



SIMATIC S7-1500, TM PTO 4 interface module for stepper drives 4 channels pulse train output PTO: 24 V, RS-422, 5 V, 2 DI, 1 DQ 24VDC per channel

| General information                                             |                                   |
|-----------------------------------------------------------------|-----------------------------------|
| Product type designation                                        | TM PTO 4                          |
| HW functional status                                            | FS02                              |
| Number of channels                                              | 4; Axes                           |
| 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 V14 or higher              |
| • STEP 7 configurable/integrated from version                   | V5.5 SP3 with GSD file / -        |
| • PROFINET from GSD version/GSD revision                        | GSDML V2.32                       |
| Installation type/mounting                                      |                                   |
| Rail mounting                                                   | Yes; S7-1500 mounting rail        |
| Supply voltage                                                  |                                   |
| 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.                                       | 70 mA; without load               |
| Power                                                           |                                   |
| Power consumption from the backplane bus                        | 1.3 W                             |
| Power loss                                                      |                                   |
| Power loss, typ.                                                | 4 W                               |
| Address area                                                    |                                   |
| Address space per module                                        |                                   |
| • Inputs                                                        | 18 byte; Per channel              |
| • Outputs                                                       | 10 byte; Per channel              |
| Digital inputs                                                  |                                   |
| Number of digital inputs                                        | 12; 3 per channel, of which 1 DIQ |
| Digital inputs, parameterizable                                 | Yes                               |
| Input characteristic curve in accordance with IEC 61131, type 3 | Yes                               |
| Digital input functions, parameterizable                        |                                   |
| • Synchronization                                               | Yes                               |
| • Probe                                                         | Yes                               |
| • Drive ready                                                   | Yes                               |
| Input voltage                                                   |                                   |
| • Type of input voltage                                         | DC                                |
| • Rated value (DC)                                              | 24 V                              |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• for signal "0"</li> <li>• for signal "1"</li> <li>• permissible voltage at input, min.</li> <li>• permissible voltage at input, max.</li> </ul>                                                                                                                                                                                                                                                                                                                     | -5 ... +5 V<br>+11 to +30V<br>-5 V<br>30 V                                                                                                                                                                                                                                                       |
| Input current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• for signal "1", typ.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                     | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• shielded, max.</li> <li>• unshielded, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                               | 1 000 m<br>600 m                                                                                                                                                                                                                                                                                 |
| Digital outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                  |
| Number of digital outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12; 3 per channel, of which 1 DIQ                                                                                                                                                                                                                                                                |
| Current-sinking                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Yes; For DQn.0 and DQn.1 push-pull outputs                                                                                                                                                                                                                                                       |
| Current-sourcing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes                                                                                                                                                                                                                                                                                              |
| Digital outputs, parameterizable                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes                                                                                                                                                                                                                                                                                              |
| Short-circuit protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes; electronic/thermal                                                                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• Response threshold, typ.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.2 A for DQn.0 and DQn.1, 0.9 A for DIQn.2                                                                                                                                                                                                                                                      |
| Controlling a digital input                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Yes                                                                                                                                                                                                                                                                                              |
| Digital output functions, parameterizable                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• PTO (pulse train output) signal interface <ul style="list-style-type: none"> <li>— 24 V asymmetrical</li> <li>— RS 422 symmetrical</li> <li>— TTL (5 V) asymmetrical</li> </ul> </li> <li>• PTO (pulse train output) signal type <ul style="list-style-type: none"> <li>— Pulse and direction</li> <li>— Count up, count down</li> <li>— Incremental encoder (A, B phase shift)</li> <li>— Incremental encoder (A, B phase shift, quadruple)</li> </ul> </li> </ul> | Yes<br>Yes<br>Yes<br><br>Yes<br>Yes<br>Yes<br>Yes                                                                                                                                                                                                                                                |
| Switching capacity of the outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• with resistive load, max.</li> <li>• on lamp load, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                  | 0.1 A; 0.5 A for DIQn.2<br>1 W; 5 W for DIQn.2                                                                                                                                                                                                                                                   |
| Load resistance range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• lower limit</li> <li>• upper limit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       | 240 Ω; 48 ohms for DIQn.2<br>12 kΩ                                                                                                                                                                                                                                                               |
| Output voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• Type of output voltage</li> <li>• for signal "1", min.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                   | DC<br>23.2 V; L+ (-0.8 V), L+ (-1.3 V) for DIQn.2                                                                                                                                                                                                                                                |
| Output current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• for signal "1" rated value</li> <li>• for signal "1" permissible range, max.</li> <li>• for signal "1" minimum load current</li> <li>• for signal "0" residual current, max.</li> </ul>                                                                                                                                                                                                                                                                             | 0.1 A; 0.5 A for DIQn.2<br>0.12 A; 0.6 A for DIQn.2<br>2 mA<br>0.5 mA                                                                                                                                                                                                                            |
| Output delay with resistive load                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• "0" to "1", typ.</li> <li>• "1" to "0", typ.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                             | 1 μs; 28 μs for DIQn.2<br>1 μs; 25 μs for DIQn.2                                                                                                                                                                                                                                                 |
| Switching frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• with resistive load, max.</li> <li>• with inductive load, max.</li> <li>• on lamp load, max.</li> <li>• For signal interface 24 V asymmetrical</li> <li>• For signal interface RS 422 symmetrical</li> <li>• For signal interface TTL (5 V) asymmetrical</li> </ul>                                                                                                                                                                                                 | 1 kHz; For DIQn.2<br>0.5 Hz; According to IEC 60947-5-1, DC-13, for DIQn.2<br>10 Hz; For DIQn.2<br>200 kHz; With DQn.0 and DQn.1<br>1 MHz<br>200 kHz                                                                                                                                             |
| Cable length                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           | 600 m; Cable length, RS 422 / TTL Siemens Type 6FX2001-5: 125 kHz, 320 meters shielded, max.; 250 kHz, 160 meters shielded, max.; 500 kHz, 60 meters shielded, max.; 1 MHz, 32 meters shielded, max. 24 V (DQn.x / DIQn.2): 10 kHz, 600 meters, shielded, max. 200 kHz, 50 meters shielded, max. |

| Isochronous mode                                                                                                                                                                                              |                                                                                                       |         |                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------|----------------|
| Bus cycle time (TDP), min.                                                                                                                                                                                    | 250 μs; 375 μs if all 4 channels are used                                                             |         |                |
| Jitter, max.                                                                                                                                                                                                  | 1 μs                                                                                                  |         |                |
| Interrupts/diagnostics/status information                                                                                                                                                                     |                                                                                                       |         |                |
| Diagnostics function                                                                                                                                                                                          | Yes                                                                                                   |         |                |
| Alarms                                                                                                                                                                                                        |                                                                                                       |         |                |
| <ul style="list-style-type: none"><li>Diagnostic alarm</li></ul>                                                                                                                                              | Yes                                                                                                   |         |                |
| Diagnoses                                                                                                                                                                                                     |                                                                                                       |         |                |
| <ul style="list-style-type: none"><li>Monitoring the supply voltage</li><li>Short-circuit</li><li>Group error</li></ul>                                                                                       | Yes<br>Yes; Thermal overload protection<br>Yes                                                        |         |                |
| Diagnostics indication LED                                                                                                                                                                                    |                                                                                                       |         |                |
| <ul style="list-style-type: none"><li>RUN LED</li><li>ERROR LED</li><li>MAINT LED</li><li>Monitoring of the supply voltage (PWR-LED)</li><li>Channel status display</li><li>for channel diagnostics</li></ul> | Yes; green LED<br>Yes; red LED<br>Yes; Yellow LED<br>Yes; green LED<br>Yes; green LED<br>Yes; red LED |         |                |
| Potential separation                                                                                                                                                                                          |                                                                                                       |         |                |
| Potential separation channels                                                                                                                                                                                 |                                                                                                       |         |                |
| <ul style="list-style-type: none"><li>between the channels</li><li>between the channels and backplane bus</li><li>Between the channels and load voltage L+</li></ul>                                          | No<br>Yes<br>No                                                                                       |         |                |
| Isolation                                                                                                                                                                                                     |                                                                                                       |         |                |
| Isolation tested with                                                                                                                                                                                         | 707 V DC (type test)                                                                                  |         |                |
| Ambient conditions                                                                                                                                                                                            |                                                                                                       |         |                |
| Ambient temperature during operation                                                                                                                                                                          |                                                                                                       |         |                |
| <ul style="list-style-type: none"><li>horizontal installation, min.</li><li>horizontal installation, max.</li><li>vertical installation, min.</li><li>vertical installation, max.</li></ul>                   | 0 °C<br>60 °C; Observe derating<br>0 °C<br>40 °C; Observe derating                                    |         |                |
| Altitude during operation relating to sea level                                                                                                                                                               |                                                                                                       |         |                |
| <ul style="list-style-type: none"><li>Installation altitude above sea level, max.</li></ul>                                                                                                                   | 5 000 m; restrictions for installation altitudes > 2 000 m, see ET 200MP system manual                |         |                |
| Decentralized operation                                                                                                                                                                                       |                                                                                                       |         |                |
| to SIMATIC S7-300                                                                                                                                                                                             | Yes; Via control and feedback interface                                                               |         |                |
| to SIMATIC S7-400                                                                                                                                                                                             | Yes; Via control and feedback interface                                                               |         |                |
| to SIMATIC S7-1200                                                                                                                                                                                            | Yes                                                                                                   |         |                |
| to SIMATIC S7-1500                                                                                                                                                                                            | Yes                                                                                                   |         |                |
| to standard PROFINET controller                                                                                                                                                                               | Yes; Via control and feedback interface                                                               |         |                |
| Dimensions                                                                                                                                                                                                    |                                                                                                       |         |                |
| Width                                                                                                                                                                                                         | 35 mm                                                                                                 |         |                |
| Height                                                                                                                                                                                                        | 147 mm                                                                                                |         |                |
| Depth                                                                                                                                                                                                         | 129 mm                                                                                                |         |                |
| Weights                                                                                                                                                                                                       |                                                                                                       |         |                |
| Weight, approx.                                                                                                                                                                                               | 300 g                                                                                                 |         |                |
| Classifications                                                                                                                                                                                               |                                                                                                       |         |                |
|                                                                                                                                                                                                               |                                                                                                       | Version | Classification |
|                                                                                                                                                                                                               | eClass                                                                                                | 14      | 27-24-22-05    |
|                                                                                                                                                                                                               | eClass                                                                                                | 12      | 27-24-22-05    |
|                                                                                                                                                                                                               | eClass                                                                                                | 9.1     | 27-24-22-05    |
|                                                                                                                                                                                                               | eClass                                                                                                | 9       | 27-24-22-05    |
|                                                                                                                                                                                                               | eClass                                                                                                | 8       | 27-24-22-05    |
|                                                                                                                                                                                                               | eClass                                                                                                | 7.1     | 27-24-22-05    |
|                                                                                                                                                                                                               | eClass                                                                                                | 6       | 27-24-22-05    |
|                                                                                                                                                                                                               | ETIM                                                                                                  | 10      | EC001422       |
|                                                                                                                                                                                                               | ETIM                                                                                                  | 9       | EC001422       |
|                                                                                                                                                                                                               | ETIM                                                                                                  | 8       | EC001422       |

|        |    |             |
|--------|----|-------------|
| ETIM   | 7  | EC001422    |
| IDEA   | 4  | 3567        |
| UNSPSC | 15 | 32-15-17-05 |

Approvals / Certificates

General Product Approval

[Miscellaneous](#)

[Manufacturer Declaration](#)



For use in hazardous locations



[FM](#)

[CCC-Ex](#)



[Type Examination Certificate](#)



For use in hazardous locations

[Miscellaneous](#)

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