SIEMENS

## Data sheet 6ES7138-6AA01-0BA0




SIMATIC ET 200SP, TM count 1x 24 V Counter module, 1 channel for 24 V incremental encoder or pulse encoder, 3 DI, 2 DQ Suitable for BU type A0, packing quantity: 1 unit,

| | |
|---|---|
| **General information** | |
| Product type designation | TM Count 1x24V |
| Firmware version | V2.0 |
| ● FW update possible | Yes |
| usable BaseUnits | BU type A0 |
| Color code for module-specific color-coded label | CC00 |
| Product function | |
| ● I&M data | Yes; I&M0 to I&M3 |
| ● Isochronous mode | Yes |
| Engineering with | |
| ● STEP 7 TIA Portal configurable/integrated from version | STEP 7 V15 SP1 or higher |
| ● STEP 7 configurable/integrated from version | V5.6 and higher |
| ● PROFIBUS from GSD version/GSD revision | One GSD file each, Revision 3 and 5 and higher |
| ● PROFINET from GSD version/GSD revision | GSDML V2.34 |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| Load voltage L+ | |
| ● 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 |
| **Input current** | |
| Current consumption, max. | 60 mA; without load |
| **Encoder supply** | |
| Number of outputs | 1 |
| 24 V encoder supply | |
| ● 24 V | Yes; L+ (-0.8 V) |
| ● Short-circuit protection | Yes; electronic/thermal |
| ● Output current, max. | 300 mA |
| **Power loss** | |
| Power loss, typ. | 1 W |
| **Address area** | |
| Address space per module | |
| ● Inputs | 16 byte; 4 bytes in Fast mode |
| ● Outputs | 12 byte; 4 bytes for Motion Control, 0 bytes for Fast mode |
| **Hardware configuration** | |
| Automatic encoding | Yes |
| ● Mechanical coding element | Yes |
| ● Type of mechanical coding element | type B |


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|---|---|
| **Digital inputs** | |
| Number of digital inputs | 3 |
| Digital inputs, parameterizable | Yes |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| Digital input functions, parameterizable | |
| ● Gate start/stop | Yes |
| ● Capture | Yes |
| ● Synchronization | Yes |
| ● Freely usable digital input | Yes |
| ● Probe | Yes |
| Input voltage | |
| ● Rated value (DC) | 24 V |
| ● for signal "0" | -5 ... +5 V |
| ● for signal "1" | +11 to +30V |
| ● permissible voltage at input, min. | -30 V; -5 V continuous, -30 V brief reverse polarity protection |
| ● permissible voltage at input, max. | 30 V |
| Input current | |
| ● for signal "1", typ. | 2.5 mA |
| Input delay (for rated value of input voltage) | |
| for standard inputs | |
| — parameterizable | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms |
| for technological functions | |
| — parameterizable | Yes |
| Cable length | |
| ● shielded, max. | 1 000 m |
| ● unshielded, max. | 600 m |
| **Digital outputs** | |
| Type of digital output | Transistor |
| Number of digital outputs | 2 |
| Digital outputs, parameterizable | Yes |
| Short-circuit protection | Yes; electronic/thermal |
| ● Response threshold, typ. | 1 A |
| Limitation of inductive shutdown voltage to | L+ (-53 V) |
| Controlling a digital input | Yes |
| Digital output functions, parameterizable | |
| ● Switching tripped by comparison values | Yes |
| ● Freely usable digital output | Yes |
| Switching capacity of the outputs | |
| ● with resistive load, max. | 0.5 A; Per digital output |
| ● on lamp load, max. | 5 W |
| Load resistance range | |
| ● lower limit | 48 Ω |
| ● upper limit | 12 kΩ |
| Output voltage | |
| ● for signal "1", min. | 23.2 V; L+ (-0.8 V) |
| Output current | |
| ● for signal "1" rated value | 0.5 A; Per digital output |
| ● for signal "1" permissible range, max. | 0.6 A; Per digital output |
| ● for signal "1" minimum load current | 2 mA |
| ● for signal "0" residual current, max. | 0.5 mA |
| Output delay with resistive load | |
| ● "0" to "1", max. | 50 µs |
| ● "1" to "0", max. | 50 µs |
| Switching frequency | |
| ● with resistive load, max. | 10 kHz |
| ● with inductive load, max. | 0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve |
| ● on lamp load, max. | 10 Hz |
| Total current of the outputs | |
| ● Current per module, max. | 1 A |


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| | |
|---|---|
| Cable length | |
| ● shielded, max. | 1 000 m |
| ● unshielded, max. | 600 m |
| **Encoder** | |
| Connectable encoders | |
| ● 2-wire sensor | Yes |
| — permissible quiescent current (2-wire sensor), max. | 1.5 mA |
| Encoder signals, incremental encoder (asymmetrical) | |
| ● Input voltage | 24 V |
| ● Input frequency, max. | 200 kHz |
| ● Counting frequency, max. | 800 kHz; with quadruple evaluation |
| ● Cable length, shielded, max. | 600 m; depending on input frequency, encoder and cable quality; max. 50 m at 200 kHz |
| ● Signal filter, parameterizable | Yes |
| ● Incremental encoder with A/B tracks, 90° phase offset | Yes |
| ● Incremental encoder with A/B tracks, 90° phase offset and zero track | Yes |
| ● pulse encoder | Yes |
| ● pulse encoder with direction | Yes |
| ● pulse encoder with one impulse signal per count direction | Yes |
| Interface types | |
| ● Sourcing/sinking input | Yes |
| ● Input characteristic curve in accordance with IEC 61131, type 3 | Yes |
| **Interfaces** | |
| Number of RS 485 interfaces | 0 |
| **Interrupts/diagnostics/status information** | |
| Substitute values connectable | Yes; Parameterizable |
| Alarms | |
| ● Diagnostic alarm | Yes |
| ● Hardware interrupt | Yes |
| Diagnoses | |
| ● Monitoring the supply voltage | Yes |
| ● Wire break | Yes |
| ● Short-circuit | Yes |
| ● A/B transition error at incremental encoder | Yes |
| ● Group error | Yes |
| Diagnostics indication LED | |
| ● Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED |
| ● Channel status display | Yes; green LED |
| ● for module diagnostics | Yes; green/red DIAG LED |
| ● Status indicator forward counting (green) | Yes |
| ● Status indicator backward counting (green) | Yes |
| **Integrated Functions** | |
| Counter | Yes |
| ● Number of counters | 1 |
| ● Counting frequency, max. | 800 kHz; with quadruple evaluation |
| Fast mode | Yes |
| Counting functions | |
| ● Can be used with TO High_Speed_Counter | Yes |
| ● Continuous counting | Yes |
| ● Counter response parameterizable | Yes |
| ● Hardware gate via digital input | Yes |
| ● Software gate | Yes |
| ● Event-controlled stop | Yes |
| ● Synchronization via digital input | Yes |
| ● Counting range, parameterizable | Yes |
| Comparator | |
| — Number of comparators | 2 |
| — Direction dependency | Yes |


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|---|---|
| — Can be changed from user program | Yes |
| Position detection | |
| ● Incremental acquisition | Yes |
| ● Suitable for S7-1500 Motion Control | Yes |
| Measuring functions | |
| ● Measuring time, parameterizable | Yes |
| ● Dynamic measurement period adjustment | Yes |
| ● Number of thresholds, parameterizable | 2 |
| Measuring range | |
| — Frequency measurement, min. | 0.04 Hz |
| — Frequency measurement, max. | 800 kHz |
| — Cycle duration measurement, min. | 1.25 µs |
| — Cycle duration measurement, max. | 25 s |
| Accuracy | |
| — Frequency measurement | 100 ppm; depending on measuring interval and signal evaluation |
| — Cycle duration measurement | 100 ppm; depending on measuring interval and signal evaluation |
| — Velocity measurement | 100 ppm; depending on measuring interval and signal evaluation |
| **Potential separation** | |
| Potential separation channels | |
| ● between the channels and backplane bus | Yes |
| **Isolation** | |
| Isolation tested with | 707 V DC (type test) |
| **Standards, approvals, certificates** | |
| Suitable for safety functions | No |
| **Ambient conditions** | |
| Ambient temperature during operation | |
| ● horizontal installation, min. | -30 °C |
| ● horizontal installation, max. | 60 °C; Observe derating |
| ● vertical installation, min. | -30 °C |
| ● vertical installation, max. | 50 °C; Observe derating |
| Altitude during operation relating to sea level | |
| ● Installation altitude above sea level, max. | 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual |
| Absolute humidity | |
| ● dew point, min. | -60 °C; suitable for dry room applications |
| **Decentralized operation** | |
| to SIMATIC S7-300 | Yes |
| to SIMATIC S7-400 | Yes |
| to SIMATIC S7-1200 | Yes |
| to SIMATIC S7-1500 | Yes |
| to standard PROFIBUS master | Yes |
| to standard PROFINET controller | Yes |
| **Dimensions** | |
| Width | 15 mm |
| Height | 73 mm |
| Depth | 58 mm |
| **Weights** | |
| Weight, approx. | 45 g |

**Classifications**

| | Version | Classification |
|---|---|---|
| eClass | 16 | 27-24-26-05 |
| eClass | 14 | 27-24-26-05 |
| eClass | 12 | 27-24-26-05 |
| eClass | 9.1 | 27-24-26-05 |
| eClass | 9 | 27-24-26-05 |
| eClass | 8 | 27-24-26-05 |
| eClass | 7.1 | 27-24-26-05 |
| eClass | 6 | 27-24-26-05 |


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|---|---|---|
| ETIM | 10 | EC001601 |
| ETIM | 9 | EC001601 |
| ETIM | 8 | EC001601 |
| ETIM | 7 | EC001601 |
| IDEA | 4 | 3567 |
| UNSPSC | 15 | 32-15-17-05 |

## Approvals / Certificates

### General Product Approval

Miscellaneous | Manufacturer Declaration | CE EG-Konf. | UKCA | UL | RCM

### General Product Approval

EAC | China RoHS | CE EG-Konf. | UKCA | UL

### For use in hazardous locations

FM

### For use in hazardous locations

CCC-Ex | ATEX | Type Examination Certificate | IECEx | Miscellaneous | CCC-Ex

### Maritime application

ABS | BUREAU VERITAS | DNV | LRS | NK / Nippon Kaiji Kyokai | RINA

### Maritime application

RMRS | CCS (China Classification Society) | KR (Korean Register of Shipping)

**last modified:** 5/12/2026


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