

SIEMENS

Application Manual

SINAMICS

G120 / G120C / S120 Blocksize

Requirements when using converters in marine applications

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Using SINAMICS G120 / G120C / S120 Blocksize converters in marine applications




Application Manual

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Legal information

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This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Safety information

WARNING

Not observing fundamental safety instructions and residual risks

If the basic safety instructions and residual risks are not carefully observed in the Power Module documentation, accidents involving severe injuries or death may occur.

- Adhere to the fundamental safety instructions.
- When assessing the risk, take into account residual risks.

WARNING

Improper transport or installation of the Power Modules

Serious injury, or even death and substantial material damage can occur if the Power Modules are not transported or installed properly.

- Transport, install and remove the Power Modules only if you are fully qualified to do so.
- Take into account that in some cases the Power Modules are heavy and top-heavy – and take the necessary precautionary measures.
- Always secure the Power Modules when installing or removing by securely attaching them to crane hooks.
- Wear your personal protection equipment (e.g. safety shoes, gloves).

Introduction

This Manual describes the use of converters, based on PM240-2 Power Modules, for marine applications.

The same technical requirements regarding function, ruggedness and protection & safety apply for marine applications, just the same as for industrial applications. Therefore, reference is made to the standard documentation available for the components involved.

However, marine-specific operating conditions require restrictions and/or additional measures, which are explained in this Manual.

Components for marine applications

The converters discussed in this Manual are based on the following components. They are built-in types that are integrated in a control cabinet.

3.1 PM240-2 Power Modules

Table 3- 1 Overview of PM240-2 Power Modules

Voltage	Frame size (FS ...)	Power range (kW)	Integrated filter
1 AC / 3 AC 200 ... 240 V	A	0.55 / 0.75	Class A (C2) / without
	B	1.1 / 1.5 / 2.2	Class A (C2) / without
	C	3 / 4	Class A (C2) / without
3 AC 200 ... 240 V	C	5.5 / 7.5	Class A (C2) / without
	D	11 / 15 / 18.5	--- / without
	E	22 / 30	--- / without
	F	37 / 45 / 55	--- / without
3 AC 380 ... 480 V	A	0.55 / 0.75 / 1.1 / 1.5 / 2.2 / 3.0	Class A (C2) / without
	B	4 / 5.5 / 7.5	Class A (C2) / without
	C	11 / 15	Class A (C2) / without
	D	18.5 / 22 / 30 / 37	Class A (C2) / without
	E	45 / 55	Class A (C2) / without
	F	75 / 90 / 110 / 132	Class A (C2) / without
	G	160 / 200 / 250	Class A (C2) / C3
3 AC 500 ... 690 V	D	11 / 15 / 18.5 / 22 / 30 / 37	Class A (C2) / without
	E	45 / 55	Class A (C2) / without
	F	75 / 90 / 110 / 132	Class A (C2) / without
	G	160 / 200 / 250	--- / C3

The article numbers are completely listed in the following table.

Other Power Modules are not considered.

3.1 PM240-2 Power Modules

Table 3- 2 PM240-2 Power Modules

Voltage range	Power [kW]	PM240-2 without integrated Class A line filter Article No.	PM240-2 with integrated Class A line filter Article No.
1 AC / 3 AC 200 ... 240 V	0.55	6SL3210-1PB13-0UL0	6SL3210-1PB13-0AL0
	0.75	6SL3210-1PB13-8UL0	6SL3210-1PB13-8AL0
	1.1	6SL3210-1PB15-5UL0	6SL3210-1PB15-5AL0
	1.5	6SL3210-1PB17-4UL0	6SL3210-1PB17-4AL0
	2.2	6SL3210-1PB21-0UL0	6SL3210-1PB21-0AL0
	3	6SL3210-1PB21-4UL0	6SL3210-1PB21-4AL0
	4	6SL3210-1PB21-8UL0	6SL3210-1PB21-8AL0
3 AC 200 ... 240 V	5.5	6SL3210-1PC22-2UL0	6SL3210-1PC22-2AL0
	7.5	6SL3210-1PC22-8UL0	6SL3210-1PC22-8AL0
	11	6SL3210-1PC24-2UL0	---
	15	6SL3210-1PC25-4UL0	---
	18.5	6SL3210-1PC26-8UL0	---
	22	6SL3210-1PC28-0UL0	---
	30	6SL3210-1PC31-1UL0	---
	37	6SL3210-1PC31-3UL0	---
	45	6SL3210-1PC31-6UL0	---
	55	6SL3210-1PC31-8UL0	---
3 AC 380 ... 480 V	0.55	6SL3210-1PE11-8UL1	6SL3210-1PE11-8AL1
	0.75	6SL3210-1PE12-3UL1	6SL3210-1PE12-3AL1
	1.1	6SL3210-1PE13-2UL1	6SL3210-1PE13-2AL1
	1.5	6SL3210-1PE14-3UL1	6SL3210-1PE14-3AL1
	2.2	6SL3210-1PE16-1UL1	6SL3210-1PE16-1AL1
	3	6SL3210-1PE18-0UL1	6SL3210-1PE18-0AL1
	4	6SL3210-1PE21-1UL0	6SL3210-1PE21-1AL0
	5.5	6SL3210-1PE21-4UL0	6SL3210-1PE21-4AL0
	7.5	6SL3210-1PE21-8UL0	6SL3210-1PE21-8AL0
	11	6SL3210-1PE22-7UL0	6SL3210-1PE22-7AL0
	15	6SL3210-1PE23-3UL0	6SL3210-1PE23-3AL0
	18.5	6SL3210-1PE23-8UL0	6SL3210-1PE23-8AL0
	22	6SL3210-1PE24-5UL0	6SL3210-1PE24-5AL0
	30	6SL3210-1PE26-0UL0	6SL3210-1PE26-0AL0
	37	6SL3210-1PE27-5UL0	6SL3210-1PE27-5AL0
	45	6SL3210-1PE28-8UL0	6SL3210-1PE28-8AL0
	55	6SL3210-1PE31-1UL0	6SL3210-1PE31-1AL0
	75	6SL3210-1PE31-5UL0	6SL3210-1PE31-5AL0
	90	6SL3210-1PE31-8UL0	6SL3210-1PE31-8AL0
	110	6SL3210-1PE32-1UL0	6SL3210-1PE32-1AL0
	132	6SL3210-1PE32-5UL0	6SL3210-1PE32-5AL0
	160	6SL3210-1PE33-0CL0	6SL3210-1PE33-0AL0
	200	6SL3210-1PE33-7CL0	6SL3210-1PE33-7AL0
	250	6SL3210-1PE34-8CL0	6SL3210-1PE34-8AL0

Voltage range	Power [kW]	PM240-2 without integrated Class A line filter Article No.	PM240-2 with integrated Class A line filter Article No.
3 AC 500 ... 690 V	11	6SL3210-1PH21-4UL0	6SL3210-1PH21-4AL0
	15	6SL3210-1PH22-0UL0	6SL3210-1PH22-0AL0
	18.5	6SL3210-1PH22-3UL0	6SL3210-1PH22-3AL0
	22	6SL3210-1PH22-7UL0	6SL3210-1PH22-7AL0
	30	6SL3210-1PH23-5UL0	6SL3210-1PH23-5AL0
	37	6SL3210-1PH24-2UL0	6SL3210-1PH24-2AL0
	45	6SL3210-1PH25-2UL0	6SL3210-1PH25-2AL0
	55	6SL3210-1PH26-2UL0	6SL3210-1PH26-2AL0
	75	6SL3210-1PH28-0UL0	6SL3210-1PH28-0AL0
	90	6SL3210-1PH31-0UL0	6SL3210-1PH31-0AL0
	110	6SL3210-1PH31-2UL0	6SL3210-1PH31-2AL0
	132	6SL3210-1PH31-4UL0	6SL3210-1PH31-4AL0
	160	6SL3210-1PH31-7CL0	---
	200	6SL3210-1PH32-1CL0	---
	250	6SL3210-1PH32-5CL0	---

3.2 Control Units / Control Unit Adapter

Table 3- 3 Overview of the Control Units / Control Unit Adapter

CU230P-2	Use ¹⁾	Selection variant for G120 → used especially for pumps, fans and compressors
		Can be plugged onto Power Module PM240-2 ²⁾ ³⁾
	Variants considered	CU230P-2 HVAC / CU230P-2 DP / CU230P-2 PN
CU240E-2	Use ¹⁾	Selection variant for G120 → standard for general mechanical engineering applications
		Can be plugged onto Power Module PM240-2 ²⁾ ³⁾
	Variants considered	CU240E-2 / CU240E-2 F / CU240E-2 DP / CU240E-2 DP-F / CU240E-2 PN / CU240E-2 PN-F
CU250S-2	Use ¹⁾	Selection variant for G120 → mechanical engineering with high demands regarding accuracy and precision
		Can be plugged onto Power Module PM240-2 ²⁾
	Variants considered	CU250S-2 / CU250S-2 DP / CU250S-2 PN / CU250S-2 CAN
CUA	Use ¹⁾	Adapter for S120 AC Drive for drive lineups with external, higher-level control module (e.g. CU320-2)
		Plugged onto Power Module PM240-2
	Variants considered	CUA31 / CUA32
CUA20	Use ¹⁾	Adapter for installing the CU offset off the PM240-2 for marine applications. (Only suitable for CU230P-2, CU240E-2, CU250S-2.) (In combination with CU320-2, CUA31 or CUA32 are used.)
		A part that is plugged onto the Power Module PM240-2

¹⁾ The "Use" described here is restricted to use when combined with PM240-2 Power Modules.

²⁾ Generally, for marine applications, Control Units are installed offset off the Power Modules.

³⁾ In marine applications, CU230P-2 and CU240E-2 can be plugged directly onto PM240-2 Power Modules of frame size FSA, FSB, or FSC.

The article numbers are completely listed in the following table.

Other Control Units are not considered.

Table 3- 4 Control Units / Control Unit Adapter

Variant	Designation	Article No.
CU230P-2 series	CU230P-2 HVAC	6SL3243-0BB30-1HA3
	CU230P-2 DP	6SL3243-0BB30-1PA3
	CU230P-2 PN	6SL3243-0BB30-1FA0
CU240E-2 series	CU240E-2	6SL3244-0BB12-1BA1
	CU240E-2 DP	6SL3244-0BB12-1PA1
	CU240E-2 PN	6SL3244-0BB12-1FA0
	CU240E-2 F	6SL3244-0BB13-1BA1
	CU240E-2 DP-F	6SL3244-0BB13-1PA1
	CU240E-2 PN-F	6SL3244-0BB13-1FA0
CU250S-2 series	CU250S-2	6SL3246-0BA22-1BA0
	CU250S-2 DP	6SL3246-0BA22-1PA0
	CU250S-2 PN	6SL3246-0BA22-1FA0
	CU250S-2 CAN	6SL3246-0BA22-1CA0
Control Unit Adapter	CUA31	6SL3040-0PA00-0AA1
	CUA32	6SL3040-0PA01-0AA0
Control Unit Adapter Kit	CUA20	6SL3255-0BW01-0NA0

3.3 Operator Panels

Table 3- 5 Overview of the Operator Panels

BOP-2	Use ¹⁾	Operator panel for Control Units used with G120 and G120C ²⁾
IOP-2	Use ¹⁾	Operator panel for Control Units used with G120 and G120C ²⁾

¹⁾ The "Use" described here is restricted to use when combined with PM240-2 Power Modules.

²⁾ Can be plugged onto the CU; however, for marine applications, it is generally installed in cabinet doors using the door mounting kit 6SL3256-0AP00-0JA0

The article numbers are completely listed in the following table.

Other Operator Panels are not considered.

Table 3- 6 Operator Panels

Variant	Designation	Article No.
Basic Operator Panel	BOP-2	6SL3255-0AA00-4CA1
Intelligent Operator Panel	IOP-2	6SL3255-0AA00-4JA2

3.4 G120C compact converter

Table 3- 7 Overview of G120C compact converters

Voltage	Frame size (FS ...)	Power range (kW)	Communication (variants)	Integrated filter
380 ... 480 V 3 AC	AA	0.55 / 0.75 / 1.1 / 1.5 / 2.2	USS / PROFIBUS / PROFINET	Class A (C2) / without
	A	3.0 / 4.0	USS / PROFIBUS / PROFINET	Class A (C2) / without
	B	5.5 / 7.5	USS / PROFIBUS / PROFINET	Class A (C2) / without
	C	11 / 15 / 18.5	USS / PROFIBUS / PROFINET	Class A (C2) / without

The article numbers are completely listed in the following table.

Other compact converters are not considered.

Table 3- 8 Compact converter G120C (380 ... 480 V 3 AC)

Power [kW]	Communication type	SINAMICS G120C without line filter Article No.	SINAMICS G120C with line filter Article No.
0.55	USS	6SL3210-1KE11-8UB2	6SL3210-1KE11-8AB2
	PROFIBUS	6SL3210-1KE11-8UP2	6SL3210-1KE11-8AP2
	PROFINET	6SL3210-1KE11-8UF2	6SL3210-1KE11-8AF2
0.75	USS	6SL3210-1KE12-3UB2	6SL3210-1KE12-3AB2
	PROFIBUS	6SL3210-1KE12-3UP2	6SL3210-1KE12-3AP2
	PROFINET	6SL3210-1KE12-3UF2	6SL3210-1KE12-3AF2
1.1	USS	6SL3210-1KE13-2UB2	6SL3210-1KE13-2AB2
	PROFIBUS	6SL3210-1KE13-2UP2	6SL3210-1KE13-2AP2
	PROFINET	6SL3210-1KE13-2UF2	6SL3210-1KE13-2AF2
1.5	USS	6SL3210-1KE14-3UB2	6SL3210-1KE14-3AB2
	PROFIBUS	6SL3210-1KE14-3UP2	6SL3210-1KE14-3AP2
	PROFINET	6SL3210-1KE14-3UF2	6SL3210-1KE14-3AF2
2.2	USS	6SL3210-1KE15-8UB2	6SL3210-1KE15-8AB2
	PROFIBUS	6SL3210-1KE15-8UP2	6SL3210-1KE15-8AP2
	PROFINET	6SL3210-1KE15-8UF2	6SL3210-1KE15-8AF2
3	USS	6SL3210-1KE17-5UB1	6SL3210-1KE17-5AB1
	PROFIBUS	6SL3210-1KE17-5UP1	6SL3210-1KE17-5AP1
	PROFINET	6SL3210-1KE17-5UF1	6SL3210-1KE17-5AF1
4	USS	6SL3210-1KE18-8UB1	6SL3210-1KE18-8AB1
	PROFIBUS	6SL3210-1KE18-8UP1	6SL3210-1KE18-8AP1
	PROFINET	6SL3210-1KE18-8UF1	6SL3210-1KE18-8AF1

Power [kW]	Communication type	SINAMICS G120C without line filter Article No.	SINAMICS G120C with line filter Article No.
5.5	USS	6SL3210-1KE21-3UB1	6SL3210-1KE21-3AB1
	PROFIBUS	6SL3210-1KE21-3UP1	6SL3210-1KE21-3AP1
	PROFINET	6SL3210-1KE21-3UF1	6SL3210-1KE21-3AF1
7.5	USS	6SL3210-1KE21-7UB1	6SL3210-1KE21-7AB1
	PROFIBUS	6SL3210-1KE21-7UP1	6SL3210-1KE21-7AP1
	PROFINET	6SL3210-1KE21-7UF1	6SL3210-1KE21-7AF1
11	USS	6SL3210-1KE22-6UB1	6SL3210-1KE22-6AB1
	PROFIBUS	6SL3210-1KE22-6UP1	6SL3210-1KE22-6AP1
	PROFINET	6SL3210-1KE22-6UF1	6SL3210-1KE22-6AF1
15	USS	6SL3210-1KE23-2UB1	6SL3210-1KE23-2AB1
	PROFIBUS	6SL3210-1KE23-2UP1	6SL3210-1KE23-2AP1
	PROFINET	6SL3210-1KE23-2UF1	6SL3210-1KE23-2AF1
18.5	USS	6SL3210-1KE23-8UB1	6SL3210-1KE23-8AB1
	PROFIBUS	6SL3210-1KE23-8UP1	6SL3210-1KE23-8AP1
	PROFINET	6SL3210-1KE23-8UF1	6SL3210-1KE23-8AF1

Referencing the standard documentation of the components

4

As explained in the introduction, the standard documentation of the components is also the basis for marine applications.

This marine-specific manual supplements and amends the standard documentation.

The following documents are used as basis:

- Hardware Installation Manual "SINAMICS G120, Power Module PM240-2", A5E33294624A AK (01/2019)
→ Download (<https://support.industry.siemens.com/cs/de/en/view/109763155>)
- Operating Instructions "SINAMICS G120C Converter", A5E34263257A AG (04/2018)
→ Download (<https://support.industry.siemens.com/cs/ww/en/view/109757226>)
- Operating Instructions "SINAMICS G120 Converter with CU250S-2 Control Units ", A5E31759476A AG (04/2018)
→ Download (<https://support.industry.siemens.com/cs/ww/en/view/109757229>)
- Operating Instructions "SINAMICS G120 Converter with CU240B-2 and CU240E-2 Control Units", A5E34259001A AF (04/2018)
→ Download (<https://support.industry.siemens.com/cs/ww/en/view/109757230>)
- Operating Instructions "SINAMICS G120 Converter with CU230P-2 Control Units ", A5E34257946A AF (04/2018)
→ Download (<https://support.industry.siemens.com/cs/ww/en/view/109757231>)
- Operating Instructions "SINAMICS BOP-2, SINAMICS G, Basic Operator Panel 2 (BOP-2)", A5E37143404A AA (02/2016)
→ Download (<https://support.industry.siemens.com/cs/ww/en/view/109483379>)
- Operating Instructions "Intelligent Operator Panel 2 (IOP-2)", A5E39549448A AF (03/2019)
→ Download (<https://support.industry.siemens.com/cs/ww/en/view/109767180>)
- Equipment Manual "SINAMICS S120 AC Drive", 6SL3097-5AL00-0AP0 (02/2018)
→ Download (<https://support.industry.siemens.com/cs/ww/en/view/109757057>)

The most recent edition of each manual is the valid version.

Presentation of the "PM240" system being considered

5

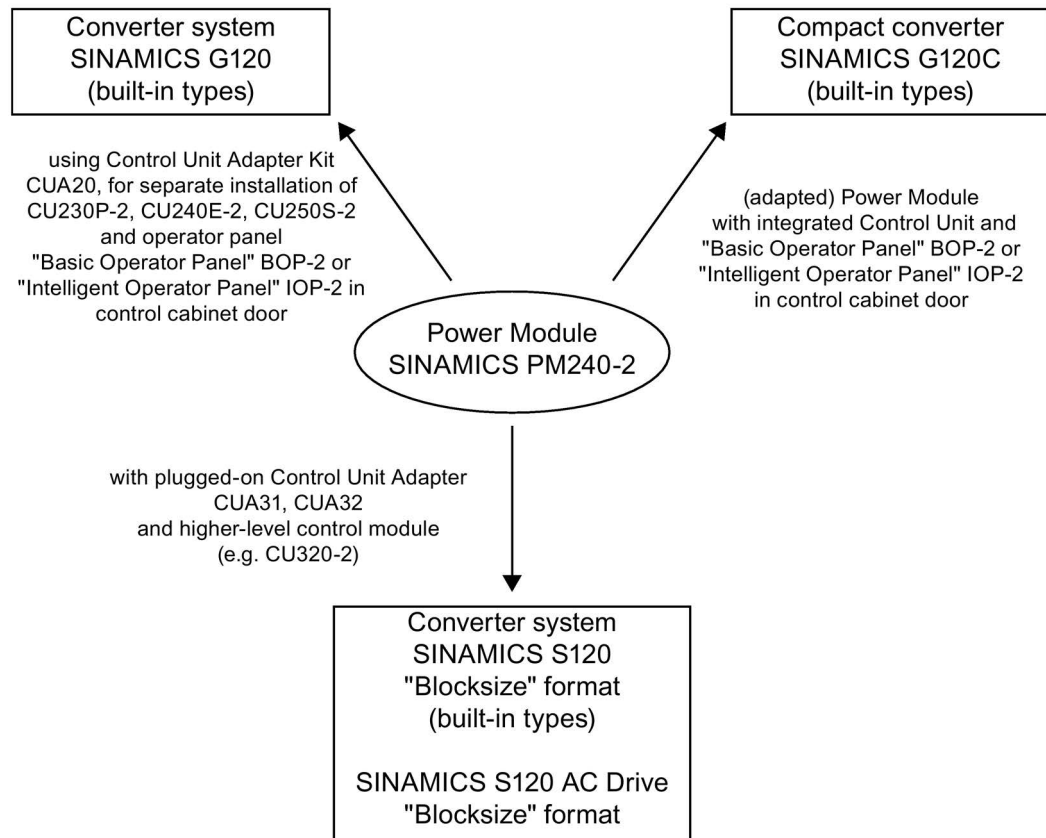


Figure 5-1 System overview

Note

Note on G120

For **marine applications**, a Control Unit is generally not plugged directly onto the Power Module, but is mechanically separated from the Power Module using a "Control Unit Adapter Kit".

Only in the case of Power Modules of frame size FSA, FSB, or FSC, can a Control Unit CU230P-2 or CU240E-2 be plugged on directly.

Note

Note on G120 and G120C

For **marine applications**, an optional operator panel must usually be installed in the door of the control cabinet.

System configuration for marine applications

The system configuration specifically for marine applications is shown in the following sketch. The components must be installed in a control cabinet or in the control cabinet door.

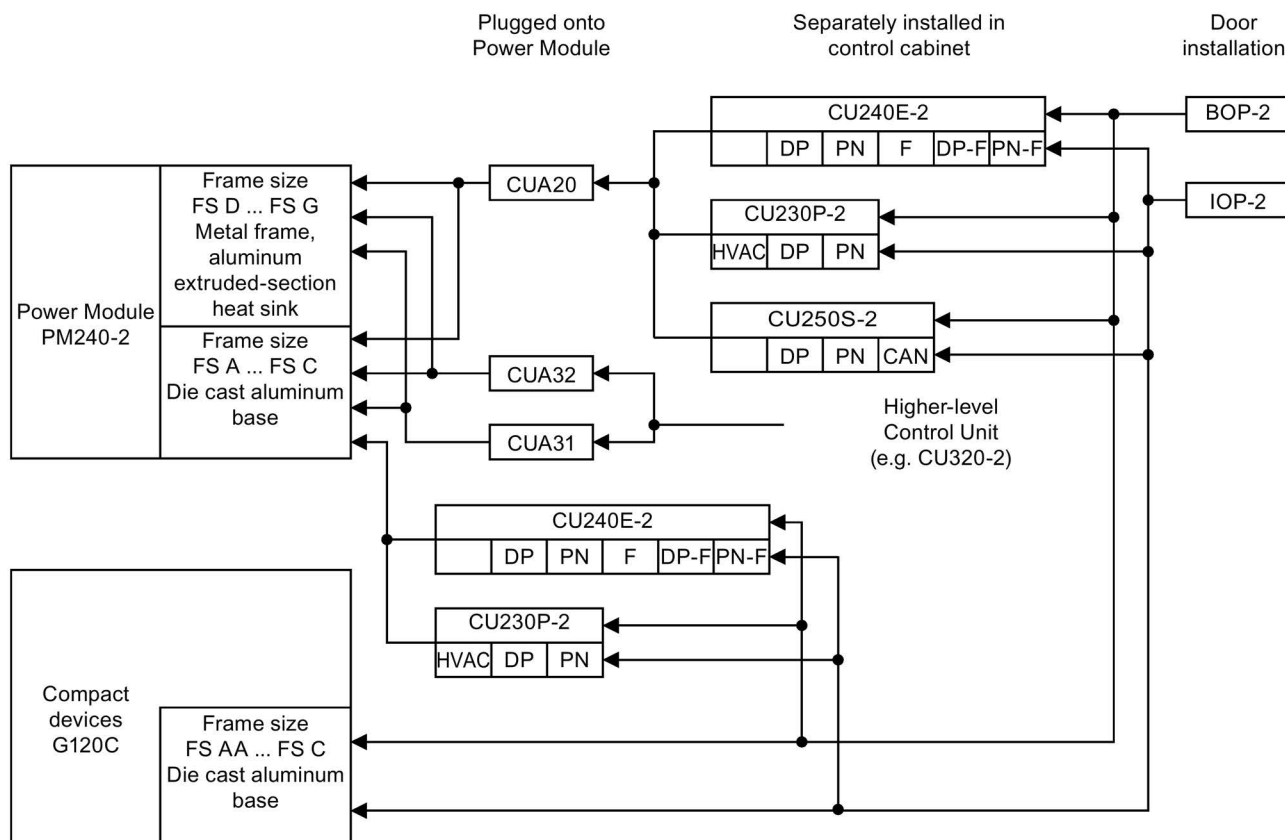


Figure 6-1 System configuration for marine applications

Marine-specific application conditions

The converters discussed here are designed for indoor installation.

The ambient conditions / general conditions on marine vessels generally differ from those in industrial plants/systems. This fact must be taken into consideration when engineering orders.

Special attention must be given to the following:

- **Temperature**

The components discussed here involve built-in types that are integrated in control cabinets.

On board marine vessels, generally ambient temperatures (outside the cabinet) of 0 ... 45 °C can be expected. Depending on the power loss in the cabinet, the performance of the cooling equipment and the installation position in the cabinet, the ambient temperature of a component in the cabinet is above the temperature of the cooling air fed into the cabinet (outside of the cabinet)

This is to be carefully taken into consideration when engineering converter systems. It may be necessary to reduce the power (derating) when dimensioning the drive. Reference is made to derating notes in the underlying documentation (see "Referencing the standard documentation of the components (Page 17)").

- **Humidity/condensation**

Generally, it should be assumed that condensation can occur on board marine vessels. Condensation is not permissible for the built-in types considered here.

If necessary, technical measures must be applied inside the cabinet to ensure that condensation does not occur (e.g. IP54 degree of protection, cabinet heating).

- **Salt mist**

The occurrence of salt mist is not permissible.

- **Vibration stress**

The onboard propulsion systems can transfer vibration to the converters installed onboard. This vibration stress can occur over long periods of time, or occur repeatedly and have a specific frequency/frequencies.

This necessitates a special, reinforced control cabinet design, see Chapter "Reinforced control cabinet design (Page 26)".

For this reason it is generally necessary to install the Control Unit offset off the Power Module.

A CU230P-2 or CU240E-2 can be plugged directly onto a PM240-2 Power Module of frame size FSA, FSB, or FSC.

- **EMC interference immunity**

The converters considered here are suitable for applications in the 2nd environment according to IEC 61800-3, and comply with marine-specific requirements relating to interference immunity according to IEC 60533. The precondition here is that the devices are installed in a control cabinet. An optional operator panel (BOP-2, IOP-2) must be installed in the control cabinet doors.

- **EMC emitted interference**

A differentiation must be made regarding emitted interference:

- All 400V and 200V devices with a Class A filter, which are allowed for Category C2 according to IEC 61800-3, are also suitable for the "General power distribution zone" according to IEC 60533

The preconditions described in the "Standard documentation" (cabinet installation, EMC measures, limited motor cable length, ...) must be observed.

It is only permissible to use devices equipped with line filter in combination with a power supply system with grounded neutral point.

- All other devices – especially all 690 V devices (irrespective of whether equipped with or without line filter) – are only intended for use in the "Special power distribution zone" according to IEC 60533, assuming that no other EMC measures are applied.

- **Power supply conditions**

It should be carefully taken into consideration that on board marine vessels, the power supplies are "weaker" than industrial power supplies (line voltage, grade) in land-based plants and systems. The line short-circuit ratio must be carefully taken into consideration on a project-for-project basis. It is especially important to ensure an appropriately fast shutdown (trip) when short-circuits/ground faults occur. It must also be expected that power supplies on board marine vessels are possibly not as "stable" as industrial power supplies; further, steady-state as well as transient deviations of the supply voltage/line frequency are significantly more pronounced.

The converters being considered here comply with the steady-state and transient voltage/frequency deviations described in IACS "Requirements concerning ELECTRICAL INSTALLATIONS" (2018).

- **Housing (all components are built-in types)**

The required control cabinet degree of protection depends on the actual location in the vessel.

The control cabinet must provide integrated components with adequate protection against pollution, water and condensation. Further, it must prevent access to dangerous active parts and components. The integrated components are designed for degree of pollution 2 according to DIN EN 61800-5-1 (11.2017).

Where necessary, depending on the usage location, minimum requirements specified by the client or the marine classification society involved must be taken into careful consideration. The actual contract defines the IP degree of protection according to IEC 60529.

Marine-specific installation regulations

For the converters discussed in this Manual, the specifications and descriptions provided in the "Standard documentation" always apply, see "Referencing the standard documentation of the components (Page 17)".

In addition, when used on board marine vessels, the following should also be carefully observed (either in addition or as deviation).

8.1 Reinforced control cabinet design

The control cabinet frame must be reinforced as a result of possible vibration stress.

The following diagrams show as example an implementation based on the Rittal TS8 control cabinet system equipped with Rittal Earthquake Kit and additional reinforcing measures for marine applications.

Standard cabinet frame
Rittal TS cabinet system
600 x 600 x 2000 mm

Standard cabinet frame with mounting plate and reinforced
using the Rittal Earthquake Kit for TS system (TS
8613.860)

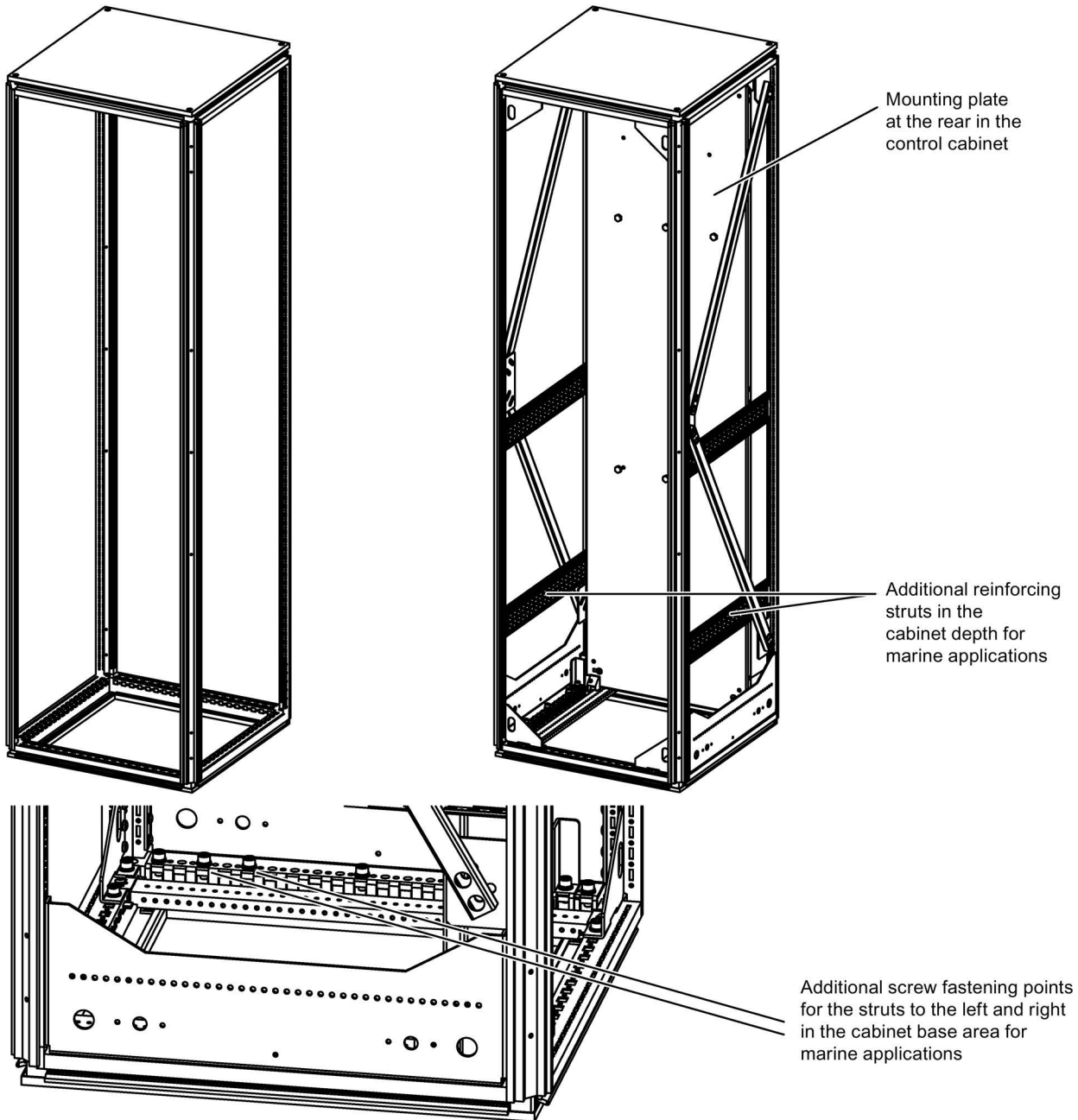


Figure 8-1 Reinforced control cabinet design

8.2 Integration of the components in the cabinet

Because of possible vibration stress, a Control Unit should not be directly plugged onto a PM240-2 Power Module but should be installed separately in a control cabinet.

An exception to this recommendation are the CU230P-2 and the CU240-2 when used in combination with Power Modules of frame size FSA, FSB, or FSC.

See "System configuration for marine applications (Page 21)".

CU230P-2, CU240E-2, CU250S-2 Control Units are installed offset off the Power Module using the "Control Unit Adapter Kit" CUA20.

The "Control Unit Adapter Kit" CUA20 comprises an adapter, which is plugged onto the Power Module, and a base that is mounted next to the Power Module in the cabinet. The Control Unit is then plugged onto this base.

When installing an S120 converter (in the Blocksize format), a Control Unit Adapter CUA31 or CUA32 is directly plugged onto a PM240-2 Power Module. A higher-level control module (e.g. CU320-2) is connected using "DRIVE-CLiQ".

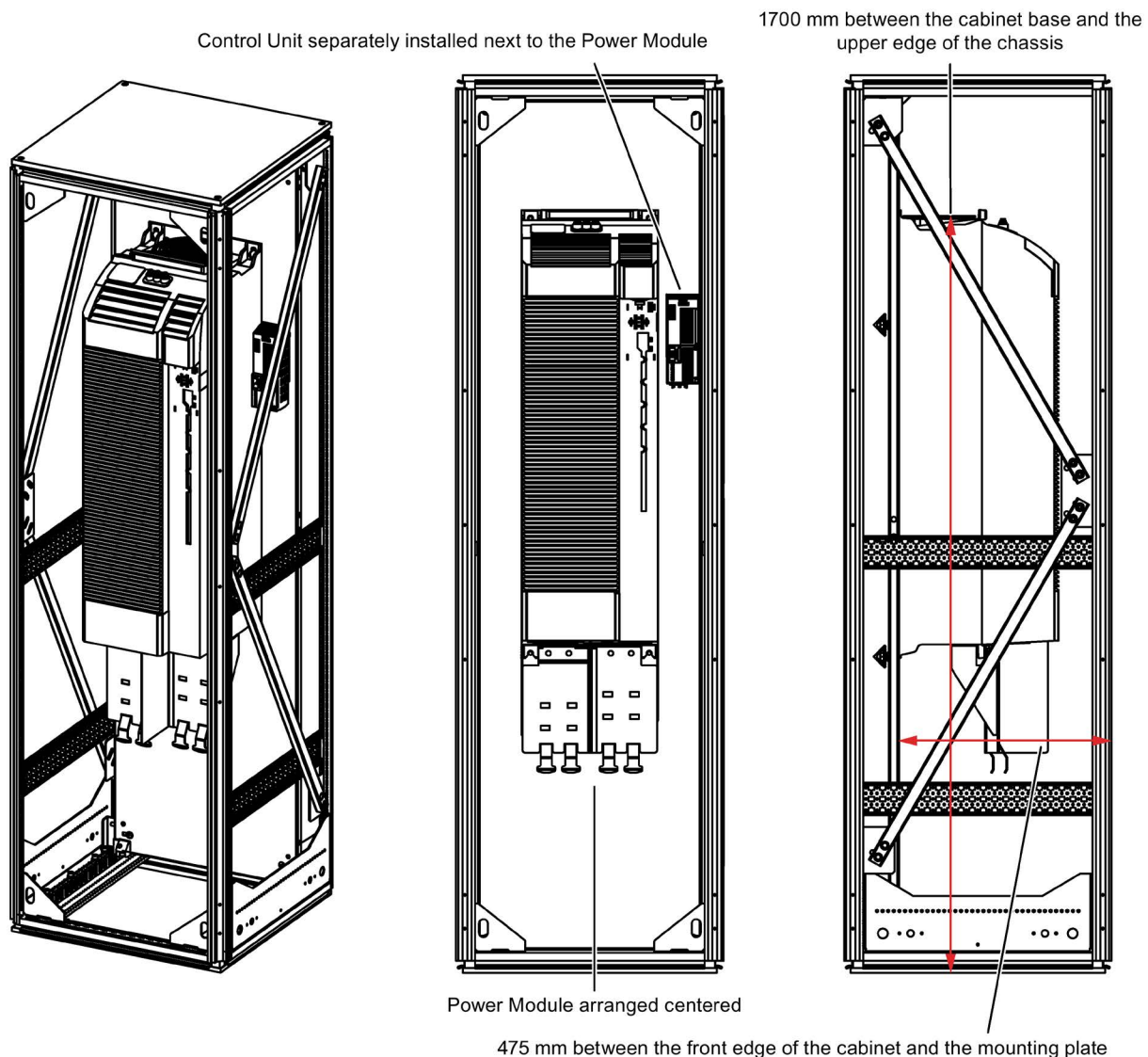


Figure 8-2 Control cabinet with integrated Power Module, frame size FSG, and an integrated, separately installed Control Unit

Control Unit Adapter Kit
Adapter plugged onto the Power Module



Control Unit Adapter Kit
Base with plugged-on Control Unit

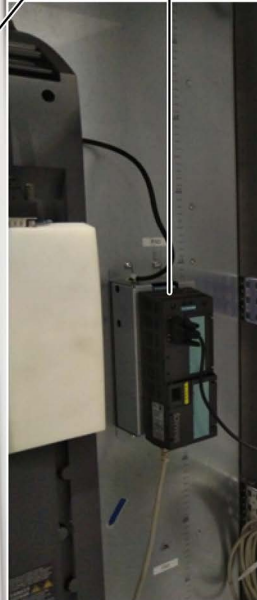


Figure 8-3 Control Unit Adapter Kit and separately installed Control Unit

Note

Integrating a Power Module into the control cabinet

- The distance between the control cabinet base and the top of the chassis should not exceed 1700 mm.
 - Power Modules, frame sizes FSD, FSE, FSF and FSG, should be arranged centered (widthwise) in the control cabinet.
 - The drilling patterns for the mounting plate can be taken from the standard documentation.
-

8.3 Operator panel installed in the cabinet doors

A BOP-2 or alternatively an IOP-2 operator panel is installed in the cabinet doors. The door mounting kit with Article No. 6SL3256-0AP00-0JA0 is available for this purpose. An IP55 degree of protection can be achieved.

BOP-2, installed in the control cabinet doors



Fastened using the door mounting kit

Figure 8-4 Control cabinet with installed operator panel

8.4 Cooling - control cabinet ventilation

The control cabinet must be ventilated in order to dissipate the power loss that occurs in it. Requirements relating to the air cooling can be taken from the "Standard documentation".

Cooling air should enter the cabinet at the bottom through the cabinet doors.

The air must be discharged at the top in the cabinet doors or in the roof section.

Air intake and/or air discharge locations should be equipped with filters corresponding to the IP degree of protection required.

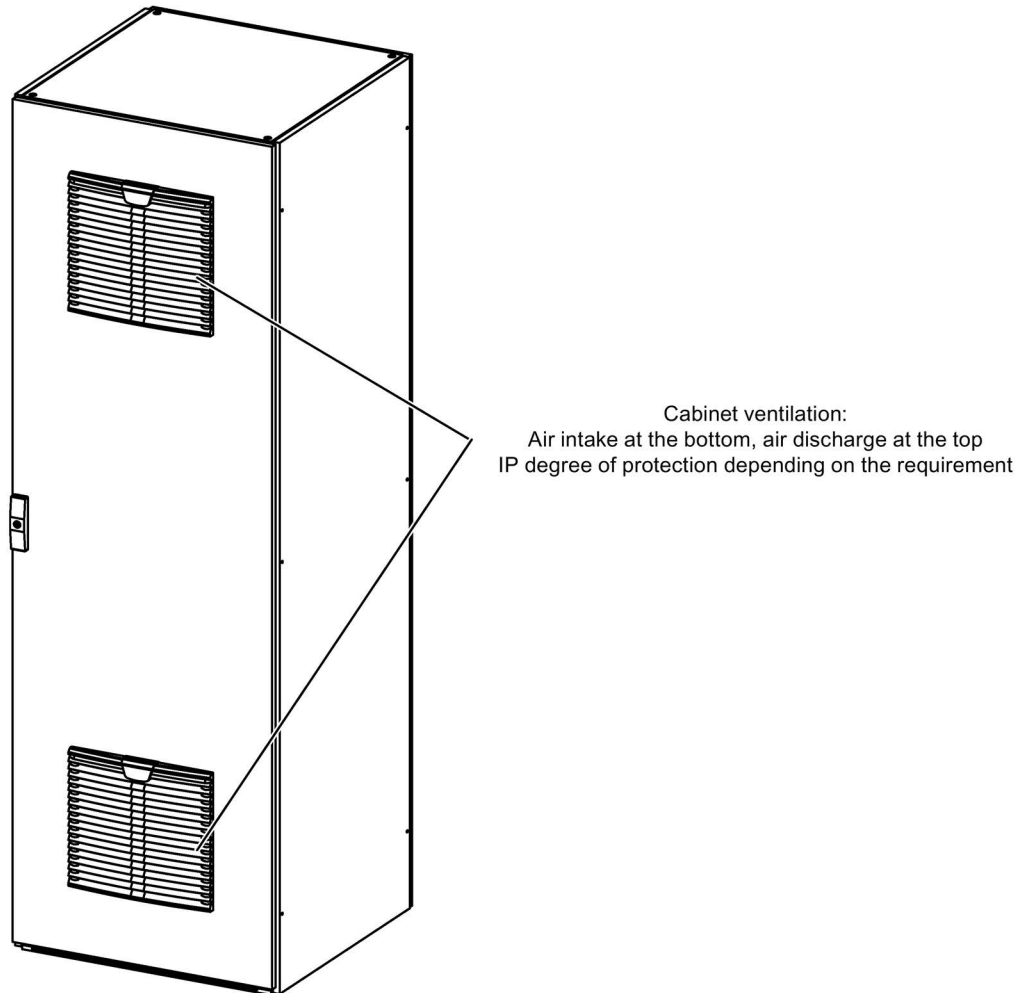


Figure 8-5 Cabinet ventilation

8.5 External auxiliary power supply

It is possible to connect an external 24-V-DC auxiliary power supply. This allows the Control Unit to be operated independent of the main circuit (DC link).

Control/auxiliary circuits in the converter must fulfill PELV specifications.

It is not permissible to supply the control/auxiliary circuits directly from a 24-V-DC onboard power supply. A switched-mode power supply must be connected in between in order to obtain an electrically decoupled, regulated and "disturbance-free" 24-V power supply. This switched-mode power supply must comply with interference immunity requirements as laid down in IEC 60533 and those laid down in IACS "Requirements concerning ELECTRICAL INSTALLATIONS".

Additional information

Siemens:

www.siemens.com

Industry Online Support (service and support):

www.siemens.com/online-support

IndustryMall:

www.siemens.com/industrymall

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