

SIMATIC DP, IM151-8 PN/DP CPU FOR ET200S, 192 KB WORKING MEMORY, INT. PROFINET INTERFACE (WITH THREE RJ45 PORTS) AS IO-CONTROLLER, W/O BATTERY MMC REQUIRED



Figure similar

Product type designation

General information

| | |
|---|-----------------------|
| Hardware product version | 01 |
| Firmware version | V3.2 |
| Engineering with | |
| <ul style="list-style-type: none"> Programming package | STEP7 V 5.5 or higher |

Supply voltage

| | |
|--|--------------------------|
| Rated value (DC) | |
| <ul style="list-style-type: none"> 24 V DC | Yes |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| Reverse polarity protection | Yes; against destruction |
| external protection for power supply lines (recommendation) | 2 A min. |
| Mains buffering | |
| <ul style="list-style-type: none"> Mains/voltage failure stored energy time | 5 ms |

Input current

| | |
|----------------------|----------------|
| Inrush current, max. | 1.8 A; Typical |
|----------------------|----------------|

| | |
|---|---|
| I^2t | 0.13 A ² ·s |
| from supply voltage 1L+, max. | 352 mA; 426 mA with DP master module |
| Output current | |
| for backplane bus (5 V DC), max. | 700 mA |
| Power loss | |
| Power loss, typ. | 5.5 W |
| Memory | |
| Work memory | |
| <ul style="list-style-type: none"> • Integrated | 192 kbyte |
| <ul style="list-style-type: none"> • expandable | No |
| <ul style="list-style-type: none"> • Size of retentive memory for retentive data blocks | 64 kbyte |
| Load memory | |
| <ul style="list-style-type: none"> • Plug-in (MMC) | Yes |
| <ul style="list-style-type: none"> • Plug-in (MMC), max. | 8 Mbyte |
| <ul style="list-style-type: none"> • Data management on MMC (after last programming), min. | 10 y |
| Backup | |
| <ul style="list-style-type: none"> • present | Yes; Ensured by SIMATIC Micro Memory Card (maintenance-free) |
| CPU processing times | |
| for bit operations, typ. | 0.06 μs |
| for word operations, typ. | 0.12 μs |
| for fixed point arithmetic, typ. | 0.16 μs |
| for floating point arithmetic, typ. | 0.59 μs |
| CPU-blocks | |
| Number of blocks (total) | 1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used. |
| DB | |
| <ul style="list-style-type: none"> • Number, max. | 1 024; Number range: 1 to 16000 |
| <ul style="list-style-type: none"> • Size, max. | 64 kbyte |
| FB | |
| <ul style="list-style-type: none"> • Number, max. | 1 024; Number range: 0 to 7999 |
| <ul style="list-style-type: none"> • Size, max. | 64 kbyte |
| FC | |
| <ul style="list-style-type: none"> • Number, max. | 1 024; Number range: 0 to 7999 |
| <ul style="list-style-type: none"> • Size, max. | 64 kbyte |
| OB | |
| <ul style="list-style-type: none"> • Description | See S7-300 operation list |
| <ul style="list-style-type: none"> • Size, max. | 64 kbyte |
| <ul style="list-style-type: none"> • Number of free cycle OBs | 1; OB 1 |

| | |
|------------------------------------|--|
| • Number of time alarm OBs | 1; OB 10 |
| • Number of delay alarm OBs | 2; OB 20, 21 |
| • Number of cyclic interrupt OBs | 4; OB 32, 33, 34, 35 |
| • Number of process alarm OBs | 1; OB 40 |
| • Number of DPV1 alarm OBs | 3; OB 55, 56, 57 |
| • Number of isochronous mode OBs | 1; OB 61; only for PROFINET |
| • Number of startup OBs | 1; OB 100 |
| • Number of asynchronous error OBs | 6; OB 80, 82, 83, 85, 86, 87 (OB83 only for centralized I/O and PROFINET IO) |
| • Number of synchronous error OBs | 2; OB 121, 122 |

Nesting depth

| | |
|---------------------------------|----|
| • per priority class | 16 |
| • additional within an error OB | 4 |

Counters, timers and their retentivity

S7 counter

| | |
|----------|-----|
| • Number | 256 |
|----------|-----|

Retentivity

| | |
|---------------|------------|
| — adjustable | Yes |
| — lower limit | 0 |
| — upper limit | 255 |
| — preset | Z 0 to Z 7 |

Counting range

| | |
|---------------|-----|
| — can be set | Yes |
| — lower limit | 0 |
| — upper limit | 999 |

IEC counter

| | |
|-----------|--|
| • present | Yes |
| • Type | SFB |
| • Number | Unlimited (limited only by RAM capacity) |

S7 times

| | |
|----------|-----|
| • Number | 256 |
|----------|-----|

Retentivity

| | |
|---------------|----------------|
| — can be set | Yes |
| — lower limit | 0 |
| — upper limit | 255 |
| — preset | No retentivity |

Time range

| | |
|---------------|---------|
| — lower limit | 10 ms |
| — upper limit | 9 990 s |

IEC timer

| | |
|-----------|-----|
| • present | Yes |
|-----------|-----|

| | |
|----------|--|
| • Type | SFB |
| • Number | Unlimited (limited only by RAM capacity) |

Data areas and their retentivity

| | |
|----------------------------|--|
| Flag | |
| • Number, max. | 256 byte |
| • Retentivity available | Yes |
| • Retentivity preset | MB 0 to MB 15 |
| • Number of clock memories | 8; 1 memory byte |
| Data blocks | |
| • Number, max. | 1 024; Number range: 1 to 16000 |
| • Size, max. | 64 kbyte |
| • Retentivity adjustable | Yes; via non-retain property on DB |
| • Retentivity preset | Yes |
| Local data | |
| • per priority class, max. | 32 768 byte; Max. 2048 bytes per block |

Address area

| | |
|-------------------------------------|---|
| I/O address area | |
| • Inputs | 2 048 byte |
| • Outputs | 2 048 byte |
| of which distributed | |
| — Inputs | 2 048 byte |
| — Outputs | 2 048 byte |
| Process image | |
| • Inputs, adjustable | 2 048 byte |
| • Outputs, adjustable | 2 048 byte |
| • Inputs, default | 128 byte |
| • Outputs, default | 128 byte |
| Subprocess images | |
| • Number of subprocess images, max. | 1; With PROFINET IO, the length of the user data is limited to 1600 bytes |
| Digital channels | |
| • Inputs | 16 336 |
| — of which central | 496 |
| • Outputs | 16 336 |
| — of which central | 496 |
| Analog channels | |
| • Inputs | 1 021 |
| — of which central | 124 |
| • Outputs | 1 021 |
| — of which central | 124 |

Hardware configuration

| | |
|---|--|
| Number of modules per system, max. | 63; Centralized |
| Mounting rail | |
| <ul style="list-style-type: none"> Number of mounting rails that can be used Length of mounting rail, max. | <p>1</p> <p>Station width: ≤ 1 m or < 2 m</p> |
| Time of day | |
| Clock | |
| <ul style="list-style-type: none"> Hardware clock (real-time clock) retentive and synchronizable Deviation per day, max. Backup time Behavior of the clock following POWER-ON Behavior of the clock following expiry of backup period | <p>Yes</p> <p>Yes</p> <p>10 s; Typ.: 2 s</p> <p>6 wk; At 40 °C ambient temperature, typically</p> <p>Clock continues running after POWER OFF</p> <p>Clock continues to run with the time at which the power failure occurred</p> |
| Operating hours counter | |
| <ul style="list-style-type: none"> Number Number/Number range Range of values Granularity retentive | <p>1</p> <p>0</p> <p>0 to 2³¹ hours (when using SFC 101)</p> <p>1 hour</p> <p>Yes; Must be restarted at each restart</p> |
| Clock synchronization | |
| <ul style="list-style-type: none"> supported to MPI, master to MPI, slave to DP, master to DP, slave in AS, master in AS, slave on Ethernet via NTP | <p>Yes</p> <p>No</p> <p>No</p> <p>Yes; With DP master module</p> <p>Yes; With DP master module</p> <p>No</p> <p>No</p> <p>Yes; As client</p> |
| Interfaces | |
| Interfaces/bus type | 1x PROFINET (3 RJ45 ports) |
| Number of USB interfaces | 0 |
| Number of parallel interfaces | 0 |
| Number of other interfaces | 1; Ethernet, 3-port switch, 3*RJ45 |
| PROFINET IO | |
| <ul style="list-style-type: none"> Number of PROFINET interfaces | 3; 3 ports (incl. switch) |
| WLAN | |
| <ul style="list-style-type: none"> Number of wireless interfaces | 0 |
| 1. Interface | |
| Interface type | PROFINET |
| Physics | Ethernet |
| Isolated | Yes |

| | |
|---|---|
| integrated switch | Yes |
| Number of ports | 3; RJ45 |
| automatic detection of transmission rate | Yes |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Change of IP address at runtime, supported | Yes |
| Media redundancy | |
| • supported | Yes |
| • Switchover time on line break, typ. | 200 ms; PROFINET MRP |
| • Number of stations in the ring, max. | 50 |
| Functionality | |
| • MPI | No |
| • DP master | No |
| • DP slave | No |
| • PROFINET IO Device | Yes; Also simultaneously with IO Controller functionality |
| • PROFINET IO Controller | Yes; Also simultaneously with IO-Device functionality |
| • PROFINET CBA | Yes |
| • Open IE communication | Yes; Via TCP/IP, ISO on TCP, and UDP |
| • Web server | Yes |
| — Number of HTTP clients | 5 |
| • Point-to-point connection | No |
| PROFINET IO Controller | |
| • Transmission rate, max. | 100 Mbit/s; full duplex |
| • Number of connectable IO Devices, max. | 128 |
| • Number of connectable IO Devices for RT, max. | 128 |
| — of which in line, max. | 128 |
| • Number of IO Devices with IRT and the option "high flexibility" | 128 |
| — of which in line, max. | 61 |
| • Number of IO Devices with IRT and the option "high performance", max. | 64 |
| — of which in line, max. | 64 |
| • IRT | Yes |
| • Shared device | Yes |
| • Prioritized startup | Yes |
| — Number of IO Devices, max. | 32 |
| • Activation/deactivation of IO Devices | Yes |
| — Number of IO Devices that can be simultaneously activated/deactivated, max. | 8 |
| • IO Devices changing during operation (partner ports), supported | Yes |

| | |
|---|---|
| — Number of IO Devices per tool, max. | 8 |
| • Device replacement without swap medium | Yes |
| • Send cycles | 250 μ s, 500 μ s, 1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option) |
| • Updating time | Minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the number of configured user data items. |
| • Updating times | 250 μ s to 512 ms (depends on operating mode; for more details, refer to Operating Instructions, "Interface Module IM151-8 PN/DP CPU") |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes; With DP master module |
| — S7 communication | Yes; with loadable FBs |
| — Isochronous mode | Yes; OB 61; only for PROFINET IO |
| — Open IE communication | Yes; Via TCP/IP, ISO on TCP, and UDP |
| Address area | |
| — Inputs, max. | 2 kbyte |
| — Outputs, max. | 2 kbyte |
| — User data consistency, max. | 1 024 byte; with PROFINET I/O |
| PROFINET IO Device | |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — S7 communication | Yes; with loadable FBs |
| — Isochronous mode | No |
| — Open IE communication | Yes; Via TCP/IP, ISO on TCP, and UDP |
| — IRT | Yes |
| — PROFINergy | Yes; With SFB 73 / 74 prepared for loadable PROFINergy standard FB for I-Device |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 2 |
| Transfer memory | |
| — Inputs, max. | 1 440 byte; Per IO Controller with shared device |
| — Outputs, max. | 1 440 byte; Per IO Controller with shared device |
| Submodules | |
| — Number, max. | 64 |
| — User data per submodule, max. | 1 024 byte |
| PROFINET CBA | |
| • acyclic transmission | Yes |
| • cyclic transmission | Yes |
| Open IE communication | |

- Number of connections, max. 8
- Local port numbers used at the system end 0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535

2. Interface

| | |
|--|---|
| Interface type | External interface via master module 6ES7138-4HA00-0AB0 |
| Physics | RS 485 |
| Isolated | Yes |
| Power supply to interface (15 to 30 V DC), max. | No |
| Functionality | |
| • MPI | No |
| • DP master | Yes |
| • DP slave | No |
| • PROFINET IO Controller | No |
| • PROFINET IO Device | No |
| • PROFINET CBA | No |
| • Open IE communication | No |
| • Web server | No |
| DP master | |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 32; Per station |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — Global data communication | No |
| — S7 basic communication | Yes; I blocks only |
| — S7 communication | Yes |
| — S7 communication, as client | No |
| — S7 communication, as server | Yes |
| — Equidistance mode support | Yes |
| — Isochronous mode | No |
| — SYNC/FREEZE | Yes |
| — Activation/deactivation of DP slaves | Yes |
| — Number of DP slaves that can be simultaneously activated/deactivated, max. | 8 |
| — Direct data exchange (slave-to-slave communication) | Yes |
| — DPV1 | Yes |
| Address area | |
| — Inputs, max. | 2 048 byte |
| — Outputs, max. | 2 048 byte |
| User data per DP slave | |
| — Inputs, max. | 244 byte |

— Outputs, max.

244 byte

Isochronous mode

Isochronous operation (application synchronized up to terminal) No

Communication functions

PG/OP communication Yes

Data record routing Yes; With DP master module

Global data communication

• supported No

S7 basic communication

• supported Yes; I blocks

• User data per job, max. 76 byte

• User data per job (of which consistent), max. 76 byte

S7 communication

• supported Yes

• as server Yes

• as client Yes; via integrated PROFINET interface and loadable FBs

• User data per job, max. See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)

Open IE communication

• TCP/IP Yes; via integrated PROFINET interface and loadable FBs

— Number of connections, max. 8

— Data length for connection type 01H, max. 1 460 byte

— Data length for connection type 11H, max. 32 768 byte

— Several passive connections per port, supported Yes

• ISO-on-TCP (RFC1006) Yes; via integrated PROFINET interface and loadable FBs

— Number of connections, max. 8

— Data length, max. 32 768 byte

• UDP Yes; via integrated PROFINET interface and loadable FBs

— Number of connections, max. 8

— Data length, max. 1 472 byte

Web server

• supported Yes

• Number of HTTP clients 5

• User-defined websites Yes

PROFINET CBA (at set setpoint communication load)

• Setpoint for the CPU communication load 50 %

• Number of remote interconnection partners 32

• Number of functions, master/slave 30

• Total of all master/slave connections 1 000

| | |
|--|---------------------------|
| • Data length of all incoming connections master/slave, max. | 4 000 byte |
| • Data length of all outgoing connections master/slave, max. | 4 000 byte |
| • Number of device-internal and PROFIBUS interconnections | 500 |
| • Data length of device-internal und PROFIBUS interconnections, max. | 4 000 byte |
| • Data length per connection, max. | 1 400 byte |
| Remote interconnections with acyclic transmission | |
| — Sampling frequency: Sampling time, min. | 500 ms |
| — Number of incoming interconnections | 100 |
| — Number of outgoing interconnections | 100 |
| — Data length of all incoming interconnections, max. | 2 000 byte |
| — Data length of all outgoing interconnections, max. | 2 000 byte |
| — Data length per connection, max. | 1 400 byte |
| Remote interconnections with cyclic transmission | |
| — Transmission frequency: Transmission interval, min. | 1 ms |
| — Number of incoming interconnections | 200 |
| — Number of outgoing interconnections | 200 |
| — Data length of all incoming interconnections, max. | 2 000 byte |
| — Data length of all outgoing interconnections, max. | 2 000 byte |
| — Data length per connection, max. | 450 byte |
| HMI variables via PROFINET (acyclic) | |
| — Number of stations that can log on for HMI variables (PN OPC/iMap) | 3; 2x PN OPC/1x iMap |
| — HMI variable updating | 500 ms |
| — Number of HMI variables | 200 |
| — Data length of all HMI variables, max. | 2 000 byte |
| PROFIBUS proxy functionality | |
| — supported | Yes |
| — Number of linked PROFIBUS devices | 16 |
| — Data length per connection, max. | 240 byte; Slave-dependent |
| iPAR server | |
| • supported | Yes |
| Number of connections | |
| • overall | 12 |
| • usable for PG communication | 11 |

| | |
|---|--------------------------|
| — reserved for PG communication | 1 |
| — adjustable for PG communication, min. | 1 |
| — adjustable for PG communication, max. | 11 |
| • usable for OP communication | 11 |
| — reserved for OP communication | 1 |
| — adjustable for OP communication, min. | 1 |
| — adjustable for OP communication, max. | 11 |
| • usable for S7 basic communication | 10 |
| — reserved for S7 basic communication | 0 |
| — adjustable for S7 basic communication, min. | 0 |
| — adjustable for S7 basic communication, max. | 10 |
| • usable for S7 communication | 10; with loadable FBs |
| — adjustable for S7 communication, max. | 10 |
| • total number of instances, max. | 32 |
| • usable for routing | 4; With DP master module |

S7 message functions

| | |
|--|--|
| Number of login stations for message functions, max. | 12; Depending on the configured connections for PG/OP and S7 basic communication |
| Process diagnostic messages | Yes; ALARM_S, ALARM_SC, ALARM_SQ, ALARM_D, ALARM_DQ |
| simultaneously active Alarm-S blocks, max. | 300 |

Test commissioning functions

| | |
|-----------------------|-----------------------------|
| Status block | Yes; Up to 2 simultaneously |
| Single step | Yes |
| Number of breakpoints | 4 |

Status/control

| | |
|------------------------------------|---|
| • Status/control variable | Yes |
| • Variables | Inputs, outputs, memory bits, DB, times, counters |
| • Number of variables, max. | 30 |
| — of which status variables, max. | 30 |
| — of which control variables, max. | 14 |

Forcing

| | |
|-----------------------------|-----|
| • Forcing | Yes |
| • Forcing, variables | I/O |
| • Number of variables, max. | 10 |

Diagnostic buffer

| | |
|----------------------------|---|
| • present | Yes |
| • Number of entries, max. | 500 |
| — can be set | No |
| — of which powerfail-proof | 100; Only the last 100 entries are retained |

| Interrupts/diagnostics/status information | |
|--|----------------------|
| Alarms | |
| • Alarms | Yes |
| Diagnostic messages | |
| • Diagnostic functions | Yes |
| Diagnostics indication LED | |
| • Bus activity PROFINET P1-LINK (green) | Yes |
| • Bus activity PROFINET P2-LINK (green) | Yes |
| • Bus activity PROFINET P3-LINK (green) | Yes |
| • Bus fault BF-PN (red) | Yes |
| • Maintenance information MT (yellow) | Yes |
| • Group error SF (red) | Yes |
| • Monitoring 24 V voltage supply ON (green) | Yes |
| Potential separation | |
| between PROFIBUS DP and all other circuit components | Yes |
| Permissible potential difference | |
| between different circuits | 75V DC/60V AC |
| Isolation | |
| Isolation tested with | 500 V DC |
| Degree and class of protection | |
| IP degree of protection | IP20 |
| Configuration | |
| Configuration software | |
| • STEP 7 | Yes; V5.5 or higher |
| Programming | |
| • Command set | see instruction list |
| • Nesting levels | 8 |
| • System functions (SFC) | see instruction list |
| • System function blocks (SFB) | see instruction list |
| Programming language | |
| — LAD | Yes |
| — FBD | Yes |
| — STL | Yes |
| — SCL | Yes; Optional |
| — CFC | Yes; Optional |
| — GRAPH | Yes; Optional |
| — HiGraph® | Yes; Optional |
| Know-how protection | |
| • User program protection/password protection | Yes |

- Block encryption Yes; With S7 block Privacy

Cycle time monitoring

- lower limit 1 ms
- upper limit 6 000 ms
- can be set Yes
- preset 150 ms

Dimensions

| | |
|--------|---------------------------------|
| Width | 120 mm; DP master module: 35 mm |
| Height | 119.5 mm |
| Depth | 75 mm |

Weights

| | |
|-----------------|--|
| Weight, approx. | 320 g; DP master module: Approx. 100 g |
|-----------------|--|

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