## **Data sheet**

## 6AG1513-1AL02-2AB0



SIPLUS S7-1500 CPU 1513-1 PN based on 6ES7513-1AL02-0AB0 with conformal coating, -40...+60 °C, central processing unit with work memory 300 KB for program and 1.5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 40 so bit performance, SIMATIC Memory Card required spare part display: 6AG1591-1AB00-2AA0

General information	
Product type designation	CPU 1513-1 PN
based on	6ES7513-1AL02-0AB0
Product function	
● I&M data	Yes; I&M0 to I&M3
Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 500 $\mu s$ (distributed) and 1 ms (central)
Engineering with	
STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
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	
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	5 ms
Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	0.7 A
Current consumption, max.	0.95 A
Inrush current, max.	1.9 A; Rated value
²t	0.02 A <sup>2</sup> ·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)	300 kbyte
• integrated (for data)	1.5 Mbyte

Load memory	20.01
Plug-in (SIMATIC Memory Card), max.	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 DBs with absolute addressing, the max. size 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; With minimum OB 3x cycle of 500 µs
Number of process alarm OBs	50
Number of DPV1 alarm OBs	3
Number of isochronous mode OBs	2
	2
Number of technology synchronous alarm OBs	
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.	128 kbyte; In total; available retentive memory for bit memories, timers,
	counters, DBs, and technology data (axes): 88 KB
Extended retentive data area (incl. timers, counters, flags), max.	1.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Flag	
• Size, max.	16 kbyte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte

Retentively adjustable PROFINET (Author) proced  Recentively proced  Profit of July class, max.  At Mary Comment (Author)  Profit of July Colors (Author)  Pr		
Per priority class, max.  Activities area  Per priority class, max.  Activities area  Number of 10 modules  Volumber 10 modules / automodules  Volumber 10 modules / automodules / automodules  Volumber 10 modules / automodules / auto	Data blocks	
Local citation		
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Number of ICI modules  10 address area  1 inputs  2 thyte; All inputs are in the process image  2 thyte; All inputs are in the process image  3 k hyte; All outputs are in the process image  2 hythe; All outputs are in the process image  3 k hyte; All outputs are in the process image  4 hyther of but (volume)  8 k hyte  9 c CMMCP  - Inputs (volume)  8 k hyte  9 c CMMCP  - Inputs (volume)  9 k kbyte  9 c CMMCP  - Inputs (volume)  8 k hyte  9 c CMMCP  - Inputs (volume)  8 k hyte  9 c CMMCP  - Inputs (volume)  8 k hyte  9 c CMMCP  - Inputs (volume)  8 k hyte  9 c CMMCP  - Inputs (volume)  8 k hyte  9 c CMMCP  - Inputs (volume)  8 k hyte  9 c CMMCP  - Inputs (volume)  8 k hyte  9 c CMMCP  - Volume of outprocess images  9 c Volume of outprocess images  1 c Volume of Operation of outprocess images  9 c Volume of Operation outprocess images		64 kbyte; max. 16 KB per block
Figure   State   Figure   State   St		
Injusts   Size Klyte, All injusts are in the process image		2 048; max. number of modules / submodules
e- Outputs (volume) per integrated IO subsystem  In projuts (volume) Per CMCP  In puts (volume) Per CMCP Per CM		
per integrated (2 subsystem	·	
Inputs (volume) 8 kbyte  per CMCP Outputs (volume) 8 kbyte  Unity (volume) 8 kbyte  Inputs (volume) 8 kbyte  Unity (volume) 8 kbyte  Studencoess images 8 kbyte  Number of subprocess images, max. 32  Number of distributed IO systems 32; A distributed IVO system is characterized not only by the integration of distributed IVO via PROFINET or PROFIBUS communication modules, but also by the commercion of ITO via AS-i master modules or links (e.g. IE/PB-Link)  Number of IDP masters 9 kbyte commercion of ITO via AS-i master modules or links (e.g. IE/PB-Link)  Number of IDP controllers 9 kbyte commercion of ITO via AS-i master modules or links (e.g. IE/PB-Link)  Number of ID controllers 9 kbyte commercion of ITO via AS-i master modules or links (e.g. IE/PB-Link)  Number of IDP controllers 9 kbyte commercion of ITO via AS-i master modules or links (e.g. IE/PB-Link)  Number of IDP controllers 9 kbyte commercion of ITO via AS-i master modules or links (e.g. IE/PB-Link)  Number of Ines, max. 1 1   PEP CM	·	32 kbyte; All outputs are in the process image
— Outputs (volume)  per CMCP  — Inputs (volume) — Outputs (volume) — Stay the Compute (volume)  Subprocess images  • Number of subprocess images, max.  Arrivarse configuration  Number of Stributed 10 systems  • Number of DP masters • Via CM  Subprocess images • Number of DP masters • Via CM  GA maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total by the connection of I/O via AS-I master modules or links (e.g. IE/PB-Link)  Number of IO Controllers • Integrated • Via CM  6. A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total Rack • Modules per rack, max. • Number of Innes, max.  1 PIP CM  • Number of Innes, max.  1 PIP CM  • Number of PP CMs  • Stay the connectable PIP CMs is only limited by the number of available sides  * Via CM  • A maximum of CMs (PROFINET + PROFIBUS) can be inserted in total Rack  • Modules per rack, max. • Number of Innes, max.  1 PIP CM  • Number of Innes, max.  1 PIP CM  • Number of PP CMs  • Stay the connectable PIP CMs is only limited by the number of available sides  * Via CM  • Type  • Backup time • Deviation per day, max.  10 s. Typ. 2 s  * Operating hours counter  • Number  • Number  • Clock synchronization • Supported • In AS, master • Ves • In AS, master • Ves • In AS, device • Yes • On Elbernet via NTP • Yes  * Integrated switch  * Ves  • Integrated switch  * Ves  • Integrated switch  * Ves  • Integrated switch  * PROFINET in Controller • PROFINET in Controller • PROFINET in Communication • PROFINET in Communication • Ves • Open IE communication • Ves • Colone Communication • Wes • Media returnation	· · · · · ·	
per CMCP - Inputs (volume) 8 kbyte - Outputs (volume) 8 kbyte  Subprocess images • Number of autphonoess images, max.  32 Hardware configuration.  Number of distributed I/O systems 22, A distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the connection of I/O via AS i master modules or links (e.g. IE/PB-Link)  Number of IO Controllers • Via CM  6. A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total  Number of Ines, max.  1  **PIP CM  • Number of Ines, max.  1  **Number of PIP CMs  **Inemation of Ines, max.  1  **Inemation of Inemation only Inemation of Inemation of Inemation on Inematical Inemation on Inematical Inemation on Inematical Inematical Inematical Inemation on Inematical In		
Inputs (volume) Outputs (volume) Subpracess images Number of subprocess images, max		8 kbyte
- Outputs (volume)  • Number of subprocess images, max.  • Number of subprocess images, max.  22  Hardware configuration  Number of distributed I/O systems  • Via CM  • Via CM  • Via CM  • CA Amaximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total Number of IO Controller  • Via CM  • Via CM  • Via CM  • CA Amaximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total Number of IO Controller  • Via CM  • Via CM  • Via CM  • Rack  • Modules per rack, max.  • Number of lines, max.  • Number of lines, max.  • Number of Ines, max.  • Number of PIP CMs  • Number of PIP CMs  • Rack  • Modules per rack, max.  • Number of pines, max.  • Number of pines, max.  • Number of pines, max.  • Tipe  • Backup time  • Deviation per day, max.  • Operation per day, max.  • Op	·	
Subprocess images  Number of subprocess images, max.  Number of distributed I/O systems  32. A distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the connection of I/O via AS-I master modules or links (e.g., IE/PB-Link)  Number of I/O controllers  **Nack**  **Nack**  **Nack**  **Nack**  **Number of Inces, max.  **PIP CM**  **Number of PIP CMs**  **In enumber of connectable PIP CMs is only limited by the number of available sides.  **Time of day**  **Click**  **Time of day**  **Click**  **Type**  **Backup time**  **Deviation per day, max.  **Operating hours counter**  **Number**  **Number**  **Number**  **Number**  **Number**  **Number**  **In AS, device**  **Yes**  **In AS, device**  **Yes**  **In AS, device**  **Yes**  **In AS, device**  **Yes**  **In Interface Size  **Protocol**  **Protocol*		
Number of subprocess images, max.  Number of distributed I/O 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  Number of I/O Controllers  • integrated  • Via CM  Rack  • Modules per rack, max.  • Number of Irines, max.  1 PP CM  • Number of PIP CMs  • Number of PIP CMs  • Number of PIP CMs  • Integrated  • Number of PIP CMs  • Number of PIP CMs  • Sackup time  • Deviation per day, max.  10 Protocol  • Rack  • Modules per rack, max.  • Via CM (a., A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total of the number of pipe CMs is only limited by the number of available slots  **Time of day**  Clock  • Type  • Backup time  • Deviation per day, max.  10 s; Typ. 2 s  **Operating hours counter*  • Number  • Number  • Number  • Number  • Rack  • In AS, device  • yes  • on Ethernet via NITP  yes  Interface types  • RI 45 (Ethemet)  • Yes; IPv4  • PROFINET in Controller  • Wedia redundancy  • Wedia red		8 kbyte
Number of distributed I/O systems  32; A distributed I/O system is characterized not only by the integration of distributed I/O via 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  • Via CM  • A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total  Number of I/O Controllers  • integrated  • Via CM  • Modules per rack, max.  • Number of lines, max.  • Number of lines, max.  • Number of IPP CMs  • Number of PIP CMs  • Number of PIP CMs  • Number of PIP CMs  • Type  • Backup time • Deviation per day, max.  • Operating hours counter  • Number  • Number  • Number  • I6  Clock synchronization • supported • in AS, master • in AS, device • on Elternet via NTP  • Yes • interface  Interface  Interface  Interface  Interface  Interface  Interface  Interface  PROFINET interfaces  • I79  Protocol • PROFINET interfaces • IP protocol • PROFINET interfaces • IP protocol • PROFINET IO Controller • Yes • Interface Open IE Communication • Yes • Stimulation Open IE Communication • Yes • Stimulation Open IE Communication • Yes • PROFINET IO Controller • PROFINET IO Controller • Yes • Media redundancy • Yes	· · ·	
Number of distributed IO systems  32: A distributed I/O system is characterized not only by the integration of distributed I/O will PROFINETS or PROFIGIBUS connation modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link). Number of I/O Centrollers  • I/O CM  • Via CM  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated  • I/O CM  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated  • I/O CM  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated  • I/O CM  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated  • (A modules per rack, max.  • (A modules per rack, max.  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated negrated  • (A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total negrated negrat		32
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  • via CM  • integrated  • via CM  • Rack  • Modules per rack, max.  • Number of Iines, max.  • Number of PIP CMs  • Number of PIP CMs  • Hardware clock  • Type  • Backup time  • Deviation per day, max.  • Supported  • In AS, master  • In AS, device  • on Ethernet via NTP  Yes  • Interfaces  Number of PROFINET interfaces  • Interface  PROFINET interfaces  • Protocol  • Profinet Io Octroler  • Yes  • Integrated switch  Pres  • Protocol  • PROFINET IO Controler  • Yes  • Media redundancy		
Via CM Number of IO Controllers  integrated Via CM 6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total  Number of IO Controllers  integrated Via CM 6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total  Rack  Number of lines, max. 12; CPU + 31 modules Number of PtP CMs Number of PtP CMs Number of PtP CMs  Time of day  Clock Type Backup time Backup time Pubviation per day, max. 10 s; Typ.: 2 s  Operating hours counter Number of PtP CMs  In AS, master In AS, master In AS, device On Ethernet via NTP Ves Interfaces  Rad 4, Ethernet) Number of PROFINET interfaces  Integrated witch Pyes PROFINET interfaces  PROFINET io Controller P	Number of distributed IO systems	distributed I/O via PROFINET or PROFIBUS communication modules, but also
Number of IO Controllers  integrated  via CM  Rack  Modules per rack, max. Number of lines, max.  Number of PtP CMs  Number of PtP CMs  Time of day  Clock  Type Backup time Deviation per day, max.  Number  Number  Number  Number  Number  Number  Number  Poperating hours counter  Number  Number	Number of DP masters	
integrated  Via CM  Rack  Modules per rack, max.  Number of lines, max.  Number of PtP CMs  Time of day  Clock  Type  Backup time  Deviation per day, max.  Number  N	• Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total
Via CM  Rack  Modules per rack, max. Number of lines, max.  Number of PIP CM  Number of PIP CMs  Time of day  Clock  Type Backup time time time time time time time time	Number of IO Controllers	
Rack  Modules per rack, max. Number of lines, max.  Number of PIP CMs  Number of day  Clock  Time of day  Clock  Backup time  Backup time  Gwk; At 40 °C ambient temperature, typically  Deviation per day, max.  Operating hours counter  Number  Number  Number  Number  Number  Number  Number  PROFINET interfaces  R J 45 (Elhemet)  R J 45 (Elhemet)  Number of ports  Interface bypes  R J 45 (Elhemet)  PROFINET interfaces  PROFINET io Controller  PROFINET IO Contro	<ul><li>integrated</li></ul>	1
Modules per rack, max. Number of lines, max.  Number of lines, max.  Number of PtP CM  Number of PtP CMs  Number of PtP CMs  Number of PtP CMs  Number of PtP CMs  Number of Asy  Clock  Number of Clock  Number of Clock synchronization  Number of ROFINET interfaces  Number of PtP CMs is only limited by the number of available slots  Number of ROFINET interfaces  Number of ROFINET of Clock synchronization  Number of PROFINET of Clock synchronization  Number of PROFINET interfaces  Number of PROFINE	• Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total
Number of lines, max.  PIP CM  Number of PIP CMs  the number of connectable PIP CMs is only limited by the number of available slots  Time of day  Clock  1 Type Backup time 6 kw; At 40 °C ambient temperature, typically Deviation per day, max. 10 s; Typ.: 2 s  Operating hours counter  Number 16  Clock synchronization  supported in AS, master in AS, device on Ethernet via NTP  Yes  not Ethernet via NTP  Yes  1. Interfaces  Interface  Interface types  RJ 45 (Ethernet) Number of ports interface switch Protocols  Protocols  Protocols  Protocol PROFINET IO Controller PROFINET IO Controller PROFINET IO Device SIMATIC communication Yes Poss Media redundancy Yes Media redundancy Yes Media redundancy Yes Media redundancy Yes	Rack	
PIP 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 Backup time Seakup time time time time time time time time	<ul> <li>Modules per rack, max.</li> </ul>	32; CPU + 31 modules
• Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots  Time of day  Clock  • Type • Backup time • Deviation per day, max.  Operating hours counter • Number • Number • Number  • Supported • in AS, master • in AS, device • on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1 1. Interface  Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch  Protocols  • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Yes • Open IE communication • Yes • Media redundancy • Wed server • Media redundancy • Media redundancy • Media redundancy • Media redundancy • Mardure clock • Mardware clock • Mardware clock • A Wark at 40 °C ambient temperature, typically • A Wark at 40 °C ambient temperature, temperature, temperature, temperature, temperature, temperature, temp	Number of lines, max.	1
Inter of day  Clock  Type Backup time Back	PtP CM	
Time of day	Number of PtP CMs	
Clock	Time of day	
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 in AS, master Yes in AS, device Yes on Ethernet via NTP Yes  Interfaces  Number of PROFINET interfaces 1  Interface types  RJ 45 (Ethernet) Yes; X1 Number of ports 2 integrated switch Yes  integrated switch Yes  Protocols  PROFINET IO Controller Yes  SIMATIC communication Yes; Optionally also encrypted Web server Yes Media redundancy Yes	Clock	
Deviation per day, max.  Operating hours counter  Number  Number  Supported  in AS, master  in AS, device  on Ethernet via NTP  Yes  Interfaces  Number of PROFINET interfaces  Ry J 45 (Ethernet)  Number of ports  integrated switch  Yes  Protocols  IP protocol  PROFINET IO Controller  PROFINET IO Device  SIMATIC communication  Yes  Open IE communication  Yes  Nes  Yes  Yes  Yes  Yes  Protocoll  Yes  PROFINET IO Device  SIMATIC communication  Yes  Open IE communication  Yes  Media redundancy  Yes  Media redundancy  Yes  Media redundancy  Yes  Prose  Media redundancy  Yes  Media redundancy  Yes  Nes  Nes  Nes  Nes  Nes  Nes  Nes	• Type	Hardware clock
Deviation per day, max.  Operating hours counter  Number  Number  Supported  in AS, master  in AS, device  on Ethernet via NTP  Yes  Interfaces  Number of PROFINET interfaces  Ry J 45 (Ethernet)  Number of ports  integrated switch  Yes  Protocols  IP protocol  PROFINET IO Controller  PROFINET IO Device  SIMATIC communication  Yes  Open IE communication  Yes  Nes  Yes  Yes  Yes  Yes  Protocoll  Yes  PROFINET IO Device  SIMATIC communication  Yes  Open IE communication  Yes  Media redundancy  Yes  Media redundancy  Yes  Media redundancy  Yes  Prose  Media redundancy  Yes  Media redundancy  Yes  Nes  Nes  Nes  Nes  Nes  Nes  Nes	Backup time	6 wk; At 40 °C ambient temperature, typically
Number	<ul> <li>Deviation per day, max.</li> </ul>	
Clock synchronization	Operating hours counter	
	Number	16
• in AS, master             • in AS, device             • on Ethernet via NTP	Clock synchronization	
in AS, device     on Ethernet via NTP     Yes  Interfaces  Number of PROFINET interfaces  1  1. Interface  Interface types      RJ 45 (Ethernet)     Number of ports     2     integrated switch  Protocols  IP protocol      PROFINET IO Controller     PROFINET IO Device     SIMATIC communication     Open IE communication     Web server     Media redundancy  Yes  Yes  Yes  Yes  Yes  Yes  Yes  Ye	5.55.1 Gynorii Grii Zation	
on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1  1. Interface  Interface types  ○ RJ 45 (Ethernet) ○ Number of prots ○ integrated switch  Protocols  ○ IP protocol ○ PROFINET IO Controller ○ PROFINET IO Device ○ SIMATIC communication ○ Open IE communication ○ Web server ○ Media redundancy	-	Yes
Interfaces  Number of PROFINET interfaces  1. Interface Interface types  • RJ 45 (Ethernet) • Number of ports • integrated switch  Protocols  • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy  1   1   1   1   1   1   1   1   1   1	• supported	
Number of PROFINET interfaces  1. Interface  Interface types  RJ 45 (Ethernet) Number of ports Number of ports Integrated switch Yes  Protocols  IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy  1  Yes; IPv4 Yes Yes Yes Yes Optionally also encrypted Yes Media redundancy Yes	<ul><li>supported</li><li>in AS, master</li></ul>	Yes
Interface types  Protocols  Interface types  Interface types  Rumber of ports Integrated switch  Protocols  IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy  Yes; V1  Yes; V2  Yes; V3  Yes; V4  Yes  Yes  Yes  Yes  Yes  Optionally also encrypted  Yes  Media redundancy Yes	<ul><li>supported</li><li>in AS, master</li><li>in AS, device</li></ul>	Yes Yes
Interface types  Page 1	<ul> <li>supported</li> <li>in AS, master</li> <li>in AS, device</li> <li>on Ethernet via NTP</li> </ul>	Yes Yes
<ul> <li>RJ 45 (Ethernet)</li> <li>Number of ports</li> <li>integrated switch</li> <li>Yes</li> </ul> Protocols <ul> <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> </ul> Yes; X1 <ul> <li>Yes</li> </ul> <ul> <li>Yes; Optionally also encrypted</li> <li>Yes</li> </ul>	<ul> <li>supported</li> <li>in AS, master</li> <li>in AS, device</li> <li>on Ethernet via NTP</li> </ul> Interfaces	Yes Yes Yes
<ul> <li>RJ 45 (Ethernet)</li> <li>Number of ports</li> <li>integrated switch</li> <li>Yes</li> </ul> Protocols <ul> <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> </ul> Yes; X1 <ul> <li>Yes</li> </ul> <ul> <li>Yes; Optionally also encrypted</li> <li>Yes</li> </ul>	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces	Yes Yes Yes
<ul> <li>Number of ports</li> <li>integrated switch</li> <li>Protocols</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> </ul> Yes	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface	Yes Yes Yes
<ul> <li>integrated switch</li> <li>Protocols</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> </ul> Yes	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface types	Yes Yes Yes 1
Protocols  IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy Yes Yes  Yes  Yes  Yes  Yes  Yes  Yes	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface types     RJ 45 (Ethernet)	Yes Yes Yes Yes Yes
<ul> <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>Yes</li> <li>Yes</li> <li>Optionally also encrypted</li> <li>Yes</li> </ul>	<ul> <li>supported</li> <li>in AS, master</li> <li>in AS, device</li> <li>on Ethernet via NTP</li> </ul> Interfaces Number of PROFINET interfaces 1. Interface Interface types <ul> <li>RJ 45 (Ethernet)</li> <li>Number of ports</li> </ul>	Yes Yes Yes Yes Xes Yes
<ul> <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>Yes</li> <li>Yes</li> <li>Optionally also encrypted</li> <li>Yes</li> </ul>	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface  Interface types     RJ 45 (Ethernet)     Number of ports     integrated switch	Yes Yes Yes Yes Xes Yes
<ul> <li>SIMATIC communication</li> <li>Open IE communication</li> <li>Web server</li> <li>Media redundancy</li> <li>Yes</li> <li>Yes</li> <li>Yes</li> <li>Yes</li> </ul>	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface  Interface types     RJ 45 (Ethernet)     Number of ports     integrated switch  Protocols	Yes Yes Yes Yes  1  Yes; X1 2 Yes
<ul> <li>Open IE communication</li> <li>Web server</li> <li>Media redundancy</li> <li>Yes; Optionally also encrypted</li> <li>Yes</li> </ul>	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface Interface types     RJ 45 (Ethernet)     Number of ports     integrated switch  Protocols     IP protocol	Yes Yes Yes Yes  1  Yes; X1 2 Yes Yes
<ul> <li>Web server</li> <li>Media redundancy</li> <li>Yes</li> </ul>	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface Interface types     RJ 45 (Ethernet)     Number of ports     integrated switch  Protocols     IP protocol     PROFINET IO Controller	Yes Yes Yes Yes  1  Yes; X1 2 Yes Yes
<ul> <li>Web server</li> <li>Media redundancy</li> <li>Yes</li> </ul>	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface  Interface types     RJ 45 (Ethernet)     Number of ports     integrated switch  Protocols     IP protocol     PROFINET IO Controller     PROFINET IO Device	Yes Yes Yes Yes Yes  1  Yes; X1 2 Yes  Yes Yes
Media redundancy     Yes	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface  Interface types     RJ 45 (Ethernet)     Number of ports     integrated switch  Protocols      IP protocol     PROFINET IO Controller     PROFINET IO Device     SIMATIC communication	Yes Yes Yes Yes  1  Yes; X1 2 Yes  Yes Yes  Yes Yes Yes
·	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface  Interface types     RJ 45 (Ethernet)     Number of ports     integrated switch  Protocols     IP protocol     PROFINET IO Controller     PROFINET IO Device     SIMATIC communication     Open IE communication	Yes Yes Yes  1  Yes; X1 2 Yes Yes  Yes; IPv4 Yes
PROFINET IO Controller	supported     in AS, master     in AS, device     on Ethernet via NTP  Interfaces  Number of PROFINET interfaces  1. Interface Interface types     RJ 45 (Ethernet)     Number of ports     integrated switch  Protocols     IP protocol     PROFINET IO Controller     PROFINET IO Device     SIMATIC communication     Open IE communication     Web server	Yes Yes Yes  1  Yes; X1 2 Yes  Yes  Yes  Yes  Yes  Yes  Yes  Ye

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
<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
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
— for send cycle of 500 μs	update time of 500 μs of the isochronous OB is decisive 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
<ul><li>for send cycle of 4 ms</li><li>With IRT and parameterization of "odd" send cycles</li></ul>	4 ms to 64 ms  Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3
Update time for RT	875 μs)
— 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 V
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
<ul> <li>Number of IO Controllers with shared device, max.</li> </ul>	4
Asset management record	Yes; per user program
nterface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
<ul> <li>Autonegotiation</li> </ul>	Yes
<ul> <li>Autocrossing</li> </ul>	Yes
<ul> <li>Industrial Ethernet status LED</li> </ul>	Yes
	Yes
	Yes No
Protocols	
Protocols PROFIsafe	
Protocols PROFIsafe Number of connections	No
Protocols  PROFIsafe  Number of connections  • Number of connections, max.	No  128; via integrated interfaces of the CPU and connected CPs / CMs
Protocols  PROFIsafe  Number of connections  • Number of connections, max.  • Number of connections reserved for ES/HMI/web  • Number of connections via integrated interfaces	No  128; via integrated interfaces of the CPU and connected CPs / CMs 10
Protocols  PROFIsafe  Number of connections  • Number of connections, max.  • Number of connections reserved for ES/HMI/web  • Number of connections via integrated interfaces  • Number of S7 routing paths	No  128; via integrated interfaces of the CPU and connected CPs / CMs 10 88
Protocols  PROFIsafe  Number of connections  • Number of connections, max.  • Number of connections reserved for ES/HMI/web  • Number of connections via integrated interfaces  • Number of S7 routing paths  Redundancy mode	No  128; via integrated interfaces of the CPU and connected CPs / CMs 10 88 16
Protocols  PROFIsafe  Number of connections  • Number of connections, max.  • Number of connections reserved for ES/HMI/web  • Number of connections via integrated interfaces  • Number of S7 routing paths  Redundancy mode  • H-Sync forwarding	No  128; via integrated interfaces of the CPU and connected CPs / CMs 10 88
Protocols  PROFIsafe  Number of connections  Number of connections, max.  Number of connections reserved for ES/HMI/web  Number of connections via integrated interfaces  Number of S7 routing paths  Redundancy mode  H-Sync forwarding  Media redundancy	No  128; via integrated interfaces of the CPU and connected CPs / CMs 10 88 16  Yes
Protocols  PROFIsafe  Number of connections  Number of connections, max.  Number of connections reserved for ES/HMI/web  Number of connections via integrated interfaces  Number of S7 routing paths  Redundancy mode  H-Sync forwarding  Media redundancy  — MRP	No  128; via integrated interfaces of the CPU and connected CPs / CMs 10 88 16  Yes  Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
Protocols  PROFIsafe  Number of connections  Number of connections, max.  Number of connections reserved for ES/HMI/web  Number of connections via integrated interfaces  Number of S7 routing paths  Redundancy mode  H-Sync forwarding  Media redundancy  MRP  MRPD	No  128; via integrated interfaces of the CPU and connected CPs / CMs 10 88 16  Yes  Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 Yes; Requirement: IRT
Protocols  PROFIsafe  Number of connections  Number of connections, max.  Number of connections reserved for ES/HMI/web  Number of connections via integrated interfaces  Number of S7 routing paths  Redundancy mode  H-Sync forwarding  Media redundancy  — MRP	No  128; via integrated interfaces of the CPU and connected CPs / CMs 10 88 16  Yes  Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50

SIMATIC communication	
• S7 routing	Yes
S7 routing     S7 communication, as server	Yes
S7 communication, as server     S7 communication, as client	Yes
User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	See of life help (S7 confindincation, user data size)
• 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
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes
OPC UA Client	Yes
<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
<ul><li>— Number of connections, max.</li></ul>	4
<ul> <li>Number of nodes of the client interfaces, recommended max.</li> </ul>	1 000
<ul> <li>Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I max.</li> </ul>	300
<ul> <li>Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.</li> </ul>	20
Number of elements for one call of OPC_UA_MethodGetHandleList, max.	100
<ul> <li>Number of simultaneous calls of the client instructions for session management, per connection, max.</li> </ul>	1
<ul> <li>Number of simultaneous calls of the client instructions for data access, per connection, max.</li> </ul>	5
<ul> <li>Number of registerable nodes, max.</li> </ul>	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, custom address space
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"anonymous" or by user name & password
— Number of sessions, max.	32
Number of accessible variables, max.	50 000
Number of registerable nodes, max.	10 000
Number of subscriptions per session, max.	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms
- Number of server methods, max.	20
Number of inputs/outputs per server method, max.	20
Number of impuls/outputs per server method, max.      Number of monitored items, recommended max.	1 000; for 1 s sampling interval and 1 s send interval
Number of monitored items, recommended max.      Number of server interfaces, max.	10; or 20, depending on type of server interface
Number of nodes for user-defined server interfaces,	1 000
— Inditibet of flodes for user-defilled server interfaces,	1 000

Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
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 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	
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
<ul> <li>Variables</li> </ul>	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	
<ul><li>Forcing, variables</li></ul>	Peripheral inputs/outputs
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
<ul> <li>Number of entries, max.</li> </ul>	1 000
— of which powerfail-proof	500
Traces	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
STOP ACTIVE LED	Yes
Connection display LINK TX/RX	Yes
Supported technology objects	V NI TI
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
<ul> <li>Number of available Motion Control resources for technology objects</li> </ul>	800
Required Motion Control resources	
— 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	
<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

Counting and measuring	
High-speed counter	Yes
Ambient conditions	
Ambient temperature during operation	
<ul> <li>horizontal installation, min.</li> </ul>	-40 °C; = Tmin (incl. condensation/frost)
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
vertical installation, min.	-40 °C; = Tmin (incl. condensation/frost)
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	
<ul> <li>Installation altitude above sea level, max.</li> </ul>	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Ambient air temperature-barometric pressure-altitude	Restrictions for installation altitudes > 2 000 m, see entry ID: 109763260
Relative humidity	
<ul> <li>With condensation, tested in accordance with IEC 60068- 2-38, max.</li> </ul>	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
Coolants and lubricants	
Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	Voci Class 2D2 mold funding and drived analysis (with the assessment)
<ul> <li>to biologically active substances according to EN 60721-3-3</li> </ul>	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
<ul> <li>to chemically active substances according to EN 60721-3-3</li> </ul>	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
<ul> <li>to mechanically active substances according to EN 60721-3-3</li> </ul>	Yes; Class 3S4 incl. sand, dust, *
Use on ships/at sea	
<ul> <li>to biologically active substances according to EN 60721-3-6</li> </ul>	Yes; Class 6B2 mold, fungal and dry rot spores (excluding fauna)
<ul> <li>to chemically active substances according to EN 60721-3-6</li> </ul>	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); $^{\star}$
— to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *
Usage in industrial process technology	
Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
<ul> <li>Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04</li> </ul>	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
<ul> <li>Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04</li> </ul>	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
<ul> <li>Coatings for printed circuit board assemblies acc. to EN 61086</li> </ul>	Yes; Class 2 for high reliability
Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
Military testing according to MIL-I-46058C, Amendment 7     Overlife at the part of Plantage and Plantage at the second sec	Yes; Discoloration of coating possible during service life
<ul> <li>Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC- CC-830A</li> </ul>	Yes; Conformal coating, Class A
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
User program protection/password protection	Yes
Copy protection	Yes

Block protection	Yes
Access protection	
<ul> <li>Password for display</li> </ul>	Yes
<ul> <li>Protection level: Write protection</li> </ul>	Yes
<ul> <li>Protection level: Read/write protection</li> </ul>	Yes
Protection level: Complete protection	Yes
programming / cycle time monitoring / header	
<ul> <li>lower limit</li> </ul>	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	405 g

last modified: 12/8/2024 🖸