Overview

- 2, 4 and 8-channel analog input (AI) modules
- Apart from the standard type of delivery in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

For different requirements, the digital output modules offer:

- Function classes Basic, Standard, High Feature and High Speed
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Potential distribution modules for system-integrated expansion with potential terminals
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option of connecting current, voltage and resistance sensors, as well as thermocouples
- Option of connecting force and torque sensors
- Energy Meter for recording up to 200 electrical variables
- Clear labeling on front of module
- LEDs for diagnostics, status, supply voltage and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
  - MSI operating mode (simultaneous reading of input data from as many as three other controllers)
  - Oversampling operating mode (n-fold equidistant acquisition of analog values within one PN cycle for increasing the time resolution for slow CPU cycles)
  - Isochronous mode (simultaneous equidistant reading in of all analog values)
  - Scalable measuring range (adaptation of measuring range, increase of the 16-bit resolution by adapting the measuring range to a limited section)
  - Scaling of the measured values (transmission of the analog value normalized to the required physical value as a 32-bit floating point value)
  - Internal compensation of the line resistance for thermo-couples by means of terminal temperature measurement in the BaseUnit for BU type A1
  - Internal compensation also for 2-conductor resistance measurement by means of adjustable line resistance
  - Calibration during runtime
  - Single-channel electrical isolation
  - HART communication
  - Re-parameterization during operation
  - Firmware update
  - Diagnosis of wire break, short circuit, overflow, underflow
  - Two upper and lower hardware interrupts in each case, interference frequency suppression, smoothing
  - Value status (optional binary validity information of the analog signal in the process image)
  - Supports the PROFIenergy profile
- Optional accessories
  - Labeling strips (film or card)
  - Equipment labeling plate
  - Color-coded label with module-specific CC code
  - Shielding terminal

A quick and clear comparison of the functions of the AI modules is offered by the TIA Selection Tool.

Overview (continued)

Overview of analog input modules

Analog input	PU	Article No.	CC code	BU type
AI 8 x I 2/4-wire BA	1	6ES7134-6GF00-0AA1	CC01	A0, A1
AI 2 x U ST	1	6ES7134-6FB00-0BA1	CC00	A0, A1
AI 8 x U BA	1	6ES7134-6FF00-0AA1	CC02	A0, A1
AI 4 x U/I 2-wire ST	1	6ES7134-6HD00-0BA1	CC03	A0, A1
AI 4 x U/I 2-wire ST	10	6ES7134-6HD00-2BA1	CC03	A0, A1
AI 2 x I 2/4-wire ST	1	6ES7134-6GB00-0BA1	CC05	A0, A1
AI 4 x I 2/4-wire ST	1	6ES7134-6GD00-0BA1	CC03	A0, A1
AI 4 x I 2-wire 4 ... 20 mA HART	1	6ES7134-6TD00-0CA1	CC03	A0, A1
AI 2 x U/I 2/4-wire HF	1	6ES7134-6HB00-0CA1	CC05	A0, A1
AI 2xU/I 2/4-wire HS With two operating modes: • High-speed isochronous AI • Oversampling	1	6ES7134-6HB00-0DA1	CC00	A0, A1
AI 8 x RTD/TC 2-wire HF	1	6ES7134-6JF00-0CA1	CC00	A0, A1
AI 8 x RTD/TC 2-wire HF	10	6ES7134-6JF00-2CA1	CC00	A0, A1
AI 4 x RTD/TC 2/3/4-wire HF	1	6ES7134-6JD00-0CA1	CC00	A0, A1
AI 4 x RTD/TC 2/3/4-wire HF	10	6ES7134-6JD00-2CA1	CC00	A0, A1
AI 2 x SG 4/6-wire High Speed	1	7MH4134-6LB00-0DA0	CC00	A0
AI Energy Meter 400 V AC ST	1	6ES7134-6PA01-0BD0	--	D0
AI Energy Meter 480 V AC ST	1	6ES7134-6PA20-0BD0	--	D0

Overview of BaseUnits

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0DA0	CC01 to CC05	--
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0BA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2BA0	CC01 to CC05	--

Technical specifications (continued)

Article number	6ES7134-6GF00-0AA1	6ES7134-6FB00-0BA1	6ES7134-6FF00-0AA1	6ES7134-6HD00-0BA1	6ES7134-6GB00-0BA1
	ET 200SP, AI 8XI 2-/4-WIRE BASIC	ET 200SP, AI 2XU STANDARD, PU 1	ET 200SP, AI 8XU BASIC	ET 200SP, AI 4XU/I 2-WIRE ST	ET 200SP, AI 2XI 2-/4-WIRE ST, PU 1
Diagnostics indication LED					
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green LED	Yes; green PWR LED
• Channel status display	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
• for channel diagnostics	No	No	No	No	No
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red LED	Yes; green/red DIAG LED
Potential separation					
Potential separation channels					
• between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates					
Suitable for safety functions	No	No	No	No	No
Dimensions					
Width	15 mm	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm	58 mm
Weights					
Weight, approx.	31 g	31 g	31 g	31 g	32 g

Article number	6ES7134-6GD00-0BA1	6ES7134-6TD00-0CA1	6ES7134-6HB00-0CA1	6ES7134-6HB00-0DA1
	ET 200SP, AI 4XI 2-/4-WIRE ST	ET 200SP, AI 4XI 2-WIRE 4...20MA HART	ET 200SP AI 2 X U/I 2-, 4-WIRE HF	ET 200SP AI 2 X U/I 2-, 4-WIRE HS
General information				
Product type designation	AI 4xI 2-/4-wire ST	AI 4xI 2-wire HART	AI 2xU/I 2-/4-wire HF	AI 2xU/I 2-/4-wire HS
Product function				
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
• Measuring range scalable	No	No	No	No
• Scalable measured values				No
• Adjustment of measuring range				No
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V11 SP2 / V13	V13 SP1	V13	V13 SP1
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP4 and higher	V5.5 / -	V5.5 SP3 / -
• PCS 7 configurable/integrated as of version	V8.1 SP1	V8.1 SP1	V8.1 SP1	
• PROFIBUS as of GSD version/ GSD revision	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3
Operating mode				
• Oversampling	No	No	No	Yes; 2 channels per module
• MSI	No	No	Yes	No
CiR – Configuration in RUN				
Reparameterization possible in RUN	Yes	Yes	Yes	Yes
Calibration possible in RUN	No	No	Yes	No
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
Analog inputs				
Number of analog inputs	4; Differential inputs	4; Differential inputs	2; Differential inputs	2; Differential inputs
• For current measurement	4	4	2	2
• For voltage measurement			2	2

Technical specifications (continued)

Article number	**6ES7134-6GD00-0BA1** ET 200SP, AI 4XI 2-/4-WIRE ST	**6ES7134-6TD00-0CA1** ET 200SP, AI 4XI 2-WIRE 4...20MA HART	**6ES7134-6HB00-0CA1** ET 200SP AI 2 X U/I 2-, 4-WIRE HF	**6ES7134-6HB00-0DA1** ET 200SP AI 2 X U/I 2-, 4-WIRE HS
permissible input voltage for voltage input (destruction limit), max.			30 V	30 V
permissible input current for current input (destruction limit), max.	50 mA	50 mA	50 mA	50 mA
Cycle time (all channels), min.	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)			125 µs
Analog input with oversampling			No	Yes
• Values per cycle, max.				16
• Resolution, min.				50 µs
Standardization of measured values			Yes	
Input ranges (rated values), voltages				
• 0 to +10 V			Yes; 15 bit	Yes; 15 bit
• 1 V to 5 V			Yes; 15 bit	Yes; 13 bit
• -10 V to +10 V			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• -5 V to +5 V			Yes; 16 bit incl. sign	Yes; 15 bit incl. sign
Input ranges (rated values), currents				
• 0 to 20 mA	Yes	No	Yes; 15 bit	Yes; 15 bit
• -20 mA to +20 mA	Yes	No	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• 4 mA to 20 mA	Yes	Yes; 15 bit + sign	Yes; 15 bit	Yes; 14 bit
Cable length				
• shielded, max.	1 000 m	800 m	1 000 m; 200 m for voltage measurement	1 000 m; 200 m for voltage measurement
Analog value generation for the inputs				
Integration and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit
• Integration time, parameterizable	Yes	Yes; channel by channel	Yes	
• Integration time (ms)			67.5 / 22.5 / 18.75 / 10 / 5 / 2.5 / 1.25 / 0.625 ms	
• Basic conversion time, including integration time (ms)			68.03 / 22.83 / 19.03 / 10.28 / 5.23 / 2.68 / 1.43 / 0.730 ms	
• Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz	10 / 50 / 60 Hz	16.6 / 50 / 60 / 300 / 600 / 1 200 / 2 400 / 4 800	No
• Conversion time (per channel)	180 / 60 / 50 ms		68.2 / 23 / 19.2 / 10.45 / 5.40 / 2.85 / 1.6 / 0.9 ms	10 µs
• Basic execution time of the module (all channels released)			1 ms	
Smoothing of measured values				
• Number of smoothing levels	4; None; 4/8/16 times	4; None; 4/8/16 times	6; none; 2-/4-/8-/16-/32-fold	7; none; 2-/4-/8-/16-/32-/64-fold
• parameterizable	Yes	Yes	Yes	Yes
Encoder				
Connection of signal encoders				
• for voltage measurement	No	No	Yes	Yes
• for current measurement as 2-wire transducer	Yes	Yes	Yes	Yes
- Burden of 2-wire transmitter, max.	650 Ω		650 Ω	650 Ω
• for current measurement as 4-wire transducer	Yes		Yes	Yes

Technical specifications (continued)

Article number	6ES7134-6GD00-0BA1 ET 200SP, AI 4XI 2-/4-WIRE ST	6ES7134-6TD00-0CA1 ET 200SP, AI 4XI 2-WIRE 4...20MA HART	6ES7134-6HB00-0CA1 ET 200SP AI 2 X U/I 2-, 4-WIRE HF	6ES7134-6HB00-0DA1 ET 200SP AI 2 X U/I 2-, 4-WIRE HS
Errors/accuracies				
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (+/-)			0.05 %; 0.1 % at SFU 4.8 kHz	0.2 %
• Current, relative to input range, (+/-)	0.3 %	0.3 %	0.05 %; 0.1 % at SFU 4.8 kHz	0.2 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	60 dB		
• Common mode voltage, max.	10 V		35 V	35 V
• Common mode interference, min.	90 dB		90 dB	90 dB
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	No	No	Yes	Yes
Filtering and processing time (TCI), min.			800 µs	80 µs
Bus cycle time (TDP), min.			1 ms	125 µs; Starting from firmware Version V2.0.1
Interrupts/diagnostics/ status information				
Diagnostics function	Yes	Yes	Yes	
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
• Limit value alarm	No	Yes	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case
Diagnostic messages				
• Monitoring the supply voltage	Yes	Yes	Yes	
• Wire-break	Yes; at 4 to 20 mA	Yes; channel by channel	Yes; Measuring range 4 to 20 mA only	Yes; channel-by-channel, at 4 to 20 mA only
• Short-circuit	Yes; 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply	Yes; Channel-by-channel, short-circuit of the encoder supply to ground or of an input to the encoder supply	Yes; channel-by-channel, at 1 to 5 V or for short-circuit in encoder supply	Yes; channel-by-channel, at 1 to 5 V or for current measuring ranges short-circuit in encoder supply
• Group error	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes; channel by channel	Yes	Yes
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
• for channel diagnostics	No	Yes; red LED	Yes; red LED	Yes; red LED
• for module diagnostics	Yes; green/red LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates				
Suitable for safety functions	No		No	No
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	31 g	31 g	32 g	32 g

Ordering data	Article No.
Analog input modules	
Type of delivery: Apart from the standard type of delivery in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules. The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10.	
Analog input module AI 8xI 2/4-wire BA, BU type A0 or A1, color code CC01	**6ES7 134-6GF00-0AA1**
Analog input module AI 2xU ST, BU type A0 or A1, color code CC00	**6ES7134-6FB00-0BA1**
Analog input module AI 8xU BA, BU type A0 or A1, color code CC02	**6ES7 134-6FF00-0AA1**
Analog input module AI 4xU/I 2-wire Standard, BU type A0 or A1, color code CC03, 16-bit, ±0.3%	
• 1 unit	**6ES7134-6HD00-0BA1**
• 10 units	**6ES7134-6HD00-2BA1**
Analog input module AI 2xI 2/4-wire Standard, BU type A0 or A1, color code CC05, 16-bit	**6ES7134-6GB00-0BA1**
Analog input module AI 4xI 2/4-wire Standard, BU type A0 or A1, color code CC03, 16-bit, ±0.3%	**6ES7134-6GD00-0BA1**
Analog input module AI 4xI 2-wire 4 ... 20 mA HART, BU type A0 or A1, color code CC03	**6ES7134-6TD00-0CA1**
Analog input module AI 2xU/I 2/4-wire High Feature, BU type A0 or A1, color code CC05, 16-bit, ±0.1%, independent channel isolation, isochronous mode above 1 ms	**6ES7134-6HB00-0CA1**
Analog input module AI 2xU/I 2/4-wire High Speed, BU type A0 or A1, color code CC00, 16-bit, ±0.3%, isochronous mode above 250 µs, oversampling above 50 µs	**6ES7134-6HB00-0DA1**
Analog input module AI 8xRTD/TC 2-wire High Feature, BU type A0 or A1, color code CC00, 16-bit, ±0.1%, scalable measuring range	
• 1 unit	**6ES7134-6JF00-0CA1**
• 10 units	**6ES7134-6JF00-2CA1**
Analog input module AI 4xRTD/TC 2/3/4-wire High Feature, BU type A0 or A1, color code CC00, 16-bit, ±0.1%, scalable measuring range	
• 1 unit	**6ES7134-6JD00-0CA1**
• 10 units	**6ES7134-6JD00-2CA1**
Analog input module AI 2xSG, 4/6-wire High Speed, BU type A0, color code CC00, channel diagnostics, 28/16-bit, ±0.05%, for DMS full bridges; for connecting force and torque sensors	**7MH4134-6LB00-0DA0**
Analog input module AI Energy Meter Standard, 400 V AC, BU type D0	**6ES7134-6PA01-0BD0**
Analog input module AI Energy Meter Standard, 480 V AC, BU type D0	**6ES7134-6PA20-0BD0**
Usable type A0 BaseUnits	
BU15-P16+A10+2D BU type A0; BaseUnit (light) with 16 process terminals (1 ... 16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	
• 1 unit	**6ES7193-6BP20-0DA0**
• 10 units	**6ES7193-6BP20-2DA0**
BU15-P16+A0+2D BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	
• 1 unit	**6ES7193-6BP00-0DA0**
• 10 units	**6ES7193-6BP00-2DA0**
BU15-P16+A10+2B BU type A0; BaseUnit (dark) with 16 process terminals (1 ... 16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	
• 1 unit	**6ES7193-6BP20-0BA0**
• 10 units	**6ES7193-6BP20-2BA0**
BU15-P16+A0+2B BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	
• 1 unit	**6ES7193-6BP00-0BA0**
• 10 units	**6ES7193-6BP00-2BA0**
Usable type A1 BaseUnits (temperature detection)	
BU15-P16+A0+12D/T BU type A1; BaseUnit (light) with 16 process terminals (1 ... 16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A)	**6ES7193-6BP40-0DA1**
BU15-P16+A0+2D/T BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6ES7193-6BP00-0DA1**
BU15-P16+A0+12B/T BU type A1; BaseUnit (dark) with 16 process terminals (1 ... 16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group	**6ES7193-6BP40-0BA1**
BU15-P16+A0+2B/T BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	**6ES7193-6BP00-0BA1**