YASKAWA

LINEAR MOTORS
SERIES

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About YASKAWA

Contents

For more than 90 years YASKAWA has been supplying mechatronic products and is one of the leading companies for motion control products worldwide. YASKAWA develops and manufactures Inverter Drives, Servo Drives and Machine Controllers and has introduced many ground-breaking innovations over the past decades. YASKAWA products are used in all fields of machine building and industrial automation and have a high reputation for their outstanding quality and durability.

Challenge for Speed

YASKAWA is continuously challenging performance barriers with its Linear ∑ (Sigma) Motor products to improve speed and accuracy. YASKAWA expertise in advanced servo technology optimises Linear Motor and improves machine performance in many applications.

YASKAWA Linear ∑ Motors are in use to improve the reliability, speed and accuracy performance in semiconductor/LCD panel production machinery, SMD placement systems as well as virtually all types of general automation applications.

Improved Machine Performance

A linear motor is directly coupled to the load. This achieves high positioning accuracies and wide operational speed ranges compared to other conventional drive/ translation mechanisms. An unlimited linear travel envelope can be obtained by coupling the stationary magnet tracks as needed.

Simplified Machine Design & Construction

Since the moving part of the motor is rigid and is directly fixed to the load, the linear motion mechanism's stiffness is greatly improved. Multiples of the moving motor parts can be operated independently over a single axis of the magnet track, a variety of motion can be generated from a very compact drive system.

Ease of Operation & High Reliability

Linear motors are quiet even at high speeds since the only contacting mechanisms in the linear motor system are the linear motion guides. The system reliability is increased and maintenance requirements are greatly reduced.

Force Density

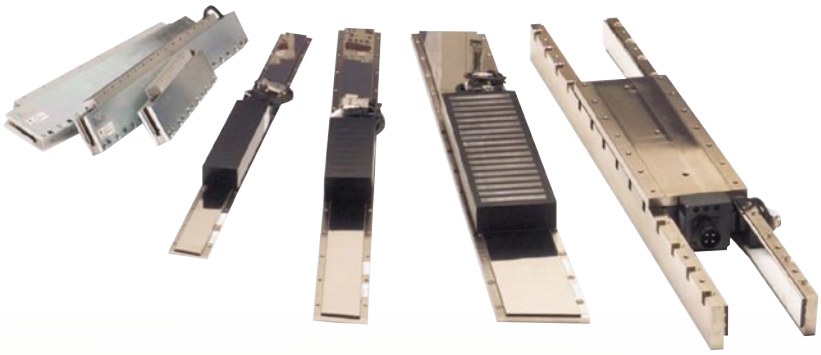
The Linear ∑ Motors are designed for high force density in compact packages. This is made possible by the extensive use of high-energy earth magnets. The Combination of cutting edge materials, YASKAWA motor design expertise and high density winding technology from the famous ∑ and ∑-II rotary servo motor series result in precise motion.

Force Linearity

The Linear ∑ Motors exhibit exceptional Force Linearity even at near the peak force regions. This is achieved through the advanced magnetic circuitry, optimum winding geometry as well as the d-q axis current control method within the powerful ∑-V Digital Servodrivers.

Velocity Ripple

The Linear ∑ Motor performance levels are further enhanced by the combined use with ∑-V Digital Servodrivers. The closed loop-direct drive linear servo system generates extremely smooth linear motion with minimum velocity ripple.



Speed

The Linear ∑ Motors can reach speeds as high as 5 meters (196 inches) per second. Since the linear motors do not suffer from the usual limitations of the conventional mechanical drive systems, the operational speed ranges are not constrained by factors such as the travel lengths of the linear motion systems.

Acceleration

The Linear ∑ Motors can accelerate well beyond the capability of other mechanical linear translation systems. The Linear ∑ Motors themselves can reach astonishing 20 Gs of maximum acceleration.

Settling Time

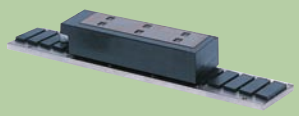
The Linear ∑ Motors combined with the ∑-V Servodrivers can shorten the system settling time after motion. The excellent dynamic stiffness of the Linear ∑ motors and one of the fastest servodriver in the industry can immediately improve your machines' motion cycle specifications.

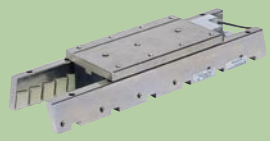
Magnetic Attraction Forces

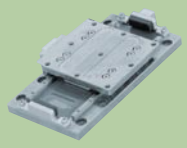
The Linear ∑ Type GW motors are Coreless and there is no attraction force between the motor members with Zero-Cogging. The Linear ∑ Type FW and TW motors are Iron-core type and there are small to large attraction forces depending on the size of the motor between the moving and the stationary parts of the motors. These attraction forces can provide benefits in some systems by providing the preload forces to the Linear Motion Guides increasing the system rigidity. Inversely, the attraction forces may negatively affect the mechanical design freedom since the forces acting on the relative members of the motors must be properly supported by increased bearing load capacities. The Iron-core TW motors overcome this limitation in the Iron-core design by a patented structure where the attraction forces are negated by its unique layout. The TW motors offer the high force density and long linear bearing life in compact packages.

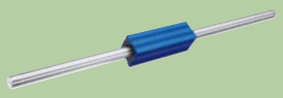
High Efficiency

The Linear ∑ Motors are extremely energy efficient. Due to its optimized magnetic circuitry design and high-density windings inherited from the company's legendary ∑ Motors, the effects of motors' heat being transferred to the other areas of your machine are minimized.



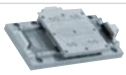






Combinations

Linear Motor with ∑-V Series SERVOPACK

Linear Motors			Peak Force (N)	Single-/ Three-phase 230 VAC Three-phase 400 VAC
	Coreless type, with standard magnetic way	SGLGW-30A050	40	SGDV-R70A☐5A
		SGLGW-30A080	80	SGDV-R90A☐5A
		SGLGW-40A140	140	
		SGLGW-40A253	280	SGDV-1R6A☐5A
		SGLGW-60A140	420	
		SGLGW-40A365	220	SGDV-2R8A☐5A
		SGLGW-60A253	440	
		SGLGW-60A365	660	SGDV-5R5A☐5A
		SGLGW-90A200	1300	SGDV-120A☐5A
	Coreless type, with high-efficiency magnetic way	SGLGW-40A140	230	SGDV-1R6A☐5A
		SGLGW-60A140	460	
		SGLGW-40A253	690	SGDV-2R8A☐5A
		SGLGW-40A365	360	SGDV-3R8A☐5A
		SGLGW-60A253	720	
	With F-type iron core	SGLFW-20A090	86	SGDV-1R6A☐5A
		SGLFW-20A120	125	
		SGLFW-35A120	220	
		SGLFW-35A230	440	SGDV-3R8A☐5A
		SGLFW-50A200	600	SGDV-5R5A☐5A
		SGLFW-50A380B	1200	SGDV-120A☐5A*
		SGLFW-35D120	220	SGDV-1R9D☐5A
		SGLFW-35D230	440	
		SGLFW-50D200	600	SGDV-3R5D☐5A
		SGLFW-50D380	1200	SGDV-5R4D☐5A
		SGLFW-1ZD200	1200	
		SGLFW-1ZD380	2400	SGDV-120D☐5A
		SGLFW-1ED380	3600	SGDV-8R4D☐5A
		SGLFW-1ED560	5400	SGDV-120D☐5A
	With T-type iron core	SGLTW-20A170	380	SGDV-3R8A☐5A
		SGLTW-35A170	660	SGDV-5R5A☐5A
		SGLTW-50A170	900	
		SGLTW-35D170	600	SGDV-3R5D☐5A
		SGLTW-35D170	900	
		SGLTW-35D320	1200	SGDV-8R4D☐5A
		SGLTW-35D320	1800	
		SGLTW-40D400	2600	SGDV-120D☐5A
		SGLTW-40D400	4000	SGDV-170D☐5A
		SGLTW-80D400	5000	
	Cylinder type ∑-Stick (Sigma Stick)	SGLCW-D16A085	60	SGDV-R70A☐5A
		SGLCW-D16A115	90	
		SGLCW-D16A145	120	SGDV-R90A☐5A
		SGLCW-D20A100	150	SGDV-1R6A☐5A
		SGLCW-D20A135	225	
		SGLCW-D20A170	300	
		SGLCW-D25A125	280	
		SGLCW-D25A170	420	SGDV-2R8A☐5A
		SGLCW-D32A165	465	
		SGLCW-D25A215	420	SGDV-5R5A☐5A
		SGLCW-D32A225	630	
		SGLCW-D32A285	840	
	∑-Trac-μ (Sigma Trac-μ)	SGTMM-01	10	SGDV-R70A☐5A
		SGTMM-03	25	SGDV-R90A☐5A

* Single-phase 230 VAC, 1.5 kW, SGDV-120A☐1A008000

Coreless SGLGW/SGLGM

With Standard-force Magnetic Ways

Voltage		230 V								
Linear Motor model SGLGW-		30A		40A			60A			90A
		050C	080C	140C	253C	365C	140C	253C	365C	200C
Rated force*	N	12.5	25	47	93	140	70	140	210	325
Rated current*	Arms	0,51	0,79	0.8	1.6	2.4	1,16	2,2	3,3	4.4
Instantaneous peak force*	N	40	80	140	280	420	220	440	660	1300
Instantaneous peak current*	Arms	1.62	2.53	2.4	4.9	7.3	3.5	7.0	10.5	17.6
Coil assembly weight	kg	0.14	0.19	0.40	0.66	0.93	0.48	0.82	1.16	2.2
Force constant	N / Arms	26.4	33.9	61.5	61.5	61.5	66.6	66.6	66.6	78
BEMF constant	V / (m / s)	8.8	11.3	20.5	20.5	20.5	22.2	22.2	22.2	26.0
Motor constant	N I √w	3.7	5.6	7.8	11.0	13.5	11.1	15.7	19.2	26.0
Electrical time constant	ms	0.2	0.4	0.4	0.4	0.4	0.5	0.5	0.5	1.4
Mechanical time constant	ms	7.30	4.78	5.59	4.96	4.77	3.41	3.08	2.98	3.18
Thermal resistance (with heat sink)	K / W	5,19	3,11	1,67	0,87	0,58	1,56	0,77	0,51	0,39
Thermal resistance (without heat sink)	K / W	-	-	3,02	1,80	1,23	2,59	1,48	1,15	1.09
Magnetic attraction	N	0	0	0	0	0	0	0	0	0
Heat sink size	mm	200 x 300 x 120			300 x 400 x 12	400 x 500 x 12	200 x 300 x 12	300 x 400 x 12	400 x 500 x 12	800 x 900 x 12

Note : 1. The items marked with an * and "force and speed characteristics" are the values at a motor winding temperature of 100°C during operation in combination with a servo drive. The others are at 20°C.

2. The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in above table is mounted on the coil assembly.
Heat sink size: 200 x 300 x 12 mm: SGLGW-30A050C, -30A080C, -40A140C, -60A140C
300 x 400 x 12 mm: SGLGW-40A253C, -60A253C
400 x 500 x 12 mm: SGLGW-40A365C, -60A365C
800 x 900 x 12 mm: SGLGW-90A200C

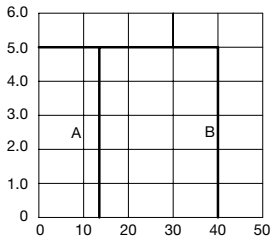
Basic Specifications

- Time rating: continuous
- Insulation class: Class B
- Ambient temperature: 0 to +40°C
- Ambient humidity: 20 to 80% (non-condensing)
- Insulation resistance: 500 VDC, 10 MΩ min.
- Excitation: permanent magnet
- Dielectric strength: 1500 VAC for 1 minute
- Protection methods: self-cooled, air-cooling
- Allowable winding temperature: 130°C

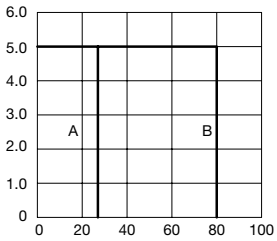
Force-speed Characteristics (with standard-force magnetic ways)

A: Continuous Duty Zone B: Intermittent Duty Zone

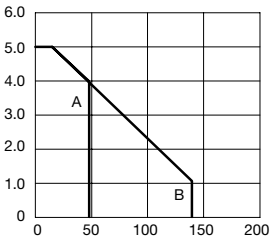
SGLGW-30A050C



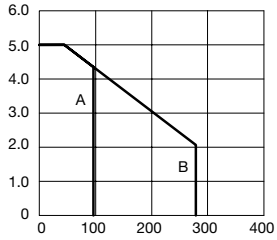
SGLGW-30A080C



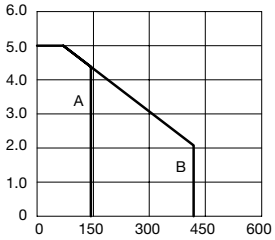
SGLGW-40A140C



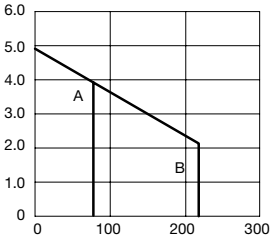
SGLGW-40A253C



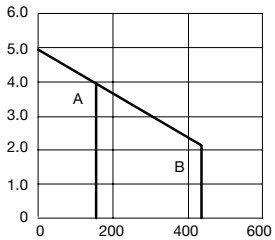
SGLGW-40A365C



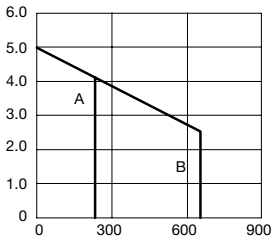
SGLGW-60A140C



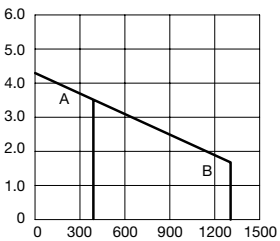
SGLGW-60A253C



SGLGW-60A365C



SGLGW-90A200C



Coreless SGLGW/SGLGM

Basic Specifications

- Time rating: Continuous
- Insulation class: Class B
- Ambient temperature: 0 to +40°C
- Ambient humidity: 20 to 80% (non-condensing)
- Insulation resistance: 500 VDC, 10 MΩ min.
- Excitation: Permanent magnet
- Dielectric strength: 1500 VAC for 1 minute
- Protection methods: Self-cooled, air-cooling
- Allowable winding temperature: 130°C

With High-force Magnetic Ways

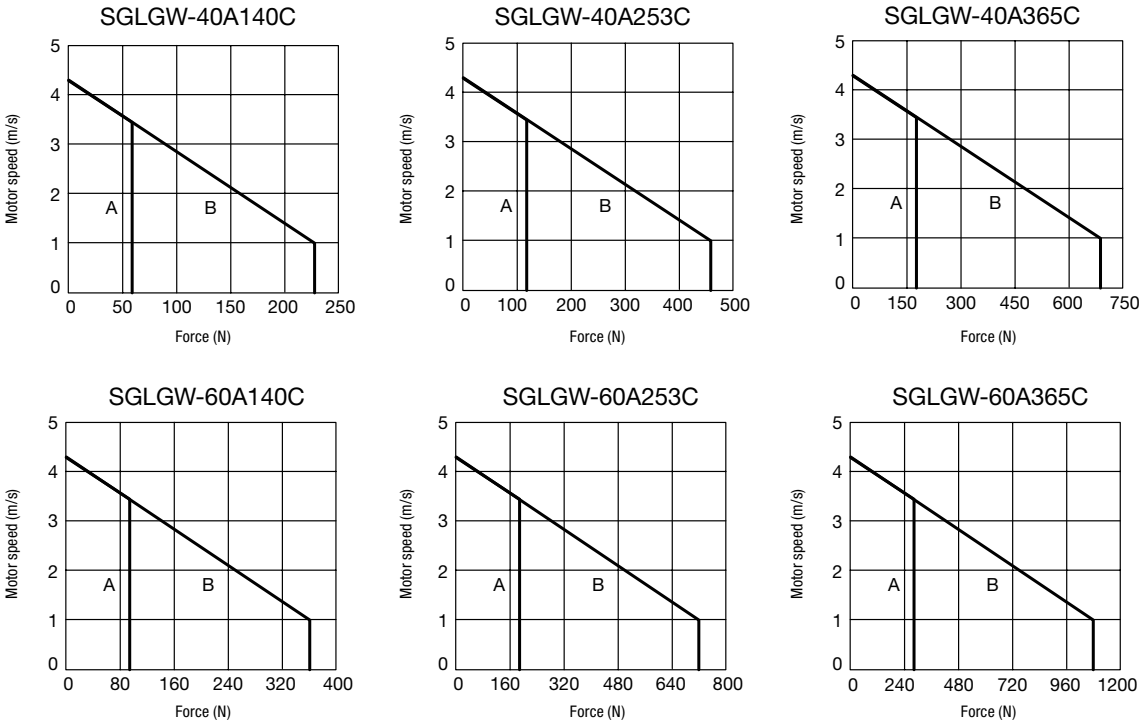
Voltage		230 V					
Linear Motor model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Rated force*	N	57	114	171	85	170	255
Rated current*	Arms	0.8	1.6	2.4	1.2	2.2	3.3
Instantaneous peak force*	N	230	460	690	360	720	1080
Instantaneous peak current*	Arms	3.2	6.5	9.7	5.0	10.0	14.9
Coil assembly weight	kg	0.40	0.66	0.93	0.48	0.82	1.16
Force constant	N / Arms	76.0	76.0	76.0	77.4	77.4	77.4
BEMF constant	V / (m / s)	25.3	25.3	25.3	25.8	25.8	25.8
Motor constant	N I √w	9.6	13.6	16.7	12.9	18.2	22.3
Electrical time constant	ms	0.4	0.4	0.4	0.5	0.5	0.5
Mechanical time constant	ms	3.69	3.24	3.12	2.52	2.29	2.21
Thermal resistance (with heat sink)	K / W	1.67	0.87	0.58	1.56	0.77	0.51
Thermal resistance (without heat sink)	K / W	3.02	1.80	1.23	2.59	1.48	1.15
Magnetic attraction	N	0	0	0	0	0	0
Heat sink size	mm	200 x 300 x 12	300 x 400 x 12	400 x 500 x 12	200 x 300 x 12	300 x 400 x 12	400 x 500 x 12

Note: 1. The items marked with an * and "force and speed characteristics" are the values at a motor winding temperature of 100°C during operation in combination with a servo drive. The others are at 20°C.
2. The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in above table is mounted on the coil assembly.

Heat sink size: 200 x 300 x 12 mm: SGLGW-40A140C, -60A140C
300 x 400 x 12 mm: SGLGW-40A253C, -60A253C
400 x 500 x 12 mm: SGLGW-40A365C, -60A365C

Force-speed Characteristics (with high-force magnetic ways)

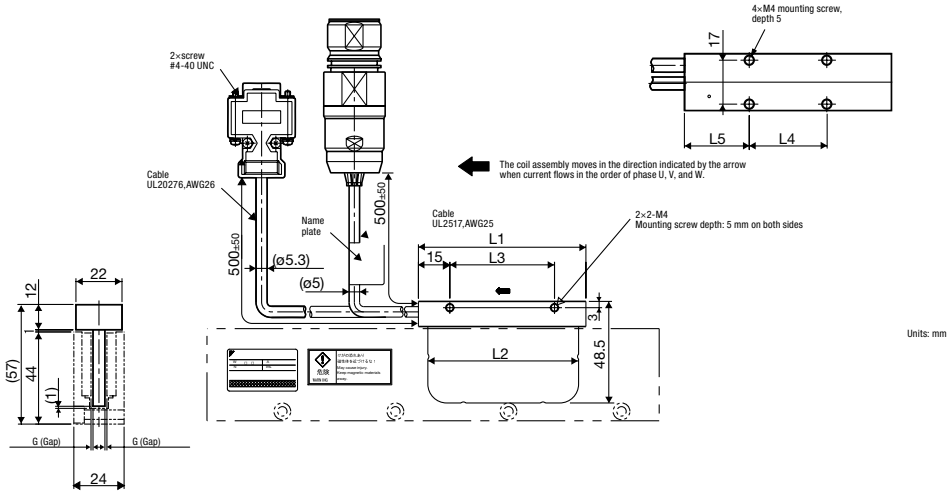
A: Continuous Duty Zone B: Intermittent Duty Zone



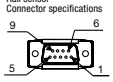
Coil Assembly: SGLGW-30A ☐☐☐C☐D

Coil assembly model SGLGW	L1	L2	L3	L4	L5	G (Gap)	Approx. weight* kg
30A050C☐D	50	48	30	20	20	0.85	0.14
30A080C☐D	80	72	50	30	25	0.95	0.19

* The values indicate the mass of moving coil with a half sensor unit.



Hall sensor Connector specifications



Pin connector type: 17JE-23090-02 (D8C) made by DDK Ltd.

The mating connector

Socket connector type: 17JE-13090-02 (D8C) Stud type: 17L-002C or 17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor Connector specifications

Extension: SROC06JMSCN169
Pin type: 021.423.1020 made by Interconnectron

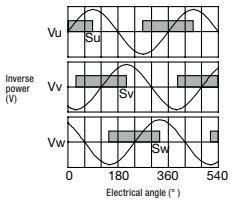
The mating connector

Plug type: SPOC06KFSDN169

Pin No.	Name	Lead Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Not used	–
5	Not used	–
6	FG	Green/yellow
7	Not used	–

Hall sensor output signals

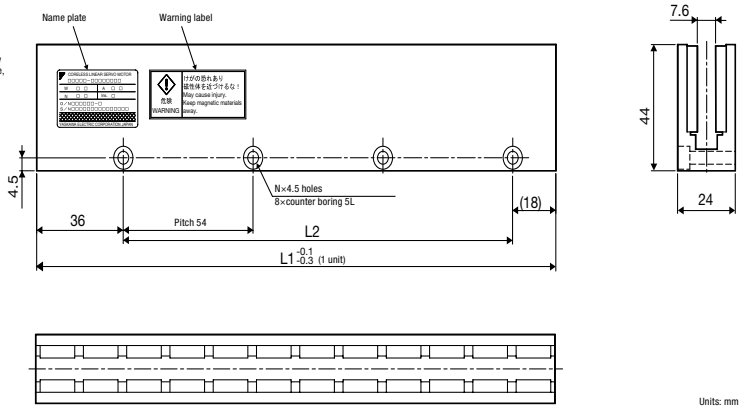
When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLGM-30☐☐☐C

Magnetic way model SGLGM	L1 mm	L2 mm	N	Approx. weight kg
30108A	108	54	2	0.6
30216A	216	162	4	1.1
30432A	432	378	8	2.3

Note:
If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the Linear Motor.



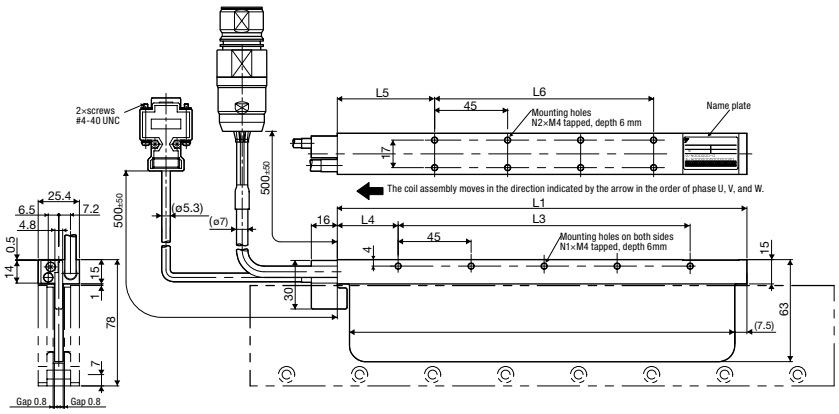
Units: mm

Coreless SGLG ☐ -40

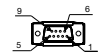
Coil Assembly: SGLGW-40A ☐☐☐C☐D

Coil assembly model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. weight* kg	
40A140C☐D	140	125	90	30	52.5	45	3	4	0.40	*The value indicates the weight of coil assembly with a hall sensor unit.
40A253C☐D	252.5	237.5	180	37.5	60	135	5	8	0.66	
40A365C☐D	365	350	315	30	52.5	270	8	14	0.93	

Note: Mounting dimensions of magnets revision B are equivalent to magnets revision C mounting type 2



Hall sensor
Connector specifications



Pin connector type:
17JE-23090-02 (D8C)
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor
Connector specifications

Extension: SROC06JMSCN169
Pin type: 021.423.1020
made by Interconnectron

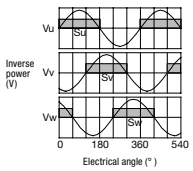
The mating connector

Plug type: SPOC06KFSDN169

Pin No.	Name	Lead Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Not used	–
5	Not used	–
6	FG	Green/yellow
7	Not used	–

Hall sensor output signals

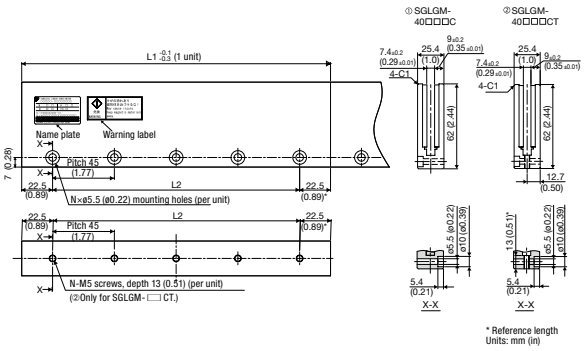
When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Units: mm

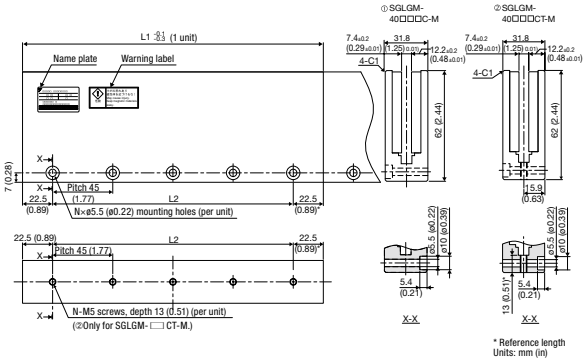
Standard-force Magnetic Way: SGLGM-40 ☐☐☐☐C☐

Standard-force magnetic way model SGLGM-		L1 mm	L2 mm	N	Approx. weight kg
Mounting type 1	Mounting type 2				
40090C	40090CT	90	45	2	0.8
40225C	40225CT	225	180	5	2.0
40360C	40360CT	360	315	8	3.1
40405C	40405CT	405	360	9	3.5
40450C	40450CT	450	405	10	3.9



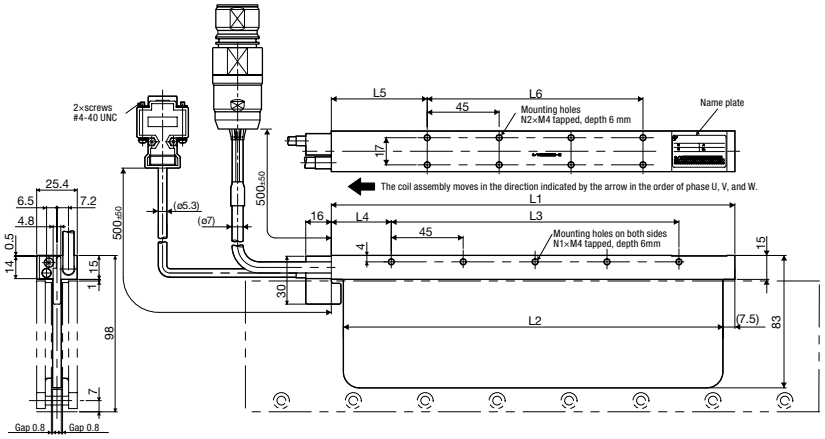
High-force Magnetic Way: SGLGM-40 ☐☐☐☐C☐-M

High-force magnetic way model SGLGM-		L1 mm	L2 mm	N	Approx. weight kg
Mounting type 1	Mounting type 2				
40090C-M	40090CT-M	90	45	2	1.0
40225C-M	40225CT-M	225	180	5	2.6
40360C-M	40360CT-M	360	315	8	4.1
40405C-M	40405CT-M	405	360	9	4.6
40450C-M	40450CT-M	450	405	10	5.1



Coil Assembly: SGLGW-60A☐☐☐C☐D

Coil assembly model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. weight* kg	
60A140C☐D	140	125	90	30	52.5	45	3	4	0.48	*The value indicates the weight of coil assembly with a hall sensor unit.
60A253C☐D	80	72	50	30	25	135	5	8	0-82	
60A365C☐D	365	350	315	30	52.5	270	8	14	1.16	



Hall sensor
Connector specifications

Pin connector type:
17JE-23090-02 (D8C)
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor
Connector specifications

Extension: SROC06JMSCN169
Pin type: 021.423.1020
made by Interconnectron

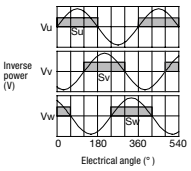
The mating connector

Plug type: SPOC06KFSDN169

Pin No.	Name	Lead Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Not used	–
5	Not used	–
6	FG	Green/yellow
7	Not used	–

Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below

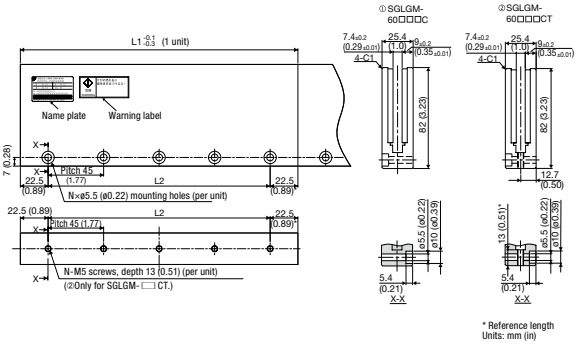


Note: Mounting dimensions of magnets revision B are equivalent to magnets revision C mounting type 2

Units: mm

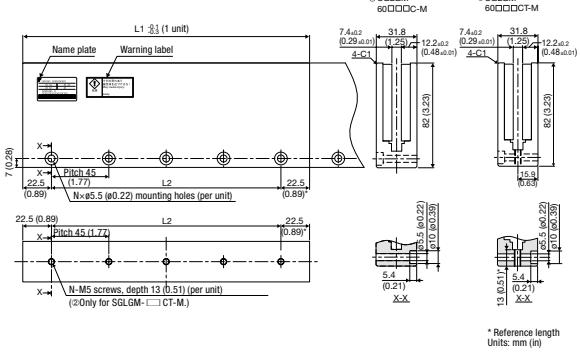
Standard-force Magnetic Way: SGLGM-60☐☐☐☐C☐

Standard-force magnetic way model SGLGM-		L1 mm	L2 mm	N	Approx. weight kg
Mounting type 1	Mounting type 2				
60090C	60090CT	90	45	2	1.1
60225C	60225CT	225	180	5	2.6
60360C	60360CT	360	315	8	4.1
60405C	60405CT	405	360	9	4.6
60450C	60450CT	450	405	10	5.1



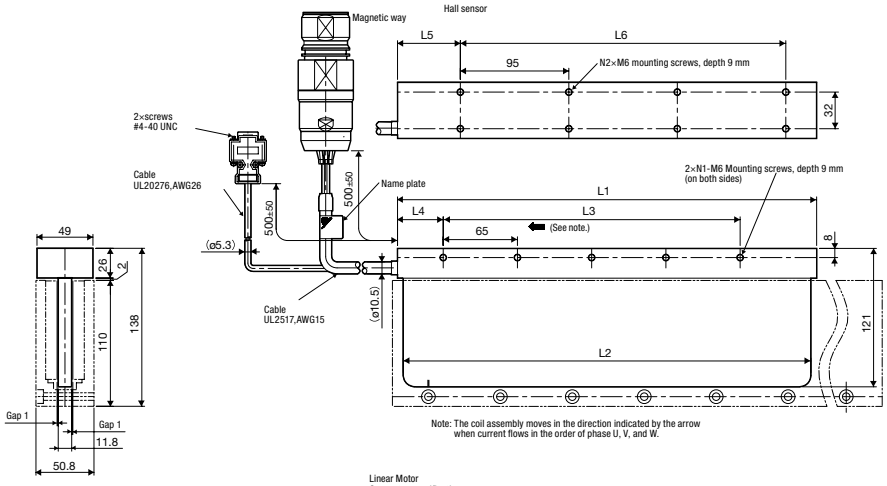
High-force Magnetic Way: SGLGM-60☐☐☐☐C☐-M

High-force magnetic way model SGLGM-		L1 mm	L2 mm	N	Approx. weight kg
Mounting type 1	Mounting type 2				
60090C-M	60090CT-M	90	45	2	1.3
60225C-M	60225CT-M	225	180	5	3.3
60360C-M	60360CT-M	360	315	8	5.2
60405C-M	60405CT-M	405	360	9	5.9
60450C-M	60450CT-M	450	405	10	6.6



Coil Assembly: SGLGW-90A ☐☐C☐D

Coil assembly model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. weight* kg	
90A200C☐D	199	189	130	40	60	95	3	4	2.2	*The value indicates the weight of coil assembly with a hall sensor unit.



Hall sensor
Connector specifications

Pin connector type:
17JE-23090-02 (D8C)
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor
Connector specifications

Extension: SROC06JMSCN169
Pin type: 021.423.1020
made by Interconnectron

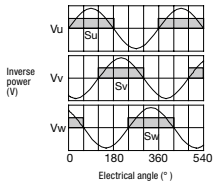
The mating connector

Plug type: SPOC06KFSDN169

Pin No.	Name	Lead Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Not used	–
5	Not used	–
6	FG	Green/yellow
7	Not used	–

Hall sensor output signals

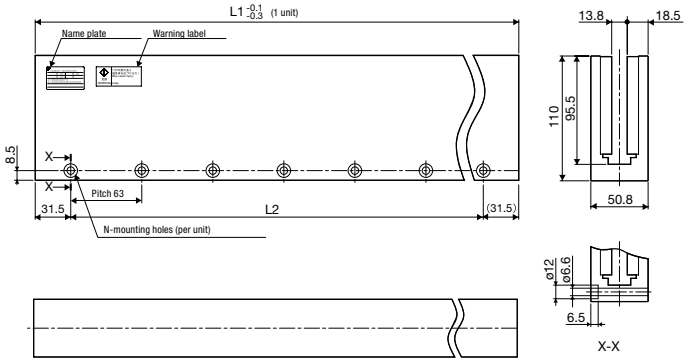
When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



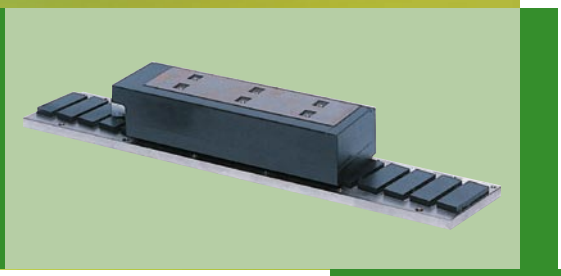
Units: mm

Magnetic Way: SGLGM-90☐☐☐A

Magnetic way model SGLGM-	L1 mm	L2 mm	N	Approx. weight kg
90252A	252	189	4	7.3
90504A	504	441	8	14.7



Units: mm



Iron-core SGLFW/SGLFM

230 V

Voltage		230 V						
Linear Motor model SGLFW-		20A		35A		50A		1ZA
		090A	120A	120A	230A	200B	380B	200B
Rated force*	N	25	40	80	160	280	560	560
Rated current*	Arms	0.7	0.8	1.4	2.8	5.0	10.0	8.7
Instantaneous peak force*	N	86	125	220	440	600	1200	1200
Instantaneous peak current*	Arms	3.0	2.9	4.4	8.8	12.4	25.0	21.6
Coil assembly weight	kg	0.7	0.9	1.3	2.3	3.5	6.9	6.4
Force constant	N / Arms	36.0	54.0	62.4	62.4	60.2	60.2	69.0
BEMF constant	V / (m / s)	12.0	18.0	20.8	20.8	20.1	20.1	23.0
Motor constant	N I √w	7.9	9.8	14.4	20.4	34.3	48.5	52.4
Electrical time constant	ms	3.2	3.3	3.6	3.6	15.9	15.8	18.3
Mechanical time constant	ms	11.0	9.3	6.2	5.5	3.0	2.9	2.3
Thermal resistance (with heat sink)	K / W	4.35	3.19	1.57	0.96	0.82	0.32	0.6
Thermal resistance (without heat sink)	K / W	7.69	5.02	4.10	1.94	1.48	0.74	0.92
Magnetic attraction	N	314	462	809	1586	1650	3260	3300
Heat sink size	mm	125 x 125 x 13		254 x 254 x 25			400 x 500 x 40	254 x 254 x 25

Note: 1. The items marked with an * and "force and speed characteristics" are the values at a motor winding temperature of 100°C during operation in combination with a servo drive. The others are at 20°C.
2. The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in above table is mounted on the coil assembly.
Heat sink size: 125 x 125 x 13 mm: SGLFW-20A090A, -20A120A
254 x 254 x 25 mm: SGLFW-35A120A, -35A230A
400 x 500 x 40 mm: SGLFW-50A200B, -50A380B, -1ZA200B
600 x 762 x 50 mm: SGLFW-1ZA380B

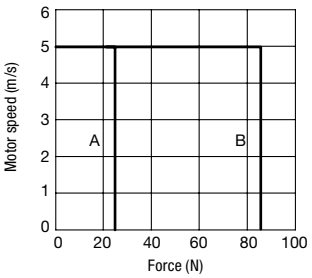
Basic Specifications

- Time rating: continuous
- Insulation class: Class B
- Ambient temperature: 0 to +40°C
- Ambient humidity: 20 to 80% (non-condensing)
- Insulation resistance: 500 VDC, 10 MΩ min.
- Excitation: permanent magnet
- Dielectric strength: 1500 VAC for 1 minute
- Protection methods: self-cooled
- Allowable winding temperature: 130°C

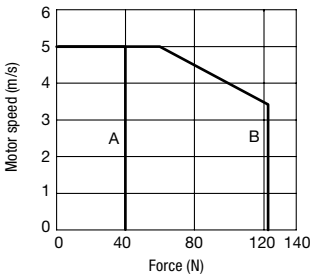
Force-speed characteristics (230 V)

A: Continuous Duty Zone B: Intermittent Duty Zone

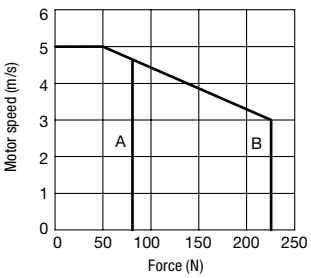
SGLFW-20A090A



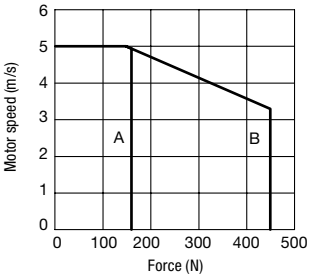
SGLFW-20A120A



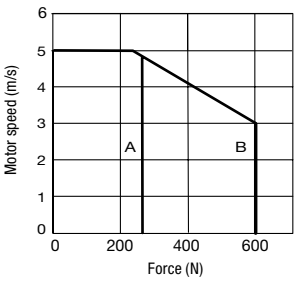
SGLFW-35A120A



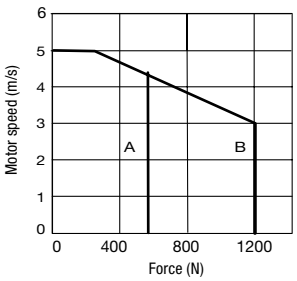
SGLFW-35A230A



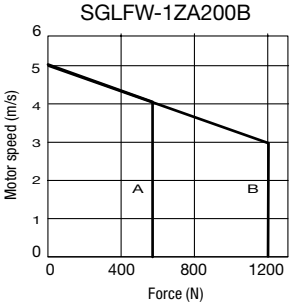
SGLFW-50A200B

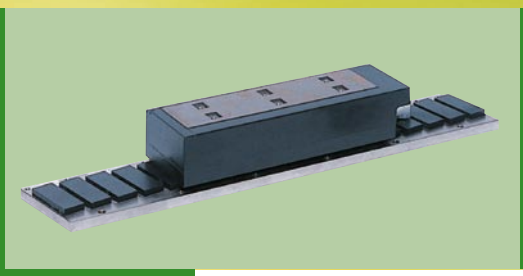


SGLFW-50A380B



SGLFW-1ZA200B





Iron-core SGLFW/SGLFM

Basic Specifications

- Time rating: Continuous
- Insulation class: Class B
- Ambient temperature: 0 to +40°C
- Ambient humidity: 20 to 80% (non-condensing)
- Insulation resistance: 500 VDC, 10 MΩ min.
- Excitation: permanent magnet
- Dielectric strength: 1500 VAC for 1 minute
- Protection methods: self-cooled
- Allowable winding temperature: 130°C

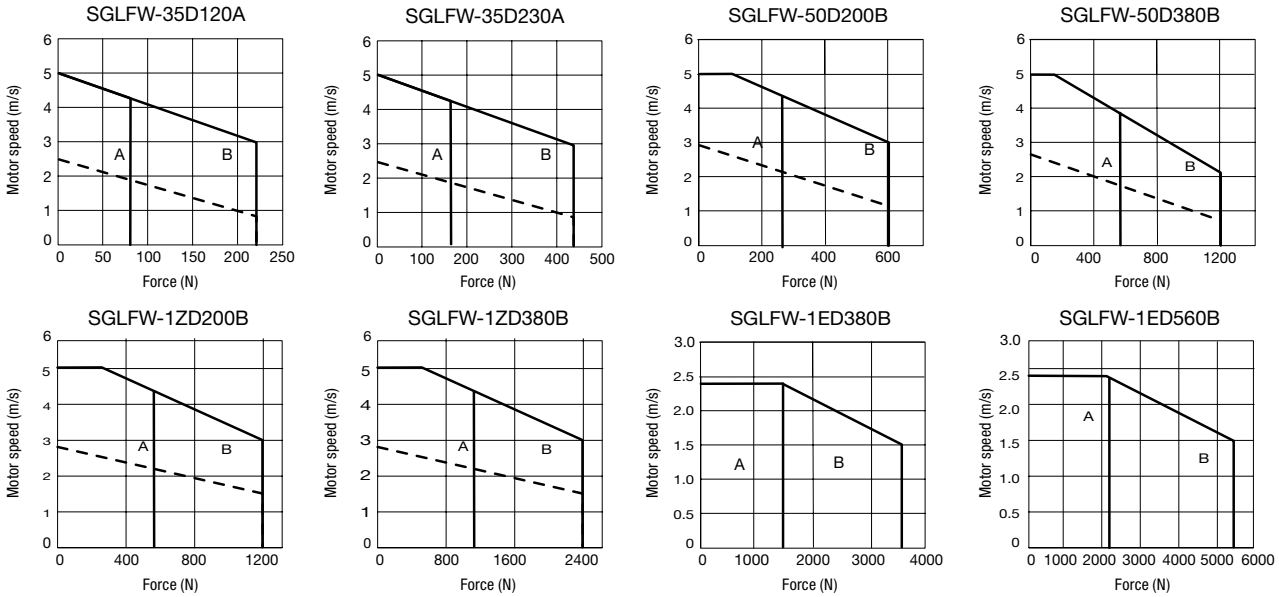
400 V

Voltage		400 V							
Linear Motor model SGLFW-		35D		50D		1ZD		1ED	
		120A	230A	200B	380B	200B	380B	380B	560B
Rated force*	N	80	160	280	560	560	1120	1500	2250
Rated current*	Arms	0.7	1.4	2.3	4.5	4.9	9.8	6.4	9.6
Instantaneous peak force*	N	220	440	600	1200	1200	2400	3600	5400
Instantaneous peak current*	Arms	2.3	4.6	5.6	11.0	12.3	24.6	18.1	27.2
Coil assembly weight	kg	1.3	2.3	3.5	6.9	6.4	11.5	22	33
Force constant	N / Arms	120.2	120.2	134.7	134.7	122.6	122.6	250	250
BEMF constant	V / (m / s)	40.1	40.1	44.9	44.9	40.9	40.9	83.2	83.2
Motor constant	N I √w	13.8	19.5	33.4	47.2	51.0	72.1	95.4	117
Electrical time constant	ms	3.5	3.5	15.0	15.0	17.4	17.2	19.7	19.6
Mechanical time constant	ms	5.5	5.5	3.2	3.2	2.5	2.2	1.8	1.8
Thermal resistance (with heat sink)	K / W	1.57	0.96	0.82	0.32	0.6	0.28	0.21	0.13
Thermal resistance (without heat sink)	K / W	4.1	1.94	1.48	0.74	0.92	0.55	0.50	0.35
Magnetic attraction	N	810	1590	1650	3260	3300	6520	9780	14600
Heat sink size	mm	254 x 254 x 25			400 x 500 x 40	254 x 254 x 25	400 x 500 x 40	609 x 762 x 50	762 x 1270 x 64

Note: 1. The items marked with an * and "force and speed characteristics" are the values at a motor winding temperature of 100°C during operation in combination with a servo drive. The others are at 20°C.
2. The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in above table is mounted on the coil assembly.
Heat sink size: 254 x 254 x 25 mm: SGLFW-35D120A, -35D230A
400 x 500 x 40 mm: SGLFW-50D200B, -50D380B, -1ZD200B
600 x 762 x 50 mm: SGLFW-1ZD380B

Force-speed Characteristics (400 V)

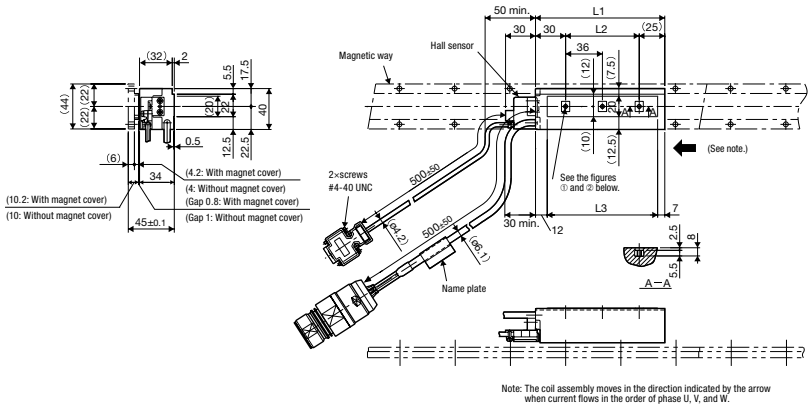
A: Continuous Duty Zone B: Intermittent Duty Zone

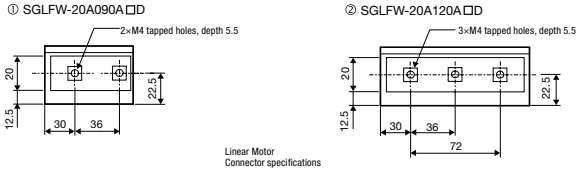


Note: The dotted line indicates characteristics when the Linear Motor for 400 VAC is used with an input power supply for 230 VAC. In this case, the serial converter should be changed. Contact your sales representatives.

Coil Assembly: SGLFW-20A ☐☐☐ A ☐ D

Coil assembly model SGLFW-	L1	L2	L3	N	Approx. weight kg
20A090A☐☐D	91	36	72	2	0.7
20A120A☐☐D	127	72	108	53	0.9





Units: mm

Hall sensor
Connector specifications

Pin connector type:
17JE-23090-02 (D8C)
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor
Connector specifications

Extension: SROC06JMSCN169
Pin type: 021.423.1020
made by Interconnectron

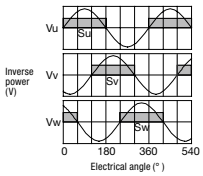
The mating connector

Plug type: SPOC06KFSDN169

Pin No.	Name	Lead Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Not used	–
5	Not used	–
6	FG	Green/yellow
7	Not used	–

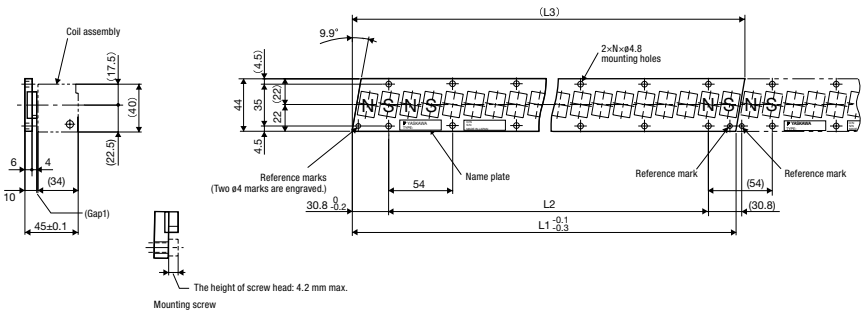
Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLFM-20 ☐☐☐ A ☐

Magnetic way model SGLFM-	L1 mm	-0.1 / -0.3	L2 mm	(L3) mm	N	Approx. weight kg
20324A☐	324		270 (54 x 5)	(331.6)	6	0.9
20540A☐	540		486 (54 x 9)	(547.6)	10	1.4
20756A☐	756		702 (54 x 13)	(763.6)	14	2



Units: mm

Note:

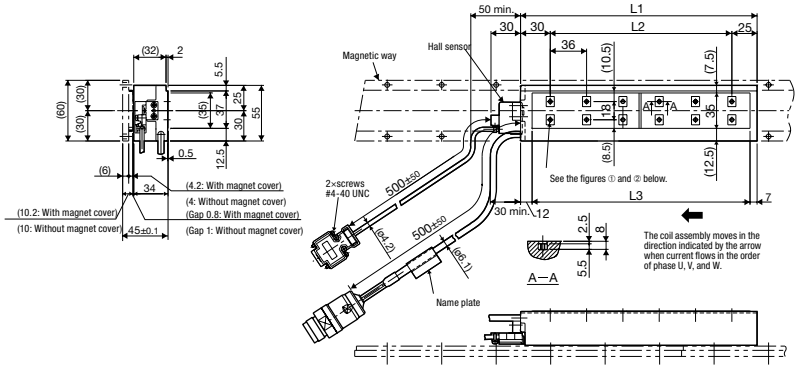
1. Multiple SGLFM-20☐ ☐ ☐A magnetic ways can be connected. Connect magnetic ways so that the reference marks match one on the other in the same direction as shown in the figure.

2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way

Iron-core SGLF ☐ -35

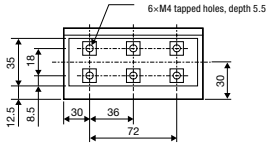
Coil Assembly: SGLFW-35 ☐☐☐☐A☐D

Coil assembly model SGLFW-	L1	L2	L3	N	Approx. weight kg	
35☐120A☐D	127	72	108	6	1.3	*The value indicates the weight of coil assembly with a hall sensor unit.
35☐230A☐D	235	300	216	12	2.3	

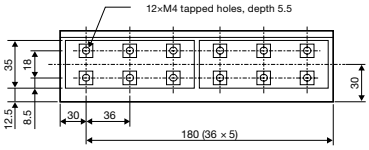


Units: mm

① SGLFW-35☐120A☐D



② SGLFW-35☐230A☐D



Hall sensor
Connector specifications

Pin connector type:
17JE-23090-02(D8C)
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

SGLFW-35☐☐☐☐A☐D

Linear Motor 230 V
Connector Specifications

Extension: SROC06JMSCN169
Pin type: 021.423.1020
made by Interconnectron

The mating connector

Plug type: SPOC06KFSDN169

Pin No.	Name
1	Phase U
2	Phase V
3	Phase W
4	Not used
5	Not used
6	FG
7	Not used

SGLFW-35☐☐☐☐A☐D

Linear Motor 400 V
Connector specifications

Extension: LRRA06AMRPN182
Pin type: 021.279.1020
made by Interconnectron

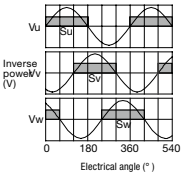
The mating connector

Plug type: LPRA06BFRBN170

Pin No.	Name
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⏚	Ground

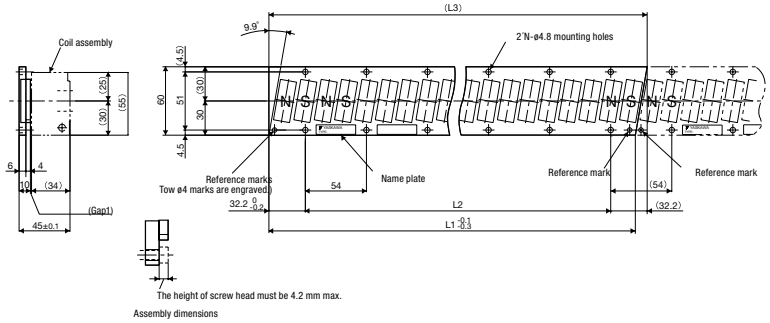
Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLFM-35 ☐☐☐A☐

Magnetic way model SGLFM	L1 mm	-0.1 / -0.3	L2 mm	(L3) mm	N	Approx. weight kg
35324A☐	324		270 (54 x 5)	(334.3)	6	1.2
35540A☐	540		486 (54 x 9)	(550.3)	10	2
35756A☐	945		702 (54 x 13)	(766.3)	14	2.9



Units: mm

Assembly dimensions

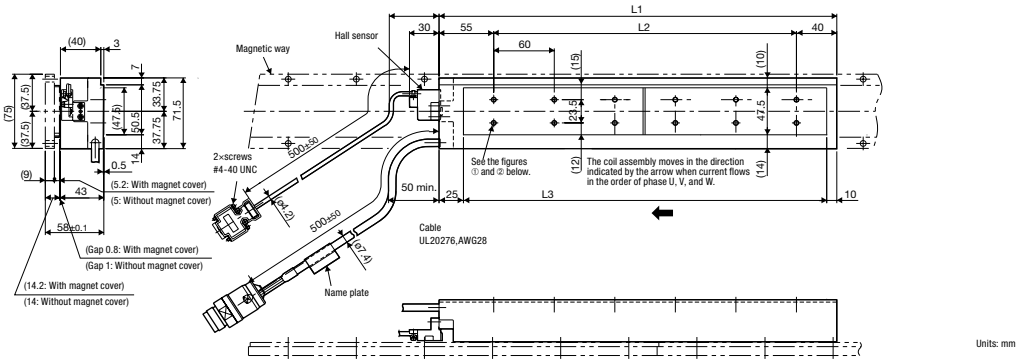
Note:

1. Multiple SGLFM-35☐ ☐ ☐A magnetic ways can be connected. Connect magnetic ways so that the reference marks match one on the other in the same direction as shown in the figure.

2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way

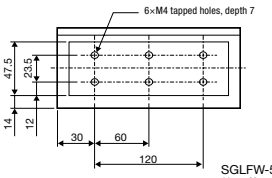
Coil Assembly: SGLFW-50 ☐☐☐☐B☐D

Coil assembly model SGLFW-	L1	L2	L3	N	Approx. weight kg	
50☐200B☐D	215	120	180	6	3.5	*The value indicates the weight of coil assembly with a hall sensor unit.
50☐380B☐D	395	300	360	12	6.9	

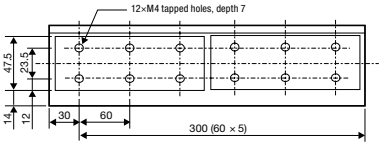


Units: mm

① SGLFW-50☐200B☐D



② SGLFW-50☐380B☐D



Units: mm

Hall sensor
Connector specifications

Pin connector type:
7JE-23090-02 (D8C)
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

SGLFW-50A☐☐☐A☐D
Linear Motor 230 V
Connector Specifications

Extension: SROC06JMSCN169
Pin type: 021.423.1020
made by Interconnectron

The mating connector

Plug type: SPOC06KFSDN169

Pin No.	Name
1	Phase U
2	Phase V
3	Phase W
4	Not used
5	Not used
6	FG
7	Not used

SGLFW-50D☐☐☐A☐D
Linear Motor 400 V
Connector specifications

Extension: LRRA06AMRPN182
Pin type: 021.279.1020
made by Interconnectron

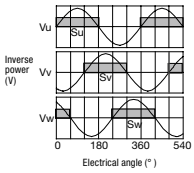
The mating connector

Plug type: LPRA06BFRBN170

Pin No.	Name
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⏚	Ground

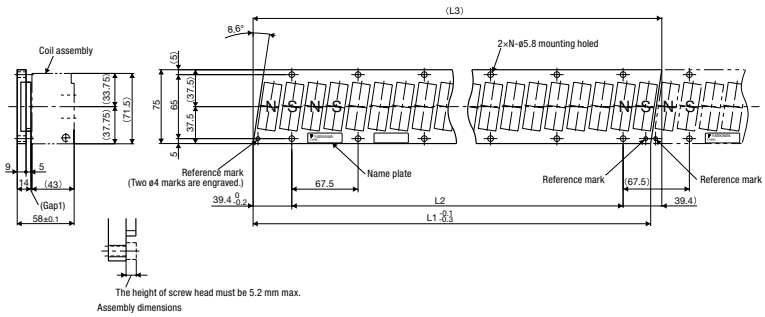
Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLFM-50 ☐☐☐A☐

Magnetic way model SGLFM	L1 mm	-0.1 / -0.3	L2 mm	(L3) mm	N	Approx. weight kg
50135A☐	135		67.5 (67.5 x 1)	(143.3)	2	1.0
50405A☐	405		337.5 (67.5 x 5)	(416.3)	6	2.8
50675A☐	675		607.5 (67.5 x 9)	(686.3)	10	4.6
50945A☐	945		877.5 (67.5 x 13)	(956.3)	14	6.5



Units: mm

Assembly dimensions

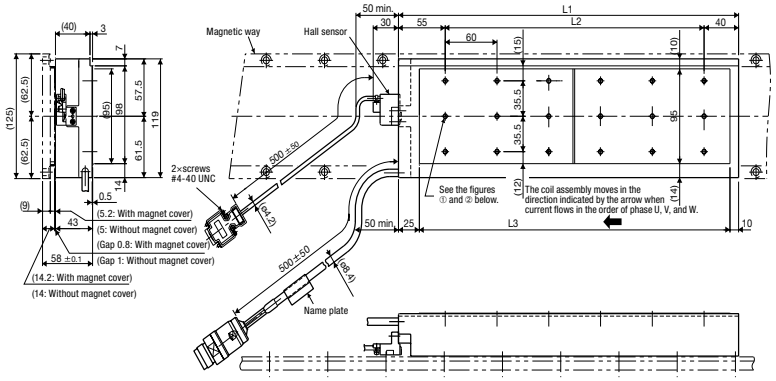
Note:

1. Multiple SGLFM-50☐☐☐A magnetic ways can be connected. Connect magnetic ways so that the reference marks match one on the other in the same direction as shown in the figure.

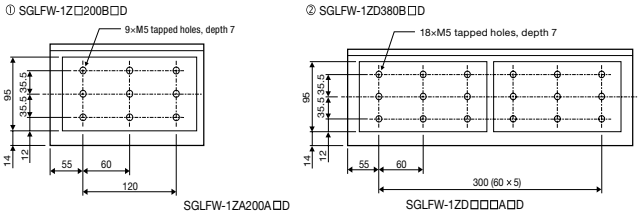
2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way

Coil Assembly: SGLFW-1Z ☐☐☐☐B☐D

Coil assembly model SGLFW-	L1	L2	L3	N	Approx. weight kg
1Z☐200B☐D	215	120	180	8	6.4
1Z☐380B☐D	395	300	360	18	11.5



Units: mm



Hall sensor
Connector specifications

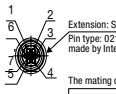
Pin connector type:
17JE-23090-02(D8C)
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

SGLFW-1ZA200A☐D
Linear Motor 230 V
Connector Specifications



Extension: SROC06JMSCN169
Pin type: 021.423.1020
made by Interconnectron

The mating connector

Plug type: SPOC06KFSDN169

Pin No.	Name
1	Phase U
2	Phase V
3	Phase W
4	Not used
5	Not used
6	FG
7	Not used

SGLFW-1ZD☐☐☐A☐D
Linear Motor 400 V
Connector specifications

Extension: LRRA06AMRPN182
Pin type: 021.279.1020
made by Interconnectron

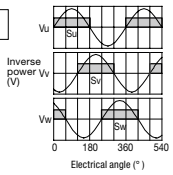
The mating connector

Plug type: LPRA06BFRBN170

Pin No.	Name
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⏚	Ground

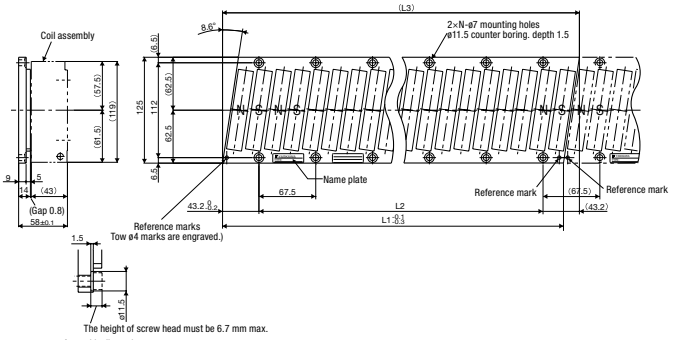
Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLFM-1Z☐☐☐A☐

Magnetic way model SGLFM-	L1 mm	-0.1 / -0.3	L2 mm	(L3) mm	N	Approx. weight kg
1Z135A☐	135		67.5 (67.5 x 1)	(153.9)	2	1.7
1Z405A☐	405		337.5 (67.5 x 5)	(550.3)	6	5
1Z675A☐	675		607.5 (67.5 x 9)	(766.3)	10	8.3
1Z945A☐	945		877.5 (67.5 x 13)		14	12



Units: mm

Assembly dimensions

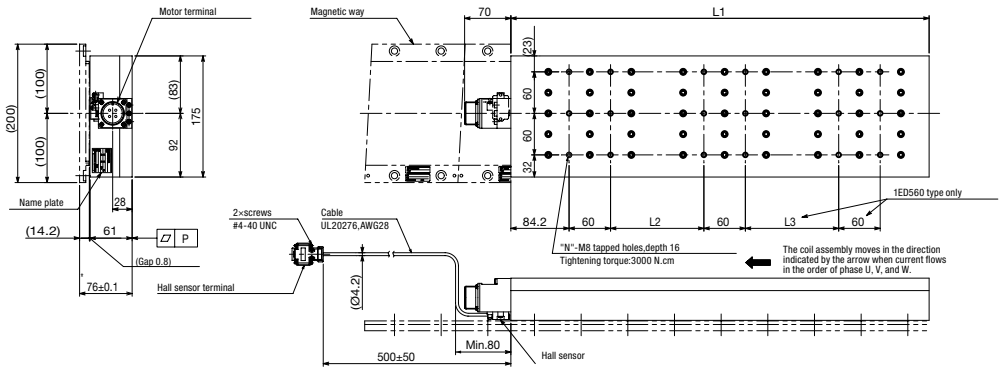
Note:

1. Multiple SGLFM-1Z☐ ☐ ☐A magnetic ways can be connected. Connect magnetic ways so that the reference marks match one on the other in the same direction as shown in the figure.

2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way

Coil Assembly: SGLFW-1ED ☐☐☐B☐

Coil assembly model SGLFW-	L1	L2	L3	N	Approx. weight kg
1ED380B☐D	395	120	-	12	0.3
1ED560B☐D	605	135	135	18	0.5



Units: mm

Hall sensor
Connector specifications

Pin connector type:
17JE-23090-02 (D8C)
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor
Connector specifications

Receptacle type: MS3102A-22-22P
made by DDK Ltd.

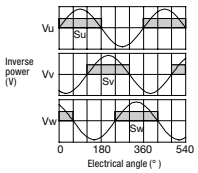
The mating connector

L-shaped plug type:
MS3108E22-22S

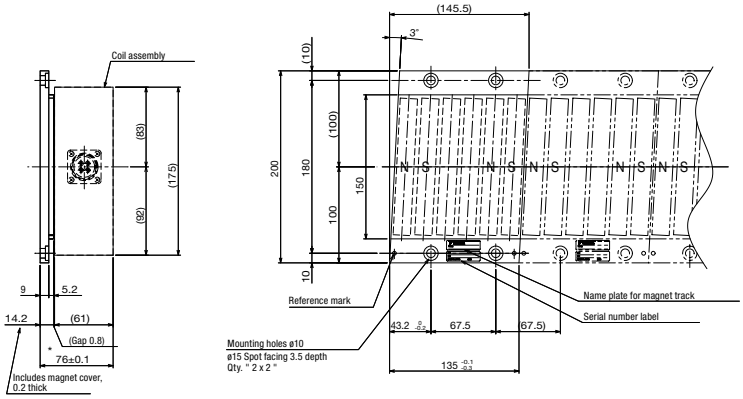
Pin No.	Name
A	Phase U
B	Phase V
C	Phase W
D	Ground

Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLFM-1E135A☐



Detail drawing of mounting

Units: mm
Approx. weight: 2.5 kg

Note:

1. Multiple SGLFM-1E☐☐☐A magnetic ways can be connected. Connect magnetic ways so that the reference marks match one on the other in the same direction as shown in the figure.

2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way

Iron-core SGLTW/SGLTM

Basic Specifications

- Time rating: Continuous
- Insulation class: Class B
- Ambient temperature: 0 to +40°C
- Ambient humidity: 20 to 80% (non-condensing)
- Insulation resistance: 500 VDC, 10 MΩ min.
- Excitation: permanent magnet
- Dielectric strength: 1500 VAC for 1 minute
- Protection methods: self-cooled
- Allowable winding temperature: 130°C

400 V

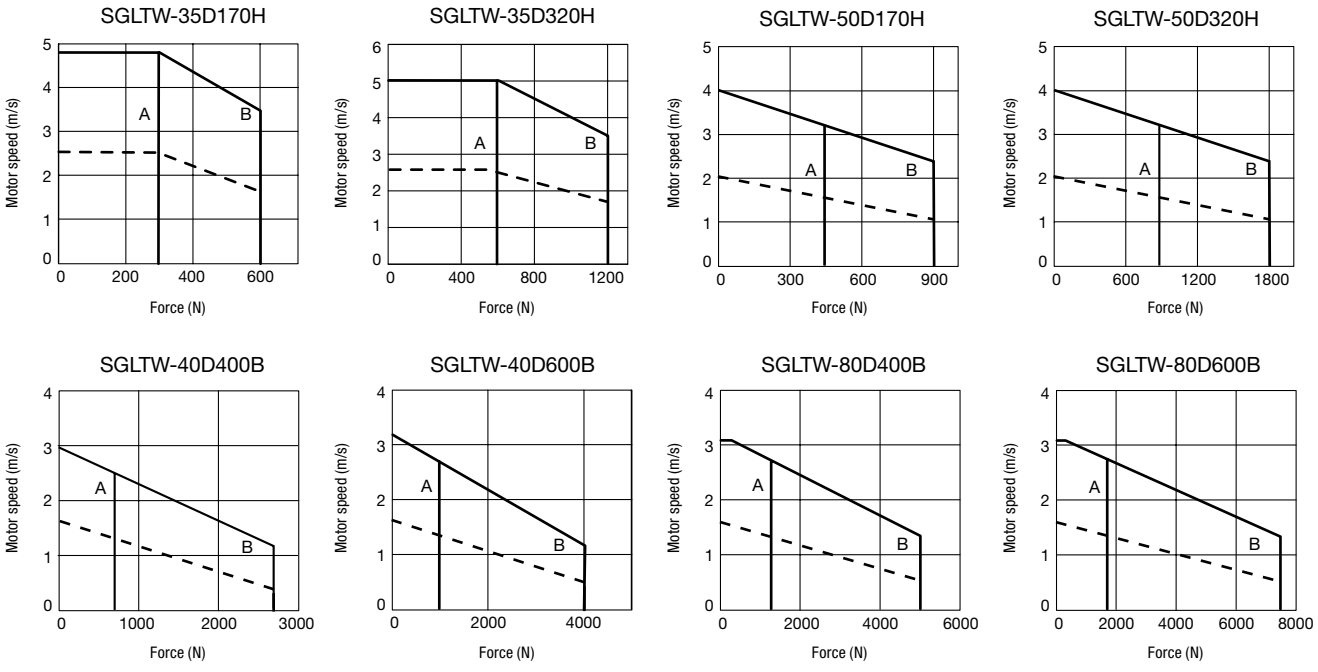
Voltage		400 V							
Linear Motor model SGLTW-		35D		50D		40 D		80D	
		170H	320H	170H	320H	400B	600B	400B	600B
Rated force*	N	300	600	450	900	670	1000	1300	2000
Rated current*	Arms	3.2	6.5	3.2	6.3	3.7	5.5	7.2	11.1
Instantaneous peak force*	N	600	1200	900	1800	2600	4000	5000	7500
Instantaneous peak current*	Arms	7.5	15.1	7.3	14.6	20.7	30.6	37.6	56.4
Coil assembly weight	kg	4.7	8.8	6	11	15	23	25	36
Force constant	N / Arms	99.6	99.6	153.3	153.3	196.1	196.1	194.4	194.4
BEMF constant	V / (m / s)	33.2	33.2	51.1	51.1	65.4	65.4	64.8	64.8
Motor constant	N I √w	36.3	51.4	48.9	69.1	59.6	73	85.9	105.2
Electrical time constant	ms	14.3	14.3	15.6	15.6	14.4	14.4	15.4	15.4
Mechanical time constant	ms	3.5	3.5	2.5	2.5	4.2	4.2	3.2	3.2
Thermal resistance (with heat sink)	K / W	0.76	0.4	0.61	0.3	0.24	0.2	0.22	0.18
Thermal resistance (without heat sink)	K / W	1.26	0.83	0.97	0.8	0.57	0.4	0.47	0.33
Magnetic attraction*1	N	0	0	0	0	0	0	0	0
Magnetic attraction*2	N	1400	2780	2000	3980	3950	5890	7650	11400
Heat sink size	mm	400 x 500 x 40				609 x 762 x 50			

*1. The unbalanced magnetic gap resulting from the coil assembly installation condition causes a magnetic attraction on the coil assembly.
*2. The value indicates the magnetic attraction generated on one side of the magnetic way.

Note: 1. The items marked with an * and "force and speed characteristics" are the values at a motor winding temperature of 100°C during operation in combination with a servo drive. The others are at 20°C.
2. The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in abovetable is mounted on the coil assembly.
Heat sink size: 400 x 500 x 40 mm: SGLTW-35D170H, -35D320H. -50D170H
254 x 254 x 25 mm: SGLTW-40D400B, -40D600B. -50D320H, - 80D400B, -80D600B

Force-speed Characteristics (400 V)

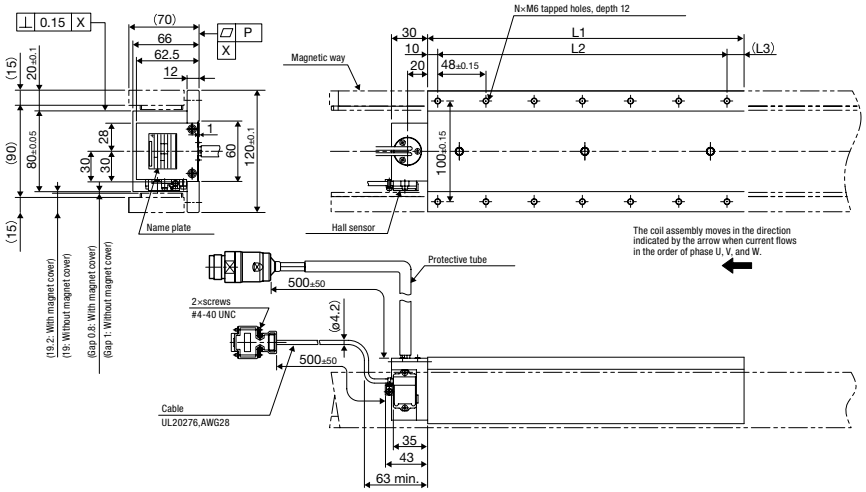
A: Continuous Duty Zone B: Intermittent Duty Zone



Note: The dotted line indicates characteristics when the Linear Motor for 400 VAC is used with an input power supply for 230 VAC. In this case, the serial converter should be changed. Contact your YASKAWA representatives.

Coil Assembly: SGLTW-35D ☐☐☐H☐D

Coil assembly model SGLTW-	L1 mm	L2 mm	(L3) mm	N	Approx. weight kg
35D320H☐D	315	288 (48 x 6)	(17)	14	8.8



Units: mm

Wiring specification of hall sensor cable

Pin connector type:
17JE-23090-02 D8C
made by DDK Ltd.

The mating connector

Socket connector type:
17JE-13090-02 (D8C)
Stud type: 17L-002C or
17L-002C1

Pin No.	Name
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor Connector specifications

Extension: LRRA06AMRPN182
Pin type: 021.279.1020
made by Interconnectron

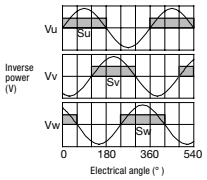
The mating connector

Plug type: LPRA06BFRBN170

Pin No.	Name
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⏚	Ground

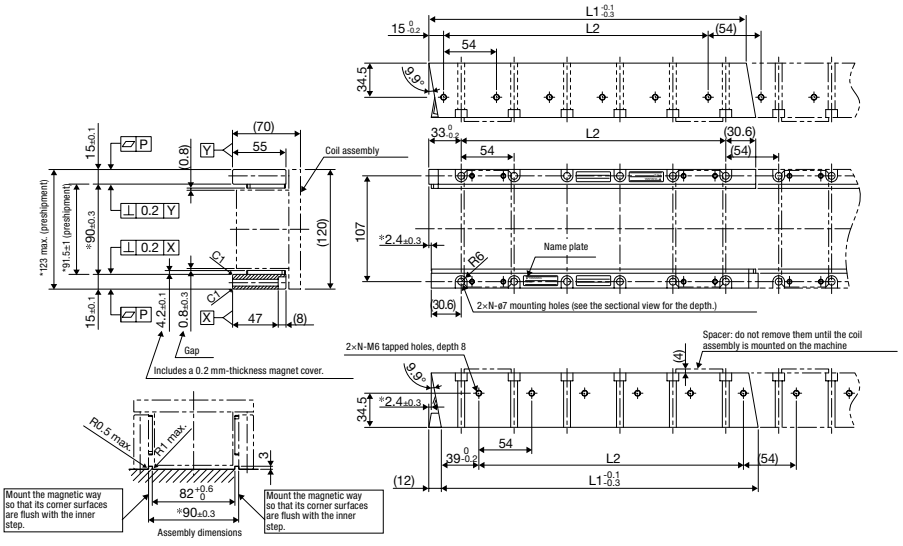
Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLTM-35☐☐☐H

Magnetic way model SGLTM-	L1 mm	-0.1 -0.3	L2 mm	N	Approx. weight kg
35324H	324		270 (54 x 5)	6	4.8
35540H	540		486 (54 x 9)	10	8
35756H	756		702 (54 x 13)	14	11



Units: mm

Note:

1. Two magnetic ways for both ends of coil assembly make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the coil assembly is mounted on a machine.

2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way.

3. Two magnetic ways in a set can be connected to each other.

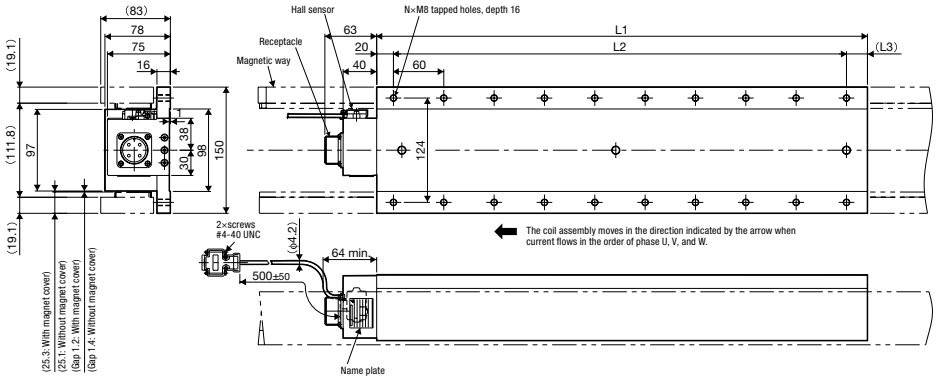
4. The dimensions marked with an * are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with an * are the dimensions at preshipment.

5. Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.

Iron-core SGLT ☐ -40

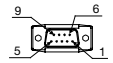
Coil Assembly: SGLTW-40D ☐☐☐ B ☐

Coil assembly model SGLTW-	L1	L2	(L3)	N	Approx. weight kg
40D400B ☐	395	360 (60 x 6)	(15)	14	15
40D600B ☐	585	540 (60 x 9)	(25)	20	23



Units: mm

Hall sensor Connector specifications



Pin connector type: 17JE-23090-02 D8C made by DDK Ltd.

The mating connector

Socket connector type: 17JE-13090-02 (D8C) Stud type: 17L-002C or 17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor Connector specifications

Receptacle type: MS3102A-22-22P made by DDK Ltd.

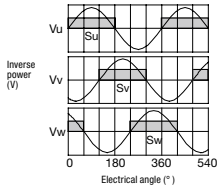
The mating connector

L-shaped plug type: MS3108E22-22S

Pin No.	Name
A	Phase U
B	Phase V
C	Phase W
D	Ground

Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLTM-40 ☐☐☐ A

Magnetic way model SGLTM-	L1 mm	-0.1 / -0.3	L2 mm	N	Approx. weight kg
40405H	405		337.5 (67.5 x 5)	6	9
40675H	675		607.5 (67.5 x 9)	10	15
40945H	945		877.5 (67.5 x 13)	14	21

Note:

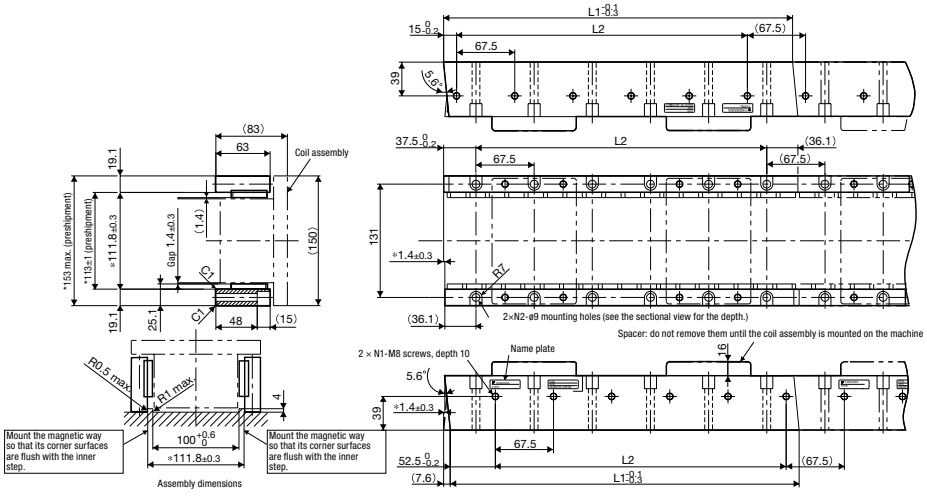
1. Two magnetic ways for both ends of coil assembly make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the coil assembly is mounted on a machine.

2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way.

3. Two magnetic ways in a set can be connected to each other.

4. The dimensions marked with an * are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with an * are the dimensions at preshipment.

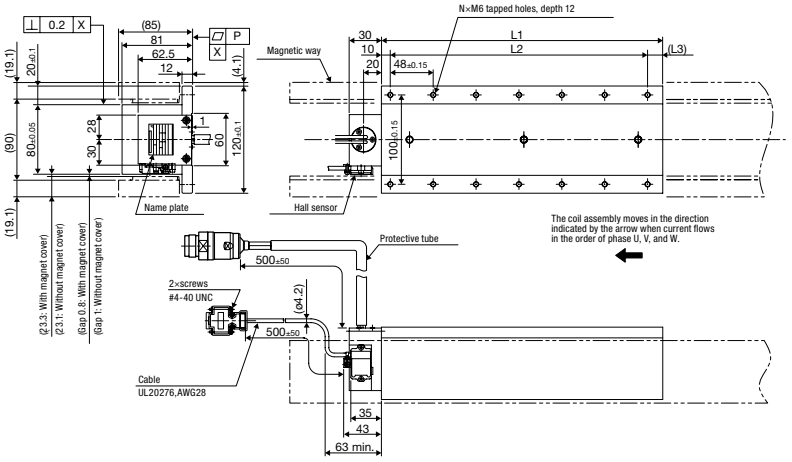
5. Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.



Units: mm

Coil Assembly: SGLTW-50D ☐☐☐H☐D

Coil assembly model SGLTW-	L1	L2	(L3)	N	Approx. weight kg
50D170H☐D	170	144 (48 x 3)	(16)	8	6
50D320H☐D	350	288 (48 x 6)	(17)	14	11



Units: mm

Wiring specification of hall sensor cable

Pin connector type: 17JE-23090-02 D8C made by DDK Ltd.

The mating connector

Socket connector type: 17JE-13090-02 (D8C) Stud type: 17L-002C or 17L-002C1

Pin No.	Name
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor Connector specifications

Extension: LRRA06AMRPN182 Pin type: 021.279.1020 made by Interconnectron

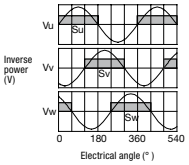
The mating connector

Plug type: LPRA06BFRBN170

Pin No.	Name
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⏚	Ground

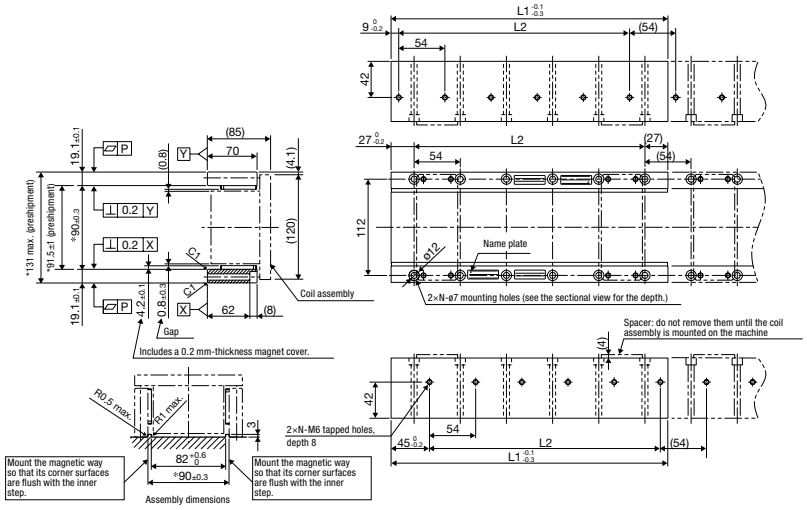
Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Magnetic Way: SGLTM-50☐☐☐H

Magnetic way model SGLTM-	L1 mm -0.1 / -0.3	L2 mm	N	Approx. weight kg
50324H	324	270 (54 x 5)	6	8
50540H	540	486 (54 x 9)	10	13
50756H	756	702 (54 x 13)	14	18



Units: mm

Note:

1. Two magnetic ways for both ends of coil assembly make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the coil assembly is mounted on a machine.

2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way.

3. Two magnetic ways in a set can be connected to each other.

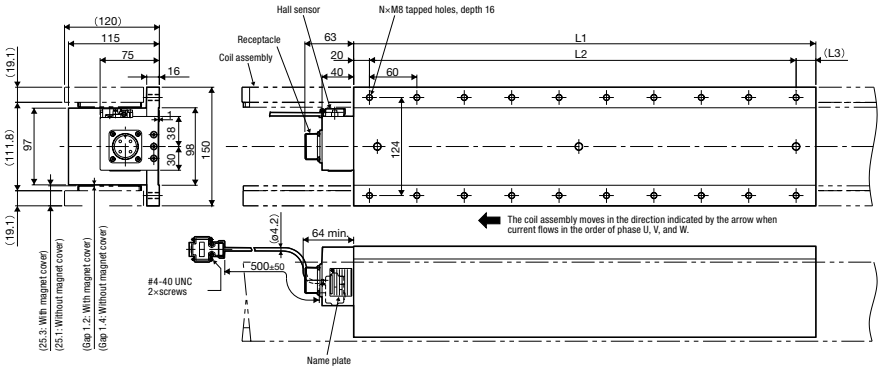
4. The dimensions marked with an * are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with an * are the dimensions at preshipment.

5. Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.

Iron-core SGLT ☐ -80

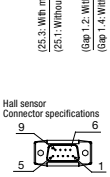
Coil Assembly: SGLTW-80D ☐☐☐ B ☐

Coil assembly model SGLTW-	L1	L2	(L3)	N	Approx. weight kg
80D400B ☐	395	360 (60 x 6)	(15)	14	25
80D600B ☐	585	540 (60 x 9)	(25)	20	36



Units: mm

Hall sensor Connector specifications



Pin connector type: 17JE-23090-02 D8C made by DDK Ltd.

The mating connector

Socket connector type: 17JE-13090-02 D8C
Stud type: 17L-002C or 17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor Connector specifications

Receptacle type: MS3102A-22-22P made by DDK Ltd.

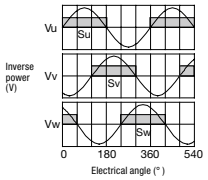
The mating connector

L-shaped plug type: MS3108E22-22S

Pin No.	Name
A	Phase U
B	Phase V
C	Phase W
D	Ground

Hall sensor output signals

When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv,Vw becomes as shown in the figure below



Magnetic Way: SGLTM-80 ☐☐☐ A

Magnetic way model SGLTM-	L1 mm	-0.1 / -0.3	L2 mm	L3 mm	N1	N2	Approx. weight kg
80405A	405		337.5 (67.5 x 5)	337.5 (33.75 x 10)	6	11	9
80675A	675		607.5 (67.5 x 9)	607.5 (33.75 x 18)	10	19	15
80945A	945		877.5 (67.5 x 13)	877.5 (33.75 x 26)	14	27	21

Note:

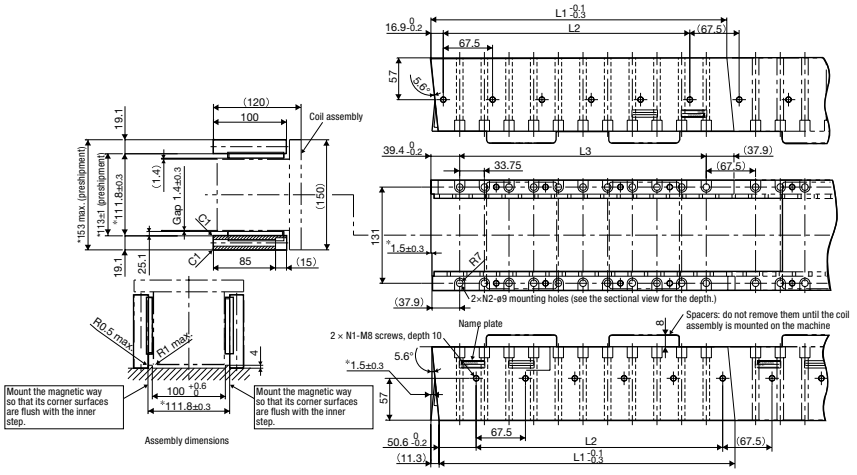
1. Two magnetic ways for both ends of coil assembly make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the coil assembly is mounted on a machine.

2. The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way.

3. Two magnetic ways in a set can be connected to each other.

4. The dimensions marked with an * are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with an * are the dimensions at preshipment.

5. Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.



Units: mm

Type Descriptions

Linear Motor Model Designation

Coil Assembly

SGL G W – 40 A 140 A P D

Linear Σ Series Motor

Motor Model	
Specifications	Code
Coreless	G
F-type iron core	F
T-type iron core	T

W: Coil assembly

Magnet height

Voltage		
Specifications	Remarks	Code
230 VAC	––	A
400 VAC	Applicable for the following • SGLFW-35D, -50D, -1ZD • SGLTW-40D^80D SGLTW-35DDDDH, -50DDDDH	D

Cable Connector for Main Circuit Cable		
Specifications	Applicable Model	Code
MS connector or connector made by Tyco Electronics AMP K.K.	All motor models	–
Connector made by Interconnectron	• SGLGW-30A, -40A, -60A • SGLFW-35D, -50D, -1ZD • SGLTW-35DDDDH, -50DDDDH	D

Options			
Specifications	Remarks		Code
With hall sensor	––		P
Forced cooling	––		C
With hall sensor and forced cooling	Air cooling	SGLGW-40A, -60A, -90A	H
	Liquid cooling	SGLTW-40A, -80A SGLTW-40D, -80D	

Design revision order A,B,C, • • •

Length of coil assembly

Magnetic Way

SGL G M – 40 225 A C

Linear Σ Series Motor

Model	
Specifications	Code
Coreless	G
F-type iron core	F
T-type iron core	T

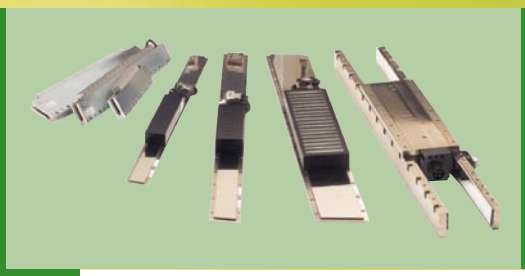
M: Magnetic way

Magnet width

Length of magnetic way

Options		
Specifications	Applicable Model	Code
With magnet cover	Only for all Iron-core types • SGLFM • SGLTM	C
High thrust force	Only for the following coreless types • SGLGM-40, 60	M
With base and magnet cover	Only for the T-type iron core types • SGLTM-20, -35, -40, -80 Note : The magnetic ways with base for SGLTW-35DDDDH, -50DDDDH are not available.	Y

Design revision order A,B,C, • • •

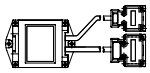
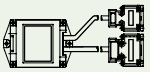


Type Descriptions

Serial Converter Unit

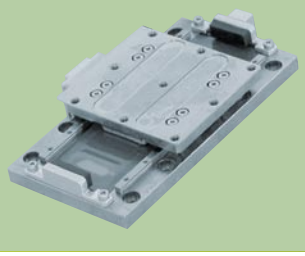
JZDP – D 008 001 – E

Design revision order A,B,C, • • •

Serial converter unit model			
Symbol	Appearance	Applicable linear scale	Hall sensor
A003 D003		Made by Renishaw or Heidenhain*	No
A005 D005		Made by Renishaw or Heidenhain*	No
A006 D006		Made by Renishaw or Heidenhain*	Yes
A008 D008		Made by Renishaw or Heidenhain*	Yes

Note: * When using a linear scale made by Heidenhain an extension cable is required

Applicable Linear Motor								
Motor model		Symbol	Model	Symbol	Motor model		Symbol
SGLGW- (coreless) When a standard-force magnetic way is used.	30A050B	158	30A050C	250	SGLTW- (Iron core, T-Type)	20A170A	011
	30A080B	156	30A080C	251		20A320A	012
	40A140B	001	40A140C	252		20A460A	013
	40A253B	002	40A253C	253		35A170A	014
	40A365B	003	40A365C	254		35A320A	015
	60A140B	004	60A140C	258		35A460A	016
	60A253B	005	60A253C	259		35A170H	105
	60A365B	006	60A365C	260		35A320H	106
	90A200A	101	90A200C	264		50A170H	108
	90A370A	102	90A370C	265		50A320H	109
	90A535A	103	90A535C	266		40A400B	185
SGLGW- + SGLGM- □ -M (coreless) When a high-force magnetic way is used.	40A140B	059	40A140C	255		40A600B	186
	40A253B	060	40A253C	256		80A400B	187
	40A365B	061	40A365C	257		80A600B	188
	60A140B	062	60A140C	261		35D170H	193
	60A253B	063	60A253C	262		35D320H	194
	60A365B	047	60A365C	263		50D170H	195
SGLFW- (Iron core, F-Type)	20A090A	017				50D320H	196
	20A120A	018				40D400B	197
	35A120A	019				40D600B	198
	35A230A	020				80D400B	199
	50A200B	181				80D600B	200
	50A380B	182					
	1ZA200B	183					
	1ZA380B	184					
	35D120A	211					
	35D230A	212					
	50D200B	189					
	50D380B	190					
	1ZD200B	191					
	1ZD380B	192					
	1ED380B	333					
	1ED560B	334					



Sigma Trac-μ

Specifications

Voltage		230 V			
Linear Motor model		SGTMM01-010AM20A	SGTMM01-030AM20A	SGTMM03-025AH20AP	SGTMM03-065AH20AP
Rated force	N	3.5	3.5	7.5	7.5
Instantaneous peak force	N	10	10	25	25
Force constant	N / Arms	9	9	13.2	12.3
Motor constant	N I √w	1.2	1.2	2.29	1.58
Maximum load *1	kg	1	1	3	3
Effective stroke lenght	mm	10	30	25	65
Linear scale resolution	μm	0.078μm = 20μm / 256 (8bit)			
Linear scale model number		M1020 (MicroE)		LIDA487/LIF181 (Heidenhain)	
Hall sensor		None	None	Yes	Yes
Weigth of moving part	kg	0.1	0.1	0.215	0.24
Total weigth of micro trac	kg	0.31	0.35	0.62	0.71
Position accuracy repetibility *2	μm	+/- 0.5	+/- 0.5	+/- 0.5	+/- 0.5

Note: *1 The maximum load is calculated for an acceleration of 4.9 m/s2.
*2 With stable environmental conditions and motor temperature unchanged motor temperature unchanged

Basic Specifications

- Time rating: continuous
- Insulation class: Class B
- Ambient temperature: 0 to +40°C
- Ambient humidity: 20 to 80% (non-condensing)
- Insulation resistance: 500 VDC, 10 MΩ min.
- Excitation: permanent magnet
- Dielectric strength: 1500 VAC for 1 minute
- Protection methods: self-cooled
- Allowable winding temperature: 130°C

Force-speed Characteristics

Force-speed

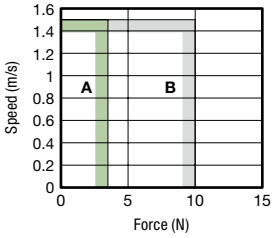
A: Continuous Duty Zone
B: Intermittent Duty Zone

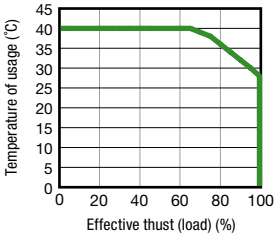
Effective thust-ambient temperature

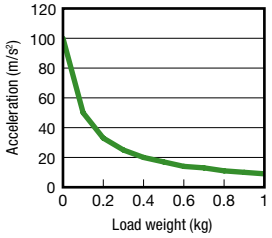
Sensor head temperature is bellow 50 ℃
Ambient temperature

Load-acceleration

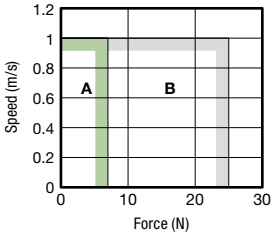
SGTMM01-□

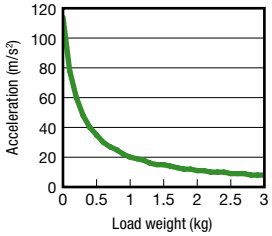




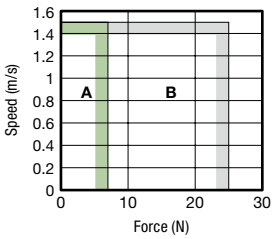


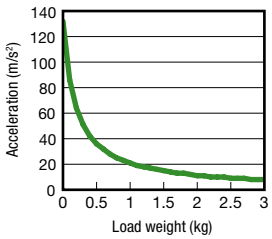
SGTMM03-025□





SGTMM03-065□



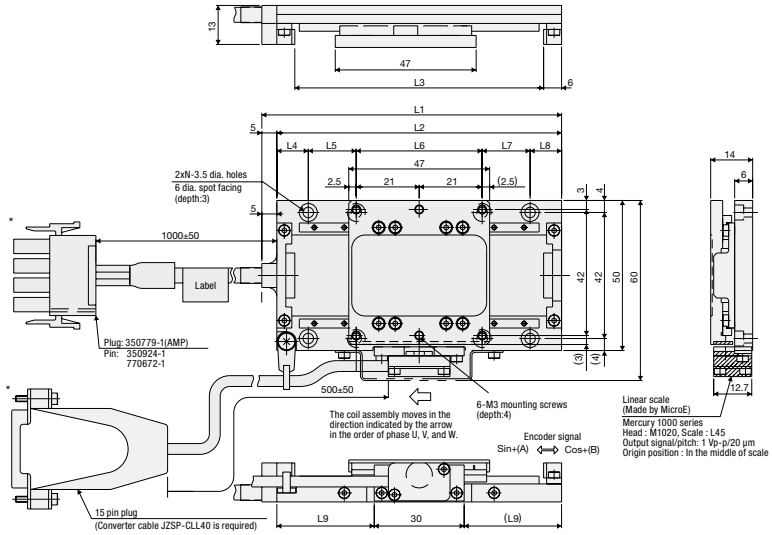


Dimensions

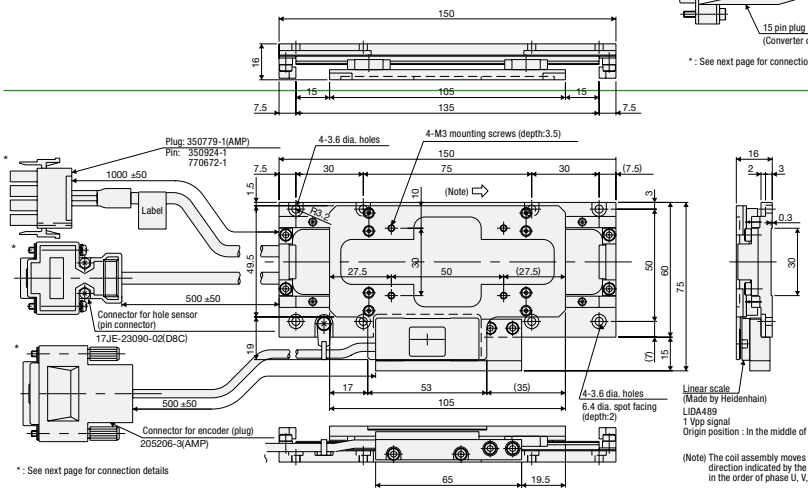
Coil Assembly: SGTMM01- ☐

Micro trac model	L1 mm	L2 mm	L3 mm	L4 mm	L5 mm	L6 mm	L7 mm	L8 mm	L9 mm	N
SGTMM01-010AM20A	80	75	63	14	42	8	-	11	22.5	3
SGTMM01-030AM20A	100	95	83	10.5	16	42	16	10.5	32.5	4

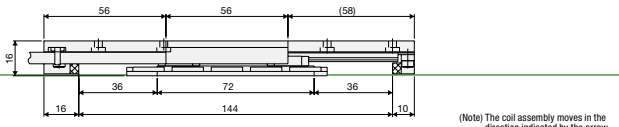
Units: mm



SGTMM03-025AH20AD

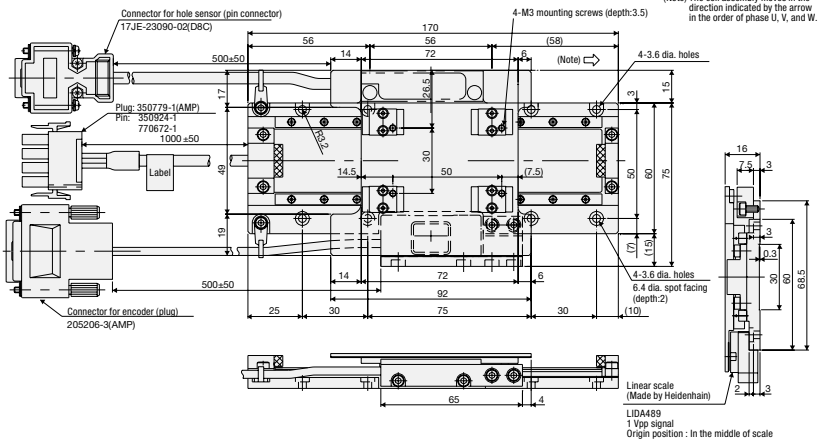


Units: mm



SGTMM03-065AH20AP

Units: mm



Connections

SGTMM01- ☐

Linear Motor Power connector

Pin No.	Name
1	Phase U
2	Phase V
3	Phase W
4	FG

Linear scale connector (Signal converter cable JZSP-CLL40 is required)

Pin No.	Signal
1	IW-
2	NW+
3	RESERVED
4	RESERVED
5	RESERVED
6	RESERVED
7	COS+
8	SIN+
9	N/C
10	N/C
11	N/C
12	+5 V
13	GND
14	GND
15	COS-
Case	Shield

SGTMM03- ☐

Linear Motor Power connector

Pin No.	Name
1	Phase U
2	Phase V
3	Phase W
4	FG

Linear scale connector

Pin No.	Signal
1	cos (A+)
2	0 V
3	sin (B-)
4	+5V
5	Empty
6	Empty
7	/Ref (R-)
8	Empty
9	/cos (A-)
10	0V sensor
11	/sin (B-)
12	5 V sensor
13	Empty
14	Ref (R+)
15	Empty
Case	Shield

Hall sensor connector

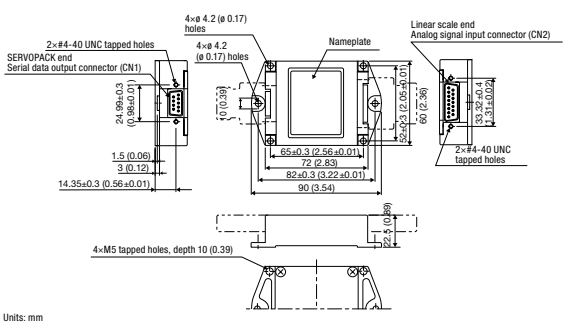
Pin No.	Name
1	+5 V (Power
2	Phase U
3	Phase V
4	Phase W
5	0 V (Power
6	Not used
7	Not used
8	Not used
9	Not used

Serial Converter Unit

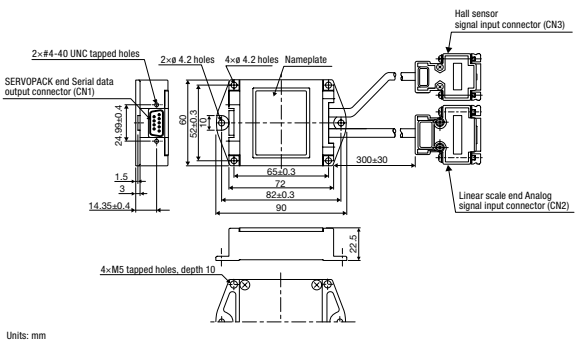
JZDP-D00 ☐ - ☐☐☐ - E

Items		Specifications
Electrical	Power supply voltage	+5.0 V ±5%, ripple content 5% max.
	Characteristics	120 mA Typ. 350 mA max.
	Mechanical	Input 2-phase sine wave: 1/256 pitch
	Characteristics	250 kHz
	Environmental	Differential input amplitude: 0.4 V to 1.2 V Input signal level: 1.5 V to 3.5 V
	Conditions	CMOS level
	Output signals	Position data, hall sensor information and alarms
	Output method	Serial data transmission (HDLC (High-level data link control) protocol format with Manchester codes)
	Transmission cycle	62.5 μs
	Output circuit	Balanced transceiver (SN75LBC176 or the equivalent) Internal terminal resistance: 120 Ω
Total weigth of micro trac	Approx. mass	150 g
	Vibration resistance	98 m/s² max. (1 to 2500 Hz) in three directions
	Shock resistance	980 m/s², (11 ms) two times in three directions
Position accuracy repetibility	Operating temperature	0°C to 55°C
	Storage temperature	-20°C to +80°C
	Humidity	20% to 90% RH (without condensation)

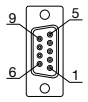
JZDP-D003- ☐☐☐ - E



JZDP-D006- ☐☐☐ - E



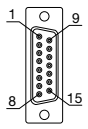
CN1
SERVOPACK end serial data output



JZDP-D003- ☐☐☐ JZDP-D006- ☐☐☐

Pin No.	Signal
1	+5 V
2	S-phase output
3	Empty
4	Empty
5	0 V
6	/S-phase output
7	Empty
8	Empty
9	Empty
Case	Shield

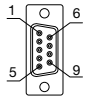
CN2
Linear scale end Analog signal input



JZDP-D003- ☐☐☐ JZDP-D006- ☐☐☐

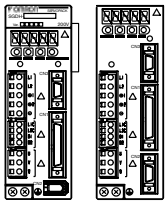
Pin No.	Signal
1	cos input (A+)
2	0 V
3	sin input (B+)
4	+5 V
5	Empty
6	Empty
7	/Ref input (R-)
8	+5 V
9	/cos input (A-)
10	0 V sensor
11	/sin input (B-)
12	5 V sensor
13	Empty
14	/Ref input (R+)
15	Empty
Case	Shield

CN3
Hall sensor signal input



JZDP-D006- ☐☐☐

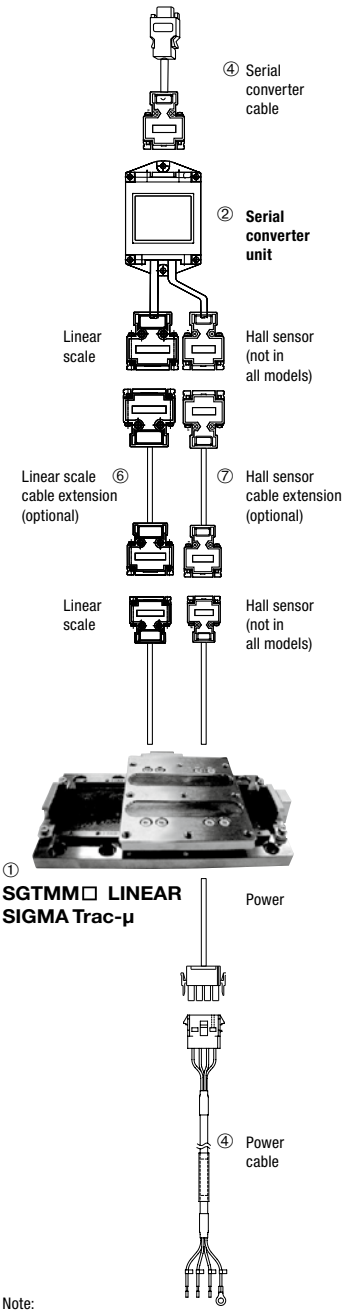
Pin No.	Signal
1	+5 V
2	U-phase input
3	V-phase input
4	W-phase input
5	0 V
6	Empty
7	Empty
8	Empty
9	Empty
Case	Shield



A B

③ **Servo drive with optionboards for flexible system configuration (A)**
Sigma-II servo drive or

Intelligent servo drive (B)
XtraDrive



Note:

The symbols ①②③... show the recommended sequence to select the motor, cables and serial converter for a Linear Motor system

Connections

Hall sensor cable to serial converter						
Symbol	Specifications		① Linear axis model	② Serial converter	③ Servo drive	
①②③	3.5 N	10 N	SGTMM01-010AM20A	JZDP-D003-242*1	SGDH-A5AE	XD-P5MN01
	3.5 N	10 N	SGTMM01-030AM20A	JZDP-D003-242*1	SGDH-A5AE	XD-P5MN01
	7 N	25 N	SGTMM03-025AH20AP	JZDP-D006-221	SGDH-01AE	XD-01MN01
	7 N	25 N	SGTMM03-065AH20AP	JZDP-D006-220	SGDH-01AE	XD-01MN01

Serial converter cable to servo drive				
Symbol	Specifications		Model	Appearance
④	Sigma-II drive to serial converter cable	3 m	JZSP-CLP70-03-E	
		5 m	JZSP-CLP70-05-E	
		10 m	JZSP-CLP70-10-E	
		15 m	JZSP-CLP70-15-E	
		20 m	JZSP-CLP70-20-E	

Power cables				
Symbol	Specifications		Model	Appearance
⑤	Power cable for sigma trac micro	3 m	JZSP-CLN11-03-E	
		5 m	JZSP-CLN11-05-E	
		10 m	JZSP-CLN11-10-E	
		15 m	JZSP-CLN11-15-E	
		20 m	JZSP-CLN11-20-E	

Linear scale cable to serial converter				
Symbol	Specifications		Model	Appearance
⑥	Extension cable for linear scale to serial converter (the extension cable is optional)	1 m	JZSP-CLL00-01-E	
		3 m	JZSP-CLL00-03-E	
		5 m	JZSP-CLL00-05-E	
		10 m	JZSP-CLL00-10-E	
		15 m	JZSP-CLL00-15-E	

Hall sensor cable to serial converter				
Symbol	Specifications		Model	Appearance
⑦	Extension cable for linear scale to serial converter (the extension cable is optional)	1 m	JZSP-CLL10-01-E	
		3 m	JZSP-CLL10-03-E	
		5 m	JZSP-CLL10-05-E	
		10 m	JZSP-CLL10-10-E	
		15 m	JZSP-CLL10-15-E	

Note:

*1. For the SGTMM01- □ motor the signal converter cable JZSP-CLL40 (0.2 m length) is required.

Servo drive
Choosing ∑-II or ∑-V drive affects to the serial converter cable needed

Type Description

SGTMM 03 – 065 A H 20 A P

∑-Trac Linear Motor

Maximum thrust	
Specifications	Code
10 N	01
25 N	03

Effective stroke length	
Specifications	Code
10 mm	010
25 mm	025
30 mm	030
65 mm	065

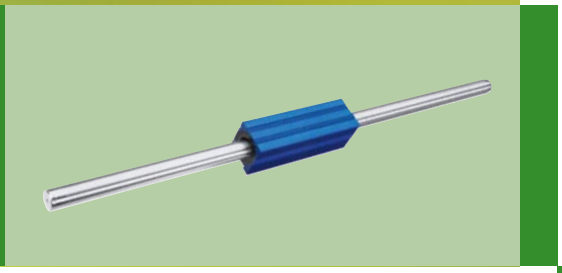
Output from linear scale	
Specifications	Code
Analogue (1 Vp-p)	A

Linear scale manufacturer	
Specifications	Code
Heidenhain	H
MicronE	M

Linear scale pitch	
Specifications	Code
20 μm	20

Design revision

Hall sensor	
Specifications	Code
None	-
Provided	P



Sigma Stick

Specifications

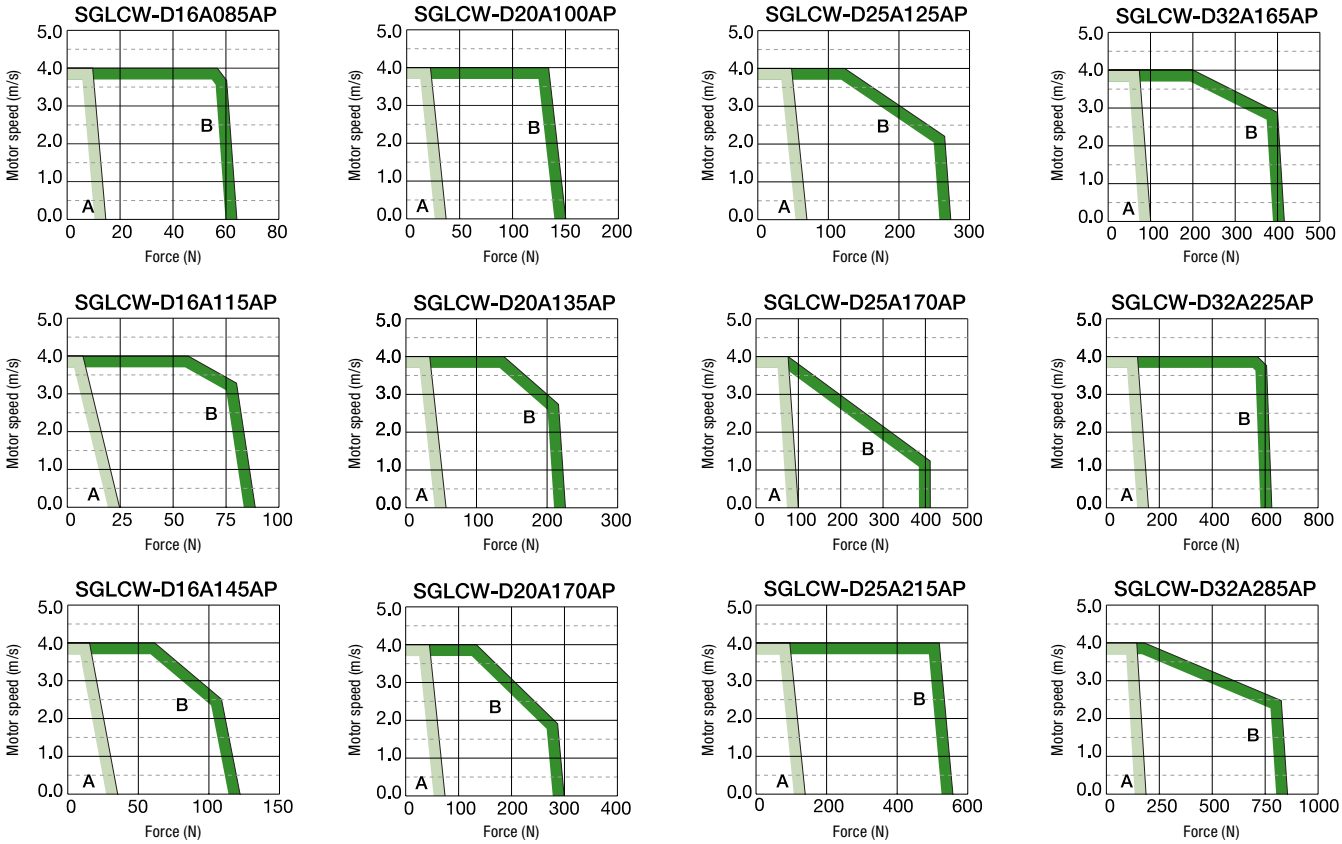
SGLCW	Units	D16A			D20A			D25A			D32A		
		085AP	115Ap	145AP	100AP	135AP	170AP	125AP	170AP	215AP	165AP	225AP	285AP
Rated force	N	17	25	34	30	34	60	70	105	140	90	135	180
Peak force	N	60	90	120	150	225	300	280	420	560	420	630	840
Coil Assembly Mass	kg	0.3	0.4	0.5	0.6	0.8	1.0	1.0	1.4	1.8	1.8	2.5	3.2

Basic Specifications

- Time rating: continuous
- Insulation Resistance: 500 VDC, 10 MΩ min.
- Ambient Temperature: 0°C to 40°C
- Excitation: permanent magnet
- Withstand Voltage: 1500 VAC for one minute
- Enclosure: Self-cooled
- Ambient Humidity: 20% to 80% (no condensation)
- Allowable Winding Temperature: 130°C (Thermal class B)
- Vibration Resistance: 24.5 m/s² (coil assembly), 4.9 m/s² (magnetic way)

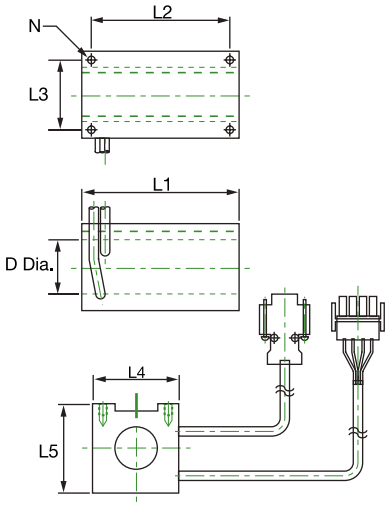
Force-speed characteristics

A: Continuous Duty Zone B: Intermittent Duty Zone



Dimensions

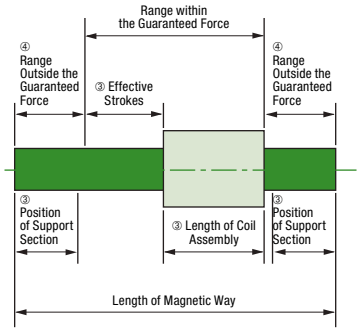
Coil Assembly: SGLCW-D ☐☐AP



Coil assembly model SGLCW-		Force		L1	L2	L3	L4	L5	D Dia.	N
		Rated (N)	Max. (N)							
D16	085AP	17	60	85	75	22	32	34	18	4-M3
	115AP	25	90	115	105					
	145AP	34	120	145	135					
D20A	100AP	30	150	100	90	30	42	44	22.5	4-M4
	135AP	45	225	135	125					
	170AP	60	300	170	160					
D25A	125AP	70	280	125	110	38	50	54	28	4-M5
	170AP	105	420	170	155					
	215AP	140	560	215	200					
D32A	165AP	90	420	165	145	45	60	64	35.5	4-M6
	225AP	135	630	225	205					
	285AP	180	840	285	265					6-M6

Magnetic Way: SGLCW-D ☐☐AP

Coil assembly model SGLCW-		Manufacturing Coil Assembly-Available Length (on request)					
		Standard Specifications					Manufacturing Coil Assembly-Available Length (on request)
		① Length of Magnetic Way (mm)					Length of Magnetic Way (mm)
			② Length of Coil assembly	③ Position of Support Section	④ Range Outside the Guaranteed Force	⑤ Effective Strokes	Min. Length to Max. Length
D16	085AP 115AP 145AP	300	85	30	37.5	140	240 to 420 (30 mm increments)
			115			110	
			145			80	
		510	85	45	52.5	320	480 to 750 (30 mm increments)
			115			290	
			145			260	
		750	85			560	
			115			530	
			145			500	
D20A	100AP 135AP 170AP	350	100	35	45	160	280 to 490 (35 mm increments)
			135			125	
			170			90	
		590	100	50	60	370	555 to 870 (35 mm increments)
			135			335	
			170			300	
		870	100			650	
			135			615	
			170			580	
D25A	125AP 170AP 215AP	450	125	45	57.5	210	360 to 630 (45 mm increments)
			170			165	
			215			120	
		750	125	60	72.5	480	705 to 1110 (45 mm increments)
			170			435	
			215			390	
		1110	125			840	
			170			795	
			215			750	
D32A	165AP 225AP 285AP	600	165	60	75	285	480 to 840 (60 mm increments)
			225			225	
			285			165	
		1020	165	90	105	645	960 to 1500 (60 mm increments)
			225			585	
			285			525	
		1500	165			1125	
			225			1065	
			285			1005	



Note: ④ Range outside the guaranteed force:
If any part of the coil assembly is located within this range, characteristics indicated in "Force and speed characteristics" on page 134 cannot be satisfied.

Calculating Length of Coil Assembly

② Length of Coil Assembly (mm)

④ Range Outside the Guaranteed Force (mm)

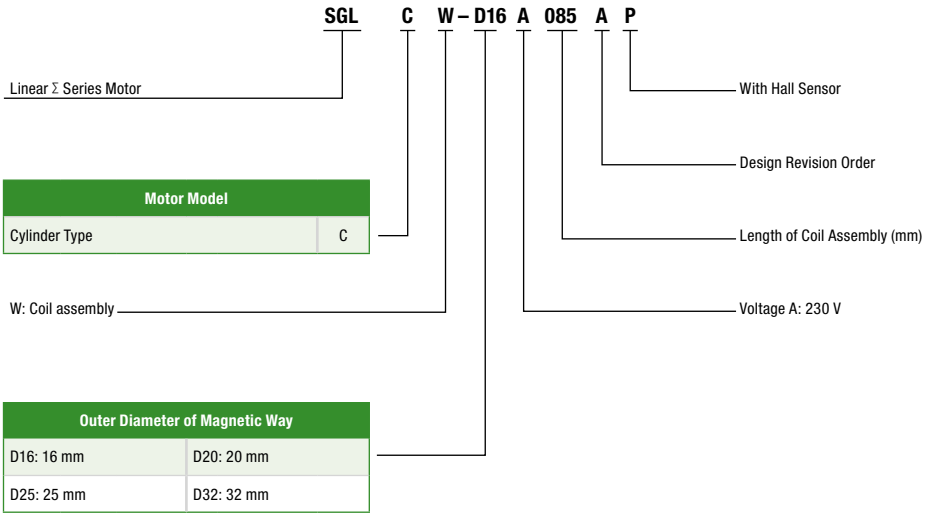
⑤ Effective Strokes (mm)

Formula

Length of Magnetic Way

[② + ④ x 2 + ⑤] (mm)

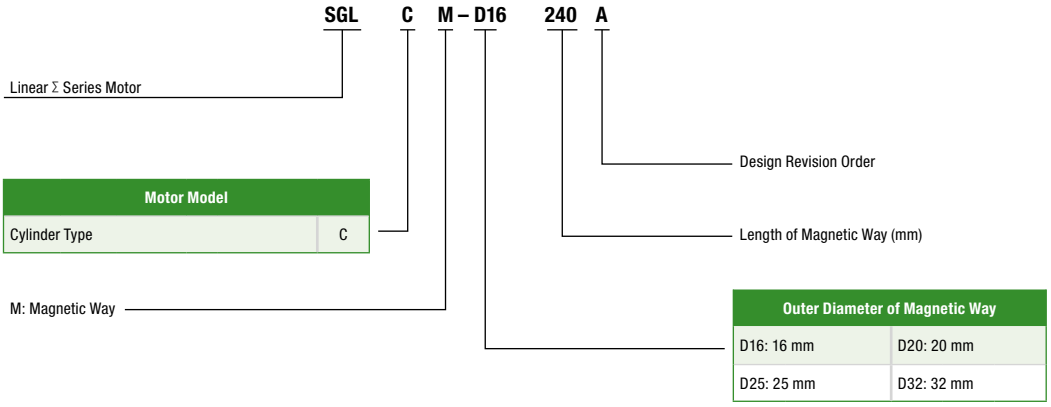
Type Descriptions
Coil Assembly



Motor Model	
Cylinder Type	C

Outer Diameter of Magnetic Way	
D16: 16 mm	D20: 20 mm
D25: 25 mm	D32: 32 mm

Magnetic Way



Motor Model	
Cylinder Type	C

Outer Diameter of Magnetic Way	
D16: 16 mm	D20: 20 mm
D25: 25 mm	D32: 32 mm

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