

Motors and Drives

Enabling machine innovation

HDS high-performance AC
permanent magnet servo motor



HDS high-performance AC permanent magnet servo motors, combine pioneering design and advanced manufacturing technologies to exceed expectations in demanding and high dynamic applications by providing superior control precision and dynamic response.

Every aspect of HDS motors are developed and assembled in our state of the art facility, built on our experience in a broad range of industry and the demands for precision and resilience expected from motors in our ABB robots.

Together with ABB servo drives, HDS will deliver productivity and efficiency to customers in the new era of intelligent manufacturing.

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HDS series servo motors

The HDS series provides outstanding performance with the combination of high torque and lowest inertia. Equipped with various high performance and resolution feedback devices, the HDS series meets the requirement of demanding applications and drives, bringing higher precision of control on speed, torque and position, ensuring reliability and stability of the whole control system.

Cooling Method	Totally enclosed, non-ventilated; Fan-cooled
Magnet Material	Ultra-high intrinsic coercive field rare earth
Insulation Class	F
Mounting	IMB5
Thermal Protection	3×PTC155
Exterior Paint	Epoxy Body in black, endcover in white with red ABB LOGO
Feedback Device	Resolver Incremental/absolute encoder DSL single-cable absolute encoder
Ingress Protection (IP)	IP54 without oil seal IP65 with oil seal
Certification	UL, CE

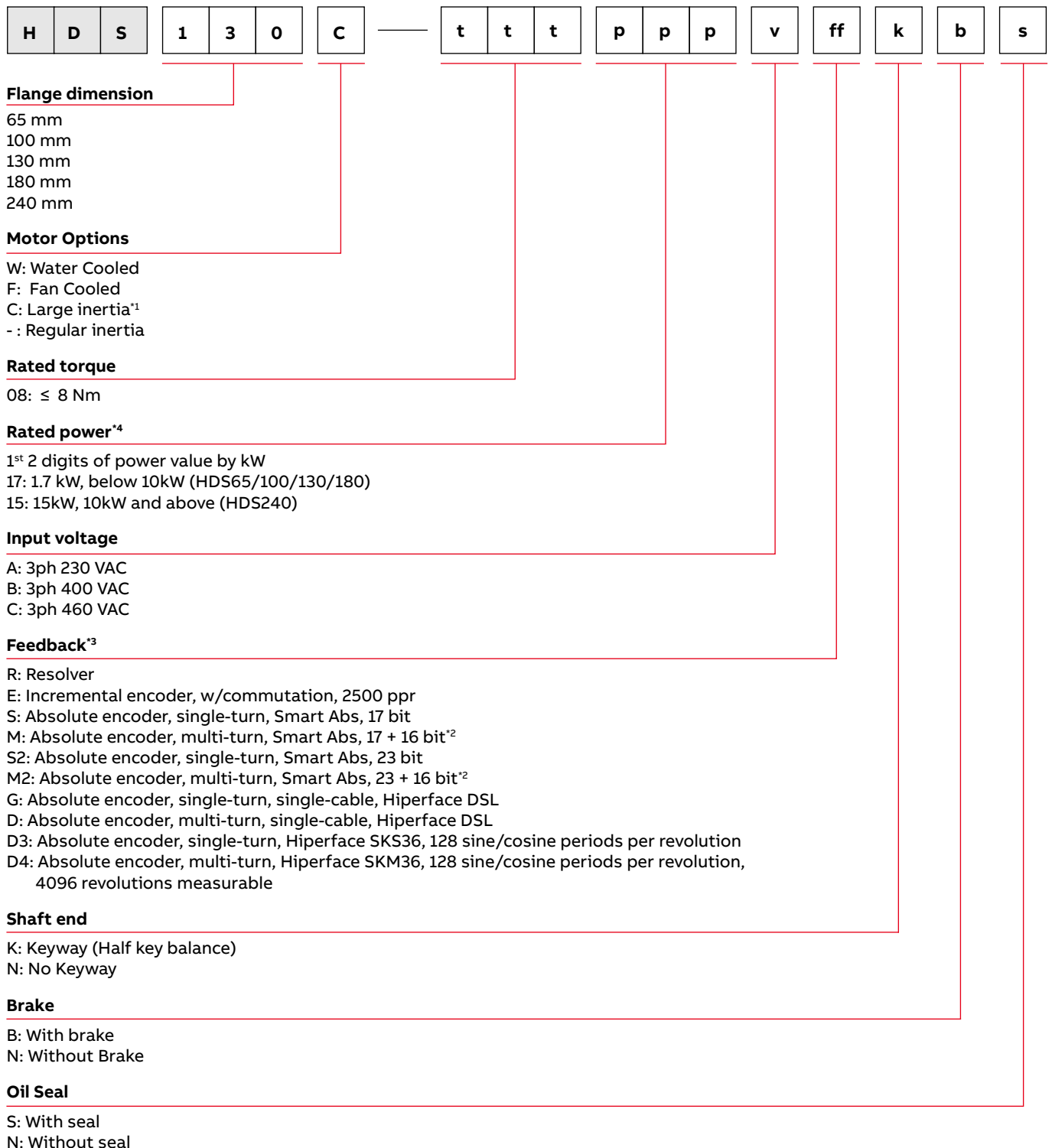
Features:

- High torque density
- Low cogging torque and torque ripple — excellent performance of low speed and system control
- Outstanding overload performance – 3 times peak torque, 4 times mechanical overload
- Epoxy resin potting technology on complete stator — compact size and maximum heat dissipation
- Fast dynamic response, accurate rotor balancing
- Wide speed range, optional high speed
- Precise flange and shaft machining, low noise and vibration
- Equipped with various feedback devices, including Hiperface DSL — single cable absolute encoder solution



Product information

Model description



Product information

Technical specifications

Frame	HDS65		
Model	HDS65-0102A	HDS65-0104A	HDS65-0206A
Input voltage	AC 230V	AC 230V	AC 230V
Continuous stall torque T_0 (Nm)	0.7	1.4	2.1
Rated torque T_N (Nm)	0.6	1.2	1.8
Peak torque T_p (Nm)	1.8	3.6	5.4
Rated speed n_N (rpm)	3000	3000	3000
Maximum speed n_{max} (rpm) ¹	5000	5000	5000
Rated power P (kW)	0.19	0.38	0.57
Continuous stall current I_0 (A)	1.9	3.9	5.5
Rated current I_N (A)	1.6	3.3	4.7
Peak current I_p (A)	5.8	12.0	17.6
Line resistance (20°C) R_L (Ω)	5.27	2.07	1.45
Line inductance L_L (mH)	17.30	8.64	6.40
Rotor inertia J_M (kg·cm ²) ²	0.16	0.27	0.38
Torque constant K_t (Nm/A) ³	0.41	0.41	0.44
Voltage constant K_e (Vrms/krpm)	25.0	25.0	26.4
Electrical time constant t_e (ms)	3.3	4.2	4.4
Mechanical time constant t_m (ms)	0.4	0.3	0.3
Thermal time constant t_{th} (min)	8	12	17
Weight W(kg) ⁴	1.41	1.98	2.55
Number of poles p	10	10	10

Frame	HDS100							
Model	HDS100-0206A	HDS100C-0206A	HDS100-0308A	HDS100C-0308A	HDS100-0413A	HDS100C-0413A	HDS100-0619A	HDS100C-0619A
Input voltage	AC 230V	AC 230V	AC 230V	AC 230V	AC 230V	AC 230V	AC 230V	AC 230V
Continuous stall torque T_0 (Nm)	2.8	2.8	3.4	3.4	5	5	7.5	7.5
Rated torque T_N (Nm)	2	2	2.5	2.5	4	4	6	6
Peak torque T_p (Nm)	6	6	7.5	7.5	12	12	18	18
Rated speed n_N (rpm)	3000	3000	3000	3000	3000	3000	3000	3000
Maximum speed n_{max} (rpm)	4000	4000	4000	4000	4000	4000	4000	4000
Rated power P (kW)	0.63	0.63	0.75	0.75	1.30	1.30	1.90	1.90
Continuous stall current I_0 (A)	4.3	4.3	5.8	5.8	8.6	8.6	12.6	12.6
Rated current I_N (A)	3.1	3.1	4.3	4.3	6.9	6.9	10.5	10.5
Peak current I_p (A)	11.5	11.5	15.5	15.5	25.7	25.7	39.5	39.5
Line resistance (20°C) R_L (Ω)	2.92	2.92	1.10	1.10	1.10	1.10	0.65	0.65
Line inductance L_L (mH)	17.10	17.10	7.54	7.54	7.54	7.54	5.15	5.15
Rotor inertia J_M (kg·cm ²)	0.76	2.00	1.31	2.68	1.31	2.68	1.85	3.35
Torque constant K_t (Nm/A)	0.73	0.73	0.68	0.68	0.68	0.68	0.69	0.69
Voltage constant K_e (Vrms/krpm)	44.0	44.0	41.3	41.3	41.3	41.3	41.8	41.8
Electrical time constant t_e (ms)	5.9	5.9	6.9	6.9	6.9	6.9	7.9	7.9
Mechanical time constant t_m (ms)	0.4	1.0	0.3	0.6	0.3	0.6	0.2	0.4
Thermal time constant t_{th} (min)	18	18	28	28	28	28	23	23
Weight W(kg)	3.71	4.00	4.71	5.00	4.71	5.00	5.51	5.80
Number of poles p	10	10	10	10	10	10	10	10

Note: *1. Max speed is under the standard conditions defined in this catalog. The max speed in applications shall be co-decided by the input voltage of the drive, feedback encoder type, etc. For higher speed applications, please contact ABB.

*2. Excluding brake inertia.

*3. The torque constant K_t decreases in a non-linear manner as the torque increases, the K_t values are considered valid until approximately 2 times cont. stall torque T_0 .

*4. Excluding brake weight, slightly different among feedback types.

Product information

Technical specifications

Frame	HDS130			
Model	HDS130-0620A	HDS130C-0620A	HDS130-1225A	HDS130C-1225A
Input voltage	AC 230V	AC 230V	AC 230V	AC 230V
Continuous stall torque T_0 (Nm)	7.2	7.2	14	14
Rated torque T_N (Nm)	6.4	6.4	12	12
Peak torque T_p (Nm)	19.1	19.1	36	36
Rated speed n_N (rpm)	3000	3000	2000	2000
Maximum speed n_{max} (rpm)	5000	5000	4000	4000
Rated power P (kW)	2	2	2.5	2.5
Continuous stall current I_0 (A)	11.5	11.5	19	19
Rated current I_N (A)	10.9	10.9	16.2	16.2
Peak current I_p (A)	36	36	54	54
Line resistance (20°C) R_L (Ω)	0.5	0.5	0.27	0.27
Line inductance L_L (mH)	4.8	4.8	3.5	3.5
Rotor inertia J_M (kg·cm ²)	4.06	10.8	7.46	14.82
Torque constant K_t (Nm/A)	0.685	0.685	0.818	0.818
Voltage constant K_e (Vrms/krpm)	41.4	41.4	49.5	49.5
Electrical time constant t_e (ms)	9.6	9.6	12.96	12.96
Mechanical time constant t_m (ms)	0.5	1.2	0.3	0.5
Thermal time constant t_{th} (min)	32.5	32.5	64	64
Weight W(kg)	6.65	7.5	8.75	9.7
Number of poles p	10	10	10	10

Frame	HDS130					
Model	HDS130-0817B	HDS130C-0817B	HDS130-1226B	HDS130C-1226B	HDS130-1829B	HDS130C-1820B
Input voltage	AC 400V	AC 400V	AC 400V	AC 400V	AC 400V	AC 400V
Continuous stall torque T_0 (Nm)	10	10	15	15	20	20
Rated torque T_N (Nm)	8	8	12	12	18	18
Peak torque T_p (Nm)	24	24	36	36	54	54
Rated speed n_N (rpm)	2000	2000	2000	2000	1500	1500
Maximum speed n_{max} (rpm)	4000	4000	4000	4000	4000	4000
Rated power P (kW)	1.7	1.7	2.6	2.6	2.9	2.9
Continuous stall current I_0 (A)	9.0	9.0	11.7	11.7	16.1	16.1
Rated current I_N (A)	7.7	7.7	9.5	9.5	14.8	14.8
Peak current I_p (A)	29.5	29.5	30.6	30.6	51.0	51.0
Line resistance (20°C) R_L (Ω)	1.60	1.60	0.78	0.78	0.58	0.58
Line inductance L_L (mH)	12.30	12.30	8.30	8.30	6.13	6.13
Rotor inertia J_M (kg·cm ²)	4.06	10.80	7.46	14.82	9,74	17.70
Torque constant K_t (Nm/A)	1.22	1.22	1.41	1.41	1.40	1.40
Voltage constant K_e (Vrms/krpm)	73.5	73.5	85.4	85.4	84.7	84.7
Electrical time constant t_e (ms)	7.7	7.7	10.6	10.6	10.5	10.5
Mechanical time constant t_m (ms)	0.4	1.0	0.3	0.5	0.3	0.5
Thermal time constant t_{th} (min)	49	49	64	64	54	54
Weight W(kg)	6.65	7.50	8.75	9.70	10,25	11.30
Number of poles p	10	10	10	10	10	10

Product information

Technical specifications

Frame	HDS130					
Model	HDS130-0817C	HDS130C-0817C	HDS130-1226C	HDS130C-1226C	HDS130-1829C	HDS130C-1829C
Input voltage	AC 460V	AC 460V	AC 460V	AC 460V	AC 460V	AC 460V
Continuous stall torque T_0 (Nm)	9.5	9.5	14.5	14.5	20	20
Rated torque T_N (Nm)	8	8	12	12	18	18
Peak torque T_p (Nm)	24	24	36	36	54	54
Rated speed n_N (rpm)	2000	2000	2000	2000	1500	1500
Maximum speed n_{max} (rpm)	4000	4000	4000	4000	4000	4000
Rated power P (kW)	1.7	1.7	2.6	2.6	2.9	2.9
Continuous stall current I_0 (A)	7.6	7.6	9.9	9.9	14.4	14.4
Rated current I_N (A)	6.6	6.6	8.2	8.2	13.0	13.0
Peak current I_p (A)	25.2	25.2	26.6	26.6	44.6	44.6
Line resistance (20°C) R_L (Ω)	2.08	2.08	1.04	1.04	0.75	0.75
Line inductance L_L (mH)	16.60	16.60	11.00	11.00	8.19	8.19
Rotor inertia J_M (kg·cm ²)	4.06	10.80	7.46	14.82	9.74	17.70
Torque constant K_t (Nm/A)	1.41	1.41	1.63	1.63	1.62	1.62
Voltage constant K_e (Vrms/krpm)	85.4	85.4	98.3	98.3	98.0	98.0
Electrical time constant t_e (ms)	8.0	8.0	10.6	10.6	10.9	10.9
Mechanical time constant t_m (ms)	0.4	1.0	0.3	0.5	0.2	0.5
Thermal time constant t_{th} (min)	38	38	65	65	54	54
Weight W(kg)	6.65	7.50	8.75	9.70	10.25	11.30
Number of poles p	10	10	10	10	10	10

Frame	HDS180					
Model	HDS180-2540B	HDS180C-2540B	HDS180-3555B	HDS180C-3555B	HDS180-4876B	HDS180C-4876B
Input voltage	AC 400V	AC 400V	AC 400V	AC 400V	AC 400V	AC 400V
Continuous stall torque T_0 (Nm)	29	29	41	41	53	53
Rated torque T_N (Nm)	25	25	35	35	48	48
Peak torque T_p (Nm)	75	75	105	105	150	150
Rated speed n_N (rpm)	1500	1500	1500	1500	1500	1500
Maximum speed n_{max} (rpm)	3500	3500	3500	3500	3500	3500
Rated power P (kW)	4.0	4.0	5.5	5.5	7.6	7.6
Continuous stall current I_0 (A)	18.0	18.0	25.7	25.7	33	33
Rated current I_N (A)	15.7	15.7	22.3	22.3	30.8	30.8
Peak current I_p (A)	48.8	48.8	68.5	68.5	99.7	99.7
Line resistance (20°C) R_L (Ω)	0.36	0.36	0.19	0.19	0.13	0.13
Line inductance L_L (mH)	5.90	5.90	3.90	3.90	2.90	2.90
Rotor inertia J_M (kg·cm ²)	44.6	146.6	63.5	169.1	82.1	191.3
Torque constant K_t (Nm/A)	1.75	1.75	1.74	1.74	1.75	1.75
Voltage constant K_e (Vrms/krpm)	105.9	105.9	105.1	105.1	105.9	105.9
Electrical time constant t_e (ms)	16.5	16.5	20.2	20.2	22.2	22.2
Mechanical time constant t_m (ms)	0.5	1.5	0.4	1.0	0.3	0.7
Thermal time constant t_{th} (min)	45	45	58	58	56	56
Weight W(kg)	19.7	25.1	24.4	30.2	28.9	35.1
Number of poles p	10	10	10	10	10	10

Product information

Technical specifications

Frame	HDS240			
Model	HDS240-5011B	HDS240-7215B	HDS240F-6715B	HDS240F-9320B
Input voltage	AC 400V	AC 400V	AC 400V	AC 400V
Continuous stall torque T_0 (Nm)	65	92	90	122
Rated torque T_N (Nm)	50	72	67	93
Peak torque T_p (Nm)	150	216	201	279
Rated speed n_N (rpm)	2200	2000	2200	2000
Maximum speed n_{max} (rpm)	3000	2700	3000	2700
Rated power P (kW)	11	15	15	20
Continuous stall current I_0 (A)	31	39	40	50
Rated current I_N (A)	23.5	29.5	30.5	39
Peak current I_p (A)	93	117	120	150
Line resistance (20°C) R_L (Ω)	0.15	0.13	0.15	0.13
Line inductance L_L (mH)	3.7	3.2	3.7	3.2
Rotor inertia J_M ($\text{kg}\cdot\text{cm}^2$)	107	142	107	142
Torque constant K_t (Nm/A)	2.2	2.4	2.2	2.4
Voltage constant K_e (Vrms/krpm)	135	150	135	150
Electrical time constant t_e (ms)	32	29	32	29
Mechanical time constant t_m (ms)	5.4	5.9	5.4	5.9
Thermal time constant t_{th} (min)	27	32	37	40
Weight W(kg)	57.5	73	62.5	78
Number of poles p	6	6	6	6

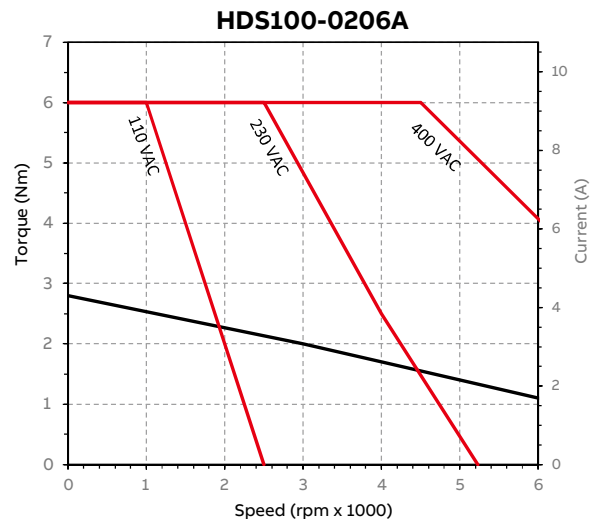
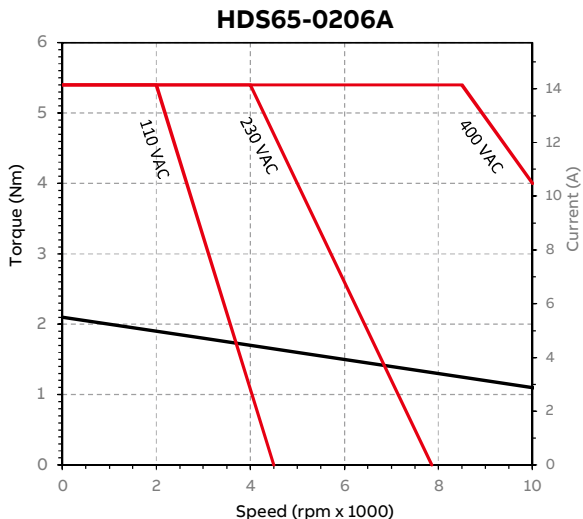
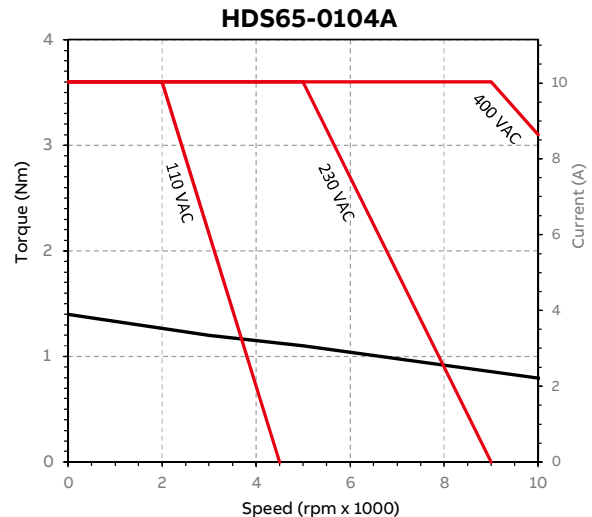
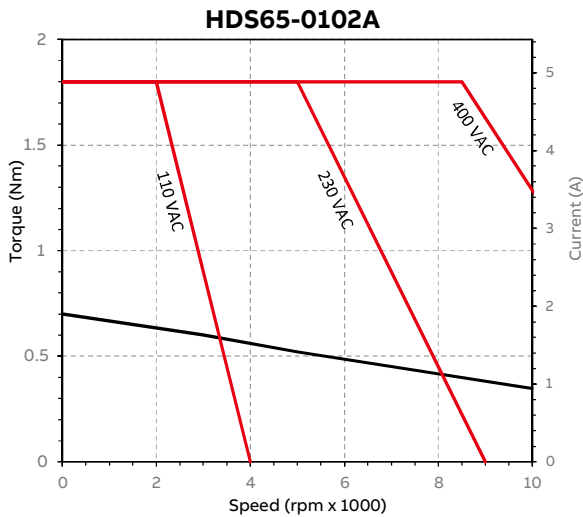
Product information

Performance curves

Motor performance curves and operation areas

The operation area of HDS servo motors is defined by performance curves in a 2-dimensional plane with coordinates of output torque and rotation speed. The performance curves of each type divide the operation area into continuous operation area and intermittent operation area.

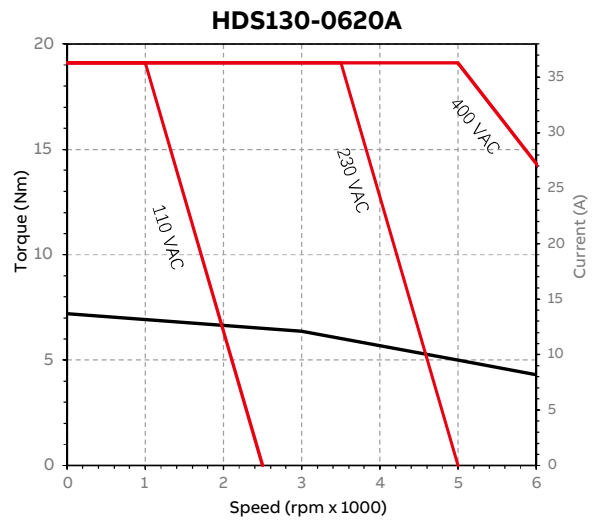
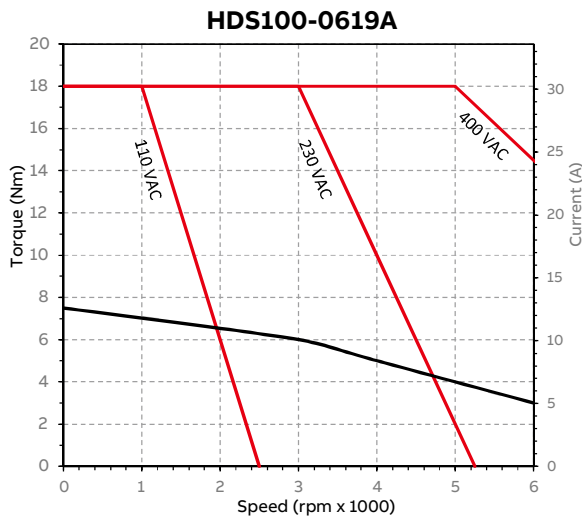
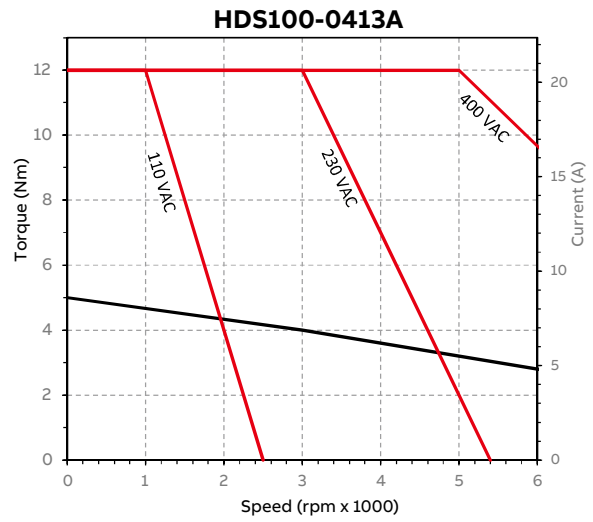
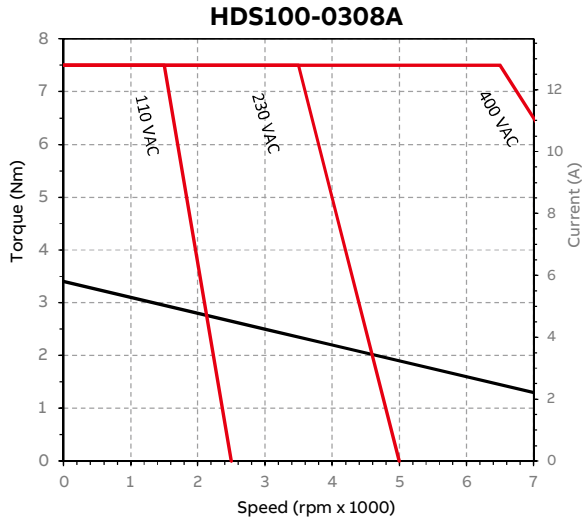
- Continuous operation area: the area where the motor could operate for a long period without over-heating*1. In the performance curves provided below, the black-colored, lower-positioned curve is the continuous performance curve. The area contained under this curve is the continuous operation area.
- Intermittent operation area: the area over the continuous area, in which motor can run for a short period of time*1 as in overload mode. In the performance curves provided below, the red-colored curves with input voltage marked (110 VAC, 230 VAC, 400 VAC or 460 VAC) are the peak performance curves. The areas between a specific peak curve and the continuous curve is the intermittent operation area by the corresponding input voltage marked. The time allowed to run a motor in the intermittent operation area is decided comprehensively by the operating environment, ventilation conditions and the drive capacity, etc.



Note:
 *1, Refer to the General Technical Specification for Permanent Magnetic AC Servo Motor (GB/T30549-2014).
 *2, When the torque is higher than the continuous stall torque, the current value interpreted from the curves will be lower than the actual current, please refer to the data table in Technical specifications of previous section for accurate peak current values.

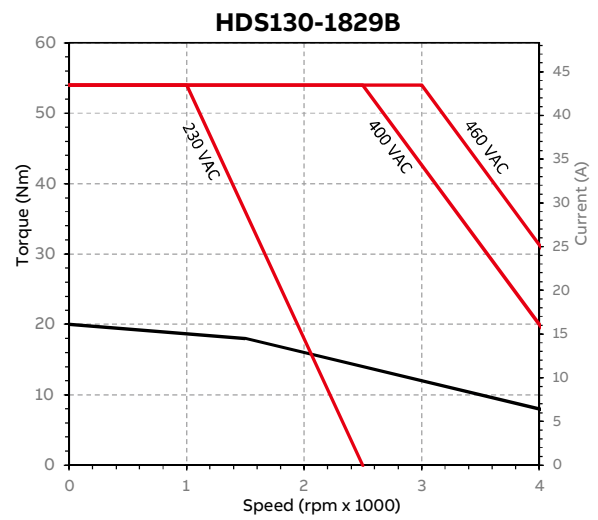
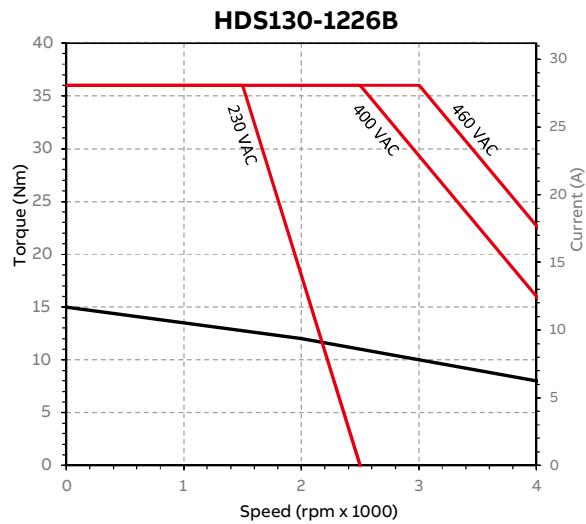
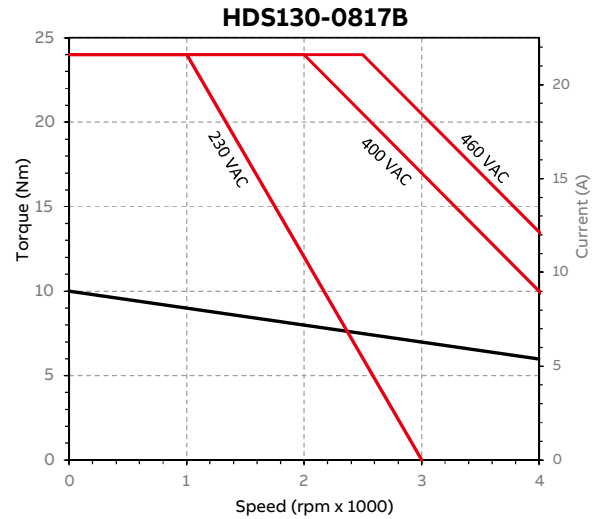
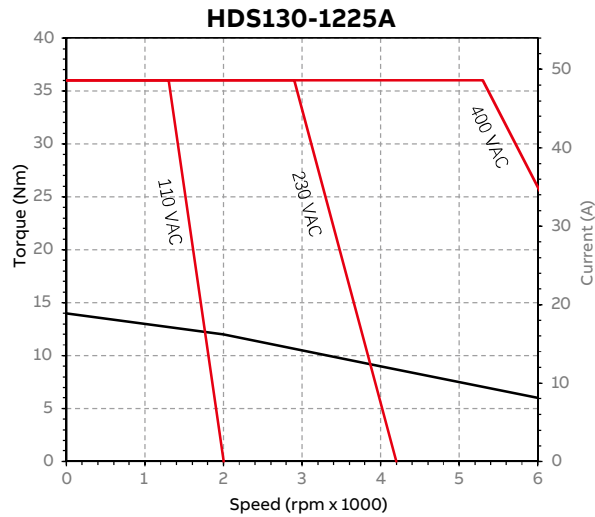
Product information

Performance curves



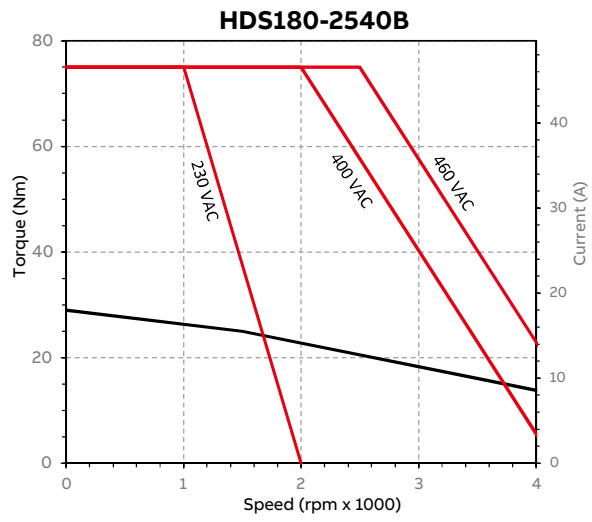
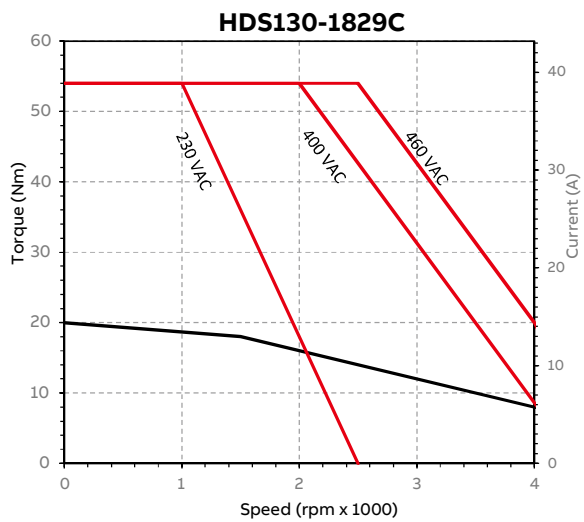
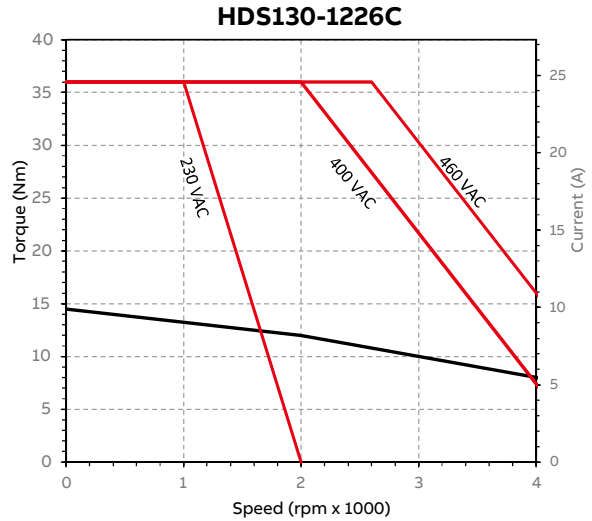
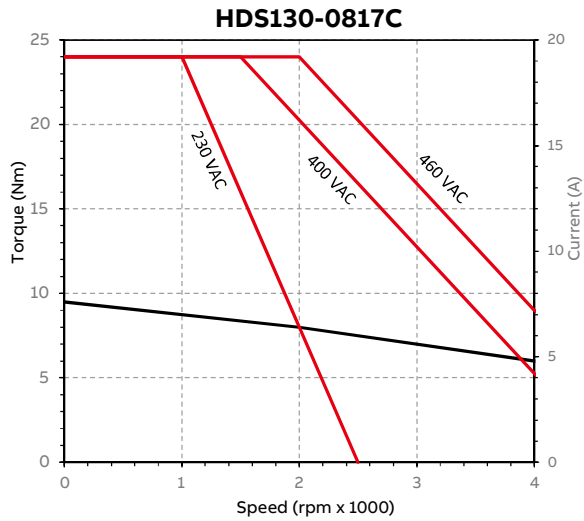
Product information

Performance curves



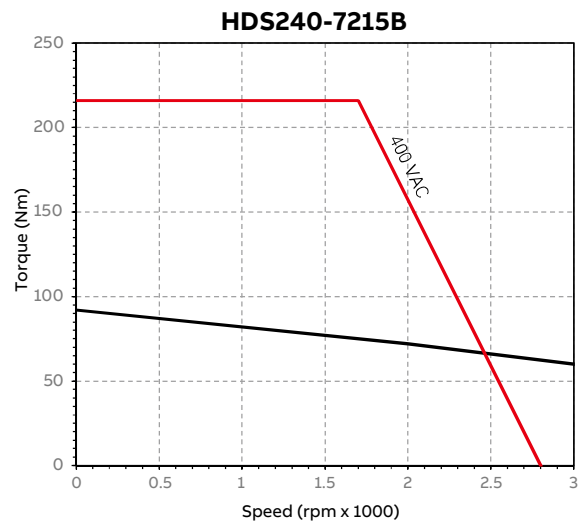
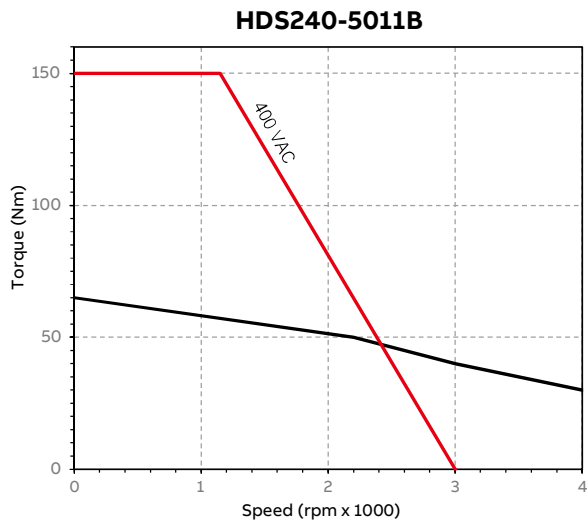
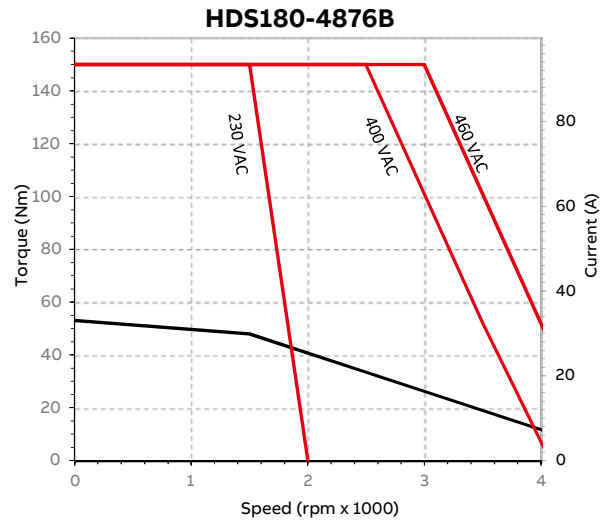
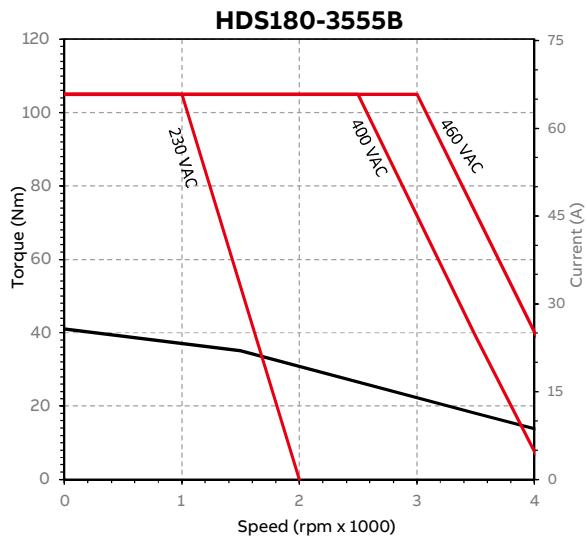
Product information

Performance curves



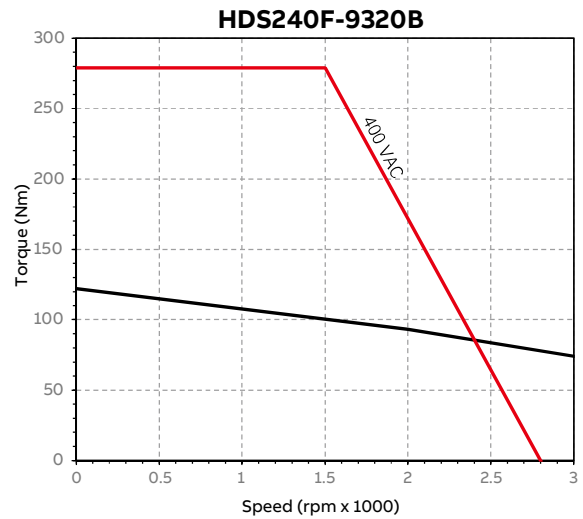
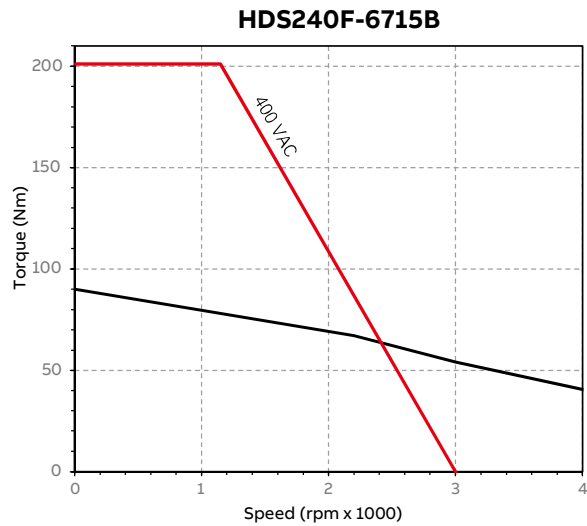
Product information

Performance curves



Product information

Performance curves



Product information

Service environment

Standard environment conditions for operation of HDS series servo motors

- Ambient temperature: - 20 ~ 40 °C
- Altitude: ≤1000 m
- Air pressure: 86 ~ 106 kPa
- Humidity: 40 ~ 80% (no dews)
- Same protection grade as motor frame

If the ambient temperature is higher than 40°C , or altitude higher than 1000m, please refer to the derating principles below. If any other conditions fall out of the above range, please contact ABB.

Cooling condition and derating

The performance specifications of HDS series servo motors provided in this catalog are obtained at an ambient temperature of 40° C, an altitude below 1,000 and with heat dissipation panel (aluminum alloy, dimensions¹ listed in the table below) equipped. If actual operation environment does not meet these conditions, derating shall be considered in light of specific heat dissipation conditions.

Motor	HDS65	HDS100	HDS130	HDS180
Heat dissipation panel dimensions L*W*H(mm)	210*210*5	300*300*8	390*390*10	380*380*8 (two panels)

In derating scenarios, the allowable torque/power of the motor shall be determined according to the table below² (when ambient temperature > 40° C or installation altitude > 1000 m). When the temperature value is not an integral multiple of 5° C or the installation altitude value is not an integral multiple of 500m, allowable torque/power should be determined using linear interpolation method or based on the next integral multiple.

Installation altitude (m)	Ambient temperature (°C)				
	<30	40	45	50	55
1000	1.07	1.00	0.96	0.92	0.87
1500	1.04	0.97	0.93	0.89	0.84
2000	1.00	0.94	0.90	0.86	0.82
2500	0.96	0.90	0.86	0.83	0.78
3000	0.92	0.86	0.82	0.79	0.75
3500	0.88	0.82	0.79	0.75	0.71
4000	0.82	0.77	0.74	0.71	0.67
4500	0.76	0.72	0.70	0.67	0.63
5000	0.69	0.67	0.65	0.62	0.58

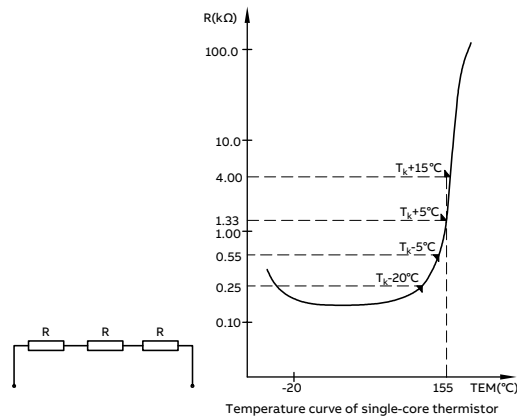
Note: *1, Refer to the General Technical Specification for Permanent Magnetic AC Servo Motor (GB/T30549-2014).

*2, If proper capacity derating operations are not done when motor's bearable load is exceeded, the servo motor will be overheated or damaged.

Product information

Thermal protection

HDS series servo motors has Class F thermal protection, with 3xPTC155 thermistor used to protect three-phase windings. The thermistor feature is shown below:



Features of 3xPTC155

Operating temperature	155°C
Resistance at 25°C	≤300Ω
Resistance below 135°C	≤750Ω
Resistance at 150°C	≤1650Ω
Resistance at 160°C	≥3990Ω

Product information

Bearing load capacity

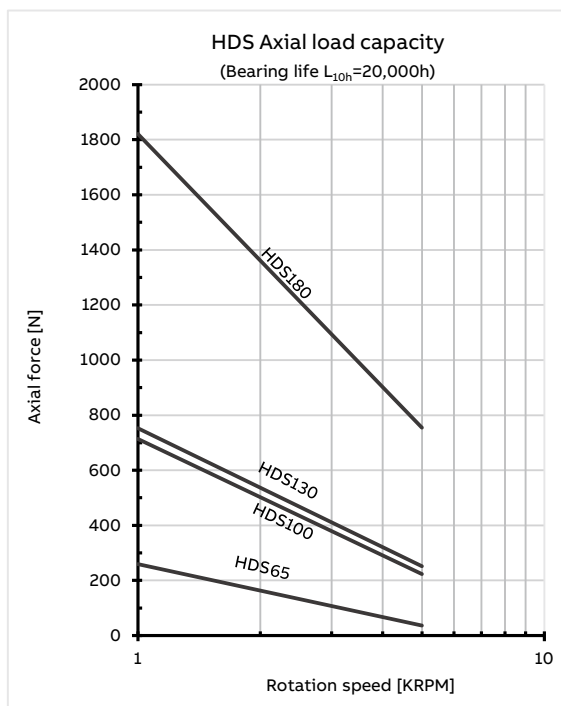
Bearing life: $L_{10h} \geq 20,000$ hours, $C/P > 15$

L_{10h} : Rated basic life of bearing in ISO 281

C: Rated basic dynamic load

P: Equivalent dynamic load

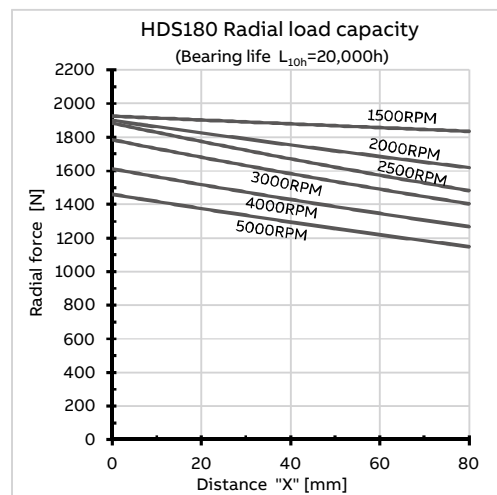
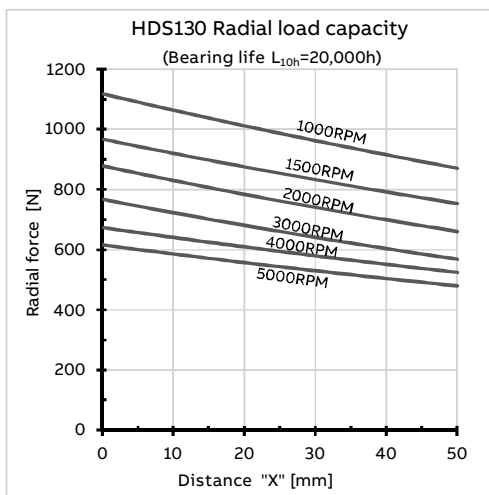
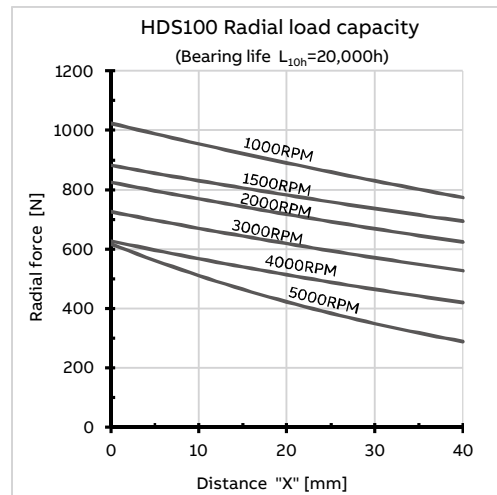
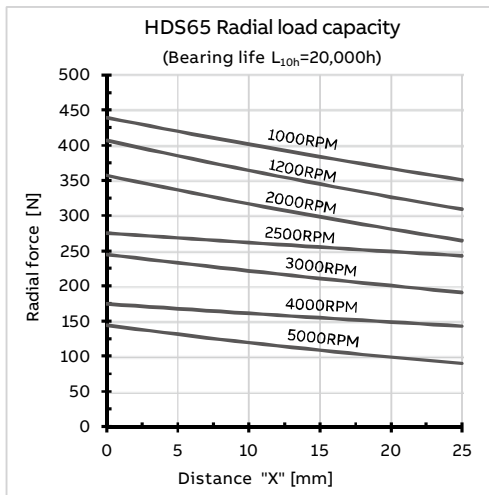
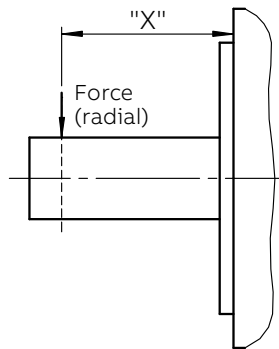
1) Axial load capacity – HDS65/100/130/180



Product information

Bearing load capacity

2) Radial load capacity – HDS65/100/130/180

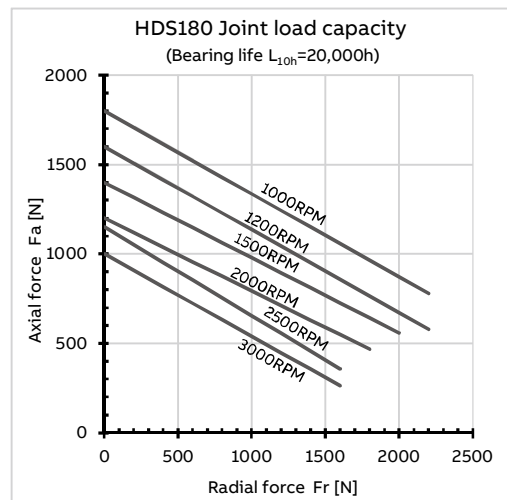
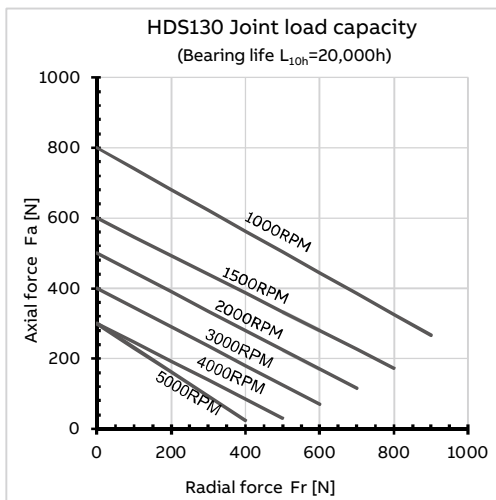
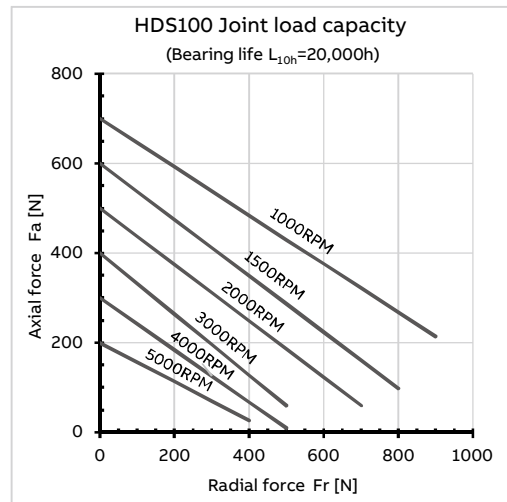
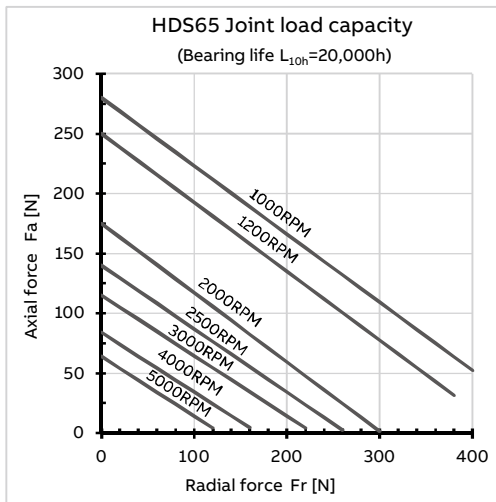
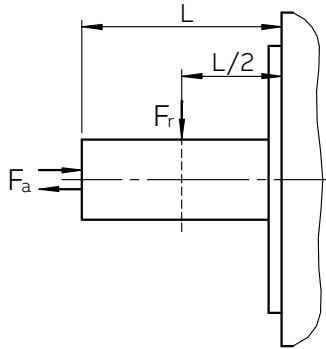


Product information

Bearing load capacity

3) Joint load capacity – HDS65/100/130/180

Load position: at 1/2 of shaft extension



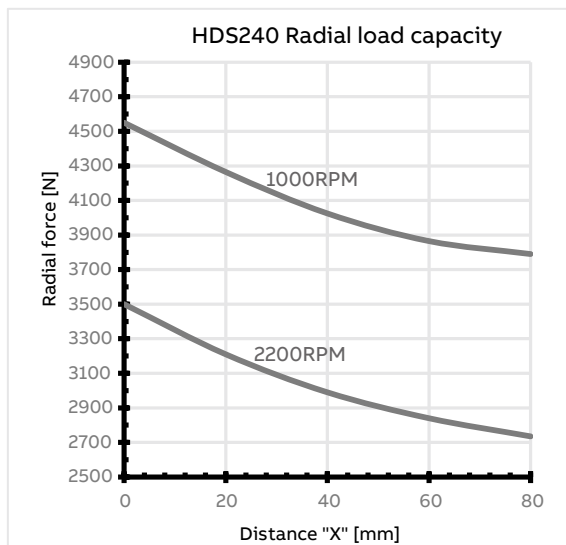
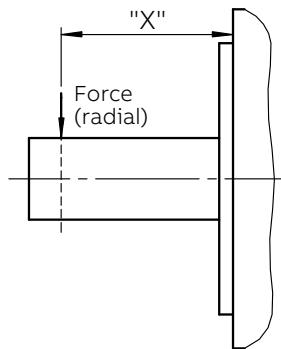
Product information

Bearing load capacity

4) HDS240 bearing load capacity

Maximum axial load capacity: 530 N

Radial load capacity:



Product information

Power and feedback interface

Power interface

Dual cable

M17 power connector		HDS65	
Pin	Definition	Pin	Definition
1	U	1	U
2	V	2	V
3	W	3	W
PE	Ground	PE	Ground
A	Thermistor	A	Thermistor
B	Thermistor	B	Thermistor
C	Brake (optional)	C	Brake (optional)
D	Brake (optional)	D	Brake (optional)
E	NC	E	NC

M23 power connector		HDS100/130	
Pin	Definition	Pin	Definition
1	U	1	U
2	Ground	2	Ground
3	W	3	W
4	V	4	V
A	Thermistor	A	Thermistor
B	Thermistor	B	Thermistor
C	Brake (optional)	C	Brake (optional)
D	Brake (optional)	D	Brake (optional)

M40 power connector		HDS180/240	
Pin	Definition	Pin	Definition
U	U	U	U
V	V	V	V
W	W	W	W
PE	Ground	PE	Ground
1	Thermistor	1	Thermistor
2	Thermistor	2	Thermistor
+	Brake (optional)	+	Brake (optional)
-	Brake (optional)	-	Brake (optional)

Single cable

M17 power connector		HDS65	
Pin	Definition	Pin	Definition
1	U	1	U
2	V	2	V
3	W	3	W
PE	Ground	PE	Ground
A	+Us/DSL+/PTC	A	+Us/DSL+/PTC
B	GND/DSL-/PTC	B	GND/DSL-/PTC
C	Brake (optional)	C	Brake (optional)
D	Brake (optional)	D	Brake (optional)
E	NC	E	NC

M23 power connector		HDS100/130	
Pin	Definition	Pin	Definition
1	U	1	U
2	Ground	2	Ground
3	W	3	W
4	V	4	V
A	+Us/DSL+/PTC	A	+Us/DSL+/PTC
B	GND/DSL-/PTC	B	GND/DSL-/PTC
C	Brake (optional)	C	Brake (optional)
D	Brake (optional)	D	Brake (optional)

M40 power connector		HDS180/240	
Pin	Definition	Pin	Definition
U	U	U	U
V	V	V	V
W	W	W	W
PE	Ground	PE	Ground
1	+Us/DSL+/PTC	1	+Us/DSL+/PTC
2	GND/DSL-/PTC	2	GND/DSL-/PTC
+	Brake (optional)	+	Brake (optional)
-	Brake (optional)	-	Brake (optional)

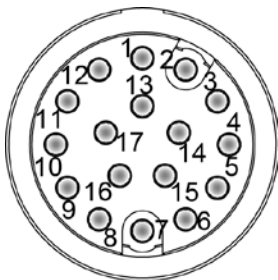
Product information

Power and feedback interface

Feedback interface

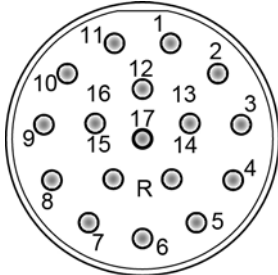
Resolver

M17 Signal connector



HDS65	
Pin	Definition
1	R1(REF+)
2	R2(REF-)
3	S1(COS+)
4	S3(COS-)
5	S4(SIN-)
6	S2(SIN+)
7~17	NC

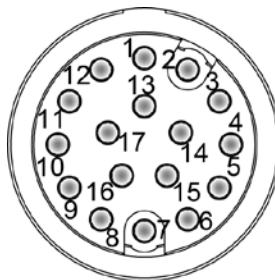
M23 Signal connector



HDS100/130/180/240	
Pin	Definition
1	R1(REF+)
2	R2(REF-)
3	S1(COS+)
4	S3(COS-)
5	S4(SIN-)
6	S2(SIN+)
7~12	NC

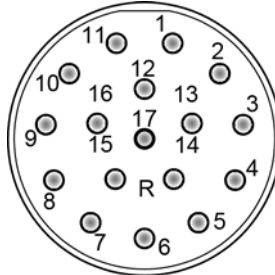
Incremental encoder (2500ppr)

M17 Signal connector



HDS65			
Pin	Definition	Pin	Definition
1	DC+5V	10	U+
2	GND	11	U-
3	A+	12	V+
4	A-	13	V-
5	B+	14	W+
6	B-	15	W-
7	Z+	9,16,17	NC
8	Z-		

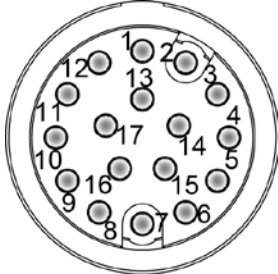
M23 Signal connector



HDS100/130/180/240			
Pin	Definition	Pin	Definition
1	DC+5V	10	U+
2	GND	11	U-
3	A+	12	V+
4	A-	13	V-
5	B+	14	W+
6	B-	15	W-
7	Z+	9,16,17	NC
8	Z-		

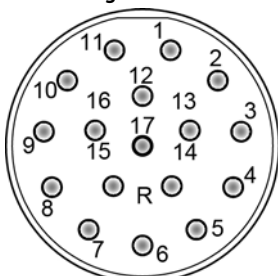
Absolute encoder (Smart Abs, single-turn)

M17 Signal connector



HDS65	
Pin	Definition
1	DC+5V
2	GND
3	-
4	-
5	SD+/Data+
6	SD-/Data-
7~17	NC

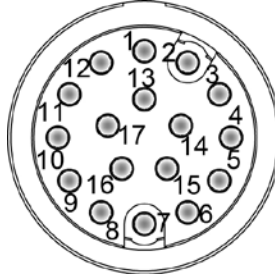
M23 Signal connector



HDS100/130/180/240	
Pin	Definition
1	DC+5V
2	GND
3	-
4	-
5	SD+/Data+
6	SD-/Data-
7~17	NC

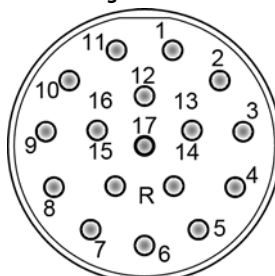
Absolute encoder (Smart Abs, multi-turn)

M17 Signal connector



HDS65			
Pin	Definition		
1	DC+5V		
2	GND		
3	VB	battery	
4	GND	battery	
5	SD+/Data+		
6	SD-/Data-		
7~17K	NC		

M23 Signal connector



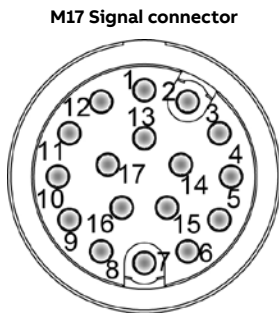
HDS100/130/180/240			
Pin	Definition		
1	DC+5V		
2	GND		
3	VB	battery	
4	GND	battery	
5	SD+/Data+		
6	SD-/Data-		
7~17K	NC		

Product information

Power and feedback interface

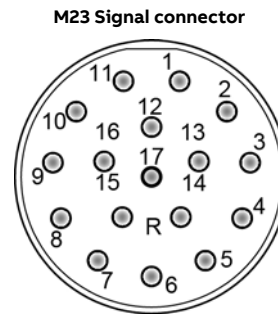
Feedback interface

Absolute encoder (Hiperface, single-turn and multi-turn)



HDS65	
Pin	Definition
1	Us
2	GND
3	NC
4	NC
5	Data +
6	Data -
7	SIN +
8	SIN -
9	COS +
10	COS -
11~17	NC

Absolute encoder (Hiperface, single-turn and multi-turn)



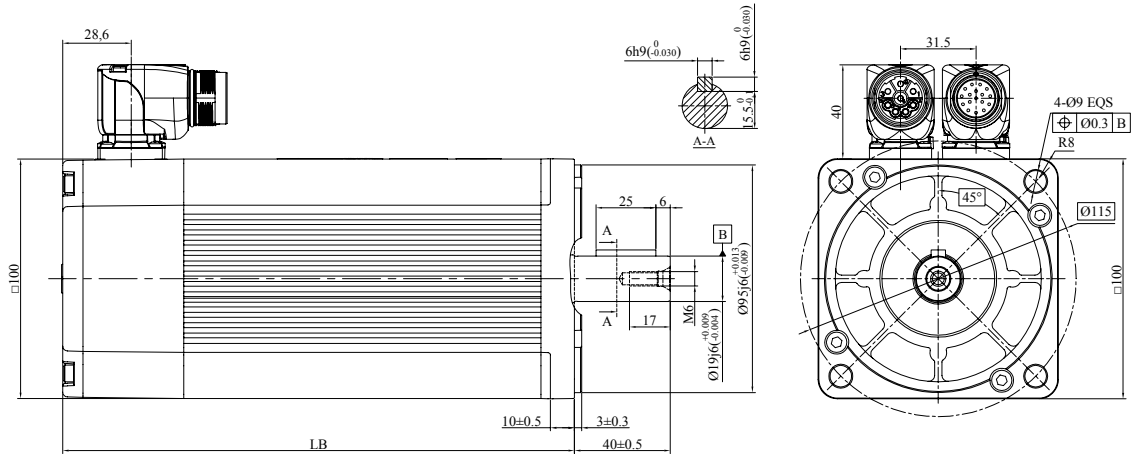
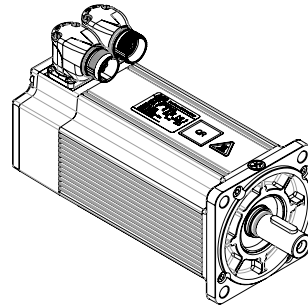
HDS100/130/180/240	
Pin	Definition
1	Us
2	GND
3	NC
4	NC
5	Data +
6	Data -
7	SIN +
8	SIN -
9	COS +
10	COS -
11~17	NC

Product information

Motor dimension

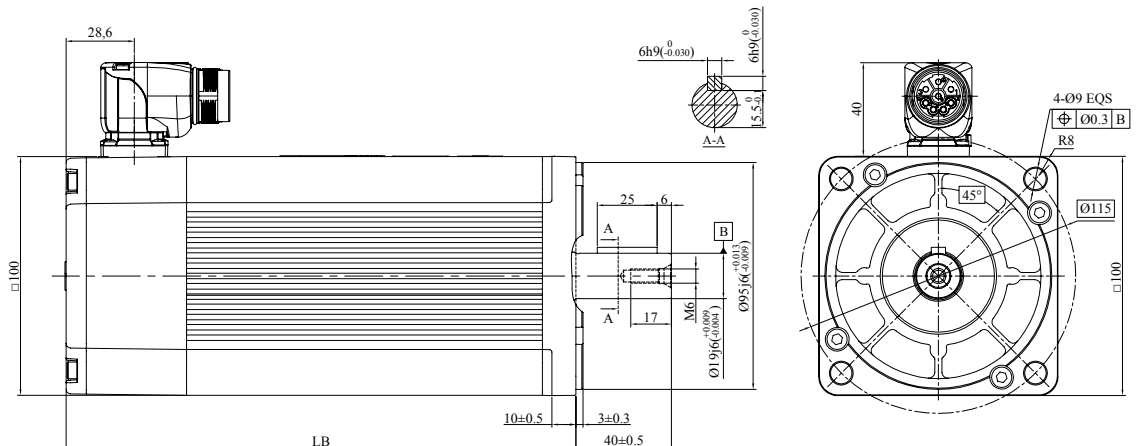
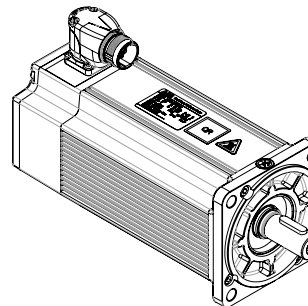
HDS100 layout (dual cable)

Model	LB [mm]
HDS100-0206	189.5
HDS100-0308	213.5
HDS100-0413	213.5
HDS100-0619	237.5



HDS100 layout (single cable)

Model	LB [mm]
HDS100-0206	189.5
HDS100-0308	213.5
HDS100-0413	213.5
HDS100-0619	237.5

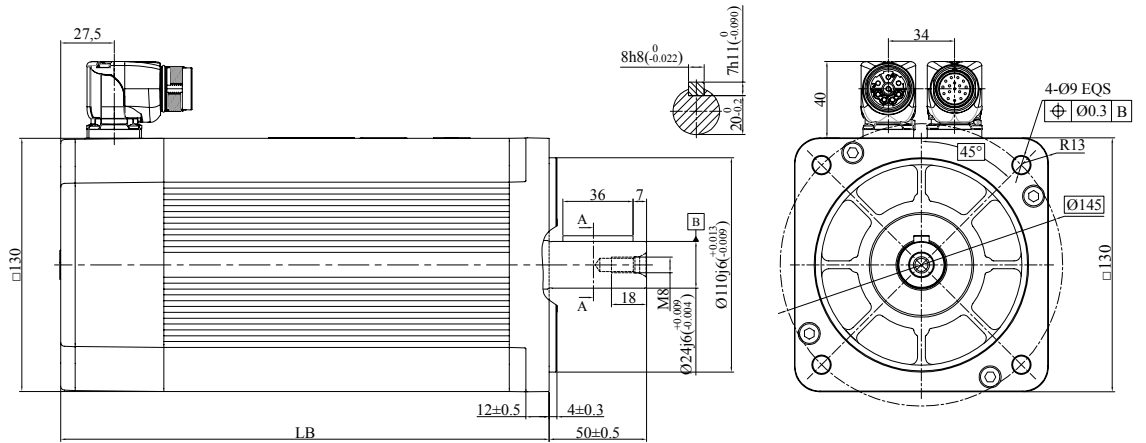
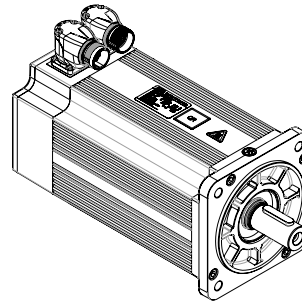


Product information

Motor dimension

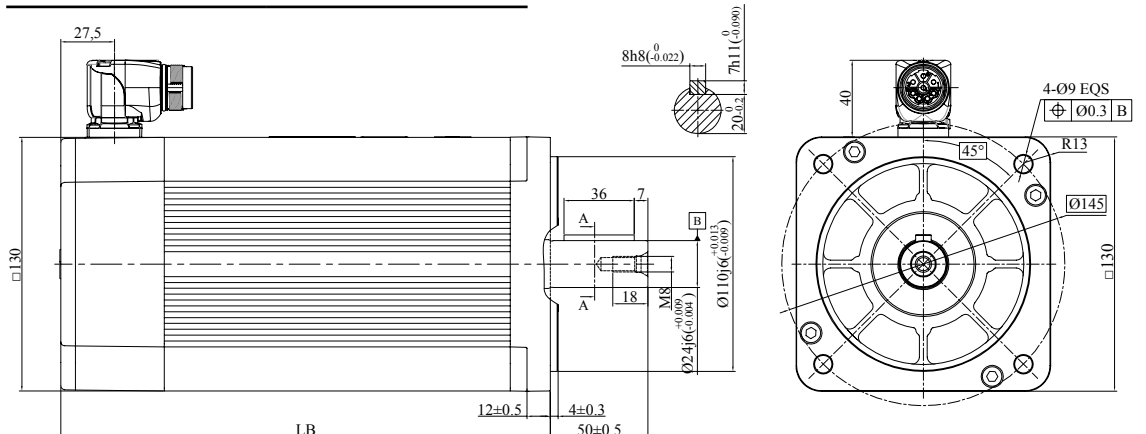
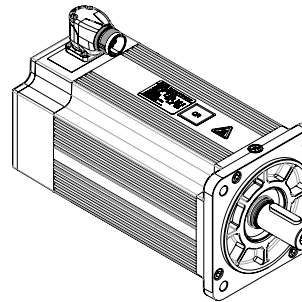
HDS130 layout (dual cable)

Model	LB [mm]
HDS130-0817, HDS130-0620	207
HDS130-1226, HDS130-1225	233
HDS130-1829	251



HDS130 layout (single cable)

Model	LB [mm]
HDS130-0817, HDS130-0620	207
HDS130-1226, HDS130-1225	233
HDS130-1829	251

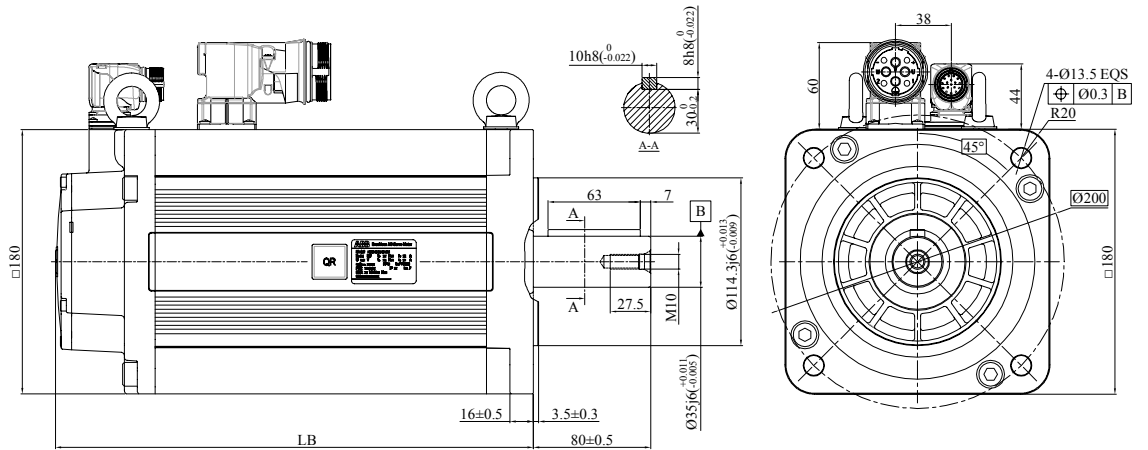
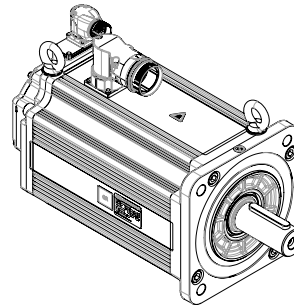


Product information

Motor dimension

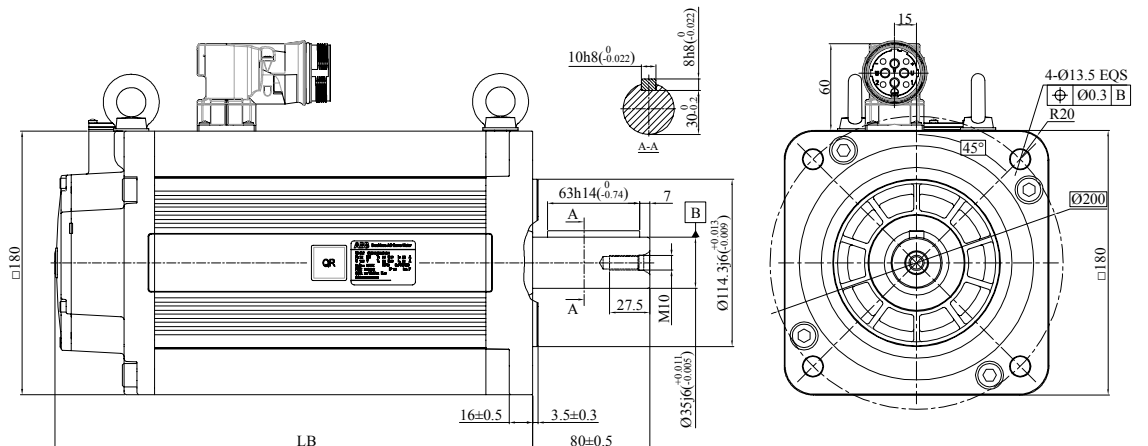
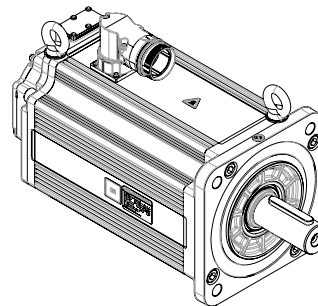
HDS180 layout (dual cable)

Model	LB [mm]
HDS180-2540	297
HDS180-3555	326
HDS180-4876	355



HDS180 layout (single cable)

Model	LB [mm]
HDS180-2540	297
HDS180-3555	326
HDS180-4876	355

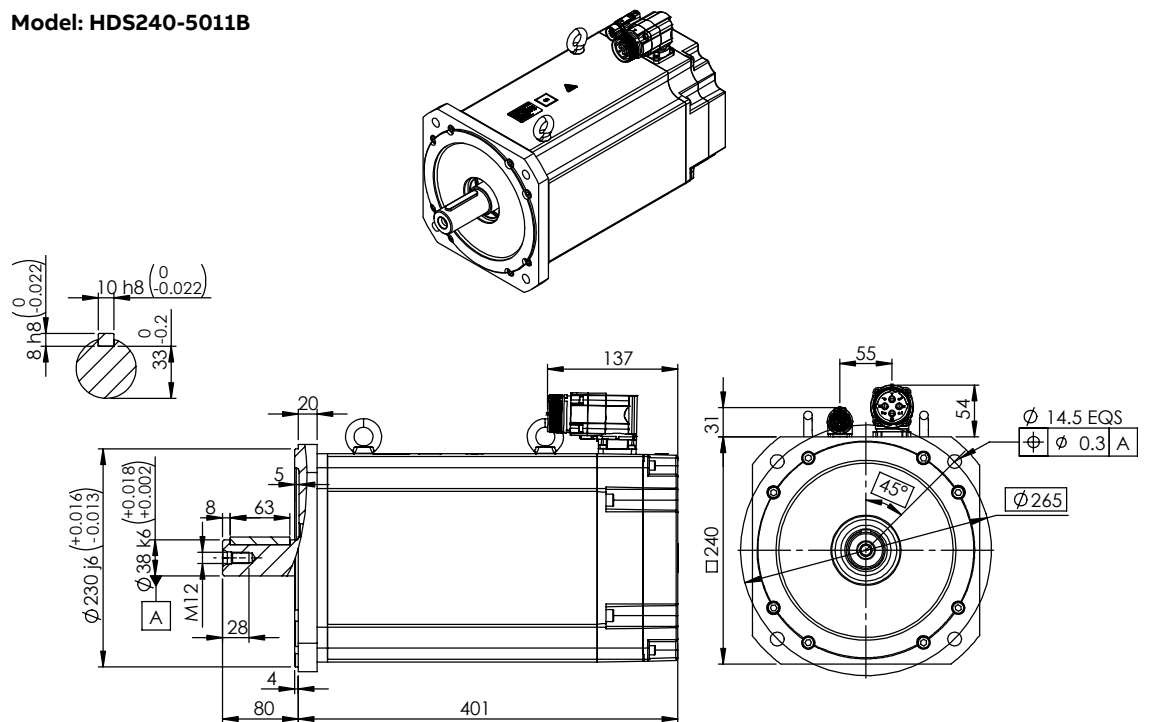


Product information

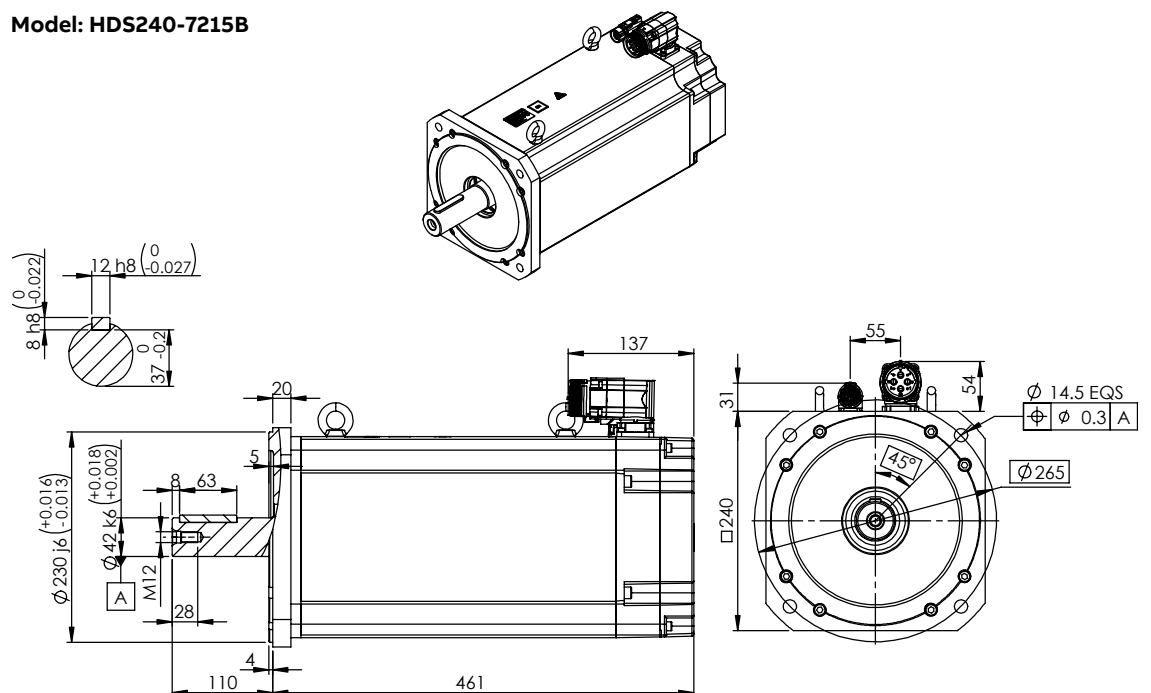
Motor dimension

HDS240 layout (w/o brake^{*1})

Model: HDS240-5011B



Model: HDS240-7215B

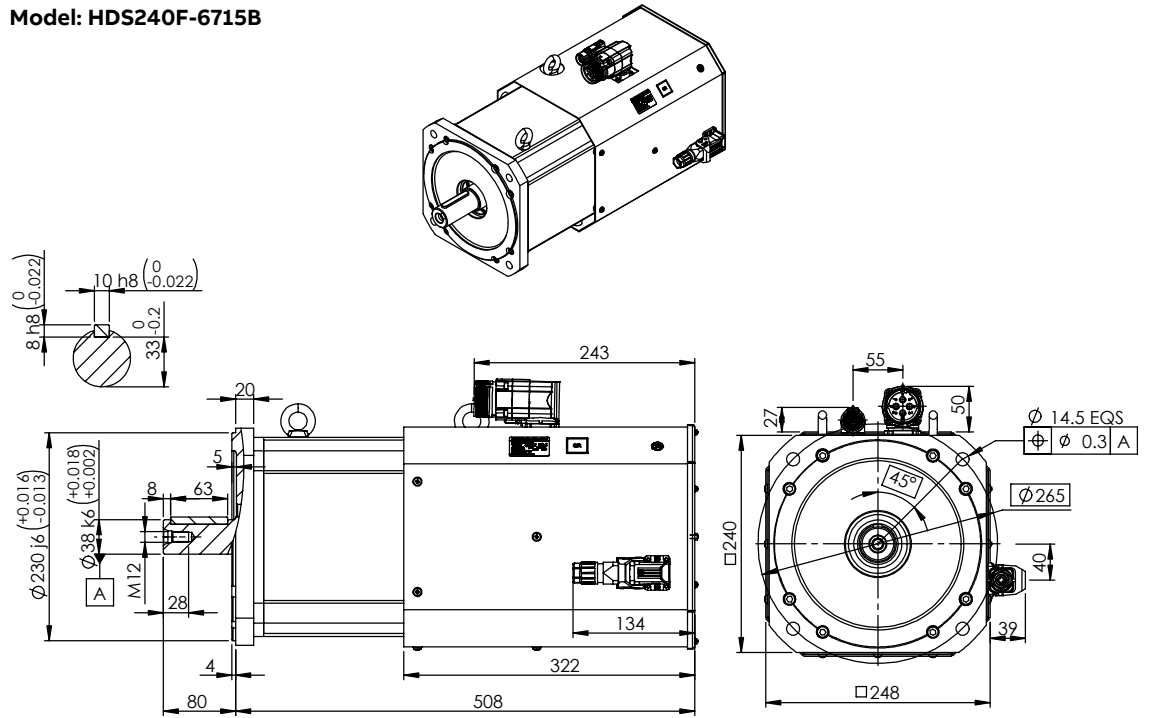


Note:*1, For models with brakes, the length of HDS240 motors are 70mm longer.

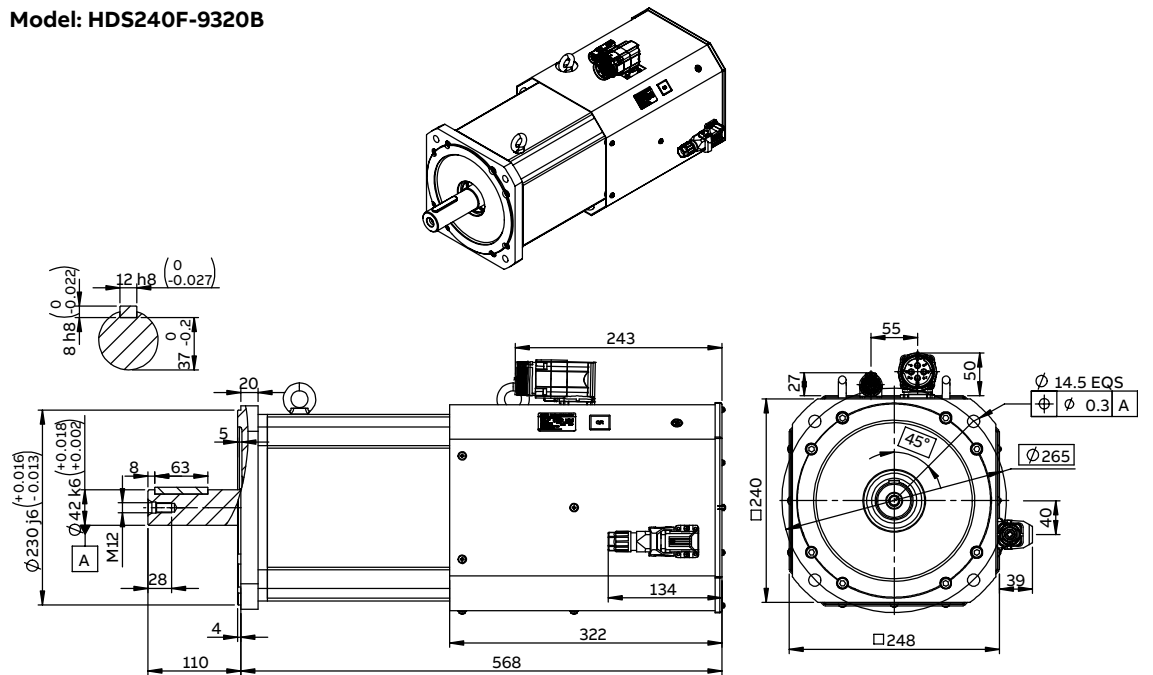
Product information

Motor dimension

Model: HDS240F-6715B



Model: HDS240F-9320B



Product information

Nameplate and identifiers

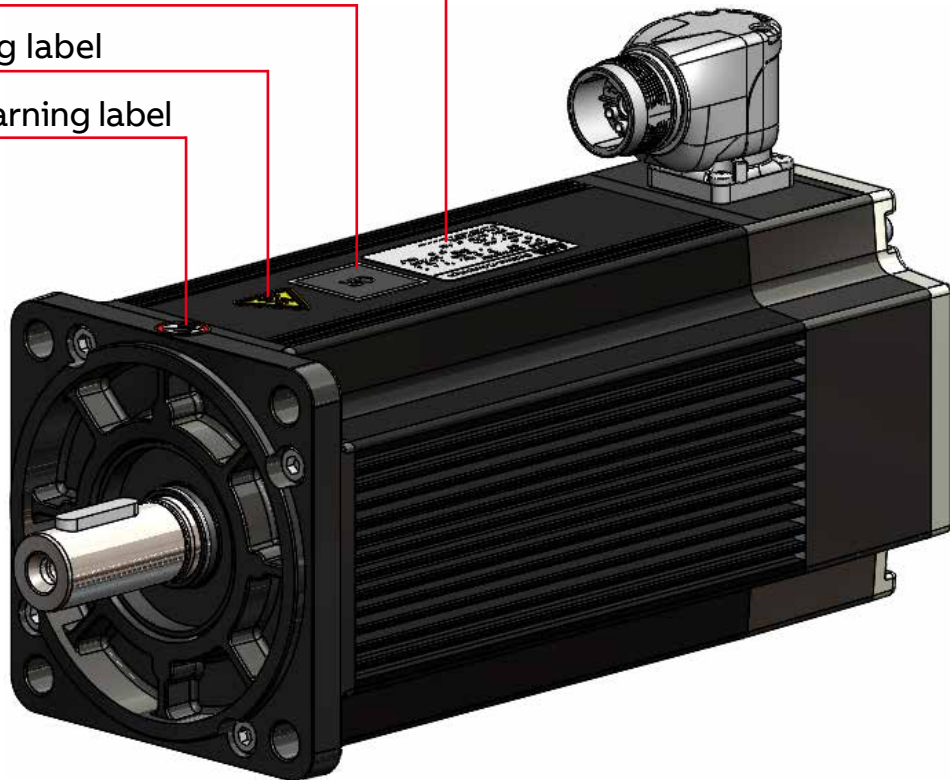
HDS series motor is accompanied with nameplate, QR code, hot warning and no strike warning marks (as shown below). Besides the parameters on the nameplate, details of the motor could be learnt by scanning QR code.

Nameplate

QR code

'Hot' warning label

'No strike' warning label



Options and accessories

Brake

Parameters of standard brakes for HDS*¹

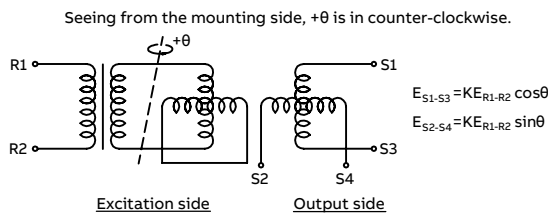
Motor model	Static torque [Nm]	Power [W]	Voltage [VDC]	Current [A]	Pull-in, release time [ms]		Rotational inertia [kg·cm ²]	Weight [kg]
					Pull-in	Release		
HDS65	2	11.4	24	0.47	10	58	0.03	0.33
HDS100	4.5	14	24	0.58	20	80	0.13	0.76
HDS130	18	20.8	24	0.87	40	145	1.00	1.95
HDS180	55	25.3	24	1.06	22	127	7.10	3.7
HDS240	143	42.7	24	1.8	60	450	48.60	8.5

Options and accessories

Feedback

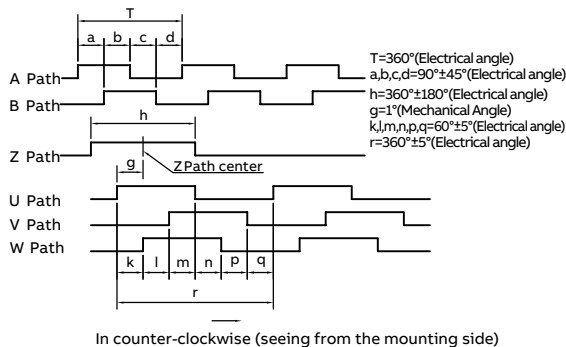
HDS series provides standard feedback options including resolver, incremental encoder, absolute encoder (Smart Abs® or Hiperface®), Hiperface DSL®, and EnDat 2.2. Please contact ABB in case of a customized feedback requirement.

1) Resolver



Input voltage	AC 5 Vrms / 4 kHz
Input current	40 mA max
Transformer ratio	0.5 ± 10%
Number of pole-pairs	1
Electrical error	6' max (mechanical angle)
Phase displacement	0 ± 10° (electrical angle)
Insulation resistance	DC 500 V, ≥ 100 MΩ
Maximum speed	20000 rpm (frame size HDS65) 6000 rpm (other frames)
Operating temperature	-55° C ~ +155° C

2) Incremental encoder



Input voltage	DC+5 V±5%
Data output	Long distance drive (AM26C31 differential drive) Incremental orthogonal 2 path 10-polar Hall output
Resolution	2500 ppr
Precision	0.018° (mechanical angle)
Maximum electrical frequency	250 kHz
Maximum speed	6000 rpm
Operating temperature	-20°C ~+85°C

3) Smart Abs absolute encoder

Input voltage	DC +5 V±5%
Resolution	Code S and M: 17 bits/turn Code S2 and M2: 23 bits/turn
Multi-turns ^{*1}	16 bits
Memory	762 Bytes
Protocol	Smart protocol
Data transmission type	RS 485
Communication Baud rate	2.5 Mbps
Maximum rotation speed	6000 rpm
Maximum angular acceleration	80,000 rad/s ²
Direction of rotation	CCW (seeing from the mounting side)
Operating temperature	-10°C ~+85°C

*1, Smart Abs multi-turn absolute encoder needs external battery

4) Hiperface DSL absolute encoder

Input voltage	DC +7~+12 V
Input current	150 mA max (idle load)
Number of bids/rotation	18 bits (single-turn) 18 bits (multi-turn)
Recordable rotation number	1 rotation (single-turn) 4096 rotations (multi-turn)
Memory	8192 Bytes
Protocol	HIPERFACE DSL®
Data transmission type	RS 485
Digital position output frequency	0~75 kHz
Communication Baud rate	9.375 Mbps
Maximum speed	6000 rpm
Direction of rotation	CW (seeing from the mounting side)
Operating temperature	-20°C ~+115°C

5) Hiperface absolute encoder

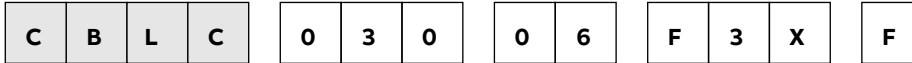
Input voltage	DC +7 ~ +12 V
Input current	60 mA max (idle load)
Sine/cosine periods per revolution	128
Bits per revolution ^{*2}	19 bit (with 12-bit interpolation of the sine/cosine signals)
Recordable rotation number	1 rotation (single-turn) 4096 rotation (multi-turn)
Memory	1792 Bytes
Protocol	HIPERFACE®
Data transmission type	RS 485
Digital position output frequency	0 ~ 65 kHz
Maximum speed	12000 rpm (single-turn) 9000 rpm (multi-turn)
Direction of rotation	CW (seeing from the mounting side)
Operating temperature	-20° C ~ +110° C

*2, The resolution of Hiperface encoder is co-decided by sine/cosine periods per revolution and the interpolation of the sine/cosine signals

Options and accessories

Cable

Cable assembly P/N



Cable length^{*1}

- 030: 3 m
- 050: 5 m
- 100: 10 m
- 150: 15 m
- 200: 20 m
- 300: 30 m

Motor type

- Power and DSL cable
- 06: HDS65
- 13: HDS100, HDS130
- 18: HDS180
- 24: HDS240
- Feedback cable
- 06: HDS65
- 13: HDS100, HDS130, HDS180
- 24: HDS240

Power and DSL cable – maximum current

- 06: 6 A
- 12: 12 A
- 20: 20 A
- 35: 35 A
- 50: 50A

Feedback cable – feedback type (corresponding ABB servo drive)

- F1: Incremental encoder (MotiFlex e180, MicroFlex e190)
- F3: Resolver (MotiFlex e180)
- F3X: Resolver (MicroFlex e190)
- F6: Absolute encoder, Hiperface single-turn/multi-turn, Smart Abs single-turn (MotiFlex e180, MicroFlex e190)
- F6X: Absolute encoder, Smart Abs multi-turn, with battery box (MotiFlex e180, MicroFlex e190)
- A6: Absolute encoder, Hiperface single-turn/multi-turn, Smart Abs single-turn (ACS880)
- A6X: Absolute encoder, Smart Abs multi-turn, with battery box (ACS880)

Type

- P = Power cable
- F = Feedback cable
- D = DSL cable

Example:

- CBL0300606P: 3 m power cable, suitable to HDS65 series motor, maximum current 6 A;
- CBL10013F3XF: 10 m feedback cable, HDS100/130/180 motor, resolver feedback, MicroFlex e190.

*1, For non-standard lengths, please contact ABB.

Options and accessories

Cable

Connector P/N

S	P	M	C	0	6	F	1
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Motor type

Power and DSL cable

06: HDS65

13: HDS100, HDS130

18: HDS180

24: HDS240

Feedback cable

06: HDS65

13: HDS100, HDS130, HDS180

24: HDS240

Type

P: Power or DSL connector

F1: Feedback connector, resolver

F2: Feedback connector, incremental encoder

F6: Feedback connector, Smart ABS or Hiperface

Example:

SPMC06P: HDS65 power connector;

SPMC13F2: HDS100/130/180 incremental encoder feedback connector.

Cable P/N

S	P	C	B	1	0	0	1	6	C	F
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Cable length

100: 10 m

150: 15 m

200: 20 m

300: 30 m

Power and DSL cable – maximum current

06: 6 A

12: 12 A

20: 20 A

35: 35 A

50: 50A

Number of cores in feedback cable

06C: 6-core

12C: 12-core

16C: 16-core

Type

P = Power and HDS cable

F = Feedback cable

Example:

SPCB20006P: 20 m power cable, maximum current 6 A;

SPCB30016CF: 30 m feedback cable, 16-core.

Drive

MicroFlex e190

MicroFlex e190 is a compact high-performance servo drive, reimagined for future machine designs. MicroFlex e190 embraces all major motor feedback types, together with soft selectable Ethernet technologies. Its versatility provides a migration path for existing designs and future network-centric automation solutions.

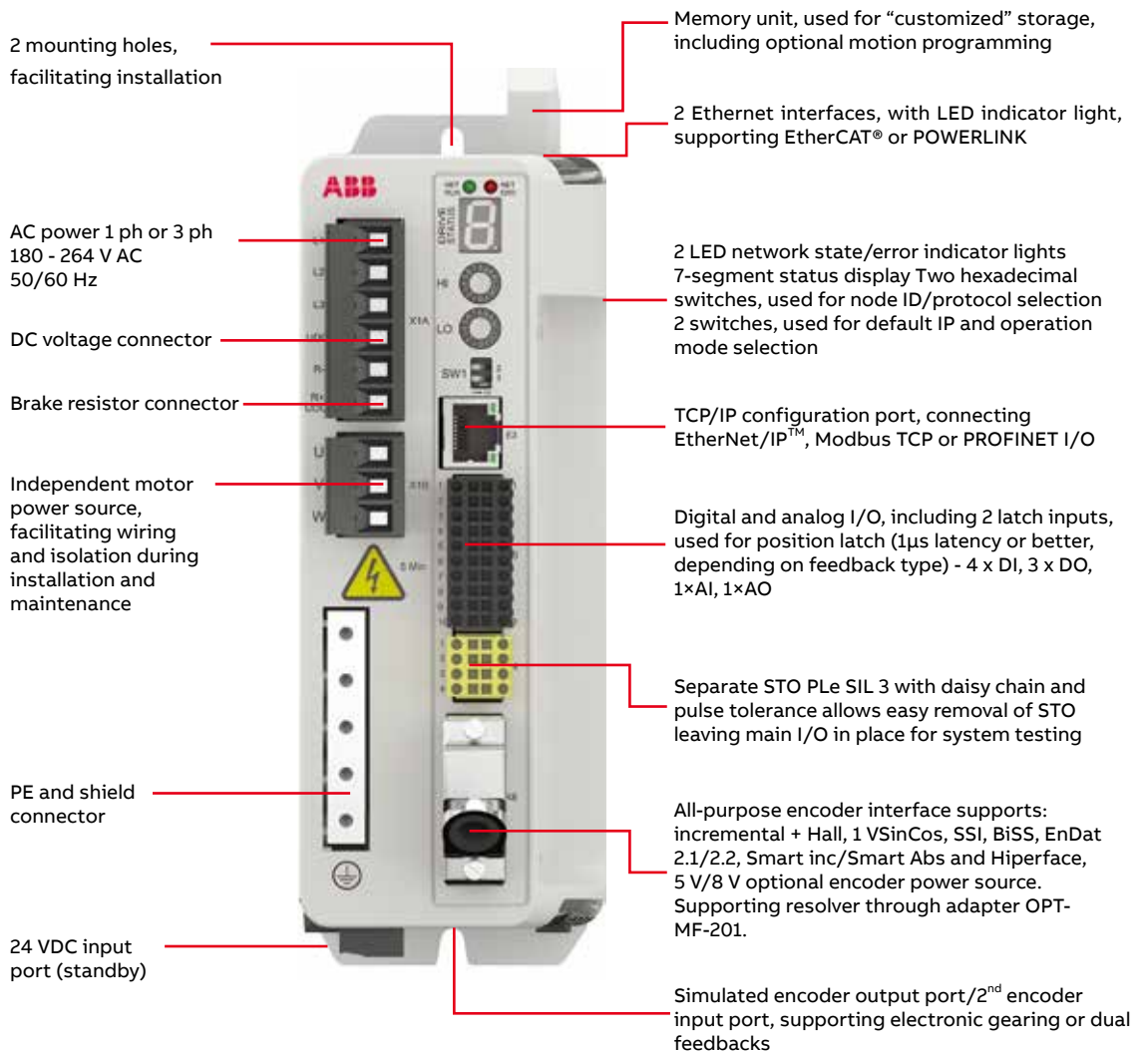
MicroFlex e190 is designed to carry today's control designs into the future. By supporting PTO and analog control, it provides flexible options for existing or legacy applications as well as a migration platform to Ethernet based control and 'IoTSP ready' machine designs.

MicroFlex e190 breaks the mould of similar products by rethinking usability throughout the product

lifecycle. MicroFlex e190 introduces a simpler approach to selection, installation, and operation.

MicroFlex e190 adds numerous improvements to the MicroFlex series, such as side by side flush mounting and a removable memory unit to prepare drive settings off-site or move settings from one drive to another. MicroFlex e190 supports all major Ethernet protocols (software selectable).

With features such as a second encoder input, an encoder output, and optional motion programming, applications such as electronic gearing, CAM, flying shear, labelling and registration control can easily be implemented without the use of an external controller, making it far more versatile than other drives in its class.



Drive

MicroFlex e190

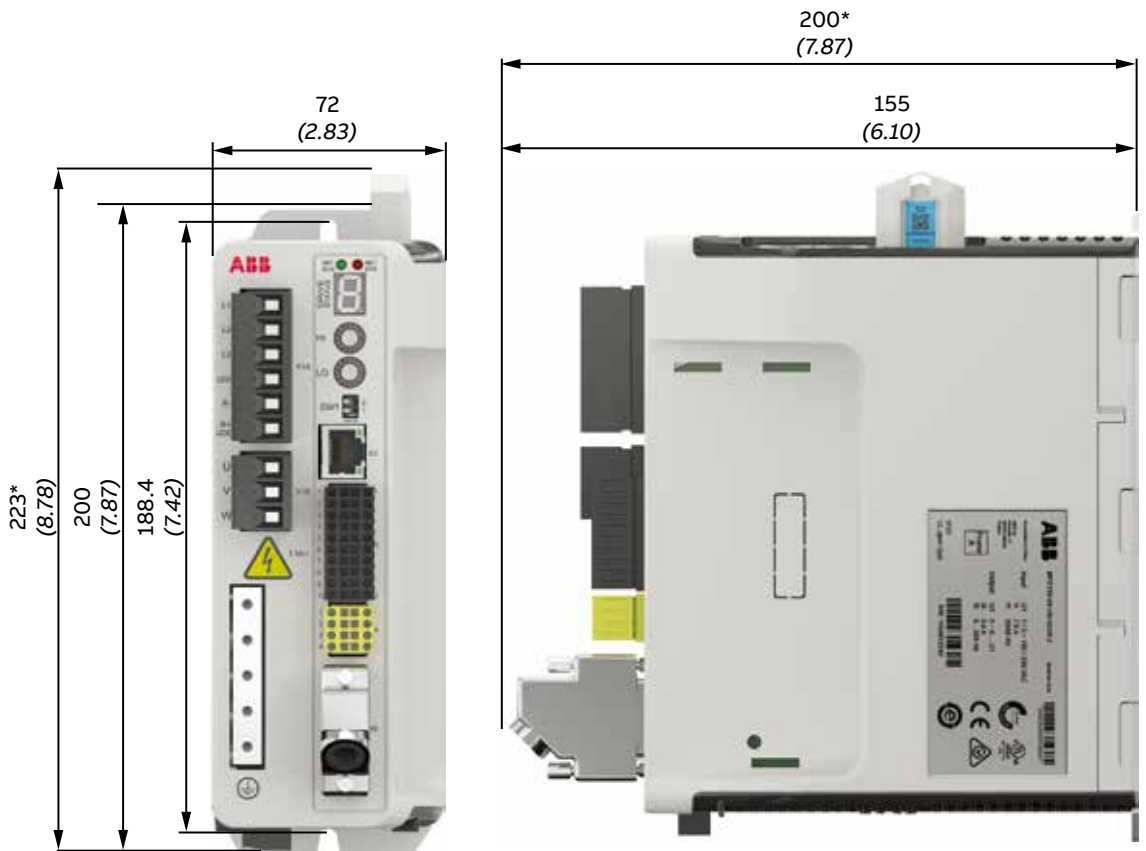
Technical parameters

Voltage/Frequency	AC 1 ph or 3 ph, 200 - 240 V AC \pm 10%, 50 - 60 Hz \pm 5%
Efficiency	>95%
PWM switching frequency / control	8 kHz / Space Vector Modulation
Motor types	Asynchronous motors (standard induction, servo) and synchronous motors (servo, high torque motor), linear servo motors
Braking resistor (external)	0.25 kW nominal / 2.7 kW Peak 10% duty with 57 W nominal (min 39 W max 100 W)
Product compliance	
Approvals	CE, cUL CE, cUR
EMC	EN61800-3 C2 emissions with external filter (50 m motor cable limit)
Environmental limits	
Operating temperature	1.6 A unit 0-50° C (derating applies to 45 to 50° C max) 3 / 6 / 9 A units 0-55° C no derating
Altitude	Rated 1000 m / 3300 ft De-rate 1.1% / 100 m (330 ft) > 1000 m (3300 ft)
Protection degree	IP20 cabinet installation
Safety	
Safe torque-off (STO) as standard	Two-channel STO to IEC61800-5-2, SIL3 PLe
I/O	
4 x digital inputs	Opto-isolated 24 V 2 inputs can be programmed as fast position latch inputs < 1 μ s (feedback device dependent) or pulse direction inputs (max 2 MHz)
3 x digit outputs	Opto-isolated 24 V PNP. 50 mA per channel Configurable / programmable function
1 x \pm 10 V analog input 1 x \pm 10V analog output	12 bit (16 bit with oversampling). Analog speed / torque control with emulated encoder output
7 segment status display with sequenced error codes	For error and communications notification to quickly identify problems and minimize downtime
NET RUN & NET ERR LEDs	Indicate EtherCAT status of operation in accordance with EtherCAT Technology Group (ETG) guidelines
Communications	
EtherCAT (E2=IN E1=Out)	2 x RJ45 for daisy chain connection LED indication built into RJ45 sockets Drive profile: DS402 / IEC61800-7-1
Powerlink (E2=IN E1=Out)	2 x RJ45 for daisy chain connection LED indication built into RJ45 sockets Drive profile: DS402 / IEC61800-7-1
PROFINET IO	Communication with PLCs / Industrial PCs Drive operation can be customized with a MINT program
EtherNet / IP (E3 port only)	Note: CIP™ sync not supported Drive operation can be customized with a MINT program
E3 Ethernet configuration port	MINT PC support tools for host PC interfacing in Visual Basic, Visual C, LabView
Motor feedback	
Universal digital feedback	Incremental encoder + Halls, SSI (synchronization sequence interface), BiSS B, EnDat 2.1 / 2.2, 1 V pk-pk Sin / Cos, SmartAbs, SmartInc, Hiperface (8 V)
Dual encoder input	For line shaft following or dual loop control (position / velocity and commutation) to eliminate mechanical errors
Ethernet and motor encoder feedback interfaces	Highly integrated with minimum latency, optimized for demanding motion applications
Resolver	Supported by option OPT-MF-201 adapter

Drive

MicroFlex e190

Model	MicroFlex e190						
	Rated current	300% continuous / peak A	200% continuous / peak A	Power single phase kW	Power three phase kW	Built-in fan	Rated temperature C
MFE190-04UP-01A6-2	1.6	1.6/4.8	1.6/3.2	0.3	0.5	No	45
MFE190-04UP-03A0-2	3	2.5/7.5	3/6	0.75	1.1	Yes	55
MFE190-04UP-06A0-2	6	5/15	6/12	1.5	2.2	Yes	55
MFE190-04UP-09A0-2	9	7.5/22.5	9/18	2.2	3.3	Yes	55



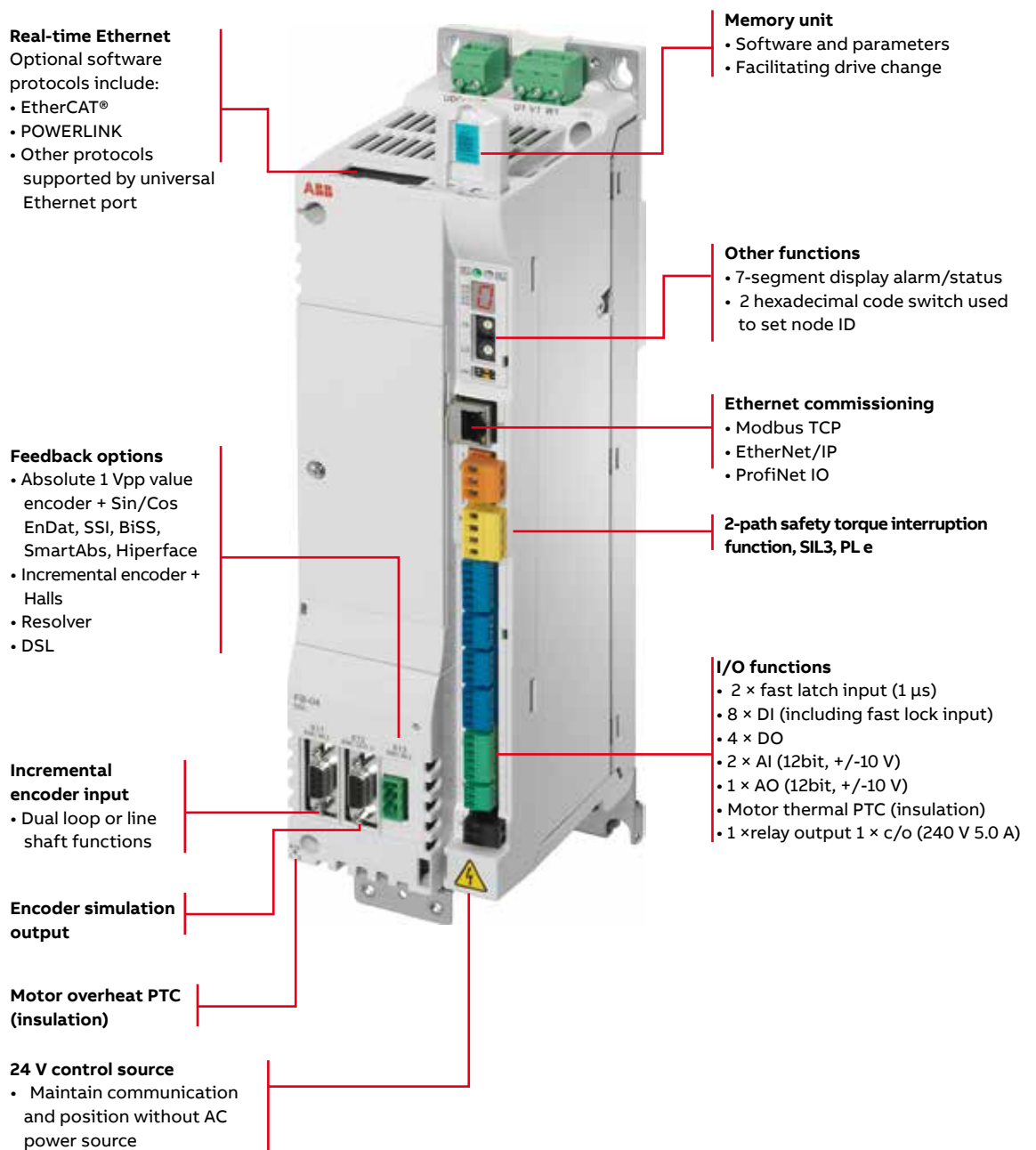
*Approximate size, extra space is allowed for feedback and other cable

Drive

MotiFlex e180

The MotiFlex e180 is a versatile motion control drive delivering high performance and capability you can depend on in a broad range of demanding motion control applications. Optimizing every move, the MotiFlex e180 and our motion control solutions enable you to improve your machine's productivity and end-product quality.

MotiFlex e180 delivers versatile motion control performance, capability and dependability to power machine innovations. Flexible connectivity with Ethernet and motor feedback technologies is highly integrated and optimized for demanding motion applications. With the MINT WorkBench PC tool you can quickly and easily customize the drive to the exact control requirements of your machine.



Drive

MotiFlex e180

Technical specification

Supply connection	
AC supply	3-phase, 200 – 480 V AC +/-10% 50 / 60 Hz +/-5%
DC supply	270-650V DC +/-10%
Motor connection	
Voltage	3-phase output voltage
Frequency	0- +/-500 Hz
Motor control	Vector, U/f
Motor types	Asynchronous motors (standard induction, servo) and synchronous motors (servo, high-torque), linear servo motors
Switching frequency/control	4 - 8 kHz Space Vector Modulation
Braking power connection	
Braking Chopper	As standard in all types
Braking resistor	External resistor connected to drive
Product compliance	
CE	Low Voltage Directive 2006/95/EC, EN 61800-5-1: 2007 Machinery Directive 2006/42/EC, EN 61800-5-2: 2007 EMC Directive 2004/108/EC, EN 61800-3: 2004 + A1: 2012
UL	cUL/UL508C (2010) Power Conversion Equipment
Environmental limits	
Ambient temperature	
Transport	-40 to +70°C (-40 to +158°F)
Storage	-40 to +70°C (-40 to +158°F)
Operation	0 to +55°C (32 to 131°F), no frost allowed
Temperature	Above 40°C (104°F) with derating of 2%/1°C
Cooling method Air-cooling	Clean dry air
Altitude	0 to 2000 m (6560 ft) above sea level Derating above 1000 m (3280 ft) by 1%/100 m (328 ft)
Relative humidity	Maximum 95%, condensation is not allowed
Degree of Protection	IP20 acc. to EN 60529; Open type acc. to UL 508C
Contamination levels	No conductive dust allowed
Vibration	Sinusoidal vibration (EN 60068-2-6:2008); 2 to 9 Hz: 3.0 mm (0.12"); 9 to 200 Hz: 1g
Shock	Half-sin pulse (IEC 60068-2-27:2008): 10g for 11 ms
EMC	Category C3 with optional filter (according to EN 61800-3)
Functional safety	Safety torque off (STO according to EN 61800-5-2) EN 61508 ed2: SIL 3, EN 62061: SIL CL 3, EN ISO 13849-1: PL e

Drive

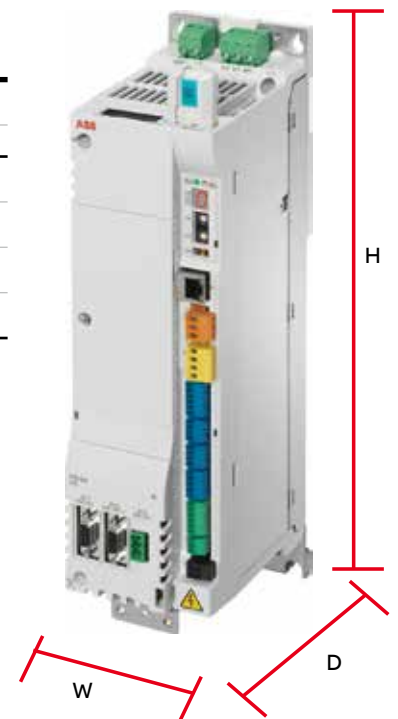
MotiFlex e180

Model:

	MFE180	-	04AN	-	XXAX	-	4	+	Lxxx	+	Nxxx
Product Series	Motiflex e180										
Construction	04AN: Air-cooled module										
Size											
Voltage rating	4 200 to 480 VAC +/-10%										
Feedback options	+L517 FB-01: Incremental +Halls +L518 FB-02: Serial Encoder +SinCos (1 V pk-pk) +L516 FB-03: Resolver +L530 FB-04: DSL (Stegmann 2 wire solution)										
Functionality level options	+N8020 MINT single axis										

Dimensions

Size	Height ^{*1}		Width		Depth ^{*2}		Weight	
	(mm)	(in)	(mm)	(mm)	(mm)	(mm)	(kg)	(lb)
A	364	14.3	90	3.54	144	5.67	3	6.61
B	380	15	100	3.94	221	8.7	5	11
C	467	18.4	155	5.5	223	8.78	10	22
D	467	18.4	220	8.66	223	8.78	17	37.5



Note: *1, Height is maximum measured value without mounting plate.
*2, Extra 50mm (2 inches) needs to be reserved for feedback wiring.

Drive

MotiFlex e180

Rated value, type and voltage

Model	Dimensions ¹	Rated value/4 kHz							
		110% 60s		150% 60s		200% 3s		300% 3s	
		I_{2N}	I_{2max}	I_{2N}	I_{2max}	I_{2N}	I_{2max}	I_{2N}	I_{2max}
-03A0-4	A	3.0	3.3	3.0	4.5	3.0	6.0	2.0	6.0
-05A0-4	A	5.0	5.5	5.0	7.5	4.0	8.0	2.7	8.1
-07A0-4	A	6.4	7.1	6.0	9.0	4.7	9.4	3.2	9.6
-016A-4	B	14.0	15.4	11.0	16.5	9.0	18.0	7.0	21.0
-024A-4	C	21.5	23.7	17.0	25.5	13.5	27.0	10.0	30.0
-031A-4	C	28.0	30.8	25.0	37.5	21.0	42.0	16.0	48.0
-046A-4	C	41.0	45.1	35.0	52.5	28.0	56.0	20.0	60.0
-060A-4	D	62.0	68.2	46.0	69.0	35.0	70.0	25.0	75.0
-090A-4	D	90.0	99.0	70.0	105.0	55.0	110.0	40.0	120.0

Model	Dimensions	Rated value /8 kHz							
		110% 60s		150% 60s		200% 3s		300% 3s	
		I_{2N}	I_{2max}	I_{2N}	I_{2max}	I_{2N}	I_{2max}	I_{2N}	I_{2max}
-03A0-4	A	3.0	3.3	3.0	4.5	3.0	6.0	2.0	6.0
-05A0-4	A	5.0	5.5	5.0	7.5	4.0	8.0	2.7	8.1
-07A0-4	A	6.4	7.1	6.0	9.0	4.7	9.4	3.2	9.6
-016A-4	B	14.0	15.4	11.0	16.5	9.0	18.0	7.0	21.0
-024A-4	C	21.5	23.7	17.0	25.5	13.5	27.0	10.0	30.0
-031A-4	C	28.0	30.8	25.0	37.5	21.0	42.0	16.0	48.0
-046A-4	C	41.0	45.1	35.0	52.5	28.0	56.0	20.0	60.0
-060A-4	D	62.0	68.2	46.0	69.0	35.0	70.0	25.0	75.0
-090A-4	D	90.0	99.0	70.0	105.0	55.0	110.0	40.0	120.0

Rated value

MotiFlex E180 has four overload modes: 110%, 150%, 200%, 300%

I_{2N} Select maximum continuous root-mean-square current in selected overload modes. Load work cycle rms current should be lower than the value.

I_{2max} Maximum overload current at 60s-duration (110%, 150%) or 3s-duration (200%, 300%)

Note: *1, The drive with C and D dimensions must be equipped with power choke coil (AC or DC) at an overload of 110% and 150%.



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Business Unit Motors and Generators ABB China

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Eastern China – Shanghai Regional Center (Shanghai and Zhejiang)

No. 380 Tianxing Road, Minhang District, Shanghai

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Fax: 025-8663 5338

<http://new.abb.com/motors-generators/zh>



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