

Synchronous motors

Torque motors for SINAMICS S120

1FW6 standard type built-in torque motors Water cooling

Selection and Ordering Data

Maximum torque	Static torque ¹⁾³⁾	Rated torque ²⁾³⁾	Max. speed at maximum torque ²⁾	Max. speed at rated torque ²⁾	1FW6 built-in torque motors Water cooled	Moment of inertia of rotor	Weight, approx. stator + rotor
$M_{\max}$	M_0	M_{rated}	$n_{\max}$ at $M_{\max}$	$n_{\max}$ at M_{rated}	Order No. Standard type	J	m
Nm (lb _f -in)	Nm (lb _f -in)	Nm (lb _f -in)	rpm	rpm		10 ⁻² kgm ² (lb _f -in-s ²)	kg (lb)
179 (1584)	119 (1053)	113 (1000)	46	140	1FW6090-0 ■ B05-0F ■ 2	1.52 (0.13)	9.2 (20.3)
		109 (965)	140	250	1FW6090-0 ■ B05-0K ■ 2	1.52 (0.13)	9.2 (20.3)
251 (2221)	166 (1469)	154 (1363)	120	220	1FW6090-0 ■ B07-0K ■ 2	2.2 (0.19)	12.2 (27)
		142 (1257)	270	430	1FW6090-0 ■ B07-1J ■ 2	2.2 (0.19)	12.2 (27)
358 (3168)	238 (2106)	231 (2044)	8.7	82	1FW6090-0 ■ B10-0K ■ 2	3.09 (0.27)	17.2 (37.9)
		216 (1912)	170	270	1FW6090-0 ■ B10-1J ■ 2	3.09 (0.27)	17.2 (37.9)
537 (4752)	357 (3159)	338 (2991)	78	150	1FW6090-0 ■ B15-1J ■ 2	4.65 (0.41)	27.2 (60)
		319 (2823)	200	310	1FW6090-0 ■ B15-2J ■ 2	4.65 (0.41)	27.2 (60)
439 (3885)	258 (2283)	241 (2133)	47	130	1FW6130-0 ■ B05-0K ■ 2	6.37 (0.56)	13.2 (29.1)
		217 (1920)	180	310	1FW6130-0 ■ B05-1J ■ 2	6.37 (0.56)	13.2 (29.1)
614 (5434)	361 (3195)	344 (3044)	21	96	1FW6130-0 ■ B07-0K ■ 2	8.92 (0.79)	18.2 (40.1)
		324 (2867)	110	200	1FW6130-0 ■ B07-1J ■ 2	8.92 (0.79)	18.2 (40.1)
878 (7770)	516 (4567)	484 (4283)	50	120	1FW6130-0 ■ B10-1J ■ 2	12.7 (1.12)	25.2 (55.6)
		450 (3983)	150	250	1FW6130-0 ■ B10-2J ■ 2	12.7 (1.12)	25.2 (55.6)
1320 (11682)	775 (6859)	744 (6584)	14	78	1FW6130-0 ■ B15-1J ■ 2	19.1 (1.69)	38.2 (84.2)
		714 (6319)	77	150	1FW6130-0 ■ B15-2J ■ 2	19.1 (1.69)	38.2 (84.2)

Cable outlet for 1FW6090/1FW6130 only:

Axial
Radially outwards
Tangential

P
Q
N

Type of connection:

Permanently connected power and signal cables with open core ends
Length: 2 m (6.56 ft)
Permanently connected power and signal cables pre-assembled with connectors
Length: 0.5 m (1.64 ft)

C
D

Synchronous motors

Torque motors for SINAMICS S120

1FW6 standard type built-in torque motors
Water cooling

Selection and Ordering Data

Motor type (continued)	Static cur- rent ¹⁾³⁾	Rated cur- rent ²⁾³⁾	Maxi- mum cur- rent ²⁾	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector ⁵⁾			
					Required rated current	Booksize format				
	I_0	I_{rated}	I_{max}	$P_{el, max}$	I_{rated}/I_{max}	Order No.	Power con- nector	Cable cross- section ⁶⁾	Order No. Pre-assembled basic cable to converter	
	A	A	A	kW (HP)	A		Size	Motor mm ²		
1FW6090-0.B05-0F..	5.9	5.6	9.5	6.55 (8.78)	5/10 ⁴⁾	6SL312 ■ - ■ TE15-0AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6090-0.B05-0K..	8.2	7.4	13	8.12 (10.88)	9/18	6SL312 ■ - ■ TE21-0AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6090-0.B07-0K..	10	9.5	16	10.3 (13.8)	9/18 ⁴⁾	6SL312 ■ - ■ TE21-0AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6090-0.B07-1J..	16	13	26	14.1 (18.9)	18/36	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6090-0.B10-0K..	8.2	7.9	13	9.43 (12.6)	9/18	6SL312 ■ - ■ TE21-0AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6090-0.B10-1J..	16	14	26	15.3 (20.5)	18/36	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6090-0.B15-1J..	16	15	26	17.1 (22.9)	18/36	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6090-0.B15-2J..	26	23	43	24.1 (32.3)	30/56	6SL312 ■ - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....	
1FW6130-0.B05-0K..	9.7	9	18	12.2 (16.4)	9/18 ⁴⁾	6SL312 ■ - ■ TE21-0AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6130-0.B05-1J..	17	14	32	18.3 (24.5)	18/36	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6130-0.B07-0K..	10	10	20	14.2 (19)	9/18 ⁴⁾	6SL312 ■ - ■ TE21-0AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6130-0.B07-1J..	17	15	32	19.7 (26.4)	18/36	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6130-0.B10-1J..	17	16	32	21.4 (28.7)	18/36	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6130-0.B10-2J..	28	24	53	30.6 (41)	30/56	6SL312 ■ - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....	
1FW6130-0.B15-1J..	19	18	36	25.4 (34.1)	18/36 ⁴⁾	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....	
1FW6130-0.B15-2J..	28	26	54	34.1 (45.7)	30/56	6SL312 ■ - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....	
Cooling:						0 1				
Internal air cooling										
External air cooling						1 2				
Motor Module:										
Internal air cooling										
External air cooling										
For length code as well as power and signal cables, see Connection system MOTION-CONNECT.										

¹⁾ Torque and current at low speeds.

²⁾ The values refer to a supply voltage of 400 V 3 AC ±10% (converter DC link voltage 600 V DC).

³⁾ In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

⁴⁾ Selection optimized to size of power module. The next higher power module offers 100% torque utilization.

⁵⁾ Permanently connected power and signal cables.

⁶⁾ The current carrying capacity of the power cables complies with IEC 60204-1 for installation type C under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).

Synchronous motors

Torque motors for SINAMICS S120

1FW6 standard type built-in torque motors Water cooling

Selection and Ordering Data

Maximum torque	Static torque ¹⁾³⁾	Rated torque ²⁾³⁾	Max. speed at maximum torque ²⁾	Max. speed at rated torque ²⁾	1FW6 built-in torque motors Water cooled	Moment of inertia of rotor	Weight, approx. stator + rotor
$M_{\max}$	M_0	M_{rated}	$n_{\max}$ at $M_{\max}$	$n_{\max}$ at M_{rated}	Order No. Standard type	J	m
Nm (lb _f -in)	Nm (lb _f -in)	Nm (lb _f -in)	rpm	rpm		kgm ² (lb _f -in-s ²)	kg (lb)
716 (6337)	467 (4133)	431 (3814)	84	140	1FW6160-0 ■ B05-1J ■ 2	0.19 (1.682)	36.3 (80.0)
		404 (3575)	150	250	1FW6160-0 ■ B05-2J ■ 2	0.19 (1.682)	36.3 (80.0)
1000 (8850)	653 (5779)	620 (5487)	53	96	1FW6160-0 ■ B07-1J ■ 2	0.258 (2.283)	48.3 (107)
		594 (5257)	100	170	1FW6160-0 ■ B07-2J ■ 2	0.258 (2.283)	48.3 (107)
1430 (12656)	933 (8257)	903 (7992)	29	60	1FW6160-0 ■ B10-1J ■ 2	0.36 (3.186)	66.3 (146)
		878 (7770)	65	110	1FW6160-0 ■ B10-2J ■ 2	0.36 (3.186)	66.3 (146)
2150 (19028)	1400 (12390)	1350 (11948)	34	66	1FW6160-0 ■ B15-2J ■ 2	0.531 (4.699)	95.3 (210)
		1280 (11328)	97	160	1FW6160-0 ■ B15-5G ■ 2	0.531 (4.699)	95.3 (210)
990 (8762)	672 (5947)	633 (5602)	54	97	1FW6190-0 ■ B05-1J ■ 2	0.358 (3.168)	42.8 (94.4)
		605 (5354)	96	160	1FW6190-0 ■ B05-2J ■ 2	0.358 (3.168)	42.8 (94.4)
1390 (12302)	941 (8328)	905 (8009)	33	63	1FW6190-0 ■ B07-1J ■ 2	0.486 (4.142)	55.8 (123)
		879 (7779)	64	110	1FW6190-0 ■ B07-2J ■ 2	0.486 (4.142)	55.8 (123)
1980 (17523)	1340 (11859)	1310 (11594)	14	38	1FW6190-0 ■ B10-1J ■ 2	0.678 (6.0)	75.8 (167)
		1290 (11417)	39	70	1FW6190-0 ■ B10-2J ■ 2	0.678 (6.0)	75.8 (167)
2970 (26285)	2020 (17877)	1970 (17435)	17	40	1FW6190-0 ■ B15-2J ■ 2	0.998 (8.832)	107.8 (238)
		1890 (16727)	62	100	1FW6190-0 ■ B15-5G ■ 2	0.998 (8.832)	107.8 (238)

Cable outlet for 1FW6160 to 1FW6290 only:

Axial
Radially outwards
Tangential

W
V
T

Type of connection:

Permanently connected power and signal cables with open core ends
Length: 2 m (6.56 ft)
Permanently connected power and signal cables pre-assembled with connectors
Length: 0.5 m (1.64 ft)

C
D

Synchronous motors

Torque motors for SINAMICS S120

1FW6 standard type built-in torque motors
Water cooling

Selection and Ordering Data

Motor type (continued)	Static cur- rent ¹⁾³⁾	Rated cur- rent ²⁾³⁾	Maxi- mum current ²⁾	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector ⁴⁾		
	I_0	I_{rated}	I_{max}	$P_{el, max}$	Required rated current	Booksized format	Power connector	Cable cross- section ⁵⁾	Order No. Pre-assembled basic cable to converter
	A	A	A	kW (HP)	A	Order No.	Size	Motor mm ²	
1FW6 160-0.B05-1J..	17	16	31	15.1 (20.2)	18/36	6SL312 - - TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....
1FW6 160-0.B05-2J..	28	24	49	20 (26.8)	30/56	6SL312 - - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 160-0.B07-1J..	17	16	31	16.7 (22.4)	18/36	6SL312 - - TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....
1FW6 160-0.B07-2J..	28	25	49	21.8 (29.2)	30/56	6SL312 - - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 160-0.B10-1J..	17	17	31	19 (25.5)	18/36	6SL312 - - TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....
1FW6 160-0.B10-2J..	28	26	49	24.4 (32.7)	30/56	6SL312 - - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 160-0.B15-2J..	28	26	49	28.2 (37.8)	30/56	6SL312 - - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 160-0.B15-5G..	56	50	98	42.6 (57.1)	60/113	6SL312 - - 1 TE26-0AA3	1.5	4 x 16	6FX8002-5CS24-....
1FW6 190-0.B05-1J..	18	17	31	16.3 (21.9)	18/36	6SL312 - - TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....
1FW6 190-0.B05-2J..	27	24	47	20.6 (27.6)	30/56	6SL312 - - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 190-0.B07-1J..	18	17	31	18.2 (24.4)	18/36	6SL312 - - TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....
1FW6 190-0.B07-2J..	27	25	47	22.7 (30.4)	30/56	6SL312 - - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 190-0.B10-1J..	18	17	31	20.7 (27.8)	18/36	6SL312 - - TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....
1FW6 190-0.B10-2J..	27	26	47	25.7 (34.5)	30/56	6SL312 - - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 190-0.B15-2J..	27	26	47	30.1 (40.4)	30/56	6SL312 - - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 190-0.B15-5G..	54	50	95	44.1 (59.1)	60/113	6SL312 - - 1 TE26-0AA3	1.5	4 x 16	6FX8002-5CS24-....

Cooling:

Internal air cooling
External air cooling

0
1

Motor Module:

Internal air cooling
External air cooling

1
2

For length code as well as power and signal cables, see Connection system MOTION-CONNECT.

....

¹⁾ Torque and current at low speeds.

²⁾ The values refer to a supply voltage of 400 V 3 AC ±10% (converter DC link voltage 600 V DC).

³⁾ In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

⁴⁾ Permanently connected power and signal cables.

⁵⁾ The current carrying capacity of the power cables complies with IEC 60204-1 for installation type C under continuous operating conditions at an ambient air temperature of 40 °C (104 °F)

Synchronous motors

Torque motors for SINAMICS S120

1FW6 standard type built-in torque motors Water cooling

Selection and Ordering Data

Maximum torque	Static torque ¹⁾³⁾	Rated torque ²⁾³⁾	Max. speed at maximum torque ²⁾	Max. speed at rated torque ²⁾	1FW6 built-in torque motors Water cooled	Moment of inertia of rotor	Weight, approx. stator + rotor
$M_{\max}$	M_0	M_{rated}	$n_{\max}$ at $M_{\max}$	$n_{\max}$ at M_{rated}	Order No. Standard type	J	m
Nm (lb _f -in)	Nm (lb _f -in)	Nm (lb _f -in)	rpm	rpm		kgm ² (lb _f -in-s ²)	kg (lb)
1320 (11682)	841 (7443)	799 (7071)	34	69	1FW6230-0 ■ B05-1J ■ 2	0.622 (5.505)	44.8 (98.8)
		774 (6850)	59	110	1FW6230-0 ■ B05-2J ■ 2	0.622 (5.505)	44.8 (98.8)
1840 (16284)	1180 (10443)	1140 (10089)	19	45	1FW6230-0 ■ B07-1J ■ 2	0.843 (7.460)	58.8 (130)
		1120 (9912)	38	73	1FW6230-0 ■ B07-2J ■ 2	0.843 (7.460)	58.8 (130)
2630 (23276)	1680 (14868)	1630 (14426)	21	46	1FW6230-0 ■ B10-2J ■ 2	1.18 (10.443)	81.8 (180)
		1520 (13452)	74	130	1FW6230-0 ■ B10-5G ■ 2	1.18 (10.443)	81.8 (180)
3950 (34958)	2520 (22302)	2440 (21594)	19	43	1FW6230-0 ■ B15-4C ■ 2	1.73 (15.310)	117.8 (260)
		2380 (21063)	44	80	1FW6230-0 ■ B15-5G ■ 2	1.73 (15.310)	117.8 (260)
8570 (75854)	4760 (42126)	4590 (40622)	28	53	1FW6290-0 ■ B15-7A ■ 2	4.40 (38.939)	214.6 (473)

Cable outlet for 1FW6160 to 1FW6290 only:

Axial
Radially outwards
Tangential

W
V
T

Type of connection:

Permanently connected power and signal cables with open core ends
Length: 2 m (6.56 ft)
Permanently connected power and signal cables pre-assembled with connectors
Length: 0.5 m (1.64 ft)

C
D

Synchronous motors

Torque motors for SINAMICS S120

1FW6 standard type built-in torque motors
Water cooling

Selection and Ordering Data

Motor type (continued)	Static current 1) 3)	Rated current 2) 3)	Maxi- mum current ²⁾	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector ⁴⁾		
					Required rated current	Booksiz e format			
	I_0	I_{rated}	I_{max}	$P_{el, max}$	I_{rated}/I_{max}	Order No.	Power connector	Cable cross- section ⁵⁾	Order No. Pre-assembled basic cable to converter
	A	A	A	kW (HP)	A		Size	Motor mm ²	
1FW6 230-0.B05-1J..	16	15	31	17.3 (23.2)	18/36	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....
1FW6 230-0.B05-2J..	24	22	45	21 (28.2)	30/56	6SL312 ■ - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 230-0.B07-1J..	16	16	31	19.4 (26.0)	18/36	6SL312 ■ - ■ TE21-8AA3	1	4 x 2.5	6FX8002-5CS11-....
1FW6 230-0.B07-2J..	24	22	45	23.6 (31.6)	30/56	6SL312 ■ - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 230-0.B10-2J..	24	23	45	27.1 (36.3)	30/56	6SL312 ■ - 1 TE23-0AA3	1.5	4 x 4	6FX8002-5CS41-....
1FW6 230-0.B10-5G..	54	48	100	42 (56.3)	60/113	6SL312 ■ - 1 TE26-0AA3	1.5	4 x 16	6FX8002-5CS24-....
1FW6 230-0.B15-4C..	33	32	63	38 (50.9)	45/85	6SL312 ■ - 1 TE24-5AA3	1.5	4 x 6	6FX8002-5CS54-....
1FW6 230-0.B15-5G..	53	49	100	47.4 (63.5)	60/113	6SL312 ■ - 1 TE26-0AA3	1.5	4 x 16	6FX8002-5CS24-....
1FW6 290-0.B15-7A..	64	61	130	65.2 (87.4)	85/141	6SL312 ■ - 1 TE28-5AA3	1.5	4 x 16	6FX8002-5CS24-....
Cooling: Internal air cooling External air cooling						0 1			
Motor Module: Internal air cooling External air cooling						1 2			
For length code as well as power and signal cables, see Connection system MOTION-CONNECT.									

Accessories

Designation	Order No.	Designation	Order No.
Cooling connection adapter for		Power connector	
• Torque motors 1FW6160 to 1FW6230	1FW6160-1BA00-0AA0	• Size 1 for 4 x 2.5 mm ²	6FX2003-1CG10
• Torque motors 1FW6290	1FW6290-1BA00-0AA0	• Size 1.5 for 4 x 4/4 x 10/4 x 16 mm ²	6FX2003-1CG20
		Signal connector	
		• M17 (socket) for 6 x 0.5 + 1 x 1.0 mm ²	6FX2003-0SU07

¹⁾ Torque and current at low speeds.

²⁾ The values refer to a supply voltage of 400 V 3 AC ±10% (converter DC link voltage 600 V DC).

³⁾ In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

⁴⁾ Permanently connected power and signal cables.

⁵⁾ The current carrying capacity of the power cables complies with IEC 60204-1 for installation type C under continuous operating conditions at an ambient air temperature of 40 °C (104 °F).