SIEMENS

Data sheet 6ES7138-6BA01-0BA0

Figure similar

SIMATIC ET 200SP, TM Posinput 1 counter and position decoder module for RS-422 incremental encoder or SSI absolute encoder, 2 DI, 2 DQ suitable for BU type A0, pack quantity: 1 unit

General information	
Product type designation	TM PosInput 1
Firmware version	V2.0
● FW update possible	Yes
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	STEP 7 V16 or higher
● STEP 7 configurable/integrated from version	V5.6 (use previous version *6BA00*)
● PROFIBUS from GSD version/GSD revision	GSD Revision 5
● PROFINET from GSD version/GSD revision	GSDML V2.34
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.	75 mA; without load
Encoder supply	
Number of outputs	2
5 V encoder supply	
● 5 V	Yes
● Short-circuit protection	Yes; electronic/thermal
● Output current, max.	300 mA; Total current of all encoders
24 V encoder supply	
● 24 V	Yes; L+ (-0.8 V)
● Short-circuit protection	Yes; electronic/thermal
● Output current, max.	300 mA; Total current of all encoders
Power loss	
Power loss, typ.	1.5 W
Address area	
Address space per module	
● Inputs	16 byte; 4 bytes in Fast mode

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● 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	2
Digital inputs, parameterizable	Yes
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	
● 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
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	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
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 Ω
● upper limit	12 kΩ
Output voltage	
● 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 µs
● "1" to "0", max.	50 µs
Switching frequency	
● with resistive load, max.	10 kHz

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● 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.	1 A
Cable length	
● shielded, max.	1 000 m
● unshielded, max.	600 m
Encoder	
Encoder signals, incremental encoder (symmetrical)	
● Input voltage	RS 422
● Input frequency, max.	1 MHz
● Counting frequency, max.	4 MHz; with quadruple evaluation
● Cable length, shielded, max.	32 m; at 1 MHz
● Signal filter, parameterizable	Yes
● Incremental encoder with A/B tracks, 90° phase offset	Yes
● Incremental encoder with A/B tracks, 90° phase offset and zero track	Yes
● pulse encoder	Yes
● Pulse encoder with direction	Yes
● pulse encoder with one impulse signal per count direction	Yes
Encoder signals, incremental encoder (asymmetrical)	
● Input voltage	5 V TTL (push-pull encoders only)
● Input frequency, max.	1 MHz
● Counting frequency, max.	4 MHz; with quadruple evaluation
● Signal filter, parameterizable	Yes
● Incremental encoder with A/B tracks, 90° phase offset	Yes
● Incremental encoder with A/B tracks, 90° phase offset and zero track	Yes
● pulse encoder	Yes
● pulse encoder with direction	Yes
● pulse encoder with one impulse signal per count direction	Yes
Encoder signals, absolute encoder (SSI)	
● Input signal	to RS-422
● Telegram length, parameterizable	10 ... 40 bit
● Clock frequency, max.	2 MHz; 125 kHz, 250 kHz, 500 kHz, 1 MHz, 1.5 MHz or 2 MHz
● Binary code	Yes
● Gray code	Yes
● Cable length, shielded, max.	320 m; Cable length, RS-422 SSI absolute encoders, Siemens type 6FX2001-5, 24 V supply: 125 kHz, 320 meters shielded, max.; 250 kHz, 160 meters shielded, max.; 500 kHz, 60 meters shielded, max.; 1 MHz, 20 meters shielded, max. 1.5 MHz, 10 meters shielded, max.; 2 MHz, 8 meters shielded, max.
● Parity bit, parameterizable	Yes
● Monoflop time	16, 32, 48, 64 µs & automatic
● Multiturn	Yes
● Singleturn	Yes
Interface types	
● TTL 5 V	Yes; push-pull encoders only
● RS 422	Yes
Interfaces	
Number of RS 485 interfaces	0
Interrupts/diagnostics/status information	
Substitute values connectable	Yes; Parameterizable
Alarms	
● Diagnostic alarm	Yes
● Hardware interrupt	Yes
Diagnoses	
● Monitoring the supply voltage	Yes
● Wire break	Yes
● Short-circuit	Yes
● A/B transition error at incremental encoder	Yes

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● Telegram error at SSI encoder	Yes
● Group error	Yes
Diagnostics indication LED	
● Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
● Channel status display	Yes; green LED
● for module diagnostics	Yes; green/red DIAG LED
● Status indicator forward counting (green)	Yes
● Status indicator backward counting (green)	Yes
Integrated Functions	
Counter	Yes
● Number of counters	1
● Counting frequency, max.	4 MHz; with quadruple evaluation
Fast mode	Yes
Counting functions	
● 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
Comparator	
— Number of comparators	2
— Direction dependency	Yes
— Can be changed from user program	Yes
Position detection	
● Incremental acquisition	Yes
● Absolute 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.	4 MHz
— Cycle duration measurement, min.	0.25 µs
— 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 and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	No
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	-30 °C
● horizontal installation, max.	60 °C; Observe derating
● vertical installation, min.	-30 °C
● vertical installation, max.	50 °C; Observe derating
Altitude during operation relating to sea level	
● Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Absolute humidity	

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● dew point, min.	-60 °C; suitable for dry room applications
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
to standard PROFINET controller	Yes
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	45 g

Classifications

	Version	Classification
eClass	16	27-24-26-05
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

Miscellaneous

Manufacturer Declaration

General Product Approval

China RoHS

For use in hazardous locations

FM

For use in hazardous locations

Type Examination Certificate

Miscellaneous

Maritime application

Maritime application

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NK / Nippon Kaiji Kyokai

CCS (China Classification Society)

Maritime application

KR (Korean Register of Shipping)

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