

Siemens  
EcoTech



ET 200eco PN TM PosInput 2, M12-L counting and position detection module for SSI absolute encoder, RS-422 incremental encoder, 24 V incremental encoder, 2 channels; 2 DI, 2 DQ per channel



General information	
Product type designation	TM PosInput 2
Firmware version	V5.1.x
<ul style="list-style-type: none"> <li>FW update possible</li> </ul>	Yes
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
Manufacturer ID according to ODVA (VendorID)	04E3H
Device ID according to ODVA (Product code)	0FAFH
Number of channels	2
Product function	
<ul style="list-style-type: none"> <li>I&amp;M data</li> <li>Isochronous mode</li> <li>IRT</li> <li>Fast startup</li> <li>Prioritized startup</li> </ul>	Yes; I&M0 to I&M3 Yes Yes Yes Yes
Engineering with	
<ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated from version</li> <li>PROFINET from GSD version/GSD revision</li> <li>Multi Fieldbus Configuration Tool (MFCT)</li> </ul>	STEP 7 V18 or higher with HSP GSDML V2.42 V1.5 or higher
Supply voltage	
Rated value (DC)	24 V
power supply according to NEC Class 2 required	No
Load voltage 1L+	
<ul style="list-style-type: none"> <li>Rated value (DC)</li> <li>permissible range, lower limit (DC)</li> <li>permissible range, upper limit (DC)</li> <li>Reverse polarity protection</li> </ul>	24 V 20.4 V 28.8 V Yes; against destruction; encoder power supply outputs applied with reversed polarity, loads conduct
Load voltage 2L+	
<ul style="list-style-type: none"> <li>Rated value (DC)</li> <li>permissible range, lower limit (DC)</li> <li>permissible range, upper limit (DC)</li> <li>Reverse polarity protection</li> </ul>	24 V 20.4 V 28.8 V Yes; against destruction
Input current	
Current consumption (rated value)	100 mA; without load
from load voltage 1L+ (unswitched voltage)	12 A; Maximum value

from load voltage 2L+, max.	12 A; Maximum value
<b>Encoder supply</b>	
Number of outputs	4; 1 per encoder connection
<b>24 V encoder supply</b>	
• 24 V	Yes; 1L+ (-0.8V)
• Short-circuit protection	Yes
• Output current, max.	300 mA; Per channel
<b>Power loss</b>	
Power loss, typ.	7.1 W
<b>Address area</b>	
Address space per module	
• Inputs	32 byte
• Outputs	24 byte; 8 bytes for Motion Control
<b>Hardware configuration</b>	
Submodules	
• Number of configurable submodules, max.	2
<b>Digital inputs</b>	
Number of digital inputs	4; 2 per channel
Digital inputs, parameterizable	Yes
Sourcing/sinking input	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Gate start/stop	Yes; only for pulse and incremental encoders
• Capture	Yes
• Synchronization	Yes; only for pulse and incremental encoders
• Freely usable digital input	Yes
Input voltage	
• 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
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
— at "0" to "1", min.	6 µs; for parameterization "none"
— at "1" to "0", min.	6 µs; for parameterization "none"
for technological functions	
— parameterizable	Yes
Cable length	
• shielded, max.	30 m
• unshielded, max.	30 m
<b>Digital outputs</b>	
Type of digital output	Transistor
Number of digital outputs	4; 2 per channel
Current-sourcing	Yes
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
• Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	2L+ (-39 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

<ul style="list-style-type: none"> <li>with inductive load, max.</li> </ul>	0.5 A
<b>Load resistance range</b>	
<ul style="list-style-type: none"> <li>lower limit</li> </ul>	48 Ω
<ul style="list-style-type: none"> <li>upper limit</li> </ul>	12 kΩ
<b>Output voltage</b>	
<ul style="list-style-type: none"> <li>Type of output voltage</li> </ul>	DC
<ul style="list-style-type: none"> <li>for signal "1", min.</li> </ul>	23.2 V; 2L+ (-0,8 V)
<b>Output current</b>	
<ul style="list-style-type: none"> <li>for signal "1" rated value</li> </ul>	0.5 A
<ul style="list-style-type: none"> <li>for signal "1" permissible range, max.</li> </ul>	0.6 A
<ul style="list-style-type: none"> <li>for signal "1" minimum load current</li> </ul>	2 mA
<ul style="list-style-type: none"> <li>for signal "0" residual current, max.</li> </ul>	0.5 mA
<b>Output delay with resistive load</b>	
<ul style="list-style-type: none"> <li>"0" to "1", max.</li> </ul>	50 μs
<ul style="list-style-type: none"> <li>"1" to "0", max.</li> </ul>	50 μs
<b>Parallel switching of two outputs</b>	
<ul style="list-style-type: none"> <li>for uprating</li> </ul>	No
<b>Switching frequency</b>	
<ul style="list-style-type: none"> <li>with resistive load, max.</li> </ul>	10 kHz
<ul style="list-style-type: none"> <li>with inductive load, max.</li> </ul>	0.5 Hz; According to IEC 60947-5-1, DC-13
<b>Total current of the outputs</b>	
<ul style="list-style-type: none"> <li>Current per module, max.</li> </ul>	2 A; Supply from 2L+
<b>Cable length</b>	
<ul style="list-style-type: none"> <li>shielded, max.</li> </ul>	30 m
<ul style="list-style-type: none"> <li>unshielded, max.</li> </ul>	30 m
<b>Encoder</b>	
<b>Encoder signals, incremental encoder (symmetrical)</b>	
<ul style="list-style-type: none"> <li>Input voltage</li> </ul>	RS 422
<ul style="list-style-type: none"> <li>Input frequency, max.</li> </ul>	1 MHz
<ul style="list-style-type: none"> <li>Counting frequency, max.</li> </ul>	4 MHz; with quadruple evaluation
<ul style="list-style-type: none"> <li>Cable length, shielded, max.</li> </ul>	30 m
<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
<b>Encoder signals, incremental encoder (asymmetrical)</b>	
<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>	30 m
<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
<b>Encoder signals, absolute encoder (SSI)</b>	
<ul style="list-style-type: none"> <li>Input signal</li> </ul>	to RS-422
<ul style="list-style-type: none"> <li>Telegram length, parameterizable</li> </ul>	10 ... 40 bit
<ul style="list-style-type: none"> <li>Clock frequency, max.</li> </ul>	2 MHz; 125 kHz, 250 kHz, 500 kHz, 1 MHz, 1.5 MHz or 2 MHz
<ul style="list-style-type: none"> <li>Binary code</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Gray code</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Cable length, shielded, max.</li> </ul>	30 m; Up to 500 kHz
<ul style="list-style-type: none"> <li>Parity bit, parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Monoflop time</li> </ul>	16, 32, 48, 64 μs & automatic

• Multiturn	Yes
• Singleturn	Yes
<b>Interfaces</b>	
Number of PROFINET interfaces	1
<b>1. Interface</b>	
Interface type	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
<b>Interface types</b>	
• M12 port	Yes; 2x M12, 4-pin, D-coded
• Number of ports	2
• integrated switch	Yes
<b>Protocols</b>	
• PROFINET IO Device	Yes
• Open IE communication	Yes
<b>PROFINET IO Device</b>	
<b>Services</b>	
— IRT	Yes; 500 µs to 4 ms at an interval of 125 µs
— Prioritized startup	Yes
— Shared device	Yes
— Number of IO Controllers with shared device, max.	2
<b>Interface types</b>	
<b>M12 port</b>	
• Autonegotiation	Yes
• Autocrossing	Yes
• Transmission rate, max.	100 Mbit/s
<b>Protocols</b>	
Supports protocol for PROFINET IO	Yes
PROFIsafe	No
EtherNet/IP	Yes
Modbus TCP	Yes
<b>Redundancy mode</b>	
• PROFINET system redundancy (S2)	Yes
— on S7-1500R/H	Yes
— on S7-400H	Yes
• PROFINET system redundancy (R1)	No
• H-Sync forwarding	Yes
<b>Media redundancy</b>	
— MRP	Yes
<b>EtherNet/IP</b>	
<b>Services</b>	
— CIP Implicit Messaging	Yes
— CIP Explicit Messaging	Yes
— CIP Safety	No
— Shared device	Yes; 2x EtherNet/IP Scanner
— Number of scanners with shared device, max.	2
<b>Updating times</b>	
— Requested Packet Interval (RPI)	2 ms
<b>Address area</b>	
— Address space per module, max.	32 byte
— LargeForwardOpen (Class3)	No
<b>Modbus TCP</b>	
<b>Services</b>	
— read coils (code=1)	Yes
— read discrete inputs (code=2)	Yes
— Read Holding Registers (Code=3)	Yes
— write single coil (code=5)	Yes
— write multiple coils (code=15)	Yes
— Write Multiple Registers (Code=16)	Yes
— Parameter change by master	No
— Modbus TCP Security Protocol	No

<b>Address space per station</b>	
— Address space per station, max.	32 byte
— Access-consistent address space	2 byte
<b>Updating time</b>	
— I/O request interval	2 ms
<b>Connections</b>	
— number of connections per device	12
<b>Open IE communication</b>	
• TCP/IP	Yes; (only EtherNet/IP or Modbus TCP)
• SNMP	Yes
• LLDP	Yes
• ARP	Yes
<b>Isochronous mode</b>	
Equidistance	Yes
shortest clock pulse	500 µs
max. cycle	4 ms
<b>Interrupts/diagnostics/status information</b>	
Substitute values connectable	Yes
<b>Alarms</b>	
• Diagnostic alarm	Yes; Parameterizable
• Maintenance interrupt	Yes; Parameterizable
• Hardware interrupt	No
<b>Diagnoses</b>	
• Diagnostic information readable	Yes
• Monitoring the supply voltage	Yes
— parameterizable	Yes
• Wire-break	Yes
• Short-circuit	Yes
• Short-circuit encoder supply	Yes
• A/B transition error at incremental encoder	Yes
• Telegram error at SSI encoder	Yes
<b>Diagnostics indication LED</b>	
• RUN LED	Yes; green LED
• ERROR LED	Yes; red LED
• MAINT LED	Yes; Yellow LED
• NS LED	Yes; green/red LED
• MS LED	Yes; green/red LED
• IO LED	Yes; red/green/yellow LEDs
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red LED
• For load voltage monitoring	Yes; green LED
• Connection display LINK TX/RX	Yes; green LED, only link
<b>Integrated Functions</b>	
Counter	Yes
• Number of counters	2
• Counting frequency, max.	4 MHz; with quadruple evaluation
Fast mode	No
<b>Counting functions</b>	
• Can be used with TO High_Speed_Counter	Yes; only for pulse and incremental encoders
• 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
<b>Comparator</b>	
— Number of comparators	2; Per channel
— Direction dependency	Yes

— Can be changed from user program	Yes
<b>Position detection</b>	
• Incremental acquisition	Yes
• Absolute 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.	4 MHz
— Cycle duration measurement, min.	0.25 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>	
between the load voltages	Yes
between Ethernet and electronics	Yes
<b>Potential separation channels</b>	
• between the channels	Yes; DI channels are isolated from the DQ channels
<b>Isolation</b>	
tested with	
• 24 V DC circuits	707 V DC (type test)
• Test voltage for interface, rms value [Vrms]	1 500 V; According to IEEE 802.3
<b>Degree and class of protection</b>	
IP degree of protection	IP65/67/69K
<b>Standards, approvals, certificates</b>	
Suitable for safety-related tripping of standard modules	Yes
<b>Ecological footprint</b>	
Global warming potential	
— global warming potential, (total) [CO2 eq]	75 kg
— global warming potential, (during production) [CO2 eq]	21.1 kg
— global warming potential, (during operation) [CO2 eq]	57.2 kg
— global warming potential, (after end of life cycle) [CO2 eq]	-3.5 kg
<b>Highest safety class achievable for safety-related tripping of standard modules</b>	
• Performance level according to ISO 13849-1	PL d
• Category according to ISO 13849-1	Cat. 3
• SIL acc. to IEC 62061	SIL 2
• remark on safety-oriented shutdown	<a href="https://support.industry.siemens.com/cs/document/39198632">https://support.industry.siemens.com/cs/document/39198632</a>
<b>Security</b>	
signed firmware update	Yes; V5.1.2 or higher
safely removing data	Yes; V5.1.2 or higher
<b>Ambient conditions</b>	
Ambient temperature during operation	
• min.	-40 °C
• max.	60 °C
Altitude during operation relating to sea level	
• Ambient air temperature-barometric pressure-altitude	Up to max. 5 000 m, at installation height > 2 000 m additional restrictions
<b>Connection method</b>	
Design of electrical connection	4/5/8-pin M12 circular connectors
Design of electrical connection for the inputs and outputs	M12, 5-pin, A-coded
Design of electrical connection for supply voltage	M12, 4-pin, L-coded
<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	No
to standard PROFINET controller	Yes

Dimensions	
Width	45 mm
Height	200 mm
Depth	48 mm

Weights	
Weight, approx.	820 g

Classifications			
		Version	Classification
	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

**Approvals / Certificates**

**General Product Approval**

[Manufacturer Declaration](#)



[Miscellaneous](#)

[KC](#)

[China RoHS](#)

**General Product Approval**

**EMV**

**For use in hazardous locations**



[CCC-Ex](#)



[Miscellaneous](#)

**For use in hazardous locations**

**Maritime application**



[NK / Nippon Kaiji Kyokai](#)

**Maritime application**

**Food, Pharmaceutical, Medical**

**Environment**



[CCS \(China Classification Society\)](#)



[Confirmation](#)

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**Industrial Communication**

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