

SIMATIC S7-400

Mounting racks

Introduction

Overview

- The basic mechanical framework of the SIMATIC S7-400/S7-400H
- For accommodating the modules, supplying with operating voltage and connecting the modules via the backplane bus
- Several variants for establishing central controllers and expansion units

Application

Racks form the mechanical framework of the SIMATIC S7-400. They perform the following functions:

- They provide mechanical support for the modules.
- They provide the power supply to the modules.
- They link individual modules together by way of the backplane bus.

Racks are designed for wall mounting or installation in frames or cabinets.

Several racks are available for setting up the SIMATIC S7-400:

- UR1 and UR2 racks; for central controllers and expansion units.
- CR2 racks; for segmented central controllers (with two CPUs operating in parallel in a single rack independently of each other).

- ER1 and ER2 racks; for expansion units with signal modules.
- UR2-H rack; for S7-400H.

Design

All racks consist of the following:

- An aluminum mounting rail with threaded bolts to mount the modules as well as lateral recesses to mount the rack on a wall or other support.
- Plastic guide pieces direct the module as it is being swung into place.
- Connection for grounding conductors.
- Backplane bus with plug-in connectors.

Technical specifications

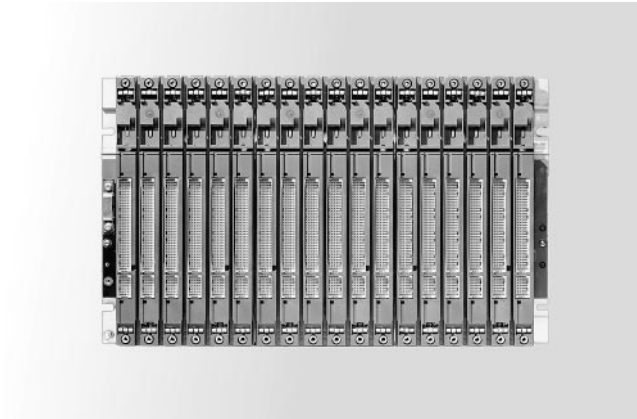
Mounting racks	UR1	UR2	CR2	UR2-H	ER1	ER2
Number of single-width slots	18	9	18, 2 segments with 8 or 10 slots	18	18	9
Buses	P, K	P, K	P, K	P, K	P	P
Dimensions (W x H x D) in mm	482.5 x 290 x 27.5	257.5 x 290 x 27.5	482.5 x 290 x 27.5	482.5 x 290 x 27.5	482.5 x 290 x 27.5	257.5 x 290 x 27.5
Weight approx.	3 kg	1.5 kg	3 kg	3 kg	2.5 kg	1.25 kg

SIMATIC S7-400 Mounting racks

UR1 rack (central controller)

4

Overview



- UR1 rack (universal rack) for setting up central controllers and expansion units (see page 4/91).
- For up to 18 modules.
- Standard PS (power supply) and redundant PS can be used in the standard S7-400 system.
- Can be expanded in a central configuration (up to 3 m) or distributed (up to 100 m).
- Required for expansions: Interface modules (send IMs); Up to six interface modules can be plugged in.
- Up to 21 expansion units can be connected.

Design

Component options for use as a central controller

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Standard PS (starting at slot 1)	■																	
Redundant PS (starting at slot 1)	■	■	■	■														
CPU, M7-CPU		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DI, DO, AI, AO		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
M7-FM		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
FM, IP ¹⁾ , WF ¹⁾		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CP		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Send IM		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

1) Only with S7 adapter casing; see page 4/96 for list of modules, not for S7-400H

Ordering data

UR1 rack
for central controllers and expansion units;
18 slots

Order No.

6ES7 400-1TA01-0AA0

Slot cover

Qty. 10 (spare part)

Order No.

6ES7 490-1AA00-0AA0

SIMATIC S7-400

Mounting racks

UR2 rack (central controller)

Overview

- UR2 rack (universal rack) for setting up central controllers and expansion units (see page 4/92).
- For up to 9 modules.
- Standard PS (power supply) and redundant PS can be used in the standard S7-400 system.
- Can be expanded in a central configuration (up to 3 m) or distributed (up to 100 m).
- Required for expansions: Interface modules (send IMs); Up to six interface modules can be plugged in.
- Up to 21 expansion units can be connected.

4

Design

Component options for use as a central controller

	1	2	3	4	5	6	7	8	9
Standard PS (starting at slot 1)	■	■	■						
Redundant PS (starting at slot 1)	■	■	■	■					
CPU, M7-CPU		■	■	■	■	■	■	■	■
DI, DO, AI, AO		■	■	■	■	■	■	■	■
M7-FM		■	■	■	■	■	■	■	■
FM, IP ¹⁾ , WF ¹⁾		■	■	■	■	■	■	■	■
CP		■	■	■	■	■	■	■	■
Send IM		■	■	■	■	■	■	■	■

1) Only with S7 adapter casing; see page 4/96 for list of modules, not for S7-400H

Ordering data

UR2 rack
for central controllers and expansion units;
9 slots

Order No.

6ES7 400-1JA01-0AA0

Slot cover

Qty. 10 (spare part)

Order No.

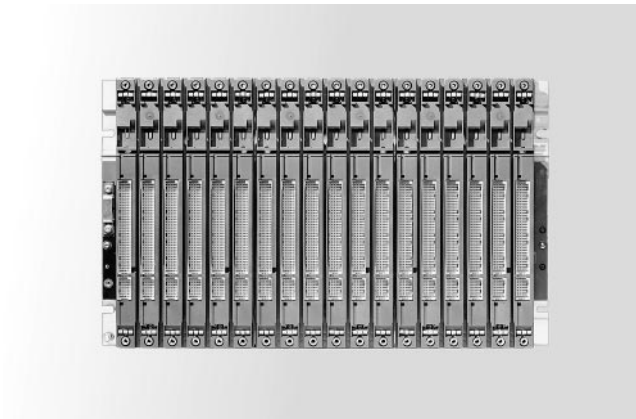
6ES7 490-1AA00-0AA0

SIMATIC S7-400 Mounting racks

CR2 rack (central controller)

4

Overview



- CR2 rack (central rack) for setting up central controllers.
- For up to 18 modules.
- Standard PS (power supply) and redundant PS can be used in the standard S7-400 system.
- 2 CPUs each with its own I/O can be operated adjacent to each other:
2 P bus segments, with 10 or 8 slots, each for 1 CPU with its own I/O.
- Continuous K bus: K bus stations can be addressed from both segments.
- Can be expanded in a central configuration (up to 3 m) or distributed (up to 100 m).
- Required for expansions: Interface modules (send IMs):
Up to six interface modules can be plugged in.
- Up to 21 expansion units can be connected.

Design

Component options

	Segment 1										Segment 2							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Standard PS (starting at slot 1)	■	■	■															
Redundant PS (starting at slot 1)	■	■	■	■														
CPU 1, M7-CPU 1		■	■	■	■	■	■	■	■	■								
CPU 2, M7-CPU 2											■	■	■	■	■	■	■	■
DI, DO, AI, AO		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
M7-FM		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
FM, IP ¹⁾ , WF ¹⁾ , CP		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Send IM		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

1) Only with S7 adapter casing; see page 4/96 for list of modules, not for S7-400H

Ordering data

CR2 rack
for segmented central controllers;
18 slots, 2 local segments

Order No.

6ES7 401-2TA01-0AA0

Slot cover

Qty. 10 (spare part)

Order No.

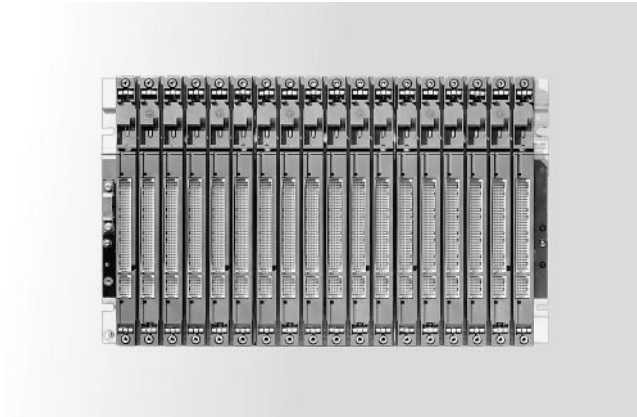
6ES7 490-1AA00-0AA0

SIMATIC S7-400

Mounting racks

UR2-H rack for S7-400H

Overview



• UR2-H mounting rack for setting up a complete S7-400H system in one mounting rack

• Also suitable for S7-400: operation of 2 separate CPUs with their own I/O (own P and K bus)
• Can also be used as expansion rack

- For up to 18 modules
- 2 CPUs each with its own I/O can be operated adjacently to each other: 2 P bus and 2 K bus segments, each with 9 slots and each for 1 CPU with its own I/O
- The following are always required: 2 power supply modules (PSs) and 2 CPUs
- Standard PS and redundant PS can be used in the standard S7-400 system
- Can be expanded centrally (up to 3 m) and in distributed configuration (up to 100 m)
- The following are required for expansions: interface modules (send IMs); up to 6 interface modules can be plugged in
- Up to 21 expansion racks can be connected

Design

Component options

	Subunit 1									Subunit 2								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Standard PS (starting at slot 1)	■	■	■							■	■	■						
Redundant PS (starting at slot 1)	■	■	■	■						■	■	■	■					
CPU 1, M7-CPU ²⁾ 1		■	■	■	■	■	■	■	■									
CPU 2, M7-CPU ²⁾ 2											■	■	■	■	■	■	■	■
DI, DO, AI, AO		■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■
M7-FM		■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■
FM, IP ¹⁾ , WF ¹⁾ , CP		■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■
Send IM		■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■

1) Only with S7 adapter casing; see page 4/96 for list of modules, not for S7-400H
2) Not for S7-400H

Ordering data

UR2-H rack
for divided central racks;
18 slots

Order No.

6ES7 400-2JA00-0AA0

Slot cover

Qty. 10 (spare part)

Order No.

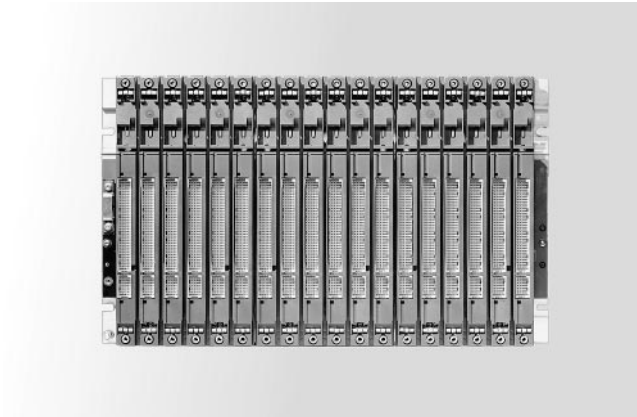
6ES7 490-1AA00-0AA0

SIMATIC S7-400 Mounting racks

UR1 rack (expansion unit)

4

Overview



- UR1 rack (universal rack) for setting up central controllers (see page 4/87) and expansion units.
- For up to 18 modules.
- Standard PS and redundant PS can be used in the standard S7-400 system.
- Always required: interface module (receive IM).

Design

Component options for use as an expansion unit

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Standard PS (starting at slot 1)	■	■	■															
Redundant PS (starting at slot 1)	■	■	■	■														
DI, DO, AI, AO	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
M7-FM		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
FM, CP		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Receive IM																		■

Ordering data

UR1 rack
for central controllers and expansion units;
18 slots

Order No.

6ES7 400-1TA01-0AA0

Slot cover

Qty. 10 (spare part)

Order No.

6ES7 490-1AA00-0AA0

SIMATIC S7-400

Mounting racks

UR2 rack (expansion unit)

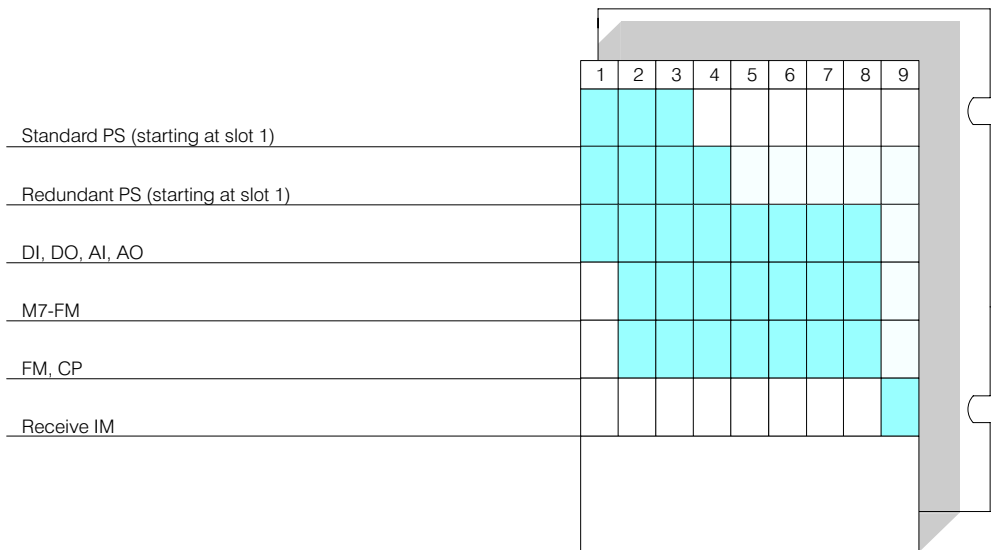
Overview

- UR2 rack (universal rack) for setting up central controllers (see page 4/88) and expansion units
- For up to 9 modules
- Standard PS and redundant PS can be used in the standard S7-400 system
- Always required: interface module (receive IM)

Design

Component options for use as an expansion unit

4



Ordering data

UR2 rack
for central controllers and expansion units;
9 slots

Order No.

6ES7 400-1JA01-0AA0

Slot cover

Qty. 10 (spare part)

Order No.

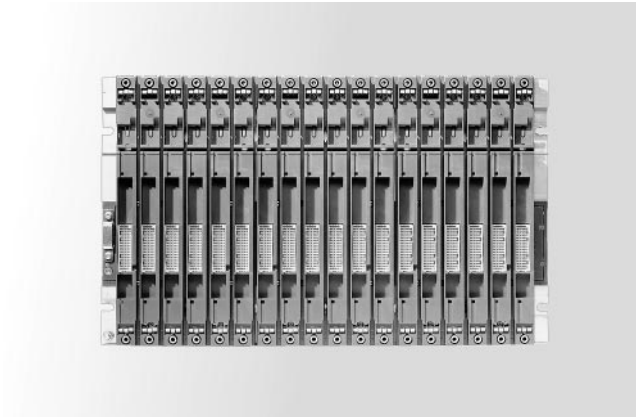
6ES7 490-1AA00-0AA0

SIMATIC S7-400 Mounting racks

ER1 rack (expansion unit)

4

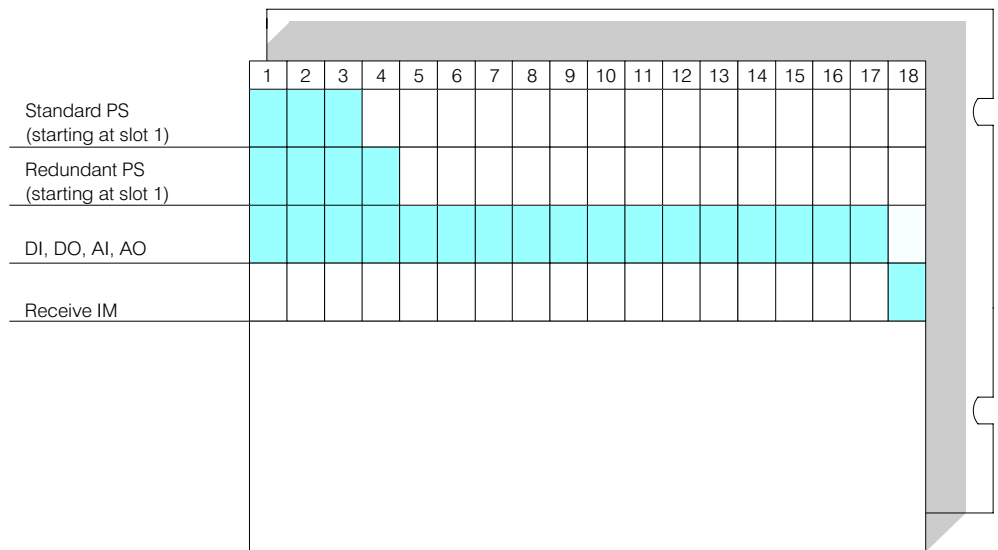
Overview



- Always required: interface module (receive IM)
- The P bus has limited functionality: No interrupt processing; No buffering of connected modules; No 24 V DC power supply to the modules.
- No K bus.
- It can be used for: SM modules; Receive IMs; Power supply module.
- ER1 rack (expansion rack) for low-cost setup of expansion units
- For up to 18 modules with restricted functionality
- Standard PS (power supply) and redundant PS can be used in the standard S7-400 system

Design

Component options



Ordering data

ER1 rack
for expansion units;
P bus only; 18 slots

Order No.

6ES7 403-1TA01-0AA0

Slot cover

Qty. 10 (spare part)

Order No.

6ES7 490-1AA00-0AA0

SIMATIC S7-400

Mounting racks

ER2 rack (expansion unit)

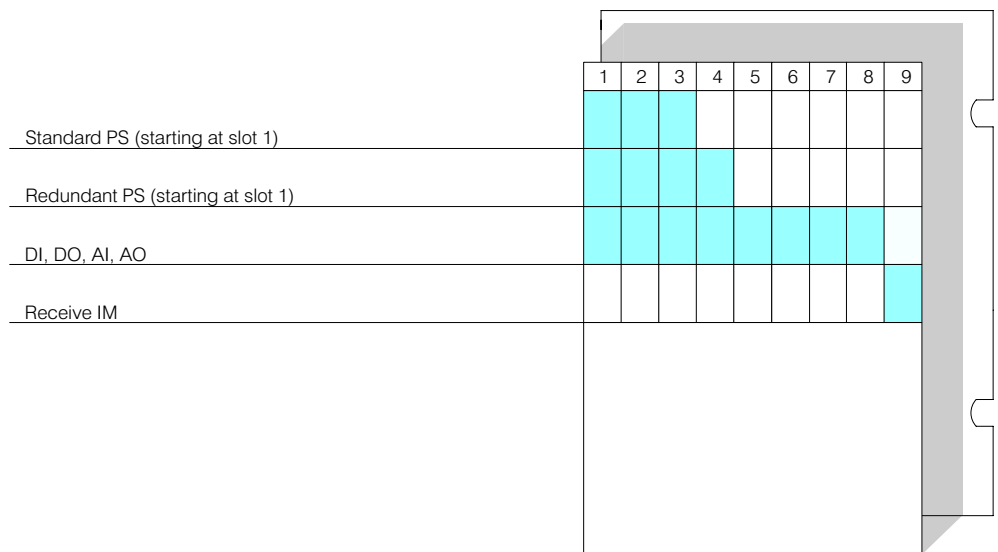
Overview



- ER2 rack (expansion rack) for low-cost setup of expansion units.
- For up to 9 modules with restricted functionality.
- Standard PS (power supply) and redundant PS can be used in the standard S7-400 system.
- Always required: Interface module (receive IM).
- The P bus has limited functionality:
 - No interrupt processing;
 - No buffering of connected modules;
 - No 24 V DC power supply to the modules.
- No K bus.
- It can be used for:
 - SM modules;
 - Receive IMs;
 - Power supply module.

Design

Component options



Ordering data

ER2 rack
for expansion units;
P bus only; 9 slots

Order No.

6ES7 403-1JA01-0AA0

Slot cover

Qty. 10 (spare part)

Order No.

6ES7 490-1AA00-0AA0

SIMATIC S7-400 Mounting racks

Fan subassembly

4

Overview



- Fan for the SIMATIC S7-400
- Required when using modules with especially high heat generation

Application

A fan subassembly is needed when the modules in a rack must be ventilated, for example as in the M7 CPU 488-5.

Any such requirement is specified with the relevant modules.

Design

The fan subassembly consists of:

- The base part with the cable duct
- Three fans and
- An electronic monitoring unit.
- Different power voltages; variants for 24 V DC and 120/230 V AC.

- Compact construction; simply mount fan subassemblies under the rack.
- Easy-to-service design; fans, air filters and electronics modules (the monitoring unit and the power-supply unit) can be replaced from the front, without tools.
- Cable duct; cables may be laid clearly in the cable duct toward the sides. The duct permits connection of the line shielding. The cable duct has a locking front panel.

- Redundant ventilation; if one fan fails, the two remaining fans ensure adequate ventilation. Failures are indicated by LEDs on the front and signaled by relay contacts.
- Variable air intake area; intake air can be drawn from the space in back or from below.

Technical specifications

Supply voltage

- Rated value 24 V DC; 120/230 V AC
- Permissible range 19.2 to 30 V DC; 85 to 132 V AC/170 to 264 V

Input current

- Rated value for 120 V AC 170 mA
- Rated value for 230 V AC 86 mA
- Rated value for 24 V DC 450 mA

Line frequency

- Rated value 50/60 Hz
 - Permissible range 47 to 63 Hz
- Power loss DC/AC 11 W/20 W
- Relay contact values 24 V DC / 200 mA
- Dimensions (W x H x D) in mm 482.5 x 109.5 x 235
- Weight approx. 1.6 kg

Ordering data

Fan subassembly

for all racks;
Supply voltage

- 24 V DC
- 120/230 V AC

Dust filter (Qty. 10)

Order No.

6ES7 408-1TA01-0XA0
6ES7 408-1TB00-0XA0
6ES7 408-1TA00-7AA0

Replacement fan (spare part)

Replacement monitoring unit
(spare part)

Replacement power supply unit
(spare part)

Cable duct

Configured like fan subassembly, but without fans or electronic units

Order No.

6ES7 408-1TA00-6AA0

6ES7 408-1TX00-6XA0

6ES7 408-1XX00-6XA0

6ES7 408-0TA00-0AA0

SIMATIC S7-400

Mounting racks

Expansion with SIMATIC S5 expansion units

Overview

- SIMATIC S5 expansion racks for distributed expansion of the S7-400
- For connecting to existing SIMATIC S5 systems

Application

The SIMATIC S7-400 can be expanded in a distributed configuration with expansion units from the SIMATIC S5-115U or SIMATIC S5-135U and S5-155U range. This means SIMATIC S7 systems can be linked with existing SIMATIC S5 systems to enhance the performance of the entire controller.

The following can be connected:

- ER 701-2 and ER 701-3 expansion units from the SIMATIC S5-115U range, and
- EG 183U and EG 185U expansion units from the SIMATIC S5-135U and S5-155U range.

Design

The following specifications apply for expanding an S7-400 with SIMATIC S5 expansion units:

- IM 463-2 interface module: plugged into the SIMATIC S7-400 central controller (see page 4/105). Up to four IM 463-2s can be plugged into any central controller.

- IM 314 interface module; plugged into SIMATIC S5 expansion units. A terminator must be plugged into the last IM 314 module.

- Maximum configuration; up to 32 SIMATIC S5 expansion units may be connected to an S7-400 central controller. These expansion units may also be expanded centrally (by means of IM 300-3, IM 300-5 or IM 306).
- Transmission distance; the maximum acceptable distance between the central unit and the last expansion unit in a line is 600 m.

Compatible SIMATIC S5 units (continued) (see Catalog ST)

Expansion unit	ER 701-2, ER 701-3	EG 183U, EG 185U
Digital input modules	6ES5 420-7LA11 6ES5 430-7LA12 6ES5 431-7LA11 6ES5 432-7LA11 6ES5 434-4UA12 6ES5 434-7LA12 6ES5 435-7LA11 6ES5 435-7LB11 6ES5 435-7LC11 6ES5 436-7LA11 6ES5 436-7LB11 6ES5 436-7LC11	6ES5 420-4UA14 6ES5 430-4UA14 6ES5 431-4UA12 6ES5 432-4UA12 6ES5 434-4UA12 6ES5 435-4UA12 6ES5 436-4UA12 6ES5 436-4UB12
Digital output modules	6ES5 441-7LA12 6ES5 451-7LA12 6ES5 451-7LA21 6ES5 453-7LA11 6ES5 454-7LA12 6ES5 454-7LB11 6ES5 455-7LA11 6ES5 456-7LA11 6ES5 456-7LB11 6ES5 457-7LA11 6ES5 458-7LA11 6ES5 458-7LB11 6ES5 458-7LC11	6ES5 441-4UA14 6ES5 451-4UA14 6ES5 453-4UA12 6ES5 454-4UA14 6ES5 455-4UA12 6ES5 456-4UA12 6ES5 456-4UB12 6ES5 457-4UA12 6ES5 458-4UA12 6ES5 458-4UC11
Digital I/O modules	6ES5 482-7LA11 6ES5 482-7LF11 6ES5 482-7LF21 6ES5 482-7LF31 6ES5 485-7LA11	6ES5 482-4UA11

SIMATIC S7-400 Mounting racks

Expansion with SIMATIC S5 expansion units

Design (continued)

Compatible SIMATIC S5 units (continued) (see Catalog ST 50)

Analog input modules	6ES5 460-7LA13	6ES5 460-4UA13
	6ES5 463-4UA12	6ES5 463-4UA12
	6ES5 463-4UB12	6ES5 463-4UB12
	6ES5 465-7LA13	6ES5 465-4UA12
	6ES5 466-3LA11	6ES5 466-3LA11
Analog output modules	6ES5 470-7LA12	6ES5 470-4UA12
	6ES5 470-7LB12	6ES5 470-4UB12
	6ES5 470-7LC12	6ES5 470-4UC12
Interface modules	6ES5 306-7LA11	6ES5 300-3AB11
	6ES5 314-3UA11	6ES5 300-5CA11 6ES5 314-3UA11

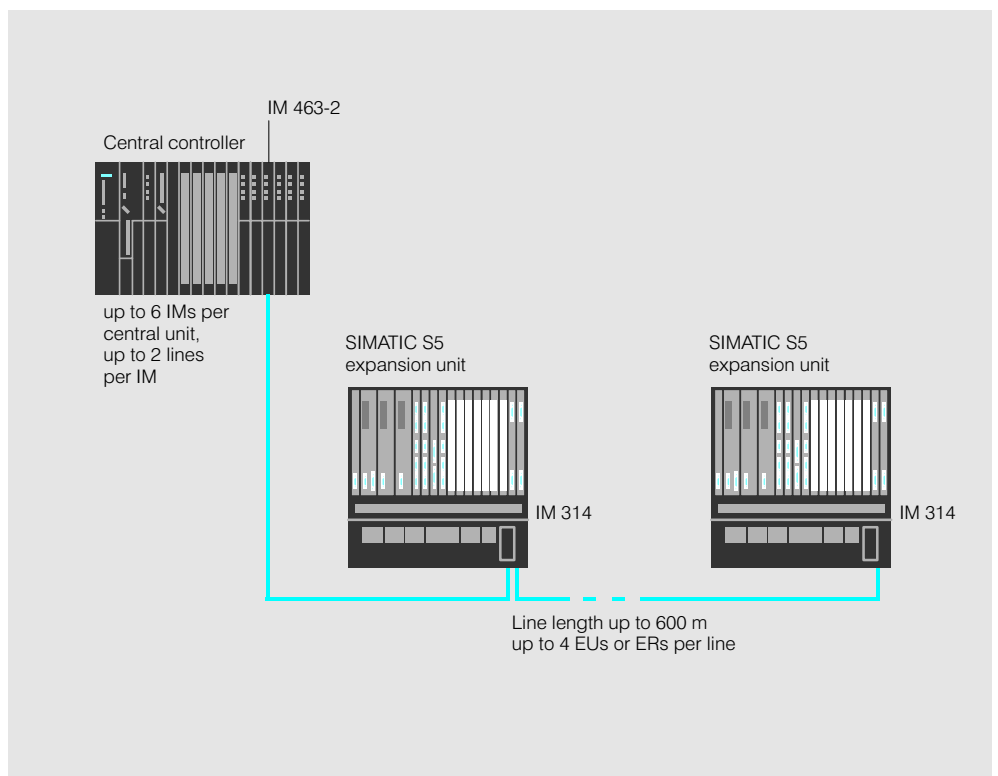


Fig. 4/23 Expansion with SIMATIC S5 expansion units