



SIMATIC S7-300 CPU319F-3 PN/DP, Central processing unit with 2.5 MB work memory, 1st interface MPI/DP 12 Mbit/s, 2nd interface DP master/slave 3rd interface Ethernet PROFINET, Micro Memory Card required

| General information | |
|---|--|
| Product type designation | CPU 319F-3 PN/DP |
| HW functional status | 01 |
| Firmware version | V3.2 |
| Product function | |
| • Isochronous mode | Yes; Via 2nd PROFIBUS DP or PROFINET interface |
| Engineering with | |
| • Programming package | STEP 7 V5.5 or higher, Distributed Safety V5.4 SP4 |
| Supply voltage | |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 19.2 V |
| permissible range, upper limit (DC) | 28.8 V |
| external protection for power supply lines (recommendation) | 2 A min. |
| Mains buffering | |
| • Mains/voltage failure stored energy time | 5 ms |
| • Repeat rate, min. | 1 s |
| Input current | |
| Current consumption (rated value) | 1 250 mA |
| Current consumption (in no-load operation), typ. | 500 mA |
| Inrush current, typ. | 4 A |
| I^2t | 1.2 A ² s |
| Power loss | |
| Power loss, typ. | 14 W |
| Memory | |
| Work memory | |
| • integrated | 2 560 kbyte |
| • expandable | No |
| Load memory | |
| • Plug-in (MMC) | Yes |
| • Plug-in (MMC), max. | 8 Mbyte |
| • Data management on MMC (after last programming), min. | 10 a |
| Backup | |
| • present | Yes |
| • without battery | Yes |
| CPU processing times | |
| for bit operations, typ. | 0.004 μ s |
| for word operations, typ. | 0.01 μ s |
| for fixed point arithmetic, typ. | 0.01 μ s |
| for floating point arithmetic, typ. | 0.04 μ s |

| CPU-blocks | |
|---|--|
| Number of blocks (total) | 4 096; (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. • Size, max. |
| | 4 096; Number range: 1 to 16000 64 kbyte |
| FB | <ul style="list-style-type: none"> • Number, max. • Size, max. |
| | 4 096; Number range: 0 to 7999 64 kbyte |
| FC | <ul style="list-style-type: none"> • Number, max. • Size, max. |
| | 4 096; Number range: 0 to 7999 64 kbyte |
| OB | <ul style="list-style-type: none"> • Size, max. • Number of free cycle OBs • Number of time alarm OBs • Number of delay alarm OBs • Number of cyclic interrupt OBs • Number of process alarm OBs • Number of DPV1 alarm OBs • Number of isochronous mode OBs • Number of startup OBs • Number of asynchronous error OBs • Number of synchronous error OBs |
| | 64 kbyte 1; OB 1 1; OB 10 2; OB 20, 21 4; OB 32, 33, 34, 35 (OB 35: smallest settable clock pulse = 500 µs) 1; OB 40 3; OB 55, 56, 57 1; OB 61 1; OB 100 6; OB 80, 82, 83, 85, 86, 87 (OB83 only for PROFINET IO) 2; OB 121, 122 |
| Nesting depth | <ul style="list-style-type: none"> • per priority class • additional within an error OB |
| | 16 4 |
| Counters, timers and their retentivity | |
| S7 counter | <ul style="list-style-type: none"> • Number |
| | 2 048 |
| Retentivity | <ul style="list-style-type: none"> — adjustable — preset |
| | Yes Z 0 to Z 7 |
| Counting range | <ul style="list-style-type: none"> — adjustable — lower limit — upper limit |
| | Yes 0 999 |
| IEC counter | <ul style="list-style-type: none"> • present • Type • Number |
| | Yes SFB Unlimited (limited only by RAM capacity) |
| S7 times | <ul style="list-style-type: none"> • Number |
| | 2 048 |
| Retentivity | <ul style="list-style-type: none"> — adjustable — preset |
| | Yes No retentivity |
| Time range | <ul style="list-style-type: none"> — lower limit — upper limit |
| | 10 ms 9 990 s |
| IEC timer | <ul style="list-style-type: none"> • present • Type • Number |
| | Yes SFB Unlimited (limited only by RAM capacity) |
| Data areas and their retentivity | |
| Retentive data area (incl. timers, counters, flags), max. | 700 kbyte |
| Flag | <ul style="list-style-type: none"> • Size, max. • Retentivity available • Retentivity preset • Number of clock memories |
| | 8 192 byte Yes; From MB 0 to MB 8 191 MB 0 to MB 15 8; 1 memory byte |
| Data blocks | |

| | |
|---|---|
| • 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 | 8 192 byte |
| • Outputs | 8 192 byte |
| of which distributed | |
| — Inputs | 8 192 byte |
| — Outputs | 8 192 byte |
| Process image | |
| • Inputs | 8 192 byte |
| • Outputs | 8 192 byte |
| • Inputs, adjustable | 8 192 byte |
| • Outputs, adjustable | 8 192 byte |
| • Inputs, default | 1 024 byte |
| • Outputs, default | 1 024 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 | 65 536 |
| — of which central | 1 024 |
| • Outputs | 65 536 |
| — of which central | 1 024 |
| Analog channels | |
| • Inputs | 4 096 |
| — of which central | 256 |
| • Outputs | 4 096 |
| — of which central | 256 |
| Hardware configuration | |
| Number of DP masters | |
| • integrated | 2 |
| • via CP | 4 |
| Number of operable FMs and CPs (recommended) | |
| • FM | 8 |
| • CP, PtP | 8 |
| • CP, LAN | 10 |
| Rack | |
| • Racks, max. | 4 |
| • Modules per rack, max. | 8 |
| Time of day | |
| Clock | |
| • Hardware clock (real-time) | Yes |
| • retentive and synchronizable | Yes |
| • Backup time | 6 wk; At 40 °C ambient temperature |
| • Deviation per day, max. | 10 s; Typ.: 2 s |
| • Behavior of the clock following POWER-ON | Clock continues running after POWER OFF |
| • Behavior of the clock following expiry of backup period | the clock continues at the time of day it had when power was switched off |
| Operating hours counter | |
| • Number | 4 |
| • Number/Number range | 0 to 3 |
| • Range of values | 0 to 2 ³¹ hours (when using SFC 101) |
| • Granularity | 1 h |
| • retentive | Yes; Must be restarted at each restart |
| Clock synchronization | |
| • supported | Yes |
| • to MPI, master | Yes |
| • on MPI, device | Yes |
| • to DP, master | Yes; With DP slave only slave clock |

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|--|---|
| • on DP, device | Yes |
| • in AS, master | Yes |
| • in AS, device | Yes |
| • on Ethernet via NTP | Yes; As client |
| Digital inputs | |
| Number of digital inputs | 0 |
| Digital outputs | |
| Number of digital outputs | 0 |
| Analog inputs | |
| Number of analog inputs | 0 |
| Interfaces | |
| Number of PROFINET interfaces | 1 |
| Number of RS 485 interfaces | 2 |
| Number of RS 422 interfaces | 0 |
| 1. Interface | |
| Interface type | Integrated RS 485 interface |
| Isolated | Yes |
| Interface types | |
| • RS 485 | Yes |
| • Output current of the interface, max. | 150 mA |
| Protocols | |
| • MPI | Yes |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP device | Yes; A DP slave at both interfaces simultaneously is not possible |
| • Point-to-point connection | No |
| MPI | |
| • Transmission rate, max. | 12 Mbit/s |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — Global data communication | Yes |
| — S7 basic communication | Yes |
| — S7 communication | Yes |
| — S7 communication, as client | No; but via CP and loadable FB |
| — S7 communication, as server | Yes |
| PROFIBUS DP master | |
| • Transmission rate, max. | 12 Mbit/s |
| • max. number of DP devices | 124 |
| 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 | Yes |
| — Isochronous mode | No |
| — SYNC/FREEZE | Yes |
| — activation/deactivation of DP devices | Yes |
| — max. number of DP devices that can be activated/deactivated at the same time | 8 |
| — Direct data exchange (slave-to-slave communication) | Yes; as subscriber |
| — DPV1 | Yes |
| Address area | |
| — Inputs, max. | 8 kbyte |
| — Outputs, max. | 8 kbyte |
| User data per DP device | |
| — Inputs, max. | 244 byte |
| — Outputs, max. | 244 byte |

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|--|--|
| 1st interface / PROFIBUS DP device / header | |
| • Transmission rate, max. | 12 Mbit/s |
| • automatic baud rate search | Yes; only with passive interface |
| • Address area, max. | 32 |
| • User data per address area, max. | 32 byte |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes; with interface active |
| — Global data communication | No |
| — S7 basic communication | No |
| — S7 communication | Yes |
| — S7 communication, as client | No |
| — S7 communication, as server | Yes; Connection configured on one side only |
| — Direct data exchange (slave-to-slave communication) | Yes |
| — DPV1 | No |
| Transfer memory | |
| — Inputs | 244 byte |
| — Outputs | 244 byte |
| 2. Interface | |
| Interface type | Integrated RS 485 interface |
| Isolated | Yes |
| Interface types | |
| • RS 485 | Yes |
| • Output current of the interface, max. | 200 mA |
| Protocols | |
| • MPI | No |
| • PROFINET IO Controller | No |
| • PROFINET IO Device | No |
| • PROFINET CBA | No |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP device | Yes; A DP slave at both interfaces simultaneously is not possible |
| • Open IE communication | No |
| • Web server | No |
| PROFIBUS DP master | |
| • Transmission rate, max. | 12 Mbit/s |
| • max. number of DP devices | 124 |
| 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; Connection configured on one side only |
| — Equidistance | Yes |
| — Isochronous mode | Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously) |
| — SYNC/FREEZE | Yes |
| — activation/deactivation of DP devices | Yes |
| — max. number of DP devices that can be activated/deactivated at the same time | 8 |
| — Direct data exchange (slave-to-slave communication) | Yes; as subscriber |
| — DPV1 | Yes |
| Address area | |
| — Inputs, max. | 8 kbyte |
| — Outputs, max. | 8 kbyte |
| User data per DP device | |
| — Inputs, max. | 244 byte |
| — Outputs, max. | 244 byte |
| 2nd interface / PROFIBUS DP device / header | |

| | |
|---|--|
| • GSD file | The latest GSD file is available at: http://www.siemens.com/profibus-gsd |
| • Transmission rate, max. | 12 Mbit/s |
| • automatic baud rate search | Yes; only with passive interface |
| • Address area, max. | 32 |
| • User data per address area, max. | 32 byte |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes; with interface active |
| — Global data communication | No |
| — S7 basic communication | No |
| — S7 communication | Yes |
| — S7 communication, as client | No |
| — S7 communication, as server | Yes; Connection configured on one side only |
| — Direct data exchange (slave-to-slave communication) | Yes |
| — DPV1 | No |
| Transfer memory | |
| — Inputs | 244 byte |
| — Outputs | 244 byte |
| 3. Interface | |
| Interface type | PROFINET |
| Isolated | Yes |
| automatic detection of transmission rate | Yes; 10/100 Mbit/s |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Change of IP address at runtime, supported | Yes |
| Interface types | |
| • RJ 45 (Ethernet) | Yes |
| • Number of ports | 2 |
| • integrated switch | Yes |
| Protocols | |
| • MPI | No |
| • PROFINET IO Controller | Yes; Also simultaneously with I-Device functionality |
| • PROFINET IO Device | Yes; Also simultaneously with IO Controller functionality |
| • PROFINET CBA | Yes |
| • PROFIBUS DP master | No |
| • PROFIBUS DP device | No |
| • Open IEC communication | Yes; Via TCP/IP, ISO on TCP, and UDP |
| • Web server | Yes |
| • Media redundancy | Yes |
| PROFINET IO Controller | |
| • Transmission rate, max. | 100 Mbit/s |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — S7 communication | Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32 |
| — Isochronous mode | Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously) |
| — Shared device | Yes |
| — Prioritized startup | Yes |
| — Number of IO devices with prioritized startup, max. | 32 |
| — Number of connectable IO Devices, max. | 256 |
| — Of which IO devices with IRT, max. | 64 |
| — of which in line, max. | 64 |
| — Number of IO Devices with IRT and the option "high flexibility" | 256 |
| — of which in line, max. | 61 |
| — Number of connectable IO Devices for RT, max. | 256 |
| — of which in line, max. | 256 |
| — Activation/deactivation of IO Devices | Yes |
| — Number of IO Devices that can be simultaneously | 8 |

| | |
|---|---|
| activated/deactivated, max. | |
| — 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 µs, 500 µs, 1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option) |
| — Updating time | 250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, technical Data" for more details) |
| Address area | |
| — Inputs, max. | 8 kbyte |
| — Outputs, max. | 8 kbyte |
| — User data consistency, max. | 1 024 byte |
| PROFINET IO Device | |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — S7 communication | Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32 |
| — Isochronous mode | No |
| — IRT | Yes |
| — PROFIenergy | Yes; With SFB 73 / 74 prepared for loadable PROFIenergy 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. | 32 |
| • 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 |
| • Keep-alive function, supported | Yes |
| Protocols | |
| PROFIsafe | Yes |
| Redundancy mode | |
| Media redundancy | |
| — Switchover time on line break, typ. | 200 ms; PROFINET MRP |
| — Number of stations in the ring, max. | 50 |
| Open IE communication | |
| • TCP/IP | Yes; via integrated PROFINET interface and loadable FBs |
| — Number of connections, max. | 32 |
| — Data length for connection type 01H, max. | 1 460 byte |
| — Data length for connection type 11H, max. | 32 768 byte |
| • ISO-on-TCP (RFC1006) | Yes; via integrated PROFINET interface and loadable FBs |
| — Number of connections, max. | 32 |
| — Data length, max. | 32 768 byte |
| • UDP | Yes; via integrated PROFINET interface and loadable FBs |
| — Number of connections, max. | 32 |
| — Data length, max. | 1 472 byte |
| Web server | |
| • supported | Yes |
| • User-defined websites | Yes |
| • Number of HTTP clients | 5 |
| communication functions / header | |
| PG/OP communication | Yes |

| | | |
|---|---|-----|
| Data record routing | | Yes |
| Global data communication | | |
| • supported | Yes | |
| • Number of GD loops, max. | 8 | |
| • Number of GD packets, max. | 8 | |
| • Number of GD packets, transmitter, max. | 8 | |
| • Number of GD packets, receiver, max. | 8 | |
| • Size of GD packets, max. | 22 byte | |
| • Size of GD packet (of which consistent), max. | 22 byte | |
| S7 basic communication | | |
| • supported | Yes | |
| • User data per job, max. | 76 byte | |
| • User data per job (of which consistent), max. | 76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server) | |
| S7 communication | | |
| • supported | Yes | |
| • as server | Yes | |
| • as client | Yes; via integrated PROFINET interface and loadable FB or via CP and loadable FB | |
| • 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) | |
| S5 compatible communication | | |
| • supported | Yes; via CP and loadable FC | |
| communication functions / PROFINET CBA (with set target communication load) / header | | |
| • Setpoint for the CPU communication load | 20 % | |
| • Number of remote interconnection partners | 32 | |
| • number of master/device functions | 50 | |
| • total of all master/device connections | 3 000 | |
| • data length of all incoming master/device connections, max. | 24 000 byte | |
| • data length of all outgoing master/device connections, max. | 24 000 byte | |
| • Number of device-internal and PROFIBUS interconnections | 1 000 | |
| • Data length of device-internal und PROFIBUS interconnections, max. | 8 000 byte | |
| • Data length per connection, max. | 1 400 byte | |
| performance data / PROFINET CBA / remote interconnection / with acyclic transfer / header | | |
| — Sampling interval, min. | 200 ms | |
| — Number of incoming interconnections | 100 | |
| — Number of outgoing interconnections | 100 | |
| — Data length of all incoming interconnections, max. | 3 200 byte | |
| — Data length of all outgoing interconnections, max. | 3 200 byte | |
| — Data length per connection, max. | 1 400 byte | |
| performance data / PROFINET CBA / remote interconnection / with cyclic transfer / header | | |
| — Transmission frequency: Transmission interval, min. | 1 ms | |
| — Number of incoming interconnections | 300 | |
| — Number of outgoing interconnections | 300 | |
| — Data length of all incoming interconnections, max. | 4 800 byte | |
| — Data length of all outgoing interconnections, max. | 4 800 byte | |
| — Data length per connection, max. | 450 byte | |
| performance data / PROFINET CBA / HMI variables via PROFINET / acyclic / header | | |
| — 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 | 600 | |
| — Data length of all HMI variables, max. | 9 600 byte | |
| performance data / PROFINET CBA / PROFIBUS proxy functionality / header | | |
| — supported | Yes | |
| — Number of linked PROFIBUS devices | 32 | |
| — Data length per connection, max. | 240 byte; Slave-dependent | |
| Number of connections | | |
| • overall | 32 | |

| | |
|---|---|
| ● usable for PG communication | 31 |
| — reserved for PG communication | 1 |
| — adjustable for PG communication, min. | 1 |
| — adjustable for PG communication, max. | 31 |
| ● usable for OP communication | 31 |
| — reserved for OP communication | 1 |
| — adjustable for OP communication, min. | 1 |
| — adjustable for OP communication, max. | 31 |
| ● usable for S7 basic communication | 30 |
| — reserved for S7 basic communication | 0 |
| — adjustable for S7 basic communication, min. | 0 |
| — adjustable for S7 basic communication, max. | 30 |
| ● usable for S7 communication | 16 |
| — reserved for S7 communication | 0 |
| — adjustable for S7 communication, min. | 0 |
| — adjustable for S7 communication, max. | 16 |
| ● total number of instances, max. | 32 |
| ● usable for routing | X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as DP master: max. 24; X2 as DP slave (active): max. 14; X3 as PROFINET: 48 max. |

S7 message functions

| | |
|--|--|
| Number of login stations for message functions, max. | 32; Depending on the configured connections for PG/OP and S7 basic communication |
|--|--|

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|--|-----|
| Process diagnostic messages | Yes |
| 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 | Inputs, outputs |
| ● Number of variables, max. | 10 |

Diagnostic buffer

| | |
|---|---------------------|
| ● present | Yes |
| ● Number of entries, max. | 500 |
| — adjustable | No |
| — of which powerfail-proof | 100 |
| ● Number of entries readable in RUN, max. | 499 |
| — adjustable | Yes; From 10 to 499 |
| — preset | 10 |

Service data

| | |
|-------------------|-----|
| ● can be read out | Yes |
|-------------------|-----|

Ambient conditions

| | |
|--------------------------------------|-------|
| Ambient temperature during operation | |
| ● min. | 0 °C |
| ● max. | 60 °C |

configuration / header

| | |
|------------------------|---------------------|
| Configuration software | |
| ● STEP 7 | Yes; V5.5 or higher |

| | |
|--------------------------------------|----------------------|
| configuration / programming / header | |
| ● 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 | | |
| — CFC | Yes | | |
| — GRAPH | Yes | | |
| — HiGraph® | Yes | | |
| Know-how protection | | | |
| • User program protection/password protection | Yes | | |
| • Block encryption | Yes; With S7 block Privacy | | |
| Dimensions | | | |
| Width | 120 mm | | |
| Height | 125 mm | | |
| Depth | 130 mm | | |
| Weights | | | |
| Weight, approx. | 1 250 g | | |
| Classifications | | | |
| | | Version | Classification |
| | eClass | 14 | 27-24-22-07 |
| | eClass | 12 | 27-24-22-07 |
| | eClass | 9.1 | 27-24-22-07 |
| | eClass | 9 | 27-24-22-07 |
| | eClass | 8 | 27-24-22-07 |
| | eClass | 7.1 | 27-24-22-07 |
| | eClass | 6 | 27-24-22-07 |
| | ETIM | 9 | EC000236 |
| | ETIM | 8 | EC000236 |
| | ETIM | 7 | EC000236 |
| | IDEA | 4 | 3565 |
| | UNSPSC | 15 | 32-15-17-05 |

| | | | |
|--------------------------|--|--|--|
| Approvals / Certificates | | | |
| General Product Approval | | | |

[Manufacturer Declaration](#)



[Miscellaneous](#)



EMV

For use in hazardous locations



[FM](#)



For use in hazardous locations

Functional Safety

Marine / Shipping

[Miscellaneous](#)

[CCC-Ex](#)



[Type Examination Certificate](#)



Marine / Shipping



Industrial Communication

[PROFINET](#)



Profibus



last modified:

12/8/2024