

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6SL3244-0BA20-1BA0

USS DRIVE CONTROL UNIT

Used with the applicable SINAMICS G120 CU240S configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens SINAMICS G120 catalogue D11.1, 2009, CU240S, printed pp.4/18 to 19 and 4/28 to 29

Overview



Example of CU240S DP-F Control Unit

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. Several Control Units are available in different versions:

- CU240E
- CU240S
- CU240S DP
- CU240S DP-F
- CU240S PN
- CU240S PN-F

Safety Integrated functions

The following Safety Integrated functions are integrated in the CU240S DP-F and CU240S PN-F Control Units and, with the exception of the "Safe Brake Control", can be implemented without external circuit elements:

The SINAMICS G120 fail-safe frequency inverter provides four safety functions, certified in accordance with EN 954-1, Category 3 and IEC 61508 SIL 2:

- Safe Torque Off (STO) to protect against active movement of the drive
- Safe Stop 1 (SS1) for continuous monitoring of a safe braking ramp
- Safely Limited Speed (SLS) for protection against dangerous movements when a speed limit is exceeded
- Safe Brake Control (SBC) for controlling motor brakes that are active in the de-energized state, e.g. motor holding brakes

The functions "Safe Stop 1" and "Safely Limited Speed" can both be implemented without having to use a motor sensor or encoder; the implementation cost is minimal. Existing systems in particular can be simply updated with safety technology without the need to change the motor or mechanical system.

The safety functions "Safely Limited Speed" and "Safe Stop 1" are not certified for pull-through loads as in the case of lifting gear and winders.

Safety functions have been extended with firmware V3.2.

Additional information is provided in the part Highlights, section Safety Integrated.

Selection and ordering data

Communication	Digital inputs Standard	Digital inputs Fail-safe	Digital outputs	Encoder interfaces	Designation	Control Unit Order No.
Standard						
RS485/USS	6	–	3	–	CU240E	6SL3244-0BA10-0BA0
RS485/USS	9	–	3	1	CU240S	6SL3244-0BA20-1BA0
PROFIBUS DP	9	–	3	1	CU240S DP	6SL3244-0BA20-1PA0
PROFINET	9	–	3	1	CU240S PN	6SL3244-0BA20-1FA0
Fail-safe for Safety Integrated						
PROFIBUS DP	6	2	3	1	CU240S DP-F	6SL3244-0BA21-1PA0
PROFINET	6	2	3	1	CU240S PN-F	6SL3244-0BA21-1FA0

SINAMICS G120

Standard inverters 0.37 kW to 250 kW (0.5 hp to 400 hp)

CU240 Control Units

Design

CU240E Control Unit



CU240E Control Unit without terminal cover

Terminal No.	Signal	Features
Digital inputs (DI)		
5 ... 8, 16.17	DI0 ... DI5	Freely programmable (isolated) 5.5 mA/24 V
Digital outputs (DO)		
18	DO0, NC	Relay output 1 NC contact (0.5 A, 30 V DC)
19	DO0, NO	Relay output 1 NO contact (0.5 A, 30 V DC)
20	DO0, COM	Relay output 1 Common contact (0.5 A, 30 V DC)
21	DO1, NO	Relay output 2 NO contact (0.5 A, 30 V DC)
22	DO1, COM	Relay output 2 Common contact (0.5 A, 30 V DC)
23	DO2, NC	Relay output 3 NC contact (0.5 A, 30 V DC)
24	DO2, NO	Relay output 3 NO contact (0.5 A, 30 V DC)
25	DO2, COM	Relay output 3 Common contact (0.5 A, 30 V DC)
Analog inputs (AI)		
3	AI0+	0 ... 10 V, -10 ... +10 V, 0/2 ... 10 V or 0/4 ... 20 mA
4	AI0-	
10	AI1+	0 ... 10 V, 0 ... 20 mA
11	AI1-	
Analog outputs (AO)		
12	AO0+	Freely programmable (0/4 ... 20 mA with max. 500 Ω, 0/2 ... 10 V with min. 500 Ω)
13	AO0-	M
26	AO1+	Freely programmable (0/4 ... 20 mA with max. 500 Ω)
27	AO1-	M
PTC/KTY interface		
14	PTC+	Positive PTC/KTY input
15	PTC-	Negative PTC/KTY input
Serial RS485 interface		
29	P+	RS485 A, USS protocol
30	N-	RS485 B, USS protocol
Power supply		
9	U 24 V	Isolated user power supply +24 V at 100 mA
28	U 0 V	Isolated user reference voltage
1	+10 V	Non-isolated, regulated 10 V power supply for I/O – max. 10 mA
2	0 V	Power supply reference

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CU240 Control Units

Technical specifications

Control Unit	CU240E 6SL3244- 0BA10-0BA0	CU240S 6SL3244- 0BA20-1BA0	CU240S DP 6SL3244- 0BA20-1PA0	CU240S PN 6SL3244- 0BA20-1FA0	CU240S DP-F 6SL3244- 0BA21-1PA0	CU240S PN-F 6SL3244- 0BA21-1FA0
Electrical specifications						
Operating voltage	24 V DC via the Power Module	24 V DC via the Power Module or external 24 V DC	24 V DC via the Power Module or external 24 V DC	24 V DC via the Power Module or external 24 V DC	24 V DC via the Power Module or external 24 V DC	24 V DC via the Power Module or external 24 V DC
Current drain from the 24 V supply	Available soon	Max. 0.5 A	Max. 0.5 A	Max. 0.7 A	Max. 0.7 A	Max. 0.7 A
Power loss (full load)	< 5.5 W	< 5.5 W	< 5.5 W	< 13 W	< 16 W	< 17 W
Interfaces						
Digital inputs – Standard	6	9	9	9	6	6
Digital inputs – Fail-safe	–	–	–	–	2	2
Digital outputs	3	3	3	3	3	3
Analog inputs	2	2	2	2	2	2
	Both analog inputs can be configured as supplementary digital inputs if an additional function is required. Switching thresholds: 0 → 1: Rated voltage 2 V 1 → 0: Rated voltage 0.8 V Analog inputs are protected against inputs in a voltage range of ±30 V and have a common-mode voltage in the ±15 V range.					
Analog outputs	2	2	2	2	2	2
	Analog outputs have short-circuit protection, but are not isolated. Maximum output voltage = 10 V in the current mode, maximum output current = 20 mA in the voltage mode. The response time should be approximately 1 ms at a load of max. 10 kΩ in the voltage mode.					
Bus interface	RS485/USS	RS485/USS	PROFIBUS DP	PROFINET	PROFIBUS DP, PROFIsafe	PROFINET, PROFIsafe
Encoder interfaces	–	1	1	1	1	1
PTC/KTY interface	✓	✓	✓	✓	✓	✓
Brake Relay interface or Safe Brake Relay interface (connected via Power Module)	✓	✓	✓	✓	✓	✓
MMC memory card slot	–	✓	✓	✓	✓	✓
Operator panels that can be used	BOP, IOP Hand-held (via PC Inverter Connection Kit)	BOP, IOP Hand-held (via PC Inverter Connection Kit)	BOP, IOP Hand-held (via PC Inverter Connection Kit)	BOP, IOP Hand-held (via PC Inverter Connection Kit)	BOP, IOP Hand-held (via PC Inverter Connection Kit)	BOP, IOP Hand-held (via PC Inverter Connection Kit)
RS232/USS interface (connection via PC Inverter Connection Kit)	✓	✓	✓	✓	✓	✓
Safety functions						
Integrated safety functions acc. to Category 3 of EN 954-1 and acc. to SIL 2 of IEC 61508	–	–	–	–	• Safe Stop 1 (SS1) • Safely Limited Speed (SLS) • Safe Brake Control (SBC) • Safe Torque Off (STO)	
Open-loop/closed-loop control techniques						
V/f linear/square/parameterizable	✓	✓	✓	✓	✓	✓
V/f with flux current control (FCC)	✓	✓	✓	✓	✓	✓
Vector control, without encoder	✓	✓	✓	✓	✓	✓
Vector control, with encoder	–	✓	✓	✓	✓	✓
Torque control, without encoder	✓	✓	✓	✓	✓	✓
Torque control, with encoder	–	✓	✓	✓	✓	✓

Technical specifications

Control Unit	CU240E 6SL3244- 0BA10-0BA0	CU240S 6SL3244- 0BA20-1BA0	CU240S DP 6SL3244- 0BA20-1PA0	CU240S PN 6SL3244- 0BA20-1FA0	CU240S DP-F 6SL3244- 0BA21-1PA0	CU240S PN-F 6SL3244- 0BA21-1FA0
Software functions						
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	✓	✓	✓	✓	✓	✓
Positioning down ramp	✓	✓	✓	✓	✓	✓
Slip compensation	✓	✓	✓	✓	✓	✓
Free function blocks (FFB) for logic and arithmetic operations	✓	✓	✓	✓	✓	✓
Ramp smoothing	✓	✓	✓	✓	✓	✓
3 selectable drive data sets	✓	✓	✓	✓	✓	✓
3 selectable command data sets (CDS) (manual/auto)	✓	✓	✓	✓	✓	✓
Flying restart	✓	✓	✓	✓	✓	✓
JOG	✓	✓	✓	✓	✓	✓
Technology controller (PID)	✓	✓	✓	✓	✓	✓
Thermal motor protection	✓	✓	✓	✓	✓	✓
Thermal inverter protection	✓	✓	✓	✓	✓	✓
Setpoint input	✓	✓	✓	✓	✓	✓
Motor identification	✓	✓	✓	✓	✓	✓
Motor holding brake	✓	✓	✓	✓	✓	✓
V_{dcmax} controller	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)
Kinetic buffering	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)
Braking functions for • DC braking • Compound braking • Dynamic braking with integrated brake chopper	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)	✓ (only with PM240)
Mechanical specifications and ambient conditions						
Degree of protection	IP20	IP20	IP20	IP20	IP20	IP20
Signal cable cross-section • min. • max.	0.05 mm ² (AWG30) 2 mm ² (AWG14)	0.05 mm ² (AWG30) 2 mm ² (AWG14)	0.05 mm ² (AWG30) 2 mm ² (AWG14)	0.05 mm ² (AWG30) 2 mm ² (AWG14)	0.05 mm ² (AWG30) 2 mm ² (AWG14)	0.05 mm ² (AWG30) 2 mm ² (AWG14)
Operating temperature	−10 ... +50 °C (14 ... 122 °F)	−10 ... +50 °C (14 ... 122 °F)	−10 ... +50 °C (14 ... 122 °F)	−10 ... +50 °C (14 ... 122 °F)	0 ... 45 °C (32 ... 113 °F)	0 ... 40 °C (32 ... 104 °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 • Height • Depth	73 mm 195 mm 31 mm	73 mm 177 mm 63 mm	73 mm 177 mm 63 mm	73 mm 177 mm 63 mm	73 mm 177 mm 63 mm	73 mm 177 mm 63 mm
Weight, approx.	0.21 kg	0.52 kg	0.52 kg	0.52 kg	0.52 kg	0.52 kg