SIEMENS

Data sheet

6ES7513-1AM03-0AB0



SIMATIC S7-1500, CPU 1513-1 PN, central processing unit with work memory 600 KB for program and 2.5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 25 ns bit performance, SIMATIC Memory Card required **** approvals and certificate according to entry 109815653 at support.industry.siemens.com to be observed! ****

General information	
Product type designation	CPU 1513-1 PN
HW functional status	FS01
Firmware version	V3.0
Product function	
• I&M data	Yes; I&M0 to I&M3
Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central)
Engineering with	
STEP 7 TIA Portal configurable/integrated from version	V18 (FW V3.0); with older TIA Portal versions configurable as 6ES7513-1AL02 0AB0
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	3.45 cm
Control elements	
Number of keys	8
Mode buttons	2
Supply voltage	
Rated value (DC)	24 V
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
Repeat rate, min.	1/s
nput current	
Current consumption (rated value)	0.73 A
Current consumption, max.	0.9 A
Inrush current, max.	1.15 A; Rated value
l²t	0.5 A ² ·s
Power	
Infeed power to the backplane bus	10 W
Power consumption from the backplane bus (balanced)	5.5 W
Power loss	
Power loss, typ.	3.4 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	

a integrated (for program)	600 khyto
integrated (for data)	600 kbyte
• integrated (for data)	2.5 Mbyte
Load memory Plug-in (SIMATIC Memory Card), max.	22 Chuta
	32 Gbyte
Backup	Voo
maintenance-free CRU processing times	Yes
CPU processing times	
for bit operations, typ.	25 ns
for word operations, typ.	32 ns
for fixed point arithmetic, typ.	42 ns
for floating point arithmetic, typ.	170 ns
CPU-blocks	
Number of elements (total)	4 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
Number range	1 60 999; subdivided into: number range that can be used by the user: 1 59 999, and number range of DBs created via SFC 86: 60 000 60 999
• Size, max.	2.5 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	2.3 Moyte, 1 of DD3 with absolute addressing, the max. size is 64 ND
Number range	0 65 535
• Size, max.	600 kbyte
• Size, max.	ovo rayto
Number range	0 65 535
Size, max.	600 kbyte
OB	ood hajto
• Size, max.	600 khyte
Number of free cycle OBs	600 kbyte 100
Number of time alarm OBs	20
Number of delay alarm OBs Alumber of cyclic interrupt OBs	20 With minimum OR 34 and of 250 up
Number of cyclic interrupt OBs Number of process clarge OBs	20; With minimum OB 3x cycle of 250 μs
Number of process alarm OBs	50
Number of DPV1 alarm OBs	3
Number of isochronous mode OBs	2
Number of technology synchronous alarm OBs	2
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
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.	256 kbyte; in total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 216 KB
Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max.	

• 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	2 0 10, 111411111111111111111111111111111
• Inputs	32 kbyte; All inputs are in the process image
•	32 kbyte; All outputs are in the process image
Outputs Outputs	32 kbyte, All outputs are in the process image
per integrated IO subsystem	0.144-
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
 Number of subprocess images, max. 	32
Hardware configuration	
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	
• Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total
Number of IO Controllers	
• integrated	1
• Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total
Rack	
Modules per rack, max.	32; CPU + 31 modules
Number of lines, max.	1
PtP CM	
Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
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	10 0, 136 2 0
Number	16
Clock synchronization	Van
• supported	Yes
• in AS, master	Yes
• in AS, slave	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	
	Yes; IPv4
	1 GO, II V T
IP protocol PROFINET IO Controller	Voc
PROFINET IO Controller	Yes
PROFINET IO ControllerPROFINET IO Device	Yes
PROFINET IO ControllerPROFINET IO DeviceSIMATIC communication	Yes Yes
PROFINET IO ControllerPROFINET IO Device	Yes

Media redundancy	Yes
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— Isochronous mode	Yes
Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— IRT	Yes
— PROFlenergy	Yes; per user program
Prioritized startup	Yes; Max. 32 PROFINET devices
Number of connectable IO Devices, max.	128; In total, up to 512 distributed I/O devices can be connected via AS-i,
	PROFIBUS or PROFINET
 Of which IO devices with IRT, max. 	64
 Number of connectable IO Devices for RT, max. 	128
— of which in line, max.	128
Number of IO Devices that can be simultaneously	8; in total across all interfaces
activated/deactivated, max.	
Number of IO Devices per tool, max.	
— Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT	
— for send cycle of 250 μs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum
	update time of 500 µs of the isochronous OB is decisive
— for send cycle of 500 μs	500 μs to 8 ms
— for send cycle of 1 ms	1 ms to 16 ms
— for send cycle of 2 ms	2 ms to 32 ms
— for send cycle of 4 ms	4 ms to 64 ms
With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 μ s: 375 μ s, 625 μ s 3 875 μ s)
Update time for RT	
— for send cycle of 250 µs	250 μs to 128 ms
— for send cycle of 500 μs	500 μs to 256 ms
— for send cycle of 1 ms	1 ms to 512 ms
— for send cycle of 2 ms	2 ms to 512 ms
— for send cycle of 4 ms	4 ms to 512 ms
PROFINET IO Device	
Services — PG/OP communication	Yes
Isochronous mode	No
— ISOCITIONOUS Mode — IRT	Yes
— PROFlenergy — Shared device	Yes; per user program Yes
— Shared device — Number of IO Controllers with shared device, max.	4
— number of IO Controllers with shared device, max. — activation/deactivation of I-devices	Yes; per user program
Asset management record	Yes; per user program
- Asset management record Interface types	100, por usor program
RJ 45 (Ethernet)	
• 100 Mbps	Yes
Autonegotiation	Yes
Autoriegotiation Autocrossing	Yes
Industrial Ethernet status LED	Yes
Protocols	
PROFIsafe	No
Number of connections	
Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs
Number of connections reserved for ES/HMI/web	10
Number of connections via integrated interfaces	88
Number of S7 routing paths	16
Redundancy mode	
H-Sync forwarding	Yes
Media redundancy	
— Media redundancy	only via 1st interface (X1)
<u> </u>	

— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
 MRP interconnection, supported 	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
— MRPD	Yes; Requirement: IRT
 Switchover time on line break, typ. 	200 ms; For MRP, bumpless for MRPD
 Number of stations in the ring, max. 	50
SIMATIC communication	
 PG/OP communication 	Yes; encryption with TLS V1.3 pre-selected
S7 routing	Yes
Data record routing	Yes
 S7 communication, as server 	Yes
S7 communication, as client	Yes
User data per job, max.	See online help (S7 communication, user data size)
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
— Data length, max. ● UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
— UDP multicast	Yes; max. 78 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Encryption	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes; Data Access (registered Read/Write), Method Call
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
 User authentication 	"anonymous" or by user name & password
Number of connections, max.	4
 Number of nodes of the client interfaces, recommended max. 	1 000
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_L max. 	300
 Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max. 	20
 Number of elements for one call of OPC_UA_MethodGetHandleList, max. 	100
 Number of simultaneous calls of the client instructions for session management, per connection, max. 	1
 Number of simultaneous calls of the client instructions for data access, per connection, max. 	5
 Number of registerable nodes, max. 	5 000
 Number of registerable method calls of OPC_UA_MethodCall, max. 	100
 Number of inputs/outputs when calling OPC_UA_MethodCall, max. 	20
OPC UA Server	Yes; Data Access (Read, Write, Subscribe), Method Call, Alarms & Condition (A&C), Custom Address Space
 Application authentication 	Yes
 Security policies 	available security policies: None, Basic128Rsa15, Basic256Rsa15,
	Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss
User authentication	"anonymous" or by user name & password

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- Number of nodes for user-defined server interfaces, max Number of nodes for user-defined server interfaces, max Alarms and Conditions - Number of program alarms - Number of alarms for system diagnostics - Number of long stations for message functions, max Program alarms - Number of long stations for messages, max Program alarms - Number of long stations for messages in RUN, max Program alarms - Number of long alarms for system diagnostics - Number of long alarms for system diagnostics - Number of treatspoints - Statusistics - Statusistics - Statusistics - Number of treatspoints - Number of variables, max of which status variables, max of which control variables, max of which powerfail-proof - Forcing - Forcin	 Number of inputs/outputs per server method, max. 	20
Supe Teclerence namespace* 15 000 Presentence namespace* 15 000	 Number of monitored items, recommended max. 	4 000; for 1 s sampling interval and 1 s send interval
Number of nodes for user-defined server interfaces, max. - Alarms and Conditions Number of program alarms Number of alarms for system diagnostics Number of alarms for system diagnostics Number of loads in stations for message functions, max Number of loads in stations for messages, max Number of loads program messages in RUN, max Number of loads program alarms Number of variables, max of which status variables, max of which status variables, max of which status variables, max of which powerfail-proof Forcing, variables, max of which powerfail-proof Number of configurable Traces Num	 Number of server interfaces, max. 	
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Number of program alarms Number of alarms for system diagnostics 50 Further protocols • MODBUS Yes, MODBUS TCP \$\forall \text{Program alarms} \text{Ves}, MODBUS TCP \$\forall \text{Number of login stations for message functions, max.} 32 Program alarms Yes Number of londfurbale program messages, max. 5000; Program messages are generated by the "Program_Alarm" block, Problag or GRAPH Number of loadable program messages in RUN, max. 2500 Number of simultaneously active program alarms Number of program alarms Number of program alarms Number of alarms for system diagnostics 100 • Number of alarms for system diagnostics 100 • Number of alarms for system diagnostics 100 • Number of alarms for motion technology objects 100 **Test commissioning functions Test commissioning functions Yes; Up to 8 simultaneously (in total across all ES clients) Single step No Number of breakpoints 8 Status/control variable		Yes
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MODBUS **Simessage functions* **Number of login stations for message functions, max.** **Jes** **Number of login stations for messages, max.** **Program alarms** **Number of login stations for messages, max.** **Number of loadable program messages in RUN, max.** **Number of loadable program messages in RUN, max.** **Number of loadable program alarms** **Number of slarms for system diagnostics** **Number of slarms for motion technology objects** **Test commissioning functions** **Joint commissioning functions** **Joint commission (Team Engineering)** **Status block** **Yes; Up to 8 simultaneously (in total across all ES clients)** **Single step** **No** **Number of treakpoints** **Status control variable** **Ves** **Number of variables, max.** **- of which status variables, max.** **- of which status variables, max.** **- of which status variables, max.** **- of which control variables, max.** **- of which powerfal-proof** **- Porcing** **		
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Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED • STOP ACTIVE LED • Connection display LINK TX/RX Supported technology objects Motion Control • Number of available Motion Control resources for Pyes • Yes • The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool		
Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Motion Control Number of available Motion Control resources for Pyes Yes Yes Yes Yes Yes Yes Yes	-	4; Up to 512 KB of data per trace are possible
RUN/STOP LED Yes ERROR LED Yes MAINT LED STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool Number of available Motion Control resources for 1 120	Interrupts/diagnostics/status information	
ERROR LED Yes MAINT LED Yes STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool Number of available Motion Control resources for 1 120	Diagnostics indication LED	
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STOP ACTIVE LED Yes Connection display LINK TX/RX Supported technology objects Motion Control Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool Number of available Motion Control resources for 1 120	• ERROR LED	Yes
 ◆ Connection display LINK TX/RX Yes Supported technology objects Motion Control Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool Number of available Motion Control resources for 1 120 	MAINT LED	Yes
Supported technology objects Motion Control Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool Number of available Motion Control resources for 1 120	STOP ACTIVE LED	Yes
Motion Control Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool Number of available Motion Control resources for 1 120	 Connection display LINK TX/RX 	Yes
 Program; selection guide via the TIA Selection Tool Number of available Motion Control resources for 1 120 	Supported technology objects	
 Program; selection guide via the TIA Selection Tool Number of available Motion Control resources for 1 120 	Motion Control	
	technology objects	1 120
Required Motion Control resources	- Dequired Metion Control recourses	

— per speed-controlled axis	40
 per positioning axis 	80
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
 Positioning axis 	
 Number of positioning axes at motion control cycle of 4 ms (typical value) 	11
Number of positioning axes at motion control cycle of 8 ms (typical value)	14
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	
High-speed counter	Yes
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; No condensation
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	-30 °C; No condensation
• 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
configuration / header	
configuration / header	
configuration / programming / header	
configuration / programming / header Programming language	Yes
configuration / programming / header	Yes Yes
configuration / programming / header Programming language — LAD — FBD	Yes
configuration / programming / header Programming language — LAD — FBD — STL	Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL	Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC	Yes Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH	Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection	Yes Yes Yes Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection	Yes Yes Yes Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection	Yes Yes Yes Yes Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection	Yes Yes Yes Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection	Yes Yes Yes Yes Yes Yes Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Write protection	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Complete protection	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection • Block protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection • Block protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Write protection • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width Height	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection • Block protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width	Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width Height Depth	Yes

