

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6SL3544-0FB20-1FA0

DISTRIBUTED INVERTER CONTROL UNIT

Used with the applicable SINAMICS G120D CU240D-2 PN configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens SINAMICS G120D CU240D-2 PN manufacturer documentation

SINAMICS G120D distributed inverters

0.75 kW to 7.5 kW (1 hp to 10 hp)

SINAMICS G120D distributed inverters

Technical specifications

Unless explicitly specified otherwise, the following technical specifications are valid for all the following SINAMICS G120D distributed inverter components listed here.

SINAMICS G120D	
Mechanical specifications	
Vibratory load	
• Transport acc. to EN 60721-3-2 ¹⁾	Class 1M2
• Operation acc. to EN 60721-3-3	Class 3M2
Shock load	
• Transport acc. to EN 60721-3-2 ¹⁾	Class 1M2
• Operation acc. to EN 60721-3-3	Class 3M2
Ambient conditions	
Degree of protection	IP65/UL Type 3
Protection class According to EN 61800-5-1	Class III (PELV)
Touch protection According to EN 61800-5-1	Class I (with protective conductor system)
Permissible ambient and coolant temperature (air) during operation for Power Modules	-10 ... +40 °C (14 ... 104 °F) without derating >40 ... 55 °C (104 ... 131 °F), see derating characteristics
Permissible ambient and coolant temperature (air) during operation for Control Units	-10 ... +55 °C (14 ... 131 °F) with derating Limit values are determined by the Control Unit used (>40 ... 55 °C (104 ... 131 °F) see derating characteristics) up to 2000 m above sea level
Humidity, max.	95 % at 40 °C (104 °F)
Ambient temperature	
• Storage ¹⁾ acc. to EN 60068-2-1	-40 ... +70 °C (-40 ... +158 °F)
• Transport ¹⁾ acc. to EN 60068-2-1	-40 ... +70 °C (-40 ... +158 °F)
• Operation acc. to EN 60068-2-2	-10 ... +40 °C (14 ... 104 °F) without derating
Environmental class/harmful chemical substances	
• Operation acc. to EN 60721-3-3	Class 3C2
Degree of pollution acc. to EN 61800-5-1	2
Certification for fail-safe versions	
• According to IEC 61508	SIL 2
• According to EN ISO 13849-1	PL d and Category 3
Standards	
Compliance with standards	UL 508C (UL list number E121068), cUL, CE, C-Tick
CE marking, according to	Low-Voltage Directive 2006/95/EC
EMC Directive ²⁾	
• Frame sizes FSA to FSC with integrated line filter class A	Category C2 ³⁾ according to EN 61800-3
Note: The EMC product standard EN 61800-3 does not apply directly to a frequency inverter but to a PDS (Power Drive System), which comprises the complete circuitry, motor and cables in addition to the inverter. The frequency inverters on their own do not generally require identification according to the EMC Directive.	

¹⁾ In product packaging.

²⁾ For further general information, [see also chapter SINAMICS G120, section Technical specifications, Compliance with standards.](#)

³⁾ With shielded motor cable up to 15 m (49 ft).

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CU240D-2 and CU250D-2 Control Units**Overview**

The Control Unit performs closed-loop control functions for the inverter. In addition to the closed-loop control, it has additional functions that can be adapted to the particular application through parameterization. The CU240D-2 Control Units supersede the CU240D Control Units, whereby both versions can be operated with PM250D Power Modules.

CU250D-2 Control Units can be used to implement applications with positioning requirements in the drive. This expansion opens up their use in lifting, swiveling, traversing or rotating applications. The positioning functionality is comparable to that of SINAMICS S110 servo drives.

Two points must be noted in this context:

- Vector control (VC) and sensorless vector control (SLVC) are possible (but not servo control)
- Positioning using one encoder (HTL/SSI) or using two encoders simultaneously (HTL and SSI)

Control Units are available in different versions:

- CU240D-2 DP
- CU240D-2 DP-F
- CU240D-2 PN
- CU240D-2 PN-F
- CU240D-2 PN-F PP (Push Pull)
- CU240D-2 PN-F FO (fiber optic)
- CU250D-2 DP-F
- CU250D-2 PN-F
- CU250D-2 PN-F PP (Push Pull)
- CU250D-2 PN-F FO (fiber optic)

The Push Pull version comprises an alternative connection method for the 24 V DC supply voltage and the PN communication.



CU240D-2 DP Control Unit



CU250D-2 DP-F Control Unit



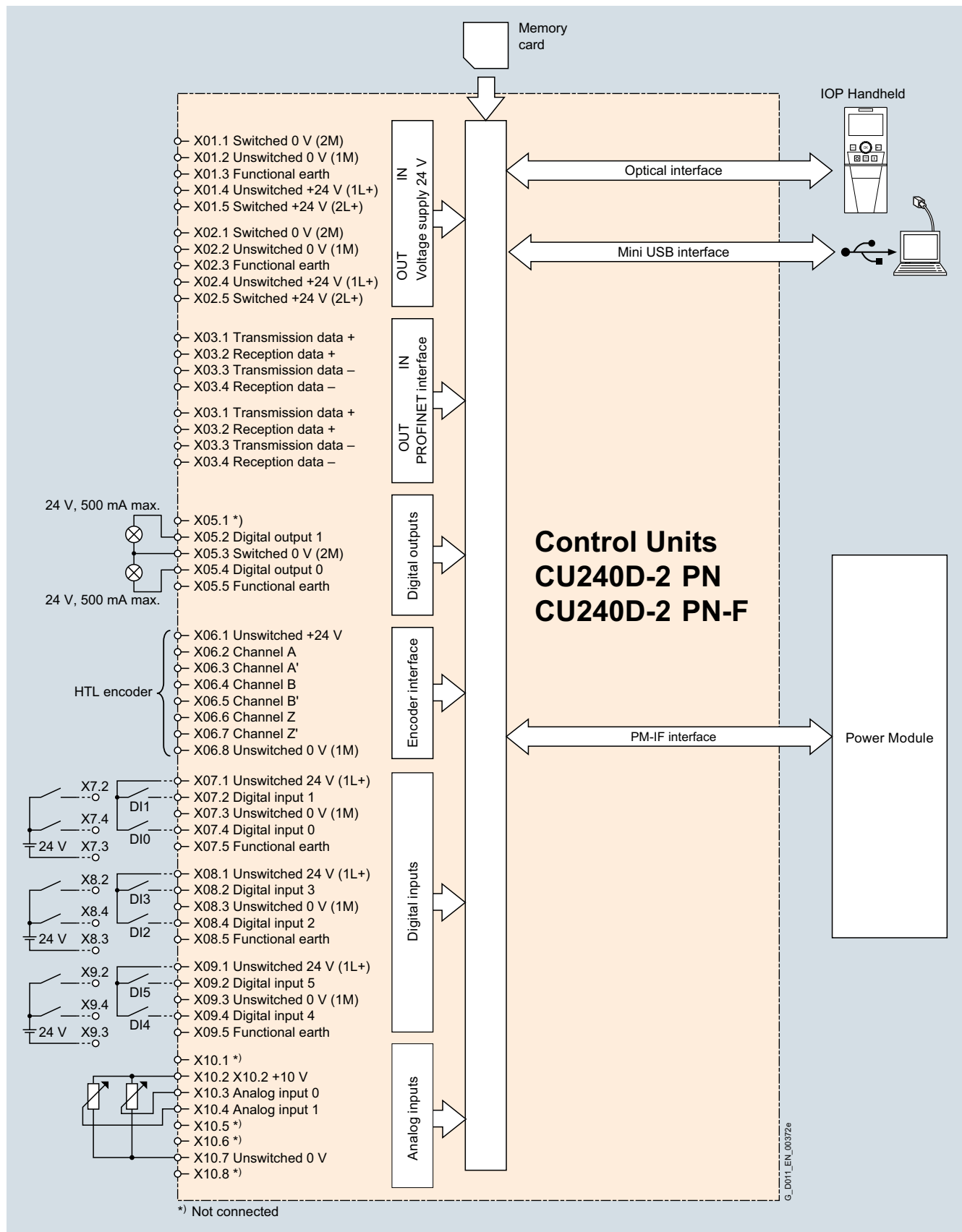
CU240D-2 PN Control Unit



CU250D-2 PN-F Control Unit

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CU240D-2 and CU250D-2 Control Units**Integration**

Connection example for CU240D-2 PN and CU240D-2 PN-F Control Units

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CU240D-2 and CU250D-2 Control Units

Technical specifications

Control Unit	CU240D-2 DP 6SL3544-0FB20-1PA0	CU240D-2 PN 6SL3544-0FB20-1FA0	CU240D-2 DP-F 6SL3544-0FB21-1PA0	CU240D-2 PN-F 6SL3544-0FB21-1FA0 CU240D-2 PN-F PP 6SL3544-0FB21-1FB0 CU240D-2 PN-F FO 6SL3544-0FB21-1FC0	CU250D-2 DP-F 6SL3546-0FB21-1PA0	CU250D-2 PN-F 6SL3546-0FB21-1FA0 CU250D-2 PN-F PP 6SL3546-0FB21-1FB0 CU250D-2 PN-F FO 6SL3546-0FB21-1FC0
Electrical specifications						
Operating voltage	External 24 V DC necessary	External 24 V DC necessary	External 24 V DC necessary	External 24 V DC necessary	External 24 V DC necessary	External 24 V DC necessary
Current consumption ¹⁾ (from the 24 V DC supply)						
• With Power Module frame sizes FSA and FSB	300 mA	400 mA	300 mA	400 mA (FO variant: 520 mA)	300 mA	400 mA (FO variant: 520 mA)
• With Power Module frame size FSC	450 mA	550 mA	450 mA	550 mA (FO variant: 670 mA)	450 mA	550 mA (FO variant: 670 mA)
Interfaces						
Digital inputs (non-isolated)	6	6	6	6	6	6
• Optionally parameterizable as safe inputs	1	1	3	3	3	3
Analog inputs (0 ... 10 V)	2	2	2	2	–	–
Digital outputs (0.5 A, fed through switched 24 V DC, isolated)	2	2	2	2	2	2
• Optionally parameterizable as safe digital output	–	–	1	1	1	1
Bus interface						
• Fieldbus protocols	PROFIBUS DP	PROFINET EtherNet/IP	PROFIBUS DP	PROFINET EtherNet/IP	PROFIBUS DP	PROFINET EtherNet/IP
• Profile	PROFIdrive PROFIsafe	PROFIdrive PROFIsafe PROFInergy	PROFIdrive PROFIsafe	PROFIdrive PROFIsafe PROFInergy	PROFIdrive PROFIsafe	PROFIdrive PROFIsafe PROFInergy
HTL encoder interface (incremental interface, bipolar up to 2048 pulses, max. 150 mA)	1	1	1	1	1	1
SSI encoder interface (absolute encoder, singleturn and multiturn 4096 pulses, 24 V, max. 250 mA)	–	–	–	–	1	1
PTC/KTY interface (connection via Power Module)	✓	✓	✓	✓	✓	✓
• Motor temperature sensor	1 input, sensors that can be connected: PTC, KTY or bimetal	1 input, sensors that can be connected: PTC, KTY or bimetal	1 input, sensors that can be connected: PTC, KTY or bimetal	1 input, sensors that can be connected: PTC, KTY or bimetal	1 input, sensors that can be connected: PTC, KTY or bimetal	1 input, sensors that can be connected: PTC, KTY or bimetal
Control of a mechanical motor brake (connection via Power Module)	✓	✓	✓	✓	✓	✓
Slot for SINAMICS memory card (SD card)	✓	✓	✓	✓	✓	✓
Commissioning interface (mini USB)	✓	✓	✓	✓ Not with PP and FO variants	✓	✓ Not with PP and FO variants

¹⁾ The current consumption of connected encoders (HTL ≤ 100 mA or SSI ≤ 250 mA), sensors (total, max. 300 mA) as well as the current drawn from the digital outputs (total, max. 500 mA) must be added, where applicable.

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CU240D-2 and CU250D-2 Control Units

Technical specifications

Control Unit	CU240D-2 DP 6SL3544-0FB20-1PA0	CU240D-2 PN 6SL3544-0FB20-1FA0	CU240D-2 DP-F 6SL3544-0FB21-1PA0	CU240D-2 PN-F 6SL3544-0FB21-1FA0 CU240D-2 PN-F PP 6SL3544-0FB21-1FB0 CU240D-2 PN-F FO 6SL3544-0FB21-1FC0	CU250D-2 DP-F 6SL3546-0FB21-1PA0	CU250D-2 PN-F 6SL3546-0FB21-1FA0 CU250D-2 PN-F PP 6SL3546-0FB21-1FB0 CU250D-2 PN-F FO 6SL3546-0FB21-1FC0
Safety functions						
Integrated safety functions acc. to IEC 61508 SIL 2, EN ISO 13849-1 PL d and Category 3	• Safe Torque Off (STO)	• Safe Torque Off (STO)	• Safe Torque Off (STO) • Safe Stop 1 (SS1) • Safely Limited Speed (SLS) • Safe Direction (SDI) • Safe Speed Monitor (SSM)	• Safe Torque Off (STO) • Safe Stop 1 (SS1) • Safely Limited Speed (SLS) • Safe Direction (SDI) • Safe Speed Monitor (SSM)	• Safe Torque Off (STO) • Safe Stop 1 (SS1) • Safely Limited Speed (SLS) • Safe Direction (SDI) • Safe Speed Monitor (SSM)	• Safe Torque Off (STO) • Safe Stop 1 (SS1) • Safely Limited Speed (SLS) • Safe Direction (SDI) • Safe Speed Monitor (SSM)
Open-loop/closed-loop control techniques						
V/f linear/quadratic/ parameterizable	✓	✓	✓	✓	✓	✓
V/f with flux current control (FCC)	✓	✓	✓	✓	✓	✓
Vector control, sensorless	✓	✓	✓	✓	✓	✓
Vector control, with sensor	✓	✓	✓	✓	✓	✓
Torque control, sensorless	✓	✓	✓	✓	–	–
Torque control, with sensor	✓	✓	✓	✓	–	–
Software functions						
Basic positioner (EPos)	–	–	–	–	✓	✓
Fixed frequencies	16, parameterizable	16, parameterizable	16, parameterizable	16, parameterizable	16, parameterizable	16, parameterizable
Signal interconnection with BICO technology	✓	✓	✓	✓	✓	✓
Automatic restart after line supply failure or operational fault	✓	✓	✓	✓	✓	✓
Slip compensation	✓	✓	✓	✓	✓	✓
Free function blocks (FFB) for logical and arithmetic operations	✓	✓	✓	✓	–	–
Ramp smoothing	✓	✓	✓	✓	✓	✓
4 selectable drive data sets	✓	✓	✓	✓	✓	✓
4 selectable command data sets (CDS) (manual/auto)	✓	✓	✓	✓	✓	✓
Flying restart	✓	✓	✓	✓	–	–
JOG	✓	✓	✓	✓	–	–
Cyclic recording of ramp-up and ramp-down	✓	✓	✓	✓	✓	✓
Technology controller (PID)	✓	✓	✓	✓	–	–
Thermal motor protection	✓	✓	✓	✓	✓	✓

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CU240D-2 and CU250D-2 Control Units

Technical specifications

Control Unit	CU240D-2 DP 6SL3544-0FB20-1PA0	CU240D-2 PN 6SL3544-0FB20-1FA0	CU240D-2 DP-F 6SL3544-0FB21-1PA0	CU240D-2 PN-F 6SL3544-0FB21-1FA0 CU240D-2 PN-F PP 6SL3544-0FB21-1FB0 CU240D-2 PN-F FO 6SL3544-0FB21-1FC0	CU250D-2 DP-F 6SL3546-0FB21-1PA0	CU250D-2 PN-F 6SL3546-0FB21-1FA0 CU250D-2 PN-F PP 6SL3546-0FB21-1FB0 CU250D-2 PN-F FO 6SL3546-0FB21-1FC0
Software functions (continued)						
Thermal inverter protection	✓	✓	✓	✓	✓	✓
Setpoint input	✓	✓	✓	✓	✓	✓
Motor identification	✓	✓	✓	✓	✓	✓
Motor holding brake	✓	✓	✓	✓	✓	✓
Mechanical specifications and ambient conditions						
Operating temperature	-10 ... +55 °C (14 ... 131 °F)	-10 ... +50 °C (14 ... 122 °F)	0 ... 55 °C (32 ... 131 °F)	0 ... 50 °C (32 ... 122 °F) (FO variant: 0 ... 45 °C (32 ... 113 °F))	0 ... 55 °C (32 ... 131 °F)	0 ... 50 °C (32 ... 122 °F) (FO variant: 0 ... 45 °C (32 ... 113 °F))
Storage temperature	-40 ... +70 °C (-40 ... +158 °F)	-40 ... +70 °C (-40 ... +158 °F)	-40 ... +70 °C (-40 ... +158 °F)	-40 ... +70 °C (-40 ... +158 °F)	-40 ... +70 °C (-40 ... +158 °F)	-40 ... +70 °C (-40 ... +158 °F)
Relative humidity	<95 % RH, condensation not permissible	<95 % RH, condensation not permissible	<95 % RH, condensation not permissible	<95 % RH, condensation not permissible	<95 % RH, condensation not permissible	<95 % RH, condensation not permissible
Dimensions						
• Width	153 mm (6.02 in)	153 mm (6.02 in)	153 mm (6.02 in)	153 mm (6.02 in)	153 mm (6.02 in)	153 mm (6.02 in)
• Height	208 mm (8.19 in)	208 mm (8.19 in)	208 mm (8.19 in)	208 mm (8.19 in)	208 mm (8.19 in)	208 mm (8.19 in)
• Depth	55 mm (2.17 in)	55 mm (2.17 in)	55 mm (2.17 in)	55 mm (2.17 in) (PP variant: 118 mm (4.65 in))	55 mm (2.17 in)	55 mm (2.17 in) (PP variant: 118 mm (4.65 in))
Weight, approx.	0.8 kg (1.76 lb)	0.8 kg (1.76 lb)	0.8 kg (1.76 lb)	0.8 kg (1.76 lb) (PP and FO variants: 1.3 kg (2.87 lb))	0.8 kg (1.76 lb)	0.8 kg (1.76 lb) (PP and FO variants: 1.3 kg (2.87 lb))