



# sinamics



**SINAMICS S120**  
Cabinet Modules

## 6SL37

**SIEMENS**

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# SINAMICS S120 Cabinet Modules

## D 21.3 Cabinet Modules – 2007 Draft Catalog (for internal use)

Edition: December 31, 2007

Invalid: Edition dated February 01, 2006

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### System description



### Overview

SINAMICS S120 Cabinet Modules form part of a modular cabinet system for multi-motor drives with a central supply infeed and a common DC busbar, of the type typically used in paper machines, roller mills, test stands or hoisting gear, for example.

This system contains built-in units from the SINAMICS S120 series in Booksize format (Motor Modules) and Chassis format, thus making it an ideal supplement to the SINAMICS G150 and SINAMICS S150 cabinet unit series for single-motor drives.

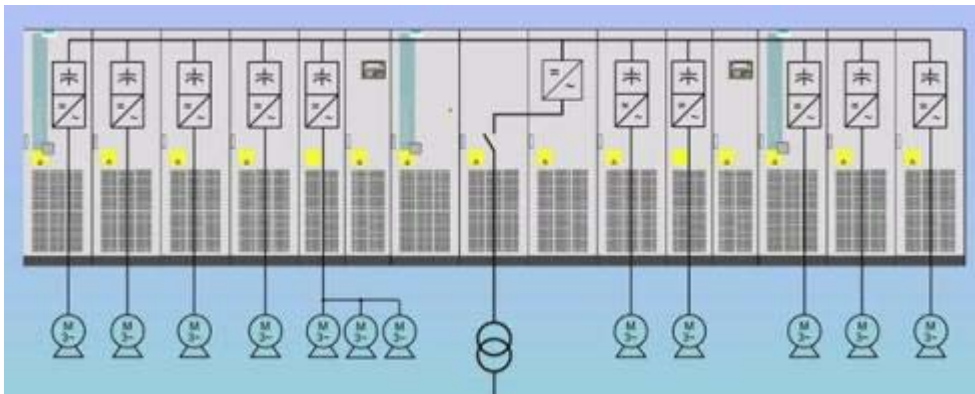
All drive components, from the supply infeed to the motor-side inverters, are configured in a clear, compact layout in the individual Cabinet Modules. They can be combined with great flexibility and can be optimally adapted to customer-specific requirements owing to a comprehensive range of options.

The main components of the system are as follows:

- Line Connection Modules with line-side components such as contactors, fuses, and circuit breakers, as well as line reactors for Basic Line Modules.
- Line Modules for the supply infeed in the following variations:
  - Basic Line Modules for 2-quadrant operation
  - Smart Line Modules for 4-quadrant operation
  - Active Line Modules for 4-quadrant operation with negligible line harmonic distortions
- Central Braking Modules for short-term braking
- The following types of Motor Module:
  - Booksize Kit
  - Chassis
- Control Units
- Auxiliary Power Supply Modules

Standardized interfaces for both the power and the control connections facilitate configuration and installation.

Communication between the power unit and the central Control Unit takes place via DRIVE-CLiQ, the internal drive serial interface.



Example of a drive line-up with SINAMICS S120 Cabinet Modules for a multi-motor drive

# SINAMICS S120 Cabinet Modules

## System description

The following table provides an overview of the voltage ranges and power ratings available for SINAMICS S120 Cabinet Modules:

	Supply voltage 3-phase AC	Input current	DC link voltage	DC-link current	Output current	Power rating
Line Connection Modules	380 ... 480 V 500 ... 690 V	250 ... 3200 A 280 ... 3200 A				
Basic Line Modules	380 ... 480 V 500 ... 690 V	365 ... 1630 A 260 ... 1580 A	510 ... 650 V 675 ... 930 V	420 ... 1880 A 300 ... 1880 A		200 ... 900 kW 250 ... 1500 kW
Smart Line Modules	380 ... 480 V 500 ... 690 V	463 ... 1430 A 463 ... 1430 A	510 ... 650 V 675 ... 930 V	550 ... 1700 A 550 ... 1700 A		250 ... 800 kW 450 ... 1400 kW
Active Line Modules	380 ... 480 V 500 ... 690 V	210 ... 1405 A 575 ... 1270 A	540 ... 720 V 710 ... 1035 V	235 ... 1574 A 644 ... 1422 A		132 ... 900 kW 560 ... 1400 kW
Central Braking Modules	380 ... 480 V 500 ... 600 V 660 ... 690 V		510 ... 720 V 675 ... 900 V 890 ... 1035 V			500 ... 1000 kW 550 ... 1100 kW 630 ... 1200 kW
Motor Modules	380 ... 480 V		510 ... 720 V	36 ... 200 A	3 ... 200 A	16 ... 107 kW
Booksized Chassis	380 ... 480 V		510 ... 720 V	252 ... 1686 A	210 ... 1405 A	110 ... 800 kW
Chassis	500 ... 690 V		675 ... 1035 V	102 ... 1524 A	85 ... 1270 A	75 ... 1200 kW

The power range can be extended as required by a parallel connection of up to 4 identical modules.

### Field of application

The modular SINAMICS S120 Cabinet Modules drive system can be implemented when several motors, set up as a unit to create a multi-motor drive, need to be coordinated. Typical examples include:

- Paper machines
- Rolling mills
- Hoisting gear
- Test stands

### Concept

SINAMICS S120 Cabinet Modules have been specially developed to facilitate the construction of multi-motor systems.

They have been designed as "zoned" units and therefore offer the highest possible standard of operational reliability. EMC measures have been rigorously implemented and with the help of simulated conditions, partitions have been designed to act as air guides and for the dissipation of heat.

The particular dimensions used in the construction of the cabinets ensure that they remain mechanically durable throughout their entire life cycle.

Attention has been paid to providing a wide range of cable routing options and special design concepts are applied consistently to broaden the scope of application and simplify servicing.

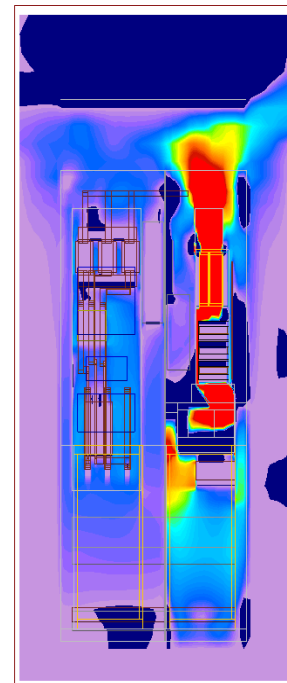
The units feature all the necessary connections and connecting elements. Thanks to their carefully considered configuration concept, cabinets are shipped in a ready-to-connect state or, in the case of multiple transport units, ready for quick assembly.

There is a wide range of options to cater for an extremely varied range of applications so that you can be sure of making the right choice.

All components, from the individual parts to the finished cabinet that is ready for connection, undergo rigorous testing throughout the entire production process. This guarantees a high level of functional safety during the construction and commissioning stages, as well as during operation.

The design of replaceable components is based on the principle that they must be quick and easy to change. In addition, the "SparesOnWeb" Internet tool makes it easy to tailor the spare parts that are available to the particular order.

The properties of S120 Cabinet Modules described in this catalog are not transferable to independently-constructed cabinet units.



Simulation of heat distribution within a Cabinet Module



### ■ Benefits

The outstanding system features of the SINAMICS S120 Cabinet Modules provide plant operators with the following advantages:

- Process optimization with minimal effort:
  - A standard PROFIBUS interface and various analog and digital interfaces allow them to be easily integrated into automation solutions.
  - Vector control ensures that they fulfill the most exacting requirements regarding the accuracy and dynamic response of drives.
- High level of reliability and availability:
  - Individual modules and power components can be replaced quickly and easily, which ensures a higher level of plant availability.
- Energy-saving during operation
  - If the drive system includes motors operating in both motor and generator modes, the motors can be coupled, through a common DC link, in such a way that a mutual energy exchange can take place. This arrangement can ensure additional energy savings and reduce harmonic distortions.
  - In certain cases, the supply infeed of the drive line-up can even be designed to supply less output than the total power of the individual Motor Modules, operated on the common DC link, would require.
- Cost minimization during operation, maintenance, and service:
  - Simple commissioning thanks to the menu-driven "STARTER" commissioning tool
  - Optional user-friendly menu-driven AOP30 operator panel with a plain-text display
  - All device modules are easily accessible, which makes servicing extremely easy.
- Space-saving design
- Environmentally-friendly operation:
  - The converters are exceptionally quiet and compact thanks to state-of-the-art IGBT power semiconductors and an innovative cooling concept.

### ■ Line Modules

Power is fed to the drive line-up via Line Modules, which generate a DC voltage from the supply voltage and, therefore, supply energy to the Motor Modules connected to the DC link. They are suitable for connection to grounded (TN, TT) and non-grounded (IT) supply systems.

The Line Modules are connected to the incoming supply via Line Connection Modules and are equipped with an RFI suppression filter in accordance with Category C3 as a standard feature. Category C3 is part of the "second environment" (in accordance with EN61800-3). The term "second environment" refers to all locations outside residential areas. These are basically industrial areas which are powered from the medium-voltage network via their own transformers.

The Line Modules cater for power ratings between 132 kW and 900 kW (380 V - 480 V) or 250 kW to 1500 kW (500 V – 690 V). Furthermore, up to four identical Line Modules can be connected in parallel in order to increase the power rating. Line Connection Modules up to input currents of 3200 A are available if a compact configuration is required. These support the operation of two Line Modules in parallel.

# SINAMICS S120 Cabinet Modules

## System description

The following types of Line Module are available:

### Basic Line Modules

Basic Line Modules are designed only for infeed operation, i.e. they are not capable of feeding regenerative energy back into the supply line.

If regenerative energy is produced, e.g. when drives brake, it must be converted to heat by means of a Braking Module and a braking resistor.

When a Basic Line Module is used as the infeed, depending on the supply conditions, a line reactor must be installed. Line reactors are generally required if two or more Basic Line Modules are operated in parallel on a common supply line in order that power may be increased.

For this reason, line reactors are installed in the appropriate Line Connection Module as standard.

If, for example, the infeed takes place by means of a converter transformer (12-pulse operation), there is no need for the line reactors and they can be omitted (option L22).

In the case of parallel connection, versions with line-side fuses are available for selective protection of the individual Basic Line Modules.

### Smart Line Modules

Smart Line Modules can supply energy to the DC link and return regenerative energy to the supply system. Braking Modules and braking resistor are required only if the drives need to be decelerated in a controlled manner after a power failure (i.e. when energy cannot be fed back to the supply). With a Smart Line Module as infeed, the necessary line reactor is included in the device as standard.

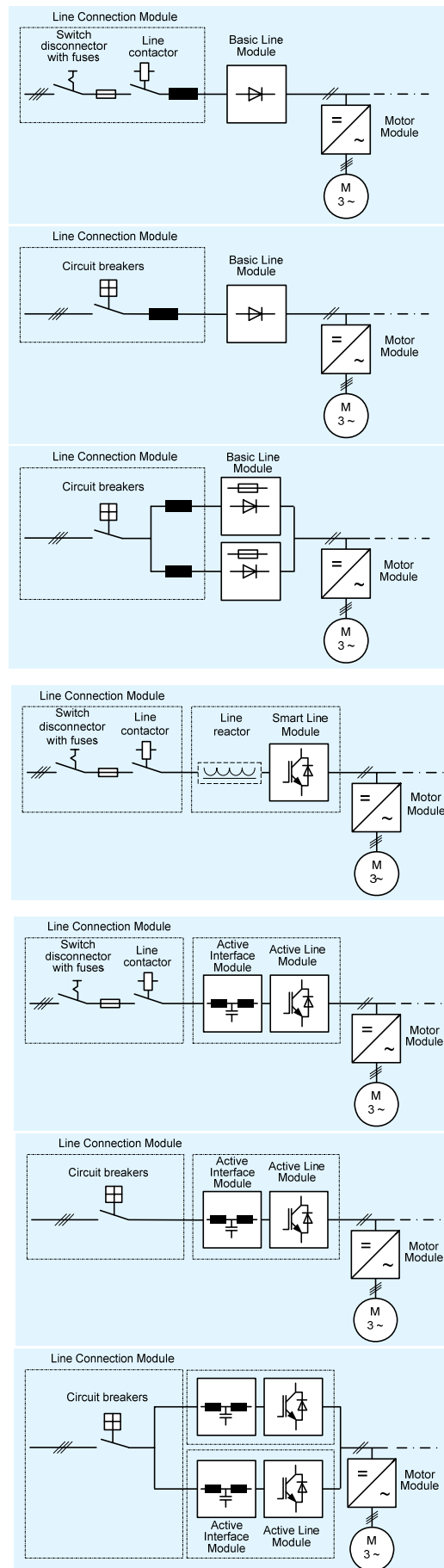
### Active Line Modules

Active Line Modules can supply energy and return regenerative energy to the supply system. Braking Modules and braking resistor are only required if the drives need to be decelerated in a controlled manner after a power failure (i.e., when energy cannot be fed back to the supply).

In contrast to Basic Line Modules and Smart Line Modules, however, Active Line Modules generate a controlled DC voltage which remains constant despite fluctuations in the line voltage. In this case, the line voltage must remain within the permissible tolerance range. Active Line Modules draw a virtually sinusoidal current from the supply and do not cause any harmful harmonics.

Active Line Modules must always be used in conjunction with an Active Interface Module. Active Interface Modules include the required pre-charging circuit for the Active Line Module, in addition to a Clean Power Filter.

Within the context of SINAMICS S120 Cabinet Modules, these two components are always regarded as a common single unit.



### ■ DC link components

Braking Modules enable braking resistors to absorb the regenerative energy produced during drive deceleration, which is then converted into heat.

#### Braking Modules as an option for Chassis units

For smaller drive powers, Braking Modules are available with continuous braking powers up to 50 kW. These Braking Modules are available as option L61 / L64 (25 kW) or L62 / L65 (50 kW) for Line and Motor Modules (please refer to the section entitled "Option descriptions").

#### Central Braking Modules

For larger continuous braking powers, separate Central Braking Modules are available. These modules are implemented centrally in the drive line-up.

### ■ Motor Modules

There are two different types of Motor Module available with the SINAMICS S120 Cabinet Modules drive system.

#### Booksize Base Cabinets with Booksize Cabinet Kits

Motor Modules at the low end of the power range 1.6 – 107 kW (380 V - 480 V) can be configured as Booksize Cabinet Kits installed in Booksize Base Cabinets. In the 1.6 – 9.7 kW power range, Booksize Cabinet Kits are also available as Double Motor Modules, which combine two inverters in a single module.

#### Chassis Cabinets

Each Chassis Cabinet is fitted with one SINAMICS S120 Motor Module in Chassis format and covers the 75 – 1200 kW power range (380 – 480 V or 500 – 690 V). Parallel connection of up to four Motor Modules in Chassis Format allows the power range to be extended up to 4500 kW.

### ■ System structure

Line Modules are coupled with the various Motor Modules by means of prefabricated busbar sets with different current carrying capacities.

All standard busbars, as well as electronic components, are protected against environmental influences. This allows nickel-plated copper bars and coated electronic parts to be used throughout.

An auxiliary busbar system spanning the individual Cabinet Modules supplies the required auxiliary voltages for the power components, fans and the 24 V load.

Communication between the Control Unit, power units and other active SINAMICS components takes place via DRIVE-CLiQ connections.

DRIVE-CLiQ is the drive-orientated internal serial interface of a drive, which enables a fast and easy configuration of the complete drive line-up with prefabricated cables in varying lengths.

As an option, Cabinet Modules can be delivered in preconfigured transport units with a total length of up to 2400 mm in each case. This option is recommended in particular for combinations of Line Modules together with Line Connection Modules since, in this case, the Line Connection Module must be equipped with a pre-charging DC link or line reactors (depending on the type of Line Module), in addition to the electrical interface (busbars). Transport units enable the devices to be constructed on-site, quickly and easily.

# SINAMICS S120 Cabinet Modules

## System description

### Technical data

Electrical data			
Supply voltages and power ranges	3AC 380 V ... 480 V, $\pm 10\%$ ( $-15\% < 1$ min)	1.6 kW - 800 kW <sup>1)</sup>	
	3AC 500 V ... 690 V, $\pm 10\%$ ( $-15\% < 1$ min)	55 kW - 1200 kW <sup>1)</sup>	
Line system configurations	TN, TT supplies or isolated supplies (IT supplies)		
Line frequency	47 Hz - 63 Hz		
Output frequency	0 Hz to 300 Hz (> 100/160 Hz, take derating into account)		
Power factor Fundamental factor	Basic Line Module: > 0.96	Smart Line Module: > 0.96	Active Line Module: Adjustable (factory-set to $\cos \varphi = 1$ )
Efficiency	> 99.0 %	> 98.5 %	> 97.0 %
Control method	Servo control, Vector control with and without encoder or V/f control		
Fixed speeds	15 fixed speed plus 1 minimum speed, parameterizable (in default setting: 3 fixed setpoints plus 1 minimum speed can be selected via terminal block/PROFIBUS)		
Skipped frequency ranges	4, parameterizable		
Braking operation	By means of additional braking modules and braking resistors		
Mechanical data			
Degree of protection	IP20, IP21, IP23, IP43, and IP54 (with options M26 and M27, side walls on the right and left respectively)		
Protection Class	To EN 50 178, Part 1		
Cooling method	Forced air ventilation		
Sound pressure level $L_{pA}$ (1 m)	With a line frequency of 50 Hz: see the technical data for the individual Cabinet Modules		
Protection against accidental contact	BGV A3		
Cabinet system	Rittal TS 8, doors with double-barb lock, triple-partition baseplates for cable entry		
Paint finish	RAL 7035 (indoor requirements)		
Compliance with standards			
Standards	EN 60 146-1, EN 61 800-2, EN 61 800-3, EN 50 178, EN 60 204-1, EN 60 529		
CE marking	To EMC directive No. 89/336/EC and low voltage directive No. 73/23/EC		
RFI suppression	In accordance with EMC product standard for variable speed drives, EN 61800-3, second environment (first environment upon request)		
Ambient conditions	During operation <sup>2)</sup>	During storage <sup>2)</sup>	During transport <sup>2)</sup>
Ambient temperature	<u>0°C</u> to +40°C Up to +50°C: see derating data	-25°C to +55°C	-25°C to +70°C from <u>-40°C</u> : for 24 hours
Relative humidity (non-condensing)	5 % to <u>95 %</u> in acc with. 3K3 to IEC 60 721-3-3	<u>5 % to 95 %</u> in acc. with 1K4 to IEC 60 721-3-1	5 % to 95 % at 40°C in acc. with 2K3 to IEC 60 721-3-2
Installation altitude	Cabinet Modules in Chassis format: Up to 2000 m above sea level no derating; > 2000 m, see characteristics/derating data Motor Modules in Booksize Cabinet Kit format and Booksize Base Cabinets: Up to 1000 m above sea level no derating; > 1000 m, see characteristics/derating data		
Mechanical stability			
Vibratory load			
- Deflection	0.075 mm at 10 Hz to 58 Hz	1.5 mm at <u>5 Hz</u> to 9 Hz	3.1 mm at <u>5 Hz</u> to 9 Hz
- Acceleration	9.8 m/s <sup>2</sup> at >58 Hz to 200 Hz	5 m/s <sup>2</sup> at >9 Hz to 200 Hz	10 m/s <sup>2</sup> at >9 Hz to 200 Hz
Shock load			
- Acceleration	100 m/s <sup>2</sup> at 11 ms	40 m/s <sup>2</sup> at 22 ms	100 m/s <sup>2</sup> at 11 ms

<sup>1)</sup> Power data applies to basic version; power can be increased by a parallel connection

<sup>2)</sup> Deviations from the specified class are underlined

### Characteristics

#### Chassis current derating

If the Cabinet Modules in Chassis format are operated at an **installation altitude > 2000 m** above sea level, the maximum permissible output current can be calculated using the following tables. To obtain these values, the air flow rate specified for the relevant Cabinet Modules in the technical data tables must be guaranteed at all times. The specified values already include a permitted correction between installation altitude and ambient temperature (incoming air temperature at the inlet to the Cabinet Module).

Installation altitude above sea level m	Current derating at an ambient temperature (incoming air temperature) of							
	20°C	25°C	30°C	35°C	40°C	45°C	50°C	
0 ... 2000	100 %					95.0 %	87.0 %	
... 2500	100 %				96.3 %	91.4 %	83.7 %	
... 3000	100 %			96.2 %	92.5 %	87.9 %	80.5 %	
... 3500	100 %		96.7 %	92.3 %	88.8 %	84.3 %	77.3 %	
... 4000	97.8 %	92.7 %	88.4 %	85.0 %	80.8 %	74.0 %		

**Current derating** depending on ambient temperature (temperature of inlet air) and installation altitude for Cabinet Modules with **degree of protection IP20, IP21, IP23 and IP43**

Installation altitude above sea level m	Current derating at an ambient temperature (incoming air temperature) of						
	20°C	25°C	30°C	35°C	40°C	45°C	50°C
0 ... 2000	100 %				95.0 %	87.5 %	80.0 %
... 2500	100 %			96.3 %	91.4 %	84.2 %	77.0 %
... 3000	100 %		96.2 %	92.5 %	87.9 %	81.0 %	74.1 %
... 3500	96.7 %	92.3 %	88.8 %	84.3 %	77.7 %	71.1 %	
... 4000	97.8 %	92.7 %	88.4 %	85.0 %	80.8 %	74.7 %	68.0 %

**Current derating** depending on ambient temperature (temperature of inlet air) and installation altitude for Cabinet Modules with **degree of protection IP54**

#### Chassis voltage derating

In addition to the current derating, the voltage derating must also be considered according to the following table with **installation altitudes > 2000 m** above sea level.

Installation altitude above sea level m	Voltage derating at a rated input voltage of											
	380 V	400 V	420 V	440 V	460 V	480 V	500 V	525 V	575 V	600 V	660 V	690 V
0 ... 2000	100 %											
... 2250	100 %											96 %
... 2500	100 %										98 %	94 %
... 2750	100 %									98 %	94 %	90 %
... 3000	100 %								95 %	91 %	88 %	
... 3250	100 %							97 %	93 %	89 %	85 %	
... 3500	100 %						98 %	93 %	89 %	85 %	82 %	
... 3750	100 %					95 %	91 %	87 %	83 %	79 %		
... 4000	96 %	92 %	87 %	83 %	80 %	76 %	91 %	87 %	80 %	76 %		

**Voltage derating** as a function of the installation altitude

# SINAMICS S120 Cabinet Modules

## System description

### Booksize Base Cabinet current derating

The Booksize Base Cabinet versions of the Cabinet Modules have different derating factors from the Chassis Modules. The reduction factors relating to the maximum permissible output current (derating) must be taken into account at an **installation altitude of > 1000 m** above sea level. These factors specified in the table below. As with the Chassis Modules, to obtain these values you must ensure an air flow rate in accordance with those stipulated in the technical data tables for the relevant Cabinet Modules. The specified values already include a permitted correction between installation altitude and ambient temperature (incoming air temperature at the inlet to the Cabinet Module).

Installation altitude above sea level m	Current derating at an ambient temperature (incoming air temperature) of						
	20°C	25°C	30°C	35°C	40°C	45°C	50°C
0 ... 1000	100 %					86 %	73 %
... 1500	92 %	92 %	92 %	92 %	92 %	79 %	67 %
... 2000	84 %	84 %	84 %	84 %	84 %	72 %	61 %
... 2500	79 %	79 %	79 %	79 %	79 %	68 %	57 %
... 3000	75 %	75 %	75 %	75 %	75 %	65 %	54 %
... 3500	66 %	66 %	66 %	66 %	66 %	56 %	48 %
... 4000	63 %	63 %	63 %	63 %	63 %	54 %	46 %

**Current derating** depending on ambient temperature (temperature of inlet air) and installation altitude for Cabinet Modules version Booksize Base Cabinet with **degree of protection IP20, IP21, IP23, IP43 and IP54**

### Booksize Base Cabinet voltage derating

In addition to the current derating, the voltage derating must also be considered according to the following table with table in the case of **installation altitudes > 1000 m** above sea level.

Installation altitude above sea level m	Voltage derating at a rated input voltage of					
	380 V	400 V	420 V	440 V	460 V	480 V
0 ... 2000	100 %					
... 2250	100 %					96 %
... 2500	100 %				98 %	94 %
... 2750	100 %			98 %	94 %	90 %
... 3000	100 %		95 %	91 %	88 %	
... 3250	100 %		97 %	93 %	89 %	85 %
... 3500	100 %		98 %	93 %	89 %	82 %
... 3750	100 %		95 %	91 %	87 %	79 %
... 4000	96 %	92 %	87 %	83 %	80 %	76 %

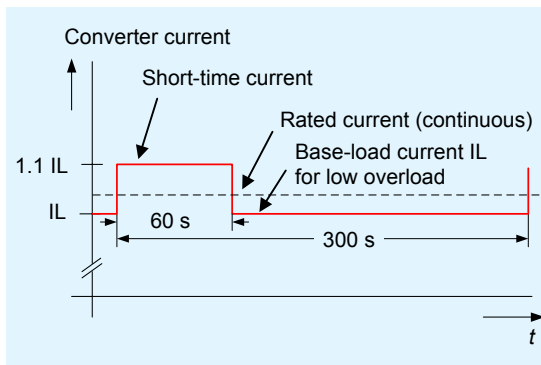
**Voltage derating** as a function of the installation altitude

### Overload capability

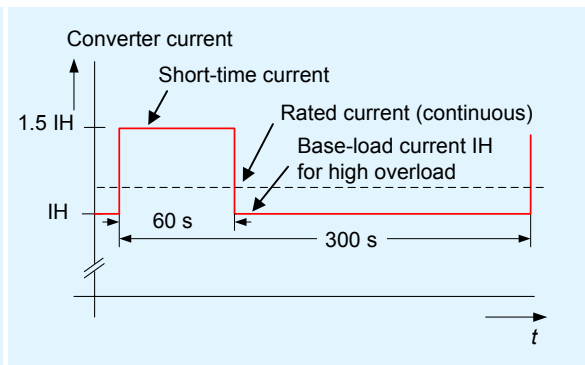
SINAMICS S120 Cabinet Modules are equipped with an overload reserve to deal with breakaway torques, for example. If larger surge loads occur, this must be taken into account when configuring. In the case of drives with overload requirements, the appropriate base-load current must therefore be used as a basis for the required load. Permissible overload assumes that the drive is operated at its base-load current before and after the overload occurs, based on a duty cycle duration of 300 s.

### Chassis format units

Cabinet Modules with Chassis format units can be configured on the basis of different base-load currents. The base-load current for low overload ( $I_L$ ) is based on a duty cycle of 110 % for 60 s or 150 % for 10 s. The base-load current for high overload ( $I_H$ ) is based on a duty cycle of 150 % for 60 s or 160 % for 10 s.



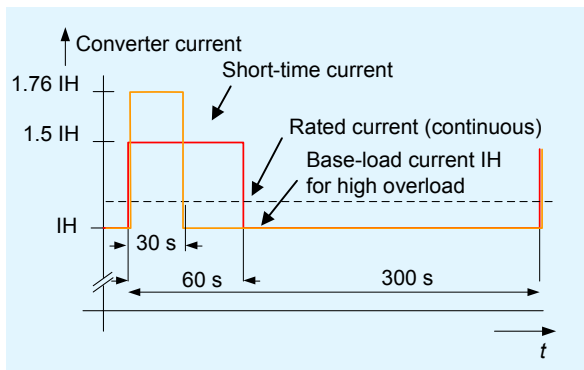
Low overload



High overload

### Booksize format units

Cabinet Modules with Booksize format units have the following overload capabilities:



Low and high overload

# SINAMICS S120 Cabinet Modules

## System description

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### ■ Degrees of protection of Cabinet Modules

The **EN60529** standard covers the protection of electrical equipment by means of housings, covers or equivalent, and includes:

1. Protection of persons against accidental contact with live or moving parts within the housing and protection of the equipment against the ingress of solid foreign matter (touch protection and protection against ingress of solid foreign bodies)
2. Protection of the equipment against the ingress of water (water protection)
3. Abbreviations for the internationally agreed degrees of protection

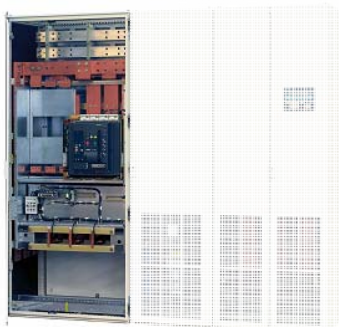
The degrees of protection are specified by abbreviations comprising the code letters IP and two digits.

Degree of protection	First digit (protection against accidental contact and solid matter)	Second digit (protection of the equipment against the penetration of water)
<b>IP20</b>	Protected against solid matter, diameter 12.5 mm and larger	No water protection
<b>IP21</b>	Protected against solid matter, diameter 12.5 mm and larger	Protected against drip water Vertically falling drip water must not have a harmful effect.
<b>IP23</b>	Protected against solid matter, diameter 12.5 mm and larger	Protected against spray water Water sprayed on both sides of the vertical at an angle of up to 60° must not have a harmful effect
<b>IP43</b>	Protected against solid matter, diameter 1 mm and larger	Protected against spray water Water sprayed on both sides of the vertical at an angle of up to 60° must not have a harmful effect
<b>IP54</b>	Protected against dust Entry of dust is not totally prevented, but the entry of dust is not allowed in such quantities that the operation of equipment or the safety will be impaired.	Protected against splash water. Water splashing against the enclosure from any direction must not have a harmful effect.

Cabinet Modules fulfill the criteria for IP20 degree of protection as standard. The other degrees of protection outlined here are available as an option.



### Line Connection Modules



#### Overview

Line Connection Modules contain the line-side infeed with main circuit breaker and fuse switch disconnecter or circuit breaker and provide the connection between the plant power system and the Line Modules.

Line Connection Modules are available for the following voltages and currents:

Supply voltage	Input current
380 ... 480 V 3AC	250 ... 3200 A
500 ... 690 V 3AC	280 ... 3200 A

#### Structure

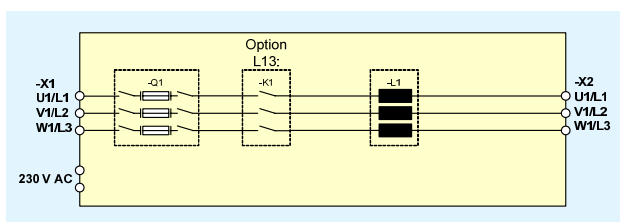
Depending on the input current, the following versions are available:

- $\leq 800$  A Main switch with fuse switch disconnector
- $> 800$  A Fixed-mounted circuit breaker type 3WL, also available as draw-out circuit breaker

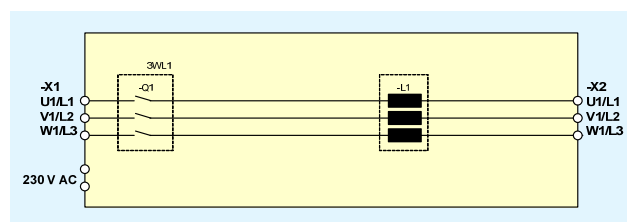
When Line Connection Modules are ordered, an option code must be specified to indicate the type of Line Module that applies:

- L42 for Active Line Modules
- L43 for Basic Line Modules
- L44 for Smart Line Modules

When Basic Line Modules are installed, a line reactor must also be used to suit the relevant supply conditions (see SINAMICS Engineering Manual for Low Voltage). The reactors are already included in the scope of delivery, but can be removed if required (option L22).



Connection example: Line Connection Module  $\leq 800$  A for connection to Basic Line Modules.  
Options: L13 and L43



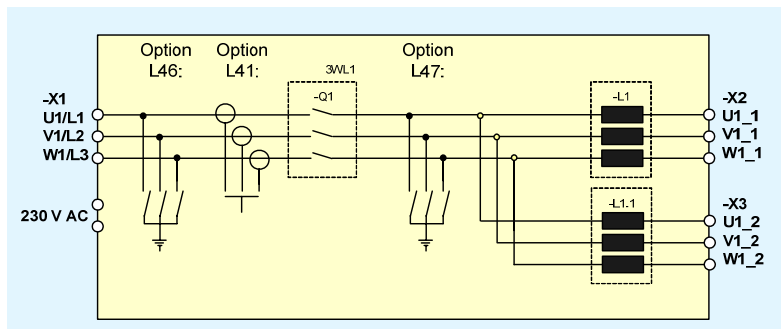
Connection example: Line Connection Module  $> 800$  A,  $< 2000$  A for connection to Basic Line Modules.  
Options: L43

Additional options are available for input currents  $\geq 2000$  A, e.g.:

- Grounding switch upstream of main circuit breaker Option L46
- Current transformer upstream of main circuit breaker Option L41
- Grounding switch downstream of main circuit breaker Option L47

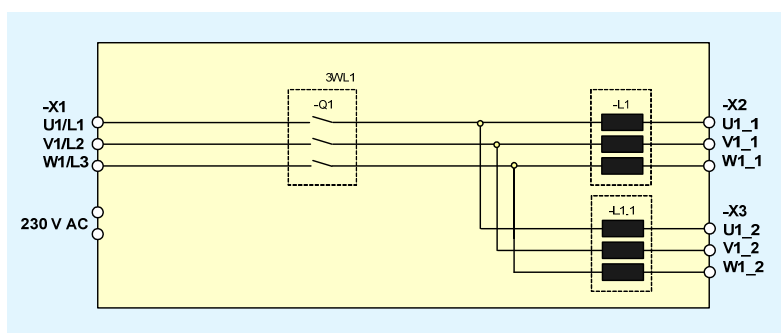
# SINAMICS S120 Cabinet Modules

## Line Connection Modules

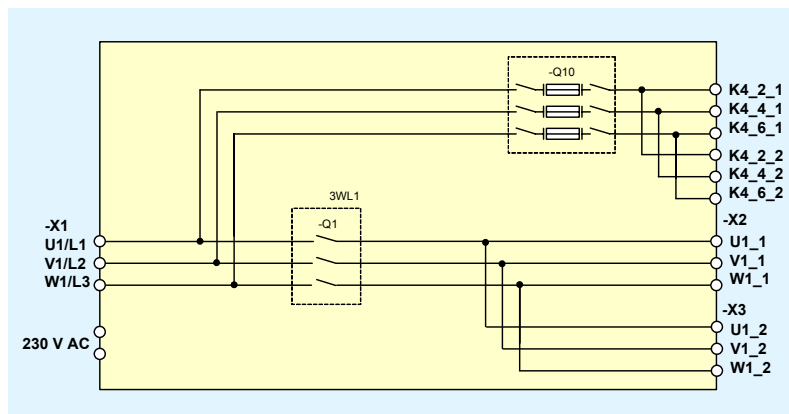


Connection example: Line Connection Module  $\geq 2000$  A  
for connection to 2 Basic Line Modules with frame size GB.  
Options: L43, L46, L41 and L47

When Basic Line Modules that are fed via a common Line Connection Module are connected in parallel, line reactors are generally required. These are installed in the Line Connection Module.



Connection example: Line Connection Module  $\geq 2000$  A  
for connection to Basic Line Modules.  
Options: L43



Connection example: Line Connection Module  $\geq 2000$  A  
for connection to Active Line Modules connected in parallel.  
Options: L42

# SINAMICS S120 Cabinet Modules

## Line Connection Modules

### Selection and ordering data

The table below shows which Line Connection Modules can be assigned to the different types of Line Modules.

Line Connection Modules		Basic Line Modules		Smart Line Modules		Active Line Modules	
Current [AC] <sup>1)</sup> A	Order No.	Curr. [AC] A	Order No.	Curr. [AC] A	Order No.	Curr. [AC] A	Order No.
<b>380 – 480 V supply voltage</b>							
250	6SL3700-0LE32-5AA0					210	6SL3730-7TE32-1BA0
400	6SL3700-0LE34-0AA0					260	6SL3730-7TE32-6BA0
630	6SL3700-0LE36-3AA0	365 460	6SL3730-1TE34-2AA0 6SL3730-1TE35-3AA0	463	6SL3730-6TE35-5AA0	380 490	6SL3730-7TE33-8BA0 6SL3730-7TE35-0BA0
800	6SL3700-0LE38-0AA0	710	6SL3730-1TE38-2AA0	614	6SL3730-6TE37-3AA0	605	6SL3730-7TE36-1BA0
1000	6SL3700-0LE41-0AA0			883	6SL3730-6TE41-1AA0	840	6SL3730-7TE38-4BA0
1250	6SL3700-0LE41-3AA0	1010	6SL3730-1TE41-2AA0	1093	6SL3730-6TE41-3AA0	985	6SL3730-7TE41-0BA0
1600	6SL3700-0LE41-6AA0	1265	6SL3730-1TE41-5AA0	1430	6SL3730-6TE41-7AA0	1405	6SL3730-7TE41-4BA0
2000	6SL3700-0LE42-0AA0	1630	6SL3730-1TE41-8AA0				
2000	6SL3700-0LE42-0BA0	2 x 935	6SL3730-1TE41-2BA0 6SL3730-1TE41-2BC0	2 x 817	6SL3730-6TE41-1BA0 6SL3730-6TE41-1BC0	2 x 936	6SL3730-7TE41-0BA0 6SL3730-7TE41-0BC0
2500	6SL3700-0LE42-5BA0	2 x 1170	6SL3730-1TE41-5BA0 6SL3730-1TE41-5BC0	2 x 1011	6SL3730-6TE41-3BA0 6SL3730-6TE41-3BC0		
3200	6SL3700-0LE43-2BA0	2 x 1508	6SL3730-1TE41-8BA0 6SL3730-1TE41-8BC0	2 x 1323	6SL3730-6TE41-7BA0 6SL3730-6TE41-7BC0	2 x 1335	6SL3730-7TE41-4BA0 6SL3730-7TE41-4BC0
<b>500 – 690 V supply voltage</b>							
280	6SL3700-0LG32-8AA0	260	6SL3730-1TH33-0AA0				
400	6SL3700-0LG34-0AA0	375	6SL3730-1TH34-3AA0				
630	6SL3700-0LG36-3AA0	575	6SL3730-1TH36-8AA0	463	6SL3730-6TG35-5AA0	575	6SL3730-7TG35-8BA0
800	6SL3700-0LG38-0AA0			757	6SL3730-6TG38-8AA0	735	6SL3730-7TG37-4BA0
1000	6SL3700-0LG41-0AA0	925	6SL3730-1TH41-1AA0				
1250	6SL3700-0LG41-3AA0	1180	6SL3730-1TH41-4AA0	1009	6SL3730-6TG41-2AA0	1025	6SL3730-7TG41-0BA0
1600	6SL3700-0LG41-6AA0	1580	6SL3730-1TH41-8AA0	1430	6SL3730-6TG41-7AA0	1270	6SL3730-7TG41-3BA0
2000	6SL3700-0LG42-0BA0	2 x 855	6SL3730-1TH41-1BA0 6SL3730-1TH41-1BC0	2 x 700	6SL3730-6TG38-8BA0 6SL3730-6TG38-8BC0	2 x 698	6SL3730-7TG37-4BA0 6SL3730-7TG37-4BC0
				2 x 934	6SL3730-6TG41-2BA0 6SL3730-6TG41-2BC0	2 x 974	6SL3730-7TG41-0BA0 6SL3730-7TG41-0BC0
2500	6SL3700-0LG42-5BA0	2 x 1092	6SL3730-1TH41-4BA0 6SL3730-1TH41-4BC0			2 x 1206	6SL3730-7TG41-3BA0 6SL3730-7TG41-3BC0
3200	6SL3700-0LG43-2BA0	2 x 1462	6SL3730-1TH41-8BA0 6SL3730-1TH41-8BC0	2 x 1323	6SL3730-6TG41-7BA0 6SL3730-6TG41-7BC0		

Parallel connection of two Line Modules with identical output rating.

The required derating factors listed below are already included in the current values given above:

- 7.5 % for Basic Line Modules
- 5 % for Active Line Modules
- 7.5 % for Smart Line Modules

<sup>1)</sup> The specified current values are based on an ambient temperature (incoming air temperature) of 40°C

#### Note:

When Line Connection Modules are ordered, the option code L42, L43 or L44 must be appended to the order number in order to indicate whether the LCM will be connected to an Active Line (L42), a Basic Line (L43) or a Smart Line Module (L44).

This information is required to ensure that the LCM is correctly equipped at the factory.

This particularly applies to the busbar connection at the 3-phase end (3AC), to any pre-charging input circuits required and to the specified line reactors for Basic Line Modules.

When Cabinet Modules are selected and combined in accordance with the above assignment table, the Line Connection Modules are equipped and prepared as specified at the factory.

**This does not apply to any Cabinet Module combinations that deviate from the information in the table. In such cases, the 3-phase (3AC) busbars will have to be configured and installed on site.**

# SINAMICS S120 Cabinet Modules

## Line Connection Modules

### Technical data

Line Connection Modules			6SL3700-0LE32-5AA0	6SL3700-0LE34-0AA0	6SL3700-0LE36-3AA0	6SL3700-0LE38-0AA0	6SL3700-0LE41-0AA0	6SL3700-0LE41-3AA0	6SL3700-0LE41-6AA0	6SL3700-0LE42-0AA0
Frame size			FL	FL	GL	HL	JL	JL	JL	KL
Rated current	A		250	400	630	800	1000	1250	1600	2000
Power loss	kW		0.115	0.19	0.31	0.39	0.18	0.29	0.41	0.60
Cooling air demand <sup>1)</sup>	m³/s		-	-	-	-	0.36	0.36	0.36	0.72
Power demand, 2-phase 230 V AC, 50/60 Hz: Making current Holding current Fan	<sup>2)</sup> A		3.6	3.6	3.6	10.8	0.5	0.5	0.5	0.5
	A		0.04	0.04	0.04	0.12	0.06	0.06	0.06	0.06
	A		-	-	-	-	1.07	1.07	1.07	2.14
	A		-	-	-	-	-	-	-	-
Line supply connection, max. cable cross-section	DIN VDE	mm²	2 x 150	2 x 150	4 x 240	8 x 240	8 x 240	8 x 240	8 x 240	10 x 240
	NEC, CEC	AWG/ MCM	2 x 300 MCM	2 x 300 MCM	4 x 500 MCM	8 x 500 MCM	8 x 500 MCM	8 x 500 MCM	8 x 500 MCM	10 x 500 MCM
M12 fixing screw	Quantity		1	1	2	4	4	4	4	5
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz <sup>1)</sup>	dB(A)		-	-	-	-	68/70	68/70	68/70	70/72
Degree of protection			IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Weight with option L42/L44 Standard version	kg		210	230	310	340	450	470	490	600
Weight with option L43 Standard version	kg		-	-	360	420	-	570	650	760
Dimensions	W	mm	400	400	600	600	600	600	600	1000
	D	mm	600	600	600	600	600	600	600	600
	H	mm	2200	2200	2200	2200	2200	2200	2200	2200

Line Connection Modules			<sup>4)</sup> 6SL3700-0LE42-0BA0	<sup>4)</sup> 6SL3700-0LE42-5BA0	<sup>4)</sup> 6SL3700-0LE43-2BA0				
Frame size			KL	KL	LL				
Rated current	A		2000	2500	3200				
Power loss	kW		0.6	0.95	0.95				
Cooling air demand <sup>1)</sup>	m³/s		0.72	0.72	0.72				
Power demand, 2-phase 230 V AC, 50/60 Hz: Making current Holding current Fan	<sup>2)</sup> A		0.5	0.5	0.5				
	A		0.06	0.06	0.04				
	A		2.14	2.14	2.14				
	A		-	-	-				
Line supply connection, max. cable cross-section	DIN VDE	mm²	10 x 240	10 x 240	10 x 300				
	NEC, CEC	AWG/ MCM	10 x 500 MCM	10 x 500 MCM	10 x 500 MCM				
M12 fixing screw	Quantity		5	5	5				
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz <sup>1)</sup>	dB(A)		70/72	70/72	70/72				
Degree of protection			IP20	IP20	IP20				
Weight with option L42/L44 Standard version	kg		620	620	720				
Weight with option L43 Standard version	kg		820	900	1000				
Dimensions	W	mm	1000	1000	1000				
	D	mm	600	600	600				
	H	mm	2200	2200	2200				

- 1) For IP23, IP43 or IP54 degree of protection only (in combination with Basic Line Modules)
- 2) Power requirement of contactors/circuit breakers and fans with degrees of protection IP23, IP43, IP54 (in combination with Basic Line Modules)
- 3) The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54
- 4) Prepared for connection to Line Modules connected in parallel

# SINAMICS S120 Cabinet Modules

## Line Connection Modules

Line Connection Modules			6SL3700- 0LG32-8AA0	6SL3700- 0LG34-0AA0	6SL3700- 0LG36-3AA0	6SL3700- 0LG38-0AA0	6SL3700- 0LG41-0AA0	6SL3700- 0LG41-3AA0	6SL3700- 0LG41-6AA0
Frame size			FL	FL	GL	HL	JL	JL	JL
Rated current I <sub>r</sub>	A		280	400	630	800	1000	1250	1600
Power loss	kW		0.125	0.19	0.31	0.39	0.18	0.29	0.41
Cooling air demand <sup>1)</sup>	m <sup>3</sup> /s		-	-	-	-	0.36	0.36	0.36
Power demand, 2-phase 230 V AC <sup>2)</sup> , 50/60 Hz:	A		3.6	3.6	3.6	10.8	0.5	0.5	0.5
Making current	A		0.04	0.04	0.04	0.12	0.06	0.06	0.06
Holding current	A		-	-	-	-	1.07	1.07	1.07
Fan									
Line supply connection, max. cable cross-section									
DIN VDE	mm <sup>2</sup>		2 x 150	2 x 150	4 x 240	8 x 240	8 x 240	8 x 240	8 x 240
NEC, CEC	AWG/ MCM		2 x 300 MCM	2 x 300 MCM	4 x 500 MCM	8 x 500 MCM	8 x 500 MCM	8 x 500 MCM	8 x 500 MCM
M12 fixing screw	Quantity		1	1	2	4	4	4	4
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz <sup>1)</sup>	dB(A)						68/70	68/70	68/70
Degree of protection			IP20	IP20	IP20	IP20	IP20	IP20	IP20
Weight with option L42/L44 Standard version	kg		220	230	310	340	450	470	490
Weight with option L43 Standard version	kg		260	310	400	-	650	670	680
Dimensions	W	mm	400	600	600	600	600	600	600
	D		600	600	600	600	600	600	600
<sup>3)</sup>	H		2200	2200	2200	2200	2200	2200	2200

Line Connection Modules			<sup>4)</sup> 6SL3700- 0LG42-0BA0	<sup>4)</sup> 6SL3700- 0LG42-5BA0	<sup>4)</sup> 6SL3700- 0LG43-2BA0
Frame size			KL	KL	LL
Rated current I <sub>r</sub>	A		2000	2500	3200
Power loss	kW		0.60	0.60	0.95
Cooling air demand <sup>1)</sup>	m <sup>3</sup> /s		0.72	0.72	0.72
Power demand, 2-phase 230 V AC <sup>2)</sup> , 50/60 Hz:	A		0.5	0.5	0.5
Making current	A		0.06	0.06	0.06
Holding current	A		2.14	2.14	2.14
Fan					
Line supply connection, max. cable cross-section					
DIN VDE	mm <sup>2</sup>		10 x 240	10 x 240	10 x 300
NEC, CEC	AWG/ MCM		10 x 500 MCM	10 x 500 MCM	10 x 500 MCM
M12 fixing screw	Quantity		5	5	5
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz <sup>1)</sup>	dB(A)		70/72	70/72	70/72
Degree of protection			IP20	IP20	IP20
Weight with option L42/L44 Standard version	kg		600	620	720
Weight with option L43 Standard version	kg		980	1000	1080
Dimensions	W	mm	1000	1000	1000
	D		600	600	600
<sup>3)</sup>	H		2200	2200	2200

<sup>1)</sup> For IP23, IP43 or IP54 degree of protection only (in combination with Basic Line Modules)

<sup>2)</sup> Power requirement of contactors/circuit breakers and fans with degrees of protection IP23, IP43, IP54 (in combination with Basic Line Modules)

<sup>3)</sup> The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54

<sup>4)</sup> Prepared for connection to Line Modules connected in parallel

# SINAMICS S120 Cabinet Modules

## Line Connection Modules

### Options

The table below lists the options available for Line Connection Modules (for a detailed description, please refer to the section entitled "Option descriptions"):

Order code	Brief description of option	Rated current:	Rated current:			
			≤ 400 A:	≤ 800 A	> 800, < 2000 A	≥ 2000 A
<b>K76</b>	Auxiliary voltage supply, mounted in LCM			x	x	x
<b>L13</b>	Input contactor for connection currents ≤ 800 A (in conjunction with BLM)		x	x		
<b>L22</b>	Delivery without line reactor (in conjunction with Basic Line Module)		x	x	x	
<b>L25</b>	Draw-out circuit breaker in place of a fixed-mounted circuit breaker				x	x
<b>L41</b>	Input current transformer upstream of circuit breaker for customer use		x	x	x	x
<b>L42</b>	Line Connection Module for Active Line Modules		x	x	x	x
<b>L43</b>	Line Connection Module for Basic Line Modules		x	x	x	x
<b>L44</b>	Line Connection Module for Smart Line Modules		x	x	x	x
<b>L45</b>	EMERGENCY OFF pushbutton, door mounted		x	x	x	x
<b>L46</b>	Grounding switch upstream of circuit breaker					x
<b>L47</b>	Grounding switch downstream of circuit breaker					x
<b>L55</b>	Enclosure space heater		x	x	x	x
<b>L87</b>	Insulation monitoring		x	x	x	x
<b>M06</b>	Plinth (base) 100 mm high, RAL 7022		x	x	x	x
<b>M07</b>	Plinth (base) 200 mm high, RAL 7035		x	x	x	x
<b>M21</b>	IP21 Degree of protection		x	x	x	x
<b>M23</b>	IP23 Degree of protection (includes M60)		x	x	x	x
<b>M27</b>	Side panel (left)		x	x	x	x
<b>M43</b>	IP43 Degree of protection (includes M60)		x	x	x	x
<b>M54</b>	IP54 Degree of protection (includes M60)		x	x	x	x
<b>M59</b>	Solid cabinet door (without ventilation holes, air inlet from below)		x	x	x	x
<b>M60</b>	Additional touch protection (included in M23, M43 and M54)		x	x	x	x
<b>M70</b>	EMC shield busbar		x	x	x	x
<b>M80</b>	DC busbar system ( $I_a = 1170$ A, 1x 60 x 10 mm)		x	x	x	x
<b>M81</b>	DC busbar system ( $I_a = 1500$ A, 1x 80 x 10 mm)		x	x	x	x
<b>M82</b>	DC busbar system ( $I_a = 1840$ A, 1x 100 x 10 mm)		x	x	x	x
<b>M83</b>	DC busbar system ( $I_a = 2150$ A, 2x 60 x 10 mm)		x	x	x	x
<b>M84</b>	DC busbar system ( $I_a = 2730$ A, 2x 80 x 10 mm)		x	x	x	x
<b>M85</b>	DC busbar system ( $I_a = 3320$ A, 2x 100 x 10 mm)		x	x	x	x
<b>M86</b>	DC busbar system ( $I_a = 3720$ A, 3x 80 x 10 mm)		x	x	x	x
<b>M87</b>	DC busbar system ( $I_a = 4480$ A, 3x 100 x 10 mm)		x	x	x	x
<b>M90</b>	Crane transport assembly (top mounted)		x	x	x	x
<b>P10</b>	Line side power monitor, door mounted (includes L41)		x	x	x	x
<b>P11</b>	Line side power monitor with PROFIBUS connection, door mounted		x	x	x	x
<b>Y09</b>	Special enclosure paint color		x	x	x	x
<b>Y11</b>	Grouped assembly into transport units		x	x	x	x
<b>Y31</b>	1-line label for plant identification, 40 x 80 mm		x	x	x	x
<b>Y32</b>	2-line label for plant identification, 40 x 180 mm		x	x	x	x
<b>Y33</b>	4-line label for plant identification, 40 x 180 mm		x	x	x	x
<b>D02</b>	Customer documentation (circuit diagram, terminal diagram, layout diagram) in DXF format		x	x	x	x
<b>D14</b>	Preliminary version of customer documentation		x	x	x	x
<b>D58</b>	Documentation language: English / French		x	x	x	x
<b>D60</b>	Documentation language: English / Spanish		x	x	x	x
<b>D80</b>	Documentation language: English / Italian		x	x	x	x
<b>D99</b>	Delivery without documentation		x	x	x	x
<b>T58</b>	Rating plate language in English / French		x	x	x	x
<b>T60</b>	Rating plate language in English / Spanish		x	x	x	x
<b>T80</b>	Rating plate language in English / Italian		x	x	x	x

### Option selection matrix for Line Connection Modules

Some options are mutually exclusive. If so, this will be indicated in the tables below.

+	Possible combinations
-	Not possible

#### Electrical options

	K76 <sup>4)</sup>	L13 <sup>1)</sup>	L25 <sup>2)</sup>	L41	L45	L46 <sup>3)</sup>	L47 <sup>3)</sup>	L55	L87	P10	P11
K76 <sup>4)</sup>		+	+	+	+	+	-	+	+	+	+
L13 <sup>1)</sup>	+		-	+	+	-	-	+	+	+	+
L25 <sup>2)</sup>	+	-		+	+	+	+	+	+	+	+
L41	+	+	+		+	+	+	+	+	-	-
L45	+	+	+	+		+	+	+	+	+	+
L46 <sup>3)</sup>	+	-	+	+	+		+	+	+	+	+
L47 <sup>3)</sup>	-	-	+	+	+	+		+	+	+	+
L55	+	+	+	+	+	+	+		+	+	+
L87	+	+	+	+	+	+	+	+		+	+
P10	+	+	+	-	+	+	+	+	+		-
P11	+	+	+	-	+	+	+	+	+	-	

- 1) Option for rated current of  $\leq 800$  A only
- 2) Option for rated current of  $> 800$  A only
- 3) Option for rated current of  $\geq 2000$  A only
- 4) Option is not available for rated current  $\leq 400$  A

#### Mechanical/electrical options

	L22	L42	L43	L44	M06	M07	M21	M23	M43	M27	M54	M59	M60 <sup>4)</sup>	M70	M90	Y09	Y11	Y31	Y32	Y33	
L22		-	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
L42	-		-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
L43	+	-		-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
L44	-	-	-		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M06	+	+	+	+		-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M07	+	+	+	+	-		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M21	+	+	+	+	+	+		-	-	+	-	+	+	+	+	+	+	+	+	+	+
M23	+	+	+	+	+	+	-		-	+	-	+	-	+	+	+	+	+	+	+	+
M43	+	+	+	+	+	+	-			+	-	+	-	+	+	+	+	+	+	+	+
M27	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
M54	+	+	+	+	+	+	-	-	-	+		+	-	+	+	+	+	+	+	+	+
M59	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+
M60 <sup>4)</sup>	+	+	+	+	+	+	+	-	-	+	-	+		+	+	+	+	+	+	+	+
M70	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+
M90	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	-	+	+	+	+
Y09	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
Y11	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+
Y31	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-
Y32	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-
Y33	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-

- 4) Option M60 is included in M23, M43 and M54.

#### DC busbar system mechanical options (busbars between individual Cabinet Modules)

	M80	M81	M82	M83	M84	M85	M86	M87
M80		-	-	+	-	-	-	-
M81	-		-	-	+	+	+	-
M82	-	-		-	-	+	-	+
M83	+	-	-		-	-	-	-
M84	-	+	-	-		-	+	-
M85	-	-	+	-	-		-	+
M86	-	+	-	-	+	-		-
M87	-	-	+	-	-	+	-	

#### Documentation and language of rating plate data

	D02	D14	D58	D60	D80	D99
D02		+	+	+	+	-
D14	+		+	+	+	-
D58	+	+		-	-	-
D60	+	+	-		-	-
D80	+	+	-	-		-
D99	-	-	-	-	-	

	T58	T60	T80
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### Basic Line Modules



#### ■ Overview

Basic Line Modules are compact supply infeeds for 2-quadrant operation (i.e. no regenerative feedback).

They are used in cases when energy does not need to be fed back into the network.

If regenerative conditions occur in the drive line-up, Braking Modules must be used because they convert the excess energy in braking resistors into heat.

Basic Line Modules are available for the following voltages and power ratings:

Supply voltage	Power rating
380 ... 480 V 3AC	200 - 900 kW
500 ... 690 V 3AC	180 - 1500 kW

The power ratings can be increased by connecting up to four identical Basic Line Modules in parallel.

When Basic Line Modules are used as the infeed, a line reactor must be installed in accordance with the supply short circuit power at the connection point (please refer to SINAMICS Low Voltage Engineering Manual). This reactor is available as a standard feature in the Line Connection Module. However, it can be removed if it is not required (option L22 with LCM).

#### ■ Structure

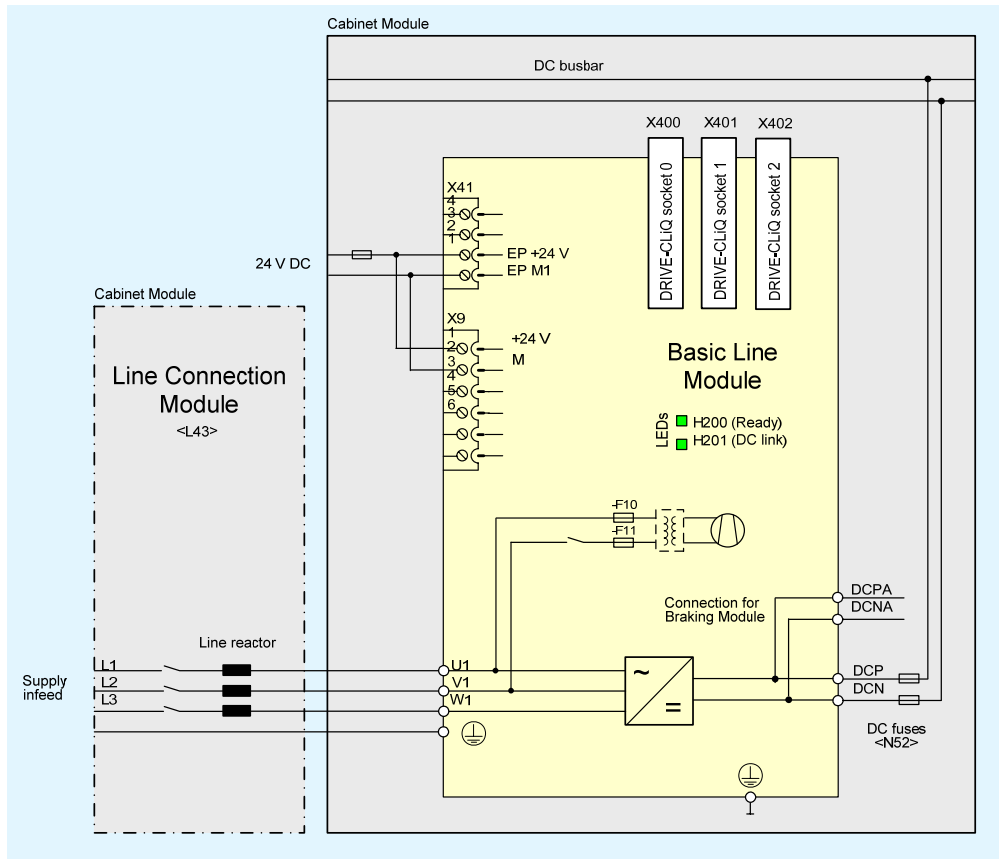
The Basic Line Modules are available in two frame sizes: Fx and Gx. In addition, two different versions of the Gx format are available, depending on the power rating.

With frame sizes FB and GB, a fully controlled thyristor bridge is used to pre-charge the Basic Line Modules and connected Motor Modules. The thyristors normally operate with a trigger delay angle of 0°.

Basic Line Modules of frame size GD for 900 kW (400 V) or 1500 kW (690 V) have a diode jumper, and the DC link is pre-charged via a separate line-side pre-charging device located in the Line Connection Module (specified by option code L43).



### Integration



Connection example: Basic Line Module

### Selection and ordering data

Power rating kW	Basic Line Modules Order no.	
<b>380 – 480 V supply voltage (510 – 650 V DC link voltage)</b>		
200	6SL3730-1TE34-2AA0	
250	6SL3730-1TE35-3AA0	
400	6SL3730-1TE38-2AA0	
560	6SL3730-1TE41-2AA0	
560	6SL3730-1TE41-2BA0	For parallel connection, mounted on right of LCM
560	6SL3730-1TE41-2BC0	For parallel connection, mounted on left of LCM
710	6SL3730-1TE41-5AA0	
710	6SL3730-1TE41-5BA0	For parallel connection, mounted on right of LCM
710	6SL3730-1TE41-5BC0	For parallel connection, mounted on left of LCM
900	6SL3730-1TE41-8AA0	
900	6SL3730-1TE41-8BA0	For parallel connection, mounted on right of LCM
900	6SL3730-1TE41-8BC0	For parallel connection, mounted on left of LCM
<b>500 – 690 V supply voltage (675 – 930 V DC link voltage)</b>		
250	6SL3730-1TH33-0AA0	
355	6SL3730-1TH34-3AA0	
560	6SL3730-1TH36-8AA0	
900	6SL3730-1TH41-1AA0	
900	6SL3730-1TH41-1BA0	For parallel connection, mounted on right of LCM
900	6SL3730-1TH41-1BC0	For parallel connection, mounted on left of LCM
1100	6SL3730-1TH41-4AA0	
1100	6SL3730-1TH41-4BA0	For parallel connection, mounted on right of LCM
1100	6SL3730-1TH41-4BC0	For parallel connection, mounted on left of LCM
1500	6SL3730-1TH41-8AA0	
1500	6SL3730-1TH41-8BA0	For parallel connection, mounted on right of LCM
1500	6SL3730-1TH41-8BC0	For parallel connection, mounted on left of LCM

# SINAMICS S120 Cabinet Modules

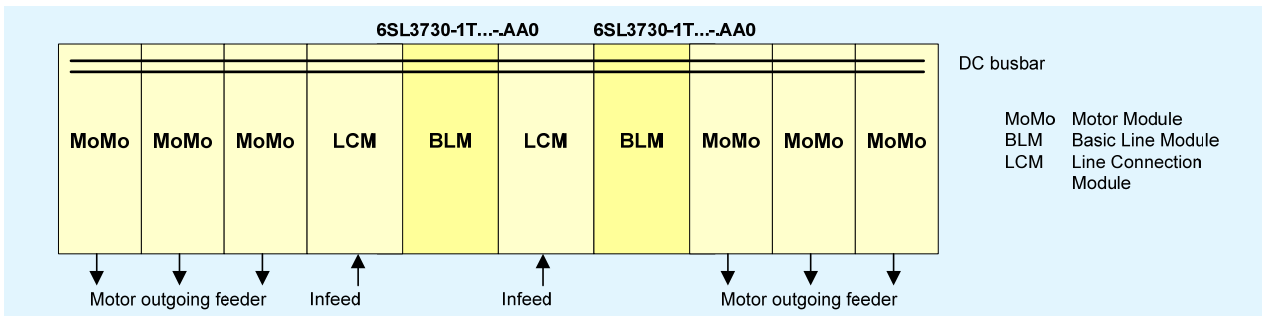
## Basic Line Modules

### Parallel connection of Basic Line Modules to increase power rating

Line Modules can be connected in parallel (relative to the line supply) for the purpose of creating drive line-ups with a higher power rating.

#### 1. Two Basic Line Modules supplied with power via two separate Line Connection Modules

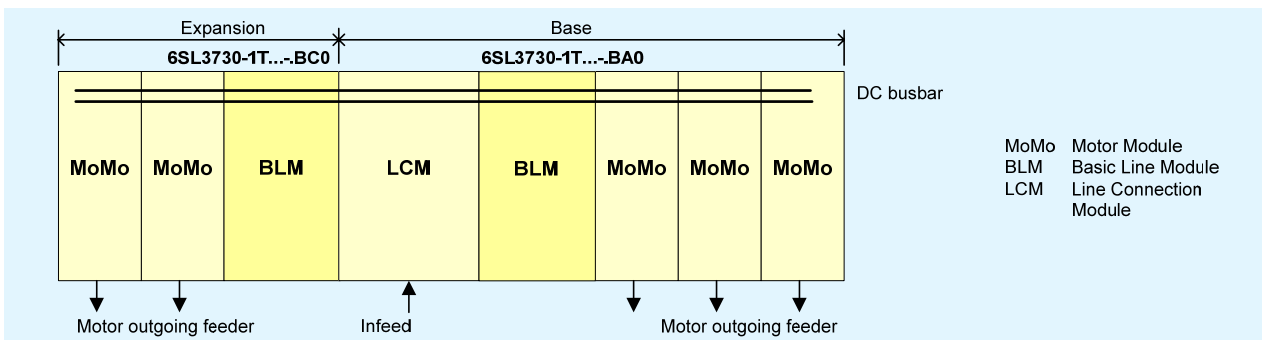
With this layout, each Basic Line Module is supplied with power by its own LCM, and the Basic Line Modules are protected by fuses/circuit breakers (with I > 800 A) in the LCMs. A BLM is assigned to and mechanically coupled to each LCM. Mechanical direct coupling of both LCM and BLM "groups" is not necessarily required. Other Modules can also be inserted in between.



#### 2. Two Basic Line Modules supplied with power via a single Line Connection Module

Basic Line Modules are available that can be operated on a single Line Connection Module. These can be connected to the left and right of the Line Connection Module. The Basic Line Module to the left of the Line Connection Module has "mirror image" power connections (insert C as the penultimate character in the order number, e.g.: 6SL3730-1T.41-.BC0), which results in an extremely compact supply infeed design (please also refer to SINAMICS Low Voltage Engineering Manual).

These module versions already include the necessary integrated line-side fuses, because the circuit breaker in the LCM is not capable of providing selective protection for the Basic Line Modules. They are, therefore, 200 mm wider in each case than version 6SL3730-1T...-AA0



#### Note:

If the Basic Line Modules are supplied with power via the same circuit breaker, line-side fuses must be provided to ensure selective individual protection of the modules. This arrangement increases the cabinet width by 200 mm (dimension data in selection tables includes extra width).

Please note that only Basic Line Modules with exactly the same output rating must be connected in parallel. The potential for imbalances in current distribution means that a current derating of 7.5 % applies; this must be taken into account when the modules are dimensioned.

If the BLMs connected in parallel use a Drive-CLiQ connection, this must be taken into account during configuration.

### Technical data

Basic Line Modules			6SL3730-1TE34-2AA0	6SL3730-1TE35-3AA0	6SL3730-1TE38-2AA0	6SL3730-1TE41-2AA0	6SL3730-1TE41-5AA0	6SL3730-1TE41-8AA0		
<b>380 – 480 V supply voltage</b>										
For parallel connection, mounted on right of LCM						6SL3730-1TE41-2BA0	6SL3730-1TE41-5BA0	6SL3730-1TE41-8BA0		
For parallel connection, mounted on left of LCM						6SL3730-1TE41-2BC0	6SL3730-1TE41-5BC0	6SL3730-1TE41-8BC0		
Frame size			FB	FB	FB	GB	GB	GD		
Power rating at 400 V		kW	200	250	400	560	710	900		
Rated DC link current		A	420	530	820	1200	1500	1880		
Max. DC link current		A	630	795	1230	1800	2250	2820		
Rated input current		A	365	460	710	1010	1265	1630		
Max. input current		A	547	690	1065	1515	1897	2380		
DC link capacitance		µF	7200	9600	14600	23200	29000	34800		
Max. permissible DC link capacitance of drive line-up		µF	57600	76800	116800	185600	232000	139200		
Power loss		kW	2.1	2.3	3.4	4.8	5.7	6.9		
Cooling air demand		m³/s	0.17	0.17	0.17	0.36	0.36	0.36		
Power demand 24 V DC <sup>1)</sup>		A	1.1	1.1	1.1	1.1	1.1	1.1		
Power demand 400 V AC <sup>3)</sup>		A	Internal	Internal	Internal	Internal	Internal	Internal		
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz		dB(A)	66/68	66/68	66/68	71/73	71/73	71/73		
Degree of protection			IP20	IP20	IP20	IP20	IP20	IP20		
Weight (standard version)		kg	166	166	166	320/440/480	320/440/480	320/440/480		
Dimensions		W mm	400	400	400	400/600/600	400/600/600	400/600/600		
		D mm	600	600	600	600	600	600		
		H mm	2200	2200	2200	2200	2200	2200		

Basic Line Modules			6SL3730-1TH33-0AA0	6SL3730-1TH34-3AA0	6SL3730-1TH36-8AA0	6SL3730-1TH41-1AA0	6SL3730-1TH41-4AA0	6SL3730-1TH41-8AA0		
<b>500 – 690 V supply voltage</b>										
For parallel connection, mounted on right of LCM						6SL3730-1TH41-1BA0	6SL3730-1TH41-4BA0	6SL3730-1TH41-8BA0		
For parallel connection, mounted on left of LCM						6SL3730-1TH41-1BC0	6SL3730-1TH41-4BC0	6SL3730-1TH41-8BC0		
Frame size			FB	FB	FB	GB	GB	GD		
Power rating at 500 V		kW	180	250	400	650	800	1100		
Power rating at 690 V		kW	250	355	560	900	1100	1500		
Rated DC link current		A	300	430	680	1100	1400	1880		
Max. DC link current		A	450	645	1020	1650	2100	2820		
Rated input current		A	260	375	575	925	1180	1580		
Max. input current		A	390	562.5	862.5	1387.5	1770	2370		
DC link capacitance		µF	3200	4800	7300	11600	15470	19500		
Max. permissible DC link capacitance of drive line-up		µF	25600	38400	58400	92800	123760	78000		
Power loss		kW	1.7	2.3	3.2	5.6	6.1	7.3		
Cooling air demand		m³/s	0.17	0.17	0.17	0.36	0.36	0.36		
Power demand 24 V DC <sup>1)</sup>		A	1.1	1.1	1.1	1.1	1.1	1.1		
Power demand 500/ 690 V AC <sup>3)</sup>			Internal	Internal	Internal	Internal	Internal	Internal		
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz		dB(A)	66/68	66/68	66/68	71/73	71/73	71/73		
Degree of protection			IP20	IP20	IP20	IP20	IP20	IP20		
Weight (standard version)		kg	166	166	166	320/440/480	320/440/480	320/440/480		
Dimensions		W mm	400	400	400	400/600/600	400/600/600	400/600/600		
		D mm	600	600	600	600	600	600		
		H mm	2200	2200	2200	2200	2200	2200		

<sup>1)</sup> Power requirement of open-loop/closed-loop control

<sup>2)</sup> The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54

<sup>3)</sup> The power requirement for the fans is taken from the supply input voltage

# SINAMICS S120 Cabinet Modules

## Basic Line Modules

### Options

The table below lists the options available for Basic Line Modules (for a detailed description, please refer to the section entitled "Option descriptions"):

Order code	Brief description of option
<b>G20</b>	CBC10 communication board
<b>G33</b>	CBE20 communication board
<b>K08</b>	AOP30 Advanced Operator Panel, door mounted
<b>K90</b>	Control Unit CU320 w/ CompactFlash Card without performance expansion
<b>K91</b>	Control Unit CU320 w/ CompactFlash Card with performance expansion 1
<b>L55</b>	Enclosure space heater
<b>L61</b>	Braking unit 25 / 125 kW for supply voltage 380 V - 480 V and 660 V - 690 V (can be used with frame size FB)
<b>L62</b>	Braking unit 50 / 250 kW for supply voltage 380 V - 480 V and 660 V - 690 V (can be used with frame size GB/GD)
<b>L64</b>	Braking unit 25 / 125 kW for supply voltage 500 V - 600 V (can be used with frame size FB)
<b>L65</b>	Braking unit 50 / 250 kW for supply voltage 500 V - 600 V (can be used with frame size GB/GD)
<b>M06</b>	Plinth (base) 100 mm high, RAL 7022
<b>M07</b>	Plinth (base) 200 mm high, RAL 7035
<b>M21</b>	IP21 Degree of protection
<b>M23</b>	IP23 Degree of protection (includes M60)
<b>M26</b>	Side panel (right)
<b>M27</b>	Side panel (left)
<b>M43</b>	IP43 Degree of protection (includes M60)
<b>M54</b>	IP54 Degree of protection (includes M60)
<b>M59</b>	Solid cabinet door (without ventilation holes, air inlet from below through floor opening)
<b>M60</b>	Additional touch protection (included in M23, M43 and M54)
<b>M80</b>	DC busbar system ( $I_d = 1170$ A, 1x 60 x 10 mm)
<b>M81</b>	DC busbar system ( $I_d = 1500$ A, 1x 80 x 10 mm)
<b>M82</b>	DC busbar system ( $I_d = 1840$ A, 1x 100 x 10 mm)
<b>M83</b>	DC busbar system ( $I_d = 2150$ A, 2x 60 x 10 mm)
<b>M84</b>	DC busbar system ( $I_d = 2730$ A, 2x 80 x 10 mm)
<b>M85</b>	DC busbar system ( $I_d = 3320$ A, 2x 100 x 10 mm)
<b>M86</b>	DC busbar system ( $I_d = 3720$ A, 3x 80 x 10 mm)
<b>M87</b>	DC busbar system ( $I_d = 4480$ A, 3x 100 x 10 mm)
<b>M90</b>	Crane transport assembly (top mounted)
<b>N52</b>	DC link fuses for BLM
<b>Y09</b>	Special enclosure paint color
<b>Y11</b>	Grouped assembly into transport units
<b>Y31</b>	1-line label for plant identification, 40 x 80 mm
<b>Y32</b>	2-line label for plant identification, 40 x 180 mm
<b>Y33</b>	4-line label for plant identification, 40 x 180 mm
<b>D02</b>	Customer documentation (circuit diagram, terminal diagram, layout diagram) in DXF format
<b>D14</b>	Preliminary version of customer documentation
<b>D58</b>	Documentation language: English / French
<b>D60</b>	Documentation language: English / French
<b>D80</b>	Documentation language: English / Italian
<b>D99</b>	Delivery without documentation
<b>T58</b>	Rating plate language in English / French
<b>T60</b>	Rating plate language in English / Spanish
<b>T80</b>	Rating plate language in English / Italian

### Option selection matrix for Basic Line Modules

Some options are mutually exclusive. If so, this will be indicated in the tables below.

+	Possible combinations
-	Not possible

#### Electrical options

	G20 <sup>1)</sup>	G33 <sup>1)</sup>	K08 <sup>1)</sup>	K90	K91	L55	L61/64	L62/65
G20 <sup>1)</sup>		-	+	+	+	+	+	+
G33 <sup>1)</sup>	-		+	+	+	+	+	+
K08 <sup>1)</sup>	+	+		+	+	+	+	+
K90	+	+	+		-	+	+	+
K91	+	+	+	-		+	+	+
L55	+	+	+	+	+		+	+
L61/64	+	+	+	+	+	+		-
L62/65	+	+	+	+	+	+	-	

<sup>1)</sup> Options K08, G20 and G33 require option K90/K91.

#### Mechanical/electrical options

	M06	M07	M21	M23	M26	M27	M43	M54	M59	M60	M90	N52	Y09	Y11	Y31	Y32	Y33
M06		-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M07	-		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M21	+	+		-	+	+	-	-	+	+	+	+	+	+	+	+	+
M23	+	+	-		+	+	-	-	+	-	+	+	+	+	+	+	+
M26	+	+	+	+		-	+	+	+	+	+	+	+	+	+	+	+
M27	+	+	+	+	+		-	+	+	+	+	+	+	+	+	+	+
M43	+	+	-	-	+	+		-	+	-	+	+	+	+	+	+	+
M54	+	+	-	-	+	+	-		+	-	+	+	+	+	+	+	+
M59	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+
M60	+	+	+	-	+	+	-	-	+		+	+	+	+	+	+	+
M90	+	+	+	+	+	+	+	+	+	+		+	+	+	-	+	+
N52	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
Y09	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
Y11	+	+	+	+	+	+	+	+	+	+	-	+	+		+	+	+
Y31	+	+	+	+	+	+	+	+	+	+	+	+	+	+		-	-
Y32	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		-
Y33	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-

<sup>2)</sup> Option M60 is included in M23, M43 and M54.

#### DC busbar system mechanical options (busbars between individual Cabinet Modules)

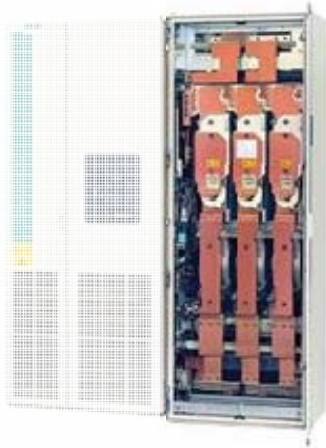
	M80	M81	M82	M83	M84	M85	M86	M87
M80		-	-	+	-	-	-	-
M81	-		-	-	+	-	+	-
M82	-	-		-	-	+	-	+
M83	+	-	-		-	-	-	-
M84	-	+	-	-		-	+	-
M85	-	-	+	-	-		-	+
M86	-	+	-	-	+	-		-
M87	-	-	+	-	-	+	-	

#### Documentation and language of rating plate data

	D02	D14	D58	D60	D80	D99
D02		+	+	+	+	-
D14	+		+	+	+	-
D58	+	+		-	-	-
D60	+	+	-		-	-
D80	+	+	-	-		-
D99	-	-	-	-	-	

	T58	T60	T80
T58		-	-
T60	-		-
T80	-	-	

### Smart Line Modules



#### ■ Overview

Smart Line Modules are uncontrolled infeed/regenerative feedback units. The infeed occurs over a diode jumper, while stable, line-commutated regenerative feedback takes place via IGBTs with 100 % continuous energy regeneration. An autotransformer is not required for regenerative feedback.

The regenerative capability can be deactivated using a digital input.

Smart Line Modules are suitable for connection to grounded (TN, TT) and non-grounded (IT) supply systems. The following voltages and power ratings are available:

Supply voltage	Power rating
380 ... 480 V 3AC	250 - 800 kW
500 ... 690 V 3AC	330 - 1400 kW

The power ratings can be increased by connecting up to four identical Smart Line Modules in parallel (for setup instructions, please refer to the SINAMICS Low Voltage Engineering Manual).

#### ■ Structure

IGBTs (fundamental frequency-switched) serve as Smart Line Module power semiconductors. Because this reduces the switching losses, high current utilization of the power units can be achieved.

The current flows in the direction of the infeed via the freewheeling diodes of the IGBTs. This means that the Smart Line Module behaves in a similar way to the Basic Line Module. While a diode is conducting, the anti-parallel IGBT is also activated. If the DC link voltage increases due to regenerative operation of the drives, the IGBTs conduct electricity, thus feeding the energy back into the supply system.

In contrast to Active Line Modules, Smart Line Modules do not require a line-side filter; all they require is a line reactor (4 %  $u_k$ ). The unit has a built-in pre-charging input circuit for the DC link capacitors. For this reason, a line contactor or a motor-driven circuit breaker is absolutely essential. LCM option L44 incorporates all these components in the Line Connection Module to provide an optimized solution for these requirements.

It should be noted that the charging capacity of the pre-charging input circuit for charging the DC link capacitors depends on the unit being used. It is limited to no more than 4 to 7.8 times the value of the DC link capacitance installed in the device.

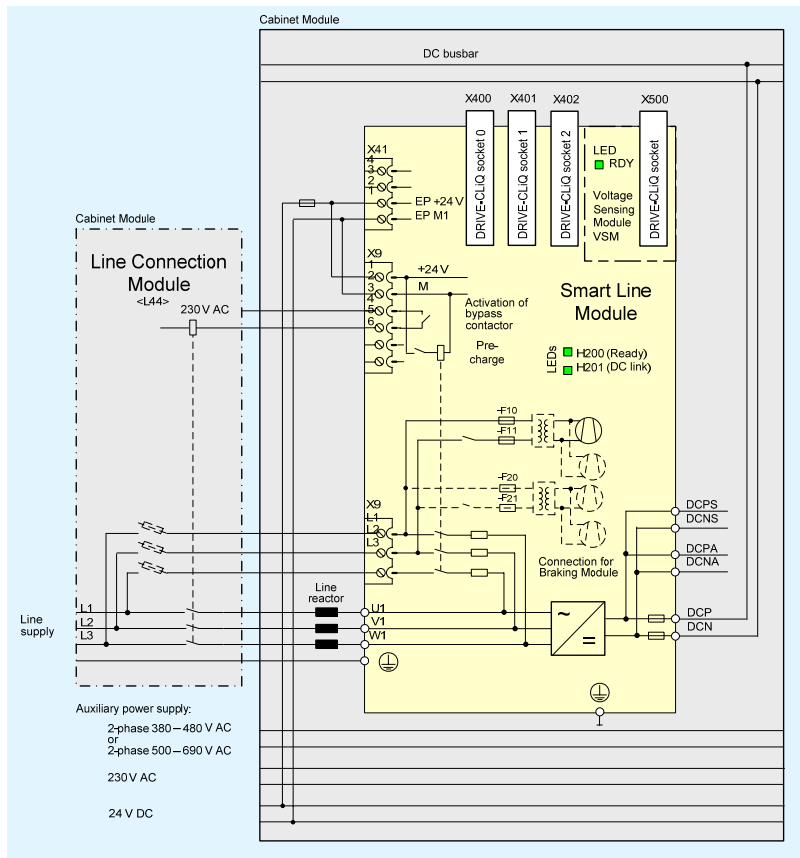
#### Parallel connection of Smart Line Modules to increase power

Up to four Smart Line Modules with the same power rating can be connected in parallel in order to increase power.

During dimensioning, a current derating of 7.5 % in relation to the rated current of each Smart Line Module should be taken into account. A 4 % reactor is always required upstream of each Smart Line Module for the purpose of current balancing. This is integrated as standard.

Just as with the Basic Line Modules, “mirror-image” power connections are available for Smart Line Modules, which enable parallel circuits to be constructed in a compact way. Units that are arranged to the left of the Line Connection Module have the letter “C” inserted in the penultimate position of the order number. For example: 6SL3730-6TE41-1BC0 (also see the equivalent example for the Basic Line Modules).

### Integration



Connection example: Smart Line Module

### Selection and ordering data

Power rating kW	Smart Line Modules Order no.	
<b>380 – 480 V supply voltage (510 – 650 V DC link voltage)</b>		
250	<b>6SL3730-6TE35-5AA0</b>	
355	<b>6SL3730-6TE37-3AA0</b>	
500	<b>6SL3730-6TE41-1AA0</b>	
500	<b>6SL3730-6TE41-1BA0</b>	For parallel connection, mounted on right of LCM
500	<b>6SL3730-6TE41-1BC0</b>	For parallel connection, mounted on left of LCM
630	<b>6SL3730-6TE41-3AA0</b>	
630	<b>6SL3730-6TE41-3BA0</b>	For parallel connection, mounted on right of LCM
630	<b>6SL3730-6TE41-3BC0</b>	For parallel connection, mounted on left of LCM
800	<b>6SL3730-6TE41-7AA0</b>	
800	<b>6SL3730-6TE41-7BA0</b>	For parallel connection, mounted on right of LCM
800	<b>6SL3730-6TE41-7BC0</b>	For parallel connection, mounted on left of LCM
<b>500 – 690 V supply voltage (675 – 930 V DC link voltage)</b>		
450	<b>6SL3730-6TG35-5AA0</b>	
710	<b>6SL3730-6TG38-8AA0</b>	
710	<b>6SL3730-6TG38-8BA0</b>	For parallel connection, mounted on right of LCM
710	<b>6SL3730-6TG38-8BC0</b>	For parallel connection, mounted on left of LCM
1000	<b>6SL3730-6TG41-2AA0</b>	
1000	<b>6SL3730-6TG41-2BA0</b>	For parallel connection, mounted on right of LCM
1000	<b>6SL3730-6TG41-2BC0</b>	For parallel connection, mounted on left of LCM
1400	<b>6SL3730-6TG41-7AA0</b>	
1400	<b>6SL3730-6TG41-7BA0</b>	For parallel connection, mounted on right of LCM
1400	<b>6SL3730-6TG41-7BC0</b>	For parallel connection, mounted on left of LCM

#### Note:

A line contactor/circuit breaker is absolutely essential for operating a Smart Line Module. These are located in a designated Line Connection Module. For this reason, option L44 ("LCM for SLM") must always be selected when ordering a Smart Line Module, to ensure that a Line Connection Module will be ordered along with it.

# SINAMICS S120 Cabinet Modules

## Smart Line Modules

### Technical data

Smart Line Modules			6SL3730-6TE35-5AA0	6SL3730-6TE37-3AA0	6SL3730-6TE41-1AA0	6SL3730-6TE41-3AA0	6SL3730-6TE41-7AA0		
<b>380 – 480 V supply voltage</b>									
For parallel connection, mounted on right of LCM					6SL3730-6TE41-1BA0	6SL3730-6TE41-3BA0	6SL3730-6TE41-7BA0		
For parallel connection, mounted on left of LCM					6SL3730-6TE41-1BC0	6SL3730-6TE41-3BC0	6SL3730-6TE41-7BC0		
Frame size		GX	GX	HX	JX	JX			
Power rating at 400 V	kW	250	355	500	630	800			
Rated DC link current	A	550	730	1050	1300	1700			
Max. DC link current	A	825	1095	1575	1950	2550			
Rated input current	A	463	614	883	1093	1430			
Max. input current	A	695	921	1325	1640	2145			
DC link capacitance	µF	8400	12000	16800	18900	28800			
Max. permissible DC link capacitance of drive line-up	µF	42000	60000	67200	75600	115200			
Power loss	kW	3.7	4.7	7.1	11.0	11.5			
Cooling air demand	m³/s	0.36	0.36	0.78	1.08	1.08			
Power demand 24 V DC <sup>1)</sup>	A	1.35	1.35	1.4	1.5	1.7			
Power demand 400 V AC	A	2.4	2.4	5.3	7.8	7.8			
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz	dB(A)	On request	On request	On request	On request	On request			
Degree of protection		IP20	IP20	IP20	IP20	IP20			
Weight (standard version)	kg	270	270	490	775	775			
Dimensions	W	mm	400	400	600	800	800		
	D	mm	600	600	600	600	600		
	H	mm	2200	2200	2200	2200	2200		

<sup>1)</sup> Power requirement of open-loop/closed-loop control

<sup>2)</sup> The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54

Smart Line Modules			6SL3730-6TG35-5AA0	6SL3730-6TG38-8AA0	6SL3730-6TG41-2AA0	6SL3730-6TG41-7AA0		
<b>500 – 690 V supply voltage</b>								
For parallel connection, mounted on right of LCM				6SL3730-6TG38-8BA0	6SL3730-6TG41-2BA0	6SL3730-6TG41-7BA0		
For parallel connection, mounted on left of LCM				6SL3730-6TG38-8BC0	6SL3730-6TG41-2BC0	6SL3730-6TG41-7BC0		
Frame size		GX	HX	JX	JX			
Power rating at 500 V	kW	330	540	720	1020			
Power rating at 690 V	kW	450	710	1000	1400			
Rated DC link current	A	550	900	1200	1700			
Max. DC link current	A	825	1350	1800	2550			
Rated input current	A	463	757	1009	1430			
Max. input current	A	695	1136	1514	2145			
DC link capacitance	µF	5600	7400	11100	14400			
Max. permissible DC link capacitance of drive line-up	µF	28000	29600	44400	57600			
Power loss	kW	4.3	6.5	12	13.8			
Cooling air demand	m³/s	0.36	0.78	1.08	1.08			
Power demand 24 V DC <sup>1)</sup>	A	1.35	1.4	1.5	1.7			
Power demand 500/ 690 V AC		1.0 / 1.4	2.3 / 3.2	3.4 / 4.7	3.4 / 4.7			
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz	dB(A)	On request	On request	On request	On request			
Degree of protection		IP20	IP20	IP20	IP20			
Weight (standard version)	kg	270	550	795	795			
Dimensions	W	mm	400	600	800	800		
	D	mm	600	600	600	600		
	H	mm	2200	2200	2200	2200		

<sup>1)</sup> Power requirement of open-loop/closed-loop control

<sup>2)</sup> The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54



**Options**

The table below lists the options available for Smart Line Modules (for a detailed description, please refer to the section entitled "Option descriptions"):

Order code	Brief description of option
<b>G20</b>	CBC10 communication board
<b>G33</b>	CBE20 communication board
<b>K08</b>	AOP30 Advanced Operator Panel, door mounted
<b>K75</b>	Second auxiliary voltage busbar system
<b>K90</b>	Control Unit CU320 w/ CompactFlash Card without performance expansion
<b>K91</b>	Control Unit CU320 w/ CompactFlash Card with performance expansion 1
<b>L55</b>	Enclosure space heater
<b>L62</b>	Braking unit 50 / 250 kW for supply voltage 380 V - 480 V and 660 V - 690 V
<b>L65</b>	Braking unit 50 / 250 kW for supply voltage 500 V - 600 V
<b>M06</b>	Plinth (base) 100 mm high, RAL 7022
<b>M07</b>	Plinth (base) 200 mm high, RAL 7035
<b>M21</b>	IP21 Degree of protection
<b>M23</b>	IP23 Degree of protection (includes M60)
<b>M26</b>	Side panel (right)
<b>M27</b>	Side panel (left)
<b>M43</b>	IP43 Degree of protection (includes M60)
<b>M54</b>	IP54 Degree of protection (includes M60)
<b>M59</b>	Solid cabinet door (without ventilation holes, air inlet from below through floor opening)
<b>M60</b>	Additional touch protection (included in M23, M43 and M54)
<b>M80</b>	DC busbar system ( $I_d = 1170$ A, 1x 60 x 10 mm)
<b>M81</b>	DC busbar system ( $I_d = 1500$ A, 1x 80 x 10 mm)
<b>M82</b>	DC busbar system ( $I_d = 1840$ A, 1x 100 x 10 mm)
<b>M83</b>	DC busbar system ( $I_d = 2150$ A, 2x 60 x 10 mm)
<b>M84</b>	DC busbar system ( $I_d = 2730$ A, 2x 80 x 10 mm)
<b>M85</b>	DC busbar system ( $I_d = 3320$ A, 2x 100 x 10 mm)
<b>M86</b>	DC busbar system ( $I_d = 3720$ A, 3x 80 x 10 mm)
<b>M87</b>	DC busbar system ( $I_d = 4480$ A, 3x 100 x 10 mm)
<b>M90</b>	Crane transport assembly (top mounted)
<b>Y09</b>	Special enclosure paint color
<b>Y11</b>	Grouped assembly into transport units
<b>Y31</b>	1-line label for plant identification, 40 x 80 mm
<b>Y32</b>	2-line label for plant identification, 40 x 180 mm
<b>Y33</b>	4-line label for plant identification, 40 x 180 mm
<b>D02</b>	Customer documentation (circuit diagram, terminal diagram, layout diagram) in DXF format
<b>D14</b>	Preliminary version of customer documentation
<b>D58</b>	Documentation language: English / French
<b>D60</b>	Documentation language: English / Spanish
<b>D80</b>	Documentation language: English / Italian
<b>D99</b>	Delivery without documentation
<b>T58</b>	Rating plate language in English / French
<b>T60</b>	Rating plate language in English / Spanish
<b>T80</b>	Rating plate language in English / Italian

# SINAMICS S120 Cabinet Modules

## Smart Line Modules

### Option selection matrix for Smart Line Modules

Some options are mutually exclusive. If so, this will be indicated in the tables below.

+	Possible combinations
-	Not possible

#### Electrical options

	G20 <sup>1)</sup>	G33 <sup>1)</sup>	K08 <sup>1)</sup>	K75	K90	K91	L55	L62/65
G20 <sup>1)</sup>		-	+	+	+	+	+	+
G33 <sup>1)</sup>	-		+	+	+	+	+	+
K08 <sup>1)</sup>	+	+		+	+	+	+	+
K75	+	+	+		+	+	+	+
K90	+	+	+	+		-	+	+
K91	+	+	+	+	-		+	+
L55	+	+	+	+	+	+		+
L62/65	+	+	+	+	+	+	+	

<sup>1)</sup> Options K08, G20 and G33 require option K90/K91.

#### Mechanical/electrical options

	M06	M07	M21	M23	M26	M27	M43	M54	M59	M60	M90	Y09	Y11	Y31	Y32	Y33
M06		-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M07	-		+	+	+	+	+	+	+	+	+	+	+	+	+	+
M21	+	+		-	+	+	-	-	+	+	+	+	+	+	+	+
M23	+	+	-		+	+	-	-	+	-	+	+	+	+	+	+
M26	+	+	+	+		-	+	+	+	+	+	+	+	+	+	+
M27	+	+	+	+	-		+	+	+	+	+	+	+	+	+	+
M43	+	+	-	-	+	+		-	+	-	+	+	+	+	+	+
M54	+	+	-	-	+	+	-		+	-	+	+	+	+	+	+
M59	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+
M60	+	+	+	-	+	+	-	-	+		+	+	+	+	+	+
M90	+	+	+	+	+	+	+	+	+	+		+	-	+	+	+
Y09	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
Y11	+	+	+	+	+	+	+	+	+	+	-	+		+	+	+
Y31	+	+	+	+	+	+	+	+	+	+	+	+	+		-	-
Y32	+	+	+	+	+	+	+	+	+	+	+	+	+	+		-
Y33	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-

<sup>2)</sup> Option M60 is included in M23, M43 and M54.

#### DC busbar system mechanical options (busbars between individual Cabinet Modules)

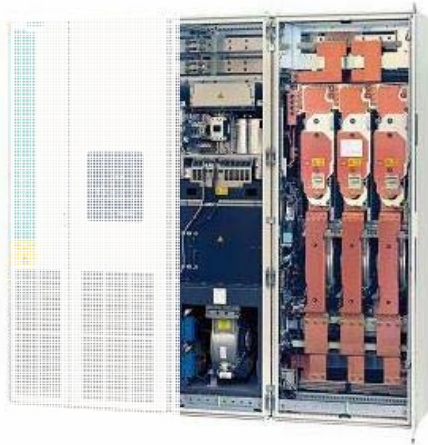
	M80	M81	M82	M83	M84	M85	M86	M87
M80		-	-	+	-	-	-	-
M81	-		-	-	+	-	+	-
M82	-	-		-	-	+	-	+
M83	+	-	-		-	-	-	-
M84	-	+	-	-		-	+	-
M85	-	-	+	-	-		-	+
M86	-	+	-	-	+	-		-
M87	-	-	+	-	-	+	-	

#### Documentation and language of rating plate data

	D02	D14	D58	D60	D80	D99
D02		+	+	+	+	-
D14	+		+	+	+	-
D58	+	+		-	-	-
D60	+	+	-		-	-
D80	+	+	-	-		-
D99	-	-	-	-	-	

	T58	T60	T80
T58		-	-
T60	-		-
T80	-	-	

### Active Line Modules with Active Interface Modules



#### Overview

Active Line Modules can supply energy and return regenerative energy to the supply system.

In contrast to Basic Line Modules and Smart Line Modules, Active Line Modules generate a controlled DC voltage that is kept constant despite fluctuations in the supply voltage (the supply voltage must remain within the permissible tolerance range). Active Line Modules draw a virtually sinusoidal current from the supply system and do not, therefore, cause any harmful harmonics.

A Braking Module and braking resistor are required only if the drives need to be decelerated in a controlled manner after a power failure (i.e. when energy cannot be fed back to the supply).

Active Line Modules are available for the following voltages and power ratings:

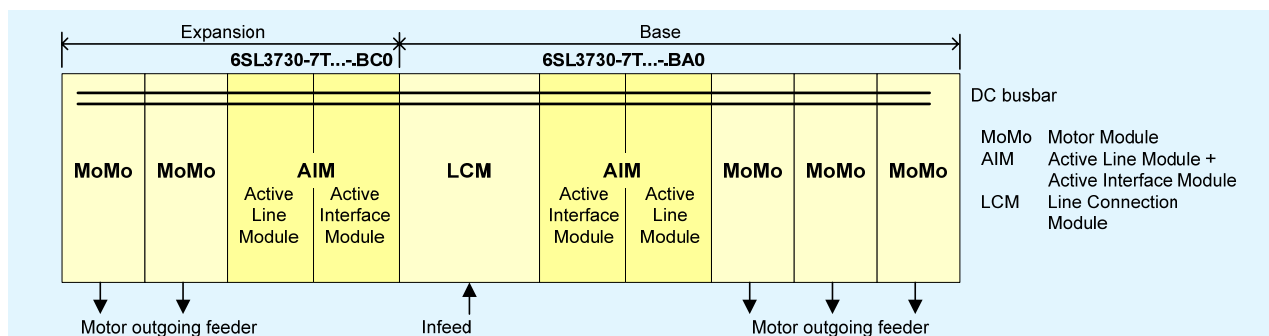
Supply voltage	Nominal power rating
380 ... 480 V 3AC	132 - 900 kW
500 ... 690 V 3AC	400 - 1400 kW

The power ratings can be increased by connecting up to 4 Active Line Modules in parallel (for setup instructions, please refer to the SINAMICS Low Voltage Engineering Manual).

#### Structure

Active Line Modules are always operated together with an Active Interface Module, which contains the associated Clean Power Filter and pre-charging circuit. The line filter that is included ensures compliance with the EMC requirements for the "second environment".

The Active Line Module and Active Interface Module are supplied as a complete, fully wired unit, i.e. the customer does not need to supply any further cables or carry out any other wiring tasks.

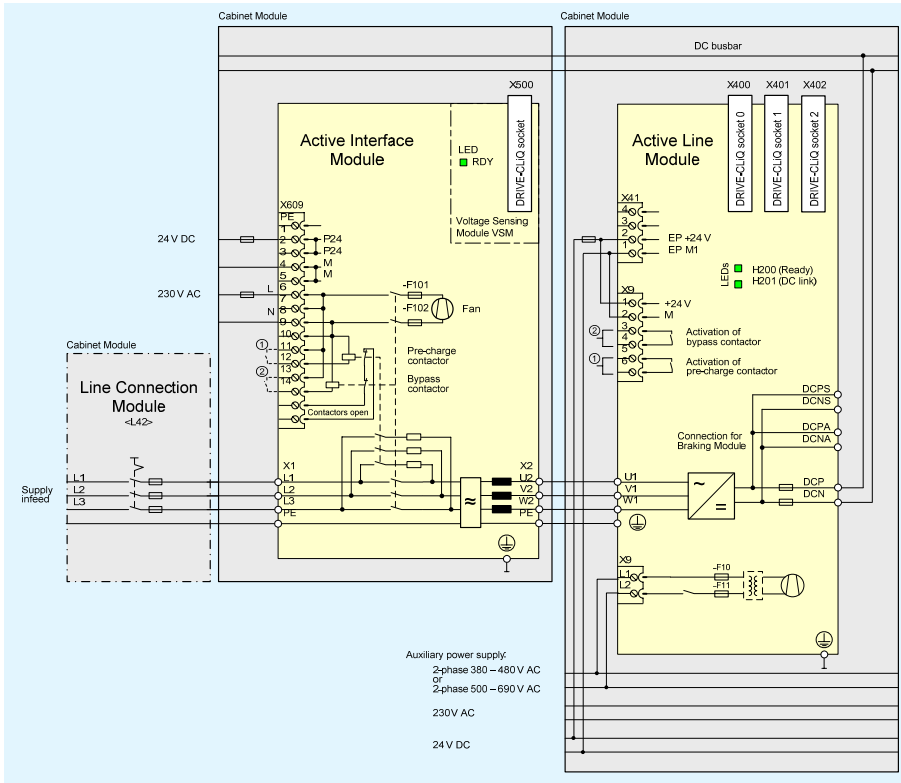


# SINAMICS S120 Cabinet Modules

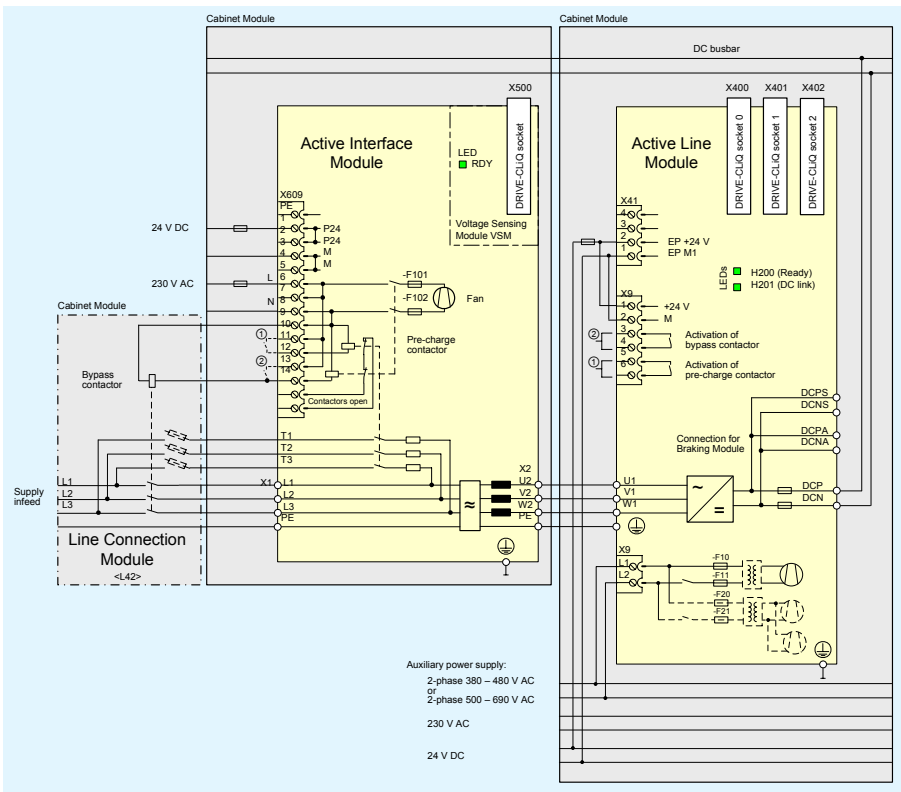
## Active Line Modules

### Integration

The Active Line Module is controlled by the CU320 Control Unit. Data is exchanged between the Control Unit and Module via the DRIVE-CLiQ connection. The Active Interface Module is included in the delivery for the Active Line Module.



Connection example: Active Line Module (frame size FI/FX and GI/GX)



Connection example: Active Line Module (frame size HI/HX and JI/JX)

### Selection and ordering data

Power rating kW	Active Line Module (incl. Active Interface Module)	
	Order no.	
<b>380 – 480 V supply voltage (510 – 720 V DC link voltage)</b>		
132	<b>6SL3730-7TE32-1BA0</b>	
160	<b>6SL3730-7TE32-6BA0</b>	
235	<b>6SL3730-7TE33-8BA0</b>	
300	<b>6SL3730-7TE35-0BA0</b>	
380	<b>6SL3730-7TE36-1BA0</b>	
500	<b>6SL3730-7TE38-4BA0</b>	
630	<b>6SL3730-7TE41-0BA0</b>	
630	<b>6SL3730-7TE41-0BC0</b>	For parallel connection, mounted on left of LCM (mirror-image design)
900	<b>6SL3730-7TE41-4BA0</b>	
900	<b>6SL3730-7TE41-4BC0</b>	For parallel connection, mounted on left of LCM (mirror-image design)
<b>500 – 690 V supply voltage (710 – 1035 V DC link voltage)</b>		
560	<b>6SL3730-7TG35-8BA0</b>	
800	<b>6SL3730-7TG37-4BA0</b>	
800	<b>6SL3730-7TG37-4BC0</b>	For parallel connection, mounted on left of LCM (mirror-image design)
1100	<b>6SL3730-7TG41-0BA0</b>	
1100	<b>6SL3730-7TG41-0BC0</b>	For parallel connection, mounted on left of LCM (mirror-image design)
1400	<b>6SL3730-7TG41-3BA0</b>	
1400	<b>6SL3730-7TG41-3BC0</b>	For parallel connection, mounted on left of LCM (mirror-image design)

#### Parallel connection of Active Line Modules to increase power

Active Line Modules are available for creating drive line-ups with a higher power rating. These modules can be operated in parallel on a common Line Connection Module and are arranged to the right and left of the Line Connection Module. The Active Line Module to the left of the Line Connection Module has "mirror image" power connections (insert C as the penultimate character in the order number, e.g.: 6SL3730-7T.41.-.BC0), which produces a very compact design for the supply infeed.

Please note that only Active Line Modules with exactly the same output rating may be connected in parallel.

The potential for imbalances in current distribution means that a current derating of 5 % applies; this must be taken into account when the modules are dimensioned.

# SINAMICS S120 Cabinet Modules

## Active Line Modules

### Technical data

Active Line Modules									
380 – 480 V supply voltage									
		6SL3730-7TE32-1BA0	6SL3730-7TE32-6BA0	6SL3730-7TE33-8BA0	6SL3730-7TE35-0BA0	6SL3730-7TE36-1BA0	6SL3730-7TE38-4BA0	6SL3730-7TE41-0BA0	6SL3730-7TE41-4BA0
For parallel connection, mounted on left of LCM								6SL3730-7TE41-0BC0	6SL3730-7TE41-4BC0
Frame size		FX + FI	FX + FI	GX + GI	GX + GI	HX + HI	HX + HI	JX + JI	JX + JI
Power rating at 400 V	kW	132	160	235	300	380	500	630	900
Rated DC link current	A	235	291	426	549	678	941	1103	1574
Max. DC link current	A	352	436	637	823	1017	1410	1654	2361
Rated input current	A	210	260	380	490	605	840	985	1405
Max. input current	A	315	390	570	735	907	1260	1477	2107
DC link capacitance	µF	4200	5200	7800	9600	12600	16800	18900	28800
Max. permissible DC link capacitance of drive line-up	µF	41600	41600	76800	76800	134400	134400	230400	230400
Power loss	kW	4.4	5.1	7.2	9	12.1	14.3	18.3	22.7
Cooling air demand	m³/s	0.41	0.47	0.83	0.83	1.18	1.18	1.5	1.5
Power demand 24 V DC <sup>1)</sup>	A	1.27	1.27	1.52	1.52	1.57	1.57	1.67	1.87
Power demand 230 V AC	A	0.6	0.6	1.2	4.6	4.6	4.6	4.9	4.9
Power demand 400 V AC	A	0.63	2.0	2.6	2.6	5.2	5.2	7.8	7.8
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz	dB(A)	74/76	75/77	76/78	76/78	78/80	78/80	78/80	78/80
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Weight (standard version)	kg	380	380	530	530	930	930	1360	1360
Dimensions	W	mm	800	800	800	800	1000	1000	1400
	D		600	600	600	600	600	600	600
<sup>2)</sup>	H		2200	2200	2200	2200	2200	2200	2200

Active Line Modules									
500 – 690 V supply voltage									
		6SL3730-7TH35-8BA0	6SL3730-7TH37-4BA0	6SL3730-7TH41-0BA0	6SL3730-7TH41-3BA0				
For parallel connection, mounted on left of LCM			6SL3730-7TH37-4BC0	6SL3730-7TH41-0BC0	6SL3730-7TH41-3BC0				
Frame size		HX + HI	JX + JI	JX + JI	JX + JI				
Power rating at 500 V	kW	400	560	800	1000				
Power rating at 690 V	kW	560	800	1100	1400				
Rated DC link current	A	644	823	1148	1422				
Max. DC link current	A	966	1234	1722	2133				
Rated input current	A	575	735	1025	1270				
Max. input current	A	862	1102	1537	1905				
DC link capacitance	µF	7400	11100	14400	19200				
Max. permissible DC link capacitance of drive line-up	µF	59200	153600	153600	153600				
Power loss	kW	13.6	19.2	22.8	26.1				
Cooling air demand	m³/s	1.18	1.48	1.48	1.48				
Power demand 24 V DC <sup>1)</sup>	A	1.57	1.67	1.87	1.87				
Power demand 230 V AC	A	4.6	4.9	4.9	4.9				
Power demand 500/ 690 V AC	A	2.2 / 3.0	3.3 / 4.5	3.3 / 4.5	3.3 / 4.5				
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz	dB(A)	78/80	78/80	78/80	78/80				
Degree of protection		IP20	IP20	IP20	IP20				
Weight (standard version)	kg	930	1360	1360	1360				
Dimensions	W	mm	1000	1400	1400				
	D		600	600	600				
<sup>2)</sup>	H		2200	2200	2200				

<sup>1)</sup> Power demand of open-loop/closed-loop control

<sup>2)</sup> The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54

### Options

The table below lists the options available for Active Line Modules (for a detailed description, please refer to the section entitled "Option descriptions"):

Order code	Brief description of option
<b>G20</b>	CBC10 communication board
<b>G33</b>	CBE20 communication board
<b>K08</b>	AOP30 Advanced Operator Panel, door mounted
<b>K90</b>	Control Unit CU320 w/ CompactFlash Card without performance expansion
<b>K91</b>	Control Unit CU320 w/ CompactFlash Card with performance expansion 1
<b>L55</b>	Enclosure space heater
<b>L61</b>	Braking unit 25 / 125 kW for supply voltage 380 V - 480 V and 660 V - 690 V (can be used with frame size FX)
<b>L62</b>	Braking unit 50 / 250 kW for supply voltage 380 V - 480 V and 660 V - 690 V (can be used with frame size GX/HX/JX)
<b>L64</b>	Braking unit 25 / 125 kW for supply voltage 500 V - 600 V (can be used with frame size FX)
<b>L65</b>	Braking unit 50 / 250 kW for supply voltage 500 V - 600 V (can be used with frame size GX/HX/JX)
<b>M06</b>	Plinth (base) 100 mm high, RAL 7022
<b>M07</b>	Plinth (base) 200 mm high, RAL 7035
<b>M21</b>	IP21 Degree of protection
<b>M23</b>	IP23 Degree of protection (includes M60)
<b>M26</b>	Side panel (right)
<b>M27</b>	Side panel (left)
<b>M43</b>	IP43 Degree of protection (includes M60)
<b>M54</b>	IP54 Degree of protection (includes M60)
<b>M59</b>	Solid cabinet door (without ventilation holes, air inlet from below through floor opening)
<b>M60</b>	Additional touch protection (included in M23, M43 and M54)
<b>M80</b>	DC busbar system ( $I_d = 1170$ A, 1x 60 x 10 mm)
<b>M81</b>	DC busbar system ( $I_d = 1500$ A, 1x 80 x 10 mm)
<b>M82</b>	DC busbar system ( $I_d = 1840$ A, 1x 100 x 10 mm)
<b>M83</b>	DC busbar system ( $I_d = 2150$ A, 2x 60 x 10 mm)
<b>M84</b>	DC busbar system ( $I_d = 2730$ A, 2x 80 x 10 mm)
<b>M85</b>	DC busbar system ( $I_d = 3320$ A, 2x 100 x 10 mm)
<b>M86</b>	DC busbar system ( $I_d = 3720$ A, 3x 80 x 10 mm)
<b>M87</b>	DC busbar system ( $I_d = 4480$ A, 3x 100 x 10 mm)
<b>M90</b>	Crane transport assembly (top mounted)
<b>Y09</b>	Special enclosure paint color
<b>Y11</b>	Grouped assembly into transport units
<b>Y31</b>	1-line label for plant identification, 40 x 80 mm
<b>Y32</b>	2-line label for plant identification, 40 x 180 mm
<b>Y33</b>	4-line label for plant identification, 40 x 180 mm
<b>D02</b>	Customer documentation (circuit diagram, terminal diagram, layout diagram) in DXF format
<b>D14</b>	Preliminary version of customer documentation
<b>D58</b>	Documentation language: English / French
<b>D60</b>	Documentation language: English / Spanish
<b>D80</b>	Documentation language: English / Italian
<b>D99</b>	Delivery without documentation
<b>T58</b>	Rating plate language in English / French
<b>T60</b>	Rating plate language in English / Spanish
<b>T80</b>	Rating plate language in English / Italian

# SINAMICS S120 Cabinet Modules

## Active Line Modules

### Option selection matrix for Active Line Modules

Some options are mutually exclusive. If so, this will be indicated in the tables below.

+	Possible combinations
-	Not possible

#### Electrical options

	G20 <sup>1)</sup>	G33 <sup>1)</sup>	K08 <sup>1)</sup>	K90	K91	L55	L61/64	L62/65
G20 <sup>1)</sup>		-	+	+	+	+	+	+
G33 <sup>1)</sup>	-		+	+	+	+	+	+
K08 <sup>1)</sup>	+	+		+	+	+	+	+
K90	+	+	+		-	+	+	+
K91	+	+	+	-		+	+	+
L55	+	+	+	+	+		+	+
L61/64	+	+	+	+	+	+		-
L62/65	+	+	+	+	+	+	-	

<sup>1)</sup> Options K08, G20 and G33 require option K90/K91. Installed in the Active Line Module.

#### Mechanical/electrical options

	M06	M07	M21	M23	M26	M27	M43	M54	M59	M60	M90	Y09	Y11	Y31	Y32	Y33
M06		-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M07	-		+	+	+	+	+	+	+	+	+	+	+	+	+	+
M21	+	+		-	+	+	-	-	+	+	+	+	+	+	+	+
M23	+	+	-		+	+	-	-	+	-	+	+	+	+	+	+
M26	+	+	+	+		-	+	+	+	+	+	+	+	+	+	+
M27	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
M43	+	+	-	-	+	+		-	+	-	+	+	+	+	+	+
M54	+	+	-	-	+	+	-		+	-	+	+	+	+	+	+
M59	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+
M60	+	+	+	-	+	+	-	-	+		+	+	+	+	+	+
M90	+	+	+	+	+	+	+	+	+	+		+	-	+	+	+
Y09	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
Y11	+	+	+	+	+	+	+	+	+	+	-	+		+	+	+
Y31	+	+	+	+	+	+	+	+	+	+	+	+	+		-	-
Y32	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
Y33	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-

<sup>2)</sup> Option M60 is included in M23, M43 and M54.

#### DC busbar system mechanical options (busbars between individual Cabinet Modules)

	M80	M81	M82	M83	M84	M85	M86	M87
M80		-	-	+	-	-	-	-
M81	-		-	-	+	-	+	-
M82	-	-		-	-	+	-	+
M83	+	-	-		-	-	-	-
M84	-	+	-	-		-	+	-
M85	-	-	+	-	-		-	+
M86	-	+	-	-	+	-		-
M87	-	-	+	-	-	+	-	

#### Documentation and language of rating plate data

	D02	D14	D58	D60	D80	D99
D02		+	+	+	+	-
D14	+		+	+	+	-
D58	+	+		-	-	-
D60	+	+	-		-	-
D80	+	+	-	-		-
D99	-	-	-	-	-	

	T58	T60	T80
T58		-	-
T60	-		-
T80	-	-	



### Motor Modules in Booksize Cabinet Kit format



#### Overview

Motor Modules are also available in Booksize Cabinet Kit format for power ratings from 1.6 to 107 kW in voltage class 380 to 480 V (DC link voltage 510 - 720 V).

Single Motor Modules are available for connecting one motor, and Double Motor Modules (in power rating range 1.6 – 9.7 kW) are available for connecting two motors.

#### Structure

Motor Modules in booksize format are factory-installed as Booksize Cabinet Kits in Booksize Base Cabinets and delivered as a complete unit including cabinet-side connection components. A Cabinet Kit contains all the necessary components for operating a SINAMICS S120 Booksize.

Multiple Booksize Cabinet Kits can be installed in one Base Cabinet, depending on the installation width requirements, which, in turn, depend on the power. The number of Cabinet Kits that can be installed within a Base Cabinet is determined solely on the basis of the available cabinet width. By changing the way in which the available cabinet width is used, it can be adapted according to system requirements.

Each booksize Motor Module is connected separately to the DC busbar of the Cabinet Modules via a separate fuse switch disconnecter with integrated fuses. The DC connecting bar integrated in the devices is not used.

The basic version of the Booksize Cabinet Kit comprises the following components:

- Motor Module in booksize format (see Catalog D21.1)
- Fuse switch disconnecter for each Motor Module installed
- Customer interface –X55 located in the connection area of the Base Cabinet
- Shield connection plate
- Complete electrical connection to the Base Cabinet interfaces

Whereas Single Motor Modules have one inverter connection, Double Motor Modules combine two inverters in a single module. Each Double Motor Module that is installed in a Cabinet Kit features dual customer interfaces and motor connections; the same applies to certain options relating to separate control. For details, please refer to the option selection table.

The Booksize Base Cabinets can be operated up to and including IP54 degree of protection without additional temperature derating. However, some of the values that need to be taken into account here are different from those associated with the chassis format. Derating data can be found in the section entitled "System description".

# SINAMICS S120 Cabinet Modules

## Motor Modules Booksize Cabinet Kits

### Selection and ordering data

600 V DC rated power kW	Rated output current I <sub>r</sub> A	Motor Modules Booksize Cabinet Kits Order no.		Mounting width mm
<b>380 – 480 V supply voltage (510 – 720 V DC link voltage)</b>				
2 x 1.6	2 x 3	<b>6SL3720-2TE13-0AB0</b>	Double motor module	200
2 x 2.7	2 x 5	<b>6SL3720-2TE15-0AB0</b>		200
2 x 4.8	2 x 9	<b>6SL3720-2TE21-0AB0</b>		200
2 x 9.7	2 x 18	<b>6SL3720-2TE21-8AB0</b>		200
1.6	3	<b>6SL3720-1TE13-0AB0</b>	Single Motor Module	100
2.7	5	<b>6SL3720-1TE15-0AB0</b>		100
4.8	9	<b>6SL3720-1TE21-0AB0</b>		100
9.7	18	<b>6SL3720-1TE21-8AB0</b>		100
16	30	<b>6SL3720-1TE23-0AB0</b>		100
24	45	<b>6SL3720-1TE24-5AB0</b>		200
32	60	<b>6SL3720-1TE26-0AB0</b>		200
46	85	<b>6SL3720-1TE28-5AB0</b>		200
71	132	<b>6SL3720-1TE31-3AB0</b>		300
107	200	<b>6SL3720-1TE32-0AB0</b>		300

Booksize Cabinet Kits must always be ordered in combination with at least one Booksize Base Cabinet (cannot be supplied as a single unit).

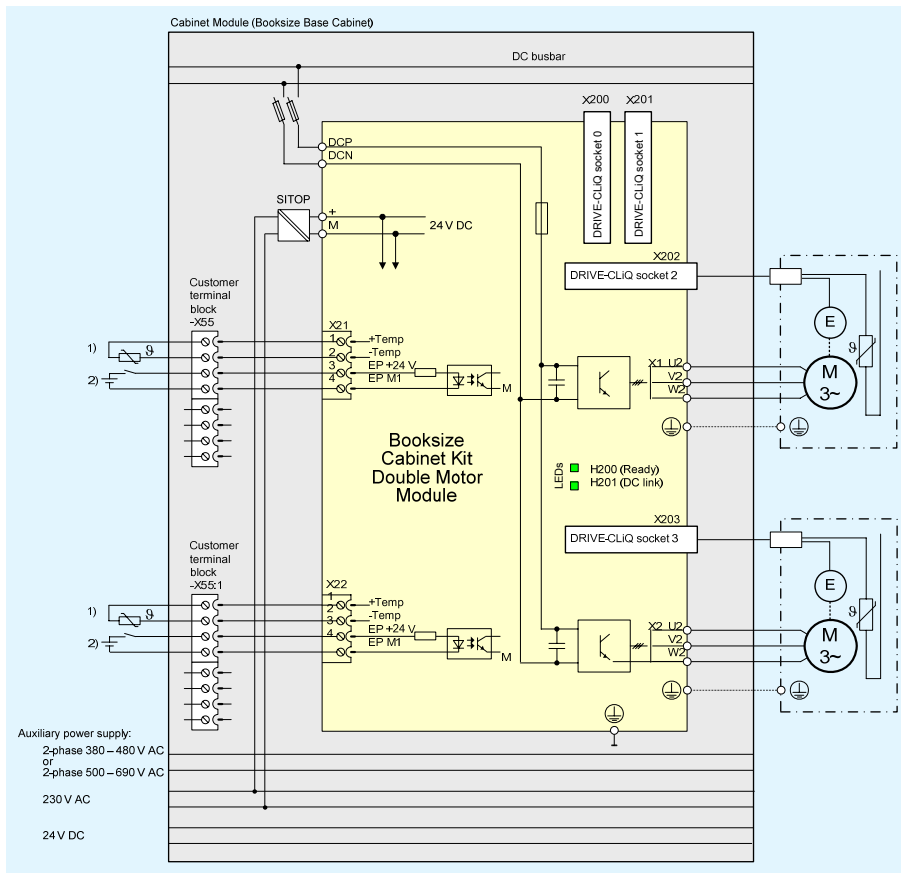
The required number of Booksize Cabinet Kits installed in a Booksize Base Cabinet should be stated in plain text when placing an order. The only constraint in this respect is the usable installation width of the Booksize Base Cabinet.

Booksize Base Cabinets ready for Booksize Cabinet Kit installation:

Usable installation width mm	Booksize Base Cabinet Order No.	Weight (standard version) kg	IP20 dimensions <sup>1)</sup> W x D x H mm
600	<b>6SL3720-1TX38-0AA0</b>	170	800 x 600 x 2200
1000	<b>6SL3720-1TX41-2AA0</b>	240	1200 x 600 x 2200

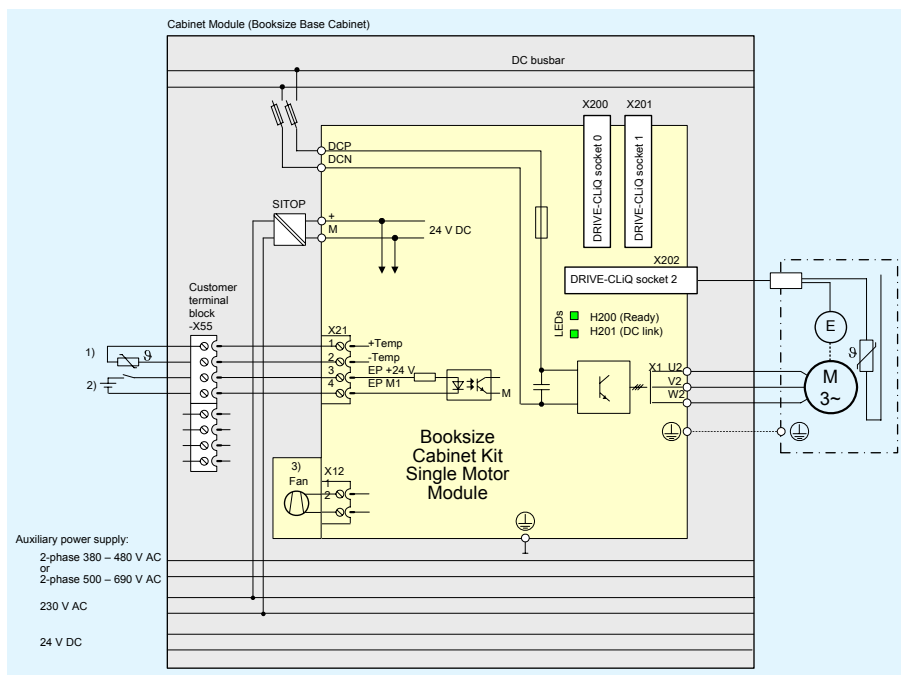
<sup>1)</sup> The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54.

### Integration



- 1) Connection of a temperature sensor for motors without a DRIVE-CLiQ interface
- 2) Required for Safety

Connection example: Double Motor Module in Booksize Cabinet Kit format



- 1) Connection of a temperature sensor for motors without a DRIVE-CLiQ interface
- 2) Required for Safety
- 3) Fan insert with 132 A and 200 A rated output current

Connection example: Single Motor Module in Booksize Cabinet Kit format

# SINAMICS S120 Cabinet Modules

## Motor Modules Booksize Cabinet Kits

### Technical data

Motor Modules in Booksize Base Cabinet Kit format	Double Motor Modules				Single Motor Modules				
		6SL3720-2TE13-0AB0	6SL3720-2TE15-0AB0	6SL3720-2TE21-0AB0	6SL3720-2TE21-8AB0	6SL3720-1TE13-0AB0	6SL3720-1TE15-0AB0	6SL3720-1TE21-0AB0	6SL3720-1TE21-8AB0
380 – 480 V supply voltage									
Nominal power rating	kW	2 x 1.6	2 x 2.7	2 x 4.8	2 x 9.7	1.6	2.7	4.8	9.7
Rated DC link current	A	7.2	12	22	43	3.6	6	11	22
Rated output current	A	2 x 3	2 x 5	2 x 9	2 x 18	3	5	9	18
Base-load current	A	2 x 2.6	2 x 4.3	2 x 7.7	2 x 15.3	2.3	4.3	7.7	15.3
Max. output current	A	2 x 6	2 x 10	2 x 18	2 x 36	6	10	18	36
Rated pulse frequency	Hz	4000	4000	4000	4000	4000	4000	4000	4000
DC link capacitance	µF	110	220	220	710	110	110	110	220
Power loss	kW	0.07	0.11	0.16	0.32	0.035	0.055	0.08	0.165
Cooling method		Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Cooling air demand	m³/s	0.008	0.008	0.008	0.016	0.008	0.008	0.008	0.008
Power demand 230 V AC <sup>1)</sup>	A	0.57	0.57	0.57	0.57	0.54	0.54	0.54	0.54
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz	dB(A)	< 60	< 60	< 60	< 60	< 60	< 60	< 60	< 60
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Motor connection, maximum cable cross-section									
DIN VDE	mm²	1.5 - 10	1.5 - 10	1.5 - 10	1.5 - 10	1.5 - 10	1.5 - 10	1.5 - 10	1.5 - 10
Fixing screws		1	1	1	1	1	1	1	1
Motor connection, maximum cable length									
Shielded	m	50	50	50	50	50	50	50	50
Unshielded	m	75	75	75	75	75	75	75	75
PE/GND, max. cable cross-section									
DIN VDE	mm²	On housing with screw M5	On housing with screw M5	On housing with screw M5	On housing with screw M5	On housing with screw M5	On housing with screw M5	On housing with screw M5	On housing with screw M5
Fixing screws		1	1	1	1	1	1	1	1
Weight (standard version)	kg	23.3	23.3	23.3	24.8	20.1	20.1	20	20
Installation width	mm	200	200	200	200	100	100	100	100

<sup>1)</sup> Power requirement of open-loop/closed-loop control/power units

## SINAMICS S120 Cabinet Modules

### Motor Modules Booksize Cabinet Kits

Motor Modules in Booksize Base Cabinet Kit format		Single Motor Modules							
		6SL3720-1TE23-0AB0	6SL3720-1TE24-5AB0	6SL3720-1TE26-0AB0	6SL3720-1TE28-5AB0	6SL3720-1TE31-3AB0	6SL3720-1TE32-0AB0		
Nominal power rating	kW	16	24	32	46	71	107		
Rated DC link current	A	36	54	72	102	158	200		
Rated output current	A	30	45	60	85	132	200		
Base-load current	A	25.5	38	51	68	105	141		
Max. output current	A	56	85	113	141	210	282		
Rated pulse frequency	Hz	4000	4000	4000	4000	4000	4000		
DC link capacitance	µF	710	1175	1410	1880	2820	3995		
Power loss	kW	0.29	0.43	0.59	0.75	1.25	2.05		
Cooling method		Internal	Internal	Internal	Internal	Mounted	Mounted		
Cooling air demand	m³/s	0.016	0.031	0.031	0.044	0.144	0.144		
Power demand 230 V AC <sup>1)</sup>	A	0.55	0.61	0.61	0.67	0.67	0.67		
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz	dB(A)	< 60	< 65	< 65	< 60	< 73	< 73		
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20		
Motor connection, maximum cable cross-section									
DIN VDE	mm <sup>2</sup>	1.5 - 10	2.5 - 50	2.5 - 50	2.5 - 95/ 2x35	2.5 - 120/ 2x50	2.5 - 120/ 2x50		
Fixing screws		1	1	1	1	1	1		
Motor connection, maximum cable length									
Shielded	m	100	100	100	100	100	100		
Unshielded	m	150	150	150	150	150	150		
PE/GND, max. cable cross-section									
DIN VDE	mm <sup>2</sup>	On housing with screw M5	On housing with screw M5	On housing with screw M5	On housing with screw M5	On housing with screw M5	On housing with screw M5		
Fixing screws		1	1	1	1	1	1		
Weight (standard version)	kg	21.9	27	27	33	41	41		
Installation width	mm	100	200	200	200	300	300		

<sup>1)</sup> Power requirement of open-loop/closed-loop control/power units

# SINAMICS S120 Cabinet Modules

## Motor Modules Booksize Cabinet Kits

### Options

The table below lists the options available for Motor Modules in Booksize Cabinet Kit format as well as Booksize Base Cabinets (for a detailed description, please refer to the section entitled "Option descriptions"):

Order code	Brief description of option	Booksize Cabinet Kits	Booksize Base Cabinet
<b>G20</b>	CBC10 communication board	x	
<b>G33</b>	CBE20 communication board	x	
<b>K08</b>	AOP30 Advanced Operator Panel, door mounted	x	
<b>K46</b>	SMC10 Sensor Module Cabinet-Mounted	x <sup>3)</sup>	
<b>K48</b>	SMC20 Sensor Module Cabinet-Mounted	x <sup>3)</sup>	
<b>K50</b>	SMC30 Sensor Module Cabinet-Mounted	x <sup>3)</sup>	
<b>K75</b>	Second auxiliary voltage busbar system		x
<b>K82</b>	Terminal interface for "Safe Torque Off" and "Safe Stop 1" safety functions	x <sup>3)</sup>	
<b>K90</b>	Control Unit CU320 w/ CompactFlash Card without performance expansion	x	
<b>K91</b>	Control Unit CU320 w/ CompactFlash Card with performance expansion 1	x	
<b>L08</b>	Motor reactor	x <sup>3)</sup>	
<b>L09</b>	Two motor reactors connected in series	x <sup>1)</sup>	
<b>L37</b>	DC interface with pre-charge circuit	x	
<b>L55</b>	Enclosure space heater		x
<b>M06</b>	Plinth (base) 100 mm high, RAL 7022		x
<b>M07</b>	Plinth (base) 200 mm high, RAL 7035		x
<b>M21</b>	IP21 Degree of protection		x
<b>M23</b>	IP23 Degree of protection		x
<b>M26</b>	Side panel (right)		x
<b>M27</b>	Side panel (left)		x
<b>M43</b>	IP43 Degree of protection		x
<b>M54</b>	IP54 Degree of protection		x
<b>M59</b>	Solid cabinet door (without ventilation holes, air inlet from below through floor opening)		x
<b>M70</b>	EMC shield busbar		x
<b>M80</b>	DC busbar system (I <sub>d</sub> = 1170 A, 1x 60 x 10 mm)		x
<b>M81</b>	DC busbar system (I <sub>d</sub> = 1500 A, 1x 80 x 10 mm)		x
<b>M82</b>	DC busbar system (I <sub>d</sub> = 1840 A, 1x 100 x 10 mm)		x
<b>M83</b>	DC busbar system (I <sub>d</sub> = 2150 A, 2x 60 x 10 mm)		x
<b>M84</b>	DC busbar system (I <sub>d</sub> = 2730 A, 2x 80 x 10 mm)		x
<b>M85</b>	DC busbar system (I <sub>d</sub> = 3320 A, 2x 100 x 10 mm)		x
<b>M86</b>	DC busbar system (I <sub>d</sub> = 3720 A, 3x 80 x 10 mm)		x
<b>M87</b>	DC busbar system (I <sub>d</sub> = 4480 A, 3x 100 x 10 mm)		x
<b>M90</b>	Crane transport assembly (top mounted)		x
<b>Y09</b>	Special enclosure paint color		x
<b>Y11</b>	Grouped assembly into transport units		x
<b>Y31</b>	1-line label for plant identification, 40 x 80 mm		x
<b>Y32</b>	2-line label for plant identification, 40 x 180 mm		x
<b>Y33</b>	4-line label for plant identification, 40 x 180 mm		x
<b>D02</b>	Customer documentation (circuit diagram, terminal diagram, layout diagram) in DXF format		x <sup>2)</sup>
<b>D14</b>	Preliminary version of customer documentation		x <sup>2)</sup>
<b>D58</b>	Documentation language: English / French		x
<b>D60</b>	Documentation language: English / Spanish		x
<b>D80</b>	Documentation language: English / Italian		x
<b>D99</b>	Delivery without documentation		x
<b>T58</b>	Rating plate language in English / French		x
<b>T60</b>	Rating plate language in English / Spanish		x
<b>T80</b>	Rating plate language in English / Italian		x

<sup>1)</sup> Not available for Double Motor Modules

<sup>2)</sup> The documentation includes the Booksize Cabinet Kits installed in the Booksize Base Cabinet

<sup>3)</sup> In the case of the Double Motor Modules, these options are available for each inverter

### Option selection matrix for Booksize Cabinet Kits and Booksize Base Cabinets

Some options are mutually exclusive. If so, this will be indicated in the tables below.

+	Possible combinations
-	Not possible

#### Electrical options

##### Booksize Cabinet Kits

	G20 <sup>1)</sup>	G33 <sup>1)</sup>	K08 <sup>1)</sup>	K46	K48	K50	K82	K90	K91	L08	L09	L37
G20 <sup>1)</sup>	-	-	+	+	+	+	+	+	+	+	+	+
G33 <sup>1)</sup>	-	-	+	+	+	+	+	+	+	+	+	+
K08 <sup>1)</sup>	+	+	-	+	+	+	+	+	+	+	+	+
K46	+	+	+	-	-	-	+	+	+	+	+	+
K48	+	+	+	-	-	-	+	+	+	+	+	+
K50	+	+	+	-	-	-	+	+	+	+	+	+
K82	+	+	+	+	+	+	-	+	+	+	+	+
K90	+	+	+	+	+	+	+	-	-	+	+	+
K91	+	+	+	+	+	+	+	-	-	+	+	+
L08	+	+	+	+	+	+	+	+	+	-	-	+
L09	+	+	+	+	+	+	+	+	+	-	-	+
L37	+	+	+	+	+	+	+	+	+	+	+	-

##### Booksize Base Cabinets

	K75	L55
K75	-	+
L55	+	-

<sup>1)</sup> Options K08, G20 and G33 require option K90/K91.

#### Mechanical options for Booksize Base Cabinets

	M06	M07	M21	M23	M26	M27	M43	M54	M59	M70	M90	Y09	Y11	Y31	Y32	Y33
M06	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M07	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M21	+	+	-	-	+	+	-	-	+	+	+	+	+	+	+	+
M23	+	+	-	-	+	+	-	-	+	+	+	+	+	+	+	+
M26	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+
M27	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+
M43	+	+	-	-	+	+	-	-	+	+	+	+	+	+	+	+
M54	+	+	-	-	+	+	-	-	+	+	+	+	+	+	+	+
M59	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+
M70	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+
M90	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+
Y09	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+
Y11	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+
Y31	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-
Y32	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-
Y33	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-

#### Mechanical options for DC busbar system

	M80	M81	M82	M83	M84	M85	M86	M87
M80	-	-	-	+	-	-	-	-
M81	-	-	-	-	+	-	+	-
M82	-	-	-	-	-	+	-	+
M83	+	-	-	-	-	-	-	-
M84	-	+	-	-	-	-	+	-
M85	-	-	+	-	-	-	-	+
M86	-	+	-	-	+	-	-	-
M87	-	-	+	-	-	+	-	-

#### Documentation and language of rating plate data

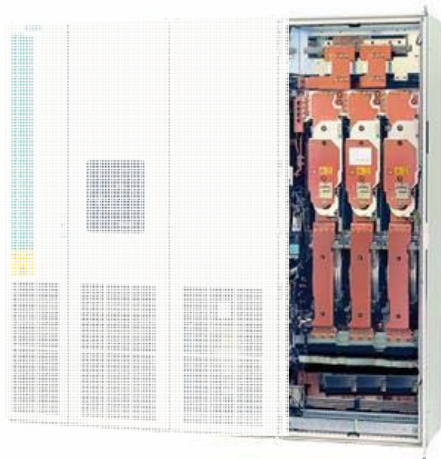
	D02	D14	D58	D60	D80	D99
D02	-	+	+	+	+	-
D14	+	-	+	+	+	-
D58	+	+	-	-	-	-
D60	+	+	-	-	-	-
D80	+	+	-	-	-	-
D99	-	-	-	-	-	-

	T58	T60	T80
T58	-	-	-
T60	-	-	-
T80	-	-	-

# SINAMICS S120 Cabinet Modules

## Motor Modules – Chassis format

### Motor Modules – Chassis format



#### Overview

In the 75 – 1200 kW power range, each Cabinet Module has a chassis format Motor Module.

Supply voltage	DC link voltage	Nominal power rating
380 ... 480 V 3AC	510 - 720 V DC	110 - 800 kW
500 ... 690 V 3AC	675 - 1035 V DC	55 - 1200 kW

By using up to 4 parallel-connected Motor Modules in conjunction with a Control Unit to supply power to a motor, it is possible to increase the available shaft output to a maximum of approx. 4500 kW (taking derating factors into consideration in accordance with the SINAMICS Low Voltage Engineering Manual).

#### Structure

Motor Modules contain the following components as standard:

- Retaining device for the DC busbar, including the connection to the DC connections of the Motor Module
- DC-Fuses, mounted in the Chassis unit
- Nickel-plated connection busbars for motor cables with Motor Modules of frame size FX and GX (connection is made directly on device with Motor Modules of frame size HX and JX)
- Cable propping bar for the electric power cables
- DRIVE-CLiQ interface (3 DRIVE-CLiQ sockets), without Control Unit
- Customer interface –A55
- Auxiliary busbar (6-pole) for the auxiliary power supply, including jumpers for looping through to the next Cabinet Module
- Nickel-plated PE busbar (60 x 10 mm), including jumper for looping through to the next Cabinet Module
- EMC-compliant design thanks to additional shielding measures and appropriate laying of cables.

#### Selection and ordering data

Nominal power rating kW	Rated output current A	Chassis format Motor Modules Order no.
----------------------------	---------------------------	--

##### 380 – 480 V supply voltage (510 – 720 V DC link voltage)

110	210	6SL3720-1TE32-1AA0
132	260	6SL3720-1TE32-6AA0
160	310	6SL3720-1TE33-1AA0
200	380	6SL3720-1TE33-8AA0
250	490	6SL3720-1TE35-0AA0
315	605	6SL3720-1TE36-1AA0
400	745	6SL3720-1TE37-5AA0
450	840	6SL3720-1TE38-4AA0
560	985	6SL3720-1TE41-0AA0
720	1260	6SL3720-1TE41-2AA0
800	1405	6SL3720-1TE41-4AA0



# SINAMICS S120 Cabinet Modules

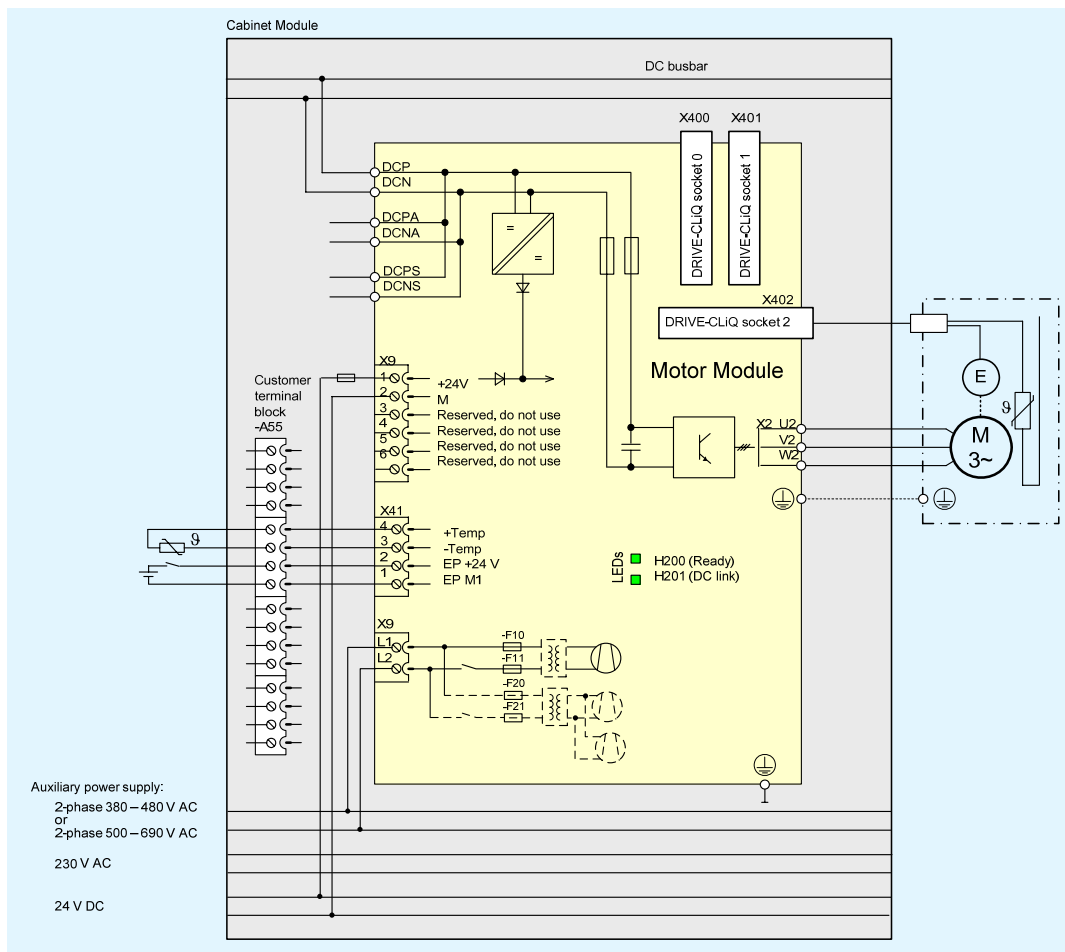
## Motor Modules – Chassis format

Nominal power rating kW	Rated output current A	Chassis format Motor Modules Order no.
<b>500 – 690 V supply voltage (675 – 1035 V DC link voltage)</b>		
75	85	6SL3720-1TG28-5AA0
90	100	6SL3720-1TG31-0AA0
110	120	6SL3720-1TG31-2AA0
132	150	6SL3720-1TG31-5AA0
160	175	6SL3720-1TG31-8AA0
200	215	6SL3720-1TG32-2AA0
250	260	6SL3720-1TG32-6AA0
315	330	6SL3720-1TG33-3AA0
400	410	6SL3720-1TG34-1AA0
450	465	6SL3720-1TG34-7AA0
560	575	6SL3720-1TG35-8AA0
710	735	6SL3720-1TG37-4AA0
800	810	6SL3720-1TG38-1AA0
900	910	6SL3720-1TG38-8AA0
1000	1025	6SL3720-1TG41-0AA0
1200	1270	6SL3720-1TG41-3AA0

### Integration

Motor Modules are controlled by the CU320 Control Unit. Data is exchanged between the Control Unit and Modules via the DRIVE-CLiQ connection.

If the Control Unit has been integrated into the same cabinet (option K90/K91), these communication cables will already be installed. If the Control Unit is to be located externally, the DRIVE-CLiQ cable will not be included in the delivery and must be configured on site (please refer to the section entitled “Supplementary system components”).



Connection example: Motor Module in Chassis format

# SINAMICS S120 Cabinet Modules

## Motor Modules – Chassis format

### Technical data

Chassis format Motor Modules		6SL3720-1TE32-1AA0	6SL3720-1TE32-6AA0	6SL3720-1TE33-1AA0	6SL3720-1TE33-8AA0	6SL3720-1TE35-0AA0			
380 – 480 V supply voltage									
Frame size		FX	FX	GX	GX	GX			
Nominal power rating at 400 V <sup>6)</sup>	kW	110	132	160	200	250			
Rated DC link current	A	252	312	372	456	588			
Rated output current	A	210	260	310	380	490			
Base-load current $I_L$ <sup>1)</sup>	A	205	250	302	370	477			
Base-load current $I_H$ <sup>2)</sup>	A	178	233	277	340	438			
Output for $I_H$	kW	90	110	132	160	200			
Max. output current	A	307	375	453	555	715			
Rated pulse frequency	Hz	2000	2000	2000	2000	2000			
DC link capacitance	µF	4200	5200	6300	7800	9600			
Power loss	kW	2.1	2.7	3.2	3.9	4.5			
Cooling air demand	m³/s	0.17	0.23	0.36	0.36	0.36			
Power demand 24 V DC <sup>3)</sup>	A	0.8	0.8	0.9	0.9	0.9			
Power demand 400 V AC	A	0.6	2	2.6	2.6	2.6			
Sound pressure level $L_{PA}$ (1 m) at 50/60 Hz	dB(A)	67/68	69/72	69/73	69/73	69/73			
Degree of protection		IP20	IP20	IP20	IP20	IP20			
Motor connection, maximum cable cross-section									
DIN VDE	mm²	2x150	2x150	2x150	2x150	2x240			
Fixing screws		M12	M12	M12	M12	M12			
Motor connection, maximum cable length									
Shielded	m	300	300	300	300	300			
Unshielded	m	450	450	450	450	450			
PE/GND, max. cable cross-section									
DIN VDE	mm²	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600			
Fixing screws		4xM12	4xM12	4xM12	4xM12	4xM12			
Weight (standard version)	kg	145	145	286	286	286			
Dimensions	mm								
<sup>4)</sup> W		400	400	400	400	400			
D		600	600	600	600	600			
<sup>5)</sup> H		2200	2200	2200	2200	2200			

- 1) The base-load current  $I_L$  is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s.
- 2) The base-load current  $I_H$  is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s.
- 3) Power demand of open-loop/closed-loop control
- 4) The cabinet width increases by 600 mm if options L10 or L34 are selected.
- 5) The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54
- 6) The nominal power rating refers to the rated motor power of a typical 6-pole motor supplied with 400 V.

Chassis format Motor Modules		6SL3720-1TE36-1AA0	6SL3720-1TE37-5AA0	6SL3720-1TE38-4AA0	6SL3720-1TE41-0AA0	6SL3720-1TE41-2AA0	6SL3720-1TE41-4AA0		
380 – 480 V supply voltage									
Frame size		HX	HX	HX	JX	JX	JX		
Nominal power rating at 400 V <sup>6)</sup>	kW	315	400	450	560	710	800		
Rated DC link current	A	726	894	1008	1182	1512	1686		
Rated output current	A	605	745	840	985	1260	1405		
Base-load current $I_L$ <sup>1)</sup>	A	590	725	820	960	1230	1370		
Base-load current $I_H$ <sup>2)</sup>	A	460	570	700	860	1127	1257		
Output for $I_H$	kW	250	315	400	450	560	710		
Max. output current	A	885	1087	1230	1440	1845	2055		
Rated pulse frequency	Hz	1250	1250	1250	1250	1250	1250		
DC link capacitance	µF	12600	15600	16800	18900	26100	28800		
Power loss	kW	6.1	6.9	7.3	9.8	11.3	12.3		
Cooling air demand	m <sup>3</sup> /s	0.78	0.78	0.78	1.1	1.1	1.1		
Power demand 24 V DC <sup>3)</sup>	A	1.0	1.0	1.0	1.25	1.4	1.4		
Power demand 400 V AC	A	5.3	5.3	5.3	7.9	7.9	7.9		
Sound pressure level $L_{PA}$ (1 m) at 50/60 Hz	dB(A)	69/73	72/74	72/74	72/74	71/73	71/73		
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20		
Motor connection, maximum cable cross-section									
DIN VDE	mm <sup>2</sup>	4x240	4x240	4x240	6x240	6x240	6x240		
Fixing screws		M12	M12	M12	M12	M12	M12		
Motor connection, maximum cable length									
Shielded	m	300	300	300	300	300	300		
Unshielded	m	450	450	450	450	450	450		
PE/GND, max. cable cross-section									
DIN VDE	mm <sup>2</sup>	PE bus	PE bus	PE bus	PE bus	PE bus	PE bus		
Fixing screws		8xM12	8xM12	8xM12	10xM12	10xM12	10xM12		
Weight (standard version)	kg	490	490	490	700	700	700		
Dimensions	mm								
<sup>4)</sup> W		600	600	600	800	800	800		
D		600	600	600	600	600	600		
<sup>5)</sup> H		2200	2200	2200	2200	2200	2200		

1) The base-load current  $I_L$  is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s.

2) The base-load current  $I_H$  is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s.

3) Power demand of open-loop/closed-loop control

4) The cabinet width increases by 600 mm if options L08, L10, or L34 are selected.

5) The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54

6) The nominal power rating refers to the rated motor power of a typical 6-pole motor supplied with 400 V.

# SINAMICS S120 Cabinet Modules

## Motor Modules – Chassis format

Chassis format Motor Modules									
500 – 690 V supply voltage		6SL3720-1TG28-5AA0	6SL3720-1TG31-0AA0	6SL3720-1TG31-2AA0	6SL3720-1TG31-5AA0	6SL3720-1TG31-8AA0	6SL3720-1TG32-2AA0	6SL3720-1TG32-6AA0	6SL3720-1TG33-3AA0
Frame size		FX	FX	FX	FX	GX	GX	GX	GX
Rated output current at 500 V <sup>6)</sup>	A	55	(55)	75	90	110	132	160	200
Nominal power rating at 690 V <sup>6)</sup>	kW	75	90	110	132	160	200	250	315
Rated DC link current	A	102	120	144	180	210	258	312	396
Rated output current	A	85	100	120	150	175	215	260	330
Base-load current I <sub>L</sub> <sup>1)</sup>	A	80	95	115	142	170	208	250	320
Base-load current I <sub>H</sub> <sup>2)</sup>	A	76	89	107	134	157	192	233	280
Output for I <sub>H</sub>	kW	55	75	90	110	132	160	200	250
Max. output current	A	120	142	172	213	255	312	375	480
Rated pulse frequency	Hz	1250	1250	1250	1250	1250	1250	1250	1250
DC link capacitance	µF	1200	1200	1600	2800	2800	2800	3900	4200
Power loss	kW	1.4	1.7	2.1	2	2.9	3.3	3.9	4.6
Cooling air demand	m <sup>3</sup> /s	0.17	0.17	0.17	0.17	0.36	0.36	0.36	0.36
Power demand 24 V DC <sup>3)</sup>	A	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9
Power demand 500/690 V AC	A	0.3 / 0.4	0.3 / 0.4	0.3 / 0.4	0.3 / 0.4	0.68 / 0.94	0.68 / 0.94	0.68 / 0.94	0.68 / 0.94
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz	dB(A)	67/68	67/68	67/68	67/68	69/73	69/73	69/73	69/73
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Motor connection, maximum cable cross-section									
DIN VDE	mm <sup>2</sup>	2x70	2x150	2x150	2x150	2x150	2x150	2x185	2x240
Fixing screws		M12	M12	M12	M12	M12	M12	M12	M12
Motor connection, maximum cable length									
Shielded	m	300	300	300	300	300	300	300	300
Unshielded	m	450	450	450	450	450	450	450	450
PE/GND, max. cable cross-section									
DIN VDE	mm <sup>2</sup>	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600
Fixing screws		4xM12	4xM12	4xM12	4xM12	4xM12	4xM12	4xM12	4xM12
Weight (standard version)	kg	145	145	145	145	286	286	286	286
Dimensions	mm								
<sup>4)</sup> W		400	400	400	400	400	400	400	400
D		600	600	600	600	600	600	600	600
<sup>5)</sup> H		2200	2200	2200	2200	2200	2200	2200	2200

- 1) The base-load current I<sub>L</sub> is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s.
- 2) The base-load current I<sub>H</sub> is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s.
- 3) Power demand of open-loop/closed-loop control
- 4) The cabinet width increases by 600 mm if options L10 or L34 are selected.
- 5) The cabinet height increases by 250 mm with Idegree of protection P21, and by 400 mm with degrees of protection IP23, IP43 and IP54
- 6) The nominal power rating refers to the rated motor power of a typical 6-pole motor supplied with the given voltage.

# SINAMICS S120 Cabinet Modules

## Motor Modules – Chassis format

Chassis format Motor Modules									
500 – 690 V supply voltage									
		6SL3720-1TG34-1AA0	6SL3720-1TG34-7AA0	6SL3720-1TG35-8AA0	6SL3720-1TG37-4AA0	6SL3720-1TG38-1AA0	6SL3720-1TG38-8AA0	6SL3720-1TG41-0AA0	6SL3720-1TG41-3AA0
Frame size		HX	HX	HX	JX	JX	JX	JX	JX
Nominal power rating at 500 V <sup>6)</sup>		250	315	400	500	560	630	710	900
Nominal power rating at 690 V <sup>6)</sup>	kW	400	450	560	710	800	900	1000	1200
Rated DC link current	A	492	558	690	882	972	1092	1230	1524
Rated output current	A	410	465	575	735	810	910	1025	1270
Base-load current I <sub>L</sub> <sup>1)</sup>	A	400	452	560	710	790	880	1000	1230
Base-load current I <sub>H</sub> <sup>2)</sup>	A	367	416	514	675	724	814	917	1136
Output for I <sub>H</sub>	kW	315	400	450	630	710	800	900	1000
Max. output current	A	600	678	840	1065	1185	1320	1500	1845
Rated pulse frequency	Hz	1250	1250	1250	1250	1250	1250	1250	1250
DC link capacitance	µF	7400	7400	7400	11100	11100	14400	14400	19200
Power loss	kW	6.4	7.1	10.6	11.1	11.7	11.9	13.4	16.2
Cooling air demand	m <sup>3</sup> /s	0.78	0.78	0.78	1.474	1.474	1.474	1.474	1.474
Power demand 24 V DC <sup>3)</sup>	A	1.0	1.0	1.0	1.25	1.25	1.4	1.4	1.4
Power demand 500/690 V AC	A	1.33 / 1.84	1.33 / 1.84	1.33 / 1.84	2.0 / 2.74	2.0 / 2.74	2.0 / 2.74	2.0 / 2.74	2.0 / 2.74
Sound pressure level L <sub>PA</sub> (1 m) at 50/60 Hz	dB(A)	72/74	72/74	72/74	71/73	71/73	71/73	71/73	71/73
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Motor connection, maximum cable cross-section									
DIN VDE	mm <sup>2</sup>	4x240	4x240	4x240	6x240	6x240	6x240	6x240	6x240
Fixing screws		M12	M12	M12	M12	M12	M12	M12	M12
Motor connection, maximum cable length									
Shielded	m	300	300	300	300	300	300	300	300
Unshielded	m	450	450	450	450	450	450	450	450
PE/GND, max. cable cross-section									
DIN VDE	mm <sup>2</sup>	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600	PE bus 600
Fixing screws		8xM12	8xM12	8xM12	10xM12	10xM12	10xM12	10xM12	10xM12
Weight (standard version)	kg	490	490	490	700	700	700	700	700
Dimensions	mm								
4)	W	600	600	600	800	800	800	800	800
	D	600	600	600	600	600	600	600	600
5)	H	2200	2200	2200	2200	2200	2200	2200	2200

- 1) The base-load current I<sub>L</sub> is based on a duty cycle of 110 % for 60 s or 150 % for 10 s with a duty cycle duration of 300 s.
- 2) The base-load current I<sub>H</sub> is based on a duty cycle of 150 % for 60 s or 160 % for 10 s with a duty cycle duration of 300 s.
- 3) Power demand of open-loop/closed-loop control
- 4) The cabinet width increases by 600 mm if options L08, L10, or L34 are selected.
- 5) The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54
- 6) The nominal power rating refers to the rated motor power of a typical 6-pole motor supplied with the given voltage.

# SINAMICS S120 Cabinet Modules

## Motor Modules – Chassis format

### Options

The table below lists the options available for Motor Modules (for a detailed description, please refer to the section entitled “Option descriptions”):

Order code	Brief description of option
<b>G20</b>	CBC10 communication board
<b>G33</b>	CBE20 communication board
<b>K08</b>	AOP30 Advanced Operator Panel, door mounted
<b>K46</b>	SMC10 Sensor Module Cabinet-Mounted
<b>K48</b>	SMC20 Sensor Module Cabinet-Mounted
<b>K50</b>	SMC30 Sensor Module Cabinet-Mounted
<b>K75</b>	Second auxiliary voltage busbar system
<b>K82</b>	Terminal interface for “Safe Torque Off” and “Safe Stop 1” safety functions
<b>K90</b>	Control Unit CU320 w/ CompactFlash Card without performance expansion
<b>K91</b>	Control Unit CU320 w/ CompactFlash Card with performance expansion 1
<b>L08</b>	Motor reactor
<b>L10</b>	dv/dt filter plus voltage peak limiter
<b>L34</b>	Output circuit breaker (motorized)
<b>L37</b>	DC interface with pre-charge circuit (includes M60)
<b>L55</b>	Enclosure space heater
<b>L61</b>	Braking unit 25 / 125 kW for supply voltage 380 V - 480 V and 660 V - 690 V (can be used with frame size FX)
<b>L62</b>	Braking unit 50 / 250 kW for supply voltage 380 V - 480 V and 660 V - 690 V (can be used with frame size GX/HX/JX)
<b>L64</b>	Braking unit 25 / 125 kW for supply voltage 500 V - 600 V (can be used with frame size FX)
<b>L65</b>	Braking unit 50 / 250 kW for supply voltage 500 V - 600 V (can be used with frame size GX/HX/JX)
<b>M06</b>	Plinth (base) 100 mm high, RAL 7022
<b>M07</b>	Plinth (base) 200 mm high, RAL 7035
<b>M21</b>	IP21 Degree of protection
<b>M23</b>	IP23 Degree of protection (includes M60)
<b>M26</b>	Side panel (right)
<b>M27</b>	Side panel (left)
<b>M43</b>	IP43 Degree of protection (includes M60)
<b>M54</b>	IP54 Degree of protection (includes M60)
<b>M59</b>	Solid cabinet door (without ventilation holes, air inlet from below through floor opening)
<b>M60</b>	Additional touch protection (included in M23, M43 and M54)
<b>M70</b>	EMC shield busbar
<b>M80</b>	DC busbar system ( $I_d = 1170$ A, 1x 60 x 10 mm)
<b>M81</b>	DC busbar system ( $I_d = 1500$ A, 1x 80 x 10 mm)
<b>M82</b>	DC busbar system ( $I_d = 1840$ A, 1x 100 x 10 mm)
<b>M83</b>	DC busbar system ( $I_d = 2150$ A, 2x 60 x 10 mm)
<b>M84</b>	DC busbar system ( $I_d = 2730$ A, 2x 80 x 10 mm)
<b>M85</b>	DC busbar system ( $I_d = 3320$ A, 2x 100 x 10 mm)
<b>M86</b>	DC busbar system ( $I_d = 3720$ A, 3x 80 x 10 mm)
<b>M87</b>	DC busbar system ( $I_d = 4480$ A, 3x 100 x 10 mm)
<b>M90</b>	Crane transport assembly (top mounted)
<b>Y09</b>	Special enclosure paint color
<b>Y11</b>	Grouped assembly into transport units
<b>Y31</b>	1-line label for plant identification, 40 x 80 mm
<b>Y32</b>	2-line label for plant identification, 40 x 180 mm
<b>Y33</b>	4-line label for plant identification, 40 x 180 mm
<b>D02</b>	Customer documentation (circuit diagram, terminal diagram, layout diagram) in DXF format
<b>D14</b>	Preliminary version of customer documentation
<b>D58</b>	Documentation language: English / French
<b>D60</b>	Documentation language: English / Spanish
<b>D80</b>	Documentation language: English / Italian
<b>D99</b>	Delivery without documentation
<b>T58</b>	Rating plate language in English / French
<b>T60</b>	Rating plate language in English / Spanish
<b>T80</b>	Rating plate language in English / Italian

### Option selection matrix for Motor Modules

Certain options are mutually exclusive.

+	Possible combinations
-	Not possible

### Electrical options

	K75	L55
K75		+
L55	+	

### Mechanical/electrical options

	M06	M07	M21	M23	M26	M27	M43	M54	M59	M90	Y09	Y11	Y31	Y32	Y33
M06		-	+	+	+	+	+	+	+	+	+	+	+	+	+
M07	-		+	+	+	+	+	+	+	+	+	+	+	+	+
M21	+	+		-	+	+	-	-	+	+	+	+	+	+	+
M23	+	+	-		+	+	-	-	+	+	+	+	+	+	+
M26	+	+	+	+		-	+	+	+	+	+	+	+	+	+
M27	+	+	+	+	-		+	+	+	+	+	+	+	+	+
M43	+	+	-	-	+	+	-	-	+	+	+	+	+	+	+
M54	+	+	-	-	+	+	-		+	+	+	+	+	+	+
M59	+	+	+	+	+	+	+	+		+	+	+	+	+	+
M90	+	+	+	+	+	+	+	+	+		+	-	+	+	+
Y09	+	+	+	+	+	+	+	+	+	+		+	+	+	+
Y11	+	+	+	+	+	+	+	+	+	-	+		+	+	+
Y31	+	+	+	+	+	+	+	+	+	+	+	+		-	-
Y32	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
Y33	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-

<sup>2)</sup> Option M60 is included in L37, M23, M43, and M54.

### DC busbar system mechanical options (busbars between individual Cabinet Modules)

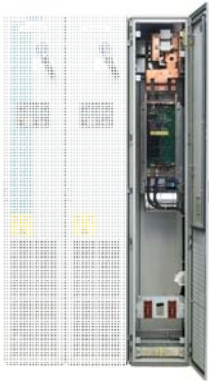
	M80	M81	M82	M83	M84	M85	M86	M87
M80		-	-	+	-	-	-	-
M81	-		-	-	+	-	+	-
M82	-	-		-	-	+	-	+
M83	+	-	-		-	-	-	-
M84	-	+	-	-		-	+	-
M85	-	-	+	-	-		-	+
M86	-	+	-	-	+	-		-
M87	-	-	+	-	-	+	-	

### Documentation and language of rating plate data

	D02	D14	D58	D60	D80	D99
D02		+	+	+	+	-
D14	+		+	+	+	-
D58	+	+		-	-	-
D60	+	+	-		-	-
D80	+	+	-	-		-
D99	-	-	-	-	-	

	T58	T60	T80
T58		-	-
T60	-		-
T80	-	-	

### Central Braking Modules



#### Overview

Central Braking Modules restrict the DC link voltage at a central point in the drive formation when the motors are working in generator mode and energy recovery is not possible. If the voltage of the DC busbar in generator mode exceeds a certain limit, an external braking resistor will be activated and a further increase in voltage avoided. The generator energy will be converted into heat. The activation of the braking resistor is enabled by the built-in braking unit and state-of-the-art MOSFET/IGBT semiconductors in the cabinet module.

Central Braking Modules are a good alternative to optional braking modules (option L61/L62 and L64/L65), especially if high brake power ratings are required in a drive formation. As a result of parallel configuration, the required, high brake power rating can also be further increased.

Line Voltage	DC Link Voltage	Braking Power $P_{150}$
3AC 380 ... 480 V	DC 510 ... 720 V	500 / 1000 kW
3AC 500 ... 600 V	DC 675 ... 900 V	550 / 1050 kW
3AC 660 ... 690 V	DC 890 ... 1035 V	630 / 1200 kW

Central Braking Modules operate entirely autonomously, requiring only a connection to the DC link. An external control voltage is not necessary.

Due to their built-in fans, central braking modules are also suitable for high, continuous power output.

#### Structure

The Central Braking Module is a cabinet unit with built-in braking-chopper. The power unit, with the help of state-of-the-art MOSFET/IGBT semiconductors, controls the switching of the braking resistor.

Central Braking Modules are constructed as 400mm wide cabinet modules. The connection to the DC busbars is made via a fuse link.

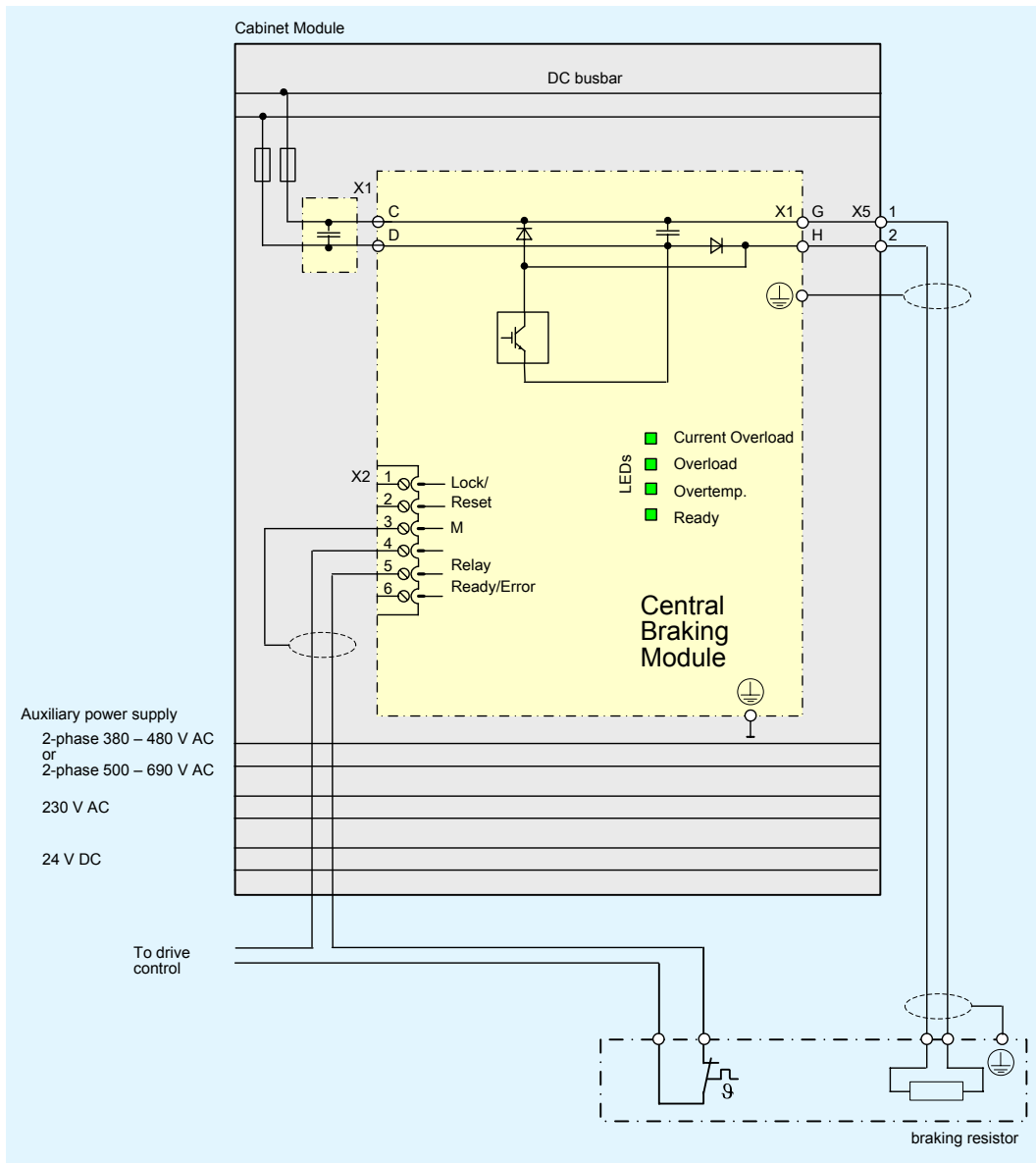
Central Braking Modules require external braking resistors, which must be ordered separately. The cables can be linked to the resistors by using straps specially prepared for this purpose.

The power units are equipped with both LEDs and a control output for the indication and transmission of faults. A special control input allows the Central Braking Module to be disabled from an external point.

The position in the DC link depends on engineering regulations which can be found in the SINAMICS Low Voltage Engineering Manual.



**Integration**



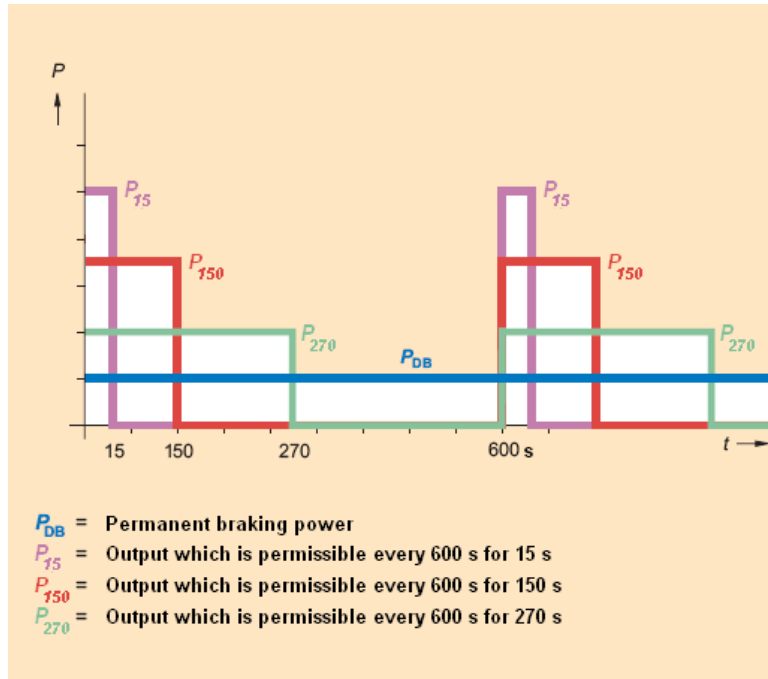
Connection example: Chassis-format Braking Module

# SINAMICS S120 Cabinet Modules

## Central Braking Modules

### Selection and ordering data

Central Braking Modules are designed for the following braking power ratings and operating sequence:



Braking Power Ratings of Central Braking Modules

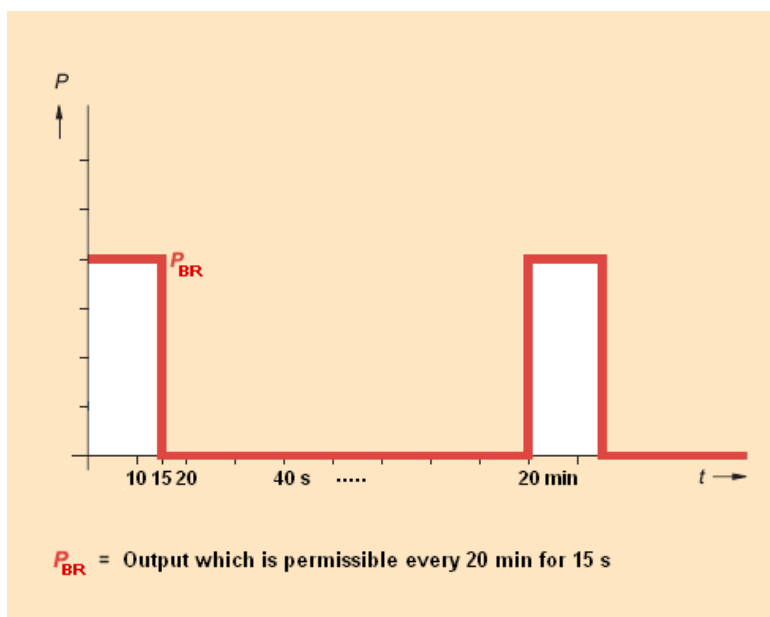
The braking power ratings are constrained by a cycle runtime of 600 seconds.

$P_{150}$  is accepted as being the rated braking power. The standard braking resistors can be assigned to these power ratings.

Braking Power				Central Braking Module
$P_{15}$ kW	$P_{150}$ kW	$P_{270}$ kW	$P_{DB}$ kW	Order No.
<b>Line Voltage 380 – 480 V</b>				
730	500	300	200	6SL3700-1AE35-0AA1
1380	1000	580	370	6SL3700-1AE41-0AA1
<b>Line Voltage 500 – 600 V</b>				
830	550	340	220	6SL3700-1AF35-5AA1
1580	1050	650	420	6SL3700-1AF41-1AA1
<b>Line Voltage 660 – 690 V</b>				
920	630	380	240	6SL3700-1AH36-3AA1
1700	1200	720	460	6SL3700-1AH41-2AA1

With most applications, Central Braking Modules are only used for occasional braking, e.g. for the stop of a drive in an emergency.

Good value braking resistors are offered especially for such applications in degree of protection IP21. For the use with braking power  $P_{BR}$  the operating sequence shown below is effective:



Operating sequence of Braking Resistors

Braking resistors with higher brake power ratings and shorter cycle runtimes are also available upon request.

Braking Power $P_{BR}$ kW	Braking Resistor (Degree of Protection IP21) Order No.	Dimensions W x D x H mm
<b>Line Voltage 380 – 480 V</b>		
500	<b>6SL3000-1BE35-0AA0</b>	960 x 620 x 790
1000	<b>6SL3000-1BE41-0AA0</b>	960 x 620 x 1430
<b>Line Voltage 500 – 600 V</b>		
550	<b>6SL3000-1BF35-5AA0</b>	960 x 620 x 1110
1100	<b>6SL3000-1BF41-1AA0</b>	960 x 620 x 1430
<b>Line Voltage 660 – 690 V</b>		
630	<b>6SL3000-1BH36-3AA0</b>	960 x 620 x 1110
1200	<b>6SL3000-1BH41-2AA0</b>	960 x 620 x 1430

Note:

In difference to optional Braking Modules (L61, L62 and L64, L65), the corresponding braking resistors for Central Braking Modules must be ordered separately.

# SINAMICS S120 Cabinet Modules

## Central Braking Modules

### Technical Data

Central Braking Modules		6SL3700-1AE35-0AA0	6SL3700-1AE41-0AA0	6SL3700-1AF35-5AA0	6SL3700-1AF41-1AA0	6SL3700-1AH36-3AA0	6SL3700-1AH41-2AA0
<b>Line Voltage</b>	<b>V</b>	<b>380 – 480</b>		<b>500 – 600</b>		<b>660 – 690</b>	
Size		400 mm	400 mm	400 mm	400 mm	400 mm	400 mm
Braking Power P <sub>150</sub>	kW	500	1000	550	1050	630	1200
Continuous Braking Power P <sub>DB</sub>	kW	200	370	220	420	240	460
Braking Current at P <sub>150</sub>	A	750	1450	680	1300	630	1200
Power Losses	kW	1.5	1.5	1.5	1.5	1.5	1.5
Cool Air Flow Requirement	m <sup>3</sup> /s	0.14	0.14	0.14	0.14	0.14	0.14
Power requirement 230 V AC <sup>1)</sup>	A	0.4	0.4	0.4	0.4	0.4	0.4
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Braking Resistance Connection, max. conductor cross-section							
DIN VDE	mm <sup>2</sup>	95	95	95	95	95	95
Mounting Screws		M10	M10	M10	M10	M10	M10
PE-/GND Connection, max. conductor cross-section		PE-Schiene	PE-Schiene	PE-Schiene	PE-Schiene	PE-Schiene	PE-Schiene
DIN VDE	mm <sup>2</sup>	600	600	600	600	600	600
Mounting Screws		4xM12	4xM12	4xM12	4xM12	4xM12	4xM12
Weight (standard version)	kg	180	180	180	180	180	180
Dimensions	mm						
W		400	400	400	400	400	400
D		600	600	600	600	600	600
H		2200	2200	2200	2200	2200	2200

<sup>1)</sup> Power requirement for fans

<sup>2)</sup> The cabinet height increases by 250 mm with degree of protection IP21 and by 400 mm with degrees of protection IP23, IP43 and IP54

Braking Resistor		6SL3700-1BE35-0AA0	6SL3700-1BE41-0AA0	6SL3700-1BF35-5AA0	6SL3700-1BF41-1AA0	6SL3700-1BH36-3AA0	6SL3700-1BH41-2AA0
<b>Line Voltage</b>	<b>V</b>	<b>380 – 480</b>		<b>500 – 600</b>		<b>660 – 690</b>	
Braking Power P <sub>BR</sub>	kW	500	1000	550	1100	630	1200
Continuous Braking Power P <sub>DBBR</sub>	kW	23	58	34	62	42	75
Resistance	Ω	1.1	0.55	1.6	0.8	1.95	1.0
Weight	kg	82	170	110	180	124	196
Dimensions	mm						
W		960	960	960	960	960	960
D		790	1430	1110	1430	1110	1430
H		620	620	620	620	620	620

### Options

The table below lists the options available for Central Braking Modules (for a detailed description, please refer to the section entitled "Option descriptions"):

Order code	Brief description of option
<b>K75</b>	Second auxiliary voltage busbar system
<b>L55</b>	Enclosure space heater
<b>M06</b>	Plinth (base) 100 mm high, RAL 7022
<b>M07</b>	Plinth (base) 200 mm high, RAL 7035
<b>M21</b>	IP21 Degree of protection
<b>M23</b>	IP23 Degree of protection
<b>M26</b>	Side panel (right)
<b>M27</b>	Side panel (left)
<b>M43</b>	IP43 Degree of protection
<b>M54</b>	IP54 Degree of protection
<b>M59</b>	Solid cabinet door (without ventilation holes, air inlet from below through floor opening)
<b>M80</b>	DC busbar system ( $I_d = 1170$ A, 1x 60 x 10 mm)
<b>M81</b>	DC busbar system ( $I_d = 1500$ A, 1x 80 x 10 mm)
<b>M82</b>	DC busbar system ( $I_d = 1840$ A, 1x 100 x 10 mm)
<b>M83</b>	DC busbar system ( $I_d = 2150$ A, 2x 60 x 10 mm)
<b>M84</b>	DC busbar system ( $I_d = 2730$ A, 2x 80 x 10 mm)
<b>M85</b>	DC busbar system ( $I_d = 3320$ A, 2x 100 x 10 mm)
<b>M86</b>	DC busbar system ( $I_d = 3720$ A, 3x 80 x 10 mm)
<b>M87</b>	DC busbar system ( $I_d = 4480$ A, 3x 100 x 10 mm)
<b>M90</b>	Crane transport assembly (top mounted)
<b>Y09</b>	Special enclosure paint color
<b>Y11</b>	Grouped assembly into transport units
<b>Y31</b>	1-line label for plant identification, 40 x 80 mm
<b>Y32</b>	2-line label for plant identification, 40 x 180 mm
<b>Y33</b>	4-line label for plant identification, 40 x 180 mm
<b>D02</b>	Customer documentation (circuit diagram, terminal diagram, layout diagram) in DXF format
<b>D14</b>	Preliminary version of customer documentation
<b>D58</b>	Documentation language: English / French
<b>D60</b>	Documentation language: English / Spanish
<b>D80</b>	Documentation language: English / Italian
<b>D99</b>	Delivery without documentation
<b>T58</b>	Rating plate language in English / French
<b>T60</b>	Rating plate language in English / Spanish
<b>T80</b>	Rating plate language in English / Italian

# SINAMICS S120 Cabinet Modules

## Central Braking Modules

### Option Selection Matrix for Central Braking Modules

Some options are mutually exclusive. If so, this will be indicated in the tables below.

+	Possible combinations
-	Not supported

#### Electrical Options

	K75	L55
K75		+
L55	+	

#### Mechanical/electrical Options

	M06	M07	M21	M23	M26	M27	M43	M54	M59	M90	Y09	Y11	Y31	Y32	Y33
M06		-	+	+	+	+	+	+	+	+	+	+	+	+	+
M07	-		+	+	+	+	+	+	+	+	+	+	+	+	+
M21	+	+		-	+	+	-	-	+	+	+	+	+	+	+
M23	+	+	-		+	+	-	-	+	+	+	+	+	+	+
M26	+	+	+	+		-	+	+	+	+	+	+	+	+	+
M27	+	+	+	+	-		+	+	+	+	+	+	+	+	+
M43	+	+	-	-	+	+		-	+	+	+	+	+	+	+
M54	+	+	-	-	+	+	-		+	+	+	+	+	+	+
M59	+	+	+	+	+	+	+	+		+	+	+	+	+	+
M90	+	+	+	+	+	+	+	+	+		+	-	+	+	+
Y09	+	+	+	+	+	+	+	+	+	+		+	+	+	+
Y11	+	+	+	+	+	+	+	+	+	-	+		+	+	+
Y31	+	+	+	+	+	+	+	+	+	+	+	+		-	-
Y32	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
Y33	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-

#### DC busbar system mechanical options (busbars between individual Cabinet Modules)

	M80	M81	M82	M83	M84	M85	M86	M87
M80		-	-	+	-	-	-	-
M81	-		-	-	+	-	+	-
M82	-	-		-	-	+	-	+
M83	+	-	-		-	-	-	-
M84	-	+	-	-		-	+	-
M85	-	-	+	-	-		-	+
M86	-	+	-	-	+	-		-
M87	-	-	+	-	-	+	-	

#### Documentation and language of rating plate data

	D02	D14	D58	D60	D80	D99
D02		+	+	+	+	-
D14	+		+	+	+	-
D58	+	+		-	-	-
D60	+	+	-		-	-
D80	+	+	-	-		-
D99	-	-	-	-	-	

	T58	T60	T80
T58		-	-
T60	-		-
T80	-	-	

### Auxiliary Power Supply Modules

#### Overview

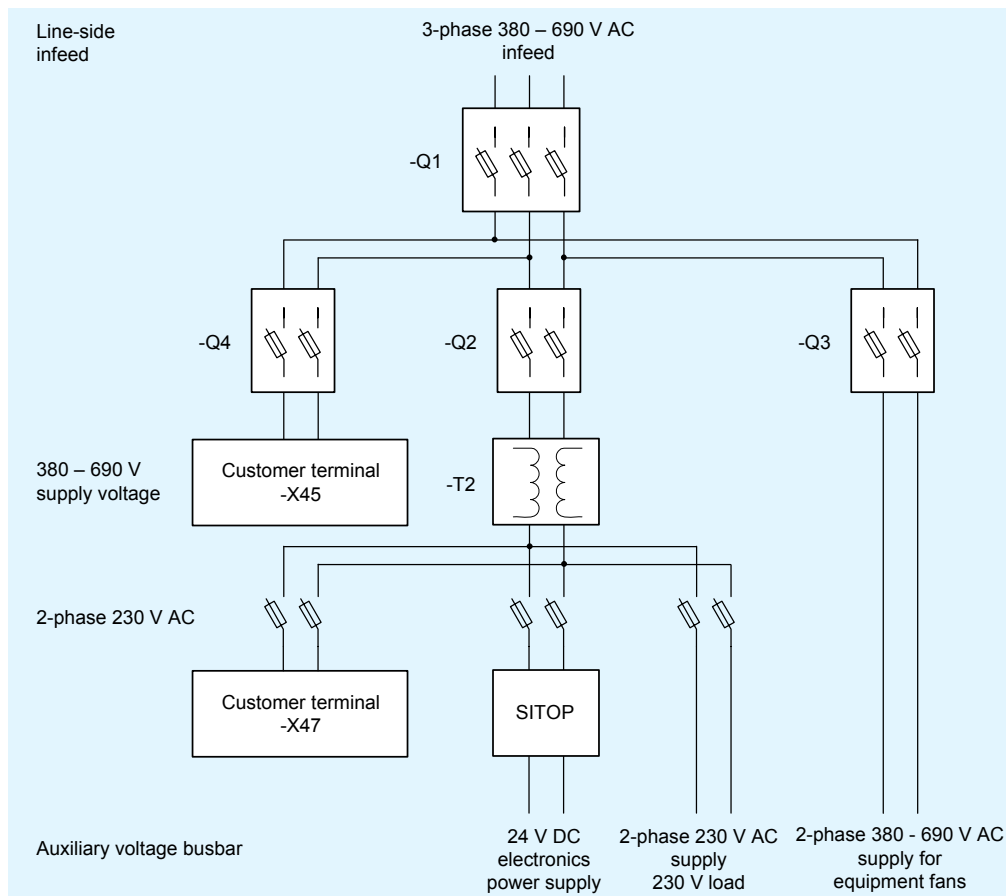
Auxiliary Power Supply Modules supply power to the auxiliary voltage busbar system of the SINAMICS S120 Cabinet Modules. The fans of the SINAMICS S120 devices installed in the Cabinet Modules are, among other things, connected to this busbar system. In addition, the auxiliary voltage busbar system supplies the electronic modules with an external 24 V DC voltage. This is required when the DC link is not charged, for instance, in order to maintain PROFIBUS communication.

#### Structure

The Auxiliary Power Supply Module is connected on the plant side to a voltage corresponding to the respective rated device voltage.

The standard version contains the following components:

- Fuse switch disconnecter with fuse monitoring for external evaluation
- Supply of auxiliary busbar system with 3 fused auxiliary voltages:
  - 24 V DC for the electronics power supply
  - 2-phase 230 V supply for 230 V loads
  - 2-phase 380 – 690 V supply for equipment fans
- 2-phase 230 V AC customer terminal blocks, and 3-phase 380 V AC for, e.g., supplying power to a second auxiliary voltage busbar system (option K75)
- Transformer with 230 V output voltage
- 24 V DC SITOP power supply
- 6-pole auxiliary busbar (ready-wired), including jumpers for looping through to the next Cabinet Module
- Nickel-plated PE busbar (60 x 10 mm), including jumper for looping through to the next Cabinet Module.



# SINAMICS S120 Cabinet Modules

## Auxiliary Power Supply Modules

### Selection and ordering data

Line-side infeed (380 – 690 V)	Auxiliary Supply Modules Order no.
125 A	<b>6SL3700-0MX14-0AA0</b>
160 A	<b>6SL3700-0MX16-3AA0</b>
200 A	<b>6SL3700-0MX21-0AA0</b>
250 A	<b>6SL3700-0MX21-4AA0</b>

#### Note:

In smaller systems, there is often no need for an additional Cabinet Module for the auxiliary power supply. In such cases, the infeed for the auxiliary voltage busbar system can also be supplied by the Line Connection Module. This can be ordered by selecting option K76.

### Technical data

Auxiliary Power Supply Modules		6SL3700- 0MX14-0AA0	6SL3700- 0MX16-3AA0	6SL3700- 0MX21-0AA0	6SL3700- 0MX21-4AA0
380 – 690 V line-side infeed	A	125	160	200	250
Line supply connection, max. cable cross-section					
DIN VDE	mm <sup>2</sup>	150	150	150	150
Max. current carrying capacity of 380 - 690 V AC load feeder connection at auxiliary busbar	A	63	80	100	100
Max. current carrying capacity of 380 - 690 V AC load connection at customer terminal –X45	A	50	63	80	80
–X45 connection, max. cable cross-section	mm <sup>2</sup>	16	16	16	16
Max. current carrying capacity of 230 V AC load connection at auxiliary busbar	A	6	10	10	20
Max. current carrying capacity of 230 V AC load connection at –X47 customer terminal	A	8	10	10	20
–X47 connection, max. cable cross-section	mm <sup>2</sup>	2.5	2.5	2.5	2.5
Max. current carrying capacity of 24 V DC load connection at auxiliary busbar	A	20	40	80	80
Cooling method		Air	Air	Air	Air
Degree of protection		IP20	IP20	IP20	IP20
Weight (standard version)	kg	170	180	210	240
Dimensions	W	600	600	600	600
	D	600	600	600	600
<sup>1)</sup>	H	2200	2200	2200	2200

<sup>1)</sup> The cabinet height increases by 250 mm with degree of protection IP21, and by 400 mm with degrees of protection IP23, IP43 and IP54



### Options

The table below lists the options available for Auxiliary Power Supply Modules (for a detailed description, please refer to the section entitled "Option descriptions"):

Order code	Brief description of option
<b>K75</b>	Second auxiliary voltage busbar system
<b>L55</b>	Enclosure space heater
<b>M06</b>	Plinth (base) 100 mm high, RAL 7022
<b>M07</b>	Plinth (base) 200 mm high, RAL 7035
<b>M21</b>	IP21 Degree of protection
<b>M23</b>	IP23 Degree of protection
<b>M26</b>	Side panel (right)
<b>M27</b>	Side panel (left)
<b>M43</b>	IP43 Degree of protection
<b>M54</b>	IP54 Degree of protection
<b>M59</b>	Solid cabinet door (without ventilation holes, air inlet from below through floor opening)
<b>M70</b>	EMC shield busbar
<b>M80</b>	DC busbar system ( $I_d = 1170$ A, 1x 60 x 10 mm)
<b>M81</b>	DC busbar system ( $I_d = 1500$ A, 1x 80 x 10 mm)
<b>M82</b>	DC busbar system ( $I_d = 1840$ A, 1x 100 x 10 mm)
<b>M83</b>	DC busbar system ( $I_d = 2150$ A, 2x 60 x 10 mm)
<b>M84</b>	DC busbar system ( $I_d = 2730$ A, 2x 80 x 10 mm)
<b>M85</b>	DC busbar system ( $I_d = 3320$ A, 2x 100 x 10 mm)
<b>M86</b>	DC busbar system ( $I_d = 3720$ A, 3x 80 x 10 mm)
<b>M87</b>	DC busbar system ( $I_d = 4480$ A, 3x 100 x 10 mm)
<b>M90</b>	Crane transport assembly (top mounted)
<b>Y09</b>	Special enclosure paint color
<b>Y11</b>	Grouped assembly into transport units
<b>Y31</b>	1-line label for plant identification, 40 x 80 mm
<b>Y32</b>	2-line label for plant identification, 40 x 180 mm
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<b>T80</b>	Rating plate language in English / Italian

# SINAMICS S120 Cabinet Modules

## Auxiliary Power Supply Modules

### Option selection matrix for Auxiliary Power Supply Modules

Certain options are mutually exclusive.

+	Possible combinations
-	Not supported

#### Electrical options

	K75	L55
K75		+
L55	+	

#### Mechanical options

	M06	M07	M21	M23	M26	M27	M43	M54	M59	M70	M90	Y09	Y11	Y31	Y32	Y33
M06		-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M07	-		+	+	+	+	+	+	+	+	+	+	+	+	+	+
M21	+	+		-	+	+	-	-	+	+	+	+	+	+	+	+
M23	+	+	-		+	+	-	-	+	+	+	+	+	+	+	+
M26	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
M27	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
M43	+	+	-	-	+	+		-	+	+	+	+	+	+	+	+
M54	+	+	-	-	+	+	-		+	+	+	+	+	+	+	+
M59	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+
M70	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
M90	+	+	+	+	+	+	+	+	+	+		+	-	+	+	+
Y09	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
Y11	+	+	+	+	+	+	+	+	+	+	-	+		+	+	+
Y31	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-
Y32	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-
Y33	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	

#### Mechanical options for DC busbar system

	M80	M81	M82	M83	M84	M85	M86	M87
M80		-	-	+	-	-	-	-
M81	-		-	-	+	-	+	-
M82	-	-		-	-	+	-	+
M83	+	-	-		-	-	-	-
M84	-	+	-	-		-	+	-
M85	-	-	+	-	-		-	+
M86	-	+	-	-	+	-		-
M87	-	-	+	-	-	+	-	

#### Documentation and language of rating plate data

	D02	D14	D58	D60	D80	D99
D02		+	+	+	+	-
D14	+		+	+	+	-
D58	+	+		-	-	-
D60	+	+	-		-	-
D80	+	+	-	-		-
D99	-	-	-	-	-	

	T58	T60	T80
T58		-	-
T60	-		-
T80	-	-	

### Documentation

Documentation in PDF format on CD-ROM is delivered as standard with Cabinet Modules and comprises the following individual documents:

- Description
- Installation instructions
- Installation guide
- Description of functions
- Maintenance instructions
- Engineering Manual
- Spare parts lists

Device-specific documents such as circuit diagrams, dimension drawings, layout diagrams and terminal diagrams are also included.

The documentation included in the delivery and on the CD-ROM is in English and German.

The documentation can be ordered in other languages using option codes D58 (English/French), D60 (English/Spanish) or D80 (English/Italian) (refer to "Option descriptions").

### Option descriptions

#### **D02**

##### **Customer documentation in DXF format**

This option can be used to order documents such as circuit diagrams and terminal diagrams, as well as the layout diagram and dimension drawing in DXF format, in order to process them further in Autocad systems, for example.

#### **D14**

##### **Preliminary version of customer documentation in PDF format**

If documents such as circuit diagrams, terminal diagrams, layout diagrams and dimension drawings are required in advance for the purpose of system engineering (integration of drive into higher-level systems, interface definition, installation, building planning, etc.), it is possible to order a draft copy of the documentation when ordering the Cabinet Modules. These documents are then supplied electronically a few working days after the order has been recorded. If the order includes options that fall outside the scope of standard delivery, these will not be covered by the documentation due to the obvious time constraints.

Documentation relating to the order is sent to the buyer by e-mail. Thus, the recipient's e-mail address should be provided when the order is placed. The recipient will also receive a link for downloading general, non-order-specific documentation such as the operating instructions, manual and installation guide.

#### **D58/D60/D80**

##### **Documentation language**

Order code	Language
<b>D58</b>	English/French
<b>D60</b>	English/Spanish
<b>D80</b>	English/Italian

#### **D99**

##### **Delivery without documentation**

Cabinet Modules/Booksize Cabinet Kit are shipped without a documentation CD.

#### **G20**

##### **CBC10 communication board**

The CBC10 communication board allows the SINAMICS S120 Cabinet Module drive system to be connected to the serial communication system, CAN-Bus, via Control Unit CU320. The CBC is inserted into the option slot of Control Unit CU320.

The CBC10 can be ordered as option G20 only if it is combined with a CU320 Control Unit (option K90/91) and will be enclosed with the delivery. Combination with option G33 is not possible.

#### **G33**

##### **CBE20 communication board**

The CBE20 communication board can be used to connect the SINAMICS S120 Cabinet Modules to a PROFINET IO network via a CU320 Control Unit. The CBE plugs into the option slot on the CU320 Control Unit.

The CBE20 can only be ordered as option G33 in conjunction with a CU320 Control Unit (option K90/91). It is supplied separately and configuration may be necessary. Combination with option G20 is not possible.

#### **K08**

##### **AOP30 Advanced Operator Panel**

The AOP30 Advanced Operator Panel is an optional input/output device for the Cabinet Modules. If an autonomous closed-loop control (option K90 or K91) is selected for the Cabinet Module, then option K08 can be ordered to provide the Cabinet Module with its own operator panel.

The AOP30 is installed in the door of the relevant Cabinet Module.

#### **K46**

##### **SMC10 Sensor Module Cabinet-Mounted for resolvers**

The SMC10 encoder module can be used to simultaneously record the actual motor speed and the rotor position angle. The signals emitted by the resolver are converted here and made available via the DRIVE-CLiQ interface of the closed-loop control for evaluation purposes.

The following encoders are supported by the SMC10:

- 2-pole resolver
- Multi-pole resolver

The motor temperature can also be detected using KTY84-130 or PTC thermistors.

### **K48**

#### **SMC20 Sensor Module Cabinet-Mounted for sin/cos incremental encoder or EnDat absolute value encoder**

The SMC20 encoder module can be used to simultaneously record the actual motor speed and path length. The signals emitted by the incremental encoder are converted here and made available for evaluation purposes via the DRIVE-CLiQ interface of the closed-loop control.

The following encoder signals can be evaluated:

- Sin/cos incremental encoder 1 V<sub>pp</sub>
- EnDat absolute value encoder

The motor temperature can also be detected using KTY84-130 or PTC thermistors.

### **K50**

#### **SMC30 Sensor Module Cabinet-Mounted for TTL and HTL incremental encoders**

The SMC30 encoder module can be used to record the actual motor speed. The signals from the rotary pulse encoder are converted here and made available for evaluation via the DRIVE-CLiQ interface of the closed-loop control.

The following encoder signals can be evaluated:

- TTL encoder
- HTL encoder

The motor temperature can also be detected using KTY84-130 or PTC thermistors.

### **K75**

#### **Second auxiliary voltage busbar system**

If further supply voltages are required in addition to the two system auxiliary voltages supplied by the auxiliary busbar system that is integrated as standard, the optional second auxiliary voltage busbar system can be installed to provide and manage these additional auxiliary voltages in the Cabinet Modules. Each cabinet module is supplied with three 2-pin connectors, thus making it easy to interconnect individual cabinet modules.

Connectors for the voltage tap and the infeed can be ordered as required using order number 5ST2545.

The current carrying capacity of the 6-pin busbars is 100 A according to IEC and 80 A according to UL.

### **K76**

#### **Auxiliary voltage supply, mounted in LCM (on request)**

Cabinet Modules require an auxiliary energy supply to function properly. This power requirement must be included in the configuration and supplied from an external source. If an external supply is not available, the required auxiliary voltages can be supplied by means of an Auxiliary Power Supply Module.

Alternatively, option K76 can be selected to generate the auxiliary voltages in the Line Connection Module. This is particularly advisable for smaller device configurations.

The following auxiliary voltages are available:

- 2-ph. 380 – 480 V or 500 – 690 V (poss. tap approx. 80 A)
- 230 V AC (poss. tap where LCM < 800 A: approx. 4 A; > 800 A: approx. 6 A)
- 24 V DC (poss. tap where LCM < 800 A: approx. 20 A; > 800 A: approx. 40 A)

The auxiliary voltages can be connected to the auxiliary voltage busbar from the Line Connection Module, and are therefore able to supply the entire cabinet group.

### **K82**

#### **Terminal interface for "Safe Torque Off" and "Safe Stop 1" safety functions**

The terminal module provides control of the safety functions integrated into the devices in a variable wide voltage range from 24 to 240 V DC/AC and can, therefore, be adapted to the relevant plant conditions.

The "Safe Torque Off" function on SINAMICS S120 Cabinet Modules is a "device for the prevention of unexpected startup" as defined by EN 60204-1, Section 5.4.

"Safe Stop 1" is based on the "Safe Torque Off" function. This means that a Category 1 stop in accordance with EN 60204-1 can be implemented.

With the Chassis format Motor Module, option K82 cannot be ordered together with option L55 (cabinet with anti-condensation heating).

# SINAMICS S120 Cabinet Modules

## Option descriptions

### K90

#### Control Unit CU320 w/ CompactFlash Card without performance expansion

Option K90 assigns a CU320 Control Unit to the Line Modules and Motor Modules. This unit takes responsibility for communication and open-loop/closed-loop control functions.

The latest firmware version is installed on the CompactFlash card including licensing, but without performance expansion.

The unit can communicate with other nodes via PROFIBUS or the DRIVE-CLiQ interface.

### K91

#### Control Unit CU320 w/ CompactFlash Card with performance expansion 1

Option K91 assigns a CU320 Control Unit to the Line Modules and Motor Modules. This unit takes responsibility for communication and open-loop/closed-loop control functions.

The latest firmware version is installed on the CompactFlash card including licensing and performance expansion 1.

The unit can communicate with other nodes via PROFIBUS or the DRIVE-CLiQ interface.

### L08

#### Motor reactor

Motor reactors reduce the voltage load on the motor windings by reducing the voltage gradients at the motor terminals that occur during converter operation. At the same time, the capacitive charge/discharge currents that occur at the converter output in the case of long motor cables are also reduced.

Suitably dimensioned motor reactors or series connections of motor reactors thus offer a solution that allows a higher capacitance and, therefore, longer motor cables to be connected.

In the case of multi-motor drives, the use of motor reactors is generally recommended.

Option L08 enables you to select a fully wired motor reactor.

This can be installed in a number of locations, depending on the design:

- Chassis format Motor Module, frame size F/G: Inside the Cabinet Module
- Chassis format Motor Module, frame size H/J: In a separate 600 mm-wide cabinet located on the right-hand side of the Motor Module. The additional width should be taken into account for transport units.
- Booksize Cabinet Kit: Inside the relevant Cabinet Kit. Double Motor Modules each have a separate reactor per inverter output.

With option L08, the max. permissible motor cable lengths increase by the amounts shown below:

Order number of Booksize Cabinet Kit	Rated output current of Motor Module [A]	Shielded cable		Unshielded cable	
		Max. permissible motor cable length without reactor. [m]	Max. perm. cable length btw. motor reactor and motor with option L08 [m]	Max. permissible motor cable length without reactor. [m]	Max. perm. cable length btw. motor reactor and motor with option L08 [m]
6SL3720-1TE13-0AB0	3	50	100	75	150
6SL3720-2TE13-0AB0	2*3	50	100	75	150
6SL3720-1TE15-0AB0	5	50	100	75	150
6SL3720-2TE15-0AB0	2*5	50	100	75	150
6SL3720-1TE21-0AB0	9	50	135	75	200
6SL3720-2TE21-0AB0	2*9	50	135	75	200
6SL3720-1TE21-8AB0	18	70	160	100	240
6SL3720-2TE21-8AB0	2*18	50	160	75	240
6SL3720-1TE23-0AB0	30	100	190	150	280
6SL3720-1TE24-5AB0	45	100	200	150	300
6SL3720-1TE26-0AB0	60	100	200	150	300
6SL3720-1TE28-5AB0	85	100	200	150	300
6SL3720-1TE31-3AB0	132	100	200	150	300
6SL3720-1TE32-0AB0	200	100	200	150	300

With Chassis format Motor Modules, there is no increase in the permissible motor cable length.

Note: The terminal lugs of the reactors are not nickel-plated.

### L09

#### Two motor reactors connected in series

With option L09, two motor reactors connected in series are used with the Booksize Cabinet Kits. These reactors are located within the standard width of the Cabinet Kit.

With option L09, the max. permissible motor cable lengths increase by the amounts shown below:

Order number of Booksize Cabinet Kit	Rated output current of Motor Module [A]	Shielded cable Max. perm. cable length between motor reactor and motor with option L09 [m]	Unshielded cable Max. perm. cable length between motor reactor and motor with option L09 [m]
6SL3720-1TE21-8AB0	18	320	480
6SL3720-1TE23-0AB0	30	375	560
6SL3720-1TE24-5AB0	45	400	600
6SL3720-1TE26-0AB0	60	400	600
6SL3720-1TE28-5AB0	85	400	600
6SL3720-1TE31-3AB0	132	400	600
6SL3720-1TE32-0AB0	200	400	600

Option L09 cannot be assigned in the case of Cabinet Kits with Double Motor Modules.

Note: The terminal lugs of the reactors are not nickel-plated.

### L10

#### dv/dt filter plus voltage peak limiter

The dv/dt filter plus VPL consists of two components: The dv/dt reactor and the voltage limiting network (voltage peak limiter), which limits voltage peaks and returns the energy to the DC link.

The dv/dt filter plus VPL must be used for motors in cases where the withstand voltage of the insulation system is unknown or insufficient. 1LA5, 1LA6 and 1LA8 standard motors only require them at supply voltages > 500 V +10 %.

The dv/dt filters plus VPL limit the rate of voltage rise to values < 500 V/μs and the typical voltage peaks to the values below (with motor cable lengths of < 300 m (frame sizes FX, GX, HX) or of < 150 m (JX):

< 1000 V with  $U_{line} < 575$  V

< 1250 V with  $660$  V <  $U_{line} < 690$  V.

Option L10 is installed in an additional cabinet with a width of 600 mm, located on the right-hand side of the Motor Module. NB: Parts of option L10 do not have nickel-plated copper busbars.

### L13

#### Input contactor for supply currents ≤ 800 A

Line Connection Modules for current ratings up to 800 A only feature a manually operated fuse switch disconnecter as standard. Option L13 is needed if a switching element is required for disconnecting a connecting device from the infeed (necessary for EMERGENCY OFF). The contactor is controlled by the closed-loop control in this case. Option L13 can be ordered for Line Connection Modules together with Basic Line Modules (option L43). With Smart and Active Line Modules, the contactor is already included for the purpose of pre-charging.

### L22

#### Delivery without line reactor

If a Line Connection Module is used to supply the Infeed for a Basic Line Module, a line reactor may be required, depending on the ratio between the supply short circuit power and the fundamental apparent power of the connected drive line-up (refer to SINAMICS Low Voltage Engineering Manual).

Since the supply short circuit power at the connection point of the drive line-up is often not known in practice, it is generally advisable to install a line reactor upstream. For this reason, a line reactor for the BLM is installed in the Line Connection Module as standard.

When ordering Line Connection Modules, the line reactor can be deselected using option L22.

A line reactor is generally required in the case of Basic Line Modules that are connected in parallel.

### L25

#### Draw-out circuit breaker

Line Connection Modules with an input current of > 800 A are equipped with fixed-mounted circuit breakers as standard. Where the customer requires a visible isolating distance, a draw-out circuit breaker can be ordered as an option.

# SINAMICS S120 Cabinet Modules

## Option descriptions

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### **L34**

#### **Output circuit breaker**

Option L34 can be used to isolate the motor terminals from the chassis format Motor Module.

At the motor terminals, a rotating, permanent-field synchronous motor generates a voltage that is proportional to the speed. The motor terminal voltage is always applied to the inverter output terminals, the DC link and the connected components.

Option L34 can be used to isolate a circuit in the event of a fault, or for maintenance work.

Option L34 is fully factory-wired and is located in a 600 mm wide additional cabinet on the right-hand side of the Motor Module. It is controlled using a TM31 terminal module, which is included with this option. For this reason, the output switch is automatically controlled via the Motor Module.

Option L34 cannot be combined with option L10 (dv/dt filter plus voltage peak limiter).

### **L37**

#### **DC interface with pre-charge circuit**

If, for reasons relating to process or availability, the Motor Module needs to be disconnected from or connected to the common DC link for an entire drive line-up during operation, a manually operated isolating distance can be ordered as an option. With chassis format power units, this takes the form of switch disconnectors, and with Booksize Cabinet Kits, the form of a contactor combination.

Option L37 is installed on the busbar between the Motor Module and the main DC busbar. To ensure that the module can be connected to a pre-charged DC link, the option also includes a pre-charging input circuit for the DC link capacitors of the relevant Motor Module.

The switching operation is performed externally. The operating levers can be locked using a padlock (padlock not included as standard in delivery). The degree of protection of the cabinets is not affected.

For ventilation, the L37 option also includes the M60 option (additional touch protection).

Options L61/L62/L64/L65 (braking units) cannot be ordered along with option L37, for reasons relating to space.

### **L41**

#### **Input current transformer upstream of circuit breaker for customer use**

If additional current transformers are required for measuring or monitoring purposes, these can be ordered as option L41 for the Line Connection Modules. The current transformers are installed upstream of the main circuit breaker in all three infeed phases.

The transformers have an accuracy class of 1.0. The secondary current is a maximum of 1 A.

The transformer measuring connections are routed to the terminal block in the Line Connection Module.

#### **Comment:**

These current transformers are already included in options P10 and P11 (measuring instrument for the display of line values).

### **L42**

#### **Line Connection Module for Active Line Modules**

If option code L42 is stated in the order, it means that the LCM will be connected to an Active Line Module. The LCM can then be adapted accordingly (pre-charging input circuit, connection busbars, etc.). Please refer to the assignment table in the section entitled "Line Connection Modules".

### **L43**

#### **Line Connection Module for Basic Line Modules**

If option code L43 is stated in the order, it means that the LCM will be connected to a Basic Infeed Module. The LCM can then be adapted accordingly (line reactors, pre-charging input circuit, connection busbars, etc.). Please refer to the assignment table in the section entitled "Line Connection Modules".

### **L44**

#### **Line Connection Module for Smart Line Modules**

If option code L44 is stated in the order, it means that the LCM will be connected to a Smart Line Module. The LCM can then be adapted accordingly (pre-charging input circuit, connection busbars, etc.). Please refer to the assignment table in the section entitled "Line Connection Modules".

### **L45**

#### **EMERGENCY OFF pushbutton, door mounted**

The EMERGENCY STOP pushbutton with protective collar is installed in the cabinet door of the Line Connection Module and its contacts are connected to a terminal block. From here, the EMERGENCY STOP pushbutton can be integrated into the plant-side EMERGENCY STOP chain.



### L46

#### Grounding switch upstream of circuit breaker

The grounding switch is upstream of the circuit breaker in the Line Connection Module and short-circuits the incoming supply system to ground.

The switch must be engaged manually via a rotary mechanism to ensure isolation from the supply when maintenance is being carried out. Measures must be taken at the plant to ensure that the grounding switch cannot be engaged when voltage is applied.

It is also essential to ensure that the supply system cannot be connected when the grounding switch is engaged.

The signals required for interlocking are available on the terminal block.

### L47

#### Grounding switch downstream of circuit breaker

The grounding switch is installed downstream of the circuit breaker in the Line Connection Module and short-circuits the incoming supply line to ground downstream of the main circuit breaker.

The grounding switch must be engaged manually via a rotary mechanism to ensure isolation from the supply during maintenance work on the converter.

In this case, the grounding switch and the main circuit breaker for the Line Connection Module are interlocked with each other, which ensures that the grounding switch cannot be engaged when the main circuit breaker is closed.

If the grounding switch is engaged, it is interconnected to ensure that the main circuit breaker cannot be switched in.

### L55

#### Enclosure space heater

Anti-condensation heating is recommended at low ambient temperatures and high levels of humidity to prevent condensation. Depending on the cabinet width, a 100 W cabinet heater is installed for each cabinet module.

1 heating element for cabinet width up to 600 mm, 2 heating elements for cabinet width over 800 mm.

The power supply to the heater (110 to 230 V AC, on terminal board -X240) must be provided externally and fused at max. 16 A.

Option L55 cannot be ordered together with option K82 (terminal module for the control of safety functions).

### L61, L62, L64, L65

#### Braking units

Braking units may be required for drives that support regenerative operating modes but have no other facility for feeding energy back into the supply system.

The braking unit comprises two components:

- A Braking Module which can be installed in the air outlet of the chassis format power units and
- A braking resistor to be installed externally (IP20 degree of protection).

The braking unit functions as an autonomous unit, and does not require an external power supply.

During the braking process, the kinetic energy is converted into heat in the externally installed braking resistor.

A max. cable length of 50 m is permissible between the Braking Module and the braking resistor. This allows the braking resistor to be mounted externally so that heat losses can be released outside the converter enclosure. The braking resistor is connected directly to the Braking Module terminals.

Terminal -X05:	Description
1	Connection of braking resistor
2	Connection of braking resistor

The braking resistors are available in two versions:

Option	Rated power $P_{DB}$	Braking power $P_{BR\ 20/90}$	Peak power $P_{BR\ 15/90}$	Can be used with the following frame sizes
<b>L61 (400V/690V) / L64 (500V)</b>	25 kW	100 kW	125 kW	Fx
<b>L62 (400V/690V) / L65 (500V)</b>	50 kW	200 kW	250 kW	Gx, Hx, Jx

$P_{DB}$ : Rated power (continuous braking power)

$P_{BR\ 20/90}$ : Permitted power for a period of 20 s, cycle time 90 s

$P_{BR\ 15/90}$ : Permitted peak power for a period of 15 s, cycle time 90 s

If the braking units listed here do not provide adequate braking power, then four braking units may be connected in parallel. Braking power can be shared among several Modules.

A Braking Module is assigned to each braking resistor.

# SINAMICS S120 Cabinet Modules

## Option descriptions

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### Comment:

Braking Modules can only be used if no DC interface (option L37) has been selected for the Motor Module.

When the system is configured, it must be ensured that the Motor Module in which the Braking Module is installed will remain switched on when the drive is braking so that the Braking Module is cooled. Failure to follow this instruction means that the Braking Module could overheat and shut down, so that the drive will no longer be able to operate in braking mode. In this case, the Braking Modules should be arranged in the Line Modules, if possible.

### L87

#### Insulation monitoring

An insulation monitor should be used if the drive line-up is operated on an isolated supply system. This device monitors the entire electrically connected circuit for insulation faults.

A warning is issued in the event of a fault.

### Notice:

Only one insulation monitor can be used within the same electrically connected supply system.

As there are different response strategies when a ground fault occurs in an isolated supply system, output relays of the insulation monitor are provided for integration in a plant-side control. It is also possible to integrate the outputs into the Cabinet Modules monitoring system on the plant side.

Terminal -A1-A101:	Description
11	Signaling relay ALARM 1
12	Signaling relay ALARM 1
14	Signaling relay ALARM 1
21	Signaling relay ALARM 2
22	Signaling relay ALARM 2
24	Signaling relay ALARM 2
M+	External kΩ display, 0 – 400 μA
M-	External kΩ display, 0 – 400 μA
R1	External cancel key (NC contact or wire jumper; otherwise the fault code is not stored)
R2	External cancel key (NC contact or wire jumper)
T1	External test button
T2	External test button

### M06

#### Plinth (base) 100 mm high, RAL 7022

The additional cabinet base allows larger bending radii for cables (cable inlet from below) and enables them to be routed within the cabinet base.

The cabinet base is supplied in RAL 7022 in all cases. No special paint finishes are available.

It is delivered in a completely mounted state along with the cabinet.

### M07

#### Plinth (base) 200 mm high, RAL 7035

The cable pedestal is made of robust sheet steel and allows for greater bending radii for cables (cable inlet from below) and cable routing within the cable pedestal.

It is delivered in a completely mounted state along with the cabinet.

### Notice:

The cable pedestal is colored RAL 7035 as standard. If a special color is requested for the cabinet (order code Y09), the cable pedestal will also be painted this color.

### M21

#### IP21 Degree of protection

Cabinet version in IP20, but with additional top plate or canopy. This increases the cabinet height by 250 mm.

For transport reasons, the top plates or canopies are delivered separately and must be fitted on-site.

### Notice:

The top covers or canopies are colored RAL 7035 as standard.

If a special color is requested for the cabinet (order code Y09), the top covers or canopies will also be painted this color.

### M23

#### IP23 Degree of protection

Cabinet Modules with IP23 degree of protection are supplied with additional roof sections, plastic ventilation grilles, and plastic mesh in the air inlet and outlet. This increases the cabinet height by 400 mm. Plastic mesh must be maintained in accordance with the local ambient conditions.

For transport reasons, the roof sections are delivered separately and must be fitted on-site.

### Notice:

The roof sections are colored RAL 7035 as standard. If a special color is requested for the cabinet (code **Y09**), the roof sections will also be painted this color. The molded plastic parts (e.g. ventilation grilles) are colored RAL 7035 and cannot be painted.

### **M26**

#### **Side panel (right)**

For side-by-side installation of Cabinet Modules from left to right, cabinets can be ordered ready-prepared at the factory for assembly on-site. If option M26 is ordered, the Cabinet Module is fitted with a side panel on the right.

This side panel is essential for ensuring compliance with IP20 and higher degrees of protection.

### **M27**

#### **Side panel (left)**

For side-by-side installation of Cabinet Modules from right to left, cabinets can be ordered ready-prepared at the factory for assembly on-site. If option M27 is ordered, the Cabinet Module is fitted with a side panel on the left.

This side panel is essential for ensuring compliance with IP20 and higher degrees of protection.

### **M43**

#### **IP43 Degree of protection**

Cabinet Modules with IP43 degree of protection are supplied with additional roof sections, plastic ventilation grilles, and plastic mesh in the air inlet and outlet. This increases the cabinet height by 400 mm. Plastic mesh must be maintained in accordance with the local ambient conditions.

For transport reasons, the roof sections are delivered separately and must be fitted on-site.

#### **Notice:**

The roof sections are colored RAL 7035 as standard. If a special color is requested for the cabinet (code Y09), the roof sections will also be painted this color. The molded plastic parts (e.g., ventilation grilles) are colored RAL 7035 and cannot be painted.

### **M54**

#### **IP54 Degree of protection**

Cabinet Modules with IP54 degree of protection are supplied with additional roof sections, plastic ventilation grilles, and a filter medium in the air inlet and outlet, which ensures compliance with IP54 degree of protection. This increases the cabinet height by 400 mm.

Filters must be maintained in accordance with the local ambient conditions.

For transport reasons, the roof sections are delivered separately and must be fitted on-site.

#### **Notice:**

- The roof sections are colored RAL 7035 as standard. If a special color is requested for the cabinet (code **Y09**), the roof sections will also be painted this color. The molded plastic parts (e.g. ventilation grilles) are colored RAL 7035 and cannot be painted.
- Where IP54 degree of protection is concerned, it is important to observe the output currents in relation to ambient temperature and installation altitude: these are outlined in the technical data.

### **M59**

#### **Solid cabinet door (without ventilation holes, air inlet from below through floor opening)**

If the Cabinet Modules are erected on a false floor or duct which forms part of a forced ventilation system, the modules can be ordered with closed cabinet doors. To ensure an adequate air inlet cross-section, the units are shipped without the standard base plates. In this case, the customer must ensure that no dirt/dust or moisture can enter the Cabinet Module. Cables must not be routed in such a way that they impede the flow of air through the opening in the cabinet floor. If the area beneath the Cabinet Modules can be accessed, the customer must provide touch protection.

### **M60**

#### **Additional touch protection**

The Cabinet Modules are designed in accordance with BGV A3 as standard. With option M60, additional covers (out of reach) are provided in the area of the AC and DC conductor bars and over the power unit.

### **M70**

#### **EMC shield busbar**

The EMC shield bus is used for the connection of line and motor shielded supply cables. The supplied EMC shield clamps provide a large surface area for the connection.

### **M80 – M87**

#### **DC busbar system**

The correct DC busbar for the Cabinet Module must be ordered. This is fitted in the upper section of the Cabinet Modules and connects the Line Modules to the Motor Modules.

The busbar is dimensioned according to the load requirements and demand factor associated with operation of the individual drives, and according to the specific Cabinet Module layout.

For these reasons, the DC busbar is not supplied as standard, but must be ordered as an option.

When selecting busbars, it is important to ensure that the systems of adjacent Cabinet Modules are compatible with one another (refer to the table below and option selection matrix for the Cabinet Modules in question).

# SINAMICS S120 Cabinet Modules

## Option descriptions

Where Cabinet Modules are ordered as a factory-assembled transport unit (with option Y11), all busbars in the transport unit must be identical.

Order code	DC busbar system Rated current $I_d$ [A]	Quantity	Dimensions [mm]	Compatible with
<b>M80</b>	1170	1	60 x 10	M83
<b>M81</b>	1500	1	80 x 10	M84 and M86
<b>M82</b>	1840	1	100 x 10	M85 and M87
<b>M83</b>	2150	2	60 x 10	M80
<b>M84</b>	2730	2	80 x 10	M81 and M86
<b>M85</b>	3320	2	100 x 10	M82 and M87
<b>M86</b>	3720	3	80 x 10	M81 and M84
<b>M87</b>	4480	3	100 x 10	M82 and M85

The DC busbars are nickel-plated as standard and are available in different designs for a variety of current carrying capacities. The delivery also includes the jumpers required to link the busbar systems of individual Cabinet Modules.

### **M90**

#### **Crane transport assembly (top mounted)**

A top-mounted crane transport aid can be ordered as an option for Cabinet Modules.

Depending on the width of the module, it consists of either transport eyebolts (width  $\leq 800$  mm) or transport rails (width  $> 800$  mm).

When Cabinet Modules are ordered as factory-assembled transport units (option Y11), they are shipped with transport rails, i.e. option M90 is automatically included in the delivery of option Y11 and does not need to be ordered separately.

### **N52**

#### **DC link fuses for BLM**

The Basic Line Modules do not have DC link fuses as standard.

If fuses are required, they can be ordered with option N52. The fuses are mounted on the rail connected to the DC busbar in the cabinet, rather than in the power unit.

DC link fuses are recommended when connecting Basic Line Modules in parallel.

### **P10**

#### **Line side power monitor, door mounted**

A measuring instrument with display, installed in the cabinet door of the Line Connection Module and used for acquiring measured values of the power supply. In addition to these measured values, additional system values (such as power rating, power factor, etc.) are calculated from the measured values using powerful state-of-the-art microprocessors.

The current transformers listed in option L41 are included in the delivery.

### **P11**

#### **Line side power monitor with PROFIBUS connection, door mounted**

A measuring instrument with display, installed in the cabinet door of the Line Connection Module, for acquiring measured values of the power supply. In addition to these measured values, additional system values (such as power rating, power factor, etc.) are calculated from the measured values using powerful state-of-the-art microprocessors. The measuring instrument has a PROFIBUS interface that enables a communication rate of up to 16 MBaud.

The current transformers listed in option L41 are included in the delivery.

### **T58, T60, T80**

#### **Rating plate language**

The standard version of the rating plate is English/German for the individual Cabinet Modules. A rating plate in another language can be selected using the following abbreviated designations.

Order code	Rating plate language
<b>T58</b>	English/French
<b>T60</b>	English/Spanish
<b>T80</b>	English/Italian

### **Y09**

#### **Special enclosure paint color**

The Cabinet Modules are delivered in RAL 7035 as standard. The special color must be specified in plain text when ordering. Any RAL colors that are available as powdered coatings can be selected.

#### **Notice:**

If options such as a cable pedestal (code M07), top plates/canopies (code M21) or roof sections (codes M23/M43/M54) are required for the Cabinet Modules, these will also be painted the same color as the cabinet. The molded plastic parts (e.g. ventilation grilles) are colored RAL 7035 and cannot be painted.

### Y11

#### Grouped assembly into transport units

Cabinet Modules can be ordered as factory-assembled transport units with a maximum width of up to 2400 mm. In this case, the relevant Modules are shipped as interconnected units (both electrically and mechanically).

When DC busbars (options M80 to M87) for these "units" are selected, identical busbars must be installed throughout the transport unit and they must be checked for compatibility with all adjacent Cabinet Modules.

In the case of a transport unit order, all the Cabinet Modules to be included in the unit and their installation sequence from left to right must be specified in plain text according to the syntax below:

**Plain text required to order:** TE 1 - 1...6

• Transportation unit	TE 1 - 1...6
• Serial number of transport unit	
• Position of Cabinet Module within transport unit (from left to right)	

Option Y11 is particularly recommended for units comprising Line Connection Modules and Line Modules, since the required pre-charging input circuits and connection busbars, for example, can be incorporated in the transport unit for certain versions. Please refer to the assignment tables in the section entitled "Line Connection Modules".

The transport unit is shipped with a crane transport rail, meaning that option M90 is not required.

### Y31

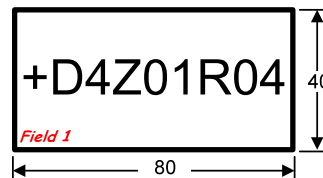
#### 1-line label for plant identification, 40 x 80 mm

Resopal labeling plates (white with black lettering) for identifying Cabinet Modules are available. The labels are attached to the cabinet door.

Dimensions H x W: 40 x 80 mm

The text must be specified in plain text when ordering.

Field 1: Max. 9 characters, font size 10 mm



### Y32

#### 2-line label for plant identification, 40 x 180 mm

Resopal labeling plates (white with black lettering) for identifying Cabinet Modules are available. The labels are attached to the cabinet door.

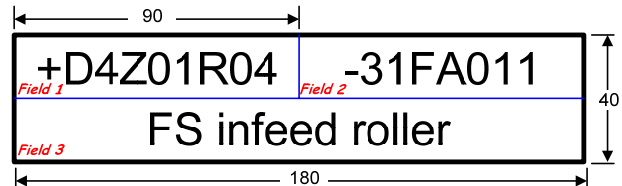
Dimensions H x W: 40 x 180 mm

The text must be specified in plain text when ordering.

Field 1: Max. 9 characters, font size 10 mm

Field 2: Max. 9 characters, font size 10 mm

Field 3: Max. 20 characters, font size 10 mm



### Y33

#### 4-line label for plant identification, 40 x 180 mm

Resopal labeling plates (white with black lettering) for identifying Cabinet Modules are available. The labels are attached to the cabinet door.

Dimensions H x W: 40 x 180 mm

The text must be specified in plain text when ordering.

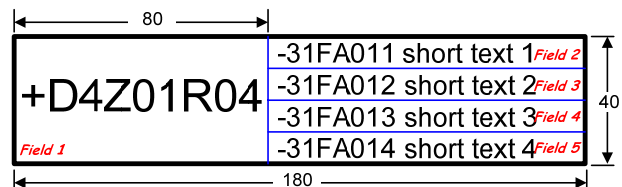
Field 1: Max. 9 characters, font size 10 mm

Field 2: Max. 20 characters, font size 6 mm

Field 3: Max. 20 characters, font size 6 mm

Field 4: Max. 20 characters, font size 6 mm

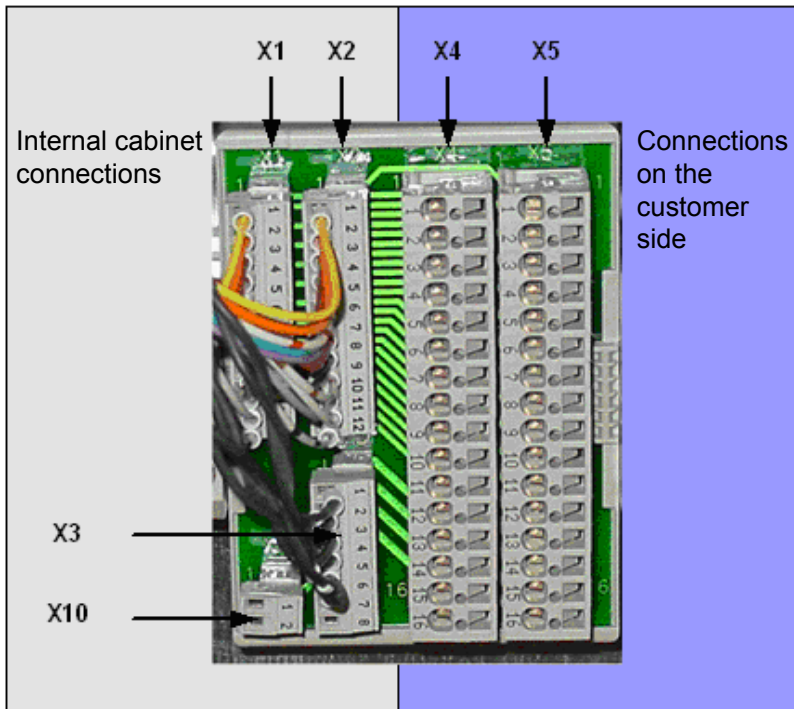
Field 5: Max. 20 characters, font size 6 mm



# SINAMICS S120 Cabinet Modules

## Customer terminal blocks

### Customer terminal block –A55



#### Overview

Customer terminal block -A55 acts as the interface to the I/O devices and marshals a range of internal cabinet signals to a central terminal block module located near the bottom of the cabinet.

This terminal block module is an interface that has been designed especially for plant construction. It is integrated as standard in the chassis format Motor Modules and in combination with a CU320 Control Unit in the Basic Line, Smart Line and Active Line Cabinet Modules as well as the Booksize Cabinet Kits.

#### Structure

Terminals -X4 and -X5 are provided for the connection of customer signal lines. A cable cross-section of 0.14 to 2.5 mm<sup>2</sup> can be connected, meaning that both solid and stranded cables can be used.

Terminals -X1 to -X3 are assigned internally in the cabinet depending on the cabinet variant (with/without option K90 or K91).

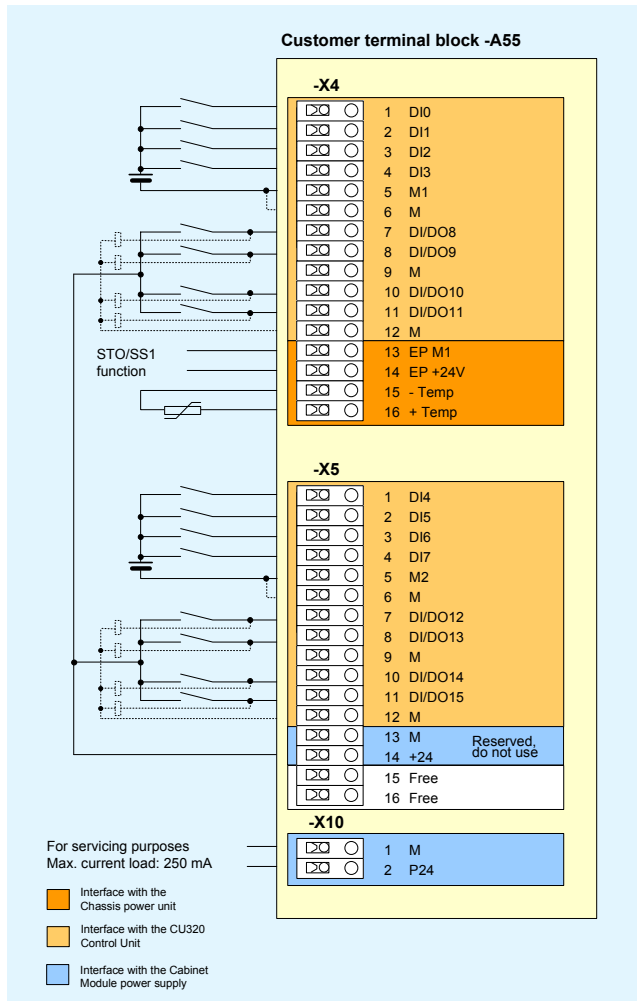
The customer terminal block –A55 includes:	Motor Modules		Line Modules/Booksize Cabinet Kits	
	With CU320 (K90/K91)	Without CU320	With CU320 (K90/K91)	Without CU320
8 digital inputs	X	-	X	-
8 bidirectional inputs/outputs (DI/DO)	X	-	X	-
Temperature sensor connection (KTY84/ PTC)	X	X	<sup>-1)</sup>	<sup>-1)</sup>
Auxiliary voltage output (+24 V)	X	X	X	X <sup>2)</sup>
Safety function ("Safe Torque Off/ Safe Stop 1")	X	X	<sup>-1)</sup>	<sup>-1)</sup>

<sup>1)</sup> Connection is provided on the separate customer terminal block –X55 with Booksize Cabinet Kits

<sup>2)</sup> Not on Line Modules

Terminal -X10 has a connector and a 24 V power supply is provided for servicing purposes. The maximum current rating is 250 mA. A cable cross-section of 0.14 to 1.5 mm<sup>2</sup> can be connected.

### Terminal assignment



Terminal assignment of customer terminal block -A55

Terminal block on -A55:	Factory setting	Comments
<b>-X4:</b>		
1	DI0	Free
2	DI1	Free
3	DI2	Free
4	DI3	Free
5	M1	
6	M	
7	DI/DO8	Free
8	DI/DO9	Free
9	M	
10	DI/DO10	Free
11	DI/DO11	Free
12	M	
13	EP M1	Free
14	EP +24V	Free
15	- Temp	Free
16	+ Temp	Free
<b>-X5:</b>		
1	DI4	Free
2	DI5	Free
3	DI6	Free
4	DI7	Free
5	M2	
6	M	
7	DI/DO12	Free
8	DI/DO13	Free
9	M	
10	DI/DO14	Free
11	DI/DO15	Free
12	M	
13	M	Reserved
14	+24 V	
15	Free	
16	Free	
<b>-X10:</b>		
1	M	
2	P24	24 V power supply from the CU320, for servicing purposes only, max. load of 250 mA

# SINAMICS S120 Cabinet Modules

## Open-loop and closed-loop control – CU320 Control Unit

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### Open-loop and closed-loop control – CU320 Control Unit



#### Overview

The communication, open-loop and closed-loop control functions for one or more Motor Modules and Line modules are handled by a CU320 Control Unit. The Control Units are designed for multi-motor operation as standard.

If a separate cabinet is provided for open-loop and closed-loop control, and the CU320 is not to be installed in the Cabinet Modules (as is the case with options K90 or K91), the CU320 and matching CompactFlash card can be ordered separately in accordance with the required performance level. The different performance levels enable the application to be adapted to the computer performance of the Control Unit in a function-orientated manner.

#### Structure



CU320 Control Unit, without guard cover

CU320 Control Units feature the following interfaces as standard:

- 4 x DRIVE-CLiQ sockets for communication with other DRIVE-CLiQ devices, e.g. Motor Modules, Active Line Modules, Sensor Modules, Terminal Modules
- 1 x PROFIBUS interface
- 8 x parameterizable digital inputs (floating)  
8 x parameterizable bidirectional digital inputs/digital outputs (not floating), of which 6 are high-speed digital inputs
- 1 serial RS232 interface
- 1 x option slot
- 3 test sockets and one ground reference for commissioning support
- 1 connection for the electronics power supply via the 24 V DC power supply connector
- 1 PE (protective earth) connection
- 1 x ground connection

There is a shield connection for the option module's signal line shield on the CU320 Control Unit.

The available option slot is used to expand the interfaces in order to include additional terminals or for communication purposes, for example.

The status of the CU320 Control Unit is indicated by multi-colored LEDs.

As the firmware parameter settings and languages for AOP30 operation are stored on a plug-in CompactFlash card, the Control Unit can be changed without the need for tools.



### Selection and ordering data

If you select option K90 or K91, the CU320 Control Unit will be installed in the Cabinet Modules fully wired. If you would prefer a centralized arrangement involving external cabinets, you can order the CU320 separately.

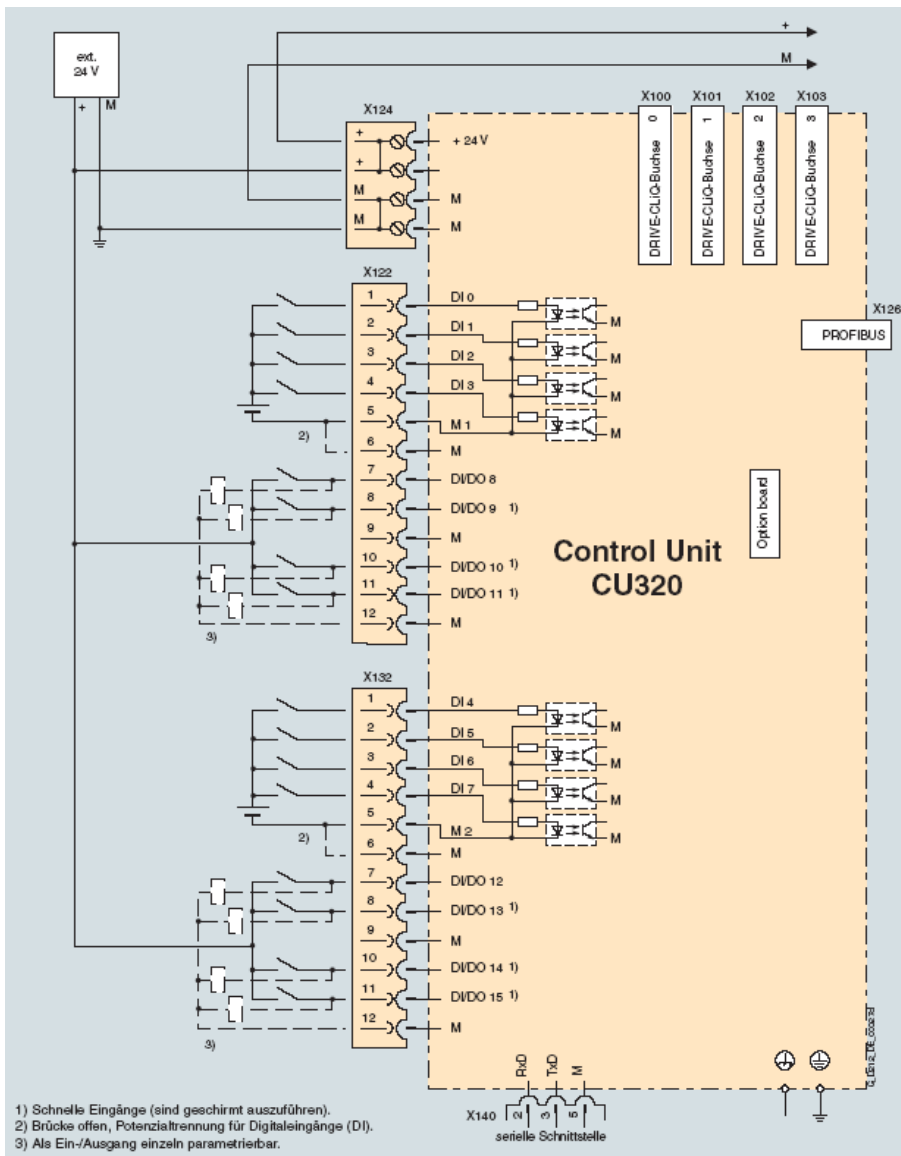
Description	Order no.
CU320 Control Unit (without CompactFlash card)	6SL3040-0MA00-0AA1

### Integration

DRIVE-CLiQ components such as Motor Modules and Active Line Modules can be connected to a CU320 Control Unit. The number of modules depends on the performance required, including the operating mode and additional functions. The CU320 Control Unit and other connected components are commissioned and diagnosed with the STARTER commissioning tool.

Communication between a CU320 Control Unit and the connected components takes place via DRIVE-CLiQ.

If a drive line-up requires more than one Control Unit, the number can be increased accordingly. The Control Units are then interconnected via PROFIBUS on a higher-level controller as standard. If the Control Unit is to be integrated into the cabinet, option G33 can be selected so that PROFINET IO is specified as communication path.



CU320 Control Unit connection diagram without S120 Cabinet Modules customer interface

# SINAMICS S120 Cabinet Modules

## Open-loop and closed-loop control – CompactFlash Card

### Technical data

Control Unit CU320	
Max. power requirements (at 24 V DC) without taking digital outputs and option slot expansion into account	0.8 A
Max. connectable cross-section	2.5 mm <sup>2</sup>
Max. fuse protection	20 A
Digital inputs	8 floating digital inputs 8 bidirectional, non-floating digital inputs/outputs
▪ Voltage	-3 V to 30 V
▪ Low level (an open digital input is interpreted as "low")	-3 V to 5 V
▪ High level	15 V to 30 V
▪ Current consumption (typ. at 24 V DC)	10 mA
▪ Signal propagation delays for digital inputs	L → H: Approx. 50 µs H → L: Approx. 100 µs
▪ Signal propagation delays for high-speed digital inputs (high-speed digital inputs can be used for position detection)	L → H: Approx. 5 µs H → L: Approx. 50 µs
▪ Max. connectable cross-section	0.5 mm <sup>2</sup>
Digital outputs (sustained short-circuit-proof)	8 bidirectional, non-floating digital outputs/inputs
▪ Voltage	24 V DC
▪ Max. load current per digital output	500 mA
▪ Max. connectable cross-section	0.5 mm <sup>2</sup>
Power loss	20 W
PE connection	On housing with M5 screw
Ground connection	On housing with M5 screw
Width	50 mm
Height	270 mm
Depth	226 mm
Weight, approx.	1.5 kg

## Open-loop and closed-loop control – CompactFlash Card



### Overview

The firmware parameter settings and operating panel languages are stored on the CompactFlash card, which is plugged into the CU320 Control Unit. The CompactFlash card is plugged into an appropriate slot on the CU320.

### Structure

A single CU320 Control Unit is capable of handling the communication, open-loop and closed-loop control functions for several Motor Modules. Computer performance requirements increase in proportion to the number of connected Motor Modules and system components and in relation to the dynamic response required. Full CU320 Control Unit computer performance is only available on systems with performance expansion 1.

The required level of computer performance/utilization depends on the control type and can be calculated with the SIZER configuration tool. The firmware options are supplied in license form, which are written to the CompactFlash card in the factory as license codes. The use of performance expansion 1 increases computer performance by 100 %.

The performance of the firmware on the CompactFlash card is scalable. The "Performance expansion 1" firmware option can be used to expand the CompactFlash card without enhancing performance.

The firmware options can also be enabled on-site if, for example, the performance expansions required are not known at the time of placing the order. The serial number of the CompactFlash card and the order number of the firmware option to be enabled are required for this purpose. With this information it is possible to purchase the associated license code

from a license database and enable the firmware option. The license code is only valid for the CompactFlash card declared and cannot be transferred to other CompactFlash cards.

### Selection and ordering data

Description	Order no.
<b>CompactFlash Card</b> With up-to-date firmware version including certificate of license, <b>without</b> performance expansion	<b>6SL3054-0AA00-1AA0</b>
<b>CompactFlash Card</b> With up-to-date firmware version including certificate of license, <b>with</b> performance expansion 1 firmware option	<b>6SL3054-0AA01-1AA0</b>
<b>License firmware</b> Performance enhancement 1 firmware option for CompactFlash card including certificate of license	<b>6SL3074-0AA01-0AA0</b>

### Firmware version

The firmware version is always encoded in the order number of the shipped CompactFlash card, i.e. the order number of the shipped CompactFlash card does not necessarily have to match the number of the card ordered. The most up-to-date firmware version is always supplied with the above CompactFlash cards.

The firmware version is encoded as follows in the order number:

Order no.: 6SL3054-0 ■■0 ■-1AA0	
<b>Firmware version</b>	<b>1</b>
	<b>2</b>
	<b>3</b>
	<b>4</b>
<b>Version</b>	<b>.1</b>
	<b>.2</b>
	<b>.3</b>
	<b>.4</b>
	<b>.5</b>
	<b>.6</b>
Without performance expansion	<b>0</b>
With performance expansion 1	<b>1</b>

This means that it is possible to specify a specific firmware version or the most recent firmware version in a replacement part order, if required.

### Example:

A CompactFlash card with order number 6SL3054-0AA00-1AA0 is ordered (as specified in the catalog). The CompactFlash card with the most recent firmware version is confirmed and shipped, e.g., order number 6SL3054-0CE00-1AA0 for firmware version 2.4. In this way, it is possible to specify a specific firmware version or the most recent firmware version in a replacement part order.

### Supplementary system components

#### Sensor Module Cabinet-Mounted

##### ■ Sensor module for resolvers/SMC10



The SMC10 Sensor Module Cabinet-Mounted is required to evaluate the encoders of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC10.

The following encoder signals can be evaluated:

- 2-pole resolver
- Multi-pole resolver

The motor temperature can also be detected using KTY84-130 or PTC thermistors.

The SMC10 Sensor Module Cabinet-Mounted features the following interface in the Cabinet Module:

- 1 encoder connection including motor temperature detection (KTY84-130 or PTC) via SUB-D connector

The status of the SMC10 Sensor Module Cabinet-Mounted is indicated by multi-colored LED.

The SMC10 Sensor Module Cabinet-mounted communicates with the closed-loop control system via DRIVE-CLiQ. If option K46 is selected, the SMC10 will be fully integrated into the Cabinet Module. This means that internal hardware cabinet configuration is not necessary.

##### ■ Sensor Module for sin/cos incremental encoder or EnDat/SMC20 absolute value encoder



The SMC20 Sensor Module Cabinet-Mounted is required to evaluate the encoders of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC20.

The following encoder signals can be evaluated:

- Sin/cos incremental encoder 1 V<sub>pp</sub>
- EnDat absolute value encoder
- SSI encoder with incremental signals sin/cos 1 V<sub>pp</sub>

The motor temperature can also be detected using KTY84-130 or PTC thermistors.

The SMC20 Sensor Module Cabinet-Mounted features the following interface in the Cabinet Module:

- 1 encoder connection including motor temperature detection (KTY84-130 or PTC) via SUB-D connector

The status of the SMC20 Sensor Module Cabinet-mounted is indicated by a multi-colored LED.

The SMC20 Sensor Module Cabinet-Mounted communicates with the closed-loop control system via DRIVE-CLiQ. If option K48 is selected, the SMC20 will be fully integrated into the Cabinet Module. This means that internal hardware cabinet configuration is not necessary.

#### ■ Sensor Module for TTL and HTL incremental encoders/SMC30



The SMC30 Sensor Module Cabinet-Mounted is required to evaluate the encoders of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC30.

The following encoder signals can be evaluated:

- TTL/HTL incremental encoders with/without open-circuit detection
- SSI encoder with TTL/HTL incremental signals
- SSI encoder without incremental signals

The motor temperature can also be detected using KTY84-130 or PTC thermistors.

The SMC30 Sensor Module Cabinet-Mounted features the following interfaces in the Cabinet Module:

- 1 encoder connection including motor temperature detection (KTY84-130 or PTC) via SUB-D connector
- or
- 1 encoder connection including motor temperature detection (KTY84-130 or PTC) via terminals

The status of the SMC30 Sensor Module Cabinet-Mounted is indicated by a multi-colored LED.

The SMC30 Sensor Module Cabinet-Mounted communicates with the closed-loop control system via DRIVE-CLiQ. If option K50 is selected, the SMC30 will be fully integrated in the Cabinet Module. This means that internal hardware cabinet configuration is not necessary.

### AOP30 Advanced Operator Panel



#### ■ Overview

The user-friendly AOP30 advanced operator panel is an input/output device that can be used with SINAMICS S120 Cabinet Modules (select option K08 in conjunction with option K90/K91) and is installed in the cabinet door of the relevant Cabinet Module.

It has the following features and characteristics:

- Graphic LCD display with backlighting for plain text display and a bar display for process variables
- Operating panel languages: Chinese, English, German, French, Italian, and Spanish; the following languages are available on request: Russian, Polish, Czech
- LEDs for display of the operating modes
- Help function suggesting causes of and solutions for faults and warnings
- Keypad for operational control of a drive
- Local/remote switchover for selecting the input point (priority assigned to operator panel or customer terminal block/PROFIBUS)
- Numeric keypad for entering setpoint or parameter values
- Function keys for prompted navigation in the menu
- Two-stage security concept to protect against accidental or unauthorized changes to settings  
Operation of the drive from the operator panel can be disabled by the keyboard lock so that only parameter values and process variables can be displayed on the operating panel. A password can be used to prevent the unauthorized modification of converter parameters.
- IP54 degree of protection (when installed).

The AOP30 communicates with the SINAMICS drive via a serial interface (RS232) with PPI protocol. It is possible to connect an AOP30 for each CU320 Control Unit.

If a Control Unit is responsible for more than just one power unit (multi-motor operation), a configuration facilitating simultaneous indication on one display unit of the parameters, warnings and faults relating to all the devices connected to the CU320 can be parameterized.

#### ■ Structure

The AOP30 is an operator panel with graphic display and membrane keyboard. An RS232 interface is used as the interface to the drive unit. The device can be installed in a cabinet door (thickness: between 2 mm and 4 mm).

Features:

- Display with green backlighting (resolution: 240 x 64 pixels)
- 26-key membrane keyboard
- Connection for a 24 V power supply
- RS232 interface
- Time and date memory with internal battery backup
- 3 LEDs to signal the drive's operating mode
  - RUN (operation)      Green
  - ALARM (warning)      Yellow
  - FAULT (fault)      Red

### ■ Selection and ordering data

If you select option K08, the AOP30 will be installed in the cabinet door fully wired. No further connections need to be made and no other materials are required.

The AOP30 may be omitted if the drive is only operated via PROFIBUS, for example, and no local display is required on the cabinet. The AOP30 can then be used simply for commissioning purposes and to obtain diagnostic information, in which case it is plugged into the RS232 interface on the CU320.

The advanced operator panel can be ordered separately for this purpose. As well as the AOP30, a connecting cable is required for connection to the Control Unit. In addition to this, an external 24 V power supply is required in order to operate the AOP30 (max. 250 mA power demand; max. 10 m serial connecting cable length).

Description	Order no.
AOP30 Advanced Operator Panel	<b>6SL3055-0AA00-4CA3</b>

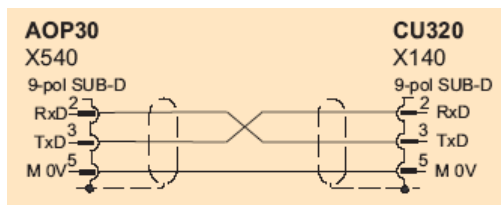
### ■ Accessories

The AOP30 is connected to the CU320 by means of a serial connecting cable (RS232 cable).

The max. cable length is 10 m.

Description	Order no.
<b>RS232 connecting cable for connecting the AOP30 to the CU320</b>	
Length	
1 m	<b>6FX8002-1AA01-1AB0</b>
2 m	<b>6FX8002-1AA01-1AC0</b>
3 m	<b>6FX8002-1AA01-1AD0</b>
4 m	<b>6FX8002-1AA01-1AE0</b>
5 m	<b>6FX8002-1AA01-1AF0</b>
6 m	<b>6FX8002-1AA01-1AG0</b>
7 m	<b>6FX8002-1AA01-1AH0</b>
8 m	<b>6FX8002-1AA01-1AJ0</b>
9 m	<b>6FX8002-1AA01-1AK0</b>
10 m	<b>6FX8002-1AA01-1BA0</b>

These special cables are recommended for interference-proof communication, since it is preferable to use a shielded cable with a cable shield connected to both connector housings.



### Signal cables



### ■ Overview

Communication between the Control Unit, the power units and other active SINAMICS components occurs via DRIVE-CLiQ, the drive's internal serial interface.

Cabinet Modules are shipped with all DRIVE-CLiQ connections already wired within the cabinet. This applies regardless of any options ordered. Connections between cabinets cannot be pre-wired on shipped units, as the customer's final implementation requirements cannot be determined from the order and the extremely wide range of connection/topology options would make pre-wiring impossible. This also applies to connections which extend beyond a Booksize Cabinet Kit. These cable connections must be ordered separately.

For this purpose, signal cables are available in prefabricated format or by the meter.

Alternatively, "order-specific integration engineering" can be used to order fully configured cabinet units: in this case it is even more important to consider which additional cables will be required within the cabinets.

# SINAMICS S120 Cabinet Modules

## Supplementary system components

### Field of application

DRIVE-CLiQ cables are used to connect components with DRIVE-CLiQ connections, having a separate or external 24 V DC power supply.

Prefabricated cables are provided for cabinet-internal connections involving distances of up to 70 meters.

For connections outside the cabinet – for example, between Motor Modules and Sensor Modules or Motor Modules and motors with a DRIVE-CLiQ interface – MOTION-CONNECT 500 DRIVE-CLiQ cables can also be used where there are more stringent requirements in terms of mechanical stress or resistance to oil, for example. These are available in specified lengths up to a maximum of 100 meters.

### Selection and ordering data

Signal line	Length	Order no.
Prefabricated DRIVE-CLiQ cables (IP20/IP20 degree of protection)	0.11 m	<b>6SL3060-4AB00-0AA0</b>
In specific lengths	0.16 m	<b>6SL3060-4AD00-0AA0</b>
	0.21 m	<b>6SL3060-4AF00-0AA0</b>
	0.26 m	<b>6SL3060-4AH00-0AA0</b>
	0.36 m	<b>6SL3060-4AM00-0AA0</b>
	0.60 m	<b>6SL3060-4AU00-0AA0</b>
	0.95 m	<b>6SL3060-4AA10-0AA0</b>
	1.20 m	<b>6SL3060-4AW00-0AA0</b>
	1.45 m	<b>6SL3060-4AF10-0AA0</b>
	2.80 m	<b>6SL3060-4AJ20-0AA0</b>
	5.00 m	<b>6SL3060-4AA50-0AA0</b>
Prefabricated cables in exact lengths, max. 70 m		<b>6FX2002-1DC00-1□□0</b>
	In tens	
	0	<b>A</b>
	10	<b>B</b>
	20	<b>C</b>
	30	<b>D</b>
	40	<b>E</b>
	50	<b>F</b>
	60	<b>G</b>
	70	<b>H</b>
	In single units	
	0	<b>A</b>
	1	<b>B</b>
	2	<b>C</b>
	3	<b>D</b>
	4	<b>E</b>
	5	<b>F</b>
	6	<b>G</b>
	7	<b>H</b>
	8	<b>J</b>
	9	<b>K</b>
Prefabricated cables in exact lengths (MOTION-CONNECT 500), incl. 24 V supply line, max. 100 m	IP20/IP20 IP20/IP67 IP67/IP67	<b>6FX5002-2DC00-□□□0</b> <b>6FX5002-2DC10-□□□0</b> <b>6FX5002-2DC20-□□□0</b>
	0	<b>1</b>
	100	<b>2</b>
	0	<b>A</b>
	10	<b>B</b>
	20	<b>C</b>
	30	<b>D</b>
	40	<b>E</b>
	50	<b>F</b>
	60	<b>G</b>
	70	<b>H</b>
	80	<b>J</b>
	90	<b>K</b>
	0	<b>A</b>
	1	<b>B</b>
	2	<b>C</b>
	3	<b>D</b>
	4	<b>E</b>
	5	<b>F</b>
	6	<b>G</b>
	7	<b>H</b>
	8	<b>J</b>
	9	<b>K</b>



## SINAMICS S120 Cabinet Modules



### Supplementary system components

In addition to the prefabricated DRIVE-CLiQ cables, cables can also be ordered by the meter according to customer cabling requirements. The customer must then cut these to the required length and fix them in place.

Length code for cables (by the meter)	6FX2008-1DC00- □ □ □ 0
0 m	1
100 m	2
200 m	3
300 m	4
0 m	A
10 m	B
20 m	C
30 m	D
40 m	E
50 m	F
60 m	G
70 m	H
80 m	J
90 m	K
0 m	A
1 m	B
2 m	C
3 m	D
4 m	E
5 m	F
6 m	G
7 m	H
8 m	J
9 m	K
<b>Examples:</b>	
2 m	6FX2008-1DC00- 1 A C 0
8 m	6FX2008-1DC00- 1 A J 0
145 m	6FX2008-1DC00- 2 E F 0

			Cables (by the meter)			
			6FX2008-1DC00-....			
Connector type	PIN	Signal name	Core color	Signal name	PIN	Connector type
RJ45/IP20 <sup>1)</sup>	1		Green		3	RJ45/IP20 <sup>1)</sup>
	2		Yellow		6	
	3		Pink		1	
	6		Blue		2	
	Yes		Outer shield at the connector housing		Yes	

#### Signal connectors for SINAMICS

	Design/scope of delivery	Designation	Packaging unit	Order number <sup>1)</sup>
<b>RJ45/IP20</b>	Connector insert, connector housing, small parts 	Signal connector with: 4 data contacts plus 2 current contacts, crimp design	1 set	Y-conkit-11
<b>Crimping tool RJ45</b>		Crimping tool for 1-step crimping RJ45/IP67 and RJ45/IP20		Y-Con Tool-11

1) Available from: Yamaichi,  
[www.Yamaichi.com](http://www.Yamaichi.com)

# SINAMICS S120 Cabinet Modules

## Supplementary system components

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### CBC10 Communication Board



#### ■ Overview

Option G20 selects the CBC10 communication board, which can be used to connect the SINAMICS S120 drive system to a CAN-protocol (Controller Area Network) via a CU320 Control Unit. The board's driver software fulfills the standards of the following CANopen specification of the CiA organization (CAN in Automation):

- Communication profiles in accordance with DS 301
- Drive profile in accordance with DSP 402 (in this case Profile Velocity Mode)
- EDS (Electronic Data Sheet) in accordance with DSP 306
- Operational status signaling in accordance with DSP 305

The CAN interface on the CBC10 has 2 SUB-D connections in each case of input and output.

#### ■ Accessories

The following plugs are recommended:

Description	Order No.
<b>SUB_D_connector</b> , 9-pin, female (3x)	<b>6FC9341-2AE</b>
<b>SUB_D_connector</b> , 9-pin, male (3x)	<b>6FC9341-2AF</b>

### CBE20 Communication Board



#### ■ Overview

Option G33 selects the CBE20 communication board, which can be used to connect the SINAMICS S120 drive system to a PROFINET IO network via a CU320 Control Unit. The Cabinet Modules then assume the function of a PROFINET IO device and offer the following functions:

- PROFINET IO device functions
- 100 Mbit/s full duplex
- Support for real-time classes of PROFINET IO:
  - RT (RealTime)
  - IRT (Isochronous RealTime)
- Connection to controls as PROFINET IO devices using PROFIdrive in accordance with specification V4
- Standard TCP/IP communication for engineering processes using the STARTER drive/commissioning software
- Integrated 4-port switch with four RJ45 sockets based on the PROFINET ASIC ERTEC400. The optimum topology (line, star, tree) can, therefore, be configured without additional external switches.

### ■ Accessories

The PROFINET cables and connectors listed below are recommended:

Description	Order no.
Industrial Ethernet FC	
RJ45 Plug 145 (1x)	<b>6GK1901-1BB30-0AA0</b>
RJ45 Plug 145 (10x)	<b>6GK1901-1BB30-0AB0</b>
Stripping tool	<b>6GK1901-1GA00</b>
Standard GP 2x2 cable	<b>6XV1840-2AH10</b>
Flexible GP 2x2 cable	<b>6XV1870-2B</b>
Trailing GP 2x2 cable	<b>6XV1870-2D</b>
Trailing 2x2 cable	<b>6XV1840-3AH10</b>
Marine 2x2 cable	<b>6XV1840-4AH10</b>

### Auxiliary supply on the auxiliary busbar system of the Cabinet Modules

To ensure a 24 V DC power supply for the open-loop and closed-loop control systems, and the power supply for the fans (380 – 480 V or 500 – 690 V), the auxiliary busbar systems within the Cabinet Modules should be provided with 24 V DC or 2-phase 380 – 480 V AC/2-phase 500 – 690 V AC from an external source. The power required is clearly stated in the technical data relating to the individual Cabinet Module.

The infeed connectors listed in the table are required in order to connect the infeed to the auxiliary busbar system. If additional cabinets are required by the plant (which should also be supplied with the auxiliary busbar system), the busbars and connectors used in the Cabinet Modules can be ordered separately.

Description	Order no.	Quantity
125 A infeed connector	<b>5ST2546</b>	1
100 A connector (2-pole)	<b>5ST2545</b>	1
6-pole busbar, length:		
390 mm	<b>5ST2540</b>	1
590 mm	<b>5ST2541</b>	1
790 mm	<b>5ST2542</b>	1
990 mm	<b>5ST2543</b>	1
1190 mm	<b>5ST2544</b>	1

### Mounting aid



Power block support for installing and removing the power blocks for the Basic Line Modules, Smart Line Modules, Active Line Modules and chassis format Motor Modules.

It is used as a mounting aid, placed in front of the Cabinet Modules and attached to the chassis. The telescopic rails allow this device to be adjusted according to the height at which the power blocks are installed. Once the mechanical and electrical connections have been undone, the power block can be removed from the Chassis, whereby it is guided and supported by the guide rails on the block support.

### ■ Selection and ordering data

Description	Order no.
Power block support for installing and removing of power blocks	<b>6SL3766-1FA00-0AA0</b>

### Notes on Configuration

#### SINAMICS Engineering Manual Low Voltage

SINAMICS S120 Cabinet Modules form an easy-to-configure cabinet system. The standard components can be used in a variety of combinations with a flexible range of options, and are secured against any potential invalid input thanks to specifications made during the ordering process.

The SINAMICS Engineering Manual contains detailed information about how to configure individual modules and options as well as information about higher-level systems. In addition to providing explanations of device and configuration details, the comprehensive information in the Engineering Manual also includes dimensional drawings of all Cabinet Modules.

The Engineering Manual is available from your Siemens contact.

#### General configuration process

The starting point for a drive configuring process is determined by the performance requirements of individual machines in the drive line-up. The definition of components is based on physical dependencies and is usually carried out as follows:

Step	Description of the configuration process
1.	Clarify the type of drive and line supply <ul style="list-style-type: none"><li>• Basic Line Module</li><li>• Smart Line</li><li>• Active Line Module</li></ul>
2.	Specify the supplementary conditions and the nature of integration in the automation system
3.	Specify the loading case, calculate the max. load torque, define the motor
4.	Specify the SINAMICS S120 Motor Module
5.	Repeat steps 3 and 4 for any further drives
6.	Calculate the required DC link power, taking into account the demand factor, and specify the SINAMICS S120 Line Module
7.	If the DC link power required is calculated to be such that a parallel connection of Line Modules is needed to provide the necessary infeed, then the correct Line Modules for the parallel connection must be selected. Only Line Modules with the same output rating may be connected in parallel. Note the derating data.
8.	Select the Line Connection Modules based on the assignment table (please refer to section entitled "Line Connection Modules")
9.	Determine the line-side power options (main circuit breaker, fuses, line reactors, etc.)
10.	Check the DC link pre-charging values by calculating the DC link capacitance
11.	Specify additional system components
12.	Calculate the power demand of the electronics 24 V DC (Refer to technical data for the Cabinet Modules) and optional components
13.	Calculate the power demand of the components 230 V AC (Refer to technical data for the Cabinet Modules)
14.	Calculate the power demand of the fans 2-phase 380 – 480 V / 500 – 690 V AC (Refer to technical data for the Cabinet Modules)
15.	If the auxiliary power cannot be supplied from an external source, select the auxiliary power supply source (external supply, option K76, Auxiliary Power Supply Modules)
16.	Determine the control performance required, select the SINAMICS S120 Control Unit and CompactFlash card and specify the component wiring (DRIVE-CLiQ topology)
17.	Determine the connection components. Select the DRIVE-CLiQ cables including those which need to be installed and connected in the existing plant. Determine the PROFIBUS cables if components are to communicate via PROFIBUS and PROFIBUS links need to be set up between multiple CU320 Control Units. An "Order-specific integration engineering" can be ordered as an option (see next page).
18.	Plan the layout of the devices and components in the drive line-up; specify mandatory selections: side walls and DC link busbars
19.	Division of the cabinet row into transport units

## Order-specific integration engineering for SINAMICS S120 Cabinet Modules

### Overview

Like the SINAMICS S120 built-in units, SINAMICS S120 Cabinet Modules form a modular drive system that consists of various intelligent “drive objects” (DO) such as Line Modules, Motor Modules, Control Units, Sensor Modules, etc.

In contrast to the SINAMICS G150/S150, in which the DO topology is clearly defined and can, therefore, be generated automatically, with the SINAMICS S120 modular drive system it is necessary to configure the drive objects individually before the actual commissioning process can begin.

SINAMICS S120 Cabinet Modules are supplied with documentation that relates exclusively to the individual Cabinet Module (current diagram, layout diagram, terminal diagram). Higher-level documentation covering the signal connections between the individual Cabinet Modules that make up the order is not included as standard. Purely mechanical assembly of individual Cabinet Modules to create transport units can be ordered by selecting option Y11.

It is not possible for the DOs to be configured automatically at the factory or the appropriate documentation to be created, since the open system means that any number of combinations is supported. The topology that is most suitable in each case depends on a variety of order-specific, supplementary conditions, such as the technological interaction between individual drives/axes, the required closed-loop control performance, and so on.

In general, the integration engineering that is required will be carried out either by a system integrator or by the customer themselves. The SIZER and STARTER tools offer effective support in this area.

In the case of orders where neither a system integrator nor the customer will be taking care of integration engineering, this work can be ordered as an additional service to supplement the Cabinet Modules order.

### Range of services

The following services are available:

- Checking of combinations and options ordered in relation to the device configurations
- Determining how the individual drive objects (DO) are to be connected; if necessary, this can be agreed with the customer. Checking the CompactFlash card performance ordered.
- Assembling the required DRIVE-CLiQ cables within the transport units. Connecting cables between transport units on one side.
- Provision of documentation relating to the delivery (layout diagram, circuit diagram, terminal diagram, dimension drawing, spare parts list).

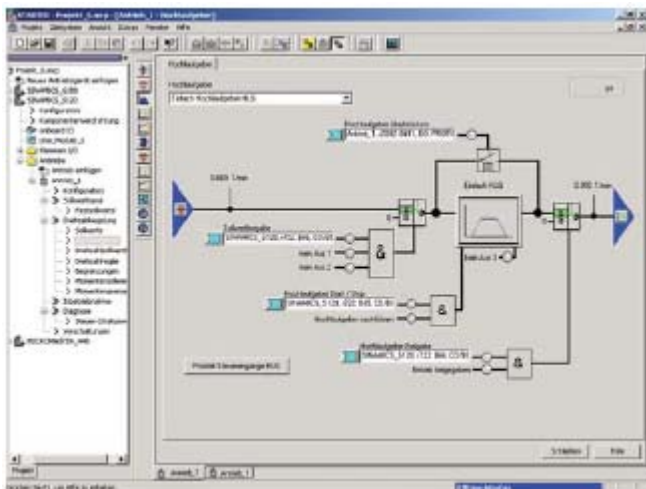
### Selection and ordering data

The following engineering services can be ordered depending on the number of drives/axes involved in an order:

Integration engineering for	Order no.
1 drive (also parallel connection), incl. corresponding Line Modules, Sensor Modules, Terminal Modules, etc.	<b>6SL3780-0AA00-0AA0</b>
Up to 3 drives (also parallel connection), incl. corresponding Line Modules, Sensor Modules, Terminal Modules, etc.	<b>6SL3780-0AC00-0AA0</b>
Up to 5 drives (also parallel connection), incl. corresponding Line Modules, Sensor Modules, Terminal Modules, etc.	<b>6SL3780-0AE00-0AA0</b>
Up to 10 drives (also parallel connection), incl. corresponding Line Modules, Sensor Modules, Terminal Modules, etc.	<b>6SL3780-0AJ00-0AA0</b>

Engineering services for larger drive systems are available on request.

### Engineering software – STARTER commissioning tool



#### Overview

The user-friendly STARTER drive/commissioning software can be used for:

- Commissioning
- Optimizing
- Diagnostics.

This software can either be operated as a stand-alone PC application or can be integrated into the SCOUT engineering system (with SIMOTION) or STEP 7 (using Drive ES Basic). The basic functions and handling are the same in both cases. In addition to the SINAMICS drives, the current version of STARTER also supports MICROMASTER 4 devices and frequency converters for the SIMATIC ET 200S FC decentralized peripherals.

The project wizards can be used to create the drives within the structure of the project tree.

Support for beginners is provided by solution-based dialog guidance, whereby a standard graphics-based display maximizes clarity when setting the drive parameters.

First-time commissioning is guided by wizards, which create all the basic settings within the drive. Thus, getting a motor up and running is merely a question of setting a few parameters as part of the drive configuration process.

The individual settings required are created using graphics-based parameterization screen forms, which also display the mode of operation.

Possible individual settings include:

- Terminals
- Bus interface
- Setpoint channel (e.g. fixed setpoints)
- Closed-loop speed control (e.g. ramp-function generator, limits)
- BICO interconnections
- Diagnostics

Experts are able to gain rapid access to the individual parameters via the Expert List and do not have to navigate dialogs.

In addition, the following functions are available for optimization purposes:

- Self-optimization
- Trace (depending on drive)

Diagnostics functions provide information about:

- Control/status words
- Parameter status
- Operating conditions
- Communication states

Performance features

- User-friendly: Only a small number of settings need to be made for successful first commissioning: Axis turning
- Solution-orientated, dialog-based user guidance simplifies commissioning
- Self-optimization functions reduce manual effort for optimization
- The built-in trace function provides optimum support during commissioning, optimization and troubleshooting.

### Minimum hardware and software requirements:

PG or PC with Pentium™ II 400 MHz (Windows™ 2000), Pentium™ III 500 MHz (Windows™ XP)  
256 MB RAM (512 MB recommended)  
Monitor resolution: 1024×768 pixels  
Windows™ 2000 SP3, XP Professional SP1  
Microsoft Internet Explorer 5.01

### **Integration**

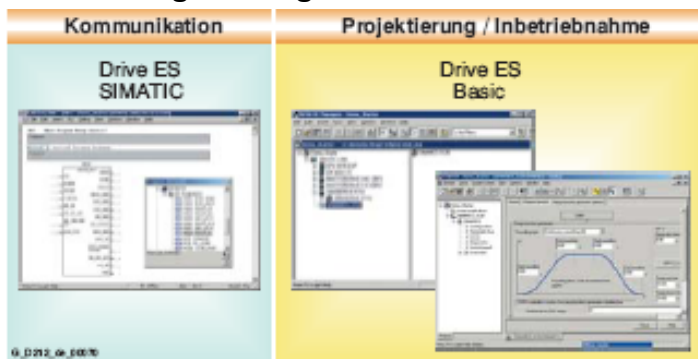
A PROFIBUS communications module and a connecting cable are required to make the communication link between the PG/PC and a Control Unit.

For example, the following can be used: CP 5512 PROFIBUS communications module (PCMCIA type 2 card + adapter with 9-pin SUB-D socket for connection to PROFIBUS. For Windows 2000/XP Professional and PCMCIA 32), order no.: 6GK1551-2AA00, and connecting cable between CP 5512 and PROFIBUS, order no.: 6ES7901-4BD00-0XA0. Alternatively, communication can be established via the serial interface of the CU320 Control Unit. A null modem cable is required for this purpose.

### **Selection and ordering data**

Description	Order no.
STARTER commissioning tool for SINAMICS and MICROMASTER (English/German/French/Italian)	<b>6SL3072-0AA00-0BG0</b>

### Drive ES engineering software



#### Overview

Drive ES is the engineering system used to integrate Siemens drive technology into the SIMATIC automation world easily, efficiently and cost-effectively in terms of communication, configuration and data management and the user interface, STEP 7 Manager, provides the ideal basis for this.

Various software packages are available for SINAMICS:

- **Drive ES Basic**

For taking your first steps into the world of Totally Integrated Automation and enjoying the benefits of routing beyond network boundaries and also the SIMATIC teleservice. Drive ES Basic is the basic software package for parameterizing all drives, both online and offline. With Drive ES Basic, the automation and drives are processed on the SIMATIC Manager screen. Drive ES Basic is the starting point for common data archiving for complete projects and also for extending the use of the SIMATIC teleservice to drives. Drive ES Basic provides the engineering tools for the new motion control functions - peer-to-peer data traffic and equidistance and isochronous operation with PROFIBUS DP.

- **Drive ES SIMATIC**

Allows easy parameter assignment of the STEP 7 communications program as an alternative to programming. Drive ES SIMATIC requires that STEP 7 has first been installed. It incorporates a SIMATIC block library; this means that the PROFIBUS interface can be simply and reliably programmed in the SIMATIC CPU for the drives. There is no longer any need for the separate, time-consuming programming of data exchange between the SIMATIC CPU and the drive.

All Drive ES users have to remember is:

Copy – Modify – Download – Ready.

Coordinated, fully developed function blocks are copied from the library into a user-specific project. Frequently required functions are completely programmed:

- Complete, read-out diagnostics buffer automatically from the drive
  - Complete parameter sets are automatically downloaded to the drive from the SIMATIC CPU, e.g. when a device has to be replaced.
  - Part parameter sets (e.g. for formula and product change) are automatically downloaded to the drive from the SIMATIC CPU
  - Complete parameter assignment or partial parameter sets are uploaded from the drive to the SIMATIC CPU, i.e. updated.
- **Drive ES PCS 7**  
Integrates drives with a PROFIBUS interface into the SIMATIC PCS 7 process control system. Drive ES PCS 7 requires a pre-installed SIMATIC PCS 7 process control system, Version 5.0 or higher. Drive ES PCS 7 provides a function block library with function blocks for the drives and the corresponding faceplates for the operator station. This means that the drives can be operated from the PCS 7 process control system.

For further information please visit our website:

<http://www.siemens.com/drivesolutions>



**Selection and ordering data**

Description	Order no.
<b>Drive ES Basic V5.4</b> <ul style="list-style-type: none"> <li>• Configuration software for the integration of drives into Totally Integrated Automation</li> <li>• Prerequisites: STEP 7, V5.3 and higher, SP 3</li> <li>• Delivery format: CD-ROM Ger, En, Fr, Sp, It With electronic documentation</li> </ul>	
Single license	<b>6SW1700-5JA00-4AA0</b>
Copy license, 60x	<b>6SW1700-5JA00-4AA1</b>
Update service for single-user license	<b>6SW1700-0JA00-0AB2</b>
Update service for copy license	<b>6SW1700-0JA00-1AB2</b>
Upgrade from V5.x to V5.4	<b>6SW1700-5JA00-4AA4</b>
<b>Drive ES SIMATIC V5.4</b> <ul style="list-style-type: none"> <li>• Function block library for SIMATIC for the parameterization of communication with the drives</li> <li>• Prerequisites: STEP 7, V5.3 and higher, SP 3</li> <li>• Delivery format: CD-ROM Ger, En, Fr, Sp, It With electronic documentation</li> </ul>	
Single-user license incl. 1x runtime license	<b>6SW1700-5JC00-4AA0</b>
Runtime license	<b>6SW1700-5JC00-1AC0</b>
Update service for single-user license	<b>6SW1700-0JC00-0AB2</b>
Upgrade from V5.x to V5.4	<b>6SW1700-5JC00-4AA4</b>
<b>Drive ES PCS 7 V6.1</b> <ul style="list-style-type: none"> <li>• Function block library for PCS 7 for the integration of drives</li> <li>• Prerequisites: PCS 7, V6 and higher.</li> <li>• Delivery format: CD-ROM Ger, En, Fr, Sp, It With electronic documentation</li> </ul>	
Single-user license incl. 1x runtime license	<b>6SW1700-6JD00-1AA0</b>
Runtime license	<b>6SW1700-5JD00-1AC0</b>
Update service for single-user license	<b>6SW1700-0JD00-0AB2</b>
Upgrade from V5.x to V6.1	<b>6SW1700-6JD00-1AA4</b>

## **Siemens AG**

Automation and Drives

Large Drives

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