## **SIEMENS**

## Data sheet

General information

## 6ES7518-4AP00-0AB0

SIMATIC S7-1500, CPU 1518-4 PN/DP, CENTRAL PROCESSING UNIT WITH WORKING MEMORY 4 MB FOR PROGRAM AND 20 MB FOR DATA, 1. INTERFACE: PROFINET IRT WITH 2 PORT SWITCH, 2. INTERFACE: PROFINET RT, 3. INTERFACE: ETHERNET, 4. INTERFACE: PROFIBUS, 1 NS BIT-PERFORMANCE, SIMATIC MEMORY CARD NECESSARY



General Information	
Product type designation	CPU 1518-4 PN/DP
HW functional status	FS04
Firmware version	V2.0
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V14
Configuration control	
via dataset	Yes
Display	
Screen diagonal (cm)	6.1 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	
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	5 ms
Input current	
Current consumption (rated value)	1.55 A
Inrush current, max.	2.4 A; Rated value
l <sup>2</sup> t	0.02 A <sup>2</sup> ·s
Power	
Power consumption from the backplane bus	30 W
(balanced)	
Infeed power to the backplane bus	12 W
Power loss	
Power loss, typ.	24 W
Memory	1
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	4 Mb. 4a
<ul> <li>integrated (for program)</li> </ul>	4 Mbyte
• integrated (for data)	20 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
maintenance-free	Yes
CPU processing times	
for bit operations, typ.	1 ns
for word operations, typ.	2 ns
for fixed point arithmetic, typ.	2 ns
for floating point arithmetic, typ.	6 ns
CPU-blocks	
Number of elements (total)	10 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
<ul> <li>Number range</li> </ul>	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.	16 Mbyte; For non-optimized block accesses, the max. size of the DB is 64 KB
FB	
Number range	0 65 535
• Size, max.	512 kbyte
FC	

size, max.512 kbyte6868686060616162626364 </th <th>Number range</th> <th>0 65 535</th>	Number range	0 65 535
OB         512 kbyte           • Size, max.         512 kbyte           • Number of free cycle OBs         100           • Number of time alarn OBs         20           • Number of cyclic interrupt OBs         20           • Number of opcics alarn OBs         20           • Number of process alarn OBs         50           • Number of process alarn OBs         3           • Number of isochnonus mode OBs         2           • Number of sisochnonus andro OBs         100           • Number of saynchronous andro OBs         100           • Number of saynchronous error OBs         4           • Number of saynchronous error OBs         1           • Number of saynchronous error OBs         1           • Number of saynchronous error OBs         1           • Number of dagnostic alarn OBs         2           • Number         Yes <td>-</td> <td></td>	-	
Number of free cycle OBs100• Number of time alarm OBs20• Number of delay alarm OBs20• Number of cycle interrupt OBs20• Number of process alarm OBs50• Number of DPV1 alarm OBs3• Number of technology synchronous alarm OBs2• Number of technology synchronous alarm OBs2• Number of startup OBs4• Number of signchronous entor OBs2• Number of signchronous entor OBs2• Number of alagnostic alarm OBs2• Number of alignostic alarm OBs2 <t< td=""><td></td><td>,</td></t<>		,
Number of time alarn OBs20Number of time alarn OBs20Number of occilic interrupt OBs20, With minimum OB 3x cycle of 100 µsNumber of process alarn OBs50Number of DPV1 alarn OBs3Number of sochronous mode OBs2Number of sochronous encor OBs100Number of synchronous encor OBs1Number of algonotic alarn OBs1Number of algonotic alarn OBs2Number of algonotic alarn OBs2Number of algonotic alarn OBs1Number of algonotic alarn OBs1Number of algonotic alarn OBs2Number of algonotic alarn OBs2Number of algonotic alarn OBs2Number of algonotic alarn OBs1Number of algonotic alarn OBs2Number of algonotic alarn OBs2Street NumberYesIEC counterYes- adjustableYesStreet NumberAny (only limited by the main memory)Retentivity adjustableYesStreet NumberAny (only limited by the main memory)Retentivity adjustableYesData aleasa and their retentivity-FagNum	• Size, max.	512 kbyte
• Number of line alarn OBs20• Number of delay alarn OBs20• Number of cyclic interupt OBs20: With minimum OB 3x cycle of 100 µs• Number of process alarn OBs3• Number of DPV1 alarn OBs3• Number of Ibortonous mode OBs2• Number of tachnology synchronous alarn OBs2• Number of asynchronous error OBs4• Number of asynchronous error OBs3• Number of alagnostic alarn OBs3• Number of alagnostic alarn OBs1• Number of diagnostic alarn OBs2• Number of alagnostic alarn OBs3• Number of alagnostic alarn OBs4• Number of alagnostic alarn OBs4• Number of alagnostic alarn OBs4• Number of alagnostic alarn OBs408• Retentivity1• adjustableYes• Number of alagnostic alarn OBs408• Number of alagnostic alarn OBs10• Number of alagnostic alarn OBs10• Number of alagnostic alarn OBs10• Alagnostic alarn OBs10• Number of alagnostic alarn OBs10 <tr< td=""><td><ul> <li>Number of free cycle OBs</li> </ul></td><td>100</td></tr<>	<ul> <li>Number of free cycle OBs</li> </ul>	100
Number of cyclic interupt DBs         20; With minimum OB 3x cycle of 100 µs           Number of process alarm OBs         50           Number of process alarm OBs         3           Number of isochronous mode OBs         2           Number of startup OBs         100           Number of startup OBs         100           Number of startup OBs         4           Number of startup OBs         2           Number of startup OBs         100           Number of startup OBs         2           Number of startup OBs         2           Number of startup OBs         2           Number of diagnostic alarm OBs         2           Number of agynchronous error OBs         2           Store         2           Outerst         Yes           IEC counter         Yes           Number (agynchable         Yes           IEC timer         Yes <tr< td=""><td>-</td><td>20</td></tr<>	-	20
• Number of cyclic interrupt OBs20, With minimum OB 3x cycle of 100 µs• Number of process alarm OBs50• Number of DPV1 alarm OBs3• Number of stochnonous mode OBs2• Number of stochnonous mode OBs100• Number of stochnonous enror OBs4• Number of asynchronous enror OBs2• Number of asynchronous enror OBs2• Number of diagnostic alarm OBs100• Number of diagnostic alarm OBs2• Number of alaynostic alarm OBs2• Alaynostic alarm OBs	<ul> <li>Number of delay alarm OBs</li> </ul>	20
Number of process alarn OBs50Number of DPV1 alarn OBs3Number of isochronous mode OBs2Number of isochronous mode OBs100Number of startup OBs4Number of startup OBs2Number of asynchronous error OBs2Number of asynchronous error OBs2Number of diagnostic alarn OBs100Number of diagnostic alarn OBs2Number of diagnostic alarn OBsYesInternovitic1Number of diokn memories1	-	20; With minimum OB 3x cycle of 100 μs
Number of isochronous mode OBS         2           Number of sochronous mode OBS         2           Number of startup OBS         100           Number of synchronous error OBS         4           Number of synchronous error OBS         2           Number of diagnostic alarm OBS         2           Number of diagnostic alarm OBS         1           Number of diagnostic alarm OBS         24           Counters. timers and their retentivity         24           For counter         24           Number         2048           Retentivity         -           - adjustable         Yes           IEC counter         -           - Number         Any (only limited by the main memory)           Retentivity         -           - adjustable         Yes           S7 times         -           - Number         2048           Retentivity         -           - adjustable         Yes           S7 times         -           - adjustable         Yes           IEC time         -           - adjustable         Yes           Data acreas and their retentivity         -           - adjustable         Yes <td></td> <td>50</td>		50
Number of technology synchronous alarn OBs       2         Number of startup OBs       100         Number of synchronous error OBs       2         Number of diagnostic alarn OBs       1         Number of diagnostic alarn OBs       1         Number of diagnostic alarn OBs       2         Number of diagnostic alarn OBs       1         Number of diagnostic alarn OBs       2         Outers       10         - Number       2         Number       2         Number       Ves         IEC counter       -         - adjustable       Ves         S7 times       -         - adjustable       Ves         IEC timer       -         - adjustable       Yes         IEC timer       -         - adjustable       Yes         Data areas and their retentivity<	Number of DPV1 alarm OBs	3
Number of startup OBs         100           Number of startup OBs         4           Number of asynchronous error OBs         2           Number of diagnostic alarn OBs         1           Per priority class         24           Counters         24           Counter         2048           Retentivity         - adjustable         Yes           - adjustable         Yes           S7 times         2048           Retentivity         - adjustable         Yes           - adjustable         Yes           IEC timer         Any (only limited by the main memory)           Retentivity         - adjustable         Yes           - adjustable         Yes           Data areas and their retentivity         Yes           - Flag         Number, ma	<ul> <li>Number of isochronous mode OBs</li> </ul>	2
Number of asynchronous error OBs       4         Number of synchronous error OBs       2         Number of diagnostic alarm OBs       1         Number of diagnostic alarm OBs       1         Number of diagnostic alarm OBs       24         Counters, timers and their retentivity       24         S7 counter       2 048         Retentivity       - adjustable         - adjustable       Yes         IEC counter       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         S7 times       - adjustable         Number       2 048         Retentivity       - adjustable         - adjustable       Yes         S7 times       - adjustable         Number       2 048         Retentivity       - adjustable         - adjustable       Yes         IEC timer       Any (only limited by the main memory)         Number       Yes         IEC timer       - adjustable         - adjustable       Yes         Data areas and their retentivity       Yes         - adjustable       Yes         Data blocks       8; 8 clock memory bits, grouped into one cloc	<ul> <li>Number of technology synchronous alarm OBs</li> </ul>	2
Number of synchronous error OBs2Number of diagnostic alarm OBs1Nesting depth24Counters, timers and their retentivity24S7 counter2048Retentivity2048RetentivityYes- adjustableYesIEC counter- nadjustableYesS7 times2048Retentivity- adjustableYesIEC counter- nadjustableYesS7 times2048Retentivity- adjustableYesS7 times2048Retentivity- adjustableYesS7 times- adjustableYesS7 times- adjustableYesIEC timer- adjustableYesIEC timer- adjustableYesIEC timer- adjustableYesIEC timer- adjustableYesData blocks16 kbyteNumber, max.16 kbyteNumber, max.16 kbyteNumber of clock memories8,8 clock memory bits, grouped into one clock memory byte		100
• Number of diagnostic alarm OBs       1         • Nesting depth       24         • per priority class       24         Counters, timers and their retentivity       2048         S7 counter       2048         • Number       2048         Retentivity       Yes         — adjustable       Yes         IEC counter       Any (only limited by the main memory)         Retentivity       — adjustable         — adjustable       Yes         S7 times       2048         Retentivity       — adjustable         — adjustable       Yes         S7 times       2048         Retentivity       — adjustable         — adjustable       Yes         Retentivity       — adjustable         — adjustable       Yes         IEC timer	<ul> <li>Number of asynchronous error OBs</li> </ul>	4
• Number of diagnostic alarm OBs       1         Nesting depth       24         • per priority class       24         Counters, timers and their retentivity       2048         S7 counter       2048         • Number       2048         Retentivity	<ul> <li>Number of synchronous error OBs</li> </ul>	2
• per priority class       24         Counters, timers and their retentivity       57 counter         • Number       2 048         Retentivity       - adjustable         - adjustable       Yes         IEC counter       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         S7 times       Yes         • Number       2 048         Retentivity       - adjustable         - adjustable       Yes         IEC timer       - Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         Data areas and their retentivity       - adjustable         Flag       - Number, max.       16 kbyte         • Number, max.       6; 8 clock memory bits, grouped into one clock memory byte         Data blocks       - Stock memory bits, grouped into one clock memory byte	<ul> <li>Number of diagnostic alarm OBs</li> </ul>	1
Counters, timers and their retentivity         S7 counter         • Number       2 048         Retentivity	Nesting depth	
S7 counter       2 048         Retentivity       Yes         - adjustable       Yes         IEC counter       Any (only limited by the main memory)         Retentivity       - adjustable         • Number       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         S7 times       2 048         Retentivity       - adjustable         - adjustable       Yes         IEC timer       Yes         IEC timer       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         IEC timer       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         Data areas and their retentivity       - adjustable         Flag       - Number, max.         • Number, max.       16 kbyte         8; 8 clock memory bits, grouped into one clock memory byte         Data blocks       - adjustable	• per priority class	24
S7 counter       2 048         Retentivity       Yes         - adjustable       Yes         IEC counter       Any (only limited by the main memory)         Retentivity       - adjustable         • Number       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         S7 times       2 048         Retentivity       - adjustable         - adjustable       Yes         IEC timer       Yes         IEC timer       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         IEC timer       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         Data areas and their retentivity       - adjustable         Flag       - Number, max.         • Number, max.       16 kbyte         8; 8 clock memory bits, grouped into one clock memory byte         Data blocks       - adjustable	Counters timers and their retentivity	
Retentivity       Yes         IEC counter       Any (only limited by the main memory)         IEC counter       Any (only limited by the main memory)         Retentivity       Yes         - adjustable       Yes         S7 times       2 048         Retentivity       Yes         - adjustable       Yes         IEC timer       Yes         - adjustable       Yes         IEC timer       Yes         IEC timer       Yes         - adjustable       Yes         IEC timer       Sta areas and their retentivity         - adjustable       Yes         IEC timer       Sta areas and their retentivity         - adjustable       Yes         Data areas and their retentivity       Sta Secok memory bits, grouped into one clock memory byte         Flag       Sta Clock memory bits, grouped into one clock memory byte		
	Number	2 048
	Retentivity	
• NumberAny (only limited by the main memory)RetentivityYes- adjustable2 048S7 times2 048• Number2 048RetentivityYes- adjustableYesIEC timerAny (only limited by the main memory)• NumberAny (only limited by the main memory)RetentivityYes- adjustableYesData areas and their retentivityYes- adjustableYesData blocks16 kbyte• Number, max.16 kbyte• Number of clock memories8; 8 clock memory bits, grouped into one clock memory byte	— adjustable	Yes
Retentivity       Yes         or adjustable       2 048         Retentivity       2 048         r - adjustable       Yes         i - adjustable       Yes         IEC timer       Any (only limited by the main memory)         Retentivity       Fage         - adjustable       Yes         Data areas and their retentivity       Yes         Data blocks       16 kbyte	IEC counter	
adjustableYesS7 times2 048Retentivity2 048RetentivityYes adjustableYesIEC timerAny (only limited by the main memory)RetentivityAny (only limited by the main memory)RetentivityYes adjustableYesData areas and their retentivityYesFlag16 kbyte• Number, max.16 kbyte• Number of clock memories3; 8 clock memory bits, grouped into one clock memory byteData blocks	• Number	Any (only limited by the main memory)
S7 times       2 048         Retentivity       2 048	Retentivity	
• Number       2 048         Retentivity       Yes         IEC timer       Any (only limited by the main memory)         • Number       Any (only limited by the main memory)         Retentivity       - adjustable         - adjustable       Yes         Data areas and their retentivity       Yes         • Number, max.       16 kbyte         • Number of clock memories       8; 8 clock memory bits, grouped into one clock memory byte	— adjustable	Yes
Retentivity     Yes       IEC timer     Any (only limited by the main memory)       Retentivity     Any (only limited by the main memory)       Retentivity     Yes       — adjustable     Yes       Data areas and their retentivity       Flag     16 kbyte       • Number, max.     16 kbyte       • Number of clock memories     8; 8 clock memory bits, grouped into one clock memory byte	S7 times	
- adjustable       Yes         IEC timer       Any (only limited by the main memory)         • Number       Any (only limited by the main memory)         Retentivity       Yes         - adjustable       Yes         Data areas and their retentivity         Flag       16 kbyte         • Number, max.       16 kbyte         • Number of clock memories       8; 8 clock memory bits, grouped into one clock memory byte	• Number	2 048
IEC timer  IEC timer  Any (only limited by the main memory)  Retentivity  — adjustable Yes  Data areas and their retentivity  Flag  Number, max. Number, max. State of clock memories State of the state	Retentivity	
• Number       Any (only limited by the main memory)         Retentivity       Yes         — adjustable       Yes         Data areas and their retentivity         Flag         • Number, max.       16 kbyte         • Number of clock memories       8; 8 clock memory bits, grouped into one clock memory byte         Data blocks	— adjustable	Yes
Retentivity     Yes       adjustable     Yes       Data areas and their retentivity     Image: Comparison of Clock memories       • Number of clock memories     16 kbyte       • Number of clock memories     8; 8 clock memory bits, grouped into one clock memory byte       • Data blocks     Image: Comparison of Clock memory byte	IEC timer	
- adjustable     Yes       Data areas and their retentivity       Flag       • Number, max.     16 kbyte       • Number of clock memories     8; 8 clock memory bits, grouped into one clock memory byte       Data blocks	• Number	Any (only limited by the main memory)
Data areas and their retentivity         Flag         • Number, max.       16 kbyte         • Number of clock memories       8; 8 clock memory bits, grouped into one clock memory byte         Data blocks       10 kbyte	Retentivity	
Flag       • Number, max.       16 kbyte         • Number of clock memories       8; 8 clock memory bits, grouped into one clock memory byte         Data blocks       2000 memory bits, grouped into one clock memory byte	— adjustable	Yes
<ul> <li>Number, max.</li> <li>Number of clock memories</li> <li>Data blocks</li> <li>16 kbyte</li> <li>8; 8 clock memory bits, grouped into one clock memory byte</li> </ul>	Data areas and their retentivity	
• Number of clock memories 8; 8 clock memory bits, grouped into one clock memory byte Data blocks		
Data blocks	• Number, max.	16 kbyte
	<ul> <li>Number of clock memories</li> </ul>	8; 8 clock memory bits, grouped into one clock memory byte
Retentivity adjustable     Yes	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	16 384; 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)	16 kbyte; 16 KB via the integrated PROFINET IO interface, 8 KB via the integrated DP interface
— Outputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface, 8 KB via the integrated DP interface
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
<ul> <li>Number of subprocess images, max.</li> </ul>	32
Hardware configuration	
Number of distributed IO systems	64; 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	
• integrated	1
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	2
● Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
<ul> <li>Modules per rack, max.</li> </ul>	32; CPU + 31 modules
<ul> <li>Number of lines, max.</li> </ul>	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	
• Туре	Hardware clock
Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s

Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• in AS, master	Yes
• in AS, slave	Yes
<ul> <li>on Ethernet via NTP</li> </ul>	Yes
Interfaces	
Number of PROFINET interfaces	3
Number of PROFIBUS interfaces	1
1. Interface	
Interface types	
Number of ports	2
<ul> <li>integrated switch</li> </ul>	Yes
• RJ 45 (Ethernet)	Yes; X1
Functionality	
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
<ul> <li>SIMATIC communication</li> </ul>	Yes
<ul> <li>Open IE communication</li> </ul>	Yes
Web server	Yes
<ul> <li>Media redundancy</li> </ul>	Yes
PROFINET IO Controller	
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.	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
— Of which IO devices with IRT, max.	64
<ul> <li>— Number of connectable IO Devices for RT, max.</li> </ul>	512
— of which in line, max.	512

<ul> <li>— Number of IO Devices that can be simultaneously activated/deactivated, max.</li> </ul>	8; in total across all interfaces
— Number of IO Devices per tool, max.	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 125 μs	125 µs
— for send cycle of 187.5 $\mu$ s	187.5 µs
— for send cycle of 250 μs	250 µs to 4 ms
— 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
<ul> <li>With IRT and parameterization of "odd" send cycles</li> </ul>	Update time = set "odd" send clock (any multiple of 125 $\mu s$ : 375 $\mu s$ , 625 $\mu s$ 3 875 $\mu s$ )
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
— S7 routing	Yes
— Isochronous mode	No
— Open IE communication	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.	
2. Interface	
Interface types	1
Number of ports	
• integrated switch	No Voc: X2
RJ 45 (Ethernet)	Yes; X2
Functionality     PROFINET IO Controller	Yes

PROFINET IO Device	Yes
<ul> <li>SIMATIC communication</li> </ul>	Yes
<ul> <li>Open IE communication</li> </ul>	Yes
Web server	Yes
Media redundancy	No
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	No
— Open IE communication	Yes
— IRT	No
— MRP	No
— PROFlenergy	Yes
— Prioritized startup	No
<ul> <li>— Number of connectable IO Devices, max.</li> </ul>	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
<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
— 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 RT	
— for send cycle of 1 ms	1 ms to 512 ms
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	No
— Open IE communication	Yes
— IRT	No
— MRP	No
— MRPD	No
— PROFlenergy	Yes
— Prioritized startup	No
— Shared device	Yes
<ul> <li>— Number of IO Controllers with shared device, max.</li> </ul>	4
2 Interface	

## 3. Interface

Interface types	
Number of ports	1
<ul> <li>integrated switch</li> </ul>	No
• RJ 45 (Ethernet)	Yes; X3
Functionality	
PROFINET IO Controller	No
PROFINET IO Device	No
<ul> <li>SIMATIC communication</li> </ul>	Yes
Open IE communication	Yes
• Web server	Yes
4. Interface	
Interface types	
Number of ports	1
• RS 485	Yes; X4
Functionality	
PROFIBUS DP master	Yes
PROFIBUS DP slave	No
SIMATIC communication	Yes
Interface types RJ 45 (Ethernet)	
• 100 Mbps	Yes
• 1000 Mbps	Yes; Only possible at the X3 interface of the CPU 1518
Autonegotiation	Yes
Autocrossing	Yes
<ul> <li>Industrial Ethernet status LED</li> </ul>	Yes
RS 485	
<ul> <li>Transmission rate, max.</li> </ul>	12 Mbit/s
Protocols	
Number of connections	
<ul> <li>Number of connections, max.</li> </ul>	384; 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>	192
<ul> <li>Number of S7 routing paths</li> </ul>	64; in total, only 16 S7-Routing connections are supported via PROFIBUS
SIMATIC communication	
<ul> <li>S7 communication, as server</li> </ul>	Yes
<ul> <li>S7 communication, as client</li> </ul>	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
<ul> <li>— several passive connections per port, supported</li> </ul>	Yes
<ul> <li>ISO-on-TCP (RFC1006)</li> </ul>	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
PROFIBUS DP master	
<ul> <li>Number of connections, max.</li> </ul>	48; for the integrated PROFIBUS DP interface
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Data record routing	Yes
— Isochronous mode	Yes
— Equidistance	Yes
— Number of DP slaves	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
<ul> <li>Activation/deactivation of DP slaves</li> </ul>	Yes
OPC UA	
OPC UA Server	Yes; Data access (read, write, subscribe), runtime license required
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"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 to terminal)	Yes; With minimum OB 6x cycle of 125 µs
to terminary	

Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Block related messages	Yes
Number of configurable alarms, max.	10 000
Number of simultaneously active alarms in alarm	
pool	
<ul> <li>Number of reserved user alarms</li> </ul>	1 000
<ul> <li>Number of reserved alarms for system</li> </ul>	200
diagnostics	
<ul> <li>Number of reserved alarms for Motion Control</li> </ul>	160
technology objects	
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 10 engineering
	systems
Status block	Yes; Up to 16 simultaneously (in total across all ES clients)
Single step	No
Status/control	
Status/control variable	Yes
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers,
	counters
• Number of variables, max.	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
Forcing, variables	Peripheral inputs/outputs
• Number of variables, max.	200
Diagnostic buffer	
• present	Yes
Number of entries, max.	3 200
— of which powerfail-proof	1 000
Traces	
<ul> <li>Number of configurable Traces</li> </ul>	8; 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
Connection display LINK TX/RX	Yes
Supported technology objects	
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</li> </ul>	10 240
for technology objects (except cam disks)	
<ul> <li>Required Motion Control resources</li> </ul>	
— 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
<ul> <li>Positioning axis</li> </ul>	
<ul> <li>— Number of positioning axes at motion control cycle of 4 ms (typical value)</li> </ul>	128
<ul> <li>— Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul>	128
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	
<ul> <li>High-speed counter</li> </ul>	Yes
Ambient conditions	
Ambient conditions Ambient temperature during operation	
	0 °C
Ambient temperature during operation	0 °C 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
Ambient temperature during operation <ul> <li>horizontal installation, min.</li> </ul>	60 °C; Display: 50 °C, at an operating temperature of typically 50
<ul> <li>Ambient temperature during operation</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> </ul>	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
<ul> <li>Ambient temperature during operation</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> </ul>	<ul> <li>60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off</li> <li>0 °C</li> <li>40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off</li> </ul>
<ul> <li>Ambient temperature during operation</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> <li>vertical installation, max.</li> </ul>	<ul> <li>60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off</li> <li>0 °C</li> <li>40 °C; Display: 40 °C, at an operating temperature of typically 40</li> </ul>
<ul> <li>Ambient temperature during operation</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> <li>vertical installation, max.</li> </ul> Ambient temperature during storage/transportation	<ul> <li>60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off</li> <li>0 °C</li> <li>40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off</li> </ul>
<ul> <li>Ambient temperature during operation</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> <li>vertical installation, max.</li> </ul> Ambient temperature during storage/transportation <ul> <li>min.</li> </ul>	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
<ul> <li>Ambient temperature during operation</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> <li>vertical installation, max.</li> </ul> Ambient temperature during storage/transportation <ul> <li>min.</li> <li>max.</li> </ul>	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during operation         • horizontal installation, min.         • horizontal installation, max.         • vertical installation, min.         • vertical installation, max.         Ambient temperature during storage/transportation         • min.         • max.         Configuration	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during operation         • horizontal installation, min.         • horizontal installation, max.         • vertical installation, min.         • vertical installation, max.         Ambient temperature during storage/transportation         • min.         • max.         Configuration         Programming	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during operation         • horizontal installation, min.         • horizontal installation, max.         • vertical installation, min.         • vertical installation, max.         Ambient temperature during storage/transportation         • min.         • max.         Configuration         Programming         Programming language	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off -40 °C 70 °C
Ambient temperature during operation         • horizontal installation, min.         • horizontal installation, max.         • vertical installation, min.         • vertical installation, max.         Ambient temperature during storage/transportation         • min.         • max.         Configuration         Programming         Programming language         — LAD	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off -40 °C 70 °C Yes
Ambient temperature during operation         • horizontal installation, min.         • horizontal installation, max.         • vertical installation, min.         • vertical installation, max.         Ambient temperature during storage/transportation         • min.         • max.         Configuration         Programming         Programming language         — LAD         — FBD	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off -40 °C 70 °C Yes Yes
Ambient temperature during operation         • horizontal installation, min.         • horizontal installation, max.         • vertical installation, min.         • vertical installation, max.         Ambient temperature during storage/transportation         • min.         • max.         Configuration         Programming         Programming language         - LAD         - FBD         - STL	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off -40 °C 70 °C Yes Yes Yes
Ambient temperature during operation         • horizontal installation, min.         • horizontal installation, max.         • vertical installation, min.         • vertical installation, max.         Ambient temperature during storage/transportation         • min.         • max.         Configuration         Programming         Programming language         - LAD         - STL         - SCL	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off -40 °C 70 °C Yes Yes Yes Yes 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
<ul> <li>Protection level: Complete protection</li> </ul>	Yes
Cycle time monitoring	
lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
upper limit Dimensions	adjustable maximum cycle time
	adjustable maximum cycle time 175 mm
Dimensions	
Dimensions Width	175 mm
Dimensions Width Height	175 mm 147 mm
Dimensions Width Height Depth	175 mm 147 mm