



Figure similar

SIPLUS ET 200SP TM Posinput 1 RAIL based on 6ES7138-6BA01-0BA0 with conformal coating -40...+70 °C, OT4 with ST1/2 (+70 °C for 10 minutes) . 1 counter and position detection module for RS-422 incremental encoder or SSI absolute encoder, 2 DI, 2DQ suitable for BU type A0, pack quantity: 1 unit pack quantity: 1 unit

General information	
Product type designation	TM PosInput 1
Firmware version	
• FW update possible	Yes
based on	6ES7138-6BA01-0BA0
usable BaseUnits	BU type A0
Color code for module-specific color identification plate	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.	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
• Outputs	12 byte; 4 bytes for Motion Control, 0 bytes for Fast mode
Hardware configuration	
Automatic encoding	Yes

<ul style="list-style-type: none"> • Mechanical coding element 	Yes
<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Gate start/stop 	Yes; only for pulse and incremental encoders
<ul style="list-style-type: none"> • Capture 	Yes
<ul style="list-style-type: none"> • Synchronization 	Yes; only for pulse and incremental encoders
<ul style="list-style-type: none"> • Freely usable digital input 	Yes
Input voltage	
<ul style="list-style-type: none"> • Rated value (DC) 	24 V
<ul style="list-style-type: none"> • for signal "0" 	-5 ... +5 V
<ul style="list-style-type: none"> • for signal "1" 	+11 to +30V
<ul style="list-style-type: none"> • permissible voltage at input, min. 	-30 V; -5 V continuous, -30 V brief reverse polarity protection
<ul style="list-style-type: none"> • permissible voltage at input, max. 	30 V
Input current	
<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • shielded, max. 	1 000 m
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Response threshold, typ. 	1 A
Limitation of inductive shutdown voltage to	L+ (-53 V)
Controlling a digital input	Yes
Digital output functions, parameterizable	
<ul style="list-style-type: none"> • Switching tripped by comparison values 	Yes
<ul style="list-style-type: none"> • Freely usable digital output 	Yes
Switching capacity of the outputs	
<ul style="list-style-type: none"> • with resistive load, max. 	0.5 A; Per digital output
<ul style="list-style-type: none"> • on lamp load, max. 	5 W
Load resistance range	
<ul style="list-style-type: none"> • lower limit 	48 Ω
<ul style="list-style-type: none"> • upper limit 	12 kΩ
Output voltage	
<ul style="list-style-type: none"> • for signal "1", min. 	23.2 V; L+ (-0.8 V)
Output current	
<ul style="list-style-type: none"> • for signal "1" rated value 	0.5 A; Per digital output
<ul style="list-style-type: none"> • for signal "1" permissible range, max. 	0.6 A; Per digital output
<ul style="list-style-type: none"> • for signal "1" minimum load current 	2 mA
<ul style="list-style-type: none"> • for signal "0" residual current, max. 	0.5 mA
Output delay with resistive load	
<ul style="list-style-type: none"> • "0" to "1", max. 	50 μs
<ul style="list-style-type: none"> • "1" to "0", max. 	50 μs
Switching frequency	
<ul style="list-style-type: none"> • with resistive load, max. 	10 kHz
<ul style="list-style-type: none"> • with inductive load, max. 	0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve
<ul style="list-style-type: none"> • on lamp load, max. 	10 Hz
Total current of the outputs	
<ul style="list-style-type: none"> • Current per module, max. 	1 A
Cable length	

<ul style="list-style-type: none"> • shielded, max. 	1 000 m
<ul style="list-style-type: none"> • unshielded, max. 	600 m
Encoder	
Encoder signals, incremental encoder (symmetrical)	
<ul style="list-style-type: none"> • Input voltage 	RS 422
<ul style="list-style-type: none"> • Input frequency, max. 	1 MHz
<ul style="list-style-type: none"> • Counting frequency, max. 	4 MHz; with quadruple evaluation
<ul style="list-style-type: none"> • Cable length, shielded, max. 	32 m; at 1 MHz
<ul style="list-style-type: none"> • Signal filter, parameterizable 	Yes
<ul style="list-style-type: none"> • Incremental encoder with A/B tracks, 90° phase offset 	Yes
<ul style="list-style-type: none"> • Incremental encoder with A/B tracks, 90° phase offset and zero track 	Yes
<ul style="list-style-type: none"> • pulse encoder 	Yes
<ul style="list-style-type: none"> • Pulse encoder with direction 	Yes
<ul style="list-style-type: none"> • pulse encoder with one impulse signal per count direction 	Yes
Encoder signals, incremental encoder (asymmetrical)	
<ul style="list-style-type: none"> • Input voltage 	5 V TTL (push-pull encoders only)
<ul style="list-style-type: none"> • Input frequency, max. 	1 MHz
<ul style="list-style-type: none"> • Counting frequency, max. 	4 MHz; with quadruple evaluation
<ul style="list-style-type: none"> • Signal filter, parameterizable 	Yes
<ul style="list-style-type: none"> • Incremental encoder with A/B tracks, 90° phase offset 	Yes
<ul style="list-style-type: none"> • Incremental encoder with A/B tracks, 90° phase offset and zero track 	Yes
<ul style="list-style-type: none"> • pulse encoder 	Yes
<ul style="list-style-type: none"> • pulse encoder with direction 	Yes
<ul style="list-style-type: none"> • pulse encoder with one impulse signal per count direction 	Yes
Encoder signals, absolute encoder (SSI)	
<ul style="list-style-type: none"> • Input signal 	to RS-422
<ul style="list-style-type: none"> • Telegram length, parameterizable 	10 ... 40 bit
<ul style="list-style-type: none"> • Clock frequency, max. 	2 MHz; 125 kHz, 250 kHz, 500 kHz, 1 MHz, 1.5 MHz or 2 MHz
<ul style="list-style-type: none"> • Binary code 	Yes
<ul style="list-style-type: none"> • Gray code 	Yes
<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • Parity bit, parameterizable 	Yes
<ul style="list-style-type: none"> • Monoflop time 	16, 32, 48, 64 µs & automatic
<ul style="list-style-type: none"> • Multiturn 	Yes
<ul style="list-style-type: none"> • Singleturn 	Yes
Interface types	
<ul style="list-style-type: none"> • TTL 5 V 	Yes; push-pull encoders only
<ul style="list-style-type: none"> • RS 422 	Yes
Interrupts/diagnostics/status information	
Substitute values connectable	Yes; Parameterizable
Alarms	
<ul style="list-style-type: none"> • Diagnostic alarm 	Yes
<ul style="list-style-type: none"> • Hardware interrupt 	Yes
Diagnoses	
<ul style="list-style-type: none"> • Monitoring the supply voltage 	Yes
<ul style="list-style-type: none"> • Wire-break 	Yes
<ul style="list-style-type: none"> • Short-circuit 	Yes
<ul style="list-style-type: none"> • A/B transition error at incremental encoder 	Yes
<ul style="list-style-type: none"> • Telegram error at SSI encoder 	Yes
<ul style="list-style-type: none"> • Group error 	Yes
Diagnostics indication LED	
<ul style="list-style-type: none"> • Monitoring of the supply voltage (PWR-LED) 	Yes; green PWR LED
<ul style="list-style-type: none"> • Channel status display 	Yes; green LED
<ul style="list-style-type: none"> • for module diagnostics 	Yes; green/red DIAG LED
<ul style="list-style-type: none"> • Status indicator forward counting (green) 	Yes
<ul style="list-style-type: none"> • Status indicator backward counting (green) 	Yes
Integrated Functions	

Counter	Yes
<ul style="list-style-type: none"> • Number of counters • Counting frequency, max. 	<p>1</p> <p>4 MHz; with quadruple evaluation</p>
Fast mode	Yes
Counting functions	
<ul style="list-style-type: none"> • Can be used with TO High_Speed_Counter • Continuous counting • Counter response parameterizable • Hardware gate via digital input • Software gate • Event-controlled stop • Synchronization via digital input • Counting range, parameterizable 	<p>Yes; only for pulse and incremental encoders</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
Comparator	
<ul style="list-style-type: none"> — Number of comparators — Direction dependency — Can be changed from user program 	<p>2</p> <p>Yes</p> <p>Yes</p>
Position detection	
<ul style="list-style-type: none"> • Incremental acquisition • Absolute acquisition • Suitable for S7-1500 Motion Control 	<p>Yes</p> <p>Yes</p> <p>Yes</p>
Measuring functions	
<ul style="list-style-type: none"> • Measuring time, parameterizable • Dynamic measurement period adjustment • Number of thresholds, parameterizable 	<p>Yes</p> <p>Yes</p> <p>2</p>
Measuring range	
<ul style="list-style-type: none"> — Frequency measurement, min. — Frequency measurement, max. — Cycle duration measurement, min. — Cycle duration measurement, max. 	<p>0.04 Hz</p> <p>4 MHz</p> <p>0.25 µs</p> <p>25 s</p>
Accuracy	
<ul style="list-style-type: none"> — Frequency measurement — Cycle duration measurement — Velocity measurement 	<p>100 ppm; depending on measuring interval and signal evaluation</p> <p>100 ppm; depending on measuring interval and signal evaluation</p> <p>100 ppm; depending on measuring interval and signal evaluation</p>
Potential separation	
Potential separation channels	
<ul style="list-style-type: none"> • between the channels and backplane bus 	Yes
Isolation	
Isolation tested with	750 V DC (type test) and according to EN 50155 (routine test)
Standards, approvals, certificates	
Suitable for safety functions	No
Railway application	
<ul style="list-style-type: none"> • EN 50121-3-2 • EN 50121-4 • EN 50121-5 • EN 50124-1 • EN 50125-1 • EN 50125-2 • EN 50125-3 • EN 50155 • EN 61373 • Fire protection acc. to EN 45545-2 	<p>Yes; EMC for rail vehicles</p> <p>Yes; EMC for signal and telecommunications systems</p> <p>Yes; EMC for fixed installations and railway power supply equipment (shielded cables required)</p> <p>Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC</p> <p>Yes; Rail vehicles - see ambient conditions</p> <p>Yes; Stationary electrical equipment - see ambient conditions</p> <p>Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)</p> <p>Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position</p> <p>Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B</p> <p>Yes; For proof of conformity, see Service & Support</p>
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • horizontal installation, min. • horizontal installation, max. 	<p>-40 °C; = Tmin (incl. condensation/frost)</p> <p>60 °C; = Tmax; +70 °C for 10 min (OT2, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT4, ST1/ST2 acc. to EN 50155)</p>

<ul style="list-style-type: none"> • vertical installation, min. • vertical installation, max. • ceiling installation, min. • ceiling installation, max. • floor installation, min. • floor installation, max. 	<p>-30 °C</p> <p>50 °C; Observe derating</p> <p>-30 °C</p> <p>50 °C; Observe derating</p> <p>-30 °C</p> <p>50 °C; Observe derating</p>
Altitude during operation relating to sea level	
<ul style="list-style-type: none"> • Installation altitude above sea level, max. 	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Relative humidity	
<ul style="list-style-type: none"> • With condensation, tested in accordance with IEC 60068-2-38, max. 	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
Coolants and lubricants	
— Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
— 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 (6AG1193-6AA00-0AA0/6AG1193-6AB00-0AA0)
Use on land craft, rail vehicles and special-purpose vehicles	
— 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 (6AG1193-6AA00-0AA0/6AG1193-6AB00-0AA0)
— against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; Level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/6AG1193-6AB00-0AA0)
Usage in industrial process technology	
— 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)
Remark	
— 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!
Conformal coating	
<ul style="list-style-type: none"> • Coatings for printed circuit board assemblies acc. to EN 61086 • Protection against fouling acc. to EN 60664-3 • Electronic equipment on rolling stock acc. to EN 50155 • Military testing according to MIL-I-46058C, Amendment 7 • Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A 	<p>Yes; Class 2 for high reliability</p> <p>Yes; Type 1 protection</p> <p>Yes; class PC2 protective coating acc. to EN 50155</p> <p>Yes; Discoloration of coating possible during service life</p> <p>Yes; Conformal coating, Class A</p>
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
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Other

Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776
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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	9	EC001601
ETIM	8	EC001601
ETIM	7	EC001601

Approvals / Certificates

General Product Approval	Railway
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[Miscellaneous](#)

[Manufacturer Declaration](#)



[Confirmation](#)

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