## **SIEMENS**

## Data sheet

6ES7513-1FL01-0AB0

SIMATIC S7-1500F, CPU 1513F-1 PN, Central processing unit with work memory 450 KB for program and 1.5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 40 ns bit performance, SIMATIC Memory Card required



General information	
Product type designation	CPU 1513F-1 PN
HW functional status	FS03
Firmware version	V2.5
Engineering with	
<ul> <li>STEP 7 TIA Portal configurable/integrated as of version</li> </ul>	V15 (FW V2.5) / V13 SP1 Update 4 (FW V1.8) or higher
Configuration control	
via dataset	Yes
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				
• Repeat rate, min.	1/s				
Input current					
Current consumption (rated value)	0.7 A				
Inrush current, max.	1.9 A; Rated value				
l²t	0.02 A²-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.	5.7 W				
Memory					
Number of slots for SIMATIC memory card	1				
SIMATIC memory card required	Yes				
Work memory					
• integrated (for program)	450 kbyte				
• integrated (for data)	1.5 Mbyte				
Load memory					
<ul> <li>Plug-in (SIMATIC Memory Card), max.</li> </ul>	32 Gbyte				
Backup					
maintenance-free	Yes				
CPU processing times					
for bit operations, typ.	40 ns				
for word operations, typ.	48 ns				
for fixed point arithmetic, typ.	64 ns				
for floating point arithmetic, typ.	256 ns				
CPU-blocks					
Number of elements (total)	2 000; 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.	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.	450 kbyte				

FC					
Number range	0 65 535				
• Size, max.	450 kbyte				
ОВ					
• Size, max.	450 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; With minimum OB 3x cycle of 500 μs				
Number of process alarm OBs	50				
<ul><li>Number of DPV1 alarm OBs</li></ul>	3				
Number of isochronous mode OBs	1				
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; Up to 8 possible for F-blocks				
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				
adjustasis					
·					
Data areas and their retentivity  Retentive data area (incl. timers, counters, flags), max.	128 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 88 KB				

Flag	
Number, max.	16 kbyte
Number of clock memories	8; 8 clock memory bits, grouped into one clock memory byte
Data blocks	e, e diesk memery site, grouped into one diesk memery syte
Retentivity adjustable	Yes
	No
Retentivity preset	NO
Local data	OA librator cross AO MD marchinals
• 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
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/CPs (PROFIBUS, PROFINET, Ethernet) 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

• Deviation per day, max.     Operating hours counter     • Number     • Number     • Number     • Supported     • supported     • In AS, master     • In AS, slave     • on Ethernet via NTP     Ves     Interface  Interface  Interface Vyes     • Number of PROFINET interfaces  1  1. Interface  Interface Vyes     • Number of ports     • RJ 45 (Ethernet)     • PROFINET IO Controller     • PROFINET IO Device     • PROFINET IO Device     • Similar Tio Communication     • Ves Server     • Media redundancy     PROFINET IO Controller  Services  - PG/OP communication     — S7 routing     — Isochronous mode     — Open IE communication     — IRT     — MRP     — MRP     — MRPD     — Yes, As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50     — MRPD     — Yes; Amax. 32 PROFINET devices     — PROFINET device of the ring: 50     — MRPD     — Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50     — MRPD     — Yes; Requirement: IRT     — MRP     — Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50     — Yes; Requirement: IRT     — Yes     — PROFINET devices     — Of which IO devices with IRT, max.     — Number of connectable IO Devices, max.     — Number of connectable IO Devices for RT, max.     — Number of connectable IO Devices for RT, max.	Backup time	6 wk; At 40 °C ambient temperature, typically				
Operating hours counter  Number  Number  Number  Supported  In AS, slave  On Ethernet via NTP  Number of PROFINET interfaces  Number of PROFINET iO Controller  PROFINET IO Controller  Services  PG/OP communication  PG/OP communication  PROFINET IO Controller  Services  PG/OP communication  PROFINET IO Controller  Services  PG/OP communication  PROFINET IO Controller  Services  PG/OP communication  PSOR Touting  PROFINET IO Controller  PROFINET IO Controller  PROFINET IO Controller  PROFINET IO Controller  Services  PG/OP communication  Yes  PG/OP communication  Yes  PG/OP communication  Yes  PROFINET IO Controller  PSOR Touting  PSOR Tout	·					
Number   16 Clock synchronization  supported   Yes	<u> </u>	, 21				
• supported		16				
• supported	Clock synchronization					
<ul> <li>in AS, master</li> <li>in AS, slave</li> <li>on Ethernet via NTP</li> <li>Yes</li> <li>non Ethernet via NTP</li> <li>Yes</li> <li>Interfaces</li> <li>Number of PROFINET interfaces</li> <li>1</li> <li>1. Interface Interface types</li> <li>Number of ports</li> <li>integrated switch</li> <li>rB, 45 (Ethernet)</li> <li>Yes; X1</li> <li>Functionality</li> <li>IP protocol</li> <li>PROFINET IO Controller</li> <li>PROFINET IO Device</li> <li>Yes</li> <li>SIMATIC communication</li> <li>Yes</li> <li>Open IE communication</li> <li>Yes</li> <li>Media redundancy</li> <li>Yes; MRP Automanager according to IEC 62439-2 Edition 2.0</li> <li>PROFINET IO Controller</li> <li>Services</li> <li>— PG/OP communication</li> <li>Yes</li> <li>— PG/OP communication</li> <li>PRO/OP communication</li> <li>PRO/OP communicat</li></ul>		Yes				
in AS, slave on Ethernet via NTP  res  Interfaces  Number of PROFINET interfaces  1  1. Interface  Interface types  Number of ports intergrated switch RI 45 (Ethernet) PROFINET IO Controller PROFINET IO Controller PROFINET IO Device SilMATIC communication Web server Media redundancy PROFINET IO Controller  Services  PROFONET IO Controller  Services  PROPOPO Communication PROFINET IO Controller PROFINET IO Controller  Services  PROFONET IO Controller  Services  PROFONET IO Controller  Services  PROFONET IO Controller  Services  PROFONET IO Controller  Services  PROFONE I Communication Pes - Services  PROFONET IO Controller  Services  1	• •	Yes				
Number of PROFINET interfaces  1. Interface Interface types  • Number of ports • Integrated switch • RJ 45 (Ethernet)  • IP protocol • PROFINET IO Controller • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy • PROFINET IO Controller  Services  - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - RT - MRP - PROFINETO - MRP - PROFINETO - PROFINETO - PROFINETO - PROFINETO - MRPD - PROFINETO - PROFINETO - MRPD - PROFINETO - MRPD - PROFINETO - MRPD - MRPO - MRPD - MR	● in AS, slave	Yes				
Number of PROFINET interfaces   1	• on Ethernet via NTP	Yes				
Interface types  Interf	Interfaces					
Interface types  Number of ports Integrated switch RJ 45 (Ethernet) PROFINET IO Controller PROFINET IO Device SiMATIC communication Web server Media redundancy PROFINET IO Controller Services  PROfOP communication Yes PROFONET IO Controller Services  PROFONE TO Controller Services  PRO	Number of PROFINET interfaces	1				
Number of ports  integrated switch  RJ 45 (Ethernet)  Proctionality  IP protocol  PROFINET IO Controller  PROFINET IO Device  SIMATIC communication  Ves  SIMATIC communication  Ves  SIMATIC communication  Yes  Web server  Media redundancy  PROFINET IO Controller  Services  PROFINET IO Controller  Yes  PROFINET IO Controller  Yes  Propritized startup  PROFINET Yes  Prioritized startup  Prioritized startup  Prioritized startup  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.  Number of connectable IO Devices for RT, 128	1. Interface					
<ul> <li>integrated switch</li> <li>RJ 45 (Ethernet)</li> <li>Yes; X1</li> <li>Functionality</li> <li>IP protocol</li> <li>PROFINET IO Controller</li> <li>PROFINET IO Device</li> <li>SIMATIC communication</li> <li>Open IE communication</li> <li>Web server</li> <li>Media redundancy</li> <li>PROFINET IO Controller</li> <li>Web services</li> </ul> PROFINET IO Controller Services — PG/OP communication <ul> <li>Yes</li> <li>Services</li> <li>— PG/OP communication</li> <li>Yes</li> <li>— Sof routing</li> <li>Yes</li> <li>— Isochronous mode</li> <li>— Ves</li> <li>— Open IE communication</li> <li>Yes</li> <li>— IRT</li> <li>— MRP</li> <li>— MRP</li> <li>— MRPD</li> <li>— PROFIenergy</li> <li>— PROFIenergy</li> <li>— Prioritized startup</li> <li>— Number of connectable IO Devices, max.</li> <li>128, In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> </ul>	Interface types					
RJ 45 (Ethernet)  RJ 45 (Ethernet)  Pronctionality  IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0  PROFINET IO Controller  Services  PG/OP communication Yes Services  PG/OP communication Yes Open IE communication Yes PROFINET IO Controller  Services  PG/OP communication Yes Open IE communication Yes Open IE communication Yes Open IE communication Yes WRP Automanager according to IEC 62439-2 Edition 2.0  PROFINET IO Controller  Services  PG/OP communication Yes Open IE communication Yes Open IE communication Yes Open IE communication Yes RRP Open IE communication Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50  PROFIenergy Yes; Requirement: IRT PROFIenergy Yes 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. Number of connectable IO Devices for RT,	Number of ports	2				
Functionality  IP protocol Yes; IPv4  PROFINET IO Controller Yes  SIMATIC communication Yes  Open IE communication Yes  Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0  PROFINET IO Controller  Services  PG/OP communication Yes  Services  PG/OP communication Yes  Open IE communication Yes  Services  PG/OP communication Yes  Services  PG/OP communication Yes  Open IE communication Yes  NRP Automanager according to IEC 62439-2 Edition 2.0  PROFINET IO Controller  Services  PG/OP communication Yes  Pisochronous mode Yes  Nes Services  PG/OP communication Yes  Pisochronous mode Yes  Popen IE communication Yes  Pes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50  Yes; Requirement: IRT  PROFIenergy Yes; Requirement: IRT  PROFIenergy 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.  Number of connectable IO Devices for RT, 128	• integrated switch	Yes				
PROFINET IO Controller PROFINET IO Device PROFINET IO Device SIMATIC communication Pessenter Web server Media redundancy PESPOFINET IO Controller  Services  PROFINET IO Controller  Services  PROFINET IO Communication Yes PROFINET IO Controller  Services  PROFINET IO Controller  Yes Prioritized temptometable IO Devices, max. Profit ID Controller  Yes PROFINET  PROFINET  PROFINET  PROFINET  PROFINET  PROFINET  Of which IO devices with IRT, max. PNumber of connectable IO Devices for RT,  128	• RJ 45 (Ethernet)	Yes; X1				
PROFINET IO Controller PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Media redundancy PROFINET IO Controller  Services  PG/OP communication Yes PG/OP communication Yes Services  PS/OP controller Yes Services  PG/OP controller Yes Services PROFINET Services  PG/OP controller Yes Services  PG/OP controller Yes Services PROFINET Services  PG/OP controller PEG/OP controller PEG/OP controller PG/OP controller PEG/OP cont	Functionality					
PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Web server Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0  PROFINET IO Controller  Services PROFOP communication Yes Services PROFOP communicati	IP protocol	Yes; IPv4				
SIMATIC communication  Open IE communication  Yes  Web server  Media redundancy  PROFINET IO Controller  Services  - PG/OP communication  Yes  - S7 routing  Isochronous mode  Open IE communication  Yes  Open IE communication  Yes  Wes  Wes  Wes  Wes  Wes  Wes  Wes	<ul> <li>PROFINET IO Controller</li> </ul>	Yes				
Open IE communication  Web server  Media redundancy  PROFINET IO Controller  Services  - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - IRT - MRP - MRP - MRP - MRP - MRPD - PROFIenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, - MRP - Wes - Open IE communication - Yes - PROFIBUS or PROFINET - MRP - PROFIBUS or PROFINET - Of which IO devices with IRT, max Number of connectable IO Devices for RT, - MRP - Yes - PROFIBUS or PROFINET - Of which IO devices with IRT, max Number of connectable IO Devices for RT, - MRPO - Number of connectable IO Devices for RT, - 128	<ul> <li>PROFINET IO Device</li> </ul>	Yes				
Web server  Media redundancy  PROFINET IO Controller  Services  PG/OP communication Yes - Isochronous mode - Open IE communication - IRT - MRP - MRP - MRP - MRP - MRP - Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50  Yes; Requirement: IRT - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, - MRP - Number of connectable IO Devices for RT, - MRPO - Number of connectable IO Devices for RT, - MRPO FINET devices - Number of connectable IO Devices for RT, - MRPO FINET devices - Number of connectable IO Devices for RT, - MRPO FINET devices - Number of connectable IO Devices for RT, - Number of connectable IO Devices for RT, - 128	<ul> <li>SIMATIC communication</li> </ul>	Yes				
● Media redundancy  PROFINET IO Controller  Services  - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - IRT - MRP - MRP - MRP - MRP - MRP - MRP - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, - MRP - MRP - MRP - Ves; MRP Automanager according to IEC 62439-2 Edition 2.0  Yes; MRP Automanager according to IEC 62439-2 Edition 2.0  Yes - PROFINET IO Controller  Yes - Services - Yes - Yes - Standard And Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - PROFINET devices - Services - Yes - Standard Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Services - Yes - Standard Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Standard Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Standard Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Standard Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Standard Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Standard Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Standard Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Standard Andrew Andrew Automanager according to IEC 62439-2 Edition 2.0  Yes - Standard Andrew Andre	<ul> <li>Open IE communication</li> </ul>	Yes				
PROFINET IO Controller  Services  - PG/OP communication Yes - S7 routing Yes - Isochronous mode Yes - Open IE communication Yes - Open IE communication Yes - MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - 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, 128	• Web server	Yes				
Services  - PG/OP communication Yes - S7 routing Yes - Isochronous mode Yes - Open IE communication Yes - IRT Yes - MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - 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 Number of connectable IO Devices for RT,	Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0				
<ul> <li>— PG/OP communication</li> <li>— S7 routing</li> <li>— Isochronous mode</li> <li>— Open IE communication</li> <li>— IRT</li> <li>— MRP</li> <li>— MRPD</li> <li>— Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>— MRPD</li> <li>— PROFlenergy</li> <li>— Prioritized startup</li> <li>— Number of connectable IO Devices, max.</li> <li>— 128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>— Of which IO devices with IRT, max.</li> <li>— Number of connectable IO Devices for RT,</li> <li>— 128</li> </ul>	PROFINET IO Controller					
<ul> <li>S7 routing</li> <li>Isochronous mode</li> <li>Yes</li> <li>Open IE communication</li> <li>IRT</li> <li>MRP</li> <li>MRP</li> <li>Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>Yes; Requirement: IRT</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> <li>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>Of which IO devices with IRT, max.</li> <li>Number of connectable IO Devices for RT,</li> <li>128</li> </ul>	Services					
<ul> <li>Isochronous mode</li> <li>Open IE communication</li> <li>IRT</li> <li>MRP</li> <li>MRP Tedundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>MRPD</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> <li>Max. 32 PROFINET devices</li> <li>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>Of which IO devices with IRT, max.</li> <li>Number of connectable IO Devices for RT,</li> <li>128</li> </ul>	<ul><li>— PG/OP communication</li></ul>	Yes				
<ul> <li>Open IE communication</li> <li>IRT</li> <li>MRP</li> <li>Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>Yes; Requirement: IRT</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> <li>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>Of which IO devices with IRT, max.</li> <li>Number of connectable IO Devices for RT,</li> <li>128</li> </ul>	— S7 routing	Yes				
<ul> <li>— IRT</li> <li>— MRP</li> <li>— Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>— MRPD</li> <li>— PROFlenergy</li> <li>— Prioritized startup</li> <li>— Number of connectable IO Devices, max.</li> <li>— Of which IO devices with IRT, max.</li> <li>— Number of connectable IO Devices for RT,</li> <li>— Number of connectable IO Devices for RT,</li> <li>— Number of connectable IO Devices for RT,</li> <li>— 128</li> </ul>	<ul><li>— Isochronous mode</li></ul>	Yes				
<ul> <li>MRP</li> <li>Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>Yes; Requirement: IRT</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> <li>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>Of which IO devices with IRT, max.</li> <li>Number of connectable IO Devices for RT,</li> <li>128</li> </ul>	<ul> <li>Open IE communication</li> </ul>	Yes				
number of devices in the ring: 50  - MRPD Yes; Requirement: IRT - PROFlenergy Yes - Prioritized startup - 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 Number of connectable IO Devices for RT, 128	— IRT	Yes				
<ul> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> <li>Of which IO devices with IRT, max.</li> <li>Number of connectable IO Devices for RT,</li> <li>Yes</li> <li>Yes; Max. 32 PROFINET devices</li> <li>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>Of which IO devices with IRT, max.</li> <li>128</li> </ul>	— MRP					
<ul> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> <li>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>Of which IO devices with IRT, max.</li> <li>Number of connectable IO Devices for RT,</li> <li>128</li> </ul>	— MRPD	Yes; Requirement: IRT				
<ul> <li>Number of connectable IO Devices, max.</li> <li>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>Of which IO devices with IRT, max.</li> <li>Number of connectable IO Devices for RT,</li> <li>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</li> <li>128</li> </ul>	— PROFlenergy	Yes				
via AS-i, PROFIBUS or PROFINET  — Of which IO devices with IRT, max.  — Number of connectable IO Devices for RT,  128	— Prioritized startup	Yes; Max. 32 PROFINET devices				
— Number of connectable IO Devices for RT, 128	— Number of connectable IO Devices, max.					
	— Of which IO devices with IRT, max.	64				
max.	— Number of connectable IO Devices for RT,	128				
	max.					

	100				
— of which in line, max.	128				
Number of IO Devices that can be	8; in total across all interfaces				
simultaneously activated/deactivated, max.					
<ul> <li>Number of IO Devices per tool, max.</li> </ul>	The minimum value of the undate time also depends on				
— 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	and the second s				
— for send cycle of 250 μs	250 μs to 4 ms; Note: In the case of IRT with isochronous mode,				
ioi seria dyore oi 200 µs	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"	Update time = set "odd" send clock (any multiple of 125 µs: 375				
send cycles	μs, 625 μs 3 875 μs)				
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				
— S7 routing	Yes				
— Isochronous mode	No				
<ul> <li>Open IE communication</li> </ul>	Yes				
— IRT	Yes				
— MRP	Yes				
— MRPD	Yes; Requirement: IRT				
— PROFlenergy	Yes				
— Shared device	Yes				
<ul> <li>Number of IO Controllers with shared</li> </ul>	4				
device, max.					
<ul> <li>Asset management record</li> </ul>	Yes; Per user program				
Interface types					
RJ 45 (Ethernet)					
• 100 Mbps	Yes				
<ul> <li>Autonegotiation</li> </ul>	Yes				
<ul> <li>Autocrossing</li> </ul>	Yes				

Yes

Protocols	
Number of connections	
Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs
<ul> <li>Number of connections reserved for ES/HMI/web</li> </ul>	10
<ul> <li>Number of connections via integrated interfaces</li> </ul>	88
<ul> <li>Number of S7 routing paths</li> </ul>	16
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	Yes
— Open IE communication	Yes
— IRT	Yes
— PROFlenergy	Yes
<ul> <li>Prioritized startup</li> </ul>	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
<ul><li>Of which IO devices with IRT, max.</li></ul>	64
<ul> <li>Number of connectable IO Devices for RT, max.</li> </ul>	128
— of which in line, max.	128
<ul> <li>Number of IO Devices that can be simultaneously activated/deactivated, max.</li> </ul>	8; in total across all interfaces
<ul> <li>Number of IO Devices per tool, max.</li> </ul>	8
— 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
Cable length	
— MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
— MRPD	Yes; Requirement: IRT
SIMATIC communication	
S7 communication, as server	Yes
<ul> <li>S7 communication, as client</li> </ul>	Yes
<ul> <li>User data per job, max.</li> </ul>	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte

<ul> <li>several passive connections per port,</li> <li>supported</li> </ul>	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					
• SNMP	Yes					
• DCP	Yes					
• LLDP	Yes					
Web server	100					
• HTTP	Yes; Standard and user pages					
• HTTPS	Yes; Standard and user pages					
OPC UA	100, Otalidala alia abbi pageo					
Runtime license required	Yes					
OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom					
• OF C OA Server	address space					
<ul> <li>Application authentication</li> </ul>	Yes					
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256					
<ul> <li>User authentication</li> </ul>	"anonymous" or by user name & password					
Further protocols						
• MODBUS	Yes; MODBUS TCP					
Media redundancy						
Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD					
<ul> <li>Number of stations in the ring, max.</li> </ul>	50					
Isochronous mode						
Isochronous operation (application synchronized up	Yes; With minimum OB 6x cycle of 500 μs					
to terminal)						
Equidistance	Yes					
S7 message functions						
Number of login stations for message functions, max.	32					
Program alarms	Yes					
Number of configurable program alarms	5 000					
Number of simultaneously active program alarms						
<ul> <li>Number of program alarms</li> </ul>	300					
<ul> <li>Number of alarms for system diagnostics</li> </ul>	100					
<ul> <li>Number of alarms for motion technology objects</li> </ul>	80					
Test commissioning functions						

	V D				
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 engineering systems				
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)				
Single step	No				
Number of breakpoints	8				
Status/control					
Status/control variable	Yes				
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters				
<ul><li>Number of variables, max.</li></ul>					
— of which status variables, max.	200; per job				
— of which control variables, max.	200; per job				
Forcing					
• Forcing, variables	Peripheral inputs/outputs				
<ul><li>Number of variables, max.</li></ul>	200				
Diagnostic buffer					
• present	Yes				
Number of entries, max.	1 000				
— of which powerfail-proof	500				
Traces					
• Number of configurable Traces	4; Up to 512 KB of data per trace are possible				
<ul> <li>Number of configurable Traces</li> </ul>	4, Op to 312 ND of data per trace are possible				
Interrupts/diagnostics/status information	4, Op to 312 ND of data per trace are possible				
<u> </u>	4, Op to 312 ND of data per trace are possible				
Interrupts/diagnostics/status information	Yes				
Interrupts/diagnostics/status information Diagnostics indication LED					
Interrupts/diagnostics/status information Diagnostics indication LED  • RUN/STOP LED	Yes				
Interrupts/diagnostics/status information Diagnostics indication LED  • RUN/STOP LED  • ERROR LED	Yes Yes				
Interrupts/diagnostics/status information  Diagnostics indication LED  • RUN/STOP LED  • ERROR LED  • MAINT LED	Yes Yes Yes				
Interrupts/diagnostics/status information  Diagnostics indication LED  • RUN/STOP LED  • ERROR LED  • MAINT LED  • Connection display LINK TX/RX	Yes Yes Yes				
Interrupts/diagnostics/status information  Diagnostics indication LED  • RUN/STOP LED  • ERROR LED  • MAINT LED  • Connection display LINK TX/RX  Supported technology objects	Yes Yes Yes Yes				
Interrupts/diagnostics/status information  Diagnostics indication LED  • RUN/STOP LED  • ERROR LED  • MAINT LED  • Connection display LINK TX/RX  Supported technology objects	Yes Yes Yes Yes Yes Yes Yes				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources	Yes Yes Yes Yes Yes Yes Yes Yes Yes The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources for technology objects (except cam disks)	Yes Yes Yes Yes Yes Yes Yes Yes Yes The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources for technology objects (except cam disks)  Required Motion Control resources	Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources for technology objects (except cam disks)  Required Motion Control resources  — per speed-controlled axis	Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources for technology objects (except cam disks)  Required Motion Control resources  — per speed-controlled axis  — per positioning axis	Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources for technology objects (except cam disks)  Required Motion Control resources  per speed-controlled axis  per positioning axis  per synchronous axis	Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources for technology objects (except cam disks)  Required Motion Control resources  per speed-controlled axis  per positioning axis  per synchronous axis  per external encoder  per output cam	Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 80				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources for technology objects (except cam disks)  Required Motion Control resources  per speed-controlled axis  per positioning axis  per positioning axis  per external encoder  per output cam  per cam track	Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800  40 80 160 80 20				
Interrupts/diagnostics/status information  Diagnostics indication LED  RUN/STOP LED  ERROR LED  MAINT LED  Connection display LINK TX/RX  Supported technology objects  Motion Control  Number of available Motion Control resources for technology objects (except cam disks)  Required Motion Control resources  per speed-controlled axis  per positioning axis  per synchronous axis  per external encoder  per output cam	Yes Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800  40 80 160 80 20 160				

<ul> <li>Number of positioning axes at motion control cycle of 4 ms (typical value)</li> </ul>	5
<ul> <li>Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul>	10
Controller	
<ul><li>PID_Compact</li></ul>	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					
<ul> <li>horizontal installation, min.</li> </ul>	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				

						40		
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Configuration	
Programming	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
User program protection/password protection	Yes
Copy protection	Yes
<ul> <li>Block protection</li> </ul>	Yes
Access protection	
Password for display	Yes
<ul> <li>Protection level: Write protection</li> </ul>	Yes; Specific write protection both for Standard and for Failsafe
<ul> <li>Protection level: Read/write protection</li> </ul>	Yes
<ul> <li>Protection level: Complete protection</li> </ul>	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	
last modified:	01/09/2018	