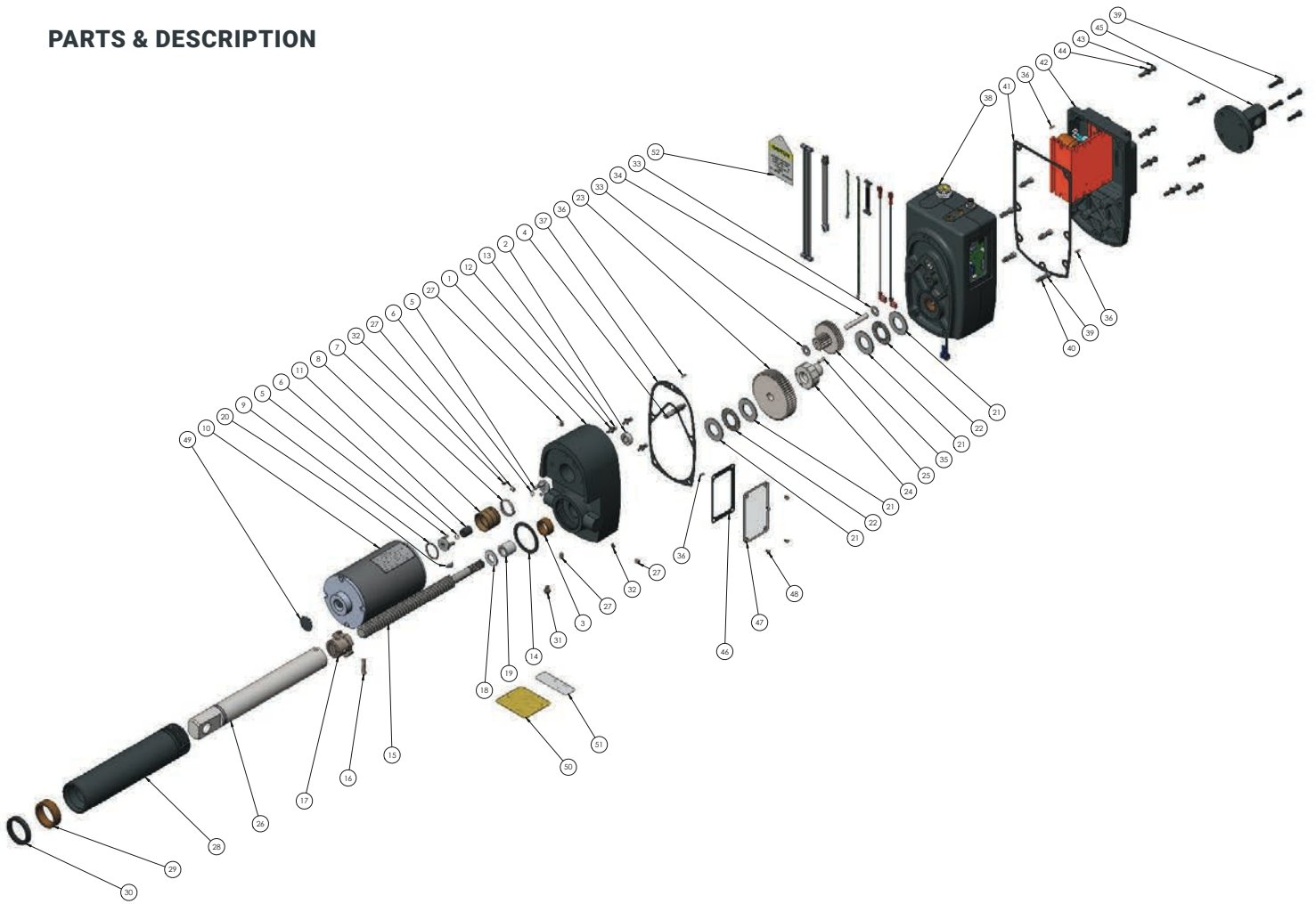
Receptacle Part Number: MDC-12MR-4-1

Mating Part: MDCPM-12FP-XX*



Pin	Signal Number	Signal	Function
1	DO 1	± 24 VDC $\pm 30\%$	Extend Limit Reached
2	DO 2	± 24 VDC $\pm 30\%$	Retract Limit Reached
3	DO 3	± 24 VDC $\pm 30\%$	Fault
4	DO 4	± 24 VDC $\pm 30\%$	—
5	DO 5	0V, +24V, OR -24V	DO Common
6	DI 1	± 24 VDC $\pm 30\%$ / 7.6 mA nominal	Enable Actuator
7	DI 2	± 24 VDC $\pm 30\%$ / 7.6 mA nominal	Extend Actuator
8	DI 3	± 24 VDC $\pm 30\%$ / 7.6 mA nominal	Retract Actuator
9	DI 4	0V, +24V, OR -24V	DI Common
10	AI 1	0 - 10 VDC / 4 - 20 mA	Actuator Position Input
11	AI 2	0 - 10 VDC / 4 - 20 mA	Actuator Position Output
12	AI 3	0V	Analog Common

PARTS & DESCRIPTION

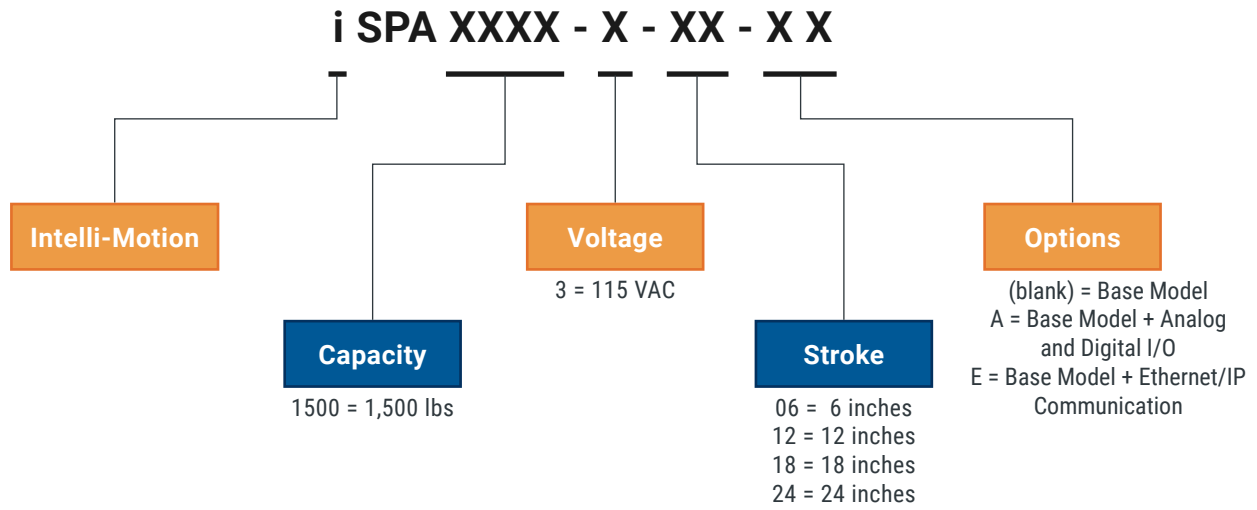


Item Number	Description
1	Housing (AC)
2	Ball Bearing, 608ZZ
3	Bush SL 22MM
4	Input Pinion
5	Coupling
6	Retaining Ring
7	Brake Spring
8	Insert
9	O-Rings
10	Motor, 3-ph
11	Rubber Grommet
12	Sealing Washer, #8
13	#8-32 X 0.625, SHCS
14	Gasket, Outer Tube
15	Screw
16	Pin, Driv-Lok
17	Lifting Nut, Anti-Rotation
18	Flat Washer

Item Number	Description
19	Gear Spacer
20	Woodruff Key
21	Thrust Washer
22	Thrust Bearing
23	Output Gear
24	Spacer Nut
25	Half Dog Point Setscrew
26	Translating Tube & Clevis Assy
27	Type A Sheer-proof
28	Outer Tube
29	Bush SL 38MM
30	Wiper Seal
31	Vent Plug
32	SKT HD Set Screw
33	Thrust Washer
34	Dowel Pin
35	Intermediate Cluster Gear
36	Pins, Dowel, Ground Hardened

Item Number	Description
37	Gasket, Gear Case
38	Controls Housing Assembly
39	1/4-20 X 7/8" LG SHCS
40	Lock Washer
41	Gasket, Cap Cover
42	Cover Cap Assembly
43	1/4-20 X 1.125 SBHCS
44	Lockwasher
45	Clevis
46	Gasket, Access Panel
47	Access Panel Cover
48	#6-32 X .25 SBHCS
49	Hole Plug
50	Warning Decal
51	Product ID Label
52	Caution Tag

CATALOG NUMBER CONFIGURATION KEY



Example:

iSPA1500-3-12-A = 1,500 lbs actuator, 115 VAC, 12 inch stroke, base model + analog and digital I/O



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