

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6SL3120-1TE28-5AA3

SINGLE MOTOR MODULE

Used with the applicable PLC System configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens official manufacturer documentation

Technical specifications (continued)

Article No.	6SL3120-1TE13-0AA4	6SL3120-1TE15-0AA4	6SL3120-1TE21-0AA4	6SL3120-1TE21-8AA4	6SL3120-1TE23-0AA4
Product designation	Single Motor Module in booksize format with <u>internal</u> air cooling				
Article No.	6SL3121-1TE13-0AA4	6SL3121-1TE15-0AA4	6SL3121-1TE21-0AA4	6SL3121-1TE21-8AA4	6SL3121-1TE23-0AA3
Product designation	Single Motor Module in booksize format with <u>external</u> air cooling				

DC link voltage 510 ... 720 V DC

Output current						
• Rated current I_{rated}	A	3	5	9	18	30
• Base-load current I_H	A	2.6	4.3	7.7	15.3	25.5
• For S6 duty I_{S6} (40 %)	A	3.5	6	10	24	40
• I_{max}	A	9	15	27	54	56
Type rating¹⁾						
• Based on I_{rated}	kW	1.6	2.7	4.8	9.7	16.0
• Based on I_H	kW	1.4	2.3	4.1	8.2	13.7
Rated pulse frequency	kHz	4	4	4	4	4
DC link current $I_d^{2)}$	A	3.6	6	11	22	36
Current carrying capacity						
• DC link busbars ³⁾	A	100	100	100	100	100
• 24 V DC busbars ⁴⁾	A	20	20	20	20	20
DC link capacitance	µF	110	110	110	220	710
Current requirement at 24 V DC, max.	A	0.85	0.85	0.85	0.85	0.9
Internal/external air cooling						
• Power loss ⁵⁾						
- Maximum losses with internal air cooling in control cabinet	W	50	70	100	190	310
- Typical losses with internal air cooling in control cabinet ⁶⁾	W	30	40	60	140	260
- With external air cooling, int./ext.	W	35/15	40/30	55/45	100/90	100/210
• Cooling air requirement	m³/s	0.008	0.008	0.008	0.008	0.016
• Sound pressure level L_{pA} (1 m)	dB	< 60	< 60	< 60	< 60	< 60
Motor connection⁷⁾ U2, V2, W2		Connector (X1), max. 30 A	Connector (X1), max. 30 A	Connector (X1), max. 30 A	Connector (X1), max. 30 A	Connector (X1), max. 30 A
Shield connection		Integrated in connector (X1)	Integrated in connector (X1)	Integrated in connector (X1)	Integrated in connector (X1)	Integrated in connector (X1)
PE connection		M5 screw	M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A	Integrated into the plug-in motor connector (X1), 24 V DC, 2 A

¹⁾ Rated power of a typical standard asynchronous (induction) motor at 600 V DC link voltage.

²⁾ Rated DC link current for dimensioning an external DC connection.

³⁾ With reinforced DC link busbar set, 150 A is possible (Accessories).

⁴⁾ If, due to a number of Line Modules and Motor Modules being mounted side-by-side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm², max. fuse protection 20 A).

⁵⁾ Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

⁶⁾ At max. motor cable length 30 m, pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

⁷⁾ Connector not included in scope of supply, see [Accessories](#).

SINAMICS S120 drive system

SINAMICS S120

Booksize format > Motor Modules > Single Motor Modules

Technical specifications (continued)

Article No.	6SL3120-1TE13-0AA4	6SL3120-1TE15-0AA4	6SL3120-1TE21-0AA4	6SL3120-1TE21-8AA4	6SL3120-1TE23-0AA4
Product designation	Single Motor Module in booksize format with <u>internal</u> air cooling				
Article No.	6SL3121-1TE13-0AA4	6SL3121-1TE15-0AA4	6SL3121-1TE21-0AA4	6SL3121-1TE21-8AA4	6SL3121-1TE23-0AA3
Product designation	Single Motor Module in booksize format with <u>external</u> air cooling				

DC link voltage 510 ... 720 V DC

Motor cable length, max.						
• Shielded	m	50	50	50	70	100
• Unshielded	m	75	75	75	100	150
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width	mm	50	50	50	50	100
Height	mm	380	380	380	380	380
Depth						
• With internal air cooling	mm	270	270	270	270	270
• With external air cooling, on/behind mounting surface	mm	226/66.5	226/66.5	226/66.5	226/66.5	226/66.5
Net weight						
• With internal air cooling	kg	5.0	5.0	5.0	5.0	6.9
• With external air cooling	kg	5.7	5.7	5.7	5.7	8.5

Article No.	6SL31201TE24-5AA3	6SL31201TE26-0AA3	6SL31201TE28-5AA3	6SL31201TE31-3AA3	6SL31201TE32-0AA4
Product designation	Single Motor Module in booksize format with <u>internal</u> air cooling				
Article No.	6SL3121-1TE24-5AA3	6SL3121-1TE26-0AA3	6SL3121-1TE28-5AA3	6SL3121-1TE31-3AA3	6SL3121-1TE32-0AA4
Product designation	Single Motor Module in booksize format with <u>external</u> air cooling				

DC link voltage 510 ... 720 V DC

Output current						
• Rated current I_{rated}	A	45	60	85	132	200
• Base-load current I_H	A	38	52	68	105	141
• For S6 duty I_{S6} (40 %)	A	60	80	110	150	230
• I_{max}	A	85	113	141	210	282
Rated pulse frequency	kHz	4	4	4	4	4
• Power ¹⁾						
At 600 V DC link voltage						
• Rated power	kW	24	32	46	71	107
• Based on I_H	kW	21	28	37	57	76
DC link current I_d ²⁾	A	54	72	102	158	200
Current carrying capacity						
• DC link busbars	A	200	200	200	200	200
• 24 V DC busbars	A	20	20	20	20	20
DC link capacitance	µF	1175	1410	1880	2820	3995
Current requirement at 24 V DC, max.	A	1.2	1.2	1.5	1.5	1.5

¹⁾ Rated power of a typical standard asynchronous (induction) motor at 600 V DC link voltage.

²⁾ Rated DC link current for dimensioning an external DC connection.

Technical specifications (continued)

Article No.		6SL31201TE24-5AA3	6SL31201TE26-0AA3	6SL31201TE28-5AA3	6SL31201TE31-3AA3	6SL31201TE32-0AA4
Product designation		Single Motor Module in booksize format with <u>internal</u> air cooling				
Article No.		6SL3121-1TE24-5AA3	6SL3121-1TE26-0AA3	6SL3121-1TE28-5AA3	6SL3121-1TE31-3AA3	6SL3121-1TE32-0AA4
Product designation		Single Motor Module in booksize format with <u>external</u> air cooling				
DC link voltage 510 ... 720 V DC						
Internal/external air cooling						
• Power loss ¹⁾						
- Maximum power loss with internal air cooling in control cabinet	kW	0.46	0.62	0.79	1.29	2.09
- Typical losses with internal air cooling in control cabinet ²⁾	kW	0.38	0.55	0.77	1.26	2.03
- With external air cooling, int./ext	kW	0.14/0.32	0.16/0.46	0.2/0.59	0.29/1.0	0.47/1.62
• Cooling air requirement	m ³ /s	0.031	0.031	0.044	0.144	0.144
• Sound pressure level L _{pA} (1 m)	dB	< 65	< 65	< 60	< 73	< 73
Motor connection U2, V2, W2		M6 screw studs (X1)	M6 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)
• Conductor cross-section, max.	mm ²	2.5 ... 50	2.5 ... 50	2.5 ... 95, 2 × 35	2.5 ... 120, 2 × 50	2.5 ... 120, 2 × 50
Shield connection		See Accessories	See Accessories	See Accessories	See Accessories	See Accessories
PE connection		M6 screw	M6 screw	M6 screw	M8 screw	M8 screw
Motor brake connection		Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A
Motor cable length, max.						
• Shielded	m	100	100	100	100	100
• Unshielded	m	150	150	150	150	150
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width	mm	150	150	200	300	300
Height	mm	380	380	380	380	380
• With fan ³⁾	mm	–	–	–	629	629
• With screwed fitting	mm	–	–	–	–	553 ¹⁾
Depth						
• With internal air cooling	mm	270	270	270	270	270
• With external air cooling, on/behind mounting surface	mm	226/71	226/71	226/92	226/82	226/82
Net weight						
• With internal air cooling	kg	9	9	15	21	21
• With external air cooling	kg	13.2	13.4	17.2	27.2	30

¹⁾ Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

²⁾ At max. motor cable length 30 m, pulse frequency 4 kHz and DC link voltage 540 ... 600 V.

³⁾ The fan is supplied with the Motor Module and must be installed before the Motor Module is commissioned.

SINAMICS S120 drive system

SINAMICS S120

Booksize format > Motor Modules > Single Motor Modules

Selection and ordering data

Rated output current	Type rating	SINAMICS S120 Single Motor Module in booksize format	
A	kW	<u>Internal</u> air cooling Article No.	<u>External</u> air cooling Article No.
DC link voltage 510 ... 720 V DC			
3	1.6	6SL3120-1TE13-0AA4	6SL3121-1TE13-0AA4
5	2.7	6SL3120-1TE15-0AA4	6SL3121-1TE15-0AA4
9	4.8	6SL3120-1TE21-0AA4	6SL3121-1TE21-0AA4
18	9.7	6SL3120-1TE21-8AA4	6SL3121-1TE21-8AA4
30	16	6SL3120-1TE23-0AA4	6SL3121-1TE23-0AA3
45	24	6SL3120-1TE24-5AA3	6SL3121-1TE24-5AA3
60	32	6SL3120-1TE26-0AA3	6SL3121-1TE26-0AA3
85	46	6SL3120-1TE28-5AA3	6SL3121-1TE28-5AA3
132	71	6SL3120-1TE31-3AA3	6SL3121-1TE31-3AA3
200	107	6SL3120-1TE32-0AA4	6SL3121-1TE32-0AA4

Description	Article No.
Accessories	
Power connector (X1) At Motor Module end, with screw-type terminals 1.5 ... 10 mm ² , For Motor Modules with rated output current of 3 ... 30 A	6SL3162-2MA00-0AA0
Shield connection plate For Line Modules and Motor Modules in booksize format	
• With a width of 150 mm for internal air cooling	6SL3162-1AF00-0AA1
• With a width of 150 mm for external air cooling	6SL3162-1AF00-0BA1
• With a width of 200 mm for internal air cooling	6SL3162-1AH01-0AA0
• With a width of 200 mm for external air cooling	6SL3162-1AH01-0BA0
• With a width of 300 mm for all cooling types	6SL3162-1AH00-0AA0
DC link rectifier adapter For direct infeed of DC link voltage	
• Screw-type terminals 0.5 ... 10 mm ² For Line Modules and Motor Modules in booksize format with a width of 50 mm or 100 mm	6SL3162-2BD00-0AA0
• Screw-type terminals 35 ... 95 mm ² For Line Modules and Motor Modules in booksize format with a width of 150 mm, 200 mm and 300 mm	6SL3162-2BM00-0AA0
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 95 mm ² For all Line Modules and Motor Modules in booksize format	6SL3162-2BM01-0AA0
Reinforced DC link busbar set For replacement of DC link busbars for 5 modules in booksize format with a width of	
• 50 mm	6SL3162-2DB00-0AA0
• 100 mm	6SL3162-2DD00-0AA0

Description	Article No.
Accessories (continued)	
SINAMICS S120 Terminal Kit Plug-in terminals, DRIVE-CLiQ jumper, dust-proof blanking plugs for DRIVE-CLiQ port For Motor Modules int./ext. air cooling	
• With a width of 50 mm	6SL3162-8AB00-0AA0
• With a width of 100 mm	6SL3162-8BD00-0AA0
• With a width of 150 mm	6SL3162-8CF00-0AA0
• With a width of 200 mm	6SL3162-8DH00-0AA0
• With a width of 300 mm	6SL3162-8EM00-0AA0
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	6SL3162-2AA00-0AA0
Warning labels in 30 languages This label set can be glued over the standard German or English labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	6SL3166-3AB00-0AA0
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	6SL3066-4CA01-0AA0
• 50 units	6SL3066-4CA00-0AA0

Design


Double Motor Modules feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC bars
- 4 DRIVE-CLiQ sockets
- 2 plug-in motor connections (not included in scope of supply)
- 2 safe standstill inputs (1 input per axis)
- 2 safe motor brake controls
- 2 temperature sensor inputs (KTY84-130 or PTC)
- 3 PE/protective conductor connections

The status of the Motor Modules is indicated via two multi-color LEDs.

On Double Motor Modules, the motor cable shield can be connected in the connector.

The signal cable shield can be connected to the Motor Module by means of a shield terminal, e.g. Weidmüller type KLBU 3-8 SC.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable appropriate to the width of the Motor Module for connection to the adjacent Motor Module, length = width of Motor Module + 0.06 m
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connectors X21 and X22
- Device fans for cooling power units on modules with internal and external air cooling supplied from the internal voltage levels
- 1 set of warning labels in 30 languages

Integration

The Double Motor Module receives its control information via DRIVE-CLiQ from:

- SINUMERIK 828D BASIC
- SINUMERIK 828D
 - Numeric Control Extensions NX10.3
 - Numeric Control Extensions NX15.3

Technical specifications

Article No.	6SL312...-2TE...
Product designation	Double Motor Modules in booksize format
DC link voltage DC Up to 2000 m above sea level	510 ... 720 V (line voltage 380 ... 480 V 3 AC)
Output frequency	0 ... 650 Hz ¹⁾²⁾
Electronics power supply DC	24 V -15 %/+20 %
Cooling method	Internal air cooling External air cooling, Power units with increased air cooling by built-in fans
Ambient or coolant temperature (air) In operation for line-side components, Line Modules, and Motor Modules	0 ... 40 °C without derating > 40 ... 55 °C with derating
Installation altitude	Up to 1000 m above sea level without derating, > 1000 ... 4000 m above sea level with derating
Certificate of suitability	CE, cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) according to IEC 61508, Performance Level d (PLd) according to ISO 13849-1 Control category 3 according to ISO 13849-1/EN 954-1

¹⁾ Note the correlation between max. output frequency, pulse frequency and current derating.

²⁾ The output frequency is currently limited to 550 Hz. The specified values apply to systems with license for high output frequency.

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Rotary inertia (to convert from A to B, multiply by entry in table)

A \ B	lb-in ²	lb-ft ²	lb-in-s ²	lb-ft-s ² slug-ft ²	kg-cm ²	kg-cm-s ²	gm-cm ²	gm-cm-s ²	oz-in ²	oz-in-s ²
lb-in ²	1	6.94×10^{-3}	2.59×10^{-3}	2.15×10^{-4}	2.926	2.98×10^{-3}	2.92×10^3	2.984	16	4.14×10^{-2}
lb-ft ²	144	1	0.3729	3.10×10^{-2}	421.40	0.4297	4.21×10^5	429.71	2304	5.967
lb-in-s ²	386.08	2.681	1	8.33×10^{-2}	1.129×10^3	1.152	1.129×10^6	1.152×10^3	6.177×10^3	16
lb-ft-s ² slug-ft ²	4.63×10^3	32.17	12	1	1.35×10^4	13.825	1.355×10^7	1.38×10^4	7.41×10^4	192
kg-cm ²	0.3417	2.37×10^{-3}	8.85×10^{-4}	7.37×10^{-5}	1	1.019×10^{-3}	1000	1.019	5.46	1.41×10^{-2}
kg-cm-s ²	335.1	2.327	0.8679	7.23×10^{-2}	980.66	1	9.8×10^5	1000	5.36×10^3	13.887
gm-cm ²	3.417×10^{-4}	2.37×10^{-6}	8.85×10^{-7}	7.37×10^{-8}	1×10^{-3}	1.01×10^{-6}	1	1.01×10^{-3}	5.46×10^{-3}	1.41×10^{-5}
gm-cm-s ²	0.335	2.32×10^{-3}	8.67×10^{-4}	7.23×10^{-5}	0.9806	1×10^{-3}	980.6	1	5.36	1.38×10^{-2}
oz-in ²	0.0625	4.34×10^{-4}	1.61×10^{-4}	1.34×10^{-5}	0.182	1.86×10^{-4}	182.9	0.186	1	2.59×10^{-3}
oz-in-s ²	24.13	0.1675	6.25×10^{-2}	5.20×10^{-3}	70.615	7.20×10^{-2}	7.09×10^4	72.0	386.08	1

Torque (to convert from A to B, multiply by entry in table)

A \ B	lb-in	lb-ft	oz-in	N-m	kg-cm	kg-m	gm-cm	dyne-cm
lb-in	1	8.333×10^{-2}	16	0.113	1.152	1.152×10^{-2}	1.152×10^3	1.129×10^6
lb-ft	12	1	192	1.355	13.825	0.138	1.382×10^4	1.355×10^7
oz-in	6.25×10^{-2}	5.208×10^{-3}	1	7.061×10^{-3}	7.200×10^{-2}	7.200×10^{-4}	72.007	7.061×10^4
N-m	8.850	0.737	141.612	1	10.197	0.102	1.019×10^4	1×10^7
kg-cm	0.8679	7.233×10^{-2}	13.877	9.806×10^{-2}	1	10^{-2}	1000	9.806×10^5
kg-m	86.796	7.233	1.388×10^3	9.806	100	1	1×10^5	9.806×10^7
gm-cm	8.679×10^{-4}	7.233×10^{-5}	1.388×10^{-2}	9.806×10^{-5}	1×10^{-3}	1×10^{-5}	1	980.665
dyne-cm	8.850×10^{-7}	7.375×10^{-8}	1.416×10^{-5}	10^{-7}	1.0197×10^{-6}	1.019×10^{-8}	1.019×10^{-3}	1

Length (to convert from A to B, multiply by entry in table)

A \ B	inches	feet	cm	yd	mm	m
inches	1	0.0833	2.54	0.028	25.4	0.0254
feet	12	1	30.48	0.333	304.8	0.3048
cm	0.3937	0.03281	1	1.09×10^{-2}	10	0.01
yd	36	3	91.44	1	914.4	0.914
mm	0.03937	0.00328	0.1	1.09×10^{-3}	1	0.001
m	39.37	3.281	100	1.09	1000	1

Power (to convert from A to B, multiply by entry in table)

A \ B	hp	Watts
hp (English)	1	745.7
(lb-in) (deg./s)	2.645×10^{-6}	1.972×10^{-3}
(lb-in) (rpm)	1.587×10^{-5}	1.183×10^{-2}
(lb-ft) (deg./s)	3.173×10^{-5}	2.366×10^{-2}
(lb-ft) (rpm)	1.904×10^{-4}	0.1420
Watts	1.341×10^{-3}	1

Force (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	dyne	N
lb	1	16	453.6	4.448×10^5	4.4482
oz	0.0625	1	28.35	2.780×10^4	0.27801
gm	2.205×10^{-3}	0.03527	1	1.02×10^{-3}	N.A.
dyne	2.248×10^{-6}	3.59×10^{-5}	980.7	1	0.00001
N	0.22481	3.5967	N.A.	100000	1

Mass (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	kg	slug
lb	1	16	453.6	0.4536	0.0311
oz	6.25×10^{-2}	1	28.35	0.02835	1.93×10^{-3}
gm	2.205×10^{-3}	3.527×10^{-2}	1	10^{-3}	6.852×10^{-5}
kg	2.205	35.27	10^3	1	6.852×10^{-2}
slug	32.17	514.8	1.459×10^4	14.59	1

Rotation (to convert from A to B, multiply by entry in table)

A \ B	rpm	rad/s	degrees/s
rpm	1	0.105	6.0
rad/s	9.55	1	57.30
degrees/s	0.167	1.745×10^{-2}	1