



Figure similar

SIPLUS ET 200SP TM count 1x24V T1 rail based on 6ES7138-6AA01-0BA0 with conformal coating, -40...+60 °C, OT2 with ST1/2 (+70 °C für 10 minutes), counter module, 1 channel for 24 V incremental or pulse generator, 3 DI, 2 DQ suitable for BU type A0,

General information	
Product type designation	TM Count 1x24V
Firmware version	
• FW update possible	Yes
based on	<a href="#">6ES7138-6AA01-0BA0</a>
usable BaseUnits	BU type A0
Color code for module-specific color-coded label	CC00
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	Yes
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
Supply voltage	
Rated value (DC)	24 V
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	19.2 V
• permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Input current	
Current consumption, max.	60 mA; without load
Encoder supply	
Number of outputs	1
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes; electronic/thermal
• Output current, max.	300 mA
Power loss	
Power loss, typ.	1 W
Address area	
Address space per module	
• Inputs	16 byte; 4 bytes in Fast mode
• Outputs	12 byte; 4 bytes for Motion Control, 0 bytes for Fast mode
Hardware configuration	
Automatic encoding	Yes
• Mechanical coding element	Yes
• Type of mechanical coding element	type B
Digital inputs	

Number of digital inputs	3
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
<b>Digital input functions, parameterizable</b>	
• Gate start/stop	Yes
• Capture	Yes
• Synchronization	Yes
• Freely usable digital input	Yes
• Probe	Yes
<b>Input voltage</b>	
• 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
for technological functions	
— parameterizable	Yes
<b>Cable length</b>	
• shielded, max.	1 000 m
• unshielded, max.	600 m
<b>Digital outputs</b>	
Type of digital output	Transistor
Number of digital outputs	2
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
• Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	L+ (-53 V)
Controlling a digital input	Yes
<b>Digital output functions, parameterizable</b>	
• Switching tripped by comparison values	Yes
• Freely usable digital output	Yes
<b>Switching capacity of the outputs</b>	
• with resistive load, max.	0.5 A; Per digital output
• on lamp load, max.	5 W
<b>Load resistance range</b>	
• lower limit	48 Ω
• upper limit	12 kΩ
<b>Output voltage</b>	
• for signal "1", min.	23.2 V; L+ (-0.8 V)
<b>Output current</b>	
• 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
<b>Output delay with resistive load</b>	
• "0" to "1", max.	50 μs
• "1" to "0", max.	50 μs
<b>Switching frequency</b>	
• 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
<b>Total current of the outputs</b>	
• Current per module, max.	1 A
<b>Cable length</b>	

<ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>	1 000 m
<ul style="list-style-type: none"> <li>• unshielded, max.</li> </ul>	600 m
<b>Encoder</b>	
Connectable encoders	
<ul style="list-style-type: none"> <li>• 2-wire sensor</li> </ul>	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA
Encoder signals, incremental encoder (asymmetrical)	
<ul style="list-style-type: none"> <li>• Input voltage</li> </ul>	24 V
<ul style="list-style-type: none"> <li>• Input frequency, max.</li> </ul>	200 kHz
<ul style="list-style-type: none"> <li>• Counting frequency, max.</li> </ul>	800 kHz; with quadruple evaluation
<ul style="list-style-type: none"> <li>• Cable length, shielded, max.</li> </ul>	600 m; depending on input frequency, encoder and cable quality; max. 50 m at 200 kHz
<ul style="list-style-type: none"> <li>• Signal filter, parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Incremental encoder with A/B tracks, 90° phase offset</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Incremental encoder with A/B tracks, 90° phase offset and zero track</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• pulse encoder</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• pulse encoder with direction</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• pulse encoder with one impulse signal per count direction</li> </ul>	Yes
Interface types	
<ul style="list-style-type: none"> <li>• Sourcing/sinking input</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input characteristic curve in accordance with IEC 61131, type 3</li> </ul>	Yes
<b>Interfaces</b>	
Number of RS 485 interfaces	0
<b>Interrupts/diagnostics/status information</b>	
Substitute values connectable	Yes; Parameterizable
<b>Alarms</b>	
<ul style="list-style-type: none"> <li>• Diagnostic alarm</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Hardware interrupt</li> </ul>	Yes
<b>Diagnoses</b>	
<ul style="list-style-type: none"> <li>• Monitoring the supply voltage</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Wire break</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Short-circuit</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• A/B transition error at incremental encoder</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Group error</li> </ul>	Yes
<b>Diagnostics indication LED</b>	
<ul style="list-style-type: none"> <li>• Monitoring of the supply voltage (PWR-LED)</li> </ul>	Yes; green PWR LED
<ul style="list-style-type: none"> <li>• Channel status display</li> </ul>	Yes; green LED
<ul style="list-style-type: none"> <li>• for module diagnostics</li> </ul>	Yes; green/red DIAG LED
<ul style="list-style-type: none"> <li>• Status indicator forward counting (green)</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Status indicator backward counting (green)</li> </ul>	Yes
<b>Integrated Functions</b>	
Counter	
<ul style="list-style-type: none"> <li>• Number of counters</li> </ul>	1
<ul style="list-style-type: none"> <li>• Counting frequency, max.</li> </ul>	800 kHz; with quadruple evaluation
Fast mode	Yes
Counting functions	
<ul style="list-style-type: none"> <li>• Can be used with TO High_Speed_Counter</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Continuous counting</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Counter response parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Hardware gate via digital input</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Software gate</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Event-controlled stop</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Synchronization via digital input</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Counting range, parameterizable</li> </ul>	Yes
Comparator	
— Number of comparators	2
— Direction dependency	Yes
— Can be changed from user program	Yes

<b>Position detection</b>	
• Incremental acquisition	Yes
• Suitable for S7-1500 Motion Control	Yes
<b>Measuring functions</b>	
• Measuring time, parameterizable	Yes
• Dynamic measurement period adjustment	Yes
• Number of thresholds, parameterizable	2
<b>Measuring range</b>	
— Frequency measurement, min.	0.04 Hz
— Frequency measurement, max.	800 kHz
— Cycle duration measurement, min.	1.25 µs
— Cycle duration measurement, max.	25 s
<b>Accuracy</b>	
— 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
<b>Potential separation</b>	
<b>Potential separation channels</b>	
• between the channels and backplane bus	Yes
<b>Isolation</b>	
Isolation tested with	750 V DC (type test) and according to EN 50155 (routine test)
<b>Standards, approvals, certificates</b>	
Suitable for safety functions	No
<b>Railway application</b>	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50121-5	Yes; EMC for fixed installations and railway power supply equipment (shielded cables required)
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT2, ST1/ST2 acc. to EN 50155); +70 °C continuously with spacing modules (6AG2193-6BN00-4BA0) or configured slots to the left and right of the module (OT4, ST0 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
<b>Altitude during operation relating to sea level</b>	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
<b>Relative humidity</b>	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
<b>Resistance</b>	
<b>Coolants and lubricants</b>	
— Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
<b>Use in stationary industrial systems</b>	
— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *

— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	
— Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
<b>Use on land craft, rail vehicles and special-purpose vehicles</b>		
— to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	
— to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	
— to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	
— Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
— against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
<b>Usage in industrial process technology</b>		
— Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	
— Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	
<b>Remark</b>		
— Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	
<b>Conformal coating</b>		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	
<b>Decentralized operation</b>		
to SIMATIC S7-300	Yes	
to SIMATIC S7-400	Yes	
to SIMATIC S7-1200	Yes	
to SIMATIC S7-1500	Yes	
to standard PROFIBUS master	Yes	
to standard PROFINET controller	Yes	
<b>Dimensions</b>		
Width	15 mm	
Height	73 mm	
Depth	58 mm	
<b>Weights</b>		
Weight, approx.	45 g	
<b>Other</b>		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	
<b>Classifications</b>		
	<b>Version</b>	<b>Classification</b>
eClass	14	27-24-26-05
eClass	12	27-24-26-05
eClass	9.1	27-24-26-05
eClass	9	27-24-26-05
eClass	8	27-24-26-05
eClass	7.1	27-24-26-05
eClass	6	27-24-26-05
ETIM	10	EC001601
ETIM	9	EC001601

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

**Approvals / Certificates**

**General Product Approval**

[Manufacturer Declaration](#)



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last modified:

10/23/2025