OFFICIAL DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected official Siemens technical pages

SIEMENS SIMATIC S7-400

6ES7414-3FM07-0AB0

SIMATIC S7-400 CPU 414F-3 PN/DP

Selected official pages retain the original technical tables, ratings, notes and pagination.

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Siemens CPU manual A5E00850746-AN, 03/2023; Hardware and Installation A5E00850741-01

CPU pages 292-307; installation sections 2.13 and 7.3

This technical extract does not replace the complete equipment and system manuals. Check the installed hardware and project before use.

10.6 Technical specifications of CPU 414-3 PN/DP (6ES7414-3EM07-0AB0), CPU 414F-3 PN/DP (6ES7414-3FM07-0AB0)

Data

	6ES7414-3EM07-0AB0 **6ES7414-3FM07-0AB0**
General information	
Product type designation	CPU414-3 PN/DP CPU414F-3 PN/DP
Hardware version	01
Firmware version	V7.0
Engineering with	
Programming package	as of STEP 7 V5.5 with HSP 262
CiR Configuration in RUN	
CiR synchronization time, base load	100 ms
CiR synchronization time, time per I/O byte	15 µs
Power supply	
Rated value (DC)	
24 V DC	No; voltage supplied via the system voltage supply
Input current	
From backplane bus 5 V DC, typ.	1.3 A
From backplane bus 5 V DC, max.	1.6 A
From the backplane bus 24 V DC, max.	300 mA; 150 mA per DP interface
From interface 5 V DC, max.	90 mA; for each DP interface
Power loss	
Typical power loss	6.5 W
Power loss, max.	8 W
Memory	
Type of memory	RAM
Work memory	
Integrated	4 MB
integrated (for program)	2 MB
integrated (for data)	2 MB
Expandable	No
Load memory	
Expandable FEPROM	Yes; with memory card (FLASH)
Expandable FEPROM, max.	64 MB
integrated RAM, max.	512 KB
Expandable RAM	Yes; with memory card (RAM)

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Expandable RAM, max.	64 MB
Battery backup	
Available	Yes
With battery	Yes; all data
Without battery	No
Battery	
Backup battery	
Backup battery current, typ.	180 µA; to 40 °C
Backup battery current, max.	850 µA
Backup battery time, max.	Covered by the conditions and effects described in the Module data manual
Feed of external backup voltage to the CPU	5 to 15 V DC
CPU processing times	
For bit operations, typ.	18.75 ns
For word operations, typ.	18.75 ns
For integer arithmetic, typ.	18.75 ns
For floating-point arithmetic, typ.	37.5 ns
CPU blocks	
DB	
Number, max.	6000; number range: 1 to 16000
Size, max.	64 KB
FB	
Number, max.	3000; number range: 0 to 7999
Size, max.	64 KB
FC	
Number, max.	3000; number range: 0 to 7999
Size, max.	64 KB
OB	
Size, max.	64 KB
Number of free-cycle OBs	1; OB 1
Number of time-of-day interrupt OBs	4; OB 10-13
Number of time-delay interrupt OBs	4; OB 20-23
Number of cyclic interrupt OBs	4; OB 32, 33, 34, 35 (smallest configurable cycle = 500 µs)
Number of hardware interrupt OBs	4; OB 40-43
Number of DPV1 interrupt OBs	3; OB 55-57
Number of isochronous OBs	3; OB 61-63
Number of multi-computing OBs	1; OB 60
Number of background OBs	1; OB 90
Number of startup OBs	3; OB 100, 101, 102 with CPU414-3 PN/DP 2; OB 100, 102 with CPU 414F-3 PN/DP
Number of asynchronous error OBs	9; OB 80-88

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Number of synchronous error OBs	2; OB 121, 122
Nesting depth	
Per priority class	24
Additional levels within an error OB	1
Counters, timers and their retentivity	
S7 counters	
Number	2048
Retentivity	
Adjustable	Yes
Low limit	0
High limit	2047
Default	C 0 to C 7
Counting range	
Low limit	0
High limit	999
IEC counters	
Available	Yes
Type	SFB
Number	Unlimited (limited only by the work memory)
S7 timers	
Number	2048
Retentivity	
Adjustable	Yes
Low limit	0
High limit	2047
Default	No retentive timers
Time range	
Low limit	10 ms
High limit	9990 s
IEC timers	
Available	Yes
Type	SFB
Number	Unlimited (limited only by the work memory)
Data areas and their retentivity	
Retentive data area, total	Total work and load memory (with backup battery)
Bit memories	
Number, max.	8 KB; size of bit memory address area
Retentivity available	Yes
Default retentivity	MB 0 to MB 15
Number of clock memories	8; in 1 memory byte

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Local data	
Adjustable, max.	16 KB
Default	8 KB
Address area	
I/O address area	
Inputs	8 KB
Outputs	8 KB
of which are distributed	
MPI/DP interface, inputs	2 KB
MPI/DP interface, outputs	2 KB
DP interface, inputs	6 KB
DP interface, outputs	6 KB
PN interface, inputs	8 KB
PN interface, outputs	8 KB
Process image	
Inputs, adjustable	8 KB
Outputs, adjustable	8 KB
Inputs, preset	256 bytes
Outputs, preset	256 bytes
Consistent data, max.	244 bytes
Access to consistent data in the process image	Yes
Process image partitions	
Number of process image partitions, max.	15
Digital channels	
Inputs	65536
of which are central	65536
Outputs	65536
of which are central	65536
Analog channels	
Inputs	4096
of which are central	4096
Outputs	4096
of which are central	4096
Hardware configuration	
Number of expansion units, max.	21
Multicomputing	Yes; max. 4 CPU (with UR1 or UR2)
Interface modules	
Number of plug-in IMs (total), max.	6
Number of plug-in IM 460s, max.	6
Number of plug-in IM 463s, max.	4; IM 463-2

	6ES7414-3EM07-0AB0 **6ES7414-3FM07-0AB0**
Number of DP masters	
Integrated	1
Via IM 467	4
Via CP	10; CP 443-5 Extended
Mixed IM + CP operation allowed	No; IM 467 cannot be used in combination with CP 443-5 Ext. or CP 443-1 n PROFINET IO mode
Via interface module	1; IF 964-DP
Number of plug-in S5 modules (via adapter bay, in the central controller), max.	6
Number of IO controllers	
Integrated	1
Via CP	4; max. 4 in central controller; no mixed operation of different CP 443-1 types in PROFINET IO mode
Number of usable FMs and CPs (recommendation)	
FM	Limited by the number of slots and connections
CP, point-to-point	CP 440: limited by the number of slots; CP 441: limited by the number of slots or connections
PROFIBUS and Ethernet CPs	14; in total max. 10 CP as DP master and PROFINET controller, of which up to 10 IM or CP as DP master and up to 4 CP as PROFINET controller
Slots	
Slots required	2
Time of day	
Clock	
Hardware clock (real-time clock)	Yes
With battery backup, can be synchronized	Yes
Resolution	1 ms
Deviation per day (with battery backup), max.	1.7 s; Power off
Deviation per day (without battery backup), max.	8.6 s; with Power on
Operating hours counter	
Number	16
Number/number range	0 to 15
Range of values	SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hour
Resolution	1 hour
Retentive	Yes
Time synchronization	
Supported	Yes
on MPI, master	Yes
on MPI, slave	Yes
on DP, master	Yes
on DP, slave	Yes
in the AS, master	Yes

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in the AS, slave	Yes
On Ethernet via NTP	Yes; as client
On IF 964 DP	Yes
Time difference in the system with synchronization via	
Ethernet, max.	10 ms
MPI, max.	200 ms
Interfaces	
Interfaces/bus type	1x MPI/PROFIBUS DP, 1x PROFINET (2 ports), 1x PROFIBUS DP (optionally plug-in)
Number of RS 485 interfaces	1; combination MPI / PROFIBUS DP
Number of other interfaces	1; PROFIBUS DP with IF 964-DP (optionally plug-in; MLFB: 6ES7964-2AA04-0AB0)
1st interface	
Interface type	Integrated
Hardware	RS 485 / PROFIBUS + MPI
Electrically isolated	Yes
Power supply at interface (15 to 30 V DC), max.	150 mA
Number of connection resources	MPI: 32, DP: 16
Functionality	
MPI	Yes
DP master	Yes
DP slave	Yes
MPI	
Number of connections	32; a diagnostics repeater in the segment reduces the number of connection resources on the segment by 1
Transmission rate, max.	12 Mbps
Services	
PG/OP communication	Yes
Routing	Yes
Global data communication	Yes
S7 basic communication	Yes
S7 communication	Yes
S7 communication, as client	Yes
S7 communication, as server	Yes
DP master	
Number of connections, max.	16; a diagnostics repeater in the segment reduces the number of connection resources on the segment by 1
Transmission rate, max.	12 Mbps
Number of DP slaves, max.	32
Services	
PG/OP communication	Yes

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Global data communication	No
S7 basic communication	Yes
S7 communication	Yes
S7 communication, as client	Yes
S7 communication, as server	Yes
Support for constant bus cycle time	Yes
Isochronous mode	Yes
SYNC/FREEZE	Yes
Enabling/disabling of DP slaves	Yes
Direct data exchange (peer-to-peer)	Yes
DPV1	Yes
Address area	
Inputs, max.	2 KB
Outputs, max.	2 KB
User data per DP slave	
User data per DP slave, max.	244 bytes
Inputs, max.	244 bytes
Outputs, max.	244 bytes
Slots, max.	244
Per slot, max.	128 bytes
DP slave	
Number of connections	16
GSD file	https://support.industry.siemens.com/cs/ww/en/view/113652
Transmission rate, max.	12 Mbps
Automatic baud rate detection	No
Address area, max.	32; virtual slots
User data per address area, max.	32 bytes
Consistent user data per address area, max.	32 bytes
Services	
PG/OP communication	Yes; with active interface
S7 routing	Yes; with active interface
Global data communication	No
S7 basic communication	No
S7 communication	Yes
S7 communication, as client	Yes
S7 communication, as server	Yes
Direct data exchange (peer-to-peer)	No
DPV1	No
Transfer memory	
Inputs	244 bytes

	6ES7414-3EM07-0AB0 **6ES7414-3FM07-0AB0**
Outputs	244 bytes
2nd interface	
Interface type	PROFINET
Hardware	Ethernet RJ45
Electrically isolated	Yes
Integrated switch	Yes
Number of ports	2
Automatic determination of transmission rate	Yes; Autosensing
Autonegotiation	Yes
Autocrossing	Yes
Change of the IP address at runtime, supported	Yes; specified by higher-level IO controller or by the user program with SFB 104 "IP_CONF"
Number of connection resources	64
Media redundancy	
Supported	Yes
Changeover time at line interruption, typ.	200 ms
Number of nodes on the ring, max.	50
Functionality	
DP master	No
DP slave	No
PROFINET IO controller	Yes
PROFINET IO device	Yes
PROFINET CBA	Yes
Open IE communication	Yes
Point-to-point link	No
PROFINET IO controller	
Transmission rate, max.	100 Mbps
Number of connectable IO devices, max.	256
Number of connectable IO devices for RT, max.	256
of which in line, max.	256
Number of IO devices with IRT and the "high flexibility" option	256
of which in line, max.	61
Max. number of IO devices with IRT and the "high performance" option	64
of which in line, max.	64
Shared device	Yes
Prioritized startup	Yes
Number of IO devices, max.	32
Enabling/disabling of IO devices	Yes
Max. number of I/O devices that can be enabled/disabled simultaneously	8

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Hot-swapping of I/O devices (partner ports), supported	Yes
Number of IO devices per tool, max.	8; 8 parallel calls of SFC 12 "D_ACT_DP" per segment are possible. Hot-swapping of maximum 32 I/O devices (partner ports) supported
Device replacement without swap medium	Yes
Send clocks	250 µs, 500 µs, 1 ms, 2 ms, 4 ms also for IRT with higher performance: 250 µs to 4 ms at an interval of 125 µs
Update time	250 µs to 512 ms; The minimum value depends on the communication slice set for PROFINET IO, the number of IO devices, and the amount of configured user data; see PROFINET system description
Services	
PG/OP communication	Yes
S7 routing	Yes
S7 communication	Yes
Isochronous mode	Yes; only with IRT and the "high performance" option
Open IE communication	Yes
Address area	
Inputs, max.	8 KB
Outputs, max.	8 KB
User data consistency, max.	1024 bytes
PROFINET IO device	
Services	
PG/OP communication	Yes
S7 routing	Yes
S7 communication	Yes
Isochronous mode	No
Open IE communication	Yes
IRT	Yes
Prioritized startup	Yes
Shared device	Yes
Number of IO controllers with shared device, max.	2
Transfer memory	
Inputs, max.	1440 bytes; per IO controller with shared device
Outputs, max.	1440 bytes; per IO controller with shared device
Submodules	
Number, max.	64
User data per submodule, max.	1024 bytes
Open IE communication	
Number of connections, max.	62
Local port numbers used by the system	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535

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Keep Alive function supported	Yes
3rd interface	
Interface type	Plug-in interface module (IF)
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Hardware	RS 485 / PROFIBUS
Electrically isolated	Yes
Power supply at interface (15 to 30 V DC), max.	150 mA
Automatic determination of transmission rate	No
Number of connection resources	16
Functionality	
MPI	No
DP master	Yes
DP slave	Yes
DP master	
Number of connections, max.	16
Transmission rate, max.	12 Mbps
Number of DP slaves, max.	96
Services	
PG/OP communication	Yes
Global data communication	No
S7 basic communication	Yes
S7 communication	Yes
S7 communication, as client	Yes
S7 communication, as server	Yes
Support for constant bus cycle time	Yes
Isochronous mode	Yes
SYNC/FREEZE	Yes
Enabling/disabling of DP slaves	Yes
Direct data exchange (peer-to-peer)	Yes
DPV1	Yes
Address area	
Inputs, max.	6 KB
Outputs, max.	6 KB
User data per DP slave	
User data per DP slave, max.	244 bytes
Inputs, max.	244 bytes
Outputs, max.	244 bytes
Slots, max.	244
Per slot, max.	128 bytes
DP slave	

	6ES7414-3EM07-0AB0 **6ES7414-3FM07-0AB0**
Number of connections	16
GSD file	https://support.industry.siemens.com/cs/ww/en/view/113652
Transmission rate, max.	12 Mbps
Automatic baud rate detection	No
Address area, max.	32; virtual slots
User data per address area, max.	32 bytes
Consistent user data per address area, max.	32 bytes
Services	
PG/OP communication	Yes
S7 routing	Yes; with active interface
Global data communication	No
S7 basic communication	No
S7 communication	Yes
S7 communication, as client	Yes
S7 communication, as server	Yes
Direct data exchange (peer-to-peer)	No
DPV1	No
Transfer memory	
Inputs	244 bytes
Outputs	244 bytes
Isochronous mode	
Isochronous mode (application synchronized up to terminal)	Yes; via PROFIBUS DP or PROFINET interface
Number of DP masters with isochronous mode	2
User data per isochronous slave, max.	244 bytes
Constant bus cycle time	Yes
Minimum clock cycle	1 ms; 0.5 ms without use of SFC 126, 127
Maximum clock cycle	32 ms
Communication functions	
PG/OP communication	Yes
Number of connectable OPs without message processing	63
Number of connectable OPs with message processing	63; when using Alarm_S/SQ and Alarm_D/DQ
Data record routing	Yes
Global data communication	
Supported	Yes
Number of GD circles, max.	8
Number of GD packets, sender, max.	8
Number of GD packets, receiver, max.	16
Size of GD packets, max.	54 bytes
Size of GD packets (of which are consistent), max.	1 variable
S7 basic communication	

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Supported	Yes
User data per job, max.	76 bytes
User data per job (of which consistent), max.	1 variable
S7 communication	
Supported	Yes
As server	Yes
As client	Yes
User data per job, max.	64 KB
User data per job (of which consistent), max.	462 bytes; 1 variable
S5-compatible communication	
Supported	Yes; via FC AG_SEND and AG_RECV, maximum via 10 CP 443-1 or 443-5
User data per job, max.	8 KB
User data per job (of which consistent), max.	240 bytes
Number of simultaneous AG-SEND/AG-RECV jobs per CPU, max.	24/24
Standard communication (FMS)	
Supported	Yes; via CP and loadable FBs
Open IE communication	
TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
Number of connections, max.	62
Data length, max.	32 KB
Multiple passive connections per port, supported	Yes
ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
Number of connections, max.	62
Data length, max.	32 KB; 1452 bytes via CP 443-1 Adv.
UDP	Yes; via integrated PROFINET interface and loadable FBs
Number of connections, max.	62
Data length, max.	1472 bytes
Web server	
Supported	Yes
Number of HTTP clients	5
User-defined websites	Yes
PROFINET CBA (with configured communication load setpoint)	
Reference setting for CPU communication load	20%
Number of remote interconnection partners	32
Number of master/slave functions	150
Total of all master/slave connections	4500
Data length of all incoming master/slave I/Os, max.	45000 bytes
Data length of all outgoing master/slave connections, max.	45000 bytes

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Number of device-internal and PROFIBUS interconnections	1000
Data length of the device-internal and PROFIBUS interconnections, max.	16000 bytes
Data length per connection, max.	2000 bytes
Remote interconnections with non-cyclic transmission	
Sampling rate: Sampling interval, min.	200 ms; Depends on preset communication load, number of interconnections and used data length
Number of incoming interconnections	250
Number of outgoing interconnections	250
Data length of all incoming interconnections, max.	8000 bytes
Data length of all outgoing interconnections, max.	8000 bytes
Data length per connection, max.	2000 bytes
Remote interconnections with cyclic transmission	
Transmission rate: Minimum transmission time	1 ms; Depends on preset communication load, number of interconnections and used data length
Number of incoming interconnections	300
Number of outgoing interconnections	300
Data length of all incoming interconnections, max.	4800 bytes
Data length of all outgoing interconnections, max.	4800 bytes
Data length per connection, max.	450 bytes
HMI variables via PROFINET (non-cyclic)	
Number of stations that can be logged on for HMI variables (PN OPC/IMAP)	2x PN OPC / 1x IMAP
Update of HMI variables	500 ms
Number of HMI variables	1000
Data length of all HMI variables, max.	32000 bytes
PROFIBUS proxy functionality	
Supported	Yes; max. 32 PROFIBUS slaves can be connected
Data length per connection, max.	240 bytes; slave dependent
Number of connections	
Total	64
Suitable for PG communication	63
Reserved for PG communication	1
Assignable for PG communication, max.	0
Suitable for OP communication	63
Reserved for OP communication	1
Assignable for OP communication, max.	0
Suitable for S7 basic communication	62
Reserved for S7 basic communication	0
Assignable for S7 basic communication, max.	0
Suitable for S7 communication	62

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Reserved for S7 communication	0
Assignable for S7 communication, max.	0
Suitable for routing	31
Reserved for routing	0
Assignable for routing, max.	0
S7 message functions	
Number of stations that can be logged on for signaling functions, max.	63; max. 63 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	Yes
SCAN procedure	Yes
Block-related messages	Yes
Process diagnostics messages	Yes
Simultaneously active Alarm_S blocks, max.	400; simultaneously active Alarm_S/SQ blocks and Alarm_D/DQ blocks
Alarm_8 blocks	Yes
Number of instances for Alarm_8 and S7 communication blocks, max.	1200
Preset, max.	300
Process control messages	Yes
Number of archives that can be logged on simultaneously (SFB 37 AR_SEND)	16
Number of messages	
Total, max.	512
In 100 ms interval, max.	128
in 500 ms interval, max.	256
in 1000 ms interval, max.	512
Number of additional values	
In 100 ms interval, max.	1
In 500, 1000 ms interval, max.	10
Test and commissioning functions	
Block status	Yes; up to 16 simultaneously
Single-step	Yes
Number of breakpoints	16
Status/modify	
Status/modify variable	Yes; up to 16 variable tables
Variables	Inputs/outputs, bit memory, DB, I/O inputs/outputs, timers, counters
Number of variables, max.	70; Status / Modify
Forcing	
Forcing	Yes
Force, variables	Inputs/outputs, bit memories, distributed I/O

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Number of variables, max.	256
Diagnostics buffer	
Available	Yes
Number of entries, max.	3200
Adjustable	Yes
Default	120
Service data	
Readable	Yes
Standards, approvals, certificates	
UKCA	Yes
CE mark	Yes
CSA approval	Yes
UL approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
CCC	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
Use in hazardous areas	
ATEX	ATEX II 3 G Ex ec IIC T4 Gc
Ambient conditions	
Ambient temperature during operation	
Min.	0° C
Max.	60 °C
Configuration	
Programming	
Instruction set	See instruction list
Nesting levels	7
System functions (SFC)	See instruction list
System function blocks (SFB)	See instruction list
Programming language	
LAD	Yes
FBD	Yes
STL	Yes
SCL	Yes
CFC	Yes
GRAPH	Yes
HiGraph®	Yes
Number of simultaneously active SFCs	

	6ES7414-3EM07-0AB0 **6ES7414-3FM07-0AB0**
DPSYC_FR	2; SFC 11; per interface
D_ACT_DP	8; SFC 12; per interface
RD_REC	8; SFC 59; per interface
WR_REC	8; SFC 58; per interface
WR_PARM	8; SFC 55; per interface
PARM_MOD	1; SFC 57; per interface
WR_DPARM	2; SFC 56; per interface
DPNRM_DG	8; SFC 13; per interface
RDSYSST	8; SFC 51
DP_TOPOL	1; SFC 103; per interface
Number of simultaneously active SFBs	
RDREC	8; SFB 52; per interface, but not more than 32 across all external interfaces
WRREC	8; SFB 53; per interface, but not more than 32 across all external interfaces
Know-how protection	
User program/password protection	Yes
Block encryption	Yes; with S7 block privacy
Dimensions	
Width	50 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	900 g

2.13 Installing Modules in a Rack

Introduction

All modules are installed using the same procedure.

Caution

Modules and racks can be damaged.

Do not apply any undue force when installing the modules in a rack, because you will more than likely damage the devices.

Carefully follow the steps described below for the installation sequence.

Tool

The tool needed to install the modules is a cylindrical screwdriver with 3.5 mm blade width.

Installation Sequence

To install modules in a rack:

1. Remove the dummy plates from the slots at which you intend to insert modules. Grasp the dummy plate at the points marked and pull it forward and off.

   With double and triple-width modules, you must remove the dummy plates from all the slots to be covered by the relevant module.
2. Remove the cover, if applicable, from the module (see Figure 2-3).
3. Disconnect the power supply connector at the power supply module.
4. Attach the first module and swing it downwards (see Figure 2-4).

   If you feel a resistance when swinging the module down, raise it slightly and then continue.
5. Tighten the module screws top and bottom with a torque of 0.8 to 1.1 N/m (see Figure 2-5). Triple-width modules are secured with two screws at the top and at the bottom.
6. Refit the module cover, if applicable.
7. Fit the remaining modules in the same way.

The individual steps for installation are explained below.

The method of removing modules is described in Chapter 7.

Removing the Cover

With modules which have a cover (for example, power supply modules and CPUs), you remove this before installing the module in the rack. Proceed as follows:

1. Push the interlock lever down (1).
2. Swing the cover forward and off (2).

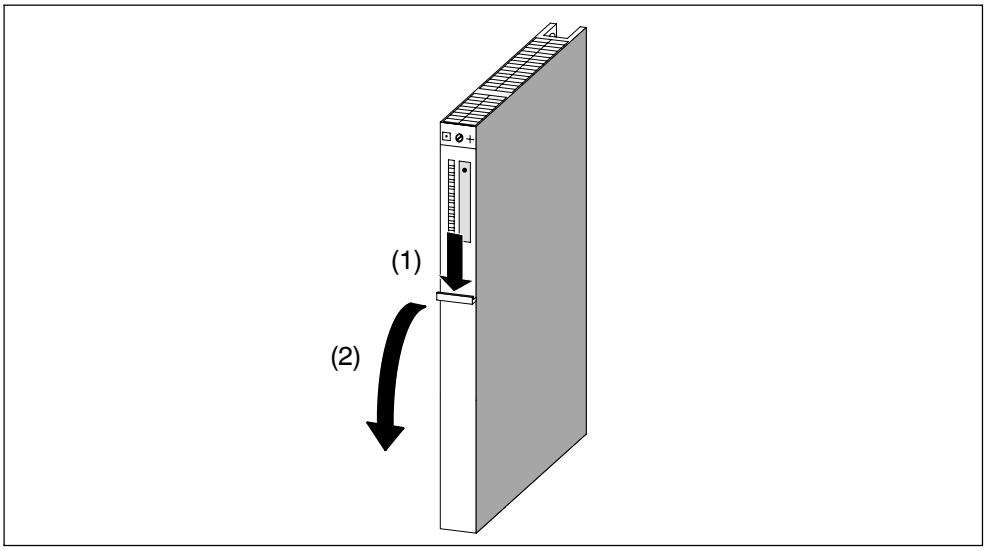

Figure 2-3 Removing the Cover

Attaching the Modules

Attach the modules one by one (1) and swing them carefully downwards (2). If you feel a resistance when swinging the module down, raise it slightly and then continue.

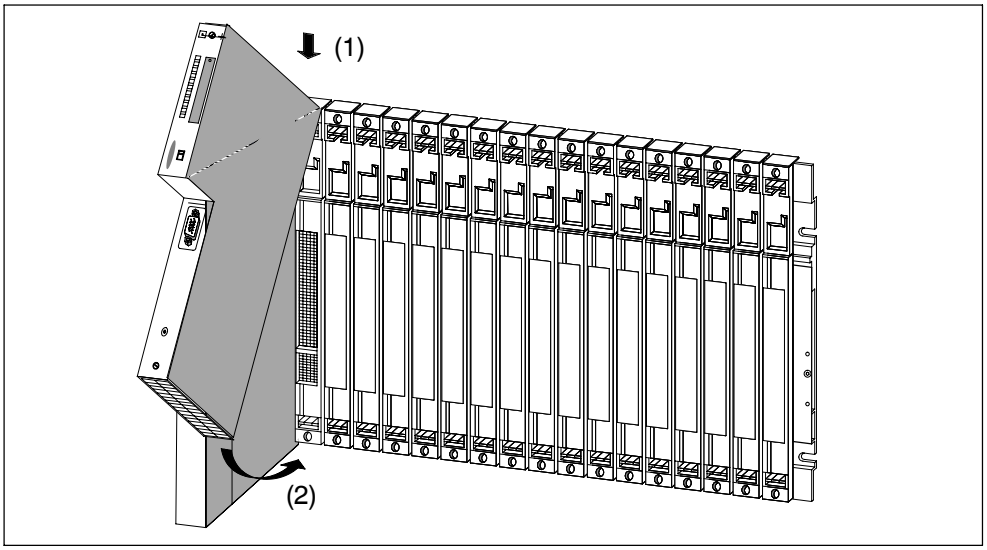

Figure 2-4 Attaching the Modules

Screwing the Modules in Place

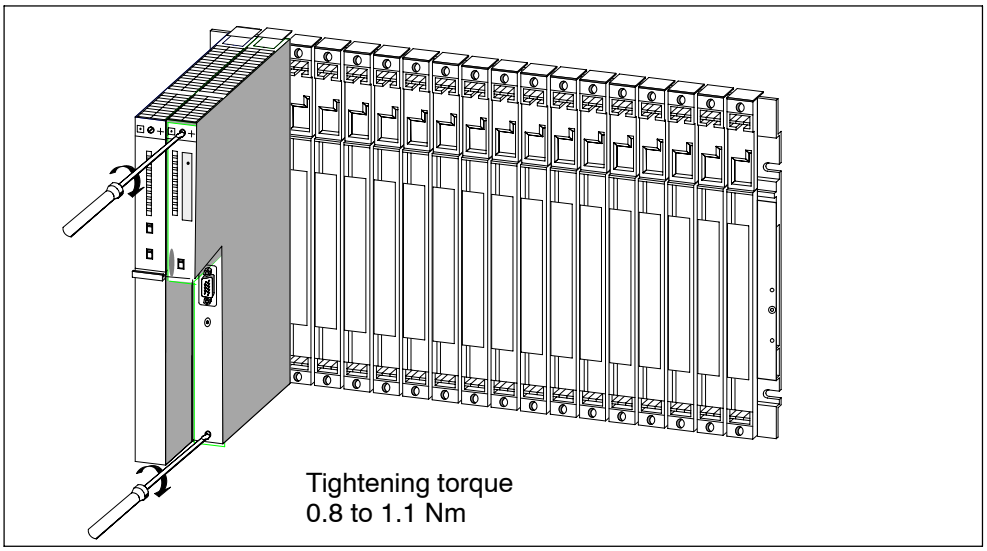

Figure 2-5 Screwing the Modules in Place

7.3 Replacing CPUs

Slot Numbering

If you have provided the modules in your system with slot numbering, you must remove the number from the old module when replacing it and apply the number to the new module.

Saving the Data

Save the user program including configuration data.

Removing the Module

1. Set the CPU mode switch to STOP.
2. Set the standby switch of the power supply module to ⏻ (0 V output voltages).
3. Remove the cover of the CPU.
4. Disconnect the MPI connector, if applicable.
5. Disconnect the connector at the EXT. BATT. socket, if applicable.
6. Remove the memory card.
7. Loosen the mounting screws of the module.
8. Swing the module out.

Installing a New Module

1. Attach the new module of the same type and swing it downwards.
2. Screw the module on.
3. If applicable, plug the connector for the external battery supply into the socket.
4. Set the CPU mode switch to STOP.
5. Insert the memory card.
6. Set the standby switch of the power supply module to I (output voltages at rated value).

   The remaining procedure depends on whether you use a Flash card and whether or not you have configured your system for networking.
7. Proceed as follows to operate with a Flash card:

   Transfer the user and configuration data.

   Set the CPU mode switch to RUN.

   Close the cover.
8. If your system is not configured for networking, proceed as follows:

   Transfer the user and configuration data by means of the programming device, via the programming device cable (see Section 6.3).

   Set the CPU mode switch to RUN.

   Close the cover.
9. If your system is configured for networking, proceed as follows:

   Transfer the user and configuration data by means of the programming device, via the programming device cable (see Section 6.3).

   Set up your network by plugging in the MPI connector.

   Set the CPU mode switch to RUN.

   Close the cover.

How the S7-400 Behaves after Exchanging Modules

If an error occurs after replacing a module, you can read out the cause of the error from the diagnostic buffer.