MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6SL3210-5FB10-1UF1

SINAMICS V90 PN 0.1 KW SERVO DRIVE

Used with the applicable SINAMICS V90 PN configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens SINAMICS V90 PN and SIMOTICS S-1FL6, A5E37208830-004, 04/2018, drive selection and technical data.

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SINAMICS V90, SIMOTICS S-1FL6

Operating Instructions

PROFINET (PN) interface

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04/2018

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Legal information

Warning notice system

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.

Proper use of Siemens products

Note the following:

⚠WARNING

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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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG
Division Digital Factory
Postfach 48 48
90026 NÜRNBERG
GERMANY

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General information

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The SINAMICS V90 drives with the PROFINET interface (referred to as SINAMICS V90 PN) are available in two variants, 400 V variant and 200 V variant.

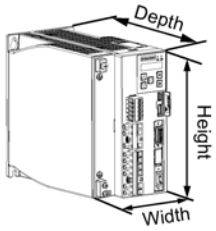
The 200 V variant is available in four frame sizes: FSA, FSB, FSC, and FSD. Frame sizes A, B, and C are used on the single phase or three phase power network while frame size D is used on the three phase power network only.

The 400 V variant is available in four frame sizes: FSAA, FSA, FSB, and FSC. All the frame sizes are used on three phase power network only.

2.1 Deliverables

2.1.1 Drive components

Components in the SINAMICS V90 PN 200 V variant drive package

Component	Illustration	Rated power (kW)	Outline dimension (Width x Height x Depth, mm)	Frame size	Article number
SINAMICS V90 PN, single/three-phase, 200 V		0.1/0.2	45 x 170 x 170	FSA	6SL3210-5FB10-1UF1
					6SL3210-5FB10-2UF1
		0.4	55 x 170 x 170	FSB	6SL3210-5FB10-4UF1
		0.75	80 x 170 x 195	FSC	6SL3210-5FB10-8UF0
SINAMICS V90 PN, three-phase, 200 V		1.0/1.5/2.0	95 x 170 x 195	FSD	6SL3210-5FB11-0UF1
					6SL3210-5FB11-5UF0
					6SL3210-5FB12-0UF0
Connectors		For FSA and FSB			
		For FSC and FSD			
Shielding plate		For FSA and FSB			
		For FSC and FSD			
User documentation	Information Guide	English-Chinese bilingual version			

2.5 Function list

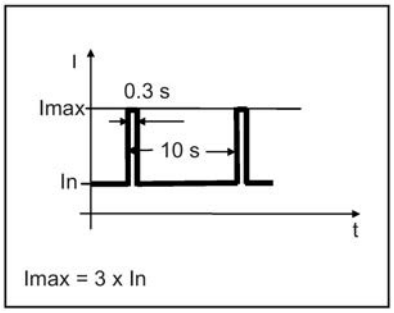
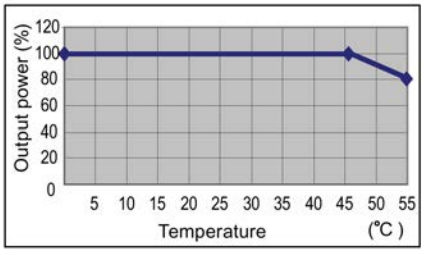
Function	Description	Control mode
Basic positioner (EPOS) (Page 162)	Positions axes in absolute/relative terms with a motor encoder	EPOS
Speed control (S) (Page 183)	Flexibly controls motor speed and direction through PROFINET communication port	S
Safe Torque Off (STO) (Page 225)	Safely disconnects torque-generating motor power supply to prevent an unintentional motor restart	EPOS, S
One-button auto tuning (Page 232)	Estimates the machine characteristic and sets the closed loop control parameters (speed loop gain, speed integral compensation, filter if necessary, etc.) without any user intervention	EPOS, S
Real-time auto tuning (Page 237)	Estimates the machine characteristic and sets the closed loop control parameters (speed loop gain, speed integral compensation, filter if necessary, etc.) continuously in real time without any user intervention	EPOS, S
Resonance suppression (Page 241)	Suppresses the mechanical resonance, such as workpiece vibration and base shake	EPOS, S
Low frequency vibration suppression (Page 244)	Suppresses the low frequency vibration in the machine system	EPOS
Speed limit (Page 183)	Limits motor speed through internal speed limit commands (two groups)	EPOS, S
Torque limit (Page 184)	Limits motor torque through internal torque limit commands (two groups)	EPOS, S
Basic operator panel (BOP) (Page 131)	Displays servo status on a 6-digit 7-segment display	EPOS, S
External braking resistor - DCP, R1 (Page 116)	An external braking resistor can be used when the internal braking resistor is insufficient for regenerative energy	EPOS, S
Digital inputs/outputs (DIs/Dos) (Page 102)	Control signals and status signals can be assigned to four programmable digital inputs and two digital outputs	EPOS, S
PROFINET communication (Page 189)	Supports communication between the SINAMICS V90 PN servo drive and PLC with PROFINET communication protocol	EPOS, S
SINAMICS V-ASSISTANT	You can perform parameter settings, test operation, adjustment and other operations with a PC	EPOS, S

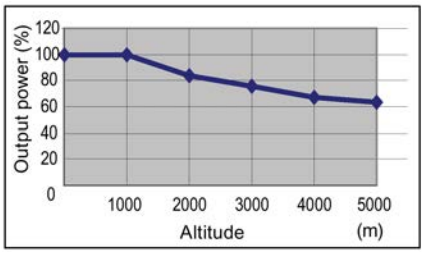
2.6 Technical data

2.6.1 Technical data - servo drives

2.6.1.1 SINAMICS V90 PN 200 V variant

General technical data

Parameter			Description
Overload capability			300% 
Control system			Servo control
Dynamic brake			Built-in
Protective functions			Earthing fault protection, output short-circuit protection [1], overvoltage/undervoltage protection [2], I^2t inverter,I^2t motor, IGBT overtemperature protection [3]
Overvoltage criteria			Category III
Speed control mode	Speed control range		Internal speed command 1:5000
	Torque limit		Set through a parameter
Environmental conditions	Surrounding air temperature	Operation	0 °C to 45 °C: without power derating 45 °C to 55 °C: with power derating
			
		Storage	-40 °C to +70 °C
	Ambient humidity	Operation	< 90% (non-condensing)
		Storage	90% (non-condensing)

Parameter			Description
	Operating environment		Indoors (without direct sunlight), free from corrosive gas, combustible gas, oil gas, or dust
	Altitude		≤ 1000 m (without power derating) 
	Degree of protection		IP 20
	Degree of pollution		Class 2
Vibration	Operation	Shock	Operational area II Peak acceleration: 5 g, 30 ms and 15 g, 11 ms Quantity of shocks: 3 per direction × 6 directions Duration of shock: 1 s
		Vibration	Operational area II 10 Hz to 58 Hz: 0.075 mm deflection 58 Hz to 200 Hz: 1 g vibration
	Product packaging	Vibration	2 Hz to 9 Hz: 3.5 mm deflection 9 Hz to 200 Hz: 1 g vibration Quantity of cycles: 10 per axis Sweep seed: 1 octave/min
Certification			

1) Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

2) The V90 PN 200 V servo drive has an overvoltage threshold of 410 VDC and an undervoltage threshold of 150 VDC; the V90 PN 400 V servo drive has an overvoltage threshold of 820 VDC and an undervoltage threshold of 320 VDC.

3) SINAMICS V90 PN does not support motor overtemperature protection. Motor overtemperature is calculated by I^2t and protected by the output current from the drive.

Specific technical data

Article No.	**6SL3210-5FB...**		**10-1UF1**	**10-2UF1**	**10-4UF1**	**10-8UF0**	**11-0UF1**	**11-5UF0**	**12-0UF0**
Frame size			**FSA**	**FSA**	**FSB**	**FSC**	**FSD**	**FSD**	**FSD**
Rated output current (A)			1.2	1.4	2.6	4.7	6.3	10.6	11.6
Max. output current (A)			3.6	4.2	7.8	14.1	18.9	31.8	34.8
Max. supported motor power (kW)			0.1	0.2	0.4	0.75	1.0	1.5	2.0
Power loss [1]	Main circuit (W)		8	15	33	48	65	105	113
	Regenerative resistor (W)		5	5	7	9	13	25	25
	Control circuit (W)		16	16	16	16	16	18	18
	Total (W)		29	36	56	73	94	148	156
Output frequency (Hz)			0 to 330						
Power supply	Voltage/frequency		FSA, FSB and FSC: single phase/three phase 200 VAC to 240 VAC, 50/60 Hz FSD: three phase 200 VAC to 240 VAC, 50/60 Hz						
	Permissible voltage fluctuation		-15% to +10%						
	Permissible frequency fluctuation		-10% to +10%						
	Permissible supply configuration		TN, TT, IT						
	Rated input current (A)	1-phase	2.5	3.0	5.0	10.4	-	-	-
		3-phase	1.5	1.8	3.0	5.0	7.0	11.0	12.0
	Power supply capacity (kVA)	1-phase	0.5	0.7	1.2	2.0	-	-	-
		3-phase	0.5	0.7	1.1	1.9	2.7	4.2	4.6
	Inrush current (A)		8.0						
24 VDC power supply	Voltage (V)		24 (-15% to +20%) [2]						
	Maximum current (A)		When using a motor without a brake: 1.6 A When using a motor with a brake: 1.6 A + motor holding brake rated current (See Section "Technical data - servo motors (Page 60)".)						
Cooling method			Self-cooled				Fan-cooled		
Mechanical design	Outline dimensions (W x H x D, mm)		45 x 170 x 170		55 x 170 x 170	80 x 170 x 195	95 x 170 x 195		
Weight (kg)			1.1		1.25	1.95	2.3	2.4	

1) The values here are calculated at rated load.

2) When SINAMICS V90 PN works with a motor with a brake, the voltage tolerance of 24 VDC power supply must be -10%to +10% to meet the voltage requirement of the brake.