PROGRESSIVE AUTOMATIONS

FORWARD THINKING

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PA-HD2

User Manual

V1.2

TABLE OF CONTENTS

Safety Precautions 3
Specifications 4
Dimensions 5
Performance Graphs 6
Connectors 8
Internal Components 10
Internal Descriptions 11

Have any queries? Our expert engineers are here to help!

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SAFETY PRECAUTIONS

When installing and using your Progressive Automations linear actuator, basic safety precautions should always be followed. Please read all safety precautions thoroughly and be familiar with all functions of the product before use. Apply all other relevant precautions when operating electrical and moving mechanical devices.

DANGER

To reduce the risk of electrical shock and injuries:

- Do not attempt to modify or repair the actuator.
- Avoid using the actuator in environments with explosive gases or flammable materials.
- Avoid using the actuator beyond its specified Ingress Protection rating.
- Make sure that the power source is properly grounded. Neglecting proper grounding can result in a dangerous electrical hazard.

WARNING

To reduce personal harm and injury:

- Follow recommended load ratings and specifications for the actuator.
- Avoid leaving the actuator unattended during operation.
- Avoid operating the actuator in areas with high levels of airborne contaminants.
- Ensure a clear path for full extension and retraction of the actuator.
- Keep hands and body parts clear of the actuator while it is in motion.
- Exercise caution around pinch points and moving components during the actuator's operation.
- Keep all loose clothing, jewelry, and personal items away from the actuator's moving parts.

OPERATING NOTES

Warranty
Any attempts to disassemble or tamper with the actuator's internal components or operation outside of the advertised usage limitations will result in voiding the product's warranty. For more information on our warranty terms, visit: https://www.progressiveautomations.com/pages/warranty-terms

Force Restrictions
Linear actuators must be used within the specified force rating outlined in this documentation. Load must be evenly distributed. Exceeding the recommended force rating may result in failure of the linear actuator. It may also damage the product and void the warranty. Please note that the weight of the load does not always equal the total force due to mechanical advantage, wherein the force may increase or decrease depending on the application.

Operation Time
Linear actuators must be operated within the specified operation time and frequency. Exceeding the duty cycle rating can significantly reduce the actuator's expected lifespan and will void the warranty.

SPECIFICATIONS

RATED LOAD CONFIGURATIONS

Rated Load (lbs)		12 VDC Current (A)		24 VDC Current (A)		12 VDC Speed[1] (inch/sec)		24 VDC Speed[1] (inch/sec)	
Dynamic	Static	No Load	Full Load	No Load	Full Load	No Load	Full Load	No Load	Full Load
270	450	4.0	15.0	2.0	7.0	2.63	2.20	2.63	2.20
450	899	2.5	18.0	1.5	9.0	1.75	1.50	1.75	1.50
674	1124	2.5	17.0	1.5	8.5	1.05	0.94	1.05	0.94
899	1349	2.5	17.0	1.5	8.5	0.79	0.71	0.79	0.71
1349	2023	2.5	18.0	1.5	9.0	0.52	0.43	0.52	0.43
2023	2698	2.0	14.0	1.0	7.0	0.26	0.24	0.26	0.24

[1]Speed specifications have a ±10% tolerance.

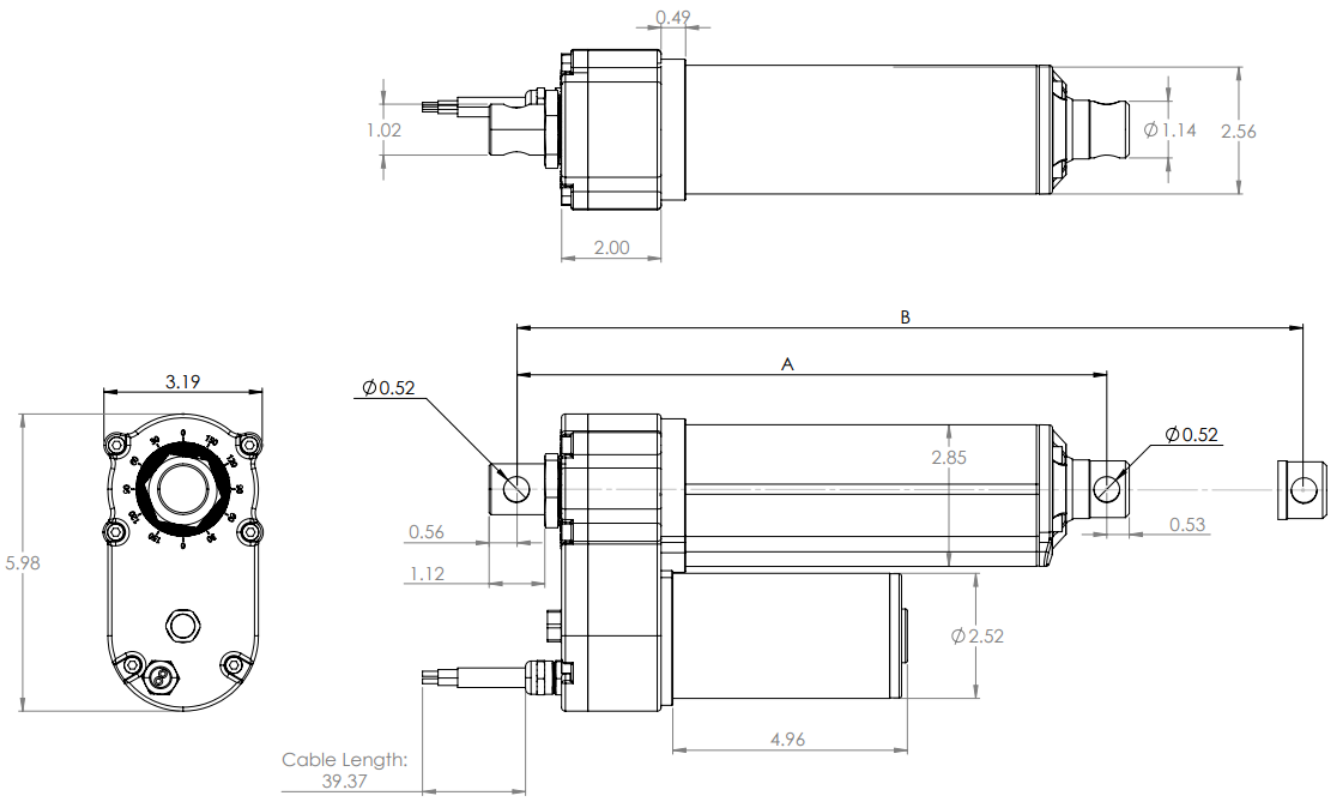
SPECIFICATIONS

Input Voltage	12 VDC or 24 VDC
Stroke	2.0" to 40.0"
Feedback	None, Hall Effect Sensor or Potentiometer (Customizable)
Duty Cycle	20% (4 minutes on, 16 minutes off)
Weather Protection	IP67
Operational Temperature	-10ºC to 65ºC (14ºF to 149ºF), -40ºC to 65ºC (Customizable)
Operating Noise	≤65 dB
Limit Switch	Built-In (Non-Adjustable)
Cable Length	39.37" (Customizable)
Connector	Molex Mega-Fit 2-Pin Receptacle (All Units) Molex Mini-Fit Jr 4-Pin Receptacle (Hall Effect Units) Tinned Wire Leads (Potentiometer Units)
Front Mounting Hole Size	0.52" (Customizable)
Rear Mounting Hole Size	0.52" (Customizable)
Actuator Type	Industrial
Motor Type	Brushed DC Motor
Screw Type	ACME
Stroke Rod Material	Stainless Steel (SUS304)
Housing Material	Aluminum Alloy
Gear Material	Powder Metallurgy/Die-Casting
Compatible Mounting Brackets	BRK-17

DIMENSIONS

Note: All dimensions are listed in inches.

DIAGRAM



HOLE TO HOLE LENGTH

Stroke Length	2”	4"	6”	8”	10”	12”	16”	18”	24”	30”	40”
A (Fully Retracted)	9.87	11.87	13.87	15.87	17.87	21.84	25.84	27.84	35.81	41.81	51.81
B (Fully Extended)	13.87	15.87	19.87	23.87	27.87	33.84	41.84	45.84	59.81	71.81	91.81

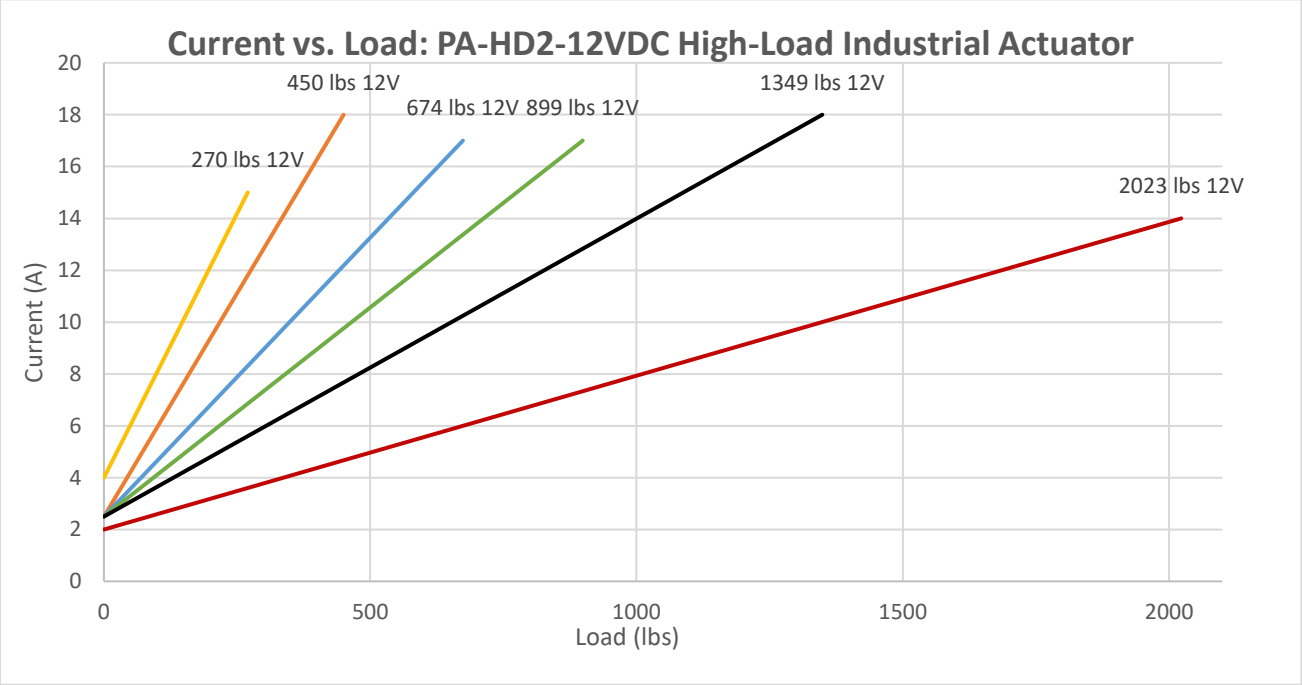
2" ≤ Stroke Length ≤ 11"
A (Fully Retracted) = Stroke Length + 7.87"
B (Fully Extended) = Stroke Length x 2 + 7.87"

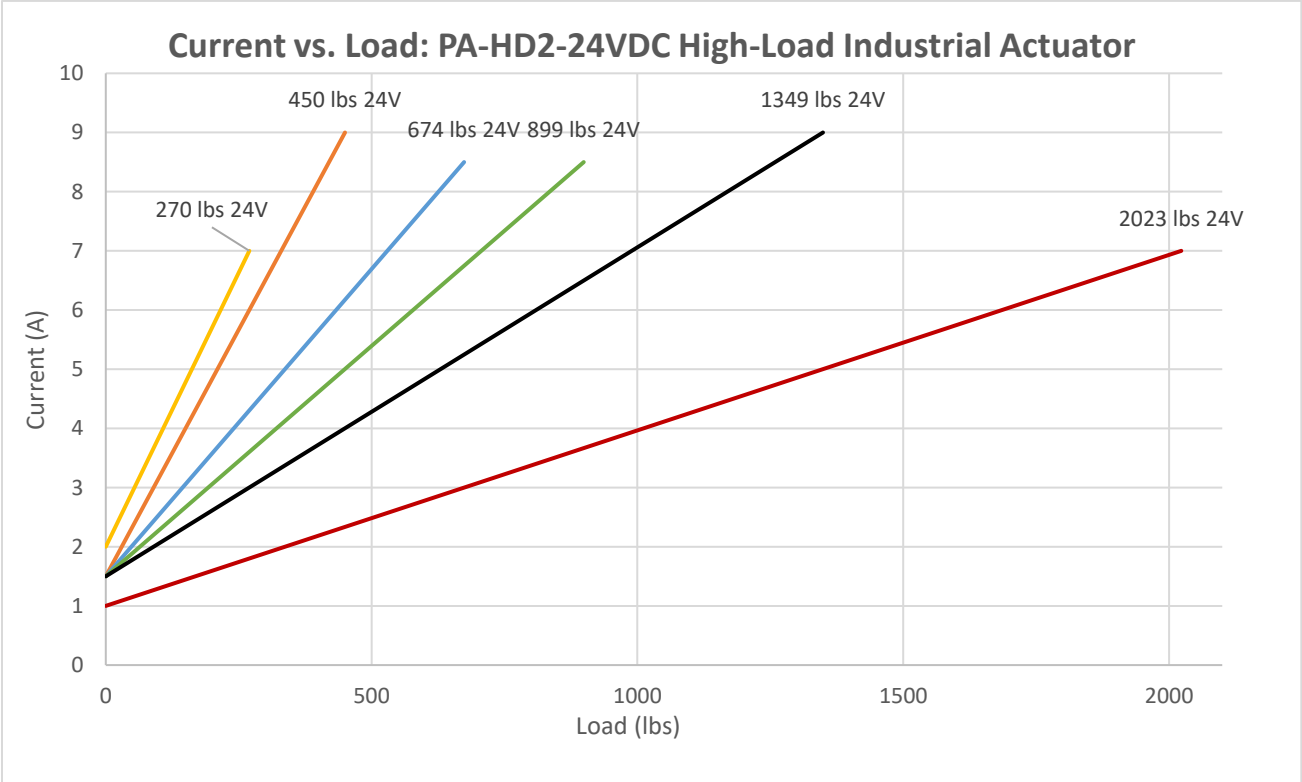
12" ≤ Stroke Length ≤ 23"
A (Fully Retracted) = Stroke Length + 9.84"
B (Fully Extended) = Stroke Length x 2 + 9.84"

24" ≤ Stroke Length ≤ 40"
A (Fully Retracted) = Stroke Length + 11.81"
B (Fully Extended) = Stroke Length x 2 + 11.81”

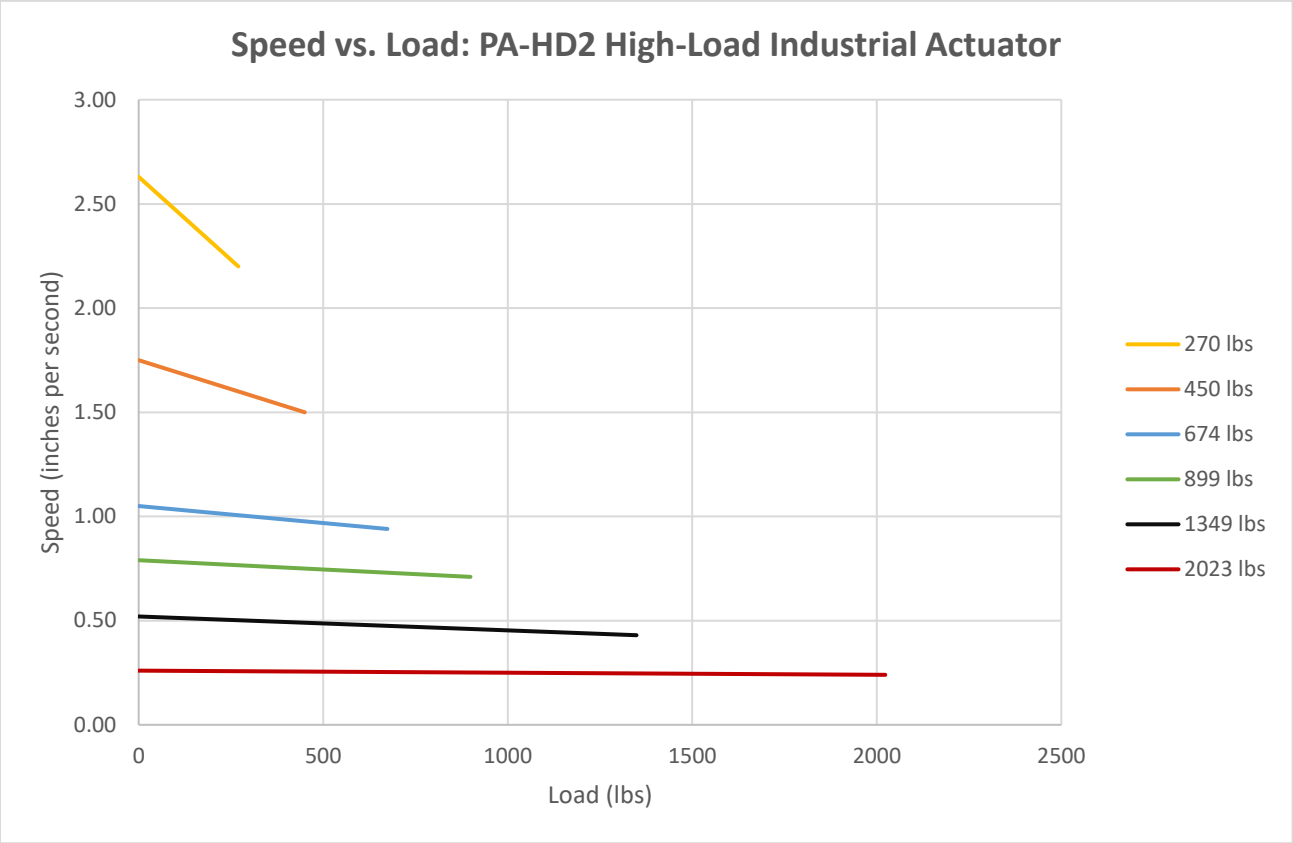
PERFORMANCE GRAPHS

SPEED VS LOAD





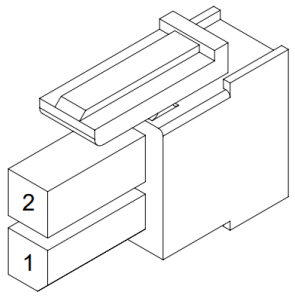
CURRENT VS LOAD



CONNECTORS

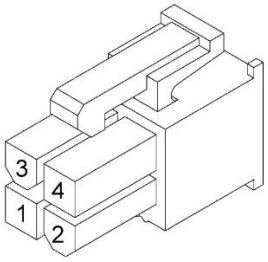
Note: Actuators without feedback come with the Motor 2-Pin Connector only.

MOTOR - 2-PIN CONNECTOR



Pin Location	Function	Wire Color	Wire Gauge
2	Motor + (Extend)	Red	15 AWG
1	Motor - (Retract)	Black	15 AWG

HALL EFFECT - 4 PIN CONNECTOR



Pin Location	Function	Wire Color	Wire Gauge
1	Hall Effect A – signal leads when extending	Brown	22 AWG
2	Hall Effect B – signal leads when retracting	Green	22 AWG
3	Hall Effect COM	Black	22 AWG
4	Hall Effect 5V	Red	22 AWG

POTENTIOMETER - TINNED LEADS

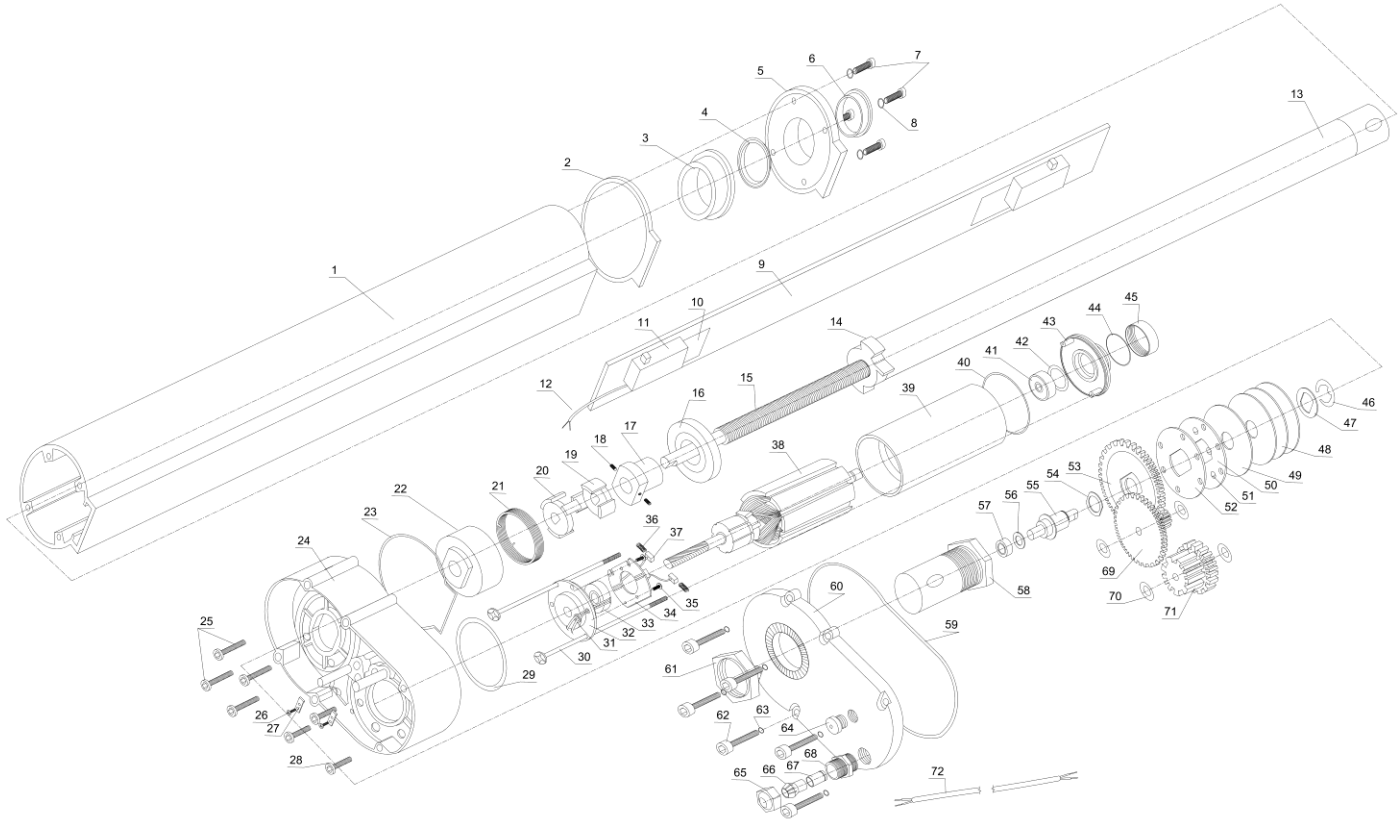
Pin Location	Function	Wire Color	Wire Gauge
N/A, Tinned Leads	Potentiometer Wiper	Red	22 AWG
N/A, Tinned Leads	Potentiometer (5 VDC, 10kΩ)	Yellow	22 AWG
N/A, Tinned Leads	Potentiometer (GND, 0 kΩ)	White	22 AWG

Force Rating (lbs)	Starting Resistance (kΩ)	Potentiometer Resolution (kΩ/inch)	Maximum Stroke Length (inch)
270	≤0.3	0.3124	28.35
450	≤0.3	0.4674	18.90
674	≤0.3	0.4674	18.90
899	≤0.3	0.3124	28.35
1349	≤0.3	0.9398	9.45
2023	≤0.3	0.9398	9.45

PARTS LIST

	Part Name	Part Number	Mating Part Number
Motor Housing	Molex Mega-Fit Receptacle 2 Circuits	1716920102	1054110102
Motor Terminals	Molex Mega-Fit Female Terminal 16-14 AWG	76823-0321	1054170334
Hall Effect Housing	Molex Mini-Fit Receptacle 4 Circuits	39-01-3045	39-01-3043
Hall Effect Terminals	Molex Mini-Fit Junior Female Terminal 24-18 AWG	39-00-0038	39-00-0040

INTERNAL COMPONENTS



INTERNAL DESCRIPTIONS

Item	Description	Qty
1	Shaft Enclosure	1
2	Shaft Enclosure Top Gasket	1
3	Shaft Top Guide	1
4	Shaft Inside Gasket	1
5	Shaft Top Cap	1
6	Shaft Outside Gasket	1
7	Shaft Top Cap Screw	4
8	Shaft Top Cap Screw O-Ring	4
9	Limit Switches Base	1
10	Limit Diode	2
11	Limit Switch	2
12	Limit Switches Wiring	1
13	Shaft with Mounting Hole	1
14	Shaft Base with Limit Switches Arm	1
15	Threaded Shaft Drive	1
16	Shaft Bearing	1
17	Shaft Bearing Base	1
18	Shaft Bearing Base Screw	2
19	Upper Clutch Element	1
20	Lower Clutch Element	1
21	Clutch Spring	1
22	Clutch Enclosure	1
23	Shaft Base Gasket	1
24	Actuator Base	1
25	Shaft Base Screw	4
26	Wire Strap Screw	2
27	Wire Strap	2
28	Electric Motor Base Screw	3
29	Electric Motor Base Gasket	1
30	Electric Motor Enclosure Screw	2
31	Electric Motor Wires	1
32	Electric Motor Base	1
33	Electric Motor Bottom Bearing	1
34	Brush Holder PCB	1
35	Brush Holder PCB Screw	2
36	Electric Motor Brush Spring	2

Item	Description	Qty
37	Electric Motor Brush	2
38	Electric Motor Rotor	1
39	Electric Motor Case and Stator	1
40	Motor Case Top O-Ring	1
41	Electric Motor Top Bearing	1
42	Electric Motor Spring Washer	1
43	Electric Motor Top Cap	1
44	Motor Top Cap O-Ring	1
45	Motor Top Cap	1
46	Clutch Snap Ring	1
47	Clutch Top Washer	1
48	Clutch Spring Disc	3
49	Clutch Flat Disc	1
50	Clutch Ball Top Plate	1
51	Clutch Ball	6
52	Clutch Ball Bottom Plate	1
53	Shaft Gear Wheel	1
54	Clutch Lock Washer	1
55	Clutch Base Rotor	1
56	Clutch Base Washer	1
57	Clutch Bottom Bearing	1
58	Actuator Bottom Mount	1
59	Actuator Base Gasket	1
60	Actuator Bottom Case	1
61	Actuator Bottom Mount Nut	1
62	Actuator Base Screw	6
63	Actuator Base Screw O-Ring	6
64	Actuator Case Plug	1
65	Power Cable Lock Screw	1
66	Power Cable Lock	1
67	Power Cable Sleeve	1
68	Power Cable Grommet	1
69	Shaft Intermediate Gear	1
70	Gear Teflon Washer	4
71	Motor Intermediate Gear	1
72	Power Cable	1