MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Selected official pages for procurement and maintenance review

PRODUCT BRAND

Siemens

PRODUCT MODEL

6ES7513-1RL00-0AB0

CPU 1513R-1 PN Redundant Controller. Relevant section pages: 34, 35, 36, 37, 38, 39, 40, 41. Adjacent model text on shared pages is outside this product reference.

OFFICIAL SOURCE

CPU 1513R-1 PN Equipment Manual; 05/2021

Siemens original documentation and product reference

Siemens 05/2021 technical reference for 1RL00. Not installation instructions. Confirm hardware, firmware and complete R/H system requirements; later 1RM03 specifications do not apply.

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

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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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.

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Preface

Purpose of the documentation

This manual supplements the system manual of the S7-1500R/H redundant system and the function manuals. This manual contains a description of the module-specific information. The system-related functions are described in the system manual. All system-spanning functions are described in the function manuals.

The information provided in this manual and the system manual enables you to commission the CPU 1513R-1 PN.

Conventions

STEP 7: In this documentation, "STEP 7" is used as a synonym for all versions of the configuration and programming software "STEP 7 (TIA Portal)".

Please also observe notes marked as follows:

Note

A note contains important information on the product described in the documentation, on the handling of the product or on the section of the documentation to which particular attention should be paid.

Recycling and disposal

For environmentally friendly recycling and disposal of your old equipment, contact a certified electronic waste disposal company and dispose of the equipment according to the applicable regulations in your country.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

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For additional information on industrial security measures that may be implemented, please visit (https://www.siemens.com/industrialsecurity).

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To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed visit (https://www.siemens.com/industrialsecurity).

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- **Product support**

  All the information and extensive know-how on your product, technical specifications, FAQs, certificates, downloads, and manuals.

- **Application examples**

  Tools and examples to solve your automation tasks – as well as function blocks, performance information and videos.

- **Services**

  Information about Industry Services, Field Services, Technical Support, spare parts and training offers.

- **Forums**

  For answers and solutions concerning automation technology.

- **mySupport**

  Your personal working area in Industry Online Support for messages, support queries, and configurable documents.

This information is provided by the Siemens Industry Online Support in the Internet (https://support.industry.siemens.com).

Technical specifications

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The following table shows the technical specifications as of 05/2021. You can find a data sheet including daily updated technical specifications on the Internet (https://support.industry.siemens.com/cs/ww/en/pv/6ES7513-1RL00-0AB0/td?dl=en).

Article number	6ES7513-1RL00-0AB0
General information	
Product type designation	CPU 1513R-1 PN
HW functional status	FS01
Firmware version	V2.9
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	No
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V17 (FW V2.9) / V16 (FW V2.8) / V15.1 (FW V2.6)
Display	
Screen diagonal [cm]	3.45 cm
Control elements	
Number of keys	6
Mode selector switch	1
Supply voltage	
Type of supply voltage	24 V DC
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Input current	
Current consumption (rated value)	0.7 A
Inrush current, max.	1.9 A; Rated value
I^2t	0.02 $A^2 \cdot s$
Power loss	
Power loss, typ.	5.7 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	300 kbyte
• integrated (for data)	1.5 Mbyte

Article number	6ES7513-1RL00-0AB0
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes
CPU processing times	
for bit operations, typ.	80 ns
for word operations, typ.	96 ns
for fixed point arithmetic, typ.	128 ns
for floating point arithmetic, typ.	512 ns
CPU-blocks	
Number of elements (total)	4 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
• Number range	Number range: 1 to 59 999
• Size, max.	1.5 Mbyte; For non-optimized block accesses, the max. size of the DB is 64 KB
FB	
• Number range	0 ... 65 535
• Size, max.	300 kbyte
FC	
• Number range	0 ... 65 535
• Size, max.	300 kbyte
OB	
• Size, max.	300 kbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of cyclic interrupt OBs	20
• Number of process alarm OBs	50
• Number of startup OBs	100
• Number of asynchronous error OBs	4
• Number of synchronous error OBs	2
• Number of diagnostic alarm OBs	1
Nesting depth	
• per priority class	24

Article number	6ES7513-1RL00-0AB0
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
Retentivity	
– adjustable	Yes
IEC counter	
• Number	Any (only limited by the main memory)
Retentivity	
– adjustable	Yes
S7 times	
• Number	2 048
Retentivity	
– adjustable	Yes
IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	
– adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	128 kbyte
Flag	
• Size, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
• Retentivity adjustable	Yes
• Retentivity preset	No
Local data	
• per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	2 048; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
– Inputs (volume)	8 kbyte
– Outputs (volume)	8 kbyte
Subprocess images	
• Number of subprocess images, max.	32
Hardware configuration	
Number of distributed IO systems	1

Article number	6ES7513-1RL00-0AB0
Number of IO Controllers	
• integrated	1
Time of day	
Clock	
• Type	Hardware clock
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	1
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1
• Number of ports	2
• integrated switch	Yes
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• SIMATIC communication	Yes; Only Server
• Open IE communication	Yes
• Web server	No
• Media redundancy	Yes
PROFINET IO Controller	
Services	
– PG/OP communication	Yes
– Isochronous mode	No
– IRT	No
– PROFIenergy	Yes
– Number of connectable IO Devices, max.	64

Article number	6ES7513-1RL00-0AB0
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes
Protocols	
Number of connections	
• Number of connections, max.	88
• Number of connections reserved for ES/HMI/web	10
Redundancy mode	
Media redundancy	
– MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
– MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
– MRPD	No
– Switchover time on line break, typ.	200 ms; PROFINET MRP
– Number of stations in the ring, max.	50; Only 16 are recommended, however
SIMATIC communication	
• PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	No
• S7 communication, as server	Yes
• S7 communication, as client	No
Open IE communication	
• TCP/IP	Yes
– Data length, max.	64 kbyte
– several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
– Data length, max.	64 kbyte
• UDP	Yes
– Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
– UDP multicast	Yes; Max. 5 multicast circuits
• DHCP	No
• DNS	Yes
• SNMP	Yes
• DCP	Yes

Article number	6ES7513-1RL00-0AB0
• LLDP	Yes
Web server	
• HTTP	No
• HTTPS	No
OPC UA	
• OPC UA Client	No
• OPC UA Server	No
Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	No
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	2 500
Number of simultaneously active program alarms	
• Number of program alarms	300
• Number of alarms for system diagnostics	100
Test commissioning functions	
Joint commission (Team Engineering)	No
Status block	Yes; up to 8 simultaneously
Single step	No
Number of breakpoints	8; Breakpoints are only supported in RUN-Solo status
Status/control	
• Status/control variable	Yes
• Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
• Number of variables, max.	
– of which status variables, max.	200; per job
– of which control variables, max.	200; per job
Forcing	
• Forcing	Yes
• Forcing, variables	Peripheral inputs/outputs
• Number of variables, max.	200

Article number	6ES7513-1RL00-0AB0
Diagnostic buffer	
• present	Yes
• Number of entries, max.	1 000
– of which powerfail-proof	500
Traces	
• Number of configurable Traces	4
• Memory size per trace, max.	512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• Connection display LINK TX/RX	Yes
Supported technology objects	
Motion Control	No
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	Yes
• High-speed counter	No
Standards, approvals, certificates	
Suitable for safety functions	No
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual

Article number	6ES7513-1RL00-0AB0
Configuration	
Programming	
Programming language	
– LAD	Yes
– FBD	Yes
– STL	Yes
– SCL	Yes
– CFC	No
– GRAPH	Yes
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	No
• Block protection	Yes
Access protection	
• protection of confidential configuration data	Yes
• Password for display	Yes
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Cycle time monitoring	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	430 g

General technical specifications

You can find information on the general technical specifications, such as standards and approvals, electromagnetic compatibility, protection class, etc. in the system manual for Redundant System S7-1500R/H (https://support.industry.siemens.com/cs/ww/en/view/109754833).