Linear Solenoids

Soft Shift®	Type	Preferred Products	Page
	2EPM	196655-030	76
	3EPM	196656-028	79
	4EPM	196657-026	82
	5EPM	196658-024	85
	6EPM	196659-023	88

2 EPM

Linear Solenoids

Soft Shift®

2 EPM

Dimensions (mm)	∅ 29 x 25
Duty cycle	continuous or intermittent
Stroke	Up to 4,1 mm
Operation	Quiet operation with 3-5 times the starting force of standard solenoids
Max. force (N)	Up to 16,9 N (@10% Duty cycle)
Life	1 million cycles
Power (W)	7–70
Supply(V)	2,2–91 VDC
Power	Average power consumption; moderate force output
Functional Advantages	Slow, smooth motion or snap action; can provide closed loop velocity and position control

Technical Data

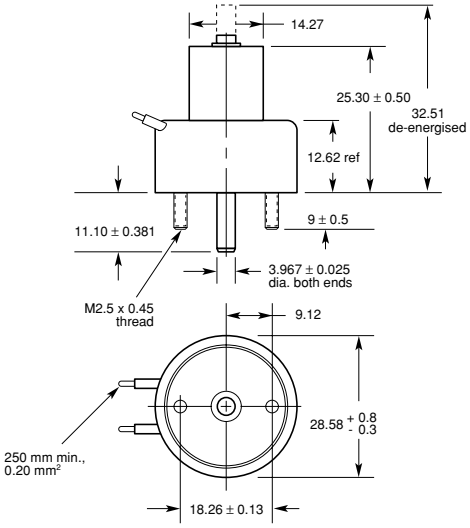
Stroke	4,06 ± 0,762 mm
Dielectric Strength	1000 VRMS
Recommended Minimum Heat Sink	Maximum watts dissipated are based on an unrestricted flow of air at 20°C, mounted on the equivalent of an aluminium plate measuring 85,7 x 85,7 x 3,2 mm
Coil Resistance	±5% tolerance on all coil awg (wire diameter)
Spring Rate	123,2 Nmm; 0,6 N ±30% preload reference
Weight	70,9 g

Preferred Range

Type	Size	Max. Stroke	Duty Cycle	Nominal voltage	Force	Nominal power	max. "On time"
196655-030	Ø 29 X 25 mm	4,1 Nm	100%	8,8 VDC	4,5 N	7 W @20˚C	∞ sec

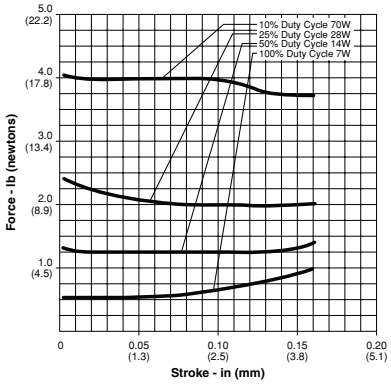
2EPM

Dimensions

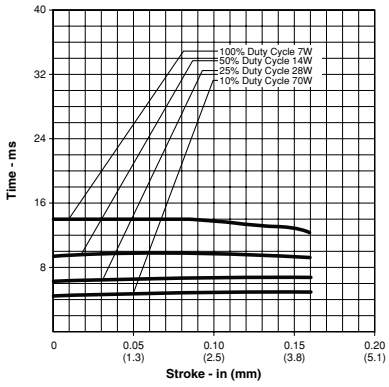


Performance chart

Typical Force @20°C



Typical Speed @ No Load, 20°C



Ordering Reference

Type	196655-(0XX)					
			100%	50%	25%	10%
Performance	Maximum ON Time (sec) when pulsed continuously[1]		∞	100	36	7
	Maximum Stroke mm ± 0.03		4.1	4.1	4.1	4.1
	Force (N) @ Maximum Stroke and Specified Duty Cycle		4.45	6.23	8.9	16.9
	Watts (@ 20°C)		7	14	28	70
	Ampere Turns (@ 20°C)		425	602	849	1350
Coil Data	awg (0XX)[2]	Resistance (@20°C)	# Turns[3]	VDC (Nom)	VDC (Nom)	VDC (Nom)	VDC (Nom)
	024	0.68	130	2.2	3.2	4.5	7.1
	025	1.16	174	2.8	4.0	5.7	9.0
	026	1.96	231	3.6	5.1	7.2	11.5
	027	3.16	296	4.5	6.4	9.0	14.4
	028	5.10	378	5.7	8.1	11.5	18.2
	029	6.94	423	7.0	9.9	13.9	22.0
	030	11.03	530	8.8	12.5	17.7	28.0
	031	16.85	649	11.0	15.6	22.0	35.0
	032	28.15	858	13.9	19.8	28.0	44.0
	033	42.75	1036	17.5	25.0	35.0	56.0
	034	69.56	1312	23.0	32.0	45.0	72.0
	035	112.00	1674	29.0	40.0	57.0	91.0

[1] Continuously pulsed at stated watts and duty cycle
[2] Other coil awg (wire diameter) sizes available — please enquire
[3] Reference number of turns

All data is at 20°C coil temperature. Force outputs degrade with increased temperatures.

3 EPM

Linear Solenoids

Soft Shift®

3EPM

Dimensions (mm)	∅ 33 x 31
Duty cycle	continuous or intermittent
Stroke	6,4 mm
Operation	Quiet operation with 3-5 times the starting force of standard solenoids
Max. force (N)	19,1 N (@10% Duty cycle)
Life	1 million cycles
Power (W)	9–90
Supply (V)	2,6–83 VDC
Power	Average power consumption; moderate force output
Functional Advantages	Slow, smooth motion or snap action; can provide closed loop velocity and position control

Technical Data

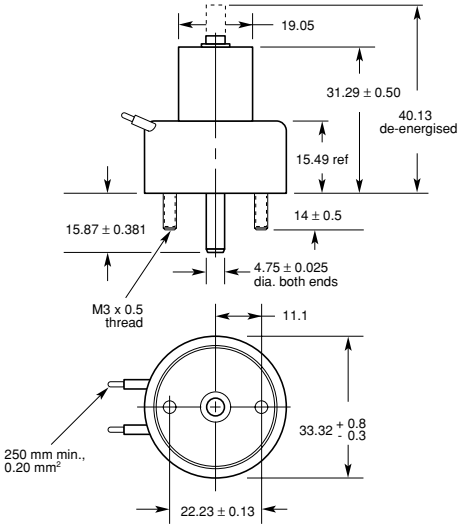
Stroke	6,35 ± 0,762 mm
Dielectric Strength	1000 VRMS (23-27 awg) (wire diameter); 1200 VRMS (28-33 awg) (wire diameter)
Recommended Minimum Heat Sink	Maximum watts dissipated by solenoid are based on an unrestricted flow of air at 20°C, with solenoid mounted on the equivalent of an aluminium plate measuring 117,5 x 117,5 x 3,2 mm
Coil Resistance	±5% tolerance on all coil awg (wire diameter)
Spring Rate	82,5 Nmm; 1,0 N ±30% preload reference
Weight	113,4 g

Preferred Range

Type	Size	Max. Stroke	Duty Cycle	Nominal voltage	Force	Nominal power	max. "On time"
196656-028	Ø 33 X 31 mm	6,4 Nm	100%	8,4 VDC	4,5 N	9 W @20°C	∞ sec

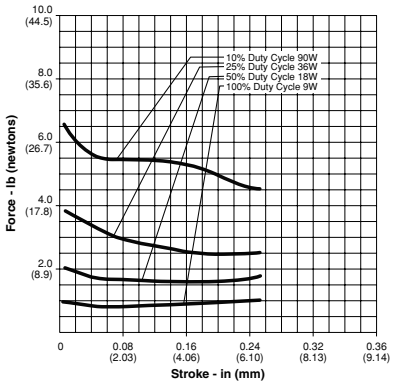
3EPM

Dimensions

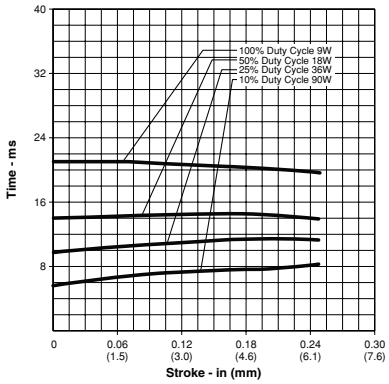


Performance chart

Typical Force @20˚C



Typical Speed @ No Load, 20˚C



Ordering Reference

Type	196656-(0XX)			100%	50%	25%	10%
Performance	Maximum ON Time (sec) when pulsed continuously[1]			∞	100	36	8
	Maximum Stroke mm ± 0.03			6.4			
	Force (N) @ Maximum Stroke and Specified Duty Cycle			4.45	8.46	10.25	19.14
	Watts (@ 20°C)			9	18	36	90
	Ampere Turns (@ 20°C)			535	756	1070	1690
Coil Data	awg (0XX)[2]	Resistance (@20°C)	# Turns[3]	VDC (Nom)	VDC (Nom)	VDC (Nom)	VDC (Nom)
	023	0.70	145	2.6	3.7	5.2	8.2
	024	1.18	192	3.3	4.6	6.6	10.4
	025	1.97	252	4.2	5.9	8.4	13.2
	026	3.26	328	5.3	7.5	10.6	16.8
	027	5.04	405	6.7	9.4	13.3	21.0
	028	8.02	510	8.4	11.9	16.8	27.0
	029	12.21	627	10.4	14.7	21.0	33.0
	030	19.20	780	13.2	18.6	26.0	42.0
	031	31.84	1008	16.9	24.0	34.0	53.0
	032	46.97	1215	21.0	29.0	41.0	65.0
	033	75.30	1530	26.0	37.0	53.0	83.0

[1] Continuously pulsed at stated watts and duty cycle
[2] Other coil awg (wire diameter) sizes available — please enquire
[3] Reference number of turns

All data is at 20°C coil temperature. Force outputs degrade with increased temperatures.

4EPM

Linear Solenoids

Soft Shift®

4EPM

Dimensions (mm)	∅ 40 x 37
Duty cycle	continuous or intermittent
Stroke	Up to 7,6 mm
Operation	Quiet operation with 3-5 times the starting force of standard solenoids
Max. force (N)	Up to 33,4 N (@ 10% Duty cycle)
Life	1 million cycles
Power (W)	12,5–125
Supply (V)	4,3–132 VDC
Power	Average power consumption; moderate force output
Functional Advantages	Slow, smooth motion or snap action; can provide closed loop velocity and position control

Technical Data

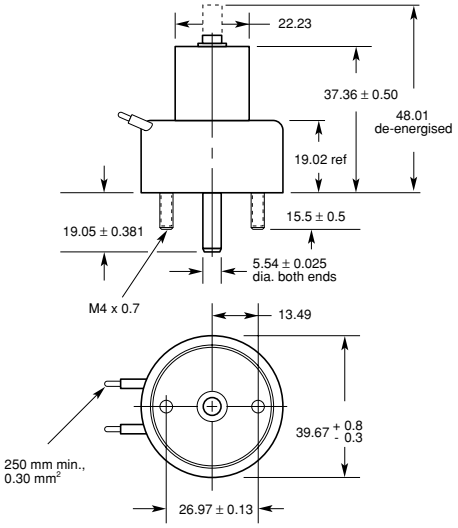
Stroke	7,62 ± 0,762 mm
Dielectric Strength	1000 VRMS (23-24 awg) (wire diameter); 1200 VRMS (25-33 awg) (wire diameter)
Recommended Minimum Heat Sink	Maximum watts dissipated by solenoid are based on an unrestricted flow of air at 20°C, with solenoid mounted on the equivalent of an aluminium plate measuring 158,8 x 158,8 x 3,2 mm
Coil Resistance	±5% tolerance on all coil awg (wire diameter)
Spring Rate	159,3 Nmm; 1,6 N ±30% preload reference
Weight	198,4 g

Preferred Range

Type	Size	Max. Stroke	Duty Cycle	Nominal voltage	Force	Nominal power	max. "On time"
196657-026	Ø 40 X 37 mm	7,6 Nm	100%	8,3 VDC	8,9 N	12,5 W @20°C	∞ sec

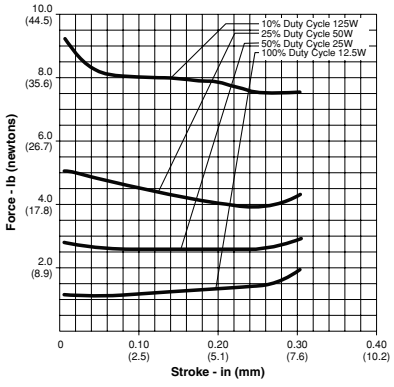
4EPM

Dimensions

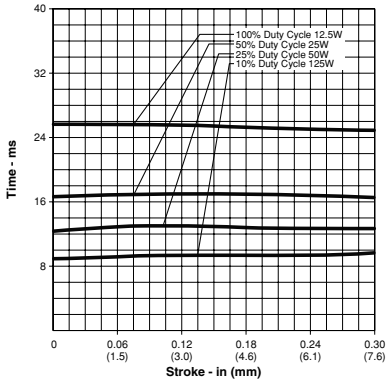


Performance chart

Typical Force @20°C



Typical Speed @ No Load, 20°C



Ordering Reference

Type	196657-(0XX)			100%	50%	25%	10%
Performance	Maximum ON Time (sec) when pulsed continuously[1]			∞	100	36	9
	Maximum Stroke mm ± 0.03			7.6			
	Force (N) @ Maximum Stroke and Specified Duty Cycle			8.9	13.35	19.14	33.38
	Watts (@ 20°C)			12.5	25	50	125
	Ampere Turns (@ 20°C)			714	1000	1425	2250
Coil Data	awg (0XX)[2]	Resistance (@20°C)	# Turns[3]	VDC (Nom)	VDC (Nom)	VDC (Nom)	VDC (Nom)
	023	1.59	266	4.3	6.0	8.5	13.4
	024	2.20	301	5.2	7.3	10.4	16.4
	025	3.54	384	6.6	9.2	13.1	21.0
	026	5.67	486	8.3	11.7	16.6	26.0
	027	8.76	600	10.4	14.6	21.0	33.0
	028	13.80	748	13.2	18.5	26.0	42.0
	029	22.60	975	16.6	23.0	33.0	52.0
	030	34.80	1190	21.0	29.0	42.0	66.0
	031	56.70	1520	27.0	37.0	53.0	84.0
	032	88.30	1908	33.0	46.0	66.0	104.0
	033	138.00	2360	42.0	59.0	83.0	132.0

1 Continuously pulsed at stated watts and duty cycle
2 Other coil awg (wire diameter) sizes available — please enquire
3 Reference number of turns

All data is at 20°C coil temperature. Force outputs degrade with increased temperatures.

5 EPM

Linear Solenoids

Soft Shift®

5EPM

Dimensions (mm)	∅ 48 x 49
Duty cycle	continuous or intermittent
Stroke	Up to 10,3 mm
Operation	Quiet operation with 3-5 times the starting force of standard solenoids
Max. force (N)	Up to 55,6 N (@ 10% Duty cycle)
Life	1 million cycles
Power (W)	21–210
Supply (V)	7,2–226 VDC
Power	Average power consumption; moderate force output
Functional Advantages	Slow, smooth motion or snap action; can provide closed loop velocity and position control

Technical Data

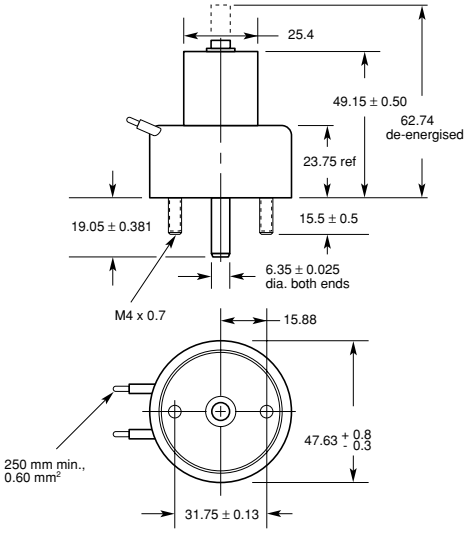
Stroke	10.16 ± 0.762 mm
Dielectric Strength	1000 VRMS (23 awg) (wire diameter); 1200 VRMS (24-33 awg) (wire diameter)
Recommended Minimum Heat Sink	Maximum watts dissipated by solenoid are based on an unrestricted flow of air at 20°C, with solenoid mounted on the equivalent of an aluminium plate measuring 190,5 x 190,5 x 3,2 mm
Coil Resistance	±5% tolerance on all coil awg (wire diameter)
Spring Rate	498,3 Nmm; 2,0 N ±30% preload reference
Weight	340,2 g

Preferred Range

Type	Size	Max. Stroke	Duty Cycle	Nominal voltage	Force	Nominal power	max. "On time"
196658-028	Ø 48 X 49 mm	10,2 Nm	100%	9 VDC	11,4 N	21 W @20°C	∞ sec

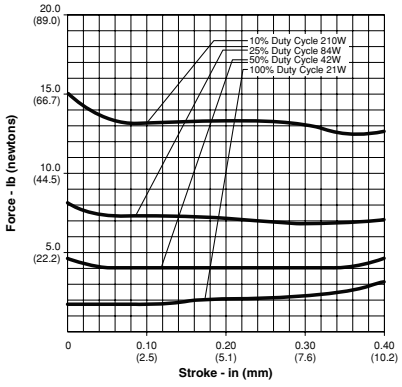
5EPM

Dimensions

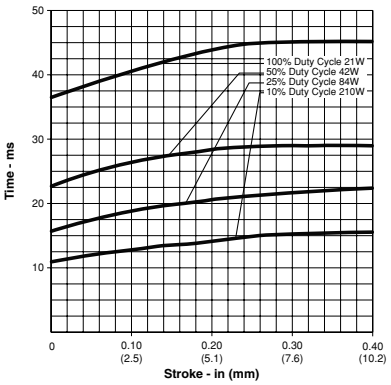


Performance chart

Typical Force @20˚C



Typical Speed @ No Load, 20˚C



Ordering Reference

Type	196658-(0XX)			100%	50%	25%	10%
Performance	Maximum ON Time (sec) when pulsed continuously[1]			∞	100	36	10
	Maximum Stroke mm ± 0.03			10.2			
	Force (N) @ Maximum Stroke and Specified Duty Cycle			13.35	20.02	31.15	55.62
	Watts (@ 20°C)			21	42	84	210
	Ampere Turns (@ 20°C)			1015	1440	2030	3210
Coil Data	awg (0XX)[2]	Resistance (@20°C)	# Turns[3]	VDC (Nom)	VDC (Nom)	VDC (Nom)	VDC (Nom)
	023	2.70	384	7.2	10.1	14.3	23.0
	024	4.30	486	9.0	12.7	18.0	28.0
	025	6.66	590	11.5	16.2	23.0	36.0
	026	10.30	737	14.0	20.0	28.0	44.0
	027	15.70	900	17.7	25.0	35.0	56.0
	028	26.60	1190	23.0	32.0	45.0	72.0
	029	38.00	1380	28.0	40.0	56.0	89.0
	030	62.10	1768	36.0	51.0	71.0	113.0
	031	96.10	2166	45.0	64.0	90.0	143.0
	032	157.00	2816	57.0	80.0	113.0	179.0
	033	241.00	3432	71.0	101.0	143.0	226.0

1 Continuously pulsed at stated watts and duty cycle
2 Other coil awg (wire diameter) sizes available — please enquire
3 Reference number of turns

All data is at 20°C coil temperature. Force outputs degrade with increased temperatures.

6 EPM

Linear Solenoids

Soft Shift®

6EP

Dimensions (mm)	∅ 57 x 56
Duty cycle	continuous or intermittent
Stroke	Up to 10,7 mm
Operation	Quiet operation with 3-5 times the starting force of standard solenoids
Max. force (N)	Up to 131,3 N (@ 10% Duty cycle)
Life	1 million cycles
Power (W)	32–320
Supply (V)	12.3–394 VDC
Power	Average power consumption; moderate force output
Functional Advantages	Slow, smooth motion or snap action; can provide closed loop velocity and position control

Technical Data

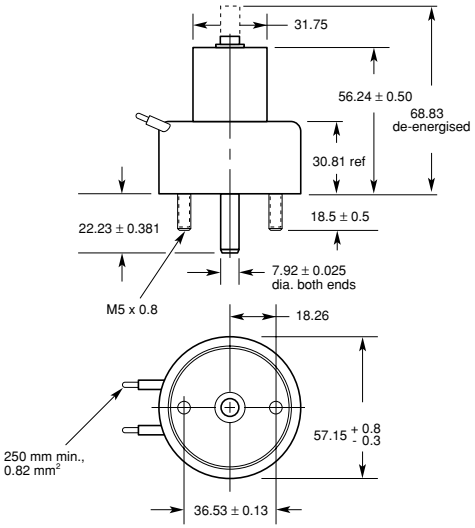
Stroke	10,67 ± 0,762 mm
Dielectric Strength	1200 VRMS (23-31 awg) (wire diameter); 1500 VRMS (32-33 awg) (wire diameter)
Recommended Minimum Heat Sink	Maximum watts dissipated by solenoid are based on an unrestricted flow of air at 20°C, with solenoid mounted on the equivalent of an aluminium plate measuring 314,3 x 314,3 x 3,2 mm
Coil Resistance	±5% tolerance on all coil awg (wire diameter)
Spring Rate	535,6 Nmm;4,8 N ±30% preload reference
Weight	652 g

Preferred Range

Type	Size	Max. Stroke	Duty Cycle	Nominal voltage	Force	Nominal power	max. "On time"
196659-023	Ø 57 X 56 mm	10,7 Nm	100%	12,3 VDC	31,1 N	32 W @20°C	∞ sec

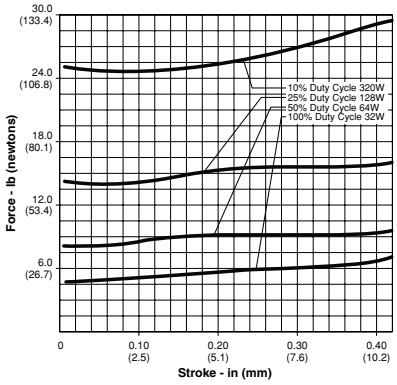
6EPM

Dimensions

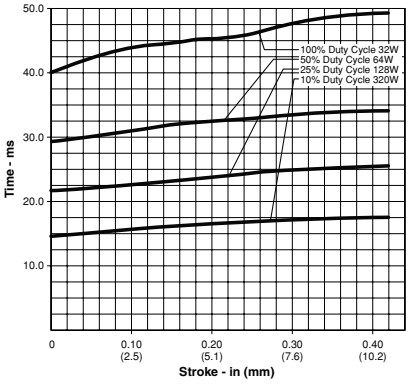


Performance chart

Typical Force @20˚C



Typical Speed @ No Load, 20˚C



Ordering Reference

Type	196659-(0XX)			100%	50%	25%	10%
Performance	Maximum ON Time (sec) when pulsed continuously[1]			∞	87	36	13
	Maximum Stroke mm ± 0.03			10.7			
	Force (N) @ Maximum Stroke and Specified Duty Cycle			31.1	42.7	71.2	131.3
	Watts (@ 20°C)			32	64	128	320
	Ampere Turns (@ 20°C)			1480	2080	2940	4620
Coil Data	awg (0XX)[2]	Resistance (@20°C)	# Turns[3]	VDC (Nom)	VDC (Nom)	VDC (Nom)	VDC (Nom)
	023	4.69	567	12.3	17.2	24.0	38.0
	024	7.43	710	15.5	22.0	31.0	48.0
	025	12.90	960	19.9	28.0	39.0	62.0
	026	19.70	1170	25.0	35.0	49.0	78.0
	027	32.00	1500	32.0	44.0	63.0	99.0
	028	51.60	1904	40.0	56.0	79.0	125.0
	029	74.40	2232	49.0	69.0	98.0	154.0
	030	126.00	2940	63.0	89.0	126.0	198.0
	031	195.00	3611	80.0	112.0	159.0	250.0
	032	288.00	4350	98.0	138.0	195.0	306.0
	033	427.00	5010	126.0	177.0	251.0	394.0

[1] Continuously pulsed at stated watts and duty cycle
[2] Other coil awg (wire diameter) sizes available — please enquire
[3] Reference number of turns

All data is at 20°C coil temperature. Force outputs degrade with increased temperatures.