ABB servo motors

for ABB high performance machinery drives
MS series, 1.1 to 35.8 Nm nominal torque

Technical catalogue

Contents

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ABB servo motors

Matched drive and motor combination

The ABB high performance machinery drive ACSM1 and the MS series of ABB servo motors provide a compact and powerful package for machine building applications.

ABB servo motors

The MS series of ABB servo motors is ideal for operation with the ABB high performance machinery drives. The motors are robust and suitable for operation in harsh environmental conditions. The resolver feedback is highly reliable, even under demanding mechanical stress levels and in high ambient temperatures.

The series comprises four frame sizes, each available in various lengths, totaling ten variants. Ready-made power and feedback cables are also available. The motors are delivered from stock, guaranteeing quick and reliable delivery.

ABB high performance machinery drives

ABB high performance machinery drives provide speed, torque and motion control for demanding machines. The drives can control induction, synchronous and asynchronous servo and high torque motors with various feedback devices. The compact hardware and programming flexibility ensure the optimum solution. The innovative memory unit concept enables flexible drive configuration.

Feature	Advantage	Benefit
MS series AC synchronous servo motors		
Compact and low weight	20% smaller than conventional designs	More advanced features can be accomondated within a given design
High performance magnetic material	Powerful and responsive motors with dynamic performance	Machinery with higher production output and improved product quality
Brushless resolver as feedback sensor	Highly reliable motors with maintenance-free operation	Low maintenance cost and reduced machine downtime
Shaft with keyway - motor delivered with half and full key	Universal solution suitable for most applications	Easy assembly
DriveSize sizing tool	Simple selection of motor and drive combination	Optimally dimensioned and cost-effective combination of motor and drive
Ready-made power and feedback cables	Simple delivery and reliable operation	Easy cabling during installation
Stocked item	Fast delivery	Better production flow

Technical specifications

MS series technical details

MS Series Servo Motor AC 400 V										
Flange size [mm]	95		115			142		190		
Motor type	MS4612	MS4614	MS4813	MS4815	MS4817	MS4836	MS4839	MS4884	MS4887	MS4889
M_N, M_0 [Nm] 1)	1.1	2.0	3.3	4.8	6.8	10.5	15.5	19.1	28.6	35.8
M_{Max} [Nm] 2)	3.82	7.16	9.9	14.3	20.4	31.5	47.7	47.7	71.5	89.5
n_N [rpm] 3)	3000	3000	3000	3000	3000	3000	3000	2000	2000	2000
n_{Max} [rpm] 4)	5000	5000	4500	4500	4500	4500	4500	3000	3000	3000
P [kW] 5)	0.345	0.628	1.0	1.5	2.0	3.3	4.9	4.0	6.0	7.5
I_0 [A] 6)	2.3	2.2	3.0	4.3	6.1	9.1	13.9	11.2	17.7	20.3
I_N [A] 7)	2.5	2.3	3.4	4.7	6.5	9.5	14.4	11.7	18.1	20.9
I_{Max} [A] 8)	8.3	8.0	9.3	13.3	18.7	27.8	43.3	28.6	44.8	51.3
K_T [Nm/A $^{\pm 10\%}$] 9)	0.47	0.91	1.11	1.12	1.12	1.15	1.121	1.69	1.612	1.76
F_N [Hz] 10)	200	200	200	200	200	200	200	133	133	133
B_{emf} in n_N [V] 11)	85.4	164.9	202.3	202.6	203.2	208.7	203.5	204.8	195.1	212.9
J_M [kgm^2 x 10-4] 12)	0.61	1.08	2.59	3.60	4.70	11.60	17.20	29.50	43.30	57.00
J_M + Brk [kgm^2 x 10-4] 13)	0.77	1.24	2.77	3.77	4.87	11.70	17.20	29.98	44.00	57.70
W [kg] 14)	1.6/2	2.5/3.1	4.7/6.2	5.7/7.2	6.7/8.2	8/10.7	11.2/13.9	15/22	17/24	21/28
Max. shaft load [N] - Radial 15)	196.0	343.0	490.0	490.0	490.0	490.0	490.0	784.0	784.0	784.0
Max. shaft load [N]- Thrust 16)	68.6	98.0	98.0	98.0	98.0	98.0	98.0	392.0	392.0	39.02

1) Nominal and stall torque
2) Intermittent peak torque
3) Nominal speed
4) Maximum speed
5) Nominal power
6) Stall current
7) Nominal current
8) Intermittent peak current
9) Torque constant
10) Nominal frequency
11) Back EMF
12) Moment of inertia
13) Moment of inertia with holding brake
14) Motor weight without / with holding brake
15) Maximum shaft load - Radial
16) Maximum shaft load - Thrust

All performance data is measured at 40 °C with aluminum heat sink sized:
- 305 x 305 x 1 mm for MS4612 and MS4614
- 450 x 450 x 5 mm for MS4813, MS4815 and MS4817
- 450 x 450 x 5 mm for MS4836 and MS4839
- 600 x 600 x 5 mm for MS4884, MS4887 and MS4889

General specifications

MS series AC synchronous servo motors	
Mounting	IM B5, V1, V3
Cooling	Self cooling IC 0041
Motor pole pairs	4
Operating temperature range	0 .. +40 °C
Storage temperature range	-10 .. +85 °C
Operating humidity range	85% max. w/o condensation
Insulation class	F, resistance 100MΩ min at DC 500V
Thermal protection	PTC thermistor in stator winding 1)
Compliance	CE, UL recognized
Degree of protection	IP 65, except for shaft entry part

1) MS4612 and 4614 without thermistor
2) MS4612 and 4614 UL approval pending

Optional holding brake specification

Motor Type	Rated voltage [VDC]	Input power [W]	Input current [A]	Static torque [Min Nm]	Armature release time [Max ms]	Armature pull-in time [Max ms]
MS4612	24	8.0	0.33	1.27	30	60
MS4614	24	8.0	0.33	2.39	30	60
MS4813, MS4815, MS4817	24	17.9	0.75	9.3	20	90
MS4836, MS4839	24	30.0	1.25	13.5	20	90
MS4884	24	34.7	1.45	32	50	170
MS4887, MS4889	24	25.0	1.05	50	140	110

* The brake will engage, when its supply power is off
* Brakes are intended only for holding static rotor position, not for emergency stop or dynamic braking

Ordering information

Motor without brake

Motor type code	Product ordering code
MS4612N4008E43F10	68846781
MS4614N4008E43F10	68847133
MS4813N4008E43F10	68847141
MS4815N4008E43F10	68847150
MS4817N4008E43F10	68847168
MS4836N4008E43F10	68847184
MS4839N4008E43F10	68847192
MS4884N4008E42F10	68847206
MS4887N4008E42F10	68847214
MS4889N4008E42F10	68847222

Motor with brake

Motor type code	Product ordering code
MS4612N9008E43F10	68847257
MS4614N9008E43F10	68847265
MS4813N9008E43F10	68847273
MS4815N9008E43F10	68847290
MS4817N9008E43F10	68847303
MS4836N9008E43F10	68847320
MS4839N9008E43F10	68847338
MS4884N9008E42F10	68847346
MS4887N9008E42F10	68847354
MS4889N9008E42F10	68847371

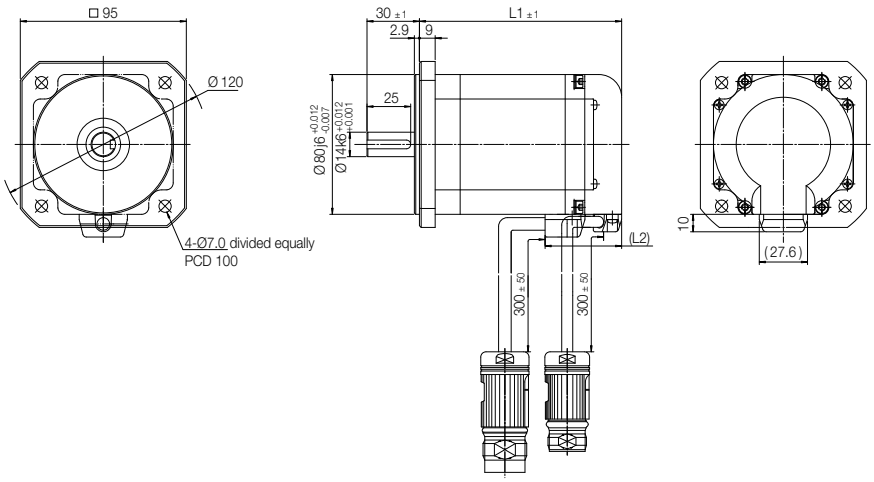
MS series type code

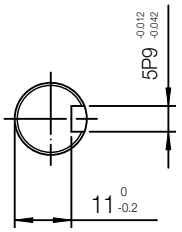
MS	XXXX	N	X	0	08	E4	X	X	10
(1)	(2)	-	(3)	(4)	(5)	-	(6)	(7)	-

Selection		Alternatives	Note
(1)	Product series	MS	MS series servo motors
(2)	Motor size	461X 481X 483X 488X	Four flange sizes, each having motors with different lengths and torque characteristics (see technical specification details)
(3)	Holding brake	4 9	Motor without holding brake Motor equipped with holding brake
(4)	Feedback device (not selectable, only for information)	0	Resolver
(5)	Outbut shaft (not selectable, only for information)	08	Shaft with keyway, without oil seal
(6)	Norminal speed (not selectable, only for information)	1 2 3	1500 rpm 2000 rpm 3000 rpm
(7)	Cable connector type (not selectable, only for information)	F C	Connectors in 300 mm flying leads Connectors in motor frame

Dimensions

MS 4612/4614



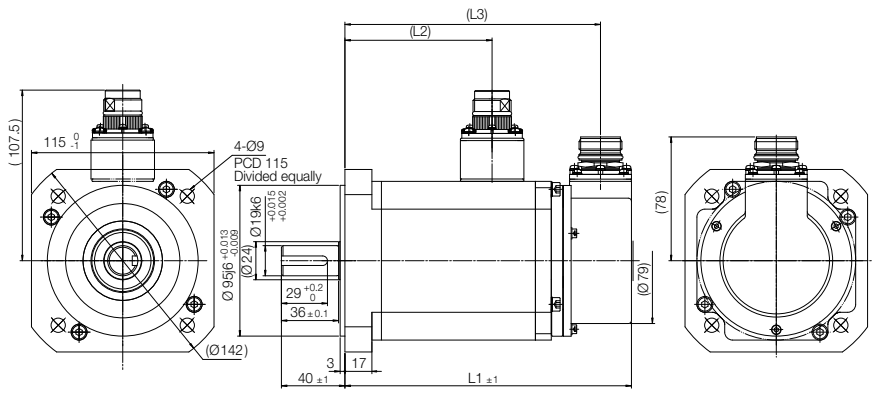


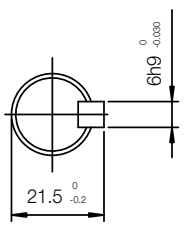
Keyway details viewed from shaft end

Key size in mm (W x H x L)	Full	5 x 5 x 25
	Half	5 x 2,5 x 25

Motor size	MS4612		MS4614	
Motor with brake	No	Yes	No	Yes
L1 Motor lenght [mm]	90.1	121.1	115.7	152.3
L2 Cable entry position [mm]	39.2	70.2	43.8	80.4

MS 4813/4815/4817





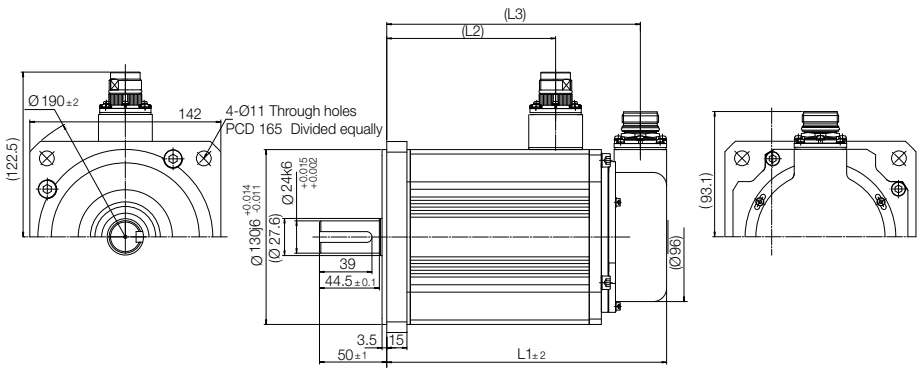
Keyway details viewed from shaft end

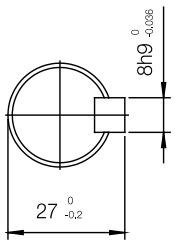
Key size in mm (W x H x L)	Full	6 x 6 x 25
	Half	6 x 3 x 25

Motor size	MS4813		MS4815		MS4817	
Motor with brake	No	Yes	No	Yes	No	Yes
L1 Motor lenght [mm]	162	194	180	212	198	230
L2 Power connector position [mm]	74.7	103.7	92.7	121.7	110.7	139.7
L3 Feedback connector position [mm]	143	171	161	189	179	207

Dimensions

MS 4836/4839



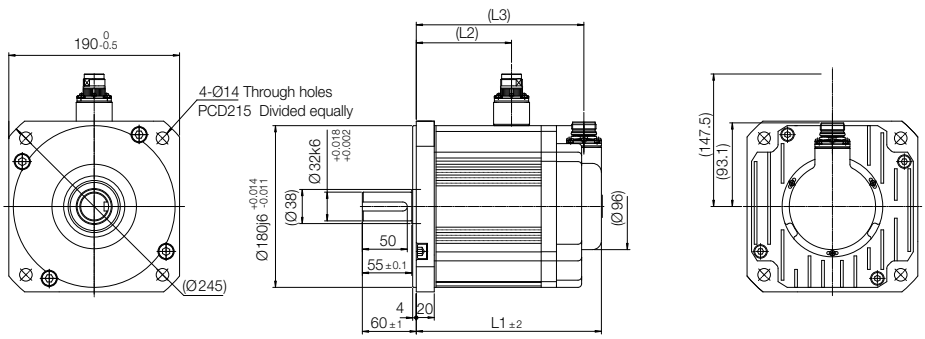


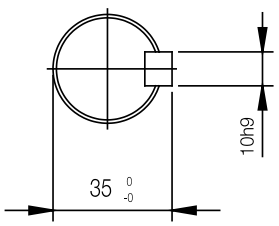
Keyway details viewed from shaft end

Key size in mm (W x H x L)	Full	8 x 7 x 35
	Half	8 x 3 x 35

Motor size	MS4836		MS4839	
Motor with brake	No	Yes	No	Yes
L1 Motor lenght [mm]	175.5	213.5	208	246
L2 Power connector position [mm]	93	127	125.5	159.5
L3 Feedback connector position [mm]	156	194	188.5	226.5

MS 4884/4887/4889





Keyway details viewed from shaft end

Key size in mm (W x H x L)	Full	10x8x45
	Half	10 x 4 x 45

Motor size	MS4884		MS4887		MS4889	
Motor with brake	No	Yes	No	Yes	No	Yes
L1 Motor lenght [mm]	182	231	206	252	230	276
L2 Power connector position [mm]	82	84	106	128	130	152
L3 Feedback connector position [mm]	162.5	211.5	186.5	232.5	210.5	256.5

Combined motor and drive performance

Combined motor and drive performance

The table below shows which ACSM1 drives match which MS series servo motor. The combined motor and drive performance helps to identify the best combination for your application.

Highlights of ACSM1

- For demanding machinery applications
- For synchronous and induction motors
- Wide range of feedback interfaces
- Memory unit for easy drive management
- Safe torque off

Motor type	M_N [1] [Nm]	M_{Max} [2] [Nm]	I_N [3] [A]	I_{Max} [4] [A]	Drive type	$I_{2cont8k}$ [6] cyclic load	I_{2max} [7] [A]	Combined M_N [8] [Nm]	Combined M_{Max} [9] [Nm]
MS4612	1.1	3.82	2.5	8.3	ACSM1-04Ax[5]-02A5-4	1.9	5.3	0.8	2.4
					ACSM1-04Ax[5]-03A0-4	2.3	6.3	1.0	2.9
					ACSM1-04Ax[5]-04A0-4	3.0	8.4	1.1	3.8
MS4614	2	7.16	2.3	8	ACSM1-04Ax[5]-02A5-4	1.9	5.3	1.6	4.7
					ACSM1-04Ax[5]-03A0-4	2.3	6.3	2.0	5.6
					ACSM1-04Ax[5]-04A0-4	3.0	8.4	2.0	7.2
MS4813	3.3	9.9	3.4	9.3	ACSM1-04Ax[5]-03A0-4	2.3	6.3	2.2	6.7
					ACSM1-04Ax[5]-04A0-4	3.0	8.4	2.9	8.9
					ACSM1-04Ax[5]-05A0-4	3.8	10.5	3.3	9.9
MS4815	4.8	14.3	4.7	13.3	ACSM1-04Ax[5]-05A0-4	3.8	10.5	3.8	11.3
					ACSM1-04Ax[5]-07A0-4	4.1	14.7	4.2	14.3
					ACSM1-04Ax[5]-09A5-4	7.1	16.6	4.8	14.3
MS4817	6.8	20.4	6.5	18.7	ACSM1-04Ax[5]-07A0-4	4.1	14.7	4.3	16.0
					ACSM1-04Ax[5]-09A5-4	7.1	16.6	6.8	18.1
					ACSM1-04Ax[5]-012A-4	9.0	21.0	6.8	20.4
MS4836	10.5	31.5	9.5	27.8	ACSM1-04Ax[5]-09A5-4	7.1	16.6	7.9	18.8
					ACSM1-04Ax[5]-012A-4	9.0	21.0	9.9	23.8
					ACSM1-04Ax[5]-016A-4	9.8	28.0	10.5	31.5
MS4839	15.5	47.7	14.8	43.3	ACSM1-04Ax[5]-024A-4	18.0	42.0	15.5	46.3
					ACSM1-04Ax[5]-031A-4	23.3	54.0	15.5	47.7
MS4884	19.1	47.7	11.7	28.6	ACSM1-04Ax[5]-012A-4	9.0	21.0	14.7	35.0
					ACSM1-04Ax[5]-016A-4	9.8	28.0	15.9	46.7
					ACSM1-04Ax[5]-024A-4	18.0	42.0	19.1	47.7
MS4887	28.6	71.5	18.1	44.8	ACSM1-04Ax[5]-024A-4	18.0	42.0	28.4	67.0
					ACSM1-04Ax[5]-031A-4	23.3	54.0	28.6	71.5
MS4889	35.8	89.5	20.9	51.3	ACSM1-04Ax[5]-024A-4	18.0	42.0	30.8	73.3
					ACSM1-04Ax[5]-031A-4	23.3	54.0	35.8	89.5

1) Nominal torque of the motor
2) Intermittent peak torque of the motor
3) Nominal current of motor
4) Intermittent peak current of the motor
5) Control type (torque, speed, motion) of the motor
6) Continuous output current of ACSM1 at a switching frequency of 8 kHz at 40 °C (104 °F)
7) Maximum short time output current of ACSM1
8) Combined nominal torque
9) Combined intermittent peak torque

Note! Combined motor and drive performance in the table is at 8 kHz switching frequency with cyclic loads. The combined values are subject to ACSM1 supply voltage, ambient temperature and installation altitude de-ratings.

Cables and connections

Ready-made motor cables with ACSM1

Cable properties

- Polyurethane (PUR) outer sheath with good flexibility and low adhesion
- Flame retardant and halogen-free
- Resistant to abrasion and oil
- Conformity to the UL and DESINA® -standards
- Motor power cables include brake control leads

Motor power cable

Product code	Conductor diam. [mm²]	Lenght [m]	Cable	Cable ratings [1] [A]
68822742	1.5	5	(4x1,5+(2x1,0))	16
68823285	1.5	10	(4x1,5+(2x1,0))	16
68823307	1.5	15	(4x1,5+(2x1,0))	16
68823323	1.5	20	(4x1,5+(2x1,0))	16
68823331	1.5	25	(4x1,5+(2x1,0))	16
68867029	2.5	5	(4x2,5+(2x1,0))	22
68867037	2.5	10	(4x2,5+(2x1,0))	22
68867053	2.5	15	(4x2,5+(2x1,0))	22
68867061	2.5	20	(4x2,5+(2x1,0))	22
68867070	2.5	25	(4x2,5+(2x1,0))	22
68867088	4.0	5	(4x4,0+(2x1,0))	30
68867096	4.0	10	(4x4,0+(2x1,0))	30
68867100	4.0	15	(4x4,0+(2x1,0))	30
68867118	4.0	20	(4x4,0+(2x1,0))	30
68867126	4.0	25	(4x4,0+(2x1,0))	30

[1] The cable current ratings are for reference only and subject to local regulations and method of installation.

Resolver feedback cable

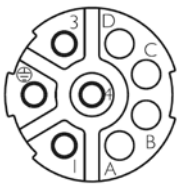
Product code	Lenght [m]	Cable
68861721	5	(3x(2x0,14)+(2x0,14))
68861730	10	(3x(2x0,14)+(2x0,14))
68861748	15	(3x(2x0,14)+(2x0,14))
68861756	20	(3x(2x0,14)+(2x0,14))
68861764	25	(3x(2x0,14)+(2x0,14))

Motor connection to ACSM1

Motor power connection

Motor end	Signal	Drive end
1	V	V2
2	PE	⏚
3	U	U2
4	W	W2
A	Brake +	R+
B	Brake -	R-
C	nc	
D	nc	

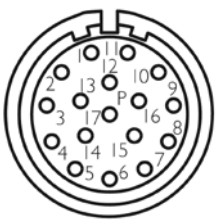
Cable connector to motor



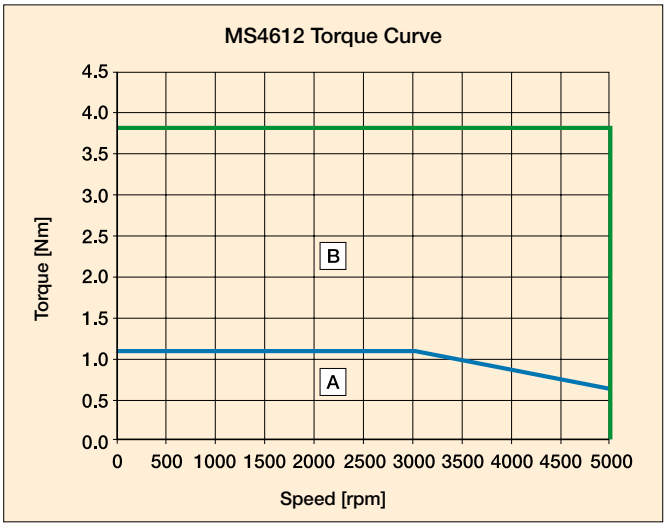
Resolver feedback connection

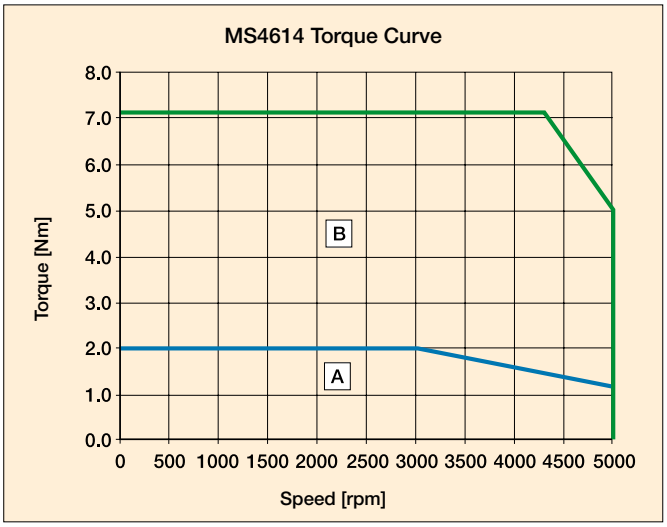
Motor end	Signal	Drive end
1	S1/COS+	7
3	S3/COS-	2
2	S2/SIN+	6
4	S4/SIN-	1
5	Thermistor +	3
6	Thermistor -	4
7	R1/EXT+	5
8	R2/EXT-	10
11	Shield	Connector housing

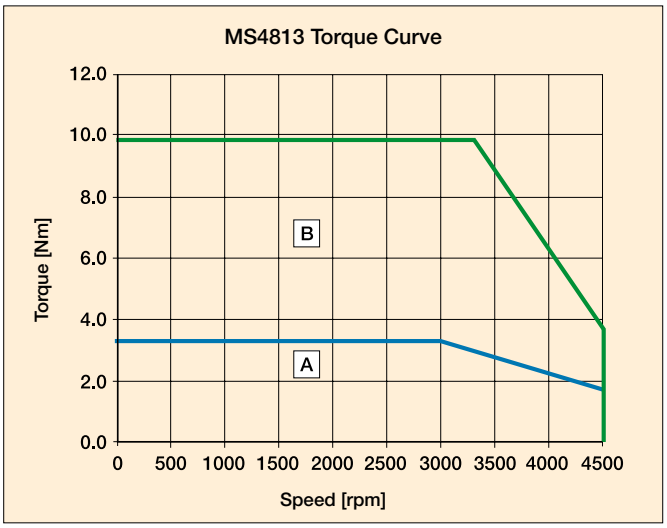
Cable connector to motor

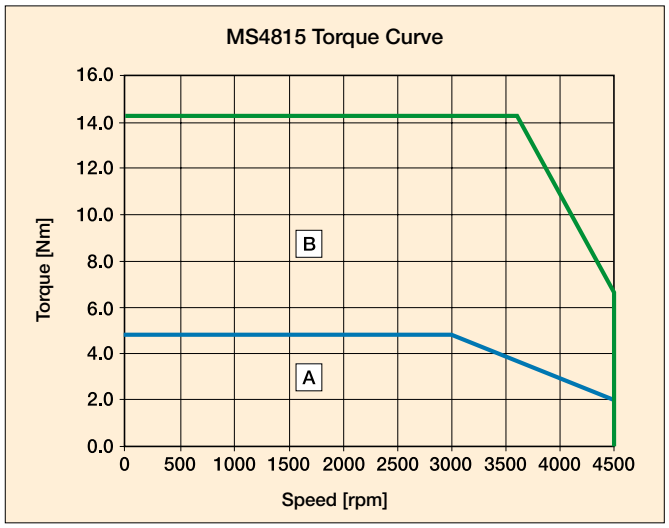


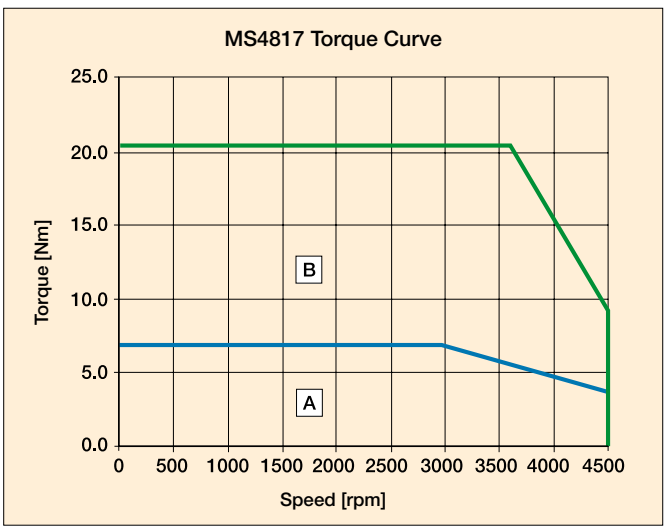
Motor speed/torque curves











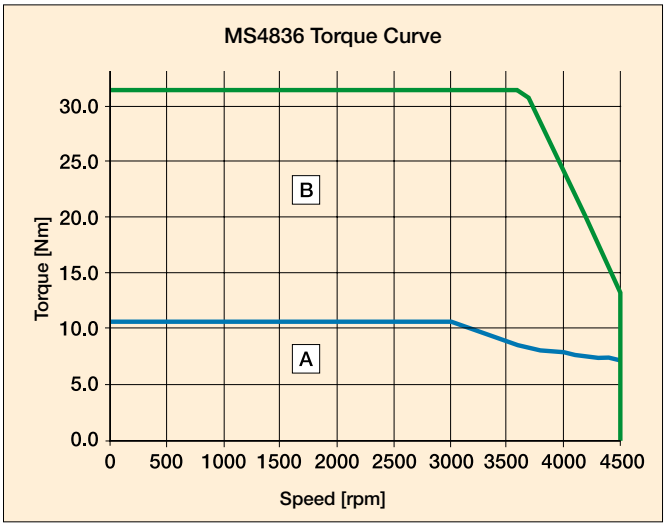
A Continuous operation zone

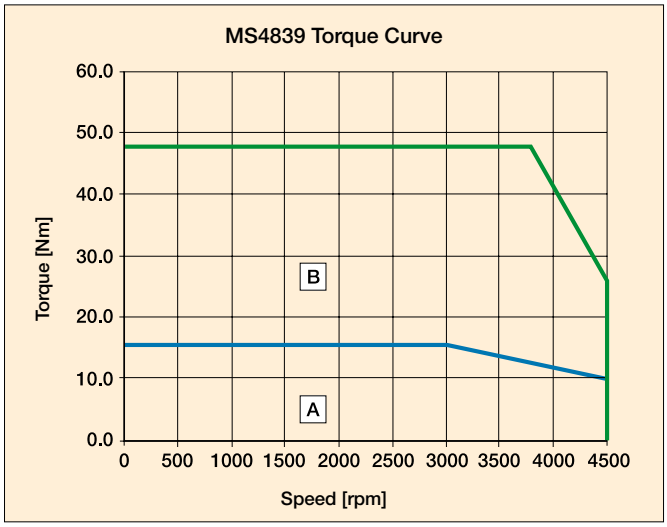
B Intermittent operation zone

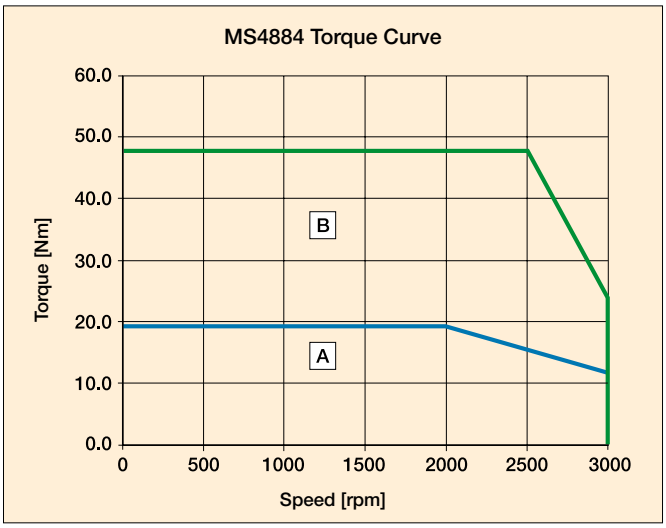
Note! The charasteristics are based on line-to-line voltage of 480 V DC (rectified from 400 V AC)

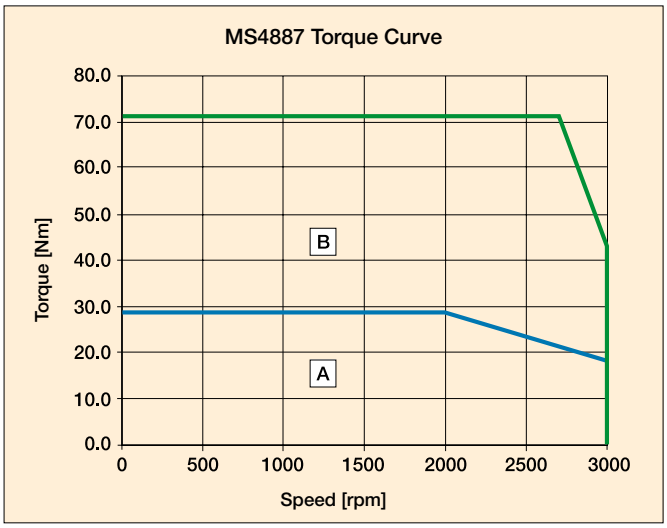
Note! All performance data is measured at 40 °C with aluminum heat sink sized:
- 305 x 305 x 1 mm for MS4612 and MS4614
- 450 x 450 x 5 mm for MS4813, MS4815 and MS4817

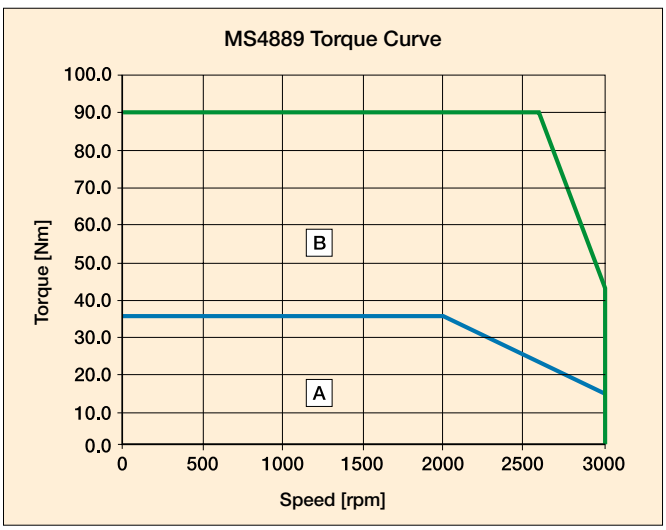
Motor speed/torque curves











A Continuous operation zone

B Intermittent operation zone

Note! The charasteristics are based on line-to-line voltage of 480 V DC (rectified from 400 V AC)

Note! All performance data is measured at 40 °C with aluminum heat sink sized:
- 450 x 450 x 5 mm for MS4836 and MS4839
- 600 x 600 x 5 mm for MS4884, MS4887 and MS4889

Notes

Contact and web information

www.abb.com/drives

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