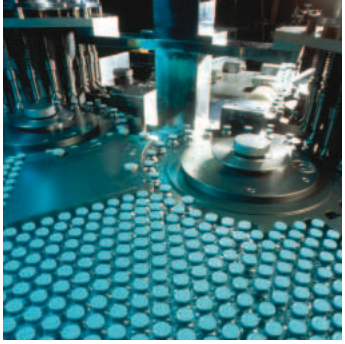
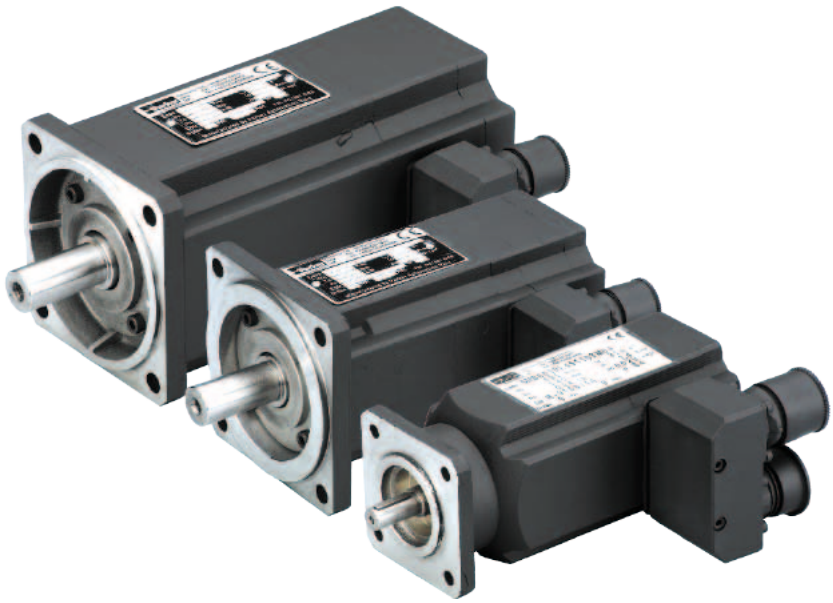




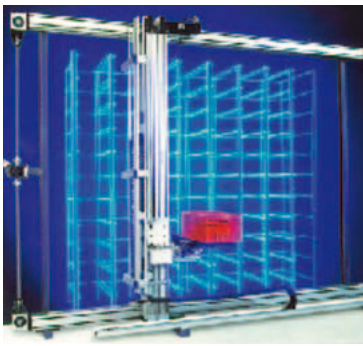
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding





SMB / SMH Series

Low Inertia Servo Motors



Parker

ENGINEERING YOUR SUCCESS.

WARNING — USER RESPONSIBILITY

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Low Inertia Servo Motors - SMB / SMH

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Parker Hannifin

The global leader in motion and control technologies

A world class player on a local stage

Global Product Design

Parker Hannifin has more than 40 years experience in the design and manufacturing of drives, controls, motors and mechanical products. With dedicated global product development teams, Parker draws on industry-leading technological leadership and experience from engineering teams in Europe, North America and Asia.

Local Application Expertise

Parker has local engineering resources committed to adapting and applying our current products and technologies to best fit our customers' needs.

Manufacturing to Meet Our Customers' Needs

Parker is committed to meeting the increasing service demands that our customers require to succeed in the global industrial market. Parker's manufacturing teams seek continuous improvement through the implementation of lean manufacturing methods throughout the process. We measure ourselves on meeting our customers' expectations of quality and delivery, not just our own. In order to meet these expectations, Parker operates and continues to invest in our manufacturing facilities in Europe, North America and Asia.

Electromechanical Worldwide Manufacturing Locations

Europe
Littlehampton, United Kingdom
Dijon, France
Offenburg, Germany
Filderstadt, Germany
Milan, Italy

Asia
Wuxi, China
Chennai, India

North America
Rohnert Park, California
Irwin, Pennsylvania
Charlotte, North Carolina
New Ulm, Minnesota



Offenburg, Germany

Local Manufacturing and Support in Europe

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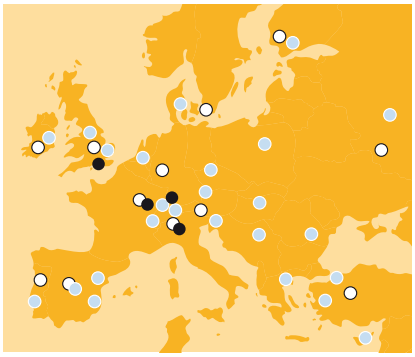
For contact information, please refer to the Sales Offices on the back cover of this document or visit www.parker.com



Milan, Italy



Littlehampton, UK



Electromechanical Manufacturing
Parker Sales Offices
Distributors



Dijon, France

Low Inertia Servo Motors - SMB / SMH

Overview

Description

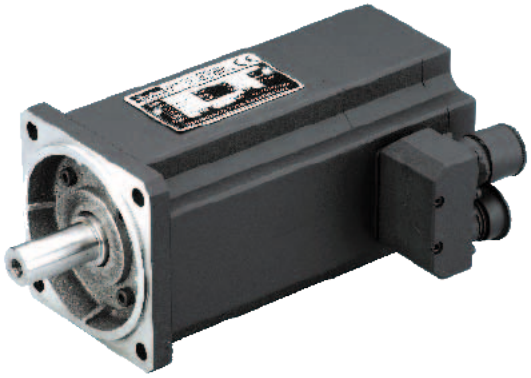
The SMB / SMH* Series of highly-dynamic brushless servo motors have been design to combine the cutting-edge technology of Parker Hannifin products with an extremely high performance.
Thanks to the innovative "salient pole" technology, the motor's dimensions are considerably reduced with significant advantages in terms of specific torque, overall dimensions and dynamic performance.
Compared to traditional-technology brushless servo motors, the specific torque is approximately 30 % higher, overall dimensions are considerably reduced and, consequently rotor inertias are extremely low.
Thanks to the high quality of Neodymium-Iron-Boron magnets, and also the encapsulation method used to fasten them to the shaft, the SMB/H motors can achieve very high acceleration and withstand high overloads without risk of demagnetisation or detachement of the magnets.
Specific applications for the SMB/H Series include all types especially those for the packaging and handling industry, and all those applications where very high dynamic performances and very low inertias are required.

Features

- High number of feedback options
- Customised windings/voltages
- Increased Inertia option
- Multiple connection options

Application

- Food, Pharma & Beverage
- Packaging Machines
- Material Forming
- Material Handling
- Factory Automation
- Life Science Diagnostic
- Automotive Industry / In-Plant
- Printing Industry
- Textile Machines
- Robotics
- Servo Hydraulic Pumps



Technical Characteristics - Overview

Motor Type	Permanent magnets synchronous servomotor
Rotor Design	Rotor with surface rare earth magnets
Number of poles	10 for SM_ 42 8 for SM_ 60-82-100-115-142
Power Range	0.2 – 5.3 kW
Torque Range	0.35 – 17 Nm
Speed Range	0 – 7500 min^{-1}
Mounting	Flange with smooth holes
Shaft End	Plain keyed shaft Plain smooth shaft (option)
Cooling	Natural ventilation
Protection Level (IEC60034-5)	IP64 IP65 (option)
Feedback sensor	Resolver Absolute Endat or Hiperface Incremental Encoder
Other options	Brake Thermal protection (PTC for SMB and KTY for SMH) Increased inertia
Marking	CE / UL
Voltage Supply	230 / 400 VAC other voltage uder request
Temperature Class	Class F
Connections	Connectors Flying cables Terminal Box (see table option for combination)

* SMB: for Drives TPD-M, SLVD-N, TWIN-N, SPD-N, Hi-Drive
SMH: for Drive Compax3

Technical Characteristics

Technical Data

230 VAC supply voltage

Model [4]	Size	Stall [1]		Nominal [1]			Peak [1] Torque	Inertia		Ke [2] [3]	Kt [2] [3]
		Torque	Current	Torque	Speed	Current		No brake	With brake		
		T_{065} (T_{105}) [Nm]	I_{065} [A]	T_{n065} [Nm]	n [min^{-1}]	I_{n065} [A]	T_{max} [Nm]	J [$kgmm^2$]	J [$kgmm^2$]	Ke [Vs]	Kt [Nm/A_{rms}]
SM_42 60 0,35	42	0.35 0.45	0.78	0.15	6000	0.38	0.9	13	n.a.	0.29	0.46
SM_60 30 0,55	60	0.55 (0.68)	0.7	0.50	3000	0.66	1.7	18	30.5	0.44	0.76
SM_60 45 0,55			1.0	0.39	4500	0.74				0.30	0.53
SM_60 60 0,55			1.4	0.24	6000	0.60				0.23	0.40
SM_60 16 1,4		1.4 (1.7)	0.95	1.35	1600	0.91	4.4	30	42.5	0.85	1.48
SM_60 30 1,4			1.73	1.20	3000	1.50				0.47	0.81
SM_60 45 1,4			2.37	1.00	4500	1.69				0.34	0.59
SM_60 60 1,4			2.98	0.80	6000	1.70				0.27	0.47
SM_60 75 1,4			3.85	0.15	7500	0.41				0.21	0.36
SM_82 10 03	82	3 (3.7)	1.2	2.9	1000	1.2	9	140	183	1.43	2.48
SM_82 16 03			1.8	2.9	1600	1.7				0.96	1.66
SM_82 30 03			3.1	2.7	3000	2.8				0.55	0.96
SM_82 33 03			3.5	2.4	3300	2.8				0.49	0.85
SM_82 45 03			4.7	2.2	4500	3.4				0.37	0.64
SM_82 60 03			6.1	1.5	6000	3.1				0.28	0.49
SM_82 75 03			7.5	0.6	7500	1.6				0.23	0.40
SM_100 16 06	100	6 (9)	3.7	5.8	1600	3.6	18	336	440	0.92	1.60
SM_100 30 06			5.9	5.0	3000	4.9				0.59	1.02
SM_100 45 06			9.4	3.5	4500	5.5				0.37	0.64
SM_100 55 06			11.8	2.6	5500	5.1				0.29	0.51
SM_100 75 06			14.7	0.6	7500	1.5				0.24	0.41
SM_115 16 10	115	10 (12.5)	6.0	9.0	1600	5.4	32	900	1000	0.96	1.66
SM_115 30 10			10.5	8.0	3000	8.4				0.55	0.95
SM_115 40 10			14.7	7.6	4000	11.2				0.39	0.68
SM_115 54 10			18.2	7.1	5400	12.9				0.32	0.55
SM_142 18 15	142	15 (19)	9.7	13.3	1800	8.6	47	1400	1600	0.89	1.54
SM_142 30 15			16.0	12.5	3000	13.4				0.54	0.94

(1) Data referred to motor mounted on a steel flange in horizontal position with dim. 200x230x20 mm (for SM_60,82), dim. 200x270x20 mm (for SM_100,115,142). Stall torques refer to motor turning at 100 min^{-1}
(2) Data measured at 20 °C. When "hot" consider -0.09 %/K derating
(3) Tolerance data ±10 %
(4) SMB: for Drives TPD-M, SLVD-N, Twin-N, SPD-N, Hi-Drive
SMH: for Drive Compax3

400 VAC power supply

Model [4]	Size	Stall [1]		Nominal [1]			Peak [1] Torque	Inertia		Ke [2] [3]	Kt [2] [3]
		Torque	Current	Torque	Speed	Current		No brake	With brake		
		T_{065} (T_{105}) [Nm]	I_{065} [A]	T_{n065} [Nm]	n [min^{-1}]	I_{n065} [A]	T_{max} [Nm]	J [kgmm^2]	J [kgmm^2]	Ke [Vs]	Kt [Nm/A_{rms}]
SM_60 30 1,4	60	1.4 (1.7)	0.95	1.2	3000	0.81	4.4	30	42.5	0.81	1.48
SM_60 45 1,4			1.37	1.0	4500	0.98				0.59	1.02
SM_60 60 1,4			1.73	0.8	6000	0.99				0.68	0.81
SM_60 75 1,4			2.15	0.15	7500	0.23				0.38	0.65
SM_82 30 03	82	3 (3.7)	1.8	2.7	3000	1.6	9	140	183	0.96	1.66
SM_82 45 03			2.7	2.2	4500	2.0				0.64	1.11
SM_82 56 03			3.1	1.6	5600	1.7				0.55	0.96
SM_82 60 03			3.5	1.7	6000	2.0				0.49	0.85
SM_82 75 03			4.4	0.6	7500	0.9				0.39	0.68
SM_100 30 06	100	6 (9)	3.7	5.0	3000	3.1	18	336	440	0.92	1.60
SM_100 45 06			5.6	3.5	4500	3.3				0.62	1.07
SM_100 56 06			5.9	2.5	5600	2.4				0.59	1.02
SM_100 75 06			9.4	0.6	7500	0.9				0.37	0.64
SM_115 20 10	115	10 (12.5)	4.5	9.0	2000	4.06	32	900	1000	1.28	2.22
SM_115 30 10			6.0	8.0	3000	4.82				0.96	1.66
SM_115 40 10			8.0	7.6	4000	6.05				0.73	1.26
SM_115 56 10			10.5	6.0	5600	6.30				0.55	0.95
SM_142 20 15	142	15 (19)	6.4	13.0	2000	5.5	47	1400	1600	1.36	2.35
SM_142 30 15			9.7	12.5	3000	8.1				0.89	1.54
SM_142 45 15			14.4	10.9	4500	10.5				0.60	1.04
SM_142 56 15			16.0	9.2	5600	9.8				0.54	0.94
SM_142 10 17		17 (21)	3.5	16.4	1000	3.4	54			2.83	4.90
SM_142 30 17			9.6	14.0	3000	8.1				1.02	1.77
SM_142 56 17			15.8	10.6	5600	9.8				0.62	1.08
SM_170 10 36	170	available on request									
SM_170 27 36											

(1) Data referred to motor mounted on a steel flange in horizontal position with dim. 200x230x20 mm (for SM_60,82), dim. 200x270x20 mm (for SM_100,115,142). Stall torques refer to motor turning at 100 min^{-1}
(2) Data measured at 20 °C. When "hot" consider -0.09 %/K derating
(3) Tolerance data ±10 %
(4) SMB: for Drives TPD-M, SLVD-N, Twin-N, SPD-N, Hi-Drive
SMH: for Drive Compax3

STANDARDS

In compliance with: 2006/95 EC

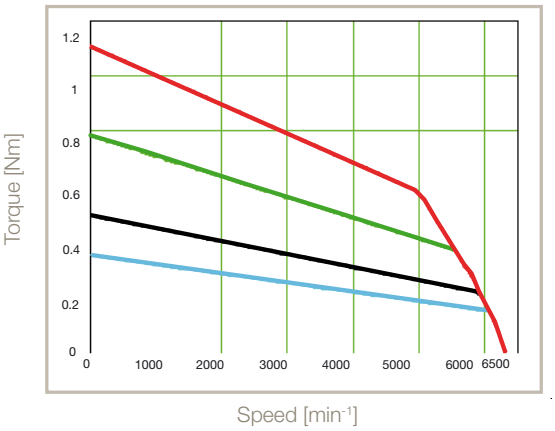
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- EN60034-5
- EN60034-5/A1

Marked CE **Marked** c UL us (execept SM_42)

Speed Torque Curves

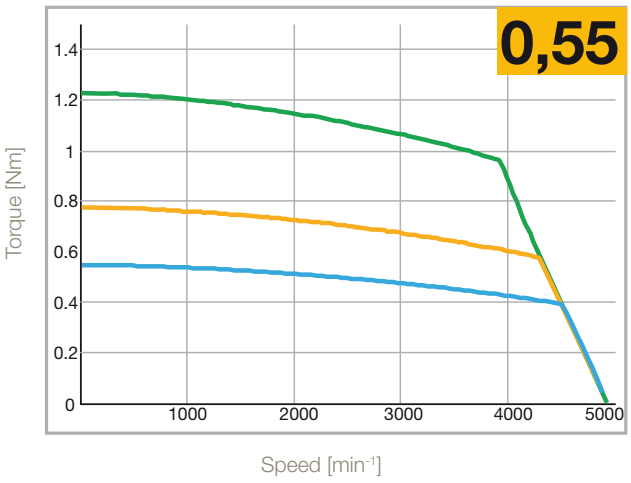
SMB/H42

6000 min^{-1} 230 V

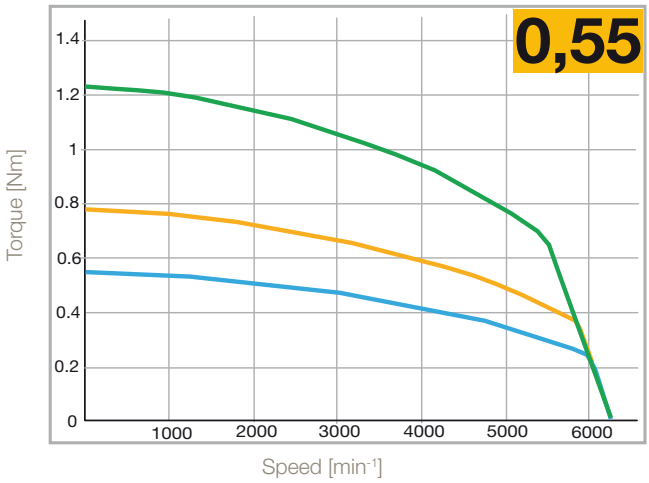


SMB/H60

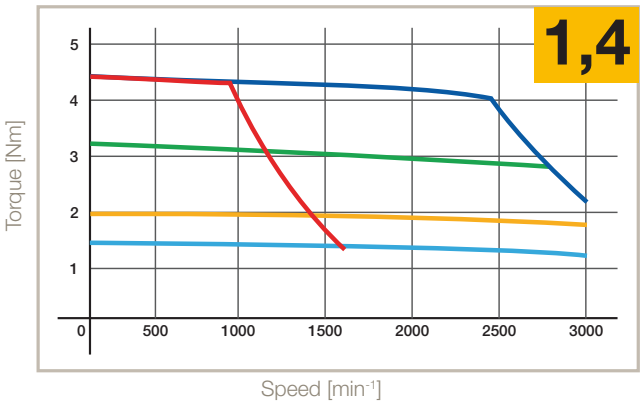
4500 min^{-1} 230 V



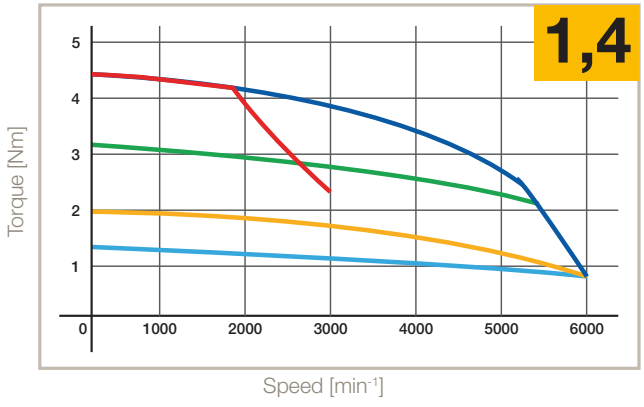
6000 min^{-1} 230 V



1600 min^{-1} 230 V - 3000 min^{-1} 400 V



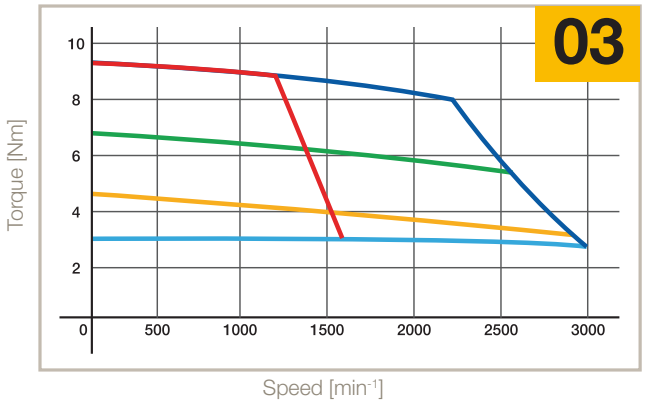
3000 min^{-1} 230 V - 6000 min^{-1} 400 V



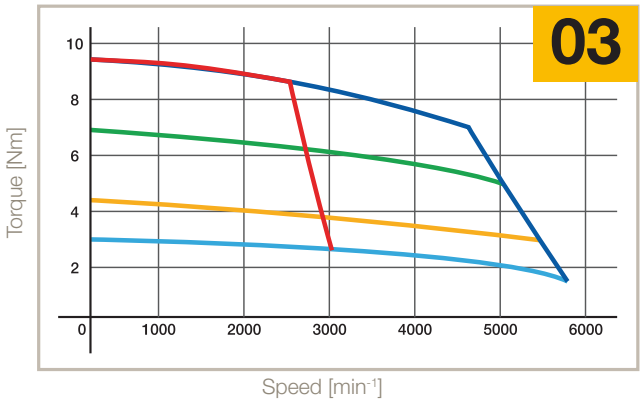
S1 65 K, ΔT
S3 10 %, 5 min, 400 V
S3 50 %, 5 min
S3 10 %, 5 min, 230 V
S3 50 %, 5 min
S3 20 %, 5 min

SMB/H82

1600 min^{-1} 230 V - 3000 min^{-1} 400 V

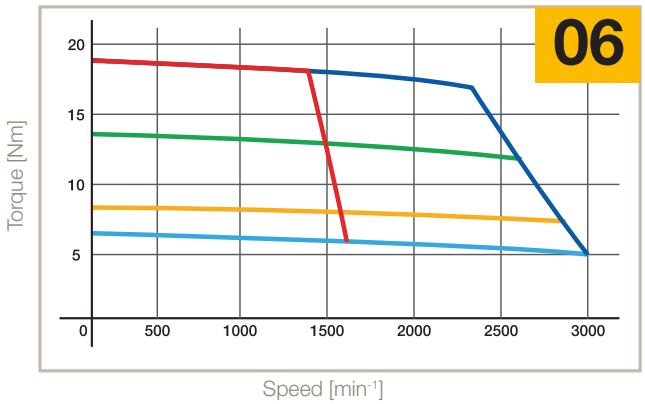


3000 min^{-1} 230 V - 5600 min^{-1} 400 V

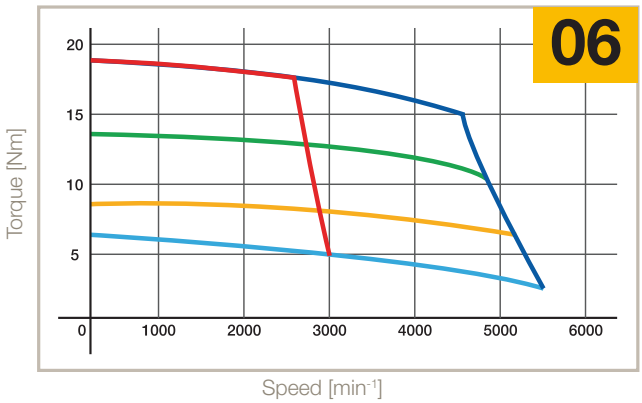


SMB/H100

1600 min^{-1} 230 V - 3000 min^{-1} 400 V

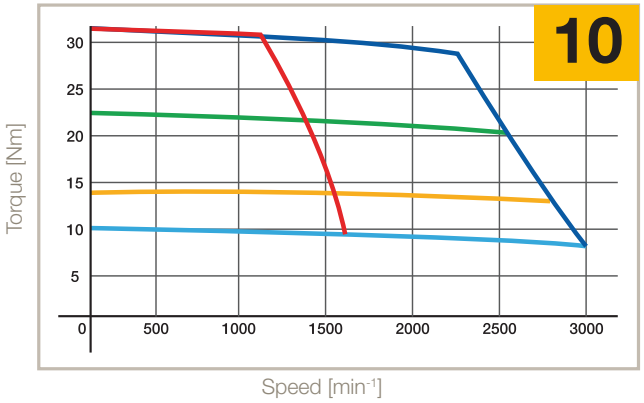


3000 min^{-1} 230 V - 5600 min^{-1} 400 V

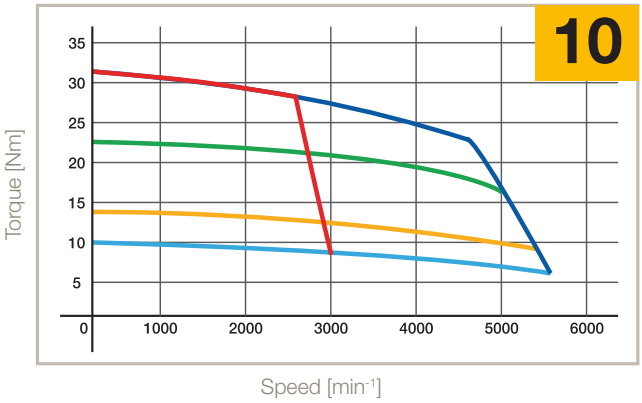


SMB/H115

1600 min^{-1} 230 V - 3000 min^{-1} 400 V



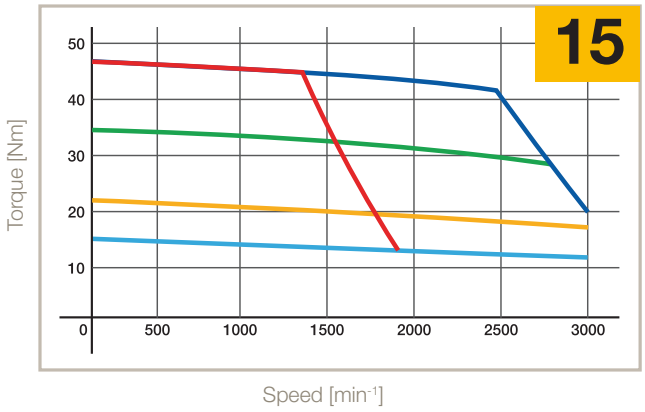
3000 min^{-1} 230 V - 5600 min^{-1} 400 V



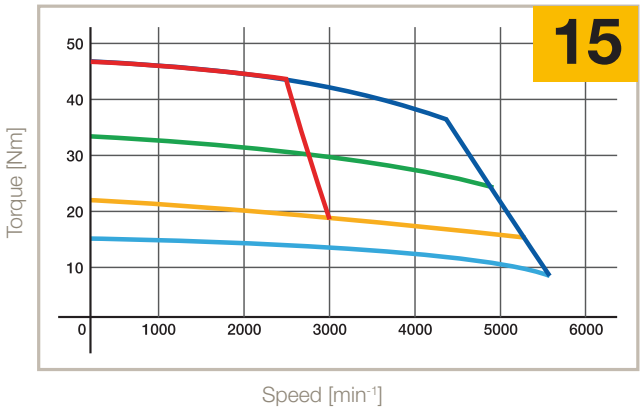
S1 65 K, ΔT
S3 10 %, 5 min, 400 V
S3 50 %, 5 min
S3 10 %, 5 min, 230 V
S3 50 %, 5 min
S3 20 %, 5 min

SMB/H142

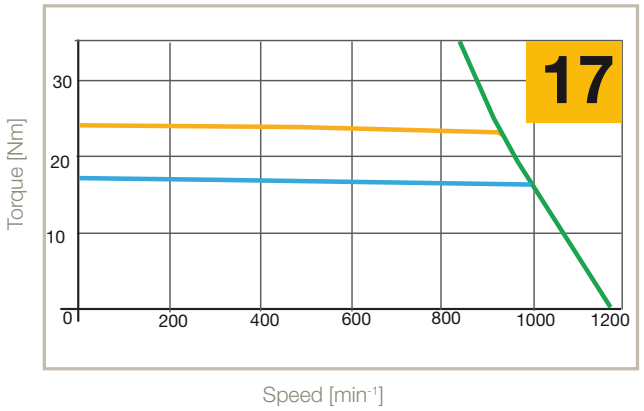
1800 min^{-1} 230 V - 3000 min^{-1} 400 V



3000 min^{-1} 230 V - 5600 min^{-1} 400 V

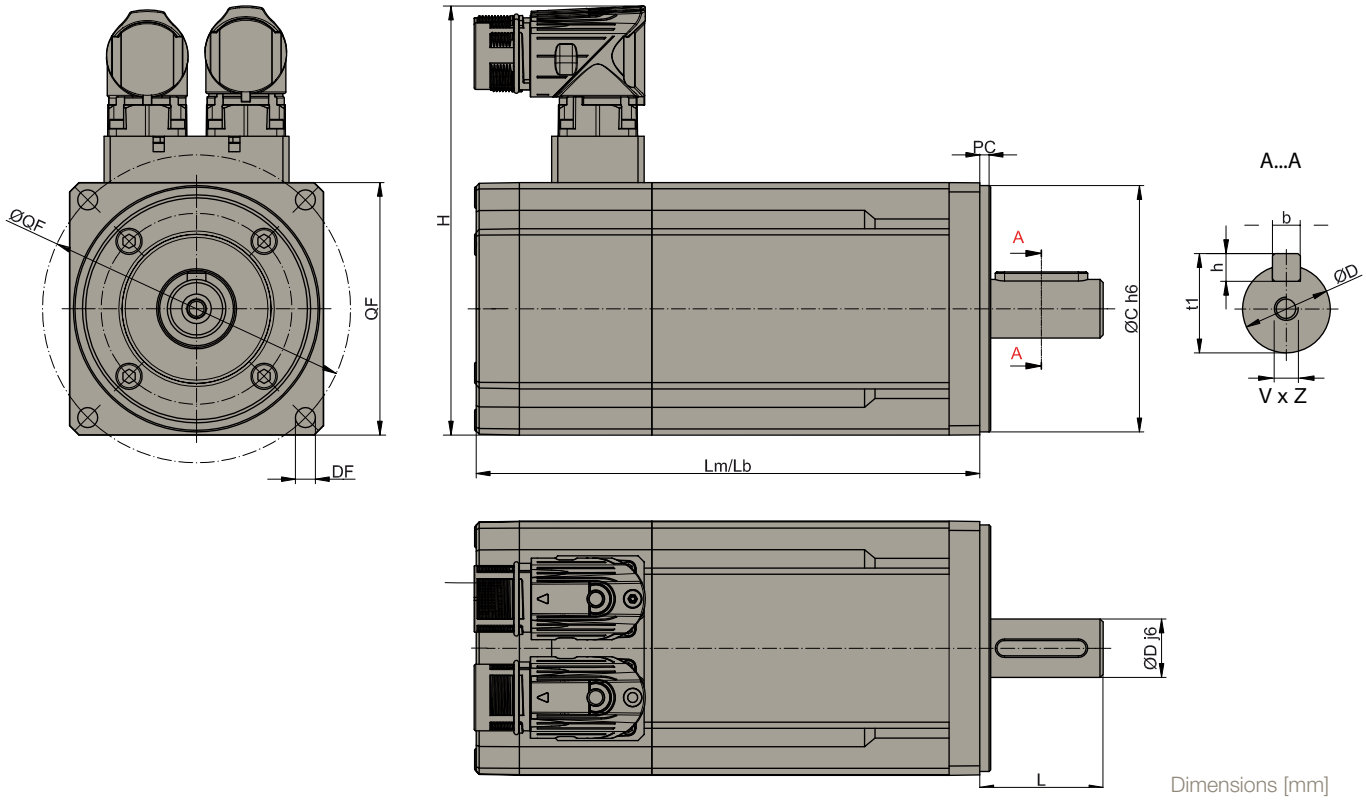


1000 min^{-1} 400 V



S1 65 K, ΔT
S3 10 %, 5 min, 400 V
S3 50 %, 5 min
S3 10 %, 5 min, 230 V
S3 50 %, 5 min
S3 20 %, 5 min

Dimensions of Standard Motors with Resolver Feedback



Dimensions [mm]

Motors Size			LM LB	Weight [kg]	DxL	bxh	t1	VxZ	H	C	ØQF	F	DF	PC	QF	Order Code QF
SMB /H	42	0,35	110	0.85	9x25	-	-	M3x9	66	30		50	3.2	2.5	42	5
	60	0,55	88 137	- 1	9x20 11x23	3x3 4x4	10.2 12.5	- M4x10	111.5	40	63	63	5.5	-	60	8
										60	75	75	6	2.5	70	5
		1,4	129.5 161	1.5	9x20 11x23	3x3 4x4	10.2 12.5	M4x10		40	63	63	5.5	2.5	60	8
										60	75	75	6	2.5	70	5
	82	03	159 202	3.6	11x23[2] 14x30	4x4	12.5	M4x12	140	60	75	75	6	3.5	70	7
			163.5 206.5	3.6	11x23[2] 14x30 19x40[1]	5x5 6x6	16 21.5	M4x12 M5x12.5 M6x16		80	100	100	6.5	3.5	82	8
										95	115	115	9	3.5	100	5
	100	06	191.5 238.5	4.7	19x40 24x50	6x6 8x7	21.5 27	M6x16 M8x19	157.5	80	100	100	7	3.5	100	8
										95	115	115	9	3.5	100	5
	115	10	220 265	7.7	19x40 24x50 28x60	6x6 8x7 8x7	21.5 27 31	M6x16 M8x19 M10x22	172	95	115	115	9	3.5	115	9
										95	130	130	9	3.5	115	8
										110	130	130	9	3.5	130	7
										130	165	165	11	3.5	145	5
	142	15	243 293	13	19x40 24x50 28x60	6x6 8x7 8x7	21.5 27 31	M6x16 M8x19 M10x22	199	130	165	165	11	3.5	142	5

LM: Motor's length without brake and with resolver
LB: Motor's length with brake and resolver
DxL: Shaft
bxh: Key
T1: Overall shaft height
VxZ: Shaft hole depth
H: Height
C: Center
DF: Fixing holes
QF: Mounting flange
F: Pitch circle diameter
PC: Centre Depth
(1) not available with flange 7
(2) only for torque <2 Nm

Options

Parker SMB / SMH family motors are available with standard and custom options to adapt motor on your application.
If the option for your application is not listed, please consult our technical department.

Holding Brake

All SMB / SMH motors are available with option holding brake.
The fail-safe (supply voltage 24 VDC ±10 %) holding brake is incorporated in the motor at the opposite side of the front flange and is applied when there is no voltage present. Because of the power loss caused by the brake, torque values must be reduced by 5 %. The holding brakes shall be used with the motor at a standstill and not for dynamic braking.
For normal uses, they are maintenance free brakes.

Motor	Voltage [V]	Current [A]	Torque @20 °C [Nm]	Added Length [mm]	Added Weight [kg]	Added Inertia [kgmm²]
SMB / SMH60	24	0.34	2.2	31.5	0.3	12.5
SMB / SMH82	24	0.5	5	43	0.7	43
SMB / SMH100	24	0.67	11	47	0.6	104
SMB / SMH115	24	0.67	11	45	2	100
SMB / SMH142	24	0.75	22	50	3	200

Medium Inertia

Where the application needs different values of inertia, SMB / SMH can provide a standard adder.

Motor	Added inertia [kgmm²]	Added length [mm]	Added weight [kg]
SMB / SMH60	29	31.5	0.32
SMB / SMH82	270	43	0.91
SMB / SMH100	284	47	0.68
SMB / SMH115	900	45	2.28
SMB / SMH142	690	50	2.49

Feedback

Motors may be eqquiped with various feedback types in order to meet the different requirements for precision, signal that the application needs. The standard motor includes the resolver feedback. Hiperface Encoder, DSL Encoder, EnDat Encoder, Incremental Encoder are available like the following tables.

Resolver

Poles	2
Transformation ratio	0.5
Operating temperature	-50...+150 °C
SM_ associations	All Sizes

Incremental Encoder with Hall Sensor

Code	A1	A2	A3	B3	C4	D3
Resolution [C/T]	2000	2048	4096	2048	5000	5000
Poles	8					
System accuracy	±32"	±32"	±16"	±32"	±13"	±13"
Voltage	+5 VDC ±5 % - 200 mA					
Reference mark	Yes					
Max speed [min⁻¹]	6000					
Output circuit	Line drive differential mode 20 mA					
Operating temperature	-20 °C...+100 °C		-20 °C...+85 °C	-20 °C...+100 °C		-20 °C...+85 °C
SM_ motors associations						
SM_42	N	N	N	N	N	N
SM_60	N	N	N	Y (+17 mm length)	N	Y (+17 mm length)
SM_82	Y	Y	Y	N	Y	N
SM_100	Y	Y	Y	N	Y	N
SM_115	Y	Y	Y	N	Y	N
SM_142	Y	Y	Y	N	Y	N

Hiperface Absolute Encoder

Code	S1	S2	S3	S4	A6	A7
Type	Optical					
Turn	Single	Multi	Single	Multi	Single	Multi
Incremental signals	1 V_{PP}					
Line count	1024		128		1024	
Resolution	32 768 (15 bit)		4096 (12 bit)		32 768 (15 bit)	
Absolute rotation	1	4096	1	4096	1	4096
System accuracy	±45"		±320"		±45"	
Power supply	8 VDC					
Max speed [min^{-1}]	6000		12 000	9000	6000	
Temperature	-20 °C...+115 °C		-20 °C...+110 °C		-20 °C...+115 °C	
Safety integrity level	SIL2 (IEC 61508), SILCL2 (IEC 62061)				Not Available	
SM_ motors associations						
SM_42	N	N	N	N	N	N
SM_60	Y (+33.5 mm length, 82 mm rear flange)		Y (+17 mm length)		Y (+33.5 mm length, 82 mm rear flange)	
SM_82	Y (+22 mm length)		Y	Y	Y (+22 mm length)	
SM_100	Y (+20 mm length)		Y (+20 mm length)		Y (+20 mm length)	
SM_115	Y	Y	Y	Y	Y	Y
SM_142	Y	Y	Y	Y	Y	Y

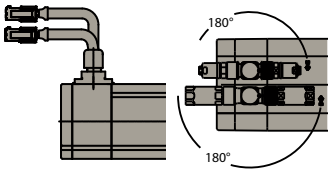
Code	C6	C7	G4	S5	S6
Type	Optical		Capacitive	Optical	
Turn	Single	Multi	Multi	Single	Multi
Incremental signals	1 V_{PP}			-	-
Line count	128		16	-	-
Resolution	4096 (12 bit)			262 144 (18 bits)	
Absolute rotation	1	4096	512	1	4096
System accuracy	±320"		±288"	±40"	
Power supply	8 VDC			7...12 VDC	
Max speed [min^{-1}]	12 000	9000	6000		
Temperature	-20 °C...+110 °C		-20 °C...+115 °C	20 °C...+105 °C	
Safety integrity level	Not Available			SIL2 (IEC 61508), SILCL2 (IEC 62061)	
SM_ motors associations					
SM_42	N	Y [2]	N	N	N
SM_60	Y (+10 mm length)		Y	Y (+10 mm length)	
SM_82	Y	Y	N	Y	Y
SM_100	Y (+20 mm length)		N	Y (+20 mm length)	
SM_115	Y	Y	N	Y	Y
SM_142	Y	Y	N	Y	Y

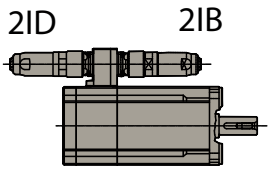
[1] +10 mm length, 56 mm rear flange

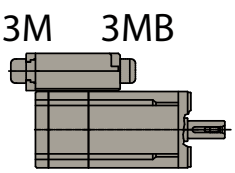
EnDat Absolute Encoder

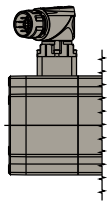
Code	B9	C1	D5	F2	F4
Type	Inductive	Optical			Inductive
Turn	Multi	Single	Multi		
Incremental signals	1 V_{PP}				
Line count	32	512			16
Positions per revolutions	131 072 (17 bit)	8192 (13 bit)			262 144 (18 bit)
Distinguishable revolutions	4096	1	4096		
System accuracy	±400"	±60"			±480"
Power supply	5 VDC				
Max speed [min^{-1}]	12 000		7000	12 000	
Temperature	-20 °C...+115 °C	-40 °C...+115 °C	-30 °C...+115 °C	-40 °C...+115 °C	-20 °C...+115°C
Absolute position values	EnDat 2.1	EnDat 2.2			EnDat 2.1
Safety integrity level	Not Available				
SM_ motors associations					
SM_42	N	N	N	N	N
SM_60	Y (+33.5 mm length, 82 mm rear flange)		N	Y (+20 mm length)	Y (+20 mm length)
SM_82	Y (+24 mm length)			N	N
SM_100	Y (+20 mm length)			N	N
SM_115	Y	Y	Y	N	N
SM_142	Y	Y	Y	N	N

Layout and Connectors









	200 mm Flying leads with molex plugs 0V	2x Parallel upright connectors 2I	2x Forward facing connectors 2IB	2x Rear facing connectors 2ID	Terminal box rear facing 3M	Terminal box forward facing 3MB	Hiperface DSL® Connector (IZ)
SMB__42	Y	N	N	N	N	N	N
SMB__60	Y	Y	Y	Y	Y	Y	N
SMB__82	N	Y	Y	Y	Y	Y	N
SMB__100	N	Y	Y	Y	Y	Y	N
SMB__115	N	Y	Y	Y	Y	Y	N
SMB__142	N	Y	Y	Y	Y	Y	N
SMH__42	Y	N	N	N	N	N	N
SMH__60	Y	Y	Y	N	N	N	N
SMH__82	N	Y	Y	N	N	N	N
SMH__100	N	Y	Y	N	N	N	N
SMH__115	N	Y	Y	N	N	N	N
SMH__142	N	Y	Y	N	N	N	N
SME__42	Y	N	N	N	N	N	Y
SME__60	N	N	Y	Y	N	N	Y
SME__82	N	N	Y	Y	N	N	Y
SME__100	N	N	Y	Y	N	N	Y
SME__115	N	Y	N	N	N	N	Y
SME__142	N	Y	N	N	N	N	Y

Power connector (0V)

6	5	4
3	2	1

Pin	Description
1	GND - shield
2	Brake 0 VDC
3	Brake +24 VDC
4	W
5	V
6	U

Resolver connector (0V)

12	11	10	9	8	7
6	5	4	3	2	1

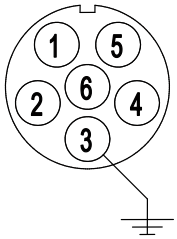
Pin	Description
1	n.c.
2	n.c.
3	n.c.
4	PTC
5	PTC
6	GND - shield
7	SIN +
8	SIN -
9	COS +
10	COS -
11	EXTC -
12	EXTC +

Absolute encoder SINCOS - Hiperface (0V)

12	11	10	9	8	7
6	5	4	3	2	1

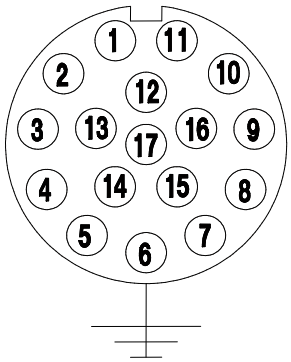
Pin	Description
1	SIN +
2	SIN -
3	RS485 +
4	0 V
5	PTC
6	PTC
7	+ VDC
8	COS +
9	COS-
10	RS485 -
11	GND - shield
12	n.c.

Power connector (2I, 2IB, 2D)



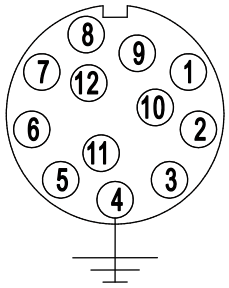
Pin	Description
1	U
2	V
3	GND - shield
4	Brake +24 VDC
5	Brake 0 VDC
6	W

Incremental encoder connector (2I, 2IB, 2D)



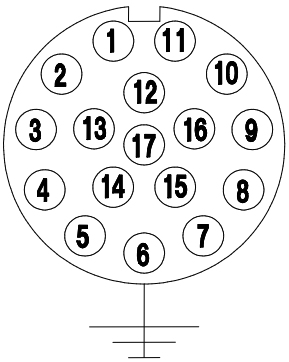
Pin	Description	
1	5 V	
2	0 V	
3	A +	
4	A -	
5	B +	
6	B -	
7	Z +	
8	PTC	KTY -
6	PTC	KTY +
10	Z -	
11	Hall A +	
12	Hall A -	
13	Hall B +	
14	Hall B -	
15	Hall C +	
16	Hall C -	
17	n.c.	

Resolver connector (2I, 2IB, 2D)



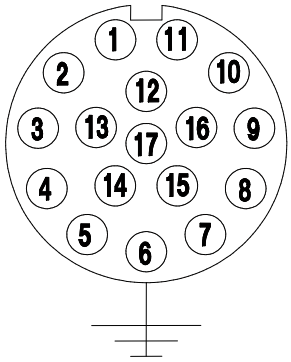
Pin	Description	
1	SIN -	
2	SIN +	
3	n.c.	
4	GND - shield	
5	n.c.	
6	n.c.	
7	EXCT -	
8	PTC	KTY -
9	PTC	KTY +
10	EXCT +	
11	COS +	
12	COS -	

Absolute encoder SINCOS - EnDat (2I, 2IB, 2D)



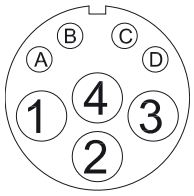
Pin	Description	
1	UP Sensor	
2	n.c.	
3	n.c.	
4	0 V Sensor	
5	PTC	KTY -
6	PTC	KTY +
7	UP	
8	CK +	
9	CK -	
10	0 V	
11	GND - shield	
12	B +	
13	B -	
14	Data +	
15	A +	
16	A -	
17	Data -	

Absolute encoder SINCOS - Hiperface (2I, 2IB, 2D)



Pin	Description	
1	SIN +	
2	SIN -	
3	RS485 +	
4	n.c.	
5	n.c.	
6	n.c.	
7	GND - shield	
8	PTC	KTY -
9	PTC	KTY +
10	+ VDC	
11	COS +	
12	COS -	
13	RS485 -	
14	n.c.	
15	n.c.	
16	n.c.	
17	n.c.	

Hiperface DSL® Connector (IZ)



Pin	Description
1	U
2	GND
3	V
4	W
A	Brake +
B	Brake -
C	Signal +
D	Signal -

Associated Drives

Motor	Rated Speed [min^{-1}]	Stall Current [A]	SLVD-N	TPD-M	Compax3	638
	230 VAC supply voltage					
SM_42 60 0,35	6000	0.78	SLVD1N…	TPD-M02…	C3S025V2…	638A-01-3-F…
SM_60 30 0,55	3000	0.7	SLVD1N…	TPD-M02…	C3S025V2…	638A-01-3-F…
SM_60 45 0,55	4500	1	SLVD1N…	TPD-M02…	C3S025V2…	638A-01-3-F…
SM_60 60 0,55	6000	1.4	SLVD2N…	TPD-M02…	C3S025V2…	638A-02-3-F…
SM_60 16 1,4	1600	0.95	SLVD1N…	TPD-M02…	C3S025V2…	638A-01-3-F…
SM_60 30 1,4	3000	1.73	SLVD2N…	TPD-M02…	C3S025V2…	638A-02-3-F…
SM_60 45 1,4	4500	2.37	SLVD5N…	TPD-M05…	C3S063V2…	638A-04-3-F…
SM_60 60 1,4	6000	2.98	SLVD5N…	TPD-M05…	C3S063V2…	638A-04-3-F…
SM_60 75 1,4	7500	3.85	SLVD5N…	TPD-M05…	C3S063V2…	638A-04-3-F…
SM_82 10 03	1000	1.2	SLVD2N…	TPD-M02…	C3S025V2…	638A-02-3-F…
SM_82 16 03	1600	1.8	SLVD2N…	TPD-M02…	C3S025V2…	638A-02-3-F…
SM_82 30 03	3000	3.1	SLVD5N…	TPD-M05…	C3S063V2…	638A-04-3-F…
SM_82 33 03	3300	3.5	SLVD5N…	TPD-M05…	C3S063V2…	638A-04-3-F…
SM_82 45 03	4500	4.7	SLVD5N…	TPD-M05…	C3S063V2…	638A-06-3-F…
SM_82 60 03	6000	6.1	SLVD7N…	TPD-M08…	C3S063V2…	638B-08-3-F…
SM_82 75 03	7500	7.5	SLVD7N…	TPD-M08…	C3S100V2…	638B-08-3-F…
SM_100 16 06	1600	3.7	SLVD5N…	TPD-M05…	C3S063V2…	638A-04-3-F…
SM_100 30 06	3000	5.9	SLVD7N…	TPD-M08…	C3S063V2…	638A-06-3-F…
SM_100 45 06	4500	9.4	SLVD10N…	TPD-M10…	C3S100V2…	638B-10-3-F…
SM_100 55 06	5500	11.8	SLVD15N…	TPD-M15…	C3S150V2…	638B-15-3-F…
SM_100 75 06	7500	14.7	SLVD15N…	TPD-M15…	C3S150V2…	638B-15-3-F…
SM_115 16 10	1600	6	SLVD7N…	TPD-M08…	C3S063V2…	638A-06-3-F…
SM_115 30 10	3000	10.5	SLVD10N…	TPD-M10…	C3S100V2…	638B-10-3-F…
SM_115 40 10	4000	14.7	SLVD15N…	TPD-M15…	C3S150V2…	638B-15-3-F…
SM_115 54 10	5400	18.2	n.a.	TPD-M30…	n.a.	n.a.
SM_142 18 15	1800	9.7	SLVD10N…	TPD-M10…	C3S100V2…	638B-10-3-F…
SM_142 30 15	3000	16	SLVD17N…	TPD-M30…	n.a.	n.a.

	400 VAC supply voltage					
SM_60 30 1,4	3000	0.95	SPD2N.. / TWIN2N	TPD-M02..	C3S015V4..	638B-03-6-F…
SM_60 45 1,4	4500	1.37	SPD2N.. / TWIN2N	TPD-M02..	C3S015V4..	638B-03-6-F…
SM_60 60 1,4	6000	1.73	SPD2N.. / TWIN2N	TPD-M02..	C3S038V4..	638B-03-6-F…
SM_60 75 1,4	7500	2.15	SPD5N.. / TWIN5N	TPD-M05..	C3S038V4..	638B-03-6-F…
SM_82 30 03	3000	1.8	SPD2N.. / TWIN2N	TPD-M02..	C3S038V4..	638B-03-6-F…
SM_82 45 03	4500	2.7	SPD5N.. / TWIN5N	TPD-M05..	C3S038V4..	638B-05-6-F…
SM_82 56 03	5600	3.1	SPD5N.. / TWIN5N	TPD-M05..	C3S038V4..	638B-05-6-F…
SM_82 60 03	6000	3.5	SPD5N.. / TWIN5N	TPD-M05..	C3S038V4..	638B-05-6-F…
SM_82 75 03	7500	4.4	SPD5N.. / TWIN5N	TPD-M05..	C3S075V4..	638B-05-6-F…
SM_100 30 06	3000	3.7	SPD5N.. / TWIN5N	TPD-M05..	C3S038V4..	638B-05-6-F…
SM_100 45 06	4500	5.6	SPD8N.. / TWIN8N	TPD-M08..	C3S075V4..	638B-08-6-F…
SM_100 56 06	5600	5.9	SPD8N.. / TWIN8N	TPD-M08..	C3S075V4..	638B-08-6-F…
SM_100 75 06	7500	9.4	SPD16N..		C3S150V4..	638B-10-6-F…
SM_115 20 10	2000	4.5	SPD5N.. / TWIN5N	TPD-M05..	C3S075V4..	638B-05-6-F…
SM_115 30 10	3000	6.0	SPD8N.. / TWIN8N	TPD-M08..	C3S075V4..	638B-08-6-F…
SM_115 40 10	4000	8.0	SPD8N.. / TWIN8N	TPD-M08..	C3S150V4..	638B-10-6-F…
SM_115 56 10	5600	10.5	SPD16N..	TPD-M15..	C3S150V4..	638B-15-6-F…
SM_142 20 15	2000	6.4	SPD8N.. / TWIN8N	TPD-M08..	C3S075V4..	638B-08-6-F…
SM_142 30 15	3000	9.7	SPD16N..	TPD-M10..	C3S150V4..	638B-10-6-F…
SM_142 45 15	4500	14.4	SPD16N..	TPD-M15..	C3S150V4..	638B-15-6-F…
SM_142 56 15	5600	16	SPD16N..	TPD-M30..	C3S300V4..	n.a.

Order Code

Serie SMB / SME

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Order example	**SMB**	**A**	**60**	**30**	**1,4**	**5**	**9**		**2I**		**64**	**A6**		**M**		**2**

1	**Type Of Motor (mandatory field)**	
	SME	Standard Motor with Encoder SME Series
	SMB	Standard Motor with Resolver SMB Series
2	**Brake Option**	
	empty field	No Brake Option
	A	Motor with Holding Brake (brakes when the supply voltage is 0)
3	**Motor Frame Size (mandatory field)**	
	42	Torque 0.35 Nm
	60	Torque range 0.55…1.4 Nm
	82	Torque 3 Nm
	100	Torque range 6 Nm
	115	Torque range 10 Nm
	142	Torque range 15…17 Nm
	170	Torque range 36…60 Nm (Provisional data)
4	**Winding (mandatory field)**	
	nn	min^{-1} (x100) see "Technical Data" (page 6)
5	**Motor Torque (mandatory field)**	
	nn	Torque [Nm] see "Technical Data" (page 6)
6	**Flange (mandatory field)**	
	5	B5 Flange
	7	Only for Frame 82 and 115
	8	Only for Frame 60, 82, 100 and 115
	9	Only for Frame 115
	A B C	Special Flange
7	**Shaft (mandatory field)**	
	9	9x25 mm for size 42 - 9x20 mm for size 60
	11	11x23 mm for size 60
	14	14x30 mm for size 82
	19	19x40 mm for size 82/100/115/142
	24	24x50 mm for size 100/115/142
	28	28x60 mm for size 115/142
	A*	Special shaft under request
8	**Key Shaft option**	
	empty field	Shaft with Key
	S	Shaft without key
9	**Layout - Connectors (mandatory field)**	
	0V	Cable exit and Molex Flying connectors - 200 mm above
	2I	Rotatable Interconnectron receptacles
	2IB	90° Interconnectron receptacles - forward facing
	2ID	90° Interconnectron receptacles - rear facing
	DC	Special Customer Layout
10	**Female connectors option**	
	empty field	With Female / flying connectors
	W	Without Female / flying connectors
11	**Protection Degree (mandatory field)**	
	64	IP64
	65	IP65
12	**Feedback**	
	empty field	Standard Resolver [SMB]
	Exx	Prearrangement for external encoder mounting Where xx is the model of feedback [SMB]
	A1	Encoder 1024 ppr + Hall - TAMAGAWA OIH48
	A2	Encoder 2048 ppr + Hall - TAMAGAWA OIH48
	A3	Encoder 4096 ppr + Hall - TAMAGAWA OIH48
	A6	SinCos Hiperface Encoder Single-Turn - STEGMANN SRS50/52
	A7	SinCos Hiperface Encoder Multi-Turn - STEGMANN SRS50/52
	B3	Encoder 2048 ppr + Hall - TAMAGAWA OIH35
	B9	SinCos EnDat Encoder Multi-Turn - HEIDENHAIN EQI1331
	C1	SinCos EnDat Encoder Single-Turn - HEIDENHAIN EQI1113
	C4	Encoder 5000 ppr + Hall - TAMAGAWA OIH48
	C6	SinCos Hiperface Encoder Single-Turn - STEGMANN SKS36
	C7	SinCos Hiperface Encoder Multi-Turn - STEGMANN SKM36
	D3	Encoder 5000ppr + Hall - TAMAGAWA OIH35
	D5	SinCos EnDat Encoder Multi-Turn - HEIDENHAIN EQN1325
	F2	SinCos EnDat Encoder Multi-Turn - HEIDENHAIN EQN1125
	F4	SinCos EnDat Encoder Multi-Turn - HEIDENHAIN EQI1130
	G4	SinCos Hiperface Encoder Multi-Turn - STEGMANN SEL37
	G5	SinCos Hiperface Encoder Multi-Turn - STEGMANN SEL52
	S1	SinCos Hiperface Encoder Single-Turn - STEGMANN SRS50S
	S2	SinCos Hiperface Encoder Multi-Turn - STEGMANN SRS50S
	S3	SinCos Hiperface Encoder Single-Turn - STEGMANN SKS36S
	S4	SinCos Hiperface Encoder Multi-Turn - STEGMANN SKM36S
	S5	32768 steps/rev Single Turn Hiperface DSL® Encoder Feedback SIL2
	S6	32768 steps/rev x 4096 Multi Turn Hiperface DSL® Encoder Feedback SIL2
13	**Option Resolver**	
	H	High Accuracy Resolver [SMB]

14	Option Inertia
empty field	Standard Inertia
M	Medium Inertia
15	**Special Option**
empty field	No Special Option
1Bxx	Motor with 2-side output shaft, where xx is the diameter of second shaft
16	**Voltage**
0A	24 V
0B	34 V
0C	48 V
0D	50 V
0E	60 V
0F	72 V
0G	74 V
0	80 V
0H	96 V
1A	108-110 V
1D	120 V
1B	125 V
1C	150 V
1	180 V
2	220-230 V
2A	222 V
2B	200 V
3	330 V
4	380-400 V
4A	425 V
4C	460 V
4B	490 V

Order Code

Serie SMH

	1	2	3	4	5	6	7	8	9	10	11	12	13
Order example	**SMH**	**A**	**60**	**30**	**1,4**	**5**	**9**		**2I**	**64**	**A6**	**M**	**2**

1	**Type Of Motor (mandatory field)**	
	SMH	Standard Motor with Resolver SMH Series
2	**Brake Option**	
	empty field	No Brake Option
	A	Motor with Holding Brake (brakes when the supply voltage is 0)
3	**Motor Frame Size (mandatory field)**	
	42	Torque 0.35 Nm
	60	Torque range 0.55…1.4 Nm
	82	Torque 3 Nm
	100	Torque range 6 Nm
	115	Torque range 10 Nm
	142	Torque range 15…17 Nm
4	**Winding (mandatory field)**	
	nn	min^{-1} (x100) see "Technical Data" (page 6)
5	**Motor Torque (mandatory field)**	
	nn	Torque [Nm] see "Technical Data" (page 6)
6	**Flange (mandatory field)**	
	5	B5 Flange
	7	Only for Frame 82 and 115
	8	Only for Frame 60, 82, 100 and 115
	9	Only for Frame 115
	A B C	Special Flange
7	**Shaft (mandatory field)**	
	9	9x25 mm for size 42 - 9x20 mm for size 60
	11	11x23 mm for size 60
	14	14x30 mm for size 82
	19	19x40 mm for size 82/100/115/142
	24	24x50 mm for size 100/115/142
	28	28x60 mm for size 115/142
8	**Key Shaft option**	
	empty field	Shaft with Key
	S	Shaft without key
9	**Layout - Connectors (mandatory field)**	
	0V	Cable exit and Molex Flying connectors - 200 mm above
	2I	Rotatable Interconnectron receptacles
	2IB	90° Interconnectron receptacles - forward facing
	2ID	90° Interconnectron receptacles - rear facing
10	**Protection Degree (mandatory field)**	
	64	IP64
	65	IP65
11	**Feedback**	
	A6	SinCos Hiperface Encoder Single-Turn - STEGMANN SRS50/52
	A7	SinCos Hiperface Encoder Multi-Turn - STEGMANN SRM50/52
	C6	SinCos Hiperface Encoder Single-Turn - STEGMANN SKS36
	C7	SinCos Hiperface Encoder Multi-Turn - STEGMANN SKM36
	G4	SinCos Hiperface Encoder Multi-Turn - STEGMANN SEL37
	G5	SinCos Hiperface Encoder Multi-Turn - STEGMANN SEL52
	S1	SinCos Hiperface Encoder Single-Turn - STEGMANN SRS50S
	S2	SinCos Hiperface Encoder Multi-Turn - STEGMANN SRM50S
	S3	SinCos Hiperface Encoder Single-Turn - STEGMANN SKS36S
	S4	SinCos Hiperface Encoder Multi-Turn - STEGMANN SKM36S
12	**Option Inertia**	
	empty field	Standard Inertia
	M	Medium Inertia
13	**Voltage**	
	2	220-230 V
	4	380-400 V

Order Code

Motor Power Cable for SMB Motors

	1	2	3	4	5	6	7
Order example	**CAVOMOT**	**A**	**1,5x**	**5**	**PM**	**I**	**40**

1	**CAVOMOT**	
	CAVOMOT	Power cable drive - motor
2	**Brake wire**	
	empty field	without brake wire
	A	Brake wire
3	**Section [mm²]**	
	1,5x	1,5 mm²
	2,5x	2,5 mm²
	4x, 6x, 10x,	4 mm², 6 mm², 10 mm²,
	25x	25 mm² (not for "PM" type)
4	**Length [m]**	
	1, ...	Length in metre
5	**Application Type**	
	PF-	Standard cable
	PM-	High flex cable
6	**Motor Connector**	
	M	Military Connector (Mil) [all layout except 08 and 5]
	8	Military Connector (Mil) [all layout 8]
	I	Interconnectron Connector [all layout]
	3	Terminal Connection Box [all layout except 3M/3MB/3MC/3MA]
	S	Terminal Connection Box [layout 3M/3M/3MC/3MA]
	SY	Terminal Connection for MBX motors [cable no ATEX]
	SL	Terminal connection box [layout 6i only for MB205 motor]
	F	Faston Connector [layout SMB42 0V]
	A	Amphenol Connector [layout SM_40 0P, 1A, 1C, 2DA, ...]
	T	Trilogy Connector
	PRM	Patch Cord Military Connector (Mil) [all layout except 08]
7	**Motor Size**	
	40..265	Motor Size
	M50	Trilogy Motor
	NX	Motors NX2-3-4-6 type NX----AKR70--

Feedback Cable for SMB Motors

	1	2	3	4	5
Order example	**CAVORESX**	**4**	**PM**	**I**	**SLVDN**

1	**Signal Cable type**	
	CAVORESX	Resolver
	CAVOENCX	Incremental encoder
	CAVOABSX	Absolute Encoder EnDat+SinCos
	CAVOHIPX	Absolute Encoder Hiperface+SinCos
	CAVOSINX	SinCos Encoder
	CAVOHALX	SinCos Encoder + Hall sensor
2	**Length [m]**	
	1, ...	Length in metre
3	**Application Type**	
	PM-	Moving Application
4	**Motor Connector**	
	M	Military Connector (Mil) [all layout except 08]
	8	Military Connector (Mil) [all layout 08]
	I	Interconnectron Connector [all layout]
	S	Terminal Connection Box layout 3M/3M/3MC/3MA and motor MBX
	F	Faston Connector [layout SMB40 0V]
	A	Amphenol Connector [layout SMB40 0P, 1A, 1C, 2DA, ...]
	T	Trilogy Connector
	NX	Motors NX2-3-4-6-8 type NX----AKR7---
	E	Free signal cable for EX motors
	PRM	Patch Cord Military Connector (Mil) [all layout except 08]
5	**Drive Type**	
	LVD	LVD Drive
	HPD	HPD Drive
	SLVD	SLVD e SLVD-N Drive
	SLVDN	SLVD-N Drive
	TPD	TPD-M
	SPD/TWIN	TWIN_N e SPD_N Drive or wire without connector drive side
	HIDRIVE	Hi-Drive
	631	Servodrives 631
	638	Servodrives 638
	637F	Servodrives 637F

Order Code

Motor Power Cable for SMH Motors

	1	2
Order example:	**MOK**	**55/02**

1	**Cable**	
	MOK	Motor cable [2]
2	**Type**	
		for SMH / MH56 / MH70 / MH105 [3]
	55/....[1]	1,5 mm²; up to 13,8 A
	54/....[1]	1,5 mm²; up to 13,8 A Moving application
	56/....[1]	2,5 mm²; up to 18,9 A
	57/....[1]	2,5 mm²; up to 18,9 A Moving application
		for MH145 / MH205 [4]
	60/....[1]	1,5 mm²; up to 13,8 A
	63/....[1]	1,5 mm²; up to 13,8 A Moving application
	59/....[1]	2,5 mm²; up to 18,9 A
	64/....[1]	2,5 mm²; up to 18,9 A Moving application
	61/....[1]	6 mm²; up to 32,3 A Moving application
	62/....[1]	10 mm²; up to 47,3 A Moving application

MOK55 and MOK54 are also possible for linear motors LXR406, LXR412 and BLMA.

Feedback Cable for SMH Motors

	1
Order example:	**REK42/02**

1	**Zubehör**	
		for MH/SMH-Motors
	REK42/....[1]	Resolver cable [2]
	REK41/....[1]	Resolver cable [2] Moving application
	GBK24/....[1]	SinCos© Feedback cable [2] Moving application
	GBK38/....[1]	EnDat 2.1 Feedback cable [2] Moving application
	GBK23/....[1]	Encoder cable [2]
		for linear motors
	GBK33/....[1]	Feedback cable for LXR Moving application
	GBK32/....[1]	Feedback cable for BLMA Moving application

Length code for cables

[1] Length code 1 (Example: SSK01/09 = length 25 m)

Length [m]	1,0	2,5	5,0	7,5	10,0	12,5	15,0	20,0	25,0	30,0	35,0	40,0	45,0	50,0
Order code	01	02	03	04	05	06	07	08	09	10	11	12	13	14

[2] Color according to DESINA
[3] with motor connector
[4] with cable eye for motor terminal box

Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 00800 27 27 5374.



AEROSPACE

Key Markets
- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

Key Products
- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes



CLIMATE CONTROL

Key Markets
- Agriculture
- Air conditioning
- Food, beverage & dairy
- Life sciences & medical
- Precision cooling
- Processing
- Transportation

Key Products
- CO^2 controls
- Electronic controllers
- Filter driers
- Hand shut-off valves
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves



ELECTROMECHANICAL

Key Markets
- Aerospace
- Factory automation
- Food & beverage
- Life science & medical
- Machine tools
- Packaging machinery
- Paper machinery
- Plastics machinery & converting
- Primary metals
- Semiconductor & electronics
- Textile
- Wire & cable

Key Products
- AC/DC drives & systems
- Electric actuators
- Controllers
- Gantry robots
- Gearheads
- Human machine interfaces
- Industrial PCs
- Inverters
- Linear motors, slides and stages
- Precision stages
- Stepper motors
- Servo motors, drives & controls
- Structural extrusions



FILTRATION

Key Markets
- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products
- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators



FLUID & GAS HANDLING

Key Markets
- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Welding

Key Products
- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



HYDRAULICS

Key Markets
- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

Key Products
- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



PNEUMATICS

Key Markets
- Aerospace
- Conveyor & material handling
- Factory automation
- Food & beverage
- Life science & medical
- Machine tools
- Packaging machinery
- Transportation & automotive

Key Products
- Air preparation
- Compact cylinders
- Field bus valve systems
- Grippers
- Guided cylinders
- Manifolds
- Miniature fluidics
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves and controls
- Rodless cylinders
- Rotary actuators
- Tie rod cylinders
- Vacuum generators, cups & sensors



PROCESS CONTROL

Key Markets
- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Microelectronics
- Oil & gas
- Power generation

Key Products
- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds



SEALING & SHIELDING

Key Markets
- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

Key Products
- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management

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