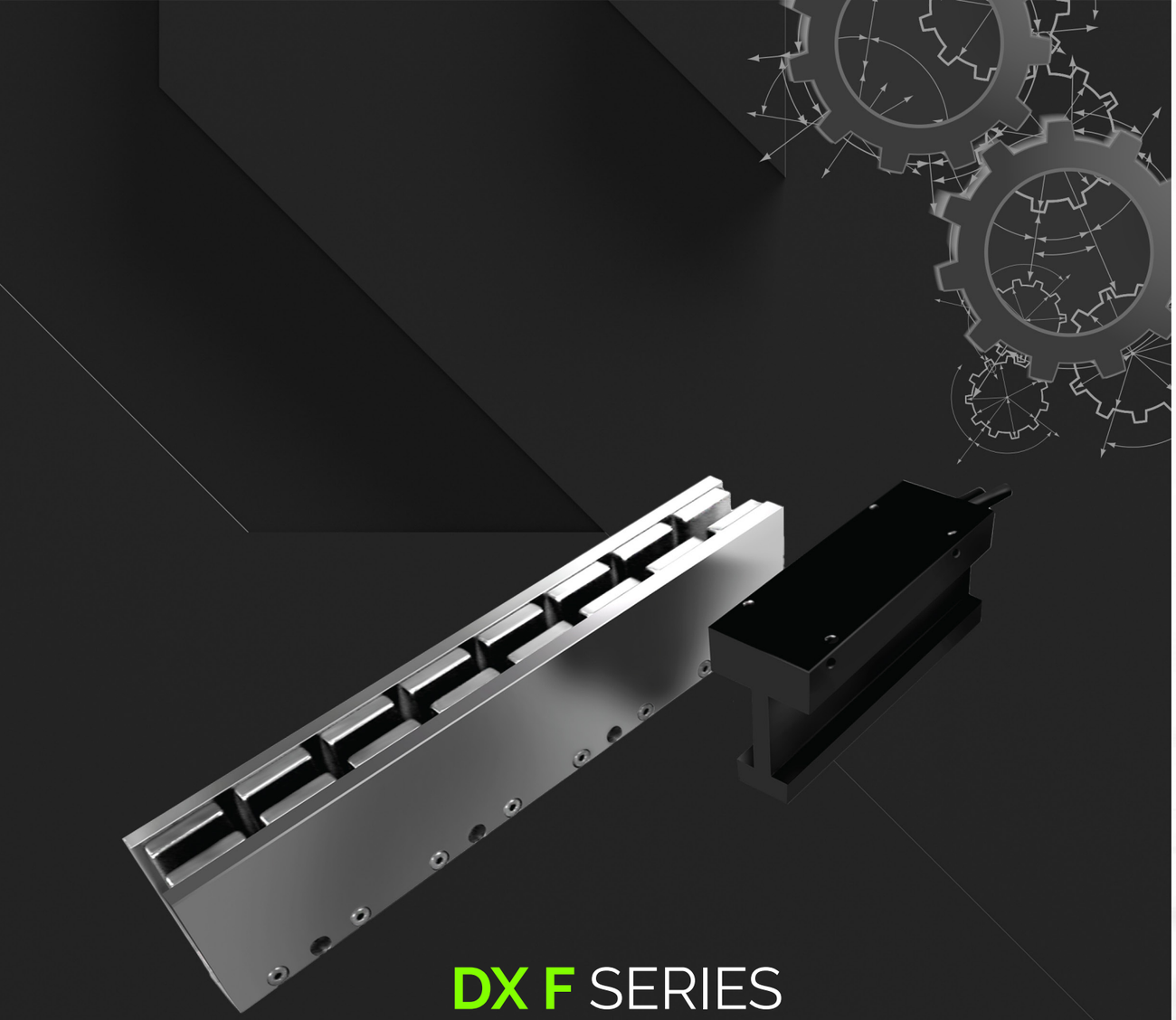
pba

SYSTEMS

DIRECT DRIVE TECHNOLOGY

Product Catalogue

VERSION 4.1.1



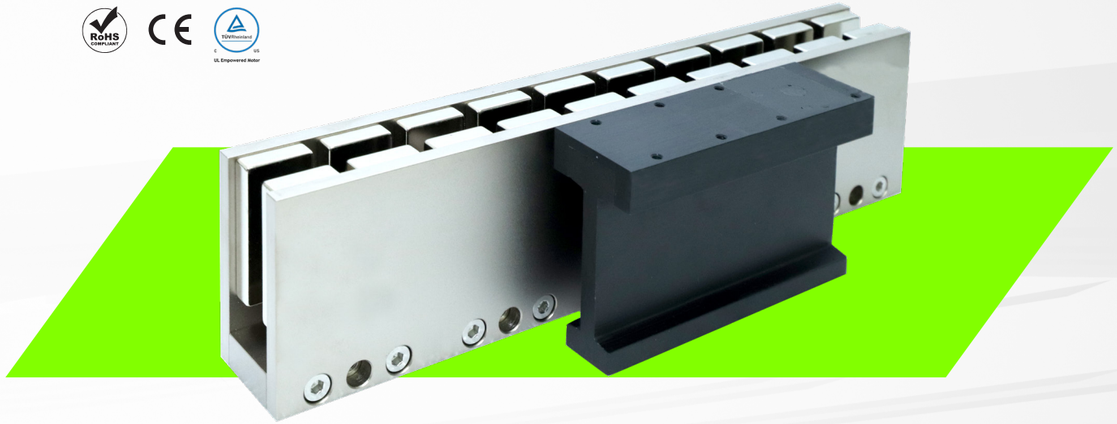
DX F SERIES

LINEAR MOTOR

- PLAY VIDEO -

DXF SERIES

IRONLESS LINEAR MOTOR



High-Speed “zero” cogging with minimal velocity ripple

DX series’ ironless patented overlapping winding forcers provides excellent force density Vs coil size ratio resulting in high force and acceleration generation. DX Coil’s overlapping manufacturing technology allows for selection of smaller size motors in comparison against the competition due to its higher force density and further improved heat dissipation achieved through optional forced air-cooling methods. All DX series forces are designed with high flex cables, modular hall effect sensor and over temperature protection (thermostats or PT100) that makes it the ideal choice for the most demanding applications. The Modular U-channel Magnet tracks available in 60mm length increments allows for easy assembly of un-restricted stroke length.

1. High Power Density
2. Zero Cogging
3. Low speed/torque ripple
4. Fast dynamic response
5. High speed and acceleration
6. Zero backlash
7. Modular hall sensor
8. Optional air-cooling configurations
9. Long strokes without performance loss
10. Easy assembly over long stroke lengths

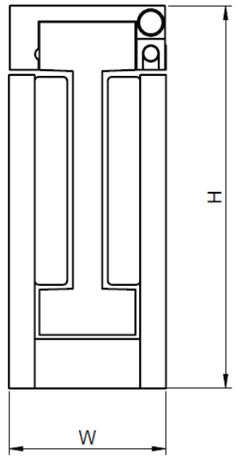
**Technical specifications subject to change without prior notice*

APPLICATION

- **Semiconductor Machine**
- **FPD/LCD transfer**
- **Hard disk drive**
- **Photonics**
- **Wire and Die Bonding**
- **Laser processing machines**
- **Biomedical equipment**
- **Microscope stages**
- **Diamond cutting**
- **Lithium battery production**
- **Micro Precise Fabrication**
- **Precision stamping**
- **Printing machines**
- **Precision positioning stages**
- **Packaging**

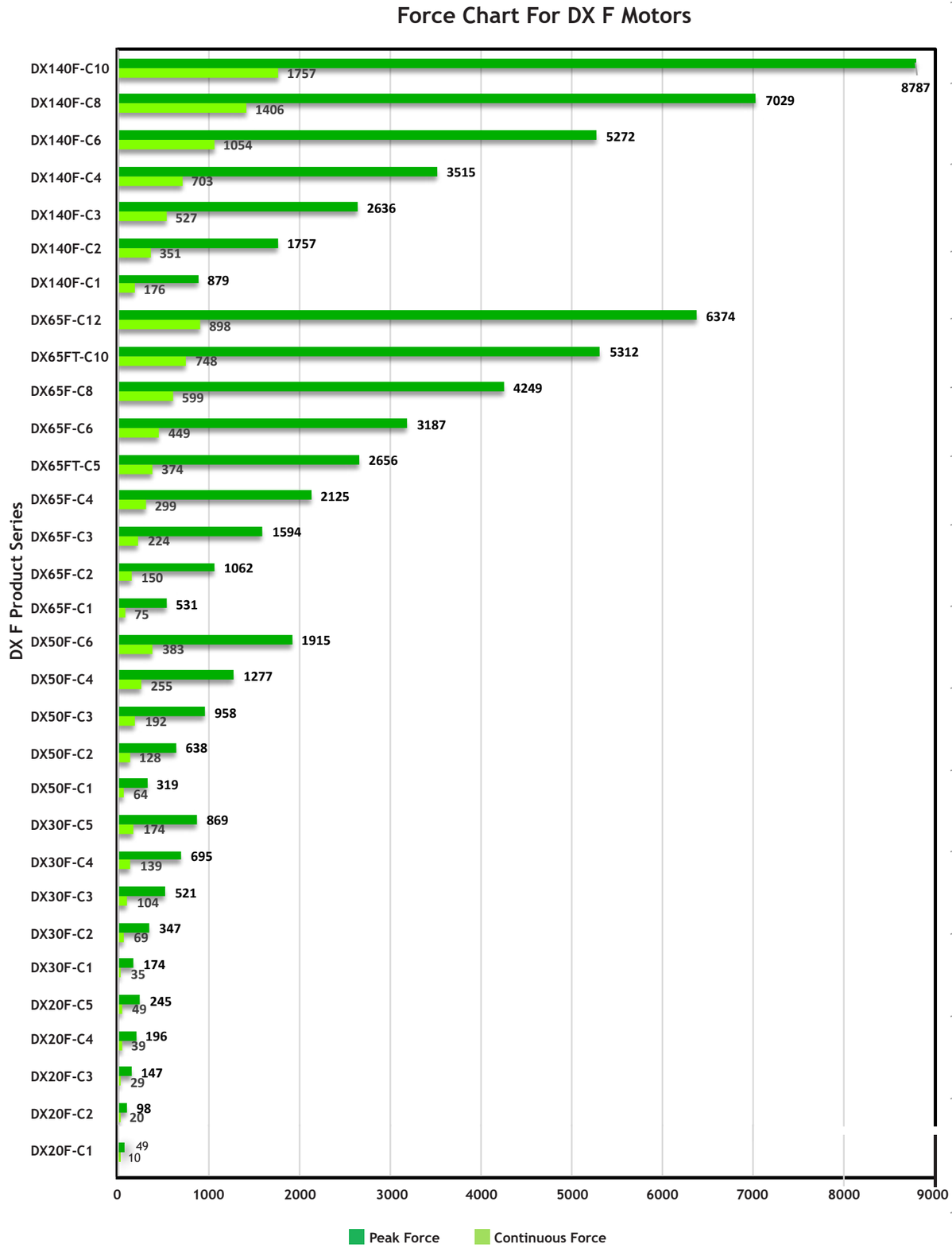
PART NUMBERING SYSTEM 31

MOTOR MODEL	COIL SIZE	CONTINUOUS FORCE (N)	PEAK FORCE (N)	COIL WEIGHT (kg)	COIL LENGTH (mm)	MOTOR W X H (mm)
DX20F	C1	10	49	0.06	31	21.2 x 55.6
	C2	20	98	0.12	61	
	C3	29	147	0.18	91	
	C4	39	196	0.27	121	
	C5	49	245	0.36	151	
DX30F	C1	35	174	0.22	61	35.7 x 68.5
	C2	69	347	0.47	121	
	C3	104	521	0.65	181	
	C4	139	695	0.89	241	
	C5	174	869	1.10	301	
DX50F	C1	64	319	0.28	61	38.7 x 93
	C2	128	638	0.56	121	
	C3	192	958	0.84	181	
	C4	255	1277	1.12	241	
	C6	383	1915	1.68	361	
DX65F	C1	75	531	0.57	85	50 x 122
	C2	150	1062	1.14	145	
	C3	224	1594	1.71	205	
	C4	299	2125	2.28	265	
	C5	374	2656	2.85	325	
	C6	449	3187	3.42	385	
	C8	599	4249	4.56	505	
	C10	748	5312	5.70	625	
	C12	898	6374	6.84	745	
DX140F	C1	176	879	0.80	85	64.5 x 207
	C2	351	1757	1.52	145	
	C3	527	2636	2.50	205	
	C4	703	3515	3.40	265	
	C6	1054	5272	5.00	385	
	C8	1406	7029	6.70	505	
	C10	1757	8787	8.40	625	



Note: Continuous force is measured under natural convection, refer to the detail parameters table for more information

FORCE CHART FOR DX F SERIES LINEAR MOTOR



PART NUMBERING SYSTEM

COIL ASSEMBLY

DX30F – C2 – P – TM – 3.0 – NC – FC – HC – 00

MOTOR MODEL

DX20F	DX65F
DX30F	DX140F
DX50F	

MOTOR COIL SIZE

C1
C2
C3
C4
C5
:

CONNECTION TYPE

S Series
P Parallel

THERMAL PROTECTION

TC* PT100 Sensor
Available for all DX series

TM** Therrmostat
Available for all DX30F-DX140 only

CABLE LENGTH***

0.5 0.5m
1.0 1.0m
3.0 3.0m
5.0 5.0m

DESIGN VERSIONS

00 Standard
01 Customised Version
:

HALL SENSOR AND CONNECTOR OPTIONS

NH No Hall Sensor
H Flying Leads *** (No Connector)
HC 9 pins D Sub *** Male Connector
CHC 5 pins Circular *** Quick Lock Male Connector
HCL 9 pins D Sub *** Male Connector with Line Driver

POWER CABLE OPTIONS

NF No Ferrite Core (Flying Leads)
FC Ferrite Core (Recommended)
9NF No Ferrite Core, D Sub 9 pins Female Connector
CNF No Ferrite Core, Circular Quick Lock 6 pins Male Connector

COOLING TYPE

NC Normal Convection
AC Air Cooling

* TC-Sensor output to temperature controller
** TM-On/Off switch, trigger at 100˚C
*** Not available for DX20-C1

MAGNET TRACK

DX30F – TL300 – [ ]

MOTOR MODEL

DX20F	DX65F
DX30F	DX140F
DX50F	

MAGNET TRACK LENGTH*

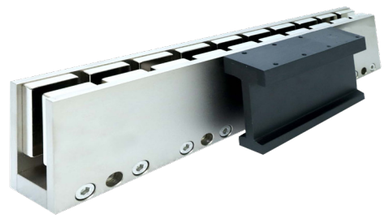
TL120 - 120mm	TL300 - 300mm
TL180 - 180mm	TL360 - 360mm
TL240 - 240mm	TL480 - 480mm

DESIGN VERSIONS

Standard
01 Customised Version
:

DXF SERIES

IRONLESS LINEAR MOTOR



DX20F

- Ironless Motor
- Peak force to 249N, Continuous force to 49N
- Modular Hall Sensor

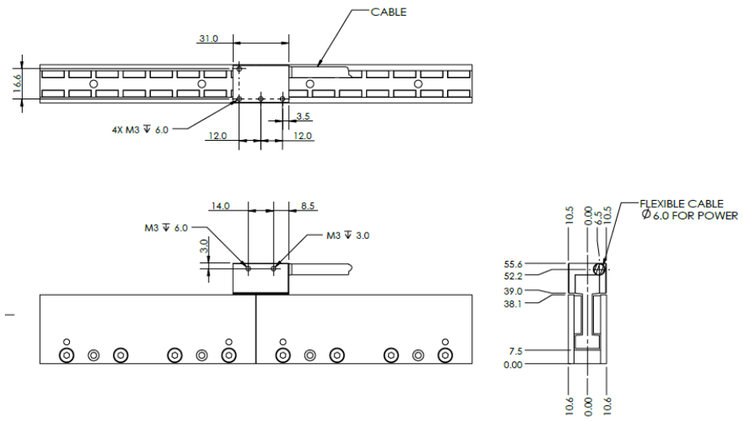
SPECIFICATION		MODEL								
		DX20F-C1	DX20F-C2		DX20F-C3		DX20F-C4		DX20F-C5	
		S	S	P	S	P	S	P	S	P
Performance	**Unit**									
Peak Force	N	49	98	98	147	147	196	196	245	245
Continuous Force@ 100˚C*	N	10	20	20	29	29	39	39	49	49
Continuous Force AC @ 100˚C'	N	-	-	-	-	-	-	-	-	-
Peak Power@ 100˚C	W	594	1204	1204	1805	1805	2407	2407	3009	3009
Continuous Power@ 100˚C*	W	24	48	48	72	72	96	96	120	120
Continuous Power AC @ 100˚C'	W	-	-	-	-	-	-	-	-	-
Electrical										
Peak Current	A^{pk}	11 .25	11.27	22.54	11.27	22.54	11.27	22.54	11.27	22.54
Continuous Current @ 100˚c•	A^{pk}	2.25	2.25	4.51	2.25	4.51	2.25	4.51	2.25	4.51
Continuous Current AC @ 100˚C'	A^{pk}	-	-	-	-	-	-	-	-	-
Continuous Stall Current @ 100˚C*	Arms	1.50	1.38	2.76	1.38	2.76	1.38	2.76	1.38	2.76
Force Constant	N/A^{pk}	4.4	8.7	4.4	13.1	6.5	17.4	8.7	21.8	10.9
Back EMF Constant	$V^{pk}/m/s$	5.0	10.0	5.0	15.0	7.5	20.0	10.0	25.0	12.5
Coil Resistance L-L@ 25˚C	ohm	4.8	9.7	2.4	14.6	3.6	19.4	4.9	24.3	6.1
Coil Resistance L-L@ 100˚C*	ohm	6.3	12.6	3.2	19.0	4.7	25.3	6.3	31.6	7.9
Inductance L-L @ 1 kHz	mH	0.83	1.78	0.45	2.67	0.67	3.56	0.89	4.45	1.11
Motor Constant @ 25˚C*	N/√ W	2.29	3.23	3.23	3.95	3.95	4.56	4.56	5.10	5.10
Motor Constant @ 100˚C*	N/√ W	2.01	2.83	2.83	3.46	3.46	4.00	4.00	4.47	4.47
Max. Terminal Voltage	Vdc	330								
Thermal										
Thermal Resistance @ 100˚C*	ºC/W	3.16	1.56	1.56	1.04	1.04	0.78	0.78	0.62	0.62
Thermal Resistance AC @ 100˚C'	ºC/W	-	-	-	-	-	-	-	-	-
Max. Coil Temperature	ºC	100								
Mechanical										
Coil Weight	kg	0.06	0.12	0.12	0.18	0.18	0.27	0.27	0.36	0.36
Coil Weight AC '	kg	-	-	-	-	-	-	-	-	-
Coil Length	mm	31	61	61	91	91	121	121	151	151
Attractive Force	N	0								
Electrical Cycle Length	mm	30								

Notes:
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms
2. * Ambient temperature 25ºC, natural convection, with heat sink of size L x 2W x 12mm. (L = length of coil, W = width of coil.)
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar
4. Specifications tolerance - inductance +/-30%, all others +/-10%
5. Peak force and current - 4% duty ratio and 1 second duration
6. Motor Insulation Class - Class B (130˚C)

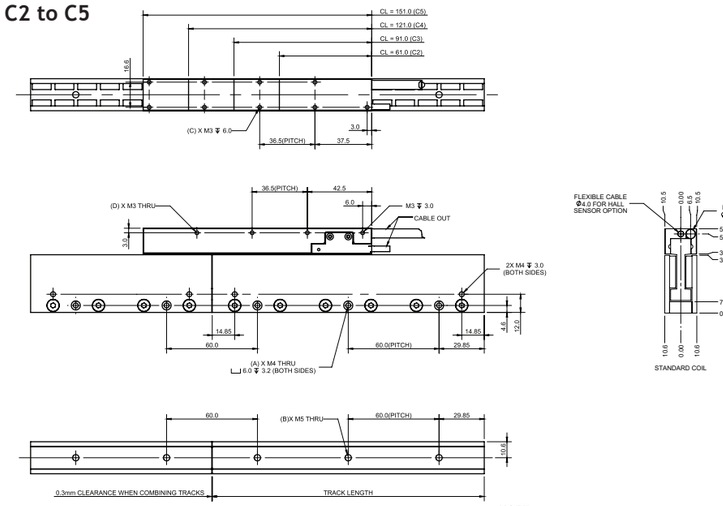
Notes:
7. IP Rating - IP00
8. IEC Protection Class - Class 1
9. Compliance Standards - CE, RoHS
10. Ambient Operating Temperature - 0 - 40˚C
11. Ambient Operating Humidity - 10 - 90% RH
12. Specifications are subject to change without prior notice.

DX20F

DX20F C1



DX20F C2 to C5



NOTE:
MOTOR AND HALL CABLES TO OBSERVE:
FIXED INSTALLATION: STATIC BEND RADIUS R >3 X CABLE DIAMETER
FLEXING INSTALLATION: DYNAMIC BEND RADIUS R >10 X CABLE DIAMETER

Standard Magnet Track

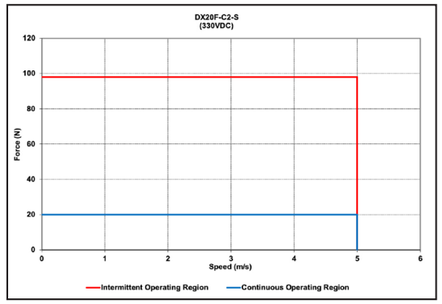
SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 120	119.7	0.46	2	2
TL 180	179.7	0.69	3	3
TL 240	239.7	0.92	4	4
TL 300	299.7	1.15	5	5
TL 360	359.7	1.32	6	6
TL 480	479.7	1.84	8	8

Motor Coil

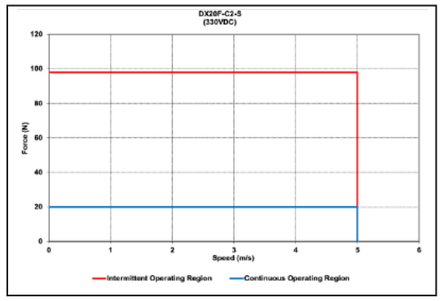
SIZE	DX20F WEIGHT (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C	NUMBER OF MOUNTING HOLE (SIDE MOUNT) D
C1	0.06	4	2
C2	0.12	3	1
C3	0.18	5	2
C4	0.27	7	3
C5	0.36	9	3

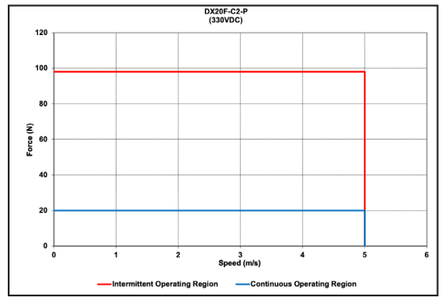
GRAPH: FORCE VS SPEED

DX20F-C1

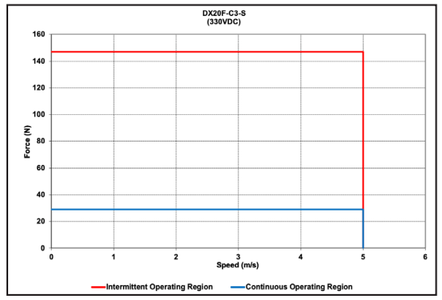


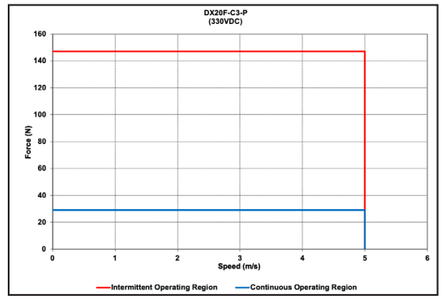
DX20F-C2



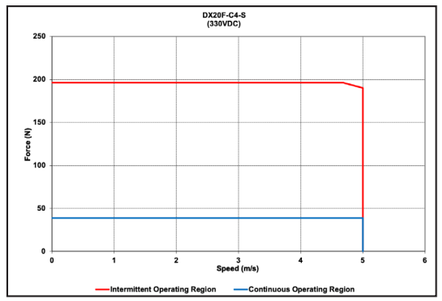


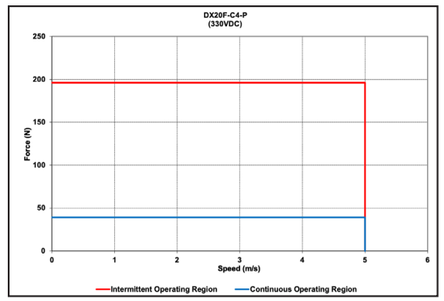
DX20F-C3



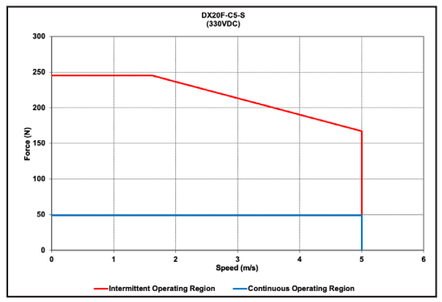


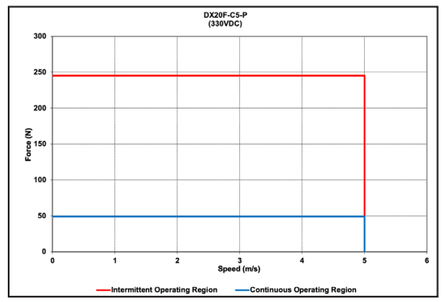
DX20F-C4





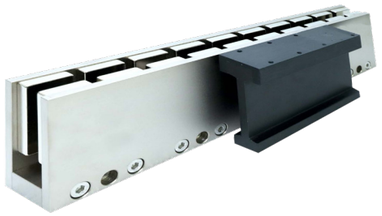
DX20F-C5





DXF SERIES

IRONLESS LINEAR MOTOR



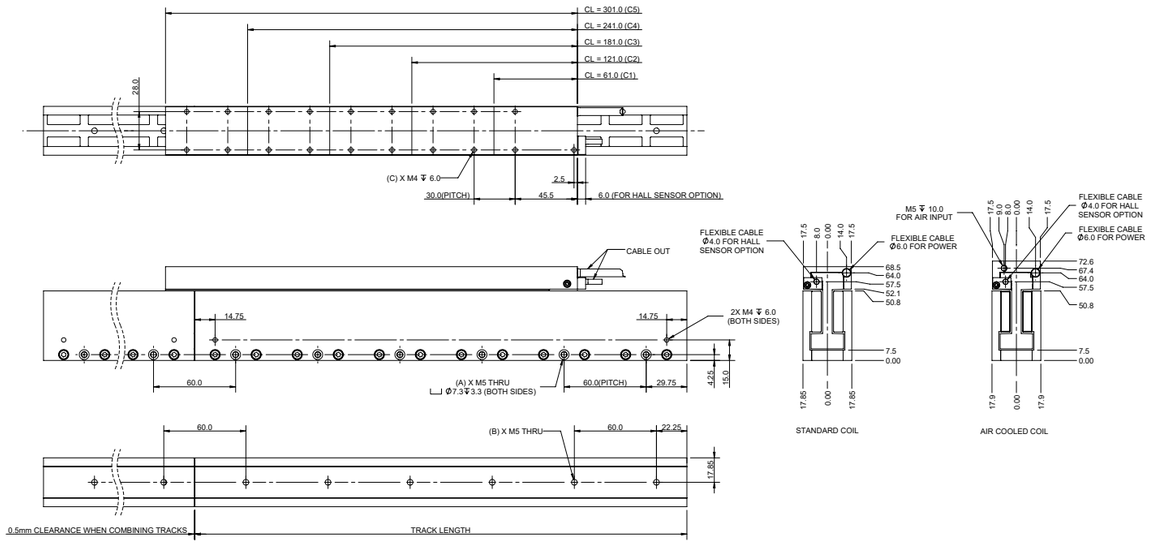
DX30F

- Ironless Motor
- Peak force to 869N, Continuous force to 208N
- Modular Hall Sensor

SPECIFICATION		MODEL									
		DX30F-C1		DX30F-C2		DX30F-C3		DX30F-C4		DX30F-C5	
		S	P	S	P	S	P	S	P	S	P
Performance	**Unit**										
Peak Force	N	174	174	347	347	521	521	695	695	869	869
Continuous Force @ 100°C*	N	35	35	69	69	104	104	139	139	174	174
Continuous Force AC @ 100°C^	N	42	42	83	83	125	125	167	167	208	208
Peak Power @ 100°C	W	1110	1110	2219	2219	3329	3329	4438	4438	5548	5548
Continuous Power @ 100°C*	W	44	44	89	89	133	133	178	178	222	222
Continuous Power AC @ 100°C^	W	64	64	128	128	192	192	256	256	320	320
Electrical											
Peak Current	A^{pk}	14.13	28.25	14.13	28.25	14.13	28.25	14.13	28.25	14.13	28.25
Continuous Current @ 100°C*	A^{pk}	2.83	5.65	2.83	5.65	2.83	5.65	2.83	5.65	2.83	5.65
Continuous Current AC @ 100°C^	A^{pk}	3.39	6.78	3.39	6.78	3.39	6.78	3.39	6.78	3.39	6.78
Continuous Stall Current @ 100°C*	Arms	1.73	3.46	1.73	3.46	1.73	3.46	1.73	3.46	1.73	3.46
Force Constant	N/A^{pk}	12.3	6.2	24.6	12.3	36.9	18.5	49.2	24.6	61.5	30.8
Back EMF Constant	$V^{pk}/m/s$	14.1	7.1	28.3	14.1	42.4	21.2	56.6	28.3	70.7	35.4
Coil Resistance L-L @ 25°C	ohm	5.7	1.4	11.4	2.8	17.1	4.3	22.8	5.7	28.5	7.1
Coil Resistance L-L @ 100°C*	ohm	7.4	1.9	14.8	3.7	22.2	5.6	29.7	7.4	37.1	9.3
Inductance L-L @ 1kHz	mH	3.14	0.79	6.28	1.57	9.42	2.36	12.56	3.14	15.70	3.93
Motor Constant @ 25°C*	N/√W	5.95	5.95	8.42	8.42	10.31	10.31	11.91	11.91	13.31	13.31
Motor Constant @ 100°C*	N/√W	5.22	5.22	7.38	7.38	9.03	9.03	10.43	10.43	11.66	11.66
Max. Terminal Voltage	Vdc	330									
Thermal											
Thermal Resistance @ 100°C*	°C/W	1.69	1.69	0.84	0.84	0.56	0.56	0.42	0.42	0.34	0.34
Thermal Resistance AC @ 100°C^	°C/W	1.17	1.17	0.59	0.59	0.39	0.39	0.29	0.29	0.23	0.23
Max. Coil Temperature	°C										
Mechanical											
Coil Weight	kg	0.22	0.22	0.47	0.47	0.65	0.65	0.89	0.89	1.10	1.10
Coil Weight AC^	kg	0.24	0.24	0.52	0.52	0.72	0.72	0.99	0.99	1.22	1.22
Coil Length	mm	61	61	121	121	181	181	241	241	301	301
Attractive Force	N	0									
Electrical Cycle Length	mm	60									

Notes:
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms
2. * Ambient temperature 25ºC, natural convection, with heat sink of size L x 2W x 12mm. (L = length of coil, W = width of coil.)
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar
4. Specifications tolerance - inductance +/-30%, all others +/-10%
5. Peak force and current - 4% duty ratio and 1 second duration
6. Motor Insulation Class - Class B (130˚C)
7. IP Rating - IP00
8. IEC Protection Class - Class 1
9. Compliance Standards - CE, RoHS
10. Ambient Operating Temperature - 0 - 40˚C
11. Ambient Operating Humidity - 10 - 90% RH
12. Specifications are subject to change without prior notice.

DX30F



NOTE:
MOTOR AND HALL CABLES TO OBSERVE:
FIXED INSTALLATION: STATIC BEND RADIUS R >3 X CABLE DIAMETER
FLEXING INSTALLATION: DYNAMIC BEND RADIUS R >10 X CABLE DIAMETER

Standard Magnet Track

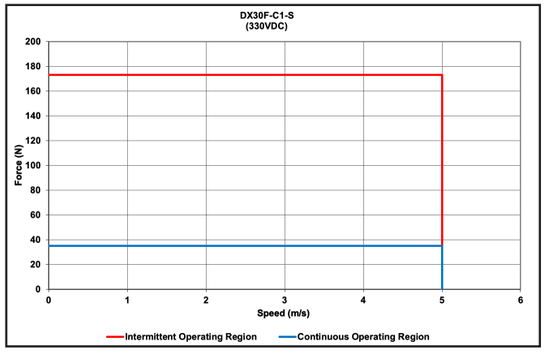
SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 120	119.5	1.14	2	2
TL 180	179.5	1.71	3	3
TL 240	239.5	2.28	4	4
TL 300	299.5	2.85	5	5
TL 360	359.5	3.42	6	6
TL 480	479.5	4.56	8	8

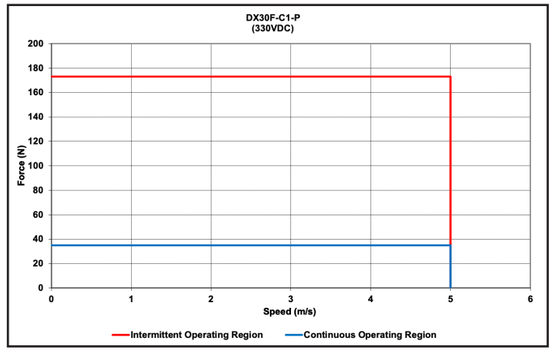
Motor Coil

SIZE	DX30F WEIGHT (kg)	DX30F AIR COOLED WEIGHT (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C1	0.22	0.24	3
C2	0.47	0.52	7
C3	0.65	0.72	11
C4	0.89	0.99	15
C5	1.10	1.22	19

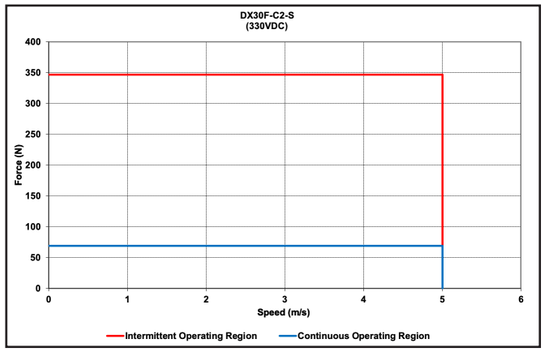
GRAPH: FORCE VS SPEED

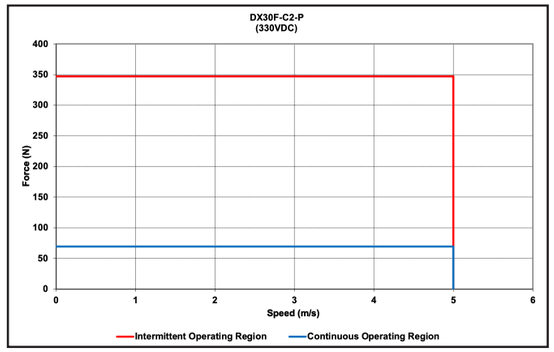
DX30F-C1



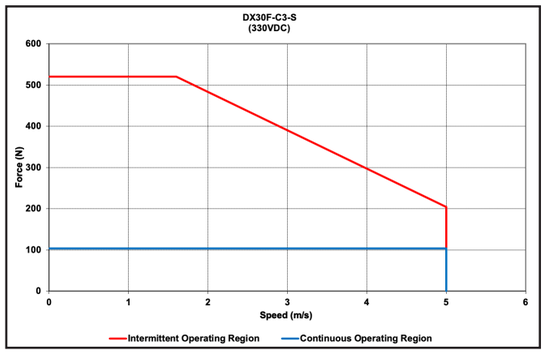


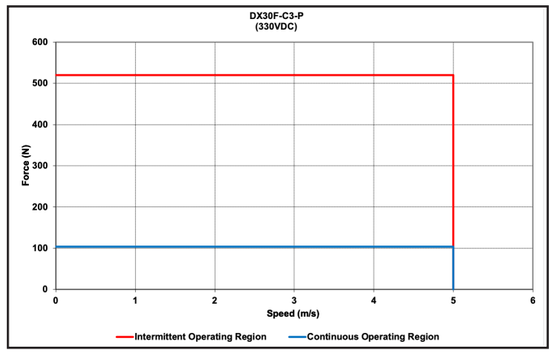
DX30F-C2



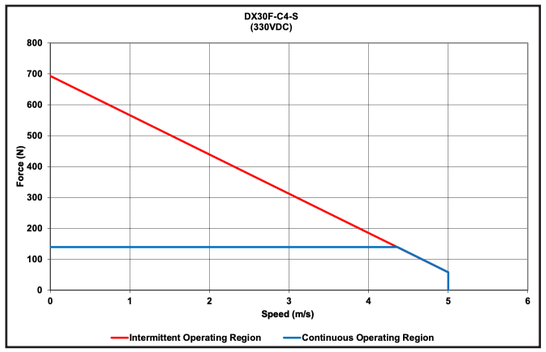


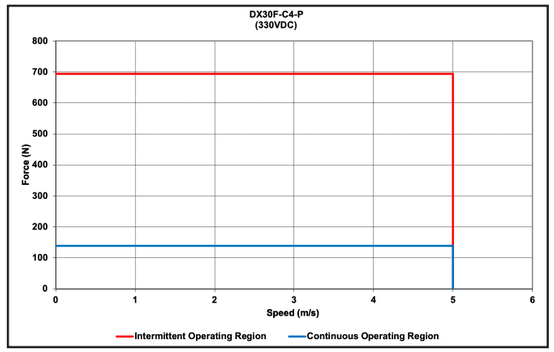
DX30F-C3





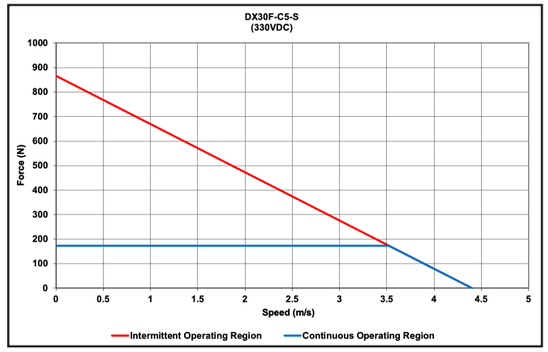
DX30F-C4

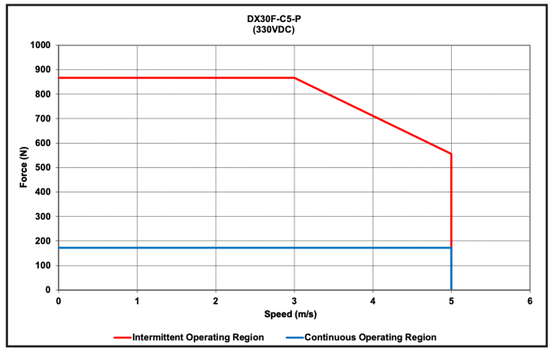




GRAPH: FORCE VS SPEED

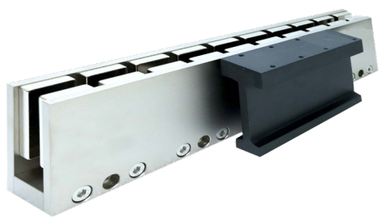
DX30F-C5





DXF SERIES

IRONLESS LINEAR MOTOR



DX50F

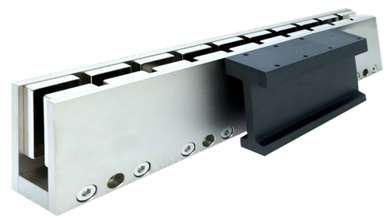
- Ironless Motor
- Peak force to 1915N, Continuous force to 460N
- Modular Hall Sensor

SPECIFICATION		MODEL		
		DX50F-C1	DX50F-C2	DX50F-C3
		S	P	P
Performance	**Unit**			
Peak Force	N	319	638	958
Continuous Force @ 100°C*	N	64	128	192
Continuous Force AC @ 100°C^	N	77	153	230
Peak Power @ 100°C	W	1605	3210	4815
Continuous Power @ 100°C*	W	64	128	193
Continuous Power AC @ 100°C^	W	92	185	277
Electrical				
Peak Current	A^{pk}	14.13	28.25	28.25
Continuous Current @ 100°C*	A^{pk}	2.83	5.65	5.65
Continuous Current AC @ 100°C^	A^{pk}	3.39	6.78	6.78
Continuous Stall Current @ 100°C*	Arms	1.73	3.46	3.46
Force Constant	N/A^{pk}	22.6	22.6	33.9
Back EMF Constant	$V^{pk}/m/s$	26.0	26.0	39.0
Coil Resistance L-L @ 25°C	ohm	8.2	4.1	6.2
Coil Resistance L-L @ 100°C*	ohm	10.7	5.4	8.0
Inductance L-L @ 1kHz	mH	5.66	2.83	4.25
Motor Constant @ 25°C*	N/√W	9.10	12.86	15.76
Motor Constant @ 100°C*	N/√W	7.97	11.27	13.80
Max. Terminal Voltage	Vdc		330	
Thermal				
Thermal Resistance @ 100°C*	°C/W	1.17	0.58	0.39
Thermal Resistance AC @ 100°C^	°C/W	0.81	0.41	0.27
Max. Coil Temperature	°C		100	
Mechanical				
Coil Weight	kg	0.28	0.56	0.84
Coil Weight AC^	kg	0.30	0.61	0.95
Coil Length	mm	61	121	181
Attractive Force	N		0	
Electrical Cycle Length	mm		60	

Notes:
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms
2. * Ambient temperature 25°C, natural convection, with heat sink of size L x 2W x 12mm. (L = length of coil, W = width of coil.)
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar
4. Specifications tolerance - inductance +/-30%, all others +/-10%
5. Peak force and current - 4% duty ratio and 1 second duration
6. Motor Insulation Class - Class B (130˚C)
7. IP Rating - IP00
8. IEC Protection Class - Class 1
9. Compliance Standards - CE, RoHS
10. Ambient Operating Temperature - 0 - 40˚C
11. Ambient Operating Humidity - 10 - 90% RH
12. Specifications are subject to change without prior notice.

DXF SERIES

IRONLESS LINEAR MOTOR



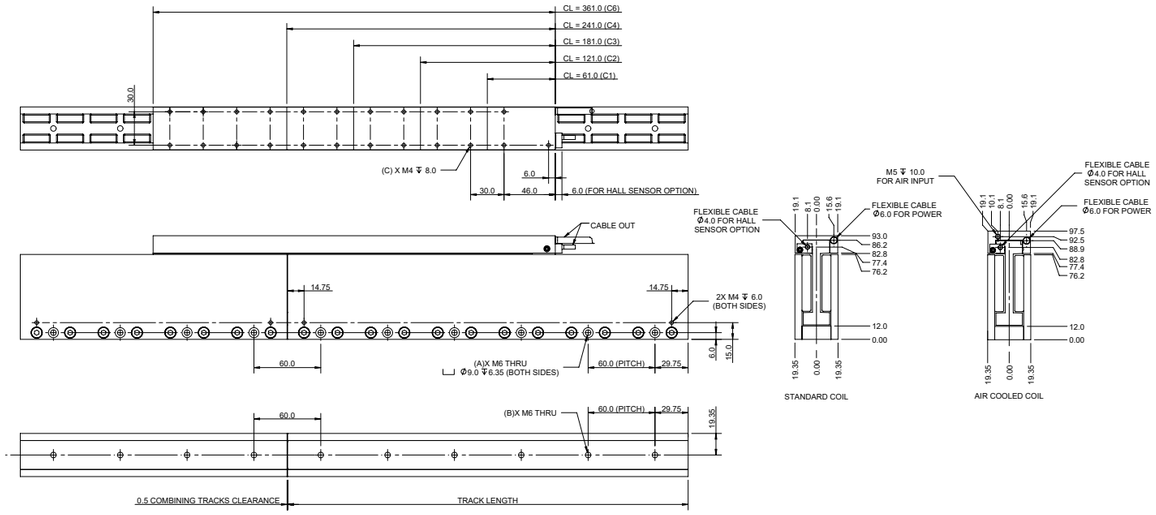
DX50F

- Ironless Motor
- Peak force to 1915N, Continuous force to 460N
- Modular Hall Sensor

SPECIFICATION		MODEL		
		DX50F-C4	DX50FT-C4	DX50FT-C6
		P	P	P
Performance	**Unit**			
Peak Force	N	1277	1277	1915
Continuous Force @ 100°C*	N	255	255	383
Continuous Force AC @ 100°C^	N	306	306	460
Peak Power @ 100°C	W	6420	6420	9630
Continuous Power @ 100°C*	W	257	257	385
Continuous Power AC @ 100°C^	W	370	370	555
Electrical				
Peak Current	A^{pk}	28.25	56.50	56.50
Continuous Current @ 100°C*	A^{pk}	5.65	11.30	11.30
Continuous Current AC @ 100°C^	A^{pk}	6.78	13.56	13.56
Continuous Stall Current @ 100°C*	Arms	3.46	6.92	6.92
Force Constant	N/A^{pk}	45.2	22.6	33.9
Back EMF Constant	$V^{pk}/m/s$	52.0	26.0	39.0
Coil Resistance L-L @ 25°C	ohm	8.2	2.1	3.1
Coil Resistance L-L @ 100°C*	ohm	10.7	2.7	4.0
Inductance L-L @ 1kHz	mH	5.66	1.42	2.12
Motor Constant @ 25°C*	N/√W	18.19	18.19	22.28
Motor Constant @ 100°C*	N/√W	15.94	15.94	19.52
Max. Terminal Voltage	Vdc		330	
Thermal				
Thermal Resistance @ 100°C*	°C/W	0.29	0.29	0.19
Thermal Resistance AC @ 100°C^	°C/W	0.20	0.20	0.14
Max. Coil Temperature	°C		100	
Mechanical				
Coil Weight	kg	1.12	1.12	1.68
Coil Weight AC^	kg	1.22	1.22	1.83
Coil Length	mm	241	241	361
Attractive Force	N		0	
Electrical Cycle Length	mm		60	

Notes:
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms
2. * Ambient temperature 25°C, natural convection, with heat sink of size L x 2W x 12mm. (L = length of coil, W = width of coil.)
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar
4. Specifications tolerance - inductance +/-30%, all others +/-10%
5. Peak force and current - 4% duty ratio and 1 second duration
6. Motor Insulation Class - Class B (130˚C)
7. IP Rating - IP00
8. IEC Protection Class - Class 1
9. Compliance Standards - CE, RoHS
10. Ambient Operating Temperature - 0 - 40˚C
11. Ambient Operating Humidity - 10 - 90% RH
12. Specifications are subject to change without prior notice.

DX50F



NOTE:
MOTOR AND HALL CABLES TO OBSERVE:
FIXED INSTALLATION: STATIC BEND RADIUS R >3 X CABLE DIAMETER
FLEXING INSTALLATION: DYNAMIC BEND RADIUS R >10 X CABLE DIAMETER

Standard Magnet Track

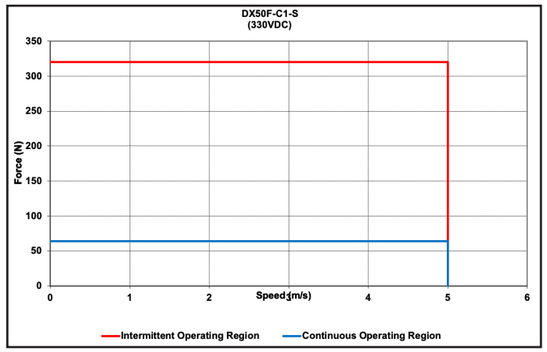
SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 120	119.5	1.8	3	3
TL 180	179.5	2.7	3	3
TL 240	239.5	3.6	4	4
TL 300	299.5	4.5	5	5
TL 360	359.5	5.4	6	6
TL 480	479.5	7.2	8	8

Motor Coil

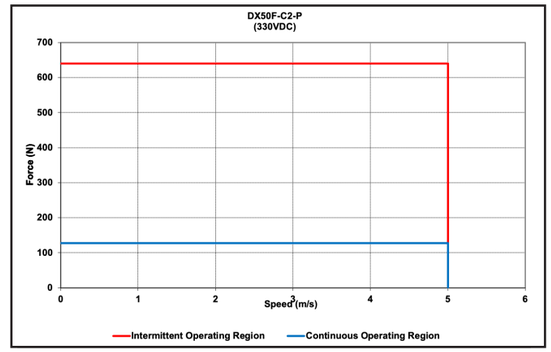
SIZE	DX50F WEIGHT (kg)	DX50F AIR COOLED WEIGHT (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C1	0.28	0.30	3
C2	0.56	0.61	7
C3	0.84	0.95	11
C4	1.12	1.22	15
C6	1.68	1.83	19

GRAPH: FORCE VS SPEED

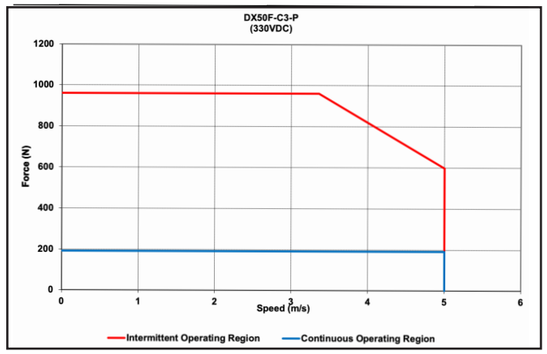
DX50F-C1



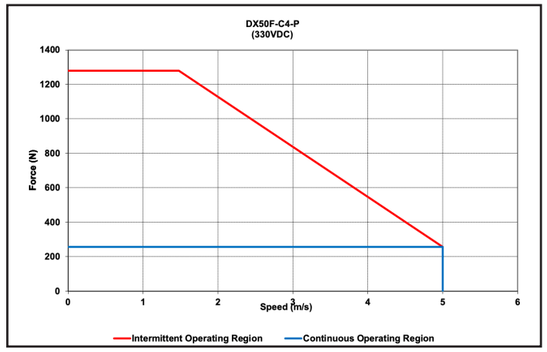
DX50F-C2



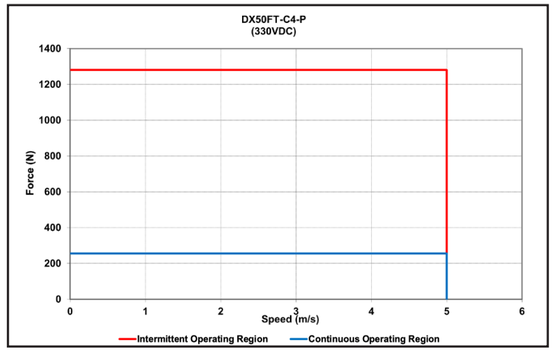
DX50F-C3



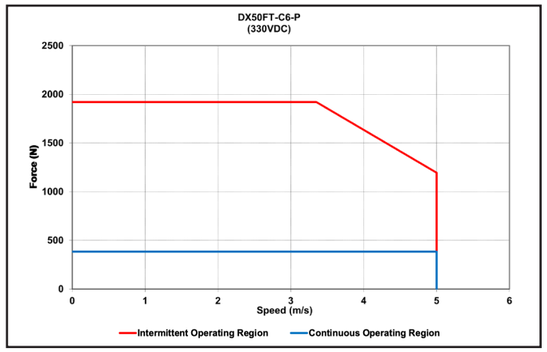
DX50F-C4



DX50FT-C4

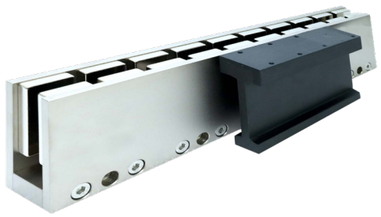


DX50FT-C6



DXF SERIES

IRONLESS LINEAR MOTOR



DX65F

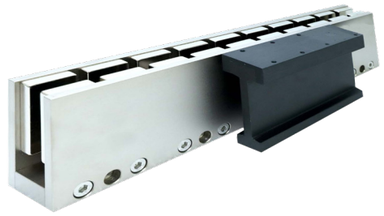
- Ironless Motor
- Peak force to 6374N, Continuous force to 898N
- Modular Hall Sensor

SPECIFICATION		MODEL				
		DX65F-C1	DX65F-C2	DX65F-C3	DX65F-C4	DX65FT-C5
		S	S	S	P	P
Performance	**Unit**					
Peak Force	N	531	1062	1594	2125	2656
Continuous Force @ 100°C*	N	75	150	224	299	374
Continuous Force AC @ 100°C^	N	90	180	269	359	449
Peak Power @ 100°C	W	2666	5332	7997	10663	13328
Continuous Power @ 100°C*	W	53	106	159	212	264
Continuous Power AC @ 100°C^	W	76	152	228	305	381
Electrical						
Peak Current	A^{pk}	33.6	33.6	33.6	67.2	97.0
Continuous Current @ 100°C*	A^{pk}	4.7	4.7	4.7	9.5	13.7
Continuous Current AC @ 100°C^	A^{pk}	5.7	5.7	5.7	11.4	16.4
Continuous Stall Current @ 100°C*	Arms	2.90	2.90	2.90	5.80	9.67
Force Constant	N/A^{pk}	15.8	31.6	47.4	31.6	27.4
Back EMF Constant	$V^{pk}/m/s$	18.2	36.5	54.7	36.5	31.6
Coil Resistance L-L @ 25°C	ohm	2.4	4.8	7.2	2.4	1.4
Coil Resistance L-L @ 100°C*	ohm	3.1	6.3	9.4	3.1	1.9
Inductance L-L @ 1kHz	mH	2.4	4.8	7.1	2.4	1.4
Motor Constant @ 25°C*	$N/\sqrt{W}$	11.7	16.6	20.3	23.5	26.3
Motor Constant @ 100°C*	$N/\sqrt{W}$	10.3	14.5	17.8	20.6	23.0
Max. Terminal Voltage	Vdc			330		
Thermal						
Thermal Resistance @ 100°C*	°C/W	1.42	0.71	0.47	0.35	0.28
Thermal Resistance AC @ 100°C^	°C/W	0.98	0.49	0.33	0.25	0.20
Max. Coil Temperature	°C			100		
Mechanical						
Coil Weight	kg	0.57	1.14	1.71	2.28	2.85
Coil Weight AC^	kg	0.61	1.23	1.84	2.45	3.07
Coil Length	mm	85.0	145.0	205.0	265.0	325.0
Attractive Force	N			0		
Electrical Cycle Length	mm			60		

Notes:
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms
2. * Ambient temperature 25ºC, natural convection, with heat sink of size L x 2W x 12mm. (L = length of coil, W = width of coil.)
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar
4. Specifications tolerance - inductance +/-30%, all others +/-10%
5. Peak force and current - 4% duty ratio and 1 second duration
6. Motor Insulation Class - Class B (130°C)
7. IP Rating - IP00
8. IEC Protection Class - Class 1
9. Compliance Standards - CE, RoHS
10. Ambient Operating Temperature - 0 - 40°C
11. Ambient Operating Humidity - 10 - 90% RH
12. Specifications are subject to change without prior notice.

DXF SERIES

IRONLESS LINEAR MOTOR



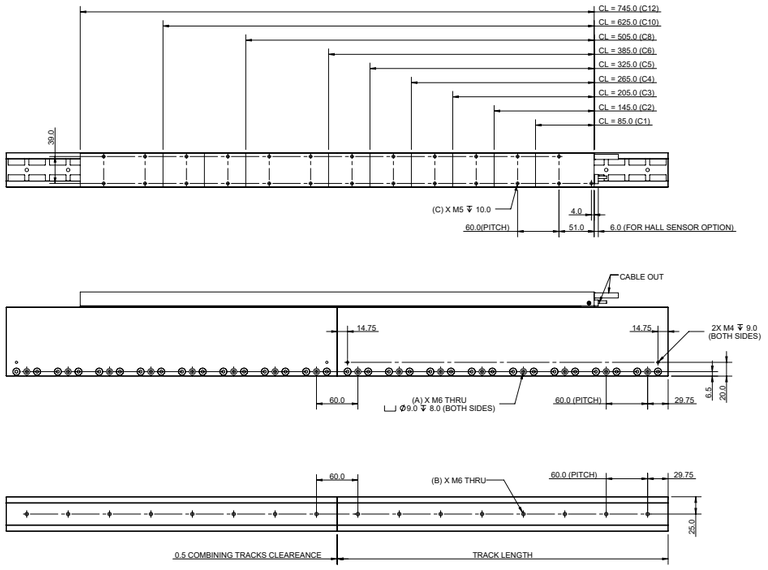
DX65F

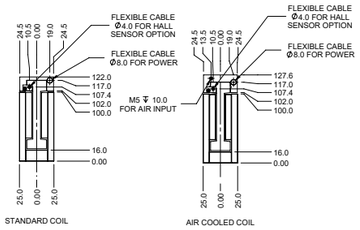
- Ironless Motor
- Peak force to 6374N, Continuous force to 898N
- Modular Hall Sensor

SPECIFICATION		MODEL				
		DX65F-C6	DX65F-C8	DX65FT-C10	DX65F-C12	
		P	P	P	P	
Performance	**Unit**					
Peak Force	N	3187	4249	5312	6374	
Continuous Force @ 100°C*	N	449	599	748	898	
Continuous Force AC @ 100°C^	N	539	718	-	-	
Peak Power @ 100°C	W	15995	21326	26656	31989	
Continuous Power @ 100°C*	W	317	423	529	635	
Continuous Power AC @ 100°C^	W	457	609	-	-	
Electrical						
Peak Current	A^{pk}	67.2	67.2	97.0	100.9	
Continuous Current @ 100°C*	A^{pk}	9.5	9.5	13.7	14.2	
Continuous Current AC @ 100°C^	A^{pk}	11.4	11.4	-	-	
Continuous Stall Current @ 100°C*	Arms	5.80	5.80	9.67	8.70	
Force Constant	N/A^{pk}	47.4	63.2	54.7	63.2	
Back EMF Constant	$V^{pk}/m/s$	54.7	73.0	63.2	73.0	
Coil Resistance L-L @ 25°C	ohm	3.6	4.8	2.9	3.2	
Coil Resistance L-L @ 100°C*	ohm	4.7	6.3	3.8	4.2	
Inductance L-L @ 1kHz	mH	3.6	4.8	2.9	3.2	
Motor Constant @ 25°C*	$N/\sqrt{W}$	28.8	33.2	37.1	40.7	
Motor Constant @ 100°C*	$N/\sqrt{W}$	25.2	29.1	32.5	35.6	
Max. Terminal Voltage	Vdc		330			
Thermal						
Thermal Resistance @ 100°C*	°C/W	0.24	0.18	0.14	0.12	
Thermal Resistance AC @ 100°C^	°C/W	0.16	0.12	-	-	
Max. Coil Temperature	°C		100			
Mechanical						
Coil Weight	kg	3.42	4.56	5.70	6.84	
Coil Weight AC^	kg	3.68	4.91	-	-	
Coil Length	mm	385.0	505.0	625.0	745.0	
Attractive Force	N		0			
Electrical Cycle Length	mm		60			

Notes:
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms
2. * Ambient temperature 25ºC, natural convection, with heat sink of size L x 2W x 12mm. (L = length of coil, W = width of coil.)
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar
4. Specifications tolerance - inductance +/-30%, all others +/-10%
5. Peak force and current - 4% duty ratio and 1 second duration
6. Motor Insulation Class - Class B (130°C)
7. IP Rating - IP00
8. IEC Protection Class - Class 1
9. Compliance Standards - CE, RoHS
10. Ambient Operating Temperature - 0 - 40°C
11. Ambient Operating Humidity - 10 - 90% RH
12. Specifications are subject to change without prior notice.

DX65F





NOTE:
MOTOR AND HALL CABLES TO OBSERVE:
FIXED INSTALLATION: STATIC BEND RADIUS R >3 X CABLE DIAMETER
FLEXING INSTALLATION: DYNAMIC BEND RADIUS R >10 X CABLE DIAMETER

Standard Magnet Track

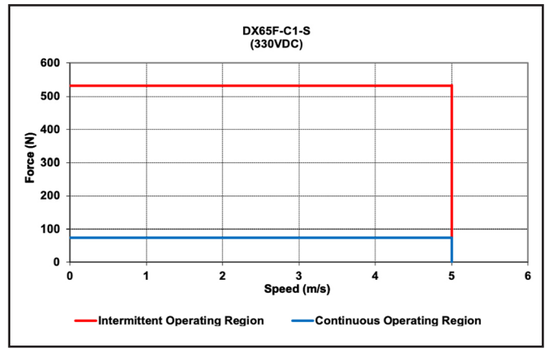
SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 180	179.5	4.5	3	3
TL 240	239.5	6.0	4	4
TL 300	299.5	7.5	5	5
TL 360	359.5	9.0	6	6
TL 480	479.5	12.0	8	8

Motor Coil

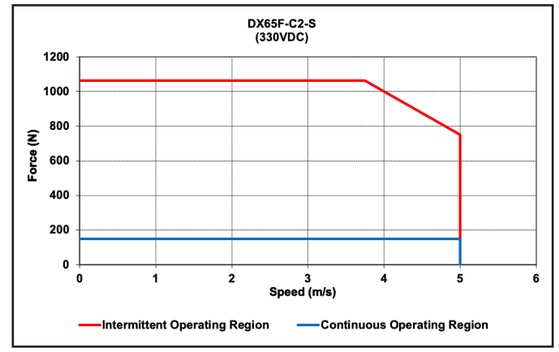
SIZE	DX65F WEIGHT (kg)	DX65F AIR COOLED WEIGHT (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C1	0.6	0.65	3
C2	1.2	1.29	5
C3	1.8	1.94	7
C4	2.4	2.58	9
C5	3.0	3.23	11
C6	3.6	3.87	13
C8	4.8	5.16	17
C9	5.4	5.81	19
C10	6.0	6.46	21
C12	7.2	7.75	25

GRAPH: FORCE VS SPEED

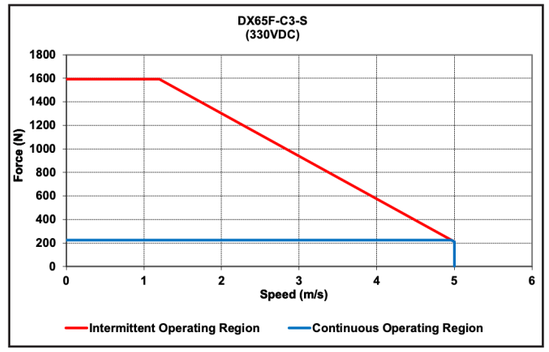
DX65F-C1



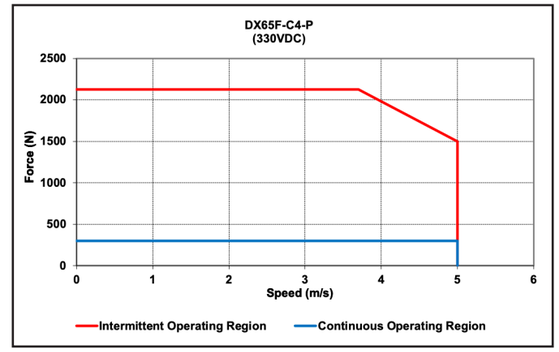
DX65F-C2



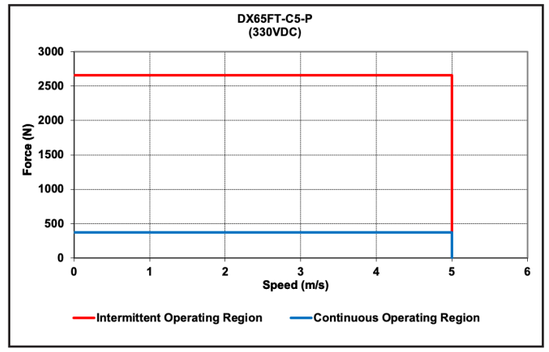
DX65F-C3



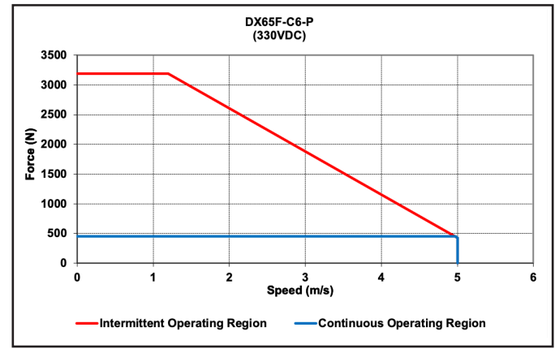
DX65F-C4



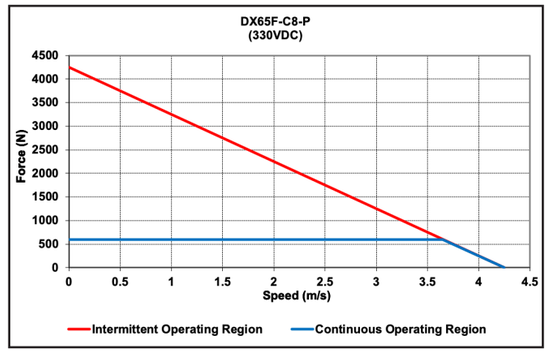
DX65FT-C5



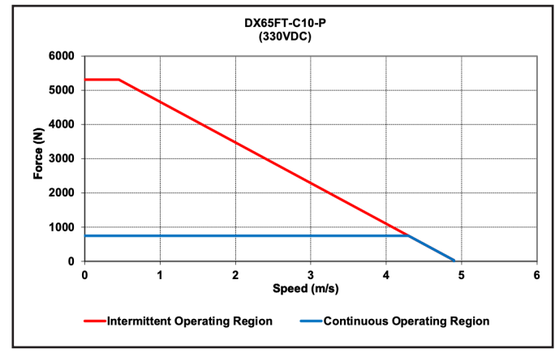
DX65F-C6



DX65F-C8

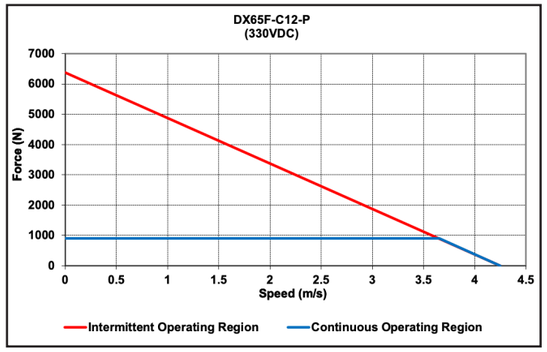


DX65FT-C10



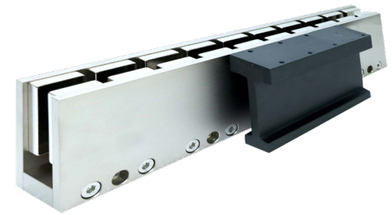
GRAPH: FORCE VS SPEED

DX65F-C12



DXF SERIES

IRONLESS LINEAR MOTOR



DX140F

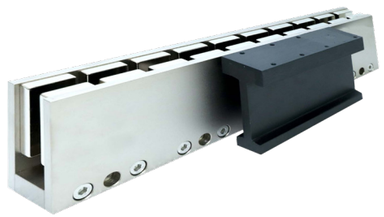
- Ironless Motor
- Peak force to 8787N, Continuous force to 1757N
- Modular Hall Sensor

SPECIFICATION		MODEL			
		DX140F-C1	DX140F-C2	DX140F-C3	DX140F-C4
		S	P	P	P
Performance	**Unit**				
Peak Force	N	883	1765	2648	3530
Continuous Force @ 100ºC*	N	160	321	481	642
Continuous Stall Force @ 100ºC*	N	113	227	340	454
Peak Power @ 100ºC	W	2683	5698	8548	11397
Continuous Power @ 100ºC*	W	89	188	283	377
Electrical					
Peak Current	A^{pk}	15.9	31.9	47.8	63.8
Continuous Current @ 100ºC*	A^{pk}	2.9	5.8	8.7	11.6
Continuous Stall Current @ 100ºC*	Arms	2.05	4.1	6.2	8.2
Force Constant	N/A^{pk}	55.4	55.4	55.4	55.4
Back EMF Constant	$V^{pk}/m/s$	63.9	63.9	63.9	63.9
Coil Resistance L-L @ 25ºC	ohm	10.8	5.4	3.6	2.7
Coil Resistance L-L @ 100ºC*	ohm	14.1	7.5	5.0	3.7
Inductance L-L @ 1kHz	mH	11.6	5.8	3.8	2.9
Motor Constant @ 25ºC*	$N/\sqrt{W}$	19.5	27.5	33.7	38.9
Motor Constant @ 100ºC*	$N/\sqrt{W}$	17.0	23.4	28.6	33.1
Max. Terminal Voltage	Vdc	600.0			
Thermal					
Thermal Resistance @ 100˚C*	ºC/W	1.07	0.50	0.34	0.25
Max. Coil Temperature	ºC	110			
Mechanical					
Coil Weight	kg	0.9	1.7	2.6	3.6
Attractive Force	N	0.0	0.0	0.0	0.0
Electrical Cycle Length	mm	60	60	60	60
Track Mass	kg/mm	0.064			

Notes:
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms
2. * Ambient temperature 25ºC, natural convection, with heat sink of size L x 2W x 12mm. (L = length of coil, W = width of coil.)
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar
4. Specifications tolerance - inductance +/-30%, all others +/-10%
5. Peak force and current - 4% duty ratio and 1 second duration
6. Motor Insulation Class - Class B (130˚C)
7. IP Rating - IP00
8. IEC Protection Class - Class 1
9. Compliance Standards - CE, RoHS
10. Ambient Operating Temperature - 0 - 40˚C
11. Ambient Operating Humidity - 10 - 90% RH
12. Specifications are subject to change without prior notice.

DXF SERIES

IRONLESS LINEAR MOTOR



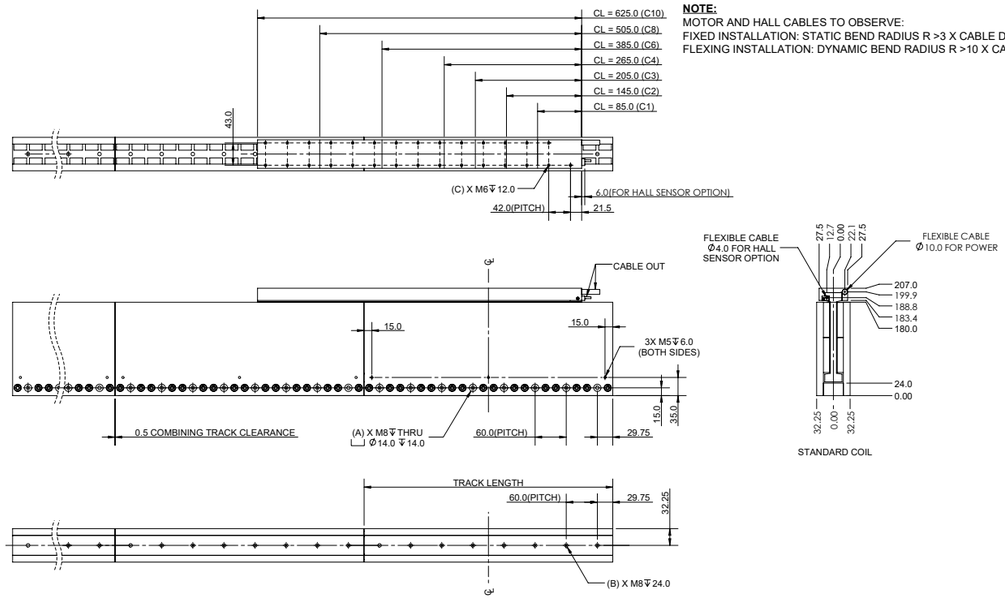
DX140F

- Ironless Motor
- Peak force to 8787N, Continuous force to 1757N
- Modular Hall Sensor

SPECIFICATION		DX140F-C6	DX140F-C8	DX140F-C10
		P	P	P
Performance	**Unit**			
Peak Force	N	5296	7061	8826
Continuous Force @ 100ºC*	N	963	1284	1605
Continuous Stall Force @ 100ºC*	N	681	908	1135
Peak Power @ 100ºC	W	17095	22793	28492
Continuous Power @ 100ºC*	W	565	754	942
Electrical				
Peak Current	A^{pk}	95.7	63.8	79.7
Continuous Current @ 100ºC*	A^{pk}	17.4	11.6	14.5
Continuous Stall Current @ 100ºC*	Arms	12.3	8.2	10.3
Force Constant	N/A^{pk}	55.4	110.7	110.7
Back EMF Constant	$V^{pk}/m/s$	63.9	127.8	127.8
Coil Resistance L-L @ 25ºC	ohm	1.8	5.4	4.3
Coil Resistance L-L @ 100ºC*	ohm	2.5	7.5	6.0
Inductance L-L @ 1kHz	mH	1.9	5.8	4.6
Motor Constant @ 25ºC*	N/√ W	47.6	55.0	61.5
Motor Constant @ 100ºC*	N/√ W	40.5	46.8	52.3
Max. Terminal Voltage	Vdc		600.0	
Thermal				
Thermal Resistance @ 100°C*	ºC/W	0.17	0.13	0.10
Max. Coil Temperature	ºC		110	
Mechanical				
Coil Weight	kg	5.3	7.1	9.0
Attractive Force	N	0.0	0.0	0.0
Electrical Cycle Length	mm	60	60	60
Track Mass	kg/mm		0.064	

Notes:
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms
2. * Ambient temperature 25ºC, natural convection, with heat sink of size L x 2W x 12mm. (L = length of coil, W = width of coil.)
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar
4. Specifications tolerance - inductance +/-30%, all others +/-10%
5. Peak force and current - 4% duty ratio and 1 second duration
6. Motor Insulation Class - Class B (130°C)
7. IP Rating - IP00
8. IEC Protection Class - Class 1
9. Compliance Standards - CE, RoHS
10. Ambient Operating Temperature - 0 - 40°C
11. Ambient Operating Humidity - 10 - 90% RH
12. Specifications are subject to change without prior notice.

DX140F



Standard Magnet Track

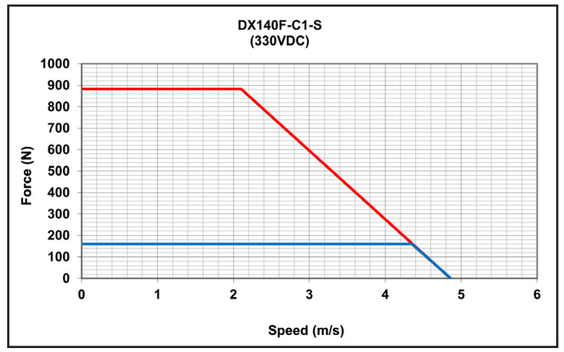
SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 240	239.5	15.4	4	4
TL 300	299.5	19.2	5	5
TL 480	479.5	30.7	7	7

Motor Coil

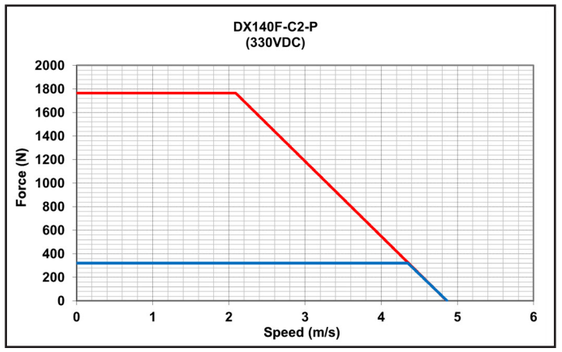
SIZE	DX140F WEIGHT (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C1	0.9	3
C2	1.7	5
C3	2.6	9
C4	3.6	11
C6	5.3	17
C8	7.1	23
C10	9.0	29

GRAPH: FORCE VS SPEED

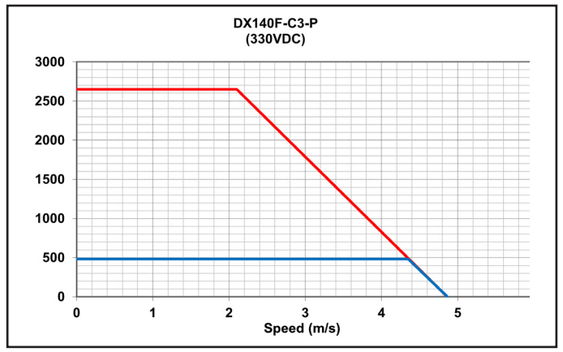
DX140F-C1



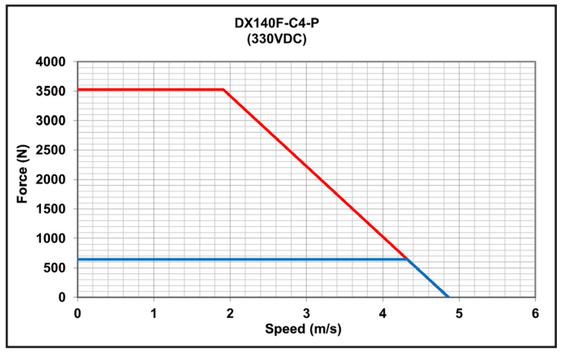
DX140F-C2



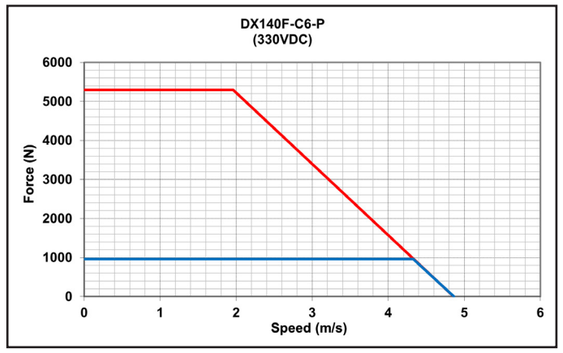
DX140F-C3



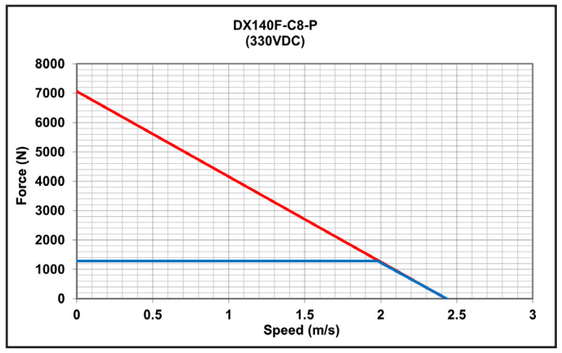
DX140F-C4



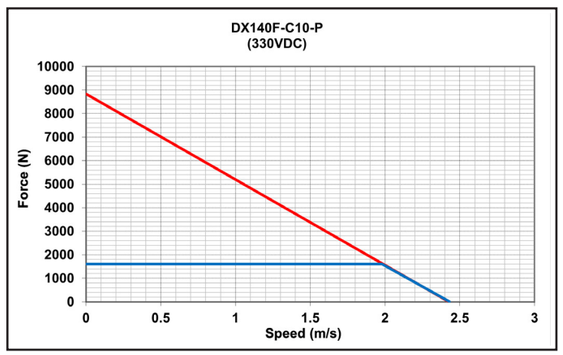
DX140F-C6



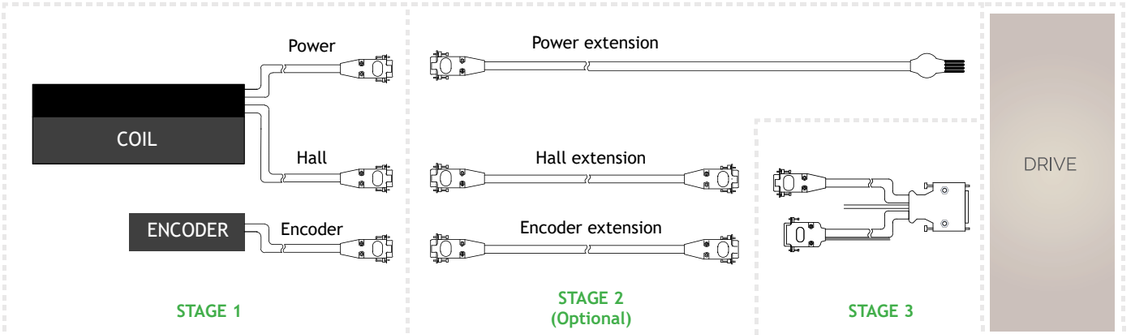
DX140F-C8



DX140F-C10



CABLE OPTION

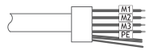


STAGE 1 | POWER AND HALL CABLE OPTION

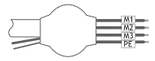
DX30F-C4-P-TM-2.0-NC-FC-HC-00

POWER CABLE OPTIONS

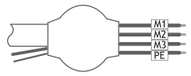
NF



FC



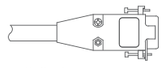
All the DX F except DX65F, DX140F



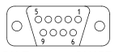
DX65F, DX140F

All DX F except DX65F, DX140F		DX65F, DX140F
M1	Grey	Red
M2	Brown	Blue
M3	Black	Brown
PE	Yellow	Yellow
TS1	Black	Red
TS2	Orange	Black

9NF

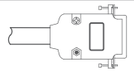


9 Pin D-sub Female



All the DX F except DX65F, DX140F

All DX F except DX65F, DX140F		
P1	M1	Grey
P2	M1	Black(Jumper)
P3	M3	Black
P4	M3	Black(Jumper)
P5	M2	Brown
P6	M2	Black(Jumper)
P7	TS1	Black
P8	TS2	Orange
P9	PE	Yellow

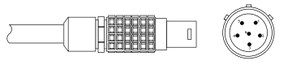


9W4 D-sub Female

DX65F, DX140F

DX65F, DX140F		
A1	M1	Red
A2	M2	Blue
A3	M3	Brown
P1	TS1	Red
P3	TS2	Black
A4	PE	Yellow

CNF

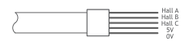


All the DX F except DX65F, DX140F

All DX F except DX65F, DX140F		
P1	M1	Grey
P2	M2	Brown
P3	M3	Black
P4	TS1	Black
P5	TS2	Orange
P6	PE	Yellow

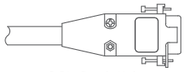
HALL SENSOR OPTIONS

H

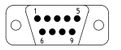


Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC

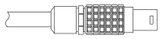


9 Pin D-sub Male



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

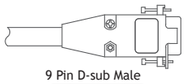
CHC



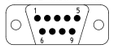
Push Pull 5 Pin Male

P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

HCL



9 Pin D-sub Male

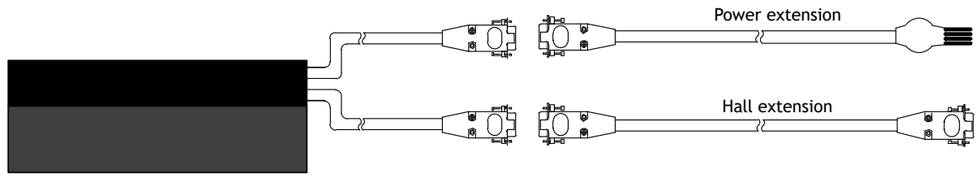


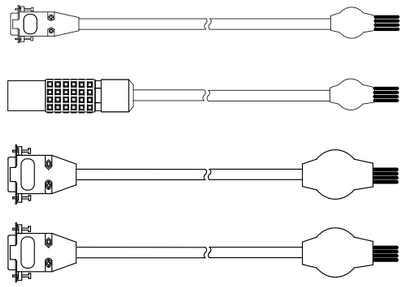
P1	Hall A+
P2	Hall A-
P3	Hall B+
P4	Hall B-
P5	Hall C+
P6	Hall C-
P7	5V
P8	0V

Notes: All connectors shown are front view

STAGE 2 | DX F SERIES EXTENSION CABLE

Connection example: DX☐F-☐-☐-☐-☐-☐-9NF-HC-00



Extension Cable		Part Number
Power Extension Cable		CBL_EXT_PWR1_X.X (DX20F, DX30F, DX50F)
		CBL_EXT_PWR1_CC_X.X (DX20F, DX30F, DX50F)
		CBL_EXT_PWR4_X.X (DX65F)
		CBL_EXT_PWR5_X.X (DX140F)
Hall Sensor Extension Cable		CBL_EXT_HALL0_X.X
		CBL_EXT_HALL0_CC_X.X
		CBL_EXT_HALL0_DIF_X.X
Encoder Extension Cable		CBL_EXT_REN00_X.X
		CBL_EXT_REN00A_X.X
		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X
		CBL_EXT_REN05_X.X
		CBL_EXT_REN05A_X.X

CABLE	
00	RGH41, VIONIC, QUANTIC Digital
00A	RGH41 Analog
01	RH200 Digital
01B	PH200 Analog
05	ATOM Ri Interface Digital
05A	ATOM Ri Interface Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0meter
2.0	2.0 meter
3.0	3.0 meter (standard)

Notes: 1. X.X is the length of the cable in meters 2. For customized cable length, contact PBA

HALL SENSOR MODULE PART NUMBERING SYSTEMS

DX30F — HM — D — 3.0 — HC — 00

MOTOR MODEL

DX30F	DX65F
DX50F	DX140F

HALL MODULE

SIGNAL TYPE

D	Digital

CABLE LENGTH

0.5	0.5m
1.0	1.0m
3.0	3.0m
5.0	5.0m

DESIGN VERSIONS

00	Standard
01	Customised Version
:	

HALL SENSOR AND CONNECTOR OPTIONS

H	Flying Leads (No Connector)
HC	9 pins D Sub Male Connector
CHC	5 pins Circular Quick Lock Male Connector
HCL	9 pins D Sub Male Connector with Line Driver

THERMAL PROTECTION

The temperature in which the thermostat is active is shown as below:

MODEL	THERMAL DEVICE TYPE	THERMOSTAT (NC) OPENS AT
DX20F, DX30F, DX50F, DX65F, DX140F	PT100	TC:Refer to note 1
DX30F, DX50F, DX65F, DX140F	Thermostat	TM: (NC) 100°C

Note 1:
- Programmable on temperature controller or analog inputs on motion controller.
- Recommended to set cut-off temperature to 100°C (max) to prevent coil damage.
- User has to ensure that the thermal protection devices are wired to appropriate electronics to ensure that the motor power cutoff is active when temperature reaches its allowable limit.

Application Form - Linear Motor Selection

Customer Name:	Date (DD/MM/YY):
Contact Email:	

PBA LINEAR MOTOR SELECTION QUESTIONAIRE

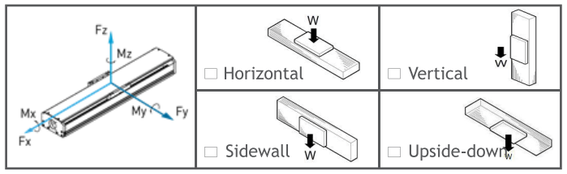
1. Application Description

1a. Application Sketch With Approx Dimensions

2. Load Parameter

Moving mass (without motor coil)	kg				
Frictional force	N				
Opposing force	N				
Mx	N.m	My	N.m	Mz	N.m

Stage Requirements



3. Motion Parameter

		Profile 1	Profile 2	Profile 3
Moving distance	mm			
Moving time	s			
Moving velocity	m/s			
Acceleration	m/s^2			
Dwell time	s			

4. Command/Bus (Please Circle Accordingly)

Pulse and direction / Analog / EtherCAT / IO trigger / Other : _____

5. Encoder (Please Circle Accordingly)

Resolution	um	
Incremental / Absolute / Analog		

6. Motion Precision

Accuracy	um/mm	
Repeatability	um	

7. Mechanical Specification

Effective stroke	mm	
Flatness	um/mm	
Straightness	um/mm	
Space constraints (L x W x H)	mm	

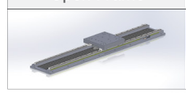
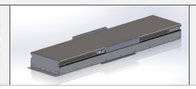
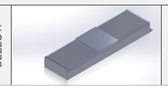
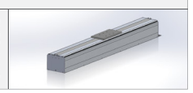
8. Working Environment

Room temperature	°C	
Clean room class		

9. Additional Requirements (Please Tick ( )Accordingly)

Motor cable length	Controller	Amplifier	Encoder	Other: _____
m				

10. Actuator

Open Frame	Enclosed				
	PARTIAL		BELLOW		STRIP SEAL	

11. Remarks: If you have any special motion request for sizing procedure, please specify your requirement in below remarks.

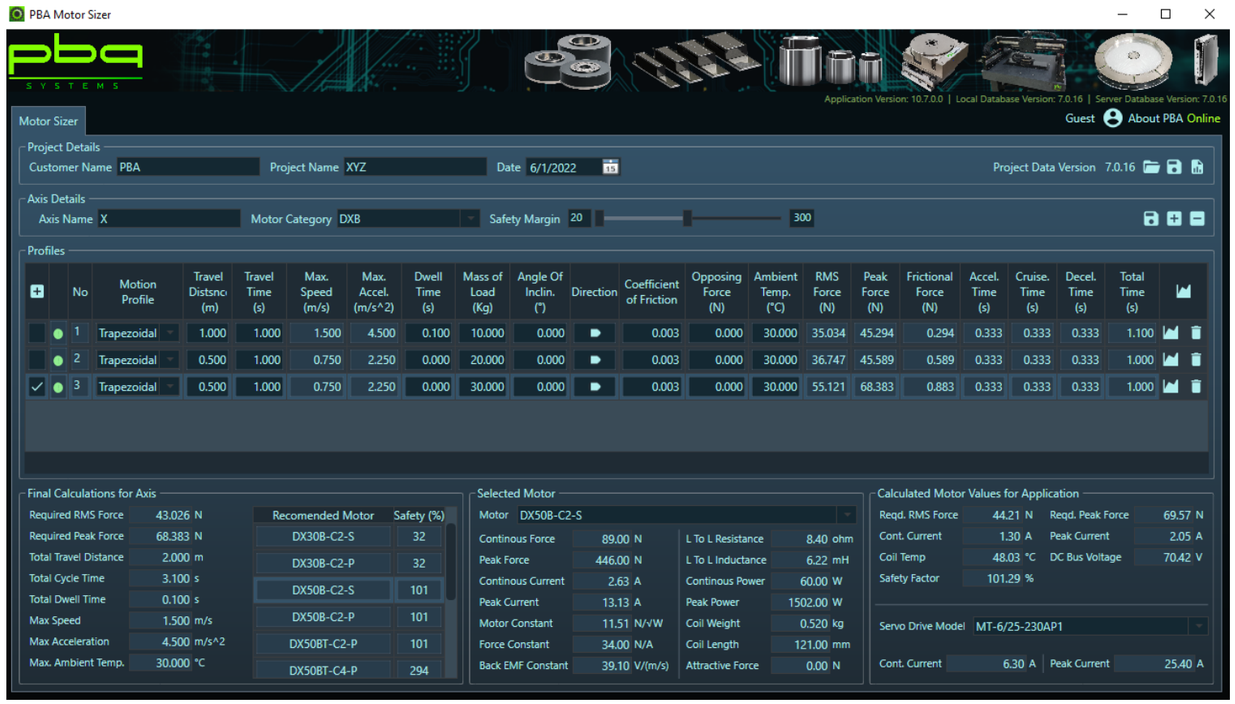
PBA SYSTEMS LINEAR MOTOR SIZER SOFTWARE

PBA SYSTEMS LINEAR MOTOR SIZER SOFTWARE

PBA Systems Motor Sizer Software is available to download from our website to assist in the calculation and selection.

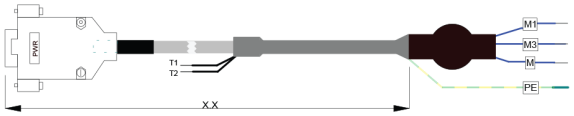
Kindly visit us at www.pbasystems.com.sg or simply scan the QR CODE

SIMULATED PERFORMANCE CHARTS

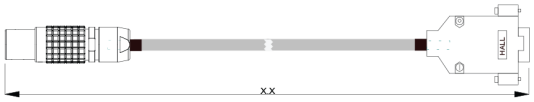


APPENDIX

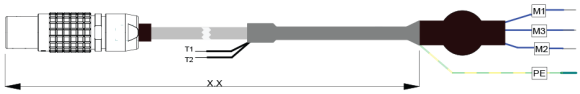
Power Extension Cable



Hall Extension Cable



Power Extension Cable



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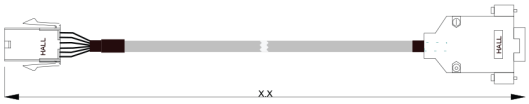

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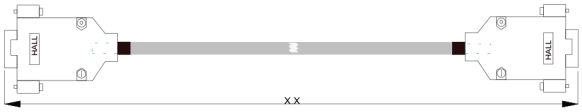
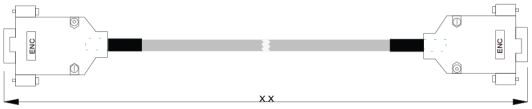
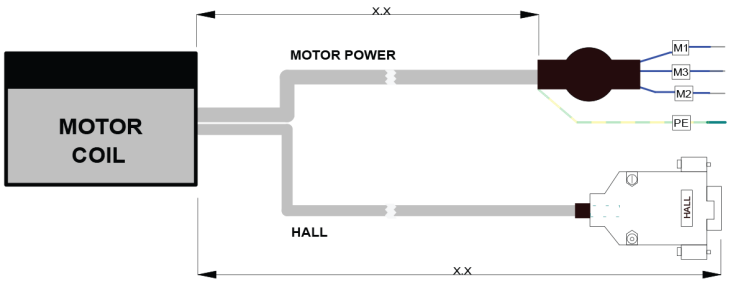


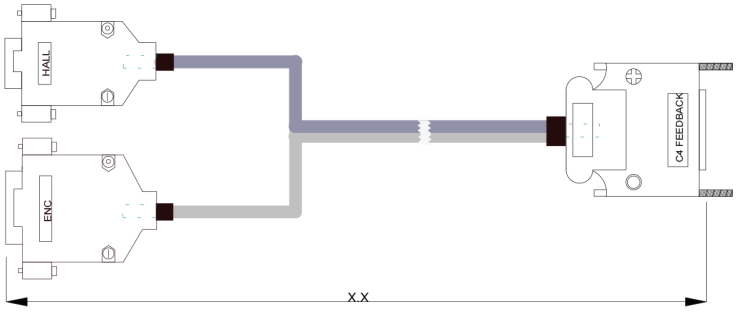
Encoder Extension Cable



MOTOR POWER HALL CABLE



MAXTUNE FEEDBACK CABLE



Notes:

1. X.X is the length of the cable in meter with a tolerance of $^{+\ 0.10}_{-\ 0}$
2. All measurements are in meters (m) unless stated