SIEMENS

14.10.2017

Customer:
Plant:

Customer No.:
Last saved:
Project: Project3
Author:
Comment:

1. Parts list

Pos.	Quantity	Order designation	Product
• Controller, SIMATIC S7-1500 based			
10	1	6EP1334-3BA10	SITOP modular 10.00 A
• Compact drive systems, S110			
20	2	6SL3040-0JA01-0AA0	CU305 PN
30	1	6EP1334-3BA10	SITOP modular 10.00 A
• Drive system / Supply system			
40	1	6SL3210-1SE11-3UA0	PM240-2 power unit; 0.37 kW; 1.30 A; -
50	1	6FX5002-5CG10-1BA0	Motor supply cable; MOTION-CONNECT 500 without brake cable, quick connection (fixed mounting); 10.0 m
60	1	1FK7032-2AK71-1QG0	Synchronous servo motor (feed motor) 1FT/1FK; 0.50 kW; Shaft height 36 mm
• Drive system / Supply system (1)			
70	1	6SL3210-1PE11-8UL1	PM240-2 power unit; 0.55 kW; 1.70 A; -
80	1	6FX5002-5CG10-1BA0	Motor supply cable; MOTION-CONNECT 500 without brake cable, quick connection (fixed mounting); 10.0 m
90	1	1FK7034-2AK71-1QG0	Synchronous servo motor (feed motor) 1FT/1FK; 0.63 kW; Shaft height 36 mm

Legend

► Please note:

The overload capability for dimensioning according to load characteristic (e.g. load cycle with constant ON duration) refers to a temporarily required overload on the motor. With longer or cyclic overloads, a configuration via the application is required.

With "Simple motor selection without load configuration", the rated data based on 400/460 V will not be attained depending on the selected drive and version (DC link, control method and control factor). Please take this into account when selecting/using the motor.

The configuration of the SIMATIC S7-1500 CPUs is based on TIA Portal V14 SP1. The firmware of the CPUs is based on FW version V2.1.
The configuration of the CU305 is based on the FW version V4.4.

2. Technical data

• Supply system

- Line data

Voltage	400 V
Frequency	50 Hz
Number of phases	3
Allowance for differing supply voltage	No
Allowance for short term supply fluctuations	Yes
Maximum temporary undervoltage to the rated voltage	15 %
Undervoltage	340 V

• Drive system / Supply system

- SINAMICS S110

- Power unit

Order designation	6SL3210-1SE11-3UA0
Drive-based Safety Integrated	No Safety Integrated functionality
Ambient conditions	
Installation altitude	1000 m
Ambient temperature	40 °C
Power unit / catalog data	
Rated power	0.37 kW
Rated current	1.30 A
Frame size	A
Pulse frequency factory setting	4.00 kHz
Energy efficiency class	-
Internal filter	None
Power unit / load-specific data	
Available base-load current	1.30 A

- Motor supply cable

Cable type	MOTION-CONNECT 500 without brake cable, quick connection (fixed mounting)
Laying method	DIN EN 60204-1
Cable cross-section	1 * 4x1.5 mm²
Order designation	6FX5002-5CG10-1BA0
Cable length	10.0 m

- Motor

Order designation	1FK7032-2AK71-1QG0
Motor / ambient conditions	
Installation altitude	1000 m
Ambient temperature	40 °C
Temperature rise class	F/100K
Dimensioning with field weakening operation	Yes
Motor / catalog data (100K values)	
Motor type	1FK7
Version	Compact (generation 2)
Calculated power	0.69 kW
Static torque	1.10 Nm
Rated torque	0.80 Nm
Stall current	1.70 A
Rated current	1.40 A
Rated speed	6000.00 rpm
Shaft height	36 mm
Efficiency	0.870
Encoder	AS20DQI - absolute encoder singleturn 20-bit
Encoder evaluation	Motor integrated
Cooling method	Self-cooling
Holding brake	Without holding brake
Shaft extension	Plain

Radial eccentricity tolerance	N
Vibration severity grade	A
Degree of protection	IP 64
Type of construction	IM B5 (IM V1, IM V3)
Direction of connection	270 degree rotatable
Paint finish	Anthracite (similar to RAL7016)
Motor / calculated data	
Load current	0.95 A
Load data on the motor shaft	
Load characteristic	Constant torque
Load power (effective power, at S3/S6 peak power)	0.39 kW
Max. load speed	7000.00 rpm

• Supply system (1)

- Line data

Voltage	400 V
Frequency	50 Hz
Number of phases	3
Allowance for differing supply voltage	No
Allowance for short term supply fluctuations	Yes
Maximum temporary undervoltage to the rated voltage	15 %
Undervoltage	340 V

• Drive system / Supply system (1)

- SINAMICS S110

- Power unit

Order designation	6SL3210-1PE11-8UL1
Drive-based Safety Integrated	No Safety Integrated functionality
Ambient conditions	
Installation altitude	1000 m
Ambient temperature	40 °C
Power unit / catalog data	
Rated power	0.55 kW
Rated current	1.70 A
Frame size	A
Pulse frequency factory setting	4.00 kHz
Energy efficiency class	-
Internal filter	None
Power unit / load-specific data	
Available base-load current	1.70 A

- Motor supply cable

Cable type	MOTION-CONNECT 500 without brake cable, quick connection (fixed mounting)
Laying method	DIN EN 60204-1
Cable cross-section	1 * 4x1.5 mm²
Order designation	6FX5002-5CG10-1BA0
Cable length	10.0 m

- Motor

Order designation	1FK7034-2AK71-1QG0
Motor / ambient conditions	
Installation altitude	1000 m
Ambient temperature	40 °C
Temperature rise class	F/100K
Dimensioning with field weakening operation	Yes
Motor / catalog data (100K values)	
Motor type	1FK7
Version	Compact (generation 2)
Calculated power	1.01 kW
Static torque	1.60 Nm
Rated torque	1.00 Nm
Stall current	1.90 A

Rated current	1.30 A
Rated speed	6000.00 rpm
Shaft height	36 mm
Efficiency	0.860
Encoder	AS20DQI - absolute encoder singleturn 20-bit
Encoder evaluation	Motor integrated
Cooling method	Self-cooling
Holding brake	Without holding brake
Shaft extension	Plain
Radial eccentricity tolerance	N
Vibration severity grade	A
Degree of protection	IP 64
Type of construction	IM B5 (IM V1, IM V3)
Direction of connection	270 degree rotatable
Paint finish	Anthracite (similar to RAL7016)
Motor / calculated data	
Load current	1.44 A
Load data on the motor shaft	
Load characteristic	Constant torque
Load power (effective power, at S3/S6 peak power)	0.62 kW
Max. load speed	6000.00 rpm

• Controller, SIMATIC S7-1500 based

- SIMATIC CPU 1511-1 PN

Order designation	6ES7511-1AK01-0AB0
Note	The dimensioning results (e.g. with regard to installation, power supply and power loss) do not take into account components that have been taken from the TIA Selection Tool or created as additional components.
Total utilization	25 %
Servo cycle clock	2.00 ms
IPO cycle clock	2.00 ms

- 24 V supply

SITOP modular 10.00 A	6EP1334-3BA10
Quantity	1
Total current requirement	0.00 A

• Compact drive systems, S110

(1) - CU305 PN	
Order designation	6SL3040-0JA01-0AA0
Externally via DRIVE-CLiQ / Drive system / Supply system (1)	
Closed-loop control	SINAMICS S110
(2) - CU305 PN	
Order designation	6SL3040-0JA01-0AA0
Externally via DRIVE-CLiQ / Drive system / Supply system	
Closed-loop control	SINAMICS S110

- 24 V supply

SITOP modular 10.00 A	6EP1334-3BA10
Quantity	1
Total current requirement	1.60 A

Legend

The overload capability for dimensioning according to load characteristic (e.g. load cycle with constant ON duration) refers to a temporarily required overload on the motor. With longer or cyclic overloads, a configuration via the application is required.
With "Simple motor selection without load configuration", the rated data based on 400/460 V will not be attained depending on the selected drive and version (DC link, control method and control factor). Please take this into account when selecting/using the motor.

The configuration of the SIMATIC S7-1500 CPUs is based on TIA Portal V14 SP1. The firmware of the CPUs is based on FW version V2.1.

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The configuration of the CU305 is based on the FW version V4.4.

3. Characteristics

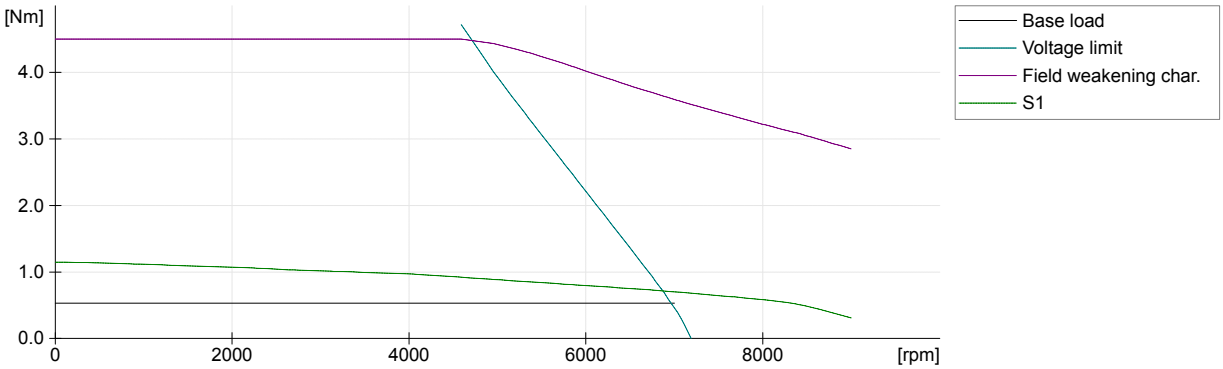

Fig. 3.1: Drive system / Supply system / 1FK7032-2AK71-1QG0 [Load characteristic Constant torque]

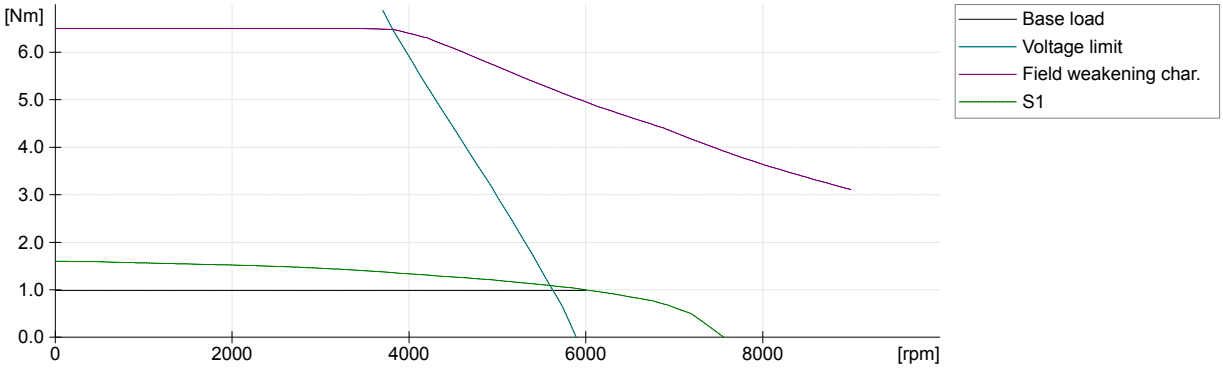

Fig. 3.2: Drive system / Supply system (1) / 1FK7034-2AK71-1QG0 [Load characteristic Constant torque]

4. Installation

4.1. Compact drive systems, S110

The required ventilation distances must be considered.
Depending on the line choke and the associated cable cross-section, a cabling space may be required.
Note that the current carrying capacity of the DC-link busbar is not checked.
The EMC specifications must be taken into account when installing filter and choke.

Topology (1) - -

#ID	Type component	Version	Name	MLFB	Width [mm]	Height [mm]	Depth [mm]
#1	PM	Blocksize	Drive system / Supply system	6SL3210-1SE11-3UA0	73	173	145
#2	PM	Blocksize	Drive system / Supply system (1)	6SL3210-1PE11-8UL1	73	196	165
#3	Group				146	196	165

#ID	I-rated [A]	I-DC link [A]	Max. I-DC link busbar [A]	DC-link adapter (for booksize)	DC link rectifier adapter	I-24 V [A]	24 V supply	24 V terminal adapter
#1	1.30	-	-			-		No
#2	1.70	-	-			-		No
#3								

#ID	Continuous motor current [A]	Maximum motor current [A]	Comment
#1	0.95		
#2	1.44		

5. 24 V supply

5.1. Compact drive systems, S110

Topology (1)

SITOP modular 10.00 A, 6EP1334-3BA10

Consumers	Current demand	Infeed type
(1) - CU305 PN	0.80 A	Terminals
(2) - CU305 PN	0.80 A	Terminals
Total	1.60 A	

5.2. Controller

Topology (1)

SITOP modular 10.00 A, 6EP1334-3BA10

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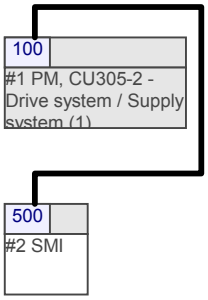
6. DRIVE-CLiQ topology

6.1. Compact drive systems, S110

(1) - CU305 PN



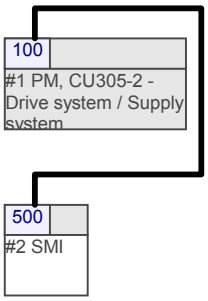
DRIVE-CLiQ node

No.	Type	Name	Type of construction	Control method	Sampling time	Performance
#1	PM, CU305-2	Drive system / Supply system (1)				
#2	SMI	Drive system / Supply system (1), Motor encoder				

DRIVE-CLiQ cables

From	To	Connection type	Cable type	Length [m]	Order designation
X100, #1 PM, CU305-2	X500, #2 SMI	Continuous	No cable selected		

(2) - CU305 PN



DRIVE-CLiQ node

No.	Type	Name	Type of construction	Control method	Sampling time	Performance
#1	PM, CU305-2	Drive system / Supply system				
#2	SMI	Drive system / Supply system, Motor encoder				

DRIVE-CLiQ cables

From	To	Connection type	Cable type	Length [m]	Order designation
X100, #1 PM, CU305-2	X500, #2 SMI	Continuous	No cable selected		

6.2. Controller

7. Application data

7.1. Drive system / Supply system / 1FK7032-2AK71-1QG0 [Load characteristic Constant torque]

Main load

Power	0.39 kW
Max. load speed	7000.00 rpm

7.2. Drive system / Supply system (1) / 1FK7034-2AK71-1QG0 [Load characteristic Constant torque]

Main load

Power	0.62 kW
Max. load speed	6000.00 rpm

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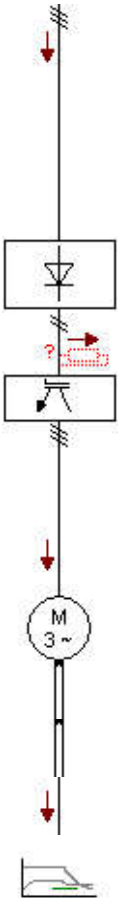
8. Energy requirements of the power electronics

8.1. Drive system / Supply system, SINAMICS S110

Only the energy requirements of the power electronic components are taken into account. Further electronic components are not considered (e.g. Sensor Modules, control electronic components, controllers, 24 V supply).

System view:

(1)	**Drive system / Supply system 943.1 kWh/a**			
(2)		**0.54 kW**		
(3)	**0.54 kW**		**-**	SINAMICS S110
(4)			**0 kW**	Unregulated DC link
(5)	**0.44 kW**		**0 kW**	1FK7
(6)	**0.39 kW**		**0 kW**	Load characteristic



Operating hours / a: 1760.0

Explanation of the values

		Total energy requirement
(1)	Total energy requirement	The resulting drive power extrapolated from the project settings for the specified number of operating hours per annum.
		Powers on the drive line
(2)	Resulting drive power	Corresponds to the motoring/generating drive power.
(3)	Drive power	This value is calculated from the motoring/generating components of the load specification and is always positive. In regenerative systems, this is the power that can be fed back to the infeed.
(4)	Braking power	When dimensioning with mechanical systems, this is the power that is lost at the braking resistor in the DC link.
(5)	Motor power	This is the required electrical power of the motor. Speed dependencies on the efficiency of the mounted gearbox and additional gearbox are not taken into account.
(6)	Load power	This is the power on the load required/produced by the specification (motor shaft power).

Refer to the online help for details.

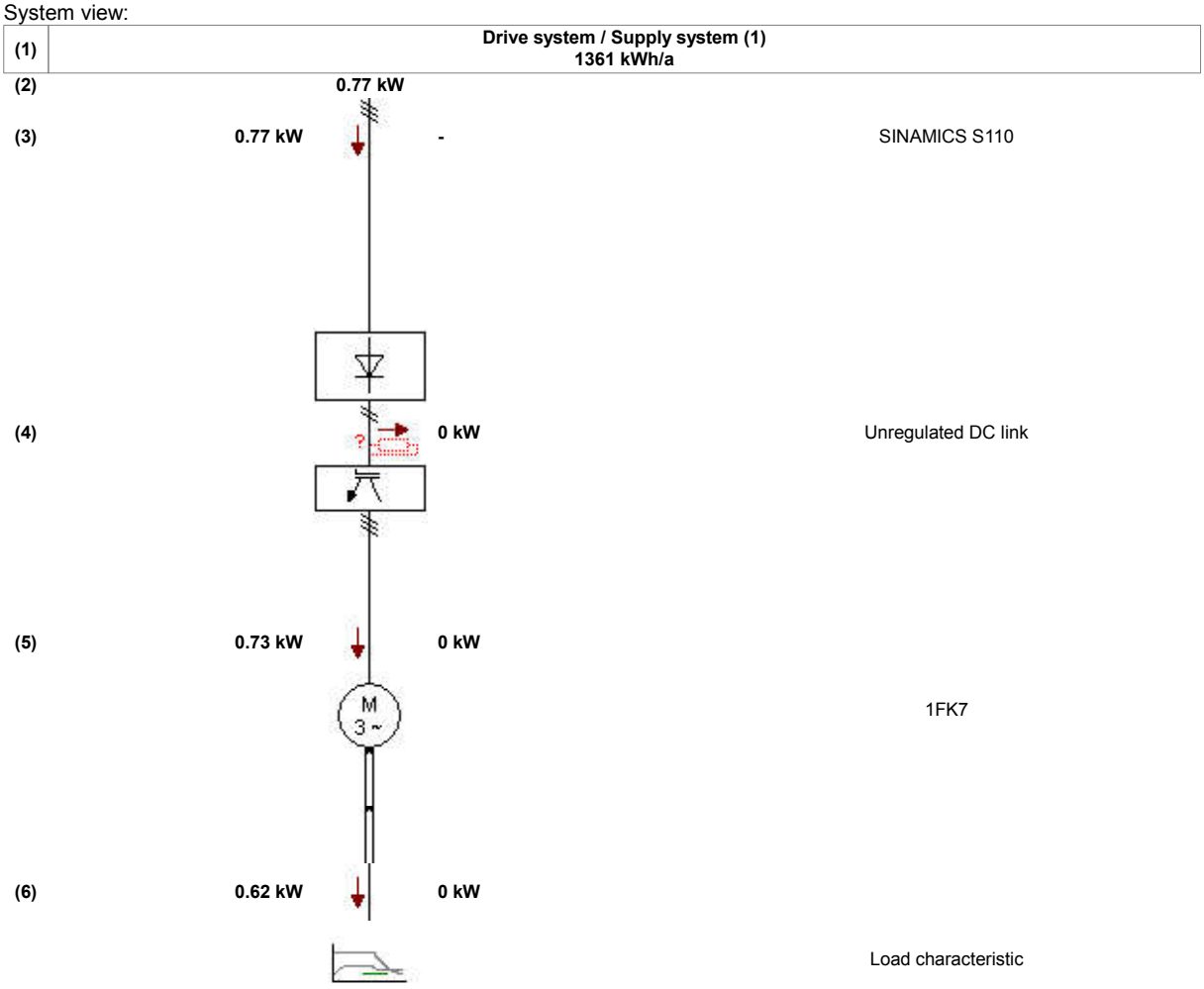
Liability for the correctness of the energy requirement data is excluded. The energy consumption of a drive system depends on the operation and ambient conditions and contains physical power losses that cannot be fully determined.

Customer:
Plant:

8.2. Drive system / Supply system (1), SINAMICS S110

Only the energy requirements of the power electronic components are taken into account. Further electronic components are not considered (e.g. Sensor Modules, control electronic components, controllers, 24 V supply).

System view:



Operating hours / a: 1760.0

Explanation of the values

		Total energy requirement
(1)	Total energy requirement	The resulting drive power extrapolated from the project settings for the specified number of operating hours per annum.
		Powers on the drive line
(2)	Resulting drive power	Corresponds to the motoring/generating drive power.
(3)	Drive power	This value is calculated from the motoring/generating components of the load specification and is always positive. In regenerative systems, this is the power that can be fed back to the infeed.
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(5)	Motor power	This is the required electrical power of the motor. Speed dependencies on the efficiency of the mounted gearbox and additional gearbox are not taken into account.
(6)	Load power	This is the power on the load required/produced by the specification (motor shaft power).

Refer to the online help for details.

Liability for the correctness of the energy requirement data is excluded. The energy consumption of a drive system depends on the operation and ambient conditions and contains physical power losses that cannot be fully determined.

9. Cabinet power loss

9.1. Compact drive systems, S110

Load-dependent power loss of the cabinet components without passive power elements

Open-loop/closed-loop control / 24 V components	
~ Control Units	0.04 kW
~ SITOPs / Control Supply Module incl. additional modules	0.02 kW
Drive system / Supply system (load-related)	
~ Power unit	0.09 kW
Input components	
System components	
Other system components	
Drive system / Supply system (1) (load-related)	
~ Power unit	0.04 kW
Input components	
System components	
Other system components	
Total power loss	**0.20 kW**

Liability for the correctness of the energy requirement data is excluded. The energy consumption of a drive system depends on the operation and ambient conditions and contains physical power losses that cannot be fully determined.

9.2. Controller

Load-dependent power loss of the cabinet components without passive power elements

Open-loop/closed-loop control / 24 V components	
~ SITOPs / Control Supply Module incl. additional modules	0.02 kW
Total power loss	**0.02 kW**

Liability for the correctness of the energy requirement data is excluded. The energy consumption of a drive system depends on the operation and ambient conditions and contains physical power losses that cannot be fully determined.