

SIMATIC S7-1500, TM TIMER DIDQ 16X24V TIME BASED DIGITAL INPUTS AND OUTPUTS MAX. 8DI, 16DQ MAX. 16 WITH TIMESTAMP COUNT, PWM, OVERSAMPLING



### General information

|                                                                                                           |                      |
|-----------------------------------------------------------------------------------------------------------|----------------------|
| Product type designation                                                                                  | TM Timer DIDQ 16x24V |
| Product function                                                                                          |                      |
| <ul style="list-style-type: none"> <li>I&amp;M data</li> </ul>                                            | Yes; I&M 0           |
| Engineering with                                                                                          |                      |
| <ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated as of version</li> </ul> | V13 Update 3         |

### Installation type/mounting

|                        |                            |
|------------------------|----------------------------|
| Rail mounting possible | Yes; S7-1500 mounting rail |
|------------------------|----------------------------|

### Supply voltage

|                                                                                       |                          |
|---------------------------------------------------------------------------------------|--------------------------|
| Load voltage 1L+                                                                      |                          |
| <ul style="list-style-type: none"> <li>Rated value (DC)</li> </ul>                    | 24 V                     |
| <ul style="list-style-type: none"> <li>permissible range, lower limit (DC)</li> </ul> | 19.2 V                   |
| <ul style="list-style-type: none"> <li>permissible range, upper limit (DC)</li> </ul> | 28.8 V                   |
| <ul style="list-style-type: none"> <li>Reverse polarity protection</li> </ul>         | Yes; against destruction |
| Load voltage 2L+                                                                      |                          |
| <ul style="list-style-type: none"> <li>Rated value (DC)</li> </ul>                    | 24 V                     |
| <ul style="list-style-type: none"> <li>permissible range, lower limit (DC)</li> </ul> | 19.2 V                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• permissible range, upper limit (DC)</li> <li>• Reverse polarity protection</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 28.8 V<br>Yes; against destruction                                                                |
| <b>Input current</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                   |
| from load voltage 1L+ (without load), max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 40 mA; without load                                                                               |
| from load voltage 2L+ (without load), max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30 mA; without load                                                                               |
| <b>Encoder supply</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                   |
| Number of outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 8; max. depending on parameterization                                                             |
| <b>24 V encoder supply</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                   |
| <ul style="list-style-type: none"> <li>• 24 V</li> <li>• Short-circuit protection</li> <li>• Output current, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes; L+ (-0.8 V)<br>Yes<br>1.2 A; Total current of all encoders / channels, max. 0.5 A per output |
| <b>Power</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                   |
| Power available from the backplane bus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.3 W                                                                                             |
| <b>Power loss</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                   |
| Power loss, typ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5 W                                                                                               |
| <b>Address area</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                   |
| <b>Occupied address area</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                   |
| <ul style="list-style-type: none"> <li>• Inputs</li> <li>• Outputs</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 44 byte<br>74 byte                                                                                |
| <b>Digital inputs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                   |
| Number of digital inputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 8; max. depending on parameterization                                                             |
| <ul style="list-style-type: none"> <li>• in groups of</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 8                                                                                                 |
| Digital inputs, parameterizable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes                                                                                               |
| Input characteristic curve in accordance with IEC 61131, type 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes                                                                                               |
| <b>Digital input functions, parameterizable</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                   |
| <ul style="list-style-type: none"> <li>• Digital input with time stamp <ul style="list-style-type: none"> <li>— Number, max.</li> </ul> </li> <li>• Counter <ul style="list-style-type: none"> <li>— Number, max.</li> </ul> </li> <li>• Counter for incremental encoder <ul style="list-style-type: none"> <li>— Number, max.</li> </ul> </li> <li>• Digital input with oversampling <ul style="list-style-type: none"> <li>— Number, max.</li> </ul> </li> <li>• HW enable for digital input <ul style="list-style-type: none"> <li>— Number, max.</li> </ul> </li> <li>• HW enable for digital output <ul style="list-style-type: none"> <li>— Number, max.</li> </ul> </li> </ul> | Yes<br>8<br>Yes<br>4<br>Yes<br>4<br>Yes<br>8<br>Yes<br>4<br>Yes<br>4                              |
| <b>Input voltage</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                   |

|                                                       |                                                                |
|-------------------------------------------------------|----------------------------------------------------------------|
| • Type of input voltage                               | DC                                                             |
| • Rated value (DC)                                    | 24 V                                                           |
| • for signal "0"                                      | -30 to +5V                                                     |
| • for signal "1"                                      | +11 to +30V                                                    |
| • permissible voltage at input, min.                  | -30 V                                                          |
| • permissible voltage at input, max.                  | 30 V                                                           |
| <b>Input current</b>                                  |                                                                |
| • for signal "1", typ.                                | 2.5 mA                                                         |
| <b>Input delay (for rated value of input voltage)</b> |                                                                |
| • Minimum pulse width for program reactions           | 3 µs for parameterization "none"                               |
| <b>for standard inputs</b>                            |                                                                |
| — parameterizable                                     | Yes; none / 0.05 / 0.1 / 0.4 / 0.8 ms                          |
| — at "0" to "1", min.                                 | 4 µs; for parameterization "none"                              |
| — at "1" to "0", min.                                 | 4 µs; for parameterization "none"                              |
| <b>Cable length</b>                                   |                                                                |
| • shielded, max.                                      | 1 000 m; Depending on sensor, cable quality and rate of change |
| • unshielded, max.                                    | 600 m; Depending on sensor, cable quality and rate of change   |
| <b>Digital outputs</b>                                |                                                                |
| Type of digital output                                | Transistor                                                     |
| Number of digital outputs                             | 16; max. depending on parameterization                         |
| • in groups of                                        | 8                                                              |
| Current-sinking                                       | Yes; With High Speed output                                    |
| Current-sourcing                                      | Yes                                                            |
| Digital outputs, parameterizable                      | Yes                                                            |
| Short-circuit protection                              | Yes; electronic/thermal                                        |
| • Response threshold, typ.                            | 1.7 A with Standard output, 0.5 A with High Speed output       |
| Limitation of inductive shutdown voltage to           | -0.8 V                                                         |
| Controlling a digital input                           | Yes                                                            |
| <b>Digital output functions, parameterizable</b>      |                                                                |
| • Digital output with time stamp                      | Yes                                                            |
| — Number, max.                                        | 16                                                             |
| • PWM output                                          | Yes                                                            |
| — Number, max.                                        | 16                                                             |
| • Digital output with oversampling                    | Yes                                                            |
| — Number, max.                                        | 16                                                             |
| <b>Switching capacity of the outputs</b>              |                                                                |
| • with resistive load, max.                           | 0.5 A; 0.1 A with High Speed output                            |
| • on lamp load, max.                                  | 5 W; 1 W with High Speed output                                |
| <b>Load resistance range</b>                          |                                                                |
| • lower limit                                         | 48 Ω; 240 ohm with High Speed output                           |
| • upper limit                                         | 12 kΩ                                                          |

|                                                         |                                                                                      |
|---------------------------------------------------------|--------------------------------------------------------------------------------------|
| Output voltage                                          |                                                                                      |
| • Type of output voltage                                | DC                                                                                   |
| • for signal "0", max.                                  | 1 V; With High Speed output                                                          |
| • for signal "1", min.                                  | 23.2 V; L+ (-0.8 V)                                                                  |
| Output current                                          |                                                                                      |
| • for signal "1" rated value                            | 0.5 A; 0.1 A with High Speed output, observe derating                                |
| • for signal "1" permissible range, max.                | 0.6 A; 0.12 A with High Speed output, observe derating                               |
| • 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.                                      | 1 µs; With High Speed output, 5 µs with Standard output                              |
| • "1" to "0", max.                                      | 1 µs; With High Speed output, 6 µs with Standard output                              |
| Switching frequency                                     |                                                                                      |
| • with resistive load, max.                             | 10 kHz                                                                               |
| • on lamp load, max.                                    | 10 Hz                                                                                |
| Total current of the outputs                            |                                                                                      |
| • Current per group, max.                               | 4 A                                                                                  |
| • Current per module, max.                              | 8 A; Observe derating                                                                |
| Cable length                                            |                                                                                      |
| • shielded, max.                                        | 1 000 m; Depending on load and cable quality                                         |
| • unshielded, max.                                      | 600 m; Depending on load and cable quality                                           |
| Encoder                                                 |                                                                                      |
| Connectable encoders                                    |                                                                                      |
| • Incremental encoder (asymmetrical)                    | Yes                                                                                  |
| • 24 V initiator                                        | Yes                                                                                  |
| • 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.                                 | 50 kHz                                                                               |
| • Counting frequency, max.                              | 200 kHz; with quadruple evaluation                                                   |
| • Cable length, shielded, max.                          | 600 m; Depending on input frequency, encoder and cable quality; max. 200 m at 50 kHz |
| • Incremental encoder with A/B tracks, 90° phase offset | Yes                                                                                  |
| • Pulse encoder                                         | Yes                                                                                  |
| Encoder signal 24 V                                     |                                                                                      |
| — permissible voltage at input, min.                    | -30 V                                                                                |
| — permissible voltage at input, max.                    | 30 V                                                                                 |
| Interface types                                         |                                                                                      |

|                                                                   |                                    |
|-------------------------------------------------------------------|------------------------------------|
| • Input characteristic curve in accordance with IEC 61131, type 3 | Yes                                |
| <b>Isochronous mode</b>                                           |                                    |
| Isochronous operation (application synchronized up to terminal)   | Yes                                |
| Bus cycle time (TDP), min.                                        | 250 µs                             |
| Jitter, max.                                                      | 1 µs                               |
| <b>Interrupts/diagnostics/status information</b>                  |                                    |
| Diagnostics function                                              | Yes                                |
| Substitute values connectable                                     | Yes                                |
| <b>Alarms</b>                                                     |                                    |
| • Diagnostic alarm                                                | Yes                                |
| <b>Diagnostic messages</b>                                        |                                    |
| • Monitoring the supply voltage                                   | Yes                                |
| • Short-circuit                                                   | Yes                                |
| <b>Diagnostics indication LED</b>                                 |                                    |
| • RUN LED                                                         | Yes; Green LED                     |
| • ERROR LED                                                       | Yes; Red LED                       |
| • MAINT LED                                                       | Yes; yellow LED                    |
| • Monitoring of the supply voltage (PWR-LED)                      | Yes; Green LED                     |
| • Channel status display                                          | Yes; Green LED                     |
| • for channel diagnostics                                         | Yes; Red LED                       |
| <b>Integrated Functions</b>                                       |                                    |
| Number of counters                                                | 4                                  |
| Counting frequency (counter) max.                                 | 200 kHz; with quadruple evaluation |
| <b>Counting functions</b>                                         |                                    |
| • Continuous counting                                             | Yes                                |
| <b>Potential separation</b>                                       |                                    |
| <b>Potential separation channels</b>                              |                                    |
| • between the channels and backplane bus                          | Yes                                |
| <b>Isolation</b>                                                  |                                    |
| Isolation tested with                                             | 707 V DC (type test)               |
| <b>Ambient conditions</b>                                         |                                    |
| <b>Ambient temperature during operation</b>                       |                                    |
| • horizontal installation, min.                                   | 0 °C                               |
| • horizontal installation, max.                                   | 60 °C                              |
| • vertical installation, min.                                     | 0 °C                               |
| • vertical installation, max.                                     | 40 °C; Observe derating            |
| <b>Decentralized operation</b>                                    |                                    |
| to SIMATIC S7-1500                                                | Yes                                |

| Dimensions            |            |
|-----------------------|------------|
| Width                 | 35 mm      |
| Height                | 147 mm     |
| Depth                 | 129 mm     |
| Weights               |            |
| Weight, approx.       | 320 g      |
| <b>last modified:</b> | 10/28/2016 |