MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Selected official pages for procurement and maintenance review

PRODUCT BRAND

Siemens

PRODUCT MODEL

6ES7222-1HF22-0XA8

EM 222 CN relay output. Relevant section pages: 419, 421, 423, 526, 527. Adjacent model text on shared pages is outside this product reference.

OFFICIAL SOURCE

S7-200 Programmable Controller System Manual; 08/2008

Siemens original documentation and product reference

Historical Siemens reference: use the eight-relay rows and CN cross-reference. Adjacent variants and historic approval statements do not establish supplied-unit approvals. This is not a complete installation guide.

AMIKON PRODUCT SUPPORT

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Amikon Limited prepared this independent reference package. Selected manufacturer pages follow with their original content and pagination visible.

Digital Expansion Modules Specifications

Table A-11 Digital Expansion Modules Order Numbers

Order Number	Expansion Model	Digital Inputs	Digital Outputs	Removable Connector
6ES7 221-1BF22-0XA0	EM 221 Digital Input 8 x 24 VDC	8 x 24 VDC	-	Yes
6ES7 221-1EF22-0XA0	EM 221 Digital Input 8 x 120/230 VAC	8 x 120/230 VAC	-	Yes
6ES7 221-1BH22-0XA0	EM 221 Digital Input 16 x 24 VDC	16 x 24 VDC	-	Yes
6ES7 222-1BD22-0XA0	EM 222 Digital Output 4 x 24 VDC-5A	-	4 x 24 VDC-5A	Yes
6ES7 222-1HD22-0XA0	EM 222 Digital Output 4 x Relays-10A	-	4 x Relay-10A	Yes
6ES7 222-1BF22-0XA0	EM 222 Digital Output 8 x 24 VDC	-	8 x 24 VDC-0.75A	Yes
6ES7 222-1HF22-0XA0	EM 222 Digital Output 8 x Relays	-	8 x Relay-2A	Yes
6ES7 222-1EF22-0XA0	EM 222 Digital Output 8 x 120/230 VAC	-	8 x 120/230 VAC	Yes
6ES7 223-1BF22-0XA0	EM 223 24 VDC Digital Comb 4 Inputs/4 Outputs	4 x 24 VDC	4 x 24 VDC-0.75A	Yes
6ES7 223-1HF22-0XA0	EM 223 24 VDC Digital Comb 4 Inputs/4 Relay Outputs	4 x 24 VDC	4 x Relay-2A	Yes
6ES7 223-1BH22-0XA0	EM 223 24 VDC Digital Comb 8 Inputs/8 Outputs	8 x 24 VDC	8 x 24 VDC-0.75A	Yes
6ES7 223-1PH22-0XA0	EM 223 24 VDC Digital Comb 8 Inputs/8 Relay Outputs	8 x 24 VDC	8 x Relay-2A	Yes
6ES7 223-1BL22-0XA0	EM 223 24 VDC Digital Comb 16 Inputs/16 Outputs	16 x 24 VDC	16 x 24 VDC-0.75A	Yes
6ES7 223-1PL22-0XA0	EM 223 24 VDC Digital Comb 16 Inputs/16 Relay Outputs	16 x 24 VDC	16 x Relay-2A	Yes
6ES7 223-1BM22-0XA0	EM 223 24 VDC Digital Comb 32 Inputs/32 Outputs	32 x 24 VDC	32 x 24 VDC-0.75 A	Yes
6ES7 223-1PM22-0XA0	EM 223 24 VDC Digital Comb 32 Inputs/32 Relay Outputs	32 x 24 VDC	32 x Relay-2 A	Yes

Table A-12 Digital Expansion Modules General Specifications

Order Number	Module Name and Description	Dimensions (mm) (W x H x D)	Weight	Dissipation	VDC Requirements	
					+5 VDC	+24 VDC
6ES7 221-1BF22-0XA0	EM 221 DI 8 x 24 VDC	46 x 80 x 62	150 g	2 W	30 mA	ON: 4 mA/input
6ES7 221-1EF22-0XA0	EM 221 DI 8 x 120/230 VAC	71.2 x 80 x 62	160 g	3 W	30 mA	-
6ES7 221-1BH22-0XA0	EM 221 DI 16 x 24 VDC	71.2 x 80 x 62	160 g	3 W	70 mA	ON: 4 mA/input
6ES7 222-1BD22-0XA0	EM 222 DO 4 x 24 VDC-5A	46 x 80 x 62	120 g	3 W	40 mA	-
6ES7 222-1HD22-0XA0	EM 222 DO 4 x Relays-10A	46 x 80 x 62	150 g	4 W	30 mA	ON: 20 mA/output
6ES7 222-1BF22-0XA0	EM 222 DO 8 x 24 VDC	46 x 80 x 62	150 g	2 W	50 mA	-
6ES7 222-1HF22-0XA0	EM 222 DO 8 x Relays	46 x 80 x 62	170 g	2 W	40 mA	ON: 9 mA/output
6ES7 222-1EF22-0XA0	EM 222 DO 8 x 120/230 VAC	71.2 x 80 x 62	165 g	4 W	110 mA	-
6ES7 223-1BF22-0XA0	EM 223 24 VDC 4 In/4 Out	46 x 80 x 62	160 g	2 W	40 mA	ON: 4 mA/input
6ES7 223-1HF22-0XA0	EM 223 24 VDC 4 In/4 Relays	46 x 80 x 62	170 g	2 W	40 mA	ON: 9 mA/output, 4 mA/input
6ES7 223-1BH22-0AX0	EM 223 24 VDC 8 In/8 Out	71.2 x 80 x 62	200 g	3 W	80 mA	ON: 4 mA/input
6ES7 223-1PH22-0XA0	EM 223 24 VDC 8 In/8 Relays	71.2 x 80 x 62	300 g	3 W	80 mA	ON: 9 mA/output, 4 mA/input
6ES7 223-1BL22-0XA0	EM 223 24 VDC 16 In/16 Out	137.3 x 80 x 62	360 g	6 W	160 mA	ON: 4 mA/input
6ES7 223-1PL22-0XA0	EM 223 24 VDC 16 In/16 Relays	137.3 x 80 x 62	400 g	6 W	150 mA	ON: 9 mA/output, 4 mA/input
6ES7 223-1BM22-0XA0	EM 223 24 VDC 32 In/32 Out	196 x 80 x 62	500 g	9 W	240 mA	ON: 4 mA/input
6ES7 223-1PM22-0XA0	EM 223 24 VDC 32 In/32 Relay	196 x 80 x 62	580 g	13 W	205 mA	ON: 9 mA/output 4 mA/input

Table A-14 Digital Expansion Modules Output Specifications

General	24 VDC Output		Relay Output		120/230 VAC Output
	0.75 A	5 A	2 A	10 A	
Type	Solid state-MOSFET (Sourcing)		Dry contact		Triac, zero-cross turn-on
Rated voltage	24 VDC		24 VDC or 250 VAC		120/230 VAC
Voltage range	20.4 to 28.8 VDC		5 to 30 VDC or 5 to 250 VAC	12 to 30 VDC or 12 to 250 VAC	40 to 264 VAC (47 to 63 Hz)
24 VDC coil power voltage range	–		20.4 to 28.8 VDC		–
Surge current (max.)	8 A for 100 ms	30 A	5 A for 4 s @ 10% duty cycle	15 A for 4 s @ 10% duty cycle	5 A rms for 2 AC cycles
Logic 1 (min.)	20 VDC		–		L1 (–0.9 V rms)
Logic 0 (max.)	0.1 VDC with 10 K Ω Load	0.2 VDC with 5 K Ω Load	–		–
Rated current per point (max.)	0.75 A	5 A	2.00 A	10 A resistive; 2 A DC inductive; 3 A AC inductive	0.5 A AC[1]
Rated current per common (max.)	10 A	5 A	10 A	10 A	0.5 A AC
Leakage current (max.)	10 μA	30 μA	–		1.1 mA rms at 132 VAC and 1.8 mA rrms at 264 VAC
Lamp load (max.)	5 W	50 W	30 W DC/ 200 W AC[4,5]	100 W DC/ 1000 W AC	60 W
Inductive clamp voltage	L+ minus 48 V	L+ minus 47 V[2]	–		–
On state resistance (contact)	0.3 Ω typical (0.6 Ω max.)	0.05 Ω max.	0.2 Ω max. when new	0.1 Ω max. when new	410 Ω max. when load current is less than 0.05A
Isolation					
Optical (galvanic, field to logic)	500 VAC for 1 minute		–		1500 VAC for 1minute
Coil to logic	–		None		–
Coil to contact	–		1500 VAC for 1 minute		–
Resistance (coil to contact)	–		100 M Ω min. when new		–
Isolation groups	See wiring diagram		See wiring diagram		1 point
Delay Off to On/On to Off (max.)	50 μs / 200 μs	500 μs	–	–	0.2 ms + 1/2 AC cycle
Switching (max.)	–	–	10 ms	15 ms	–
Switching frequency (max.)	–		1 Hz		10 Hz
Lifetime mechanical cycles	–		10,000,000 (no load)	30,000,000 (no load)	–
Lifetime contacts	–		100,000 (rated load)	30,000 (rated load)	–
Output on simultaneously	All at 55° C (horizontal), All at 45° C (vertical)			All at 55 °C (horizontal) with 20A max. module current. All at 45°C (vertical) with 20A max. module current[5]. All at 40 °C (horizontal) with 10A per point	All at 55° C (horizontal), All at 45° C (vertical)
Connecting two outputs in parallel	Yes, only outputs in same group		No		No
Cable length (max.)					
Shielded	500 m		500 m		500 m
Unshielded	150 m		150 m		150 m

1 Load current must be full wave AC and must not be half-wave because of the zero-cross circuitry. Minimum load current is 0.05 A AC. With a load current between 5 mA and 50 mA AC, the current can be controlled, but there is an additional voltage drop due to series resistance of 410 Ohms.

2 If the output overheats due to excessive inductive switching or abnormal conditions, the output point may turn off or be damaged. The output could overheat or be damaged if the output is subjected to more than 0.7 J of energy switching an inductive load off. To eliminate the need for this limitation, a suppression circuit as described in Chapter 3 can be added in parallel with the load. These components need to be sized properly for the given application.

3 The EM 222 DO 4 x Relay has a different FM rating than the rest of the S7-200. This module has a T4 rating, instead of T4A for FM Class I, Division Groups A, B, C, and D Hazardous Locations.

4 Relay lifetime with a lamp load will be reduced by 75% unless steps are taken to reduce the turn-on surge below the surge current rating of the output.

5 Lamp load wattage rating is for rated voltage. Reduce the wattage rating proportionally for voltage being switched (for example 120 VAC – 100 W).



Warning

When a mechanical contact turns on output power to the S7-200 CPU, or any digital expansion module, it sends a “1” signal to the digital outputs for approximately 50 microseconds.

This could cause unexpected machine or process operation which could result in death or serious injury to personnel, and/or damage to equipment.

You must plan for this, especially if you are using devices which respond to short duration pulses.

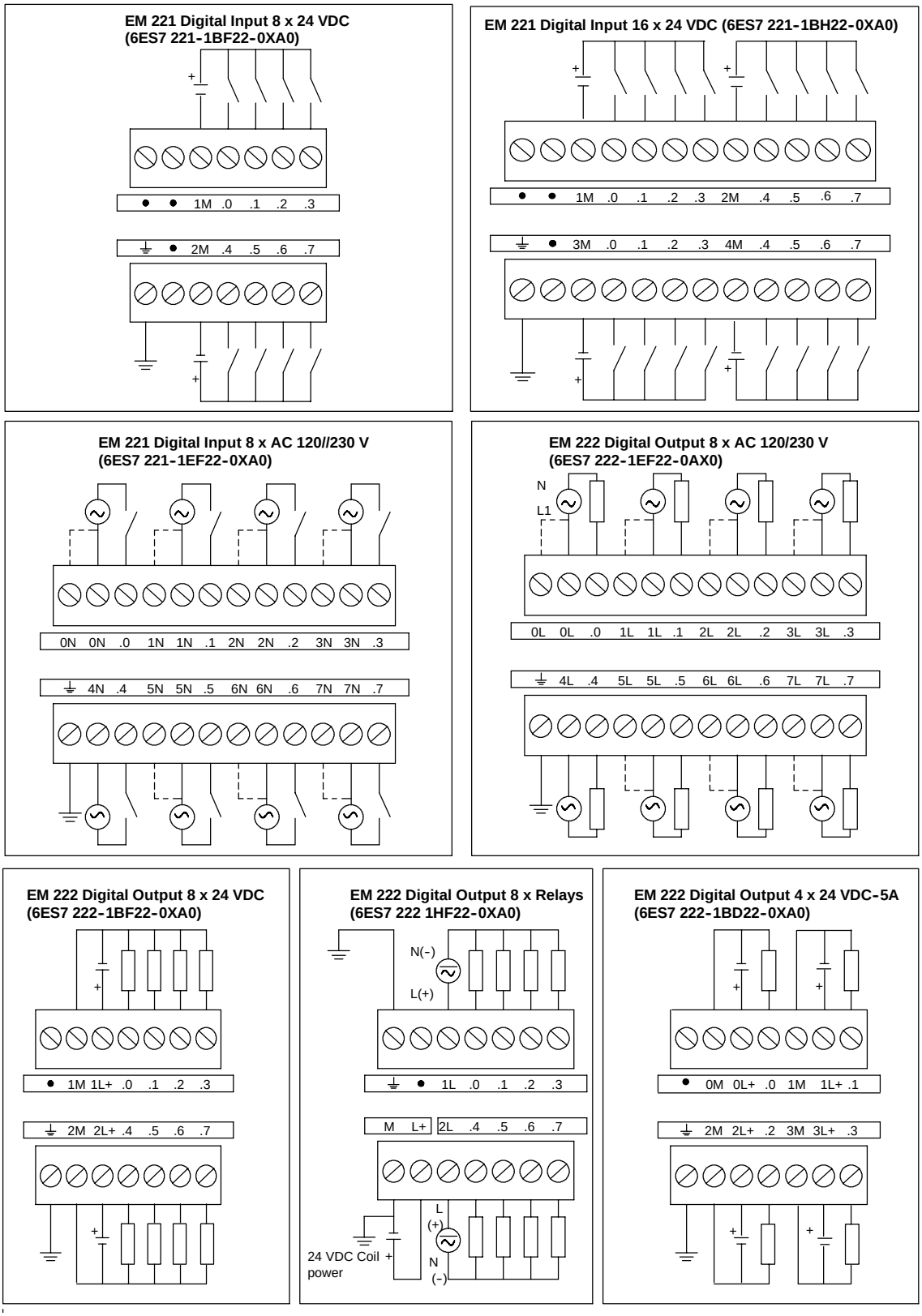


Figure A-10 Wiring Diagrams for EM 221 and EM 222 Expansion Modules

Certifications and Approvals for S7-200CN Products

CE Labeling of S7-200CN Products

The S7-200CN products fulfill the requirements and protection guidelines of the following EU directives.

- EC Directive 73/23/EEC “Low–voltage directive”
- EC Directive 89/336/EEC “EMC directive”

After July 2009 the following applies:

- EC Directive 2004/108/EC (EMC Directive) “Electromagnetic Compatibility”

Standards of S7-200CN Products

The S7-200CN products fulfill the requirement and criteria of IEC 61131–2, Programmable controllers – Equipment requirements. Check the markings on the actual S7-200CN product for the specific Agency approvals and Certifications.

S7-200CN Products

A cross-reference of SIMATIC S7-200 products to S7-200CN products is shown in the following table. For wiring and performance specifications, refer to the cross-referenced SIMATIC S7-200 product in Appendix A. Check the markings on the actual S7-200CN product for the specific Agency approvals and Certifications.

Table H-1 Cross Reference for SIMATIC S7-200 Products to S7-200CN Products

Model Name and Description	S7-200 SIMATIC Product	S7-200CN Product
CPU 222 DC/DC/DC, 8 Inputs/6 Outputs	6ES7 212-1AB23-0XB0	6ES7 212-1AB23-0XB8
CPU 222 AC/DC/Relay 8 Inputs/ 6 Relays	6ES7 212-1BB23-0XB0	6ES7 212-1BB23-0XB8
CPU 224 DC/DC/DC 14 Inputs/ 10 Outputs	6ES7 214-1AD23-0XB0	6ES7 214-1AD23-0XB8
CPU 224 AC/DC/Relay14 Inputs/ 10 Relays	6ES7 214-1BD23-0XB0	6ES7 214-1BD23-0XB8
CPU 224XP DC/DC/DC 14 Inputs/10 Outputs	6ES7 214-2AD23-0XB0	6ES7 214-2AD23-0XB8
CPU 224XPsi DC/DC/DC 14 Inputs/10 Outputs	6ES7 214-2AS23-0XB0	6ES7 214-2AS23-0XB8
CPU 224XP AC/DC/Relay 14 Inputs/10 Relays	6ES7 214-2BD23-0XB0	6ES7 214-2BD23-0XB8
CPU 226 DC/DC/DC 24 Inputs/16 Outputs	6ES7 216-2AD23-0XB0	6ES7 216-2AD23-0XB8
CPU 226 AC/DC/Relay 24 Inputs/16 Relays	6ES7 216-2BD23-0XB0	6ES7 216-2BD23-0XB8
EM 221 Digital Input 8 x 24 VDC	6ES7 221-1BF22-0XA0	6ES7 221-1BF22-0XA8
EM 221 Digital Input 16 x 24 VDC	6ES7 221-1BH22-0XA0	6ES7 221-1BH22-0XA8
EM 222 Digital Output 8 x 24 VDC	6ES7 222-1BF22-0XA0	6ES7 222-1BF22-0XA8
EM 222 Digital Output 8 x Relays	6ES7 222-1HF22-0XA0	6ES7 222-1HF22-0XA8
EM 223 24 VDC Digital Comb 4 Inputs/4 Outputs	6ES7 223-1BF22-0XA0	6ES7 223-1BF22-0XA8
EM 223 24 VDC Digital Comb 4 Inputs/4 Relay Outputs	6ES7 223-1HF22-0XA0	6ES7 223-1HF22-0XA8
EM 223 24 VDC Digital Comb 8 Inputs/8 Outputs	6ES7 223-1BH22-0XA0	6ES7 223-1BH22-0XA8
EM 223 24 VDC Digital Comb 8 Inputs/8 Relay Outputs	6ES7 223-1PH22-0XA0	6ES7 223-1PH22-0XA8
EM 223 24 VDC Digital Comb 16 Inputs/16 Outputs	6ES7 223-1BL22-0XA0	6ES7 223-1BL22-0XA8
EM 223 24 VDC Digital Comb 16 Inputs/16 Relay Outputs	6ES7 223-1PL22-0XA0	6ES7 223-1PL22-0XA8
EM 223 24 VDC Digital Comb 32 Inputs/32 Outputs	6ES7 223-1BM22-0XA0	6ES7 223-1BM22-0XA8
EM 223 24 VDC Digital Comb 32 Inputs/32 Relay Outputs	6ES7 223-1PM22-0XA0	6ES7 223-1PM22-0XA8
EM 231 Analog Input, 4 Inputs	6ES7 231-0HC22-0XA0	6ES7 231-0HC22-0XA8
EM 235 Analog Combination 4 Inputs/1 Output	6ES7 235-0KD22-0XA0	6ES7 235-0KD22-0XA8
EM 232 Analog Output, 2 Outputs	6ES7 232-0HB22-0XA0	6ES7 232-0HB22-0XA8
EM 231 Analog Input RTD, 2 Inputs	6ES7 231-7PB22-0XA0	6ES7 231-7PB22-0XA8
EM 231 Analog Input Thermocouple, 4 Inputs	6ES7 231-7PD22-0XA0	6ES7 231-7PD22-0XA8