

SIMATIC S7-1500, TM count 2x24V Counter module, 2 channels for 24 V incremental or encoder 3 DI, 2 DQ per channel



General information	
Product type designation	TM Count 2x24V
Firmware version	V1.3
<ul style="list-style-type: none"> <li>FW update possible</li> </ul>	Yes
Product function	
<ul style="list-style-type: none"> <li>I&amp;M data</li> </ul>	Yes; I&M0 to I&M3
Engineering with	
<ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated as of version</li> </ul>	V12 (FW V1.0) ... V15 (FW V1.3)/V12 (FW V1.0), V13 (FW V1.1)
<ul style="list-style-type: none"> <li>PROFIBUS as of GSD version/GSD revision</li> </ul>	GSD Revision 5
<ul style="list-style-type: none"> <li>PROFINET as of GSD version/GSD revision</li> </ul>	V2.3 / -
Installation type/mounting	
Rail mounting	Yes; S7-1500 mounting rail
Supply voltage	
Load voltage L+	
<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

• Reverse polarity protection	Yes
<b>Input current</b>	
Current consumption, max.	75 mA; without load
<b>Encoder supply</b>	
Number of outputs	1; A common 24V encoder supply for both channels
<b>24 V encoder supply</b>	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	1 A; total current of all encoders/channels
<b>Power</b>	
Power available from the backplane bus	1.3 W
<b>Power loss</b>	
Power loss, typ.	4 W
<b>Address area</b>	
Address space per module	
• Inputs	16 byte; Per channel
• Outputs	12 byte; per channel; 4 bytes for Motion Control
<b>Digital inputs</b>	
Number of digital inputs	6; 3 per channel
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
<b>Input voltage</b>	
• Type of input voltage	DC
• 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
<b>Input current</b>	
• for signal "1", typ.	2.5 mA
<b>Input delay (for rated value of input voltage)</b>	
for standard inputs	
— parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
— at "0" to "1", min.	6 µs; for parameterization "none"

— at "1" to "0", min.	6 $\mu$ s; for parameterization "none"
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	4; 2 per channel
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
• Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	L+ (-33 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 $\Omega$
• upper limit	12 k $\Omega$
Output voltage	
• Type of output voltage	DC
• 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 $\mu$ s
• "1" to "0", max.	50 $\mu$ s
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.	2 A
Cable length	
• shielded, max.	1 000 m

- unshielded, max. 600 m

## Encoder

<b>Connectable encoders</b>	
<ul style="list-style-type: none"> <li>• 2-wire sensor           <ul style="list-style-type: none"> <li>— permissible quiescent current (2-wire sensor), max.</li> </ul> </li> </ul>	Yes 1.5 mA
<b>Encoder signals, incremental encoder (asymmetrical)</b>	
<ul style="list-style-type: none"> <li>• Input voltage</li> <li>• Input frequency, max.</li> <li>• Counting frequency, max.</li> <li>• Cable length, shielded, max.</li> <li>• Signal filter, parameterizable</li> <li>• Incremental encoder with A/B tracks, 90° phase offset</li> <li>• Incremental encoder with A/B tracks, 90° phase offset and zero track</li> <li>• Pulse encoder</li> <li>• Pulse encoder with direction</li> <li>• Pulse encoder with one impulse signal per count direction</li> </ul>	24 V 200 kHz 800 kHz; with quadruple evaluation 600 m; depending on input frequency, encoder and cable quality; max. 50 m at 200 kHz Yes Yes Yes Yes Yes Yes Yes
<b>Encoder signal 24 V</b>	
<ul style="list-style-type: none"> <li>— permissible voltage at input, min.</li> <li>— permissible voltage at input, max.</li> </ul>	-30 V 30 V
<b>Interface types</b>	
<ul style="list-style-type: none"> <li>• Source/sink input</li> <li>• Input characteristic curve in accordance with IEC 61131, type 3</li> </ul>	Yes Yes
<b>Isochronous mode</b>	
<ul style="list-style-type: none"> <li>• Isochronous operation (application synchronized up to terminal)</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Filtering and processing time (TCI), min.</li> </ul>	130 µs
<ul style="list-style-type: none"> <li>• Bus cycle time (TDP), min.</li> </ul>	250 µs
<b>Interrupts/diagnostics/status information</b>	
<b>Alarms</b>	
<ul style="list-style-type: none"> <li>• Diagnostic alarm</li> <li>• Hardware interrupt</li> </ul>	Yes Yes
<b>Diagnostic messages</b>	
<ul style="list-style-type: none"> <li>• Monitoring the supply voltage</li> <li>• Wire-break</li> <li>• Short-circuit</li> <li>• A/B transition error at incremental encoder</li> </ul>	Yes Yes Yes Yes

Diagnostics indication LED	
• 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
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes

### Integrated Functions

Number of counters	2
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Counting frequency (counter) max.	800 kHz; with quadruple evaluation
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### 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; Per channel
— Direction dependency	Yes
— 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 $\mu$ s
— 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                     | No  |
| • between the channels and backplane bus   | Yes |
| • Between the channels and load voltage L+ | No  |

## Isolation

Isolation tested with	707 V DC (type test)
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## Ambient conditions

### Ambient temperature during operation

- |                                 |   |
|---------------------------------|---|
| • horizontal installation, min. | 0 °C  |
| • horizontal installation, max. | 60 °C; Please note derating for inductive loads |
| • vertical installation, min.   | 0 °C  |
| • vertical installation, max.   | 40 °C; Please note derating for inductive loads |

## 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; FW V1.1 and higher
to standard PROFINET controller	Yes

## Dimensions

Width	35 mm
Height	147 mm
Depth	129 mm

## Weights

Weight, approx.	250 g
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**last modified:** 08/30/2019