

ABB Motion product brochure

# High Density, High Accuracy and High Efficiency

## HDS high-performance AC PM servo motor



Enabling machine innovation  
HDS high-performance  
AC PM servo motor

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**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 servo motors provide more effective combinations of torque and inertia. Equipped with various high performance and high-resolution feedback options, HDS meets various requirements of applications and drives. By providing control on speed, torque and position with high precision and quality for the operation of terminal equipment, HDS helps to improve the efficiency and stability of equipment and ensure higher reliability of complete system.



<b>Cooling Method</b>	Totally enclosed, non-ventilated; Fan-cooled; Water-cooled <sup>*1</sup>
<b>Magnet Material</b>	Ultra-high intrinsic coercive field rare earth
<b>Insulation Class</b>	F
<b>Mounting</b>	IMB5; IMB35 optional
<b>Thermal Protection<sup>*2</sup></b>	3×PTC155
<b>Exterior Paint</b>	Epoxy
<b>Color</b>	Motor body: Black End-cover: White, with ABB logo
<b>Feedback Device</b>	Resolver Incremental/absolute encoder DSL single-cable absolute encoder
<b>Ingress Protection (IP)</b>	IP54 without oil seal IP65 with oil seal
<b>Certification</b>	UL, CE

### Features

- High torque density and power density:  
reduced volume and weight
- Low cogging torque and torque ripple: excellent  
performance at low speed and system control
- Outstanding overload performance: 3 times peak torque,  
4 times mechanical overload capacity
- Wide speed characteristic, optional high speed  
characteristic<sup>\*3</sup>
- Fast dynamic response, accurate rotor balance
- Epoxy resin potting technology on complete stator:  
compact size and better heat dissipation
- Precise flange and shaft machining: low noise and  
vibration
- Various feedback options, including Hiperface DSL -  
single cable absolute encoder solution



Notes: \*1, For more details on water cooling options, please contact ABB.

\*2, Standard models of 60 and 80 flanges do not have the heat protection option. If customization is required, please contact ABB.

\*3, The maximum speed in the technical specifications tables is based on standard conditions. If it is required to exceed the maximum speed in the technical specifications tables, please contact ABB.

## Product information

### Model description

H	D	S	1	3	0	c	-	t	t	t	p	p	v	f	f	k	b	s
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#### Flange dimension

60 mm  
 80 mm  
 6A: 60mm, plastic connector  
 8A: 80mm, plastic connector  
 65 mm  
 100 mm  
 130 mm  
 180 mm  
 240 mm

#### Motor Options

W: Water Cooled  
 F: Fan Cooled  
 C: Large inertia<sup>1</sup>  
 - : Regular inertia

#### Rated torque

08: ≤ 8 Nm

#### Rated power<sup>2</sup>

1<sup>st</sup> 2 digits of power value by kW  
 17: 1.7 kW, below 10kW (HDS60/80/65/100/130/180)  
 15: 15kW, 10kW and above (HDS240)

#### Input voltage

A: 3ph 230 VAC  
 B: 3ph 400 VAC

#### Feedback<sup>3</sup>

R: Resolver  
 E: Incremental encoder, w/commutation, 2500 ppr  
 S: Absolute encoder, single-turn, Smart Abs, 17 bit  
 M: Absolute encoder, multi-turn, Smart Abs, 17 + 16 bit<sup>4</sup>  
 S2: Absolute encoder, single-turn, Smart Abs, 23 bit  
 M2: Absolute encoder, multi-turn, Smart Abs, 23 + 16 bit<sup>4</sup>  
 G: Absolute encoder, single-turn, single-cable, Hiperface DSL  
 D: Absolute encoder, multi-turn, single-cable, Hiperface DSL  
 D3: Absolute encoder, single-turn, Hiperface SKS36, 128 sine/cosine periods per revolution  
 D4: Absolute encoder, multi-turn, Hiperface SKM36, 128 sine/cosine periods per revolution, 4096 revolutions measurable

#### Shaft end

K: Keyway (Half key balance)  
 N: No Keyway

#### Brake

B: With brake  
 N: Without Brake

#### Oil Seal

S: With seal  
 N: Without seal

Notes: \*1, Large inertia types have the same dimensions as the corresponding regular inertia types.

\*2, For motors below 10kW (HDS65/100/130/180), "04" = 0.4kW, "17" = 1.7 kW, etc.; for 10kW and above (HDS240), "15" = 15kW, etc.

\*3, HDS series servo motors also provide the feedback encoders of EnDat protocol, please contact ABB for configuration and motor types of EnDat feedback options.

\*4, Smart Abs multi-turn absolute encoder requires external battery to operate, its feedback cable shall provide an external battery box. Please contact ABB for necessary customization needs.

## Product information

### Technical specifications

Frame	HDS60 / HDS6A		HDS80 / HDS8A	
Model	HDS60-0102A HDS6A-0102A	HDS60-0104A HDS6A-0104A	HDS80-0309A HDS8A-0309A	HDS80C-0309A HDS8AC-0309A
Input voltage	AC 230 V	AC 230 V	AC 230	AC 230
Continuous stall torque $T_o$ (Nm)	0.7	1.4	3.2	3.2
Rated torque $T_N$ (Nm)	0.637	1.27	2.7	2.7
Peak torque $T_p$ (Nm)	2.23	4.46	9.4	9.4
Rated speed $n_N$ (rpm)	3000	3000	3000	3000
Maximum speed $n_{max}$ (rpm) <sup>*1</sup>	6000	6000	6000	6000
Rated power P (kW)	0.2	0.4	0.85	0.85
Continuous stall current $I_o$ (A)	1.5	2.8	6.4	6.4
Rated current $I_N$ (A)	1.3	2.6	5.5	5.5
Peak current $I_p$ (A)	5.1	10.5	20.5	20.5
Line resistance (20□) $R_L$ (Ω)	12.9	5.1	1.42	1.42
Line inductance $L_L$ (mH)	30.9	14.6	3.94	3.94
Rotor inertia $J_M$ (kg·cm <sup>2</sup> ) <sup>*2</sup>	0.198	0.340	1.45	2.28
Torque constant $K_t$ (Nm/A) <sup>*3</sup>	0.554	0.554	0.554	0.554
Voltage constant $K_e$ (Vrms/krpm)	33.5	33.5	33.5	33.5
Electrical time constant $t_e$ (ms)	2.39	3.96	3.66	3.66
Mechanical time constant $t_m$ (ms)	0.4	0.3	0.4	1
Thermal time constant $t_{th}$ (min)	6	9	16	16
Weight W(kg) <sup>*4</sup>	1.4	1.6	2.5	2.7
Number of poles p	10	10	10	10

Frame	HDS65		
Model	HDS65-0102A	HDS65-0104A	HDS65-0206A
Input voltage	AC 230 V	AC 230 V	AC 230 V
Continuous stall torque $T_o$ (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)	5000	5000	5000
Rated power P (kW)	0.19	0.38	0.57
Continuous stall current $I_o$ (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□) $R_L$ (Ω)	5.27	2.07	1.45
Line inductance $L_L$ (mH)	17.30	8.64	6.40
Rotor inertia $J_M$ (kg·cm <sup>2</sup> )	0.16	0.27	0.38
Torque constant $K_t$ (Nm/A)	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)	1.41	1.98	2.55
Number of poles p	10	10	10

Notes: \*1, The max speed in applications shall be co-decided by the input voltage and the output frequency range and the output frequency range 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  $T_o$ .

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

## Product information

### Technical specifications

Frame	HDS100			
Model	HDS100-0206A	HDS100C-0206A	HDS100-0308A	HDS100C-0308A
Input voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Continuous stall torque $T_o$ (Nm)	2.8	2.8	3.4	3.4
Rated torque $T_N$ (Nm)	2	2	2.5	2.5
Peak torque $T_p$ (Nm)	6	6	7.5	7.5
Rated speed $n_N$ (rpm)	3000	3000	3000	3000
Maximum speed $n_{max}$ (rpm)	4000	4000	4000	4000
Rated power P (kW)	0.63	0.63	0.75	0.75
Continuous stall current $I_o$ (A)	4.3	4.3	5.8	5.8
Rated current $I_N$ (A)	3.1	3.1	4.3	4.3
Peak current $I_p$ (A)	11.5	11.5	15.5	15.5
Line resistance (20°C) $R_L$ ( $\Omega$ )	2.92	2.92	1.10	1.10
Line inductance $L_L$ (mH)	17.10	17.10	7.54	7.54
Rotor inertia $J_M$ (kg·cm <sup>2</sup> )	0.76	2.00	1.31	2.68
Torque constant $K_t$ (Nm/A)	0.73	0.73	0.68	0.68
Voltage constant $K_e$ (Vrms/krpm)	44.0	44.0	41.3	41.3
Electrical time constant $t_e$ (ms)	5.9	5.9	6.9	6.9
Mechanical time constant $t_m$ (ms)	0.4	1.0	0.3	0.6
Thermal time constant $t_{th}$ (min)	18	18	28	28
Weight W(kg)	3.71	4.00	4.71	5.00
Number of poles p	10	10	10	10

Frame	HDS100			
Model	HDS100-0413A	HDS100C-0413A	HDS100-0619A	HDS100C-0619A
Input voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Continuous stall torque $T_o$ (Nm)	5	5	7.5	7.5
Rated torque $T_N$ (Nm)	4	4	6	6
Peak torque $T_p$ (Nm)	12	12	18	18
Rated speed $n_N$ (rpm)	3000	3000	3000	3000
Maximum speed $n_{max}$ (rpm)	4000	4000	4000	4000
Rated power P (kW)	1.30	1.30	1.90	1.90
Continuous stall current $I_o$ (A)	8.6	8.6	12.6	12.6
Rated current $I_N$ (A)	6.9	6.9	10.5	10.5
Peak current $I_p$ (A)	25.7	25.7	39.5	39.5
Line resistance (20°C) $R_L$ ( $\Omega$ )	1.10	1.10	0.65	0.65
Line inductance $L_L$ (mH)	7.54	7.54	5.15	5.15
Rotor inertia $J_M$ (kg·cm <sup>2</sup> )	1.31	2.68	1.85	3.35
Torque constant $K_t$ (Nm/A)	0.68	0.68	0.69	0.69
Voltage constant $K_e$ (Vrms/krpm)	41.3	41.3	41.8	41.8
Electrical time constant $t_e$ (ms)	6.9	6.9	7.9	7.9
Mechanical time constant $t_m$ (ms)	0.3	0.6	0.2	0.4
Thermal time constant $t_{th}$ (min)	28	28	23	23
Weight W(kg)	4.71	5.00	5.51	5.80
Number of poles p	10	10	10	10

## Product information

### Technical specifications

Frame	HDS130			
Model	HDS130-0620A	HDS130C-0620A	HDS130-1225A	HDS130C-1225A
Input voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Continuous stall torque $T_o$ (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 $I_o$ (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□) $R_L$ (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 <sup>2</sup> )	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-1829B
Input voltage	AC 400V	AC 400V	AC 400V	AC 400V	AC 400V	AC 400V
Continuous stall torque $T_o$ (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 $I_o$ (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□) $R_L$ (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 <sup>2</sup> )	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	HDS180					
Model	HDS180-2540B	HDS180C-2540B	HDS180-3555B	HDS180C-3555B	HDS180-4876B	HDS180C-4876B
Input voltage	AC 400 V	AC 400 V	AC 400 V	AC 400 V	AC 400 V	AC 400 V
Continuous stall torque $T_o$ (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 $I_o$ (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 <sup>2</sup> )	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

Frame	HDS240			
Model	HDS240-5011B	HDS240-7215B	HDS240F-6715B	HDS240F-9320B
Input voltage	AC 400 V	AC 400 V	AC 400 V	AC 400 V
Continuous stall torque $T_o$ (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 $I_o$ (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 $J_M$ (kg·cm <sup>2</sup> )	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

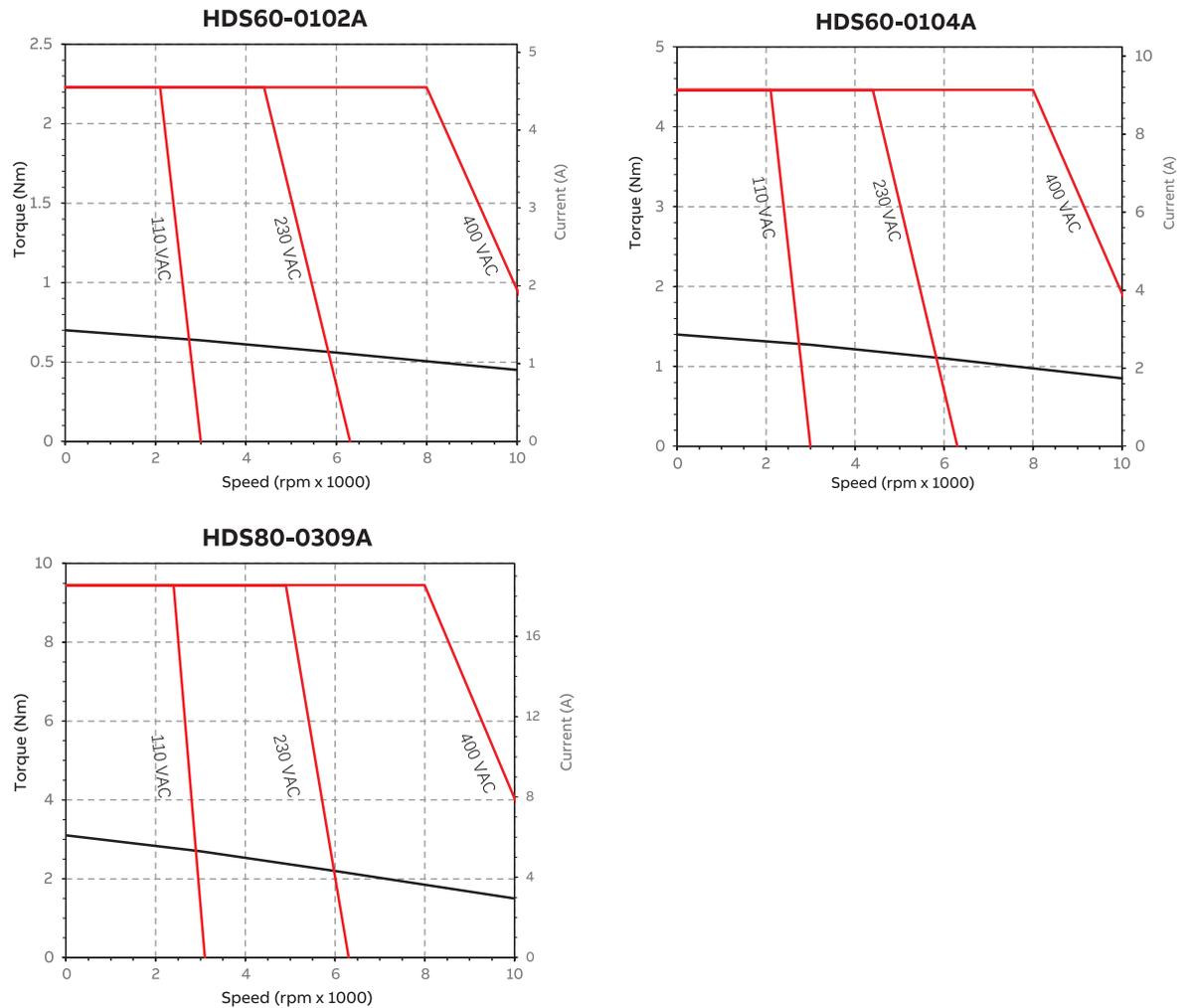
## Product information

### 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.



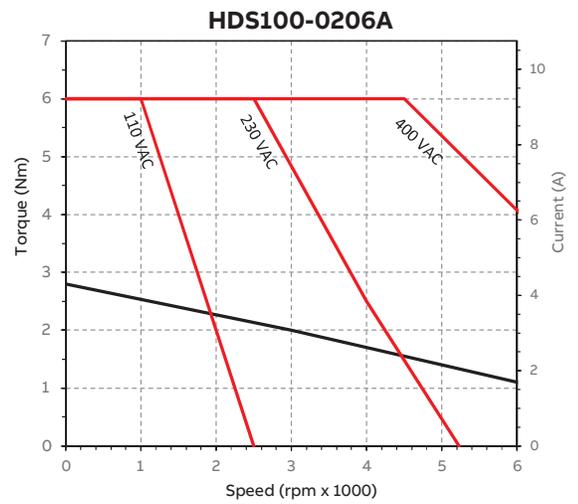
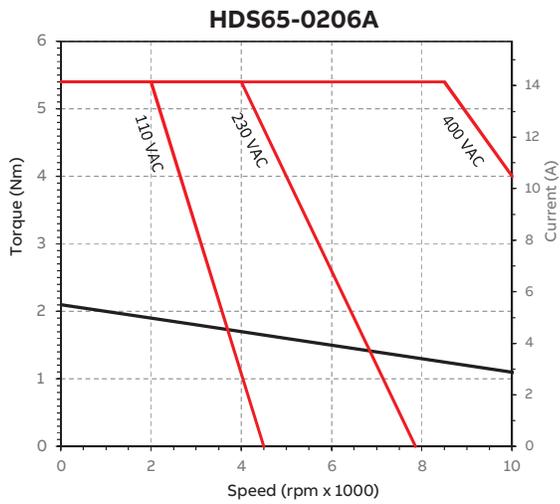
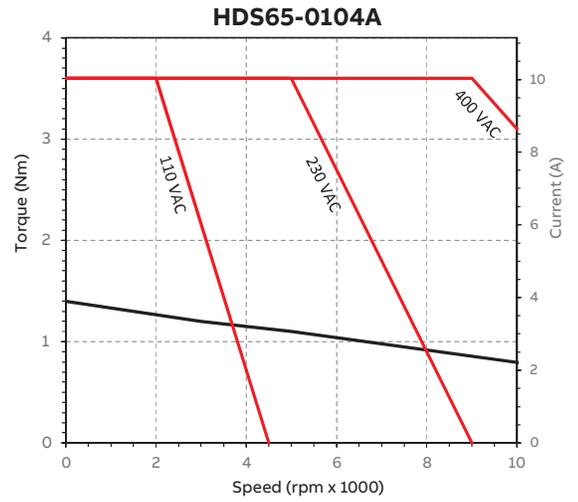
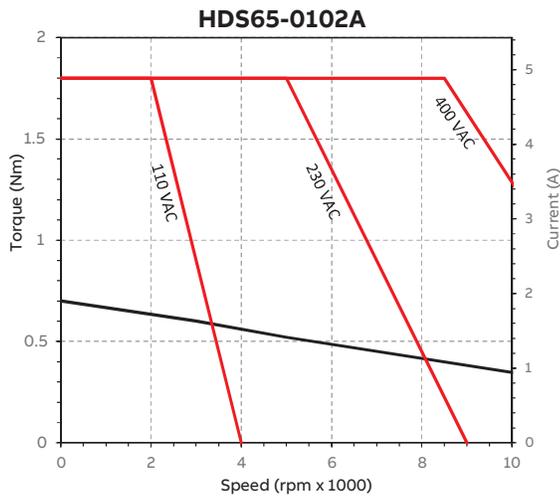
Notes: \*1, Refer to the General Technical Specification for Permanent Magnetic AC Servo Motor (GB/T30549-2014).

\*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.

\*3, The actual maximum speed at which the motor can operate is related to the output frequency of the drive. The maximum speeds covered by the different voltages in curves are values not considering frequency limits. If it is required to exceed the maximum speed, please contact ABB.

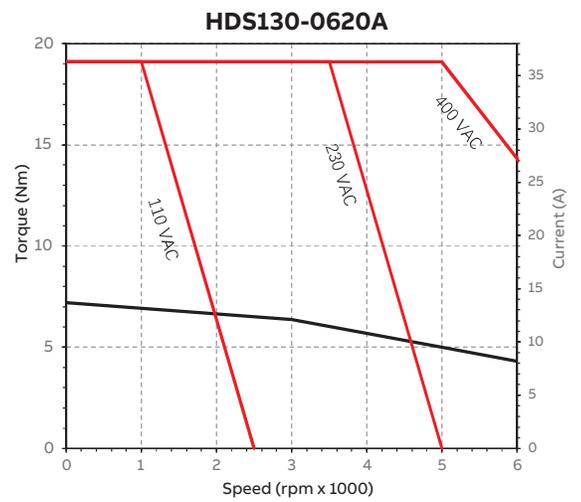
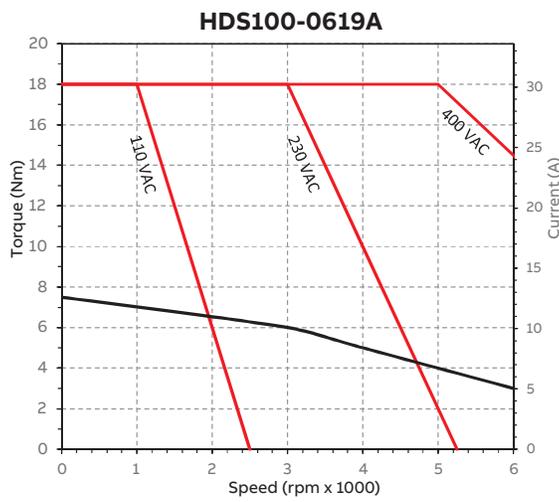
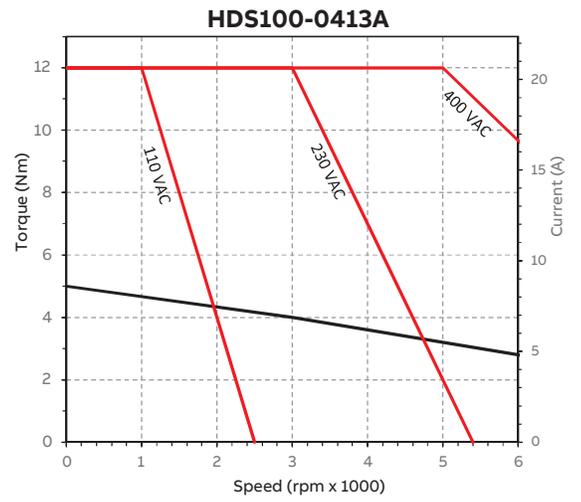
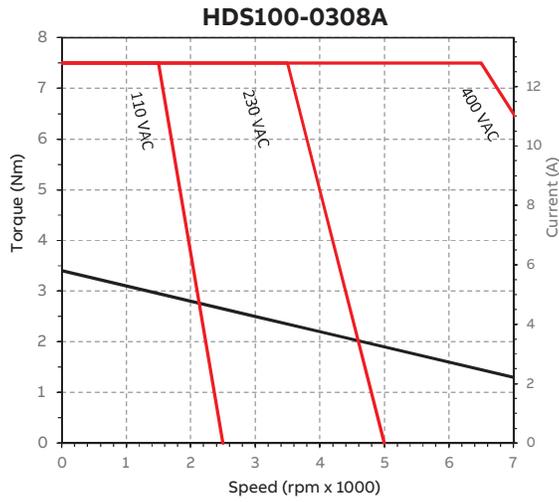
## Product information

### Performance curves



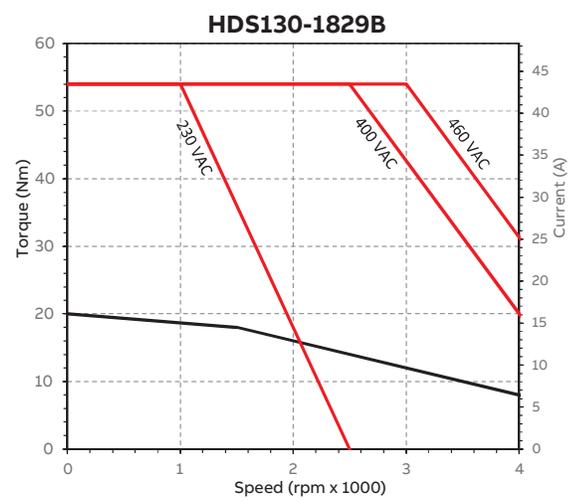
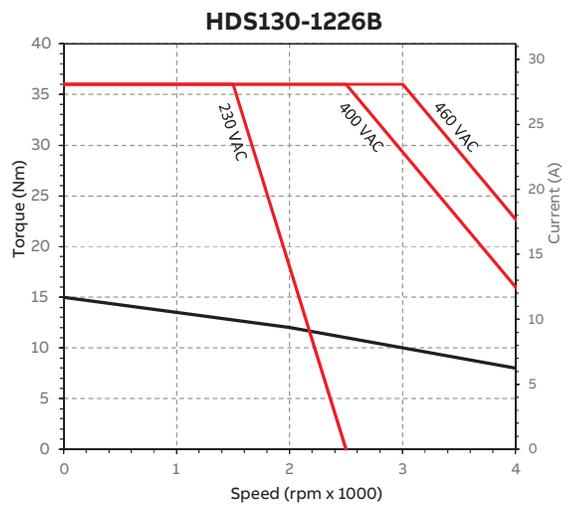
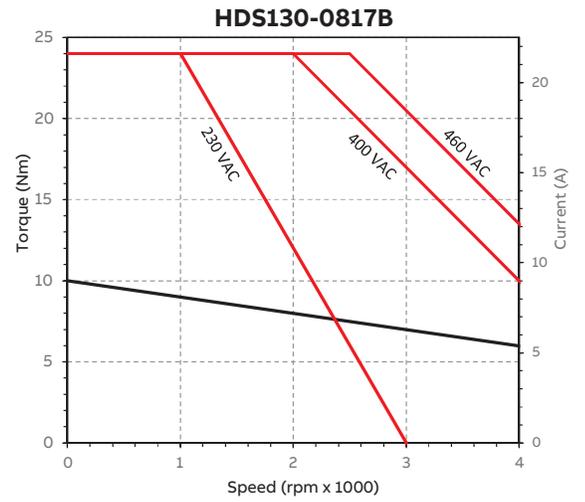
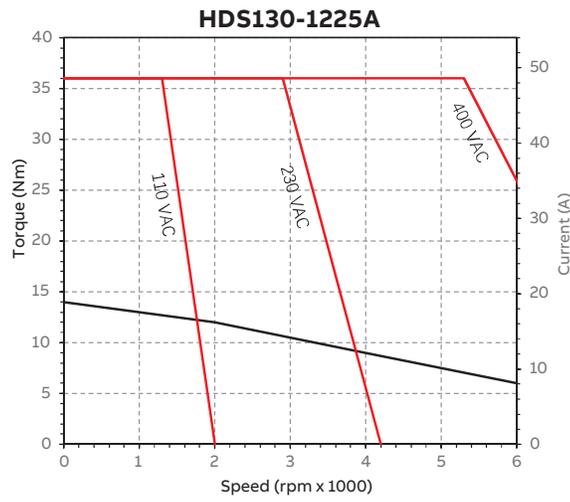
# Product information

## Performance curves



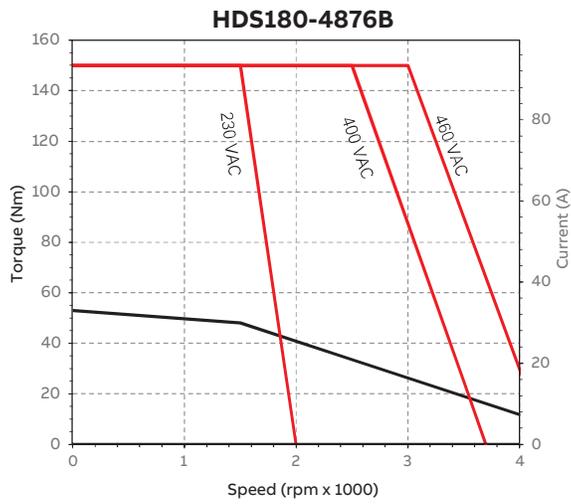
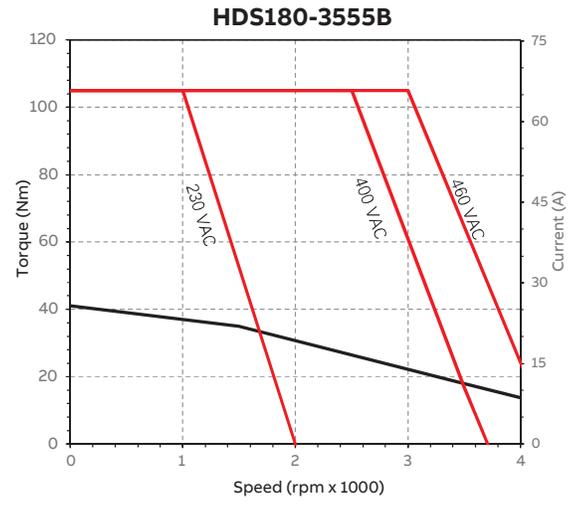
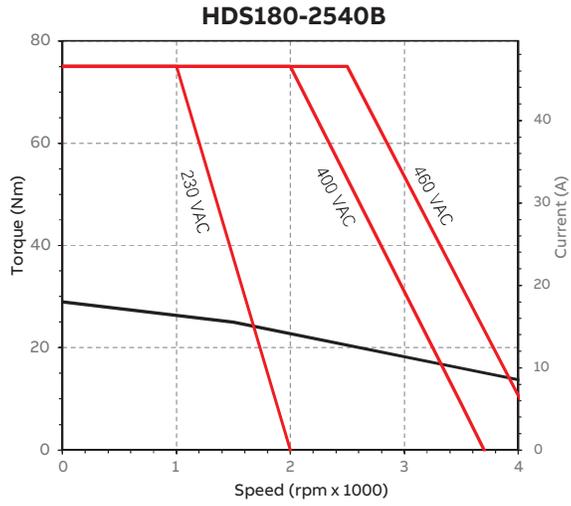
## Product information

### Performance curves



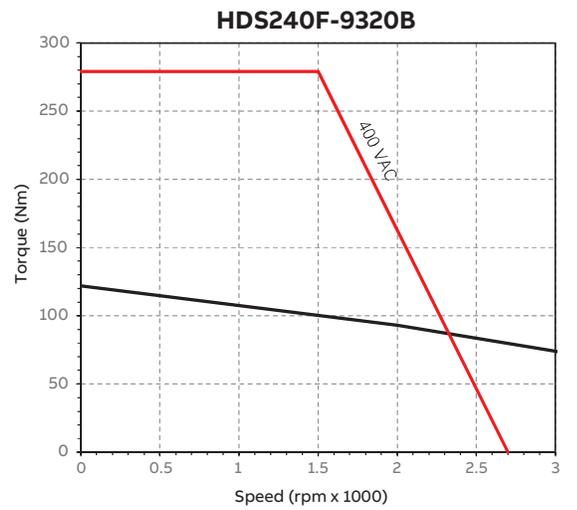
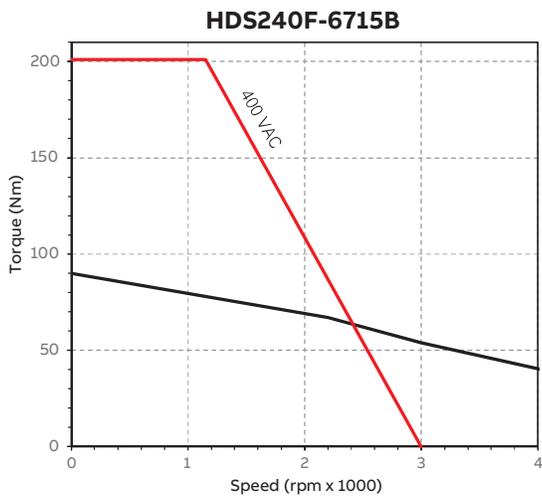
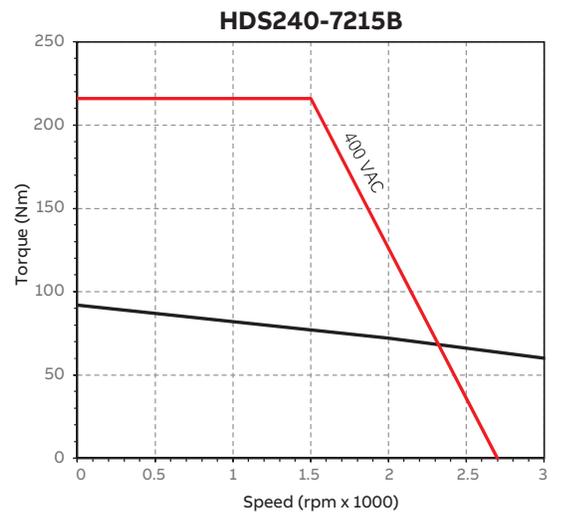
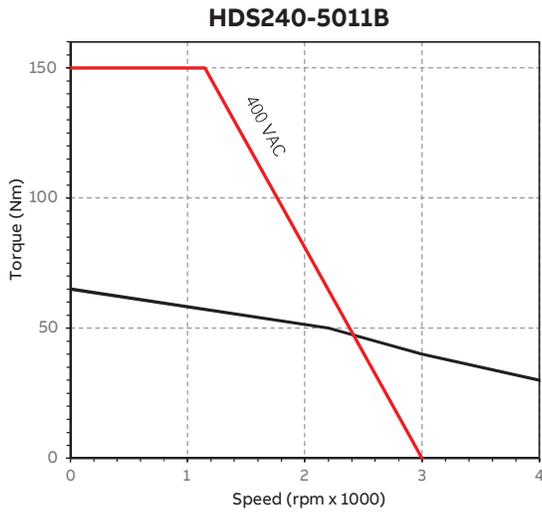
## Product information

### 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, dimensions<sup>1</sup> 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 flange (mm)	Heat dissipation panel dimensions L*W*H (mm)
60/80	250*250*6
65	210*210*5
100	300*300*8
130	390*390*10
180	380*380*8 (two panels)
240	380*380*8 (two panels)

In derating scenarios, the allowable torque/power of the motor shall be determined according to the table below<sup>2</sup> (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.

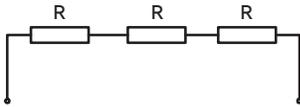
Installation altitude (m)	Ambient temperature (°C)				
	<30	40	45	50	55
1000	1.07	1.00	0.96	0.92	0.87
1500	1.04	0.97	0.93	0.89	0.84
2000	1.00	0.94	0.90	0.86	0.82
2500	0.96	0.90	0.86	0.83	0.78
3000	0.92	0.86	0.82	0.79	0.75
3500	0.88	0.82	0.79	0.75	0.71
4000	0.82	0.77	0.74	0.71	0.67
4500	0.76	0.72	0.70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

## Product information

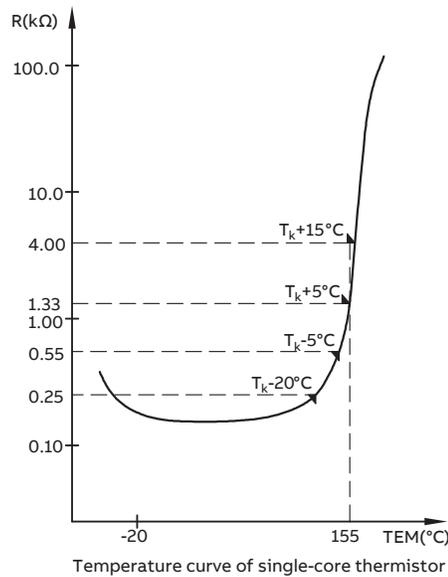
### Thermal protection

The HDS series servo motors have Class F thermal protection, the maximum allowable operating temperature of the motor winding is 155°C and the maximum allowable temperature rise is 105 K at the environmental temperature 40°C.

3 x PTC 155 thermistor\*1 is used and are connected in series to protect the 3-phase windings of motor.



The thermistor feature is shown below:

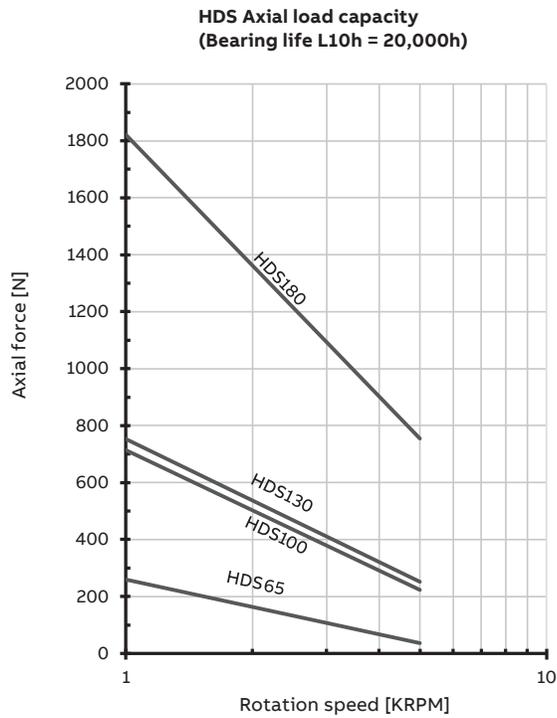


Features of 3xPTC155	
Operating temperature	155°C
Resistance at 25°C	≤300Ω
Resistance below 135°C	≤750Ω
Resistance at 150°C	≤1650Ω
Resistance at 160°C	≥3990Ω

## Product information

### Bearing load capacity

#### Axial load capacity - HDS65/100/130/180

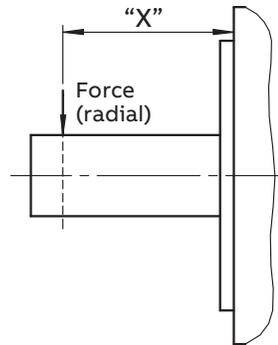


Bearing life:  $L_{10h} > 20,000$  hours,  $C/P > 15$   
 $L_{10h}$ : Rated basic life of bearing in ISO 281  
 C: Rated basic dynamic load  
 P: Equivalent dynamic load

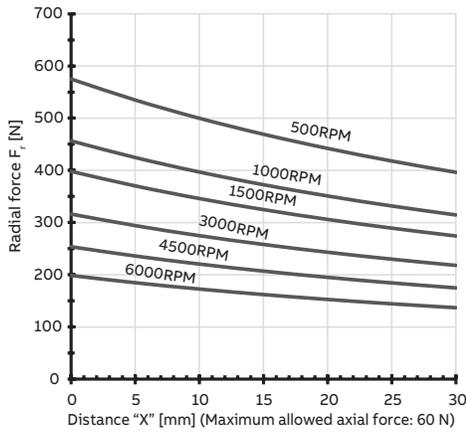
# Product information

## Bearing load capacity

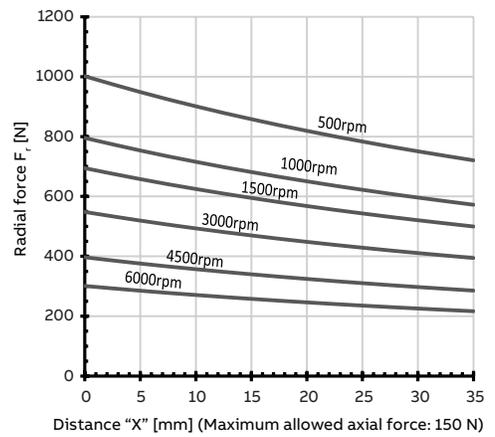
### Radial load capacity



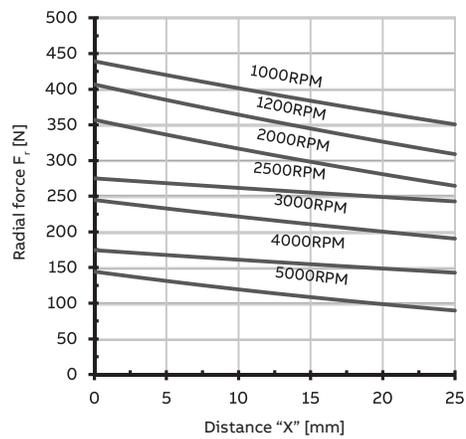
HDS60 Radial load capacity



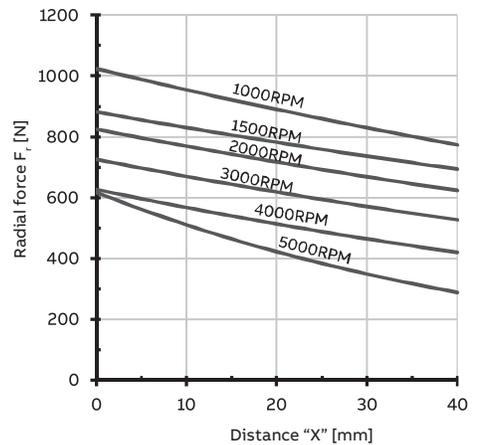
HDS80 Radial load capacity



HDS65 Radial load capacity



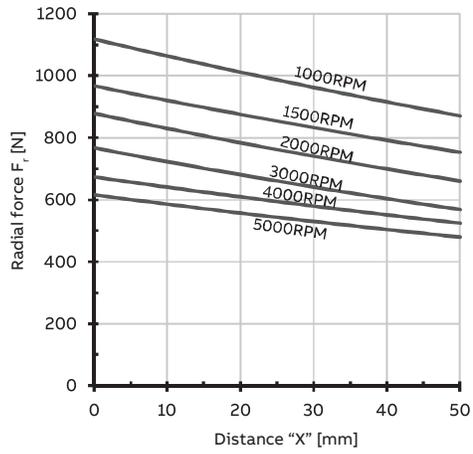
HDS100 Radial load capacity



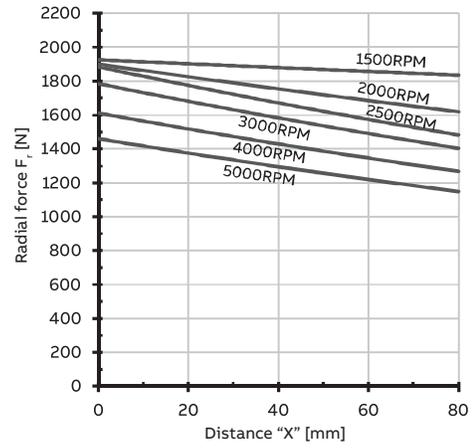
## Product information

### Bearing load capacity

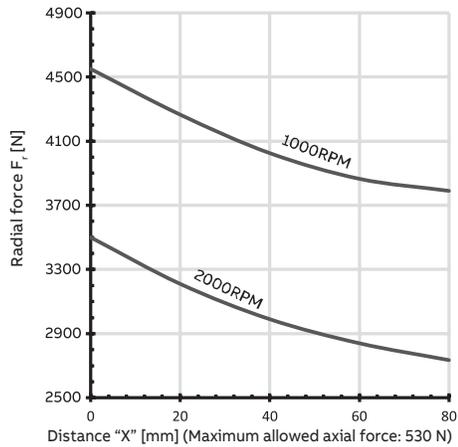
HDS130 Radial load capacity



HDS180 Radial load capacity



HDS240 Radial load capacity

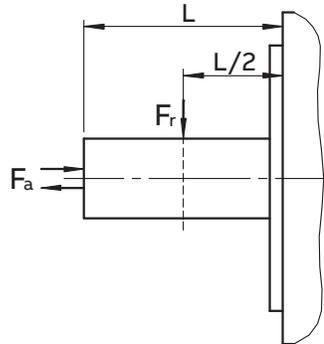


# Product information

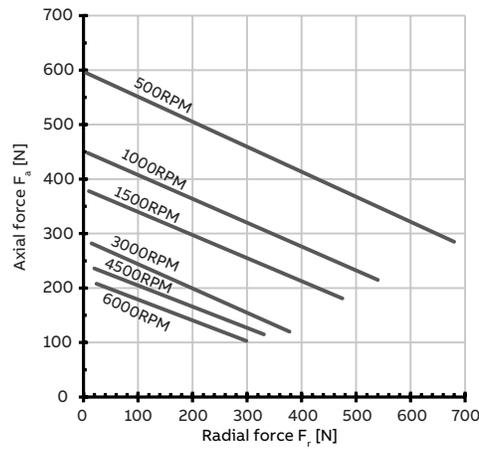
## Bearing load capacity

### Joint load capacity

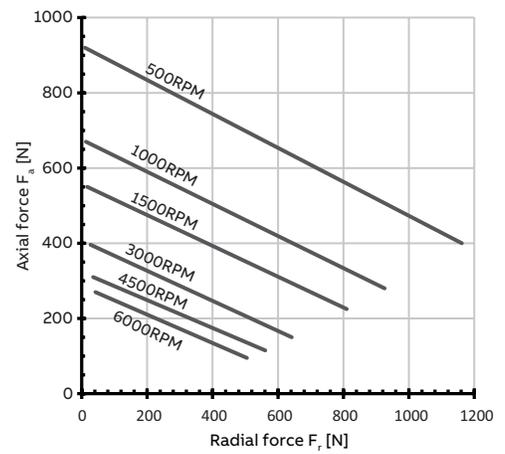
Load position: at 1/2 of shaft extension



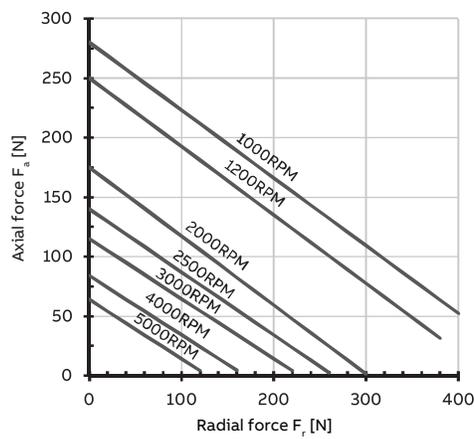
HDS60 Joint load capacity



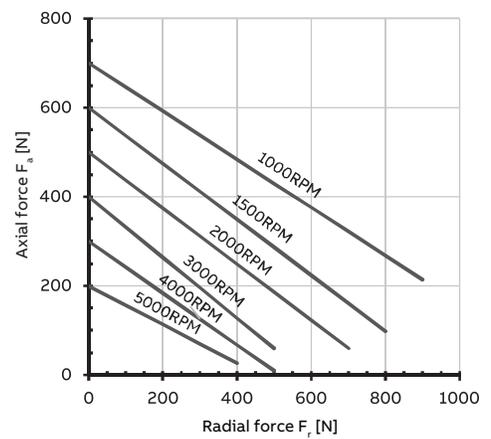
HDS80 Joint load capacity



HDS65 Joint load capacity



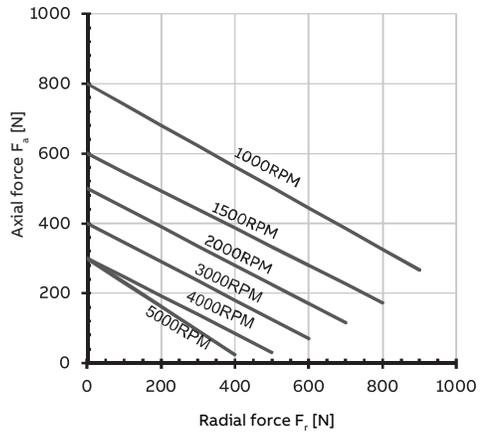
HDS100 Joint load capacity



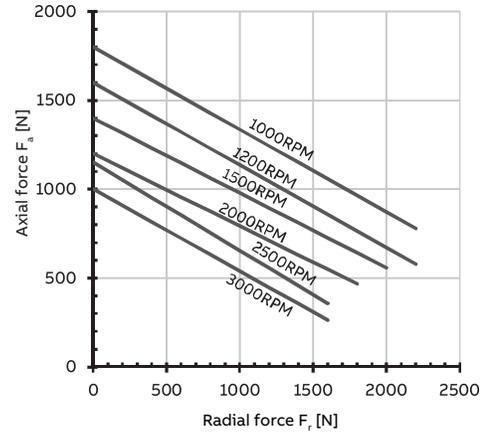
## Product information

### Bearing load capacity

HDS130 Joint load capacity



HDS180 Joint load capacity



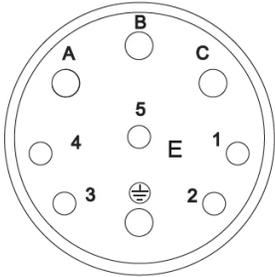
## Product information

Power and feedback interface

### Power interface - HDS60/80/6A/8A

#### Metal connector

M15 power connector

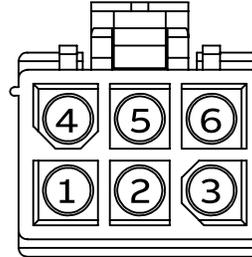


HDS60/80

Pin	Definition
A	U
B	V
C	W
PE	GND
1	Brake 24 V (optional)
2	Brake 0 V (optional)
3~5	-

#### Plastic connector

6-pin plastic connector



HDS60/80

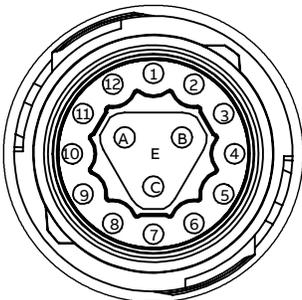
Pin	Definition
1	U
2	V
3	Brake 24 V (optional)
4	W
5	GND and shield
6	Brake 0 V (optional)

### Feedback interface - HDS60/80/6A/8A

#### Absolute encoder

(Smart ABS single-turn & multi-turn)

M15 Signal connector



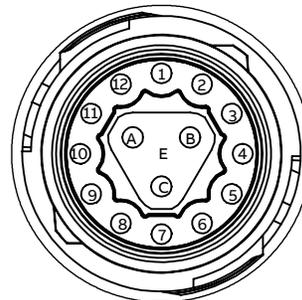
HDS60/80

Pin	Definition
1	DC +5V
2	GND
3	VB (multi-turn battery)
4	GND (multi-turn battery)
5	Data +
6	Data -
7~C	-

#### Absolute encoder

(Hiperface single-turn & multi-turn)

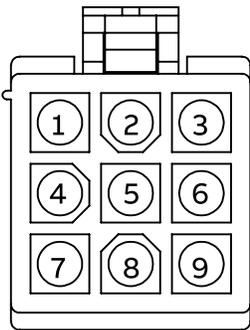
M15 Signal connector



HDS60/80

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

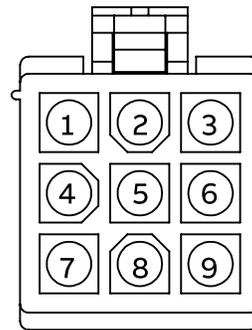
9-pin plastic connector



HDS6A/8A

Pin	Definition
1	DC +5V
2	GND
3	VB (multi-turn battery)
4	GND (multi-turn battery)
5	Data +
6	Data -
7	-
8	-
9	Shield

9-pin plastic connector



HDS6A/8A

Pin	Definition
1	Us
2	GND
3	COS +
4	COS -
5	Data +
6	Data -
7	SIN +
8	SIN -
9	Shield

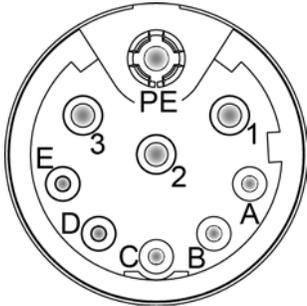
## Product information

Power and feedback interface

### Power interface - HDS65/100/130/180/240

#### Dual cable

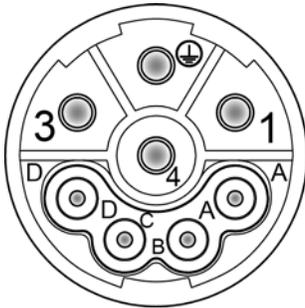
M17 power connector



HDS65

Pin	Definition
1	U
2	V
3	W
PE	Ground
A	Thermistor
B	Thermistor
C	Brake (optional)
D	Brake (optional)
E	-

M23 power connector



HDS100/130

Pin	Definition
1	U
2	□
3	W
4	V
A	Thermistor
B	Thermistor
C	Brake (optional)
D	Brake (optional)

M40 power connector

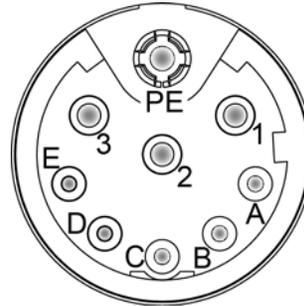


HDS180/240

Pin	Definition
U	U
V	V
W	W
PE	Ground
1	Thermistor
2	Thermistor
+	Brake (optional)
-	Brake (optional)

#### Single cable

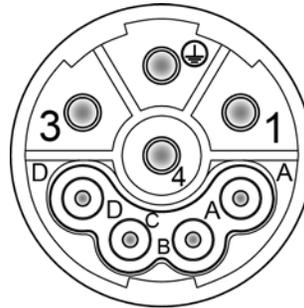
M17 power connector



HDS65

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

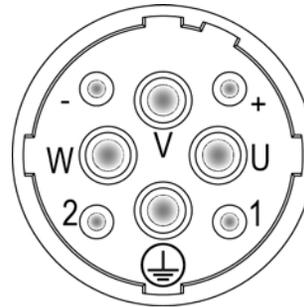
M23 power connector



HDS100/130

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

M40 power connector



HDS180/240

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

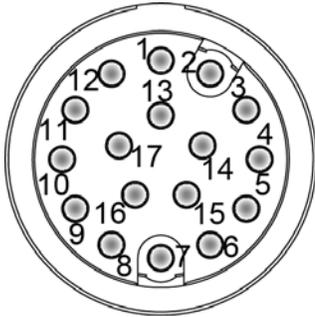
## Product information

Power and feedback interface

### Feedback interface - HDS65/100/130/180/240

#### Resolver

M17 Signal connector

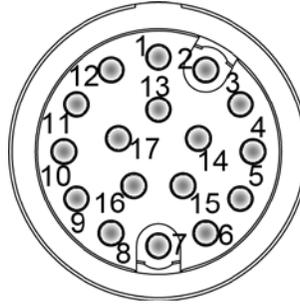


HDS65

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

#### Incremental encoder (2500 ppr)

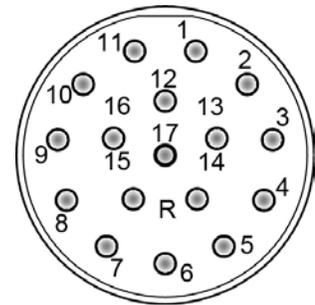
M17 Signal connector



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	-
8	Z-		

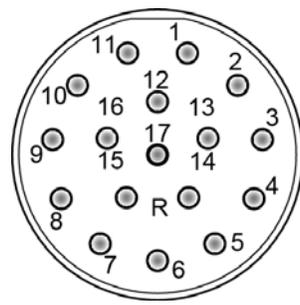
M23 Signal connector



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	-

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	-
8	Z-		

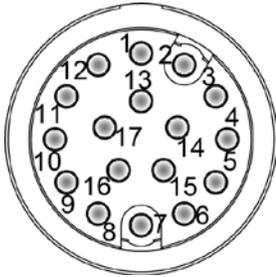
## Product information

### Power and feedback interface

#### Absolute encoder (Smart Abs, single-turn)

M17 Signal connector

HDS65

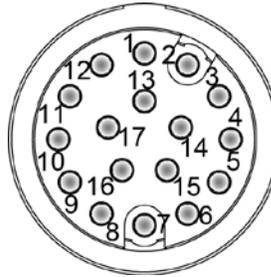


Pin	Definition
1	DC+5V
2	GND
3	-
4	-
5	SD+/Data+
6	SD-/Data-
7~17	-

#### Absolute encoder (Smart Abs, multi-turn)

M17 Signal connector

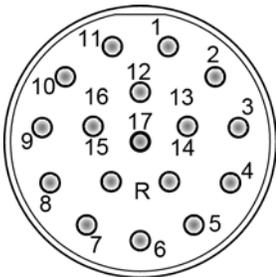
HDS65



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

M23 Signal connector

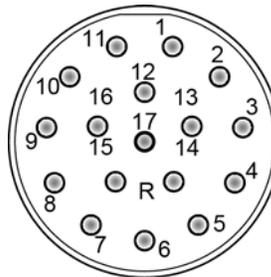
HDS100/130/180/240



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

M23 Signal connector

HDS100/130/180/240



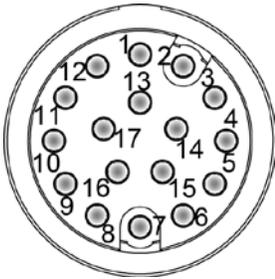
Pin	Definition
1	DC+5V
2	GND
3	VB battery
4	GND battery
5	SD+/Data+
6	SD-/Data-
7~17	-

## Product information

Power and feedback interface

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

M17 Signal connector

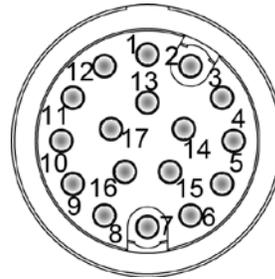


HDS65

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

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

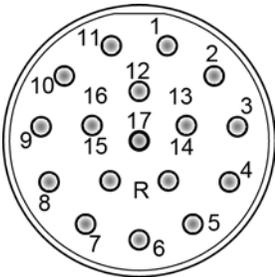
M17 Signal connector



HDS65

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

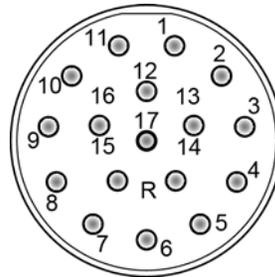
M23 Signal connector



HDS100/130/180/240

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

M23 Signal connector



HDS100/130/180/240

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



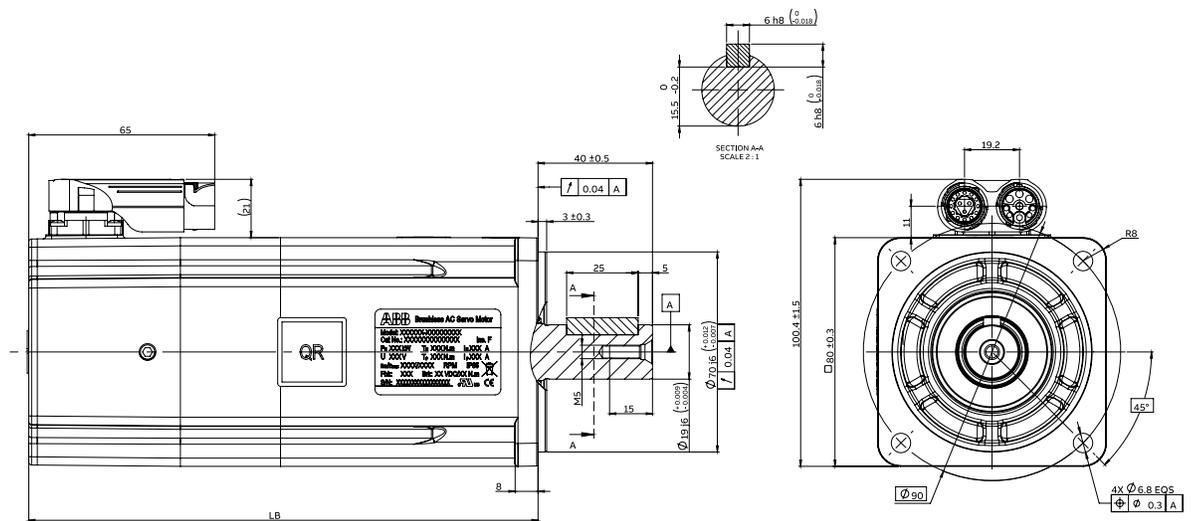
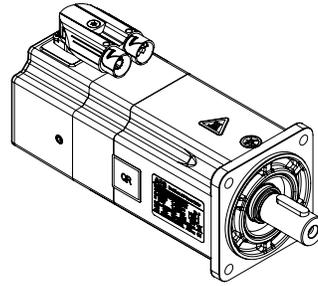


## Product information

### Motor dimension

#### HDS80 layout (dual cable)

Model	LB [mm]
HDS80-0309A, w/o brake	143
HDS80-0309A, with brake	178



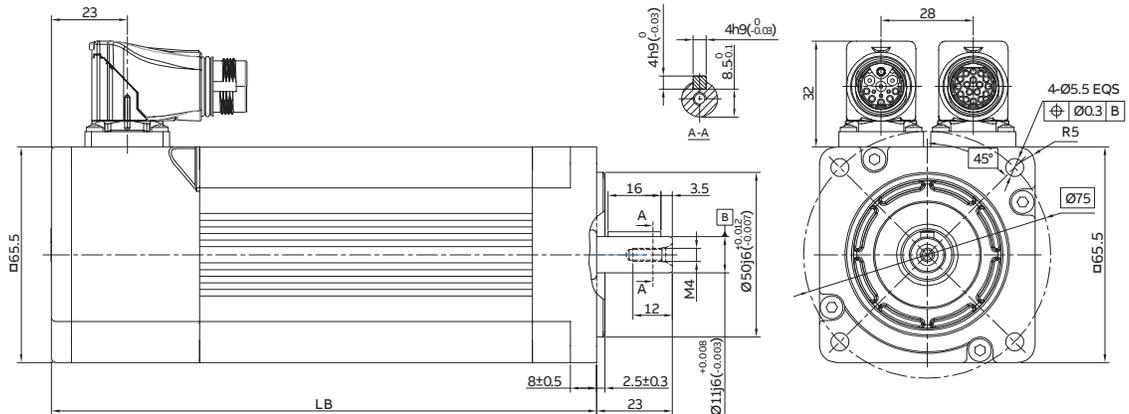
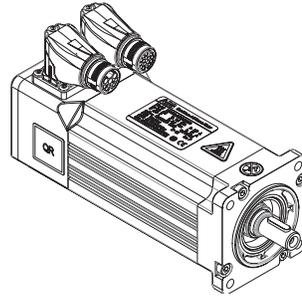


## Product information

### Motor dimension

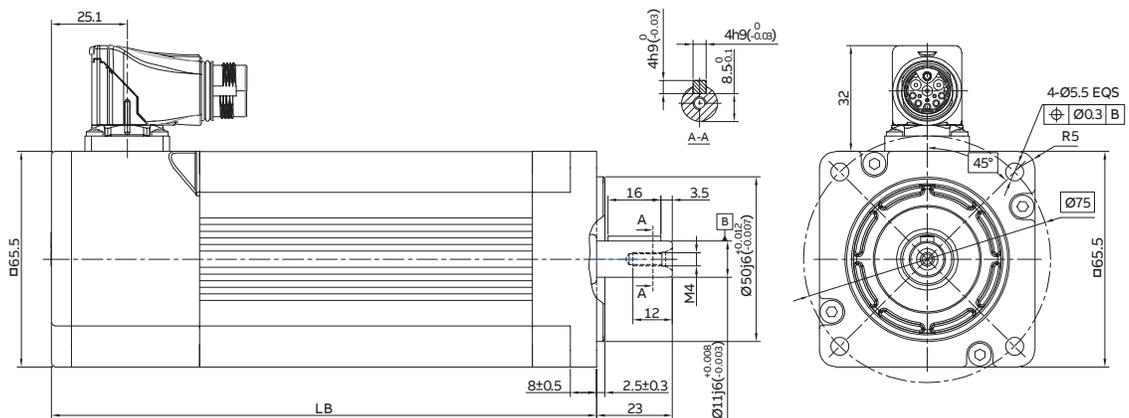
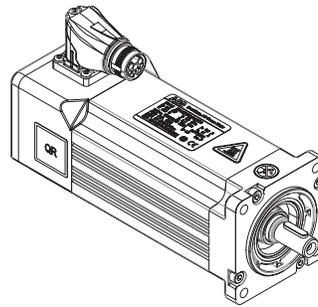
#### HDS65 layout (dual cable)

Model	LB [mm]
HDS65-0102	147.5
HDS65-0104	165.5
HDS65-0206	183.5



#### HDS65 layout (single cable)

Model	LB [mm]
HDS65-0102	147.5
HDS65-0104	165.5
HDS65-0206	183.5

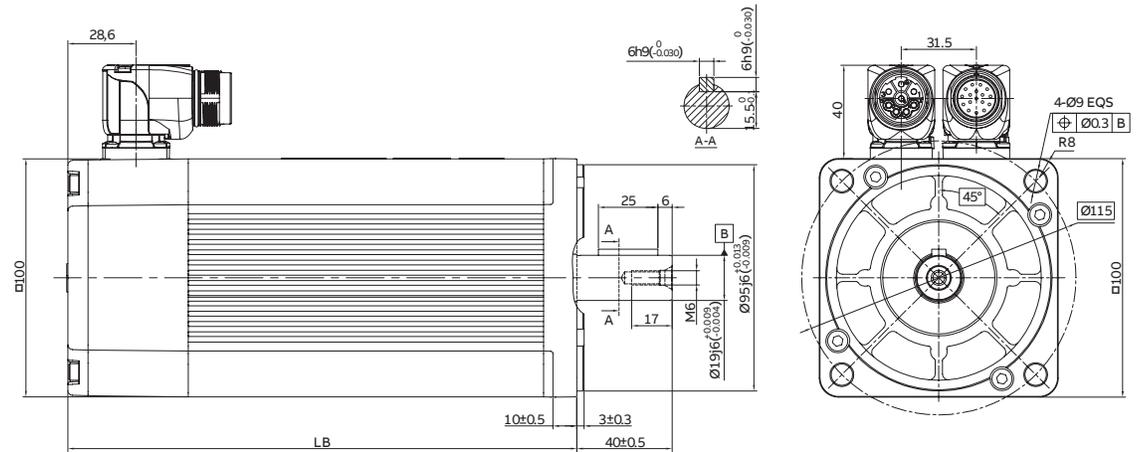
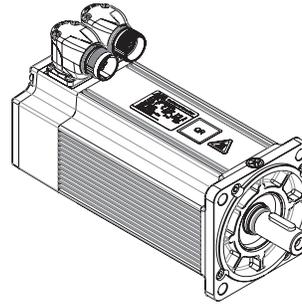


## Product information

### Motor dimension

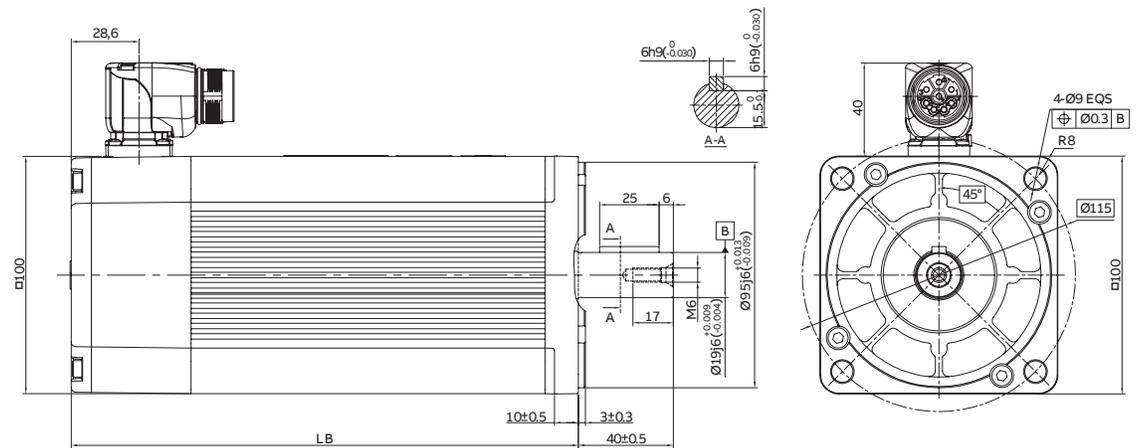
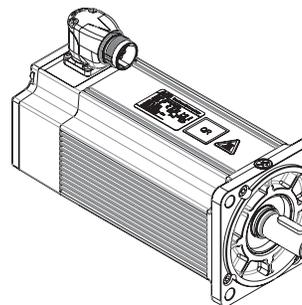
#### HDS100 layout (dual cable)

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



#### HDS100 layout (dual cable)

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

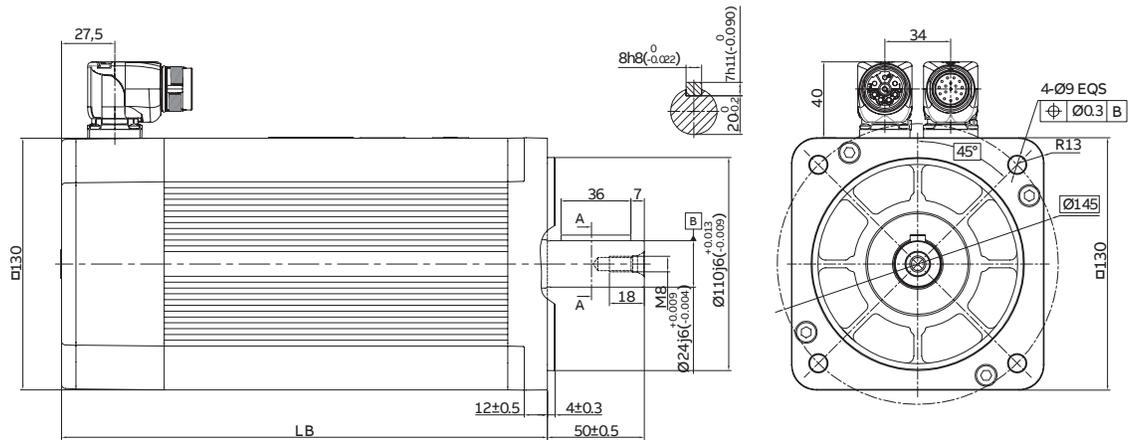
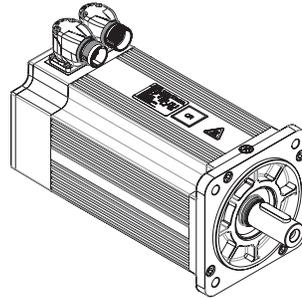


## Product information

### Motor dimension

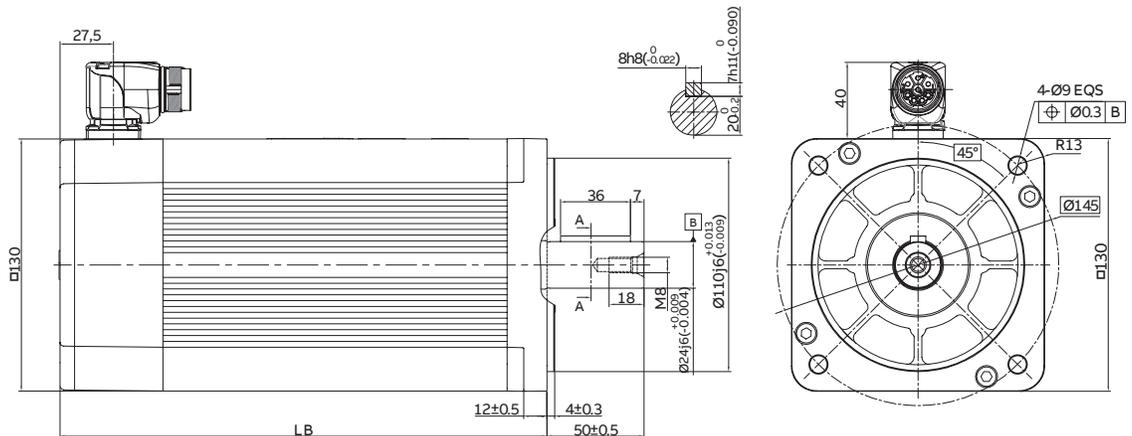
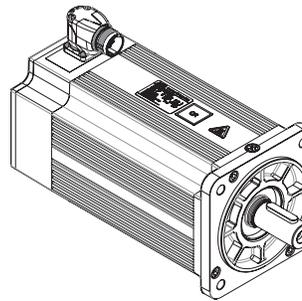
#### HDS130 layout (dual cable)

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

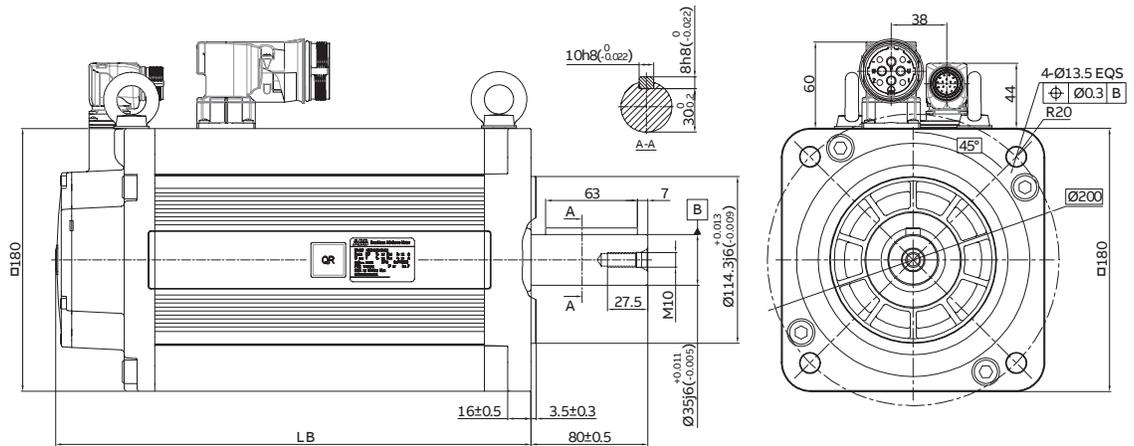
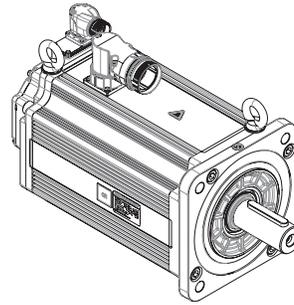


## Product information

### Motor dimension

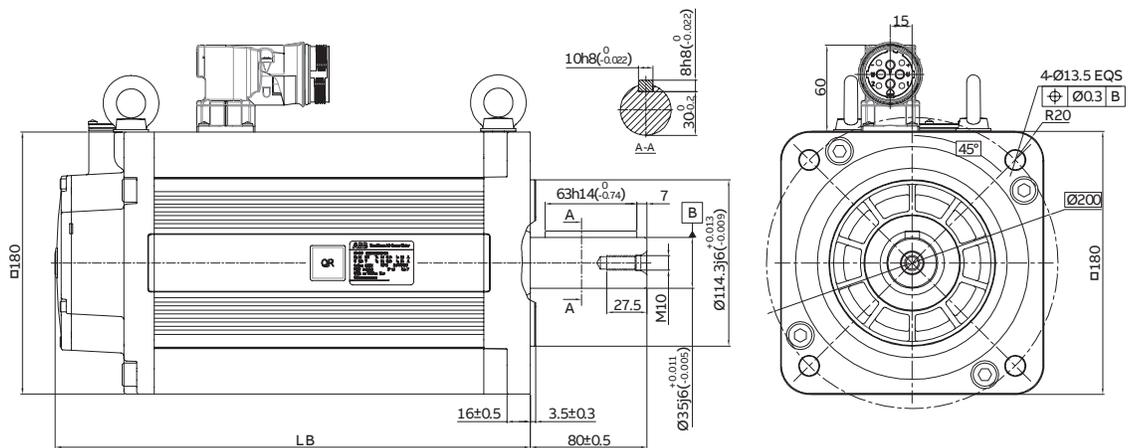
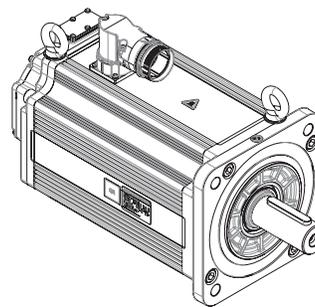
#### HDS180 layout (dual cable)

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

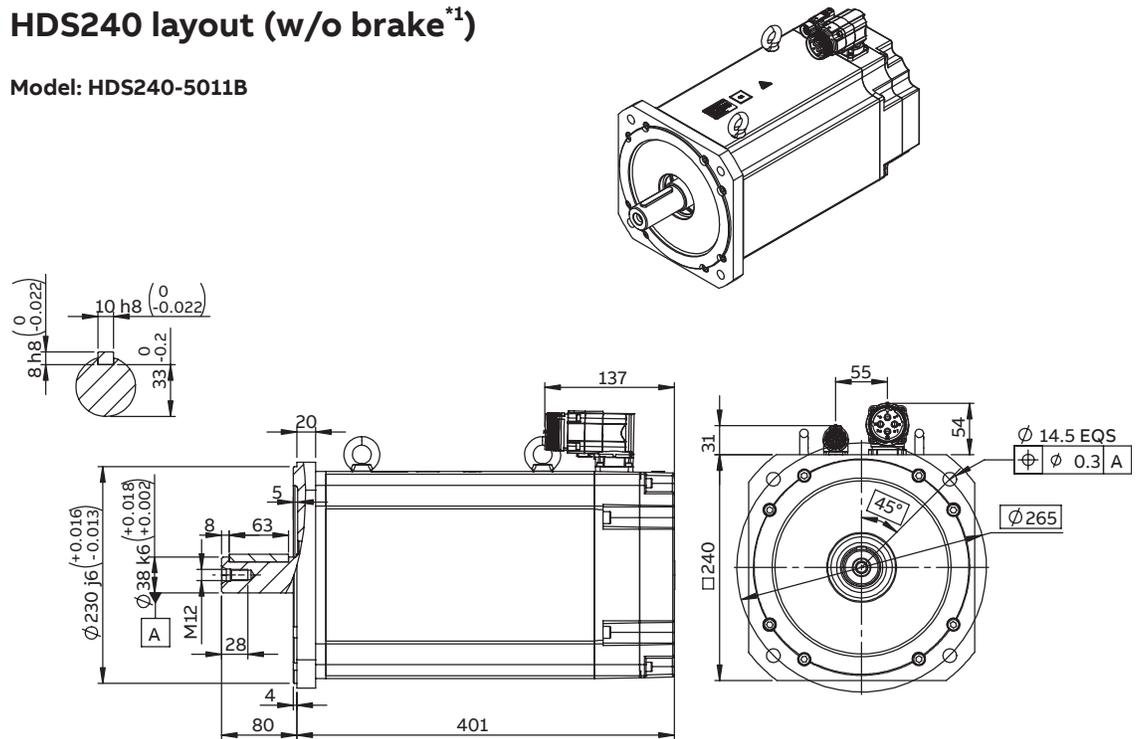


## Product information

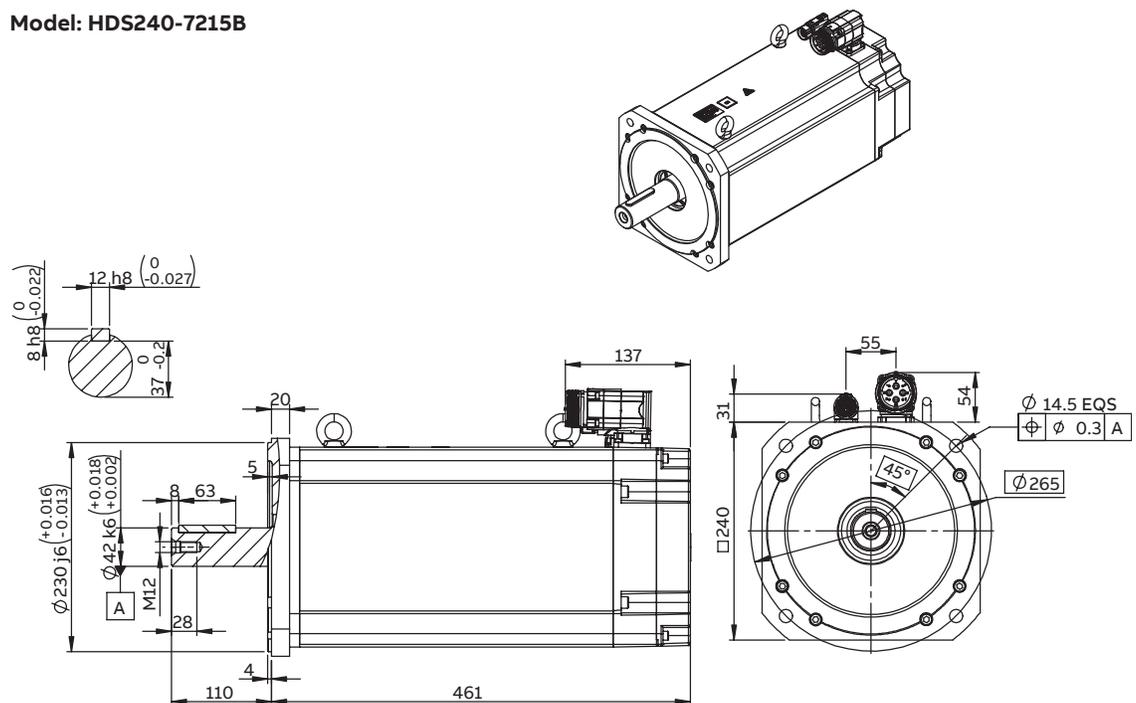
### Motor dimension

#### HDS240 layout (w/o brake <sup>\*1</sup>)

Model: HDS240-5011B



Model: HDS240-7215B



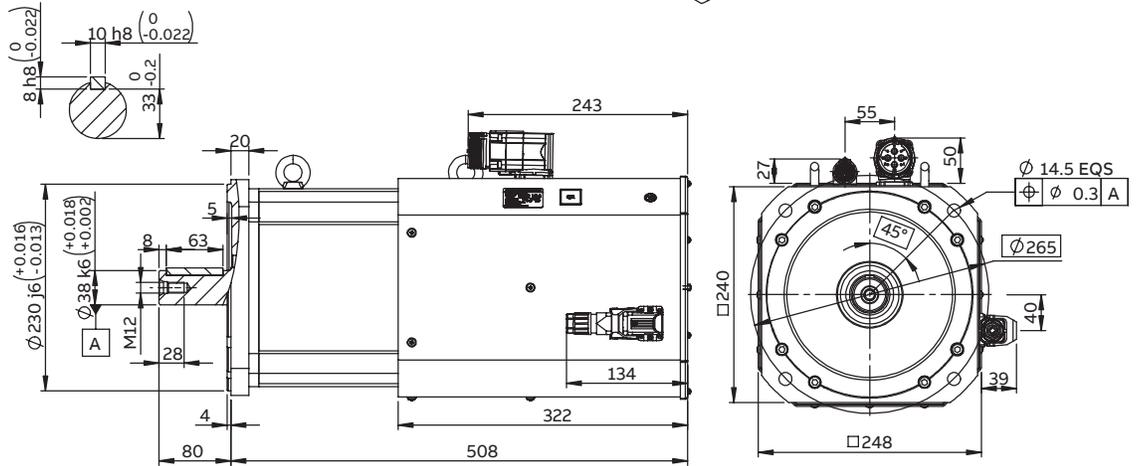
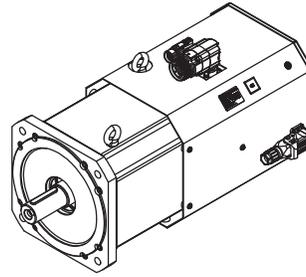
Notes: \*1, For models with brakes, the length of HDS240 motors are 70 mm longer.

# Product information

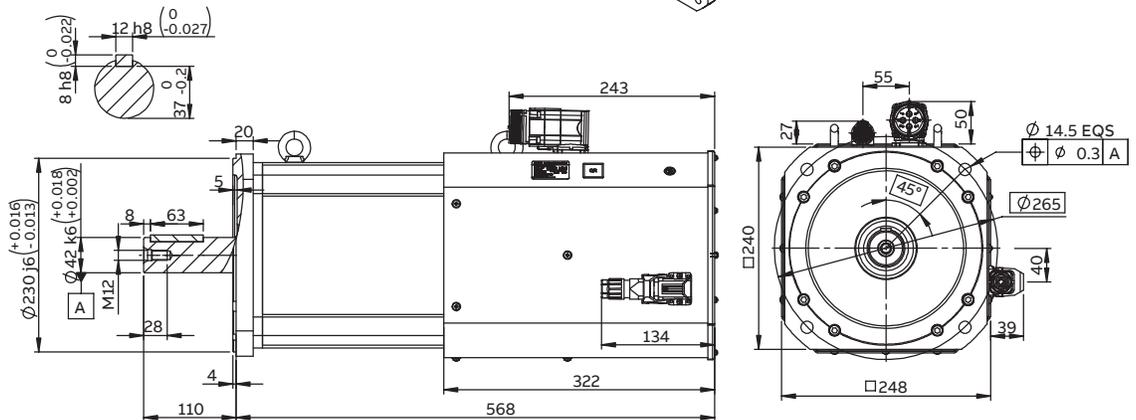
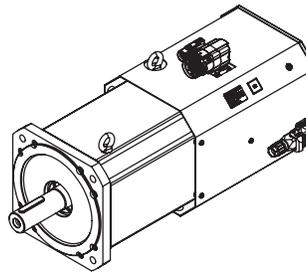
## Motor dimension

### HDS240 layout (w/o brake <sup>\*1</sup>)

Model: HDS240F-6715B



Model: HDS240F-9320B

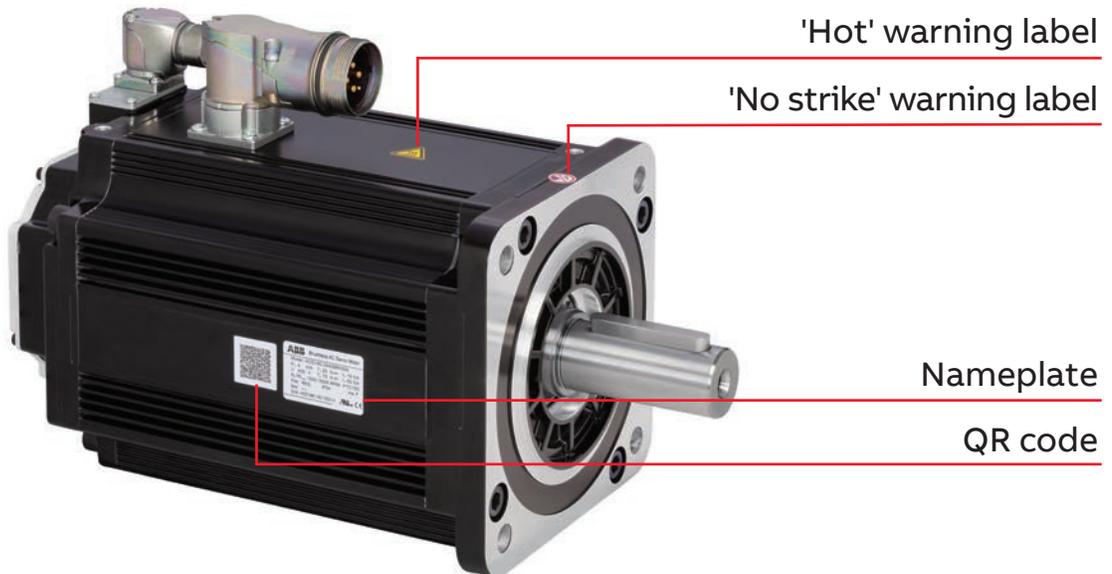


## Product information

### Nameplate and identifiers

HDS series motor is accompanied with nameplate, QR code, hot warning and no strike warning marks.

Besides the parameters on the nameplate, details of the motor could be learnt by scanning QR code.



## Options and accessories

### Brake

#### Parameters of standard brakes for HDS<sup>\*1</sup>

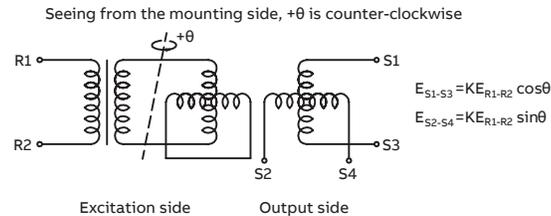
Motor model	Static torque [Nm]	Power [W]	Voltage [VDC]	Current [A]	Pull-in, release time [ms]		Rotational inertia [kg·cm <sup>2</sup> ]	Weight [kg]
					Pull-in	Release		
HDS60/6A	1.4	11.3	24	0.47	10	30	0.013	0.30
HDS80/8A	4.5	14.7	24	0.61	10	50	0.084	0.70
HDS65	2.0	11.4	24	0.47	10	58	0.03	0.33
HDS100	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	3.70
HDS240	143	42.7	24	1.80	60	450	48.60	8.50

## Options and accessories

### Feedback

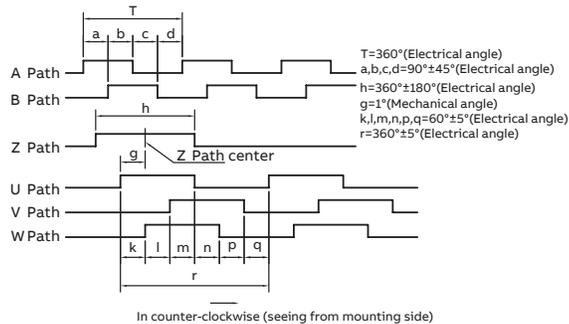
HDS series provides standard feedback options including resolver, incremental encoder, absolute encoder (Smart Abs® or Hiperface®), Hiperface DSL®, and EnDat 2.2. Please contact ABB in case of a customized feedback requirement.

#### 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 <sup>*1</sup>	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 <sup>2</sup>
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 bits/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 <sup>*2</sup>	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

C	B	L	C	0	3	0	0	6	F	3	X	F
---	---	---	---	---	---	---	---	---	---	---	---	---

#### Cable length<sup>\*1</sup>

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

#### Motor type - Power and DSL cable

08: HDS60, HDS80  
 A8: HDS6A, HDS8A  
 06: HDS65  
 13: HDS100, HDS130  
 18: HDS180  
 24: HDS240

#### Motor type - Feedback cable

08: HDS60, HDS80  
 A8: HDS6A, HDS8A  
 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: 50 A

#### 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:

CBLC0300606P: 3 m power cable, suitable to HDS65 series motor, maximum current 6 A;  
 CBLC10013F3XF: 10 m feedback cable, HDS100/130/180 motor, resolver feedback, MicroFlex e190.

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

## Options and accessories

### Cable

#### Connector P/N

S	P	M	C
---	---	---	---

0	6
---	---

F	1
---	---

#### Motor type - Power and DSL cable

08: HDS60, HDS80  
 A8: HDS6A, HDS8A  
 06: HDS65  
 13: HDS100, HDS130  
 18: HDS180  
 24: HDS240

#### Motor type - feedback cable

08: HDS60, HDS80  
 A8: HDS6A, HDS8A  
 06: HDS65  
 13: HDS100, HDS130, HDS180  
 24: HDS240

#### Type

P: Power or DSL connector

F1: Feedback connector, resolver, 6 pins

F2: Feedback connector, incremental encoder, 12 pins

F5: Feedback connector, Hiperface, 8 pins

F6: Feedback connector, Smart ABS and Hiperface, 10 pins

Example:

SPMC06P: HDS65 power connector;

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

## Options and accessories

### Cable

#### Cable P/N

S	P	C	B	1	0	0	1	6	C	F
---	---	---	---	---	---	---	---	---	---	---

#### 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: 50 A

#### Number of cores in feedback cable

06C: 6-core  
08C: 8-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.



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**ABB Motors and Mechanical Inc.**

5711 R.S. Boreham, Jr. Street  
Fort Smith, AR 72901  
Ph: 1.479.646.4711

Mechanical Power Transmission Support  
Ph: 1.864.297.4800

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